MODEL 831
ELECTRONIC PRESSURE TRANSMITTER

INSTRUCTIONS FOR INSTALLATION AND OPERATION

AMETEK
U. S. GAUGE, PMT PRODUCTS

K796350
REV D, MARCH 16, 2001

WARRANTY POLICY

Ametek [“Seller”] warrants these products for a period of one year from the date of shipment that all products manufactured by the seller are free from defects of material and workmanship when used within the service, range, and purpose for which they were manufactured. Seller will, at its option, repair, replace, or refund the purchase price of parts found by Seller to be defective in material or workmanship provided that written notice of such defect requesting instructions for repair, replacement, or refund is received by Seller at the address below within the warranty period and provided that any instructions thereafter given by Seller are complied with.

This warranty shall not apply (i) to the performance of any system of which Seller's products are a component part, (ii) to deterioration by corrosion or any cause of failure other than defect of material or workmanship, or (iii) to any of Seller's products or parts thereof which have been tampered with or altered or repaired by anyone except Seller or someone authorized by Seller, or subjected to misuse, neglect, abuse or improper. use or misapplication such as breakage by negligence, accident, vandalism, the elements, shock, vibration, or exposure to any other service, range, or environment of greater severity than that for which the products were designed.

SELLER MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF FITNESS OR OF MERCHANTABILITY WITH RESPECT TO ITS PRODUCTS, OR ANY PART THEREOF, OTHER THAN AS EXPRESSLY SET FORTH ABOVE. NOR SHALL SELLER HAVE INCURRED ANY OTHER OBLIGATIONS OR LIABILITIES OR BE LIABLE FOR ANY ANTICIPATED OR LOST PROFITS, INCIDENTAL DAMAGES, CONSEQUENTIAL DAMAGES, TIME CHARGES, OR ANY OTHER LOSSES INCURRED IN CONNECTION WITH THE PURCHASE, INSTALLATION, REPAIR, OR OPERATION OF ITS PRODUCTS (INCLUDING ANY PARTS REPAIRED OR REPLACED.)

This warranty does not extend to anyone other than the original Buyer from the Seller.

SECTION IV *SERVICE*

FACTORY SERVICE

Factory or field service is available by contacting the Service Department. Supply the following information:
1) Instrument Model Number and Serial Number as shown on the Instrument Data Tag.
2) Description of problem being experienced.
3) Description and location of the installation.

For service:

TELEPHONE: 215-355-6900
FAX: 215-355-7143

PARTS - ORDERING

When ordering replacement transmitters, supply the following information:
1) Part description and model number.
2) Quantity of each transmitter required.
3) Shipping instructions and address.
4) P.O. number and billing address or phone in your credit card information.

Mail, FAX or Email Orders to:

AMETEK U.S. GAUGE, PMT PRODUCTS
820 Pennsylvania Blvd.
Feasterville, PA 19053

TELEPHONE 215-355-6900
FAX 215-364-9537
EMAIL pmt@ametek.com
WEBPAGE www.ametekusg.com

ISO 9001 REGISTERED MANUFACTURER

SECTION III

OPERATION

OPERATION

PRINCIPLE OF OPERATION

The Model 831 Pressure Transmitter series is designed to continuously measure process pressure. The heart of the Model 831 series pressure transmitter is a silicon piezoresistive sensing chip. This miniature microetched semiconductor gives an output proportional to the applied pressure. This chip is isolated from the process media by a stainless steel diaphragm. A silicone oil or other specified fill fluid is used to transmit the process pressure to the sensor.

A surface mount amplifier board, enclosed in a sealed chamber, is used to convert the millivolt signal from the sensor to a calibrated transmitter output. Transmitter electronics are completely surge protected.

Each transmitter is tested over both pressure and temperature ranges. A thick film compensator circuit is used to bring the output of the sensor into specification. After compensation, every transmitter is tested a second time for pressure and temperature effects to ensure that it meets performance specifications.

CONTENTS

INTRODUCTION

INTRODUCTION

The Model 831 pressure transmitter provides fixed range performance and all 316 stainless steel construction in a durable, accurate and cost effective package. The transmitters provide 4-20 mA or Low Power Voltage output, ±0.30% accuracy and are designed to meet FM & CSA approvals for explosion proof apparatus for use in hazardous locations.

Model 831 provides as standard a 1/2" NPT female process connection for direct mounting to existing piping systems. It is provided with a 3/4" NPT female conduit connection and a 24-inch, 22AWG, cable.

SAFETY SUMMARY

This instrument is designed to prevent an accidental shock to the operator when properly used. However, no design can ensure the safety of an instrument improperly installed or used negligently. Read this manual carefully and completely before operating the instrument. Failure to read this manual in its entirety could result in damage to the instrument or injury to the operator. Standard safety precautions must be used during installation and operation. Important messages located throughout this manual are as follows:

WARNING - Denotes a hazardous procedure or condition which, if ignored, could result in injury or death to the operator.

CAUTION - Denotes a hazardous procedure or condition which, if ignored, could result in damage or destruction to the instrument.

IMPORTANT - Denotes a procedure or condition that is essential to the correct operation of the instrument.

NOTE - Specifies supplementary and perhaps essential information in relation to a particular procedure or condition.

SECTION II *INSTALLATION*

WIRING

CAUTION - Power must be off while connections are made to wires.

NOTE - In order to avoid “Ground Loop” conditions, there should be only one ground in a loop. The shield / drain can be used to provide optional noise rejection if required.

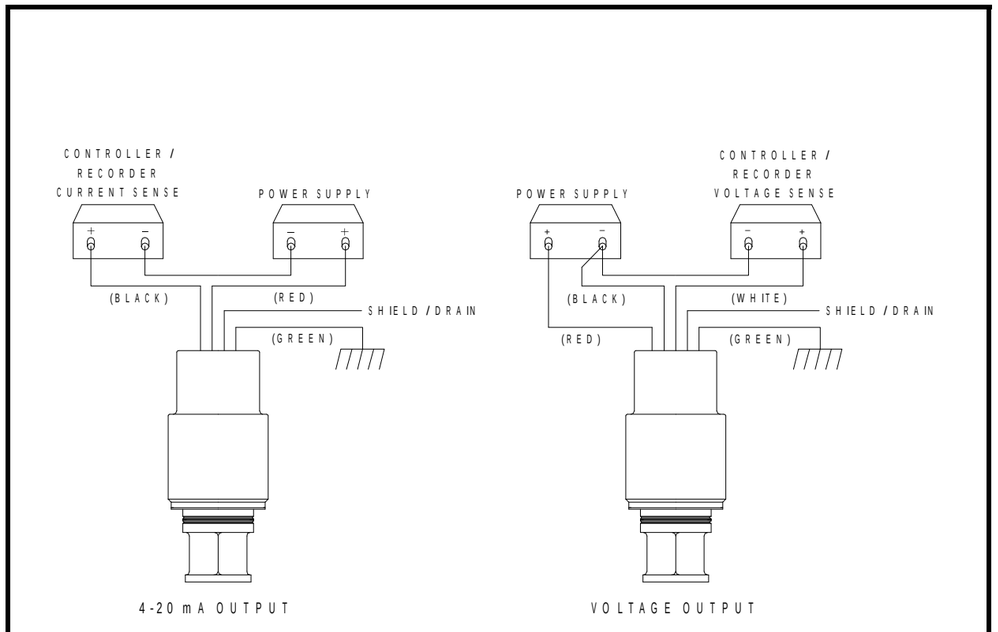


FIGURE 2-2
WIRING

SECTION II *SPECIFICATIONS*

MODEL 831 PIPING

Transmitter mounting is shown in Figure 1A and 1B of Figure 2-1, below.

Conduit drain should be provided to prevent moisture buildup in the conduit compartment.

Figure 1C shows a transmitter mounting with an elbow to prevent sediment in the process from clogging the line.

Figure 1D shows a transmitter mounting with an elbow to eliminate trapped vapor.

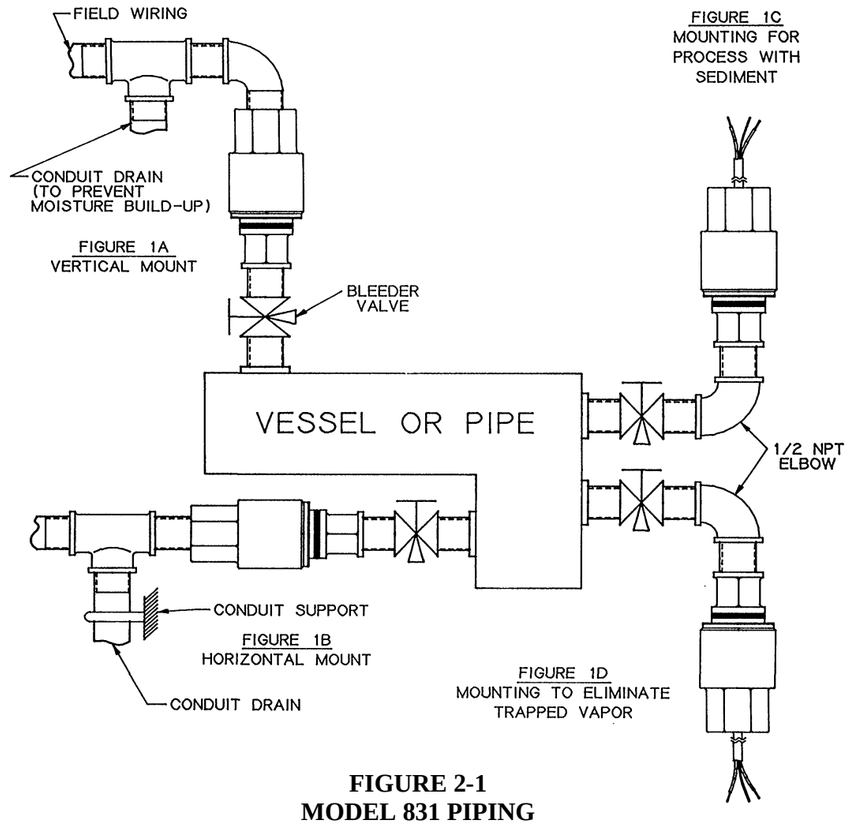


FIGURE 2-1
MODEL 831 PIPING

SCECTION I *SPECIFICATIONS*

MODEL 831 TRANSMITTER MODEL NUMBER CODE

831 ELECTRONIC PRESSURE TRANSMITTER

PROCESS CONNECTION
T = 1/2” NPT FEMALE

PRESSURE TYPE
G = GAUGE
A = ABSOLUTE
C = COMPOUND
V = VACUUM

PRESSURE RANGE
0015 = 0-15 PSI (0-1.0 bar)
0030 = 0-30 PSI (0-2.1 bar)
0100 = 0-100 PSI (0-6.9 bar)
0300 = 0-300 PSI (0-20.7 bar)
1000 = 0-1000 PSI (0-69.0 bar)
3000 = 0-3000 PSI (0-206.9 bar)
5000 = 0-5000PSI (0-344.8 bar)

INPUT/OUTPUT
B = 12-30 VDC / 4-20 mA
C = 8-14 VDC / 1-5 VDC (LOW POWER)
D = 6-14 VDC / 0.8-3.2 VDC (LOW POWER)

	MATERIAL	BASE	DIAPHRAGM
L	=	316L SS	316L SS
H	=	316L SS	HASTELLOY C276

FILL
S = SILICONE OIL
M = MINERAL OIL

831 T G 5000 B L S (EXAMPLE)

EXAMPLE: Model 831 Electronic Pressure Transmitter, 1/2” NPT-Female Process Connection, Gauge Pressure Type, 5000 psi Range, 12-30 VDC Input, 4-20 mA DC Output, 316L Stainless Steel Diaphragm, Silicon Oil Fill.

DESCRIPTION

The Model 831 is the most durable and cost effective pressure transmitter presently available. A fixed range, all stainless steel transmitter, it is designed to continuously measure process pressure for years of stable performance in even the toughest environmental and media conditions. The silicon piezoresistive sensing element consists of four ion implanted strain gauges forming a Wheatstone bridge circuit which will vary its resistance when subjected to process pressure. The Model 831 meets FM & CSA approval for explosion-proof rating in hazardous locations. The Model 831 also meets NACE standards for offshore applications.

The small size and light weight of the Model 831 transmitter eliminates the need for complicated mounting hardware and mechanical supports, thereby reducing installation time substantially. The inline connection permits simple field wiring without the need for additional hardware, adding to the speed and ease of installation. Its profile allows for mounting in places too tight for other transmitters.

With all 316 stainless steel welded construction, the Model 831 is compatible with corrosive media and hazardous environments. The transmitter is weather proof and capable of withstanding direct spray.

SPECIFICATIONS

FUNCTIONAL SPECIFICATIONS

Service: Liquid, Gas or Vapor

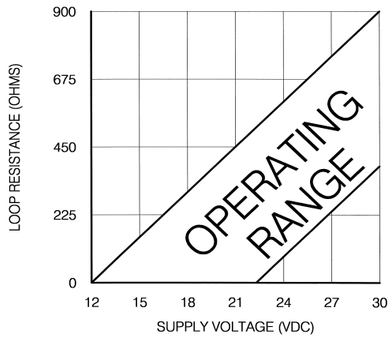
Pressure Range Limits:
-14.7 to 5000 PSI (-1.0 to 345 BAR)

Input (Power Supply) / Output:
B Option = 12-30 VDC / 4-20 mADC,
*Limited to 30 mADC
C Option = 8-14 VDC / 1-5 VDC
D Option = 6-14 VDC / 0.8 to 3.2 VDC

Offset
B Option = 4.0 mA ±2% Span
C Option = 1.0 VDC ±2% Span
D Option = 0.8 VDC ±2% Span

Span
B Option = 16.0 mA ±l % Span
C Option = 4.0 VDC ±1% Span
D Option = 2.4 VDC ±1% Span

Loop Resistance: 900 ohms max @ 30 VDC
(B Output Option Only)



Temperature RANGE:
Ambient Operating: -40^{0}F to 140^{0}F (-40^{0}C to 60^{0}C)
Process Interface: -40^{0}F to 212^{0}F (-40^{0}C to 100^{0}C)
Storage: –40^{0}F to 212^{0}F (-40^{0}C to 100^{0}C)
Overpressure: 300% Span
Humidity Limits: 0-100%RH

PERFORMANCE SPECIFICATIONS

Accuracy: ±0.30% of Span (BFSL) including linearity, Hysteresis and repeatability at 25^{0}C and 12 VDC supply voltage
Stability: ±0.50 Span for six months
Temperature Effect: (includes zero & span)
Compensated: -20 to 140^{0}F (-29 to 60^{0}C)
±2.0% / 50^{0}F (28^{0}C)
Vibration Effect: ±0.1% for 3g to 200 Hz

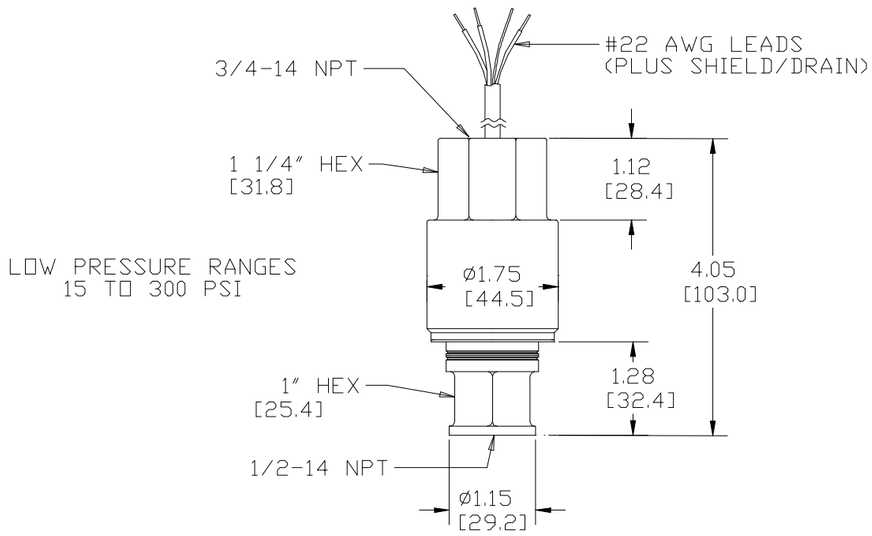
PHYSICAL SPECIFICATONS

Materials of Construction
Process Wetted Parts: 316L SS or Hastelloy C276
Non Wetted Parts: 316 SS
Fill Fluid: Silicone (DC200) or Mineral Oil
Process Connection: 1/2" NPT-Female
Electrical Connection: 3/4" NPT-Female / Cable
Weight 0.83 lb. (374 grams)
Cable: 24 inches (61 cm), 22 AWG

CLASSIFICATIONS

Factory Mutual
Explosion-proof for Class I, Division 1, Groups B, C & D Class II Groups E, F & G; and Class III Hazardous Locations and Indoor and Outdoor NEMA Type 4 Enclosure.

Canadian Standards Association
Explosion-proof for Class I, Division 1, Groups B, C & D, Class II, E, F & G and Class III Hazardous Locations and meets CSA requirements for Enclosure 4.



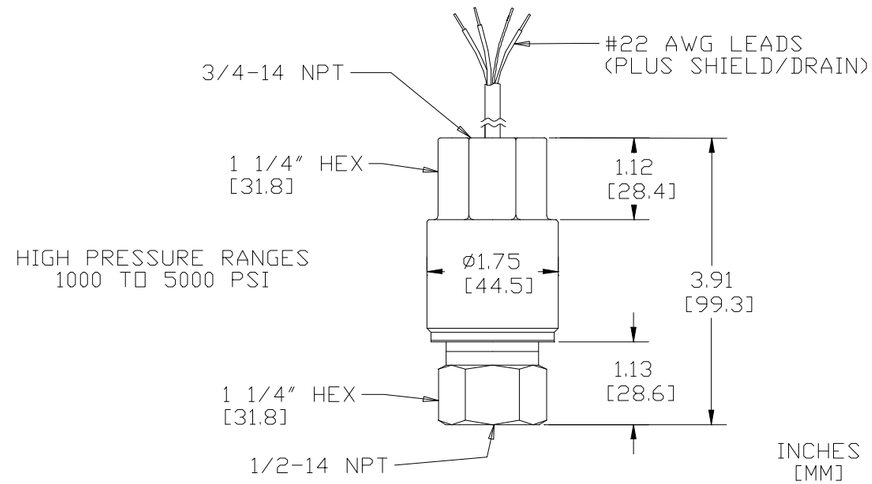


FIGURE 1-1
OUTLINE DIMENSIONS (MODEL 831)