PoolPak®

DEHUMIDIFICATION THAT WORKS

Installation, Operation and Maintenance

PoolPak® SWHP

FORM #: SVW05-SWHPIOM-20171107

SUPERCEDES: MK5-IOMSWHP REV

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PoolPak®
DEHUMIDIFICATION THAT WORKS

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TABLES

FIGURES

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IMPORTANT

This product has been thoroughly tested before leaving the PoolPak factory.

However, please check at the earliest opportunity that the product has arrived in good condition and that no damage occurred during shipping. If any damage is suspected, contact the carrier to file a claim.

If the product is to sit in storage for a length of time before installation, contact PoolPak Service department for proper storage guidelines.

Warning

Only suitably qualified personnel who thoroughly understand the operation of this product and any associated machinery should install, start-up or attempt maintenance of this product. Non-compliance with this warning may result in personal injury or equipment damage.

PoolPak Service department must be contacted at least 2 weeks prior to equipment startup. A PoolPak authorized service technician will perform startup and provide training for owner and site personnel.

PoolPak recommends that all troubleshooting, service, and maintenance be completed by an authorized service technician for the best service experience with the equipment. If a labor or parts warranty claim is expected, PoolPak service must be contacted before any work is to be performed. Refer to the standard PoolPak warranty for complete details.

Intended Users

This manual is to be made available to all persons who are required to install, operate or service the product or any other associated operation. Please ensure that a copy of this manual is presented to the end customer. Additional copies of this manual are available on request and on the PoolPak website, www.PoolPak.com.

SECTION I: INDOOR POOL APPLICATION

Moisture Loads

An indoor swimming pool produces large quantities of water vapor through evaporation, which accounts for roughly 95% of the pool water heat loss, making the water colder. This excessive humidity will form damaging condensation unless removed from the building. In the past, the method of removing this water vapor was by ventilating an otherwise energy efficient building, exhausting the humid air and the energy it contained. Additional energy was used to bring in and heat the make-up air and to heat the pool water. More cost effective technologies offer an alternative method adding heat exchangers and mechanical heat recovery systems with many useful options. The ideal solution to removing the water vapor from the pool area is to convert the latent (wet) heat contained in the moist air back into sensible (dry) heat, placing it back into the pool water and air.

Effects of Moisture

Excess humidity in natatorium structures may be readily apparent as condensation on cool surfaces such as windows and outside doors, the growth of mildew or mold and when coupled with poor pool chemistry, the accelerated corrosion of metals. In its less obvious forms, moisture may penetrate walls and ceilings and cause rot that becomes noticeable only when large scale structural failure occurs. Humidity levels are also a major factor in the comfort of pool users.

Indoor Air Quality

Pools and water parks with water features have a higher evaporation rate than a standard pool because of the increased water surface area. Chloramines (See Pool Water Chemistry below), which are present in the water, become more concentrated in the air as the "water to air" interactions increase, affecting the indoor air quality. To control the buildup of chloramines and gases in an enclosed poolroom, the space must have an adequate supply of outside air or ventilation circulating through the structure at all times.

A strong "chlorine" odor is an indicator of poor pool water chemistry and is generally offensive to the occupants. Higher levels of chloramines can cause skin/eye irritation and respiratory problems commonly known as "lifeguard lung". Most poolrooms are designed with a minimum ventilation rate to dilute the airborne pollutants generated from the chemical interactions in the pool water. Typically these rates are based on ASHRAE standard 62.1 and dictated by local codes at about 0.5 CFM/square foot of pool and deck area, but depending on the pool water chemistry the ventilation rate may not always be adequate for good poolroom IAQ.

However, increasing ventilation rates can significantly add to the cost of operation. Energy conservation strategies such as heat recovery, airflow measurement and CO2 based control help control costs while improving IAQ. Depending on the geographic location and season of the year, treating the outside air has a direct effect on energy consumption. Some facilities prefer higher than minimum ventilation rates, up to 100% of OA, to maximize indoor air quality, but the cost of treating this air can be significant.

Occupant Comfort

Occupant comfort in a natatorium is easy to understand. If you ever swam in an outdoor pool on a cold, windy day or exited a pool in a dry, desert location you will probably notice an immediate chill. The opposite is true where high humidity is not adequately controlled either through ventilation or by mechanical means. The moisture level can reach such a state where it is oppressive or stuffy. Common complaints are difficulty in breathing and the room being perceived to be warmer than the actual dry bulb temperature would suggest.

Regardless of the source of discomfort, users will not enjoy the facility if water/air temperatures and humidity levels are not within a narrow range. Depending on the application, the ideal pool water temperature is typically maintained between 78 and 86 degrees. The air temperature should be kept about 2 degrees above the water temperature to prevent chilling when exiting the pool and to minimize evaporation from the pool surface.

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Refer to Table 1 for some recommended temperatures for poolrooms, which can be adjusted to meet specific needs of bathers. In general, "active" poolrooms are maintained at lower temperature ranges so the users don't overheat, while warmer temperatures are more common for seniors or children or less active pools.

The desirable humidity range is generally between 50 and 60%. A humidity level greater than 60% can create a sticky feeling and difficulty breathing. A humidity level lower than 50% will result in evaporative cooling on the bather's skin, creating a chill. Poor air movement caused by improper duct placement within the poolroom will also lead to occupant discomfort. Excessive supply air blowing on bathers can create drafts, while uneven air distribution may create stagnant zones within the space.

Table 1-1. Typical Pool Water & Air Temperature Set-Points

POOL TYPE	WATER TEMP (°F)	AIR TEMP (°F)	ROOM RH %
Recreational Pool	80 to 85	Water Temp + 2	55 to 60
Therapy Pool	86 to 92	86[1]	55 to 60
Whirlpools	99 to 104	86[1]	55 to 60

[1] Normally max 86°F to minimize overheating of occupants

Pool Water Chemistry

Water chemistry in swimming pools is critical for the health of the bathers and the condition of the enclosure and components. An enclosure with poor water chemistry has a noticeable "chlorine" smell, which is an indication of high chloramines in the air. Not only does this have an effect on the water, but it affects the bathers and the air they breathe. Dehumidification/ventilation equipment is not designed to remedy the effects of poor pool chemistry, but is designed to deliver prescribed ventilation to manage smaller amounts of pollutants generated from normal pool activity. Pool water chemistry is a part of daily maintenance and it is recommended that the users follow the current National Spa and Pool Institute standards. *See "Indoor Pool Water Chemistry – Controlling Chloramines with Proper Chlorine Management," MK2-BROPOOLCHEM, for more information on pool water chemistry.*

Table 1-2. Recommended Pool Water Chemistry

	POOL			SPA		
	Ideal	Min	Max	Ideal	Min	Max
Total Chlorine (ppm)	1.0 - 3.0	1	3	3.0 - 5.0	1	10
Free Chlorine (ppm)	1.0 - 3.0	1	3	3.0 - 5.0	1	10
Combined Chlorine (ppm)	0	0	0.3	0	0	0.3
Bromine (ppm) if applicable	2.0 - 4.0	2	4	3.0 - 5.0	2	10
pH	7.4 - 7.6	7.2	7.8	7.4 - 7.6	7.2	7.8
Total Alkalinity (ppm)	80 - 100	80	180	80 - 100	60	180
TDS (ppm)	1000 - 2000	300	3000	1000 - 2000	300	3000
Calcium Hardness (ppm)	200 - 400	150	1000	200 - 400	150	1000
Calcium Acid (ppm)	30 - 50	10	100	30 - 50	10	100

SECTION II: POOLPAK PRINCIPLES, FUNCTIONS, AND FEATURES

Principles of Operation

The PoolPak® System is a complete environmental control system designed expressly for indoor swimming pool enclosures. It takes into account two important factors: the swimming pool occupant (personal comfort) and the swimming pool environment (the physical structure and surrounding furnishings).

The swimming pool enclosure can be a hostile environment for equipment, decor and building structures. A PoolPak® System's major function is to dehumidify the pool enclosure air through a vapor compression cycle. During this cycle the PoolPak® System recycles the sensible and latent heat and places it back into the pool water and air as needed. This recycling process saves money and keeps your pool environment comfortable and safe.

Solid state microprocessor technology, working in conjunction with sensors, continually monitors water and air conditions to provide superior occupant comfort. Unlike typical outside air ventilation systems, a PoolPak® System recycles energy and blankets the walls and windows with warm, dry air.

PoolPak® dehumidification systems reduce the energy input required to maintain pool water and air temperatures. By dehumidifying the air and recycling the latent energy back into the pool air and water, the unit will reduce operating costs when compared to conventional heating and ventilating systems. Pool water and enclosure heating are still needed but with greatly reduced requirements.

A PoolPak® unit, when matched correctly to the evaporation rate of the pool water and overall dehumidification requirements, will efficiently maintain the pool air at relative humidity levels between 50% and 60%. It should be noted that a lower evaporation rate occurs when the pool enclosure's air temperature is maintained above the pool water temperature. Evaporation losses, and the energy required to maintain desired room conditions, will dramatically increase if the air temperature is allowed to fall below the pool water temperature. It is recommended that the continuous dry bulb temperature entering the evaporator of the PoolPak® unit not fall below 75°F.

PoolPak® LLC recommends that backup heating equipment for both pool water and pool enclosure air is capable of carrying the full system heating requirements. This makes for a well-designed system that will provide the least amount of pool down time if unforeseen system problems occur. Building conductive loads and other losses must be taken into consideration.

Automatic Control of Air Temperature and Humidity

An integral part of any 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.

To reduce the likelihood of condensation on walls and windows, the PoolPak® System automatically adjusts humidity setpoint in response to changes in wall or window surface temperatures. As the seasons and weather conditions change, the PoolPak® System changes its own mode of operation. Throughout the year, the PoolPak thinks "efficiency" and automatically selects the least expensive energy source for the poolroom conditions.

PoolPak® models include a factory mounted and wired space temperature and humidity sensor at the return air opening of the unit. Refer to the installation section for mounting location. Caution should be exercised. When the outside air is to be introduced into the space for ventilation, adequate exhaust capacity via an integral (or a separate external fan) must be specified to ensure the poolroom remains slightly negative. An inadequately sized exhaust system may result in damage to the structure and pool odors may be forced into other areas of the building.

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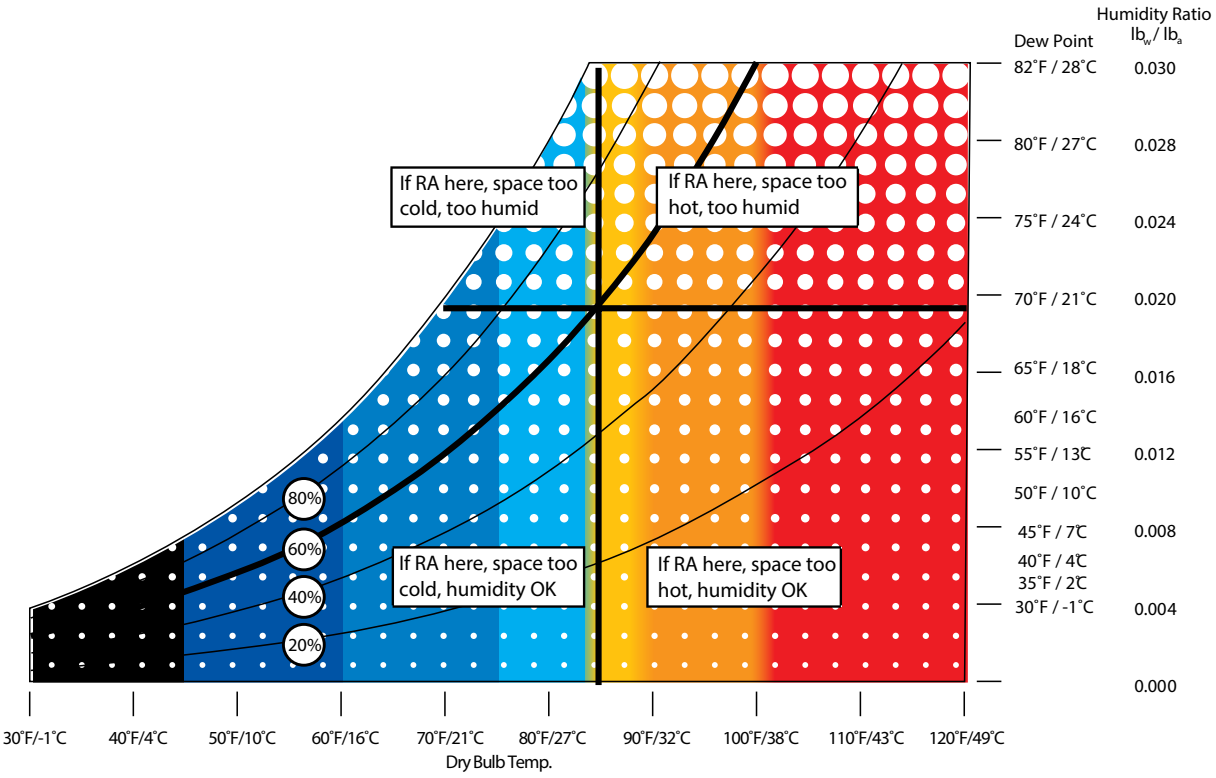
Room Dew Point Control

PoolPak® units with the CommandPak Control System (CPCS) controller operate using an advanced type of control utilizing dew point and dry bulb temperature control. This method of control is more accurate than conventional relative humidity control. The main purpose of a dehumidification system is to maintain the amount of moisture in the pool area below a level that would cause damage to the building. Relative humidity is a measurement of the percentage of moisture which is in the air at a given dry bulb temperature in proportion to the maximum amount of moisture that could be contained at this particular dry bulb temperature. Warmer air can hold more moisture than colder air, therefore, changes in dry bulb temperature will change the relative humidity reading without any change in the actual amount of moisture in the air. The amount of moisture in the air is expressed as "grains of moisture per pound of dry air" and is directly related to the dew point temperature.

The CPCS uses dew point control to operate the PoolPak® unit and maintain the moisture level below the setpoint (see Figure 2-1). The space dry bulb temperature and relative humidity determine the dew point temperature. By varying the space temperature and space relative humidity set points, the dew point set point is changed. When the space dew point temperature rises more than 1/2 degree Fahrenheit above the space dew point temperature set point, the CPCS controller creates a dehumidification need which will be addressed with either outside air or by energizing the compressor system. As the dew point temperature drops more than 1/2 degree Fahrenheit below the dew point temperature set point, the controller eliminates the dehumidification need.

Figure 2-1. Dew Point Control Psychrometric



Pool Pak® Operation

The PoolPak® fan draws in warm, moist air from the pool enclosure. This air passes through the evaporator (dehumidification) coil and gives up heat energy to the refrigerant which is in a cool, liquid state. This exchange of energy causes the air temperature to fall below its dew point, resulting in moisture condensation on the evaporator coil. The moisture formed falls into the unit's condensate drain pan. After passing through the evaporator coil, the refrigerant becomes a cool gas.

The refrigerant enters the unit's compressor, where it is compressed into a hot gas. While in the compressor, the refrigerant absorbs the energy used to operate the compressor. This hot gas refrigerant then travels either through an air reheat coil, the pool water condenser or to an optional auxiliary air conditioning condenser, which may be either air or water cooled. If air heating is called for, the air reheat coil is used. The hot refrigerant exchanges energy with the cooler, dehumidified air coming from the evaporator coil. This causes the temperature of the air to rise for heating.

If pool water heating is required, the hot gas flows into a pool water condenser, where it adds energy to the incoming pool water. This heats the pool water while the refrigerant is condensed into a warm liquid. If space cooling is called for, the refrigerant flows to the auxiliary air conditioning condenser bypassing the air reheat coil and pool water condenser and allowing cool air from the evaporator coil to provide space cooling.

The SR series includes a return fan that allows for economizer operation and up to 100% outside air as shown in the SR typical schematic, Figure 2-2.

The S series can include a factory mounted exhaust fan (SE), an exhaust and purge fan (SEP) or just an outside air damper (S). A typical SEP series unit is shown in Figure 2-3. This series does not have a return fan so that the outside air is limited to about 30% under normal operation.

STANDARD ITEMS FACTORY MOUNTED

- Evaporator (dehumidification) coil
- Air reheat coil (hot gas reheat coil)
- Bottom, top (for indoor installations) or horizontal supply air configuration
- Filters and filter rack
- Air temperature and relative humidity sensor
- Compressor suction and discharge pressure transducers
- Compressor suction and liquid temperature sensors for superheat and subcooling calculations
- Pool Water Temperature Sensor
- Capability of introducing outside air for minimum ventilation requirements.

STANDARD ITEMS FACTORY SUPPLIED FOR FIELD INSTALLATION

- Remote Interface Unit (RIU)
- Cold surface temperature sensor
- Outside air temperature and humidity sensor
- Pool Water Temperature Sensor (for systems utilizing the Smart Pump feature).

SYSTEM OPTIONS

- Remote air-cooled condenser for space air conditioning
- Flywheel air conditioning (SR and SEP)
- Water-cooled condenser (cooling tower or chiller water)
- Economizer control (SR and SEP)
- Network multiple units
- Remote monitoring via Internet
- Weatherproofing for outdoor installation

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Figure 2-2. SWHP SR System Schematic

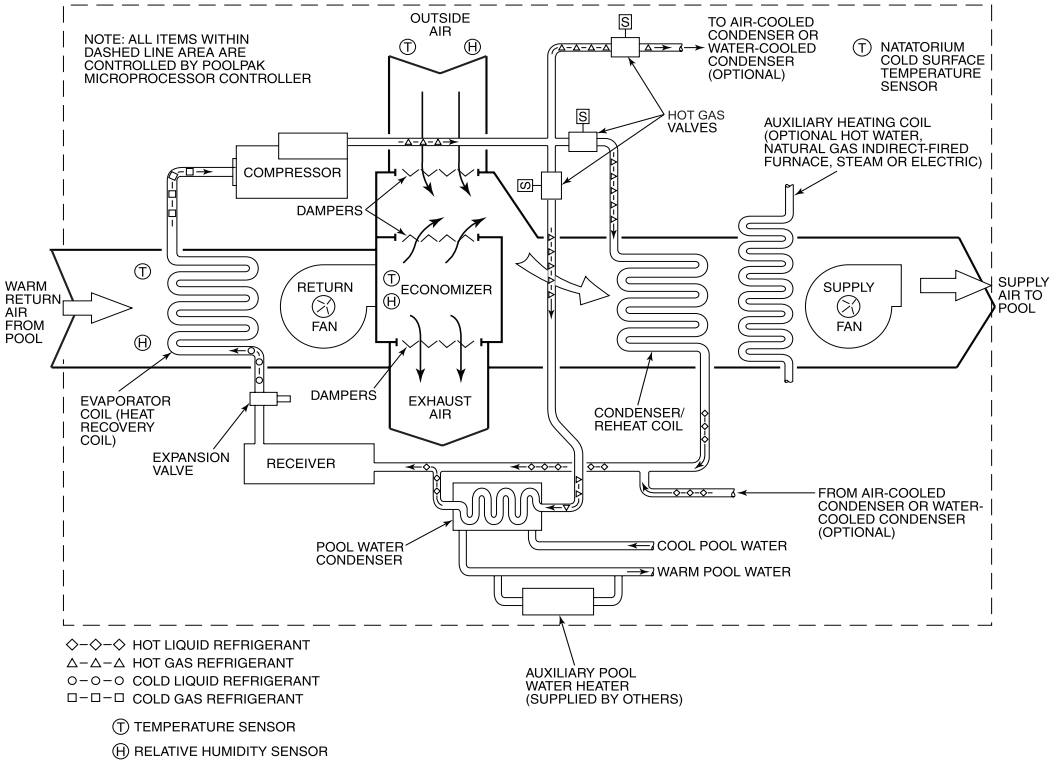
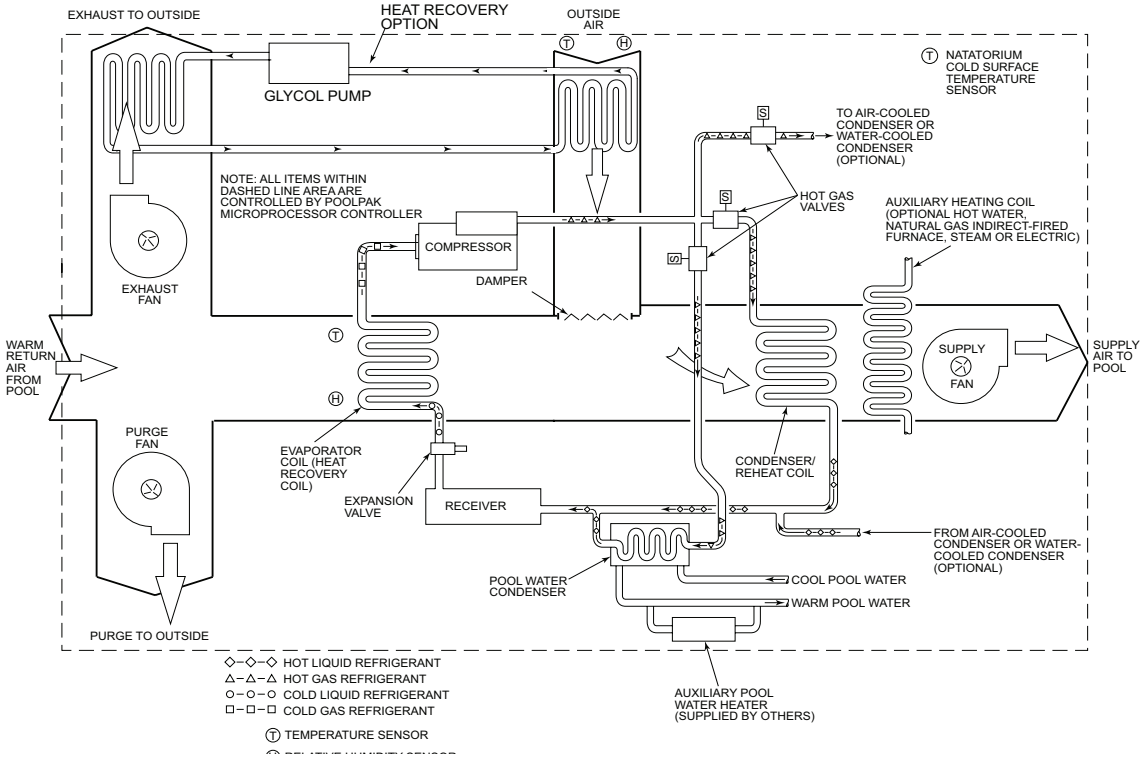


Figure 2-3. SWHP SEP System Schematic



CommandPak™ Control System

Overview

The PoolPak® is controlled by the CommandPak™ Control System (CPCS), a microprocessor-based system that incorporates all of the functions necessary to maintain correct natatorium space temperature and humidity and control pool water temperature. The CPCS is designed to work with the PoolPak® dehumidification system to provide an environment that is both comfortable and cost effective. It controls unwanted humidity in the pool enclosure and helps to prevent potentially damaging condensation from forming on surfaces.

System parameters and/or system status readouts are provided on the remote-mounted display/keypad panel, Remote Interface Unit (RIU). Set points may be changed easily and may be password protected. Set points are saved in the memory of the CPCS and are not erased in the event of a power failure. Critical operating data can be easily accessed by a qualified service technician for the purpose of system operation and evaluation.

The CPCS controller has a fault code history log that records the last 50 faults in the order of their occurrence. Each fault code is recorded along with the date and time and the values of the critical system parameters. This fault code history log is accessible at the control panel via the CPCS 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). This Remote Access Package is available only with a BACnet/IP based Building Automation System (BAS).

The PoolPak® CPCS also has the option to be directly connected to several different BAS options. The CPCS can be connected to either a LonWorks based BAS or a Modbus RTU based BAS, BACnet/IP and BACnet MS/TP. 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 of heating and dehumidification by loading stages of compressor capacity as necessary. As building requirements are satisfied, the compressor stages down.

The PoolPak® System provides outside air ventilation to satisfy minimum air ventilation requirements per ASHRAE 62.1 ventilation standard.

Humidity Control

When equipped, the economizer is activated if dehumidification is required, air temperature is satisfied, 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 humidity controller 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. Cold Surface Temperature

Humidity Reset

The CPCS control system includes a sensor that measures the temperature of the coldest surface in the pool enclosure, usually an exterior window or door frame. When the temperature of this surface approaches the dewpoint temperature of the space, the controller lowers the humidity setpoint to activate dehumidification.

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This function helps to prevent condensation on the cold surface. Typical locations for this condensate prevention surface temperature sensor are north facing exterior walls, windows, window/door frames and skylights.

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 room return 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.

Networking Multiple Units

CPCS networking allows multiple units to be connected together. The units will work with each other to control water temperature, air temperature and relative humidity. Networked units have all the features of standard units plus the ability to control water temperature in multiple pools. All units on the network are accessible from a single remote interface unit for convenience.

Smart Economizer (SR)

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® unit refrigerant is transferred to the supply air in the air reheat condenser. The Smart Economizer saves more energy than a standard mixing box and economizer.

Space Cooling (Optional)

If space cooling is required and the unit is equipped with an auxiliary refrigerant condenser (air-cooled or water-cooled), the CPCS will activate the space cooling mode of operation. In this mode, the heat removed from the space air will be directed to the auxiliary condenser. The air cooling mode of operation is independent of the need for dehumidification.

The PoolPak® SR and SEP units are equipped with economizer sections. The CPCS will automatically select the most economical method for space cooling. An economizer utilizes outside air rather than the refrigeration system to achieve space cooling. A sensor connected to the CPCS monitors the outside air temperature. When appropriate, the controller will disable the compressor and bring in cool outside air for economical operation.

AIR CONDITIONING WITH AIR-COOLED CONDENSER

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

AIR CONDITIONING WITH WATER-COOLED CONDENSER

The PoolPak® can be equipped with a factory-mounted or remote-mounted air conditioning water condenser. This condenser can be either cleanable (cooling tower water) or non-cleanable (chiller water). 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

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 two-way flow control valve and is controlled by the PoolPak® control system.

Pool Water Heating

If the space temperature is at or above the set point and the pool water temperature is below the set point and there is sufficient pool water flow, hot gas is 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 pool water heater. An auxiliary pool water heater must be supplied as part of the pool water pump and filter system.

NOTE
Contact factory for pool water temperature set points greater than 87° F

Smart Pump Control

Smart Pump control allows the CPCS to control operation of the PoolPak® water loop pump. When the CPCS determines that pool heating and space cooling are required, a contact closure signal activates the remote pump. The pump will be deactivated when the pool heating or space cooling requirement is satisfied.

Occupied/Unoccupied Control Mode

The PoolPak® unit 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 the dampers to satisfy minimum air ventilation requirements per ASHRAE 62.1 ventilation standard.

Purge Mode (SR and SEP)

The PoolPak® has a purge cycle to fully ventilate the natatorium at the airflow (CFM) specified for the unit's supply 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 fan and return (or purge) fan and by opening the outside air and exhaust air dampers for the programmed time intervals.

CO2 Based Demand Ventilation

The amount of outside air ventilation provided is controlled by the PoolPak® unit based on the CO2 level sensors in the return air stream.

Event Mode (SR)

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 is user adjustable at the Remote User Interface (RUI). During Event Mode, the minimum damper position is raised to a value higher than the minimum damper setpoint. For each event, the screen shows the day of the week, the hour in 24-hour format, the minute, and the event type.

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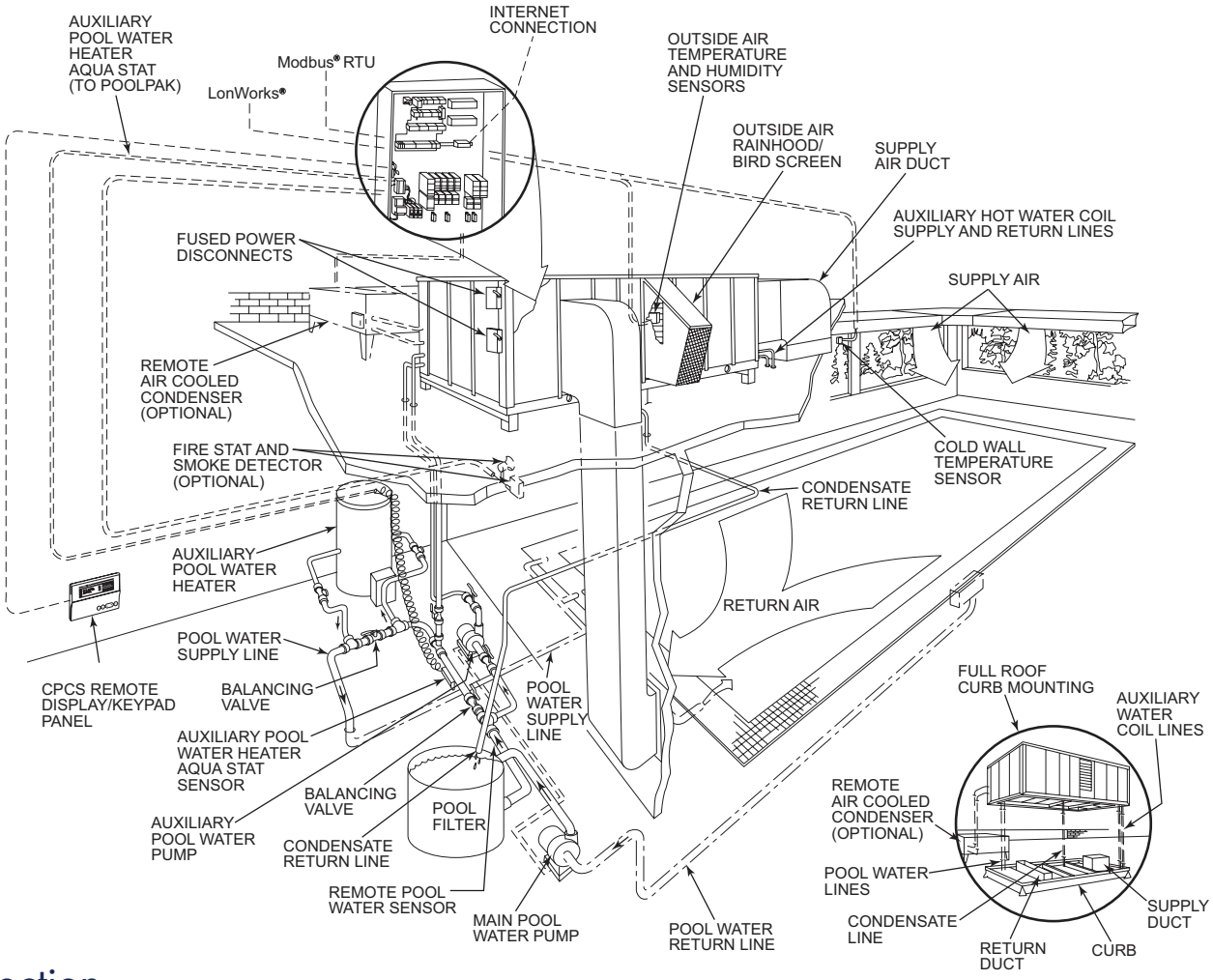
Figure 2-4. Typical PoolPak® Rooftop Installation



Selection

Overview

The PoolPak® system is available in several configurations. Contact your authorized PoolPak® representative for the best configuration for your application.

AVAILABLE CONFIGURATIONS

- Indoor and outdoor units from 15 tons to 80 tons
- SR units with integral supply and return fans, including 100% Outside Air economizer and Purge capability
- S units with integral supply fan and provision for up to 35% outside air
- SE units with integral supply and exhaust fans and provision for up to 35% outside air
- SEP units with integral supply, exhaust and purge fans and provision for up to 100% outside air during a purge cycle

Unit Selection Software Program

PoolPak® LLC maintains a computerized software selection program. Please contact your Exclusive PoolPak® Sales Representative. A copy of the information required for the program can be found in publication "PoolPak® Site Survey Form". A copy of this form in spreadsheet format may be obtained from the *Product Library of the PoolPak® website.*

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SECTION IV: INSTALLATION

Overview

Installation requires the unit to be placed on a roof mounted curb, in a mechanical room or outside on an equipment housekeeping pad. Isolation pads should be placed under the unit to minimize transmission of noise due to unit operation. Then pool water is piped to the unit. Electrical power from a properly sized fused disconnect is connected to the unit. The supply and return air ducts are connected to their respective locations on the unit. The condensate is piped back to the pool or to the sewer. If an optional remote air-cooled condenser is used, place the condenser in a proper outdoor location. Refrigerant piping is then run from the air cooled condenser to the PoolPak® unit. Refrigerant lines must be leak checked and evacuated through installer provided Schrader valves. Control and power wiring are run to complete the installation. If a field-furnished auxiliary space heating coil is installed, the control for this heater must be field-wired to the PoolPak® controls shown in the field wiring diagram. Refer to Figure 2-4 for a typical installation.

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 lifting points provided on the unit base frame.

Use suitable spreaders or a frame to prevent damage to the PoolPak®. Cables must be adjusted to length to correct for the heavier compressor end of the unit.

⚠ CAUTION
Lifting hooks must be blocked away from the side of the unit to prevent damage to the door panels while lifting. Do NOT walk on top of the unit or serious damage may result.

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.**

Rigging

PoolPak® units require the use of a spreader bar that is at least as wide as the unit. Care must be taken to remove all doors or openings that will interfere with the chains or slings to prevent damage to the unit. In general, two to four lifting points are provided on each side of the unit, depending on the unit size and length. All provided lifting points must be used to prevent unit damage. Proper lifting technique for each unit type is provided by a decal on that unit.

PoolPak® SWHP Unit Dimensions and Weights

Refer to the *PoolPak® SWHP Weights and Dimensions Guide found in the Product Library of the PoolPak® website.*

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.

Mounting

The PoolPak® unit is designed and built specifically for either indoor or outdoor locations. The location must allow for free condensate drainage (without freezing), ventilation, supply and return ducts and sufficient clearance for servicing the unit.

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. Tables of weight distribution can be found at the *Product Library section of the PoolPak® website*.

Foundation

The unit must be mounted on a flat and level foundation capable of supporting the entire operating weight of the equipment. The unit MUST NOT set flat on a concrete slab. The PoolPak® unit MUST BE raised 6 inches to allow for sufficient height to adequately trap the condensate line 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. Each support should be at least 12 inches long. The unit must be level to ensure proper condensate drainage. If the unit is elevated beyond the normal reach of service personnel, a catwalk capable of supporting service personnel, their equipment, and any replacement system components (about 1,000 lb.) must be constructed around the unit.

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.

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.

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.

DUCT CONNECTIONS

Duct connections, flanges, or hoods may be disassembled and stored inside the unit for shipping. Follow the accompanying installation instructions found with the loose parts.

GAS FURNACE AUXILIARY HEAT (OPTIONAL)

When using a gas furnace, power venting is provided for all unit sizes. Additional venting or caps may or may not be provided. Please refer to the furnace manufacturer's manual for piping and venting instructions. Natural gas furnaces are available with outputs of 180,000 to 1,250,000 BTU, as determined by unit configuration and project requirements.

POWER SUPPLY

The contractor is required to supply (unless supplied as an option by PoolPak®) and install separate fused disconnect(s) within easy accessibility of the PoolPak® unit. Use the minimum circuit capacity listed on the unit's data plate to determine the minimum wire size for incoming electrical power. The ground connection for the unit is located in the unit control panel. The power supply to the unit must be adequate for the compressor starting amperage (LRA). All field wiring must be done according to the wiring diagram provided with the unit and in conformance to the National Electrical Code (NEC) and any other applicable local electrical code(s).

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If a remote or piggy-backed air-cooled condenser is required, a separate power feed must be provided for the air-cooled condenser. When the auxiliary electric heater option is provided, another power connection point (3L1, 3L2, and 3L3) is provided in the supply fan compartment. This power connection feeds the auxiliary electric heating coil. With this option, the contractor is required to supply and install a second fused disconnect.

SINGLE POINT POWER SUPPLY

Refer to the "Single Point Power Wiring" diagram, Figure 6-1, in the Wiring section of this manual. Only the following models of PoolPak® SR units

- SWHP 60/80/100/120 – all voltages
- SWHP140/190/220/260/300 - 460V and 575V only.

All models of the PoolPak® S, SE, SEP units

DUAL POINT POWER SUPPLY

See the "Dual Point Power Wiring" diagram, Figure 6-2, in the Wiring section of this manual. All models of PoolPak® SR Units

- S, SE, SEP units are NOT available in this configuration

CONTROL WIRING

All control wiring field connections are described in the *CPCS for SWHP Controls Field Wiring* section of this manual. The wiring diagram is also furnished with the PoolPak®. All control wiring is low voltage.

CONDENSATE PIPING

The condensate may be piped to a drain or returned to the pool if local codes allow. If returned to the pool, the condensate should be piped to the skimmer. PoolPak® LLC recommends neither for, nor against, the practice of returning condensate to the pool. The installer should review the local codes prior to making the decision of where to dispose of the condensate. The amount of condensate produced in a year is about equal to the volume of the pool.

CURB MOUNTING

Curbs have been designed specifically for the PoolPak® product line. Contact factory for roof curb dimensions. The outside dimensions of the curb are such that the base of the PoolPak extends beyond the edge of the curb on each side. Please note, the unit does not overhang the curb. This aids in preventing rain water, running down the sides of the unit, from getting between the base of the PoolPak® and the curb.

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 top surface to the bottom of the PoolPak® with supplied gasket and a weatherproof caulk or sealant.
- For SR units, 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 connections include:

- Pool water
- Condensate
- Auxiliary hot water coil

- Chilled water coil
- Domestic hot water
- Whirlpool water

If the PoolPak® unit is to be mounted on another manufacturer's curb, the factory must be notified of this at the time the sales order is submitted. PoolPak® units produced for curb mounting, whether on a PoolPak® curb or on another manufacturer's curb, receive special weatherizing and insulating that non-curb mounted PoolPak® units do not receive. For SR series units, the compressor end of the curb must have a special weather tight pan with

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

the weather seal under the bulkhead between the compressor and return air compartments. The pan under the compressor compartment has provisions for running the pool water lines through the cap and 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.

CPCS for SWHP Controls Field Wiring

Overview

The CommandPak™ Control System (CPCS) is the programmable controller designed specifically for the PoolPak® dehumidification system. It is a robust system capable of a variety of functions. The following text describes the field wiring required for proper operation of the CPCS dehumidification system in a typical PoolPak® unit installation. The field wiring diagram, Figure 4-1, shows the location of the connections for the sensors and other required devices. The numbers following the text identifies the location on the field wiring diagram showing how each field wired device is connected to the PoolPak® unit electrical panel.

Remote Interface Unit (1)

The Remote Interface Unit (RIU) allows the user to view space temperature, relative humidity and pool water temperature. 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 splashing pool 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.

⚠ CAUTION
The RIU should NOT BE installed in the pool room or anywhere it exposed to wet or chemical-laden air. Failure due to corrosion will not be covered by warranty.

The CPCS 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® 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® control panel to the remote location. One end of this cable will terminate on terminal block T17 in the control panel. The other end will terminate on a factory-supplied RJ25 jack.

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The wires for terminals T17.1 and T17.2 should be from the same twisted pair. The second pair should be used 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. Do not use the "through-the-wall" mounting option. 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.

Outside Air Temperature and Relative Humidity Sensor (2)

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

The sensor should be mounted on the exterior surface of a north-facing surface without exposure to direct sunlight. If the unit is located outdoors, it is acceptable to mount the sensor on the unit cabinet away from any door panels or factory wiring. 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 shields is essential. Carefully review the wiring connections shown on the field-wiring diagram. Improper connection may damage the sensor and/or the CPCS control module. The cable should be four-conductor (two twisted pairs), 16–20 AWG copper.

⚠ CAUTION
Improper connection may damage the sensor and/or the CPCS control module. The cable should be four-conductor (two twisted pairs), 16-20 AWG copper.

Cold Surface Temperature Sensor (3)

This sensor measures the temperature of the coldest surface in the pool enclosure. When the temperature of the surface drops 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 so it is in direct contact with an exterior door, window, or skylight frame not subject to direct sunlight. Do not mount on a gang box. In cases where there are no exterior doors or windows, the sensor should be mounted on the interior surface of an exterior wall. Avoid mounting the surface temperature sensor where it will get direct exposure from sunlight. The sensor housing has a single 1/8-inch hole for mounting.

The cold wall temperature sensor is shipped wired to the field wiring terminals. Remove the sensor from the field terminals and wire as shown on the field-wiring diagram. Connect the shield drain wire to ground at the PoolPak® control panel end only.

Smoke Purge Input (SR Only) (4)

The CPCS 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 CPCS 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 CPCS configuration menu, it is possible to set this input to be active on open or active on close.

Fire Trip Input (5)

The CPCS can receive a signal 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 CPCS 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 CPCS configuration menu, it is possible to set this input to be active on open or active on close.

Occupied Mode Input (6)

The CPCS can receive a contact closure 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 CPCS internal schedule, it will not override commands sent to the controller via the Building Automation System (BAS).

Purge Mode Input (SR and SEP) (7)

The CPCS can receive a contact closure from a remote mounted switch. This input must be connected to dry (voltage free) contacts only. When activated, the controller will shut down the compressors. During purge mode operation, the CPCS will attempt to maintain space temperature with the auxiliary heating system. If the supply air temperature drops to 40°F, purge mode is automatically terminated to provide freeze protection. Purge mode commands sent to the CPCS through the Building Automation System (BAS) take precedence over the purge mode input.

Remote Exhaust Fan Interlock (S only) (8)

The CPCS can provide a contact closure to enable a remote exhaust fan. These contacts will close during an occupied time period in the CPCS occupancy schedule. The contacts may be directly connected to an external circuit, provided it is 24 VAC maximum and the current does not exceed 1A inductive. Please Note: A field-installed exhaust fan is REQUIRED for an S model unit

Alarm Output (9)

The CPCS 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.

Auxiliary Pool Water Heating System (10)

The auxiliary pool water heating system is not provided by PoolPak®. The CPCS provides a dry contact closure that signals a need for auxiliary water heating. The contacts may be directly connected to the heater 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 field-provided and installed relay to interface to the heater. The auxiliary heating system must provide its own thermostat, wired in series with the output of the CPCS . Typically, the set point for this thermostat is 2°F above the pool water temperature set point in the CPCS .

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Auxiliary Air Heating System (11)

The auxiliary heating system is normally factory-installed inside the PoolPak® unit. In this case, all interface wiring between the CPCS and the heater is factory-installed. If the PoolPak® is not equipped with an auxiliary heating option, the CPCS 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.

System 1 Remote Air-Cooled Condenser Interlock and Control (12)

The CPCS 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 CPCS 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.

System 2 Remote Air Cooled Condenser Interlock and Control (SWHP220-SWHP340 only) (13)

The CPCS monitors terminals T11.1 and T11.2 for 120 VAC provided by 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 T11.1 and 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.

Auxiliary Air Heat Control Valve (14)

The CPCS 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® 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.

Building Automation System Connection (15)

The CPCS is capable of direct connection to BACnet IP or MS/TP, LonWorks, or Modbus RTU BAS systems. 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.

When equipped with the LonWorks interface, the CPCS 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. When the CPCS is equipped with the BACnet/IP interface or PoolPak® RAP, the RJ45 connection is to the serial card port on control module CM1.

Detailed information on BAS interface operation is available on the *PoolPak® website*.

Multi-Unit Network Connection (Multi-Unit Installations Only) (16)

The CPCS utilizes a proprietary, private network to coordinate with other PoolPak® units operating in the same space. This allows up to five PoolPak® units to coordinate operation using a master/slave scheme. The PoolPak® units 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.

System 1 Remote Water-Cooled Condenser Interlock (If Equipped) (17)

The CPCS monitors the entering water temperature in the remote water-cooled condenser to ensure it is below 90°F and that there will be adequate water flow to operate in the air cooling mode. Field wiring must be connected in series between the normally closed (open on rise) contacts of the system 1 temperature switch, the normally open terminals of the flow switch located in the remote water cooled condenser enclosure, and relay 5R, terminals 11 and 14, located on the PoolPak® Control Panel. The CPCS will not select the mechanical air conditioning mode if the proof signal is inactive.

System 2 Remote Water-Cooled Condenser Interlock (If Equipped) (18)

The CPCS monitors the entering water temperature in the remote water-cooled condenser to ensure it is below 90°F and that there will be adequate water flow to operate in the air cooling mode. Field wiring must be connected in series between the normally closed (open on rise) contacts of the system 1 temperature switch, the normally open terminals of the flow switch located in the remote water cooled condenser enclosure, and relay X5R, terminals 11 and 14, located on the PoolPak® Control Panel. The CPCS will not select the mechanical air conditioning mode if the proof signal is inactive.

Pool Water Temperature Sensor (19)

Units that will utilize the Smart Pump Technology to control the PoolPak® secondary pool water loop pump require the installation of a factory supplied pool water temperature sensor. It must be mounted upstream of the PoolPak® unit and the auxiliary water heater. The sensor can be threaded directly into a 1/4" FPT fitting. Electrical connections should be made with 22 AWG, copper, 2 conductor, shielded, twisted-pair cable. The wires from the factory-installed pool water temperature sensor must be removed from the bottom of T3, terminals 9 and 10, before connecting the field wires for the remote mounted sensor. Connect the shield drain wire to ground at the PoolPak® unit end only.

Smart Pump Control Output (20)

The CPCS provides a contact closure to activate the PoolPak® water loop pump when pool water heating and space cooling are required. The output contacts may be directly connected to an external circuit provided it is 115VAC maximum and less than 1A inductive.

Event Mode (21)

The CPCS can receive a contact closure to activate the Event Mode function. During Event Mode, the minimum damper position is raised to a value higher than the minimum damper setpoint. This can be used to temporarily allow dilution of the space air during extremely high pool usage or a large number of spectators.

Summer Ventilation Mode (22)

The CPCS can receive a contact closure to activate the Summer Ventilation Mode feature. The purpose of this mode is to draw the entire return air volume using outside air through a retractable roof or large open windows or doors in the pool room during the summer. During this mode, the Return Fan (Purge & Exhaust on SEP) runs, but the compressors are disabled, the Supply Fan turns off, the intake and reset air dampers close and the exhaust damper opens. No alarm will be displayed during this mode.

Supply Temperature Sensor (Not Shown)

For units with a Jackson and Church furnace, there will be a supply sensor shipped loose in the poolpak control panel. This sensor is to be located in the supply duct at least 10 feet downstream from the unit.

Electrical connections should be made with 22 AWG, copper, 2 conductor, shielded, twisted-pair cable. The wires from the factory-installed temperature sensor must be removed and replaced on terminals 30 and TC2 in the power flame terminal block in the Jackson and Church furnace.

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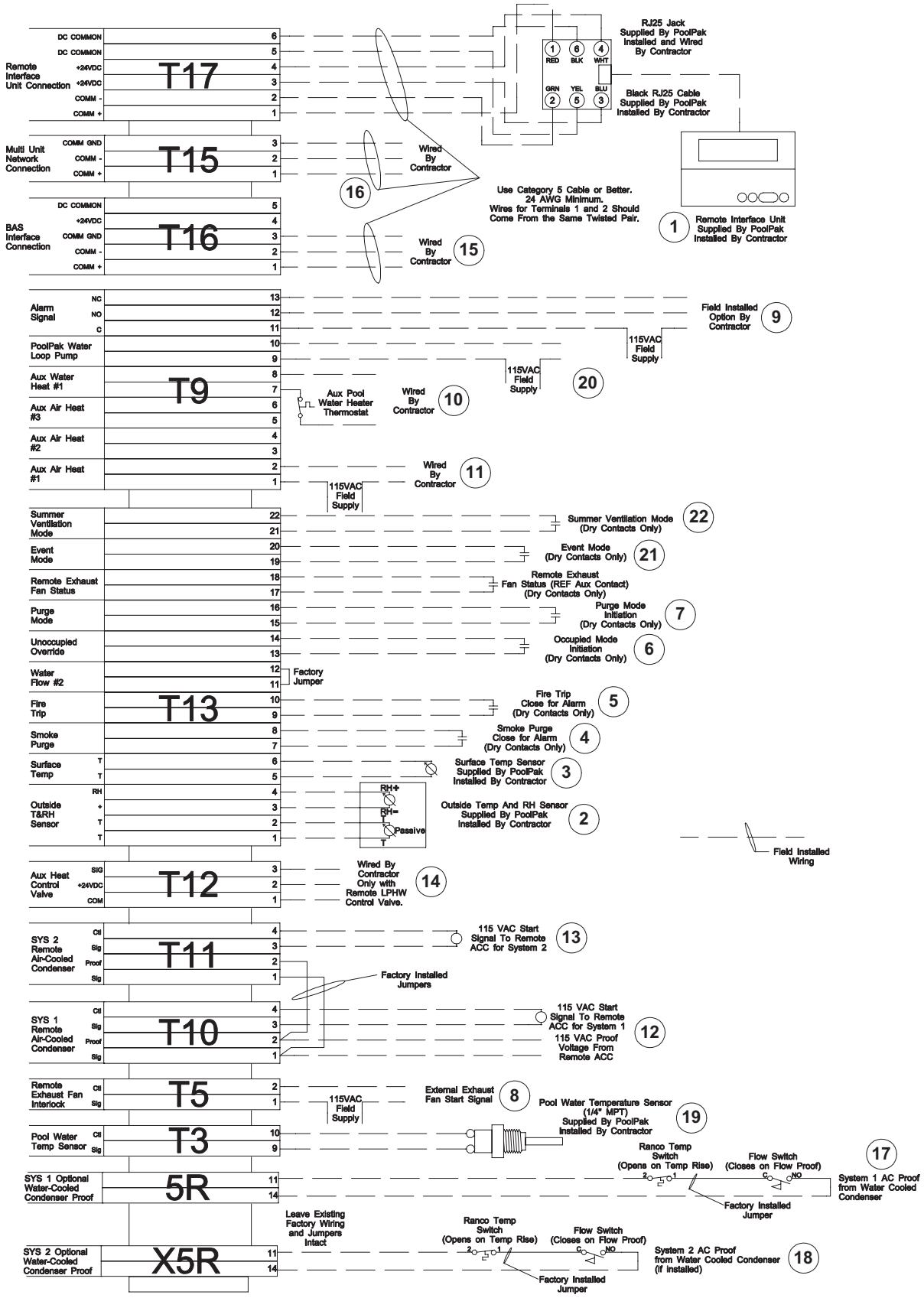
Figure 4-1. SWHP Field Wiring Diagram



Pool Water Piping and Installation

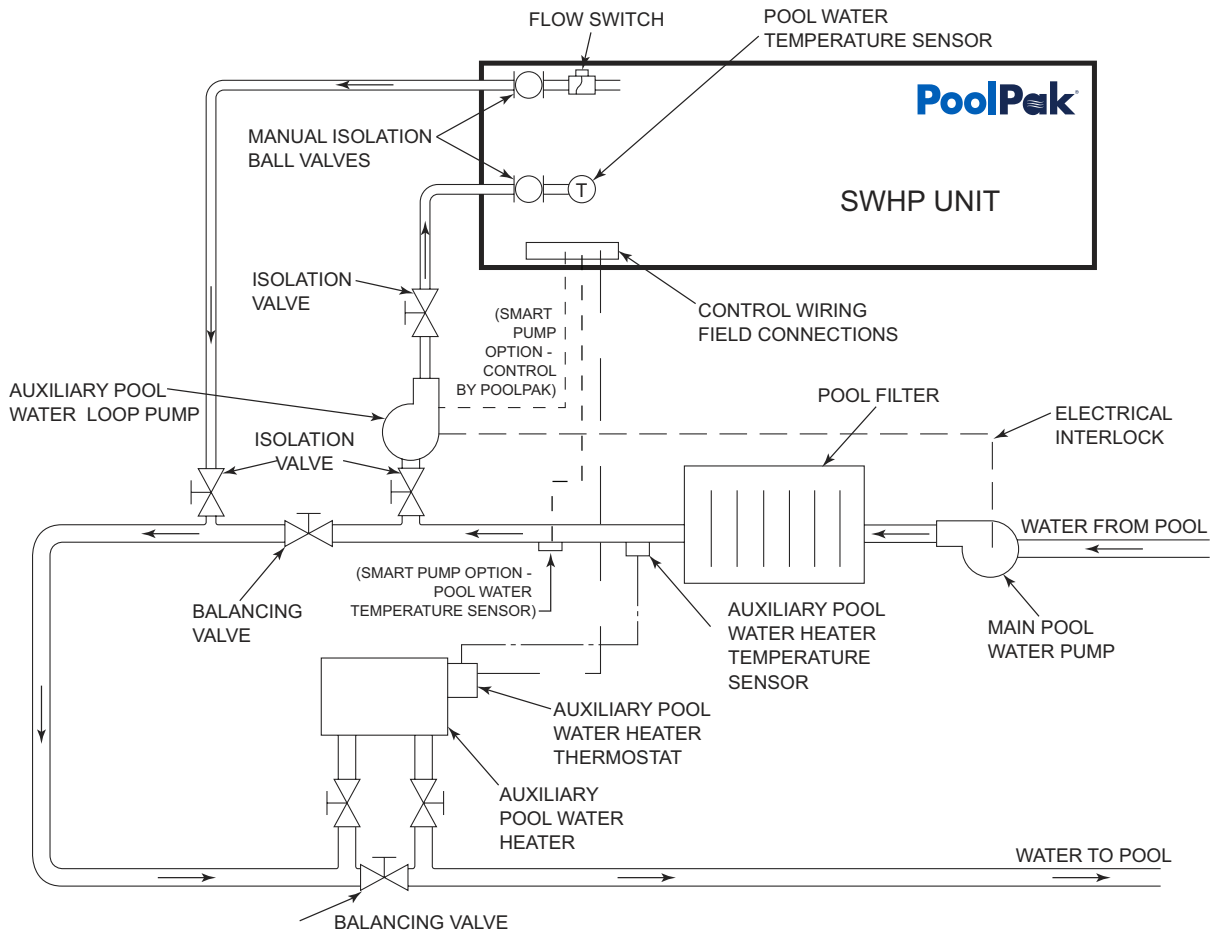
PoolPak Pool Water Circulation Loop

The PoolPak® unit pool water condenser must be connected to a secondary circulation loop with its own circulation pump (field-supplied) to obtain the required design water flows. See Figure 4-2 for a typical piping configuration.

The secondary pool water loop supply must come from the main pool water distribution line, downstream of the main pool water pump and the pool filter, before the take off to the auxiliary pool water heater. 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.

This circulation pump should be located on the supply line of the secondary pool water loop feeding the PoolPak unit and as close as possible to the main pool water distribution line. The pump should be self-priming and vented. The pump should be located at the lowest point possible in this secondary circulation loop. For example, if the PoolPak® unit is located on a mezzanine and the main pump filter are located in the basement below the mezzanine; the second pump should be located in the basement with the filter, not on the mezzanine with the PoolPak® unit. Particular attention must be given to venting when the PoolPak® unit 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).

Figure 4-2. Pool Water Piping Schematic



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Auxiliary Pool Water Heater (Field Supplied)

The auxiliary pool water heater must be installed downstream of the PoolPak® unit's secondary loop supply line. It is normally installed in its own secondary loop as shown in the figure. The auxiliary pool water heater is controlled by the PoolPak® System. The contacts will be closed to enable the heater to operate based on its thermostat when the heat available from the PoolPak® is insufficient for pool water heating and pool water temperature drops to 0.7°F below set point (adjustable), when the pool water flow to the PoolPak® unit is below the minimum required water flow or when the PoolPak® unit loses power.

Main Pool Water Pump and PoolPak Pool Water Loop Pump Interlocks

The main pool water distribution pump and the PoolPak® pool water loop pump must each have its own start/stop switch. Wire the main pool water pump's auxiliary contacts in accordance with the manufacturer's specifications and run the wires to the PoolPak® unit 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 pool water piping and PoolPak® pool water loop pump.

Pool Water Isolation Valves

Hand stop valves and pressure gauge stopcocks are factory-installed in the pool water supply and return lines inside the PoolPak® unit 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 in the main pool water line between the secondary loop supply and return, is normally required to balance the flow in the PoolPak® unit secondary loop.

Pool Water Flow Switch

A pool water loop flow switch is factory-installed in the PoolPak® unit. 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 unit, there may be insufficient water flow. The PoolPak® unit can be operated with inadequate water flow; however, the system will not go into a water-heating mode until the water flow switch contacts are closed by sufficient water flow. Refer to Table 4-1 for design pool water flow.

Pool Water Piping Composition

Pipe must be a suitable material such as CPVC Schedule 80 plastic pipe. PVC, copper, iron or steel pipe is NOT suitable. 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 against freezing. Wrap pipes with electric heat tape (follow manufacturer's instructions) controlled by an automatic thermostat and set at a minimum of 35°F. Insulate all piping. Insulation must be sealed at all seams.

NOTE
Power for the field-installed heat tape must be supplied external to the PoolPak unit.

Table 4-1. Pool Water Condenser Pressure Drop and Heating Capacity

MODEL	POOL WATER GPM	WATER (WC-FT)1	WATER (WC-FT)2	HEATING CAP. (MBTU/HR)
FULL WATER CONDENSER				
SWHP 0060	25	28	23	230
SWHP 0080	35	32	28	310
SWHP 0100	40	24	26	350
SWHP 0120	50	30	25	450
SWHP 0140	60	33	29	520
SWHP 0190	70	32	26	600
SWHP0 220	80	31	28	700
SWHP 0260	100	32	27	900
SWHP 0300	120	35	31	1040
SWHP 0340	140	34	28	1200
PARTIAL WATER CONDENSER				
SWHP 0060	N/A	N/A	N/A	N/A
SWHP 0080	20	18	14	155
SWHP 0100	25	21	16	175
SWHP 0120	25	21	16	225
SWHP 0140	25	21	16	225
SWHP 0190	30	22	20	300
SWHP0 220	40	29	26	350
SWHP 0260	50	30	25	450
SWHP 0300	60	33	29	520
SWHP 0340	70	32	26	600

1 Cleanable (U-tube), vented condenser (double wall).

2 Non-Cleanable (Spiral), vented condenser (double wall).

NOTE: To calculate pressure drop in psig, use number above x 0.435.

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Condensate Drains and Piping

The drain pans are connected to a common drain system. Connections are available on both sides of the base frame as well as under the unit. The connection underneath the unit comes with a stub out and glued cap from the factory. Field installation of negative pressure condensate drain traps is required using one of these three connections. The non-trapped drain connections must be permanently capped with a suitable PVC plug. See Figure 4-3 for more detail on the sizing and materials of the negative pressure condensate drain trap.

For outdoor units, wrap drain lines and trap with electric heat tape (follow manufacturer's instructions) controlled by an automatic thermostat set at a minimum of 35°F to protect against freezing. Outdoor units also require insulation of all external condensate piping. Insulation must be sealed at all seams.

NOTE

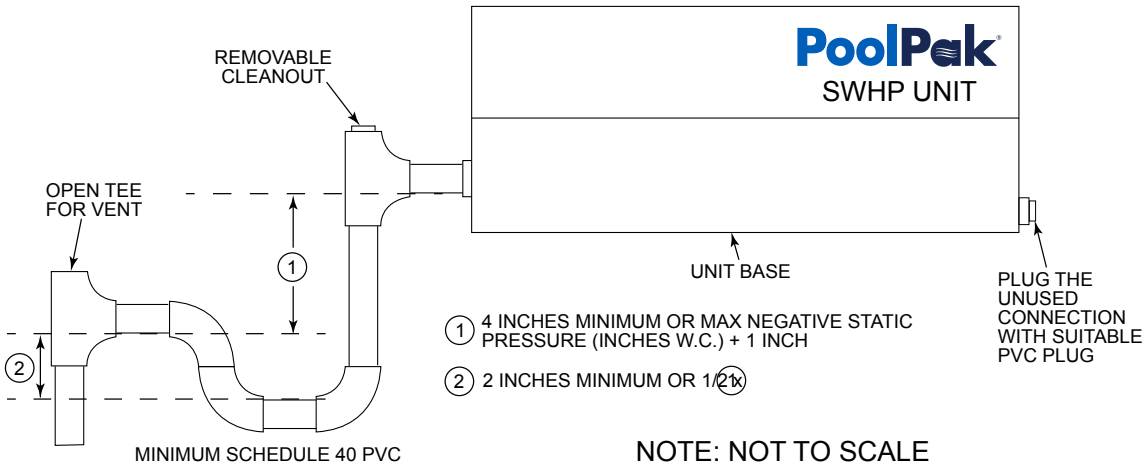
Power for heat tape must be supplied external to the PoolPak unit.

If the drain traps are vented to ambient pressure, they can be tied together after trapping and directed towards the nearest roof or floor drain. Provisions MUST be made for disposal of condensate as directed by local plumbing code.

⚠ 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.

Figure 4-3. Negative Pressure Condensate Piping Schematic



Overflow Drains

There are up to 3 overflow drains per unit. These connections normally do not need to be piped and are in place in case of water leakage or potential rain water entry during purge mode.

Remote Air-Cooled Condenser (ACC) Installation

Space and Location Requirements

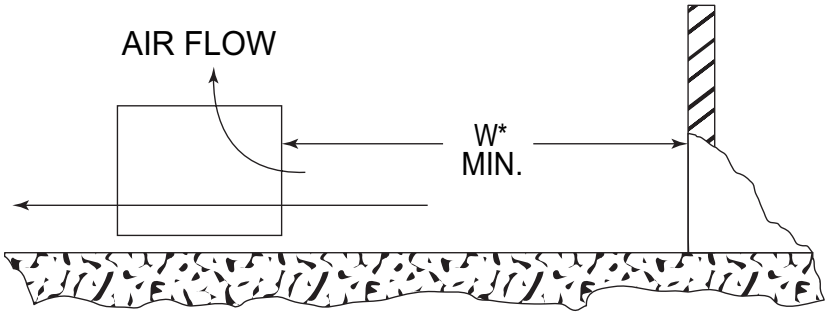
The most important consideration which must be taken into account when deciding upon the location of air-cooled condenser is to minimize the distance of the refrigerant piping. All attempts should be made to locate the ACC as close to the unit with as few elevation changes and turns as possible. Failure to do so can hinder proper refrigerant and oil flow, which can lead to poor efficiency or damage to the compressors. The maximum allowable line set length is 100' and the condenser may not be located more than 50' above or 20' below the PoolPak unit.

The second very important consideration which must be taken is that the unit should be mounted away from noise sensitive spaces and must have adequate support to avoid vibration and noise transmission into the building. Units should be mounted over corridors, utility areas, rest rooms, and other auxiliary areas where high levels of sound are not an important factor. Sound and structural consultants should be retained for recommendations.

Walls or Obstructions

The unit should be located so that air may circulate freely and not be re-circulated. For proper air flow and access all sides of the units should be a minimum of "W" away from any wall or obstruction (see Figure 4-4, Figure 4-5, Figure 4-6, or Figure 4-7). It is preferred that this distance be increased whenever possible. Care should be taken to see that ample room is left for maintenance work through access doors and panels. Overhead obstructions are not permitted. When the unit is in an area where it is enclosed by three walls, the unit must be installed as indicated for units in a pit.

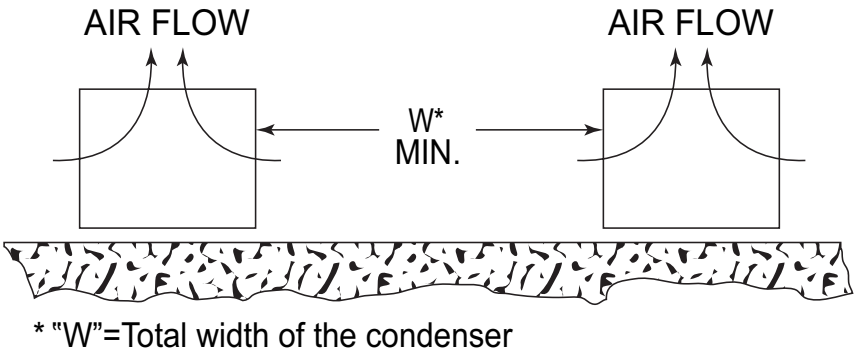
Figure 4-4. Remote ACC Installation Around Walls or Obstructions



Multiple Units

For units placed side by side, the minimum distance between units is the width of the largest unit. If units are placed end to end, the minimum distance between the units is 4 feet.

Figure 4-5. Remote ACC Installation When Installing Multiple Units



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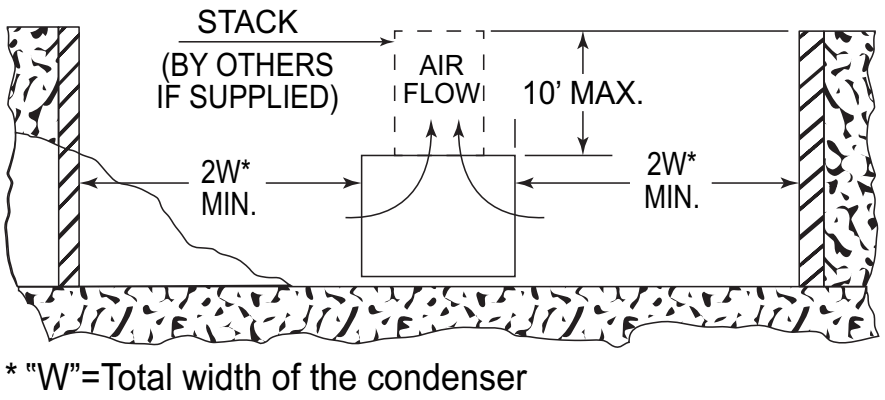
Units in Pits

The top of the unit should be level with the top of the pit and side distances increased to "2W". If the top of the units is not level with the top of the pit, discharge cones or stacks must be used to raise discharge air to the top of the pit. This is a minimum requirement.

Figure 4-6. Remote ACC Installation When Installing Units in Pits

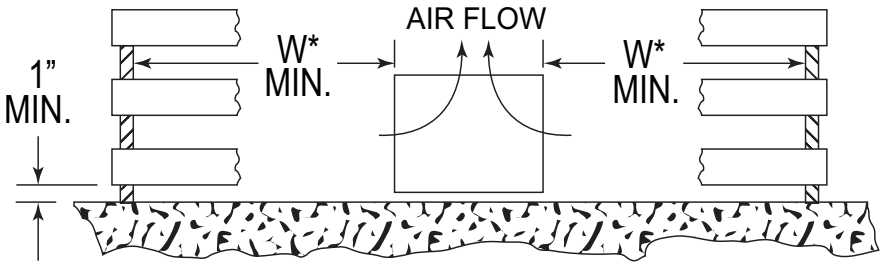


* "W"=Total width of the condenser

Decorative Fences

Fences must have 50% free area, with 1 foot undercut, a "W" minimum clearance, and must not exceed the tops of the unit. If these requirements are not met, the unit must be installed as indicated for "Units in Pits".

Figure 4-7. Remote ACC Installation When Installing Units Near Decorative Fences



* "W"=Total width of the condenser

PoolPak® ACC Dimensions, Weight and Electrical

Note: Below tables contain the piping sizes of the remote ACC stub-outs. **Additional field piping may be needed to make the transition from the ACC connections (ACC Conns) to correct refrigeration lineset sizing (see Table 4-12).**

Table 4-2. ACC - Model SWHP 0060

MODEL 0060**											
AMBIENT AIR (ºF)	ACC MODEL	NUMBER FANS		REFRIGERANT CIRCUITS	ACC CONNS (STUB OUTS)		WEIGHT	ACC VOLTAGE	FLA	MCA	MOP
		WIDE	LONG		HOT GAS	LIQUID	LBS				
95/100º	ACC0273	1	2	One	1-5/8	1-1/8	580	208/230-3-60	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
105º	ACC0333	1	2	One	1-5/8	1-1/8	630	208/230-3-60	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	ACC0453	1	2	One	2-1/8	1-3/8	690	208/230-3-60	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	ACC0623	1	3	One	2-1/8	1-3/8	1010	208/230-3-60	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

** Dimensions - see Air Cooled Condenser dimension views with number of fans wide (end) and number long (side)

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Table 4-3. ACC - Model SWHP 0080

MODEL 0080**											
AMBIENT AIR (ºF)	ACC MODEL	NUMBER FANS		REFRIGERANT CIRCUITS	ACC CONNS (STUB OUTS)		WEIGHT	ACC VOLTAGE	FLA	MCA	MOP
		WIDE	LONG		HOT GAS	LIQUID	LBS				
95/100º	ACC0333	1	2	One	1-5/8	1-1/8	580	208/230-3-60	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
105º	ACC0363	1	2	One	1-5/8	1-1/8	630	208/230-3-60	14.0	20.0	35.0
								460-3-60	7.0	15.0	15.0
								575-3-60	5.6	15.0	15.0
	ACC0433	1	2	One	2-1/8	1-3/8	680	380-3-50	5.8	15.0	15.0
110º	ACC0523	1	3	One	2-1/8	1-3/8	930	208/230-3-60	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	ACC0773	2	2	One	2-1/8	1-3/8	1320	208/230-3-60	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

** Dimensions - see Air Cooled Condenser dimension views with number of fans wide (end) and number long (side)

Table 4-4. ACC - Model SWHP 0100

MODEL 0100**											
AMBIENT AIR (ºF)	ACC MODEL	NUMBER FANS		REFRIGERANT CIRCUITS	ACC CONNS (STUB OUTS)		WEIGHT	ACC VOLTAGE	FLA	MCA	MOP
		WIDE	LONG		HOT GAS	LIQUID	LBS				
95/100º	ACC0363	1	2	One	1-5/8	1-1/8	630	208/230-3-60	14.0	20.0	35.0
								460-3-60	7.0	15.0	15.0
								575-3-60	5.6	15.0	15.0
	ACC0433	1	2	One	2-1/8	1-3/8	680	380-3-50	5.8	15.0	15.0
105º	ACC0433	1	2	One	2-1/8	1-3/8	680	208/230-3-60	14.0	20.0	35.0
								460-3-60	7.0	15.0	15.0
								575-3-60	5.6	15.0	15.0
	ACC0493	1	3	One	2-1/8	1-3/8	930	380-3-50	8.8	15.0	20.0
110º	ACC0683	1	3	One	2-1/8	1-3/8	1010	208/230-3-60	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	ACC0963	2	2	One	2-1/8	1-3/8	1490	208/230-3-60	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

** Dimensions - see Air Cooled Condenser dimension views with number of fans wide (end) and number long (side)

Table 4-5. ACC - Model SWHP 0120

MODEL 0120**											
AMBIENT AIR (ºF)	ACC MODEL	NUMBER FANS		REFRIGERANT CIRCUITS	ACC CONNS (STUB OUTS)		WEIGHT	ACC VOLTAGE	FLA	MCA	MOP
		WIDE	LONG		HOT GAS	LIQUID	LBS				
95/100º	ACC0433	1	2	One	2-1/8	1-3/8	680	208/230-3-60	14.0	20.0	35.0
								460-3-60	7.0	15.0	15.0
								575-3-60	5.6	15.0	15.0
	ACC0493	1	3	One	2-1/8	1-3/8	930	380-3-50	8.8	15.0	20.0
105º	ACC0553	1	3	One	2-1/8	1-3/8	930	208/230-3-60	21.0	22.8	40.0
								460-3-60	10.5	15.0	20.0
								575-3-60	8.4	15.0	15.0
	ACC0593	1	3	One	2-1/8	1-3/8	1000	380-3-50	8.8	15.0	20.0
110º	ACC0773	2	2	One	2-1/8	1-3/8	1390	208/230-3-60	28.0	29.8	45.0
								460-3-60	14.0	15.0	20.0
			2 x 2		2-1/8	1-3/8	1390	575-3-60	11.2	15.0	15.0
								380-3-50	11.7	15.0	20.0
115º	ACC1163	2	3	One	2-1/8	1-3/8	2060	208/230-3-60	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

** Dimensions - see Air Cooled Condenser dimension views with number of fans wide (end) and number long (side)

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Table 4-6. ACC - Model SWHP 0140

MODEL 0140**											
AMBIENT AIR (ºF)	ACC MODEL	NUMBER FANS		REFRIGERANT CIRCUITS	ACC CONNS (STUB OUTS)		WEIGHT	ACC VOLTAGE	FLA	MCA	MOP
		WIDE	LONG		HOT GAS	LIQUID	LBS				
95/100º	ACC0493	1	3	One	2-1/8	1-3/8	930	208/230-3-60	21.0	22.8	40.0
								460-3-60	10.5	15.0	20.0
								575-3-60	8.4	15.0	15.0
	ACC0593	1	3	One	2-1/8	1-3/8	1000	380-3-50	8.8	15.0	20.0
105º	ACC0663	2	2	One	2-1/8	1-3/8	1340	208/230-3-60	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
110º	ACC0923	2	2	One	2-1/8	1-3/8	1490	208/230-3-60	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
115º	ACC1373	2	3	One	2-1/8	1-3/8	2210	208/230-3-60	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

** Dimensions - see Air Cooled Condenser dimension views with number of fans wide (end) and number long (side)

Table 4-7. ACC - Model SWHP 0190

MODEL 0190**											
AMBIENT AIR (ºF)	ACC MODEL	NUMBER FANS		REFRIGERANT CIRCUITS	ACC CONNS (STUB OUTS)		WEIGHT	ACC VOLTAGE	FLA	MCA	MOP
		WIDE	LONG		HOT GAS	LIQUID	LBS				
95/100º	ACC0593	1	3	One	2-1/8	1-3/8	1000	208/230-3-60	21.0	22.8	40.0
								460-3-60	10.5	15.0	20.0
								575-3-60	8.4	15.0	15.0
	ACC0663	2	2	One	2-1/8	1-3/8	1340	380-3-50	11.7	15.0	20.0
105º	ACC0733	2	2	One	2-1/8	1-3/8	1340	208/230-3-60	28.0	29.8	45.0
								460-3-60	14.0	15.0	20.0
								575-3-60	11.2	15.0	15.0
	ACC0863	2	2	One	2-1/8	1-3/8	1440	380-3-50	11.7	15.0	20.0
110º	ACC1163	2	3	One	2-1/8	1-3/8	2060	208/230-3-60	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	ACC1813	2	4	One	2-1/8	1-3/8	2930	208/230-3-60	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

** Dimensions - see Air Cooled Condenser dimension views with number of fans wide (end) and number long (side)

Table 4-8. ACC - Model SWHP 0220

MODEL 0220**											
AMBIENT AIR (ºF)	ACC MODEL	NUMBER FANS		REFRIGERANT CIRCUITS	ACC CONNS (STUB OUTS)		WEIGHT	ACC VOLTAGE	FLA	MCA	MOP
		WIDE	LONG		HOT GAS	LIQUID	LBS				
95/100º	ACC0734	2	2	Two	2@ 1-5/8	2@ 1-1/8	1340	208/230-3-60	28.0	29.8	45.0
								460-3-60	14.0	15.0	20.0
								575-3-60	11.2	15.0	15.0
	ACC0864	2	2	Two	2@2-1/8	2@1-3/8	1440	380-3-50	11.7	15.0	20.0
105º	ACC0994	2	3	Two	2@ 2-1/8	2@ 1-3/8	1990	208/230-3-60	42.0	43.8	60.0
								460-3-60	21.0	21.9	30.0
								575-3-60	16.8	20.0	25.0
	ACC1094	2	3	Two	2@2-1/8	2@1-3/8	1990	380-3-50	17.5	21.9	30.0
110º	ACC1374	2	3	Two	2@ 2-1/8	2@ 1-3/8	2210	208/230-3-60	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	ACC1974	2	5	Two	2@ 2-1/8	2@ 1-3/8	3410	208/230-3-60	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

** Dimensions - see Air Cooled Condenser dimension views with number of fans wide (end) and number long (side)

Table 4-9. ACC - Model SWHP 0260

MODEL 0260**											
AMBIENT AIR (ºF)	ACC MODEL	NUMBER FANS		REFRIGERANT CIRCUITS	ACC CONNS (STUB OUTS)		WEIGHT	ACC VOLTAGE	FLA	MCA	MOP
		WIDE	LONG		HOT GAS	LIQUID	LBS				
95/100º	ACC0864	2	2	Two	2@2-1/8	2@1-3/8	1440	208/230-3-60	28.0	29.8	45.0
								460-3-60	14.0	15.0	20.0
								575-3-60	11.2	15.0	15.0
	ACC0994	2	3	Two	2@2-1/8	2@1-3/8	1990	380-3-50	17.5	21.9	30.0
105º	ACC1094	2	3	Two	2@2-1/8	2@1-3/8	1990	208/230-3-60	42.0	43.8	60.0
								460-3-60	21.0	21.9	30.0
								575-3-60	16.8	20.0	25.0
	ACC1294	2	3	Two	2@2-1/8	2@1-3/8	2140	380-3-50	17.5	21.9	30.0
110º	ACC1654	2	4	Two	2@ 2-1/8	2@ 1-3/8	2730	208/230-3-60	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	ACC2444	2	5	Two	2@ 2-1/8	2@ 1-3/8	3660	208/230-3-60	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

** Dimensions - see Air Cooled Condenser dimension views with number of fans wide (end) and number long (side)

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Table 4-10. ACC - Model SWHP 0300

MODEL 0300**											
AMBIENT AIR (ºF)	ACC MODEL	NUMBER FANS		REFRIGERANT CIRCUITS	ACC CONNS (STUB OUTS)		WEIGHT	ACC VOLTAGE	FLA	MCA	MOP
		WIDE	LONG		HOT GAS	LIQUID	LBS				
95/100º	ACC0994	2	3	Two	2@ 2 1/8	2@ 1-3/8	1990	208/230-3-60	42.0	43.8	60.0
								460-3-60	21.0	21.9	30.0
								575-3-60	16.8	20.0	25.0
	ACC1184	2	3	Two	2@ 2-1/8	2@ 1-3/8	2140	380-3-50	17.5	21.9	30.0
105º	ACC1294	2	3	Two	2@ 2-1/8	2@ 1-3/8	2140	208/230-3-60	42.0	43.8	60.0
								460-3-60	21.0	21.9	30.0
								575-3-60	16.8	20.0	25.0
	ACC1464	2	4	Two	2@ 2-1/8	2@ 1-3/8	2630	380-3-50	23.3	28.9	35.0
110º	ACC1924	2	4	Two	2@ 2-1/8	2@ 1-3/8	2930	208/230-3-60	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	ACC2934	2	6	Two	2@ 2-1/8	2@ 1-3/8	4370	208/230-3-60	84.0	85.8	100.0
								460-3-60	42.0	42.9	50.0
								575-3-60	33.6	34.3	40.0
								3z80-3-50	35.0	42.9	50.0

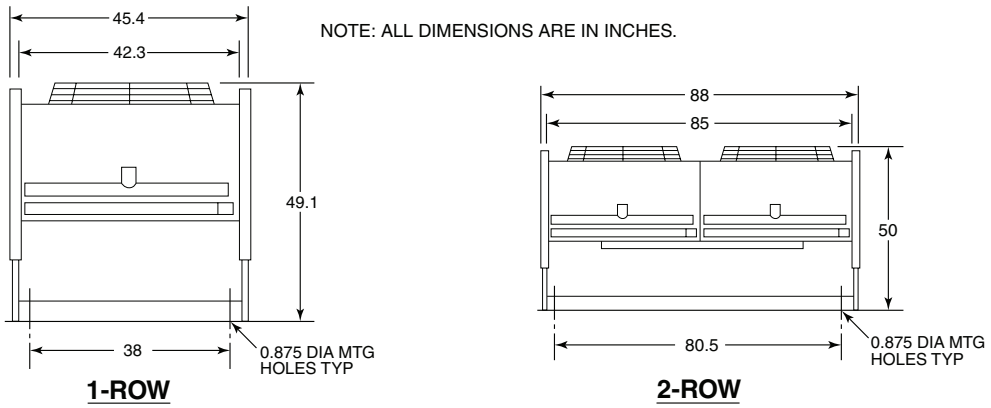
** Dimensions - see Air Cooled Condenser dimension views with number of fans wide (end) and number long (side)

Table 4-11. ACC - Model SWHP 0340

MODEL 0340**											
AMBIENT AIR (ºF)	ACC MODEL	NUMBER FANS		REFRIGERANT CIRCUITS	ACC CONNS (STUB OUTS)		WEIGHT	ACC VOLTAGE	FLA	MCA	MOP
		WIDE	LONG		HOT GAS	LIQUID	LBS				
95/100º	ACC1294	2	3	Two	2@ 2 1/8	2@ 1-3/8	2140	208/230-3-60	42.0	43.8	60.0
								460-3-60	21.0	21.9	30.0
								575-3-60	16.8	20.0	25.0
	ACC1464	2	4	Two	2@ 2-1/8	2@ 1-3/8	2630	380-3-50	23.3	28.9	35.0
105º	ACC1564	2	4	Two	2@ 2-1/8	2@ 1-3/8	2630	208/230-3-60	56.0	57.8	70.0
								460-3-60	28.0	28.9	35.0
								575-3-60	22.4	23.1	30.0
	ACC1824	2	4	Two	2@ 2-1/8	2@ 1-3/8	2830	380-3-50	23.3	28.9	35.0
110º	ACC2444	2	5	Two	2@ 2-1/8	2@ 1-3/8	3660	208/230-3-60	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
115º	ACC1813 x 2 ***	2	4	Two	2@ 2-1/8	2@ 1-3/8	2930	208/230-3-60	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

** Dimensions - see Air Cooled Condenser dimension views with number of fans wide (end) and number long (side).
***The ACC package contains 2 separate condenser units. Each condenser should be piped to each individual refrigerant circuit. Values for physical and electrical characteristics are for each individual condenser unit.

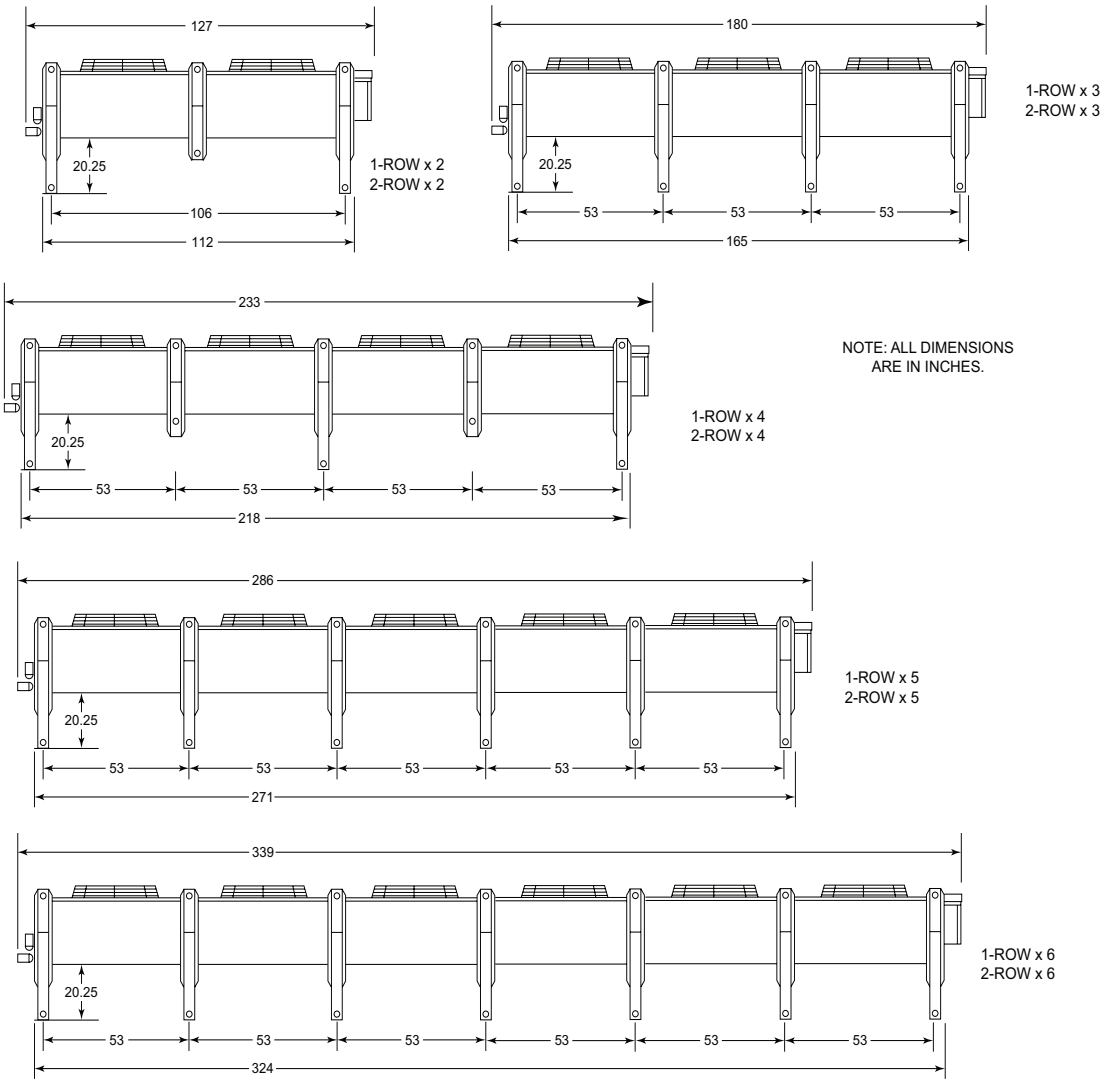
Figure 4-8. Air Cooled Condenser Dimensions - End View



NOTE

"Be sure to follow the manufacturer's installation instructions.
This includes properly extending the support legs from their shipping location."

Figure 4-9. Air Cooled Condenser Dimensions - Side View



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Water-Cooled Condenser (WCC)

A remotely located water-cooled condenser utilizing either cooling tower water or chilled water is available. Some models may be able to have the cooling tower/chilled water condenser mounted to the side of the unit. Contact factory for specific applications.

Figure 4-10. Remote Cooling Tower Dimensions

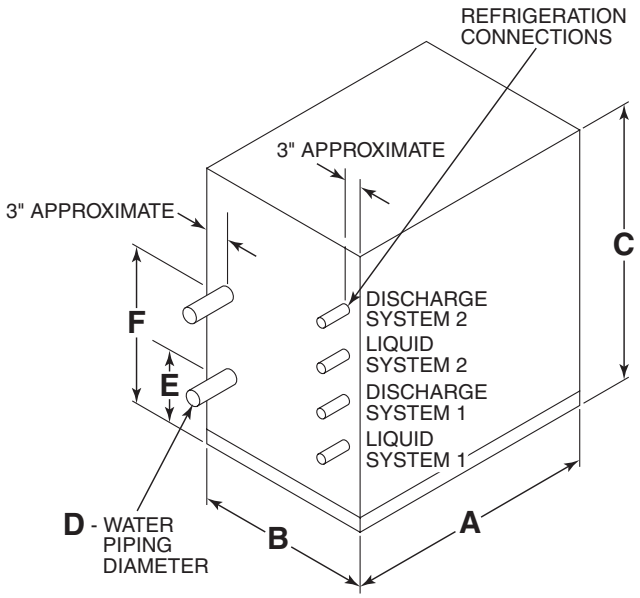

Table 4-12. Remote Water Cooled Condenser Dimensions

CABINET SIZE2	REMOTE COOLING TOWER AND CHILLED WATER CABINET DIMENSIONS1					WEIGHT (LB)
	A**	B**	C**	E**	F**	
A	79	44	63	15	55	950
B	79	44	63	15	55	1200
C	79	44	63	15	55	1500

1 ALL DIMENSIONS ARE ROUNDED TO THE NEAREST INCH. CONTACT FACTORY FOR EXACT DIMENSIONS
2 A CABINET - 060, 080, 100; B CABINET - 100, 120, 140; C CABINET - 140, 190, 220, 260, 300, 340
** REFER TO DRAWING ABOVE FOR DIMENSION CALL-OUTS

Table 4-13. WCC Piping Connections

	WATER PIPING1, CPVC	WCC CONNECTIONS1 (STUB OUTS)	
MODEL2	D	DISCHARGE	LIQUID
060	2	1-1/8	1-1/8
080/100	2	1-3/8	1-1/8
120/140/190	2	1-5/8	1-3/8
220	3	1-3/8	1-1/8
260/300/340	3	1-5/8	1-3/8

1 Piping dimensions in inches
2 Models 220, 260, 300, 340 have 2 refrigeration circuits piped independently

Figure 4-11. PoolPak® Optional Water-Cooled Condenser Cabinet - Attached

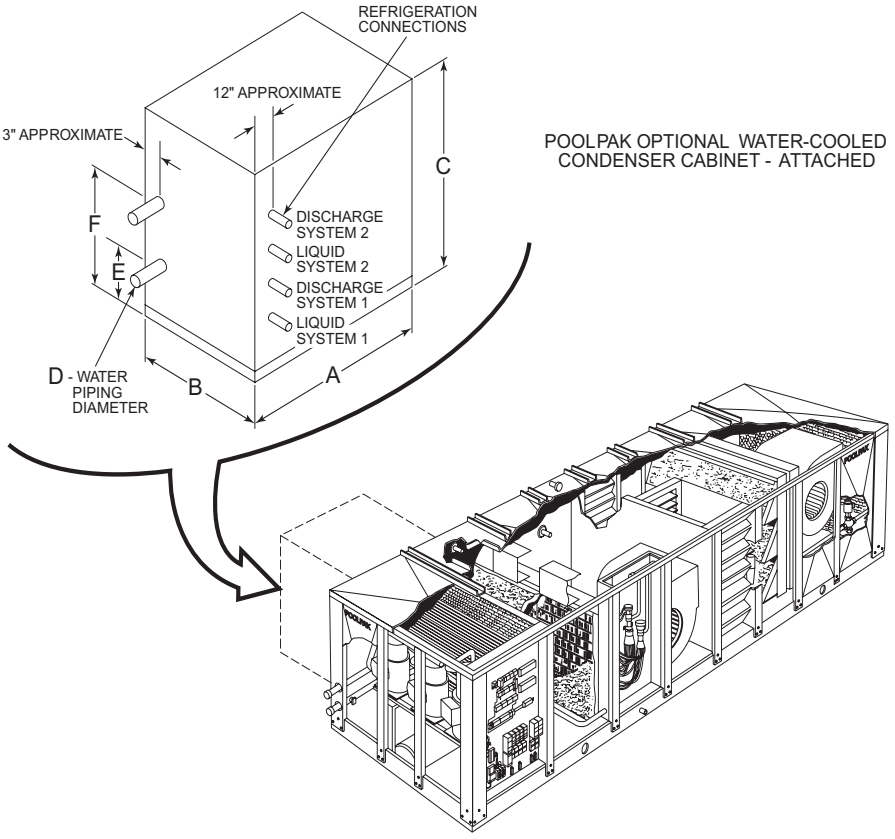

Table 4-14. WCC Piping Connections

SWHP MODEL	COOLING TOWER WATER CONDENSER [1]		CHILLED WATER CONDENSER [2]		HEAT REJECTION [3]
	GPM	WATER (FEET) [4]	GPM	WATER (FEET) [5]	MBTU/HR
060	25	28	25	24	230
080	35	32	25	31	310
100	40	29	35	23	350
120	50	30	40	18	450
140	60	33	50	27	520
190	70	32	60	27	600
220	80	31	70	24	350/350 [6]
260	100	32	80	20	450/450 [6]
300	120	35	100	28	520/520 [6]
340	140	34	120	28	600/600 [6]

1 Maximum 90 oF EWT
2 Maximum 55 F EWT
3 Heat rejection at 120 F Condensing Temperature
4 Cleanable, vented condenser
5 Spiral, vented condenser
6 Two circuit water-cooled condenser, one for each compressor

NOTE

Contact factory if water-cooled condenser line length is more than 100 ft and/or the water-cooled condenser is located more than 50 feet above or 20 feet below.

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Field-Installed Refrigerant Piping

Installation of the remote water-cooled or air-cooled condenser should only be done by a qualified refrigeration mechanic familiar with this type of work. Many service problems can be avoided by taking adequate precautions to provide an internally clean and dry system and by using procedures and materials that conform to established standards.

PIPING GUIDELINES

The following piping recommendations are intended for use as a general guide. For more complete information, refer to the latest ASHRAE Handbook.

Materials:

- Use clean, dehydrated, refrigeration-grade copper tubing for all refrigerant lines. Hard drawn tubing should be used where no appreciable amount of bending around pipes or obstructions is necessary. If soft copper tubing must be used, care should be taken to avoid sharp bends which may cause restrictions and excessive refrigerant pressure drops.
- Use long radius elbows wherever possible with one exception - short radius elbows should be used for any traps in the hot gas riser.
- Braze all copper to copper joints with a phosphorus-copper alloy material such as Silfos 5 or equivalent. Do not use soft solder.
- During brazing operations flow an inert gas, such as nitrogen, through the lines to prevent internal oxidation scaling and contamination.
- Support refrigeration lines at intervals with suitable hangers, brackets or clamps.
- Pack glass fiber insulation and a sealing material around refrigerant lines, where they penetrate a wall, to reduce vibration and to retain some flexibility.
- The liquid line and discharge line should not be in contact with one another. If the installing contractor must tie these lines together because of an installation requirement, the contractor must insulate them from each other to prevent heat transfer. Because the discharge line is hot during system operation, precautions should be taken to avoid personnel injury.
- PoolPak® units do not utilize compressors with unloading stages. Consequently, double hot gas risers are not needed for reduced load conditions as refrigerant flow rates will not fall below minimum velocities necessary to carry oil up through the discharge line.
- A field provided, field installed liquid line filter-drier is required in the field piping adjacent to the PoolPak® unit.

Sizing:

- The lines must be sized and routed so that oil is carried through the system. Using smaller lines than recommended will give excessive pressure drops, resulting in reduced capacity and increased power consumption. Oversized lines could result in an oil flow problem within the system and possible compressor damage.
- Excessive pressure drops in the liquid line may cause flashing of the refrigerant and a loss of a liquid seal at the expansion valve inlet. A reduction in capacity may then occur because the presence of gaseous refrigerant will partially block the expansion valve. Using the hot gas and liquid line sizes recommended in the Air-Cooled or Water-Cooled Condenser sections for these units and the proper system refrigerant charge will prevent this problem.
- Discharge lines should be designed to prevent condensed refrigerant and oil from draining back to the compressor during OFF cycles. Use the following guidelines:
  - The highest point in the discharge line should be above the highest point in the condenser coil. (See Figure 4-10)
  - The hot gas line should loop toward the floor if the condenser is located above the PoolPak® unit, especially if the hot gas riser is long.
- For refrigerant line sizing for an Air-Cooled or Water-Cooled Condenser (ACC/WCC) where the lineset length is less than 100 feet or the ACC/WCC location is less than 50 feet higher or 20 feet lower than the unit, use the below Table 4-12.
- **ACC/WCC line lengths beyond the above limits will void warranty unless written approval is obtained from the factory PRIOR to installation and startup.**

Table 4-15. Pipe Sizes for Remote Refrigerant Condensers

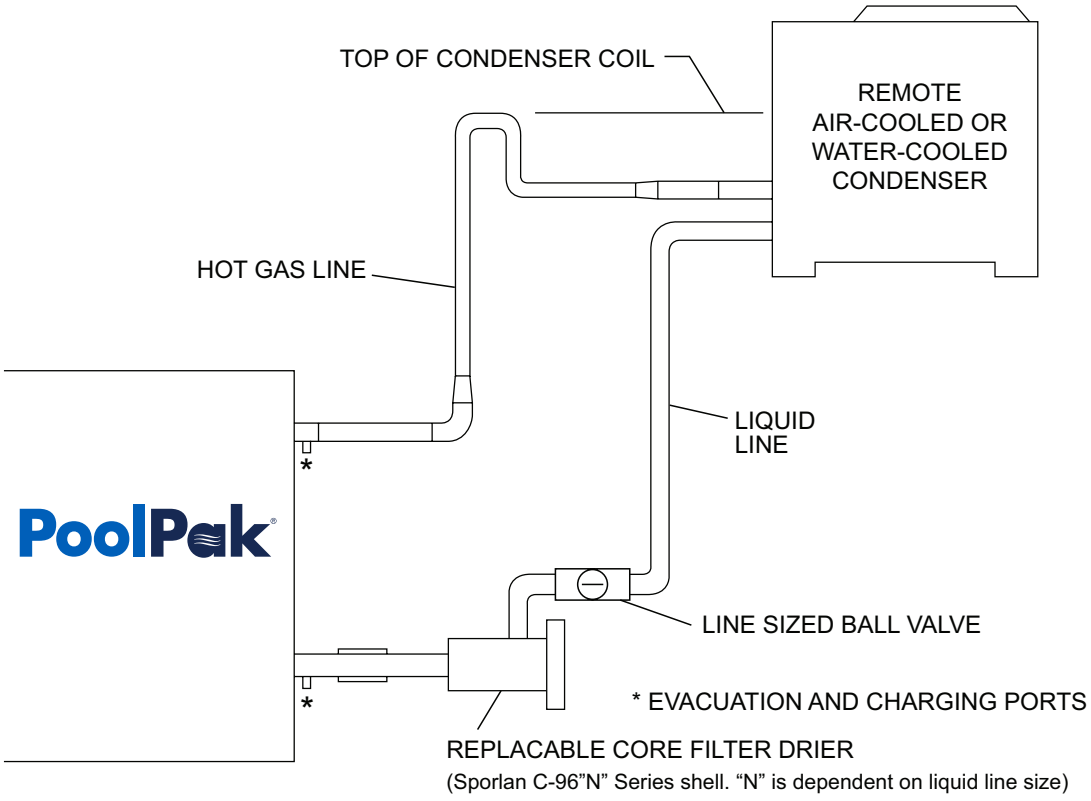
MODEL[1]	HOT GAS LINES[2]		LIQUID LINES[2]
	HORIZONTAL RUN	VERTICAL RISER	
0060	1-3/8	1-3/8	7/8
0080	1-3/8	1-3/8	1-1/8
0100	1-5/8	1-5/8	1-1/8
0120	1-5/8	1-5/8	1-3/8
0140	2-1/8	1-5/8	1-3/8
0190	2-1/8	1-5/8	1-3/8
0220	1-5/8	1-5/8	1-1/8
0260	1-5/8	1-5/8	1-3/8
0300	2-1/8	1-5/8	1-3/8
0340	2-1/8	1-5/8	1-3/8

1 Models 220, 260, 300, 340 have two refrigeration circuits piped independently.
2 All pipe diameters are nominal OD inch sizes. Use only certified refrigeration tubing.

⚠ CAUTION

Above chart is for lineset length less than 100 ft and ACC located less than 50ft above unit or 20ft below unit. Failures due to a piping layout not within these limits nor receiving prior PoolPak® factory approval will not be covered under PoolPak® warranty.

Figure 4-12. Remote ACC Above Unit



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Refrigerant and Oil Charging:

- PoolPak® units are shipped with the required charge for self contained operation only. The factory does NOT provide the refrigerant charge or oil required for the ACC or for the ACC/WCC line sets.
- Refer to the below charging charts to calculate the additional refrigerant required for the remote ACC and the ACC/WCC field-installed refrigerant piping lineset.
- For the additional oil required, multiply 2% by the total additional refrigerant charge (ACC/WCC and lineset length).
  - For Copeland compressors, use Copeland Ultra 32 CC POE refrigeration oil.
  - For Bitzer compressors, use Idemitsu FVC32D PVE refrigeration oil.
- Contact Factory for additional help or verifying the additional refrigerant charge.

Table 4-16. Remote ACC Refrigerant (R-410A) Charge

ACC MODEL	SINGLE CIRCUIT	ACC MODEL	TWO CIRCUITS - PER CIRCUIT
ACC0273	8.4	ACC0734	12.2
ACC0333	12.6	ACC0864	16.8
ACC0363	12.6	ACC0994	18.5
ACC0433	16.8	ACC1094	18.5
ACC0453	16.8	ACC1184	24.4
ACC0493	18.5	ACC1294	24.4
ACC0523	18.5	ACC1374	24.4
ACC0553	18.5	ACC1464	43.8
ACC0593	25.3	ACC1564	43.8
ACC0623	25.3	ACC1654	43.8
ACC0663	24.4	ACC1824	58.9
ACC0683	25.3	ACC1924	58.9
ACC0733	24.4	ACC1974	53.9
ACC0773	24.4	ACC2444	72.4
ACC0863	33.7	ACC2934	85.9
ACC0923	33.7		
ACC0963	33.7		
ACC1163	37.0		
ACC1373	48.8		
ACC1813	117.8		

Table 4-17. Refrigerant (R-410A) Charge for Different Line Sizes

TUBE OD (IN)	WALL THICKNESS (IN)	TUBING TYPE	DISCHARGE1 LB/FT	LIQUID1 LB/FT
7/8	0.045	L	0.021	0.192
1 1/8	0.05	L	0.036	0.327
1 3/8	0.055	L	0.055	0.499
1 5/8	0.072	K	0.076	0.684
2 1/8	0.083	K	0.133	1.196

⚠ WARNING!

Above chart is for lineset length less than 100 ft and ACC located less than 50ft above unit or 20ft below unit. Failures due to a piping layout not within these limits nor receiving prior PoolPak® Factory approval will not be covered under PoolPak® warranty.

SECTION V: OPERATION

Remote Interface Unit (RIU)

The PoolPak® CPCS control system includes a Remote Interface Unit (RIU) display/keypad panel 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 RIU connects to this telephone jack using the special RJ-25 cable supplied.

Normally, the Remote Interface Unit (RIU) 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.

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.

Service Display Connection

For service convenience, there is an auxiliary RJ-25 jack located on the upper left side of CPCS Control Module #1, port J10. The RIU may be removed from its remote location and connected here using the special RJ-25 cable supplied with the control system.

Extensive troubleshooting features accessible from the RIU are described in the troubleshooting section.

Multiple Unit Networking

When there are multiple PoolPak® units serving a single pool room, the units MUST be networked together for proper control of the room conditions. This network connection also allows the user to access operational information for all the units from a single RIU. If there are multiple PoolPak® units serving separate pool rooms, this networking connection is optional.

Building Automation System (BAS) Connection

The PoolPak® CPCS control system provides four optional Building Automation System (BAS) connection types; LonWorks, Modbus RTU, BACnet/IP, or BACnet MS/TP. When the optional Virtual-Tech® Remote Access Package (RAP) is installed, BACnet/IP is the only option available.

When the CPCS is equipped with the BACnet/IP interface, the RJ45 connection is to the serial card port on control module CM1. All other interface options are connected to terminal block T16 in the main control panel.

PoolPak® Virtual-Tech® Remote Access Package (RAP)

The PoolPak® Virtual-Tech® Remote Access Package (RAP) is a stand-alone communication system. The system runs an embedded web server over an IEEE 802.3 10/100 BaseT Ethernet. 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.

Send Emails – Alerts for Alarms

When a critical alarm occurs with the PoolPak® unit, the Virtual-Tech® Remote Access Package (RAP) will send an email to the PoolPak® Service Department, via a mail server maintained by PoolPak®.

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CPCS Network Operation

CPCS networking allows up to five PoolPak® units to be connected together over a proprietary, private network. When configured and wired for Network Control, the units will work together to efficiently maintain the desired air temperature and relative humidity, water temperature and ventilation air requirements. All units on the network are accessible from any RIU (Remote Interface Unit) on the network. Refer to the Multiple Unit Networking diagram in the wiring section of this manual for multiple PoolPak® unit field communication loop connections.

Networked CPCS 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 un-cleared 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 un-cleared 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 un-cleared 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 displaying a 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. 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, connection status, and network address.

CM1 Configuration

The unit networking address is set by pressing the small button to the right of the CM1 plug, J3. Pressing the button one time will display the current I/O address setting. On single unit installations, this should be 1. On multi-unit installations, each unit should be set to a different address between 1 and 5. No two I/O addresses can be the same while connected to the same network. The largest model unit should always be identified as Unit ID #1 increasing Unit ID for smaller unit models.

To change the I/O address, press and hold the button for approximately 5 seconds until it begins flashing slowly. Once flashing, release the button and press it sequentially until the desired address is displayed (must be 1, 2, 3, 4 or 5) and release the button. After approximately 5 seconds, the displayed number will begin flashing faster to indicate the new address has been set. Cycle power at the Control Power switch to complete the address change.

RIU Configuration

The RIU network address is set by pressing the UP, DOWN, and ENTER buttons simultaneously and holding them down for approximately 5 seconds. The display will show "Display address setting". Press the ENTER to move the cursor to the current address field. Use the UP and DOWN buttons to change the address to either 10, 11, or 12 and press ENTER.

To configure the CPCS RIU addresses, press the UP, DOWN, and ENTER buttons simultaneously and hold them down for approximately 5 seconds. The display will show "Display address setting". Press the ENTER four times to move the cursor past the screens showing "Display address setting", "I/O Board address" and "Terminal config Press ENTER to continue. Use the keypad to enter the RIU configuration as follows:

P: 0x	Adr	Priv/Shared	(x = CM1 I/O address)
Trm1	10	Sh	
Trm2	11	Sh	
Trm3	12	Sh Ok? Y	

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 status display.

NETWORK CONFIGURATION

Using the following parameters, it is possible to configure the CPCS 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 - No (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 CPCS 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/slave environment, 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 (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 is controlling 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 same Network Ctl and Water Temp Ctl parameters. Units that are configured for Network Ctl and Local Water Temp Ctl will use the local water temperature, set point and the network air temperature and relative humidity set points. 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.

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CPCS Operation

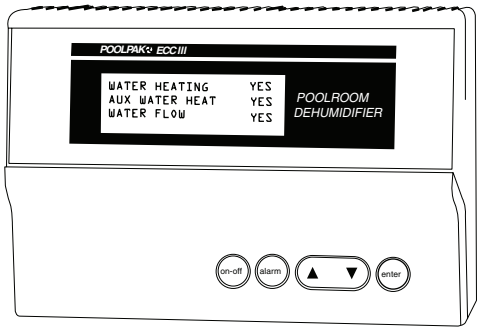
Operation Status Screens - VI Key (PRG & ESC on CPCS CM1)

Normally, the RIU (Figure 5-1) or CPCS CM1 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.

Screen 1 displays:

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

Figure 5-1. CPCS Remote Interface Unit (RIU)



Screen 2 displays:

- Pool Water Temperature #1
- Pool Water Temperature #2
- Outside Air Temperature
- Outside Air Relative Humidity

Screen 3 displays: (SR models only)

- Outside Air Damper Position
- Recirc Air Damper Position
- Exhaust Air Damper Position

Screen 4 displays:

- System 1 Mode
  - 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 - 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 - 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 CPCS 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.

NOTE

Setpoints should be programmed based on the design conditions. These can be found on the laminated sheet inside the PoolPak Control Section door. Changes made to setpoints may result in poor space conditions or excessive operation of the PoolPak unit. For questions on design data, please contact PoolPak Service.

SPACE TEMPERATURE (RANGE 70–95°F)

The space temperature should normally be set to about 2°F above the pool water temperature to minimize the water evaporation rate.

SPACE RELATIVE HUMIDITY (RANGE 40–65%)

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 70–104°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).

CPCS-SWHP: System Configuration

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

System 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 CPCS control parameters for 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 ENTER key to move the cursor to the parameter 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 ENTER 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.

The following parameters are available in the configuration menu:

OCCUPANCY SCHEDULE

The CPCS can store up to 28 occupancy events. An event is a change to occupied mode or unoccupied mode.

To view the current list of events stored in the controller memory, press the ENTER key to move the cursor to the Occupancy 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.

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PURGE MODE SCHEDULE (SR AND SEP ONLY)

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

To view the current list of events stored in the controller memory, press the ENTER key to move the cursor to the Purge 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.

Timed Purge Mode -OFF (Range OFF or ON)
By opening the outside air and exhaust air dampers to 100%, the CPCS can introduce large quantities of outside air to the pool enclosure. This can be useful during "shocking" of the pool water. Purge mode remains active for an adjustable period of time and then automatically terminates.

To start a purge cycle move the cursor to the Purge Mode parameter and set it to ON. If the CPCS 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 CPCS 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.

Enab Prg OAT Lim - Yes (Range Yes or No)
Enable Purge Outside Air Temperature Limit. When this parameter is set to Yes, the CPCS will prevent the unit from performing purge mode when the outside air temperature is below the programmed purge outside air temperature limit.

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

Prg OAT Lim - 030.0 (Range -999.9 to 999.9)
Purge Outside Air Temperature Limit. This sets the temperature below which the unit will not perform purge mode. The Enab Prg OAT Lim setting must be set to Yes.

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

Enab Post Prg Dly – Yes (Range Yes or No)
Enable Post Purge Delay. When this parameter is set to Yes, the CPCS will prevent the compressors from operating for 3 minutes after exiting purge mode.

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

EVENT MODE SCHEDULE

The CPCS can store up to 28 Event Mode schedule entries. An event is a change to "Start" or "End" Event Mode. During Event Mode, the minimum damper position is raised to a value higher than the minimum damper setpoint. This value is set in the field below. To view the current list of events stored in the controller's memory, press the "Enter" 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.

Event Minimum Damper Position - 45 % (Range 0 to 75)
This parameter sets the minimum intake damper position during event mode.

Event Mode Active - Yes or No - Read Only

This parameter indicates whether the unit is in Event Mode.

053. Time SP - N/A
This parameter allows adjustment of the CPCS 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 CPCS . 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 CPCS . 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 CPCS . It is normal for the 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 % - 30% (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 CPCS will use to display system conditions and set points.

062. BaudRate - 19,200 (Range 1,200–19,200)
This parameter controls the baud rate of the CPCS BAS serial port. When connected to a LonWorks based BAS this parameter must be set to 4,800. For Modbus RTU networks this parameter should be set as required for the installation. For BACnet/IP and BACnet/MS/TP this parameter must be set to 19,200.

063. Unit ID - Read Only
This read only parameter displays the CPCS address on the private multi-unit network. The DIP switches, on control module CM1 in the PoolPak® control panel, set the value of this parameter.

071. Stages Inst - N/A (Range 1 to 4)
This parameter indicates how many compressor stages are installed in the PoolPak® unit.

- For an SWHP060–SWHP120, set this parameter to 2.
- For an SWHP140–SWHP190 with Bitzer compressors, set this parameter to 3. On SWHP190 equipped with Emerson (Copeland) compressors, set to 2
- For an SWHP220–SWHP340, set this parameter to 4.

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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 CPCS 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® 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 CPCS 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 CPCS 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 CPCS 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 CPCS 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 - Yes (Range No to Yes)
This parameter determines whether the CPCS 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 CPCS 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® 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.

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

NOTE
Parameters 90–99 are used to calibrate the CPCS 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

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.

Rtn Air WB Lim – 55.0 (Range 50.0 – 99.9)
Return Air Wetbulb Limit. The CPCS will disable the compressors when the calculated wet bulb temperature of the return air drops below this value.

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

Ax Heat Fst Max OAT – 99.9 (Range 00.0 – 99.9)
Auxiliary Air Heat First Maximum Outside Air Temperature. This setting can be adjusted on applications which have a high ambient override on the building hot water supply used for auxiliary air heat.

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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 will never 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 command (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 RTU based network. For LonWorks based networks, this parameter must always be set to 1.

IP Address – 192.168.010.108
This setting can be used to configure the BACnet/IP card settings.

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

Subnet Mask – 255.255.255.0
This setting can be used to configure the BACnet/IP card settings.

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

IP Gateway - 192.168.010.001
This setting can be used to configure the BACnet/IP card settings.

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

Primary DNS – 000.000.000.000
This setting can be used to configre the BACnet/IP card settings.

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

Secondary DNS – 000.000.000.000
This setting can be used to configure the BACnet/IP card settings.

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

BACnet Dev Instance – 0077000
This setting can be used to configure the BACnet card settings.

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

BACnet Max Info Frames – 00000
This setting can be used to configure the BACnet card settings.

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

BACnet Max Master – 000
This setting can be used to configure the BACnet card settings.

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

BACnet MSTP MAC Addr – 000
This setting can be used to configure the BACnet card settings.

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

BAC MSTP Baud Rate – N/A
This setting can be used to configure the BACnet MS/TP card settings.

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

IP Config Mode – Get Current Config or Write New Config
This setting can be used to configure the BACnet card settings.

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

Execute Config Change – No (Yes or No)
This setting can be used to configure the BACnet card settings.

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

LonWorks Inst - No (Yes or No)
This parameter configures the CPCS to use the LonWorks interface card. If this parameter is not set to Yes when connected to a LonWorks network, the CPCS values, as seen by the LonWorks devices, will be incorrect.

SpclOptxxxx - No (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 (DCV Only) - None (None, CO2 or VOC)
This parameter indicates whether the Demand-Controlled Ventilation option is installed.

The DCV option consists of a unit or space-mounted sensor that measures the CO2 or VOC levels. As the level rises above a set point, the CPCS will override the minimum damper set point to provide additional outside air for ventilation.

CO2 Based DCV (ppm) - Used if DCV Installed is set to CO2

- Dpr Offs Lim (CO2 Only) - 15.0 (Range 00.0 to 30.0)
  This parameter sets the maximum amount (%) that the minimum damper position can be offset for CO2-based ventilation.
- Min CO2 Level (CO2 Only) - 500.0 (Range 0000.0 to 3000.0)
  This parameter sets the CO2 level at which the damper position override is activated.
- Max CO2 Level (CO2 Only) - 800.0 (Range 0000.0 to 3000.0)
  This parameter sets the CO2 level at which the damper position override is at the maximum allowed offset (Dpr Offs Lim).

VOC Based DCV (ppm) - Used if DCV Installed is set to VOC

- DprPos (VOC Only) - Min 028.3% (Range 00.0 to 100.0) Max 100.0% (Range 00.0 to 100.0)
  These parameters set the minimum and maximum damper position (%) used for VOC-based ventilation.
- Level (VOC Only) - Min 0500 (Range 0000 to 2000) Max 0800 (Range 0000 to 2000)
  These parameters set the deadband of VOC based DCV. Do not change unless instructed by the factory.
- Dband (VOC Only) - Min 0050 (Range 0000 to 2000) Max 0050 (Range 0000 to 2000)
  This parameter sets the CO2 level at which the damper position override is at the maximum allowed offset (Dpr Offs Lim).
- EvpDpr (VOC Only) - Min 050.0% (Range 00.0 to 100.0) Max 35.0% (Range 00.0 to 100.0)
  These parameters set the evaporator bypass damper position (%) range used for VOC-based ventilation. Do not change unless instructed by the factory.

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Mix Air Lim (SR only) - 050.0 (Range 000.0 to 100.0)
The CPCS uses this parameter to limit the outside air damper position in order to ensure a mixed air temperature of 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 CPCS BAS serial port communication.

- Units with a LonWorks or BACnet interface should be set for RS485.
- Units with a Modbus RTU interface should be set for MBRTU.

Dpr Err Tol % (SR only) -3.0% (Range 0.0 to 100%)
This parameter sets the maximum discrepancy allowed between the requested damper position and the 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 CPCS 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 PoolPak® units equipped with scroll compressors.

The low pressure delays should be set for 120 on units with refrigerant sensors and a firmware version of at least 1.37. On units with no refrigerant sensors and/or older firmware, contact PoolPak Service.
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 CPCS waits after starting a motor to check for current.

If this many seconds have elapsed and the current read by the CPCS is still less than the threshold value, a fan or compressor alarm will be generated.

- Supply Fan, Return Fan, and System 1 should be set to 5 seconds.
- System 2 should be set to 15 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 CPCS 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 - No (Yes or No)
This parameter indicates whether the CPCS 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 (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.
Improper setting of this parameter may cause permanent damage to the unit.

Refrig Type – R-410A, R-407C, or R-22
Refrigerant Type. Set this based on the type of refrigerant used in the unit. This info can found as the last digits of the unit model number on the unit data plate.
Improper setting of this parameter may cause permanent damage to the unit.

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 CPCS 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 (SR only) - Off (On or Off)
This parameter enables damper position correction based on the feedback signal from the actuator.

Monitor Exh Fan? (SE, SEP only)– No (Yes or No)
When enabled, the controller will generate an alarm if the exhaust fan status contact closure input is not active.

AC Proof Alm – Disable (Disable or Enable)
When enabled, the controller will generate an alarm if the AC Proof status contact closure input is not active.

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.*

OADprMinVolts - 2.0 (Range 0.0 to 10.0)
Special application with separate OA damper controls.
Do not change these parameters unless instructed to do so by the factory.

OADprMaxVolts - 10.0 (Range 0.0 to 10.0)
Special application with separate OA damper controls.
Do not change these parameters unless instructed to do so by the factory.

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 of OPEN means fire trip mode will be active when the dry contacts are open.

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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.

Buzzer Enable – No (Yes or No)
When set to Yes, a buzzer will sound whenever the alarm light is lit.

Buzzer Delay – 0060 (Range 0 – 9999)
The number seconds between alarm buzzer tones.

Exp Brd Stat Chk – Yes (Range Yes or No)
The parameters on this screen determine whether or not the CM3, CM4, and CM5 Expansion Boards are enabled.
Do not change these parameters unless instructed to do so by the factory.

Pool Tmp Displ – NORM (Range Norm or Always)
With this parameter set to Norm, the water temperature is displayed only when the pool water flow switch input is active.

With this parameter set to Always, the water temperature is displayed at all times, even when the pool water flow switch input is not active.

Sys1 HGSoftStart – NO (Yes or No)
Units with Step Motor Valves for Hot Gas Control (CDS Valves) should be set to NO. Units with solenoid valves for hot gas control and a soft-start valve should be set to YES.
Improper setting of this parameter may cause permanent damage to the unit.

Sys1 HGOverlapPer – 0
Units with Step Motor Valves for Hot Gas Control (CDS Valves) should be set to 0. Units with solenoid valves for hot gas control and a soft-start valve should be set to 7.
Improper setting of this parameter may cause permanent damage to the unit.

Sys1 HG SftStrtPer – 0
Units with Step Motor Valves for Hot Gas Control (CDS Valves) should be set to 0. Units with solenoid valves for hot gas control and a soft-start valve should be set to 5.
Improper setting of this parameter may cause permanent damage to the unit.

Sys2 HGSftStrt – (SWHP220 - SWHP340 only) - NO (Yes or No)
Units with Step Motor Valves for Hot Gas Control (CDS Valves) should be set to NO. Units with solenoid valves for hot gas control and a soft-start valve should be set to YES.
Improper setting of this parameter may cause permanent damage to the unit.

Sys2 HGOverlapPer – (SWHP220 - SWHP340 only) - 0
Units with Step Motor Valves for Hot Gas Control (CDS Valves) should be set to 0. Units with solenoid valves for hot gas control and a soft-start valve should be set to 7.

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

Sys 2 HGSftStrtPer – (SWHP220 - SWHP340 only) - 0
Units with Step Motor Valves for Hot Gas Control (CDS Valves) should be set to 0. Units with solenoid valves for hot gas control and a soft-start valve should be set to 5.

Cmpr1 On Delay - 10 (Range - 0-99)
Units with Step Motor Valves for Hot Gas Control (CDS Valves) should be set to 10. Units with solenoid valves for hot gas control and a soft-start valve should be set to 2.

Cmpr2 On Delay - 10 (Range - 0-99)
Units with Step Motor Valves for Hot Gas Control (CDS Valves) should be set to 10. Units with solenoid valves for hot gas control and a soft-start valve should be set to 2.

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

WtrHtHiEvent – 0.5 (Range –9.9 to 9.9)
This parameter determines the point, as related to the Pool Water Setpoint, at which the PoolPak® will stop a water heating need.

WtrHtLoEvent – -0.2 (Range –9.9 to 9.9)
This parameter determines the point, as related to the Pool Water Setpoint, at which the PoolPak® will start a water heating need.

AuxWtrHtHiEvent – -0.2 (Range –9.9 to 9.9)
This parameter determines the point, as related to the Pool Water Setpoint, at which the PoolPak® will disable the auxiliary water heat contacts.

AuxWtrHtLoEvent – -0.7 (Range –9.9 to 9.9)
This parameter determines the point, as related to the Pool Water Setpoint, at which the PoolPak® will enable the auxiliary water heat contacts.

Power Freq – 60 Hz (Range 50 or 60 Hz)
This parameter determines the power frequency of the unit.
Improper setting of this parameter may cause permanent damage to the unit.

WtrHtCalcDly – 120s (Range 1 – 999)
This parameter sets the interval in minutes at which the controller determines water heating need

Compressor 1 Enabled – Yes (Yes or No)
This parameter provides the option to disable system 1 compressors operation using the software.

Compressor 2 Enabled – Yes (Yes or No)
This parameter provides the option to disable system 2 compressors operation using the software.

Run Timer Save Interval – 4 (Range 1 – 9)
This parameter sets the interval in hours at which the controller records the run times.

CCH Bkr Stat Inst – Yes (Yes or No)
When set to Yes, the controller will monitor the status of the crankcase heater breakers. If any of the breakers are off, an alarm is generated and the compressors are disabled. This parameter should be set to No if the unit is not equipped with this feature.

No AuxHt Ovr Setp – No (Yes or No)
No Auxiliary Air Heat Over Setpoint. When set to Yes, the CPCS will turn off all stages of auxiliary air heat when the return air temperature is above its setpoint regardless of the fuzzy logic control.
Do not change this parameter unless instructed to do so by the factory.

Dpr Lim 6 Ena – Yes or No
Damper Limit 6 Enabled. Factory use only.
Do not change this parameter unless instructed to do so by the factory.

AuxAir Stg % (Range 000.0-100.0)
Auxiliary Air Heat Stage percentages. Factory setting for stage 1 – 50.0, stage 2 – 75.0, stage 3 – 100.0

Unocc Min Exh % - 03.0 (Range 00.0-20.0) (SR only)

Unoccupied Minimum Exhaust Damper %. In order to maintain a negative pressure during unoccupied periods, the exhaust damper should remain slightly open.

SF Econo Enabled (SEP only) – ON (OFF or ON)
This feature allows for a single fan economizer cycle using a purge fan. This feature requires additional components both inside the unit and in the rest of the system. For all SEP units, this parameter should be set to ON.
Do not change these parameters unless instructed to do so by the factory.

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Econo OATempLim (SEP only) – 60.0 (Range 50.0 – 99.9)
This parameter sets the outside air temperature low limit for operation in economizer mode.

Econo MaxTmpRis (SEP only) – 03.0 (Range 01.0 – 10.0)
This parameter sets the maximum temperature rise above the return air temperature setpoint for operation in economizer mode.

Econo OATempDif (SEP only) – 07.0 (Range 00.0 – 30.0)
This parameter sets the number of degrees the outside air temperature must be below the return air temperature for operation in economizer mode

Enable Smart Pump – ON (ON or OFF)
When set to ON, the Smart Pump terminals can be used to operate the PoolPak® secondary loop pump to turn on only when there is a call for pool water heating and the CPCS determines that it can use the compressors for pool water heating mode.

Dig Output – Inverted (Inverted or Standard)
Digital Output for relay 14R. If the Enable Smart Pump parameter is set to ON, this output should be set to Inverted. If the Enable Smart Pump parameter is set to OFF and 079 - SPLIT WTR is set to ON, this output should be set to Standard.

Min On/Off – 030/060s (Range 0-999)
Minimum On/Off time for the Smart Pump output.

Flow Sw Delay – 05s (Range 0-99)
This parameter sets the time that the flow switch must be closed for a continuous period before the CPCS will allow the compressor to operate in pool heating mode.

S,SE,SEP Damper Setpoints
On S, SE and SEP units with proportional damper actuators, the dampers go to programmed settings for occupied, unoccupied, purge and no purge modes. The following settings are used to ensure ventilation requirements are met and space pressurization is maintained. These setting should only be changed by qualified personnel.

OADprOccPos – (S,SE,SEP only) – 050.0% (Range 000.0-100.0)
OADprUnoccPos – (S,SE,SEP only) – 000.0% (Range 000.0-100.0)
OADprPurgePos – (S,SE,SEP only) – 100.0% (Range 000.0-100.0)
OADprEventPos – (S,SE,SEP only) – 060.0% (Range 000.0-100.0)

PrgDprOccPos – (S,SE,SEP only) – 000.0% (Range 000.0-100.0)
PrgDprUnocPos – (S,SE,SEP only) – 000.0% (Range 000.0-100.0)
PrgDprPurgPos – (S,SE,SEP only) – 100.0% (Range 000.0-100.0)
PrgDprEvntPos – (S,SE,SEP only) – 000.0% (Range 000.0-100.0)

BypDprOccPos – (S,SE,SEP only) – 020.0% (Range 000.0-100.0)
BypDprUnocPos – (S,SE,SEP only) – 030.0% (Range 000.0-100.0)
BypDprPurgPos – (S,SE,SEP only) – 000.0% (Range 000.0-100.0)
BypDprEvntPos – (S,SE,SEP only) – 010.0% (Range 000.0-100.0)

Refr Sensors Ins – Yes (Yes or No)
This setting should be set to Yes if the unit is equipped with compressor suction and discharge pressure sensors and suction and liquid temperature sensors.

Disch Tstat Inst – No (Yes or No)
This parameter should be set to Yes if the unit is equipped with compressor discharge temperature sensors.

CO2 Sensor Ins – No (Yes or No)
This parameter should be set to Yes if the unit is equipped the Demand Control Ventilation feature.

ACC Min OAT – 60.0 (Range 20.0-90.0)
This parameter sets the low outside temperature limit that the CPCS will allow operation of the air-cooled condenser. It may be necessary to lower this setting on S, SE and SEP models. Contact PoolPak Service before changing this parameter.

OA Fltr Sen Ins – ON (ON or OFF)
This parameter should be set to ON if the unit is equipped the filter pressure drop sensors.

Initial PD – 0.250 H2O (Range 0.000-3.999)
This parameter is used to calibrate the actual pressure drop across the outside air filters with new filters.

Final PD – 0.500 (Range 0.000-3.999)
This parameter is used to set the additional pressure drop present across the outside air filters with dirty filters that must be changed before allowing continued compressor operation.

OA Fltr PD – Read Only
The actual pressure drop across the outside air filters.

RA Fltr Sen Ins – ON (ON or OFF)
This parameter should be set to Yes if the unit is equipped with the filter pressure drop sensors.

Initial PD – 0.250 H2O (Range 0.000-3.999)
This parameter is used to calibrate the actual pressure drop across the return air filters with new filters.

Final PD – 0.500 (Range 0.000-3.999)
This parameter is used to set the additional pressure drop present across the return air filters with dirty filters that must be changed before allowing continued compressor operation.

RA Fltr PD – Read Only
The actual pressure drop across the return air filters.

Fan Spd Ctl Ins – No (Yes or No)
This parameter should be set to Yes if the unit is equipped with fan speed controls.

RtnWetBlbHiLim – 99.0 (Range 00.0-99.9)
This parameter sets the high return air wet bulb temperature limit for compressor operation.

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

Unocc Exh Fan On – No (Yes or No)
If this parameter is set to Yes, the exhaust fan output will remain on during unoccupied mode.
Do not change this parameter unless instructed to do so by the factory.

DH Frc HC Stgs: NO (Range Yes or No)
Do not change this parameter unless instructed to do so by the factory.

Cmpr Min OAT: 20.0 (Range 99.9 - 99.9)
This parameter sets the minimum outside air temperature for compressor operation in any mode. Do not change this parameter unless instructed to do so by the factory.

Cmpr Low OAT: ON (Range On or Off)
This parameter determines whether the CPCS will prevent compressor operation in any mode below the compressor minimum outside air temperature. Do not change this parameter unless instructed to do so by the factory.

FrcMBUnocCls: Yes (Range Yes or No)
This parameter determines whether the CPCS will outside air damper closed during unoccupied mode. Do not change this parameter unless instructed to do so by the factory.

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NetCtlType: V2.0 (Range V1.0 or V2.0)
Do not change this parameter unless instructed to do so by the factory.

NetForceDprs: OFF (Range OFF or ON)
Do not change this parameter unless instructed to do so by the factory.

NetForceStgs: ON (Range OFF or ON)
Do not change this parameter unless instructed to do so by the factory.

NetForceSFEco: OFF (Range OFF or ON)
Do not change this parameter unless instructed to do so by the factory.

NetForceAuxHt: OFF (Range OFF or ON)
Do not change this parameter unless instructed to do so by the factory.

NetForceEcono: OFF (Range OFF or ON)
Do not change this parameter unless instructed to do so by the factory.

CPCS-SWHP: Advanced Configuration

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 CONFIG MODE

Each sensor configuration screen contains the following parameters:

Current Value - Read Only
This will be displayed in the upper right corner of each configuration screen.

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 CPCS 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)
Any sensor with a reading less than this parameter will be flagged as failed.

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.

Max - (Range varies by sensor)
Any sensor with a reading greater than this parameter will be flagged as failed.

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.

Ovrd - 000.0 (Range varies by sensor)
Setting this parameter to a non-zero value will cause the CPCS to use this number instead of the actual reading from the sensor. This parameter is stored in the CPCS 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.

SplyFanCurr - Supply Fan Current Transducer
Default Values: Tol = 5.0, Min = 0.0, Max = 200.0*
*Max value must match actual maximum value on current transducer.

RtnFanCurr - Return Fan Current Transducer (SR only)
Default Values: Tol = 5.0, Min = 0.0, Max = 200.0*
*Max value must match actual maximum value on current transducer.

Cmpr1Curr - Compressor System 1 Current Transducer
Default Values: Tol = 5.0, Min = 0.0, Max = 200.0*
*Max value must match actual maximum value on current transducer.

RtnAirRH - Space Relative Humidity Sensor
Default Values: Tol = 10.0, Min = 0.0, Max = 100.0

OutsAirRH - Outside Air Relative Humidity Sensor
Default Values: Tol = 10.0, Min = 0.0, Max = 100.0

AirOffEvapRH - Air Leaving Evaporator Relative Humidity Sensor
Default Values: Tol = 10.0, Min = 0.0, Max = 100.0

Cmpr2Curr - Compressor System 2 Current Transducer
Default Values: Tol = 5.0, Min = 0.0, Max = 200.0*
*Max value must match actual maximum value on current transducer.

RtnFltrPD - Return Air Filter Pressure Drop Sensor
Default Values: Tol = 0.250, Min = 0.000, Max = 2.000

OAFltrPD - Outside Air Filter Pressure Drop Sensor
Default Values: Tol = 0.250, Min = 0.000, Max = 2.000

ExhDprFdBk - Exhaust (SR) / Purge (SEP) Damper Actuator Feedback Signal
Default Values: Tol = 10.0, Min = –25.0, Max = 100.0

OutsDprFdBk - Outside Damper Actuator Feedback Signal
Default Values: Tol = 10.0, Min = –25.0, Max = 100.0

RcrcDprFdBk - Recirculation (SR) / Bypass (S,SE,SEP) Damper Actuator Feedback Signal
Default Values: Tol = 10.0, Min = –25.0, Max = 100.0

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RtnAirCO2 - Space Air CO2 Level Sensor
Default Values: Tol = 0050.0, 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

Cpr1DisPr - Compressor System 2 Discharge Pressure Transducer
Default Values: Tol = 10.0, Min = 000.0, Max = 652.0

Cpr2DisPr - Compressor System 1 Discharge Pressure Transducer
Default Values: Tol = 10.0, Min = 000.0, Max = 652.0

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 (SR only)
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 = 250.0

SpclOptAI1 - Special Option Thermistor Input 1
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

Cmpr1LiqT - Compressor System 1 Liquid Line Temperature Sensor
Default Values: Min = –040.0, Max = 150.0

Cmpr2LiqT - Compressor System 2 Liquid Line Temperature Sensor
Default Values: Min = –040.0, Max = 150.0

SYSTEM RUN TIMERS

The CPCS contains run time counters for the following: Cmpr1A, Cmpr1B, Cmpr1C, Cmpr2A, Cmpr2B, Cmpr2C, Sply Fan, Rtn Fan, Sys1 AC Mode, Sys2 AC Mode, Sys1 Wtr Heat, Sys2 Wtr Heat, Sys1 RH Mode, Sys2 RH Mode, Economizer, Economizer 2, Smart Econo, Occupied Mode, and Occ+Econo Mode.

The counters will accumulate the number of hours each device has been active since the unit was started. The contents of each counter are saved in permanent memory so they will not be affected by loss of power. Each timer has the following fields:

Val – 000,000h This is the number of hours the device or mode of operation has be in use.

It is possible to manually adjust the value field of each counter if a controller has to be replaced or if the firmware is updated.

Thr – 999,999h Not used.
Do not change these parameters unless instructed to do so by the factory.

Adj – 3600 The number of seconds for each hour recorded.
Do not change these parameters unless instructed to do so by the factory.

Reset – OFF Setting this to ON will set the value to 0 hours.
Do not change these parameters unless instructed to do so by the factory.

DIGITAL INPUT STATUS

The CPCS displays the status of the following digital input relays as either OP to indicate the input is open or CL to indicate the input in closed:

SmokePurgeDI – Smoke Purge contacts

FireTripDI –Fire Trip contacts

OccOvrdDI – Occupied Override contacts

PurgeModeDI – Purge Mode contacts

WtrFlow1DI – System 1 Water Flow Switch

WtrFlow2DI – System 2 Water Flow Switch

S1PmpDwnSwDI – System 1 Compressor Pumpdown Switch

S1MtrTempDI – System 1 Compressor Breakers and Thermal Overload (Scrolls); System 1 Motor Temperature Module (Recips)

S1OilPressDI – System 1 Compressor Oil Pressure switch (Recips only)

S1LowPressDI – System 1 Low Pressure Switch

S1ACCProofDI – System 1 Air-cooled condenser voltage proof; System 1 Water-cooled condenser temperature/ flow proof

RemExhFanStatDI – Remote Exhaust Fan Status contacts

S2PmpDwnSwDI – System 2 Compressor Pumpdown Switch

S2MtrTempDI – System 2 Compressor Breakers and Thermal Overload (Scrolls); System 2 Motor Temperature Module (Recips)

S2OilPressDI – System 2 Compressor Oil Pressure switch (Recips only)

S2LowPressDI – System 2 Low Pressure Switch

S2ACCProofDI – System 2 Air-cooled condenser voltage proof; System 2 Water-cooled condenser temperature/ flow proof

SpclOptDI1 – Special Option 1 contacts

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SpclOptDI2 – Special Option 2 contacts

SpclOptDI3 – Special Option 3 contacts

SpclOptDI4 – Special Option 4 contacts

EventModeDI – Event Mode contacts

SummerVentModeDI – Summer Vent Mode contacts

MANUAL CONTROL PARAMETERS

The CPCS 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.

Digital Output Tests

Each digital output of the CPCS 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 CPCS. ON will force the output relay to energize regardless of the status requested by the software. OFF will force the output relay to de-energize regardless of the status requested by the software.

The following manual digital output parameters are available:

Sply Fan Outp - Supply Fan Contactor

⚠ 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 the configuration menu (Key I). Set parameters 76 to 1 and 78 to 3. This will immediately 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!

Rtn Fan Outp - Return Fan Contactor (SR); Purge Fan Contactor (S, SE, SEP)

Aux Air 1Outp - 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

Pool Pump Outp - Smart Pump Relay

Alarm Outp - Alarm Output Relay

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

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

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

S1 AC Sol Outp - System 1 AC, CDS or 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 CDS or Solenoid Valve

Occupied - Occupied output

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

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

S1 RH1 Sft Strt - System 1 Air Reheat Soft Start Solenoid Valve 1

S1 RH2 Sft Strt - System 1 Air Reheat Soft Start Solenoid Valve 2

S2 AC Sol Outp - System 2 AC CDS or 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 CDS or Solenoid Valve

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

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

S2 RH1 SftStrt - System 1 Air Reheat Soft Start Solenoid Valve 1

S2 RH2 SftStrt - System 1 Air Reheat Soft Start Solenoid Valve 2

Exh Fan Outp - Exhaust Fan Contactor (SE,SEP only)

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

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

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

More OA Rqd Out: AUTO - More Outside Air Required

ANALOG OUTPUT TESTS

Each analog output of the CPCS 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 CPCS 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/Purge Dpr Pos - Exhaust (SR) / Purge (SEP) Air Damper Actuator Position

Rcrc/Bypass Dpr Pos - Recirculation (SR) / Bypass (S,SE,SEP) Air Damper Actuator Position

Outs Dpr Pos - Outside Air Damper Actuator Position

AuxAirHtSig - Auxiliary Air Heating Hot Water Control Valve Position

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CPCS Controller: System Status

System Status Information— Key (ESC + Down on CM1's Keypad)

Pressing the 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 CPCS II are listed with the CPCS 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 in 24 hour format

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 (SR only)

    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 be 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 Out of Range (<60°F or >105°F dry bulb, <55°F wet bulb)

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

16 - Compressor Current Transducer Failed

17 - Crankcase Heater Breaker Off

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

2 - System Startup Is Active (2 minutes after power application)

3 - Return Fan Motor Not Running

4 - Supply Fan Motor Not Running

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5 - Fire Trip Active
6 - Smoke Purge Active
7 - Space Temperature Out of Range (<60°F or >105°F dry bulb, <55°F wet bulb)
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
16 - Compressor Current Transducer Failed
17 - Crankcase Heater Breaker Off
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 (SR) Purge Fan Motor Status (SEP)
    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. Pool Pump Outp - Pool Pump Status
    ON or OFF
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 (SR only)
42. Off Evap % - Air Leaving Evaporator Relative Humidity (SR only)
43. AOE Dpt - Air Leaving Evaporator Dewpoint Temperature (SR only)
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 -CPCS Control Module 1 Software Version Number

104. Purge - Purge Mode Status (SR, SEP only)

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

CM2 Ver - CPCS Control Module 2 Software Version Number

CM3 - CPCS Control Module 3 Software Version Number

CM4 - CPCS Control Module 4 Software Version Number

CM5 - CPCS Control Module 5 Software Version Number

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

ON or OFF. ON indicates that power is on if equipped with remote air-cooled condenser or that there is adequate water flow and the entering water temperature is less than 90F if equipped with a water-cooled condenser. If this parameter is OFF, the CPCS 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 if equipped with remote air-cooled condenser or that there is adequate water flow and the entering water temperature is less than 90F if equipped with a water-cooled condenser. If this parameter is OFF, the CPCS 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 or Purge Air Damper Position

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

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173. Rcrc Dpr - Actual Recirculation or Bypass air Damper Position

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

175. Des Dpr - Desired Outside Air Damper Position (SR only)

This is the position of the outside air damper requested by the CPCS mixing box control routine.

176. Min D Alw - Minimum Damper Position Setpoint (SR only)

177. Max D Alw - Maximum Damper Position Setpoint (SR only)

178. Economiz - Economizer Status (SR & SEP only)

ON or OFF. ON indicates that the CPCS 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 CPCS 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 CPCS 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 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 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 (SR only)

Cmpr 1 Curr - System 1 Compressor Current

Cmpr 2 Curr - System 2 Compressor Current

Dpr Limit Code - Damper Position Limit Code (SR only)

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 50°F 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 40°F. 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 (SR only) 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/cool stages should be decreased. As the value gets farther away from 100.0, changes to the number of stages 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.

SF Econo Actv – Single Fan Economizer Active? (SEP only)
Y or N. Yes indicates the conditions are such that the CPCS is trying to use the purge mode for the purposes of economizer cooling. This is only available on SEP model units.

Network Unit Status – Displays if unit ID 1-5 are ONLINE or OFFLINE. (Network installations only)

Network Role – Displays if the unit is operating in the master or slave role. (Network installations only)

Unit ID Number – Read only. Displays the unit ID that is currently displayed (1-5)

Run time information – The CPCS records the number of run hours for the following components or modes: Supply Fan, Return Fan, Compressor 1A, 1B, 1C, System 1 Reheat Mode, System 1 Air Cooling Mode, System 1 Water Heat Mode, Compressor 2A, 2B, 2C, System 2 Reheat Mode, System 2 Air Cooling Mode, System 2 Water Heat Mode, Economizer Mode, Smart Economizer Mode, Occupied Mode, and Occupied & Economizer Mode.

Last Hour Averages – The CPCS does rolling averages of the following information: Return Air Temperature, Return Air Humidity, Outside Air Temperature, Outside Air Humidity, Percent of Compressor Staging, Mixing Box % Open, Economizer Active, Smart Economizer Active, and Occupied Time.

SchedPurgeActv – Scheduled Purge Active. Displays whether the unit is operating in purge mode due to an entry in the CPCS Purge Schedule.

BAS Purge Actv – Building Automation System Purge Active. Displays whether the unit is operating in purge mode due to command from the Lonworks, Modbus RTU, or BACnet system.

Timed Purge Actv – Timed Purge Active. Displays whether the unit is operating in purge mode due to the CPCS timed purge function.

DigIn Purge Actv – Digital Input Purge Active. Displays whether the unit is operating in purge mode due to a contact closure on the field wiring terminal strip.

Summer Vent Mode – Displays if the Summer Ventilation Mode is active due to the a contact closure on the field wiring terminal strip.

Sys Startup – Read Only. Displays if the CPCS has completed its initial sequence. It is normal for this to display "Active" during the first five minutes after power up. After five minutes, the status should change to "Complete".

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Rtn WB Temp – Return Air Wet Bulb Temperature calculated by the CPCS.
Sys Start Compl: Yes or No
SysStatus1 – Factory use.
SysStatus2 – Factory use.

OA Fltr Lif Rem – Outside Air Filter Life Remaining. The percentage of life remaining before the outside air filters must be changed.

RA Fltr Lif Rem – Return Air Filter Life Remaining. The percentage of life remaining before the return air filters must be changed.

Compressor Sys 1 & Compressor Sys 2 - The CPCS displays the following information for Compressor System 1 & Compressor System 2 (SWHP220-340 only):

DP – Discharge Pressure

SP – Suction Pressure

ST – Suction Temperature

SH – Superheat

LT – Liquid Temperature

SC – Subcooling

Fault History Screens – The CPCS records information when a fault occurs. For details, please refer to the CPCS-SWHP Service Troubleshooting section of this manual.

CPCS Service Troubleshooting

Troubleshooting Overview

When properly installed according to the instructions in this manual, the PoolPak® CPCS 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 CPCS 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
- Space Temperature Out of Range

Additionally, the compressor and/or fan motors will be shut down when a fire control system alerts the CPCS 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 will show 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 in conjunction 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 CPCS control system:

SUPPLY FAN NOT RUNNING

The controller has detected that the supply fan motor is not running even though the digital output for 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 or a damper feedback issue.

RETURN FAN NOT RUNNING (SR ONLY)

The controller has detected that the return fan motor is not running even though the digital output for 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 or a damper feedback issue.

FIRE TRIP ACTIVE

An external fire control system has requested fire trip operation by sending a signal to the PoolPak® unit Fire Trip terminals.

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SMOKE PURGE ACTIVE

An external control has requested smoke purge operation by sending a contact closure to the PoolPak® unit 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 dry bulb, <55°F wet bulb) 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.

SUPPLY AND RETURN FANS NOT RUNNING

The controller has detected that both fan motors (SR) are not running even though the appropriate digital outputs are energized. The most likely cause is the motor protectors have been set to the OFF position or a damper feedback issue.

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 CPCS will close the outside and exhaust air dampers in an attempt to protect the nonfunctioning coil. The most likely cause of this condition is a failure of the auxiliary heat source (e.g., hot water pump or valve) or a bad outside air damper or acuator.

LOW COMPRESSOR OIL PRESSURE (RECIP COMPRESSORS ONLY)

The oil pressure monitor on the compressor has detected insufficient oil pressure for 2 minutes. The CPCS will shut down the affected compressor. The most likely cause of this condition is loss of power 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 based on the compressor overload detection device(s). This can also occur when there is a power issue (single-phasing, over/under voltage, phase rotation) feeding 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 585 psig on R-410A units. 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 40 psig on R-410A units. The most likely cause is insufficient evaporator airflow caused by dirty filters or loose belts.

COMPRESSOR CURRENT TRANSDUCER FAILED

The controller has detected that the current transducer for the compressor has failed. Compressor operation will be disabled to prevent repetitive high pressure faults. The most likely cause of this fault is a defective compressor motor current transducer.

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 to assist 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 CPCS 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 snapshot of system conditions at the time of the fault.

The fault history log is accessed from the System Status Information menu. Press the key to access the menu and then press the UP arrow key until the fault history screens are displayed. There are two screens on SWHP60-190 units and a third screen on SWHP220-340 models.

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 on any of the fault history screens and then press ENTER. Use the UP and DOWN arrow keys to cycle through the fault history screens one at a time. To go to the next fault, repeat these steps.

All fault history screens display 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 (<60°F to >105°F dry bulb, <55°F wet bulb)
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
16 - Current Transducer Failure Compressor System 1
17 - Crankcase Heater Breaker Off on 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
116 - Current Transducer Failure Compressor System 2
117 - Crankcase Heater Breaker Off on Compressor System 2
150 - 10 Fault Lockout of Compressor System 2

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Fault history screen 1 also displays the following parameters:

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.

Fault history screen 2 also displays the following parameters:

SS1 – System Status 1. Factory use.

DP1 – Compressor System 1 Discharge Pressure

SS2 – System Status 2. Factory use.

SP1 – Compressor System 1 Suction Pressure

ST1 – Compressor System 1 Suction Temperature

LT1 – Compressor System 1 Liquid Temperature

Fault history screen 3 also displays the following parameters: (SWHP220-340 only)

SS1 – System Status 1. Factory use.

DP1 – Compressor System 1 Discharge Pressure

SS2 – System Status 2. Factory use.

SP2 – Compressor System 2 Suction Pressure

ST2 – Compressor System 2 Suction Temperature

LT2 – Compressor System 2 Liquid Temperature

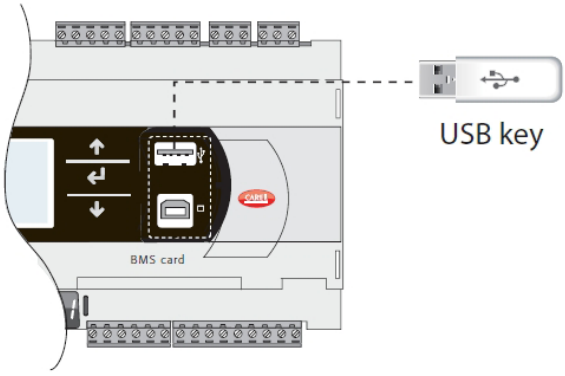
For more troubleshooting guidelines, please contact PoolPak® Factory Service at 800-959-7725.

Data Log Retrieval

The CPCS records data every minute keeping approximately 30 days of data. To aid in troubleshooting, this data can be downloaded to a USB pen drive and sent to PoolPak® Service for analysis.

To begin, remove the cover to the right of the service buttons on the CM1 module. It is the part that has a red Carel label attached. Gently pry it off from the top. Insert a USB pen drive with at least 3MB of storage available into the USB slot.

Figure 5-2. Data Retrieval Using USB Key



Press Alarm and Enter together for 3 seconds to enter the option menu. Select FLASH/USB memory and press Enter to confirm.

Select USB pen drive and press ENTER. Wait a few seconds after the pendrive has been plugged in for it to be recognized by the controller. If the message "No USB disk or PC connected" is displayed momentarily with the request to connect a pendrive key or computer USB cable, wait a few seconds until the recognition message is shown ("USB disk found").

Insert Password is displayed. Use the up arrow to change the password to 1943 and DOWNLOAD (pCO-pen) and press ENTER. Select Download LOGS and press ENTER. Press ENTER key to start the download. Downloading logs Please wait…. is displayed. Once the download is completed (approximately, the screen will display "Operation complete. Data downloaded. LOG00_01"

Open the folder called LOG00_01 and confirm there a file called LOGS.DWL. Do not attempt to open it. If the file is not in the folder, you will need to start the data log retrieval process at the beginning. Once you see the LOGS.DWL file, email it to service@poolpak.com. Include the most recent applicable dates, times and fault code numbers along with the job name and serial number of the PoolPak® unit.

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Maintenance

Overview

Periodic routine maintenance will promote extended equipment life. While PoolPak® units use components that are usually maintenance free and do not require service, a simple check could result in noticing possible problems before they develop into major problems.

Daily Maintenance

Pool water chemistry is a part of daily maintenance and it is recommended that National Spa and Pool Institute standards are followed. PoolPak® LLC recommends daily logging of your pool water chemistry.
MAINTENANCE AND POOL WATER CHEMISTRY ARE IMPORTANT FACTORS IN THE PROTECTION OF YOUR WARRANTY RIGHTS.

Table 5-1. Recommended Pool Water Chemistry

	POOL			SPA		
	IDEAL	MIN	MAX	IDEAL	MIN	MAX
Total Chlorine	1.0 - 3.0	1	3	3.0 - 5.0	1	10
Free Chlorine (ppm)	1.0 - 3.0	1	3	3.0 - 5.0	1	10.0q
Combined Chlorine (ppm)	0	0	0.3	0	0	0.3
Bromine (ppm) if applicable	2.0 - 4.0	2	4	3.0 - 5.0	2	10
PH	7.4 - 7.6	7.2	7.8	7.4 - 7.6	7.2	7.8
Total Alkalinity	80 - 100	80	180	80 - 100	60	180
TDS	1000 - 2000	300	3000	1000 - 2000	300	3000
Calcium Hardness (ppm)	200 - 400	150	1000	200 - 400	150	1000
Calcium Acid (ppm)	30 - 50	10	100	30 - 50	10	100

Monthly Maintenance

NOTE

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. On average, filters need to be replaced every three months.
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 with BX style cogged belts.
3. BEARINGS: For Comefri fans, use SHC-100 Mobil Synthetic bearing grease to lubricate the ball bearings every six (6) months, the spherical roller bearings every month. For Lau fans, use standard lithium bearing greases to lube fan bearings every month. DO NOT GREASE ANY MOTOR BEARING WITH BEARING TYPE ENDING IN "ZZ". This information can be found on the motor nameplate
4. COMPRESSOR OIL LEVEL: The ideal time for checking the oil level is during an extended period of operation because then there will be the least amount of refrigerant mixed with the oil. The compressor should have been in operation for at least 15 minutes 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. Each compressor system is equipped with an oil sight glass for checking oil level. 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.

5. 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. Intermittent bubbles are normal during the first 10 minutes of operation or following a change in stages or operating mode.
6. 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 40 gallons of condensate per hour.
7. 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.
8. LOGBOOK: Check and record, in the logbook, the following actual operating values and the values read from the CPCS controller display:
    - Space Temperature
    - Space Relative Humidity
    - Pool Water Temperature
    - Pool Water Free and Total Chlorine
9. DAMPER OPERATION: Ensure that dampers open and close fully without binding.

Annual Maintenance

Perform the following on an annual basis:

1. 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:
    - Change and inspect the refrigerant filter drier (only if the system has been open).
    - Complete unit operation test including log entries.
    - Inspect fan bearings and belts for excessive wear and replace if necessary.
    - General refrigeration system inspection for possible leaks, chafing between tubing, or other items detrimental to operation.
    - Touch up scratches in the paint.
    - Check electrical connections for tightness including those in the compressor electrical box.
    - Clean debris and dirt from drain pans.

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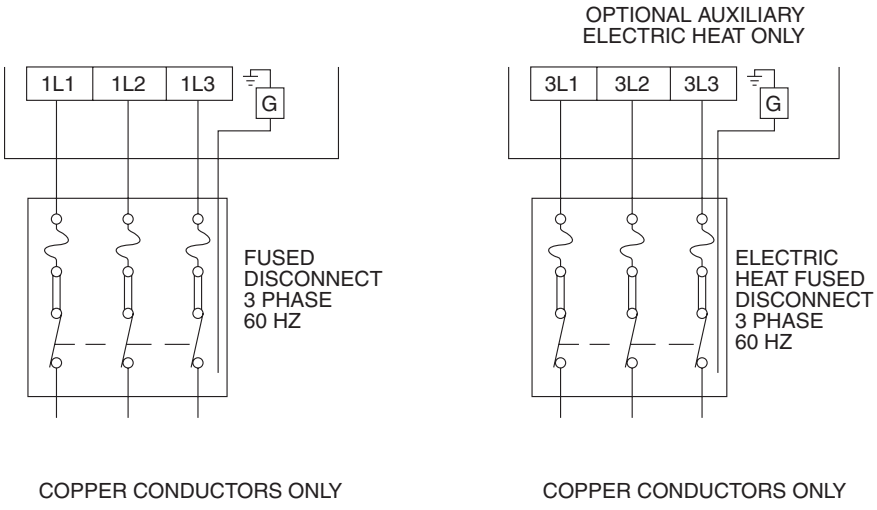
SECTION VI: WIRING

Single Point Power Connection

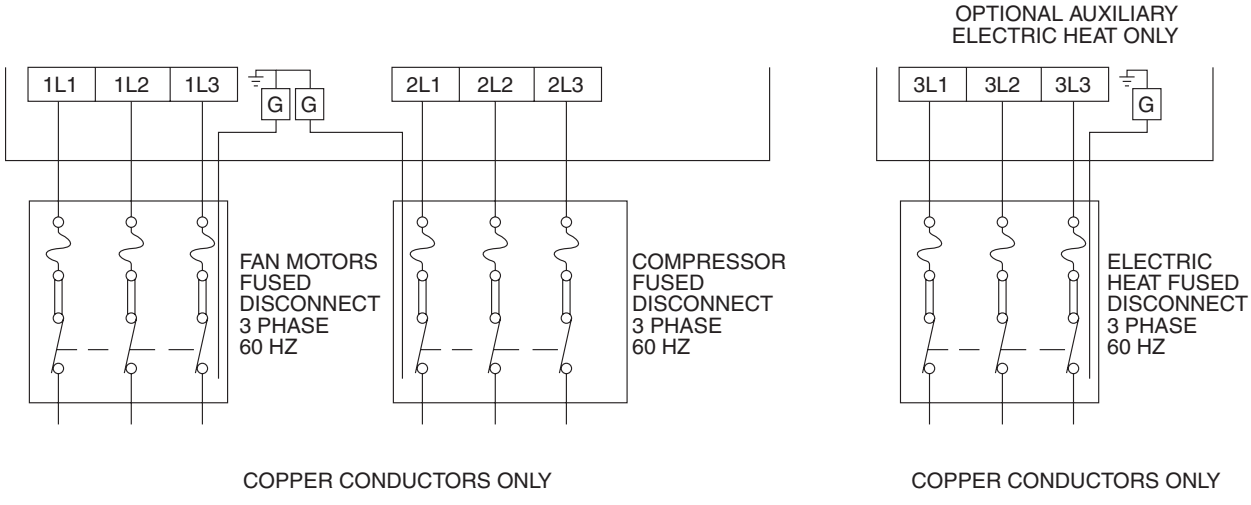
Figure 6-1. Single Point Power Connection



POWER WIRING - SWHP S, SE, SEP 60/80/100/120 - ALL VOLTAGES; SWHP SR 140/190/220/260/300 - 460V & 575V

Dual Point Power Connection

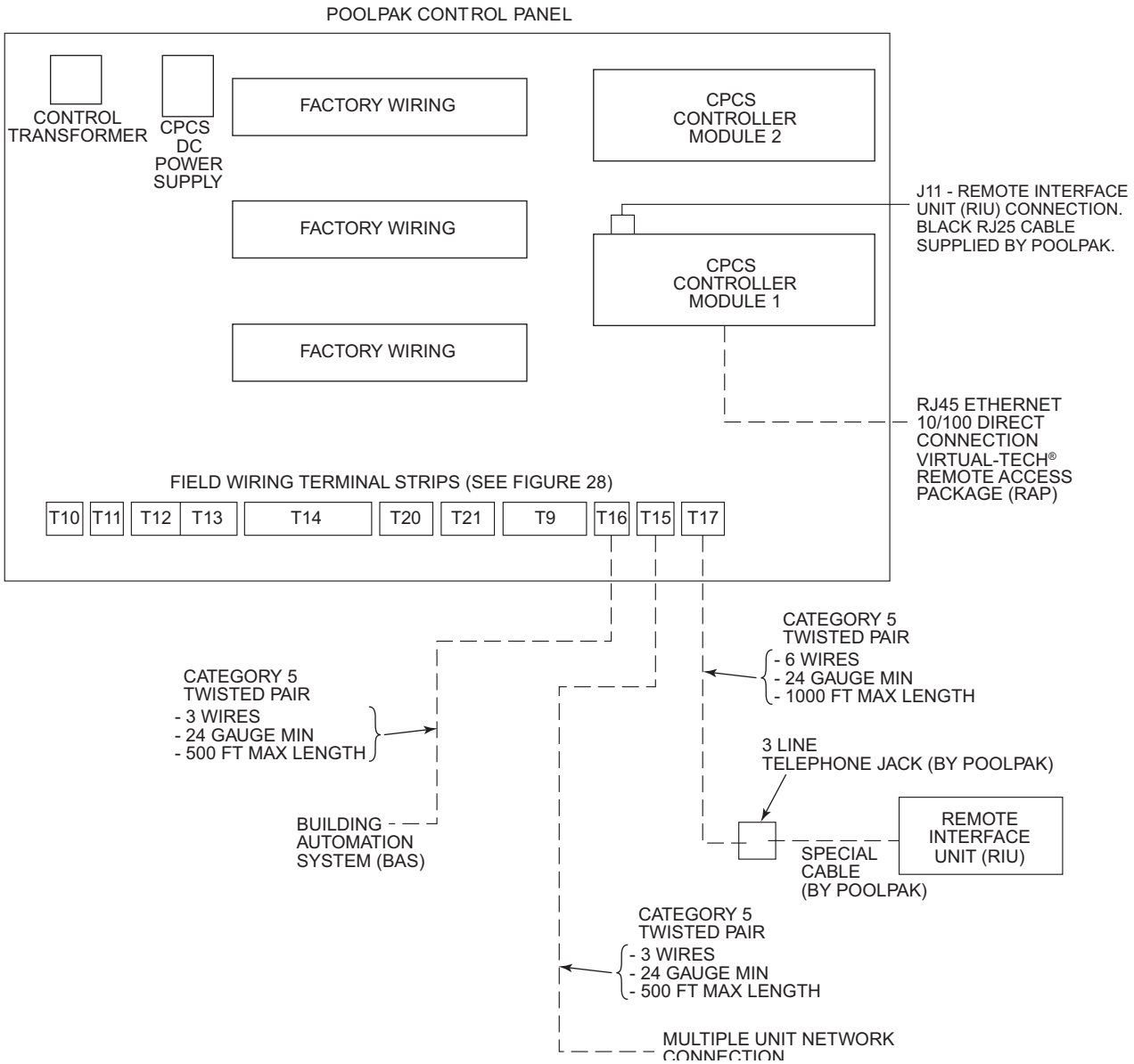
Figure 6-2. Dual Point Power Connection



POWER WIRING - SR UNITS; ALL VOLTAGES

Remote Connections

Figure 6-3. Remote Connections



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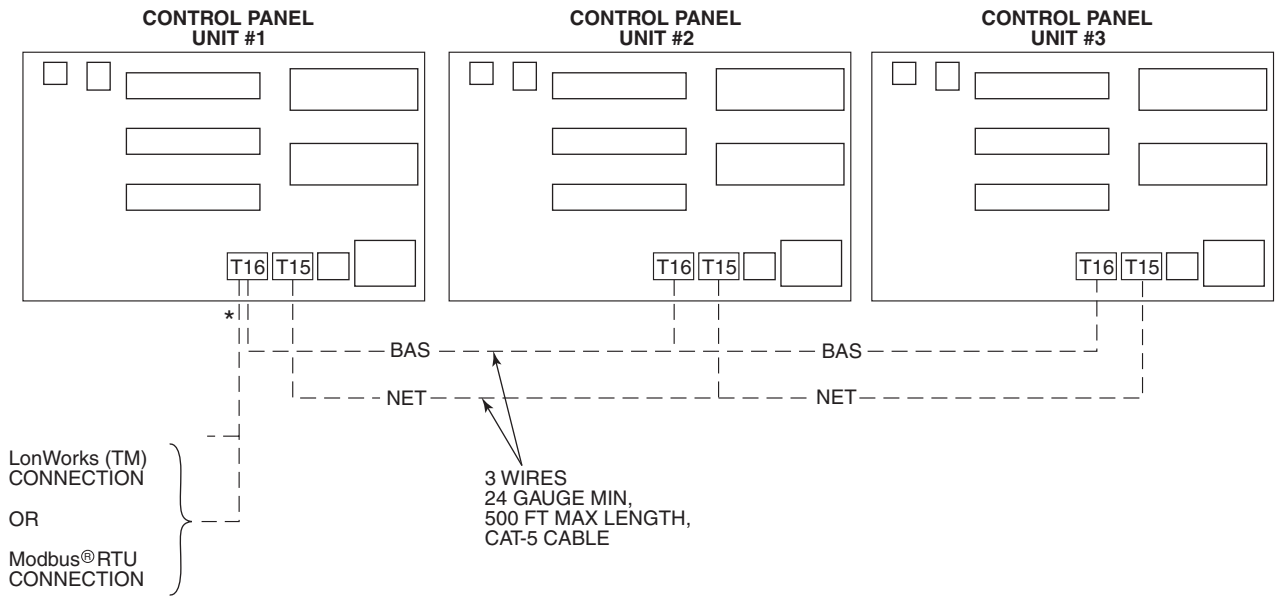
Multiple Unit Networking

Figure 6-4. Multiple Unit Networking



* MAY BE CONNECTED ON ANY T16 TERMINAL BLOCK

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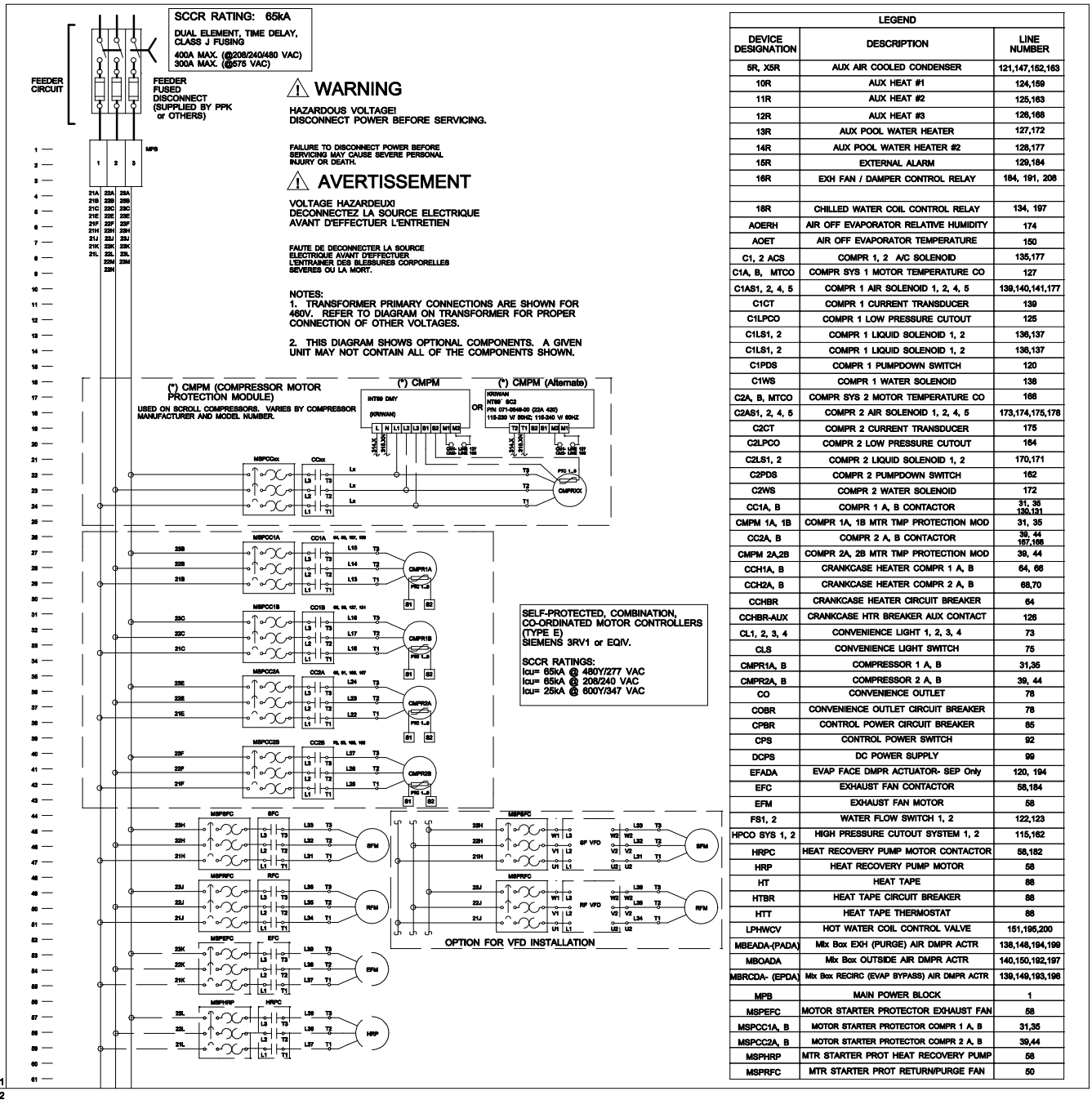
Unit Wiring Diagram

Figure 6-5. Unit Wiring Diagram - 1 of 4 MPB, Fans



LEGEND		
DEVICE DESIGNATION	DESCRIPTION	LINE NUMBER
5R, X5R	AUX AIR COOLED CONDENSER	121,147,152,163
10R	AUX HEAT #1	124,159
11R	AUX HEAT #2	125,163
12R	AUX HEAT #3	126,168
13R	AUX POOL WATER HEATER	127,172
14R	AUX POOL WATER HEATER #2	128,177
15R	EXTERNAL ALARM	129,184
16R	EXH FAN / DAMPER CONTROL RELAY	184, 191, 208
18R	CHILLED WATER COIL CONTROL RELAY	134, 197
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, MTCO	COMPR SYS 1 MOTOR TEMPERATURE CO	127
C1AS1, 2, 4, 5	COMPR 1 AIR SOLENOID 1, 2, 4, 5	139,140,141,177
C1CT	COMPR 1 CURRENT TRANSDUCER	139
C1LPCO	COMPR 1 LOW PRESSURE CUTOUT	125
C1LS1, 2	COMPR 1 LIQUID SOLENOID 1, 2	136,137
C1LS1, 2	COMPR 1 LIQUID SOLENOID 1, 2	136,137
C1PDS	COMPR 1 PUMPDOWN SWITCH	120
C1WS	COMPR 1 WATER SOLENOID	138
C2A, B, MTCO	COMPR SYS 2 MOTOR TEMPERATURE CO	166
C2AS1, 2, 4, 5	COMPR 2 AIR SOLENOID 1, 2, 4, 5	173,174,175,178
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	COMPR 1 A, B CONTACTOR	31, 35 130,131
CMPM 1A, 1B	COMPR 1A, 1B MTR TMP PROTECTION MOD	31, 35
CC2A, B	COMPR 2 A, B CONTACTOR	39, 44 167,168
CMPM 2A,2B	COMPR 2A, 2B MTR TMP PROTECTION MOD	39, 44
CCH1A, B	CRANKCASE HEATER COMPR 1 A, B	64, 66
CCH2A, B	CRANKCASE HEATER COMPR 2 A, B	68,70
CCHBR	CRANKCASE HEATER CIRCUIT BREAKER	64
CCHBR-AUX	CRANKCASE HTR BREAKER AUX CONTACT	126
CL1, 2, 3, 4	CONVENIENCE LIGHT 1, 2, 3, 4	73
CLS	CONVENIENCE LIGHT SWITCH	75
CMPR1A, B	COMPRESSOR 1 A, B	31,35
CMPR2A, B	COMPRESSOR 2 A, B	39, 44
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	99
EFADA	EVAP FACE DMPR ACTUATOR- SEP Only	120, 194
EFC	EXHAUST FAN CONTACTOR	58,184
EFM	EXHAUST FAN MOTOR	58
FS1, 2	WATER FLOW SWITCH 1, 2	122,123
HPCO SYS 1, 2	HIGH PRESSURE CUTOUT SYSTEM 1, 2	115,162
HRPC	HEAT RECOVERY PUMP MOTOR CONTACTOR	58,182
HRP	HEAT RECOVERY PUMP MOTOR	58
HT	HEAT TAPE	88
HTBR	HEAT TAPE CIRCUIT BREAKER	88
HTT	HEAT TAPE THERMOSTAT	88
LPHWCV	HOT WATER COIL CONTROL VALVE	151,195,200
MBEADA-(PADA)	Mix Box EXH (PURGE) AIR DMPR ACTR	138,148,194,199
MBOADA	Mix Box OUTSIDE AIR DMPR ACTR	140,150,192,197
MBRCDA- (EPDA)	Mix Box RECIRC (EVAP BYPASS) AIR DMPR ACTR	139,149,193,198
MPB	MAIN POWER BLOCK	1
MSPEFC	MOTOR STARTER PROTECTOR EXHAUST FAN	58
MSPCC1A, B	MOTOR STARTER PROTECTOR COMPR 1 A, B	31,35
MSPCC2A, B	MOTOR STARTER PROTECTOR COMPR 2 A, B	39,44
MSPHRP	MTR STARTER PROT HEAT RECOVERY PUMP	58
MSPRFC	MTR STARTER PROT RETURN/PURGE FAN	50

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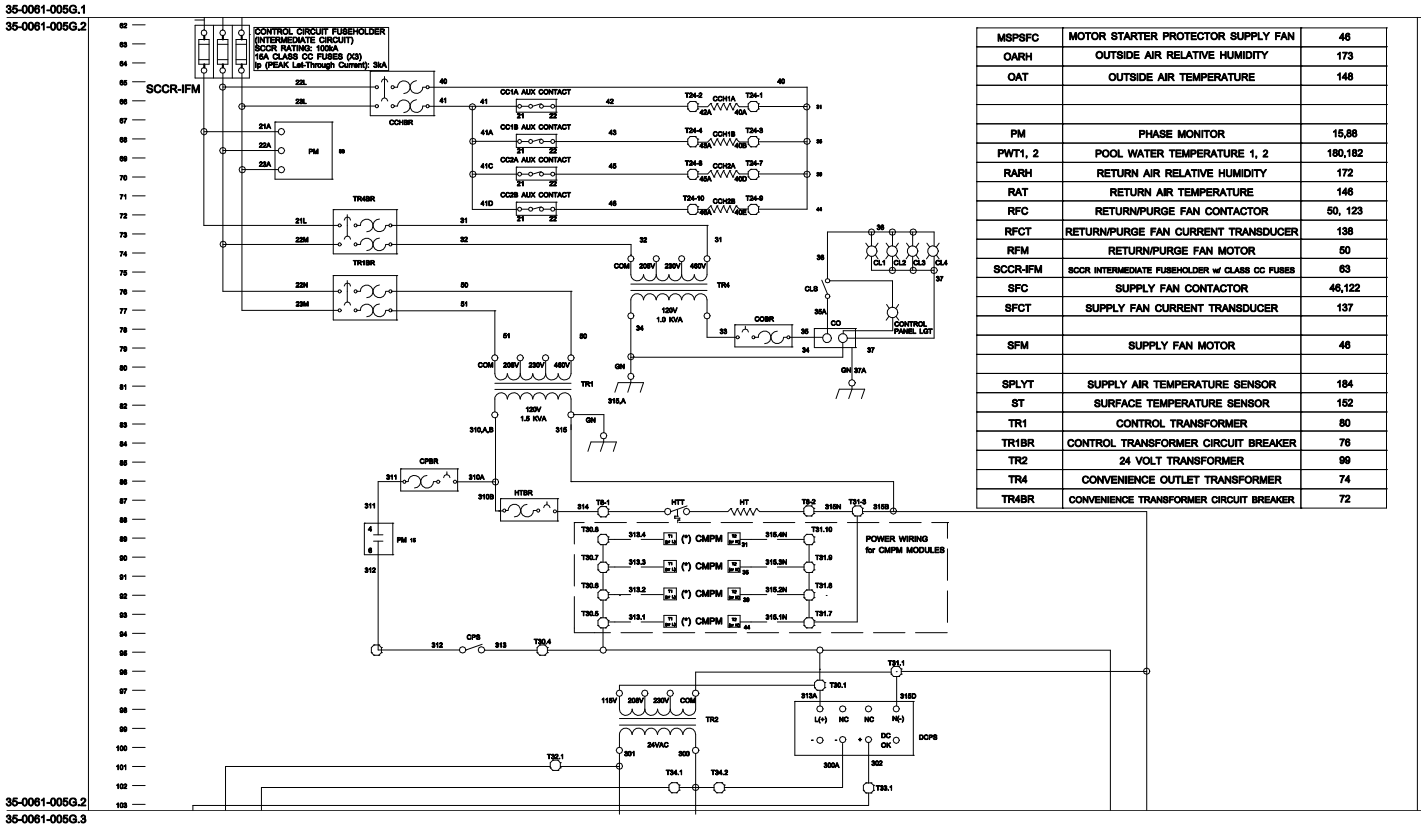
Figure 6-6. Unit Wiring Diagram - 2 of 4 Transformers



MSPSFC	MOTOR STARTER PROTECTOR SUPPLY FAN	46
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
RFC	RETURN/PURGE FAN CONTACTOR	50, 123
RFCT	RETURN/PURGE FAN CURRENT TRANSDUCER	138
RFM	RETURN/PURGE FAN MOTOR	50
SCCR-IFM	SCCR INTERMEDIATE FUSEHOLDER w/ CLASS CC FUSES	63
SFC	SUPPLY FAN CONTACTOR	46,122
SFCT	SUPPLY FAN CURRENT TRANSDUCER	137
SFM	SUPPLY FAN MOTOR	46
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	99
TR4	CONVENIENCE OUTLET TRANSFORMER	74
TR4BR	CONVENIENCE TRANSFORMER CIRCUIT BREAKER	72

Figure 6-7. Unit Wiring Diagram - 3 of 4, CM1 (Controller with Display)

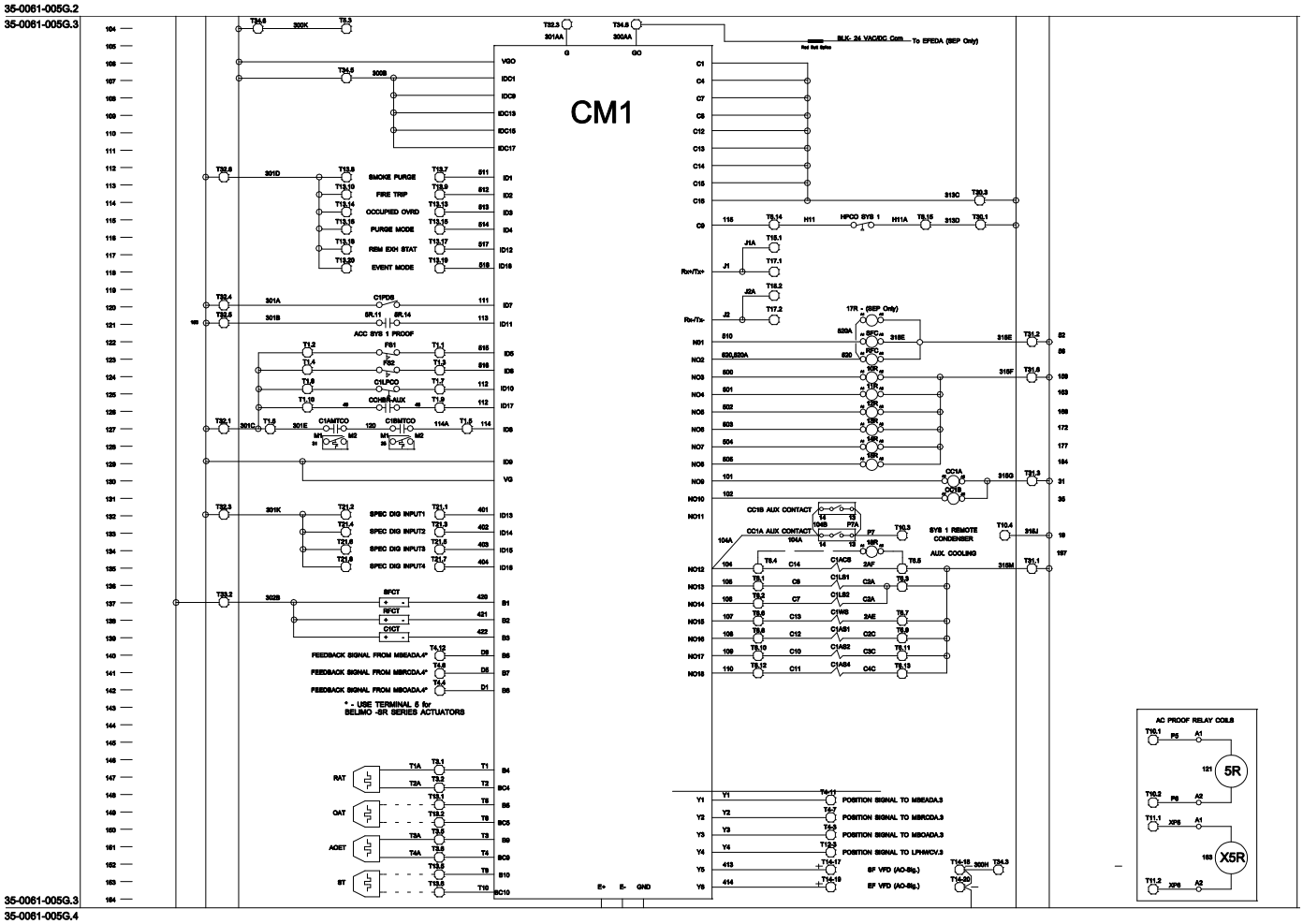


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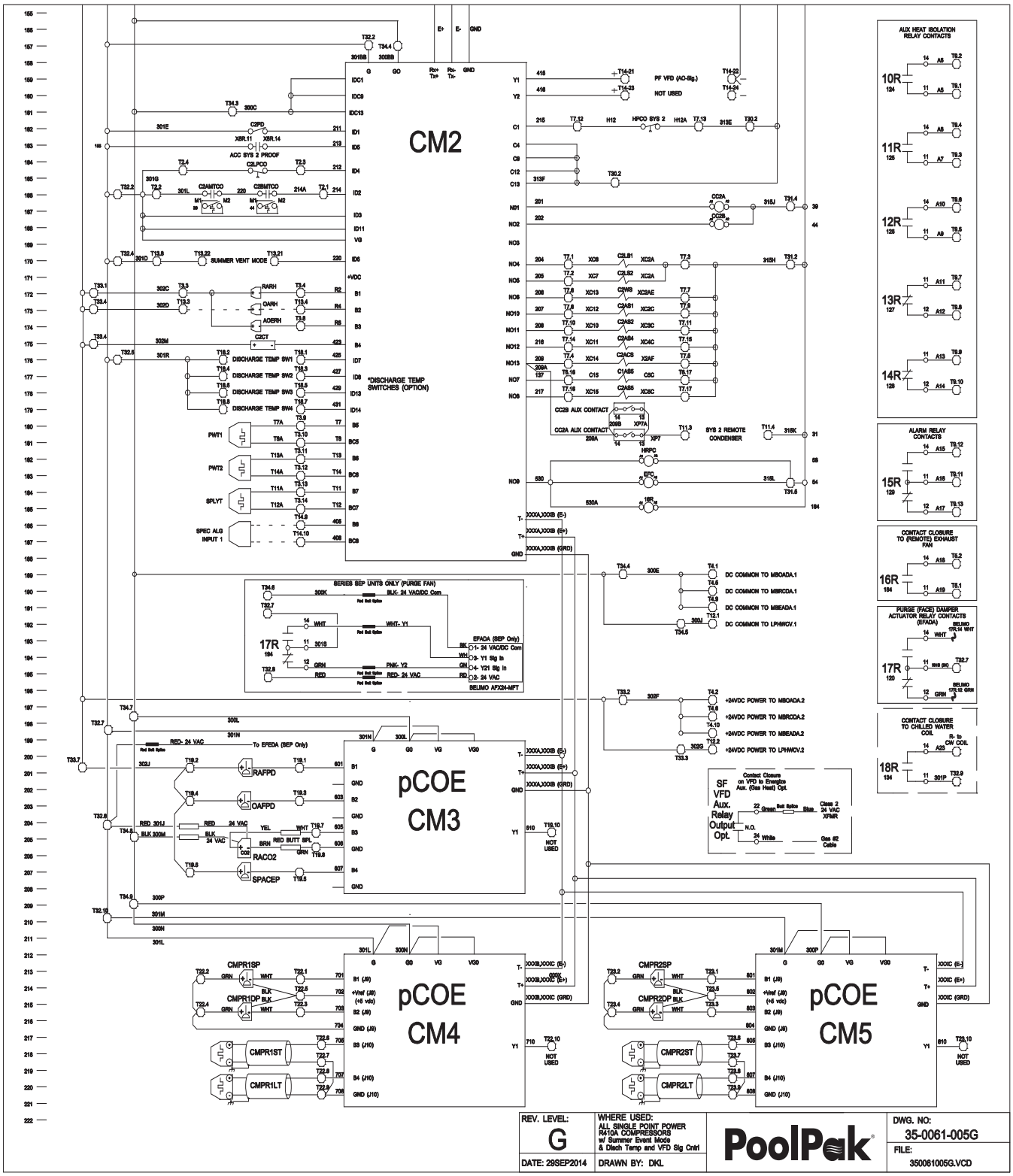
Figure 6-8. Unit Wiring Diagram - 4 of 4, CM2, Relays and Expansion Modules

35-0061-005G.3
35-0061-005G.4



35-0061-005G.5 (COMPLETE DRAWING)

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