

**Models:**

MS5-04: 3 Speed FAN, 1 COOL, 1 HEAT, 1 Hot Water Controller

**MS5-04****Microcontroller****Specifications****Power Supply**Voltage: 240VAC  $\pm 10\%$  @ 50/60Hz

Power Consumption: 7VA Max

**Input**10k $\Omega$  Thermistor temperature sensor

Switched contact for AC Unit Disable

Switched contact for Timeclock input

Switched contact for After Hours operation

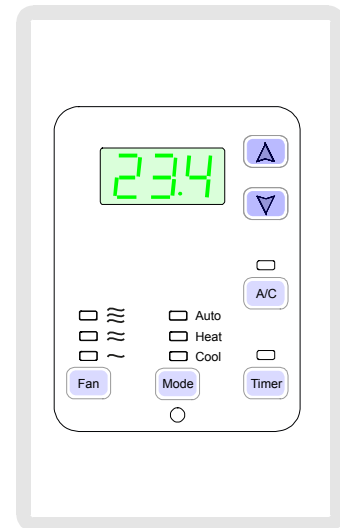
Switched contact for Heat / Cool disable

**Outputs**

Relay 1 to 4 Voltage free relay contacts:

Normally Open: 24V, 16A resistive

24VAC, 6A inductive

Analogue Output 1: 0-10VDC  $\pm 0.1V$  into  $>2k\Omega$  load**Connection between Controller and Control Station**

5 way connection via 4 core plus screen cable

**Control Terminal Identification**TH1 Temperature Sensor Input (10k $\Omega$  thermistor)TH2 Temperature Sensor Input (10k $\Omega$  thermistor)

DI#n+ Digital Input - positive

DI#n- Digital Input - negative

AO#n+ Analogue Output positive

AO#n- Analogue Output negative

P+ 12VDC to Control Station

P- 0VDC to Control Station

C+ RS485 Comms + to Control Station

C- RS485 Comms - to Control Station

SHLD Wall Panel Cable Shield

**Input Terminal Identification**

240V Power connection to Control Station:

E Earth

N Neutral supply

240V Mains 240VAC Supply

**Output Relays**

NO Normally Open contact

Com Common contact

**Enclosure:**

The control is provided in three parts. The wall mounted Control Station, the Remote Controller and a Bead Type Return Air Detector.

**Control Station**

HPM or Clipsal style switchplate

Dimensions: 115mm x 72mm x 30mm

**Controller**

Plastic enclosure manufactured from an ignition resistant grade of ABS which meets the requirements of AS2420.

Colour: Grey

Dimensions: 107mm x 89mm x 69mm

**Temperature Ratings**

Storage: 0-50°C non-condensing

Operating: 0-40°C non-condensing

**Application**

The INNOTECH Microstat Controller is designed to be used in commercial applications to provide complete control for air conditioning systems.

**Features**

- LED Display of Temperature, Set Point and Program Functions
- Control Station fits standard electrical wall plates
- Four core screened cable simplifies connection between the Control Station and Controller
- Adjustable Proportional Band, Dead Zone, Compressor Off Time and Setpoint Range
- Hot Water Valve (0-10V), Cool and 3-speed fan outputs
- Unit Disable, Timeclock Override, After Hours functions and Heat/Cool Disable Functions
- Display auto-dims when the lights are out
- Time to start or stop
- Configurable Power On settings
- All adjustments are made from the Control Station

## Installation

1. Mount in a dry and reasonable clean location free of excessive vibration.
2. Wire in accordance with INNOTECH connection diagrams and local bylaws or refer to your local distributor.

 This product should only be installed by qualified personnel.

## Wiring

1. Connect 240VAC supply to the correct terminals on the controller, observing the correct polarity of the connections.
2. Connect the EARTH to the correct terminals on all units.
3. DO NOT connect 240VAC to the control terminals.
4. Ensure that the wiring between the control station and the controller is correctly connected. Failure to do so will result in malfunctioning and may damage either or both units.
5. The maximum wire length between the control station and controller should not exceed 50 metres. The wiring between these devices should not be run in parallel with conductors carrying high current.

## Digital Inputs

### D11 Timeclock

The Microcontroller is equipped with a remote timeclock enable function.

When the time clock input (D11) is "ON", the Microcontroller will run in A/C mode.

### D12 After Hours

The Microcontroller is equipped with an After Hours timer.

When a pulse is received on the After Hours input (D12), the unit will run in A/C mode for the period set in Program Parameter 6.

If a pulse is received while the Microcontroller is in After Hours mode, it will toggle off.

### D13 Unit Disable

The Microcontroller is equipped with an AC Unit Disable function.

If the Disable Input (D13) is "ON" for the period set in Parameter 7, the Microcontroller will shut down the air conditioning unit. When the Microcontroller is disabled, the A/C LED will flash to indicate that it is being overridden. When the remote disable input is opened, the unit can be restarted by pressing the A/C button.

### D14 Device Disable

The Microcontroller is equipped with a Heat/Cool disable function.

If the remote disable input (D14) is "ON" for the period set in Parameter 9, the Microcontroller will shut down the specified A/C devices (Heat only, Cool only or Heat and Cool) as indicated in Parameter 8. If an A/C device is being overridden, the corresponding Mode LED (Heat/Cool) will flash. When the input is turned off, the unit will restart the A/C devices as required.

## Analogue Outputs

### AO1 Hot Water Valve

The Microcontroller is equipped with an output for a hot water valve. When the Microcontroller is in heating mode, the analogue output will vary linearly from 0-10V over the range of the Proportional Band (Parameter 4).

## Digital Display

The digital display will show the following error codes to assist with fault finding.

- Display Reads "99.9"  
This indicates either a faulty sensor or faulty sensor cabling.
- Display Reads "HLP"  
This indicates that communication between the Control Station and Controller is not operating.

First check the interconnecting cabling and if this is OK, contact your local Innotech Distributor for assistance.

## Adjustable Parameters

### Jumper Settings on the Control Station

#### Jumper #1 (JP1 Rev)

Not Used.

#### Jumper #2 (JP2 H/C)

Not Used.

#### Jumper #3 (JP3 Fan)

This jumper is used to select continuous fan operation or fan cycles with heating.

When the link is closed, the fan runs continuously on cooling and cycles with heating.

## Program Functions on the Control Station

All variable settings for the Microcontroller are adjusted at the Control Station.

### Programming Mode

To enter Programming Mode, depress and hold the  and  buttons for 5 seconds. The display will become blank indicating that you are in the Programming Mode. Release both keys and the display will show parameter 0.

While in the programming mode, the following buttons are active:

-  Change to the next parameter
-  Increase the current parameter value
-  Decrease the current parameter value

To Exit the Programming Mode, depress the  and  buttons and the new setting will be saved.

#### Parameter 0 - Sensor Calibration

The Display will show the sensor temperature. To offset the sensor temperature, adjust using  the or  buttons.

- The range of the Offset is  $\pm 9.9^{\circ}\text{C}$
- The factory default setting is  $0.0^{\circ}\text{C}$

#### Parameter 1 - Minimum Setpoint

The display will show the Minimum Setpoint to which the controller can be set.

- The range of the Minimum Setpoint is 0 to  $99^{\circ}\text{C}$
- The factory default setting is  $15^{\circ}\text{C}$

#### Parameter 2 - Maximum Setpoint

The display will show the Maximum Setpoint to which the controller can be set.

- The range of the Maximum Setpoint is 0 to  $99^{\circ}\text{C}$
- The factory default setting is  $30^{\circ}\text{C}$

#### Parameter 3 - Dead Band

The display will show the Dead Band setting.

- The range of the Dead Band is 0 to  $9.9^{\circ}\text{C}$
- The factory default is  $1.0^{\circ}\text{C}$

#### Parameter 4 - Proportional Band

The display will show the Proportional Band (PB) setting. A PB setting of  $2^{\circ}\text{C}$  will result in a differential of  $2^{\circ}\text{C}$  for heating and  $2^{\circ}\text{C}$  for cooling.

- The range of the Proportional Band is 0 to  $9.9^{\circ}\text{C}$
- The factory default is  $1.0^{\circ}\text{C}$

#### Parameter 5 - Fan Run On Time

The display will show the Fan Run On Time.

This is the period that fan will run for if it is operating in heating mode and the controller is turned off. This is to remove any residual heat where electric heating is used.

- The range of the Run On Time is 0 to 99 seconds.
- The factory default setting is 30 seconds.

#### Parameter 6 - After Hours Timer

The display will show the After Hours Time.

This is the period the unit will run for if an After Hours pulse is received.

- The range of the After Hours Time is 0 to 9.9 hours.
- The factory default setting is 1 hour.

#### Parameter 7 - Unit Disable Timer

The display will show the Unit Disable Time.

This is the time that the controller must see the Unit Disable input for before it turns off.

- The range of the Disable Timer is 0 to 99 minutes.
- The factory default setting is 1 minute.

#### Parameter 8 - Devices Disable

The display will show 4 settings of device disable.

- 0 - None, 1 - Heat, 2 - Cool, 3 - Heat and Cool
- The factory default setting is 3 - Heat and Cool.

#### Parameter 9 - Device Disable Timer

The display will show the Device Disable Time. This is the time that the controller must see the device disable input for before it turns off the specified devices.

- The range of the Device Disable Timer is 0 to 99 seconds.
- The factory default setting is 0 seconds.

#### Timer Function

The  button when pressed will display the time in which the unit will change state. For example: if the unit is off, the unit will display the time till the unit will turn on. If the unit is on, it will display the time till it will turn off.

Continuously pressing the button will increase this time by 10 minutes until it reaches 24 hours, when it will then roll over and display the minimum time adjustment. The time is adjustable from 10 minutes to 24 hours. If left for 5 seconds, the display will revert to displaying the sensed temperature.

#### Mode Function

The  button will switch between Auto, Heat and Cool modes.

In Auto mode, the unit will heat and cool as required to maintain the setpoint conditions.

In heat mode, the cooling is disabled and the unit can only heat to maintain set point conditions (winter mode).

In cool mode, the heating is disabled and the unit can only cool to maintain conditions (summer mode).

#### Start Up Default Settings

The Microcontroller can be set to start in any mode of operation.

To set the start up default, adjust the Microcontroller to the desired settings and then press and hold the  and  buttons for 5 seconds.

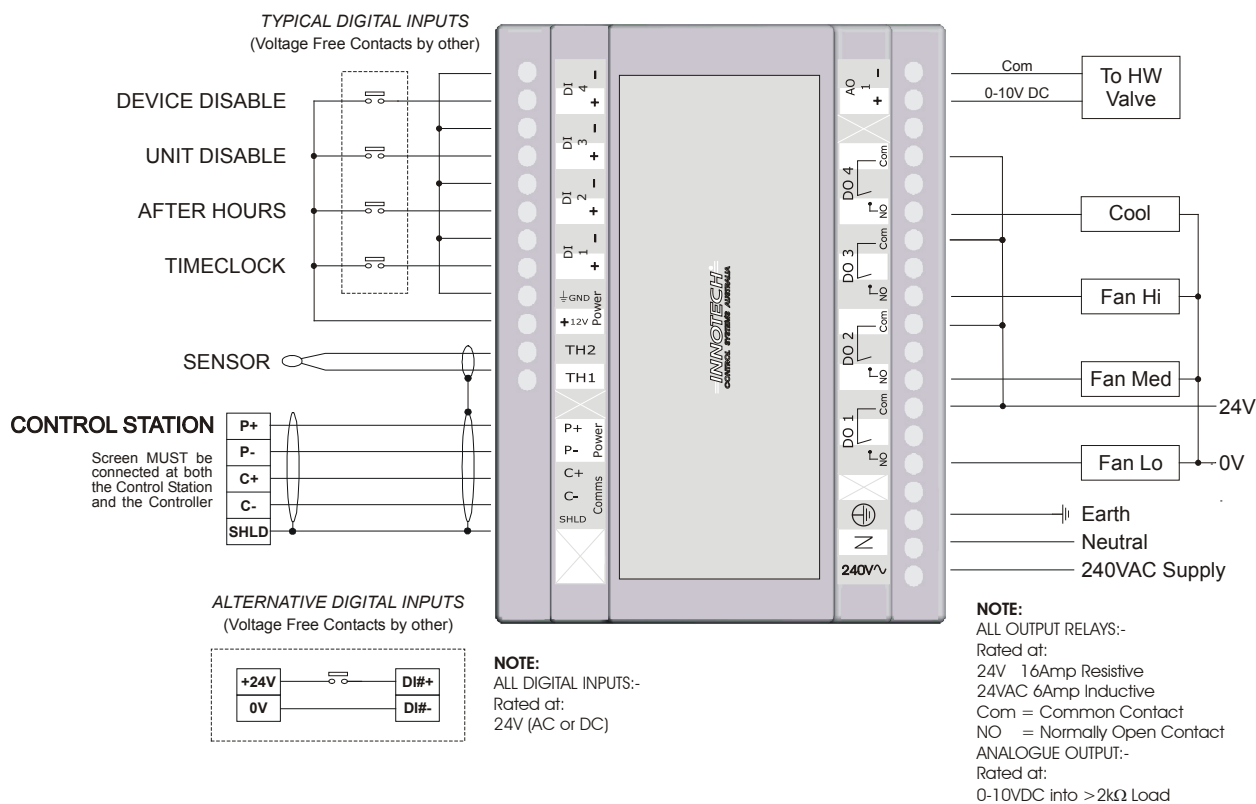
The display will become blank indicating that the new settings are saved.

#### Factory Set Default Settings

|                |        |                       |
|----------------|--------|-----------------------|
| Setpoint       | 22.5°C | (0.0 to 99.9°C)       |
| Operating Mode | Off    | (Off / On)            |
| Fan Speed      | High   | (Low / Medium / High) |
| A/C Cycle      | Auto   | (Auto, Heat, Cool)    |

## STANDARD CONNECTION

### CONTROLLER



\* MAXIMUM CABLE LENGTH BETWEEN THE CONTROL STATION & CONTROLLER IS 50 METRES.

# INNOTECH®

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