Texmate NZ
intelligent control

PROCESS CONTROLLER + BAR GRAPH

TEX - BAR Setup Manual R2/R4 (A/S/AS)

CONTENTS

1 INTRODUCTION

The TEX - BAR process controller interfaces smoothly with a wide range of PLC and monitoring systems.

The key feature of this controller is its 0-100% front panel bar graph, which provides instant, efficient viewing of your selected variable. This compact controller also includes a 5-digit LED display, 6 setpoints and 3 front panel buttons.

Designed specifically for use in process applications, the TEX - BAR accepts 0-20mA, 4-20mA, 0-2V or 0-10V inputs. Setup and calibration is simple, with on-screen, step-by-step instructions.

The TEX - BAR is available in models with either 2 or 4 relay outputs. A serial port and/or an analog output can also be added.

2 SPECIFICATIONS

Input	Current: 0-20mA, 4-20mA **or**
	Voltage: 0-2V, 0-10V
Power supply	HV: 85-265V AC/95-370V DC **or**
	LV: 15-48V AC/10-72V DC
Sampling rate	10Hz
Resolution	16-bit
Accuracy	0.05% of reading
Temperature drift	Typically 50ppm/°C
Calibration	Factory pre-calibrated - automatic or
	manual user calibration available
Security	Setup is PIN code protected
Case	96 x 48 x 119.5mm (H x W x D)
	92.5 x 45.5mm panel cutout

OPTIONAL OUTPUTS

Analog output
Isolated 16-bit 4-20mA/0-10V output (fully scaleable). Window programmable over full-scale range.

Serial port
Isolated RS232 **or** RS485
Modes: Texmate ASCII, Modbus RTU slave, Ranger A
Data rates: 1200-115k2 baud.
Parity: Odd/even/none

Relay outputs
2 **or** 4 x 5A Form A relays

HEADER SELECTABLE OPTIONS

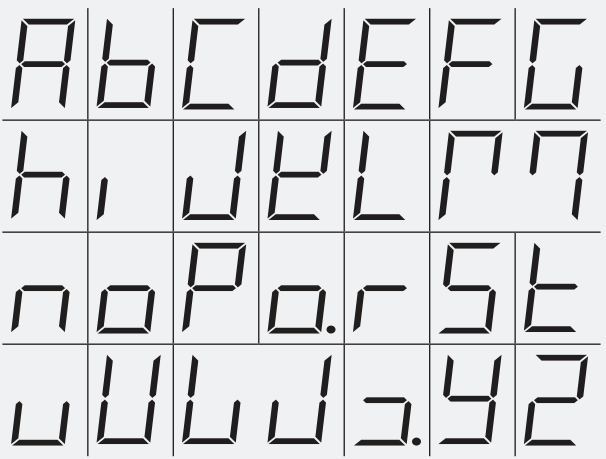
Input range

20mA	Custom	2V	10V

3 CASE DIAGRAMS

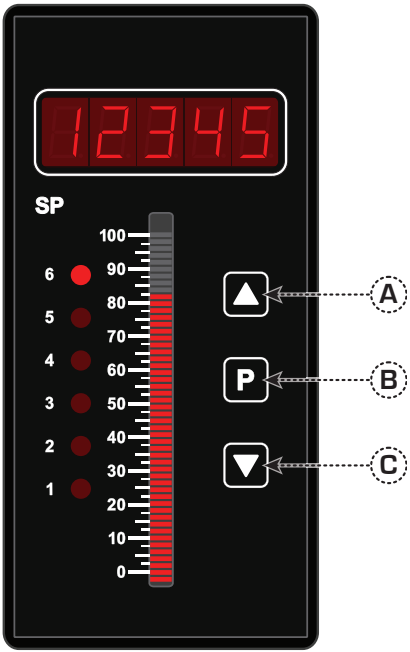
The TEX - BAR has a 5-digit LED display, three buttons and six setpoint annunciators. It also features a 1-100% bar graph for efficient viewing of your selected variable.

7-SEGMENT ALPHA DISPLAY CHARACTERS



3.1 Fig 1 - Front view

KEY: Page 7



3.2 Fig 2 - Rear view

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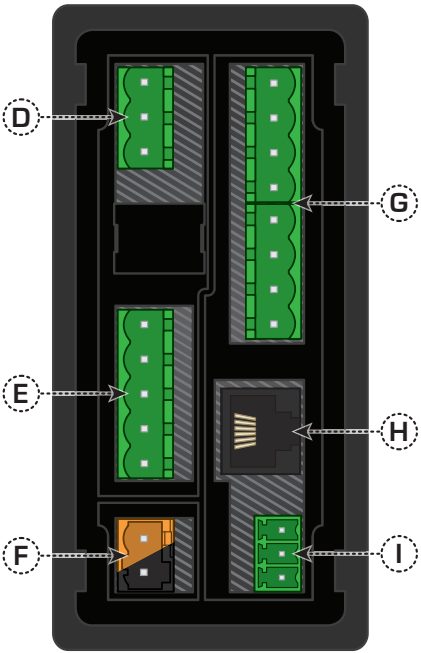


BUTTON PRESS FUNCTIONS

Refer to 3.1

Ⓐ	**Up -** Used to access the **setup and calibration** menu (Section 6), and to scroll through options.
Ⓑ	**Program -** Typically used to save your settings and advance to the next step in the process.
Ⓒ	**Down -** Used to access the **setpoint setup** menu (Section 7) and the **setpoint direct access** menu (Section 8). Also used to scroll through options.

CONNECTOR PINS

Refer to 3.2

Ⓓ	**Analog input module (IP07) -**	Header setup: 4.1 Wiring: 5.2
Ⓔ	**Function pins -**	Wiring: 5.6
Ⓕ	**Power supply (HV/LV) -**	Wiring: 5.1
Ⓖ	**Relays (x2/x4) -**	Wiring: 5.3
Ⓗ	**Serial port (RS232/485) -**	Wiring: 5.5
Ⓘ	**Analog output -**	Wiring: 5.4

4 INPUT HEADER CONFIGURATION

Before you begin:

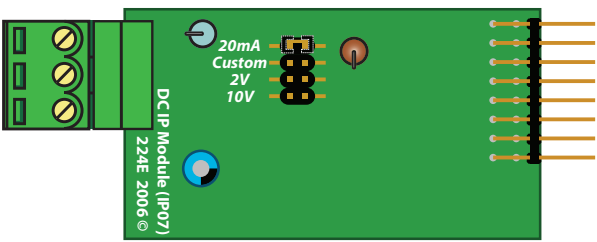
Before you can begin wiring, the IP07 input module must be removed from the meter case so that the headers can be positioned for your input type.

Remove the plastic backing plate from the rear of the meter by inserting a screwdriver into these indents

Once the backing plate has been removed, gently slide the input module from the case (see Section 3.2D to identify the input module).

4.1 Position your input headers

The IP07 input module has one header, which may need to be repositioned to suit your application. When you have finished, slide the input module back into the case and replace the plastic backing plate.



INPUT HEADER

20mA	Current input - 0-20mA or 4-20mA	**2V**	Voltage input - 0-2V
Custom	Custom input - call for options	**10V**	Voltage input - 0-10V

5 WIRING

Before you begin:

Determine whether your controller is configured for low or high voltage power supply. Make sure to check the label on the unit against the colour of the power connector:

- **Orange** = high voltage
- **Black** = low voltage

5.1 Connect your controller to the power supply

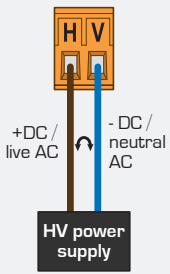
Refer to 3.2F

Wire your controller to your power supply as per the appropriate diagram below.

Remember to switch your power supply off before you begin wiring, and NEVER connect your low voltage controller to mains power.

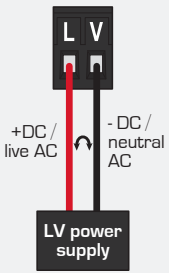
High voltage (HV) -

5-265V AC, 95-370V DC



Low voltage (LV) -

15-48V AC, 10-72V DC



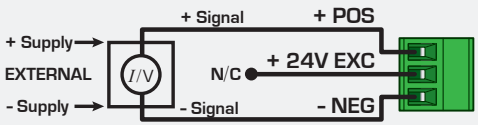
5.2 Wire your IP07 analog input module

Refer to 3.2D

Make sure that you have completed Section 4 before you begin wiring your input module.

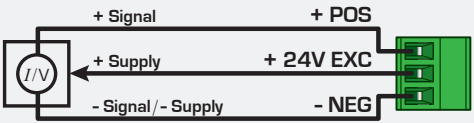
Once you have adjusted your header settings as needed (see Section 4) and replaced the plastic backing plate, wire your input module as shown in the appropriate diagram on the following page.

2-wire current or voltage process input
External excitation used



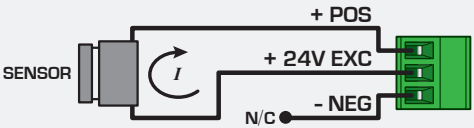
3-wire current or voltage process input

Controller supplied excitation



2-wire current input

Loop powered sensor



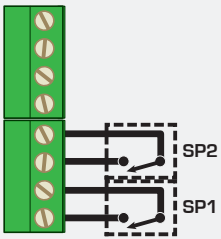
5.3 Wire your relays

Refer to 3.2G

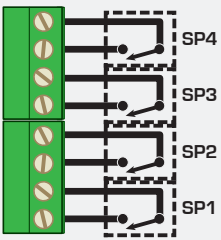
Wire your relays as per the appropriate diagram below, depending on whether you have 2 or 4 relays installed.

Relays can be programmed to operate within the total span range of the controller. If you do not have any relays fitted then step 5.3 is skipped.

R2 *(2 relays)*



R4 *(4 relays)*



5.4 Wire your analog output (if fitted)

Refer to 3.2I

If your controller has an analog output fitted, wire it as shown.

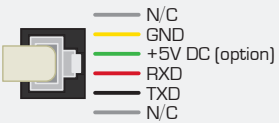
5.5 Wire your serial port (if fitted)

Refer to 3.2H

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

RS485
(Screw terminal)

RS232 *(RJ11)*



5.6 Wire your function pins (if required)

Refer to 3.2E

Connect external switches (as shown below) to enable a function to be executed when its switch is activated.

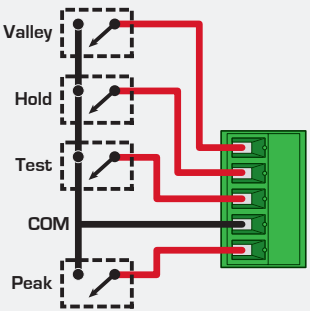
FUNCTION PINS

Valley
Activating this pin will clear the valley reading

Hold
Activating this pin will hold the current display value

Test
Activating this pin will reset the meter

Peak
Activating this pin will clear the peak reading



5.7 Power up your controller

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.

6 SETUP & CALIBRATION

Enter the setup and calibration mode by pressing the ▲ button for half a second.

6.1 Enter calibration PIN

A **_ _ _ ENTER CAL PIN NUMBER** scrolls across the display and toggles with **0**. Use the ▲ and ▼ buttons to enter your security code (factory default 1). Then press P. If the correct PIN is entered then the 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.

You will be given the opportunity to change your PIN number at the end of this section (6.8). If you have forgotten your PIN number, see Section 9.

6.2 Input setup

Input defaults are set to 4-20mA, 50Hz, no decimal and no rounding.

A _ _ _ **INPUT SETUP** scrolls across the display and toggles with **SKIP**. Press [P] to skip to 6.3, or the [▲] button and then [P] to **ENTER** input setup.

B _ _ _ **MAINS FREQUENCY** scrolls across the display and toggles with the currently selected mains frequency. Using the [▲] and [▼] buttons, select either **50HZ** or **60HZ**. Then press [P].

C _ _ _ **INPUT MODE** scrolls across the display and toggles with the currently selected input mode. Using the [▲] and [▼] buttons, select: **4-20** (4-20mA), **0-20** (0-20mA), **2 V** (0-2V) or **10 V** (0-10V). Then press [P].

If you opt to change the input mode in this section then the header plug on the input module must also be changed to match. See Section 4 for more information.

D **_ _ _ DECIMAL POINT POSITION** scrolls across the display and toggles with the currently selected decimal point position. Use the ▲ and ▼ buttons to choose between: **NO DP**, **0.1**, **0.12**, **0.123**, or **0.1234**, and then press P.

E **_ _ _ DISPLAY ROUNDING** scrolls across the display and toggles with the currently selected display rounding. Using the ▲ and ▼ buttons, select: **NONE**, **2**, **5** or **10**. Then press P.

Rounding is quoted in display counts and is not influenced by decimal point position. For example, if your input signal is 5.3mA, the display will show: 5.3 (for rounding=None), 5.4 (for rounding=2), 5.5 (for rounding=5) or 5.0 (for rounding=10).

6.3 Calibration

A **_ _ _ CALIBRATION TECHNIQUE** scrolls across the display and toggles with **SKIP**. Press (P) to skip to 6.4, or use the (▲) and (▼) buttons select either **AUTO**, **MAN** (manual) or **S.G.** (specific gravity), and then press (P).

AUTO *- The automatic (key-in) 2-point calibration procedure uses zero and span values to calculate the scale and offset. This is the most accurate calibration method, but requires known low and high input signals (or the use of a calibrator).*

MAN - *The manual calibration procedure uses low and high display values, and is intended for a pre-calibrated sensor with a known output range. (For example 4mA=0 and 20mA=1000.) It does not require any input signals to be applied to the controller during calibration.*

S.G. - *The specific gravity calibration procedure allows the user to enter a scale factor which is used to compensate for changes in the specific gravity of different substances.* ***This does not constitute a full calibration and assumes that either an automatic or manual calibration has been applied previously with the S.G. value set to 1.0.***

! **If you selected AUTO in 6.3A:**

B **_ _ _ APPLY LOW INPUT SIGNAL – – ENTER LOW DISPLAY VALUE** scrolls across the display. Apply the required low input signal to the controller. Using the ▲ and ▼ buttons, enter your low end display value. Then press P to accept.

_ _ _ APPLY HIGH INPUT SIGNAL – – ENTER HIGH DISPLAY VALUE scrolls across the display. Apply the required high input signal to the controller. Using the ▲ and ▼ buttons, enter your high end display value. Press P. If calibration is successful, the controller will return to the operational display.

_ _ _ CALIBRATION FAILED

A calibration failure results when the controller cannot detect any change in input signal during the calibration procedure.

After viewing this message you will be redirected to the operational display. Check your input signal and connections, and then repeat the process.

! **If you selected MAN in 6.3A:**

C **___ ENTER DISPLAY VALUE FOR (X)** scrolls across. (X=0mA/4mA/0V, depending on your selection in 6.2C.) Using the ▲ and ▼ buttons, enter your display value for the selected low input signal. Press **P**.

___ ENTER DISPLAY VALUE FOR (X) scrolls across. (X=20mA/2V/10V, depending on your selection in 6.2C.) Using the ▲ and ▼ buttons, enter your display value for the selected high input signal. Then press **P** to accept the new calibration values and return to the operational display.

! **If you selected S.G. in 6.3A:**

D **___ SPECIFIC GRAVITY** scrolls across and toggles with the current specific gravity scale factor. Adjust this value using the ▲ and ▼ buttons, and then press **P** to accept and return to the operational display.

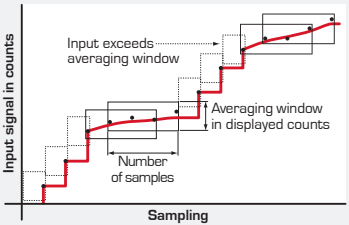
6.4 Averaging

▸▸ 6.4 Quick Access from operating mode ▸▸
Press and hold ▲. Use ▲ & ▼ to enter PIN. Press P 3 times.

A **_ _ _ AVERAGING PARAMETERS** scrolls across the display and toggles with **SKIP**. Press P to skip to 6.5, or the ▲ button and then P to **ENTER** averaging parameters setup.

Your controller has input signal averaging, guaranteeing stable measurement.

If the input exceeds the averaging window value it will not average, ensuring fast response.



B **_ _ _ AVE SAMPLES** scrolls across the display and toggles with the currently selected averaging. 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.

C **_ _ _ AVE WINDOW** scrolls across the display and toggles with the currently selected averaging window value. 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 the of 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.

6.5 Analog output setup

If your controller does not have this option installed then you will not view this section - setup will continue at 6.6.

A _ _ _ **ANALOG OUTPUT SETUP** scrolls across the display and toggles with **SKIP**. Press (P) to skip to 6.6, or the (▲) button and then (P) to **ENTER** analog output setup.

B _ _ _ **LOW SCALE VALUE FOR ANALOG OUTPUT** scrolls across the display and toggles with the currently selected low scale value. Use the (▲) and (▼) buttons to set the low scale value. Then press (P).

This sets the display value for cal low (as at 6.5E).

C _ _ _ **HIGH SCALE VALUE FOR ANALOG OUTPUT** scrolls across the display and toggles with the currently selected high scale value. Use the (▲) and (▼) buttons to set the high scale value. Then press (P).

This sets the display value for cal high (as at 6.5F).

D **_ _ _ CALIBRATE ANALOG OUTPUT?** scrolls across the display and toggles with **SKIP**. If you do not wish to calibrate your analog output now then press (P) to skip the rest of this section and proceed to 6.6.

Otherwise, press the (▲) button to **ENTER** analog output calibration. **Before continuing, connect a milliamp meter across the analog output connector.** Then press (P).

E **_ _ _ CAL LOW ANALOG OUTPUT** scrolls across the display and toggles with a calibration number. Using the (▲) and (▼) buttons, calibrate your low analog output as required. Then press (P).

F **_ _ _ CAL HIGH ANALOG OUTPUT** scrolls across the display and toggles with a calibration number. Using the (▲) and (▼) buttons, calibrate your high analog output as required. Then press (P).

6.6 Serial setup

If your controller does not have this option installed then you will not view this section - setup will continue at 6.7.

A _ _ _ **SERIAL SETUP** scrolls across the display and toggles with **SKIP**. Press [P] to skip to 6.7, or the [▲] button and then [P] to **ENTER** serial setup.

B _ _ _ **SERIAL MODE** scrolls across the display and toggles with the currently selected serial mode. Using the [▲] and [▼] buttons, select either: **ASCII**, **MDBS** (Modbus/RTU) or **RNGRA** (Ranger A). Then press [P].

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

Modbus - *Industry standard RTU slave mode that allows connection to a wide range of devices, such as PC's or PLC's.*

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

C _ _ _ **BAUD RATE** scrolls across the display and toggles with the currently selected baud rate. Use the ▲ and ▼ buttons to choose between: **300**, **600**, **1200**, **2400**, **4800**, **9600**, **19200** or **38400**. Then press P.

D _ _ _ **PARITY** scrolls across the display and toggles with the currently selected parity. Use the ▲ and ▼ buttons to select: **NONE**, **ODD** or **EVEN**. Then press P.

E _ _ _ **SERIAL ADDRESS** scrolls across the display and toggles with the currently selected serial address. Use the ▲ and ▼ buttons to alter the serial address. Then press P.

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 a RS485 network.) The serial address of the controller must be set to match the serial address used in the master device.

▸▸ **More info on registers** ▸▸ See Tables (p30-31)

MODBUS REGISTERS - These 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).

Please note that registers pertaining to SP3-4 are not used for models with only two relays installed.

16-BIT SIGNED	
Address	***Function***
40001	Alarm status (Bit 0=SP1, Bit 1=SP2, Bit 2=SP3, Bit 3 = SP4)
40065	SP 1 hysteresis
40071	SP 1 make delay
40066	SP 2 hysteresis
40072	SP 2 make delay
40067	SP 3 hysteresis
40073	SP 3 make delay
40068	SP 4 hysteresis
40074	SP 4 make delay

32-BIT SIGNED (2x16-bit)	
LSW / MSW	***Function***
40513 / 40514	Process display
40525 / 40526	Peak
40527 / 40528	Valley
40535 / 40536	SP 1
40537 / 40538	SP 2
40539 / 40540	SP 3
40541 / 40542	SP 4
40587 / 40588	D/A scale low
40591 / 40592	D/A scale high

RANGER A - This allows the SC 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. *(If there is no decimal point, then the first character is a space. Leading zero blanking applies.)*
<Status>	Single character output value status: U=Under, O=Over, E=Error
<End>	ETX character (ASCII 03)

6.7 Bar graph setup

A _ _ _ **BAR GRAPH SETUP** scrolls across the display and toggles with **SKIP**. Press [P] to skip to 6.8, or the [▲] button and then [P] to **ENTER** bar graph setup.

B _ _ _ **LOW SCALE VALUE FOR BAR GRAPH** scrolls across the display and toggles with the current low scale bar graph setting. Use the [▲] and [▼] buttons to enter the low scale value (in display counts), and then press [P].

C _ _ _ **HIGH SCALE VALUE FOR BAR GRAPH** scrolls across the display and toggles with the current high scale bar graph setting. Use the [▲] and [▼] buttons to enter the high scale value (in display counts), and then press [P].

6.8 Edit calibration PIN

A **_ _ _ EDIT CAL PIN NUMBER** scrolls across the display and toggles with **SKIP**. Press [P] to skip and return to the operational display, or the [▲] button and then [P] to **ENTER**.

B **_ _ _ ENTER NEW CAL PIN NUMBER** scrolls across the display and toggles with the current PIN (default 1). Using the [▲] and [▼] buttons, enter your new calibration PIN number. Then press [P] to exit and return to the operational display.

7 SETPOINT SETUP

Enter the setpoint setup mode by pressing and holding the ▼ button for 3 seconds.

7.1 Enter setpoint PIN

A **_ _ _ ENTER SP PIN NUMBER** scrolls across the display and toggles with **0**. Use the ▲ and ▼ buttons to enter your security code (factory default 1). Then press P. If the correct PIN is entered then the setup is started at 7.2.

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

You will be given the opportunity to change your PIN number at the end of this section (7.3). If you have forgotten your PIN number, see Section 9.

7.2 Edit setpoints

A **_ _ _ EDIT SETPOINT** scrolls across the display and toggles with **SKIP**. Press (P) to skip to 7.3, or use the (▲) and (▼) buttons to select a setpoint to edit: either **SP 1**, **SP 2**, **SP 3** or **SP 4**. Then press (P).

SP3-4 are not available for models with only two relays installed.

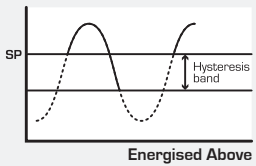
B **_ _ _ SP VALUE** scrolls across the display and toggles with the last setpoint value entered. Using the (▲) and (▼) buttons, adjust the display value at which the setpoint will activate. Then press (P).

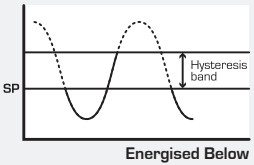
C **_ _ _ SP ACTIVATION** scrolls across the display and toggles with the last selected setpoint activation. Using the (▲) and (▼) buttons, select the relay activation to operate **ABOVE** or **BELW** (below) the setpoint value, and then press (P).

*Select **ABOVE** for the relay to turn on above the setpoint value and off below it. Select **BELW** for the relay to turn on below the setpoint value and off above it.*

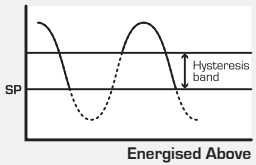
D **_ _ _ SETPOINT TYPE** scrolls across the display and toggles with the last selected setpoint type. Using the ▲ and ▼ buttons, select either **ALRM** (alarm) or **CNTRL** (control). Then press P.

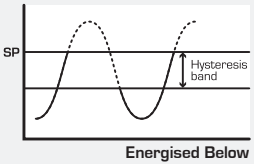
ALRM - The **setpoint value** controls the point at which the setpoint will activate. The **hysteresis value** controls the point at which the setpoint will deactivate.





CNTRL - The **setpoint value** controls the point at which the setpoint will deactivate. The **hysteresis value** controls the point at which the setpoint will reactivate.





E **_ _ _ HYSTERESIS VALUE** scrolls across the display and toggles with the last selected value. Use the ▲ and ▼ buttons to alter the hysteresis value if required. Then press P.

*The hysteresis value defines the separation band between setpoint activation and deactivation. Hysteresis will operate as per the specified type setting (**ALRM** or **CNTRL**) - see 7.2D.*

F **_ _ _ MAKE DELAY** scrolls across the display and toggles with the last selected make delay value. Adjust the make delay value using the ▲ and ▼ buttons and then press P.

The make delay value defines the delay between setpoint activation and when the relay turns on. This value is in tenths of a second.

G **_ _ _ OPEN ACCESS TO SP VALUE** scrolls across the display and toggles with the last selected direct access setting. Using the ▲ and ▼ buttons, select either **NO** or **YES**, and then press P.

When enabled, this option allows the setpoint value to be edited directly after pressing the ▼ button, without needing to enter a PIN number or go through all of the other options. Each setpoint can individually have this option enabled or disabled.

! If you selected SP 1 in 7.2A:

Skip 7.2H and continue to 7.2I now.

H **_ _ _ TRAIL SP1** scrolls across the display and toggles with the current trailing setting. Using the ▲ and ▼ buttons, select either **OFF** or **ON**, and then press P.

*If you choose **On**, the selected setpoint will be automatically adjusted whenever SP1 is changed, so that the 2 setpoints always trail each other by the same amount.*

I **_ _ _ SHOW SP ON BAR** scrolls across and toggles with the current display setting. Using the ▲ and ▼ buttons, select either **NO** or **YES**, and then press P.

*If you select **YES**, the setpoint value will be marked on the graph by a single bar. Multiple setpoints may have this option enabled.*

J **_ _ _ EDIT SETPOINT** scrolls across the display and toggles with **SKIP**. You are now back at 7.2A. To edit another setpoint, follow the instructions from 7.2A-J again. If you have finished editing setpoints, press P now to **SKIP** to 7.3.

7.3 Edit setpoint PIN

A _ _ _ **EDIT SP PIN NUMBER** scrolls across the display and toggles with **SKIP**. Press [P] to skip the rest of this section and return to the operational display, or the [▲] button and then [P] to **ENTER**.

B _ _ _ **ENTER NEW SP PIN NUMBER** scrolls across the display and toggles with the current PIN (default 1). Using the [▲] and [▼] buttons, enter your new setpoint entry PIN number. Then press [P] to exit and return to the operational display.

8 SETPOINT DIRECT ACCESS

If none of the setpoints have their direct access option enabled then the ▼ button will not respond to a short press. (See 7.2G to enable.)

8.1 Setpoint direct access

A Begin by pressing the ▼ button for half a second. The name of the first access-enabled setpoint (**SP 1**, **SP 2**, **SP 3** or **SP 4**) will appear on the display and toggle with the current value for that setpoint. Using the ▲ and ▼ buttons, adjust the selected value. Then press P to accept and progress to the next access-enabled setpoint.

SP3-4 are not available for models with only two relays installed.

B Pressing P for the last access-enabled setpoint will exit and return to the operational display.

9 RESET PIN NUMBERS

If you have forgotten your PIN number, follow the procedure below to reset the calibration and setpoint entry PIN numbers to their factory default of 1.

9.1 Reset PIN numbers

A Press ▲, ▼ and P 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 calibration PIN numbers if required by following the instructions in Sections 6.8 and 7.3.

10 DISPLAY BRIGHTNESS

Follow the instructions below to adjust the brightness of your LED display.

10.1 Adjust display brightness

A Press the [P] and [▲] buttons together from the operational display. **BRI** appears on the screen and toggles with the current brightness setting.

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.

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DOCUMENT REVISION CODE:
TEX-BAR-MAN-09-V.01