# Phasefale Power Miser
# Humidity & Temperature Control [Hu]
## _Installation & Programming_

_These instructions are for the_ **Hu** - Humidity and Temperature Control _mode only. Instructions for the_ **Po** _-_ Anti-sweat heater _and_ **rP** - Retarder Prover _controls are detailed separately._

**General Overview and Introduction**

The Power-Miser **Hu** function gives proportional control between an adjustable humidity band (subject to minimum timing constraints) to provide excellent system performance. Independent temperature control and both humidity and temperature alarm functions are available.

<M>The humidity and/or temperature are shown on the LED display. An **H** indicates humidity is being displayed while **t** indicates temperature is being displayed. The display may be toggled between humidity and temperature by pressing the select button. Control status is indicated by a point at the end of the humidity display. Flashing of the display indicates an alarm situation. The programmed settings may be viewed by pressing **M+**.

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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 two of the mounting screws to the lid. The lid can then be hinged to allow the electrical connections to be made.

**Humidity Sensor Installation**

The Humidity sensor is a 4 - 20 mA current loop - 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 8.

**Temperature Sensor  (Optional)**

The temperature sensor is an NTC thermistor of extreme accuracy (0.2 degrees C), and it has a non-linear resistance-temperature characteristic.  It is ideally mounted in a position where controlled air is circulating. In rooms, for example, position the sensor 500-1500mm in front of the supply air. Ensure that at least 150mm of the sensor cable is in the controlled space to ensure accurate temperature sensing. If the sensor cable is open or short circuit, the Power-Miser will display **Er** to indicate the fault. The sensor cable is double insulated and therefore does not need to be enclosed in a conduit. There is no polarity to the sensor connection. It may be extended by up to 100 metres by joining an extra cable (use double insulated cable) but the join must be well insulated and away from any dirt or moisture.

**Electrical Installation**

Refer also to the electrical wiring diagram for connection details. The Active supply to the unit should be fused wih a maximum rating of 10A.

The Humidity and Temperature control outputs are rated at 10A resistive.

Motors of 1/2HP or larger MUST be switched via a solid state relay or contactor (available from Phasefale).

The dialler outputs D1/D2 provide alarm contacts which open on alarm or power loss. The D1/D2 outputs are voltage free, and can be used to connect Power-Miser to _any_ type of equipment for remote monitoring.  [eg DDC (direct digital control), BMS (Building management systems), Multi channel security systems etc, and our AD1 dialler]. The AD1 provides a remote alarm via the phone lines if connected to the dialler outputs, and a  2-way connector at the bottom left can be used to supply 12VDC to the dialler, the correct polarity is indicated on the wiring drawing. The D1/D2 contacts can alternatively be used as a temperature or humidity control safety contact (opens when alarm limits are exceeded for the delay time).

Battery units are supplied with the battery back-up disconnected. Reconnect once mains power is connected.

If an option PCB, for flashing alarm light outputs is to be fitted, follow the instructions supplied with it.

The complog interface wiring is described separately.

**Installation Self-Test**

Press **M+** and up together for 5 seconds. The Power-Miser automatically cycles the outputs as follows:

CO/CF Hum. Ctl On/Off
Lo/LF Temp Ctl On/Off
dO/dF Dialler ON/Off
HO/HF Humidity Alm ON/OFF
FO/FF Temp Alm ON/OFF

**2. INITIAL PROGRAMMING**

The Power-Miser must first be set

to the **Hu** 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 selects one of the following:

      **Hu** Humidity and temperature control

        **Po** Anti-sweat control

        **rP** Retarder Prover control

        **dF** Humidity and temperature control with settings as per default [Section 7]

c) Select **Hu**, instructions on programming **Po** and **rP** modes are detailed separately.

d) Press **M+** to save to memory and return to normal operation.

## 3. PROGRAMMING THE CONTROL

The basic programming steps are:

a) "Unlock" the permanent memory for programming.

b) Select the setting to be adjusted

c) Alter the setting to your desired value

d) Store the changed value

e) Return to normal operation.

a) To unlock the Power-Miser and alter settings, press **M+** and select together for three seconds. **UL** will be displayed to indicate that the system is unlocked. **HP** will be displayed showing the first setting.

b) After the Power-Miser is unlocked press **M+** until the setting you wish to alter is displayed.

c) After the setting to be adjusted is displayed, you can increase or decrease the setting by pressing **^** or **v** until the value required is displayed.

d) To store the changed value, press the **M+** keypad. The new value is now stored indefinitely and will even 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 >> key is pressed during the programming operation. Remember! you must store each altered value using **M+**.

## 4. CONTROL OPERATIONS

Once programmed to **Hu**, humidity and temperature can be programmed individually. Both the temperature and humidity functions have the following settings:

Setpoint for the control routine (**HP, tP**)

Differential of the control routine(**Hd, td**) Minimum Cycle time of output (**HC, tC**) Output mode of the control (**HO, tO**)

The humidity control is between the Setpoint (**HP, tP**) and the Setpoint minus the Differential (**Hd, td**). If the humidity falls within this range the output will be switched to provide an average output proportional to the closeness of the humidity to the setpoint.

The Cycle time (**HC, tC**) sets the minimum time that the output must stay in one position before being allowed to change. This may be used to protect devices subject to damage from frequent cycling, such as motors.

The output polarity (**Ho, to**) determines the state of the output relays. A value of 1 will cause the output to close when the reading is higher than the setpoint (ie. to switch on the control to reduce the reading, as with refrigeration or a dehumidifier). A value of 0 will cause the output to close when the reading is lower than the setpoint (ie. to switch on the control to increase the reading, as with heaters or a steam generator).

The control setpoints use the programmed values (**HP**, **tP**) if no potentiometers are fitted as in section 8, otherwise the potentiometer resistance is used for the setpoint. For both temperature and humidity the setpoint is the resistance in kilo-ohms, ie. 33k is 33C or 33%rH. Temperature control can be disabled by setting **tP** to **OF** (reduce it below 5).

## 5. HUMIDITY LOGGING

Power-Miser stores an hourly record of both the highest humidity, and the lowest humidity reached. To access logging, press both up and down 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 is indicated - up to 99 hours ago. **PL** indicates that a power loss occurred.
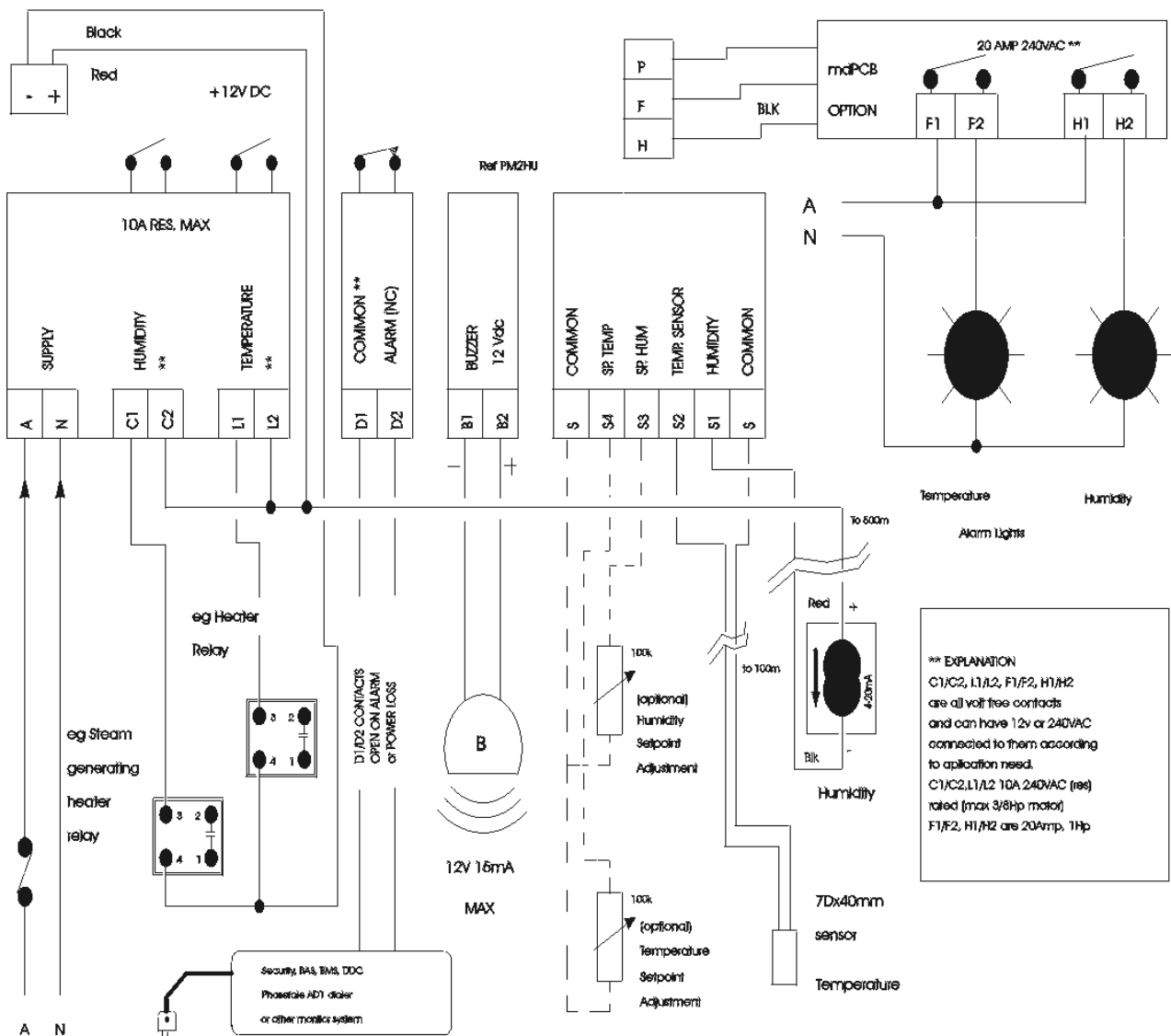
If you wish to know how many hours ago a record was stored, press **v** to show the hours since the record was made. Once again, pressing **>>** will return you to normal operation.

To view the lowest humidity readings, repeat the above sequence but press **v** and the lowest humidity logs are displayed.

## 6. ALARM

Both Temperature and Humidity alarm functions have a high setting, a low setting, and a time delay. If these limits are exceeded for longer than the time delay an alarm will occur.

An Alarm is indicated by the relevent display (temperature or humidity) flashing accompanied by the sounding of a buzzer, and/or a dial signal if these accessories are connected. When the optional mdPCB relay board is fitted, it can separately drive an alarm light for temperature and humidity. An alarm may be acknowledged by pressing **>>** momentarily. The light will

Black
Red
+12V DC
- +

10A RES. MAX

SUPPLY — A N
HUMIDITY ** — C1 C2
TEMPERATURE ** — L1 L2
COMMON ** / ALARM (NC) — D1 D2
BUZZER 12 Vdc — B1 B2
COMMON — S / SP. TEMP — S4 / SP. HUM — S3 / TEMP. SENSOR — S2 / HUMIDITY — S1 / COMMON — S

Ref PM2HU

P F H — BLK — mdPCB OPTION — 20 AMP 240VAC **
F1 F2 H1 H2
A N
Temperature    Humidity
Alarm Lights

eg Heater Relay
eg Steam generating heater relay
A N

D1/D2 CONTACTS OPEN ON ALARM OR POWER LOSS

B
12V 15mA MAX

Security, BAS, BMS, DDC
Phonetale AD1 dialer
or other monitor system

100k (optional) Humidity Setpoint Adjustment
100k (optional) Temperature Setpoint Adjustment

To 500m
to 100m
Red +
Blk -
Humidity
7Dx40mm sensor
Temperature

** EXPLANATION
C1/C2, L1/L2, F1/F2, H1/H2
are all volt free contacts
and can have 12v or 240VAC
connected to them according
to aplication need.
C1/C2,L1/L2 10A 240VAC (res)
rated (max 3/8Hp motor)
F1/F2, H1/H2 are 20Amp, 1Hp

then be steady on and the buzzer and dialler off for the period set by **AA.** The alarm will reoccur after this period of time unless the condition returns to normal. (this function may be disallowed by setting **AA** to **OF** (reduce below 1)).
An Alarm Memory is shown by the relevent display flashing but no other alarm indications. This indicates that an alarm has occurred but that the condition has since returned to normal, and it may be cleared by pressing **>>** while the relevent display is shown. The dialler and buzzer outputs will operate if the source of the alarm is either temperature or humidity.
The alarms may be separately disabled by setting the relevent alarm time (**Ht, tt**) to **OF** (reduce below 1).

## 7 . List of Indications

| Dis. | Description | Def. |
|------|-------------|------|
| AA | Alarm Acknowledge | 10 min. |
| AC | AC Mains Failure | |
| CF | C1/C2 Open Circuit | |
| CO | C1/C2 Closed Circuit | |
| dF | D1/D2 Closed B1/B2 | 0V |
| dF | Load Factory Defaults | |
| dO | D1/D2 Open B1/B2 | 12V |
| Er | Probe Error | |
| FF | F1/F2 Open Circuit | |
| FO | F1/F2 Closed Circuit | |

| HC | Hum. min. Cycle Time | 0 min. |
|------|----------------------|--------|
| Hd | Humidity Differential | 10 %rh |
| HF | H1/H2 Open Circuit | |
| HH | Hum. High Alm. Pnt. | 75 %rh |
| HL | Humidity Low Alm. Pnt. | 25 %rh |
| HO | H1/H2 Closed Circuit | |
| Ho | Hum. O/put Polarity 1 | |
| HP | Hum. Control Setpoint | 50 %rh |
| Ht | Hum. Alarm Time Del. | 10 min. |
| Hu | Humidity & Temp. Ctl. | |
| LF | L1/L2 Open Circuit | |
| LO | L1/L2 Closed Circuit | |
| Lo | Logging | |
| OF | Function Off | |
| OP | Operating Mode Hu | |
| PL | Power Loss | |
| Po | Anti Sweat Heater Ctl. | |
| rP | Ret. Prover Control | |
| tC | Temp. min. Cycle Time | 0 min. |
| td | Temp. Differential | 1 °C. |
| tH | Temp. High Alm. Pnt. | 45 °C. |

| tL | Temp. Low Alm. Pnt. | 15 °C . |
|----|---------------------|---------|
| to | Temp. O'put Polarity | 1 |
| tP | Temp. Ctl Setpoint | 25 °C. |
| tt | Temp. Alm. Delay Time | 10 min. |

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