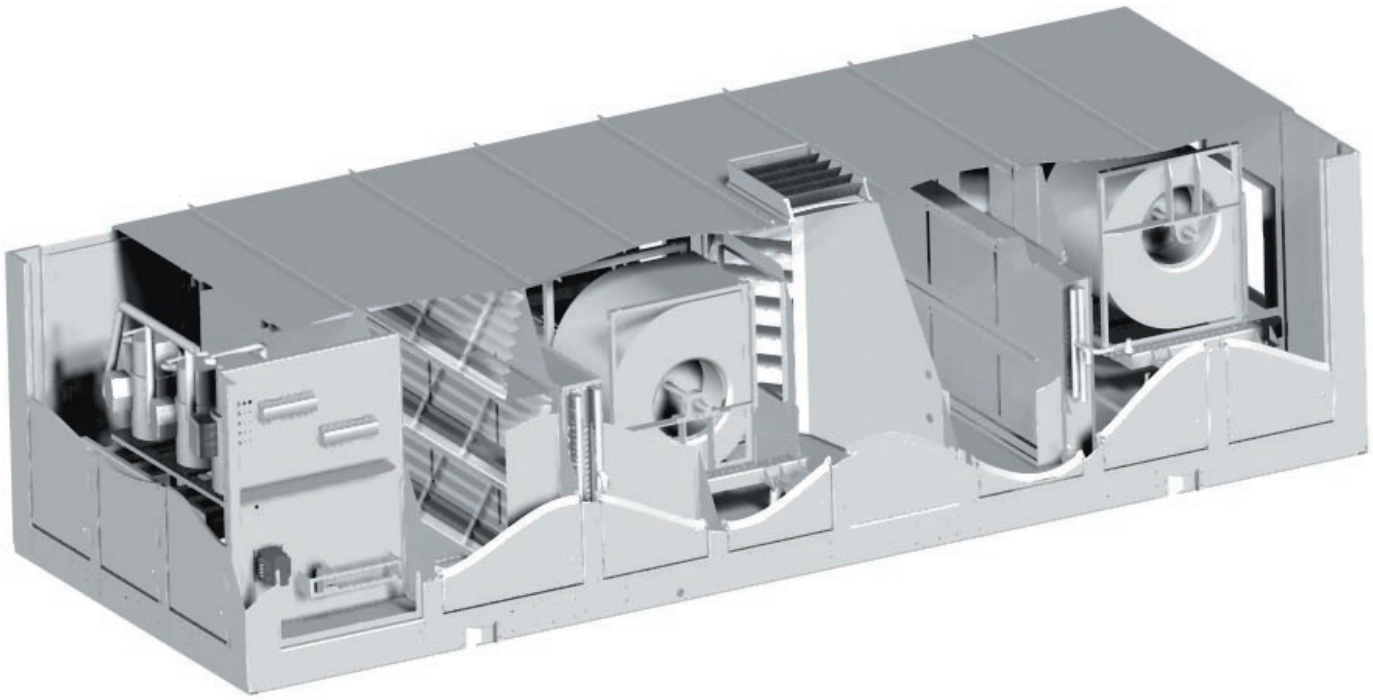
POOLPAK SWHP SR MANUAL

- APPLICATION
- SPECIFICATION
- INSTALLATION
- OPERATION
- MAINTENANCE

Packaged Natatorium Environment Control and Heat Recovery System



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INTRODUCTION

CREATING AN IDEAL ENVIRONMENT FOR INDOOR POOL FACILITIES

Indoor pool facilities are unlike any other structure in design, construction, and maintenance requirements. Air and water temperatures and humidity are especially difficult to control, and improper control usually results in an uncomfortable environment, excessive operating costs, and possibly serious structural damage. Effectively controlling these special conditions require control hardware and control sequences specially engineered for natatorium applications. PoolPak is the first environmental control package designed to meet all special needs of the indoor pool environment, while reducing energy usage and building maintenance costs.

KEY BENEFITS

Automatic Control of Air and Water Temperatures and Humidity

An integral part of the PoolPak system is a proven microprocessor control system which automatically senses and maintains comfort conditions. Sensors detect changes in humidity and air temperature in the indoor pool environment and quickly regulate supply air conditions to meet set point comfort levels, even during periods of unusually heavy pool use. PoolPak also continuously monitors pool water temperature and adds heat as necessary. To prevent condensation on walls and windows, PoolPak automatically adjusts humidity in response to changes in wall or window surface temperatures. As seasons and weather conditions change, PoolPak changes its own method of operation. Throughout the year, PoolPak thinks “efficiency” and automatically selects the least expensive energy source for pool air and water heating needs.

Prevention of Building Damage

Effective control of humidity and temperature conditions in the indoor pool environment eliminates condensation on interior surfaces. Laden with pool chemicals, this condensation encourages mold, mildew, paint blistering, paint peeling, and rust. Steel supports, lockers, light fixtures, and hardware along with heating and air conditioning systems can quickly corrode beyond repair. In many cases, reinforcement steel embedded in concrete can be seriously damaged and weakened by the percolating effects of pool chlorine and moisture condensation. PoolPak significantly reduces routine maintenance costs while preventing structural damage.

Reduction in Energy Costs

PoolPak dramatically reduces energy costs in two important ways:

By recovering exhaust air heat energy and returning it to the indoor pool environment.

By closely controlling indoor air conditions, minimum outside air along with the energy to heat it is required.

PoolPak offers significant advantages compared to either conventional heat and ventilation natatorium systems, which waste energy and money by exhausting large volumes of indoor air, or to improperly applieddehumidifiers, which waste dollars and energy, and may provide inadequate control.

Application of Heat Pump Technology

Through the use of heat pump technology, PoolPak automatically performs the following seven functions:

- Dehumidification/Humidity Control
- Natatorium Space Heating
- Pool Water Heating
- Proper Ventilation
- Recovery of Reusable Heat
- Natatorium Space Cooling
- Wall Condensate Prevention

POOLPAK SWHP QUICK SELECTION (TABLE 1)

POOLPAK SWHP QUICK SELECT CHART							
SWHP Unit Size	**Cabinet Size**	**#/HR Capacity[1]**	**Supply Fan CFM**	**Return Fan CFM**	**Evap Coil Cap. (BTUH) (Heat Recovery)**	**Pool H_20 Condenser Capacity**	**Reheat Coil Capacity**
060	A	88	8000	8000	173,000	220,000	220,000
080		98	8000	8000	226,000	270,000	270,000
100		125	8000	8000	280,000	345,000	345,000
100	B	125	12,000	12,000	280,000	345,000	345,000
120		146	15,000	15,000	350,000	425,000	425,000
140		178	18,000	18,000	415,000	500,000	500,000
140	C	178	18,000	18,000	415,000	500,000	500,000
190	B	218	18,000	18,000	482,000	600,000	600,000
190	C	218	20,000	20,000	482,000	600,000	600,000
220		254	24,000	24,000	603,000	700,000	700,000
260		305	28,000	28,000	719,000	850,000	850,000
300		355	28,000	28,000	849,000	1,000,000	1,000,000

[1] Based on 82°F and 60% RH room conditions.

Table 1. SWHP Quick Selection Chart

FUNCTIONAL DESCRIPTION OF SYSTEM

PRIMARY FUNCTION

The primary function of the PoolPak is to provide environmental control of the space through the use of heat pump technology. Heat from the warm, humid pool air is recovered for reuse while the air is dehumidified andcooled. The recovered heat is then used to heat the supply air and, if necessary, the pool water.

AIR FLOW

(SEE FIGURES 1 AND 2)

Warm, humid air from the pool enclosure is received in the return air section of the PoolPak. The return air is cooled and dehumidified as it passes over the evaporator coil. The sensible (dry) and latent (moist, change of state) heat is extracted from the return air and is absorbed by refrigerant in the evaporator coil, causing the refrigerant to flash from a liquid to a vapor. Refrigerant gas leaving the evaporator coil is supplied to the suction of the compressor. This refrigerant gas is compressed to a higher pressure and temperature. The high pressure hotgas from the compressor can be supplied, as required, to the condenser/reheat coil (for reheating the air), to the pool water condenser (for heating pool water), or to the optional auxiliary condenser (either air or water cooledwhen air conditioning is needed) by microprocessor-controlled solenoid valves.

The return fan discharges the cool/dry air into the mixing plenum where automatically controlled dampersexhaust a continuously-calculated portion of the air. The dampers mix recirculated air from the evaporator with air from the outside. The air mixture is then drawn over the condenser/reheat coil by the supply fan. Hot gas supplied to the condenser/reheat coil releases the recovered sensible and latent heat along with the added heat from the compressor to the supply air as it passes through the coil, causing the refrigerant to condense into a liquid. This hot liquid refrigerant is then stored in the receiver.

If an optional auxiliary heating system is installed, the air is heated further by the system as required. The supply fan then supplies the warm, dry air to the pool enclosure.

If the gaseous refrigerant is not needed for reheat, it is routed to the pool water condenser, and it gives uprecovered heat to the incoming cooler pool water, causing the refrigerant to condense.

Optionally, when the hot gas is not needed for reheat or pool water heating, it is supplied to an auxiliary, externalcondenser, which removes the heat from the refrigerant gas. The hot liquid refrigerant is then stored in the receiver. Liquid refrigerant stored in the receiver passes through an expansion valve(s), where the refrigerant is expanded to the operating evaporator pressure and temperature. The cycle then repeats itself.

An auxiliary pool water heater (supplied by others) is installed in the pool water return line. The auxiliary pool water heater is automatically cycled by the PoolPak microprocessor control system and is turned on only when the heat available from the Poolpak unit is insufficient to heat the pool water.

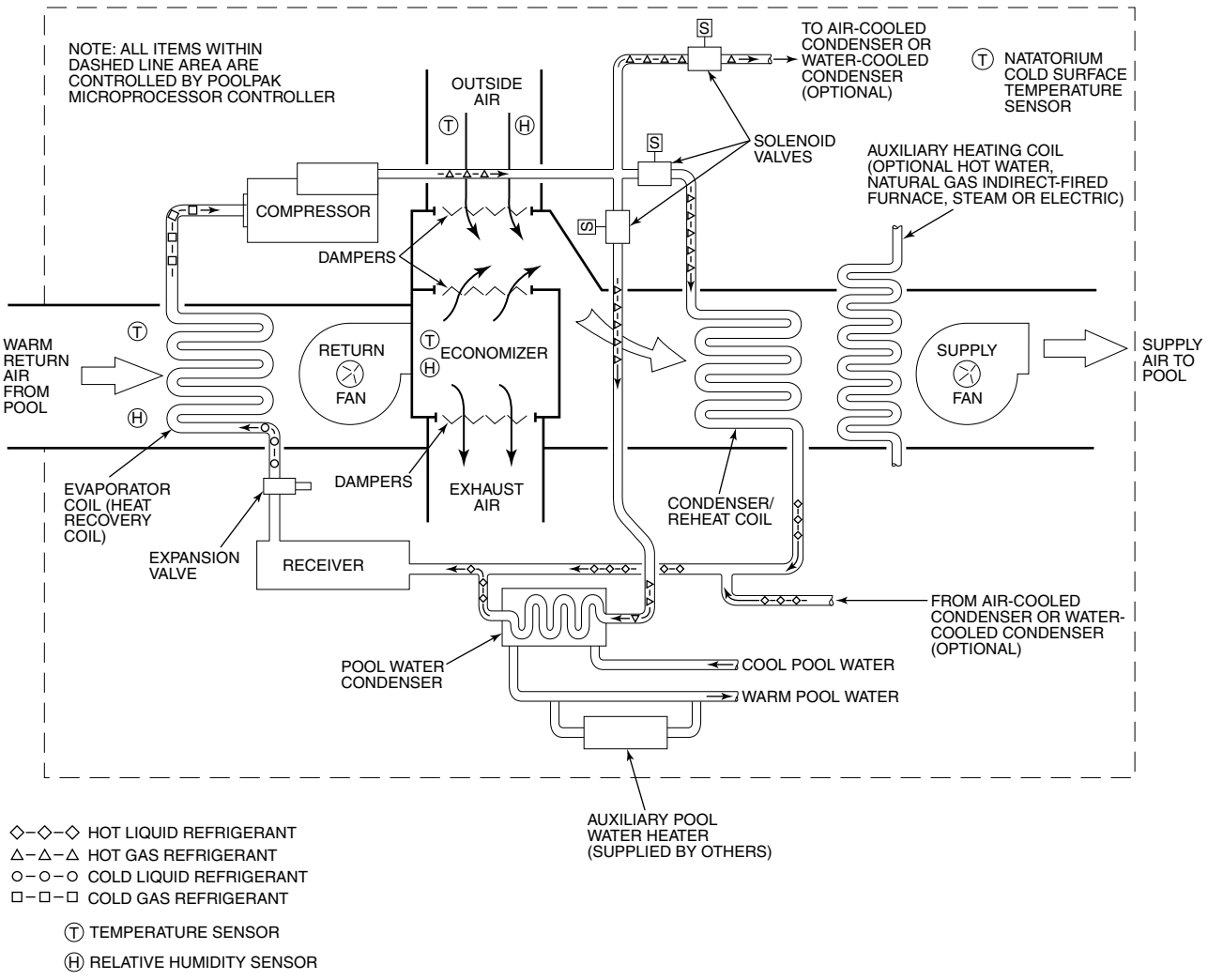
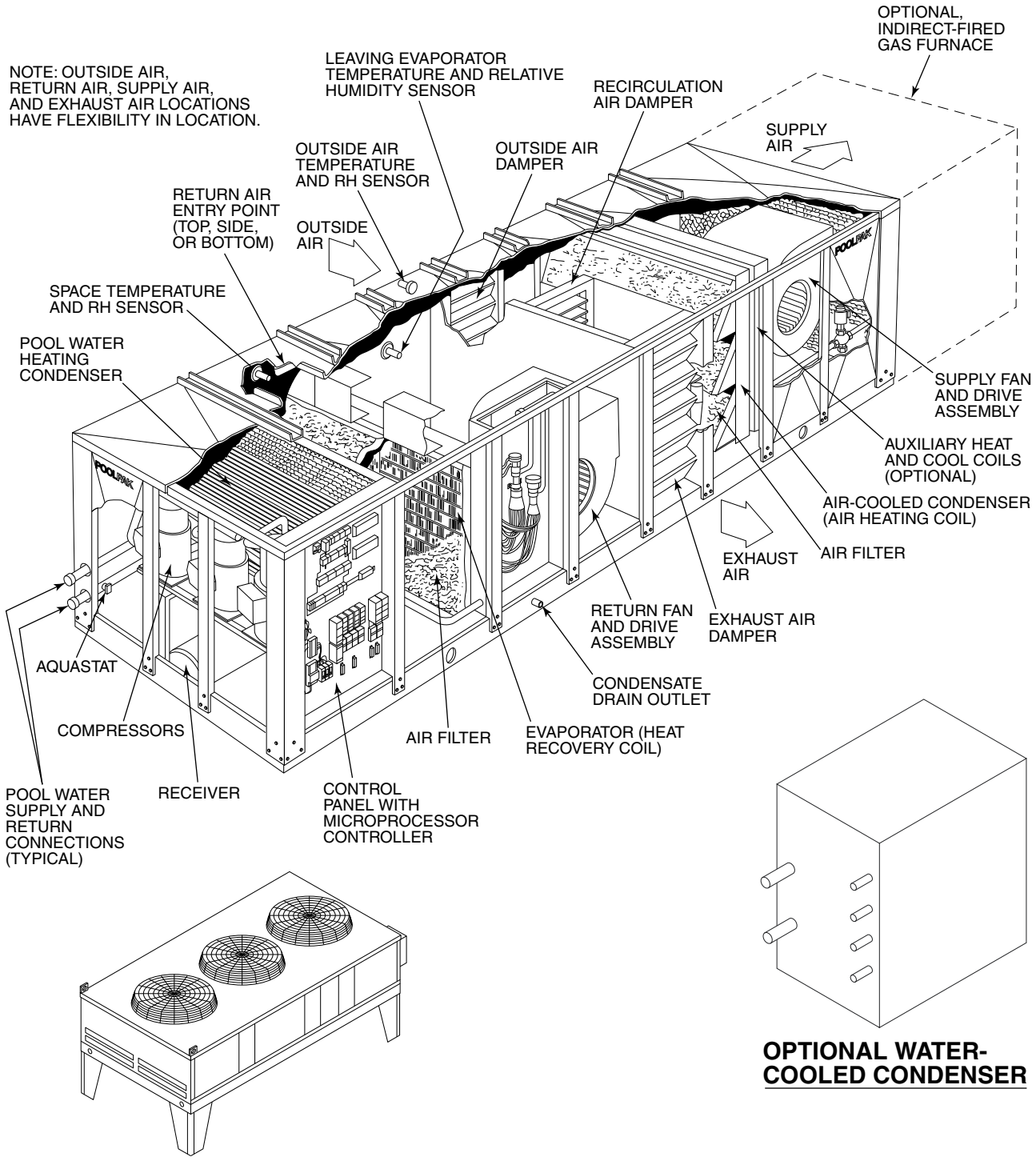


Figure 1. PoolPak Natatorium Environmental Control System Schematic



OPTIONAL AIR-COOLED CONDENSER

OPTIONAL WATER-COOLED CONDENSER

Figure 2. PoolPak Isometric View

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ELECTRONIC CONTROL CENTER III

The PoolPak is controlled by the Electronic Control Center III (ECC III). The ECC III controller (Figure 3) is a microprocessor-based system that incorporates all of the functions necessary to maintain correct natatorium space temperature and humidity, to introduce outside air and exhaust stale building air, to control pool water temperature, and to maintain occupied/unoccupied schedules. All programming resides in the ECC III controller.

System parameters and/or system status readouts are provided on the unit-mounted or remote-mounted display/keypad panel, also known as the Remote Interface Unit (RIU) (Figure 3).

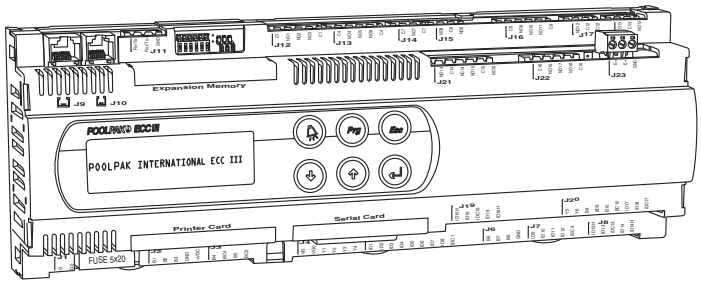
The memory of the ECC III controller has a fault code history log. This log will record the last 50 faults in the order of their occurrence. Each code will be recorded along with the date and time it occurred and the values of the critical system parameters. This fault code history log is accessible at the control panel via the ECC III controller and at the remote display/keypad panel (Remote Interface Unit, RIU). The fault code history log is also accessible with the optional Remote Access Package (RAP) server via a modem (telephone line) or an Internet (10 BaseT ethernet) connection. This Remote Access Package is available only with a LonWorks¨ based Building Automation System (BAS).

The PoolPak ECC III also has the option to be directly connected to several different Building Automation Systems (BAS). The ECC III can be connected to either a LonWorks¨ based BAS or a Modbus¨ RTU based BAS.

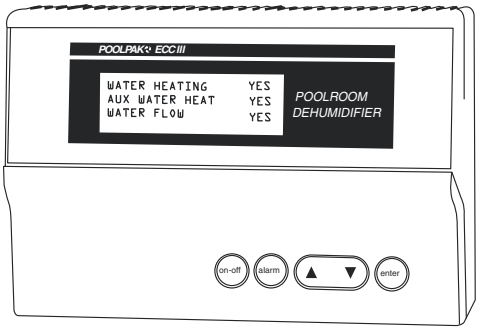
All PoolPak operating and logic controls are factory mounted and wired. The control sequences are designed specifically to control swimming pool environmental conditions.

As a minimum, the PoolPak control system provides full modulation of the heat recovery/heating system by proportional control of dry bulb temperature, relative humidity, interior building-skin-temperature-based humidity reset, and outside air volume.

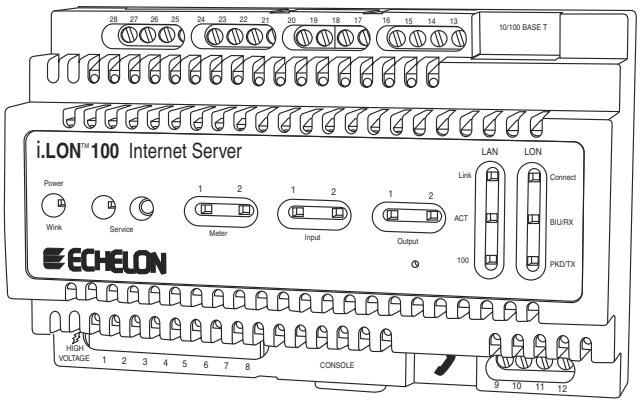
The PoolPak controls automatically operate the heating, dehumidification, and heat recovery system in response to the greatest requirements while adjusting unit outputs to maintain building conditions. The PoolPak controls are capable of providing full heating capacity to either air or water and of providing proportional control ofheating and dehumidification by loading stages of compressor capacity as necessary. As building requirements are satisfied, the compressor unloads and shuts off. Additional PoolPak functions are discussed in the following paragraphs.



ECC III CONTROLLER
(LonWorks® or Modbus® Interface)



ECC III REMOTE
DISPLAY/KEYPAD PANEL
(REMOTE INTERFACE UNIT, RIU)



ECC III REMOTE ACCESS
PACKAGE (RAP)
(LonWorks® only)

Figure 3. Electronic Control Center III

SET POINTS

The space temperature, space relative humidity, pool water temperature, time of day, day of week, maximum damper opening, minimum damper opening, and occupied/unoccupied schedules are entered from the keypad onthe Control/Display module. All set point and schedule information is maintained in a nonvolatile memory so that the information is not lost in case of a power failure.

When a change in set point is made, depending on the magnitude of the change, it may take an hour or longer for the space and/or water conditions to come to equilibrium. Do not expect the water temperature to change rapidly.

Space Temperature

The recommended setting for the space temperature is between 80°F and 88°F. It should normally be set about 2°F higher than the desired pool water temperature.

Space Relative Humidity

The recommended setting for the space relative humidity is 60%. The lower the relative humidity setting, the longer the compressor will be required to run and the higher the operating cost and first cost will be.

Pool Water Temperature

Refer to Table 2 for the recommended pool water temperature settings.

Application	Recommended Temperature Settings
Competitive Swimming	77°F to 80°F
Diving Pools	82°F to 86°F
Recreational Pools	80°F to 85°F
Therapy Pools	86°F to 92°F
Whirlpools	99°F to 104°F

Table 2. Pool Water Temperatures

Time/Date

The time of day and the day of the week are maintained by the ECC III, which has a replaceable battery backup. The battery will maintain the correct settings for a period of several weeks without external power. Time and day settings can be made from the keypad.

Occupied/Unoccupied Schedules

Occupied and unoccupied times may be entered on a weekly basis. During unoccupied periods, the outside air and exhaust dampers automatically close. During occupied periods, the outside air, the exhaust, and the recirculation air dampers modulate between minimum and maximum positions depending on indoor and outdoor conditions to provide the required outside air.

Damper Position

Under guidance of the Economizer or Smart Economizer, the dampers are controlled to either the minimum or maximum position during occupied periods. The minimum and maximum damper positions are user-controlledvia programmed ECC III settings. The outside air and exhaust dampers are closed during unoccupied periods soall air is recirculated for the most economical operation.

CONTROL SEQUENCE

Ventilation

The PoolPak provides outside air ventilation to satisfy minimum air ventilation requirements per ASHRAE 622004 Ventilation Standard.

Event Mode

The Event Mode changes the ventilation air quantity to meet the demands of an event or situation where additional outside air is needed. The unit controller can store up to 28 schedule events, which shall be user adjustable at the Remote User Interface (RUI). During Event Mode, the minimum damper positions is raised to a value higher than the minimum damper setpoint. For each event, the screen shall show the day of the week, the hour in 24-hour format, the minute, and the event type

Purge Mode

The PoolPak has a purge cycle to fully ventilate the natatorium at the airflow (CFM) specified for the unit's return fan. The purge cycle is programmable by the owner as necessary to ventilate the natatorium after shocking the pool. Unit controls provide completely automatic operation by controlling the supply and return fans and by opening the outside air and exhaust air dampers for the programmed time intervals.

CO_2 Based Demand Ventilation

The amount of outside air ventilation provided is controlled by the PoolPak unit based on the CO_2 level sensors in the return air stream.

Economizer

The PoolPak provides outside air as a function of indoor and outdoor conditions. The economizer operates either in the space heating, space cooling, space heating and dehumidification, or space cooling and dehumidification modes.

Space Heating

Space heating via heat recovery uses full proportional control of the space dry bulb temperature by staging compressor loading of unit capacity with humidity override. Heat is recovered automatically from the pool roomreturn air. The PoolPak automatically controls the output of the optional factory-installed auxiliary air-heating coil which can be hot water, steam, electric, or gas.

Smart Economizer

The Smart Economizer utilizes the simultaneous operation of the heat recovery and economizer control sequence. When the PoolPak compressor is operating in the heating and/or dehumidifying heat recovery mode, return air passes through the evaporator. The sensible and latent heat in the return air is transferred to the refrigerant. Air leaving the evaporator is cold and saturated. The exact temperature and dew point of the air leaving the evaporator is monitored and compared to outside air temperature and dew point. If the outside air is warmer and/or dryer than the air leaving the evaporator, all the air leaving the evaporator is exhausted and 100% outside air is drawn into the PoolPak. All the heat recovered in the PoolPak's refrigerant is transferred to the supply air in the air reheat condenser. The Smart Economizer can usually save $3,000 to $4,000 annually inaddition to a standard mixing box and economizer for an average-sized pool.

Humidity Control

The economizer is activated if dehumidification is required, and the air and water temperatures are satisfied and the absolute humidity of the outside air is lower than the absolute humidity of the pool room air and the outside air temperature will not adversely affect the pool room air temperature.

The PoolPak provides full proportional control of relative humidity by staging unit capacity. The humiditycontroller energizes the compressor. The moist air from the pool room is drawn over the evaporator coil, where the air is cooled below its dew point. In this cooling process, the moisture in the return air is condensed onto the evaporator coil. The heat recovered in the refrigerant from the dehumidification process is directed to the air reheat condenser if the space needs heating or to the pool water condenser if pool water temperature is below the set point.

Pool Water Heating

If the space temperature is at or above the set point and the pool water temperature is below the set point, hot gasis directed to the pool water condenser when the compressor is running. During times when the pool water requires more heat than is available from the pool water condenser, the PoolPak activates the auxiliary poolwater heater.

NOTE

The maximum allowable temperature of pool water entering the PoolPak is 95°F.

Cold Wall-Temperature Sensor/Humidity Reset Control

Every pool room has one wall that sweats before the other walls. The PoolPak prevents moisture fromcondensing on this trouble wall by monitoring its surface temperature using the wall-temperature sensor.

When the temperature of the cold surface at the wall-temperature sensor drops to within 5°F of the dew point temperature of the space air, the PoolPak automatically resets the relative humidity set point downward. This condition causes the dehumidifier system to activate humidity control, lowering the space dew point and preventing condensation on the cold wall surfaces.

Typical locations for this condensate prevention wall-temperature sensor are north exterior walls, windows, window/door frames, and skylights.

Occupied/Unoccupied Control Mode

The PoolPak's time clock allows 7-day, 24-hour scheduling of operational control for both occupied and unoccupied times during the year. During unoccupied times, the outside air and exhaust dampers are kept in the closed position to minimize the air-heating load. During occupied times, the PoolPak operates to maintain programmed natatorium parameters.

Flywheel Air Conditioning (Standard)

Flywheel air conditioning control strategy uses the thermal storage capacity of the swimming pool. During occupied times, the PoolPak cools natatorium air by removing sensible and latent heat from the return air withthe evaporator coil. This cool air is supplied to the space. Heat removed from the air is rejected to the pool water condenser and is temporarily "parked" in the pool water. The pool water temperature is allowed to rise slightly (a maximum of 2°F) above its normal set point.

After a full day of flywheel air conditioning, pool water temperature typically rises about 1°F. Heat that has been "parked" in the pool during the day is removed at night during the unoccupied cycle. This is done by shutting off the compressor and purging the pool room with 100% cool and dry nighttime air. This lowering of the air temperature below the pool water temperature causes the pool water to release its heat at an accelerated rate, causing the pool water temperature to return to its set point at which point the PoolPak dampers shut and the PoolPak is ready to start the next day's air conditioning.

In lieu of using flywheel air conditioning, the PoolPak can be equipped with an optional factory-mounted chilled water coil, a remote air-cooled condenser, or a second water condenser to reject heat to a cooling tower or other water loop.

Air Conditioning with Air-Cooled Condenser (Optional)

The PoolPak can be equipped with a properly sized remote air-cooled condenser. This condenser can be "piggyback-mounted" on the PoolPak during installation or installed on a separate pad.

Air Conditioning with Water-Cooled Condenser (Optional)

The PoolPak can be equipped with a factory-mounted or remote-mounted air conditioning water condenser. This condenser can be either cleanable or noncleanable. Sensible and latent heat recovered in the air conditioning mode is rejected to the water condenser if pool water temperature requirements are satisfied.

Air Conditioning with Chilled Water Coil (Optional)

When chilled water is available, a chilled water coil can be factory-installed upstream of the supply fan. The coil has a factory-installed and wired three-way flow control valve and is controlled by the PoolPak control system.

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APPLICATION

PIPING INTERFACES

POOL WATER PIPING

PoolPak Pool Water Circulation Loop

The PoolPak pool water condenser (full or partial) must be connected to a secondary circulation loop with its own circulation pump (field-supplied) to obtain the required design water flows, which are outlined in Table 3. A typical piping configuration is shown in Figure 4.

PoolPak Model	Pool Water GPM	Water (WC-ft)[1]	Water (WC-ft)[2]	Water (WC-ft)[3]	Water (WC-ft)[4]	Heating Cap. Mbtu/hr
Full Water Condenser						
SWHP 060	25	18	15	13	11	220
SWHP 080	35	24	20	20	18	270
SWHP 100	40	15	13	20	10	345
SWHP 120	50	24	20	20	15	425
SWHP 140	60	23	20	19	23	500
SWHP 190	70	23	21	19	18	600
SWHP 220	80	18	15	20	15	700
SWHP 260	100	24	21	20	15	850
SWHP 300	120	25	22	20	23	1000
Partial Water Condenser						
SWHP 060	N/A	N/A	N/A	N/A	N/A	N/A
SWHP 080	20	16	14	12	10	130
SWHP 100	25	12	10	10	9	170
SWHP 120	25	18	12	14	10	195
SWHP 140	25	12	10	10	9	165
SWHP 190	30	13	11	10	9	200
SWHP 220	40	15	13	20	15	350
SWHP 260	50	23	26	19	15	430
SWHP 300	60	23	20	19	23	500

[1]Cleanable, vented condenser (double wall).

[2]Cleanable, nonvented condenser (single wall).

[3]Spiral, vented condenser (double wall).

[4]Spiral, nonvented condenser (single wall).

Table 3. Pool Water Required Design Flow

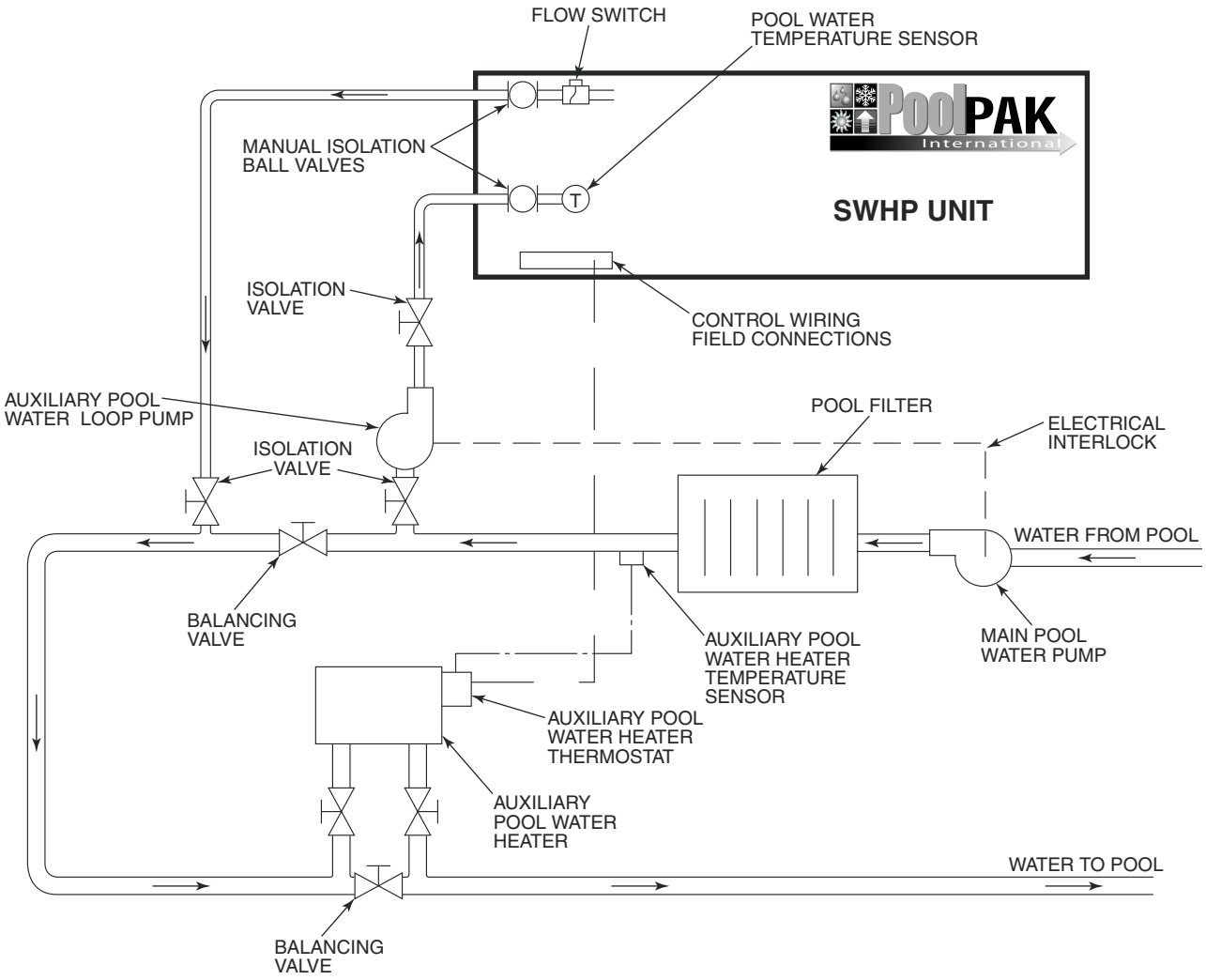

Figure 4. Pool Water Piping Schematic

The secondary pool water loop supply must come from the main pool water distribution line downstream of both the main pool water pump and the pool filter. The discharge from this secondary loop goes back into the primary distribution line downstream of the secondary loop supply and upstream of the auxiliary pool water heater. This location is required so that the PoolPak unit will sense the actual pool water temperature.

The secondary circulation loop should be self-priming and vented. Particular attention must be given to venting when the Poolpak is installed above the level of the main pool water system. When designing a system that has over 20 to 30 feet of vertical rise, the system should be considered to be open (size pump accordingly, assuming no gravitational assistance).

Pool Water Heater

The auxiliary pool water heater (field-supplied) must be installed downstream of the PoolPak secondary loop discharge. It is normally installed in its own secondary loop as shown in Figure 4. The auxiliary pool water heater is controlled by the PoolPak. It is only turned on either when the heat available from the PoolPak is insufficient for pool water heating and pool water temperature drops to 1.5°F below set point or the PoolPak loses water flow.

The normally-closed auxiliary pool water heater contacts (terminals T9-7 and T9-8) open when pool water temperature rises as sensed by the PoolPak water temperature sensor. This prevents the auxiliary pool water heater from energizing. The contacts close when the pool water temperature falls below the set point or when there is a shutdown of the PoolPak control system. This provides fail-safe heating of the pool water via the auxiliary pool water heater. These contacts must be used to interrupt the signal from the auxiliary pool water heater thermostat. The auxiliary pool water heater thermostat should be set approximately 2°F above the PoolPak pool water temperature set point. If the pool water flow switch shows a lack of flow to the PoolPak water condenser and temperature sensor, the correct water temperature cannot be determined by the PoolPak controls, and the PoolPak control will maintain the auxiliary pool water heater contacts in the closed position, returningcontrol to the auxiliary pool water heater thermostat.

Main Pool Water Pump and Auxiliary Pool Water Loop Pump Interlocks

The main pool water distribution pump and the auxiliary pool water loop pump must each have its own start/stop switch. Check the main pool water pump starter for a set of auxiliary contacts. If the starter does not have a set of auxiliary contacts, install an auxiliary contact kit, available for most starters in use today.

Wire the main pool water pump's auxiliary contacts in accordance with the manufacturer's specifications, and run the wires to the PoolPak auxiliary pool water loop pump starter. Wire the auxiliary pump so that it operates only when the main pool water pump operates. This interlocking is necessary to prevent overheating and possible damage to the Schedule 80 CPVC pipe and auxiliary pool water loop pump.

Hand Valves

Hand stop valves and pressure gauge stopcocks are factory-installed in the pool water supply line and return line inside the PoolPak for servicing. A third hand valve (field-supplied) should be installed upstream of the auxiliary pool water pump so that the pump can be isolated for service. A fourth hand valve (field-supplied), installed inthe main pool water line between the secondary loop supply and return, is normally required to balance the flow in the PoolPak secondary loop. Figure 4 shows the locations of the hand valves.

Flow Switch

An auxiliary water loop flow switch is factory-installed in the PoolPak. The flow switch is factory-calibrated and should not be adjusted. If the flow switch contacts are not closed when water is flowing through the PoolPakunit, this is an indication of insufficient water flow. The PoolPak unit can be operated with inadequate water flow, however, the PoolPak will not go into a water-heating mode until the water flow switch contacts are closedby sufficient water flow.

Pool Water Piping Composition

Pipe must be CPVC plastic pipe (PVC pipe is NOT suitable) with a minimum wall thickness of Schedule 80. It must be kept free of all foreign matter.

Freeze Protection

Any pool water piping (field-supplied) exposed to outdoor ambient air temperatures must be protected againstfreezing. Wrap lines with electric heat tape (follow manufacturer's instructions) controlled by an automatic thermostat set at a minimum of 35°F. Insulate all piping. Insulation must be sealed at all seams. Power for the customer-installed heat tape must be supplied external to the PoolPak.

Condensate Piping

The drain pans are connected to a common drain system that directs condensate out both sides of the base frame or through the base for curb-mounted PoolPaks. The condensate drain trap and piping can be installed at either side of the unit. The trap and piping must be supplied and installed by the customer. The drain connections not trapped must be permanently sealed with a suitable PVC plug. Provisions MUST be made for disposal of condensate.

▲ CAUTION
If condensate is returned to a closed filter system that does not have a surge tank, care must be taken to ensure free flow of condensate back to the closed filter.

Condensate from the dehumidifier coil will have nearly the same properties as the pool water itself. It is recommended that building materials subjected to condensate and that systems used for condensate disposal be checked for compatibility. For drain piping, use PVC plastic pipe with a minimum wall thickness of Schedule 40.

The drain line must be trapped and sloped to provide proper drainage. The trap depth must be a minimum of 6 inches (see Figure 5). Drain line exposed to outdoor ambient temperatures must be protected against freezing.

Wrap lines with electric heat tape (follow manufacturer's instructions) controlled by an automatic thermostat set at a minimum of 35°F to protect against freezing. Insulate all piping. Insulation must be sealed at all seams. Power for heat tape must be supplied external to the PoolPak.

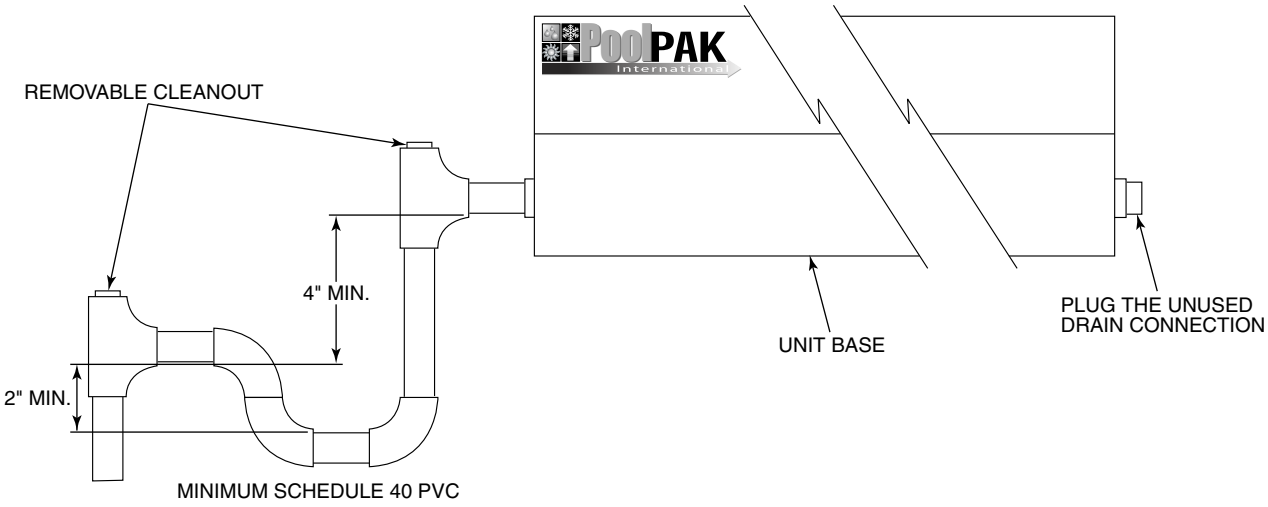

Figure 5. Condensate Drain Trap

AIR DISTRIBUTION

All supply and return duct work to the unit should be installed such that no condensate occurs in the duct work. Duct turns and transitions must be made carefully to keep friction losses to a minimum. Duct elbows should contain splitters or turning vanes and should avoid short turns.

Duct work that is connected to the fan discharge should run in a straight line (refer to Table 4 for minimum length per PoolPak model) and should not be reduced in cross-sectional area. Duct turns should be in the same direction as fan rotation. Never deadhead the fan discharge into the flat side of a plenum.

PoolPak Model	Minimum Straight Run (Feet)
SWHP 060	6
SWHP 080	6
SWHP 100	6
SWHP 120	8
SWHP 140	8
SWHP 190	8
SWHP 220	10
SWHP 260	10
SWHP 300	10

Table 4. Supply Fan Duct

Supply and return duct work should have all seams sealed before applying insulation to the exterior of the duct work. The insulation's seams must be sealed, wrapped, and mastic coated. Use of pre-insulated duct work (interior) is acceptable if it meets local codes, however, all seams must be sealed prior to startup.

The following design criteria give the best results when designing duct work:

- The most even control of space conditions occurs with proper air distribution and an air flow rate equivalent to three to six air changes per hour. This provides space control without excessive loading and unloading of the dehumidifying equipment.

- Supply outlets and return grilles should be carefully placed to avoid short-circuiting in the space. Short-circuiting creates stagnant areas where humidity and temperatures may build up to undesirable levels, reducing the effectiveness of the PoolPak.

- Supply air should be directed 45 degrees up and down (most of the air will be directed downward) toward exterior walls, windows, skylights, and other areas where stagnant conditions could cause humidity buildup andcondensation problems or drafts.

- Supply outlets should not discharge directly onto surfaces where drafts may be created that will blow on swimmers walking along the edges of the pool.

- Supply outlets should not discharge directly onto pool surfaces where drafts will cause swimmer discomfort and increase the evaporation rate.

- Spectators should have supply air directed toward their faces.

- Return grilles should be placed as high in the space as practical without causing short-circuiting of the air.

- Air velocities in ducts should be kept as low as is reasonable to avoid excessive noise in the ducts.

The outside air intake and exhaust must have rain hoods if the unit is mounted outdoors. A sample rain hood design is illustrated in Figure 6. The intake and exhaust should be screened to prevent the entrance of foreign matter. Also, when auxiliary gas heat is selected (in an outside installation), a combustion air louver or rainhood is required.

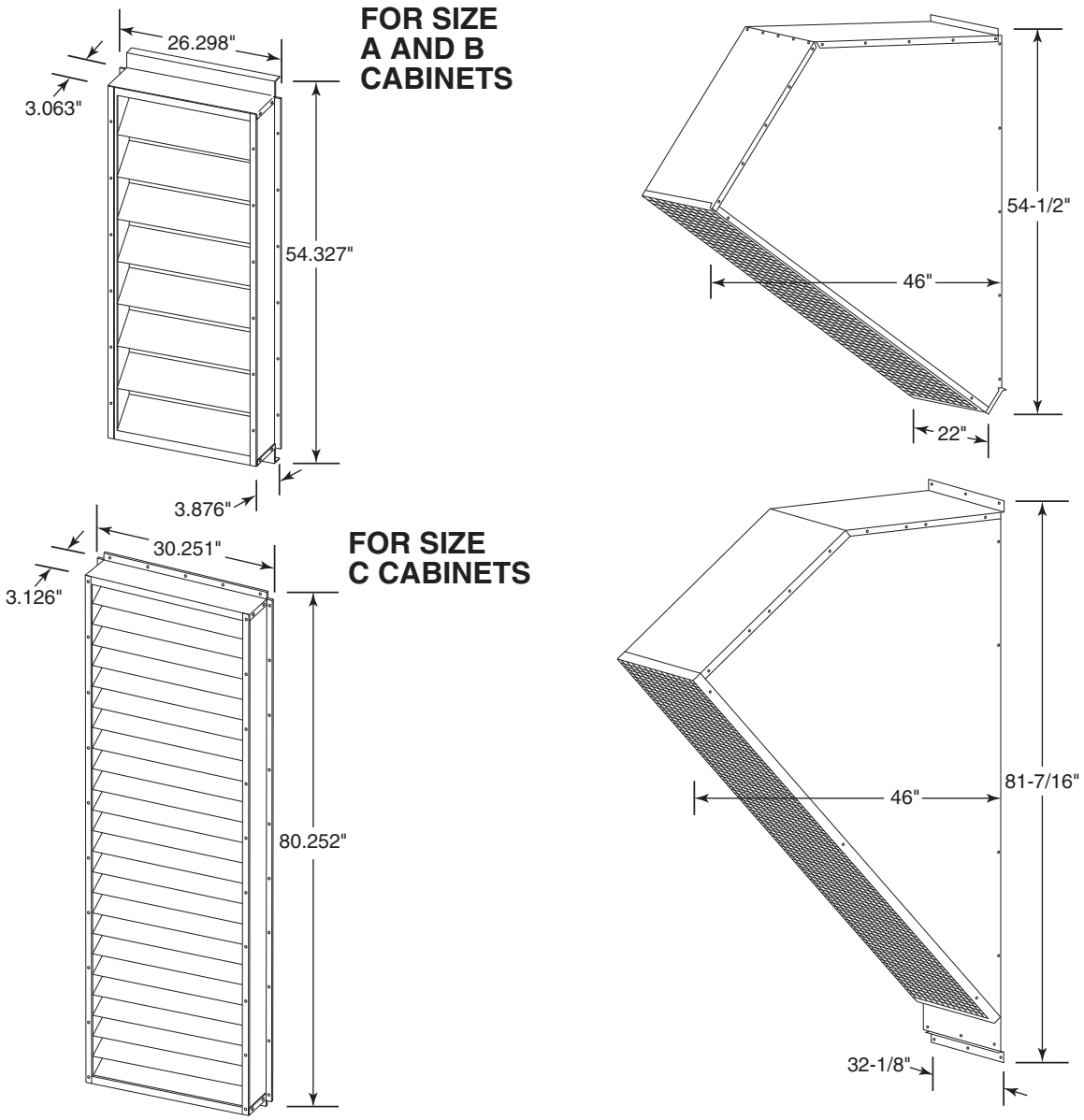

Figure 6. Louver and Rain Hood Options for Outdoor Units

ELECTRICAL INTERFACES

Electrical Information

Compressor Starting Equipment and Power Supply

Compressor motor starters, thermal overloads, and relevant controls are included and wired within the control center of the PoolPak and do not require additional wiring by the installing contractor.

The starting contactors are factory-wired to terminal blocks inside the control center for field connection. See the dual point power wiring diagram (Figure 24) if separate power connections are required for the compressors andfans/controls.

Fan Starting Equipment and Control Panel Power Supply

Fan motor starters, thermal overloads, and relevant controls are included and wired within the control center. Control panel power is factory-wired from the supply side of the fan motor starters.

The starting contactors are factory-wired to terminal blocks inside the control center for field connection on the supply side. A single point power disconnect (typically supplied by others) is required. See the dual point power wiring diagram (Figure 24) if separate power connections are required for the compressors and fans/controls.

General Electrical Supplies

All wiring, disconnects, fuses, etc. are to be supplied and installed by the customer unless these options havebeen special-ordered from PoolPak.

Field-Installed Sensor Mounting

Outside Air Temperature and Relative Humidity Sensor

This factory-supplied combination sensor is to be field-mounted outdoors in a location that is out of directsunlight. A double radiation shield must be used if the sensor will be in direct sunlight. The sensor may bemounted on a north-facing building wall, as explained below, for indoor PoolPaks.

For indoor applications, mounting in the outside air intake duct is not permissible because true outdoor temperature and humidity will not always be available. The sensor should be mounted on a north wall, out of direct sunlight and away from other heat sources which can cause erroneous temperature readings. A wooden ortwo-layered aluminum sun shield should be constructed if the sensor must be mounted in an area exposed todirect sunlight.

Wall Condensation Temperature Sensor

The purpose of the wall condensation sensor is to measure the temperature of the coldest surface in the pool enclosure. When the temperature of the interior surface at the condensation sensor drops to within 5°F of the dew point temperature set point of the space air, the relative humidity set point is offset downward. This causes the ECC III to activate humidity control and helps to prevent condensation on the cold wall surfaces.

Proper location of this sensor is critical. This factory-supplied wall condensation sensor must be field-mountedon the coldest surface in the natatorium such as the metal frame around an exterior window or door. If there are no exterior windows, the wall condensation sensor should be mounted directly on an exterior wall surface. The condensation sensor may be mounted either horizontally or vertically, with the sensing plate on the back of the sensor in direct contact with the cold surface.

INSTALLATION

Location

The PoolPak unit is designed for indoor or outdoor locations, either ground-level or roof-top. The location must allow for free condensate drainage (without freezing), ventilation, supply and return ducts, and sufficient clearance for servicing the unit. Refer to Figure 7 for a typical roof-top installation.

For ground-level installation, precautions should be taken to protect the unit from tampering by or injury to unauthorized personnel. Safety precautions such as a fenced enclosure or additional locking devices on the panels or doors are advisable. Check with local authorities for safety regulations.

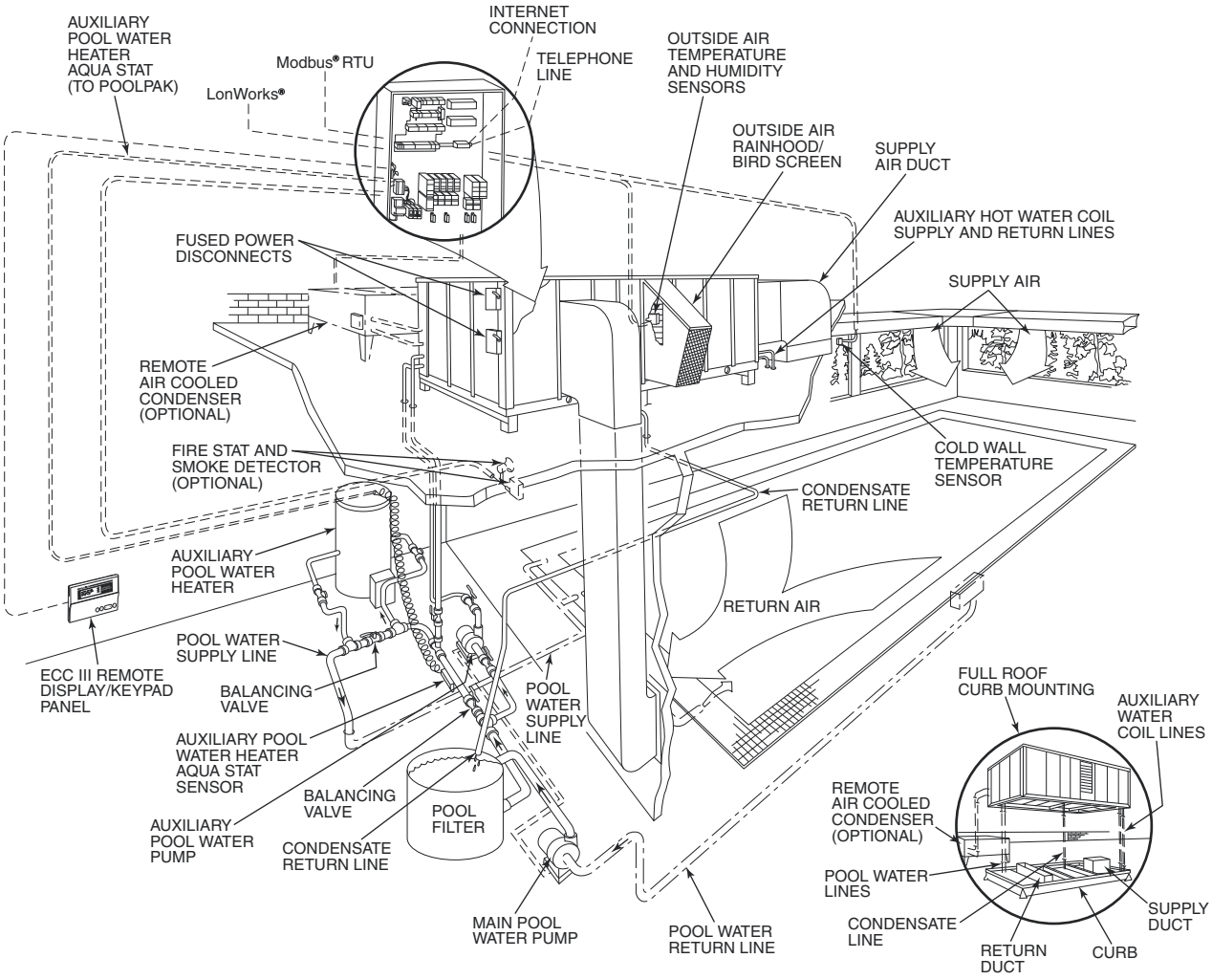

Figure 7. PoolPak Field Installation

Foundation

The unit must be mounted on a flat and level foundation capable of supporting the entire operating weight of the equipment. Refer to Figure 15 for clarification of weight distribution. The unit MUST NOT be set flat on a concrete slab. The PoolPak MUST BE raised 6 inches to allow for sufficient height to adequately trap the condensate line (see Figure 5) and to allow for electrical service entrance. The unit must be supported at a minimum of six places, including all corners and the center points of each side (see Figure 8). Each support should be at least 12 inches long. The unit must be level to ensure proper condensate drainage. If the unit iselevated beyond the normal reach of service personnel, a catwalk capable of supporting service personnel, their equipment, and the scroll compressor(s) (about 1,000 lb.) must be constructed around the unit.

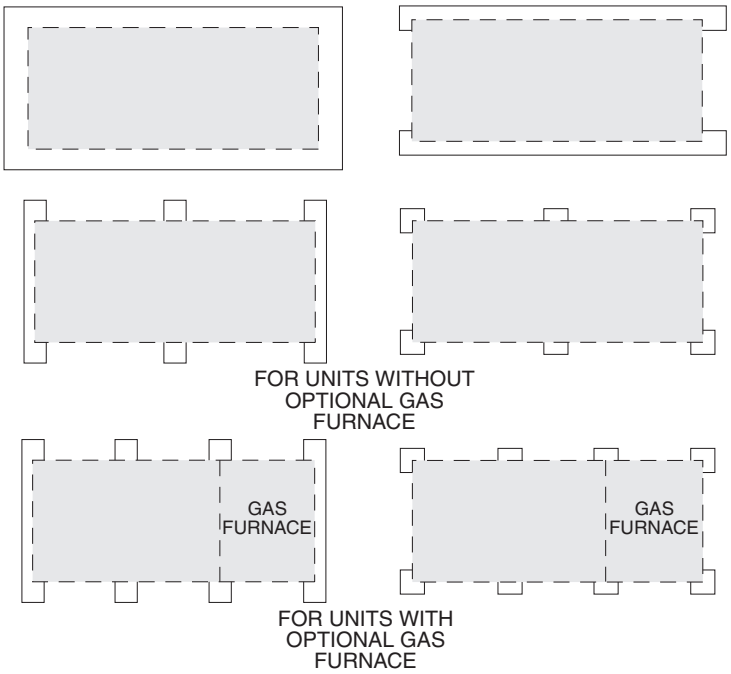

Figure 8. Unit Support Alternatives

For ground-level installation, a one-piece concrete slab with footers that extend below the frost line is highly recommended. Additionally, the slab should not be tied to the main building foundations to prevent noise transmission. The unit must be supported with adequate space to allow for a condensate line trap.

For roof-top installation, choose a location with adequate structural strength to support the entire weight of the unit and service personnel. For non-curb mounted units, provide spring vibration isolation to minimize vibration transmission to the roof structure. The unit must be situated with adequate height for a condensate line trap. The PoolPak unit may be mounted on equipment rails with spring vibration isolation. For any alternative mountings not discussed here, contact the factory for additional guidance. Care must be taken not to damage the roof. If the roof is bonded, consult the building contractor for allowable installation procedures.

Service Clearance

The clearance for service and repair must be 4 feet on all sides. For less than 4-foot clearances, consult your local PoolPak representative or the factory.

Unit Hookup

Avoid tearing or damaging unit insulation while working on or around the unit. Do not stack access panels. Stand them upright with the insulation away from traffic.

Gas Furnace Auxiliary Heat (Optional)

When using a gas furnace, power venting is provided for all unit sizes. **No additional venting or caps are provided. Please refer to the furnace manufacturer's manual for piping and venting instructions.** Gas furnaces are available with outputs of 180,000 to 1,250,000 BTU, as determined by unit configuration and project requirements.

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RIGGING

HANDLING

Care should be taken during handling to avoid damage to panels, drain piping, etc. The PoolPak can be moved into position using pipe rollers underneath the base of the unit, or it can be lifted using a crane or a hoist attached through the four lifting holes provided in the unit base frame.

Use suitable spreaders or a frame to prevent damage to the PoolPak (see Figure 9). Cables must be adjusted to length to correct for the heavier compressor end of the unit. *Lifting hooks must be blocked away from the side of the unit* to prevent damage to the door panels while lifting (see Figure 9). Failure to follow these directions will result in serious damage to the unit. **PoolPak will not accept responsibility or liability for repairing any resulting damage.**

Do NOT walk on top of the unit or serious damage may result. **PoolPak will not accept responsibility or liability for repairing any resulting damage.**

INSPECTION

Immediately upon receiving the unit, inspect it for damage which may have occurred during transit. If damage is evident, note it on the carrier's freight bill. A written request for inspection by the carrier's agent should be made at once.

NOTES: RIGGING - Remove side air return panel before lifting. Use cable or chain sling. Use spreader bars to prevent damage to unit. DO NOT USE FORKLIFT.

TRANSPORTING - Secure each unit to trailer by lifting holes to prevent damage to unit. These units shall not have any items stacked on top during transit. DO NOT SECURE WITH STRAP OR CHAIN OVER TOP OF UNIT.

SPREADER BARS - For models SWHP 060, 080, and 100, use 5-foot spreader bars. For models SWHP 120, 140, 190, 220, 260, and 300, use 8.5-foot spreader bars.

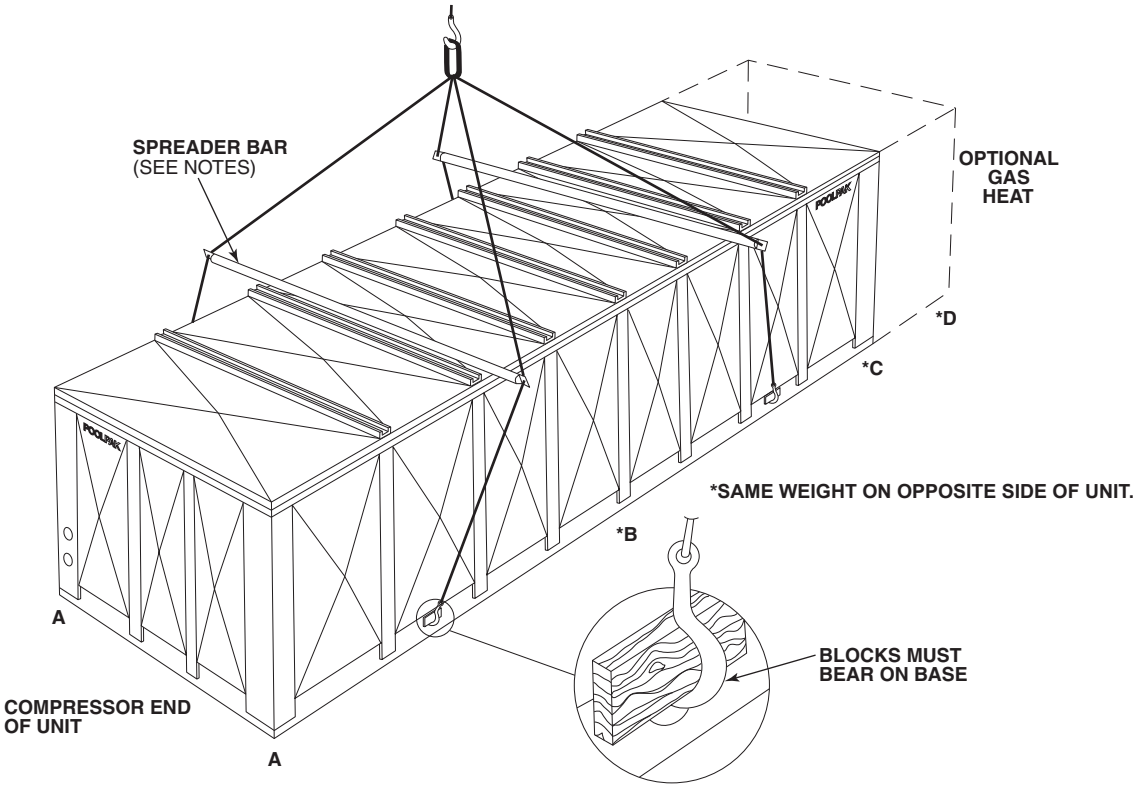


Figure 9. Rigging the PoolPak

PoolPak SWHP Nomenclature

SWHP[1] 0190[2] SR[3] — 22[4] A[5] — C[6] JF[7] — R022[8]

1. Swimming-Pool Water Heat Pump

2. Nominal Refrigeration Size

a. 0060 - 15 tons
b. 0080 - 20 tons
c. 0100 - 25 tons
d. 0120 - 30 tons
e. 0140 - 35 tons
f. 0190 - 40 tons
g. 0220 - 50 tons
h. 0260 - 60 tons
i. 0300 - 70 tons

3. Fan Configuration

a. SR = Supply and Return fans
b. S = Supply fan
c. SE = Supply and Exhaust fans
d. SEP = Supply, Exhaust and Purge fans

4. Fan Motor Horsepower(s):

a. If "Item 3" is SR, then "Item 4" is the code for the supply and return fan motor horsepower combinations:

Code	Motor Sizes (HP)	Code	Motor Sizes (HP)	Code	Motor Sizes (HP)
03	3/3	15	15/15	30	30/30
05	5/5	17	15/20	35	30/40
07	7.5/7.5	20	20/20	40	40/40
08	7.5/10	22	20/25	45	40/50
10	10/10	25	25/25	50	50/50
12	10/15	27	25/30		

b. If "Item 3" is S, SE or SEP, then "Item 4" is the code for the supply fan motor horsepower:

Code	Motor Sizes (HP)	Code	Motor Sizes (HP)	Code	Motor Sizes (HP)
03	3	15	15	30	30
05	5	17	15	35	30
07	7.5	20	20	40	40
08	7.5	22	20	45	40
10	10	25	25	50	50
12	10	27	25		

5. Voltage

A = 208/3/60
C= 230/3/60
E = 460/3/60
G = 575/3/60
L = 380/3/50
J = 200/3/50

6. Cabinet Size

a. A
b. B
c. C

7. Internal Use Only

8. Refrigerant:

a. R022 = Refrigerant 22
b. R407 = Refrigerant 407c
c. R410 = Refrigerant 410a

PoolPak Model	Cabinet Size	Supply Air (CFM)		Hot Water & Steam Heating Coil Size	Total Evaporator Capacity (Btu/hr)[1]	Reheat Condenser Capacity (MBH)[1]
		Min	Max			
A	B	C	D	K		
Cabinet A						
060	A	3500	8000	A	173,000	220
080	A	5500	8000	A	226,000	270
100	A	6500	8000	A	280,000	345
Cabinet B						
100	B	8000	10,500	B	280,000	345
100	B	10,500	12,000	B	280,000	345
120	B	8000	10,500	B	350,000	425
120	B	10,500	12,000	B	350,000	425
120	B	12,000	15,000	C	350,000	425
140	B	10,000	15,000	C	415,000	500
140	B	15,000	18,000	D	415,000	500
190	B	11,000	18,000	D	482,000	600
Cabinet C						
140	C	15,000	18,000	D	415,000	500
190	C	18,000	20,000	E	482,000	600
190	C	18,000	20,000	E	482,000	600
220	C	15,000	20,000	E	603,000	700
220	C	20,000	24,000	F	603,000	700
260	C	18,000	24,000	F	719,000	850
260	C	24,000	28,000	G	719,000	850
300	C	21,000	28,000	G	849,000	1000

[1]At 82°F and 60% relative humidity

Table 5. Cabinet Configuration Number

Supply Air (CFM)	Coil A		Coil B		Coil C		Coil D		Coil E		Coil F		Coil G	
	CAP	LAT	CAP	LAT	CAP	LAT	CAP	LAT	CAP	LAT	CAP	LAT	CAP	LAT
3500	228	135												
4000	247	132												
5000	281	127												
5500	296	124												
6000	311	123												
6500	325	121												
7000	339	119												
8000	364	117	385	119										
9000			411	117										
10,000			435	115	492	120								
10,500			446	114	505	119								
11,000			458	113	518	118	571	123						
12,000			479	112	544	117	600	121						
13,000					567	115	626	119						
14,000					590	114	652	118						
15,000					612	112	677	116	695	118				
16,000							700	115	720	116				
17,000							723	114	744	115				
18,000							745	113	767	114	822	117		
19,000									790	113	846	116		
20,000									811	112	870	115		
21,000											892	114	1011	119
22,000											916	113	1036	118
23,000											937	112	1062	117
24,000											958	112	1088	117
25,000													1111	116
26,000													1134	115
27,000													1158	114
28,000													1180	114

*Entering air temperature: 75°F; entering steam pressure: 5 psig.

Table 6. Steam Coil Capacities (CAP) (MBH) and Leaving Air Temperature (LAT) (°F)

Cabinet Size	Total SA Flow (CFM)	Furnace Size (MBH Output[1]/Input[2])												
		Single Furnace					Dual Furnace					Drum Furnace		
		1	180	200	240	280	320	360	400	480	560	640	850	1000	1250
		2	225	250	300	350	400	450	500	600	700	800	1060	1250	1560
A	3500		48	53	63	74	85	Temperature Rise (°F)							
	4000		42	46	56	65	74								
	4500		37	41	49	58	66								
	5000		33	37	44	52	59								
	5500		30	34	40	47	54								
	6000		28	31	37	43	49								
	6500		26	28	34	40	46								
	7000		24	26	32	37	42								
	7500		22	25	30	35	40								
	8000		21	23	28	32	37								
B	8000			23	28	32	37	42	46	56	65	74			
	8500			22	26	31	35	39	44	52	61	70			
	9000			21	25	29	33	37	41	49	58	66			
	9500				23	27	31	35	39	47	55	62			
	10,000				22	26	30	33	37	44	52	59			
	10,500					25	28	32	35	42	49	56			
	11,000					24	27	30	34	40	47	54			
	11,500					23	26	29	32	39	45	52			
	12,000					22	25	28	31	37	43	49	66		
	12,500					21	24	27	30	36	41	47	63		
	13,000					20	23	26	28	34	40	46	61		
	13,500						22	25	27	33	38	44	58		
	14,000						21	24	26	32	37	42	56	66	
	14,500							23	26	31	36	41	54	64	
B, C	15,000							22	25	30	35	40	52	62	77
	15,500							22	24	29	33	38	51	60	75
	16,000							21	23	28	32	37	49	58	72
	16,500								22	27	31	36	48	56	70
	17,000								22	26	31	35	46	54	68
	17,500								21	25	30	34	45	53	66
	18,000								21	25	29	33	44	51	64
C	18,500									24	28	32	43	50	63
	19,000									23	27	31	41	49	61
	19,500									23	27	30	40	47	59
	20,000									22	26	30	39	46	58
	20,500										25	29	38	45	56
	21,000										25	28	37	44	55
	21,500										24	28	37	43	54
	22,000										24	27	36	42	53
	22,500										23	26	35	41	51
	23,000										23	26	34	40	50
	23,500										22	25	33	39	49
	24,000										22	25	33	39	48
	24,500										21	24	32	38	47
	25,000										21	24	31	37	46
	26,000										20	23	30	36	45
	27,000											22	29	34	43
	28,000											21	28	33	41

1. Find cabinet size. 2. Find total supply airflow rate (CFM). 3. If box is shaded, airflow rate is below or above furnace airflow rating. Furnace configuration should be reselected.

Table 7. Gas Furnace Capacities (MBH) and Temperature Rise (°F)

Cabinet Size	Total SA Flow (CFM)	Electric Heater (kW)										
		20	25	30	35	40	50	60	70	80	90	100
A	3500	18	23	27	32	36	45		Temperature			
	4000	16	20	24	28	32	40	47	55		Rise	
	4500	14	18	21	25	28	35	42	49		(°F)	
	5000	13	16	19	22	25	32	38	44			
	5500	12	14	17	20	23	29	35	40	46		
	6000	11	13	16	18	21	26	32	37	42	47	
	6500	10	12	15	17	19	24	29	34	39	44	49
	7000		11	14	16	18	23	27	32	36	41	45
	7500		11	13	15	17	21	25	30	34	38	42
	8000		10	12	14	16	20	24	28	32	36	40
B	8000		10	12	14	16	20	24	28	32	36	40
	8500			11	13	15	19	22	26	30	34	37
	9000			11	12	14	18	21	25	28	32	35
	9500			10	12	13	17	20	23	27	30	33
	10,000				11	13	16	19	22	25	28	32
	10,500				11	12	15	18	21	24	27	30
	11,000				10	12	14	17	20	23	26	29
	11,500				10	11	14	17	19	22	25	28
	12,000					11	13	16	18	21	24	26
	12,500					10	13	15	18	20	23	25
	13,000					10	12	15	17	19	22	24
	13,500						12	14	16	19	21	23
	14,000						11	14	16	18	20	23
	14,500						11	13	15	17	20	22
B and C	15,000						11	13	15	17	19	21
	15,500						10	12	14	16	18	20
	16,000						10	12	14	16	18	20
	16,500							12	13	15	17	19
	17,000							11	13	15	17	19
	17,500							11	13	14	16	18
	18,000							11	12	14	16	18
C	18,500								12	14	15	17
	19,000								12	13	15	17
	19,500								11	13	15	16
	20,000								11	13	14	16
	20,500									12	14	15
	21,000	Temperature Rise (°F)								12	14	15
	21,500									12	13	15
	22,000									12	13	14
	22,500									11	13	14
	23,000									11	12	14
	23,500									11	12	13
	24,000									11	12	13
	24,500											13
	25,000											13
	26,000											12
	27,000											12
	28,000											11

Note: For larger capacity electric heaters, contact your PoolPak representative.

Table 8. Electric Heater Capacities (kW) and Temperature (°F)

UNIT DIMENSIONS

PRODUCT DRAWING NOTES

Notes refer to Figure 12 and table 24, 25, and 26.

1. PoolPak is designed for indoor and outdoor locations, either ground-level or roof-top, on a housekeeping pad or curb. The foundation should be flat and level. The unit must not be set flat on a concrete slab but should be raised 6 inches to allow adequate height for the condensate line trap. The unit must be supported at a minimum of six places, including all corners and the center points of the length. Each support should be at least 12 inches long. Refer to Figure 8 for further guidance.

2. The air damper on the opposite side of the unit (not shown) has the same dimensions and location as the damper shown. The exhaust air damper can only be located as shown on Figure 12. A rain hood with bird screen or louver are recommended for the outside air damper and exhaust air damper. Bird screening can be used for the exhaust air damper. Top exhaust dampers are not available on outdoor units.

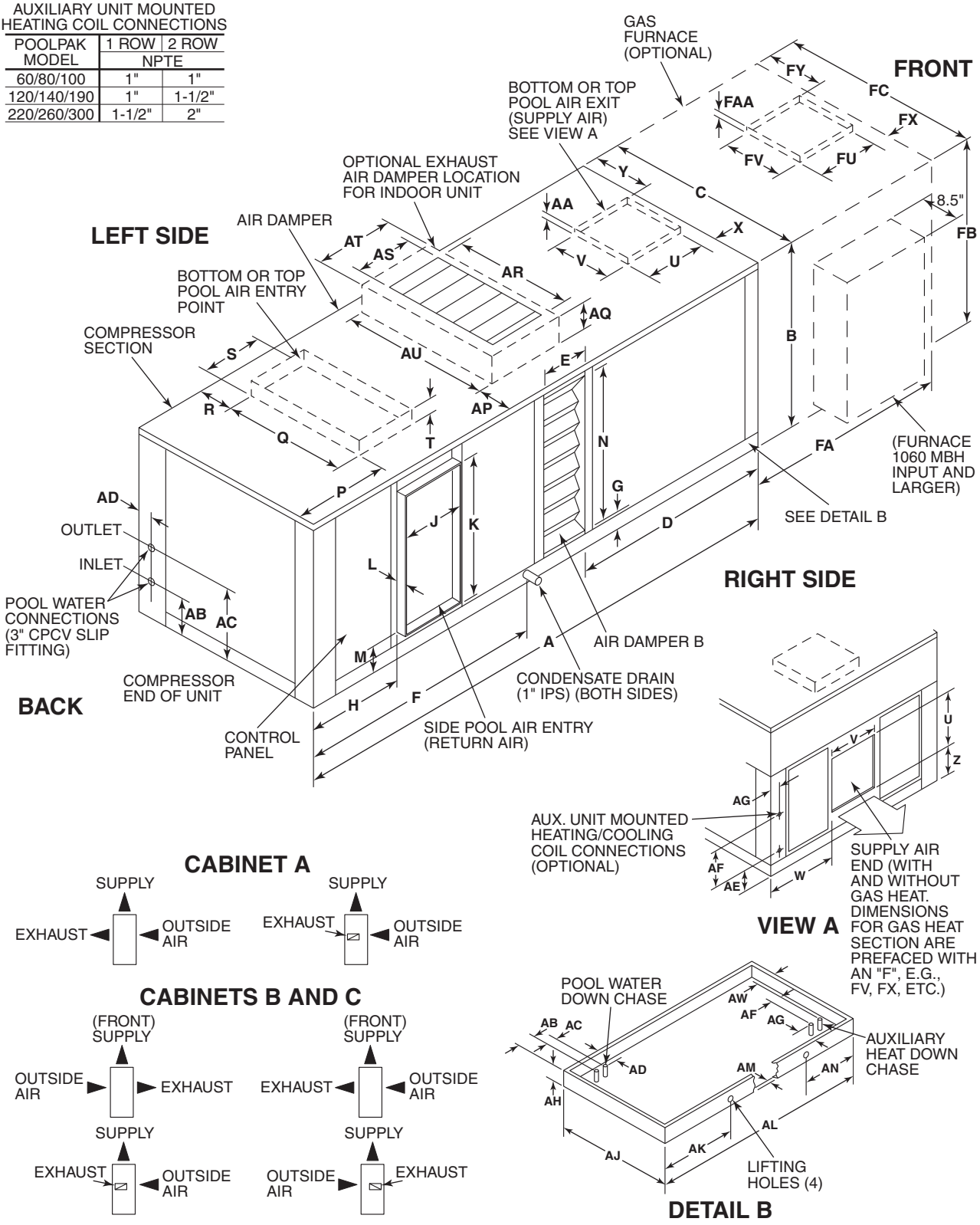
3. Side, bottom, or top return air locations are available. If side return is used, the air filter access is on the opposite side from the pool air entry panel. Side return pool air is available on either side (interchangeable). Air filter access is from either side when using top or bottom pool air return. The dimensions are different for the top and bottom return. Top return air can be specified unless there could be interference with a piggyback-mounted air-cooled condenser.

4. All sections of the unit except the compressor section are equipped with drain pans. Each condensate drain upstream from the reheat condenser coil is connected to a common drain outlet on either side of the unit base. Condensate drain piping external to the unit must be supplied and installed by the customer. The drain line must be sloped and trapped (see Figure 5). Outdoor (exposed) condensate lines must be protected against freezing with heat tape and insulation

5. Pool water piping must be CPVC with a minimum wall thickness of Schedule 80. COPPER PIPE IS NOT ACCEPTABLE. The water circuit should be self-priming. Lines exposed to outdoor ambient conditions must be protected against freezing.

AUXILIARY UNIT MOUNTED HEATING COIL CONNECTIONS

POOLPAK MODEL	1 ROW	2 ROW
	NPTE	
60/80/100	1"	1"
120/140/190	1"	1-1/2"
220/260/300	1-1/2"	2"



Dimensions are illustrative only. Contact the factory for your specific requirements.

Figure 12. PoolPak Unit Dimensions

CABINET COMBINATIONS							
	Cabinet Size				Cabinet Size		
	A	B	C		A	B	C
Models	60-100	100-190	140-300	Unit Range	60-100	100-190	140-300
Dimension				Dimension			
Overall Dimensions				**Pool Water Piping - Down through Curb**			
A	189.3	249.4	296.2	AB	19.2	4.7	4.7
B	62.3	63.1	99.2	AC	12.0	10.0	10.0
C	54.5	95.0	95.0	AD	5.4	7.1	7.1
Damper Location - Side				**Auxiliary Heat Piping - End Front**			
D	70.0	93.5	118.5	AE	17.0	23.5	23.5
E	18.0	18.0	24.0	AF	24.0	12.0	12.0
N	46.0	46.0	70.0	AG	11.0	3.8	3.8
G	12.0	13.7	19.6				
Condensate Drain - Side				**Auxiliary Heat Piping - Down through Curb**			
F	72.0	96.3	104.0	AW	5.0	6.0	6.0
Side Return				AF	5.0	12.0	12.0
H	37.4	43.3	43.3	AG	10.0	15.0	15.0
J	23.6	31.6	39.9	**Base Detail**			
K	49.3	49.3	86.0	AH	6.3	8.0	8.0
L	3.0	3.0	3.0	AJ	54.0	94.5	94.5
M	9.9	11.0	9.6	AK	20.0	53.0	52.5
Top Return				AL	189.0	248.8	296.2
P	36.4	45.5	45.0	AM	2.5	3.0	3.0
Q	49.0	78.8	84.0	AN	20.0	41.1	59.5
R	3.2	8.0	5.4	**Exhaust Damper - Top Right**			
S	14.8	19.8	36.0	AP	N/A	0.0	0.0
T	5.5	5.7	3.0	AQ	N/A	8.2	8.5
Bottom Return				AR	N/A	46.0	48.0
P	40.2	46.3	48.8	AS	N/A	18.0	30.0
Q	48.0	79.8	84.0	AT	N/A	20.0	32.2
R	3.2	7.5	5.4	AU	N/A	52.3	50.2
S	14.8	19.8	29.5	**Exhaust Damper - Top Left**			
T	Flush*	Flush*	Flush*	AP	26.5	42.8	43.0
Pool Water Piping - End				AQ	8.2	8.2	8.5
AB	22.8	13.5	24.0	AR	24.0	46.0	48.0
AC	35.5	24.5	50.0	AS	18.0	18.0	30.0
				AT	20.3	20.0	32.2
AD	4.4	4.0	4.0	AU	26.2	52.3	50.2

*Bottom return flange is flush with the bottom of the base rails.

Note: Openings on top of unit are for indoor installations only.

Table 24. PoolPak Unit Dimensions - Cabinet Combinations

BLOWER COMBINATIONS						
	Cabinet Size					
	A	B		C		
Unit Range	60-100	100-190		140-300		
Blower Size	15-11	18-18	20-20	22-22	25-20	25-25
Dimension						
Supply Opening - No Furnace						
U	15.9	18.9	24.5	27.3 27.3	31.3	31.3
V	14.7	21.9	24.8	27.3	26.3	31.3
E & F - End Supply (CW Fan) - No Furnace STD						
W	25.8	38.0	35.1	27.0	31.0	28.5
Z	15.0	19.1	28.6	25.8	26.8	26.8
T & C - Top Supply (CW Fan) - No Furnace						
X	10.7	13.8	15.5	15.9**	15.9**	
Y	14.2	34.8	34.8	34.7**	34.7**	
AA	5.8	3.0	4.5	4.5	4.5	3.0
B & H - Bottom Supply (CW Fan) - No Furnace STD						
X	3.0	4.3	4.3	4.4	4.4	4.4
Y	14.2	34.8	34.8	34.7	34.7	35.3
AA	Flush*	Flush*	Flush*	Flush*	Flush*	Flush*
E & F - End Supply (CCW Fan) - No Furnace						
W	25.8	38.0	35.1	27.0	31.0	26.0
Z	26.5	19.5	19.5	15.5	15.5	15.5
T &C - Top Supply (CCW Fan) - No Furnace STD						
X	3.0	4.3	4.3	4.4	4.4	4.4
Y	14.2	34.8	34.8	34.8	34.8	34.8
AA	5.8	3.0	4.5	3.0	3.0	3.0
B & H - Bottom Supply (CCW Fan) - No Furnace						
X	10.6	13.8	14.5	NA	NA	NA
Y	14.2	34.8	34.8	NA	NA	NA
AA	Flush*	Flush*	Flush*	NA	NA	NA

*Bottom supply flange is flush with the bottom of the base rails.

**Indoor unit only

Note: Openings on top of unit are for indoor installations only.

Table 25. PoolPak Unit Dimensions - Blower Combinations

Cabinet Furnace Combinations			
	Cabinet Size		
	A	B	C
Unit Range	60-100	100-190	140-300
Dimension			
Furnace Added Length - End Supply			
FA	54.2	78.0	78.0
FB	62.1	63.1	99.2
FC	54.0	95.0	95.0
Furnace Added Length - Top/Bottom Supply			
FA	88.8	117.5	117.5
FB	62.1	63.1	99.2
FC	54.0	95.0	95.0
Supply Opening - Furnace - 225 In (180 Out)			
FU (End/Top)	23.2	23.2	N/A
FV (End/Top)	24.3	24.3	
FU (Bottom)	22.8	22.8	N/A
FV (Bottom)	23.7	23.7	
G - End Supply - Furnace			
FW	14.9	35.2	N/A
FZ	18.2	20.2	
FAA	2.0	2.0	
D - Top Supply - Furnace			
FX	5.6	13.8	N/A
FY	15.3	35.2	
FAA	2.0	2.0	
J - Bottom Supply - Furnace			
FX	5.6	13.7	N/A
FY	15.3	35.5	
FAA	Flush with bottom	Flush with bottom	
Supply Opening - Furnace - 250 In (200 Out) & 300 In (240 Out)			
FU (End/Top)	23.2	27.4	N/A
FV (End/Top)	27.4	23.2	
FU (Bottom)	22.8	26.8	N/A
FV (Bottom)	26.8	22.8	
G - End Supply - Furnace			
FW	13.4	33.7	N/A
FZ	18.2	20.2	
FAA	2.0	2.0	
D - Top Supply - Furnace			
FX	5.6	13.8	N/A
FY	13.7	33.7	
FAA	2.0	2.0	
J - Bottom Supply - Furnace			
FX	5.6	13.7	N/A
FY	13.7	34.0	
FAA	Flush with bottom	Flush with bottom	

Note: Openings on top of unit are for indoor installations only.

Table 26. PoolPak Unit Dimensions - Cabinet Furnace Combinations (1 of 4)

Cabinet Furnace Combinations			
	Cabinet Size		
	A	B	C
Unit Range	60-100	100-190	140-300
Dimension			
Supply Opening - Furnace - 350 In (280 Out) & 400 In (320 Out)			
FU (End/Top)	23.2	23.2	N/A
FV (End/Top)	38.9	38.9	
FU (Bottom)	22.8	22.8	N/A
FV (Bottom)	38.2	38.2	
G - End Supply - Furnace			
FW	7.6	27.9	N/A
FZ	18.2	20.2	
FAA	2.0	2.0	
D - Top Supply - Furnace			
FX	5.6	13.8	N/A
FY	8.0	27.9	
FAA	2.0	2.0	
J - Bottom Supply - Furnace			
FX	5.6	13.7	N/A
FY	8.0	28.2	
FAA	Flush with bottom	Flush with bottom	
Supply Opening - Furnace - 450 In (360 Out)			
FU (End/Top)	N/A	23.2	N/A
FV (End/Top)		49.4	
FU (Bottom)	N/A	22.6	N/A
FV (Bottom)		48.9	
G - End Supply - Furnace			
FW	N/A	22.6	N/A
FZ		19.9	
FAA		2.0	
D - Top Supply - Furnace			
FX	N/A	13.8	N/A
FY		22.6	
FAA		2.0	
J - Bottom Supply - Furnace			
FX	N/A	13.7	N/A
FY		22.8	
FAA		Flush with bottom	

Note: Openings on top of unit are for indoor installations only.

Table 26. PoolPak Unit Dimensions - Cabinet Furnace Combinations (2 of 4)

Cabinet Furnace Combinations			
	Cabinet Size		
	A	B	C
Unit Range	60-100	100-190	140-300
Dimension			
Supply Opening - Furnace - 500 In (400 Out) & 600 In (480 Out)			
FU (End/Top)	N/A	23.2	23.2
FV (End/Top)		55.5	55.5
FU (Bottom)	N/A	22.6	23.2
FV (Bottom)		55.0	55.5
G - End Supply - Furnace			
FW	N/A	19.6	19.8
FZ		19.9	19.8
FAA		2.0	2.0
D - Top Supply - Furnace			
FX	N/A	7.0	13.6
FY		19.6	19.8
FAA		2.0	2.0
J - Bottom Supply - Furnace			
FX	N/A	13.6	13.6
FY		19.8	19.8
FAA		Flush with bottom	Flush with bottom
Supply Opening - Furnace - 700 In (560 Out) & 800 In (640 Out)			
FU (End/Top)	N/A	23.2	23.2
FV (End/Top)		78.5	78.5
FU (Bottom)	N/A	23.2	23.2
FV (Bottom)		78.5	78.5
G - End Supply - Furnace			
FW	N/A	8.0	8.0
FZ		19.9	19.9
FAA		2.0	2.0
D - Top Supply - Furnace			
FX	N/A	13.8	13.8
FY		8.0	8.0
FAA		2.0	2.0
J - Bottom Supply - Furnace			
FX	N/A	13.8	13.8
FY		8.0	8.0
FAA		Flush with bottom	Flush with bottom

Note: Openings on top of unit are for indoor installations only.

Table 26. PoolPak Unit Dimensions - Cabinet Furnace Combinations (3 of 4)

Cabinet Furnace Combinations			
	Cabinet Size		
	A	B	C
Unit Range	60-100	100-190	140-300
Dimension			
End Supply Opening - Furnace - 1060 In (850 Out)			
FU	N/A	50.0	
FV		77.2	
G - End Supply - Furnace			
FW	N/A	12.1	
FZ		9.7	
FAA		2.0	
Top/Bottom Supply Opening - Furnace - 1060 In (850 Out)			
FU	N/A	28.0	
FV		67.0	
D - Top Supply - Furnace			
FX	N/A	4.5	
FY		9.8	
FAA		2.0	
J - Bottom Supply - Furnace			
FX	N/A	4.5	
FY		9.8	
FAA		Flush with Bottom	
End Supply Opening - Furnace - 1250 In (1000 Out)			
FU	N/A	50.0	
FV		77.2	
G - End Supply - Furnace			
FW	N/A	12.1	
FZ		9.7	
FAA		2.0	
Top/Bottom Supply Opening - Furnace - 1250 In (1000 Out)			
FU	N/A	28.0	
FV		67.0	
D - Top Supply - Furnace			
FX	N/A	4.5	
FY		9.8	
FAA		2.0	
J - Bottom Supply - Furnace			
FX	N/A	4.5	
FY		9.8	
FAA		Flush with Bottom	
Supply Opening - Furnace - 1560 In (1250 Out)			
FU	N/A	Contact Factory	
FV			
G - End Supply - Furnace			
FW	N/A	Contact Factory	
FZ			
FAA			
D - Top Supply - Furnace			
FX	N/A	Contact Factory	
FY			
FAA			
J - Bottom Supply - Furnace			
FX	N/A	Contact Factory	
FY			
FAA			

Note: Openings on top of unit are for indoor installations only.

Table 26. PoolPak Unit Dimensions - Cabinet Furnace Combinations (4 of 4)

OPTIONAL PIGGYBACK AIR-COOLED CONDENSER CONFIGURATION

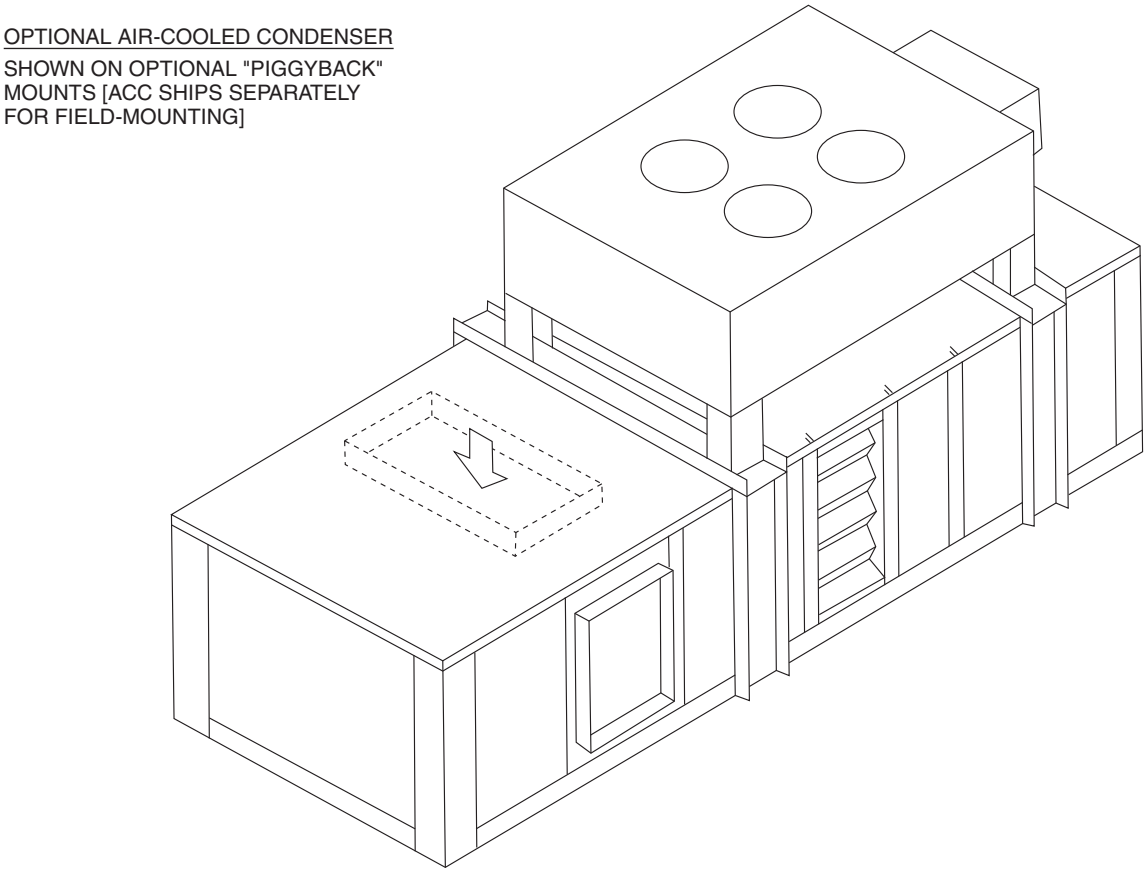


Figure 13. Optional Piggyback Air-Cooled Condenser Layout

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CURB MOUNTING

Illustrated in Figure 14 is a curb that has been designed specifically for the PoolPak product line. Refer to Table 27 for roof curb dimensions. The outside dimensions of the curb are such that the base of the PoolPak extends over the edge of the curb on each side. This aids in preventing rain water, running down the sides of the unit, from getting between the base of the PoolPak and the curb. The curb also features a waterproof capped area under the PoolPak's compressor compartment with provisions for running the pool water lines through the cap.

It is the installing contractor's responsibility to properly complete the following:

- Flash the curb into the roof
- Insulate the curb
- Connect the supply and return duct to the PoolPak
- Connect condensate drain lines with appropriate traps
- Seal the curb's top surface to the bottom of the PoolPak with supplied gasket
- Seal the pool water pipes where they go through the curb cap under the compressor compartment

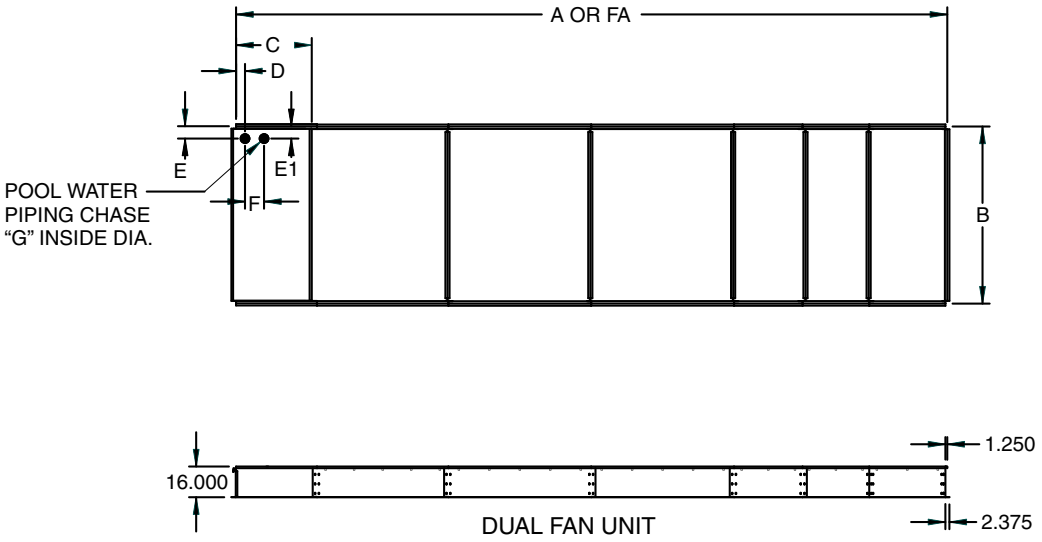
If specified when ordering, all water piping connections can be made through the curb. These water connectionsinclude: pool water, condensate, auxiliary hot water coil, chilled water coil, domestic hot water, and whirlpool water.

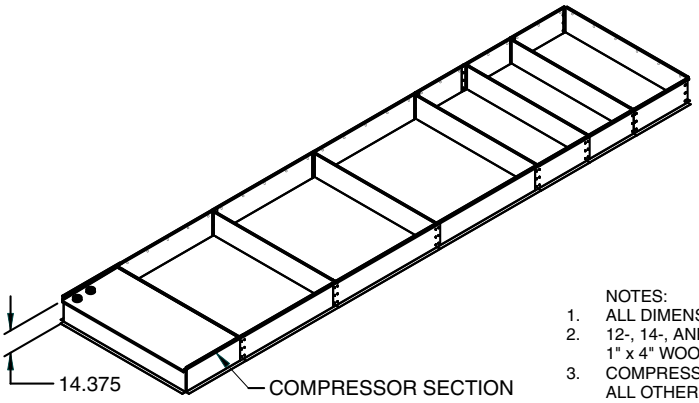
If the PoolPak is to be mounted on another manufacturer's curb, the PoolPak factory must be notified of this fact at the time the PoolPak sales order is submitted. PoolPaks produced for curb mounting, whether on a PoolPak curb or on another manufacturer's curb, receive special weatherizing and insulating that non-curb mounted PoolPaks do not receive.

NOTE

If the factory is not notified that a PoolPak is to be curb mounted, the PoolPak base will not be watertight, it will leak, and it will not be properly insulated.

If a non-PoolPak curb is used, note that the weather seal at the compressor end is under the bulkhead between the compressor and return air compartments. The pan under the compressor compartment isolates the area under the curb from the compressor compartment and from possible pool water or oil leaks as well as from the ambient conditions present in the compressor compartment.





NOTES:
1. ALL DIMENSIONS ARE IN INCHES.
2. 12-, 14-, AND 16-GAUGE GALVANIZED STEEL CONSTRUCTION, 1" x 4" WOOD NAILER, 1/4" x 1" GASKETING.
3. COMPRESSOR COMPARTMENT SECTION SHIPPED ASSEMBLED. ALL OTHER CURB PARTS SHIPPED KNOCKED DOWN.
4. CONTRACTOR MUST PROVIDE A SEAL BETWEEN CURB PIPE AND POOL WATER PIPE.
5. UNIT OVERHANGS CURB BY 3/4" ON ALL SIDES.
6. CURB MOUNTED UNITS WITH OPTIONAL COOLING TOWER OR CHILLED WATER AIR CONDITIONING CONDENSER; CONTACT THE FACTORY FOR CURB DRAWING.

Dimensions are illustrative only. Contact the factory for your specific requirements.

Figure 14. PoolPak Curb Assembly

Cabinet	Curb Dimensions								FA	FA
Size	A	B	C	D	E	E1	F	G	H or S	T/B Supply
A	187.8	53.0	36.2	16.2	3.9	6.9	16.1	4.0	241.8	276.4
B	247.5	93.5	39.8	4.7	6.5	6.5	10.0	4.0	325.5	364.5
C	294.5	93.5	39.8	4.7	6.5	6.5	10.0	4.0	372.5	412.9

Table 27. Roof Curb Dimensions

WEIGHT DISTRIBUTION

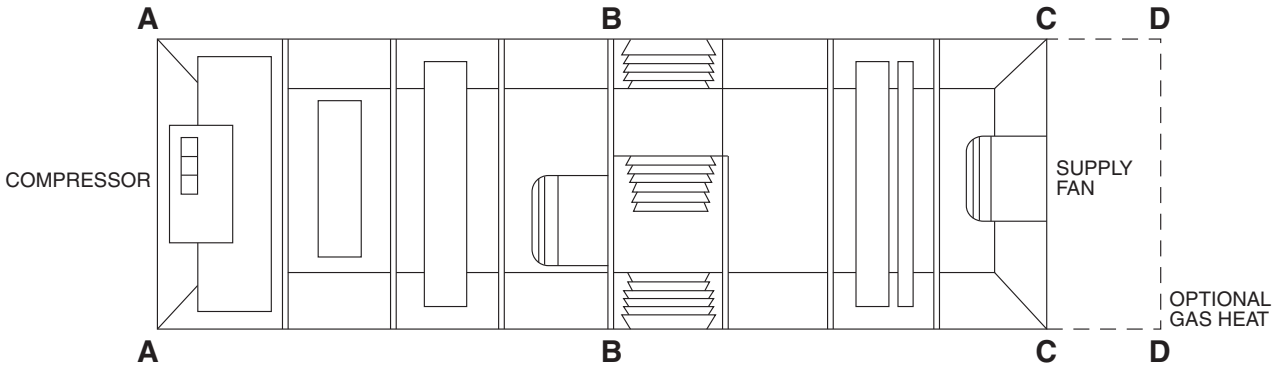


Figure 15. Distribution of Operating Weight for PoolPak Models

PoolPak Model	Cabinet Size	PoolPak Weight Distribution (lb)							Total Operating Weight (lb)		
		Without Furnace			With Furnace				HW, STM, Electric, or No Aux. Heat	Gas End SA	Gas, Up or Down SA
		A	B	C	A	B	C	D			
060	A	480	1440	480	290	1440	720	430	4800	5600	5750
080	A	490	1470	490	290	1460	730	440	4900	5700	5850
100	A	510	1530	510	300	1510	760	450	5100	5900	6050
100, 120	B	820	2460	820	470	2350	1180	710	8200	9200	9400
140	B	840	2520	840	480	2400	1200	720	8400	9400	9600
140	B	890	2620	890	530	2500	1250	720	8600	9600	9800
190	B	890	2670	890	510	2530	1260	760	8900	9900	10,100
190	B	940	2770	940	560	2630	1310	760	9100	10,100	10,300
140, 190, 220	C	1200	3600	1200	680	3380	1690	1010	12,000	13,200	13,500
140, 190, 220	C	1245	3690	1245	725	3470	1735	1010	12,180	13,380	13,680
260	C	1250	3750	1250	700	3500	1750	1050	12,500	13,700	14,000
260	C	1295	3795	1295	745	3590	1795	1050	12,680	13,880	14,180
300	C	1400	4200	1400	780	3880	1940	1160	14,000	15,200	15,500
300	C	1445	4290	1445	825	3970	1985	1160	14,180	15,380	15,680

Table 28. PoolPak Weight Information

PoolPak Model	Cabinet Size	Dimension from:			
		A-B	B-C	C-D[1]	C-D[2]
060-100	A-A	101.3	88.0	54.2	88.8
100-190	B-B	137.9	111.5	82.4	117.5
140-300	C-C	153.7	142.5	82.4	117.5

[1] For end supply furnaces

[2] For top/bottom supply furnaces

Table 29. PoolPak Weight Distribution Dimensions

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AIR CONDITIONING CONDENSER SELECTION GUIDE

NON-POOLPAK-PROVIDED AIR-COOLED CONDENSER SELECTION PROCEDURE

The procedure for selecting an optional remote air-cooled condenser is:

1. Find the PoolPak's total heat rejection capacity from Table 30.

   EXAMPLE (for SWHP 140):
   Heat Rejection Capacity = 505,000 Btu/hr

2. Determine the difference between 120°F (the PoolPak design condensing temperature) and the design outdoor dry bulb temperature.

3. For the given Heat Rejection Capacity and temperature difference (from step 2), select the proper sized condenser using R-22 refrigerant.

4. It is permissible to select a condenser with the proper capacity at the nominal temperature difference + 3°F. Choose the closest one.

5. The field wiring diagram (Figure 28) requires an auxiliary transformer (115 VAC/20 VA), connected to the "Power in" at the air-cooled condenser, for proof of operation readiness.

6. Choose a condenser with fan-cycling head pressure controls set to maintain a minimum condensing temperature of 90°F.

If there are questions, consult the factory.

PoolPak Model	Remote ACC Heat Rejection[1]
SWHP 060	238,000
SWHP 080	272,000
SWHP 100	346,000
SWHP 120	425,000
SWHP 140	505,000
SWHP 190	600,000
SWHP 220	352,000/352,000[2]
SWHP 260	425,000/425,000[2]
SWHP 300	505,000/505,000[2]

[1]Heat rejection at 120°F condensing temperature (Btu/hr).

[2]Two circuit air-cooled condenser, one for each compressor manifold, required for these units.

Table 30. Heat Rejection Data

POOLPAK-PROVIDED AIR-COOLED CONDENSER SELECTION AND ELECTRICAL INFORMATION

See Table 31and 32 for selection of PoolPak Air-Cooled Condenser for each PoolPak model as a function of ambient temperature and electrical data.

PoolPak Model (R 22)	Ambient Air (°F)	ACC Selection	Arrangement: # rows X # Fans	Voltage & Phase	No. of Circuits	Gas	Liquid	charge Lbs./ circuit	Weight Lbs.	FLA	MCA	MOP	Remote ACC Heat Rejection[1]
60	95/ 100º	ACC0271	1 x 2	208/230-3-60	1	1-5/8	1-1/8	10	580	14.0	20.0	35.0	220
				460-3-60						7.0	15.0	15.0	
				575-3-60						5.6	15.0	15.0	
				380-3-50						5.8	15.0	15.0	
	105º	ACC0331	1 x 2	208/230-3-60	1	1-5/8	1-1/8	15	630	14.0	20.0	35.0	
				460-3-60						7.0	15.0	15.0	
				575-3-60						5.6	15.0	15.0	
				380-3-50						5.8	15.0	15.0	
	110º	ACC0451	1 x 2	208/230-3-60	1	2-1/8	1-3/8	29	690	14.0	20.0	35.0	
				460-3-60						7.0	15.0	15.0	
				575-3-60						5.6	15.0	15.0	
				380-3-50						5.8	15.0	15.0	
	115º	ACC0621	1 x 3	208/230-3-60	1	2-1/8	1-3/8	30	1010	21.0	22.8	40.0	
				460-3-60						10.5	15.0	20.0	
				575-3-60						8.4	15.0	15.0	
				380-3-50						8.8	15.0	20.0	
80	95/ 100º	ACC0271	1 x 2	208/230-3-60	1	1-5/8	1-1/8	10	580	14.0	20.0	35.0	270
				460-3-60						7.0	15.0	15.0	
				575-3-60						5.6	15.0	15.0	
		ACC0331	1 x 2	380-3-50	1	1-5/8	1-1/8	15	630	5.8	15.0	15.0	
	105º	ACC0331	1 x 2	208/230-3-60	1	1-5/8	1-1/8	15	630	14.0	20.0	35.0	
				460-3-60						7.0	15.0	15.0	
				575-3-60						5.6	15.0	15.0	
		ACC0431	1 x 2	380-3-50	1	2-1/8	1-3/8	29	680	5.8	15.0	15.0	
	110º	ACC0521	1 x 3	208/230-3-60	1	2-1/8	1-3/8	22	930	21.0	22.8	40.0	
				460-3-60						10.5	15.0	20.0	
				575-3-60						8.4	15.0	15.0	
				380-3-50						8.8	15.0	20.0	
	115º	ACC0771	2 x 2	208/230-3-60	1	2-1/8	1-3/8	29	1390	28.0	29.8	45.0	
				460-3-60						14.0	15.0	20.0	
				575-3-60						11.2	15.0	15.0	
				380-3-50						11.7	15.0	20.0	
100	95/ 100º	ACC0361	1 x 2	208/230-3-60	1	1-5/8	1-1/8	15	630	14.0	20.0	35.0	345
				460-3-60						7.0	15.0	15.0	
				575-3-60						5.6	15.0	15.0	
		ACC0431	1 x 2	380-3-50	1	2-1/8	1-3/8	29	680	5.8	15.0	15.0	
	105º	ACC0431	1 x 2	208/230-3-60	1	2-1/8	1-3/8	29	680	14.0	20.0	35.0	
				460-3-60						7.0	15.0	15.0	
				575-3-60						5.6	15.0	15.0	
		ACC0491	1 x 3	380-3-50	1	2-1/8	1-3/8	22	930	8.8	15.0	20.0	
	110º	ACC0681	1 x 3	208/230-3-60	1	2-1/8	1-3/8	30	1010	21.0	22.8	40.0	
				460-3-60						10.5	15.0	20.0	
				575-3-60						8.4	15.0	15.0	
				380-3-50						8.8	15.0	20.0	
	115º	ACC0961	2 x 2	208/230-3-60	1	2-1/8	1-3/8	40	1490	28.0	29.8	45.0	
				460-3-60						14.0	15.0	20.0	
				575-3-60						11.2	15.0	15.0	
				380-3-50						11.7	15.0	20.0	

[1]Heat rejection at 120°F condensing temperature (MBtu/hr).

[2]Two circuit air-cooled condenser, one for each compressor manifold, required for these units

Table 31. SWHP SR Optional Air-Cooled Condenser Data for R-22 (continued on next page)

PoolPak Model (R 22)	Ambient Air (°F)	ACC Selection	Arrangement: # rows X # Fans	Voltage & Phase	No. of Circuits	Gas	Liquid	charge Lbs./ circuit	Weight Lbs.	FLA	MCA	MOP	Remote ACC Heat Rejection[1]
120	95/ 100°	ACC0431	1 x 2	208/230-3-60	1	2-1/8	1-3/8	29	680	14.0	20.0	35.0	425
				460-3-60						7.0	15.0	15.0	
				575-3-60						5.6	15.0	15.0	
		ACC0491	1 x 3	380-3-50	1	2-1/8	1-3/8	22	930	8.8	15.0	20.0	
	105°	ACC0551	1 x 3	208/230-3-60	1	2-1/8	1-3/8	22	930	21.0	22.8	40.0	
				460-3-60						10.5	15.0	20.0	
				575-3-60						8.4	15.0	15.0	
		ACC0591	1 x 3	380-3-50	1	2-1/8	1-3/8	30	1000	8.8	15.0	20.0	
	110°	ACC0771	2 x 2	208/230-3-60	1	2-1/8	1-3/8	29	1390	28.0	29.8	45.0	
				460-3-60						14.0	15.0	20.0	
				575-3-60						11.2	15.0	15.0	
				380-3-50						11.7	15.0	20.0	
	115°	ACC1161	2 x 3	208/230-3-60	1	2-1/8	1-3/8	44	2060	42.0	43.8	60.0	
				460-3-60						21.0	21.9	30.0	
				575-3-60						16.8	20.0	25.0	
				380-3-50						17.5	21.9	30.0	
140	95/ 100°	ACC0491	1 x 3	208/230-3-60	1	2-1/8	1-3/8	22	930	21.0	22.8	40.0	500
				460-3-60						10.5	15.0	20.0	
				575-3-60						8.4	15.0	15.0	
		ACC0591	1 x 3	380-3-50	1	2-1/8	1-3/8	30	1000	8.8	15.0	20.0	
	105°	ACC0661	2 x 2	208/230-3-60	1	2-1/8	1-3/8	29	1340	28.0	29.8	45.0	
				460-3-60						14.0	15.0	20.0	
				575-3-60						11.2	15.0	15.0	
				380-3-50						11.7	15.0	20.0	
	110°	ACC0921	2 x 2	208/230-3-60	1	2-1/8	1-3/8	40	1490	28.0	29.8	45.0	
				460-3-60						14.0	15.0	20.0	
				575-3-60						11.2	15.0	15.0	
				380-3-50						11.7	15.0	20.0	
	115°	ACC1371	2 x 3	208/230-3-60	1	2-1/8	1-3/8	58	2210	42.0	43.8	60.0	
				460-3-60						21.0	21.9	30.0	
				575-3-60						16.8	20.0	25.0	
				380-3-50						17.5	21.9	30.0	
190	95/ 100°	ACC0591	1 x 3	208/230-3-60	1	2-1/8	1-3/8	30	1000	21.0	22.8	40.0	600
				460-3-60						10.5	15.0	20.0	
				575-3-60						8.4	15.0	15.0	
		ACC0661	2 x 2	380-3-50	1	2-1/8	1-3/8	29	1340	11.7	15.0	20.0	
	105°	ACC0731	2 x 2	208/230-3-60	1	2-1/8	1-3/8	29	1340	28.0	29.8	45.0	
				460-3-60						14.0	15.0	20.0	
				575-3-60						11.2	15.0	15.0	
		ACC0861	2 x 2	380-3-50	1	2-1/8	1-3/8	40	1440	11.7	15.0	20.0	
	110°	ACC1161	2 x 3	208/230-3-60	1	2-1/8	1-3/8	44	2060	42.0	43.8	60.0	
				460-3-60						21.0	21.9	30.0	
				575-3-60						16.8	20.0	25.0	
				380-3-50						17.5	21.9	30.0	
	115°	ACC1811	2 x 4	208/230-3-60	1	2-1/8	1-3/8	140	2930	56.0	57.8	70.0	
				460-3-60						28.0	28.9	35.0	
				575-3-60						22.4	23.1	30.0	
				380-3-50						23.3	28.9	35.0	

[1]Heat rejection at 120°F condensing temperature (MBtu/hr).
[2]Two circuit air-cooled condenser, one for each compressor manifold, required for these units

Table 31. SWHP SR Optional Air-Cooled Condenser Data for R-22 (continued on next page)

PoolPak Model (R 22)	Ambient Air (ºF)	ACC Selection	Arrangement: # rows X # Fans	Voltage & Phase	No. of Circuits	Gas	Liquid	charge Lbs./ circuit	Weight Lbs.	FLA	MCA	MOP	Remote ACC Heat Rejection[1]
220	95/100º	ACC0732	2 x 2	208/230-3-60	2	2@ 1-5/8	2@ 1-1/8	14.5/ 14.5	1340	28.0	29.8	45.0	350/ 350[2]
				460-3-60						14.0	15.0	20.0	
				575-3-60						11.2	15.0	15.0	
		ACC0862	2 x 2	380-3-50	2	2@2-1/8	2@1-3/8	20/20	1440	11.7	15.0	20.0	
	105º	ACC0992	2 x 3	208/230-3-60	2	2@ 2-1/8	2@ 1-3/8	22/22	1990	42.0	43.8	60.0	
				460-3-60						21.0	21.9	30.0	
				575-3-60						16.8	20.0	25.0	
		ACC1092	2 x 3	380-3-50	2	2@2-1/8	2@1-3/8	22/22	1990	17.5	21.9	30.0	
	110º	ACC1372	2 x 3	208/230-3-60	2	2@ 2-1/8	2@ 1-3/8	29/29	2210	42.0	43.8	60.0	
				460-3-60						21.0	21.9	30.0	
				575-3-60						16.8	20.0	25.0	
				380-3-50						17.5	21.9	30.0	
	115º	ACC1972	2 x 5	208/230-3-60	2	2@ 2-1/8	2@ 1-3/8	63/63	3410	70.0	71.8	90.0	
				460-3-60						35.0	35.9	45.0	
				575-3-60						28.0	28.7	35.0	
				380-3-50						29.2	35.9	45.0	
260	95/100º	ACC0862	2 x 2	208/230-3-60	2	2@2-1/8	2@1-3/8	20/20	1440	28.0	29.8	45.0	425/ 425[2]
				460-3-60						14.0	15.0	20.0	
				575-3-60						11.2	15.0	15.0	
		ACC0992	2 x 3	380-3-50	2	2@2-1/8	2@1-3/8	22/22	1990	17.5	21.9	30.0	
	105º	ACC1092	2 x 3	208/230-3-60	2	2@2-1/8	2@1-3/8	22/22	1990	42.0	43.8	60.0	
				460-3-60						21.0	21.9	30.0	
				575-3-60						16.8	20.0	25.0	
		ACC1292	2 x 3	380-3-50	2	2@2-1/8	2@1-3/8	29/29	2140	17.5	21.9	30.0	
	110º	ACC1652	2 x 4	208/230-3-60	2	2@ 2-1/8	2@ 1-3/8	52/52	2730	56.0	57.8	70.0	
				460-3-60						28.0	28.9	35.0	
				575-3-60						22.4	23.1	30.0	
				380-3-50						23.3	28.9	35.0	
	115º	ACC2442	2 x 5	208/230-3-60	2	2@ 2-1/8	2@ 1-3/8	86/86	3660	70.0	71.8	90.0	
				460-3-60						35.0	35.9	45.0	
				575-3-60						28.0	28.7	35.0	
				380-3-50						29.2	35.9	45.0	
300	95/100º	ACC0992	2 x 3	208/230-3-60	2	2@ 2 1/8	2@ 1-3/8	22/22	1990	42.0	43.8	60.0	500/ 500[2]
				460-3-60						21.0	21.9	30.0	
				575-3-60						16.8	20.0	25.0	
		ACC1182	2 x 3	380-3-50	2	2@ 2-1/8	2@ 1-3/8	29/29	2140	17.5	21.9	30.0	
	105º	ACC1292	2 x 3	208/230-3-60	2	2@ 2-1/8	2@ 1-3/8	29/29	2140	42.0	43.8	60.0	
				460-3-60						21.0	21.9	30.0	
				575-3-60						16.8	20.0	25.0	
		ACC1462	2 x 4	380-3-50	2	2@ 2-1/8	2@ 1-3/8	52/52	2630	23.3	28.9	35.0	
	110º	ACC1922	2 x 4	208/230-3-60	2	2@ 2-1/8	2@ 1-3/8	70/70	2930	56.0	57.8	70.0	
				460-3-60						28.0	28.9	35.0	
				575-3-60						22.4	23.1	30.0	
				380-3-50						23.3	28.9	35.0	
	115º	ACC2932	2 x 6	208/230-3-60	2	2@ 2-1/8	2@ 1-3/8	102/ 102	4370	84.0	85.8	100.0	
				460-3-60						42.0	42.9	50.0	
				575-3-60						33.6	34.3	40.0	
				380-3-50						35.0	42.9	50.0	

[1]Heat rejection at 120°F condensing temperature (MBtu/hr).

[2]Two circuit air-cooled condenser, one for each compressor manifold, required for these units

Table 31. SWHP SR Optional Air-Cooled Condenser Data for R-22

PoolPak Model (R 407C)	Ambient Air (°F)	ACC Selection	Arrangement: # rows X # Fans	Voltage & Phase	No. of Circuits	Gas	Liquid	charge Lbs./ circuit	Weight Lbs.	FLA	MCA	MOP	Remote ACC Heat Rejection[1]
60	95/100°	ACC0271	1 x 2	208/230-3-60	1	1-5/8	1-1/8	10	580	14.0	20.0	35.0	220
				460-3-60						7.0	15.0	15.0	
				575-3-60						5.6	15.0	15.0	
				380-3-50						5.8	15.0	15.0	
	105°	ACC0331	1 x 2	208/230-3-60	1	1-5/8	1-1/8	15	630	14.0	20.0	35.0	
				460-3-60						7.0	15.0	15.0	
				575-3-60						5.6	15.0	15.0	
				380-3-50						5.8	15.0	15.0	
	110°	ACC0451	1 x 2	208/230-3-60	1	2-1/8	1-3/8	29	690	14.0	20.0	35.0	
				460-3-60						7.0	15.0	15.0	
				575-3-60						5.6	15.0	15.0	
				380-3-50						5.8	15.0	15.0	
	115°	ACC0621	1 x 3	208/230-3-60	1	2-1/8	1-3/8	30	1010	21.0	22.8	40.0	
				460-3-60						10.5	15.0	20.0	
				575-3-60						8.4	15.0	15.0	
				380-3-50						8.8	15.0	20.0	
80	95/100°	ACC0331	1 x 2	208/230-3-60	1	1-5/8	1-1/8	15	630	14.0	20.0	35.0	270
				460-3-60						7.0	15.0	15.0	
				575-3-60						5.6	15.0	15.0	
		ACC0361	1 x 2	380-3-50	1	1-5/8	1-1/8	15	630	5.8	15.0	15.0	
	105°	ACC0431	1 x 2	208/230-3-60	1	2-1/8	1-3/8	29	680	14.0	20.0	35.0	
				460-3-60						7.0	15.0	15.0	
				575-3-60						5.6	15.0	15.0	
				380-3-50						5.8	15.0	15.0	
	110°	ACC0521	1 x 3	208/230-3-60	1	2-1/8	1-3/8	22	930	21.0	22.8	40.0	
				460-3-60						10.5	15.0	20.0	
				575-3-60						8.4	15.0	15.0	
				380-3-50						8.8	15.0	20.0	
	115°	ACC0831	2 x 2 2 x 2	208/230-3-60	1	2-1/8	1-3/8	29	1390	28.0	29.8	45.0	
				460-3-60						14.0	15.0	20.0	
				575-3-60						11.2	15.0	15.0	
				380-3-50						11.7	15.0	20.0	
100	95/100°	ACC0431	1 x 2	208/230-3-60	1	2-1/8	1-3/8	29	680	14.0	20.0	35.0	345
				460-3-60						7.0	15.0	15.0	
				575-3-60						5.6	15.0	15.0	
				380-3-50						5.8	15.0	15.0	
	105°	ACC0491	1 x 3	208/230-3-60	1	2-1/8	1-3/8	22	930	14.0	20.0	35.0	
				460-3-60						7.0	15.0	15.0	
				575-3-60						5.6	15.0	15.0	
		ACC0551	1 x 3	380-3-50	1	2-1/8	1-3/8	22	930	8.8	15.0	20.0	
	110°	ACC0681	1 x 3	208/230-3-60	1	2-1/8	1-3/8	30	1010	21.0	22.8	40.0	
				460-3-60						10.5	15.0	20.0	
				575-3-60						8.4	15.0	15.0	
				380-3-50						8.8	15.0	20.0	
	115°	ACC0961	2 x 2	208/230-3-60	1	2-1/8	1-3/8	40	1490	28.0	29.8	45.0	
				460-3-60						14.0	15.0	20.0	
				575-3-60						11.2	15.0	15.0	
				380-3-50						11.7	15.0	20.0	

[1]Heat rejection at 120°F condensing temperature (MBtu/hr).
[2]Two circuit air-cooled condenser, one for each compressor manifold, required for these units

Table 32. SWHP SR Optional Air-Cooled Condenser Data for R-407c (continued on next page)

PoolPak Model (R 407C)	Ambient Air (°F)	ACC Selection	Arrangement: # rows X # Fans	Voltage & Phase	No. of Circuits	Gas	Liquid	charge Lbs./ circuit	Weight Lbs.	FLA	MCA	MOP	Remote ACC Heat Rejection[1]
120	95/100°	ACC0491	1 x 3	208/230-3-60	1	2-1/8	1-3/8	22	930	14.0	20.0	35.0	425
				460-3-60						7.0	15.0	15.0	
				575-3-60						5.6	15.0	15.0	
		ACC0551	1 x 3	380-3-50	1	2-1/8	1-3/8	22	930	8.8	15.0	20.0	
	105°	ACC0591	1 x 3	208/230-3-60	1	2-1/8	1-3/8	30	1000	21.0	22.8	40.0	
				460-3-60						10.5	15.0	20.0	
				575-3-60						8.4	15.0	15.0	
		ACC0641	1 x 3	380-3-50	1	2-1/8	1-3/8	30	1000	8.8	15.0	20.0	
	110°	ACC0771	2 x 2	208/230-3-60	1	2-1/8	1-3/8	29	1390	28.0	29.8	45.0	
				460-3-60						14.0	15.0	20.0	
				575-3-60						11.2	15.0	15.0	
				380-3-50						11.7	15.0	20.0	
	115°	ACC1161	2 x 3	208/230-3-60	1	2-1/8	1-3/8	44	2060	42.0	43.8	60.0	
				460-3-60						21.0	21.9	30.0	
				575-3-60						16.8	20.0	25.0	
				380-3-50						17.5	21.9	30.0	
140	95/100°	ACC0551	1 x 3	208/230-3-60	1	2-1/8	1-3/8	22	930	21.0	22.8	40.0	500
				460-3-60						10.5	15.0	20.0	
				575-3-60						8.4	15.0	15.0	
		ACC0591	1 x 3	380-3-50	1	2-1/8	1-3/8	30	1000	8.8	15.0	20.0	
	105°	ACC0731	2 x 2	208/230-3-60	1	2-1/8	1-3/8	29	1340	28.0	29.8	45.0	
				460-3-60						14.0	15.0	20.0	
				575-3-60						11.2	15.0	15.0	
		ACC0781	2 x 2	380-3-50	1	2-1/8	1-3/8	29	1340	11.7	15.0	20.0	
	110°	ACC0921	2 x 2	208/230-3-60	1	2-1/8	1-3/8	40	1490	28.0	29.8	45.0	
				460-3-60						14.0	15.0	20.0	
				575-3-60						11.2	15.0	15.0	
				380-3-50						11.7	15.0	20.0	
	115°	ACC1371	2 x 3	208/230-3-60	1	2-1/8	1-3/8	58	2210	42.0	43.8	60.0	
				460-3-60						21.0	21.9	30.0	
				575-3-60						16.8	20.0	25.0	
				380-3-50						17.5	21.9	30.0	
190	95/100°	ACC0641	1 x 3	208/230-3-60	1	2-1/8	1-3/8	30	1000	21.0	22.8	40.0	600
				460-3-60						10.5	15.0	20.0	
				575-3-60						8.4	15.0	15.0	
		ACC0731	2 X 2	380-3-50	1	2-1/8	1-3/8	29	1340	11.7	15.0	20.0	
	105°	ACC0861	2 x 2	208/230-3-60	1	2-1/8	1-3/8	40	1440	28.0	29.8	45.0	
				460-3-60						14.0	15.0	20.0	
				575-3-60						11.2	15.0	15.0	
				380-3-50						11.7	15.0	20.0	
	110°	ACC1161	2 x 3	208/230-3-60	1	2-1/8	1-3/8	44	2060	42.0	43.8	60.0	
				460-3-60						21.0	21.9	30.0	
				575-3-60						16.8	20.0	25.0	
				380-3-50						17.5	21.9	30.0	
	115°	ACC1811	2 x 4	208/230-3-60	1	2-1/8	1-3/8	140	2930	56.0	57.8	70.0	
				460-3-60						28.0	28.9	35.0	
				575-3-60						22.4	23.1	30.0	
				380-3-50						23.3	28.9	35.0	

[1]Heat rejection at 120°F condensing temperature (MBtu/hr).
[2]Two circuit air-cooled condenser, one for each compressor manifold, required for these units

Table 32. SWHP SR Optional Air-Cooled Condenser Data for R-407c (continued on next page)

PoolPak Model (R 407C)	Ambient Air (ºF)	ACC Selection	Arrangement: # rows X # Fans	Voltage & Phase	No. of Circuits	Gas	Liquid	charge Lbs./ circuit	Weight Lbs.	FLA	MCA	MOP	Remote ACC Heat Rejection[1]
220	95/100º	ACC0862	2 x 2	208/230-3-60	2	2@2-1/8	2@1-3/8	20/20	1440	28.0	29.8	45.0	350/ 350
				460-3-60						14.0	15.0	20.0	
				575-3-60						11.2	15.0	15.0	
				380-3-50						11.7	15.0	20.0	
	105º	ACC0992	2 x 3	208/230-3-60	2	2@ 2-1/8	2@ 1-3/8	22/22	1990	42.0	43.8	60.0	
				460-3-60						21.0	21.9	30.0	
				575-3-60						16.8	20.0	25.0	
		ACC1092	2 x 3	380-3-50	2	2@2-1/8	2@1-3/8	22/22	1990	17.5	21.9	30.0	
	110º	ACC1372	2 x 3	208/230-3-60	2	2@ 2-1/8	2@ 1-3/8	29/29	2210	42.0	43.8	60.0	
				460-3-60						21.0	21.9	30.0	
				575-3-60						16.8	20.0	25.0	
				380-3-50						17.5	21.9	30.0	
	115º	ACC1972	2 x 5	208/230-3-60	2	2@ 2-1/8	2@ 1-3/8	63/63	3410	70.0	71.8	90.0	
				460-3-60						35.0	35.9	45.0	
				575-3-60						28.0	28.7	35.0	
				380-3-50						29.2	35.9	45.0	
260	95/100º	ACC0992	2 x 3	208/230-3-60	2 2	2@2-1/8	2@1-3/8	22/22	1990	28.0	29.8	45.0	425/ 425
				460-3-60						14.0	15.0	20.0	
				575-3-60						11.2	15.0	15.0	
		ACC1092	2 x 3	380-3-50		2@2-1/8	2@1-3/8	22/22	1990	17.5	21.9	30.0	
	105º	ACC1182	2 x 3	208/230-3-60	2	2@2-1/8	2@1-3/8	29/29	2140	42.0	43.8	60.0	
				460-3-60						21.0	21.9	30.0	
				575-3-60						16.8	20.0	25.0	
		ACC1292	2 x 3	380-3-50	2	2@2-1/8	2@1-3/8	29/29	2140	17.5	21.9	30.0	
	110º	ACC1652	2 x 4	208/230-3-60	2	2@2-1/8	2@1-3/8	52/52	2730	56.0	57.8	70.0	
				460-3-60						28.0	28.9	35.0	
				575-3-60						22.4	23.1	30.0	
				380-3-50						23.3	28.9	35.0	
	115º	ACC2442	2 x 5	208/230-3-60	2	2@2-1/8	2@1-3/8	86/86	3660	70.0	71.8	90.0	
				460-3-60						35.0	35.9	45.0	
				575-3-60						28.0	28.7	35.0	
				380-3-50						29.2	35.9	45.0	
300	95/100º	ACC1182	2 x 3	208/230-3-60	2	2@ 2 1/8	2@ 1-3/8	29/29	2140	42.0	43.8	60.0	500/ 500
				460-3-60						21.0	21.9	30.0	
				575-3-60						16.8	20.0	25.0	
		ACC1292	2 x 3	380-3-50	2	2@2-1/8	2@1-3/8	29/29	2140	17.5	21.9	30.0	
	105º	ACC1462	2 x 4	208/230-3-60	2	2@ 2-1/8	2@ 1-3/8	52/52	2630	42.0	43.8	60.0	
				460-3-60						21.0	21.9	30.0	
				575-3-60						16.8	20.0	25.0	
		ACC1562	2 x 4	380-3-50	2	2@2-1/8	2@1-3/8	52/52	2630	23.3	28.9	35.0	
	110º	ACC1922	2 x 4	208/230-3-60	2	2@ 2-1/8	2@ 1-3/8	70/70	2930	56.0	57.8	70.0	
				460-3-60						28.0	28.9	35.0	
				575-3-60						22.4	23.1	30.0	
				380-3-50						23.3	28.9	35.0	
	115º	ACC2932	2 x 6	208/230-3-60	2	2@ 2-1/8	2@ 1-3/8	102/102	4370	84.0	85.8	100.0	
				460-3-60						42.0	42.9	50.0	
				575-3-60						33.6	34.3	40.0	
				380-3-50						35.0	42.9	50.0	

[1]Heat rejection at 120°F condensing temperature (MBtu/hr).
[2]Two circuit air-cooled condenser, one for each compressor manifold, required for these units

Table 32. SWHP SR Optional Air-Cooled Condenser Data for R-407c

POOLPAK-PROVIDED AIR-COOLED CONDENSER DIMENSIONS AND PERFORMANCE INFORMATION

Refer to Figures 16 and 17 for the dimensions of air-cooled condensers. Refer to Tables 31 and 32 for performance data, connection sizes, and fan configuration options for air-cooled condensers.

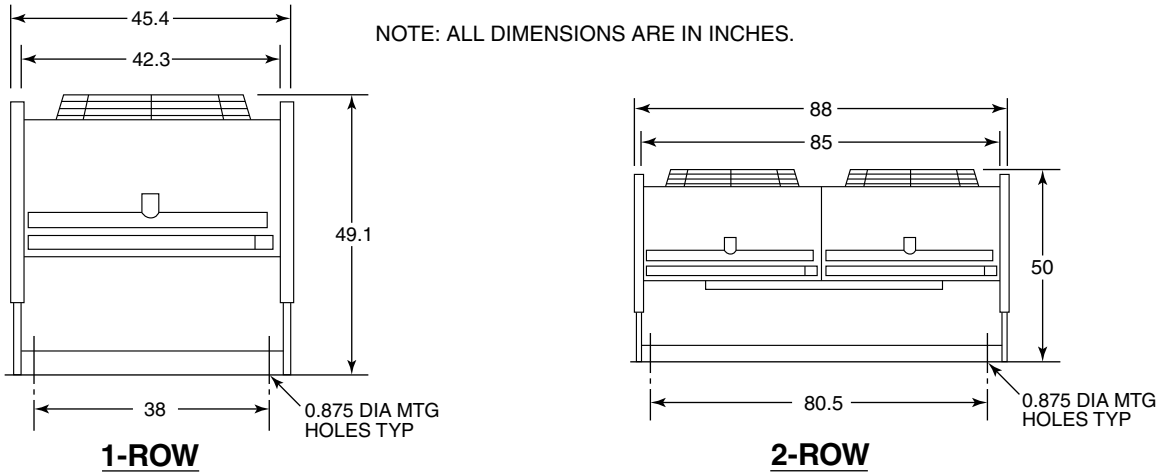


Figure 16. End Views of Air-Cooled Condensers

NOTE: ALL DIMENSIONS ARE IN INCHES.

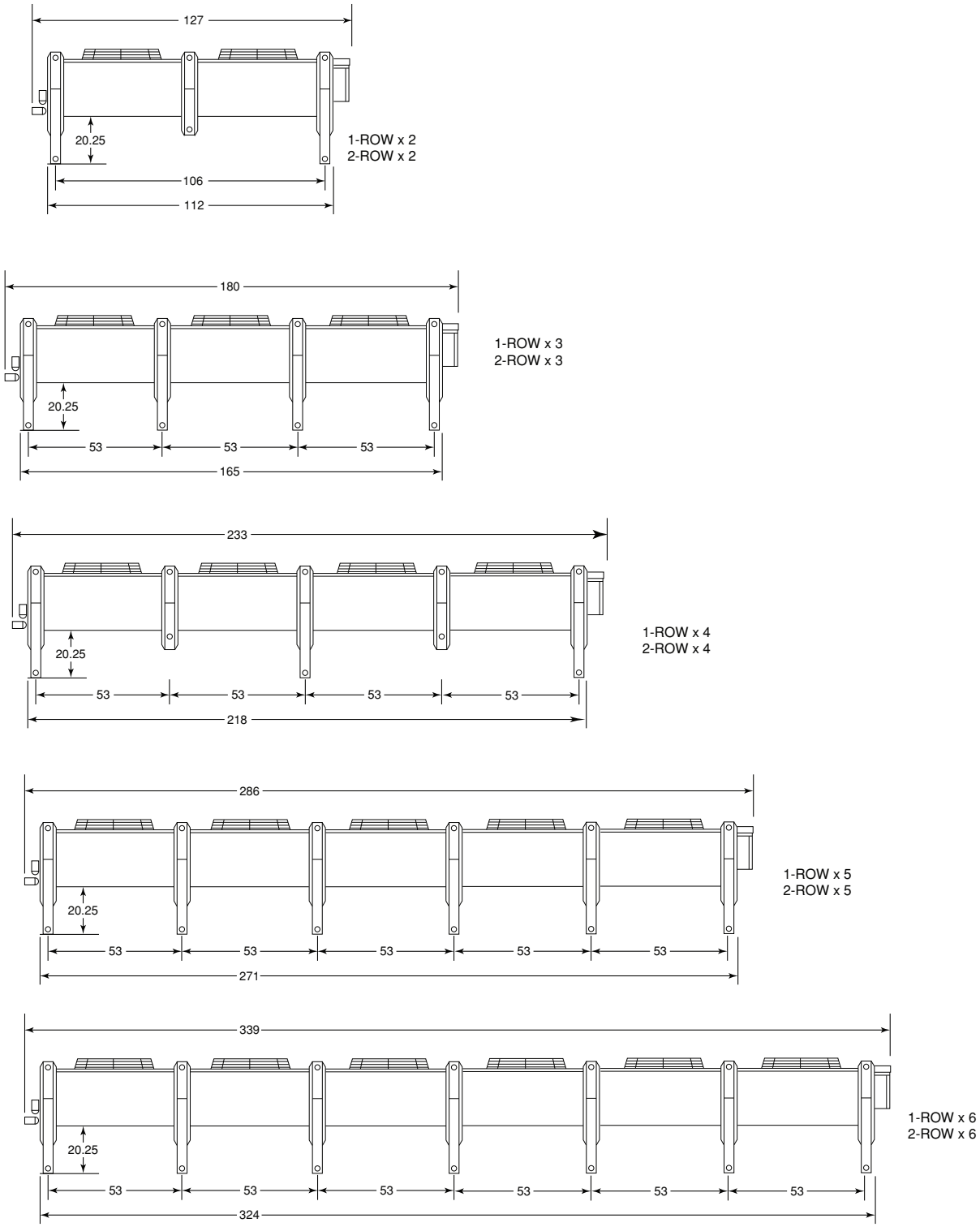


Figure 17. Side Views of Air-Cooled Condensers

REMOTE AIR-COOLED AND WATER-COOLED CONDENSER PIPING DIAGRAM

Refer to Figure 18 and to Table 33 for remote air-cooled and water-cooled condenser piping configuration and design requirements.

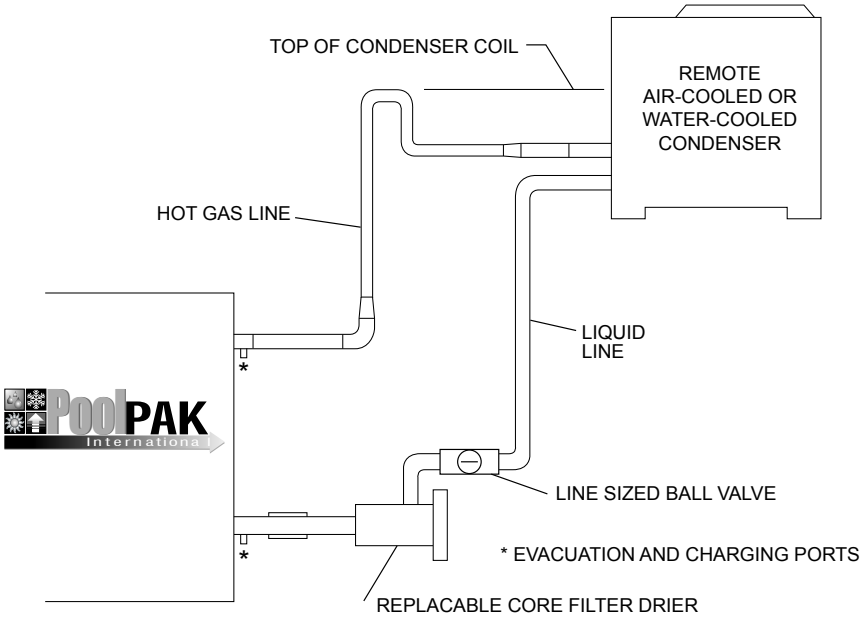


Figure 18. Remote Air-Cooled and Water-Cooled Condenser Refrigerant Piping Guideline

Remote Refrigerant Condensers Above or at PoolPak Unit Level*			
PoolPak Model	Hot Gas Lines		Liquid Lines
	Horizontal Run	Vertical Riser	
SWHP 060	1-3/8	1-3/8	7/8
SWHP 080	1-3/8	1-3/8	1-1/8
SWHP 100	1-5/8	1-5/8	1-1/8
SWHP 120	1-5/8	1-5/8	1-3/8
SWHP 140	2-1/8	1-5/8	1-3/8
SWHP 190	2-1/8	1-5/8	1-3/8
SWHP 220 †	1-5/8	1-5/8	1-1/8
	1-5/8	1-5/8	1-1/8
SWHP 260 †	1-5/8	1-5/8	1-3/8
	1-5/8	1-5/8	1-3/8
SWHP 300 †	2-1/8	1-5/8	1-3/8
	2-1/8	1-5/8	1-3/8

***Refrigerant condensers located below PoolPak unit level. Contact factory.**

†Models 220, 260, and 300 have two refrigeration circuits piped independently.

Notes:

1. Tables for equivalent length of 100 feet or less. Contact factory for longer lines.

2. Double riser not required for vertical hot gas lines.

3. All pipe diameters are nominal OD inch sizes. Use only certified refrigeration tubing.

4. For scroll compressors, add 4 ounces of Trane No. 00042 or 00045 refrigerant oil per 10 pounds of R-22 refrigerant added.

Table 33. Remote Air-Cooled Condenser Refrigerant Piping Guideline

WATER-COOLED CONDENSER SPECIFICATIONS

Cooling Tower Water Condensers

Refer to Figure 19 and Table 34 for performance data, sizes, and weights of cooling tower water condensers.

Chilled Water Condensers

Refer to Figure 19 and Table 34 for performance data, sizes, and weights of chilled water condensers.

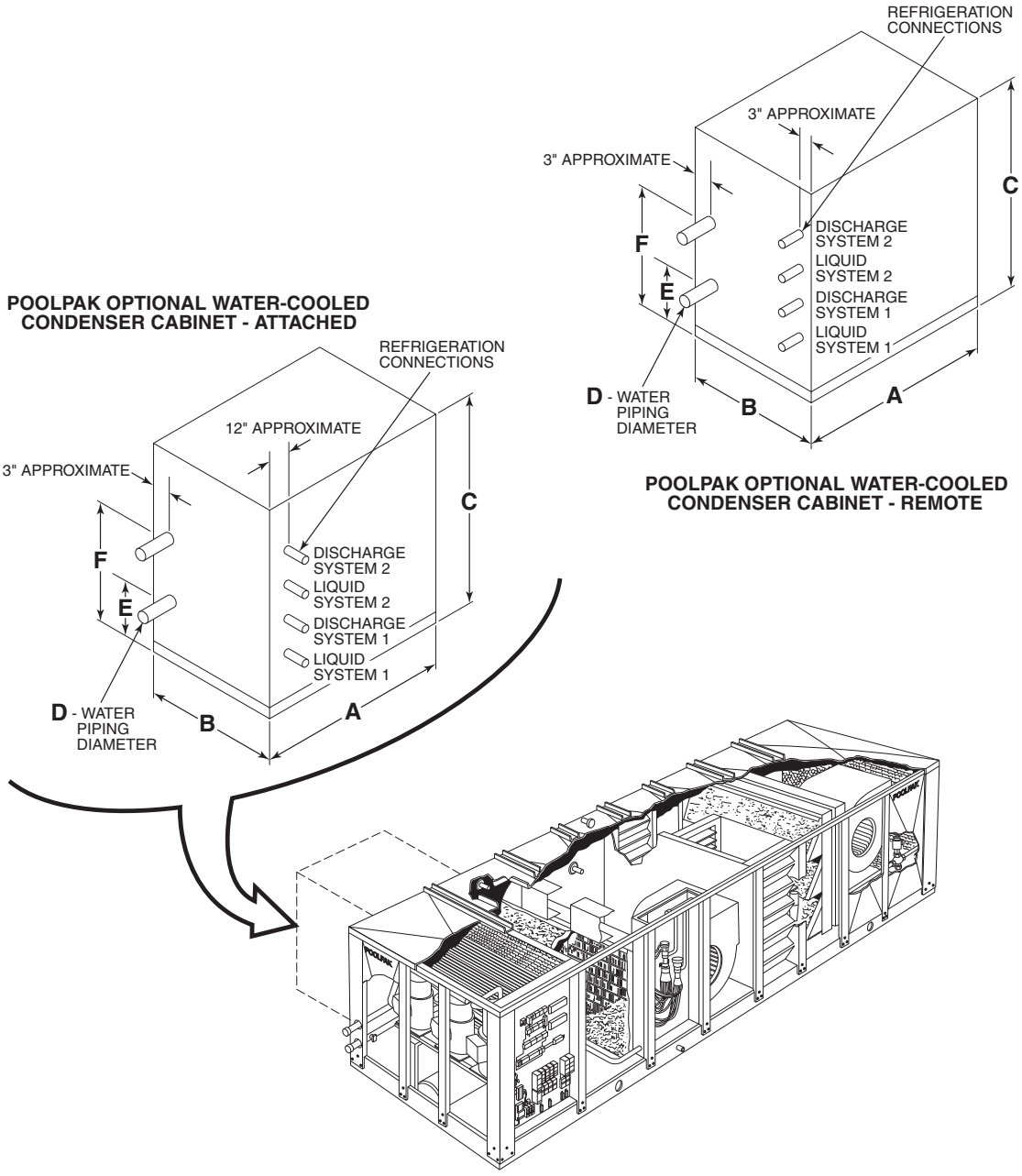


Figure 19. Water-Cooled Condenser

Cabinet	Location	Cooling Tower Cabinet Dimensions (Inches)						Weight (lb)
		A	B	C	D (dia*)	E (approx)	F (approx)	
A	Remote	72	44	36	2	8	30	950
B	Remote	79	44	63	2	15	55	1200
	Attached	79	44	63	2	15	55	1000
C	Remote	79	44	63	2 or 3	15	55	1500
	Attached	83.5	44	63	2 or 3	15	55	1300

* CPVC Nominal Size - diameter depends on refrigerant system size

Cabinet	Location	Chilled Cabinet Dimensions (Inches)						Weight (lb)
		A	B	C	D (dia**)	E (approx)	F (approx)	
A	Remote	79	44	63	1	15	55	950
B	Remote	79	44	63	1-1/2 or 2	15	55	1200
	Attached	40	36	63	1-1/2 or 2	15	55	1000
C	Remote	79	44	63	1-1/2 or 2 or 2-1/2	15	55	1500
	Attached	83.5	44	63	1-1/2 or 2 or 2-1/2	15	55	1300

** Male Pipe Thread - Copper

PoolPak Model	Water Piping		Refrigeration Connections			
			System 1*		System 2*	
	CPVC	MPT	Discharge	Liquid	Discharge	Liquid
060	2	1	1-1/8	1-1/8		
080	2	1	1-3/8	1-1/8		
100, 120	2	1-1/2	1-3/8	1-1/8		
140	2	1-1/2	1-5/8	1-3/8		
190	2	2	1-5/8	1-3/8		
220, 260	3	2	1-3/8	1-1/8	1-3/8	1-1/8
300	3	2-1/2	1-5/8	1-3/8	1-5/8	1-3/8

* OD Solder

PoolPak Model	Cooling Tower Water Condenser[1]		Chilled Water Condenser[2]		Remote ACC Heat Rejection[3]
	gpm	Water (Feet)[4]	gpm	Water (Feet)[5]	Mbtu/hr
060	35	30	25	13	220
080	35	27	25	11	270
100	40	20	30	10	345
120	50	28	40	15	425
140	60	34	50	20	500
190	70	39	60	26	600
220	80	22	70	16	350/350[6]
260	100	30	80	17	425/425[6]
300	120	36	100	21	500/500[6]

[1]Maximum 85°F EWT

[2]Maximum 55°F EWT

[3]Heat rejection at 120°F condensing temperature

[4]Cleanable, nonvented condenser

[5]Spiral, nonvented condenser

[6]Two circuit water-cooled condenser, one for each compressor manifold, required for these units

Table 34. Cooling Tower and Chilled Water Cabinet Data

REMOTE INTERFACE PANELS

SERVICE DISPLAY CONNECTION

For service convenience, there is an auxiliary RJ25 jack located on the upper left side of ECC III Controller #1. The remote display may be removed from its remote location and connected here using the special cable supplied with the control system.

REMOTE DISPLAY

The PoolPak ECC III control system includes a Remote Display/Keypad Panel (Figure 3) that can be located remotely from the unit for the convenience of the owner. A standard three-line telephone jack connects to the control system at terminal block T17 using a six-wire cable. The remote display/keypad panel connects to this telephone jack using the special cable supplied.

MULTIPLE UNIT INTERFACING

When there is more than one PoolPak unit installed at a single site, the units should be connected together as shown in Figure 21. This is necessary so that each PoolPak unit can be coordinated. It also allows the owner to access PoolPak operational information for all the units from a single location.

BUILDING AUTOMATION SYSTEM (BAS) CONNECTION

The PoolPak ECC III control system provides two optional Building Automation System (BAS) connection types, LonWorks¨ or ModBus¨. When the optional Remote Access Package (RAP) is installed, LonWorks¨ is the only option available. These standard BAS connections are attached to the building system at any T16 terminal block.

POOLPAK REMOTE ACCESS PACKAGE (RAP)

The PoolPak Remote Access Package (RAP) (Figure 3) is a stand-alone communication system. The system runs an embedded web server over an IEEE 802.3 10/100 BaseT ethernet or an embedded dial-in server over a standard phone line. The web server operates on TCP/IP port 80, the Internet default for web traffic. The web server port is configurable. The RAP can be accessed from either an internal network or the Internet. IP addresses and ports must be routed to the RAP for access via the Internet. Virtual Private Network Connections (VPN) to the RAP will not be supported. The dial-in server can be used where a full-time ethernet connection is not available.

ETHERNET 10/100 DIRECT CONNECTION

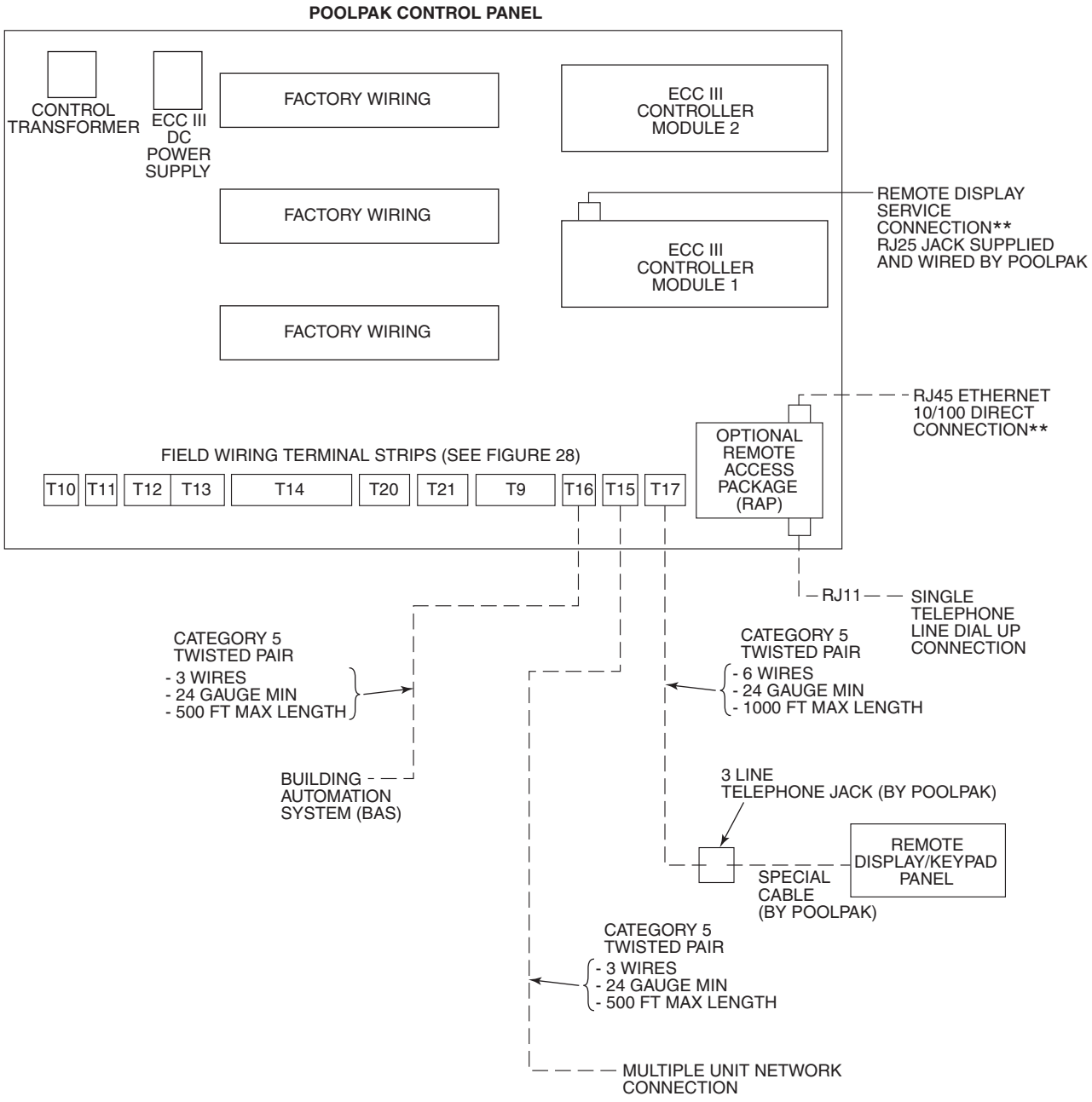
When the optional RAP is installed, the ECC III control system can be connected to an external network using the ethernet 10/100 connection on the upper right side of the RAP (see Figure 3).

TELEPHONE LINE CONNECTION

A standard RJ11 single line analog phone jack is provided on the lower right side of the optional RAP (see Figure 3). This connection may be used for dial-up access instead of the direct ethernet connection.

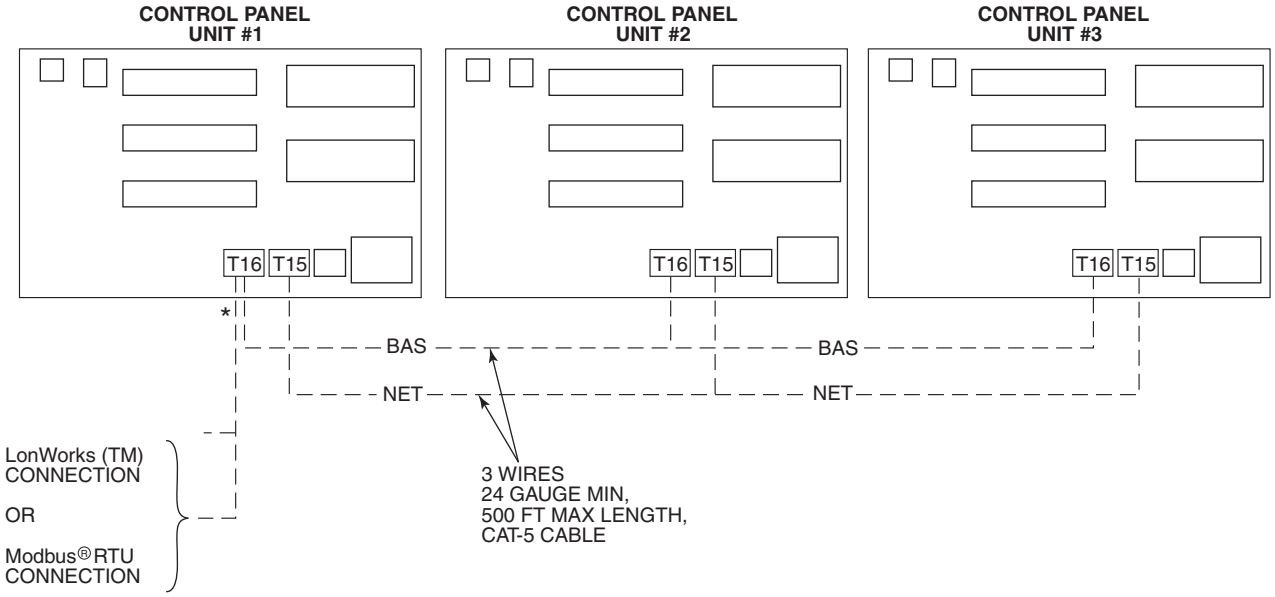
SEND EMAILS - ALERTS FOR ALARMS

When a critical alarm occurs with the PoolPak unit, the RAP will send an email to the PoolPak Service Department, via a mail server maintained by PoolPak. The Internet connection can be either ethernet or dial-up, connected directly to the server at PoolPak. The RAP will create no other network traffic.



** ANY UNIT MAY BE USED FOR MULTIPLE UNIT APPLICATIONS

Figure 20. PoolPak ECC III Remote Connections



* MAY BE CONNECTED ON ANY T16 TERMINAL BLOCK

Figure 21. PoolPak ECC III Multiple SWHP Unit Field Communication Loop Connection

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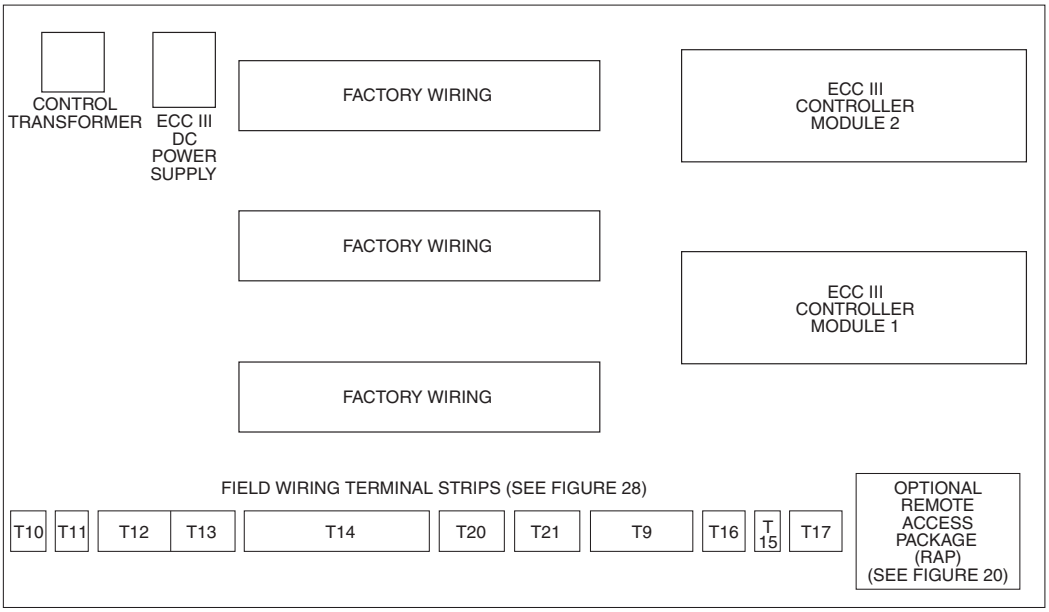
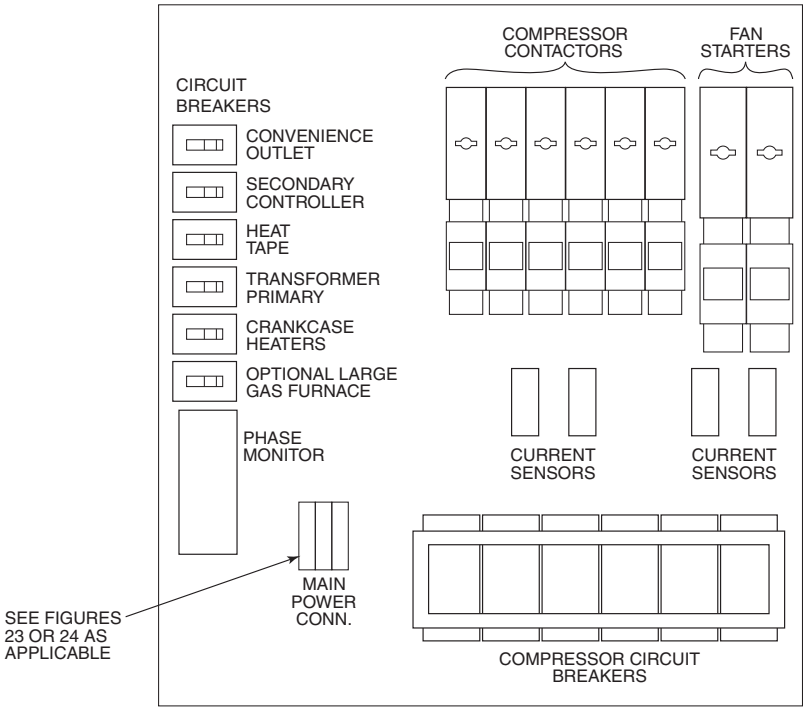
FIELD WIRING DIAGRAM



CONTROL PANEL



POWER PANEL

Figure 22. SWHP Control and Power Panels

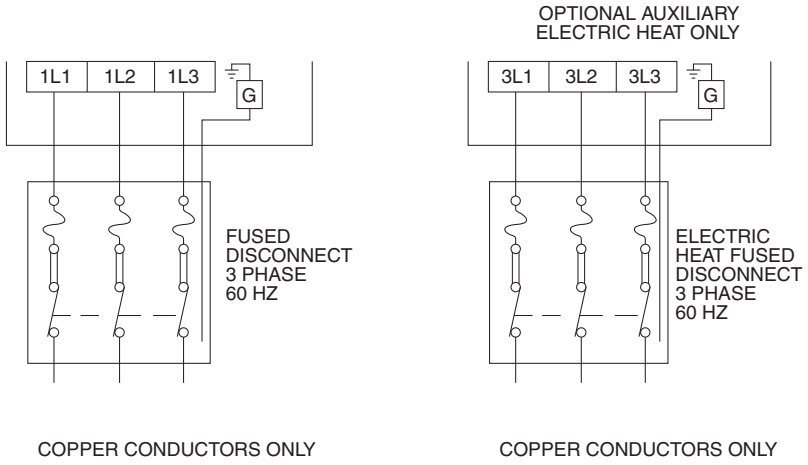
POOLPAK SINGLE POINT POWER WIRING

MODELS SWHP 60/80/100/120 - ALL VOLTAGES; SWHP140/190/220/260/300 - 460V AND 575V
(SEE FIGURES 22 AND 23)

The contractor is required to supply (unless supplied as an option by PoolPak) and install a separate fused disconnect. Recommended sizing is provided in the SELECTION PROCEDURE of this manual.

When the auxiliary electric heater option is provided, a second power connection point (3L1, 3L2, and 3L3) isprovided in the supply fan compartment. The second power connection feeds the auxiliary electric heating coil. With this option, the contractor is required to supply and install a second fused disconnect.

If a remote air-cooled condenser is required, a separate power feed must be provided for the air-cooledcondenser.



POWER WIRING - SWHP 60/80/100/120 - All Voltages; SWHP 140/190/220/260/300 - 460V & 575V

Figure 23. Single Point Power Wiring

POOLPAK DUAL POINT POWER WIRING

ALL MODELS AND VOLTAGES

(SEE FIGURES 22 AND 24)

The PoolPak's Control Panel for these models is set up with two power connection points:

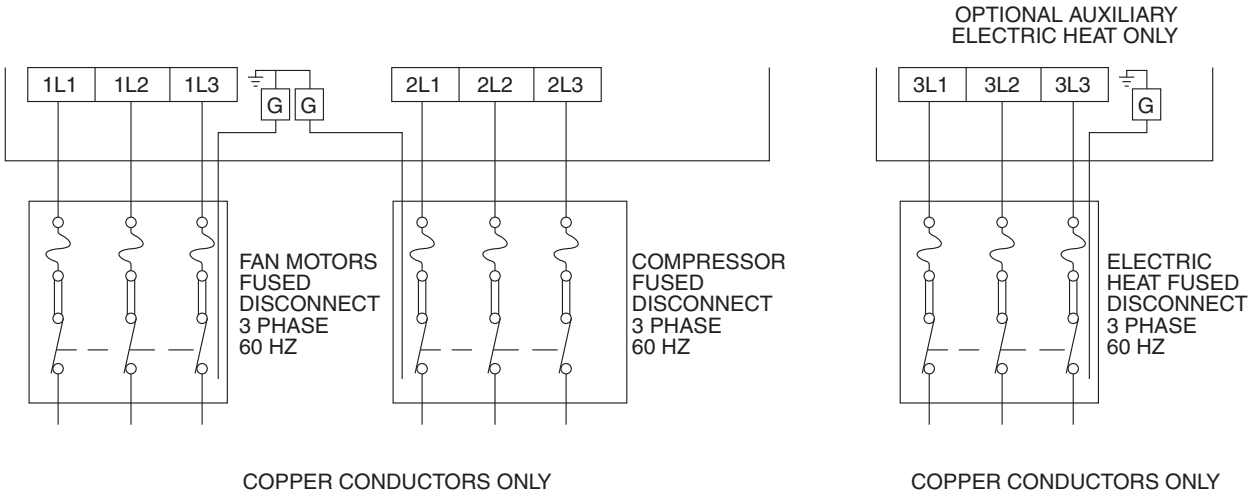
a. 1L1, 1L2, and 1L3: feeds the fan circuit and control transformer

b. 2L1, 2L2, and 2L3: feeds the compressor circuit

The contractor is required to supply (unless supplied as an option by PoolPak) and install a separate fused disconnect for each unit. Recommended sizing for the fan and control fused disconnects (1L1, 1L2, and 1L3) and the compressor circuit disconnect (2L1, 2L2, and 2L3) is provided in the SELECTION PROCEDURE of this manual.

When the auxiliary electric heater option is provided, a third power connection point (3L1, 3L2, and 3L3) is located in the supply fan compartment. The third power connection feeds the auxiliary electric heating coil. With this option, the contractor is required to supply and install a third fused disconnect.

If a remote air-cooled condenser is required, a separate power feed must be provided for the air-cooled condenser.



POWER WIRING - ALL UNITS AND ALL VOLTAGES

Figure 24. Dual Point Power Wiring

SWITCH PANEL (SEE FIGURE 25)

Unit

This switch controls the operation of the entire unit, including fans. This switch must be “ON” for unit operation. When it is turned “OFF”, the compressor, fans, all solenoid valves, and damper motors are deenergized. Power is also removed from the ECC III controller. However, all set points are retained in nonvolatile memory.

Compressor #1 and Compressor #2

This switch enables the compressor operating mode. The “PD” position puts the compressor in a standby mode but leaves the fans and economizer operating normally. The “RUN” position allows normal operation of the refrigeration system, provided all safeties are satisfied.

Unit Light

This switch energizes and deenergizes the customer-specified “service lighting” on the PoolPak unit.

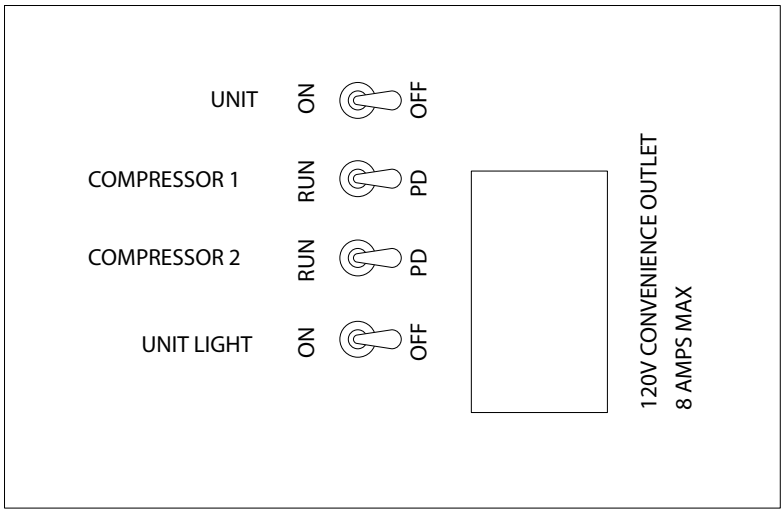
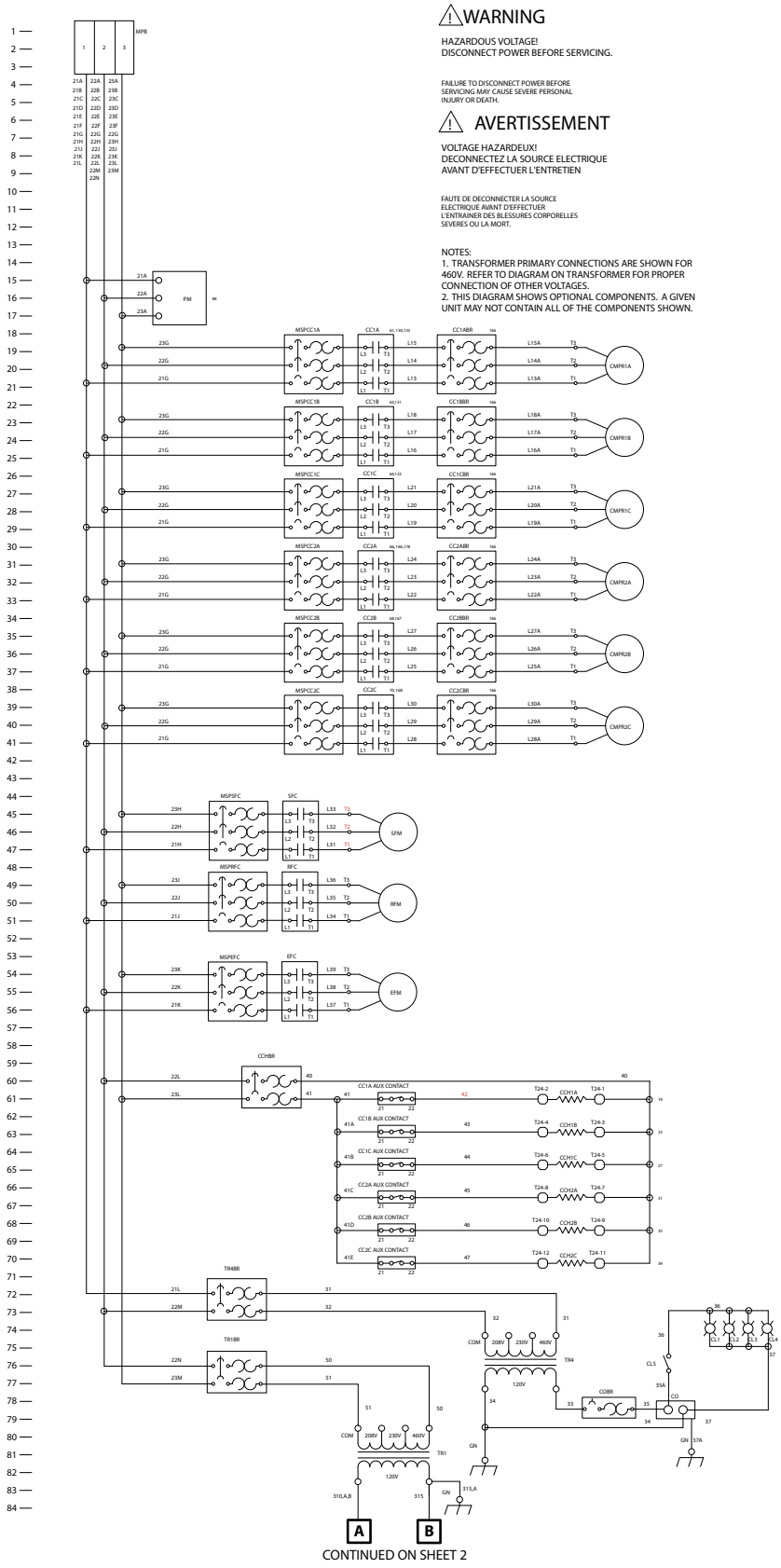


Figure 25. Switch Panel



LEGEND		
DEVICE DESIGNATION	DESCRIPTION	LINE NUMBER
5R, X5R	AUX AIR COOLED CONDENSER	121,137,142,163
10R	AUX HEAT #1	124,150
11R	AUX HEAT #2	125,154
12R	AUX HEAT #3	126,159
13R	AUX POOL WATER HEATER	127,163
14R	AUX POOL WATER HEATER #2	128,168
15R	EXTERNAL ALARM	129,172
16R	EXH FAN / DAMPER CONTROL RELAY	162,182
AOERH	AIR OFF EVAPORATOR RELATIVE HUMIDITY	174
AOET	AIR OFF EVAPORATOR TEMPERATURE	150
C1, 2 ACS	COMPR 1, 2 A/C SOLENOID	135,177
C1A, B, C MT	COMPR 1 MOTOR TEMPERATURE	126
C1AS1, 2, 4	COMPR 1 AIR SOLENOID 1, 2, 4	139,140,141
C1CT	COMPR 1 CURRENT TRANSDUCER	137
C1LPCO	COMPR 1 LOW PRESSURE CUTOUT	125
C1LS1, 2	COMPR 1 LIQUID SOLENOID 1, 2	136,137
C1PDS	COMPR 1 PUMPDOWN SWITCH	120
C1WS	COMPR 1 WATER SOLENOID	138
C2A, B, C MT	COMPR 2 MOTOR TEMPERATURE	166
C2AS1, 2, 4	COMPR 2 AIR SOLENOID 1, 2, 4	173,174,175
C2CT	COMPR 2 CURRENT TRANSDUCER	175
C2LPCO	COMPR 2 LOW PRESSURE CUTOUT	164
C2LS1, 2	COMPR 2 LIQUID SOLENOID 1, 2	170,171
C2PDS	COMPR 2 PUMPDOWN SWITCH	162
C2WS	COMPR 2 WATER SOLENOID	172
CC1A, B, C	COMPR 1 A, B, C CONTACTOR	19,23,27 130,131,132
CC1A, B, C BR	COMPR 1 A, B, C CIRCUIT BREAKER	19,23,27
CC1A, B, C BRS	COMPR 1 CIRCUIT BREAKER STATUS SWITCH	126
CC2A, B, C	COMPR 2 A, B, C CONTACTOR	31,35,39 167,168,169
CC2A, B, C BR	COMPR 2 A, B, C CIRCUIT BREAKER	31,35,39
CC2A, B, C BRS	COMPR 2 CIRCUIT BREAKER STATUS SWITCH	166
CCH1A, B, C	CRANKCASE HEATER COMPR 1 A, B, C	61,63,65
CCH2A, B, C	CRANKCASE HEATER COMPR 2 A, B, C	67,68,70
CCHBR	CRANKCASE HEATER CIRCUIT BREAKER	60
CL1, 2, 3, 4	CONVENIENCE LIGHT 1, 2, 3, 4	73
CLS	CONVENIENCE LIGHT SWITCH	75
CMPR1A, B, C	COMPRESSOR 1 A, B, C	19,23,27
CMPR2A, B, C	COMPRESSOR 2 A, B, C	31,35,39
CO	CONVENIENCE OUTLET	78
COBR	CONVENIENCE OUTLET CIRCUIT BREAKER	78
CPBR	CONTROL POWER CIRCUIT BREAKER	85
CPS	CONTROL POWER SWITCH	92
DCPS	DC POWER SUPPLY	96
EFS	EXHAUST FAN STARTER	54,179
EFM	EXHAUST FAN MOTOR	54
FS1, 2	WATER FLOW SWITCH 1, 2	122,123
HPCO SYS 1, 2	HIGH PRESSURE CUTOUT SYSTEM 1, 2	115,162
HT	HEAT TAPE	89
HTBR	HEAT TAPE CIRCUIT BREAKER	89
HTT	HEAT TAPE THERMOSTAT	89
LPHWCV	HOT WATER COIL CONTROL VALVE	151,195,200
MBEADA	MIXING BOX EXHAUST AIR DMPR ACTUATOR	138,148,194,199
MBOADA	MIXING BOX OUTSIDE AIR DMPR ACTUATOR	140,150,192,197
MBRCDA	MIXING BOX RECIRC AIR DMPR ACTUATOR	139,149,193,198
MPB1	MAIN POWER BLOCK - FANS AND CONTROLS	1
MPB2	MAIN POWER BLOCK - COMPRESSORS	1
OARH	OUTSIDE AIR RELATIVE HUMIDITY	173
OAT	OUTSIDE AIR TEMPERATURE	148
PM	PHASE MONITOR	15,88
PWT1, 2	POOL WATER TEMPERATURE 1, 2	180,182
RARH	RETURN AIR RELATIVE HUMIDITY	172
RAT	RETURN AIR TEMPERATURE	146
RFS	RETURN FAN STARTER	49,123
RFCT	RETURN FAN CURRENT TRANSDUCER	135
RFM	RETURN FAN MOTOR	49
SFS	SUPPLY FAN STARTER	45,122
SFCT	SUPPLY FAN CURRENT TRANSDUCER	134
SFEADA	SINGLE FAN EXHAUST AIR DMPR ACTUATOR	208
SFM	SUPPLY FAN MOTOR	45
SFOADA	SINGLE FAN OUTSIDE AIR DMPR ACTUATOR	204
SPLYT	SUPPLY AIR TEMPERATURE SENSOR	184
ST	SURFACE TEMPERATURE SENSOR	152
TR1	CONTROL TRANSFORMER	80
TR1BR	CONTROL TRANSFORMER CIRCUIT BREAKER	76
TR2	24 VOLT TRANSFORMER	96
TR4	CONVENIENCE OUTLET TRANSFORMER	74
TR4BR	CONVENIENCE TRANSFORMER CIRCUIT BREAKER	72

Figure 26. Power Wiring Diagram: Single Point Power (Sheet 1 of 3)

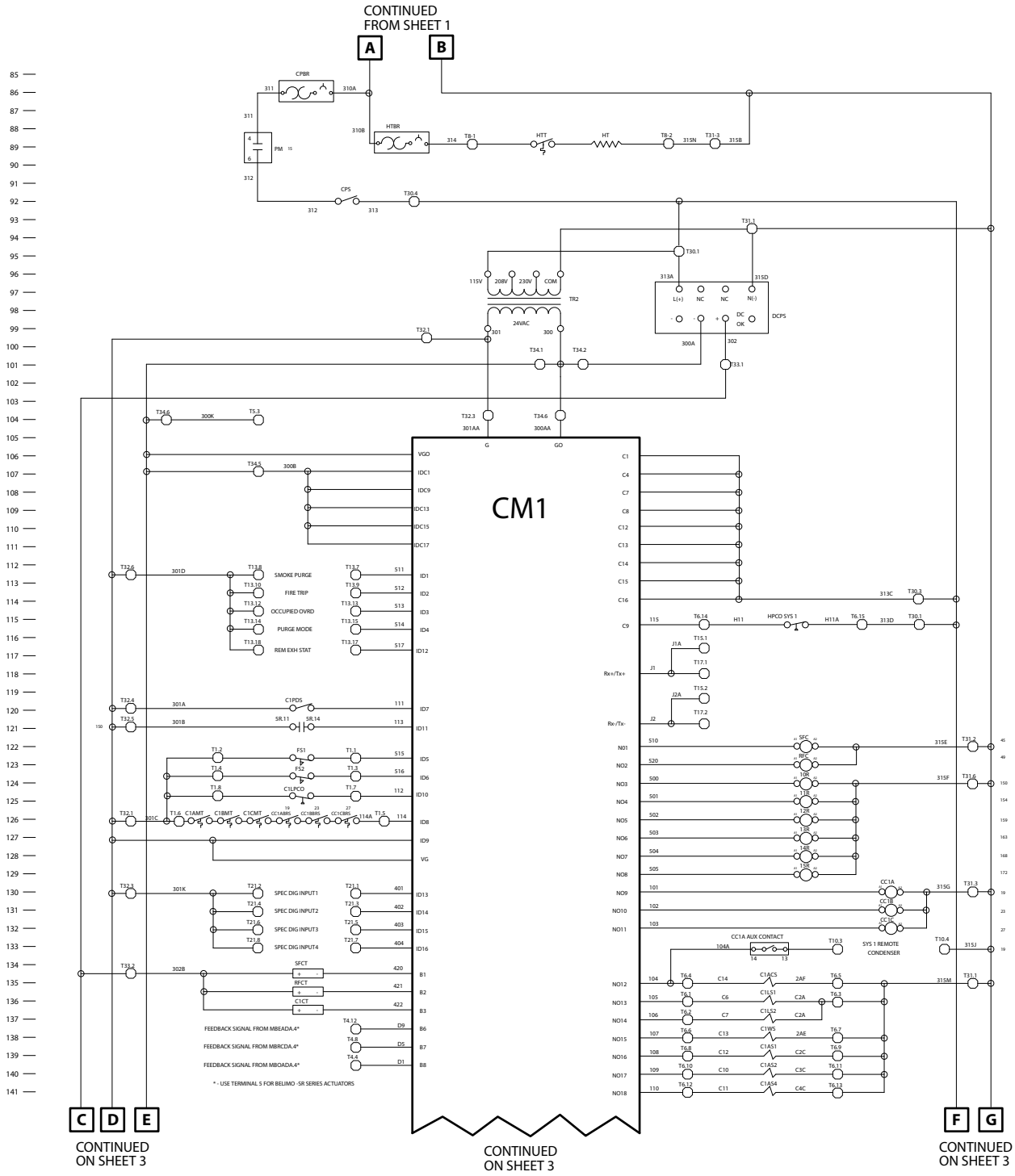


Figure 26. Power Wiring Diagram: Single Point Power (Sheet 2 of 3)

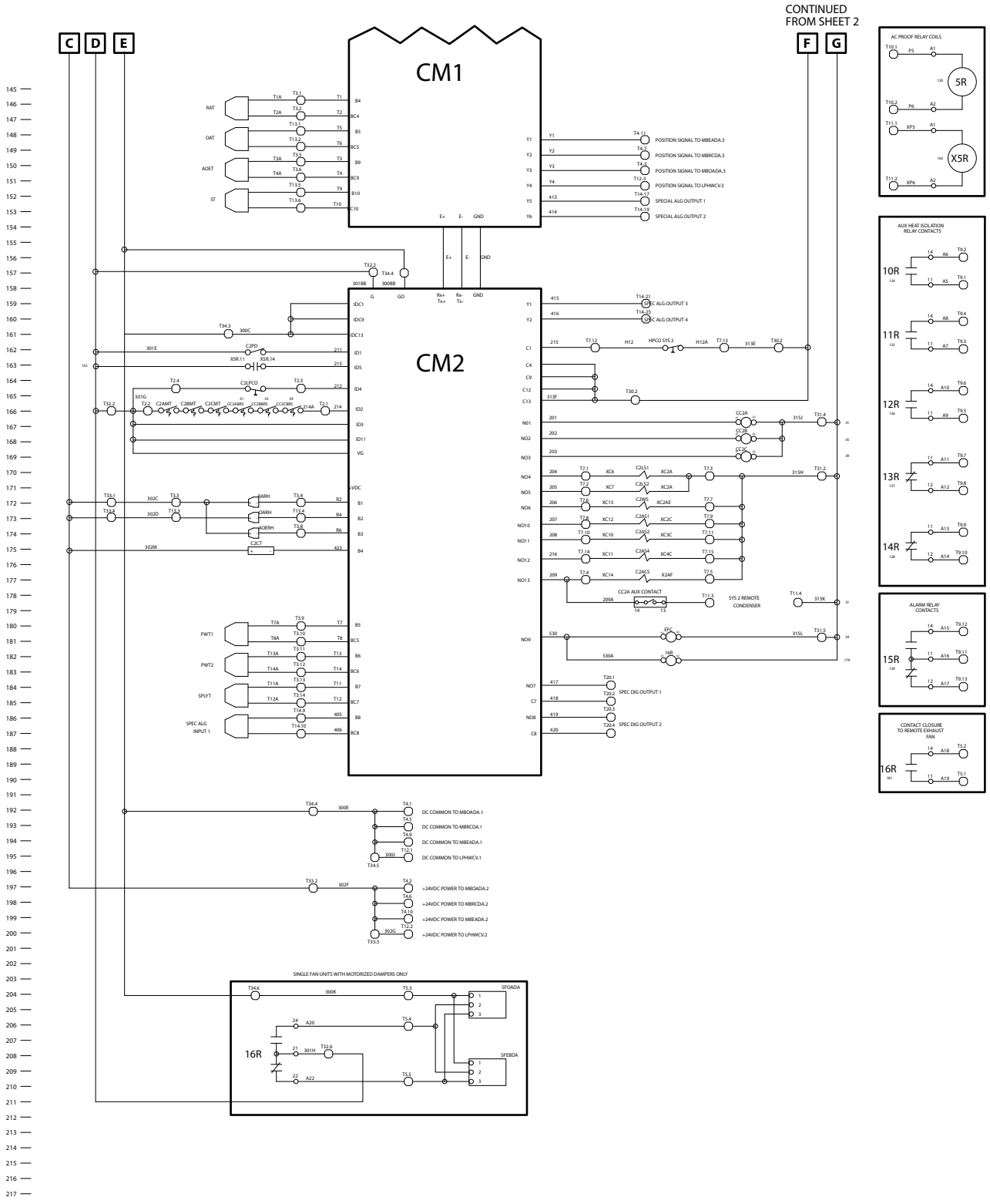
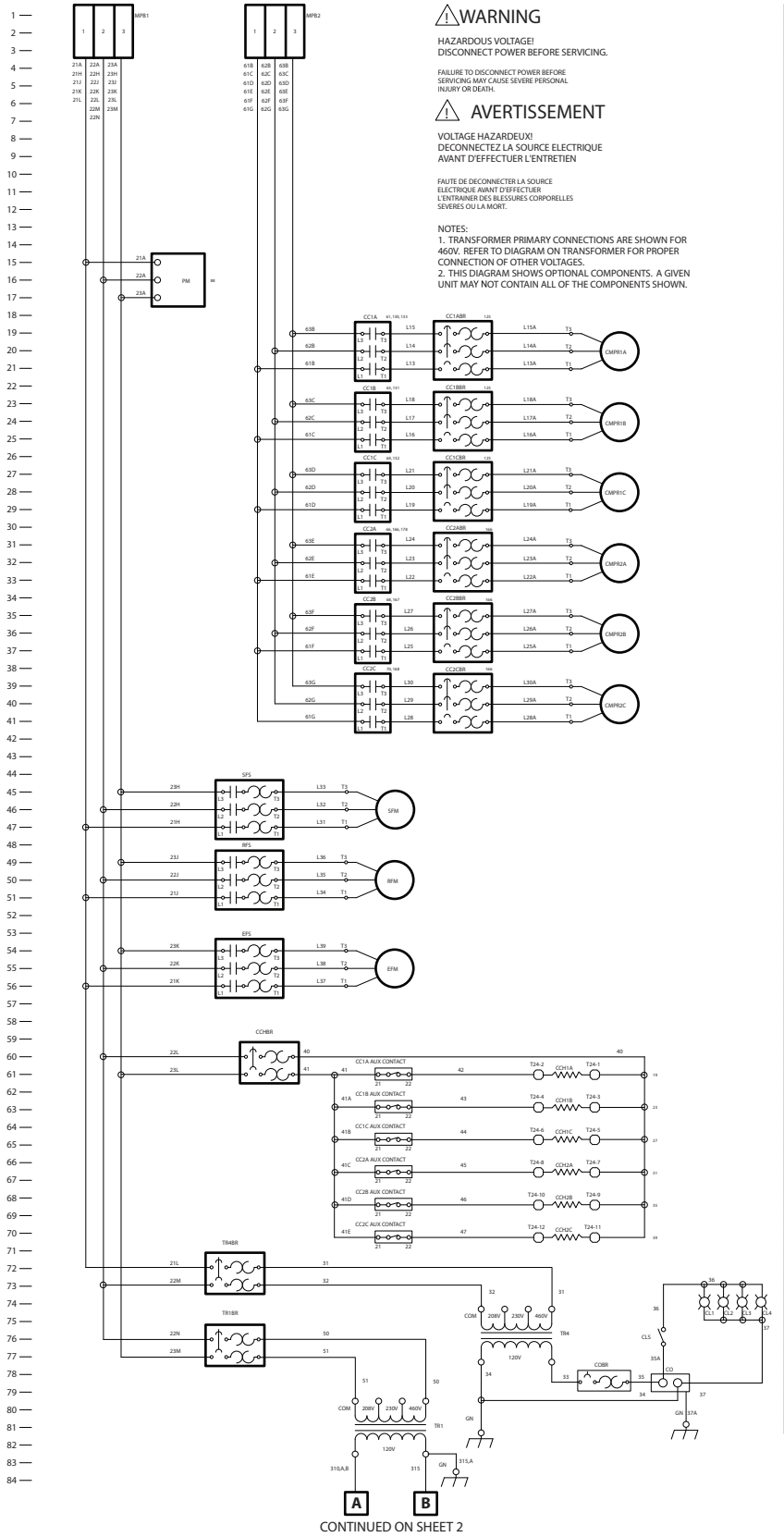


Figure 26. Power Wiring Diagram: Single Point Power (Sheet 3 of 3)



LEGEND		
DEVICE DESIGNATION	DESCRIPTION	LINE NUMBER
5R, X5R	AUX AIR COOLED CONDENSER	121,137,142,163
10R	AUX HEAT #1	124,150
11R	AUX HEAT #2	125,154
12R	AUX HEAT #3	126,159
13R	AUX POOL WATER HEATER	127,163
14R	AUX POOL WATER HEATER #2	128,168
15R	EXTERNAL ALARM	129,172
16R	EXH FAN / DAMPER CONTROL RELAY	162,182
AOERH	AIR OFF EVAPORATOR RELATIVE HUMIDITY	174
AOET	AIR OFF EVAPORATOR TEMPERATURE	150
C1, 2 ACS	COMPR 1, 2 A/C SOLENOID	135,177
C1A, B, C MT	COMPR 1 MOTOR TEMPERATURE	126
C1AS1, 2, 4	COMPR 1 AIR SOLENOID 1, 2, 4	139,140,141
C1CT	COMPR 1 CURRENT TRANSDUCER	137
C1LPCO	COMPR 1 LOW PRESSURE CUTOUT	125
C1LS1, 2	COMPR 1 LIQUID SOLENOID 1, 2	136,137
C1PDS	COMPR 1 PUMPDOWN SWITCH	120
C1WS	COMPR 1 WATER SOLENOID	138
C2A, B, C MT	COMPR 2 MOTOR TEMPERATURE	166
C2AS1, 2, 4	COMPR 2 AIR SOLENOID 1, 2, 4	173,174,175
C2CT	COMPR 2 CURRENT TRANSDUCER	175
C2LPCO	COMPR 2 LOW PRESSURE CUTOUT	164
C2LS1, 2	COMPR 2 LIQUID SOLENOID 1, 2	170,171
C2PDS	COMPR 2 PUMPDOWN SWITCH	162
C2WS	COMPR 2 WATER SOLENOID	172
CC1A, B, C	COMPR 1 A, B, C CONTACTOR	19,23,27 130,131,132
CC1A, B, C BR	COMPR 1 A, B, C CIRCUIT BREAKER	19,23,27
CC1A, B, C BRS	COMPR 1 CIRCUIT BREAKER STATUS SWITCH	126
CC2A, B, C	COMPR 2 A, B, C CONTACTOR	31,35,39 167,168,169
CC2A, B, C BR	COMPR 2 A, B, C CIRCUIT BREAKER	31,35,39
CC2A, B, C BRS	COMPR 2 CIRCUIT BREAKER STATUS SWITCH	166
CCH1A, B, C	CRANKCASE HEATER COMPR 1 A, B, C	61,63,65
CCH2A, B, C	CRANKCASE HEATER COMPR 2 A, B, C	67,68,70
CCHBR	CRANKCASE HEATER CIRCUIT BREAKER	60
CL1, 2, 3, 4	CONVENIENCE LIGHT 1, 2, 3, 4	73
CLS	CONVENIENCE LIGHT SWITCH	75
CMPR1A, B, C	COMPRESSOR 1 A, B, C	19,23,27
CMPR2A, B, C	COMPRESSOR 2 A, B, C	31,35,39
CO	CONVENIENCE OUTLET	78
COBR	CONVENIENCE OUTLET CIRCUIT BREAKER	78
CPBR	CONTROL POWER CIRCUIT BREAKER	85
CPS	CONTROL POWER SWITCH	92
DCPS	DC POWER SUPPLY	96
EFS	EXHAUST FAN STARTER	54,179
EFM	EXHAUST FAN MOTOR	54
FS1, 2	WATER FLOW SWITCH 1, 2	122,123
HPCO SYS 1, 2	HIGH PRESSURE CUTOUT SYSTEM 1, 2	115,162
HT	HEAT TAPE	89
HTBR	HEAT TAPE CIRCUIT BREAKER	89
HTT	HEAT TAPE THERMOSTAT	89
LPHWCV	HOT WATER COIL CONTROL VALVE	151,195,200
MBEADA	MIXING BOX EXHAUST AIR DMPR ACTUATOR	138,148,194,199
MBOADA	MIXING BOX OUTSIDE AIR DMPR ACTUATOR	140,150,192,197
MBRCDA	MIXING BOX RECIRC AIR DMPR ACTUATOR	139,149,193,198
MPB1	MAIN POWER BLOCK - FANS AND CONTROLS	1
MPB2	MAIN POWER BLOCK - COMPRESSORS	1
OARH	OUTSIDE AIR RELATIVE HUMIDITY	173
OAT	OUTSIDE AIR TEMPERATURE	148
PM	PHASE MONITOR	15,88
PWT1, 2	POOL WATER TEMPERATURE 1, 2	180,182
RARH	RETURN AIR RELATIVE HUMIDITY	172
RAT	RETURN AIR TEMPERATURE	146
RFS	RETURN FAN STARTER	49,123
RFCT	RETURN FAN CURRENT TRANSDUCER	135
RFM	RETURN FAN MOTOR	49
SFS	SUPPLY FAN STARTER	45,122
SFCT	SUPPLY FAN CURRENT TRANSDUCER	134
SFEADA	SINGLE FAN EXHAUST AIR DMPR ACTUATOR	208
SFM	SUPPLY FAN MOTOR	45
SFOADA	SINGLE FAN OUTSIDE AIR DMPR ACTUATOR	204
SPLYT	SUPPLY AIR TEMPERATURE SENSOR	184
ST	SURFACE TEMPERATURE SENSOR	152
TR1	CONTROL TRANSFORMER	80
TR1BR	CONTROL TRANSFORMER CIRCUIT BREAKER	76
TR2	24 VOLT TRANSFORMER	96
TR4	CONVENIENCE OUTLET TRANSFORMER	74
TR4BR	CONVENIENCE TRANSFORMER CIRCUIT BREAKER	72

Figure 27. Power Wiring Diagram: Dual Point Power (Sheet 1 of 3)

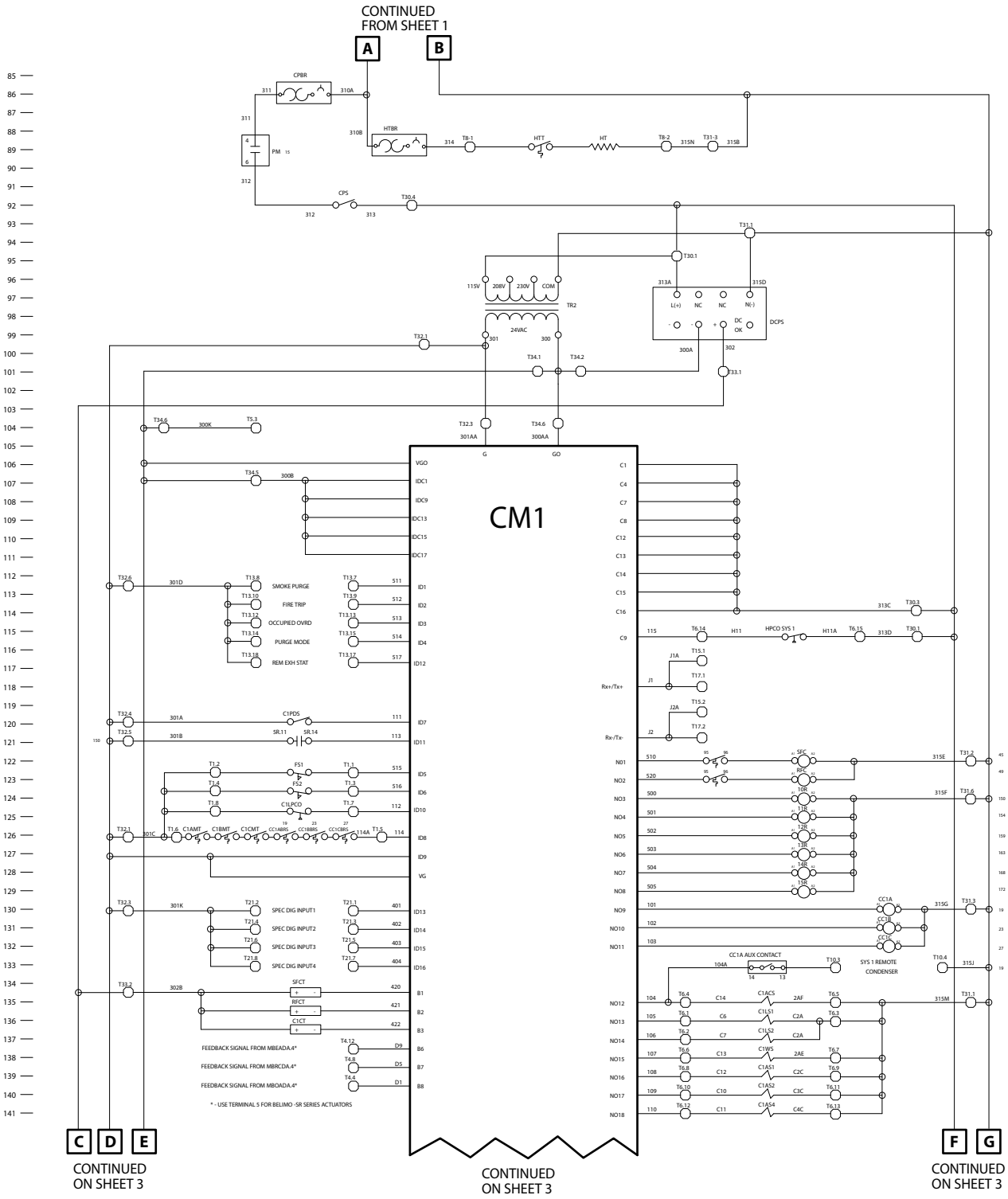


Figure 27. Power Wiring Diagram: Dual Point Power (Sheet 2 of 3)

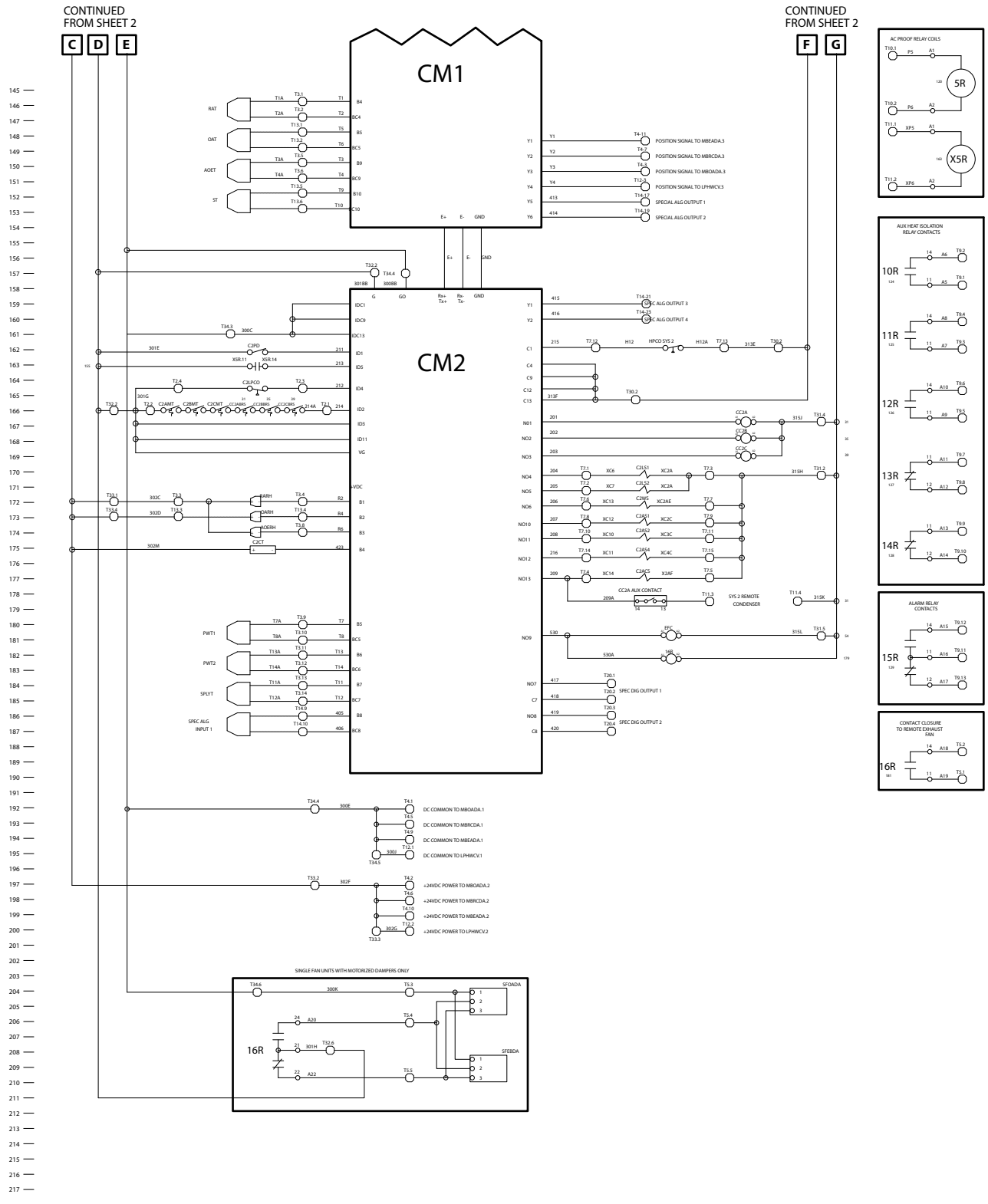


Figure 27. Power Wiring Diagram: Dual Point Power (Sheet 3 of 3)

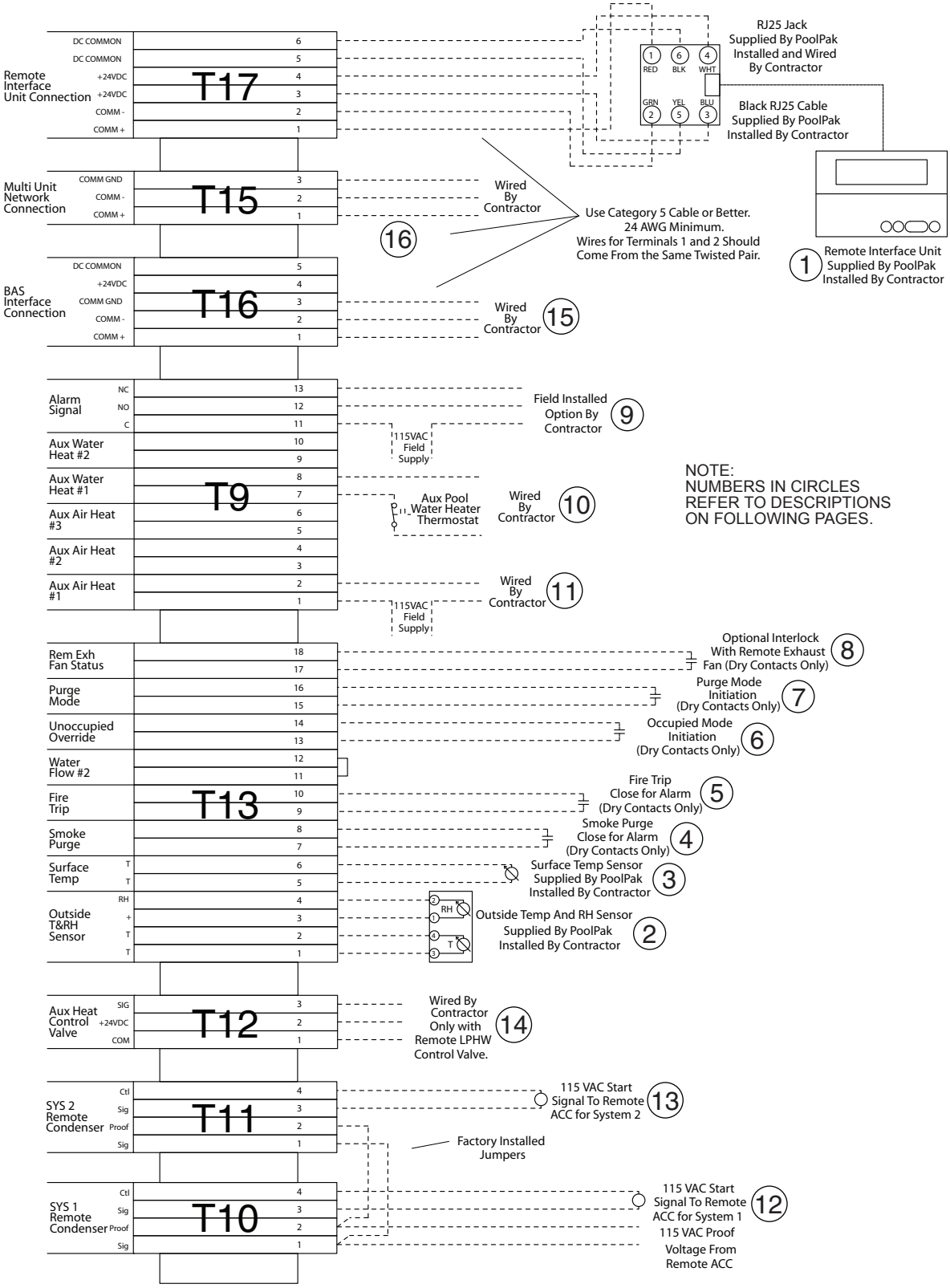


Figure 28. ECC III Field Wiring Diagram

1. REMOTE INTERFACE UNIT

The Remote Interface Unit (RIU) allows the user to view space temperature and relative humidity, pool water temperature, and damper positions. It also provides the ability to change set points, receive alarm notifications, and perform advanced diagnostic functions.

The RIU should be mounted in a convenient location, outside the natatorium, that is protected from splashingpool water and corrosive air. The ambient temperature of the mounting location must always be greater than 32°F. The maximum distance from the PoolPak control panel is 1,000 feet. For distances greater than 1,000 feet, contact the factory.

The ECC III includes a 7-foot long, black RJ25 cable. If the RIU is to be mounted directly to the PoolPak unit, this cable can be plugged directly into port J10 on control module CM1 in the PoolPak's control panel.

For remote mounting of the RIU, the installing contractor must run a six-conductor (three twisted pairs), 16–20 AWG cable from the PoolPak's control panel to the remote location. One end of this cable will terminate onterminal block T17 in the control panel (see Figure 28). The other end will terminate on a factory-supplied RJ25jack. The wires for terminals T17.1 and T17.2 should be from the same twisted pair. The second pair should beused for T17.3 and T17.4 and the third pair for T17.5 and T17.6. Proper polarity and connection is essential for correct operation of the RIU. Improper wiring can cause permanent damage. Please review the color code and connections to the RJ25 jack carefully.

The RIU includes a mounting bracket that is designed to fit a standard, single-gang box, mounted horizontally in the wall. The RJ25 jack and most of the black cable should be placed inside the box before installing the mounting bracket. Use the screws that come with the box to secure the bracket. Using an "extra deep" box will make it easier to fit the RJ25 cable and jack inside. After the mounting bracket is secured to the wall, connect the RJ25 cable to the jack on the back of the RIU. Slide the RIU onto the bracket until it snaps into place.

An extra RJ25 cable is supplied to allow direct connection of the RIU at the PoolPak control panel during service or startup.

2. OUTSIDE AIR TEMPERATURE AND RELATIVE HUMIDITY SENSOR

The ECC III uses an outside air temperature and humidity sensor to make smart economizer decisions and toprevent air-cooled condenser operation during low ambient conditions.

The sensor should be mounted on the exterior surface of a north-facing wall without exposure to direct sunlight. Wire entry to the sensor terminal box is provided with a compression-type fitting, suitable for cable diameters of from 1/8 to 1/4 inch.

Do not connect a conduit directly to the sensor's terminal box. Use a small piece of UV-resistant cable to make the transition from the conduit to the sensor. A direct conduit connection will allow condensation to form inside the sensor, resulting in permanent damage.

Orient the sensor as shown on the included instruction sheet. Proper orientation of the sensor and radiation shieldis essential.

Carefully review the wiring connections shown on the field-wiring diagram (see Figure 28). *Improper connection may damage the sensor and/or the ECC III control module.* The cable should be four-conductor (two twisted pairs), 16–20 AWG copper.

3. SURFACE TEMPERATURE SENSOR

This sensor measures the temperature of the coldest surface in the pool enclosure. When the temperature of the surface drops to within 5°F of the space dew point, the dew point set point will automatically be reset downward to help prevent condensation on the cold surface. It should be noted that this function will not be able to compensate for lower-quality building materials, such as single-pane glass or non-thermally broken window frames.

The sensor should be mounted on an exterior window or skylight frame not subject to direct sunlight. In cases where there are no exterior doors or windows, the sensor should be mounted on the interior surface of an exterior wall. The sensor housing has a single 1/8-inch hole for mounting.

Wire as shown on the field-wiring diagram (see Figure 28). Electrical connection should be made with two-conductor (one shielded, twisted pair), 16–20 AWG copper cable. Connect the shield drain wire to ground at the PoolPak control panel end only.

4. SMOKE PURGE INPUT

The ECC III can receive a contact closure from a building fire and smoke control system. This input must be connected to dry (voltage free) contacts only. When this input is activated, the ECC III will energize the return fan only and will open the exhaust air damper to 100%, while closing the outside air intake and recirculation dampers to 0%. The compressors will be disabled during this mode, and the RIU will display an alarm message indicating that smoke purge mode has been activated. Using the ECC III configuration menu, it is possible to set this input to be active on open or active on close.

5. FIRE TRIP INPUT

The ECC III can receive a contact closure from a building fire and smoke control system. This input must be connected to dry (voltage free) contacts only. When this input is activated, the ECC III will shut down the compressors and all unit-mounted fans, and will close the outside air and exhaust air dampers. The RIU will display an alarm message indicating that fire trip mode has been activated. Using the ECC III configuration menu, it is possible to set this input to be active on open or active on close.

6. OCCUPIED MODE INPUT

The ECC III can receive a contact closure from a Building Automation System (BAS) or from a time clock to override the occupancy schedule stored in the controller's memory. This input must be connected to dry (voltage free) contacts only. If the schedule is currently requesting unoccupied operation, activating this input will force the controller into occupied mode. Although this input overrides the ECC III internal schedule, it will not override commands sent to the controller via the LonWorks¨ or Modbus¨ interfaces.

7. PURGE MODE INPUT

The ECC III can receive a contact closure from a remote mounted switch or from a BAS. This input must be connected to dry (voltage free) contacts only. When activated, the controller will shut down the compressors and open the outside air and exhaust air dampers to 100%. The recirculation damper will close. This allows the introduction of all outside air to the space when needed (e.g., during "shocking" of the pool). During purge modeoperation, the ECC III will attempt to maintain space temperature with the auxiliary heating system. If the supply air temperature drops to 40¼F, purge mode is automatically terminated to provide freeze protection. Purge mode commands sent to the ECC III through the LonWorks¨ or Modbus¨ interface take precedence over the purge mode input.

8. REMOTE EXHAUST FAN INTERLOCK

The ECC III can receive a contact closure from a remote exhaust fan. This input must be connected to dry (voltage free) contacts only.

9. ALARM OUTPUT

The ECC III will activate the alarm output when uncleared alarms are present. This output mimics the status of the red alarm light on the RIU. The output provides form C dry contacts. The contacts may be directly connected to an external circuit, provided it is 24 VAC maximum and the current does not exceed 1A inductive.

10. AUXILIARY POOL WATER HEATING SYSTEM

The auxiliary pool water heating system is not provided by PoolPak. The ECC III provides a dry contact closure that signals a need for auxiliary water heating. The contacts may be directly connected to the heater's control circuit, provided it is 24 VAC maximum and the current does not exceed 1A inductive. Any other application will require the use of an additional relay to interface to the heater. The auxiliary heating system must provide its own thermostat, wired in series with the output of the ECC III. Typically, the set point for this thermostat is several degrees higher than the pool water temperature set point in the ECC III.

11. AUXILIARY AIR HEATING SYSTEM

The auxiliary heating system is normally factory-installed inside the PoolPak unit. In this case, all interface wiring between the ECC III and the heater is factory-installed. If the PoolPak is not equipped with an auxiliary heating option, the ECC III provides contact closures to control three discrete stages of auxiliary air heating. The contacts may be directly connected to the heater's control circuit provided it is 24 VAC maximum and the current does not exceed 1A inductive. The three outputs are energized in order, by number, as heating demands dictate.

12. SYSTEM 1 REMOTE AIR-COOLED CONDENSER INTERLOCK AND CONTROL

The ECC III monitors terminals T10.1 and T10.2 for 120 VAC from the remote air-cooled condenser. This 120 VAC proof signal indicates that power is on at the remote condenser. The ECC III will not select the mechanical air conditioning mode if the proof signal is inactive. When mechanical air conditioning is selected, a 120 VAC control signal is sent to the remote condenser through terminals T10.3 and T10.4. This signal energizes the fan starters in the ACC.

13. SYSTEM 2 REMOTE AIR-COOLED CONDENSER INTERLOCK AND CONTROL

The ECC III monitors terminals T11.1 and T11.2 for 120 VAC from the remote air-cooled condenser. This 120 VAC proof signal indicates that power is on at the remote condenser. In most cases, a single remote condenser is used for both system 1 and system 2. For this reason, the factory installs jumpers from T10.1 and T10.2 to T11.1and T11.2, respectively. This allows a single 120 VAC proof signal from the condenser to activate the proof input of both systems. When mechanical air conditioning is selected, a 120 VAC control signal is sent to the remote condenser through terminals T11.3 and T11.4. This signal energizes the fan starters in the ACC.

14. AUXILIARY AIR HEAT CONTROL VALVE

The ECC III provides an analog signal to control a proportional hot water or steam valve. Normally, the valve is factory-mounted and wired inside the PoolPak unit. However, if a remote valve is used, it can be connected directly to the PoolPak's control panel. Terminal block T12 provides 24 VDC power and a control signal. The actuator on the external valve must consume less than 5 VA at 24 VDC. The default control signal to the actuator is 2–10 VDC. The voltage span of the control signal can be adjusted in the configuration menu.

15. BUILDING AUTOMATION SYSTEM INTERFACE CONNECTION

The ECC III is capable of direct connection to LonWorks¨ or Modbus¨ BAS systems. When equipped with the LonWorks¨ interface, the ECC III utilizes an Echelon FTT10 transceiver for connection to a TP/FT-10 network channel. The Modbus¨ RTU interface is RS485-based, with user selectable baud rates of 1,200, 2,400, 4,800, 9,600, and 19,200.

This interface allows a BAS to monitor detailed dehumidifier status information. It also allows the BAS to make set point changes, to control occupancy modes, and to control purge mode.

Detailed information on BAS interface operation is available on PoolPak's website at www.poolpak.com.

16. MULTI-UNIT NETWORK CONNECTION

The ECC III utilizes a proprietary, private network to coordinate with other PoolPaks operating in the same space. This allows up to five PoolPaks to coordinate operation using a master/slave scheme. The PoolPaks are connected to each other by daisy-chaining the three terminals of T15. The network is RS485-based. The connections should be made with 24 AWG minimum, category 5 cable. Use wires from the same pair for the connection of terminals 1 and 2. The total network length should not exceed 500 feet. For total network lengths of more than 500 feet, contact the factory.

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OPERATION

STATUS SCREENS—VI KEY

Normally, the RIU (Figure 29) will automatically rotate between four different screens to display the status of the system. Pressing the HOLD/ROTATE key will stop the automatic screen rotation and will hold the presently-displayed screen. After a 10-minute delay, the screens will resume normal rotation. The user may also turn off the hold function before the delay terminates by pressing the HOLD/ROTATE key a second time.

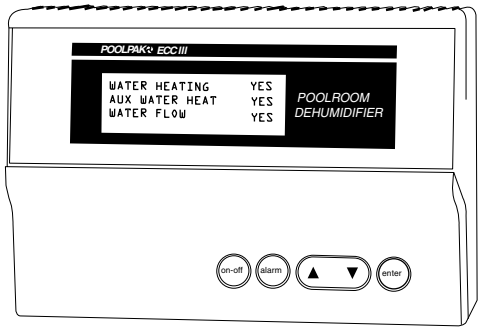

Figure 29. Remote Interface Unit (RIU)

Screen 1 displays:
- Day, Date, and Time (24-Hour Format)
- Space Temperature
- Space Relative Humidity
- Space Dew Point

Screen 2 displays:
- Pool Water Temperature #1
- Pool Water Temperature #2
- Outside Air Temperature
- Outside Air Relative Humidity

Screen 3 displays:
- Outside Air Damper Position
- Recirc Air Damper Position
- Exhaust Air Damper Position

Screen 4 displays:

System 1 Mode OFF, AIR HEAT, WATER HEAT, AIR COOL
- OFF - System 1 compressors are not active
- AIR HEAT - System 1 compressors on; air reheat coil is active
- WATER HEAT - System 1 compressors on; pool heat is active
- AIR COOL - System 1 compressors on; AC condenser is active

System 2 Mode OFF, AIR HEAT, WATER HEAT, AIR COOL
- OFF - System 2 compressors are not active
- AIR HEAT - System 2 compressors on; air reheat coil is active
- WATER HEAT - System 2 compressors on; pool heat is active
- AIR COOL - System 2 compressors on; AC condenser is active

Occupancy Status OCC or UNOCC
- OCC - Occupied; outside air is being introduced to the space to meet ventilation requirements
- UNOCC - Unoccupied; outside air will not be introduced into the space unless required by the smart economizer

CHANGING SET POINTS

Four set points, space temperature, space relative humidity, pool water temperature 1, and pool water temperature 2, can be accessed through the RIU. To change a set point, press the corresponding set point key.The associated set point screen will appear. Use the UP and DOWN keys to select the new set point value. Press the ENTER key to save the change.

Tip: Set points can also be changed with the keys on the ECC III's main control module CM1. For space temperature, press PRG and the DOWN arrow simultaneously. For relative humidity, press PRG and the UP arrow simultaneously. For water temperature, press PRG and ENTER simultaneously.

SPACE TEMPERATURE (RANGE 70–95˚F)

The space temperature should normally be set to about 2¼F above the pool water temperature to minimize the water evaporation rate.

SPACE RELATIVE HUMIDITY (RANGE 45–65%)

A normal setting for the space relative humidity set point is 50–60%. Lower set points require more electricity to satisfy the dehumidification requirement.

POOL WATER TEMPERATURE (RANGE 75–95˚F)

A normal setting for the pool water temperature set point is between 78°F and 83°F, depending on the type of use for the pool (competitive swimming *vs.* recreation).

SERVICE

The following instructions detail the service functions of the ECC III. These instructions are meant for use by a qualified HVAC service technician. Improper settings will cause poor operation.

CONFIGURATION MENU

—I KEY (ESC ON CM1 KEYPAD)

Pressing the I key or ESC prompts the user for the service password: 0005. Press the UP arrow key until the service password is displayed, then press the ENTER key. The user may then set the ECC III control parametersfor the specific application and user preferences.

Pressing the UP and DOWN arrow keys will cycle through the available parameters. When the parameter to be changed is shown on the screen, press the II key to move the cursor to the parameter's value. Once the cursor is highlighting the parameter to be changed, use the UP and DOWN arrow keys to change the value. Press ENTER to accept the new value. The cursor will then move to the next field on the screen. If no other parameter changes are required on the current screen, press the II key until the cursor returns to the upper left corner of the screen. The UP and DOWN arrow keys may now be used to navigate the parameter list again.

Tip: Parameters that correspond directly to the old ECC II are listed with the ECC II key number. Defaultparameter values are shown in bold-faced type.

The following parameters are available in the configuration menu:

Occupancy Schedule

The ECC III can store up to 28 schedule events. An event is a change to occupied mode or unoccupied mode.

To view the current list of events stored in the controller's memory, press the II key to move the cursor to the Event #: field. Use the UP and DOWN arrow keys to cycle through the events one at a time. It will take a second for the screen to update after the event number is changed. For each event, the screen shows the day of the week, the hour in 24-hour format, the minute, and the event type.

To enter or change an event, select the event number and then press ENTER. The cursor will move to the Day field. Use the UP and DOWN keys to select the correct day. Press ENTER. Set the correct hour. Press ENTER. Repeat this process for the minutes and event type. After pressing ENTER in the event type field, the cursor will move to the "Save This Event" field. If the event information shown on the screen is correct, use the UP arrow key to change the Save field to YES. The cursor will automatically return to the upper left corner of the screen. Otherwise, press ENTER while NO is displayed and repeat the process to enter the correct schedule information.

Purge Mode Schedule

The ECC III can store up to 28 schedule events. An event is a change to purge mode or "no purge" mode.

To view the current list of events stored in the controller's memory, press the II key to move the cursor to the Event #: field. Use the UP and DOWN arrow keys to cycle through the events one at a time. It will take a second for the screen to update after the event number is changed. For each event, the screen shows the day of the week, the hour in 24-hour format, the minute, and the event type.

To enter or change an event, select the event number and then press ENTER. The cursor will move to the Day field. Use the UP and DOWN keys to select the correct day. Press ENTER. Set the correct hour. Press ENTER. Repeat this process for the minutes and event type. After pressing ENTER in the event type field, the cursor will move to the "Save This Event" field. If the event information shown on the screen is correct, use the UP arrow key to change the Save field to YES. The cursor will automatically return to the upper left corner of the screen. Otherwise, press ENTER while NO is displayed and repeat the process to enter the correct schedule information.

Purge Mode -**OFF** *(Range OFF or ON)*

By opening the outside air and exhaust air dampers to 100%, the ECC III can introduce large quantities of outside air to the pool enclosure. This can be useful during "shocking" of the poolwater. Purge mode remains active for an adjustable period of time and then automaticallyterminates.

To start a purge cycle, move the cursor to the Purge Mode: parameter and set it to ON. If the ECC III detects a supply air temperature less than 40°F during a purge cycle, the cycle will be terminated immediately to protect the coils from freeze damage. Although compressor operation is disabled during purge mode, the ECC III will utilize the auxiliary air heating system to maintain the space temperature during a purge cycle.

Purge Length - **30 min** *(Range 1 to 999)*

This parameter sets the duration of a purge mode cycle in minutes.

Time Remaining - **Read Only**

This read only parameter indicates how many minutes remain in the current purge mode cycle.

053. Time SP - N/A

This parameter allows adjustment of the ECC III's internal clock. The time is in 24-hour format (e.g., 21:00:00 is 9 p.m.). It is normal for the field to briefly flash the old value when a change is made.

054. Day - N/A

This parameter allows adjustment of the day of the week in the internal calendar of the ECC III. It is normal for the field to briefly flash the old value when a change is made.

055. Date - N/A

This parameter allows adjustment of the month and day in the internal calendar of the ECC III. It is normal for the field to briefly flash the old value when a change is made.

056. Year - N/A

This parameter allows adjustment of the year in the internal calendar of the ECC III. It is normal forthe field to briefly flash the old value when a change is made.

057. Max Dpr % - **80%** (Range 0–100%)

Maximum outside air damper position set point. During normal operation, the outside air damper position will not exceed this number.

058. Min Dpr % - **20%** (Range 0–100%)

Minimum outside air damper position set point. During normal operation in occupied periods, the outside air damper position will not be less than this number. During unoccupied periods, the outside air damper may actually close depending on space conditioning requirements.

061. SI Display - **°F** (Range °F–°C)

This parameter allows the user to select the temperature units the ECC III will use to display system conditions and set points.

062. BaudRate - **4,800** (Range 1,200–19,200)

This parameter controls the baud rate of the ECC III's BAS serial port. When connected to a LonWorks¨ based BAS, this parameter must always be set to 4,800. For Modbus¨ networks, this parameter should be set as required for the installation.

063. Unit ID - **Read Only**

This read only parameter displays the ECC III's address on the private multi-unit network. The DIP switches, on control module CM1 in the PoolPak's control panel, set the value of this parameter.

071. Stages Installed - N/A (Range 1 to 4)

This parameter indicates how many compressor stages are installed in the PoolPak unit.

For an SWHP60, set this parameter to 1. For an SWHP80–SWHP120, set this parameter to 2.

For an SWHP140–SWHP190, set this parameter to 3. For an SWHP220–SWHP300, set this parameter to 4.

072. Ext Conds - 1 (Range 0 to 4)

This parameter indicates what type of external heat rejection (for air-cooling mode) is installed on the PoolPak unit.

For units with no external heat rejection, set this parameter to 0.

For a standard air-cooled condenser, set this parameter to 1.

For a cooling tower or chilled water condenser, set this parameter to 2.

For air cooling with a chilled water coil, set this parameter to 3.

073. Cpr Delay -**5** (Range 1 to 9)

This parameter sets the minimum time, in minutes, that the compressor must be off before it can be restarted.

This value is automatically reset to 5 minutes when power to the controller is cycled.

076. Manual Ctl - **0** (Range 0 to 1)

This parameter places the ECC III into manual control mode. The actual type of manual control is set by parameter

077. Manual Stg - **0** (Range 0 to 7)

This parameter sets the number of stages to be activated during Manual Modes 0, 1, and 2. It has no effect in Manual Mode 3.

078. Manual Mode - **0** (Range 0 to 3)

This parameter selects the type of manual mode operation as follows:

0 - Air Heating Mode

1 - Water Heating Mode

2 - Air Cooling Mode

3 - Output Test Mode

NOTE

All manual mode parameters are reset to the default values when power to the controller is cycled. Power to the controller must be cycled when the user is finished with manual control mode.

079. Split Wtr - **0** (Range 0 to 1)

This parameter indicates whether the PoolPak's water heating system is set up to heat a single pool (0) or two pools (1).

080. Temp Delay - **8.0** (Range 0.0 to 99.9)

This parameter is used by the ECC III's fuzzy logic engine for space temperature control. **Do not change this parameter unless instructed to do so by the factory.**

081. Dpt Delay - **5.0** (Range 0.0 to 99.9)

This parameter is used by the ECC III's fuzzy logic engine for space dew point control. **Do not change this parameter unless instructed to do so by the factory.**

082. Max T Rate - **4** (Range 0 to 99)

This parameter is used by the ECC III's fuzzy logic engine for space temperature control. **Do not change this parameter unless instructed to do so by the factory.**

083. Dpr Delay - **6.0** (Range 0.0 to 9.9)

This parameter is used by the ECC III's fuzzy logic engine for mixing box damper control. **Do not change this parameter unless instructed to do so by the factory.**

086. Aux Ht First - **No** (Range No to Yes)

This parameter determines whether the ECC III will use the compressor(s) or the auxiliary heat first when satisfying a space heating requirement. If there is a simultaneous dehumidification requirement, the compressor(s) will be activated.

A setting of No will cause the ECC III to use the compressor(s) before using the auxiliary heating system.

087. Aux Ht Inst - **3** (Range 0 to 3)

This parameter indicates how many stages of auxiliary air heat are installed in the PoolPak. Set this parameter to the actual number of stages installed. Use a setting of 3 for hot water and steam coils.

088. F/W Cool - **00.0** (Range 00.0 to 30.0)

This parameter controls the PoolPak's flywheel air conditioning feature. A setting of 00.0 disables flywheel cooling. A setting of 5.0 or greater activates flywheel cooling. The parameter value is the number of degrees that the space temperature is allowed to drop below the set point while cooling the pool during the unoccupied period.

NOTE

Parameters 90–99 are used to calibrate the ECC III's sensors. This offset value is added to the actual reading from the sensor. The resulting value is used for control and display. If a given sensor reads 2.0°F too high, the corresponding offset value should be set to –2.0°F.

090. Offs Rtn F - **00.0** (Range –99.9 to 99.9) - Space Temperature Sensor Offset

091. Offs Rtn % - **00.0** (Range –99.9 to 99.9) - Space Relative Humidity Sensor Offset

092. Offs OA F - **00.0** (Range –99.9 to 99.9) - Outside Air Temperature Sensor Offset

093. Offs OA % - **00.0** (Range –99.9 to 99.9) - Outside Air Relative Humidity Sensor Offset

094. Offs AOE F - **00.0** (Range –99.9 to 99.9) - Air Off Evap Temperature Sensor Offset

095. Offs AOE % - **00.0** (Range –99.9 to 99.9) - Air Off Evap Relative Humidity Sensor Offset

096. Offs PW#1 - **00.0** (Range –99.9 to 99.9) - Pool Water Temperature 1 Offset

097. Offs PW#2 - **00.0** (Range –99.9 to 99.9) - Pool Water Temperature 2 Offset

098. Offs Surf -**00.0** (Range –99.9 to 99.9) - Surface Temperature Sensor Offset

099. Offs Supl F - **00.0** (Range –99.9 to 99.9) - Supply Temperature Sensor Offset

100. Fan, Wtr - **O, F** (Range O or S, N or P or F)

This parameter indicates the type of PoolPak unit and the type of pool water condenser installed.

The first parameter before the comma indicates whether the PoolPak is a SR Series (O) or S, SE, SEP Series (S) design.

The second parameter indicates the type of pool water condenser, (N)ot installed, (P)artial condensing, or (F)ull condensing.

Network Ctl - Yes or **No**

This parameter determines whether the unit will participate in the master/slave environment.Setting this parameter to No will cause the unit to operate as a standard single unit. The unit willnever become the master on the network and will not listen to demands broadcast by the master. Although units with this parameter set to No do not participate in the master/slave environment, they are still accessible from any RIU connected to the network.

Water Temp Ctl - **Local** or Net

This parameter determines whether the unit will control water temperature based on the master'scommand (Net) or its own temperature sensor and set points (Local). If a unit set to Local becomes the master in the network, other units in the network will not use the master's command for water heating. Instead, they will look for the next unit in line that is set for Net water temperature control.Typically, this parameter is set to Local only when the unit is connected to a different pool than the rest of the units on the network.

BAS Addr - **001**

This parameter is the address of the controller on the BAS network. This parameter may be adjusted as necessary for a Modbus¨ based network. For LonWorks¨ based networks, this parameter must always be set to 1.

LonWorks Inst - Yes or **No**

This parameter configures the ECC III to use the LonWorks¨ interface card. If this parameter is not set to Yes when connected to a LonWorks¨ network, the ECC III values, as seen by the LonWorks¨ devices, will be incorrect.

SpclOptxxxx - Yes or **No**

All parameters starting with the prefix "SpclOpt" enable special control sequences.

Leave all special control sequences disabled unless instructed otherwise by the factory.

DCV Installed - Yes or **No**

This parameter indicates whether the demand-controlled ventilation option is installed. This option consists of a unit-mounted sensor that measures the CO_2 level in the space. As the CO_2 level rises above a set point, the ECC III will override the minimum damper set point to provide additional outside air for ventilation.

Dpr Offs Lim - **15.0** (Range 00.0 to 30.0)

This parameter sets the maximum amount (%) that the minimum damper position can be offset for CO_2-based ventilation.

Min CO_2 Level -**500.0** (Range 0000.0 to 3000.0)

This parameter sets the CO_2 level at which the damper position override is activated.

Max CO_2 Level - **800.0** (Range 0000.0 to 3000.0)

This parameter sets the CO_2 level at which the damper position override is at the maximum allowed offset (Dpr Offs Lim).

OA Temp Lim - **050.0** (Range 000.0 to 100.0)

This parameter sets the outside air temperature at which the ECC III starts to limit the outside air damper position to ensure the mixed air temperature is at least 50°F.

Do not change this parameter unless instructed to do so by the factory.

Ser Port Proto - **RS485** (RS485, RS232, or MBRTU)

This parameter sets the protocol assigned to the ECC III's BAS serial port communication. Units with a LonWorks¨ interface should be set for RS485. Units with a Modbus¨ interface should be set for MBRTU.

Dpr Err Tol % **-3.0%** (Range 0.0 to 100%)

This parameter sets the maximum discrepancy allowed between the requested damper position andthe actual position before a damper position error is shown.

Do not change this parameter unless instructed to do so by the factory.

Fuzzy Calc Dly **-020** (Range 10 to 100)

This parameter controls the frequency of the fuzzy logic engine's calculations.

Do not change this parameter unless instructed to do so by the factory.

Stg Delays

The parameters on this screen set the delay times for compressor staging.

The parameters listed for Low Press set the low pressure cutout bypass duration.

The ECC III will ignore the low pressure cutout input for this many seconds after a compressor is started or staged up or down.The four staging delay times should be set to **180** for PoolPaks equipped with scroll compressors.

Older PoolPaks, equipped with semi-hermetic reciprocating compressors should have staging delay times of **30**. The low pressure cutout bypass should be set for **20**.

Do not change these parameters unless instructed to do so by the factory.

Cur Dly

The parameters on this screen set the time in seconds that the ECC III waits after starting a motor to check for current. If this many seconds have elapsed and the current read by the ECC III is still less than the threshold value, a fan or compressor alarm will be generated.

Supply Fan, Return Fan, and Compressor 1 should be set to **5** seconds.

Compressor 2 should be set to **9** seconds.

Do not change these parameters unless instructed to do so by the factory.

Prf Cur

The parameters on this screen set the threshold values for motor current. If the measured motor current is less than this value, the ECC III reads the motor status as off. Conversely, if the motor current is greater than this value, the motor status is on. All four parameters should be set to **2.5A**.

Do not change these parameters unless instructed to do so by the factory.

Enable Pumpdown - Yes or **No**

This parameter indicates whether the ECC III will perform a pumpdown cycle before shutting off a compressor.

This parameter should be set to No for units equipped with scroll compressors.

Older units with semi-hermetic reciprocating compressors should be set to Yes.

Cmpr Type - **SCROLL** or RECIP

This parameter indicates the type of compressor installed in the unit.

Improper setting of this parameter may cause permanent damage to the unit.

Refrig Size

This parameter indicates the size of the refrigeration system installed in the unit. Proper setting of this parameter should match the first section of the unit model number shown on the data plate.

Example: For unit model number SWHP300-40E, this parameter should be set to SWHP300.

Setpoint Passwd - **0000** (Range 0000 to 9999)

This parameter can be used to require a password for set point changes. If this parameter is set to 0000, no password will be required.

Setting this parameter to any other value will cause the ECC III to ask for a password whenever a set point button is pressed. The password value is the same as the value set for this parameter.

Damper Pos Corr - **On** or Off

This parameter enables damper position correction based on the feedback signal from the actuator.

DprMinVolts - **2.0** (Range 0.0 to 10.0)

This parameter sets the analog output voltage that sets the damper actuators to 0% open. The value of this parameter must be less than DprMaxVolts for proper operation.

DprMaxVolts - **10.0** (Range 0.0 to 10.0)

This parameter sets the analog output voltage that sets the damper actuators to 100% open. The value of this parameter must be greater than DprMinVolts for proper operation.

AuxAirMinVolts - **2.0** (Range 0.0 to 10.0)

This parameter sets the analog output voltage that sets the hot water valve actuator to 0% open. The value of this parameter must be less than AuxAirMaxVolts for proper operation.

AuxAirMaxVolts - **10.0** (Range 0.0 to 10.0)

This parameter sets the analog output voltage that sets the hot water valve actuator to 100% open. The value of this parameter must be greater than AuxAirMinVolts for proper operation.

Fire Trip Actv - **CLOSE** (Range OPEN or CLOSE)

This parameter sets the operation of the digital input for fire trip mode.

A setting of CLOSE means fire trip mode will be active when the dry contacts connected to the PoolPak are closed. A setting ofOPEN means fire trip mode will be active when the dry contacts are open.

Smk Purge Actv - **CLOSE** (Range OPEN or CLOSE)

This parameter sets the operation of the digital input for smoke purge mode.

A setting of CLOSE means smoke purge mode will be active when the dry contacts connected to the PoolPak are closed. A setting of OPEN means smoke purge mode will be active when the dry contacts are open.

ADVANCED CONFIGURATION MENU

—IV KEY (ESC + UP ON CM1'S KEYPAD)

Pressing the IV key prompts the user for the password: 9995. Press the DOWN arrow key until the service password is displayed and then press the ENTER key. The parameters contained in the advanced configuration menu are for use by an experienced HVAC service technician only. Improper settings will cause poor operation and, in some cases, permanent damage to the PoolPak unit.

The advanced configuration menu contains parameters of two major types: detailed sensor configuration and manual control of each analog input, analog output, and digital output.

Sensor Configuration Properties

Each sensor configuration screen contains the following parameters:

Fail - **Read Only**

This flag indicates the current status of the sensor. A value of **OFF** is normal, indicating that the reading from the sensor is within the expected range. A value of ON indicates that the value read from the sensor is outside of the expected range.

Tol - (Range varies by sensor)

This value is the tolerance used by the sensor failure detection feature. If the reading of the sensor is greater than the Max parameter plus the tolerance parameter, the sensor is considered failed. If the reading from the sensor is less than the Min parameter minus the tolerance parameter, the sensor is also considered failed. This parameter is present only on the screens for current loop based sensors (4–20 mA).

Offs - (Range varies by sensor)

This value is added to the actual reading from the sensor. The resulting value is used by the ECC III for control decisions.

Example: If the reading from the space relative humidity sensor is 2.0% higher than the actual value, setting the offset parameter to –2.0% will calibrate the sensor reading. The offsets for common sensors are also adjustable from the configuration menu as parameters 90–99.

Min - (Range varies by sensor)

For current loop sensors (4–20 mA), this parameter is the sensor value when the current in the loop is 4 mA. For voltage mode signals (0–10 VDC), this parameter is the sensor value when the voltage is 0 VDC. For thermistor based sensors, this parameter is the low limit value. Any sensor with a reading less than this parameter will be flagged as failed.

Max - (Range varies by sensor)

For current loop sensors (4–20 mA), this parameter is the sensor value when the current in the loop is 20 mA. For voltage mode signals (0–10 VDC), this parameter is the sensor value when the voltage is 10 VDC. For thermistor-based sensors, this parameter is the high limit value. Any sensor with a reading greater than this parameter will be flagged as failed.

Ovrd **-000.0** (Range varies by sensor)

Setting this parameter to a non-zero value will cause the ECC III to use this number instead of the actual reading from the sensor. This parameter is stored in the ECC III's permanent memory and will remain even if power to the controller is cycled.This parameter can be used to temporarily restore unit operation if a sensor has failed.

The following sensor configuration screens are available:

SplyFanCurr - Supply Fan Current Transducer

Default Values: Tol = 5.0, Min = 0.0, Max = 100.0

RtnFanCurr - Return Fan Current Transducer

Default Values: Tol = 5.0, Min = 0.0, Max = 100.0

Cmpr1Curr - Compressor System 1 Current Transducer

Default Values: Tol = 5.0, Min = 0.0, Max = 100.0

RtnAirRH - Space Relative Humidity Sensor

Default Values: Tol = 5.0, Min = 0.0, Max = 100.0

OutsAirRH - Outside Air Relative Humidity Sensor

Default Values: Tol = 5.0, Min = 0.0, Max = 100.0

AirOffEvapRH - Air Leaving Evaporator Relative Humidity Sensor

Default Values: Tol = 5.0, Min = 0.0, Max = 100.0

Cmpr2Curr - Compressor System 2 Current Transducer

Default Values: Tol = 5.0, Min = 0.0, Max = 100.0

OAFltrPD - Outside Air Filter Pressure Drop Sensor

Default Values: Tol = 5.0, Min = 0.0, Max = 200.0

RtnFltrPD - Return Air Filter Pressure Drop Sensor

Default Values: Tol = 5.0, Min = 0.0, Max = 200.0

ExhDprFdBk - Exhaust Damper Actuator Feedback Signal

Default Values: Tol = 5.0, Min = –25.0, Max = 100.0

OutsDprFdBk - Outside Damper Actuator Feedback Signal

Default Values: Tol = 5.0, Min = –25.0, Max = 100.0

RcrcDprFdBk - Recirculation Damper Actuator Feedback Signal

Default Values: Tol = 5.0, Min = –25.0, Max = 100.0

RtnAirCO2 - Space Air CO_2 Level Sensor

Default Values: Tol = 50.0, Min = 0000.0, Max = 2000.0

SpacePres - Space Air Pressure Sensor

Default Values: Tol = 5.0, Min = 000.0, Max = 500.0

Cpr1SucPr - Compressor System 1 Suction Pressure Transducer

Default Values: Tol = 10.0, Min = 000.0, Max = 250.0

Cpr2SucPr - Compressor System 2 Suction Pressure Transducer

Default Values: Tol = 10.0, Min = 000.0, Max = 500.0

Cpr2DisPr - Compressor System 2 Discharge Pressure Transducer

Default Values: Tol = 10.0, Min = 000.0, Max = 500.0

Cpr1DisPr - Compressor System 1 Discharge Pressure Transducer

Default Values: Tol = 10.0, Min = 000.0, Max = 500.0

RtnAirTemp - Space Temperature Sensor

Default Values: Min = 025.0, Max = 135.0

OutsAirTemp - Outside Air Temperature Sensor

Default Values: Min = –040.0, Max = 135.0

AOETemp - Air Leaving Evaporator Temperature Sensor

Default Values: Min = 020.0, Max = 110.0

SurfaceTemp - Cold Surface Temperature Sensor

Default Values: Min = 000.0, Max = 135.0

PoolTemp1 - Pool 1 Temperature Sensor

Default Values: Min = 030.0, Max = 135.0

PoolTemp2 - Pool 2 Temperature Sensor

Default Values: Min = 030.0, Max = 135.0

SplyAirTemp - Supply Air Temperature Sensor

Default Values: Min = 000.0, Max = 180.0

SpclOptAI1 - Special Option Thermistor Input 1

Default Values: Min = 000.0, Max = 150.0

SpclOptAI2 - Special Option Thermistor Input 2

Default Values: Min = 000.0, Max = 150.0

SpclOptAI3 - Special Option Thermistor Input 3

Default Values: Min = 000.0, Max = 150.0

SpclOptAI4 - Special Option Thermistor Input 4

Default Values: Min = 000.0, Max = 150.0

Cmpr1SuctT - Compressor System 1 Suction Temperature Sensor

Default Values: Min = 000.0, Max = 135.0

Cmpr2SuctT - Compressor System 2 Suction Temperature Sensor

Default Values: Min = 000.0, Max = 135.0

Cmpr2MiscT - Compressor System 2 Misc. Temperature Sensor

Default Values: Min = –040.0, Max = 150.0

Cmpr1MiscT - Compressor System 1 Misc. Temperature Sensor

Default Values: Min = –040.0, Max = 150.0

Manual Control Parameters

The ECC III contains an enhanced manual control mode for improved troubleshooting efficiency. This allows a qualified HVAC service technician to manually control all digital and analog outputs.

WARNING!

Before using any of the manual control mode functions, place the controller into manual output test mode. This can be done through parameters 76 and 78 under theconfiguration menu (Key I). Set parameters 76 to 1 and 78 to 3. This willimmediately shut off all digital outputs and bypass all normal control logic. When manually energizing digital outputs, make sure that the power to the compressor contactors is disconnected at the motor starter or compressor disconnect switch. Energizing compressors while all solenoid valves are closed may cause permanent damage to the unit!

Digital Output Tests

Each digital output of the ECC III may be controlled individually by setting the corresponding parameter to one of three possible values: AUTO, ON, or OFF. A setting of AUTO gives control of the digital output relay to the software in the ECC III. ON will force the output relay to energize regardless of the status requested by the software. OFF will force the output relay to deenergize regardless of the status requested by the software.

The following manual digital output parameters are available:

Sply Fan Outp - Supply Fan Contactor

Rtn Fan Outp - Return Fan Contactor Aux Air 1

Outp - Auxiliary Air Heating Stage 1 Relay

Aux Air 2 Outp - Auxiliary Air Heating Stage 2 Relay

Aux Air 3 Outp - Auxiliary Air Heating Stage 3 Relay

Aux Wtr 1 Outp - Auxiliary Water Heating 1 Relay

Aux Wtr 2 Outp - Auxiliary Water Heating 2 Relay

Alarm Outp - Alarm Output Relay

S1 Cmpr 1 Outp - Compressor 1A Contactor (Scrolls); Sys 1 Compressor Contactor (Recip)

S1 Cmpr 2 Outp - Compressor 1B Contactor (Scrolls); Sys 1 Stage 2 Unloader (Recip)

S1 Cmpr 3 Outp - Compressor 1C Contactor (Scrolls); Sys 1 Stage 3 Unloader (Recip)

S1 AC Sol Outp - System 1 AC Solenoid Valve

S1 Liq #1 Outp - System 1 Liquid Solenoid Valve 1

S1 Liq #2 Outp - System 1 Liquid Solenoid Valve 2

S1 Wtr Sl Outp - System 1 Water Heating Solenoid Valve

S1 Reh 1 Outp - System 1 Air Reheat Solenoid Valve 1

S1 Reh 2 Outp - System 1 Air Reheat Solenoid Valve 2

S1 RH Sft Strt - System 1 Air Reheat Solenoid Valve 4

S2 Cmpr 1 Outp - Compressor 2A Contactor (Scrolls); Sys 2 Compressor Contactor (Recip)

S2 Cmpr 2 Outp - Compressor 2B Contactor (Scrolls); Sys 2 Stage 2 Unloader (Recip)

S2 AC Sol Outp - System 2 AC Solenoid Valve

S2 Liq #1 Outp - System 2 Liquid #1 Solenoid Valve

S2 Liq #2 Outp - System 2 Liquid #2 Solenoid Valve

S2 Wtr Sl Outp - System 2 Water Heating Solenoid Valve

S2 Reh 1 Outp - System 2 Air Reheat Solenoid Valve 1

S2 Reh 2 Outp - System 2 Air Reheat Solenoid Valve 2

Exh Fan Outp - Exhaust Fan Contactor

Spl 1 Dig Outp - Special Option Digital Output Relay 1

Spl 2 Dig Outp - Special Option Digital Output Relay 2

S2 RH Sft Strt - System 2 Air Reheat Solenoid Valve 4

S2 Cmpr 3 Outp - Compressor 2C Contactor (Scrolls); Sys 2 Stage 3 Unloader (Recip)

Analog Output Tests

Each analog output of the ECC III may be controlled individually by setting the corresponding parameter. If the parameter is set to 0, the analog output will remain under the control of the ECC III's software. Any other value will override automatic control and force the output to the value of this parameter. To manually force an output to 0, set the parameter to 0.1.

The following analog output test parameters are available:

Exh Dpr Pos - Exhaust Air Damper Actuator Position

Rcrc Dpr Pos - Recirculation Air Damper Actuator Position

Outs Dpr Pos - Outside Air Damper Actuator Position

AuxAirHtSig - Auxiliary Air Heating Control Valve Position

Spl1AlgOut - Special Option Analog Output 1

Spl2AlgOut - Special Option Analog Output 2

Spl3AlgOut - Special Option Analog Output 3

Spl4AlgOut - Special Option Analog Output 4

SYSTEM STATUS INFORMATION

—III KEY (ESC + DOWN ON CM1'S KEYPAD)

Pressing the III key accesses the System Status Information menu. Use the Up and Down keys to scroll through the list of parameters. All parameters contained in this menu are read only.

Tip: Parameters that correspond directly to the old ECC II are listed with the ECC II key number. The following parameters are available in this menu:

01. Day Of Week - Occupancy Status - Date
    Occupancy Status is shown as an "O" for occupied and a "U" for unoccupied.

02. Time - Time of Day

03. Spc Air T - Space Air Temperature

04. Spc RH % - Space Relative Humidity

05. PoolWtr 1 - Pool Water Temperature 1

06. PoolWtr 2 - Pool Water Temperature 2

07. Outside T - Outside Air Temperature

08. Outside % - Outside Air Relative Humidity

09. Damper Pos - Outside Air Damper Position

Indicates the requested position of the outside air and exhaust air dampers. Recirculation damper position is 100% minus this value.

10. Compr #1 - System 1 Compressor Status

OFF or ON

11. Compr Avl #1 - System 1 Compressor Anticycle Timer Status

NO or YES. YES means the anticycle duration has elapsed and the compressor can be started.

12. Low Press #1 - System 1 Low Pressure Cutout Status

NRM or LOW. NRM is normal. LOW means the low pressure cutout switch is open.

13. Hi Press #1 - System 1 High Pressure Cutout Status

NRM or ALM. NRM is normal. ALM means the high pressure cutout has opened and the compressor is supposed to running.

14. Oil Press #1 - Sys 1 Compressor Oil Pressure Status (Recip Only)

NRM or ALM. NRM is normal. ALM means the oil pressure in the compressor is too low.

15. Motor T #1 - Sys 1 Compressor Motor Temperature Cutout Status

NRM or ALM. NRM is normal. ALM means the winding temperature inside the compressor is too high or the compressor circuit breaker has tripped.

16. Operation #1 - System 1 Compressor Control Switch Status

RUN or PD. PD is pumpdown. Units with scroll compressors do not use pumpdown. In this case, the compressor will simply shut off when the switch is placed in the PD position.

17. Stages #1 - System 1 Compressor Stages Active

0, 1, 2, or 3 as applicable

18. Curr Flt #1 - System 1 Current Compressor Fault Code

0 - Normal Operation, No Faults
1 - Compressor Control Switch in Pumpdown/Off Position
2 - System Startup Is Active (2 minutes after power application)
3 - Return Fan Motor Not Running
4 - Supply Fan Motor Not Running
5 - Fire Trip Active
6 - Smoke Purge Active
7 - Space Temperature Sensor Error (<60°F or >105°F)
8 - Supply and Return Fan Motors Not Running
9 - Supply Temperature Less Than 40°F. Freeze Danger.
11 - Low Oil Pressure (Recip Only)
13 - Low Refrigerant Pressure
14 - High Motor Temperature
15 - High Refrigerant Pressure
50 - 10 Faults Since Last Reset, Compressor Locked Out

19. Last Flt #1 - System 1 Last Compressor Fault Code

The same codes apply as shown for 18.

20. Compr #2 - System 2 Compressor Status

    OFF or ON

21. Compr Avl #2 - System 2 Compressor Anticycle Timer Status

    NO or YES. YES means the anticycle duration has elapsed and the compressor can be started.

22. Low Press #2 - System 2 Low Pressure Cutout Status

    NRM or LOW. NRM is normal. LOW means the low pressure cutout switch is open.

23. Hi Press #2 - System 2 High Pressure Cutout Status

    NRM or ALM. NRM is normal. ALM means the high pressure cutout has opened and the compressor is supposed to running.

24. Oil Press #2 - Sys 2 Compressor Oil Pressure Status (Recip Only)

    NRM or ALM. NRM is normal. ALM means the oil pressure in the compressor is too low.

25. Motor T #2 - Sys 2 Compressor Motor Temperature Cutout Status

    NRM or ALM. NRM is normal. ALM means the temperature of the windings inside the compressor is too high or the compressor circuit breaker has tripped.

26. Operation #2 - System 2 Compressor Control Switch Status

    RUN or PD. PD is pumpdown. Units with scroll compressors may not use pumpdown. In this case, the compressor will simply shut off when the switch is placed in the PD position.

27. Stages #2 - System 2 Compressor Stages Active 0, 1, 2, or 3 as applicable

28. Curr Flt #2 - System 2 Current Compressor Fault Code

    0 - Normal Operation, No Faults
    1 - Compressor Control Switch in Pumpdown/Off Position
    11 - Low Oil Pressure (Recip Only)
    13 - Low Refrigerant Pressure
    14 - High Motor Temperature
    15 - High Refrigerant Pressure
    50 - 10 Faults Since Last Reset, Compressor Locked Out

29. Last Flt #2 - System 2 Last Compressor Fault Code

    The same codes apply as shown for 28.

30. Supply Fan - Supply Fan Motor Status

    ON or OFF

31. Return Fan - Return Fan Motor Status

    ON or OFF

32. Smoke Purge - Smoke Purge Input Status

    NRM or ALM. NRM is normal.

33. Fire Trip - Fire Trip Input Status

    NRM or ALM. NRM is normal.

34. Surface T - Surface Temperature

35. Supply T - Supply Air Temperature

36. Dampr Err -Damper Error Code

    000 - Normal Operation, No Error
    003 - Outside Air Damper Position Error
    020 - Exhaust Air Damper Position Error
    023 - Exhaust Air and Outside Air Damper Position Error
    050 - Exhaust and Recirc Dampers Closed. Return Fan Off
    060 - Recirc and Outside Dampers Closed. Supply Fan Off
    070 - OA Damper Open and OA Temp <40°F. Both Fans Off
    080 - All three dampers closed. Both Fans Off
    100 - Recirc Air Damper Position Error
    103 - Recirc and Outside Air Damper Position Error
    120 - Recirc and Exhaust Air Damper Position Error
    123 - Recirc, Exhaust, and Outside Air Damper Position Error

37. Wtr #1 Need - Pool 1 Water Heating Requirement

    YES or NO. YES indicates that pool 1 has a water heating requirement.

38. Wtr #2 Need - Pool 2 Water Heating Requirement

    YES or NO. YES indicates that pool 2 has a water heating requirement.

39. Wtr Flow #1 - System 1 Pool Water Flow Switch Status

    ON or OFF

40. Wtr Flow #2 - System 2 Pool Water Flow Switch Status

    ON or OFF

41. Off Evap - Air Leaving Evaporator Temperature

42. Off Evap % - Air Leaving Evaporator Relative Humidity

43. AOE Dpt - Air Leaving Evaporator Dewpoint Temperature

44. Space Dpt - Space Dewpoint Temperature

45. Outs Dpt - Outside Air Dewpoint Temperature

46. Ht/Cool Need - Current Space Heating and Cooling Requirements

    A positive value indicates a heating requirement. A negative value indicates a cooling requirement. A value of 0 indicates no heating or cooling is required. If the compressors are running for dehumidification, the unit will default to air heating.

47. Dehumid Need - Current Space Dehumidification Requirements

    A value of 0 indicates no dehumidification is required.

48. Stages - Compressor Stages Running

    0, 1, 2, 3, or 4 as applicable

49. Version -ECC III Software Version Number

104. Purge - Purge Mode Status

    ON or OFF. ON indicates the unit is currently operating in purge mode.

124. ACC #1 Stat - System 1 Air Cooled Condenser Status

    ON or OFF. ON indicates that power is on and the outside air temperature is greater than 60¼F if equipped with a remote air-cooled condenser or the entering water temperature is less than 90¼F if equipped with a water-cooled condenser. If this parameter is OFF, the ECC III will not select air conditioning mode.

125. ACC #2 Stat - System 2 Air Cooled Condenser Status

    ON or OFF. ON indicates that power is on and the outside air temperature is greater than 60¼F if equipped with a remote air-cooled condenser or the entering water temperature is less than 90¼F if equipped with a water-cooled condenser. If this parameter is OFF, the ECC III will not select air conditioning mode.

140. Cpr 1 Mode - System 1 Mode of Operation

    0 - Pumpdown/Off
    1 - Air Heating
    3 - Water Heating
    4 - Air Cooling

141. Cpr 2 Mode - System 2 Mode of Operation

    0 - Pumpdown/Off
    1 - Air Heating
    3 - Water Heating
    4 - Air Cooling

142. Occ_Flag - Occupancy Mode

    OCC - Occupied
    UNOCC - Unoccupied

170. Fault Cnt 1 - System 1 Compressor Fault Count Since Last Reset

    If the value of this parameter reaches 10, the compressor will be locked out. The unit must be reset to allow the compressor to run.

171. Fault Cnt 2 - System 2 Compressor Fault Count Since Last Reset

    If the value of this parameter reaches 10, the compressor will be locked out. The unit must be reset to allow the compressor to run.

172. Exh Dpr - Actual Exhaust Air Damper Position

    This is the actual position of the exhaust air damper as reported by the actuator’s feedback signal.

173. Rcrc Dpr - Actual Recirculation Air Damper Position

    This is the actual position of the recirculation air damper as reported by the actuator’s feedback signal.

174. Outs Dpr - Actual Outside Air Damper Position

This is the actual position of the outside air damper as reported by the actuator's feedback signal.

175. Des Dpr - Desired Outside Air Damper Position

This is the position of the outside air damper requested by the ECC III's mixing box controlroutine.

176. Min D Alw - Minimum Damper Position Setpoint

177. Max D Alw - Maximum Damper Position Setpoint

178. Economiz - Economizer Status

ON or OFF. ON indicates that the ECC III is currently using the economizer feature to maintain space conditions.

180. Aux Air Ht - Auxiliary Air Heating Stages Active

0, 1, 2, or 3 as applicable.

181. Aux Wtr 1 - Pool 1 Auxiliary Water Heater Status

YES or NO. YES indicates that auxiliary water heating is needed for pool 1. The relay contacts for the interface with the auxiliary heating system are normally closed. This means that the ECC III will energize the relay to shut off the auxiliary pool water heater.

182. Aux Wtr 2 - Pool 2 Auxiliary Water Heater Status

YES or NO. YES indicates that auxiliary water heating is needed for pool 2. The relay contacts for the interface with the auxiliary heating system are normally closed. This means that the ECC III will energize the relay to shut off the auxiliary pool water heater.

183. Flywhl Act - Flywheel Cooling Status

YES or NO. YES indicates that flywheel cooling is active.

184. Cpr1 Remain - System 1 Anticycle Time Remaining

This parameter is the number of seconds remaining in the compressor's anticycle timer. When this number reaches 0, the compressor can be started immediately.

185. Cpr2 Remain - System 2 Anticycle Time Remaining

This parameter is the number of seconds remaining in the compressor's anticycle timer. When this number reaches 0, the compressor can be started immediately.

Sply Fan Curr - Supply Fan Motor Current

Rtn Fan Curr - Return Fan Motor Current

Cmpr 1 Curr - System 1 Compressor Current

Cmpr 2 Curr - System 2 Compressor Current

Dpr Limit Code - Damper Position Limit Code

0 - Standard Min and Max Position Set Points.
1 - Fire Trip. Outside and Exhaust Dampers to 0%.
2 - Smoke Purge. Outside and Recirc Dampers to 0%. Exhaust Damper to 100%.
3 - Unoccupied Mode with No Dew Point Override. Outside and Exhaust Dampers May Close to 0%.
4 - Flywheel Air-Conditioning. Outside and Exhaust Dampers to 100%.
5 - Outside Air Temp Below Limit. Outside Damper Position Limited to Maintain 50¼F Mixed Air Temperature.
6 - Air-Cooling Required and Compressor is Active.
7 - Air Heating or Dehumidification and Compressor is Active.
8 - Supply Temperature Less than 40¼F. Outside Air Damper to 0%.
9 - Heating and Outside Air Temperature is Less than Air Leaving Evaporator Temperature.
10 - System Startup Mode is Active.

FzyDprChg - Fuzzy Logic Mixing Box Control Output

0.0 - 150.0

A value greater than 75.0 indicates that the fuzzy logic routine has determined that the outside air damper should be moved toward the open position. Values less than 75.0 indicate that the outside air damper should be moved toward the closed position. As the value gets farther from 75.0, the changes to the damper position will be more aggressive and frequent.

FzyRatCprChg - Fuzzy Logic Space Temperature Control Variable

0.0 - 200.0

A value greater than 100.0 indicates that the fuzzy logic routine has determined that the number of heat/cool stages should be increased. Values less than 100.0 indicate that the number of heat/coolstages should be decreased. As the value gets farther away from 100.0, changes to the number ofstages will happen more often.

FzyDptCprChg - Fuzzy Logic Dew Point Control Variable

0.0 - 200.0

A value greater than 100.0 indicates that the fuzzy logic routine has determined that the number of dehumidification stages should be increased. Values less than 100.0 indicate that the number of dehumidification stages should be decreased. As the value gets farther away from 100.0, changes to the number of stages will happen more often.

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ECC III NETWORK OPERATION

ECC III networking allows up to five PoolPak units to be connected together over a proprietary, private network.The units will work with each other to control water temperature, air temperature, and relative humidity.Networked PoolPak units have all the features of standard PoolPaks plus the ability to control water temperature in multiple pools. All units on the network are accessible from any RIU on the network. Refer to Figure 21 for multiple SWHP unit field communication loop connections.

Networked ECC III units operate in a master/slave environment. This means that the fuzzy logic engine in one unit (master) determines heating, cooling, and dehumidification requirements and broadcasts them over the network to the other units (slaves). This ensures that each unit will make control decisions based on the same information. During steady state conditions, all units networked together will operate in the same basic mode (i.e., heating or cooling). Slight discrepancies in damper position and number of stages active are normal. This is caused by slight sensor calibration differences among the units.

Each networked unit contains all sensors and controls necessary for independent operation and is capable of acting in the master role. Units on the network are identified by an address of one to five. The unit with the lowest address having no uncleared alarms will be the master unit. If an alarm condition occurs in the master unit, it will give up the role of master. The unit with the next lowest address and no uncleared alarms will take over the master role. The unit that experienced the alarm condition will operate in the slave role until the alarm is cleared at the RIU.
In the unlikely event that all units have uncleared alarms, they will each act individually.

A single RIU can be used to monitor all units on the network. Indicator lights beside Roman numeral buttons I through V indicate which unit is being displayed. The next unit in line can be selected by pressing the V button. If an alarm condition occurs in a unit, the corresponding light will flash and the RIU will automatically switch to the unit with the alarm. The light will continue to flash even if the RIU is displaying another unit.

For the standard configuration, all set points can be changed while the RIU is displaying any unit. The set point is automatically updated in every unit on the network. Other configurations may require the RIU to be displayinga particular unit to change the set point.

The RIU provides two network status screens. They can be accessed through the status menu accessed with key

III. The first screen displays the status of units one through five as ONLINE or OFFLINE. Use this screen to verify that all units on the network are connected and communicating with each other. The second screen displays network information for the unit that is being displayed by the RIU, including network role, connectionstatus, and network address.

CM1 CONFIGURATION

The unit's networking address is set by the DIP switches located next to connector J11 on control module CM1 inthe PoolPak's control panel. All DIP switches should be OFF except as follows:

Unit Address = 1, SW1 = ON

Unit Address = 2, SW2 = ON

Unit Address = 3, SW1 = ON, SW2 = ON

Unit Address = 4, SW3 = ON

Unit Address = 5, SW1 = ON, SW3 = ON

RIU CONFIGURATION

The network address is set by DIP switches located on the back of the RIU. The following table shows the correct switch positions for the common RIU addresses.

Address	DIP SW 1	DIP SW 2	DIP SW 3	DIP SW 4
10	OFF	ON	OFF	ON
11	ON	ON	OFF	ON
12	OFF	OFF	ON	ON

To configure the ECC III's RIU addresses, press and hold keys I, II, and III at the same time for approximately 10 seconds. The display will show the RIU address and ask for the "IO Board Addr". Use the UP and DOWN keys to select the ECC III address to be configured, then press ENTER. Use the keypad to enter the RIU configuration. Set the terminal type as "SH" for shared. When prompted "OK?", select "Y" to save the configuration and to exit. The RIU will go blank and then beep several times before bringing up the normal statusdisplay.

NETWORK CONFIGURATION

Using the following parameters, it is possible to configure the ECC III network to accommodate a wide variety of installation options. Press the I key to access these parameters on the configuration menu. These parameters must be set in each unit individually. Default values are shown in bold type.

Network Ctl - Yes or **No**

Determines whether the unit will participate in the master/slave environment. Setting this parameter to **No** will cause the unit to act like a standard single ECC III unit. This unit will never become the master on the network and will not listen to the control variables broadcast by the master. Although units with this parameter set to **No** do not participate in the master/slaveenvironment, they are still accessible through any network RIU. Like **Local** pool water control, this parameter, when set to **No**, requires this unit to be displayed on the RIU before changing any of the set points.

Water Temp Ctl - **Local** or Net

Determines whether the unit will control water temperature based on the master's command (Net) or its own temperature sensor(s) and set points (**Local**). If a unit set to **Local** becomes the master, other units in the network will not use the master's command for water heating. Instead, they will look at the next unit in line that is not set to **Local**. This parameter is set to **Local** only if the unit is connected to a different pool than the rest of the units on the network. Because the unit iscontrolling water temperature on its own, it is necessary to select the correct unit with the RIU before changing the water temperature set point.

CHANGING NETWORK SET POINTS

Each unit on the network maintains two groups of set points: network and local. If a unit has the Network Ctl parameter set to Yes and the Water Temp Ctl parameter set to Net, it will control to the network set points. Set points changed when the RIU is displaying this unit will be changed in every unit on the network with the sameNetwork Ctl and Water Temp Ctl parameters. Units that are configured for Network Ctl and **Local** Water TempCtl will use the local water temperature set point and the network air temperature and relative humidity setpoints. The water temperature set point will only be changed in the unit currently being displayed by the RIU.Units that are not configured for Network Control will use all local set points. Therefore, any set points changed while the control panel is displaying this unit will be changed only in this unit.

TROUBLESHOOTING

When properly installed according to the instructions in this manual, the PoolPak ECC III control system will perform as designed and will provide a pool environment that is both comfortable and cost effective. However,in the unlikely event that the system does not function properly, the ECC III has many features that will help a service technician resolve the issue.

The PoolPak has numerous safety devices designed to protect the system from failures. The compressor(s) will be shut down when any of the following occur:

High Refrigerant Pressure

Low Refrigerant Pressure

High Compressor Motor Temperature

Low Compressor Oil Pressure

Fan Motors Not Operating

Compressor Motor Overload

Additionally, the compressor and/or fan motors will be shut down when a fire control system alerts the ECC III that a fire trip or smoke purge mode of operation is required.

Whenever a fault condition occurs, the alarm button on the RIU and CM1 will glow red and the displays willshow the fault condition and a recommended course of action. After 10 compressor-related faults occur, the affected compressor system will be locked out for protection. Repetitive faults can cause compressor motor failure. When a compressor fault condition exists, it must be diagnosed and corrected before resetting the system.

After a fault has been eliminated, the control panel alarm light will remain lit. However, the alarm will no longer be shown in the normal status screen rotation. Pressing the alarm key will show any faults that have occurred since the alarm light was reset.

ALARM RESET

To reset the alarm light, press and hold key VI and then press the ALARM button. If there are currently no active fault conditions, the alarm light will go off. The alarm contact closure output of the controller operates inconjunction with the alarm light on the RIU and CM1. To reset the alarm light using the keypad on CM1, press ALARM and ESC at the same time.

The following fault conditions are detected by the ECC III control system:

Supply Fan Not Running

The controller has detected that the supply fan motor is not running even though the digital outputfor the contactor is energized. This condition is detected by the current transducer for the supply fan motor. The most likely cause is a motor overload condition that caused the motor protector to trip.

Return Fan Not Running

The controller has detected that the return fan motor is not running even though the digital outputfor the contactor is energized. This condition is detected by the current transducer for the return fan motor. The most likely cause is a motor overload condition that caused the motor protector to trip.

Fire Trip Active

An external fire control system has requested fire trip operation by sending a contact closure to the PoolPak's Fire Trip terminals.

Smoke Purge Active

An external control has requested smoke purge operation by sending a contact closure to the PoolPak's Smoke Purge terminals.

Return Air Temperature Out of Range

The return air temperature is outside of the safe operating range (60°F to 105°F) for the compressor(s). If the space temperature is close to the set point, the most likely cause of this alarm is a defective return air temperature sensor.

Both Fans Not Running

The controller has detected that both fan motors are not running even though the appropriate digitaloutputs are energized. The most likely cause is both motor protectors have been set to the OFF position.

Freeze Danger, Low Supply Air Temperature

The supply air temperature measured by the controller is less than 40°F. This condition can potentially damage a hot water or steam coil. The ECC III will close the outside and exhaust air dampers in an attempt to protect the non-functioning coil. The most likely cause of this condition is a failure of the auxiliary heat source (e.g., hot water pump or valve).

Low Compressor Oil Pressure

The oil pressure monitor on the compressor has detected insufficient oil pressure for 2 minutes. The ECC III will shut down the affected compressor. Only PoolPaks equipped with semi-hermetic compressors monitor compressor oil pressure. The most likely cause of this condition is loss ofpower during compressor operation.

High Compressor Motor Temperature

The controller has detected that the temperature of the compressor motor winding is too high or the compressor motor is drawing too much current. Two devices in units equipped with scroll compressors detect this condition a thermal switch in the compressor winding and a calibrated circuit breaker. If either device opens for any compressor, the entire bank of compressors will be shut down. Units equipped with semi-hermetic reciprocating compressors monitor motor winding temperature with a special control located in the terminal box of the compressor.

High Refrigerant Pressure

The controller has detected that the compressor is not running even though the digital output for the compressor contactor is energized. This condition is detected with the current transducer for the compressor motor. The most likely cause is the high-pressure safety switch is open. The switch opens if the discharge pressure exceeds 360 psig. The most likely cause of this condition is insufficient airflow caused by dirty filters or loose belts.

Low Refrigerant Pressure

The controller has detected that the low-pressure safety switch is open. The switch opens if the suction pressure drops below 20 psig. The most likely cause is insufficient evaporator airflow caused by dirty filters or loose belts.

10 Fault Compressor Lockout

Ten compressor faults have occurred since the unit was last reset. This condition indicates that a repetitive compressor fault is present. See the history log to determine the mode of operation toassist in determining the cause of the lockout.

Sensor Failure (All Sensors)

The controller has detected that the value of a system sensor is outside of the expected range. The alarm screen will show which sensor has failed. The most likely cause is a defective sensor.

Expansion Board Comm Failure

The main control module CM1 is unable to communicate with the expansion card, CM2. The most likely cause is a blown fuse on the control module CM2.

FAULT HISTORY LOG

To assist in troubleshooting, the ECC III maintains a log of the 50 most recent faults. The log contains the date and time of occurrence, along with the fault code and a snap shot of system conditions at the time of the fault.

The fault history log is accessed from the System Status Information menu. Press the III key to access the menu and then press the UP arrow key until the fault history screen is displayed.

Each fault in the log is assigned a number from 1 to 50. Fault number 1 is the most recent and 50 is the oldest. To cycle through the list of faults, move the cursor to the fault number and then use the UP and DOWN arrow keys to cycle through the faults one at a time. Each fault is displayed with the following parameters:

Date & Time - Date and time the fault occurred. The date is in MMDD format. The time is in 24-hour format, HHMM.

FC: - Code number assigned to the fault. The codes are as follows:

2 - Power Restored

3 - Return Fan Motor Not Running

4 - Supply Fan Motor Not Running

5 - Fire Trip Active

6 - Smoke Purge Active

7 - Space Temperature Out of Range

8 - Supply and Return Fan Motors Not Running

9 - Supply Temperature Less than 40°F

11 - Low Oil Pressure in Compressor System 1

13 - Low Refrigerant Pressure in Compressor System 1

14 - High Motor Temperature in Compressor System 1

15 - High Refrigerant Pressure in Compressor System 1

50 - 10 Fault Lockout of Compressor System 1

111 -Low Oil Pressure in Compressor System 2

113 - Low Refrigerant Pressure in Compressor System 2

114 - High Motor Temperature in Compressor System 2

115 - High Refrigerant Pressure in Compressor System 2

150 - 10 Fault Lockout of Compressor System 2

T: - Return air temperature at the time the fault occurred.

RH: - Return air relative humidity at the time the fault occurred.

OT: - Outside air temperature at the time the fault occurred.

DP: - Outside air damper position at the time the fault occurred.

C1: - Compressor System 1 Mode at the time the fault occurred. The codes are as follows:

0 - Off
1 - Air Heating
3 - Water Heating
4 - Air Cooling

C2: - Compressor System 2 Mode at the time the fault occurred. The codes are the same as C1.

S1: - Compressor System 1 stages active at the time the fault occurred.

S2: - Compressor System 2 stages active at the time the fault occurred.

ST: - Supply air temperature at the time the fault occurred.

For more detailed troubleshooting guidelines, contact the factory.

MAINTENANCE

PREVENTATIVE MAINTENANCE

Each PoolPak has been constructed of the finest materials available in order to withstand the harsh environment to which it will be subjected. To maximize the effectiveness and life of the PoolPak, it is imperative to initiate a program of scheduled maintenance. A regular maintenance program will return dividends by preventing costly and unexpected periods of downtime. *It is the responsibility of the owner to provide the necessary, routine maintenance for the PoolPak unit.* If a system failure occurs due to improper maintenance during the warranty period, PoolPak International will not be responsible for costs incurred to return the unit to satisfactoryoperation.

POOL WATER CHEMISTRY

Proper maintenance of the pool water chemistry is important for many reasons. One of the more important reasons is that proper maintenance of pool water chemistry will greatly extend the useful life of all the various pieces of equipment related to the operation of the pool. These include devices as simple as light switches and door hinges as well as more complicated pool-related equipment such as filter systems and the dehumidification system.

It is extremely important to properly control combined chlorine levels in the pool water and to properly maintain the pool water pH level between 7.2 and 7.6. Excessive combined chlorine levels or higher/lower pH levels willcause deterioration of PoolPak components that come in contact with the pool enclosure, air, or pool water.

NOTE

Failure to maintain the pool water pH level between 7.2 and 7.6 or to properly control the combined chlorine level will void the manufacturer's warranty on the PoolPak.

Combined chlorine levels in the pool water should be maintained at less than 0.3 ppm. The level of combined chlorine in the pool water is controlled by super-chlorinating the pool. The frequency of super-chlorinationrequired to properly control the combined chlorine level in the pool is directly proportional to the bather load. The heavier the bather load, the more frequently the pool will have to be super-chlorinated.

The proper control of pool water pH is important to the longevity of the equipment related to the operation of the pool. The proper control of pool air pH is also extremely important to the longevity of much of the pool-related equipment. Pool air pH is governed by the level of combined chlorine (chloromines) in the pool water. It is relatively simple to detect high levels of combined chlorine in the pool water. If the pool room has a strongchlorine odor or if there are complaints of eye irritation and/or breathing difficulty, these are all indicators of high levels of chloromines in the air, which are, in turn, caused by high levels of combined chlorine in the pool water.

A more detailed discussion of pool water chemistry can be found on the PoolPak International website (www.poolpak.com).

MONTHLY MAINTENANCE

WARNING!

To prevent personal injury, disconnect all electrical power to the unit prior to performing any of the following maintenance procedures.

Perform the following on a monthly basis:

1. AIR FILTERS: Check and replace as necessary.

2. FANS AND DRIVES: Check for worn or loose belts and adjust or replace as necessary. When it is necessary to replace one belt in a set, the entire set of belts should be replaced. Fan belts can be retightened 24 to 48 hours after replacement. Check that the four fan-bearing locking-collar setscrews are tight and lubricate the bearings using a high quality lithium grease.

3. COMPRESSOR OIL LEVEL: The ideal time for checking the oil level is after a period of operation because then there will be the least amount of refrigerant mixed with the oil. The compressor should have been in operation at least 1/2 hour and the crankcase should feel warm or hot to the touch. During the period of operation, the refrigerant will be pumped out of the oil until only the normal quantity remains. The compressor is equipped with an oil sight glass for checking oil level. The sight glass is located in the crankcase handhole cover. Oil should be added to the system by a qualified refrigerant service technician only. *The oil level in the compressor is correct when oil is visible between the bottom and two-thirds of the sight glass.*

4. REFRIGERANT CHARGE: Check the two sight glasses located in the valve compartment on the end of the evaporator coil. When the refrigerant charge is correct, there should be no bubbles in the sight glasses.

5. CONDENSATE LINE: Ensure that it is free of obstructions. Always keep the condensate trap and lines free and clear. The PoolPak is capable of producing up to 25 gallons of condensate per hour.

6. UNIT INTERIOR/EXTERIOR: Check for torn insulation and repair if necessary. Check for scratches, nicks, rust, etc. and repaint promptly using Fox Gard Gray, Part No. 13-0008Z003.

7. LOGBOOK: Check and record, in the logbook, the following actual operating values and the values read from the computer display:

Space Temperature
Space Relative Humidity
Pool Water Temperature
Pool Water pH

8. DAMPER OPERATION: Ensure that the dampers open and close fully without binding.

ANNUAL MAINTENANCE

Perform the following on an annual basis:

All items listed under MONTHLY MAINTENANCE.

2. COMPRESSOR AND REFRIGERATION SYSTEM: The compressor and refrigeration system should be inspected annually by a qualified service technician. At minimum, the following items should be done:

    a. Change and inspect the refrigerant filter drier.

    b. Complete unit operation test including log entries.

    c. Inspect fan bearings and belts for excessive wear and replace if necessary.

    d. General refrigeration system inspection for possible leaks, chafing between tubing, or other items detrimental to operation.

    e. Touch up scratches in the paint.

    f. Check electrical connections for tightness including those in the compressor electrical box.

    g. Clean debris and dirt from drain pans.

For more information contact:

PoolPak International • P.O. Box 3331, York, PA 17402 • 717-757-2648 or 1-800-959-7725 • Fax: 717-757-5085