PoolPak®
DEHUMIDIFICATION THAT WORKS

Installation, Operation and Maintenance

ComPak® R-410A
AW/HCD Series
RoofComPak® Series

HCD (High Capacity Dehumidifier)
AW (Air and Water)
Horizontal (H) and Vertical (V) Configurations

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Table of Contents

PoolPak®
DEHUMIDIFICATION THAT WORKS

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LIST OF TABLES

LIST OF FIGURE

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 ComPak 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 DESIGN

Introduction

Creating an ideal environment for indoor pool facilities

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

Operating Cost

Energy consumption is a direct function of the variables necessary to satisfy the occupant and protect the facility. These variables include space heating and cooling, water heating, humidity removal and ventilation. Maintaining ideal and precise environmental conditions has a fairly high cost of operation. And for a majority of the indoor pools, regardless of geographic location, require water and space heating 70% to 90% of the year.

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. 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 indoor air quality.

However, increasing ventilation rates can significantly add to the cost of operation. Including energy conservation strategies such as heat recovery, airflow measurement and CO2 based control help control costs while improving indoor air quality.

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. Ideal water temperature is around 82° with the air temperature about 2 degrees F higher to prevent chilling when exiting the pool and to minimize evaporation from the pool surface. Here are 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, warmer temperatures are more common for seniors or children or less active pools.

The desirable humidity range is generally between 50% and 60%--greater than 60% creates a sticky feeling and/or difficult breathing, and low humidity results in evaporative cooling on the bather's skin, resulting in 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 systems are not designed to remove the effects of incorrect pool water chemistry. 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.

For more information, review the Controlling Chloramines with Proper Chlorine Management chapter in the Indoor Pool Water Chemistry publication at the online *PoolPak® Educational Library.*

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: PRINCIPLES, FUNCTIONS, AND FEATURES

The Mechanical Dehumidification System

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 efficient and safe.

Solid state microprocessor technology, working in conjunction with sensors, continually monitors water and air conditions 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 required 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 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 prevent condensation on walls and windows, The PoolPak® System automatically adjusts humidity 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, 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.

Room Dew Point Control

PoolPak units with the CommandPak® Control System (CPCS) controller operate using an advanced type of control called dew point 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 and, 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.

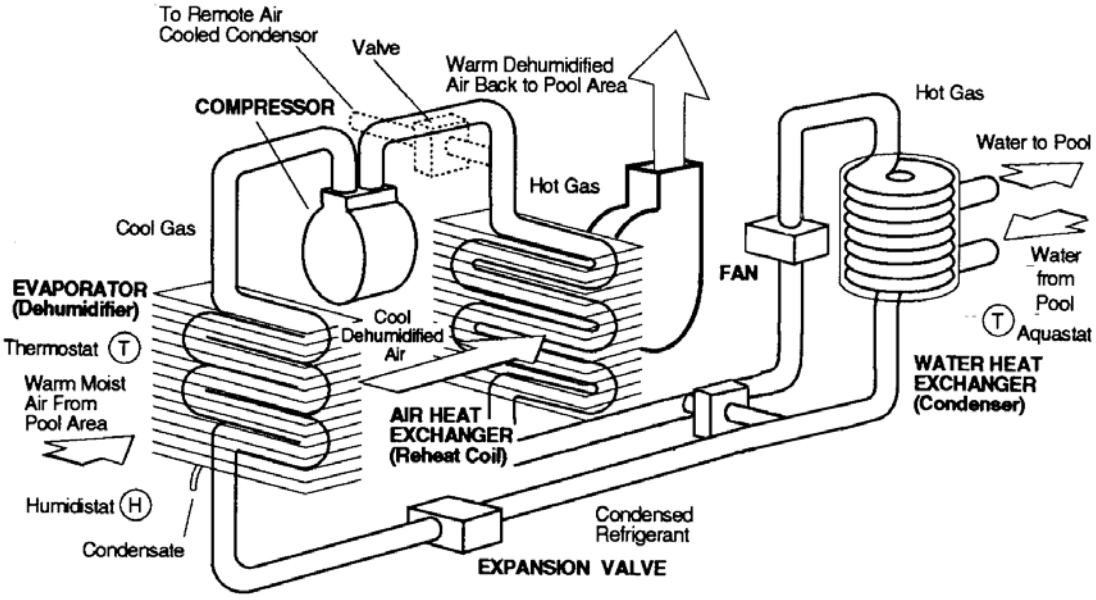
The CPCS-PCP uses dew point control to operate the PoolPak® unit and maintain the moisture level below the setpoint. The space dry bulb temperature and relative humidity determine the dew point temperature. By varying the space temperature and space relative humidity set points, the dew point set point 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-PCP controller energizes the compressor for dehumidification. As the dew point temperature drops more than 1/2 degree Fahrenheit below the dew point temperature set point the controller de-energizes the compressor.

ComPak Operation

The ComPak® 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.

Figure 2-1. ComPak® AW and HCD Typical Refrigerant System Schematic



If pool water heating is required (AWH models only), 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.

CommandPak® Control System

Overview

The CPCS-PCP controller is a micro-processor based system that maintains pool enclosure humidity and air and water temperatures at optimum levels automatically. It is also possible to monitor this critical data via the Internet using the optional "Virtual-Tech® Remote Access Package (RAP). This also allows the controller to be accessed from the factory via the internet or a telephone line. (AWH and HCDH only)

The CPCS-PCP is designed to work with the ComPak® 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 unsightly condensation from forming on surfaces.

The CPCS-PCP provides accurate control and allows the user to monitor system parameters and change setpoints easily. For this purpose, a remote interface unit with a text display and keypad is provided. The remote panel should be mounted outside the pool space, in an office or in the equipment room. (The CPCS-PCP remote interface unit contains no sensors.) All setpoints are saved in the memory of the CPCS-PCP and are not erased in the event of a power failure. Critical operating data can be easily accessed by a service technician for the purpose of system operation and evaluation.

Humidity Control

As the dewpoint temperature within the pool enclosure rises above the desired setpoint, the CPCS-PCP activates the compressor within the ComPak® to begin the dehumidification process. If the space temperature is below the desired setpoint, the heat recovered during dehumidification is directed to the air reheat coil for space heating. If the pool water temperature is also below the setpoint, some of the recovered heat is directed to the pool water condenser (model AW only) for pool water heating. If neither air heating nor pool water heating is required,

the recovered heat can be directed to an auxiliary air conditioning condenser if the system is so equipped. If the system does not include an auxiliary air conditioning condenser, the CPCS-PCP will direct the recovered heat to the air reheat coil until the need for dehumidification is satisfied.

Cold Surface Temperature Humidity Reset

The CPCS-PCP 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. This function helps to prevent condensation on the cold surface.

Space Heating

When the compressor is running, the CPCS-PCP directs the recovered heat to the air reheat coil. Space heating will continue until the space temperature reaches the setpoint. The CPCS-PCP will activate the auxiliary space heating system if the ComPak® unit is unable to satisfy the heating need with heat recovered during dehumidification. An auxiliary pool water heater must be supplied as part of the pool water pump and filter system.

Networking Multiple Units

CPCS-PCP networking allows up to four ComPak® units to be connected together. The units will work with each other to control water temperature, air temperature, and relative humidity. Networked ComPak® units have all the features of standard ComPak® plus the ability to control water temperature in multiple pools. They also allow system dehumidification capacity to be staged. All units on the network are accessible from a single remote interface unit for convenience.

Space Cooling (Optional)

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

When the ComPak® unit is equipped with a field supplied economizer, the CPCS-PCP 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-PCP monitors the outside air temperature. When appropriate, the controller will disable the compressor and bring in cool outside air for economical operation.
A separate exhaust system must be installed to ensure negative room pressure during the economizer mode.

Water Heating (Models AWV and AWH only)

If the pool water temperature is also below the set point, some of the recovered heat is directed to the pool water condenser for pool water heating. Heating can only take place during the dehumidification when heat is captured in the refrigeration circuit. This is only available on the Model AW, which is equipped with a pool water condenser. The CPCS-PCP will activate the auxiliary pool water heating system if the water temperature cannot be satisfied with recovered heat.

Features and Options

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 temperature

Standard Items Factory Supplied for Field Installation

- CPCS-PCP control interface device
- Cold surface temperature sensor
- Outside air temperature sensor (with economizer control kit option only)
- Pool water temperature sensor (AW models only)

System Options

- Remote air-cooled condenser for space air conditioning
- Capability of introducing up to 30% outside air
- Economizer control
- Network multiple units
- Remote monitoring via Internet (AWH and HCDH only)
- Weatherproofing for outdoor installation (AWH and HCDH only)
- A factory-mounted water-cooled condenser with a refrigerant head-pressure controlled water regulating valve for space air conditioning. Chilled water and closed loop cooling tower water may be used for the water-cooled condenser loop. Never use ground water for the water-cooled condenser. Consult the factory for cooling tower applications.

RoofComPak® Series

PoolPak has taken their most popular ComPak® configuration and repacked it as a self-contained, all-in-one dehumidification system. This product comprises the RoofComPak® Series. This offering merges a highly reliable ComPak® AWH or HCDH base system with an integral air-cooled condenser and either an integral gas furnace or an electric heater. The RoofComPak Series is only available in horizontal configuations which can be utilized over a wide range of popular applications. The ten and twelve ton models are ideally suited for applications having a surface area between 1,200 sq. ft. and 2,500 sq. ft.

Design Features

The RookPak Series is designed with features that provide cost savings and greater reliability over traditional systems. Key features are:

- Single, self-contained unit can be installed with one crane lift
- Enclosed refrigerant system reduces refrigerant charge
- Factory assembly ensures wiring and brazing are accomplished under ideal situations
- Single power connection to minimize field wiring. (Separate power connection required for integral electric heat.)

Durable Construction

- Heavy duty construction designed for outside installation to withstand the elements
- Double-wall construction enhances product longevity
- Designed for quiet operation

Rooftop Installation

- Requires only one mounting curb
- Bottom return air
- Bottom supply air
- Side outside air
- Can also be installed indoors with a remote ACC

Microprocessor Controller

- Utilizes PoolPak® proven CPCS-PCP, microprocessor based contol technology
- Incorporates Virtual-Tech® Remote Access Package (RAP) to allow system access via the ethernet/internet
- RAP is easily adaptable to BAS systems including BACnet (MS/TP & IP), LonWorks, and Modbus

Heating Packages

- 200, 240, 280 or 320 MBH indirect gas furnace for consistent temperature control
- 20kW or 30kW electric heater (requires separate power connection)
- Hot water coil using PoolPak® standard Hycor® Blue coil or optional Electro-Guard® coils

Self-Contained Air-Cooled Condensing Section

- Built-in Air Cooled Condenser (ACC) reduces cost and eliminates field piping
- Utilizes efficient dual rotary blade fans
- Efficient to 105°F ambient outside air temperature
- Choice of coil coatings for specific applications

Evaporator Coil Options

- Hycor® Blue (standard)
- Electro-Guard® Plus
- All copper

Electronically Commutated (EC) Fans

- Integral fan motor and drive for easy fan speed adjustment
- Direct drive reduces system maintenance
- Quieter, lower energy use

Unique Outside Air System

- Houses adjustable louvers and filter
- Convenient external filter access
- Swing-out door-mount design for easy service access to fan motor and belts

Cupronickel Water Heat Exchanger

- Supplies 100% of available recycled energy to the pool water
- Reaches water temperature set-point conditions faster
- Efficiently maintains the water temperature set-point
- Redirects heat only after space temperature is satisfied

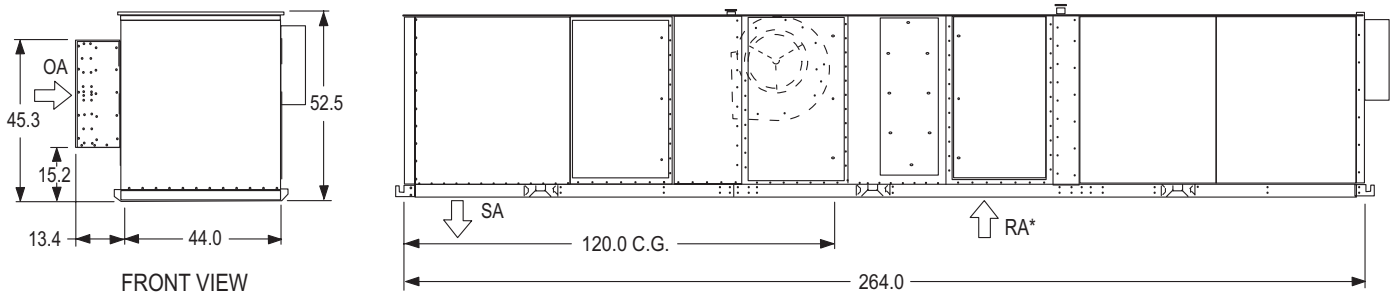
Technical Summary

Table 2-1. RoofComPak® Technical Data

MODEL NUMBER	AWH / HCDH 3500 - 10 TON	AWH / HCDH 4000 - 12 TON
Pool Size (Sq. Ft.)	1,200 - 2,000	1,400 - 2,500
Reheat Capacity (MBH)	170	200
Moisture Removal (Lb/Hr@82°F/60%RH)	63	70
Pool Water Flow (GPM)	26	28
Pool Water Condenser PD (FT WC)*	20	30
Pool Water Condenser Capacity (MBH)	170	200
Outside Air (CFM)(Nominal)	0 - 2,800	0 - 2,800
Total Supply Airflow CFM (Maximum)	3,500 - 8,000	4,000 - 8,000
Refrigerant Charge (lbs)	81	83
Dimensions (in inches) with integral air-cooled condenser and gas furnace		
Length	264	264
Width	57.4	57.5
Height	52.5	52.2

Dimensional Data

Figure 2-2. PCP RoofComPak® Dimensions



* Side return air available; horizontal return air available without integral air-cooled condenser

RoofComPak® Weights

AWH/HCDH 3500/4000 with integral gas or electric heat, remote ACC	2900 lbs
AWH/HCDH 3500/4000 with integral gas or electric heat, integral ACC	3700 lbs
AWH/HCDH 3500/4000 with no integral auxiliary heat, integral ACC	2700 lbs

SECTION III: PERFORMANCE AND SIZING

ComPak® Performance

Detailed performance and dimensional information are provided in the PoolPak® WAVES Selection Software.

ComPak® AW (AWV, AWH) Performance

Table 3-1. ComPak® AW Performance Summary

PERFORMANCE AT 82°F AIR AND 80°F WATER						POOL WATER CONDENSER (VENTED)	
MODEL AW	RETURN AIR CFM	RETURN AIR RH (%)	MOISTURE REMOVAL (LBS/HR)	SENSIBLE COOLING CAPACITY (MBH)	ACC MAX. HEAT REJECTION (MBH)	GPM	PRESSURE DROP FT WATER
0550	900	60	11.1	13.6	31.2	4	6
		50	8.5	15.6	30.1		
0800	1600	60	15.7	22.1	47.5	6	10
		50	11.7	24.9	45.7		
1200	1700	60	20.8	26.9	57.9	10	24
		50	15.5	30.5	55.5		
1400	2300	60	26.0	38.4	76.6	10	8
		50	18.8	43.4	73.6		
1800	2500	60	30.9	41.8	89.1	12	12
		50	22.9	47.8	86.1		
2600	3300	60	45.1	54.6	120.9	13	6
		50	35.0	60.6	115.6		
3500	4300	60	59.7	78.9	170.0	24	17
		50	44.2	89.8	163.4		
4000	4500	60	70.4	87.6	197.5	28	24
		50	52.4	100.1	189.3		

ComPak® HCD (HCDV, HCDH) Performance

Table 3-2. ComPak® HCD Performance Summary

PERFORMANCE AT 82°F AIR AND 80°F WATER					
MODEL HCD	RETURN AIR CFM	RETURN AIR RH (%)	MOISTURE REMOVAL (LBS/HR)	SENSIBLE COOLING CAPACITY (MBH)	ACC MAX. HEAT REJECTION (MBH)
0550	900	60	10.2	13.2	30.5
		50	7.7	15.2	29.5
0800	1600	60	14.5	20.8	46.2
		50	10.3	23.9	44.4
1200	1700	60	19.0	25.2	56.4
		50	14.5	28.4	54.4
1400	2300	60	24.1	36.2	74.7
		50	17.9	40.5	71.8
1800	2500	60	28.9	41.8	88.1
		50	20.9	47.4	84.6
2600	3300	60	41.0	53.5	118.8
		50	31.3	59.7	113.8
3500	4300	60	56.9	80.5	169.9
		50	41.5	95.2	166.8
4000	4500	60	66.5	86.2	195.3
		50	50.2	97.9	187.8

ComPak® Unit Dimensions

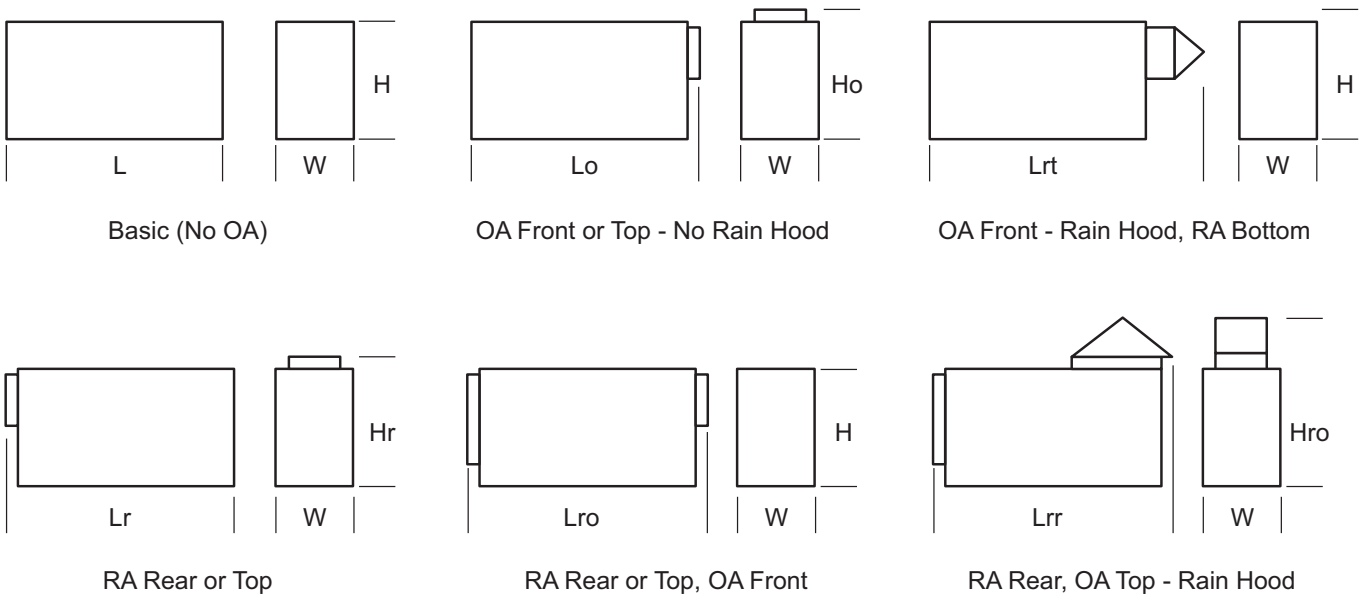
The latest detailed unit dimensional data may be found in the ComPak® Series AWH/HCDH, AWV/HCDV All Models R-410A Dimensional Drawings publication which can be downloaded from the *Engineering Library.* RoofComPak® generic drawings are also available in the same location on the PoolPak® website.

ComPak® Horizontal Dimensions

Table 3-3. AW/HCD Horizontal Unit Overall Dimensions

		MODEL NUMBER							
		550	800	1200	1400	1800	2600	3500	4000
WIDTH	BASIC (W)	33.9	33.9	33.9	44.1	44.1	44.1	44.1	44.1
HEIGHT	BASIC (H)	30.6	30.6	30.6	30.5	30.5	48.6	48.6	48.6
	TOP RETURN (Hr)	32.6	32.6	32.6	33.0	33.0	51.1	51.1	51.1
	TOP OA (Ho)	41.1	41.1	41.1	43.0	43.0	61.1	61.1	61.1
	TOP OA RAINHOOD (Hro)	50.9	50.9	50.9	52.8	52.8	70.8	70.8	70.8
LENGTH	BASIC (L)	60.1	60.1	60.1	72.0	72.0	92.1	92.1	92.1
	REAR RETURN (Lr)	61.8	61.8	61.8	74.7	74.7	94.8	94.8	94.8
	FRONT OA (LO)	70.8	70.8	70.8	84.8	84.8	104.8	104.8	104.8
	REAR RETURN & FRONT OA (Lro)	72.1	72.1	72.1	87.0	87.0	107.1	107.1	107.1
	FRONT OA RAINHOOD (Lrt)	88.0	88.0	88.0	99.9	99.9	120.0	120.0	120.0
	TOP OA RAINHOOD (Lrr)	71.3	71.3	71.3	88.2	88.2	108.3	108.3	108.3

Figure 3-1 AW/HCD Horizontal Unit Elevation and End Views

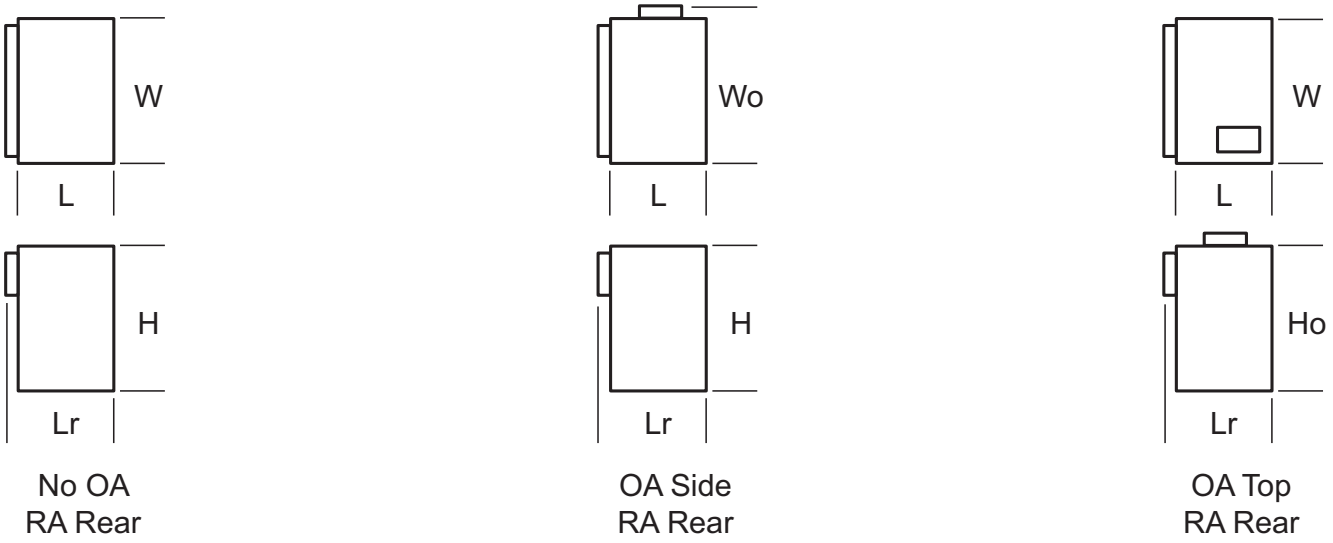


ComPak® Vertical Dimensions

Table 3-4. AW/HCD Vertical Unit Overall Dimensions

		MODEL NUMBER							
		550	800	1200	1400	1800	2600	3500	4000
WIDTH	BASIC (W)	32.1	32.1	32.1	38.8	38.8	49.6	68.2	68.2
	SIDE OA (Wo)	39.0	39.0	39.0	45.7	45.7	56.5	75.0	75.0
HEIGHT	BASIC (H)	49.3	49.3	49.3	55.9	55.9	60.5	60.5	60.5
	TOP OA (Ho)	56.3	56.3	56.3	62.9	62.9	67.5	67.5	67.5
LENGTH	BASIC (L)	26.2	26.2	26.2	27.8	27.8	41.4	41.4	41.4
	REAR RETURN (Lr)	32.2	32.2	32.2	33.8	33.8	47.3	47.3	47.3

Figure 3-2. AW/HCD Vertical Unit Elevation and Plan Views



ComPak® Outside Air Damper Size

Table 3-5. ComPak® Outside Air Damper Size

MODEL#	OUTSIDE AIR (OA) LOCATION	OPENING SIZE[1] (in.)	DAMPER CODE	OA CFM RANGE[2]
COMPAK® VERTICAL AWV/HCDV				
V550/800/1200	Top	A, 14 x 10	OA-TR	0-800
	Left		OA-LT	
V1400/1800	Top	A, 14 x 10	OA-TR	0-800
	Left		OA-LT	
	Top	B, 14 x 22	OA-TR	800-2000
	Left		OA-LT	
V2600	Top	A, 14 x 10	OA-TR	0-800
	Left		OA-LT	
	Top	C, 14 x 30	OA-TR	800-2500
	Left		OA-LT	
V3500/4000	Top	A, 14 x 10	OA-TR	0-800
	Left		OA-LT	
	Top	C, 14 x 30	OA-TR	800-2800
	Left		OA-LT	
COMPAK® HORIZONTAL AWH/HCDH				
H550/800/1200	Top	A, 12 x 12	OA-TC	0-450
	Front		OA-FC	
	Top	B, 12 x 24	OA-TC	450-800
	Front		OA-FC	
H1400/1800	Top	C, 16 x 20	OA-TC	0-1000
	Front		OA-FC	
	Top	D, 16 x 40	OA-TC	1000-2000
	Front		OA-FC	
H2600/3500/4000	Top	E, 20 x 20	OA-TC	0-1400
	Front		OA-FC	
	Top	F, 20 x 40	OA-TC	1400-2800
	Front		OA-FC	

1 Size may change depending on RA CFM and ESP. See product dwg request/pulley request from section software for exact damper size.

2 Operating these units at OA quantities different from which the unit was selected will be detrimental to the unit's operation.

Hot Water Coil Capacities

Table 3-6. Hot Water Coil Capacities

VERTICAL (AWV, HCDV) MODELS 1 ROW HOT WATER COIL				
MODEL	FLOW RATE RANGE (GPM)		HEATING CAPACITY RANGE (MBH)	
	MIN	MAX	MIN	MAX
0550	5	15	35	56
0800	5	15	44	69
1200	5	15	48	75
1400	10	25	73	109
1800	10	25	82	115
2600	15	35	108	166
3500	20	40	165	248
4000	20	40	165	248

HORIZONTAL (AWH, HCDH) MODELS 1 ROW HOT WATER COIL				
MODEL	FLOW RATE RANGE (GPM)		HEATING CAPACITY RANGE (MBH)	
	MIN	MAX	MIN	MAX
0550	5	15	33	54
0800	5	15	43	66
1200	5	15	48	75
1400	10	25	71	105
1800	10	25	80	111
2600	15	35	104	161
3500	20	40	147	203
4000	20	40	158	209

HORIZONTAL (AWH, HCDH) MODELS 2 ROW HOT WATER COIL				
MODEL	FLOW RATE RANGE (GPM)		HEATING CAPACITY RANGE (MBH)	
	MIN	MAX	MIN	MAX
0550	15	25	54	84
0800	15	25	76	108
1200	15	25	87	123
1400	20	35	115	168
1800	20	35	134	180
2600	30	50	167	258
3500	35	55	237	326
4000	35	55	260	340

NOTE

Coils add 0.1"WC to ESP
Entering Air Temperature - 80°F
Entering Water Temperature - 180°F
Max. Working Pressure - 125 psi
Capacity is a function of Return Airflow and is independent of Supply Airflow

Factory Refrigerant Charge

Table 3-7. Factory Refrigerant R410A Charge

	UNIT FACTORY CHARGE1 (R410A)			
	AIR COOLED CONDENSER (ACC)		WATER COOLED CONDENSER (WCC)	
MODEL	LBS	OZ	LBS	OZ
0550	14	3	9	9
0800	15	5	10	7
1200	18	2	13	4
1400	24	13	17	9
1800	26	5	19	1
2600	36	1	25	15
35002	42 (81)	1 (0)	33	15
40002	44 (83)	1 (0)	35	15

1 Factory charge for remote ACC option does not include refrigerant for either ACC or lineset.

2 Factory charge for RoofComPak® with Integral ACC in parentheses.

NOTE

Factory charge for remote ACC option does not include refrigerant or oil charge for either ACC or connecting refrigerant line between unit and ACC.

For ACC and lineset charging, see *Table 4-2* and *Table 4-3* in the Installation section.

Remote Air-Cooled Condenser (ACC) Performance

Table 3-8. Remote ACC Performance Chart

Note: Below table contains the piping sizes of the remote ACC stub-outs. Additional field piping may be needed to make the transition from the connections to correct refrigeration lineset sizing (See *Table 4-3*.)

UNIT SIZE	ACC MODEL*	AMBIENT TEMP (°F)	UNIT HEIGHT (INCHES)	VAPOR O.D. (INCHES)	LIQUID O.D. (INCHES)	UNIT WEIGHT	MOTOR FLA		MIN. CIRCUIT AMPACITY	
			A	B	C		208/230V	460V	208/230V	460V
0550	ACC0041	95/100/105/115	39.3	5/8	1/2	120	3	1.5	3.8	1.9
0800	ACC0041	95/100/105	39.3	5/8	1/2	120	3	1.5	3.8	1.9
	ACC0051	110		3/4	1/2	120				
	ACC0081	115		7/8	5/8	210				
1200	ACC0051	95/100/105	39.3	3/4	1/2	120	3	1.5	3.8	1.9
	ACC0081	110		7/8	5/8	210				
	ACC0121	115	39.3	1-1/8	3/4	470	6	3	7.5	3.8
1400/1800	ACC0081	95/100/105	39.3	7/8	5/8	210	3	1.5	3.8	1.9
	ACC0121	110/115	39.3	1-1/8	3/4	470	6	3	7.5	3.8
2600	ACC0121	95/100/105/110	39.3	1-1/8	3/4	470	6	3	7.5	3.8
	ACC0301	115	49.0	1-1/8	7/8	640	14	7	20	15
3500	ACC0161	95/100/105	39.3	1-1/8	7/8	470	6	3	7.5	3.8
	ACC0301	110	49.0			640	14	7	20	15
	ACC0341	115				690				
4000	ACC0161	95/100	39.3	1-1/8	7/8	470	6	3	7.5	3.8
	ACC0211	105	40.5			550	10	5	11.2	5.6
	ACC0301	110	49.0			640	14	7	20	15
	ACC0341	115				690				

*NOTES: For models ACC00XX, see figure #3-3 (Single Fan).
For models ACC01XX, see figure #3-3 (Dual Fan).
For models ACC02XX, see figure #3-4 (Three Fan-Bohn).
For models ACC03XX, see figure #3-4 (Dual Fan-Bohn).

Figure 3-3. Air-Cooled Condenser (PoolPak®) - Isometric Views

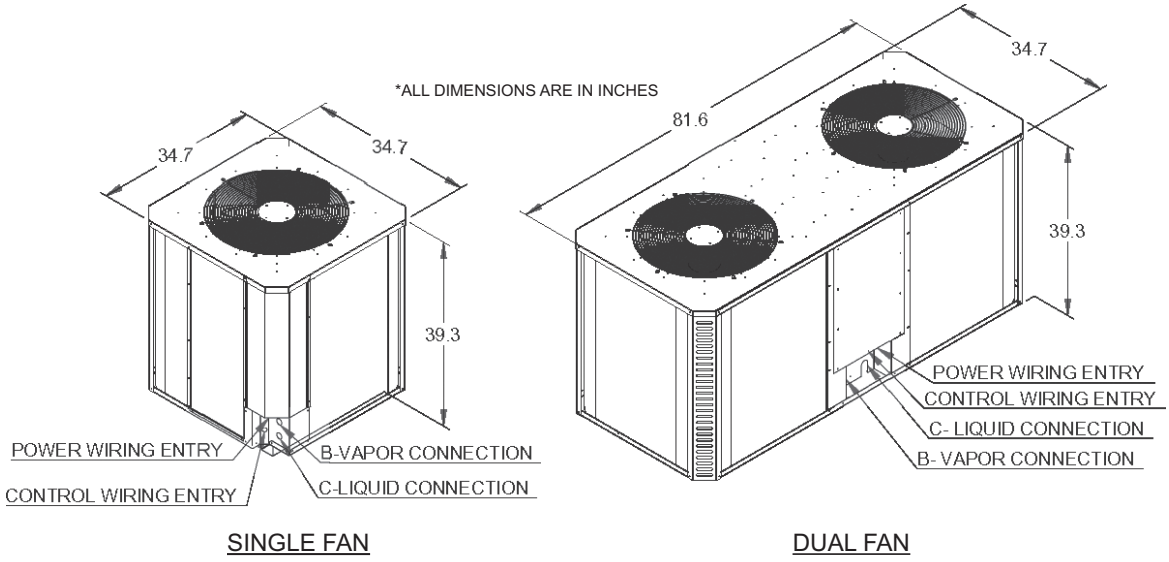
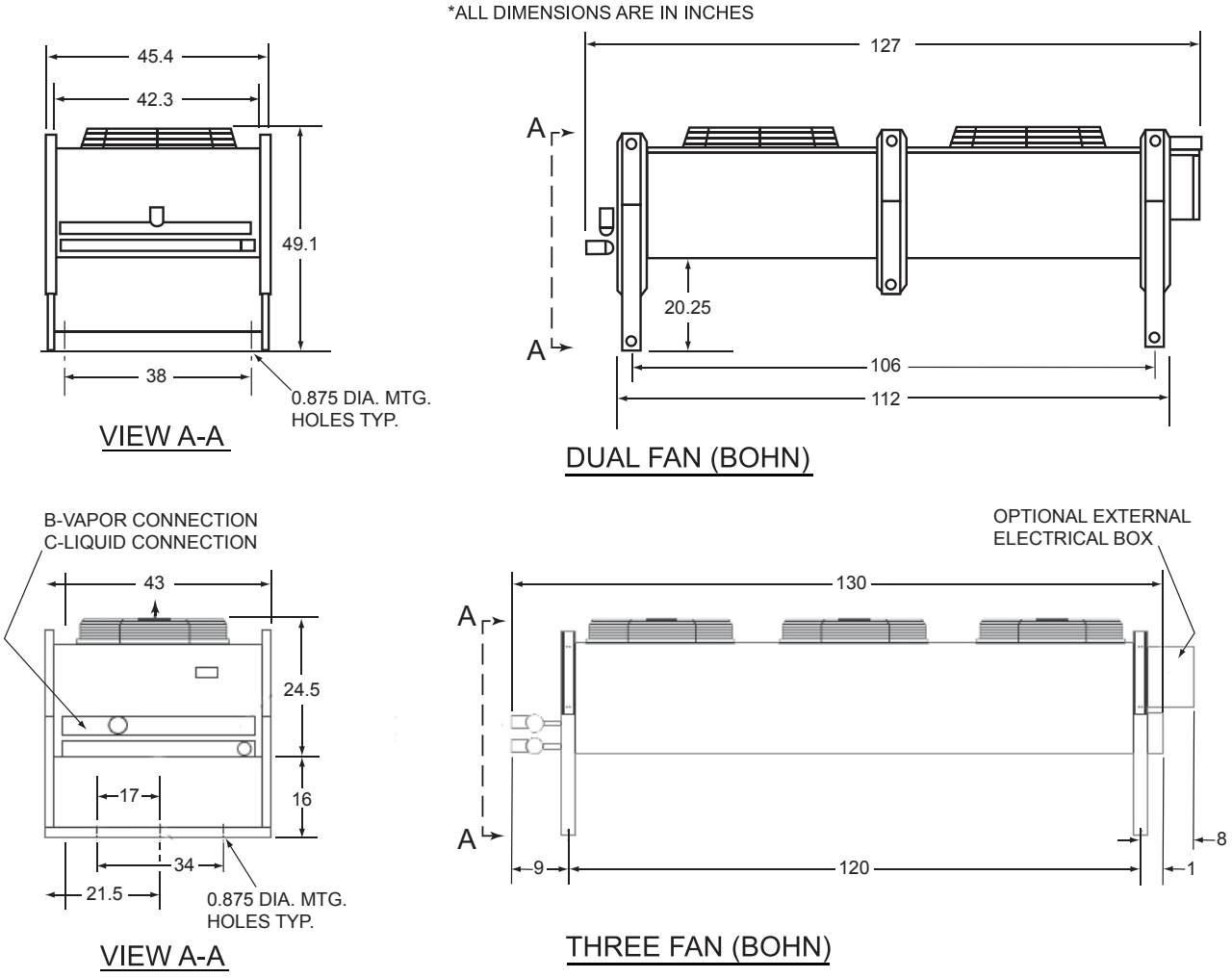


Figure 3-4. Air-Cooled Condenser (Bohn) - Elevation Views



Electric Duct Heater

General Duct Heater Information

Power wiring should incorporate properly sized fuses or motor rated circuit breakers. A disconnect must be fitted within easy access and sight of the unit. Supply voltage must be maintained within +/- 10% of design voltage on both single and three phase units. Cycles must be within +/- 5% of design. Failure to operate within these ranges can adversely affect performance, cause failure of the equipment, and may void warranty terms.

- Tubular, sheathed elements
- Galvanized steel cabinet
- Duct-mounted, flanged type
- Airflow in either direction
- UL and CSA approved heater
- Airflow proving switch
- Auto and manual reset, high temperature limits
- Magnetic contactors
- 24 volt control circuit and transformer
- Standard heater for indoor installation in non-insulated duct

Figure 3-5. Duct Heater

Duct Heater Sizes

Table 3-9. Duct Sizes

VOLTS/HZ/PH	DUCT SIZE			
	12″ X 12″	15″ X 15″	20″ X 20″	28″ X 28″
208/60/1 or 230/60/1	5KW-1STG	10KW-1STG	20KW-1STG	---
	10KW-2STG	15KW-1STG	30KW-1STG	---
	---	15KW-2STG	30KW-2STG	---
	---	20KW-2STG	40KW-2STG	---
208/60/3 or 230/60/3	5KW-1STG	10KW-1STG	20KW-1STG	30KW-1STG
	10KW-2STG	15KW-1STG	30KW-1STG	45KW-1STG
	---	15KW-2STG	30KW-2STG	45KW-2STG
	---	20KW-2STG	40KW-2STG	60KW-2STG
460/60/3 or 575/60/3	5KW-1STG	10KW-1STG	20KW-1STG	30KW-1STG
	10KW-2STG	15KW-1STG	30KW-1STG	45KW-1STG
	---	15KW-2STG	30KW-2STG	45KW-2STG
	---	20KW-2STG	40KW-2STG	60KW-2STG

Duct Heater Installation

1. Flange both ends of the ducts outwards on three sides to match heater flanges as shown.
2. Fasten heater to duct using sheet metal screws for smaller heaters or bolts for larger ones.
3. Seal opening with suitable sealing compound.
4. If needed use additional hangers to support heater.
5. Electrical power connections must be made within NEC standards and local electrical codes.
6. Refer to the Field Wiring Diagram at the back of this manual for controls connection.

Reference Dimensions: Fan Outlet

AWH/HCDH 550/800/1200: 9-1/4 x 10-3/8 inches
AWH/HCDH 1400/1800/2600: 12-1/2 x 13-1/2 inches
AWH/HCDH 2600/3500/4000: 17 x 19 inches
Duct heater width = 8, 10 or 12 inches depending on heater kW; Flange width = 1 inch

SECTION IV: INSTALLATION

PCP Installation

Introduction

Installation requires the unit to be placed on a roof mounted curb, the mechanical room floor, an appropriate location in the pool 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.

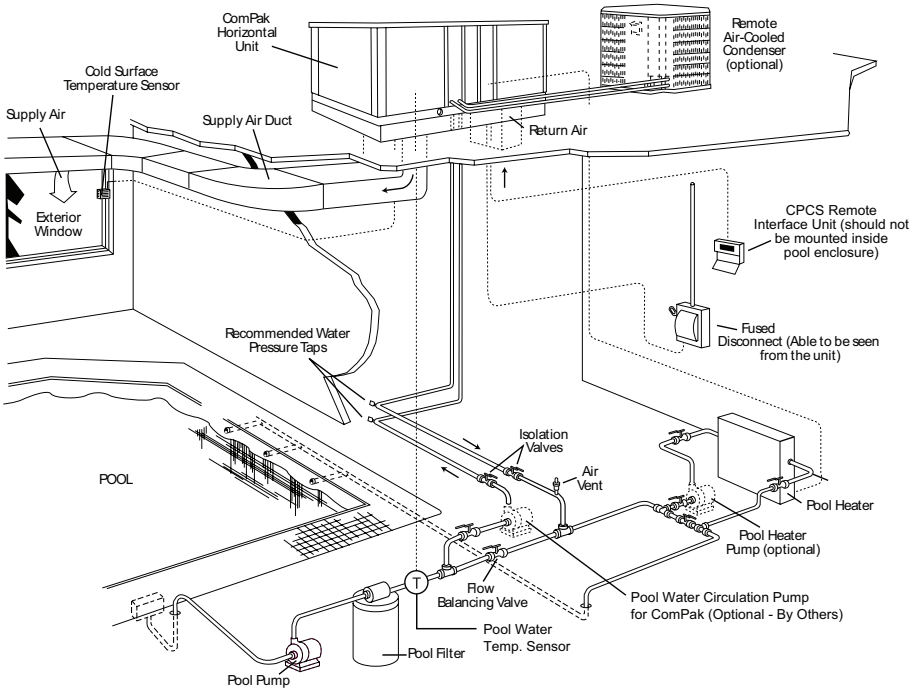
If an optional remote air-cooled condenser is used, place the condenser in a proper outdoor location. Refrigerant piping is then run from the air cooled condenser to the ComPak® unit. Refrigerant lines must be leak checked and evacuated through installer provided Schrader valves. Control and power wiring 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 ComPak® controls shown in *Figure 4-8*.

Outside air can be ducted into the unit through the optional outside air duct connection. The unit can draw up to 30% of its supply air from the outside. When ventilating the natatorium in this way, an exhaust fan must be furnished in the natatorium to exhaust to the outside an air volume slightly greater than the air volume introduced into the natatorium from the outside. This will maintain a negative pressure in the space, preventing odor and moisture migration. Outside air filters are provided for Horizontal ComPak® units. For Vertical ComPak® units, outside air must be filtered before entering the unit.

UNIT/FACILITY INTERFACE

A typical ComPak® system layout and its connection to the natatorium and pool water piping systems is shown in the figure below.

Figure 4-1. Typical ComPak® AWH Series System Layout

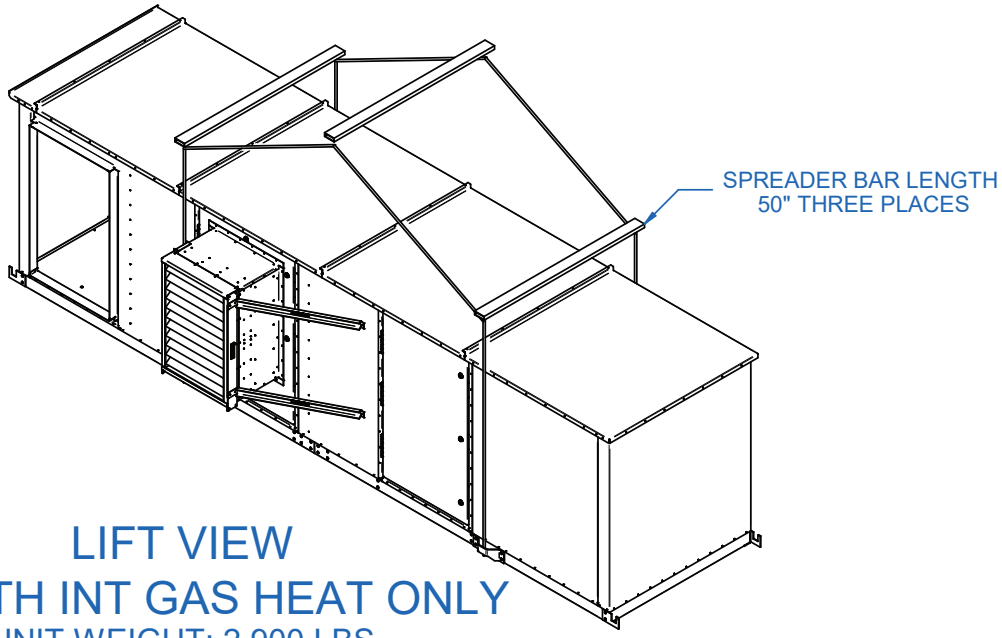


Handling

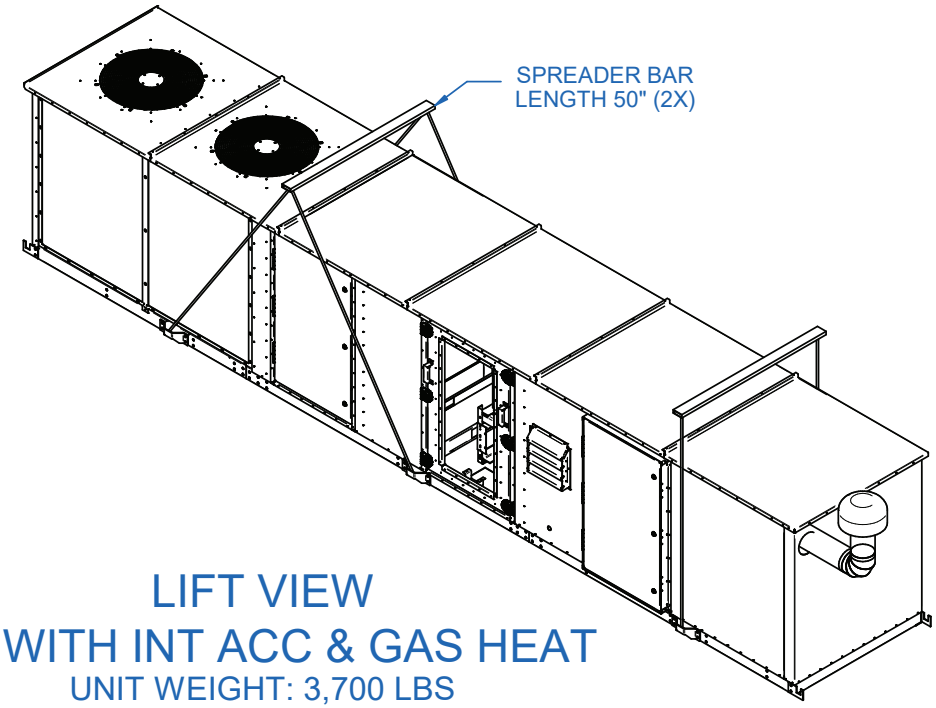
All units are shipped completely assembled. Care should be taken to avoid damage due to rough handling. If the unit is not to be immediately installed, it must be protected from weather and site hazards.

For ComPak rigging, refer to the generic or job specific product drawing in the Technical Product Library. For RoofComPak rigging, see *Figure 4-2.*

Figure 4-2. RP Lift Views



LIFT VIEW
RP WITH INT GAS HEAT ONLY
UNIT WEIGHT: 2,900 LBS



LIFT VIEW
RP WITH INT ACC & GAS HEAT
UNIT WEIGHT: 3,700 LBS

Clearance

For proper operation and service, ComPak® Vertical, ComPak® Horizontal and RoofComPak® units require 36" clearance on all sides.

Mounting of ComPak Units

Locate the ComPak® unit on a firm level base. If floor mounting, ensure that the floor is capable of supporting the operating weight. If wall mounting or hanging a unit, provide a support structure that is capable of supporting the unit while protecting pool patrons and employees from injury. Ensure that the support structure will not interfere with the operation of the unit. Provision must be made for servicing units suspended above floor level. Install isolation pads under the unit to minimize unit transmitted vibration noise.

Inspection

Upon receipt of the ComPak® unit(s), immediately inspect for damage. In particular, inspect the housing and the evaporator coil face. Minor indentations of the fins will not affect performance. However, if there is substantial damage, immediately notify shipping company of unseen damage at delivery with a detailed letter outlining the damage. Retain copies of all shipping damage claim documentation as well as photographs of the observed damage.

NOTE
PoolPak® LLC does not ship damaged units from its facility nor is it responsible for damage incurred during transit.

Power Supply

A separate fused disconnect switch must be provided per local codes and be within easy accessibility of the ComPak® 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). If it is not, a compressor rotor stall will occur during start-up due to an excessive voltage drop.

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). Conduits connected to outdoor units must be sealed in accordance with NEC 300.7(A).

For Vertical and Horizontal ComPaks, installing contractor must punch a hole into the electrical compartment to run power wires. The hole is to be properly finished with a rubber grommet and weather sealing.

Control Wiring

All control wiring field connections are described in the wiring diagram furnished with the ComPak® unit as well as in the Field Wiring section of this manual. 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 overflow drain should be piped in a similar fashion. 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

For curbs by PoolPak, see the specific curb drawing that is specifically designed for the ComPak *(Fig. 4-4)* or for the RoofComPak *(Fig. 4.3)*. For curbs by others, you must use the same dimensions as shown.

The outside dimensions of the curb are such that the base of ComPak® extends over the edge of the curb all the way around. This aids in preventing rainwater from getting between the base of the ComPak® and the curb. PP It is the installing contractor's responsibility to complete the following:

- Flash the curb into the roof
- Connect the supply and return duct to the curb's duct support rails.
- Connect condensate drain line with appropriate trap
- Seal the curb to the bottom of the ComPak® using the gasket supplied with the curb
- Install counter-flashing provided with the curb separately between the curb and the ComPak unit.
- Seal any piping connections where piping is going through the curb

If specified when ordering, all water piping connections can be made through the curb. These water connections may include: pool water, condensate, auxiliary hot water coil (optional).

For outdoor units with top duct connections, contractor is responsible for sealing these connections.

Figure 4-3. RoofComPak® Curb Assembly

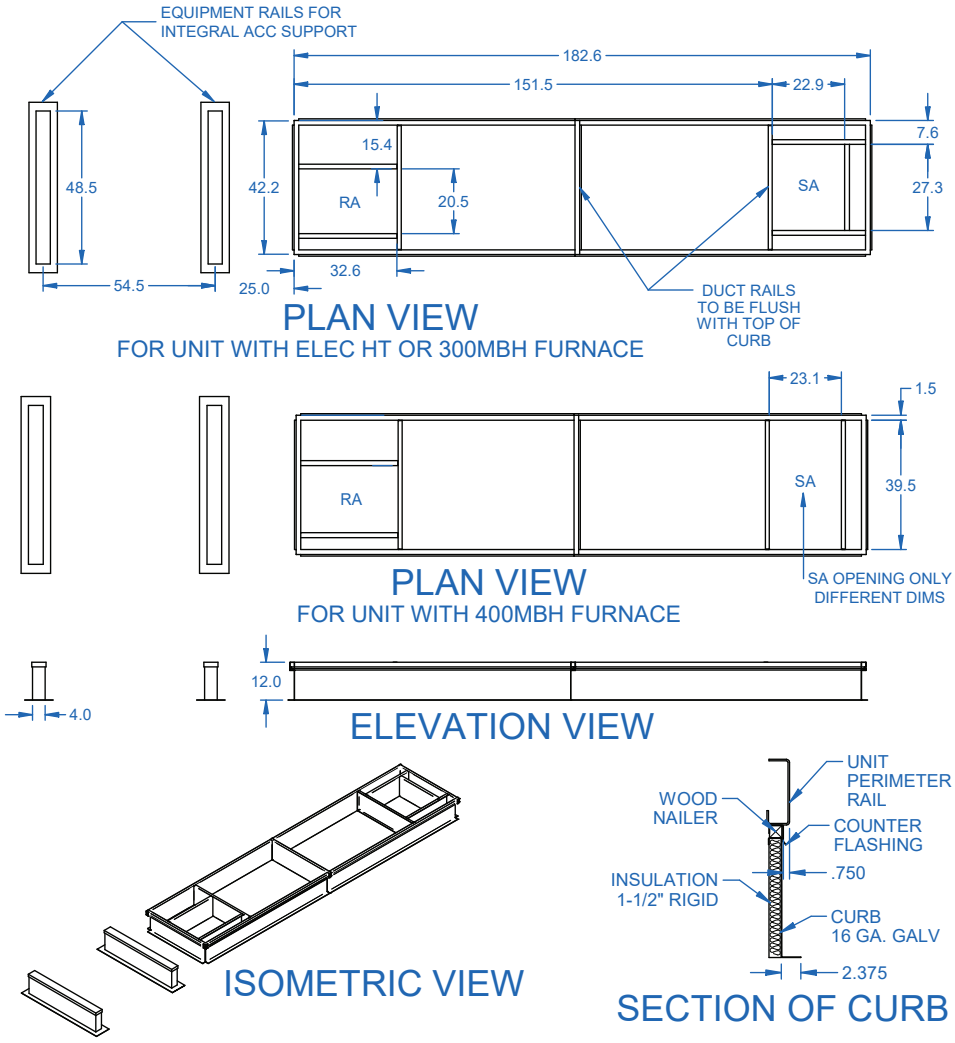


Figure 4-4. ComPak Horizontal Curb Assembly

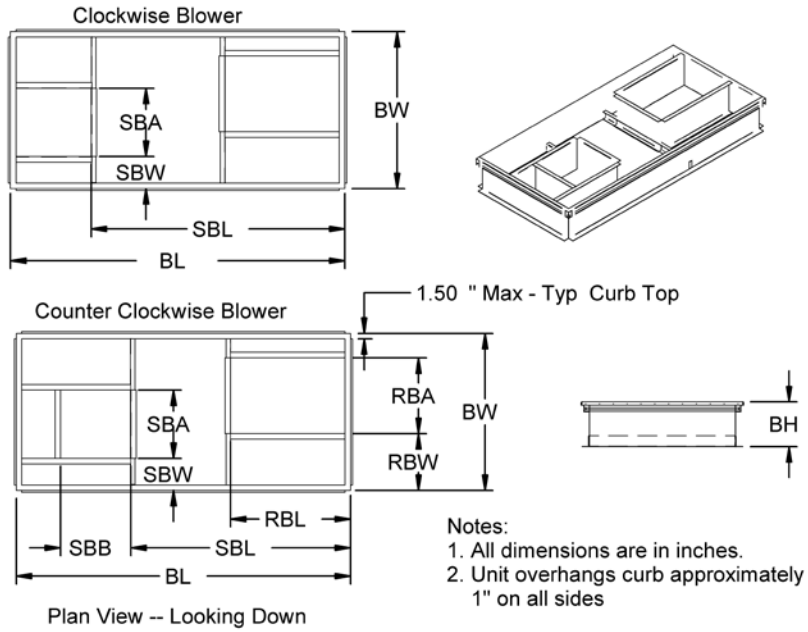


Table 4-1. Horizontal ComPak Curb Dimension

MODEL#:	550/800/1200	1400/1800	2600/3500/4000	2600/3500/4000
FAN SIZE:	9″X7″ BLOWER	12″X9″ BLOWER	12″X9″ BLOWER	18″X13″ BLOWER
OVERALL DIMENSIONS				
BL	58.5	70.5	90.5	90.5
BW	32.3	42.5	42.5	42.5
BH	12	12	12	12
RETURN DUCT CHASE				
RBW	14.6	20	15.4	15.4
RBL	22.2	25.5	32.7	32.7
RBA	12	15	20.5	20.5
SUPPLY DUCT CHASE				
SBW	15.7	18.6	8.4	8.4
SBA	10.6	13.6	13.3	18.6
SBB	12	15.5	14.9	21
SBL (CW Rotation)	44.8	53.5	72.8	66.7
SBL (CCW Rotation)	41.7	49.3	59	59

Note: Dimensions relate to Figure 4-4.

Integral Gas Furnace Option (RoofComPak Only)

When using a gas furnace, power venting is provided for all unit sizes. External vent piping and/or cap is required. Please refer to the furnace manufacturer's manual for piping and venting instructions. Install, leak-test, and properly regulate piping for the gas-fired heater. Pressures should be regulated to the entering pressures as shown on the furnace manufacturer's data plate or manual.

CPCS-PCP Controls Field Wiring

Overview

The CPCS-PCP is the CommandPak® Control System programmable controller designed specifically for the ComPak® dehumidification system. It is a robust system capable of a var iety of functions. The following text describes the field wiring required for for proper operation of the CPCS-PCP dehumidification system in a typical ComPak® unit installation.The field wiring diagram *(see Figure 4-10)* shows the location of the connections for the sensors and other required devices.The numbers following the text identify the location on the field wiring diagram where each device is connected to the ComPak® unit electrical panel.

Remote Interface Unit (1)

The remote interface unit allows the user to view space temperature, pool water temperature, and relative humidity, change set points, and receive fault notifications. It should be mounted in a convenient location that is outside the pool area. The ambient temperature of the mounting location must always be above 32 F.

NOTE
The maximum distance from the Remote Interface Unit to the ComPak® unit is 1000 feet. For distances greater than 1000 feet, contact the factory.

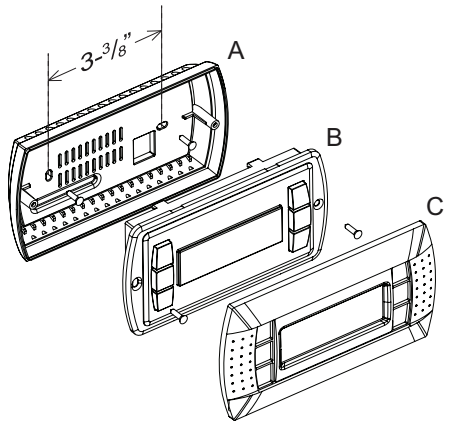
The control panel does not contain any sensors and should be mounted outside the pool enclosure. A factory supplied 6 ft cable RJ25 (6 conductor) must be installed between the ComPak® unit and the control panel.

For distances greater than 6 feet, use 6 conductor, 22 AWG, shielded, twisted-pair cable along with the supplied RJ25 jack and second 6 foot cable shipped loose with the unit.

The wall mounting of the terminal first requires the back piece (A) of the RIU assembly. The RIU is designed to fit a single gang, extra-deep electrical box mounted horizontally in the wall. The RJ25 jack and most of the black cable should be placed inside the box before installing the mounting bracket. A ¾" hole must be drilled for the 6-conductor cable which connects the remote interface unit to the PoolPak® unit. The below is specific mounting instructions that correspond to the mounting schematic below:

1. Fasten the back piece (A) to the gang box using the rounded-head screws supplied in the packaging. Use the screws that come with the box to secure the bracket.
2. Thread the 6-conductor cable through the back piece (A) and connect to the back of front panel (B).
3. Rest the front panel (B) on the back piece A and fasten the parts together using the flush-head screws supplied in the packaging.
4. Finally, fit the click-on frame (C).

Figure 4-5. Remote Interface Mounting Plate



Cold Surface Temperature Sensor (2)

The cold wall temperature sensor is shipped pre-wired and mounted on to the field wiring terminals. This sensor is used to measure the temperature of the coldest surface in the pool enclosure. The sensor is an aluminum bar 1" long by ¼" square with a clearance hole for a number 8 screw and two 6" wires on one end.

When the temperature of the surface drops to within 5 F of the space air dew point the humidity set point will be automatically reset downward to help prevent condensation on the cold surface. It should be noted that resetting the humidity set point will not compensate for lower quality building materials such as single pane glass or non-thermally broken frames.

The sensor should be mounted on an exterior window or door frame that is not in direct sunlight. In cases where there are no exterior windows or doors, the sensor should be mounted on the inside surface of an exterior wall. The sensor must be in contact with the cold surface. Electrical connection should be made with 22 AWG, copper, two-conductor, shielded, twisted-pair cable. Connect the shield drain wire to ground at the ComPak® unit end only.

Economizer System (Optional) (3)

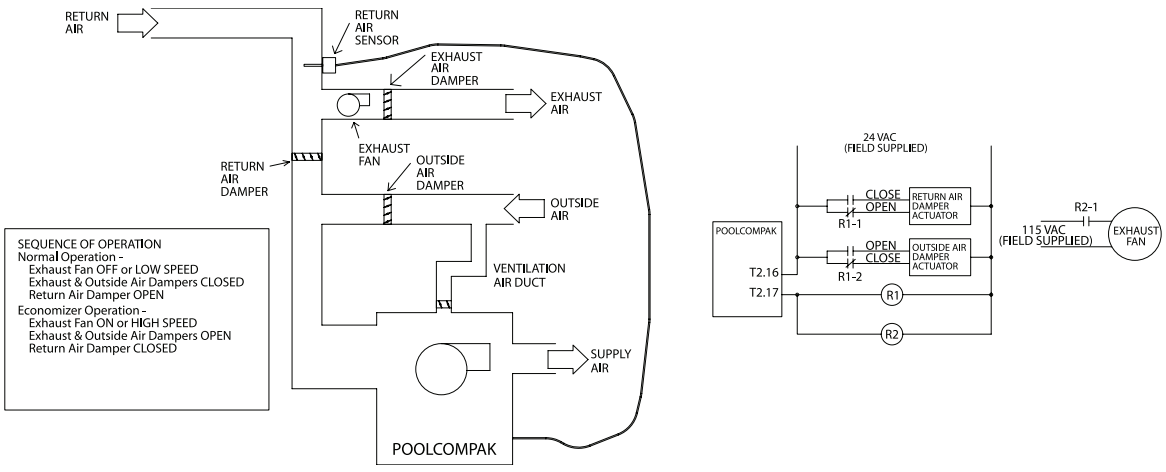
An economizer system cools the space with outside air instead of the compressor. The CPCS-PCP provides a dry contact closure to activate the economizer. The contacts of the CPCS-PCP may be connected directly to the economizer control circuit provided the circuit is 24 VAC maximum and the current does not exceed 1 amp inductive. The other components of the system must be provided by others. (See figure 4-6 below for an illustration of a typical economizer system.)

Units equipped with an economizer require relocation of the factory mounted return air sensor. It must be located in a duct that will always contain air that represents the space temperature and humidity.

The economizer will operate only when space cooling is required and there is no dehumidification requirement. When the outside air temperature is greater than 50°F and more than 5°F below the space temperature set point and the space temperature rises above the set point, the compressor is disabled and a dry contact closure between T2.16 and T2.17 is made to activate the economizer.

When the CPCS-PCP contacts close relay R1 is energized causing the outside and exhaust air dampers (by others) to open and the return air damper (by others) to close. At the same time relay R2 is energized causing the exhaust fan to run. If the space temperature continues to rise and exceeds the space temperature set point by more than two degrees, the economizer contact is opened, reversing the damper positions. The compressor is energized in the space cooling mode (if so equipped). The compressor will then continue to run until the call for space cooling is satisfied. The economizer will also be activated in the space cooling mode if the auxiliary air conditioning condenser option is not installed or if the compressor is locked out by a fault condition.

Figure 4-6. Economizer Operation



⚠ WARNING

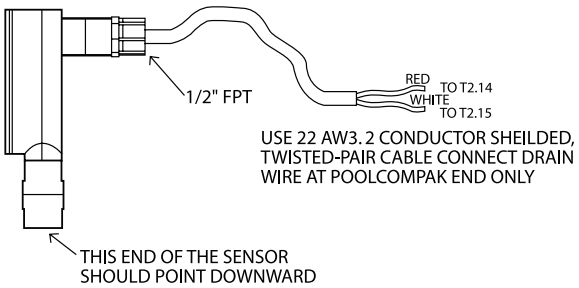
When economizer option is selected, adequate exhaust capacity via a separate fan must be specified to ensure the natatorium pressure remains slightly negative. Failure to specify adequately sized exhaust system may result in damage to structure and pool odors may be forced into other areas of the building.

Outside Air Temperature Sensor (Economizer Option Only) (4)

The outside air temperature sensor is installed only when the outside air economizer option is included. The sensor is mounted inside a 1/2" PVC conduit pull elbow. It can be mounted to the outside of the building using standard PVC conduit fittings. The sensor should be mounted near the outside air intake vent for the economizer system. It is very important to mount the sensor so that it does not receive direct sunlight. The exposure to sunlight will cause the sensor housing to warm, resulting in temperature readings that are higher than the actual air temperature. This condition may prevent the CPCS-PCP from selecting the economizer mode of operation. If possible, mount the sensor under an overhang or on a surface with a northern exposure.

Electrical connection should be made with 22 AWG, copper, 2-conductor, shielded, twisted-pair cable. Connect the shield drain wire to ground at the ComPak® end only. See figure below for an illustration of the outside air temperature sensor. Seal the conduit leading to the sensor with silicone caulk to prevent moisture from migrating out to the sensor and condensing inside the sensor.

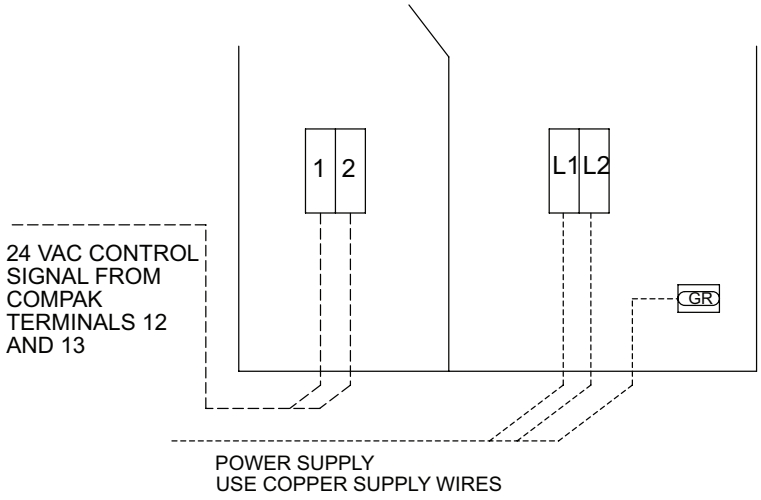
Figure 4-7. Outside Air Sensor



Air Cooled Condenser (Optional) (5)

The air-cooled condenser is used to reject heat recovered during the space cooling mode of operation. Only ComPak® brand air-cooled condensers (PAC Units) should be used with a ComPak® Unit. The CPCS-PCP provides 24 VAC control signal to the speed control located in the PAC unit control panel. The speed control then runs the condenser fan motor at the appropriate speed. See figure below for an illustration of a PAC unit field wiring.

Figure 4-8. PAC Unit Field Wiring



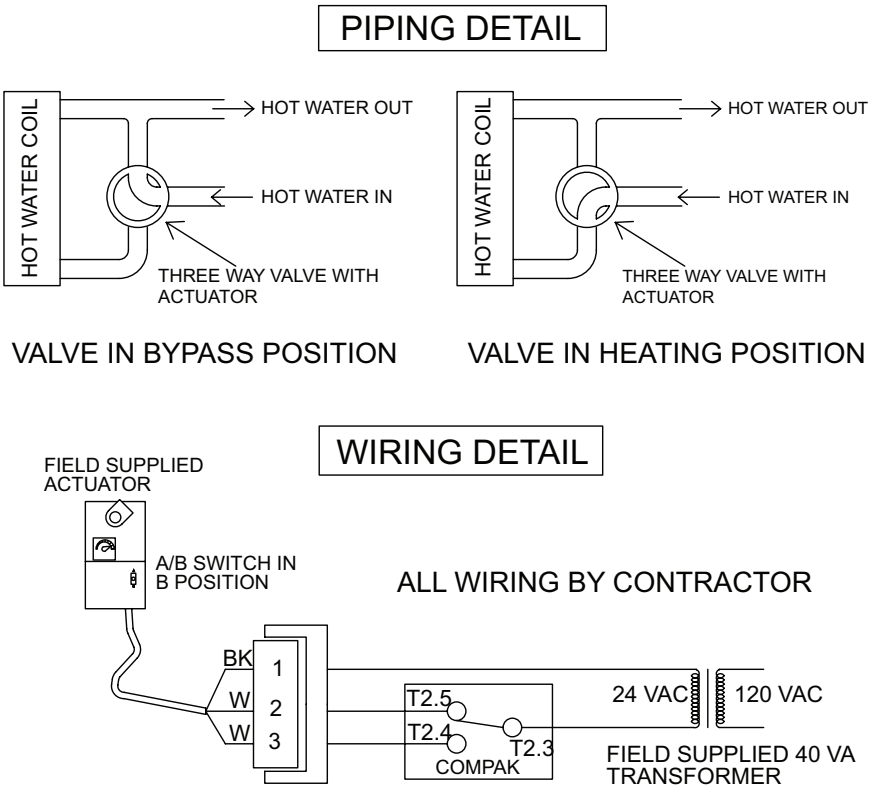
Auxiliary Pool Water Heating System (AWH Model only*) (6)

The auxiliary pool water heating system is provided by others. Typically a gas fired or electric pool water heater is used. The CPCS-PCP provides a dry contact closure that signals a need for auxiliary water heating. The contacts of the CPCS-PCP may be connected directly to the heater's control circuit provided the circuit is 24 VAC maximum and the current does not exceed 1 amp inductive. Any other applications will require an additional relay (by others) to be installed between the CPCS-PCP and the pool water heating system.

Auxiliary Air Heating System (7)

Typically a duct mounted electric heater, hot water coil or a factory installed unit mounted hot water coil is used to provide air heating. The CPCS-PCP provides a form "C" (NO and NC) dry contact closure that signals a need for auxiliary air heating. The CPCS-PCP contacts may be directly connected to an electric duct heater control circuit provided the circuit is 24 VAC maximum and the current through the contacts does not exceed 1 amp inductive. Figure 4-9 shows a typical installation that utilizes a 3-way hot water control valve and a unit or duct mounted hot water coil.

Figure 4-9. Installation of a Hot Water Coil 3-Way Valve



External Alarm System (8)

The CPCS-PCP provides a normally open contact closure for connection to a building management system. If a fault occurs, the controller will energize this output to indicate that there is a problem with the dehumidification system. The remote interface unit will display the cause of the fault and provide a suggested course of action. This output may also be used to energize an external alarm light or buzzer. It may also be directly connected to an external circuit as long as the circuit is 24 VAC maximum and the current through the contacts does not exceed 1 amp inductive.

Building Fire Control System (9)

The CPCS-PCP can receive a contact closure signal from a building fire control system. This input of the controller must be connected to dry (voltage free) contacts only. When this input receives a contact closure, the ComPak® unit compressor and fan will be shut down and the remote interface unit will show an alarm condition. When the contact closure opens, The ComPak® unit will resume normal operations. It is possible to change the operation of the fire trip input to be active on open instead of close. See CPCS-PCP Service in the Operation section for further explanation.

Return Air Sensor (10)

The return air sensor measures air temperature and relative humidity. The sensor is normally factory mounted in the ComPak® unit return air section. However, with the optional economizer it is necessary to field mount this sensor in the duct work. The sensor must be located in the return duct upstream of the exhaust duct connection. *(See Figure 4-6. Economizer Operation* for a typical location of the sensor in the economizer system.)

When field mounting is necessary, the sensor will be provided from the factory and must be field wired using 22 AWG, copper 4-conductor, shielded, twisted-pair cable.

Purge Mode Input (11)

The CPCS-PCP can receive a contact closure signal from an external source to activate purge mode operation. During purge mode, the compressor is disabled and the economizer output is activated to bring in 100% outside air.

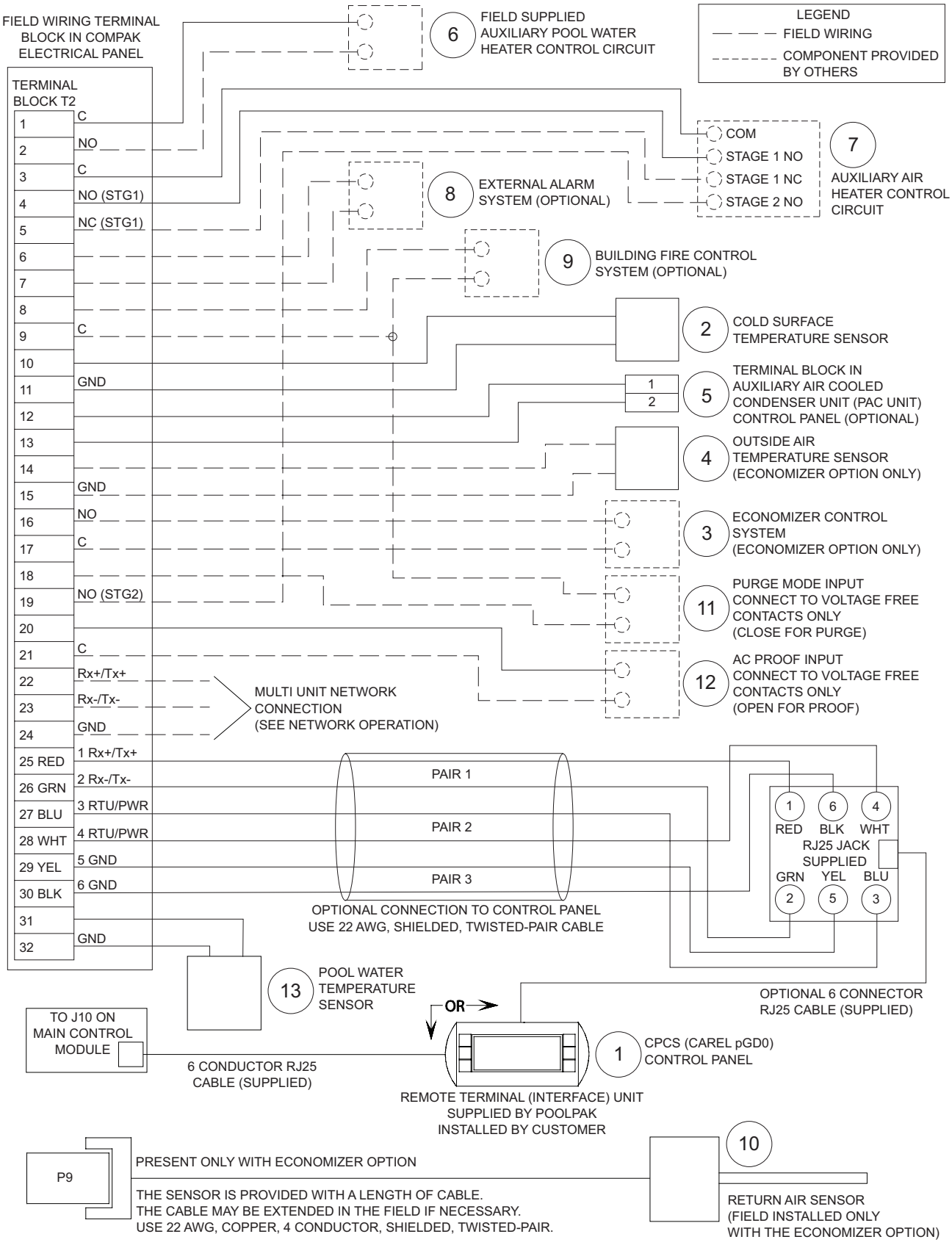
AC Proof Input (12)

An optional interlock used with certain types of heat rejection condensers. Dry contact closure indicates a problem and prevents compressor operation in air cooling mode.

Pool Water Temperature Sensor (13)

Units equipped with a pool water heating condenser require installation of factory supplied pool water temperature sensor. It must be mounted upstream of the ComPak® and the auxiliary water heater. The sensor can be threaded directly into a 1/4" FPT fitting. Electrical connection should be made with 22 AWG copper, 2 conductor, shielded, twisted-pair cable. Connect the shield drain wire to ground at the ComPak® end only.

Figure 4-10. Field Wiring Schematic



Pool Water Piping (AWH and AWV models only*)

⚠ CAUTION

Do not run piping across service panels, evaporator coil face or air discharge outlet.

If a new or existing pool water heater is piped within the same circuit, the ComPak® unit should be connected in a parallel loop between the filter and the other heater. This allows the ComPak® unit to act as the primary water heating source and the other heater as a backup or supplemental water heater.

All pool purification and chemical feed systems MUST be installed downstream of the unit. See Figure 4-11 for typical water piping illustration. This includes the practice of adding chemicals directly to the skimmer which results in highly concentrated, corrosive chemicals passing over and through the ComPak® water condenser. Water chemistry must be maintained at a pH level between 7.2 and 7.6, with a free chlorine level not exceeding 3.0 PPM and a combined chlorine level less than 0.3 PPM.

If possible, install the ComPak® unit above the pool water level. If it is installed below the pool level, isolation valves must be added. Breakable couplings should be located near the unit on both the water inlet and outlet lines. When installing piping, connect the piping to these couplings last so as not to place stress on the other connection in the plumbing system.

A constant flow of water is required through the ComPak® units' condenser. The circuit to and from the unit must be capable of maintaining the flow rate as specified for the installed unit (see ComPak® AW Performance in *Table 3-1*). To ensure correct water flow, the filter pump usually operates at the same time as the ComPak® unit. However, to reduce energy consumption during filter off cycle times, a two-speed or small auxiliary water pump which bypasses the filter may be used.

⚠ CAUTION

CAUTION! Excessive water flow can cause premature erosion and pitting of the pool water condenser. Adjust valve so that the water flow does not exceed the GPM or pressure drop listed in the table. PoolPak® recommends a fixed flow control or adjustable flow circuit setter.

PoolPak recommends installing water pressure tap ports to check influent and effluent water pressure. See ComPak® AW Performance in *Table 3-1* for the particular unit model in question for the proper flow rate and pressure drop across the pool water condenser. The pressure tap ports should be installed in a straight length of the water piping, exterior to the ComPak® unit. Install the port before any 90-degree turns and approximately 6 inches from the corner-post of the unit.

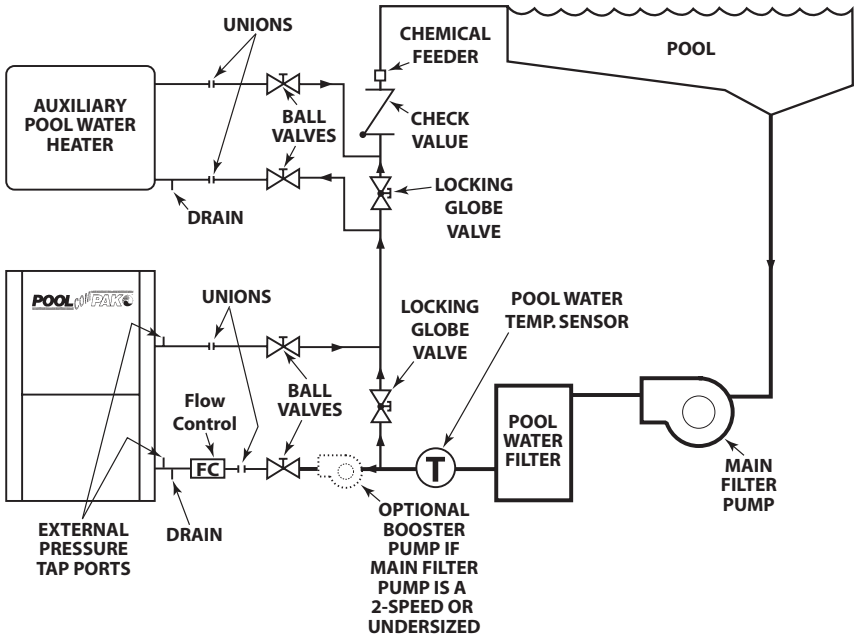
In some instances, piping from the ComPak® unit to the filter return line may not be feasible or economical. The unit may be installed on its own supply and return line using a properly sized water pump and appropriate strainer. Ensure that auxiliary water heating systems are staged to supplement the ComPak® unit water heating.

If the ComPak® unit is installed above the pool surface and the main circulating pump cannot provide the proper water flow to it at the specified pressure, an auxiliary booster pump is required.

Condensate may be returned to the pool (if local codes allow), but PoolPak® LLC neither recommends nor disapproves this practice. The installer should check local codes prior to making this decision. Condensate must be filtered prior to being returned to the pool.

If multiple ComPak® units are installed on the pool water piping circuit, pipe them (and any auxiliary water heater) in parallel. Piping ComPak® units in series may result in the downstream unit(s) sensing the pool water temperature as satisfied and not reject heat to the water to its full capacity. The actual pool water temperature should be sensed by each ComPak® unit and auxiliary water heater.

Figure 4-11. Typical Pool Water Piping Diagram (AWH and AWV Model Only)*



Salt Water Pools

For units (AW models only) installed serving a salt water pool, wire the pool bonding system to the bonding lug on the unit copper pool water piping. This connection is required to prevent corrosion of the internal ComPak® water piping.

For more information on salt water pools, see the article "Salt Water Pools"_*in the Pool Water Chemistry section of the PoolPak educational library.*

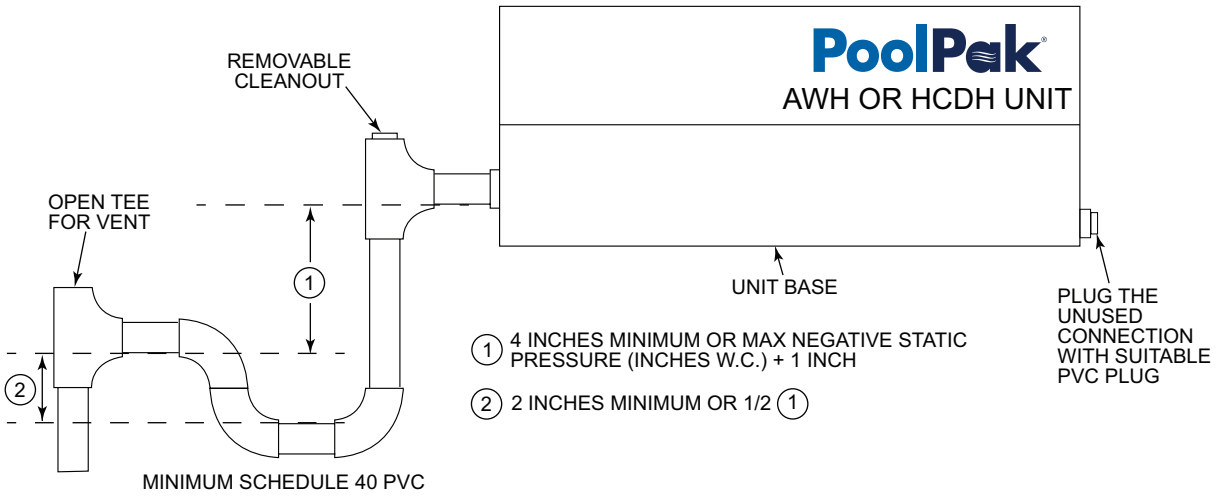
Condensate Drains

Drain pans are connected to a common drain system and must be trapped for proper operation. For AWH and HCDH units, a trap and piping must be supplied and installed by the customer. The trap depth must be a minimum of 6 inches *(See Figure 4-12).* For AWV and HCDV units, a condensate trap is located inside the unit and the field condensate piping and overflow drain must not have an additional trap.

Provisions MUST be made for disposal of condensate. Condensate from the dehumidifier coil will have nearly the same properties as the pool water itself. It is recommended that building materials subjected to the condensate and systems used for its disposal are checked for compatibility. For drain piping use PVC plastic pipe minimum Schedule 40. The drain line must be sloped to provide proper drainage.

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

Figure 4-12. AWH and HCDH Condensate Trap



Water Cooled Condenser

A standard option for ComPak® units is an integral water-cooled condenser. For this option, all valves and refrigerant piping is internal to the unit. No additional field wiring is required. No additional refrigerant or oil charge is required. Water piping connections are 1-1/4" MPT and labeled on the unit.

Remote Air-Cooled Condenser Installation

Space and Location Requirements

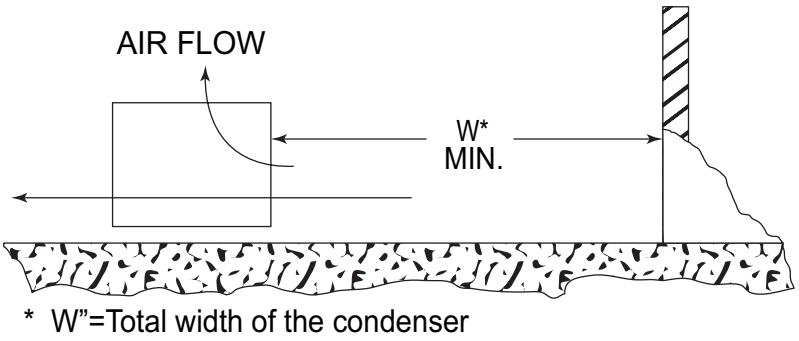
The most important consideration which must be taken into account when deciding upon the locations of air-cooled equipment is the provision for a supply of ambient air to the condenser, and removal of heated air from the condenser area. Where this essential requirement is not adhered to, it will result in higher head pressures, which cause poor operation and possible eventual failure of equipment. Units must not be located in the vicinity of steam, hot air, or fume exhausts.

Another 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. 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.

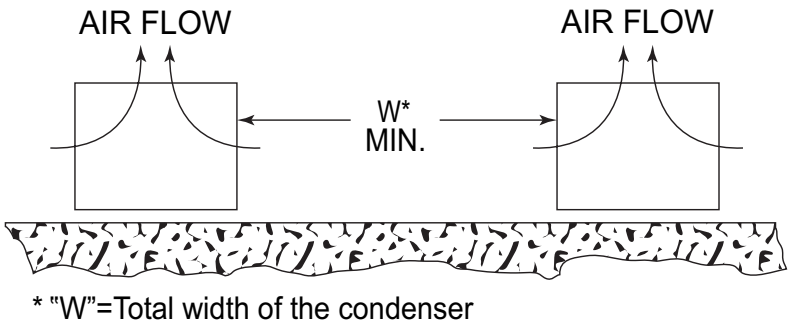
Figure 4-13. Remote ACC Installation Around Walls or Obstructions



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.

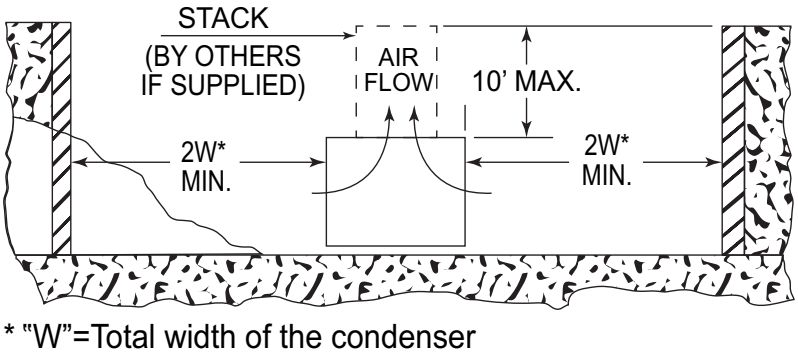
Figure 4-14. Remote ACC Installation When Installing Multiple Units



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.

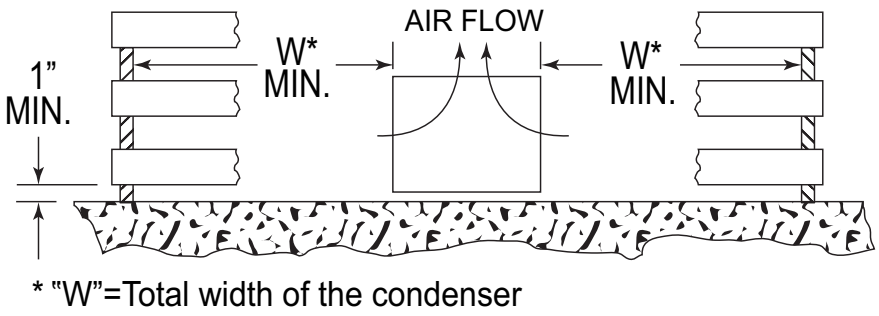
Figure 4-15. Remote ACC Installation When Installing Units in Pits



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 4-16. Remote ACC Installation When Installing Units Near Decorative Fences



Field Installed Piping

Installation of the outdoor 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 procedural 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.

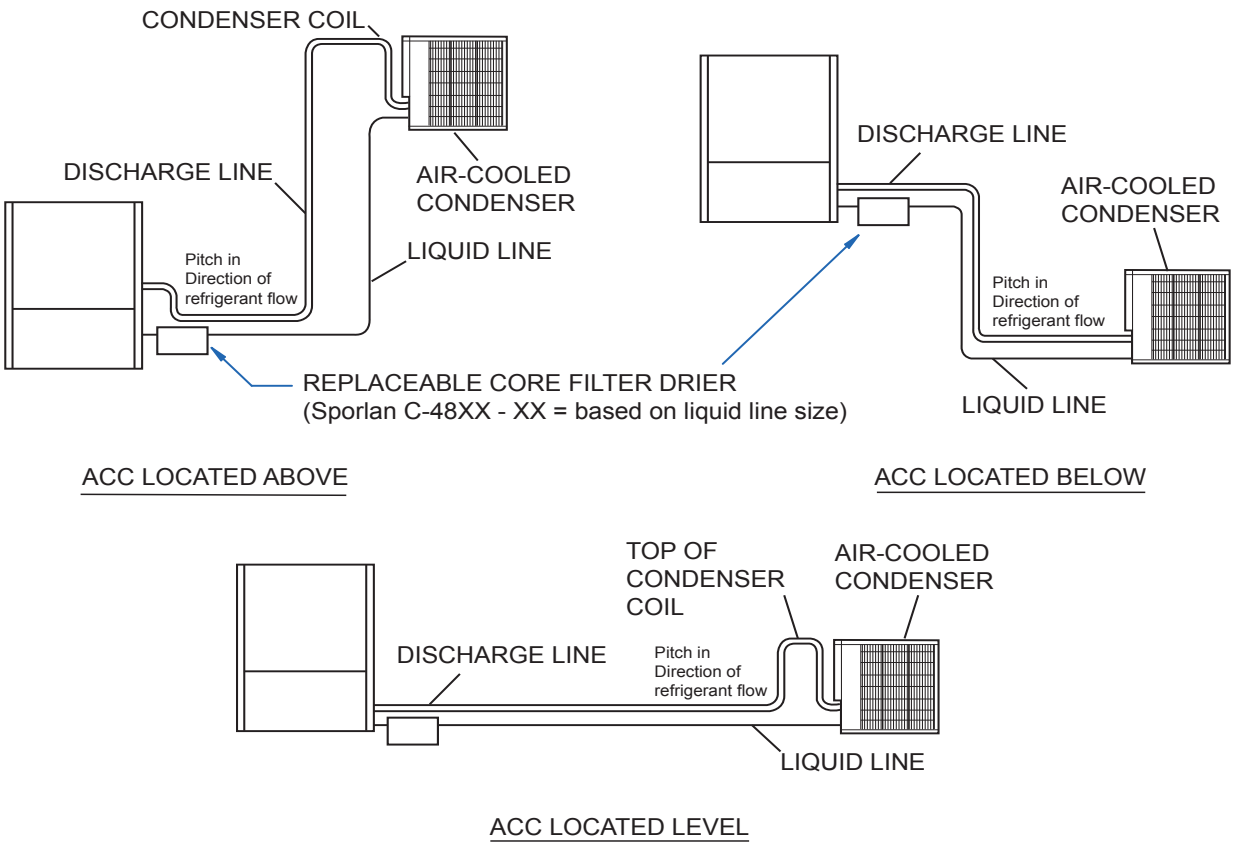
Materials:

- 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.
- ComPak® 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 recommended in the field piping to the ComPak® 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 hot gas and liquid line sizes recommended in the Air Cooled Condenser section 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.
  - The hot gas line should loop toward the floor if the condenser is located above the ComPak® unit, especially if the hot gas riser is long.

Figure 4-17. ACC Refrigerant Piping



- For refrigerant line sizing for an Air Cooled Condenser (ACC) where the lineset length is less than 100 feet or the ACC location is less than 50 feet higher or 20 feet lower than the unit, use the below *Table 4-2.*
- **ACC line lengths beyond the above limits will void warranty unless written approval is obtained from the factory PRIOR to installation and startup.**

Refrigerant and Oil Charging:

- PoolPak® units are shipped with the required charge for self contained operation only. The remote ACC option does NOT provide the refrigerant charge or oil required for the ACC and line sets.
- Refer to *Table 4-2* for the additional ACC condenser charge.
- Refer to *Table 4-3* for the required additional oil and refrigerant charge. Use the calculation method shown to calculate the additional refrigerant and oil.
- For the additional oil required, multiply 2% of additional refrigerant charge of both ACC and refrigerant line length. Use the correct oil type of POE oil depending on the compressor installed:
- For Alliance models SXA, SPA, SSA compressors, use Copeland Ultra P/N 998-E022-00
- For Trane models CSHD compressors, use Trane P/N OIL00080

Sample Charging Calculation:

For an AWV2600 with 73 feet line length and ACC0121 located 30 feet above the unit,

- Table 4-3 indicates: 3/4" discharge line and 5/8" liquid line piping sizes.
- Using R410A oz/ft, additional charge for the lineset is: 73 feet x 0.25 oz/ft + 73 feet x 1.48 oz/ft = 126.0 oz
- Table 4-2 indicates additional charge for ACC0121 (allow 30 F Operation) is: 39 lb x 16 oz/lb = 624.0 oz
- Total additional R410A charge for both ACC and refrigerant line is: 126.0 + 624.0 oz = 750 oz or 46 lbs 14 oz
- Total additional oil charge is: 750 oz x 2% = 15 oz.

Table 4-2. R410A Charge for Air Cooled Condensers (lb.)

ACC MODEL #	30°F AMBIENT OPERATION (LB)
ACC0041	8.8
ACC0051	10.1
ACC0081	19.6
ACC0121	39.0
ACC0161	39.0
ACC0211	30.9
ACC0301	25.6
ACC0341	35

Table 4-3. Refrigerant (R410A) Charge for Different Line Size

MODEL		REFRIGERANT LINE SIZE (ACC)				REFRIGERANT CHARGE FOR UNITS WITH AIR COOLED CONDENSERS (ACC)							
		DISCHARGE		LIQUID		LINE LENGTH (FT) VS R410A CHARGE (LBS)							
		OD	R410A OZ/FT	OD	R410A OZ/FT	25 FT		50 FT		75 FT		100 FT	
						LBS	OZ	LBS	OZ	LBS	OZ	LBS	OZ
0550	*	1/2	0.10	3/8	0.49	0	15	1	14	2	13	3	12
	**	5/8	0.16	1/2	0.92	1	11	3	6	5	1	6	13
0800	*	5/8	0.16	3/8	0.49	1	0	2	1	3	1	4	2
	**	5/8	0.16	1/2	0.92	1	11	3	6	5	1	6	13
1200	*	5/8	0.16	1/2	0.92	1	11	3	6	5	1	6	13
	**	3/4	0.25	5/8	1.48	2	11	5	6	8	1	10	13
1400	*	5/8	0.16	1/2	0.92	1	11	3	6	5	1	6	13
	**	3/4	0.25	5/8	1.48	2	11	5	6	8	1	10	13
1800	*	3/4	0.25	1/2	0.92	1	13	3	10	5	8	7	5
	**	7/8	0.34	5/8	1.48	2	14	5	11	8	9	11	6
2600	*	3/4	0.25	5/8	1.48	2	11	5	6	8	1	10	13
	**	1 1/8	0.58	3/4	2.21	4	6	8	12	13	1	17	7
3500	*	7/8	0.34	5/8	1.48	2	14	5	11	8	9	11	6
	**	1 1/8	0.58	7/8	3.07	5	11	11	7	17	2	22	13
4000	*	7/8	0.34	3/4	2.21	3	16	7	16	11	15	15	15
	**	1 1/8	0.58	7/8	3.07	5	11	11	7	17	2	22	13

Note:

1. This table applies to ACC line length less than 100 ft only. Contact factory if ACC line length is more than 100 ft.
2. Line size ** should be used for ACC at the same level or located up to 20ft below the unit
3. Line size * should be used for ACC located up to 50 ft above the unit.

⚠ 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

CPCS-PCP Configuration

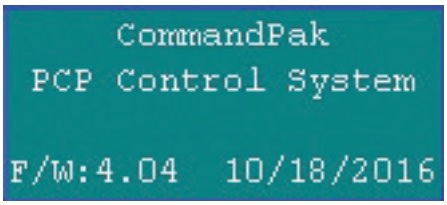
Figure 5-1. RIU Keypad

CPCS-PCP Remote Interface Unit

The CPCS-PCP Remote Interface Unit (RIU) is designed around the Carel pGD0, 4-line x 20 character, backlit, LCD display module. The RIU displays are accessed through six backlit selection buttons. They consist of a Return/ Enter Key, Up Key, Down Key, Program Key, Alarm Key, and Escape Key, as shown above.

After application of power to the ComPak® Control System, a "self-test, please wait…" image will appear for approximately 3 to 5 seconds followed by an initial startup screen as shown below.

Figure 5-2. Initial Startup Screen

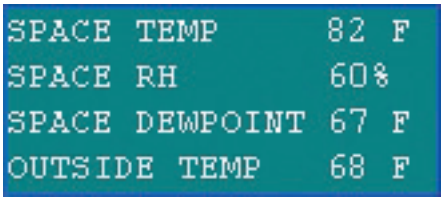


After approximately 5 minutes, the RIU will display the status screen rotation. Press the Escape key to bypass the five minute delay and move directly to the status display.

Status Display

The status screens contain basic information about operation of the ComPak® system. Press the up or down arrow keys to move from screen to screen. The screens will also rotate automatically every 10 seconds.

Figure 5-3. Status Screen 1



Status Screen 1 displays:

- Space Temperature in °F or °C
- Space Relative Humidity in %
- Space Dew Point in °F or °C
- Outside Air Temperature in °F or °C (with Economizer Option Only)

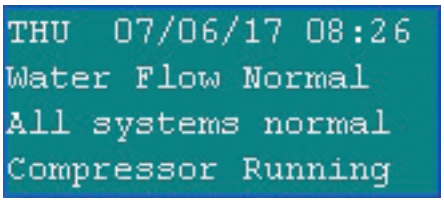
Status Screen 2 displays:

- Water Heating - YES or NO
  - YES indicates that the unit is returning recovered heat back to the pool water.
- Aux Water Heat - YES or NO
  - YES indicates that the controller has closed the relay contact requesting auxiliary pool water heater operation.
- Water Temperature in °F or °C

Status Screen 3 displays:

- SPACE temperature control requirement:
  - TEMPERATURE- OK Indicates the space temperature is at setpoint.
  - HEATING- YES Indicates the space requires heating.
  - COOLING- YES Indicates the space requires cooling.
- AUX AIR HEAT- YES or NO Indicates the space requires additional heating. The auxiliary air heating relay contacts close to activate the external heating system.
- DEHUMID (SURFACE) - YES or NO Indicates the space requires dehumidification. The word SURFACE indicates that the unit is temporarily lowering the dew point set point to minimize condensation at the cold surface temperature sensor.
- ECONOMIZER MODE- YES or NO Indicates the unit is cooling the space with outside air. ECONOMIZER MODE is only shown if the optional economizer system is present.

Figure 5-4 Status Screen 4



Status Screen 4 displays the current system status as follows:

- Line 1: Day, Date and Time
- Line 2: Pool water flow status for units configured as full pool water heating. Possible text values include:
  - Water Flow Normal
  - Water Flow Too Low
- Line 3: Text relating the current active fault code. Possible text values include:
  - All systems normal
  - Unit is in OFF mode
  - Sys Startup Active
  - Fan Motor Overload
  - Fire Trip Active
  - Abnormal Space Temp
  - Defrost Switch Open
  - Cmpr Low Pressure
  - Cmpr High Mtr Temp
  - Cmpr High Pressure
  - Space T Sens Fail
  - Space RH Sens Fail Pool T Sens Fail
  - Outs T Sens Fail

  - Surf T Sens Fail
  - Self Diagnostic Fail
  - 10 Fault Lockout
- Line 4: Compressor status indication. Possible values include:
  - Compressor Off
  - Compressor Running
  - Compressor Delay Act
  - Pool T Sens Fail
  - Outs T Sens Fail
  - Surf T Sens Fail
  - Self Diagnostic Fail
  - 10 Fault Lockout
- Line 4: Compressor status indication. Possible values include:
  - Compressor Off
  - Compressor Running
  - Compressor Delay ActSet Point Change Menu
- Press the PRG key to access the main menu.
- Use the arrow keys to scroll to the menu selection for Set Points and then press the Enter key.
- Use the arrow keys to select the set point to be changed and then press Enter. Available set points are shown in the following examples:

AIR TEMPERATURE

Figure 5-6. Air Temperature Selection on the Set Points Menu

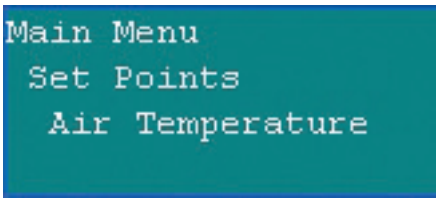
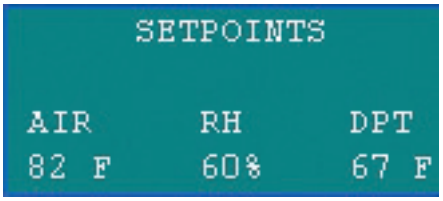


Figure 5-7. Air Temperature Set Point Change Screen



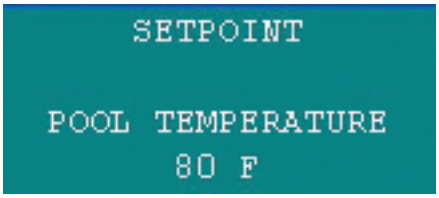
For air temperature set point, use the arrow keys to change the set point and then press Enter. The new dew point set point is shown immediately as DPT. The set point change screen will remain visible for a short time to allow verification of the new dew point set point. After about five seconds, the RIU will return to the status screen display.

RELATIVE HUMIDITY

For relative humidity set point, use the arrow keys to change the set point and then press Enter. The new dew point set point is shown immediately as DPT. The set point change screen will remain visible for a short time to allow verification of the new dew point set point. After about five seconds, the RIU will automatically return to the status screen display.

POOL TEMPERATURE

Figure 5-8. Pool Temperature Set Point Change Screen



For pool water temperature set point, use the arrow keys to change the set point and then press Enter. The RIU will automatically return to the status screen display.

RECOMMENDATIONS:

> ⚠ CAUTION
>
> The dehumidifier should be configured to operate at the set points designed for the facility. These set points are shown on the yellow label on the door of the RIU. Set points other than those shown may not be attainable with this dehumidifier.

- Air Temperature (Range 70˚F to 95˚F) The air temperature should normally be set about 2˚F above the pool water temperature to minimize the pool water evaporation rate (high temperature spas are an exception).
- Relative Humidity (Range 40% to 65%) The normal range for the humidity set point is 50% to 60%. Lower set points will require more energy (electricity) to satisfy the dehumidification requirement and increase pool water evaporation.
- Pool Temperature (Range 70˚F to 104˚F) The pool temperature set point is normally set between 80˚F and 88˚F for a typical swimming pool and higher for a spa, depending on user preference.

Purge Mode Control Menu

> ⚠ CAUTION
>
> TIt is the user's responsibility to use this feature properly to prevent freeze damage to downstream equipment. 100% outside air at below freezing conditions has the potential to cause serious damage.

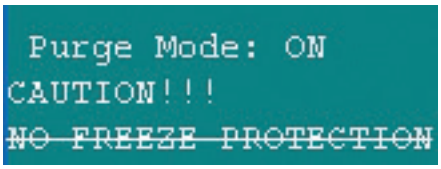
Purge Mode causes the unit to force the optional, field-provided, economizer dampers and fan to full open, introducing large quantities of outside air to the space. This is typically used when "shocking" the pool. Compressor operation is disabled during purge, but the auxiliary air and water heating systems remain active.

To access the purge mode control menu:

- Press the PRG key to access the main menu.
- Use the arrow keys to scroll to the menu selection for Purge Mode and then press the Enter key.
- To activate purge mode, press the enter key to move the cursor to the OFF/ON parameter.
  - Press the Up or Down key to toggle the value to ON.

If the unit is not equipped with the economizer option, a flashing "CAUTION!!! NO FREEZE PROTECTION" warning will be displayed. This warning indicates that operation of purge mode, without regard for outside air temperatures below freezing, can result in damage to hot water coils or other equipment in the pool area.

Figure 5-9. Purge Mode Freeze Caution Screen

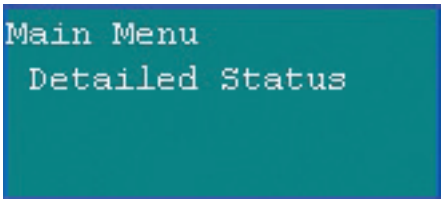


Detailed Status Menu

To access the detailed status menu:

- Press the PRG key to access the main menu.
- Use the arrow keys to scroll to the menu selection for Detailed Status and then press the Enter key.

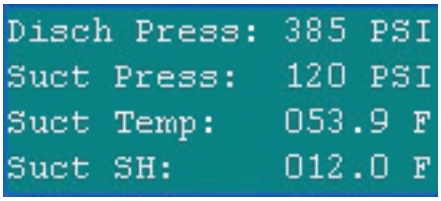
Figure 5-10. Detailed Status Menu



Detailed Status Screen 1 display temperatures:

- Surface – The temperature measured at the cold surface sensor.
- Dew Point – The calculated dew point of the space.
- Dewpt Setpoint – The dew point set point calculated from the temperature and relative humidity set points.

Figure 5-11. Detailed Status Screen 2



Detailed Status Screen 2 display run hours:

- Disch Press – The measured refrigerant pressure in the discharge line at the compressor.
- Suct Press – The measured refrigerant pressure in the suction line at the compressor.
- Suct Temp – The refrigerant temperature measured on the surface of the suction line at the compressor.
- Suct SH – The calculated superheat at the suction of the compressor.

Detailed Status Screen 3 display refrigeration system status:

The number of hours the following device or system has been active since power was last applied to the unit:

- Cmpr - Compressor
- Fan – Supply Fan
- A/C – Mechanical Air Cooling (Economizer Cooling Not Included)
- Aux – Air – Auxiliary Air Heating
- Aux - Wtr – Auxiliary Water Heating

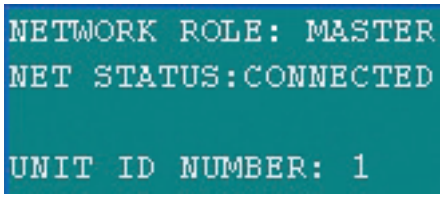
Detailed Status Screen 4 displays:

- Fault Count – The total number of high pressure, low pressure, and defrost trips that have occurred since power was last applied to the unit. When this number reaches 10, the compressor is locked out.
- AC Proof – Indicates a status of "Proven" if AC mode operation is allowed. "Not Proven" indicates that AC mode operation is not allowed.

Detailed Status Screen 5 is only present in units configured for multi-unit networking. It displays the following:

- Network Role – Indicates if the unit currently being displayed by the RIU is the master or a slave.
- Net Status – Indicates "CONNECTED" if the unit is properly connected to the multi-unit network. "NO LINK" indicates the unit is not connected.
- Unit ID Number – Indicates the unit address on the multi-unit network.

Figure 5-12. Detailed Status Screen 5



Detailed Status Screen 6 is only present in units configured for multi-unit networking. It displays the following:

- Unit 1 Present – Indicates if the unit currently being displayed by the RIU can communicate with unit 1 on the multiunit network
- Unit 2, 3, 4 – Same as for unit 1, but for the other 3 possible units on the network.

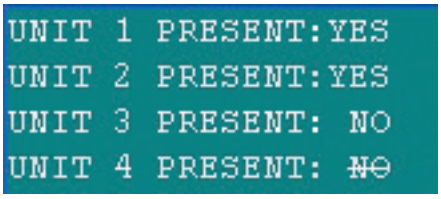
CPCS-PCP Network Operation

Networked CPCS-PCP units operate in a MASTER/SLAVE environment. This means that one unit (master) determines heating, cooling, and dehumidification requirements and broadcasts them on the network to the other units (slaves). This ensures that all units work together instead of against other. Each networked unit contains all sensor and controls necessary for independent operation and is capable of acting in the master role. Units on the network are identified by a number between one and four. The unit with the lowest identification number having no uncleared alarms will be the master unit.

If an alarm condition occurs in the master unit, it will give up the role of master. The unit with the next lowest identification number and no unclear 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 control panel.

A single control panel is used to monitor all units on the network. Starting with detailed status screen 5 to identify the unit currently being monitored, Press and hold the `esc' key and use the `up arrow' key to get to the next unit. Return to detailed status screen 5 to verify that the correct unit has been chosen. For the standard configuration, all set points can be changed while the remote interface unit is displaying any unit. The set point is automatically updated in every unit on the network. Other configurations may require the remote interface unit to be displaying a particular unit to change the set point.

Figure 5-13. Unit Present Screen



The control panel provides two network status screens. These can be accessed in the detailed status menu. The figure above shows the first screen that displays the status of units one through four as present or not. Use this screen to verify that all units on the network are connected and communicating with each other. The figure below shows the second screen that displays network information for the unit that is being displayed by the remote interface unit, including network role, connection status and network identification number.

Network Configuration

Using the following four parameters, it is possible to configure the CPCS-PCP network to accommodate a wide variety of installation options. Network configuration can be accessed in the service menu in MultiUnit Network. These parameters must be set in each unit individually. Default values are shown in bold type.

POOL WATER TEMPERATURE CONTROL - LOCAL OR NETWORK.

Determines whether the unit will control water temperature based on the master's command (NETWORK) or its own temperature sensor and set point (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. They will look to the next line that is not set to LOCAL. This parameter is only set to LOCAL 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 control panel before changing the water temperature set point.

STAGED DEHUMIDIFICATION CONTROL - YES OR NO

Determines whether the unit will run in dehumidification when there is a need for 1 stage or 2 stages of dehumidification. The master unit will start on any need for dehumidification independent of this parameter. Slave units with this parameter set to YES will dehumidify only if the master is asking for 2 stages of dehumidification. Setting this parameter to NO will cause the unit to dehumidify when the master calls for at least 1 stage of dehumidification. Using this parameter, it is possible to configure the number of units in each dehumidification stage.

DEHUMIDIFICATION STAGE 2 OFFSET (IN DEGREES OF DEW POINT) - 0 TO 9.9°F (4.0°F).

Determines how far humidity of the space has to rise above the set points before the unit will request 2 stages of dehumidification on the network. This parameter is normally the same in all units on the network. Making this parameter smaller will bring on the second stage of dehumidification sooner.

ENABLE NETWORK CONTROL - 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 CPCS-PCP single unit. The unit will never become the master on the network and will not listen to the demands broadcast by the master on the network. Although units with this parameter set to NO do not participate in the master/slave environment, they are still accessible through the network control panel. Like the LOCAL pool water temperature setting, this parameter, when set to NO, requires this unit to be displayed on the control panel before changing any of the set points. The other screens for Pool Water Temperature Control, Staged Dehumidification, and Stage 2 Offset are not available when this parameter is set to NO.

CHANGING SET POINTS

Each unit on the network maintains two groups of set points, network and local. If a unit has the Enable Network Control parameter set to YES and the Water Temperature Control parameter set to NETWORK, it will control to the network set points. Set points changed when the remote interface unit is displaying this unit will be changed in every unit on the network with the same NETWORK and Water Temperature Control parameters. Units that are configured for Network

Control and LOCAL water temperature control will control using local water temperature set point, the network air temperature and relative humidity set points. When the air temperature and relative humidity set points are changed when the remote interface unit is displaying the unit, they will be changed in all units configured for Network control. The water temperature set point will only be changed in the unit currently being displayed by the remote interface unit. Units that are not configured for Network Control will use all local set points. Therefore any set points changed while the remote interface unit is displaying this unit will only be changed in this unit.

CPCS-PCP Service

Service Menu

⚠ WARNING!

These instructions are for use by a qualified HVAC service technician only. Improper use of the parameters in this menu will cause poor operation and possibly hazardous conditions.

To access the service menu:

- Press the PRG key to access the main menu.
- Use the arrow keys to scroll to the menu selection for Service and then press the Enter key.
- A password is required to access the service menu. Use the up and down arrow keys to set the password to 0005. Press the enter key to accept.

Service menu navigation is similar to that described above for set point changes.

- Use the up and down arrow keys to select a sub-menu or parameter.
- Press Enter to accept the selection.
- To return to the previously selected parameter, press the Escape key.
- To completely exit the menu, press the Escape key repeatedly until the status screens are shown.

The following sub-menus are available in the service menu:

- I/O Configuration 🔑
  - Digital Inputs
  - Digital Outputs
  - Analog Inputs
- Unit Configuration 🔑
  - Installed Options
  - Aux Air Heating
  - Aux Water Heating
  - Temperature Ctrl
  - Humidity Control
  - Water Temp Ctrl
  - BAS Interface
  - Multi-Unit Network
  - Compressor
  - Economizer
- History
- Manual Mode 🔑
  - Demand Control
  - Digital Outp Ctrl
- Utilities 🔑
  - Units of Measure
  - Passwords

🔑 Some service sub-menus above require an additional password. For these menus, use the arrow keys and enter a password of 9995.

⚠ WARNING!

I/O configuration parameters allow inputs and outputs to be forced to the selected state. Improper use or settings will cause poor operation and possibly hazardous conditions.

I/O Configuration

Digital Inputs

This menu contains a screen for each digital input. Each screen contains the following parameters:

- Status of the data point linked to the input. This read-only value is shown as Active or Inactive.
- Status of the raw digital input. This read-only value is shown as Active or Inactive.
- Input type. This configurable value can be set to active on Open or Close.

The following parameter list shows the available digital input screens and the default value of the Input Type for each.

- Defrost Switch – Active on Open
- Cpr High Temp – Active on Open
- Water Flow – Active on Close
- Fire Trip – Active on Close
- AC Proof – Active on Open
- Cpr High Prs – Active on Open
- Fan Overload – Active on Open
- Low Pressure – Active on Open
- Purge Input – Active on Close

Digital Outputs

This menu contains a screen for each digital output. Each screen contains the following parameters:

- Current output status – This read-only parameter is shown as On or Off.
- Requested output status – This read-only parameter is shown as On or Off.
- Override – This configurable parameter can have three different states:
- Auto – Default value for normal operation.
- Off – Force the digital output to the off state.
- On – Force the digital output to the on state.

The following digital output screens are available:

- Supply Fan
- Compressor
- Bypass Solenoid
- Water Heating Solenoid
- Reheat Solenoid
- AC Solenoid
- Aux Water Heat
- Alarm Output
- ACC Run Signal
- Economizer
- Aux Air Heat Stage 1
- Aux Air Heat Stage 2

Analog Inputs

This menu contains a screen for each analog input. Each screen contains the following parameters:

- Current read-only value from the input.
- Fail – This read-only parameter indicates a failed sensor as Y or N. Y means the value read from the sensor is too far outside of the expected range. Where applicable, the value shown in parenthesis indicates whether or not the control logic should react to a failed sensor.

- Tol – Indicates how far outside of the Min – Max range the value can be before the sensor is flagged as failed.
- Offs – This parameter can be used to calibrate the sensor to a known standard. The signed value of this parameter is added to actual value read from the sensor.
- Ovrd – This parameter can be used to override the value read from the sensor. When set to a non-0.0 value, the control logic will use this parameter instead of the value read from the sensor.
- Min – For thermistor inputs, this parameter indicates the low end of the expected range for the sensor value. For a 4-20mA input, the value of this parameter indicates the sensor value at 4 mA.
- Max - For thermistor inputs, this parameter indicates the high end of the expected range for the sensor value. For a 4-20mA input, the value of this parameter indicates the sensor value at 20 mA.

The following analog input screens are available. Factory default values are shown for non-zero parameters:

- Discharge Pressure - Tol = 20, Min = 0.0, Max = 652
- Suction Pressure - Tol = 20, Min = 0.0, Max = 652
- Return Relative Humidity - Tol = 15.0, Min = 0.0, Max = 100.0
- Suction Temperature - Min = 0.0, Max = 100.0
- Return Air Temperature - Min = -20.0, Max = 195.0
- Pool Water Temperature - Min = -20.0, Max = 195.0
- Surface Temperature - Min = -20.0, Max = 195.0
- Outside Air Temperature - Min = -20.0, Max = 195.0

Analog Outputs

The following analog output applies for RoofComPak models (units with EC fans):

- SupFanSpd - Supply Fan Speed the actual analog output DC voltage multiplied by 10. The RPM is shown on the second line with “Nrm” being the RPM from the control logic. If the “Ovrd” value is set to a non-zero value, the analog output voltage will correspond to the “Ovrd” RPM value instead of the “Nrm.” - Nrm = 1600, Min Val = 0000 =00.0V, Max Val = 1750 = 10.0V

UNIT CONFIGURATION

Installed Options

This menu contains parameters that indicate the hardware options installed in the dehumidifier. The parameters are set by the factory and do not typically require modification. The following parameters are available:

Unit Type – AW or HCD. AW units contain a pool water heating condenser. HCD units do not contain a pool water heating condenser.

- Air Cooling – Yes or No. Set to Yes if the unit or system contains an air or water cooled condenser for external heat rejection.
- Economizer – Yes or No. Set to Yes if the system is equipped with optional field provided and installed dampers for economizer operation.
- LonWorks Board – Yes or No. Set to Yes if the controller serial card slot contains a LonWorks PW Condenser – Partial or Full.

⚠ CAUTION

Most dehumidifiers should be set for Partial. Contact factory service before changing this parameter to Full. An improper setting of Full will cause a high pressure fault condition and possible equipment damage.

- Cmpr Module – Yes or No. Set to Yes if the dehumidifier compressor contains an overload module that provides a contact closure signal to indicate high motor temperature.
- Hot Gas Bypass – Yes or No. Most dehumidifiers should be set to No. Contact factory service before changing this parameter.
- Low Pressure Cutout – Yes or No. Set to Yes if the unit contains a low pressure cutout switch. Units that have a suction pressure transducer should be set to No.
- EC Supply Fan - Yes or No. Set to yes for units with an EC supply fan (-RP models).

Aux Air Heating

This menu contains parameters that configure the auxiliary air heating system:

- Staging Offset – 1.0˚F (Range 1.0 – 2.0). The number of degrees between activation of stage 1 and stage 2.

Aux Water Heating

This menu contains parameters that configure the auxiliary water heating system:

- Below Setp By – 1.0˚F (Range 0.0 – 9.9˚F). The auxiliary water heating system will be activated when the pool temperature drops this many degrees below set point.
- Deadband – 0.5˚F (Range 0.5 – 1.5˚F). The auxiliary water heating system will be deactivated when the pool temperature rises this many degrees above set point.

Temperature Ctrl

This menu contains parameters that configure the air temperature control routines of the dehumidifier. Default values are shown in bold-faced type:

- Cmpr Air Heating – Yes or No. This parameter, typically set to No, indicates whether the control routine should use the compressor for air heating when there is no dehumidification requirement. Do not change this parameter to Yes unless instructed by the factory service department.
- Deadband – 1.0˚F (Range 1.0 – 2.0˚F). This parameter is the base deadband used by the space temperature control routine. The actual deadband is calculated dynamically based past system performance.

Humidity Control

This menu contains parameters that configure the humidity control routines of the dehumidifier. Default values are shown in bold-faced type:

- DewPt Deadband: 1.0˚F (Range 1.0 – 2.0˚F). This parameter is the deadband used by the humidity control routine. Note that humidity control is based on dew point, not relative humidity.

Water Temp Ctrl

This menu contains parameters that configure the compressor based water heating system of the dehumidifier. Default values are shown in bold-faced type:

- Water Heat First: Yes or No. Typically set to No, this parameter indicates whether the control routine will use the compressor for water heating when there is no dehumidification requirement. Contact factory service before changing this parameter.
- Deadband: 0.5˚F (Range 0.5 – 1.5˚F). This parameter is the deadband used by the compressor based pool water heating control routine.

BAS INTERFACE

This menu contains parameters that configure the building automation system interface of the dehumidifier. Default values are shown in bold-faced type:

- Protocol: Lon/BACnet, Modbus RTU, or RS232. This parameter indicates the type of BAS interface the dehumidifier has been equipped with.
- Unit ID: 001 (Range 0 - 254). This parameter defines the dehumidifier address on a Modbus based BAS.
- Baud Rate: 1200, 2400, 4800, 9600, or 19200. This parameter defines the communication speed of the BAS interface port.

- BASRtnTempSetp: This value indicates the space temperature set point being requested by the BAS interface. It is provided for troubleshooting only and should not need to be modified.
- BASRtnRHSetp: This value indicates the space humidity set point being requested by the BAS interface. It is provided for troubleshooting only and should not need to be modified.
- BASPoolTempSetp: This value indicates the pool temperature set point being requested by the BAS interface. It is provided for troubleshooting only and should not need to be modified.
- BASForcePurge: Off or On. This value indicates the whether the BAS is requesting purge mode operation. It is provided for troubleshooting only and should not need to be modified.
- BASForceNoPurge: Off or On. This value indicates the whether the BAS is requesting non-purge mode operation. It is provided for troubleshooting only and should not need to be modified.

MULTI-UNIT NETWORK

This menu contains parameters that configure the operation of dehumidifier in a multiple unit installation. Default values are shown in bold-faced type:

- Network Control: No or Yes. This parameter indicates whether the dehumidifier should participate in multi-unit coordination.
- Staged Dehum: No or Yes. This parameter indicates whether the unit should participate in the first or second stage of dehumidification. When set to No, the unit will start dehumidification immediately when required. A setting of Yes will cause the dehumidifier to participate in the second stage as determined by the next parameter.
- Stg2 DH Offset: 4.0˚F (Range 0.0 – 9.9˚F). This parameter indicates how far the dew point must rise above set point before the unit energizes the compressor for the second stage of dehumidification.
- Pool Temp Ctl: Local or Network. This parameter indicates whether the unit should control pool temperature based on the network requirement or its own internal temperature sensor. A setting of Local should be used if this dehumidifier is connected to a different pool than the rest of the units on the network.

COMPRESSOR

This menu contains parameters that configure the operation of the dehumidifier compressor. Default values are shown in bold-faced type:

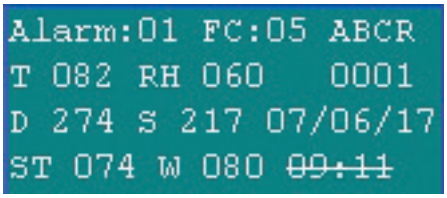
- Air Temp Limits: No or Yes. This parameter indicates whether the space temperature must be between 60 and 105 ˚F to allow compressor operation. Do not change this parameter to No unless instructed by factory service.
- Anti-cycle Time: 5 minutes (Range 1 – 9 minutes) This parameter indicates how long the compressor must remain off before it can be restarted. It defaults to 5 minutes after every power cycle. Do not change to less than 5 minutes unless instructed by factory service.
- LP Cutout: 40 PSI (Range 0 – 99 PSI). This parameter indicates the suction pressure at which the compressor will be shut down with a low pressure fault. Do not change this parameter unless instructed by factory service.
- LP Cutout Dif: 15 PSI (Range 0 – 99 PSI). This parameter indicates how far the suction pressure must rise above the cutout setting before the compressor will be re-enabled after a low pressure fault.
- LPCO Byp Tim: 120s. Do not change this parameter without PoolPak service authorization.
- Cmpr Enabled: Yes or No. This parameter should typically be set to Yes. Do not set to No unless instructed by factory service.

ECONOMIZER

This menu contains parameters that configure the operation of the optional field provided and field installed economizer damper system. Default values are shown in bold-faced type:

- OA/RA Min Dif: 5.0˚F (Range 2.0 – 9.9˚F) This parameter indicates how much the outside air temperature must be below the return air temperature to allow economizer operation.
- Min OA Temp: 50.0˚F (Range 40.0 – 60.0˚F). This parameter indicates the lowest outside air temperature allowed for economizer operation.

Figure 5-14. Fault History Log screen



SUPPLY FAN

This menu contains the supply fan speed set point for units with EC fans (-RP models)

- Speed: 1600 RPM

History

The history screen provides information on the last 50 faults that have occurred in the dehumidifier. It can be used for troubleshooting by an experienced HVAC technician. The faults are recorded with a sequence number from 01 to 50. Sequence number 01 is always the most recent fault. To view the list of faults, press the Enter key to move the cursor to the sequence number. Use the up and down arrow keys to change the number and move through the list of faults. The fault information updates automatically when the sequence number changes. The following information is stored and displayed for each fault:

- Hour at which the fault occurred. This is the number of hours since the dehumidifier was last powered on.

FAULT CODE NUMBER

- A 2-digit fault code for indicating an alarm status including:
  - 3 – High Pressure
  - 4 – Low Pressure
  - 5 – Fire Trip
  - 6 – Fan Overload
  - 7 – High Compressor Motor Temperature
  - 8 – Return Air Temperature Sensor Failure
  - 9 - Return Air Relative Humidity Sensor Failure
  - 10 - Pool Water Temperature Sensor Failure
  - 11 - Outside Air Temperature Sensor Failure
  - 12 - Surface Temperature Sensor Failure
  - 13 - Compressor Locked Out After 10 Faults
  - 14 - Controller Hardware Failure

SYSTEM STATUS

The following system status items will show for each alarm:

- Return Air Temperature (T)
- Return Air Humidity (RH)
- Discharge Pressure (D)
- Suction Pressure (S)
- Suction Temperature (ST)
- Pool Water Temperature (W)

STATUS CODE

A 4-digit status code for on/off. On = 1, Off = 0. For the following sequence:

- Return Air Temperature (T)
- Return Air Humidity (RH) AC Solenoid Status

- Bypass Solenoid Status
- Compressor Status
- Reheat Solenoid Status

TIME AND DATE

The time and date that the alarm occurred will show for each alarm instance. To configure time and date, see Service>Utilities.

Manual Mode

⚠ WARNING!

Manual mode operation should only be performed by a qualified HVAC service technician. Improper use will cause system damage and possibly hazardous operation.

The Manual Mode menu provides two options, Demand Control and Digital Output Control.

DEMAND CONTROL

- Enabled: Yes or No. This parameter enables manual demand mode. In this mode, the routines that normally control air temperature, humidity, and pool temperature are bypassed. A service technician can then enable individual demands to test each system in the dehumidifier.
- Cmpr Air Heat: Off or On. Set to On to cause the unit to run the compressor in air heating mode.
- Air Cooling: Off or On. Set to On to cause the unit to run the compressor in air cooling mode.
- Pool Heating: Off or On. Set to On to cause the unit to enable compressor based pool water heating. This will not cause the compressor to run. The compressor must be running based on one of the other demands.
- Aux Air Heat 1: Off or On. Set to On to activate the first stage of auxiliary air heat.
- Aux Air Heat 2: Off or On. Set to On to activate the second stage of auxiliary air heat.
- Aux Water Heat: Off or On. Set to On to activate the auxiliary pool water heating system.
- Economizer: Off or On. Set to On to activate the field provided and installed economizer damper system.

DIGITAL OUTPUT CONTROL

- Fan Motor: Auto, On, or Off. Set to On or Off to force the dehumidifier fan on or off.
- Compressor: Auto, On, or Off. Set to On or Off to force the dehumidifier compressor on or off. Do not force compressor operation unless the appropriate solenoid valves are open. Doing so will cause the compressor to cycle repeatedly on the high pressure cutout. This will destroy the compressor.
- AC Valve: Auto, On, or Off. Set to On or Off to force the AC solenoid valve open or closed.
- Water Ht Vlv: Auto, On, or Off. Set to On or Off to force the pool heating solenoid valve open or closed.
- Bypass Valve: Auto, On, or Off. Set to On or Off to force the bypass solenoid valve open or closed.
- Aux Water Heat: Auto, On, or Off. Set to On or Off to force the auxiliary pool heating system on or off.
- Reheat Valve: Auto, On, or Off. Set to On or Off to force the reheat solenoid valve open or closed.
- Aux Air Ht 1: Auto, On, or Off. Set to On or Off to force auxiliary air heating system stage 1 on or off.
- Aux Air Ht 2: Auto, On, or Off. Set to On or Off to force auxiliary air heating system stage 2 on or off.
- ACC Fan: Auto, On, or Off. Set to On or Off to force the ACC run signal on or off.
- Alarm Output: Auto, On, or Off. Set to On or Off to force the alarm output contacts closed or open.
- Economizer: Auto, On, or Off. Set to On or Off to force the field provided and installed economizer damper system to full open or full close.

Utilities

The Utilities menu provides sub menus for configuring units of measure, passwords and time and date.

UNITS OF MEASURE

- Temperature Units: ˚F or ˚C. When set to ˚C, commonly used parameters and set points will be shown in degrees Celsius. Some configuration parameters are shown in ˚F only.

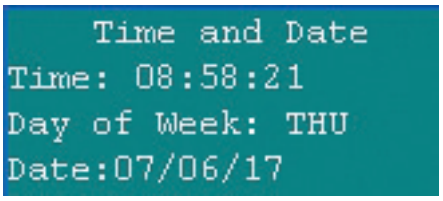
PASSWORDS

- Set Point: 0000 (Range 0000 to 9999). When set to a non-zero value, this parameter causes the RIU to prompt for a password when any of the set point change menus are accessed. The required password is the value of this parameter.
- Service: 0005 (Range 0000 to 9999). This is the password required to access most service menus.
- Advanced Password (not shown): 9995. This is the password required for access to service sub-menus.

SET TIME AND DATE

- Time: set this to the current time as 24-hour time clock, HH:MM:SS. For example, for 1:24:00, use 13:24:00
- Day of Week: set this to the current day of the week.
- Date: set this to the current date, MM/DD/YY

Figure 5-15. Time and Date Screen



Startup

Pre-Start Checklist

- Before starting the unit, be sure that the following items have been completed.
- Check that the unit physical installation (ducting, piping, etc.) is in accordance with the recommendations of the Installation section.
- Verify electrical power and control connections are in accordance with local and NEC codes. Check for proper power supply and a properly sized and installed fused disconnect switch located within sight of the ComPak® unit.
- Ensure that proper pool water flow and pressure are available. Check the water flow direction into and out of the unit. Make sure that the ComPak® unit is down line from the filter and up line from the chemical feed system.
- Check that the condensate drain is connected. If returning condensate to the pool, ensure that this practice is in compliance with local codes. Make sure that the condensate is filtered prior to returning to the pool.
- Check that the overflow drain (AWV and HCDV only) is connected independent of the condensate drain. If returning the overflow to the pool, ensure that this practice is in compliance with local codes. Make sure that the overflow is filtered prior to returning to the pool.
- Ensure that the space air temperature of the pool enclosure is not lower than 72°F, and the temperature of the pool water is at least 70°F.
- If the ComPak® unit is equipped with the auxiliary air-cooled air conditioning condenser, ensure that it has been correctly wired and piped and that the control wiring has been connected between the ComPak® and the ACC unit. See “Air Cooled Condenser Installation,” for installation recommendations.
- If the ComPak® unit is equipped with the auxiliary water-cooled air conditioning condenser, ensure that proper water flow and temperature are available. Check the water flow direction into and out of the unit.

- Verify all electrical connections with the field wiring diagram. Check all connections to be sure they are tight.
- Check to be sure that all packaging materials have been removed from the unit.
- Make sure that the fan belt(s) are tight and the fan scroll turns freely in the blower housing.
- Ensure that the cold surface temperature sensor has been properly installed.
- Ensure that the pool water temperature sensor (AW units) has been properly installed.
- Complete Section 1 on the ComPak® Warranty Registration and Start-up log .

Start-Up

Follow the *Startup procedure* attached to the back of this manual, fill out all applicable fields and then send copy to PoolPak service department.

PoolPak LLC
Attn: Service Department
P.O. Box 3331 York PA 17402.
Or fax to (717) 718-4245. Or scan and email to service@poolpak.com

NOTE

LOW VOLTAGE - DO NOT be misled by the term "low voltage." Voltages as low as 50 volts may cause death

⚠ WARNING!

HIGH VOLTAGE is used in the operation of this equipment. DEATH OR SERIOUS INJURY may result if personnel fail to observe precautions. Work on electronic equipment should not be undertaken unless the individual(s) has (have) been trained in the proper maintenance of the equipment and is (are) familiar with its potential hazards. Shut off power supply to equipment before beginning work and follow lockout procedures. When working inside equipment with power off, take special care to discharge every capacitor likely to hold dangerous potential. Be careful to not contact high voltage connections when installing or operating this equipment.

NOTE

All warranty rights are jeopardized if the Warranty Registration & Start-Up Report is not received within 10 days of start-up date.

Troubleshooting

When properly installed according to the instructions in this manual, the ComPak® unit with a CPCS-PCP controller will perform as designed and 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-PCP has many features that will help a service technician resolve the issue.

The ComPak® unit has numerous safety devices designed to protect the system from failures. The compressor will shut down whenever a high refrigerant pressure, low refrigerant pressure, high motor temperature (scroll compressor models), or evaporator coil freeze-up occurs. Additionally, the compressor and fan will be shut down whenever a fire detection system alerts the ComPak® unit that a fire trip mode of operation is required or if a fan motor overload condition is present.

If the ComPak® compressor will not operate upon start-up or troubleshooting and there are no alarm conditions, check to see that the actual dew point temperature is not below the dew point temperature set point. The dew point temperature and dew point temperature set point is displayed under the detailed status screen menu. The compressor will only run after the dew point temperature rises above the dew point temperature set point. This is usually achieved by a rise in the air temperature. The compressor will not operate unless these dew point conditions are satisfied. Normally a rise in the air temperature will bring the dew point above the dew point set point. The rise in air temperature is achieved by energizing the auxiliary air heat circuit.

Whenever a fault condition occurs, the alarm button will glow red and the remote interface unit will display the fault condition and a recommended course of action. If the fault is a high pressure, low pressure, or defrost, the CPCS-PCP will display a three digit number representing the status of the A/C solenoid, reheat solenoid and bypass solenoid at the time of the fault. In the table below, a 1 indicates ON and a 0 indicates OFF.

Table 5-1. Solenoid Activation

A/C SOLENOID	REHEAT SOLENOID	BYPASS SOLENOID
1	0	0
1	0	1
0	1	0
0	1	1

After 10 faults occur, the controller will lockout the compressor to prevent it from being damaged. Repeated high pressure, low pressure, high motor temperature, or defrost trips can cause the compressor motor to fail. When any of these conditions are present, the problem must be diagnosed and corrected immediately. Faults caused by fire trips are not counted in the 10 fault lockout protection. If the space relative humidity is greater than the humidity set point but the compressor is not operating, and the CPCS-PCP control panel reads that the unit is calling for dehumidification, make sure the ComPak® has sufficient water flow. The CPCS-PCP will lock out the compressor if the unit does not have sufficient water flow.

After a fault condition has been eliminated, the remote interface unit alarm light will remain lit. However, the alarm will no longer be shown during normal screen rotation. Pressing the alarm key will show any faults that have occurred since the alarm light was reset. To reset the alarm light, press and hold the Escape key and then press the alarm key. If there are currently no 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 remote interface unit.

The alarm history can be viewed at any time by going to "HISTORY" in the Service menu. A list of the 50 most recent faults is kept there. See HISTORY earlier in this manual for details on reading the fault history log.

Fault conditions detected by the CPCS-PCP are displayed as the following:

Compress High Pressure
Indicates that the compressor was shut down due to high refrigerant pressure when the pressure rises above 585 PSIG. See the Troubleshooting Guide for possible causes and solutions. The CPCS-PCP will restart the compressor five minutes after the fault occurred.

Compress Low Pressure
Indicates that the compressor was shut down due to low refrigerant pressure when the pressure falls below 50 PSIG. See the Troubleshooting Guide for possible causes and solutions. The CPCS-PCP will restart the compressor five minutes after the fault occurred.

EEPROM Failure
Indicates that a problem with the CPCS-PCP has been detected through self diagnostics. The ComPak® unit will be shut down if this fault occurs. Contact a qualified service provider to correct the problem.

Fire Trip
Indicates that the CPCS-PCP has received an alarm signal from the building fire control system. The ComPak® unit will be shut down as long as the alarm signal is present. When the signal is cleared, the unit will resume normal operation.

Sensor Failure
Indicates that a sensor attached to the CPCS-PCP has failed. Depending on which sensor has failed, some functions of the ComPak® unit may be disabled until the sensor is repaired. This alarm screen will show the status of several sensors.

Compressor Motor Thermal Overload
Indicates that the compressor protection module has detected a high motor winding temperature in the compressor. The CPCS-PCP will shut down the compressor until the protection module resets. See the Troubleshooting Guide for causes and solutions.

10 Fault Lockout
Indicates that 10 faults have occurred since the unit was powered up. Faults included in this count are high pressure, low pressure, thermal overload, and defrost. The CPCS-PCP will lock out the compressor to protect it from damage caused by a recurring fault condition. Contact a qualified service provider to correct the problem.

Fan Overload
Indicates that the fan starter overload has tripped. The CPCS-PCP will shut down the ComPak® unit when this fault occurs. The fan starter must be reset manually, after which the unit will resume normal operation. See the Troubleshooting Guide for causes and solutions.

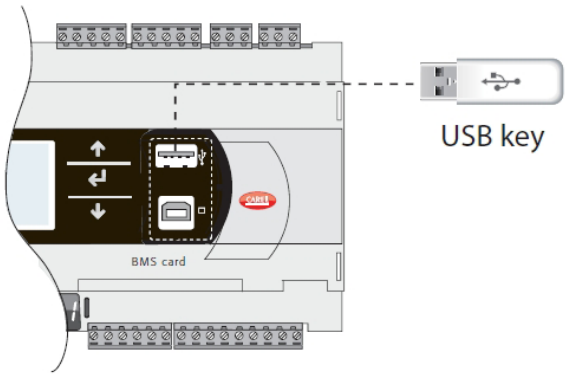
Defrost Trip Active
Indicates that the defrost thermostat is open (opens at 30° F). The CPCS-PCP will shut down the compressor when this fault occurs. The unit will resume normal operation after the thermostat closes (closes at 40° F). See the Troubleshooting Guide for causes and solutions.

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 5-16. 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"

Remove the pen drive and connect it to a USB port on your computer. Email the folder called LOG00_01 to service@poolpak.com along with the job name and serial number of the PoolPak®.

Network Troubleshooting Guide

SYMPTOM	CAUSE	SOLUTION
Not all units shown as present on network status screen.	1. Unit is not properly connected to network.	1. Correct the network connection.
	2. Unit is not powered on.	2. Apply power to all units.
Unit not available at the control panel.	1. Unit is not properly connected to network.	1. Correct the network connection.
	2. Unit is not powered on.	2. Apply power to all units.
Units working against each other (#1-heat, #2-cool, etc.)	1. Network Control parameter set to NO on some units.	1. Set Network Control to YES for units that are to operate together.
	2. Unit is not properly connected to the network.	2. Correct the network connection.
All compressors are off and the space conditions are not close to the setpoints.	1. All units are powered off.	1. Apply power to all units.
	2. All units have uncleared alarm conditions.	2. Determine and correct the cause of the alarm and then clear alarms in the units.

Troubleshooting Guide

SYMPTOM		CAUSE	SOLUTION
Fan Off Compressor Off	No Display On RIU	1. Main power disconnect open.	1. Turn disconnect ON.
		2. Blown main power fuse.	2. Replace blown fuse.
		3. Tripped circuit breaker.	3. Reset circuit breaker.
		4. No 24 VAC output from transformer T2.	4. Isolate and correct problem.
Fan On Compressor On or Off	No Display On RIU	1. Cable between ComPak® and terminal unit is disconnected or damaged.	1. Check cable connection
Fan Off Compressor Off	Display shows: Fan Overload	1. Adjustable fan pulley incorrectly adjusted.	1. Adjust pulley to lower current.
		2. Very low static pressure on supply duct.	2. Connect duct if not connected; correct low static pressure.
		3. Fuse FU3 blown.	3. Replace fuse.
		4. Fuse FU1 & FU2 blown.	4. Replace fuses.
Fan Off Compressor Off	Display shows: Fire Trip	1. Fire/Smoke detection system indicates an alarm condition.	1. System will automatically reset when alarm condition clears.
Fan On Compressor Off	Display shows: Compress Hi Pressure Trip code 010 or 011	1. Fan belt off or loose.	1. Replace or tighten fan belt.
		2. Obstruction in supply duct.	2. Remove duct obstruction.
		3. Excessive refrigerant in system.	3. Remove charge to proper amount.
		4. Non-condensibles in system.	4. Recover, evacuate and charge system.
		5. Reheat solenoid not opening.	5. Repair reheat solenoid.
Fan On Compressor Off	Display shows: Compress Hi Pressure Trip code 100 or 101	1. A/C condenser power off.	1. Restore power to A/C condenser
		2. A/C condenser fan blocked.	2. Remove blockage.
		3. Excessive refrigerant charge.	3. Remove charge to proper amount.
		4. Non-condensibles in system.	4. Recover, evacuate and charge system.
		5. A/C solenoid not opening.	5. Repair A/C solenoid.
Fan On Compressor Off	Display shows: Compress Lo Pressure Trip code 100 or 101	1. Fan belt off or loose.	1. Replace or tighten fan belt.
		2. Dirty air filter.	2. Replace air filter.
		3. Obstruction in return duct.	3. Remove duct obstruction.
		4. Plugged filter drier.	4. Replace filter drier.
		5. TXV valve malfunctioning.	5. Replace TXV valve.
Fan On Compressor Off	RIU shows: Water Flow Low	1. Pool water circulation pump off	1. Turn on pump
		2. Pool water filter dirty	2. Backwash filter
		3. Valve in wrong position	3. Restore valve to proper position
Fan On Compressor Off	Display shows: Defrost Trip Active	1. Dirty air filter	1. Replace air filter
		2. Ambient air temp below 75°F	2. Heat space with auxiliary heat
		3. Low refrigerant charge	3. Properly charge system
		4. Not enough return air	4. Adjust air flow to unit
Fan On Compressor Off	Display shows: Compressor Motor Thermal Overload	1. Low refrigerant charge	1. Properly charge system
		2. Plugged filter drier	2. Replace filter drier
		3. Defective thermal overload	3. Replace thermal overload module
		4. Defective compressor	4. Replace compressor

Maintenance

Overview

Periodic routine maintenance will promote extended equipment life. While ComPak® 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 to follow National Spa and Pool Institute standards. PoolPak® LLC strongly recommends following the National Spa and Pool Institute values.

Table 5-2. 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

- PoolPak recommends daily logging of your pool water chemistry. MAINTENANCE AND YOUR POOL WATER CHEMISTRY IS IMPORTANT TO PROTECT YOUR WARRANTY RIGHTS.

Monthly Maintenance

- Air Filters, inspect and replace or clean as applicable. Dirty filters restrict air flow and can cause improper unit operation.
- Ensure that the condensate collection pan is draining properly and the condensate is not overflowing or being drawn into the supply air stream. Check the condensate and overflow lines to ensure that neither are clogged.
- Check the operation of the blower motor and scroll. Ensure that the scroll does not rub the housing. Check for proper belt tension. Worn or cracked belts should be replaced. Check fan and mounting brackets for tightness.
- Ensure that the ALARM light is not illuminated.

Annual Maintenance

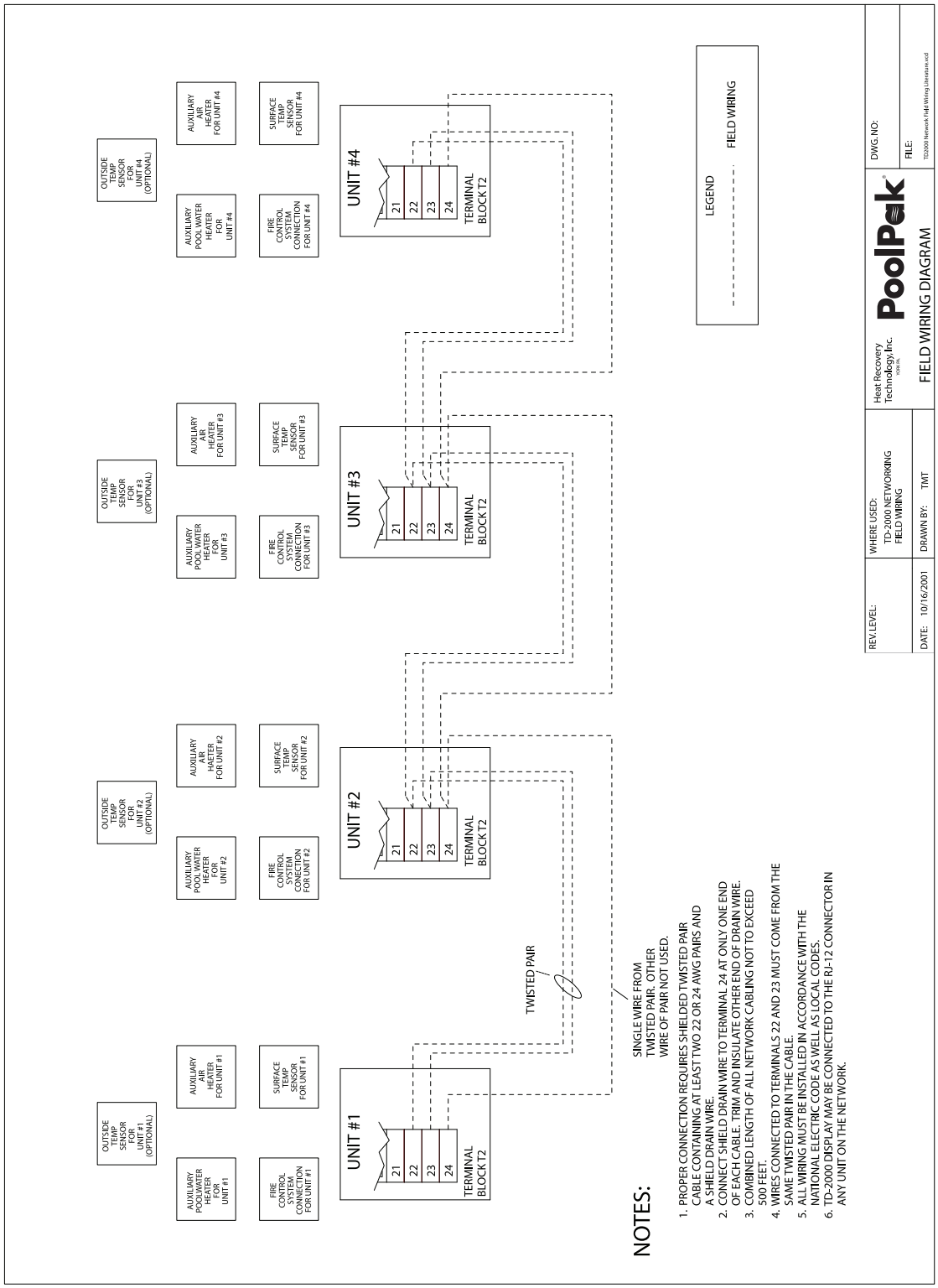
- Inspect the refrigeration and water circuits for leaks, wear or corrosion. Corrosion on the water piping or condenser may indicate poor pool chemical maintenance and improper chlorine and pH levels.
- Check electrical components for loose wiring.
- Although the exterior of the ComPak® units are powder coated, wipe down unit, particularly if installed in an area subject to dirt or chemical concentration.
- Wash, brush, or vacuum the evaporator and air condenser coils. This will ensure proper heat transfer and reduce static pressure losses. Caution should be taken not to wet electrical components inside the unit.

NOTE
If service and inspections are not performed by a competent and experienced service firm, the manufacturer warranty may be voided.

SECTION VI: WIRING

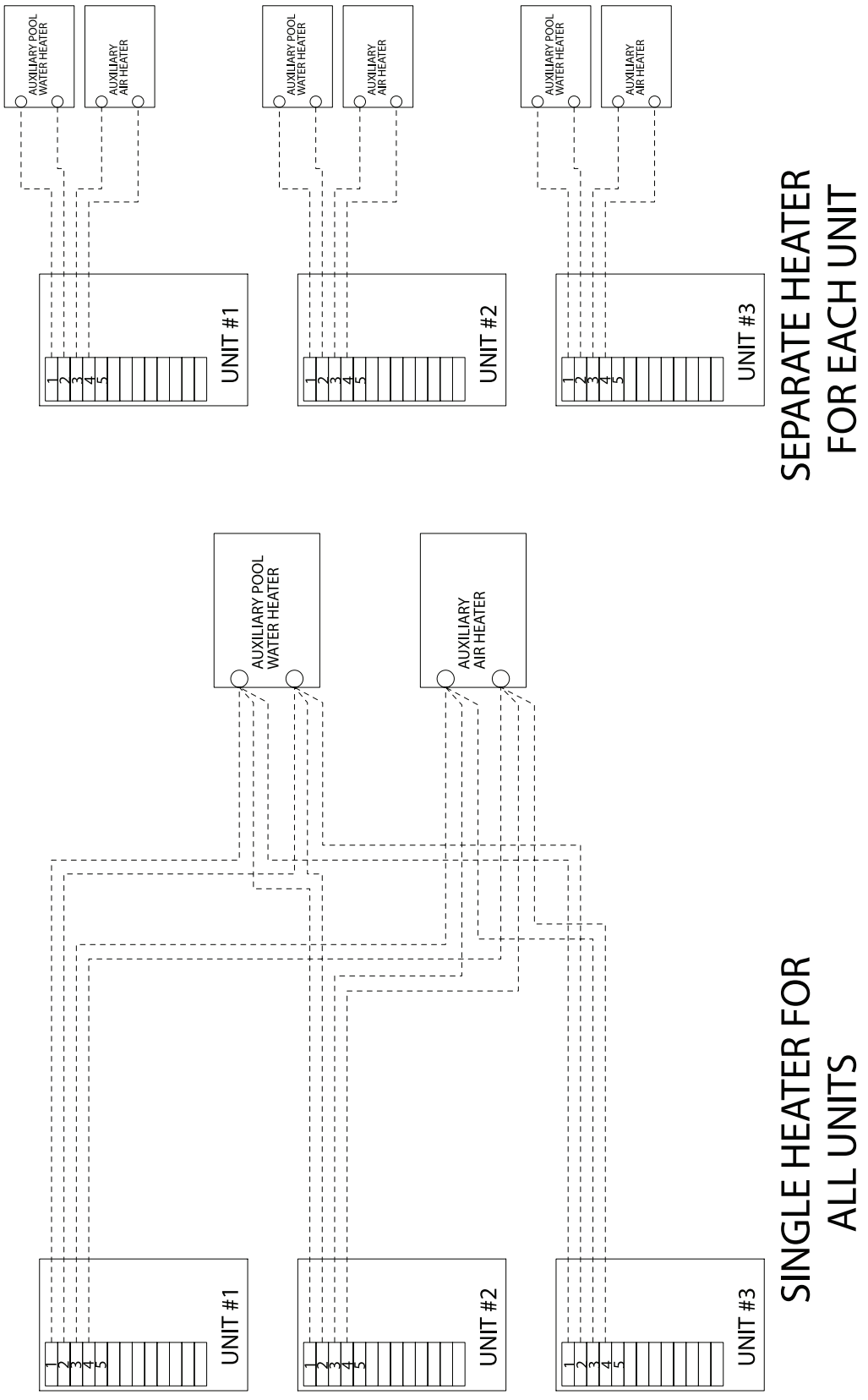
Auxiliary Air & Pool Water Heater Connections for Multiple Unit Installation

Figure 6-1. Auxiliary Air and Pool Water Heater Connections for Multiple Units



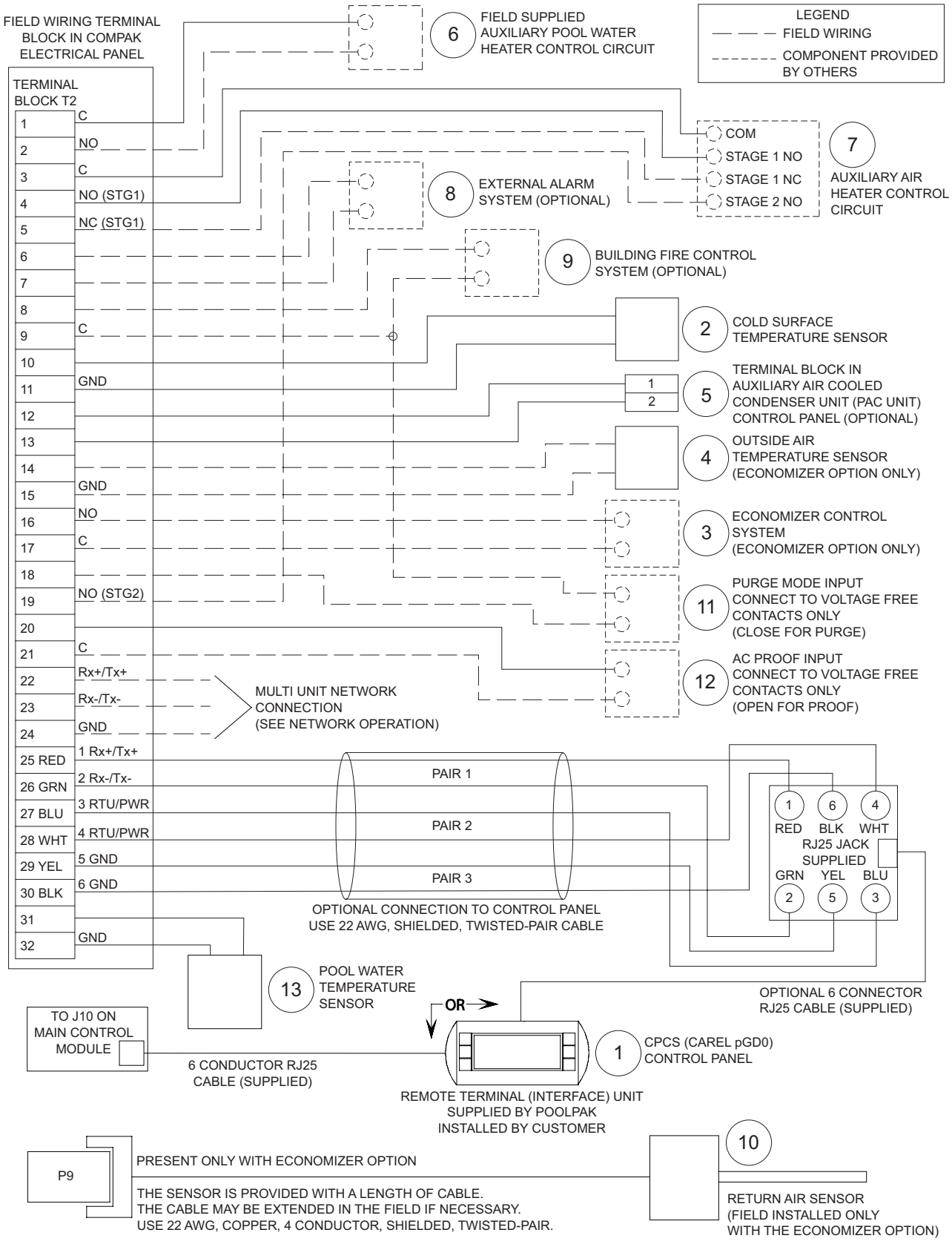
Auxiliary Air & Pool Water Heater Connection for a Two Pool Installation

Figure 6-2. Auxiliary Air and Pool Water Heater Connections for Two Pool Installations



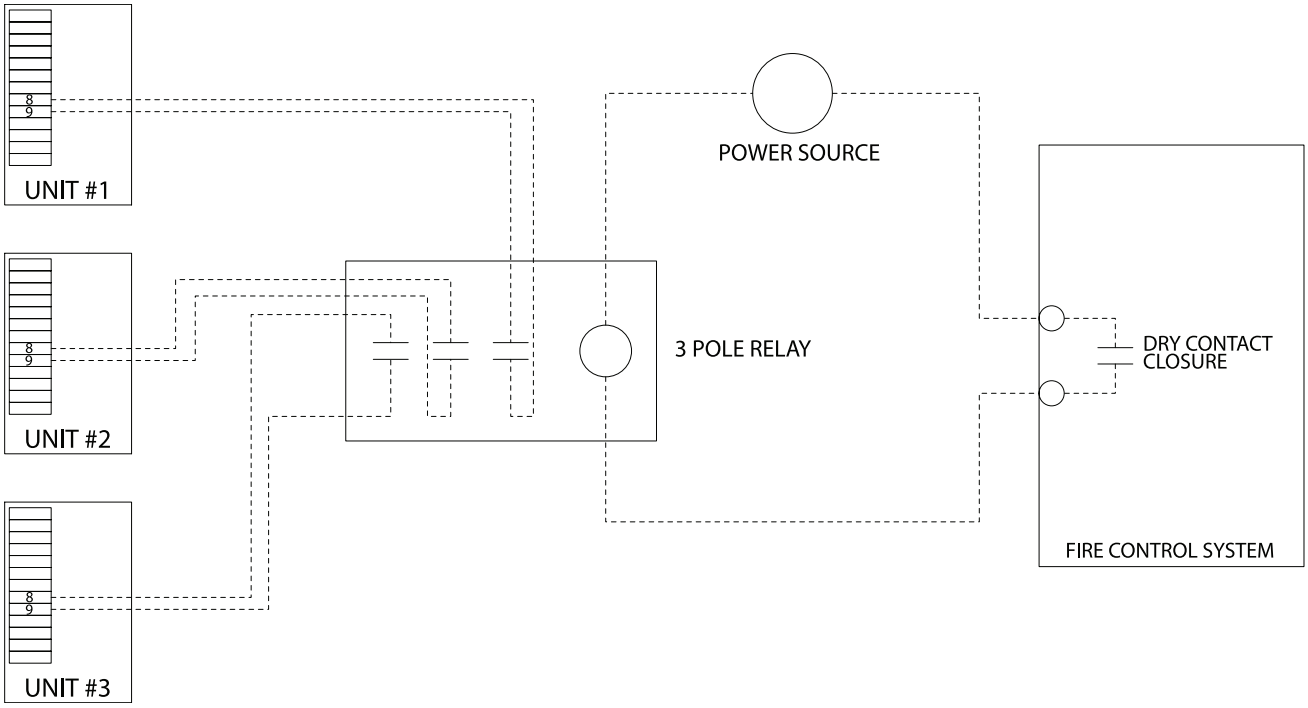
Field Wiring

Figure 6-3. Field Wiring Diagram



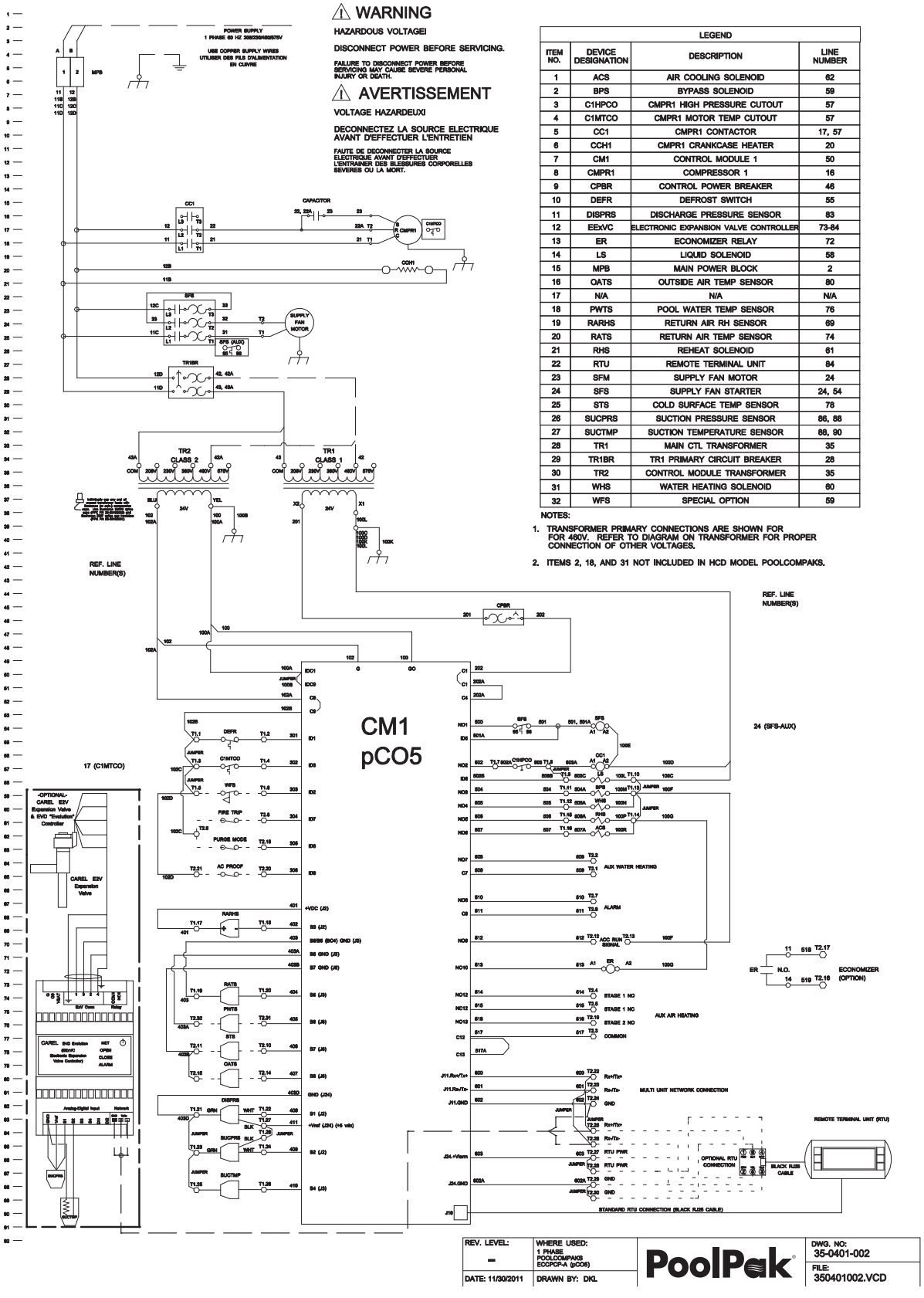
Fire Control System Connection

Figure 6-4. Fire Control System Connection



Factory Wiring Diagrams

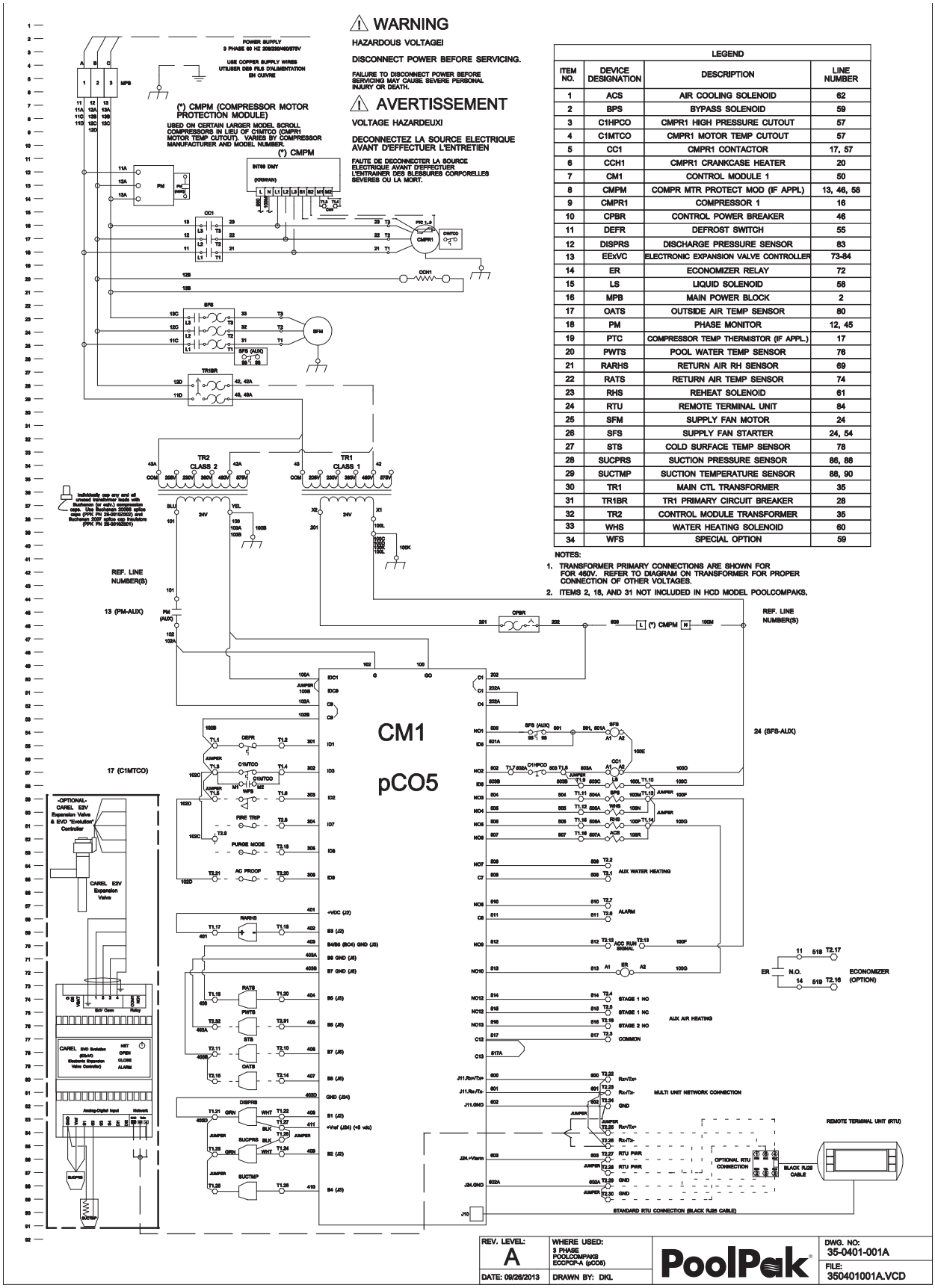
Figure 6-5. ComPak AW/HCD Main Schematic - Single Phase



LEGEND			
ITEM NO.	DEVICE DESIGNATION	DESCRIPTION	LINE NUMBER
1	ACS	AIR COOLING SOLENOID	62
2	BPS	BYPASS SOLENOID	59
3	C1HPCO	CMPR1 HIGH PRESSURE CUTOUT	57
4	C1MTCO	CMPR1 MOTOR TEMP CUTOUT	57
5	CC1	CMPR1 CONTACTOR	17, 57
6	CCH1	CMPR1 CRANKCASE HEATER	20
7	CM1	CONTROL MODULE 1	50
8	CMPR1	COMPRESSOR 1	16
9	CPBR	CONTROL POWER BREAKER	46
10	DEFR	DEFROST SWITCH	55
11	DISPRS	DISCHARGE PRESSURE SENSOR	83
12	EExVC	ELECTRONIC EXPANSION VALVE CONTROLLER	73-84
13	ER	ECONOMIZER RELAY	72
14	LS	LIQUID SOLENOID	58
15	MPB	MAIN POWER BLOCK	2
16	OATS	OUTSIDE AIR TEMP SENSOR	80
17	N/A	N/A	N/A
18	PWTS	POOL WATER TEMP SENSOR	76
19	RARHS	RETURN AIR RH SENSOR	69
20	RATS	RETURN AIR TEMP SENSOR	74
21	RHS	REHEAT SOLENOID	61
22	RTU	REMOTE TERMINAL UNIT	84
23	SFM	SUPPLY FAN MOTOR	24
24	SFS	SUPPLY FAN STARTER	24, 54
25	STS	COLD SURFACE TEMP SENSOR	78
26	SUCPRS	SUCTION PRESSURE SENSOR	86, 88
27	SUCTMP	SUCTION TEMPERATURE SENSOR	88, 90
28	TR1	MAIN CTL TRANSFORMER	35
29	TR1BR	TR1 PRIMARY CIRCUIT BREAKER	28
30	TR2	CONTROL MODULE TRANSFORMER	35
31	WHS	WATER HEATING SOLENOID	60
32	WFS	SPECIAL OPTION	59

NOTES:
1. TRANSFORMER PRIMARY CONNECTIONS ARE SHOWN FOR FOR 460V. REFER TO DIAGRAM ON TRANSFORMER FOR PROPER CONNECTION OF OTHER VOLTAGES.
2. ITEMS 2, 18, AND 31 NOT INCLUDED IN HCD MODEL POOLCOMPAKS.

Figure 6-6. ComPak AW/HCD Main Schematic - Three Phase



LEGEND			
ITEM NO.	DEVICE DESIGNATION	DESCRIPTION	LINE NUMBER
1	ACS	AIR COOLING SOLENOID	62
2	BPS	BYPASS SOLENOID	59
3	C1HPCO	CMPR1 HIGH PRESSURE CUTOUT	57
4	C1MTCO	CMPR1 MOTOR TEMP CUTOUT	57
5	CC1	CMPR1 CONTACTOR	17, 57
6	CCH1	CMPR1 CRANKCASE HEATER	20
7	CM1	CONTROL MODULE 1	50
8	CMPM	COMPR MTR PROTECT MOD (IF APPL)	13, 46, 58
9	CMPR1	COMPRESSOR 1	16
10	CPBR	CONTROL POWER BREAKER	46
11	DEFR	DEFROST SWITCH	55
12	DISPRS	DISCHARGE PRESSURE SENSOR	83
13	EExVC	ELECTRONIC EXPANSION VALVE CONTROLLER	73-84
14	ER	ECONOMIZER RELAY	72
15	LS	LIQUID SOLENOID	58
16	MPB	MAIN POWER BLOCK	2
17	OATS	OUTSIDE AIR TEMP SENSOR	80
18	PM	PHASE MONITOR	12, 45
19	PTC	COMPRESSOR TEMP THERMISTOR (IF APPL.)	17
20	PWTS	POOL WATER TEMP SENSOR	76
21	RARHS	RETURN AIR RH SENSOR	69
22	RATS	RETURN AIR TEMP SENSOR	74
23	RHS	REHEAT SOLENOID	61
24	RTU	REMOTE TERMINAL UNIT	84
25	SFM	SUPPLY FAN MOTOR	24
26	SFS	SUPPLY FAN STARTER	24, 54
27	STS	COLD SURFACE TEMP SENSOR	78
28	SUCPRS	SUCTION PRESSURE SENSOR	86, 88
29	SUCTMP	SUCTION TEMPERATURE SENSOR	88, 90
30	TR1	MAIN CTL TRANSFORMER	35
31	TR1BR	TR1 PRIMARY CIRCUIT BREAKER	28
32	TR2	CONTROL MODULE TRANSFORMER	35
33	WHS	WATER HEATING SOLENOID	60
34	WFS	SPECIAL OPTION	59

NOTES:
1. TRANSFORMER PRIMARY CONNECTIONS ARE SHOWN FOR FOR 460V. REFER TO DIAGRAM ON TRANSFORMER FOR PROPER CONNECTION OF OTHER VOLTAGES.
2. ITEMS 2, 18, AND 31 NOT INCLUDED IN HCD MODEL POOLCOMPAKS.

REV. LEVEL:	WHERE USED:		DWG. NO:
A	3 PHASE POOLCOMPAKS ECCPCP-A (pCO5)	PoolPak®	35-0401-001A
DATE: 09/26/2013	DRAWN BY: DKL		FILE: 350401001A.VCD

Figure 6-7. ComPak AW/HCD Point to Point Schematic - Single Phase, Vertical Unit

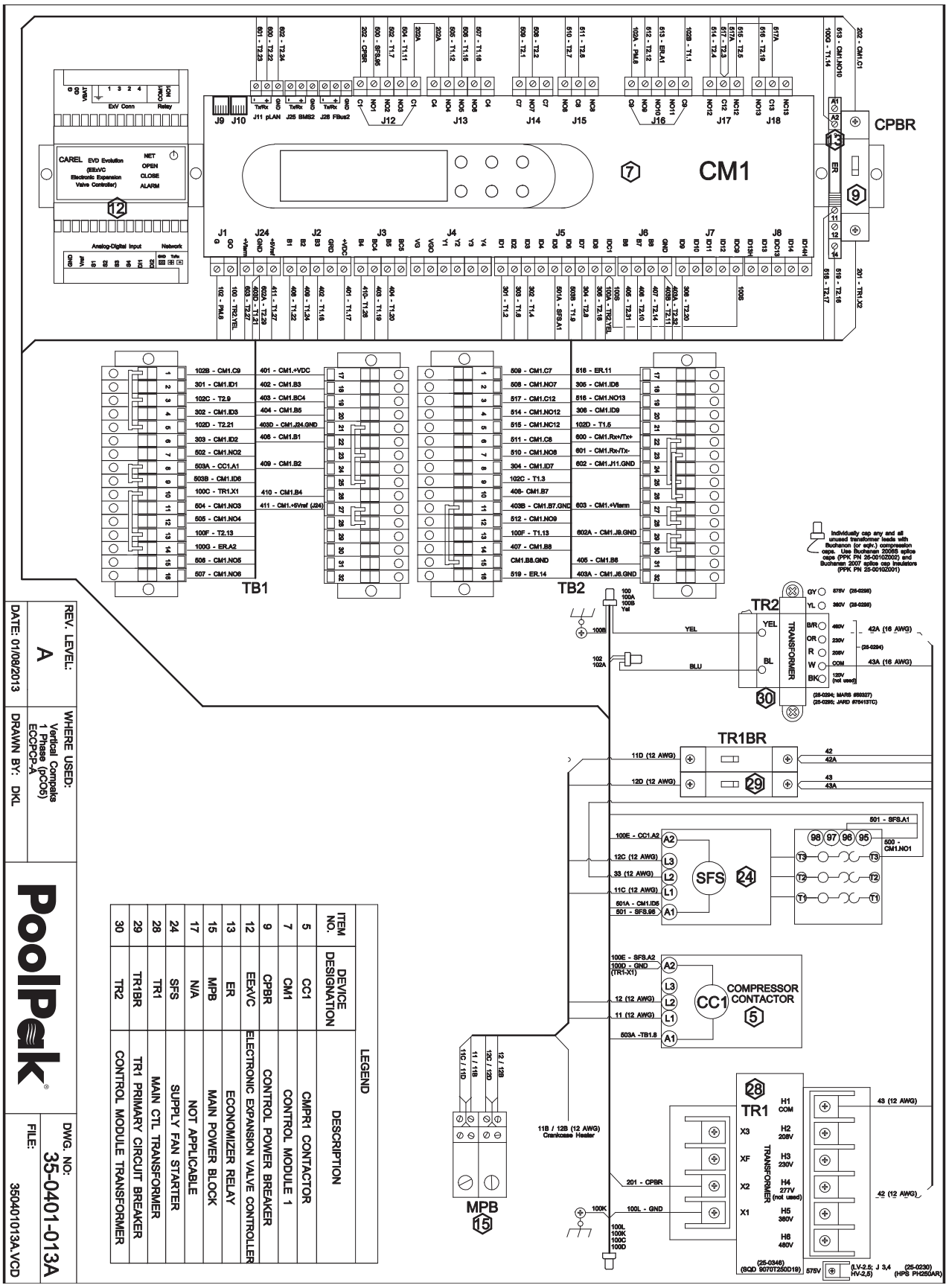


Figure 6-8. ComPak AW/HCD Point to Point Schematic - Three Phase, Vertical Unit

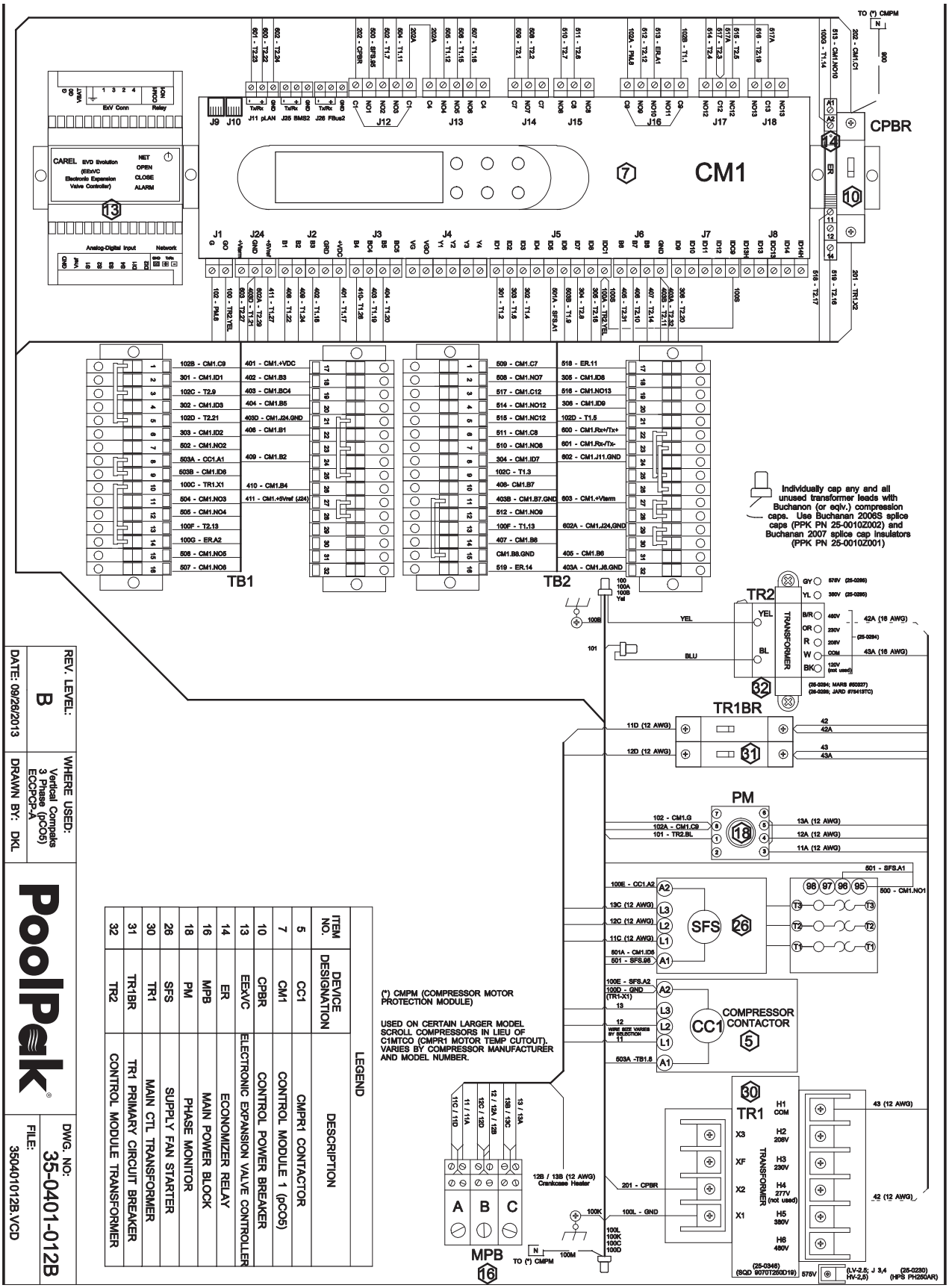


Figure 6-9. ComPak AW/HCD Point to Point Schematic - Single Phase, Horizontal Unit

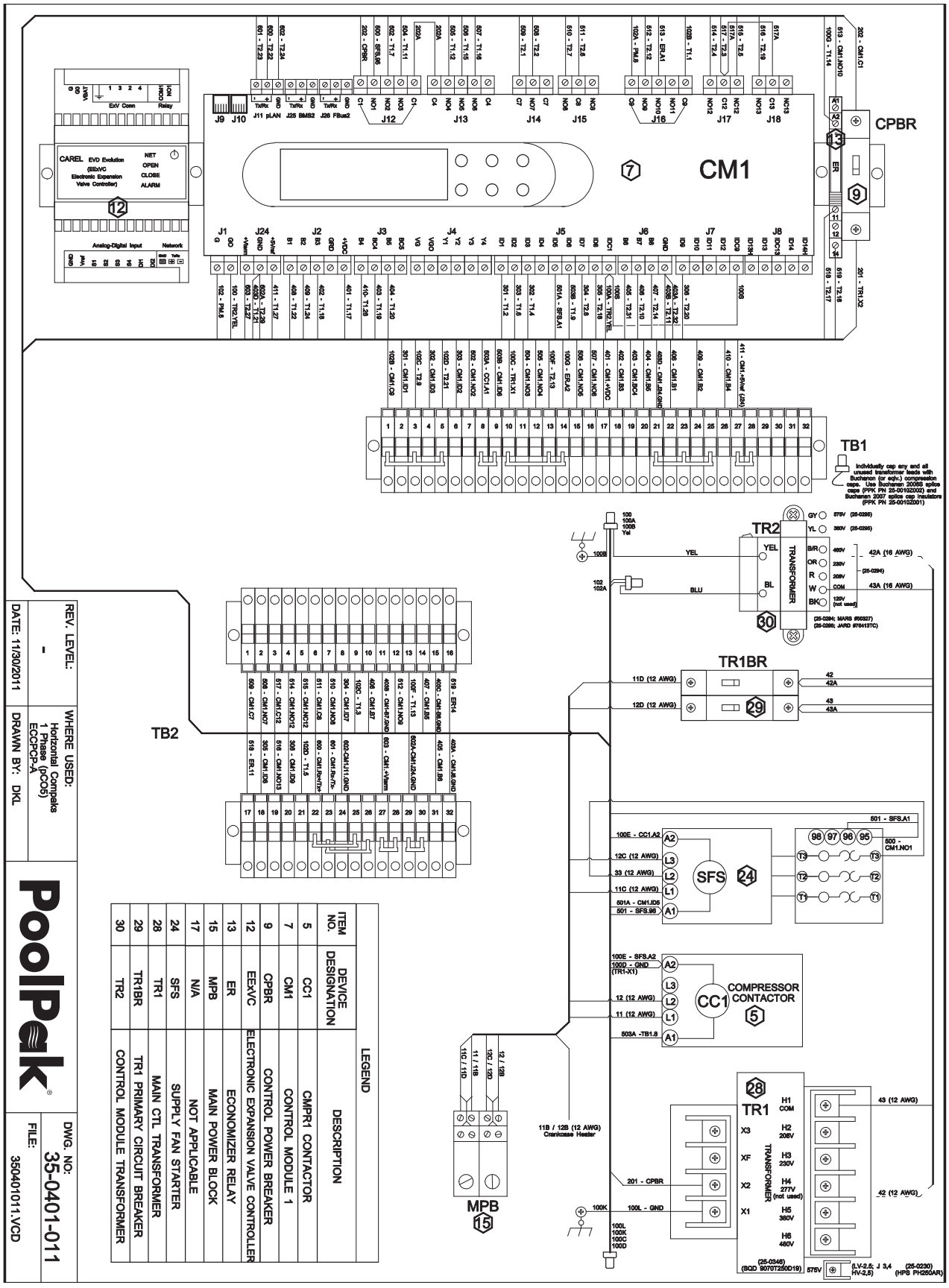


Figure 6-10. ComPak AW/HCD Point to Point Schematic - Three Phase, Horizontal Unit

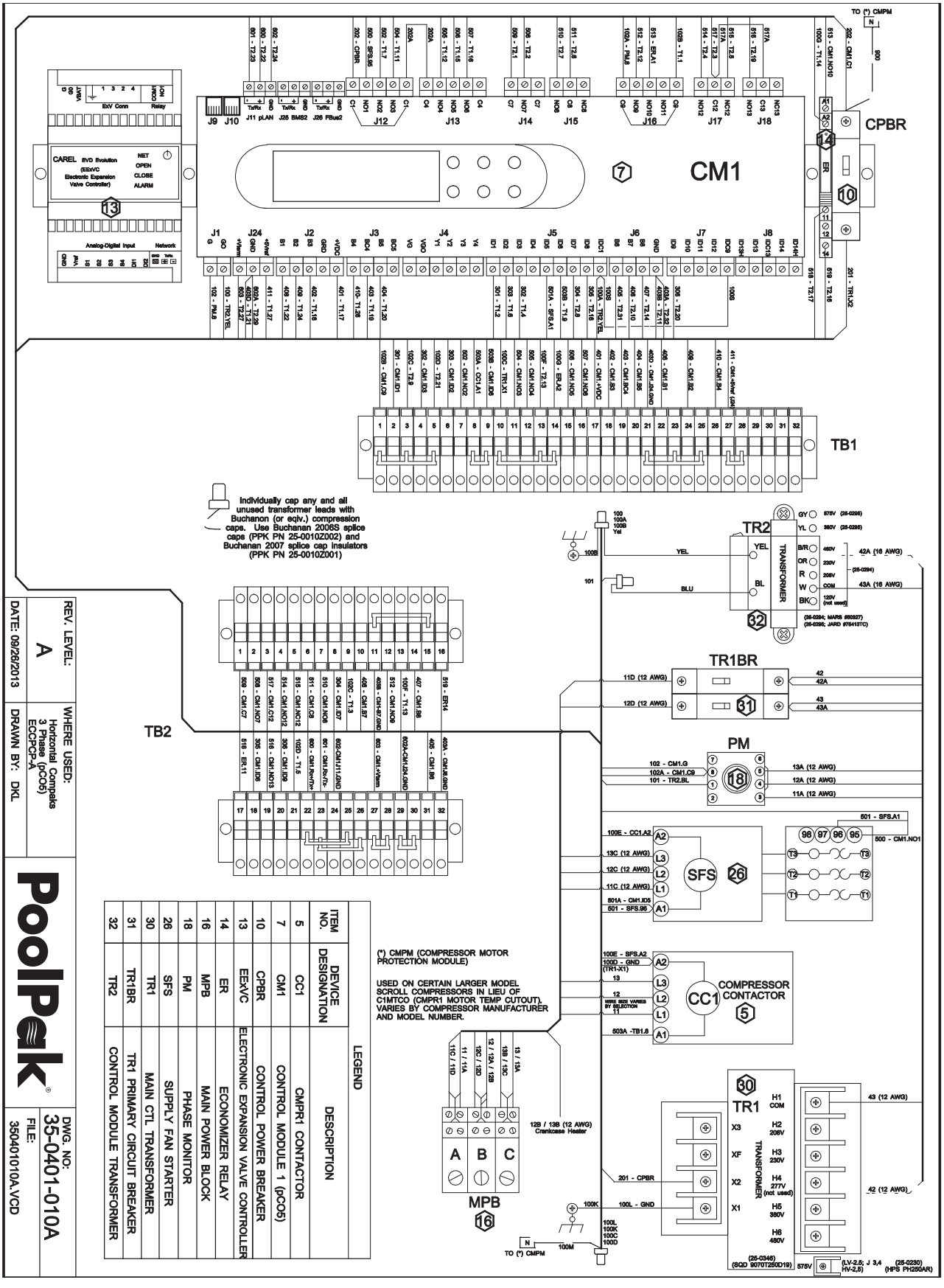
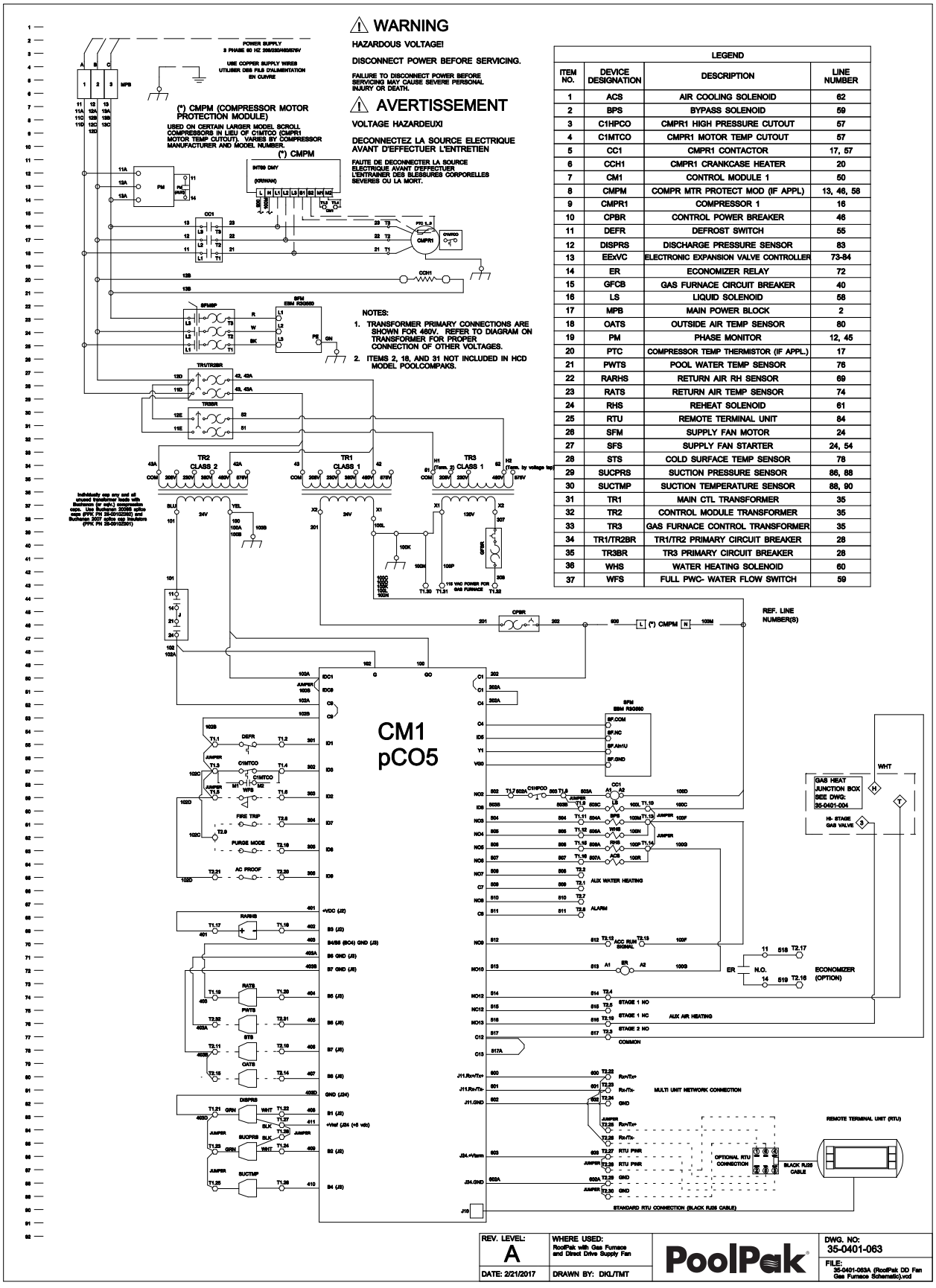


Figure 6-11. RoofComPak Factory Wiring Diagram



LEGEND			
ITEM NO.	DEVICE DESIGNATION	DESCRIPTION	LINE NUMBER
1	ACS	AIR COOLING SOLENOID	62
2	BPS	BYPASS SOLENOID	59
3	C1HPCO	CMPR1 HIGH PRESSURE CUTOUT	57
4	C1MTCO	CMPR1 MOTOR TEMP CUTOUT	57
5	CC1	CMPR1 CONTACTOR	17, 57
6	CCH1	CMPR1 CRANKCASE HEATER	20
7	CM1	CONTROL MODULE 1	50
8	CMPM	COMPR MTR PROTECT MOD (IF APPL)	13, 46, 58
9	CMPR1	COMPRESSOR 1	16
10	CPBR	CONTROL POWER BREAKER	48
11	DEFR	DEFROST SWITCH	55
12	DISPRS	DISCHARGE PRESSURE SENSOR	83
13	EExVC	ELECTRONIC EXPANSION VALVE CONTROLLER	73-84
14	ER	ECONOMIZER RELAY	72
15	GFCB	GAS FURNACE CIRCUIT BREAKER	40
16	LS	LIQUID SOLENOID	58
17	MPB	MAIN POWER BLOCK	2
18	OATS	OUTSIDE AIR TEMP SENSOR	80
19	PM	PHASE MONITOR	12, 45
20	PTC	COMPRESSOR TEMP THERMISTOR (IF APPL.)	17
21	PWTS	POOL WATER TEMP SENSOR	76
22	RARHS	RETURN AIR RH SENSOR	69
23	RATS	RETURN AIR TEMP SENSOR	74
24	RHS	REHEAT SOLENOID	61
25	RTU	REMOTE TERMINAL UNIT	84
26	SFM	SUPPLY FAN MOTOR	24
27	SFS	SUPPLY FAN STARTER	24, 54
28	STS	COLD SURFACE TEMP SENSOR	78
29	SUCPRS	SUCTION PRESSURE SENSOR	86, 88
30	SUCTMP	SUCTION TEMPERATURE SENSOR	88, 90
31	TR1	MAIN CTL TRANSFORMER	35
32	TR2	CONTROL MODULE TRANSFORMER	35
33	TR3	GAS FURNACE CONTROL TRANSFORMER	35
34	TR1/TR2BR	TR1/TR2 PRIMARY CIRCUIT BREAKER	28
35	TR3BR	TR3 PRIMARY CIRCUIT BREAKER	28
36	WHS	WATER HEATING SOLENOID	60
37	WFS	FULL PWC- WATER FLOW SWITCH	59

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Figure 6-12. ComPak and RoofComPak Startup Checklist

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DOC# SVW06-STARTUP-20170630

ComPak & RoofComPak Warranty Registration and Startup Form

Date: _____ Technician Name: _____ Company: _____

Job Name: _____ Facility Contact Name: _____

Address: _____ City: _____ State: _____ Zip: _____

PCP Model Number: _____ PCP Serial Number: _____

PAC Model Number: _____ PAC Serial Number: _____

Please note all discrepancies in the space provided for the sections throughout this startup report.

GENERAL INSTALLATION REVIEW

___ 1. Check installation to ensure proper:

a) support for unit (flat, level foundation supported minimum four corners and every 4')

b) service accessibility (36" minimum all sides)

c) supply and return ductwork installation

d) pool water piping, heat-tape, insulation (AW models only)

e) AW**V**/HCD**V** – Condensate drain & overflow lines connected separately and run to a drain (no traps)

f) AW**H**/HCD**H** – Condensate drain trapped, heat taped/insulated (outdoor only) and run to a drain

___ 2. Verify that the main electrical services for proper voltage, fusing/breakers and wire sizes are in accordance with the MCA/MOCP info on ComPak unit data plate.

___ 3. If the Remote Interface Unit (display/keypad) is mounted remotely, verify that the wiring is correct based on the field wiring diagram. If you are unable to verify correct wiring, remove the wires from T2.25-T2.30 until verification is obtained.

Incorrect field wiring can cause damage to the RIU or CommandPak Control System. Failures due to improper wiring will not be covered under warranty.

___ 4. If connected at the unit, verify the factory RJ-25 black cable is connected to the **J10** port on the CM1.

___ 5. Check to see that field-mounted surface sensor is properly installed and field wires connected to terminals T2.10 & T2.11 of the ComPak control panel.
NOTE: This sensor is installed on these terminal strips from the factory. It must be removed for field installation.

___ 6. If shipped separately from the unit, install the CM1 (Carel PCO5M) on the din rails and connect all the plugs to their appropriate terminals.

Incorrect connections can cause improper operation or damage to the CommandPak and unit components. Failure due to improper plug connections will not be covered under warranty.

DO NOT TURN ON MAIN POWER FOR THE UNIT AT THIS TIME.

1

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DEHUMIDIFICATION THAT WORKS

DOC# SVW06-STARTUP-20170630

PRE-START INSPECTION

___ 1. Check electrical connections in the ComPak unit for tightness. Include all screw terminals and wiring lugs on all breakers, motor contactors and field wiring terminals.

___ 2. **NOTE:** Some terminals on the ***line side*** of the Main Power Block may contain factory wiring. Verify that the incoming power wires were not landed on one of the terminals used from the factory. ***Failure to verify may cause damage to wiring or components and will not be covered under warranty.***

___ 3. Verify proper pulley alignment and belt tension on the blower (about 1" of deflection). Check that the setscrews on the pulleys are tight. (Not present on RoofComPak)

FAN OPERATION

___1. Turn on the main power breaker or disconnect to the unit.

___ 2. On Single-Phase units, skip to step 3. On **3-Phase units**, Check the Siemens phase monitor. If the display shows the correct voltage (U1-U2), skip to step 3. If there is a flashing symbol on the display, turn off the main power breaker and switch any two legs of the ***incoming power at the main power block***. Reapply power and verify that the display shows the correct voltage. If you have any other problems, please contact the factory.

___ 3. On the ComPak electrical panel, the white 2-pole breaker labeled TR1BR and place the Control Power Breaker (CPBR) in the **ON (-)** position. The CommandPak CM1 will display "Loading", the RIU will beep 5 times and then both will display "CommandPak PCP Control System" and the firmware version and revision date.

Record the firmware version: **Ver: _____**

NOTE: If it displays anything lower than **Ver:4.04**, contact PoolPak Service *immediately* for ComPak Firmware Revision instructions and files.

Throughout this checklist, the first button listed refers to the RIU, the button in ( ) refers to the CM1. When more than one button is listed in ( ), both buttons must be pressed and released simultaneously. Use the ENTER (↵) *button to enter changes or move the cursor to the next field.*

Always remember to return the cursor to the upper left corner of a screen before attempting to move to the next screen.

___ 4. The supply fan motor will start approximately 10 seconds after power is applied.
NOTE: If the amps are above the FLA value, the duct static pressure may be lower than design. If above FLA, adjust the motor pulley out to lower the amperage below the FLA value. If you are unable to get the amps below the rated FLA, contact the factory immediately.

Record the following data:				ComPak Nameplate
Supply fan volts	1-2 _____V	1-3 _____V	2-3 _____V	_____ V
Supply fan amps	1 _____A	2 _____A	3 _____A	_____ FLA
Supply fan speed (RoofComPak only – See Detailed Status screens)				_____ RPM

2

PoolPak® DEHUMIDIFICATION THAT WORKS

DOC# SVW06-STARTUP-20170630

AUXILIARY AIR HEAT TEST

___ 1. If unit is equipped with a gas-fired furnace for auxiliary air heat, verify that a regulation device is present. Use a manometer to verify that the entering gas pressure is not exceeding the max on the nameplate of the furnace. Turn on all gas valves, both inside the ComPak and external. On Modine furnaces, turn on the toggle switch for the electronic gas valve.

___ 2. If unit is equipped with an duct-mounted electric coil for auxiliary air heat, verify proper field wiring, disconnect size and fuse or breaker size. Turn on disconnect.

___ 3. Place the controller into manual output test mode by setting the following: Press the PRG (⊙) button. The screen will show “Main Menu – Status Screens”. Press the UP ARROW (▲) to select “Main Menu – Service” and then press the ENTER (↵) button. “Password Required” is displayed. Use the UP ARROW (▲) to change the number to: **0005** and press the ENTER (↵) button. The display will show “Main Menu – Service – I/O Configuration”.

Press the UP ARROW (▲) to select “Main Menu – Service – Manual Mode” and then press the ENTER (↵) button. “Password Required” is displayed. Use DOWN ARROW (▼) to change the number to: **9995** and press the ENTER (↵) button. The display will show “Main Menu – Service – Manual Mode – Demand Control”. Press the UP ARROW (▲) to select “Main Menu – Service – Manual Mode – Digital Outp Ctl” and then press the ENTER (↵) button. The screen will display “Digital Outp Ctl 1 – Improper use may cause equipment damage! ESC to exit”.

Press the DOWN ARROW (▼) so that “Digital Outp Ctl 2” is displayed. Press the ENTER (↵) button to move the cursor next to “AuxHt 1 Output”. Press the UP ARROW (▲) to change it from AUTO to ON and press ENTER (↵).

___ 2. The Auxiliary Air Heat 1 output should turn on. Verify if auxiliary air stage one control is on. This could be an electric heat contactor, a furnace ignition or a hot water valve actuator.
Did the Aux Air Heat 1 turn on? **YES** or **NO**

___ 3. Repeat this process if there is a second stage of Auxiliary Air Heat.
Did the Aux Air Heat 2 turn on? **YES** or **NO**

___ 4. If aux air heat worked properly, change the output(s) back to **AUTO**. If not contact PoolPak Service.

COMPRESSOR STARTUP

Note: Do not open the ball valves for the air-cooled or water-cooled condenser line set.

___ 1. Record the voltage on the line side of the compressor contactor:

Compressor 1A 1-2 ____V 1-3 ____V 2-3 ____V

___ 2. Press the PRG (⊙) button. The screen will show “Main Menu – Status Screens”. Press ENTER (↵) then press the DOWN ARROW (▼) and record the following data:

SPACE TEMP: _____°F OUTSIDE TEMP (Economizer units only): _____°F
SPACE RH: _____%
SPACE DEWPOINT: _____°F POOL TEMP (AW models only) _____°F

3

PoolPak DEHUMIDIFICATION THAT WORKS

DOC# SVW06-STARTUP-20170630

___3. Press the PRG (⊙) button. The screen will show “Main Menu – Status Screens”. Press the DOWN ARROW (▼) until “Main Menu – Detailed Status” is displayed and then press ENTER (↵). Press the DOWN ARROW (▼) and record the following data:

SURFACE TEMP:	_____°F	DISCH PRESS:	_____PSIG
DEWPOINT:	_____°F	SUCT PRESS:	_____°F
DEWPOINT SETPOINT:	_____°F	SUCT TEMP:	_____°F
		SUCT SH:	_____°F

___ 4. If you find any discrepancies between the values recorded above and the actual conditions, please contact PoolPak Service for assistance.

COMPRESSOR AIR REHEAT MODE

*Please note: The Space Air Temp must be **above 75° F** for the compressor to operate. If it is not at least **75° F**, allow the auxiliary heat to raise the temperature before proceeding.*

___ 1. To place the controller into Demand Control Mode: Press the PRG (⊙) button. The screen will show “Main Menu – Status Screens”. Press the UP ARROW (▲) to select “Main Menu – Service” and then press the ENTER (↵) button. “Password Required” is displayed. Use the UP ARROW (▲) to change the number to: **0005** and press the ENTER (↵) button.

Press the UP ARROW (▲) to select “Main Menu – Service – Manual Mode” and then press the ENTER (↵) button. “Password Required” is displayed. Use DOWN ARROW (▼) to change the number to: **9995** and press the ENTER (↵) button. The display should show “Main Menu – Service – Manual Mode – Demand Control”. Press the ENTER (↵) button.

Press the ENTER (↵) button to move the cursor next to “**CMPR HEAT**”. Press the UP ARROW (▲) to change it from NO to **YES** and press ENTER (↵).

___ 2. Once the compressor has been operating for at least 10 minutes press the PRG (⊙) button. The screen will show “Main Menu – Status Screens”. Press ENTER (↵) then press the DOWN ARROW (▼) and record the following data:

SPACE TEMP:	_____°F	OUTSIDE TEMP (Economizer units only):	_____°F
SPACE RH:	_____%		
SPACE DEWPOINT:	_____°F	POOL TEMP (AW models only)	_____°F

___ 3. Press the PRG (⊙) button. The screen will show “Main Menu – Status Screens”. Press the DOWN ARROW (▼) until “Main Menu – Detailed Status” is displayed and then press ENTER (↵). Press the DOWN ARROW (▼) and record the following data:

SURFACE TEMP:	_____°F	DISCH PRESS:	_____PSIG
DEWPOINT:	_____°F	SUCT PRESS:	_____°F
DEWPOINT SETPOINT:	_____°F	SUCT TEMP:	_____°F
		SUCT SH:	_____°F

4

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DOC# SVW06-STARTUP-20170630

POOL WATER HEATING – AW UNITS ONLY (HCD UNITS SKIP TO AIR COOLING MODE)

___ 1. Verify that there is a wire connecting to the ground lug labeled "POOL BONDING LUG" and that the rest of the wet metal surfaces from the pool system (boiler, lights, ladder, etc.) have been bonded to each other and then to ground.

NOTE: Improperly bonded metal components or piping are prone to galvanic corrosion and <u>will not be covered under warranty</u>.

___ 2. If present, start the ComPak secondary loop pool water pump.

___ 3. To place the controller into Demand Control Mode: Press the PRG (⊙) button. The screen will show "Main Menu – Status Screens". Press the UP ARROW (▲) to select "Main Menu – Service" and then press the ENTER (↵) button. "Password Required" is displayed. Use the UP ARROW (▲) to change the number to: **0005** and press the ENTER (↵) button.

Press the UP ARROW (▲) to select "Main Menu – Service – Manual Mode" and then press the ENTER (↵) button. "Password Required" is displayed. Use DOWN ARROW (▼) to change the number to: **9995** and press the ENTER (↵) button. The display should show "Main Menu – Service – Manual Mode – Demand Control". Press the ENTER (↵) button.

Press the ENTER (↵) button to move the cursor next to "**POOL HEAT**". Press the UP ARROW (▲) to change it from NO to **YES** and press ENTER (↵).

___ 4. After 5 minutes, press the PRG (⊙) button. The screen will show "Main Menu – Status Screens". Press ENTER (↵) then press the DOWN ARROW (▼) and record the following data:

SPACE TEMP:	_____°F	OUTSIDE TEMP (Economizer units only):	_____°F
SPACE RH:	_____%		
SPACE DEWPOINT:	_____°F	POOL TEMP (AW models only)	_____°F

___ 5. Press the PRG (⊙) button. The screen will show "Main Menu – Status Screens". Press the DOWN ARROW (▼) until "Main Menu – Detailed Status" is displayed and then press ENTER (↵). Press the DOWN ARROW (▼) and record the following data:

SURFACE TEMP:	_____°F	DISCH PRESS:	_____PSIG
DEWPOINT:	_____°F	SUCT PRESS:	_____°F
DEWPOINT SETPOINT:	_____°F	SUCT TEMP:	_____°F
		SUCT SH:	_____°F

AIR COOLING MODE

If equipped with an *integrated (factory installed)* air-cooled condenser, skip to Step 2 below.

If equipped with a *remote* air-cooled or water-cooled condenser, verify that the air-cooled or water-cooled condenser and refrigerant piping has been pressure tested to at least 450 PSI and then placed into a vacuum. use a recovery machine to add the necessary field refrigerant charge to the A/C lineset or condenser. The additional oil should be added to the suction line while the compressor is operating in A/C mode. Refer to the IOM or contact PoolPak Service for assistance in calculating the required field refrigerant and oil amounts.

5

PoolPak DEHUMIDIFICATION THAT WORKS

DOC# SVW06-STARTUP-20170630

NOTE: Failure to add the correct amount and type of refrigerant and oil will void the warranty.

If equipped with *remote* ***or*** *integrated* water-cooled condenser for air cooling, verify water flow is present. On a chilled water condenser, verify that the bypass valve over the water-regulating valve is **OPEN**.

___ 1. Open the ball valves to the A/C condenser (not present on RoofComPak integrated ACC).

___ 2. To place the controller into Demand Control AIR COOL Mode: Press the PRG (⊙) button. Press the UP ARROW (▲) to select "Main Menu – Service" and then press the ENTER (↵) button. "Password Required" is displayed. Use the UP ARROW (▲) to change the number to: **0005** and press the ENTER (↵) button.

Press the UP ARROW (▲) to select "Main Menu – Service – Manual Mode" and then press the ENTER (↵) button. "Password Required" is displayed. Use DOWN ARROW (▼) to change the number to: **9995** and press the ENTER (↵) button. The display should show "Main Menu – Service – Manual Mode – Demand Control". Press the ENTER (↵) button.

Press the ENTER (↵) button to move the cursor next to "**CMPR HEAT**". Press the UP ARROW (▲) to change it from YES to **NO** and press ENTER (↵).

Press the ENTER (↵) button to move the cursor next to "**AIR COOLING**". Press the UP ARROW (▲) to change it from NO to **YES** and press ENTER (↵).

___ 3. After 10 minutes, press the PRG (⊙) button. The screen will show "Main Menu – Status Screens". Press ENTER (↵) then press the DOWN ARROW (▼) and record the following data:

SPACE TEMP:	_____°F	OUTSIDE TEMP (Economizer units only):	_____°F
SPACE RH:	_____%		
SPACE DEWPOINT:	_____°F	POOL TEMP (AW models only)	_____°F

___ 4. Press the PRG (⊙) button. The screen will show "Main Menu – Status Screens". Press the DOWN ARROW (▼) until "Main Menu – Detailed Status" is displayed and then press ENTER (↵). Press the DOWN ARROW (▼) and record the following data:

SURFACE TEMP:	_____°F	DISCH PRESS:	_____PSIG
DEWPOINT:	_____°F	SUCT PRESS:	_____°F
DEWPOINT SETPOINT:	_____°F	SUCT TEMP:	_____°F
		SUCT SH:	_____°F

Amount of refrigerant added: _____ Lbs. Compressor oil: Type: _____ Amount: _____ Oz.

Lineset info: Total length: _____ Ft. Pipe Size: _____" Vapor _____" Liquid

Condenser Elevation: _____ Ft. Circle one: Above or Below ComPak unit.

NOTE: Failure to add the correct amount and type of refrigerant and oil will void the warranty.

6

DOC# SVW06-STARTUP-20170630

UNIT RESET

___ 1. Once testing is complete, place the Control Power Breaker (CPBR) in the **OFF** position.

___ 2. Wait 15 seconds and then place the Control Power Breaker (CPBR) in the **ON** position. This will allow the unit to start in automatic mode. ***It is essential to cycle power after performing manual testing.***

PARALLEL CONTROL (Only applies when multiple ComPak units are controlling the same space)

___ 1. For multiple CPCS-PCP to control in parallel, there **must** be field-installed Category 5 cable run between the ComPak control panel terminal strip T2, 22-24. Are the units interlocked? YES or NO

___ 2. Press the PRG (⊙) button. Press the UP ARROW (▲) to select "Main Menu – Service" and then press the ENTER (↵) button. "Password Required" is displayed. Use the UP ARROW (▲) to change the number to: **0005** and press the ENTER (↵) button.

Press the UP ARROW (▲) to select "Main Menu – Service – Network Config" and then press the ENTER (↵) button. "Password Required" is displayed. Use DOWN ARROW (▼) to change the number to: **9995** and press the ENTER (↵) button.

___ 3. Go through the options to set them per the job:

Enable Network Ctl: YES or NO Pool Temp Ctl: YES or NO Staged Dehum Ctl: YES or NO

REMOTE COMMUNICATIONS WIRING & SETUP

___ 1. Verify that the remote communications parameters in the CPCS-PCP are set properly from the factory as required for LonWorks, Modbus, Bacnet IP or Bacnet MS/TP. See IOM for details.

___ 2. For LonWorks, Modbus and BACnet MS/TP, verify that the field wiring is connected to the terminals of the serial card jack (BMS Card) on the bottom of CM1.

___ 3. If equipped with an Virtual-Tech RAP or BACnet IP, verify that the field provided Ethernet cable is connected to the RJ-45 jack in the serial card slot of the CM1. Refer the customer's IT staff to complete the "CPCS-PCP RAP Network Configuration" form from www.poolpak.com. If this form is complete, please use the CPCS-PCP to configure the addressing.

___ 4. Is the RAP or Building Automation System communicating? (If applicable) **YES NO**

SETPOINTS

___ 1. Enter the setpoints based on the build sheet in the control panel. Record the setpoints below:

Space temperature ____°F Space relative humidity ____%

Pool water temperature #1 ____°F Pool water temperature #2 ____°F

7

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DOC# SVW06-STARTUP-20170630

GENERAL INSTALLATION NOTES:

_____

_____

_____

_____

WARNING: The factory warranty is VOID if a completed copy of the ComPak Warranty Registration & Startup Form is not provided to PoolPak Service within 7 days of the initial start-up date. PoolPak LLC will not be held responsible for improper installation procedures.

8

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⚠ WARNING!

The proceeding 7 pages for the startup checklist are required or the unit warranty will be voided.
Follow the instructions as specified.

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