

The DPM 950S-FPSI is a standard 3.5 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. The user can then read off the actual value from the display and take corrective action. 3 open collector outputs are included, that indicate high, ok and low conditions. Both the backlight colour and outputs can be inverted independently.

Module setup is a simple operation, using a six-way DIP switch and two push buttons. No special tools or equipment are required.

### FEATURES

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



### 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 'Scaling calibration' section on page two 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 L3 is open if fitting Ra.

### SPECIFICATIONS

Specification	Min.	Typ.	Max.	Unit
Accuracy (overall error)		0.05	0.1	% ( $\pm 1$ count)
Linearity			$\pm 1$	count
Sample rate		3		samples/second
Hysteresis (High and low thresholds)		2		counts
Operating temperature range	0		50	$^{\circ}\text{C}$
Temperature stability		100		ppm/ $^{\circ}\text{C}$
Supply voltage	4.5	5	5.5	V
Supply current (Not including backlight)		500		$\mu\text{A}$
Backlight current		35		mA
Input leakage current ( $V_{IN} = 0V$ )			10	$\mu\text{A}$

LASCAR ELECTRONICS LTD.  
 MODULE HOUSE  
 WHITEPARISH  
 WILTSHIRE SP5 2SJ  
 UK  
 TEL: +44 (1794) 884567  
 FAX: +44 (1794) 884616  
 E-mail: sales@lascar.co.uk

LASCAR ELECTRONICS INC.  
 4258 West 12th Street  
 Erie  
 PA 16505  
 USA  
 TEL: +1 (814) 835 0621  
 FAX: +1 (814) 838 8141  
 E-mail: us-sales@lascarelectronics.com

LASCAR ELECTRONICS (HK) LIMITED  
 Unit Nos. 6-8, 19/F., Futura Plaza  
 111-113 How Ming Street  
 Kwun Tong, Kowloon  
 Hong Kong  
 TEL: +852 2389 6502  
 FAX: +852 2389 6535  
 E-mail: saleshk@lascar.com.hk

Specifications liable to change without prior warning

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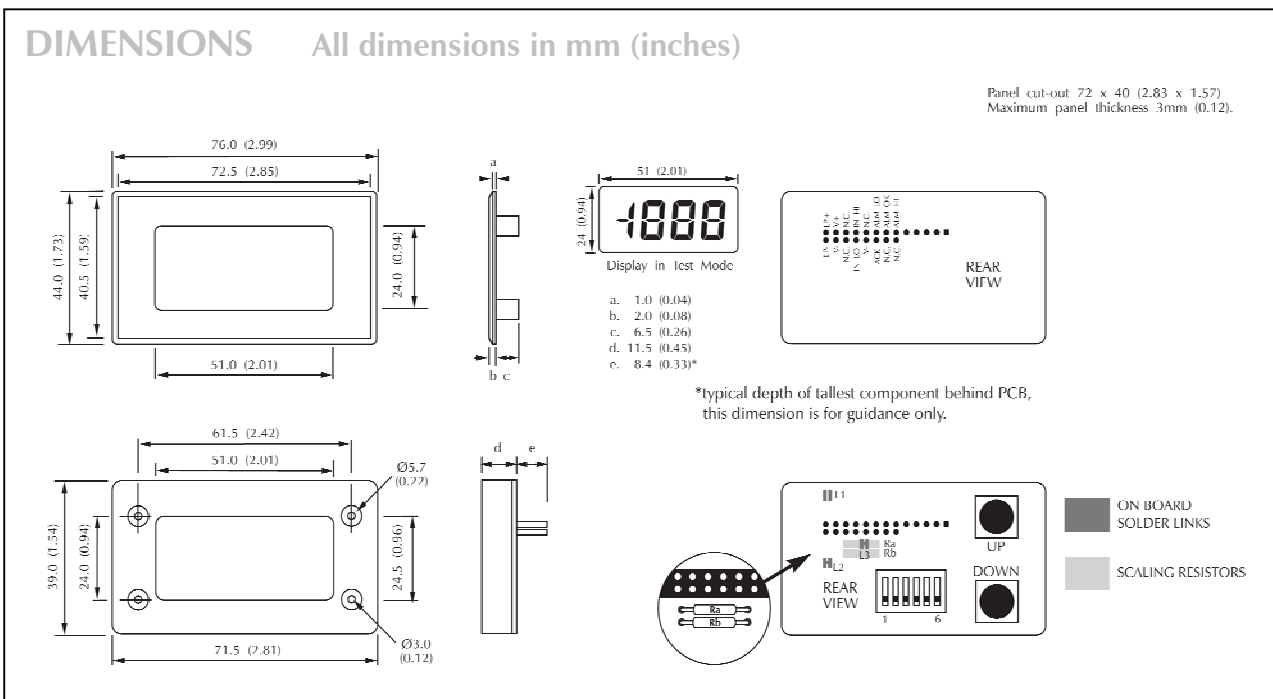
Applies to DPM 950S-FPSI

## PIN FUNCTIONS

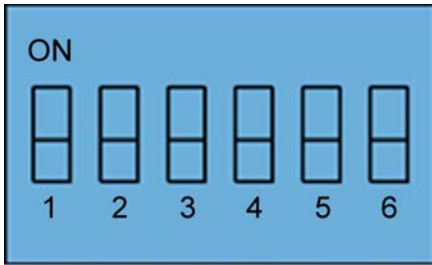
1. LP- Negative power supply to LED backlighting.
  2. LP+ Positive power supply to LED backlighting.
  3. V- Negative power supply connection
  4. V+ Positive power supply connection
  5. N.C. Not Connected
  6. N.C. Not Connected
  7. INLO Negative measuring differential input
  8. IN HI Positive measuring 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
- L1 Connects LP+ to V+. Left open by default  
 L2 Connects LP- to V-. Left closed by default  
 L3 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 these 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



## DIP SWITCH CONFIGURATION



- 1) Enable scaling calibration
- 2) Enable high threshold calibration
- 3) Enable low threshold calibration
- 4) Adjust decimal place
- 5) Invert backlight colours
- 6) Invert outputs

## SCALING CALIBRATION

Scaling calibration is enabled by moving position 1 of the DIP switch into the 'on' position. Whilst inputting a constant F.S.R. 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. The function of each button can be identified by an arrow marked next to it. Pressing the up arrow once will increase the value on the LCD by one count. Pressing the down arrow 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.

## THRESHOLD CALIBRATION

There are 2 independent thresholds on the modules: A high value that is triggered when exceeded by the input signal and a low value which is triggered when the input signal drops below it. Both thresholds can be enabled, disabled and set independently.

In the default colour scheme, the backlighting is green when an input is normal and red when a limit is exceeded.

The thresholds can be set to any value between -1999 and +1999, however it is not possible to assign a value to the high threshold, that is below that of the low threshold, and vice versa. In addition to numerical values, it is also possible to set both values to an 'overrange' condition. This will only trigger a red backlight when the input goes beyond a value that can be displayed.

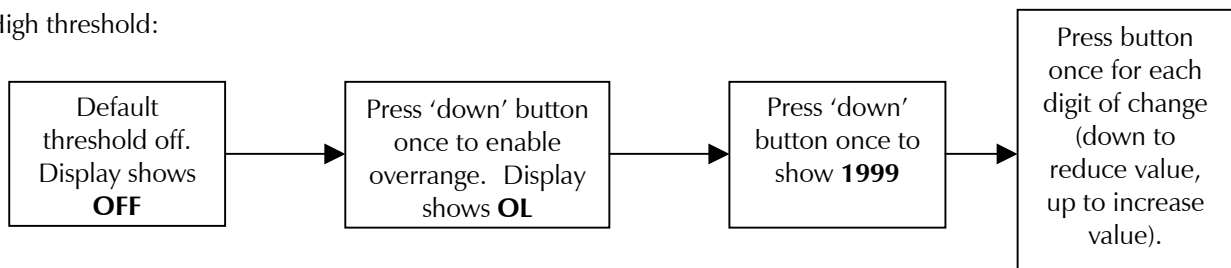
To adjust the threshold calibration:

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

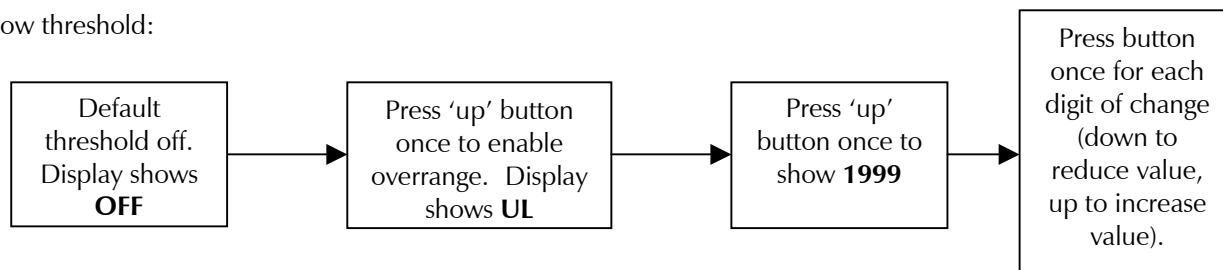
- Moving position 2 to 'on' will display the high threshold value.
- Moving position 3 to 'on' will display the low threshold value.

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 signal being fed into the module.

In standard operation, the high and low thresholds have a hysteresis 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.

## 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.