THE STATE OF SOUTH CAROLINA
In The Court of Appeals

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SC Court of Appeals

APPEAL FROM CHARLESTON COUNTY
Court of Common Pleas

Diane Goodstein, Circuit Court Judge

Case No. 2012-CP-10-7594
Appellate Case No. 2018-001230

One Belle Hall Property Owners Association, Inc., and Marvin T. Meek and Francis E. Hill, individually and on behalf of all others similarly situated,..... Respondents,

v.

Builders FirstSource-Southeast Group, LLC, ... Appellant.

RECORD ON APPEAL
VOLUME V

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Certificate of Counsel

Water Heater

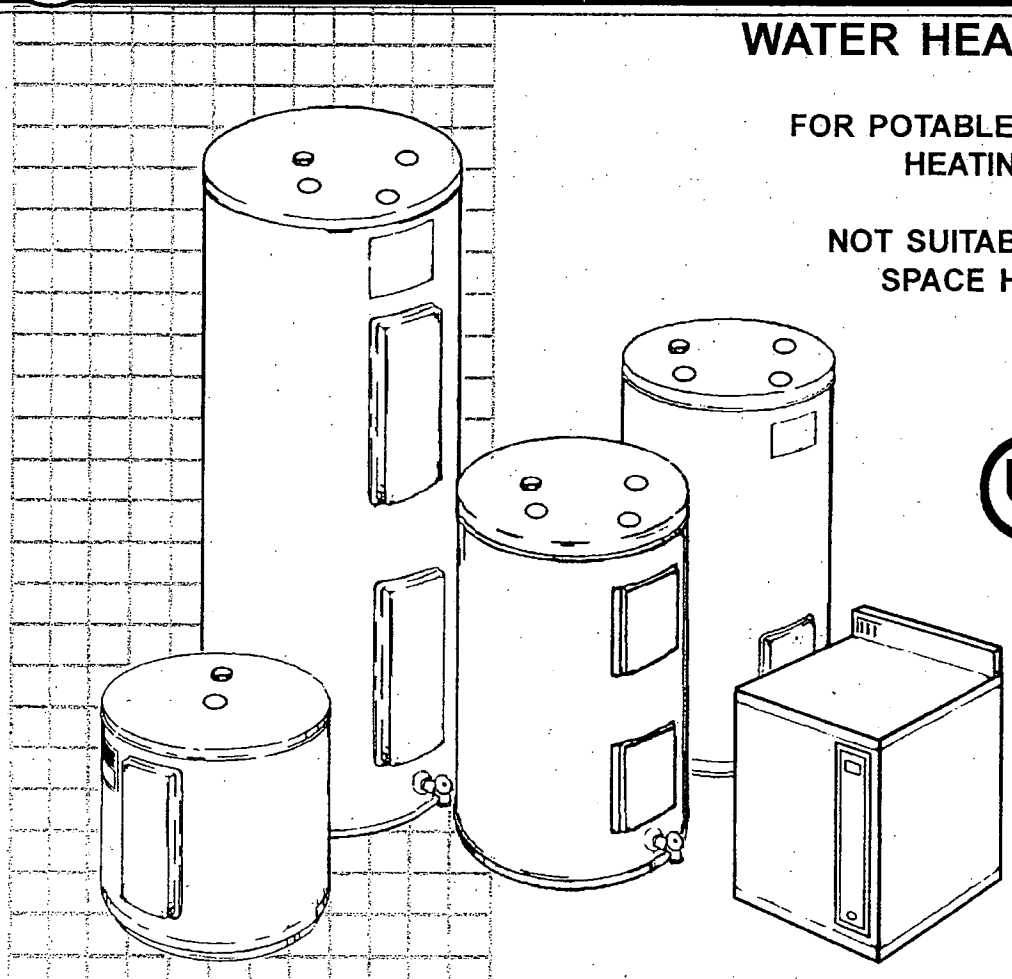
state WATER HEATERS

Instruction Manual

RESIDENTIAL ELECTRIC WATER HEATERS

FOR POTABLE WATER HEATING ONLY

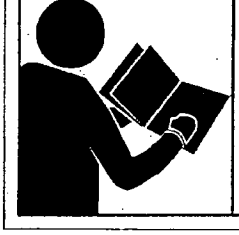
NOT SUITABLE FOR SPACE HEATING



UL LISTED

EFFICIENCY RATING CERTIFIED Gama

GAMA certification applies to all residential electric water heaters with capacities of 20 to 120 gallons. Input rating of 12 Kw or less.



⚠ WARNING

Read and understand instruction manual and safety messages before installing, operating or servicing this water heater.

Failure to follow instructions and safety messages could result in death or serious injury.

Instruction manual must remain with water heater.

ALL TECHNICAL AND WARRANTY QUESTIONS: SHOULD BE DIRECTED TO THE LOCAL DEALER FROM WHOM THE WATER HEATER WAS PURCHASED. IF YOU ARE UNSUCCESSFUL, PLEASE WRITE TO THE COMPANY LISTED ON THE RATING PLATE ON THE WATER HEATER.

KEEP THIS MANUAL IN THE POCKET ON HEATER FOR FUTURE REFERENCE WHEN EVER MAINTENANCE ADJUSTMENT OR SERVICE IS REQUIRED.

PRINTED IN THE U.S.A 1203

PART NO. 184671-000

OBH - O&M 462

SAFE INSTALLATION, USE AND SERVICE

Your safety and the safety of others is extremely important in the installation, use and servicing of this water heater.

Many safety-related messages and instructions have been provided in this manual and on your own water heater to warn you and others of a potential injury hazard. Read and obey all safety messages and instructions throughout this manual. It is very important that the meaning of each safety message is understood by you and others who install, use or service this water heater.

	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER	DANGER indicates an imminently hazardous situation which, if not avoided, could result in death or injury.
WARNING	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or injury.
CAUTION	CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
CAUTION	CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, could result in property damage.

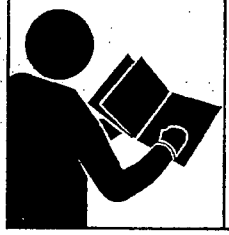
All safety messages will generally tell you about the type of hazard, what can happen if you do not follow the safety message and how to avoid the risk of injury.

IMPORTANT DEFINITIONS

- **Qualified Installer:** A qualified installer must have ability equivalent to a licensed tradesman in the fields of plumbing, and electrical installation of these appliances. This would include a thorough understanding of the requirements of the National Electrical Code and applicable local electrical and plumbing codes (and tools necessary to confirm proper installation and operation of the water heater) as they relate to the installation of electric water heaters. The qualified installer must have a thorough understanding of the water heater Instruction Manual.

- **Service Agency:** A service agency also must have ability equivalent to a licensed tradesman in the fields of plumbing, and electrical installation of these appliances. This would include a thorough understanding of the requirements of the National Electrical Code and applicable local electrical and plumbing codes (and tools necessary to confirm proper installation and operation of the water heater) as they relate to the installation of electric water heaters. The service agency must have a thorough understanding of the water heater Instruction Manual.

GENERAL SAFETY



⚠ WARNING

Read and understand instruction manual and safety messages before installing, operating or servicing this water heater.

Failure to follow instructions and safety messages could result in death or serious injury.

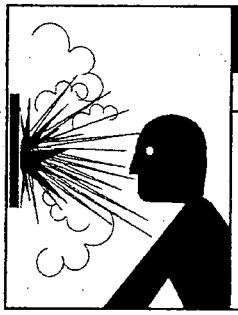
Instruction manual must remain with water heater.

CAUTION

Improper installation and use may result in property damage.

- Do not operate water heater if flood damaged.
- Inspect and replace anode.
- Install in location with drainage.
- Fill tank with water before operation.
- Be alert for thermal expansion.

Refer to instruction manual for installation and service.



⚠ WARNING

Explosion Hazard

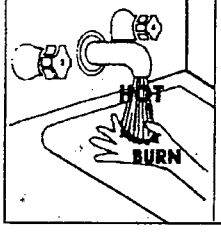
- Overheated water can cause water tank explosion.
- Properly sized temperature and pressure relief valve must be installed in opening provided.



⚠ WARNING

- **Before removing any access panels or servicing the water heater, make sure the electrical supply to the water heater is turned "OFF".**
- **Failure to do this could result in death, serious bodily injury, or property damage.**

⚠ DANGER



Water temperature over 125°F (52°C) can cause severe burns instantly resulting in severe injury or death.

Children, the elderly, and the physically or mentally disabled are at highest risk for scald injury.

Feel water before bathing or showering.

Temperature limiting valves are available.

Read instruction manual for safe temperature setting.

⚠ WARNING

Fire Hazard / Electric Shock Hazard



- Do not use this water heater with any voltage other than shown on the model rating plate.
- Failure to use the correct voltage shown on the model rating plate could result in death, serious bodily injury, or property damage.



INTRODUCTION

Thank You for purchasing this water heater. Properly installed and maintained, it should give you years of trouble free service.

Abbreviations Found In This Instruction Manual:

- ANSI - American National Standards Institute
- ASME - American Society of Mechanical Engineers
- GAMA - Gas Appliance Manufacturers Association
- NEC - National Electrical Code
- NFPA - National Fire Protection Association
- UL - Underwriters Laboratories Inc.

PREPARING FOR THE INSTALLATION

1. Read the "General Safety" section of this manual first and then the entire manual carefully. If you don't follow the safety rules, the water heater will not operate properly. It could cause DEATH, SERIOUS BODILY INJURY AND/OR PROPERTY DAMAGE.

   This manual contains instructions for the installation, operation, and maintenance of the electric water heater. It also contains warnings throughout the manual that you must read and be aware of. All warnings and all instructions are essential to the proper operation of the water heater and your safety. Since we cannot put everything on the first few pages, **READ THE ENTIRE MANUAL BEFORE ATTEMPTING TO INSTALL OR OPERATE THE WATER HEATER.**

2. The installation must conform with these instructions and the local code authority having jurisdiction and the requirements of the power company. In the absence of code requirements follow NFPA-70 (latest edition). The National Electric Code which may be ordered from: National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269.

3. If after reading this manual you have any questions or do not understand any portion of the instructions, call the local utility or the manufacturer whose name appears on the rating plate.

4. Carefully plan the place where you are going to put the water heater. INSTALLATION OR SERVICE OF THIS WATER HEATER REQUIRES ABILITY EQUIVALENT TO THAT OF A LICENSED TRADESMAN IN THE FIELD INVOLVED. PLUMBING AND ELECTRICAL WORK ARE REQUIRED.

   Examine the location to ensure the water heater complies with the "Facts to Consider About the Location" section in this manual.

5. For California installation this water heater must be braced, anchored, or strapped to avoid falling or moving during an earthquake. See instructions for correct installation procedures. Instructions may be obtained from California Office of the State Architect, 400 P Street, Sacramento, CA 95814.

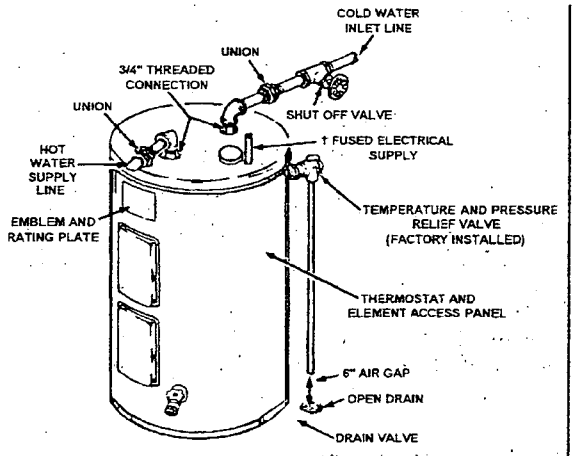
6. Massachusetts Code requires this water heater to be installed in accordance with Massachusetts 248-CMR 2.00: State Plumbing Code and 248-CMR 5.00.

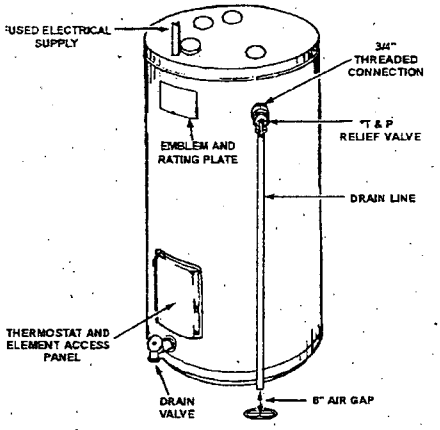
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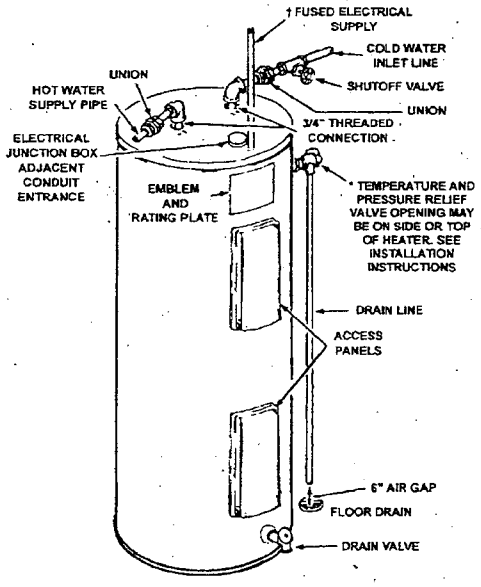
TYPICAL INSTALLATION

LOWBOYS

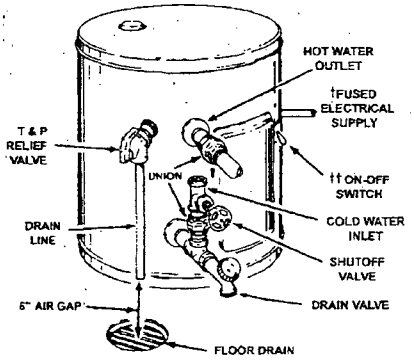




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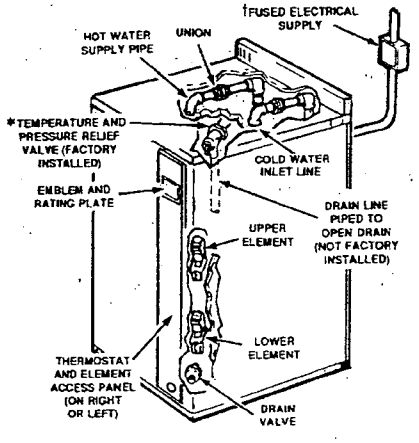


COMPACTS



†† 120V MODELS ONLY

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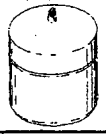




INSTALL SUITABLE DRAIN PANS UNDER HEATERS TO PREVENT DAMAGE DUE TO LEAKAGE. REFER TO WATER HEATER LOCATION ON PAGE 8.



INSTALL VACUUM RELIEF IN COLD WATER INLET LINE AS REQUIRED BY LOCAL CODES.



INSTALL THERMAL EXPANSION TANK OR DEVICE IF WATER HEATER IS INSTALLED IN A CLOSED WATER SYSTEM.

FIGURE 1.

MIXING VALVE USAGE

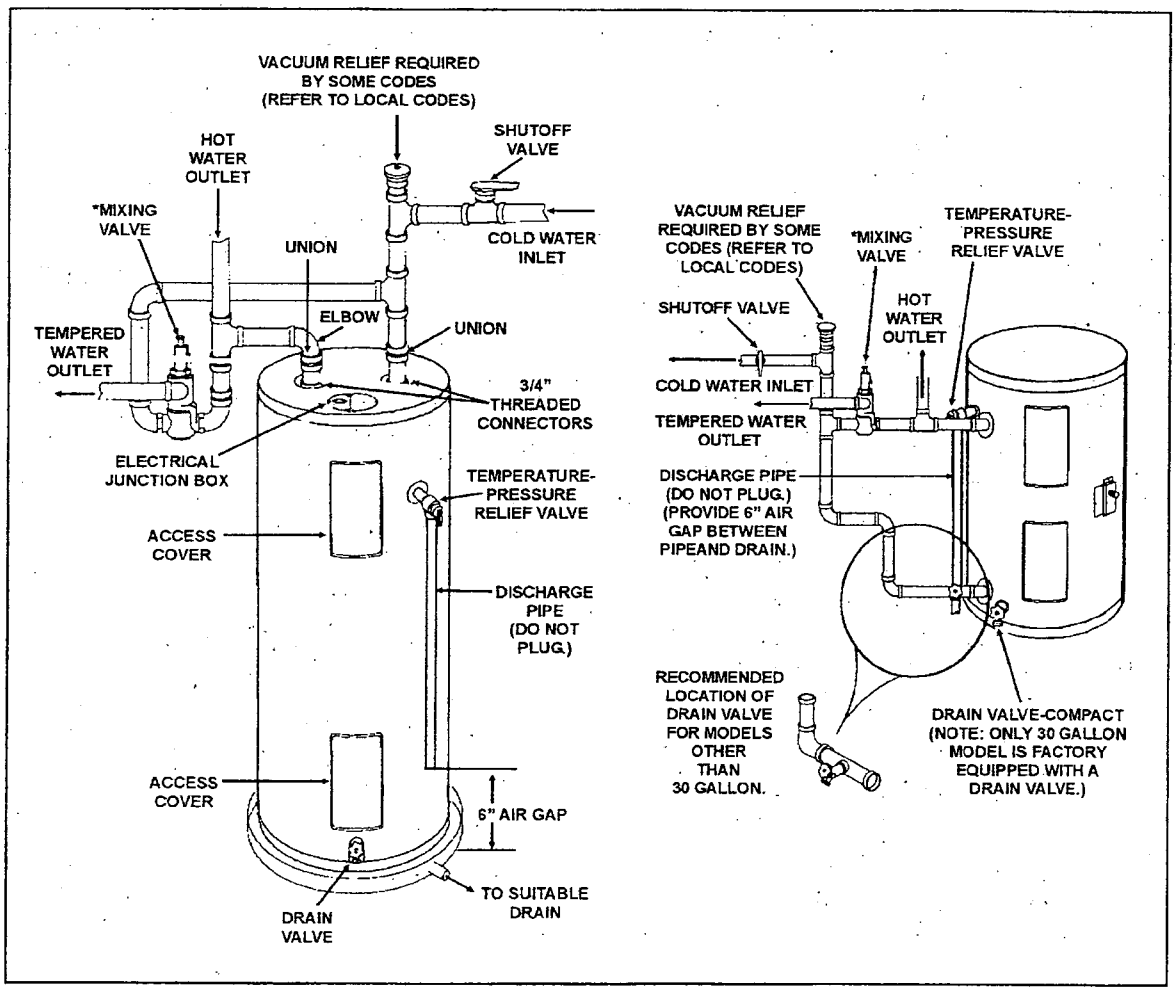
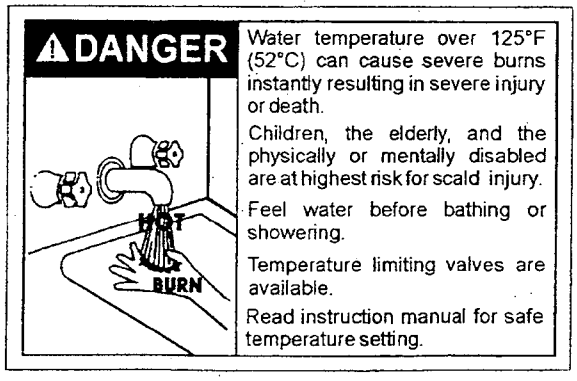


FIGURE 2.

Water (Potable) Heating: All models are considered suitable for water (potable) heating only.



HOTTER WATER CAN SCALD:

Water heaters are intended to produce hot water. Water heated to a temperature which will satisfy space heating, clothes washing, dish washing, and other sanitizing needs can scald and permanently injure you upon contact. Some people are more likely to be permanently injured by hot water than others. These include the elderly, children, the infirm, or physically/mentally handicapped. If anyone using hot water in your home fits into one of these groups or if there is a local code or state law requiring a certain temperature water at the hot water tap, then you must take special precautions. In addition to using the lowest possible temperature setting that satisfies your hot water needs, a means such as a *mixing valve, shall be used at the hot water taps used by these people or at the water heater. Mixing valves are available local plumbing contractor. Consult a Qualified Installer or Service Agency. Follow mixing valve manufacturer's instructions for installation of the valves. Before changing the factory setting on the thermostat, read the "Temperature Regulation" section in this manual.

LOCATING THE NEW WATER HEATER

FACTS TO CONSIDER ABOUT THE LOCATION

CAUTION

Property Damage Hazard

- All water heaters eventually leak
- Do not install without adequate drainage.

Carefully choose an indoor location for the new water heater, because the placement is a very important consideration for the safety of the occupants in the building and for the most economical use of the appliance.

Whether replacing an old water heater or putting the water heater in a new location, the following critical points must be observed:

1. Select a location indoors as close as practical or centralized to the water piping system as possible. The water heater should be located in an area not subject to freezing temperatures.
2. Selected location must provide adequate clearances (4") for servicing parts such as the thermostats, drain valve and relief valve. Adequate clearance for servicing this appliance should be considered before installation, such as changing the anodes, etc.

Installation of the water heater must be accomplished in such a manner that if the tank or any connections should leak, the flow will not cause damage to the structure. For this reason, it is not advisable to install the water heater in an attic or upper floor. When such locations cannot be avoided, a suitable drain pan should be installed under the water heater. Drain pans are available from your local plumbing contractor. Such a drain pan must have a minimum length and width of at least 2 inches (51 mm) greater that the water heater dimensions and must be piped to an adequate drain.

Also, the water heater must be located and/or protected so it is not subject to physical damage by a moving vehicle.

INSULATION BLANKETS

Insulation blankets are available to the general public for external use on electric water heaters but are not necessary with this product. The purpose of an insulation blanket is to reduce the standby heat loss encountered with storage tank heaters. Your water heater meets or exceeds the National Appliance Energy Conversation Act standards with respect to insulation and standby loss requirements, making an insulation blanket unnecessary.

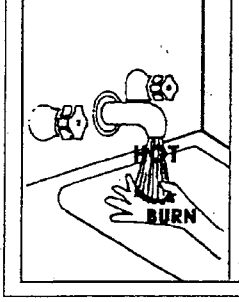
Should you choose to apply an insulation blanket to this heater, you should follow these instructions below. Failure to follow these instructions can result in fire, serious personal injury, or death.

- Do not cover the temperature and pressure relief (T & P) valve with an insulation blanket.
- Do not cover the instruction manual. Keep it on the side of the water heater or nearby for future reference.
- Do obtain new warning and instruction labels for placement on the blanket directly over the existing labels.

INSTALLING THE NEW WATER HEATER

WATER PIPING

⚠DANGER



Water temperature over 125°F (52°C) can cause severe burns instantly resulting in severe injury or death.

Children, the elderly, and the physically or mentally disabled are at highest risk for scald injury.

Feel water before bathing or showering.

Temperature limiting valves are available.

Read instruction manual for safe temperature setting.

HOTTER WATER CAN SCALD:
Water heaters are intended to produce hot water. Water heated to a temperature which will satisfy space heating, clothes washing, dish washing, cleaning and other sanitizing needs can scald and permanently injure you upon contact. Some people are more likely to be permanently injured by hot water than others. These include the elderly, children, the infirm, or physically/mentally handicapped. If anyone using hot water in your home fits into one of these groups or if there is a local code or state law requiring a certain temperature water at the hot water tap, then you must take special precautions. In addition to using the lowest possible temperature setting that satisfies your hot water needs, a means such as a *mixing valve, shall be used at the hot water taps used by these people or at the water heater. Valves for reducing point of use temperature by mixing cold and hot water are also available.

Consult a Qualified Installer or Service Agency. Follow manufacturer's instructions for installation of the valves. Before changing the factory setting on the thermostat, read the "Temperature Regulation" section in this manual.

⚠ WARNING

Toxic Chemical Hazard

- Do not connect to non-potable water system.

This water heater shall not be connected to any heating systems or component(s) used with a non-potable water heating appliance.

Toxic chemicals, such as those used for boiler treatment shall not be introduced into this system.

Water supply systems may, because of such events as high line pressure, frequent cut-offs, the effects of water hammer among others, have installed devices such as pressure reducing valves, check valves, back flow preventers, etc. to control these types of problems. When these devices are not equipped with an internal by-pass, and no other measures are taken, the devices cause the water system to be closed. As water is heated, it expands (thermal expansion) and closed systems do not allow for the expansion of heated water.

The water within the water heater tank expands as it is heated and increases the pressure of the water system. If the relieving point of the water heater's temperature-pressure relief valve is reached, the valve will relieve the excess pressure. **The temperature-pressure relief valve is not intended for the constant relief of thermal expansion.** This is an unacceptable condition and must be corrected. It is recommended that any devices installed which could create a closed system have a by-pass and/or the system have an expansion tank or device to relieve the pressure built by thermal expansion in the water system. Expansion tanks are available for ordering through a local plumbing contractor. Contact the local water supplier and/or a service agency for assistance in controlling these situations.

NOTE: To protect against untimely corrosion of hot and cold water fittings, it is strongly recommended that di-electric unions or couplings be installed on this water heater when connected to copper pipe.

CAUTION

Property Damage Hazard

- Avoid water heater damage.
- Install thermal expansion tank if necessary.
- Do not apply heat to cold water inlet.
- Contact qualified installer or service agency.

Figure 3 shows the typical attachment of the water piping to the water heater. The water heater is equipped with 3/4 inch NPT water connections.

NOTE: If using copper tubing, solder tubing to an adapter before attaching the adapter to the cold water inlet connection. Do not solder the cold water supply line directly to the cold water inlet, it will harm the dip tube and damage the tank.

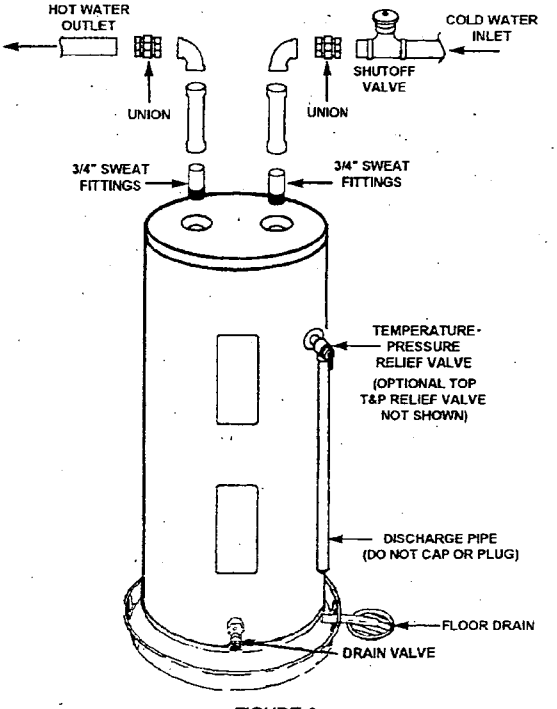
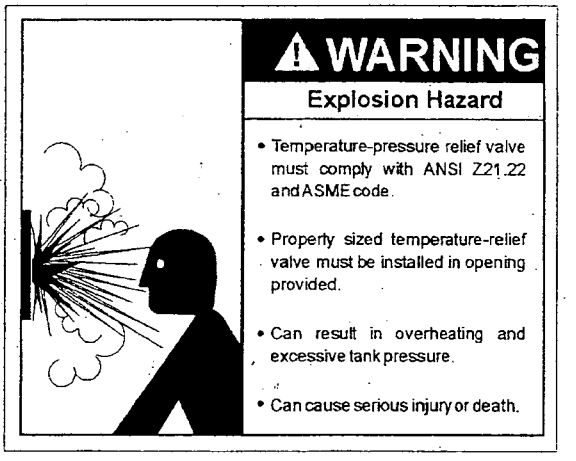


FIGURE 3.

TEMPERATURE-PRESSURE RELIEF VALVE



This heater is provided with a properly certified combination temperature - pressure relief valve by the manufacturer.

The valve is certified by a nationally recognized testing laboratory that maintains periodic inspection of production of listed equipment of materials as meeting the requirements for Relief Valves and Automatic Gas Shut-off Devices for Hot Water Supply Systems, ANSI Z21.22 • CSA 4.4, and the code requirements of ASME.

If replaced, the valve must meet the requirements of local codes, but not less than a combination temperature and pressure relief valve certified as indicated in the above paragraph.

The valve must be marked with a maximum set pressure not to exceed the marked hydrostatic working pressure of the water heater (150 psi = 1,035 kPa) and a discharge capacity not less than the water heater input rate as shown on the model rating plate.

For safe operation of the water heater, the relief valve must not be removed from its designated opening nor plugged.

The temperature-pressure relief valve must be installed directly into the fitting of the water heater designed for the relief valve. Position the valve downward and provide tubing so that any discharge will exit only within 6 inches (153 mm) above, or at any distance below the structural floor. Be certain that no contact is made with any live electrical part. The discharge opening must not be blocked or reduced in size under any circumstances. Excessive length, over 30 feet (9.14 m), or use of more than four elbows can cause restriction and reduce the discharge capacity of the valve.

No valve or other obstruction is to be placed between the relief valve and the tank. Do not connect tubing directly to discharge drain unless a 6 inch air gap is provided. To prevent bodily injury, hazard to life, or property damage, the relief valve must be allowed to discharge water in quantities should circumstances demand. If the discharge pipe is not connected to a drain or other suitable means, the water flow may cause property damage.

CAUTION

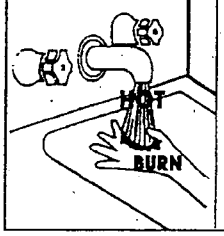
Water Damage Hazard

- Temperature-pressure relief valve discharge pipe must terminate at adequate drain.

The Discharge Pipe:

- Shall not be smaller in size than the outlet pipe size of the valve, or have any reducing couplings or other restrictions.
- Shall not be plugged or blocked.
- Shall be of material listed for hot water distribution.
- Shall be installed so as to allow complete drainage of both the temperature-pressure relief valve, and the discharge pipe.
- Shall terminate at an adequate drain.
- Shall not have any valve between the relief valve and tank.

⚠ DANGER



Water temperature over 125°F (52°C) can cause severe burns instantly resulting in severe injury or death.

Children, the elderly, and the physically or mentally disabled are at highest risk for scald injury.

Feel water before bathing or showering.

Temperature limiting valves are available.

Read instruction manual for safe temperature setting.

The temperature-pressure relief valve must be manually operated at least once a year. Caution should be taken to ensure that (1) no one is in front of or around the outlet of the temperature-pressure relief valve discharge line, and (2) the water manually discharged will not cause any bodily injury or property damage because the water may be extremely hot.

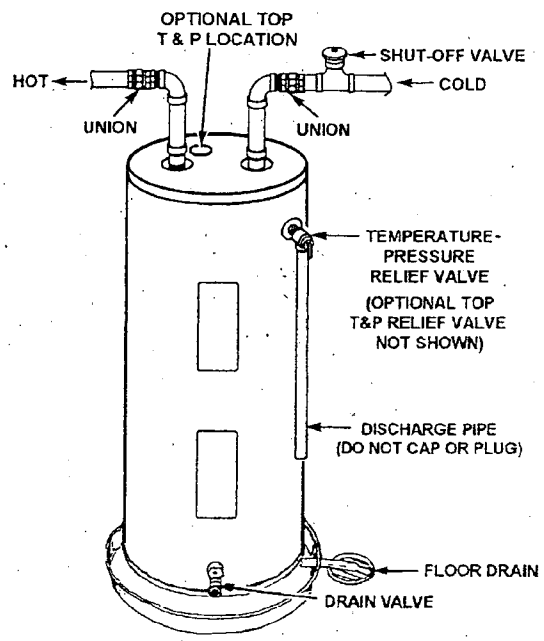


FIGURE 4.

If after manually operating the valve, it fails to completely reset and continues to release water, immediately close the cold water inlet to the water heater, follow the draining instructions, and replace the temperature-pressure relief valve with a new one.

FILLING THE WATER HEATER

CAUTION

Property Damage Hazard

- Avoid water heater damage.
- Fill tank with water before operating.

Never use this water heater unless it is completely full of water. To prevent damage to the tank, the tank must be filled with water. Water must flow from the hot water faucet before turning "ON" electrical supply to the water heater.

To fill the water heater with water:

1. Close the water heater drain valve by turning the handle to the right (clockwise). The drain valve is on the lower front of the water heater.
2. Open the cold water supply valve to the water heater. **NOTE: The cold water supply valve must be left open when the water heater is in use.**
3. To insure complete filling of the tank, allow air to exit by opening the nearest hot water faucet. Allow water to run until a constant flow is obtained. This will let air out of the water heater and the piping.
4. Check all water piping and connections for leaks. Repair as needed.

T&P VALVE and PIPE INSULATION (On Selected Models)

Remove insulation for T&P Valve and pipe connections from carton.

Fit pipe insulation over the incoming cold water line and the hot water line. Make sure that the insulation is against the top cover of the heater.

Fit T&P Valve insulation over valve. Make sure that the insulation does not interfere with the lever or outlet of the T&P valve.

Secure all insulation using tape.

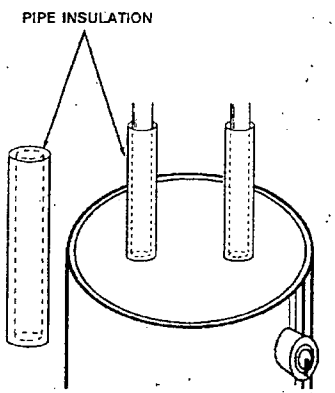
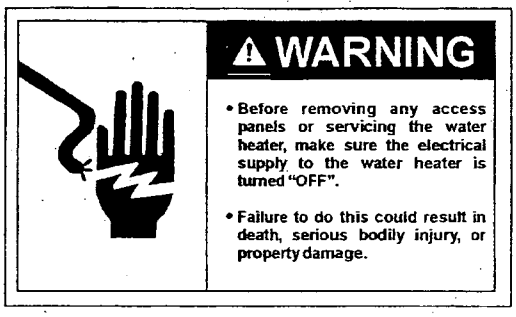


FIGURE 5.

WIRING DIAGRAMS



⚠ WARNING

- Before removing any access panels or servicing the water heater, make sure the electrical supply to the water heater is turned "OFF".
- Failure to do this could result in death, serious bodily injury, or property damage.

TURN OFF THE HEATER ELECTRICAL SUPPLY BEFORE SERVICING ANY ELECTRICAL COMPONENTS.

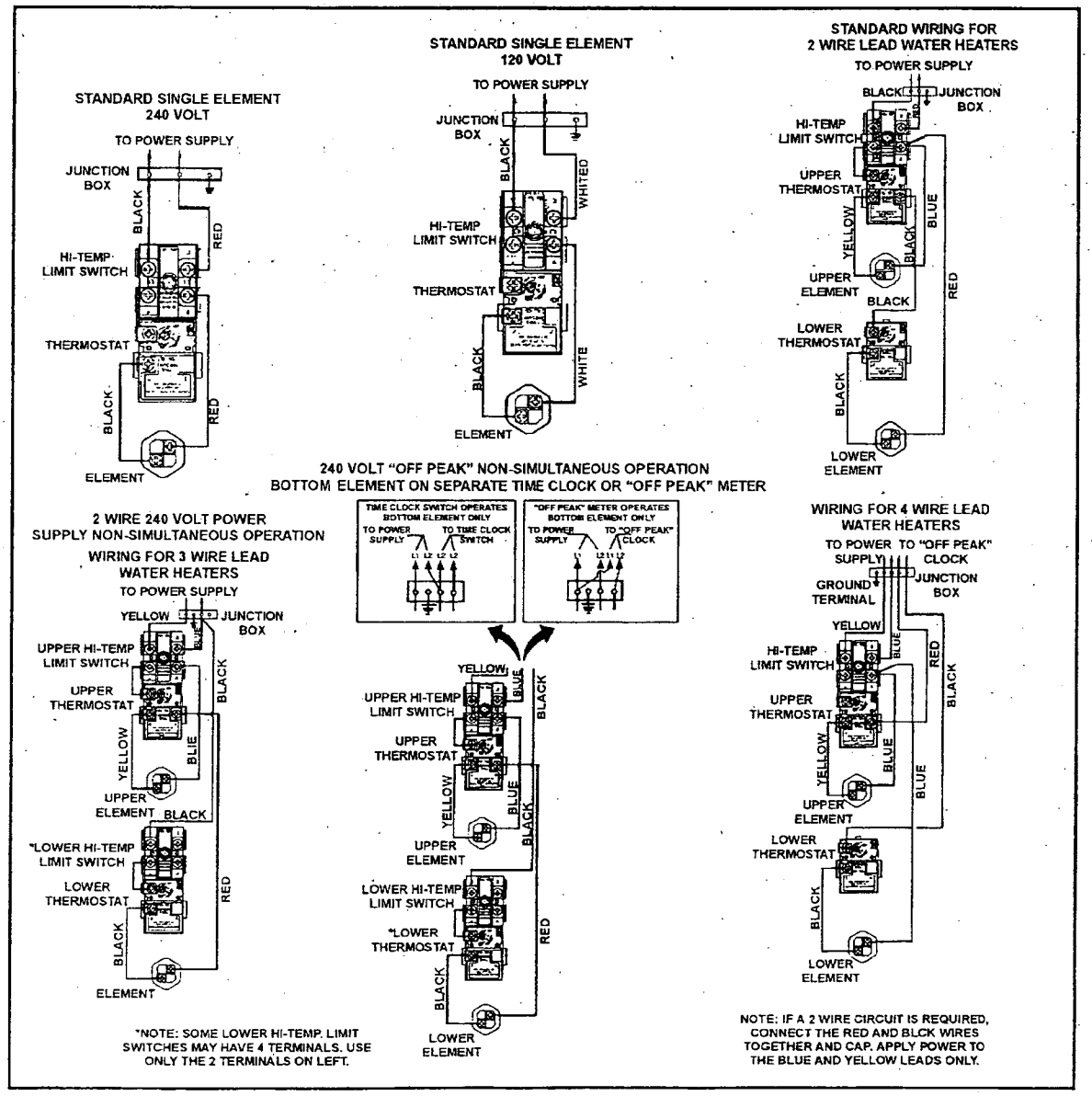


FIGURE 6.

WIRING

CAUTION

Improper installation and use may result in property damage.

- Fill tank with water before operation.

Never use water heater unless it is completely full of water. To prevent damage to the tank and heating element, the tank must be filled with water. Water must flow from the hot water faucet before turning on power.

You must provide all wiring of the proper size outside of the water heater. You must obey local codes and electric company requirements when you install this wiring.

If you are not familiar with electric codes and practices, or if you have any doubt, even the slightest doubt, in your ability to connect the wiring to this water heater, obtain the service of a competent electrician. Contact a local electrical contractor and/or the local electric utility.

⚠ WARNING

Fire Hazard / Electric Shock Hazard



- Do not use this water heater with any voltage other than shown on the model rating plate.
- Failure to use the correct voltage shown on the model rating plate could result in death, serious bodily injury, or property damage.

WATER HEATERS EQUIPPED FOR ONE VOLTAGE ONLY: This water heater is equipped for one type voltage only. Check the rating plate near the bottom access panel for the correct voltage. DO NOT use this water heater with any voltage other than the one shown on the model rating plate. Failure to use the correct voltage can cause problems which can result in DEATH, SERIOUS BODILY INJURY, OR PROPERTY DAMAGE. If you have any questions or doubts consult your electric company.

If wiring from your fuse box or circuit breaker box was aluminum for your old water heater, replace it with copper wire. If you wish to reuse the existing aluminum wire, have the connection at the water heater made by a competent electrician. Contact a local electrical contractor and/or the local electric utility.

1. Provide a way to easily shut off the electric power when working on the water heater. This could be with a circuit breaker or fuse block in the entrance box or a separate disconnect switch.
2. Install and connect a circuit directly from the main fuse or circuit breaker box. This circuit must be the right size and have its own fuse or circuit breaker.
3. If metal conduit is used for the grounding conductor:
   A. The grounding electrode conductor shall be of copper, aluminum, or copperclad aluminum. The material shall be of one continuous length without a splice or joint.
   B. Rigid metal conduit, intermediate metal conduit, or electrical, metallic tubing may be used for the grounding means if conduit or tubing is terminated in fittings approved for grounding.
   C. Flexible metal conduit or flexible metallic tubing shall be permitted for grounding if all the following conditions are met:
      - The length in any ground return path does not exceed 6 feet.
      - The circuit conductors contained therein are protected by overcurrent devices rated at 20 amperes or less.
      - The conduit or tubing is terminated in fittings approved for grounding.

For complete grounding details and all allowable exceptions, refer to the current edition of the National Electrical Code NFPA 70.

4. A standard 1/2" conduit opening has been made in the water heater junction box for the conduit connections.
5. Use wire nuts and connect the power supply wiring to the wires inside the water heater's junction box.
6. The water heater must be electrically "grounded" by the installer. A green ground screw has been provided on the water heater's junction box. Connect ground wire to this location.
7. Replace the wiring junction cover using the screw provided.

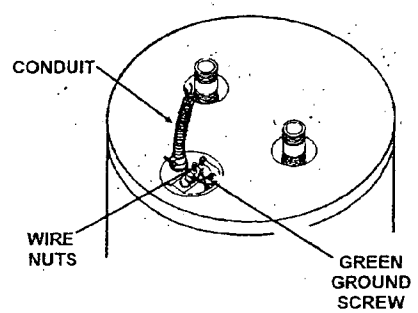


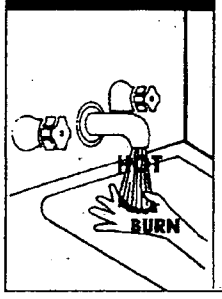
FIGURE 7.

TEMPERATURE REGULATION

Due to the nature of the typical water heater, the water temperature in certain situations may vary up to 30°F (16.7 °C) higher or lower at the point of use such as, bathtubs, showers, sink, etc.

Any water heater's intended purpose is to heat water. Hot water is needed for cleansing, cleaning, and sanitizing (bodies, dishes, clothing). Untempered hot water can present a scald hazard. Depending on the time element, and the people involved (adults, children, elderly, infirm, etc.) scalding may occur at different temperatures.

⚠ DANGER



Water temperature over 125°F (52°C) can cause severe burns instantly resulting in severe injury or death.

Children, the elderly, and the physically or mentally disabled are at highest risk for scald injury.

Feel water before bathing or showering.

Temperature limiting valves are available.

Read instruction manual for safe temperature setting.

HOTTER WATER CAN SCALD: Water heaters are intended to produce hot water. Water heated to a temperature which will satisfy space heating, clothes washing, dish washing, and other sanitizing needs can scald and permanently injure you upon contact. Some people are more likely to be permanently injured by hot water than others. These include the elderly, children, the infirm, or physically/mentally handicapped. If anyone using hot water in your home fits into one of these groups or if there is a local code or state law requiring a certain temperature water at the hot water tap, then you must take special precautions. In addition to using the lowest possible temperature setting that satisfies your hot water needs, a means such as a mixing valve, shall be used at the hot water taps used by these people or at the water heater. Mixing valves are available from your local plumbing contractor. Follow manufacturer's instructions for installation of the valves. Before changing the factory setting on the thermostat, read the "Temperature Regulation" section in this manual.

THIS WATER HEATER IS EQUIPPED WITH AN ADJUSTABLE THERMOSTAT TO CONTROL WATER TEMPERATURE. HOT WATER TEMPERATURES DESIRED FOR AUTOMATIC DISHWASHER AND LAUNDRY USE CAN CAUSE SCALDS RESULTING IN SERIOUS PERSONAL INJURY AND/OR DEATH. THE TEMPERATURE AT WHICH INJURY OCCURS VARIES WITH THE PERSON'S AGE AND THE TIME OF THE EXPOSURE. THE SLOWER RESPONSE TIME OF CHILDREN, AGED OR DISABLED PERSONS INCREASES THE HAZARDS TO THEM. NEVER ALLOW SMALL CHILDREN TO USE A HOT WATER TAP, OR TO DRAW THEIR OWN BATH WATER. NEVER LEAVE A CHILD OR DISABLED PERSON UNATTENDED IN A BATHTUB OR SHOWER.

It is recommended that lower water temperatures be used to avoid the risk of scalding. It is further recommended, in all cases, that the water temperature thermostat be set for the lowest temperature which satisfies your hot water needs, see Figure 3. This will also provide the most energy efficient operation of the water heater. Thermostat(s) are factory set at 120°F (49°C) unless specified differently by state requirements.

KEEPING THE THERMOSTAT SETTING AT 120°F (49°C) WILL REDUCE THE RISK OF SCALDS.

Figure 8 shows the approximate time-to-burn relationship for normal adult skin.

TEMPERATURE ADJUSTMENT



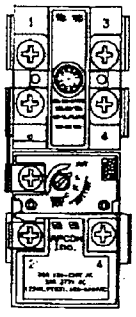
⚠ WARNING

- **Before removing any access panels or servicing the water heater, make sure the electrical supply to the water heater is turned "OFF".**
- **Failure to do this could result in death, serious bodily injury, or property damage.**

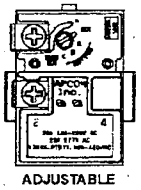
To change the temperature setting:

NOTE: It is not necessary to adjust the upper thermostat. However, if it is adjusted above the factory set point (120°F (49°C)/HOT) it is recommended that it not be set higher than the lower thermostat setting.

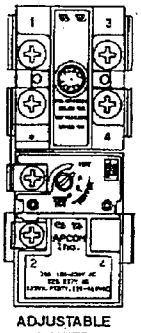
1. Turn off the heater electrical supply. Do not attempt to adjust thermostat with power on.
2. Remove the thermostat access panels and covers from the thermostats. Do not remove the plastic personnel protectors covering the thermostats.
3. Using a flat tip screwdriver, rotate the adjustment knob to the desired temperature setting.
4. Replace the covers and access panels and turn on heater electrical supply.



ADJUSTABLE UPPER THERMOSTAT BEHIND UPPER ACCESS PANEL PANEL (DUAL ELEMENT MODELS ONLY)



ADJUSTABLE LOWER THERMOSTAT (FOR DUAL ELEMENT MODELS)



ADJUSTABLE LOWER THERMOSTAT WITH HIGH LIMIT

TEMPERATURE SETTINGS

It is recommended that the dial be set lower whenever possible.

Temperature Setting	Time to Produce 2nd & 3rd Degree Burns on Adult Skin
160°F (71°C)	About 1/2 second
150°F (66°C)	About 1-1/2 seconds
140°F (60°C)	Less than 5 seconds
130°F (54°C)	About 30 seconds
120°F (49°C)	More than 5 minutes

FIGURE 8.

FOR YOUR INFORMATION

THERMAL EXPANSION

CAUTION

Property Damage Hazard

- Avoid water heater damage.
- Install thermal expansion tank or device if necessary.
- Contact qualified installer or service agency.

Water supply systems may, because of such events as high line pressure, frequent cut-offs, the effects of water hammer among others, have installed devices such as pressure reducing valves, check valves, back flow preventers, etc. to control these types of problems. When these devices are not equipped with an internal by-pass, and no other measures are taken, the devices cause the water system to be closed. As water is heated, it expands (thermal expansion) and closed systems do not allow for the expansion of heated water.

The water within the water heater tank expands as it is heated and increases the pressure of the water system. If the relieving point of the water heater's temperature-pressure relief valve is reached, the valve will relieve the excess pressure. **The temperature-pressure relief valve is not intended for the constant relief of thermal expansion.** This is an unacceptable condition and must be corrected. It is recommended that any devices installed which could create a closed system have a by-pass and/or the system have an expansion tank or device to relieve the pressure built by thermal expansion in the water system. Expansion tanks are available for ordering through a local plumbing contractor. Contact the local water heater supplier or service agency for assistance in controlling these situations.

STRANGE SOUNDS

Possible noises due to expansion and contraction of some metal parts during periods of heat-up and cool-down do not necessarily represent harmful or dangerous conditions.

OPERATIONAL CONDITIONS

SMELLY WATER

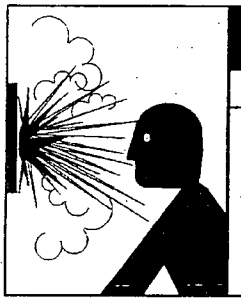
In each water heater there is installed at least one anode rod (see parts sections) for corrosion protection of the tank. Certain water conditions will cause a reaction between this rod and the water. The most common complaint associated with the anode rod is one of a "rotten egg smell" in the hot water. This odor is derived from hydrogen sulfide gas dissolved in the water. The smell is the result of four factors which must all be present for the odor to develop:

A. A concentration of sulfate in the supply water.
B. Little or no dissolved oxygen in the water.
C. A sulfate reducing bacteria which has accumulated within the water heater (this harmless bacteria is nontoxic to humans).
D. An excess of active hydrogen in the tank. This is caused by the corrosion protective action of the anode.

Smelly water may be eliminated or reduced in some water heater models by replacing the anode(s) with one of less active material, and then chlorinating the water heater tank and all hot water lines. Contact the local water heater supplier or service agency for further information concerning an Anode Replacement Kit and this chlorination treatment. If the smelly water persists after the anode replacement and chlorination treatment, we can only suggest that chlorination or aeration of the water supply be considered to eliminate the water problem.

Do not remove the anode leaving the tank unprotected. By doing so, all warranty on the water heater tank is voided.

"AIR" IN HOT WATER FAUCETS



⚠ WARNING

Explosion Hazard

- Flammable hydrogen gases may be present.
- Keep all ignition sources away from faucet when turning on hot water.

HYDROGEN GAS: Hydrogen gas can be produced in a hot water system that has not been used for a long period of time (generally two weeks or more). Hydrogen gas is extremely flammable and explosive. To prevent the possibility of injury under these conditions, we recommend the hot water faucet, located farthest away, be opened for several minutes before any electrical appliances which are connected to the hot water system are used (such as a dishwasher or washing machine). If hydrogen gas is present, there will probably be an unusual sound similar to air escaping through the pipe as the hot water faucet is opened. There must be no smoking or open flame near the faucet at the time it is open.

HIGH WATER TEMPERATURE SHUT OFF SYSTEM

A non-adjustable high temperature limit control operates before steam temperatures are reached. The high limit is in the same area as the upper thermostat and must be reset manually when it operates. BECAUSE THE HIGH LIMIT OPERATES ONLY WHEN ABNORMALLY HIGH WATER TEMPERATURES ARE PRESENT, IT IS IMPORTANT THAT A QUALIFIED SERVICE AGENT BE CONTACTED TO DETERMINE THE REASON FOR OPERATION BEFORE RESETTING.



⚠ WARNING

- **Before removing any access panels or servicing the water heater, make sure the electrical supply to the water heater is turned "OFF".**
- **Failure to do this could result in death, serious bodily injury, or property damage.**

- Turn off the heater electrical supply. Do not attempt to reset thermostat with power on.
- Remove the two screws securing the outer door and remove door.
- Remove the insulation block and pad to expose the reset button opening.
- Reset the high limit by pushing in the red button marked "RESET".
- Replace the insulation block and pad so that it completely covers the thermostat and element.
- Replace the outer door.
- Turn "ON" electric power to the water heater.

PERIODIC MAINTENANCE

ANODE ROD INSPECTION

CAUTION

Property Damage Hazard

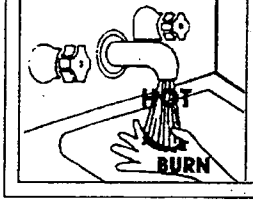
- Avoid water heater damage.
- Inspection and replacement of anode rod required.

The anode rod is used to protect the tank from corrosion. Most hot water tanks are equipped with an anode rod. The submerged rod sacrifices itself to protect the tank. Instead of corroding the tank, water ions attack and eat away the anode rod. This does not affect the water's taste or color. The rod must be maintained to keep the tank in operating condition.

Anode deterioration depends on water conductivity, not necessarily water condition. A corroded or pitted anode rod indicates high water conductivity and should be checked and/or replaced more often then an anode rod that appears to be intact. Replacement of a depleted anode rod can extend the life of your water heater. Inspection should be conducted by a qualified technician, and at a minimum should be checked annually after the warranty period.

TEMPERATURE-PRESSURE RELIEF VALVE OPERATION

⚠DANGER



- Burn hazard
- Hot water discharge.
- Keep clear of relief valve discharge outlet.

The temperature-pressure relief valve must be manually operated at least once a year.

When checking the temperature-pressure relief valve operation, make sure that (1) no one is in front of or around the outlet of the temperature-pressure relief valve discharge line, and (2) that the water discharge will not cause any property damage, as the water may be extremely hot, see Figure 9.

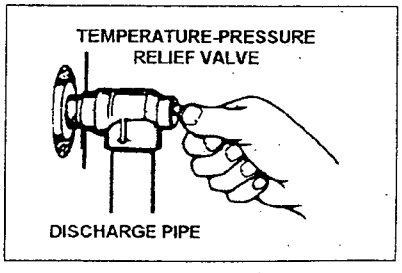


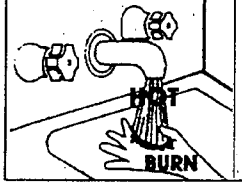
FIGURE 9.

If after manually operating the valve, it fails to completely reset and continues to release water, immediately close the cold water inlet to the water heater, follow the draining instructions, and replace the temperature-pressure relief valve with a new one.

If the temperature-pressure relief valve on the appliance weeps or discharges periodically, this may be due to thermal expansion. You may have a check valve installed in the water line or a water meter with a check valve. Consult your local water supplier or service agency for further information. Do not plug the temperature-pressure relief valve.

DRAINING

⚠DANGER



- Burn hazard
- Hot water discharge.
- Keep hands clear of drain valve discharge.

The water heater should be drained if being shut down during freezing temperatures. Also periodic draining and cleaning of sediment from the tank may be necessary.

1. Turn electrical supply "OFF".
2. CLOSE the cold water inlet valve to the water heater.
3. OPEN a nearby hot water faucet and leave open to allow for draining.
4. Connect a hose to the drain valve and terminate to an adequate drain.
5. OPEN the water heater drain valve to allow for tank draining.

   NOTE: If the water heater is going to be shut down and drained for an extended period, the drain valve should be left open with hose connected allowing water to terminate to an adequate drain.
6. Close the drain valve.
7. Follow the instructions in the "Filling the Water Heater" section.

THERMOSTAT REMOVAL / REPLACEMENT



⚠WARNING

- **Before removing any access panels or servicing the water heater, make sure the electrical supply to the water heater is turned "OFF".**
- **Failure to do this could result in death, serious bodily injury, or property damage.**

1. Turn "OFF" the electric power supply to the water heater.
2. Remove the outer door, insulation block and pad in the order they are installed.
3. A. **Models with lower thermostat without high limit:** Lift out the tab as shown below to unclip the terminal cover from the thermostat. The terminal cover can now be removed from the thermostat.

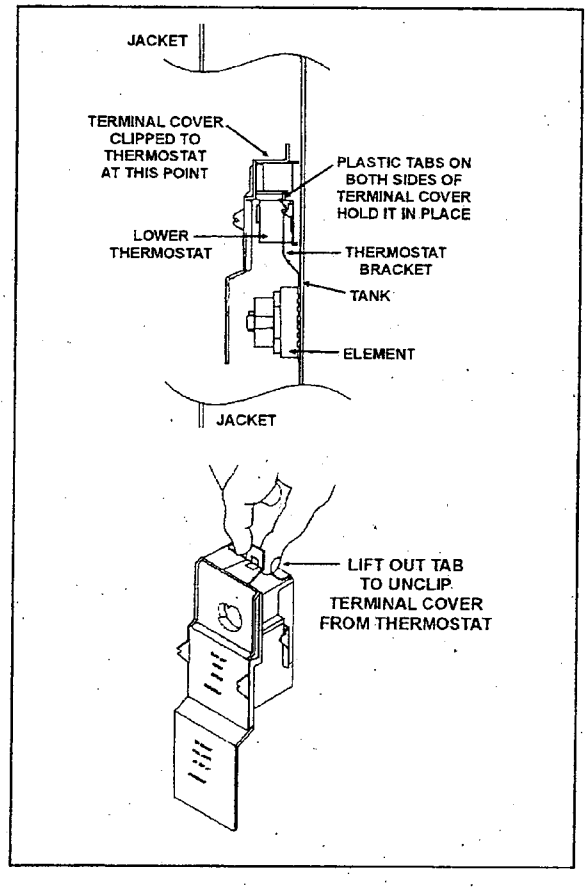


FIGURE 10.

B. **Models with Upper or Lower Thermostat with High Limit:** Lift out the tab as shown below to unclip the terminal cover from the thermostat. The terminal cover can now be removed from the thermostat.

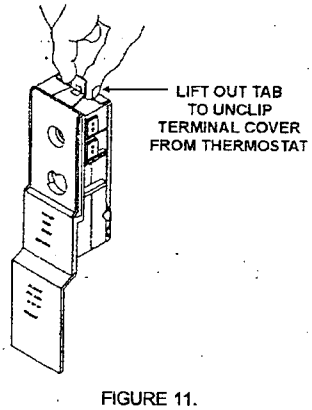


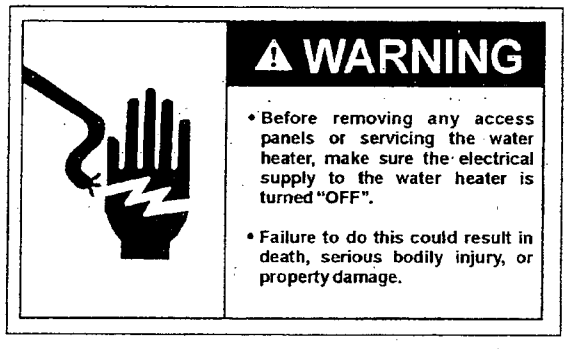
FIGURE 11.

4. Remove the two wires attached to the thermostat.
5. Remove the thermostat from behind the thermostat bracket.
6. Disconnect wires from thermostat and slide out of the bracket.
7. Place the new lower thermostat in the bracket making sure it fits firmly against the tank.
8. Attach the wires to the new thermostat.

   NOTE: Some of the terminals may require straight-in wiring through an eye-opening. If wires are now looped, recut and strip wire 3/8" to a straight length and insert.
9. Put plastic terminal cover back in place.
10. Replace the insulation block and pad to cover the thermostat.
11. Replace outer door then turn the electric power on.

ELEMENT CLEANING / REPLACEMENT

NOTE: These instructions are written for element cleaning and element replacement for the lower element.



To remove the element from the tank in order to clean or replace it:

1. Before beginning turn "OFF" the electric power supply to the water heater.
2. Turn off the water supply to the water heater at the water shut-off valve or water meter.

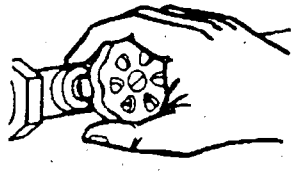


FIGURE 12.

3. Attach a hose to the water heater drain valve and put the other end in a floor drain or outdoors. Open the water heater drain valve. Open a nearby hot water faucet which will relieve pressure in the water heater and speed draining. **NOTE: Certain models may not be factory equipped with a drain valve.**

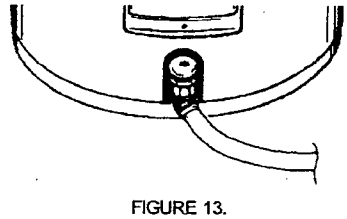


FIGURE 13.

The water passing out of the drain valve may be extremely hot. To avoid being scald, make sure all connections are tight and that the water flow is directed away from any person.

4. Remove the two screws securing the outer door, and remove door.

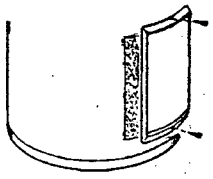


FIGURE 14.

5. Remove the insulation block and pad.

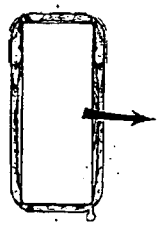
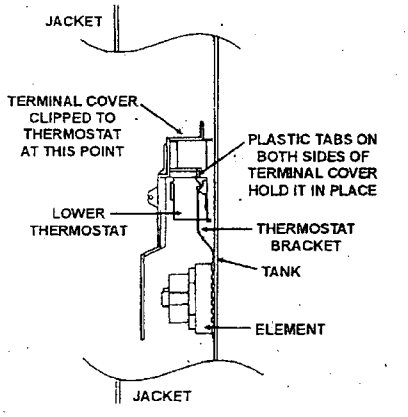


FIGURE 15.

6. A. **Models with lower thermostat without high limit:** Lift out the tab as shown below to unclip the terminal cover from the thermostat. The terminal cover can now be removed from the thermostat.



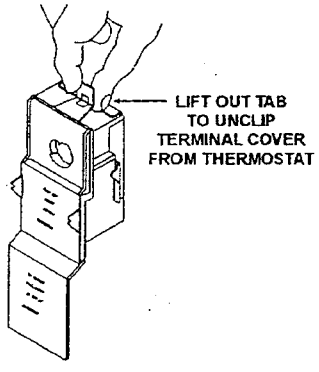


FIGURE 16.

B. **Models with Upper or Lower Thermostat with High Limit:** Lift out the tab as shown below to unclip the terminal cover from the thermostat. The terminal cover can now be removed from the thermostat.

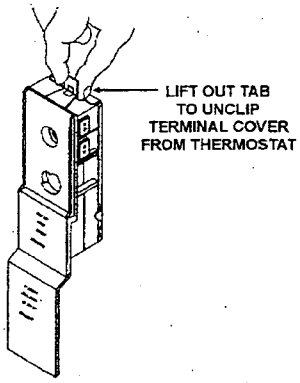


FIGURE 17.

7. Disconnect the two wires on the element and unscrew the old element from the tank.

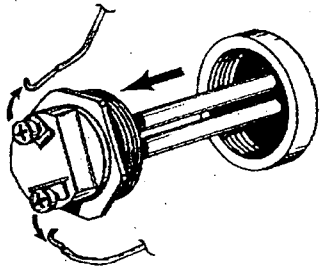


FIGURE 18.

8. Clean the area around the element opening. Remove any sediment from or around the element opening and inside the tank.

9. If you are cleaning the element you have removed, do so by scraping or soaking in vinegar or a deliming solution.

NOTE: Replacement elements must (1) be the same voltage and (2) no greater wattage than listed on the model rating plate affixed to the water heater.

10. A new gasket should be used in all cases to prevent a possible water leak. Place the new element gasket on the threaded side of the cleaned or new element and screw into tank, securing tightly using an element wrench.

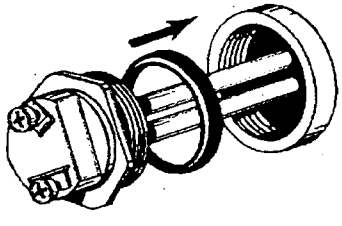


FIGURE 19.

11. Close the water heater drain valve by turning the handle to the right (clockwise). The drain valve is on the lower front of the water heater.

12. Open the cold water supply valve to the water heater.

NOTE: The cold water supply valve must be left open when the water heater is in use.

13. To insure complete filling of the tank, allow air to exit by opening the nearest hot water faucet. Allow water to run until a constant flow is obtained. This will let air out of the water heater and the piping.

CAUTION

Improper installation and use may result in property damage.

- Fill tank with water before operation.

Never use this water heater unless it is completely full of water. To prevent damage to the tank and heating element, the tank must be filled with water. Water must flow from the hot water faucet before turning "ON" power.

14. Check element for water leaks. If leakage occurs, tighten element or repeat Steps 2 and 3, remove element and reposition gasket. Then repeat Steps 10 through 14.

15. Reconnect the two wires to the element and then check to make sure the thermostat remains firmly against the surface of the tank.



FIGURE 20.

16. Replace terminal cover on thermostat making sure the locking tabs on the terminal cover are in place.

17. Replace the insulation block and pad so that it covers the thermostat and element, see Figure 21.

18. Replace outer door.

19. Turn "ON" electric power to water heater.

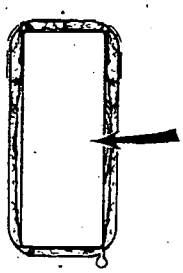


FIGURE 21.

DRAIN VALVE WASHER REPLACEMENT

(See Figure 22)

1. Follow "Draining" instructions.
2. Turning counter clockwise (↶), remove the hex cap below the screw handle.
3. Remove the washer and put the new one in place.
4. Screw the handle and cap assembly back into the drain valve and retighten using a wrench. DO NOT OVER TIGHTEN.
5. Follow instructions in the "Filling The Water Heater" section.
6. Check for leaks.

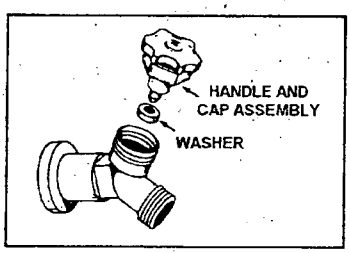


FIGURE 22.

SERVICE

If a condition persists or you are uncertain about the operation of the water heater contact a service agency.

Use this guide to check a "Leaking" water heater. Many suspected "Leakers" are not leaking tanks. Often the source of the water can be found and corrected.

If you are not thoroughly familiar with your water heater and safety practices, contact a qualified installer to check the water heater.

LEAKAGE CHECKPOINTS

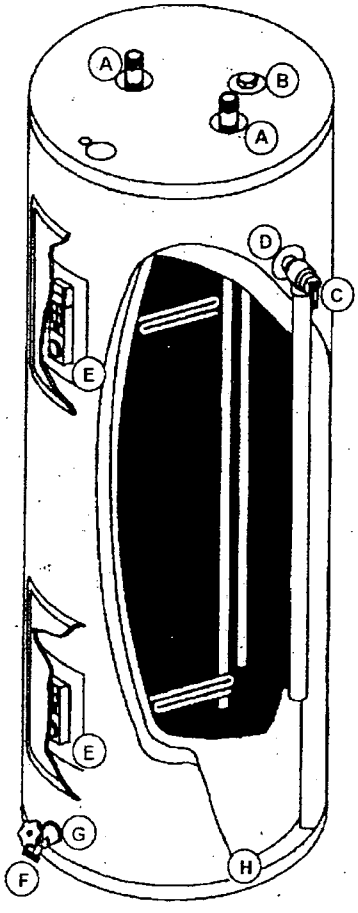
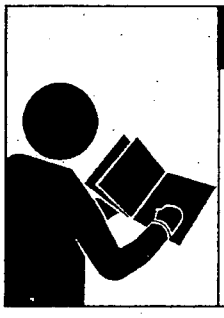


FIGURE 23.



⚠ WARNING

- **Before removing any access panels or servicing the water heater, make sure the electrical supply to the water heater is turned "OFF".**
- **Failure to do this could result in death, serious bodily injury, or property damage.**



⚠ WARNING

Read and understand instruction manual and safety messages before installing, operating or servicing this water heater.

Failure to follow instructions and safety messages could result in death or serious injury.

Instruction Manual must remain with water heater.

Read this manual first. Then before checking the water heater make sure the electrical power supply has been turned "OFF" before checking the tank for leakage.

*A. Condensation and dripping may be seen on pipes if the water temperature is low in humid weather or pipe connections may be leaking.

*B. The anode rod fitting may be leaking.

C. Small amounts of water from temperature-pressure relief valve may be due to thermal expansion or high water pressure in your area. If the valve is not piped to an open drain the released water could be mistaken for a leaking heater.

*D. The temperature-pressure relief valve may be leaking at the tank fitting.

E. Water on the side of the tank may be condensation due to the panel or insulation not being in place.

F. Water from a drain valve may be due to the valve being slightly opened.

*G. The drain valve may be leaking at the tank fitting.

*H. Water in the water heater bottom or on the floor may be from condensation, loose connections, or the relief valve. DO NOT replace the water heater until a full inspection of all possible water sources is made and necessary corrective steps taken.

Leakage from other appliances, water lines, or ground seepage should also be checked.

* To check where threaded portion enters tank, insert cotton swab between jacket opening and fitting. If cotton is wet, follow "Draining" instructions in the "Periodic Maintenance" section and then remove fitting. Put pipe dope or teflon tape on the threads and replace. Then follow "Filling the Water Heater" instructions in the "Installing the New Water Heater" section.

TROUBLESHOOTING GUIDELINES

These guidelines should be utilized by a qualified service agent.

Problem	Cause	Solution
WATER LEAKS (See Leakage Checkpoints on 19)	Improperly sealed, hot or cold supply connection, relief valve or drain valve.	Tighten threaded connections.
	Leakage from other appliances or water lines.	Inspect other appliances near water heater.
LEAKING TEMPERATURE AND PRESSURE RELIEF VALVE	Thermal expansion in closed water system.	Install thermal expansion tank (DO NOT plug T&P valve).
	Improperly seated valve.	Check relief valve for proper operation (DO NOT plug T&P valve).
HOT WATER ODORS (CAUTION: UNAUTHORIZED REMOVAL OF THE ANODE(S) WILL VOID THE WARRANTY FOR FURTHER INFORMATION, CONTACT YOUR DEALER)	High sulfate or mineral content in water supply.	Drain and flush heater thoroughly, then refill.
	Bacteria in water supply.	Chlorinate water supply.
NOT ENOUGH OR NO HOT WATER	Power supply to heater is not on.	Turn disconnect switch on or contact electrician.
	Thermostat set too low.	Refer to temperature regulation.
	Heater undersized.	Reduce hot water use.
	Incoming water is usually cold (Winter).	Allow more time for heat to reheat.
	Leaking hot water from pipes or fixtures.	Have plumber check and repair leaks.
	High temperature limit switch activated.	Contact dealer to determine cause. See temperature regulation.
HOT WATER TOO HOT	Thermostat set too high.	Refer to temperature regulation.
	High temperature limit switch activated.	Contact dealer to determine cause. See temperature regulation.
WATER HEATER SOUNDS	Scale accumulation on elements.	Contact dealer to clean or replace elements.
	Sediment build-up on tank bottom.	Drain and flush thoroughly, then refill.

REPAIR PARTS LIST

LOWBOY AND UPRIGHT ELECTRIC MODELS (Single and Dual Element)

Key No.	Part Description
1	Temperature-Pressure Relief Valve
2	Secondary Anode Rod/Nipple w/Heat Trap*
3	Element w/Gasket
4	Element Gasket
5	Lower Outer Door
6	Terminal Cover (Double Element)
7	Upper Thermostat w/Hi Limit (Double Element)
8	Terminal Cover
9	Lower Thermostat w/Hi Limit
10	Terminal Cover
11	Lower Thermostat
12	Thermostat Bracket (ea.)
13	Drain Valve
14	Primary Anode
15	Dip Tube
16	Nipple w/Heat Traps*
17	Upper Outer Door
18	Base Pan w/Side Drain
19	Pipe Insulation*
20	T & P Insulation*
**	Instruction Manual

* If Applicable
** Not Illustrated

Now that you have purchased this water heater, should a need ever exist for repair parts or service, simply contact the company it was purchased from or the manufacturer listed on the rating plate on the water heater.

Be sure to provide all pertinent facts when you call or visit.

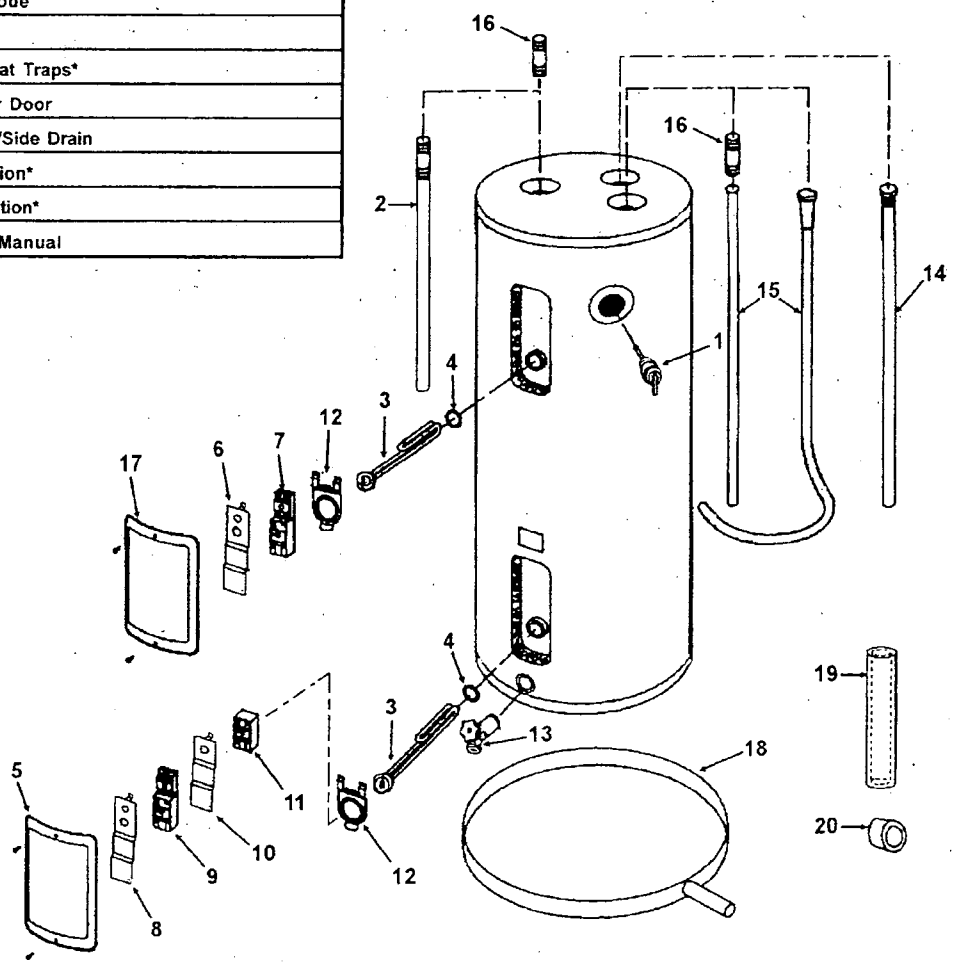
Selling prices will be furnished on request or parts will be shipped at prevailing prices and you will be billed accordingly.

The model number of your Water Heater will be found on the rating plate located above or adjacent to outer door.

WHEN ORDERING REPAIR PARTS, ALWAYS GIVE THE FOLLOWING INFORMATION:

- MODEL NUMBER
- SERIAL NUMBER
- VOLTAGE AND ELEMENT WATTAGE
- PART DESCRIPTION

THIS IS A REPAIR PARTS LIST, NOT A PACKING LIST.

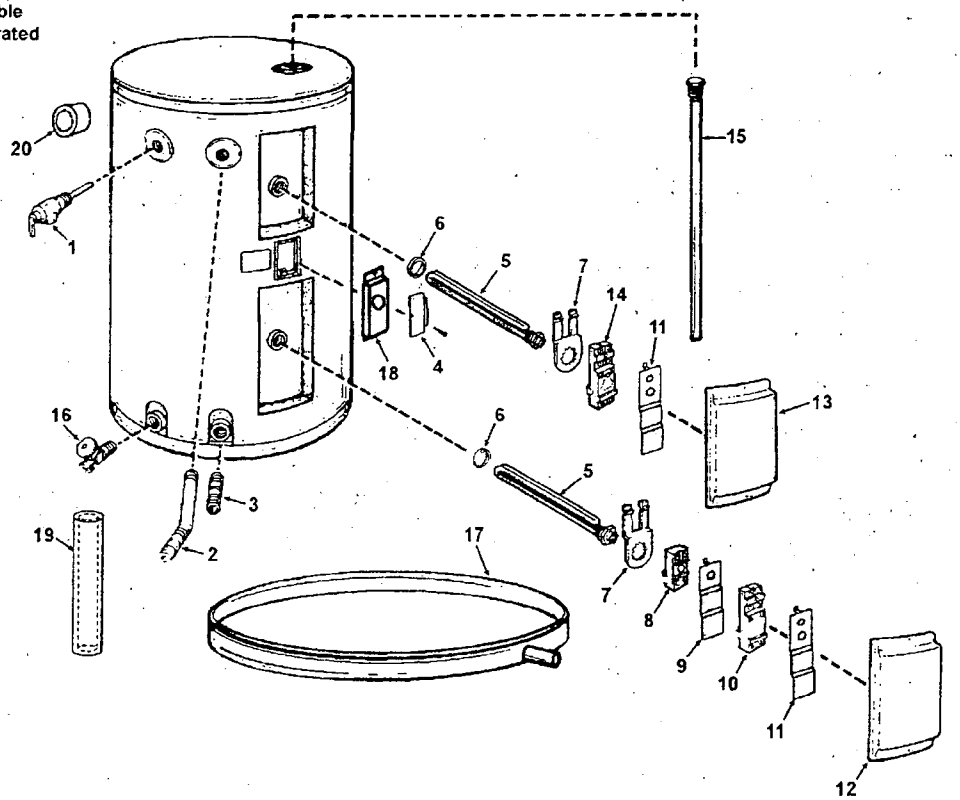


REPAIR PARTS LIST

COMPACT OR MANUFACTURED (MOBILE) HOME ELECTRIC MODELS

Key No.	Part Description	Key No.	Part Description
1	Temperature-Pressure Relief Valve	12	Lower Outer Door
2	Outlet Nipple Assembly	13	Upper Outer Door
3	Inlet Nipple	14	Upper Thermostat w/Hi/Limit
4	Junction Box Cover	15	Anode Rod
5	Upper and Lower Element	16	Drain Valve (30 Gallon Model Only)
6	Element Gasket	17	Base Pan w/Side Drain
7	Thermostat Bracket (ea.)	18	Conduit Bracket
8	Lower Thermostat	19	Pipe Insulation*
9	Terminal Cover	20	T & P Insulation*
10	Lower Thermostat w/Hi Limit	**	Instruction Manual
11	Terminal Cover		

* If Applicable
** Not Illustrated



Now that you have purchased this water heater, should a need ever exist for repair parts or service, simply contact the company it was purchased from or the manufacturer listed on the rating plate on the water heater.

Be sure to provide all pertinent facts when you call or visit.

Selling prices will be furnished on request or parts will be shipped at prevailing prices and you will be billed accordingly.

The model number of your Water Heater will be found on the rating plate located above or adjacent to outer door.

WHEN ORDERING REPAIR PARTS, ALWAYS GIVE THE FOLLOWING INFORMATION:

- MODEL NUMBER
- SERIAL NUMBER
- VOLTAGE AND ELEMENT WATTAGE
- PART DESCRIPTION

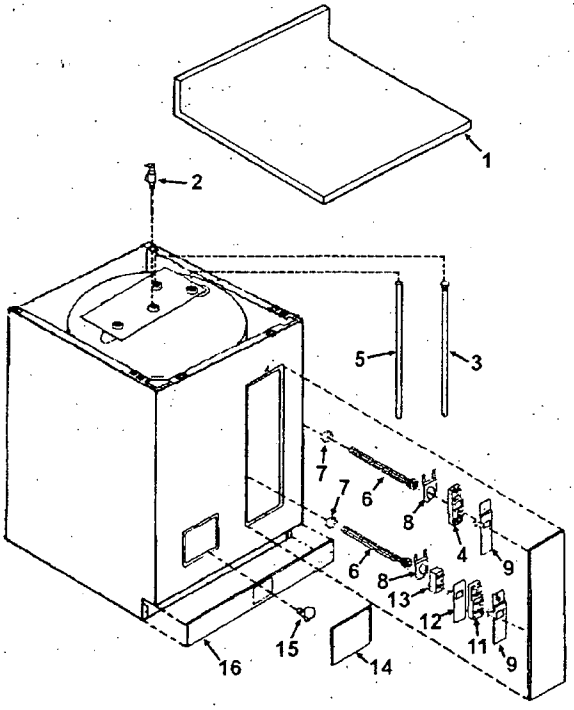
THIS IS A REPAIR PARTS LIST, NOT A PACKING LIST.

REPAIR PARTS LIST

TABLE TOP ELECTRIC MODELS

Key No.	Part Description
1	Porcelain Top
2	Temperature and Pressure Relief Valve
3	Primary Anode Rod
4	Upper Thermostat w/Hi Limit
5	Dip Tube
6	Element w/Gasket
7	Element Gasket
8	Thermostat Bracket (ea.)
9	Terminal Cover
10	Outer Door (ea.)
11	Lower Thermostat w/Hi Limit
12	Terminal Cover
13	Lower Thermostat
14	Drain Access Door
15	Drain Valve
16	Toe Panel
**	Instruction Manual

** Not Illustrated



Now that you have purchased this water heater, should a need ever exist for repair parts or service, simply contact the company it was purchased from or the manufacturer listed on the rating plate on the water heater.

Be sure to provide all pertinent facts when you call or visit.

Selling prices will be furnished on request or parts will be shipped at prevailing prices and you will be billed accordingly.

The model number of your Water Heater will be found on the rating plate located above or adjacent to outer door.

WHEN ORDERING REPAIR PARTS, ALWAYS GIVE THE FOLLOWING INFORMATION:

- MODEL NUMBER
- SERIAL NUMBER
- VOLTAGE AND ELEMENT WATTAGE
- PART DESCRIPTION

THIS IS A REPAIR PARTS LIST, NOT A PACKING LIST.

state WATER HEATERS

RESIDENTIAL ELECTRIC WARRANTY

THIS WARRANTY IS APPLICABLE TO THE ORIGINAL OWNER ONLY. In accordance with the warranty terms and conditions specified below.

State Water Heaters (the warrantor) will furnish the ORIGINAL OWNER, 1) a replacement State water heater of equivalent size and current model if the glass-lined tank in this water heater leaks and, 2) a replacement part for any component part which fails.

THE STATE WATER HEATERS REPLACEMENT MODEL OR PART WILL BE WARRANTED FOR ONLY THE UNEXPIRED PORTION OF THE ORIGINAL WARRANTY. The warranty period will be determined by the original date of purchase of the water heater, or in the absence of a Bill of Sale verifying said date, from the date of manufacture indicated on rating plate affixed to this water heater. This warranty is not transferrable and applies to models listed below:

SERIES	Tank	Parts
Premier®	**10-year**	**10-year**
EPX		
Select® 10-Year Models	**10-year**	**6-year**
ESX		
Select® 6-Year Models	**6-year**	**6-year**
ES6		

When the water heater has been used for other than single family residential application;

1. The tank warranty shall be reduced to 1 year for 6 year models and to 3 years for 10 year models.
2. The parts warranty shall be reduced to 1 year for all models.

CONDITIONS AND EXCEPTIONS

This warranty shall apply only when the water heater is installed and operated in accordance with 1) all local fire codes and plumbing codes, ordinances and regulations, 2) the printed instructions provided with it, 3) good industry practices, and 4) proper safety practices such as but not limited to a properly sized drain pan if installed in an area where leakage from the tank or its connections would result in damage to the area adjacent to the heater. In addition, a new temperature and pressure relief valve, certified by the Canadian Gas Association must have been properly installed and piped to the nearest drain.

This warranty shall apply only when the heater is:

- owned by the original purchaser;
- installed for indoor operation only;
- used at temperatures not exceeding the maximum calibrated setting of its thermostat;
- used at water pressure not exceeding the working pressure shown on the heater;
- filled with potable water, free to circulate at all times and with the tank free of damaging water sediment or scale deposits;
- used in a non-corrosive and non-contaminated atmosphere;
- used with factory approved anode(s) installed;
- in its original installation location;
- in the United States, its territories or possessions, and Canada;
- sized in accordance with proper sizing techniques for residential water heaters;
- bearing a rating plate which has not been altered, defaced or removed except as required by the warrantor;
- used in an open system or in a closed system with a properly sized and installed thermal expansion tank;
- connected to the proper voltage or:
- operated at the factory rated input;
- installed with no attempted, nor actual modification or alteration of the water heater's design in any way, including but not limited to, the attachment of non-company approved appliances or equipment.

Any accident to the water heater or any part thereof (including freezing, fire, floods, or lightning), any misuse, abuse or alteration of it, any operation of it in a modified form, any operation of the water heater on desalinated (deionized) water, or any damage caused by attempts to repair tank leaks or parts, will void this warranty. This warranty does not cover water heaters replaced for cosmetic reasons or for reasons of noise, taste, odor, discolored and/or rusty water. This warranty does not apply to water heaters used to heat pools, whirlpools or hot tubs or used for space heating where its sizing does not conform with specifications of the heating component manufacturer.

This warranty gives you specific legal rights, and you may have other rights which vary under the laws of each state. If any provision of this warranty is prohibited or invalid under applicable state law, that provision shall be ineffective to the extent of the prohibition or invalidity without invalidating the remainder of the affected provision or the other provisions of this warranty.

SERVICE AND LABOR RESPONSIBILITY

UNDER THIS LIMITED WARRANTY, THE WARRANTOR WILL PROVIDE ONLY A REPLACEMENT WATER HEATER OR PART THEREOF. THE OWNER IS RESPONSIBLE FOR ALL OTHER COSTS. Such costs may include but are not limited to:

a. Labor charges for service, removal, or reinstallation of the water heater or part thereof.

b. Shipping and delivery charges for forwarding the new water heater or replacement part from the nearest distributor and returning the claimed defective heater or part to such distributor.

c. All cost necessary or incidental for handling and administrative charges, and for any materials and/or permits required for installation of the replacement heater or part.

LIMITATION ON IMPLIED WARRANTIES

Implied warranties, including any warranty of merchantability imposed on the sale of this heater under state law are limited to one year duration for the heater or any of its parts. Some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.

CLAIM PROCEDURE

Any claim under this warranty should be initiated with the dealer who sold the heater, or with any other dealer handling the warrantor's products. If this is not practical, the owner should contact: State Industries, Inc., 500 Lindahl Parkway, Ashland City, Tennessee 37015. Phone: 1.800.365.0024 or visit our website: www.stateind.com.

Replacement Parts may be ordered through authorized servicers or distributors. Refer to your local Yellow Pages for where to call or contact State Water Heaters, 500 Lindahl Parkway, Ashland City, TN 37015, phone: 1.800.821.2017.

The warrantor will only honor replacement with identical or similar water heater or parts thereof which are manufactured or distributed by the warrantor.

Dealer replacements are made subject to in-warranty validation by warrantor.

PROOF-OF-PURCHASE AND PROOF-OF-INSTALLATION DATE ARE REQUIRED TO SUPPORT WARRANTY CLAIM FROM ORIGINAL OWNER. THIS FORM DOES NOT CONSTITUTE PROOF-OF-PURCHASE OR PROOF-OF-INSTALLATION.

DISCLAIMERS

NO EXPRESSED WARRANTY HAS BEEN OR WILL BE MADE IN BEHALF OF THE WARRANTOR WITH RESPECT TO THE MERCHANTABILITY OF THE HEATER OR THE INSTALLATION, OPERATION, REPAIR OR REPLACEMENT OF THE HEATER OR PARTS. THE WARRANTOR SHALL NOT BE RESPONSIBLE FOR WATER DAMAGE, LOSS OF USE OF THE UNIT, INCONVENIENCE, LOSS OR DAMAGE TO PERSONAL PROPERTY, OR OTHER CONSEQUENTIAL DAMAGE. THE WARRANTOR SHALL NOT BE LIABLE BY VIRTUE OF THIS WARRANTY OR OTHERWISE FOR DAMAGE TO ANY PERSONS OR PROPERTY, WHETHER DIRECT OR INDIRECT, AND WHETHER ARISING IN CONTRACT OR IN TORT.

Should governmental regulations or industry standards prohibit the Manufacturer from furnishing a comparable model replacement under this warranty, the Owner will be furnished with the closest comparable water heater meeting the then current governmental regulations and industry standards. A supplementary fee may be assessed to cover the additional cost associated with the changes made to meet applicable regulations and standards.

IMPORTANT INFORMATION

Model Number _____

Serial Number _____

INSTALLATION INFORMATION

Date Installed _____

Company's Name _____

Street or P.O. Box _____

City, State, and Zip Code _____

Phone Number _____

Plumber's Name _____

state WATER HEATERS

NOTES



500 Lindahl Parkway, Ashland City, TN 37015
Phone: 800-821-2017 Fax: 800-644-9306
www.statewaterheaters.com

Pressure Reducing Valve

CONBRACO

36 Series

MAINTENANCE INSTRUCTIONS

All standard valves are factory set at 50 P.S.I. In order to raise or lower the pressure setting, loosen lock nut and turn adjusting screw CLOCKWISE to RAISE pressure or COUNTERCLOCKWISE to LOWER pressure, retighten lock nut.

TO REPLACE CARTRIDGE

1. Shut off water service to dwelling at main.
2. Open a faucet to relieve pressure, leave open.
3. Back off adjusting screw and lock nut.
4. Loosen bell housing, remove spring, disc, and friction washer.
5. Remove bolt, pressure plate, and diaphragm.
6. Remove cartridge assembly.
7. Remove screen, clean off any grit, examine body for debris and flush out.

TO RE-ASSEMBLE

1. Screw in new cartridge assembly, tighten.
2. Replace diaphragm, pressure plate and bolt.
3. Replace spring, disc, friction washer and bell housing, tighten.
4. Turn in adjusting screw to old setting, tighten lock nut.
5. Turn water back on, let water run a few moments to flush the system of air.
6. To adjust pressure on regulator to desired setting, turn CLOCKWISE to RAISE pressure or COUNTER CLOCKWISE to LOWER pressure.

INSTALLATION INSTRUCTIONS

The #36 Series CONBRACO Pressure Reducing Valve is to be installed in the water line with the arrow on the valve pointing in the direction of the flow. The valve is factory set at 50 P.S.I., unless otherwise specified by customer. The primary purpose of a pressure reducing valve is to reduce the water pressure coming from the city main down to a more functional line pressure in the home. It will enable the household to use water at a constant pressure, whatever the demand, even to a remote outlet in the home. At 100 pounds pressure, water would have more push behind it than at 50 pounds pressure, so less water will be used by lowering the pressure. Reduce pressure will result in a savings to the user on their water consumption. This valve is designed to give years of satisfactory service when installed and maintained properly. The CONBRACO Water Pressure Reducing Valve has a unique cartridge assembly facilitating easy removal and/or replacement using ordinary hand tools.

REPAIR KITS FOR 36 SERIES PRESSURE REDUCING VALVES

#36-103, #36-203, #36-303 PRV ½ Size use W-6462-06 CARTRIDGE ASSEMBLY AND D-2419-00 DIAPHRAGM
#36-104, #36-204, #36-304 PRV ¾ Size use W-6462-06 CARTRIDGE ASSEMBLY AND D-2419-00 DIAPHRAGM
#36-105, #36-205, #36-305 PRV 1" Size use W-6474-06 CARTRIDGE ASSEMBLY AND D-2421-00 DIAPHRAGM
#36-106, #36-206, #36-306 PRV 1¼" Size use W-6712-06 CARTRIDGE ASSEMBLY AND D-2558-00 DIAPHRAGM
#36-107, #36-207, #36-307 PRV 1½ Size use W-6712-06 CARTRIDGE ASSEMBLY AND D-2559-00 DIAPHRAGM
#36-108, #36-208, #36-308 PRV 2" Size use W-6714-06 CARTRIDGE ASSEMBLY AND D-2559-00 DIAPHRAGM

CONBRACO INDUSTRIES, INC. MATTHEWS, NC Made in U.S.A. I-4222-00 Rev. E

ROA_01629

DIVISION 15 – MECHANICAL & PLUMBING

HVAC – GENERAL HEATING & AIR

WARRANTY AGREEMENT

Project: Belle Hall Condominiums

Owner: Belle Hall Direct 101, LP
Contractor: TCR NC Construction I Limited Partnership

Subcontractor: General Heating & Air

Subcontractor hereby expressly warrants and guarantees that all labor, materials, and equipment furnished and work performed in conjunction with the above referenced project are in accordance with the plans, specifications, the Subcontract Agreement and authorized modifications thereto. All labor, materials and equipment shall be free from defects, due to defective materials and/or workmanship, for a period of one (1) year from the date of Certificate of Occupancy for each building/structure, unless otherwise stated in the Subcontract Agreement.

Should any defects develop during the warranty period due to improper workmanship and/or arrangement, the same shall, upon notice, be made good by this Subcontractor at no expense to the Contractor, Owner, or Owner's Representative. Nothing in the above shall be deemed to apply to work or equipment which has been abused, neglected or altered by the Contractor, Owner, or Owner's Representative.

Unless otherwise stated in the Subcontract Agreement, warranty work shall be responded to within twenty-four (24) hours of notification by the Contractor, Owner, or Owner's Representative, including weekends and holidays. Warranty notices received before 10:00 am shall be responded to on the same day. Should Subcontractor fail to respond within twenty-four (24) hours of notification or correct the defective work or equipment within seventy-two (72) hours, the Contractor, Owner, or Owner's Representative shall proceed with the correction of the defective work. All costs associated with this corrective action shall be reimbursed by this Subcontractor or charged against its account. Subcontractor shall remit payment for such charges within five (5) calendar days of notification by the Contractor, Owner, or Owner's Representative.

Signature: Melvin J Clark

Printed Name: MELVIN J CLARK

Position/Title: VICE PRES. MULTI FAMILY

Date: 12-07-2006

General Heating & A/C Co. of Greenville, Inc.
224 HICKS ROAD • GREENVILLE, SOUTH CAROLINA 29605 • (864) 277-4554 • FAX (864) 299-0246

Belle Hall Condominiums
Charleston, SC

Operation & Instruction Manuals

AWUF-XX	Air Handler
GSH13XX	Heat Pump

GENERAL HEATING & AIR

HEAT PUMP

ROA_01633

CONDENSING UNIT

HEAT PUMP
INSTALLATION & SERVICE REFERENCE

Goodman Manufacturing Company, L.P. © 2005-2006
2550 North Loop West, Suite 400, Houston, TX 77092
www.goodmanmfg.com -or- www.amana-hac.com
P/N: IO-259C Date: October 2006

Important Safety Instructions

The following symbols and labels are used throughout this manual to indicate immediate or potential safety hazards. It is the owner's and installer's responsibility to read and comply with all safety information and instructions accompanying these symbols. Failure to heed safety information increases the risk of personal injury, property damage, and/or product damage.

⚠ WARNING

HIGH VOLTAGE!



Disconnect ALL power before servicing. Multiple power sources may be present. Failure to do so may cause property damage, personal injury or death.

⚠ WARNING

Installation and repair of this unit should be performed ONLY by individuals meeting the requirements of an "entry level technician" as specified by the Air Conditioning and Refrigeration Institute (ARI). Attempting to install or repair this unit without such background may result in product damage, personal injury or death.

⚠ CAUTION

Scroll equipped units should never be used to evacuate the air conditioning system. Vacuums this low can cause internal electrical arcing resulting in a damaged or failed compressor.

Shipping Inspection

Always keep the unit upright; laying the unit on its side or top may cause equipment damage. Shipping damage, and subsequent investigation is the responsibility of the carrier. Verify the model number, specifications, electrical characteristics, and accessories are correct prior to installation. The distributor or manufacturer will not accept claims from dealers for transportation damage or installation of incorrectly shipped units.

Codes & Regulations

This product is designed and manufactured to comply with national codes. Installation in accordance with such codes and/or prevailing local codes/regulations is the responsibility of the installer. The manufacturer assumes no responsibility for equipment installed in violation of any codes or regulations.

The United States Environmental Protection Agency (EPA) has issued various regulations regarding the introduction and disposal of refrigerants. Failure to follow these regulations may harm the environment and can lead to the imposition of substantial fines. Should you have any questions please contact the local office of the EPA.

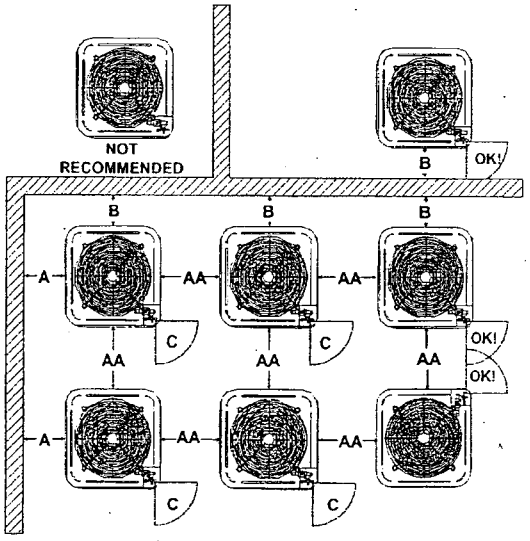
If replacing a condensing unit or air handler, the system must be manufacturer approved and Air Conditioning and Refrigeration Institute (ARI) matched. **NOTE:** Installation of unmatched systems is strongly discouraged.

Operating the unit in a structure that is not complete (either as part of new construction or renovation) will void the warranty.

Installation Clearances

Special consideration must be given to location of the condensing unit(s) in regard to structures, obstructions, other units, and any/all other factors that may interfere with air circulation. Where possible, the top of the unit should be completely unobstructed; however, if vertical conditions require placement beneath an obstruction **there should be a minimum of 60 inches between the top of the unit and the obstruction(s).** The specified dimensions meet requirements for air circulation only. Consult all appropriate regulatory codes prior to determining final clearances.

Another important consideration in selecting a location for the unit(s) is the angle to obstructions. Either side adjacent the valves can be placed toward the structure provided the side away from the structure maintains minimum service clearance. Corner installations are strongly discouraged.



Minimum Airflow Clearance				
Model Type	A	B	C	AA
Residential	10"	10"	18"	20"
Light Commercial	12"	12"	18"	24"

This unit can be located at ground floor level or on flat roofs. At ground floor level, the unit must be on a solid, level foundation that will not shift or settle. To reduce the possibility of sound transmission, the foundation slab should not be in contact with

or be an integral part of the building foundation. Ensure the foundation is sufficient to support the unit. A concrete slab raised above ground level provides a suitable base.

Rooftop Installations

If it is necessary to install this unit on a roof structure, ensure the roof structure can support the weight and that proper consideration is given to the weather-tight integrity of the roof. Since the unit can vibrate during operation, sound vibration transmission should be considered when installing the unit. Vibration absorbing pads or springs can be installed between the condensing unit legs or frame and the roof mounting assembly to reduce noise vibration.

NOTE: These units require special location consideration in areas of heavy snow accumulation and/or areas with prolonged continuous subfreezing temperatures. Heat pump unit bases have cutouts under the outdoor coil that permit drainage of frost accumulation. Situate the unit to permit free unobstructed drainage of the defrost water and ice. A minimum 3" clearance under the outdoor coil is required in the milder climates.
In more severe weather locations, it is recommended that the unit be elevated to allow unobstructed drainage and air flow. The following elevation minimums are recommended:

Design Temperature	Suggested Minimum Elevation
+15° and above	2 1/2"
-5° to +14°	8"
below -5°	12"

Safe Refrigerant Handling

While these items will not cover every conceivable situation, they should serve as a useful guide.

⚠ WARNING

To avoid possible injury, explosion or death, practice safe handling of refrigerants.

⚠ WARNING

Refrigerants are heavier than air. They can "push out" the oxygen in your lungs or in any enclosed space.To avoid possible difficulty in breathing or death:

- **Never purge refrigerant into an enclosed room or space. By law, all refrigerants must be reclaimed.**
- **If an indoor leak is suspected, throughly ventilate the area before beginning work.**
- **Liquid refrigerant can be very cold. To avoid possible frostbite or blindness, avoid contact and wear gloves and goggles. If liquid refrigerant does contact your skin or eyes, seek medical help immediately.**
- **Always follow EPA regulations. Never burn refrigerant, as poisonous gas will be produced.**

⚠ WARNING

To avoid possible explosion:

- **Never apply flame or steam to a refrigerant cylinder. If you must heat a cylinder for faster charging, partially immerse it in warm water.**
- **Never fill a cylinder more than 80% full of liquid refrigerant.**
- **Never add anything other than R-22 to an R-22 cylinder or R-410A to an R-410A cylinder. The service equipment used must be listed or certified for the type of refrigerant used.**
- **Store cylinders in a cool, dry place. Never use a cylinder as a platform or a roller.**

⚠ WARNING

To avoid possible explosion, use only returnable (not disposable) service cylinders when removing refrigerant from a system.

- **Ensure the cylinder is free of damage which could lead to a leak or explosion.**
- **Ensure the hydrostatic test date does not exceed 5 years.**
- **Ensure the pressure rating meets or exceeds 400 lbs.**

When in doubt, do not use cylinder.

Refrigerant Lines

⚠ CAUTION

The compressor POE oil for R-410A units is extremely susceptible to moisture absorption and could cause compressor failure. Do not leave system open to atmosphere any longer than necessary for installation.

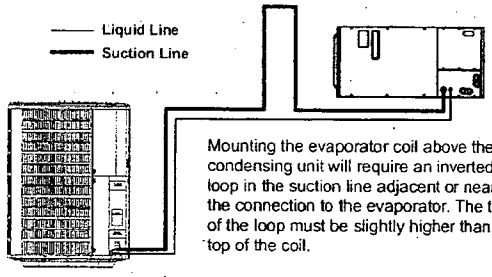
Use only refrigerant grade (dehydrated and sealed) copper tubing to connect the condensing unit with the indoor evaporator. After cutting the tubing, install plugs to keep refrigerant tubing clean and dry prior to and during installation. Tubing should always be cut square keeping ends round and free from burrs. Clean the tubing to prevent contamination.

Do NOT let refrigerant lines come in direct contact with plumbing, ductwork, floor joists, wall studs, floors, and walls. When running refrigerant lines through a foundation or wall, openings should allow for sound and vibration absorbing material to be placed or installed between tubing and foundation. Any gap between foundation or wall and refrigerant lines should be filled with a pliable silicon-based caulk, RTV or a vibration damping material. Avoid suspending refrigerant tubing from joists and studs with rigid wire or straps that would come in contact with the tubing. Use an insulated or suspension type hanger. Keep both lines separate and always insulate the suction line.

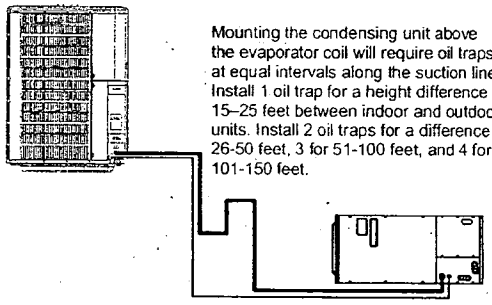
These sizes are suitable for line lengths of 74 feet or less. If a run of more than fifty feet is required, refer to Remote Cooling Service Manual, or TP-106 Long Line Set Application R-22, or TP-107 Long Line Set Application R-410A or contact your distributor for assistance.

REFRIGERANT LINE LENGTH (Ft)						
Cond Unit	0-24		25-49		50-74***	
	Line Diameter (In. OD)					
Tons	Suct	Liq	Suct	Liq	Suct	Liq
1 1/2	5/8	1/4	3/4	3/8	3/4	3/8
2	5/8	1/4	3/4	3/8	3/4	3/8
2 1/2	3/4	3/8	3/4*	3/8	7/8	3/8
3	3/4	3/8	3/4**	3/8	7/8**	3/8
3 1/2	3/4	3/8	7/8**	3/8	1 1/8	3/8
4	7/8	3/8	1 1/8	3/8	1 1/8	3/8
5	7/8	3/8	1 1/8	3/8	1 1/8	3/8

* 7/8" required for full ratings
** 1 1/8" required for full ratings
*** Lines greater than 74 feet in length or vertical elevation changes more than 50 feet refer to the Remote Cooling Service Manual or contact your distributor for assistance.



Mounting the evaporator coil above the condensing unit will require an inverted loop in the suction line adjacent or near the connection to the evaporator. The top of the loop must be slightly higher than the top of the coil.



Mounting the condensing unit above the evaporator coil will require oil traps at equal intervals along the suction line. Install 1 oil trap for a height difference of 15–25 feet between indoor and outdoor units. Install 2 oil traps for a difference of 26-50 feet, 3 for 51-100 feet, and 4 for 101-150 feet.

Insulation is necessary to prevent condensation from forming and dropping from the suction line. Armflex (or satisfactory equivalent) with 3/8" min. wall thickness is recommended. In severe conditions (hot, high humidity areas) 1/2" insulation may be required. Insulation must be installed in a manner which protects tubing from damage and contamination.

Where possible, drain as much residual compressor oil from existing systems, lines, and traps; pay close attention to low areas where oil may collect. **NOTE:** If changing refrigerant types, ensure the indoor coil and metering device is compatible with the type of refrigerant being used; otherwise, the indoor coil must be replaced.

Burying Refrigerant Lines

If burying refrigerant lines can not be avoided, use the following checklist.

1. Insulate liquid and suction lines separately.
2. Enclose all underground portions of the refrigerant lines in waterproof material (conduit or pipe) sealing the ends where tubing enters/exits the enclosure.
3. If the lines must pass under or through a concrete slab, ensure lines are adequately protected and sealed.

Refrigerant Line Connections

IMPORTANT: To avoid overheating the service valve, TXV valve, or filter drier while brazing, wrap the component with a wet rag, or use a thermal heat trap compound as recommended by the compound manufacturer. Use a brazing alloy of 2% minimum silver content. Do not use flux.

1. The ends of the refrigerant lines must be cut square, deburred, cleaned, and be round and free from nicks or dents. Any other condition increases the chance of a refrigerant leak.
2. "Sweep" the refrigerant line with nitrogen or inert gas during brazing to prevent the formation of copper-oxide inside the refrigerant lines. The POE oils used in R-410A applications will clean any copper-oxide present from the inside of the refrigerant lines and spread it throughout the system. This may cause a blockage or failure of the metering device.
3. After brazing, quench the joints with water or a wet cloth to prevent overheating of the service valve.
4. Ensure the filter drier paint finish is intact after brazing. If the paint of the steel filter drier has been burned or chipped, repaint or treat with a rust preventative. This is especially important on suction line filter driers which are continually wet when the unit is operating.

NOTE: Be careful not to kink or dent refrigerant lines. Kinked or dented lines will cause poor performance or compressor damage.

Do NOT make final refrigerant line connection until plugs are removed from refrigerant tubing.

NOTE: Before brazing, verify indoor piston size by checking the piston kit chart packaged with indoor unit.

Leak Testing (Nitrogen or Nitrogen-Traced)

⚠ WARNING

To avoid the risk of fire or explosion, never use oxygen, high pressure air or flammable gases for leak testing of a refrigeration system.

⚠ WARNING

To avoid possible explosion, the line from the nitrogen cylinder must include a pressure regulator and a pressure relief valve. The pressure relief valve must be set to open at no more than 150 psig.

Pressure test the system using dry nitrogen and soapy water to locate leaks. If you wish to use a leak detector, charge the system to 10 psi using the appropriate refrigerant then use nitrogen to finish charging the system to working pressure then apply the detector to suspect areas. If leaks are found, repair them. After repair, repeat the pressure test. If no leaks exist, proceed to system evacuation.

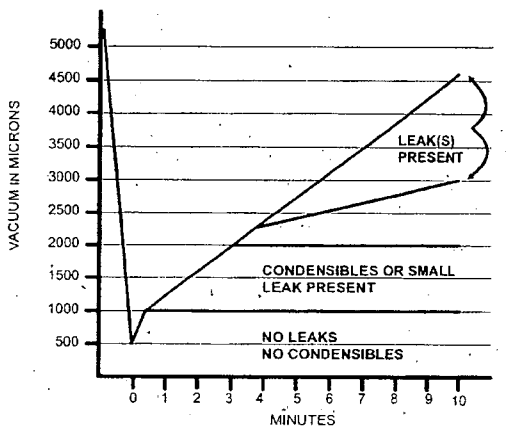
System Evacuation

Condensing unit liquid and suction valves are closed to contain the charge within the unit. The unit is shipped with the valve stems closed and caps installed. **Do not open valves until the system is evacuated.**

⚠ WARNING

REFRIGERANT UNDER PRESSURE!
Failure to follow proper procedures may cause property damage, personal injury or death.

1. Connect the vacuum pump with 250 micron capability to the service valves.
2. Evacuate the system to 250 microns or less using suction **and** liquid service valves. Using both valves is necessary as some compressors create a mechanical seal separating the sides of the system.
3. Close pump valve and hold vacuum for 10 minutes. Typically pressure will rise during this period.



- If the pressure rises to 1000 microns or less and remains steady the system is considered leak-free; proceed to startup.
- If pressure rises above 1000 microns but holds steady below 2000 microns, moisture and/or noncondensibles may be present or the system may have a small leak. Return to step 2: If the same result is encountered check for leaks as previously indicated and repair as necessary then repeat evacuation.
- If pressure rises above 2000 microns, a leak is present. Check for leaks as previously indicated and repair as necessary then repeat evacuation.

Electrical Connections

⚠ WARNING

HIGH VOLTAGE!
Disconnect ALL power before servicing. Multiple power sources may be present. Failure to do so may cause property damage, personal injury or death due to electric shock. Wiring must conform with NEC or CEC and all local codes. Undersized wires could cause poor equipment performance, equipment damage or fire.



⚠ WARNING

To avoid the risk of fire or equipment damage, use copper conductors.

NOTICE

Units with reciprocating compressors and non-bleed TXV's require a Hard Start Kit.

The condensing unit rating plate lists pertinent electrical data necessary for proper electrical service and overcurrent protection. Wires should be sized to limit voltage drop to 2% (max.) from the main breaker or fuse panel to the condensing unit. Consult the NEC, CEC, and all local codes to determine the correct wire gauge and length.

Local codes often require a disconnect switch located near the unit; do not install the switch on the unit. Refer to the installation instructions supplied with the indoor furnace/air handler for specific wiring connections and indoor unit configuration. Likewise, consult the instructions packaged with the thermostat for mounting and location information.

Overcurrent Protection

The following overcurrent protection devices are approved for use.

- Time delay fuses
- HACR type circuit breakers

These devices have sufficient time delay to permit the motor-compressor to start and accelerate its load.

Three Phase Compressor Rotation

⚠ CAUTION

Use care when handling scroll compressors. Dome temperatures could be hot.

Three phase scrolls are power phase dependent and can compress in more than one direction.

Verify proper rotation for three phase compressors by ensuring the suction pressure drops and discharge pressure rises when the compressor is energized. **NOTE:** When operated in reverse, a three phase scroll compressors is noisier and its current draw substantially reduced compared to marked values.

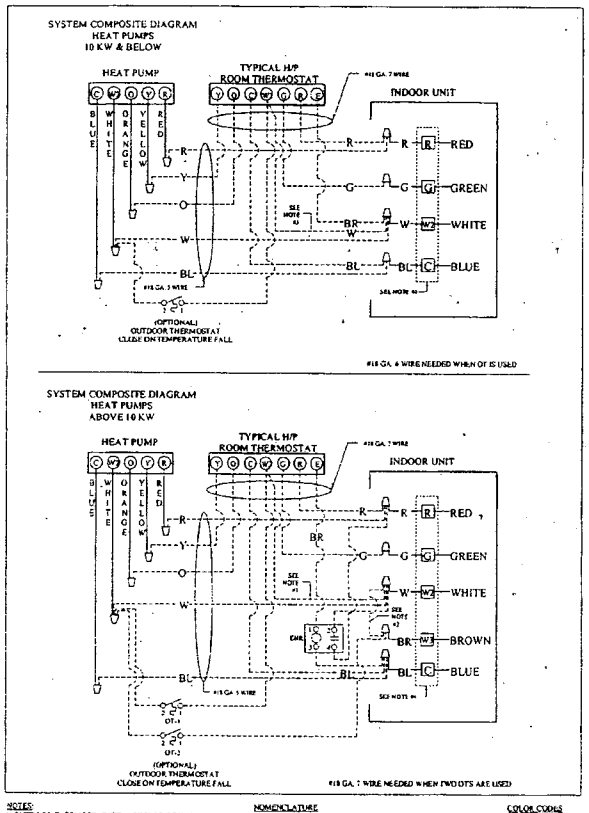
To correct, disconnect power and switch any two leads at the unit contactor and re-observe.

High Voltage Connections

Route power supply and ground wires through the high voltage port and terminate in accordance with the wiring diagram provided inside the control panel cover.

Low Voltage Connections

Condensing unit control wiring requires 24 Volt minimum, 25VA service from the indoor transformer. Low voltage wiring for two-stage units depends on the thermostat used and the number of control wires between the indoor unit and the condensing unit. Route control wires through the low voltage port and terminate in accordance with the wiring diagram provided inside the control panel cover.



Thermostat
with Low Voltage Wires to Heat Pump Unit

NOTE: For two-stage units, refer to the Installation Instructions supplied with the variable speed indoor units for field wiring connections.

System Start Up

Adequate refrigerant charge for a matching evaporator and 15 feet lineset is supplied with the condensing unit. **NOTE:** If lineset exceeds 15 feet in length, refrigerant should be added at .6 ounces per foot of liquid line.

Open each valve only until the top of the stem is 1/8" from the retainer. To avoid loss of refrigerant, do not apply pressure to the retainer.

1. Break vacuum by fully opening liquid and suction base valves.
2. Set thermostat to call for cooling. Check indoor and outdoor fan operation and allow system to stabilize for 10 minutes for fixed orifices and 20 minutes for expansion valves.

Charge Verification

WARNING

REFRIGERANT UNDER PRESSURE!

- **Do not overcharge system with refrigerant.**
- **Do not operate unit in a vacuum or at negative pressure.**

Failure to follow proper procedures may cause property damage, personal injury or death.

CAUTION

Use refrigerant certified to ARI standards. Used refrigerant may cause compressor damage, and will void the warranty. Most portable machines cannot clean used refrigerant to meet ARI standards.

NOTICE

Violation of EPA regulations may result in fines or other penalties.

CAUTION

Operating the compressor with the suction valve closed will void the warranty and cause serious compressor damage.

Final Charge Adjustment

The outdoor temperature must be 60°F or higher. Set the room thermostat to COOL, fan switch to AUTO, and set the temperature control well below room temperature.

After system has stabilized per startup instructions, check subcooling and superheat as detailed in the following section.

Fixed Orifice

CAUTION

To prevent personal injury, carefully connect and disconnect manifold gauge hoses. Escaping liquid refrigerant can cause burns. Do not vent refrigerant into the atmosphere. Recover all refrigerant during system repair and before final unit disposal.

1. Purge gauge lines. Connect service gauge manifold to base-valve service ports. Run system at least 10 minutes to allow pressure to stabilize.
2. Temporarily install thermometer on suction (large) line near suction line service valve with adequate contact and insulate for best possible reading.

3. Refer to the superheat table provided for proper system superheat. Add charge to lower superheat or recover charge to raise superheat.

SYSTEM SUPERHEAT					
Ambient Condenser Inlet Temp. (°F Drybulb)	Return Air Temperature (°F Drybulb)				
	65	70	75	80	85
115					3
100				5	5
95			5	5	5
90			7	12	18
85		5	10	17	20
80		5	12	21	26
75	5	10	17	25	29
70	5	14	20	28	32
65	13	19	26	32	35
60	17	25	30	33	37

4. Disconnect manifold set, installation is complete.

Superheat Formula = Suct. Line Temp. - Sat. Suct. Temp.

SATURATED SUCTION PRESSURE TEMPERATURE CHART		
SUCTION PRESSURE	SATURATED SUCTION TEMPERATURE °F	
PSIG	R-22	R-410A
50	26	1
52	28	3
54	29	4
56	31	6
58	32	7
60	34	8
62	35	10
64	37	11
66	38	13
68	40	14
70	41	15
72	42	16
74	44	17
76	45	19
78	46	20
80	48	21

Expansion Valve System

Single Speed Application

1. Purge gauge lines. Connect service gauge manifold to base-valve service ports. Run system at least 10 minutes to allow pressure to stabilize.
2. Temporarily install thermometer on liquid (small) line near liquid line service valve with adequate contact and insulate for best possible reading.
3. Check subcooling and superheat. Systems with TXV application should have a subcooling of 7 ± 2 °F and superheat of 7 to 9 °F.
   a. If subcooling and superheat are low, **adjust** TXV to 7 to 9 °F superheat, then check subcooling.
      NOTE: To adjust superheat, turn the valve stem clockwise to increase and counter clockwise to decrease.
   b. If subcooling is low and superheat is high, **add** charge to raise subcooling to 7 ± 2°F then check superheat.
   c. If subcooling and superheat are high, **adjust** TXV valve to 7 to 9 °F superheat, then check subcooling.
   d. If subcooling is high and superheat is low, **adjust** TXV valve to 7 to 9 °F superheat and **remove** charge to lower the subcooling to 7 ± 2°F.

   NOTE: Do **NOT** adjust the charge based on suction pressure unless there is a gross undercharge.
4. Disconnect manifold set, installation is complete.

Subcooling Formula = Sat. Liquid Temp. - Liquid Line Temp.

SATURATED LIQUID PRESSURE TEMPERATURE CHART		
LIQUID PRESSURE	SATURATED LIQUID TEMPERATURE °F	
PSIG	R-22	R-410A
200	101	70
210	105	73
220	108	76
225	110	78
235	113	80
245	116	83
255	119	85
265	121	88
275	124	90
285	127	92
295	130	95
305	133	97
325	137	101
355	144	108
375	148	112
405	155	118

Two Speed Application

Run the remote on low stage cooling for 10 minutes until refrigerant pressures stabilize. Follow the guidelines and methods below to check unit operation and ensure that the refrigerant charge is within limits. Charge the unit on low stage.

1. Purge gauge lines. Connect service gauge manifold to base-valve service ports. Run system at least 10 minutes to allow pressure to stabilize.
2. Temporarily install thermometer on liquid (small) line near liquid line service valve with adequate contact and insulate for best possible reading.
3. Check subcooling and superheat. Systems with TXV application should have a subcooling of 5 to 7 °F and superheat of 7 to 9 °F.

a. If subcooling and superheat are low, **adjust** TXV to 7 to 9 °F superheat, then check subcooling.

   NOTE: To adjust superheat, turn the valve stem clockwise to increase and counter clockwise to decrease.

b. If subcooling is low and superheat is high, **add** charge to raise subcooling to 5 to 7 °F then check superheat.

c. If subcooling and superheat are high, **adjust** TXV valve to 7 to 9 °F superheat, then check subcooling.

d. If subcooling is high and superheat is low, **adjust** TXV valve to 7 to 9 °F superheat and **remove** charge to lower the subcooling to 5 to 7 °F.

NOTE: Do **NOT** adjust the charge based on suction pressure unless there is a gross undercharge.

4. Disconnect manifold set, installation is complete.

Subcooling Formula = Sat. Liquid Temp. - Liquid Line Temp.

Hot Gas Method

System charge can be checked in the heating mode by measuring the hot discharge gas at the compressor.

1. Allow the system to operate at least 20 minutes.
2. Attach and **insulate** an electronic thermometer probe to the vapor service valve (large line) at the base valve.
3. Operate the system for 10 minutes.
4. Using an accurate electronic thermometer, measure the temperature of the discharge gas at the probe and the outdoor ambient temperature.
5. The temperature measured on the vapor service valve line should be equal to the outdoor ambient temperature plus 110°F (± 4°). For example, if the outdoor ambient temperature is 45°F, then the temperature measured by the thermometer probe at the vapor service valve line should be 155°F for a system that is properly charged. If the temperature measured by the thermometer probe is higher than the outdoor ambient plus 110°F, the system charge should be adjusted by adding refrigerant to lower the temperature. If the temperature measured is lower than the outdoor ambient plus 110°F, the system charge should be adjusted by recovering charge to raise the temperature

   NOTE: When adjusting the charge in this manner, allow the system to operate for at least 10 minutes before taking the next temperature reading.

NOTICE

Units with reciprocating compressors and non-bleed TXV's require a Hard Start Kit.

Troubleshooting Information

Complaint	No Cooling							Unsatisfactory Cooling/Heating								System Operating Pressures				Test Method Remedy
POSSIBLE CAUSE DOTS IN ANALYSIS GUIDE INDICATE "POSSIBLE CAUSE" SYMPTOM	System will not start	Compressor will not start - fan runs	Comp. and Cond. Fan will not start	Evaporator fan will not start	Condenser fan will not start	Compressor runs - goes off on overload	Compressor cycles on overload	System runs continuously - little cooling/htg	Too cool and then too warm	Not cool enough on warm days	Certain areas too cool, others too warm	Compressor is noisy	System runs - blows cold air in heating	Unit will not terminate defrost	Unit will not defrost	Low suction pressure	Low head pressure	High suction pressure	High head pressure	
Power Failure	●																			Test Voltage
Blown Fuse	●		●	●																Inspect Fuse Size & Type
Unbalanced Power, 3PH		●				●	●													Test Voltage
Loose Connection	●			●		●														Inspect Connection - Tighten
Shorted or Broken Wires	●	●	●	●	●	●														Test Circuits With Ohmmeter
Open Fan Overload				●	●															Test Continuity of Overload
Faulty Thermostat	●		●	●					●											Test Continuity of Thermostat & Wiring
Faulty Transformer	●		●																	Check Control Circuit with Voltmeter
Shorted or Open Capacitor		●		●	●	●	●													Test Capacitor
Internal Compressor Overload Open		●											♦							Test Continuity of Overload
Shorted or Grounded Compressor		●				●														Test Motor Windings
Compressor Stuck		●				●	●						♦							Use Test Cord
Faulty Compressor Contactor			●		●	●														Test Continuity of Coil & Contacts
Faulty Fan Relay				●																Test Continuity of Coil And Contacts
Open Control Circuit				●																Test Control Circuit with Voltmeter
Low Voltage		●				●	●													Test Voltage
Faulty Evap. Fan Motor				●												●			♦	Repair or Replace
Shorted or Grounded Fan Motor					●														●	Test Motor Windings
Improper Cooling Anticipator							●		●											Check Resistance of Anticipator
Shortage of Refrigerant							●	●					♦			●	●			Test For Leaks, Add Refrigerant
Restricted Liquid Line							●	●								●	●		●	Remove Restriction, Replace Restricted Part
Open Element or Limit on Elec. Heater								♦					♦							Test Heater Element and Controls
Dirty Air Filter								●		●	●					●			♦	Inspect Filter-Clean or Replace
Dirty Indoor Coil								●		●	●					●			♦	Inspect Coil - Clean
Not enough air across Indoor Coil								●		●	●					●			♦	Check Blower Speed, Duct Static Press, Filter
Too much air across Indoor Coil																	♦	●		Reduce Blower Speed
Overcharge of Refrigerant						●	●					●	♦					●	●	Recover Part of Charge
Dirty Outdoor Coil						●	●			●						♦			●	Inspect Coil - Clean
Noncondensibles							●			●			♦						●	Recover Charge, Evacuate, Recharge
Recirculation of Condensing Air							●			●									●	Remove Obstruction to Air Flow
Infiltration of Outdoor Air								●		●	●									Check Windows, Doors, Vent Fans, Etc.
Improperly Located Thermostat						●			●											Relocate Thermostat
Air Flow Unbalanced									●		●									Readjust Air Volume Dampers
System Undersized								●		●										Refigure Cooling Load
Broken Internal Parts												●	♦							Replace Compressor
Broken Valves								●				●					●	●		Test Compressor Efficiency
Inefficient Compressor								●					♦				●	●		Test Compressor Efficiency
Wrong Type Expansion Valve						●	●	●		●						●	●		♦	Replace Valve
Expansion Device Restricted						●	●	●		●						●	●		●	Remove Restriction or Replace Expansion Device
Oversized Expansion Valve								●											●	Replace Valve
Undersized Expansion Valve						●	●	●		●						●				Replace Valve
Expansion Valve Bulb Loose												●						●		Tighten Bulb Bracket
Inoperative Expansion Valve						●		●								●				Check Valve Operation
Loose Hold-down Bolts												●								Tighten Bolts
Faulty Reversing Valve						●							♦	♦	♦		♦	♦	♦	Replace Valve or Solenoid
Faulty Defrost Control					●								♦	♦	♦	♦	♦		♦	Test Control
Faulty Defrost Thermostat													♦	♦	♦	♦	♦	♦	♦	Test Defrost Thermostat
Flowrator Not Seating Properly								●									●	●		Check Flowrator & Seat or Replace Flowrator

● Cooling or Heating Cycle (Heat Pump) ♦ Heating Cycle Only (Heat Pump)

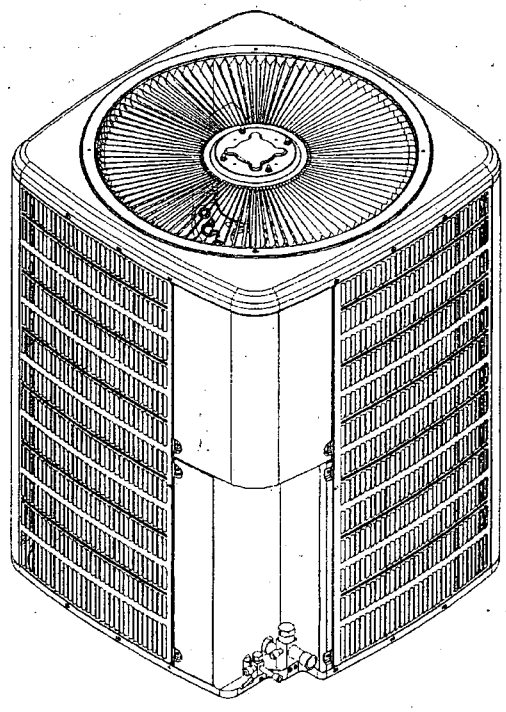
For detailed service information refer to the Remote Condensing Unit Service manual.

Goodman®

REPAIR PARTS

GSH 13 SEER
Remote Heat Pump Units

GSH130181AA
GSH130191AA
GSH130241AA
GSH130251AA
GSH130301AA
GSH130311AA
GSH130361AA
GSH130363AA
GSH130421AA
GSH130481AA
GSH130483AA
GSH130484AA
GSH130601AA
GSH130603AA
GSH130604AA



Made in the USA by:
Goodman Manufacturing Company, L.P.
2550 North Loop West, Suite 400
Houston Texas 77092

www.goodmanmfg.com

RP-355F
October 2006

This manual replaces RP-355E.

This manual is to be used by qualified technicians only.

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OBH - O&M 504

ROA_01642

Important Information

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Functional Parts List ..... 3 - 4

Illustration and Parts ..... 6 - 13

Views shown are for parts illustrations only, not servicing procedures

Rev. F: Added models GSH130603AA and GSH130604AA.

Text Codes:

AR - As Required
NA - Not Available
NS - Not Shown
00000000 - See Note
QTY - Quantity Example (QTY 3) (If Quantity not shown, Quantity = 1)
M - Model Example (M1) (If M Code not shown, then part is used on all Models)

Expanded Model Nomenclature:

Example
M1 - Model#1
M2 - Model#2
M3 - Model#3

Goodman Manufacturing Company, L.P. is not responsible for personal injury or property damage resulting from improper service. Review all service information before beginning repairs.

Warranty service must be performed by an authorized technician, using authorized factory parts. If service is required after the warranty expires, Goodman Manufacturing Company, L.P. also recommends contacting an authorized technician and using authorized factory parts.

Goodman Manufacturing Company, L.P. reserves the right to discontinue, or change at any time, specifications or designs without notice or without incurring obligations. Goodman® brand products are proudly made in the USA.

For assistance within the U.S.A. contact:
Consumer Affairs Department
Goodman Manufacturing Company, L.P.
7401 Security Way
Houston, Texas 77040
877-254-4729-Telephone
713-863-2382-Facsimile

For assistance outside the U.S.A. contact:
International Division
Goodman Manufacturing Company, L.P.
7401 Security Way
Houston, Texas 77040
713-861-2500-Telephone
713-863-2382-Facsimile

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Functional Parts

Part No:	Description:
B1226206	ACCUMULATOR (M1, M2, M3, M4, M5, M6)
B1226207	ACCUMULATOR (M7, M8, M9, M10, M11, M12, M13, M14, M15)
0201R00070S	ASSY, SERVICE COIL (M9)
0201R00064	ASSY, SERVICE COIL (M2)
0201R00066	ASSY, SERVICE COIL (M6)
0201R00058S	ASSY, SERVICE COIL (M4)
0201R00053S	ASSY, SERVICE COIL (M14, M15)
0201R00068S	ASSY, SERVICE COIL (M10, M11, M12)
1362203	ASSY, SERVICE COIL (M7, M8)
1362203	ASSY, SERVICE COIL (M5)
1362207	ASSY, SERVICE COIL (M3)
1362200	ASSY, SERVICE COIL (M1)
1362206	ASSY, SERVICE COIL (M13)
B1219204	BI-FLOW FILTER DRIER
B945650	CAPACITOR 5/370 (M8, M11, M12, M14, M15)
B94578700	CAPACITOR 30/5/370 (M2, M3)
B94575300S	CAPACITOR 35/5/370 (M1, M4, M6)
B94575400	CAPACITOR 35/5/440 (M7)
B94575500	CAPACITOR 40/5/370 (M5)
B94577400	CAPACITOR 50/5/370 (M9)
B94575900S	CAPACITOR 55/5/370 (M10)
CAP050800370RT	CAPACITOR 80/5/370 (M13)
CR14K7PFV970	COMPRESSOR, CR14K7PFV270 (M1)
CR19K7PFV970	COMPRESSOR, CR19K7PFV270 (M3)
CR24K7PFV970	COMPRESSOR, CR24K7PFV270 (M5)
CR28K7PFV970	COMPRESSOR, CR28K7PFV270 (M7)
CR28K7TF5970	COMPRESSOR, CR28K7TF5270 (M8)
ZR16K4PFV930	COMPRESSOR, ZR16K4PFV230 (M2)
ZR22K4PFV930	COMPRESSOR, ZR22K4PFV230 (M4)
ZR24K4PFV930	COMPRESSOR, ZR24K4PFV230 (M6)
ZR36K3PFV930	COMPRESSOR, ZR36K3PFV230 (M9)
ZR40K3PFV930	COMPRESSOR, ZR40K3PFV230 (M10)
ZR40K3TF5230	COMPRESSOR, ZR40K3TF5230 (M11)
ZR40K3TFD230	COMPRESSOR, ZR40K3TFD230 (M12)
ZR52K3PFV930	COMPRESSOR, ZR52K3PFV230 (M13)
ZR54K3TF5930	COMPRESSOR, ZR54K3TF5230 (M14)
ZR54K3TFD930	COMPRESSOR, ZR54K3TFD230 (M15)
B1370803	DEFROST THERMOSTAT
B1226008S	DEFROST TIMER
B1789873	FLOW CHECK PISTON KIT (M7, M8)
B1789861	FLOW CHECK PISTON KIT (M3, M4)
B1789852	FLOW CHECK PISTON KIT (M1, M2)
B1789882	FLOW CHECK PISTON KIT (M9)
B1789865	FLOW CHECK PISTON KIT (M6)
B1789893	FLOW CHECK PISTON KIT (M13, M14, M15)
B1789884	FLOW CHECK PISTON KIT (M10, M11, M12)
B1789868	FLOW CHECK PISTON KIT (M5)
0162M00032	FLOWRATOR-3 ST TUBE .046 (M4)
0162M00013P	FLOWRATOR-4 ST TUBE .039 (M1, M2)
0162M00015P	FLOWRATOR-4 ST TUBE .049 (M5, M6)
0162M00014P	FLOWRATOR-6 ST TUBE .043 (M3)
0162M00016P	FLOWRATOR-6 ST TUBE .055 (M7, M8)
0162M00017P	FLOWRATOR-6 ST TUBE .062 (M9)
0162M00037	FLOWRATOR-8 .188 ST TUBE .071 (M14, M15)
0162M00038	FLOWRATOR-8 .188 ST TUBE .076 (M13)
0162M00018P	FLOWRATOR-8 ST TUBE .065 (M10, M11, M12)
B1360719	LOW PRESSURE SWITCH
0131M00014PS	MOTOR 1/4 HP, 8 PL, 1 SP (M7, M8, M9, M10, M11)
0131M00022	MOTOR 1/4 HP, 8 PL, 460V (M12)
0131M00023	MOTOR 1/6 HP, 8 PL 460V (M15)
0131M00016PS	MOTOR 1/6 HP, 8 PL, 1 SP (M1, M2, M3, M4, M5, M6)
0131M00012PS	MOTOR 1/6 HP, 8 PL, 1 SP (M13, M14)
B1219301	MUFFLER 1/2 X 1/2 (M1, M3, M5, M7, M8)
B1227315S	REVERSING VALVE (M1, M2, M3, M4)
B1227317S	REVERSING VALVE (M7, M8, M9, M10, M11, M12, M13, M14, M15)
B1227316S	REVERSING VALVE (M5, M6)
B1225022S	SOLENOID COIL
B1787000	VALVE CORE
0151R00002P	VALVE, SERVICE 3/4" OPEN LEFT (M1, M2, M3, M4, M5, M6)
B12825171	VALVE, SERVICE 3/8" OPEN
0151R00003P	VALVE, SERVICE 7/8" OPEN LEFT (M7, M8, M9, M10, M11, M12, M13, M14, M15)

Functional Parts

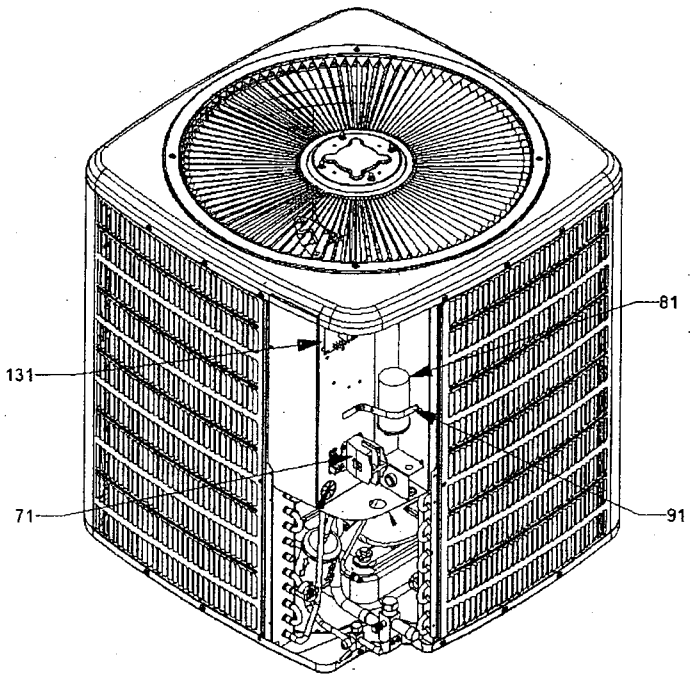
Part No:	Description:
SPECIAL PARTS	
IO-259B	INSTALLATION INSTRUCTIONS
0161R00009P	NAMEPLATE, GOODMAN
RP-355F	REPAIR PARTS MANUAL

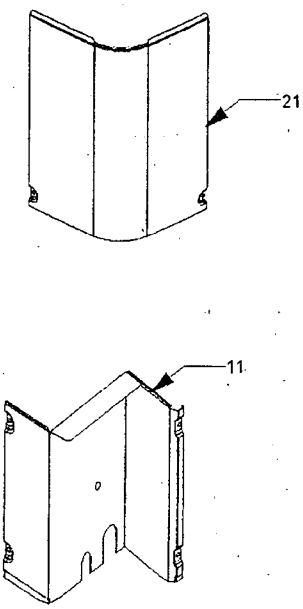
Expanded Model Nomenclature

M1 - GSH130181AA
M2 - GSH130191AA
M3 - GSH130241AA
M4 - GSH130251AA
M5 - GSH130301AA
M6 - GSH130311AA
M7 - GSH130361AA
M8 - GSH130363AA
M9 - GSH130421AA
M10 - GSH130481AA
M11 - GSH130483AA
M12 - GSH130484AA
M13 - GSH130601AA
M14 - GSH130603AA
M15 - GSH130604AA

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Control Cover/ Control Box





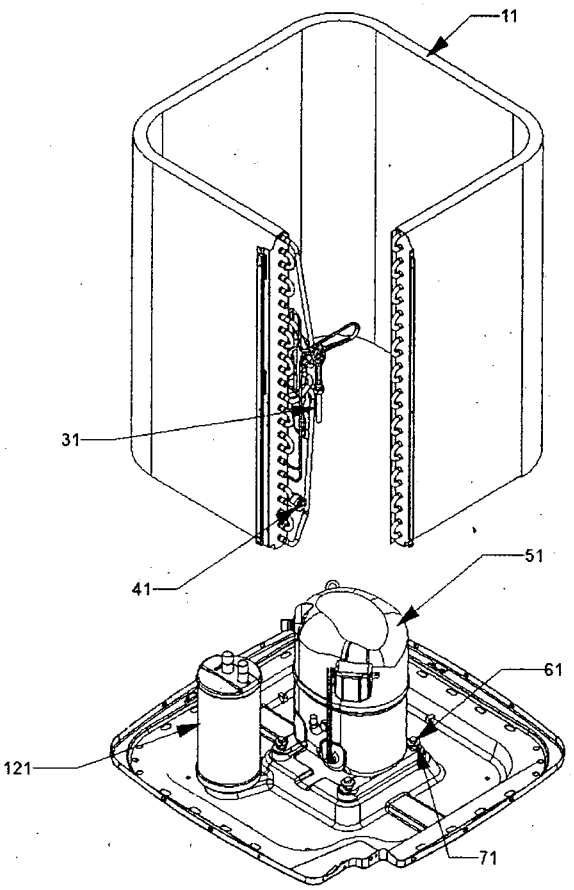
Control Cover/ Control Box

Ref. No:	Part No:	Description:
Image 1:		
11	4400201PDG	PANEL, LOWER ACCESS (M1, M2, M4, M9)
11	4400202PDG	PANEL, LOWER ACCESS (M5, M6, M10, M11, M12, M13, M14, M15)
11	4400203PDG	PANEL, LOWER ACCESS (M3)
11	4400205PDG	PANEL, LOWER ACCESS (M7, M8)
21	4400064PDG	CONTROL COVER
71	B1360321	CONTACTOR 25 A,125LRA,1P,277V (M1, M2, M3, M4, M5, M6)
71	B1360315	CONTACTOR 25 AMP, 3P, 24V (M8, M11, M12, M14, M15)
71	B1360324	CONTACTOR 30 AMP, 150 LRA, 277V (M7, M9, M10)
71	B1360305	CONTACTOR 40 AMP, 240V (M13)
81	B945650	CAPACITOR 5/370 (M8, M11, M12, M14, M15)
81	B94578700	CAPACITOR 30/5/370 (M2, M3)
81	B94575300S	CAPACITOR 35/5/370 (M1, M4, M6)
81	B94575400	CAPACITOR 35/5/440 (M7)
81	B94575500	CAPACITOR 40/5/370 (M5)
81	B94577400	CAPACITOR 50/5/370 (M9)
81	B94575900S	CAPACITOR 55/5/370 (M10)
81	CAP050800370RT	CAPACITOR 80/5/370 (M13)
91	4400065	STRAP, CAPACITOR (M1, M2, M3, M4, M5, M6, M7, M9, M10, M13)
91	4400066	STRAP, CAPACITOR (M8, M11, M12, M14, M15)
131	B1226008S	DEFROST TIMER
NS	0161R00009P	NAMEPLATE, GOODMAN

Expanded Model Nomenclature

M1 - GSH130181AA
M2 - GSH130191AA
M3 - GSH130241AA
M4 - GSH130251AA
M5 - GSH130301AA
M6 - GSH130311AA
M7 - GSH130361AA
M8 - GSH130363AA
M9 - GSH130421AA
M10 - GSH130481AA
M11 - GSH130483AA
M12 - GSH130484AA
M13 - GSH130601AA
M14 - GSH130603AA
M15 - GSH130604AA

Basepan/Compressor/Coil Assembly



Basepan/Compressor/Coil Assembly

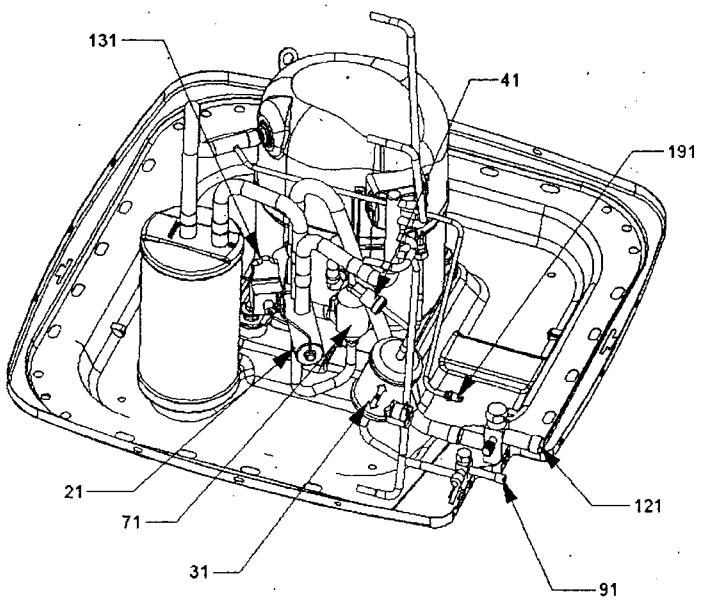
Ref. No:	Part No:	Description:
Image 1:		
11	0201R00053S	ASSY, SERVICE COIL (M14, M15)
11	0201R00058S	ASSY, SERVICE COIL (M4)
11	0201R00064	ASSY, SERVICE COIL (M2)
11	0201R00066	ASSY, SERVICE COIL (M6)
11	0201R00068S	ASSY, SERVICE COIL (M10, M11, M12)
11	0201R00070S	ASSY, SERVICE COIL (M9)
11	1362200	ASSY, SERVICE COIL (M1)
11	1362203	ASSY, SERVICE COIL (M7, M8)
11	1362203	ASSY, SERVICE COIL (M5)
11	1362206	ASSY, SERVICE COIL (M13)
11	1362207	ASSY, SERVICE COIL (M3)
31	0162M00032	FLOWRATOR-3 ST TUBE .046 (M4)
31	0162M00013P	FLOWRATOR-4 ST TUBE .039 (M1, M2)
31	0162M00015P	FLOWRATOR-4 ST TUBE .049 (M5, M6)
31	0162M00014P	FLOWRATOR-6 ST TUBE .043 (M3)
31	0162M00016P	FLOWRATOR-6 ST TUBE .055 (M7, M8)
31	0162M00017P	FLOWRATOR-6 ST TUBE .062 (M9)
31	0162M00037	FLOWRATOR-8 .188 ST TUBE .071 (M14, M15)
31	0162M00038	FLOWRATOR-8 .188 ST TUBE .076 (M13)
31	0162M00018P	FLOWRATOR-8 ST TUBE .065 (M10, M11, M12)
41	B1370803	DEFROST THERMOSTAT
51	CR14K7PFV970	COMPRESSOR, CR14K7PFV270 (M1)
51	CR19K7PFV970	COMPRESSOR, CR19K7PFV270 (M3)
51	CR24K7PFV970	COMPRESSOR, CR24K7PFV270 (M5)
51	CR28K7PFV970	COMPRESSOR, CR28K7PFV270 (M7)
51	CR28K7TF5970	COMPRESSOR, CR28K7TF5270 (M8)
51	ZR16K4PFV930	COMPRESSOR, ZR16K4PFV230 (M2)
51	ZR22K4PFV930	COMPRESSOR, ZR22K4PFV230 (M4)
51	ZR24K4PFV930	COMPRESSOR, ZR24K4PFV230 (M6)
51	ZR36K3PFV930	COMPRESSOR, ZR36K3PFV230 (M9)
51	ZR40K3PFV930	COMPRESSOR, ZR40K3PFV230 (M10)
51	ZR40K3TF5230	COMPRESSOR, ZR40K3TF5230 (M11)
51	ZR40K3TFD230	COMPRESSOR, ZR40K3TFD230 (M12)
51	ZR52K3PFV930	COMPRESSOR, ZR52K3PFV230 (M13)
51	ZR54K3TF5930	COMPRESSOR, ZR54K3TF5230 (M14)
51	ZR54K3TFD930	COMPRESSOR, ZR54K3TFD230 (M15)
61	M0221641	SCREW-SHOULDER TF (QTY 4)
71	B1339530	GROMMET, COMPRESSOR (M1, M3, M5, M7, M8)
71	B1339533	GROMMET, COMPRESSOR (M2, M4, M6, M9, M10, M11, M12, M13, M14, M15)
121	B1226206	ACCUMULATOR (M1, M2, M3, M4, M5, M6)
121	B1226207	ACCUMULATOR (M7, M8, M9, M10, M11, M12, M13, M14, M15)

Ref. No:	Part No:	Description:

Expanded Model Nomenclature

M1 - GSH130181AA
M2 - GSH130191AA
M3 - GSH130241AA
M4 - GSH130251AA
M5 - GSH130301AA
M6 - GSH130311AA
M7 - GSH130361AA
M8 - GSH130363AA
M9 - GSH130421AA
M10 - GSH130481AA
M11 - GSH130483AA
M12 - GSH130484AA
M13 - GSH130601AA
M14 - GSH130603AA
M15 - GSH130604AA

Tubing Assembly



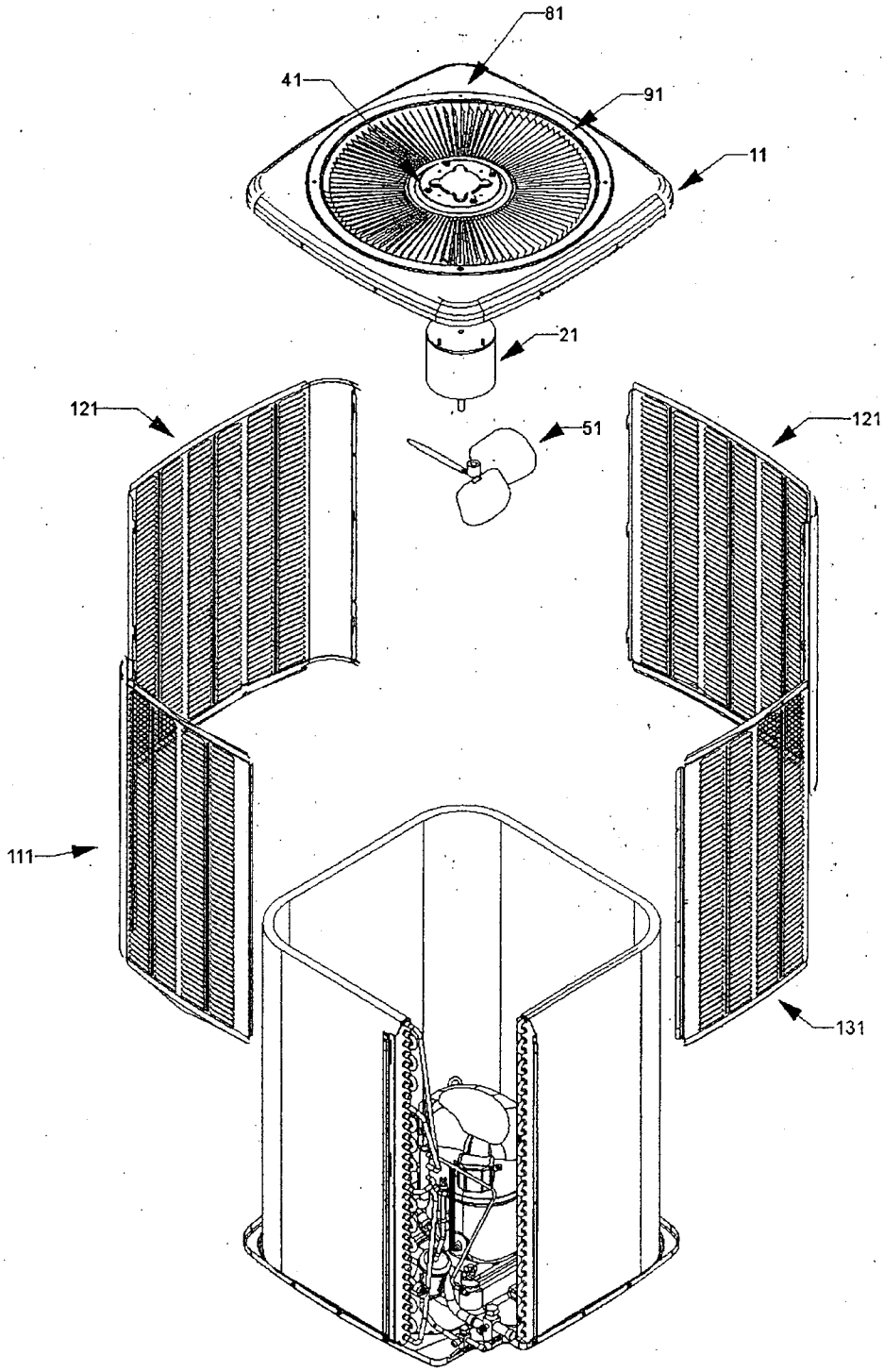
Tubing Assembly

Ref. No:	Part No:	Description:
Image 1:		
21	B1227315S	REVERSING VALVE (M1, M2, M3, M4)
21	B1227316S	REVERSING VALVE (M5, M6)
21	B1227317S	REVERSING VALVE (M7, M8, M9, M10, M11, M12, M13, M14, M15)
31	B1219204	BI-FLOW FILTER DRIER
51	B1360719	LOW PRESSURE SWITCH
71	B1219301	MUFFLER 1/2 X 1/2 (M1, M3, M5, M7, M8)
91	0151R00002P	VALVE, SERVICE 3/4" OPEN LEFT (M1, M2, M3, M4, M5, M6)
121	B12825171	VALVE, SERVICE 3/8" OPEN
121	0151R00003P	VALVE, SERVICE 7/8" OPEN LEFT (M7, M8, M9, M10, M11, M12, M13, M14, M15)
131	B1225020	SOLENOID COIL CORD W/1/4"TERMINAL
191	B1787000	VALVE CORE
NS	B1789852	FLOW CHECK PISTON KIT (M1, M2)
NS	B1789861	FLOW CHECK PISTON KIT (M3, M4)
NS	B1789865	FLOW CHECK PISTON KIT (M6)
NS	B1789868	FLOW CHECK PISTON KIT (M5)
NS	B1789873	FLOW CHECK PISTON KIT (M7, M8)
NS	B1789882	FLOW CHECK PISTON KIT (M9)
NS	B1789884	FLOW CHECK PISTON KIT (M10, M11, M12)
NS	B1789893	FLOW CHECK PISTON KIT (M13, M14, M15)
NS	B1225022S	SOLENOID COIL

Expanded Model Nomenclature

M1 - GSH130181AA
M2 - GSH130191AA
M3 - GSH130241AA
M4 - GSH130251AA
M5 - GSH130301AA
M6 - GSH130311AA
M7 - GSH130361AA
M8 - GSH130363AA
M9 - GSH130421AA
M10 - GSH130481AA
M11 - GSH130483AA
M12 - GSH130484AA
M13 - GSH130601AA
M14 - GSH130603AA
M15 - GSH130604AA

Cabinet Top/Side Panels



Cabinet Top/Side Panels

Ref. No:	Part No:	Description:
Image 1:		
11	4400067PDG	PANEL, LOUVER TOP (M1, M2, M3, M4, M5, M6, M7, M8, M9, M10, M11, M12)
11	4400092PDG	PANEL, LOUVER TOP, 35" (M13, M14, M15)
21	0131M00014PS	MOTOR 1/4 HP, 8 PL, 1 SP (M7, M8, M9, M10, M11)
21	0131M00022	MOTOR 1/4 HP, 8 PL, 460V (M12)
21	0131M00023	MOTOR 1/6 HP, 8 PL 460V (M15)
21	0131M00012PS	MOTOR 1/6 HP, 8 PL, 1 SP (M13, M14)
21	0131M00016PS	MOTOR 1/6 HP, 8 PL, 1 SP (M1, M2, M3, M4, M5, M6)
41	B1783803	ACORN NUT (QTY 4)
51	B1086775S	FAN BLADE (M2, M3, M4, M5, M6)
51	0150M00002P	FAN BLADE 22" (M1)
51	10625738S	FAN BLADE 26" ALUM CCW (M13, M14, M15)
51	B1086764S	FAN BLADE TYPE 2 (M7, M8, M9, M12)
51	B1086765S	FAN BLADE TYPE 3 (M10, M11)
81	B1393530	SCREW, HWH, 10X1/2, A, YZD, SLOT, SR (QTY 4)
91	0161R00006P	RING, VENTURI 29" (M1, M2, M3, M4, M5, M6, M7, M8, M9, M10, M11, M12)
91	0161R00007P	RING, VENTURI 35" (M13, M14, M15)
111	4400130PDG	PANEL, LOUVER SIDE (M5, M6, M10, M11, M12)
111	4400131PDG	PANEL, LOUVER SIDE (M7, M8)
111	4400137PDG	PANEL, LOUVER SIDE (M13, M14, M15)
111	4400160PDG	PANEL, LOUVER SIDE (M1, M2, M4, M9)
111	4400161PDG	PANEL, LOUVER SIDE (M3)
121	4400132PDG	PANEL, LOUVER SIDE (M5, M6, M10, M11, M12)
121	4400133PDG	PANEL, LOUVER SIDE (M7, M8)
121	4400139PDG	PANEL, LOUVER SIDE (M13, M14, M15)
121	4400167PDG	PANEL, LOUVER SIDE (M1, M2, M4, M9)
121	4400168PDG	PANEL, LOUVER SIDE (M3)
131	4400134PDG	PANEL, LOUVER SIDE (M5, M6, M10, M11, M12)
131	4400135PDG	PANEL, LOUVER SIDE (M7, M8)
131	4400141PDG	PANEL, LOUVER SIDE (M13, M14, M15)
131	4400174PDG	PANEL, LOUVER SIDE (M1, M2, M4, M9)
131	4400175PDG	PANEL, LOUVER SIDE (M3)
NS	0161R00002P	CONDUIT (M1, M2, M3, M4, M5, M6, M7, M8, M9, M10, M11, M12)
NS	0161R00004P	CONDUIT (M13, M14, M15)
NS	B1778800	CONDUIT-1/2" PVC

Ref. No:	Part No:	Description:

Expanded Model Nomenclature

M1 - GSH130181AA
M2 - GSH130191AA
M3 - GSH130241AA
M4 - GSH130251AA
M5 - GSH130301AA
M6 - GSH130311AA
M7 - GSH130361AA
M8 - GSH130363AA
M9 - GSH130421AA
M10 - GSH130481AA
M11 - GSH130483AA
M12 - GSH130484AA
M13 - GSH130601AA
M14 - GSH130603AA
M15 - GSH130604AA

GENERAL HEATING & AIR

AIR HANDLER

ROA_01655

VERTICAL MOUNT AIR HANDLERS

INSTALLATION INSTRUCTIONS

Goodman Manufacturing Company, L.P. © 2005-2006
2550 North Loop West, Suite 400, Houston, TX 77092
www.goodmanmfg.com -or- www.amana-hac.com
P/N: IO-281A Date: June 2006

Important Safety Instructions

The following symbols and labels are used throughout this manual to indicate immediate or potential safety hazards. It is the owner's and installer's responsibility to read and comply with all safety information and instructions accompanying these symbols. Failure to heed safety information increases the risk of personal injury, property damage, and/or product damage.

⚠ WARNING

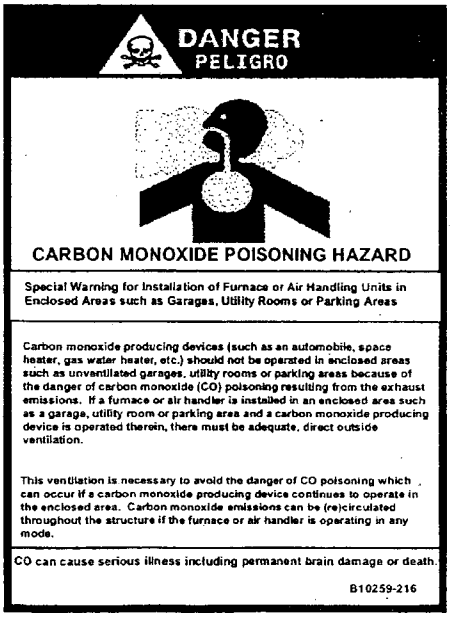
Hazards or unsafe practices could result in property damage, product damage, severe personal injury or death.

⚠ CAUTION

Hazards or unsafe practices which may result in property damage, product damage, personal injury or death.

⚠ WARNING

HIGH VOLTAGE!
Disconnect ALL power before servicing or installing this unit. Multiple power sources may be present. Failure to do so may cause property damage, personal injury or death.



⚠ WARNING

ONLY individuals meeting the requirements of an "Entry Level Technician" as specified by the Air Conditioning and Refrigeration Institute (ARI) may use this information. Attempting to install or repair this unit without such background may result in product damage, personal injury, or death.

⚠ WARNING

Do not connect to or use any device that is not design certified by Goodman for use with this unit. Serious property damage, personal injury, reduced unit performance and/OR hazardous conditions may result from the use of such non-approved devices.

⚠ WARNING

To prevent the risk of property damage, personal injury, or death, do not store combustible materials or use gasoline or other flammable liquids or vapors in the vicinity of this appliance.

⚠ CAUTION

Have your contractor identify all the various cutoff switches and devices that service this unit. Know where the switch is that will cut off energy to the heating system in the event of overheating.

Shipping Inspection

Upon receiving the product, inspect it for damage from shipment. Shipping damage, and subsequent investigation is the responsibility of the carrier. Verify the model number, specifications, electrical characteristics, and accessories are correct prior to installation. The distributor or manufacturer will not accept claims from dealers for transportation damage or installation of incorrectly shipped units.

Codes & Regulations

This product is designed and manufactured to comply with national codes. Installation in accordance with such codes and/or prevailing local codes/regulations is the responsibility of the installer. The manufacturer assumes no responsibility for equipment installed in violation of any codes or regulations.

The United States Environmental Protection Agency (EPA) has issued various regulations regarding the introduction and disposal of refrigerants. Failure to follow these regulations may harm the environment and can lead to the imposition of substantial fines. These regulations may vary by jurisdiction. A certified technician must perform the installation and service of this product. Should you have any questions please contact the local office of the EPA.

Replacement Parts

When reporting shortages or damages, or ordering repair parts, give the complete product model and serial numbers as stamped on the product. Replacement parts for this product are available through your contractor or local distributor. For the location of your nearest distributor consult the white business pages, the yellow page section of the local telephone book or contact:

SERVICE PARTS DEPARTMENT
GOODMAN MANUFACTURING COMPANY, L.P.
2550 NORTH LOOP WEST, SUITE 400
HOUSTON, TEXAS 77092
(713) 861 – 2500

Pre-Installation Instructions

Carefully read all instructions for the installation prior to installing product. Make sure each step or procedure is understood and any special considerations are taken into account before starting installation. Assemble all tools, hardware and supplies needed to complete the installation. Some items may need to be purchased locally. Make sure everything needed to install the product is on hand before starting.

Before attempting any installation, the following points should be considered:

- Structural strength of supporting members
- Clearances and provision for servicing
- Power supply and wiring
- Air duct connections
- Drain facilities and connections

Application Information

The unit is designed to be installed either recessed into a wall or hanging in a vertical "upflow" position. If units are recessed in a wall, use the holes along the inside of the front flange to attach units to the framing studs. The vertical airhandler comes equipped with an offset hanging bracket attached to the rear of the cabinet for hanging applications.

The airhandler also has a bottom and front return. **Large chassis installations should be installed as front return only.** If the airhandler is to be installed in a bottom return application, discard the drain access panel in bottom of unit. If the airhandler is to be installed in a front return application, remove and discard the front access panel with insulation. The unit is shipped with a filter rack and filter. Remember to inspect, clean and/or replace the filter monthly.

Units are equipped with both a bottom primary and secondary drain. **Both drains must be trapped.** Failure to install a trap could result in condensation overflowing the drain pan resulting in substantial water damage to the nearby area.

To prevent potential sweating and dripping on to finished space, it may be necessary to insulate the condensate drain line located inside the building. Use Armaflex® or similar material.

NOTE: If you intend to install this unit with a "WAD" door it must be mounted 1/4" behind front edge of stud.

Special Instructions

This airhandler comes equipped with an evaporator coil with a check style flowrator assembly, an indoor blower and all necessary internal electrical wiring. For most installations with matching applications, no change to the flowrator orifice is required. However, in mix-matched applications, a flowrator change may be required. See the Goodman piston kit chart or consult your local distributor for details regarding mix-matched orifice sizing. If the mix-match application requires a different piston size, change the piston in the distributor on the indoor coil before installing the coil and follow the procedure in this section.

⚠ WARNING

The evaporator coil is shipped from the factory with approximately 90 PSI tracer gas charge. Use caution when relieving pressure.

⚠ CAUTION

To prevent feeder tube damage, hold the distributor body with a 3/4" open end wrench when removing or replacing the 13/16" flare nut.

1. Remove the valve core to allow high pressure tracer gas to escape. No gas indicates a possible leak.
2. Remove the 13/16" flare nut and tailpiece.
3. Unsweat the access fitting on the tailpiece
4. Remove the check piston to verify it is correct and then replace the piston. See piston kit chart in instructions.
5. Unsweat the cap on the suction line.
6. Slide the 13/16" flare nut over the tailpiece.
7. Braze tailpiece to the lineset liquid tube.
8. Insert the suction line into the connection, slide the insulation at least 18" away from the braze joint. Braze suction line.
9. **AFTER THE TAILPIECE HAS COOLED**, confirm position of the white Teflon® seal and hand tighten the 13/16" flare nut.
10. Torque the 13/16" flare nut to 10-30 ft-lbs. Do not overtighten.

⚠ CAUTION

Excessive torque can cause orifices to stick. Use the proper torque settings when tightening orifices.

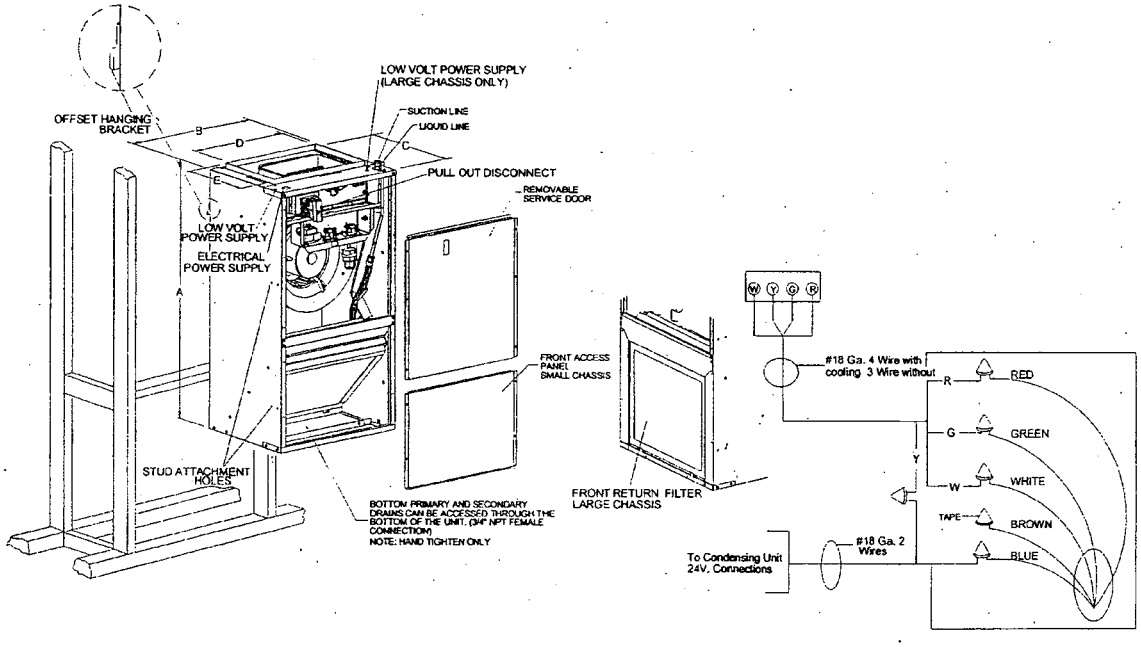
11. Replace suction line insulation.
12. After installation, evacuation and charging of the low side is complete, check fittings for leaks.

NOTE: With the piston in the distributor, the seal end should point inside the distributor body and should not be seen when looking into the end of distributor. Make sure the piston is free to rotate, and move up and down in the distributor body.

MAINTENANCE

Periodic Checkup and Service

This unit is designed to provide many years of dependable, trouble-free comfort when properly maintained. Proper maintenance will consist of annual checkups and cleaning of the internal electrical and heat transfer components by a qualified service technician. Failure to provide periodic checkup and cleaning can result in excessive operating cost and/or equipment malfunction.



CABINET DIMENSIONS		
	LARGE CHASSIS 3.0 TON	SMALL CHASSIS 1.5 AND 2.0 TON
A	36	36
B	24	20 3/16
C	21	16 1/8
D	19 7/8	16
E	15 7/8	11

NOTE: Thermostat heat anticipator setting is 0.2.

NOTE: SPECIFICATIONS AND PERFORMANCE DATA LISTED HEREIN ARE SUBJECT TO CHANGE WITHOUT NOTICE

Quality Makes the Difference!

All of our systems are designed and manufactured with the same high quality standards regardless of size or efficiency. We have designed these units to significantly reduce the most frequent causes of product failure. They are simple to service and forgiving to operate. We use quality materials and components. Finally, every unit is run tested before it leaves the factory. That's why we know. . .**There's No Better Quality.**

Visit our websites at **www.goodmanmfg.com** or **amana-hac.com** for information on:

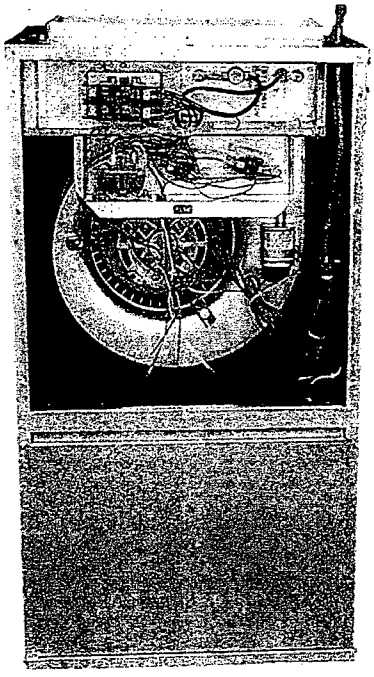
- Products
- Warranties
- Customer Services
- Parts
- Contractor Programs and Training
- Financing Options

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REPAIR PARTS

13 SEER AWUF Air Handlers

AWUF18051AA
AWUF18081AA
AWUF24051AA
AWUF24081AA
AWUF24101AA
AWUF36051AA
AWUF36081AA
AWUF36101AA



Made in the USA by:
Goodman Manufacturing Company, L.P.
2550 North Loop West, Suite 400
Houston Texas 77092

www.goodmanmfg.com www.amana-hac.com

RP-373A
Revision 0
January 2006

This manual replaces RP-373

This manual is to be used by qualified technicians only.

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ROA_01660

Important Information

Index

Functional Parts List 3

Illustration and Parts ..... 4 - 7

Views shown are for parts illustrations only, not servicing procedures

Rev. A: Changed flowrator 0162A0002 to BT1369011 on models AWUF36051AA, AWUF36081AA, and AWUF36101AA

Text Codes:

AR - As Required
NA - Not Available
NS - Not Shown
00000000 - See Note
QTY - Quantity Example (QTY 3) (If Quantity not shown, Quantity = 1)
M - Model Example (M1) (If M Code not shown, then part is used on all Models)

Expanded Model Nomenclature:

Example
M1 - Model#1
M2 - Model#2
M3 - Model#3

Goodman Manufacturing Company, L.P. is not responsible for personal injury or property damage resulting from improper service. Review all service information before beginning repairs.

Warranty service must be performed by an authorized technician, using authorized factory parts. If service is required after the warranty expires, Goodman Manufacturing Company, L.P. also recommends contacting an authorized technician and using authorized factory parts.

Goodman Manufacturing Company, L.P. reserves the right to discontinue, or change at any time, specifications or designs without notice or without incurring obligations. Goodman® brand products are proudly made in the USA.

For assistance within the U.S.A. contact:
Consumer Affairs Department
Goodman Manufacturing Company, L.P.
7401 Security Way
Houston, Texas 77040
877-254-4729-Telephone
713-863-2382-Facsimile

For assistance outside the U.S.A. contact:
International Division
Goodman Manufacturing Company, L.P.
7401 Security Way
Houston, Texas 77040
713-861-2500-Telephone
713-863-2382-Facsimile

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Functional Parts

Part No:	Description:
3796007S	ASSY, COIL, TUBING (M3, M4, M5)
0270A00046P	ASSY, COIL, TUBING (M1, M2)
0270A00100	ASSY, COIL, TUBING (M6, M7, M8)
B1370735S	BOARD, TIME DELAY
BT9458003	CAPACITOR, 7.5/370
BT1753510S	DISCONNECT, PULL-OUT
DSK-01	DRIP SHEILD KIT, LARGE (M6, M7, M8)
DSK-00	DRIP SHEILD KIT, SMALL (M1, M2, M3, M4, M5)
0162A00000P	FLOWRATOR / DISTRIBUTOR ASSY (M1, M2)
BT1369011	FLOWRATOR / DISTRIBUTOR ASSY (M6, M7, M8)
BT1420034	HEATER ELEMENT, 10KW, LARGE (M8)
BT1420031	HEATER ELEMENT, 10KW, SMALL (M5)
BT1420032	HEATER ELEMENT, 5KW, LARGE (M6)
BT1420029	HEATER ELEMENT, 5KW, SMALL (M1, M3)
BT1420033	HEATER ELEMENT, 8KW, LARGE (M7)
BT1420030	HEATER ELEMENT, 8KW, SMALL (M2, M4)
BT1340031	MOTOR, DIRECT DRIVE, 1/3 HP, 1075 RPM, 2 SPEED (M6, M7, M8)
BT1340030	MOTOR, DIRECT DRIVE, 1/5 HP, 990 RPM, 2 SPEED (M1, M2, M3, M4, M5)
BT1243752	OVERLOAD, PRIMARY, THERMAL (M1, M2, M3, M4, M6, M7, M8)
BT1243754	OVERLOAD, PRIMARY, THERMAL (M5)
BT1243753	OVERLOAD, SECONDARY, THERMAL
BT1256500	SEQUENCER, 5KW (M1, M3, M6)
BT1256501	SEQUENCER, 8-10KW (M2, M4, M5, M7, M8)
BT1141601	TRANSFORMER, 208/230V TO 24V
BT1368008S	WHEEL, BLOWER, 10" X 6" (M3, M4, M5)
B1368042S	WHEEL, BLOWER, 9" X 6" (M1, M2)
B1368036S	WHEEL, BLOWER, 9" X 8" (M6, M7, M8)

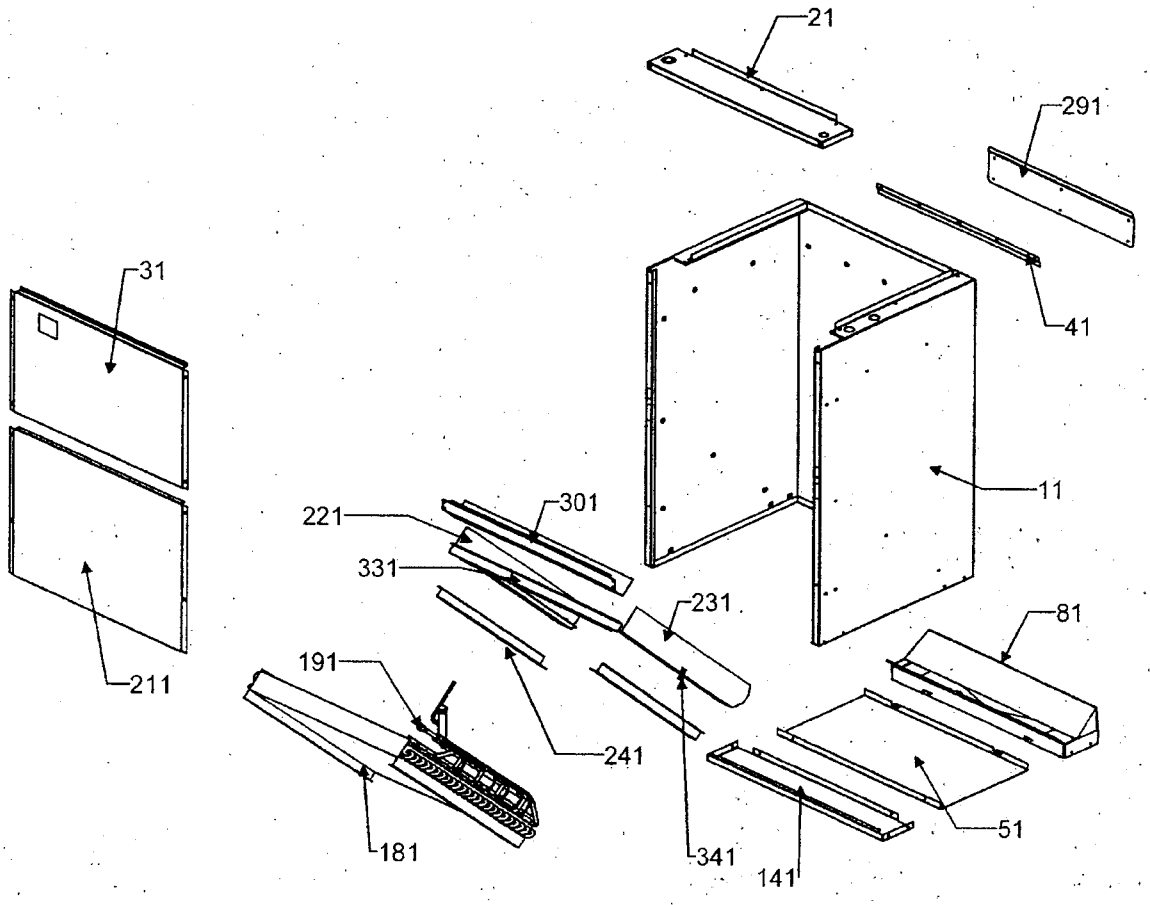
SPECIAL PARTS

IO-281	INSTALLATION INSTRUCTIONS
RP-373	REPAIR PARTS MANUAL

Expanded Model Nomenclature

M1 - AWUF18051AA
M2 - AWUF18081AA
M3 - AWUF24051AA
M4 - AWUF24081AA
M5 - AWUF24101AA
M6 - AWUF36051AA
M7 - AWUF36081AA
M8 - AWUF36101AA

Chassis and Coil Tubing Assy



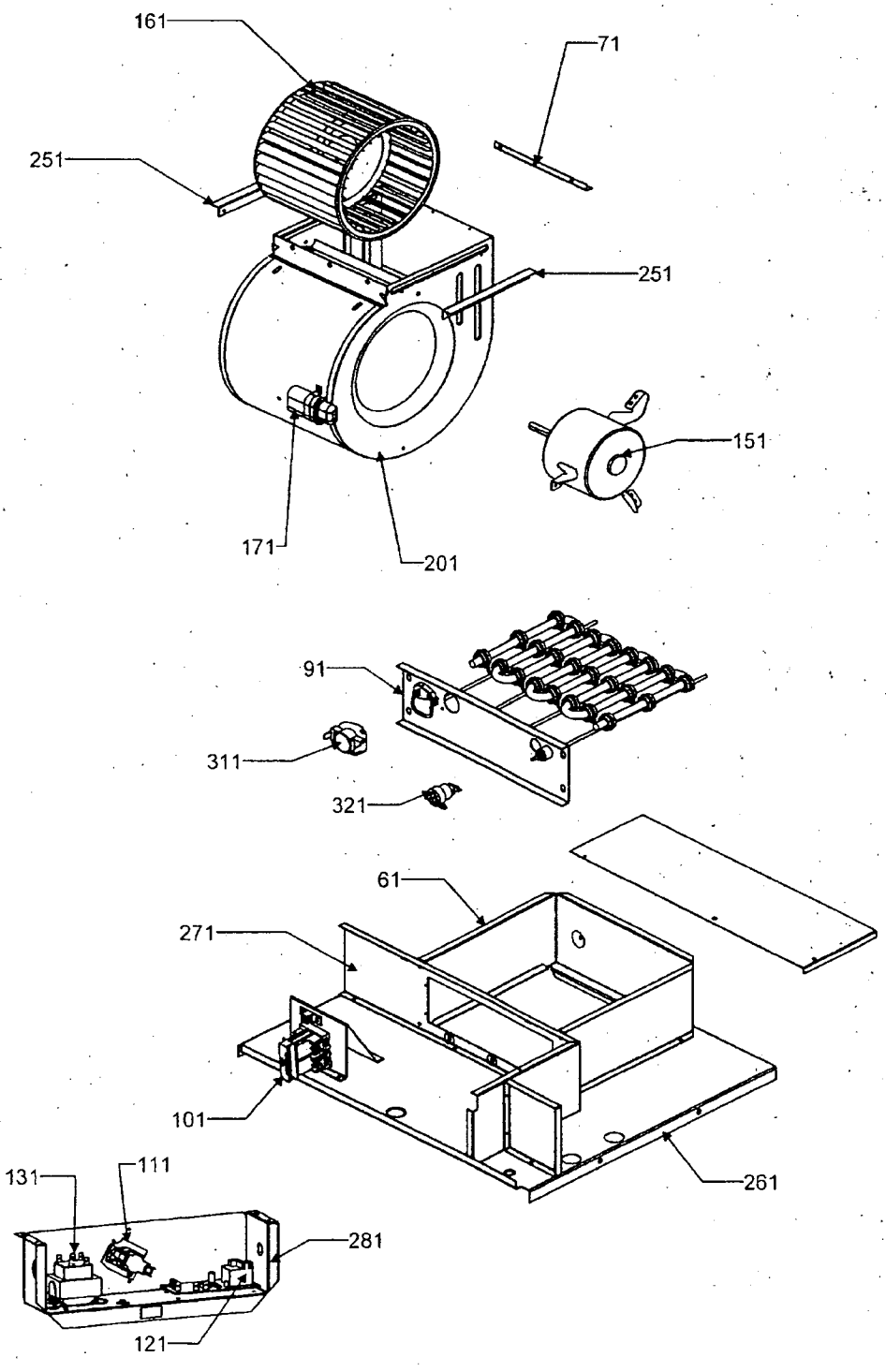
Chassis and Coil Tubing Assy

Ref. No:	Part No:	Description:
Image 1:		
11	3750010	ASSY, WRAPPER, W/INSULATION, LARGE (M6, M7, M8)
11	3750006	ASSY, WRAPPER, W/INSULATION, SMALL (M1, M2, M3, M4, M5)
21	3702105	ASSY, WRAPPER TOP, LARGE (M6, M7, M8)
21	3702104	ASSY, WRAPPER TOP, SMALL (M1, M2, M3, M4, M5)
31	3701535	ASSY, FRONT ACCESS PANEL, LARGE (M6, M7, M8)
31	3701536	ASSY, FRONT ACCESS PANEL, SMALL (M1, M2, M3, M4, M5)
41	3702500	BRACKET, HANGING, LARGE (M6, M7, M8)
41	3702501	BRACKET, HANGING, SMALL (M1, M2, M3, M4, M5)
51	3701500	ASSY, PANEL DRAIN ACCESS, LARGE (M6, M7, M8)
51	3701502	ASSY, PANEL DRAIN ACCESS, SMALL (M1, M2, M3, M4, M5)
81	BT3076501	PAN, DRAIN, LARGE (M6, M7, M8)
81	BT3076500	PAN, DRAIN, SMALL (M1, M2, M3, M4, M5)
141	3702301	ASSY, PANEL, BOTTOM TIE, LARGE (M6, M7, M8)
141	3702303	ASSY, PANEL, BOTTOM TIE, SMALL (M1, M2, M3, M4, M5)
181	0270A00046P	ASSY, COIL, TUBING (M1, M2)
181	0270A00100	ASSY, COIL, TUBING (M6, M7, M8)
181	3796007S	ASSY, COIL, TUBING (M3, M4, M5)
191	BT1369009	ASM, FEEDER TUBE (M3, M4, M5)
191	0162A00000P	FLOWRATOR / DISTRIBUTOR ASSY (M1, M2)
191	BT1369011	FLOWRATOR / DISTRIBUTOR ASSY (M6, M7, M8)
211	3701506	ASSY, PANEL, LOWER FRONT, LARGE (M6, M7, M8)
211	3701505	ASSY, PANEL, LOWER FRONT, SMALL (M1, M2, M3, M4, M5)
221	3701232	GUTTER, RAIL LEFT, LARGE (M6, M7, M8)
221	3701225	GUTTER, RAIL LEFT, SMALL (M1, M2, M3, M4, M5)
231	3701231	GUTTER, RAIL RIGHT, LARGE (M6, M7, M8)
231	3701224	GUTTER, RAIL RIGHT, SMALL (M1, M2, M3, M4, M5)
241	3701243	SUPPORT, FILTER, LARGE (M6, M7, M8)
241	3701203	SUPPORT, FILTER, SMALL (M1, M2, M3, M4, M5)
291	3702800	BRACKET, FIELD HANGING
301	3702301	PLATE, CENTER TIE, LARGE (M6, M7, M8)
301	3702302	PLATE, CENTER TIE, SMALL (M1, M2, M3, M4, M5)
331	3701805	BRACKET, FILTER OFFSET, LARGE (M6, M7, M8)
331	3701802	BRACKET, FILTER OFFSET, SMALL (M1, M2, M3, M4, M5)
341	3701805	BRACKET, OFFSET
NS	DSK-01	DRIP SHEILD KIT, LARGE (M6, M7, M8)
NS	DSK-00	DRIP SHEILD KIT, SMALL (M1, M2, M3, M4, M5)
NS	BT1369604	FILTER, 14 X 18 X 1 (M1, M2, M3, M4, M5)
NS	BT1369606	FILTER, 16 X 20 X 1 (M6, M7, M8)

Expanded Model Nomenclature

M1 - AWUF18051AA
M2 - AWUF18081AA
M3 - AWUF24051AA
M4 - AWUF24081AA
M5 - AWUF24101AA
M6 - AWUF36051AA
M7 - AWUF36081AA
M8 - AWUF36101AA

Blower and Heater Assemblies



Blower and Heater Assemblies

Ref. No:	Part No:	Description:
Image 1:		
61	3701507	COLLAR, HEATER, LARGE (M6, M7, M8)
61	3701522	COLLAR, HEATER, SMALL (M1, M2, M3, M4, M5)
71	3702701	ANGLE, BLOWER, 8.531" (M6, M7, M8)
71	3702700	ANGLE, BLOWER, 9" (M1, M2, M3, M4, M5)
91	BT1420034	HEATER ELEMENT, 10KW, LARGE (M8)
91	BT1420031	HEATER ELEMENT, 10KW, SMALL (M5)
91	BT1420032	HEATER ELEMENT, 5KW, LARGE (M6)
91	BT1420029	HEATER ELEMENT, 5KW, SMALL (M1, M3)
91	BT1420033	HEATER ELEMENT, 8KW, LARGE (M7)
91	BT1420030	HEATER ELEMENT, 8KW, SMALL (M2, M4)
101	BT1753510S	DISCONNECT, PULL-OUT
111	BT1256500	SEQUENCER, 5KW (M1, M3, M6)
111	BT1256501	SEQUENCER, 8-10KW (M2, M4, M5, M7, M8)
121	B1370735S	BOARD, TIME DELAY
131	BT1141601	TRANSFORMER, 208/230V TO 24V
151	BT1340031	MOTOR, DIRECT DRIVE, 1/3 HP, 1075 RPM, 2 SPEED (M6, M7, M8)
151	BT1340030	MOTOR, DIRECT DRIVE, 1/5 HP, 990 RPM, 2 SPEED (M1, M2, M3, M4, M5)
161	BT1368008S	WHEEL, BLOWER, 10" X 6" (M3, M4, M5)
161	B1368042S	WHEEL, BLOWER, 9" X 6" (M1, M2)
161	B1368036S	WHEEL, BLOWER, 9" X 8" (M6, M7, M8)
171	BT9458003	CAPACITOR, 7.5/370
201	3750113	ASSY, HOUSING, BLOWER (M6, M7, M8)
201	3750110	ASSY, HOUSING, BLOWER, (M1, M2)
201	3750111	ASSY, HOUSING, BLOWER, (M3, M4, M5)
251	3702700	BLOWER, ANGLE (M1, M2, M3, M4, M5)
251	3702705	BLOWER, ANGLE (M6, M7, M8)
261	3751446	BLOWER, DECK, 10 KW, LARGE (M8)
261	3751443	BLOWER, DECK, 10 KW, SMALL (M5)
261	3751444	BLOWER, DECK, 5KW, LARGE (M6)
261	3751441	BLOWER, DECK, 5KW, SMALL (M1, M3)
261	3751445	BLOWER, DECK, 8KW, LARGE (M7)
261	3751442	BLOWER, DECK, 8KW, SMALL (M2, M4)
271	3700807	PANEL, HEATER MOUNTING, LARGE (M6, M7, M8)
271	3700805	PANEL, HEATER MOUNTING, SMALL (M1, M2, M3, M4, M5)
281	3700808	BOX, ELECTRIC JUNCTION
311	BT1243752	OVERLOAD, PRIMARY, THERMAL (M1, M2, M3, M4, M6, M7, M8)
311	BT1243754	OVERLOAD, PRIMARY, THERMAL (M5)
321	BT1243753	OVERLOAD, SECONDARY, THERMAL
NS	3739000	BLOWER, CUT-OFF (M1, M2, M3, M4, M5)
NS	3739002	BLOWER, CUT-OFF (M6, M7, M8)
NS	B821700	BOOT, CAPACITOR
NS	3784800	STRAP, CAPACITOR

Expanded Model Nomenclature

M1 - AWUF18051AA
M2 - AWUF18081AA
M3 - AWUF24051AA
M4 - AWUF24081AA
M5 - AWUF24101AA
M6 - AWUF36051AA
M7 - AWUF36081AA
M8 - AWUF36101AA

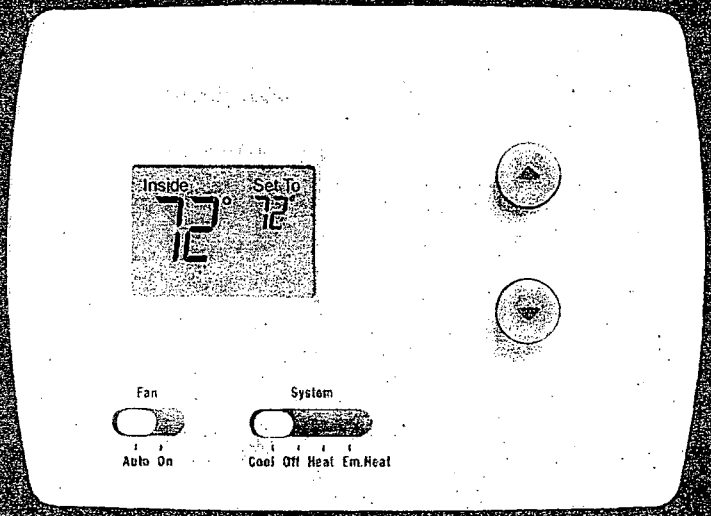
GENERAL HEATING & AIR

THERMOSTAT

ROA_01667

Honeywell

Installation Guide



PRO *TH3210D*

Non-programmable Digital Thermostat

OBH - O&M 530

ROA_01668

Product Application

This thermostat provides electronic control of 24 VAC heat pump systems with auxiliary heat (2 heat/1 cool).

Power Type

- Battery power
- Common wire
- Common wire with battery backup

System Settings

- Heat, Off, Cool, Em Heat

Fan Settings

- Auto, On

Must be installed by a trained, experienced technician

- Read these instructions carefully. Failure to follow these instructions can damage the product or cause a hazardous condition.
- Check the ratings in this booklet to verify that this product is suitable for your application (see page 11).
- Always test for proper operation after installation (see pages 7-8).



CAUTION: ELECTRICAL HAZARD
Can cause electrical shock or equipment damage. Disconnect power before beginning installation.



MERCURY NOTICE
If this product is replacing a control that contains mercury in a sealed tube, do not place the old control in the trash. Contact your local waste management authority for instructions regarding recycling and proper disposal.

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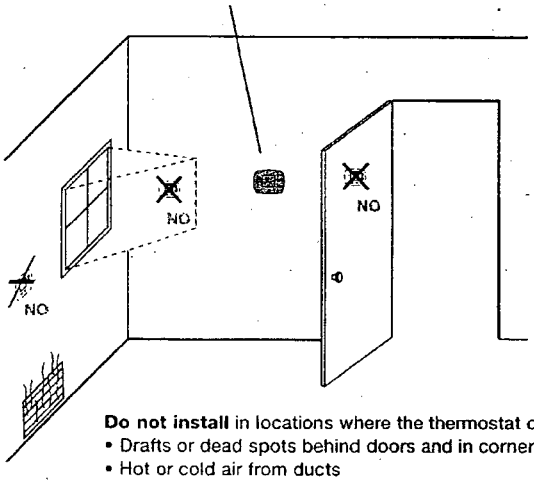
Installation
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Installation tips

Install the thermostat about 5 feet (1.5m) above the floor in an area with good air circulation at average temperature.



Do not install in locations where the thermostat can be affected by:
- Drafts or dead spots behind doors and in corners
- Hot or cold air from ducts
- Sunlight or radiant heat from appliances
- Concealed pipes or chimneys
- Unheated/uncooled areas such as an outside wall behind the thermostat

Pre-installation checklist

Package contents

Check to make sure your package includes the following items:

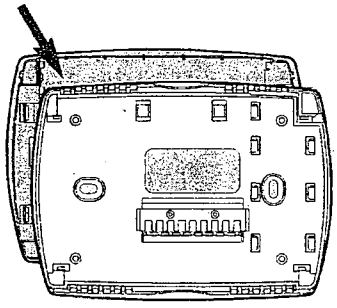
- PRO TH3210D digital thermostat (wallplate attached to back)
- Operating manual
- Wall anchors and mounting screws (2 each)
- AA alkaline batteries (2)

Required tools & supplies

- No. 2 Phillips screwdriver
- Small pocket screwdriver
- Drill
- Drill bit (3/16" for drywall, 7/32" for plaster)
- Hammer
- Pencil
- Electrical tape
- Level (optional)

Wallplate installation

Grasp top and bottom of wallplate and pull to remove from thermostat.



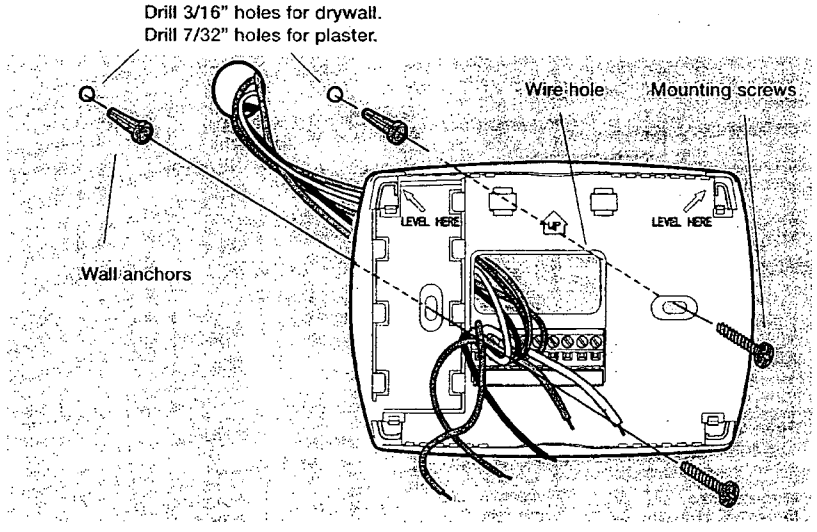
Remove the wallplate from the thermostat as shown at left, then follow directions below for mounting.

1 Pull wires through wire hole.

2 Position wallplate on wall, level and mark hole positions with pencil.

3 Drill holes at marked positions as shown below, then tap in supplied wall anchors.

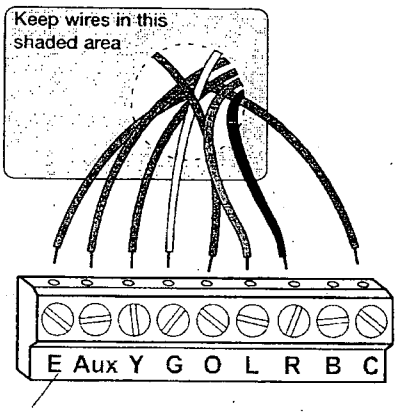
4 Place wallplate over anchors, insert and tighten mounting screws.



ROA_01672

Wiring

CAUTION: ELECTRICAL HAZARD. Can cause electrical shock or equipment damage. Disconnect power before wiring.



Terminal block

NOTES

C terminal
The C (common wire) terminal is optional when thermostat is powered by batteries.

L terminal
Heat pump reset. L terminal is powered continuously when thermostat is set to Em Heat.

Wire specifications
Use 18- to 22-gauge thermostat wire. Shielded cable is not required.

Wiring

1 Loosen screw terminals, insert wires into terminal block, then re-tighten screws.

2 Push excess wire back into the wall opening. Keep wires in shaded area as shown at left.

3 Plug the wall opening with non-flammable insulation to prevent drafts from affecting thermostat operation.

Terminal Designations

E	Emergency heat relay.
Aux	Auxiliary heat relay.
Y	Compressor contactor.
G	Fan relay.
O	Heat pump changeover valve energized in cooling.
L	Heat pump reset.
R	Power wire from secondary side of system transformer.
B	Heat pump changeover valve energized in heating.
C	Common wire from secondary side of system transformer.

Wiring diagram

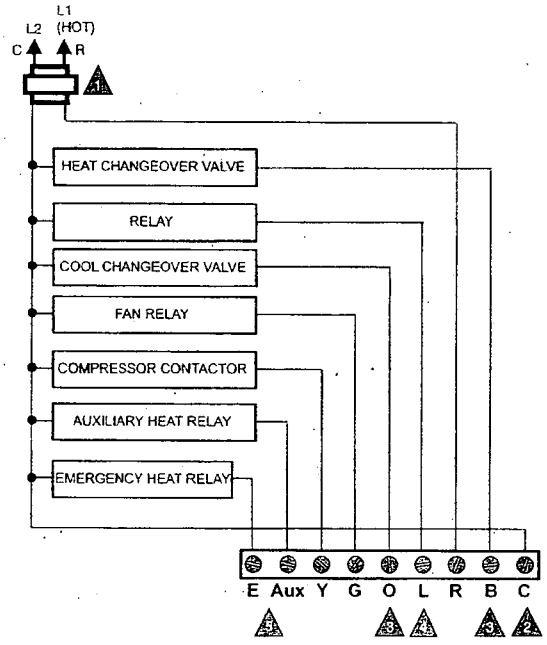
1 Power supply. Provide disconnect means and overload protection as required.

2 Optional 24 VAC common connection.

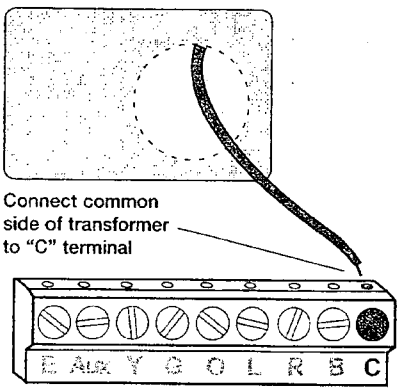
3 Use either **O** or **B** terminals for changeover valve.

4 L terminal is powered continuously when thermostat is set to Em Heat.

5 Install field jumper between E and Aux if there is no emergency heat relay.



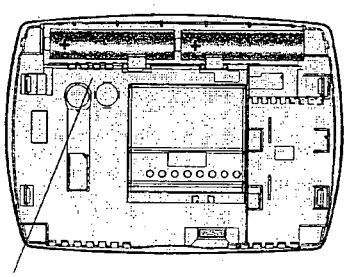
Power options & mounting



AC Power

The thermostat can be powered by 24 VAC power, or by batteries.

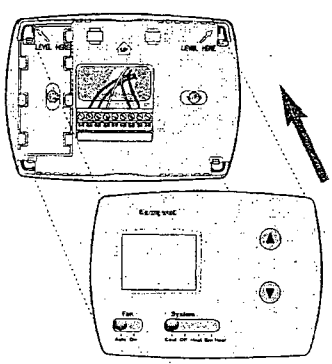
To wire the thermostat for AC power, connect the common side of the transformer to the "C" terminal as shown at left.



Install batteries in back of thermostat (optional if AC powered).

Battery Power

The thermostat can be powered by batteries alone or, if used with AC power, can provide backup power to the display during power interruptions.



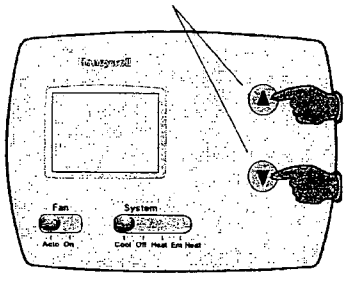
To Mount Thermostat

Align the 4 tabs on the wallplate with corresponding slots on the back of the thermostat, then push gently until the thermostat snaps in place.

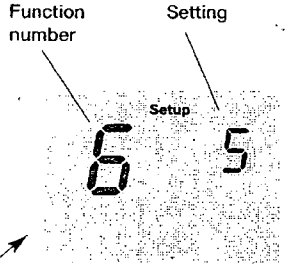
Installer setup

Follow the procedure below to configure the thermostat to match the installed heating/cooling system, and customize feature operation as desired.

Press and hold both buttons



To begin, press and hold the ▲ and ▼ buttons until the display changes



Press ▼ to change settings
Press ▲ to advance to next function
Press and hold ▼ ▲ to exit and save settings

Setup Function	Settings & Options
6 **Auxiliary heat cycle rate** (CPH)	**5 For gas or oil furnaces of less than 90% efficiency** 1 For steam or gravity systems 3 For hot water systems & furnaces of over 90% efficiency 9 For electric furnaces [Other cycle rate options: 2, 4, 6, 7, 8, 10, 11 or 12 CPH]
8 **Emergency heat cycle rate** (CPH)	**9 For electric furnaces** 1 For steam or gravity systems 3 For hot water systems & furnaces of over 90% efficiency 5 For gas or oil furnaces of less than 90% efficiency [Other cycle rate options: 2, 4, 6, 7, 8, 10, 11 or 12 CPH]
9 **Compressor cycle rate** (CPH)	**3 Recommended for most compressors** [Other cycle rate options: 1, 2, 4, 5 or 6 CPH]
14 **Temperature display**	**0 Fahrenheit** 1 Celsius
15 **Compressor protection**	**5 Five-minute compressor off time** **See page 9 [Other options: 0, 1, 2, 3 or 4-minute off time]

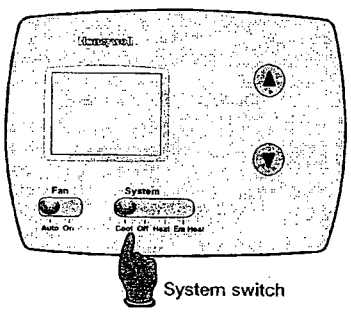
Installer system test

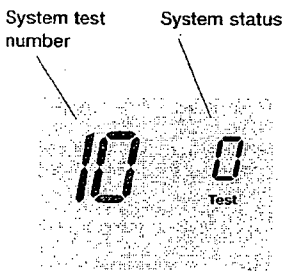
After completing the installer setup above, press the ▲ button again to begin a system test (see next page).

ROA_01676

Installer system test

Follow the procedure below to test the heating and cooling system.





1 Set **SYSTEM** switch to Heat.
2 Press ▼ to turn on and check systems (see table, below).
3 Press ▼ until systems turn off.
4 Set **SYSTEM** switch to Em Heat and repeat steps 2-3 above.
5 Set **SYSTEM** switch to Cool and repeat steps 2-3 above.
5 Press and hold ▼▲ to terminate test at any time.

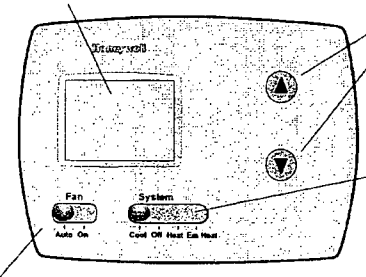
System Test		System Status
10	**Heating system**	0 Compressor and fan turn off. 1 Compressor and fan turn on. 2 Auxiliary heat turns on.
20	**Emergency heat**	0 Heat and fan turn off. 1 Heat and fan turn on. 2 Auxiliary heat turns on.
30	**Cooling system**	0 Compressor and fan turn off. 1 Compressor and fan turn on.
70	**Thermostat information** (for reference only)	71 Software revision number (major revisions) 72 Software revision number (minor revisions) 73 Configuration identification code (major) 74 Configuration identification code (minor) 75 Production configuration date code (week) 76 Production configuration date code (year)

CAUTION: EQUIPMENT DAMAGE HAZARD
Compressor protection (minimum off time) is bypassed during testing. To prevent equipment damage, avoid cycling the compressor quickly.

ROA_01677

Quick reference to controls

Digital display screen



Fan switch
On: Fan runs continuously.
Auto: Fan runs only when heating or cooling system is on.

Temperature buttons
Press to adjust temperature settings

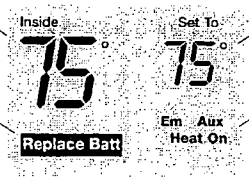
System switch

- **Cool:** Thermostat controls only the cooling system.
- **Heat:** Thermostat controls only the heating system.
- **Off:** Heating and cooling systems are off.
- **Em Heat:** Thermostat controls emergency and auxiliary heat. Compressor is locked out.

Quick reference to display screen

Current inside temperature

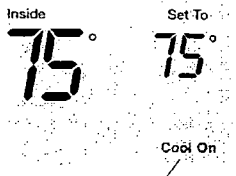
Low battery warning



Temperature setting

System status
Em: Emergency heat on
Aux: Auxiliary heat on
Heat On/Cool On: (Flashes when waiting for compressor restart)

Built-in compressor protection (Setup Function 15)



Message flashes until safe restart time has elapsed

This feature helps prevent damage to the compressor.

Damage can occur if the compressor is re-started too soon after shutdown. This feature forces the compressor to wait for a few minutes before restarting.

During the wait time, the message Cool On or Heat On will flash on the display. When the safe wait time has elapsed, the message stops flashing and the compressor turns on.

ROA_01678

In case of difficulty

If you have difficulty with your thermostat, please try the suggestions below. Most problems can be corrected quickly and easily.

Display is blank

- Check circuit breaker and reset if necessary.
- Make sure heating & cooling power switches are on.
- Make sure equipment door is securely closed.
- If battery powered, make sure fresh AA alkaline batteries are installed.

Temperature settings do not change

Make sure heating and cooling temperatures are set to acceptable ranges:

- Heat: 40° to 90°F (4.5° to 32°C).
- Cool: 50° to 99°F (10° to 37°C).

Heating system does not respond ("Heat On" appears on screen)

- Check for 24 Vac at the equipment on the secondary side of the transformer between power and common. If voltage is not present, check the heating equipment to find the cause of the problem.
- Check for 24 Vac between the heat terminal (Y) and the transformer common. If 24 Vac is present, the thermostat is functional. Check the heating equipment to find the cause of the problem.
- Check for loose or broken wires between the thermostat and the heating equipment.

Cooling system does not respond ("Cool On" appears on screen)

- Check for 24 Vac at the equipment on the secondary side of the transformer between power and common. If voltage is not present, check the cooling equipment to find the cause of the problem
- Check for 24 Vac between the cooling terminal (Y) and the transformer common. If 24 Vac is present, the thermostat is functional. Check the cooling system to find the cause of the problem.
- Check for loose or broken wires between the thermostat and the cooling equipment.

"Cool On" or "Heat On" is flashing

- Compressor protection timeout is engaged. Wait 5 minutes for the system to restart safely, without damage to the compressor.

"Heat On" is not displayed

- Set the System switch to Heat, and set the temperature level above the current room temperature.

"Cool On" is not displayed

- Set the System switch to Cool, and set the temperature level below the current room temperature.

ROA_01679

Accessories

Please contact your distributor to order accessories.

Cover plate assembly .....Part Number 50002883-001
(Used to cover marks left by old thermostats.)

Specifications

Temperature Ranges
- Heat: 40° to 90°F (4.5° to 32°C)
- Cool: 50° to 99°F (10° to 37°C)

Operating Ambient Temperature
- 32° to 120°F (0° to 48.9°C)

Shipping Temperature
- -20° to 120°F (-28.9° to 48.9°C)

Operating Relative Humidity
- 5% to 90% (non-condensing)

Physical Dimensions
- 3-13/16" H x 5-3/8" W x 1-1/4" D
- 97 mm H x 137 mm W x 32 mm D

Electrical Ratings

System	Voltage (50/60Hz)	Running Current
Heat (1st stage)	20-30 Vac	0.02-1.0 A
Emergency heat	20-30 Vac	0.02-1.0 A
Auxiliary heat	20-30 Vac	0.02-1.0 A
Cooling	20-30 Vac	0.02-1.0 A

ROA_01680

GENERAL HEATING & AIR

WARRANTY

ROA_01681

General Heating & A/C Co. of Greenville, Inc.

224 HICKS ROAD • GREENVILLE, SOUTH CAROLINA 29605 • (864) 277-4554 • FAX (864) 299-0246

11/20/06

Re: Checklist before calling for service

Dear Sir or Madam:

Professional service calls can be costly, but here are some things you can do before placing a service call. Before you call in a request for service you will need to check the following:

- Make sure your circuit breakers are in the "ON" position.
- Make sure your filters are clean. On new construction I recommend you change them once a month for the first year. After that first year once every 3 months.
- Open your supply and return vents and make sure they are unobstructed.
- Double check both your indoor and outdoor disconnect switches.
- Check the settings on your thermostat:
    - Do not turn your temperature below 67° this will cause your inside unit to freeze and it will not work.
    - Make sure the system is on the appropriate COOL or HEAT setting.
    - Have the fan switch on for continuous vent.

Sincerely,

Cori Ballew
Service Coordinator
General Heating & A/C

General Heating & A/C Co. of Greenville, Inc.
224 HICKS ROAD • GREENVILLE, SOUTH CAROLINA 29605 • (864) 277-4554 • FAX (864) 299-0246

GENERAL HEATING EST. 1959 MECHANICAL CONTRACTOR

MECHANICAL SUBCONTRACTOR'S ONE YEAR GUARANTEE

PROJECT: Belle Hall Condominiums
Charleston, SC

GENERAL HEATING & A/C CO., INC. AS MECHANICAL SUBCONTRACTOR ON THIS PROJECT DOES HEREBY GUARANTEE THAT ALL MECHANICAL WORK EXECUTED UNDER THE REQUIREMENTS OF THE CONTRACT DOCUMENTS SHALL BE FREE FROM DEFECTS DUE TO FAULTY MATERIALS AND OR WORKMANSHIP FOR A PERIOD OF ONE (1) YEAR FROM THE DATES OF EACH CERTIFICATE OF OCCUPANCY. IN ADDITION TO THE WARRANTY THERE SHALL BE A FOUR (4) YEAR PARTS ONLY WARRANTY COVERAGE FOR ALL COMPRESSORS.

GENERAL HEATING & AC CO., INC.

MELVIN J. CLARK
VICE-PRESIDENT, MULTI-FAMILY DIVISION

LIMITED WARRANTY

Models
AC, ACHP, ACNF, ADPF, AEPF, AEPT, AH, AR, ARPF, ARPT, ARUF, AWB, AWUF, MBE, MBR, WMC, WMH

This heating or air conditioning product is warranted by Goodman Manufacturing Company, L.P. ("Goodman") to be free from defects in materials and workmanship that affect performance under normal use and maintenance, as described below:

- The refrigerant coil in the AC, ACHP, ACNF, ADPF, AEPF, AEPT, AH, AR, ARPF, ARPT, ARUF, AWB, AWUF, WMC and WMH is warranted for a period of **10 YEARS** when installed in conjunction with a new split system air conditioner or heat pump to which it is properly matched by the installer, and which is covered by a **10 YEAR** parts warranty, except as provided below.
- All remaining parts (and the refrigerant coil, if the **10 YEAR** warranty does not apply) are warranted for a period of **5 YEARS**, except as provided below.

Neither warranty continues after the product is removed from the location where it was originally installed.

Neither warranty applies to, and no warranty is offered by Goodman on, any product ordered over the Internet.

The warranty period begins on the date of the original installation. If that date cannot be verified, the warranty period begins three months from the month of manufacture (indicated by the first four digits of the serial number (yymm)).

As its only responsibility, and your only remedy, Goodman will furnish a replacement part, without charge for the part only, to replace any part that is found to be defective due to workmanship or materials under normal use and maintenance. For warranty credit, the defective part must be returned to a Goodman heating and air conditioning products distributor by a state certified or licensed contractor. Any part replaced pursuant to this warranty is warranted only for the unexpired portion of the warranty term applying to the original part.

These warranties do not apply to labor, freight, or any other cost associated with the service, repair or operation of the product.

These warranties are in lieu of all other express warranties. **ALL IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE, ARE LIMITED TO THE DURATION OF THIS WARRANTY.** Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

GOODMAN SHALL IN NO EVENT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO EXTRA UTILITY EXPENSES OR DAMAGES TO PROPERTY. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply to you.

Goodman is not responsible for:

1. Damage or repairs required as a consequence of faulty installation or application.
2. Damage as a result of floods, fires, winds, lightning, accidents, corrosive atmosphere or other conditions beyond the control of Goodman.
3. Use of components or accessories not compatible with this unit.
4. Products installed outside the United States or Canada.
5. Normal maintenance as described in the installation and operating manual, such as cleaning of the coils, filter cleaning and/or replacement and lubrication.
6. Parts not supplied or designated by Goodman.
7. Damage or repairs required as a result of any improper use, maintenance, operation or servicing.
8. Failure to start due to interruption and/or inadequate electrical service.
9. Any damage caused by frozen or broken water pipes in the event of equipment failure.
10. Changes in the appearance of the product that do not affect its performance.

This warranty gives you specific legal rights, and you may also have other rights that may vary from state to state.

Owner Name _____

Address of Installation _____

City/State/Zip _____

Installer Name _____

City/State/Zip _____

Phone # / Fax # _____

Distributor Name _____

City/State/Zip _____

Phone # / Fax # _____

Model # & Serial # _____

Installation Date _____

Part No. PW-316B
Printed in USA
11/05

For further information about this warranty, contact Goodman Consumer Affairs at **(877) 254-4729** or by mail to 7401 Security Way, Houston, Texas 77040.

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LIMITED WARRANTY

Models: CKL, CPLE, CPRT, CRT, PCK, PHK, TWC, GSC10, GSH10, GSC13, GSH13

This heating or air conditioning product is warranted by Goodman Manufacturing Company, L.P. ("Goodman") to be free from defects in materials and workmanship under normal use and maintenance for a period of **5 YEARS** or so long as it remains in the location where it was originally installed, whichever expires first, except as provided below.

This warranty does not apply to, and no warranty is offered by Goodman on, any product ordered over the Internet.

The warranty period begins on the date of the original installation. If that date cannot be verified, the warranty period begins three months from the month of manufacture (indicated by the first four digits of the serial number (yymm)).

As its only responsibility, and your only remedy, Goodman will furnish a replacement part, without charge for the part only, to replace any part that is found to be defective due to workmanship or materials under normal use and maintenance. For warranty credit, the defective part must be returned to a Goodman heating and air conditioning products distributor by a state certified or licensed contractor. Any part replaced pursuant to this warranty is warranted only for the unexpired portion of the warranty term applying to the original part.

This warranty does not apply to labor, freight, or any other cost associated with the service, repair or operation of the product.

This warranty is in lieu of all other express warranties. **ALL IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE, ARE LIMITED TO THE DURATION OF THIS WARRANTY.** Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

GOODMAN SHALL IN NO EVENT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO EXTRA UTILITY EXPENSES OR DAMAGES TO PROPERTY. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply to you.

Goodman is not responsible for:

1. Damage or repairs required as a consequence of faulty installation or application.
2. Damage as a result of floods, fires, winds, lightning, accidents, corrosive atmosphere or other conditions beyond the control of Goodman.
3. Use of components or accessories not compatible with this unit.
4. Products installed outside the United States or Canada.
5. Normal maintenance as described in the installation and operating manual, such as cleaning of the coils, filter cleaning and/or replacement and lubrication.
6. Parts not supplied or designated by Goodman.
7. Damage or repairs required as a result of any improper use, maintenance, operation or servicing.
8. Failure to start due to interruption and/or inadequate electrical service.
9. Any damage caused by frozen or broken water pipes in the event of equipment failure.
10. Changes in the appearance of the product that do not affect its performance.

This warranty gives you specific legal rights, and you may also have other rights that may vary from state to state.

Owner Name _____

Address of Installation _____

City/State/Zip _____

Installer Name _____

City/State/Zip _____

Phone # / Fax # _____

Distributor Name _____

City/State/Zip _____

Phone # / Fax # _____

Model # & Serial # _____

Installation Date _____

Part No. PW-329B
Printed in USA
09/05

For further information about this warranty, contact Goodman Consumer Affairs at **(877) 254-4729** or by mail to 7401 Security Way, Houston, Texas 77040.

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DIVISION 16 – ELECTRICAL

ELECTRICAL/LIGHT FIXTURES – HOUSTON STAFFORD

ROA_01686

WARRANTY AGREEMENT

Project: Belle Hall Condominiums

Owner: Belle Hall Direct 101, LP
Contractor: TCR NC Construction I Limited Partnership

Subcontractor: Houston-Stafford Electric

Subcontractor hereby expressly warrants and guarantees that all labor, materials, and equipment furnished and work performed in conjunction with the above referenced project are in accordance with the plans, specifications, the Subcontract Agreement and authorized modifications thereto. All labor, materials and equipment shall be free from defects, due to defective materials and/or workmanship, for a period of one (1) year from the date of Certificate of Occupancy for each building/structure, unless otherwise stated in the Subcontract Agreement.

Should any defects develop during the warranty period due to improper workmanship and/or arrangement, the same shall, upon notice, be made good by this Subcontractor at no expense to the Contractor, Owner, or Owner's Representative. Nothing in the above shall be deemed to apply to work or equipment which has been abused, neglected or altered by the Contractor, Owner, or Owner's Representative.

Unless otherwise stated in the Subcontract Agreement, warranty work shall be responded to within twenty-four (24) hours of notification by the Contractor, Owner, or Owner's Representative, including weekends and holidays. Warranty notices received before 10:00 am shall be responded to on the same day. Should Subcontractor fail to respond within twenty-four (24) hours of notification or correct the defective work or equipment within seventy-two (72) hours, the Contractor, Owner, or Owner's Representative shall proceed with the correction of the defective work. All costs associated with this corrective action shall be reimbursed by this Subcontractor or charged against its account. Subcontractor shall remit payment for such charges within five (5) calendar days of notification by the Contractor, Owner, or Owner's Representative.

Signature: Jimmy Aplin

Printed Name: Jimmy Aplin

Position/Title: Sr. Division Manager

Date: 12-7-06

Houston-Stafford Electric
A subsidiary of Integrated Electrical Services, Inc.
3670 Burnette Park Drive, Suite A
Suwanee, GA 30096
770-945-4244
FAX 770-945-1929

Tuesday, December 05, 2006

Trammell Crow Residential
230 Seven Farms Dr.
Suite 104
Charleston, SC 29492

Warranty Letter for "Belle Hall Condominiums

To Whom It May Concern:

Houston-Stafford Electric Contractors LP hereby warrants the electrical equipment and installation for the above referenced project for a period of (1) year, commencing upon the date that the Certificate of Occupancy is issued for each building, on a building by building basis.

For service assistance, Monday through Friday, call 770-945-4244. After hours or weekends you may call the same number and we will provide you with the pager number of our on-call personnel.

Very truly yours,

Jimmy Aplin
Division Manager for Houston-Stafford Electrical Contractors LP

STATE OF GEORGIA
COUNTY OF GWINNETT

NOTARY PUBLIC

12/5/06
DATE

Straight Blade Devices
TradeMaster® Receptacles
15A, 125V

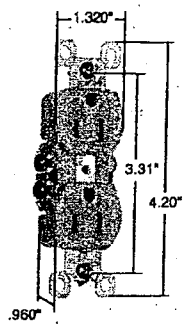
Pass & Seymour
legrand

Features

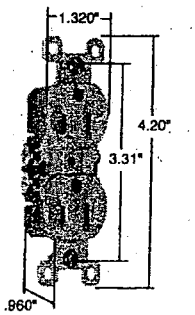
- High-impact resistant thermoplastic construction.
- Extra-long strap.
- Quickloop wire looping aid.
- Long-term blade retention.
- Longer tri-drive screws for easier 12 AWG looping.
- Extra-large circuit break-off tabs.
- Side-access push wire release.
- Ultrasonic welding of face to back body.
- Side wire accepts #12 – #14 AWG solid wire.
- Push wire accepts #14 AWG solid only.
- "S" model provides automatic ground clip.

Catalog Number	Rating A.	V.	Color	NEMA Config. No.	3rd Party Compliance UL498	C22.2 No. 42
Duplex Receptacles – Grounding						
3232-I*	15	125	Ivory	5-15R	•	•
3232-W*	15	125	White	5-15R	•	•
3232*	15	125	Brown	5-15R	•	•
3232-BK	15	125	Black	5-15R	•	•
3232-LA*	15	125	Light Almond	5-15R	•	•
Self-Grounding Receptacles						
3232-SI	15	125	Ivory	5-15R	•	•
3232-SW	15	125	White	5-15R	•	•
3232-S	15	125	Brown	5-15R	•	•
3232-SLA	15	125	Light Almond	5-15R	•	•
4 Terminal, Screws In						
3232-I4	15	125	Ivory	5-15R	•	•
3232-W4	15	125	White	5-15R	•	•
3232-4	15	125	Brown	5-15R	•	•
Duplex Receptacles – Without Ears						
3232-IMH	15	125	Ivory	5-15R	•	•
3232-WMH	15	125	White	5-15R	•	•
3232-MH	15	125	Brown	5-15R	•	•

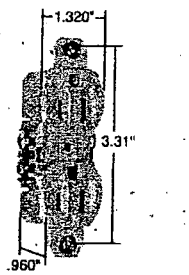
*Available in bulk packs of 150. Add "U" to end of Catalog Number. Example: 3232-LAU.



3232-I

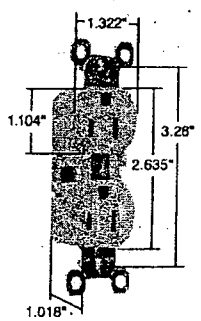


3232-SI



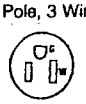
3232-IMH

Catalog Number	Rating A.	V.	Color	NEMA Config. No.	3rd Party Compliance UL498	C22.2 No. 42
8 Hole Push Wire Without Terminal Screws						
880-I	15	125	Ivory	5-15R	•	•
880-W	15	125	White	5-15R	•	•
880	15	125	Brown	5-15R	•	•
8 Hole Push Wire – Without Ears Without Terminal Screws						
880-IMH	15	125	Ivory	5-15R	•	•
880-WMH	15	125	White	5-15R	•	•
880-MH	15	125	Brown	5-15R	•	•



880-I

2 Pole, 3 Wire


NEMA 5-15R

For Decorator version of 880 Series, see Page B-29.

All devices listed on this page conform to NEMA WD-1 and WD-6.

Q&M 551

ROA_01689

Straight Blade Devices
TradeMaster® & Specification Grade GFCI Receptacles

2 Pole, 3 Wire Grounding 15 & 20A, 125VAC

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Legrand

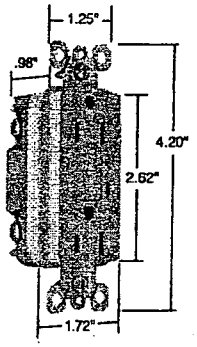
Features

- Meets 2006 UL requirements.
- SafeLock™ Protection: if critical components are damaged and ground fault protection is lost, power to receptacle is disconnected.
- Prevents line-load reversal miswire: no power to the face or downstream receptacles if wired incorrectly.
- Exceeds UL943 voltage surge requirements; survives 100x the required UL 3kA/6kV voltage surge test cycles.
- FSUL Listed (Federal Specification WC596).
- Trip indicator light (red lamp).
- Side or internal screw-pressure-plate back wire with #10 – #14 AWG solid or stranded copper wire.
- Two back wire holes per terminal.
- Ground screw has a back wire clamp for easy installation.
- 1/4" thinner than competitors' GFCIs; leaves more room for wires in the box.
- Mounting screws are shipped captive in the device and wall plate for easier installation.
- High-impact-resistant thermoplastic construction.
- Extra-long strap.
- Button colors match the device face.
- Dual-direction test and reset buttons.
- Class A rated GFCI.
- Supplied with matching TP26 nylon wall plate.
- Tri-drive screws.
- GFCIs with Auto-Ground assure a positive ground to metal box.

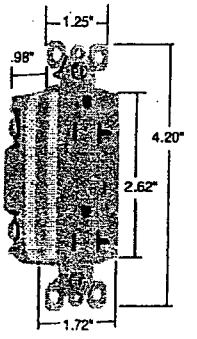
Specifications

- Supply Voltage: 125VAC, 60 Hz
- Supply Voltage Range: 102-132 VAC
- Trip Threshold: 5± 1mA
- Trip Time: 0.025 sec., nominal per UL Standard
- 20 Amp feed-thru capacity

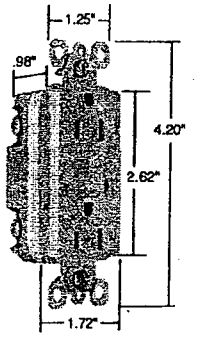
Catalog Number	Rating A.	Rating VAC	Color	NEMA Config. No.	3rd Party Compliance UL943 C22.2 No. 144	UL498 C22.2 No. 42	FSUL WC596
NEW TradeMaster®/Spec Grade 15 Amp Duplex GFCI							
1595-I	15	125	Ivory	5-15R	•	•	•
1595-W	15	125	White	5-15R	•	•	•
1595	15	125	Brown	5-15R	•	•	•
1595-GRY	15	125	Gray	5-15R	•	•	•
1595-BK	15	125	Black	5-15R	•	•	•
1595-RED	15	125	Red	5-15R	•	•	•
1595-LA	15	125	Light Almond	5-15R	•	•	•
NEW TradeMaster®/Spec Grade 15 Amp Duplex GFCI with Auto-Ground							
1595-SI	15	125	Ivory	5-15R	•	•	•
1595-SW	15	125	White	5-15R	•	•	•
1595-SLA	15	125	Light Almond	5-15R	•	•	•
NEW Specification Grade 20 Amp Duplex GFCI							
2095-I	20	125	Ivory	5-20R	•	•	•
2095-W	20	125	White	5-20R	•	•	•
2095	20	125	Brown	5-20R	•	•	•
2095-GRY	20	125	Gray	5-20R	•	•	•
2095-BK	20	125	Black	5-20R	•	•	•
2095-RED	20	125	Red	5-20R	•	•	•
2095-LA	20	125	Light Almond	5-20R	•	•	•
NEW Specification Grade 20 Amp Duplex GFCI with Auto-Ground							
2095-SI	20	125	Ivory	5-20R	•	•	•
2095-SW	20	125	White	5-20R	•	•	•
2095-SLA	20	125	Light Almond	5-20R	•	•	•



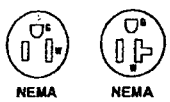
1595-W



2095-W



1595-SW


NEMA 5-15R NEMA 5-20R

Available in Bulk Packaging, i.e. 1595-W20 is 20 pack, 1595-W100 is 100 pack. Please contact Customer Support at 1-800-223-4189.

Available Spring 2006.

For Configurable Solutions, see Page U-1.

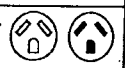
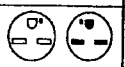
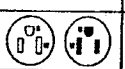
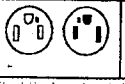
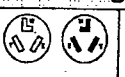
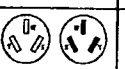
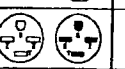
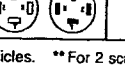
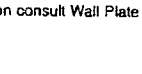
All devices listed on this page conform to NEMA WD-1 and WD-6.

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ROA_01690

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Straight Blade Devices
Power Outlet Receptacles & Plugs
20, 30, 50, & 60A

Rating A. V.	Receptacle/Plug Configuration & NEMA No.	Flush Receptacle	Wall Plate	Surface Receptacle	Plug	Angle Plug	Connector
				Catalog Nos.			
2 Pole, 3 Wire Grounding							
30 125	5-30 	**3802** AL/CU	1-Gang: **TP724**** 2-Gang: **SS702**** 2-Gang: **TP703**†		**D0531** .57"-1.26"		**D0533** .57"-1.26"
30 125	NEMA TT30 	**3830** AL/CU*	1-Gang: **TP724**** 2-Gang: **SS702**** 2-Gang: **TP703**†				
30 250	6-30 	**3801** AL/CU	1-Gang: **TP724**** 2-Gang: **SS702**** 2-Gang: **TP703**†		**D0631** .57"-1.26"	**3869**	**D0633** .57"-1.26"
50 125	5-50 				**D0551** .57"-1.26"		**D0553** .57"-1.26"
50 250	6-50 	**3804** AL/CU	1-Gang: **TP724**** 2-Gang: **SS702**** 2-Gang: **TP703**†	**3852** AL/CU	**D0651** .57"-1.26"	**3869**	**D0653** .57"-1.26"
3 Pole, 3 Wire Non-Grounding							
30 125/250 Dryer	10-30 	**3860** AL/CU	1-Gang: **TP724**** 2-Gang: **SS702**** 2-Gang: **TP703**†	**388** AL/CU	**1031**	**3861**	
50 125/250 Range	10-50 	**3890** AL/CU	1-Gang: **TP724**** 2-Gang: **SS702**** 2-Gang: **TP703**†	**385** AL/CU	**1051** .57"-1.26"	**3861**	**1053** .32"-.91"
3 Pole, 4 Wire Grounding							
20 125/250	14-20 	**3820**	1-Gang: **SS7****				
30 125/250 Dryer	14-30 	**3864** AL/CU	2-Gang: **SS702**** 2-Gang: **TP703**†	**3884/3884-40**‡ AL/CU	**1431** .57"-1.26"	**5746-AN** **3867**	
30 3ø, 250	15-20 				**1521** .57"-1.26"		
30 3ø, 250	15-30 	**5740** AL/CU	2-Gang: **SS702**** 2-Gang: **TP703**†			**5741-AN**	
50 125/250 Range	14-50 	**3894** AL/CU	2-Gang: **SS702**** 2-Gang: **TP703**†	**3854/3854-40**‡ AL/CU	**1451** .57"-1.26"	**5745-AN** **3867**	
50 3ø, 250	15-50 	**5750** AL/CU	2-Gang: **SS702**** 2-Gang: **TP703**†			**5751-AN**	
60 3ø, 250	15-60 	**5760** AL/CU	2-Gang: **SS702**** 2-Gang: **TP703**†			**5761-AN**	
4 Pole, 4 Wire Non-Grounding							
20 3øY, 120/208	18-20 	**3822**	1-Gang: **SS7****		**7251-DF** .35"-1.05"		
60 3øY, 120/208	18-60 	**3870** AL/CU	2-Gang: **SS701**†		**D1861** .57"-1.26"	**8302-AN**	

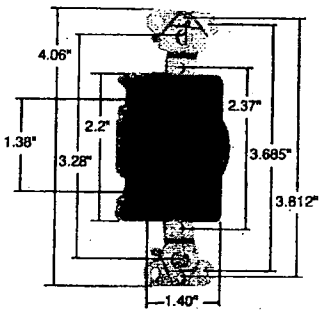
*For recreational vehicles. **For 2 screw mounting. †For 4 screw mounting. ‡In bulk pack of 40 with plastic snap-in wire clamp.
For further information consult Wall Plate Section R (for Stainless Steel versions of TP724 and TP703, refer to pages S-11 and S-12).

All devices listed on this page conform to NEMA WD-1 and WD-6.

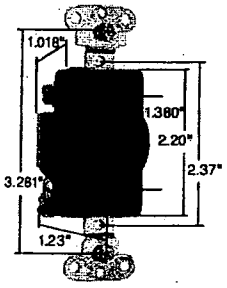
ROA_01691

Straight Blade Devices
Power Outlet Receptacles & Plugs
20, 30, 50, & 60A

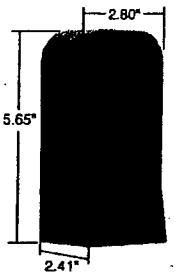
Pass & Seymour
legrand



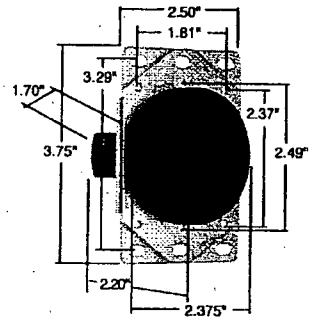
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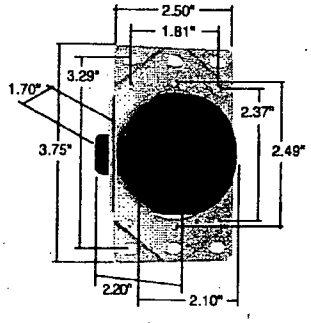
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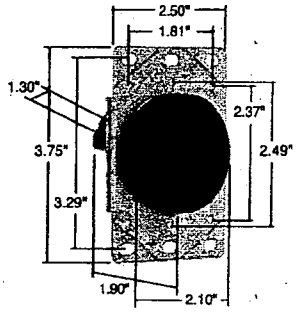
385 3854
388 3884
3852



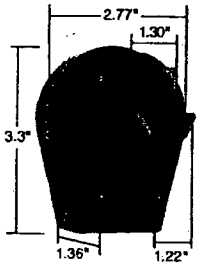
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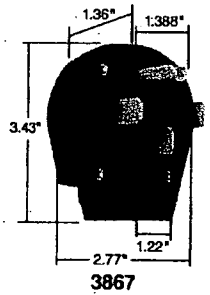
3801 3802
3804 3864
3894 5740
5750 5760



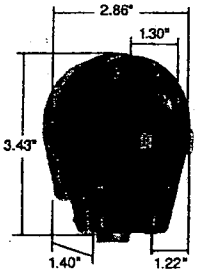
3830
3860
3890



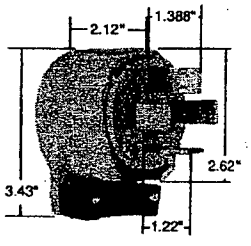
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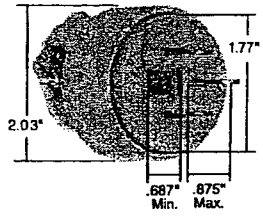
3867



3869



5741-AN 5751-AN
5745-AN 5761-AN
5746-AN 8302-AN



7251-DF

All devices listed on this page conform to NEMA WD-1 and WD-6.

OBI 2166 1554

Opening	Catalog #	Colors	Pkg. Qty
1 Toggle	TP1	BR, BK, GRY, I, LA, W	1 / 25 / 250
2 Toggle	TP2	BR, BK, GRY, I, LA, W	1 / 20 / 200
3 Toggle	TP3	BR, BK, GRY, I, LA, W	1 / 15 / 150
4 Toggle	TP4	BR, BK, GRY, I, LA, W	1 / 10 / 100
5 Toggle	TP5	BR, BK, GRY, I, LA, W	1 / 10
6 Toggle	TP6	BR, BK, GRY, I, LA, W	1 / 10
1 Duplex	TP8	BR, BK, GRY, I, LA, W	1 / 25 / 250
2 Duplex	TP82	BR, BK, GRY, I, LA, W	1 / 20 / 200
1 Decorator	TP26	BR, BK, GRY, I, LA, W	1 / 20 / 200
2 Decorator	TP262	BR, BK, GRY, I, LA, W	1 / 20 / 200
3 Decorator	TP263	BR, BK, GRY, I, LA, W	1 / 15 / 150
4 Decorator	TP264	BR, BK, GRY, I, LA, W	1 / 10 / 100
5 Decorator	TP265	BR, BK, GRY, I, LA, W	1 / 20
6 Decorator	TP266	BR, BK, GRY, I, LA, W	1 / 10
1 Single Receptacle	TP7	BR, BK, GRY, I, LA, W	1 / 25 / 250

Opening	Catalog #	Colors	Pkg. Qty
Telephone (box mt.)	TP11	BR, BK, GRY, I, LA, W	1 / 20 / 200
Telephone (strap mt.)	TP12	BR, BK, GRY, I, LA, W	1 / 20 / 200
Blank (box mt.)	TP13	BR, BK, GRY, I, LA, W	1 / 20 / 200
2 Blank (box mt.)	TP23	BR, BK, GRY, I, LA, W	1 / 20 / 200
Blank (strap mt.)	TP14	BR, BK, GRY, I, LA, W	1 / 20 / 200
2 Blank (strap mt.)	TP24	BR, BK, GRY, I, LA, W	1 / 20 / 200
1 Toggle, 1 Duplex	TP18	BR, BK, GRY, I, LA, W	1 / 20 / 200
2 Toggle 1 Duplex	TP28	BR, BK, GRY, I, LA, W	1 / 15 / 150
1 Toggle 1 Decor	TP126	BR, BK, GRY, I, LA, W	1 / 20 / 200
2 Toggle 1 Decor	TP226	BR, BK, GRY, I, LA, W	1 / 15 / 150
1 Duplex 1 Decor	TP826	BR, BK, GRY, I, LA, W	1 / 20 / 200
1 Toggle 1 Blank	TP113	BR, BK, GRY, I, LA, W	1 / 20 / 200
1 Blank 1 Duplex	TP138	BR, BK, GRY, I, LA, W	1 / 20 / 200
Power Outlet	TP703	BR, GRY, I, LA, W	1 / 20 / 200
Power Outlet	TP720	BR, GRY, I, LA, W	1 / 20 / 200
Power Outlet	TP724	BR, BK, GRY, I, LA, W	1 / 20 / 200

250 Bulk Pack: TP1U, TP8U, TP26U.
Available in 1, 8, & 26 opening only.
Available in Ivory, White and Light Almond.
For each Bulk Pack, indicate quantity of 250.

Colors:

Brown	BR (Note: When ordering brown, no color suffix required.)
Black	BK
Gray	GRY
Ivory	I
Light Almond	LA
White	W

Packaging: Bulk Pack: U
Available in 1, 8, & 26 opening only.

How to Order:

TP8IU

Catalog # Color Bulk

Duplex receptacle ivory bulk pack

ROA_01693

TradeMaster® Devices
Toggle Switches
15A, 120VAC

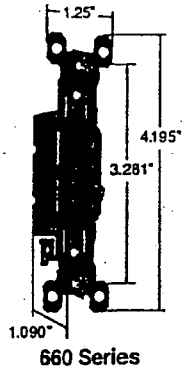
Pass & Seymour
legrand®

Features

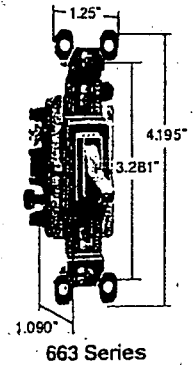
- Thermoplastic toggle & frame.
- Extra-long strap.
- High-impact resistant construction.
- Combination head screws.
- Side or speed wire #14 - #12 AWG.
- Easy-access green hex head ground screw.
- Smooth, quiet toggle action.

Catalog Number	Rating A.	VAC	Color	3rd Party Compliance UL20	C22.2 111
Single Pole Toggle Switch Ungrounded					
660-I	15	120	Ivory	•	
660-W	15	120	White	•	
660	15	120	Brown	•	
NEW 660-LA	15	120	Light Almond	•	
✤ 660-ICN	15	120	Ivory	•	•
✤ 660-WCN	15	120	White	•	•
Single Pole Toggle Switch Grounded					
660-IG	15	120	Ivory	•	
660-WG	15	120	White	•	
660-G	15	120	Brown	•	
660-LAG	15	120	Light Almond	•	
Single Pole Toggle Switch Grounded - Without Ears					
660-IGMH	15	120	Ivory	•	
660-WGMH	15	120	White	•	
660-GMH	15	120	Brown	•	
Three-Way Toggle Switch Ungrounded					
663-I	15	120	Ivory	•	
663-W	15	120	White	•	
663	15	120	Brown	•	
NEW 663-LA	15	120	Light Almond	•	
✤ 663-ICN	15	120	Ivory	•	•
✤ 663-WCN	15	120	White	•	•
Three-Way Toggle Switch Grounded					
663-IG	15	120	Ivory	•	
663-WG	15	120	White	•	
663-G	15	120	Brown	•	
663-LAG	15	120	Light Almond	•	
Three-Way Toggle Switch Grounded - Without Ears					
663-IGMH	15	120	Ivory	•	
663-WGMH	15	120	White	•	
663-GMH	15	120	Brown	•	
Four-Way Toggle Switch Grounded					
664-IG	15	120	Ivory	•	
664-WG	15	120	White	•	
664-G	15	120	Brown	•	
664-LAG	15	120	Light Almond	•	
✤ 664-ICN	15	120	Ivory	•	•
✤ 664-WCN	15	120	White	•	•

✤ Denotes Canadian catalog number. All Canadian products have Combination Slotted/Robertson Head Brass Screws.



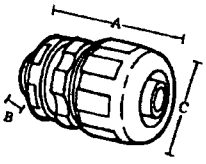
660 Series



663 Series

LIQUID TIGHT CONNECTORS
COMPONENT TYPE FOR FLEXIBLE NONMETALLIC LIQUID TIGHT TUBING

NYLON



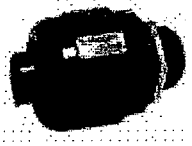
CAT #	A	B	C
P470/B	2.00	.44	1.09
P471/B	2.00	.44	1.09
P472/B	2.03	.46	1.30
P473/B	2.25	.57	1.50
P474/B	2.00	.57	2.40
P475/B	2.25	.57	2.68
P476/B	2.50	.57	3.31



E170258

STRAIGHT
GRAY

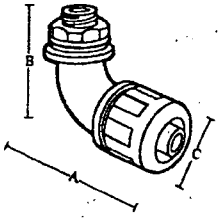
TOPAZ CAT#	UPC#	SIZE	UNIT CTN	SHIP CASE	WT/ CASE
P470	21570	3/8"	25	100	7
P471	21580	1/2"	25	100	6
P472	21590	3/4"	10	100	8
P473	21600	1"	5	50	12
P474	21602	1 1/4"	5	50	12
P475	21604	1 1/2"	5	50	14
P476	21606	2"	2	20	9



E170258

STRAIGHT
BLACK

P470B	21610	3/8"	25	100	7
P471B	21620	1/2"	25	100	6
P472B	21630	3/4"	10	100	8
P473B	21640	1"	5	50	12



CAT #	A	B	C
P490/B	2.56	2.14	1.09
P491/B	2.56	2.14	1.09
P492/B	2.84	2.38	1.30
P493/B	3.25	2.81	1.50
P494/B	3.96	3.36	2.40
P495/B	4.13	3.45	2.68
P496/B	4.68	4.04	3.31

90° ANGLE
GRAY

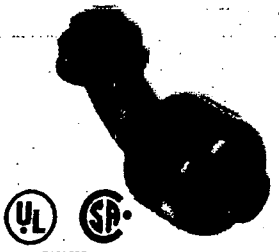
P490	21650	3/8"	10	100	9
P491	21660	1/2"	10	100	8
P492	21670	3/4"	10	100	11
P493	21680	1"	5	50	8
P494	21681	1 1/4"	2	20	8
P495	21682	1 1/2"	2	20	10
P496	21683	2"	1	10	9



E170258

90° ANGLE
BLACK

P490B	21690	3/8"	10	100	9
P491B	21700	1/2"	10	100	8
P492B	21710	3/4"	10	100	11
P493B	21720	1"	5	50	8

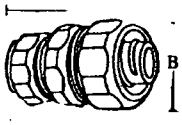


E170258

COMBINATION COUPLINGS
EMT TO LIQUID TIGHT

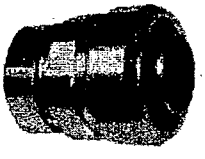
■ COMPRESSION TYPE

STEEL



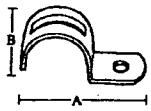
CAT #	A	B	C
Z71	1.64	1.39	1.09
Z72	1.75	1.72	1.30
Z73	2.00	1.75	1.50

TOPAZ CAT#	UPC#	SIZE	UNIT CTN	SHIP CASE	WT/ CASE
271	12260	1/2"- 1/2"	25	250	20
272	12270	3/4"- 3/4"	20	200	14
273	12280	1"- 1"	10	100	16



E170258

EMT STRAPS
SNAP-ON TYPE 1/2" - 2"



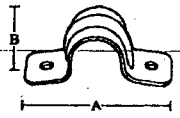
CAT #	A	B	C
511	1.79	.57	—
512	1.96	.62	—
513	2.25	.75	—
514	2.85	.88	—
515	3.16	.99	—
516	3.93	1.10	—
517	5.00	1.28	—
518	5.95	1.28	—
519	6.37	1.28	—
520	6.87	1.28	—



E170258

STEEL

TOPAZ CAT#	UPC#	SIZE	UNIT CTN	SHIP CASE	WT/ CASE
ONE HOLE					
511	15610	1/2"	100	1000	25
512	15620	3/4"	100	1000	30
513	15630	1"	50	500	25
514	15640	1 1/4"	25	250	20
515	15650	1 1/2"	10	100	12
516	15660	2"	10	100	16
517	15670	2 1/2"	—	50	21
518	15680	3"	—	25	13
519	15690	3 1/2"	—	25	18
520	15700	4"	—	25	20
TWO HOLE					
521	14950	1/2"	50	500	10
522	14960	3/4"	50	500	10
523	14970	1"	50	500	15
524	14980	1 1/4"	20	200	12
525	14990	1 1/2"	20	200	16
526	15000	2"	—	50	7
527	15010	2 1/2"	—	25	6
528	15020	3"	—	25	7
529	15030	3 1/2"	—	25	8
530	15040	4"	—	25	7

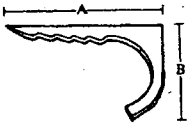


CAT #	A	B	C
521	2.20	.56	—
522	2.67	.62	—
523	2.97	.68	—
524	3.67	.75	—
525	4.22	.88	—
526	4.91	1.00	—
527	5.91	1.00	—
528	6.71	1.00	—
529	7.51	1.00	—
530	8.31	1.00	—



E170258

EMT DRIVE STRAPS
FLAT TYPE

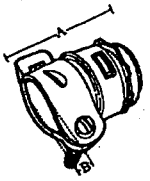


CAT #	A	B	C
DS1	2.13	1.10	—
DS2	2.13	1.20	—
DS3	2.25	1.50	—



STEEL

TOPAZ CAT#	UPC#	SIZE	UNIT CTN	SHIP CASE	WT/ CASE
DS1	20380	1/2"	100	1000	10
DS2	20390	3/4"	100	1000	18
DS3	20400	1"	100	1000	23



CAT #	A	B(Min-Max)	C
191	1.413	.620-.780	—

BX-FLEX & MC CABLE CONNECTOR

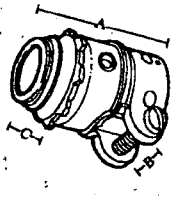
SQUEEZE STRAP TYPE

ZINC DIE CAST

TOPAZ CAT#	UPC#	SIZE	UNIT CTN	SHIP CASE	WT/ CASE
191	11530	1/2"	25	250	25
		FITS MC RANGE .620 - .780			



E148743



CAT #	A	B(Min-Max)	C
150	1.00	0.58-0.61	.370
151/i	1.47	0.74-0.95	.400
152/i	1.58	0.88-1.11	.440
153/i	1.75	1.14-1.38	.540
154/i	1.91	1.42-1.65	.640
155/i	2.09	1.68-1.94	.750
156/i	2.34	2.08-2.56	.740
157	2.81	2.85-3.25	.875
158	3.84	3.33-3.63	1.03
159	4.19	3.75-4.10	1.03
160	4.56	4.18-4.58	1.03

BX-FLEX CONNECTORS

STRAIGHT SQUEEZE TYPE

ZINC DIE CAST

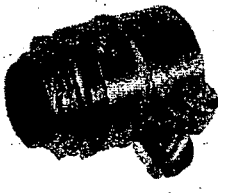
TOPAZ CAT#	UPC#	SIZE	UNIT CTN	SHIP CASE	WT/ CASE
150	10990	3/8"	50	500	35
151	11000	1/2"	25	250	25
152	11010	3/4"	25	250	32
153	11020	1"	10	100	20
154	11030	1 1/4"	10	100	29
155	11040	1 1/2"	5	50	20
156	11050	2"	10	40	21
157	11060	2 1/2"	—	10	9
158	11070	3"	—	10	17
159	11080	3 1/2"	—	1	3
160	11090	4"	—	1	3



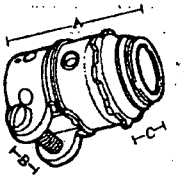
3/8-2 E148716
2 1/2-4 E170258

WITH INSULATED THROAT

151i	11001	1/2"	25	250	25
152i	11011	3/4"	25	250	32
153i	11021	1"	10	100	20
154i	11031	1 1/4"	10	100	29
155i	11041	1 1/2"	5	50	20
156i	11051	2"	10	40	21



E148716



CAT #	A	B(Min-Max)	C
151M	0.94	0.78-0.94	0.50
152M	1.13	0.91-1.08	0.50
153M	1.19	1.28-1.44	0.56
154M	1.25	1.44-1.63	0.63
155M	1.88	1.63-1.88	0.69
156M	2.00	2.19-2.38	0.75
157M	2.06	2.70-2.95	0.94
158M	2.25	3.13-3.50	0.94
159M	3.56	3.72-4.00	1.25
160M	3.69	4.06-4.44	1.25

MALLEABLE IRON

151M	11100	1/2"	25	250	30
152M	11110	3/4"	25	250	48
153M	11120	1"	10	100	26
154M	11130	1 1/4"	10	100	39
155M	11140	1 1/2"	5	50	33
156M	11150	2"	—	20	21
157M	11160	2 1/2"	—	10	14
158M	11170	3"	—	2	4
159M	11180	3 1/2"	—	1	5
160M	11190	4"	—	1	7

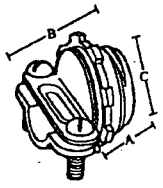


E170258

NM CLAMP TYPE CONNECTORS

■ NON-WATERTIGHT
■ TWO SCREWS

ZINC DIE CAST



CAT #	A	B	C
120	.37	.82	1.12



E155941

TOPAZ CAT#	UPC#	SIZE	FITS CABLE	UNIT CTN	SHIP CASE	WT/ CASE
3/8" NM CABLE						
120	10690	1/2"	NM CABLE FROM 2#14 TO .64 MAX OPENING	100	1000	50

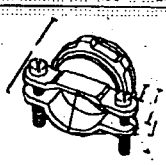


CAT #	A	B	C
952	.42	1.03	0.90
953	.57	1.20	1.19
954	.64	1.32	1.49
955	.60	1.32	1.75
956	.71	1.55	2.20



3/4 - 1 E155941
1 1/4-2 E148711

FOR OVAL NM CABLE						
952	19500	3/4"	OVAL NM 8-2 TO 6-3	25	250	25
953	19510	1"	OVAL NM 8-3 TO 4-3	25	250	37
954	19520	1 1/4"	OVAL NM 4-3 TO 1-3	10	100	24
955	19530	1 1/2"	OVAL NM 1-3 TO 1/0-3	10	100	34
956	19540	2"	OVAL NM 1/0-3 TO 4/0-3	5	50	45



CAT #	A	B	C
143R	1.190	1.500	.645
144R	1.330	1.900	.660
145R	1.470	2.115	.740
146R	1.620	2.640	.750



E170250

FOR NM & SE CABLE						
143R	10950	1"	SE CABLE 6-3, 4-3, 4-2, 2-2 NM CABLE 12-3, 12-4, 10-3, 10-4, 8-3, 8-2, 6-2, 4-2	25	250	37
144R	10960	1 1/4"	SE CABLE 10-2, 8-2, 6-2, 4-2 NM CABLE 8-3, 6-3, 4-3, 2-3	10	100	24
145R	10970	1 1/2"	SE CABLE 3-3, 3-2, 3-1	10	100	34
146R	10980	2"	SE CABLE 3-4/0	5	50	23



CAT #	A	B(Min)	B(Max)
971	1.87	.40	0.95
972	1.84	.50	1.10
973	2.00	.62	1.40
974	2.28	.50	1.38
975	2.49	.75	1.61
976	3.35	.90	2.04

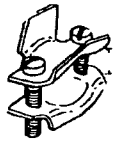


FOR NM & ROUND SE CABLE						
■ TAKE-ALL TYPE						
971	19580	1/2"		25	250	25
972	19590	3/4"	ROUND NM 8-2 TO 6-3	20	200	20
973	19600	1"	ROUND NM 8-3 TO 4-3	10	100	15
974	19610	1 1/4"	ROUND NM 4-3 TO 1-3	10	100	25
975	19620	1 1/2"	ROUND NM 1-3 TO 1/0-3	5	50	34
976	19630	2"	ROUND NM 1/0-3 TO 4/0-3	—	50	45

NM BOX CONNECTORS

■ TWO PIECE CLAMP BUTTERFLY TYPE

STEEL



CAT #	A	B	C
441	1.310	.640	—
442	1.750	.765	—
444	2.120	.765	—
445	2.500	.780	—

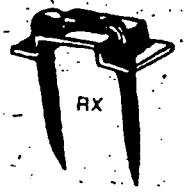


TOPAZ CAT#	UPC#	SIZE	FITS NM CABLE	UNIT CTN	SHIP CASE	WT/ CASE
441	13990	3/8" TO 1/2"	2 OR 3#14, 12, 10, 8	100	1000	50
442	14000	3/4 TO 1"	2 OR 3#8, 6, 4	50	500	35
444	14010	1 1/4"	#2/0	25	250	25
445	14020	1 1/2"	#3/0, #4/0	25	250	40

TOPAZ ELECTRIC • 925 Waverly Avenue • Holtsville, New York 11742 • 800-666-2852 • FAX 800-333-3488 • www.topaz-usa.com

The BRISCON® Family of Staples & Fasteners

SN150I (Insulated)



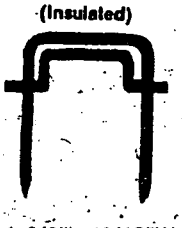
1 1/2"L 1/2"W
X-Long

SN150



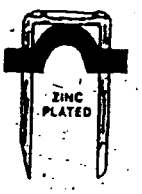
1 1/2"L 1/2"W
X-Long

SN300I (Insulated)



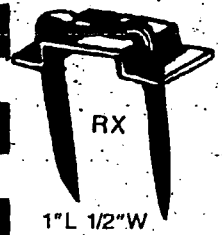
1 3/8"L 13/16"W
Range Cord

CX90



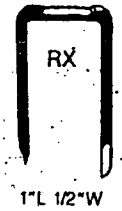
1"L 1/2"W
Coaxial Cable

SN40I (Insulated)



1"L 1/2"W

SN40



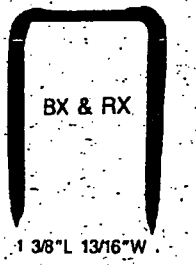
1"L 1/2"W

SN100



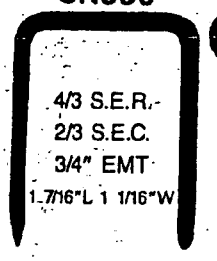
1 1/4"L 9/16"W

SN300



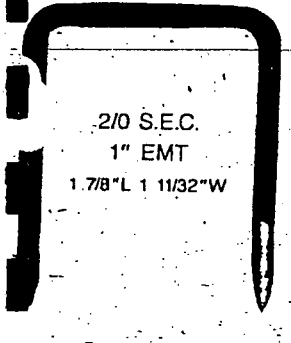
1 3/8"L 13/16"W

SN350



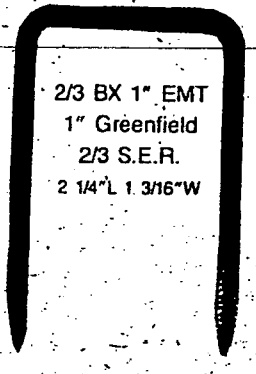
1 7/16"L 1 1/16"W

SN400



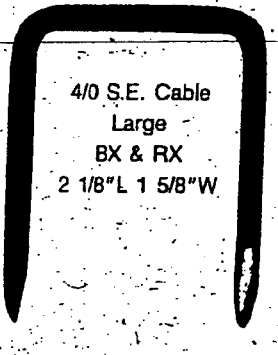
1 7/8"L 1 11/32"W

SN450



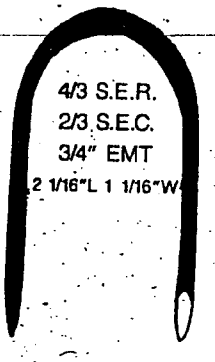
2 1/4"L 1 3/16"W

SN500



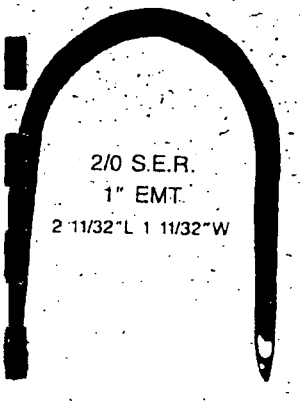
2 1/8"L 1 5/8"W

SN600



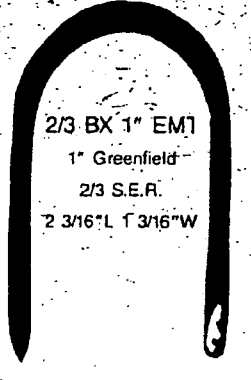
2 1/16"L 1 1/16"W

SN700



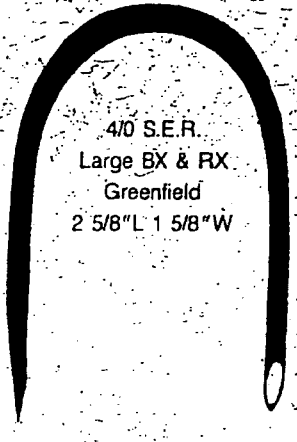
2 11/32"L 1 11/32"W

SN800



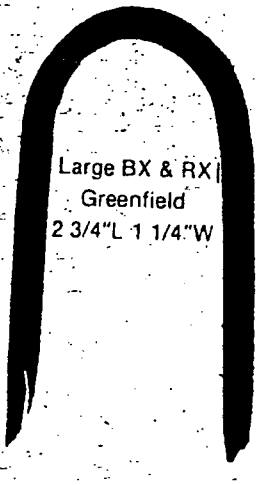
2 3/16"L 1 3/16"W

SN900

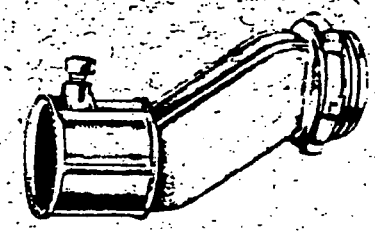


2 5/8"L 1 5/8"W

SN1000



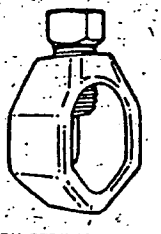
2 3/4"L 1 1/4"W



BRISCON®
E.M.T. CONNECTORS

SET SCREW OFFSET

NO.	SIZE	WT. PER C	STD. PKG.	PRICE PER C
2A2-2	1/2"	10	200	125.40
2A3-2	3/4"	15	100	167.15
2A4-2	1"	21	100	208.30

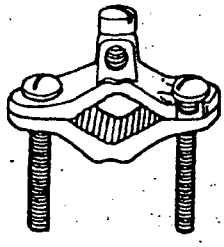


MADE OF HIGH STRENGTH BRONZE WITH HEX HEAD BOLT FOR EASY ASSEMBLY.

BRISCON®
GROUND ROD CLAMP

CAST BRONZE

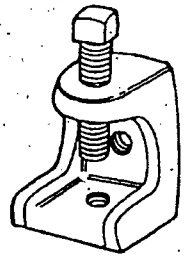
NUMBER	GROUND ROD SIZE	WIRE RANGE	WEIGHT PER 100	STANDARD PACKAGE	PRICE PER 100
GR-4	1/2	2 STR. — 10 SOL.	9	100	236.50
GR-5	5/8	1 STR. — 10 SOL.	15	50	280.55
GR-6	3/4	2/0 STR. — 8 SOL.	23	100	339.40



BRISCON®
GROUND FITTINGS

GF-1 DIE CAST ZINC PLATED — GF-2 SOLID BRASS
FOR BARE GROUND WIRE 8-6-4-2

NUMBER	PIPE SIZE	WEIGHT PER 100	UNIT	STANDARD PACKAGE	PRICE PER 100
GF-1	1/2" — 1"	18	20	200	174.10
GF-2	1¼" — 2"	48	5	50	446.50

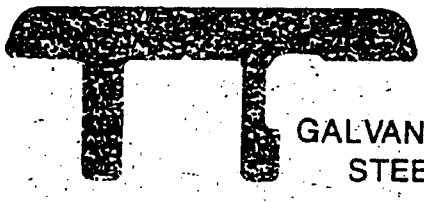


BRISCON®
BEAM CLAMPS

MALLEABLE

NUMBER	SIZE	WEIGHT PER 100	STANDARD PACKAGE	PRICE PER 100
BCM	1/4 — 20	32	200	141.80

BOX-SUPPORT

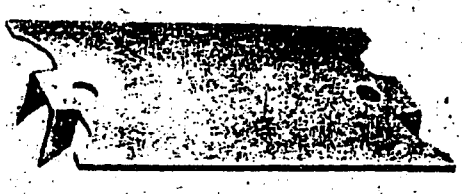


GALVANIZED STEEL

		WT. PER M	UNIT	STD. PKG.	PRICE/100 50 PAIR
BS1	Standard	20	100	1000	7.00
BS2	X-Long	30	100	1000	9.55

STUD "SAFETY PLATE"

16 GA. STEEL



	SIZE	WT. PER M	UNIT	STD. PKG.	PRICE/100
SSP-1	1½ x 2¾	80	50	500	10.50

STEEL JACK CHAIN

INDIVIDUALLY BOXED
ZINC PLATED - 100 FT. REEL



	SIZE	CARTON QUANTITY	WEIGHT	PRICE PER REEL
JC100	NO. 12	100' REEL	9 LBS.	18.30

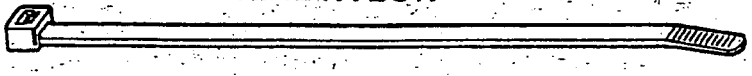
STANDARD & HEAVY "S" HOOKS

ZINC PLATED STEEL

		UNIT	STD. PKG.	WT. PER M	PRICE/100
SH10	NO. 10	100 PK	1000	9	10.00
SH12	NO. 12	100 PK	1000	15	4.70

CABLE TIES

COLOR CT NATURAL/CTB UV BLACK
MATERIAL NYLON

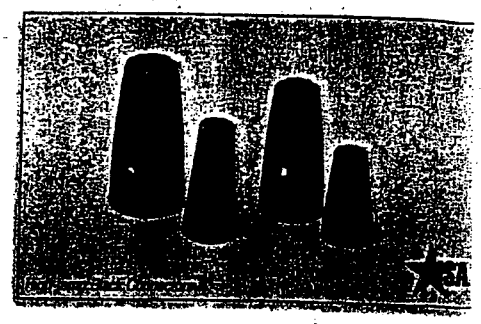


	LENGTH	BUNDLE DIAMETER	TENSILE LB	UNIT	STD. PKG.	PRICE/M NATURAL	PRICE/M UV BLACK
CT4/CTB4	4"	1/16-7/8	18	100	25M	15.15	17.45
CT5/CTB5	5.6"	1/16-1¼	30	100	20M	24.80	28.50
CT7/CTB7	7.5"	1/16-1¾	50	100	10M	33.30	38.35
CT11/CTB11	11"	1/16-3	50	100	5M	69.10	79.45
CT14/CTB14	14"	3/16-4	120	100	3M	133.30	153.35
*CT8/CTB8	8"	1/16-1¾	50	100	5M	71.35	82.05

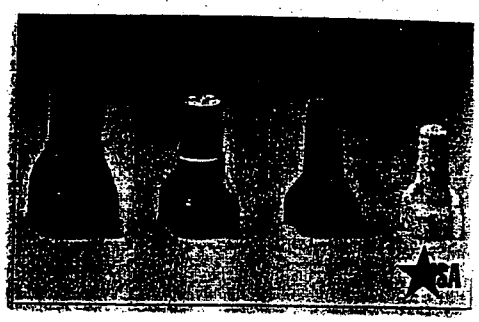
* (Screw Mount)

Hi-Temp Black Connectors for Tough Environments

For applications in high-temperature environments, specify Hi-temp Black connectors, temperature-rated to 150°C (302°F). Available in four standard models: GB-1, GB-2, GB-3 and GB-4 (see chart on previous page).

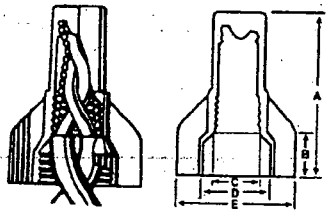


WingGard™ Color-coded Twist-on Connectors



Unsurpassed quality and durability in a high-leverage, easy-on wing-type design

- Easy-on, easy-off without tools. WingGard™'s finger-pleasing wings are knurled for a surer grip and offset from the centerline for greater twisting leverage. Easily removed for repeat usage on same size combination or larger.
- Secure connections mean positive continuity. The expandable square-wire plated spring instantly adjusts to the shape and size of the splice, then bites down to thread onto the wires without ratcheting and creates a strong, vibration-resistant connection. No pre-twisting or tools are necessary.
- Tough thermoplastic shell shields against environmental extremes. Flame-retardant, non-porous and non-corrosive shell resists surface cracking and chemical action. Temperature rating: 105°C (221°F).
- Superior flash-over protection. High-dielectric shell features deep skirt design to prevent exposure of bare wire. Buttress threads screw into wire insulation.
- Copper to copper connections only.



Dimensions					
Model	A	B	C	D	E
#84™	1 1/32	5/16	7/32	1/4	23/32
#86™	1 1/4	5/16	9/32	7/16	29/32
#88™	1 5/16	3/8	1 1/32	9/16	1 1/16
#89™	1 5/16	7/16	3/8	3/4	1 1/4

Catalog Number	Package Quantity	Model/Size	Application
19-084	6/Card	#84™	#22 to #10 AWG***
25-084	25/Resealable Bag	Yellow	Min: 2 #18
10-084	100/Box		Max: 3 #12
11-084	1,000/Bulk Case		
12-084	10,000/Bulk Keg		
13-084	10,000/Keg (20 bags of 500 ea.)		
50-084	5,000/Bucket (10 bags of 500 ea.)		
19-086	6/Card	#86™	#18 to #10 AWG***
25-086	25/Resealable Bag	Red	Min: 2 #14
10-086	100/Box		Max: 5 #12
11-086	1,000/Bulk Case		
12-086	10,000/Bulk Keg		
13-086	10,000/Keg (20 bags of 500 ea.)		
50-086	3,000/Bucket (6 bags of 500 ea.)		
19-088	3/Card	#88™	#18 to #8 AWG**
25-088	15/Resealable Bag	Gray	Min: 1 #12 w/2 #14
10-088	50/Box		Max: 4 #10 SOL
11-088	1,000/Bulk Case		
12-088	2,500/Bulk Keg		
13-088	2,500/Keg (25 bags of 100 ea.)		
19-089	2/Card	#89™	#14 to #6 AWG***
25-089	10/Resealable Bag	Blue	Min: 1 #10 w/1 #12
10-089	50/Box		Max: 1 #6 STR
11-089	1,000/Bulk Case		w/2 #8 STR
12-089	2,500/Bulk Keg		
13-089	2,500/Keg (25 bags of 100 ea.)		

** *Connections rated at 600 V Max.*
*** *Connections rated at 300 V Max. and 600 V Max. Connections rated at 600 V Max. for Building Wiring are rated at 1000 V Max. in lighting fixtures/luminaries and signs.*

Wire Connectors

GreenGard™ Grounding Connectors

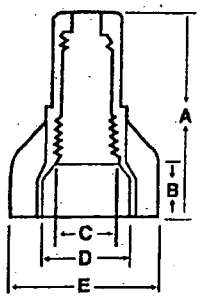
Specifically designed for making positive ground connections, GreenGard™ connectors feature the same live-action as GB WingGard™ connectors with the added plating protection for corrosion resistance in grounding applications.

- Contoured, offset wings enable firm ground connections with the twist of a hand.
- Flame retardant, thermoplastic shell resists punctures, cuts, abrasion and corrosion.
- Connectors have a hole in the tip for ground wire.
- Solid copper to copper connections only.

Catalog Number	Package Quantity	Model/Size	Application
19-095	6/Card	#95™	#14 to #10 AWG**
25-095	25/Resealable Bag	GreenGard™	Min: 2 #14
10-095	100/Box	Grounding	Max: 4 #12
11-095	1,000/Bulk Case	Connector	
12-095	10,000/Bulk Keg		
13-095	10,000/Keg (20 bags of 500 ea.)		

* *Connectors rated at 300V Max. rating.*
** *Connectors rated at 600V Max. and rated at 1000V Max. in lighting fixtures/luminaries and signs.*





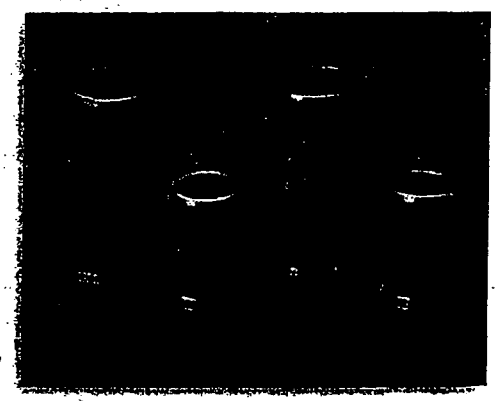
Dimensions					
Model	A	B	C	D	E
#95™	1 5/32	5/16	9/32	7/16	23/32

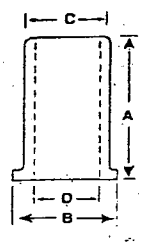
Crimp Connectors

Use GB crimp connectors for strong, vibration-resistant permanent connections in branch circuit and fixture wiring. Choose copper (models 310 and 311) or zinc-plated steel (models 410 and 411).

Use crimp tool GCP-400 (See page 110).

Catalog Number	Package Quantity	Model	Application
10-310	100/Box	310 (Copper)	#18 to #10 AWG Min: 2 #16 Max. 2 #10 w/1 #12
11-310	1,000/Bulk case		
10-410	100/Box	410 (Zinc-plated steel)	
11-410	1,000/Bulk Case		
13-410	10,000/Keg (20 bgs of 500 ea)		
10-311	50/Box	311 (Copper)	#14 to #8 AWG Min: 3 #12 Max: 4 #10
10-411	50/Box	411 (Zinc-plated steel)	





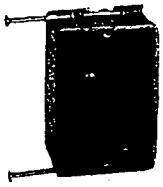
Dimensions				
Model	A	B	C	D
310/410	3/8	19/64	1/4	13/64
311/411	5/8	23/64	21/64	17/64

Steel City®

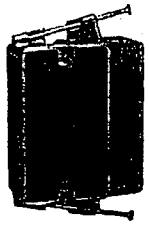
Single Gang—Nail-On



N1-614-M



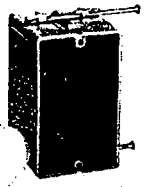
N1-614-R



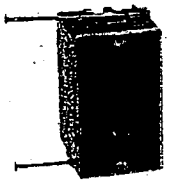
N01-712-R



N01-712-M



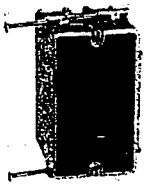
N1-710-R



N1-710-M



SN-18



SN-18-FS

Thermoplastic

Cat. No.	Size cu. in.	Feature	Mounting Means	Outside Dim. (in.) L.	W.	D.	Std. Pkg.	Residential New	Old	Mfrd. Housing
N1-614	12.0	⅞" Offset Wallboard Tabs	Reverse Angled Side Nails	3½	2⅛	1⅜	100			✓
N1-614-R		⅞" Offset						✓		
N01-712-R	16.0	⅞" Offset Wallboard Tabs	Angled Side Nails	4	2¼ opn 3¼ over-all	1¼		✓		
N01-712-M										✓
N1-710	18.0	—	Angled Side Nails	3¾	2¼	2⅛		✓		
N1-710-M		⅞" Offset Wallboard Tabs	Reverse Angled Side Nails							✓
SN-18		—	Angled Side Nails	3 7/32	2⅛	2⅜		✓		
SN-18-FS		Fast Set						✓		
RN-18		—	Recessed Angled Nails	3 7/32	2⅛	3		✓		
RN-18-FS		Fast Set						✓		
SN-21	20.5	—	Angled Side Nails	3 7/32	2⅛	3⅜		✓		
SN-21-FS		Fast Set						✓		
RN-21		—	Recessed Angled Nails	3 7/32	2⅛	3⅜		✓		
RN-21-FS		Fast Set						✓		
RN-23	22.5	—						✓		
RN-23-FS		Fast Set						✓		
RS-18	18.0	—	Recessed Angled Screws	3 21/32	2⅝	3		✓		
RS-21	20.5	—				3⅜				
RS-23	22.5	—	Recessed Angled Screws	3 21/32	2⅝	3⅝		✓		
RD-30	30.0	Large KO for #6 or #8 cable Suitable for Range & Dryer use.	Recessed Angled Nails	3 11/16	3 17/32	3⅝	50	✓		
RDS-30	30.0		Recessed Angled Screws	3 11/16	3 17/32	3⅝		✓		

NEW NEW NEW NEW

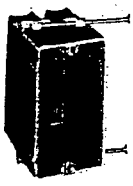
- *Permissible for use with 90°C insulated conductors*
- *80°C heat rated material*



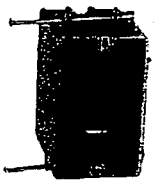
RN-18



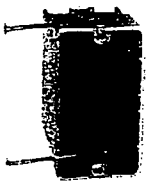
RN-18-FS



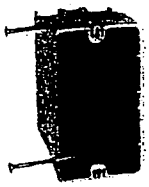
SN-21



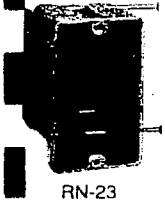
SN-21-FS



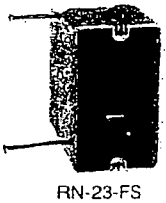
RN-21



RN-21-FS



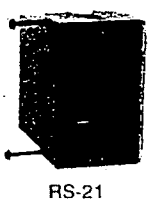
RN-23



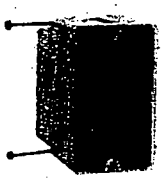
RN-23-FS



RS-18



RS-21



RS-23

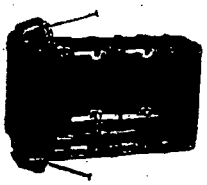


RDS-30

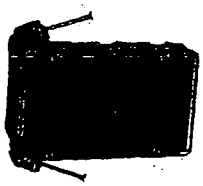
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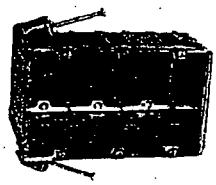
Three Gang—Nail On



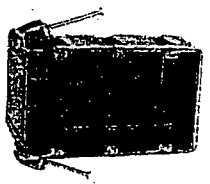
1043-C



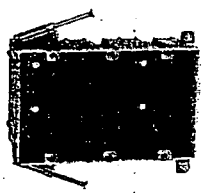
1043



1063-C



1063



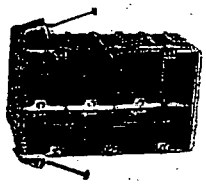
SN-357



SN-357-FS

Reinforced Phenolic

Cat. No.	Size cu. in.	Feature	Mounting Means	Outside Dim. (in.) L.	W.	D.	Std. Pkg.	Residential New	Old	Mfrd. Housing
1043-C	42.9	High Clamps	Compound Angled Nails	3⅜	5¼	2¾	20	✓		✓
NEW 1043-PC		Non-Metallic Clamps						✓		✓
1043		#36 Clamps Bulk Packed						✓		✓
1063-C	58.5	High Clamps		3⁹⁄₃₂	5⁹⁄₁₆	3¹⁄₃₂		✓		
1063		#36 Clamps Bulk Packed						✓		
NEW 1063-C-UB-S		High Clamps	Compound Angled Screws					✓		



1063-C-UB-S

Thermoplastic

Cat. No.	Size cu. in.	Feature	Mounting Means	Outside Dim. (in.) L.	W.	D.	Std. Pkg.	Residential New	Old	Mfrd. Housing
SN-357	56.5	¾" Offset Wallboard Tabs Molded Fast Clamp	Compound Angled Nails	5¹³⁄₁₆	3¼	3⅛	20	✓		
SN-357-FS		¾" Offset Wallboard Tabs Molded Fast Clamp/ Fast Set						✓		
NEW SS-357		¾" Offset Wallboard Tabs Molded Fast Clamp	Compound Angled Screws					✓		

- *Permissible for use with 90°C insulated conductors*
- *80°C heat rated material*
- *Classified for two hour firewall*



SS-357

Steel City®

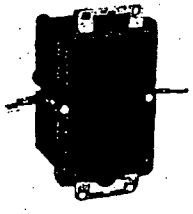
Single Gang—Brackets



9050-702



7090

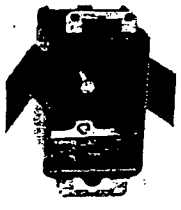


6020-402

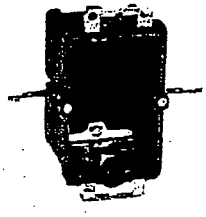


7060

NEW



7020-8



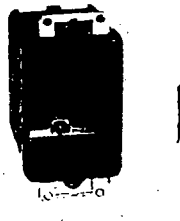
6050-4

Reinforced Phenolic

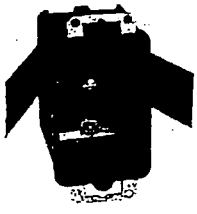
Cat. No.	Size cu. in.	Feature	Mounting Means	Offset Inch	Outside Dim. (in.) L.	W.	D.	Std. Pkg.	Residential New	Old	Mfrd. Housing
9050-702	5.0	See NEC 725-2 Class 2 only	¼" Offset Bracket for Wood/ Steel Studs	¼	3 3/16	2 1/8	1	100	✓		
7090	7.5		Ears	—	3 1/4	2 1/4	1 1/16				✓
6020-402	8.0	Ears	Ears, #4 Swing Brackets		3 7/16		1 1/4				✓
7060	9.0		Ears								✓
7020-β	10.0	High Clamps	Ears, #8 Snap-in Bracket		3 1/4	2 5/16	2 1/4	50		✓	✓
6050-4	10.5		Ears, #4 Swing Brackets		3 1/2	2 1/4	2 1/4	100		✓	✓
7010			Ears							✓	✓
7010-8											
7010-8-PC	12.5	Non-Metallic Clamp	Ears, #8 Snap-in Bracket		3 1/4	2 5/16	2 1/16	50		✓	✓
6090-402	14.0	No Clamp Blocks	Ears, #4 Swing Brackets				2 1/2			✓	✓
6010	16.0	High Clamps	Ears							✓	✓
6010-02		—								✓	✓
6010-4-UB		High Clamps	Ears, #4 Swing Brackets		3 3/8	2 3/4	2 3/4	100		✓	✓
6010-402		—								✓	✓
6000-402*†		No Clamp Blocks				2 1/2	1 1/16	50			✓
6060-402						2 3/4	2 3/16	100			✓

• *150°C heat rated material*
• *Classified for two hour firewall/fireceiling*

* *Not U.L. Listed*
† *U.L. Recognized component*



7010



7010-8



6090-402



6010



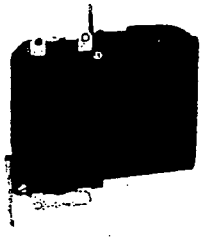
6010-02



6010-4-UB



6010-402



6000-402

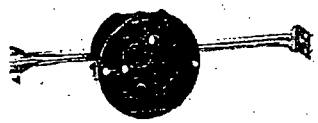


6060-402

Thomas&Betts

Steel City®

4" Outlet Boxes—Bar Hanger



4060-9402



4060-9502



4070-94



4070-9402

Reinforced Phenolic

Cat. No.	Size cu. in.	Feature	Mounting Means	Depth (in.)	Std. Pkg.	Residential New	Residential Old	Mfrd. Housing
4060-9402	13.5	#36 Clamps Bulk Packed	16" Bar Hanger	1⅛	50	✓		
4060-9502			24" Bar Hanger			✓		
4070-94	20.8	High Clamps	16" Bar Hanger 12¼" min.-19" max.	2⅛		✓		
4070-9402		#36 Clamps Bulk Packed				✓		
4070-95		High Clamps	24" Bar Hanger 16⅞" min.-27" max.			✓		
4070-95-40		Ground Strap						
4070-9502		#36 Clamps Bulk Packed				✓		

- ***150°C heat rated material***
- ***Classified for two hour firewall/fireceiling***



4070-95



4070-95-40



4070-9502



N-423-C-94



N-423-GC-94



N-423-C-95



N-423-GC-95

Thermoplastic (STC-2000)

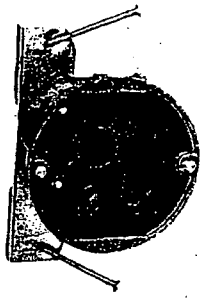
Cat. No.	Size cu. in.	Feature	Mounting Means	Depth (in.)	Std. Pkg.	Residential New	Residential Old	Mfrd. Housing
N-423-C-94	22.5	Molded Fast Clamps	16" Bar Hanger 12¾" min.-19" max.	2½	50	✓		
N-423-GC-94		Molded Fast Clamps Ground Strap Installed				✓		
N-423-C-95		Molded Fast Clamps	24" Bar Hanger 16⅞" min.-27" max.			✓		
N-423-GC-95		Molded Fast Clamps Ground Strap Installed				✓		

- ***90°C heat rated material***
- ***Classified for two hour firewall/fireceiling***

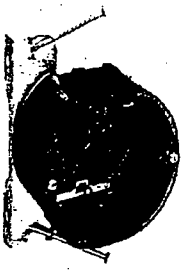
Thomas&Betts

Steel City®

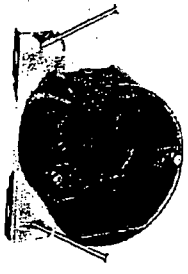
4" Outlet Boxes—Brackets



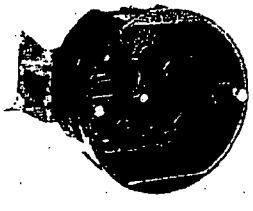
4060-N02



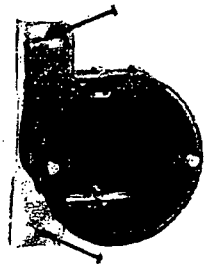
4070-N



4070-N02



4070-302



4070-N-S

Reinforced Phenolic

Cat. No.	Size cu. in.	Feature	Mounting Means	Depth (in.)	Std. Pkg.	Residential		Mfrd. Housing
						New	Old	
4060-N02	13.5	#36 Clamps Bulk Packed	"N" Bracket	1¾	50	✓		
4070-N	20.8	High Clamps		2¾		✓		
4070-N02		#36 Clamps Bulk Packed				✓		
4070-302			#3 Bracket					
NEW 4070-N-PC		Non-Metallic Clamp	N-Bracket With Screws			✓		
NEW 4070-N-S		High Clamps	N-Bracket With Screws			✓		

- *150°C heat rated material*
- *Classified for two hour firewall/fireceiling*

Type SE Style R

Description:

Alcan Type SE Style R three conductor insulated, round-type Service Entrance Cable is designed for above-ground service entrance use, as well as interior wiring.* The cable meets the requirements of Underwriters Laboratories Inc., Standard #854 and is approved for use in accordance with the recommendations of the National Electrical Code as Type SE. Alcan Type SE Style R meets the requirements of Federal Specification JC-30B. STABILOY alloy conductor is recognized by ASTM in Standards B 800 and B 801.

Conductor:

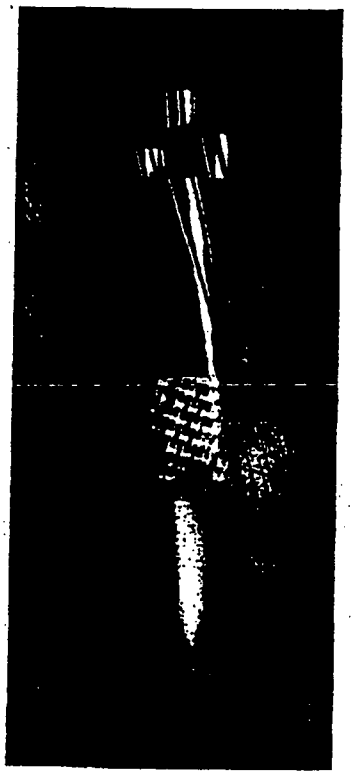
STABILOY: #8 is solid, all other sizes compact stranded (AA-8000 Series aluminum alloy).

Insulation:

Black cross-linked polyethylene (XLPE).

Identification:

Insulated conductors are phase identified. One insulated conductor has a single longitudinal red stripe. One insulated conductor is total surface painted white. One insulated conductor is black. If provided, a fourth insulated conductor has a single longitudinal blue stripe.



Cables will bear the following surface marking: Alcan (Plant Of Manufacture) STABILOY® AA-8000 AL Type SE Cable Style R XHHW 600 V 3 CDRS (Size) 1 CDR (Size) (UL) (Year Of Manufacture).

Construction:

The conductors are twisted together and a glass-reinforced tape is applied over the twisted conductors. A polyvinyl chloride (PVC) jacket is extruded over the subassembly. The jacket is flame retardant, moisture resistant, and sunlight resistant. The PVC used for jacket by Alcan Cable is now free of the heavy metals lead and cadmium.

Marking:

Three conductor cables with ground will bear the following surface marking: Alcan (Plant Of Manufacture) STABILOY® AA-8000 AL Type SE Cable Style R XHHW 600 V 3 CDRS (Size) 1 CDR (Size) (UL) (Year Of Manufacture).

Three conductor cables without ground will bear the following surface marking: Alcan (Plant Of Manufacture) STABILOY® AA-8000 AL Type SE Cable Style R XHHW 600 V 3 CDRS (Size) (UL) (Year Of Manufacture).

INSULATED CONDUCTOR		BARE CONDUCTOR		Nominal Diameter	NOMINAL WEIGHT (LBS./1000 FT.)		STANDARD PACKAGE	
Size/AWG	Stranding	Size/AWG	Stranding	(Inches)	STABILOY	Total	Length	Reel
8	Solid	8	Solid	.630	62	128	1000'	NRC 24.18
6	7	6	7	.710	100	180	1000'	NRC 27.18
4	7	6	7	.790	145	240	1000'	NRC 30.24
2	7	4	7	.920	230	344	1000'	NRC 30.24
1	19	3	7	1.105	285	432	1000'	NRC 34.26
1/0	19	2	7	1.135	350	521	1000'	NRC 36.28
2/0	19	1	19	1.230	455	633	500'	NRC 30.24
3/0	19	1/0	19	1.350	572	771	500'	NRC 32.24
4/0	19	2/0	19	1.470	722	942	500'	NRC 36.24

NOTES:

1. *Data are approximate and subject to normal manufacturing tolerances.*
2. *Standard lengths are subject to normal manufacturing tolerances of ± 10%.*

**Also available in two conductor with ground and four conductor with ground cable assemblies.*

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COLONIAL WIRE & CABLE CO., INC

PHONE (516) 234-6600
FAX (516) 234-6644

P.O. BOX 12117
40 ENGINEERS ROAD
HAUPPAUGE, LONG ISLAND, N.Y. 11788

UF-B: Copper Conductor - 600 Volt Building Wire - Conductors have 90° C THHN Insulation

APPLICATION: Type UF-B cable is permitted for use underground, including direct burial in the earth, as feeder or branch-circuit cable where provided with overcurrent protection. Type UF-B may be exposed to direct rays of the sun when identified as sunlight-resistant. Type UF-B cable may be used for interior wiring in wet, dry, or corrosive locations under the recognized wiring methods of the National Electrical Code. Type UF-B cables are not to be used as service entrance cables or in commercial garages, theaters, in motion picture studios, in storage battery rooms, in hoistways, in any hazardous (classified) location, embedded in poured cement, concrete, or aggregate.

SPECIFICATIONS: U.L. Listed, Standard 493; conforms to Federal specification JC-30-B.

MADE IN THE U.S.A.

Conductor AWG Size	THICKNESS MILS		APPROX. NET WT./PER M.F.T.		Approx. O.D. Inches	Put-up Feet per Unit	Ampacity
	Insulation	Jacket	Without Ground	With Ground			
TWO CONDUCTOR — 600 VOLTS							
14 Solid	19	30	57	70	.17 x .40	250'	15
12 Solid	19	30	72	90	.19 x.43	250'	20
10 Solid	24	30	105	135	.22 x .53	250'	30
8 Stranded	35	45		220	.30 x .67	250'*	40
6 Stranded	35	45		315	.34 x .75	250'*	55
THREE CONDUCTOR — 600 VOLTS							
14 Solid	19	30	85	100	.18 x .60	250'	15
12 Solid	19	30	123	130	.20 x .65	250'	20
10 Solid	24	30	150	195	.23 x .80	250'	30
8 Stranded	35	45		315	.30 x .92	125'	40
6 Stranded	35	45		450	.34 x 1.10	125'	55

*125' CARTON AVAILABLE ON REQUEST.

UF - B U.L. # E-26113

OBH - O&M 572

COLONIAL WIRE & CABLE CO., INC

PHONE (516) 234-8300
FAX (516) 234-8544

P.O. BOX 12117
40 ENGINEERS ROAD
HAUPPAUGE, LONG ISLAND, N.Y. 11788

NM-B: Copper Conductor — 600 Volt Building Wire - Conductors have 90° C THHN Insulation

APPLICATION: Colonial NM-B (Non-Metallic Sheathed Cable) may be used for either new wiring or for rewiring in normally dry locations at temperatures not to exceed 90°C as defined in article 336 of the National Electrical Code. NM-B may be used for both exposed and concealed work in one and two family dwellings or multi-family dwellings and other structures not exceeding three floors above grade. Type NM-B cable may be installed or run in air voids in masonry blocks or tile walls where such walls are not subject to excessive moisture or dampness. Type NM-B shall not be installed where exposed to corrosive fumes or vapors; nor shall it be embedded in masonry, concrete, fill or plaster, nor run in shallow chase in masonry or concrete and covered with plaster or similar finish. It is not permissible to use type NM-B cable as service entrance cables, in commercial garages, theaters and assembly halls, in motion picture studios , in storage battery rooms, in hoistways, in any hazardous location, or embedded in poured concrete, cement or aggregate.

SPECIFICATIONS: U.L. Listed, Standard 719; Conforms to Federal Specification JC-30-B.

MADE IN THE U.S.A.

CONDUCTOR			Jacket Thickness Mils	Approx. O.D. Finished	Standard Feet per Put-Up	Approx. Net Wt. Lbs./M Ft.		"Ampacity" *
AWG Size	No. of Strands	Insulation Thickness Mils				Without Grd. Wire	With Grd. Wire	
TWO CONDUCTOR								
14	1	19	30	.18 x .39	250'	54	67	15
12	1	19	30	.20 x .42	250'	70	88	20
10	1	24	30	.23 x .50	250'	102	140	30
8	19	35	30	.31 x .66	250'*		220	40
6	19	35	30	.33 x .75	250'*		305	55
THREE CONDUCTORS								
14	1	19	30	.39	250'	78	90	15
12	1	19	30	.42	250'	109	130	20
10	1	24	30	.46	250'	158	185	30
8	19	35	30	.62	125'	270	310	40
6	19	35	30	.75	125'	330	415	56

*125' CARTON AVAILABLE ON REQUEST.

**Consult the N.E.C.

NM-B U.L # E-24723

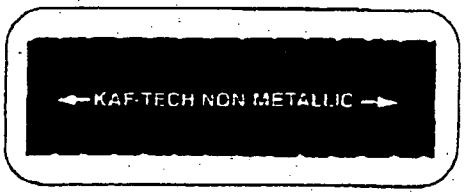
OBH - O&M 573

NMC

UL Non-Metallic PVC Liquid-Tight Conduit

KAF-TECH INC.
7100 123rd Circle N.
Suite 500
Largo, FL 33773
(727) 539-0588
Fax (727) 539-0278

UL-Listed — File #E121778



Specification Description

Type Product Code	Description	Temperature Range	Listing
NMT/ 60XX		-20°C to +80°C	UL CSA

Applications

Designed for a variety of general purpose installations where flexibility and protection from moisture are necessary. Non metallic conduit is sunlight resistant, lightweight and non-conductive. For use indoors or out.

References & Ratings

- UL 1660, CSA Certified
- NEC 351-8, 354-15, 501-4(b), 502-4, 503-3, 511-6, 620, 645-5(d), 680-20
- Canadian Electrical Code (CEC) Part 1 Clause 12-1300
- UL approved for use in direct burial applications (size 3/8" through 1")

Weights, Measurements and Packaging

Product Code	Trade Size (inches)	Trade Size (mm)	Minimum Wall Thickness	Coil Length (feet)	Reel Length (feet)	Inside Diameter inch min/max	Outside Diameter inch min/max	Weight/ 100 feet (pounds)	Bend Radius (inches)
6001	3/8	12	0.095	100	1000	0.484/0.504	0.690/0.710	13	2
6002	1/2	16	0.090	100	1000	0.622/0.642	0.820/0.840	14.5	3.25
6003	3/4	21	0.095	100	700	0.820/0.840	1.030/1.050	16.5	4.25
6004	1	27	0.100	100	500	1.041/1.066	1.290/1.315	26	6.5
6005	1-1/4	35	0.105	50	—	1.380/1.410	1.630/1.660	34	8
6006	1-1/2	41	0.125	50	—	1.575/1.600	1.865/1.900	45	9
6007	2	53	0.125	50	—	2.020/2.045	2.340/2.375	62	11.1

NOTE: All dimensions and weights are subject to normal manufacturing tolerances

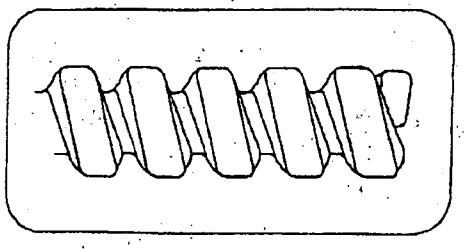
UFS/ALF

Reduced Wall Steel/ Aluminum Flexible Conduit

KAF-TECH INC.
7100 123rd Circle N.
Suite 500
Largo, FL 33773
(727) 539-0588

Specification Description

Product Code	Description	Construction	Listing
55XX	Reduced Wall Flexible Conduit	Steel	UL, CSA
56XX	Reduced Wall Flexible Conduit	Aluminum	UL, CSA



References & Ratings

- UL 1, UL 1479. UL File #E106956
- Federal Specification WW-C-566C. (now superseded by UL 1)
- NEC 300-22(c). 350. 430-123. 502-4. 503-3. 517-30. 645-5
- UL rated for Cable Tray and Environment Air-Handling space installation; 1, 2-hour (aluminum, steel) and 3-hour (steel) through-penetration Fire Wall rated.

Weights, Measurements and Packaging

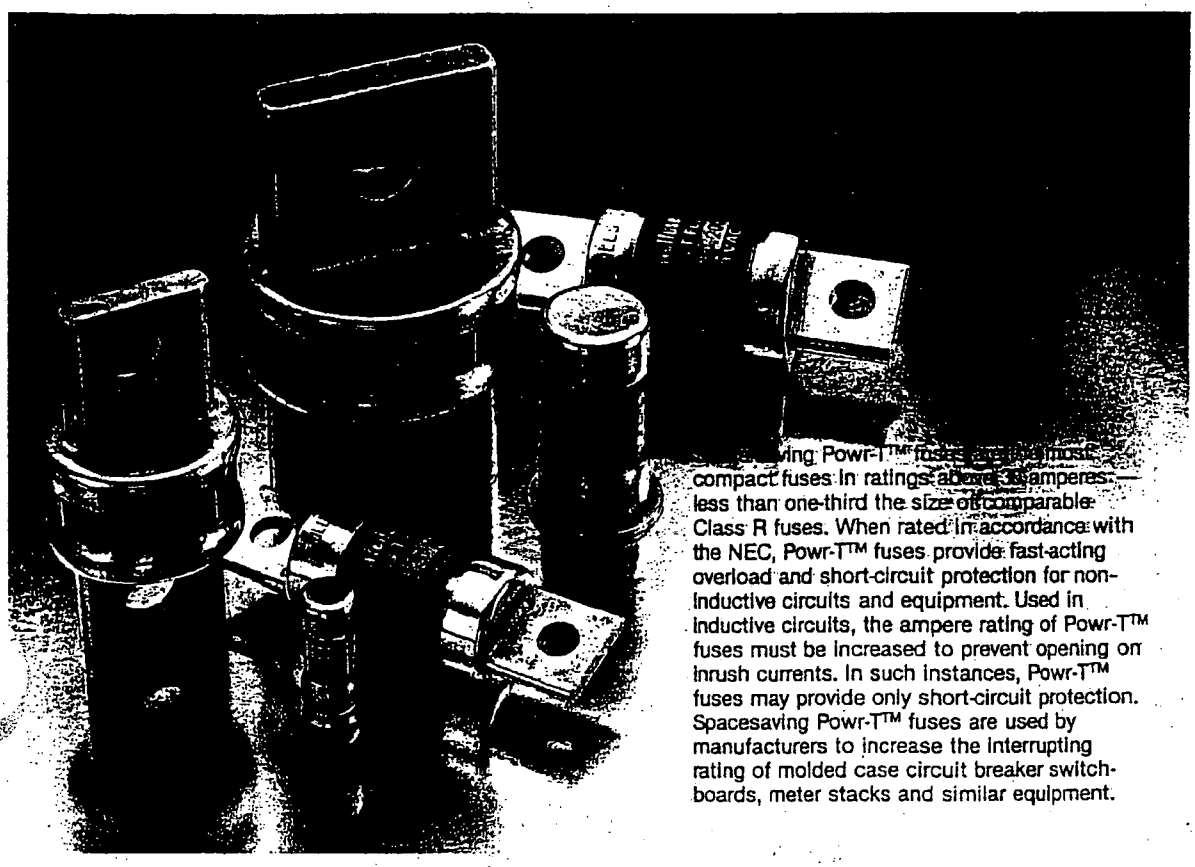
Product Code*	Trade Size (inches)	Trade Size (mm)	Coil Length (feet)	Reel Length (feet)	Internal Diameter (min/max) inches	External Diameter (min/max) inches	Approx. Weight/ 100 feet (pounds)*	Bend Radius (inches)
5501/5601	3/8	12	100	500 1000	0.375/0.393	0.560/0.610	18/7	2
5502/5602	1/2	16	100	500 1000	0.625/0.645	0.860/0.920	28/12	3
5503/5603	3/4	21	100	500	0.812/0.835	1.045/1.105	33/15	4
5504/5604	1	27	50	300	1.000/1.040	1.300/1.380	52/28	5
5505/5605	1-1/4	35	50	200	1.250/1.300	1.550/1.630	65/35	6-1/4
5506/5606	1-1/2	41	25	—	1.500/1.575	1.850/1.950	80/40	7-1/2
5507/5607	2	53	25	—	2.000/2.080	2.350/2.450	100/75	10
5508/5608	2-1/2	63	25	—	2.500/—	2.860/3.060	150/90	12-1/2
5509/5609	3	78	25	—	3.000/—	3.360/3.560	190/110	15
5510/5610	3-1/2	91	25	—	3.500/—	3.860/4.060	220/125	17-1/2
5511/5611	4	103	25	—	4.000/—	4.360/4.560	270/140	20

JTE: All dimensions and weights are bject to normal manufacturing tolerances

*Dual values refer to steel and aluminum conduits respectively

Powr-T™ JLLN/JLLS CLASS T FUSES

ST-ACTING • 300/600 VAC • 125 VDC • 1.– 1200 AMPERES • 200,000 A.I.R. AC/20,000 A.I.R. DC



ving Powr-T™ fuses are the most compact fuses in ratings above 30 amperes— less than one-third the size of comparable Class R fuses. When rated in accordance with the NEC, Powr-T™ fuses provide fast-acting overload and short-circuit protection for non-inductive circuits and equipment. Used in inductive circuits, the ampere rating of Powr-T™ fuses must be increased to prevent opening on inrush currents. In such instances, Powr-T™ fuses may provide only short-circuit protection. Spacesaving Powr-T™ fuses are used by manufacturers to increase the interrupting rating of molded case circuit breaker switchboards, meter stacks and similar equipment.

FEATURES/BENEFITS:

200,000 A.I.R.

- Reliable interruption of all overcurrents up to 200,000 amperes.
- Minimizes need for short-circuit calculations.

Extremely current limiting

- Greatly reduces damage caused by heating and magnetic effects of short-circuit currents.
- Stops damaging short-circuit current faster than any mechanical protective device.
- Often permits use of readily-available, less-costly equipment. See Application Section.

Fast-acting

- Provides fast-acting protection to equipment such as variable speed drives, rectifiers, and other equipment containing surge sensitive components.
- Used as input or output fuses for such equipment, may prevent opening of expensive semiconductor fuses protecting individual components.

Widest choice of voltage ratings

- JLLN 300 volt UL listed Class T fuses. UL listed for circuits not exceeding 300 volts. However, UL does not include testing 300 volt Class T fuses on 277/480 volt three-phase bolted faults. Therefore, Littelfuse does not recommend using 300 volt Class T fuses where voltage exceeds 300 volts, phase-to-phase.
- Contact factory for information on 480 volt JLLT fuses.
- JLLS 600 volt UL listed Class T fuses.

CHARACTERISTICS:

Voltage ratings

AC: 300 Volts (JLLN); 600 Volts (JLLS)

DC: 125 Volts (JLLN 110-1200A); Contact factory for JLLS DC ratings.

Interrupting ratings

AC: 200,000 amperes rms symmetrical.

DC: 20,000 amperes (JLLN 110-1200A).

Ampere range

JLLN: 1 — 1200 amperes.

JLLS: 1 — 800 amperes.

Approvals

UL listed Class T fuse per UL 198H; JLLN (110-1200A) additionally UL Listed per UL 198L.

CSA Certified HRCI-T: 1 — 600 amperes.

RECOMMENDED FUSE BLOCKS:

See Littelfuse Class T fuse blocks in Fuse Block Section of this catalog.

AMPERE RATINGS:

1	15	40	80	150	300	600
2	20	45	90	175	350	800
3	25	50	100	200	400	1000*
6	30	60	110	225	450	1200*
10	35	70	125	250	500	

*Not available in JLLS, 600 volt ratings

FUSE DIMENSIONS:

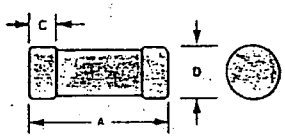


FIG. 1

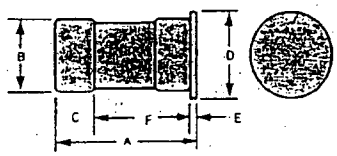


FIG. 2

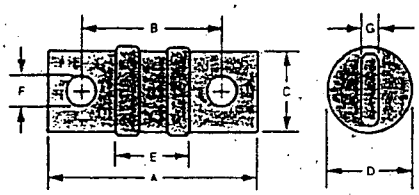
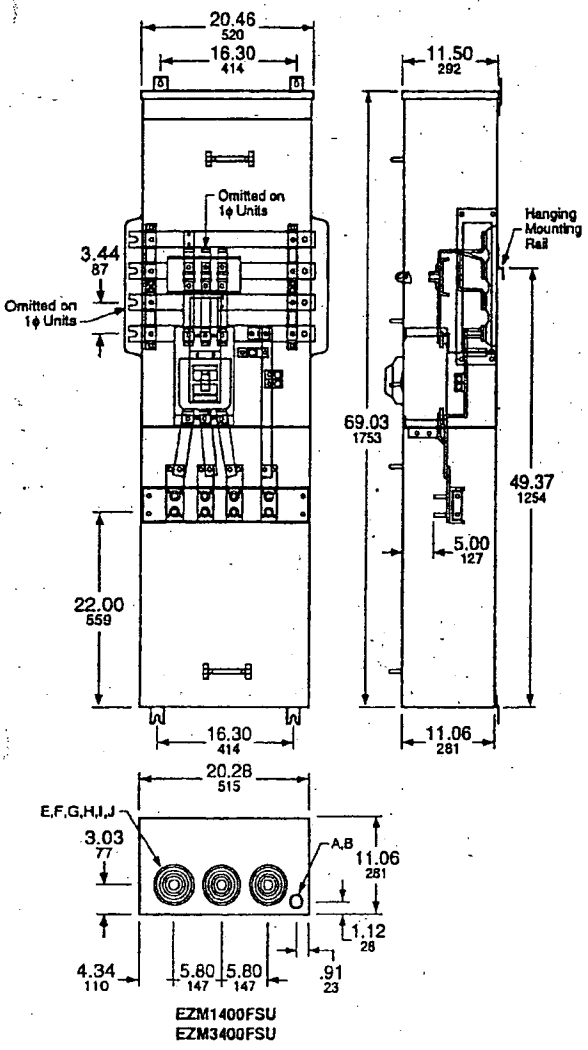


FIG. 3

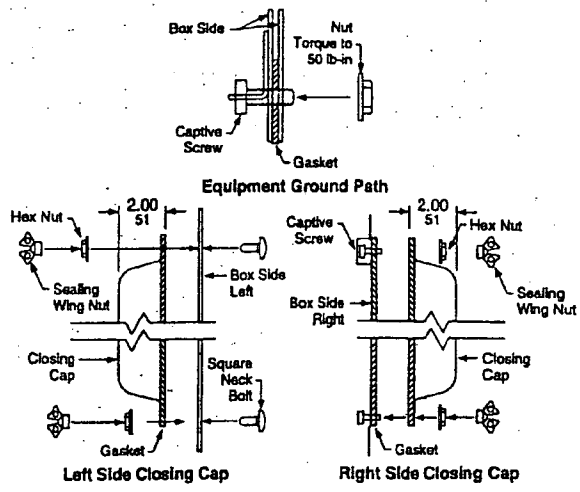
AMPERES	REFER TO FIG. NO.	SERIES	DIMENSIONS IN INCHES (mm in parentheses)						
			A	B	C	D	E	F	G
1 — 30	1	JLLN	7/8 (22.2)	—	9/32 (7.1)	13/32 (10.3)	—	—	—
		JLLS	1-1/2 (38.1)	—	9/32 (7.1)	9/16 (14.3)	—	—	—
35 — 60	1	JLLN	7/8 (22.2)	—	9/32 (7.1)	9/16 (14.3)	—	—	—
	2	JLLS	1-9/16 (39.7)	13/16 (20.6)	13/32 (10.3)	1 (25.4)	1/16 (1.6)	1-3/32 (27.8)	—
70 — 100	3	JLLN	2-5/32 (54.8)	1-9/16 (39.7)	3/4 (19.1)	13/16 (20.6)	27/32 (21.4)	9/32 (7.1)	1/8 (3.2)
		JLLS	2-61/64 (75.0)	2-23/64 (59.9)	3/4 (19.1)	13/16 (20.6)	1-41/64 (41.7)	9/32 (7.1)	1/8 (3.2)
110 — 200	3	JLLN	2-7/16 (61.9)	1-11/16 (42.9)	7/8 (22.2)	1-1/16 (27.0)	27/32 (21.4)	11/32 (8.7)	3/16 (4.8)
		JLLS	3-1/4 (82.6)	2-1/2 (63.5)	7/8 (22.2)	1-1/16 (27.0)	1-21/32 (42.1)	11/32 (8.7)	3/16 (4.8)
225 — 400	3	JLLN	2-3/4 (69.9)	1-27/32 (46.8)	1 (25.4)	1-5/16 (33.3)	53/64 (21.0)	13/32 (10.3)	1/4 (6.4)
		JLLS	3-5/8 (92.1)	2-23/32 (69.1)	1 (25.4)	1-19/32 (40.5)	1-23/32 (43.7)	13/32 (10.3)	1/4 (6.4)
450 — 600	3	JLLN	3-1/16 (77.8)	2-1/32 (51.6)	1-1/4 (31.8)	1-19/32 (40.5)	7/8 (22.2)	31/64 (12.3)	5/16 (7.9)
		JLLS	3-63/64 (101.2)	2-61/64 (75.0)	1-1/4 (31.8)	2-1/16 (52.4)	1-49/64 (44.8)	31/64 (12.3)	5/16 (7.9)
800	3	JLLN	3-3/8 (85.7)	2-7/32 (64.3)	1-3/4 (44.5)	2-1/16 (52.4)	7/8 (22.2)	35/64 (13.9)	3/8 (9.5)
		JLLS	4-21/64 (109.9)	3-11/64 (80.6)	1-3/4 (44.5)	2-1/2 (63.5)	1-55/64 (47.2)	35/64 (13.9)	3/8 (9.5)
1000 — 1200	3	JLLN	4 (101.6)	2-17/32 (64.3)	2 (50.8)	2-1/2 (63.5)	1-1/32 (26.2)	39/64 (15.5)	7/16 (11.1)

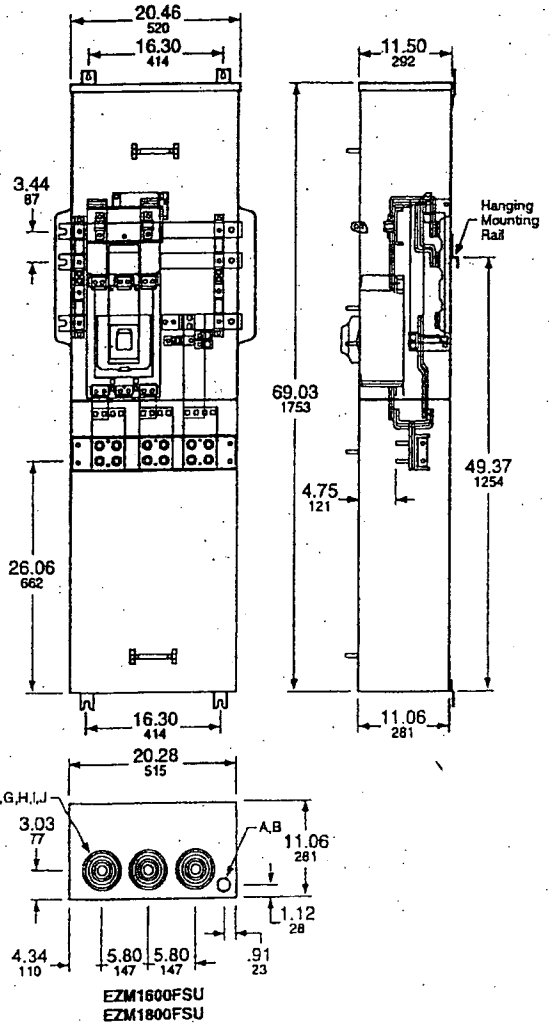
ROA_01715

EZ METER-PAK® Meter Centers — Class 4161, 4162
Dimensions and Knockouts



EZM1400FSU
EZM3400FSU





EZM1600FSU
EZM1800FSU

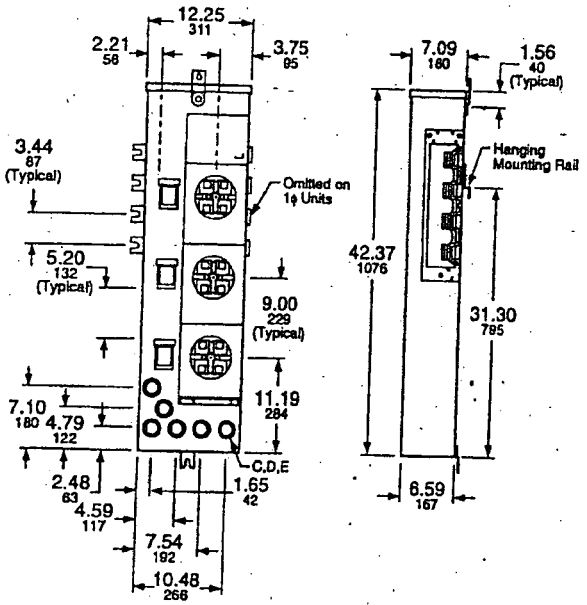
Dual Dimensions: INCHES / Millimeters

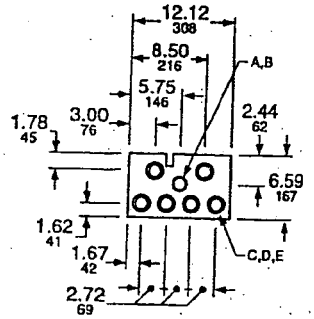
Symbol	Knockouts			
	Conduit Size		Hole Diameter	
	IN	mm	IN	mm
A	.50	13	.88	22
B	.75	19	1.25	32
C	1.00	25	1.38	35
D	1.25	32	1.75	44
E	1.50	38	2.00	51
F	2.00	51	2.50	64
G	2.50	64	3.00	76
H	3.00	76	3.63	92
I	3.50	89	4.13	105
J	4.00	102	4.63	118

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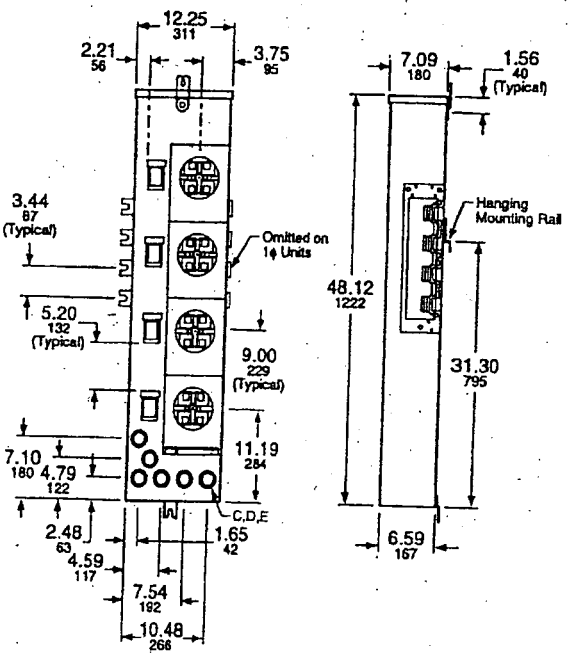
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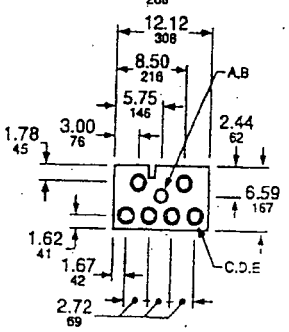
EZ METER-PAK® Meter Centers — Class 4161, 4162
Dimensions and Knockouts





EZM113125, EZM313125
EZMR113125, EZMR313125
EZMH113125, EZMH313125





EZM114125, EZM314125
EZMR114125, EZMR314125
EZMH114125, EZMH314125

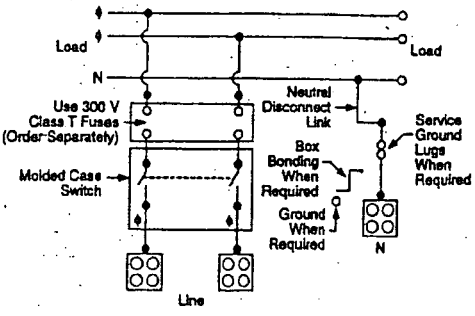
Dual Dimensions: INCHES
Millimeters

Symbol	Knockouts			
	Conduit Size		Hole Diameter	
	IN	mm	IN	mm
A	.50	13	.88	22
B	.75	19	1.25	32
C	1.00	25	1.38	35
D	1.25	32	1.75	44
E	1.50	38	2.00	51
F	2.00	51	2.50	64
G	2.50	64	3.00	76
H	3.00	76	3.63	92
I	3.50	89	4.13	105
J	4.00	102	4.63	118

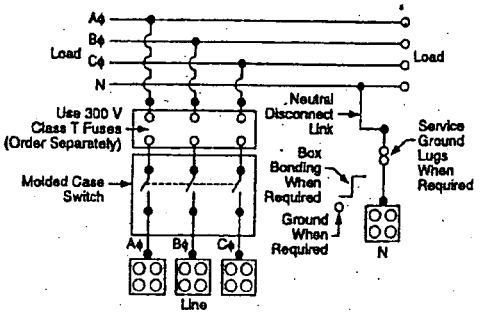
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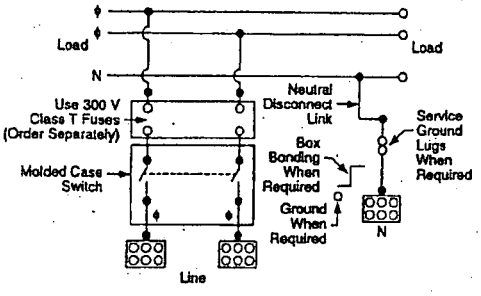
EZ METER-PAK® Meter Centers — Class 4161
Wiring Diagrams



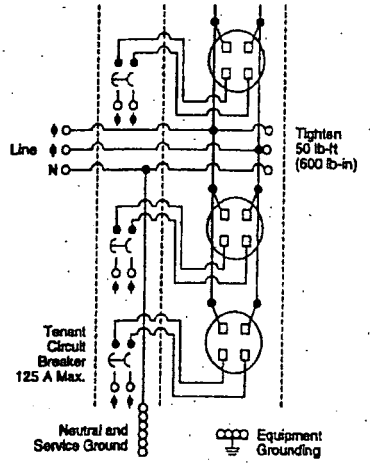
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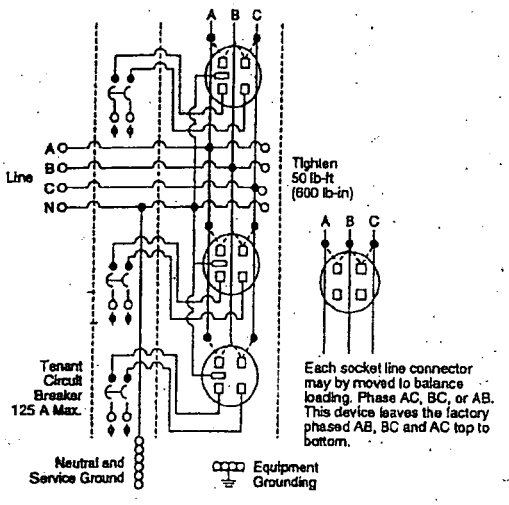
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EZM11200FSU



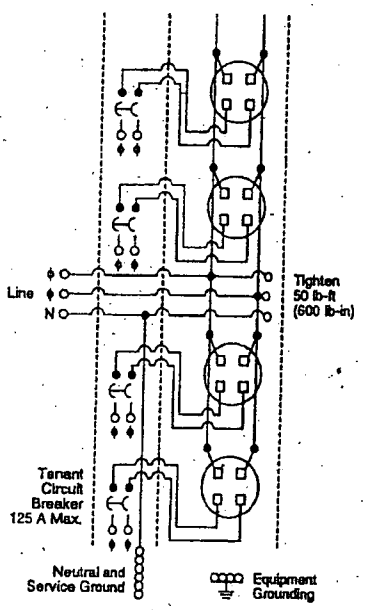
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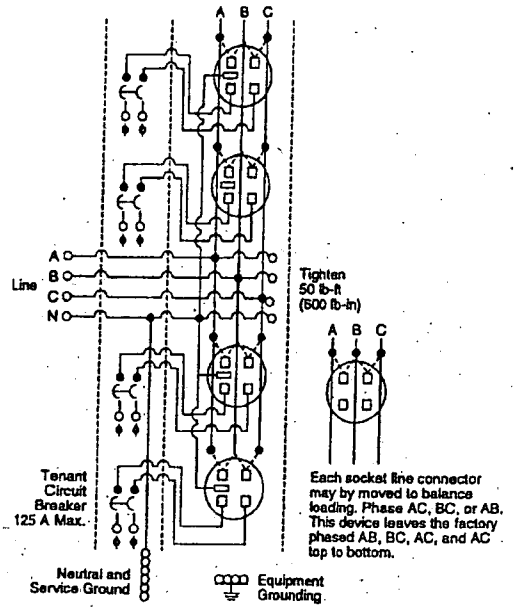
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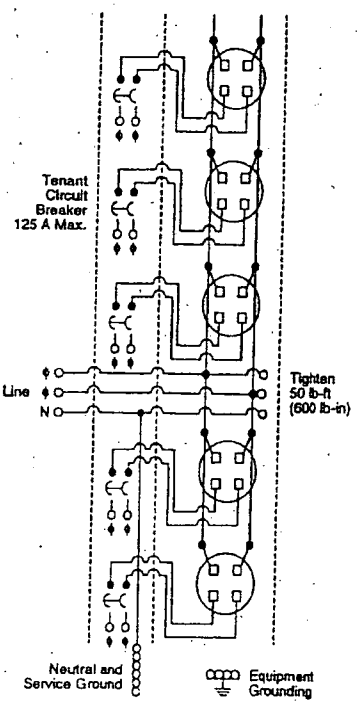
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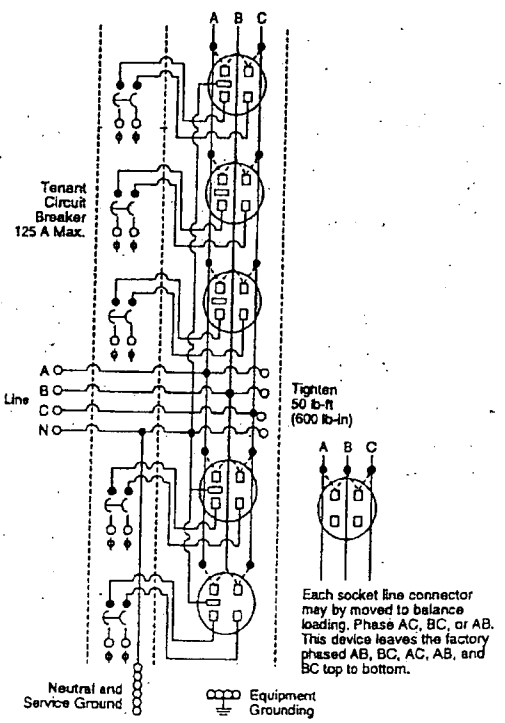
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EZM314125, EZMR314125, EZMH314125

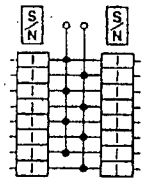


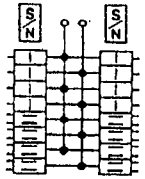
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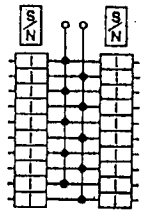


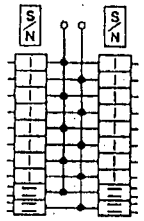
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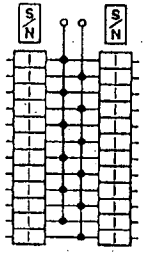
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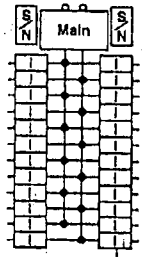

QO116L125G


QO11624L125G

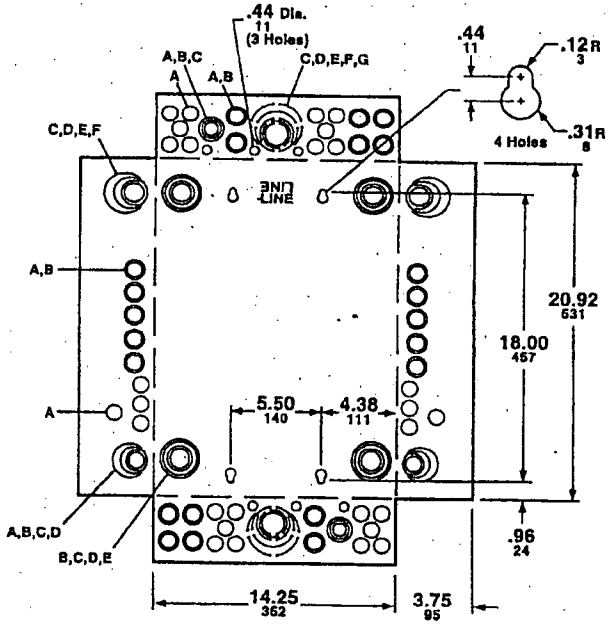

QO120L125G


QO12024L125G


QO124L125G



QO124M100
QO124M125



log Number	Maximum System Voltage	Mains Ampere Rating	Spaces	Maximum Number of Single Pole Circuits	Main Wire Size AWG Al or Cu
1624L125G	120/240Vac 1PH3W	125	16	24	4-2/0
16L125G		125	16	16	4-2/0
2024L125G		125	20	24	4-2/0
20L125G		125	20	20	4-2/0
24L125G		125	24	24	4-2/0
24M100		100	24	24	4-1
24M125		125	24	24	4-2/0

Dual Dimensions: INCHES Millimeters

KNOCKOUTS							
Symbol	A	B	C	D	E	F	G
Conduit Size	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2

TES: Finish – Gray baked enamel electrodeposited over cleaned phosphatized steel.
ıtral – Insulated Groundable.
Listed – File E-6294.
d centers with "G" in catalog number include a field installable equipment
ınd bar kit.

QO LOAD CENTERS
General Purpose NEMA Type 1 Enclosure
Indoor

SQUARE D

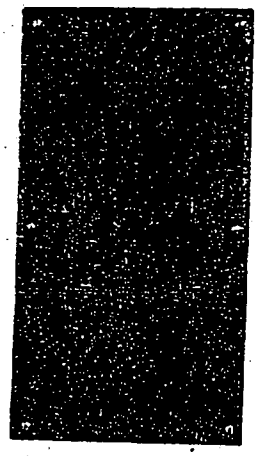
DWG. NO. QOD-208

ROA_01720

CLASS 1130

QO®
CIRCUIT BREAKER LOAD CENTERS
SINGLE PHASE
12 THROUGH 42 CIRCUIT, 100 THROUGH 225 AMPERES, CONVERTIBLE MAINS
APPLICATION DATA

SEPTEMBER, 1991



Cover:

Flush or surface merchandised separately.

Flush covers have spring loaded interior trim for automatic flush adjustment.

Low profile front.

Positive action, easy open door latch.

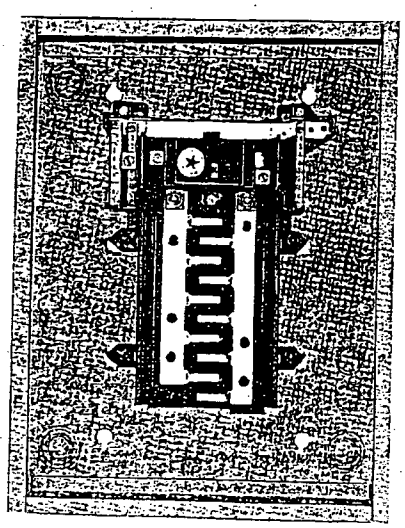
Interior:

Removable interior.

Held in place by captive mounting screws and embossments.

Branch Neutral Terminals:

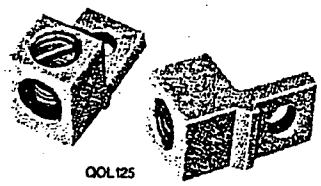
Positioned on both sides of mains.



QO20M100

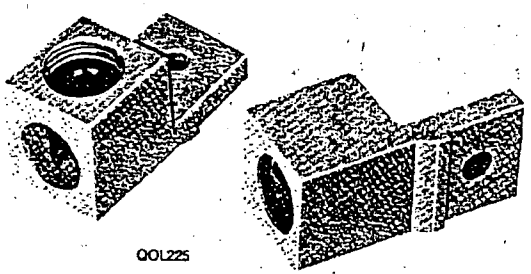
Main Lugs Kits:

Field installable in main breaker or main lugs load centers.



QOL125

125 ampere kit usable in 100 through 125 ampere load centers.



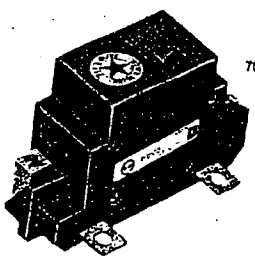
QOL225

225 ampere kit usable in 150 through 225 ampere load centers.

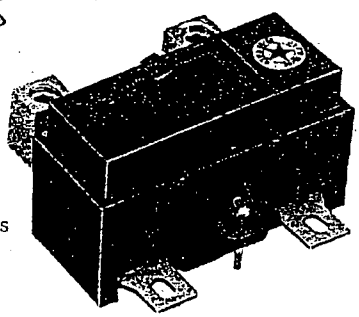
Main Breaker Kits:

Field installable in main lugs or main breaker load centers.

22,000 AIC main breaker kit 70 through 225 amperes usable with 10,000 AIC branch circuit breakers.



70-125 AMPERES



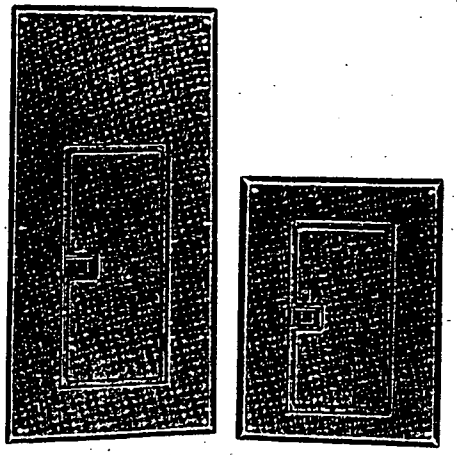
150-225 AMPERES

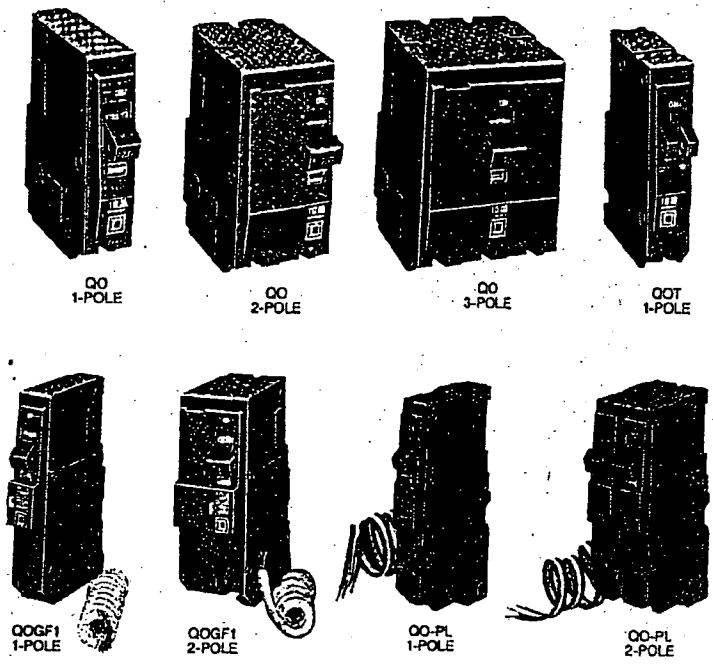
ROA_01721

CLASS
1130

QO®
CIRCUIT BREAKER LOAD CENTERS
APPLICATION DATA

SEPTEMBER, 1991





Type:

Circuit breaker load centers for use on ac systems. Underwriters Laboratories listed under File E-6294 (Panelboards). Federal Specifications W-P-115c, Type 1, Class 2 for use in government housing. QO, QOT, QO-PL and QO-GFI branch circuit breakers.

Service:

1Ø2W. 120Vac
1Ø3W. 120/240Vac
3Ø3W. 240Vac
3Ø4W. 208Y/120Vac and 240/120Vac
3Ø Grounded BØ 240Vac

Ratings:

Main Lugs	1Ø 30-400A. 3Ø 60-400A.
Main Breaker	1Ø 100-400A. 3Ø 100-400A.
Main Fusible Pullout	1Ø 100-200A. 3Ø 200A.
Main Lugs Recreational Vehicle	1Ø 30-100A.
Main Breaker Mobile Home	1Ø 100-200A.

Branch Circuit Breakers:

10,000 AIC

QO	1-Pole 10-70A.
QOT	1-Pole 15-20A.
QO	2-Pole 10-125A.
QO	3-Pole 10-100A.

22,000 AIC

QO-VH	1-Pole 15-30A.
QO-VH	2-Pole 15-125A.
QO-VH	3-Pole 15-100A.
QOB-VH	2-Pole 150A.
QOB-VH	3-Pole 110-150A.

42,000 AIC

QOH	2-Pole 35-125A.

65,000 AIC

QH	1-Pole 15-30A.
QH	2-Pole 15-30A.
QH	3-Pole 15-30A.

ROA_01722

Gamewell™
A 150-Year Tradition

IDENTIFLEX 602SS

ANALOG / ADDRESSABLE

FIRE ALARM CONTROL PANEL

INSTALLATION & OPERATION MANUAL

GAMEWELL
12 CLINTONVILLE ROAD
Northford, CT 06472

P/N 52358
ISSUE A
09/07/2004
ECN 04-511

OBH - O&M 585

ROA_01723

Fire Alarm System Limitations

While a fire alarm system may lower insurance rates, it is not a substitute for fire insurance!

An automatic fire alarm system—typically made up of smoke detectors, heat detectors, manual pull stations, audible warning devices, and a fire alarm control panel with remote notification capability—can provide early warning of a developing fire. Such a system, however, does not assure protection against property damage or loss of life resulting from a fire.

The Manufacturer recommends that smoke and/or heat detectors be located throughout a protected premise following the recommendations of the current edition of the National Fire Protection Association Standard 72-1999 (NFPA 72-1999), manufacturer's recommendations, State and local codes, and the recommendations contained in the Guide for Proper Use of System Smoke Detectors, which is made available at no charge to all installing dealers. A study by the Federal Emergency Management Agency (an agency of the United States government) indicated that smoke detectors may not go off in as many as 35% of all fires. While fire alarm systems are designed to provide early warning against fire, they do not guarantee warning or protection against fire. A fire alarm system may not provide timely or adequate warning, or simply may not function, for a variety of reasons:

Smoke detectors may not sense fire where smoke cannot reach the detectors such as in chimneys, in or behind walls, on roofs, or on the other side of closed doors. Smoke detectors also may not sense a fire on another level or floor of a building. A second-floor detector, for example, may not sense a first-floor or basement fire.

Particles of combustion or "smoke" from a developing fire may not reach the sensing chambers of smoke detectors because:

- Barriers such as closed or partially closed doors, walls, or chimneys may inhibit particle or smoke flow.
- Smoke particles may become "cold," stratify, and not reach the ceiling or upper walls where detectors are located.
- Smoke particles may be blown away from detectors by air outlets.
- Smoke particles may be drawn into air returns before reaching the detector.

The amount of "smoke" present may be insufficient to alarm smoke detectors. Smoke detectors are designed to alarm at various levels of smoke density. If such density levels are not created by a developing fire at the location of detectors, the detectors will not go into alarm.

Smoke detectors, even when working properly, have sensing limitations. Detectors that have photoelectronic sensing chambers tend to detect smoldering fires better than flaming fires, which have little visible smoke. Detectors that have ionizing-type sensing chambers tend to detect fast-flaming fires better than smoldering fires. Because fires develop in different ways and are often unpredictable in their growth, neither type of detector is necessarily best and a given type of detector may not provide adequate warning of a fire.

Smoke detectors cannot be expected to provide adequate warning of fires caused by arson, children playing with matches (especially in bedrooms), smoking in bed, and violent explosions (caused by escaping gas, improper storage of flammable materials, etc.).

Heat detectors do not sense particles of combustion and alarm only when heat on their sensors increases at a predetermined rate or reaches a predetermined level. Rate-of-rise heat detectors may be subject to reduced sensitivity over time. For this reason, the rate-of-rise feature of each detector should be tested at least once per year by a qualified fire protection specialist. Heat detectors are designed to protect property, not life.

IMPORTANT! Smoke detectors must be installed in the same room as the control panel and in rooms used by the system for the connection of alarm transmission wiring, communications, signaling, and/or power. If detectors are not so located, a developing fire may damage the alarm system, crippling its ability to report a fire.

Audible warning devices such as bells may not alert people if these devices are located on the other side of closed or partly open doors or are located on another floor of a building. Any warning device may fail to alert people with a disability or those who have recently consumed drugs, alcohol or medication. Please note that:

- Strobes can, under certain circumstances, cause seizures in people with conditions such as epilepsy.
- Studies have shown that certain people, even when they hear a fire alarm signal, do not respond or comprehend the meaning of the signal. It is the property owner's responsibility to conduct fire drills and other training exercise to make people aware of fire alarm signals and instruct them on the proper reaction to alarm signals.
- In rare instances, the sounding of a warning device can cause temporary or permanent hearing loss.

A fire alarm system will not operate without any electrical power. If AC power fails, the system will operate from standby batteries only for a specified time and only if the batteries have been properly maintained and replaced regularly.

Equipment used in the system may not be technically compatible with the control panel. It is essential to use only equipment listed for service with your control panel.

Telephone lines needed to transmit alarm signals from a premise to a central monitoring station may be out of service or temporarily disabled. For added protection against telephone line failure, backup radio transmission systems are recommended.

The most common cause of fire alarm malfunction is inadequate maintenance. To keep the entire fire alarm system in excellent working order, ongoing maintenance is required per the manufacturer's recommendations, and UL and NFPA standards. At a minimum, the requirements of Chapter 7 of NFPA 72-1999 shall be followed. Environments with large amounts of dust, dirt or high air velocity require more frequent maintenance. A maintenance agreement should be arranged through the local manufacturer's representative. Maintenance should be scheduled monthly or as required by National and/or local fire codes and should be performed by authorized professional fire alarm installers only. Adequate written records of all inspections should be kept.

Precau-L-1-2004.fm

Installation Precautions

Adherence to the following will aid in problem-free installation with long-term reliability:

WARNING - Several different sources of power can be connected to the fire alarm control panel. Disconnect all sources of power before servicing. The control unit and associated equipment may be damaged by removing and/or inserting cards, modules, or interconnecting cables while the unit is energized. Do not attempt to install, service, or operate this unit until this manual is read and understood.

CAUTION - System Reacceptance Test after Software Changes. To ensure proper system operation, this product must be tested in accordance with NFPA 72-1999 Chapter 7 after any programming operation or change in site-specific software. Reacceptance testing is required after any change, addition or deletion of system components, or after any modification, repair or adjustment to system hardware or wiring.

All components, circuits, system operations, or software functions known to be affected by a change must be 100% tested. In addition, to ensure that other operations are not inadvertently affected, at least 10% of initiating devices that are not directly affected by the change, up to a maximum of 50 devices, must also be tested and proper system operation verified.

This system meets NFPA requirements for operation at 0°C to 49°C (32°F to 120°F) and at a relative humidity (noncondensing) of 85% at 30°C (86°F) per NFPA, and 93% ± 2% at 32°C ± 2°C (89.6°F ± 1.1°F) per ULC. However, the useful life of the system's standby batteries and the electronic components may be adversely affected by extreme temperature ranges and humidity. Therefore, it is recommended that this system and all peripherals be installed in an environment with a nominal room temperature of 15-27° C/60-80° F.

Verify that wire sizes are adequate for all initiating and indicating device loops. Most devices cannot tolerate more than a 10% I.R. drop from the specified device voltage.

Like all solid state electronic devices, this system may operate erratically or can be damaged when subjected to lightning-induced transients. Although no system is completely immune from lightning transients and interferences, proper grounding will reduce susceptibility. Overhead or outside aerial wiring is not recommended, due to an increased susceptibility to nearby lightning strikes. Consult with the Technical Services Department if any problems are anticipated or encountered.

Disconnect AC power and batteries prior to removing or inserting circuit boards. Failure to do so can damage circuits.

Remove all electronic assemblies prior to any drilling, filing, reaming, or punching of the enclosure. When possible, make all cable entries from the sides or rear. Before making modifications, verify that they will not interfere with battery, transformer, and printed circuit board location.

Do not tighten screw terminals more than 9 in-lbs. Over-tightening may damage threads, resulting in reduced terminal contact pressure and difficulty with screw terminal removal.

Though designed to last many years, system components can fail at any time. This system contains static-sensitive components. Always ground yourself with a proper wrist strap before handling any circuits so that static charges are removed from the body. Use static-suppressive packaging to protect electronic assemblies removed from the unit.

Follow the instructions in the installation, operating, and programming manuals. These instructions must be followed to avoid damage to the control panel and associated equipment. FACP operation and reliability depend upon proper installation by authorized personnel.

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FCC Warning

WARNING: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for class A computing device pursuant to Subpart B of Part 15 of FCC Rules, which is designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user will be required to correct the interference at his own expense.

Canadian Requirements

This digital apparatus does not exceed the Class A limits for radiation noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la classe A prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.

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Section 1

IF 602SS

System Description

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SYSTEM OVERVIEW

IF 602SS Control Panel

The Gamewell IF 602SS is a microprocessor based fire alarm control panel. The IF 602SS system is available as, a one or two circuit, 198/396 point, analog/addressable control panel. The system is designed to accommodate a wide variety of applications providing the user with a full range of features including; self-programming, self-testing, self-monitoring, and full field programming capability. The IF 602SS system comes complete with a system housing, a main 8 amp fully regulated power supply, the Operators Display module and the System module.
IF602SS-198XL and IF602SS-396XL models are shipped with an extra-large housing that can accomodate up to 26AH batteries.

	IF 602SS Models	
	IF 602SS-198R	Single loop SmartScan FACP, regular cabinet
	IF 602SS-396R	Dual loop SmartScan FACP, regular cabinet
	IF 602SS198XL	Single loop SmartScan FACP, extra-large cabinet
	IF 602SS-396XL	Dual loop SmartScan FACP, extra-large cabinet

SYSTEM MODULAR CONSTRUCTION

IF 602SS Modules

The IF 602SS consists of three modules; the Operators Display Module, the System Module, and an 7.5 Amp, 24 VDC, regulated power supply.

Operators Display Module

The operators display module (ODM) is the main user interface to the IF 602SS system. It includes the interactive alphanumeric display, LED indicators, and tactile switches. The operators display module provides the user with visual indications and guided prompts during all operating conditions. All alarms, faults, or supervisory actions, as well as system operating conditions (*Normal, Alarms, Faults)* are shown on the alphanumeric display. LED's provide indication and prompt the user to respond to the next sequential action. The "Power On" LED indicator is green, Alarms are indicated by red LED's. Faults and user prompts are indicated by yellow LED's.

System Module

The System Module is equipped with one or two circuits of Analog Addressable interface each capable of supporting 198 devices, four Style Y or Z, limited energy Signaling Circuits (3.0 amps, maximum, each), three relays which provide *Common Alarm, Common Trouble and Auxiliary* relays (Form c), and an optional, plug-in, City Tie circuit. It has two power outputs one for 24 Vdc auxiliary power, and one for resetable 24 Vdc smoke detector power. Circuitry to monitor the status of the CPU and set the system in a default mode of operation is also incorporated in the System Module. The CPU circuitry includes the system operating firmware and true non-volatile memory (No battery required). It provides all the system memory and processing functions as well as providing the local and remote communications and supervision. Two RS-232 ports (one with an optional isolator module) are provided to communicate with external systems, displays, and for programming with a laptop computer. The System Module has a built in battery charger and connections to the battery. This charger will monitor and recharge up to 26 AH lead acid type batteries and has provisions for extending the life of batteries. "Brown Out" protection functions when the main AC power drops below a safe operating voltage level.

System I/O Components

Analog Addressable Interface

The one or two circuit Analog Addressable interface monitors and controls up to 99 analog/addressable input and 99 analog addressable output modules per circuit for a total of 198 points per panel. The analog interface has its own microprocessor which simultaneously communicates with the connected field devices and with the main CPU. Each Analog Addressable circuit can be wired as a Style 4 (class B) or, Style 6 (class A) Analog Addressable circuit.

Addressable Devices

The IF 602SS system is designed to operate with Gamewell's complete line of analog detectors (ionization, photoelectric) and with the SmartScan Addressable Input and Output Devices.
Refer to the SLC Wiring manual for more information on SmartScan devices.

Section 2

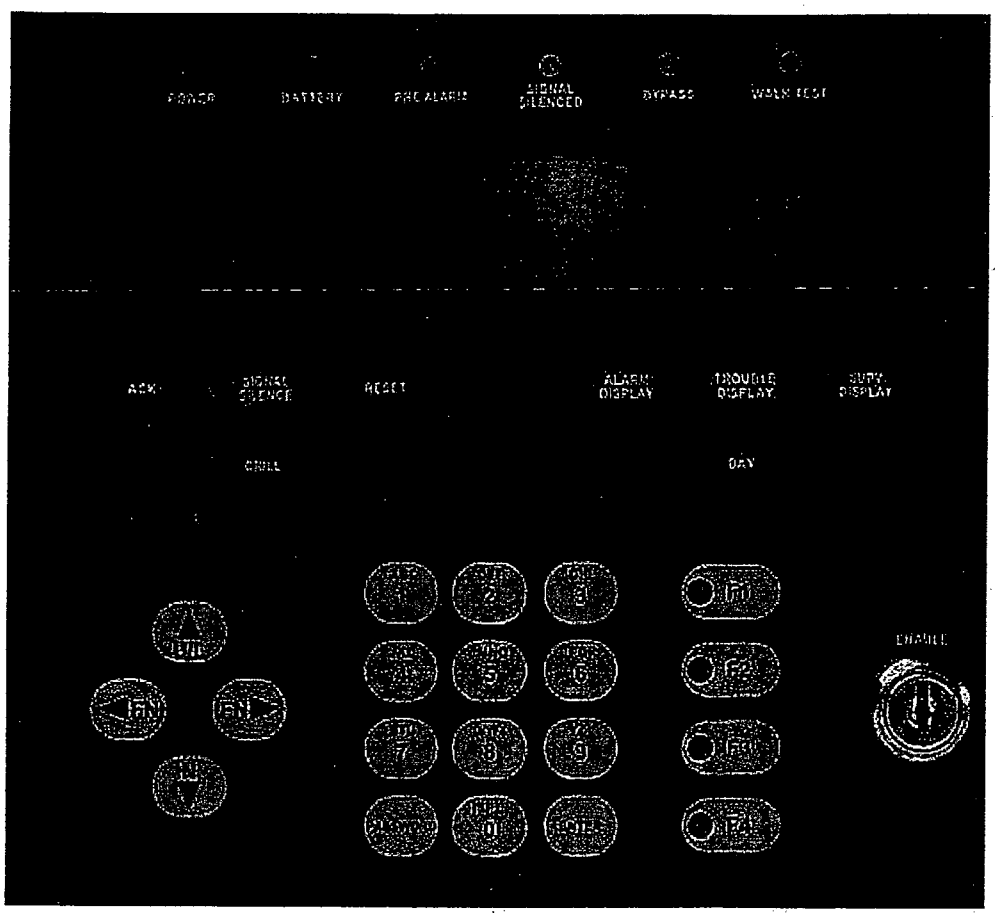
IF 602SS

System Operation

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Operator Display Module-Functional Description



OPERATOR CONTROLS

>>NOTE: THE "ENABLE" KEY SWITCH MUST BE ACTIVATED BEFORE ANY OF THE PUSH BUTTON SWITCHES WILL OPERATE

ACK

The "Acknowledge" switch (ACK) silences the internal buzzer of the panel and returns to normal any signal circuit or relay programmed to return to normal condition, when the "ACK" switch is depressed. Should a second alarm activate the same points (signal circuit or relay) which have been returned to normal, the system will re-activate. The buzzer will resound.

Δ WARNING !

Do NOT reset the system until the Authority having Jurisdiction has authorized reset.

RESET	The "Reset" switch (RESET). Restores all internal circuits to their idle state, power is temporarily removed from the S+ S- terminals which removes power from any conventional initiating devices for a period of four (4) seconds. Any devices latched into alarm should return to the normal condition, provided the cause of alarm has been eliminated. The signal circuits, city tie, alarm relay and/or supervisory relay will restore, and the panel will return to the normal quiescent condition. If the cause of the Alarm is still present, the panel will return to the Alarm state.
SIGNAL SILENCE	The "Signal Silence" switch (SIGNAL SILENCE) will silence (i.e. return to normal), any circuit or relay that is programmed to restore on Signal Silence. The Signal Silence switch is an alternating action switch. Pressing the Signal Silence switch will return the silenced circuits to an active state. Should any new points go into Alarm, the the silenced circuits will return to the active state.
DRILL	The "Drill" switch (DRILL) will activate all circuits that have been programmed to respond when the Drill switch is pressed. The Drill switch is alternate acting, pressing the Drill switch again will deactivate the test.
DAY	The "Day" switch (DAY) places the panel in the day mode, and enables Positive Alarm Sequence (PAS).
ALARM DISPLAY	Flashes when Alarm messages are available, pressing the button selects ALARM messages for display. Use the ARROW keys to scroll the messages.
SUPV DISPLAY	Flashes when Supervisory messages are available, pressing the button selects SUPERVISORY messages for display. Use the ARROW keys to scroll the messages.
TROUBLE DISPLAY	Flashes when Trouble messages are available, pressing the button selects TROUBLE messages for display. Use the ARROW keys to scroll the messages.
KEYPAD SWITCHES	These switches are used to enter alpha and numeric information for test and programming functions.
F1 – F4	Programmable Bypass function keys.
ARROW KEYS	Use to scroll the alphanumeric display and assist the user during system programming.

INDICATORS

ACK	The "ACK" LED (red) will flash to indicate the next action is to press the "ACK" switch.
RESET	The "Reset" LED's (red) will flash when the RESET switch is available for use.
SIGNAL SILENCE	The "Signal Silence" LED (red) will flash to indicate that the SIGNAL SILENCE switch is active.
DRILL	The "Drill" LED (red) indicates the Drill feature has been activated.
DAY	The "Day" LED (yellow) indicates the system is in the day mode, and that Positive Alarm Sequence (PAS) is active.
TROUBLE DISPLAY	The "Trouble" LED (yellow) indicates the system is not in the normal condition, a fault has been detected.
SUPV DISPLAY	The "Supervisory" LED (yellow) indicates a SUPERVISORY zone has activated (alarmed).
ALARM DISPLAY	The "Alarm" LED (red) indicates a common fire alarm has been activated in the system.
POWER ON	The "Power On" LED (green) indicates AC line operation. If pulsing, this indicates a problem with the incoming AC line voltage, main or backup (battery) power supplies.
BATTERY	The "Battery" LED (yellow) indicates a battery fault such as low or missing battery
PRE ALARM	The "PreAlarm" LED (red) indicates that the system is in a first stage alarm condition , such as in Positive Alarm Sequence (PAS).
SIGNAL SILENCED	The "Signal Silenced" LED indicates that the signal circuits have been silenced during an alarm.
BYPASS	The "Bypass" LED indicates that points which have been programmed for bypass are bypassed.
WALK TEST	The "Walk test" LED indicates that the panel is in the walk test mode.
F1 – F4	Programmable bypass functin keys. F1: Default bypass Group 1 F2: Default bypass Group 2 F3: Default bypass Group 127, 128 F4: Default bypass Group 129, 130

SYSTEM OPERATING CONDITIONS

Default Mode

When shipped from the factory, the IF 602SS system has been initialized to a minimal "default" configuration as part of our system testing procedures. It is important that the system be re-initialized utilizing the SmartStart feature upon installation. This will result in a customized default configuration.

WARNING NOTE

The IF 602SS System will not recognize or communicate with any of the connected devices until the SmartStart process has been exercised. The IF 602SS will not report an alarm until this process has been completed. Refer to the programming section of this manual for details about activating SmartStart.

After the SmartStart routine has initialized the IF 602SS, the system will be configured as follows:

1. All (input) initiating points are configured to be "Automatic" initiating points (standard smoke detector points). Point Identification Devices (PID's) are configured as manual stations if the priority interrupt is set.

2. The system defaults to Security Level #2 (Acknowledge, Signal Silence and Reset Switches are accessible without a password).

3. Whenever any input point(s) goes into alarm:

A. All output signaling circuits activate and produce a steady, 24VDC output.

B. All output relays are activated.

C. The city-tie and common alarm relays are activated.

Normal Quiescent Condition (default)

When the system is in the normal quiescent condition, the green "Power On" LED is illuminated indicating the system is operating from normal AC line power. All input and output circuits are "normal" (no alarm or trouble conditions). All other LED's and the alphanumeric display backlight are extinguished, the system internal buzzer is silent. To activate the alphanumeric display backlight and view system status message, press "**Enter**". Refer to Figure O-1. Any message on the display will be visible in a lighted room without the alphanumeric display backlight.

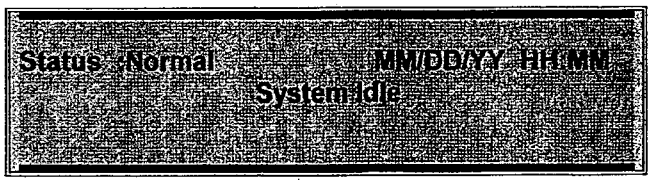


Figure O-1

>>NOTE: The system is equipped with a built-in energy saver. When the system remains in the idle mode (i.e. normal quiescent condition) for over 15 seconds the alphanumeric display backlight will automatically be turned off, however the display will be visible in normal ambient light.

Alarm Condition (default)

The IF 602SS will go into an ALARM state when any AUTO analog/addressable initiation device reports an alarm condition. By default the following actions will occur at the Operator Display Module. Refer to **System Events Messages** in the Appendix for complete listing of message displays.

1. The red "Alarm Display" LED will begin flashing. The flash rate is a continuously repeating sequence of 1/4 second 'On' followed by 1/4 second 'Off'. The internal system buzzer will sound.
2. The alphanumeric display will show the identification of the *Alarm* along with date and time. (Refer to Figure O-2) Alarm information is logged into the History Buffer to provide a time stamped record of the event's occurrence. In the event of multiple alarms, the alphanumeric display can be scrolled (using the up/down arrow keys) to show all active initiating devices.
3. The Form C Common Alarm relay contacts will transfer.
4. The ACKnowledge switch red LED will begin to flash. This guided prompt feature notifies the user that the next expected action is to press the "ACK" switch - acknowledging the *Alarm Condition.*



Figure O-2

Display for Multiple Alarm(s)

- **NOTE:** Multiple alarms are shown after the words ALARM Total "x"; with "x" representing the total amount of alarms.

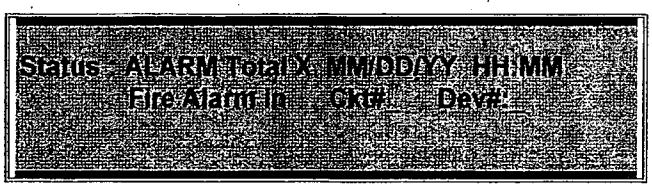


Figure O-3

OPERATING PROCEDURES

Acknowledging the Alarm Condition

When the user presses the "ACK" switch to acknowledge an alarm condition, the following actions will occur.

1. The control panel's internal audible buzzer will silence.
2. The ACKnowledge key's activation is logged into the History Buffer to provide a time stamped record of the event's occurrence.

3. The Acknowledge red LED will extinguish.

4. Any outputs programmed to return to the normal condition upon pressing the "ACK" switch will return to normal at this time.

5. The red LED's for RESET and SIGNAL SILENCE switches will flash. This "guided prompt" feature notifies the user that the next expected action is to *Reset* the system or *Silence* the signals (if so programmed).

Signal Silence

In the Alarm condition, the red LED for SIGNAL SILENCE will begin to flash. This guided prompt feature notifies the user that it is possible, but not necessary, to press the SIGNAL SILENCE switch. In the *default mode*, all signal circuits will silence.

Signal Silence Inhibit will prevent the signals from being silenced before a programmed delay expires
If the user presses the SIGNAL SILENCE switch, the following actions will occur:

Auto Signal Silence will automatically silence the signals after a programmed delay.

1. The LED for the SIGNAL SILENCE switch will remain flashing.

2. All output signal circuits which have been programmed to silence when the SIGNAL SILENCE switch is activated (which is all output circuits in the "default" case) will silence and Signal Silenced LED will light.

Resound or Return of Signals

The signal silence switch is an alternating action switch. If the user subsequently presses the SIGNAL SILENCE switch again, the signal circuits will activate.

1. The LED for the SIGNAL SILENCE switch will remain flashing.

2. All the output signal circuits which had deactivated will reactivate, returning to the *Alarm* condition. The "Signal Silenced" LED's will extinguish.

Reset

After the initiating device(s) have been restored to normal condition, the momentary RESET switch should be activated, the following actions will occur:

1. The LCD Display will announce the System Reset (Refer to Figure O-4).

2. If no further alarms exist in the system, all Signal Circuits will deactivate. The RESET key's activation is logged into the History Buffer to provide a time stamped record of the event's occurrence.

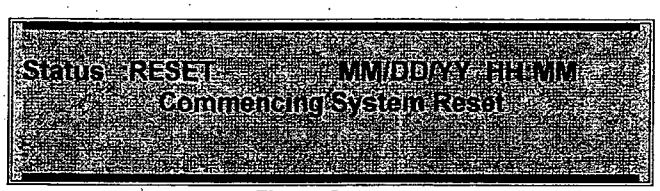


Figure O-4

Alarm Verification

Alarm verification is used to reduce the occurrence of nuisance alarm conditions (transient smoke etc.). Careful consideration should be taken before enabling the Alarm Verification feature on any device.

WARNING ACTIVATING THE ALARM VERIFICATION FEATURE MAY DELAY THE REPORTING OF AN ACTUAL EMERGENCY.

Only those devices that are subject to conditions that require verification should be programmed with this feature.

Individual devices within the IF 602SS system may be programmed as verification zones. When this feature is enabled, all automatic detectors connected to the device are subject to the alarm verification cycle.

Any two wire automatic detectors reporting an alarm condition, programmed for verification will start the pre-set verification timer (see Programming section) and the event will be recorded in the verification history log. At the expiration of the Verification Timer (10 seconds), the device is automatically reset for a period of four seconds and the devices are allowed a stabilization period (30 seconds). After the device stabilization period, a sixty second monitor cycle begins. If an alarm condition is detected from the initial device or any other initiating device, during any portion of the verification sequence the system will go into full ALARM, activate all CBE functions and the alarm condition processed. If no alarm conditions are reported during this period the system resumes normal SYSTEM IDLE operation.

Alarm Verification Tally

The panel counts the number of times each initiating device, assigned to verification, goes through the verification cycle over the past 30 days without producing a general alarm. If the total exceeds the number programmed into the Tally(default = 2), a trouble is originated for the detector. This feature assists in locating detectors which are prone to false alarms.

Positive Alarm Sequence

The panel can be programmed to utilize Positive Alarm Sequence (PAS) to minimize the chances of false alarms while the building is occupied. Careful consideration should be taken before enabling the PAS feature.

WARNING: ACTIVATING THE PAS FEATURE MAY DELAY THE REPORTING OF AN ACTUAL EMERGENCY.

Positive Alarm Sequence is enabled by turning on the Day/Night operation feature. When in the Day mode, a smoke detector must be ACKnowledged within 15 seconds, and RESET within 180 seconds of the ACK. to prevent the sounding of the alarm. Day mode is activated by pressing the Day switch on the Operator Control Panel. The night (normal) mode can be entered either manually by pressing the Day switch on the OCP while in the Day mode, or automatically at a programmed time.

Waterflow Zone

Initiating devices can be designated as Water flow zones. Activated by Waterflow switches, there are three types of Waterflow zones.

1. Water, immediate alarm, not silenceable.
2. Water Retard, alarm is generated if the switch remains closed longer than the programmed delay, not silenceable.
3. Water Retard Silence, same as Water Retard except the alarm is silenceable.

Supervisory Event Condition

A Supervisory Event condition occurs when an analog/addressable device programmed as a *supervisory* device activates. The common "supervisory display" LED (yellow) illuminates. The alphanumeric display indicates the point where the supervisory device is located and logs it into the History Buffer to provide a time stamped record of the event's occurrence. Refer to Figure O-5. The system common buzzer shall sound, and the Form C common Supervisory Event Aux relay transfers. Any signal, or relay point programmed to the supervisory zone will activate.

When the momentary *Acknowledge* switch is pressed, the audible indicator will be silenced. If a subsequent Supervisory Event should occur in a different Supervisory Event zone, the alphanumeric display will annunciate the new point, and the system common buzzer will reactivate.

The acknowledged Supervisory Event(s) will remain until the device(s) have been restored to normal condition, and the momentary *Reset* switch has been depressed. If no further Supervisory Events exist in the system, the panel will return to normal quiescent condition otherwise the panel will return to Supervisory Event condition.

Any unacknowledged Supervisory Events, that are cleared before the point was acknowledged, will not latch in and do not need to be reset. The information will still be placed into the history log. Refer *to Appendix, System Event Messages*, for complete listing of message displays.

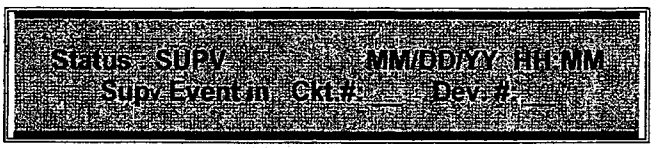


Figure O-5

Trouble Condition

A trouble condition occurs when a fault or identified problem develops within the system, system components, or system wiring connections. When a fault is detected the system common *Trouble Display* LED will be illuminated on the Operator Display Module, and the system common audible will be sounded. The origin of the fault message will be shown on the LCD alphanumeric display and logged into the History Buffer to provide a time stamped record of the event's occurrence. When the *Acknowledge* button is depressed, the system trouble audible is silenced and the system *Trouble Display* LED remains illuminated. Should another trouble occur the panel will return the trouble audible. Refer to the *Appendix, System Event Messages*, for a complete listing of message displays.

When all trouble conditions have been corrected the panel will extinguish the common *Trouble Display* LED, returning the system to the normal quiescent condition.

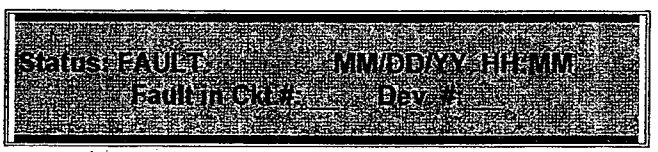


Figure O-6

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Section 3

IF 602SS

Installation

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IF 602SS System Housing

The cabinet for the IF602SS-126R and the IF602SS-252R measures 12.5"H x 18.5"W x 4.5"D. A 6"H x 5"W x 4"D area is reserved for batteries. Models IF602SS-126XL and IF602SS-252XL come with a cabinet that measures 30"H x 22"W x 5.5"D. There is a 14"H x 22"W x 5.5"D area used for battery storage. Both cabinets house the Operators Display, the System Module, and the power supply.
For complete system installation (including subassembly and control device circuit wiring) refer to Wiring, IF 602SS Analog Addressable System (B-W494). All field wiring must be in accordance with N.F.P.A. pamphlet #70 article #760.

Drawing #	Title
C-M818-3	Assembly of IF 602SS Cabinet (IF602SS-126R, IF602SS-252R)
C-M818-4	Assembly of IF 602SS XL Cabinet (IF602SS-126XL, IF602SS-252XL)

Table 1, Installation Drawings

Hardware Assembly

>>**NOTE: Upon receiving the IF 602SS panel, remove all packaging materials. Inspect for any damage that may have occurred during shipment. Notify the manufacturer immediately if damage is detected.**

Back Panel Mounting

The IF 602SS is shipped unassembled. Set aside the components in their protective packaging, for installation later. Install the empty cabinet in the required location, with the hinge to the **left**. Attach conduit and run all wiring.

System Assembly (Refer to drawing C-M818-3 Assembly of IF 602SS Cabinet)

1. Dress all field wires away from the inside of the cabinet. Ensure the cabinet is clean before mounting the assemblies. Clean as required.
2. Mount the System Module and Power Supply Assembly PN 31101 for 1 loop or PN 31102 for 2 loop) using the four (4) #10 Kep nuts supplied
3. Mount the Front Display Assembly PN 31087, on the front door using the four (4) #6 Kep nuts supplied.
4. Connect the ribbon cable from the Display assembly to the J1 connector on the Main card
5. Connect all field wiring. Referenced drawing B-W494, Wiring, IF 602SS System. (All field wiring must be in accordance with N.F.P.A. pamphlet #70 article #760.). Ensure the cabinet is clean.
6. Connect the Red and Black battery WIRE to TB4. Red to + and Black to -. Connect the white jumper between the adjacent + and – terminals of the batteries. **DO NOT CONNECT THE RED AND BLACK WIRES**

TO THE BATTERIES AT THIS TIME!

Module Identification and Placement

Modular Functions

The IF 600 series of Fire Alarm Panels utilize a unique addressing scheme that allows it to supervise and monitor card types. In the IF 602SS system this addressing scheme monitors specific pre-assigned functions as "card" locations. The "card" locations used in the IF 602SS system are 0, 4, 5, 6 and 8.

Card Type Code

Each function returns a card type code when polled by the main CPU. Card type codes are fixed codes that are assigned to each function type. When a valid response is detected to any of the addresses polled, a data base for the device is created in memory. The specific card type codes which are read from these locations are defined in Table I-1 below.

Card Locations 0 through 7

Cards numbered 0 through 7 identify the location of card types that reference the Master Module section of the system. Specifically, the electronic module functions are identified. These card location numbers reference hardwired physical circuits.
Card identification numbered 0 through 3 reference designated hardwired circuits on the Operator Display Module. Card identification numbered 4 - 7 reference designated hardwired circuits on the main module.

Cards #8

The IF 602SS utilizes card number 8 to identify the analog addressable interface.

Card Location	Card ID No.	Card Type Code (hex value)	Card Description
Display Module	Card # 0	0C	Alphanumeric (LCD) display card and operator switches.
Main Module	Card # 4	01	4 Signal Circuits
Main Module	Card # 5	02	4 Relays
Main Module	Card # 6	05	Variety of features (city tie supervision, ground fault, default power supply supervision, +24 V, +12V, +5V supervision, V-battery to power supply, unregulated raw supply, system on AC/Battery, Charging Monitor, battery monitor, aux 1 & 2).
Main Module	Card # 8	FA	SmartScan analog addressable interface 1 or 2 circuit)

Table I-1

Specifications

Primary Input Voltage	120 VAC 50/60 Hz. 3 amps Max. or 240 VAC 50/60 Hz. 1.5 Amps Max.
Power Fail / Brownout Transfer	Per UL 864
Operating Temperature	0 to +49 degrees C
Humidity	85% non-condensing
Secondary Input Voltage	24 VDC Nominal (Two 12 VDC sealed lead/acid batteries wired in series
Max. Battery capacity supported by charger	26 AH
Max. Charge current	0.75 Amps

Interconnects

P1	Connects to J1 of Power Supply
BATT+ BATT-	(2) connections to Battery
J1 connector	Connects to Display Assembly

Operators Display

The Operators Display (OD) is the user interface to system. The display provides the user with all necessary switches, keys and annunciation points to monitor and maintain the system. ALARM, SUPERVISORY and TROUBLE conditions are indicated by dedicated LED's and the internal sounder. The system's operating status is shown on the alphanumeric display. LED annunciation is also provided for AC power, PreAlarm, and Bypass. The numeric keypad provides user access for programming and password entry.

The alphanumeric display contains a 4 x 40 character backlit display. To regulate the contrast of the alphanumeric LCD display, adjust the potentiometer R45 located (solder side of the display board – upper left hand corner) – see (Assembly of IF 602SS System, drawing C-M818-3). The card location identification number is " 0 " (see above Table I-1).

Installation Diagram

Refer to (Assembly of IF 602SS drawing C-M818) The ribbon cable from the Operator Display interconnects to the main module (J1 connector).

Main Module

The main module provides the system with the following :

- CPU circuits.
- Controls the default alarm mode bus if the CPU fails.
- Monitors system for ground and power faults.
- Watchdog circuit.
- Programmable Signal Circuits (1 - 4).
- Auxiliary Power Outputs (A+/A-, S+/S-).
- Two RS-232 ports for serial communications.
- Facility for City Tie circuits.
- Battery monitor and charging circuits.
- Analog device interface circuits.

CPU Circuits (Located on the Main Module)

The CPU circuits contain the system operating firmware and non-volatile memory. It provides all the system memory and processing functions as well as providing the local/remote communications and supervision.

The LED controlled by the CPU circuit provides the following indications:

LED Indication		
	LED1 "ON"	Normal, Quiescent Condition Indication
	LED2 "ON"	Program fail, Default Mode
	LED2 "Off"	Normal, Quiescent Condition Indication

Cable Connections:

ISBX, J2 connector	Connection (ribbon cable) to SmartNet adapter.
J5 connector	Laptop interface – use cable PN 70703, for using 600 loader program.
J6, TB3 connector	Serial Port for RAN, SAN, programming PC (SmartProgram II) and external system communications. Requires the use of the RS-232 Optical Isolator module, ISO-RS232 (31078) when communicating with grounded devices.

Baud Rate Setting

Setting the system's baud rate is accomplished by utilizing dip switch S1 (7 & 8), see DIP Switch S2 Table below.

	Default Settings	
1	Open	Do Not Change
2	Open	Do Not Change
3	Always Closed	Do Not Change
4	Open	Do Not Change
5	Open	Do Not Change
6	Open	Do Not Change
7, 8 Open	9600 Baud Rate	*Auto Detect Baud*
7, 8 Closed	4800 Baud Rate	
7 Open, 8 Closed	2400 Baud Rate	Default
7 Closed, 8 Open	1200 Baud Rate	

DIP Switch S2 Table

City Tie Programming

The main module contains a header, J4, for the installation of the optional City Tie interface module.

For City Tie Programming - Set jumpers on the City Tie module as follows:	
Reverse Polarity	RVS
Master Box	MB

Installation Diagram

Refer to C-M818-3/4 Assembly of IF 602SS Cabinet. The module utilizes card identification locations 4 through 7.

SYSTEM SPECIFICATIONS

System Specifications

The specifications listed identify the interfacing circuits housed in the Master Module and the Operators Display module.

System	
Input Power	24VDC
Quiescent Current	160 mA
Alarm Current	226 mA plus Signal Circuit power plus 2 mA for master box or 22 mA for reverse polarity connections.

	Designation	Description
Auxiliary Output		(See Table A-5 for list of compatible Devices.)
TB9*	A+	24 VDC, 1.5 Amps max. auxiliary power
Power Limited	A-	24 VDC Common for A+
Smoke Detector Power		(See Table A-5 for list of compatible Devices.)
TB9*	S+	24 VDC, 1.75 Amps max., resettable power - power is removed for 4 seconds during the Reset cycle.
Power Limited	S-	24 VDC common for S+
City Tie TB2	M1 M2	Connections for master box or line reversal option

*Total panel loading cannot exceed 7.5 Amps.

NAC Output Circuit Wiring

Power Limited

The IF 602SS Notification Appliance Circuit outputs can provide up to 3.0 Amps (power limited) of regulated 24 VDC each (total panel output is limited to 7.5 Amps). The outputs can be arranged as 4 Style Y (Class B), 2 Style Z (Class A) or 1 Style Z and 2 Style Y circuits. The EOL resistor value for Style Y wiring is 3.9K. Terminals (n)L1 and (n)L2 are connections for style Y (Class B) wiring These designations are preceded by the circuit number (n). When Style Z (Class A) wiring is used, terminal 1L1 will return to terminal 2L1 and terminal 1L2 will return to terminal 2L2, likewise, terminal 3L1 will return to terminal 4L1 and terminal 3L2 will return to terminal 4L2 for the second Class A circuit. **Terminal L1 switches negative and terminal L2 switches positive during alarm condition.** Either pair of circuits can be designated Class A or Class B independently of the other pair. If shielded wire is used connect the shield to TB9 terminal A -.

Style Z - Class A NOTIFICATION APPLIANCE CIRCUIT CONNECTIONS TERMINALS					Circuit	Style Y - Class B NOTIFICATION APPLIANCE CIRCUIT CONNECTIONS TERMINALS	
-	-R		+	+R		-	+
1L1	2L1	TB	1L2	2L2	1	1L1	1L2
na	na	7	na	na	2	2L1	2L2
3L1	4L1	TB	3L2	4L2	3	3L1	3L2
na	na	8	na	na	4	4L1	4L2

Polarities shown are during alarm. Total panel loading cannot exceed 7.5 amps.

Relays

COMMON TROUBLE	Terminal	* Relay is shown normally energized (normal condition)
	NC	Form C normally closed Trouble contact
TB1	C	Form C Trouble relay common contact 2.0A @ 30 VDC Resistive load.
	NO	De-energizes on Trouble, restores when Trouble is remedied

COMMON ALARM	Terminal	Description
	NC	Form C normally closed Alarm contact
TB1	C	Form C Alarm relay common contact 2.0A @ 30 VDC Resistive load
	NO	Form C normally open Alarm contact

COMMON AUX	Terminal	Description
	NC	Form C normally closed Aux contact
TB2	C	Form C Aux relay common contact 2.0A @ 30 VDC Resistive load
	NO	Form C normally open Aux contact

232	Designation	Description
TB3	X	RS-232 Compatible Out
	C	Common (logic) ground
	R	RS-232 Compatible Input
	G	Earth Ground

232	Description
	RS-232 Compatible Input
Telephone	RS-232 Compatible Output
Jack	NC
J5 J6	Common (logic) ground

Analog Interface Specifications

SmartScan Analog Addressable Interface

The 602SS contains one or two circuits that can monitor and control up to 99 analog addressable input and 99 output devices (points) for a total of 198 devices per line. The functions of this card are controlled by a micro-controller and the software programming. The system uses an 8-point, removable, field wiring terminal strip for Class A and B wiring.

The IF 602SS-198 has 1 circuit.

The IF 602SS-396 has 2 circuits.

Analog Addressable Connections

Loop 1	Pin #	Designation	Description
TB-5	1	+24V	Loop 1 24V Device power (+) (0.25 A max)*
	2	GND	Loop 1 24V Device power (-)
	3	1L1	Loop 1 Addressable line (-)
	4	1L2	Loop 1 Addressable line (+)
	5	+24VR	Loop 1 24V Device power return (+)
	6	GNDR	Loop 1 24V Device power return (-)
	7	1L1R	Loop 1 Addressable line (-) return
	8	1L2R	Loop 1 Addressable line (+) return

Jumpers JMP 1-4 must be installed for Class B operation. Remove for Class A.

Loop 2	Pin #	Designation	Description
TB-6	1	+24V	Loop 2 +24V Device power (+) (0.25 A max)*
	2	GND	Loop 2 +24V Device power (-)
	3	1L1	Loop 2 Addressable line (-)
	4	1L2	Loop 2 Addressable line (+)
	5	+24VR	Loop 2 24V Device power return (+)
	6	GNDR	Loop 2 24V Device power return (-)
	7	1L1R	Loop 1 Addressable line (-) return
	8	1L2R	Loop 2 Addressable line (+) return

Jumpers JMP 5-8 must be installed for Class B operation. Remove for Class A.

* 0.25A max per circuit. Total panel loading cannot exceed 7.5 Amps.

Analog Circuit Wiring Requirements and Limitations :	
1.	Cable length per circuit - 12,000 feet maximum including all "T-tap" runs.
2.	Use unshielded twisted cable, even when in conduit.
3.	Unshielded twisted cable is required on all open wiring runs involving 4,000 Ft. or more.
4.	Avoid running analog circuits parallel with power wiring for any distance.
5.	Avoid running analog circuits parallel with cables having high switching rates.
6.	Avoid running analog circuits parallel with fluorescent fixtures.
7.	Avoid running analog circuits parallel with signal circuit wiring when ever possible.
8.	Shield Signal circuit wiring, even if in conduit, if run together with analog circuits.
9.	Maximum total conductor resistance for analog circuits is 25 ohms.
10.	Maximum total loop capacitance for analog circuits is 1.0 microfarads

Table 4

See the SLC Manual for more information on SmartScan Analog Addressable Devices.

Wiring Guides

This table provides general information regarding wiring practices used in installation of the IF 602SS panel.

NOTIFICATION CIRCUIT WIRE SIZES 24 VOLT DC							
WIRE SIZE and RESISTANCE		MAXIMUM DISTANCE TO LAST DEVICE					
AWG	OHM/ 1000ft	Max Load Current 0.5amp	Max Load Current 1.0amp	Max Load Current 1.5amp	Max Load Current 2.0amp	Max Load Current 2.5amp	Max Load Current 3.0amp
18	6.5	400'	200'	130'	100'	80'	65'
16	4.1	620'	300'	210'	160'	125'	105'
14	2.6	1000'	500'	330'	250'	200'	165'
12	1.6	1600'	800'	520'	400'	325'	270'
10	1.0	2500'	1250'	840'	620'	520'	420'
To figure which wire size to use, multiple the number of devices by the maximum current draw for the devices. Take the total current draw and round it up to the nearest ½ amp. Then look at which wire size gives you the distance you need to get to the last device. See the Compatible Indicating Appliances table in the Appendix for which devices can be used on these circuits.							

INITIAL SYSTEM STARTUP

CAUTION !

Connect AC power to the system before connecting battery/standby power source.

1. Activate main power. The "Power ON" message (Figure I-1) is displayed.



Figure I-1

2. Wait the required 15 seconds. [Power ON] LED is flashing. Commencing System Reset screen is displayed (see Figure I-2).

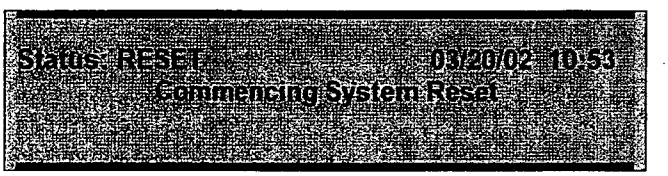


Figure I-2

3. After the initial system startup is completed, the display will show the current date (month/day/year) and time (military), see Figure I-3.

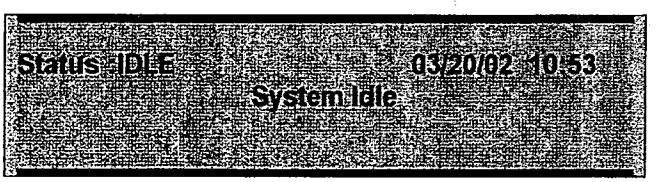


Figure I-3

>>NOTE: The system is equipped with a built-in power saver. When the system remains in a idle mode (i.e. normal quiescent condition) for over 15 seconds the backlight will turn off.

>>NOTE: To regulate the contrast of the alphanumeric LCD display, adjust the potentiometer R45 located (solder side of the display board - upper left hand corner) - see drawing C-M818-3/4.

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Section 4

IF 602SS

System Test Mode

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Overview

Walk Test, Bypass mode, Detector/Device Test, and information displays can be selected at any time from the Password Protected, Access Level 3. Function Programming Menu by pressing one of the **FN** keys on the left or right arrow keys, and selecting the desired test as indicated on the LCD screen.

1. Make sure that a level 3 pass word has been entered
2. From the Operational Mode press the key marked '**FN**'.

```
Function Programming
1=Walk Test 2=Bypass 3=Input Test
4=Output Test 5=Display 0=exit
```

Walk Test

Walk Test is an automatic test used to test devices in the system both silently and audibly. Testing the system in the Walk Test mode enables one person to test the system without the aid of another to confirm activation and reset the panel. Activation (i.e. detected ALARM or TROUBLE signal) in the initiating device will cause the panel to log the event and activate all associated indicating circuits if programmed. The device is reset after four (4) seconds. Activation of a Fault (Trouble) follows the same routine. For ALARM testing all associated signal circuits will sound twice. For TROUBLE testing, all associated signal circuits will sound once.

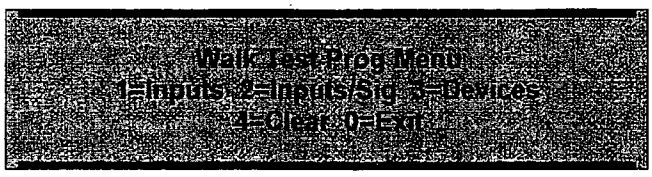
>>NOTE: All devices selected for Walk Test become disabled and will not ALARM. Devices not selected for Walk Test will report an ALARM condition. After 25 minutes of inactivity the system will time out of Walk Test.

1. From Function Programming Display, press the "**1**" key followed by the "**Enter**" key
2. The **Walk Test** LED will begin flashing at 60 PPM. Figure T4 is now displayed.

```
Function Programming
1=Walk Test 2=Bypass 3=Input Test
4=Output Test 5=Display 0=exit
>1
Walk Test Menu
1=Display 2=Program
3=Exit
```

Figure T4

3. Select "Display" [1] to display the circuits (input and output) that are currently in the Walk Test mode. Select "Prog" [2] to select circuits for Walk Test mode.



1=Inputs	Places all inputs in Walk Test
2=Inputs/Sig	Places all Inputs and Signal Circuits in Walk Test
3=Devices	Allows individual selection of Inputs and Signal circuits to placed in Walk Test through the following procedures..

Figure T5 is now displayed. Use the up/down arrow keys to select the circuit of the devices to be tested.

>>**NOTE: Use the right arrow key to move the cursor under the device address.**

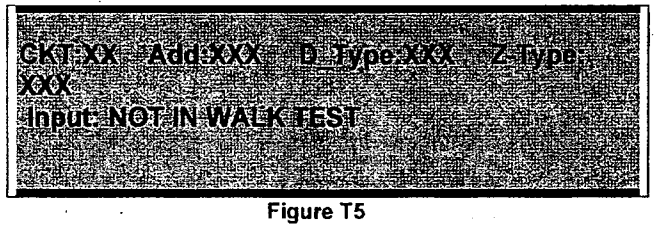


Figure T5

4. Use the up/down arrow keys to select the device address. When the device address is selected, the device type, zone type and zone status will be displayed automatically.
5. Use the left/right arrow keys to move to the Walk Test status field.
6. Use the up/down arrow keys to select "NOT in Walk Test" or "In Walk Test" option.
7. Repeat steps 3 through 6 for each device to be tested.
8. When all desired devices have been selected - Press "**Enter**".
9. The system will now prompt you for a signal circuit to select for Walk Test annunciation.

>>**NOTE: The system will display addressable relay modules that are not available for walk test mode.**

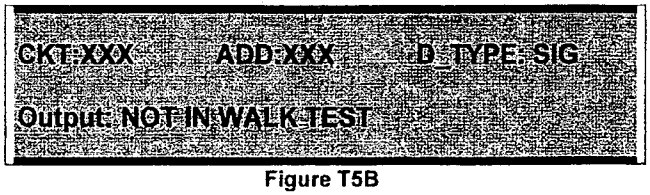


Figure T5B

9A. Signal circuits are numbered by their physical location in the system. Use the up/down arrows to select circuits sequentially or enter the circuit number with the alphanumeric keypad and press enter.

>>NOTE: Signal Circuits 1, 2, 3, and 4 located on the Operators Display are Numbers 127, 128, 129, and 130 respectively.

10. The display will show the status of the signal circuit in respect to Walk Test. Use the up/down arrow keys to toggle the signal circuit into and out of the Walk Test mode. When you have made your selection press the **"Enter"** key to begin Walk Test.

11. The system will now enter the Walk Test Mode. The Acknowledge and Trouble LED's will flash and the buzzer will sound. The system will remain in Trouble until all Walk Test devices are cleared from the system.

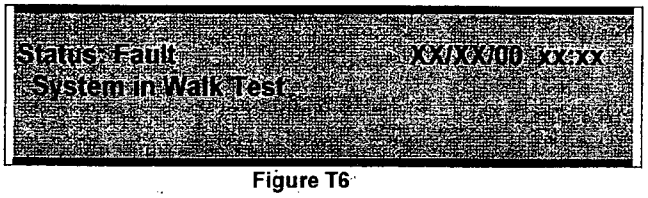


Figure T6

Δ WARNING !

If the system is in Walk Test mode ,and a device not in the test mode is activated, the system will go into alarm and all output circuits will be activated.

12. To clear Walk Test operation select 4=Clear from the Walk Test Prog Menu to clear all devices, individual devices may be cleared in the same manner as described in steps 1-10 above. Each device must be set to "NOT IN WALK TEST".

13. If all devices have been cleared from Walk Test the system will return to the Idle Mode.

ByPass Mode

The ByPass function is used to remove an addressable device or signal circuit from service. Bypassing a device will disable the control panel response from the device selected or prevent activation of the device or signal circuit.

1. From the Function Programming menu, press the "2" followed by the "Enter" key.
2. Figure T7 is now displayed. The ByPass LED will flash at 60 PPM.

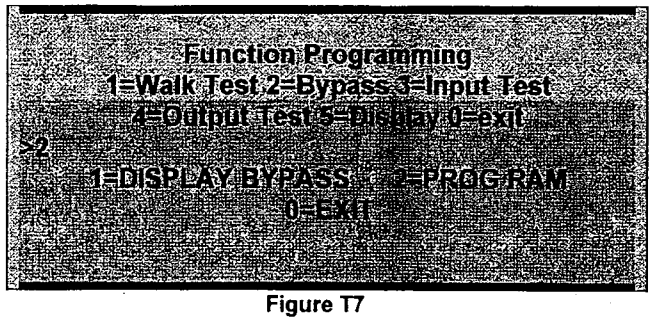


Figure T7

Δ WARNING !

Devices will not report an alarm or trouble condition. A Fire Watch or other reliable means should be employed to monitor the unprotected area.

3. Select "Display" [**1**] to display the circuits (input and output) that are currently in the Bypass mode.
4. Select "Prog" [**2**] to select circuits for bypass. Figure T8 is now displayed.

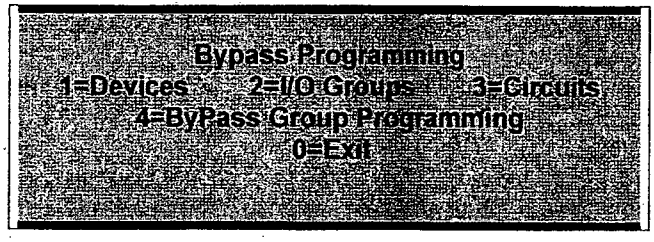


Figure T8

5. Select [**1**] to program circuits. Figure T8A is now displayed

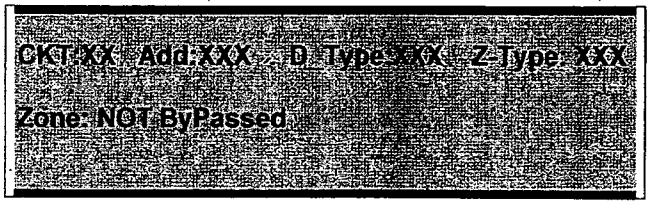


Figure T8A

6. Use the up/down arrow keys to select the circuit of the devices to be bypassed.

>>NOTE: Use the right arrow key to place the cursor under the device address.

7. Use the up/down arrow keys to select the device address. When the device address is selected, the device type, zone type and zone status will be displayed automatically.
8. Use the left/right arrow keys to move to the Bypass status field.
9. Use the up/down arrow keys to select "NOT ByPassed" or "ByPassed" option.
10. Repeat steps 3 through 6 for each device to be Bypassed.
11. When all desired input devices have been selected - press "**Enter**".
12. Repeat steps 3-8 to bypass outputs.
13. Press the Enter key. Then exit the test menu by depressing 0, then Enter.

In the same manner as above, Select I/O Groups [2] and/or Circuits [3] for ByPass.

14. The system will now flash the Acknowledge and Trouble LED's and the sounder will activate. Once the system has been acknowledged the Trouble LED will remain flashing until all bypassed devices are cleared. The display will indicate that a part of the system has been disabled. Figure T10 is now displayed.

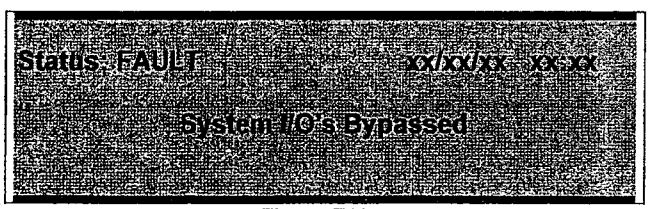


Figure T10

15. To reactivate Bypassed devices repeat steps 1-11 toggling each device to the "NOT-BYPASSED" selection.

ByPass Group Programming

1. Select [4] from the ByPass Menu. Figure T11 is now displayed

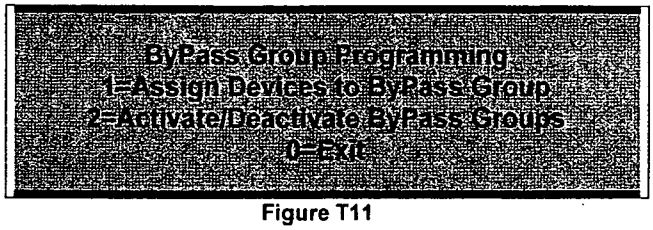


Figure T11

2. Select [1] from the menu to assign Devices to ByPass groups, then select either [**1**] for Inputs, or [**2**] for Outputs
3. Select the desired Circuit and Device by using the arrow keys. With the left/right arrow keys select **B_Grp:**. Using the up/down arrow keys select the desired ByPass Group number, or enter the number and press the ENTER key.
4. Repeat this process until all of the desired Devices are assigned to ByPass Groups.
5. Press the Enter key to exit the menu to active or deactivate ByPass Groups, press[**2**] at the ByPass Group Programming menu
7. Enter the number of the desired ByPass group and press the Enter key
8. The selected ByPass group number will be displayed with a message that the Group is either ByPassed or NOT ByPassed.
9. Pressing any key will toggle the state of the group. When the desired condition is shown, press the Enter key to go to the next group selection.
10. Pressing the Enter key at the Group number selection screen without entering a group number will exit the ByPass Group Activate/Deactivate programming operation.

ROA_01766

Input Test

The Input test function allows the user to individually test the functionality of each device, operation and response.

Device LED will illuminate if selected for Input Test. The LED will turn off when the device is deselected.

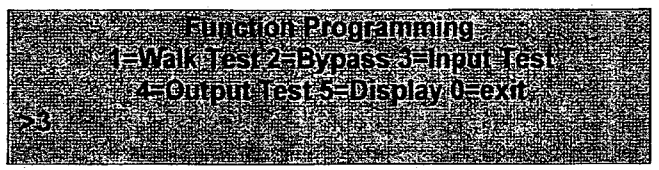


Figure T2

1. Press "**3**" and then "**Enter**"
2. Figure T3 is now displayed.

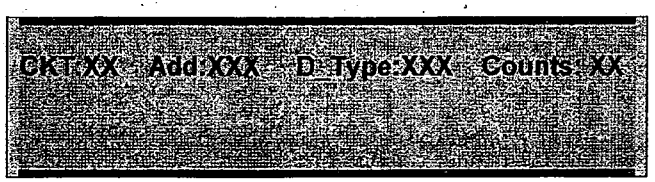


Figure T3

CKT	Circuit of selected device (1-4)
Add	Address of the selected device
D_Type	Device type (*see table P3 in programming section)*
Counts	Real time analog value

3. Use the up/down arrow keys to scroll through the connected devices. When the device address is selected, the device type and real time analog value will be displayed automatically.
4. Determine the functionality and operating response of the Detector using the following table.
5. To exit the Detector Test Mode press the Enter key at any time.

ROA_01767

Output Test

The Output test function allows the user to individually test the functionality of each device, operation and response.

Device LED will illuminate if selected for Output Test. The LED will turn off when the device is deselected.

```
Function Programming
1=Walk Test 2=Bypass 3=Input Test
4=Output Test 5=Display 0=exit
>4
```

This displays in the same fashion as the Input Test

```
CKT:XX Add:XXX D_type:XXX Counts:XX
Flags:xXX Bits:xXX
```

Display

The Display Function allows the Operator to view or download the system configuration, dictionaries, operating information, and current detector values.

```
Function Programming
1=Walk Test 2=Bypass 3=Input Test
4=Output Test 5=Display 0=exit
>5

Display
1=Config 2=Dict. 3=Events
4=Misc. 5=Detectors 0=Exit
```

```
Display
1=Config 2=Dict. 3=Events
4=Misc. 5=Detectors 0=exit
>1
```

Config.

The Configuration Menu allows selection of either viewing or downloading the system configuration.

```
Configuration Menu
1=Display 2=Download 3=Exit
```

Dict. The Dictionary Menu allows selection of either viewing or downloading the system dictionaries.

```
Display
1=Config 2=Dict. 3=Events
4=Misc 5=Detectors 0=Exit
>2
```

```
Display Dictionary Menu
1=Display 2=Download 3=Exit
```

```
Display
1=Config 2=Dict. 3=Events
4=Misc 5=Detectors 0=Exit
>3
```

Events The Events Menu allows viewing of the system events log

```
Use up/down keys to scroll
Press Enter key to Exit
```

```
Display
1=Config 2=Dict. 3=Events
4=Misc 5=Detectors 0=exit
>4
```

Misc. The Misc. function allows the viewing of critical information about the operation of the panel..

```
Display Menu (Misc.)
1=Pass 2=Codes 3=Tally
4=Ver 5=Ram 0=exit
>1
```

Pass

The Passwords Menu Is not available in this mode. It requires a Level 4 password to activate.

```
This Function Is Only Accessible
At Security Level 4
```

```
Display Menu (Misc.)
1=Pass 2=Codes 3=Tally
4=Ver 5=Ram 0=exit
>2
```

Codes

The Codes Menu allows viewing of the programmed Codes

```
Use Up/down keys to scroll
Press Enter key to Exit
```

Tally

The Menu Menu allows selection of either viewing or downloading the 30 day accumulated tally of Verification events that did not result in a general alarm.

```
Tally Menu
1=Display 2=Download 3=Exit
```

```
Display Menu (Misc.)
1=Pass 2=Codes 3=Tally
4=Ver 5=Ram 0=exit
>4
```

Ver

The Version Display shows the system type and the panel software version and update date and time.

```
602SS System Ver. 7.2.1
Last Updated On:
Feb 05 2004 At 09:55:11
Press Any Key To Continue
```

```
Display Menu (Misc.)
1=Pass 2=Codes 3=Tally
4=Ver 5=Ram 0=exit
>5
```

RAM

The RAM Display shows the available Random Access Memeory.

```
Unallocated Bytes of Ram: 206123
Press Any Key To Continue
```

```
Display
1=Config 2=Dict 3=Events
4=Misc 5=Detectors 0=exit
>4
```

Detectors

The Display Detectors menu allows the downloading of the smoke and heat detector sensitivity values.

```
List Detector Sensitivity
1= Download 0=Exit
```

Section 5

IF 602SS

Programming

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PROGRAMMING OVERVIEW

1 Circuit programming
- 1 Inputs
- 2 Outputs
- 3 Init

2 Control by Event

3 Function programming
- 1 Walk test
  - 1 Display
  - 2 Program
    - I Inputs
    - 2 Inputs/Sig
    - 3 Devices
    - 4 Clear
- 2 Bypass
  - 1 Display
  - 2 Program
    - 1 Device
    - 2 I/0 Groups
    - 3 Circuits
    - 4 Bypass groups
      - 1Assign devices to grp
      - 2 Act/Deact Groups
- 3 Test input devices
- 4 Test output devices
- 5 Display
  - 1 Configuration
    - 1 Display
    - 2 Download
  - 2 Dictionary
    - 1 Display
    - 2 Download
  - 3 Events
    - 1 Display
    - 2 Download
  - 4 Misc.
    - 1 Display pass codes
    - 2 Display codes
    - 3 Tally
    - 4 Display software version
    - 5 Display available RAM
  - 5 Detectors
    - 1 Download

4 System

- 1 Display
  - 1 Configuration
    - 1 Display
    - 2 Download
  - 2 Dictionary
    - 1 Display
    - 2 Download
  - 3 Events
  - 4 Misc.
    - 1 Display pass codes
    - 2 Display codes
    - 3 Tally
    - 4 Display software version
    - 5 Display available RAM
  - 5 Detectors
    - 1 Download
- 2 Change
  - 1 Menu 1
    - 1 Pass Codes
    - 2 Initiating codes
    - 3 Time/date
    - 4 Access level
    - 5 Baud rate
  - 2 Menu 2
    - 1 City
      - Select Master Box, Line Reversal, Chicago, Dialer
    - 2 Ann. Supervision
    - 3 I/O troubles
    - 4 Not Used
    - 5 UDACT
    - 6 Day Enable
    - 7 Day/night – manual/auto
  - 3 Menu 3
    - 1 Abort type
    - 2 Alarm Prefix
    - 3 Config file name
    - 4 Tally verification
    - 5 Silence inhibit
    - 6 Auto silence
  - 4 Menu 4
    - 1 Cfg {Not available from Front Panel}
    - 2 Waterflow delay
    - 3 Release timing
    - 4 Dump timing
    - 5 Dictionary
      - 1 Edit
      - 2 Upload

3 Test
- 1 Inputs
- 2 Outputs
- 3 Card I.D
- 4 Ground fault
- 5 Lamp test
- 6 Analog test

INTRODUCTION

"SmartStart"

The SmartStart automated programming process feature is available in the Gamewell's IF 600 control panels. This initialization process uniquely configures the system parameters in memory. The system automatically ties its inputs to its outputs through the creation of the Control-By-Event tables. During power-up and after a hardware reset, the controller decides if the system has previously had a configuration in memory. If the system does not have a configuration data base, the system polls all of the modules for type codes, status and placement, then builds a hardware configuration data base. It then polls all 198 device addresses on each loop of the Analog Loop. When a valid response is detected to any of the addresses polled, a data base for the device is created in memory. This data base for the device consists of information specific to the device such as its circuit, its address, its device type etc. The complete data base for the addressable devices is divided into circuit tables that store the information for all of the possible devices on each circuit. The circuit table is then further divided into an input table and an output table. Input tables consist of all initiating devices (detectors, pull stations, etc.) while the output table consists of all the actuating devices (relays and signal circuits, etc.). At the completion of the SmartStart cycle the system is configured as a general alarm system. All initiating devices are assigned to automatic zones. Any initiating device(s) reporting an alarm condition will activate all signal circuits steady and relays active.

Polling

During system operation the controller sequentially polls all initiating devices that are listed in the input tables in groups of ten devices per poll. Analog loops are polled independently and asynchronously.

General Overview

The additional system programming is completed through tactile keypad switches mounted on the front Operators Display (OD). Main level display screens are menu driven and users are prompted to enter sequential keystrokes. Additional programming can also be accomplished through a laptop computer connected to the serial port.

Programming Prompts

Δ WARNING !

During all levels of programming, the system will be in an off-line status and no alarms will be processed. The protected premises should be monitored by a fire watch or other reliable measure(s).

>>NOTE: Before proceeding, notify all personnel, monitoring companies and municipalities that the system will be temporarily "out of service".

Programming Prompts (continued)

Throughout the programming sequence, the user is prompted to enter data selections at the location of the flashing cursor. To select sub- menu options, use the following prompts:

To Select a Field Option	Use Right and Left arrow keys to horizontally scroll and select option field.
To Select Field Variable Types	Use up and down arrows keys to vertically scroll variable types.
Keypad prompts	Keypad prompts (e.g. [Password], [Drill], [1] [2] etc.) will be enclosed with brackets.
Display Messages	All formats for display messages will be enclosed in quotation marks.
"**Enter**" key	To complete the choice of an option, press the "**Enter**" key. This standard format of the word "**Enter**" is used throughout the programming section.

SYSTEM STARTUP

This section is subdivided into two sections, Initial System Startup and System Restart / Re-Configuration. Instructions for a newly installed system, or a system in which the firmware has been changed, are detailed in the Initial System Startup section. Instructions for a "hardware reset" are detailed in the System Restart / Re-Configuration section.

CAUTION !

Connect primary power to the system before connecting battery/standby power source.

>>NOTE: It is assumed all system installation wiring procedures detailed in this manual have been completed in accordance with local, state and federal codes.

Initial System Startup

1. Activate main power. The "Power ON" message (Figure 2) is displayed. Power will now be applied to all modules and devices.

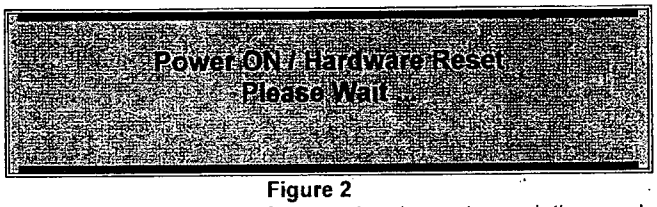


Figure 2

2. If this is an initial power up, or if the processor firmware has been changed, the panel will proceed into the SmartStart, without the need for a password. Wait the required 15 seconds. [Power ON] LED is flashing. Commencing System Reset screen is displayed (see Figure 2A).

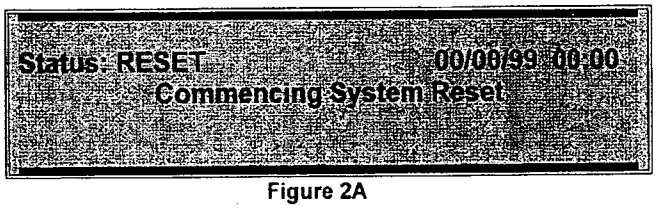


Figure 2A

3. To modify the program, proceed to **Password Entry - Access Levels** section.

SYSTEM RESTART / RE-CONFIGURATION - SMARTSTART

Δ WARNING !

All programming data will be lost when the system is re-configured. The system will initialize the SmartStart feature and will configure a new data base.

Hardware Reset

1. Complete a hardware reset by pressing S1 "RESET", located at the bottom left of the Main Module. The **Power On/System Reset** screen will be displayed.
2. While the Power On LED is still flashing, press the [**ACK**] switch. Figure 3 will be displayed.

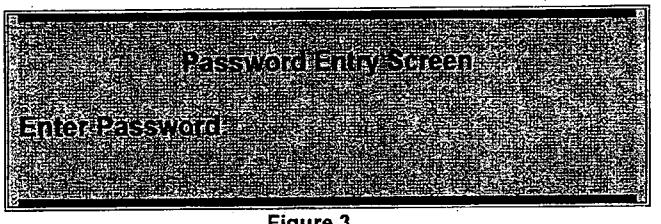


Figure 3

3. Enter a Level 4 password. If an invalid password is entered, or no password is entered, the system will go into normal reset and skip the SmartStart.

4. Press "**Enter**" to begin SmartStart processing. Figure 3A is displayed. "Time remaining *N* sec" is a countdown from 15 seconds.

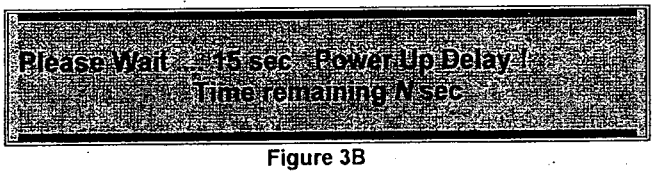


Figure 3B

Hardware Reset (continued)

5. After a 15 second delay, the system commences a hardware restart. Modules and devices are being read. After a several second pause the System RESET screen is shown, Figure 2A. Then the "System Idle" screen is displayed, Figure 4.

>>**NOTE: Upon completion of the SmartStart process, all connected addresses will be contained in system memory and all inputs will be tied to all outputs. Any input in Alarm will activate the system outputs.**

System Idle Display

After the initial system startup or system re-configuration is completed, the display will show the current date (month/day/year) and time (military), see Figure 4.

>>**NOTE: The system is equipped with a built-in screen saver. When the system remains in a idle mode (i.e. normal quiescent condition) for over 15 seconds the screen will automatically go blank.**

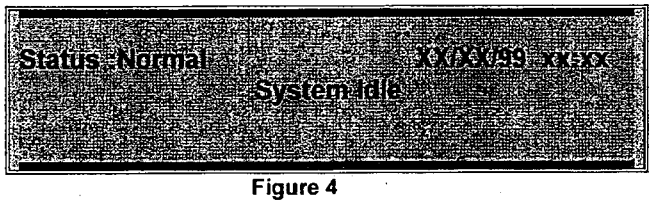


Figure 4

PASSWORD ENTRY - ACCESS LEVELS

Four levels of password protection have been incorporated in the IF 602SS system firmware. These passwords allow access to various functions of the system. Each of the four levels default to certain functions of the system and can be re-assigned to other functions via programming. Up to ten passwords may be assigned to these access levels. As well, an area to assign a user ID to each password has also been provided for quick reference. Each user ID may contain up to 10 characters. Each of these password ID's may be assigned up to a ten character string.

>>NOTE: System configuration (i.e. SmartStart) defaults to level 2 password access. When the password access level is changed, the system defaults to that level even when the system loses power. The system will not default to a Level 4 .

The four access level default settings are:

Access level 1 = Ack.
Access level 2 = Ack., Sig. Sil., Reset, Drill
Access level 3 = Ack., Sig. Sil., Reset, Drill, Det. test, Walk Test, Bypass
Access level 4 = Programming, SmartStart

Default passwords for the access levels are:

Password 1111 = Access level 1
Password 2222 = Access level 2
Password 3333 = Access level 3
Password 4444 = Access level 4

Δ WARNING !

>>When the system is in access level 4, programming, the system will not recognize an alarm or trouble condition. The premises should be protected by a fire watch or other reliable measure(s) whenever the system is being programmed.

Password Entry

1. Press "Password" keypad switch. Figure 5 is now displayed.

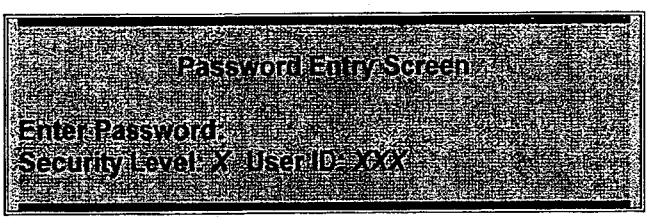


Figure 5

2. To change access levels, enter the appropriate password on the keypad.
3. To enter the programming mode after a system configuration, enter the password access LEVEL 4.

>>NOTE: System will exit the Programming mode and commence a Reset after 5 minutes of inactivity.

PROGRAMMING MODE

Main Display

The main programming display shows the user an overview of the programming modes. The user is allowed to select from four categories. (Figure 6)

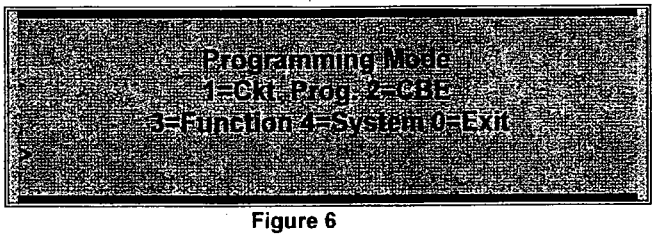


Figure 6

1= Ckt Prog	Circuit Programming
2 = CBE	Control-By-Event
3= Function	System Test/Bypass
4 = System	System Wide Programming
0= Exit	Exit

PROGRAMMING MODES
TABLE P1

Circuit Programming

Each loop employs two logical circuits. The first circuit supports up to 99 detector addresses, while the second suppots up to 99 I/O modules. A single loop panel will utilize two logical circuits, while a dul loop panel will use four.

Loop 1	Circuit 1	1-99 Detectors
	Circuit 2	1-99 Modules
Loop 2	Circuit 3	1-99 Detectors
	Circuit 4	1-99 Modules

Select "Ckt Prog" from the main "Programming Mode" menu to modify input/output device characteristics (e.g. zone type, group assignment, signal code and device specification text). (Figure 7)

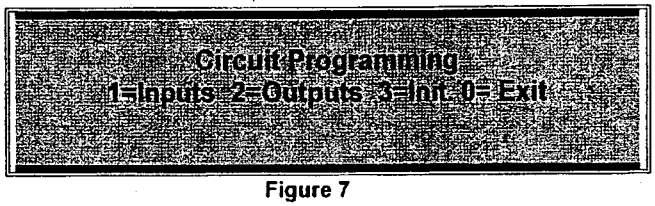


Figure 7

"Inputs" Circuit Selection

1. From the Circuit Programming menu, Press [**1**] on keypad.
2. Press "**Enter**".

>>NOTE: The cursor will be flashing under the circuit number. If the device type is an ion detector Figure 8 will be displayed.

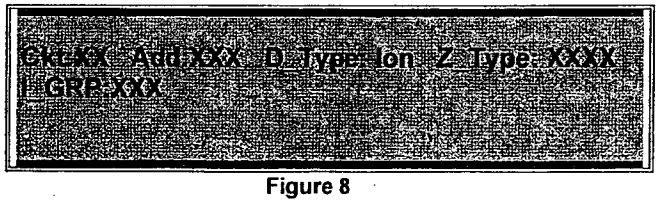


Figure 8

>>NOTE: The display starts with Circuit 1 and begins with the highest address in circuit.

Field Descriptions

"Ckt": xx"	Indicates the circuit (analog line or conventional) address that has been selected.
"Add: xxx"	Shows the address of the analog device to be modified (1 - 126).
"D_Type:xxx"	Shows the type of device (from type code of addressed device). If the device type is a photo detector, Figure 8A will be displayed. For a complete list of Device Types refer to Table P3.
"Comp:x"	A photo detector can be selected for operation with drift compensation (Yes) or without drift compensation (no). Default is Yes.
"Sens:x"	The sensitivity range of a photo detector can be adjusted (compensated) to the environment. The device sensitivity range; 3 is the least sensitive and 0 is the most sensitive. The default is '2'.
"RofR:x" "Temp:x"	If the device is a heat detector, Figure 8B will be displayed. If the device is a heat detector, the temperature can be defined in Celsius or Fahrenheit. RofR:x indicates if Rate of Rise detection is enabled. Temp:x shows the fixed temperature setting in °C and °F.
"Z_Type: xxx"	Shows the type of zone that has been selected for the device. Zone types are defined in Zone Type Table P2.
"I_GRP: x"	Indicates the selected initiating group of the device. Each input device can only be assigned to one group. One initiating group can contain many input devices (logically arranged). The user can utilize up to 256 initiating groups.
"W1:xxx "	Indicates the five (5) separate word dictionaries (W1 - W5) stored and words contained in each dictionary (0 - 127 coded words for Dict. 1 - 4, and 0 - 1024 for Dict. 5). This field is not displayed until selected. Refer to Table P4.

>>NOTE: The user can scroll through field variables using up/down arrow keys or enter the address number directly via the key pad.

Device Selection

4. Use the left/right arrow keys to move the cursor flashing under the device address "Add:xxx", enter the address number or use the up/down arrow keys to select the address of the device to be modified then press enter.

Photo Device Sensitivity Selection

Δ WARNING !

>>Changing the sensitivity of a Smoke Detector may delay alarm reporting. No device should be changed without the approval of the authority having jurisdiction. All settings should be in compliance with all NFPA codes, UL listings, or other local codes.

4.1 To modify the device sensitivity, use the left/right arrow keys to scroll to "sense:". Use the up arrow key to adjust sensitivity.

>>NOTE: The sensitivity scale allows the user to select a range of settings which are numeric values (0 through 3). The number 0 is the most sensitive device setting and the number 3 is the least sensitive device setting. Refer to Figure 8A.

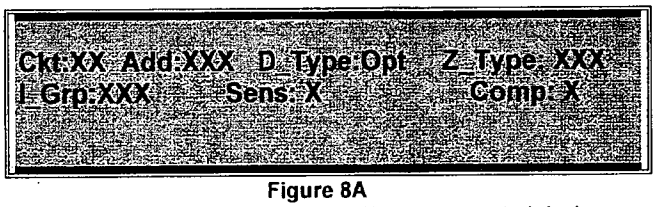


Figure 8A

4.2 To change an optical detector to a compensated/uncompensated device use the left/right arrow keys to scroll to "comp:". Use the up/down keys to select "Y" or "N" (Yes/No).

Zone Type Selection

5. Use the right arrow key to move to "Z_Type:". Use the up/down arrow keys to select zone type. Only zone types that apply to device types will be displayed. Refer to Table P2 for a complete list of all zone types.

Initiating Group Selection

6. Use the right arrow key to move to "I_Grp". Enter the initiating group number or use the up/down arrow keys to select initiating group type (see Field Description).

When an input device has a Zone Type of AutSB (Automatic Sounder Base) or AutSBS (Automatic Sounder Base Silenceable) The Sounder Base is assigned the same Output group number as the Input Group number selected. This allows the Sounder Base to be programmed as an output device in the CBE table.

User Text Selection

7. Use the right/left arrow keys to move to select *text word dictionaries* "W1" through "W5:" field (not shown until selected).

8. Use the up/down arrow keys or enter the three digit word number to select text entries from *text word dictionaries* "W1" through "W5:". The ## represents the text entry number in dictionary *D*. See Figure 10.

>>NOTE: The "W*D*" field is not displayed until the cursor is placed in its field. When the dictionary 1 through 5 is selected "W*D*" will be shown on the lower right hand corner of the display. See Figure 10.

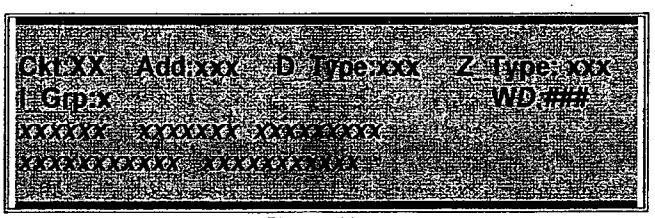


Figure 10

9. When the desired coded word is displayed, use the left/right arrow keys to select the next field.

>>**NOTE: It is not necessary to press "Enter" when the Up/Down arrow keys are used to change the parameter of a field. The field contents are automatically updated for the device as shown on the display (Except I_Grp).**

10. When all input devices have been programmed, press "**Enter**" to exit the input circuit programming mode.

ZONE TYPE TABLE - P2

Display Panel	Name	Description
Ver	Verification	Automatically verifies the device. After a Reset/Stabilization delay, the panel monitors the device for 60 seconds. If no alarm exists during this period, the panel returns to Idle.
Auto	Automatic	Places the panel into General Alarm
AutSB	Automatic detector with Sounder Base	Places the panel into General Alarm. The Sounder in the base has the same group number as the detector, and is a CBE programmable output. Activating output group 254 will activate all Sounder Bases in the system.
AutSBS	Automatic detector with Sounder Base, Silenceable	Same as AutSB, plus the Sounder in the base can be silenced by SIGNAL SILENCE commands.
Gener	Generic	All the device control functions are active without placing the system in a general alarm condition at the panel.
And	And Initiating Zone	Two stage automatic detection.
Ack	Acknowledgment	Remote location acknowledgment
Drill	Drill	Remote drill system condition.
SigSil	Signal Silence	Remote location Signal Silence
Reset	Reset	Remote reset of the panel - resets system.
Abort	Abort	Delays or stops discharge cycle
Dump	Dump	Initiates discharge manually
Super	Supervisory	Sprinkler Supervisory signal input
SupvSB	Supervisory with Sounder Base	Same as AutSB, but with supervisory
SupvSBS	Supervisory with Sounder Base (Silenceable)	Same as SupvSB, plus the Sounder in the base can be silenced by SIGNAL SILENCE commands.
Water	Water flow	Water flow, non silenceable
Watr	Water flow delayed	Water flow, delayed, non silenceable
Watrs	Water flow delayed	Water flow, delayed, silenceable

DEVICE TYPE TABLE - P3

Display Panel	Description
Ion.	Ionization Sensor
Opt.	Photo-Electric Sensor
Heat	Thermal Sensor
Multi	Multisensor (Ion – Thermal)
Mon.	Switch closure
Man.	Manual Station (or PID with priority interrupt set)
CZI	Collective Zone Interface
HHeat	High Temp Thermal

Rheat	Rate of Rise Thermal

TEXT DICTIONARY TABLE - P4

W1	W2	W3	W4	W5
Fire Alarm	Smoke Detector	1st.	Floor Room Number	1
Alarm	Heat Detector	2nd.	Floor Corridor	2
Gas	Duct Detector	3rd.	Floor Elevator Lobby	3
Sprinkler	Water flow	4th.	Floor	4
Trouble	Tamper switch	5th.	AHU	5
Acknowledge	Manual Station	6th.	Floor-Closet	6
Reset	Pull Station	7th.	Level	7
Mechanical	Beam Detector	8th.	Floor-Service Elevator Lobby	8
Electrical	Fire Station	9th.	Sub-level	9
Boiler	Ionization Smoke Detector	10th.	Basement Level	10
Utility	Photo Smoke Detector	11th.	Sub-basement Level	11
Extinguishing	Tunnel Heat Detector	12th.	Basement	12
Fire	PIV switch	13th.	Parking Level	13
	Pressure switch	14th.	Garage Level	14
	Fire Pump	15th.	Wing	15
	Generator	16th.	Floor Wing	16
		17th.	Atrium	17
		18th.	Mezzanine	18
		19th.	Ballroom	19
		20th.	Kitchen	20

Output Circuit Programming

Select "Outputs" from the Circuit Programming menu to modify Indicating and Output signal characteristics (e.g. zone type, group assignment signal codes, restore options and Drill mode).

Signal Circuit 1, 2, 3, and 4

Select Outputs from the circuit programming menu to modify the signal circuits characteristics (e.g. drill, group assignments, signal type, etc).

1. From the Circuit Programming menu, Press **[2]** on keypad, see Figure 7.
2. Press **"Enter"**.

3. When a signal circuit is selected for programming from the operators display, Figure 11. The red LED of the selected circuit will illuminate.

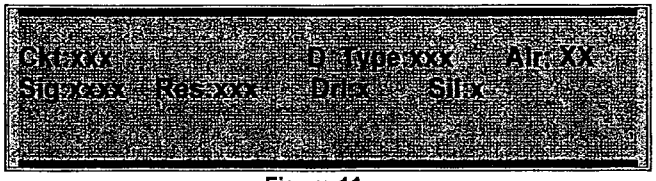
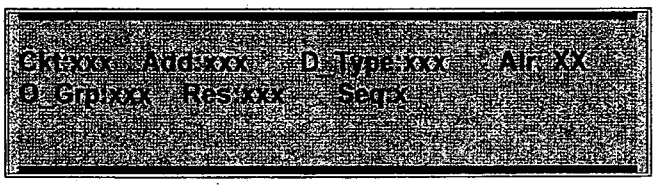


Figure 11

4. When an analog addressable line is selected for programming from the operators display, Figure 11B. The yellow LED of the selected circuit will illuminate



>>NOTE: If an output device is not present on the selected analog addressable line, the result is no action.

Field Descriptions for Signal Circuits and Analog Addressable

"Ckt:xxx" Indicates the signal circuits memory address

"Add:xxx Address of analog relay module

"D_Type:Sig" Shows the type of output circuit

"ALR:x" Indicates to what alarm level the circuit will be activated in the event that "and" zones are programmed.

>>NOTE: The use of Cross and Counting Zones must comply with the applicable requirements of Sect. 6.8.5.4 of NFPA 72, 2002 Edition.

Systems that require the operation of two automatic detection devices to initialize the alarm response shall be permitted, provided:

(a) They are not prohibited by the authority having jurisdiction.

(b) There are at least two automatic detection devices in each protected space.

(c) Automatic detection device area spacing is no more than one-half that determined by the application of Chapter 8 of NFPA 72, 2002 Edition.

"Sig:xxx" Indicates the type of signaling to be output by the circuit (i.e. steady, marchtime, etc). Refer to ***Output Signal Circuit Type*** for a complete description.

"Res:xxx" Indicates when the signal circuit has been programmed to return to normal. **Refer to *Signal Circuit Restore*** for a complete list of options.

"DRL:x" Indicates if a signal circuit will activate when the drill switch is depressed.

"Sil:x" Auto Silence – Programmable, 2 – 15 min..

"O_Grp:xxx" Identifies the output group.

"Seq:" Sequentially Restores.

>>NOTE: If an analog addressable line (or single device) is not programmed when selected, the result is no action.

5. Program the signal circuit by using the left/right arrow keys to move between fields and the up/down keys to assign the desired characteristics.

6. To exit output circuit programming press the "**Enter**" key.

Signal Circuit Types

Output Signal Circuit Type

A. STEADY DC
Steady DC type signal circuit is the System Default. When Activated, any signal circuits programmed for Steady DC will provide a 24VDC uninterrupted output.

B. MARCHTIME 60
Marchtime 60 circuits, when activated, will provide a 24 VDC output on the selected circuits at a 60 pulses per minute rate with a duration of 50% on and 50% off cycle.

C. MARCHTIME 120
Marchtime 120 circuits, when activated, will provide a 24 VDC output on the selected circuits at a 120 pulses per minute rate with a duration of 50% on and 50% off cycle.

D. TEMPORAL
Temporal signaling circuits, when activated, will provide a 24 VDC output pattern which is active for 0.5 seconds, off for 0.5 seconds, active for 0.5 seconds, off for . 0.5 seconds, active for . 0.5 seconds, off for 1.5 seconds. The pattern repeats until the circuit is returned to Idle.

E. CALIFORNIA UNIFORM FIRE CODE
California Uniform Fire Code Signal circuits, when activated, will provide a 24 VDC output which is active for 0.25 seconds, and off for 0.25 seconds for 10 seconds and then silent for 5 seconds. The pattern repeats until the circuit is returned to Idle.

F. CODED
Zone coded signaling circuits when activated will produce a 24VDC pulsed numeric code to be transmitted up to 6 times or as programmed. A separate code is usually transmitted for each input zone.

G RELEASING
Releasing coded signaling circuits will sound at 60 bpm during one alarm, 120 bpm during pre-release, and steady during discharge and the discharge delay if programmed.

H. SYNC TYPE
Horn/Strobe synchronization protocol to be output on NAC 1-4. Selections are: Wheelock, Gentex, System Sensor, Faraday, Amesco.

Signal Circuit Restore

A. Restore On - ACKNOWLEDGE *For use with signaling and functions that are not required for the detection and notification of a fire incedent.*

Any active output point programmed to restore on ACKNOWLEDGE will return to Idle whenever the Acknowledge switch is pressed. All output points that were returned to Idle will reactivate upon a subsequent alarm which is programmed to activate those output points.

B Restore On - SIGNAL SILENCE (** System Default **) *All required Fire Alarm outputs in which silence is intended to occur, shall be programmed under this switch or function.*

Any active output point programmed to restore on Signal Silence will be silenced by the activation of the Signal Silence Switch and will return to Idle. The Signal Silence Switch operates as an alternate acting switch. All outputs that were returned to idle will reactivate upon a subsequent alarm or by depressing the Signal Silence Switch again. Both Signal Circuits and Relay Outputs can be programmed to restore on Signal Silence. . All output points that were returned to Idle will reactivate upon a subsequent alarm.

C. Restore On - RESET

Serves as System Back up. Any active output point not restored by any other means will restore on RESET. Any active output programmed to restore on RESET will not restore on any other action.

>>**NOTE: There are a few restrictions to be aware of regarding output signal circuits:**

1. The four signal circuits on the System Module can be used for steady or pulsing DC (marchtime, temporal, etc.) and programmed separately.

Alarm Levels Available

ALR:0
ALR:1
ALR:2
ALR:3

There are four levels of alarm that can be assigned to each type of output circuit, These levels designate at which level of alarm an output circuit will activate. *PreAlarm* (ALR:0), Circuits designated as PreAlarm will activate when a prealarm level is detected on an input circuit. *1st Alarm* (ALR:1), Output circuits assigned to 1st alarm level (system default) will activate when a first alarm is detected on its assigned input circuit(s), provided the input circuit is assigned to activate that output circuit in the CBE table. *2nd Alarm* (ALR:2 Circuits requiring activation on 2nd alarm (AND zones) can be assigned to alarm level 2. An AND zone assigned to activate both 1st and 2nd alarm level output circuits will activate only those outputs assigned to level 1 during a first alarm condition. When a second alarm is detected both first and second alarm outputs will activate. *Releasing* (ALR:3), outputs (RSM/RSI) Discharge devices are assigned to Level three, and will activate after the 2nd alarm plus the releasing and dump timing, if not aborted.

Special Signal Circuit Functions

A. SIGNAL SILENCE INHIBIT

Silence Inhibit will prevent the operation of the Signal Silence function for a programmable period ranging from 30 seconds to 5 minutes from the time the panel detects the first alarm. If the panel is programmed for Silence Inhibit any activation of the Signal Silence Switch will be ignored, allowing the output signal circuits to be active, until the programmed delay has elapsed.

B. AUTO SILENCE - Automatic Signal Cutoff

If an output signaling circuit is programmed for STEADY output and AUTO SILENCE it will automatically silence the signal circuits after the programmed delay, from the time the first point goes into alarm. If subsequent to its silencing, a new alarm occurs, the output signaling circuit will resound and the auto silence time-out feature will reset its timer to silence its associated outputs after the programmed delay. Coded outputs cannot be programmed for Auto Silence

C. DRILLABLE

Any signal circuit programmed as drillable will activate when the drill feature is activated.

Restoring Outputs

A. Restore On - ACKNOWLEDGE *For use with signaling and functions that are not required for the detection and notification of a fire incedent.*

Any active output point programmed to restore on ACKNOWLEDGE will return to Idle whenever the Acknowledge switch is Depressed. All output points that were returned to Idle will reactivate upon a subsequent alarm.

B. Restore On - RESET

Serves as System Back up. Any active output point not restored by any other means will restore on RESET. Any active output programmed to restore on RESET will not restore on any other action.

C. SEQUENTIAL RESTORE - Upon System Reset

The sequential restore only applies to relay outputs. Any active RCE-95 programmed for Sequential Restore will only restore on Reset, not on Acknowledge. Selected relays will return to Idle 4 seconds apart, starting with the highest address and ending at the lowest address set. The restore sequence is determined by the actual address of the RCE and is not programmable.

Initializing an analog Circuit Initializes an individual circuit. Allows the user to add new devices (detectors) or remove devices in the specific circuit selected. All other circuit information previously entered (utilized in Control By Event data base programming) is protected and cannot be altered or damaged.

1. From the circuit programming display menu, select the [3] numeric key.

2. Press "**Enter**"..

3. Select the circuit to initialize (1-4). SmartStart feature configures new data base making any changes that have been detected. See Figure 12D.

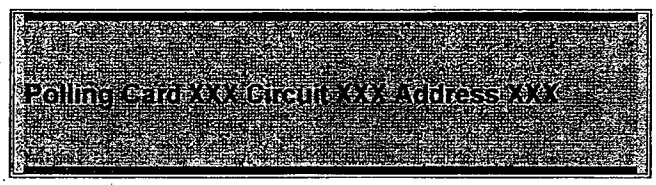


Figure 12D

CONTROL BY EVENT

Control-by-Event programming allows the user to create a matrix whereby selected groups of input devices are logically connected to selected groups of output devices or circuits. The SmartStart feature automatically assigns all input devices to select all output devices or circuits.

In the device specific screens, input or output group numbers (1 - 256) can be assigned to each device. Multiple devices can be assigned to a single group but each device can only be assigned to one group.

In the output programming menu for each device or circuit there is a field (Alr) for assigning the Alarm level it will activate. The four levels of alarm, 0=pre-alarm, 1=1st alarm, 2=2nd alarm and 3=Releasing. These levels combined with the CBE table determine when the circuit or device will activate.

CBE Programming

Control-by-Event "CBE" programming is dedicated to system wide ALARM functions. Select "CBE" (#2) from the main "Programming Mode" menu to change or assign input group assignment with the associated output group.

To select "logical" Group Inputs

1. Select "CBE" (**2**) from the main "Programming Mode" menu.

2. Press "**Enter**".

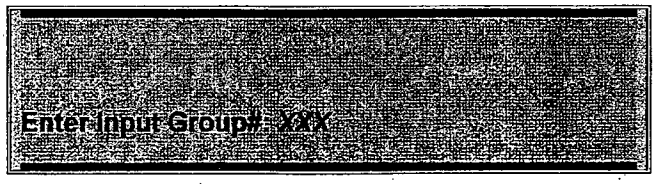


Figure 13

3. Using numeric keys, enter the corresponding input group number. The group number will be displayed in the location as shown in Figure 14.

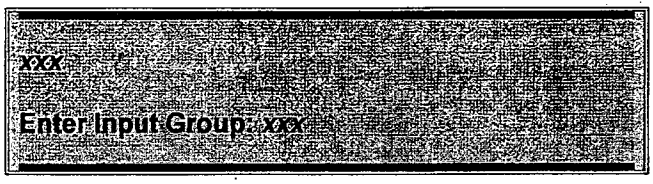


Figure 14

4. Enter all desired input group numbers. The assigned input group number is displayed in top left of screen. As the next input group number is entered, group numbers are sequentially arranged (ascending order). Enter up to 256 group input numbers.

>>**NOTE: To cancel an individual input group, enter that group number and press "Enter". The group number is <u>not</u> shown and is then canceled.**

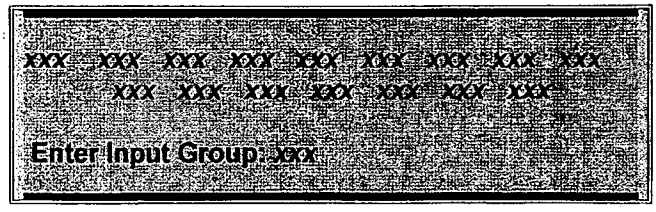


Figure 14A

To assign a "logical" Output Group

5. Press **"Enter"**. Figure 15 is now displayed.

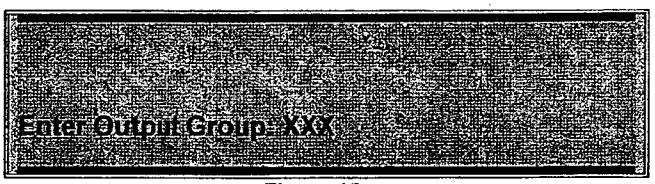


Figure 15

6. Using numeric keys, enter the desired output group number or press the signal circuit switch. The assigned output group number now is displayed in top left as shown in Figure 15A.

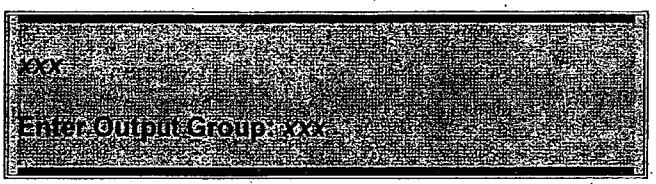


Figure 15A

7. Enter all desired output group numbers. The assigned output group number is displayed in the top left of the screen. As the next output group number is entered, group numbers are sequentially arranged (ascending order). Enter up to 256 group output numbers, see Figure 15B.

>>**NOTE: To cancel an individual output group, enter that group number and press "Enter". The group number is <u>not</u> shown and is then canceled.**

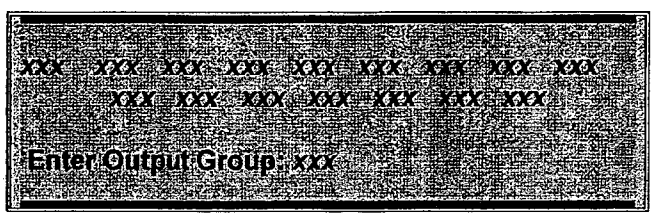


Figure 15B

8. Repeat sequential steps (3 through 7) for each associated input/output group to be modified in the selected circuit.

FUNCTION PROGRAMMING

See *System Test*

SYSTEM PROGRAMMING

Programming

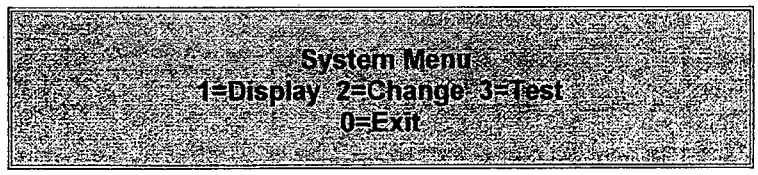
System programming menus may be accessed if the proper programming password is entered at the "ENTER PASSWORD:" prompt.

Programming may also be performed from a laptop computer connected to the RS-232 compatible port on the CPU of the control panel. Refer to the end of this section for instructions.

>>**NOTE: Before proceeding, notify all personnel, monitoring companies and municipalities the system will be temporarily "out of service". During all levels of programming, the system will be in an off-line status.**

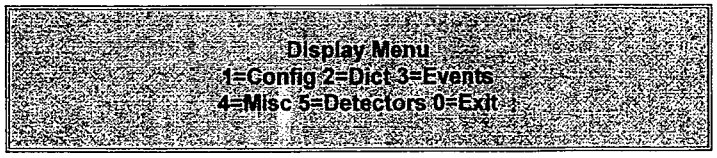
System Menu

The "System Menu" menu is displayed when selected from the programming mode menu.



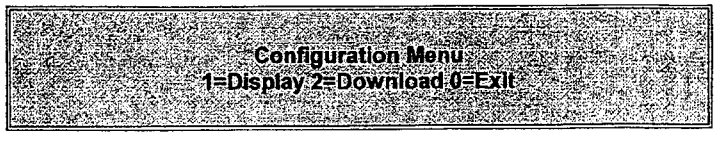
Display Menu

Selecting the "Display" option from the "System Menu" which allows the user to display or download various system parameters. There are four options that may be selected from this menu (see Figure 5-2) and four options that may be selected from the "MISC." menu selection. (Figure 5-3).



Config Menu

The Configuration Menu allows the user to select either displaying the system module configuration or downloading the entire system configuration.



Display Config

The system module configuration is displayed when option 1 is selected from the Configuration Menu. This display shows the modules that are present in each card location, their associated card type, code and a description of the card. The modules displayed are retrieved from the system configuration memory and are not a real time scan of the actual cards present (refer to the system test menu for a real time display).

```
Configuration Menu
1=Display 2=Download 0=Exit
>1
Card 0, ID 0C is CCM0, A/N Panel
Card 1, ID FF is Vacant
Card 2, ID FF is Vacant
Card 3, ID FF is Vacant
Card 4, ID 01 is CCM4, 4 Sig Ckt, Class A
Card 5, ID 02 is CCM5, 4 Rel Ckt
Card 6, ID 05 is CCM6, Misc. Ckts
Card 7, ID FF is Vacant
Card 8, ID 09 is Analog Addressable Module
Card 9, ID FF is Vacant
Card 10, ID FF is Vacant
Card 11, ID FF is Vacant
Card 12, ID FF is Vacant
Card 13, ID FF is Vacant
Card 14, ID FF is Vacant
Card 15, ID FF is Vacant
Card 16, ID FF is Vacant
Card 17, ID FF is Vacant
Press AnyKey To Continue
```

System Configuration

Select this field to view the system modular placement (hardware configuration, card identification number and I/O card type assignment).

Modular Placement

Card numbered 0 through 7 are reserved for the various common control module sections. These card location numbers are hardwired physical circuits.

Card ID #

Each type of card is assigned a unique 8 bit code that the card transmits to the CPU when it is polled. In operation each card is periodically polled and returns its type code. The CPU detects if the card is functioning correctly, for a card type at that location. Refer to Table L4, Card ID Type.

Card Location	Card No.	Card ID Type Code (hex value)	Card Description
Display Module	Card# 0	0C	Alphanumeric (LCD) display card
System Module	Card# 4	01	Signal Circuits
System Module	Card# 5	02	Relays
System Module	Card# 6	05	Variety of features (city tie supervision, ground fault, default power supply supervision, +24 V, +12V, +5V supervision, V-battery to power supply, unregulated raw supply, system on AC/Battery, Charging Monitor, battery monitor, aux 1 & 2).
System Module	Card# 8	08	SmartScan analog addressable interface (1, or 2 loops)

Table L4, Typical Card ID Type

System Configuration

1. Select [1], the "Config" field.

2. Select "Display" [1], Press "**Enter**". (*Figure L-3 is an example of data shown*).

3. The alphanumeric screen will scroll and the user can view the system module configuration.

4. Select "Download" [2] to download system configuration to a laptop computer.

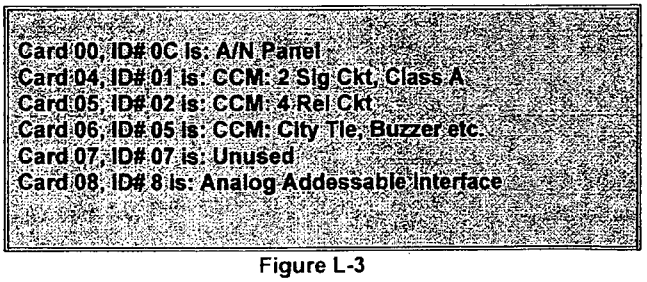
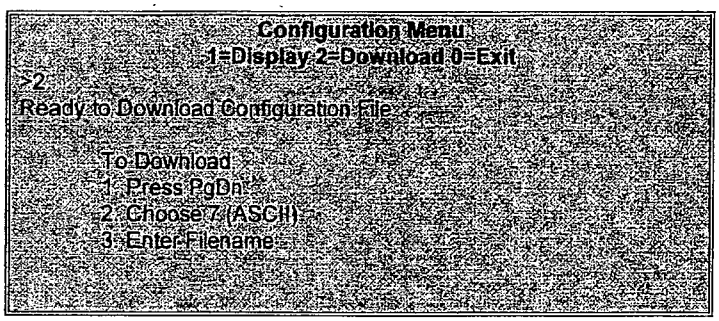


Figure L-3

4. Press "**Enter**" key for previous menu. Figure L-3, is shown.

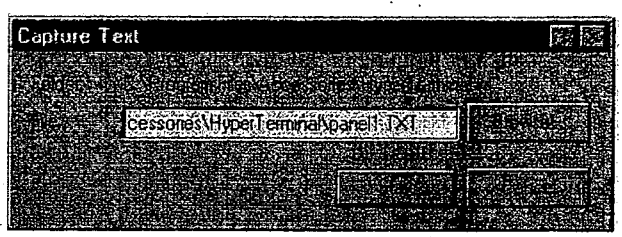
Download Config

Selecting Download from the Display Configuration Menu will prompt the system to transmit the complete system configuration file to the RS-232 port. When this is selected the system prompts the user to perform several steps. These steps are the actions required to receive an ASCII file when using PROCOMM communications software. When using alternate software packages follow the procedure required for that software to receive an ASCII file. The next CR the system receives will start the transmission of the file.



HYPERTERMINAL

1. Select the **Transfer** pull down menu, select **Capture Text**, enter the file name and path for the file to be down loaded, and click on **Start**. When the down load is complete, select the **Transfer** pull down menu, select **Capture Text** , select **Stop**, and then press Enter to return to the panel



Display Dict. Menu

This display option allows the user to view the contents of word dictionaries 1 - 5. Dictionaries 1 - 4 may contain up to 128 entries and dictionary 5 may contain up to 1024 entries. By selecting this option the contents of all 5 user dictionaries are output to the laptop/computer screen.

```
Display Dictionary Menu
1=Display 2=Download 0=Exit
```

Display Dict.

The following is the format in which the dictionary will be displayed.

```
Start of Dictionary #1

End of Dictionary #1
Start of Dictionary #2

End of Dictionary #2
Start of Dictionary #3

End of Dictionary #3
Start of Dictionary #4

End of Dictionary #4
Start of Dictionary #5

End of Dictionary #5

Press Enter Key to Continue
```

Download Dict.

Selecting Download from the Display Dictionary Menu will prompt the system to transmit the complete set of 5 dictionaries to the RS-232 port. When this is selected, the system prompts the user to perform several steps. These steps are the actions required to receive an ASCII file when using PROCOMM communications software. When using alternate software packages follow the procedure required for that software to receive an ASCII file. The next CR the system receives will start the transmission of the file.

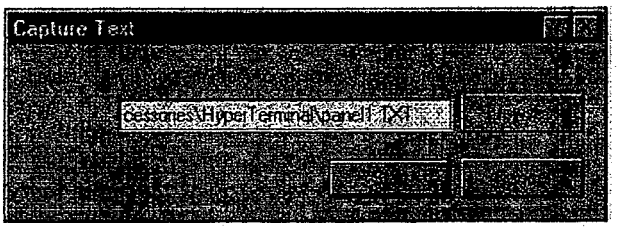
```
Display Dictionary Menu
1=Display 2=Download 0=Exit
>2
Ready to Download Dictionary File

To Download
1- Press PgDn
2- Choose 7 (ASCII)
3- Enter Filename
```

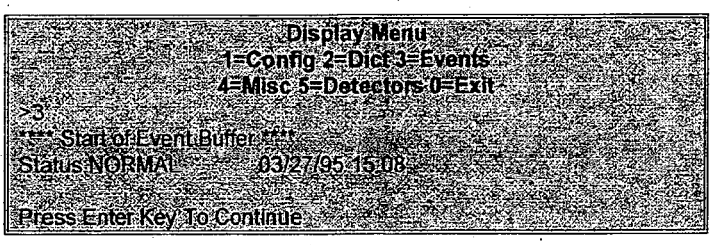
HYPERTERM

2. Select the **Transfer** pull down menu, select **Capture Text**, enter the file name and path for the file to be down loaded, and click on **Start**. When the down load is complete, select the **Transfer** pull down menu, select **Capture Text** , select **Stop**, and then press enter to return to the panel

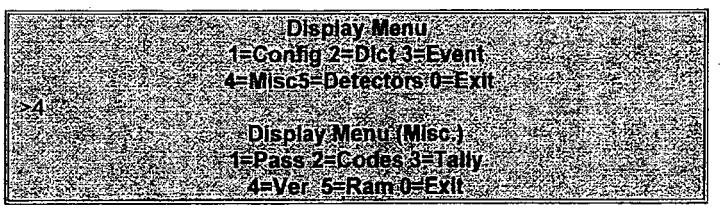
3.



Display Events The display events selection will prompt the CPU to output it's complete history log to the RS-232 port. The history log will contain all information regarding the system status changes for the previous 1000 events or since the last time the system SmartStart™ feature was invoked.

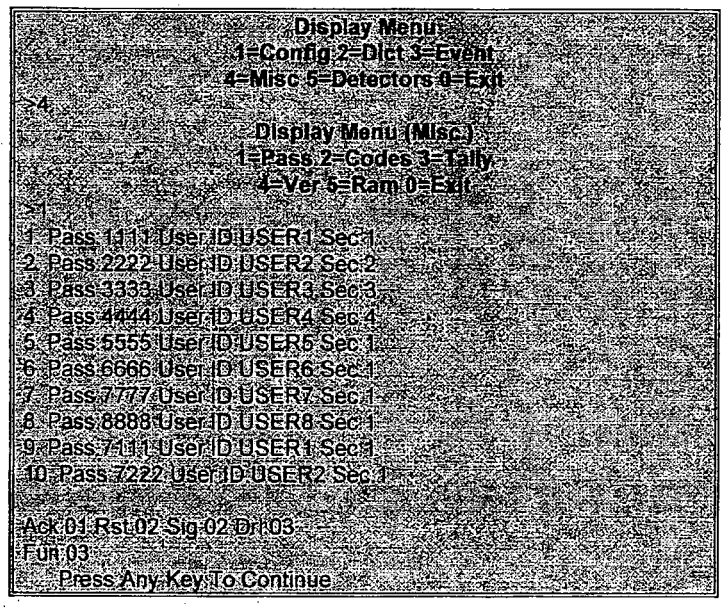


Display, Misc. When 4 (Misc) is selected from the Display menu, a sub-menu of selections is displayed.



Display Pass

Displaying the passwords allows the user to view the 10 passwords that are assigned to the system. Each password has a user ID and a security or access level assigned to it. This screen also shows the security levels that are assigned to each of the function keys. **[Enter]** to scroll passwords. The following display are the default settings for the IF 600 system.



Display Codes

Displaying the codes will allow the user to view the codes that are assigned to each of the 256 input groups. This is followed by information on the timing of the codes, number of rounds transmitted and whether the system reverts to March Time coding or silences after the coding is completed. The default setting for each code is 1,2,3,4,5,6.

```
                Display Menu (Misc.)
          1=Pass 2=Codes 3=Tally
          4=Ver 5=Rain 0=Exit
>2
1=123456 2=123456 3=123456 4=123456
5=123456 6=123456 7=123456 8=123456
9=123456 10=123456 11=123456 12=123456
13=123456 14=123456 15=123456 16=123456
17=123456 18=123456 19=123456 20=123456
21=123456 22=123456 23=123456 24=123456
25=123456 26=123456 27=123456 28=123456
29=123456 30=123456 31=123456 32=123456
33=123456 34=123456 35=123456 36=123456
37=123456 38=123456 39=123456 40=123456
41=123456 42=123456 43=123456 44=123456
45=123456 46=123456 47=123456 48=123456
49=123456 50=123456 51=123456 52=123456
53=123456 54=123456 55=123456 56=123456
57=123456 58=123456 59=123456 60=123456
61=123456 62=123456 63=123456 64=123456
65=123456 66=123456 67=123456 68=123456
69=123456 70=123456 71=123456 72=123456
73=123456 74=123456 75=123456 76=123456
77=123456 78=123456 79=123456 80=123456
81=123456 82=123456 83=123456 84=123456
85=123456 86=123456 87=123456 88=123456
89=123456 90=123456 91=123456 92=123456
93=123456 94=123456 95=123456 96=123456
97=123456 98=123456 99=123456 100=123456
101=123456 102=123456 103=123456 104=123456
105=123456 106=123456 107=123456 108=123456
109=123456 110=123456 111=123456 112=123456
113=123456 114=123456 115=123456 116=123456
117=123456 118=123456 119=123456 120=123456
121=123456 122=123456 123=123456 124=123456
125=123456 126=123456 127=123456 128=123456

Pls:10Sec Cyl:04 Sig:OFF
Press Any Key To Continue
```

Tally

This displays the number of times that a detector which is selected for Verification, has activated without confimation within the last 30 days.

```
Display Menu (Misc.)
1=Pass 2=Codes 3=Tally
4=Ver 5=Ram 0=Exit
>3
Press any Key To Continue
```

Display Ver.

The version of firmware installed in the main CPU will be displayed when 3 (Ver) is selected from the Display Menu (Misc.).

```
Display Menu (Misc.)
1=Pass 2=Codes 3=Tally
4=Ver 5=Ram 0=Exit
>4
600 System Version 7.2.1
Last Updated on FEB 05, 2004 at 15:43:58

Press any Key To Continue
```

Display RAM

Displaying the RAM allows the user to view the available system Random Access Memory.

```
Display Menu (Misc.)
1=Pass 2=Codes 3=Tally
4=Ver 5=Ram 0=Exit
>5
XXXXX Bytes are available
Each additional device requires 32 bytes

Press any Key to continue
```

Display Detectors

The Detector Display Menu allows the average counts of the input devices to be down loaded.

```
Display Menu
1=Config 2=Dict 3=Events
4=Misc 5=Detectors 0=Exit
>5

1=Down Load 0=Exit
```

Change Menu The system change menu allows the user to change various system parameters.

Change Menu 1

```
Change Menu
1=Menu 1 2=Menu 2 3=Menu 3
4=Menu 4 0=Exit
```

```
Change Menu
1=Menu 1 2=Menu 2 3=Menu 3
4=Menu 4 0=Exit
>1

Change Menu 1
1=Pass 2=Code 3=Date 4=Seq
5=Baud 8=Strobe Sync 0=Exit
```

Change Pass

The Change Password menu is used to change the password, user name and/or the access level associated with the passwords. When this is selected from Change Menu 1, the previously programmed password information is displayed, followed by a prompt requesting the password number to be changed. When the password number is entered the "Enter Password" prompt is displayed. Enter the new password (Four Digits) or press enter to leave the existing password. This is followed with the User ID prompt. The User ID may contain up to 8 ASCII characters. After defining the user, the access level or security level (Sec:) assigned to that password is defined.

NOTE: Before changing the password # 4 (programming password) make sure that you have added a new Security Level 4 password to access the programming area.

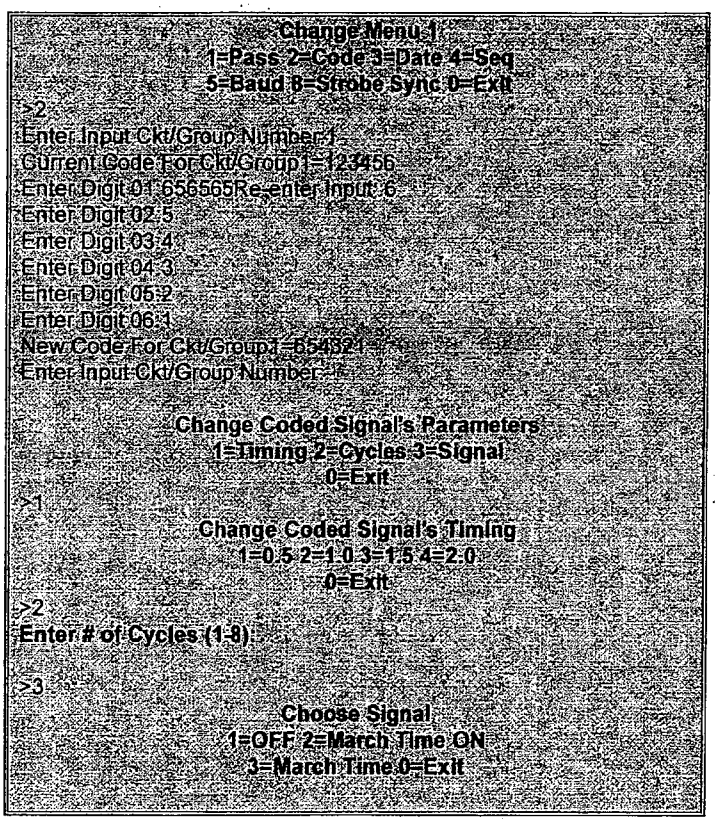
```
                Change Menu
        1=Menu 1 2=Menu 2 3=Menu 3
        4=Menu 4 0=Exit
>1

              Change Menu 1
        1=Pass 2=Code 3=Date 4=Seq
        5=Baud 8=Strobe Sync 0=Exit
>1
1 Pass 1111 User ID USER1 Sec 1
2 Pass 2222 User ID USER2 Sec 2
3 Pass 3333 User ID USER3 Sec 3
4 Pass 4444 User ID USER4 Sec 4
5 Pass 5555 User ID USER5 Sec 1
6 Pass 6666 User ID USER6 Sec 1
7 Pass 7777 User ID USER7 Sec 1
8 Pass 8888 User ID USER8 Sec 1
9 Pass 7111 User ID USER1 Sec 1
10 Pass 7222 User ID USER2 Sec 1
Enter Password # To Change 1
Enter Password 1234
Enter User ID John Doe
Enter Security level 1
1 Pass 1234 User ID John Doe Sec 1
2 Pass 2222 User ID USER2 Sec 2
3 Pass 3333 User ID USER3 Sec 3
4 Pass 4444 User ID USER4 Sec 4
5 Pass 5555 User ID USER5 Sec 1
6 Pass 6666 User ID USER6 Sec 1
7 Pass 7777 User ID USER7 Sec 1
8 Pass 8888 User ID USER8 Sec 1
9 Pass 7111 User ID USER1 Sec 1
10 Pass 7222 User ID USER2 Sec 1
Enter Password # To Change
```

Change Code

The codes in the IF 600 systems are assigned to the input groups. When a device within that group alarms, that code would be sounded on the signal circuits that have been programmed as coded circuits. Each input group may be assigned an individual code that contains up to 6 digits. The digits are defined in hexadecimal and range from 0-9 and A-F. When selected each digits (1-6) of the code is entered individually.

After the code has been entered a sub-menu appears. This menu allows you to change the Timing, the number of Cycles and the output of the signal circuits after the code is complete, silence or March Time signal.



Change Date

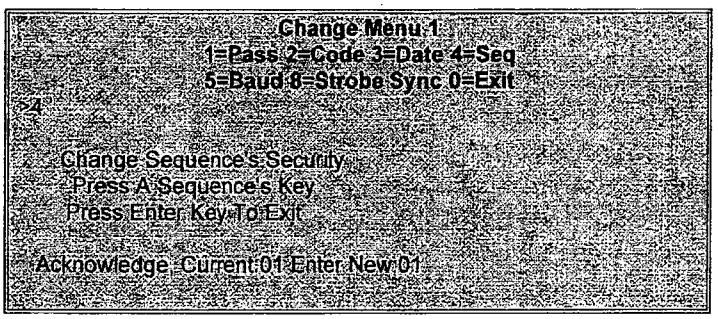
To change the date and/or time in the IF 600 system, the Change Date Menu must be selected. This menu prompts the user with the information the system requires to enter a new time and date.

```
                    Change Menu 1
          1=Pass 2=Code 3=Date 4=Seq
          5=Baud 8=Strobe Sync 0=Exit
>3
                      Date Menu
              1=Date 2=Time 3=Savings
>1
THR Date 09/30/99  Time 09:52:41
Enter Month  :09
Enter Date   :30
Enter Year   :99
Enter Day 1=SUN 2=MON 3=TUE 4=WED
          5=THR 6=FRI 7=SAT 0=EXIT  5
>Enter
                      Date Menu
              1=Date 2=Time 3=Savings
>2
Current Date/Time
THR Date 09/30/99  Time 09:54:21
Enter Hour   :10
Enter Minutes :43
          New Date/Time
    Date 09/30/99  Time 10:43:00
    Press Enter Key To Continue
>Enter
                      Date Menu
              1=Date 2=Time 3=Savings
>3
Daylight Savings Time DISABLED
Enable Daylight Savings Time
1=Yes 2=No Enter=Exit
>Enter
```


ROA_01812

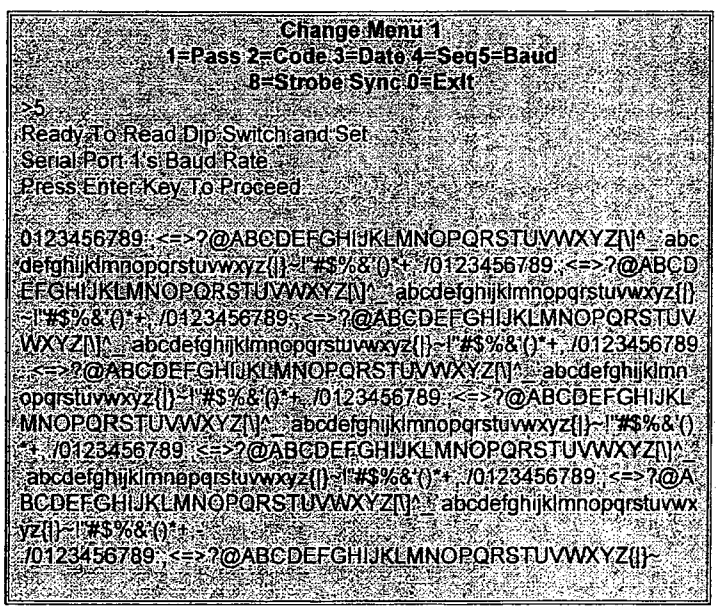
Change Seq

The Change Sequence option allows the user to redefine the access levels associated with each of the sequence keys. Each of these keys is assigned an access level by default. The Acknowledge key is assigned to level 1 access. The Reset, Signal Silence and Drill keys are assigned to level 2. Also, the Function and Day keys are assigned to level 3.
Any of these keys may be reassigned by selecting this option, pressing the key to be reassigned and entering the access level desired. These keys may also be assigned to level 4 access (programming level). By assigning a key to level 4 access, that keys operation is inhibited.



Change Baud

The Change Baud selection will cause the system to output a printer test pattern to the RS-232 port. This continuous output allows the user to select the baud rate of the connected device without having to cause system abnormalities.



Baud Rate Switch Settings

The baud rate is changed by setting DIP switch SW2 on the Main module to the desired speed (see below table). Select this option to read new setting.

SW1 - Settings		
S1	Open	Do Not Change
S2	Open	Do Not Change
S3	Always Closed	Do Not Change
S4	Open	Do Not Change
S5	Open	Do Not Change
S6	Open	Do Not Change
Note:	P2 baud rate of is selected via S7 and S8. **Auto Detect Baud rate is utilized for peripheral devices.**	
S7, S8 Open	*9600 Baud Rate*	
S7 Closed, S8 Open	*4800 Baud Rate*	
S7 Open, S8 Closed	*2400 Baud Rate*	
S7, S8 Closed	*1200 Baud Rate*	

Change Menu 2

```
Change Menu
1=Menu 1 2=Menu 2 3=Menu 3
4=Menu 4 0=Exit
>2
Change Menu 2
1=City 2=Ann 3=Trbl 5=UDACT
6=Day Enable 7=Day/Night 0=Exit
```

Change City

The City Tie Circuit is designed to operate in four modes of operation; Line Reversal, Master Box, Dialer, and Chicago mode. In the Line Reversal and Dialer modes all alarms and troubles are transmitted over the circuit. In the Chicago mode the City Tie transmits all troubles and alarms with the exception of City Tie circuit troubles. If the City Tie circuit detects a trouble condition the Spare relay will transfer for use with a local indicator which indicates that troubles and alarms can't be transmitted Also, the Signal silence function is disabled.. In the Dialer mode AC loss troubles are delayed for 6 hours to prevent unnecessary telephone messages. In the Master Box mode, the circuit will trip the Master Box coding device during alarms only. Master Box troubles aren't transmitted on this circuit.

```
Change Menu
1=Menu 1 2=Menu 2 3=Menu 3
4=Menu 4 0=Exit
>2
Change Menu 2
1=City 2=Ann 3=Trbl 5=UDACT
6=Day Enable 7=Day/Night 0=Exit
>1
City Tie Is In XXXXXXX Mode
Press Enter Key To Exit
Press Any Other Key To Select New Mode
```

Note: Be sure that the jumper J1 is in the correct position for Line Reversal or Master Box.

Change Ann

The Change Ann option allows the user to enable and disable the supervision of the supervised devices connected to the Annunciator port.

```
Change Menu 2
1=City 2=Ann 3=Trbl 5=UDACT
6=Day Enable 7=Day/Night 0=Exit
>2
Press Enter Key To Exit
Press Any Other Key To Toggle
Remote Annunciator Is Detached
Remote Annunciator Is Attached
```

Change Trbl

The Change Trouble option should be in the default "I/OTroubles are Annunciated" Mode. This should not be changed unless directed by a Gamewell factory representative..

```
Change Menu 2
Change Menu 2
1=City 2=Ann 3=Trbl 5=UDACT
6=Day Enable 7=Day/Night 0=Exit
>3
Press Enter Key To Exit
Press Any Other Key To Toggle
I/O Troubles Are Annunciated
I/O Troubles Are Not Annunciated
```

UDACT Enable

The UDACT Enable option allows the communications between the panel and a UDACT when it is installed. A UDACT *must* be enabled to work.

```
Change Menu 2
1=City 2=Ann 3=Trbl 5=UDACT
6=Day Enable 7=Day/Night 0=Exit
>5
Press Enter Key To Exit
Press Any Other Key To Change
UDACT is NOT Installed
```

Change Day Enable

The Change Day Enable option allows the selection of Positive Alarm Sequence. When enabled the Day key on the front panel is active and can select the mode of operation.

```
Change Menu 2
1=City 2=Ann 3=Trbl 5=UDACT
6=Day Enable 7=Day/Night 0=Exit
>6
Day Night Keys Are Not Enabled
Press Enter Key To Exit
Press Any Other Key To Toggle
```

Change Day Night Mode

The Change Day Night option allows the selection of manual or automatic termination of Positive Alarm Sequence.

```
                    Change Menu 2
          1=City 2=Annt 3=Trbl 5=UDACT
          6=Day Enable 7=Day/Night 0=Exit
>7
System In Manual Day Mode
Press Enter Key To Exit
Press Any Other Key To Toggle
>1
System Is In Auto Day Mode
>Enter
Day Mode Exit Time Is Currently  17:00
Do You Want To Modify (Y/N) ?
>Y
Enter Time To Exit Day Mode:
Enter Hour: 18
Enter Minutes: 30
>Enter
Day Mode Exit Time Is Currently  18:30
```

Change Menu 3

```
                    Change Menu
          1=Menu 1 2=Menu 2 3=Menu 3
          4=Menu 4 0=Exit
>3
                    Change Menu 3
          1=Abort 2=Prefix 3=Config 4=Tally
          5=Sil Inh 6=AutoSil 0=Exit
```

Change Abort Type

The Change Abort Type option allows the selection of different mode of Abort operation in a discharge application.

```
                    Change Menu 3
          1=Abort 2=Prefix 3=Config 4=Tally
          5=Sil Inh 6=AutoSil 0=Exit
>1
Abort Type Set To One Shot
Press Enter Key To Exit
Press Any Other Key To Changee
(Other Choices)
        Timer Expirey
        Immediate
        10 Sec Delay
        Reset Timer
```

Change Prefix

This option allows the user to change the Prefix for alarm events that occur. The default setting is FIRE Alarm. If the panel were monitoring Gas detectors, for example. The Prefix could be changed to GAS and therefore display GAS Alarm during alarm conditions.

```
Change Menu 3
1=Abort 2=Prefix 3=Config 4=Tally
5=Sil Inh 6=AutoSil 0=Exit
>2
Current Alarm Prefix is: Fire
Enter New Alarm Prefix: XXXX
Do you want to clear prefix Y/N? N
Alarm Prefix is set to: Fire
Press any key to continue
```

Change Configuration Name

The Change Config. name option allows a textual designation of the configuration file for archive identification..

```
Change Menu 3
1=Abort 2=Prefix 3=Config 4=Tally
5=Sil Inh 6=AutoSil 0=Exit
>3
Current Config String Is:
SmartStart Config
Enter New Config String:
New Name
>Enter
Do You Want To Clear String (Y/N)
>N
```

Change Tally Count

The Change Tally Count option allows the selection of the number of times a Verification detector can activate without a full alarm, in a 30 day period. If the number is exceeded the detector is put into "Verification Trouble" status..

```
Change Menu 3
1=Abort 2=Prefix 3=Config 4=Tally
5=Sil Inh 6=AutoSil 0=Exit
>4
Verification Count Is Set To: 2
Enter Verification Count (2-15)
```

Change Silence Inhibit Delay

The Change Sil Inh option allows the selection of the time period in which Silence is inhibited after an alarm signal.

```
Change Menu 3
1=Abort 2=Prefix 3=Config 4=Tally
5=Sil Inh 6=AutoSil 0=Exit
>5
Sil Inh Delay Is Set To: 0 Min
Enter New Signal Sil Delay (0-10)
Delay=Entry (0-10) X 30 sec
```

Change Auto Silence Delay

The Change Auto Sil Delay option allows the selection of the time period after an alarm which Silence automatically actuated.

```
Change Menu 3
1=Abort 2=Prefix 3=Config 4=Tally
5=Sil Inh 6=AutoSil 0=Exit
>6
Auto Sil Delay Is Set To: 10 Min
Enter New Signal Sil Delay (0-26)
Delay=2 min + Entry (0-26) X 30 sec
```

Change Menu 4

```
                    Change Menu
          1=Menu 1 2=Menu 2 3=Menu 3
                4=Menu 4 0=Exit
>4
                  Change Menu 4
          1=Cfg 2=Water 3=Relse 4=Dump
              5=Dict 7=I/O GRP MSG 0=Exit
```

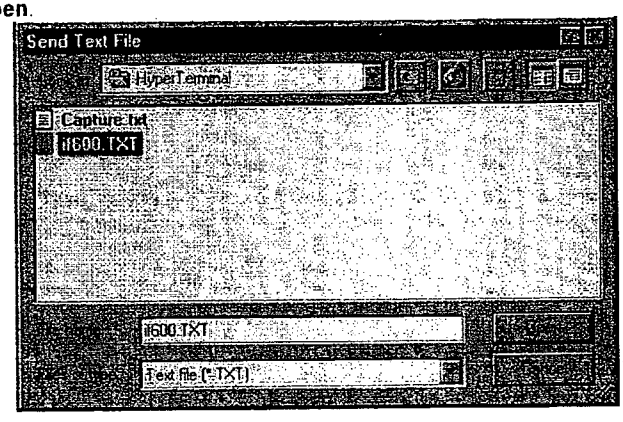
Change Config Changing the system configuration requires a previously downloaded system configuration file. This option is only available when programming through a P. C. attached to the serial port..

WARNING: It is necessary to perform a Smart Start on the panel before uploading a new configuration. Failure to do so will result in unpredictable operation of the panel

```
                  Change Menu 4
          1=Cfg 2=Water 3=Relse 4=Dump
                5=Dict 0=Exit
>1
Ready to Upload Configuration File

        To Upload
        1. Press PgUp
        2. Choose 7 (ASCII)
        3. Enter Filename
```

HYPERTERMINAL Select the **Transfer** pull down menu, select **Send Text File**, select the file name to upload and click on **Open**.



Change Water Flow Delay

The Change Water option allows the selection of the delay time before a Water flow alarm is activated..

```
Change Menu 4
1=Cfg 2=Water 3=Relse 4=Dump
5=Dict 0=Exit
>2
Waterflow Zone Delay Is Set To: 30 sec
Enter Waterflow Delay (5-90 sec)
```

Change Releasing Delay

The Change Relse option allows the selection of the time delay from the ANDed releasing alarms to the Discharge command..

```
Change Menu 4
1=Cfg 2=Water 3=Relse 4=Dump
5=Dict 0=Exit
>3
Releasing Delay Is Set To: 30 sec
Enter Releasing Delay (0-60 sec)
```

Change Discharge Delay

The Change Dump option allows the selection of the time delay from the Discharge command to the actual Discharge..

```
Change Menu 4
1=Cfg 2=Water 3=Relse 4=Dump
5=Dict 6=Card 0=Exit
>4
Discharge Delay Is Set To: 0 sec
Enter Discharge Delay (0-30 sec)
```

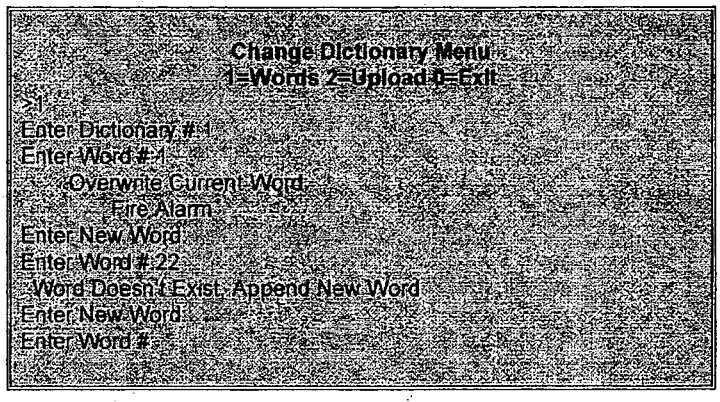
Change Dictionary

Changing the dictionary entries can be achieved by two means, changing the words or uploading an entirely new dictionary. The upload function should only be accomplished throug a P. C. connected through the serial port, or from the Master in a network.

```
Change Menu 4
1=Cfg 2=Water 3=Relse 4=Dump
5=Dict 0=Exit
>5
Change Dictionary Menu
1=Words 2=Upload 0=Exit
```

Change Dictionary Words

To change the Dictionary words, select 1 from the Change Dictionary Menu. The system will prompt you with the dictionary and word number to be changed. The existing word is then displayed. To change the word, type the desired text or press enter to leave the existing text and return to the word number prompt.



To select word options from the control panel:

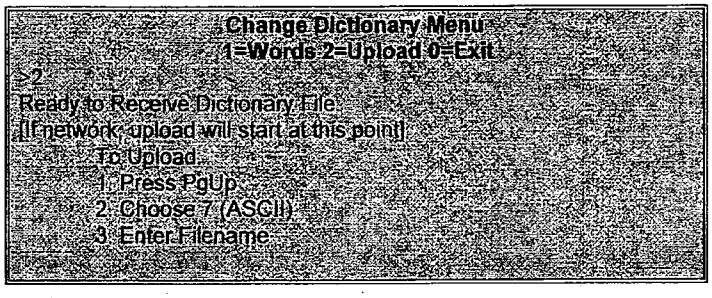
Prompt	Description
<a1> =	first lower case letter of a word or key
<a2> =	second lower case letter of a word or key
<a3> =	third lower case letter of a word or key
<a#> =	etc. (sequential order)
<A1> =	First Upper Case letter of a word or key
<A2> =	Second Upper Case letter of a word or key
<A#>	etc. (sequential order)

1. Press the Letters/ Numbers key on the Keypad until the proper selection is displayed. The display indicates the selection by the following means.
2. When selecting the first letter on a key, <a1> should be displayed in the upper right hand corner of the display. To select the second letter on a key, press the Letters/ Numbers key until <a2> is displayed. <a3> should be displayed if the third letter is desired and <#> should be displayed if the number associated with that key is desired.
3. The case of the letters may be changed by pressing the Upper Case key. The case is indicated by the case setting of the <A> within the brackets shown on the display.
4. When the desired number or letter field is displayed press the key associated with it then go on to the next letter, number or punctuation mark.
5. When the text entry is complete press the "**Enter**" key and go on to the next text entry to change.
6. To exit the programming area, and save the changes made, press the "**Enter**" key a second time.

>>NOTE: When changes are made to any dictionaries they are appended to the existing dictionary. Therefore the entire number of added text may change when you exit the programming area. For example, if dictionary 2 has twelve entries and you add an entry as number 15, when enter the word the dictionary is appended and your new entry becomes number 13.

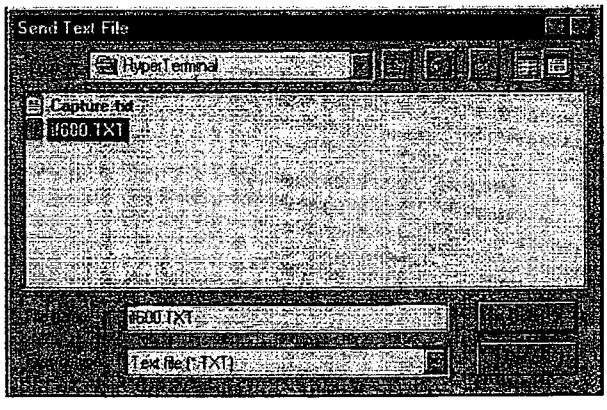
Upload Dictionary

Uploading is accessed by selecting 2 from the Change Dictionary Menu. In order to upload a new dictionary, a file containing the new dictionary entries must be created using an ASCII text editor. The dictionary file is comprised of a simple format that has very few restrictions (See Dictionary File Format).



HYPERTERMINAL

4. Select the **Transfer** pull down menu, select **Send Text File**, select the file name to upload and click on **Open**.

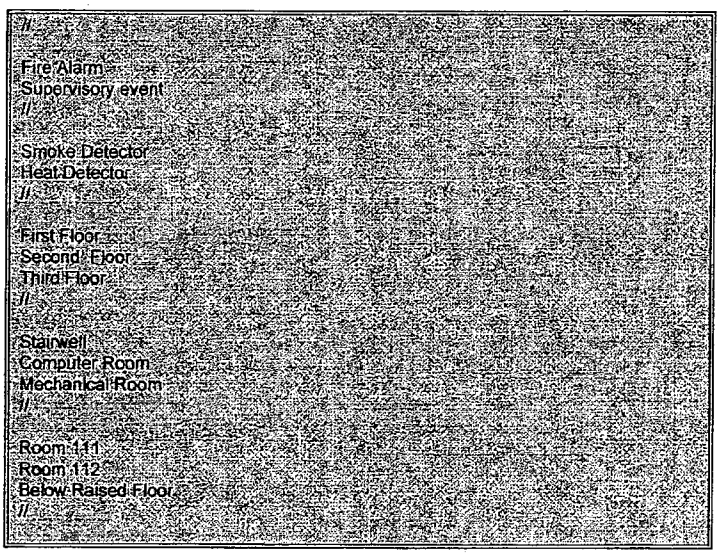


Dictionary File

The dictionary file format consists of the five dictionaries, each separated by two fore slashes (//) as delimiters. The first line of the dictionary file would contain two fore slashes indicating that it is the beginning of the file and the next line received will be word #0 of dictionary #1. This line should be left blank since each device defaults to word #0 of each dictionary. The following lines would contain the desired text entries, in numerical order, for dictionary #1. When all of the entries for dictionary #1 have been entered two fore slashes should be inserted on the next line to signify the end of dictionary #1 and the start of dictionary #2. Again the next line, word #0 dictionary #2, should be left blank for default purposes. This format is followed throughout the five dictionaries. The end of dictionary five is also signified by two fore slashes.

Some important points to keep in mind when writing the file are as follows. Dictionary #1 through dictionary #4 may contain up to 128 entries (0-127). Dictionary #5 may contain up to 1024 entries (0-1023). If all of the entries in any one dictionary are not used, the file does not need to contain blank lines before terminating the dictionary with two fore slashes. Each dictionary entry may contain up to 40 characters. However, entries from dictionaries #1 and #2 are displayed on the third line of the alphanumeric display, and, entries from dictionaries #3, #4, and #5 are displayed on the fourth line of the alphanumeric display. The total characters of dictionary entries used in conjunction with each other should not exceed 40 characters.

The file below illustrates a simple dictionary file.



Test Menu

The test menu is a useful tool when testing and troubleshooting the IF 600 systems. The various options allow the testing of input and output devices, circuits, ground fault monitoring and system communications.

```
Test Menu
1=Input 2=Output 3=ID 4=Gnd
5=Lamp 6=Analog 0=Exit
```

Test Input

Not applicable to the IF 602SS

Test Output

Not applicable to the IF 602SS

Test ID

Selecting the Test ID option will continuously display the "real time" card readings from the system card locations. The card locations (0-39) should always equal the card type installed in that location.

```
Test Menu
1=Input 2=Output 3=ID 4=Gnd
5=Lamp 6=Analog 0=Exit
3
00=0C 01=FF 02=FF 03=FF 04=01 05=02
06=05 07=FF 08=09 09=FF 10=FF 11=FF
12=FF 13=FF 14=FF 15=FF 16=FF 17=FF
18=FF 19=FF 20=FF 21=FF 22=FF 23=FF
24=FF 25=FF 26=FF 27=FF 28=FF 29=FF
30=FF 31=FF 32=FF 33=FF 34=FF 35=FF
36=FF 37=FF 38=FF 39=FF

00=0C 01=FF 02=FF 03=FF 04=01 05=02
06=05 07=FF 08=09 09=FF 10=FF 11=FF
12=FF 13=FF 14=FF 15=FF 16=FF 17=FF
18=FF 19=FF 20=FF 21=FF 22=FF 23=FF
24=FF 25=FF 26=FF 27=FF 28=FF 29=FF
30=FF 31=FF 32=FF 33=FF 34=FF 35=FF
36=FF 37=FF 38=FF 39=FF
```

Test Gnd

The Gnd (Ground) test utilizes a unique method of ground detection. A measurement is taken from the +5 supply to earth ground and a value is displayed. Then a measurement from system common is taken and its value is displayed. The differential value between these two measurements must be greater than 142 but less than 255 for a reading of "Good".

NOTE: The values displayed are derived from an A/D conversion and not displayed in actual voltages.

ROA_01826

```
                    Test Menu
          1=Input 2=Output 3=ID 4=Gnd
          5=Lamp 6=Analog 0=Exit
>4
      Ground Fault Test
   Press Enter Key To Exit
    142 < Diff < 255
  5V=216 Gnd=1 Diff=215 Good
```

Test Lamps

The Lamp test feature will illuminate all of the system LEDs when selected. It will light one panel at a time while alternating the internal sounder with each panel lit.

```
                    Test Menu
          1=Input 2=Output 3=ID 4=Gnd
          5=Lamp 6=Analog 0=Exit
>5
Press enter to continue
```

Test Analog

The analog test is designed to allow the user to control and obtain "real time" information about individual analog addressable devices. When analog is selected from the Test Menu ,the system prompts the user to enter the channel of the card and device address. The system displays the "real time "information including CCT#, Address #, Device type and Counts for the device selected. For interpretation of the counts, see Fig. 2.

```
                    Test Menu
          1=Input 2=Output 3=ID 4=Gnd
          5=Lamp 6=Analog 0=Exit
>6
Enter Card # 8
Enter Channel to Poll (1-4)
Enter Address to Poll (0-99)
Enter Data to Send (0-7)

Ch:01  Add:26  D  Type:Mon  Counts:17
Flags:x08  Bits:x08
```

Display Panel	Description	Trouble / No Feedback	Backgroun d	Dirty	Pre-Alarm on 1st	Alarm / Shorted
Ion	Ionization Detector	0 - 9	10 - 40	41 - 44	Background + 26	Background + 36
Opt.	Photo Detector (non-comp.)	0 - 9	10 - 40	41 - 44	25 + (sensitivity * 6) + 8	25 + (sensitivity * 6) + 18
Opt.	Photo Detector (Compensate d)	0 - 9	10 - 40	41 - 44	Background + (sensitivity * 6) + 8	Background + (sensitivity * 6) + 18
Heat	Thermal Detector	0 - 7	10 - Fixed Value	NA	NA	Above Fixed Value
Multi	Multisensor Detector	0 –9	18 – 32	33 - 44	45 – 54	55 - 127
CZI or CZII	CZI-95	0 - 16	17 - 54	NA	NA	55 - 122 2nd Alarm above 122
PID or MAN	PID - 95 or MS - 95	0 - 9	10 - 54	N/A	N/A	55 - 127
REL	RCE - 95	0 - 14	15 - 45	NA	NA	46 - 127
RSM	RSM-95	0 – 14	15 – 45	NA	NA	46 - 127
SCE or Snd.	SCE - 95	0 - 14	15 - 45	NA	NA	46 - 127

Figure 1: Device Count Threshold

COMPUTER/LAPTOP PROGRAMMING OVERVIEW

Overview of Computer Programming

This section describes the system communications via a computer. System monitoring, general control functions and system programming can be achieved from a computer terminal. All figures shown are displayed on the computer screen.

Interconnect

The cable P/N 70703, is used to connect the computer to the Main Module port J5. (Updating the firmware.) Use cable P/N 70703 to connect to the isolated RS-232 compatible port of the Main module, J6. (Sending and receiving custom CFG file.) Refer to (drawing # B-W494).

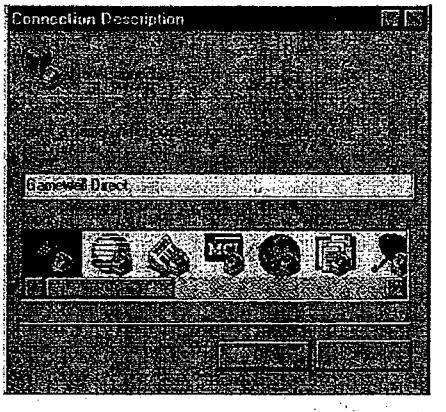
Communication Protocol

The system communicates with a computer at baud rates of 1200,2400,4800 and 9600 BPS (see baud rate settings in CPU Circuits of the Installation section). The baud rate of to the isolated RS-232 compatible port is 2400. The standard protocol is Xon/Xoff, one Start bit, 8 Data Bits, No Parity, and 1 Stop Bit.

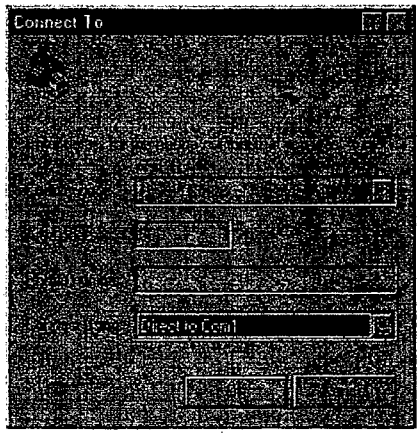
NOTE: Most standard communication packages for computers will allow you to set the proper protocol for the communications port of your computer.

HYPERTERMINAL SETUP

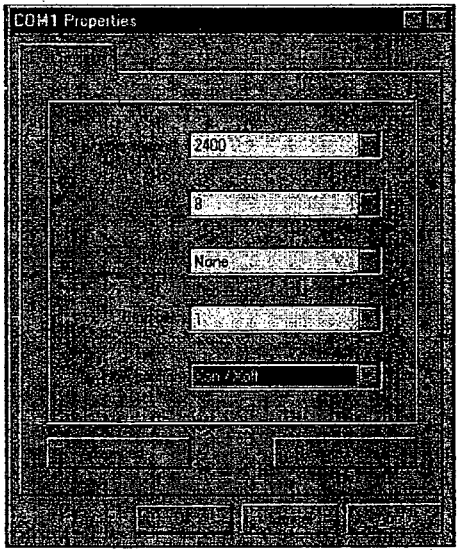
1. Start Hyperterminal from windows
2. Select a name for the configuration, click on OK



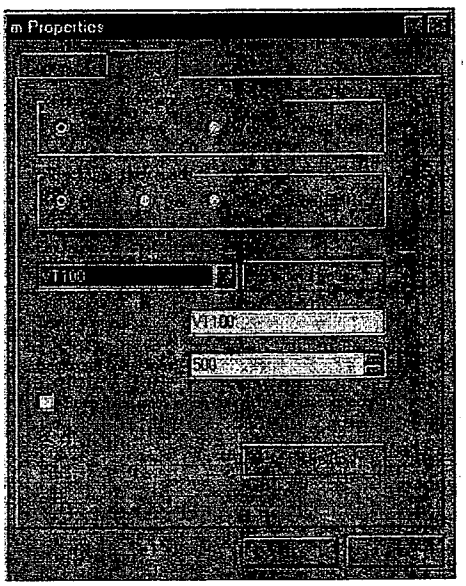
3. Select Direct to Com1 (or 2), click on OK



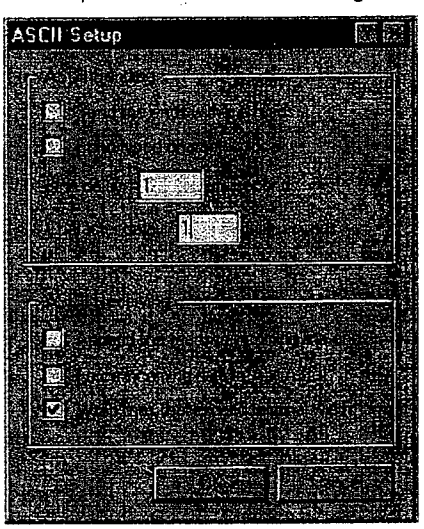
4. Select Baud rate, (usually 2400)select Data bits = 8, select Parity = N, select Stop bits = 1, and Flow control = Xon / Xoff. Click on OK



5. Select the pull down **File** menu at the top of the screen. Select **Properties,** Select the **Settings** tab, set Emulation to VT-100



6. Select ASCII Setup, change Line delay setting to 1 millisecond, change Char delay setting to 10 milliseconds, Click on OK. Click on OK again



Hyperterminal set up is complete. To us Hyperterminal to communicate with the panel, select the setup name that you assigned to this application.

SYSTEM MONITORING & CONTROL

Status Monitoring

The computer can be used to monitor the status of the system. All status changes are transmitted from the J6 port of the Main Module. The data transmitted can provide detailed information on alarm, trouble and system status changes. It can also aid in troubleshooting by providing detailed information of system faults.

System Access

System access I may be obtained via the computer. By transmitting a carriage return (**Enter**) to the system you will be prompted with " ENTER PASSWORD". By entering the proper password you may set the system to it's various access levels.

Section 6

IF 602SS

Appendix

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FLEX 600 COMPATIBLE INDICATING APPLIANCES			
GAMEWELL PART NUMBER	MODEL NUMBER	DESCRIPTION	CURRENT
70874	MB-G6-24-R	MOTORBELL 6"	.030
70875	MB-G10-24-R	MOTORBELL 10"	.030
71557	RSP-2430-VFR	30 Cd Strobe Adapter Red	.124
71631	SRP-2475-VFR	75 Cd Strobe Adapter Red, Sync.	.215
71558	RSP-2475-VFR	75 Cd Strobe Adapter Red	.200
71561	SRP-24110-HFR	110 Cd Strobe Adapter Red	.250
71586	CSX10-24-DC-R	10" SS Exp indoor Red..	.500
71587	CSXG10-24DC-R	10" SS Exp outdoor Red..	.500
71581	CH-BF1-R	Chime SS/Vib Red	.020
71585	CH-CF1-W	Chime SS/Vib ceiling white	.020
68460-01	CH-DF1-R	Chime Vibrating	.020
71583	CH-CF1-LS-24-VFR	Chime SS/Vib Red	.100
71300	CH-DF1-LS-24-VFR	Chime SS/Vib Red	.100
71301	CH-DF1-LSM-24-VFR	Chime SS/Vib Red	.135
71584	CH-CF1-MS-24-CFW	Chime SS/Vib White	.155
71302	CH-DF1-MS-24-VFR	Chime SS/Vib Red	.155
71582	CH-CF1-IS-24-CFW	Chime SS/Vib White	.245
71303	CH-DF1-IS-24-VFR	Chime SS/Vib Red	.245
71548	SM-12/24-R	Single Circuit Sync Module	.025
71549	DSM-12/24-R	Dual or Class A Sync Module	.038
70871	MIZ-24-R	Mini Horn Red	.017
70873	MIZ-24-W	Mini Horn White	.017
71287	MIZ-24-LS-VFR	Mini Horn/Strobe 15 Cd	.092
71288	MIZ-24-LSM-VFR	Mini Horn/Strobe 15/75 Cd	.127
71289	MIZ-24-MS-VFR	Mini Horn/Strobe 30 Cd	.147
71290	MIZ-24-IS-VFR	Mini Horn/Strobe 75 Cd	.237
71138	MT-12/24-R	Multi-tone Horn Red	See DS851
71573	AMT-12/24-R	Multi-tone Horn Red 3 Input	See DS851
71614	MT4-12/24-R	Multi-tone Horn Red Surface	See DS851
71292	MT-24-LS-VFR	Multi-tone Horn/Strobe Red 15 Cd	See DS851
71574	AMT-24-LS-VFR	Multi-tone Horn/Strobe Red 15 Cd 3 input	See DS851
71295	MT-24-IS-VFR	Multi-tone Horn/Strobe Red 75 Cd	See DS851
71575	AMT-24-IS-VFR	Multi-tone Horn/Strobe Red 75 Cd 3 input	See DS851
71293	MT-24-LSM-VFR	Multi-tone Horn/Strobe Red 15/75 Cd	See DS851
71576	AMT-24-LSM-VFR	Multi-tone Horn/Strobe Red 15/75 Cd 3 input	See DS851

FLEX 600 COMPATIBLE INDICATING APPLIANCES (Cont.)			
GAMEWELL PART NUMBER	MODEL NUMBER	DESCRIPTION	CURRENT
71294	MT-24-MS-VFR	Multi-tone Horn/Strobe Red 30 Cd	See DS851
71140	MT-24-WM-VFR	Multi-tone Horn/Strobe Red 110 Cd	See DS851
71426	MT-24-SL-VFR	Multi-tone Horn/Strobe Red 15 Cd Sync	See DS851
71427	MT-24-SLM-VFR	Multi-tone Horn/Strobe Red 15/75 Cd Sync	See DS851
71550	RS-2415-VFR	Strobe 15 Cd	.074
71553	RS-241575-VFR	Strobe 15/75 Cd	.100
71552	SRP-2415-VFR	Strobe 15 Cd Plate mount Sync	.096
71551	SR-2415-VFR	Strobe 15 Cd Sync	.096
71569	RSP-241575-VFR	Strobe 15/75 Cd Plate Mount	.100
71554	SRP-241575-VFR	Strobe 15/75 Cd Plate Mount Sync	.138
71555	SR-241575-VFR	Strobe 15/75 Cd Sync	.138
71557	RSP-2430-VFR	Strobe 30 Cd Plate mount	.124
71556	RS-2430-VFR	Strobe 30 Cd	.124
71558	RSP-2475-VFR	Strobe 75 Cd Plate mount	.200
71559	RS-2475-VFR	Strobe 75 Cd	.200
71616	SR-2475-VFR	Strobe 75 Cd Sync	.200
71560	RS-24110-HFR	Strobe 110 Cd	.200
71561	SRP-24110-HFR	Strobe 110 Cd Plate mount Sync	.200
71562	SR-24110-HFR	Strobe 110 Cd Sync	.200
71543	AS-2415-VFR	Horn/Strobe 15 Cd	.093
71544	AS-241575-VFR	Horn/Strobe 15/75 Cd	.121
71545	AS-2430-VFR	Horn/Strobe 30 Cd	.126
71546	AS-2475-VFR	Horn/Strobe 75 Cd	.239
71547	AS-24110-HFR	Horn/Strobe 110 Cd	.269

Table A-1

Wiring Guides

This table provides general information regarding wiring practices used in installation of the IF 602SS panel.

SIGNALING CIRCUIT WIRE SIZES 24 VOLT DC							
WIRE SIZE and RESISTANCE		MAXIMUM DISTANCE TO LAST DEVICE					
AWG	OHM/ 1000ft	Max Load Current 0.5amp	Max Load Current 1.0amp	Max Load Current 1.5amp	Max Load Current 2.0amp	Max Load Current 2.5amp	Max Load Current 3.0amp
18	6.5	400'	200'	130'	100'	80'	65'
16	4.1	620'	300'	210'	160'	125'	105'
14	2.6	1000'	500'	330'	250'	200'	165'
12	1.6	1600'	800'	520'	400'	325'	270'
10	1.0	2500'	1250'	840'	620'	520'	420'
To figure which wire size to use, multiple the number of devices by the maximum current draw for the devices. Take the total current draw and round it up to the nearest ½ amp. Then look at which wire size gives you the distance you need to get to the last device. See the Compatible Indicating Appliances table in the Appendix for which devices can be used on these circuits.							

Analog Circuit Wiring Requirements and Limitations

1. Cable length per circuit - 12,000 feet maximum including all "T-tap" runs.
2. Use unshielded, twisted cable wherever possible, even when in conduit.
3. Unshielded, twisted cable required on all open wiring runs involving 4,000 Ft. or more.
4. Avoid running circuits parallel with power wiring for any distance.
5. Avoid running circuits parallel with cables having high switching rates.
6. Avoid running circuits parallel with fluorescent fixtures.
7. Avoid running analog circuits parallel with signal circuit wiring.
8. Shield signal circuit wiring, even if in conduit, if run together with analog circuits.
9. Maximum conductor resistance for each circuits is 25 ohms.
10. Maximum conductor to conductor capacitance for each SLC circuit is 1.0 microfarads.

Table A-3

ROA_01837

AUX POWER COMPATIBLE DEVICES		
Gamewell PART NUMBER	**DESCRIPTION**	**MANUFACTURER/SUPPLIER**
RAN2-SF	Annunciator	Gamewell
RAN2-RCS	Annunciator	Gamewell
RAN2-RCF	Annunciator	Gamewell
SS-PD	Duct Detector	System Sensor
SS-PDR	Duct Detector with Relay	System Sensor
AUX POWER COMPATIBLE DEVICES (Cont.)		
Gamewell PART NUMBER	**DESCRIPTION**	**MANUFACTURER/SUPPLIER**
RAN2-19	Annunciator	Gamewell
RAN2-RC19	Annunciator	Gamewell
SAN	Annunciator	Gamewell
SAN-RC	Annunciator	Gamewell
72223-160	Beam Detector	FireFighting Enterprises (Fireray 50R)
72223-330	Beam Detector	FireFighting Enterprises (Fireray 100R)
72051	Beam Detector	FireFighting Enterprises (Fireray 2000)
SCE-SS	Supervised Control Module	System Sensor
CZI-SS	Zone Interface Module	System Sensor

Table A-5

IDENTIFLEX 602SS BATTERY CALCULATION CHART

MODULE		QTY	NORMAL CURRENT	ALARM CURRENT	NORMAL TOTAL [1]	ALARM TOTAL [2]
NOTE [3]	MAIN	1	0.160	0.226 +signal Ckt. Current +0.002 for master box or 0.022 for reverse polarity		
	S+S	NOTE [4]				
	A+A	NOTE [2]				
1 LOOP ANA. IO			0.030	0.050		
2 LOOP ANA. IO			0.035	0.055		
SmartScan Devices (See SLC manual for device current draws.)						
SIM-422			0.065	0.065		
SIM-FIB			0.085	0.085		
SIM-422/FIB			0.075	0.075		
RAN			0.040	0.040		
SAN			0.040	0.040 + 0.040 per point activated		
PDM-16			0.002	0.002 + 0.040 per point activated		
				TOTAL NORMAL CURRENT		

HOURS OF STANDBY		TOTAL NORMAL CURRENT		TOTAL ALARM CURRENT	
	X		=	NORMAL A.H.	
HOURS OF ALARM [6]		TOTAL ALARM CURRENT			
	X		=	ALARM A.H.	
				TOTAL	
				CONTINGENCY X 1.25	
				BATTERY AH REQUIRED [5]	

[1] NORMAL TOTAL is obtained by multiplying the number of modules times the normal current values for that module.
[2] ALARM TOTAL is obtained by multiplying the number of modules times the alarm current values for that module.
[3] The Common Control (CC) Module consists of the Bus Driver Module, CPU and Display, Common Relays and Power Supply.
[4] The actual current loads for Normal and Alarm should be placed in the NORMAL TOTAL and ALARM TOTAL columns respectively.
[5] Maximum of 25 AH Permitted
[6] Hours of alarm is obtained by dividing the Minutes of Alarm by 60. I.e. 5 Minutes of Alarm is 5/60 = .0.083 Hours

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Section 7

IF 602SS

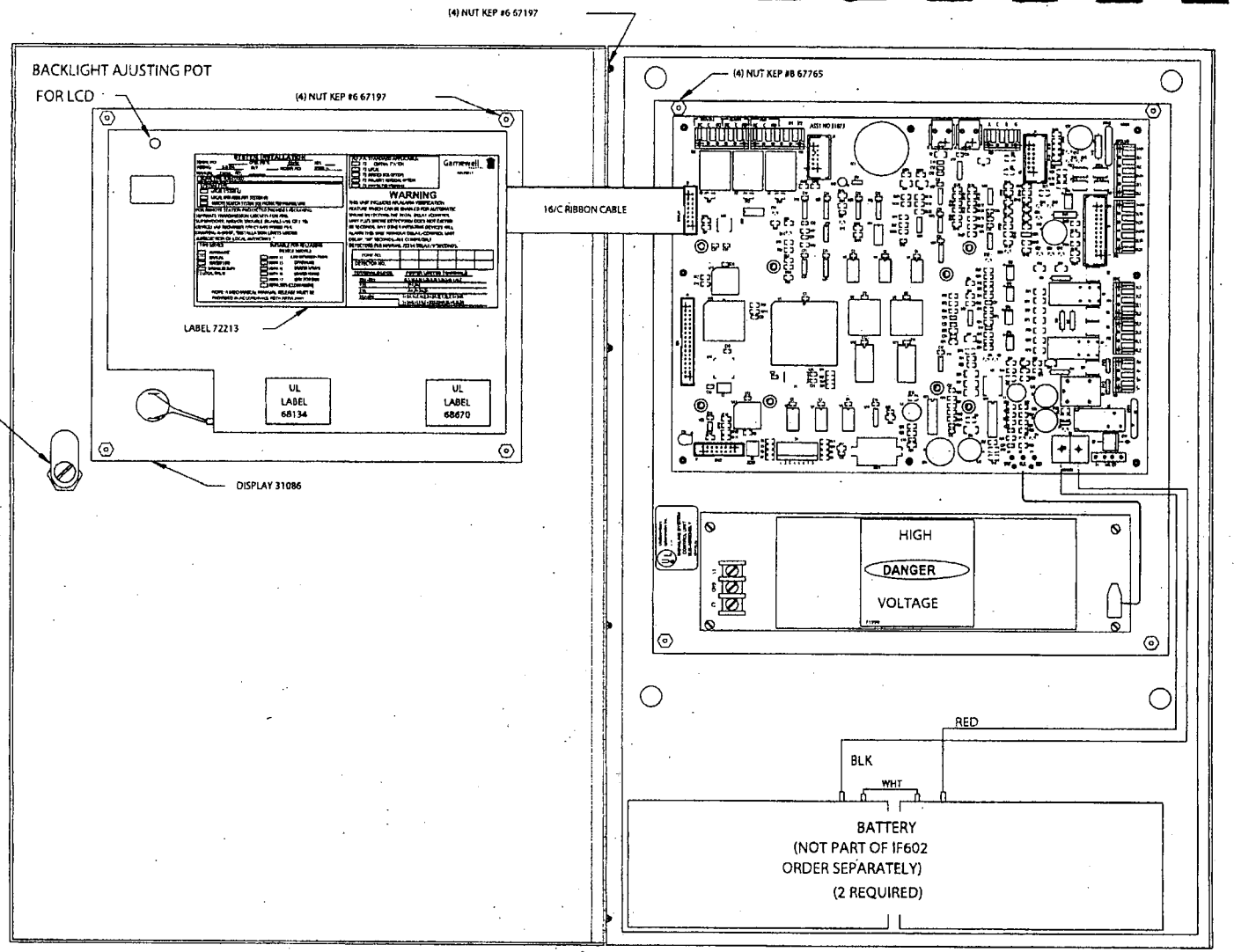
Drawings

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Drawings

The following drawings are a part of this manual:

C-M818-3	Assembly of IF 602SS Cabinet
C-M818-4	Assembly of IF 602SS XL Cabinet

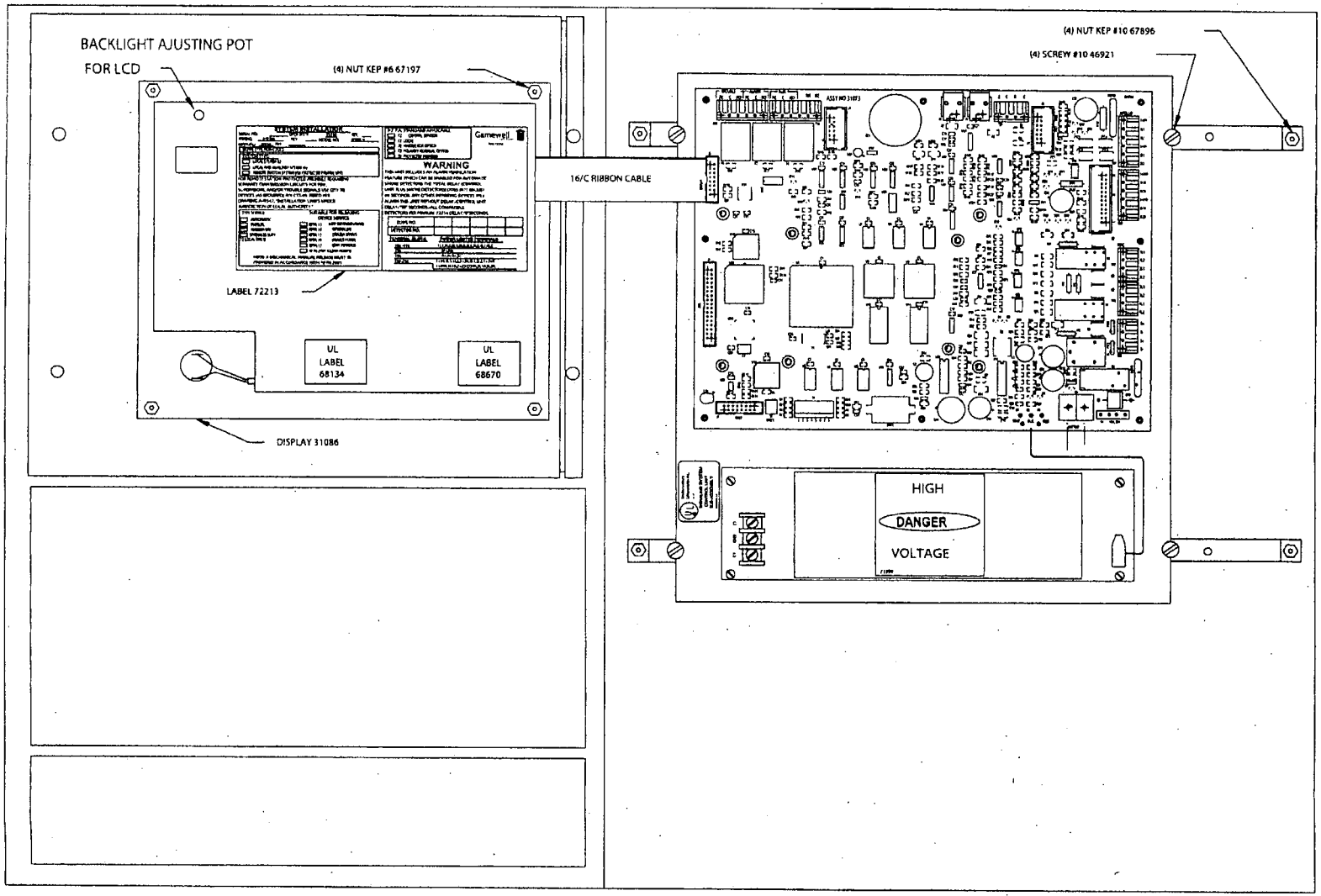


ASSEMBLY OF IF602 SYSTEM

DRAWN BY: JAB	CHECKED BY:	SCALE:	
APPROVED BY:		DATE: 06-22-02	
Gamewell WORLDWIDE	REV/DATE A 06-22-02	C-M818-3	

TOLERANCE UNLESS OTHERWISE STATED
DECIMAL: .XX ±.02 .XXX ±.005 ANGULAR: ±1° AT 1" RADIUS

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ROA_01847

OBH - O&M 709

ASSEMBLY OF IF602 SYSTEM IN XL CABINET

DRAWN BY: MB	CHECKED BY:	SCALE:	
APPROVED BY:		DATE: 05-01-02	
Gamewell WORLDWIDE	REV/DATE A 05-01-02	C-M818-4	

TOLERANCE UNLESS OTHERWISE STATED
DECIMAL: .XX ±.02 .XXX ± .005
ANGULAR: ±1° AT 1° RADIUS

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Limited Warranty

The manufacturer warrants its products to be free from defects in materials and workmanship for eighteen (18) months from the date of manufacture, under normal use and service. Products are date stamped at time of manufacture. The sole and exclusive obligation of the manufacturer is to repair or replace, at its option, free of charge for parts and labor, any part which is defective in materials or workmanship under normal use and service. For products not under manufacturing date-stamp control, the warranty is eighteen (18) months from date of original purchase by the manufacturer distributor unless the installation instructions or catalog sets forth a shorter period, in which case the shorter period shall apply. This warranty is void if the product is altered, repaired or serviced by anyone other than the manufacturer or its authorized distributors or if there is a failure to maintain the products and systems in which they operate in a proper and workable manner. In case of defect, secure a Return Material Authorization form from our customer service department. Return product, transportation prepaid, to the manufacturer.

This writing constitutes the only warranty made by the manufacturer with respect to its products. The manufacturer does not represent that its products will prevent any loss by fire or otherwise, or that its products will in all cases provide the protection for which they are installed or intended. Buyer acknowledges that the manufacturer is not an insurer and assumes no risk for loss or damages or the cost of any inconvenience, transportation, damage, misuse, abuse, accident or similar incident.

THE MANUFACTURER GIVES NO WARRANTY, EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR OTHERWISE WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. UNDER NO CIRCUMSTANCES SHALL THE MANUFACTURER BE LIABLE FOR ANY LOSS OF OR DAMAGE TO PROPERTY, DIRECT, INCIDENTAL OR CONSEQUENTIAL, ARISING OUT OF THE USE OF, OR INABILITY TO USE THE MANUFACTURER'S PRODUCTS. FURTHERMORE, THE MANUFACTURER SHALL NOT BE LIABLE FOR ANY PERSONAL INJURY OR DEATH WHICH MAY ARISE IN THE COURSE OF, OR AS A RESULT OF, PERSONAL, COMMERCIAL OR INDUSTRIAL USE OF ITS PRODUCTS.

This warranty replaces all previous warranties and is the only warranty made by the manufacturer. No increase or alteration, written or verbal, of the obligation of this warranty is authorized.

Warr-GL-10-2001.fm

Gamewell
A 150-Year Tradition

The Gamewell Company
12 Clintonville Road
Northford, CT 06472-1653 USA
203-484-7161
fax 203-484-7118

www.gamewell.com

A Honeywell company.

ISO 9001 CERTIFIED
QUALITY SYSTEMS

ONE BELLE HALL



Homeowner's Manual and Warranty Book

PLAINTIFF'S EXHIBIT 188
tabbies

ONE BELLE HALL

Homeowner's Manual and Warranty Book

This manual is provided by Belle Hall Direct 101, LP for general information purposes only regarding warranty coverage and homeowner maintenance responsibilities. Read manufacturers' manuals and information before using your appliances, or heating and air conditioning system.

CAUTION: Other than routine maintenance, do not attempt repairs of electrical equipment. Please call a licensed electrician if you are ever unsure.

Homeowners should contact their property manager to report any concerns regarding common elements such as landscaping, exterior building maintenance, walkways, roadways, snow removal, etc.

Developed by:
Belle Hall Direct 101, LP

ROA_01852

OVERVIEW

Congratulations on the purchase of your new home!

Belle Hall Direct 101, LP is pleased to provide you with this copy of your Homeowner's Manual. This Manual has four general purposes:

- To give a general introduction to the most familiar components of your home.
- To provide you with basic information needed to care for and maintain your home.
- To prepare you for the minor adjustments and repairs necessary in most new homes.
- To provide you with the necessary procedures for obtaining warranty service during the first year of ownership.

Belle Hall Direct 101, LP is committed to providing every homeowner with a level of craftsmanship and service that meets or exceeds the industry standards. Our company has endeavored to select the most qualified subcontractors for each trade as well as high-quality building materials. Belle Hall Direct 101, LP will service items that in our opinion are the result of poor workmanship or do not meet necessary tolerances as compared to the industry standard. It is critical that each homeowner understands the following manual and implements those items that fall within the homeowner's obligations.

If any standards or tolerances are referenced herein, such data is applicable only during the warranty period (one year from the Certificate of Occupancy date) provided to you at closing. Homeowners should reference the "Limited Warranty" documentation for additional construction tolerances. Belle Hall Direct 101, LP cannot be obligated to repair items that exceed the tolerances after the first year of ownership.

OVERVIEW

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SECTION 1: IMPORTANT PHONE NUMBERS

Emergency

First Aid – EMS – Fire – Police	911
South Carolina Electric & Gas – Leaks & Emergencies	843-745-6000
Comcast of Carolina, Inc.	843-554-4100
Bellsouth	888-757-6500
Electrical Contractor – Houston-Stafford Electric	770-900-8684
Plumbing Contractor-Budget Mechanical Plumbing	843-557-2672
Heating/AC Contractor – General Heating & Air	864-277-4554
Fire Sprinkler Contractor – Century Fire Protection	770-945-2330

Non-Emergency

Fire Department - Dispatch	843-884-4155
Police Department – non emergency	843-884-4176

Condominium Management

Southeastern Management Group 151 Ring St Charleston, SC 29401	843-577-8595 ext 16
	843-577-8597
Property Manager: Bevin Carchidi	Bevin@semgsc.com
After Hours Emergency Pager	843-434-0235

Warranty Service – Customer Care

Customer Care. Gudrun Stromic	843-278-8000
customercare@tcresidential.com	843-278-1841 Fax

Appliance Manufacturer – GE Appliances	800-GE-CARES (800-432-2737)
Air Filters,-East Coast Metal Distributors 4400 Arco Lane, N Charleston, SC 29418	843-745-0490

Vanessa Witt
(843) 200-9590

Mt. Pleasant Waterworks
843-884-9626

SCE&G - 843-554-7234

Other Numbers

Alligator Control	843-577-8595 x18
DHEC	888-481-0125
Drainage – Charleston County	843-202-7600
Emergency Preparedness, Evacuation Information	843-202-7400
Mosquito Abatement – Charleston County	843-202-7880
-- After Hours	843-202-7899
Post Office - Mt. Pleasant	843-884-8221
Voter Registration	843-744-8683
Weather Information - National Weather Service	843-744-3207
Missing Children – National Center	800-843-5678
Toxic Chemical/Oil Spills/Biological Terrorism – National Response Center	800-424-8802
Suicide Crisis Hotline	800-SUICIDE
Poison Center	800-922-1117
Recycling Center – Charleston County	843-720-7111

SECTION 2: WARRANTY COVERAGE

The information contained in this Handbook is provided for general informational purposes only. We urge you to read the Limited Warranty Certificate for full details and a comprehensive understanding of the warranty, its limitations, exclusions and applications.

General Guidelines

- The Limited Warranty Certificate warrants that Belle Hall Direct 101, LP shall repair or replace (at our sole option) any defect in structural elements of the unit for a period of one year from the date of Certificate of Occupancy which will be provided to the purchaser at closing. Defects in structural elements are those defects in components which reduce the stability or safety of the structure below acceptable standards or restrict the normal intended use of all or part of the structure.

- Except for the warranty on structural elements above, the units and common elements are sold "as is" and Belle Hall Direct 101, LP. makes no other warranties.

- All manufacturers' warranties on new appliances and mechanical items are transferred to the Homeowner at time of settlement. Therefore, the manufacturers and subcontractors who made or installed the various parts and equipment in your house will be responsible for handling some of the service problems that may arise while you are living in the home. Belle Hall Direct 101, LP does not extend any such manufacturers' warranties.

- The information that follows in this handbook will help you understand what you must do to maintain your new home in proper working order and to keep problems to a minimum.

Specific Exclusions

- Any material installed by the Homeowner or defects in any item that was not part of the original home as constructed by the Belle Hall Direct 101, LP.

- Any defect caused by or worsened by negligence, improper maintenance, lack of maintenance, improper action or inaction, or willful or malicious acts by any party other than the Company, its employees, agents, or trade contractors.

- Normal wear and tear of the home or consumer products in the home.

- Loss or damage caused by acts of God, including but not limited to fire, explosion, smoke, water escape, changes that are not reasonably foreseeable in the level of underground water table, glass breakage, windstorm, hurricane, hail, lightning, falling trees, aircraft, vehicles, flood, and earthquakes.

- Any loss or damage that arises while the home is being used primarily for nonresidential purposes.

- Any damage to the extent it is caused or made worse by the failure of anyone other than the Belle Hall Direct 101, LP. or its employees, agents, or trade contractors to comply with the requirements of this warranty or the requirements of warranties of manufacturers of appliances, equipment, or fixtures.

- Any defect or damage that is covered by a manufacturer's warranty that has been assigned to Owner. Please see Section (d) below for more information.

- Damage caused by the failure of the homeowner to keep the unit in good repair and condition.

- Damage caused by dampness or condensation as a result of the homeowner not maintaining adequate ventilation.

- Any cracks, nail pops, effects of aging, normal settlement or expansion, contraction, shrinkage or materials that may occur in walls, floors, ceiling, doors or any of the components of the unit, provided they do not prevent normal or intended use of all or part of the unit.

- Imperfections in plaster or other wall surfaces.

- Stoppage in plumbing system caused by misuse.

Protection Provided

The limited warranty program provides you with the following protection:

(a) Warranty Coverage

Commencing on the Certificate of Occupancy date for your building provided to you at closing, subject to the terms, conditions and exclusions as set forth in your Warranty documents, Belle Hall Direct 101, LP. warrants that for the period of one year, your home's materials and workmanship, and your home's heating, cooling, ventilating, electrical and plumbing systems will be free from defects due to nonconformity with the **LIMITED WARRANTY STANDARDS** and that your home will be free from Major Structural Defects, as set forth in your warranty document.

(b) Common Elements Coverage

Warranty coverage on the Common Elements includes elements of the building structure which are used in common by or are for the common good of the residents of the building structure. Common elements are more clearly defined in the Master Deed, a copy of which is contained in your Condominium Instruments. Common elements will be covered for the same periods and to the same extent as comparable items in individual homes, subject to the terms, conditions and exclusions as set forth in your warranty document.

Modifications must adhere to the condominium documents explanation of unit boundaries. Homeowners are prohibited to puncture or modify the exterior of the building and/or common or limited common elements. For further explanation please refer to your Master Deed, Section 4a-4c – Units and Boundaries.

By accepting this Limited Warranty you agree to and understand that you will allow access to, on, through and within your home and any limited common elements appurtenant thereto within normal, reasonable hours, after receiving proper notice, in order to make repairs to any adjoining or adjacent unit and/or adjoining or adjacent limited or general common elements as called for under this agreement, should this access be the reasonable and ordinary way to effect such repairs as covered under this agreement. You also agree to and understand that if emergency repairs that would be the responsibility of Belle Hall Direct 101, LP. are required and you cannot be contacted within a reasonable time, given the nature of the emergency, you waive such notice as stated above. Such entry, with or without notice, shall be made with as little inconvenience to you as practicable.

In the event that any common element concerns arise, Homeowners must contact the condominium association and/or the management company.

(d) Manufacturer Warranties

All rights to any manufacturer's warranties on any new appliances or mechanical items have been transferred to you, the Homeowner.

Manufacturer Warranties: Some of the equipment installed in your home is covered by manufacturer warranties lasting up until the Year One Coverage provided by Belle Hall Direct 101, LP. For details, please refer to the warranties contained in the product information you received during your closing. You should remove, fill out and mail any registration cards necessary to record warranties within 10 days of your closing; failure to do so may void your warranties.

Manufacturer Manuals: Your appliances, heating and air conditioning system, and major equipment are accompanied by owner manuals and other information from manufacturers. Please read all instructional literature carefully before operating, cleaning, maintaining or repairing equipment.

Annual Service Contracts: Although most routine maintenance may be accomplished by a homeowner, inspections and certain maintenance procedures require the skill of an authorized service technician. If you are interested in annual service contracts for inspections, cleaning and/or maintenance, please contact the appliance manufacturer, heating and air conditioning company or other appropriate contractor. If they do not provide this service directly, they should be able to refer you to a qualified maintenance company.



ONE BELLE HALL PROJECT DIRECTORY

ALL WARRANTY QUESTIONS SHOULD BE ADDRESSED TO THE FOLLOWING:
SERVICE PROGRAM REPRESENTATIVE (843) 278-8000
CUSTOMERCARE@TCRESIDENTIAL.COM

SUBCONTRACTOR

ARCHITECT

BOB NAEGELE
CLINE DESIGN & ASSOC., PA
125 N. HARRINGTON ST
RALEIGH NC 27603
PROJECT #02139
Tel - 919-833-6413
Fax - 919-836-1280

CIVIL ENGINEER

LEE GASTLEY
SEAMON WHITESIDE & ASSOCIATES, INC.
503 WALDO PARK BLVD
SUITE 100
MT. PLEASANT, SC 29464
Tel - 843-884-1667
Fax - 843-884-6944

MECHANICAL, ELECTRICAL & PLUMBING ENGINEER

LIGHTHOUSE ENGINEERING
400 WEST MORGAN STREET
SUITE 10C
RALEIGH, NC 27603
919-835-9781
919-835-9754 FAX

STRUCTURAL ENGINEER

WILLY STEWART
CARA PIERCE
STEWART ENGINEERING
260 TOWN HAL DRIVE
MORRISVILLE, NC 27560
PROJECT #02139
Tel - 919-380-8750
Fax - 919-380-8752



ONE BELLE HALL PROJECT DIRECTORY

GEOTECHNICAL ENGINEER

WARREN CHICO
GS2 ENGINEERING
1716 PINEVIEW ROAD
SUITE D
CHARLESTON, SC 29407
843-763-4093
843-763-4094 Fax

ARBORIST

P O MEAD
MEAD'S TREE SERVICE
PO BOX 31413
CHARLESTON, SC 29417
843-556-5679
843-884-5528 Fax

WATERPROOFING CONSULTANT

CHRISTOPHER MATTHEWS
GLAZING CONSULTANTS
708 TATUM TRACE
FL 32259
904-230-4401
904-230-4402 Fax

WATERPROOFER

JEFF CAMPBELL
ABG CAULKING & WATERPROOFING
3407 WEST ANDREW JOHNSON HIGHWAY
MORRISTOWN, TN 37814
423-587-0638
423-587-3921 Fax

AIR QUALITY CONSULTANT

CHRIS UHLAND
SKYTEC INDOOR ENVIRONMENTAL SOLUTIONS
11233 ST JOHNS INDUSTRIAL PKWY S
SUITE 1
JACKSONVILLE, FL 32246
904-247-4321
904-247-9347 Fax

ONE BELLE HALL PROJECT DIRECTORY

TOWN OF MT. PLEASANT

BUILDING OFFICE/BUSINESS LICENSES
TOWN OF MT PLEASANT
PO BOX 745
MT. PLEASANT, SC 29464
843-884-5184 Inspections
843-849-2029 Permits
843-216-3869 Fax

SURVEYOR

MARK BUSEY
SOUTHEASTERN SURVEYORS OF CHARLESTON
147 WAPPOO CREEK DRIVE SUITE 102
CHARLESTON, SC 29412
843-795-9330
843-795-2007 Fax

ELECTRIC SERVICE

SCE&G
1277 CHUCK DAWLEY BLVD
MT PLEASANT, SC 29464
843-576-8544
843-576-8466 Fax

WATER AND SEWER

MT. PLEASANT WATERWORKS
1619 RIFLE RANGE ROAD
MT. PLEASANT, SC 29464
843-884-9626

CONCRETE STRUCTURE

BRETT DAVIS
JC CONCRETE
1160-A CRIPPLE CREEK DRIVE
LAWRENCEFILLE, GA 30043
770-277-3242
770-277-8679 Fax

GYPCRETE & LIGHT WEIGHT CONCRETE

SHAWNNA STAFFORD
KMAC OF THE CAROLINAS, INC.
3748 PERFORMANCE ROAD
CHARLOTTE, NC 28214
704-398-8911
704-398-8910 Fax



ONE BELLE HALL PROJECT DIRECTORY

OVERHEAD GARAGE DOOR

RUSTIN ROPER
GALE CONTRACTOR SERVICES
9516 HAMBURG ROAD
SUMMERVILLE, SC 24985
843-760-9144
843-760-6808 Fax

WIRE SHELVING, MIRRORS & SHOWER DOORS

RUSTIN ROPER
GALE CONTRACTOR SERVICES
9516 HAMBURG ROAD
SUMMERVILLE, SC 24985
843-760-9144
843-760-6808 Fax

FRAMING

ROB SEBENY
COASTAL LUMBER & FRAMING
MOUNT DORA, FL 32757
352-735-6005
352-735-6006 Fax

ELECTRICIAN

JIMMY APLIN
HOUSTON-STAFFORD ELECTRIC
3670 BURNETTE PARK DRIVE
SUITE A
SUWANEE, GA 30024
770-945-4244
770-945-1929 Fax

CABINETS

MARK APPLEWHITE
LEEDO CABINETRY
7416-A CHAPEL HILL ROAD
RALEIGH, NC 27607
919-851-2452
919-859-0378 Fax

GRANITE TOPS

KIM CURRIE
SOLID SOLUTIONS OF CLAYTON
107 BESTWOOD DRIVE
CLAYTON, NC 27520
919-550-5969
919-550-7037 Fax



ONE BELLE HALL PROJECT DIRECTORY

FLOORS

JACKIE BLACKMON
FLOORING SERVICES, INC.
2220 TECHNICAL PARKWAY
NORTH CHARLESTON, SC 29406
843-764-4675
843-764-4676 Fax

TRUSSES & LUMBER COMPONENTS

CRAIG AUFDERHAR
TRUSSWAY, INC.
400 PIEDMONT PARKWAY SUITE 217
HIGH POINT, NC 27265
336-883-6939
336-883-6966 Fax

WINDOWS

LARRY BRATTON
TOTAL OPENING SALES & INSTALLATIONS, LLC
430 LEISURE LANE
CATAWBA, SC 29704
803-328-3685
803-328-3839 fax

PEST CONTROL

RAY LANEY
DODSON PEST CONTROL
3333-D MARATHON COURT
NORTH CHARLESTON, SC 29418
843-767-1218
843-767-4594 Fax

STUCCO

CARL ULM
FIRST EXTERIORS
3285 ASSOCIATES DRIVE
NORTH CHARLESTON, SC 29418
843-207-1244
843-207-1242

STEEL

COLIN SALMAN
ALLEN'S STEEL PRODUCTS, INC.
11475 MEMPHIS ARLINGTON ROAD
ARLINGTON, TN 38002
901-867-0171
901-867-7533 Fax



ONE BELLE HALL PROJECT DIRECTORY

APPLIANCES

DENNY JORDAN
GE CONSUMER PRODUCTS
1912 BARONSMEDE DR
RALEIGH, NC 27615
800-432-2737
919-845-8520 Fax

HEATING AND AIR CONDITIONING

MELVIN CLARK
GENERAL HEATING & AIR
224 HICKS ROAD
GREENVILLE, SC 29605
864-277-4554
864-299-0246 Fax

BRICK

PAUL IRWIN
SUPERIOR CONSTRUCTION SERVICES, INC.
152 HILLCREST DRIVE
FORT MILL, SC 29715
803-547-1168
803-547-1368 Fax

PLUMBING

JAMIE BALLIET
BUDGET MECHANICAL PLUMBING, INC.
733 TALLWOOD ROAD
CHARLESTON, SC 29412
843-406-2800
843-406-1050 Fax

ROOFING

BILL HOOD
GWC ROOFING COMPANY
600 UNION WEST BOULEVARD
PO BOX 1670
MATTHEWS, NC 28104
704-882-7663
704-882-6443 Fax



ONE BELLE HALL PROJECT DIRECTORY

SITE WORK

DAN THOMPSON
O.L. THOMPSON GRADING CONTRACTORS
PO Box 63535
Charleston, SC 2419
843-572-0088
843-553-8528 Fax

FIRE SPRINKLERS/FIRE PROTECTION

CHRIS MACKEY
CENTURY FIRE PROTECTION
2625 PINEMEADOW COURT
SUITE F
DULUTH, GA 30096
770-945-2330
770-945-2651 Fax

DRYWALL

ED CLARKE
DRY TECH, INC
7282 TANGLEWOOD DRIVE
CHARLESTON, SC 29418
843-552-3702
843-552-3725 Fax

MEDIA/CABLE

COMCAST OF CAROLINA, INC.
4400 BELLE OAKS DRIVE
NORTH CHARLESTON, SC 29405
843-554-4100

LANDSCAPER

BOBBIE GROGAN
PLEASANT PLACES
449 LONG POINT ROAD
MT. PLEASANT, SC 29464
843-881-3430
843-884-7671 Fax

SECTION 3: HOW TO REQUEST WARRANTY SERVICE

Our warranty service system is designed to accept written reports of non-emergency items. This provides you with the maximum protection and allows us to operate efficiently, thereby providing faster service to all homeowners. Emergency reports are the only reports accepted by phone.

To comply with the terms of your warranty as well as for reasons of record-keeping, all non-emergency items for which you request service must be reported in writing. "Request for Service" forms are provided in this section for your convenience. We cannot accept reports of routine warranty items over the phone. However, please feel free at any time to call our customer care line at 843-278-8000 and we will assist you in any way possible.
In order to provide you with the most efficient service possible on all future warranty items, we have established the following procedures. Please follow the steps below.

Step 1: Warranty Service Checkpoints:

Post-Closing: Within 20 days of closing on your new home, you will receive a courtesy phone call. Should you have any concerns at this time, you may submit, in writing, an "Interim Request for Service" (attached.) Upon our receipt of this form, you will be contacted to arrange for service.

6-month Post-Closing: Approximately 5 months after closing on your home, you will be reminded to submit your "6-Month Request for Service" (attached) requesting repairs needed to any items covered by your warranty. You will also be reminded that you will need to submit your final request for warranty repair items, utilizing the "12-Month Request for Service" (attached) prior to your warranty expiration date. After our receipt of each of these forms, you will again be contacted to arrange for service.

Warranty Expiration: Once your warranty period has expired, you will be sent a letter providing you with a list of the names and numbers of contractors that will be willing to provide repair services. At this time, the cost of all repairs will become the responsibility of the homeowner.

Step 2: Service Procedures: Upon Customer Care's receipt of a "Service Request", you will be contacted to schedule an inspection appointment. A Customer Care Coordinator will schedule our Service Technician and/or contact the appropriate contractors to arrange appointment times for repairs. If you have not already done so, you may be asked to contact the subcontractor directly to schedule an appointment. If necessary, you will need to be available to allow the subcontractor access to your home.

1. Appointments are available Monday through Friday, 8:30 am to 5:30 pm.

2. After the work is completed by a One Belle Hall Service Program representative and/or contractors, they will ask you to sign the Request For Service (30-Day, 6-Month or 12-Month) Form, indicating that the specified work has been completed to your satisfaction.

ONE BELLE HALL

6 Month Request for Service

This form is to be used for warranty work requested at your 6-Month Inspection.
(Forms should be mailed no later than 5 months after occupancy for the 6-Month inspection.)

Name: _____ Request Date: _____

Address: _____ Closing Date: _____

_____

Home Tel.: _____

Work Tel.: _____

Warranty Work Items:

Location	Description	Completion			
		Action Taken	Date	Customer Service Initials	Home-owner Initials
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					

Codes, Action Taken:
(A) Warranty, (B) Homeowner Responsibility, (C) Repaired as Courtesy, (D) No Action Required

Please mail to: **Belle Hall Direct 101, LP**
Attn: Customer Care
230 Seven Farms Drive, Suite 104 Daniel Island, SC 29492

Date Received _____

Rev. 0: 6/22/06

ONE BELLE HALL

12 Month Request for Service

This form is to be used for warranty work requested at your 12-Month Inspection.
(Forms should be mailed no later than 11 months after occupancy for the 12-Month inspection.)

Name: _____ Request Date: _____

Address: _____ Closing Date: _____

_____

Home Tel.: _____

Work Tel.: _____

Warranty Work Items:

Location	Description	Completion			
		Action Taken	Date	Customer Service Initials	Home-owner Initials
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					

Codes, Action Taken:
(A) Warranty, (B) Homeowner Responsibility, (C) Repaired as Courtesy, (D) No Action Required

Please mail to: **Belle Hall Direct 101, LP**
Attn: Customer Care
230 Seven Farms Drive, Suite 104, Daniel Island, SC 29492

Date Received _____

Rev. 0: 6/22/06

EMERGENCY SERVICE

Step 1: Determine if the incident is a true emergency. An emergency, as defined by the warranty, includes:

1. Total loss of heat when the outside temperature is 40 degrees or below.
2. Total loss of electricity
3. Plumbing leak that requires the entire water supply to be shut off
4. Total loss of hot water
5. Total sewage stoppage
6. Roof leak
7. Or any situation that that has the potential to affect your personal safety or to cause additional damage to your home if not corrected immediately.

Note: Air conditioning malfunctions do not qualify for emergency service.

Step 2: Contact the responsible Party

Emergency calls during normal business hours (8:30 a.m. to 5:30 p.m.) will be handled by a Customer Care Representative who will contact the responsible Contractor. Customer Care will contact the Homeowner to schedule service, in the event of a true emergency.

CUSTOMER CARE – Call 843-278-8000

Emergency calls after hours, weekends, or holidays must be directed to the applicable subcontractor. In the event that you have a true emergency after normal business hours, call the number for the following emergencies:

PLUMBING EMERGENCY – Call 843-557-2672

HVAC EMERGENCY – Call 864-277-4554

ELECTRICAL EMERGENCY – Call 770-900-8684

FIRE SPRINKLER – Call 770-945-2330

Important: In the event you experience an emergency after normal business hours, you must inform Customer Care on the next business day and complete the "Emergency Service Request" form (attached).

Note: In the event that a responsible subcontractor fails to respond to a request for emergency service, the homeowner will be authorized to seek assistance from any qualified repair company. In the event of a true emergency, as stated above, Belle Hall Direct 101, LP will reimburse the homeowner for the expense of such repair (warranty items only).

ONE BELLE HALL

EMERGENCY Request for Service

This form is to be used for service work requested on an emergency basis. During normal business hours (8:30 a.m. – 5:30 p.m.), please contact Customer Care at tel. 843-278-8000/fax. 843-278-1841.
For emergencies after-hours, please contact appropriate contractors as listed in Section 1 of the Homeowner's Manual.
Please forward this written Emergency Request for Service in all instances to Customer Care.

Name: _____ Request Date: _____

Address: _____ Closing Date: _____

_____

Home Tel.: _____

Work Tel.: _____

Emergency Service Work Item:

Location	Description	Completion			
		Action Taken	Date	Customer Service Initials	Home-owner Initials

Codes, Action Taken:
(A) Warranty, (B) Homeowner Responsibility, (C) Repaired as Courtesy, (D) No Action Required

Please mail to: **Belle Hall Direct 101, LP**
Attn: Customer Care
230 Seven Farms Drive, Suite 104 Daniel Island, SC 29492

Date Received _____

INTERIM SERVICE

Should warranty service be required outside of the 30-day and 6-Month checkpoints and before the 12-month checkpoint and is not considered an emergency, an Interim Service Request may be forwarded to Customer Care. Submit, in writing, any concerns you may have with your new home, utilizing the "Interim Service Request" form (attached). We will handle these requests according to the same procedures that apply to the 6-month and 12 month checkpoints.

APPLIANCE SERVICE

The manufacturers of kitchen and laundry appliances will work directly with you if any repairs are needed for these products. For any concerns regarding the appliances in your home, call GE Appliances directly at 1-800-432-2737 (800-GE-CARES). Be prepared to provide the model and serial numbers of the item and the closing date on your home when you call.

FLOORING SERVICE

The installer of your flooring will work directly with you on required repairs in your flooring. Please call Jackie Blackmon of Flooring Services, Inc. directly at 843-764-4675.

SERVICE CALLS AT HOMEOWNER'S EXPENSE

Occasionally a request of Homeowner service turns out to be an item which is not covered by the warranty or was the result of some action by the homeowner, or someone working for the homeowner.

In the event it is determined that the work to resolve a repair was not covered by the warranty, the cost of the repair is the responsibility of the homeowner. An example of this is the unclogging of a sewer line caused by some foreign object being lodged in the drain after closing (i.e., paper towels, sanitary products, etc.).

ACTS OF GOD OR NATURE

Damage from or repairs necessitated by acts of God or nature including, windstorms, hurricane, hail, lightning, falling trees or other causes, are excluded from warranty coverage.

ONE BELLE HALL

Interim Request for Service

This form is to be used for service work requested on an as-needed basis.
(Requests for Service outside of the 6-month and 12-month service periods will be accepted by fax or mail.)

Name: _____ Request Date: _____

Address: _____ Closing Date: _____

_____

Home Tel.: _____

Work Tel.: _____

Interim Service Work Items:

Location	Description	Completion			
		Action Taken	Date	Customer Service Initials	Home-owner Initials
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					

Codes, Action Taken:
(A) Warranty, (B) Homeowner Responsibility, (C) Repaired as Courtesy, (D) No Action Required

Please mail to: **Belle Hall Direct 101, LP**
Attn: Customer Care
230 Seven Farms Drive, Suite 104, Daniel Island, SC 29492

Date Received _____

COLOR AND TEXTURE MATCHING POLICY

The color content of ceramic tile, grout, vinyl flooring, plastic laminates, carpet, paint, siding, and many of the materials used in your home have been created by batches of chemical compounds and dyes. Although these batches are formulated and measured as accurately as possible, color and texture matches for repairs or replacements cannot be guaranteed. Mined products such as granite fall under this category as well.

Variations in materials used for repairs and aging/weathering of existing materials make it even more difficult to match colors. For example, variations are to be expected on items such as interior and exterior touch-up paint, kitchen and bathroom cabinets, replacement of siding or boards, concrete or mortar repairs, and patching of asphalt driveways.

In the event it becomes necessary to refinish a surface or repair a specific material, the affected area will be touched up to blend with the original finish **as closely as possible**. Please note that if the area of the repair has been wallpapered, custom painted or otherwise altered from its original condition, the repair will be completed, however repairs to the custom paint and other decorative finishes are the responsibility of the homeowner.

Carpet repairs may terminate at stairs, doors and or obvious room breaks. Carpet color/shade may not match adjacent rooms due to dye-lot variations.

Reporting Warranty Items

The many details of warranty coverage can be confusing. We hope this chart will make reporting items easier. If you do not know whom to contact, call our office and we will guide you. 843-278-8000.

Appliances	Contact the manufacturer directly with model and serial number, closing date, and description of problem – 800-GE-CARES (800-432-2737)
Flooring	Contact the installer directly with a description of the problem – **843-764-4675 (Flooring Services, Inc.)**
Emergency	During our business hours (Monday through Friday, 8:30 am to 5:30 pm) call our office at 843-278-8000. After business hours or on weekends or holidays, contact the trade or appropriate utility company directly using the emergency numbers listed in Section 1 of this book.
Non-Emergency	Mail or fax your written list of items to our office. You can find service request forms in this section. Belle Hall Direct 101, LP Customer Care 230 Seven Farms Drive, Suite 104 Daniel Island, SC 29492 Ph. 843-278-8000 Fax. 843-278-1841
Storm damage or other natural disaster	Contact your homeowner's insurance agent immediately. Contain damage as much as possible without endangering yourself. In extreme situations, photograph the damage.

Hours Office:	**Monday - Friday, 8:30 am to 5:30 pm**
Inspection appointments:	Monday - Friday, 8:30 am to 5:30 pm
Work appointments:	Monday - Friday, 8:30 am to 5:30 pm

Questions? Call the office during normal business hours: 843-278-8000

SECTION 4: HOMEOWNER RESPONSIBILITY

Responsibility: Homeowner maintenance is essential to keep the features of your home looking attractive and functioning properly. Maintenance such as changing filters in the heating and air conditioning systems and so forth are both necessary and extremely beneficial in avoiding costly repairs and protecting the value of your home.

The "Warranty and Maintenance Guidelines" section of this Handbook will provide you with some of the important maintenance requirements, cleaning tips and safety precautions. Maintenance items not covered by the warranty are the responsibility of the homeowner so it is important that you review the information contained in this Handbook.

Alteration and Repairs: Alterations to your home or repairs by unauthorized service technicians may void the warranty on the affected system or components, unless the work is performed by Belle Hall Direct 101, LP or its employees, agents and subcontractors.

Neglect and Abuse: In order to protect the warranty, homeowners are responsible for properly maintaining their home. Please read the information contained in this Handbook, as well as the owner's manuals and other product information provided by the manufacturers of equipment and materials used in your home, for details on routine maintenance which is the responsibility of the homeowner.

SECTION 5: WARRANTY AND MAINTENANCE GUIDELINES

This section of your Belle Hall Direct 101, LP Homeowner Manual – organized alphabetically by key features of your home – includes specific details on ***our service program responsibilities*** as your builder and ***your maintenance responsibilities*** as a homeowner. You will also find tips on routine cleaning and maintenance to keep your home in proper working order and to prevent problems that may arise in the future.

Beginning on the following page, you will find a feature-by-feature description of warranty service and homeowner maintenance responsibilities. If you have any questions about your Warranty Guidelines, please refer to your warranty agreement or Section 2 of this handbook for full details.

This Handbook also includes important ***safety information*** including information on some functions that should only be performed by authorized service technicians. We strongly recommend that you employ certified professionals to perform such repairs and do not attempt such repairs yourself.

IMPORTANT: Please take time to read the literature provided by the manufacturers of consumer products in your home. The information contained in that material is not repeated here. The information contained in manufacturer product manuals should always take precedence over information contained in this Handbook.

Should you have further questions or concerns regarding your warranty, or any of the maintenance information contained in this handbook, please write or contact a Customer Care Representative. 843-278-8000.

AIR CONDITIONING AND HEATING SYSTEMS

Warranty Guidelines: Your air conditioning and heating system is warranted by the HVAC Subcontractor for one (1) year against manufacturing and installation defects.

General

Monthly utility charges for the operation of the heating or air conditioning system are the homeowner's responsibility. The amount of the utility costs will depend on the usage of the system and utility rates. Neither the builder nor the manufacturer can be responsible for increased utility costs resulting from a malfunction of the heating or cooling system. If the malfunction is covered by the manufacturer's warranty, the manufacturer, through the installing subcontractor, will make the required repair(s) in accordance with the terms and provisions of the manufacturer's warranty. It is the homeowner's responsibility to arrange for utilities the day of closing. Failure to initiate a power source to operate your air conditioning and heating system to facilitate proper air flow in your unit could result in damage to sheetrock walls.

Your heating and air conditioning system is controlled by a thermostat. The thermostats have been carefully located so it is not influenced by drafts of air or sudden temperature variations, which occur near doors and windows. During the summer months, avoid changing the thermostat setting or turning the air conditioning system "on" and "off". This causes the system to overwork to return the temperature and humidity in your home to the desired comfort level. This applies to all cooling systems.

The registers are the primary mean of regulating air flow (and, therefore, temperature) in individual rooms throughout your home. There are two kinds of registers: air outlet (supply) registers and air intake (return) grilles. Adjusting the supply registers rather than changing the thermostat setting may be the most efficient way to regulate room temperature. All registers should be kept unobstructed by furniture, drapery, or other objects at all times. It is a good practice to occasionally vacuum both supply and return grilles to ensure that they remain free of lint and dust accumulations, which interfere with the passage of air through your system decreasing its efficiency and increasing the cost of operation.

Air Conditioning

Your new home is equipped with a central air conditioning system. The main part of the cooling system is the compressor warranted by the manufacturer. Please see operating instructions, warranties, and other paperwork accompanying the air conditioning equipment.

Your air conditioning system consists of a cooling unit (condenser), compressor, coil, air handler (including filter), thermostat, ductwork, and registers. The average inside temperature will vary up to 6° between the thermostat and any room in the house.

Maintenance: Just as your air filter will need to be cleaned during the heating season, the same filter will need to be cleaned or replaced during the cooling season. We recommend replacing your filter every month. Do not operate the HVAC system without a filter. Add one cup of bleach to the condensate drain pan bi-annually to keep the drain clean. This also prevents mold and algae growth.

While the thermostat, registers, and filters are the keys to efficient operation of your cooling system, there are a number of other measures you may take to ensure that you get the most for your utility dollar:

- Always keep exterior doors and windows closed tightly. Draperies (especially insulated ones) will do much to reduce your operating costs;
- Keep the outdoor portion of your cooling system free from obstructions, which may prevent the flow of air to, and from the unit.
- The cooling system should be inspected and cleaned at least once a year by a professional serviceman. Refer to the manufacturer's instruction manual for additional details.
- If for any reason your system should fail to operate properly: (1) Check the circuit breakers to be sure that they are in the ON position. If necessary, reset the breakers. If the breakers should trip a second time call your serviceman at the number listed in section 1 of this manual. (2) Check to make sure the disconnect switch is in the ON position. This switch (which looks like an ordinary light switch) is located in the mechanical closet and it controls the heating and air conditioning system.

Heating System

The system is designed to maintain a normal temperature if it is operated and maintained properly. The heating system will automatically turn on if the room temperature drops 2°-4° Fahrenheit below the thermostat setting. For best results, your windows and glass doors should be covered by lined or insulated draperies during the cold months of the year. Your draperies will also help keep out the sun's rays in the summer when your air conditioner is operating. Please read the manufacturer's operating instructions carefully.

Maintenance: The following suggestions may help if you encounter difficulties with your heating system:

- Before calling a serviceman, 1) Check the circuit breakers to be sure that they are in the ON position. If necessary, reset the breakers. If the breakers should trip a second time call your serviceman at the number listed in section 1 of this manual. (2) Check to make sure the disconnect switch is in the ON position. This switch (which looks like an ordinary light switch) is located in the mechanical closet and it controls the heating and air conditioning system.

- If a variance in room temperature occurs, adjusting the flow of air through the registers may help balance the air temperature. Check to be certain that all room registers are open and unobstructed by furniture.
- In many instances, insufficient heat is caused by a dirty air filter. Filters should be replaced every month. Do not remove the filter without replacing it immediately;
- Have your heating system inspected and cleaned at least once a year by a professional serviceman;
- Make sure the thermostat is properly set for either cooling or heat and set at the appropriate temperature.

Thermostat

Your home is equipped with a thermostat which controls your air conditioning and heating system. Adjust the thermostat to maintain the indoor temperature at the level you select. The thermostats have three controls:

1. "Temperature" control selector: This will allow you to establish the temperature that is best for your personal comfort. Setting the heat control high or cooling control low does not make a system heat or cool faster. Keeping the thermostat at an even temperature will result in more efficient and economical heat. However, you can lower your heating bill by lowering the thermostat during sleeping hours and when your home is unoccupied for a prolonged period.

   For maximum energy efficiency, the thermostat should be set to 78 degrees for cooling and 68 degrees for heating. Avoid frequent or abrupt changes in temperature setting.

2. "Fan" switch: The switch for the fan has two choices – ON or AUTO. In the ON position, the fan circulates air continuously whether or not the heat or cooling unit is cycling. In the AUTO position, the fan will circulate air only during the operation. Do not be concerned if the fan continues to run after the compressor unit has stopped. This is normal in order to distribute the cooled or heated, dehumidified air throughout the home.

3. "System" switch: The system switch offers three settings: COOL, HEAT, or OFF. Neither the heating nor cooling system will operate in the OFF position.

The thermostat helps to keep your entire home at a comfortable temperature. Individual room temperatures may be further regulated by adjusting the registers in the various rooms.

APPLIANCES

Your new electric appliances are accompanied by instruction booklets. Read all instruction literature carefully and remove, fill out, and mail any postcards necessary to record warranties.

If an electric appliance fails to operate, be sure it is plugged in before you call a repair service.

Warranty Guidelines: During the first year of ownership, your appliances are warranted directly from the manufacturer. For specific details refer to the warranty you received with the appliance. Warranty service for kitchen appliances and washers-dryers should be arranged directly by the homeowner by calling the number listed in the appliance manual. When placing a service call, please have your appliance model number and serial number available.

Dishwashers

Since operating instructions vary by model and manufacturer, please refer to your manufacturer's manual for details.

Dishwasher Shut-Off Valve: To turn off the dishwasher water supply, turn the valve located under the kitchen sink leading to the appliance, to the "OFF" position (clockwise). To restore water supply to dishwasher, turn the valve counter-clockwise.

Malfunctions: In the event your dishwasher does not operate, follow these instructions before arranging for service:

1. Check to see if the circuit breaker is in the ON position.
2. Check to see that the door is in the locked position and that the controls are properly set.
3. If the dishwasher still does not work, refer to your manufacturer's manual for additional instructions.

CAUTION: In order to prevent serious damage, do not put small objects in the dishwasher that can fall out of the trays or bins into the pump opening.

Disposals

Since operating instructions vary by model and manufacturer, please refer to your manufacturer's manual for details.

NOTE: Improper use or grinding is not covered by the warranty.

Maintenance: In addition to the information supplied by manufacturers, the following guidelines include some of the important maintenance items which are the responsibility of the homeowner.

Grinding: Always use **cold** water when the disposal is on and especially when grinding greasy substances. Many people erroneously conclude that because their waste disposal is capable of grinding up most of their garbage, that it is also capable of eliminating grease and other substances they would not otherwise pour down a drain. In fact, you should be equally careful not to clog disposal drains with grease. Should the drain become clogged, do not put chemicals down the disposal. (See also "Drains".)

Avoid putting large amounts of fibrous materials (such as potato peels, celery, banana peels or corn husks) down your disposal. Also, do not put coffee grounds in disposals or grind bones or other hard materials.

Reset Button: The disposal installed in your home has a reset button that works in much the same way as a circuit breaker. Should the disposal become overloaded with a substance it cannot grind, it will turn itself off. If this happens, turn the switch OFF, remove the substance obstructing the disposal's operation, wait approximately 3 minutes and push the reset button. See your owner's manual for the location of the reset button and specific instructions that apply to your disposal.

Once the reset button has been pushed, turn the switch ON; if the disposal still does not start, turn it OFF again and check to see if you have tripped the circuit breaker. Be sure the circuit breaker to the ON position, push the reset button again, and then turn the disposal switch ON. Refer to your manufacturer's manual for full details.

> **WARNING:** Be absolutely sure the power is OFF before inserting tongs to remove material when the disposal is stalled. Do **NOT** put your hands inside the disposal.

Exhaust Systems

Since operating instructions vary by model and manufacturer, please refer to your manufacturer's manual for details.

Maintenance: Your hood has an aluminum mesh grease filter which requires periodic cleaning. After removing the filter, soak it in a hot water solution of hand dishwashing detergent, and then spray with hot water. If necessary, use a strong degreaser. Do not forget to clean the inside portions of the hood with a heavy-duty cleaner solution.

In addition to the aluminum mesh filter, a re-circulating type range hood also has a disposable charcoal filter that should be replaced periodically. For details on filters, fan motors and cleaning inside portions of range hoods, please read your owner's manual from the manufacturer.

Microwave Ovens

Since operating instructions vary by model and manufacturer, please refer to your manufacturer's manual for details.

Maintenance:

Cleaning: Remove spatters and drips from the oven's interior with a damp cloth. Greasy spatters require a sudsy cloth and rinse. A cloth dampened in a solution of baking soda is also safe, but never use a commercial oven cleaner on any part of your microwave oven. Do not use abrasives, cleaning powders, steel or plastic pads on any part of your microwave oven.

For exterior maintenance, wipe the case and control panel with a damp cloth and dry thoroughly. Do not use cleaning sprays, large amounts of soap and water, abrasives or sharp objects on the panel.

If the microwave does not operate, follow these procedures before arranging for service:

1. Check the circuit breaker to make sure it is in the ON position.
2. Check to see that the door is in the locked position and that the controls are properly set.
3. If the microwave still does not work, refer to your owner's manual for additional instructions.

CAUTION: Do not attempt to operate a microwave oven if the door does not work properly or if the hinges, seals or latches are loose or damaged. The microwave should only be repaired by qualified technicians because some containers and utensils may permanently damage microwave ovens, make sure that the ones you use in your oven are safe for microwaving. For details, please refer to your manufacturer's manual.

Ovens and Ranges

Since operating instructions vary by model and manufacturer, please refer to your manufacturer's manual for details.

Maintenance:

The outside of your stove can be cleaned with a non-abrasive cleaner such as baking soda sprinkled on a damp cloth or sponge, or a solution of ¼ cup baking soda to 1 quart of water. Gentle rubbing with a paste of baking soda and water may be necessary for some spots. Glass cleaners also work well for surface cleaning of porcelain finishes or the black glass oven door that is installed in most homes. If your burner panel or oven front is stainless steel, you may want to use a stainless steel cleaner. A degreasing cleaner may be used on heavily soiled areas such as the backsplash. Never use harsh, abrasive cleaners or colored nylon-backed scrub pads on the outside of ovens and ranges. Smooth top ranges have specific cleaning guidelines. Always refer to your manufacturer's manual for cleaning tips on your specific model.

For details on cleaning your oven, read the instructions from your manufacturer.

> **WARNING:** Other than for surface cleaning; do not begin cleaning of burner elements or inside cleaning until you turn OFF the circuit breaker. Read the manufacturer's manual for cleaning directions.
>
> **WARNING:** If you suspect a gas leak, follow instruction under "Gas Leaks" in this section of the Handbook. Never use a gas or electric range as a space heater in the event of a power failure or for any other reason.

Refrigerators (if purchased)

Since operating instructions vary by model and manufacturer, please refer to your manufacturer's manual for details.

Maintenance: The surface of your refrigerator may be cleaned with an all-purpose cleaner or glass cleaner. The inside may be washed with a baking soda solution (3 tablespoons to 1 quart of water) of mild hand dishwashing detergent solution. Do not use abrasive cleaners or pads. Unplug the refrigerator and vacuum the back and underneath at least twice a year.

Washer/Dryer (if purchased)

Since operating instructions vary by model and manufacturer, please refer to your manufacturer's manual for details.

BATH TUBS, SINKS AND SHOWERS

Plumbing fixtures are made of a variety of materials. Generally, these items include the following:

Bathtubs are usually made of vitreous china, porcelain enamel on cast iron or steel, or fiber-glass reinforced plastic. The bathtubs are surrounded by ceramic tile walls.

Bathroom sinks are usually made of marble resin.

Showers are made with ceramic tile walls and fiberglass-reinforced plastic bases.

The kitchen sink is made of stainless steel.

Warranty: During the first year of ownership, the following warranty service guidelines apply to bath tubs, sinks and showers installed in your home:

Ceramic Tile and Grout: Cracked ceramic tiles will only be replaced if reported, in writing, during the first year. Excessive cracking of grout joints will be repaired **ONLY ONCE**. The builder is not responsible for variations in colors of tile or grout.

Caulk: Cracking or shrinkage of caulk between ceramic tile and the tub or shower pan will be replaced **ONLY ONCE**, if reported, in writing, during the first year.

Chips, Scratches or Cracks: Chips, scratches or cracks in vanity countertops, plumbing fixtures and tub/shower enclosures will be repaired if reported in writing during your Pre-Settlement Orientation prior to settlement. Any such conditions not reported during your Pre-Settlement Orientation are not covered by the warranty.

Clogs: When the drain pipe from a tub, sink, or shower becomes clogged, use a plunger first. The rubber cup of the plunger should cover the drain opening, and the water should well up over the cup edge. Working the plunger up and down rhythmically 10 to 20 times in succession will build up pressure in the pipe and do more good than sporadic plunges. Plug any overflow outlet with a piece of old cloth.

If the plunger does not work use a plumber's auger or snake, a long, flexible steel cable used to break up or hook onto objects. These devices are available for rent at most equipment rental stores or you can purchase them at your local hardware, plumbing store or home center. Turn the handle of the snake in the same direction when removing it as you did when inserting it. This technique will keep anything attached to the snake from coming loose before it is removed.

If the drain can be partly opened with the plunger or snake, boiling water (140 degrees for plastic pipes) may complete the job. If not, you can open the curved trap under the fixture. It can be removed by loosening the two large nuts at either end. Put a pan below the trap before you start. A piece of wire may help to dislodge the blockage. The snake can also be run at this point. Do not forget to return the rubber washers before you re-install the trap.

Ordinary dishwashing soap added to a drain on a regular basis will help to keep it clear of the grease. Run hot water through the drain, turn off the water, add dishwashing soap, and follow it with just enough hot water to wash it down the drain opening. Let stand for 15 minutes and run more hot water. To avoid clogging drains or toilets, never pour grease into them. (See also "Plumbing", "Toilets", and "Bath tubs, Sinks, and Showers".)

> **CAUTION:** Do not use chemical cleaners to solve a major blockage because the chemicals must come in direct contact with the stoppage to be effective. Although it is sold commercially as drain cleaner, never use caustic soda – it will combine with the grease from soap or food waste to form an insoluble compound. Most chemical cleaners are dangerous if not used properly.
>
> **CAUTION:** Do not use sinks, tubs or showers for photographic or developing solutions.

Maintenance: By using proper cleaning and maintenance techniques, bathtubs and sinks will retain their newness and luster for many years.

Caulking: When the caulking around your bathtub or sink shrinks or cracks, remove the old caulking and replace it. If you do not have a caulking gun, caulking material can be bought in applicator tubes or in disposable caulking guns. Fill the tub before caulking it.

Glass Shower Enclosures: To clean glass shower enclosures, a glass cleaner or an ordinary hand dishwashing detergent solution with a soft cloth will do a good job unless hard water minerals have built up. For this condition use a commercial glass cleaner. Do not use metal polishes or cleaners, tile cleaners, or abrasive cleaners.

Mildew: Surface mildew can appear in bathrooms and other areas that collect water vapor. An exhaust fan should always be used during baths and showers to help remove water vapor. To eliminate mildew, clean with a mildew remover, rinse, and dry; then use a disinfectant to retard mildew growth and eliminate odor.

Plastic and Other Substances: Plastic and other substances usually will respond to a nonabrasive cleaner.

Stainless Steel: Stainless steel fixtures generally resist staining and require a thorough scrubbing only occasionally. Use a nonabrasive cleanser.

Vitreous China and Porcelain Enamel: A blow from a heavy or sharp object will chip the surface, and scraping with metal utensils will gradually scratch and dull the surface. Most household cleaners are mildly abrasive but are safe if used with plenty of water. A nonabrasive cleaner is safer. If you prefer a dry material, baking soda is nonabrasive.

CABLE TV

Every home is equipped with cable TV outlets. In the event of defective outlets during the first year, contact Customer Service so that a repair may be scheduled. If the problem is with your cable reception or damage to the cable from outside your home, call your cable provider.

CABINETRY

Manufactured cabinetry, just as wood trim, will expand and contract as the seasons change. Cracks will be repaired only if documented in the Pre-Settlement Orientation. Warping of cabinet doors is normal and should be expected. Warping in excess of 3/8" as measured from the cabinet will be repaired during the first year. Wood panels in style and rail doors will move during seasonal changes. Shrinkage of the panels to the extent that unpainted surfaces are visible, is normal during the winter months.

Maintenance: Soiled or greasy portions of your cabinets can be cleaned with a hand dishwashing detergent solution. Use a light application and always buff dry with a soft cloth, wiping with the grain. A light application of spray, furniture polish every six months or so will protect and improve the finish of your cabinets.

Cabinet interiors and shelves can be washed with a damp cloth or sponge. To protect cabinet shelves use shelf paper. Avoid contact paper with adhesives that cannot be easily removed. Do not overload shelves or lazy Susans. Heavier items should always be placed on the bottom shelf of base cabinets.

> **NOTE:** Do not over-wet cabinets when cleaning. In order to prevent damage to wood finishes, do not install under-cabinet coffee makers or operate countertop coffee makers directly under overhead cabinets.
>
> **NOTE:** Nicks, scratches and cracks can be repaired with putty and fillers available from your local hardware or home center.

Warranty Guidelines:

During the orientation we will confirm that all cabinet parts are installed and that their surfaces are in acceptable condition.

Alignment – doors, drawer fronts, and handles should be level and clean.

Operation – Cabinets should operate properly under normal use.

Separations – Gaps between cabinets and the ceiling or cabinets and the walls will be corrected by caulking or other means if the gap exceeds ¼ inch (locations behind appliances are excluded from this repair).

Warping – If door or drawer fronts warp in excess of ¼ inch within 24 inches, we will correct this by adjustment or replacement.

Wood grain – Readily noticeable variations in wood grain and color are normal in all wood or wood veneer selections. Replacements are not made due to such variations.

CARPET

Your selection sheets provide a record of the brand, style, and color of floor coverings in your home. Please retain this information for future reference. Refer to the various manufacturers' recommendations for additional information on the care of your floor covering.

Maintenance:

Cleaning – you can add years to the life of your carpet with regular care. Carpet wears out because of foot traffic and dirt particles that get trampled deep into the pile beyond the suction of the vacuum. The dirt particles wear down the fibers like sandpaper and dull the carpet. The most important thing you can do to protect your carpet is vacuum frequently.

Wipe spills and clean stains immediately. For best results, blot or dab any spill or stain; avoid rubbing. Test stain removers on an out-of-the-way area of the carpet, such as a closet, to check for any undesirable effects. Have your carpet professionally cleaned regularly, usually once a year.

Burns: Take care of any burn immediately. First, snip off the darkened fibers. Then use a soapless cleaner and sponge with water. If the burn is extensive, speak with a professional about replacing the damaged area.

Crushing: Furniture and traffic may crush the carpet's pile fibers. Frequent vacuuming in high-traffic areas and glides or cups under heavy pieces of furniture can help prevent this. Rotating your furniture to change the traffic pattern in a room promotes more even wear. There is no guarantee that no matting or crushing will occur. Heavy traffic areas such as halls and stairways are more susceptible to wear and crushing. This is considered normal wear.

Seams: Carpet usually comes in 12-foot widths, making seams necessary in most rooms. Visible seams are not a defect unless they have been improperly made or unless the material has a defect, making the seams appear more pronounced than normal. The more dense and uniform the carpet texture, the more visible the seams will be. Seams are most visible when the carpet is first installed. Usually with time, use and vacuuming the seams become less visible.

Snags: Sharp-edged objects can grab or snap the carpet fiber. When this occurs, cut off the snag. If the snag is especially large, call a professional.

Stains: Refer to your care and maintenance brochures for recommended cleaning procedures for your particular fiber.

Warranty Guidelines:

During your orientation, we will confirm that your carpet is in acceptable condition. We will correct stains or spots noted at this time by cleaning, patching, or replacement. Belle Hall Direct 101, LP is not responsible for dye lot variations if replacements are made.

Edges: Edges of carpet along moldings and edges of stains should be held firmly in place. In some areas, metal or other edging material may be used where carpet meets another floor covering.

Seams: Carpet seams will be visible. Gaps or fraying at seams will be repaired.

CAULKING

Maintenance:

Time and weather will shrink and dry caulking so that it no longer provides a good seal. As routine maintenance, check the caulking and make needed repairs. Caulking compounds and dispenser guns are available at hardware stores. Read the manufacturer's instructions carefully to be certain that you select an appropriate caulk for the intended purpose. Lack of caulking may cause rot to wood products from the effects of the weather and time. We suggest you perform touch up at the end of your first year in your home.

Colored caulk: colored caulk is available where larger selections are provided. As with any colored material, dye lots can vary.

Latex caulk: latex caulking is appropriate for an area that requires painting, such as along the stair stringer or where wood trim meets the wall.

Silicone caulk: caulking that contains silicone will not accept paint, unless specifically indicated on the label that it will; it works best where water is present, for example, where tub meets tile or sink meets a countertop.

Warranty Guidelines:

During the orientation we confirm that appropriate areas are adequately caulked.

CERAMIC TILE, KITCHEN

Maintenance:

Ceramic tile normally needs only to be wiped with a damp cloth or an occasional wet mopping to stay clean and new looking. If necessary, a more thorough cleaning with a hand dishwashing detergent solution or ceramic tile cleaner will remove grime.

To remove particularly heavy accumulations of film from glazed tile, you may need a stiff brush and mild scouring powder. Unglazed tiles may be scrubbed, but do not use brown or black nylon-backed scrub pads on any ceramic tile.

To clean the joints between tiles use a grout brush which is available from a janitorial supply store. Do not use steel wool. Staining agents should be mopped up promptly. Even though they rarely affect ceramic tile, staining agents may permanently stain the grout.

A special sealer for grout will make it more stain resistant. For recommendations, contact a Ceramic Tile Contractor.

Warranty Guidelines:

During the orientation we confirm that tile and grout areas are in acceptable condition. We will repair or replace cracked, badly chipped, or loose tiles noted at that time. Landing Drive, LP is not responsible for variations in color or discontinued patterns. New grout may vary in color from the original.

CERAMIC TILE, BATH

Maintenance: The ceramic tile surrounds for bathtubs and showers are impervious to water; however, the caulked seams and grout joints are not waterproof.

Caulk and Grout: In order to prevent damage to materials behind ceramic tile, seams and joints should be properly maintained. The heavy moisture content common in bathrooms, the weight of the tub when filled with water, and the settling of the home over a period of time causes separation between the tub or shower pan and the ceramic tile walls. This condition should be repaired with silicon caulk to prevent damage to other parts of the home.

When the caulk around the upper edge or base of the tub or shower shrinks, dries out or cracks, remove the old caulk and replace it with silicone caulk. If you do not have a caulk gun, caulk material can be bought in applicator tubes or in disposable caulk guns. Fill the tub before caulking it. (See also "Drains".)

Cracks or voids in grout around ceramic tile should be re-grouted. Pre-mixed grout is available from your local hardware store or home center.

Cleaning: Ceramic tile surrounds in tub and shower areas can be cleaned with a non-abrasive detergent solution or ceramic tile cleaner. To remove particularly heavy accumulations of film from glazed tile, you may need a stiff brush and mild scouring powder. Only use a white nylon-back scrub pad for problem areas.

To clean the joints between tiles, use a grout brush available from a janitorial supply store. Scrub with a 1:5 solution of liquid chlorine bleach and water in a well-ventilated room. Do not use steel wool or colored nylon-backed scrub pads.

Warranty Guidelines:

During the orientation we confirm that tile and grout areas are in acceptable condition. We will repair or replace cracked, badly chipped, or loose tiles noted at that time. Belle Hall Direct 101, LP is not responsible for variations in color or discontinued patterns. New grout may vary in color from the original.

CONDENSATION

Condensation in a new home is a normal occurrence and is not considered a deficiency. Condensation takes place whenever warm, moist air inside the house comes in contact with a colder surface, such as a window.

A dehumidifier can be used to remove excess moisture.

Warranty Guidelines:

Condensation results from a family's lifestyle and Belle Hall Direct 101, LP has no control over this. The limited Warranty Guidelines excludes condensation.

COUNTERTOPS, GRANITE

Maintenance:

Your kitchen countertops are granite and are relatively easy to maintain. Spills should be wiped up immediately to minimize absorption. Use soap and water or a mild kitchen cleaner. Contact with acidic substances such as citrus juices or alcohol should be avoided. Use trivets or mats under hot dishes and place mats under china, ceramics, sliver, or other objects that can scratch the surface.

Granite is a porous material. To help repel stains, a 15 year sealer has been applied to your granite countertop. Stain-Proof allows the material to maintain its natural beauty while allowing the stone to breathe.

Warranty Guidelines:

During your orientation we confirm that all countertops are in acceptable condition.

COUNTERTOPS, CULTURED MARBLE

Maintenance:

Your bathrooms feature cultured marble vanity tops which look attractive and are easy to maintain. Although cultured marble is denser than real marble, do not use powdered cleaners or colored nylon-backed scrub pads. All-purpose cleaners and a soft cloth are recommended.

The joints between the vanity top and backsplash or between the backsplash and wall can be repaired with silicone caulk.

To remove minor scratches, use an automotive polish. Heavy scratches and chips are best left to the attention of a professional.

Warranty Guidelines:

During your orientation we confirm that all countertops are in acceptable condition. We repair noticeable surface damage such as chips, cracks, and scratches noted on the orientation list. Repair of surface damage that occurs during or after your move-in is one of your maintenance responsibilities.

DOORS AND LOCKS

Maintenance: The following guidelines include important maintenance items which are the responsibility of the homeowner.

Bi-fold and Bi-pass Doors: If a bi-fold or bi-pass door does not operate properly, check the track for dirt or obstructions. Remove any dirt and use silicone spray on the track.

Sliding Glass: The glass on sliding doors can be cleaned with Windex or other glass cleaners. Clean frames with a mild detergent solution and a soft cloth. If the glass slide door is not operating smoothly, check the track and adjust rollers if necessary. Unclog

drain holes and brush out loose dirt. Spray the track with an all-purpose cleaner solution, and let it stand. Clean the track with a paper towel or wrap a cloth around a screw driver to reach dirt in hard-to-reach grooves. Wipe dry and apply a silicone spray.

> **NOTE:** Excessive condensation on glass sliding doors during the winter months can result in freezing that causes the door to become inoperable.

Swinging Doors: During the initial settlement and shrinkage period of any new home, you may experience some binding of your interior or exterior doors. This problem may correct itself so you may want to wait a while before requesting warranty service. Excessive sticking caused by swelling in damp weather can be corrected by planning or folding sandpaper around a wooden block and sanding the edge that binds. If the door is still out of alignment, it may be that the hinge screws need to be tightened.

Weather Stripping: To maintain your home's energy efficiency, exterior doors are equipped with weather stripping made from a variety of materials, including metal, plastic, and rubber. This weather stripping must remain properly in place to prevent the loss of conditioned air or infiltration of outside air. Damaged-weather stripping should be replaced.

Painting: Most exterior doors are metal-clad, requiring minimal maintenance. Exterior doors should be painted when the house or trim is painted, usually every three to five years.

> **NOTE:** Color and texture variations are common with repairs; however, the original color will be matched as closely as possible. Custom color finishes are the responsibility of the homeowner.

Cleaning: Painted doors may be cleaned with a mild detergent solution. A white nylon-backed scrub pad with gentle pressure should only be used on heavily soiled areas.

The doors in your home are painted with semi-gloss latex paint which should only be cleaned with a mild detergent and gentle scrubbing. Over-wetting or hard scrubbing will remove the paint. **Do not** use heavy-duty or abrasive cleaners.

A variety of door styles and types have been installed in your home. Depending on their function and use, occasional adjustments may be required to assure that they operate properly.

Warranty Guidelines:

During the orientation we confirm that all doors are in acceptable condition and correctly adjusted. We will repair any construction damage to doors noted on the orientation list.

Adjustments – Due to normal settling of the home, doors may require adjustment for proper fit.

DRAINS

Each plumbing fixture in your home has a drain trap. This curved piece of pipe is designed to provide a water barrier that prevents the airborne bacteria and odor of sewer gas from entering the home. Any fixture that is used infrequently (such as a second or third bathroom) should be turned on at regular intervals to replace evaporated water and ensure that the barrier remains intact. Because of their shape, traps are also the source of most clogging problems.

Warranty Guidelines: Clogged drains and lines to the outside sewer connection will be corrected so long as the clog resulted from a construction defect **prior to closing**. In the event of a clog, the homeowner should contact their own plumbing contractor to remedy the concern. It is the responsibility of the homeowner, and their contractor, to prove the cause of the clog.

DRYWALL

Maintenance:

Slight cracking, nail pops, or seams may become visible in walls and ceilings. These are caused by the shrinkage of the wood and normal deflection of rafters to which the drywall is attached.

Repairs: Care of drywall is your maintenance responsibility. Most drywall repairs can be easily made. This work is best done when you redecorate the room.

Warranty Guidelines:

Some separation between moldings and adjacent surfaces, including casing is normal and should be expected within certain tolerances. Separation in excess of ¼ inch will be repaired by caulking or other methods. Slight imperfections such as nail pops, seam lines and cracks not exceeding 1/8 inch in width are common in gypsum wallboard installations and are considered acceptable. **Only interior paint/drywall items identified, noted, and agreed upon during the acceptance/orientation process will be corrected by Belle Hall Direct 101, LP.** Any additional or future corrections will be your responsibility. Items agreed upon during acceptance will be corrected after orientation including listed drywall shrinkage cracks, nail pops and paint touch up of repaired areas. This will be done using the same paint color that was on the surface when the home was delivered. Note: touch-ups will be visible.

Repainting the entire wall or the entire room to correct this is your choice and responsibility. You are also responsible for custom paint colors or wallpaper that has been applied subsequent to closing. Due to the effects of time on paint and wallpaper, as well as possible dye lot variations, touch ups are unlikely to match the surrounding area.

Lighting conditions: Belle Hall Direct 101, LP. does not repair drywall flaws that are only visible under particular lighting conditions.

Related Warranty Repairs: If a drywall repair is identified and agreed upon during the acceptance process that is needed as a result of poor workmanship (such as blisters in tape) or other warranty-based repair (such as a plumbing leak), **Belle Hall Direct 101, LP will complete the repair by touching up the repaired area with the same paint that was on the surface when the home was delivered.** If more than one-third of the wall was involved, we will repaint the wall corner to corner. **You are responsible for custom paint colors or wallpaper that has been applied subsequent to closing.** Due to the effects of time on paint and wallpaper, as well as possible dye lot variations, touch up may not match the surrounding area.

ELECTRICAL SYSTEM

Maintenance:

Know the location of the breaker panel; it includes a main shut-off that controls all electrical power to the home. Individual breakers control the separate circuits. Each breaker is marked to help you identify which breaker is connected to which major appliance, outlets, or other service. Should a failure occur, always check the breakers in the main panel box.

Breakers: Circuit breakers have three positions: on, off, and tripped. When a circuit breaker trips, it must first be turned off before it can be turned on. Switching the breaker directly from tripped to on will not restore service.

Breaker tripping: Breakers trip due to overloads caused by plugging too many appliances into the circuit, a worn cord or defective appliance, or operating with too high a voltage requirement for the circuit. The starting of an electric motor can also trip a breaker. If any circuit trips repeatedly, then unplug all items connected to it and reset. If it trips when nothing is connected to it, you need an electrician. If the circuit remains on, one of the items you unplugged is defective and will require repair or replacement.

Fixture Locations: We install light fixtures in the locations indicated substantially in accordance with electrical plans. Moving fixtures to accommodate specific furniture arrangements or room use is your responsibility.

GFCI (Ground-Fault Circuit-Interrupters)

GFCI receptacles have a built-in element that senses fluctuations in power. Quite simply, the GFCI is a circuit breaker. Building codes require installation of these receptacles in bathrooms and the kitchen (areas where an individual can come into contact with water while holding an electric appliance or tool). Heavy appliances will trip the GFCI breaker.

Each GFCI receptacle has a test and reset button. Once each month, press the test button. This will trip the circuit. To return service, press the reset button. If a GFCI breaker trips during normal use, it may indicate a faulty appliance and you will need to investigate the problem. One GFCI breaker can control up to three or four outlets.

Light Bulbs: You are responsible for replacing burned-out light bulbs other than those noted during your orientation.

Modifications: If you wish to make any modifications, contact the electrician listed in Section 1. Having another electrician modify your electrical system during the warranty period may void the warranty.

Outlets: If an outlet is not working, check first to see if it is controlled by a wall switch or GFCI. Next, check the breaker. If there are small children in the home, install safety plugs to cover unused outlets. This also minimizes the air infiltration that sometimes occurs with these outlets.

Warranty Guidelines:

During the orientation we confirm that light fixtures are in acceptable condition and that all bulbs are working. Belle Hall Direct 101, LP limited warranty excludes any fixture you supplied.

Designed Load: Any electrical wiring that fails to carry its designed load to meet specifications will be repaired. If electrical outlets, switches, or fixtures do not function as intended, we will repair or replace them.

Power Surge: Power surges are the result of local conditions beyond the control of Belle Hall Direct 101, LP and are excluded from limited Warranty Guidelines. These can result in burned-out bulbs or damage to sensitive electronic equipment such as TVs, alarm systems, and computers. Damage resulting from lightning strikes is excluded from limited Warranty Guidelines.

IMPORTANT FACTS AND SAFETY PRECAUTIONS:

1. Any electrical repairs should be performed by a licensed, insured electrician.
2. Always turn the circuit breaker to the OFF position before making electrical repairs.
3. Always check a circuit with a test light to determine if it is LIVE before undertaking repairs.
4. Before cleaning an electrical appliance, always turn it off by pulling the plug or turning the circuit breaker to the OFF position.
5. Do not overload circuits. Too many small appliances on one circuit will cause it to overload, which could result in a fire.
6. Do not exceed the maximum wattage light bulb recommended for each light fixture in your home. Excess wattage bulbs could result in a fire.

7. Circuit breakers that trip frequently should be inspected and repaired by a licensed electrician to prevent a potential fire hazard.

8. Install tamper-proof protective devices on all outlets within reach of small children.

9. Do not use your telephone and do not turn on switches or appliances if you suspect a gas leak. (See "Gas Leaks" under "Appliances".)

10. Keep all electrical devices away from water.

EXPANSION AND CONTRACTION

Maintenance:

Changes in temperature and humidity cause all building materials to expand and contract. Dissimilar materials expand or contract at different rates. This movement results in separation between materials, particularly dissimilar ones. You will see the effects in small cracks in drywall and in paint, especially where moldings meet drywall, at mitered corners, and where tile grout meets tub or sink. While this can alarm an uniformed homeowner, it is normal.

Shrinkage of the wood members of your home is inevitable and occurs in every new home. Although this is most noticeable during the first year, it may continue beyond that time. In most cases, caulk and paint are all that you need to conceal this minor evidence of a natural phenomenon. Even though properly installed, caulking shrinks and cracks. Maintenance of caulking is your responsibility.

Warranty Guidelines:

Belle Hall Direct 101, LP provides one-time repairs to many of the effects of expansion and contraction. See individual categories for details.

FAUCETS

Maintenance: In order to protect the finish, you should follow these procedures:

1. Wipe as needed with a soft damp cloth:

2. Use only warm water to remove dry water spots.

3. Use a glass cleaner with a soft cloth if necessary.

4. Do not use metal or chrome cleaners, alcohol, or organic solvents.

5. Apply a high quality car polish occasionally to make routine care easier.

The faucets in your home will sometimes require maintenance or repair. The less strain you put on faucets, the less frequently they will need repair.

Aerators: Cleaning the aerators in kitchen and bathroom faucets will be your most frequent task in maintaining faucets. An aerator adds air to the water as it leaves the faucet and eliminates splashing. It also reduces water usage, thereby saving you money.

To clean an aerator, unscrew it from the mouth of the faucet, remove any deposits, remove and rinse the washers and screens, replace them in their original order, and put the aerator back on the faucet. The frequency of cleaning will depend on the condition of the water, but generally every three months is adequate.

Leaks: Leaking faucets generally can be fixed by replacing the washers or cartridges, depending on the type of faucet.

Washer Type Faucets: Take care to shut off washer type faucets with just enough pressure to discontinue the flow of water. If closed too forcefully, the washers may be cut or otherwise damaged. However, even under normal operations, washers will eventually become worn.

Cartridge Type Faucets: Some faucets with single controls for hot and cold water have no washers, but their cartridges, which last longer than washers, must be changed periodically. Washer and cartridges are available from your local hardware, plumbing or home center.

CAUTION: Before attempting to repair a faucet, turn off the water at the nearest shut-off valve to prevent leaks and personal injury.

FLOORS

The structural lumber in your condominium has been selected in sizes and grades to provide a safety factor well beyond what is required to carry the load of normal household items. Some shrinkage may occur in these framing members, but your home has been designed so that any settling will be as even as possible.

Heavy items such as water beds or fish tanks, etc. must be approved by the Condominium Association Board before installing such items into your home.

HARDWARE

Maintenance:

It is your responsibility to check doorknobs and locks routinely to make sure that they are functioning properly. Over time, they may need slight adjustments due to normal shrinkage of the framing. Occasionally, you may need to tighten screws.

Warranty Guidelines:

We confirm that all hardware is in acceptable condition during orientation. The limited warranty excludes repairs for cosmetic damage subsequent to the orientation. We will repair hardware items that do not function as intended.

HARDWOOD FLOORING

As with other building materials, wood may contract or expand with weather changes. It may shrink under extreme dryness or swell under extreme humidity. Although it is impossible to completely alleviate this problem, keeping your home at an even temperature is a good precautionary measure.

Maintenance: Normal maintenance should include regular vacuuming or dry mopping to remove surface dust and dirt. If your floors have a polyurethane finish you should vacuum them regularly and wipe them occasionally with a damp (not wet) mop or cloth. Do not use water on hardwood floors finished with anything other than polyurethane.

Water sometimes causes the grain to rise, and prolonged use may cause cracks from the expansion and shrinkage of the wood.

Hardwood floors with other finishes will probably need to be waxed periodically. The frequency of cleaning and waxing is dependant on the amount of traffic they receive.

NOTE: Protect the finish on the floors by attaching furniture rests to the bottom of furniture legs; they also help to distribute weight.

Warranty Guidelines:

During the orientation we will confirm that hardwood floors are in acceptable condition. We will correct any readily noticeable cosmetic defects listed during the orientation. You are responsible for routine maintenance of hardwood floors.

Separations: Shrinkage will result in separations between the members of hardwood floors. If these exceed 1/8 inch, we will repair one time only.

INSULATION

Insulation has been installed in your home to increase its energy efficiency, meeting or exceeding the building codes applicable at the time of construction. Note that electrical outlets normally emit noticeable amounts of cold air when outside temperatures are low.

MILDEW

Although today's homes are carefully climate controlled, mildew can appear in bathrooms and other areas that collect water vapor. An exhaust fan should always be used during baths, showers and cooking to help remove water vapor. Mold and/or mildew can grow in any portion of the condominium that is exposed to elevated levels of moisture.

Maintenance:

The condominium association and each owner should: (i) regularly inspect the parts of the condominium that they respectively maintain, and which are visible and accessible without having to first conduct invasive testing, for the existence of mold, mildew, and/or water intrusion (except when the water intrusion is part of the normal functioning of improvements and appliances such as showers, sinks, dishwashers, and other similar appliances and improvements) and/or damage; (ii) upon discovery, immediately repair in a good and workmanlike condition the source of any water intrusion in the parts of the condominium that they respectively maintain; (iii) remediate or replace any building material located in the parts of the condominium that they respectively maintain that has absorbed water or moisture as a result of water intrusion; and (iv) promptly and regularly remediate all mold and/or mildew discovered in the parts of the condominium that they respectively maintain in accordance with current industry-accepted methods. In addition, the condominium association shall notify the owners, and each owner shall

notify the condominium association of the discovery of mold, mildew, and/or water intrusion and/or damage in the parts of the condominium that they respectively maintain. Owners shall not block or cover any of the heating, ventilation or air-conditioning ducts located in the unit.

To eliminate mildew, clean with a mildew remover, rinse, and dry; then use a disinfectant to retard mildew growth and eliminate odor.

Warranty Guidelines:

We will remove any mildew noted during the orientation. The limited warranty excludes mildew after that time. Belle Hall Direct 101, LP. shall have no obligation to perform any invasive testing or inspections, maintenance or repairs and shall not be held liable for any loss or damage caused by the failure of the condominium association or an owner to perform their obligations.

MIRRORS

Maintenance:

Mirrors are easily cleaned with Windex glass cleaner and a soft cloth. In order to prevent damage to the reflective silver coating on the back of the mirror, spray the cleaner on a cloth (not directly on the mirror) to avoid wetting the edges, particularly at the bottom of the mirror. If excessive cleaner comes in contact with the reflective silver coating, it will begin to turn black over time.

Warranty Guidelines:

We will confirm that all mirrors are in acceptable condition during the orientation. We will correct scratches, chips or other damage to mirrors noted during the orientation.

PAINT

Maintenance:

Painted surfaces can be cleaned with a mild detergent and gentle scrubbing. Over wetting or hard scrubbing will remove the paint. Do not use Formula 409, Fantastik or any heavy-duty or abrasive cleaners.

Ceiling and Walls: The interior walls and ceilings of your new home are painted with flat latex paint.

Trim and Molding: The interior millwork in your home may include window and door trim, and crown molding. Each of these items is painted with semi-gloss latex paint.

Warranty Guidelines:

During your orientation we will confirm that all painted surfaces are in acceptable condition. Belle Hall Direct 101, LP. will touch up paint as indicated on the orientation list. You are responsible for all subsequent touch-up, except painting we perform as part of another warranty repairs.

Paint touch-up is visible under certain lighting conditions.

PLUMBING

Maintenance:

We want to draw your attention to a water-saving regulation that went into effect in 1993, which prohibits the manufacturer of toilets to use more than 1.6 gallons of water per flush. In the search for a balance among comfort, convenience, and sensible use of natural resources, the government conducted several studies. The 1.6 gallon toilet turned out to be the size that overall consistently saves water.

As a result of implementing this standard, flushing twice is occasionally necessary to completely empty the toilet bowl. Even though you flush twice on occasion, rest assured that overall you are saving water and we have complied with the law. Similarly, flow restrictors are manufactured into most faucets and all shower heads and can not be removed. We apologize for any inconvenience this may cause.

Aerators: Even though your plumbing lines have been flushed to remove dirt and foreign matter, small amounts of minerals may enter the line. Aerators on the faucets strain much of this from your water. Minerals caught in these aerators may cause the faucets to drip because washers wear more rapidly when they come in contact with foreign matter.

Follow manufacturer's directions for cleaning fixtures. Avoid abrasive cleansers. They remove the shiny finish and leave behind a porous surface that is difficult to keep clean. Clean plumbing fixtures with a soft sponge and soapy water (a nonabrasive cleaner or liquid detergent is usually recommended). Then polish the fixtures with a dry cloth to prevent water spots.

Clogs: the main causes of toilet clogs are domestic items such as disposable diapers, excessive amount of toilet paper, sanitary supplies, Q-tips, dental floss, and children's toys. Improper garbage disposal use also causes many plumbing clogs. Always use plenty of cold water when running the disposal. This recommendation also applies to grease; supplied with a steady flow of cold water, the grease congeals and is cut up by the blades. If you use hot water, the grease remains a liquid, then cools and solidifies in the sewer line. Allow the water to run 10-15 seconds after shutting off the disposal.

You can usually clear clogged traps with a plunger. If you use chemical agents, follow directions carefully to avoid personal injury or damage to the fixtures.

Clean a plunger drain stopper usually found in bathroom sinks by loosening the nut under the sink at the back, pulling out the rod attached to the plunger, and lifting the stopper. Clean and return the mechanism to its original position.

Dripping Faucet: You can repair a dripping faucet by shutting off the water at the valve directly under the sink, then removing the faucet stem, changing the washer, and reinstalling the faucet stem. The shower head is repaired the same way. Replace the washer with another of the same type and size. You can minimize the frequency of this repair by remembering not to turn faucets off with excessive force. (Please note that some manufacturers do not use rubber washers.)

Freezing Pipes: Provided the home is heated at a normal level, pipes should not freeze at temperatures above 0 degrees F. Set the heat at 65 degrees F if you are away during winter months. Use an ordinary hair dryer to thaw pipes that are frozen. Never use and open flame.

Leaks: If a major plumbing leak occurs, the first step is to turn off the supply of water to the area involved. Most plumbing fixtures will have shut off valves at or near the fixture. This may mean shutting off the water to the entire home. Then contact the appropriate contractor and the warranty department.

Low pressure: Occasional cleaning of the aerators on your faucets (normally every three to four months) will allow proper flow of water. The water department controls the overall water pressure.

Manufactured Marble: Manufactured marble will not chip as readily as porcelain enamel but can be damaged by a sharp blow. Avoid abrasive cleansers or razor blades on manufactured marble; both damage the surface. Always mix hot and cold water at manufactured marble sinks; running only hot water can damage the sink.

Porcelain: You can damage porcelain enamel with a sharp blow from a heavy object or by scratching. Do not stand in the bathtub wearing shoes unless you have placed a protective layer of newspaper over the bottom of the tub. If you splatter paint onto the porcelain enamel surfaces during redecorating, wipe it up immediately. If a spot dries before you notice it, use a recommended solvent.

Running Toilet: To stop running water, check the shut-off float in the tank. You will most likely find it has lifted too high in the tank, preventing the valve from shutting off completely. In this case, gently bend the float rod down until it stops the water at the correct level. The float should be free and not rub the side of the tank or any other parts. Also check the chain on the flush handle. If it is too tight, it will prevent the rubber stopper at the bottom of the tank from sealing, resulting in running water.

Shut-Offs: Your main water shut-off is located near your meter. You use this shut-off for major water emergencies such as a water line break. Each toilet has a shut-off on the water line under the tank. Hot and cold shut-offs for each sink are on the water lines under the sink.

Stainless Steel: Clean stainless steel sinks with soap and water to preserve their luster. Avoid abrasive cleaners; these will damage the finish. An occasional cleaning with a good stainless steel cleaner will enhance the finish. Avoid leaving produce on a stainless steel surface, since prolonged contact with produce can stain the finish.

Warranty Guidelines:

During the orientation we will confirm that all plumbing fixtures are in acceptable condition and that all faucets and drains operate freely. We will correct clogged drains that occur during the first 30 days after closing. If a household item is removed from a clogged drain during this time, we will bill you for the drain service. After the first 30 days, you are responsible for correcting clogged drains.

Cosmetic damage: Belle Hall Direct 101, LP will correct any fixture damage noted on the orientation list. Repairing chips, scratches, or other surface damage noted subsequent to the orientation list is your responsibility.

Freezing pipes: Provided that your home is heated at a normal level, pipes should not freeze. Set heat at 65 degrees F if you are away during winter months.

Leaks: We will repair leaks in the plumbing system. If a plumbing leak caused by a warranted item results in drywall or floor covering damage, we will repair or replace items that were part of the home as originally purchased. We do not make adjustments for secondary damages (for example, damage to wallpaper, drapes, and personal belongings). Insurance should cover these items.

Noise: Changes in temperature or the flow of the water itself will cause some noise in the pipes. This is normal and requires no repair. Belle Hall Direct 101, LP. will repair persistent water hammer.

Temperature: Expect temperature to vary if water is used in more than one location in the home.

Supply: Construction conditions that disrupt the supply of water to your home will be repaired.

ROUGH CARPENTRY

Warranty Guidelines: Some floor and stair squeaks are unavoidable. Although, Belle Hall Direct 101, LP does not warrant against floor squeaks, a reasonable effort will be made to correct them.

Floor Deflection: Floors will deflect (bend) when walked on. This will be more noticeable next to hutches, book cases, pianos, chairs, and other heavy furniture. This is not a structural deficiency and no action will be taken for this occurrence.

Floor Level: Floors will be level to within1/2 inch within any 32-inch distance as measured perpendicular to any ridge or indentation.

Plumb Walls: Walls that are out of plumb more than ¾ inch in an 8-foot distance or walls that are bowed more than ½ inch in any 32-inch measurement.

SCREENS, WINDOW

Maintenance: In order to prevent stretching of screens, do not clean them while they are still attached to the window frames. Remove the screen and lay it on a sheet of plastic on a flat, rigid surface. Scrub the screen with a soft brush in an all-purpose cleaner solution; stand up and rinse.

Warranty Guidelines: Screens are easily damaged and unless noted at your Pre-Settlement Orientation Walk, the Builder will not be responsible for the repair or replacement.

SMOKE DETECTORS

Maintenance Guidelines: Read the manufacturer's manual for detailed information on the care of your smoke detector.

Warranty Guidelines: Belle Hall Direct 101, LP does not represent that the smoke detector will provide the protection for which they are installed or intended. We will test smoke detectors during the orientation to confirm that they are working and to familiarize you with the alarm. You are responsible for obtaining fire insurance.

STAINLESS STEEL

Maintenance: Stainless steel fixtures generally resist staining and require a thorough scrubbing only occasionally. Use a non-abrasive cleanser or commercial stainless steel cleanser.

CAUTION: Do not use chlorine bleach on stainless steel.

TELEPHONE

Your home is pre-wired for telephone outlets. Arranging for service is the responsibility of the homeowner. Simply plug telephones in the nearest interior jack after you have arranged for service. If you are using your own telephone and the connectors do not fit, adapters are available from your local hardware or home center.

WARNING: Do not use telephones in the event of electrical storms or gas leaks in your home.

TRIM

Maintenance: Shrinkage of wood trim occurs during the first two years or longer, depending on temperature and humidity. All lumber is more vulnerable to shrinkage during the heating season. Maintaining a moderate and stable temperature helps to minimize the effects of shrinkage. Wood will shrink less lengthwise than across the grain. Wood shrinkage can result in separation at joints of trim pieces. You can usually correct this with caulking and touch-up painting.

Shrinkage may also cause a piece of trim to pull away from the wall. If this occurs, drive in another nail close to, but not exactly in, the existing nail hole. Fill the old nail hole with putty and touch up with paint as needed. If the base shoe (small trim between base molding and the floor) appears to be lifting from the floor, this is probably due to slight shrinkage of the floor joists below. Again, you can correct this condition by removing the old nails and renailing. You may prefer to wait until after the first heating season to make any needed repairs at one time when redecorating.

See also "Expansion and Contraction".

Warranty Guidelines: During the orientation we will confirm that wood trim is acceptable condition. Minor imperfections in wood materials will be visible and will require no action. Belle Hall Direct 101, LP will correct readily noticeable construction damage such as chips and gouges listed during the orientation.

WATER HEATER

Maintenance:

Temperature Settings: The electric water heater installed in your home has a control mechanism to set water temperature. For efficient operation and to prevent scalding, the dial should be set at 120 degrees or lower. However, your household's individual preferences should determine the hot water temperature. The lower temperature setting, the less energy you will use, which could produce considerable savings on your utility bills. Additional savings may result from putting an insulation jacket on the water heater. (See also "Warning" at the end of this section.)

Temperature and Pressure Relief Valve: For your protection, your water heater comes with a temperature and pressure relief valve, which prevents dangerous levels of water temperature and build-up of pressure due to the failure of the thermostat or for any other reason. When the valve is operating, it may appear that the tank is leaking while it is merely releasing excess pressure. If this happens, simply check your hot water temperature setting and adjust if necessary.

Water Heater Supply Shut-Off Valve:

In case of emergency, the water heater has a shut-off valve located at the supply line to the heater, which will shut off the hot water supply to your entire home:

1. Turn valve horizontal (or perpendicular to the pipe) to turn off water supply to water heater.
2. To restore water supply to heater, turn valve vertical to the pipe.

Water Meter and Remote Read Out:

Your home has its own individual water meter that will be billed to you directly. Neither the builder nor the manufacturer can be responsible for increased utility costs resulting from a malfunction of the water heater. If the malfunction is covered by the manufacturer's warranty, the manufacturer, through the installing subcontractor, will make the required repair(s) in accordance with the terms and provisions of the manufacturer's warranty. It is the homeowner's responsibility to arrange for utilities the day of closing.

A shut off valve has been located adjacent to your water meter for emergency shut off of your water supply. (See "Water Shut-Off Valves").

WINDOWS AND PATIO DOORS

Maintenance: Vinyl windows have been installed in your home. The following guidelines include some of the important maintenance items which are the responsibility of the homeowner.

Vinyl windows do not need to be painted. All window frames and wood sills can be cleaned with a mild detergent solution.

Windows should be lubricated seasonally as exposure to sunlight will cause sticking. If a window does not slide easily, rubbing the channel with a piece of paraffin should help; an old candle or silicone spray will also help.

Replacement: All glass replacement must be approved and coordinated through the HOA.

Door locks: Acquaint yourself with the operation of patio door hardware for maximum security.

Door tracks: Keep patio door tracks clean for smooth operation and to prevent damage to the door frame. Silicone lubricants work well for these tracks.

Sticking windows: Most sliding windows are designed for a 10-pound pull. If sticking occurs or excessive pressure is required to open or close a window, apply a silicone lubricant. This is available at hardware stores.

Weep holes: In heavy rains, water may collect in the bottom channel of window frames. Weep holes are provided to allow excess water to escape to the outside. Keep the bottom window channels and weep holes free of dirt and debris for proper operation.

Warranty Guidelines: We will confirm that all windows and screens are in acceptable condition during the orientation. We will repair or replace broken windows or damaged screens noted on the orientation list.

Windows should operate with reasonable ease and locks should perform as designed.

Scratches: Belle Hall Direct 101, LP confirms that all window glass is in acceptable condition at the orientation. Minor scratches on windows can result from delivery, handling, and other construction activities. We will replace readily visible from a distance of 4 feet if reported on the orientation list.

SECTION 6: FINAL HOMEOWNER TIPS

You will need a few basic tools and supplies for everyday use in keeping your home in top shape. A list of suggested items follows:

- Medium-sized adjustable wrench
- Standard hand pliers
- Needle-nose pliers with wire cutter
- Screwdrivers, small, medium, and large with standard and Phillips heads
- Electric screwdriver
- Claw hammer
- Rubber mallet
- Handsaw
- Assorted nails, brads, screws, nuts, bolts, and washers
- Level
- Caulking gun
- Putty knife

Other tools can be rented or purchased as needed.

Fire Extinguisher – Every homeowner should buy at least one fire extinguisher. Each member of the family should be familiar with its location and operation. Have it checked annually to be sure it functions properly and is fully charged. Be sure you and your family know how to turn off the electricity, gas and water in event of an emergency. Some types of fire extinguishers should not be used for electrical fires.

First Aid Kit – Keep a home first aid kit or first aid materials in a convenient location. Buy and keep with it a booklet on first aid and home safety.

Duplicate Keys – Have duplicate keys made and keep them in convenient places. When you take a vacation, leave a key with a trusted neighbor. If you forget to attend to something before you leave or if an emergency arises, your neighbor may be able to take care of it.

SECTION 7: ROUTINE MAINTENANCE AND PREVENTION CHECKLIST

Below is a list of items that should be periodically inspected to keep your home in top shape.

- ✓ Check interior paint and redecorate when necessary.
- ✓ Have your heating and air conditioning system cleaned and repaired if necessary (when not in use). Replace the air filter at least once a month. Adjust registers and confirm that returns are clear of furniture or draperies.
- ✓ Check cords and plugs of all electrical appliances for wear. If necessary, have them repaired or replaced.
- ✓ Test your smoke detector for proper operation. Be sure to clean the unit (with a vacuum or swab), clean filter (if any), and replace batteries and light bulbs when necessary.
- ✓ Inspect all doors and windows for proper operation and a tight fit. Wash windows and screens; lubricate tracks. Clean and adjust the door thresholds, and check the weather-stripping on windows and doors. Preventing unwanted outside air from leaking into your home will reduce your energy bills.
- ✓ Make a careful safety inspection of your home, inside and out, to seek out problem areas before someone is injured.
  - Make periodic checks of storage areas, backs of closets, etc., to be sure no oily rags, unvented gas cans, painting supplies, or flammable cleaning materials have been forgotten. These items could be a fire hazard and should be discarded. Many local fire departments will provide free home safety inspections.
  - Check stairs, steps, and ladders for broken or hazardous areas that could cause an accident. Report any loose or unsteady handrails and railings to your HOA.
  - Check all connections to your electrical system to correct any possible hazards. Replace frayed electrical cords and do not overload extension cords
  - Follow all instructions for safe operation of any fireplace.
  - Decorate safely for the holidays.
- ✓ Check window seals for water penetration. Check under all bathroom sinks for water dripping from waist lines. Check the hot and cold stops for leaks.

- ✓ Check under kitchen sink for water leaks on all connections.
- ✓ Look behind refrigerator for water from ice maker line.
- ✓ Check all water connections and drain lines in utility closet.
- ✓ Check water lines hooked to the washing machine. Make sure the dryer line is tight and that no moisture is present.

South Carolina Residential Construction Standards

The Residential Builders Commission of the South Carolina Department of Labor, Licensing and Regulation adopted the Residential Standards as the Guidelines by which all investigations shall be conducted, as approved July 26, 1995 and revised October 29, 1997.

Adopted by the Commission on February 18, 1998.

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APPLICABLE TIME LIMITS

The Commission, under normal conditions, will inspect for code violations during the time limits shown below. Contractor responsibility does not extend to items, which have been subject to owner neglect, modification, or abnormal use.

Defects in appliances, fixtures and heating/air conditioning equipment, properly installed by the contractor, shall be limited to the manufacturer's warranty.

Nothing in this section creates a warranty or limits a warranty.

The following classifications shall be open to inspection for code violations for the first twenty-four months:

1. Grading, fill and other site work
2. Masonry and concrete*
3. Carpentry and wood products*
4. Insulation
5. Moisture
6. Doors and windows
7. Finishes: paint, stain, wallpaper, carpet, tiles, flooring, etc.
8. Cabinets and countertops
9. Drywall and plaster
10. Roofing*
11. Siding
12. Windows and skylights
13. Caulking and weatherstripping
14. Hardware

The following classifications shall be open to inspection for code violations for the first sixty months:

1. Heating and air conditioning
2. Plumbing
3. Electrical

Major structural damage, including structural damage to systems noted above by an asterisk*, and building which are unsafe, unsanitary, do not provide adequate egress, constitute a fire hazard, or are otherwise dangerous to human life shall be inspected for code violations during the first ten years only.

INTRODUCTION TO STANDARDS

STRUCTURAL, MECHANICAL-PLUMBING, AND ELECTRICAL STANDARDS

Building codes change from time to time. Applicable codes shall be the current codes at the time of construction or, in the case of locally adopted codes, the adopted codes at the time of construction.

I. The structural, mechanical-plumbing, and electrical standards shall be those contained in the Building Code, Mechanical-Plumbing Code and Electrical Code regulating that respective construction in the area. Inspection by qualified inspectors of the governmental jurisdiction will provide evidence of compliance.

II. In the case where no Codes exist the following will apply:

(A) A combination of the following Model Codes to cover building, mechanical, plumbing, and electrical.

BUILDING CODES

CABO One and Two Family Dwellings Code

Southern Standard Building Code

MECHANICAL CODES

The Standard Mechanical Code and the Standard Gas Code of the Southern Building Code Congress International

ELECTRICAL CODES

The National Electrical Code

(Other appropriate Southern, National, State or Federal Standard Codes, where applicable.)

CONSTRUCTION STANDARDS

The Construction Standards are intended to specify the minimum performance standards for construction of homes and to set forth the basis for determining the validity of all home buyer complaints related to defective materials and workmanship during the initial one-year warranty period.

Only the most frequent defects of concern to the industry have been addressed in the Construction Standards set forth in the following pages. It is not possible to discuss every conceivable situation that can occur in building. Because of the limitless combinations that can be incorporated into a home, infinite conditions can occur. This manual describes the most common and repetitive situations. Likewise, the validity of any homeowner's complaint for defects for which a standard has not yet been addressed herein shall be determined on the basis of good industry practice, which assures quality of materials and workmanship, and any conciliation or arbitration of such complaints shall be conducted accordingly.

The following Construction Standards are expressed in terms of performance standards. Noncompliance with the performance standard calls for corrective action by the Builder. The format is designed for easy comprehension by both layman and builder as follows:

1. Common Defect or Problem – a brief statement in simple terms of the problems to be considered.

2. Performance Standard – Performance Standards relating to a specific deficiency.

3. Builder Repair Responsibility – statement of the corrective action required of the builder to repair the deficiency or any other damage resulting from making the required repair. The method of correction to meet the industry standard is at the builder's discretion. Alternatives for making acceptable repairs exist in most cases.

There are many items that are homeowner maintenance responsibilities. To assure themselves of long, comfortable use of their home and protection of their investment, homeowners should learn about and act on those maintenance responsibilities.

CARPENTRY STANDARDS - ROUGH

(Rough Carpentry, Lumber & Truss)

Framing or rough carpentry provides the skeletal structure which includes fabrication of wood portions of the floor systems, exterior walls, interior partitions and roof which are built on and supported by the foundation.

The exterior wall framing is designed to support the vertical load from the floors and roof and to resist lateral loads resulting from winds. Interior partitions may or may not be load bearing. The roof is designed to support its own weight plus that of anticipated loads from snow, ice and wind. The framing is quality controlled by the building code and subject to building inspection when the entire framed structure can be viewed.

Wood framing can be fabricated on or off a job site, or a combination of both. Even when most of the framing is done on site, there has been a trend to use premanufactured components, such as roof or floor trusses, in lieu of the more conventional joist and rafter construction. As a natural product, wood will respond to humidity and temperature conditions and can cause shrinking, twisting or warping of the framing material. Some of these conditions can be controlled or minimized; others are due to the nature of wood itself.

In single family construction, lumber type and grade, span, spacing and load bearing capacities are tightly controlled by code, while the carpentry foreman uses his own judgment in determining the exact layout. Hence, the accumulation of tolerances of several inches in overall dimension is not unusual.

1. Common Defect or Problem

   Floors squeak.

   Performance Standard

   Floor squeaks are common to new construction and a squeak-proof floor cannot be guaranteed.

   Builder Repair Responsibility

   Builder should try to minimize the floor squeaks and must correct if caused by a construction defect. It should be noted that a second floor repair would be surface nailing in carpeted areas and impossible in vinyl or ceramic areas.

2. Common Defect or Problem

   Uneven or unlevel floors

   Performance Standard

   Floors shall not be more than ¼" out of plane or level in wood, vinyl and ceramic areas or ½" out of plane in carpeted areas within any 32" measurement when measured parallel to the joists.

Builder Repair Responsibility

Builder to repair to meet performance standard

3. Common Defect or Problem

Crowned floor joist.

Performance Standard

Floors shall not be more than ¼" out of plane or level in wood, vinyl and ceramic areas or ½" out of plane in carpeted areas within any 32" measurement when measured parallel to the joists.

Builder Repair Responsibility

Builder to repair to meet performance standard

4. Common Defect or Problem

Seams or ridges appear in the resilient flooring due to subfloor irregularities.

Performance Standard

In the natural settling and shrinkage process, some mismatch of the subfloor may exhibit and mirror itself as ridges or depressions showing on the surface goods. This can be minimized by the customer in his selection of an embossed pattern in a darker color. In particular, lighter solid colors and/or smooth vinyl surfaces mirror any minor variations of the subsurfaces to which they are applied and emphasize this ridging. If the ridge or depression effect exceeds 1/8" and cannot be corrected from below, the resilient floor must be corrected. The ridge measurements should be made by measuring the gap created when a 6" straight edge is placed tightly 3"on each side of the defect and the gap measured between the floor and the straight edge at the other end.

Builder Repair Responsibility

If ridges exceeds standard, builder to remove the sheet goods in the minimum area where the joint will not be readily visible when repaired, renail the subflooring, sand smooth and/or fill gap and replace the sheet goods. Owner should note that there may be a mismatch in materials due to time or dye lot variations. If the material is unavailable due to discontinuation, unless the owner will accept a repair with as closely matching materials as is currently available or correction by some other means, builder should credit the owner 1 ½" times the cost to repair if the material were available. This would be 1½ times the minimum service charge, plus the additional hourly labor charge and the material cost needed to make the repair.

5. Common Defect or Problem

Bowed walls.

Performance Standard

All interior and exterior walls have slight variances on their finished surfaces. Walls should not bow more than ¼" out of line within any 32" horizontal or vertical measurement.

Builder Repair Responsibility

Builder will repair to meet performance standard.

6. Common Defect or Problem

Out of plumb walls

Performance Standard

Walls should not be more than ¼" out of plumb for any 32" vertical measurement.

Builder Repair Responsibility

Builder will repair to meet performance standard.

7. Common Defect or Problem

Out of plumb windows or windows do not operate.

Performance Standard

Windows must operate with reasonable ease as designed.

Builder Repair Responsibility

Builder to repair to be operable

8. Common Defect or Problem

Truss lift

Performance Standard

Truss lift occurs during the heating season and normally returns back down in the summer months. Builder is not responsible for inadvertent cutting of tape where wallpapering may have been done.

Builder Repair Responsibility

This is to be corrected only during the summer months after the first heating season, only if first reported during year one. If the problem reoccurs in the next heating season, and gap exceeds 1", then additional methods must be taken to correct the problem.

9. Common Defect or Problem

Cracked trusses

Performance Standard

Builder to contact truss manufacturer to make sure truss conforms to its engineering.

Builder Repair Responsibility

Repair as per recommendation of truss manufacturer

10. Common Defect or Problem

Bowed ceilings

Performance Standard

All interior and exterior frame walls or ceilings have slight variations on the finished surfaces. Bowing should not be visible so as to detract from the finished surface. Ceilings, which are bowed more than ½ inch within a 36-inch measurement running parallel with ceiling joist, shall be excessive.

Builder Repair Responsibility

Ceiling bowed in excess of the performance standard shall be corrected.

CARPENTRY STANDARDS - FINISH

(Finished Carpentry, Plumbing, Cabinetry, Millwork and Countertops)

Wood and wood-like products are the basic materials used in finished carpentry. Wood is a natural product with individual grain variations in each species of wood. The matching of grain is not a standard procedure and may possibly be accomplished only as a specific contractual agreement between the owner and builder and with the careful selection of matching panels by the supplier. The variations in wood separate it from man-made products. One of the wonderful characteristics of wood is the difference in each piece.

Over the past several years, a marked change has taken place in the area of finished carpentry, paneling and millwork. Considerably less of the labor is being done on the site. Almost all millwork, paneling, cabinetry, countertops and doors are purchased by the builder as a completed product and are warranted by the builder according to manufacturer's standards.

Scratches, chips, gouges or nicks should be noted by the owner at the time of the preoccupancy inspection. To maintain the beauty of the wood and wood products, wood should be cared for by the owner much like furniture. Builder should caution owner to only use products recommended by the manufacturers when cleaning and maintaining wood products and also in caring for countertops.

During the initial building stabilization period (first heating and cooling seasons), it is not unusual for doors to warp slightly or twist and alternately stick or not close. Warping, shrinking and swelling of wood and wood-like products can occur due to temperature and humidity changes.

If painting, varnishing and/or staining are to be done by the owner, it should be finished at the earliest possible opportunity. Their primary purpose is preservation, protecting the surfaces and edges from weather and moisture penetration. Owner should be made aware that all surfaces must be sealed on all six sides. If a door or drawer fails and if it was not sealed on all six sides and the owner did or contracted for his own staining, then the builder is not responsible to make the repair. Filling and sanding of minor imperfections, nail holes and splits are the responsibility of the painter. If the builder is responsible for the painting and/or staining, samples or names of the paint products should be left with the owner for minor touch-ups.

1. Common Defect or Problem

   Interior doors, closet doors, cabinet doors, or drawers warp and cannot be closed or will not stay closed.

Performance Standard

a. The owner should note that during the initial building stabilization period, it is not unusual for doors to warp or twist and alternately stick or not close as the home goes through a settling and drying period, especially over the first heating season. The builder is obligated only to make replacements after this initial stabilization period, since often the door straightens during this process. Doors MUST be sealed on all six sides by the person contractually responsible for painting/staining.

b. All interiors doors, closet doors, cabinet doors or drawers whose warpage exceeds the National Woodwork Manufacturers Association Standards (1/4" in most cases) and where the warp cannot be corrected by adjustment of either jambs, stops, and/or hinges and cabinet catches to properly latch after the initial stabilization period of the building, at the end of the first year, shall be replaced by the builder. Doors MUST be sealed on all six sides by the person contractually responsible for painting/staining.

Builder Repair Responsibility

Adjust, upon request of the owner, one time only, preferably at the end of the warranty period, any doors and drawers that fail to operate properly. Replace any doors or drawers, which cannot be corrected to be within acceptable tolerance after stabilization. Refinish as necessary if staining was part of the builder's contract.

2. Common Defect or Problem

Garage to house solid core door warps

Performance Standard

Garage to house doors are more subject to weather conditions and thus these doors may warp, but will tend to come back to their original state. This can be a continual occurrence with seasonal changes.

Builder Repair Responsibility

If the door does not come back in summer to seal, builder to replace (provided door was sealed on all six sides if staining was owner's obligation). Refinish as necessary if staining was part of the builder's contract.

3. Common Defect or Problem

Warpage or non-closing of exterior doors (except storm doors)

Performance Standard

Because of the security provided by these doors, the doors must be adjusted or corrected as required.

Builder Repair Responsibility

During the first year, if the security of the building is jeopardized, correct as requested by the owner to maintain the security of the building. Replace any exterior doors whose permanent warpage exceeds the standards referred to in item #1 after the stabilization period. Refinish as necessary if painting and staining was part of the builder's contract. If painting is part of owner's contract they are cautioned to finish doors on all six surfaces at the earliest possible opportunity to prevent weather deterioration and warpage of the doors and to maintain a warranty on the door.

4. Common Defect or Problem

Cabinet doors do not align properly or there is a gap between door and cabinet frame.

Performance Standard

Space between doors where doors butt should not exceed 1/8". Top or bottom alignment should not exceed 1/16". Separation between the door and the frame should not exceed ¼".

Builder Repair Responsibility

Builder to repair if any of the above conditions exceed acceptable tolerance.

5. Common Defect or Problem

Loosening or separation of veneer on doors and cabinet doors

Performance Standard

Veneer should not crack or separate during the first year's warranty provided the doors have been properly finished. If painting is to be done by the owner, they are cautioned to finish all six surfaces of the veneer doors at the earliest possible opportunity to prevent weathering deterioration of the door which can lead to delamination or warpage.

Builder Repair Responsibility

Builder should repair or replace any doors where the veneer has separated or delaminated during the first year of occupancy. Door replacement due to delamination is the owner's responsibility if the owner has not promptly followed through on his responsibility to finish the door or has not finished all six sides of the doors. Builder to refinish only if painting or staining was part of the builder's contract.

6. Common Defect or Problem

Shrinkage or swelling of paneled doors, panels in cabinet doors and/or paneling.

Performance Standard

Panels will, due to the nature of wood products, shrink and expand and may expose unpainted or unstained surfaces.

Builder Repair Responsibility

None.

7. Common Defect or Problem

Panels or door graining and/or color do not match.

Performance Standard

Since wood is a natural product and the grain structure is unique for each piece of wood, the builder is only responsible for supplying the grades and types of lumber and millwork and paneling specified in the contract. Grain and color matching is not the industry standard.

Builder Repair Responsibility

None, unless matched lumber was specifically stated in the contract.

8. Common Defect or Problem

Scratches on glass in doors.

Performance Standard

Scratching is inherent in the added safety features that are mandated in glass doors.

Builder Repair Responsibility

None.

9. Common Defect or Problem

Millwork trim graining or color does not match.

Performance Standard

See #7

Builder Repair Responsibility

See#7

10. Common Defect or Problem

Gaps in miter joints.

Performance Standard

Gaps in miter joints should not exceed 1/16/".

Builder Repair Responsibility

Builder should repair any gaps exceeding 1/16". If the owner is responsible for the staining portion of the contract, the owner is responsible for restaining. If staining was part of the builder's contract, builder must restain, if necessary.

11. Common Defect or Problem

Gouges, cracks, nicks or other material or workmanship imperfections.

Performance Standard

Nail pops, blisters and other such blemishes at the time the owner closes or takes occupancy of the home that are readily visible from a distance of six (6'') under normal lighting conditions are unacceptable.

Builder Repair Responsibility

Builder to replace millwork components with the above listed defects where the defect cannot be easily corrected through the use of sanding or filling, so long as these items were noted prior to occupancy. It should be noted that if the owner is responsible for the painting portion of the contract, the finishing work becomes the owner's responsibility.

12. Common Defect or Problem

Splices of millwork material within the length of a wall.

Performance Standard

Splicing is permissible.

Builder Repair Responsibility

None.

13. Common Defect or Problem

Cabinets separate from wall or loosen.

Performance Standard

Provided the cabinet installation is secure, some shrinkage may occur which may appear to indicate a gap between the cabinets and their mounting surface. This is normal and requires no correction. However, if the cabinet is actually loose, the builder shall correct.

Builder Repair Responsibility

Correct any loose cabinetry from the mounting surface, except those due to shrinkage.

14. Common Defect or Problem

Countertops separate from wall.

Performance Standard

Acceptable tolerance is 1/8" in width.

Builder Repair Responsibility

Builder to caulk if gap is over 1/8".

15. Common Defect or Problem

Seams in laminate countertops raise.

Performance Standard

This will occur occasionally. Owner should keep seams sealed as water can penetrate.

Builder Repair Responsibility

None.

16. Common Defect or Problem

Exposed plastic laminate surfaces, laminate cabinetry and molded marble crack, chip, delaminate or are burned or scratched.

Performance Standard

There should be no imperfections in exposed plastic laminate surfaces at the time the owner takes occupancy of the home. Any defects must be noted by the owner in writing at the preoccupancy inspection and should be corrected by he builder. In some rare cases there may be some latent defects in laminates, which would require adjustments by manufacturer.

Builder Repair Responsibility

Correct defects noted at occupancy inspection. Defects occurring after that time are the owner's responsibility for correction since these surfaces are subject to owner's damage.

CAULKING & WEATHER-STRIPPING STANDARDS

Background

Weather stripping of doors and windows helps keep the home properly heated or cooled. Metal stripping should be free of dents and loose sections, and plastic or rubber, stripping should be glued tightly. The junction between windows, doors and exterior wall material (i.e. siding, brick) will need to be caulked to minimize air infiltration. Caulking will need to be maintained by the homeowner throughout the life of the home. It should be noted that some air infiltration is normal during high winds.

1. Common Defect or Problem

   Caulking cracks.

   Performance Standard

   All types of caulk will dry out. Builder to remove old caulk and replace with new caulk at cracked areas one time during the first year. After the one repair, caulking becomes an owner maintenance responsibility.

   Builder Repair Responsibility

   Builder to repair to performance standard one time during the first year.

2. Common Defect or Problem

   Caulking is missing.

   Performance Standard

   Builder is responsible to caulk all wood, wood to masonry, aluminum to wood and aluminum to masonry to local codes.

   Builder Repair Responsibility

   Repair to meet performance standard.

3. Common Defect or Problem

   Air infiltration around doors and windows.

Performance Standard

Doors and windows are cold spot sources and some infiltration of air must be expected. Proper weatherstripping and insulating around these areas can minimize air passage. However, depending on the type of window (i.e.double hung and sliding windows will have more air infiltration than casement or stationary windows) and under certain temperature and wind conditions, some infiltration will be observed by the homeowner.

Builder Repair Responsibility

Builder to inspect and adjust poorly fitted weatherstripping. If draft comes around casings, builder to make sure insulation is in place around window wherever possible.

DRYWALL AND PLASTER STANDARDS

Background

In reviewing drywall and plaster problems, which occur during the first year of warranty, it is necessary to include some explanatory material on the nature of the material and its perfomance during and after the initial stages of construction.

Drywall is a relatively inflexible gypsum material, which is applied to the interior surfaces. Drywall and plaster are applied in sheets, which are nailed to the stud or joists for application. The sheets are then taped and the entire surface is sprayed and textured to produce a finished surface. In plaster, the final coats are trowelled on.

Because the drywall or plaster has been placed on lumber surfaces which are subject to shrinkage and warpage and which are not perfectly level and plumb, problems occur through stress and strain placed on drywall during the drying of the lumber which is inherent in the construction of a home.

In evaluating the need for drywall and plaster repairs, the general rule to be applied is, if the defect is readily noticed by visual inspection, it should be repaired. However, due to the initial shrinkage problem, which exists with the new home, it is impossible to correct each individual defect as it occurs, and for that matter is essentially useless to do so. The entire house will tend to stabilize itself near the end of the warranty period, and one repair should made when necessary, preferably near the end of the 12th month after occupancy upon request by the homeowner. Repairs will be made no more than one time during the warranty period. All repairs should be made to within industry standards. Any reoccurrence beyond the warranty period becomes a homeowner's maintenance item.

Since drywall and plaster are finish materials, repairs will be slightly visible due to a color of texture mismatch after they have been made. The mismatch will be even more visible when a special textured finish has been employed. Repairs do not require repainting when they are applied on unpainted surfaces such as unpainted ceiling or when the builder did not contract for the painting. The builder will attempt to match the repair as closely as possible but the exact color match of the unpainted surface is impossible to achieve. Where the repair has been made on a painted surface, the builder will not be responsible for paint touch-up, provided color samples are left by the painter at the home, otherwise the builder shall be responsible to touch up the repair, but the owner should be cautioned that the color match will not be perfect.

1. Common Defect or Problem

   Visual defects caused by normal shrinkage or nail pops, cracks, seam lines, ridging or cracked corner beads.

Performance Standard

Any of the above defects which can be readily determined by visual inspection (without lighting the defect from one direction) shall be repaired by the builder except where normal repainting will cover the defect as in the case of a hairline

crack. Cracks not exceeding 1/16 inch in width are common in gypsum wallboard installations and are considered acceptable.

Builder Repair Responsibility

Repair to original finish as closely as possible. Repairs will be made no more than one time during the first year.

2. Common Defect or Problem

Defects caused by workmanship during installation such as blisters in the tape, excess compound in joints, or trowelling marks.

Performance Standard

Defects, which can be readily observed by visual inspection (without lighting the defect from one direction), are beyond the standard of industry except where normal repainting will cover in the defect.

Builder Repair Responsibility

Correct such defects as in (1) above.

3. Common Defect or Problem

Photographing of mudded areas (tape lines, nails, corners).

Performance Standard

The paint on the wallboard surface has a different texture than on the taped and mudded areas.

Builder Repair Responsibility

Photographing is not common, but when it is readily visible (without lighting the defect from one direction), it is the builder's obligation to repair.

4. Common Defect or Problem

Uneven texturing.

Performance Standard

As textures are composed of natural materials, there will be some variation. Blemishes should not be visually apparent.

Builder Repair Responsibility

Repair finish to be uniform to standard.

5. Common Defect or Problem

Separation at ceiling due to trusses lifting.

Performance Standard

Truss lift occurs during the heating season and normally returns back down in the summer months. Builder is not responsible for inadvertent cutting of tape where wallpapering may have been done by the homeowner.

Builder Repair Responsibility

This is to be corrected only during the summer months after the first heating season. If the problem reoccurs in the next heating season and gap exceeds 1", then additional methods must be taken to correct the problem (i.e. the use of a molding at the ceiling).

6. Common Defect or Problem

Uneven angular joints or corners.

Performance Standard

Defects, which can be readily determined by visual inspection, are to be repaired by builder only prior to decorating. The use of a rounded corner is acceptable at angles.

Builder Repair Responsibility

Builder to repair to be visually acceptable.

7. Common Defect or Problem

Texturing on repairs is uneven.

Performance Standard

Since drywall and plaster are finish materials, repairs will be slightly visible due to a color or texture mismatch after they have been made.

Builder Repair Responsibility

Every attempt should be made to uniformly match the texture.

ELECTRICAL STANDARDS

Background

Electrical system installation is performed by licensed contractors and in accordance with state and national electrical codes. The electrical code dictates safety requirements predominantly to prevent fires and minimize the chance of personal injury.

The builder cannot be responsible for what an owner plugs into an electrical outlet. Builder is also not responsible for what an owner has added to the electrical system.

1. Common Defect or Problem

   Outlets and switches do not work.

   Performance Standard

   All outlets and switches must be operative.

   Builder Repair Responsibility

   Repair or replace wiring or replace defective outlets and switches to make units work properly.

2. Common Defect or Problem

   Lights and fans do not work.

   Performance Standard

   Wiring to fixture must be operative.

   Builder Repair Responsibility

   Builder to repair defective wiring to lights and fans. If it is found that the fixture is inoperative, it would fall under a manufacturer's warranty. If the fixture was builder supplied, the builder would be responsible for the service call. If the fixture was owner supplied, the owner would pay the service call.

3. Common Defect or Problem.

   Lights dim or flicker in parts of building.

Performance Standard

Lights may dim or flicker during starting of some motor driven equipment.

Builder Repair Responsibility

Check wiring for installation per standards of State Electrical Code. If flickering/dimming does not occur when motor driven equipment is turned off, the owner should notify the builder to check if the wiring is per Code. If nothing is found, the owner should contact the electric power company for possible defects in supply source.

4. Common Defect or Problem

Lights dim/flicker in entire building.

Performance Standard

Lights should not flicker throughout entire building at one time.

Builder Repair Responsibility

Builder should first check internal wiring as necessary. If internal wiring is proper, owner should then notify the electric power company for possible defects in supply source.

5. Common Defect or Problem

Circuit breakers trip out.

Performance Standard

Circuit breakers should not disengage under normal usage except in cases where they may be an overload of portable appliances. (See #6 re: GFI circuits).

Builder Repair Responsibility

If it is determined that there is not an overload of portable appliances, builder to repair or replace breaker.

6. Common Defect or Problem

Ground fault interruptor (GFI) circuit trips frequently.

Performance Standard

Ground fault interruptors are sensitive safety devices installed into the electrical system to provide protection against electrical shock. These sensitive devices can be tripped very easily.

Builder Repair Responsibility

Builder shall install ground fault interruptor in accordance with approved electrical code. Tripping is to be expected and is not covered, unless due to a construction or product defect.

7. Common Defect or Problem

Fluorescent lights hum.

Performance Standard

Some fluorescent ballast will hum.

Builder Repair Responsibility

Excessive hum must be checked by an electrician.

8. Common Defect or Problem

Door bells/chimes do not work.

Performance Standard

Door bells/chimes carry a one-year warranty and should operate.

Builder Repair Responsibility

Builder to repair or replace if door bell/chimes supplied by builder. Owner is responsible if owner supplied.

9. Common Defect or Problem

Drafts from electrical outlets.

Performance Standard

Electrical junction boxes on exterior walls may produce airflow whereby the cold air can be drawn through the outlet into a room.

Builder Repair Responsibility

None. Owner can place a foam type insulation behind cover plate to cut down the infiltration.

10. Common Defect or Problem

Water leaks into basement at builder installed conduits going through walls.

Performance Standard

Water leaks into basement should not occur at conduits assuming owner has properly graded around foundation.

Builder Repair Responsibility

Builder to repair, providing grading is not at fault.

FIREPLACE STANDARDS

Background

Fireplaces fall into two categories. The first being "full masonry." This type of fireplace is constructed with a masonry flue, exterior veneer and interior firebox. The second is "prefabricated", having a metal pipe chimney and a manufactured metal firebox

1. Common Defect or Problem

   Fireplace or chimney does not draw properly.

   Performance Standard

   A properly designed and constructed fireplace and chimney shall function properly. It is normal to expect that high winds can cause temporary negative draft situations. Similar negative draft situations can also be caused by obstructions such as large branches of trees too close to the chimney.

   Builder Repair Responsibility

   Builder will determine the cause of malfunction and correct, if the problem is one of design or construction of the fireplace.

2. Common Defect or Problem

   Firebox paint changed by fire.

   Performance Standard

   Heat from fires can alter finish.

   Builder Repair Responsibility

   None.

3. Common Defect or Problem

   Cracked firebrick and mortar joints in firepot.

   Performance Standard

   Expansion and contraction will cause cracking.

Builder Repair Responsibility

None, unless crack exceeds 1/8" width. Builder will then tuckpoint.

4. Common Defect or Problem

Rust on the exterior of the fireplace or rust on the damper.

Performance Standard

As rust can form from condensation or moisture within a home, the owner should use a rust-removing product to remove rust.

Builder Repair Responsibility

None.

5. Common Defect or Problem

Cracks in chimney and fireplace caps.

Performance Standard

Chimney and fireplace caps should be checked periodically by the owners for hairline cracks in the concrete and brick, and especially next to the flue. These cracks are caused by shrinkage and severe weather conditions and should be caulked with an elastic type caulking compound or tuckpointed with mortar or cement. Failure to do this could result in moisture getting into the chimney, freezing and cracking the flue material or the face of the brick or stone.

Builder Repair Responsibility

None, unless crack exceed 1/8" in width. Builder will then tuckpoint.

6. Common Defect or Problem

Fireplace fans are noisy.

Performance Standard

Fans will make some noise due to the location of their installation but should not be excessively noisy. Fireplace fans are covered by a one-year manufacturer's warranty. Noise level is not to exceed manufacturer's acceptable noise level.

Builder Repair Responsibility

Builder to inspect and repair if fan is touching any party of fireplace.

7. Common Defect or Problem

Cracks in mortar joints of brick or other masonry walls or veneers.

Performance Standard

Small hairline cracks due to shrinkage are common in mortar joints in masonry construction. Cracks greater than 1/8" in width are considered excessive.

Builder Repair Responsibility

Builder will repair cracks in excess of Performance Standard by pointing or patching. These repairs shall be made at the end of the first year of the warranty period. Owner should be aware that some variation between old and new mortar color will occur.

8. Common Defect or Problem

Chimney separation from structure to which it is attached.

Performance Standard

Newly built fireplaces will often incur slight amounts of separation. Separation shall not exceed 1/2" from the main structure in any 10' vertical measurement.

Builder Repair Responsibility

Builder will determine the cause of separation and correct if standard is not met.

FLOORING FINISH STANDARDS

Background

Finished flooring work is subject to the same phenomena during construction of a home that applies to drywall and plaster, namely shrinkage and warpage of the surface to which it is applied, settling of the home, expansion and contraction of the subsurface to which it is applied with moisture and temperature variations. Most of the problems which occur affecting flooring are a result of these natural phenomena occurring during the stabilization of the home during the initial warranty period and are mirrored in the floor coverings.

Resilient flooring is a manufactured bought as a finished product, either in the form of squares or sheet goods, which is applied by the appropriate trade, predominantly with mastic directly over the surface prepared to accept it.

The following finished flooring standards are contained separately in this section:

1. Carpeting
2. Ceramic or Quarry Tile
3. Resilient Flooring
4. Wood Flooring

CARPETING STANDARDS

Background

Carpet installation may often be contracted assumed by the owners or may be done by the builder as an allowance item. A standard carpet installation will use seaming techniques to join the material and these seams will be somewhat visible. Carpeting is subject to normal manufacturing tolerance and most particularly to lot variations affecting color, texture and pattern. From time to time, patterns are discontinued, which makes it impossible to exactly duplicate the material; hence it is recommended that the owner save any scrap material from the carpet installation for any future repairs that may be required because of burns, spots, etc.

1. Common Defect or Problem

   Open carpet seams.

   Performance Standard

   Carpet seams will show. However, no visible gap is acceptable.

   Builder Repair Responsibility

   Builder will correct any open gaps.

2. Common Defect or Problem

   Carpeting becomes loose, seams separate or stretching occurs.

   Performance Standard

   Wall to wall carpeting, installed as the primary floor covering, when stretched and secured properly, shall not come up, become loose, or separate from its point of attachment.

   Builder Repair Responsibility

   Builder will re-stretch or re-secure carpeting as needed, if original installation was performed by the builder.

3. Common Defect or Problem

   Spots on carpet, minor fading

Performance Standard

Exposure to light may cause spots on carpet and/or minor fading. Spots, if noted prior to occupancy in writing, would be the builder's responsibility.

Builder Repair Responsibility

None, unless noted prior to occupancy in writing. Builder would then clean or repair.

CERAMIC AND QUARRY STANDARDS

Background

Ceramic or quarry tile is also used as a finished flooring surface and in some counter and wall applications. Hard tile is supplied as a finished product and is subject to lot variations. The tiles may be attached to the subfloor, finish floor, or wall surface with mastic (glue) or directly set into a mud base (special concrete mix). After the tile is set, grout is applied to fill the joints. Grouting will be affected by the natural settling and shrinkage of the home. Regrouting will be required by the homeowner as normal maintenance throughout the life of the home. With colored grout, it is virtually impossible to match colors should a repair of grout be desired.

Ceramic tile installation may be performed as an allowance item. Installation and tile costs may vary with tile size, shapes and patterns selected by the homeowner.

In all cases of finished floor covering materials, the owner is advised to follow the manufacturer's suggested recommendations for maintenance and cleaning.

Narrow tipped or stiletto high heels will damage ceramic and quarry tile flooring and would not be the builder's responsibility for repair. Because of this and the wear and tear caused by normal use of the floor, no reasonable repair can be expected to restore perfectly the flooring to a new, unused condition.

1. Common Defect or Problem

   Cracks appear in grouting of ceramic tile joints or at junctions with other materials such as a bathtub.

   Performance Standard

   Cracks at the joints of ceramic tile are commonly due to the settling process, especially between the horizontal and vertical surfaces or the butting of dissimilar materials. As such, they require repointing.

   Builder Repair Responsibility

   Ceramic tile should be repointed when necessary, only once during the warranty period, preferably near the end of the warranty period. After one repointing, it becomes an item of owner's maintenance.

2. Common Defect or Problem

   Ceramic tile cracks or become uncemented.

Performance Standard

Tile should not crack or become loose during warranty period under normal wear. It should be noted that ceramic tile can crack if something is dropped on the floor and type of cracking is not warranted.

Builder Repair Responsibility

Replace any cracked tiles and recement any loose tiles, unless the defects were caused by owner's negligence. (Owner is cautioned that there may be a color mismatch if no extra tiles are available).

3. Common Defect or Problem

Ceramic tile grout discolors.

Performance Standard

Normal efflorescence is a condition, which can be cleaned with a special solution or will disappear in time. Grout is porous and can be sealed by the homeowner to prevent dirt penetration.

Builder Repair Responsibility

None.

4. Common Defect or Problem

Mildew forms on tile or grout.

Performance Standard

This is a homeowner's maintenance responsibility.

Builder Repair Responsibility

None.

5. Common Defect or Problem

Color variations in tile.

Performance Standard

Color variations are inherent in all ceramic glazes fixed clay products.

Builder Repair Responsibility

None.

6. Common Defect or Problem

Tile style or pattern no longer available when repair called for.

Builder Repair Responsibility

Unless owner will accept a repair with as closely matching materials as is currently available or correction by some other means, builder should credit the owner 1 ½ times the cost to repair if the material were available. This would be 1 ½ time the minimum service charge, plus the additional hourly charge and material cost estimate.

7. Common Defect or Problem

Floors squeak.

Performance Standard

Floor squeaks are common to new construction and a squeak-proof floor cannot be guaranteed.

Builder Repair Responsibility

Builder should try to minimize the floor squeaks and must correct if caused by a construction defect. It should be noted that second floor repair would be a surface nailing in carpeted areas and impossible in vinyl or ceramic areas.

RESILIENT FLOORING STANDARDS

Background

Resilient flooring includes inlaid, roto-vinyl, seamless sheet vinyl, and resilient vinyl composition tile.

All resilient flooring is subject to normal manufacturing tolerances and most particularly to dye lot variation affecting color, texture, and pattern. From time to time, patterns are taken off the market, which makes it impossible to exactly duplicate a material when none is available. The most common problem occurring when partial replacement is called for in repair is the inability to match closely in color due to variation from dye lot to dye lot. In the replacement or correction of resilient flooring, the owner must be prepared to accept a variation in dye lot, when the pattern is still in existence and is cautioned that a seam may show. When a repair is made, the smallest possible area should be repaired. Although the builder will attempt to match colors as closely as possible, the owner should note that the wax or vinyl dressing build-up on the existing areas, light variations, atmospheric conditions and other chemical reactions will produce a color variation, even within within the same dye lot. The owner can minimize this variation by removing any build-up and thoroughly cleaning the floor according to the flooring manufacturer's recommendations. Likewise, the color variations will become less noticeable with subsequent dressings and use of the floor.

The nature of resilient flooring makes possible permanent deformation of the surface when subject to high loads which can be exerted by furniture with improper floor protectors or no protectors at all. Manufacturer recommended protectors are a necessity. The protectors must rest flat on the floor, not at an angle. The maximum surface load per square inch must not exceed 75lbs. Narrow tipped or stiletto high heels will damage vinyl tile and all sheet vinyl flooring and would not be the builder's responsibility for repair. Because of this and the wear and tear caused by normal use of resilient flooring, no reasonable repair can be expected to restore perfectly the resilient flooring to a new, unused condition.

Resilient flooring is a manufactured product bought as a finished product, either in the form of squares or sheet goods, which is applied by the appropriate trade, predominantly with mastic directly over the surface prepared to accept it.

1. Common Defect or Problem

   Nail pops appear on the surface of resilient flooring.

   Performance Standard

   All nail pops should be repaired.

Builder Repair Responsibility

Correct all nail pops which have not broken the surface of the goods by driving the nails back into place. Replace any areas where the nail pop has broken the surface. Replace sheet goods in the minimum area where the joint will not be readily noticeable where the nail pop broke the surface.

2. Common Defect or Problem

Seams or ridges appear in the resilient flooring due to subfloor irregularities.

Performance Standard

In the natural settling and shrinkage process, some mismatch of the subfloor may exhibit and mirror itself as ridges or depressions showing on the surface goods. This can be minimized by the customer in his selection of an embossed pattern in a darker color. In particular, lighter solid colors and/or smooth vinyl surfaces mirror any minor variations of the subsurfaces to which they are applied and emphasize this ridging. If the ridge or depression effect exceeds 1/8 " and cannot be corrected from below, the resilient floor must be corrected. The ridge measurements should be made by measuring the gap created when a 6"straight edge is placed tightly 3" on each side of the defect and the gap measured between the floor and the straight edge at the other end.

Builder Repair Responsibility

If ridge exceeds standard, builder to remove the sheet goods in the minimum area where the joint will not be readily visible when repaired, renail the subflooring, sand smooth and/or fill gap and replace the sheet goods. Owner should note that there may be a mismatch in materials due to time difference or dye lot variations. If the material is unavailable due to discontinuation, unless the owner will accept a repair with as closely matching materials as is currently available or correction by some other means, builder should credit the owner 1 ½ times the cost to repair if the material were available. This would be 1 ½ times the minimum service charge, plus the additional hourly labor charge and material cost need to make the repair.

3. Common Defect or Problem

Resilient flooring lifts, bubbles, or becomes unglued at joint.

Performance Standard

Resilient flooring should not loosen during the normal warranty period unless caused by the owner's negligence or excessive use of water.

Builder Repair Responsibility

Providing edges are still intact, resecure the material. If not replace the minimum area as per standard #2.

4. Common Defect or Problem

Shrinkage gaps show in resilient flooring

Performance Standard

Gaps shall not exceed 1/16" in width in vinyl to vinyl joints. However, where dissimilar materials abutt, larger gaps may appear.

Builder Repair Responsibility

Correct to meet standard.

5. Common Defect or Problem

Flooring discoloration.

Performance Standard

Certain conditions and substance such as heat, oil, fertilizers, asphalt from driveways and driveway sealers with an asphalt or coal tar base, and some carpet dyes can cause permanent stains especially in traffic areas. The owners are also cautioned that the use of certain latex or rubber back throw rugs can cause discoloration of the resilient flooring due to a chemical reaction that occurs.

Builder Repair Responsibility

This is not a manufacturing defect nor the builder's responsibility, but is the owner's responsibility to protect these areas with doormats or proper rugs at each entrance. There are certain instances in which discoloration may be warranted by the manufacturer. Owner should contact the manufacturer for a determination under their warranty.

6. Common Defect or Problem

Fading of color of resilient flooring.

Performance Standard

Exposures to excessive direct sunlight through glass sliding doors, for example, can cause fading or discoloration.

Builder Repair Responsibility

This is not a manufacturing defect nor the builder's responsibility, but is the owner's responsibility to protect these areas by the use of drapes or blinds during times of direct sunlight exposure. Resilient flooring is no different in this instance than any drapes, furniture or carpeting in the home.

7. Common Defect or Problem

Heel marks, burns, scratches, scuffs and indentations on resilient flooring.

Performance Standard

All of the above items are caused by the owner use and abuse.

Builder Repair Responsibility

None, unless problems are relayed to the builder in writing prior to occupancy or noted during walk-through. If builder is notified prior to occupancy or at walk-through, it is builder's responsibility to repair. If it occurs after that time, it is the responsibility of the homeowner.

8. Common Defect or Problem

Wear on surface or loss of sheen on resilient flooring.

Performance Standard

Depending on the type of product, owner to refer to manufacturer's warranty.

Performance Standard

Builder Repair Responsibility

None

9. Common Defect or Problem

Floors squeak

Performance Standard

Floor squeaks are common to new construction and a squeak-proof cannot be guaranteed.

Builder Repair Responsibility

Builder should try to minimize the floor squeaks and must correct if caused by a construction defect. It should be noted that second floor repair would be surface nailing in carpeted areas and impossible in vinyl and ceramic areas.

WOOD FLOORING STANDARDS

Background

Wood flooring, as a finished surface, is applied directly over the subfloor. Wood flooring, while predominantly hardwood, may occasionally be softwood. Hardwood is generally preferred because of its better wearing qualities and the resistance to abrasions. Wood floorings may be either pre-finished or job-finished. All wood floors are subject to shrinkage, as a natural occurrence. Both stains and sealers on job-finished floors may require maintenance different from that of pre-finished floors. It should be noted that due to climate and humidity changes, wood floors may be subject to gapping.

1. Common Defect or Problem

   Gaps in wood floor.

   Performance Standard

   It must be understood that gapping is a normal occurrence during the heating season. Repairs should then be made during the summer so a proper correction can be made because warm, humid weather will cause the floor to expand. Gaps in excess of 1/8" in summer are to be corrected.

   Builder Repair Responsibility

   Builder to repair gaps in excess of 1/8"

2. Common Defect or Problem

   Wearing of finish on wood floor.

   Performance Standard

   Elements of nature, moisture, and driveway materials may cause the finish on wood floors to wear faster. The homeowner should maintain their flooring to prevent this condition.

   Builder Repair Responsibility

   None

3. Common Defect or Problem

Finish is uneven on wood floors

Performance Standard

Slight variations may appear in the finish, but must not be readily visible.

Builder Repair Responsibility

Builder to repair/replace if visibly uneven

4. Common Defect or Problem

Cupping of hardwood floors.

Performance Standard

Cups in strip hardwood floorboards shall not exceed 1/16 inch in height in a 3-inch maximum span measured perpendicular to the long axis of the board.

Builder Repair Responsibility

Builder to repair or replace any boards that have cupped in excess of the performance standard on hardwood floors. The Builder is not responsible for cupping caused by moisture beyond the control of the Builder. There is no warranty for cupping on a pine or soft wood floor.

5. Common Defect or Problem

Dents in wood floors

Performance Standard

This is a normal occurrence in wood floors due to high heels, etc., and must be noted to builder in writing at preoccupancy inspection.

Builder Repair Responsibility

None, unless noted in writing prior to occupancy, then builder to repair.

6. Common Defect or Problem

Fading of wood floors.

Performance Standard

Exposures to excessive direct sunlight through glass sliding doors, for example, can cause fading or discoloration.

Builder Repair Responsibility

This is not a manufacturing defect nor the builder's responsibility, but is the owner's responsibility to protect these areas by the use of drapes or blinds during times of direct sunlight exposure. This is no different than other fabrics such as furniture or carpeting in the home.

7. Common Defect or Problem

Floors squeak

Performance Standard

Floors squeaks are common to new construction and a squeak-proof floor cannot be guaranteed.

Builder Repair Responsibility

Builder should try to minimize the floor squeaks and must correct if caused by a construction defect. It should be noted second floor repair would be surface nailing in carpeted areas and impossible in vinyl and ceramic areas.

GARAGE DOOR STANDARDS

Background

The surface of hardboard used on garage doors is ideal for field applied coatings, since hardboard does not have any knots, grain raise, or other defects that typically shorten the coatings life. Hardboard used on garage doors is made from wood. As such, it must be properly coated initially and maintained if satisfactory performance is to be achieved from the hardboard door as well as the field applied coating.

If the homeowner does his own painting and staining, for the warranty to be effective, paint must be applied to inside and outside surfaces and on all edges, immediately after installation.

An inherent characteristic of flush doors is the possibility of bowing (either inward or outward). This is not considered a defect. Proper painting of the door, plus the use of paint other than a dark color, will minimize this possibility. (Dark paint does not deflect the heat of the sun as well as lighter paints do).

1. Common Defect or Problem

   Bottom of overhead door does not fit to the floor.

   Performance Standard

   Door weather-stripping should fit flush to the floor.

   Builder Repair Responsibility

   Builder to scribe the bottom of the door to conform to the level of the concrete so Weather-stripping on bottom of door affects a seal.

2. Common Defect or Problem

   Garage doors allow entrance of snow or water.

   Performance Standard

   Garage doors allow shall be installed as recommended by the manufacturer. Some entrance of the elements can be expected under severe weather conditions, if the door is not weatherstripped.

Builder Repair Responsibility

Builder will adjust or correct garage doors to meet manufacturers recommendations. If weatherstripped, door must seal out the elements.

3. Common Defect or Problem

Door does not fit tightly at the sides and top.

Performance Standard

A. If it is an unweatherstripped door, there may be some small gaps.

B. If the door is weather-stripped, the door should fit tight.

Builder Repair Responsibility

A. If the door is unweather-stripped; the builder has no repair responsibility.

B. If the door is weather-stripped; the builder is to repair.

4. Common Defect or Problem

Garage doors fail to operate under normal use.

Performance Standard

Garage doors shall operate properly.

Builder Repair Responsibility

Builder will correct or adjust garage doors as required, except where the cause is determined to result from homeowner abuse or negligence.

5. Common Defect or Problem

Garage doors sag.

Performance Standard

Due to the excessive weight of a panel door, some sagging may occur.

Builder Repair Responsibility

None, as long as it is within manufacturer's tolerance.

6. Common Defect or Problem

Split in door panel.

Performance Standard

Split panels shall not allow light to be visible through the door.

Builder Repair Responsibility

Builder will, if light is visible, fill split and match paint or stain as closely as possible if they did painting originally. This will be done only one time in the warranty period, preferably at the end of the first year.

GRADING, GROUND REMOVAL, GRAVEL, AND FILL STANDARDS

Background

It is the intention of this standard to assist in obtaining a uniform acceptable understanding of grading and related problems. The standard is not meant to supersede or substitute for other restrictions placed by agencies or communities. It is for this reason no mention is made as to FHA requirements or disputes that may arise as a result of similar agencies. Such agencies have written manuals or means of arbitrating such disputes.

Because this phase of construction dealing with the movement of earth is so broad and ambiguous, since each site is unique unto itself and subject to the most diverse contractual relationships, it is thus necessary to establish certain "ground rules" or definitions for phases of work.

If finished grading or landscaping is not included in the building contract, it is of absolute necessity the owner promptly follow through with his grading and landscaping responsibilities and maintain a positive slope away from the foundation, including refilling any settled backfilled and trenched areas. The lack of proper maintenance in this area may cause foundation failure that will not be covered by the builder.

Excavation

To remove soil to the level and outline of the proposed footings in such a way as to permit material delivery for the mason to commence work. Excavated soil is normally cast (dropped on the property) around the foundation except where lot size, site conditions and/or elevation requires its removal. Trucking costs are the responsibility of the owner.

Hauling (Trucking)

Hauling away excess ground or supplying and hauling in required fill, unless otherwise specified in the contract, is the responsibility of the owners.

Backfilling

To fill the exterior around a foundation or in a trench using a bulldozer or other necessary mechanical equipment utilizing only the ground which was available from such excavation or trench. The purpose of backfilling is to improve working conditions for further construction; attempt to protect the foundation from the elements such as frost, water etc., reduce the hazards inherent to open basements or foundations and get the process of ground settlement started which could take three or more years depending upon the type of soil. Builder is not responsible for settling.

Rough Grading

Using mechanical equipment, the grader provides drainage away from the foundation, in such a way to indicate approximate grades at the building, walks, patios, and driveways. This is normally done on an allowance specified in the contract. Builder is not responsible for settling.

Finish Grading

Using mechanical equipment and the dirt on the site, the grader establishes the yard grade within two inches of final landscaped grade with respect to the building, walks, drive and adjoining properties. Depending on the terms of the contract this would ordinarily include the entire lot. This is normally contracted for by the owner and is the step just prior to landscaping.

Landscaping

Using light machinery or hand labor the grader finishes establishment of final grade, sodding or seeding, and provides ornamental shrubbery, trees and other planting. This is normally contracted for by the owner.

Site, Drainage and Erosion

Site drainage must comply with all applicable building codes in jurisdiction. All sites must be prepared initially to prevent or reduce erosion from excessive water run off. All contractual agreements made between parties will take precedents over guidelines. Homeowner maintenance is required after the possession of site.

1. Common Defect or Problem

Settling of ground foundation, sewer or septic trenches and gravel-fill-in garage area after backfill operations.

Performance Standard

Backfilled ground will settle. In fact, it is the intent to permit settling before further grading is done.

Builder Repair Responsibility

To the extent provided in the building contract, the builder is to perform the initial backfilling.

Where the builder is not responsible by contract for finish grade or landscaping, the builder shall not be responsible for normal settling of backfilled or trenched areas.

Lines installed by the Builder that settle excessively shall be repaired by the builder during the first year.

Owner's Responsibility

Unless otherwise specified by contract, fill in such depression as they occur or as soon as possible to avoid other related problems.

2. Common Defect or Problem

Wet basement walls after backfilling, due to insufficient slope away from the foundation when builder is responsible for backfill and/or rough grading only. "Wet" shall be defined as actual water running or trickling from, through or under the basement wall and onto the floor thus puddling or eventually finding the floor drain. Dampness of the walls particularly at the upper two (2) and lower (1) foot are common to new construction and should not be construed as "wet".

Performance Standard

Wet walls are usually a result of sunken areas around the foundation since the owner's grading hasn't been done. But even if there are no depressions, this is still not a builder responsibility since he is only doing the backfilling and/or rough grading. The subsequent proper grading and landscaping should eliminate damp or wet basements.

Builder Repair Responsibility

Backfill in accordance to item #1.

3. Common Defect or Problem

Wet basement walls due to insufficient slope and drainage away from foundation when builder has contracted for finish grading.

Performance Standard

While some dampness is normal, wall should not be wet as defined in item #2 above.

Builder Repair Responsibility

If landscaping is owner's contractual responsibility and not completed within 30 days of finished grading, there is no builder responsibility. Otherwise, builder should correct slope as needed, other costs incidental to such correction are borne by the builder.

Owner Responsibility

Fill in depressions, as they occur, due to settling. Direct downspouts and sump pump discharge from foundation and use extensions as needed. The owner's proper landscaping should eliminate a wet basement.

4. Common Defect or Problem

Improper drainage of the site.

Performance Standard

The builder, to insure proper drainage away from the home, shall have established the necessary preliminary grades and swells. Standing or ponding water shall not remain for periods in excess of 48 hours in the immediate area after a rain, except that in swales which drain other areas, or in areas where sump pumps discharge, a longer period can be anticipated. Consideration must be given to the type of soil present and to the relationship to surrounding terrain. The possibility of standing water after an unusually heavy rainfall should be anticipated. No grading determination shall be made while there is frost or snow on the ground, or while the ground is saturated.

Builder Repair Responsibility

The builder will try to establish the proper grades and swales based on soil conditions, site, and weather conditions. The homeowner is responsible for maintaining such grades and swales once they have been established.

5. Common Defect or Problem

Heavy rains will cause erosion where grass and sod has not had time to be permanently established.

Additional landscaping by homeowner or his agent can change the topography of site.

Performance Standard

The defects or problems can be determined by visual inspection or by additional information gathered at site inspection.

Builder Repair Responsibility

Repair to original finish as closely as possible.

Repairs, if required by inspection, will be made no more than one time during first year.

6. Common Defect or Problem

Grass, ornamental shrubbery, trees and other plantings die.

Performance Standard

These are items of nature and are subject to homeowner care and maintenance.

Builder Repair Responsibility

None, unless noted in writing at a preoccupancy inspection prior to move-in and agreed to by builder that it would be taken care of.

7. Common Defect or Problem

Water appears on interior crawl space surfaces.

Performance Standard

Crawl spaces should be graded and drained properly to prevent water from accumulating deeper than ¾ inch and larger than 36 inches in diameter in crawl space area. Standing or ponding water shall not remain for extended periods after a rain (generally, no more than 48 hours) except in surfaces that drain other areas where sump pumps discharge. In these areas a longer period can be anticipated. The possibility of standing water after an unusually heavy rainfall should be anticipated by the owner.

Builder Repair Responsibility

The Builder will take the necessary corrective measures to create positive flow within the crawl space to discharge to exterior of the structure.

HARDWARE AND LIGHTING FIXTURE STANDARDS

Background

All hardware and lighting fixtures are finished products and care should be taken to protect them, especially during painting and staining. Homeowner maintenance is required. The homeowner should make sure not to use abrasive products (i.e. laquer thinner, solvents, cleaners and cleaning solutions, etc.) to clean the hardware and light fixtures.

It should be understood that the natural chemicals in your body will cause a breakdown of the finish in time. It should be understood that there will be color variations within finishes.

Any hardware or light fixtures with a protective coating will gradually tarnish and eventually take on an antique appearance. Atmospheric conditions, direct sunlight, caustic agents such as cleaners, or scratches from contact with sharp objects may cause the protective coating to crack or peel, exposing the natural material, causing spotting and discoloration. The integrity of the surface under such conditions of exposure is not warranted. Initial care for these products requires only periodic cleaning with mild non-abrasive soap and light buffing with a soft cloth.

Regarding breakage of glass in light fixtures, it should noted that such breakage is the responsibility of the manufacturer only until acceptance of delivery. Upon delivery, it is the owner's responsibility.

1. Common Defect or Problem

   Finish on hardware or lighting fixture wears off.

   Performance Standard

   If the defect is caused by products such as lacquer, stain or varnish that was applied by the builder's subcontractor, the builder would be responsible for correcting.

   Builder Repair Responsibility

   If the defect was caused by the builder's subcontractor, the builder is to replace or repair. If due to natural causes or negligence on the part of the homeowner, the builder would not be responsible.

2. Common Defect or Problem

   Locks do not work.

Performance Standard

All locks must work.

Builder Repair Responsibility

Builder to view lock to verify if it was installed properly. A faulty lock is covered by the manufacturer's one-year warranty. Builder is responsible for installation.

3. Common Defect or Problem

Lights or fans do not work.

Performance Standard

Wiring to fixture must be operative.

Builder Repair Responsibility

Builder is to repair defective wiring to lights and fans. If it is found that the fixture is inoperative, it would fall under a manufacturer's warranty. If the fixture was owner supplied, the owner will be responsible for the cost of the service call.

HEATING & SHEET METAL STANDARDS

Background

The heating and cooling systems are specified by code, with the equipment selection (size and capacity) being dependent upon the size of the home, outside design temperatures, and anticipated heat loss due to the home design. It should be noted that temperatures in the home may vary due to wind direction, windows, doors, etc. If parts of the home are colder than others, running the blower of the furnace constantly may help.

Cleaning of furnace filters is a homeowner's responsibility.

1. Common Defect or Problem

   Noisy ductwork.

   Performance Standard

   When metal is heated it expands and when cooled it contracts. The result is "ticking" or "crackling" which is generally to be expected and shall be considered acceptable.

   Builder Repair Responsibility

   Installation to comply with codes.

2. Common Defect or Problem

   Oilcanning.

   Performance Standard

   The stiffening of the ductwork and the gauge of the metal used shall be such that ducts do not "oilcan". The booming noise caused by "oilcanning" is not acceptable.

   Builder Repair Responsibility

   Builder will correct to eliminate this sound.

3. Common Defect or Problem

   Furnace not placed as per plan.

Performance Standard

Due to heating design, venting and layout, the furnace location is to be determined by a heating contractor.

Builder Repair Responsibility

None.

4. Common Defect or Problem

Inadequate heating.

Performance Standard

Heating system shall be capable of producing an inside temperature of 70 degrees, as measured in the center of each room at a height of 5 feet above the floor, under local outdoor winter design conditions of –10 degree specified in ASHRAE handbook. Federal, state, or local energy codes shall supersede this standard where such codes have been locally adopted.

Builder Repair Responsibility

Builder will correct heating system to provide the required temperatures. However, the homeowner shall be responsible for balancing dampers, registers and other minor adjustments.

Builder shall not be responsible when installation follows guidelines of special rate Programs offered by utility companies if utility standards are lower than manufacturers recommendations.

Common Defect or Problem

Inadequate cooling.

Performance Standard

Where air-conditioning is provided, the cooling system shall be capable of maintaining a temperature of 78 degrees, as measured in the center of each room at a height of 5 feet above the floor, under local outdoor summer design conditions as specified in ASHRAE handbook. In the case of outside temperatures exceeding 95 degrees, a differential of 15 degrees from the outside temperature will be maintained where there is excessive glass, this may not be attainable. Owner should be advised on the use of shading in that area. Federal, state, or local energy codes shall supersede this standard where such codes have been locally adopted.

Builder Repair Responsibility

Builder will correct system to meet temperature conditions, in accordance with specifications. Builder shall not be responsible for changes when installation follows guidelines of special rate programs offered by utility companies if utility standards are lower than manufacturer's recommendations.

6. Common Defect or Problem

Temperature in house is different than temperature set on the thermostat.
Performance Standard

If thermostat is properly calibrated according to equipment specs, temperature should not differ more than 4 degrees.

Builder Repair Responsibility

Builder to repair if there is a difference of more than 4 degrees.

Common Defect or Problem

Kitchen or hood fan lets cold air into home.

Performance Standard

All exhaust fans should have dampers, but drafts may develop during cold or windy weather. Because code requires boring through the outside wall, there also may be some condensation.

Builder Repair Responsibility

None. Owner should check to make sure damper operates and notify builder to repair if it does not operate.

8. Common Defect or Problem

Moisture runs back in at bath vent fan.

Performance Standard

See #11.

Builder Repair Responsibility

See #11.

9. Common Defect or Problem

Furnace is noisy.

Performance Standard

New furnaces are noisier due to design and blower size.

Builder Repair Responsibility

Builder to have manufacturer's representative determine if noise is excessive.

10. Common Defect or Problem

Condensation lines clog up.

Performance Standard

Condensation lines may clog eventually under normal use. This is a homeowner maintenance item. Builder shall provide unobstructed condensation lines at time of first occupancy.

Builder Repair Responsibility

None if installed properly. Builder shall provide unobstructed condensation lines at time of first occupancy.

11. Common Defect or Problem

Excessive humidity in home.

Performance Standard

See Moisture Standards.

17. Common Defect or Problem

Settling of air conditioning slab.

Performance Standard

Owner is required to maintain a proper slope and fill in dirt underneath slab.

Builder Repair Responsibility

Builder shall level within the first year.

INSULATION STANDARDS

Background

Insulating is the process by which a fire resistant material is installed at the perimeter or outer envelope of the structure to act as a barrier - to create a resistance to heat flow. This produces a more controlled interior comfort climate and conserves energy. The primary characteristic that is desired in an insulating material is the ability to trap a gas to increase the resistance to heat flow. Physically, the efficiency of the insulating material increases as either the bulk of the air entrapped is increased or the movement of the gas is decreased within a given volume of insulating material.

The measurement of insulating effectiveness is called "resistance to heat flow" and is expressed as "R Value". Each manufacturer is required to label his materials with its resistance to heat flow at 75 degrees mean temperature (R Value). R Value is a number rating system. As R increases, the overall effectiveness of the insulating material increases. Caution – Insulation may not cover an entire surface. Its R Value must be averaged with other assembly material to give a true total average R value.

Minimum R value are established by the State Energy Code.

The commonly used fiberous insulating materials are mineral wool, fiberglass and cellulose. These materials are selected for their large ration of surface area to mass of the material in order to better entrap air. The normal form of the insulating material is either the blown loose material, as is most often used in the ceiling, or the batt form. Other forms are rigid materials such as polyurethane or polystyrene, which are usually supplied in panel form or are sprayed in their application.

Air infiltration can be further minimized by the installation of weatherstripping and caulking. Both require owner maintenance throughout the life of the home. Some infiltration will occur under certain temperature and wind conditions.

The system of electric boxes and wiring on exterior walls produces an air flow passage whereby the cold or outside air can be drawn through the outlet into the room under most heating conditions, since the outside of the home is at a higher pressure than the inside. Also, venting for fans will produce some air flowage. With acceptable building practices, this situation is virtually unpreventable, as are certain other situations resulting from many openings that do not exist in the home under normal construction.

Moisture in insulation causes it to lose its insulating value. Therefore, vapor barriers are put on the inside to keep moisture from entering into the walls and ceilings. It is also important to properly vent the attic to create airflow. This can be accomplished with roof

vents, gable louvers, ridge vents and soffit vents. Cathedral ceiling areas, where there is no attic, requires proper ventilation. Year round ventilation is necessary.

Insulation and ventilation performance standards in some locations are specified by Code.

You may wish to refer to the Moisture Standard for additional information.

With the above background on the insulation material in mind, the following are the most common problems occurring in the area of insulation:

1. Common Defect or Problem

   Pipes freeze.

   Performance Standard

   Drain, waste and vent, and water pipes shall be adequately protected, as required by applicable code, during normally anticipated cold weather, and as defined in accordance with ASHRAE design temperatures, to prevent freezing.

   Builder Repair Responsibility

   Builder will correct situations not meeting the code. It is the homeowner's responsibility to drain or otherwise protect lines and exterior faucets and hose bibs (even if they have an anti-siphon valve attached) exposed to freezing temperatures.

2. Common Defect or Problem

   Moisture condensation on windows.

   Performance Standard

   Moisture condenses on the window since it is the coldest object in any given room with the glass having a much higher rate of heat transmission and hence, being the colder surface during the normal heating season. Moisture condensation on windows is an indication of either too much moisture in the room, or poor circulation of the moisture that is present. The owner can minimize this condition by merely opening a window to permit the excess moisture to escape or by installing a dehumidifying system if the condition persists. It should be noted that in homes with humidification equipment, the formation of moisture on the windows is an indication that the humidifying equipment is set too high and producing too much moisture. It is also recommended that screens be removed from casement windows during the heating season.

   Builder Repair Responsibility

   None, except to explain to the owner more thoroughly how this condition is caused.

3. Common Defect or Problem

Drafts at baseboards.

Performance Standard

The juncture of the floor and wall system is conducive to openings so a certain amount of draft is permissible, although it should be minimized.

Builder Repair Responsibility

Check out the areas to assure the air leakage is at a minimum.

4. Common Defect or Problem

Drafts from electric outlets.

Performance Standard

Electrical junction boxes on exterior walls may produce airflow whereby the cold air can be drawn through the outlet into a room.

Builder Repair Responsibility

Check out the areas to assure the air leakage is at a minimum.

5. Common Defect or Problem

Drafts from recessed lights, ceiling fans, vent fans.

Performance Standard

Drafts in these areas are normal.

Builder Repair Responsibility

None, as long as there is proper insulation around the unit.

6. Common Defect or Problem

Drafts around doors and windows.

Performance Standard

Doors and windows are cold spot sources and some infiltration of air must be expected. Proper weather-stripping and insulating around these areas can minimize air passage. However, depending on the type of window (i.e. double hung and sliding windows will have more air infiltration than casement or stationary

windows) and under certain temperature and wind conditions, some infiltration will be observed by the homeowner.

Builder Repair Responsibility

Builder to inspect and adjust poorly fitted weather-stripping. If draft comes around casings, builder to make sure insulation is in place around window wherever possible.

7. Common Defect or Problem

Blown insulation in attic displaces.

Performance Standard

This may occur due to wind and air movement in the attic.

Builder Repair Responsibility

During the first year, builder to redistribute insulation to Code

Common Defect or Problem

Blown insulation in attic settles.

Performance Standard

During the first year insulation should not settle. However, after time, settling will occur.

Builder Repair Responsibility

Builder to correct during first year.

8. Common Defect or Problem

Not enough insulation.

Performance Standard

The builder must provide the R rating as specified by Code or contract.

Builder Repair Responsibility

Builder to correct to Code/contract.

9. Common Defect or Problem

Gaps at the top of batt insulation.

Performance Standard

There should be no gaps.

Builder Repair Responsibility

Builder to insulate or foam spaces.

MASONRY & CONCRETE STANDARDS

Background

Masonry and concrete work in residential construction provides the base structure upon which the house is built and a permanent fire-proof construction and weatherproof exterior. The work is performed with quarried natural materials or with products manufactured by relatively simple processes, which have been selected for they're wearing qualities. As such, they are subject to the same weathering phenomena as in their natural state, such as erosion, freezing and thawing, chipping, natural color variations and non-uniformity of size. Masonry work can be performed with an almost infinite variety of materials, methods of application and techniques of installation. This permits the owner an almost infinite range of personal choice but at the same time, creating, once that choice has been made a situation that can never be exactly duplicated. Masonry, more than any other trade, is dependent upon the variation of the product and the techniques of the individual workman.

Masonry and concrete work consists of four primary divisions:

1. The construction of a basement which may be either cast-in-place (poured) concrete or concrete block masonry installed on footings.

2. The placing (pouring) of flat slab areas consisting of footings, basement and garage floors, stoops, patios, walks or drives.

3. The veneering of the exterior of some structures with brick, stone or other masonry products.

4. The construction of fireplaces and chimneys.

Concrete is subject to several natural changes. The first is shrinkage in the hardening process, which creates shrinkage cracks, the type most common in concrete work, especially in flat slabs. Shrinkage cracks themselves do not affect the integrity of the surface. Concrete is subject to the elements and is attacked by certain chemicals. Pitting, scaling or spalling can develop under unusual conditions or when certain salt or chemicals are placed on a slab in winter for ice removal or drop from a car onto a garage slab and/or drive. A certain amount of surface dusting is normal. Proper owner maintenance can alleviate most of these situations. A sealer can be applied by the homeowner to the concrete to minimize dusting and sapling and effects from chemicals.

Cracking is characteristic of concrete, and cracks in concrete walls or mortar joints of block foundations generally do not affect the structural strength of the home. Cracks are caused by settling of the house, shrinkage of concrete, and expansion and contraction and may occur continually throughout the life of the house.

Settling is a natural phenomenon in the construction of a new home and concrete slabs are subject to the settling process. For this reason it is recommended that wherever possible, the construction of floating slabs, such as patios, walks and drives, be postponed until at least the end of the first year of occupancy or even longer so that a more stabilized soil condition will be available prior to actually doing the work.

Masonry and concrete work is also subject to color and texture variations due to the nature of the materials. Repairs, when made, seldom, match in color and some variation is to be expected by the owner.

When selecting a veneer material, predominantly a matter of owner preference, many factors enter in, such as: the bond or pattern to be used for the brick or stone; the selection of the type of mortar joint (whether struck, raked or weeping pattern); the color of the mortar and the shading variation from batch to batch; the shades of the material involved and their relative contrast with the mortar chosen; the choice of material size, standard or king size brick or the type of stone chosen; and, finally, the individual workmanship of the mason. All of these variables set up a distinctive situation within the masonry field.

1. Common Defect or Problem

   Leaks in basement or wet basement.

   Performance Standard

   No leaks or flow of water are acceptable, except when caused by an improper ground pitch away from the foundation (a proper pitch is 6"down for every 10' out from the foundation and must be maintained by the owner), or improper landscaping or subterranean problems where the responsibility is defined as the owner's by the building contract. Leaking conditions should not be confused with dampness or moisture, which can be expected by the owner during the first year of the settling process, or with condensation during the summer months. If the basement had an engineered waterproofing system on it, then the owner should refer to the manufacturer's warranty.

   Builder Repair Responsibility

   Builder should correct as required. After correction, any openings made in order to correct should be repaired. Color variations in repairs are to be expected.

2. Common Defect or Problem

   Cracked basement walls.

   Performance Standard

   Hairline cracks in mortar joints or cast-in-place concrete not exceeding 1/8" average width or hairline cracks in a single isolated block not extending to any adjacent blocks, providing these cracks do not cause a leaking problem are

acceptable. If the cracks are caused by an improper pitch away from the foundation or owner landscaping, it is the responsibility of the owner to repair.

Builder Repair Responsibility

Builder to repair any cracks in mortar joints or poured walls exceeding 1/8" average width. Unless structural danger exists, repairs should be made approximately a year after occupancy to permit normal settling through the stabilization period. Broken blocks should be removed from the inside and refused with a 4" block. Grout colors should be matched as closely as possible, but color variations should be expected by the owner. Exterior repairs will not be made except in the case of major structural damage.

3. Common Defect or Problem

Cracking of basement floor.

Performance Standard

Shrinkage cracking is to be expected and requires no repair unless one or both of the following conditions exist:

a. If the two surfaces of the crack are mismatched in height by more than 3/16".

b. If the shrinkage occurs non-uniformly (e.g. all in one crack rather than several) and exceeds 3/16 average width.

Builder Repair Responsibility

Builder should correct using a latex filler, surface patching or other methods as required, grinding surfaces smooth in case of mismatch. Owner is cautioned repair will not match in color and a hairline crack may reappear.

4. Common Defect or Problem

Cracking of garage slab.

Performance Standard

Cracks in garage slabs in excess of 5/16" in width or 5/16 " in vertical displacement shall be repaired.

Builder Repair Responsibility

Builder will repair cracks exceeding maximum tolerances by surface patching or other methods as required. See repair method for #3.

5. Common Defect or Problem

Cracks in patio, walks and drives.

Performance Standard

Except as may be otherwise covered by contract, no warranty against settling can be extended for floating slabs installed on soil, which is less than 95% compacted. Cracks in excess of 5/16" in width or 5/16" vertical displacement on a surface which is 95% compacted shall be repaired. It should be noted that floating slab type concrete should not be installed until at least the end of the first year, if possible.

Builder Repair Responsibility

Builder to repair to meet performance standard. If replacement of a section is required, the minimum section should be removed from the walk, drive or patio at the blind or open joint.

6. Common Defect or Problem

Pitting, scaling or sapling, and chert pops of concrete work.

Performance Standard

The aggregate in concrete work should not be exposed unless it is caused by a concentration of water, freezing and thawing, use of salt or other chemicals and mechanical implements, and other factors beyond the builder's control. Owner should consider sealing the concrete.

Builder Repair Responsibility

Correct using a latex filler or grind to remove defect to meet acceptable tolerance. Owner is cautioned latex repair will not match in color.

7. Common Defect or Problem

Powdering or chalking of concrete work.

Performance Standard

Powdering or chalking may occur. Builder should advise owner to seal the surface with a concrete sealing compound.

Builder Repair Responsibility

None. However, only if the surface is soft, other repairs may be required- these are rare and severe instances in which builder would then be required to correct.

8. Common Defect or Problem

Low spots in concrete slabs, except for stoops with foundations.

Performance Standard

No water pockets exceeding 5/16" depth shall exist in any slab, which is pitched. Where a level slab has been requested by the owner or in basements, water pockets may appear.

Builder Repair Responsibility

Correct to meet performance standards by filling with a latex or equivalent filler or grind as necessary. Finished repair should be feathered and smoothed. Minor color variations are to be expected.

9. Common Defect or Problem

Cracking of stoops with foundations.

Performance Standard

The effects of cracks or settling with inadequate drainage on stoops make acceptable tolerances much lower than for other slab forms. All cracks, except hairline cracks with no settling, require repair. Minor chips and cracks just beyond the acceptable tolerance should be corrected with a latex filler and beyond that point when complicated by settling.

Builder Repair Responsibility

Correct to meet performance standard.

10. Common Defect or Problem

Water stands on stoops with foundations.

11. Performance Standard

No measurable water depth exceeding 1/16' is permissible on stoops.

Builder Repair Responsibility

Correct to meet performance standards by filling with a latex filler or grinding. If the defect becomes qualified under item #9 on stoops, it shall be replaced as stated in that item.

Common Defect or Problem

Settling, heaving, or separating of stoops, steps or garage floors.

Performance Standard

Stoops, steps or garage floors shall not settle, heave or separate in excess of 1 inch from the house structures.

Builder Repair Responsibility

Builder will take whatever corrective action is required to meet the Performance Standard.

12. Common Defect or Problem

Basement floor does not pitch to floor drain.

Performance Standard

Basement floors are only pitched in the immediate area of the floor drain. When there is to be a finished floor area around the drain, floors will not be pitched.

Builder Repair Responsibility

None, if the floor meets the Performance Standard.

13. Common Defect or Problem

Cracks in mortar joints of brick or other masonry veneer walls.

Performance Standard

Small hairline cracks due to shrinkage are common in mortar joints in masonry veneer construction as long as they don't exceed 1/8 " width.

Builder Repair Responsibility

Builder will repair cracks in excess of Performance Standards by pointing or patching. These repairs shall be made at the end of the first year of the warranty period. Owner should note that there will be a color variation between old and new mortar.

14. Common Defect or Problem

Brick is different color than what was selected or colors vary.

Performance Standard

Due to the natural materials used to make brick, there will be color lot variations. Even within a lot, brick may vary in color.

Builder Repair Responsibility

None.

MOISTURE STANDARDS

Background

Because of the greater amount of desired and required insulation, vapor barriers, caulking, tighter windows and building practices used to cut down air infiltration, new homes have become more energy efficient. In some homes this can also cause problems with high humidity. The homes are so tight that normal humidity caused by cooking, breathing, showering, etc. builds up inside the home. This can cause steamed-up windows, condensation around outlets or recessed lights, and even drywall damage. When these conditions are first noticed, it is important to exhaust the humidity from the home. This can be done by running bath fans and vented cooking exhaust fans when necessary, using a dehumidifier, making sure the owner's dryer is vented outside, installing an air to air heat exchanger, or opening the house and letting the inside air exchange with the outside air.

The installation of de-humidification and humidification equipment and air to air exchangers is usually an owner option. Proper levels of humidity must be maintained. Just as too much moisture causes problems as described above, insufficient humidity, or excessive dryness can cause other serious problems.

It should be pointed out that household size; lifestyle and outdoor temperatures will affect the humidity level in the home. A home with an enclosed pool can be the source of excessive damaging moisture and requires special care in design, use and maintenance. To a lesser degree, saunas, hot tubs, and whirlpools also require similar care. The owners are responsible for maintaining proper temperatures and humidity in the home as well as for damage caused by failure to do so.

As outside temperature drop, the indoor relative humidity level of your home should be decreased. For homes equipped with at least insulating glass on their windows, the following levels can be used to keep window condensation to a minimum:

Humidity for:

Outside Air Temperature	Inside Relative: 70 Degrees F Indoor Air Temp.
-20 degrees F	15 to 20 percent
-10 degrees F	20 to 25 percent
0 degrees F	25 to 30 percent
+1 degrees F	30 to 35 percent
+20 degrees F	35 to 40 percent

1. Common Defect or Problem

   Moisture condensation on windows.

Performance Standard

Moisture condensation on the window since it is the coldest object in any given room with the glass having a much higher rate of heat transmission and, hence, being the colder surface during the normal heating season. Moisture condensation on windows is an indication of either too much moisture in the room, or poor circulation of the moisture that is present. The owner can minimize this condition by merely opening the window to permit the excess moisture to escape or by installing a dehumidifying system if the condition persists. It should be noted that in homes with humidification equipment, the formation of moisture on the windows is an indication that the humidifying equipment is set too high and producing too much moisture. It is recommended that screens be removed from casement windows during the heating season.

Builder Repair Responsibility

None, except to explain to the owner more thoroughly how this condition is caused.

2. Common Defect or Problem

Moisture in attic.

Performance Standard

Builder must provide adequate ventilation to all areas of attic.

Builder Repair Responsibility

Builder to meet performance standards so that no moisture forms in the attic during normal weather conditions.

3. Common Defect or Problem

Dampness and moisture on basement walls, floors, pipes, etc.

Performance Standard

Owner should make sure that clothes dryer has been vented to the outside and no internal heat moisture recovery device is being used. Electronic dampers, if applicable, on furnace should be checked. Walls and slabs are cold due to ground conditions; war moist air strikes the cold surfaces and condenses. Direct outside air should not be brought in as it is usually very moist during spring, summer and fall and the problem will be increased if such air is brought into the home.

Builder Repair Responsibility

None, other than explaining the causes to the owner and advising the use of a dehumidifier and increasing air circulation.

4. Common Defect or Problem

Water appears on interior crawl space surfaces.

Performance Standard

Crawl spaces should be graded and drained properly to prevent water from accumulating deeper than ¾ inch and larger than 36 inches in diameter in crawl spaces area. Standing or ponding water shall not remain for extended periods after a rain (generally, no more than 48 hours) except in surfaces that drain other areas or in areas where sump pumps discharge. In these areas a longer period can be anticipated. The possibility of standing water after an unusually heavy rainfall should be anticipated by the owner.

Builder Repair Responsibility

The Builder will take the necessary corrective measures to create positive flow within the crawl space to discharge to the exterior of the structure.

5. Common Defect or Problem

Condensation on skylights.

Performance Standard

All skylights can develop condensation due to high humidity levels. If skylight is in bathroom, ventilating fans should always be used or the window opened.

Builder Repair Responsibility

Builder not responsible for humidity levels in home.

6. Common Defect or Problem

Condensation on toilets.

Performance Standard

Condensation may occur during high humidity times of the year.

Builder Repair Responsibility

Builder not responsible for humidity levels in the home.

7. Common Defect or Problem

Condensation or frost on electrical outlets.

Performance Standard

Electrical junction boxes on exterior walls may produce airflow whereby the cold air can be drawn through the outlet into a room, sometimes creating condensation or frost.

Builder Repair Responsibility

None.

8. Common Defect or Problem

Mildew or fungus on painted surfaces.

Performance Standard

Mildew or fungus will form on a painted surface if the structure is subject to abnormal exposures or excessive moisture.

Builder Repair Responsibility

Mildew or fungus formation is a condition the builder cannot control and is a homeowner maintenance item.

PAINTING, STAINING AND WALLPAPERING STANDARDS

Background

Preservation is the primary purpose of painting, varnishing and staining as they protect exposed surfaces, both interior and exterior from environmental conditions and moisture penetration.

The prime cost in this type of work is labor, and for that reason owners often undertake the responsibility for painting/staining their homes. Ins such cases, the owners undertake all responsibility for the painting/staining contract unless otherwise specified. In any event, the party who undertakes the painting/staining contract, be it owner or the builder, assume's responsibility for:

Promptly and properly providing protection to exposed surfaces to prevent damage due to deterioration of unfinished surfaces. Warping, checking, cracking, dry rot and blackening of lumber or millwork, which takes place due to improper, untimely or no painting/staining is the responsibility of the party contracting for the painting/staining. Millwork manufactures do not normally extend warranties on their product against warping or cracking unless the surface has been properly finished. Special care must be exercised to assure that all sides and edges of doors are sealed to prevent warping.

Properly preparing the surface to accept the paint, stain or wallpaper, including filling nail holes and filling or sanding of imperfections.

Properly applying material in accordance with manufacturer's recommendations. The number of coats to be applied as specified in the contract.

Replacing hardware, fixtures and doors if they are removed for painting/staining or other finishing.

Consequential damages are not the responsibility of the builder.

Ceilings are not normally painted in new construction, but receive the drywall texture spray. Ceiling drywall repairs do not require painting.

By applying surface material or wall covering, the painting or wall covering contractor implies an acceptance of the work underneath.

Grain variations in wood will accept strain differently; therefore, it is not uncommon for two pieces of the same type wood, stained with the same product to vary in color. An attempt should be made by the painter to leave small quantities of all paints and stains for future touch up, if there is any left.

Some breakdown of the finish may occur around heavy concentrations of moisture (i.e. ranges, dishwashers, coffeepots) and is a homeowner maintenance item.

Varnished, painted or stained millwork and floors must be cared for like furniture and cannot be scrubbed. Exterior varnished surfaces requires more maintenance than painted surfaces.

Common Defect or Problem

Exterior paint or stain peels, chalks or fades, including gutters, downspouts or other sheet metal areas.

Performance Standard

The occurrence of peeling, chalking or fading should not occur during the warranty period unless the builder has specifically informed the owner that the particular color chosen may fade or chalk.

Builder Repair Responsibility

Builder shall properly and repaint affected areas, matching color as closely as possible. Owner must understand touch-ups may not match exactly. Should the paint deterioration affect the majority of a wall or area, the area should be repainted. The builder shall repaint in accordance with standards of good workmanship, but no warranty will be extended on the newly repainted surfaces.

2. Common Defect or Problem

   Repainting of areas affected by drywall repairs.

   Performance Standard

   Industry standards require that the builder repaint new areas or repaired areas where painting has been affected by drywall repairs only when responsible for the painting contract. Repairs required shall be finished to match surrounding areas as closely as possible. Owner must be aware that there may be a slight color mismatch.

   Builder Repair Responsibility

   Builder will finish repair areas as indicated above.

3. Common Defect or Problem

   Ceiling not painted originally or after repair.

Performance Standard

Industry standards do not require painting of ceiling unless specified in contract or specifications. Ceiling drywall repairs do not require painting if the painting of ceilings was not specified in the contract.

Builder Repair Responsibility

None, unless ceiling painting was specified in the contract or specifications.

4. Common Defect or Problem

Deterioration of varnish, polyurethane or lacquer finishes.

Performance Standard

Natural finishes on interior woodwork shall not deteriorate during the first year of the warranty period. However, varnish type finishes used on the exterior will deteriorate rapidly and are not covered by the warranty. Millwork and floors must be cared for like furniture and cannot be scrubbed.

Builder Repair Responsibility

Builder will refinish affected areas of interior woodwork, matching the color as closely as possible.

5. Common Defect or Problem

Insufficient coats applied.

Performance Standard

Builder is responsible to apply the number of coats specified in the contract. Pre-priming of millwork or trim does count as one coat.

Builder Repair Responsibility

Builder to provide the proper number of coats as per contract.

6. Common Defect or Problem

Paint and stain inside closet not of quality of other interior surfaces.

Performance Standard

Quality of workmanship may be lower in confined quarters where space limitations affect ability of workmen to work freely.

Builder Repair Responsibility

Paint and stain in a proper workmanlike manner within limitations stated above.

7. Common Defect or Problem

Mildew or fungus on painted surfaces.

Performance Standard

Mildew or fungus will form on a painted surface if the structure is subject to abnormal exposures or excessive moisture.

Builder Repair Responsibility

Mildew or fungus formation is a condition the builder cannot control and is a homeowner maintenance item.

8. Common Defect or Problem

Color variation within similar woods.

Performance Standard

Since wood is a natural product and its grain structure is unique for each piece of wood, builder cannot guarantee an exact color match.

9. Common Defect or Problem

Color variations between different types of wood.

Performance Standard

Dissimilar woods cannot be matched exactly.

Builder Repair Responsibility

None.

10. Common Defect or Problem

Doors warp.

Performance Standard

The owner should note that during the initial building stabilization period, it is not unusual for doors to warp or twist and alternately stick or not close as the home goes

through its initial settling and drying period, especially over the first heating season. The builder is obligated only to make replacements after this initial stabilization

period, since often the door straightens in that process. Doors must be sealed on all six sides by the person contractually responsible for painting/staining.

All interior doors, closet doors, cabinet doors or drawers whose warpage exceeds the National Woodwork Manufacturers Association Standards (approximately ¼ " in

most cases), and where the warp cannot be corrected by adjustment of either jambs, stops, and/or hinges and cabinet catches to properly latch after initial stabilization period of the home, approximately the end of the first year, shall be replaced by the builder assuming the person responsible for painting/staining has sealed all six sides.

Builder Repair Responsibility

Adjust, upon request of the owner, one time only, preferably at the end of the warranty period, any doors that fail to operate properly, assuming that all six sides have been sealed by owner if owner was responsible for painting/staining. Replace any doors, which cannot be corrected to be within performance standards after stabilization. Refinishing to be the responsibility of party contractually responsible for painting/staining.

11. Common Defect or Problem

Wallcovering pulls loose.

Performance Standard

Wallcovering should not pull loose.

Builder Repair Responsibility

Provided the wallcovering is in the builder's contract, it should be repaired. If a patch must be made, builder shall match as closely as possible. Because of dye lot differences, owner must understand exact match may not be possible. If installed by owner, wallcovering repairs are the owner's responsibility.

12. Common Defect or Problem

Edge mismatching in pattern of wallcovering.

Performance Standard

Wallcovering should match as closely as possible.

Builder Repair Responsibility

Repair to meet performance standard. Because of dye lot differences, owner must understand that an exact match may not be possible.

PLUMBING STANDARDS

Background

Plumbing system installation is performed by licensed contractors in accordance with detailed plumbing code requirements. These code requirements were established primarily for individual and public health reasons.

1. Common Defect or Problem

   Leakage of any kind from piping

   Performance Standard

   No leaks of any kind should exist in any soil, waste, vent or water pipe. Condensation on pipes or sweating fixtures does not constitute a leak.

   Builder Repair Responsibility

   Builder shall make necessary repairs to eliminate leakage

2. Common Defect or Problem

   Faucet leak or valve leak

   Performance Standard

   No valve or faucet should leak.

   Builder Repair Responsibility

   Builder shall repair or replace the leaking faucet or valve. Washer or cartridge replacement is a homeowner's responsibility after the first year.

3. Common Defect or Problem

   Water pipe banging/water hammer

   Performance Standard

   There can be some instances when the electric valves on appliances or single control valves are shut off fast, which can cause some banging. All noises due to water flow and pipe expansion cannot be removed.

   Builder Repair Responsibility

Builder is responsible to have pipes fastened properly

1. Common Defect or Problem

Fixtures do not hold water.

Performance Standard

Stoppers on fixtures should retain water for a sufficient length of time to accomplish the fixture's intended use.

Builder Repair Responsibility

Builder to correct until fixture holds water to meet Performance Standard.

5. Common Defect or Problem

Cracking, scratches or chipping of porcelain, fiberglass surfaces or faucets.

Performance Standard

Chips, cracks and scratches on surfaces of bathtubs, kitchen sinks and faucets can occur when surfaces is hit with sharp or heavy objects.

Builder Repair Responsibility

Builder shall repair any fixture or fitting which is outside acceptable standards as defined by the manufacturer. Builder will not be responsible for repairs unless damage has been reported to builder in writing at preoccupancy inspection prior to closing.

6. Common Defect or Problem

Stopped-up sewers, fixtures, and drains

Performance Standard

Sewers, fixtures, and drains should operate properly to accomplish their intended function.

Builder Repair Responsibility

Builder will not be responsible for sewers, fixtures, and drains, which are clogged through natural causes or the homeowner's negligence. If a problem occurs, the homeowner should consult builder for a proper course of action. Where defective construction is shown to be the cause, builder will assume the cost of the repair where homeowner negligence is shown to be the cause, the homeowner shall assume all repair costs.

7. Common Defect or Problem

Waste disposal unit does not operate properly.

Performance Standard

Disposal unit must accomplish its intended function.

Builder Repair Responsibility

Builder will repair any defective fixture or fitting which does not meet acceptable standards, as defined by the manufacturer, unless caused by homeowner negligence.

8. Common Defect or Problem

Sump pump does not operate.

Performance Standard

Sump pump should reasonably be expected to perform for a one-year period satisfactorily, unless unusual conditions such as underground springs or high water tables are encountered. Owner is responsible for maintaining a proper grade and downspout extensions should be used to keep water from pooling near foundation.

Builder Repair Responsibility

Builder shall repair or replace malfunctioning sump pump, except under unusual conditions.

9. Common Defect or Problem

Inadequate flushing of toilets.

Performance Standard

It is not unusual for a toilet to be flushed twice due to energy conservation fixtures.

Builder Repair Responsibility

None, unless it is a manufacturer's defect or plumbing clog which is the cause.

10. Common Defect or Problem

Plumbing pipes freeze and burst.

Performance Standard

Drain, waste, and vent, and water pipes shall be adequately protected, as required by applicable code, during normally anticipated cold weather, and as defined in accordance with ASHRAE design temperatures, to prevent freezing.

Builder Repair Responsibility

Builder will correct situations not meeting the code. It is the homeowner's responsibility to drain or otherwise protect lines and exterior faucets and hose bibs even if they have an anti-siphon valve attached) exposed to freezing temperatures.

11. Common Defect or Problem

Condensation (sweating) of pipes.

Performance Standard

Condensation (sweating) in normal and may occur most often in well water systems due to the extreme cold temperature (45-50 degree of water) of well water and humid basements.

Builder Repair Responsibility

None, unless pipe is leaking. A dehumidifier and pipe and tank insulation can be added by the owner.

Common Defect or Problem

Defective appliance or fixtures supplied by owner.

Performance Standard

Any appliances or fixtures supplied by the owner will not be warranted for leakage, etc. by the builder. There may be some instances where a plumber will not install an owner's fixtures if the fittings are not proper.

Builder Repair Responsibility

None.

ROOFING STANDARDS

Background

The purpose of roofing material is to form a weatherproof surface, which prevents water or snow from entering the house. The materials used must be both waterproof and wind-resistant to afford effective protection of the dwelling.

Roofing materials have various life expectancies. Life expectancy is dependent upon building orientation to the sun and roof slope. The manufacturer provides a written warranty for each particular product, which delineates what, is and is not covered. Although the sun is the major damaging force, wind and moisture also causes deterioration.

There are several types of roofing material used including asphalt, glass fiber, asbestos, wood tile and slate. The normal measurement of shingling material is the "square" which represents enough material to cover 100 square feet of roof area. Most manmade roofing materials are sold on the basis of longevity rather than weight and can be divided into several categories: organic vs. fiberglass, standard, laminated and specialty.

Wood shakes, slate, and tile roofs each have a specific method of installation recommended by manufacturer.

Shingle underlayment must be applied directly to roof boards. The purpose for this underlayment is as a secondary barrier to your roof covering.

Roofs or flashing should not leak under normally anticipated conditions. However, occasionally leakage may result from severe weather conditions, such as ice buildup, high winds, or driving rain.

During extreme weather conditions, water may overflow the gutters. Homeowners should check gutters and downspouts regularly to prevent leaf build-up in fall and snow and ice dams in the winter, which can cause water to backup under shingle and cause leaks.

Storm damage to properly installed roofing is the owner's responsibility.

It must be noted that in the case of a repair to a roof, every effort should be made by the builder to match material and color as closely as possible. The homeowner must expect color variations.

1. Common Defect or Problem

   Roof leaks.

   Performance Standard

Roof should not leak. See homeowner's maintenance responsibility below. The integrity of the roof is dependent upon the performance of many trades. Roof

application, sheet metal work, siding application, masonry, carpentry and plumbing can all have an effect on the ultimate performance of the roof system.

Builder Repair Responsibility

When a leak appears, builder should make an inspection to assure that the proper trade makes the repair, except when the leakage is a homeowner's maintenance responsibility.

Homeowner Maintenance Responsibility

Excessive ice or snow buildup with alternate freezing and thawing can create a condition causing leakage, which is a homeowner maintenance responsibility. Owner can correct this by preventing leaf buildup gutters and removal of excess snow and ice. In severe cases, a gutter heating cable can be used. On some occasions, a driving rain with high wind velocity can produce a temporary leak. Owner can also contract builder as to alternative suggestions on how to correct.

2. Common Defect or Problem

Chimney or chimney flashing leaks

Performance Standard

Chimney or chimney flashing should not leak.

Builder Repair Responsibility

Builder to check and repair chimney flashing. On particularly persistent and severe leaks, the builder may find it necessary to modify, or install a saddle between the roof and the chimney to divert roof water run off from the chimney. If the flashing is not the cause of the leak, owner is responsible to seal masonry.

3. Common Defect or Problem

Shingles blow off.

Performance Standard

Shingles should not blow off during the warranty period except under storm conditions. It should be noted that seal down shingles require heat from the sun to cause their sealing, so that some warm weather is required to affect the full seal.

Builder Repair Responsibility

Builder to repair shingles that have blown off if not due to winds in excess of basic wind speeds (see codes). In a repair situation, the owner is cautioned that a color mismatch in shingles may occur.

4. Common Defect or Problem

   Shingle color mismatch.

   Performance Standard

   Color variations in roofing materials are normal and acceptable and are not covered under any warranty. Angle of the sun, granule placement, pitch of the roof, any many variables can all have an effect on the appearance of the roof.

   Builder Repair Responsibility

   None.

5. Common Defect or Problem

   Broken shingles.

   Performance Standard

   Broken shingles must be replaced if reported to builder in writing prior to occupancy.

   Builder Repair Responsibility

   Builder to repair and match shingles as closely as possible.

6. Common Defect or Problem

   Standing water on flat roof.

   Performance Standard

   Flat roofs must be installed according to manufacturer's specifications.

   Builder Repair Responsibility

   Builder to repair to manufacturer's specifications.

7. Common Defect or Problem

   Moss and fungus growth on wood shake shingles.

   Performance Standard

Under some conditions, moss and fungus tends to grow on cedar shake shingles.

Builder Repair Responsibility

None. Homeowners may wish to pursue remedies on the market that can be applied

to shingles to prevent or retard these conditions.

8. Common Defect or Problem

Skylights leak.

Performance Standard

Skylights should not leak.

Builder Repair Responsibility

Builder to repair. Care should be taken not to confuse condensation for leakage. Refer to Moisture Section #5.

9. Common Defect or Problem

Roof vents leak.

Performance Standard

Under driving rains or snow conditions, vents may leak. Vents are a necessary and integral part of a building. Anything that lets air out can, under certain circumstance, let snow or rain back in.

Builder Repair Responsibility

This is a normal, temporary condition, which should require no repair.

10. Common Defect or Problem

Ridges of roof decking showing through roof.

Performance Standard

If the ridge or depression effect exceeds 3/8" and cannot be corrected from below, the ridge must be corrected. The ridge measurements should be made by measuring the gap created when a 6" straight edge is placed tightly 3" on one side of the defect and the gap measured between the roof and the straight edge of the other end. Fiberglass shingles will magnify and mirror any uneveness of the roof decking below.

Builder Repair Responsibility

Builder to meet Performance Standard

11. Common Defect or Problem

Chimney flashing leaks.

Performance Standard

Chimney flashing should not leak. However, some masonry is porous, allowing moisture/dampness to seep in under certain conditions.

Builder Repair Responsibility

Builder to check and repair chimney flashing. If the flashing is not the cause of the leak, owner is responsible to seal masonry. On particularly persistent and severe leaks, the builder may find it necessary to modify, or install a saddle between the roof and the chimney to divert roof water run off from the chimney.

12. Common Defect or Problem

Any other flashings, valleys, roofing leak.

Performance Standard

Flashings, valleys, and roofing should not leak.

Builder Repair Responsibility

Builder to repair.

13. Common Defect or Problem

Gutters and downspouts leak.

Performance Standard

Gutters and downspouts should not leak, but may overflow during heavy rains. It shall be the owner's responsibility to keep gutters and downspouts free of leaves and debris which could cause excessive overflow.

Builder Repair Responsibility

Builder to repair so gutters and downspouts do not leak.

14. Common Defect or Problem

Water stands in gutters.

Performance Standard

A water level not in excess of 1" depth in any gutter section after the rain ceases when unobstructed by debris is acceptable. Industry practices is to install gutter

approximately level without pitch. Consequently, it is entirely possible that small amounts of water will stand in certain sections of the gutter after a rain.

Builder Repair Responsibility

Builder shall correct when water level is in excess of ½" in depth.

SIDING STANDARDS

Background

There are numerous types of siding. Wood and wood products, aluminum and vinyl are the most prevalent types being used. Each product is different and has its own inherent characteristics.

It should be noted that caulk does not adhere to vinyl siding and thus, as per manufacturer's recommendation, vinyl is not caulked. Caulking is an owner's maintenance responsibility after one repair.

1. Common Defect or Problem

   Aluminum siding buckles or ripples.

   Performance Standard

   This problem may be inherent due to the shrinkage of the wood underneath. Siding should not be ¼" out of plane in an 8' length. This can be measured by laying an 8' straight edge at the highest point of the buckle.

   Builder Repair Responsibility

   Builder to repair to meet Performance Standard.

2. Common Defect or Problem

   Dents, chips, or scratched on the aluminum/vinyl siding.

   Performance Standard

   Dents are to be noted in writing at the time the owner closes or takes occupancy of the home.

   Builder Repair Responsibility

   Builder to repair within one year of initial closing- if notified prior to occupancy. It should be noted that repaired area may not match in color and/or textures.

3. Common Defect or Problem

   Siding comes loose.

Performance Standard

Siding should not come loose.

Builder Repair Responsibility

Builder to refasten.

4. Common Defect or Problem

Caulking cracks.

Performance Standard

All types of caulk can dry out. Builder to remove old caulk and replace with new caulk at cracked areas one time during first year. After the one repair, caulking becomes an owner maintenance responsibility.

Builder Repair Responsibility

Builder to repair to Performance Standard one time during the first year

5. Common Defect or Problem

Fading of aluminum or vinyl siding.

Performance Standard

Aluminum and vinyl siding will fade.

Builder Repair Responsibility

None.

6. Common Defect or Problem

Wood shrinks, cracks, twists, bows and knots fall out.

Performance Standard

Due to the inherent characteristics of wood, all of the above may happen.

Builder Repair Responsibility

Builder will caulk knotholes one time and any gaps in excess of ¼" shall be caulked if noted prior to occupancy. After occupancy, this is a homeowner maintenance responsibility.

7. Common Defect or Problem

Wood siding splits where nail penetrates siding.

Performance Standard

If noted in writing to builder prior to occupancy, builder to replace piece and restrain, if staining was builder's responsibility.

Builder Repair Responsibility

Builder to repair in accordance with Performance Standard.

8. Common Defect or Problem

Lap on wood bevel siding.

Performance Standard

Lap shall be no less than ¾" prior to shrinkage.

Builder Repair Responsibility

Repair to meet Performance Standard.

9. Common Defect or Problem

Delamination of veneer siding.

Performance Standard

All siding should be installed according to manufacturers and industry's accepted standards. Delaminations shall be repaired or replaced. If owner is responsible for staining or painting of exterior surfaces and does not do it, builder is not responsible for delamination.

Builder Repair Responsibility

Builder will repair or replace siding as needed unless caused by homeowner's neglect to maintain siding properly. Repaired area may not match in color and/or texture. For surfaces requiring paint, builder will paint only the new materials if builder was responsible for exterior painting or staining. The homeowner can expect that the newly painted surface may not match the original surface in color.

10. Common Defect or Problem

Paint peels or fades on wood siding.

Performance Standard

Exterior paints or stains should not fail during the first year warranty. However, fading is normal and the degree is dependent on climatic conditions.

Builder Repair Responsibility

If paint or stain peels and builder is responsible for painting, builder will properly prepare and refinish affected areas, matching color as close as possible. Where finish deterioration affects the majority of the area, the whole area will be refinished. The builder shall repaint in accordance with standards of good workmanship, but no warranty will be extended on the newly repainted surfaces.

11. Common Defect or Problem

Cracks in exterior stucco wall surfaces.

Performance Standard

Cracks are not unusual in exterior stucco wall surfaces.

Builder Repair Responsibility

Builder will repair exceeding 1/8" in width or where causing water damage.

WINDOW STANDARDS

Background

Air infiltration around double-hung and slide by windows.

Homeowners are cautioned not to use razor blades when cleaning windows.

1. Common Defect or Problem

   Scratches, cracks, or breakage of glass not caused by vandalism.

   Performance Standard

   If glass damage is not reported to builder in writing prior to occupancy, it is the homeowner's responsibility.

   Builder Repair Responsibility

   Builder to repair only if noted in writing prior to occupancy.

2. Common Defect or Problem

   Holes in screens not caused by vandalism.

   Performance Standard

   If screen damage is not reported to builder in writing prior to occupancy, it is the homeowner's responsibility.

   Builder Repair Responsibility

   Builder to repair only if noted in writing prior to occupancy.

3. Common Defect or Problem

   Window check rails not even or flush.

   Performance Standard

   Acceptable tolerance is 3/16".

   Builder Repair Responsibility

Builder to correct

4. Common Defect or Problem

Out of plumb windows.

Performance Standard

Windows must operate with reasonable ease as designed.

Builder Repair Responsibility

Builder to repair to be operable.

5. Common Defect or Problem

Windows do not operate properly

Performance Standard

Windows shall operate with reasonable ease as designed.

Builder Repair Responsibility

Builder to correct as required.

6. Common Defect or Problem

Air infiltration around doors and windows.

Performance Standard

Drafts around the doors and windows are cold spot sources. Proper weatherstripping and insulating around these areas can minimize air passage. However, under certain temperature and wind conditions, some infiltration will be observed by the homeowner.

Builder Repair Responsibility

Builder to adjust poorly fitted doors, windows, and weatherstripping.

Common Defect or Problem

Moisture condensation on windows.

Performance Standard

Moisture condenses on the window since it is the coldest object in any given room with the glass having a much higher rate of heat transmission and, hence, being the colder surface during the normal heating season. Moisture condensation on windows is an indication of either too much moisture in the room, or poor circulation of the moisture that is present. The owner can minimize this condition by merely opening the window to permit the excess moisture to escape or by installing a dehumidfying system if the condition persist. It should be noted that in homes with humidification equipment, the formation of moisture on the windows is an indication that the humidifying equipment is set too high and producing too much moisture. Screens should be removed from casement windows during the heating season.

Builder Repair Responsibility

None, except to explain to the owner more thoroughly how this condition is caused and to assist the homeowner in correcting the condition.

SKYLIGHT STANDARDS

Background

1. Common Defect or Problem

   Condensation on skylights

   Performance Standard

   All skylights can develop condensation due to high humidity levels.

   Builder Repair Responsibility

   Builder not responsible for humidity levels in home. Bathroom ventilating fans should always be used or window opened.

2. Common Defect or Problem

   Leaks around skylights.

   Performance Standard

   Skylights should not leak.

   Builder Repair Responsibility

   Builder to repair.

3. Common Defect or Problem

   Scratches, cracks, or breakage of glass to skylight not caused by vandalism.

   Performance Standard

   If glass damage is not reported to builder in writing prior to occupancy, it is the homeowner's responsibility.

   Builder Repair Responsibility

Builder to repair only if noted in writing prior to occupancy.

4. Common Defect or Problem

Discoloration on plastic skylight windows.

Performance Standard

This is inherent in the product.

Builder Repair Responsibility

None.

SITE DRAINAGE AND EROSION

Background

Site drainage must comply with all applicable building codes in jurisdiction. All sites must be prepared initially to prevent or reduce erosion from excessive water run off. Homeowner maintenance is required after possession of site.

1. Common Defect or Problem

   Heavy rains will cause erosion where grass and sod has not had time to be permanently established.

   Additional landscaping by homeowner or his agent's can change the topography of site.

   Performance Standard

   The defects or problems can be determined by visual inspection or by additional Information gathered at site inspection.

   Builder Repair Responsibility

   Repair to original finish as closely as possible.

   Repair will be made no more than one time during first year.

SHERWIN WILLIAMS

Technical Data Sheet

Optimus Plus™ Interior Latex Flat B30 Series

Optimus Plus Interior Latex Flat is an economical flat wall paint designed to meet the demanding expectations of the new residential construction market. This product is recommended for new construction and repaints on interior drywall, wood and concrete block. Optimus Plus provides a smooth uniform flat finish with good hiding and touch-up characteristics.

PRODUCT CHARACTERISTICS

Color:	Pure White, Soft Shell, Off White, Aria Ivory, Antique Linen, Canvas Tan	
Sheen:	0 - 2 units @ 85°	
Coverage:	350-400 sq ft/gal 4.5 mils wet; 1.4 mils dry	
Drying Time @ 77°F, 50% RH	To touch:	1 hour
	To recoat:	4 hours
Flash Point:	N/A	

Tinting Information:	oz/gal	Strength
Pure White	0-3	100%

B30WW6101

Volume Solids	22% ± 2%
Weight Solids:	37% ± 2%
Weight Per Gallon	11.0 lb
VOC: (less exempt solvents)	53 g/L; 0.45 lb/gal

APPLICATION

Brush:	No reduction necessary. Use quality nylon brush.
Roller:	No reduction necessary. Use a 3/8" to 1/2" woven cover.
Spray - Airless	
Reduction:	Not recommended
Pressure:	2000 psi
Tip:	.017" to .021"

APPLICATION SPECIFICATIONS

WARNING! Removal of old paint by sanding, scraping or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup. For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority.

Remove all surface contamination by washing with ProClean Professional® Prep Wash Concentrated Cleaner or other appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with PrepRite ProBlock Primer Sealer.

Previously Painted Surfaces: Remove all loose coatings and corrosion by scraping or sanding. Remove all surface contaminants by washing with appropriate cleaner. Fill nail holes and cracks in drywall with spackling paste and sand smooth. Dull glossy and non-porous surfaces with sandpaper or abrasive deglosser. Spot prime patches with PrepRite High Build Interior Latex Primer/Surfacer, B28W601. Finish with one or two coats of Optimus Plus Latex Flat Wall Paint.

SHERWIN WILLIAMS

Technical Data Sheet

Optimus Plus™
Interior Latex Flat
B30 Series

Unpainted Wood:
Prime with one coat of PrepRite Wall and Wood Primer, B49W2 and finish with one or two coats of Optimus Plus Latex Flat Wall Paint.

Unpainted Drywall:
Remove all surface contaminants. Joint compound must be cured and sanded smooth. Prime with one coat of PrepRite High Build Interior Latex Primer/Surfacer, B28W601 and finish with one or two coats of Optimus Plus Latex Flat Wall Paint.

Unpainted Concrete Block:
Surfaces must be thoroughly cured according to supplier's recommendations. Remove all surface contaminants and prime with one coat of PrepRite Classic, B28W101 or where a smoother finish is desired, fill block with one coat of PrepRite Interior/Exterior Block Filler, B25W25. Finish with two coats of Optimus Plus Latex Flat Wall Paint.

Mildew
Remove before painting by washing with ProClean Professional® Mildew Eliminator or a solution of 1 part liquid bleach and 3 parts water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking
Gaps between walls, ceilings, crown moldings, and other interior trim can be filled with ProSelect® Premium Siliconized Acrylic Latex Caulk 1100A after priming the surface.

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. Flush spray equipment after cleaning with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

CAUTIONS

Interior use only.
Protect from freezing.
Do not apply at temperature below 50°F
This product meets all current ecological and lead hazard regulations.
Non-Photochemically reactive.
Use only with adequate ventilation.
Avoid contact with eyes and skin.
See label for additional cautions.
DO NOT TAKE INTERNALLY
KEEP OUT OF THE REACH OF CHILDREN
16 00 B30WW6101 4/23/2003

PRODUCTS

Color	Rex	SMIS	Size
Pure White	B30WW6101	6011-21304	5's
Soft Shell	B30HV6411	6011-36393	5's
Off White	B30HV6436	6011-36385	5's
Aria Ivory	B30HV6456	6011-36351	5's
Antique Linen	B30HV6425	6011-36377	5's
Canvas Tan	B30HV6450	6011-36369	5's

Technical Data Sheet
Master Hide
Interior Latex Semi-Gloss
B31WW5251

Master Hide Interior Latex Semi-Gloss is specifically formulated to meet the demands of today's new homebuilder, where a semi-gloss durable finish is desired. The Master Hide Interior Latex Semi-Gloss also meets the expectations of the professional applicator, providing a uniform appearance and can be applied to various substrates. An excellent product for new construction or repaint.

PRODUCT CHARACTERISTICS

Color:	Extra White and Tints	
Sheen:	25 - 30 units @ 60°	
Coverage:	400 sq ft/gal 4.0 mils wet; 1.3 mils dry	
Drying Time @ 77°F, 50% RH	To touch: To recoat:	1 hour Overnight
Flash Point:	N/A	

Tinting Information:	oz/gal	Strength
Extra White	0-4	100%

B31WW5251

Volume Solids	33% ± 2%
Weight Solids:	41% ± 2%
Weight Per Gallon	9.9 lb
VOC: (less exempt solvents)	61 g/L; 0.50 lb/gal

APPLICATION

Brush:	No reduction necessary Use quality nylon brush
Roller:	No reduction necessary Use a 1/4" to 3/8" woven cover
Spray - Airless	
Reduction:	Not recommended
Pressure:	2000 psi
Tip:	.015" to .019"

APPLICATION SPECIFICATIONS

WARNING! Removal of old paint by sanding, scraping or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup. For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority.

Remove all surface contamination by washing with ProClean Professional® Prep Wash Concentrated Cleaner or other appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with PrepRite ProBlock Primer Sealer.

Previously Painted Surfaces:
Remove all loose coatings, dirt, grease and other foreign matter. Repair and fill cracks in wallboard with patching compound. Spot prime with PrepRite® 200 Latex Primer, B28W200. Dull glossy surfaces by lightly sanding. Finish with one or two coats of Master Hide Interior Latex Semi-Gloss.

Unpainted Wood:
Prime with one coat of PrepRite Wall and Wood Primer, B49W2 and finish with one or two coats of Master Hide Interior Latex Semi-Gloss.

Technical Data Sheet

Master Hide
Interior Latex Semi-Gloss
B31WW5251

Unpainted Drywall:
Remove all surface contaminants. Joint compound must be cured and sanded smooth. Prime with one coat of MasterPrep Interior Acrylic Latex Primer/Undercoater and finish with one or two coats of Master Hide Interior Latex Semi-Gloss.

Unpainted Concrete Block:
Surfaces must be thoroughly cured according to supplier's recommendations. Remove all surface contaminants and prime with one coat of PrepRite Classic, B28W101 or where a smoother finish is desired, fill block with one coat of PrepRite Interior/Exterior Block Filler, B25W25. Finish with one or two coats of Master Hide Interior Latex Semi-Gloss.

Mildew:
Remove before painting by washing with ProClean Professional® Mildew Eliminator or a solution of 1 part liquid bleach and 3 parts water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking:
Gaps between walls, ceilings, crown moldings, and other interior trim can be filled with Pro Select® Premium Siliconized Acrylic Latex Caulk 1100A after priming the surface.

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. Flush spray equipment after cleaning with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

CAUTIONS

Interior use only.
Protect from freezing.
Do not apply at temperature below 50^0F.
This product meets all current ecological and lead hazard regulations.
Non-Photochemically reactive.
Use only with adequate ventilation.
Avoid contact with eyes and skin.
See label for additional cautions.
DO NOT TAKE INTERNALLY
KEEP OUT OF THE REACH OF CHILDREN
01 00 B31WW5251 4/24/2003

PRODUCTS

Color	Rex	SMIS	Size
Extra White	B31WW5251	6011-37409	1's
Extra White	B31WW5251	6011-37417	5's

Carpet Care
Preventive Maintenance
Vacuuming
Spot and Spill Removal
Overall Cleaning
R2X Stain & Soil Remover
Area Rug Care
Ceramic Care
Hardwood Care
Laminate Care
Warranty Registration

Care & Maintenance: Carpet Care

Protect your carpet--step by-step
With the exceptional quality of Shaw's carpet, your carpet could "ugly" out long before it "wears" out. Make sure it doesn't with a comprehensive care program made up of four parts:

- Preventive Maintenance - protect your investment before problems occur.
- Vacuuming - the most important step in caring for your carpet.
- Spot and Spill Removal - because, let's face it, they just can't always be avoided.
- Overall Cleaning - because vacuuming doesn't get everything.
- R2X Stain & Soil Remover - R2X Stain & Soil Remover

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No carpet is absolutely stain proof
Some carpets have stain resistant treatments that improve your ability to clean stains, but not prevent stains. Similarly, carpets with soil resistant treatments reduce the rate of soiling, but all carpets require regular care and maintenance. Click here to learn about Shaw's own breakthrough in carpet soil and stain resistance technology, R2X.

Staining versus soiling
There is often confusion about the difference between soiling and staining carpet. The majority of stain complaints are actually soil related. For example, many sugar-based spills, such as soft drinks and coffee, leave a sugar residue after removal. This sticky residue readily attracts soil from ordinary shoe traffic, and the resulting discolored area appears to be a stain.

The same thing happens when spills are cleaned with a detergent solution and the area is not sufficiently rinsed with plain water, leaving a sticky detergent residue. It is important to rinse thoroughly with water and blot dry after removing any spill.

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Carpet Care: Preventative Maintenance

New flooring represents a substantial investment. The proper steps will make sure it stays attractive for years to come.

Place walk-off mats at all entrances
Walk-off mats should be used at the exterior of all entrances to absorb the soil and moisture. They can help trap the excessive dirt, sand, grit, and other substances such as oil, asphalt, or driveway sealer that would otherwise be tracked into the home. Mats should also be cleaned on a regular basis so they don't become sources of soil themselves.

Use a quality pad
You should always use a quality pad under your carpet, particularly on stairs. A good carpet pad not only gives better resilience and comfort underfoot, it can extend the life of your carpet. Because some carpets carry warranties with specific density and thickness requirements, be sure and review your warranty before purchasing your pad. Click here to learn about Shaw's Soft Foundations line of carpet cushion.

Occasionally move heavy furniture
Move heavy furniture occasionally to avoid excessive pile crushing. You should also use floor protectors designed for carpet under the legs of tables, chairs, and other furniture to help distribute the weight. Do not use chairs or appliances with rollers or casters without a chair pad designed specifically for carpet or damage can occur.

Protect carpet when moving furniture
When moving heavy wheeled furniture (pianos, buffets, etc.), prevent damage by placing a protective barrier of heavy cardboard or plywood between the wheels and the carpet.

Clean your area rugs
If you use area rugs on your carpet, be sure to clean them regularly. Clean and restore the pile of the carpet underneath as well. Also, be sure to check area rugs for colorfastness before placing them on carpet because the color in some rugs may bleed through. After cleaning your carpet, allow it to dry completely before replacing rugs.

Reduce periods of direct sunlight

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Protect your carpet from prolonged periods of direct sunlight with blinds, shades, or awnings.

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Carpet Care

Preventive Maintenance
Vacuuming
Spot and Spill Removal
Overall Cleaning
R2X Stain & Soil Remover

Area Rug Care

Ceramic Care

Hardwood Care

Laminate Care

Warranty Registration

Carpet Care: Vacuuming

The most important step in caring for your carpet is vacuuming. Vacuum carpet thoroughly and frequently, particularly in high-traffic areas. Realize that walking on soiled carpet allows the soil particles to work their way below the surface of the pile where they are far more difficult to remove and can damage the carpet fibers. Frequent vacuuming removes these particles from the surface before problems occur.

For rooms with light traffic, vacuum the carpet traffic lanes twice weekly and the entire area once weekly. In areas with heavy traffic, vacuum the carpet traffic lanes daily and the entire area twice weekly. Up to three passes of the machine will suffice for light soiling, but five to seven passes are necessary for heavily soiled areas. Change the vacuuming direction occasionally to help stand the pile upright and reduce matting.

Check the quality of your vacuum
A good vacuum cleaner is vital to prolonging the beauty and life of your carpet. An inexpensive machine can remove surface dirt but will not effectively remove the hidden dirt and particles embedded in the pile.

To ensure that your vacuum will conform to the highest industry standards, make sure that your vacuum cleaner is certified through the Carpet and Rug Institute (CRI) Vacuum Cleaner Indoor Air Quality Program. Visit www.carpet-rug.org for details and listings.

Select the best vacuum for your type of carpet
Shaw recommends using vacuums with a rotating brush or combination beater/brush bar that agitates the carpet pile and mechanically loosens soil for removal. Carpet with thick loop pile construction, particularly wool and wool-blend styles, may be sensitive to brushing or rubbing of the pile surface and may become fuzzy. For these products, Shaw recommends a suction-only vacuum or a vacuum with an adjustable brush lifted away from the carpet so it does not agitate the pile. A vacuum with a beater/brush bar can be tested for excessive fuzzing in an inconspicuous location before regular use.

Pay attention to vacuum bags
Replaceable paper vacuum bags do a better job of trapping small particles than cloth bags. With cloth bags, the particles pass back into the room. High efficiency vacuum bags, also called micro filtration bags, trap even smaller microscopic particles such as mold and mildew spores and dust mite byproducts, which are often found to be a source of allergies. All vacuum bags should be checked often and replaced when half full.

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Check the belt and the setting
Make sure the belt is in good condition and that the brush or beater bar rotates when in contact with the carpet. To adjust the vacuum to the correct height setting for the carpet, raise the beater/brush bar to the highest setting and then lower it until it contacts the pile enough to slightly vibrate the carpet several inches away from the machine, but not low enough to cause significant slowing of the motor.

Change vacuuming directions
Change the vacuuming direction occasionally to help stand the pile upright and help reduce matting.

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Carpet Care: Spot and Spill Removal

Protect your carpet--step by-step
No carpet is stain proof, but since many are stain resistant, you have time to act. Look below to see if the specific spill you're trying to remove is listed. If so, you'll see instructions to help. If not, use the following general guidelines.

1. Remove as much of food spills as possible by scraping the carpet gently with a spoon or a dull knife.
2. Absorb wet spills as quickly as possible by blotting repeatedly with white paper or white cloth towels. Always blot; never rub or scrub abrasively, as a fuzzy area may result. When blotting, work from the outer edge in toward the center of the spot to avoid spreading the spill.
3. Remove the stain using one of the cleaning items from the checklist below.
4. Rinse the cleaned carpet area with water to remove detergent residue that may become sticky and cause rapid re-soiling.
5. Absorb any remaining moisture by placing several layers of white towels over the spot and weighing them down with a heavy object. This step is necessary even when the carpet doesn't seem particularly damp.

Select a specific stain Select Go

What do you use to clean the spill? Be prepared with the following checklist.
You should use the following items for handling spills on your carpet. It's important to use only the items listed, because many other household cleaners contain chemicals that may permanently damage your carpet..

White cloths or white paper towels

Detergent solution
Mix mild liquid detergent with water (no more than 1/4 teaspoon of detergent to 32 ounces of water). A clear, non-bleach liquid dishwashing detergent such as Dawn, Joy, or clear Ivory is recommended. Do not use detergents that are cloudy or creamy because they may leave a sticky residue.

Vinegar solution
Mix 1 part white vinegar to 1 part water.

Ammonia solution
Mix one tablespoon of ammonia to one cup of water. (Do not use on

wool or wool-blend carpets.)

Non-oily nail polish remover

Chewing gum remover (freeze or solid type)

Spot Remover
Use spot removers designed specifically for grease, oil, or tar, such as Carbona or Energine.

Solution-dyed fibers can withstand bleach, but do you know if your carpet is solution-dyed?
Difficult stains on carpets made from polypropylene or other solution-dyed fibers may be removed with a mild bleach solution (one part chlorine bleach to five parts water). But be careful. If you aren't absolutely certain your carpet is solution dyed, call Shaw's Information Center at 1-800-441-Shaw.

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Carpet Care: Overall Cleaning

Vacuuming alone won't protect your carpet
Even though vacuuming can remove most soil, it is also necessary to clean your carpet on a regular basis to remove the oily, sticky soil that vacuums don't remove. These soils result from cooking vapors, air pollution, and tracked-in dirt from outside. The particles of oily soil deposited on carpet fibers can cause gradual but significant dulling of colors. The color isn't lost, but is hidden under the film. If this type of soil is allowed to accumulate, it begins to attract and hold the dry soil.

If carpet is cleaned before it becomes too unsightly, the cleaning chore will be easier and more successful. Carpet in a typical household should be cleaned every 12 to 18 months, depending on the number of residents and amount of activity.

Choosing the proper cleaning system is important. Some systems may leave residues which accelerates re-soiling and defeats the whole purpose of cleaning. The recommendations below represent the best current knowledge and should help prolong the time between cleanings.

What cleaning system should you use? Shaw recommends the hot water extraction system.
Research indicates that the hot water extraction system provides the best capability for cleaning. This system is commonly referred to as "steam cleaning," although no steam is actually generated. The process consists of spraying a solution of water and detergent into the carpet pile and recovering the water and soil with a powerful vacuum into a holding tank. This can be done from a truck-mounted unit outside the home with only the hose and wand brought inside or by a portable system brought into the home.

Professional or do-it-yourself?
It is to your advantage to use professional carpet cleaners because their experience enables them to do a better job than you can do yourself. Their equipment has more extraction power than the rental units available to individuals, and the carpet should dry more quickly. True professionals also understand the equipment, know the proper cleaning agents for the situation at hand, and recognize the differences in fibers and carpet construction.

How do you locate a professional carpet cleaner?
One way to locate a professional carpet cleaner is to contact the Institute of Inspection, Cleaning and Restoration Certification (11CRC) at 1-800-835-4624. This organization maintains a national directory of independent professional cleaners who are trained and certified in a variety of cleaning specialties. Call and explain that you have purchased

a Shaw carpet, and be sure to ask for a cleaner near you who uses the "hot water extraction system."

If you prefer tackling the job yourself, check these do-it-yourself guidelines before you begin.

What about spot and stain removal?
Shaw's R2X Stain and Soil Remover is the only carpet cleaning product with the endorsement consumers have trusted for more than 100 years: the Good Housekeeping Seal. Because of our patented process, it's even easier to use than most spot cleaners. Learn more about R2X or order your bottle today.

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Carpet Care
Preventive Maintenance
Vacuuming
Spot and Spill Removal
Overall Cleaning
R2X Stain & Soil Remover
Area Rug Care
Ceramic Care
Hardwood Care
Laminate Care
Warranty Registration

R2X Removes Carpet Stains and Prevents Them from Reappearing!

Thank you for your interest in Shaw's R2X Stain & Soil Remover. Although our free sample promotion has ended, you can contact a retailer of Shaw floors near you or you can purchase a bottle of R2X directly from this website.

Please call our Information Center at 1-800-441-7429 to learn which retailers in your area carry this breakthrough in carpet cleaning.

If you've been looking for an easy way to care for your new carpet, you'll love R2X Stain & Soil Remover.

Just clean, blot dry...and forget about it!

While extensive testing by Shaw Technical Services has clearly proven the effectiveness and superiority of R2X Stain & Soil Remover, we also had a credible outside laboratory evaluate our product: the Good Housekeeping Institute, the respected appraiser of consumer products for more than 100 years. Shaw is proud to offer R2X Stain & Soil Remover as the only carpet cleaning product to carry the Good Housekeeping Seal.

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Carpet warranties don't have to be confusing.

Shaw's Star Selling System makes our warranties easy to understand and, even more importantly, easy to compare.

Shaw's Star Selling System is a labeling approach that assigns specific criteria for each of three carpet categories: 3-Star, 4-Star, and 5-Star. The system works across all of Shaw's residential carpet brands.

Although there are a few exceptions within categories, the packages of features and benefits for each of the star ratings are outlined below:



3-Star

Residential products in this carpet category may carry one or more of the following warranties:

- Shaw Limited 5-Year Quality Assurance Warranty (warranty against manufacturing defects)
- Limited 5-year generic stain warranty (Stain Safety™ or other)
- Limited 5-Year TEXTUREGARD® texture retention warranty, if the product meets stringent performance requirements and rating guidelines.

4-Star

Residential carpet products in this category may carry one or more of the following warranties:

- Shaw Limited 7-Year Quality Assurance Warranty
- Limited 7-year stain and soil warranty (either Shaw's R2X™ Stain and Soil Repellent, DuPont
- Stainmaster™, or Scotchgard™ Soil and Stain Release)

- Limited 7-year texture retention warranty, if the product meets stringent performance requirements and rating guidelines.

5-Star

Residential carpet products in this category may carry one or more of the following warranties:

- Shaw Limited 10-Year Quality Assurance Warranty
- Limited 10-year stain and soil warranty (either Shaw's R2X™ Stain and Soil Repellent, DuPont Stainmaster™, or Scotchgard™Soil and Stain Release)
- Limited 10-year texture retention warranty, if the carpet product meets stringent performance requirements and rating guidelines
- 30-Day Customer Satisfaction Guarantee
- 5-Star products are also backed with SoftBac®Platinum which carries a ten-year no-wrinkle/no re-stretch guarantee.

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Product Catalog Specifications

Product Specifications

Style Name	VIPER
Style Number	HF255
Product Type	CARPET
Description	"STAIN SAFETY" SAXONY CUT PILE
Size	12.00 X 150.00
Fiber / Brand	100% CONTINUOUS FILAMENT NYLON/HOME FOUNDATIONS
Pattern Repeat	
Face Weight	025.0
Thickness	0.52
Total Weight	057.0
Weight Density	43275
Density	0001731
Gauge	5/32
FHA/MEA	50776
Stiches (Contract Only)	08.80
Primary Backing (Contract Only)	POLYPROPYLENE
Secondary Backing (Contract Only)	POLYPROPYLENE

Special Features

...FOR STAIN REMOVAL ASSISTANCE CALL 1-800-441-7429

Product Data - Flammability

Pill Test	PASS
Radiant Panel	0
ASTM e-648	
NBS Smoke Density	
Flamming Mode	0
Non Flamming Mode	0

Static

Static	0
Type Static Control	TOPICAL

Electric Resistance (NFPA99)

Burroughs Method	N/A
IBM Method	N/A

FHA Data (UM44D)

Type	IF

Colors

Number	Name
55810	BLOSSOM
55712	BUCKEYE BROWN
55704	BUFFALO
55310	CACTUS
55116	DAWN BEIGE
55114	DESERT TAUPE
55170	DRIFTWOOD
55560	EBONY
55112	FAWN'S LEAP
55311	FIRTREE
55115	FOSSIL
55460	FRENCH BLUE
55110	GLACIER
55160	GOLDEN WHEAT
55510	GRANITE FALLS
55760	KIDSKIN
55711	MOCCASIN
55521	MORNING MIST
55113	PEBBLE RIDGE
55260	RAFFIA
55360	SAGE
55542	SHIPYARD
55161	SISAL
55111	SPLIT OAK
55710	STONE CANYON
55741	TWIG
55410	WATERCREEK
55811	WINEBERRY

Class 1

Warranties

HF: 5 YEAR STAIN SAFETY

HF: 10 YEAR QUALITY ASSURANCE WARRANTY

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STYLE: **WALDEN PARK** HF718
FIBER: 100% NYLON
WIDTH: 12

Collection: HOME FOUNDATIONS

Style Type: Pattern Loop

Product Features:

R2X® - Shaw's patented soil and stain repellent system achieves total fiber coverage--from the top of the yarn to the bottom.

* Because of differences in color calibration of different monitors, the colors depicted on this website may not be an exact representation of the true product color.

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R2X®--The ultimate stain protection

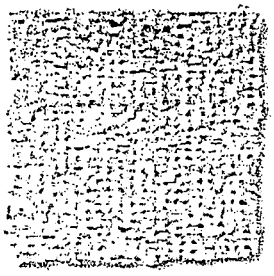
R2x®, Shaw's patented stain and soil resistance treatment provides unequaled protection against soiling and liquid spills. There is no better protection for your carpet - it's as simple as that.

R2X is the product of years of research and testing. Shaw's patented and exclusive R2X system goes beyond conventional repellents that only protect the surface of the carpet. With R2X, carpets are armed with total fiber coverage, offering complete protection from the top to the bottom of the yarn. This total fiber coverage offers unprecedented protection against household spills and everyday soiling. With R2X, spills that reach the base of the yarn don't penetrate and wick back to the top as they do with conventional solutions.

In testing, R2X demonstrated superior stain resistance on two levels. First, it provides better initial protection. Second, it allows more time to react to a problem.
Another significant benefit of R2X is its effectiveness with polypropylene. Most polypropylene carpets have an inherent tendency to attract soil. Topical soil treatments are only "skin deep," and the limited protection they offer wears away after cleaning or normal wear and tear. In contrast, R2X continues to perform well even after repeated cleanings--with both nylon and polypropylene--when the performance of ordinary systems begins to diminish. And of course, Shaw's warranty protection ensures customer satisfaction, time after time.

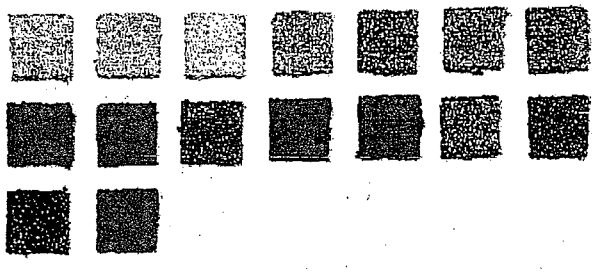
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Shaw Where Great Floors Begin



STYLE: **VILLAGE CREST (S)** HG742
FIBER: 100% NYLON
WIDTH: 12

16 Available Colors



Product Features:

R2X® - Shaw's patented soil and stain repellent system achieves total fiber coverage--from the top of the yarn to the bottom.

Honeywell Caress® - This fiber from the trusted Anso® nylon brand family combines softness and elegance in a carpet that will last.

Collection: HOME FOUNDATIONS

Style Type: Pattern Loop

* Because of differences in color calibration of different monitors, the colors depicted on this website may not be an exact representation of the true product color.

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Honeywell Anso Caress® - Softness and elegance in a carpet that will last

This fiber from the trusted Anso® nylon brand family takes carpet fiber to an exceptional level of softness and durability. The technology starts with nylon, the most durable carpet fiber. By reducing the diameter of the individual nylon fibers and tightly packing more fibers into each yarn bundle, Honewell has created a soft, durable carpet fiber.

Carpet made with Anso Caress® nylon offers consumers elegance, silky comfort, and long-lasting beauty.

Introduced over 36 years ago, Anso® nylon is the oldest continuously marketed fiber brand in the industry and has earned a trusted reputation for exceptional performance. Honeywell's high quality standards require carpets to meet strict construction standards and undergo certification testing prior to using the Anso® nylon label. Constantly developing and utilizing new technologies, the Anso® nylon brand family includes Anso CrushResister® III, Anso CrushResister® III TLC™, Anso CrushResister® III ACT™, Anso Caress®, Anso CHOICE!®, Anso Total Comfort®, Anso Infinity® and Anso Soft® nylon.

R2X®--The ultimate stain protection

R2x®, Shaw's patented stain and soil resistance treatment provides unequaled protection against soiling and liquid spills. There is no better protection for your carpet - it's as simple as that.

R2X is the product of years of research and testing. Shaw's patented and exclusive R2X system goes beyond conventional repellents that only protect the surface of the carpet. With R2X, carpets are armed with total fiber coverage, offering complete protection from the top to the bottom of the yarn. This total fiber coverage offers unprecedented protection against household spills and everyday soiling. With R2X, spills that reach the base of the yarn don't penetrate and wick back to the top as they do with conventional solutions.

In testing, R2X demonstrated superior stain resistance on two levels. First, it provides better initial protection. Second, it allows more time to react to a problem.
Another significant benefit of R2X is its effectiveness with polypropylene. Most polypropylene carpets have an inherent tendency to attract soil. Topical soil treatments are only "skin deep," and the limited protection they offer wears away after cleaning or normal wear and tear. In contrast, R2X continues to perform well even after repeated cleanings--with both nylon and polypropylene--when the performance of ordinary systems begins to diminish. And of course, Shaw's warranty protection ensures customer satisfaction, time after time.

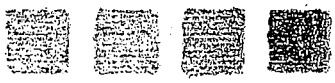
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STYLE: **VILLAGE CREST (B)** HG743
FIBER: 100% NYLON
WIDTH: 12

4 Available Colors



Collection: HOME FOUNDATIONS

Style Type: Pattern Loop 

* Because of differences in color calibration of different monitors, the colors depicted on this website may not be an exact representation of the true product color.

Product Features:

R2X® - Shaw's patented soil and stain repellent system achieves total fiber coverage--from the top of the yarn to the bottom.

Honeywell Caress® - This fiber from the trusted Anso® nylon brand family combines softness and elegance in a carpet that will last.

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R2X®--The ultimate stain protection

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STYLE: **BEST BET I 12' HF727**
FIBER: 100% NYLON
WIDTH: 12

Collection: HOME FOUNDATIONS

Style Type: Cut Pile

Product Features:

R2X® - Shaw's patented soil and stain repellent system achieves total fiber coverage--from the top of the yarn to the bottom.

* Because of differences in color calibration of different monitors, the colors depicted on this website may not be an exact representation of the true product color.

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R2X®--The ultimate stain protection

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ENGINEERED HARDWOOD FLOORS
Maintenance

Columbia Engineered Hardwood Floors are very easily maintained. No wax, no mess. Use Columbia's Hardwood Floor Cleaner and specialty terry cloth flooring mop available from flooring retailers.

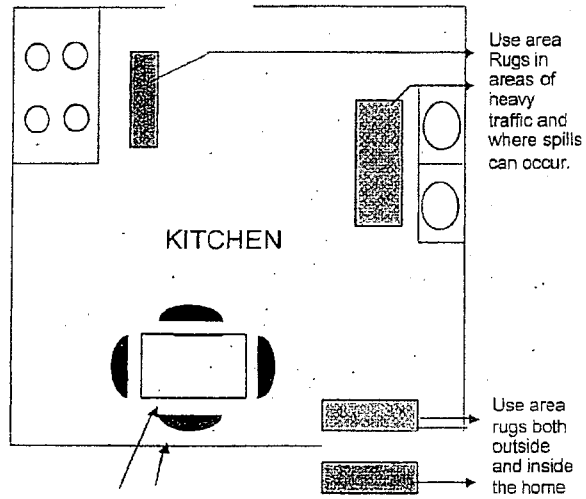
STEP ONE: Vacuum or sweep your floor to remove any particles that could scratch your floor.

Warning: Vacuums with beater bar or power rotary brush head can damage a wood floor and never should be used.

STEP TWO: Apply the cleaner directly to the terry cloth flooring mop, **not** to the floor!

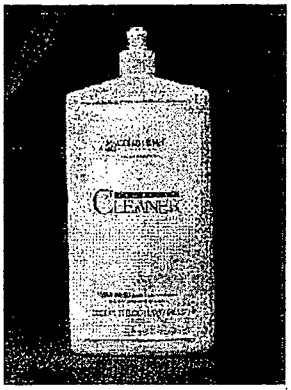
STEP THREE: Use a back and forth motion with the mop. When the terry cloth cover becomes soiled, simply replace it with a clean one. Cleaning the floor with a soiled cover could cause streaking. The covers are re-usable so simply throw the cover in the wash and dry it, as you would any towel.

FLOOR CARE DIAGRAM



12 easy steps to ensure satisfaction with your New Columbia Hardwood Floor.

- Vacuum or sweep regularly.
- Remove spills promptly using Columbia Floor Cleaner and a clean white cloth.
- Use felt protectors under heavy pieces of furniture and chairs.
- Use protective mats at all exterior entrances. (Do not use black rubber back mats.)
- Spiked heels or shoes in need of repair can severely damage your floor.
- Never wet or damp mop your wood floors. Water can cause damage to wood flooring.
- Never use oil soaps, wax, liquid or other household products to clean your floor.
- The sun's UV rays can change the color of your floor. Rearrange furniture and rugs periodically so that your floor will age evenly.
- Keep animal nails trimmed.
- Protect your floor when using a dolly for moving furniture or appliances. **Never slide or roll heavy furniture or appliances across the floor.**
- Never use steam cleaners on your wood floors. This will force moisture into the wood and can cause damage to your flooring.
- Use Columbia Performance Molding



Available at your local retailer.

ROA_02034

columbia FLOORING

Engineered and Solid Hardwood Flooring
Warranty & Maintenance

Congratulations on purchasing Columbia hardwood flooring. We make every effort to ensure your complete satisfaction, with the strongest guarantees in the industry on all of our engineered and solid hardwood floors.

Your protection doesn't end here. Columbia offers a complete floor-care system designed to help you maintain your hardwood floor. Read this booklet carefully. It contains all the warranty and care information you need to keep your Columbia hardwood floor looking beautiful for years.

Columbia Pre-Installation Warranty

Columbia hardwood floors are crafted to the highest quality standards. Every plank goes through numerous quality inspections. However, we urge you and your installer to inspect each plank for color, finish, and quality BEFORE installation. If you are not 100% satisfied with any hardwood plank prior to cutting it, just return the carton to your floor-covering retailer. Columbia will replace it at no charge. Note: All hardwood floors have an average 5% cutting waste allowance. Builder grade products (Adams and Taylor) are excluded from this warranty.

Columbia Full Lifetime Structural Warranty

Columbia's engineered cross-grained constructed products resist expansion and contraction due to climate. Each ply is fused under heat and pressure. In the unlikely event that our fused plies should separate, Columbia will replace the defective planks and install new ones at no cost to you for as long as you own your home.

Columbia Loss of Bond Warranty

Columbia Flooring offers two adhesive choices, Gator Glue™ and Columbia Flooring Urethane Adhesive for the installation of your hardwood flooring. Gator Glue is covered by the loss of bond warranty and provides easy troweling and clean up as well as a quick grab for an easy installation. Columbia Flooring Urethane Adhesive is covered by the loss of bond warranty and also offers a lifetime moisture warranty. This Columbia Flooring adhesive offers a high grab and is recommended for areas susceptible to subfloor moisture.

Columbia Full Lifetime Moisture Warranty

Columbia engineered hardwood flooring installed with our Columbia Flooring Urethane Adhesive is specifically designed to withstand the effects of subfloor moisture. If the subfloor is visually dry, without a history of moisture problems, and installed according to Columbia's installation instructions, Columbia will warrant the floor not to release from your subfloor due to subfloor moisture for as long as you own your home. Columbia will repair or replace the floor if it releases from the subfloor due to subfloor moisture (provided that testing approved by Columbia indicates that the moisture came through the subfloor). If the floor has a moisture failure a second time, we must conclude that the problem is specific to your installation and would happen again. Therefore, we will replace a floor due to subfloor moisture one time only. Specifically, you the purchaser are protected from:

- Unsightly cupping of the plank
- Buckling due to expansion
- Warping or twisting

Radiant Heat

In-Floor radiant heating systems can alter product performance due to surface temperatures if the proper installation guidelines are not followed. Please keep surface temperatures under 85°F for best results. Please see more information pertaining to radiant heat in Columbia's installation instructions. *Note: Do not install solid hardwood floors over radiant heat.*

Columbia 25-Year DiamondPlate Finish Warranty

Your Columbia hardwood flooring is protected by DiamondPlate, our exclusive, state-of-the-art, clear, aluminum oxide finish. This means that your floor, when maintained according to Columbia's care and maintenance recommendations, will not wear through the DiamondPlate aluminum oxide finish during the specified warranty period. See the warranty chart at right for all products.

Understanding Wood and its Installation will Help You Understand Your Columbia Warranties

Wood is a natural product, containing natural variations in color, shade and grain. Columbia cannot guarantee against natural variations in each plank, nor against minor differences between samples and the color of the floor once the floor has been installed.

In all cases, Columbia reserves the right to inspect any problem and to remove a sample, if required, for technical analysis.

Clearly, Columbia cannot be responsible for improper installation. To ensure your total protection under Columbia's written warranties, be sure your floor is installed according to Columbia's published installation guidelines for both engineered and solid products.

Warranties

PRODUCT	PRE-INSTALL	STRUCTURAL	MOISTURE	WEAR
Intermezzo Collection				
Braxton Oak	Yes	Lifetime	Lifetime	25 yrs
Rutledge Oak	Yes	Lifetime	Lifetime	25 yrs
Rodney Oak	Yes	Lifetime	Lifetime	25 yrs
Livingston Oak	Yes	Lifetime	Lifetime	25 yrs
Stockton Oak	Yes	Lifetime	Lifetime	15 yrs
Hopkins Oak	Yes	Lifetime	Lifetime	15 yrs
Ellery Oak	Yes	Lifetime	Lifetime	15 yrs
Bartlett Oak	Yes	Lifetime	Lifetime	10 yrs
Harrison Oak	Yes	Lifetime	Lifetime	10 yrs
Classics Collection				
Williams Maple	Yes	Lifetime	Lifetime	25 yrs
Gwinnett Pecan	Yes	Lifetime	Lifetime	25 yrs
Witherspoon Mpl	Yes	Lifetime	Lifetime	25 yrs
Revere Cherry	Yes	Lifetime	Lifetime	25 yrs
Hayward Pecan	Yes	Lifetime	Lifetime	25 yrs
3/4" Solid Collection				
Carrolton Oak	Yes	n/a	n/a	25 yrs
Thornton Oak	Yes	n/a	n/a	25 yrs
Adams Oak	No	n/a	n/a	15 yrs
Taylor Oak	No	n/a	n/a	15 yrs
Out Of Africa Collection				
Afr. Cedar-Eng	Yes	Lifetime	Lifetime	25 yrs
Afr. Cherry-Eng	Yes	Lifetime	Lifetime	25 yrs
Afr. Pearwood-Eng	Yes	Lifetime	Lifetime	25 yrs
Afr. Rosewood-Eng	Yes	Lifetime	Lifetime	25 yrs
Afr. Walnut-Eng	Yes	Lifetime	Lifetime	25 yrs
Afr. Cedar-Solid	Yes	n/a	n/a	25 yrs
Afr. Cherry-Solid	Yes	n/a	n/a	25 yrs
Afr. Pearwood-Solid	Yes	n/a	n/a	25 yrs
Afr. Rosewood-Solid	Yes	n/a	n/a	25 yrs
Afr. Walnut-Solid	Yes	n/a	n/a	25 yrs
The Dales Collection Longstrip Click Hardwood Flooring				
Barnard	Yes	Lifetime	Lifetime	25 yrs
Bowbank	Yes	Lifetime	Lifetime	25 yrs
Appleby	Yes	Lifetime	Lifetime	25 yrs
Wensley	Yes	Lifetime	Lifetime	25 yrs
Denby	Yes	Lifetime	Lifetime	25 yrs
Dailey	Yes	Lifetime	Lifetime	25 yrs
Carlisle	Yes	Lifetime	Lifetime	25 yrs
Cotherstone	Yes	Lifetime	Lifetime	25 yrs
Greta	Yes	Lifetime	Lifetime	25 yrs
Settle	Yes	Lifetime	Lifetime	25 yrs

MAINTENANCE

A Little Care Goes a Long Way Toward Protecting Your Investment

Wood is a natural material and can be scratched or dented. To help guard against scratches and dents, place protective felt pads under furniture legs and chairs, and make sure any furniture casters are clean, operate freely and have a minimum 1 inch wide vinyl surface where it comes in contact with the wood floor.

The above warranties do not cover damage caused by spiked heels or shoes that need repair, heavy furniture, and appliances. A stiletto or any heel with a diameter of approximately 3/8" can concentrate as much as 2,000 pounds per square inch on the floor.

Follow Columbia's recommended guidelines when caring for your new floor. Use only floor care products recommended by Columbia. Your warranties do not cover damage caused by cleaning products we do not recommend. Do not use oil soaps, liquid or paste wax products or other household cleaners that contain lemon or tung oils. These products can dull the finish and make future cleaning and refurbishment difficult.

Remove spills promptly. Use a soft cotton cloth and Columbia Cleaner on wet spills. For dry spills, sweep or vacuum.
- Never damp mop a wood floor.
- Don't let dirt or sand build up.
- Sweep or vacuum your floor regularly.
- Do not use a vacuum with a beater bar.

Wood will age and change color due to ultra-violet light. Consider rearranging rugs and furniture periodically so the floor will age evenly. Cherry and the "Out Of Africa" Collection material are more susceptible to change during the aging process.

Use entry mats to clean shoes to avoid tracking oils from asphalt driveways and streets as they can permanently stain a floor.

Please note that light colored maple and cherry hardwood floors require extra care. Light colors will show dirt and require more frequent care than dark colors. Maple and cherry are inherently smooth woods and will show scratches and dents more readily than oak.

Keep animal's nails trimmed, as they are capable of scratching wood floors.

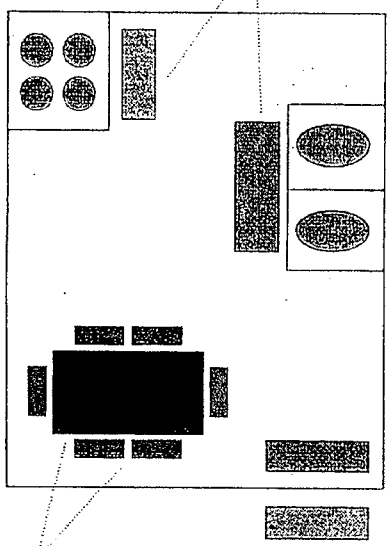
When moving heavy appliances or furniture, put down a quarter-inch sheet of plywood to protect the floor, and use a dolly. Never try to slide or roll heavy objects across your floor without taking these precautions.

Keep unused planks after installation. In case of accident or damage, you can use them for repair.

ROA_02035

Care Plan For Your Hardwood Floor

Use area rugs in areas of heavy traffic and where spills can occur



REMEMBER: Felt Protectors under all table and chair legs

Use area rugs both outside and inside the home at entrances to keep dirt and gravel out.

EXCLUSIONS

Not Covered By Your Warranty

- Improper storage, handling or installation of flooring. Squeaking and/or cracking by any cause other than the mis-manufacture of the flooring.

- Man-made or natural disasters including, but not limited to, leaking or broken plumbing, fire, flood, earthquake, or standing water during or after construction.

- Improper preparation of, or deficiencies in, the subfloor/floor joist assembly including, but not limited to, subfloor material, fasteners, patching or leveling compounds, adhesives other than Columbia products. These situations are considered to be part of the installation inspection process prior to installing the flooring. Do not install flooring if these situations exist.

- Insect infestation after shipment from the factory.

- Neglect or abuse including, but not limited to, not taking proper precautions to protect furniture legs and feet with felt protectors, dirty or improper casters, moving heavy objects without a dolly and protective plywood beneath.

- Spiked and/or damaged heels and pet claws.

- Dents or scratches in the flooring caused by furniture, appliances, casters, or unusual foot traffic.

- Falling or dropped objects which can dent or fracture the flooring and finish.

- Moisture infiltration from sidewalls or from any surface other than through the subfloor.

- Construction traffic abuse to the surface of the flooring.

- Non-factory applied finish (by the owner or installer) including, but not limited to, refinishing or recoating.

- Normal color variations and natural characteristics of real wood products discovered AFTER the flooring is installed.

- The normal wearing of the finish in high traffic areas, pivot points, and seating areas. Gloss reduction is not considered wear-through, and therefore is not covered under the finish warranty.

Additional Terms of the Warranties

These warranties apply only to the original purchaser and to flooring in its original installation, and are not transferable.

Responsibility for final inspection and approval falls upon the consumer and installer prior to permanent installation. Prior to actual installation, dry-lay the floor, blending the planks from several cartons to determine optimum appearance.

Columbia is not responsible for labor costs associated with the repair or replacement of visually defective planks after the floor is installed.

Seasonal Checking:
In order to maintain the recommended relative humidity of (35% - 55%) inside the home, the installation of a humidifier, or dehumidifier maybe necessary. Hardwood flooring is designed to perform in an environmentally controlled structure. Seasonal checking may occur when your environment falls outside of these recommended areas.

Incidental or consequential damages are excluded under all Columbia warranties.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you. The Columbia warranties give you specific legal rights. You may have others which vary from state to state.

These warranties do not apply to any product designated as other than first quality, including, but not limited to, economy grade, cabin grade, specials, non-standard items, or any items or products sold "as is."

Columbia will, at its option, repair, refinish, or replace defective flooring, including adhesives (if applicable). This does not include the removal or replacement of cabinets, appliances or other fixtures.

These warranties are effective for all Columbia engineered and solid hardwood flooring sold after "date of acceptance."

DISCLAIMER OF UNSTATED WARRANTIES:

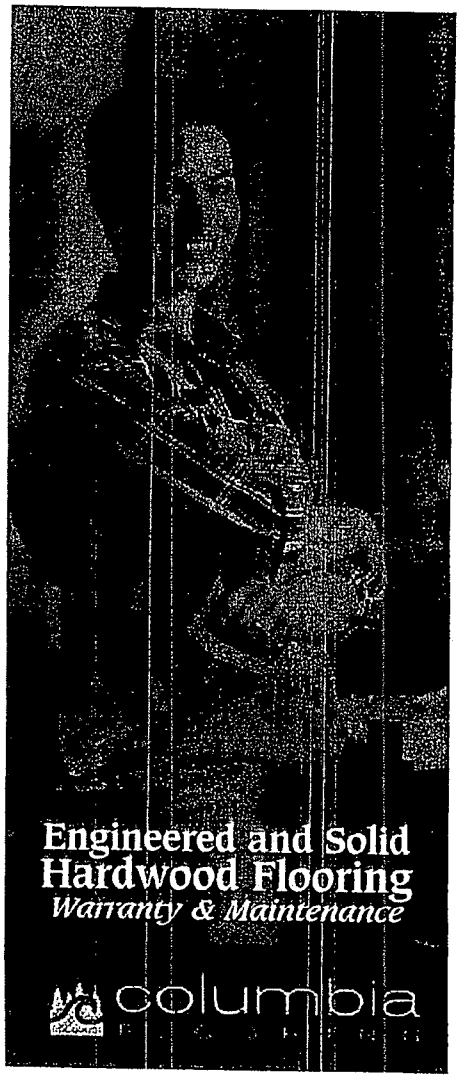
The limited warranty described in this section is in lieu of all other warranties of Columbia, and Columbia disclaims all other warranties concerning the flooring, express or implied, including but not limited to, any implied warranty of merchantability, fitness or adequacy for any particular purpose, use, or quality.

WHAT TO DO IF YOU HAVE A PROBLEM

Columbia takes every possible precaution to ensure that our wood floors perform as warranted. In the unlikely event our product fails to meet your expectations, you should contact your retailer or builder within 30 days of experiencing a problem. They are a great source of information and should be able to rectify the situation to your satisfaction.

columbia FLOORING

LIT520 12/02



ROA_02036

AZROCK by Tarkett

1. Product Name
Azrock Vinyl Composition Tile (VCT)
- Cortina Colors
- Cortina Complements
- Cortina SD
- Solids
- Classic Granite
- Classic Granite SR
- Thru-Quartz
- CortinaStone
- Plaza Marble
- StoneGlow

2. Manufacturer
Azrock
A Brand of Tarkett Commercial
1705 Oliver Street
Houston, TX 77007
(713) 366-2689
Fax: (713) 869-5271
E-mail: AzTech@tarkett.com
www.tarkett.com

3. Product Description
BASIC USE
Azrock Vinyl Composition Tile (VCT) is recommended for use in high traffic applications where a smooth surfaced, easily maintained, durable, long-wearing floor is required.
Recommended areas of use are:
- School offices, classrooms and corridors
- Commercial office areas
- Hospital lobbies, patient rooms and corridors
- Retail stores

COMPOSITION & MATERIALS
Azrock resilient floor tile is available in 1/8" (3.2 mm) nominal thicknesses. Selected Cortina Colors tile are also available in a 3/32" (2.4 mm) thickness. Color and pattern details are dispersed uniformly throughout the thickness of the product.

SIZES
- Nominal overall thickness - 1/8" (3.2 mm)
- Size – All styles of VCT come in a 12" × 12" (305 × 305 mm)
- Area per carton - 45 ft² (4.2 m²)
- Weight per carton - 62 lb (28 kg)

COLORS
- Cortina colors- 53 colors
- Cortina Complements- 7 colors
- Solids- 16 colors
- Classic Granite- 9 colors
- Classic Granite SR- 9 colors
- Thru-Quartz- 15 colors
- CortinaStone- 14 colors
- Plaza Marble- 5 colors
- StoneGlow- 5 colors

LIMITATIONS
These products are unsuitable for concrete substrates where hydrostatic pressure or excessively alkaline conditions exist. Concrete floors containing curing agents, sealers or hardeners are not suitable. Do not install over gypsum type underlayment or patching compounds.

Unsuitable substrates or any other conditions that are obviously unsuited to good installation should not be considered acceptable, even if those conditions are not listed in the paragraph above.

4. Technical Data
APPLICABLE STANDARDS
ASTM International
- ASTM D2047 Standard Test Method for Static Coefficient of Friction of Polish- Coated Floor Surfaces as Measured by the James Machine
- ASTM E648 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
- ASTM E662 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
- ASTM F150 Standard Test Method for Electrical Resistance of Conductive and Static Dissipative Resilient Flooring
- ASTM F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
- ASTM F970 Standard Test Method for Static Load Limit
- ASTM F1066 Standard Specification for Vinyl Composition Floor Tile
- ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
- ASTM FM1678 Standard Test Method for Using a Portable Articulated Strut Slip Tester (PAST)

APPROVALS
Consult manufacturer for current information on compliance with requirements of specific agencies and/or building code jurisdictions.

PHYSICAL/CHEMICAL PROPERTIES
- Product classification (ASTM F1066) - Class 2,Through Pattern
- Static load limit (ASTM F970) ≥ 125psi (861 kPa)
- Static load limit (ASTM F970) (Cortina SD)- 75 psi (517kPa)
- Static coefficient of friction (ASTM D2047)- 0.6
- Azrock VCT exceeds minimum requirement of 0.6 static coefficient of friction per ASTM D2047.

Azrock VCT exceeds minimum ADA requirements of 0.6 (Slip Resistant 0.8) static coefficient of friction per ASTM F1678.

Although Azrock VCT meets the recommendations for a safe walking surface, tiles are always maintained with floor polish.
Contact the polish manufacturer for slip resistance qualities of the floor polish to be used.
Test reports and additional product information are available upon request.
FIRE PERFORMANCE
- Flooring Radiant Panel Test (ASTM E648) - ≥ 1.0 critical radiant flux
- Smoke Density Test (ASTM E662) - Less than 450

5. Installation
PREPARATORY WORK
Refer to the latest edition of the Azrock Installation and Maintenance manual for complete information.
Handle and store product according to Azrock recommendations.

Maintain minimum air temperature of 65 degrees F (18 degrees C) at flooring installation area for a minimum 2 days prior to, during and for minimum 24 hours after installation of flooring tile.
Store flooring materials in area of application and allow 2 days for material to reach the ambient temperature of the installation area.

Construct concrete floors in accordance with the American Concrete Institute (ACI) 302.1 R-96 Guide for Concrete Floor and Slab Construction. Floors must be finished and cured according to ACI with a minimum compressive strength of 3500 psi (24 Mpa).

Floors must be dry, clean and smooth. Any surface materials such as paint, wax, grease, oil, adhesive residues, etc., must be removed. Floors must be free of any sealers, curing hardening or parting compounds that would adversely affect the adhesive used with the flooring. Installation of a moisture barrier, such as 1/8" (3.2mm) Sealtight®, manufactured by W.R. Meadows Inc., or similar product, is recommended prior to placement of on-grade or below-grade slabs. Moisture vapor transmission must not exceed 5 lb/1000 square ft/24 hours when tested according to ASTM F1869 (Anyhdrous Calcium Chloride Test). Surface pH of concrete slabs should be no greater than 9. As a general rule, a 4" (102 mm) thick slab will require a 3 month drying time before moisture tests are performed.

METHODS

Wood floors must be double construction with a minimum thickness of 1" (25.4mm). The top layer of wood should be American Plywood Association (APA) Underlayment Grade Plywood or other underlayment panel approved and warranted for use beneath resilient flooring.

Adhere flooring with Tarkett 100 Clear Thin Spread Adhesive. Apply adhesive with a notched trowel with notches 1/32" deep x 1/16" wide x 1/32" apart.

Slip Resistant Tile installed in areas subject to temperature extremes and/or topical moisture should be installed with Tarkett 940 Polyurethane adhesive.

PRECAUTIONS

Gypsum type patching compounds and underlayments are not recommended. Tarkett will not accept responsibility for flooring failures related to the use of gypsum type patching compounds and underlayments.

6. Availability & Cost

AVAILABILITY

These products are marketed throughout the United States, Canada and many foreign countries. Contact manufacturer for information on local availability.

COST

Approximate installed cost per square ft (US $):

- Cortina SD- $5.45-$6.30
- Cortina Colors- $1.20-$1.80 (1/8" gauge); $1.15-$1.60 (3/32" gauge)
- Cortina Complement- $1.20-$1.80
- Granite- $1.60-$2.25
- Granite SR- $2.40-$3.15
- Thru-Quartz- $1.60-$2.25
- Solids- $2.20-$3.00
- CortinaStone- $1.80-$2.35
- Plaza Marble- $3.50-$4.00
- Stone Glow- $2.75-3.25

Variations may result from competitive bidding depending on local labor costs, job conditions, extent of floor preparation, etc. Budget installed cost information may be obtained from a local Azrock distributor or from the manufacturer.

7. Warranty

Azrock VCT is warranted to be free of manufacturing defects for 5 years from installation. Refer to Azrock Commercial Products Limited Warranty.

8. Maintenance

One of the main reasons for the popularity of Azrock VCT is the minimal effort required to keep the tiles clean and attractive. A new tile floor should not be washed until it has become tightly adhered to the subfloor. This will generally take a week or longer, depending on room temperature and the temperature of the subfloor. In the meantime, sweep or vacuum the flooring to remove loose grit or debris and wipe clean with a damp mop. Spots of adhesive can be removed with a clean, white cloth dampened with mineral spirits. Use caution when handling flammable solvents.

Note- Stop dirt in the doorway. By doing so, time, work and money are saved. The use of non-staining walk-off mats at all heavy traffic entrances is recommended. Mats should wipe dirt and grit from shoes and allow particles to fall beneath the mat surface, preventing accumulated dirt from being tracked into the building. Frequency of maintenance will always vary depending on the traffic and use. Do not use abrasive cleaners. Use Tarkett Commercial maintenance products or their equivalent.

Initial Cleanup/Daily Care

Sweep or vacuum to remove loose dirt. Allow treated mops to dry overnight before reusing. Wash floor with a neutral floor cleaner. If the floor was subjected to excess dirt and heavy traffic before initial mainenance., use a wax stripping solution to clean floor. Use a standard scrubbing machine or an automatic scrubber with a red polyester scrubbing pad. Rinse the floor with clean water and wet vacuum or mop dry. The floor must be thoroughly rinsed to remove all detergent.

Surface Treatment

Apply 3-5 coats of good quality, acrylic floor polish. The use of a sealer prior to application of floor polish is optional. Floor polishes should be applied and maintained according to the instructions of the manufacturer.

Slip Resistant Tile is maintained with application of floor polish and scrubbing procedures involving bristle brushes.

Spot Removal

Spills and spots should be cleaned up while still fresh. Use a red polyester pad moistened with detergent.

Precautions

Do not use acetone or similar materials to clean floors. Furniture rests, cart wheels and tires should be made of soft, nonstaining rubber and should be large enough to fully dissipate the load. Use plywood panels to protect flooring from damage that may occur when moving heavy objects directly over flooring. The use of dolies may not be sufficient protection from heavy loads.

A detailed maintenance manual is available from Tarkett.

9. Technical Services

A staff of factory trained service personnel offers design assistance and technical support. For technical assistance, contact the Tarkett Technical Service Department.

10. Filing Systems

- Sweet's Catalog Files
- Additional product information is available from the manufacturer upon request.

AZROCK BY TARKETT
VINYL COMPOSITION TILE
5-YEAR LIMITED WARRANTY
FOR PROFESSIONAL INSTALLATIONS

I. **Warranty**

This warranty applies to all first quality commercial vinyl composition tile manufactured by Tarkett Commercial Flooring, installed by qualified professional installer according to procedures outlined in the then-current edition of Tarkett Installation and Maintenance Manual.

Tarkett Vinyl Composition Tile is guaranteed to be free of manufacturing defects for a period of five years from the date of original purchase. If a manufacturing defect is detected, reported and verified by Tarkett within the first year from the date of original purchase, Tarkett will repair or replace the defective area of floor at no charge, including reasonable labor costs. Reasonable labor costs are the average charged by local flooring contractors to install or repair similar material.

If a manufacturing defect is detected, reported and verified by Tarkett in the second year after the date of original purchase, Tarkett will provide replacement tile for the defective area or floor at no charge and will pay 50% of reasonable labor costs.

If a manufacturing defect is detected, reported and verified by Tarkett in the third, fourth or fifth year after the date of original purchase, Tarkett will provide replacement tile for the defective area or floor, but will not pay any labor costs.

If replacement material is required pursuant to this warranty and the defective material has been discontinued or otherwise are unavailable, Tarkett reserves the right to select and supply similar Tarkett replacement material.

II. **Exclusions to Warranty**

A. Damages or customer's dissatisfaction caused by improper installation (including, but not limited to, use of Tarkett adhesive, underlayments and sundry items), maintenance or use when seller's recommendations are not followed. Tarkett installation and maintenance instructions are available from your flooring dealer or Tarkett Installation Services.

B. Surface damage caused by stains (including those caused by Asphalt paving, sealers, carpet dyes and rubber backed mats), burns, scuffs, indentation (including improperly castered chairs, high heels, rolling loads and furnishings/fixtures without proper floor protectors) or exposure to direct sunlight.

C. Labor expenses for floors installed with visible defects.

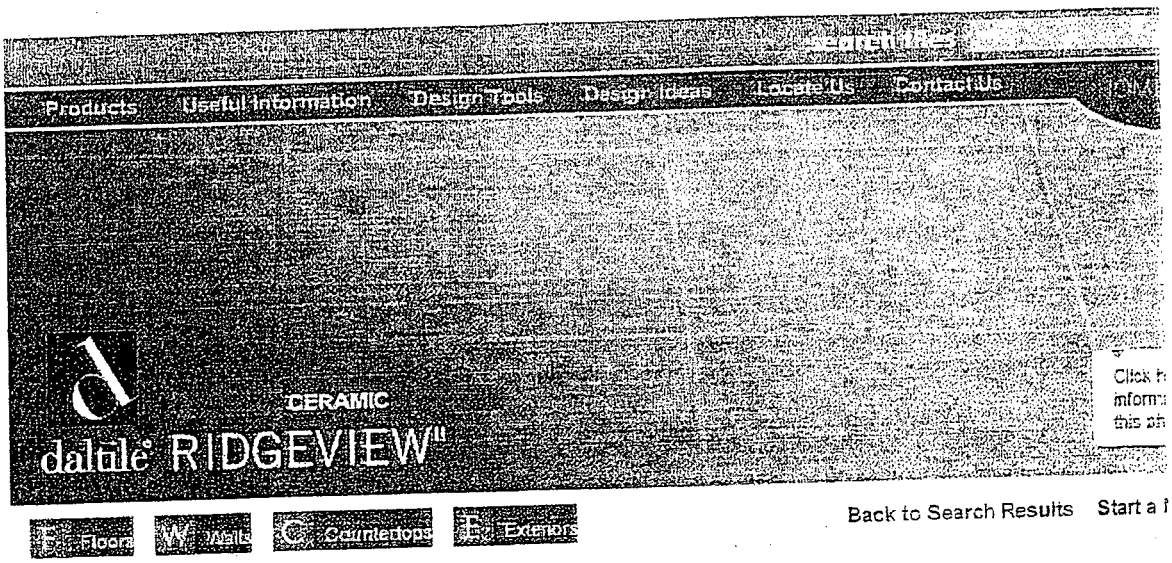
D. Cost of labor to remove and replace furniture, fixtures and equipment attached to the surface upon which corrective work or replacement is to be done.

E. Damage caused by subfloor moisture, hydrostatic pressure or alkali.

F. Claims regarding any difference between actual flooring and samples or photographs.

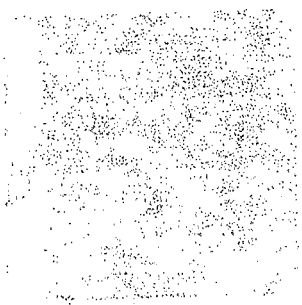
G. This warranty is non-transferable and does not apply to sales of irregular material. It solely constitutes the full extent of Tarkett's responsibility, shall be the exclusive remedy, AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING MERCHANT ABILITY AND FITNESS FOR A PARTICULAR PURPOSE. ALL OTHER DAMAGES AND EXPENSES OF WHATEVER NATURE, WHETHER BASED UPON NEGLIGENCE OR OTHERWISE, INCLUDING CONSEQUENTIAL DAMAGES, SPECIFICALLY ARE EXCLUDED FROM DOMCO TARKETT'S LIABILITY. THESE PROVISIONS APPLY SOLELY TO AZROCK FLOOR PRODUCTS SOLD HEREUNDER. THIS WARRANTY IS NOT EXTENDED TO CONSUMERS.

Tarkett USA Inc. 1705 Oliver St. Houston, TX 77007 Mailing address: P.O. Box 3145 Houston, TX 77253
Tel.: (713) 869-5811 Fax: (713) 869-5271

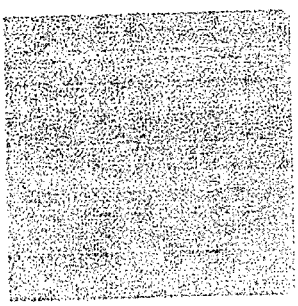


Products » Tile Catalog » Ridgeview™

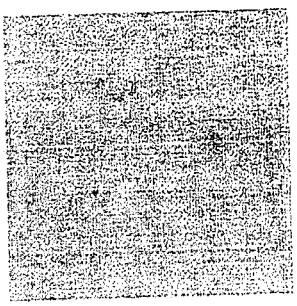
Field Tile



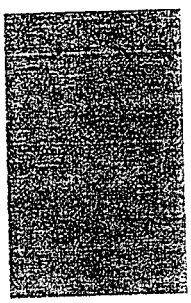
Cream
RD01
Zoom
Add to Favorites
Order Sample



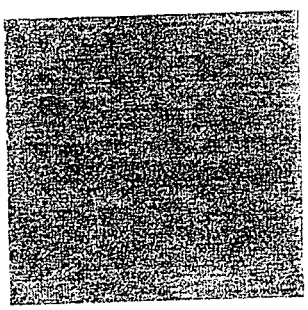
Beige
RD02
Zoom
Add to Favorites
Order Sample



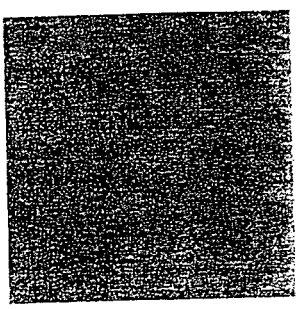
Light Gold
RD03
Zoom
Add to Favorites
Order Sample



Warm Green
RD04
Zoom
Add to Favorites
Order Sample



Rust
RD05
Zoom
Add to Favorites
Order Sample



Blue/Gray
RD06
Zoom
Add to Favorites
Order Sample

Relative Price: Low

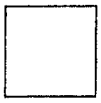
Shade Variation: Medium

Tile Thickness: 5/16"

Recommended Grout Width: 3/16"

Applications: Residential Floors, Walls/Backsplashes, Countertops, Exteriors
Suitable for exterior walls in non-freezing climates when proper installation methods are followed. Not for use on ramps.

Tile Sizes

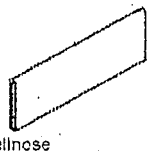


12" x 12" Field Tile



18" x 18" Field Tile

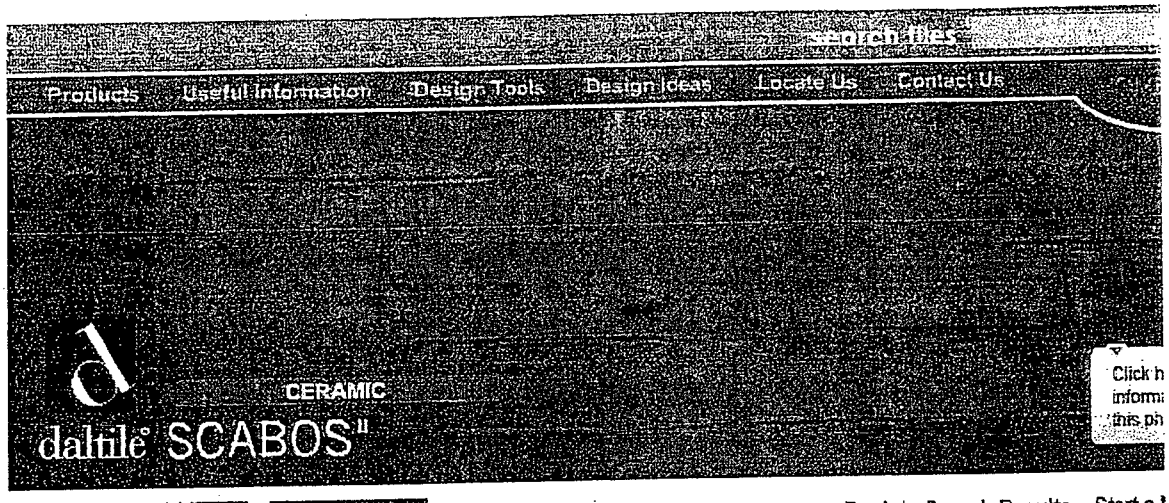
Available Trim



Bullnose
F-43C9
3" x 12"

Water, oil, grease, etc. create slippery conditions. Floor applications with exposure to these conditions require extra caution in product sel
For additional application information, refer to our "Factors to Consider" by clicking HERE.

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F Floors W Walls C Countertops

Back to Search Results Start a f

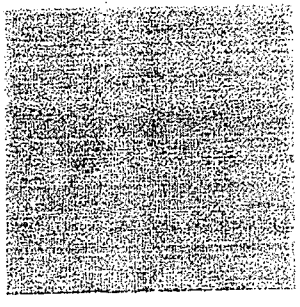
PRINTER

Products » Tile Catalog » Scabos™

Floor & Wall Field Tile



Cream
SC40
Zoom
Add to Favorites
Order Sample



Walnut
SC42
Zoom
Add to Favorites
Order Sample



Beige
SC41
Zoom
Add to Favorites
Order Sample

Warm Gray
SC43
Zoom
Add to Favorites
Order Sample

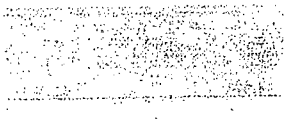
Floor Decorative Accents



Cream Floral Border
SC40



Cream Floral Corner
SC40



Beige Floral Border
SC41



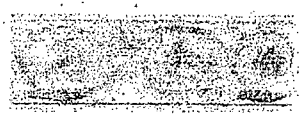
Beige Floral Co
SC41

Zoom
Add to Favorites

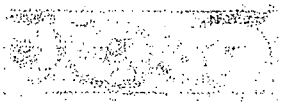
Zoom
Add to Favorites

Zoom
Add to Favorites

Zoom
Add to Favorites









Walnut Floral Border SC42
Zoom
Add to Favorites

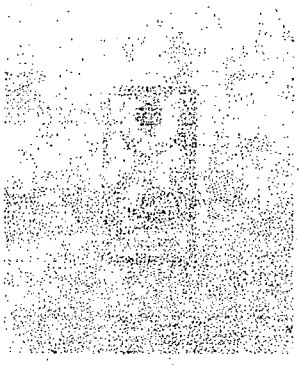
Walnut Floral Corner SC42
Zoom
Add to Favorites

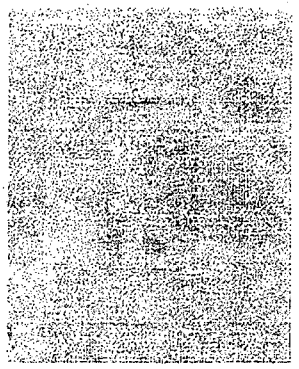
Warm Gray Floral Border SC43
Zoom
Add to Favorites

Warm Gray Flor Corner SC43
Zoom
Add to Favorites

Wall Decorative Accents









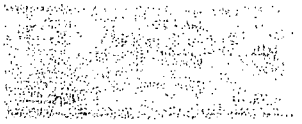
Cream Floral Deco SC40
Zoom
Add to Favorites

Beige Floral Deco SC41
Zoom
Add to Favorites

Walnut Floral Deco SC42
Zoom
Add to Favorites

Warm Gray Flor Deco SC43
Zoom
Add to Favorites







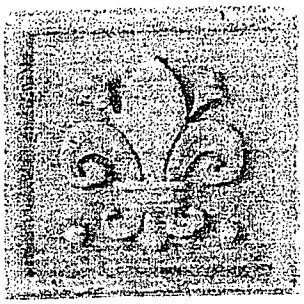


Cream Floral Accent Strip SC40
Zoom
Add to Favorites

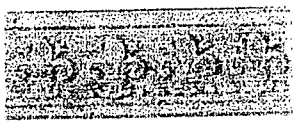
Beige Floral Accent Strip SC41
Zoom
Add to Favorites

Walnut Floral Accent Strip SC42
Zoom
Add to Favorites

Warm Gray Flor Accent Strip SC43
Zoom
Add to Favorites



Fleur de Lis Insert
SC50
Zoom
Add to Favorites



Fleur de Lis Accent Strip
SC50
Zoom
Add to Favorites

PRINTER FRIENDLY

Relative Price:

Shade Variation: Medium

Tile Thickness: 5/16"

Recommended Grout Width: 3/164" (floor), 1/16" (wall)

Applications: Residential Floors, Walls/Backsplashes, Countertops
Suitable for use on exterior applications in freezing and non-freezing climates when proper installation methods are followed.

Notes:

- Suitable for exterior walls in non-freezing climates when proper installation methods are followed.

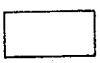
Tile Sizes



3" x 8" Decorative Wall Tile



4" x 4" Decorative Floor Corner



4" x 12" Decorative Floor Border



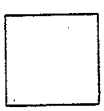
6" x 6" Decorative Wall Fleur de lis Insert



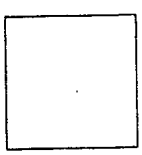
6" x 6" W Tile



8" x 10" Wall Field / Accent Tile

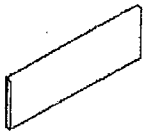


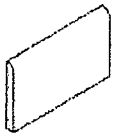
12" x 12" Field Tile

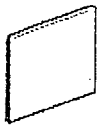


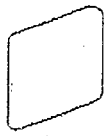
18" x 18" Field Tile

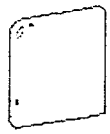
Available Trim


Bullnose
P-43C9
3" x 12"

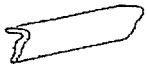

Bullnose
S-4389
3" x 8"


Bullnose
S-4669
6" x 6"


Bullnose Corner
SCRL-4669
6" x 6"


Bullnose Corner
SN-4389
3" x 3"


Counter/Chair Corner
22CRC
2" x 2"

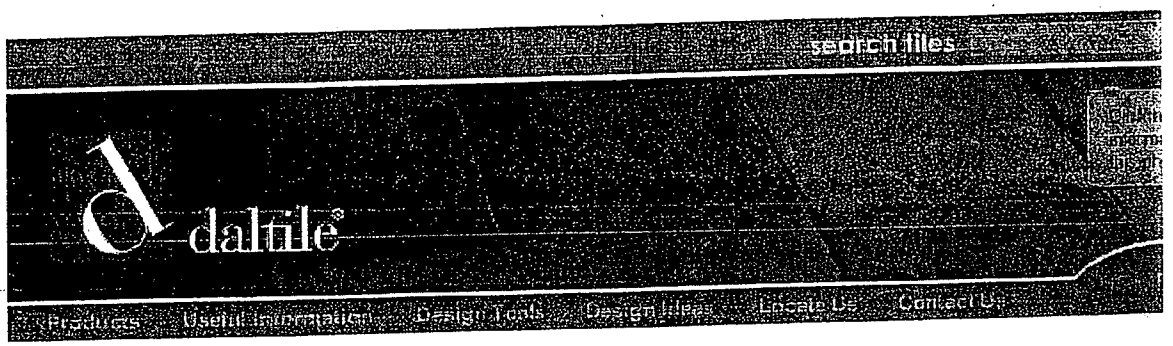

Counter/Chair Rail
26CR
2" x 6"


Quarter Corner
UC-106
1" x 1"


Quarter Round
A-106
1" x 6"

Water, oil, grease, etc. create slippery conditions. Floor applications with exposure to these conditions require extra caution in product sel
For additional application information, refer to our "Factors to Consider" by clicking HERE.

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TILE CARE

Useful Information » Tile Care

Ceramic Tile:
» Routine Care
» Grout Care
» New Installation

Natural Stone:
» Routine Stone Care
» New Installation

Saltillo Tile:
» Routine Care

Ceramic Tile - Routine Care

Contaminants and spills on a glazed ceramic tile are, generally, easier to clean then other, more impervious surfaces. ***Glazed tile products should be cleaned routinely with an all-purpose, non oil-based household or commercial cleaner***. The product chosen should also be grout joint cleaning compatible. The type of product may vary depending on the tile application and use. A multipurpose spray cleaner, which removes soap scum, hard water deposits, and mildew designed for every day use, can be used on wall tile areas in residential baths and showers.

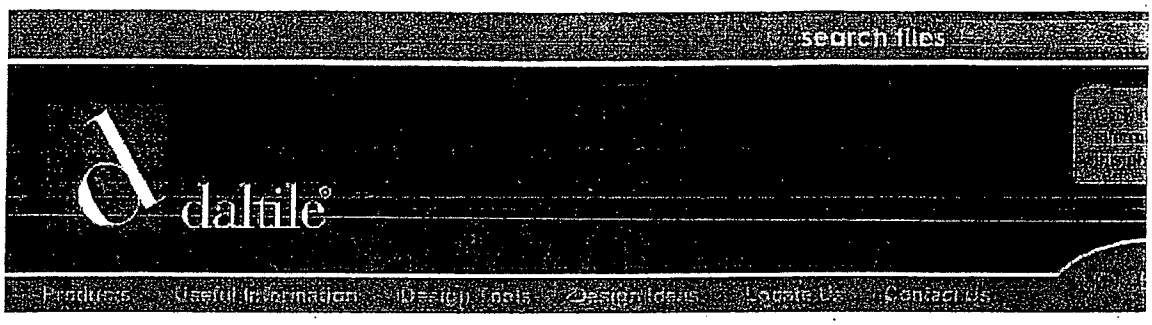
The entire area should be cleaned and scrubbed with cleaner solution through the use of a cotton mop, cloth, sponge, or non-metallic brush. The entire area should be rinsed with clean water to remove any cleaning solution residue. Remember that you should sweep or vacuum floor areas prior to cleaning to remove any dust or debris. Routine cleaners should never contain acids or ammonia. Acids can damage the grout and the glazed surface of the tile, and ammonia can discolor the grout.

Unglazed tile should be cleaned routinely with concentrated tile cleaners that have a neutral pH for safe regular use. These cleaners are better suited at removing grease, oils and normal spills from unglazed products. Again these products will vary depending on the application, amount of traffic and the use. The product chosen should also be compatible with cleaning the grout joints at the same time.

Removal of Sealers/Waxes/Floor Finishes:
If you need to remove a topical sealer or floor wax from a ceramic tile you should use a Tile Sealer & Adhesive remover. Always test a small area first. Apply a liberal amount of undiluted sealer & adhesive remover to a manageable area. Allow setting without drying until coating or residue softens. Reapply if necessary until sealer softens and can be removed. If necessary, agitate with white nylon scrub pad. Wipe up the residue with a cotton towel or sponge. Rinse thoroughly with clean water. Do not use on natural stone products.

» Disclaimer

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TILE CARE

Useful Information >> Tile Care

Ceramic Tile:
» Routine Care
» Grout Care
» New Installation

Natural Stone:
» Routine Stone Care
» New Installation

Saltillo Tile:
» Routine Care

Ceramic Tile - Grout Care

Grout is the material used to fill the spaces between the individual tiles. Grout comes in many colors. While color is important to the final finished look of the tile installation, it has little effect on the functionality of the grout. The purpose of grout is, simply, to fill the joint between the tiles and becomes a permanent, integral component of the finished installation.

Penetrating/Impregnating Sealer:
Most tile installations use cementitious grouts. This type of grout should be sealed after installation to prevent the color from staining. The grout should be sealed with a penetrating/impregnating sealer (often called grout sealers) which does not contain silicone, as silicone can shorten the useful life of the sealer. Epoxy grouts, conversely, are chemically cured and acid resistant and, as a result, do not require a sealer. The application of a good quality penetrating/impregnating sealer into the grout joints of a cementitious grout will not change the natural color of the grout, but will prevent the penetration of moisture, simplify maintenance, and help prevent staining or discoloration. Only the grout needs to be sealed, not glazed floor or wall tiles. Grout can be sealed seventy-two hours after installation.

There are different grades of penetrating/impregnating sealers, therefore the useful life and price will differ between a low quality and high quality sealer. You may need to reapply the sealer on an annual basis depending on the sealer quality, traffic patterns, and maintenance routine. Some sealers have multiple year warranties for useful life. Refer to the manufacturer warranty, technical & product information for specific details on product installation, useful life, and product applications (including any warnings) before use.

Grout Maintenance:
Neither sealing the grout nor using a 100% Epoxy Grout will guarantee against surface build-up or discoloration of the grout. Grout needs to be cleaned on a periodic basis to remove any surface build-up. Routine grout cleaning can be done with a daily concentrated household or commercial cleaner depending on the application. When heavy duty grout cleaning is required, you will need to use a professional strength Tile & Grout Cleaner that is capable of removing grease, soap scum, body oil, mildew stains, algae, and synthetic or acrylic waxes from the grout joints. This type of product can be purchased from most Home Centers, or through your local professional Floor Covering Dealer.

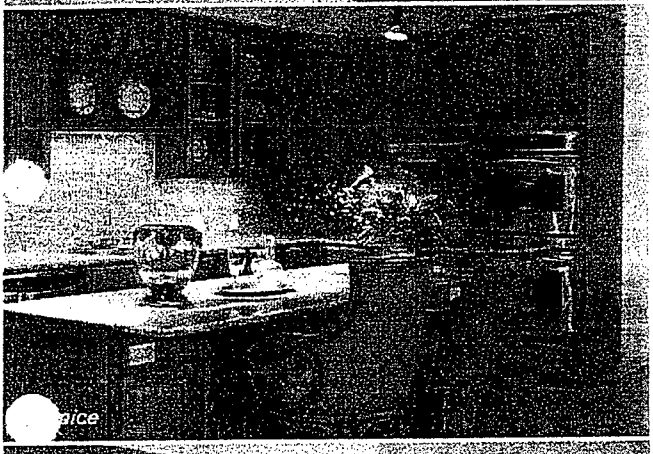
Grout Color Restoration:
When grout has been stained to the point that it cannot be maintained or returned to its natural color, you can return the grout back to its original color or any other color through the use of a "grout stain". Grout Stains are epoxy-based products that are specifically designed to penetrate into the grout and seal the surface with a permanent color. Once the grout has been stained there is no need to seal it any further with a penetrating/impregnating sealer. Prior to staining, the grout joint should be cleaned thoroughly to remove any dirt, oils, grease or sealers with a professional strength Tile & Grout Cleaner. This can be purchased from most Home Centers or through your local Professional Floor Covering Dealer.

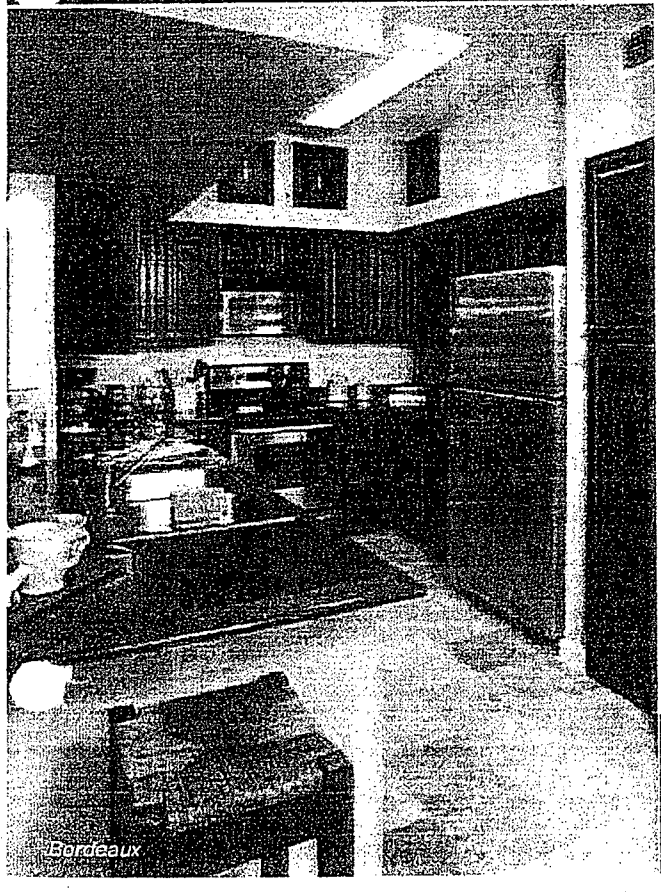
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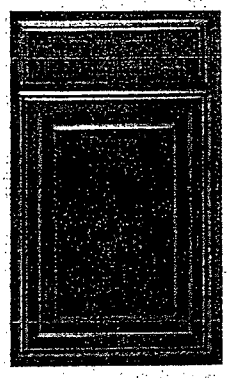
Dealers & Builders | Archit

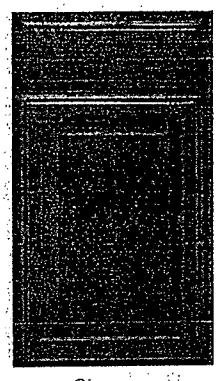

Natural

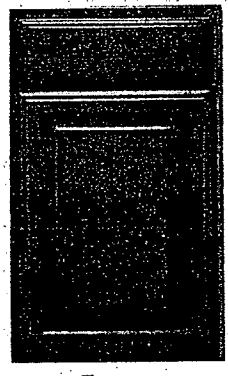

Spice

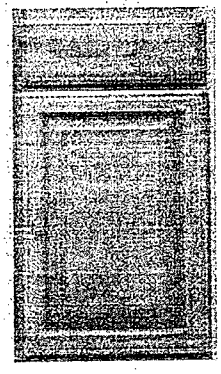

Bordeaux

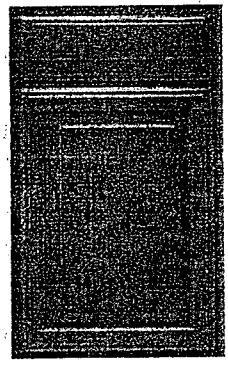
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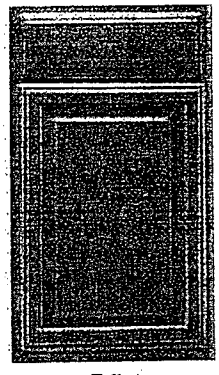

Bordeaux


Cinnamon


Espresso


Natural


Spice


Toffee

Richmond

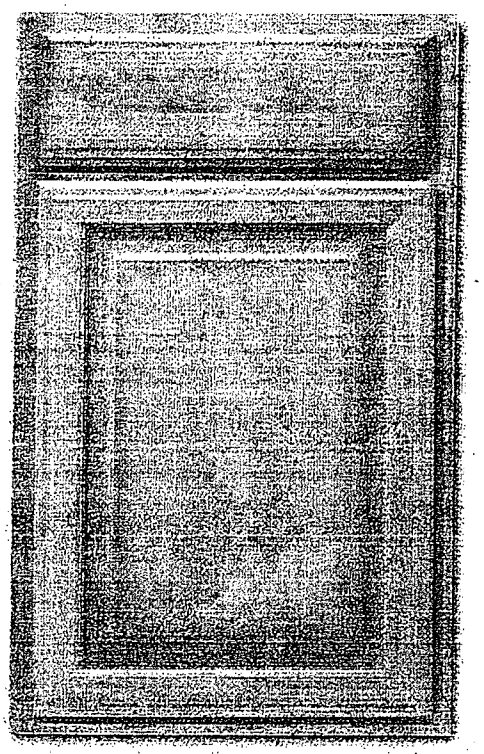
ROA_02050

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www.leedo.com

LEEDO CABINETRY

Richmond

This raised-panel maple door accommodates the most discriminating of tastes. A standard overlay door with details that set it apart makes Richmond one of our most popular door styles. Richmond is available in all 6 maple stains.

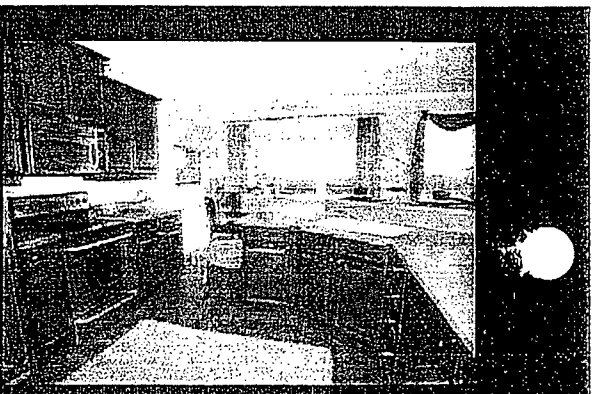


Construction Features ...

- **Face Frames:** All face frames are solid hardwood (oak or hard maple). All joints are mortise and tenon. Frames are glued and stapled, then sanded to a uniform ¾" thickness.
- **Drawers:** All standard drawers feature a four-sided box made from ½" particleboard and 1/8" hardboard bottom finished with melamine coated laminate. Fronts and backs of drawers are nailed to the drawer sides with 1" galvanized steel staples. Drawers measure 19" long and 3 ½" deep, larger than most of our competitors.
- **Hinges:** European, fully-concealed hinges. All Leedo hinges have a lifetime guarantee.
- **Sides, Tops, Bottoms and Shelves:** All sides, tops, bottoms, and shelves are ½" particleboard with melamine coated laminate on all visible faces. Shelf edges are finished with matching PVC edge banding. Tops and bottoms are secured to sides, back and face frames by a dado joint. All shelves are adjustable. Wall cabinets with center mullions feature shelf supports at the center mullion.
- **Back:** Back panels are 1/8" hardboard with a melamine coated laminate finish. The back is glued to the edge of a dado cut in the end panel and stapled at the joint. A ½" plywood nail strip is applied at the top and bottom of the cabinet resting on the hardboard. We then staple the nail strips to the back of the cabinet using a 1 1/8" staple through the nail strip which firmly attaches the back into the hang rails. The back is then stapled to the end panel. Finally, a 1/8" hot melt is applied around the perimeter of the back, firmly securing the cabinet.

Upgrades Available

- *Cabinets Prepped for Glass*
- *All Plywood Cabinets*
- *Plywood Sink Base Floors*
- *All Plywood Drawers*
- *Roll Out Shelves*
- *Full Extension Slides*
- *Solid Hardwood Drawer*
- *Solid Hardwood Drawer w/Full Extension Slides*



LEEDO CABINETRY

EXPERIENCE the DIFFERENCE

Warranty and Cleaning



One Year Warranty

Leedo works hard to provide an excellent product at a very competitive price. We guarante products for a period of One (1) year from the date of installation to be free of defects in ma manufacturing. During this period we agree to replace, at no cost to the owner, any portion that is found defective.

Due to the naturally occurring variations in wood that are beyond Leedo's control, we do nc uniformity of color, tone or grain pattern in our cabinetry. Leedo does warrant all structural our products for a period of one year, excluding the results of normal wear and tear and da arise from abuse or misuse of our products.

Printable One Year Warranty Details DOWNLOAD

Cleaning Instructions



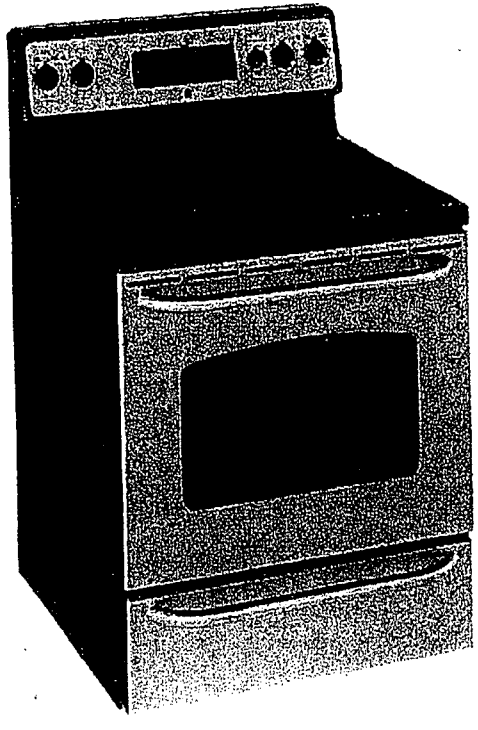
Leedo Cabinets are very easy to maintain. They should be cleaned regularly, with a mild moist cloth. You should never use any abrasive material to clean the wood, as this may cause scratching. You should also never allow liquid to remain on the wood or thermofoil surface. No chemicals are needed to clean our products. Treat your cabinetry as you would fine furniture and it will maintain its appearance for years to come.

To contact Customer Service for Warranty issues, please call 1-866-GO-LEEDO.

ALL CONTENT COPYRIGHT 2004-2006 LEEDO CABINETRY

CREATED BY DESIGN CEN

GE® 30" Free-Standing Electric Convection Range



Imagination at work

Features

- Self-Clean Oven - Conveniently cleans the oven cavity without the need for scrubbing
- Super-Large 5.3 Cu. Ft. Oven Capacity - Provides an impressively large oven interior to cook more dishes and large meals at once
- Hidden Bake Oven Interior - Hides previously exposed bottom element to deliver a clean interior appearance
- Self-Clean Heavy-Duty Oven Racks - Double coated porcelain-enameled racks no longer require hand cleaning
- Dual Size Ribbon Element - Offers a convenient choice of using a 9" or 12" heating element, depending on the size of the pan
- Bridge Element - Combines three cooktop elements into one large cooking area, ideal for oversized cooking pans
- Warming Drawer - Convenient drawer keeps breads, desserts or just-cooked foods warm and ready-to-serve

Available models

- **JBP84SKSS:** Stainless Steel
- **JBP84BKBB:** Black on Black
- **JBP84TKWW:** True White
- **JBP84KKCC:** True Bisque

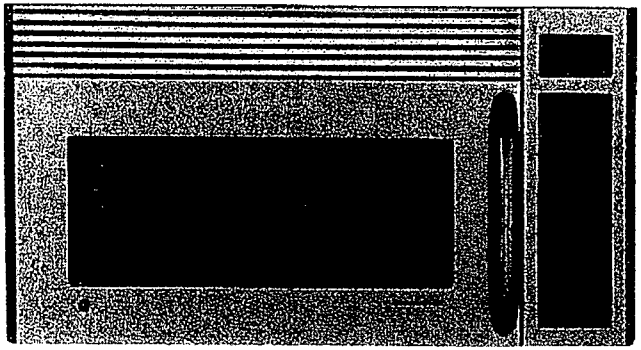
Approximate dimensions

- **Height:** 46 7/8"
- **Width:** 29 7/8"
- **Depth:** 27 3/4"

Warranty information

- Limited Five Year: Ribbon Elements & Glass Surface; Parts Only
- One Year Warranty: Entire Appliance; Parts & Labor; In-Home

GE Spacemaker® XL1800 Microwave Oven with Recirculating Venting



Features

- 1.8 cu. ft. capacity - 1100 Watts (IEC-705 test procedure)
- Circuwave™ 1100 cooking system - Patented system provides more power for faster more even cooking results
- Sensor cooking controls - Automatically adjust the time and power for perfect cooking results
- Convenience cooking controls - Allows cooking and reheating at the touch of a button
- 1-lb. Quick Defrost - Evenly defrosts a pound meat, poultry or fish in a fraction of the usual time, without precooking or turning the food
- 14-1/4" recessed turntable - Large enough to handle 5-qt. casserole dishes and can easily be removed for cleaning
- Three-speed, 300-CFM Vortex venting system (with recirculating exhaust fan) - Quickly removes smoke and steam from your cooktop

Available models

- **JVM1851SH:** Stainless Steel
- **JVM1851WH:** White on White
- **JVM1851CH:** Bisque on Bisque
- **JVM1851BH:** Black on Black

Approximate dimensions

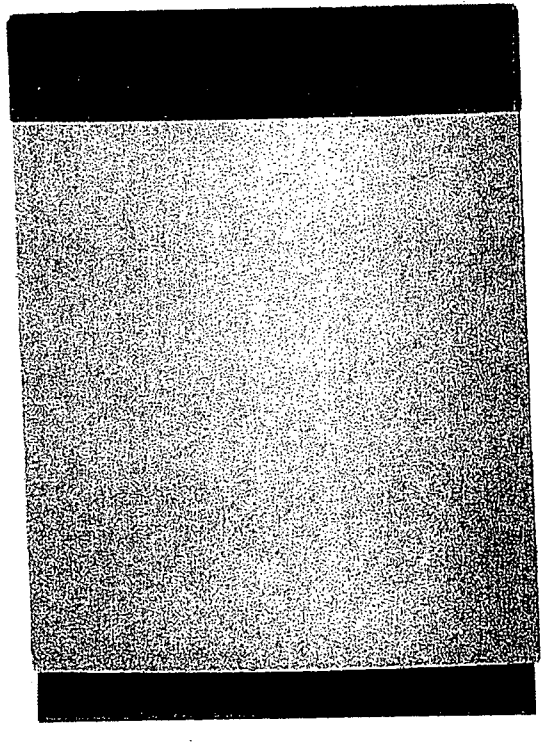
Height: 16 13/32" **Width:** 29 7/8" **Depth:** 15 1/4"

Warranty information

- Limited Nine-Year Magnetron Warranty (10yrs Total): Magnetron Tube; Part Only; In-Home
- One Year Warranty: Entire Appliance; Parts & Labor; In-Home

imagination at work

GE Triton® XL Built-In Dishwasher



imagination at work

Features

- Stainless full-length contour door - Stainless is shaped with subtle curves for a designer look
- ExtraClean™ wash system with 3 direct-feed wash arms - Provides multiple wash levels to clean every spot on every dish
- ExtraClean™ sensor - Continually monitors every cycle adjusting to ensure dishes get clean efficiently
- Giant Tub with Maximum Capacity Nylon Racking - Holds tall and oversized items; washes 16 place settings at once
- Four-Position Adjustable Upper Rack - Moves up, down and diagonally for maximum loading flexibility
- QuietPower™ IV sound package - Delivers quiet performance with added sound-deadening materials and extra insulation
- Countdown display with 1-9 hour Delay Start - Signals remaining cycle time and makes it easier than ever to wash dishes at any hour, taking advantage of reduced energy rates or washing dishes even when the family is asleep

Available models

- **GSD6960JSS:** Stainless Steel
- **GSD6900JCC:** Bisque on Bisque
- **GSD6900JWW:** White on White
- **GSD6900JBB:** Black on Black

Approximate dimensions

- **Height:** 34"
- **Width:** 24"
- **Depth:** 25 1/4"

Warranty information

- Full Ten Year: PermaTuf™ Tub & Door Liner; Parts & Labor; In-Home
- Limited 2 Year: Water Distribution System ; Parts Only

GE® 3/4 Horsepower Continuous Feed Disposer



imagination at work

Features

- 3/4 Horsepower Motor
- Super Capacity Continuous Feed Disposer
- 2700 RPM Grinding Action
- Stainless Steel Jam Resistant, Dual Swivel Impellers
- EZ Mount Installation
- Direct Wire Power Connection
- Warranty - 1 Full Year Replacement ; Additional 4 Yr. Limited Replacement

Available models

- **GFC720F: .**

Approximate dimensions

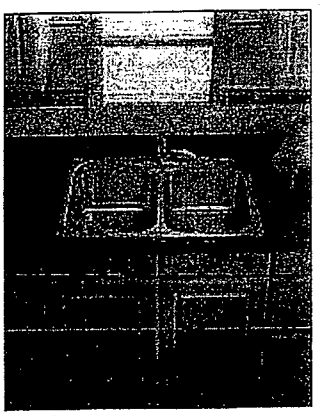
- **Height:** 14 1/2"
- **Width:** 8 1/2"

Warranty information

- 4-Year Limited: Replacement; Parts
- One Year Warranty: Entire Appliance; In-Home

Care and Cleaning

GENERAL CARE & CLEANING



Example

For best results, keep the following in mind when caring for your STERLING® product:

Test First
Always test your cleaning solution on an inconspicuous area before applying to the entire surface.

Wipe Clean
Wipe surfaces clean and rinse completely with water immediately after applying cleaner. Rinse and dry and overspray that lands on nearby surfaces.

Don't Let Cleaners Soak
Do not allow cleaners to sit or soak.

Avoid Abrasive Materials
Use a soft, dampened sponge or cloth. Never use an abrasive material such as a brush or scouring pad to clean surfaces.

STAINLESS STEEL

STERLING® stainless steel sinks are constructed of high-grade stainless steel with a nickel and chrome content for excellent corrosion resistance. The satin and buffed finishes are made to withstand the wear and tear of everyday use. Regular cleaning will retain the sink's good looks for years to come.

HOW TO CARE FOR YOUR STAINLESS STEEL LAVATORIES & SINKS

- Clean stainless steel once a week.
- Always apply stainless steel cleaner/polish with a non-abrasive cloth or sponge, working with, not across, the grain.
- Do not use steel wool, wire brushes or abrasive sponge pads.
- Cleaners containing chloride are not recommended. If used, rinse the surface immediately to prevent corrosion.

PRODUCTS TO CONSIDER

- Fantastik Antibacterial Heavy Duty
- Formula 409 Antibacterial All Purpose
- Formula 409 Glass & Surface
- Lysol Bathroom Cleaner

CARE TIP

Allowing water to evaporate on metal will form water deposits. To avoid this, it is important to use a dabbing action to dry metal, not an abrasive or rubbing action. Cleaning with a damp sponge and drying should keep your product looking beautiful.

Neuse Stone Works, Inc.
107 Bestwood Drive
Clayton, North Carolina 27520
919-550-5969 Office
919-550-7037 Fax

September 20, 2006

TCR NC Construction 1 Limited Partnership
230 Seven Farms Drive
Suite 104
Charleston, South Carolina 29492

Attention Alicia:

As a courtesy, we will be applying a 15 year sealer to each granite counter top installed for the Belle Hall Condominium project.

Stain-Proof is an impregnating sealer for natural stone, tiles, pavers, concrete and grout by DryTreat. Stain-Proof will allow the material to maintain its' natural beauty while allowing the stone to breathe.

The benefits of Stain-Proof are that a porous material such as granite will be able to repel stains from food products and everyday kitchen use allowing easier maintenance for the consumer. Spills should still be cleaned up immediately to minimize absorption. This can be done with soap and water or a mild kitchen cleaner.

While this product is advertised as protecting these tops for a 15-year period, granite is not a warranted product.

CLEANING AND MAINTENANCE

1.0 INTRODUCTION

ASTM C1515-01 Standard Guide for Cleaning of Exterior Dimension Stone, Vertical and Horizontal Surfaces, New or Existing

1.1 Definition of Terms

Maintenance: Scheduled cleaning, specific procedures, and inspections performed on a daily, weekly, or other regular basis to keep the stone in proper condition.

Refinishing: Repolishing or honing of dull, once-polished marble, limestone, or granite floors and walls. Refinishing of traffic patterns, for example.

Renovation: Cleaning and repolishing of neglected dimension stone surfaces.

Restoration: Large-scale remedial actions taken to restore a structure or area to its original or acceptable "near original" condition. Generally applies to historic structures.

2.0 SLIP RESISTANCE OF STONE FLOOR SURFACES

The Americans With Disabilities Act (ADA) recommends that walking surfaces provide an adequate static coefficient of friction so as to provide a safe walking surface. Local building codes do take precedence. The MIA has had extensive ASTM C1028-96 Coefficient of Friction tests performed on a number of varieties of dimension stone. The results of those tests confirm that dimension stone used for paving provides an adequate walking surface when properly maintained. Proper maintenance includes prompt cleanup of spills and correcting other conditions that can cause a sudden reduction in the static coefficient of friction of the floor.

3.0 BAD WEATHER SAFETY RECOMMENDATIONS

Wet Flooring Surfaces. All flooring surfaces can become slippery when wet. It is common courtesy as well as prudent management to reduce the hazards caused by wet flooring surfaces.

Spread carpeted runners from each outside door into lobbies and corridors to help dry shoe soles.

Pylons. Place bright-colored "slippery when wet" pylons on walking surfaces in conspicuous places.

Mop or shovel walking surfaces as often as necessary to remove standing water, ice, or snow.

Maintenance Instructions. Issue standard instructions to building maintenance personnel and prominently post at all janitorial workstations.

Local Codes. Follow local building and safety codes.

4.0 MOISTURE DAMAGE

Efflorescence. Water penetrating exterior wall cavities through defective flashing or unsealed joints can cause efflorescence, a mineral salt residue left on the surface of masonry when water evaporates. In addition, condensation in wall cavities prevented from reaching the exterior surface because of blocked weep holes can dislodge masonry in a freeze-thaw climate.

Moisture coming up through a floor slab seeks the easiest possible pathway to evaporate into the atmosphere. Often, the veining or microcracks in the structures of

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some stones provide that path. The moisture dissolves all the salts from the ground, the substrate, and the stone, carries them to the surface, and deposits them as the moisture evaporates, giving the appearance of a faulty stone. Steps to eliminate this moisture can be implemented during the installation process (refer to chapters on Installation and Wet Areas.)

5.0 TOPICAL SEALERS AND IMPREGNATORS

Topical Sealers are coatings designed to protect the surface of stone against water, oil, and other contaminants. They are formulated from natural wax, acrylic, and other plastic compounds.

Impregnators (Penetrating Sealers). Impregnators penetrate below the surface and become repellents. They are generally hydrophobic (water-repelling), but are also oliophobic (oil-repelling). Impregnators keep contaminants out, but do not stop the interior moisture from escaping. These sealers are considered "breathable," meaning they have vapor transpiration.

Treatment Type. The type of treatment (i.e., impregnator or topical sealer) that is applied to the stone must be determined by the type of stone and the environment of the application. All treatments must be applied in accordance with the Manufacturer's specifications.

When to Use. A treatment may be used when a defined benefit can be determined. Situations in which a benefit may be derived from the use of surface treatments include:

- Where the risk of staining is present.
- As an aid in daily maintenance procedures.
- Where a coating may help to preserve the stone finish in excessively high wear conditions.
- Where weathering has or may affect the integrity of the surface of the stone.
- To prolong the aesthetic beauty of the original installation.
- Where the risk of graffiti or other vandalism is high.

6.0 MAINTENANCE OF INTERIOR STONE

Polished-finish stone has a glossy surface that reflects light and emphasizes the color and marking of the material. It is used in interiors as wall veneer, furniture and desk tops, counter and lavatory tops, tables, and tiles for commercial and residential installations.

Honed-finish stone has a satin-smooth surface with relatively little light reflection. It is generally preferred for floors, treads, thresholds, and other pedestrian traffic locations where heavy traffic would wear off a polished finish.

Normal Maintenance. All stone flooring should be dust mopped as necessary to remove debris and dirt. A dry, untreated dust mop should be used. Normal maintenance involves periodic washing with clean, potable water and neutral (pH 7) cleaners. Soapless cleaners are preferred because they minimize streaks and film. Mild, phosphate-free, biodegradable liquid dishwashing soaps or powders or stone soaps are acceptable if rinsing is thorough.

Wet the stone surfaces with clean water. Using the cleaner solution (following Manufacturer's directions), wash in small, overlapping sweeps. Work from the bottom up if it is a vertical surface. Rinse thoroughly with clean, potable water to remove all traces of soap or cleaner solution. Change the water in the rinse pail frequently. Dry with soft cloth and allow to thoroughly air dry.

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Safety Precautions. Any flooring surface, regardless of how it is finished, can be slippery when wet. Promptly remove liquids or foreign materials that might result in safety hazards before permitting pedestrian traffic.

For honed finishes, a neutral (pH 7), mildly abrasive cleaner may be used. Use only according to Manufacturer's directions.

For counter or table tops, use coasters under all glasses, particularly those containing alcohol or citrus juices. Many common foods, drinks, and cosmetics contain acids that will etch or dull the surface of many stones. Use trivets or mats under hot dishes and place mats under china, ceramics, silver, or other objects that can scratch the surface.

In food preparation areas, the stone may need to have an impregnator or topical sealer applied. If an impregnator or topical sealer is applied, it must be nontoxic and safe for use on food preparation surfaces.

Never use any acidic cleaner or chemical on marble or limestone surfaces. It is best to use a cleaner specifically formulated for stone cleaning.

7.0 EXTERIOR STONE

Exterior stone is a general term denoting stone installed in a place where temperature, moisture, and airborne contaminants are caused primarily or solely by the forces of nature. It can be used in a honed, textured, or polished finish in any mode in an exterior environment. Uses include building cladding, walkways, steps or stairs, retaining walls, paving, fountains, benches, planters, and decorative items such as sculptures.

Normal Maintenance. In accessible areas, routinely follow maintenance procedures as specified in Section 6.0 of this chapter, as applicable.

The large expanses of stone generally found on exterior applications may make it impractical to perform normal maintenance on a frequent basis. Large installations, however, should be given periodic overall cleaning as necessary to remove accumulated pollutants. Easily accessible stone surfaces such as steps, walkways, fountains, etc., should be kept free of debris and soiling by periodically sweeping and washing with water.

Normal maintenance should include periodic inspection of stone surfaces for structural defects, movement, deterioration, or staining.

8.0 STAIN REMOVAL

Surface stains can often be removed by cleaning with an appropriate commercial cleaning product or household chemical. Identifying the type of stain is the key to removing it. Look for color, shape, and environmental factors that could be causing the staining.

8.1 Types of Stains and Removal Procedures

Oil-Based Stains (grease, tar, cooking oil, cosmetics). An oil-based stain will darken the stone and normally must be chemically dissolved so the source of the stain can be flushed or rinsed away. Clean gently with a soft liquid cleanser, household detergent, ammonia, mineral spirits, or acetone.

Organic Stains (coffee, tea, fruit, tobacco, paper, food, urine, leaves, bark, bird droppings). May cause a pinkish-brown stain and may disappear after the source of the stain has been removed. Outdoors, with the sources removed, normal sun and rain action will generally bleach out the stains. Indoors, clean with 12% hydrogen peroxide and a few drops of ammonia.

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Inorganic Metal Stains (iron, rust, copper, bronze). Iron or rust stains are orange to brown in color and leave the shape of the staining object, such as nails, bolts, screws, cans, flowerpots, or metal furniture. Copper and bronze stains appear as green or muddy brown and result from the action of moisture on nearby or embedded bronze, copper, or brass items. Metal stains must be removed with a poultice (see Section 9.0 of this chapter on Poultices). Deep-seated, rusty stains are extremely difficult to remove, and the stone may be permanently stained.

Biological Stains (algae, mildew, lichens, moss, fungi). Clean with dilute (1/2 cup in a gallon of water) ammonia, bleach, or hydrogen peroxide. WARNING: DO NOT MIX BLEACH AND AMMONIA! THIS COMBINATION CREATES A TOXIC GAS!

Ink Stains (magic marker, pen, ink). Clean light-colored stones with bleach or hydrogen peroxide. Use lacquer thinner or acetone for dark-colored stones.

Paint Stains. Small amounts can be removed with lacquer thinner or scraped off carefully with a razor blade. Heavy paint coverage should be removed with a commercial liquid paint stripper. DO NOT USE ACIDS OR FLAME TOOLS TO STRIP PAINT FROM STONE.

Water Spots and Rings (surface accumulation of hard water). Buff with dry 0000 steel wool.

Fire and Smoke Damage. Older stones and smoke- or fire-stained fireplaces may require a thorough cleaning to restore their original appearance. Commercially available smoke removal products may save time and effort.

Etch Marks. Caused by acids left on the surface of the stone, some will etch the finish but not leave a stain; others will both etch and stain. Once the stain has been removed, wet the surface with clear water and sprinkle with marble polishing powder. Rub the powder into the stone with a damp cloth or by using a buffing pad with a low-speed power drill or polisher. Continue buffing until the etch mark disappears and the marble surface shines. Honing may be required for deep etching. This process may require the services of a Professional Refinisher.

Efflorescence. A white powder that may appear on the surface of the stone, it is caused by water carrying mineral salts from below the surface of the stone to the surface and evaporating. When the water evaporates, it leaves the powdery salt residue. If the installation is new, dust mop or vacuum the powder. Repeat as necessary as the stone dries out. Do not use water to remove the powder. If the problem persists, contact the Contractor to identify and remove the cause of the moisture.

9.0 POULTICES

9.1 General Application

Definition and Use. Applied to stone to remove stains, a poultice is a chemical or mixture of chemicals combined with an absorbent material, forming a thick paste. The poultice is spread over the stained area to a thickness of about ¼" to ½" with a wood or plastic spatula or scraper, covered with plastic, and left to work for 24 to 48 hours. The chemical will draw out the stain into the absorbent material. Poultice applications may have to be repeated to thoroughly remove a stain, but some stains may never be completely removed.

9.2 Materials

Poultice materials include kaolin, fuller's earth, whiting, diatomaceous earth, powdered chalk, white molding plaster, and talc. Approximately one pound of prepared poultice material will cover one square foot.

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Do not use whiting or iron-type clays such as fuller's earth with acid chemicals; the reaction will cancel the effect of the poultice. A poultice can also be prepared using white cotton balls, white paper towels, or gauze pads. Premixed poultices that require adding only water are also available from stone maintenance supply companies.

9.3 Poultice Mixtures for Various Stains

Oil-Based Stains. Poultice with baking soda and water or one of the powdered poultice materials and mineral spirits or a commercial degreaser.

Organic Stains. Poultice with one of the powdered poultice materials and 12% hydrogen peroxide solution, or use acetone instead of hydrogen peroxide.

Iron Stains. Poultice with diatomaceous earth and a commercially available rust remover. Rust stains are particularly difficult to remove; professional assistance may be required. Many rust removers contain acids that will etch marble, limestone, and certain granites.

Copper Stains. Poultice with one of the powdered poultice materials and ammonia. These stains are difficult to remove; professional assistance may be required.

Paint Stains (water-based). Poultice with one of the powdered poultice materials and a commercial paint remover.

Paint Stains (oil-based). Poultice with one of the powdered poultice materials and mineral spirits. Deep stains may require methylene chloride.

Ink Stains. Poultice with one of the powdered poultice materials and mineral spirits or methylene chloride.

Biological Stains. Poultice with one of the poultice materials and dilute ammonia or bleach or hydrogen peroxide. WARNING: DO NOT MIX AMMONIA AND BLEACH! THIS COMBINATION CREATES A TOXIC GAS!

9.4 Applying the Poultice

Prepare the poultice. If using a powdered poultice material, mix with the cleaning agent or chemical to a paste with a thick, creamy consistency. If using paper, soak in the chemical and let drain. Don't let the liquid drip.

Prepare stain area. Wet the stained area with distilled water.

Apply the poultice to the stained area about ¼" to ½" thick, and extend the poultice beyond the stained area by about 1". Use a wood or plastic scraper to spread the poultice evenly.

Cover the poultice with plastic and tape the edges to seal it. Punch several small holes in the plastic to allow vapor to escape.

Allow the poultice to dry thoroughly, usually about 24 to 48 hours. The drying process draws the stain out of the stone and into the poultice material. After about 24 hours, remove the plastic and allow the poultice to dry.

Remove the poultice from the stain. Rinse with distilled water and buff dry with a soft cloth.

Repeat the poultice application if the stain is not removed. It may take five or more applications for difficult stains.

If the surface is etched by the chemical, apply polishing powder and buff with a polishing pad recommended by the Polishing Powder Manufacturer.

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10.0 EXTERIOR BUILDING CLEANING

General. The purpose of this section is to give the Specifying Authority the basic information to prepare a specification for the cleaning of exterior building stone.

Exterior building stone is considered in this section to be all stone used on the exterior of a structure, either as a structural component or as a facing material, with the exception of polished, finished marble. Even though polished marble is not recommended for exterior use, it is occasionally used on storefronts, column facings, and similar treatments.

Regular Cleaning. The ideal in maintaining exterior building stone is to clean it at periodic intervals (at least annually, depending on atmospheric conditions) by simply hosing down with clean water. This will prevent accumulation of dirt and impurities.

Sporadic Cleaning. If cleaning the stone is not done regularly, one of the water systems (hydraulic, hydro-air, plain water) will be the most effective method at the lowest cost.

Dirt on Older Buildings. Where dirt has accumulated on older structures over a long period of time, a combination of methods may have to be employed to properly clean the stone. Plain waterjet is satisfactory for removing most accumulation. No chemicals should be used which would be injurious to the stone.

Brushes may be necessary for the removal of certain surface impurities. Soft-fiber brushes are recommended.

Test Panels. By cleaning and inspecting test panels, the Specifying Authority can determine if the method is satisfactory. This procedure eliminates the possibility of improper cleaning, since the Owner and Specifying Authority can see what results will be obtained prior to commencement of the total contract. It also gives the Cleaning Contractor a standard to work toward, making definition of the cleaning more specific for all parties concerned.

Further Reading Suggestions:

Cleaning Masonry – Review of the Literature
by Grimm, Clayford T., P.E.
Construction Research Center,
University of Texas at Arlington, 1988.

Cleaning Stone and Masonry
Clifton, James R., Editor.
ASTM Special Technical Publication 935,
American Society for Testing and Materials, 1983.

Keeping It Clean
by Grimmer, Anne E.
U.S. Department of the Interior,
National Park Service, Washington, DC: U.S. Government Printing Office, 1988.

"Cleaning of Masonry Interiors of Public Buildings," Cleaning Stone and Masonry by Roth, J.W., ASTM STP 935, 1986.

"Chemical Cleaning of Historical Structures – A Practical Approach," Cleaning Stone and Masonry by Rudder, T.H., ASTM STP 935, 1986.

"A Case Study of the Cleaning of Marble at the Schenectady, New York, City Hall," Cleaning Stone and Masonry, by Waite, J.C. and R.J. Chen; ASTM STP 935, 1986.

"A Macrostereogrammetric Technique for Measuring Surface Erosion Losses on Stone," Cleaning Stone and Masonry by Winkler, E.M., ASTM STP 935, 1986.

Stain Removal Guide for Stone and Masonry
by Hueston, Frederick M., NTC Enterprises Inc.

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Historic Stone & Tile Restoration Manual
by Hueston, Frederick M., NTC Enterprises Inc., 1998.

11.0 SPECIFICATIONS BUILDING CLEANING

11.1 General

Information to be shown on drawings:

Location, size, or area and items to be cleaned.

Location, size, and number of test panels.

Areas not included in cleaning contract.

Location, size, and description of materials requiring protection.

Building and property boundaries.

11.2 Description

General. This section pertains to the furnishing of all labor, materials, equipment, and services necessary for the complete cleaning of exterior building stone as indicated on the plans and described in the specifications.

Repointing, Sealing, and Replacement. Repointing or sealing of joints and replacement of stone are not included in the cleaning contract.

Related Sections. To be determined by design requirements.

11.3 Requirements

General. The Plans, General Conditions, Supplementary General Conditions, and Executed Agreement are all a part of this section as if written out in full.

Certification. Furnish certified statements, as required, attesting that all materials to be used meet the requirements specified and approved.

Scheduling. Furnish Specifying Authority with schedule of cleaning operations indicating time of day work will be performed. The "wet method" of cleaning shall not be performed when temperatures reach 35°F or lower.

Test Area(s). Clean for approval by Specifying Authority at least a 4' x 4' test area for each type of soiling, stone variety, and finish required to be cleaned. Test panels shall be so located to include intersection of horizontal and vertical joints. The approved panel(s) shall be the standard for cleaning methods and finish of all areas to be cleaned.

Protection. Furnish for approval by Specifying Authority types of materials and methods to be used in the protection of adjacent materials and surfaces from damage, moisture, and staining. If other refurbishing operations are being conducted, protect cleaned stone areas with an approved nonstaining covering.

Cleaning. After the surface has been cleaned, it shall be rinsed with potable water applied at the temperature and pressure of the municipal water supply.

11.4 Materials

Water shall be potable, nonstaining, and free of materials detrimental to the surface being cleaned.

11.5 Methods

To be determined by approved test area(s).

Hydraulic. Water at varying pressures between 300 and 600 psi and at municipal supply temperatures shall be jetted against the surface to be cleaned. Care must be exercised

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in selecting nozzle tip degree; 0 (zero) nozzle tips are never to be used.

Water Misting. Cleaning the surface with water. Misting heads are set up on scaffolding and water is misted onto the surface of the building. The misting heads may be set on a timer so that they go on and off intermittently. The intermittent cycle allows the building to dry and prevents over-saturation of the stone. This method is the safest for cleaning and is widely used on historical buildings.

Pressure washing employs the use of high-pressure waterjets of up to 2500 psi or more. Pressure washing works by blasting the dirt off the surface of the stone, and can cause irreversible damage to the stone surface. Pressure should never exceed 1000 psi and only a fan-tip spray nozzle should be used. This method should be employed only by highly trained technicians.

Chemical Cleaning is used in combination with one or several of the water washing methods to dislodge soiled particles. Chemicals can be dangerous to the stone, the Operator, and the surrounding landscape; therefore, all chemicals used must be tested and monitored.

Acids. Chemicals with a pH less than 7 should not be used on calcareous or dolomitic stones.

Alkalis. Chemicals with a pH greater than 7 are safe for use on most stones. These are usually followed with a mild acid wash to neutralize the alkaline salts.

Neutral Cleaners. Chemicals containing surfactants with a pH equal to 7 are safe for most stones.

Solvents. Waterless chemicals such as mineral spirits and acetone. Rarely used for building cleaning due to their high flammability.

Bacteria. Application of special bacteria to "eat" dirt and salts.

J.O.S. System for removal of dirt and graffiti. Uses low-pressure washer and milled glass or dolomite powder. Premise required.

Dry Cleaning. Uses organic powder or mineral powder (aluminum silicate) crystals sized between 10 and 90 microns.

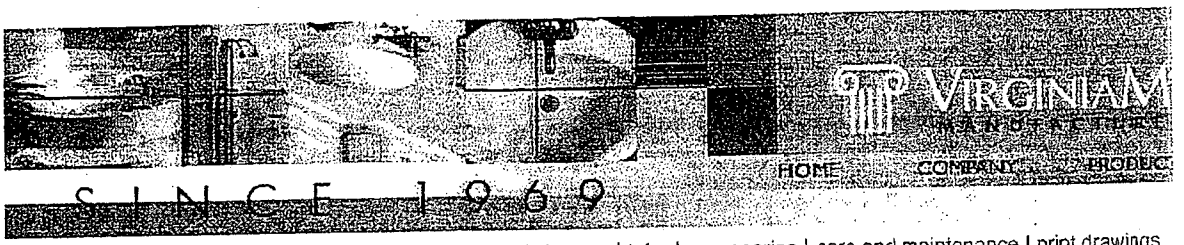
Sandblasting should never be used to clean stone surfaces.

Safety Requirements: All of these methods require specialized equipment. Adherence to OSHA safety requirements by highly skilled technicians is mandatory.

Testing. All methods must be tested for potential damage to the stone.

MIA Bookstore Resources:
A consumer brochure, "Care & Cleaning of Natural Stone Surfaces," can be purchased separately from the MIA Bookstore.

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bowl styles

VANITY TOPS

custom vanity tops

Vanity Top in #107 White / Black
Vanity Top in #117 Gray / White
Custom Angled Vanity Top
Custom Vanity with Custom Cut-Out
Three Edge Treatments to Choose From

From basic drop-in bowls to multi-featured vanity tops with beveled edges, VirginiaMarble makes custom vanity tops to order—the perfect compliment to your décor and fixtures. With everything we make, our cast polymer manufacturing process provides a diversity of benefits:

- Custom colors, color-matching & textures
- Unique cultured marble patterns
- Custom sizes and shapes
- Resistant to impact, stains, mold & mildew
- Easy-cleaning, non-porous material
- Seamless, one-piece design
- Easy installation
- High value for price

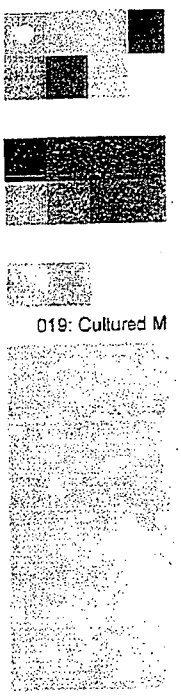
We also carry standard size vanity tops that are designed to fit the standard vanities produced by the cabinet manufacturers.



Vanity Top in #107 White / Black with a #031 Bright White Bowl

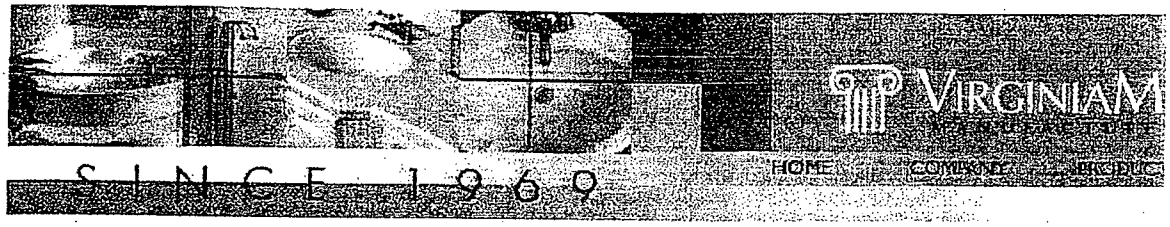
This is a custom made vanity top with a 1 1/2" thick beveled edge and solid color bowl.

Cu



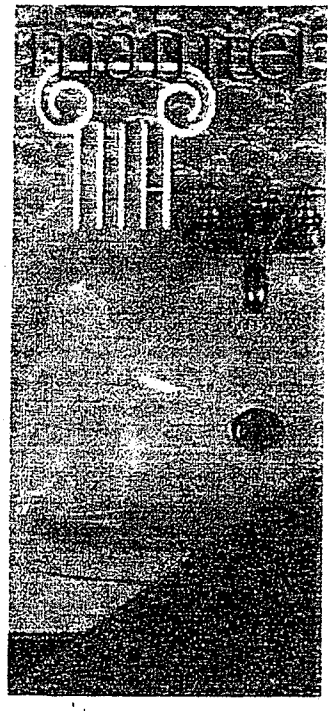
019: Cultured M

These are just some
Marble. Color sample
Contact your local Vir
color samples before



CARE AND MAINTENANCE

All VirginiaMarble cultured marble products need to be maintained with care to assure long-lasting beauty and satisfaction. Cultured marble provides an extremely durable, nonporous, stain resistant surface. Routine cleaning with a soft sponge or cloth and a non-abrasive aerosol foam cleaner is all that is required for many years of trouble-free service. Harsh abrasive cleaners are not needed or recommended. Scratching or dulling of surfaces can occur from the use of products such as SoftScrub®, Ajax®, Comet®, etc. Periodic applications of paste wax or products like "Gel Gloss" will help maintain a high gloss luster and make cleaning easier.





Virginia Marble Manufacturers
1201 Fifth Avenue
Kenbridge, Virginia 23944
Telephone: (434-676-3204)

WARRANTY

Seller warrants to its immediate purchasers that all new products supplied by seller are free from defects in workmanship and materials used in manufacturing of the same, when installed and used in accordance with seller's recommended procedures. Seller's obligation under this warranty is limited to repairing or replacing, as seller may elect, any product sold by seller which shall be returned to seller's place of business, with transportation charges prepaid, and as to which examination shall disclose to seller's satisfaction to have been thus defective, provided that such products shall be so returned not later than thirty-six (36) months from seller's shipment of same to purchaser. Such defective product shall be repaired or replaced at seller's place of business.

This warranty shall not apply, and seller shall have no liability with respect (1) to the removal or reinstallation of warranted products; (2) to any product installed or used in any way so as to have affected adversely such product; (3) damages to products while in transit after leaving seller's place of business; (4) cracks or chips in surface unless caused by defects in workmanship or material; (5) slight imperfections, warpage and shade variations in products; or (6) any transportation or cartage charges.

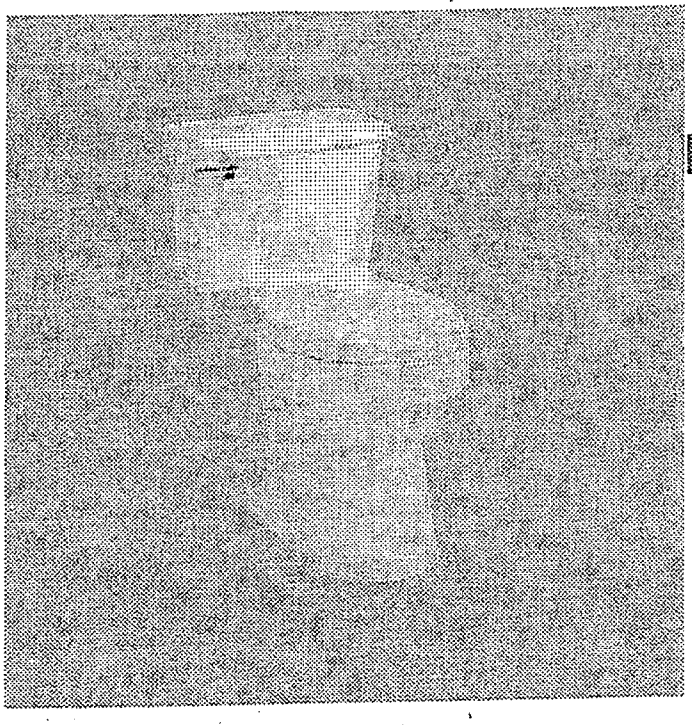
Close inspection of synthetic marble may reveal minor surface irregularities and warpage, color variation, small particles of foreign matter and other conditions commonly encountered with products of nature such as stone, marble, granite, etc.

This warranty is in lieu of all warranties, express or implied, including, but without limitation, warranties of **MERCHANTABILITY** and **FITNESS FOR PARTICULAR PURPOSE**, all other representations to purchaser, and all other obligations or liabilities, including liability for incidental or consequential damages on the part of the seller. No person is authorized to give any other warranties or to assume any liability on seller's behalf unless made or assumed in writing by seller.

ATLAS®

4191/4194
4196/4199

Two Piece Toilet
Vitreous China



NOTES

- *Fixtures conform with dimension and performance requirements of ASME A112.19.2M.*
- *Toilet seat not included.*

WATER ECONOMY FACTS

Average Gallons Per Flush	20 PSI	50 PSI	80 PSI
4191, 4194 Regular Rim	1.52	1.55	1.57
4196, 4199 Elongated Rim	1.54	1.56	1.60

Trapway	2"
Water Surface	9 ½" x 8"
Water Seal	2 ⅝"

FEATURES

- ***4191 Atlas®***

  Bowl: *4290 Atlas® (1.6 gpf / 6.0 lpf) regular rim, vitreous china, low consumption, floor-mounted, siphon wash, close-coupled combination with bolt caps.*

  Tank: *4471 Atlas® 12" roughing-in vitreous china tank and cover with anti-siphon ballcock and flushvalve.*

- ***4194 Atlas® Plus***

  Bowl: *4290 Atlas® (1.6 gpf / 6.0 lpf) regular rim, vitreous china, low consumption, floor-mounted, siphon wash, close-coupled combination with bolt caps.*

  Tank: *4474 Atlas® Plus 12" roughing-in insulated vitreous china tank and cover with anti-siphon ballcock and flushvalve.*

- ***4196 Atlas®***

  Bowl: *4295 Atlas® (1.6 gpf / 6.0 lpf) elongated rim, vitreous china, low consumption, floor-mounted, siphon wash, close-coupled combination with bolt caps.*

  Tank: *4471 Atlas® 12" roughing-in vitreous china tank and cover with anti-siphon ballcock and flushvalve.*

- ***4199 Atlas® Plus***

  Bowl: *4295 Atlas® (1.6 gpf / 6.0 lpf) elongated rim, vitreous china, low consumption, floor-mounted, siphon wash, close-coupled combination with bolt caps.*

  Tank: *4474 Atlas® Plus 12" roughing-in insulated vitreous china tank and cover with anti-siphon ballcock and flushvalve.*

CRANE
PLUMBING
Universal-Rundle

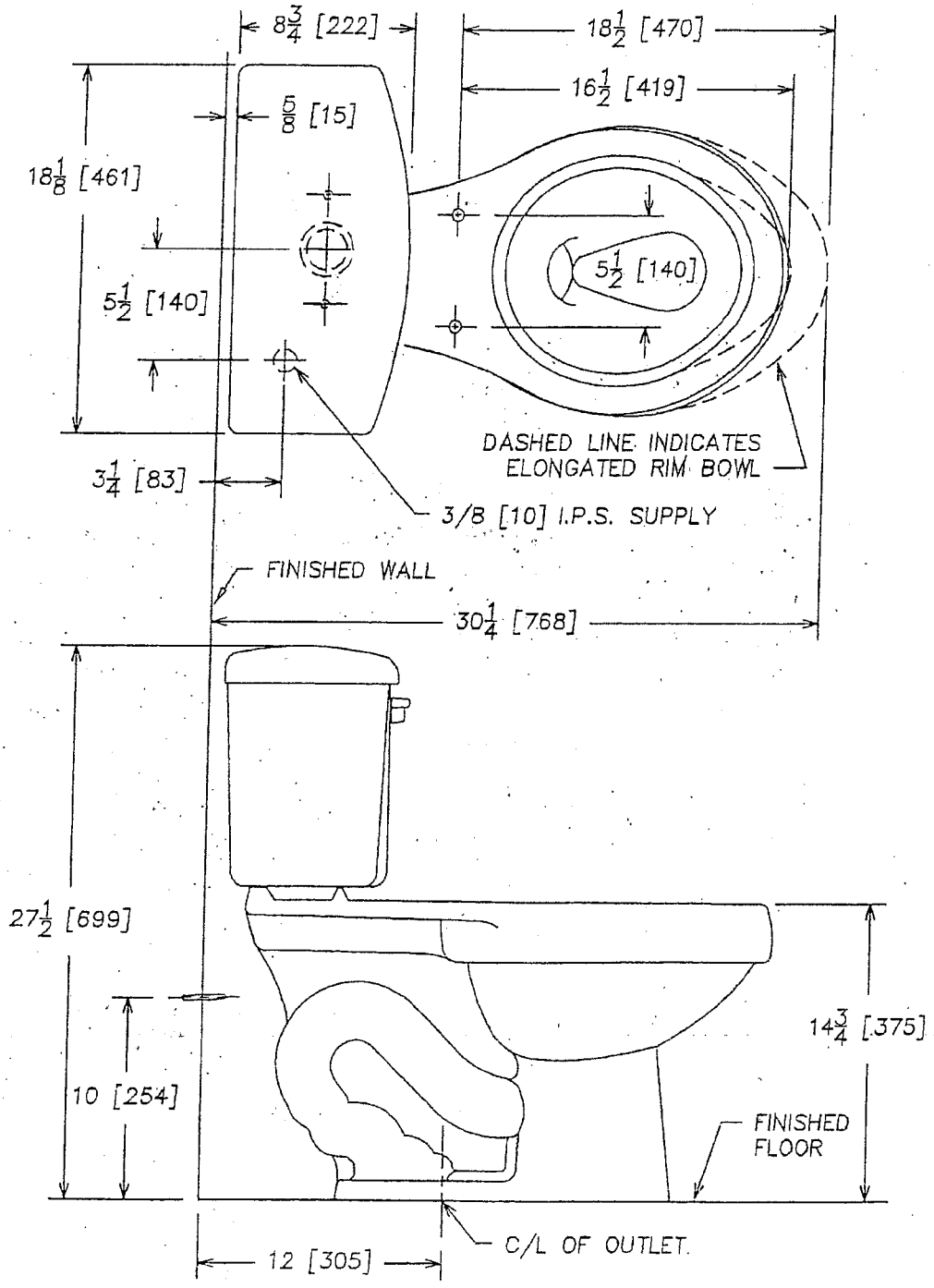
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ROA_02070

ATLAS®

Two Piece Vitreous China Toilet

4191/4194
4196/4199



CRANE PLUMBING
Universal-Rundle

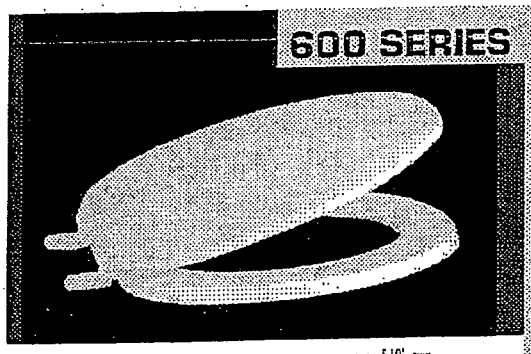
IMPORTANT: Roughing-in dimensions may vary ⅛" and are subject to change or cancellation without prior notice. No responsibility is assumed for use of superseded or voided leaflets.

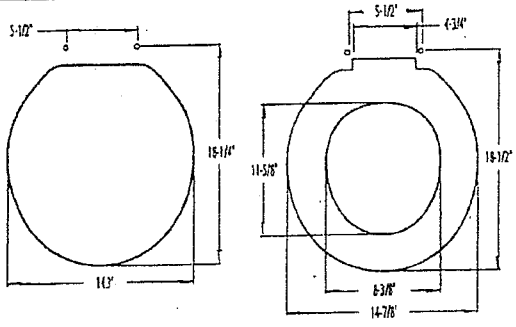
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ROA_02071

Solid Plastic Seats

Residential • Light Duty Commercial





DETAILS

600
Heavy Duty closed front with cover for elongated bowl. Top mount hinge.

Standard Features:
- Extended back with concealed hinge
- Integrally molded permanent and sanitary color keyed bumpers
- Corrosion free hardware
- Withstands cleansers, strong chemicals
- Easy clean
- Finger lift

SPECIFICATIONS

Seats shall be Centoco No. _____
Seat and cover shall be injection molded of polypropylene with integrally molded permanent bumpers.

Color to be _____

ROA_02072

PIONEER

QUALITY FAUCET AND PLUMBING PRODUCTS

DECO SERIES TWO HANDLE LAVATORY FAUCET



447400BP SHOWN * ADA

DESCRIPTION
Metal Construction
½" IPS Connections with Brass Supply nuts
Brass Waterways
4" Centers
1/4 Turn Washerless Operation
Deco Lever Handles

FLOW
Aerator limited to 2.0 gpm

STANDARDS
ASME A112.18.1M
ANSI A117.1
ANSI / NSF 61, SECTION 9
IAPMO LISTED

PRODUCT NUMBERS

#447400	Brass Pop-Up Drain Supplied – Chrome Finish
#447500	Less Pop-Up Drain – Chrome Finish
#448400CB	Brass Pop-Up Drain Supplied – Chrome w/ Polished Brass Accents
#448500CB	Less Pop-Up Drain – Chrome w/ Polished Brass Accents

FINISHES

BN	PVD Brushed Nickel
~~BP~~	~~PVD Black Pearl~~
CB	Chrome w/ PVD Polished Brass Accents
CP	Chrome
PB	PVD Polished Brass
PN	PVD Polished Nickel
TB	PVD Tuscany Bronze

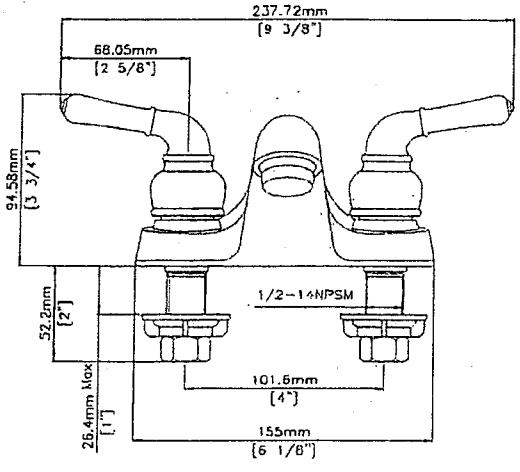
Model #: _____

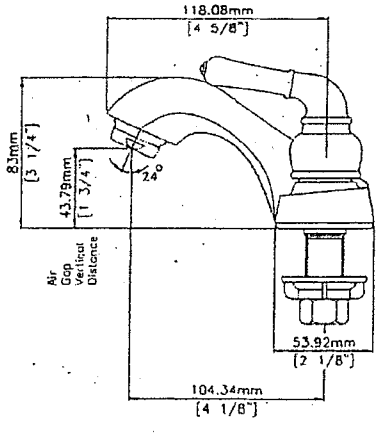
Specific Features: _____

Project Name: _____

Submitted For: _____

Date: _____





PIONEER

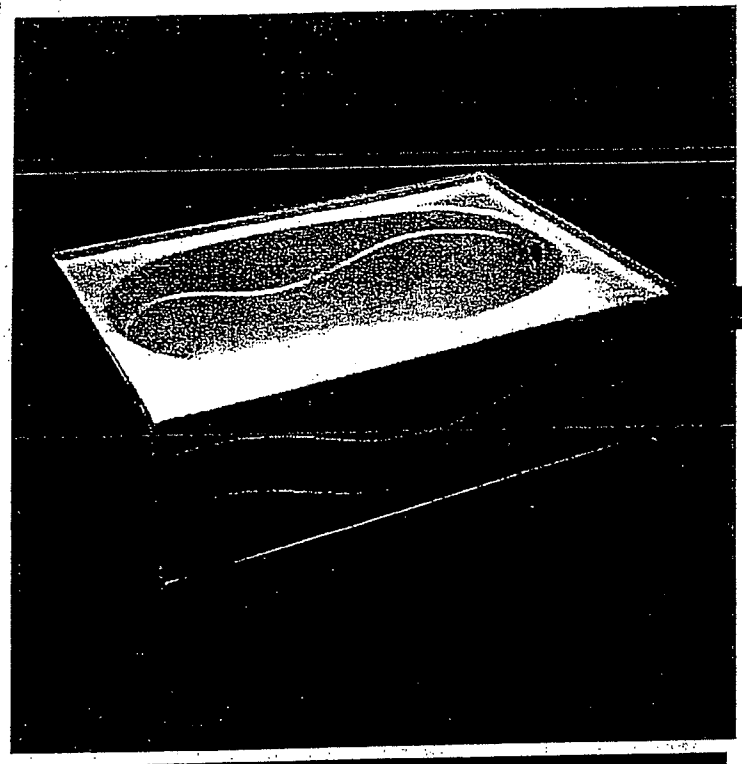
Commerce, CA 90040
www.pioneerind.com
Pioneer Industries, Inc. © 2004

DMSP447400/REV. 01 2004

ODYSSEY

26035R/L

Oval Recessed Bathtub
High Gloss Gelcoat Finish



FEATURES

- ***26035 Odyssey***

  60" x 35" x 20" (nominal outside).

  Deep bathing well for a relaxing experience.

  The Odyssey is made of sanitary grade polyester high gloss gelcoat with reinforced composite matrix.

NOTES

- *Dimensions: 60" x 35 ¼" x 20 ¼"*
  Dry Weight: 66 lbs.
  Wet Weight: 465 lbs.
  Water Capacity: 48 gallons
  Shipping Weight: 80 lbs.
  Certifications: ANSI Z124.2, NAHB

WARRANTY

Georgia Bathware warrants to the purchaser a one year warranty from the date of installation against defects in material and workmanship only.

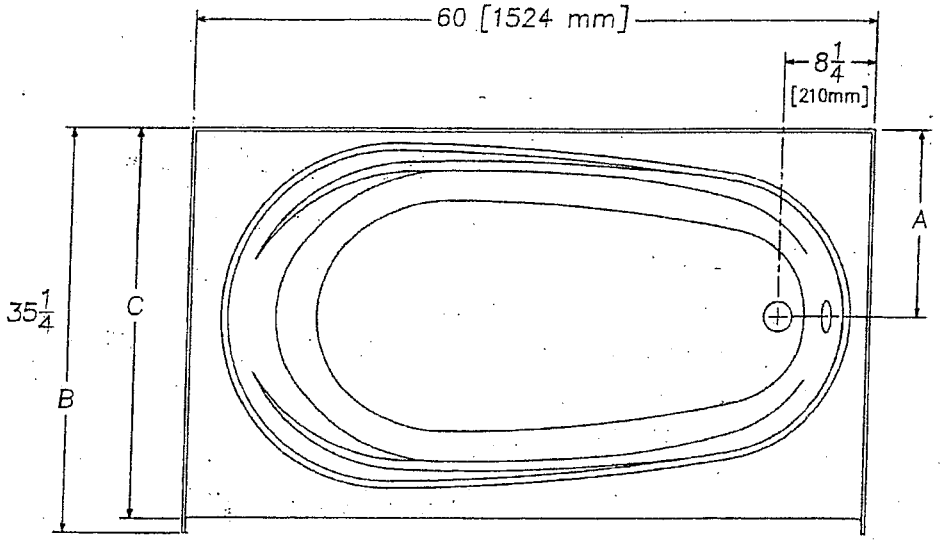
GEORGIA BATHWARE

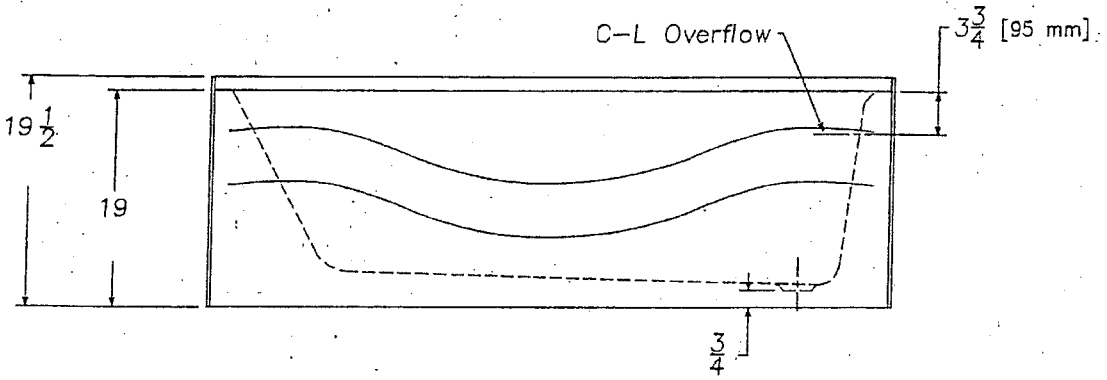
ROA_02074

ODYSSEY

Oval Recessed Bathtub
High Gloss Gelcoat Finish

26035R/L





IMPORTANT: Roughing-in dimensions may vary 1/2" and are subject to change or cancellation without prior notice.
No responsibility is assumed for use of superseded or voided leaflets.

GEORGIA BATHWARE

KOHLER.

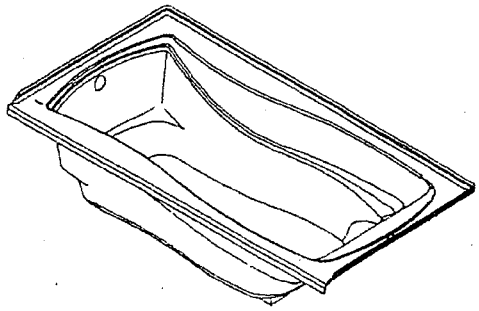
MARIPOSA™

6' BATH

K-1259

FEATURES

- *72" x 36" x 20"*
- *Acrylic*
- *Left or right outlet*
- *Optional K-1283 front apron*
- *Optional K-1491 removable pillow*



CODES/STANDARDS APPLICABLE

Specified model meets or exceeds the following:

- *ANSI Z124.1*
- *IAPMO/UPC*
- *Canadian Standards Association (CSA)*
- *State of Massachusetts*

COLORS/FINISHES

- 0 White
- Other Refer to Fixtures Price Book for additional colors

Accessories:

- CP Polished Chrome
- PB Polished Brass
- Other Refer to Price Book for additional finishes

SPECIFIED MODEL:

Model	Description	Colors/Finishes	
K-1259-L	Bath with left outlet, integral flange	☐0 White	☐Other_____
K-1259-R	Bath with right outlet, integral flange	☐0 White	☐Other_____
K-1259	Bath, drop-in rim style	☐0 White	☐Other_____
Recommended Accessories			
K-7166-AF	Drain	☐CP ☐PB	☐Other_____
Optional Accessories			
K-1283	Apron (removable)	☐0 White	☐Other_____
K-1491	Pillow	☐0 White	☐Other_____

PRODUCT SPECIFICATION:

The bath shall be 72" in length, 36" in width, and 20" in height. Bath shall be made of acrylic. Bath shall have optional K-1283 front apron. Bath shall have optional K-1491 removable pillow. Bath shall be Kohler Model K-1259-_____-_____.

We reserve the right to make revisions without notice in the design of fixtures or in packaging unless this right has specifically been waived at the time the order is accepted.

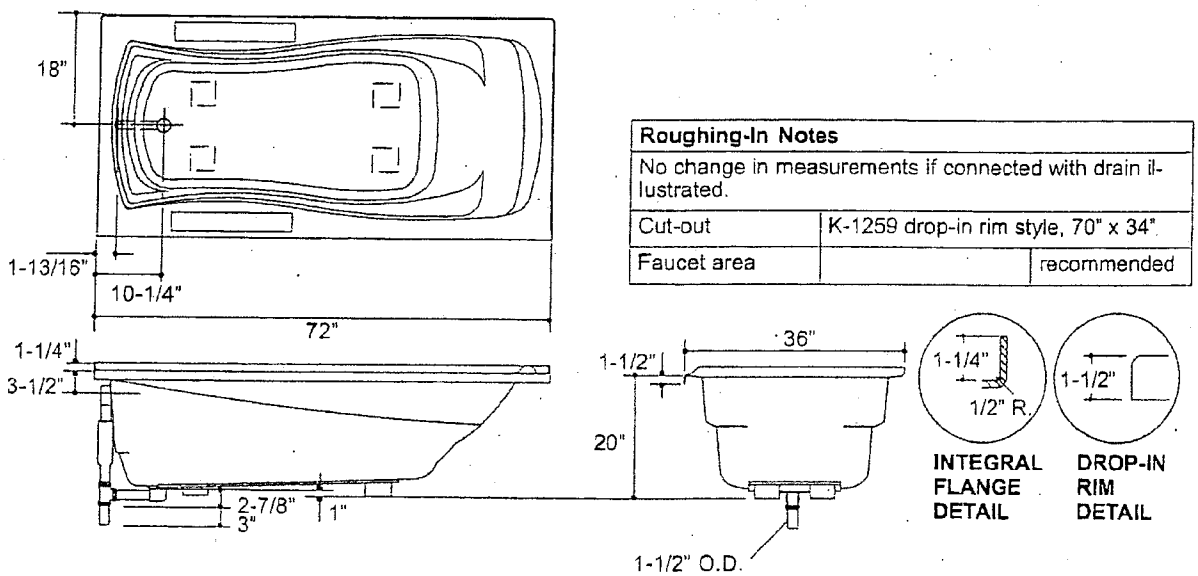
MARIPOSA™

PRODUCT INFORMATION

Fixture*:	basin area	top area	weight
Bathing well	50" x 24"	65" x 27"	77 lbs.
	water depth	capacity	
To overflow	14"	72 gal.	
* Approximate measurements for comparison only.			

INSTALLATION NOTES

The apron must be installed before the finish floor and wall materials are installed.



Roughing-In Notes		
No change in measurements if connected with drain illustrated.		
Cut-out	K-1259 drop-in rim style, 70" x 34"	
Faucet area		recommended

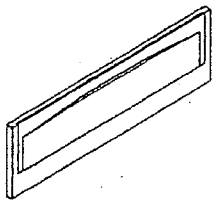
1.25>132

PRODUCT DIAGRAM

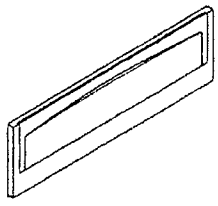
Installation Guide

Acrylic Aprons

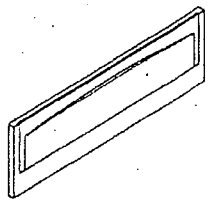
K-1278



K-1279



K-1283



M product numbers are for Mexico (i.e. K-12345M)
Los números de productos seguidos de M corresponden a México (Ej. K-12345M)
Français, page "Français-1"
Español, página "Español-1"

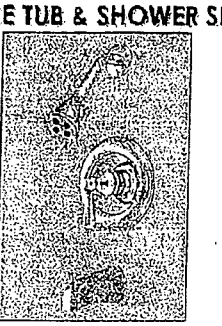
THE BOLD LOOK OF KOHLER.

1018323-2-B

PIONEER

QUALITY FAUCETS AND PLUMBING PRODUCTS

Brentwood SERIES PRESSURE BALANCE TUB & SHOWER SET



#991612-T SHOWN * ADA

DESCRIPTION

Valve :
½" IPS and CxC Connections
With or Without Brass Inlet Stops
Wide Internal Waterways
Washerless Cartridge
Adjustable Temperature Stop
Back to Back Installation

Trim:
Tub and Shower Set Brentwood Trim
Brentwood Series Lever Handle
Solid Brass Showerhead
Shower Arm and Flange
Brentwood Face Plate
Combo ½" IPS/Slip-On Diverter Tub Spout
Tub Spout Flange
SS Pressure Balancing Spool

FLOW

Showerhead is limited to 2.5 gpm

STANDARDS

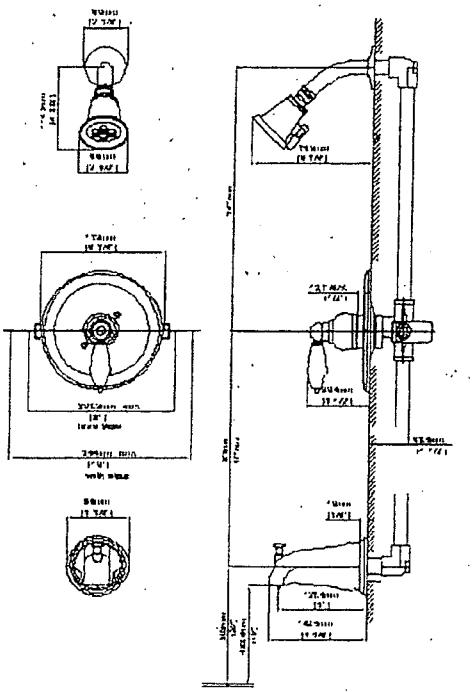
ASME A112.18.1M
ANSI A117.1
ANSI / NSF 61, SECTION 9
IAPMO LISTED

PRODUCT NUMBERS

#990612-B	½" IPS and CxC Inlets Valve Pack Brass Inlet Stops
#990612-B	½" IPS and CxC Inlets Valve Pack Without Brass Inlet Stops
#991612-T	Brentwood Series Trim Pack

FINISHES

BN	PVD Brushed Nickel
BP	PVD Black Pearl
CP	Chrome
CPPB	Chrome with PVD Polished Brass Accents
PB	PVD Polished Brass
PN	PVD Polished Nickel
TB	PVD Tuscany Bronze



Model #: _____

Specific Features: _____

Project Name: _____

Submitted For: _____

Date: _____

PIONEER

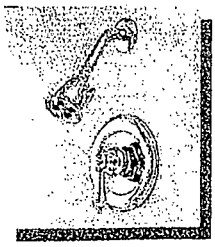
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DMSP991612/REV. 01 2005

PIONEER

QUALITY FAUCETS AND PLUMBING PRODUCTS — SPECIFICATION SHEET

BRENTWOOD SERIES PRESSURE BALANCE SHOWER SET



991812PN SHOWN * ADA

DESCRIPTION
Solid Brass Valve
Replaceable Scald Guard Cartridge & Parts
Stainless Steel Pressure Balancing Spool Assembly
Brass Brentwood Trim
Brass Showerhead
Shower Arm and Flange

FLOW
Showerhead is limited to 2.5 gpm

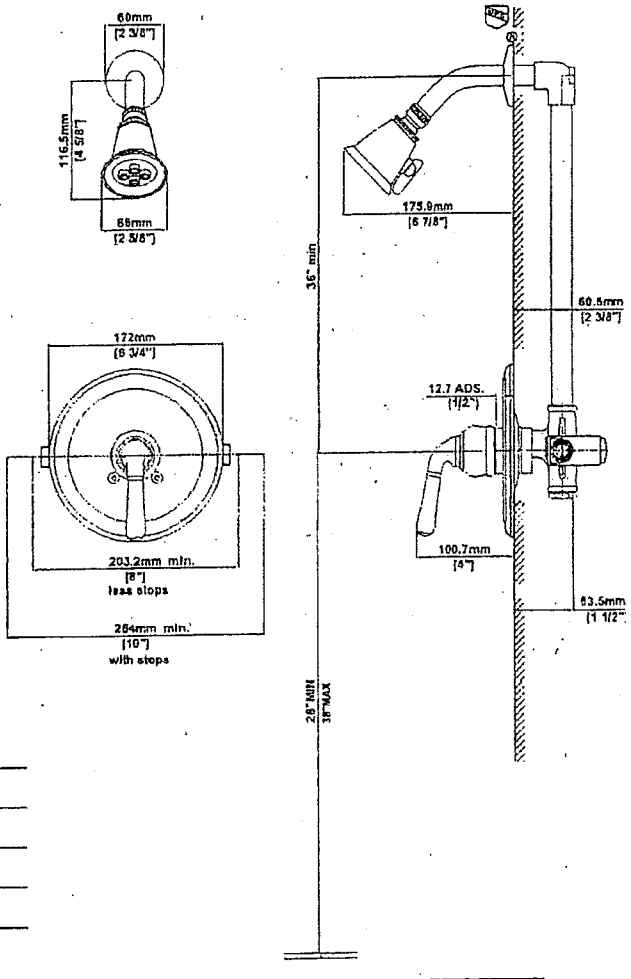
STANDARDS
ASME A112.18.1M
ANSI A117.1
ANSI / NSF 61, SECTION 9
IAPMO LISTED

PRODUCT NUMBERS
#991811DC ½" IPS Inlets Brass Screwdriver Stops
#991812DC ½" CxC Inlets Brass Screwdriver Stops
#991821DC ½" IPS Inlets

#991822DC ½" CxC Inlets

FINISHES
BN PVD Brushed Nickel
~~BP PVD Black Pearl~~
CB Chrome w/ PVD Polished Brass Accents

CP Chrome
PB PVD Polished Brass
PN PVD Polished Nickel
TB PVD Tuscany Bronze



Model #: _____

Specific Features: _____

Project Name: _____

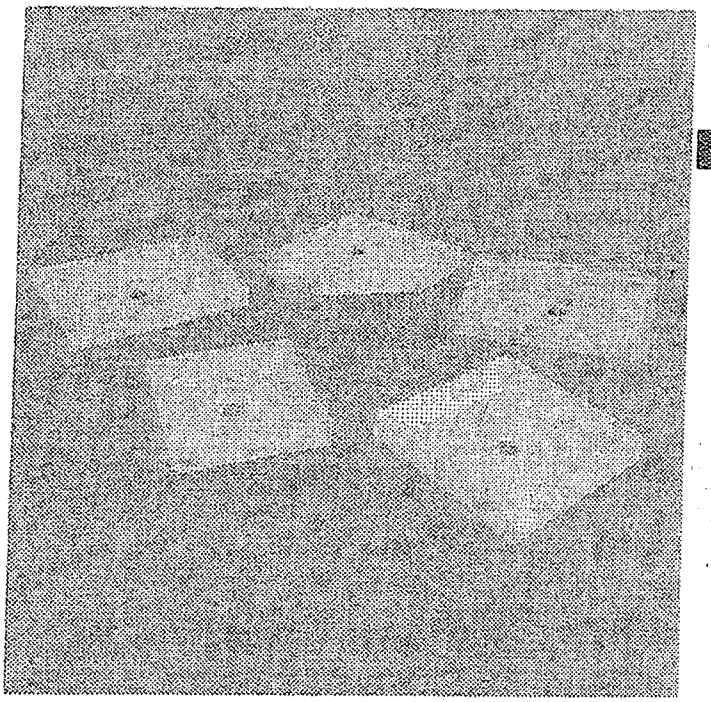
Submitted For: _____

Date: _____

DMSP991811DC/REV. 03 2004

PIONEER
Commerce, CA 90040
www.pioneerind.com
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CASCADE™ RECEPTORS



Superior Quality Shower Receptors
Molded Stone

FEATURES

Cascade™ Shower Receptors

Cascade shower floor shall be the type as manufactured by Fiat Products. Molding shall be done in matched metal dies, resulting in a one piece homogenous product. A permanent slip resistant surface shall also be integrally molded so that it will neither trap nor impede the flow of water.

The shoulder shall be note less than 3 ¼" high or less than 1 ½" wide. The tilting flange shall extend not less than 1 ½" above the shoulder and shall be not less than 1" higher than the threshold providing an integrally molded water barrier. The threshold shall be not less than 4 ¾" high (see following table).

- *Available in single and double threshhold and neo-corner*
- *One-piece with 1½" water retention tiling flange*
- *Durable molded stone construction*
- *Slip resistant surface*
- *Integral molded drain with plastic strainer*

NOTES

- *Each receptor comes with a protective coating*
- *Matching Estate™ shower wall surrounds, C9960/U9960 (32"x 32"); C9970/U9970 (36"x 36"); C9980/U9980 (48"x36"); C9990/U9990 (36"x 36" right angle)*
- *Meets all requirements of ANSI Z-124.2 Standard*
- *FHA, IAMPO, BOCA, SBCCI listed*
- *Illustrated installation instructions included*
- *Available in White and Bone*
- *Five-year warranty*

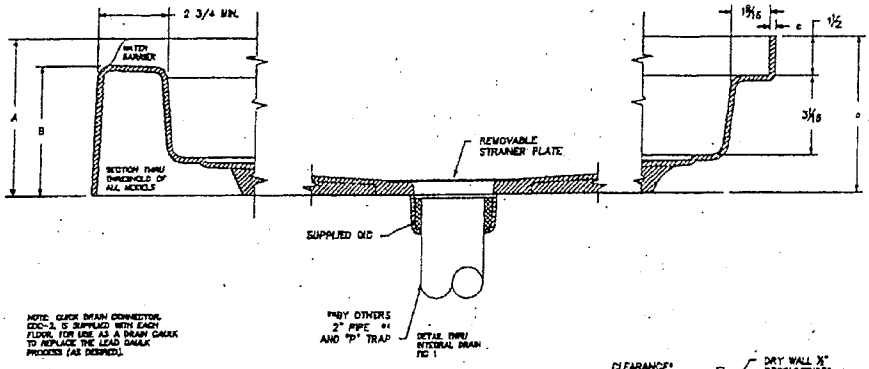
Model	Size
32WL	32"x32"
34WL	34"x34"
36WL	36"x36"
42WL	42"x34"
4242WL	42" x 42"
48WL	48"x34"
4832WL	48"x32"
54WL	54"x34"
60WL	60"x34"
34WLD	34"x34" Double Threshold
36WLC	36"x36" Neo-Corner
36WLD	36"x36" Double Threshold
38WLC	38"x38" Neo-Corner

CRANE
PLUMBING
Universal-Rundle

CR/PL© 04/03 Printed in U.S.A.

CASCADE™ RECEPTORS

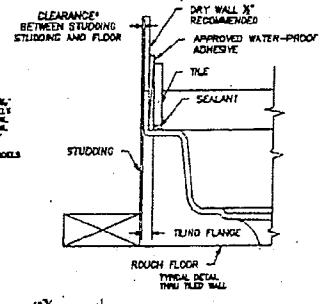
Shower Receptor

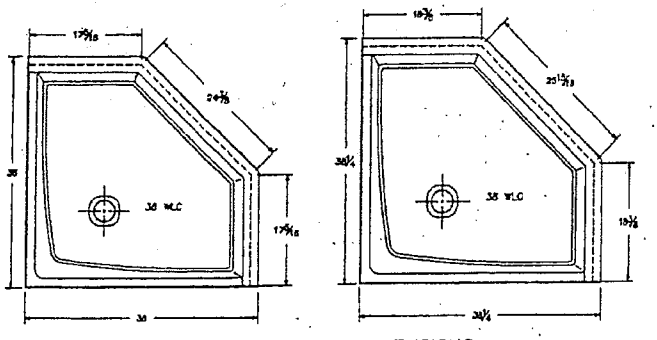


NOTE: QUICK DRAIN CONNECTOR, CDC-2, IS SUPPLIED WITH EACH FLOOR, FOR USE AS A DRAIN GAUGE TO REPLACE THE LEAD GAUGE PROCESS (AS DESIRED).

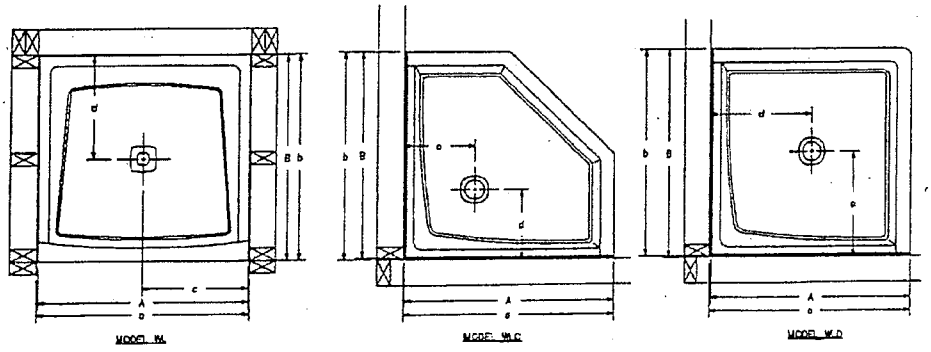
MODEL NO.	NOMINAL SIZE A	NOMINAL SIZE B	ACTUAL SIZE ± 1/16 A	ACTUAL SIZE ± 1/16 B	ROUGHING-IN DIMENSIONS a	b	c	d	APPROX. SHIPPING WT. lbs
32WL	32	32	32	32	32 3/8	32 3/16	18 3/16	18 1/8	29
34WL	34	34	34 1/4	34 1/4	34 5/8	34 7/16	17 5/16	17 1/4	31
36WL	36	36	36	36	36 3/8	36 3/16	18 3/16	18 1/8	34
42WL	42	34	42	34	42 3/8	34 3/16	21 3/16	17 1/8	36
4242WL	42	42	42	42	42 1/4	42 1/4	21 1/8	21 1/8	48
48WL	48	34	48	34	48 3/8	34 3/16	24 3/16	17 1/8	42
54WL	54	54	54 3/8	34 1/4	54 11/16	34 9/16	27 3/8	17 5/16	47
60WL	60	34	60	34	60 3/8	34 3/16	30 3/16	17 1/8	51
34WLD	34	34	34 1/4	34 1/4	34 7/16	34 7/16	17 1/4	17 1/4	34
36WLD	36	36	36 1/4	36 1/4	36 7/16	36 7/16	18 1/4	18 1/4	36
36WLC	36	36	36	36	36 1/4	36 1/4	12 1/4	12 1/4	39
36WLC	36	36	36 1/4	36 1/4	36 7/16	36 7/16	12 5/16	12 5/16	39
4832WL	48	32	48 3/16	32 1/8	48 1/2	32 1/4	24 1/4	16 1/8	41

MODEL NO.	TABLE (SEE FIG. 1) A	B	C
32WL	6	5	7/32
34WL	6	5	5/16
36WL	5 7/8	4 3/4	7/32
42WL	6	5	7/32
48WL	5 7/8	4 3/4	7/32
54WL	6	5	5/16
60WL	6	5	7/32
34WLD	6	5	5/16
36WLD	6	5	5/16
36WLC	6	5	5/16
4832WL	6	5	5/16





WLC THRESHOLD DIMENSIONS

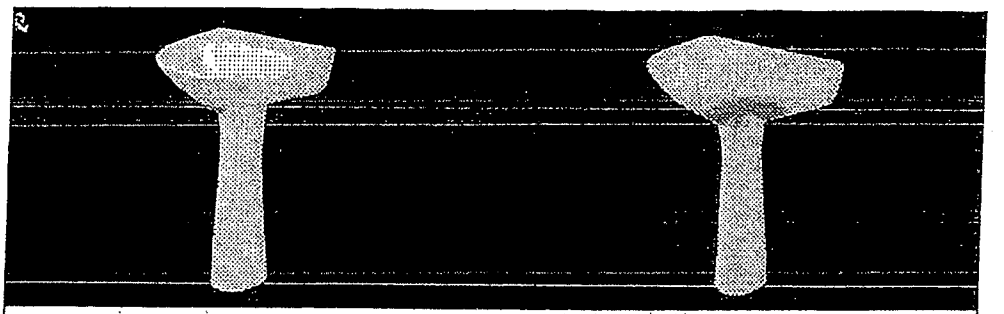


CRANE PLUMBING
Universal-Rundle

IMPORTANT: Roughing-in dimensions may vary ½" and are subject to change or cancellation without prior notice. No responsibility is assumed for use of superseded or voided leaflets.

CR/PL© 04/03 Printed in U.S.A.

ROA_02082



PF4704/4600 → **PF4608/4600**

PRODUCT FEATURES

- Vitreous china
- 20" x 18"
- Available 4CC or 8CC
- Concealed front overflow
- Pedestal conceals all plumbing
- Intergral self-draining soap dishes
- High gloss and stain resistant surface
- Mounting bracket included

PRODUCT FEATURES

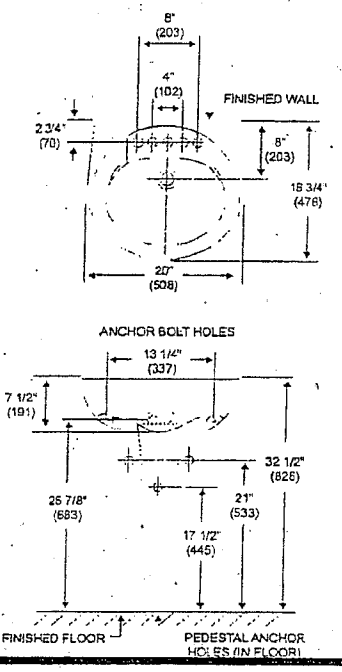
- Vitreous china
- 24" x 19"
- Available 4CC or 8CC
- Concealed front overflow
- Pedestal conceals all plumbing
- Intergral self-draining soap dishes
- High gloss and stain resistant surface
- Mounting bracket included

COLOR PALETTE

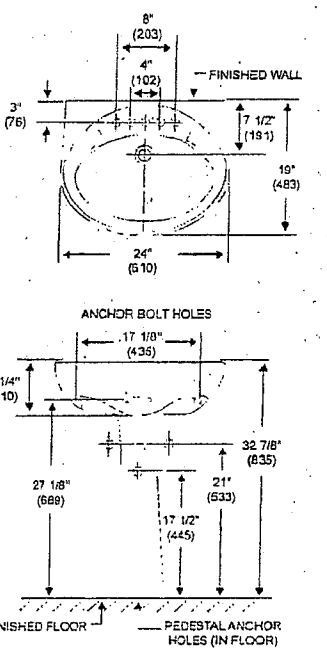
☐ White ☐ Almond
☐ Biscuit ☐ Bone

PRODUCT SPECIFICATIONS

PF4704/PF4708/PF4600



PF4608/PF4604/PF4600



MODEL NUMBERS

PF4608	24 x 19 8CC VC PED LAV ONLY
PF4604	24 x 19 4CC VC PED LAV ONLY
PF4600	PED ONLY F/4600 & 4700 LAV
PF4704	20 x 18 4CC VC PED LAV ONLY
PF4708	20 x 18 8CC VC PED LAV ONLY

WARRANTY AND CODES

These products come complete with installation, operating, care and maintenance instructions. All PROFLO fixtures carry a 1-year limited warranty. These products meet or exceed ASME/ANSI A112.19.2M. In an effort to continually improve our products, FEI will make design changes from time to time. We reserve the right to ship newly designed product to fill any order unless we agree in writing to do otherwise.

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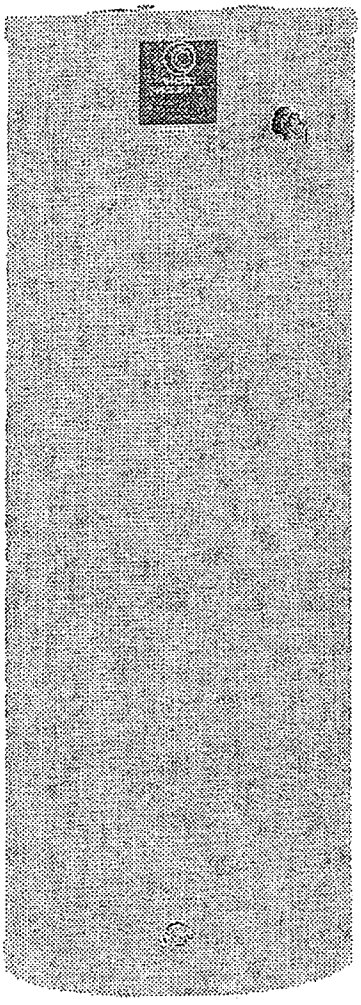
PFFIXLAV3 rev. 04/05

ROA_02083

SELECT®

Residential Electric Water Heaters

6-Year Tank Warranty • **6-Year** Parts Warranty



Tall, Short and Lowboy models available.

Longer-Lasting Low-Watt Density Copper Lower Heating Element – Upper heating element is high-watt density copper element.

Diffuser Dip Tube – helps reduce lime and sediment buildup, maximize hot water output. Made of State PEXAN™ a cross-link PEX polymer that can withstand long-term exposure to water temperatures up to 400ºF.

Aluminum Anode Rod – helps protect against corrosion for longer life.

Durable Tamper-Resistant Brass Drain Valve.

Glasslined Tank – For long-lasting protection against rust and corrosion.

Factory-Installed Side-Mounted Temperature & Pressure (T&P) Relief Valve – Top-mounted T&P available as option on some models.

Code Compliance – All models meet or exceed federal minimum energy standards effective January 20, 2004, according to latest editions of the National Appliance Energy Conservation Act (NAECA). They also comply with the latest editions of the B.O.C.A. National Codes, C.E.C., U.B.C., S.B.C.C., C.A.B.O. and the H.U.D. standards. All models U.L. Listed according to safety specifications outlined in Underwriters' Laboratories, Inc. Standards for Safety (U.L. 174).

UL® LISTED

For Additional Technical Information,
PHONE 800-365-0024

STATE WATER HEATERS
500 Lindahl Parkway, Ashland City, TN 37015
www.statewaterheaters.com

state WATER HEATERS
The Expert's Choice©

ROA_02084

TradeMaster® Receptacles

15A, 125V

Pass & Seymour

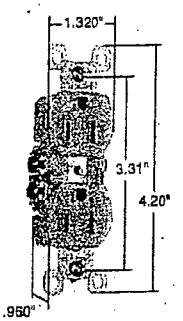
Legrand

Features

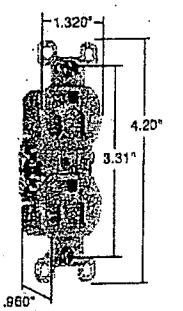
- High-impact resistant thermoplastic construction.
- Extra-long strap.
- Quickloop wire looping aid.
- Long-term blade retention.
- Longer tri-drive screws for easier 12 AWG looping.
- Extra-large circuit break-off tabs.
- Side-access push wire release.
- Ultrasonic welding of face to back body.
- Side wire accepts #12 – #14 AWG solid wire.
- Push wire accepts #14 AWG solid only.
- "S" model provides automatic ground clip.

Catalog Number	Rating A.	V.	Color	NEMA Config. No.	3rd Party Compliance UL498	C22.2 No. 42
Duplex Receptacles – Grounding						
3232-I*	15	125	Ivory	5-15R	•	•
3232-W*	15	125	White	5-15R	•	•
3232*	15	125	Brown	5-15R	•	•
3232-BK	15	125	Black	5-15R	•	•
3232-LA*	15	125	Light Almond	5-15R	•	•
Self-Grounding Receptacles						
3232-SI	15	125	Ivory	5-15R	•	•
3232-SW	15	125	White	5-15R	•	•
3232-S	15	125	Brown	5-15R	•	•
3232-SLA	15	125	Light Almond	5-15R	•	•
4 Terminal, Screws In						
3232-I4	15	125	Ivory	5-15R	•	•
3232-W4	15	125	White	5-15R	•	•
3232-4	15	125	Brown	5-15R	•	•
Duplex Receptacles – Without Ears						
3232-IMH	15	125	Ivory	5-15R	•	•
3232-WMH	15	125	White	5-15R	•	•
3232-MH	15	125	Brown	5-15R	•	•

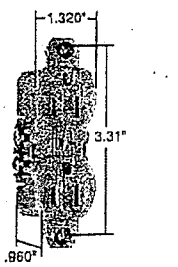
*Available in bulk packs of 150. Add "U" to end of Catalog Number. Example: 3232-LAU.



3232-I

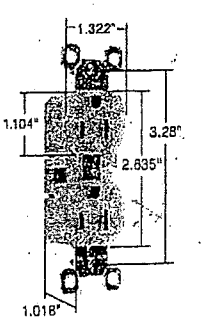


3232-SI



3232-IMH

Catalog Number	Rating A.	V.	Color	NEMA Config. No.	3rd Party Compliance UL498	C22.2 No. 42
8 Hole Push Wire Without Terminal Screws						
880-I	15	125	Ivory	5-15R	•	•
880-W	15	125	White	5-15R	•	•
880	15	125	Brown	5-15R	•	•
8 Hole Push Wire – Without Ears Without Terminal Screws						
880-IMH	15	125	Ivory	5-15R	•	•
880-WMH	15	125	White	5-15R	•	•
880-MH	15	125	Brown	5-15R	•	•



880-I

2 Pole, 3 Wire



NEMA 5-15R

For Decorator version of 880 Series, see Page B-29.

All devices listed on this page conform to NEMA WD-1 and WD-6.

ROA_02085

TradeMaster® & Specification Grade GFCI Receptacles

2 Pole, 3 Wire Grounding 15 & 20A, 125VAC

Pass & Seymour

Legrand

Features

- Meets 2006 UL requirements.
- SafeLock™ Protection: if critical components are damaged and ground fault protection is lost, power to receptacle is disconnected.
- Prevents line-load reversal miswire: no power to the face or downstream receptacles if wired incorrectly.
- Exceeds UL943 voltage surge requirements; survives 100x the required UL 3kA/6kV voltage surge test cycles.
- FSUL Listed (Federal Specification WC596).
- Trip indicator light (red lamp).
- Side or internal screw-pressure-plate back wire with #10 – #14 AWG solid or stranded copper wire.
- Two back wire holes per terminal.
- Ground screw has a back wire clamp for easy installation.
- 1/4" thinner than competitors' GFCIs; leaves more room for wires in the box.
- Mounting screws are shipped captive in the device and wall plate for easier installation.
- High-impact-resistant thermoplastic construction.
- Extra-long strap.
- Button colors match the device face.
- Dual-direction test and reset buttons.
- Class A rated GFCI.
- Supplied with matching TP26 nylon wall plate.
- Tri-drive screws.
- GFCIs with Auto-Ground assure a positive ground to metal box.

Specifications

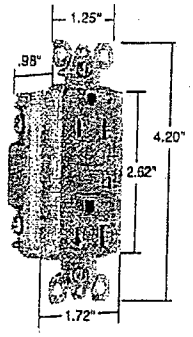
- Supply Voltage: 125VAC, 60 Hz
- Supply Voltage Range: 102-132 VAC
- Trip Threshold: 5± 1mA
- Trip Time: 0.025 sec., nominal per UL Standard
- 20 Amp feed-thru capacity

Catalog Number	Rating A.	VAC	Color	NEMA Config. No.	3rd Party Compliance UL943 C22.2 No. 144	UL498 C22.2 No. 42	FSUL WC596
NEW TradeMaster®/Spec Grade 15 Amp Duplex GFCI							
1595-I	15	125	Ivory	5-15R	•	•	•
1595-W	15	125	White	5-15R	•	•	•
1595	15	125	Brown	5-15R	•	•	•
1595-GRY	15	125	Gray	5-15R	•	•	•
1595-BK	15	125	Black	5-15R	•	•	•
1595-RED	15	125	Red	5-15R	•	•	•
1595-LA	15	125	Light Almond	5-15R	•	•	•
NEW TradeMaster®/Spec Grade 15 Amp Duplex GFCI with Auto-Ground							
1595-SI	15	125	Ivory	5-15R	•	•	•
1595-SW	15	125	White	5-15R	•	•	•
1595-SLA	15	125	Light Almond	5-15R	•	•	•
NEW Specification Grade 20 Amp Duplex GFCI							
2095-I	20	125	Ivory	5-20R	•	•	•
2095-W	20	125	White	5-20R	•	•	•
2095	20	125	Brown	5-20R	•	•	•
2095-GRY	20	125	Gray	5-20R	•	•	•
2095-BK	20	125	Black	5-20R	•	•	•
2095-RED	20	125	Red	5-20R	•	•	•
2095-LA	20	125	Light Almond	5-20R	•	•	•
NEW Specification Grade 20 Amp Duplex GFCI with Auto-Ground							
2095-SI	20	125	Ivory	5-20R	•	•	•
2095-SW	20	125	White	5-20R	•	•	•
2095-SLA	20	125	Light Almond	5-20R	•	•	•

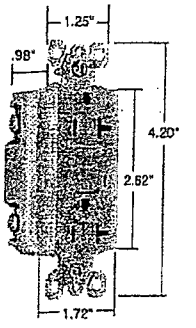
Available Spring 2006.

For Configurable Solutions, see Page U-1.

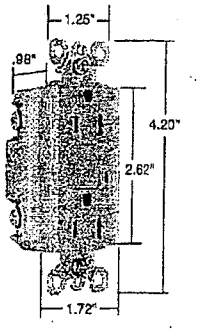
All devices listed on this page conform to NEMA WD-1 and WD-6.



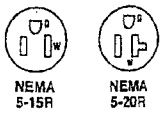
1595-W



2095-W



1595-SW



NEMA 5-15R NEMA 5-20R

Available in Bulk Packaging, i.e. 1595-W20 is 20 pack, 1595-W100 is 100 pack. Please contact Customer Support at 1-800-223-4189.

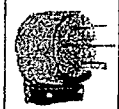
ROA_02086

Pass & Seymour
Legrand

Straight Blade Devices
Power Outlet Receptacles & Plugs
20, 30, 50, & 60A








Rating A. V.	Receptacle/Plug Configuration & NEMA No.	Flush Receptacle	Wall Plate	Surface Receptacle	Plug	Angle Plug	Connector
				Catalog Nos.			
2 Pole, 3 Wire Grounding							
30 125	5-30	3802 AL/CU	1-Gang: TP724** 2-Gang: SS702** 2-Gang: TP703†		D0531 .57"-1.26"		D0533 .57"-1.26"
30 125	NEMA TT30	3830 AL/CU*	1-Gang: TP724** 2-Gang: SS702** 2-Gang: TP703†				
30 250	6-30	3801 AL/CU	1-Gang: TP724** 2-Gang: SS702** 2-Gang: TP703†		D0631 .57"-1.26"	3869	D0633 .57"-1.26"
50 125	5-50				D0551 .57"-1.26"		D0553 .57"-1.26"
50 250	6-50	3804 AL/CU	1-Gang: TP724** 2-Gang: SS702** 2-Gang: TP703†	3852 AL/CU	D0651 .57"-1.26"	3869	D0653 .57"-1.26"
3 Pole, 3 Wire Non-Grounding							
30 125/250 Dryer	10-30	3860 AL/CU	1-Gang: TP724** 2-Gang: SS702** 2-Gang: TP703†	388 AL/CU	1031	3861	
50 125/250 Range	10-50	3890 AL/CU	1-Gang: TP724** 2-Gang: SS702** 2-Gang: TP703†	385 AL/CU	1051 .57"-1.26"	3861	1053 .32"-.91"
3 Pole, 4 Wire Grounding							
20 125/250	14-20	3820	1-Gang: SS7**				
30 125/250 Dryer	14-30	3864 AL/CU	2-Gang: SS702** 2-Gang: TP703†	3884/3884-40‡ AL/CU	1431 .57"-1.26"	5746-AN 3867	
30 3ø, 250	15-20				1521 .57"-1.26"		
30 3ø, 250	15-30	5740 AL/CU	2-Gang: SS702** 2-Gang: TP703†			5741-AN	
50 125/250 Range	14-50	3894 AL/CU	2-Gang: SS702** 2-Gang: TP703†	3854/3854-40‡ AL/CU	1451 .57"-1.26"	5745-AN 3867	
50 3ø, 250	15-50	5750 AL/CU	2-Gang: SS702** 2-Gang: TP703†			5751-AN	
60 3ø, 250	15-60	5760 AL/CU	2-Gang: SS702** 2-Gang: TP703†			5761-AN	
4 Pole, 4 Wire Non-Grounding							
20 3øY, 120/208	18-20	3822	1-Gang: SS7**		7251-DF .35"-1.05"		
60 3øY, 120/208	18-60	3870 AL/CU	2-Gang: SS701†		D1861 .57"-1.26"	8302-AN	

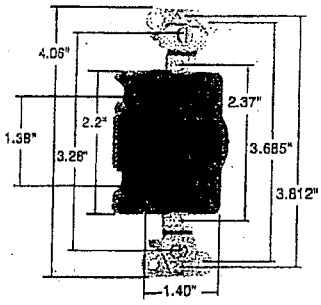
*For recreational vehicles. **For 2 screw mounting. †For 4 screw mounting. ‡In bulk pack of 40 with plastic snap-in wire clamp.
For further information consult Wall Plate Section R (for Stainless Steel versions of TP724 and TP703, refer to pages S-11 and S-12).

All devices listed on this page conform to NEMA WD-1 and WD-6.

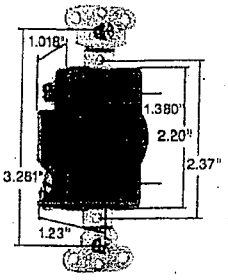
OBH - HO's Manual & Warranty 237

ROA_02087

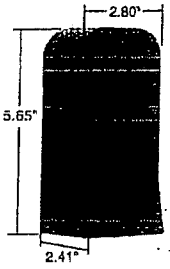
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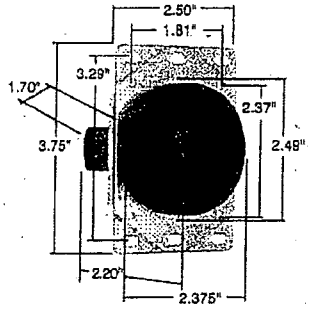
3822



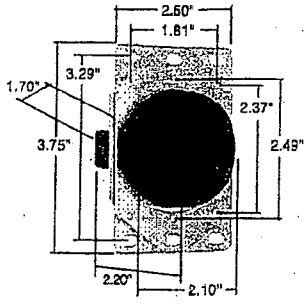
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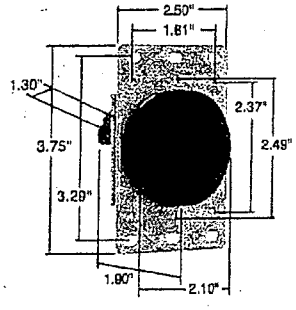
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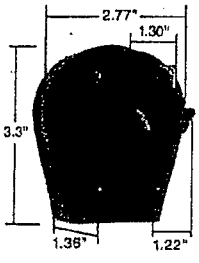
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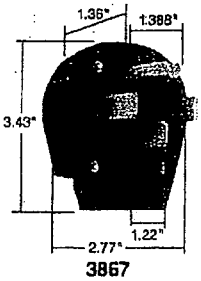
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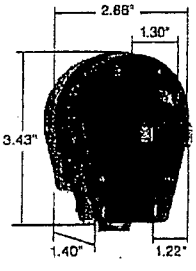
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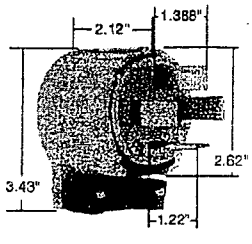
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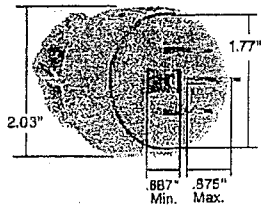
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5745-AN 5761-AN
5746-AN 8302-AN



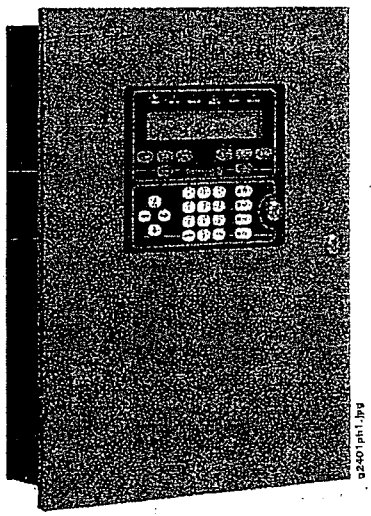
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All devices listed on this page conform to NEMA WD-1 and WD-6.

Straight Blade Devices
Power Outlet Receptacles & Plugs

ROA_02088

IdentiFlex 602
with Smart*Scan*™
Analog Addressable Control Panel



Description

The IdentiFlex 602 (IF602SS) with Smart*Scan*™ is ideally suited for small- to medium-sized installations at commercial, institutional, and industrial life-safety projects.

The IF602SS has all the features of today's most advanced life safety systems. The integration of analog and addressable hardwired circuits allows system engineers to customize panels and maximize efficiency for any application.

The IF602SS can monitor and control up to 396 intelligent analog addressable input/output points. The interactive operator's display uses LED prompting for ease of programming and user operation. The alphanumeric display and keypad simplify field programming, or download programming from a Windows®-based application.

The IF602SS's housing will fit between 16" studs for semi-flush mounting. Access to system function keys is limited by a key switch. Multiple levels of password protection prohibit unauthorized use. The circuit boards are mounted on a removable chassis with pluggable terminal strips for ease of installation and service.

Operator's Display

The IF602SS's operator's display controls all user access to the system. The display provides all of the necessary keys and annunciation points to maintain and monitor the system. Alarm, supervisory, and trouble conditions are all indicated on the operator's display by dedicated LEDs and an internal sounder. The Acknowledge, Reset, and Signal Silence keys are located directly below the 4 x 40-character backlit alphanumeric display. All system functions and operational logic can be programmed from the front panel in the field. The IF602SS display has four user-programmable function keys.

Analog Addressable Signaling Line Circuits

The IF602SS analog interface module provides Signaling Line Circuits (SLC), loop circuits that can monitor and control up to 198 analog/addressable devices on each power-limited loop, for a total of 396 analog points in a dual-loop system. Loop wiring is polarity sensitive.

Each SLC loop has a dedicated microprocessor that simultaneously communicates with connected field devices and the main CPU.

Features

- One or two Signaling Line Circuits (SLC), up to 396 points.
- Smart*Scan*™ protocol 99 detectors, 99 devices per WP.
- Smart*Start*™ self-programming logic.
- Downloadable or front-panel programmable.
- Password protected.
- Approved for Agent Releasing and Supervisory Service.
- Fully digital SLC protocol.
- Smart*Link*™ peer-to-peer networkable.
- 1000-event history log.
- Automatic drift compensation.
- Coded signaling capability.
- Adjustable sensor sensitivity and temperature settings.
- Supervisory service.
- Style 6 (Class A) or Style 4 (Class B) SLC.
- Four Style Y (Class B), or two Style Z (Class A) notification appliance circuits (NACs).
- Semi-flush mounting (between 16" studs).
- 160-character display.
- Optional UDACT.
- Built-in strobe and horn synchronization.

Listings

Listings and approvals below apply to the basic IdentiFlex 602 control panel with Smart*Scan*™. In some cases, certain modules may not be listed by certain approval agencies, or listing may be in process. Consult factory for latest listing status.

- UL Listed: file S521.

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The IF602SS uses Smart*Scan*™ fully digital communications protocol to improve the speed and accuracy of event reporting. The communications protocol provides for alarm verification per detector, detector adjustability and compensation, adjustable analog heat detector range circuit isolation, and priority interrupts. Priority interrupts allow contact-type devices such as manual fire alarm stations to interrupt the polling cycle and transmit their addresses at any time during a polling sequence.

The fully digital protocol allows the IF602SS to operate on most types of field wiring, greatly expanding its use in retrofit applications. Consult the supplemental SLC manual on tech support for specific wiring requirements.

IF602SS Power Supply

The IF602SS power supply is a fully regulated 8 Amp supply that furnishes system operating and signaling power. It is equipped with a battery charger which maintains the secondary power source. The power supply is monitored by the main CPU, ensuring that adequate power levels are available. The power supply design allows for high efficiency while providing precise power output. The battery charger maintains batteries up to 26 AH. The supply powers four on-board Notification Appliance Circuits (NACs) (two Class A) with multiple built-in synchronization protocols for System Sensor, Wheelock and others.

Input (I) / Output (O) Devices

Addressable control output devices are the interface between analog circuits and building functions. The outputs are controlled with Control By Event (CBE) software within the IF602SS, and can be programmed to respond to any event. The control devices can be used as supervised remote signaling circuits.

The IF602SS, with Gamewell's complete line of 600 Series devices, provides a foundation for system design. The IF602SS's RS-232 output expands system monitoring and control capabilities.

Remote Display and Control

Serial annunciator drivers are available in 16-point increments and are an ideal interface to graphic annunciators. Switches can be used for \cknowledge, Reset, Signal Silence, Drill, etc., to customize the remote status control network.

An alphanumeric display can also be used for remote status and control. The alphanumeric display is designed to communicate over the serial communications network.

The IF602SS can communicate locally or remotely with a printer to document system activity.

See the RAN/SAN data sheet (CS-2025) for complete annunciator details.

Applications

The IF602SS Analog Addressable Control Panel is designed for new or retrofit small- to mid-sized projects that require state-of-the-art life-safety systems. The embedded CPU offers users unrivaled reliability without sacrificing flexibility or value.

With compatible analog sensors and addressable input and control interface devices, and its remote status and control capabilities, the IF602SS provides system engineers with all the tools necessary to design effective system solutions for any application.

Specifications

Common control

Standby current: 0.125 A.

Alarm current: 0.171 A plus signaling circuit power, plus 0.002 A for master box; or plus 0.022 A for reverse-polarity.

Input power: 120 VAC, 3.0 A; or 240 VAC, 1.5 A.

Auxiliary output

S+/S–, A+/A–, 2.0 A maximum.

Common relays: 1.0 A @ 30 VDC, or 0.5 A @ 250 VAC.

Notification appliance circuits

Circuits: four Class B, two Class A.

Output: 3.0 A maximum @ 24 VDC per circuit. Maximum 8.0 A total for all circuits.

Analog SLC:	198	396
Standby current:	0.045 A	0.055 A
Alarm current:	0.045 A	0.055 A

Panel dimensions

Standard cabinet: 20.0" H x 14.0" W x 4.5" D (cm: 50.8 H x 35.56 W x 11.43 D).

XL cabinet: 30.0" H x 22.0" W x 5.5" D (cm: 76.2 H x 55.88 W x 13.97 D).

Battery storage dimensions

Standard cabinet: 6.0" H x 9.0" W x 4.5" D (cm: 15.24 H x 22.86 W x 11.43 D).

XL cabinet: 14" H x 22.0" W x 5.5" D (cm: 35.56 H x 55.88 W x 13.97 D).

Relative humidity

93% noncondensing.

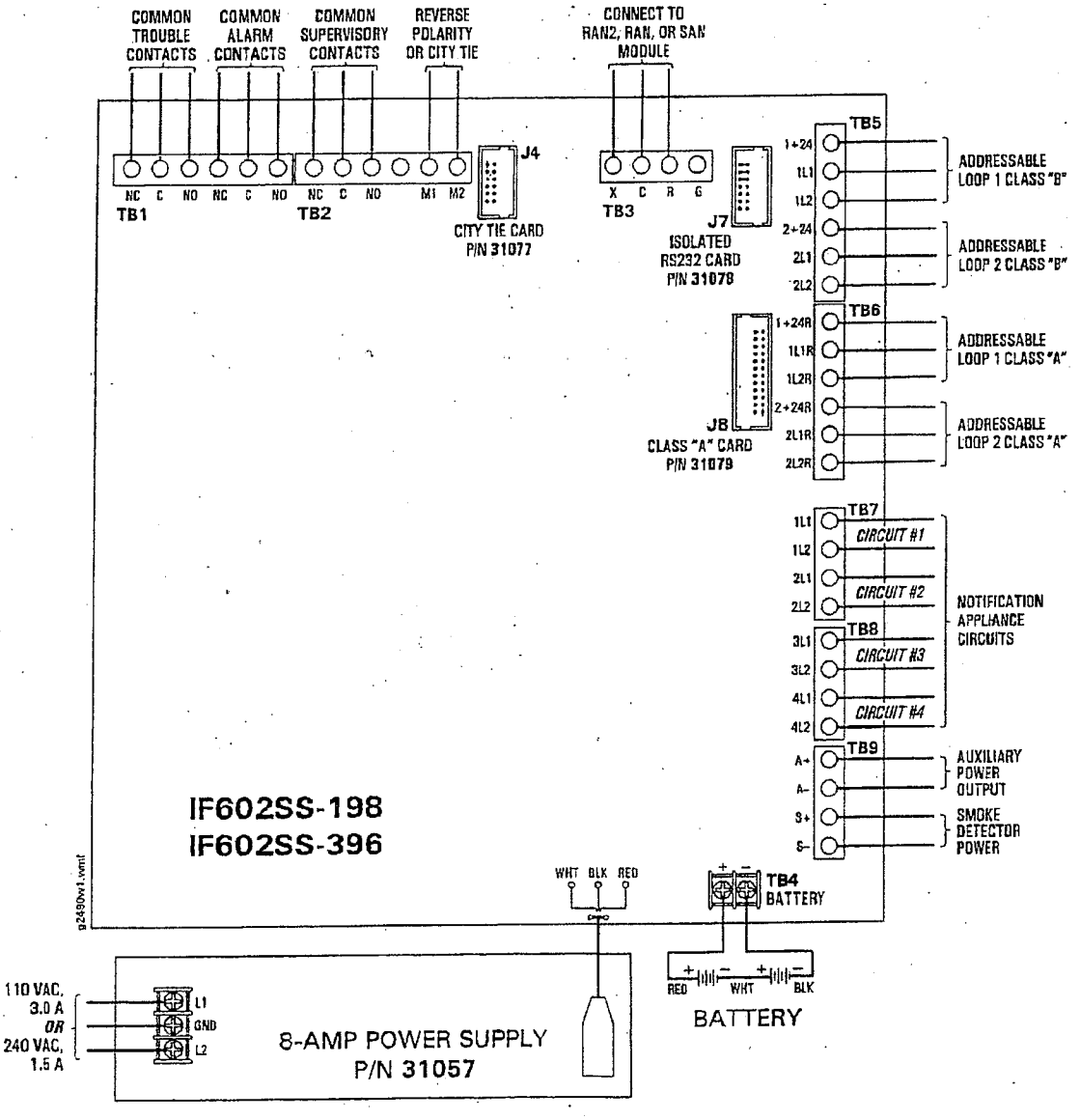
Temperature rating

32°F – 120°F (0°C – 49°C).

Architectural/Engineering Specifications

The control panel furnished and installed shall be capable of supporting 396 addressable devices and two analog loops. The panel shall utilize a fully digital Signaling Line Circuit (SLC) protocol. The panel shall contain four on-board Notification Appliance Circuits (NACs) that support multiple synchronization protocols. The panel shall utilize a 160-character Liquid Crystal Display (LCD) and a 1,000-event history log. The panel shall be a Gamewell IF602SS with Smart*Scan*™.

Wiring Diagram



Ordering Information

IF602SS-198R	IF602SS analog addressable system with Smart*Scan*™, consisting of: IF602SS common control, 8 Amp main power supply, **one analog circuit** module (198 analog addressable points), and standard cabinet assembly (CAB-602R). Dimensions: 20.0" H x 14.0" W x 4.5" D (50.8 cm H x 35.56 cm W x 11.43 cm D).
IF602SS-198XL	198 point/one SLC IF602SS (refer to IF602SS-198R above) in extra-large housing, allowing space for battery storage. Extra-large cabinet dimensions: 30.0" H x 22.0" W x 5.5" D (76.2 cm H x 55.88 cm W x 13.97 cm D).
IF602SS-396R	IF602SS analog addressable system with Smart*Scan*™, consisting of: IF602SS common control, 8 Amp main power supply, **two analog circuits** module (396 analog addressable points), and standard cabinet assembly (CAB-602R). Dimensions: 20.0" H x 14.0" W x 4.5" D (50.8 cm H x 35.56 cm W x 11.43 cm D).
IF602SS-396XL	396 point/two SLC IF602SS (refer to IF602SS-396R above) in extra-large housing, allowing space for battery storage. Extra-large cabinet dimensions: 30.0" H x 22.0" W x 5.5" D (76.2 cm H x 55.88 cm W x 13.97 cm D).
72214	*Installation and Maintenance Manual — IdentiFlex 602.*
30177	3.9K ohm, 0.5 watt end-of-line resistor.
31077	**CTM-602**, city-tie/remote signaling module, for 602 Series panels.
31078	**ISO-232**, RS-232 serial-port isolator module, for 602 Series panels.
31079	**CLA-602**, Class "A" adapter module for SLC, 602 Series panels.

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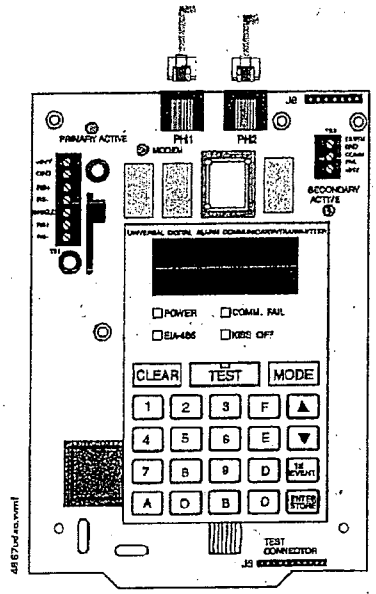
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GW-UDACT

Universal Digital Alarm Communicator Transmitter



Description

The Gamewell Universal Digital Alarm Communicator Transmitter (GW-UDACT) is designed for use on all Gamewell 600 Series Fire Alarm Control Panels (FACPs). The GW-UDACT transmits system status to UL-Listed Central Station Receivers via the public switched telephone network.

GW-UDACT is compact in size and may be mounted externally in a separate cabinet. EIA-485 annunciator communications bus and regulated 24-volt connections are required.

GW-UDACT is capable of transmitting the status of software zones (Alarm and Trouble), System Trouble, Panel Off-Normal, Supervisory, Bell Trouble, Low Battery, and AC Fail. GW-UDACT is capable of transmitting the status of all zones associated with each panel. Reporting is in the form of software zones or groups (up to 256). Each zone can be programmed for fire, waterflow, supervisory, etc.

NOTE: Descriptions regarding point capacity, listed above, are for receivers which receive in Ademco Contact ID format. See chart on page 2 for compatible receivers.

Engineer's Specifications

The Universal Digital Alarm Communicator Transmitter (UDACT) shall continuously supervise the state of each of two connected Telco Lines (at approximately one-minute intervals) by a Line-DC level measurement. If supervision fails, a Line #1 or Line #2 Trouble event will be reported. Once a line has been restored, a Line Trouble Restored event will be reported. The product will always report events sorted in the order in which they are received/recognized. The UDACT shall be capable of reporting multiple events to a single account number, within a single call session. Up to three attempts for a single message not yet reported will be made within a single call attempt. A failure to communicate to either or both accounts will generate a corresponding event which will be queued for reporting. The unit shall be a Gamewell model GW-UDACT. The unit shall be capable of reporting Alarm, Trouble, Supervisory, and Waterflow events and event-specific restorals for each of up to 256 groups or software zones.

Features

- Maximum of 14 point trouble messages transmitted.
- Dual phone lines.
- Dual telephone line voltage detect.
- Surface Mount Technology.
- Compact in size: 6.75" x 4.25" (17.145 x 10.795 cm).
- Built-in programmer.
- Built-in four-character red seven-segment LED display.
- Manual Test Report function.
- Mounts directly in panel.
- Communicates vital system status including:
  - Independent zone fire alarm.
  - Independent zone non-fire alarm.
  - Independent zone trouble.
  - Independent zone supervisory.
  - AC (mains) Power Loss (programmable).
  - Low Battery and Earth Fault.
  - System Off-Normal.
  - 12 or 24 hour test signal.
  - Abnormal Test Signal per UL requirements.
  - EIA-485 Communication Bus Failure.
- Annunciation of UDACT Troubles including: loss of phone lines, communication failure with either Central Station, total communications failure.
- Troubleshoot Mode converts keypad to DTMF touchpad.
- Individual LEDs for: Power, EIA-485 Loss, Manual Test, Kissoff, Comm Fail, Primary Line Seize, Secondary Line Seize, and Modem Communications.
- Open Collector relay driver for Total Communications Failure or UDACT trouble.
- Real-time clock.
- Extensive transient protection.
- Simple EIA-485 interface to host panel.

Listings

Listings and approvals below apply to the basic GW-UDACT Universal Digital Alarm Communicator Transmitter. In some cases, certain modules may not be listed by certain approval agencies, or listing may be in process. Consult factory for latest listing status.

- UL Listed: file S521.

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ROA_02093

Ordering Information

GW-UDACT	Gamewell Universal Digital Alarm Communicator Transmitter for use with Gamewell 600 Series panels. Includes operating and programming instructions, and mounting hardware.
MCBL-7	DACT phone cord, 7 ft (2.13 m) long *(two required).*

Compatible Receivers

	Format # (Addresses 16 & 42)	Ademco 685 (1)	Silent Knight 9000	ITI CS-4000 (3)	FBI CP220FB	Osborne Hoffman Models 1&2	Radionics 6600/ 6500 (5)	Sescoa 3000R (7)	Sur-Gard MLR-2 (9)
0	4+1 Ademco Express	✔			✔				✔
1	4+2 Ademco Express	✔			✔	✔ (8)			✔
2	3+1/Standard/1800/2300	✔	✔ (2)	✔	✔ (4)	✔	✔(5,6)	✔	✔
3	(NOT USED)								
4	3+1/Standard/1900/1400	✔	✔ (2)		✔ (4)	✔		✔	✔
5	(NOT USED)								
6	4+1/Standard/1800/2300	✔	✔ (2)	✔	✔ (4)	✔	✔ (5)	✔	✔
7	(NOT USED)								
8	4+1/Standard/1900/1400	✔	✔ (2)		✔ (4)	✔		✔	✔
9	(NOT USED)								
A	4+2/Standard/1800/2300	✔	✔ (2)	✔	✔ (4)	✔	✔ (5)	✔	✔
B	(NOT USED)								
C	4+2/Standard/1900/1400	✔	✔ (2)		✔ (4)	✔		✔	✔
D	(NOT USED)								
E	Ademco Contact ID	✔			✔	✔			✔
F	(NOT USED)								

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(1) With 685-8 Line Card with Rev 4.4d software.
(2) With 9002 Line Card Rev 9035 software or 9032 Line Card with 9326A software.
(3) Rev. 4.0 software.
(4) FBI CP220FB Rec-11 Line Card with Rev 2.6 software and a memory card with Rev 3.8 software.
(5) Model 6500 with Rev 600 software.
(6) Model 6000 with Rev 204 software.
(7) With Rev B control card at Rev 1.4 software and Rev C line card at Rev 1.5 software.
(8) Model 2 only.
(9) Version 1.62 software.

Specifications

Electrical

Standby current: 40 mA.

Current while communicating: 75 mA.

Nominal voltage: 24 volts.

Communication formats

- 3+1 Standard.
- 4+1 Standard.
- 4+2 Standard.
- 4+1 and 4+2 Ademco Express.
- Ademco Contact ID.

***NOTE:** Ademco Contact ID must be used for independent zone reporting.*

Mounting

When used with the Gamewell 600 Series, the GW-UDACT mounts directly into the panel cabinet.

Relative humidity

93% noncondensing.

Temperature rating

32°F – 120°F (0°C – 49°C).

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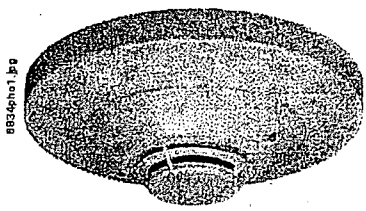
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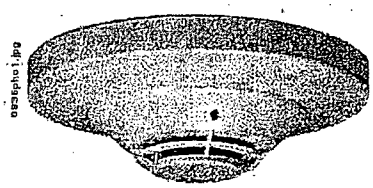
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SS-P and SS-M

Intelligent Addressable Plug-In Photoelectric Smoke Detectors with Smart*Scan*®



SS-P with SS-B6 base



SS-M with SS-B6 base

Description

Gamewell's SS-P and SS-M Smart*Scan*® intelligent, addressable plug-in photoelectric smoke detectors with integral communication provide features that surpass conventional detectors. Detector sensitivity can be programmed in the control panel software. Sensitivity is continuously monitored and reported to the panel. Point ID capability allows each detector's address to be set with decade address switches, providing exact detector locations for selective maintenance when chamber contamination reaches an unacceptable level. The SS-P photoelectric detector's unique optical sensing chamber is engineered to sense smoke produced by a wide range of combustion sources. Dual electronic thermistors add 135°F (57°C) fixed-temperature thermal sensing on the SS-M. SS-P and SS-M detectors are compatible with any 600 Series panels and a Smart*Scan*® SLC.

Installation

SS-P and SS-M plug-in detectors use a separate base to simplify installation, service, and maintenance. A special tool allows maintenance personnel to plug in and remove detectors without using a ladder.

Mount base on an electrical backbox which is at least 1.5" (3.81 cm) deep. Suitable mounting back boxes include:

- 4.0" (10.16 cm) square box.
- 3.5" (8.89 cm) or 4.0" (10.16 cm) octagonal box.
- Single-gang box *(except for relay or isolator base).*
- ***With B501BH or B501BHT base,*** use a 4.0" (10.16 cm) square box.
- ***With B224RB or B224BI base,*** use a 3.5" (8.89 cm) octagonal box, or a 4.0" (10.16 cm) octagonal or square box.

NOTES: *1) Because of the inherent supervision provided by the SLC loop,* ***end-of-line resistors*** *are not required. Wiring "T-taps" or branches are permitted for Style 4 (Class "B") wiring.* ***2)*** *When using* ***relay or sounder bases,*** *consult the SS-LI data sheet for device limitations between isolator modules and isolator bases.*

Features

- Sleek, low-profile design.
- Addressable-analog communication.
- Stable communication technique with noise immunity.
- Low standby current.
- Two-wire SLC connection.
- Rotary, decimal addressing (1 – 99).
- Optional remote, single-gang LED accessory (RA400Z).
- Dual LED design provides 360° viewing angle.
- Visible bicolor LEDs blink green every time the detector is addressed, and illuminate steady red on alarm.
- Remote test feature from the panel.
- Built-in functional test switch activated by external magnet.
- Built-in tamper-resistant feature.
- Sealed against back pressure.
- Constructed of off-white Bayblend®, designed to commercial standards, and offers an attractive appearance.
- 94-5V plastic flammability rating.
- SEMS screws for wiring of the separate base.
- Optional relay, isolator, or sounder bases.

Listings

Listings and approvals below apply to the SS-P and SS-M Intelligent Plug-In Photoelectric Smoke Detectors. In some cases, certain modules may not be listed by certain approval agencies, or listing may be in process. Consult factory for latest listing status.

- UL Listed: file S1195.
- CSFM approved: file 7272-1288:165.
- MEA approved: file 275-02-E Vol. IV.

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Product Line Information

SS-P: Low-profile intelligent photoelectric smoke detector. Must be mounted to one of the bases listed below.

SS-M: Same as SS-P but includes a built-in 135°F (57°C) fixed-temperature thermal device.

Bases:

SS-B6: Standard U.S. low-profile base, UL Listing.

B501BP: Standard European flangeless base, pkg. of 10.

B501: Standard European flangeless base, UL Listing.

B501BH: Sounder base, includes B501 base above.

B501BHT: Same as B501BH, but includes temporal sounder.

B224RB: Intelligent relay base.

B224BI: Intelligent isolator base. Isolates SLC from loop shorts.

Accessories:

RA400Z: Remote LED annunciator. 3 – 32 VDC. Fits U.S. single-gang electrical box. *Supported by SS-B6 and B501 bases only.*

SMK400: Surface mounting kit provides for entry of surface wiring conduit. *For use with B501 base only.*

RMK400: Recessed mounting kit. *For use with B501 base only.*

SMB600: Surface mounting kit for use with SS-B6.

BCK-200B: Black detector covers, box of 10.

M02-04-01: Test magnet.

M02-09-00: Test magnet with telescope stick.

XR2B: Detector removal tool. Allows installation and/or removal of SS-P and SS-M detector heads from base in high ceiling installations.

T55-127-000: Detector removal tool without pole.

XP-4: Extension pole for XR2B. Comes in three 5-ft. sections.

Detector Guards:

NOTE: Detector guards are not UL listed. Consult with AHJ.

STI 9601: Low-profile, flush-mount smoke detector guard, wire.

STI 9602: Low-profile, surface-mount, smoke detector guard, wire.

STI 9609: High-profile, flush-mount, smoke detector guard, wire.

STI 9605: High-profile, surface-mount, smoke detector guard, wire.

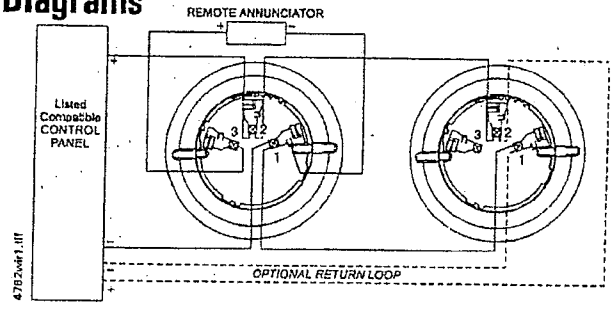
STI 9604: Flush-mount heat detector guard, wire.

STI 9610: Surface-mount heat detector guard, wire.

STI-8200-SS: Flush-mount stainless steel smoke detector guard

STI-8230-SS: Surface-mount stainless steel smoke detector guard.

Wiring Diagrams

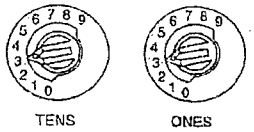


Gamewell
A 150-Year Tradition
by Honeywell

Gamewell
12 Clintonville Road
Northford, CT 06472-1610
Phone: 203-484-7161
Fax: 203-484-7118
www.gamewell.com

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Address dial on back of detector.

Specifications

Size
2.1" (5.3 cm) high x 4.1" (10.4 cm) diameter installed in B501 base, 6.1" (15.5 cm) diameter installed in SS-B6 base.

Shipping weight
6.2 oz. (147 g).

Operating temperature
SS-P: 0°C to 49°C (32°F to 120°F)
SS-M: 0°C to 38°C (32°F to 100°F). Low-temperature signal for SS-M at 45°F +/– 10°F (7.22°C +/– 5.54°C).

UL-Listed velocity range
0 – 4000 ft./min. (1219.2 m/min.), suitable for installation in ducts.

Nominal sensitivity
0.5 – 3.71 %/ft.

Relative humidity
10% – 93% noncondensing.

Thermal ratings
Fixed-temperature setpoint 135°F (57°C).

DETECTOR SPACING and APPLICATIONS:
Gamewell recommends spacing detectors in compliance with NFPA 72. In low airflow applications with smooth ceilings, space detectors 30 feet (9.144 m) for ceiling heights 10 feet (3.048 m) and higher. For specific information regarding detector spacing, placement, and special applications, refer to NFPA 72, *System Smoke Detector Application Guide*, document A05-1003, is available at **systemsensor.com**. SS-P and SS-M are Listed for use in ducts, but they are ***NOT*** Listed for use inside duct smoke detector housings. See *Duct Application Smoke Detectors Guide*, document A05-1004, available at **systemsensor.com**, for details on pendant-mount applications.

ELECTRICAL SPECIFICATIONS:

Voltage range
15 – 32 volts DC peak.

Standby current (max. avg.)
250 µA @ 24 VDC (with no communication enabled);
360 µA @ 24 VDC (one communication every 5 seconds with LED enabled).

LED current (max.)
6.5 mA @ 24 VDC ("ON").

BASES AVAILABLE:

SS-B6: 6.1" (15.5 cm) diameter.

B501: 4.1" (10.4 cm) diameter.

B501BH or B501BHT: Sounder base assembly. Includes B501 base.

B224RB Relay Base: ***Screw terminals:*** up to 14 AWG (2.0 mm²). ***Relay type:*** Form-C. ***Rating:*** 2.0 A @ 30 VDC resistive; 0.3 A @ 110 VDC inductive; 1.0 A @ 30 VDC inductive. ***Dimensions:*** 6.2" (15.748 cm) x 1.2" (3.048 cm).

B224BI Isolator Base: ***Dimensions:*** 6.2" (15.748 cm) x 1.2" (3.048 cm). ***Maximum:*** 25 devices between isolator bases.

Specifications and wiring information are provided for information only and are believed to be accurate. Gamewell assumes no responsibility for their use. Data and design are subject to change without notice. Installation and wiring instructions shipped with the product shall always be used for actual installation. For more information, contact Gamewell.

MS95-L Series

Addressable XP95 Manual Pull Stations



Description

The Gamewell MS95-L Series is a state-of-the-art, single- or dual-action XP95 pull station that includes an XP95 addressable interface for any Gamewell 600 Series Fire Alarm Control Panel (FACP). Because the MS95-L Series is addressable, the FACP can display the exact location of the activated manual station. This leads fire personnel quickly to the location of the alarm.

Operation

Pushing in, then pulling down on the handle causes it to latch in the down/activated position. Once latched, the word "ACTIVATED" (in bright yellow) appears at the top of the handle, while a portion of the handle protrudes from the bottom of the station. To reset the station, simply unlock the station with the key and pull the door open. This action resets the handle; closing the door automatically resets the switch. Each manual station, on command from the control panel, sends data to the panel representing the state of the manual switch. DIP switch is used to set addresses.

Construction

Shell, door, and handle are molded of durable LEXAN® (or polycarbonate equivalent) with a textured finish.

Installation

The MS95-L Series will mount semi-flush into a single-gang, double-gang, or standard 4" (10.16 cm) square electrical outlet box, or will surface mount to the Model SB-IO surface backbox. If the MS95-L Series is being semi-flush mounted, then the optional trim ring (BG-TR) may be used. The BG-TR is usually needed for semi-flush mounting with 4" (10.16 cm) or double-gang boxes (not with single-gang boxes).

Features

- Maintenance personnel can open station without causing an alarm condition.
- Built-in bicolor LED, which is visible through the handle of the station, flashes in normal operation and latches steady read when in alarm.
- Handle latches in down position and the word "Activated" appears to clearly indicate the station has been operated.
- Captive screw terminals wire-ready for easy connection to SLC loop (accepts up to 12 AWG/3.25 mm² wire).
- Semi-flush, mounts to a standard single gang (2.125" [5.3975] minimum depth), double gang, or 4" (10.16 cm) square electrical box.
- Smooth dual-action design.
- Within ADA 5 lb. pull force.
- Highly visible.
- Attractive shape and textured finish.
- Key reset.
- Includes Braille text on station handle.
- Optional trim ring (BG-TR).
- Meets UL 38, standard for manually actuated signalling boxes.
- Up to 126 stations per XP95 loop.

Listings

Listings and approvals below apply to the basic MS95-L Series. In some cases, certain modules may not be listed by certain approval agencies, or listing may be in process. Consult factory for latest listing status.

- UL Listed: file S281.

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Engineer's Specifications

Manual Fire Alarm Stations shall be non-coded, with a key- operated reset lock in order that they may be tested, and so designed that after actual Emergency Operation, they cannot be restored to normal except by use of a key. An operated station shall automatically condition itself so as to be visually detected as activated. Manual stations shall be constructed of red-colored LEXAN® (or polycarbonate equivalent) with clearly visible operating instructions provided on the cover. The word **FIRE** shall appear on the front of the stations in white letters, 1.00 inches (25.4 mm) or larger. Stations shall be suitable for surface mounting on matching backbox SB-I/O; or semi-flush mounting on a standard single-gang, double-gang, or 4" (10.16 cm) square electrical box, and shall be installed within the limits defined by the Americans with Disabilities Act (ADA) or per national/local requirements. Manual Stations shall be Underwriters Laboratories listed.

Manual stations shall connect with two wires to one of the control panel SLC loops. The manual station shall, on command from the control panel, send data to the panel representing the state of the manual switch. Manual stations shall provide address setting by use of rotary decimal switches.

The loop poll LED shall be clearly visible through the front of the station. The LED shall flash while in the normal condition, and stay steadily illuminated when in alarm.

Ordering Information

MS95-SL	XP-95 pull station, single with key.
MS95-DL	XP-95 pull station, dual with key.
SB-I/O	Surface box.
BG-TR	Optional trim ring.

Specifications

Normal operating voltage
24 VDC.

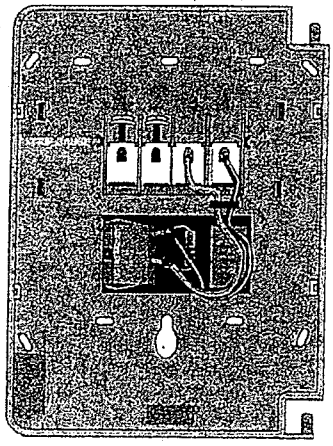
Maximum SLC loop voltage
28.0 VDC.

Maximum SLC loop current
170 mA.

Standby current
0.0005 A.

Alarm current
0.0015 A.

Wiring Diagram



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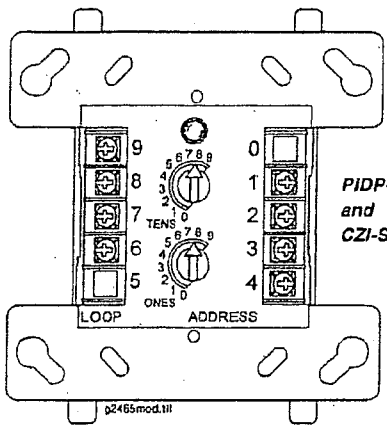
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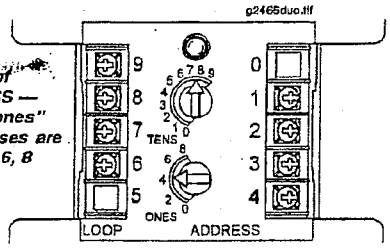
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PIDP-SS, PID-SS, CZI-SS, and DPID-SS

Monitor Modules with Smart*Scan*™



PIDP-SS and CZI-SS



detail of DPID-SS — note "ones" addresses are 0, 2, 4, 6, 8 only

Description

Four different monitor modules are available for Gamewell intelligent controls with Smart*Scan*™ to suit a variety of applications. Monitor modules are used to supervise an initiating device circuit of dry-contact input devices, such as conventional heat detectors and pull stations, or monitor and power a circuit of two-wire smoke detectors (CZI-SS).

PIDP-SS — is a standard-sized module (typically mounts to a 4" [10.16 cm] square box) that supervises either a Style D (Class A) or Style B (Class B) circuit of dry-contact input devices.

PID-SS — is a miniature monitor module (a mere 1.3" (3.302 cm) H x 2.75" (6.985 cm) W x 0.5" (1.270 cm) D) used to supervise a Style B (Class B) circuit. Its compact design allows the PID-SS to often be mounted in a single-gang box behind the device it's monitoring.

CZI-SS — is a standard-sized module used to monitor and supervise compatible two-wire, 24 volt, smoke detectors on a Style D (Class A) or Style B (Class B) circuit.

DPID-SS — is a standard-sized dual monitor module used to monitor and supervise two independent Style B (Class B) initiating device circuits (IDCs) at two separate, consecutive addresses in intelligent, two-wire systems.

PIDP-SS Monitor Module

The **PIDP-SS Monitor Module** is intended for use in intelligent, two-wire systems, where the individual address of each module is selected using the built-in rotary switches. It provides either a two-wire or four-wire fault-tolerant Initiating Device Circuit (IDC) for normally-open-contact fire alarm and supervisory devices. The module has a panel-controlled LED indicator.

PIDP-SS Applications — Use to monitor a zone of four-wire smoke detectors, manual fire alarm pull stations, waterflow devices, or other normally-open dry-contact alarm activation devices. May also be used to monitor normally-open supervisory devices with ***special supervisory indication*** at the control panel. Monitored circuit may be wired as an NFPA Style B (Class B) or Style D (Class A) Initiating Device Circuit. A 47K ohm End-of-Line Resistor (provided) terminates the Style B circuit. No resistor is required for supervision of the Style D circuit. Maximum IDC loop length is 2,500 ft./762 m (20 ohms maximum).

PIDP-SS Operation — Each PIDP-SS uses one of 99 available module addresses on an SLC loop. It responds to regular polls from the control panel and reports its type and the status (open/normal/short) of its Initiating Device Circuit (IDC). A ***flashing LED*** indicates that the module is in communication with the control panel. The LED latches steady on alarm (subject to ***current limitations*** on the loop).

Features

PIDP-SS

- Built-in type identification automatically identifies this device as a monitor module to the control panel.
- Powered directly by two-wire SLC loop. No additional power required.
- High noise (EMF/RFI) immunity.
- SEMS screws with clamping plates for ease of wiring.
- Direct-dial entry of address: 01 –99
- LED flashes green during normal operation (this is a programmable option) and latches on steady red to indicate alarm.
- Built-in type identification automatically identifies this device as a monitor module to the panel.

PID-SS

- Powered directly by two-wire FACP. No additional power required.
- High noise (EMF/RFI) immunity.
- Tinned, stripped leads for ease of wiring.
- Direct-dial entry of address: 01 – 99

CZI-SS

- Supports compatible two-wire smoke detectors.
- Supervises IDC wiring and connection of external power source.
- High noise (EMF/RFI) immunity.
- SEMS screws with clamping plates for ease of wiring.
- Direct-dial entry of address: 01 – 99
- LED flashes during normal operation (this is a programmable option).
- LED latches steady to indicate alarm on command from control panel.

Listings

Listings and approvals below apply to the basic PIDP-SS, PID-SS, CZI-SS and DPID-SS monitor modules. In some cases, certain modules may not be listed by certain approval agencies, or listing may be in process. Consult factory for latest status.

- UL Listed: file S521.
- CSFM approved: file 7300-1288:170.

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