

Installation and Operating Instructions - Model 105/106

1. Safety



Before installing verify compatibility to the process media and temperature in contact with the wetted parts. Incompatible media and / or operation at temperature extremes can cause premature degradation of materials which could result in safety risk to personnel.

Verify the selected pressure range (differential pressure and working pressure) and the switch ratings are within specification for your application.

Warning! *Remaining media may result in a risk to personnel, environment etc. Use sufficient precautionary measures when removing and transporting the product.*

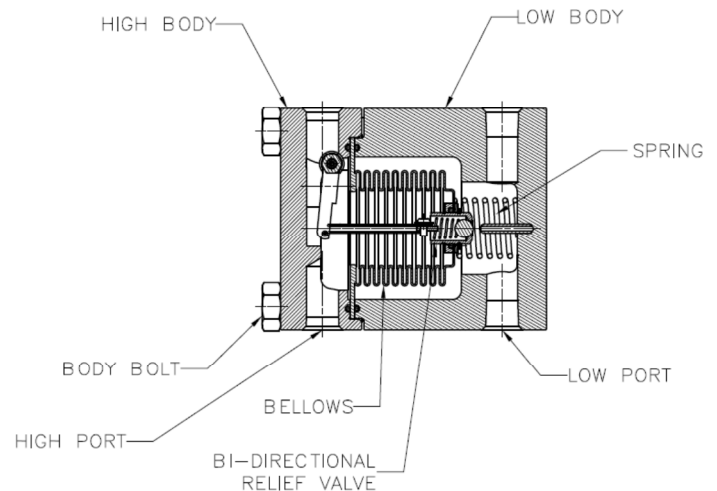
1.1 Intended use: The indicating / non-indicating differential pressure switches are used for monitoring differential pressures in industrial applications. The manufacturer shall not be liable for any claims if the product is used in applications contrary to the intended use.

1.2 Personnel: Personnel installing and putting this instrumentation into service shall be suitably trained and qualified in accordance with local codes, practices and regulations.

PRODUCT DESCRIPTION

The Model 105/106 is a precision differential pressure instrument capable of working at low differential pressure in high pressure systems. The compact design results in a simple device that is reduced to essential and necessary elements with a high output motion and rugged construction.

The major components of the Model 105/106 are a two-piece body, a multiple diaphragm/bellows sensing element and over-pressure assembly, a torque tube assembly, a range spring and a gauge front assembly.



The body halves provide the pressure containment function. They also clamp the sensing element and over-pressure assembly between the body halves, isolating the high side and low side pressures of the system. The high side body half also provides a mount for the torque tube assembly.

The sensing element is exposed to and deflects in response to the differential pressure. This assembly incorporates a bi-directional relief valve which provides over-pressure protection in both directions. The opening of the valve in either direction equalizes the pressure and protects the unit.

A range spring is provided to adjust the spring rate of the system to suit the various differential pressure ranges of the instrument.

The torque tube assembly consists of a rigid shaft and torque tube. The torque tube is welded to a bushing which is fixed to the high side pressure body half. The other end of the tube is welded to the shaft. The shaft is connected to the sensing element by a linkage. As the sensing element deflects, it causes the torque tube to twist. The torque tube provides a frictionless leak-free transmission of an output which is proportional to the differential pressure.

The torque tube shaft extends into the gauge front assembly and is connected to a low-friction, **jeweled** movement which provides output to the pointer.

When equipped with switches, a contact is made or broken by the magnetic field of the internal magnet. See Bulletin ELECIM105/106 Series/latest for gauges with switches.

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INSPECTION

Before installation check the product label on each instrument against the receiving paperwork and the intended application for correct part number, materials of construction, working pressure, dial range, etc. If equipped with switches, check electrical rating, type of enclosure, etc. Inspect for shipping damage and, if damaged, report it immediately.

NOTE - Before attempting repairs contact your local Mid-West Representative or our factory. Failure to do so will void any warranty.

INSTALLATION

Model 105/106 is calibrated and tested prior to shipment and is ready for immediate installation. Use of the following installation procedures should eliminate potential damage and provide optimum trouble-free operation.

1. CONNECTIONS

Dual ¼" FNPT connections, top and bottom, are provided as standard however check the paperwork for the connections ordered. They are identified as "HIGH" and "LOW" for high and low pressure. Be sure to plumb to proper connections on your system. The other two ports should either be plugged or plumbed as drains or bleeds, depending on whether the service is liquid or gas.

NOTE: It is strongly recommended that a 3-valve manifold be used in plumbing your model 105/106 to your system. Properly used it should insure that your instrument is not over-ranged or damaged by pressure shocks during pressurization. It will facilitate later zeroing, ranging and calibration checking. It is good practice to purge or flush the instrument loop prior to connecting the instrument.

2. INSTRUMENT LOCATION

On liquid service, the instrument should be mounted **below** the process connections to facilitate self bleeding. On gas service, it should be located **above** the process fluid. If the process contains particulates, a "pigtail" loop or drop leg (manometer "U-tube" configuration) in the tubing will minimize the possibility of it migrating into the instrument.

NOTE – On liquid applications, unequal liquid heads on high or low side will result in an inaccurate differential pressure indication.

3. PANEL MOUNTING

The Model 105/106 is designed for mounting through the **front** of the instrument panel and is normally provided with a panel mounting kit. The kit consists of (4) panel mounting studs and nuts.

Refer to the table in Figure 1 on the last page for panel mount diagrams, dimensions, and options.

4. PIPE MOUNTING

An optional pipe mounting kit is available for mounting the gauge to a 2" vertical or horizontal pipe. Refer to drawing below pipe mount diagrams and dimensions

INSTRUMENT INSTALLATION RECOMMENDATIONS

Rapid pressurization can cause severe damage to the sensing element in pressure instruments. Rapid pressure change (either increase or decrease) can be described as a change in pressure occurring fast enough to drive an instrument full scale in less than one second.

Most better quality instruments have over-range protection built-in but they are mechanical in design and cannot be relied upon to react in time to protect the instrument against a rapid change in pressure.

The simplest method to avoid this problem is by installation and proper use of a 3-valve manifold. Open the equalizer valve prior to opening one or both of the block valves to insure pressure is applied simultaneously to both sides of the sensing element.

If a 3-valve manifold is not used, protection can be provided by installation of Mid-West Model 150 snubbers to both sides of the instrument. This unit provides an infinitely adjustable choke valve and an excess flow ball check. The ball check is designed not to shut off completely but will restrict flow during sudden changes in pressure while bleeding pressure to the instrument, preventing sudden surges from being transmitted to the instrument.

Refer any questions regarding these recommended procedures to the local Mid-West representative in your area or our factory in Sterling Heights, Michigan, U.S.A.

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TROUBLE SHOOTING

1. Gauge does not indicate differential

- Check for proper hook up, high to "HIGH" and low to "LOW"
- Make certain block valves are open and, if using a 3-valve manifold, that the equalizer (balance) valve is closed.
- If A & B check out correctly, loosen or disconnect the high pressure line to determine if there is pressure to the instrument.
- If there is pressure to the instrument, check to determine that there is differential across the unit being monitored. If so, contact the factory for assistance and/or an "RGA" (return goods authorization) number to return the instrument for repair or replacement.

2. Indicating pointer off zero. (With block valves closed, equalizer valve open, or no system differential.)

- Tap gauge **lightly**.
- Make certain block valves are closed and equalizer valve is open.
- If A & B do not correct the "off zero" condition, remove the bezel and lens assembly by removing the (4) bezel screws. Loosen **slightly** the "phillips head" screw, located in a slot in the dial in the lower left dial area at about "7:30". Rotate the dial until "zero" is under the pointer, by use of any pointed object inserted in one of the small notches at the top and bottom of the dial. Retighten the "phillips head" screw and reinstall the bezel and lens assembly.

RECALIBRATION AND/OR REPAIR

- If recalibration or repair is required, secure and "RGA" (return goods authorization) number from Mid-West Instrument and return the instrument to the factory.
- If (1) is not practical we recommend you discuss your problem with one of our customer service representatives and request a "technical service" manual. Please have both the model and serial numbers available before calling.

MODEL NO.	DIAL SIZE	DIAMETER C	LENGTH H	LENGTH J	LENGTH K	LENGTH L
		Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)	Inch (mm)
105	4-1/2 in.	6.21 (157.7)	3.98 (101.1)	3.75 (95.3)	3.75 (95.3)	5.73 (145.5)
	6 in.	8.18 (208.0)	3.98 (101.1)	3.75 (95.3)	3.75 (95.3)	5.79 (147.1)
106	4-1/2 in.	6.21 (157.7)	3.77 (95.7)	3.25 (82.5)	3.00 (76.2)	5.25 (133.4)
	6 in.	8.18 (208.0)	3.77 (95.7)	3.25 (82.5)	3.00 (76.2)	5.31 (134.9)

