



# Regulator Systems

MANUFACTURER OF AIR CONDITIONING CONTROLS AND INSTRUMENTATION

## HC2004 HUMIDITY CONTROLLER



### SYSTEM 2000

SYSTEM 2000 is totally Australian designed and manufactured. Exclusive circuitry gives the HC2004 Humidity Controller all the features that has made this system an industry leader. The HC2004 is part of the System 2000 control devices developed by Regulator Australia. The basic features common to all the 2000 Series controllers create a uniquely flexible yet powerful configuration. With all the functions that create an accurate and reliable controller housed in the one unit, the HC2004 offers the finger-tip control needed for complex conditions.

### FRONT PANEL

#### Digital Display & Display Selector Switch

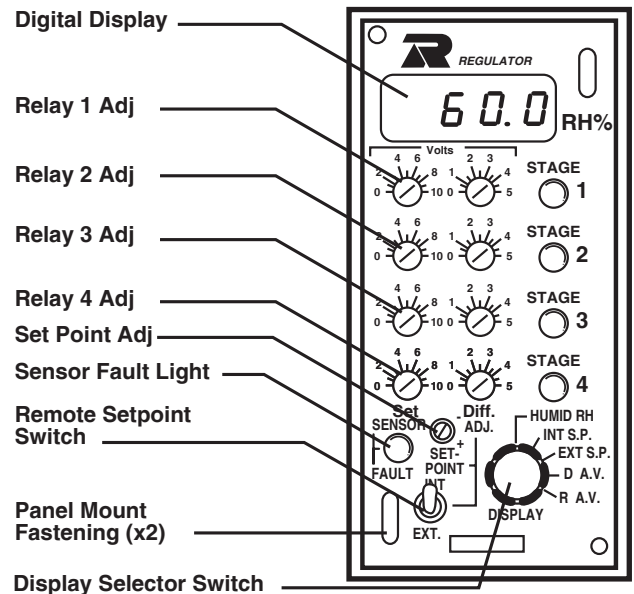
The Display Selector Switch has five positions:

1. HUMID RH Displays the humidity within 0.1% resolution from 0-100% RH.
2. INT S.P. Displays the INTERNAL SETPOINT to which the Controller is working from 0-100% RH.
3. EXT S.P. Displays the remote setpoint when the external setpoint is installed and the INT/EXT switch is set to EXT; standard remote setpoint is from 40-90% RH.
4. D/A Displays the 0-10VDC signal generated when the humidity is ABOVE the setpoint selected.
5. R/A Displays the 0-10VDC signal generated when the humidity is BELOW the setpoint selected.

**Relay Setpoints & LED Display** The operation of the relay stages in the system are indicated by their respective LED's and controlled by the potentiometers immediately below the digital display. The pull in volts is set by the left potentiometer and the differential by the right potentiometer. When the relay is energised the LED is illuminated. The zero volts drop out feature prevents any relay from locking on if the differential voltage is set higher than the pull in volts. The internal circuitry will drop out the relay at 100mV. (The settings on the differential are in volts not in percentage of pull in volts.)

#### Sensor Fault & Setpoint Selection & Adjustment

At the lower left is the sensor fault light to indicate when a fault is detected and shutdown is effected. A setpoint adjustment screw is located to the right of the sensor LED and a switch to select internal or external setpoint is located below.



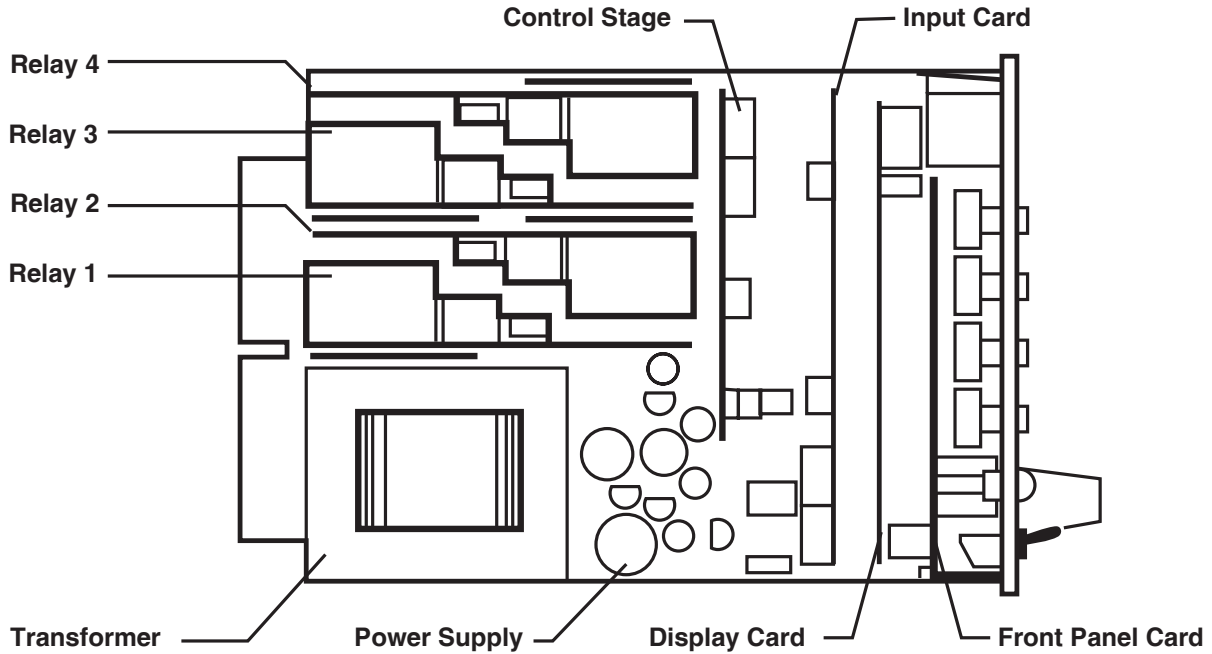


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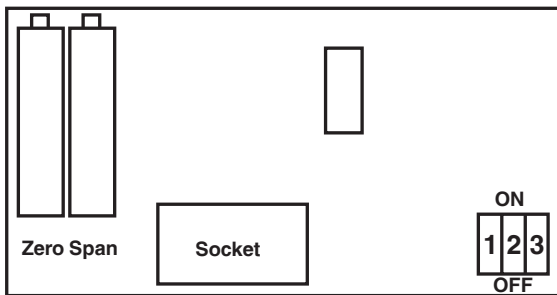
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## HC2004 HUMIDITY CONTROLLER

### INTERNAL LAYOUT

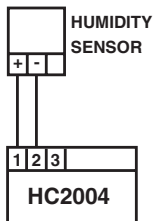


### INPUT CARD

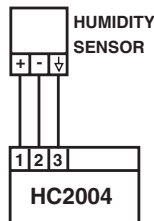


The HC2004 can be used with any 4 - 20 mA Humidity Sensor, two or three wire connection. The HC2004 has a 12VDC supply available from terminal 1 for loop powered devices. If a higher voltage is required, then an external power supply is connected to the sensor (+) and terminal 3 (signal ground). The sensor output (-) is connected to terminal 2 (input). For three wire devices, connect to terminals 1, 2 & 3. The zero and span potentiometers can be used to adjust the 4 - 20 mA signal to display a range from 0 to 100. Dip switches 1 & 2 are used to set the decimal points. They are not required in this instance. Dip switch 3 is not used.

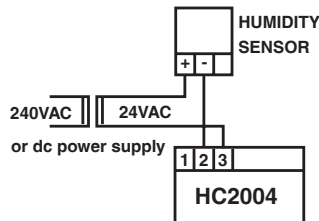
#### 2 - WIRE CONNECTION



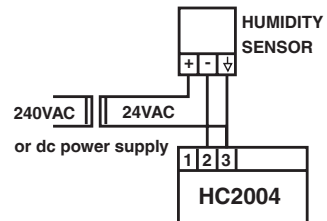
#### 3 - WIRE CONNECTION



#### EXTERNAL POWER SUPPLY



#### EXTERNAL POWER SUPPLY - 3 WIRE



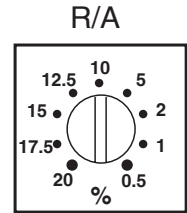
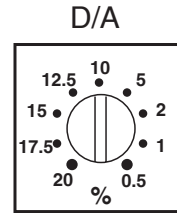
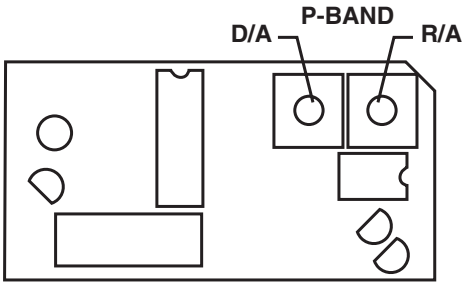


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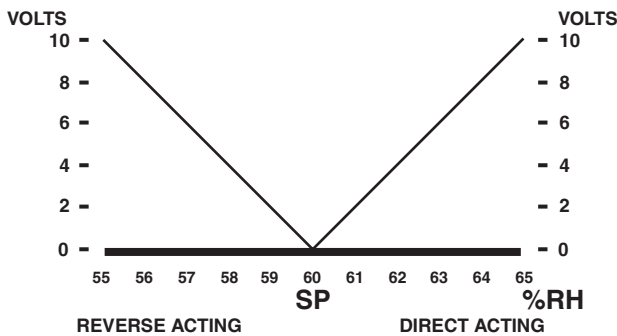
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## HC2004 HUMIDITY CONTROLLER

### CONTROL STAGE



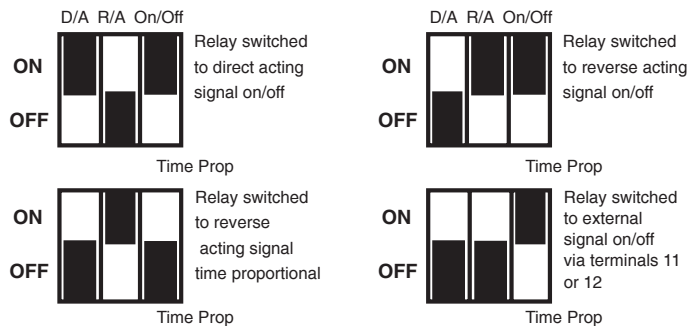
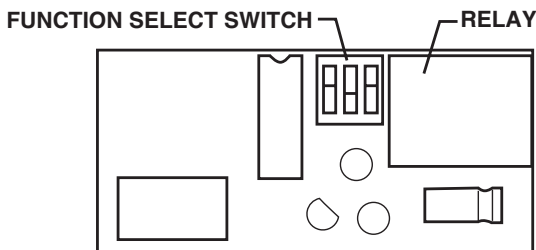
### PROPORTIONAL OUTPUTS



The HC2004 generates 2 voltage signals, D/A direct acting and R/A reverse acting. Each is independently adjustable. These 0 - 10vdc signals are proportional to the deviation of the input humidity to the setpoint. E.G. With a P-Band setting of 5%, this will give a 0 - 10vdc output with a 5%RH change at the sensor. With a P-Band setting of 20%, this will give a 0 - 10vdc output with a 20%RH change at the sensor.

### RELAY CARDS

#### Functional select switches - example settings



The Series 2000 relay cards have identical features:

1. Easy plug in replacement with expansion to 4 outlets.
  2. 240VAC 2.5 amp ratings with voltage-free contacts.
  3. Selection for operation of each relay stage on the D/A or R/A voltage signal.
  4. Selection of each stage to operate as ON/OFF or TIME PROPORTIONAL basis with DIP switching.
- Relays 3 & 4 can be isolated from the internal D/A and R/A signal rails and operated through terminals 11 & 12 by an external 0-10VDC signal. The diagram shows the DIP switch positions



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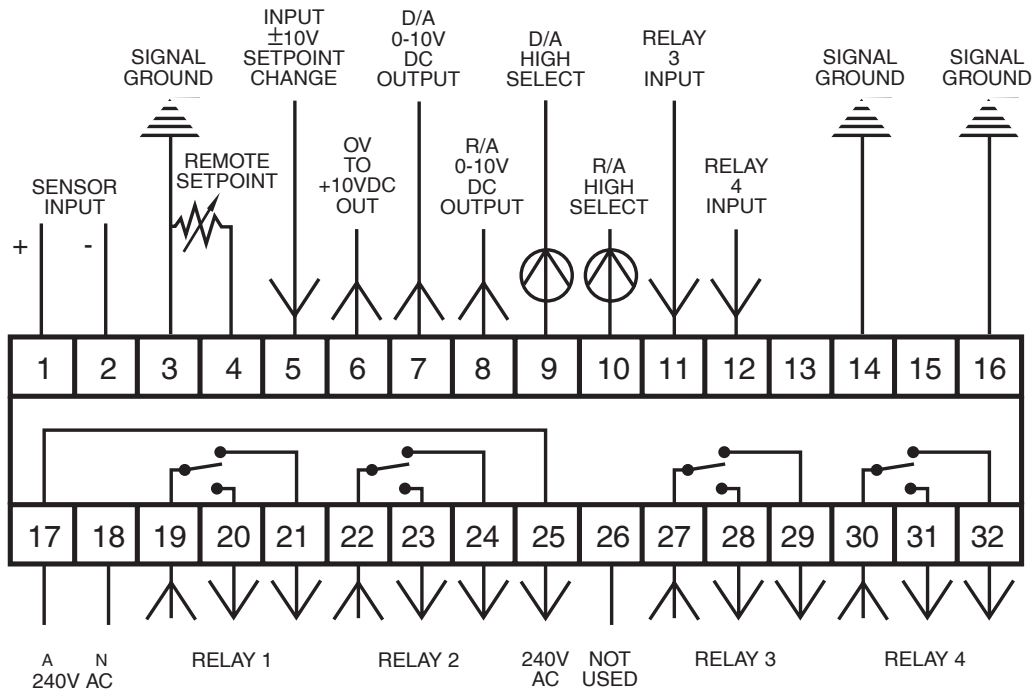
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## HC2004 HUMIDITY CONTROLLER

### TECHNICAL DATA

Supply Voltage	240v $\pm$ 10%
	24v $\pm$ 10%
Power Consumption	2VA
Ambient Temperature	
Operating	0 to 50°C
Storage	-20 to 60°C
Ambient Humidity	max 90% RH
Enclosure	Flame retardant ABS
Weight	max 0.2kg
Size	H: 140mm
	W: 48mm
	D: 170mm
Output Voltage	
D/A + R/A	0 to 10VDC 10mA max
High Select D/A + R/A	0 to 10VDC 10mA max
Relay Outputs	
SPDT Contacts - Voltage Free	250VAC 2.5A

### TERMINAL CONNECTION DIAGRAM



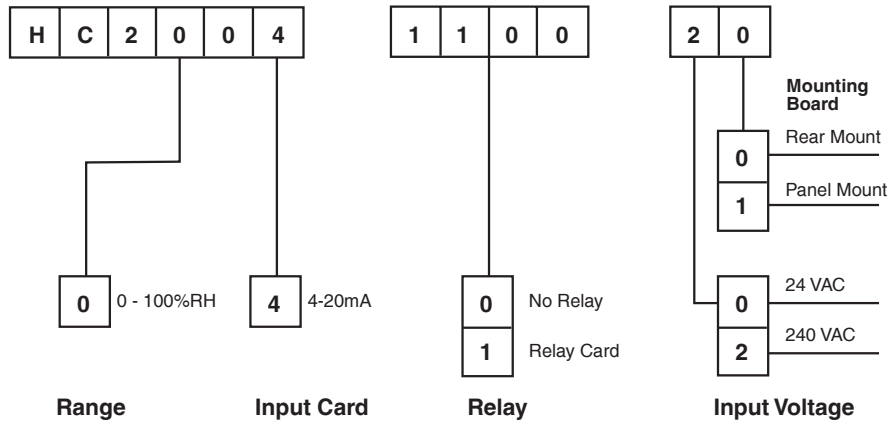


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## HC2004 HUMIDITY CONTROLLER

### MODEL NUMBERING SYSTEM



### SENSOR INPUTS

4-20mA loop powered transducer. Connect between terminals 1 & 2. If transducer is externally powered, then connect between terminals 2 & 3.

### COMMON SIGNAL GROUND

All signal inputs and control voltage outputs are referenced to this point. In multiple control configurations, #3 must be commoned.

### REMOTE SET POINT

If a remote setpoint is required, it is wired across terminals 3 & 4. The standard humidity setpoint has a range of 40-90% RH combined with a temperature setpoint of 10-35°C. Other ranges by special order. The external remote setpoint is only operational when the remote setpoint switch on the front panel is switched to remote setpoint.

### SET POINT CHANGE

If a remote setpoint is required, it is wired across terminals 3 & 4. The standard humidity setpoint has a range of 40-90% RH combined with a temperature setpoint of 10-35°C. Other ranges by special order. The external remote setpoint is only operational when the remote setpoint switch on the front panel is switched to remote setpoint.

### 240VAC/24VAC

All System 2000 Controllers have internal mains transformer isolation. Active supply is via terminals 17 & 18. Terminals 19 to 32 are relay connections. Relays are rated 2.5 amps at 240VAC.

### D/A & R/A 0-10VDC OUTPUT

When switched to the D/A or R/A position, these output voltages are the same as shown on the front panel digital display. These voltages are generated by the HC2004 in response to movement away from the setpoint of the measured variable and are the voltage ramps used to switch the internal relays. Used for analog output for external equipment control.

### D/A & R/A HIGH SELECT

These terminals are used for high selecting on multiple control hookups. Voltages are the same as for 0-10 output terminals. Diode protected to prevent voltage feeding back into the controller.

### RELAY 3 & 4 INPUT

When it is desired to operate a relay from an external signal then the dip switch settings on the appropriate relay card are switched to external signal. These external signals are connected to terminal 11 for relay 3 and terminal 12 for relay 4.

### 0V to +10V DC

This terminal output is a direct output voltage of the input signal. In the HC2004 it represents 0% RH to 100% RH. Commonly used to interface with a DDC or BMS system. NOTE: If there is a sensor fault and the Controller shuts down, this voltage drops to -15VDC allowing for an external fault indicator to be incorporated.

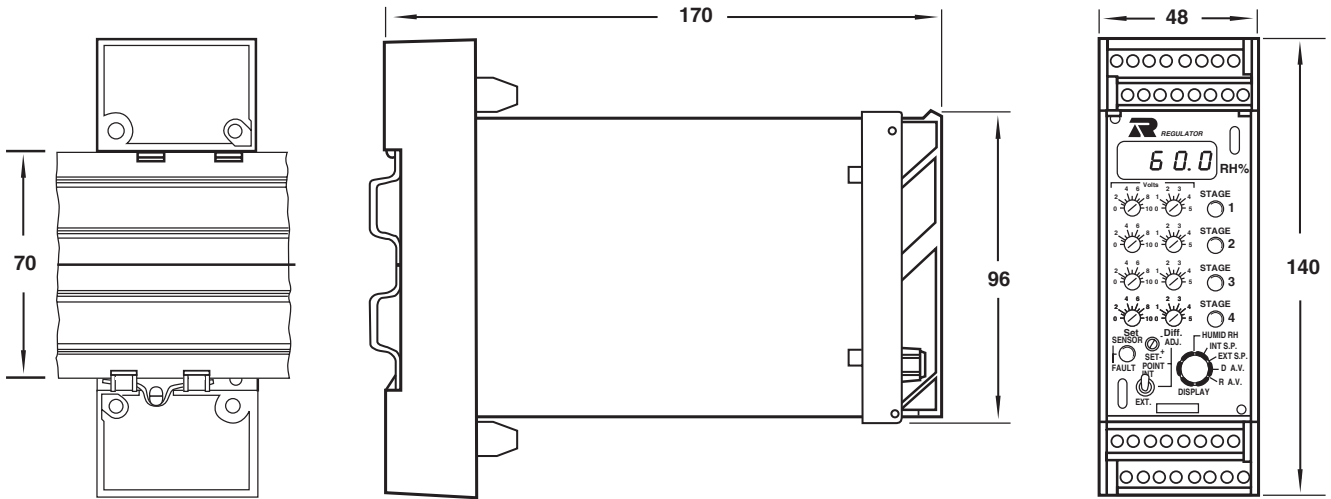


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### DIN MOUNTAIN RAILING

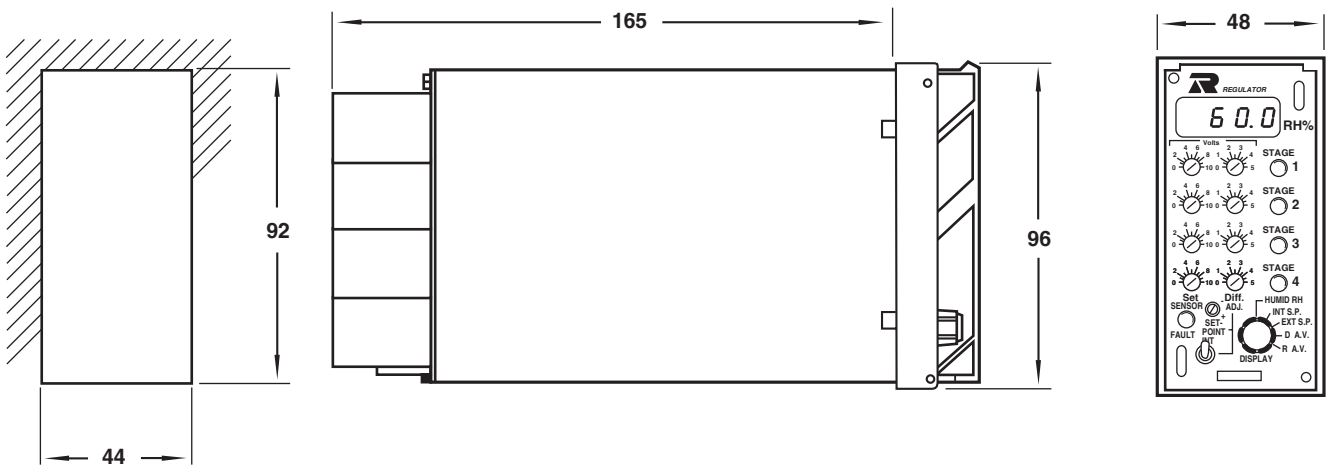


NOTE: Double 35 mm DIN Rail

### PANEL OR REAR MOUNTING

All HC2004 Controllers are suitable for panel or rear mounting. Available in a white custom-made enclosure, the HC2004 can be mounted through the front panel of a switchboard to take full advantage of the digital display. Wiring is easy. The DIN rail (spring loaded clip system) supports the minimum of interconnections with all signal and high voltages at opposite ends.

### PANEL MOUNT TERMINAL BLOCK



CUT OUT - DIMENSIONS