

**Model SWAD
Self Contained Cooling /
Hot Water Heating Units**

Supersedes: 145.29-IOM1 (708)

Form 145.29-IOM1 (908)

**UNIT MODELS
SWAD-R410A
HOT WATER HEATING / ELECTRIC COOLING
INSTALLATION, OPERATION
& MAINTENANCE INSTRUCTIONS**

Cooling Capacities

12,000, 18,000, 24,000, & 30,000 Btu/Hr.

Heating Coil Capacities

24,000 - 62,000 Btu/Hr.



IMPORTANT!

READ BEFORE PROCEEDING!

GENERAL SAFETY GUIDELINES

This equipment is a relatively complicated apparatus. During installation, operation, maintenance or service, individuals may be exposed to certain components or conditions including, but not limited to: refrigerants, oils, materials under pressure, rotating components, and both high and low voltage. Each of these items has the potential, if misused or handled improperly, to cause bodily injury or death. It is the obligation and responsibility of operating/service personnel to identify and recognize these inherent hazards, protect themselves, and proceed safely in completing their tasks. Failure to comply with any of these requirements could result in serious damage to the equipment and the property in

which it is situated, as well as severe personal injury or death to themselves and people at the site.

This document is intended for use by owner-authorized operating/service personnel. It is expected that this individual possesses independent training that will enable them to perform their assigned tasks properly and safely. It is essential that, prior to performing any task on this equipment, this individual shall have read and understood this document and any referenced materials. This individual shall also be familiar with and comply with all applicable governmental standards and regulations pertaining to the task in question.

SAFETY SYMBOLS

The following symbols are used in this document to alert the reader to areas of potential hazard:



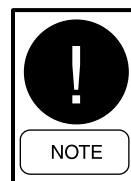
DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



CAUTION identifies a hazard which could lead to damage to the machine, damage to other equipment and/or environmental pollution. Usually an instruction will be given, together with a brief explanation.



WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



NOTE is used to highlight additional information which may be helpful to you.



All wiring must be in accordance with published specifications and must be performed **ONLY** by qualified service personnel. Johnson Controls will not be responsible for damages/problems resulting from improper connections to the controls or application of improper control signals. Failure to follow this will void the manufacturer's warranty and cause serious damage to property or injury to persons.

CHANGEABILITY OF THIS DOCUMENT

In complying with Johnson Controls policy for continuous product improvement, the information contained in this document is subject to change without notice. While Johnson Controls makes no commitment to update or provide current information automatically to the manual owner, that information, if applicable, can be obtained by contacting the nearest Johnson Controls service office.

It is the responsibility of operating/service personnel as to the applicability of these documents to the equipment in question. If there is any question in the mind of operating/service personnel as to the applicability of these documents, then, prior to working on the equipment, they should verify with the owner whether the equipment has been modified and if current literature is available.



Work on this equipment should only be done by properly trained personnel who are qualified to work on this type of equipment. Failure to comply with this requirement could expose the worker, the equipment and the building and its inhabitants to the risk of injury or property damage.

The instructions are written assuming the individual who will perform this work is a fully trained HVAC & R journeyman or equivalent, certified in refrigerant handling and recovery techniques, and knowledgeable with regard to electrical lock out/tag out procedures. The individual performing this work should be aware of and comply with all national, state and local safety and environmental regulations while carrying out this work. Before attempting to work on any equipment, the individual should be thoroughly familiar with the equipment by reading and understanding the associated service literature applicable to the equipment. If you do not have this literature, you may obtain it by contacting a Johnson Controls Service Office.

Should there be any question concerning any aspect of the tasks outlined in this instruction, please consult a Johnson Controls Service Office prior to attempting the work. Please be aware that this information may be time sensitive and that Johnson Controls reserves the right to revise this information at any time. Be certain you are working with the latest information.

SWAD models provide a complete air-conditioning and heating system as an all-in-one package. Specifically designed for convenient through-the-wall installation in residential low and high rise applications. The all-indoor design eliminates the need for unsightly exterior equipment, thereby maintaining architectural esthetics.

All units are shipped completely wired and factory tested. The cooling section features enhanced refrigeration coils, a thermostatic expansion valve for refrigerant control, and a high efficiency Scroll or rotary compressor. Air circulating fans are centrifugal, direct driven. The evaporator fan motor allows operation at three different fan speeds.

The standard unit may be operated on the cooling cycle at outdoor ambient above 60°F.

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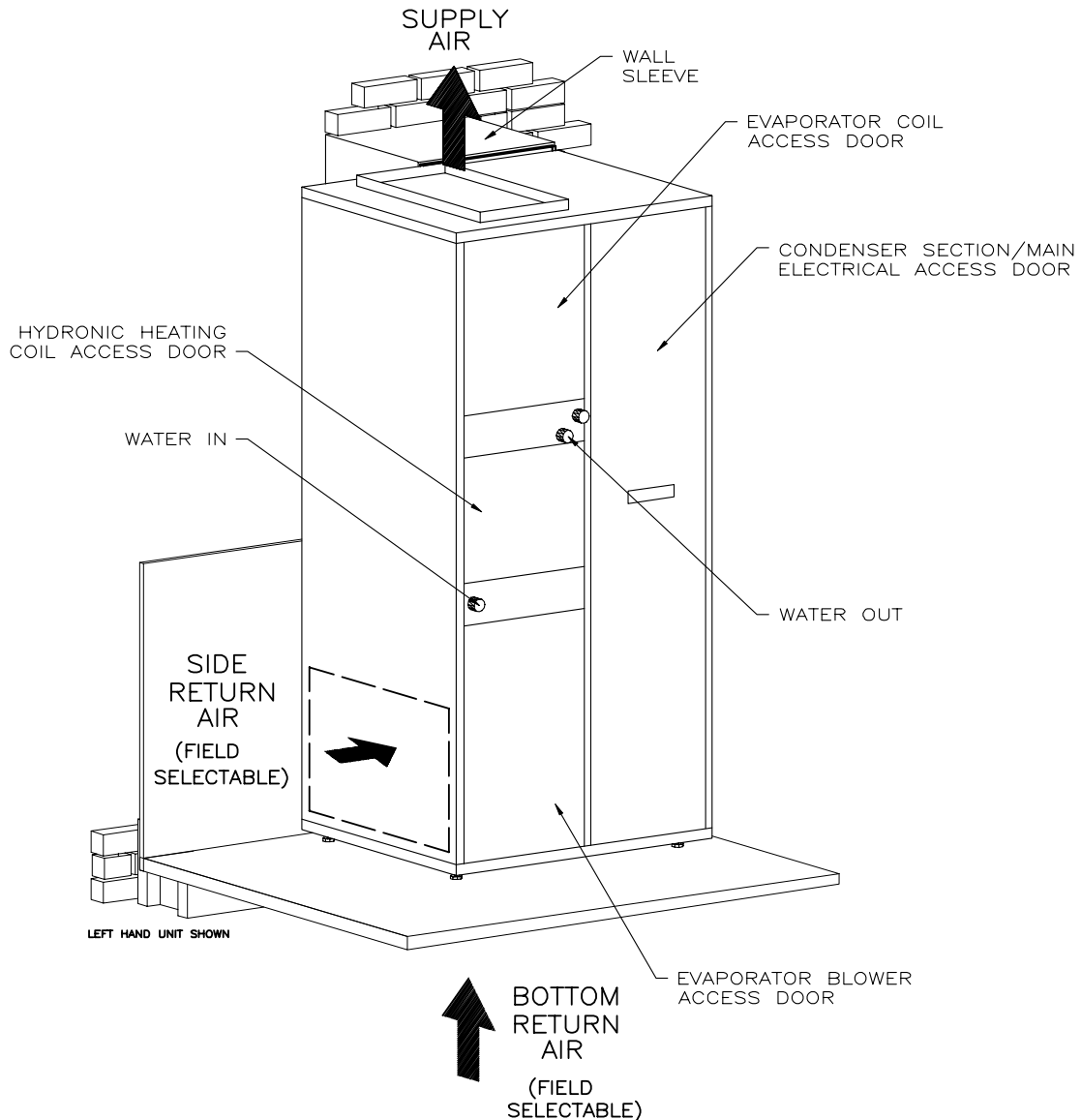
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To assure both safe and proper operation, please carefully follow the instructions in this manual to correctly install this new furnace.

INSTALLER! After installation, give the user:

- Operation & Installation Instructions
- Warranty Information

USER! Your furnace installer should give you the above documents relating to your furnace. Keep these as long as you keep your furnace. Pass these documents on to later furnace purchases or Users. Throughout this Installer's Information Manual, we frequently use the word "you" when referring to the person responsible for application, installation and service of your furnace. Please remember to have only qualified service technicians perform these services.



After installing the furnace, show the user how to turn off the electricity to furnace. Point out control and switch locations for turning off the electricity.

Make sure user understands the importance of following all safety precautions.

1. PREPARING TO INSTALL FURNACE

Review this Manual and the Users' Manual Information.

After installing the furnace; give this Installer's Information Manual, the Users' Information Manual, and the Warranty card to the end user. If you need help on any of the installation instructions or other matters relating to the furnace, contact the office where you bought the furnace. You may also refer to the furnace rating plate for a contact name.

2. IMPORTANT SAFETY RULES



Read and exactly follow these rules. Failure to do so could cause improper furnace operation, resulting in damage, injury or death.

- a) **DO NOT** install this furnace outdoors or in a mobile home, trailer or recreational vehicle. It is not design-certified for these installations. This furnace is suitable for a home built on site or manufactured home completed at final site.
- b) **DO NOT** install furnace in a corrosive or contaminated atmosphere.
- c) **DO NOT** use this furnace for temporary heating of buildings or structures under construction.
- d) Always install duct system with furnace. Be sure duct system has external static pressure within allowable furnace range.
- e) Completely seal supply and return air ducts to furnace casing. Ductwork must run to an area outside furnace air space. Seal duct work whenever it runs through walls, ceilings or floors. See Section 10 for more information.

3. MEETING CODES

Before installing furnace, make sure you know all applicable codes. National, state and local codes may take precedence over any instructions in this manual. Be sure to consult:

- Authorities having jurisdiction over furnace installations;
- Local code authorities for information on electrical wiring.

4. UNPACKING

- a) Check the unit for indications of damage in shipment. Notify the Transportation Company of any damage and note the damage on the shipping receipt.

NOTE: Rough handling may dislocate internal components.

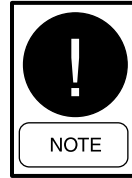
- b) Allow the shipping base to remain with the unit until it is ready to be set in its final location.
- c) Rotate blowers to assure free movement.
- d) The compressor is mounted on neoprene isolators with metal spacing sleeves inside and secured with nuts, which must be snug against the metal spacer sleeves.
- e) Check all refrigeration tubing to assure that it does not rub against any other parts.

5. INSTALLATION LOCATION

DO NOT install this furnace outdoors or in a mobile home, trailer or recreational vehicle. It is not design certified for these installations. This furnace is suitable for a home built on site or a manufactured home completed at final site.

This unit is designed for indoor installation adjacent to an exterior wall having an opening for condenser airflow. The air flow products must:

- a) Discharge directly to the outside.
- b) Discharge away from any obstructions that could cause discharged air recirculation.



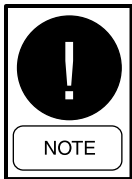
DO NOT install this unit at an exterior wall location that will position the bottom of the wall grille below the exterior grade level. Below grade installation will allow the accumulation of rain or snow into the wall sleeve and unit base, and could result in water penetration into the building interior.

A. CLEARANCES

The unit is design certified for closet installation with the minimum clearances to combustible materials as stated on the data label. No clearance is required from the top, sides, or back of the unit. A minimum of 1-inch clearance is required from the front to any combustible materials. A combustible door may be placed 1 inch from the front of the unit. When the door is open there must be 30 inches clearance to any obstruction, to allow sufficient access for service and the replacement of parts. The unit shall not be installed directly on carpeting, tile or other combustible material other than wood flooring.

B. RETURN AIR CONFIGURATION

The SWAD unit is equipped for field selection of the return air opening orientation. The intended installation location will dictate whether the side return air, or bottom return air inlet is required (Use only one return air access).



See Section 11 of this manual for details on removing the pre-scored panel. Prior to installing the unit, the appropriate panel insert must be removed (Remove only the panel area defined by the pre-scored lines on the side or bottom of the cabinet – DO NOT cut opening larger than indicated).

6. WALL OPENING

A finished opening in an outside wall is required for intake and exhaust of condenser airflow. The wall opening required is 16" wide by 56" high for R models and 16" wide by 63" high for S models. The wall opening must be flush with the finished floor.

Consult local ordinances for building opening framing requirements.

7. WALL SLEEVE

A wall sleeve is required to finish the wall opening. A factory-made wall sleeve is available as an optional accessory for new construction. When replacing a FEDDERS unit with a retrofit model "R", the unit will mate with the existing FEDDERS wall sleeve.

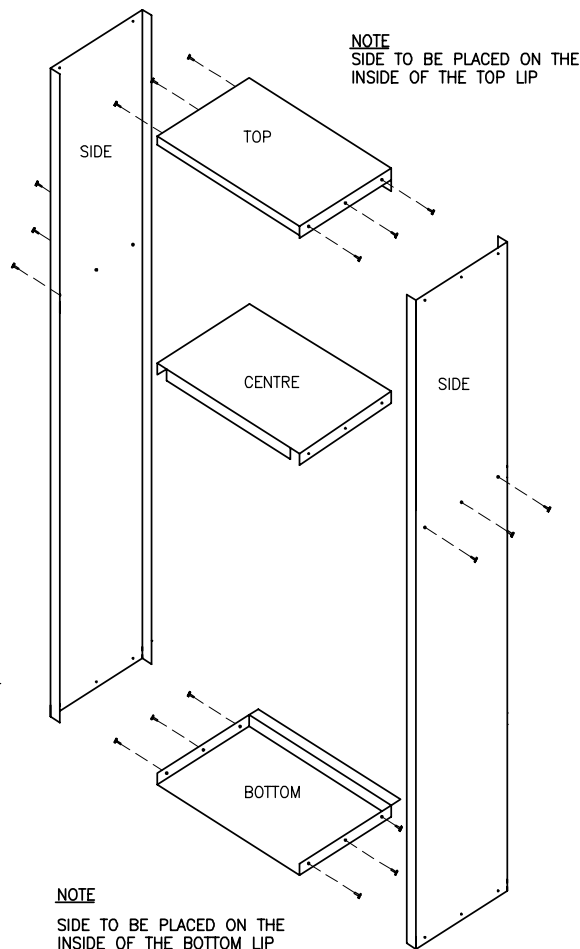
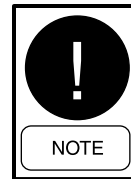


Fig. 1 - WALL SLEEVE ASSEMBLY

Use a spirit level or plumb line to make sure that the wall sleeve vertical flanges, which must mate with the back of the unit, are perfectly vertical. If the flanges are not vertical, the unit will not seal properly against the wall sleeve.



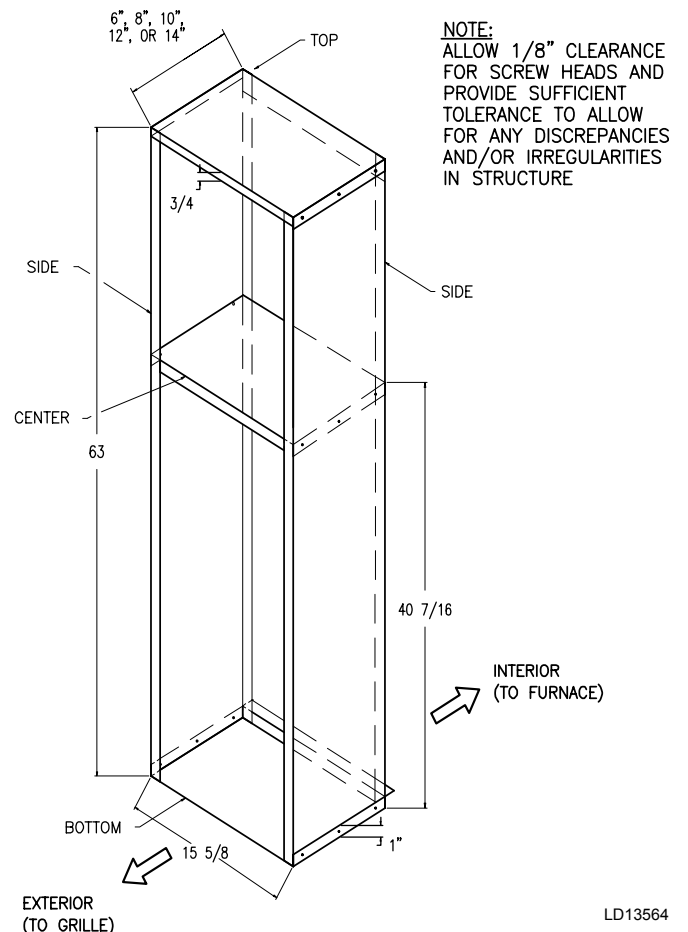
Completely seal any gaps or openings around the wall sleeve and the wall opening (use exterior grade caulking or expanding foam sealant), to prevent air and weather penetration into the building envelope.

A roll of 1 inch wide x 1/4 inch thick self-adhesive sponge rubber gasket is packed in the blower compartment of the unit, to be used for sealing between the wall sleeve and the unit. Before moving the unit into final position, apply the self-adhesive gasket to all mating flanges on the wall sleeve.

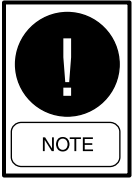
Apply gasket material to the top surface of the horizontal lip, located at the bottom of the wall sleeve.

EXTERIOR GRILLE

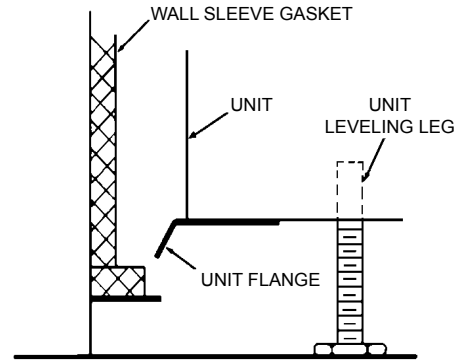
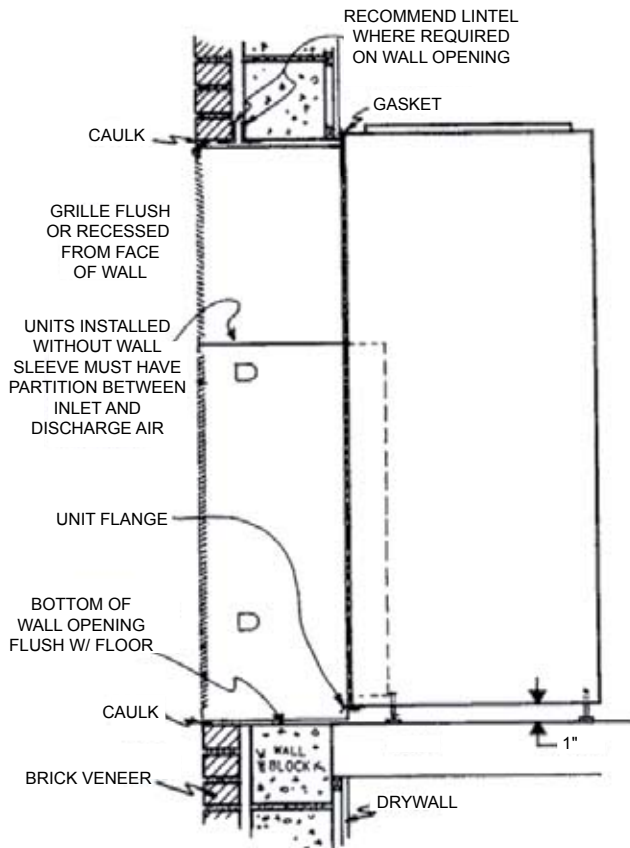
Finish the sleeve exterior with a factory supplied intake and discharge grille.



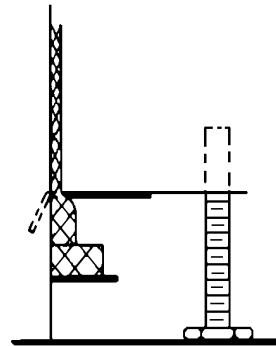
8. UNIT TO SLEEVE ATTACHMENT



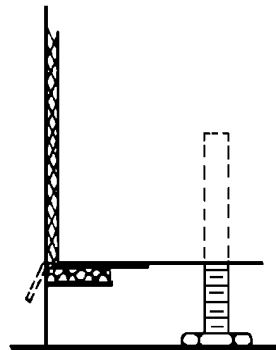
Ensure to apply gasket material to the horizontal divider panel flange between the top and bottom sections of the wall sleeve. Apply two layers of gasket tape at this location to ensure a satisfactory seal. Should this joint not have a good seal, rainwater may accumulate in the bottom of the unit.



1. RAISE UNIT BY MEANS OF LEVELING LEGS. UNIT FLANGE MUST CLEAR BOTTOM ANGLE OF WALL SLEEVE.



2. SLIDE UNIT INTO CONTACT WITH WALL SLEEVE. UNIT FLANGE MUST BE INSIDE WALL SLEEVE.



3. LOWER UNIT TO OBTAIN TIGHT SEAL BETWEEN WALL SLEEVE AND UNIT. INSERT SCREWS THRU SLEEVE ATTACHMENT ANGLE TO SECURE UNIT

Raise the unit by screwing down the three leveling legs, until the flange at the bottom of the condenser is above the flange at the bottom of the wall sleeve. Then move the unit forward until the unit contacts the wall sleeve and makes a seal with the gasket on the wall sleeve. Then lower the unit by means of the three leveling legs until the unit bottom flange is resting on the wall sleeve bottom flange and the gasket is compressed. Then use the front two leveling screws only to level the unit.

The "S" series units are secured to the wall sleeve by installing two #10 x 1/2 inch self drilling sheet metal screws through the flange standing up at the back of the unit top. These two screws will screw into the wall sleeve. The "R" series units are secured to the wall sleeve using a piece of angle 1-3/8 inch x 1-3/8 inch x 16 inches long. This angle should be placed on the top of the unit at the back with one flange facing down and clipping over the vertical flange at the top of wall sleeve. Then screw this piece of angle to the top of the unit using two #10 x 1/2 inch self-drilling sheet metal screws. The required piece of angle and screws are packed inside the blower compartment of "R" series units.

9. INSTALLING DUCT WORK



Install all ductwork to meet current standard:

- ASHRAE/NFPA 90, Standard for Installation of Warm Air Heating and Air Systems.
- State, provincial, and local codes

Failure to follow these standards could reduce airflow or increase air leakage, resulting in reduced system performance or furnace damage.

Properly size ductwork based on heat loss and heat gain calculations. Doing so assures:

- Good heating and cooling installations;
- Delivery of required circulating air.

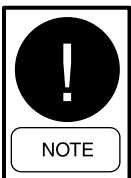
For all furnaces, design duct systems within the maximum external static pressure limits indicated in Table 1.

TABLE 1 - CFM & MOTOR SPEED SELECTION

UNIT MODEL	SPEED TAP	EXTERNAL STATIC PRESSURE (in. wg.)						
		0.1	0.2	0.3	0.4	0.5	0.6	0.7
SWAD01212	HIGH	560	530	500	460	415	355	295
	MED-HI	450	425	400	370	335	300	-
	MED-LO	365	350	330	310	270	-	-
	LOW	315	290	275	-	-	-	-
SWAD01812	HIGH	705	375	635	585	535	470	405
	MEDIUM	650	620	585	540	485	425	-
	LOW	520	510	490	465	430	-	-
SWAD02412	HIGH	920	880	840	800	750	700	640
	MEDIUM	775	760	735	705	665	625	-
	LOW	580	565	550	530	-	-	-
SWAD03012	HIGH	1060	1020	980	935	885	830	770
	MEDIUM	840	825	810	790	765	730	-
	LOW	735	725	715	700	-	-	-

10. SUPPLY AIR DUCT WORK

Duct attaching hardware must only be used on the supply air outlet flanges. Refrigeration tubing is located under the top panel near these flanges. Do not drill or use screws in this area.



Supply air duct (plenum) connection must be at least the same size as the furnace supply air opening. Seal supply air ductwork to furnace casing, walls, ceilings or floors.

DUCT DAMPERS

You may balance airflow with dampers installed in each branch run duct and adjust for even temperature throughout the heated space. For proper furnace operation, make sure:

- Supply air registers and return air grilles are open.
- Rugs, carpets, drapes or furniture are clear of registers and grilles;
- Size and shape of supply air plenum is correct;
- Number of supply air duct outlets is sufficient

11. RETURN AIR DUCT CONNECTION & FILTER ARRANGEMENT

All return air entering the unit must be filtered. Dirty equipment may cause damage to the heat exchanger or air conditioning unit. The return-air duct should be sealed to the unit casing and should terminate outside the space containing the furnace.

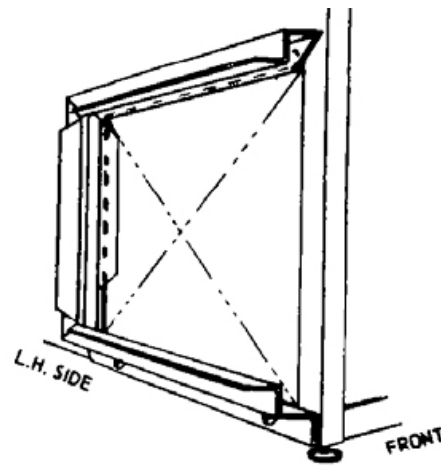
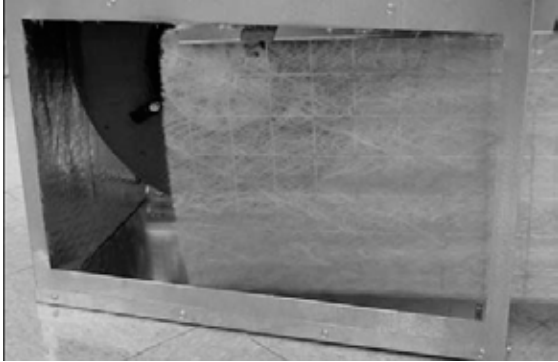
FILTER ARRANGEMENTS

All equipment models include an internally suspended wire-frame style filter rack (hammock type), complete with a 1-inch thick replaceable media filter. The universal wire-frame rack has been designed to provide filtration in either side-return or bottom return applications (Use only one return air access).

The replaceable media size is 24-in X 34-in.

SIDE RETURN AIR INSTALLATIONS

When a ducted side-return intake is used, remove the pre-scored 13-5/8 x 23-5/8 inch opening in the side of the cabinet, prior to installing the unit.



The required disposable panel filter size is 16 X 25 X 1-in. There is no filter supplied with this accessory. The installing contractor must provide and install the recommended filter.

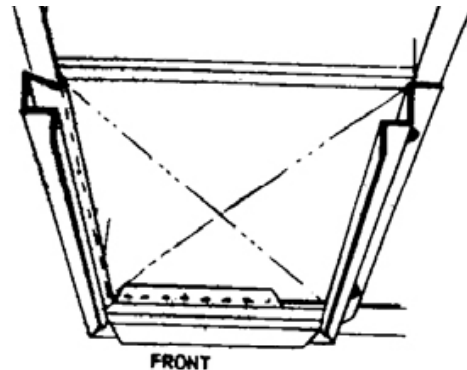
BOTTOM RETURN AIR INSTALLATIONS

When a bottom return plenum is used, remove the pre-scored 11 x 20 inch opening in the bottom of the cabinet, prior to installing the unit.



ALTERNATIVE FILTER ARRANGEMENTS

On 1 and 1-1/2 ton units only, an optional filter frame to hold a 14 x 20 x 1-inch disposable filter may be fitted to the front of the blower compartment, in place of the access door. The filter frame, and a section of the return duct connected to it, must be easily removable to allow room for removal of the indoor blower and motor assembly.



OPTIONAL FLAT FILTER RACK INSTALLATION - SIDE RETURN APPLICATION ONLY

This accessory filter frame is field installed, after removing the pre-scored access opening in the side of the unit.

Position the three-sided filter frame so that the short side is towards the back of the furnace and the 1-inch duct flange is facing outwards. The long sides of the frame should be pulled slightly towards each other, so that the continuous lip formed on the back of the frame clears the opening in the cabinet. Push the frame towards the back of the unit firmly until the short vertical part of the frame clips onto the cabinet. Then insert the other vertical side of the frame between the ends of the top and bottom parts of the frame. This will keep the top and bottom parts of the frame clipped into position.

12. CONDENSATE DRAIN PIPING

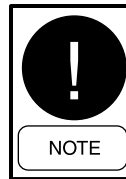
The condensate drain pan is fitted with a 3/4" NPT female pipe fitting which protrudes through the unit casing. The 3/4" drain piping should be run horizontally from this fitting, until the piping is past the side of the unit casing and not passing in front of any of the access doors. Once the piping is clear of the unit casing, a trap should be installed to prevent conditioned air from being blown out of the drain line. The trap should be at least 2 inches deep with the outlet a minimum of 1/2 inch below the inlet. The drain piping on the outlet side of the trap should be pitched 1/4 inch per foot down towards an open drain. Unions should be installed between the unit and the trap, and on the outlet side of the trap to allow for disconnecting the piping and the trap for cleaning out.

13. HOT WATER PIPING

The SWAD models are supplied with a 2-row hot water heating coil. The water connections to the heating coil project through the front of the unit cabinet, adjacent to the heating section access door. For proper heating operation, the orientation of the water in / water out must be as follows: water-in = lower connection, water-out = upper connection. The coil design is self-draining and self-venting (provision for draining the water supply line, and venting the water return line, must be field supplied).

The maximum design entering water temperature for these units is 200°F.

The threaded coil connection stubs are provided with 1/2" FPT fittings. Unions should be installed on both the inlet and outlet piping (as close to the unit as possible), to allow for disconnecting and removal of the entire unit.



There is no means for control of water flow included with this unit. A slow-closing 2-way solenoid control valve, or a circulating pump unit – capable of activation by a low-voltage pilot signal, must be field provided and installed.

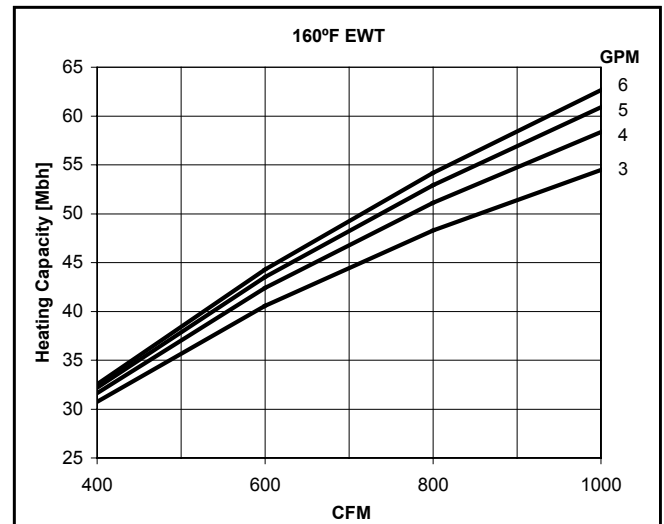
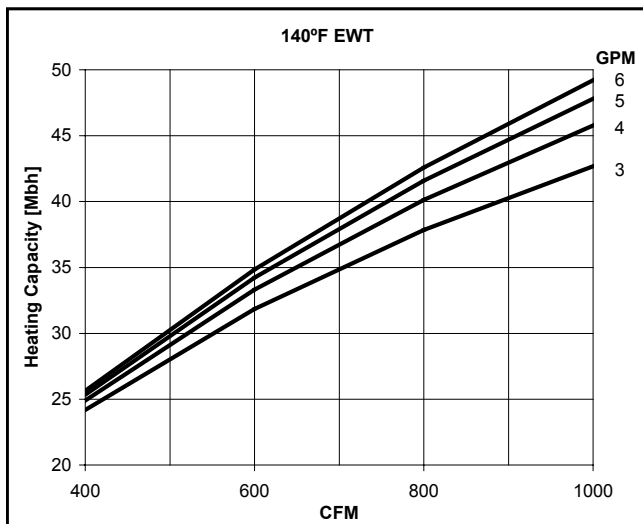
The maximum design water flow through the heating coil is 6 USGPM. Higher water flows may result in excessive tube erosion, and a shortening of the coil operating life.

Recommended water flow rate is 4-5 USGPM. This flow range will provide the most economical balance between heat output versus fluid pressure drop.

HEATING COIL WATER PRESSURE DROP (WPD)				
USGPM	3	4	5	6
FT H ₂ O	4.9	8.4	12.9	18.4

HEATING COIL PERFORMANCE

(Capacity based on 65°F Return Air Temperature)



14. ELECTRICAL CONNECTIONS

Check the voltage and phase listed on the unit rating plate, before installation, to be sure the power supply is correct. If the compressor fails as the result of installation or improper voltage, the compressor is not replaceable under warranty and the manufacturer will not be responsible for the cost of replacement. The minimum and maximum operating voltages, and fuse sizes, are listed on the unit rating plate.

The power leads must be brought to the entry knockouts provided in the unit control box through a customer supplied fused disconnect switch placed within sight of the unit. Knockouts are provided on the side of all units.

15. INSTALLING ELECTRICAL WIRING



Provide each furnace with its own separate electrical circuit, means of circuit protection, and electrical disconnect switch. Follow current National Electrical Code ANSI/NFPA 70, CSA C22.1 C.E.C. Part 1, and state and local codes. Failure to provide these shut-off means could cause electrical shock or fire, resulting in damage, injury or death.

Furnace must have proper electrical ground. Failure to provide a proper electrical ground could cause electrical shock or fire, resulting in damage, injury or death.

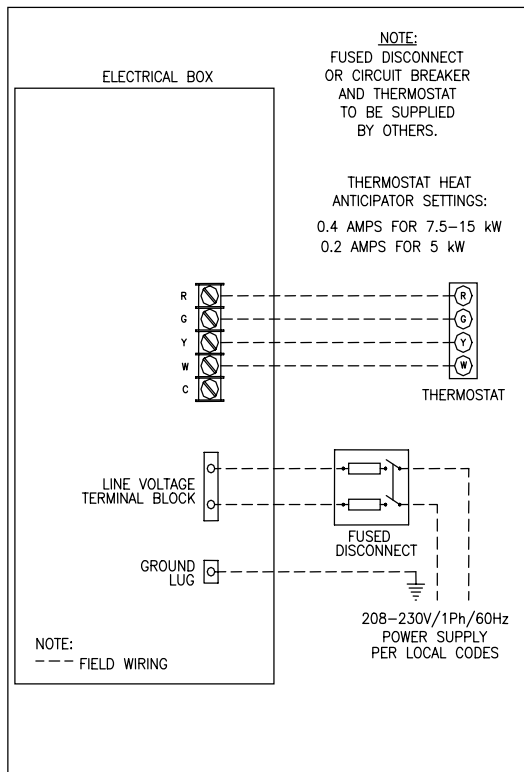
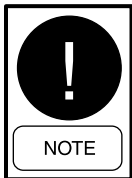


Fig. 3 - FIELD WIRING DIAGRAM

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Select a location for room thermostat that is away from supply air registers, on draft-free interior wall, and not near lights, television, direct sunlight, or other heat sources.



Thermostats with heat anticipators should have the heat anticipator set for 0.20.

16. SEQUENCE OF OPERATION - HEATING CYCLE

- 1) Room thermostat calls for heat, connecting R and W terminals.
- 2) Hydronic Heat Circulating Pump/valve relay is energized (field supplied). Heating fan is energized simultaneously with hot water flow interlock.
(Note: An electric heat / hot water heat thermostat, which energizes the indoor fan during the heating cycle, must be used.)
- 3) When the room thermostat is satisfied, terminals R and W on the thermostat open, de-energizing the hot water pump/valve interlock relay.

SEQUENCE OF OPERATION - COOLING CYCLE

- 1) Room thermostat calls for cooling connecting R to Y terminals.
- 2) The compressor and condenser fan start immediately on a call for cooling. Air circulating fan also starts immediately with cooling operation.
- 3) When the room thermostat is satisfied, terminal Y on the module is de-energized.
- 4) The compressor and condenser fan stop immediately when the thermostat is satisfied.
- 5) The air circulating fan continues to run for an off delay period of 100 seconds. The off delay on the cooling cycle is factory set for maximum efficiency. Adjustment of this delay is not recommended.

ELECTRICAL DATA

MODEL #	VOLTAGE	COMPRESSOR			EVAPORATOR FAN		CONDENSER FAN		MIN. CCT. AMPACITY	MAX FUSE / CCT. BKR. AMP
		QTY	RLA	LRA	HP	FLA	HP	FLA		
SWAD01212*	208-230/1/60	1	@ 5.7	31.0	0.10	0.8	0.17	1.1	9.03	15
SWAD01812*	208-230/1/60	1	@ 10.0	48.0	0.17	1.2	0.17	1.1	14.80	20
SWAD02412*	208-230/1/60	1	@ 14.1	58.3	0.25	1.5	0.25	1.5	20.63	30
SWAD03012*	208-230/1/60	1	@ 15.7	73.0	0.25	1.5	0.33	1.9	23.03	35

LD13570

17. FURNACE SECTION START-UP CHECKLIST

Before starting furnace for the first time, be sure you can answer "Yes" to each of these questions:

- i) Is the furnace level?
- ii) Have you cleared away all loose construction and insulation materials?
- iii) Is furnace installed within proper clearances to combustible materials? See Section 5.
- iv) Does electrical wiring follow current National Electrical Code ANSI 70 or CSA C22.1 as well as local codes? See Section 14.
- v) Is furnace electrically grounded? See Section 14.
- vi) Is room thermostat properly installed? See Section 14.
- vii) Is ductwork correctly sized and sealed? See Section 9.
- viii) Are air filters in place and correctly sized? See Section 11.

18. SYSTEM BALANCE

Blower speed taps are factory set for optimum heating and cooling airflow ranges.

Refer to Table 3 for factory blower speed settings, and minimum allowable heating airflow.

Heating speed tap should not normally be reduced below initial factory setting. Some duct system configurations and supply register locations may result in "cold blow".

TABLE 3 - BLOWER SETTINGS

UNIT MODEL	FACTORY BLOWER SPEED SETTING		RECOMMENDED MIN. COOLING CFM
	COOLING	HEATING	
SWAD01212	MED-HI	MED-LO	300
SWAD01812	MED.	LO	450
SWAD02412	HIGH	MED.	600
SWAD03012	HIGH	MED.	775



Operating furnace below the minimum heating airflow may cause poor heating performance.

Installed system must be test run to ensure operation with sufficient heating and cooling airflow. Total system static pressure should be measured and compared with airflow performance data shown in Table 1.

Measuring duct work static pressure

- 1) Place slope gauge near furnace where level, and adjust scale to read 0.00 inches W.C
- 2) Insert one static pressure tap into the supply air plenum. Insert other static pressure tap in return air duct on the air entering side of the filter.
- 3) Connect pressure tap attached to supply air duct or warm air supply plenum to positive pressure side of slope gauge.
- 4) Connect pressure tap attached to return air duct to negative pressure side of slope gauge.
- 5) Start blower
 - a) Jumping terminals "R" and "G" on the 24-volt terminal block (TB2) will run heating speed on blower motor.
 - b) Jumping terminals "R" and "Y" on the 24-volt terminal block (TB2) will run cooling speed on blower motor.
- 6) With blower running, read ductwork static pressure from slope gauge.
- 7) Ductwork static pressure should not exceed 0.3 inches W.C. in order to ensure proper volume of airflow.
- 8) Remove jumper wire from 24volt terminal strip. Remove pressure taps and seal holes in ductwork. Failure to seal holes could result in reduced system performance.

19. MAINTAINING UNIT IN GOOD WORKING ORDER



Follow these procedures before inspecting furnace.

- Turn room thermostat to its lowest or off setting.
- Wait at least five minutes for furnace to cool if it was recently operating.
- Turn off furnace electrical power; failure to do so could result in injury or death.



Use only recommended replacement parts. Failure to do so could cause improper furnace operation, resulting in damage, injury or death.

Perform periodic preventive maintenance once before heating season begins and once before cooling season. Inspect, clean and repair, as needed the following items:

- 1) All electrical wiring and connections, including electrical ground.
 - 2) All supply air and return air ducts for obstructions, air leaks and loose insulation
 - 3) Blower housing/wheel and blower motor. Blower motors are equipped with permanently lubricated bearings, and do not require oiling.
 - A qualified service technician should follow these steps to remove the indoor circulating blower assembly.
 - a) Disconnect room thermostat wires from 24-volt terminal strip in the condenser section electrical panel.
 - b) Locate the four blower motor wires that feed through the blower mounting deck. Disconnect the wires from the Motor terminal block.
- NOTE:** Label blower motor wires before removal from the terminal block to ensure proper replacement.
- c) Remove blower door.
 - d) Pull blower motor wires through casing hem.
 - e) Remove screws holding blower assembly to blower deck.
 - f) Slide blower assembly out of unit cabinet.
 - g) After cleaning blower assembly, re-assemble in reverse order making sure speed selection wires are in their original positions.
- 4) Inspect evaporator and condenser coils for accumulations of dirt and debris – clean as required. (If the coils appear dirty, clean them using mild detergent or a commercial coil cleaning agent).
 - 5) Inspect electric heating element limit switches for signs of excessive heat (scorched surfaces, cracking of phenolic insulator)
 - 6) Assure that the furnace is operating properly and safely.

20. AIR-CONDITIONING SYSTEM - TROUBLESHOOTING and SERVICE



The Air Conditioning section of this equipment is charged with R-410A; a hi-pressure refrigerant. Only qualified technicians, using appropriately pressure-rated test instruments, should perform troubleshooting or service on this equipment.

1. If there is a call for cooling from the room thermostat, and the compressor does not start, check the following:
 - Is the compressor contactor pulling in? If not, check if the High Refrigerant Pressure switch is open. This manual reset switch will open if high-side pressures exceed 610 psig. To reset the switch, depress the red reset button on the switch body. (Note: If this switch trips repeatedly, the cause of the excessive system pressures should be determined, and corrected.)
 - If there is 24v at the contactor coil and the compressor contactor does not pull in, replace the contactor.
 - Is there correct line voltage to the compressor terminals of the contactor? (If there is correct voltage at the compressor and the compressor still will not start, turn off power to unit. Disconnect the electrical leads to the compressor. Check if compressor is hot to touch and check with OHMmeter to see if internal overload or windings are open.) (Let compressor cool down and if open reading is still found with OHMmeter, replace compressor.)
 - If compressor tries to start, but shuts down immediately, check capacitor with meter for proper microfarad rating. If capacitor is good, connect refrigeration gauges to see if pressures have equalized. (If pressures are not relatively equal and are excessively higher on the discharge side, check system for blockage)
2. If the compressor starts, but system not cooling, check the following:
 - Is the evaporator coil frosting or freezing up? (Is coil dirty or plugged, is the air filter plugged?)
 - Is the supply blower/motor operating? Check to see if there is proper voltage to the blower motor. (If voltage is present and motor does not operate, replace motor.)
 - If system has refrigerant, start compressor and check operating pressures. "Normal" operating pressures for a R410A system should be around 150-200 psig suction pressure and 400-500 psig discharge pressure, under typical ambient load conditions.
 - Using a surface type thermometer, check system super heat (should be 9-12°F with a return air temp of approximately 73 to 75°F). Also check sub-cooling (typical sub-cooling for TXV type system is 6-8°F). If super heat appears high and sub-cooling appears to be low, check system for leaks.

- If compressor appears to be pumping but has a higher than normal head pressure and suction pressure, check to make sure condenser coil is not plugged or dirty. Also is the condenser blower/motor operating? Check to see if there is proper voltage to the blower motor. (If voltage is present and motor does not operate, replace motor.)
- If head pressure is high, but suction pressure is low (or is pulling down to a vacuum), check system for restriction or poorly operating TXV valve. Check for temperature drop across filter drier or frosting of capillary tubes and/or TXV valve. (A simple test for

TXV valve is to warm bulb with hand and look for reaction on low side gauge. If there is no reaction, it is possible that the TXV has lost its operating charge in the head of the valve. If this is the case, replace the valve.

NOTE: when the valve has lost its operating charge in the head of the valve, it will automatically close. You CANNOT manually open the valve by adjusting the stem.

- If system starts and compressor does NOT increase the head pressure,

PRESSURE AND TEMPERATURE SYMPTOMS CHART

Symptoms Exhibited				Condition / Solution
Suction Pressure	Discharge Pressure	Super-Heat	Sub-Cooling	
Lower Than Normal	Lower Than Normal	Lower Than Normal	Lower Than Normal	Insufficient air flow across Evaporator coil. Check filter, check for dirty/plugged evaporator, adjust blower speed
Lower Than Normal	Lower Than Normal	Higher Than Normal	Lower Than Normal	Insufficient refrigerant charge. Check system for leak's (Recover refrigerant, repair leak's), evacuate system, pressure test and recharge with refrigerant.
Lower Than Normal	Higher Than Normal	Higher Than Normal	Higher Than Normal	Restriction in refrigeration circuit. Look for significant temperature difference at point of restriction. TXV stuck closed, plugged filter dryer, plugged coil circuit
Higher Than Normal	Higher Than Normal	Higher Than Normal	Higher Than Normal	Excessive loading of evaporator coil. Due to excessive air flow across coil. Adjust blower speed (reduce blower speed)
Higher Than Normal	Higher Than Normal	Lower Than Normal	Lower Than Normal	Insufficient air flow across Condenser coil. Check cleanliness of coil. Check condenser fan operation motor/blower.
Higher Than Normal	Higher Than Normal	Lower Than Normal	Lower Than Normal	Excessive refrigerant charge. Recover / adjust charge using Superheat or Subcooling method, or weigh in new charge to factory specs.
Higher Than Normal	Higher Than Normal	Lower Than Normal	Lower <u>or</u> Higher Than Normal	Air and/or Non-condensables in system. Recover refrigerant from system, evacuate system to 500 microns, and recharge to factory specs.
Higher Than Normal	Lower Than Normal	Lower Than Normal	Lower Than Normal	Incorrect/over feeding of metering device. TXV sensing bulb not securely fastened to suction line, TXV improperly adjusted / stuck open.
Higher Than Normal	Lower Than Normal	Lower <u>or</u> Higher Than Normal	Lower <u>or</u> Higher Than Normal	Defective compressor (i.e. runs but won't pump), abnormally low Amp draw and abnormally high compressor temperature may be indicated.

** Normal refers to Pressures, Temperatures and/or values obtained at a rated air flow under a given set of conditions and assumes that no changes have been made to the factory refrigerant charge. Check installation manuals for specified performance data charts and correct refrigerant charge.*

21. REFRIGERANT CHARGES

Unit Cooling Capacity (BTU/HR.)

R-22 Refrigerant Charge

SWAD**1212
 SWAD**1812
 SWAD**2412
 SWAD**3012

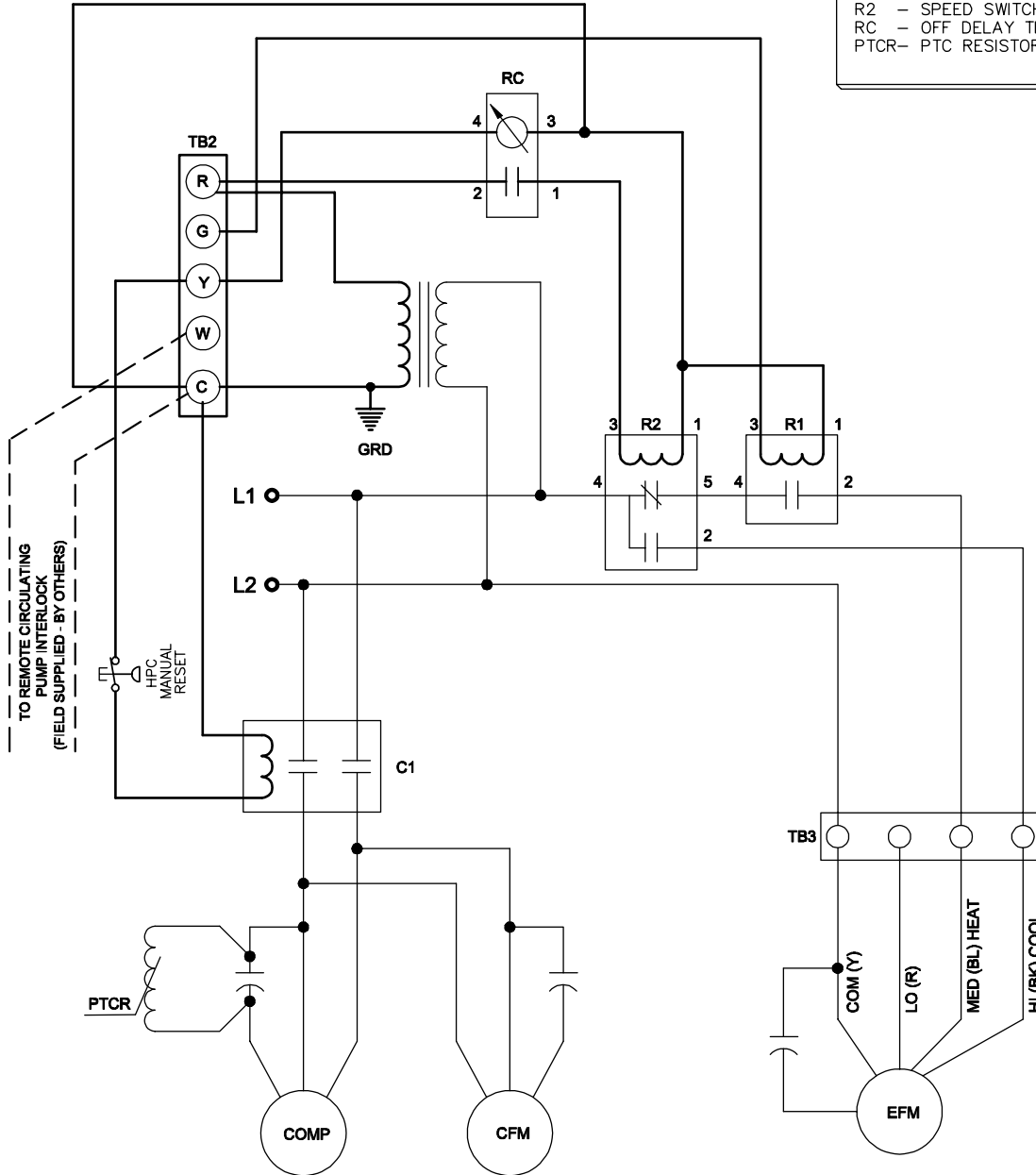
2 lb.- 9 oz.
 2 lb.-11 oz.
 3 lb.- 9 oz.
 4 lb.- 4 oz.

22. SCHEMATIC WIRING DIAGRAM

INTERCONNECTION DRAWING
SKYPAK HYDRONIC HEAT UNIT

LEGEND:
 C1 - COMPRESSOR CONTACTOR
 CFM - COND. FAN MOTOR
 EFM - EVAP. FAN MOTOR
 R1 - BLOWER RELAY
 R2 - SPEED SWITCHING RELAY
 RC - OFF DELAY TIMER-COOLING
 PTCR- PTC RESISTOR

DWG: SWAD-JEC-00-1
 APRIL 19, 2006



LD13572

NOTES

NOTES

LIMITED WARRANTY

Johnson Controls warrants this product to be free from defects in workmanship or material for a period of one year from date of original installation or 18 months from date of shipment, whichever comes first.

Johnson Controls obligation under this Warranty is LIMITED to repairing or replacing at our sole option, at our factory, any part thereof which shall be returned to our factory, transportation charges prepaid and which on examination proves to have been thus defective under normal domestic use not exceeding the fuel rating. The defective part should be returned through a qualified servicing dealer. Upon warranty determination, the replacement part will be shipped freight collect and assumes the unexpired portion of this Limited Warranty.

When a defective part can be repaired or replaced, Johnson Controls shall not be obligated to repair the entire unit or any part thereof other than the defective part.

This warranty applies only to the original homeowner, and is subject to the terms and conditions hereof.

COMPRESSOR – FIVE YEAR LIMITED WARRANTY

In addition to the One Year Limited Warranty, Johnson Controls warrants the compressor to be free from defects in workmanship or material for a period of five (5) years from the date of original installation. If a compressor fails during this five year period, a new compressor will be supplied. The customer will be responsible for freight costs from our factory for delivery of the replacement compressor and also for the return of the defective compressor which may be required under the terms of the Warranty. Labor and any other expense involved in replacing the compressor is not covered by this Warranty.

LABOR AND COST NOT COVERED

This Warranty provides only replacement parts or credits, and does not provide for or cover any labor, shipping, handling or other costs for service travel, servicing, removing, or installing any parts.

EXCLUSIONS

This Warranty shall be void if:

1. The unit is not installed by a licensed or otherwise qualified contractor and in compliance with the Installation Manual, applicable installation and good trade practices.
2. The defect or damage is caused by accident, abuse, negligence of any person or company, misuse, riot, flood, fire or Acts of God.
3. The unit is not operated and regularly serviced and maintained as called for in the Users' Manual.
4. Damages are caused by operating the unit in a commercial or corrosive atmosphere containing any damaging or dangerous chemicals.
5. The unit is modified or services in a manner not in accordance with the Installation Manual and Users' Manual.
6. Components, replacement parts, or other accessories not compatible with the unit or not approved by Johnson Controls have been used with or attached to the unit.
7. The defect or damage is not caused by Johnson Controls, or it arises from circumstances beyond the control of Johnson Controls.
8. The unit is installed outside the United States or Canada, or has been removed from the place where it was originally installed.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, OBLIGATIONS OR LIABILITIES, EXPRESSED OR IMPLIED BY EMPLOYEES OR REPRESENTATIVES OF JOHNSON CONTROLS. ALL STATUTORY, EXPRESSED OR IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY NEGATED AND EXCLUDED. ANY CLAIMS FOR INCIDENTAL AND CONSEQUENTIAL DAMAGES, OR ANY OTHER DAMAGES OR EXPENSES BEYOND THE TERMS OF THIS LIMITED WARRANTY ARE HEREBY EXPRESSLY NEGATED AND EXCLUDED.

