

HPL1-2 Water Source Heat Pump Controller

Self-Contained Interoperable Controller Model UCP-1 for Software Version 2

SUPERSEDES: New

EFFECTIVE: May 21, 2014

Plant ID: 001-4079

Specifications

Electrical Inputs

Cabling: twisted shielded pair, 18 AWG recommended—500 feet max. (152 meters), 10 bit resolution

Thermostat: Slink, Precon II or III 10K Thermistor (Space Temp Only)

Supply Air Temp, Return Air Temp: Precon III 10K Thermistor

Supply Water Temperature, Return Water Temperature: 0-5 VDC VFTS/VTs, Precon Type II or III 10K Thermistor

Water Flow: 0-5 VDC VFTS

Fan Proof Sensor, Occupancy Sensor, Filter Status: Dry Contact - Normally Open - 5 Volts DC Max

IAQ Sensor: Based on configuration, may be either one of the following: Dry Contact - Normally Open - 5 Volts DC Max; 0-10 VDC

Electrical Outputs

Modulated Compressor, Injection Pump, Modulated Fan: 0-10 VDC - 2K Ohm minimum load, 8 bit resolution

Compressor Stage 1, Compressor Stage 2, Reversing Valve, Reheat, Fan Speed 1, Fan Speed 2, Fan Speed 3, Dehumidification: 24 Volts AC - 1 amp at 50 °C, 0.5 amps at 60 °C, limited by Class 2 supply

Recommended Sensor Wire

Maximum Length: 500 feet (152 meters)

Cable Type	Pairs	Details	Taco Catalog No.
18AWG	1	Stranded Twisted Shielded Pair, Plenum	WIR-018

Recommended LON Bus FTT-10A Network Wire

Speed: 78KBPS

Max Volts: 42.4 Volts DC

Cabling: Maximum node-to-node distance: 1312 feet (400 meters); Maximum total distance: 1640 feet (500 meters)

Cable Type	Pairs	Details	Taco Catalog No.
Level 4 22AWG (0.65mm)	1	Unshielded, Plenum, U.L. Type CMP	WIR-022

Mechanical

Dimensions: 5.55" (141mm) high, 6.54" (166 mm) wide, 1.75" deep (44 mm), ABS

Controller Weight: 0.70 pounds (0.32 kilograms)

Shipping Weight: 1.0 pounds (0.46 kilograms)

Processor: 3150 Neuron 10 MHz

Flash: 48 Kilobytes

SRAM: 8 Kilobytes

Termination: 0.197" (5.0 mm) Pluggable Terminal Blocks, 14-22 AWG

Temperature: 32 °F to 140 °F (0 °C to 60 °C)

Humidity: 0 to 90%, non-condensing

UL Listed for US and Canada, Energy Management Equipment PAZX and PAZX7

FCC Part 15 Class A compliant

Equipment Location



Abide by all warnings regarding equipment location provided in this document. This equipment is suitable for indoor use only. Preferably, or as required by National Electrical Code, the unit is intended to be installed within an electrical control enclosure. Operate where ambient temperatures do not exceed 140 °F (60 °C) or fall below 32 °F (0 °C) and relative humidity does not exceed 90%, non-condensing.

If the equipment is to be installed outdoors, it must be contained within a protective enclosure that maintains internal temperature and humidity within the ranges specified for this equipment.

The equipment must be installed within 500 feet of all input peripherals (smoke detectors, sensors, etc.) that are connected to the equipment.

Avoid locations where corrosive fumes, excessive moisture, vibration or explosive vapors are present.

Avoid electrical noise interference. Do not install near large contactors, electrical machinery, or welding equipment.

Selecting a Power Source

This equipment requires a UL recognized Class 2 external power source (not supplied) to operate. The controller power input requires a voltage of 24 Volts AC.

To calculate power source current requirements, add the power consumption of all peripheral devices to that of the controller.

The controller and sensor power supplies can use the same power source. If both are using the same power source, the loads must have EMF protection. This protection can be integral to the load, or installed in the 24 VAC wiring across the load's coil.

To provide necessary RFI and transient protection, the controller's ground (GND) pin (T40) must be connected to earth ground or the earth ground of the packaged unit's enclosure ground. Failure to properly ground the controller may cause it to exceed FCC limits. Excessive noise could also produce inaccurate sensor data. The power source must be capable of operating with this connection to ground.

Installation Precautions

General



CAUTION: This symbol is intended to alert the user to the presence of important installation and maintenance (servicing) instructions in the literature accompanying the equipment.



CAUTION: Risk of explosion if battery is replaced by an incorrect type. Contains lithium type battery; dispose of properly.



WARNING: Electrical shock hazard. Disconnect **ALL** power sources when installing or servicing this equipment to prevent electrical shock or equipment damage.

Make all wiring connections in accordance with these instructions and in accordance with pertinent national and local electrical codes. Use only copper conductors that are suitable for 167 °F (75 °C).

Static Electricity

Static charges produce voltages that can damage this equipment. Follow these static electricity precautions when handling this equipment.

- Work in a static free area.
- Touch a known, securely grounded object to discharge any charge you may have accumulated.
- Use a wrist strap when handling printed circuit boards. The strap must be secured to earth ground.

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference. This equipment can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to a power source different from that to which the receiver is connected.
- Consult the equipment supplier or an experienced radio/TV technician for help.

You are cautioned that any changes or modifications to this equipment not expressly approved in these instructions could void your authority to operate this equipment in the United States.

Installation



Warning: Electrical shock hazard. To prevent electrical shock or equipment damage, disconnect **ALL** power sources to controllers and loads before installing or servicing this equipment or modifying any wiring.

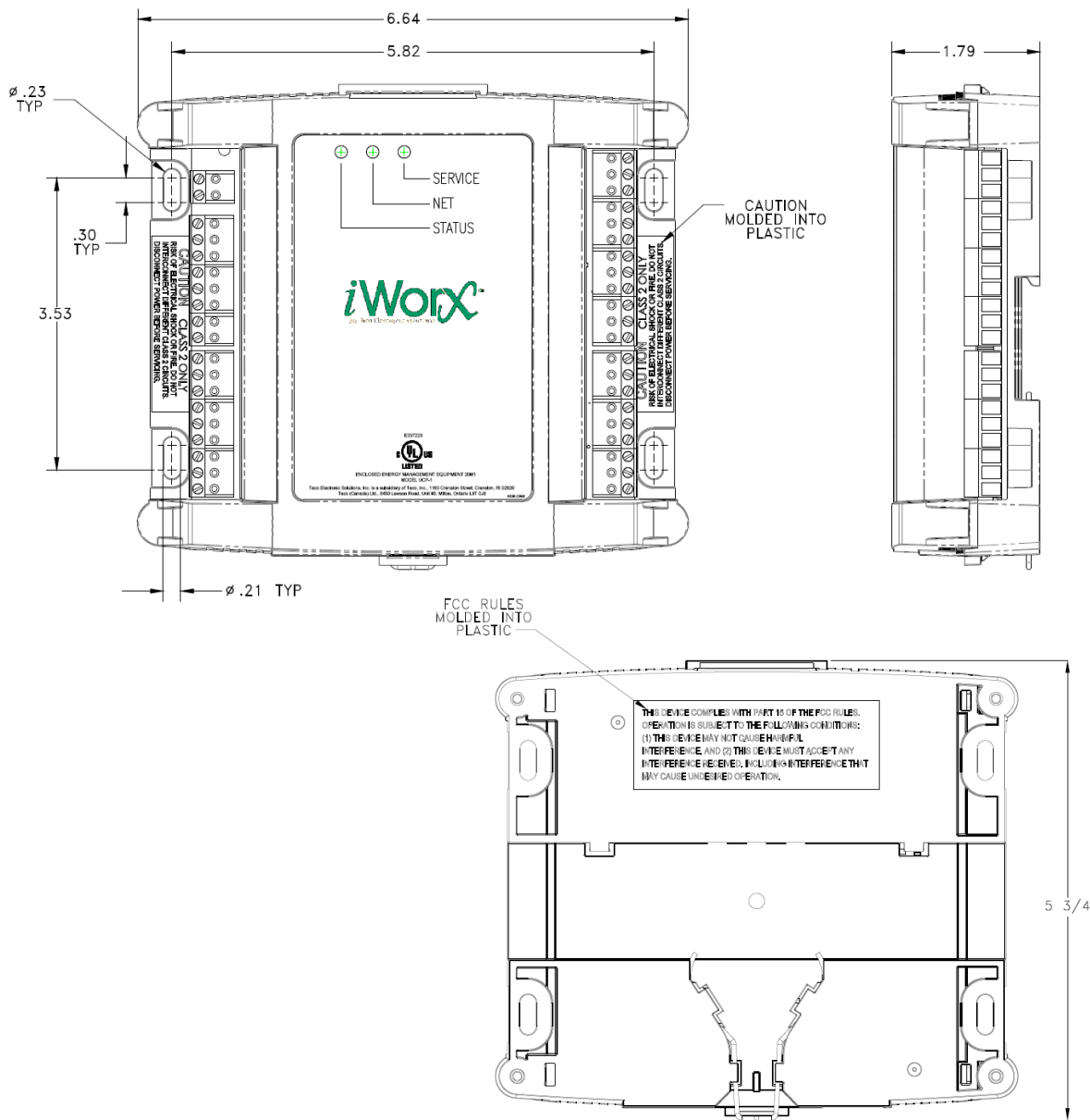
Installation



Warning: Electrical shock hazard. To prevent electrical shock or equipment damage, disconnect **ALL** power sources to controllers and loads before installing or servicing this equipment or modifying any wiring.

Mounting the Device

1. Select a mounting location. Enclosure mounting is recommended.
2. Hold the controller on the panel you wish to mount it on. With a marker or pencil mark the mounting locations on the panel.
3. Using a small drill bit pre-drill the mounting holes.
4. Using two #6 pan head screws, mount the controller to the panel.
5. Wire the controller.

Figure 1: Mounting Dimensions

Grounding the Device



The ground terminal (T40) must be securely connected to earth ground. Failure to properly ground this equipment will result in improper operation. Improper grounding may also increase the risk of electrical shock and may increase the possibility of interference with radio/TV reception.

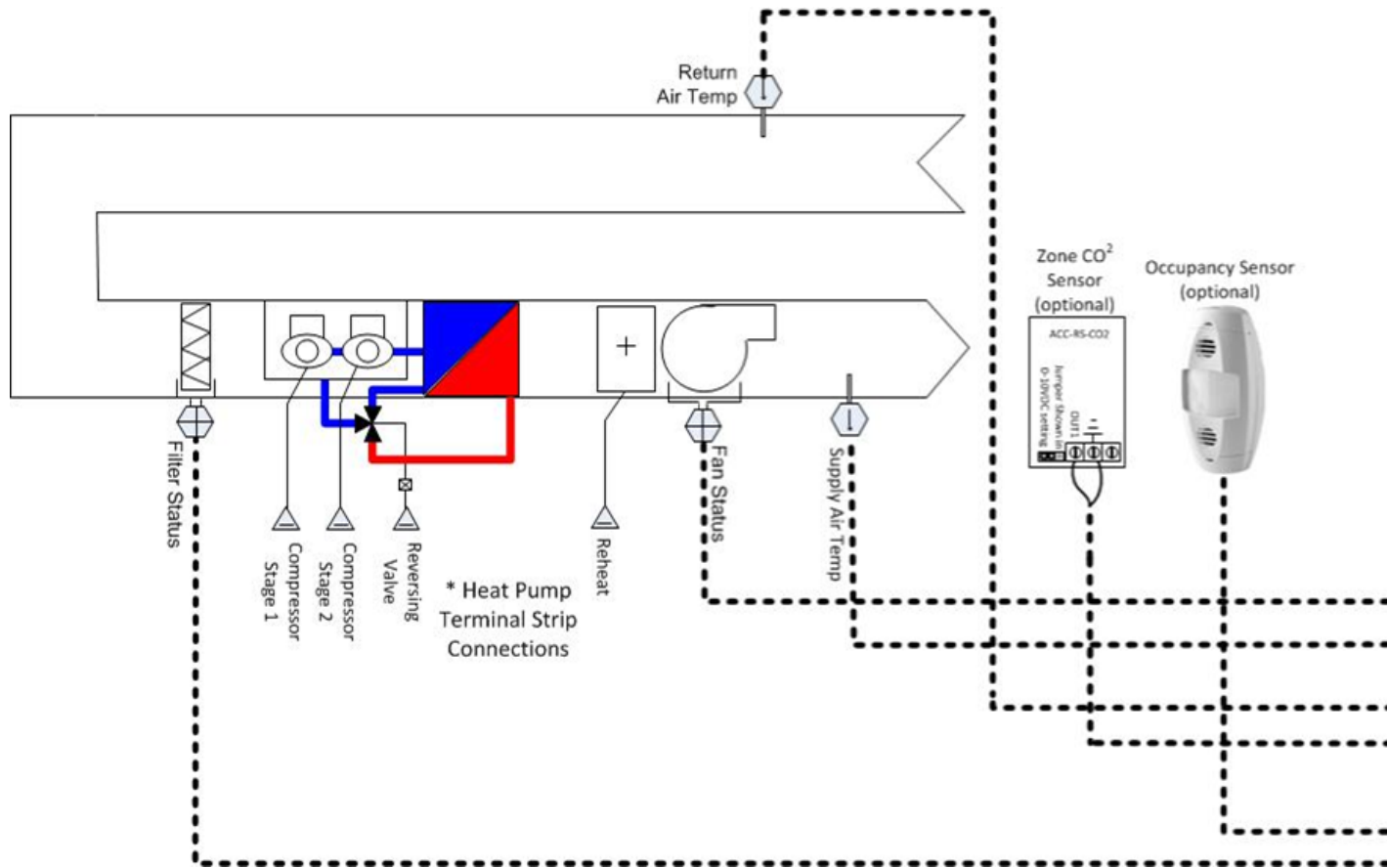


For best performance, connect the power supply common terminal (T38) to the same external point as the ground terminal (T40).

Power

Requires: 24VAC (20VAC to 28VAC), requires an external Class 2 supply

Consumes: 7.2W with no external loads, maximum limited by the Class 2 supply rating



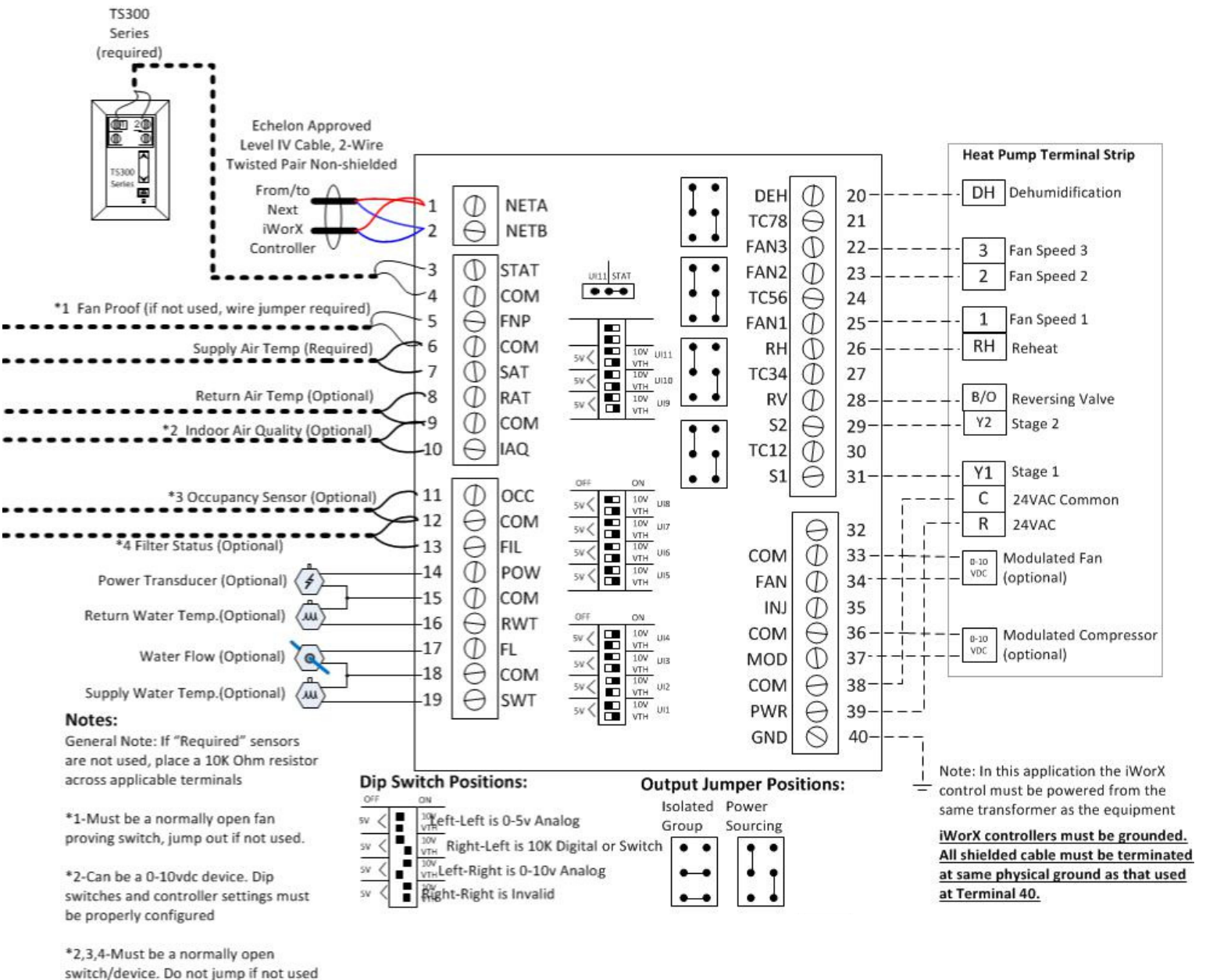
Symbols:

- Duct Mount - 10K ohm Precon Type III thermistor
Taco Part #ACC-DS-8-10KP3-PB, ACC-DS12-10KP3-PB
- Power Transducer
0-10V
- Pipe Mount Sensor – Bullet, Taco Part #TRP-1, Immersion Well w/Galvanized Box, Taco Part #ACC-WS-4-10KP3-GB, Strap On w/ Galvanized Box, Taco Part #ACC-SOS-10KP3-GB

- Duct Mount – Air Differential Pressure (Flow Proof) Switch
Normally Open, Dry Contact Switch, Taco Part #ACC-ADPS-12WC
- Duct Mount - 10K ohm Precon Type III thermistor
Taco Part #ACC-DS-8-10KP3-PB, ACC-DS12-10KP3-PB
- Pipe Mount Sensor – Inline Flow, Taco Part: VFTS 1-20, VFTS 2-40, VFTS 5-100, VFTS 10-200, VFTS 20-400

Wire Types:

- Line Voltage
- 24VAC Low Voltage
- Echelon Approved Level IV Cable
2-Wire, Twisted Pair, Non-shielded
Taco Part #WIR-022
- 2-Wire Low Voltage, Shielded Cable
Shield Grounded, Taco Part #WIR-018
- 10K Ohm 1/2 or 1/4 Watt Resistor
- Wire Jumper



Heat Pump Unit

Controlled: 2 Stages Heating/Cooling, Reversing Valve, Equipment Status, 3-Speed or Modulating Fan, Modulating Compressor

Sensors Required: Room Temp, Supply Air Temp, Fan Proof Added

Added Module Required: Add LHP, CSM, or ASM module and make HPL a Member

Setup Instructions

1. Press **Controllers** from main screen

LCD2	14:57	PREV	HOME
Controllers	LZones	Remote LCIs	Alarms (None)
Schedules	Groups	Holidays	Utilities
Data Logs	Trends	Log Out	

2. Select required HPL1 from controller list and press appropriate controller.

Controllers	11:22	PREV	HOME
Unit_2_HPL1	Temp: 73.3°F Setp: 71.0°F		

3. Press **All Settings**.

Edit Controller	11:22	PREV	HOME		
Save	Delete	Replace	Details	Upgrade	Reset
Name	HPL1				
Setpoint	71.0 °F				
Override	°F				
All Settings	Inputs	Outputs	Alarms		
HVAC Setup	Reset Runtimes	Commissioning	BTU Log		
Restore Defaults					

4. Press **Thermostat**.

HPL1 Settings	11:23	Paste	PREV	HOME
Thermostat	More...			
HPL1 Thermostat	13:54	Save	PREV	HOME
Type	SLink			
Occupancy Extension	60 Min			
Alarm Temp Offset	2.0 °F			
Temperature Offset	0.0 °F			
Accumulated Ext Occ	0 Min			
SAT Setpoints	More...			
Fan Set	More...			
Fan Mod	More...			
Next 18	Bottom			

5. The *Thermostat* menu opens.

- Select **Type** of thermostat. Slink=TS300 Series Stat, Precon III = TS100 Series Stat
- Specify desired **Occupancy Extension** (TS300 Series Only)
- Specify Setpoint **Temperature Offset** which will trigger an alarm.
- Specify **Temperature Offset**. This value is a calibration of room temperature from a separate calibrated device if required (Precon II or III Only).
- Accumulated Ext Occ** indicates the minutes of occupancy override of the DXU.
- Press **Save**.

6. Press **Setpoints**.

HPL1 Settings	11:23	Paste	PREV	HOME
Thermostat	More...			
Setpoints	More...			
HPL1 Setpoints	11:24	Save	PREV	HOME
Setpoint	<input type="text" value="71.0"/> °F			
Cooling Offset	<input type="text" value="1.0"/> °F			
Heating Offset	<input type="text" value="1.0"/> °F			
SP Adjust Limit	<input type="text" value="2.0"/> °F			
Unocc Cooling	<input type="text" value="82.0"/> °F			
Unocc Heating	<input type="text" value="60.0"/> °F			
Fan Set	More...			
Fan Mod	More...			
Next 18	Bottom			

7. The *Setpoints* menu opens.

- Specify **Setpoint**.
- Specify **Cooling Offset**.
- Specify **Heating Offset**.
- Specify USER setpoint adjustable limits (**SP Adjust Limit**). Setting is +/- setpoint.
- Specify unoccupied cooling setpoint (**Unocc Cool**).
- Specify unoccupied heating setpoint (**Unocc Heat**).
- Press **Save**.

8. Press **Operating Mode**.

HPL1 Settings	11:23	Paste	PREV	HOME
Thermostat	More...			
Setpoints	More...			
Operating Mode	Auto			
HPL1 Operating Mode	11:25	Save	PREV	HOME

Operating Mode

Auto				
SAT Setpoints	More...			
Fan Set	More...			
Fan Mod	More...			
Next 18	Bottom			

9. The *Operating Mode* menu opens.

- Select **Auto**, **Heat** or **Cool**.

b. Press **Save**.10. Press **Staged Compressor**.

HPL1 Settings	11:23	Paste	PREV	HOME
Thermostat	More...			
Setpoints	More...			
Operating Mode	Auto			
Staged Comp	More...			
HPL1 Staged Comp	11:25	Save	PREV	HOME
Stages	<input type="text" value="2"/>			
Control Band	<input type="text" value="1.0"/> °F			
Stage Time	<input type="text" value="5"/> Min			
Fan Set	More...			
Fan Mod	More...			
Next 18	Bottom			

11. The *Staged Compressor* menu opens.

- Select number of **Stages** of equipment (0-2).
- Specify the stage **Control Band** in degrees. Cannot be set to 0.
- Specify the **Stage Time** in minutes. Cannot be set to 0.
- Press **Save**.

12. Press **Rev. Valve Action**.

HPL1 Settings	11:23	Paste	PREV	HOME
Thermostat	More...			
Setpoints	More...			
Operating Mode	Auto			
Staged Comp	More...			
Modulated Comp	More...			
Rev Vlv Action	Energize on Cool			
HPL1 Rev Vlv Action	11:26	Save	PREV	HOME

Rev Vlv Action

Energize on Cool				
Next 18	Bottom			

13. The *Rev Valve Action* menu opens.

- Select **Energize on Heat** or **Energize on Cool**.

Note: Consult Heat Pump Equipment Installation Instructions to determine correct selection.

b. Press **Save**.

14. Press **Anti Cycle Timer**.

HPL1 Settings	11:23	Paste	PREV	HOME
Thermostat	More...			
Setpoints	More...			
Operating Mode	Auto			
Staged Comp	More...			
Modulated Comp	More...			
Rev Vlv Action	Energize on Cool			
Anti Cycle Timer	More...			
HPL1 Anti Cycle Timer	11:26	Save	PREV	HOME

Min On Time Min

Min Off Time Min

Next 18	Bottom
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15. The *Anti Cycle Timer* menu opens.

a. Specify **Min On Time** in minutes.

b. Specify **Min Off Time** in minutes.

c. Press **Save**.

16. Press **SAT Setpoints**.

HPL1 Settings	11:23	Paste	PREV	HOME
Thermostat	More...			
Setpoints	More...			
Operating Mode	Auto			
Staged Comp	More...			
HPL1 SAT Setpoints	11:26	Save	PREV	HOME

SAT Cool SetPt °F

SAT Heat SetPt °F

SAT Setpoints	More...
Fan Set	More...
Fan Mod	More...
Next 18	Bottom

17. The *SAT Setpoints* menu opens.

a. Specify **SAT Cool SetPt** in degrees.

b. Specify **SAT Heat SetPt** in degrees.

c. Press **Save**.

18. Press **Fan Set**.

HPL1 Settings	11:23	Paste	PREV	HOME
Thermostat	More...			
Setpoints	More...			
Operating Mode	Auto			
Staged Comp	More...			
Modulated Comp	More...			
HPL1 Fan Set	11:27	Save	PREV	HOME
Fan Type	Auto ▾			
Fan OpMode	Fan 1 ▾			
Fan Set	More...			
Fan Mod	More...			
Next 18	Bottom			

19. The Fan Set menu opens.

Select **Fan Type**:

a. "ON" = On in Occupied mode, cycles with Heat/Cool call in Unoccupied.

b. "Auto" = cycles with Heat/Cool call always.

Select **Fan Op Mode**:

c. "Not Used."

d. "Fan 1, 2 or 3" = Fan always runs at user set speed.

e. "Auto (Fan1-3)" = FCU4 selects fan speed.

f. "Modulated" = FCU4 selects modulated fan speed output (0-10VDC).

g. "Configured" = User sets digital and analog outputs to configured values.

h. Press **Save**.

NOTE: See next step for Fan Configuration

20. Press **Fan Config**.

HPL1 Settings	11:23	Paste	PREV	HOME
Prev 10			Top	
Fan Config			More...	
HPL1 Fan Config	11:28	Save	PREV	HOME

Fan Dehumidification	Fan 1 ▾
Motor Speed Dehum	33.00 %
Fan Cooling	Fan 1 ▾
Motor Speed Cooling	0.00 %
Fan Heating	Fan 1 ▾
Motor Speed Heating	0.00 %
Fan Max	Fan 1 ▾
Motor Speed Max	0.00 %

Power Scale	1000Watt
Next 8	Bottom

21. The *Fan Config* menu opens.

3-Speed Fan, select:

- Fan Dehumidification** speed: Fan Speed 1,2 or 3.
(if using modulated fan see below.)
 - Motor Speed Cooling**: “Not used” or Fan Speed 1,2 or 3.
 - Motor Speed Heating**: “Not used” or Fan Speed 1,2 or 3.
 - Fan Max** (IAQ Event): “Not used” or Fan Speed 1,2 or 3.
- e. Press **Save**.

OR

Modulated Fan, select:

- Motor Speed Dehumid** in % of fan speed.
 - Motor Speed Cooling** in % of fan speed.
 - Motor Speed Heating** in % of fan speed.
 - Motor Speed Max** (IAQ Event) in % of fan speed.
- e. Press **Save**.

Adding Demand Controlled Ventilation (CO2)

Controlled: 0-10VDC Modulated or up to 3-speed fan based on space or return duct CO2

Added Sensors Required: Duct Mount (Taco Part #ACC-DS-CO2) or Wall Mount (Taco Part #ACC-RS-CO2) CO2 Sensor

Existing Sensors Required: Room Temp (temp only), Supply Air Temp, Fan Proof, Filter Status

Setup Instructions

1. Press **Controllers** from main screen

LCD2	14:57	PREV	HOME
Controllers	LZones	Remote LCls	Alarms (None)
Schedules	Groups	Holidays	Utilities
Data Logs	Trends	Log Out	

2. Select required HPL1 from controller list and press appropriate controller.
3. Press **All Settings**.
4. Press **IAQ Mode**.

HPL1 Settings	11:23	Paste	PREV	HOME
Prev 10				Top
Fan Config				More...
Supply Water Setpt				More...
Inj Settings				More...
Dehumid Set				More...
IAQ Mode				Digital
HPL1 IAQ Mode	11:29	Save	PREV	HOME

IAQ Mode

Digital			
Next 8			Bottom

5. The *IAQ Mode* menu opens.
 - a. Select IAQ sensor input mode:
 - "Digital" = Open/close switch sensor
 - "Analog" = 0-10VDC Sensor (shown)
 - b. Press **Save**.

6. Press **IAQ Settings**.

HPL1 Settings	11:23	Paste	PREV	HOME
Prev 10				Top
Fan Config				More...
Supply Water Setpt				More...
Inj Settings				More...
Dehumid Set				More...
IAQ Mode				Digital
IAQ Settings				More...
HPL1 IAQ Settings	11:29	Save	PREV	HOME

IAQ Delay Time Min

Temp Reset Limit °F

Deadband ppm

7. The *IAQ Settings* menu opens.

- a. Select **IAQ Delay Time** before response to IAQ demand.
- b. Select **Temp Reset Limit** to allow +/- deviation from space temperature setpoint in order to satisfy IAQ demand.
- c. Set **Deadband** in PPM.
- d. Press **Save**.

8. Press **IAQ Sensor**.

HPL1 Settings	11:23	Paste	PREV	HOME
Prev 10				Top
Fan Config				More...
HPL1 IAQ Sensor	11:30	Save	PREV	HOME
Min	<input type="text" value="0"/>	ppm		
Max	<input type="text" value="2000"/>	ppm		
Setpoint	<input type="text" value="1200"/>	ppm		
Offset	<input type="text" value="0"/>	ppm		
IAQ Sensor				More...
Runtime Limits				More...
BTU Settings				More...
Power Scale				1000Watt
Next 8				Bottom

9. The *IAQ Sensor* menu opens.
 - a. Select **Min** PPM.
 - b. Select **Max** PPM.
 - c. Select **Setpoint** PPM.
 - d. Select **Offset** (calibration) PPM.
 - e. Press **Save**.

Adding Dehumidification Control (HPL1)

Controlled: Up to 2 stage heat pump, dehumidification output and reheat output.

Added Sensors Required: Wall Mount Temp/Humidity (Taco Part #TS302-1 or TS304-1) Sensor

Existing Sensors Required: Room Temp (if Temp Only), Supply Air Temp, Fan Proof, Filter Status

Setup Instructions

1. Press **Controllers** from main screen.
2. Select required HPL1 from controller list and press appropriate controller.
3. Press **All Settings**.
4. Press **Next 18**.
5. Press **Dehumid Set**.

HPL1 Settings	11:23	Paste	PREV	HOME
Prev 10		Top		
Fan Config		More...		
Supply Water Setpt		More...		
Inj Settings		More...		
Dehumid Set		More...		
HPL1 Dehumid Set	11:29	Save	PREV	HOME
Type	Occupied ▾			
Setpoint	0.00 %			
Shutoff Offset	2.0 °F			
Mode	External ▾			
Power Scale		1000Watt		
Next 8		Bottom		

6. The *Dehumid Set* menu opens.
 - a. Select Type of Dehumidification
 - “Occupied” - Only active in occupied periods.
 - “Always Enabled”
 - b. Select **Humidity Setpoint** in RH%.
 - c. Select **Shutoff Offset** in degrees F. Shutoff offset sets the degrees of overcooling allowed before dehumidification is turned off.

d. Select Mode.

Mode	Outputs						
	RV	S1	S2	Fan	DEH	RH	LOFlo
External	On/Off to Heat/Cool Demand			On/Off to Ventilation Demand	On	Reheat: On/Off	On/Off to Heat/Cool Demand
Heat Pumps	On/Off	Off*	Off*	Off*	On	Zone Pump: On	On
Internal	On/Off	On	Off	On	On	Reheat: On/Off	On

* In Heat Pumps Mode, S1 and Fan are on when cooling is also required. S2 is on when the second stage of cooling is configured and required.

e. Press Save.

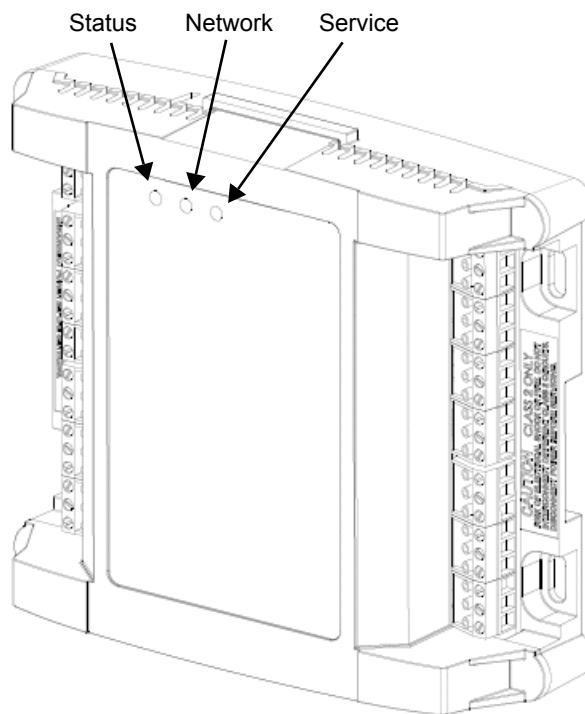
Troubleshooting

Diagnostic LEDs

The controller has 3 LED indicators. These indicators can aid in troubleshooting equipment operation problems. The following table lists the functions of the controller's LEDs in the order they appear from left to right on the unit.

LED	Indication
Status	<ul style="list-style-type: none"> – Solid green when running and configured by an LCI (networking) – Flashing green when running and NOT configured by an LCI (stand-alone) – Solid red when a fault condition exists (control shut down) – Blinking Red - the controller has a device failure – Solid Amber - The controller has not received a LCI ping message in over 10 minutes and is part of a network.
Network	<ul style="list-style-type: none"> – Yellow while the controller is transmitting data onto the FTT-10A network – Green when there is network activity – Off when there is no network activity
Service	– Illuminated when the service pin is depressed or when a controller gets configured by the LCI.

Figure 2: HPL1 Controller LEDs



Troubleshooting Tips

This section provides remedies for common problems.

Problem	Solution
Controller is not running and Status LED is not illuminated.	No power to controller. Verify the voltage on the controller's power connector (24 VAC).
How do I reset the controller?	The controller can be reset by the LCI, or you can cycle power to the controller. Refer to the LCI documentation for more information on resetting the controller using the LCI.
The RWT or SWT reading is out of range, at minimum, or maximum.	The input is either shorted or open.
The compressor stages fail to activate.	Is the ASM/CSM Unit Enable signal On? The controller does not operate the compressor without the Unit Enable signal.
The flow sensor is not reading values.	Has the proper sensor been selected in the "All Settings" section? Is the cable from the VFTS plugged into the BTUPS? Are the FM and WT wires connected to the proper inputs? Are the DIP switches for the FM inputs set for 10V? Is 24VAC power connected to the BTUPS? (Its LED should be on.) Is the VFTS properly connected to a pipe ground?

Getting Help

Components within an iWorx® controller, sensor, or power supply cannot be field repaired. If there is a problem with a unit, follow the steps below before contacting your local TES representative or TES technical service.

1. Make sure controllers, sensors, and power supplies are connected and communicating.
2. Record precise hardware setup indicating the following:
 - Version numbers of application software.
 - Device and/or firmware version number.
 - A complete description of difficulties encountered.

Applicable Documentation

Description	Audience	Purpose
<i>iWorx® HPL1 Application Guide</i> , Document No. 505-040-2	<ul style="list-style-type: none"> – Application Engineers – Wholesalers – Contractors – Start-up Technicians – End user 	Provides instructions for setting up and using the iWorx® HPL1.
<i>iWorx® LCI Application Guide</i> , Document No. 505-002 <i>iWorx® LC13 Application Guide</i> , Document No. 505-050	<ul style="list-style-type: none"> – Application Engineers – Installers – Service Personnel – Start-up Technicians – End user 	Provides instructions for setting up and using the iWorx® Local Control Interface.
http://www.iWorxWizard.com	<ul style="list-style-type: none"> – Application Engineers – Wholesalers – Contractors 	An on-line configuration and submittal package generator based on user input. Automatically generates bill of materials, sequence of operations, flow diagrams, wiring diagrams, points and specifications.
Additional Documentation	<i>LonWorks FTT-10A Free Topology Transceiver User's Guide</i> , published by Echelon Corporation. It provides specifications and user instructions for the FTT-10A Free Topology Transceiver. See also: www.echelon.com/support/documentation/manuals/transceivers .	

Representations and Warranties

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Notes:

LIMITED WARRANTY STATEMENT

Taco Electronic Solutions, Inc. (TES) will repair or replace without charge (at the company's option) any product or part which is proven defective under normal use within one (1) year from the date of start-up or one (1) year and six (6) months from date of shipment (whichever occurs first).

In order to obtain service under this warranty, it is the responsibility of the purchaser to promptly notify the local TES stocking distributor or TES in writing and promptly deliver the subject product or part, delivery prepaid, to the stocking distributor. For assistance on warranty returns, the purchaser may either contact the local TES stocking distributor or TES. If the subject product or part contains no defect as covered in this warranty, the purchaser will be billed for parts and labor charges in effect at time of factory examination and repair.

Any TES product or part not installed or operated in conformity with TES instructions or which has been subject to accident, disaster, neglect, misuse, misapplication, inadequate operating environment, repair, attempted repair, modification or alteration, or other abuse, will not be covered by this warranty.

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