Geo

FILL IN AND SIGN WITH INK

304

1 c/o

PERMIT ISSUED

08/1063

APPLICATION FOR PERMIT
HEATING OR POWER EQUIPMENT

To the INSPECTOR OF BUILDINGS, PORTLAND, ME.

WW. FHP-MFG. com

The undersigned hereby applies for a permit to install the following heating, cooking or power equipment in accordance with the Laws of Maine, the Building Code of the City of Portland, and the following specifications:

Location / CBL 1609 Westbrook St 248-B-5 Use of Building Residence Date 9-26

Name and address of owner of appliance 1609 Westbrook St Portland, ME 04102

H-761-3815 C-210-7661

Installer's name and address Todd Ouellette 100 State St Portland ME 04101

Telephone 671-6484

Location of appliance:

- ☐ Basement
- ☒ Floor 1rst
- ☐ Attic
- ☐ Roof

Type of Fuel: Electric

- ☐ Gas
- ☐ Oil
- ☐ Solid

Appliance Name: CS-18 Florida Heat Pump

U.L. Approved ☒ Yes ☐ No

Will appliance be installed in accordance with the manufacture's installation instructions? ☒ Yes ☐ No

IF NO Explain:

The Type of License of Installer:

- ☐ Master Plumber #
- ☐ Solid Fuel #
- ☐ Oil #
- ☐ Gas #
- ☑ Other Electrician LM5001687 4

Type of Chimney:

- ☐ Masonry Lined
  Factory built
- ☐ Metal
  Factory Built U.L. Listing #
- ☐ Direct Vent
  Type UL#

Type of Fuel Tank

- ☐ Oil
- ☐ Gas

AUG 2 0

Size of Tank

Number of Tanks

Distance from Tank to Center of Flame feet.

Cost of Work: $ 9689.00

Permit Fee: $

Approved

Fire:

Ele.:

Bldg.:

Approved with Conditions

☑ See attached letter or requirement

Inspector's Signature

8/26/03

Date Approved

Signature of Installer

White - Inspection Yellow - File Pink - Applicant's Gold - Assessor's Copy

City of Portland, Maine - Building or Use Permit Application

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No:	Issue Date:	CBL:
08-1063	8/26/08	248 B005001

Location of Construction:	Owner Name:	Owner Address:	Phone:
1607 WESTBROOK ST	OPLINGER JON P & TAMMY L J	1607 WESTBROOK ST	
Business Name:	**Contractor Name:**	**Contractor Address:**	**Phone**
	Todd Ouellette	100 State Street Portland	2076716494
Lessee/Buyer's Name	**Phone:**	**Permit Type:**	**Zone:**
		HVAC	

Past Use:	Proposed Use:	Permit Fee:	Cost of Work:	CEO District:
Single Family Home	Single Family Home - install a Florida Heat Pump	$120.00	$9,689.00	3

FIRE DEPT: ☐ Approved ☐ Denied

Signature:

INSPECTION:
Use Group: R-3 Type: 5B
IMC 2003
NFPA 211
Signature: 8/26/08

Proposed Project Description:
install a Florida Heat Pump

PEDESTRIAN ACTIVITIES DISTRICT (P.A.D.)

Action: ☐ Approved ☐ Approved w/Conditions ☐ Denied

Signature: Date:

Permit Taken By:	Date Applied For:
ldobson	08/26/2008

1. This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules.
2. Building permits do not include plumbing, septic or electrical work.
3. Building permits are void if work is not started within six (6) months of the date of issuance. False information may invalidate a building permit and stop all work..

Zoning Approval

Special Zone or Reviews	Zoning Appeal	Historic Preservation
☐ Shoreland	☐ Variance	☑ Not in District or Landmark
☐ Wetland	☐ Miscellaneous	☐ Does Not Require Review
☐ Flood Zone	☐ Conditional Use	☐ Requires Review
☐ Subdivision	☐ Interpretation	☐ Approved
☐ Site Plan O.K.	☐ Approved	☐ Approved w/Conditions
Maj ☐ Minor ☐ MM ☐	☐ Denied	☐ Denied
Date:	Date:	Date:

CERTIFICATION

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the application is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT | ADDRESS | DATE | PHONE

RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE | DATE | PHONE

City of Portland, Maine - Building or Use Permit

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No:	Date Applied For:	CBL:
08-1063	08/26/2008	248 B005001

Location of Construction:	Owner Name:	Owner Address:	Phone:
1607 WESTBROOK ST	OPLINGER JON P & TAMMY L J	1607 WESTBROOK ST	
Business Name:	**Contractor Name:**	**Contractor Address:**	**Phone**
	Todd Ouellette	100 State Street Portland	(207) 671-6494
Lessee/Buyer's Name	**Phone:**	**Permit Type:**	
		HVAC	

Proposed Use:	Proposed Project Description:
Single Family Home - install a Florida Heat Pump	install a Florida Heat Pump

Dept: Zoning **Status:** Approved **Reviewer:** Chris Hanson **Approval Date:** 08/26/2008

Note: **Ok to Issue:** ☑

Dept: Building **Status:** Approved with Conditions **Reviewer:** Chris Hanson **Approval Date:** 08/26/2008

Note: **Ok to Issue:** ☑

1) Installation shall comply with 2003 International Mechanical Code and State of Maine Oil and Solid Fuel Board Laws and Rules

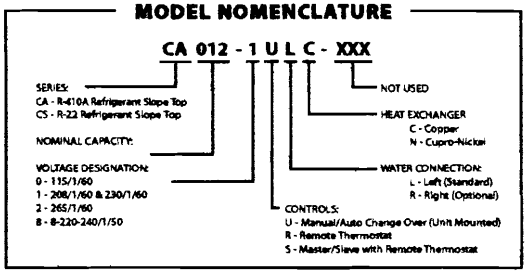
CS-18

INSTALLATION manual

CA-CS CONSOLE SERIES

Table of Contents

MODEL NOMENCLATURE



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:

CAUTION: Console Series CA contain refrigerant R-410A. R-410A systems operate at higher pressures than standard R-22 systems. Do not use R-22 service equipment or components on R-410A equipment.

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 it's 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 it's 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:

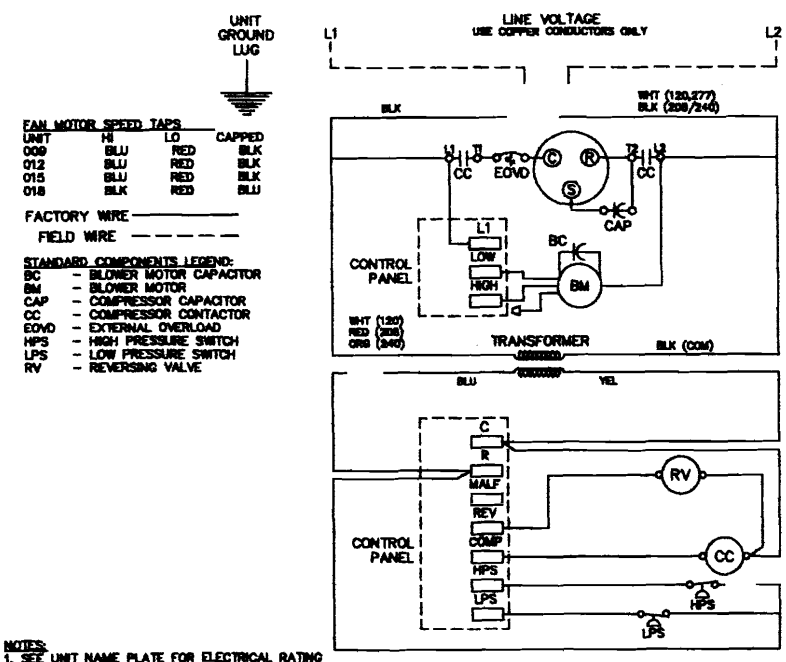
1) Filter changes or cleanings are required at regular intervals. The time period between filter changes will depend upon type of environment the equipment is used in. In a single family home, that is not under construction, changing or cleaning the filter every 60 days is sufficient. In other applications, 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:

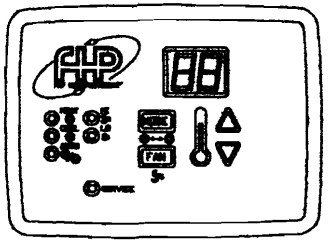
- After completing the installation, and before energizing the unit, the following system checks should be made:
- Verify that the supply voltage to the heat pump is in accordance with the nameplate ratings.
- Make sure that all electrical connections are tight and secure.
- Check the electrical fusing and wiring for the correct size.
- 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...



NOTES:
1. SEE UNIT NAME PLATE FOR ELECTRICAL RATING
2. ALL FIELD WIRING MUST BE IN ACCORDANCE WITH N.E.C.–N.F.P.A. #70
3. 208/230V UNITS ARE FACTORY WIRED FOR 230V OPERATION. FOR 208V OPERATION, REMOVE ORG LEAD AND REPLACE WITH RED LEAD. CAP ALL UNUSED LEADS
4. FOR ALTERNATE EMS COIL VOLTAGES CONSULT FACTORY.
5. DO NOT OPERATE WITH ACCESS PANELS REMOVED OR CABINET OPEN.
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 LOCK OUT
8. SERVICE LIGHT WILL BLINK TWICE ON A LOW PRESSURE LOCK OUT
9. LOCK OUTS 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: FARENHEIT/CELCIUS (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.

TYPICAL WIRING DIAGRAM SINGLE PHASE – 115 – 230 VAC
CONSOLE SOLID STATE UNIT MOUNTED CONTROLLER

Operating Temperatures & Pressures Consoles

			OPERATING DATA R-22							
			COOLING				HEATING			
MODEL	ENTERING FLUID TEMP, °F	FLUID FLOW GPM	SUCTION PRESSURE PSIG	DISCHARGE PRESSURE PSIG	FLUID TEMP RISE, °F	AIR TEMP DROP, °F	SUCTION PRESSURE PSIG	DSICH PRESS., PSIG	FLUID TEMP DROP, °F	AIR TEMP RISE, °F
CS009	30°	1.5					43-47	163-181	4.3-4.7	12.2-13.4
		2					47-52	164-182	3.3-3.7	12.4-13.8
	40°	1.5					51-57	169-187	5.2-5.8	14.3-15.8
		2					56-61	171-189	4.1-4.5	14.6-16.2
	50°	1.5	79-87	142-156	12.8-14.2	18.1-20.0	60-66	175-193	6.2-6.8	16.2-18.0
		2	76-84	130-144	10.5-11.6	18.1-20.0	64-71	177-195	4.8-5.3	16.7-18.5
	60°	1.5	81-90	164-182	12.6-14.0	17.4-19.2	68-76	181-200	7.1-7.9	18.3-20.3
		2	78-86	152-168	9.8-10.8	17.6-19.4	72-80	182-202	5.5-6.1	18.8-20.8
	70°	1.5	84-92	186-206	12.4-13.8	16.7-18.5	77-86	187-207	8.2-9.0	20.0-22.2
		2	80-88	172-190	9.7-10.7	17.0-18.8	80-88	189-209	6.3-6.9	20.9-23.1
	80°	1.5	86-95	209-231	12.4-13.7	16.2-17.9	86-96	194-214	9.0-10.0	22.3-24.7
		2	82-91	196-216	9.5-10.5	16.3-18.1	89-99	197-217	7.0-7.8	22.9-25.3
	90°	1.5	88-98	234-258	12.2-13.4	15.5-17.1				
		2	85-94	219-243	9.4-10.4	15.7-17.3				
	100°	1.5	90-100	283-313	12.1-13.3	14.8-16.4				
		2	87-96	268-296	9.3-10.3	15.1-16.7				
CS012	30°	2					40-44	173-191	4.6-5.0	15.3-16.9
		2.5					45-49	177-195	3.8-4.2	15.6-17.2
	40°	2					48-54	181-200	5.4-6.0	17.4-19.2
		2.5					52-57	183-203	4.5-4.9	17.8-19.6
	50°	2	77-85	141-155	12.5-13.9	20.0-22.2	56-62	187-207	6.3-6.9	19.5-21.5
		2.5	74-82	126-140	10.3-11.3	20.2-22.4	59-65	190-210	5.1-5.7	19.9-21.9
	60°	2	78-86	163-181	12.4-13.7	19.4-21.4	65-71	196-216	7.0-7.8	21.5-23.7
		2.5	76-84	148-164	10.2-11.2	19.7-21.7	68-75	199-220	5.8-6.4	21.9-24.2
	70°	2	79-87	193-213	12.3-13.5	18.9-20.9	74-82	205-227	7.9-8.7	23.5-25.9
		2.5	78-86	177-195	10.1-11.1	19.1-21.1	77-85	208-230	7.4-8.2	23.9-26.5
	80°	2	81-89	219-242	12.2-13.4	18.3-20.3	84-92	217-239	8.7-9.7	25.6-28.2
		2.5	80-88	201-223	10.0-11.0	18.5-20.5	86-96	219-243	7.1-7.9	26.0-28.8
	90°	2	83-92	246-272	12.1-13.3	17.8-19.6				
		2.5	82-90	228-252	9.9-10.9	18.1-20.0				
	100°	2	87-96	292-322	12.0-13.2	17.3-19.1				
		2.5	85-93	274-302	9.8-10.8	17.5-19.3				
CS015	30°	3					42-46	164-182	3.6-4.0	13.6-15.0
		4					46-50	166-184	2.9-3.2	13.9-15.3
	40°	3					51-56	171-189	4.4-4.8	15.8-17.4
		4					54-59	173-191	3.4-3.8	16.2-17.9
	50°	3	76-84	133-147	12.4-13.8	21.8-24.0	59-65	178-196	5.2-5.8	18.1-20.1
		4	75-83	124-137	9.7-10.7	22.0-24.4	62-68	181-200	4.1-4.5	18.5-20.5
	60°	3	78-86	154-170	12.2-13.4	20.7-22.9	67-74	185-205	6.1-6.7	20.5-22.7
		4	77-85	144-160	9.4-10.4	21.0-23.2	69-77	188-208	4.8-5.3	21.1-23.3
	70°	3	80-89	175-193	11.8-13.0	19.8-21.8	74-82	193-213	6.9-7.7	23.0-25.4
		4	79-87	165-183	9.1-10.1	20.0-22.2	77-85	196-216	5.4-6.0	23.6-26.0
	80°	3	83-91	200-222	11.5-12.7	18.7-20.7	82-90	205-227	7.8-8.6	25.3-27.9
		4	81-90	190-210	8.9-9.9	19.0-21.0	85-93	209-231	6.0-6.6	25.9-28.7
	90°	3	86-95	224-248	11.1-12.3	17.7-19.5				
		4	84-92	214-236	8.6-9.6	18.0-19.8				
	100°	3	89-99	257-285	10.8-12.0	16.7-18.5				
		4	86-96	245-271	8.4-9.2	16.9-18.7				

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.

FHP MANUFACTURING
601 N.W 65th Court • Ft. Lauderdale, FL 33309
Phone: (954) 776-5471 • Fax: (800) 776 5529
http://www.fhp-mfg.com

Operating Temperatures & Pressures Consoles

			OPERATING DATA R-22							
			COOLING				HEATING			
MODEL	ENTERING FLUID TEMP, °F	FLUID FLOW GPM	SUCTION PRESSURE PSIG	DISCHARGE PRESSURE PSIG	FLUID TEMP RISE, °F	AIR TEMP DROP, °F	SUCTION PRESSURE PSIG	DSICH PRESS., PSIG	FLUID TEMP DROP, °F	AIR TEMP RISE, °F
CS018	30°	4					37-40	169-187	3.4-3.8	14.3-15.9
		6					40-45	176-194	2.4-2.6	14.8-16.4
	40°	4					44-48	177-196	4.0-4.4	16.1-17.7
		6					47-52	184-203	2.8-3.0	16.6-18.4
	50°	4	71-79	137-151	10.6-11.8	20.0-22.1	50-56	185-205	4.7-5.1	18.1-20.0
		6	68-76	127-141	7.4-8.2	20.4-22.6	54-60	193-213	3.2-3.6	18.7-20.7
	60°	4	73-81	158-174	10.5-11.6	19.4-21.4	57-64	193-214	5.2-5.8	20.0-22.2
		6	70-78	147-163	7.3-8.1	19.8-21.8	61-68	200-222	3.7-4.1	20.7-22.9
	70°	4	74-82	176-194	10.3-11.3	18.7-20.7	65-71	201-223	6.0-6.6	22.2-24.6
		6	71-79	167-185	7.1-7.9	19.1-21.1	68-76	209-231	4.2-4.6	23.0-25.4
	80°	4	76-84	202-224	10.0-11.0	18.1-20.0	72-80	211-233	6.7-7.4	24.3-26.9
		6	72-80	192-212	6.9-7.7	18.3-20.3	76-84	219-242	4.7-5.1	25.3-27.9
	90°	4	78-86	228-252	9.8-10.8	17.3-19.1				
		6	76-84	218-240	6.8-7.6	17.7-19.5				
	100°	4	82-90	261-289	9.6-10.6	16.6-18.4				
		6	80-88	249-275	6.7-7.4	16.9-18.7				

			OPERATING DATA R-410A							
			COOLING				HEATING			
MODEL	ENTERING FLUID TEMP, °F	FLUID FLOW GPM	SUCTION PRESSURE PSIG	DISCHARGE PRESSURE PSIG	FLUID TEMP RISE, °F	AIR TEMP DROP, °F	SUCTION PRESSURE PSIG	DSICH PRESS., PSIG	FLUID TEMP DROP, °F	AIR TEMP RISE, °F
CA009	30°	1.5					120-125	295-305	4.3-4.7	12.2-13.4
		2					125-130	300-310	3.3-3.7	12.4-13.8
	40°	1.5					120-125	300-305	5.2-5.8	14.3-15.8
		2					125-130	300-310	4.1-4.5	14.6-16.2
	50°	1.5	125-130	285-295	12.8-14.2	18.1-20.0	135-140	305-310	6.2-6.8	16.2-18.0
		2	126-131	275-285	10.5-11.6	18.1-20.0	130-135	310-320	4.8-5.3	16.7-18.5
	60°	1.5	127-132	295-305	12.6-14.0	17.4-19.2	135-140	315-320	7.1-7.9	18.3-20.3
		2	125-130	285-295	9.8-10.8	17.6-19.4	140-145	320-330	5.5-6.1	18.8-20.8
	70°	1.5	132-137	315-325	12.4-13.8	16.7-18.5	155-165	325-335	8.2-9.0	20.0-22.2
		2	130-135	305-315	9.7-10.7	17.0-18.8	160-170	330-340	6.3-6.9	20.9-23.1
	80°	1.5	136-141	345-355	12.4-13.7	16.2-17.9	165-175	335-345	9.0-10.0	22.3-24.7
		2	135-140	335-345	9.5-10.5	16.3-18.1	170-175	340-350	7.0-7.8	22.9-25.3
	90°	1.5	139-144	370-380	12.2-13.4	15.5-17.1				
		2	137-142	360-370	9.4-10.4	15.7-17.3				
	100°	1.5	141-145	415-425	12.1-13.3	14.8-16.4				
		2	139-144	410-420	9.3-10.3	15.1-16.7				
CA012	30°	2					110-115	305-315	4.6-5.0	15.3-16.9
		3					115-120	305-315	3.8-4.2	15.6-17.2
	40°	2					110-115	310-315	5.4-6.0	17.4-19.2
		3					115-120	310-315	4.5-4.9	17.8-19.6
	50°	2	140-145	290-300	12.5-13.9	20.0-22.2	115-120	315-320	6.3-6.9	19.5-21.5
		3	135-140	270-280	10.3-11.3	20.2-22.4	120-125	320-325	5.1-5.7	19.9-21.9
	60°	2	142-147	320-320	12.4-13.7	19.4-21.4	125-130	325-330	7.0-7.8	21.5-23.7
		3	137-142	300-310	10.2-11.2	19.7-21.7	130-135	330-335	5.8-6.4	21.9-24.2
	70°	2	145-150	335-345	12.3-13.5	18.9-20.9	145-150	335-240	7.9-8.7	23.5-25.9
		3	143-152	325-335	10.1-11.1	19.1-21.1	150-155	340-350	7.4-8.2	23.9-26.5
	80°	2	152-157	360-370	12.2-13.4	18.3-20.3	155-160	345-350	8.7-9.7	25.6-28.2
		3	150-155	350-360	10.0-11.0	18.5-20.5	160-165	350-360	7.1-7.9	26.0-28.8
	90°	2	154-159	385-395	12.1-13.3	17.8-19.6				
		3	152-158	375-385	9.9-10.9	18.1-20.0				
	100°	2	156-160	435-445	12.0-13.2	17.3-19.1				
		3	154-159	425-435	9.8-10.8	17.5-19.3				

Operating Temperatures & Pressures Consoles

			OPERATING DATA R-410A							
			COOLING				HEATING			
MODEL	ENTERING FLUID TEMP, °F	FLUID FLOW GPM	SUCTION PRESSURE PSIG	DISCHARGE PRESSURE PSIG	FLUID TEMP RISE, °F	AIR TEMP DROP, °F	SUCTION PRESSURE PSIG	DSICH PRESS., PSIG	FLUID TEMP DROP, °F	AIR TEMP RISE, °F
CA015	30°	3					110-115	280-290	3.6-4.0	13.6-15.0
		4					110-115	290-295	2.9-3.2	13.9-15.3
	40°	3					115-120	295-300	4.4-4.8	15.8-17.4
		4					115-120	300-305	3.4-3.8	16.2-17.9
	50°	3	127-132	275-285	12.4-13.8	21.8-24.0	115-120	305-310	5.2-5.8	18.1-20.1
		4	125-130	265-275	9.7-10.7	22.0-24.4	120-125	310-315	4.1-4.5	18.5-20.5
	60°	3	129-135	310-320	12.2-13.4	20.7-22.9	125-130	315-320	6.1-6.7	20.5-22.7
		4	127-132	295-305	9.4-10.4	21.0-23.2	130-135	320-325	4.8-5.3	21.1-23.3
	70°	3	135-140	330-340	11.8-13.0	19.8-21.8	145-150	325-330	6.9-7.7	23.0-25.4
		4	133-138	320-330	9.1-10.1	20.0-22.2	150-155	330-340	5.4-6.0	23.6-26.0
	80°	3	142-147	355-365	11.5-12.7	18.7-20.7	155-16-	335-340	7.8-8.6	25.3-27.9
		4	140-145	345-365	8.9-9.9	19.0-21.0	160-165	345-350	6.0-6.6	25.9-28.7
	90°	3	144-149	380-390	11.1-12.3	17.7-19.5				
		4	143-148	370-380	8.6-9.6	18.0-19.8				
	100°	3	147-152	430-440	10.8-12.0	16.7-18.5				
		4	145-150	420-430	8.4-9.2	16.9-18.7				
CA018	30°	4					75-80	280-290	3.6-4.0	13.6-15.0
		5					85-90	290-295	2.9-3.2	13.9-15.3
	40°	4					90-100	295-300	4.4-4.8	15.8-17.4
		5					95-105	300-305	3.4-3.8	16.2-17.9
	50°	4	105-110	200-220	12.4-13.8	21.8-24.0	100-105	305-310	5.2-5.8	18.1-20.1
		5	102-106	190-200	9.7-10.7	22.0-24.4	110-120	310-315	4.1-4.5	18.5-20.5
	60°	4	115-120	240-245	12.2-13.4	20.7-22.9	125-130	315-320	6.1-6.7	20.5-22.7
		5	110-115	230-240	9.4-10.4	21.0-23.2	130-135	320-325	4.8-5.3	21.1-23.3
	70°	4	118-123	250-260	11.8-13.0	19.8-21.8	130-145	325-330	6.9-7.7	23.0-25.4
		5	115-120	240-250	9.1-10.1	20.0-22.0	140-145	330-340	5.4-6.0	23.6-26.0
	80°	4	125-130	295-300	11.5-12.7	18.7-20.7	150-155	335-340	7.8-8.6	25.3-27.9
		5	120-125	285-290	8.9-9.9	19.0-21.0	160-165	345-350	6.0-6.6	25.9-28.7
	90°	4	130-135	330-335	11.1-12.3	17.7-19.5				
		5	127-132	320-325	8.6-9.6	18.0-19.8				
	100°	4	132-135	380-400	10.8-12.0	16.7-18.5				
		5	131-134	370-390	8.4-9.2	16.9-18.7				

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.

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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

	Cooling Mode	Heating Mode
Entering / Leaving Air Temp	_____/_____	_____/_____
Entering Air Measured at:	_____	_____
Leaving Air Measured at:	_____	_____
Entering / Leaving Fluid Temp	_____/_____	_____/_____
Fluid Flow (gpm)	_____	_____
Fluid Side Pressure Drop	_____	_____
Suction / Discharge Pressure (psig)	_____/_____	_____/_____
Suction / Discharge Temp	_____/_____	_____/_____
Suction Superheat	_____	_____
Entering TXV / Cap Tube Temp	_____	_____
Liquid Subcooling	_____	_____
Compressor Volts / Amps	_____/_____	_____/_____
Blower Motor Volts / Amps	_____/_____	_____/_____

Auxiliary Heat

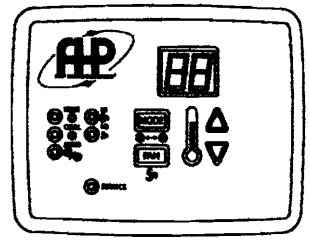
Unit Make _____
Model Number _____ Serial Number _____
Max Fuse Size (Amps) _____
Volts / Amps _____/_____
Entering Air Temperature _____
Leaving Air Temperature _____

CUC SOLID STATE CONSOLE UNIT CONTROLLER

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

NOTES: