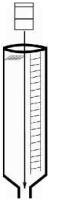


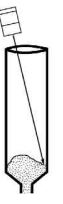
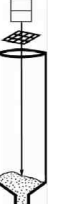


SHICO. LASER LEVEL TRANSMITTER

MODEL : LM80

The laser level transmitter (LM80) is a non-contact, level measuring instrument designed for granular solid materials and opaque liquids. Based on pulsed laser technology, the LM80 embodies speed and accuracy in a single, easy to use and install product. The characteristic narrow beam divergence of the laser permits direct aiming to the target surface without interference from structure or falling material. With both continuous 4-20 mA and single point relay outputs, the LM80 can operate as a process control transmitter while simultaneously providing high and low alarms. Whether measuring a few meters into the confined space of a crusher, or to the bottom of the tallest silo, the LM80 with its laser pointer and long range is the plug-and-play solution to level measurement

■ FEATURES

	Easy measurement in Silos with an internal structure and/or buildup		Level silos and bins. Ideal for pellets, grain, coffee, coal, dry bulk solids, opaque liquids and powders	
Measures surfaces at any angle.		Non-contact, level measurement through obstacles such as protective grids etc		

■ SPECIFICATIONS

■ Measurements

Range	0.5 m (1.5 ft) to 30 m (100 ft) - dark colored surfaces 0.5 m (1.5 ft) to 100 m (150 ft) - light colored surfaces 0.5 m (1.5 ft) to 150 m (500 ft) - reflective targets in positioning applications
Resolution	±10mm(0.4 in) / ±7 mm(0.3in) with 12second sliding window
Accuracy	±30mm(1.2 in) / ±25mm(1.0 in) with 12second sliding window
Update rate	3 readings per second (maximum), 1 reading per minute (min)
Operating temp'	-40°C~+60°C (-40°F~+140°F)/-40°C~+45°C(-40°F~+113°F) with non-condensing option (heated lens option (AC and SC)) Note: While the initial (cold start) accuracy of the LM80 will be within specifications, a settling period of approximately 15 minutes is recommended to allow the electronics to warm up and the internal temperature to stabilize.
Survival temp'	-40°C ~+80 °C / -40°F~+176°F
Pressure	1 bar

■ Output

Analog	4-20 mA, NAMUR compliant non-isolated and self powered
Digital (Relay)	2 SPST relays: 0.5 A at 120 VAC, 0.25 A at 250 VAC, 1 A at 24 VDC, 0.5 A at 60 VDC
Communication	Standard male DB9 connector-RS232 for testing, troubleshooting and configuration 19200 baud, 8 data bits, 1 stop bit, no parity, no flow control

■ Power supply

Voltage	24 V DC typical (18 to 32 V DC)
Current	0.4 A peak, 0.2 A continuous / 0.52 A peak, 0.32A continuous with non-condensing optics



■ Mechanical

Base plate diameter	Flange - 140 mm (5.51 in) / Triclover - 120 mm (4.72 in)
Length	Flange - 172 mm (6.77 in) / Triclover - 166 mm (6.54 in)
Weight	Aluminum enclosure - 1.6 kg (3.53 lbs) Aluminum enclosure with triclover -2.2 kg (4.85 lbs) / 316 Stainless steel enclosure - 4.2 kg (9.26 lbs)
Enclosure material	Powder coated aluminum standard, 316 stainless steel option
O-ring seal material	Buna-N (Nitrile Rubber)
Mounting / process connection	Flange - 4 holes, 8.5 mm (0.33 in) diameter on 120 mm (4.72 in) diameter circle / Triclover - 316 Stainless steel plate with seal groove

■ Optical

Total optical aperture	90 mm (3 in)
Measuring laser lens diameter	25 mm (1 in)
Receiver lens diameter	50 mm (1.97 in)
Lens material	Acrylic
Lens impact resistance	Impact tested at 4 joule
Beam divergence	$\Delta < 0.3^\circ$
Beam spot diameter	$2R \tan(\Delta/2)$ (Where R is the range to the target and Δ is the beam divergence)
Beam direction	$90^\circ \pm 1^\circ$ from mounting flange

■ Purge

Purge air flow	Must be oil free dry air recommended flow between 0.5 and 4 l/minute maximum pressure 5.5 bar (80 psi)
Purge fitting	1/8 NPT

■ Environmental

Enclosure rating	IP66/Nema 4X (Dust proof, can be washed down with high pressure hose)
Gas rating	This equipment can be used in flammable gases or vapor hazardous locations.

■ Laser

Measuring laser	905 nm near infrared pulsed semiconductor laser / 12 mW average power output / 20W peak power output
Pointing laser	635 nm red semiconductor laser / 3 mW continuous
Measuring laser life expectancy	25 years typical MTBF
Measuring laser	Always on IEC60825-1 class 1M laser
safety	A class 1M laser is safe for all conditions of use except when passed through magnifying optics. This means the maximum permissible exposure cannot be exceeded when viewing the laser with the naked eye without the aid of magnifying optics.



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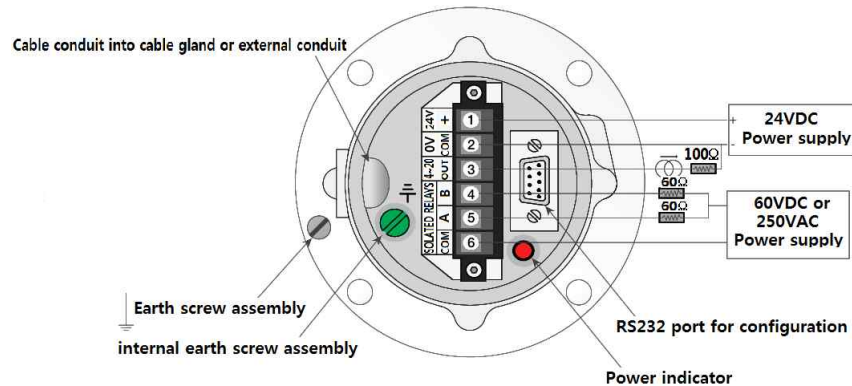
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L-55

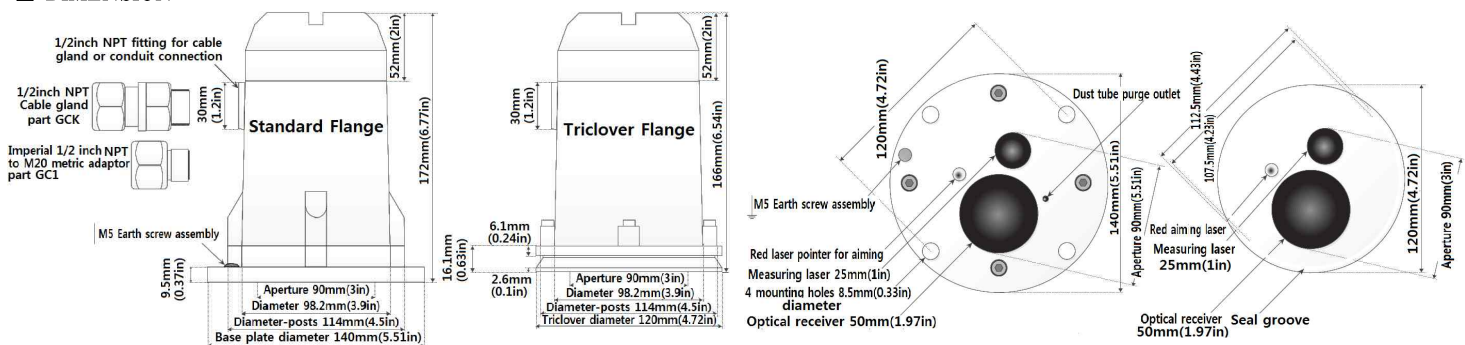
SHICO. LASER LEVEL TRANSMITTER

MODEL : LM80

ELECTRICAL CONNECTION



DIMENSION



ACCESSORIES

<p>Dust tube gasket 3mm (0.12in) thick 4holes 8.5mm (0.33in) diameter Bolt circle 120mm (4.72in) Laser pointer opening 12mm (0.47in)</p>	<p>● Dust tube (P801)</p> <table border="1"> <tbody> <tr> <td>Base plate diameter</td> <td>140 mm (5.51 in) mounts on LM80 standard flange</td> </tr> <tr> <td>Length</td> <td>257.2 mm (10.125 in)</td> </tr> <tr> <td>Material</td> <td>304 Stainless steel</td> </tr> <tr> <td>Gasket material</td> <td>Black neoprene rubber durometer rating shore 60A</td> </tr> <tr> <td>Function</td> <td>Static air space prevents dust buildup, can be purged</td> </tr> </tbody> </table>	Base plate diameter	140 mm (5.51 in) mounts on LM80 standard flange	Length	257.2 mm (10.125 in)	Material	304 Stainless steel	Gasket material	Black neoprene rubber durometer rating shore 60A	Function	Static air space prevents dust buildup, can be purged				
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<p>4holes 8.5mm (0.33in) diameter Bolt circle 120mm (4.72in)</p> <p>3.2mm (0.125in) thick</p> <p>4holes 8.5mm (0.33in) diameter Bolt circle 120mm (4.72in)</p>	<p>● Cooling tube (P802)</p> <table border="1"> <tbody> <tr> <td>Base plate diameter</td> <td>140 mm (5.51 in) mounts on LM80 standard flange</td> </tr> <tr> <td>Length</td> <td>140 mm (5.51 in) compatible with LM80 mounting accessories</td> </tr> <tr> <td>Material</td> <td>260.4 mm (10.25 in)</td> </tr> <tr> <td>Gasket material</td> <td>304 Stainless steel</td> </tr> <tr> <td>Function</td> <td>Offset from hot process interface to allow convection cooling, can be purged</td> </tr> </tbody> </table>	Base plate diameter	140 mm (5.51 in) mounts on LM80 standard flange	Length	140 mm (5.51 in) compatible with LM80 mounting accessories	Material	260.4 mm (10.25 in)	Gasket material	304 Stainless steel	Function	Offset from hot process interface to allow convection cooling, can be purged				
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Gasket material	304 Stainless steel														
Function	Offset from hot process interface to allow convection cooling, can be purged														
<p>8.33mm (0.33in) diameter hole for 5/16-18x0.75 in long hex bolt</p> <p>47.6mm (1.87in) 95.3mm (3.75in) 112.7mm (4.44in)</p> <p>38.1mm (1.5in) 4.76mm (0.19in) thick 177.8mm (7in) 233mm (9.17in) 27.6mm (1.07in) 25.4mm (1in) 12.7mm (0.5in)</p>	<p>● Adjustable pivot bracket (A800)</p> <table border="1"> <tbody> <tr> <td>Outer diameter / width</td> <td>160 mm (6.3 in)</td> </tr> <tr> <td>Opening diameter</td> <td>90 mm (3.54 in)</td> </tr> <tr> <td>Mounting plate thickness</td> <td>4.76 mm (0.19 in)</td> </tr> <tr> <td>Mounting bolt</td> <td>HHCS screw 5/16-18, bolt hole 8.33 mm (0.33 in)</td> </tr> <tr> <td>Height of pivot</td> <td>25.4 mm (1 in)</td> </tr> <tr> <td>Tilt angle for aiming</td> <td>Continuously adjustable over 180°</td> </tr> <tr> <td>Material</td> <td>304 Stainless steel</td> </tr> </tbody> </table>	Outer diameter / width	160 mm (6.3 in)	Opening diameter	90 mm (3.54 in)	Mounting plate thickness	4.76 mm (0.19 in)	Mounting bolt	HHCS screw 5/16-18, bolt hole 8.33 mm (0.33 in)	Height of pivot	25.4 mm (1 in)	Tilt angle for aiming	Continuously adjustable over 180°	Material	304 Stainless steel
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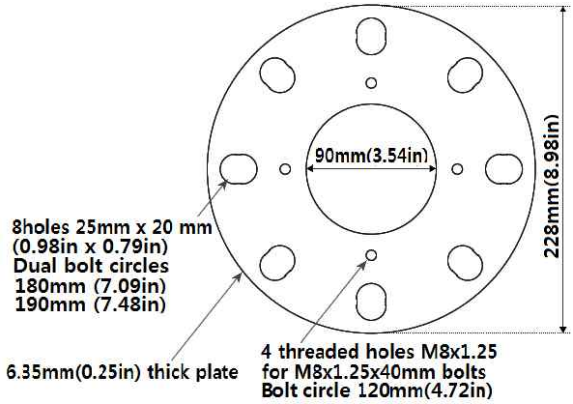
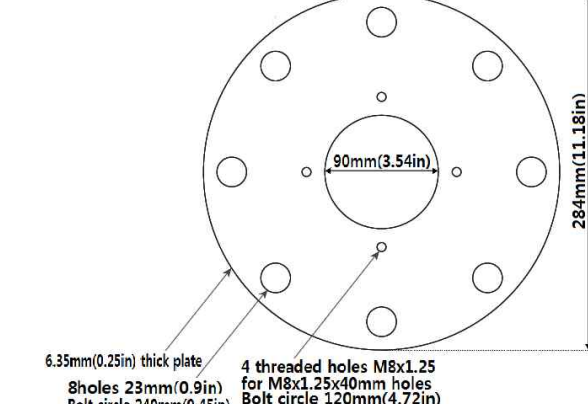
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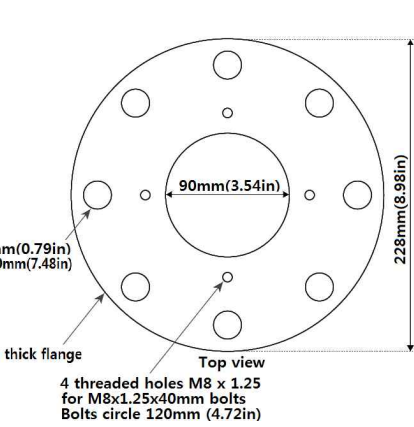
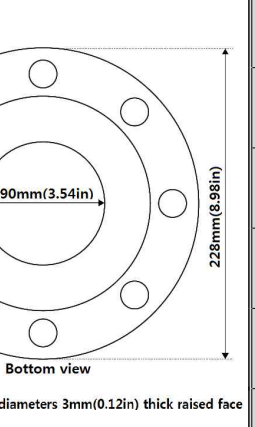
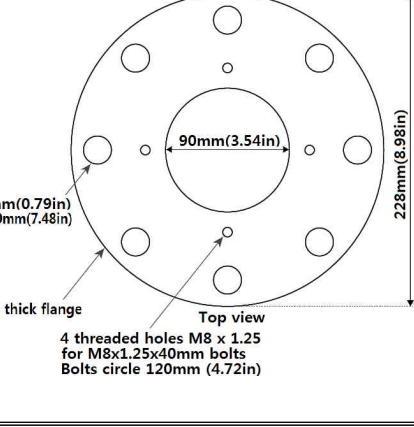
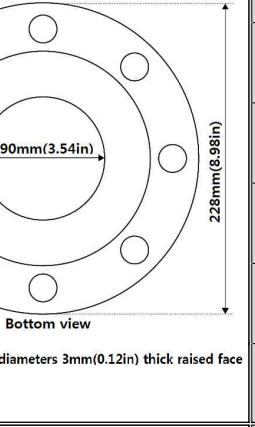
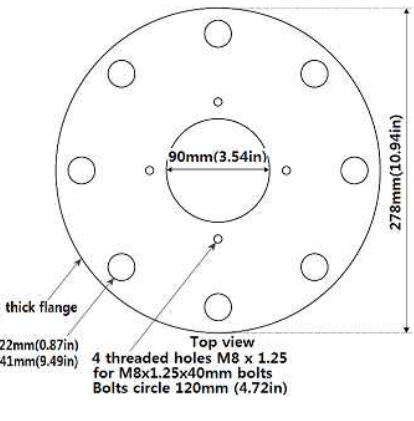
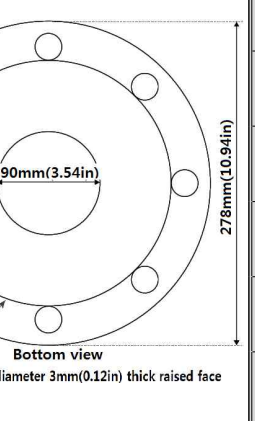
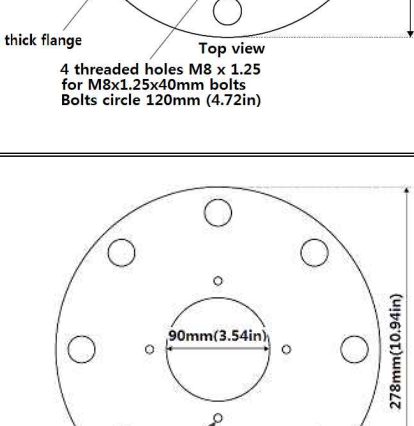
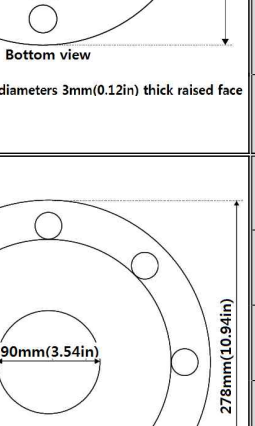
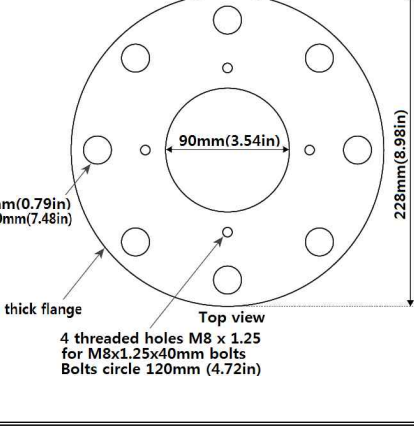
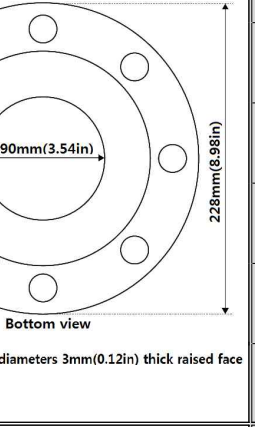
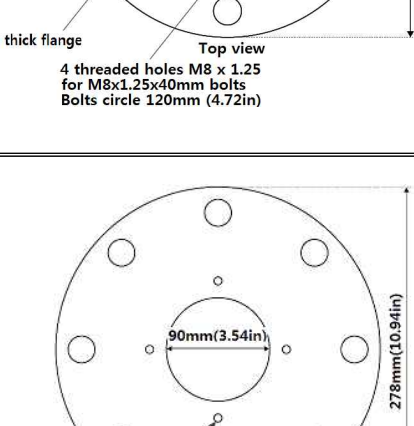
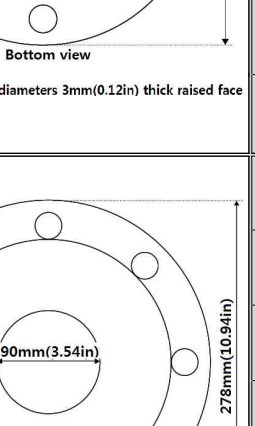
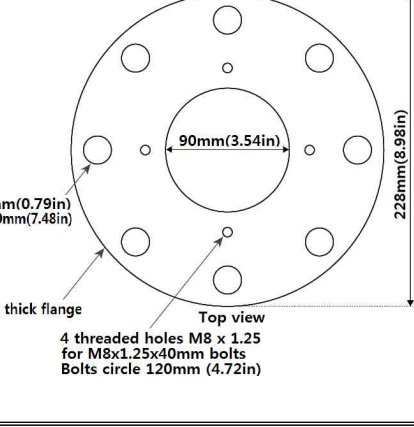
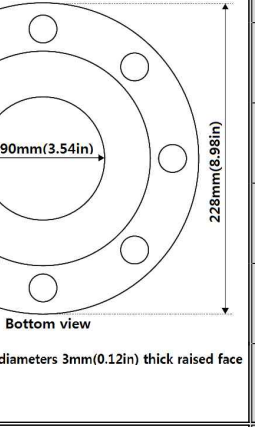
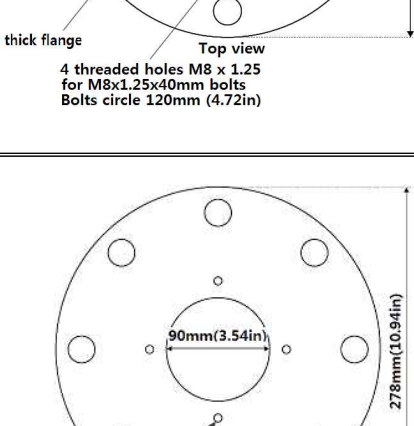
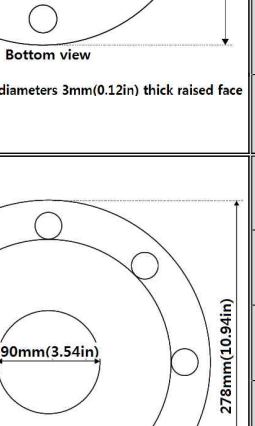
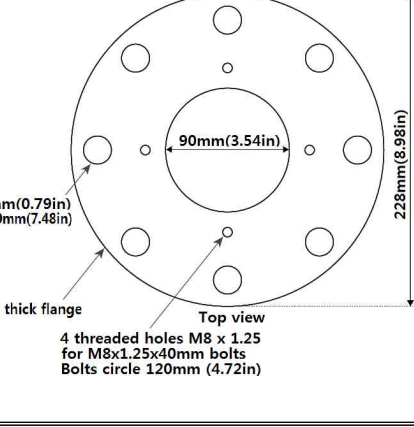
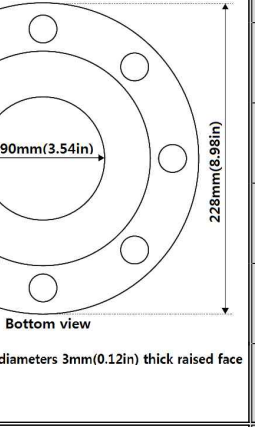
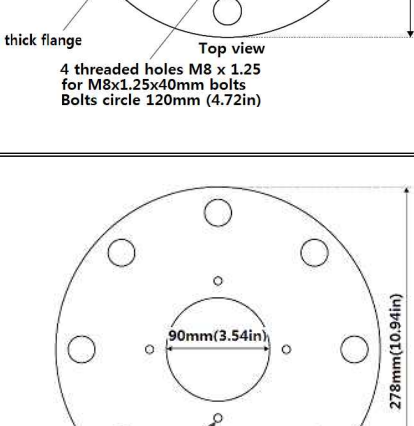
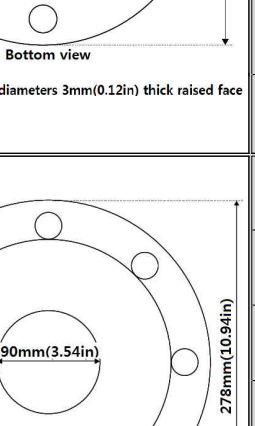
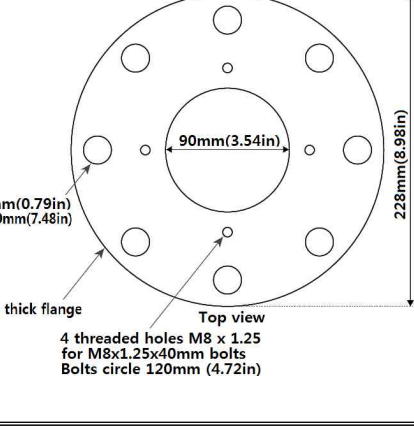
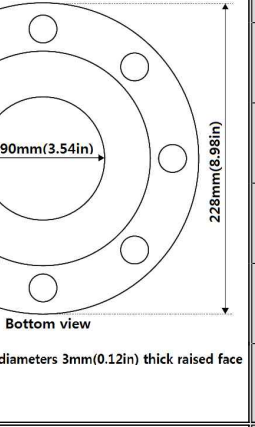
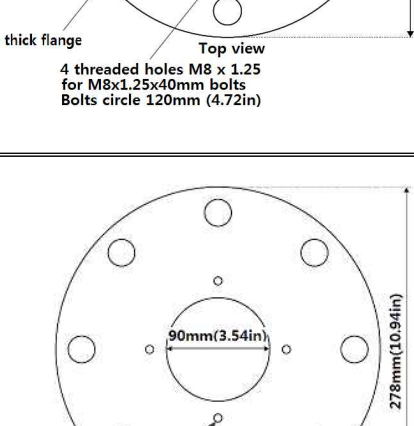
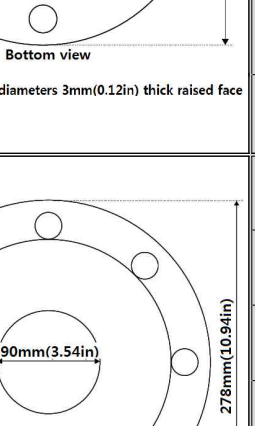
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● Mounting plates

			
Nominal diameter	4 in / DN 100	Nominal diameter	6 in / DN 150
Part number	P804	Part number	P806
Outer diameter	228 mm (8.96 in)	Outer diameter	284 mm (11.18 in)
Mounting bolt pattern	Dual pattern ANSI/DIN ANSI class 150 : 8 bolts, size 5/8 in, bolt circle 7.5 in DIN PN 10 : 8 bolts, size 18 mm, bolt circle 180 mm	Mounting bolt pattern	Dual pattern ANSI/DIN ANSI class 150:8 bolts, size 3/4 in, bolt circle 9.5in DIN PN 10 : 8 bolts, size 22mm, bolt circle 240 mm
Material	304 Stainless steel	Material	304 Stainless steel
Pressure rating	No pressure rating, atmospheric pressure only	Pressure rating	No pressure rating, atmospheric pressure only

● Mounting flange

				Nominal diameter	4 in raised face
				Part number	F804
				Outer diameter	9 in
				Mounting bolt pattern	ANSI class 150 8 bolts, size 5/8 in Bolt circle 7.5 in
				Material	304 Stainless steel
				Pressure rating	No pressure rating, atmospheric pressure only
				Nominal diameter	6 in raised face
				Part number	F806
				Outer diameter	11 in
				Mounting bolt pattern	ANSI class 150 8 bolts, size 5/8 in Bolt circle 7.5 in
				Material	304 Stainless steel
				Pressure rating	No pressure rating, atmospheric pressure only



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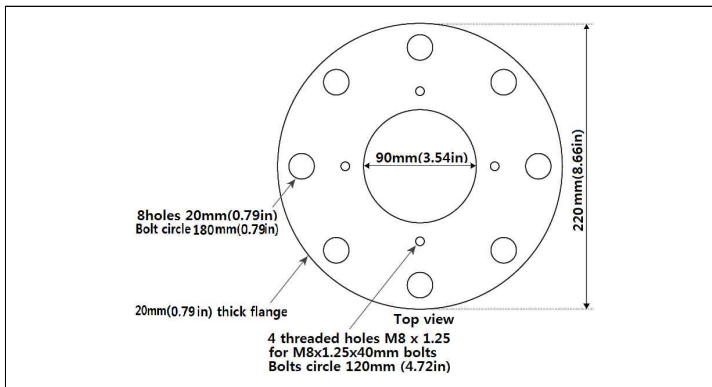
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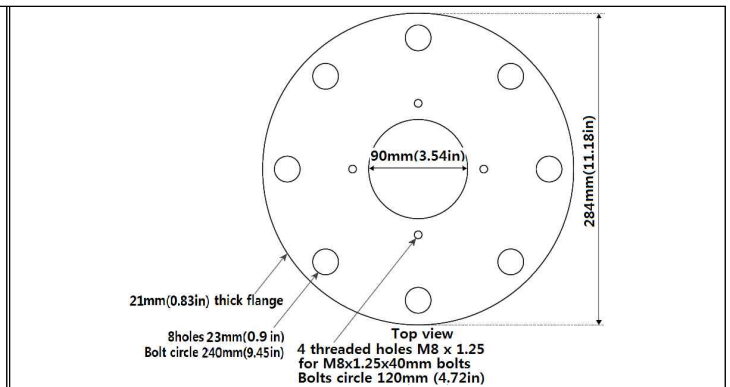
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SHICO. LASER LEVEL TRANSMITTER

MODEL : LM80



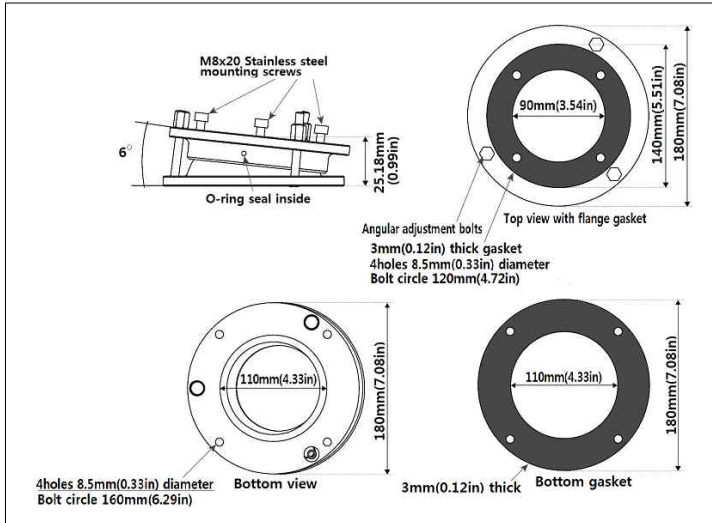
Nominal diameter	DN 100
Part number	F810
Outer diameter	220 mm
Mounting bolt pattern	PN10 ; 8 bolts, size 18mm; Bolt circle 180 mm
Material	304 Stainless steel
Pressure rating	No pressure rating, atmospheric pressure only



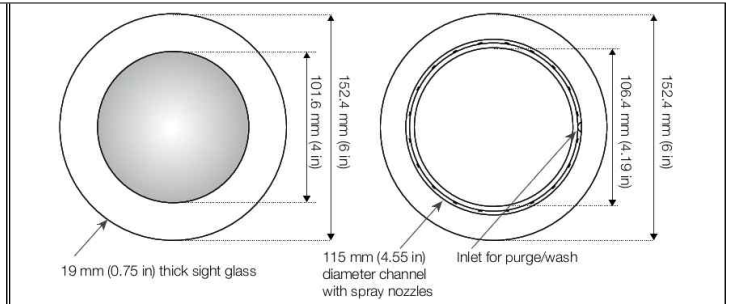
Nominal diameter	DN 150
Part number	F815
Outer diameter	285 mm
Mounting bolt pattern	PN10; 8 bolts, size 22 mm; Bolt circle 240mm
Material	304 Stainless steel
Pressure rating	No pressure rating, atmospheric pressure only

● Adjustable swivel flange (S800)

● High pressure sight glass (HPSG)



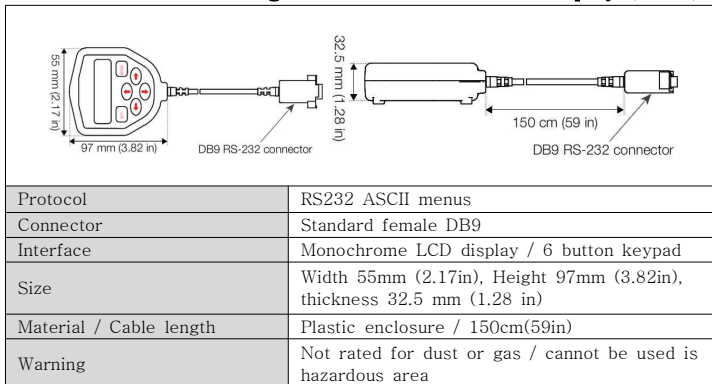
Outer diameter	180 mm (7.08 in)
Mounting bolt pattern	4 bolt holes, 8.5 mm (0.33 in) diameter, bolt circle 160 mm (6.29 in)
Height	25.4 mm (1 in)
Tilt angle for aiming	Continuously adjustable from 0° to 6°
Material	Aluminum



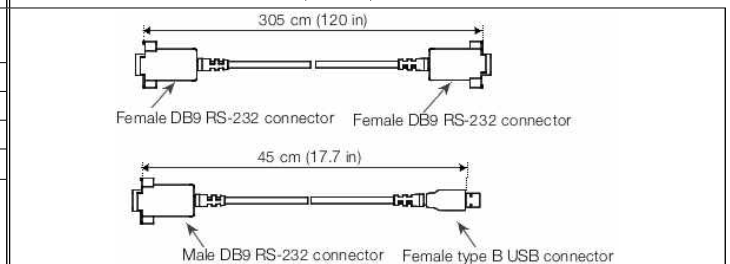
Window diameter	101.6 mm (4 in)
Outer diameter	152.4 mm (6 in)
Spray ring	Open channel, 1/8 NPT fitting for purge or cleaning fluid injection
Thickness	12.7 mm (0.5 in)
Material	316 Stainless steel
Pressure rating	10 bar (150 psi)
Temperature rating	230 °C (450 °F)

● Communication/configuration device and local display (LCD2)

● RS232 to USB cable (USBR)



Protocol	RS232 ASCII menus
Connector	Standard female DB9
Interface	Monochrome LCD display / 6 button keypad
Size	Width 55mm (2.17in), Height 97mm (3.82in), thickness 32.5 mm (1.28 in)
Material / Cable length	Plastic enclosure / 150cm(59in)
Warning	Not rated for dust or gas / cannot be used is hazardous area



Function	Connect to standard PC for configuration
Description	Made up of two cables that work together: Standard DB9 female to female null modem RS232 cable Standard male DB9 to full size type B female USB
Cable length	Null modem DB9 cable 305 cm (120 in) DB9 to USB cable 45 cm (17.7 in)
Recommended software	Windows: PuTTY free open source terminal emulator Mac OS X: Terminal built in terminal emulator
Warning	Not rated for dust or gas / cannot be used is hazardous area



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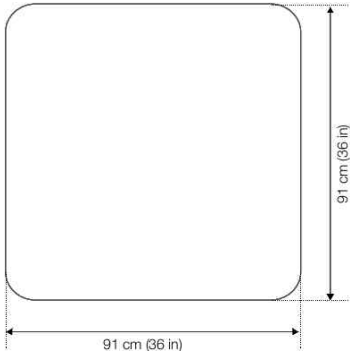
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SHICO. LASER LEVEL TRANSMITTER

MODEL : LM80

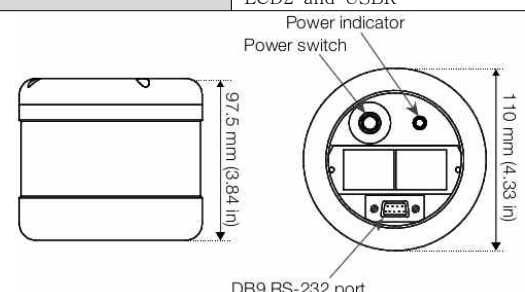
● Reflector (REFL)

Function	Reflective panel for positioning applications up to 150 m
Size	90 cm x 90 cm (36 in x 36 in)
Material	Aluminum with reflective paint



● Battery pack (BPK)

Function	Provide stand-alone power to LM80 for mobility and demonstration purposes
Battery	2 standard 9 volt batteries
Height	97.5 mm (3.84 in)
Diameter	110 mm (4.33 in)
Connector	Standard male DB9 compatible with LCD2 and USBR



● Cable glands (GCK)

Description	Set of 2 Ex cable glands with 1/2 in. NPT thread, size 0/8 mm and size 00/12 mm
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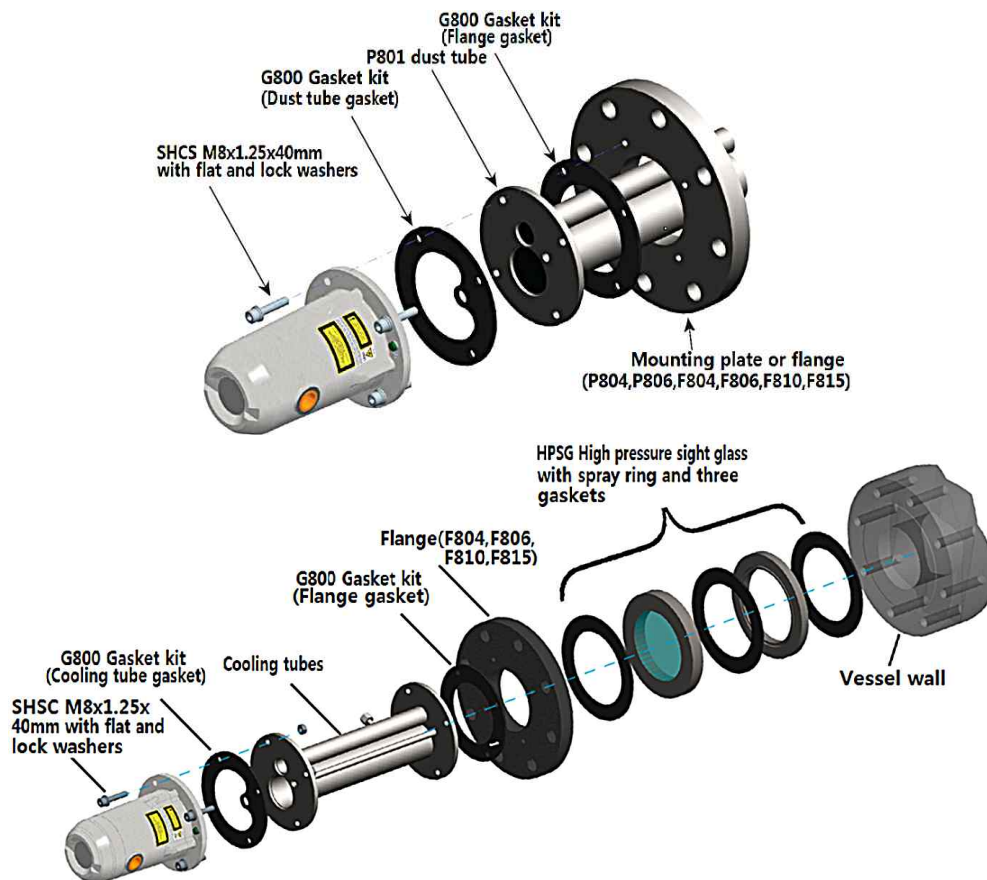
● Demo Kit

Description	Rugged carrying case with LM80, dust tube, LCD2 and battery pack
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● Metric adaptor (GC1)

Description	Exd/e Flameproof imperial to metric adaptor, 1/2 inch NPT to M20
Function	Enables use of metric M20 threaded conduits or cable glands with LM80

■ MOUNTING ACCESSORIES



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SHICO. LASER LEVEL TRANSMITTER

MODEL : LM80

ORDERING INFORMATION

Laser level transmitter	A	B	C	D	E
Unit options					
Powder coated aluminum	A				
Powder coated aluminum with non condensing optics	AC				
Powder coated aluminum with 304 stainless steel dust tube	AP801				
Powder coated aluminum with non condensing optics and stainless steel dust tube	ACP801				
Powder coated aluminum with 304 stainless steel cooling tube	AP802				
Powder coated aluminum with non condensing optics and stainless cooling tube	ACP802				
Powder coated aluminum, non condensing optics and 4 in stainless triclover fitting	ACT804				
Aluminum positioning unit 150 m / 492 ft, dust tube, reflector & adjustable mounting	AP150				
Aluminum positioning unit and accessories with non condensing optics	ACP150				
316 Stainless steel	S				
316 Stainless steel with non condensing optics	SC				
316 Stainless steel with 304 stainless steel dust tube	SP801				
316 Stainless steel with non condensing optics and stainless steel dust tube	SCP801				
316 Stainless steel with 304 stainless steel cooling tube	SP802				
316 Stainless steel with non condensing optics and stainless cooling tube	SCP802				
Stainless positioning unit 150 m / 492 ft, dust tube, reflector & adjustable mounting	SP150				
Stainless positioning unit and accessories with non condensing optics	SCP150				
Approvals					
North America (Canada, USA) cCSAus Class 1 Div 2		CSA			
Factory Mutual FMus Class 1 Div 2		FM			
ATEX non sparking		ATEX			
IECEX non sparking		IECEX			
Metrology certification for Russia		RMET			
GOST-R non sparking and metrology certification for Russia		GR			
Extended warranty					
Extended warranty for 3 extra years - provides a total of 5 years warranty			EW		
Replacement warranty - provides customer with new replacement unit instead of repair			RW		
Accessories					
304 Stainless steel 4 in. / DN 100 mounting plate, bolt pattern as per class 150 and DN 100 / PN 10, no pressure rating				P804	
304 Stainless steel 6 in. / DN 150 mounting plate, bolt pattern as per class 150 and DN 150 / PN 10, no pressure rating				P806	
304 Stainless steel 4 in. raised face flange, bolt pattern as per class 150, no pressure rating				F804	
304 Stainless steel 6 in. raised face flange, bolt pattern as per class 150, no pressure rating				F806	
304 Stainless steel DN 100 flange, bolt pattern as per DN 100 / PN 10, no pressure rating				F810	
304 Stainless steel DN 150 flange, bolt pattern as per DN 150 / PN 10, no pressure rating				F815	
304 Stainless steel adjustable pivot mounting bracket				A800	
Aluminum swivel mount flange				S800	
High pressure sight glass with spray ring cleaning system for high pressure/temperature applications					HPSG
Communication/configuration device and local display					LCD2
RS232 to USB cable for configuring LM80 using laptop or desktop computer					USBR
Set of 2 Ex cable glands with 1/2 in. NPT thread; size 0 / 8 mm and size 00 / 12 mm					GCK
Exd/e Flameproof imperial to metric adapter, 1/2 inch NPT to M20					GC1
Reflector plate 36 in. x 36 in. / 90 cm x 90 cm, for positioning applications					REFL
Battery pack for demo and mobility purposes					BPK
Gasket kit - contains 1 dust tube gasket and 1 flange gasket					G800
Swivel Flange Gasket kit - contains 1 swivel flange gasket					G801
OPTION : -70°C ~ 150°C					



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SHICO. LASER LEVEL TRANSMITTER

MODEL : LM80

□ LEVEL DISPLAY DEVICE

■ Software menu system

Communication with the LM80 takes place via the RS232 port located in the terminal compartment. Connect a computer with a standard USB port using the USB cable and a terminal emulation programme such as PuTTY, or the handheld Communication Device (LCD2) directly to this port. Power up the LM80 and press the "EXIT" or "ENTER" button on the LCD2, or the PC's "Spacebar" to enter the menu system.

The LM80 has advanced settings for more difficult applications. If the surface is unstable then the output can be smoothed by the rolling average "Buffer". If material occasionally falls into the beam then the erroneous result can be removed and the correct level maintained by using the "Keep" setting. If the LM80 is being used in a dusty environment the incorrect readings can be eliminated using the "Dust" settings.

There are controls for the visible pointer, for the maximum range, for offsets, test facilities for the 4-20 mA and relay outputs, a choice of Metric or Imperial measuring units and settings for fail-safe conditions based on the NAMUR standards.



■ Introduction of menu & option

Menu item	Values / Options	LCD2	Description
Running mode	Distance measured and 4-20 mA current output displayed.		
4-20 mA Settings	A group of settings and options related to the 4-20 mA analog output.		
4 mA setpoint	0.00 m (ft) to max range	Yes	Sets the distance at which the analog output reads 4 mA
20 mA setpoint	0.00 m (ft) to max range	Yes	Sets the distance at which the analog output reads 20 mA
Fail-safe output	3.6 mA, 21.00 mA, last mA reading	Yes	Select the fail-safe 4-20 mA analog value to be output if there is no signal
Safety time (Fail-safe delay)	0 sec to 450 sec	Yes	Enter the time that the signal is lost before the fail-safe condition is output
4-20 mA test	4.00 mA, 12.00 mA, 20.00 mA	Yes	Select a value to output on the analog channel for test purposes
4-20 mA trim	4 mA reading / 20 mA reading	No	This function recalibrates the laser transmitter current output loop based on the readings entered at 4 mA and 20 mA
Relay settings	A group of settings and actions related to the relay outputs		
Relay A open	0.00 m (ft) to max range	Yes	Sets the distance at which the relay opens
Relay A closed	0.00 m (ft) to max range	Yes	Sets the distance at which the relay closes
Relay A test	open, closed	Yes	Toggles between relay open and relay closed
Relay B open	0.00 m (ft) to max range	Yes	Sets the distance at which the relay opens
Relay B closed	0.00 m (ft) to max range	Yes	Sets the distance at which the relay closes
Relay B test	open, closed	Yes	Toggles between relay open and relay closed
Application settings	A group of settings for filtering, smoothing and adjusting to application conditions		
Program	Standard, Light dust, Heavy dust, Position, Custom	Yes	Select predefined settings for selected application Use custom program for user defined application settings
Laser pointer	On / Off	No	Switch from service only mode (off - pointer comes on for 2 minutes at power up) to always on mode. All new LM80s are shipped set to off.
Range Blank	0.00 m (ft) to max range	No	If signal is lost this range is output instead of the fail safe setting
Resolution	High / Low	No	High resolution is the normal setting, low resolution can be used for faster response at the expense of device resolution
Measuring units	meters, feet	Yes	Select measuring units; either meters or feet
Datum trim	-1.00 m (-3.28 ft) to 1.00 m (+3.28 ft)	Yes	Adjusts the zero datum point of the instrument. Factory default is from the front face of the flange (0.00 m).
Setpoint limit	0.00 m (ft) to ~150 m (~500 ft)	No	Adjusts the maximum range of the device. The firmware allows up to 2980 m but the hardware is only capable of about 150 m (500 ft).
Smoothing	Settings to adjust the filtering and smoothing of the output for the custom program		
Pause	0 sec to 255 sec	No	Sets the time between reading updates
Buffer	1 to 25	No	Sets the size of the rolling average buffer
Keep	1 to buffer	No	Sets the number of readings to keep in the averaging buffer, readings are removed starting with the shortest readings
Fill rate	0, 0.001 to 20000.000 units per minute	No	Sets the fastest filling speed expected, if zero the setting is not used. Otherwise, any sudden rise in level is smoothed by this setting.
Empty rate	0, 0.001 to 20000.000 units per minute	No	Sets the fastest emptying speed expected, if zero the setting is not used. Otherwise, any sudden drop in level is smoothed by this setting.
Environment	Normal Dust	No	"Normal" for most applications, uses fixed gain "Dust" uses variable gain to compensate for dusty conditions, is used in conjunction with fill rate



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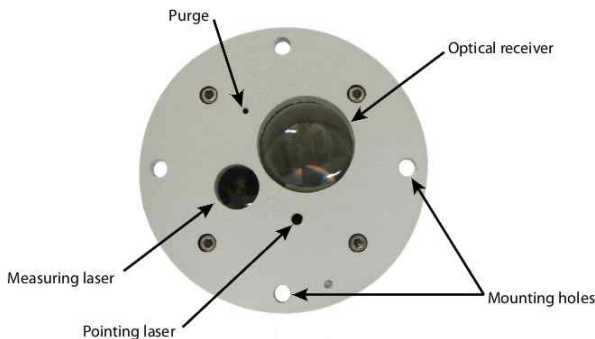
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□ Bottom Side Configure



■ Red laser pointer

The LM80 ships with a visible red laser pointer (Class 3R) to enable easy and accurate alignment. Through the menu system, the pointer can be set to "On" or "Off". When set to "Off" the pointer will only shine for 2 minutes at power on and when the unit is in the menu system. When set to "On", the pointer will shine continuously when the unit is in the menu system. After exiting the menu system, the aiming pointer will flash to indicate that the unit is taking measurements in operational mode. The LM80 always ships from the factory with the pointer set to "Off".

■ Mounting

The LM80 produces a narrow, straight measuring laser beam.

The unit should be mounted facing towards the area to be measured with no obstacles directly in the beam path. Avoid mounting the instrument close to a stream of material that may fall in front of it. The LM80 has four 8.5mm (0.33 in) diameter mounting holes on a 120 mm (4.72 in) bolt circle. The instrument can be bolted directly onto a flange or bracket. The LM80 may receive stronger signals in subdued lighting and dark conditions than it does in direct sunlight.

Check the operation over the full range of conditions to be measured after installing.

■ Grounding

It is recommended to use a AWG 16 or 1.5 mm² wire for earth connection. For best results use a size 10 earth lug with a copper body terminal per ASTM B-152, and tin plating per MIL-T-10727, and a manufacturer AMP part No. 34112 or No. 34109. The earth wire terminated with the recommended earth lug must be connected to the designated terminal for this purpose. The internal and the external earth screws are made of stainless steel.

■ Cables, wiring and routing

Always use shielded cables for power supply and signal. It is recommended to use a AWG16 or 1.5 mm² multi-core cable.

The number of cores will depend upon the outputs required from the LM80. For a 4-20mA output, use a twisted pair shielded cable. Do not install the LM80 or route the signal cables in close proximity to high voltage electrical cables.

□ Dust management



In applications where dust may be present (even in very small quantities) it is recommended that the P801 dust tube accessory be used. The dust tube is a simple and effective device, designed to prevent dust settling on the lenses by creating a static airspace. When abundant dust is present the dust tube can additionally be purged with dry oil free air to further reduce any dust settling on the lens. There are a number of advanced settings to improve performance when dust is present. The "Dust" setting in the "Environment" menu increases the dust penetration capabilities of the laser. In applications where the vessel may be loaded in batches and intermittent clouds of dust appear, a "Fill rate" may be entered to slow down the rate of response of the instrument.

■ STANDARD PRECAUTIONS

The LM80 is designed to withstand many industrial environmental conditions. However, a few precautions will ensure reliable operation of the unit for extended periods of time:

- Do not drop the instrument.
- Do not open the terminal compartment lid when an explosive dust or gas atmosphere may be present.
- Do not connect to the RS232 port when an explosive dust or gas atmosphere may be present.
- Do not expose the internal electronics to water or dirt.
- Do not install or connect with the power on.
- Use appropriate insulated lugs or ferrules for connections to the terminal block and grounding screws
- The flat stainless steel washer must be incorporated between the enclosure body and the lug to prevent corrosion from occurring.
- External transient protection of up to 40%(44V) of the maximum supply voltage(32Vx1.4≤44V) should be incorporated in the power supply line to the equipment when used in hazardous areas.
- Always keep the terminal compartment lid seal clean and lightly lubricated with Vaseline® Petroleum Jelly.
- Ensure that the terminal compartment lid is tight after connections have been made.
- If using cable glands, only use glands that have been suitably certified by a notified body for cable entry into the enclosure. If in doubt use cable glands supplied by SHICO.
- Ensure that the cable glands are tight after connecting the external cable.
- Do not install conduit so that it can drain into the LM80 terminal compartment
- Remove dirt from the lenses with a clean, damp cloth only.
- Do not point the instrument at the sun.
- Avoid aiming the LM80 directly into the fill path of the vessel.
- For liquids always mount the laser to aim perpendicular to the liquid surface.



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