DPM 950S-FPSI

3½ Digit LCD Voltmeter with Programmable Backlighting

ORDERING INFORMATION

Standard Instrument (panel meter, fixing kit, data sheet)	DPM 950S-FPSI

FEATURES

- 19mm (0.75“) Digit height
- Dual colour backlight with programmable high and low levels
- Open collector outputs that mirrors the backlight status (with inverted output option)
- IDC Interface
- Auto-zero
- Auto-polarity
- 200mV d.c. Full Scale Reading (F.S.R.)



The DPM 950S-FPSI is a standard 3½ digit LCD voltmeter that can also be used as a dual colour go-stop display. This functionality is ideal for simplifying monitoring applications, where an operator needs to know the status of the equipment at a glance. During standard operation the backlight is green, however if the reading goes outside the user programmable thresholds, the display will turn red. Three open collector outputs are included, that indicate high, ok and low conditions. Both the backlight colour and outputs can be inverted independently.

Setup of the meter is a simple operation, using an eight-way DIP switch and two push buttons. No special tools or equipment are required.

SCALING

Two resistors Ra and Rb may be fitted in order to alter the full scale reading (F.S.R.) of the meter (see table).

Calibration may be required after fitting scaling resistors. Please see ‘Recalibration and scaling’ section on page three for details.

Required F.S.R		Ra	Rb
2V	Note	910k	100k
20V	Note	1M	10k
200V	Note	1M	1k
2KV	Note	1M	10R
200µA		LINK	1k
2mA		LINK	100R
20mA		LINK	10R
200mA		LINK	1R

Note: Ensure that link L2 is open if fitting Ra.

SPECIFICATIONS

	Minimum	Typical	Maximum	Unit
Accuracy (overall error)		0.05	0.1	% (±1 count)
Linearity			±1	count
Sample rate		3		samples/second
Hysteresis (high and low thresholds)		2		counts
Operating temperature range	0 (32)		50 (122)	°C (°F)
Temperature stability		100		ppm/°C
Supply voltage	4.5	5	5.5	V
Supply current (not including backlight)		2.0	2.2	mA
Backlight current			40	mA
Input leakage current (VIN = 0V)			10	µA

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PIN FUNCTIONS

1. LP-	Negative power supply to LED backlighting. (Connected to V- by default)
2. LP+	Positive power supply to LED backlighting. (Not connected to V+ by default)
3. V-	Negative power supply connection
4. V+	Positive power supply connection
5. N.C.	Not connected
6. N.C.	Not connected
7. INLO	Negative measuring differential input
8. IN HI	Positive measuring differential input
9. V-	Negative power supply connection (Internally connected to pin 3)
10. N.C.	Not connected
11. ACK	Acknowledge pin to stop flashing backlight in alarm condition. Temporarily connect to V- (pin 9) to acknowledge and stop flashing. Permanently connect to V- to disable flashing. See section below for more information
12. ALM LO	Open collector alarm output. Goes low when the lower threshold of the module has been passed
13. N.C.	Not connected
14. ALM OK	Open collector alarm output. Goes low when the module is measuring a signal between the high and low thresholds
15. N.C.	Not connected
16. ALM HI	Open collector alarm output. Goes low when the high threshold of the module has been passed

The analogue inputs should never be more than 0.3V outside of the supply voltage.

L1	Connects LP- to V-. Left closed by default
L2	Bridges Ra when no resistor is present. Left closed by default

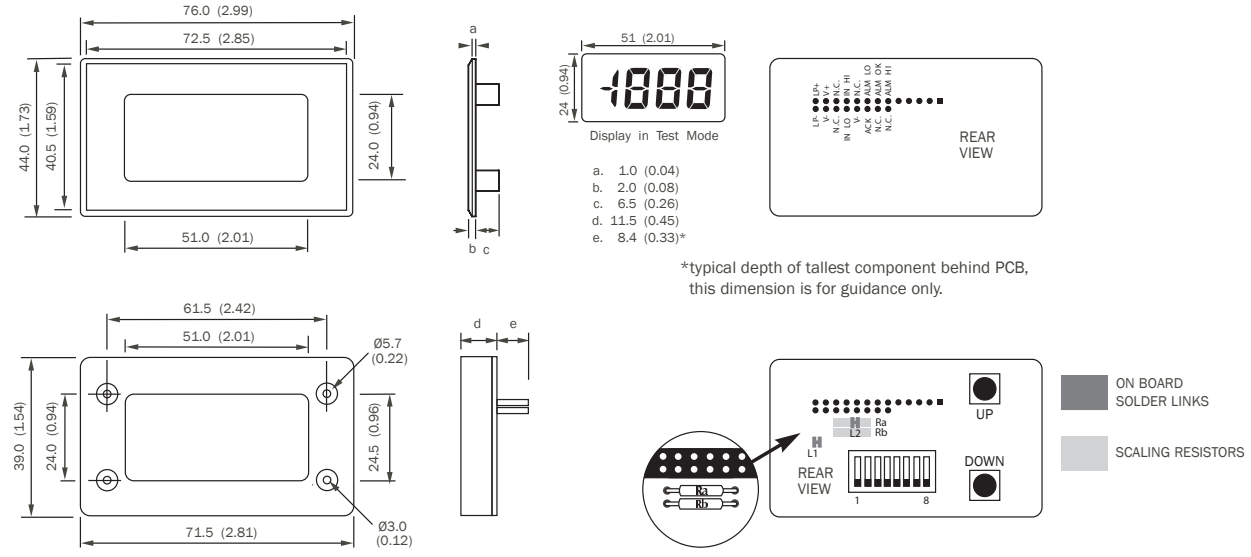
LCD SYMBOLS

'Err'	Return dip switches 1 to 4 to the off position. Only 1 of theses switches may be used at a time
!	The unit is in set-up mode. To view the measured signal, ensure switches 1 to 4 are in the off position
	Low battery. Increase supply voltage or replace battery to ensure continued operation

DIMENSIONS

All dimensions in mm (inches)

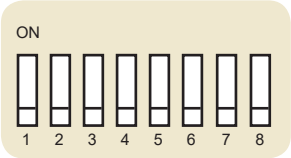
Panel cut-out 72 x 40 (2.83 x 1.57)
Maximum panel thickness 3mm (0.12).



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DIP SWITCH CONFIGURATION



1. Enter recalibration and scaling mode
2. Enter high threshold setup mode
3. Enter low threshold setup mode
4. Enter decimal place setup mode
5. Invert backlight colours
6. Invert outputs
7. Select backlight supply
8. Connect INLO to GND (not required for standard operation)

RECALIBRATION AND SCALING

Calibration is enabled by moving position 1 of the DIP switch into the 'on' position. Whilst inputting a constant voltage into INHI and INLO, the user should then use the 2 push buttons mounted on the rear of the device to adjust the calibration. Pressing the 'up' button once will increase the value on the LCD by one count. Pressing the 'down' button once will decrease the value on the LCD by one count. If either button is held down, the value will continuously change until the button is released again.

Once the appropriate value is displayed, position 1 of the DIP switch should be returned to the off position. It is not possible to apply an offset value (i.e. 0v is always displayed as zero).

THRESHOLD SETUP

There are two independent thresholds on the unit which control the backlight colour and open-collector outputs. The high threshold is triggered when exceeded by the input signal and the low threshold is triggered when the input signal drops below it. Both thresholds can be set, enabled and disabled independently.

By default the backlighting is green when an input is normal and red when the input exceeds a threshold (see INVERT BACKLIGHT COLOURS for more information). The thresholds can be set to any value between -1999 and 1999, however, it is not possible to assign a value to the low threshold which exceeds that of the high threshold and vice versa. In addition to numerical values, it is also possible to set both values to an 'over range' condition. This will only trigger the backlight when the input goes beyond a value that can be displayed.

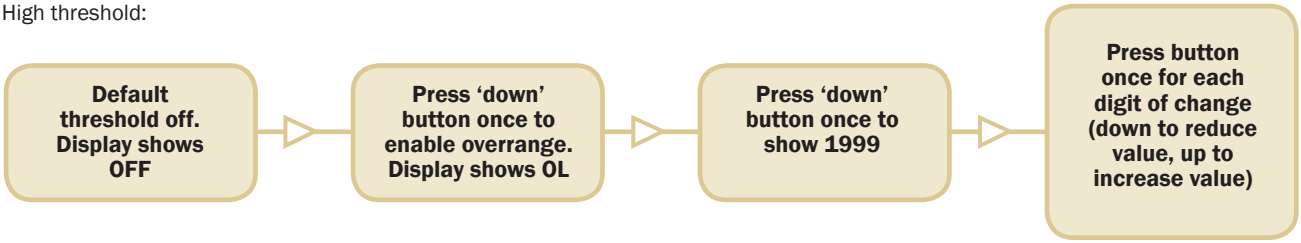
To adjust the threshold calibration:

First select a position on the miniature DIP switch, mounted on the reverse of the module.

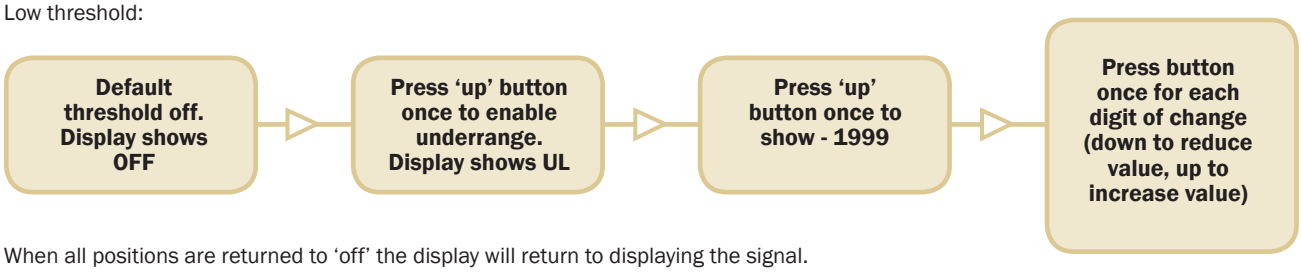
- Moving position 2 to 'on' will display the high threshold value
- Moving position 3 to 'on' will display the low threshold value

When a threshold is selected, it can then be adjusted using the two push buttons mounted on the rear of the device. The thresholds are adjusted as below:

High threshold:



Low threshold:



When all positions are returned to 'off' the display will return to displaying the signal.

In standard operation, the high and low thresholds have a hysterisis value of two counts. This only applies when going from an alarm condition to a non-alarm condition (i.e. the signal has to go at least 2 counts into the non-alarm condition before the backlight will return to green). This is to prevent flickering and unnecessary repeat alarms.

DECIMAL PLACE SELECTION

Changing DIP switch 4 to 'on' allows modification of the decimal point. There are three possible positions, as well as an 'off' option. These are cycled by pressing the up and down buttons.

INVERT BACKLIGHT COLOURS

The red and green backlighting can be inverted by moving DIP switch 5 to the 'on' position.

INVERT OUTPUTS

Changing DIP switch 6 to 'on' makes all 3 outputs invert. i.e. the output that was previously on is now off, and the two outputs that were previously off are now on.

SELECT BACKLIGHT SUPPLY

By default, the meter and backlight share a common ground (V-) but do not share a positive rail (V+). Moving DIP switch 7 to the 'on' position connects LP+ directly to V+, removing the need for a separate backlight connection.

FLASHING BACKLIGHT

By default, when an alarm threshold is exceeded, the backlight will flash Red. Temporarily connecting pin 11 (ACK) to pin 9 (V-) will stop the flashing (the backlight will remain red however). The backlight will not flash again, until the alarm has cleared (i.e. returned to green) and another threshold is exceeded.

The flashing can be disabled by putting a jumper over pins 9 and 11, or joining the pins together when a wiring loom is attached.

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FACTORY RESET

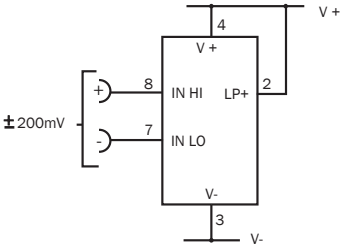
Calibration can be reset to the factory default by moving all 6 dip switches to 'ON' and powering up the unit. The LCD will display 4 dashes when the reset is complete. Moving all the dip switches back to the 'OFF' position will return the module to the operating mode.

SAFETY

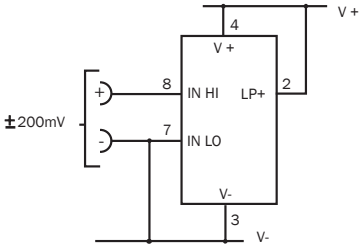
To comply with the Low Voltage Directive (LVD 93/68/EEC), input voltages to the module's pins must not exceed 60V d.c. If voltages to the measuring inputs do exceed 60V d.c., then fit scaling resistors externally to the module. The user must ensure that the incorporation of the DPM into the user's equipment conforms to the relevant sections of BS EN 61010 (Safety Requirements for Electrical Equipment for Measuring, Control and Laboratory Use).

VARIOUS OPERATION MODES

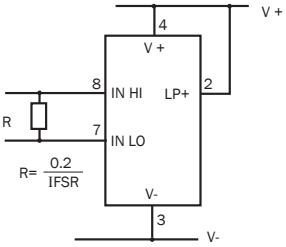
ON-BOARD LINKS: In order to quickly and easily change operating modes for different applications, the meter has several on-board links. They are designed to be easily opened (cut) or shorted (soldered). Do not connect more than one meter to the same power supply if the meters cannot use the same signal ground. Taking any input beyond the power supply rails will damage the meter



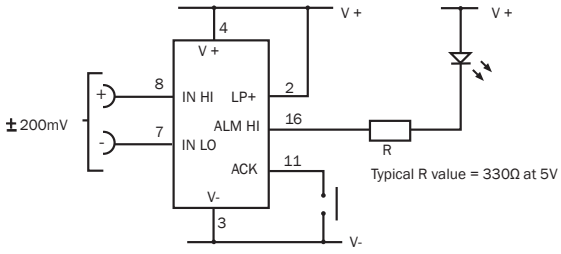
Measuring a floating voltage source of 200mV full scale. As an alternative to connecting LP+ to V+, move DIP switch 7 to the 'on' position



Measuring a single ended input referenced to supply



Measuring current. Supply MUST be isolated



Using an external LED as a high alarm and a switch to acknowledge the alarm (to stop it flashing)

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