

Installation & Maintenance Instructions

MID-WEST INSTRUMENT

Model 130



Supplied by

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Installation and Operating Instructions - Model 130

1. Safety



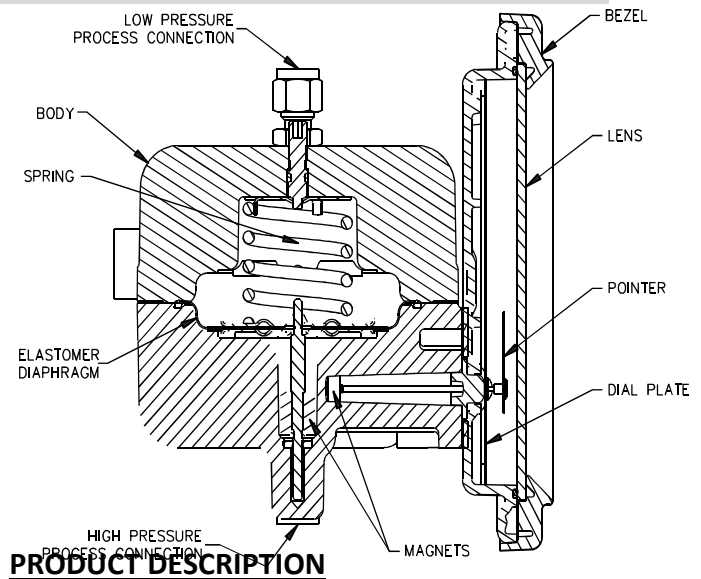
Before installing verify compatibility to the process media and temperature in contact with the wetted parts. Incompatible media and / or operation at temperature extremes can cause premature degradation of materials which could result in safety risk to personnel.

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 130 is a differential pressure instrument available as a switch, gauge, or both. A flexible elastomer diaphragm and calibrated range spring are moved by differential pressure. A magnet, coupled with the diaphragm, transmits motion through the wall of the pressure housing to a follower magnet attached to an indicating pointer. The rotation of the follower magnet causes the pointer to track movement of internal driver magnet and indicate differential on the dial scale.

When equipped with switches for Aluminum, Brass or 316SS bodies only, a contact is made or broken by the magnetic field of the internal magnet. See Bulletin ELECIM130/latest for gauges with switches.

The diaphragm is totally supported upon reaching full travel in either direction, providing full over-range protection to rated working pressure.

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, report it immediately.

Installation and Operating Instructions - Model 130 Series

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

INSTALLATION

Model 130 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

Model 130 P is provided with ¼" compression tube fittings, one low and one high, on the top and bottom of gauge body.

Model 130 A, B, S, is provided with **dual** ¼" FNPT connections top and bottom as standard. One pair of high and low pressure ports is for process connections.

Ports are identified for high and low pressure. Be sure to plumb to proper connections and system. Improper connection will not damage instrument but it will not function properly.

Flexible tubing is recommended to minimize effect of any vibration that may exist.

When attaching connections to the 130 P, care must be taken to prevent over-tightening which may result in stripping threads and/or cracking ports. In order to prevent this, use a suitable wrench to hold the factory supplied fitting in place while tightening, sometimes called "double wrenching".

2. INSTRUMENT LOCATION

It is recommended that installation is no closer than one inch of a steel surface otherwise accuracy will be affected. 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.

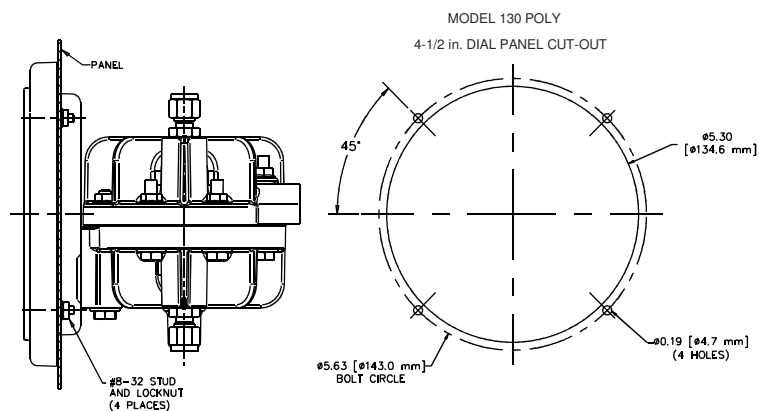
NOTE – On liquid applications, unequal liquid heads on high or low side will result in an inaccurate differential pressure indication.

3. PANEL MOUNTING

The Model 130 is designed for mounting through the **front** of the instrument panel and is provided with a panel mount kit, consisting of four panel mounting studs/nuts.

Make cutouts as indicated in figure shown. Insert panel mounting studs, finger tight, into metal inserts located in the rear of the bezel.

Insert gauge through the panel, aligning panel mounting studs with holes in the panel. Install #8-32 nuts onto studs and tighten securely.



4. PIPE MOUNTING

If specified, your Model 130 will have a pipe mount kit installed. This provides for mounting on a 2" vertical or horizontal pipe.

TROUBLE SHOOTING

1. Gauge does not indicate differential

- Check for proper hook up, high to "HI" and low to "LO"
- 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.

Installation & Maintenance Instructions

MID-WEST INSTRUMENT

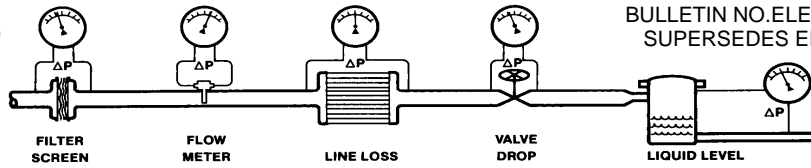
Model 130 Electrical



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Model 130 Electrical: Installation and Operating Instructions

ELECTRICAL

Gauges with switches have one or two hermetically sealed adjustable set point reed switch assemblies. Load ratings and capabilities for each switch type are defined as follows:

REED SWITCH RATINGS (Resistive Load)

Type	SPDT
Option:	A
*Power	3W
Max. Current	0.25 Amps
Max. Voltage VAC/VDC	125
**Setting (%F.S.)	10 to 90
Hysteresis (Max/Nom)	10% / 5% (F.S.)
Repeatability	1% F.S.
Leads 22 Awg.	(3), 26"

* Product of the switching voltage and current shall not exceed the power rating of the device.

The following warnings apply to all gauge options with electrical interface:

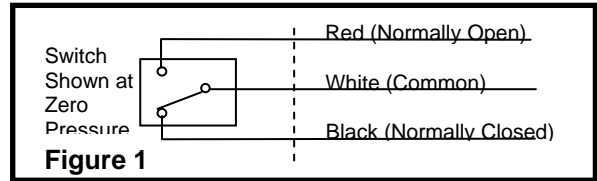


WARNING: ELECTRICAL CONNECTIONS SHOULD BE PERFORMED BY QUALIFIED PERSONNEL AND MEET THE REPRESENTATIVE COUNTRY'S NATIONAL ELECTRICAL CODE.

WARNING: FAILURE TO CONNECT TO THE PROTECTIVE CONDUCTOR TERMINAL MAY RESULT IN A SHOCK HAZARD.

WARNING: REMOVAL OR REPLACEMENT OF INSTRUMENT HARDWARE VOIDS ALL WARRANTIES AND CONFORMANCE TO ANY STANDARDS (EXCEPT COVERS AND/OR SWITCH ADJUST PLUG(S))

The SPDT switch ('A' Electrical Option) lead colors and associated functionality at '0' PSID is shown in Figure 1. The SPDT switch is adjustable within the range of 10% to 90% F.S. To increase the set point rotate switch adjustment screw counter clockwise (CCW). **Do not use excessive force when rotating the adjustment screw or the adjustment mechanism may be damaged.**



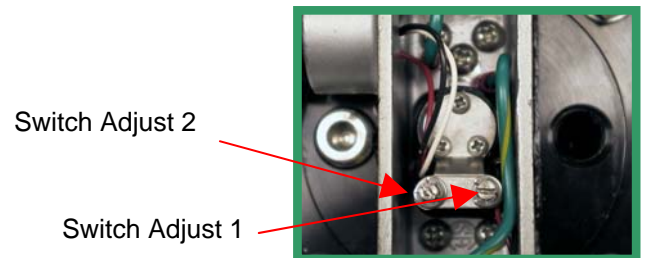
Provide standard protection techniques for the switch contacts for capacitive and inductive loads. Use current limiting techniques near the switch to protect the contacts due to high inrush (i.e.; in line resistor or inductor) for long cable interfaces. Provide clamping devices at or near inductive loads (i.e.; relay). **Maximum wire length between the 3W switch and its load, should not exceed 70 – 100 Feet. for 120 VAC applications.** Contact the factory for assistance regarding this condition.

Use the Mid-West Power Relay 1000TR or equivalent relay for loads above the switch rating.

CONDULET ENCLOSURE (Standard) (Options H & I)

The standard switch enclosure is a conduit with 1/2" FNPT interface. On orders that do not require wall or pipe mounting the flying leads exit the rear of the gauge. For the remaining orders the wires exit the side of the gauge. You may re-route the wires out the back of the gauge by removing the switch access cover and relocating the conduit pipe plug to the side conduit port. See Fig. 2.

To access the switch adjustment screws, remove the cover from the conduit. Make adjustments as necessary using a screwdriver.



A provision to connect a protective conductor terminal is also provided. The Green / Yellow wire is provided for shock safety.

The 26 Awg., 300 Volt rated, flying leads are color coded and labeled as follows:

- White- 1 or 2 Com
- Black- 1 or 2 NC
- Red - 1 or 2 NO

Deviations from the above configurations may exist. Therefore check the description block of your order to verify your configuration.


DIN Plug-in Connector (Condulet Housing)
(Options J & K)




WARNING: POSSIBLE ACCESSIBLE LIVE PARTS. REMOVE POWER PRIOR TO MAKING ADJUSTMENTS. USE AN OHM METER OR EQUIVALENT DEVICE TO MONITOR SWITCH CONTACTS WHILE MAKING ADJUSTMENTS.

The DIN interface conforms to DIN 43 650A / ISO 4400 and **when mated** provides an IP65 rated protection class. The right angle mating connector is supplied with the gauge upon order. Clocking (orientation) can be changed by prying out the insert and rotating the insert to the desired clocking (90 ° increments).

Wiring for the SPDT switch(es) is as follows:

1. - **Common**
 2. - **N.C.**
 3. - **N.O.**
-  - **Chassis**

For a single switch order the connector will be located out the side of the condulet housing. For a double switch order, two separate connector interfaces are provided on opposite sides of the condulet housing. C

 A protective conductor terminal is provided on the DIN connector.

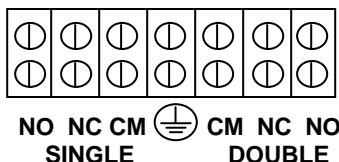
NEMA 4X (Weatherproof Enclosure)
(Options L & M)



The gauge and switch(es) are mounted inside the enclosure with the switch(es) wired to a seven (7) position terminal strip. The terminal strip connection uses 6-32 screws and is rated for use with wire up to 14 Awg.. An opening is provided on the bottom of the enclosure for a 1/2" flexible cable or conduit connection.

Access the terminal strip by removing the cover from the enclosure and loosening the (4) screws. Insert wires through an appropriate weatherproof connector (not supplied) into the enclosure and connect to the terminal strip. See the terminal strip diagram shown below or on the outside of the switch enclosure. Reinstall the cover and (4) screws. See Figure 3.

Access holes and plugs are provided for external adjustment of the switches if required.



NEMA 7 (Explosion-proof) Enclosure
(Options N & P)



WARNING: THE COVER AND/OR SWITCH ADJUST ACCESS PLUGS MUST NEVER BE REMOVED WHEN THERE IS POWER TO THE UNIT. MAKE ALL ADJUSTMENTS IN A NON HAZARDOUS AREA.

The gauge and switches are mounted inside the enclosure (see Fig. 4). A 1/2"-14 FNPT conduit connection is provided in the bottom side of the enclosure. A proper explosion-proof, dust tight sealing fitting with appropriate sealing cement must be used when making connections to the 24", 18 Awg. wire leads. The leads are labeled and/or color coded as described in the condulet section.

Adjustment of the set point can be accomplished by removing the switch adjustment access plug(s). Insert the screw driver through the hole into the switch adjustment slot and rotate until the desired set point is reached. **Do not use excessive force.** Reinstall the access plugs with **at least 5 threads of engagement** after completion.

Enclosures with SPDT switches comply with NEC Class 1, Groups **C & D**; Class 2 Groups E,F, & G, NEMA 7 and 9, and **are** CSA and UL listed.

TROUBLE SHOOTING

A. Switch doesn't function

- i. Make sure that the switch load does not exceed the specified wattage rating of the switch. (steady-state and transient). Contact factory for assistance for excessive loads, otherwise proceed to the next step.
- ii. Perform a continuity check of the switch contacts by trying to actuate the switch using an external magnet. An operational switch usually indicates a problem with the gauge. If not operational proceed to the next step.
- iii. Verify the reed switch wires are connected to the terminal strip (NEMA 4X enclosure only). Contact the factory for assistance if the switch is connected and/or request an "RGA".

B. Gauge accuracy and set point problems:

- i. Verify gauge is not in an electromagnetic / magnetic environment. i.e.; close proximity to high current power lines.
- ii. All others, contact the factory for assistance.

MOUNTING INFORMATION & DIMENSIONAL DATA

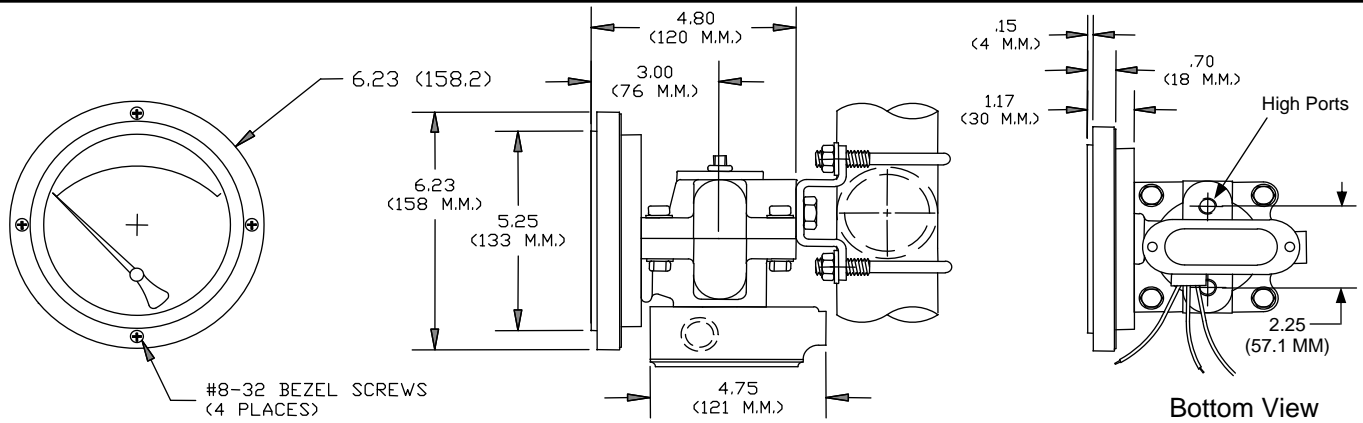


FIGURE 2
Model 130-S
Options: H & I

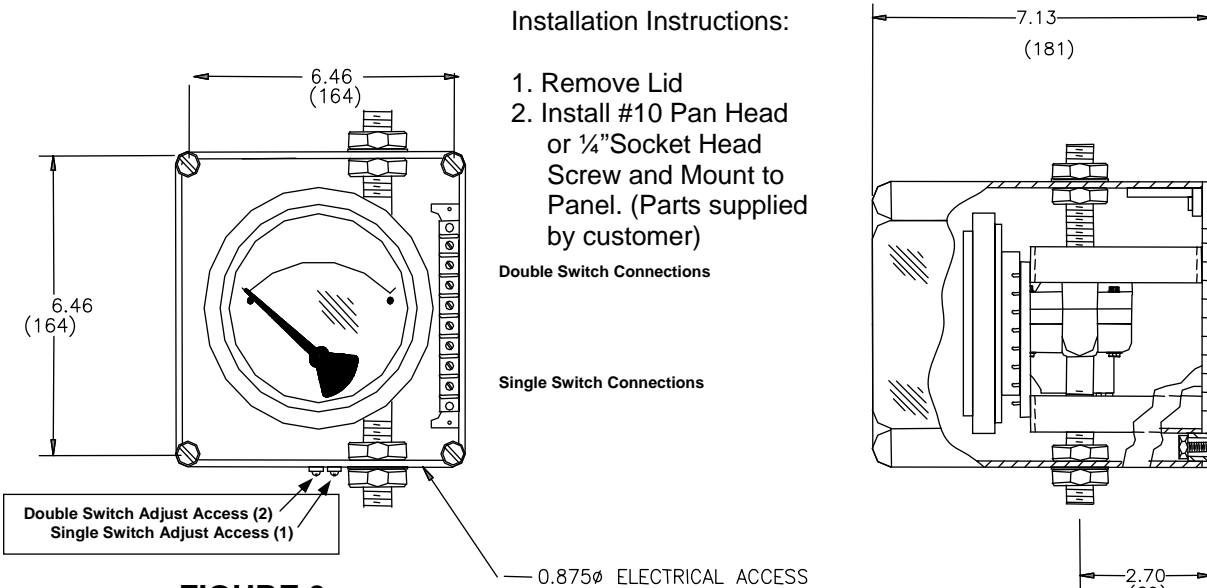
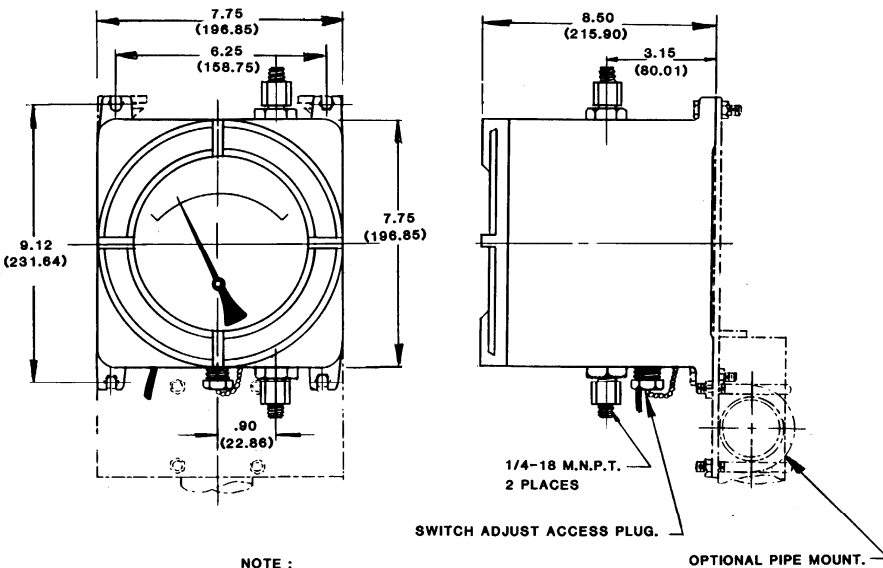


FIGURE 3
NEMA 4X Options L & M



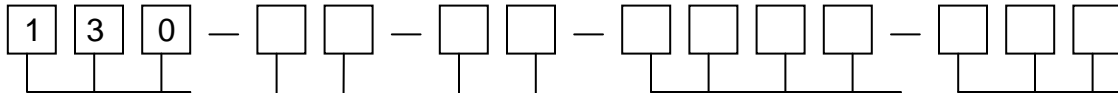
NOTE :

1. DRAWINGS SHOW STANDARD GAUGE NOMINAL DIMENSIONS.
2. DIMENSIONS SHOWN IN PARENTHESES ARE IN MILLIMETERS.



FIGURE 3
Explosion-proof
Options: N & P
CSA & UL Listed

PART NUMBERING SYSTEM



① BASIC MODEL NUMBER

② MATERIAL

- A. Aluminum (3000 P.S.I.G.)
- B. Brass (1500 P.S.I.G.)
- H. Hastelloy C. (500 P.S.I.G.)
- S. 316 S.S. (3000 P.S.I.G.)
- Z. Special

③ DIAL SIZE

- C. 4-1/2" Round Dial (**Standard**)
- E. 3-1/2" Round Anod. Alum. Dial Assy.
- G. 4-1/2" Round Anod. Alum. Dial Assy.
- T. Differential Pressure Switch Only (**Without Indication**).
(Selection Appropriate Electrical Options)
- Z. Special (Uncoded Options)

④ SEALS & DIAPHRAGM MATERIAL

- 0. Buna N (**Standard**)
- 1. Viton®
- 2. Silicone
- 5. Ethylene Propylene (0-5" H2O THRU 0-100" H2O MAX.)
- 9. Special (Uncoded Options)

⑤ CONNECTIONS

- 0. 1/4" C.S. Comp. Tube Ftgs. (2) Model P or 1/4" FNPT (4) for Models A, B, & S
- 1. 1/4" 316 S.S. Comp. Tube Ftgs (2).
- 2. 1/4" FNPT Brass Adapters (2) (Model P Only)
- 3. 1/4" FNPT 316 S.S. Adapters (2) (Model P Only)
- 4. 1/2" FNPT S.S. Adaptors (2) (All Models Except P)
- 9. Special (Uncoded Options)

⑥ OPTIONS (Up to four options)

- O. None
- B. Drain & Bleed Plugs, 316 Stainless Steel (2) (Model 130 P)
- D. Drain & Bleed For Model 130 P in NEMA 4X Enclosure
- E. Drain & Bleed For all other Model 130's in NEMA 4X Enclosure
- F. Pipe Mounting Kit
- M. Maximum Indicator Follower Pointer
- T. Oxygen Cleaning
- U. S.S. Tag w/S.S. Wire
- V. S.S. Tag w/S.S. Screws
- W. Wall Mounting Kit
- Z. Special (Uncoded Options)

NOTE: NOT ALL OPTIONS AVAILABLE IN COMBINATION WITH OTHER OPTIONS.

⑦ ELECTRICAL CONFIGURATIONS

(Switch Adjustable Range 10-90% except where stated below)

- O. None
- H. One (1) Reed Switch in Condulet Enclosure
- I. Two (2) Reed Switches in Condulet Enclosure
- J. One (1) Reed Switch in Condulet Enclosure and Plug-In
- K. Two(2) Reed Switches in Condulet Enclosure and Plug-In Connector (DIN 43650- PG11)
- L. One (1) Reed Switch in NEMA4X Plastic Enclosure
- M. Two (2) Reed Switches in NEMA4X Plastic Enclosure
- N. One (1) Reed Switch in Explosion-proof enclosure with glass window cover and C.S.A. & UL Listing ⁽¹⁾
- P. Two (2) Reed Switches in Explosion-proof enclosure with glass window cover and C.S.A. & UL Listing ⁽¹⁾
- Z. Special

(1) Complete Assembly Rated Class I, Div. 1, Groups C & D; Class II, Div. 1, Groups E, F, & G.

⑧ ELECTRICAL SPECIFICATIONS

- A. S.P.D.T., 3 Watts, 0.25 Amp, 125 VAC/VDC
- Z. Special

Manufacturer reserves the right to change specifications without prior notice.

Temperature Limitations: -40° F (-40° C) to +200° F (+93° C)

Proof Pressure: Two times rated working pressure.

**Mid-West[®]
Instrument**

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