

AUTOMATION

PRODUCTS
GROUP, INC.

Operator's Manual

PT-500

4-20 mA Series

9002823
Rev. C3, 08/14



Automation Products Group, Inc.

APG...Providing tailored solutions for measurement applications

Tel: 1/888/525-7300 • Fax: 1/435/753-7490 • www.apgsensors.com • E-mail: sales@apgsensors.com

Table of Contents

<i>Warranty</i>	3
<i>Instructions</i>	4
<i>Output</i>	4
<i>Wiring Information</i>	4
<i>Intrinsically Safe Wiring</i>	5
<i>Nonincendive Wiring</i>	6
<i>Model Configurator</i>	7
<i>Field Maintenance</i>	8
<i>Zero Adjust</i>	8
<i>Suspension Mounting</i>	8
<i>Desiccant Drying Cartridge</i>	9
<i>Certificate of Compliance</i>	10 -13

Note:

Wiring and CSA Certification information in this User Manual is specific to the 4-20 mA Series of the PT-500. If you have a 0-5 V, mV/V, or Modbus Series sensor, please consult the factory at 1-888-525-7300, or our website at www.apgsensors.com, for the appropriate manual for your sensor.

• Warranty and Warranty Restrictions

APG warrants its products to be free from defects of material and workmanship and will, without charge, replace or repair any equipment found defective upon inspection at its factory, provided the equipment has been returned, transportation prepaid, within 18 months from date of shipment from factory.

THE FOREGOING WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES NOT EXPRESSLY SET FORTH HEREIN, WHETHER EXPRESSED OR IMPLIED BY OPERATION OF LAW OR OTHERWISE INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

No representation or warranty, express or implied, made by any sales representative, distributor, or other agent or representative of APG which is not specifically set forth herein shall be binding upon APG. APG shall not be liable for any incidental or consequential damages, losses or expenses directly or indirectly arising from the sale, handling, improper application or use of the goods or from any other cause relating thereto and APG's liability hereunder, in any case, is expressly limited to the repair or replacement (at APG's option) of goods.

Warranty is specifically at the factory. Any on site service will be provided at the sole expense of the Purchaser at standard field service rates.

All associated equipment must be protected by properly rated electronic/electrical protection devices. APG shall not be liable for any damage due to improper engineering or installation by the purchaser or third parties. Proper installation, operation and maintenance of the product becomes the responsibility of the user upon receipt of the product.

Returns and allowances must be authorized by APG in advance. APG will assign a Return Material Authorization (RMA) number which must appear on all related papers and the outside of the shipping carton. All returns are subject to the final review by APG. Returns are subject to restocking charges as determined by APG's "Credit Return Policy".

• Instructions

All units are factory calibrated prior to shipment.

1. Output

The PT-500 transmitter is a two wire 4-20mA output device. The two wire system connects the power supply, transmitter, and indicating/recording instruments in a series circuit. This creates a “current loop” with the transmitter functioning as a current regulating device.

2. Wiring Information

Below, are the wiring diagrams, and terminal coding notes, needed to assist you in wiring your transducer.

■ Wiring

2-Wire Current Loop	
Signal	Wire Color
Supply +	Red
Signal -	Black
Ground	Green

Terminal Coding Notes:

V_B+ : Plus power supply

OV : Minus power supply

S+ : Plus output signal

S- : Minus output signal

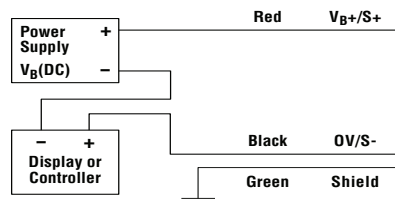
Shield : Cable shield/transmitter body

The supply voltage must be higher than the minimum required voltage as determined by the load equation for the specific transmitter. Refer to the specifications section of the data sheets for additional information.

4-20 mA 2 Wire System

The 2 wire system connects the power supply, transmitter, and indicating/recording instruments in a series circuit. This creates a “current loop” with the transmitter functioning as a current regulating device.

Flying Leads



Load Limitation

$$R_{(max)} = ((V_S - 12V) / 0.02 A) - (0.042 \text{ per ft. of cable})$$

• Intrinsically Safe Wiring

DATE CODE 02450	DOCUMENT NO 9002803	SHEET 1	REV A1	
REVISIONS		CHANGE ORDER	DATE	APPROVED
- A1 SEE CHANGE ORDER.		CO-	1104 12/11/07	R. OBORN

INSTALLATION IN CLASS I, DIVISION 1, GROUPS C, & D.
INSTALLATION IN CLASS I, ZONE 0, Acc. to IEC 114 Temp. -40° TO 60° C

PI-500 LI 4-20mA OUTPUT

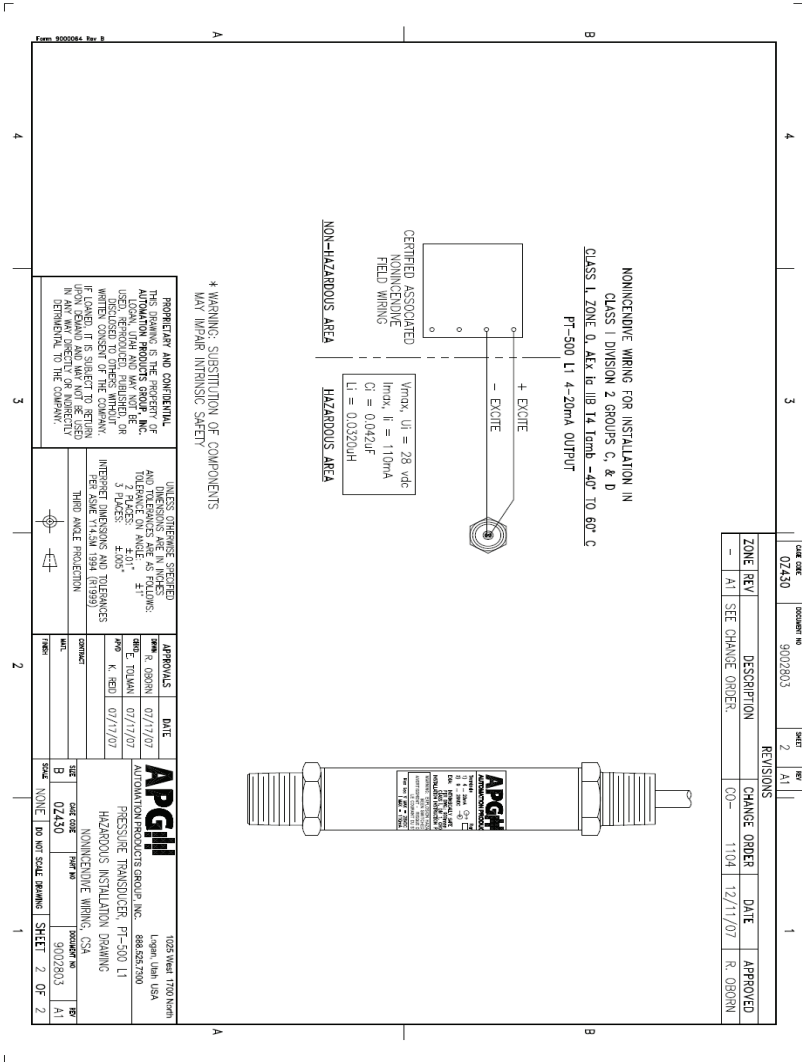
$V_{max}, U_I = 28 \text{ vdc}$
 $I_{max}, I_E = 110\text{mA}$
 $C_I = 0.042\mu\text{F}$
 $U = 0.320\text{UH}$

HAZARDOUS AREA

* WARNING: SUBSTITUTION OF COMPONENTS
MAY IMPAIR INTRINSIC SAFETY

APPROVALS	DATE	APGHI	1005 West 1700 North Draper, Utah 84304 USA 801-438-7300
R. OBORN	07/17/07	AUTOMATION PRODUCTS GROUP, INC.	
E. IULIANI	07/17/07	PRESSURE TRANSDUCER, PT-500 LI	
K. REDD	07/17/07	HAZARDOUS INSTALLATION DRAWING	
DRAWN		INTRINSICALLY SAFE WIRING, CSA	
DATE	DRAWN NO	REVISION NO	REV
B	02450	NONE	A1
SHEET			1
OF			2

• Nonincendive Wiring



• **Model Configurator**

Options

PT-500 _____
 A B C D E F G H

A. Cable Type

- ▲ Urethane - Blue (with vent tube)
- A** PVC - Black (no vent tube - sealed unit)
- B** Hytrel - Black (with vent tube)
- C** PVC - Black (with vent tube)

B. Pressure Range

- Specify range in desired unit of measure
- _____ Max Water Depth
 462.2 ft. (140.9 m), 300 psig

C. Standard Units of Measure

- PSI**
- FTH2O**
- INWC**
- INH2O**
- MMH2O**
- FWC**

D. Output

- L1▲** 4-20 mA, 2-wire
- L3** 0-5V, 3-wire (Approvals Pending)
- L9** mV/V, 4-wire (Approvals Pending)

Modbus

- L5** RS-485 (Modbus/RTU), 4-wire Pressure reading only (Approvals Pending)
- L31** RS-485 (Modbus/RTU), 4-wire Level calculations, tank volume (Approvals Pending)

E. Overmold

- E0▲** No overmold for 1/2" NPTM fitting for conduit
- E37** Pigtail with overmolded cable

F. Process Connection

- P1▲** 1/2" NPTM with removable plastic nose cone
- P5** 1/4" NPTF
- P37** Cage (anti-snag 1 piece fitting)
- P38** 1-1/2" tri-clover with 3/4" diaphragm
- P39** Cage (includes P38 fitting)

G. Cable Length

- (specify length of cable needed)
- _____

H. Accuracy

- N0▲** ±0.25%
- N1** ±0.25% with NIST certification
- N2** ±0.1% with NIST certification

Note: ▲ Indicates this option is standard.



*Shown with anti-snag cage.

- **Field Maintenance**

1. Zero Adjust

The zero output (4mA) can be adjusted by holding a magnet close to the can, approx. **1 1/2 inches** from the top or bottom of the can.

If the zero output values do not change right away, hold the magnet in place near the top of the can until the values change, up to two minutes. If there is no change, repeat the procedure near the bottom of the can. If there is still no change, consult the factory.



Holding the magnet perpendicular near the top increases the output.



Holding the magnet perpendicular near the bottom decreases the output

Note: Span calibration must be done at the factory.

2. Suspension Mounting

For suspension mounting the PT-500, drill a 3/16" hole into the 1/2" NPTF to 1/2" NPTF hex coupler (P/N 511414) and secure it to the 1/2" NPTM coupler fitting of the PT-500. Attach a .060 in diameter 316L SS cable of desired length to the hex coupler and secure the steel cable according to your application requirements.



3. Desiccant Drying Cartridge

The desiccant drying cartridge with vent tube adapter is used to keep vapor from condensing in the vent tube. Condensation in the vent tube could create an output offset.

The installation of the desiccant drying cartridge is quick and easy. Common installation methods are cable tie, velcro and cable clamps

Note: Replacement of the desiccant cartridge is recommended when the desiccant crystals have turned from blue to pink.



Desiccant Drying Cartridge with vent tube adapter attached to vented cable



Certificate of Compliance

Certificate: 1984045

Master Contract: 237484

Project: 2517306

Date Issued: August 22, 2012

Issued to: Automation Products Group Inc
1025 West 1700 North
Logan, UT 84321
USA
Attention: Karl Reid

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.



Eshwar Kashyap

Issued by: Eshwar Kashyap

PRODUCTS

CLASS 2258 03 - PROCESS CONTROL EQUIPMENT - Intrinsically Safe and Non - Incendive Systems - For Hazardous Locations

CLASS 2258 83 - PROCESS CONTROL EQUIPMENT-Intrinsically Safe and Non-Incendive - Systems-For Hazardous Locations-Certified to U.S. Standards

Class I, Div. 2, Groups C and D

Class I, Zone 2, Group IIB

Ex nL IIB T4; Ta: -40°C ... +85°C

AEx nC IIB T4; Ta: -40°C ... +85°C

- Model PT-400-L1xxxx Pressure Transmitter. Rated 9-28VDC, 4-20mA. Maximum Ambient 85° C; Temperature Code T4; Maximum Working Pressure 10,000 PSI. Enclosure type: IP65. Installed as per Drawing 9002794. Non-Incendive with the following Entity Parameters:

Vmax, Ui = 28V

Imax, Ii = 110mA

Pmax, Pi = 0.77W



Certificate: 1984045

Master Contract: 237484

Project: 2517306

Date Issued: August 22, 2012

$C_i = 0.055\mu\text{F}$

$L_i = 7.95\mu\text{H}$

- Model PT-400-L3/L10xxxx Pressure Transmitter. Rated 9-28VDC, 4-20mA or 0-5V, 20mA or 0-10V, 20mA; Maximum Ambient 85° C; Temperature Code T4; Maximum Working Pressure 10,000 PSI. Installed as per Drawing 9002794. Non-Incendive with the following Entity Parameters:

$V_{\text{max}}, U_i = 28\text{V}$

$I_{\text{max}}, I_i = 110\text{mA}$

$P_{\text{max}}, P_i = 0.77\text{W}$

$C_i = 0\mu\text{F}$

$L_i = 0\mu\text{H}$

- Model PT-500-xxxx Pressure Transmitter, Rated 10-28VDC, 4-20mA; Maximum Ambient 85° C; Temperature Code T4; Maximum Working Pressure 10,000 PSI; Non-Incendive with the following Entity Parameters:

$V_{\text{max}}, U_i = 28\text{V}$

$I_{\text{max}}, I_i = 110\text{mA}$

$P_{\text{max}}, P_i = 0.77\text{W}$

$C_i = 0\mu\text{F}$

$L_i = 0\mu\text{H}$

Notes for Models PT-400, PT-500:

1. The "x" in the Model designations may be any alpha-numeric character, to denote minor mechanical options, not affecting safety.
2. These devices must be connected to a suitably certified and approved apparatus that provides non-incendive outputs either equal to or less than those as indicated by the applicable control drawings. This certified apparatus must be located in a safe area.

CLASS 2258 04 - Process Control Equipment - Intrinsically Safe, Entity - For Hazardous Locations



Certificate: 1984045

Master Contract: 237484

Project: 2517306

Date Issued: August 22, 2012

CLASS 2258 84 - Process Control Equipment - Intrinsically Safe, Entity - For Hazardous Locations - Certified to US Standards

Class I, Div. 1, Groups C, D

Class I, Zone 0, Group IIB

Ex ia IIB T4; Ta: -40°C ... +85°C

AEx ia IIB T4; Ta: -40°C ... +85°C

- Model PT-400-L1xxxx Pressure Transmitter. Rated 9-28VDC, 4-20mA. Maximum Working Pressure: 10,000 PSI. Installed as per Drawing 9002794. Ambient Range: -40°C to +85°C. Enclosure type: IP65. Intrinsically safe with the following entity parameters:

$V_{max}, U_i = 28V$

$I_{max}, I_i = 110mA$

$P_{max}, P_i = 0.77W$

$C_i = 0.055\mu F$

$L_i = 7.95\mu H$

- Model PT-500-xxxx Pressure Transmitter; Maximum Ambient 85° C; Temperature Code T4; Maximum Working Pressure 10,000 PSI; Entity parameters as follows: $V_{max}, U_i = 28V$

$I_{max}, I_i = 110mA$

$P_{max}, P_i = 0.77W$

$C_i = 0.042\mu F$

$L_i = 0.320\mu H$

Notes for Models PT-400, PT-500:

1. The "x" in the Model designations may be any alpha-numeric character, to denote minor mechanical options, not affecting safety.
2. These devices must be connected to a NRTL approved safety barrier (located in a safe area).



Certificate: 1984045

Master Contract: 237484

Project: 2517306

Date Issued: August 22, 2012

APPLICABLE REQUIREMENTS

C22.2 No 0 - M1991	General Requirements - Canadian Electrical Code Part II.
C22.2 No 0.4 - M2004	Bonding and Grounding of Electrical Equipment (Protective Grounding).
C22.2 No 142 - M1987	Process Control Equipment.
C22.2 No 157 - M1992	Intrinsically Safe and Non-Incendive Equipment for Use in Hazardous Locations.
C22.2 No 213 - M1987	Non-Incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations.
CAN/CSA-C22.2 No. 60079-0:11	Explosive Atmospheres - Part 0: Equipment - General requirements
CAN/CSA-C22.2 No. 60079-11:11	Explosive Atmospheres – Part 11: Equipment protection by intrinsic safety "i"
CAN/CSA-C22.2 No. 60079-15:12	Electrical apparatus for explosive gas atmospheres - Part 15: Construction, test and marking of type of protection "n" electrical apparatus
CAN/CSA-C22.2 No. 60529:05	Degrees of protection provided by enclosures (IP Code)
UL 508, 17th Edition	Industrial Control Equipment.
UL 913, 7Th Edition	Intrinsically Safe Apparatus and Associated Apparatus for use in Class I, II, III, Division 1, Hazardous (Classified) Locations.
ANSI/ISA-12.12.01-2007	Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations
ANSI/UL 60079-0:09	Electrical Apparatus for Explosive Gas Atmospheres - Part 0: General Requirements
ANSI/UL 60079-11:09	Electrical apparatus for Explosive Gas Atmospheres - Part 11: Intrinsic Safety "i"
ANSI/UL 60079-15:09	Electrical apparatus for Explosive Gas Atmospheres - Part 15: Type of Protection "n"
ANSI/IEC 60529:2004	Degrees of Protection Provided by Enclosures (IP Code)

Notes

Notes

AUTOMATION PRODUCTS GROUP, INC.

***APG...Providing tailored solutions
for measurement applications***



Automation Products Group, Inc.

Tel: 1/888/525-7300

1/435/753-7300

Fax: 1/435/753-7490

e-mail: sales@apgsensors.com

www.apgsensors.com

Automation Products Group, Inc.

1025 W. 1700 N.

Logan, UT 84321