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MODEL NOMENCLATURE

CA 012 - 1 U L C - XXX

SERIES:
CA - R-410A Refrigerant Slope Top

VOLTAGE DESIGNATION:
0 - 115/1/60
1 - 208/1/60 & 230/1/60
2 - 265/1/60
8 - 8-220-240/1/50

WATER CONNECTION:
L - Left (Standard)
R - Right (Optional)

HEAT EXCHANGER
C - Copper
N - Cupro-Nickel

CONTROLS:
U - Manual/Auto Change Over (Unit Mounted)
R - Remote Thermostat
S - Master/Slave with Remote Thermostat

NOT USED

ISO 9001:2000 Certified
INTRODUCTION:

The FHP console water source heat pumps are designed for use as decentralized room terminals that are field connected to a closed-circuit piping loop within a structure. Typically these units are installed in perimeter zones and are ideal for installations where ducted systems are impractical.

All FHP Console Series units are designed for boiler/tower systems geothermal closed loop applications and can operate with fluid temperatures as low as 25°F in heating and as high as 110°F in cooling. Units are available in 3/4, 1, 1-1/4 and 1-1/2 tons nominal capacity in cooling. Refer to the unit specification sheet for precise performance figures at various entering air and water conditions.

NOTE: Console units are designed for indoor installation in the conditioned space only. Do not install outdoors, in attics or in any other location that would subject the unit to extreme temperature or humidity or to corrosive environments. Doing so will inhibit performance, reliability and service life of the unit.

SAFETY CONSIDERATIONS:

Installation and servicing of this system can be hazardous due to system pressure, electrical components and moving parts. Only trained and qualified service personnel should install and service this equipment. Untrained personnel can perform basic maintenance such as cleaning coils/cabinet or replacing filters.

**WARNING:** Before performing service or maintenance operations on system, turn off main power to unit. On units with unit mounted controls, the On/Off switch DOES NOT disconnect the unit from main power. High voltage components or moving parts can cause injury or death.

When working on this equipment, always observe precautions described in the literature, tags and labels attached to the unit. Follow all safety codes. Wear safety glasses and work gloves. Use a quenching cloth for brazing operations and place a fire extinguisher close to the work area.

This unit is designed to be operated with the cabinet, subbase and filter in place. Never operate unit without the cabinet and filter in place or with open access panels. Doing so can expose the operator to hazardous voltage and moving parts and can damage the equipment.

**INITIAL INSPECTION, MOVING AND STORAGE:**

Inspect the carton or packaging of each console unit as it is received at the job site and before signing the freight bill. Note any damage or shortage on all copies of the freight bill. Concealed damage must be reported to the carrier within 24 hours of receipt.

Unit wiring diagrams and Installation/Operation manuals are provided with each unit. Read these manuals prior to start up to become familiar with the unit and its operation.

Note that an Installation/start-up checklist is provided at the end of this manual to encourage thorough unit check-out at start-up.

Take care when moving the unit as most of the unit’s weight is located on the left (compressor) end. Always store and move unit in an upright position. Take care to protect the unit cabinet and subbase when moving or storing. Never move or lift unit by its water connections.

If the equipment is not needed for immediate installation, it should be stored in its original packaging in a clean, dry area. Units must be moved and stored in an upright position, never lay the unit on its side. When storing, do not stack units.

**INSTALLATION:**

Before installing the unit, examine each pipe, fitting and valve; remove any dirt or debris found on or in these components. Use care when installing the system components to avoid damage to the cabinet finish or chassis.

1. After removing the console unit from its packaging remove the cabinet by removing the cabinet screws on either side of the unit and lifting the cabinet off the chassis. Set the cabinet aside and cover it (the console unit’s packaging can be used for this purpose).

2. Position the sub base directly on the finished floor. Make sure the sub base is level (use shims if necessary). The sub base has a frame that supports the cabinet and may be secured to wall.

3. Position the chassis onto the sub base. Check and align electrical, water and condensate connections and secure to the sub base with 4 screws.

4. Before connecting the unit to water, make sure that the loop has been properly flushed. After flushing the system, connect piping or hoses to the proper supply, return and condensate connections. Refer to the piping section of this manual for more information.

5. Make all necessary electrical connections to the unit. Refer to the unit wiring diagram and the Electrical section of this manual.

**CAUTION:** When making electrical connections to the unit make sure that the power is disconnected. Failure to do disconnect power before connecting power wiring to the unit can result in serious injury or death and damage to the unit.

6. Make sure the unit’s washable filter is clean and installed in the subbase. Also make sure that the filter clip is in place.

7. Reinstall the unit cabinet via locating pins at the top of the chassis and two screws in the unit subbase.
PIPING:

SUPPLY AND RETURN PIPING:
The following items should be adhered to in addition to applicable piping codes.

- A drain valve at the base of each riser to enable proper flushing of the system at startup and during servicing.
- Shut-off/Isolation ball valves at the supply and return connections and unions at each unit to permit proper flow balancing and unit servicing.
- Strainers at the inlet of each circulating pump.
- Use of teflon tape on threaded pipe fittings to eliminate water leaks and insure against air entering the system.
- Flexible hose connections between the unit and the rigid system to eliminate the possibility of vibration transmission through the piping.
- Insulation is not normally required on supply and return piping for boiler tower installations except in unheated sections or outdoor runs.
- Insulation is required for closed-loop geo-thermal installations as loop temperatures may fall below the dew point and can even fall below the freezing point of water during heating season.

CONDENSATE PIPING:
Console units are designed with a blow-through configuration in the air handling section. This means that there is positive pressure at the unit drain pan and thus trapping is not required. Condensate is routed from the drain pan via a 5/8" non-pressure rated vinyl hose that is located below the supply and return water connections.

Though horizontal runs of condensate piping are usually too short to pose problems, horizontal runs should be pitched at least 1 inch for every 10 feet of piping. Avoid low spots or unpitched piping, as these areas can collect sediment and eventually block condensate flow.

Always inspect both internal and external condensate piping for kinks that could block condensate flow.

HOSE KITS:
When using optional hose kits follow the manufacturer’s recommendations for installation. Never stretch or twist hoses and never use hoses that show external wear or damage or are suspected of having damage. Never exceed the manufacturer’s maximum working pressure recommendations.

ELECTRICAL:

CAUTION: Use only copper conductors for field installed electrical wiring. Always make sure that the power disconnect is open before performing service on the unit’s electrical circuits.

Field wiring must comply with local and national fire, safety and electrical codes. Power to the unit must be within the operating voltage range indicated on the unit chassis nameplate or the performance data sheet.

Properly sized fuses or HACR breakers must be installed for branch circuit protection. See unit chassis name plate for maximum size.

Each chassis is supplied with a 2 x 4 junction box for power connection. Inside this box there are 2 pigtail leads for power wiring. The field ground is to be connected to the ground connection on the junction box.

On remote thermostat and master/slave units there are also 5 position terminal blocks for low voltage thermostat or slave unit connection. On remote thermostat units, connect the thermostat wires to the low voltage terminal block. On master/slave units connect the thermostat to the "Master" terminal block of the lead unit and the "Slave" terminal block to the "Master" terminal block of the next unit, daisy chaining the units together as required. Note that there is no limit to the number of units that can be connected together in this manner as each unit provides its own low voltage power supply.

NOTE: All 208/230 volt (-1 voltage code) units are factory wired to 230 volts unless ordered otherwise. In 208 voltage applications the transformer wiring may need to be switched from the 230 volt tap to the 208 volt tap. Cap all unused leads.

COOLING TOWER/BOILER APPLICATIONS:
The cooling tower and boiler water loop temperature is usually maintained between 50°F and 100°F to assure adequate cooling and heating performance.

In the cooling mode, heat is rejected from the console unit into the water loop. A cooling tower provides evaporative cooling to the loop water thus maintaining a constant supply water temperature to the unit. When utilizing open cooling towers chemical water treatment is mandatory to ensure the water is free from corrosive elements. A secondary heat exchanger may also be used between the unit and the cooling tower water. In closed loop systems such as this it is imperative that all air be removed from the closed side of the system to insure against fouling of the heat pump water-to-refrigerant heat exchanger.

In the heating mode, heat is absorbed from the loop by the console unit. A boiler may be used to maintain the loop at the desired temperature.

No unit should be connected to the supply or return piping until the water system has been completely cleaned and flushed to remove any dirt, piping chips or...
other foreign material. Supply and return hoses should be connected together during this process to ensure the entire system is properly flushed. After the cleaning and flushing has taken place the unit may be connected to the water loop and should have all valves wide open.

**EARTH COUPLED SYSTEMS:**

Closed loop and pond applications require specialized design knowledge. No attempt at these installations should be made unless the contractor has received specialized training.

Anti freeze solutions are utilized when low evaporating conditions are expected to occur (I.E.: low loop temperatures in heating). Typical temperatures are 30°F fluid temperature in heating and 100°F in cooling.

**MAINTENANCE:**

1) Filter changes or cleanings are required at regular intervals. The time period between filter changes will depend upon type of environment the equipment is used in. In a single family home, that is not under construction, changing or cleaning the filter every 60 days is sufficient. In other applications, such as motels, where daily vacuuming procedures a large amount of lint, filter changes may need to be as frequent as biweekly.

2) An annual “checkup” is recommended by a licensed refrigeration mechanic. Recording the performance measurements of volts,amps, and water temperature differences (both heating and cooling) is recommended. This data should be compared to the information on the unit’s data plate and the data taken at the original startup of the equipment.

3) Lubrication of the blower motor is not required.

4) The condensate drain should be checked annually by cleaning or flushing to insure proper drainage.

5) Periodic lockouts almost always are caused by air or water flow problems. The lockout (shut down) of the unit is a normal protective measure in the design of the equipment. If continual lockouts occur call a mechanic immediately and have them check for: water flow problems, water temperature problems, air flow problems or air temperature problems. Use of the pressure and temperature charts for the unit may be required to properly determine the cause.

**SYSTEM CHECKOUT:**

- Verify that the low voltage wiring between the thermostat and the unit is correct.
- Verify that the water piping is complete and correct.
- Check that the water flow is correct, and adjust if necessary.
- Check the blower for free rotation, and that it is secured to the shaft.
- Verify that vibration isolation has been provided.
- Unit is serviceable. Be certain that all access panels are secured in place.

**UNIT START-UP:**

1. Set the thermostat to the highest setting.

2. Set the thermostat system switch to "COOL", and the fan switch to the "AUTO" position. The reversing valve solenoid should energize. The compressor and fan should not run.

3. Reduce the thermostat setting approximately 5 degrees below the room temperature.

4. Verify the heat pump is operating in the cooling mode.

5. Turn the thermostat system switch to the "OFF" position. The unit should stop running and the reversing valve should deenergize.

6. Leave the unit off for approximately (5) minutes to allow for system equalization.

7. Turn the thermostat to the lowest setting.

8. Set the thermostat switch to "HEAT".

9. Increase the thermostat setting approximately 5 degrees above the room temperature.

10. Verify the heat pump is operating in the heating mode.

11. Set the thermostat to maintain the desired space temperature.

12. Check for vibrations, leaks, etc...

**FREEZE SENSOR**

This is optional and can be set to ignore or monitor a freeze sensor. There are 2 configurable freeze points, 35°F & 15°F. The unit will enter a soft lock out until the temperature climbs above the set point and the anti-short cycle time delay has expired. The freeze sensor may not provide protection in the case of loss of flow in the heating mode. A flow switch or pressure differential switch is recommended to prevent unit operation in case of loss of flow.
UNIT PROTECTION MODULE (UPM)

The Unit Protection Module (UPM) as shown in figure 1, is a printed circuit board (PCB) that interfaces with the thermostat or the digital direct controller.

The main purpose of this device is to protect the compressors by monitoring the different states of switches and sensors of each refrigerant circuit, this device provides time delays and protects the unit against freezing of the water and refrigerant heat exchangers as well as condensate overflow when the appropriate sensors are installed.

![Figure 1](image)

Alarm output is Normally Open (NO) dry contact. If 24 VAC output is needed R must be wired to the ALR-COM terminal; 24VAC will be available on the ALR-OUT terminal when the unit is in alarm condition. If pulse is selected the alarm output will be pulsed.

POWER RANDOM START UP

This feature prevents multiple units sharing same electrical circuit or network from starting at the same time.

It assures that Heat Pumps sharing the same electrical circuit do not demand high inrush currents simultaneously when starting back up after a power failure.

If the controller has been completely powered down for more than 28 milliseconds, a random delay is initiated typically the unit will start between the time range of 270 and 300 seconds, this only if the controller is set to normal operation (test switch set to NO).

In order for the random sequence to initiate the unit power must be removed completely.

IMPORTANT: If the board is set to “TEST” mode through the “TEST” DIP switch the delay will be 10 seconds.

ANTI SHORT CYCLE DELAY

This feature protects the compressor short cycling if the Y call is set and removed.

The anti short cycle delay is 300sec delay on break during normal operation.

NOTE: If the board is set to test mode through the “TEST” DIP switch the delay will be 5 seconds.

Y CALL

The UPM will energize the compressor’s output (CC) in an event of a “Y” call from a thermostat or controller (after the random start up and/or the anti short cycle delays have elapsed). Y input terminal must be energized with a 24 VAC signal.

HIGH AND LOW PRESSURE PROTECTION

The UPM monitors the state of the High and Low pressure Switch inputs of each refrigerant circuit, HPC and LPC on the board respectively, these switches must be closed in order for the controller to energize the compressor output (CC). The CC output will only be energized when the switches are closed and the anti short cycle (and/or random start up when applicable) has expired.

HIGH PRESSURE PROTECTION

If the HPC switch is open upon a Y call the UPM will not energize the CC output and therefore the compressor will remain off, the fault LED will flash one (1) time for the HPC and the alarm contact will remain off.

If the compressor is running in normal mode on a Y call and the high pressure switch opens, the UPM will shut down the compressor output and will keep it off until the switch closes and the anti short cycle has expired. The controller will keep track of the number of times the switch opens, if within one (1) hour period the switch opens the number of times set via the DIP switch the controller will shut the compressor down and perform a hard lockout condition under this condition the alarm contact will be energized.

The UPM allows the user to configure the counts that the HPC will be allowed to open within one hour before the UPM performs a hard lockout on the compressor. The user can select either two or four times by changing switch four (4) on the DIP switch SW1 (shown on table 3) on the UPM board.

LOW PRESSURE PROTECTION

If the LPC switch is open upon a Y call the UPM will not energize the CC output and therefore the compressor will remain off, the fault LED will flash two (2) times for the LPC and the alarm contact will remain off.

If the compressor is running in normal mode on a Y call and the low pressure switch opens, the UPM will keep the compressor running for two (2) minutes if the condition remains after this period of time the compressor will shut down and the UPM will start a soft lockout. The UPM will flash two (2) times for the LPC. And the alarm contact will remain off.
If the switch closes, the UPM will start the compressor after the anti short cycle has expired. UPM will energize the compressor output.

**IMPORTANT:** To exit the hard lockout, the controller must be reset from the Y or R terminal by removing the power from the selected terminal. The user can choose which will be the reset point via the DIP switch SW1.

**GROUND**
The UPM controller takes its ground reference from the unit chassis which is connected to the controller via the C-GND spade terminal.

**DIP SWITCH SETTINGS**
The DIP switch is used to configure most of the available features of the UPM as follows:

- Alarm mode, Constant or Pulse
- Reset mode, Y signal or R signal
- Lockout mode, two (2) or four (4) Strikes
- Test mode, Normal or Test operation

The settings shown below are factory default for most heat pump applications, however, the Unit wiring diagram is the ultimate guide for factory DIP switch default settings (Figure 2).

![DIP Switch Configuration](image)

The following table is available on the UPM board as well and it depicts the switch position and its associated functionality.

<table>
<thead>
<tr>
<th>UPM Dip Switch Configuration</th>
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<tbody>
<tr>
<td>4</td>
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<tr>
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<td>2</td>
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</table>

**SELECTABLE ALARM MODE**
The UPM controller can be configured to have either a constant signal or a pulse.

If constant (CONT) is selected, the UPM will provide a closed contact until the alarm is cleared.

If pulsed (PULSE) is selected, the UPM will sequence the alarm contact with the fault LED flashes.

**FREEZE PROTECTION**
The default setting for the freeze limit trip is 30°F, however, this can be changed to 15°F by cutting the R42 resistor located on top of the DIP switch SW1.

The UPM controller will constantly monitor the refrigerant temperature with the sensor mounted close to the condensing water coil between the thermal expansion valve and water coil as shown in Figure 4. If temperature drops below or remains at the freeze limit trip for 30 seconds, the controller will shut the compressor down and enter into a soft lockout condition. Both the status LED and the Alarm contact will be active. The LED will flash (three (3) times) the code associated with this alarm condition.

**BROWNOUT PROTECTION**
The UPM controller will constantly monitor the power supply, if the nominal voltage drops below 25% of its value (18 VAC approximately), the unit will enter brownout protection mode. The compressor CC output will be de-energized and the unit will enter the soft lockout mode.

The controller will not monitor the power supply during the first 500 milliseconds of compressor start-up to avoid noise and false alarms.

Once the UPM detects a brownout condition, its fault LED will flash five (5) times as error code indication.
CONDENSATION OVERFLOW

The UPM controller continuously monitors the drain pan for high condensate water level, and to do so it utilizes a sensor and identifies an alarm condition when the sensor’s impedance drops below 230KΩ +/- 15 % (ONLY when condensate sensor option is present). Once the UPM senses this resistance value it enters into a hard lockout and reports the correspondent code via its status LED (4 flashes).

To exit the hard lockout water has to return to its normal level the UPM has to be reset by removing the power from the Y terminal (R if set on the DIP switch) the compressors will be turned on after anti short cycle expires.
UPM Sequence of Operation (SOO) Flow Chart

1. **Y1=1**
   - YES
   - NO
   - **Power/ Switchs/ Sensor Status Check**

2. **V >18VAC**
   - NO
   - **YES**

3. **HPC = 1**
   - NO
   - **YES**

4. **LPC = 1**
   - YES
   - NO
   - **Start Timer**
   - **TIME >120 SEC**

5. **FRZ > TEMP LIM**
   - NO
   - **YES**
   - **Start Timer**
   - **TIME >30 SEC**

6. **CON > 0**
   - NO
   - **YES**
   - **initial Power Up**
   - NO
   - **YES**

7. **T > ASC OR RS SEC**
   - NO
   - **YES**
   - **CC Output = On**

8. **Lockout Can Be Set To 4 Via Dip Switch**
   - **YES**
   - **COUNT = 2**
   - NO


10. **CC Output = Off**

**Start** Anti Short Cycle
    **Start** Random Start Up

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**8 CA CONSOLE SERIES**

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970-293 Revised 05-12
FAN MOTOR SPEED TAPS
UNIT HI LO CAPPED
009 BLU RED BLK
012 BLU RED BLK
015 BLU RED BLK
018 BLK RED BLK

STANDARD COMPONENTS LEGEND:
BC = BLOWER MOTOR CAPACITOR
BM = BLOWER MOTOR
BR = BLOWER RELAY
CAP = COMPRESSOR CAPACITOR
CC = COMPRESSOR CONTACTOR
CSR = COMPRESSOR SLAVE RELAY
EOVD = EXTERNAL OVERLOAD (SEE NOTE 4)
FSS = FAN SPEED SWITCH
HPS = HIGH PRESSURE SWITCH
LPS = LOW PRESSURE SWITCH
RV = REVERSING VALVE (HEAT PUMPS)
RVS = REVERSING SLAVE RELAY

FACTORY WIRE
FIELD WIRE

OPTIONAL COMPONENTS LEGEND:
• AUX = AUXILIARY RELAY (FOR LOF PUMP, ETC)
• BM = BLOWER MONITOR RELAY
• CBR = 24 VAC CIRCUIT BREAKER
• CMR = COMPRESSOR MONITOR RELAY
• CS = CONDENSATE SENSOR
• CS = DISCONNECT SWITCH (NON-FUSED)
• EMS = ENERGY MGMT SYSTEM RELAY
• FS = FREEZE SENSOR
• OAD = OUTSIDE AIR DAMPER INCLUDES:
  • DAMPER MTR (OAD)
  • DAMPER SWITCH (OMS)

NOTES:
1. SEE UNIT NAME PLATE FOR ELECTRICAL RATING.
2. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH NEC-N.F.P.A. #70, COPPER CONDUCTORS ONLY
3. 208/230V UNITS ARE FACTORY WIRE FOR 230V OPERATION. FOR 208V OPERATION, REMOVE ORG LEAD AND REPLACE WITH RED LEAD. CAP ALL UNUSED LEADS.
4. EXTERNAL OVERLOAD STANDARD ON ALL UNITS EQUIPPED WITH ROTARY COMPRESSORS.
5. FOR ALTERNATE EMS COIL VOLTAGES CONSULT FACTORY.
6. 672-1 INCLUDES BUILT IN: 270-300 SECOND RANDOM START
7. "TEST" DIP SWITCH REDUCES DELAYS TO 10 SEC WHEN SET TO YES. MUST BE SET TO "NO" FOR NORMAL OPERATION.
8. "FREEZE SENSOR" WILL OPERATE AT 0°F BY DEFAULT. IF 15°F OPERATION IS REQUIRED JUMPER R42 MUST BE CUT.
9. "ALARM OUTPUT" DIP SWITCH MUST BE SET TO "PULSE" IF BUNKING T-STAT SERVICE LIGHT IS DESIRED.
10. DEFAULT SETTINGS FOR UPM BOARD FROM FACTORY SHOWN. ALSO SEE INSTALLATION MANUAL.
11. ALARM OUTPUT IS NORMALLY OPEN (NO) DRY CONTACT. IF 24VAC IS NEEDED, CONNECT R TO ALR-COM TERMINAL, 24VAC WILL BE SENSED ON THE ALR-OUT WHEN THE UNIT IS IN ALARM CONDITION. OUTPUT WILL BE PULSED IF PULSE IS SELECTED.

1 STAGE - 1 PHASE - PSC MOTOR
CONSOLE - REMOTE THERMOSTAT - MASTER-SLAVE
UPM I

PART No. 8 733 800 948

970-293 Revised 05-12
NOTES:
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2. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH N.E.C.-N.F.P.A. #70, COPPER CONDUCTORS ONLY.
3. 208/230V UNITS ARE FACTORY WIRRED FOR 230V OPERATION. FOR 208V OPERATION,
   REMOVE ORG LEAD AND REPLACE WITH RED LEAD. CAP ALL UNUSED LEADS.
4. EXTERNAL OVERLOAD STANDARD ON ALL UNITS EQUIPPED WITH ROTARY COMPRESSORS.
5. FOR ALTERNATE EMS COIL VOLTAGES CONSULT FACTORY.
6. UNIT INCLUDES BUILT IN: 30-60 SECOND RANDOM START
   5 MINUTE DELAY ON BREAK
   90 SECOND LOW PRESSURE BYPASS
7. SERVICE LIGHT WILL BLINK ONCE ON A HIGH PRESSURE LOCKOUT
8. SERVICE LIGHT WILL BLINK TWICE ON A LOW PRESSURE LOCKOUT
9. LOCKOUTS CAN BE RESET BY CYCLING THE CONTROLLER OFF WITH THE (MODE) BUTTON

PROGRAMMING INSTRUCTIONS:
TO PROGRAM THE CONTROLLER'S USER CONFIGURABLE FEATURES PRESS THE TEMPERATURE UP AND DOWN ARROW BUTTONS SIMULTANEOUSLY AND
HOLD FOR 5 SECONDS. THIS WILL PUT THE CONTROLLER IN THE
CONFIGURATION MODE.

USE THE (MODE) BUTTON TO SELECT THE FEATURE TO BE CONFIGURED:
FAHRENHEIT/Celsius (F/C), TEMPERATURE DIFFERENTIAL, TIME DELAY/NO
TIME DELAY (de/nd), CYCLING FAN/CONSTANT FAN (CY/CO).

ONCE THE DESIRED FEATURE IS SELECTED, USE THE ARROW
BUTTONS TO ADJUST IT. THE CONTROLLER WILL REVERT TO
NORMAL OPERATION AFTER 5 SECONDS OF NO ACTIVITY.
## Operating Temperatures & Pressures Consoles

### OPERATING DATA R-410A

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### CA009

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### CA012

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## Operating Temperatures & Pressures Consoles

### OPERATING DATA R-410A

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<tr>
<th>MODEL</th>
<th>ENTERING FLUID TEMP, °F</th>
<th>FLUID FLOW GPM</th>
<th>SUCTION PRESSURE PSIG</th>
<th>DISCHARGE PRESSURE PSIG</th>
<th>FLUID TEMP RISE, °F</th>
<th>AIR TEMP DROP, °F</th>
<th>SUCTION PRESSURE PSIG</th>
<th>DISCHARGE PRESSURE PSIG</th>
<th>FLUID TEMP RISE, °F</th>
<th>AIR TEMP DROP, °F</th>
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</tr>
</tbody>
</table>

This chart shows approximate temperatures and pressures for a unit in good repair. The values shown are meant as a guide only and should not be used to estimate system charge. This chart assumes rated air flow and 80° d.b./67° w.b. entering air temperature in cooling, 70° d.b. entering air temperature in heating. Heating data at entering fluid temperatures below 50° assumes the use of antifreeze.

As a result of continuing research and development, specifications are subject to change without notice.
# UNIT CHECK-OUT SHEET

## Customer Data

Customer Name ____________________________________________ Date ________________________________

Address __________________________________________________

Phone ______________________________________________________ Unit Number __________________________

## Unit Nameplate Data

Unit Make ____________________________________________

Model Number ____________________________________________ Serial Number ________________________________

Refrigerant Charge (oz) ________

Compressor: RLA _______________ LRA _______________

Blower Motor: FLA (or NPA) ___________ HP _______________

Maximum Fuse Size (Amps) _______________

Minimum Circuit Ampacity (Amps) _______________

## Operating Conditions

<table>
<thead>
<tr>
<th></th>
<th>Cooling Mode</th>
<th>Heating Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entering / Leaving Air Temp</td>
<td>___________ / ___________</td>
<td>___________ / ___________</td>
</tr>
<tr>
<td>Entering Air Measured at:</td>
<td>___________</td>
<td>___________</td>
</tr>
<tr>
<td>Leaving Air Measured at:</td>
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<tr>
<td>Entering / Leaving Fluid Temp</td>
<td>___________ / ___________</td>
<td>___________ / ___________</td>
</tr>
<tr>
<td>Compressor Volts / Amps</td>
<td>___________ / ___________</td>
<td>___________ / ___________</td>
</tr>
<tr>
<td>Blower Motor Volts / Amps</td>
<td>___________ / ___________</td>
<td>___________ / ___________</td>
</tr>
<tr>
<td>Fluid Flow (gpm)*</td>
<td>___________</td>
<td>___________</td>
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<tr>
<td>Fluid Side Pressure Drop*</td>
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<tr>
<td>Suction / Discharge Pressure (psig)*</td>
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<td>Suction / Discharge Temp*</td>
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<td>Liquid Subcooling*</td>
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<td>___________</td>
</tr>
</tbody>
</table>

* Required for Troubleshooting ONLY

## Auxiliary Heat

Unit Make ____________________________________________

Model Number ____________________________________________ Serial Number ________________________________

Max Fuse Size (Amps) _______________

Volts / Amps _______________ / _______________

Entering Air Temperature _______________

Leaving Air Temperature _______________
FHP introduces the latest in console solid state control technology. Designed to enhance the unit operation with more flexibility, accurate control and operating modes the CUC provides an increased level of comfort in the conditioned space together with solid state reliability and ease of operation.

The same functions of the proven UPM module are incorporated into the CUC for unit protection.

CUC controllers are standard on all FHP series CA/CS console units except for remote and master/slave options.

- **Tactile touchpad** for temperature, fan and mode adjustment.
- **Digital display** of temperature in either degrees Fahrenheit or Celsius.
- **LED Display** provides indication for unit operating mode as well as fan speed and fault indication for high or low pressure lockout.
- **Adjustable Temperature Set point** from 60° F through 80° F (15.5° C through 26.7° C).
- **Adjustable Temperature Differential** between 1° F and 6° F (0.6° C and 3.3° C).
- **Selectable options**
  - Manual/Automatic changeover
  - Fan speed – High or Low
  - Fan operation constant fan or cycling with compressor
- **Additional features**
  - 5 minute anti short cycling delay
  - Random start
  - 90 second low pressure bypass timer prevents nuisance lockouts during cold winter start up
  - Intelligent reset allows the unit to automatically restart after 5 minutes if a fault is no longer active