ROLBIT Controllers and Thermostats

Manufacturers of AEROTemp

Thermostats and Energy Management Systems

Features C516HP Lockout Board

C516-HP - Controller Specification

Rev. C1

1. Introduction:

The C516-HP controller was designed specially for the use inside W.S.H.P units. It is 24 Volts AC it has thermostat inputs, a compressor relay, a fault relay and diagnostic LED's to indicate faults. The controller uses 1/4" quick connect terminals for factory installation. (These can be a terminal strip for thermostat connections), or any other connections that may work best for your application.

2. Features:

2.1. Complete solid-state lockout circuit (H.P.S, L.P.S, F.S, COND.)
2.2. Lock out indication output (Alarm relay). – Dry Contact
2.3. Five (5) diagnostics LED's.
2.4. 5 minute anti-short cycle timer.
2.5. Test mode.
2.6. 90 second L.P.S. by-pass timer, on start up. Timing can be changed to meet specific customer requirements.
2.7. Intelligent automatic fault reset.
2.8. Under/over voltage protection. (Brownout)
2.9. Random start timer.
2.10. Fault memory
2.11. Status LED will blink on normal operation mode.

3. Hardware configuration:

Inputs:

1. Cond. = condensate overflow sensor, the condensate sensor is a wire in the drain pan, when water touches the wire a ground circuit is made and the unit trips.
2. H.P. = high pressure switch.
3. L.P. = low pressure switch.
4. F.S. = Flow switch or low temperature thermostat. Can also be supplied to work with a thermistor sensor.
5. Test = Jumper TEST.
6. Water solenoid = Delay compressor operation. Makes sure flow is present if unit has a motorized valve on the water side.
7. "Y" = compressor input.

Outputs:

1. Four (4) diagnostics LED's., HP(green), LP(Orange), Condensate(Yellow), FS(Low temp)(red)
2. Power on status light (green)
3. Compressor relay. 24 pilot signal
4. Fault relay (L) lockout.- dry contact
5. Water Solenoid relay.-
6. Status LED.

Field Wiring Terminals- Quick Connects:

A 24 volt output, to activate water valve. Compressor delayed 10 seconds when this feature used.
C Common for 24 VAC
R Hot 24 VAC
Y Input to call for compressor.
L 24 VAC output for to indicate fault.
O Landing point **O** wire, not used by the controller.

4. Hardware Description:

4.1. Micro-Controller made by Micro-Chip.
4.2. Printed circuit board FR-4, U.L. rated.
4.3. Relays for outputs. 5 amps relay.
4.4 Jumper that defines Test Mode.
4.5. Jumper that defines Water Solenoid relay (10 Second delay for the compressor).
4.6. Mounts with 4 Metal stand-ups. (Per UL requirement)
4.7. Filters and other protection devices on inputs-outputs and Micro controller.
4.8. Operating voltage 24 volts A.C.
4.9. Power Consumption approx. 2 VA
4.10. Input will allow dry-contacts or 24VAC or GND signals.
4.11 Condensate over flow uses one pin at the condensate drain pan.
4.12 Size 3.7" x 3" x 1".
4.13 Built according to UL, IEC, and CE applicable standards.

5. Sequence of operation:

5.1. If the controller operates in normal mode, the green Status LED blinks. This indicates that 24 volt power is applied to the board and the controller is running in normal operation.

5.2. "Y" = first time a closure occurs (after power on), a random start delay of 0 to 60 second is applied, after the random delay, the compressor

relay is energized (Terminals CC & CCG). When the "Y" input opens the compressor de-energizes.
There is 5 minute anti short cycle timer that begins on de-energization.

5.3 Water Solenoid – "**A**", When Y has a demand, the water solenoid output **A** will energize if the jumper is in place for water valve operation. The compressor will start after 10 seconds delay that begins after A is energized.

5.4 Anti-short cycle timer.
After compressor shut-down, a 5 minute timer is applied and prevents the compressor from operating.

5.5. Safety features:
H.P.S = dry-contact input for the high-pressure switch.
will operate immediately. Green fault light illuminated.

L.P.S. = dry-contact input for the low-pressure switch.
This input will be ignored for the first 90 seconds after a demand for compressor operation. Orange fault light illuminated.

F.S. = Flow switch or low temperature protection. When contact opens for more then 30 seconds, the safety stops the compressor. Red fault light illuminated.

COND. = Condensate over flow sensor input.
This input will operates when the water level in the condensation pan rises. The one spade connector and the chassis ground will complete the path in case of water level. This input will operate after 30 sec. Yellow fault light illuminated.

Under & over voltage protection = when an under or over voltage condition exists, the controller locks out the unit.
When condition clears, the controller automatically releases the unit to normal operation and the compressor restarts after the random start and anti short cycle timings are met. The under & over voltage protection starts at plus or minus 20% from nominal voltage and returns to operation at plus or minus 10% from nominal voltage. .All four LED fault lights will flash when an under or over voltage condition occurs. The over under voltage protection can be disabled by removing the O/V jumper

5.6. The lockout can be manually reset by cycling the thermostat.

5.7. Intelligent Reset
The controller has an intelligent reset feature, after a safety control is activated, the controller locks out the unit for 5 minutes, at the end of this period, the controller checks to verify that all faults have been cleared. If faults have been cleared, the controller restarts the unit, if a second lock out happens the controller locks out again for 5 minutes, at the end of this period, the controller checks to verify that all faults have been cleared. If faults have

been cleared, the controller restarts the unit, if a third fault occurs then the controller will lock out the unit until the unit is manually reset. The last fault will be kept in memory after a full lockout; this is only cleared by cycling the power.

5.8. The "**L**" terminal has 24 volts applied when a lockout occurs. This can be used to drive a fault light or a low voltage relay.

5.9. Test Mode.

Test mode allows fast testing at the production line or serviceman to check the operation of the unit quickly. The normal operation is the test jumper in place. Removal of the jumper speeds up all timings by a factor of 60.

5.10. Water Solenoid jumper allows activates '**A**" on a compressor call and delays compressor operation by 10 seconds delay. This feature activated by removing the jumper.

6. **Startup**

The Unit will not operate until all the inputs and safety controls are checked for normal conditions. On a call from "**Y**" the controller will check the LP input, and if it's open then the compressor will not start and the LP LED will illuminate. If the LP input is closed then the compressor will start and this input will be ignored for the first 90 seconds. If after 90 seconds the LP input opens for 30 continuous seconds then the compressor will stop and the LP LED will illuminate.

7. **Anti Short Cycle Protection and Random Start**

The control provides a minimum off time of 5 minutes for short cycle protection. A random time delay of 0 to 60 seconds is generated after: each power up to prevent simultaneous start up of all units within the building.

8. **Cond. = Condensate Overflow Protection**

When a condensate overflow is sensed then the cooling operation is suspended. After a 30 second delay and if a fault still exists then a lockout is generated and the yellow LED is illuminated.

9. **Status LED:**

If the controller operates in normal mode, the green Status LED will blink which indicate power is applied to the board, test jumper in place and the controller is in normal operation.
In test mode - status LED is <u>off.</u> At lock out - status LED is ON.