

LD-PRC

PROCESS INDICATOR MANUAL



LD - PRC

- I
- R4
- R4A

- HV
- LV

LD series process indicator

Indicator only

4 x relay outputs

4 x relay outputs, 1 x analogue output

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

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

1 INTRODUCTION

The LD - PRC process indicator and alarm controller is a technically advanced but cost effective instrument, designed specifically for use in process applications with 4-20mA or 0-10V DC inputs.

This instrument has been designed for ease of use, with intuitive, scrolling text prompts that guide you step-by-step through the setup process. The front panel includes 5 buttons, for simple operator interface, and the large 4-digit display ensures that the figures can be easily read from a distance.

Up to four relay outputs and an analogue output can be added.

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GENERAL INFORMATION

Input signal	Current (0-20mA, 4-20mA) or Voltage (0-2V or 0-10V)
Power supply	HV (85-265V AC/95-370V DC) or LV (15-48V AC/10-72V DC)
Excitation	24V DC (50mA MAX)
Sampling rate	10Hz
Resolution	16 bit
Accuracy	0.05% OF READING
Temperature drift	Typically 50ppm/°C
Factory defaults	Factory set up for 4-20mA. Calibrated for 0-20mA, 4-20mA, 0-2V and 0-10V. (Simple header adjustments necessary for voltage input - see 4.2).
Security	Setup and setpoint functions have independent security code access. Setpoint functions are independently configurable, and accessible through the F2 key.

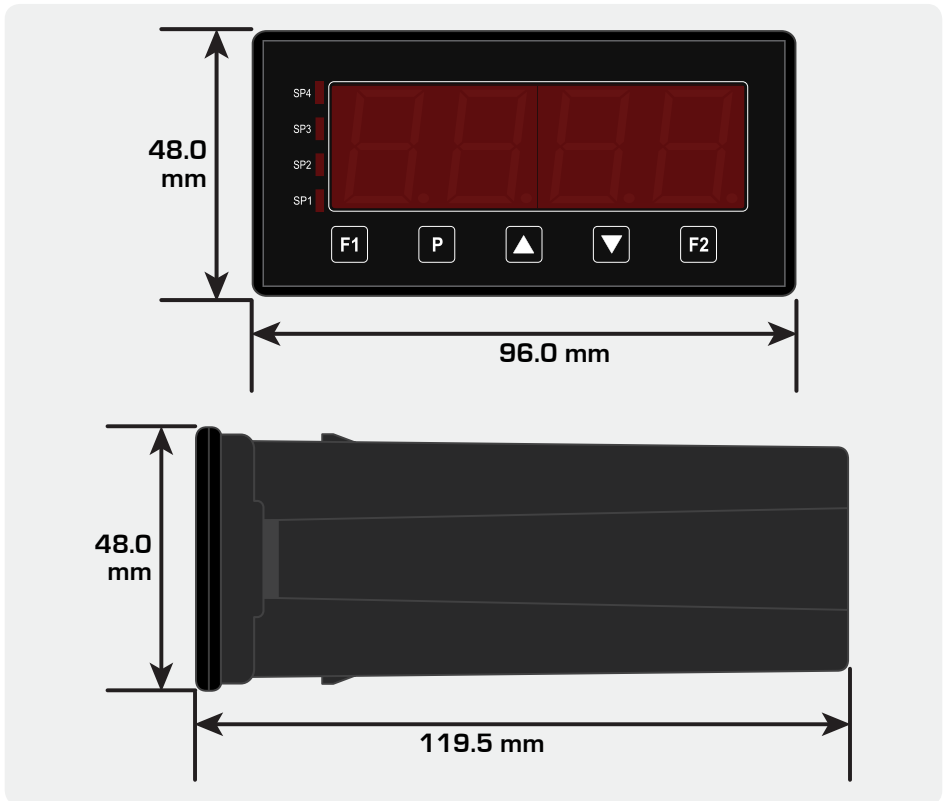
OPTIONAL OUTPUTS

Relay outputs	4 x 5A Form A relays
Analogue output	Fully scaleable isolated analogue output, factory set to either current (4-20mA) or voltage (0-10V). Window programmable over any range within the full-scale range of the controller

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











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 allows 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 allows 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).






7-SEGMENT ALPHA DISPLAY CHARACTERS

A	B	C	D	E	F	G	H	I	J	K
L	M	N	O	P	Q	R	S	T	U	
V	W	X	Y	Z	!	?	/			

3.3 Display shortcuts

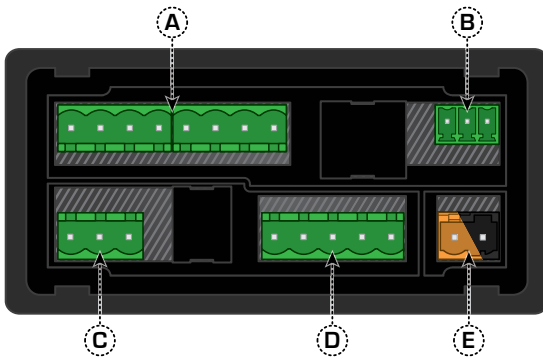
- A** The  button is used to view/reset the **PEAK** value.
- i - Press the  button once from the main display. **PEAK** toggles with the maximum measured process input value since the instrument was turned on or reset. (To reset **PEAK** now, press  and  at the same time. **PEAK** can also be reset via the rear function pins - see 4.6.)
 - ii - Press  at any time to return to the main display.
- B** The  button is used to view/reset the **VALY** (valley) value.
- i - Press the  button once from the main display. **VALY** (valley) toggles with the minimum measured process input value since the instrument was turned on or reset. (To reset **VALY** now, press  and  at the same time. **VALY** can also be reset via the rear function pins - see 4.6.)
 - ii - Press  at any time to return to the main display.

3.4 Display brightness

- A** Press the  and  buttons together from the operational display. **BRI** appears 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 . The display returns to normal operating mode.

4 WIRING

4.1 Pinouts



- Ⓐ Relay output [see 4.4]

- Ⓑ Analogue output [see 4.5]

- Ⓒ Analogue input [see 4.2-3]

- Ⓓ Function pins [see 4.6]

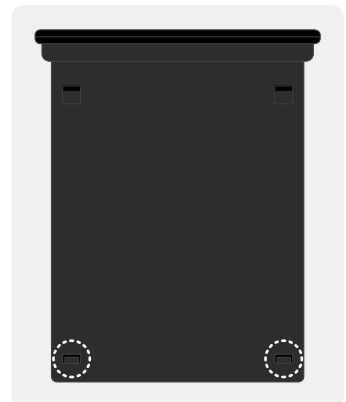
- Ⓔ Power supply [see 4.7]

4.2 Position the input header

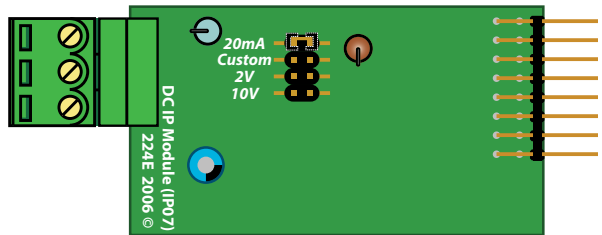
THE DEFAULT POSITION OF THE INPUT HEADER IS 20MA. IF YOUR APPLICATION REQUIRES CURRENT INPUT, SKIP THIS STEP AND PROCEED TO 4.3.

If you require voltage input (and the unit has not been custom factory configured for your order), you will need to remove the input module from the case and reposition the input header.

Remove the backing plate by inserting a screwdriver into the indents (indicated on the diagram). Then gently slide the input module from the case (see 4.1C to identify the input module).



Reposition the header on the input module to suit your application.



INPUT HEADER POSITIONS

20mA	Current input: 0-20mA or 4-20mA	2V	Voltage input: 0-2V
Custom	Custom input - contact us for options	10V	Voltage input: 0-10V

When you have finished repositioning the input headers, slide the input module back into the case and replace the plastic backing plate.

4.3

Wire the IP07 analogue input module

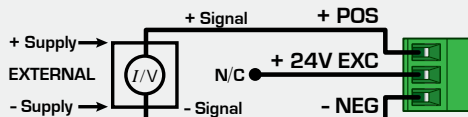
(see 4.1C)

PLEASE COMPLETE SECTION 4.2 (IF NEEDED) BEFORE WIRING YOUR ANALOGUE INPUT.

Once you have adjusted your header settings as needed (as in 4.2) and replaced the plastic backing plate, wire your input module as shown in the appropriate diagram below.

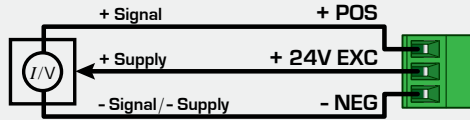
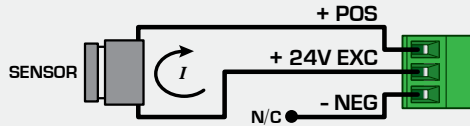
2-WIRE, CURRENT OR VOLTAGE

(External excitation used)



3-WIRE, CURRENT OR VOLTAGE

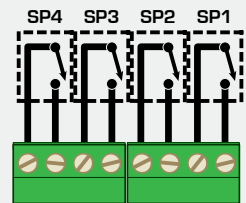
(Controller supplied excitation)

**2-WIRE LOOP POWERED, CURRENT ONLY****4.4 Wire the relay outputs**

(see 4.1A)

If your controller has relay outputs fitted, wire them as shown. Relays can be programmed to operate within the total span range of the controller.

If there are no relays fitted, skip this step.

**4.5 Wire the analogue output**

(see 4.1B)

If your controller has analogue output fitted, wire it as shown in the diagram. The analogue output is factory set to either current or voltage.

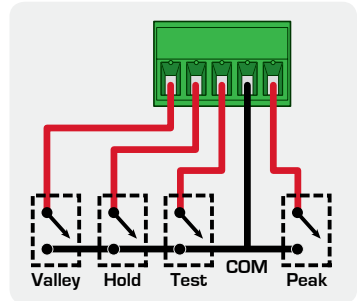
If there is no analogue output fitted, skip this step.



4.6 Wire the function pins (see 4.1D)

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

Valley	Clears the valley reading
Hold	Holds the current display value
Test	Resets the meter
Peak	Clears the peak reading

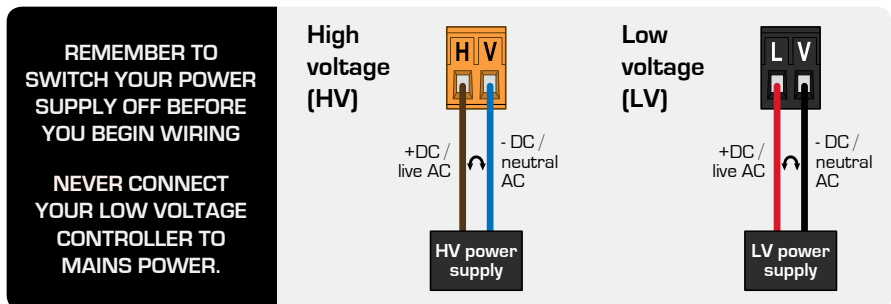


4.7 Wire the power supply (see 4.1E)

Determine whether your meter 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).

Then wire your power supply as shown below.



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 (5.6). 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 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, 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 display and toggles with **SKIP**. Press **P** to skip to 5.3, or the **▲** button and then **P** to **ENTR** (enter) input setup.
- B **__ MAINS FREQUENCY** scrolls across the display and toggles with the current selection. Use the **▲** and **▼** buttons to select either **50HZ** or **60HZ**, and then press **P**.
- C **__ INPUT MODE** scrolls across the display and toggles with the currently selected input mode. Use the **▲** and **▼** buttons to select: **0-20** (0-20mA), **4-20** (4-20mA), **2V** (0-2V), or **10V** (0-10V). Then press **P**.

If the input mode is changed in this step from current to voltage (or vice versa), the input header must also be adjusted to match (see 4.2).

D **__ DECIMAL POINT POSITION** scrolls across the display and toggles with the current selection. Use the **▲** and **▼** buttons to select: **0.123**, **0.12**, **0.1** or **NODP** (no decimal point). Then press **P**.

E **__ DISPLAY ROUNDING** scrolls across the display and toggles with the current selection. Use the **▲** and **▼** buttons to select: **NONE**, **2**, **5**, or **10**. 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**).*

5.3 Calibration

A **__ CALIBRATION TECHNIQUE** scrolls across the display and toggles with **SKIP**. Press **P** to skip to 5.4, or use the **▲** and **▼** buttons to select either **AUTO** or **MAN** (manual) and then press **P**.

***AUTO** (key-in) - This 2-point calibration procedure uses zero and span values to calculate the scale and offset. It is the most accurate calibration method, but requires known low and high input signals (or the use of a calibrator). **MAN** - This procedure does not require any input signals to be applied to the controller during calibration. Instead, it relies on the factory calibrated ranges (0-20mA, 4-20mA, 0-2V or 0-10V) and allows the user to enter the required display values for the low and high ends of these ranges (i.e. 4mA=0 and 20mA=1000).*

B **The step that you proceed to now will depend on your selection in 5.3A:**

AUTO: Complete steps 5.3C-E

MAN: Complete steps 5.3F-H

▶▶ AUTO CALIBRATION METHOD ▶▶

C **__ APPLY LOW INPUT SIGNAL - - - ENTER LOW DISPLAY VALUE** scrolls across the display, and the currently selected low display value appears. Apply the required low level input signal to the meter, and wait a moment for the signal to stabilise. Then use the **▲** and **▼** buttons to set the required low level display value, and press **P** to accept.

D **__ APPLY HIGH INPUT SIGNAL - - - ENTER HIGH DISPLAY VALUE** scrolls across the display, and the currently selected high display value appears. Apply the required high level input signal to the meter, and wait a moment for the signal to stabilise. Then use the **▲** and **▼** buttons to set the required high level display value, and press **P** to accept.

E If **AUTO** calibration was successful, you will be directed out of the calibration menu to the operational display. (To enter step 5.4, you must select **SKIP** at 5.3.)

If calibration fails, **__ CALIBRATION FAILED** will scroll across the display and you will be directed out of the calibration menu to the operational display.

The most likely cause of this message is that the controller has not detected any change in input signal during the calibration process. Check your signal and connections, and then repeat the calibration procedure.

▶▶ MANUAL CALIBRATION METHOD ▶▶

F **__ ENTER DISPLAY VALUE FOR [LOW INPUT]** scrolls across the display, and the currently selected low display value appears. Use the **▲** and **▼** buttons to set the display value for the low level input signal. Press **P** to accept.

*The text string for [LOW INPUT] will differ depending on your selected input range: **0MA** (for 0-20mA), **4MA** (for 4-20mA) or **0 VOLTS** (for 0-2V & 0-10V).*

G **__ ENTER DISPLAY VALUE FOR [HIGH INPUT]** scrolls across the display, and the currently selected high display value appears. Use the **▲** and **▼** buttons to set the display value for the high level input signal. Press **P** to accept.

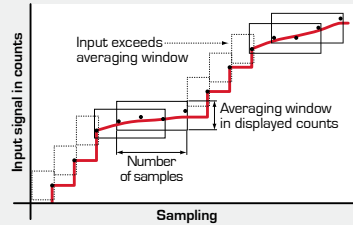
*The text string for [HIGH INPUT] will differ depending on your selected input range: **20MA** (for 0-20mA & 4-20mA), **2 VOLTS** (for 0-2V) or **10 VOLTS** (for 0-10V).*

H You will be directed out of the calibration menu to the operational display. (To enter step 5.4, you must select **SKIP** at 5.3.)

5.4 Averaging

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.



A **__ AVERAGING PARAMETERS** scrolls across the display and toggles with **SKIP**. Press **(P)** to skip to 5.5, or the **(▲)** button and then **(P)** to **ENTR** (enter) setup.

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 slow down response rates.

C **__ AVE WINDOW** scrolls across the display and toggles with the currently selected signal averaging window value. Adjust this value using the **(▲)** and **(▼)** buttons, and then press **(P)**.

*If your input signal contains large noise spikes, you can increase the size of averaging window to ensure that these 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. Setting **AVE WINDOW** to **0** will give continuous averaging as per the selected averaging samples.*

5.5 Analogue output setup

PLEASE SKIP THIS SECTION IF YOU DO NOT HAVE ANALOGUE OUTPUT INSTALLED.

A **__ ANALOG OUTPUT SETUP** scrolls across display and toggles with **SKIP**. Press **(P)** now to skip to 5.6, or go to 5.5B if you wish to calibrate your analogue output.

- B** Connect a mA or volt meter across the analogue output connector (see 4.5). Press the **▲** button and then **P** to **ENTR** (enter) analogue output setup.
- C** **__ CAL LOW ANALOG OUTPUT** scrolls across the display and toggles with a calibration number. Using the **▲** and **▼** buttons, calibrate your low analogue output as required. Then press **P**.
The display value is shown in internal units (mA or V).
- D** **__ CAL HIGH ANALOG OUTPUT** scrolls across the display and toggles with a calibration number. Using the **▲** and **▼** buttons, calibrate your high analogue output as required. Then press **P**.
The display value is shown in internal units (mA or V).
- E** **__ LOW SCALE VALUE FOR ANALOG OUTPUT** scrolls across the display and toggles with the current selection. Use the **▲** and **▼** buttons to enter your cal low position, and then press **P**.
This sets the display value for cal low (as in 5.5C).
- F** **__ HIGH SCALE VALUE FOR ANALOG OUTPUT** scrolls across the display and toggles with the current selection. Use the **▲** and **▼** buttons to enter your cal high position, and then press **P**.
This sets the display value for cal high (as in 5.5D).

5.6 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 **ENTR** (enter) and change your PIN number.
- 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 to the operational display.

6 SETPOINT SETUP

6.1 Enter setpoint PIN

IF NO RELAYS ARE INSTALLED, SECTION 6 WILL BE DISABLED AND THE **F2** BUTTON WILL NOT RESPOND TO A 3 SECOND PRESS. YOU CAN EDIT YOUR PIN NUMBER AT THE END OF THIS SECTION (6.3). IF YOU HAVE FORGOTTEN YOUR PIN, SEE SECTION 8.

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

__ 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, 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 display and toggles with **SKIP**. 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 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. Use the **▲** and **▼** buttons to select **ABV** (Above) or **BLW** (Below), and then press **P**.

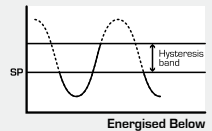
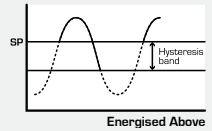
ABV: Relay turns on above the setpoint value and off below it. BLW: Relay turns on below the setpoint value and off above it.

- D** **__ HYSTERESIS VALUE** scrolls across the display and toggles with the current selection. Use the **▲** and **▼** buttons to adjust this value if required. Press **P**.

The **HYSTERESIS VALUE** defines the separation band between setpoint activation and deactivation, and will operate as per the **SP ACTIVATION** selected in 6.2C:

If **ABV** [above] is selected, then the **HYSTERESIS VALUE** determines how far the input must fall below the setpoint value to deactivate the setpoint.

If **BLW** [below] is selected, then the **HYSTERESIS VALUE** determines how far the input must rise above the setpoint value to deactivate the setpoint.



- E** **__ MAKE DELAY** scrolls across the display and toggles with the current selection. Use the **▲** and **▼** buttons to adjust this value if required, and then press **P**.

This value is displayed in seconds with a 0.1 second resolution, and is the time delay before the relay energises.

- F** **__ OPEN ACCESS TO SP VALUE** scrolls across the display and toggles with the last selected direct access setting. Use the **▲** and **▼** buttons to select either **YES** or **NO**, and then press **P**.

*When enabled, this option allows the setpoint value to be edited directly after pressing the **FE** 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. See section 7 for more information.*

- G** **__ EDIT SETPOINT** scrolls across the display and toggles with **SKIP**. You are now back at 6.2A. To edit another setpoint, follow the instructions from 6.2A-G again. If you do not wish to edit another setpoint, press **P** now to proceed to 6.3.

6.3 Edit setpoint PIN

- A** **__ EDIT SP 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 **ENTR** (enter) and change your PIN number.
- 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 to the operational display.

7 SETPOINT OPEN ACCESS

OPEN ACCESS IS CONFIGURED INDIVIDUALLY FOR EACH SETPOINT (SEE 6.2F). 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 display and toggle with the current value for that setpoint. 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 **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 default PIN numbers if required by following the instructions in 5.6 (for setup and calibration) and 6.3 (for setpoint setup), entering '1' whenever you are prompted for your current PIN.

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10B Vega Place, Mairangi Bay
North Shore City 0632, New Zealand

Ph: +64 (9) 835-1550

Aus: 1800 810-820

Fax: +64 (9) 835-1250

Email: info@texmate.co.nz

Web: www.texmate.co.nz



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