



# TEX-DEW200

## HUMIDITY CONTROLLER MANUAL



### TEX-DEW200

- R4

ADI

S

- HV

- LV

TEX series humidity controller

4 x relay outputs

2 x analogue outputs

1 x serial port

85-265V AC / 95-370V DC power

15-48V AC / 10-72V DC power

# 1 INTRODUCTION

The TEX - DEW200 controller is the ideal solution for a variety of humidity and temperature applications. It features dual 4-20mA analogue output for temperature and humidity, and includes four relay outputs. An optional serial port may also be added to allow easy interface with your PC, or with your existing PLC or monitoring system.

This controller has been designed for ease of use, and has intuitive, scrolling text prompts that guide you step-by-step through the setup process. The front panel includes a dual, 6-digit LED display and five buttons, for simple operator interface.

The TEX - DEW200 comes factory precalibrated for a 385 RTD input, and is simple to recalibrate (if required) using a two-point calibration method.

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## 2

## GENERAL INFORMATION

<b>Sensor input</b>	1 x wet bulb, 1 x dry bulb Dual 3-wire RTD Pt100 (385/392)
<b>Power supply</b>	HV (85-265V AC/95-370V DC) <b>or</b> LV (15-48V AC/10-72V DC)
<b>Analogue output</b>	Temperature and humidity output. Dual 16-bit 4-20mA (fully scalable). Window programmable over any range within the full-scale range of the controller
<b>Relay output</b>	4 x 5A Form A relays
<b>Sampling rate</b>	2.5Hz
<b>Resolution</b>	0.025% FULL SCALE 16-bit
<b>Accuracy</b>	0.05% OF READING
<b>Temp. drift</b>	Typically 50ppm/°C
<b>Temp. units</b>	°C or °F
<b>Easy setup</b>	Intuitive text prompts for easy setup.
<b>Calibration</b>	Precalibrated for 385 RTD, 0-100°C. Simple recalibration (if required) using high and low display values.
<b>Security</b>	Calibration and setpoint functions have independent security code access. Setpoint functions are independently configurable, and accessible through the <b>F2</b> key.

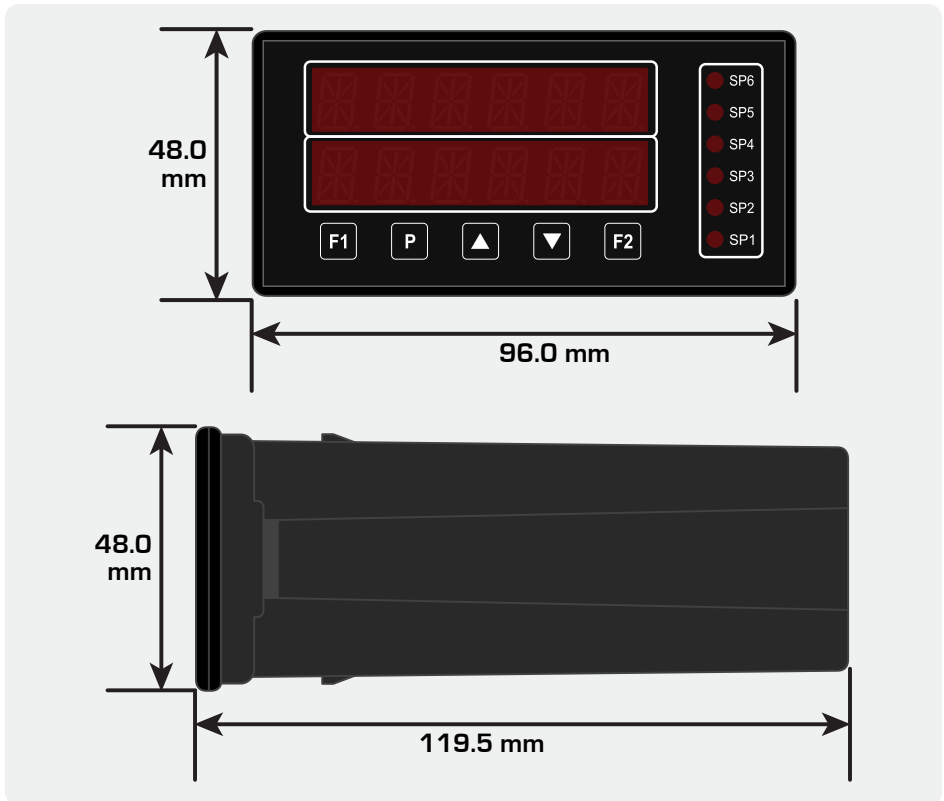
## OPTIONAL OUTPUT

<b>Serial port</b>	Isolated RS232 or RS485 <i>Modes:</i> ASCII, Modbus RTU slave, Ranger A output. <i>Data rates:</i> 300-38400. <i>Parity:</i> Odd, even or none.
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**3 CASING & DISPLAY****3.1 Case dimensions**

**Dimensions** 48 x 96 x 119.5mm (H x W x D)

**Panel cutout** 45.5 x 92.5mm (H x W)



## 3.2 Front panel

The TEX-DEW200 has a 2 x 6-digit, 14-segment alphanumeric LED display, five front-panel buttons and four setpoint annunciator LED's.



- SPX The setpoint LED's are used to indicate active setpoints.
- F1** This button is used to access the **Input Setup & Calibration** menu. See section 5.
- P** This button is typically used to save your settings and advance to the next step in the setup process.
- ▲** This button is typically used to scroll through options or increase values in the setup menu. Pressing this button from the main display will allow you to view/reset the peak value (see 3.3).
- ▼** This button is typically used to scroll through options or decrease values in the setup menu. Pressing this button from the main display will allow you to view/reset the valley value (see 3.3).
- F2** This button is used to access the **Setpoint Setup** menu (see section 6) and the **Setpoint Open Access** menu (see section 7).

### 3.3 Display shortcuts

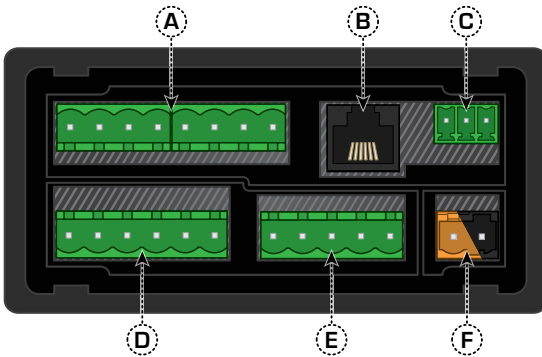
- ▲ Used to view/reset the **PEAK** value. Press **P** to return to the main display.
- Press the ▲ button once from the main display. **PEAK** appears in the bottom row, and the maximum measured humidity value (since the instrument was turned on or reset) appears in the top row.
  - To reset **PEAK**, press both the ▲ and ▼ buttons together now.
- ▼ Used to view/reset the **VALLEY** value. Press **P** to return to the main display.
- Press the ▼ button once from the main display. **VALLEY** appears in the bottom row, and the minimum measured humidity value (since the instrument was turned on or reset) appears in the top row.
  - To reset **VALLEY**, press both the ▲ and ▼ buttons together now.

### 3.4 Display brightness

- A** Press the **P** and ▲ buttons together from the operational display. **BRI** appears on the bottom row and the current brightness setting appears on the top row.
- B** Use the ▲ and ▼ buttons to adjust the brightness of the LED backlight as required, and then press **P**. The display returns to normal operating mode.

## 4 WIRING

### 4.1 Pinouts



- (A)** Relay output (see 4.5)
- (B)** Serial port (see 4.6)
- (C)** Analogue output (see 4.4)
- (D)** Analogue input (see 4.3)
- (E)** Function pins (see 4.7)
- (F)** Power supply (see 4.2)

### 4.2 Power supply

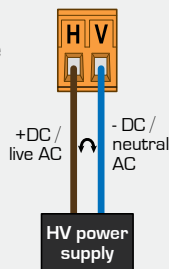
(see 4.1F)

**Before you begin**, determine whether your controller is configured for low or high voltage power supply. Check the label on the unit against the colour of the connector: **Orange** = high voltage (85-265V AC, 95-370V DC), **Black** = low voltage (15-48V AC, 10-72V DC).

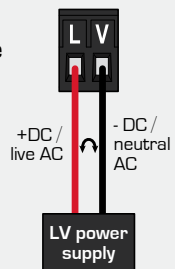
**REMEMBER TO SWITCH YOUR POWER SUPPLY OFF BEFORE YOU BEGIN WIRING**

**NEVER CONNECT YOUR LOW VOLTAGE CONTROLLER TO MAINS POWER.**

**High voltage (HV)**



**Low voltage (LV)**

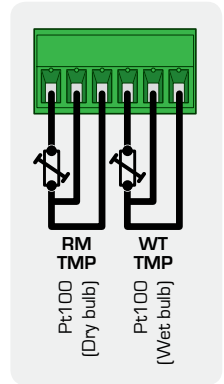


### 4.3 Analogue input

(see 4.1D)

Wire your humidity input module as shown in the diagram.

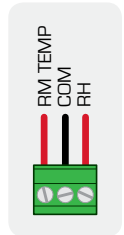
This input module is pre-calibrated for RTD385.



### 4.4 Analogue output

(see 4.1C)

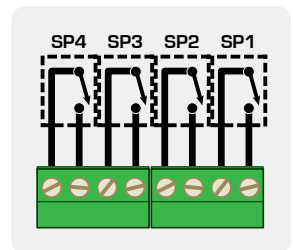
Wire your 4-20mA analogue outputs as shown in the diagram.



### 4.5 Relay output

(see 4.1A)

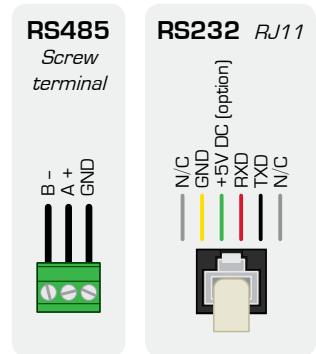
Wire your relay outputs as shown. Relays can be programmed to operate within the total span range of the controller.



## 4.6 Serial port (if installed) (see 4.1B)

If your controller has a serial port fitted, wire it as per the appropriate diagram.

If you do not have a serial port fitted then skip this step.



## 4.7 Function pins (see 4.1E)

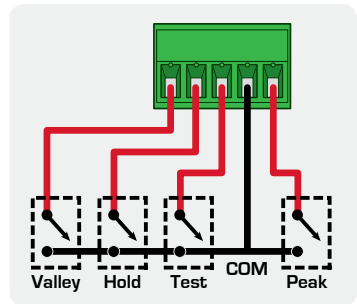
Connect switches as required between the function pins.

**Valley** Clears the valley reading

**Hold** Holds the current display value

**Test** Resets the meter

**Peak** Clears the peak reading



## 4.8 Power up

Once you have completed the wiring process it is safe to switch on your power supply. Ensure that your display is functioning before you proceed.

## 5 SETUP & CALIBRATION

### 5.1 Enter calibration PIN

**YOU WILL HAVE THE OPPORTUNITY TO CHANGE YOUR PIN NUMBER AT THE END OF THIS SECTION (5.7). IF YOU HAVE FORGOTTEN YOUR PIN NUMBER, SEE SECTION 8.**




- A Enter the calibration mode by pressing **F1**.




\_\_\_ **ENTER CAL PIN NUMBER** scrolls across the bottom row, and **0** appears in the top row. Use the **▲** and **▼** buttons to enter your security code (factory default 1). Then press **P**. If the correct PIN is entered, setup is started at 5.2.




If an incorrect PIN number is entered, \_\_\_ **INCORRECT PIN NUMBER - ACCESS DENIED** scrolls across the display and it returns to normal operating mode.

### 5.2 Input setup

- A \_\_\_ **INPUT SETUP** scrolls across the bottom row, and **SKIP** appears in the top row. Press **P** to skip to 5.3, or the **▲** button and then **P** to **ENTER** input setup.
- B \_\_\_ **MAINS FREQUENCY** scrolls across the bottom row, and the current selection appears in the top row. Use the **▲** and **▼** buttons to select: **50HZ** (default) or **60HZ**. Then press **P**.
- C \_\_\_ **SENSOR TYPE** scrolls across the bottom row, and the currently selected sensor type appears in the top row. Use the **▲** and **▼** buttons to select: **RTD385** (default) or **RTD392**. Then press **P**.
- D \_\_\_ **SELECT TEMPERATURE SCALE** scrolls across the bottom row, and the

current temperature scale appears in the top row. Use the  and  buttons to select: **DEG C** (default) or **DEG F**. Then press .

**E** **\_\_\_ DISPLAY TEMPERATURE UNITS** scrolls across the bottom row, and the current selection appears in the top row. Use the  and  buttons to select: **YES** (default) or **NO**. Then press .





**F** **\_\_\_ DISPLAY HUMIDITY UNITS** scrolls across the bottom row, and the current selection appears in the top row. Use the  and  buttons to select: **YES** (default) or **NO**. Then press .


## 5.3 Calibration

**WHEN CALIBRATION IS COMPLETE, YOU WILL BE AUTOMATICALLY DIRECTED BACK TO THE OPERATIONAL DISPLAY. TO ENTER STEP 5.4, YOU MUST SELECT SKIP AT 5.3A.**


### IMPORTANT

THE TEMPERATURE CHANNELS HAVE BEEN PRECALIBRATED FOR 0–100°C. MOST USERS WILL NOT NEED TO CALIBRATE.




**A** **\_\_\_ CALIBRATE** scrolls across the bottom row, and **SKIP** appears in the top row. Press  to skip to 5.4, or use the  and  buttons to select a channel to calibrate: **RH** (relative humidity), **RM TMP** (room temperature) or **WT TMP** (wet bulb temperature). Then press .


**B**  **If you selected RH in 5.3A:**

Skip steps 5.3C-G and continue to 5.3H now.




**C** **\_\_\_ APPLY LOW INPUT AND WAIT FOR STABLE READING** scrolls across the bottom row, and the current input signal appears in the top row. Wait for the input signal to stabilise, and then press .

*If averaging has been applied to the selected channel (see 5.4), it may take 20-30 seconds or more for the reading to stabilise.*

**D** \_ \_ \_ **ENTER LOW DISPLAY VALUE** scrolls across the bottom row, and the current low display value appears in the top row. Use the  and  buttons to adjust the low display value, and then press  to accept.




**E** \_ \_ \_ **APPLY HIGH INPUT AND WAIT FOR STABLE READING** scrolls across the bottom row, and the current input signal appears in the top row. Wait for the input signal to stabilise, and then press .

*If averaging has been applied to the selected channel (see 5.4), it may take 20-30 seconds or more for the reading to stabilise.*

**F** \_ \_ \_ **ENTER HIGH DISPLAY VALUE** scrolls across the bottom row, and the current high display value appears in the top row. Use the  and  buttons to adjust the high display value, and then press  to accept.

**G**  **If you selected RM TMP or WT TMP in 5.3A:**

Skip step 5.3H and continue to 5.3I now.

**H** \_ \_ \_ **ENTER HUMIDITY OFFSET CORRECTION** scrolls across the bottom row, and the current offset value appears in the top row. Use the  and  buttons to adjust the humidity offset value, and then press  to accept.

*This allows the user to add an offset of -20-+20% to the RH value.*

**I** If calibration was successful, you will be directed out of the calibration menu to the operational display without viewing any further scrolling messages.

*To enter step 5.4, you must select **SKIP** at 5.3A.*

If calibration fails, \_ \_ \_ **CALIBRATION FAILED** will scroll across the display and you will be directed out of the calibration menu to the operational display. Check your signal and connections, and then repeat the calibration procedure.

## 5.4 Averaging setup

**WHEN AVERAGING SETUP IS COMPLETE, YOU WILL BE AUTOMATICALLY DIRECTED BACK TO THE BEGINNING OF THE AVERAGING SETUP MENU (5.4A). TO ENTER STEP 5.5, YOU MUST SELECT SKIP AT 5.4A.**

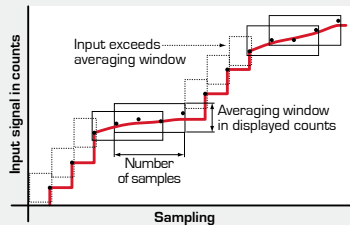
**A** **\_\_\_ AVERAGING SETUP** scrolls across the bottom row, and **SKIP** appears in the top row. Press **[P]** to skip to 5.5, or use the **[▲]** and **[▼]** buttons to select a channel to set up: **RH** (relative humidity), **RM TMP** (room temperature) or **WT TMP** (wet bulb temperature). Then press **[P]**.

**B** **\_\_\_ AVE SAMPLES** scrolls across the bottom row, and the currently selected averaging appears in the top row. Using the **[▲]** and **[▼]** buttons, alter the number of input samples that the controller will average, and then press **[P]**.

*Increasing the number of samples will stabilise measurement, but it will also slow down response rates. Typical value is 4.*

**AVERAGING**-Your controller has input signal averaging, optimising stable measurement.

If the change in input exceeds the averaging window value it will not average, ensuring fast response when there are large differences between readings.



**C** **\_\_\_ AVE WINDOW** scrolls across the bottom row, and the currently selected averaging window value appears in the top row. Using the **[▲]** and **[▼]** buttons, alter the signal averaging window. Then press **[P]**.

*If your input signal contains large noise spikes, then you can increase the size of the averaging window to ensure that these pulses are still averaged. However, increasing the averaging window too far will reduce the ability of the controller to respond quickly to real changes in input signal. A setting of 0 averages all reading. A typical value is 10% of your system capacity.*

- D You will be directed back to the beginning of the averaging setup menu (5.4A). If you are ready to proceed to 5.5, press **P** now to **SKIP**. If you would like to set up averaging for a different channel, repeat the steps from 5.4A.

## 5.5 Analogue output setup

**WHEN ANALOGUE OUTPUT SETUP IS COMPLETE, YOU WILL BE AUTOMATICALLY DIRECTED BACK TO THE BEGINNING OF THE ANALOGUE OUTPUT SETUP MENU (5.5A). TO ENTER STEP 5.6, YOU MUST SELECT SKIP AT 5.5A.**

- A **\_\_\_ ANALOGUE O/P SETUP** scrolls across the bottom row, and **SKIP** appears in the top row. Press **P** now to skip to 5.6, or use the **▲** and **▼** buttons to select an analogue output channel to calibrate: either **RH** (relative humidity) or **RM TMP** (room temperature). Then press **P**.
- B **\_\_\_ LOW SCALE VALUE FOR ANALOGUE O/P** scrolls across the bottom row, and the currently selected low scale value appears in the top row. Use the **▲** and **▼** buttons to set the low scale value. Then press **P**.
- C **\_\_\_ HIGH SCALE VALUE FOR ANALOGUE O/P** scrolls across the bottom row, and the currently selected high scale value appears in the top row. Use the **▲** and **▼** buttons to set the high scale value. Then press **P**.
- D **\_\_\_ CALIBRATE ANALOGUE O/P?** scrolls across the bottom row, and **SKIP** appears in the top row. Use the **▲** and **▼** buttons to select either **SKIP** (to skip analogue output calibration) or **ENTER** (to continue with analogue output calibration). Then press **P**.

- E **!** **If you selected SKIP in 5.5D:**

Skip steps 5.5F-G and continue to 5.5H now.

- F** \_\_\_ **CAL LOW ANALOGUE O/P** scrolls across the bottom row, and a calibration number (shown in mA) appears in the top row. Use the **▲** and **▼** buttons to calibrate your low analogue output as required, and then press **P** to accept.
- G** \_\_\_ **CAL HIGH ANALOGUE O/P** scrolls across the bottom row, and a calibration number (shown in mA) appears in the top row. Use the **▲** and **▼** buttons to calibrate your high analogue output as required, and then press **P** to accept.
- H** You will be directed back to the beginning of the calibration menu (5.5A). If you are ready to proceed to 5.6, press **P** now to **SKIP**. If you would like to recalibrate your analogue output (or calibrate an alternative analogue output channel), please repeat the steps from 5.5A.

## 5.6 Serial setup










SEE APPENDIX A FOR SERIAL REGISTER TABLES. CONFIGURING THE SERIAL PORT WILL ALLOW YOU TO CONNECT YOUR CONTROLLER TO A PC OR ANOTHER DEVICE. SKIP THIS STEP IF YOUR UNIT DOES NOT HAVE THIS OPTION INSTALLED.

- A** \_\_\_ **SERIAL SETUP** scrolls across the bottom row, and **SKIP** appears in the top row. Press **P** to skip to 5.7, or the **▲** button and then **P** to **ENTER** serial setup.
- B** \_\_\_ **SERIAL MODE** scrolls across the bottom row, and the currently selected serial mode appears in the top row. Using the **▲** and **▼** buttons, select either: **ASCII**, **MODBUS** (RTU) or **RNGR A** (Ranger A). Then press **P**.

*ASCII is a simple protocol that allows connection to various PC configuration tools.*

*MODBUS is an industry standard RTU slave mode that allows connection to a wide range of devices, such as PC's or PLC's.*







*RNGR A is a continuous output, used to drive remote displays and other instruments in the Rinstrum™ range. (Ranger is a trade name belonging to Rinstrum Pty Ltd.)*

- C** \_\_\_ **BAUD RATE** scrolls across the bottom row, and the current selection appears in the top row. Using the  and  buttons, select one of: **300, 600, 1200, 2400, 4800, 9600, 19200** or **38400**. Then press .
- D** \_\_\_ **PARITY** scrolls across the bottom row, and the currently selected parity appears in the top row. Using the  and  buttons, select: **NONE, ODD** or **EVEN**, and then press .
- E** \_\_\_ **SERIAL ADDRESS** scrolls across the bottom row, and the currently selected serial address appears in the top row. Use the  and  buttons to alter the serial address. Then press .

*The serial address parameter is used to identify a particular device when it is used with other devices in a system. (It applies particularly to Modbus mode when used on an RS485 serial network.) The serial address of the controller must be set to match the serial address defined in the master device.*

*For serial register tables, see Appendix A.*

## 5.7 Edit calibration PIN

- A** \_\_\_ **EDIT CAL PIN NUMBER** scrolls across the bottom row, and **SKIP** appears in the top row. Press  to skip and return to the operational display, or the  button and then  to **ENTER** and change your PIN number.
- B** \_\_\_ **ENTER NEW CAL PIN NUMBER** scrolls across the bottom row, and the current PIN (default 1) appears in the top row. Using the  and  buttons, enter your new calibration PIN number. Then press  to exit and return to the operational display.

## 6 SETPOINT SETUP

### 6.1 Enter setpoint PIN

**YOU WILL HAVE THE OPPORTUNITY TO CHANGE YOUR PIN NUMBER AT THE END OF THIS SECTION (6.3). IF YOU HAVE FORGOTTEN YOUR PIN NUMBER, SEE SECTION 8.**

- A Enter the setpoint setup mode by pressing the **F2** button for 3 seconds.

**\_\_ \_ ENTER SP PIN NUMBER** scrolls across the bottom row, and **0** appears in the top row. Use the **▲** and **▼** buttons to enter your security code (factory default 1). Then press **P**. If the correct PIN is entered, setup is started at 6.2.










If an incorrect PIN number is entered, **\_\_ \_ \_ INCORRECT PIN NUMBER - ACCESS DENIED** scrolls across the display and it returns to the normal operating mode.

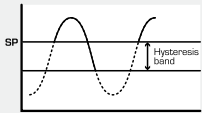
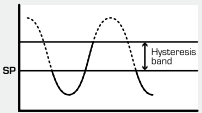
### 6.2 Edit setpoints







- A **\_\_ \_ EDIT SETPOINT** scrolls across the bottom row, and **SKIP** appears in the top row. Press **P** to skip to 6.3, or use the **▲** and **▼** buttons to select a setpoint to edit: **SP 1**, **SP 2**, **SP 3** or **SP 4**. Then press **P**.




- B **\_\_ \_ SP VALUE** scrolls across the bottom row, and the display value at which the setpoint will activate appears in the top row. Adjust this value using the **▲** and **▼** buttons, and then press **P**.


*The units for the SP VALUE will always correspond with your chosen SP SOURCE. I.e. If you select 50.0% as your SP VALUE in this step, and then you choose RM TEMP as your SP SOURCE in 6.2C, your SP VALUE will be changed to 50.0°C/F.*


- C** \_\_\_ **SP SOURCE** scrolls across the bottom row, and the current setpoint source appears in the top row. Use the  and  buttons to select **RH** (relative humidity) or **RM TMP** (room temperature). Then press .
- D** \_\_\_ **SP ACTIVATION** scrolls across the bottom row, and the current selection appears in the top row. Using the  and  buttons, select the relay activation to operate **ABOVE** or **BELOW** the setpoint value, and then press .
- Select **ABOVE** for the relay to turn on above the setpoint value and off below it. Select **BELOW** for the relay to turn on below the setpoint value and off above it.*
- E** \_\_\_ **SP TYPE** scrolls across the bottom row, and the current selection appears in the top row. Use the  and  buttons to select **ALARM** or **CNTRL**, and then press .

<p><b>ALARM - Setpoint value</b> controls setpoint activation point. <b>Hysteresis value</b> controls setpoint deactivation point.</p>	<p><b>CNTRL - Setpoint value</b> controls setpoint deactivation point. <b>Hysteresis value</b> controls setpoint reactivation point.</p>
 <p>Energised Above</p>	 <p>Energised Below</p>







- F** \_\_\_ **HYSTERESIS VALUE** scrolls across the bottom row, and the current selection appears in the top row. Adjust this value using the  and  buttons, and then press .
- This defines the separation band between setpoint activation and deactivation, and will operate as per the type setting (see 6.2E.)*
- G** \_\_\_ **MAKE DELAY** scrolls across the bottom row, and the current selection appears in the top row. Use the  and  buttons to adjust the make delay value (in tenths of a second) as required, and then press .
- The make delay value defines the delay between setpoint activation and when the relay turns on.*

- H \_ \_ \_ **OPEN ACCESS TO SP VALUE** scrolls across the bottom row, and the current access setting appears in the top row. Use the  and  buttons to select **NO** or **YES**, and then press .

*Choosing YES will allow the selected setpoint to be quick-edited via the  button without entering a PIN (see section 7). User access can be independently configured for each setpoint.*

- I \_ \_ \_ **EDIT SETPOINT** scrolls across the bottom row, and **SKIP** appears in the top row. You are now back at 6.2A. To edit another setpoint, follow the instructions from 6.2A-I again. If you do not wish to edit another setpoint, press  now to skip to 6.3.

## 6.3 Edit setpoint PIN

- A \_ \_ \_ **EDIT SP PIN NUMBER** scrolls across the bottom row, and **SKIP** appears in the top row. Press  to skip and return to the operational display, or the  button and then  to **ENTER**.
- B \_ \_ \_ **ENTER NEW SP PIN NUMBER** scrolls across the bottom row, and the current PIN (default 1) appears in the top row. Using the  and  buttons, enter your new setpoint entry PIN number. Then press  to save and exit to the operational display.




## 7 SETPOINT OPEN ACCESS

OPEN ACCESS IS CONFIGURED INDIVIDUALLY FOR EACH SETPOINT (SEE 6.2H). IF NONE OF THE SETPOINTS HAVE OPEN ACCESS TURNED ON, THIS FEATURE WILL BE DISABLED AND THE **F2** BUTTON WILL NOT RESPOND TO A SHORT BUTTON PRESS.

- A Begin by pressing the **F2** button for less than 3 seconds. The setpoint name (**SP 1**, **SP 2**, **SP 3** or **SP 4**) will appear on the bottom row and the current value for that setpoint will appear in the top row. Using the **▲** and **▼** buttons, adjust the selected value. Then press **P** to accept the new setpoint value.
- B If any other setpoints have the direct access option enabled then the same process is repeated for the next setpoint. Pressing **P** for the last enabled setpoint will exit and return to the operational display.

## 8 RESET PIN NUMBERS

IF YOU HAVE FORGOTTEN YOUR PIN NUMBER(S), FOLLOW THE PROCEDURE BELOW TO RESET BOTH THE CALIBRATION AND SETPOINT SETUP PIN NUMBERS TO THEIR FACTORY DEFAULT OF 1.

- A Press ,  and  at the same time. (This key combination can be difficult to execute and you may need several tries to get it right.)
- B When successful, a factory identification text will scroll across the display, followed by: - **ALL PIN NUMBERS RESET TO 1.**
- C Reset the default PIN numbers if required by following the instructions in 5.7 (for setup and calibration) and 6.3 (for setpoint setup), entering '1' whenever you are prompted for your current PIN.

## A

## APPENDIX A

### Serial Register Tables

#### MODBUS (RTU) / ASCII

16-BIT UNSIGNED		
MODBUS*	ASCII	FUNCTION
40001	1	Alarm status (Bit 0=SP1, Bit 1=SP2, Bit 2 =SP3, Bit 3=SP4)
40065	65	Hysteresis SP1
40071	71	Make delay SP1
40066	66	Hysteresis SP2
40072	72	Make delay SP2
40067	67	Hysteresis SP3
40073	73	Make delay SP3
40068	68	Hysteresis SP4
40074	74	Make delay SP4

32-BIT SIGNED (2x16-BIT)		
MODBUS*	ASCII	FUNCTION
40515	254	Humidity display
40523	250	Wet bulb temperature
40529	16	Room temperature
40525	12	Peak
40527	13	Valley
40535	6	Setpoint 1
40537	7	Setpoint 2
40539	8	Setpoint 3
40541	9	Setpoint 4
40587	34	D/A 1 scale low value (humidity)
40589	35	D/A 2 scale low value (room temp)
40591	36	D/A 1 scale high value (humidity)
40593	37	D/A 2 scale high value (room temp)

\*Modbus (RTU) addresses are all holding registers and should be accessed via function codes 3 and 6. Register addresses are displayed in the Modicon™ addressing format. i.e. Register 65=40065 (subtract 1 for direct addressing).

#### RANGER A

This allows the controller to drive a remote display from the Rinstrum range. The following shows the output string format when Ranger A output is selected:

<Start> <Sign> <Output Value> <Status> <End>

STRING CHARACTER(S)	
<Start>	STX character (ASCII 02)
<Sign>	Output value sign [space for + and dash for -]
<Output Value>	Seven character ASCII string containing the current output value and decimal point. <i>(If there is no decimal point, then the first character is a space. Leading zero blanking applies.)</i>
<Status>	Single character output value status: U=Under, O=Over, E=Error
<End>	ETX character (ASCII 03)



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