

# SGD 24-M-IP

## Waterproof PanelPilot-Compatible Smart Graphics Display

### FEATURES

- 2.4" colour TFT screen
- IP-67 and NEMA 6 rated
- Rugged and scratch resistant Corning® Gorilla® Glass window
- Supplied with free Windows design software, to setup and customise the display. Compatible with Windows XP, 2000, Vista and Windows 7
- Download meter applications from the ever expanding online library
- Programmable with the USB interface
- Simple and easy panel mounting solution
- IP-67 12-way connection
- Wide operating voltage of 4V – 30V d.c.
- 0 – 40V d.c. measurement range
- 2 analogue inputs
- 2 alarm outputs
- SPI and I<sup>2</sup>C

### ORDERING INFORMATION

Standard Display (Panel meter, fixing kit, IP-67 connector, quick start guide)	SGD 24-M-IP
USB Cable (Type A to mini-B)	CABLE USB A-MF
2m Rightangle cable with IP-67 connector	CABLE IP-12W-RA



The SGD 24-M-IP is a PanelPilot Compatible IP-67 graphics display with a 320 x 240 pixel (QVGA) colour display and USB programming interface.

Using the PanelPilot software (available for Windows XP, 2000, Vista and Windows 7), users are able to choose from an ever-increasing number of configurations which can then be customised to their needs. The additional voltmeter types and other functions are available through [www.PanelPilot.com](http://www.PanelPilot.com).

Colours, text labels, splash screen and input voltage scaling can all be customised by the user through the software and then uploaded to the SGD 24-M-IP through the USB connection. When setup is complete, the settings can be saved and then uploaded to the meter using the supplied USB cable. Panel or enclosure installation of the finished module is simple, using the 32mm nut and the IP67 connector supplied with the unit.

Specifications	Minimum	Typical	Maximum	Unit
Accuracy		0.05	0.1	%
Linearity			±1*	Count
Sample rate		3		Samples/second
Operating temperature range	0 (+32)		+40 (+104)	°C (°F)
Supply voltage	4		30	V d.c.
Measurement voltage (single ended only) **	0		40	V d.c.
Supply current ***	35		190	mA

\* Depending on user calibration settings

\*\* The SGD 24-M-IP uses a programmable gain amplifier. There are 8 different voltage ranges, to optimise the resolution. See page 2 for details.

\*\*\* Voltage dependent. See graph on Page 2.

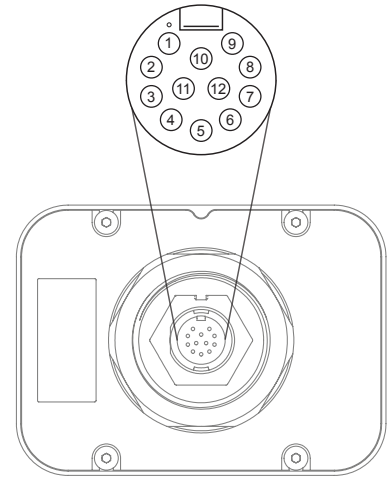
# SGD 24-M-IP

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### IP67 CONNECTION

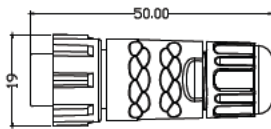
#### Connector Pin Functions

1	ESPI-CS2	-SPI chip select
2	ESPI-MISO	- SPI master input, slave output
3	ESPI-CLK	- SPI serial clock
4	ESPI-MOSI	- SPI master output, slave input
5	SDA	- Serial data
6	SCL	- Serial clock
7	ALM2	- Alarm output 2
8	ALM1	- Alarm output 1
9	IN1	- Analogue voltage input 1 (maximum of 40V d.c. w.r.t 0v)
10	IN2	- Analogue voltage input 2 (maximum of 40V d.c. w.r.t 0v)
11	0V	- 0V power supply input
12	V+	- Positive power supply input (4V – 30V d.c.)

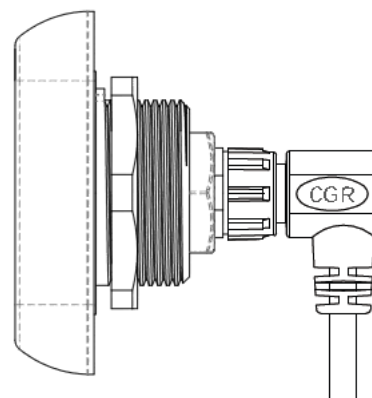
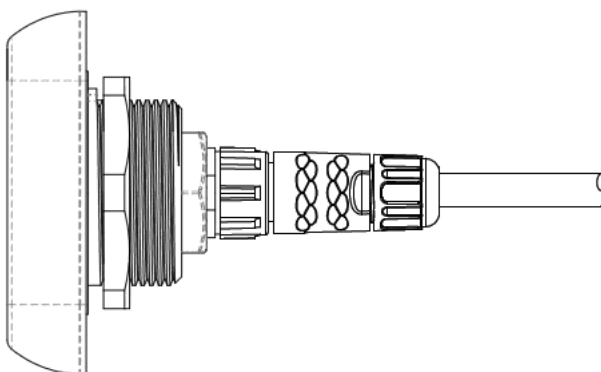
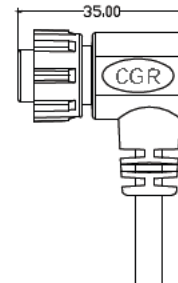


#### Connector plug options

Twist lock, field installable connector with solder bucket pins.  
Seals for Cable OD=4.5mm~7.0mm



Twist lock connector with right angle overmoulded strain relief.  
Cable length 2m.



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### VOLTAGE INPUT

The SGD 24-M-IP features 2 voltage inputs, which use a Programmable Gain Amplifier (PGA) to make the best use of available resolution (the smallest voltage range offers the highest resolution). Each channel can be programmed independently, with the option of eight different input voltage ranges:

Voltage Range (V)	Resolution (mV)
0 - 1.25	0.3
0 - 2.5	0.6
0 - 4	1.0
0 - 5	1.2
0 - 8	2.0
0 - 10	2.4
0 - 20	4.9
0 - 40	9.8

The input voltage range is decided using the two voltages that the user enters in the scaling section of the Panel Pilot software. The software uses the smallest range available, which can accommodate both of the voltages entered by the user. The absolute maximum voltage input is 40V d.c.

For example:

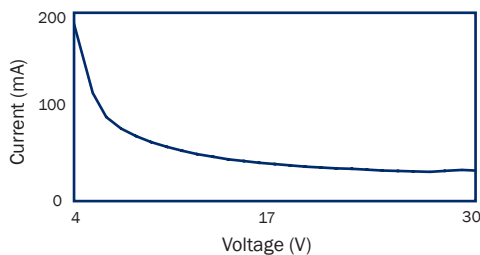
Entering a voltage scale of 0 – 30V in the software will use the 0 – 40V range.

Entering a voltage scale of 0 – 3V in the software will use the 0 – 4V range.

Entering a voltage scale of 5 – 15V in the software will use the 0 – 20V range.

Note: V+, IN1 and IN2 share a common ground (i.e. not floating or isolated from each other).

### Typical Supply Current



### USB Connection

A 'Type A to Mini-B' USB cable is required to program and customise the SGD 24-M-IP by unscrewing the 4xM3 screws and removing the back cover. The packing tray supplied can be used as a jig to hold the module and to avoid disconnecting the 12 way connector from the PCB inside.

The device will be powered for programming via USB.

It typically takes between 10 and 30 seconds to send a configuration, with an additional 5 seconds needed for the hardware to reset.

### Display

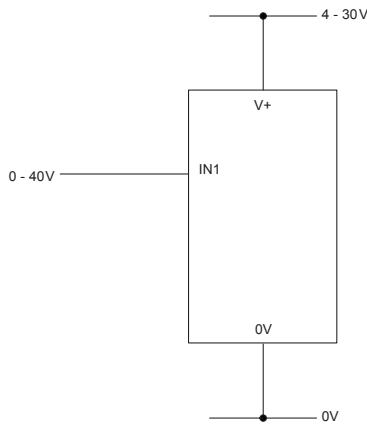
The display is a 2.4" TFT panel, with a resolution of 320 x 240 pixels and a 16-bit colour depth. Any graphics that are uploaded to the meter are automatically converted to this specification.



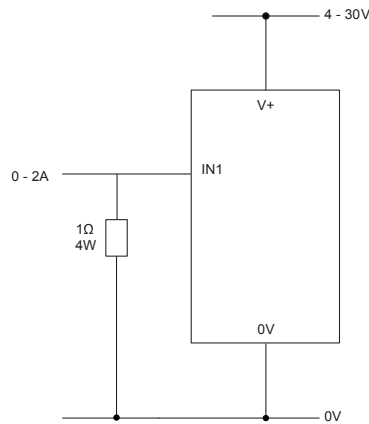
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### VARIOUS OPERATING MODES

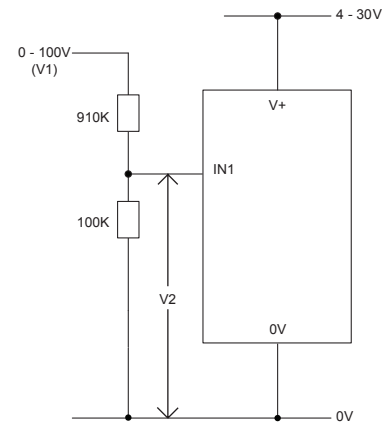


MEASURING A VOLTAGE SOURCE



MEASURING 0-2 AMPS CURRENT RANGE

Use a 1 Ω resistor, with a 4W rating.  
Setup scaling in software: 0V = 0.00 and 2V = 2.00



MEASURING 0-100V (d.c. only)

Input a known voltage of between 0 and 100V (V1)  
Measure the voltage between IN1 and 0V (V2)  
Setup scaling in software: 0V = 0.0  
V2 = V1 (Enter with the same number of decimal points, i.e 50.0)

### PANELPILOT SOFTWARE

Lascar's PanelPilot software is available for download free of charge from [www.PanelPilot.com](http://www.PanelPilot.com). Easy to install and use, the control software runs under Windows 2000, XP (Home and Professional Editions), Vista and Windows 7. The software is used to setup the appearance and operation of the meter and then upload these settings to the meter.

Multiple types of voltmeter are supplied with the software. See [lascarelectronics.com](http://lascarelectronics.com) for details of available meters.

The software allows the following parameters to be configured:

- Meter type
- Text labels (including units and graph labels)
- Background, graph segment and text colors
- Input scaling / calibration (at two points)
- Decimal points (entered during scaling)
- Splashscreen image selection (to display a user image, such as a logo, when the meter is powered up)

