OleumTech[®] Hseries sensors



User Guide

Document ID: 80-7094-001_U

OleumTech® H Series Sensors

Smart Gauge Pressure Transmitters

Model Number: HGPTxxxx

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1. PRODUCT INTRODUCTION

1. Description

The OleumTech H Series Smart Gauge Pressure Transmitter is a high performance instrument utilizing the world's most advanced monocrystalline silicon* pressure sensor and patented encapsulation technology. The Smart Pressure Transmitter is designed for use in rigorous industrial applications with robust resistance to chemical exposures, mechanical loads, and EMI. The Smart Pressure Transmitter is easy to install and operate. It can be ordered with a 1/2" NPT male or female process connection option.

The OleumTech H Series Smart Pressure Transmitter is a natural choice for a wide variety of oil, gas, water, wastewater, and other mission-critical applications that require high level of accuracy and reliability.

Adjustable span**: High accuracy and stability

Output Signal: 1-5 V, 4-20 mA, 4-20 mA/HART, RS485 (Modbus)

Process Temperature: Silicone Oil Filling: -40 to 120 °C (-40 to 248 °F)

Local Display Interface: Simple menu system along with built-in configuration buttons allow you to configure the device in minutes. Configure in hazardous areas without removing the transmitter cover using externally isolated magnetic menu operation keys.

*HGPT10000 utilizes a piezoresistive silicon sensor.

2. Main Parameters

| Pressure Type | Gauge Pressure |
|--------------------|--|
| Measuring Range | 5 to 10,000 PSI (nominal), please refer to the ordering information section. |
| Output Signal | 1-5 V, 4-20 mA, 4-20 mA + HART, RS485 (Modbus) |
| Reference Accuracy | ± 0.075 % of full span |
| Adjustable Span | TD (Turn Down) Ratio 20:1** |

**The span adjustability does not apply to the RS485 model since the reading output is digital. The 20:1 turndown ratio does not apply to the HGPT10000.

3. Measuring Medium

Liquid, gas, and pressure

- 4. Applications Pressure, level
- 5. Approvals

OleumTech Smart Pressure Transmitters, approved for hazardous locations, are dual seal certified per CSA C22.2 No. 30-20.



| 6. | Technica | Specifications |
|----|----------|----------------|
|----|----------|----------------|

Datasheet

| HARDWARE FEATURES | | |
|-----------------------------------|--|--|
| Device Functionality | · Smart Gauge Pressure Transmitter | |
| Output Signal Options | · 1-5 V, 4-20 mA, 4-20 mA + HART, RS485 Modbus | |
| | \cdot TD \leq 10, ± 0.075% of span (With a TD ratio equal to or less than 10:1, the accuracy is 0.075% of span) | |
| Linear Output Accuracy | \cdot 10 < TD \leq 20, \pm 0.0075% x TD of span (With a TD ratio greater than 10:1 but equal to or less than 20:1, the accuracy is 0.0075% times the turndown of the span) | |
| LCD Display Mode | · PV (Process Variable) / mA / % | |
| Damping Time | Amplifier: 0-100 Seconds (Adj), Diaphragm Capsule and Silicone Oil Filling: ≤0.2 S, Start After Power Off: ≤ 6 S | |
| Unit | · PSI (Factory Default), OSI, Pa, kPa, MPa, BAR, mbar, mmHg, mHg, INHg, mmH2O, mH2O, INH2O, FTH2O, TORR, g/cm2, kg/cm2, ATM, mm, m | |
| Analog Output Type | · Linearity | |
| Basic Operational Functions | · Set PV = 0, Zero Adj (4 mA Re-range with Pressure), Span Adj (20 mA Re-range with Pressure), Factory Reset | |
| ELECTRICAL SPECIFICATIO | NS | |
| | · 1-5 V: 9-55 Vdc Max | |
| Power Supply | · 4-20 mA: 16.5 Vdc to 55 Vdc Max (28 Vdc Max for IS) | |
| | · 4-20 mA/HART: 16.5 Vdc to 55 Vdc Max (28 Vdc Max for IS) | |
| | · RS485 Modbus: 9 to 30 Vdc Max | |
| Power Consumption | · 1-5 V: 5 mA (Max) / 4-20 mA/HART: 21 mA (Max) / HART Multi-drop: 4 mA / RS485: 12 mA (Max) | |
| Surge Protection | \cdot The transmitter has been tested to withstand a transient surge up to 2000 V (common mode) or 1000 V (normal mode) without damage (Per IEC Std. 61000-4-5) | |
| MECHANICAL SPECIFICATI | ONS | |
| Dimensions (LCD) | · 3.7" (W) x 5.1" (H) x 5.2" (D) / 94 mm (W) x 130 mm (H) x 133 mm (D) | |
| Weight | · Net: 3.1 lbs. (1.39 kg), Package: 4.0 lbs. (1.81 kg) | |
| Package Dimensions | · 9.5" (W) x 8.0" (H) x 8.25" (D) / 241 mm (W) x 203 mm (H) x 210 mm (D) | |
| Enclosure Casing Material | · Type 4X Aluminum; IP66 | |
| Cable Entry Ports | · (2) 1/2" NPT, 1 Plug Included | |
| Process Connection | · 1/2" NPT 316 SS: Male (6R01) or Female (6R03), See Ordering Info | |
| CERTIFICATION & COMPLI | ANCE | |
| Safety | \cdot IS Option Available on 4-20 mA and 4-20 mA/HART Only, Explosion-proof (Standard) All Models | |
| ^ | · Class I, Division 1, Groups A, B, C, D T6; Class I Division 2, Groups A, B, C, D, T4 | |
| (SP ₀ | · Class II Division 1, Groups E, F, G T80 °C; Class III | |
| cus | · Ambient Temperature: Ta = -40 to 60 °C (-40 to 140 °F) | |
| | · Smart Pressure Transmitters, approved for hazardous locations, are dual seal certified per CSA C22.2 No. 30-20. | |
| NACE | NACE MR0175 Compliant | |
| GENERAL SPECIFICATIONS | | |
| Storage Temperature | · -40 to 85 °C (-40 to 185 °F) | |
| Process Temperature | · Silicone Oil Filling (S): -40 to 120 °C (-40 to 248 °F) | |
| Process Temp. Measurement | \cdot -40 to 85 °C (-40 to 185 °F), ±4% Accuracy (°C), Supported on Modbus and HART (SV) Models | |
| Operating Humidity | · 5 to 100% @ 40 °C (104 °F) | |
| Warranty | · 2-Year Parts and Labor | |
| ACCESSORIES | | |
| Mounting Kit | · SX1000-MK9, Includes L-Bracket 6.93" x 6.3" (176 x 160 mm), 2" U-Bolt (50.8 mm), 3" U-Bolt (76.2 mm) | |

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a. Measuring Range and Limit

| Part Number | Nominal Value / Upper Range Limit | Smallest Calibratable Span | Lower Range Limit | Overload Limit | Burst Pressure |
|--------------------------------|--------------------------------------|-------------------------------|---------------------|----------------------|----------------------|
| HGPT0005 | 5 PSI (0.345 BAR) | 0.3 PSI (0.021 BAR) | -5 PSI (-0.345 BAR) | 145 PSI (10 BAR) | 1450 PSI (100 BAR) |
| HGPT0030 30 PSI (2.068 BAR) | | 2 PSI (0.138 BAR) | -14.5 PSI (-1 BAR) | 580 PSI (40 BAR) | 3625 PSI (250 BAR) |
| HGPT0150 | 150 PSI (10.34 BAR) | 10 PSI (0.689 BAR) | -14.5 PSI (-1 BAR) | 870 PSI (60 BAR) | 7250 PSI (500 BAR) |
| HGPT0400 | 400 PSI (27.58 BAR) | 25 PSI (1.723 BAR) | -14.5 PSI (-1 BAR) | 2175 PSI (150 BAR) | 14500 PSI (1000 BAR) |
| HGPT1500 1500 PSI (103.4 BAR) | | 75 PSI (5.171 BAR) | -14.5 PSI (-1 BAR) | 2900 PSI (200 BAR) | 14500 PSI (1000 BAR) |
| HGPT3000 3000 PSI (206.84 BAR) | | 750 PSI (51.711 BAR) | -14.5 PSI (-1 BAR) | 11600 PSI (800 BAR) | 14500 PSI (1000 BAR) |
| HGPT6000 | 6000 PSI (413.68 BAR) | 750 PSI (51.711 BAR) | -14.5 PSI (-1 BAR) | 11600 PSI (800 BAR) | 14500 PSI (1000 BAR) |
| HGPT10000* | 10000 PSI (689.48 BAR) | 7250 PSI (499.87 BAR) | -14.5 PSI (-1 BAR) | 21750 PSI (1500 BAR) | 24650 PSI (1700 BAR) |

*The 20:1 turndown ratio does not apply to the HGPT10000. Setting the URV below 7250 PSI can impact accuracy on the HGPT10000.

Above measurement ranges can be converted to MPa and kPa units. Lower Range Value (LRV) and Upper Range Value (URV) can be adjusted within the scope of the upper and lower range limit.

b. Standard Specifications and Reference Conditions

Test standard: IEC60770; Zero-based calibration span, Silicon oil filling, 316L stainless steel isolated diaphragm, 4-20 mA analog output.

c. Performance Specifications

The overall performance including but not limited to reference accuracy, environmental temperature affects and other comprehensive error.

Accuracy: \pm 0.075% of full span (see Reference Accuracy for details) Stability: \pm 0.15% URL/5 years

d. Process Temperature Measurement

-40 to 85 $^\circ\text{C}$ (-40 to 185 $^\circ\text{F}), \pm$ 4% Accuracy $^\circ\text{C},$ Supported on MODBUS and HART (SV) Models Only

The limitation of the upper range is due to the industry rating of the sensor component.

e. Reference Accuracy

Standard and reference conditions, including linearity (BFSL), hysteresis and repeatability. Temperature Specifications: 20 °C \pm 5 °C (68 °F \pm 9 °F)

Linear output accuracy:

 $TD \le 10:1, \pm 0.075\%$ of span With a turndown ratio equal to or less than 10:1, the accuracy is 0.075\% of span.

 $10:1 < TD \le 20:1, \pm 0.0075\% x TD of span$

With a turndown ratio greater than 10:1 but equal to or less than 20:1, the accuracy is 0.0075% times the turndown of the span.

TD = URL/ |URV-LRV| TD = Turndown Ratio URL = Upper Range Limit URV = Upper Range Value LRV = Lower Range Value

f. Power Supply Effect

Zero and span change should not be more than \pm 0.005% URL/V when power supply changes within the range of 16.5 to 55 Vdc.

g. Mounting Position Effect

Apply to any position. Max value lower than 0.058 PSI can be corrected by zero clearing function.

h. Vibration Effects

Per IEC61298-3 tests, < 0.075% URL

i. Ambient Temperature Affect (Typical)

Apply to any position. Max value lower than 0.058 PSI can be corrected by zero clearing function.

Within the range -20 to 80 °C (-4 to 176 °F) total impact

j. Insulation Resistance

≥20 MΩ@,100 Vdc

k. Damping Time

Total damping time constant: equal to the sum of damping time of amplifier and sensor capsule

Damping time of amplifier: 0-100 S adjustable

Diaphragm capsule (isolated diaphragm and silicone oil filling) damping time: ≤ 0.2 S

Startup after power off: ≤ 6 S

Normal services after data recovery: ≤ 31 S

I. Surge Protection

The transmitter has been tested to withstand a transient surge up to 2000 V (common mode) or 1000 V (normal mode) without damage (Per IEC Std. 61000-4-5).

m. Weight

Net: 3.1 lbs. (1.39 kg), Package: 4.0 lbs. (1.81 kg)

n. 4-20 mA Power Supply Voltage vs Loop Resistance



o. HART Multi-drop Minimum Power Supply Voltage
 V min = 15.5 Vdc + 0.004 x N devices x (250 + R_loop)
 Example: four devices with round loop resistance 20 ohm
 V min = 15.5 + 0.004 x 4 x 270 = 14.82 Vdc

p. EMC Environment

| NO. | Test Items | Basic Standards | Test Conditions | Performance Level |
|----------------------|---|-----------------|--|-------------------|
| 1 | Radiated interference | CISPR22 | 30 MHz-1000 MHz | ОК |
| 2 | Conducted interference (DC power port) | CISPR22 | 0.15 MHz-30 MHz | ОК |
| 3 | Electrostatic discharge immunity test (ESD) | IEC61000-4-2 | 4 kV (Contact), 8 kV (Air) | B** |
| 4 | Immunity to radio frequency EM-fields | IEC61000-4-3 | 10 V/m (80 MHz-1 GHz) | A* |
| 5 | Power frequency magnetic field immunity test | IEC61000-4-8 | 30 A/m | A* |
| 6 | Electrical fast transient / Burst immunity test | IEC61000-4-4 | 2 kV (5/50 ns,100 kHz) | B** |
| 7 | Surge immunity requirements | IEC61000-4-5 | 1 kV (Line to line) 2 kV (Line to ground) (1.2 us/50 us) | B** |
| 8 | 8 Immunity to conducted disturbances induced IEC61000-4-6 3 V (150 kHz-80 MHz) A* by radio frequency fields A* | | | |
| *Per **Per ope | *Performance level A: The performance within the limits of normal technical specifications. **Performance level B: Temporary reduction or loss of functionality or performance, it can restore itself. The actual operating conditions, storage and data will not be changed. | | | |

7. Menu Functions

a. Output Type

| Output Signal |
|----------------|
| 1-5 V |
| 4-20 mA |
| 4-20 mA + HART |
| RS485 (Modbus) |

b. LCD Display Unit

| Display mode | Details |
|-----------------|---|
| PV | Process variable shows on main screen, percentage and progress bar shows on main screen |
| mA* | Current shows on main screen, percentage and progress bar shows on main screen |
| %* | Percentage shows on main screen, percentage and progress bar shows on main screen |

*Not applicable on the RS485 model.

c. Measuring Menu

| Mark | State |
|------|--------------------------|
| URV | Upper range value, 20 mA |
| LRV | Lower range value, 4 mA |

d. Damping Time

| Units | Setting Range |
|-------|---------------|
| S | 0-100 Seconds |

e. Unit

| Unit | Definition | |
|---|--------------------------------|--|
| kPa | Kilopascal | |
| MPa | Megapascals | |
| BAR | BAR | |
| PSI | Pounds per square inch | |
| mmHg | Millimeter of mercury @ 0 °C | |
| mmH2O | Millimeter of water @ 4 °C | |
| mH2O | Meter of water @ 4 °C | |
| INH2O | Inches of water @ 4 °C | |
| FTH2O | Feet of water @ 4 °C | |
| INHg | Inches of mercury @ 0 °C | |
| mHg | Meter mercury column @ 0 °C | |
| TORR | Torr | |
| mBAR | Millibar | |
| g/cm2 | Gram per square centimeter | |
| kg/cm2 | Kilogram per square centimeter | |
| Ра | Pascal | |
| ATM | Standard atmospheric pressure | |
| mm | Millimeter (Note1) | |
| OSI | Ounce per square inch | |
| m | Meter (Note1) | |
| Note1: Length unit need mark medium density | | |

f. Analog Output Type***

| Parameters | Output Type |
|------------|--------------------------------------|
| mA LINER | Linearity (default) |
| mA √ | Square Root |
| mA SET √ | Set Square Root (Advanced Menu Item) |

***Applies only to 4-20 mA + HART models.

g. Alarm Signal

| Parameters | Alarm Signal |
|------------|--------------|
| ALARM NO | None |
| ALARM H | 20.8 mA |
| ALARM L | 3.8 mA |

h. Fixed Output

| Parameters | Fixed Output Value |
|------------|--------------------|
| FIX/C NO | None |
| 3.8000 | 3.8000 mA |
| 4.0000 | 4.0000 mA |
| 8.0000 | 8.0000 mA |
| 12.000 | 12.000 mA |
| 16.000 | 16.000 mA |
| 20.000 | 20.000 mA |
| 20.800 | 20.800 mA |

8. Product Selection Guide

a. Ordering Information



b. Optional Mounting Kit: SX1000-MK9

L-Bracket: 6.93" x 6.3" (176 mm x 160 mm) U-Bolt 1: Diameter: 2" (50.8 mm), Radius: 0.83" (21 mm) U-Bolt 2: Diameter: 3" (76.2 mm), Radius: 1.28" (32.5 mm)



c. Sensor Selection Table

| Code | Nominal Value | Description |
|--|------------------|---|
| HGPT0005 | 5 PSI | Range -5.8 to 5 PSI, smallest calibratable span 0.3 PSI |
| HGPT0030 | 30 PSI | Range -1.45 to 30 PSI, smallest calibratable span 2 PSI |
| HGPT0150 | 150 PSI | Range -1.45 to 150 PSI, smallest calibratable span 10 PSI |
| HGPT0400 | 400 PSI | Range -14.5 to 400 PSI, smallest calibratable span 25 PSI |
| HGPT1500 | 1500 PSI | Range -14.5 to 1500 PSI, smallest calibratable span 75 PSI |
| HGPT3000 | 3000 PSI | Range -14.5 to 3000 PSI, smallest calibratable span 750 |
| HGPT6000 | 6000 PSI | Range -14.5 to 6000 PSI, smallest calibratable span 750 PSI |
| HGPT10000 | 10000 PSI | Range -14.5 to 10000 PSI, smallest calibratable span 7250 PSI |
| Lower Range Value (LRV) and Upper Range Value (URV) can be adjusted within the scope of the upper and lower range limit, smallest calibratable span \leq URV – LRV \leq URL. | | |

d. Diaphragm

| Code | Items | Description |
|------|-----------|-------------|
| Н | Diaphragm | Hastelloy C |
| S | material | 316L SS |



e. Sensor Filling Fluid and Sensor Seal

| Code | Items | Description | |
|------|---------------|---|--|
| S | Fluid Filling | Silicone Oil Filling: -40 to 120 $^\circ\text{C}$ (-40 to 248 $^\circ\text{F})$ | |
| F | F Sensor seal | FKM | |
| S | | Stainless steel welding seal | |

f. Housing Type

Aluminum-alloy terminal, 2 cable entry 1/2" NPT (F), 1 plug included



g. Output Type

| Code | Items | Description |
|------|------------------|-------------------------|
| D | Output signal | 1-5 V |
| F | | 4-20 mA two wire |
| Н | - | 4-20 mA + HART two wire |
| R | | RS485 MODBUS |

h. Display Option

| Code | Items | Description |
|------|---------|-------------------------------------|
| А | Display | Without display |
| С | | With LCD display (Backlit LCD type) |

i. Process Connection Selection Table

| Code | Items | Description |
|------|----------------|--|
| 6R01 | Specifications | 1/2"-14 NPT(M), Φ3 pressure lead holes, ANSI/ASME B1.20.1, Stainless steel, 316 SS |
| 6R03 | | 1/2"-14 NPT(F), Φ3 pressure lead holes, ANSI/ASME B1.20.1, Stainless steel, 316 SS |

Process Connection (R01) (mm)



Process Connection (R03) (mm)



- 9. Product Dimensions
 - a. Drawings and Dimensions of HGPTxxxx with a Display (C option)





b. Drawings and Dimensions of HGPTxxxx without a Display (A option, contact sales for more details) (inches/mm)





2. HARDWARE OVERVIEW

1. Enclosure







4

All housing entries MUST be tightly SEALED using thread seal tape or sealant. Failure to seal all port entries may allow moisture to enter the transmitter housing, cause damage to internal components, and void warranty.



All housing covers MUST be tightly fastened to protect against external environmental elements.



Check the housing cover O-ring(s) every time the access cover is removed.

- Apply lubricant if the O-ring is dry.
- Replace the O-ring when it is damaged, discolored, or showing signs of wear.
- The O-ring should be seated firmly on the bottom of threads without stretching to fit or without bulging.



While the transmitter includes multiple layers of UV protection to prevent degradation of the LCD Display, it is strongly recommended to install the unit facing the display away from direct sunlight to maximize the life of the LCD.



Set Screw(s) for Front and Rear Enclosure Covers (For Explosion-Proof Compliance)

Ext. Config. Buttons Located Underneath the Top Metal Plate

Process Connection
 1/2" NPT Male or
 1/2" NPT Female



3. SAFETY, CERTIFICATIONS, COMPLIANCE

1. Safety



CAUTION: Ensure installation of the transmitter meets applicable state and National Electrical Code requirements. The installation of the transmitter should only be performed by a qualified installer or a factory representative.

WARNING: The pressure transmitter is powered by an external power supply. The power supply circuit must comply with energy-limiting circuit by relevant standards and pay attention to the high voltage circuits that may exist.

WARNING: Do not exceed the maximum static pressure rating of the sensor.

WARNING: Using the pressure transmitter in hazardous areas, installation, use and maintenance must also comply with the operation manual and relevant requirements of national standards.

WARNING: Disassemble the pressure transmitter only at normal atmospheric pressure.

WARNING: EXPLOSION HAZARD – THIS DEVICE SHALL BE REMOVED FROM THE AREA KNOWN TO BE HAZARDOUS IF MAINTENANCE IS REQUIRED.

WARNING: To prevent static discharge, wipe with damp cloth only.

WARNING: Although the transmitter is very durable, do not install it on high vibration applications or where transmitter is subject to severe mechanical shock.

WARNING: If the equipment is used in a manner not specified by OleumTech, the protection provided by the equipment may be impaired.

WARNING: Safety of any system incorporating the transmitter is the responsibility of the assembler of the system.

WARNING: Do not open when an explosive atmosphere is present.

WARNING: A seal shall be installed within 50 mm of the enclosure.

CAUTION: While the transmitter includes multiple layers of UV protection to prevent degradation of the LCD Display, it is strongly recommended to install the unit facing the display away from direct sunlight to maximize the life of the LCD.

Sécurité



MISE EN GARDE: Veiller à l'installation de la passerelle répond Etat et des exigences nationales de code de l'électricité. L'installation de la transmitter ne doit être effectuée par un installateur qualifié ou un représentant de l'usine.

AVERTISSEMENT: le transmetteur de pression est alimenté par une alimentation externe, le circuit d'alimentation doit être conforme au circuit de limitation d'énergie selon les normes applicables et faire attention aux circuits haute tension qui peuvent exister.

AVERTISSEMENT: Ne dépassez pas la pression nominale maximale du capteur.

AVERTISSEMENT: L'utilisation du transmetteur de pression dans des zones dangereuses, l'installation, l'utilisation et la maintenance doivent également être conformes au manuel d'utilisation et aux exigences pertinentes des normes nationales.

AVERTISSEMENT: ne démontez le transmetteur de pression qu'à la pression atmosphérique normale.

AVERTISSEMENT: RISQUE D'EXPLOSION - CET APPAREIL DOIT ÊTRE RETIRÉ DE LA ZONE CONNUE POUR ÊTRE DANGEREUSE SI L'ENTRETIEN EST NÉCESSAIRE.

AVERTISSEMENT: pour éviter les décharges d'électricité statique, essuyez uniquement avec un chiffon humide.

AVERTISSEMENT: bien que le transmetteur soit très durable, ne l'installez pas sur des applications à fortes vibrations ou là où le transmetteur est soumis à de graves chocs mécaniques.

AVERTISSEMENT: si l'équipement est utilisé d'une manière non spécifiée par OleumTech, la protection fournie par l'équipement peut être altérée.

AVERTISSEMENT: La sécurité de tout système intégrant l'émetteur est de la responsabilité de l'assembleur du système.

AVERTISSEMENT: ne pas ouvrir en présence d'une atmosphère explosive.

AVERTISSEMENT: Un joint doit être installé à 50 mm du boîtier.

ATTENTION: Bien que l'émetteur comprenne plusieurs couches de protection UV pour éviter la dégradation de l'écran LCD, il est fortement recommandé d'installer l'unité face à l'écran à l'abri de la lumière directe du soleil pour maximiser la durée de vie de l'écran LCD.

2. Certifications

OleumTech Smart Pressure Transmitters, approved for hazardous locations, are dual seal certified per CSA C22.2 No. 30-20.



Class I, Division 1, Groups A, B, C, D T6 Class I, Division 2, Groups A, B, C, D T4 Class II, Division 1, Groups E, F, G T80 °C Class III Ambient Temperature: Ta = -40 to 60 °C (-40 to 140 °F)

| Certificate Organization | ECM |
|-----------------------------|---|
| License Scope | HGPT pressure transmitter |
| Mark | RoHS |
| Directive | 2011/65/EU |
| Certification Criteria | IEC62321-1:2013 IEC62321-5:2014 IEC62321-2:2013 IEC62321-6:2015 IEC62321-4:2014 IEC62321-7-1:2015 |

Flameproof Certificates

| Certificate Organization | CSA |
|--------------------------|--|
| License Scope | HGPT Pressure Transmitter |
| Explosion-proof Ratings | Class Div 1, Grp A,B,C,D T6, Class II Div 1 Grp E,F,G T80 °C |
| Working Environmental | -40 °C to +60 °C |
| Maximum Medium | +120 °C |
| Registration Number | Master Contract 601800 |

NACE MR0175 Compliance

NACE MR0175 is the standard most often used when determining suitability of devices for use in H2S measurement or sour oil field production environments. The standard details requirements for the selection and material qualifications. NACE does not provide product certification services.

OleumTech Smart Pressure Transmitters use 316 SS, 316L SS and Hastelloy C in wetted metal applications and connection components, and conforms to NACE MR0175 metallurgical recommendations and requirements.

3. Special Conditions of Use (Special Conditions)

Copies of Certificate of Compliance are available on <u>https://hseries.oleumtech.com</u> (Look under Resources)

Specific Conditions of Use (Special Conditions)

The following conditions relate to the safe installation and/ or use of the equipment.

- a. When the transmitter is installed in a Zone 0 hazardous area ignition sources due to impact and friction sparks could occur. The user must ensure protection of transmitter against impact or friction.
- b. The flameproof joints shall not be repaired. Contact the manufacturer for information on the dimensions of the flameproof joints.
- c. The Intrinsically Safe version of the transmitter does not satisfy 500 V test per IEC 60079-11, Clause 6.3.1.3 and shall be supplied by an isolated barrier which is suitable with the electrical parameters of the equipment: Ui = 28 V, Ii = 93 mA, Pi= 0.65 W, Li = 0 mH, Ci = 0 μ F.
- d. The user shall ensure the surface temperature of the sensor connector does not exceed +60 $^\circ C$ (+140 $^\circ F).$

Conditions of Acceptability:

a. Temperature code depends on process temperature as follows:

| T-Code | Ambient Temperature | Process Temperature |
|--------|---------------------|---------------------|
| | Gas, Vapo | r & Mists |
| Т6 | -40 to 60 °C | -40 to 80 °C |
| | Dusts, Fiber | rs & Flyings |
| T80°C | -40 to 60 °C | -40 to 80 °C |

- b. The branch pointing and entry point temperature may exceed 60 °C when the process temperature is more than 80 °C. If this occurs, the end user shall select the suitable certified cable, conduit fittings and stopping plug for final installation. Use conductors rated at least 5 °C above the maximum operating ambient.
- Wiring to or from this equipment, which enters or leaves the explosionproof enclosure, must utilize wiring methods suitable for Class I, Division 1 Hazardous Locations in accordance to the Canadian Electrical Code or National Electrical Code.
- d. This equipment may only be powered by a power supply unit with a limited energy electric circuit in accordance with CAN/CSA C22.2 No. 61010-1-12 and ANSI/UL 61010-1, or Class 2 as defined in the Canadian Electrical Code C22.1, Section 16-200 and/or National Electrical Code (NFPA 70), article 725.121.

4. POWER

1. Supply Voltage

- 1-5 V: 9 to 55 Vdc Max
- 4-20 mA: 16.5 Vdc to 55 Vdc Max (28 Vdc Max for IS)
- 4-20 mA/HART: 16.5 Vdc to 55 Vdc Max (28 Vdc Max for IS)
- RS485 (Modbus): 9 to 30 Vdc Max

2. Current Consumption

- 1-5 V: 5 mA (Max)
- 4-20 mA, 4-20 mA/HART: 21 mA (Max)
- HART Multi-drop: 4 mA
- RS485 (Modbus): 12 mA (Max)

3. Grounding

• To avoid ground loops, shielded twisted pair signal cable is recommended. Shielded layer utilizes single-grounding, insulated from the pressure transmitter, with grounding at the control cabinet.

4. Surge Protection

• The transmitter has been tested to withstand a transient surge up to 2000 V (common mode) or 1000 V (normal mode) without damage (Per IEC Std. 61000-4-5).

5. WIRING DIAGRAMS

1. Electrical Connection

a. RS485 Wiring

- i. Use twisted wire pair.
- ii. The last RS485 device in the chain requires a 120 ohm termination.

| Terminal | 4-Wire |
|----------|--------|
| + | Power+ |
| - | Power- |
| А | TR+ |
| В | TR- |



RS485 MODBUS MULTIDROP WIRING



b. 1-5 V Wiring

c. 4-20 mA Wiring

1-5 V WIRING

Latest hardware version:



4-20mA WIRING



| Terminal | 2-Wire |
|----------|---------|
| + | Signal+ |
| - | Signal- |
| А | N/A |
| В | N/A |

Original hardware version:



*Barriers Boards are only required with Intrinsically Safe models and not required for standard Explosion Proof models.

<u>*Click here</u> to view third-party barrier board reference for use with this device (Only required with IS model option).

d. HART Multi-drop Wiring

- Multi-drop up to 10 devices for Intrinsic Safety wiring.
- Multi-drop up to 15 devices for Explosion-proof wiring.

<u>*Click here</u> to view third-party barrier board reference for use with this device (Only required with IS model option).

Minimum Power Supply Voltage:

V min = 15.5 Vdc + 0.004 x N devices x (250 + R_loop)

Example: four devices with round loop resistance 20 ohm

V min = 15.5 + 0.004 x 270 = 14.82 Vdc



HART MULTIDROP WIRING Use HART IDs 1-15

6. INSTALLATION

- 1. Mounting
 - a. Direct Mount Installation







Do not loosen the set screw or the sensor.

The sensor has been pre-installed and sealed from the factory. Loosening the sensor set screw may cause transmitter damage and also cause water ingress issues.





While the transmitter includes multiple layers of UV protection to prevent degradation of the LCD Display, it is strongly recommended to install the unit facing the display away from direct sunlight to maximize the life of the LCD.

b. Bracket Mount Installation (Use SX1000-MK9 Mounting Kit)



- 2. Process Connection
 - a. Straight Threaded Connection



Picture 1: The length of pressure transmitter thread should be longer than the depth of the thread to ensure an effective seal with the head gasket.

Picture 2: The length of pressure transmitter thread should be shorter than the depth of the thread to ensure an effective seal with the root gasket.

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3. Cable Protection Conduit





When using Explosion-proof pressure transmitters in hazardous locations, a metal Explosion-proof conduit should be used to connect the cable into the threading box, and lead to a non-hazardous location.

WARNING: Do not open when an explosive atmosphere is present.

WARNING: A seal shall be installed withing 50 mm of the enclosure.

4. Zero Point Calibration

- Perform the calibration after completing the installation because the mounting position will affect the zero setting.
- The transmitter must be isolated from the process.
- No pressure or medium on the measuring diaphragm, the system is under atmospheric conditions.
- Power connection please refer to Local LCD Display Interface sections.
- Please set PV=0 after three weeks of installation to ensure the best accuracy
- Set PV=0 at least once a year.

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7. MODBUS RTU COMMUNICATIONS PROTOCOL

1. Communication Command List

Items in parentheses are the decimal form of Starting Register / Register Quantity / Register Value

| No. | Function Code | Starting Address | Register Quantity | Byte Count | Register Value | Description |
|-----|-------------------------------|------------------|-------------------|---------------|-------------------|---|
| | 3 - Read Holding Registers | 0 | 4 | No | | Read Pressure & Temperature |
| 1 | | 0 | 2 | | No | Read Pressure |
| | | 4 | | | | Read Temperature |
| | 4 - Read Input Registers | 4 | 2 | No | No | Read Parameter - Lower Limit (SLL), Read Only |
| | | 8 | | | | Read Parameter - Upper Limit (SLH), Read Only |
| | | 40 | | | | Read Parameter - Baud Rate (BT) |
| 2 | | 44 | | | | Read Parameter - Slave Address (DE) |
| | | 48 | | | | Read Parameter - Check Mode (0ddP) |
| | | 52 | | | | Read Parameter - Stop Bit (Stop) |
| | | 60 | | | | Read Parameter - Float Format (FFT) |
| | 6 - Write Single Registers | | No | No | 0 | PV Clear |
| | | 0 | | | 1 | Zero Micro Adjustment |
| 3 | | | | | 2 | Full Scale Micro Adjustment |
| | | 2 | No | No | 222 | Software Reset |
| | | 4 | | | 165 | Restore Factory Data |
| 4 | 16 - Write Multiple Registers | 40 | 2 | 4 | Float Data | Write Parameter - Baud Rate (BT) |
| | | 44 | | | | Write Parameter - Slave Address (DE) |
| | | 48 | | | | Write Parameter - Check Mode (0ddP) |
| | | 52 | | | | Write Parameter - Stop Bit (Stop) |
| | | 60 | | | | Write Parameter - Float Format (FFT) |

Starting Address Example:

Table's Starting Address = 4

PLC Starting Address = 30004

Floating Point Starting Address = 7004

*All read register values are float (split 32 -bit).

2. RS485 Error Code Table

The product has a dynamic self-test function, which can reflect the running error through LCD or RS485 interface.

| Error Code | Description | | |
|------------|---|--|--|
| ERR00 | CRC error | | |
| ERR01 | Function code error | | |
| ERR02 | Start address error | | |
| ERR03 | Register quantity error | | |
| ERR11 | Measure data or parameter value outside the valid display range! | | |
| ERR12 | Output current < AOLC (LCD displays "OUT < AOLC") | | |
| ERR13 | Output current > AOHC (LCD displays "OUT > AOHC") | | |
| ERR20 | Product block 1 calibration data is damaged(LCD displays"NO CAL") | | |
| ERR21 | Product block 2 calibration data is damaged(LCD displays"NO CAL") | | |
| ERR22 | Product backup data is damaged(LCD displays "No BAK") | | |
| ERR30 | Product control data calculation error 1! | | |
| ERR31 | Product control data calculation error 2! | | |
| ERR32 | Product control data calculation error 3! | | |
| ERR33 | Product control data calculation error 4! | | |
| ERR34 | Product control data calculation error 5! | | |
| ERR35 | Product control data calculation error 6! | | |
| ERR36 | Product control data calculation error 7! | | |
| ERR37 | Product control data calculation error 8! | | |
| ERR40 | Product control data calculation error 9! | | |
| ERR41 | Product control data calculation error 10! | | |
| ERR42 | Product control data calculation error 11! | | |
| ERR42 | Product control data calculation error 11! | | |
| ERR43 | Product control data calculation error 12! | | |
| ERR49 | Product control data calculation error 13! | | |

| Error Code | Description | |
|--|---|--|
| ERR51 | LRV parameter value outside the valid range! | |
| ERR52 | URV parameter value outside the valid range! | |
| ERR56 | KK parameter value outside the valid range! | |
| ERR57 | FIXC parameter value outside the valid range! | |
| ERR58 | AOLC parameter value outside the valid range! | |
| ERR59 | AOHC parameter value outside the valid range! | |
| ERR60 | BD parameter value outside the valid range! | |
| ERR61 | ID parameter value outside the valid range! | |
| ERR62 | PAR parameter value outside the valid range! | |
| ERR63 | Stop parameter value outside the valid range! | |
| ERR64 | FFT parameter value outside the valid range! | |
| ERR65 | UUR parameter value outside the valid range! | |
| ERR43 | Product control data calculation error 12! | |
| ERR49 | Product control data calculation error 13! | |
| ERR51 | LRV parameter value outside the valid range! | |
| ERR52 | URV parameter value outside the valid range! | |
| ERR56 | KK parameter value outside the valid range! | |
| ERR57 | FIXC parameter value outside the valid range! | |
| ERR58 AOLC parameter value outside the valid rar | | |

8. LOCAL LCD DISPLAY INTERFACE - RS485

1. LCD Function

The LCD-enabled transmitter provides a 3-button (1, 2, 3) local display interface that allows the users to fully configure the device settings and parameters.

The internal buttons are designed for use in non-hazardous locations, whereas the external buttons are for use in hazardous locations.

The 3-button interface is located on both the LCD Module (internal) and on top of the enclosure (external) accessible by pivoting the metal plate cover.



While the transmitter includes multiple layers of UV protection to prevent degradation of the LCD Display, it is strongly recommended to install the unit facing the display away from direct sunlight to maximize the life of the LCD.

a. Local LCD Display Interface:



The backlit local LCD display is always on for providing instant process data and configuration accessibility.

b. Operation in Non-Hazardous Locations:



The internal buttons located on the LCD Module can be used in safe areas.

c. Operation in Hazardous Locations:



The external buttons are located on top of the enclosure accessible underneath the metal plate cover.

- 2. Basic LCD Functions RS485 Modbus
 - a. Set the **Process Value** (PV) = 0 Atmospheric Pressure The transmitter must be isolated from the process.



b. Factory Reset



c. Switching Temperature Unit (°C or °F)



3. Operating Instructions

Use button 2 to scroll through the menu system.



*The 20:1 turndown ratio does not apply to the HGPT10000. Setting the URV below





Range: -19999 to 99999

The span adjustability does not apply to the RS485 model since the reading output is digital.

b. Optional - Configure the **Upper Range Value** (URV).



Range: -19999 to 99999

The span adjustability does not apply to the RS485 model since the reading output is digital.





e. Configure the **Parity Mode**.



Options: 0 = None 1 = Odd (Default) 2 = Even

Parity

Mode

f. Configure the **Stop Position**.



Options: 1 = 1 Stop Position (Default)

2 = 2 Stop Position

g. Configure the Float Format*.



Options:

0 = ABCD (Default)

1 = CDAB

- 2 = BADC
- 3 = DCBA

*The float format parameter is used for the device output pressure/temperature float data format, the factory default is ABCD.

h. Configure the Output Pressure Unit.



Options:

| 0 = None | 1 = kPa | 2 = Mpa |
|-------------------------|---------------|---------------|
| 3 = Pa | 4 = bar | 5 = mbar |
| 6 = psi (Default) | 7 = mH2o@4C | 8 = mmH2o@4C |
| 9 = cmH2o@4C | 10 = inH2o@4C | 11 = ftH2o@4C |
| 12 = cmHg@0C | 13 = mmHg@0C | 14 = inHg@0C |
| 15 = kg/cm ² | $16 = g/cm^2$ | 17 = Torr |
| 18 = Atm | 19 = m | 20 = mm |
| 21 = osi | 22 = psf | |
| | | |

4. Display Advanced Menu System



Use button 2 to scroll through the menu system.

a. Configure the TxDT (Transmit Delay Time).



Range: 0 to 600

Transmit delay time is used to allow the communication line to stabilize before sending data.

b. Exit the Advanced Menu System by power cycling the device without pressing any buttons.

9. LOCAL LCD DISPLAY INTERFACE - 1-5 V

1. LCD Function

The LCD-enabled transmitter provides a 3-button (1, 2, 3) local display interface that allows the users to fully configure the device settings and parameters.

The internal buttons are designed for use in non-hazardous locations, whereas the external buttons are for use in hazardous locations.

The 3-button interface is located on both the LCD Module (internal) and on top of the enclosure (external) accessible by pivoting the metal plate cover.



While the transmitter includes multiple layers of UV protection to prevent degradation of the LCD Display, it is strongly recommended to install the unit facing the display away from direct sunlight to maximize the life of the LCD.

a. Local LCD Display Interface:



The backlit local LCD display is on by default and can be turned off. It provides instant access to process data and configuration.

b. Operation in Non-Hazardous Locations:



The internal buttons located on the LCD Module can be used in safe areas.

c. Operation in Hazardous Locations:



The external buttons are located on top of the enclosure accessible underneath the metal plate cover.

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- 2. Basic LCD Functions 1-5 V
 - a. Set the Pressure Value (PV) = 0 Atmospheric Pressure



b. **PV (Pressure Value) and SV (Secondary Value)** Auto Switching display

The PV and SV display on two rows. The PV, pressure value is displayed continuously on the top row in large font. The PV engineering units and the temperature values alternate displaying every four seconds each on the bottom row.

Default temperature unit is °F.



c. Backlight Settings (1-5 V Models Only)



d. Factory Reset



3. Operating Instructions

Use button 2 to scroll through the menu system



a. Configure the Display Mode.



Options:

% = Percentage, PV = Process Value (Default), V = Voltage

b. Configure the Unit.



Options:

PSI (Default), kPa, MPa, bar, mmHg, mmH2O, mH2O, inH2O, ftH2O, inHg, mHg, TORR, Mbar, g/cm2, kg/cm2, Pa, ATM, osi, mm, m

Options in the Advanced Menu System: °C, °F (Default), K, m/s, kPa

c. Configure the Lower Range Value - LRV.



Range: -19999 to 99999 (actual editable range depends on the model)

d. Configure the **Upper Range Value** - URV.



Range: -9999 to 99999 (actual editable range depends on the model)

g. Configure the Fault Alarming Signal.



e. Configure the **Damping Time**.



f. Configure the **Output Signal Type**.

LINER = Linear (Default)



h. Configure the PV Offset (if applicable)



After applying a PV Offset, you can use the Unit Zoom parameter to apply a correction coefficient (analog output is not affected by this setting).

Display New Value = Displayed Value before correction * Zoom e.g. 50 = 5 * 10



10. LOCAL LCD DISPLAY INTERFACE - 4-20 mA/HART



The polling address must be set to 0 to enable the 4-20 mA analog output signal.

1. LCD Function

The LCD-enabled transmitter provides a 3-button (1, 2, 3) local display interface that allows the users to fully configure the device settings and parameters.

The internal buttons are designed for use in non-hazardous locations, whereas the external buttons are for use in hazardous locations.

The 3-button interface is located on both the LCD Module (internal) and on top of the enclosure (external) accessible by pivoting the metal plate cover.

While the transmitter includes multiple layers of UV protection to prevent degradation of the LCD Display, it is strongly recommended to install the unit facing the display away from direct sunlight to maximize the life of the LCD.

a. Local LCD Display Interface:



The backlit local LCD display is always on and provides instant access to process data and configuration.

b. Operation in Non-Hazardous Locations:



The internal buttons located on the LCD Module can be used in safe areas.

c. Operation in Hazardous Locations:



The external buttons are located on top of the enclosure accessible underneath the metal plate cover.

LOADING

Release

button.

Loading/

processing

0.00

PSI

2. Basic LCD Functions – 4-20 mA/HART

a. Set the Pressure Value (PV) = 0 Atmospheric Pressure



b. PV (Pressure Value) and SV (Secondary Value) Auto Switching display

The PV and SV display on two rows. The PV, pressure value is displayed continuously on the top row in large font. The PV engineering units and the temperature values alternate displaying every four seconds each on the bottom row.

ii. Method 2
 Press and hold 3, then power on device and wait about 5 seconds.
 0.00
 PSI

Release 1, then

least 2 seconds.

press 3 for at

0.00

RESTORE

Factory Reset

Method 1

0.00

PSI

Press 1, for at

least 5 seconds.

c. |

Default temperature unit is °F.



3. Operating Instructions

Use button 2 to scroll through the menu system



m. Configure the Display Mode.



Options:

% = Percentage, PV = Process Value (Default), mA = Current

n. Configure the Unit.



Options:

PSI (Default), kPa, MPa, bar, mmHg, mmH2O, mH2O, inH2O, ftH2O, inHg, mHg, TORR, Mbar, g/cm2, kg/cm2, Pa, ATM, osi, mm, m

Options in the Advanced Menu System: °C, °F (Default), K, m/s, kPa

o. Configure the Lower Range Value - LRV.



Range: -19999 to 99999 (actual editable range depends on the model)

p. Configure the Upper Range Value - URV.



Range: -9999 to 99999 (actual editable range depends on the model)

s. Configure the Fault Alarming Signal.



t. Configure the PV Offset (if applicable)



r. Configure the Output Signal Type.





After applying a PV Offset, you can use the Unit Zoom parameter to apply a correction coefficient (analog output is not affected by this setting).

Display New Value = Displayed Value before correction * Zoom e.g. 50 = 5 * 10

u. Configure the **HART ID** (if applicable)



Optional address 0-15

K, Kelvin

0 (Default) = Broadcast address (4-20 mA Output)

v. SV (Secondary Value) Display Mode

1-15: Non-broadcast address (fixed analog output to 4 mA)



The polling address must be set to 0 to enable the 4-20 mA analog output signal.

w. Configure the Decimal Placement.



NON = No decimals

1 = Max one decimal

- 2 = Max two decimals
- 3 = Max three decimals



х.

Press 1

Configure the Fixed Output Current.

NO = None, 3.8000 mA, 4.0000 mA, 8.0000 mA, 12.000 mA, 16.000 mA, 20.000 mA, 20.8000 mA

to modify.

3.8000

FIX\C mA



4. Display Advanced Menu System



Use button 2 to scroll through the menu system.

The advanced menu items are visible along with the normal operations menu items.

b. Configure the **Display Unit Function**.



c. Set the Secondary Table Display (TBL).



LRV TBL: Set 4 mA corresponding value URV: Set 20 mA corresponding value

d. Configure the **Output Type (Square root output initial value configurable)**.



Options:

√, Square root

LINER, Linear (Default)

Set V, Set initial value of square root output

a. Configure the **Display Mode**.



Options:

% = Percentage, PV = Process Value (Default), mA = Current,

TBL = Secondary display table is not supported

K





Range: 0 to 0.008 Default: Initial Square Root Value: 0.002

I. Configure the Density Compensation.



- $F2 = 2^{nd}$ coefficient (Default)
- m. Configure the Density Compensation Temperature Initial Value.



Temperature Compensation unit: °C Compensation starts when the value is over the set value Range: 0 to 100 Default: 85 °C n. Set the Initial Value of the Secondary Thermal Effect Correction Function.



Range: -50 to 50 Default: 0 %

Directly subtract the percentage of the set value full scale output (16 mA from the original output, subject to the initial temperature value.

o. Configure the **Unit Zoom**.



Range: 0.1000 to 9.8999

Default: 1

In some multi-device occasions, the instrument display needs to be consistent, and this setting value can be used to make the LCD display value consistent, but does not change the loop output value.

p. Exit the Advanced Menu System by power cycling the device without pressing any buttons.

11. HART DEVICE CONNECTION

1. HART Support

4-20 mA/HART (LCD and Non-LCD) models support HART Universal and Common Practice Commands, which are compatible with most of the HART field Communicators.

2. Steps to connect to the HART device

- a. Connect the HART modem to the HART device.
- b. Run the HART software.
- c. Select Tools from the toolbar.
- d. Select Default Params.
- e. Select the serial port for the HART device.
- f. Select the device's polling address.
- g. Set the display units.
- h. Click update.
- i. The device should be connected.

3. Steps to change the HART ID

- a. Complete the steps above.
- b. Once you have a stable connection, click on the instrument number.
- c. On Station, change the value as needed.
- d. Click update.
- e. On the bottom left of the screen set the new ID number.

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12. TROUBLESHOOTING

1. RS485

- a. MODBUS read failures:
 - i. Verify that you are providing enough power and the load resistance meets normal working requirements.
 - ii. Check the unit for damage or malfunction.
- iii. Verify that the configuration for RS485 communication matches on the unit as well as on the software/PLC being used.
- iv. Verify the wiring for RS485 communication to the PC/PLC.
- v. Verify that the LCD is on the main screen, cycling through the configuration settings can cause a timeout error to appear when trying to use RS485 to communicate.
- vi. If the MODBUS registers are not populated with any data, verify the correct register addresses are set by referencing the register table.
- vii. If ERR15 shows on the LCD as well as on the software or PLC being used, factory reset the device.
- b. The device is reporting incorrect measurements:
 - i. Verify the wiring using the provided diagrams and ensure a good connection.
 - ii. If pressure values are dropping, ensure that there is a proper seal between connections to prevent leakage. If the pressure values remain that same even while applying/increasing pressure, ensure there is nothing blocking the pressure.
- iii. Zero the unit under atmospheric conditions.
- iv. If values are larger or outside the anticipated range, verify that the configured range settings are correct or preform the appropriate calibration. Determining if there are temperature fluctuations in the installation can also help identify what could be causing these values.
- c. How to escape the advanced settings mode:
 - If the device is held in advanced settings mode or has an "Expert" message showing on all screens, first disconnect power from the device. Clear out any possible obstructions that may be jammed or compressing the 2 button and then power the device back on. Upon start up there should be no "Expert" message displayed.

2. HART

- a. HART Communication failures:
 - i. Verify that you're providing enough power and the load resistance meets normal working requirements.
 - ii. Check the unit for damage or malfunction.
 - iii. Verify the wiring to the HART module / HART device.
 - iv. Verify that the ID is correctly set on the device when using HART software (Multidrop).
 - v. Multi-drop requires unique IDs and final assembly numbers in order to communicate.
- b. The device is reporting incorrect measurements:
 - i. Verify the wiring using the provided diagrams and ensure a good connection.
 - If pressure values are dropping, ensure that there is a proper seal between connections to prevent leakage. If the pressure values remain that same even while applying/increasing pressure, ensure there is nothing blocking the pressure.
- iii. Zero the unit under atmospheric conditions.
- If values are larger or outside the anticipated range, verify that the configured range settings are correct or preform the appropriate calibration. Determining if there are temperature fluctuations in the installation can also help identify what could be causing these values.
- c. How to escape the advanced settings mode:
 - i. If the device is held in advanced settings mode or has an "Expert" message showing on all screens, first disconnect power from the device. Clear out any possible obstructions that may be jammed or compressing the 2 button and then power the device back on. Upon start up there should be no "Expert" message displayed.

3. 4-20 mA

- a. 4-20 mA Output failures:
 - i. Verify that you are providing enough power and the load resistance meets normal working requirements.
 - ii. Check the unit for damage or malfunction.
 - iii. Verify the wiring for the 4-20 mA model is correct.
 - iv. Verify that the ID is set to 0 for 4-20 mA output.
- b. The device is reporting incorrect measurements:
 - i. Verify the wiring using the provided diagrams and ensure a good connection.
 - ii. If pressure values are dropping, ensure that there is a proper seal between connections to prevent leakage. If the pressure values remain that same even while applying/increasing pressure, ensure there is nothing blocking the pressure.
 - iii. Zero the unit under atmospheric conditions.
 - If values are larger or outside the anticipated range, verify that the configured range settings are correct or preform the appropriate calibration.

Determining if there are temperature fluctuations in the installation can also help identify what could be causing these values.

- c. How to escape the advanced settings mode:
 - If the device is held in advanced settings mode or has an "Expert" message showing on all screens, first disconnect power from the device. Clear out any possible obstructions that may be jammed or compressing the 2 button and then power the device back on. Upon start up there should be no "Expert" message displayed.

4. 1-5 V

- a. 1-5 V Output failures:
 - i. Verify that you are providing enough power and the load resistance meets normal working requirements.
 - ii. Check the unit for damage or malfunction.
 - iii. Verify the wiring for the 1-5 V model is correct.
 - iv. Verify that the ID is set to 0 for 1-5 V output.
- b. The device is reporting incorrect measurements:
 - i. Verify the wiring using the provided diagrams and ensure a good connection.
 - ii. If pressure values are dropping, ensure that there is a proper seal between connections to prevent leakage. If the pressure values remain that same even while applying/increasing pressure, ensure there is nothing blocking the pressure.
 - iii. Zero the unit under atmospheric conditions.
 - iv. If values are larger or outside the anticipated range, verify that the configured range settings are correct or preform the appropriate calibration. Determining if there are temperature fluctuations in the installation can also help identify what could be causing these values.
- c. How to escape the advanced settings mode:
 - If the device is held in advanced settings mode or has an "Expert" message showing on all screens, first disconnect power from the device. Clear out any possible obstructions that may be jammed or compressing the 2 button and then power the device back on. Upon start up there should be no "Expert" message displayed.

13. MAINTENANCE

1. General

The H Series transmitter is easy to maintain and does not require periodic system checks. Sensor generally only needs a yearly visual inspection determine:

- Is the device still securely fastened to the mounting location?
- Are there any visible signs of corrosion, cracks or residue build-up on the unit?
- Has anything about the intended use of the original application changed?

If the device is securely fastened, with no signs of corrosion, cracks, or residue build-up, or if nothing has changed about the location of its intended use, it should continue to operate within designed specification.

If the device is not securely fastened; if there are signs of corrosion, cracks, residue build-up; or if there has been a change to the location of its intended use resulting in undesirable performance, contact the manufacturer for service instructions.

2. Cleaning

- a. Cleaning: To prevent static discharge, wipe the outer casing with a damp cloth only.
- b. Please notice the following when cleaning:
 - Use cleaning agent that will not damage the instruments.
 - Prevent mechanical damage to the process diaphragm, such as damage caused by sharp objects.
 - Do not attempt to clean metal diaphragm (technical and reference).
 - Do not point the pressure washer nozzles directly into the diaphragm when performing internal cleaning.

3. Transportation / Storage

- Do not store the instrument outside.
- Keep it dry and dust-free.
- Do not expose it to corrosive medium.
- Avoid solar radiation.
- Avoid mechanical shock and vibration.
- Storage temperature: -40 to 85 °C.
- Maximum relative humidity: 95 %.

4. Recycling/Disposal

Recycling of equipment and package recommended. Dispose of equipment and packaging in accordance with local and national regulations.

14. LIMITED WARRANTY

- OleumTech warrants that goods described herein and manufactured by
 OleumTech are free from defects in material and workmanship for two (2)
 years from the date of shipment.
- b. OleumTech warrants that goods repaired by it pursuant to the warranty are free from defects in material and workmanship for a period to the end of the original warranty or ninety (90) days from the date of delivery of repaired goods, whichever is longer.
- c. Warranties on goods not manufactured by OleumTech are expressly limited to the terms of the warranties given by the manufacturer of such goods.
- d. All warranties are void in the event that the goods or systems or any part thereof are (i) misused, abused or otherwise damaged, (ii) repaired, altered or modified without OleumTech's consent, (iii) not installed, maintained and operated in strict compliance with instructions furnished by OleumTech, (iv) worn, injured or damaged from abnormal or abusive use in service time, (v) subjected to acts of God, or extreme weather phenomenon including, but not limited to, flood, lightning, tornado or hurricane, or (vi) intentional acts including, but not limited to vandalism, sabotage, explosion or acts of terrorism.
- e. THESE WARRANTIES ARE EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED (INCLUDING WITHOUT LIMITATION WARRANTIES AS TO MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE), AND NO WARRANTIES, EXPRESSED OR IMPLIED, NOR ANY REPRESENTATIONS, PROMISES, OR STATEMENTS HAVE BEEN MADE BY OLEUMTECH UNLESS ENDORSED HEREIN IN WRITING. FURTHER, THERE ARE NO WARRANTIES, WHICH EXTEND BEYOND THE DESCRIPTION OF THE FACE HEREOF. ANY WARRANTIES BEYOND THOSE SET FORTH HEREIN MUST COME DIRECTLY FROM OLEUMTECH.

15. REVISION HISTORY

Version A

New document.

Version B

Added an additional specifications table. Revised LCD menu options. Removed materials required section. Revised MODBUS Communication section. Updated LCD UI screenshots and instructions on RS485 and 4-20 mA/HART LCD sections. Revised document formatting.

Version C

Revised pending certification status Addded additional safety warnings. Added conditions of acceptability pg 20.

Version **D**

Revised power supply specs. Revised wiring diagrams. Revised ordering number diagram to include 4-20 mA model as part of IS offering. Revised IS and flameproof certification sections.

Version E

Added 4-20 mA troubleshooting information. Added warning for 4-20 mA output must equal polling address 0 at the beginning of section 9.

Version F

Revised technical specifications by removing certifications that were pending. Added surge protection information. Added new 10,000 PSI model to the product ordering information.

Version G Revised power supply specifications.

Version H

Updated bracket mounting instructions information. Optional mounting kit added to the ordering information.

Revision J Added additional cautions for improving installation best practices.

Revision K

Integrated 1-5 V Model into the document including wiring diagram and LCD menu instructions. 10K PSI option Lower Range Limit (LRL) spec revised to 0 PSI (-14.5 PSI previously)

Revision L

Added the following disclaimers where applicable:1) The span adjustability does not apply to the RS485 model since the reading output is digital.2) The 20:1 turndown ratio does not apply to the HGPT10000.3) Setting the URV below 7250 PSI can impact accuracy on the HGPT10000.

Revision M

Burst pressure spec added.

Revision N PV Offset parameter added to 1-5 V and 4-20mA / HART LCD User Interface.

Revision P

Revised RS485 Modbus error code table. 1-5 V model wiring label changed from V-/V+ to S-/S+.

Revision Q

Revised input power supply spec to 16.5 Vdc to 55 Vdc Max for 4-20 mA and 4-20 mA/HART models. Minimum power supply spec formula for HART multi-drop application changed to: V min = 15.5 Vdc + 0.004 x N devices x (250 + R_loop) Changed default Modbus baud rate to 9600. Added a warning statement to not loosen the sensor set screw.

Revision R Updated regulatory certifications.

Revision S Added installation recommendation to face the LCD away from direct sunlight to maximize the life of the LCD.

Revision T Added dual seal CSA C22.2 No. 30-20 certification information.

Revision U Updated the technical specifications by removing the Fluorocarbon oil sensor filling fluid option.





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