

SWICHGAGE Mitter® SGM45F Series

Installation Instructions



Please read the following instructions before installing. A visual inspection is recommended before mounting. General Information and these installation instructions are intended for all 4-1/2 in. (114 mm) dial pressure models.

GENERAL INFORMATION

WARNING

BEFORE BEGINNING INSTALLATION OF THIS MURPHY PRODUCT

- ✓ Disconnect all electrical power to the machine.
- ✓ Make sure the machine cannot operate during installation.
- ✓ Follow all safety warnings of the machine manufacturer.
- ✓ Read and follow all installation instructions.



Description

The SGM45F Pressure SWICHGAGEMitter® is a combination 4-20 mA pressure transmitter and a pressure indicating gage with adjustable low and high limit contacts or snap acting switches. Limit switches can be wired directly to electric pilot circuits to operate alarms, shut down or start/stop engines and electric motors.

The SGM45F features a 4-1/2 in. (114 mm) dial for easy viewing. Adjustable limit switches are accessible from the front and limit contacts have self-cleaning motion to enhance electrical continuity. Gage-only models, without switches (GAGEMitter®) are available.

Swichgage® Specs.

Case: Die cast aluminum; weatherproof.

Contacts: See *Electrical* section on page 2.

Dial: 4-1/2 in. (114 mm) white on black, dual scaled psi /kPa.

Gage Accuracy: ±2% for the first and last quarters of the scale, the middle half is ±1%.

Geared Movement: 302 & 304 stainless steel.

Lens: Optically clear polycarbonate.

Pointer: High visibility, has pointer calibration hub.

Temperature Effect: 1.5 % per 100°F.

Over Pressure/Proof Pressure: No more than 10% without calibration shift.

Sensing Element: 316 stainless steel bourdon tube.

Process Connection: 1/4 NPT Drawn C-Tube Thru 1,000 psi (6.89 MPa) [68.95 bar]

1/2 NPT Drawn Helical 1,500/2,000 psi (10.3/13.8 MPa) [103.4/137.9 Bar].

4–20 mA Output Specifications

Accuracy (Full Scale, Best Straight Line): ±0.5% including non-linearity, hysteresis and repeatability.

Temperature:

Operating: -40 to 180°F (-40 to 82°C).

Compensated: +14 to 120°F (-10 to 50°C).

Total Thermal Effects Over Compensated Range: ±2% FS TEB

Environmental Effect:

Humidity: No effect.

Shock/Vibration: Negligible effect unless severe.

Physical: Wetted Parts: 316L stainless steel, Hastelloy C276.

Electrical Cable: Shielded cord set with female plug to mate with sealed male connector (on the back of the unit), 78.74 in. (2 m)

Power Requirements: Typically 24 VDC required. Using the Loop Resistance Graph, 10-30 VDC. **Output:** 4–20 mA, 2-wire.

Insulation: Greater than 100 Mohms @ 500 VDC. Contact lead termination is by pigtail wires.

Shipping Weights: 3 lbs 7 oz (1.6 kg).

Shipping Dimensions: 9-1/4 x 8-1/4 x 5-1/2 in. (235 x 210 x 140 mm).

Over Pressure / Proof Pressure

400% for up to 400 psi range (2.76 MPa) [27.6 Bar]

200% on 1000 psi range (6.89 MPa) [68.9 Bar]

125% on 2000 psi range (13.8 MPa) [138 Bar]

Burst Pressure

600% for up to 400 psi range (2.76 MPa) [27.6 Bar]

300% on 1000 psi range (6.89 MPa) [68.9 Bar]

150% on 2000 psi range (13.8 MPa) [138 Bar]

Options

Tamperproof Contact Accessory: Helps prevent tampering with contact knobs.

Environmentally Sealed Option: The "ES" option helps minimize damage caused by the elements.

Warranty

A limited warranty on materials and workmanship is given with this FW Murphy product. A copy of the warranty may be viewed or printed by going to www.fwmurphy.com/support/warranty.htm



WARNING: READ BEFORE INSTALLATION

Fluid hammer and surges can destroy any pressure indicator and must always be avoided. A pressure snubber should be installed to eliminate the damaging hammer effects.

Fluid hammer occurs when a liquid flow is suddenly stopped, as with quick closing solenoid valves. Surges occur when flow is suddenly begun, as when a pump is turned on at full power or a valve is quickly opened.

Liquid surges are particularly damaging to pressure indicator if the pipe is originally empty. To avoid damaging surges, fluid line should remain full (if possible), pumps should be brought up to power slowly and valves operated slowly. To avoid damage from both fluid hammer and surges, a surge chamber should be installed, and a pressure snubber, such as Murphy PD-8100 Series (adjustable) or PM6203 Series (fixed) call Murphy for details, should be installed on every transmitter/transducer.

Symptoms of fluid hammer and surges damaging effects:

- a. Pressure indicator exhibits an output at zero pressure (large zero offset).
- b. Pressure indicator output remains constant regardless of pressure.
- c. In severe cases, there will be no output.

Noise

For minimum noise susceptibility avoid running the SGM45F cable in a conduit that contains high current AC power cables or ignition loom on engine. Where possible avoid running the cable near inductive equipment.

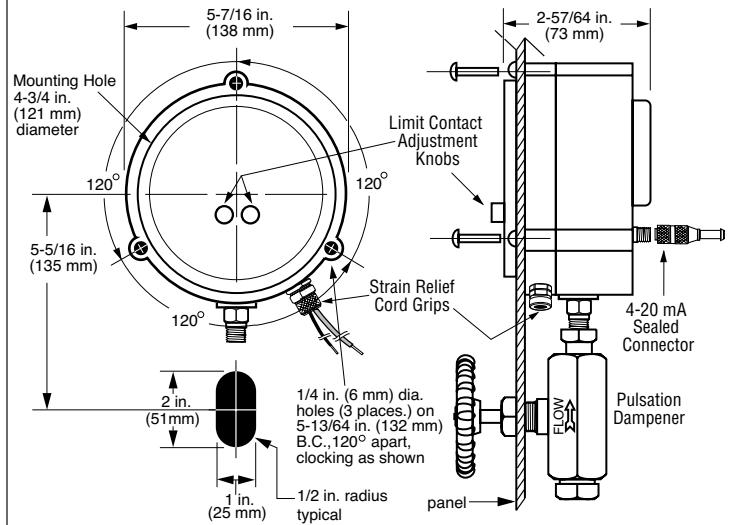


WARNING: PERFORM THE WIRING OPERATION WITH THE POWER SOURCE "OFF". MAKE SURE THE VOLTAGE AND CURRENT REQUIREMENTS ARE WITHIN THE SWICHGAGE® RATINGS. BEFORE WIRING DETERMINE VOLTAGE AND POLARITY FOR THE APPLICATION. USE THE APPROPRIATE WIRE SIZE. ALL CONNECTIONS SHOULD BE MADE USING A SPADE (FORKED) OR RING TERMINALS. FOR PIGTAIL CONNECTIONS USE WIRE NUTS. CONDUIT IS RECOMMENDED TO PROTECT WIRES FROM DAMAGE.

Case Mounting

Flush Mount (SGM45F Model shown)

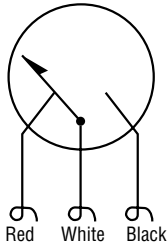
A round case design to be mounted within a panel from 1/32 in. (1 mm) to 1/8 in. (3 mm) thick. It can also be direct mounted. Shown with pulsation dampener option.



When used in pulsating service such as positive displacement pumps or compressor discharge monitoring, a pulsation dampener must be used or product may not be covered by warranty.

Typical Wiring Diagrams

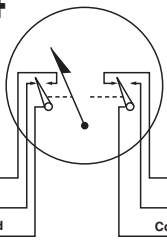
SGM45F



SPST Contacts: 1 SPST; Center off; 2A, 30 V DC, 1A, 125 VAC pilot duty.

NOTE: When using in Hazardous Environment defined by CSA as Class 1, Group C & D, Div. 2, energy level across switch contacts must not exceed non-incendive levels as defined by CSA.

SGM45EF



Contact Rating: 2-SPDT snap-switches (one for high and low pressure); 2 A @ 250 VAC

NOTE: Diagrams show the pointer in the at rest (shelf) position.

4-20mA Output



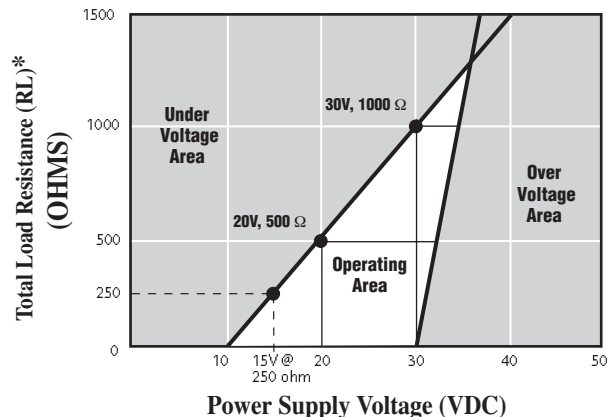
CAUTION: HOOKUP CABLE IS NON-SERVICEABLE.

Wire leads color coding:
Red wire (+ DC) = Power Supply.
Black wire (-DC) = 4-20mA output.
Shield wire = Not connected.

Loop Resistance Chart

Loop Resistance Graph

Supply voltage for the SGM45 must be within range of 10-30 VDC. The Graph below shows the minimum supply voltage (VDC) required for a given load resistance (RL).



*NOTE: Cable resistance effect included in RL.

4-20mA output: Red wire (+DC); Black wire (-DC) 4-20mA output.

LIMIT CONTACT / INDICATION POINTER ADJUSTMENTS

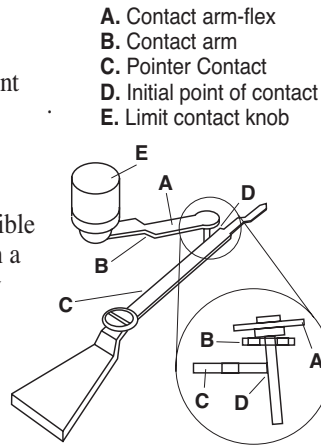
Limit Contact Adjustments

Facing the dial, left side knob is "Low limit" contact. "High limit" contact is located next to the "Low" limit contact.

To set limit contact simply turn the fingertip type knob to the desired point on the scale.

Limit Contact Wiping Feature

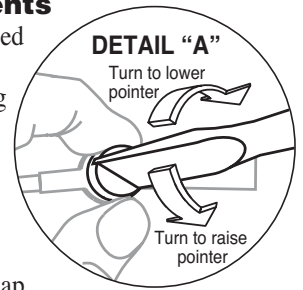
The force of pointer causes the flexible contact arm (A) to "tilt" resulting in a wiping action (D). This clears away film or corrosion formed on the contact surfaces.



Indication Pointer Adjustments

To reset to zero or to a known value proceed as follows:

1. Turn off power. Remove the snap ring and the lens/contact assembly (or open hinged cover).
2. Hold the pointer hub with thumb and forefinger then turn screw to desired point. See **DETAIL "A"**.
3. Replace lens contact assembly and snap ring (or close hinged cover), and turn on power.



NOTE: Span adjustments and recalibration must be performed by authorized mechanic or return the unit to FWMurphy.

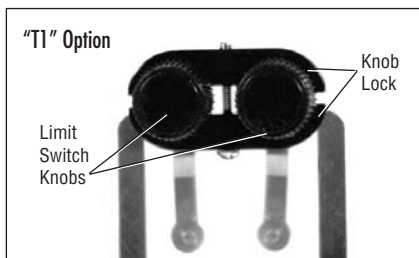
OPERATION TEST INSTRUCTIONS

SGM45F

1. Perform operation test after the unit is installed and wired appropriately. (See below.)
2. When pressure is applied to the instrument either directly from a process variable or through a fluid/gas filled capillary, the pointer will travel in a clockwise direction. (Adjust contacts to desired set points.)
3. To test the limit contacts, turn the limit contact to be tested until it touches the pointer. That will trip the control circuit.
4. Reset the shutdown or alarm circuit device and repeat above sequence.

Options and Accessories

Tamperproof Contact Option



Tamperproof Contact Option: The "T1" option is available to help prevent tampering with contact knobs.

Pulsation Dampener

- Eliminate pointer contact flutter on pressure SWITCHGAGEMitter® instruments which are subject to pulsating pressure from reciprocating pumps or compressors.
- Allow close high-low contact settings for more accurate pressure indication and equipment control.
- Decrease wear on internal geared movement and increase the life of your instrument by eliminating excessive strain and unnecessary pointer movement.
- Available in brass, carbon steel and stainless steel.
- **Must be ordered separately.** See bulletin PD-95145B.





Precautions: Do NOT exceed rated pressure range. Dope or use teflon tape on connection threads. Do not block the inlet orifice. For direct mount into the process, a vertical or ninety degree mounting is recommended.

Use wrench on shank to tighten or loosen connection. Do not twist case when installing, this will damage internal components and will void the warranty. **Do not over tighten.**

Use shock mounts as necessary to prevent excessive vibration.

If liquid in the system freezes, it will expand and will damage the tube.

Specify the model = **SGM45F-1000-ES**

Base Model

SGM45F= Round Case; SPST Contacts, Center off.

***SGM45EF**= Round Case; SPDT Snap Switches

***SGM45FG**= Round Case; w/4-20 mA only; w/o contacts.

*Non-stock—call for delivery.

Range gage (psig)	Transmitter range
30V30	30V30
30V100	30V100
30	30
60	100
100	100
200	400
400	400
600	1000
1000	1000
1500	2000
2000	2000

Options

ES= Environmentally Sealed

Blank= No Options

Note:

Transmitter and Gage ranges may be different. Verify actual range on product nameplate.

Indicating Dials

All dials are dual scaled psi and kPa/MPa. Single scale dials and custom dials available. Additional charges may apply.



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