



Pressure, Level & Temperature Products

INSTALLATION MANUAL FOR PRODUCTS WITH F, AF OR GF FLAMEPROOF / EXPLOSION APPROVAL CODES

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1. INTRODUCTION

1.1 Product Description

GP:50 pressure, temperature, differential pressure and dual pressure/temperature transmitters (referred to as the “device” or “product”) provide an electrical output directly proportional to the device’s calibrated process pressure and/or temperature range. Devices are available with maximum calibrated ranges of up to:

- 75,000 PSI for pressure measurement
- 5,000 PSI for differential pressure measurement and
- -50 °F to 500 °F for temperature measurement

The actual calibrated pressure/temperature measurement range as well as the device’s electrical output signal and input voltage shall be identified directly on the device itself. Devices shall typically be operated within a standard operating temperature range from -40 °F to 185 °F (-40 °C to 85 °C), however, this may vary based upon options ordered. The general part number configuration is as shown below. Please contact GP:50 if you have specific questions regarding your GP:50 device.


A – BBB – CC – DD / DD / DD

- | | | |
|-----|---|--|
| A | = | Electrical Output Code (i.e. 1, 2, 3, 5, 7, or 8) |
| BBB | = | Base Model Code (i.e. 40, 14, 15, 36, 40T, or 43) |
| CC | = | Approval Code (i.e. F, AF, or GF) |
| DD | = | A series of additional option codes to identify device accuracy, range, port style and other miscellaneous items (contact GP:50 for details) |

1.2 Hazardous Location Approvals

GP:50 products with F, AF, or GF approval codes are 3rd party certified as Flameproof and/or Explosion Proof for use in Hazardous Location areas. Reference [Section 4](#) of this manual for additional details.

1.3 Warning

Pressurized vessels and associated equipment are potentially dangerous. The products described in this manual should be operated only by personnel trained in the procedures that will assure safety to themselves, to others, to the equipment, and to the product. Specific warnings are noted as  in specific installation/operation sections.

1.4 Unpacking and Inspection

The device was carefully tested, inspected, and packed prior to leaving GP:50’s manufacturing facility. Upon receipt of the shipment, thoroughly inspect the device for any signs of obvious shipping damage. Notify the freight company immediately if found.

1.5 Using this Manual

This manual is intended to help the end user install, maintain, and provide general service of the device. The user should have a general understanding of electro-mechanical measurement instrumentation and instrument control. The device shall be handled and treated as a precision instrument. Special care should be given to the device, as with any precision instrument, during installation and operation to preclude unwanted damage from occurring to the device due to misuse.



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2. INSTALLATION

The device is supplied with both a process connection end as well as an electrical connection end. The electrical connection end can be identified by the end of the device which has a ½" NPT (M) conduit end with either 18 AWG lead wire or 18 AWG cable exiting from the device. Installation of the device shall be as follows for each end of the device:

2.1 Mounting/Process Connection

Many different process connection methods are available for mounting the device. The device shall be mounted in accordance with industry standard fitting practices for the supplied/ordered process connection method. Torque shall only be applied to the supplied hex (or wrench flats) on the process connection end of the device during installation or removal. As a rule, the device shall be torqued "wrench-tight" to preclude leakage from the process connection. Contact GP:50 sales personnel for additional information if required.



Ensure media is compatible with wetted materials to avoid premature corrosion of any parts and in particular to the pressure sensing diaphragm. This can cause performance degradation and eventual sensor rupture/failure.



Properly tighten process connections before applying pressure to ensure no leaks or mechanical failure can occur.



Never insert sharp objects into the pressure port region or against the diaphragm. This could cause permanent damage to the sensor and/or mechanical failure/diaphragm rupture.



Ensure the pressure range of the device can safely handle the anticipated process pressure conditions as over-pressurization of the device can cause permanent damage to the sensor and/or mechanical failure/diaphragm rupture.

2.2 Power Supply Connection

All devices are supplied with a ½" NPT (M) conduit connection with either 18 AWG lead wire or 18 AWG cable. Attachment of the lead wire or cable ends shall be made per the applicable wiring diagrams provided in the Appendix of this manual. The wire color / designation scheme is identified on the device markings for easy reference. Any industry standard wiring connection methods are acceptable for making said connections. The device shall also be mated to electrical conduit via the supplied ½" NPT Male conduit connection per your local electrical code requirements for Zone 1 / Division 1 installation. Note, the conduit end of the device is certified "Factory Sealed" so additional conduit seals may not be required during the installation process.

For best operation, the device requires a clean, regulated power supply with an output impedance less than 20Ω. It is noted that the device's actual required input voltage range (typically 9-29 VDC) may vary by options ordered but will be identified on the device itself for easy reference.



Exceeding maximum supply voltage can damage electronics and cause malfunctions or failure.



Always inspect/clean electrical connection and sealing surface prior to installation.



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If possible, do not run device wires next to power lines, electrical systems, motors, generators, or any other equipment which may generate a significant amount of electrical noise or magnetic fields.



Install only after verifying the input power is off.



Avoid contact with exposed leads, high voltage may be present on leads and can cause electrical shock.



Observe safe ESD handling precautions to avoid static damage to sensitive components.



Maximum allowable inputs are 36 VDC and 30 mA.

2.3 Environmental Concerns

The typical operating temperature range of the device is from -40 °F to 185 °F (-40 °C to 85 °C) but may vary based upon ordered options. See [Section 4](#) of this manual for additional details. If possible, the device should be mounted in a fashion to minimize heat input from process conditions or localized surrounding temperature hot spots in an effort to keep the device temperature as cool as possible.

All products have an Ingress Protection Rating of IP65 / NEMA 4.



Exceeding maximum temperature rating can cause electronics malfunction or failure or an explosion risk.



Protect electrical connection from direct/continued exposure to fluids. Moisture ingress can occur, causing eventual electrical failure.

3. OPERATION

3.1 Maintenance/Handling

The device is designed to give an electrical output signal directly proportional to pressure and/or temperature being measured. Specific pressure/temperature range, input voltage requirements and electrical output wiring designation are marked on the device. Appropriate wiring connections are required for proper installation and safety.

Some low range pressure measuring devices (typically for pressure ranges less than or equal to 500 PSI) which provide a pressure measurement reading referenced to local atmospheric pressure conditions are designed such that a small vent port is machined into the device enclosure. In the unlikely event of an internal explosion within the device, the vent port is plugged with a small $\varnothing 0.125$ [$\varnothing 3.2\text{mm}$] cylindrical sintered stainless steel flame arrester to preclude the explosion from potentially igniting any flammable gas mixtures which may be present surrounding the ambient environment of the device. If installed, the flame arrester is typically press fit into either the “Hex” of the process connection end or it may be installed into a special $\varnothing 1.00$ ” adapter slightly above the process connection end. To preclude moisture from entering through the flame arrester, an additional cylindrical hydrophobic vent plug will be press fit over the flame arrester. Special care shall be taken to ensure the vent port region of the device (if installed) does not become blocked by foreign objects which could affect the measurement reading of the device.



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Unit can be hot when removed from service. Wear protective gloves when handling unit in this condition.



The device is designed to safely handle inadvertent pressure overloads above the device's specified pressure range provided the overloaded condition is below the device's proof pressure which is identified on the device itself. In the event the overpressure condition exceeds the allowable proof pressure, it may cause the device to no longer satisfy its designated performance.



Ensure device vent ports (if installed) are not altered, blocked, or damaged.

3.2 Specific Conditions for Safe Use

- The flying leads or cable of the equipment shall be suitably installed within rigid metal conduit with appropriate seal(s) and routed to a suitably rated and Ex certified enclosure for connection / termination per local Zone 1 / Division 1 electrical code requirements.
- The equipment is not capable of passing a 500V dielectric test. This must be considered during equipment installation.
- When an optional RTD is included in addition to pressure output, and/or for devices with a dual pressure / temperature output, the RTD or Temperature output shall be considered a separate electrical circuit and installed as such.
- Except for the installation of conduit connections, once the equipment is installed, it shall not be used to mount or support additional hardware which may impart bending loads to the device enclosure.

4. HAZARDOUS LOCATION APPROVALS

4.1 Product Marking Information

Each device is marked/labeled with information similar to that identified below. Actual marking information will vary between different model numbers ordered. For devices small in size where available marking space is limited, coded markings may be used and/or a separate Identification Tag may be supplied with each device which shall be installed by the end-user next to device once installed into service to identify the product and its approval markings.

- | | | |
|----------------------------|--------------------------------|----------------------------|
| - GP:50 Name or Address | - <i>Part / Model Number</i> | - Wiring Designation |
| - Serial Number | - Pressure / Temperature Range | - Electrical Input Voltage |
| - Year of Mfg | - Proof Pressure | - Electrical Output |
| - <i>Approval Markings</i> | | |

In terms of the device's actual Hazardous Location approval requirements, the device's Model/Part Number and the device's Approval Marking information is of particular interest for identifying the Hazardous Location areas of where the device can be installed.



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4.1.1 Part / Model Number





Per [Section 1.1](#) of this manual, the Part / Model Number Scheme of the device is identified. After identification of the Electrical Output and the Base Model Number code, the device's Approval Code (e.g. F, AF, or GF) is identified.

- F = FM / CSA Explosion Proof Approved
- AF = ATEX / IEC Flameproof Approved
- GF = Global FM / CSA / ATEX / IEC / Flameproof Approved

4.1.2 Approval Markings

Most device products should be large enough in size which permits the actual approval markings to be identified directly on the device itself as identified below. The Maximum Surface Temperature Ratings of the device (e.g. T6, T5, T4, etc.) are identified below as variable items (Tx) as these ratings will vary based upon ordered device options. Refer to each unit for its actual "T" rating which will be identified on the device.

Additionally, the Ambient Temperature rating is also identified below as a variable item as those too will vary based upon ordered device options. Refer to each unit for its actual Ambient Temperature rating which will be identified on the device. For North American FM and CSA approvals, all devices are certified for use in both Zone and Division rated classification systems.

 2460	 II 2 G	 APPROVED	PENDING	 PENDING
Ex d IIC Tx Gb -40 °C < Ta < XXX ITX18 ATEX 13544X IECEX ETL 18.0022X		AEx d IIC Tx Gb Class I, Div. 1 Groups A, B, C, D Class II, III, Div. 1 Groups E, F, G Tx. Ta = XXX°C		AEx d IIC Tx Gb Class I, Div. 1 Groups A, B, C, D Class II, Groups E, F, G, Class III Tx. Ta = XXX°C

4.2 Product Certifications

Flameproof / Explosion Proof

- A8EG-10XPA.CC ATEX Flameproof (AF/GF)
- A8EG-10XPI.CC IEC Flameproof (AF/GF)
- A8EG-10XPC.CC CSA Explosion Proof (F/GF)
- A8EG-10XPF.CC FM Explosion Proof (F/GF)

CE

- A8EG-10AIE.DC EMC Declaration of Conformity (AI/GI/AN/GN/AP/GP/EC/AF/GF)
- A8EG-10AIP.DC PED Declaration of Conformity (AI/GI/AN/GN/AP/GP/EC/AF/GF)
- A8EG-10AFA.DC ATEX Flameproof Declaration of Conformity (AF/GF)
- A8EG-10AIR.DC RoHS Declaration of Conformity (AI/GI/AN/GN/AP/GP/EC/AF/GF)



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5. TROUBLESHOOTING / RETURN INFORMATION

The following are some common troubleshooting tips to try in the event the device is not working properly.

5.1 No output

- Verify power supply voltage meets transmitter requirements
- Check wiring connections
- Verify pressure if being applied
- Verify output load is not shorted

5.2 Erratic output or zero drift

- Verify pressure applied is constant
- Verify power supply remains within specifications
- Inspect electrical connections for discontinuity or damage
- Verify output with a multi-meter
- Check insulation resistance between amplifier and transmitter case

5.3 Slow Response

- Verify pressure port is not clogged

If the problem persists, please call the factory as indicated below for assistance. Please have the following information ready:

- Part / Model Number & Serial number
- A description of your installation (hook-up) method and process conditions
- A description of the issue (Does it respond to pressure, what is the device's "zero" reading, etc.)
- Was the device previously working? If so, what action(s) potentially caused the device to fail?

Contact: sales@gp50.com
Phone: 716-773-9300



Repairs should only be done by GP:50. Repairs done by customer will void any warranties and/or certifications and may cause permanent damage to the device and are a potential explosion hazard.



Returned products that have been exposed to hazardous substances must be cleaned prior to return and include the Material Safety Data Sheet for all substances.



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6. WARRANTY

GP:50 warrants its products to the original customer/purchaser against defects in material and workmanship for a period of one (1) year from the date of delivery by GP:50, as shown in its shipping documents, subject to the following terms and conditions:

Without charge GP:50 will repair or replace products found to be defective in materials or workmanship within the warranty period provided that:

1. The product has not been subjected to abuse, neglect, accident, incorrect wiring (not provided by GP:50), improper installation or servicing, or use in violation of instructions furnished by GP:50.
2. As to any prior defect in materials or workmanship covered by this warranty, the product has not been repaired or altered by anyone except GP:50 or its authorized service agencies.
3. The serial number has not been removed, defaced or otherwise changed.
4. Examination discloses, in the judgment of GP:50, a defect in materials or workmanship which developed under normal installation, use and service.
5. GP:50 is notified in advance of, and approves, the return by issuing a Return Material Authorization Number; and the products are returned to GP:50 transportation prepaid. Products returned without an RMA number will not be accepted and be returned to sender at sender's expense.

THIS WARRANTY IS THE ONLY WARRANTY AND IS IN LIEU OF ANY OTHER WARRANTY EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OR MERCHANTABILITY OR FITNESS. NO REPRESENTATIVE OR PERSONS ARE AUTHORIZED TO GIVE ANY OTHER WARRANTY OR TO ASSUME FOR GP:50 ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF ITS PRODUCTS. GP:50 DOES NOT ASSUME THE COSTS OF REMOVAL AND/OR INSTALLATION OF THE PRODUCT OR ANY OTHER WORKMANSHIP, OR WILL GP:50 BE LIABLE FOR ANY CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OR INSTALLATION OF ITS PRODUCT.

For a copy of our warranty policy and to fill out a warranty registration form, visit our website at: <https://www.gp50.com/products/warranty/> .

For assistance with repairs, call our Repair Dept. at 716-773-9300, ext. 237, or complete a Repairs, Returns, RMA form at: <https://www.gp50.com/resources/repairs-returns-rma/>.

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7. APPENDIX: STANDARD WIRING DIAGRAMS

The first character of device's part / model number as described in [Section 1.1](#) of this manual defines the electrical output of the device. Available electrical output types / codes are as follows:

- 1 = 100 Series Device (4-wire mV / V output signal)
- 2 = 200 Series Device (3 or 4-wire Vdc output signal depending upon options ordered)
- 3 = 300 Series Device (2-wire 4-20mA output signal or Dual 2-wire 4-20mA output signals)
- 5 = 500 Series Device (4-wire Digital CanBus or CanOpen output signal)
- 7 = 700 Series Device (4-wire Digital RS485 ASCII or ModBus output signal)
- 8 = 800 Series Device (5-wire Digital RS-232 output signal)

Reference the following Standard Wiring Diagrams for proper installation of your device based on the device's electrical output and options ordered. Specific wiring color code designations are identified directly on the device. All devices also include an additional dedicated case ground wire which is attached directly to the metal case of the device.

Please contact GP:50 for additional assistance if needed and/or if you cannot find a wiring diagram for your particular device options.

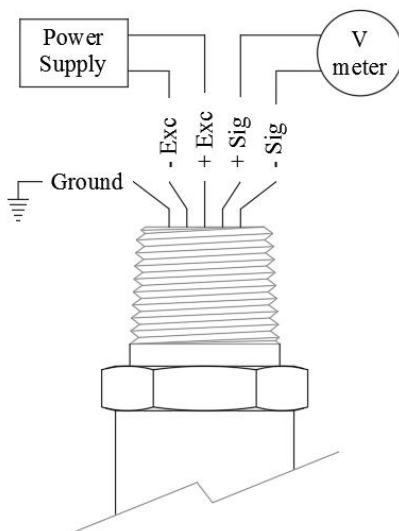


Figure 7.1: 100 Series (mV/V)
200 Series (4-Wire Vdc)

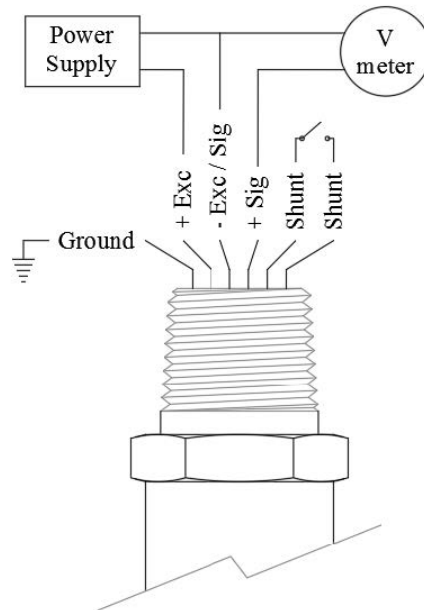


Figure 7.2: 200 Series (3-Wire Vdc)
Shunt Wires are Optional



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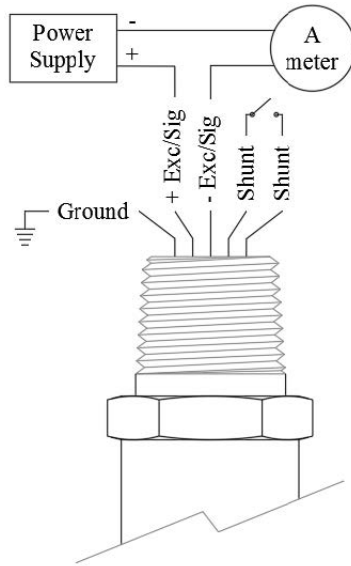


Figure 7.3: 300 Series (4-20 mA)
Shunt Wires are Optional

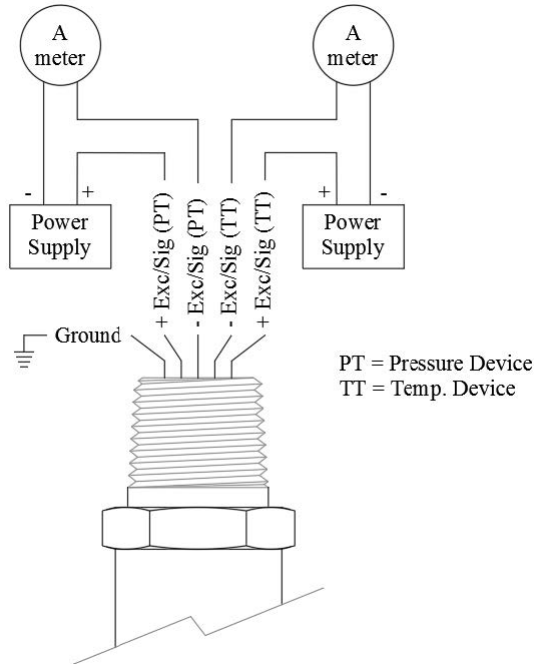


Figure 7.4: 300 Series (Dual 4-20 mA)

PT = Pressure Device
TT = Temp. Device

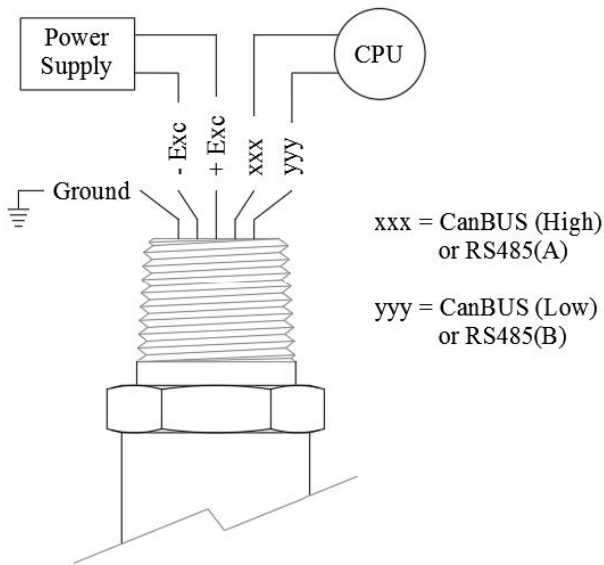


Figure 7.5: 500 Series (CanBus or CanOpen),
700 Series (RS-485)

xxx = CanBUS (High)
or RS485(A)

yyy = CanBUS (Low)
or RS485(B)

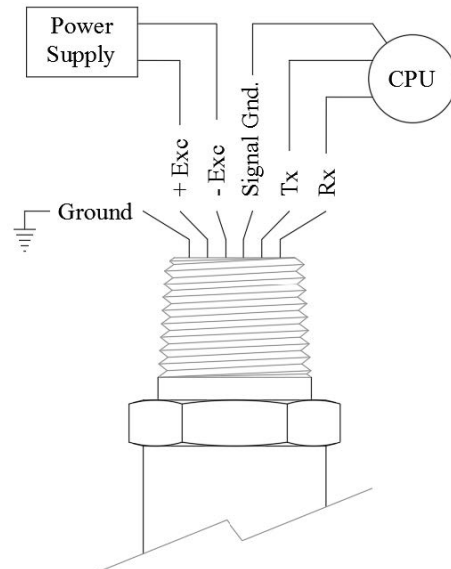


Figure 7.6: 800 Series (RS-232)