

# Phasefale Power Miser

## Anti-Sweat Power Saving Control [Po mode]

### Installation & Programming

These instructions are for the Po - Anti-Sweat Heater Energy Saver mode only. Instructions for the Hu and rP functions are detailed separately.

#### **General Overview and Introduction**

Phasefale's Power-Miser Po saves electrical power by reducing anti-sweat heater power as humidity reduces.

A microprocessor continuously controls the power level by cycling anti-sweat heaters according to the humidity signal obtained.

A setting allows the power level to be adjusted according to the humidity level. Multiple Power-Misers can share a humidity sensor with the slave feature. The humidity is displayed on the digital display. The humidity setting may be viewed by pressing M+. An indicator shows when power is on to the anti-sweat heaters.

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#### **1. INSTALLATION**

##### **Enclosure Installation**

The Enclosure can be mounted in any position, and is splash proof.

Mount the base and fit 2 of the mounting screws to the lid. The lid can then be hinged, allowing the electrical connections to be made.

##### **Humidity Sensor Installation**

The Humidity sensor is a 4 - 20 mA current loop type, that is a 2 wire connection with polarity. It may be extended up to 500m, and should be mounted in a position to sense the controlled air but where it will not be subject

to large temperature swings.

Up to 4 Power Misers can operate from the same humidity sensor by selecting the slave jumper on all but one of the units and wiring, as shown in Section 9: Wiring Diagram.

##### **Solid State Relay Installation**

Mount the solid state relays solidly on a metal base such that a good heat-sink of at least twice the base area is available.

##### **Electrical Installation**

Refer also to the electrical wiring diagram (section 9) for connection details.

The Active supply to the unit should be fused with a maximum rating of 10A.

The control output from C1/C2 is rated at 10A resistive, and is used to switch solid state relays. The +12v supply generated by the Power-Miser is used to energise the solid state relay inputs.

**IMPORTANT:** Drain heaters are not to be controlled by the Power-Miser, or Ice-Up may occur.

##### **Solid State Relays**

Each solid state relay can be used to switch 20Amps of 240VAC power maximum and each relay is electrically isolated from the others.

The low voltage input of solid state relays should be driven in banks of 3 in series. The input at 3(+) and 4(-) is rated 3-32V DC. Odd single or dual relays can be connected across direct.

Reverse polarity to the solid state relays will not damage them, but their outputs will not switch.

The switched heater supply can control hand rail and perimeter heaters as required.

Up to 42 relays can be switched in 14 banks of 3 relays.

**WARNING:** Solid state relays have a small "leakage" current in the Off condition. Therefore they should never be considered as a means of electrical switch isolation.

Slave connection

A second Power-Miser control can be connected to a common humidity sensor which allows different setpoints for different types of cabinets (eg one for open case and another for glass door freezers)

To fit a slave, wire the auxiliary units as in the wiring drawing and move the jumper on the circuit board from "master" to "slave". Only 1 unit should be set as "master".

Complog (computer logging of the humidity) is available for the Power-Miser, and wiring is described separately.

#### **2. INITIAL PROGRAMMING**

The Power-Miser must first be set to the yPo operating mode, to do this follow these steps:

- a) Press and hold M+ and >> together for 15 seconds. After 3 seconds, UL is displayed, but keep holding until OP is displayed.
- b) Pressing the ^ and v keys will allow you to select one of the following:

Po Anti-sweat control  
rP Retarder Prover control  
Hu Humidity and temperature control  
dF Humidity and temperature control with settings as per default [Section 8]

- c) The Po function should be selected, instructions on programming the rP and Hu modes are detailed separately.
- d) Press M+ to save to memory and return to normal operation.

#### **3. PROGRAMMING**

To program the humidity setpoint HP:

- a) "Unlock" the permanent memory for programming.
  - b) Alter the HP setting to your desired value
  - c) Store the changed value
  - d) Return to normal operation.
- a) To unlock the Power-Miser, press M+ and select together for 3 seconds. UL will be displayed to indicate that the system is unlocked then HP will be

displayed, then the current setting (eg. 60).

b) After the setting is displayed, you can increase or decrease the setting by pressing up or down until the value required is displayed. Increasing HP gives greater power saving- but be careful to avoid extra condensation.

d) To store the altered HP setting, press M+. The new value is now stored indefinitely and will remain during power loss.

e) If no keypad is pressed for 60 seconds the Power-Miser will once again lock itself and disallow any further alterations until unlocked again. This will also occur if the select key is pressed during the programming operation.

Remember! you must store the new HP value using M+.

#### 4. CONTROL OPERATIONS

During normal operation, the Power-Miser displays the relative humidity and the "Output" LED cycles on and off to show the heater operation. The less percentage of time that the LED is on, the greater the savings. As store humidity decreases, the percentage time on also decreases.

The heater power level can be adjusted by the humidity setting HP. The setpoint indicates the level at which the heaters are full on, when full heating is required as the humidity is high. The adjustment of the HP setpoint is described in Section 3- Programming.

A reading of the current power savings can be obtained by pressing either up or down keys momentarily. PS then the actual current savings (eg. 30 for 30%) is displayed. The savings is based on the current humidity and setpoint, and is accurate to within 3%.

#### 5. MAXIMISING YOUR POWER SAVINGS

a) Program HP to 70 as an initial setting.

b) Wait at least 6 hours, then check hand rails, glass doors etc. for signs of condensation. Glass doors will always fog a little, so make a judgement as to what is

acceptable. If the level of condensation is too high, the set-point needs to be decreased. Try 5% lower at 65%.

c) If there is no sign of condensation, increase the setting no more than 5% to 75%.

d) Repeat the evaluation, allowing plenty of time between each test until a balance is achieved between savings and anti-sweat performance.

e) Generally air-conditioned stores will allow savings of 35-45% (more if carefully tuned), and non air-conditioned stores will allow around 20-35% savings.

#### **Remember:**

Increase Set-Point HP = Less Heating, Decrease Set-Point HP = More Heating.

#### 6. TROUBLESHOOTING

If checking the output switching of the solid state relays, the leakage current can lead to the conclusion that the relay is always on. By checking that a load is connected proper readings will be obtained.

The humidity sensor operates on the 4-20mA current loop standard and can be checked with a milliammeter 0-300mA range.

If the display shows Er, this indicates either an open or short circuit to the humidity sensor.

Do not attempt to field calibrate the humidity sensor, return to supplier for workshop calibration.

#### 7. HUMIDITY LOGGING

Press both ^ and v buttons together, Lo (Logging) is displayed.

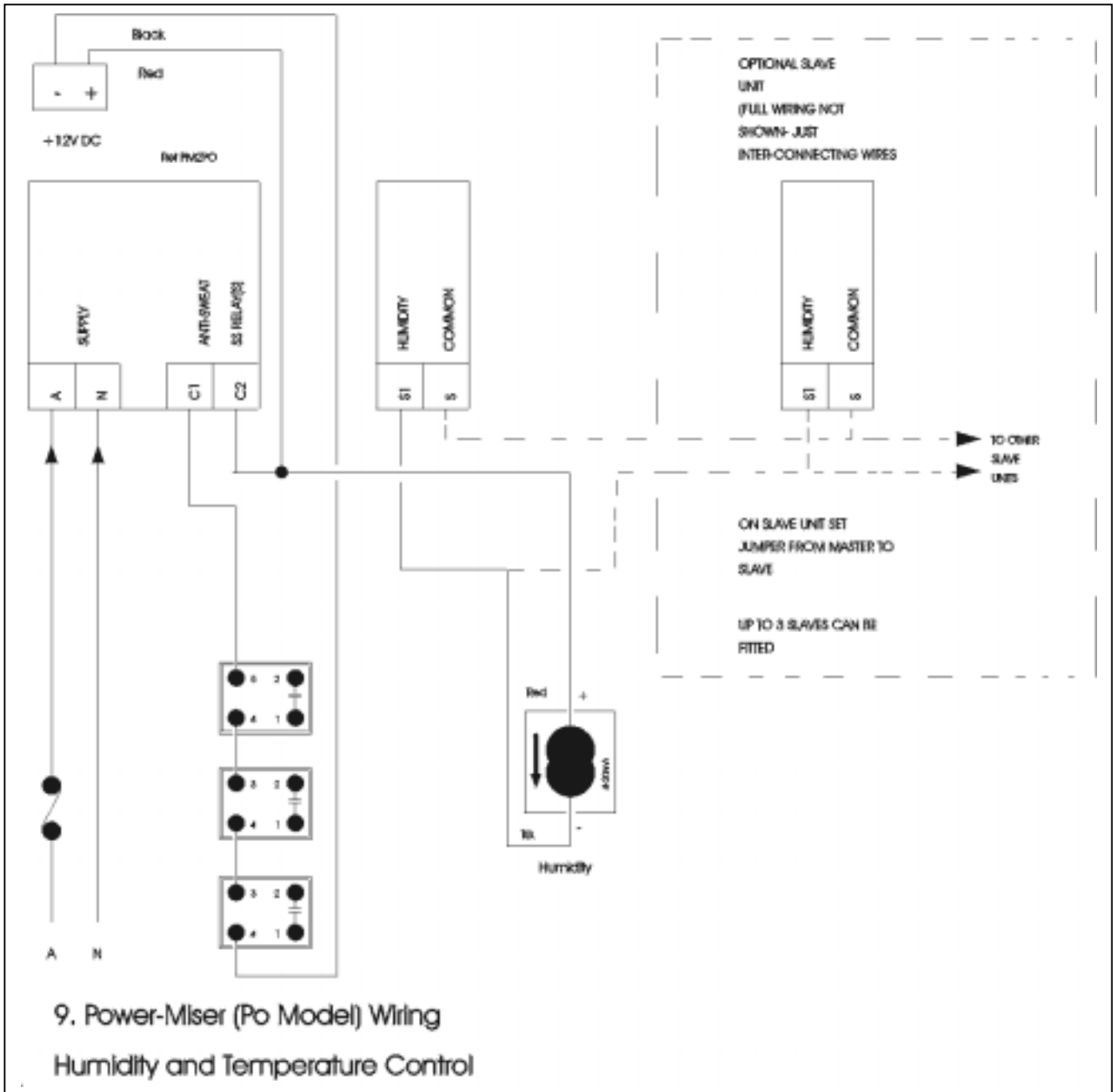
Pressing ^ will show the highest humidity reached in the last hour. Continue pressing ^ and the previous hour's highest humidity is indicated and so on up to 99 hours. PL indicates that a power loss occurred.

If you wish to know how many hours ago a record was stored, press down to show the hours since the record was made.

Once again, pressing >> will return you to normal operation. Repeat the above sequence but press v and the lowest readings will be shown.

#### 8. LIST OF INDICATIONS

Dis	Description	Def.
AC	AC Mains Failure	
CF	C1/C2 Open Circuit	
CO	C1/C2 Closed Circuit	
dF	Load Factory Defaults	
Er	Probe Error	
HP	Hum. Ctl S'point	50%rh
Hu	Hum. & Temp. Ctl	
Lo	Logging	
OP	Operating Mode	Hu
PL	Power Loss	
Po	Anti Sweat Htr Ctl.	
PS	Power Savings	
rP	Retarder Prover Ctl.	



Phasefale Pty. Ltd.  
36 Bulli Street MOORABBIN  
VICTORIA 3189, AUSTRALIA  
Tel +613 9553 3993  
Fax +613 9553 0800  
Web Site [www.phasefale.com.au](http://www.phasefale.com.au)  
Email [sales@phasefale.com.au](mailto:sales@phasefale.com.au)