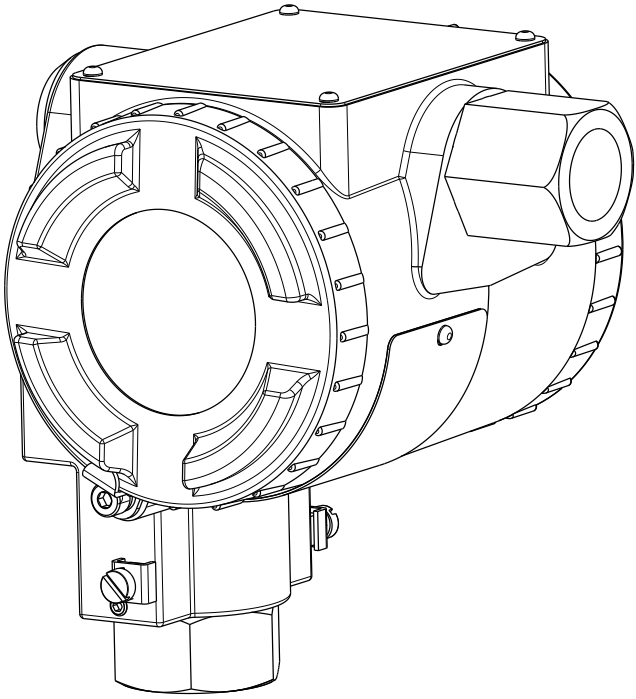
GE
Digital Solutions

# Druck RTX 1000H series

## HART® Pressure transmitter

## User Manual - 111M3356 Revision -

English



# Safety

To use this equipment safely, you must use the data and procedures in these publications:

- The "Calibration data and instructions" for the equipment.
- The applicable "Requirements in hazardous areas/locations" manual (for use of the product in explosive atmospheres).
- The applicable "Control Drawing" (for use of the product in explosive atmospheres).
- This user manual.
- The product data sheet or specification drawing (if applicable).

These publications contain instructions to operate the equipment and maintain it in a safe condition. To prevent damage or injury:

- Obey all warnings and cautions.
- Use the equipment only for the specified applications.
- Operate the equipment only within the specified limits.

To install and use the equipment, use only approved engineers who have the necessary skills and qualifications.

## Explosive Atmospheres (Hazardous Areas / Locations)

Some versions of this equipment are certified for use in explosive atmospheres. For these versions, the following publications contain additional data:

| | |
|---|---|
| 110M1116 | IECEx and ATEX certifications: Requirements in hazardous areas |
| 110M1117 | FM Approved (United States & Canada): Requirements in hazardous locations |
| X-A3-0551 | RTX1000H Series Control Drawing (FM) |

## European Single Market – Directives of the European Union

| | |
|---|---|
| CE | This product complies with the requirements of the relevant EU directives. For data on the applied standards, refer to the "EU Declaration of Conformity". |

## Electromagnetic compatibility

### a) Power supply and metering

The quality of the power supply and current monitoring equipment will directly affect the EMC performance of the entire system. Since Druck Limited has no control over the installation of the transmitter it must remain the responsibility of the user to ensure that the EMC performance of the system as a whole is adequate.

In order to maintain good immunity to electromagnetic disturbances, the power supply should filter any transient interference from the incoming line and present a clean regulated DC supply for the transmitter. The monitoring equipment should likewise be immune from the effects of electromagnetic disturbances and not impart disruptive signals on the current loop.

The equipment is not intended for connection to a DC distribution network.

### b) Cable type and earthing (grounding)

The choice of cable type should reflect the environment through which it is going to run. Screened cable should always be used where electrical noise is present. Good cabling practice will be reflected in signal quality.

The configuration tested had the cable screen and drain wire connected to local earth (ground) at the monitoring end and was connected to the transmitter body. The test configuration had the body of the transmitter connected to earth (ground). This is the normal recommended configuration for good EMC performance but it may not be suitable for intrinsically safe installations.

## Pressure equipment directive

### a) Pressure ranges > 1,000 bar (14,504 psi):

The transmitter has been assessed as a 'pressure accessory', Category I.

### b) Pressure ranges ≤ 1,000 bar (14,504 psi):

The pressure transmitter has been assessed as a 'pressure accessory' meeting the requirements for Sound Engineering Practice (SEP) in accordance with this directive.

For product classification and regulatory information, refer to the following publication:

| | |
|---|---|
| K0581 | Pressure Equipment Directive Alignment Statement |

# Abbreviations

The abbreviations in this publication are as follows:

***Note:*** *Abbreviations are the same in the singular and plural.*

| | |
|---|---|
| a | absolute pressure |
| A/D | analogue to digital |
| ATEX | ATmosphères EXplosibles (explosive atmospheres) |
| AWG | American wire gauge |
| COSHH | Control Of Substances Hazardous to Health |
| D/A | digital to analogue |
| DAC | digital to analogue convertor |
| DC | direct current |
| DIN | Deutsche Industrie Norm |
| DIP | dual inline package |
| DPM | digital pressure module |
| °C | degrees Celsius |
| °F | degrees Fahrenheit |
| EEPROM | electrically erasable programmable read-only memory |
| EMC | electromagnetic compatibility |
| EU | European Union |
| FM | Factory Mutual Approvals |
| FS | full-scale |
| g | gauge pressure |
| HART® | highway addressable remote transducer |
| HHC | hand held communicator |
| IECEx | International Electrotechnical Commission Certification Scheme for Explosive Atmospheres |
| in | inch (") |
| in$H_20$ | inches of water |
| kg | kilogram |
| lb | pound |
| LCD | liquid crystal display |

| | |
|---|---|
| LRL | lower range limit |
| LRV | lower range value |
| m | metre |
| mA | milliampere |
| max | maximum |
| mbar | millibar |
| µF | microfarad |
| mH | millihenry |
| min | minimum/minute |
| mm | millimetre |
| $mmH_2O$ | millimetre of water |
| MWP | maximum working pressure |
| MSDS | materials specification data sheet |
| NAMUR | Normenarbeitsgemeinschaft für Mess- und Regeltechnik (An association of users of process control technology) |
| PCB | printed circuit board |
| psi | pound-force per square inch |
| PTFE | polytetrafluoroethylene |
| PV | primary variable |
| RH | relative humidity |
| RTX | Rangeable Transmitter |
| s | seconds |
| sg | specific gravity |
| TSL | terminal straight line |
| URL | upper range limit |
| URV | upper range value |
| V | volt |
| V d.c. | volt direct current |
| Ω | ohm |

# Table of Contents

# Illustrations



# Tables

# 1 DESCRIPTION

## 1.1 Introduction

The Druck RTX 1000H series is a process pressure transmitter that measures the pressure of liquid, gas or vapour and gives an analogue output proportional to the applied pressure. The transmitter is available in a compact and lightweight metal housing with facilities for direct mounting to pipeline installations. The type of housing is specified in the order.

The transmitter uses the HART® protocol to give digital two-way communication. The HART® protocol gives easy access to the process data and makes it possible to adjust the transmitter operation. For example: to make accurate adjustments to the zero and span. There are also push-buttons and switches on the electronics module to adjust the transmitter operation.

## 1.2 About the Electronics Housing (Figure 1-1)

The electronics housing contains a Digital Pressure Module (DPM), electronics module, connecting cables and the terminal block.

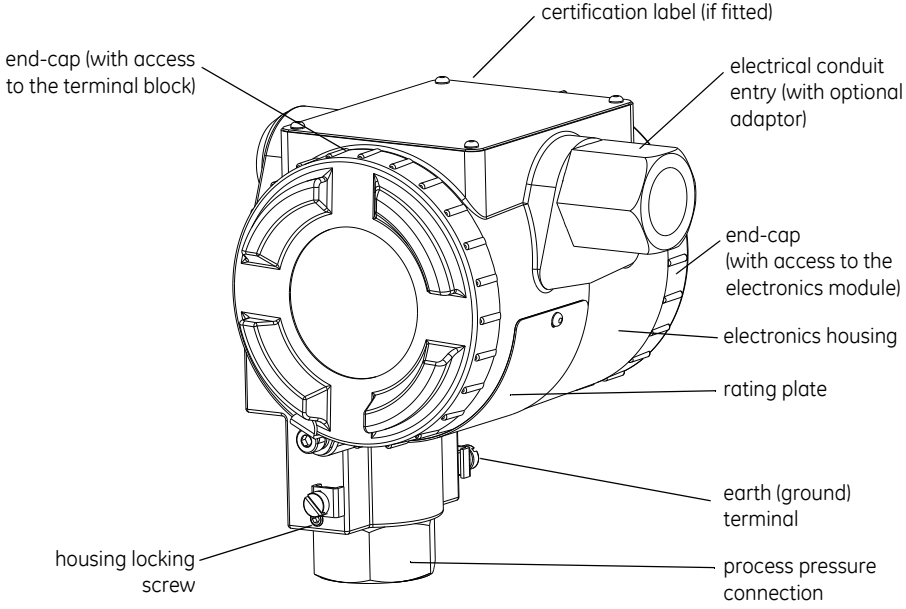



**Figure 1-1 General view**

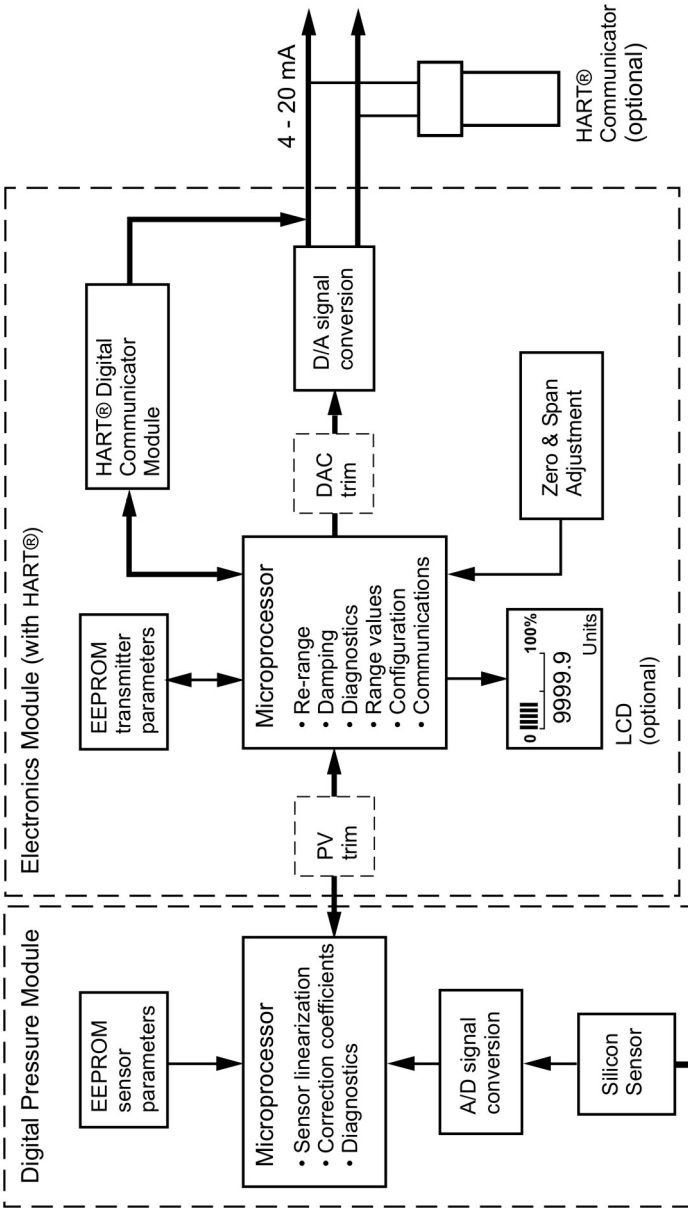



**Figure 1-2 Transmitter schematic diagram**

**Digital Pressure Module (DPM) - (Figure 1-2)**

The sensing element in the DPM is constructed from a micro-machined silicon diaphragm assembly bonded to a stainless steel or Hastelloy body. A Hastelloy isolation diaphragm and silicone fluid isolates the sensing element from the process media.

The sensor piezo-resistors, diffused into the surface of the silicon diaphragm, produce a signal in response to applied pressure. The accuracy of the sensor element is enhanced by measuring the residual errors over its operating temperature and pressure range and applying digital compensation in the transmitter electronics.

**Electronics Module (Figure 1-2)**

The electronics module uses microprocessor technology to give a compact circuit with the minimum of components. The module produces an extremely stable signal unaffected by changes in ambient temperature.

The HART® communication module gives digital two-way communications. The HART® protocol gives easy access to the process data and makes it possible to adjust the transmitter configuration from any point in the loop.

An optional LCD module shows the applied pressure value in two ways:

- as a % of calibrated span represented by a bar graph
- as a value in the applicable engineering units.

The LCD shows the Primary Variable (PV) value for the applied pressure. The LCD value is not affected by the re-range facilities.

## 1.3 Identification Codes

The data sheet shows the identification codes for the transmitter. Before you install the transmitter, use this table to make sure that the data on the transmitter is correct.

# 2 TECHNICAL DATA

Please refer to the data sheet for additional information.

## 2.1 Environment data

Service ..... Liquid, gas or vapour
Pollution Degree ..... 2
Installation (over-voltage) Category ..... II

## 2.2 Turn-on time

..... 2 seconds

## 2.3 Sensor fill fluid

..... Silicone oil

## 2.4 HART® receive impedance data

Transmitter equivalent resistance (Rx) ..... 40 kΩ
Transmitter equivalent capacitance (Cx) ..... 13 nF

# 3 INSTALLATION

**WARNING:**

**IF THE EQUIPMENT IS CERTIFIED FOR USE IN EXPLOSIVE ATMOSPHERES, REFER TO THE SAFETY SECTION AT THE BEGINNING OF THIS DOCUMENT FOR ADDITIONAL DATA BEFORE PROCEEDING.**

## 3.1 Introduction

The following procedures detail the correct installation of the unit.

Use qualified plant installation personnel and follow good engineering practice at all times.

**WARNINGS:**

1. **OBSERVE APPROPRIATE LOCAL SAFETY INSTRUCTIONS.**
2. **BEFORE INSTALLATION, EXAMINE ALL FITTINGS AND EQUIPMENT FOR DAMAGE AND MAKE SURE THAT ALL EQUIPMENT IS TO THE CORRECT PRESSURE RATING.**
3. **USE THE IDENTIFICATION CODE ON THE TRANSMITTER TO MAKE SURE THAT IT HAS THE CORRECT SPECIFICATION FOR THE INSTALLATION (REFER TO DATA SHEET).**

## 3.2 Special Tools and Equipment

The following special tools and equipment are required.

***Note:*** *Equivalent substitutes can be used.*

**Special tools**

- Applicable torque wrench
- Druck UPS-III [to measure current output]
- Multimeter [to measure loop resistance]

**Materials**

- Piping - the necessary length and rating depends on the distances
- Fittings to connect the above items including (but not limited to):

- Pipe tee (steam or high temperature liquid)
- Pipe fittings

- Pipe compound or Teflon tape (where local piping codes allow)
- Loctite PST sealant

## 3.3 Location and Mounting (Figure 3-3)

Although designed to withstand harsh industrial environments, the transmitter should be located to minimize the following:

- Vibration
- Ambient temperature fluctuations
- Physical impact or shock

## 3.4 To Rotate the LCD Module Through 90° (Figure 3-1)

If applicable, use the following procedure to turn the optional LCD module in the electronics housing.

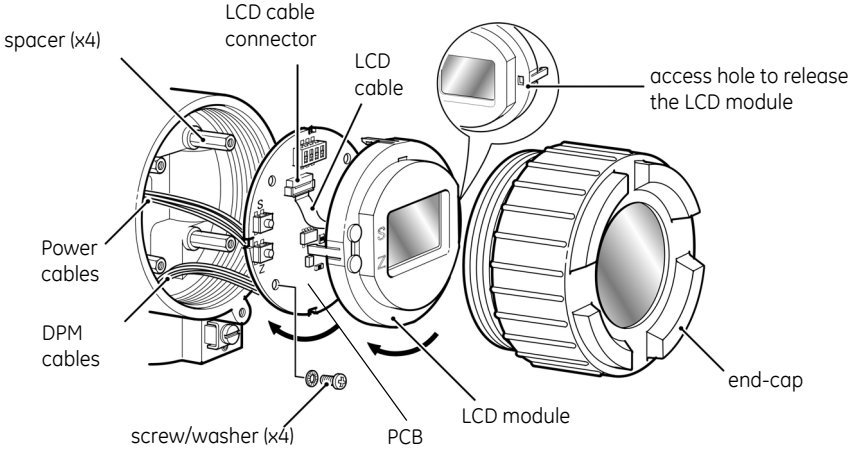



**Figure 3-1 LCD module - Turn through 90°**

1. Isolate the power supply to the transmitter.
2. Unscrew the end-cap.
3. Insert a suitable tool into the access hole and release the first leg of the LCD module from the PCB. Then carefully release the remaining legs from the PCB.

4. To disconnect the LCD cable from the PCB, release the clamp on the LCD cable connector and carefully remove the cable.
5. Remove each screw/washer (x4).
6. Turn the PCB through 90° until the screw holes align with the spacers again.
7. Tighten each screw/washer (x4) back in position, but make sure that there is not too much force on the cables, and that they are not caught.
8. Reconnect the LCD cable.
9. With the LCD module at the correct angle, push the module into the new position until the legs are fully engaged with the PCB.
10. Attach the end-cap.

## 3.5 To Rotate the Housing (Figure 3-2)

**CAUTION:**

**Do not rotate the electronics housing on the transmitter more than 180 degrees relative to the pressure connection, from the fully tightened position.**

Two locking screws (hexagon socket screws) lock the electronics housing to the sensor body. To rotate the housing, loosen both of the screws and rotate the housing. When the angle is correct, tighten the screws.

***Note:*** *Do not remove the locking screws or allow them to damage the threaded flamepath between the housing and the pressure connection.*

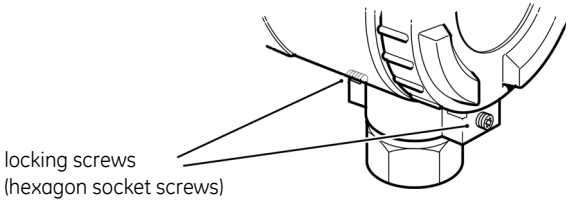



**Figure 3-2 Housing locking screws**

## 3.6 Impulse Piping (Figure 3-3)

The purpose of arranging impulse piping for the specific application is to maintain a single phase of fluid in the piping and transmitter. Liquid applications should maintain a liquid state and allow any air or gas formation to travel up and away from the transmitter. Gas applications should allow the formation of liquids to drain down and away from the transmitter.

The pipe or tubing used for connection must be rated for continuous operation at the pipeline designed pressure and temperature. Threaded pipe fittings create voids (where air can be trapped) and increase the possibility of leaks.

When installing the connecting tubing or impulse piping, the following apply:

- Horizontally installed impulse piping must slope at least 75 mm per metre (approximately 1" per foot). For liquid and steam applications the piping must slope down towards the transmitter. For gas applications the piping must slope down away from the transmitter.
- Impulse piping should be kept as short as possible and maintained at ambient temperature avoiding fluctuations and gradients.
- Installations outdoors for liquid or saturated gas service may require insulation and heat tracing to prevent freezing.
- For installations where the transmitter is more than 1.8 m (6 feet) from the tapping, the impulse piping must be supported to prevent sagging and vibration.
- Impulse piping must be located in protected areas or against walls or ceilings. If routed across a floor, protective coverings or kick plates must be used. High temperature piping or equipment should be avoided.
- Appropriate pipe sealing compound rated at the design piping temperature must be used on all threaded connections. When making threaded connections between stainless steel fittings, Loctite PST Sealant is recommended.

## 3.7 The Transmitter Pressure Connections

The recommended connection uses a two-valve manifold connected between the transmitter and the process pressure. Before connecting the transmitter remove the protection caps and carefully inspect the sealing face and threaded bore of the connection for damage.

**Liquid service connections (Figure 3-3a)**

Liquid measurement connections should be made to the side of the process line to avoid deposits of sediment. The transmitter should be mounted beside or below the connection so that gases vent into the process line.

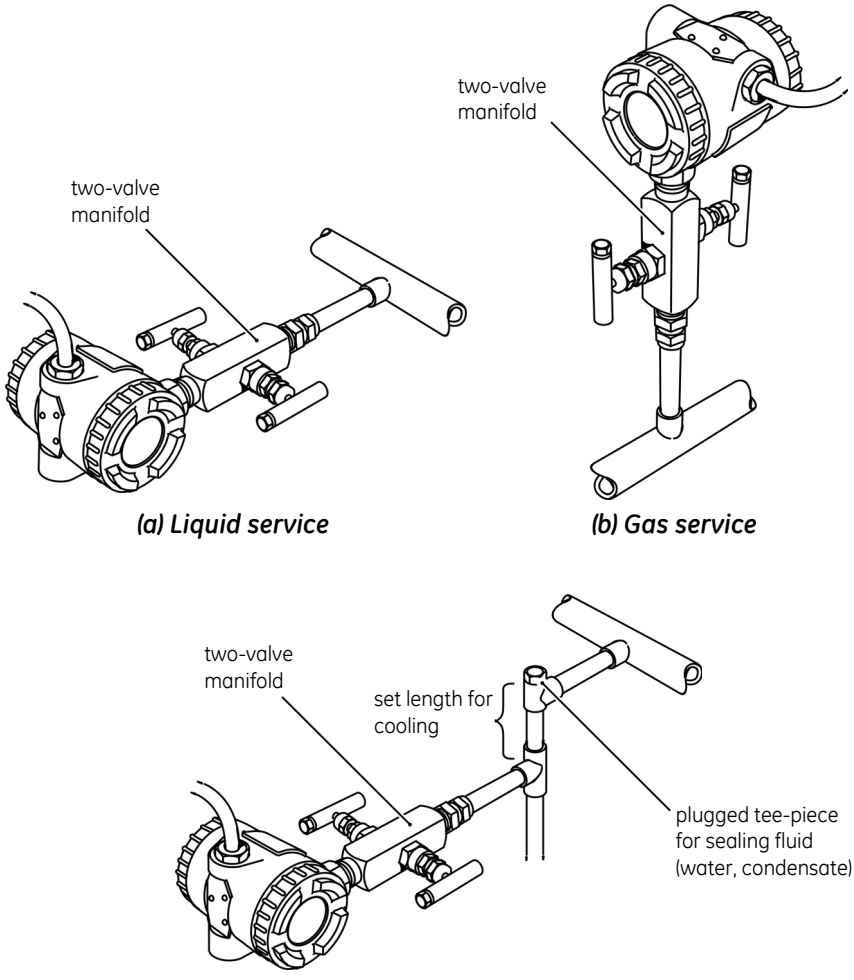
**Gas service connections (Figure 3-3b)**

Gas measurement connections should be made to the top or side of the process line. The transmitter should be mounted beside or above the connection allowing any liquid to drain into the process line.

**Steam service connections (Figure 3-3c)**

Steam measurement connections should be made to the side of the process line.

The transmitter should be mounted below the connection so that the piping remains filled with condensate. Live steam must not come into contact with the transmitter; to prevent this the lines should be filled with water or condensate.




*(a) Liquid service*

*(b) Gas service*

*(c) Steam service*

**Figure 3-3 Piping arrangements**

## 3.8 Liquid Level Measurement

Gauge pressure transmitters can be used to measure liquid level in an open or vented tank by measuring the hydrostatic pressure head. The head pressure can be calculated by multiplying the liquid height above the transmitter diaphragm by the specific gravity of the liquid.

The tank's volume and shape does not affect the head pressure. If the transmitter is mounted below the zero point (minimum level) of the measured range, zero suppression will be required.

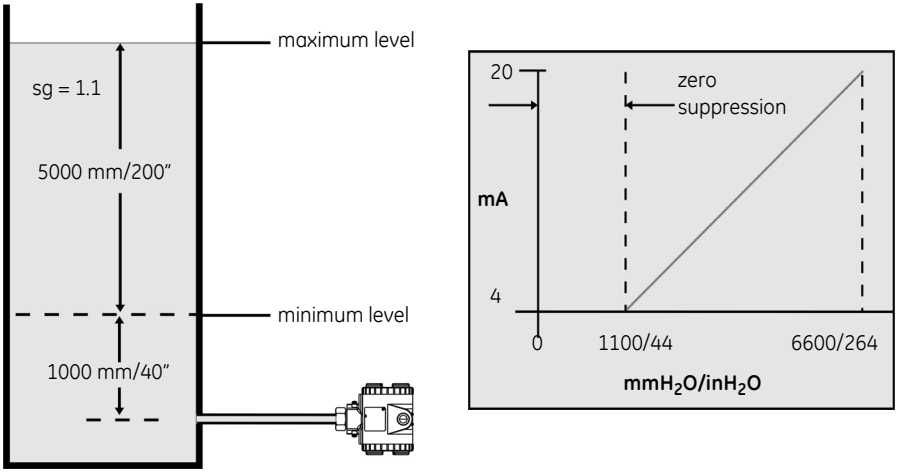



**Figure 3-4 Open tank level measurement**

### Calculations

| | | | |
|---|---|---|---|
| Min. level | = | (1000 x 1.1) $mmH_2O$ | (40" x 1.1) $inH_2O$ |
| | = | 1100 $mmH_2O$ | 44" $inH_2O$ |
| Max level | = | ([1000 + 5000] x 1.1) $mmH_2O$ | ([40 + 200] x 1.1) $inH_2O$ |
| | = | (6000 x 1.1) $mmH_2O$ | (240 x 1.1) $inH_2O$ |
| | = | 6600 $mmH_2O$ | 264 $inH_2O$ |
| Range | = | 1100 to 6600 $mmH_2O$ | 44 to 264 $inH_2O$ |
| (Span | = | 5500 $mmH_2O$) | 220 $inH_2O$ |

## 3.9 Electrical Data

**WARNING:**
**IF THE EQUIPMENT IS CERTIFIED FOR USE IN EXPLOSIVE ATMOSPHERES, REFER TO THE SAFETY SECTION AT THE BEGINNING OF THIS DOCUMENT FOR ADDITIONAL DATA BEFORE PROCEEDING.**

**WARNING:**
**SWITCH OFF AND ISOLATE THE POWER SUPPLY BEFORE CONNECTING OR DISCONNECTING THE TRANSMITTER.**

**CAUTIONS:**

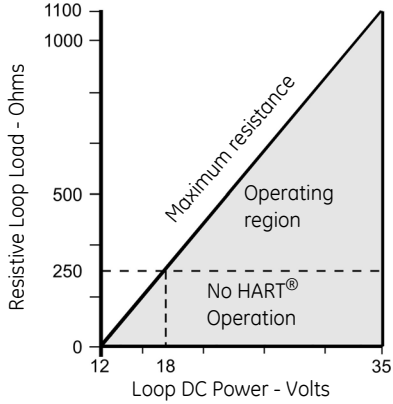
1. **The transmitter uses DC power in a 2-wire system to control current through a resistive load.**
2. **Do not apply more than 35 Volts to the loop circuit. The transmitter may be damaged.**

**General**

The electrical installation must comply with local wiring codes and standards. To get the full performance from the transmitter, carefully choose the wiring scheme to be used and take care connecting the transmitter.

**Power and maximum load (Figure 3-5)**

The total loop resistance must include the connection wire resistance.




*Note:*

*For HART® operation, the minimum loop resistance is 250 Ohm.*

**Figure 3-5 Power and load requirements**

**Wire selection (Table 3-1)**

To get the best EMC performance, use shielded twisted pair cable for the field wiring.

- Select a wire gauge for the required total length so the transmitter operates within the load requirements.
- When using external power supplies, make sure the connection polarity allows current to flow into the +ve terminal and out of the -ve terminal. Refer to Figure 3-7.

**Table 3-1 Wire resistance**

| AWG | Wire Diameter | | Loop Resistance | |
|---|---|---|---|---|
| | Inches | mm | Ohms/Foot | Ohms/Metre |
| **16** | 0.0508 | 1.291 | 0.0082 | 0.0264 |
| **18** | 0.0403 | 1.024 | 0.0128 | 0.0418 |
| **20** | 0.0320 | 0.812 | 0.0204 | 0.0666 |
| **22** | 0.0254 | 0.644 | 0.0322 | 0.1060 |
| **24** | 0.0201 | 0.511 | 0.0514 | 0.1680 |

***Note:*** *The typical values for resistance per length are doubled as the circuit is a direct current loop.*

**Electrical conduit (Figure 3-6)**

Use electrical conduit in accordance with local wiring codes. The electronics housing has two M20 threaded holes for electrical conduit connections and may be supplied with a thread adaptor. The configuration in Figure 3-6 prevents moisture getting into the housing. If conduit is not used, use the correct cable gland/plugs to seal the housing.

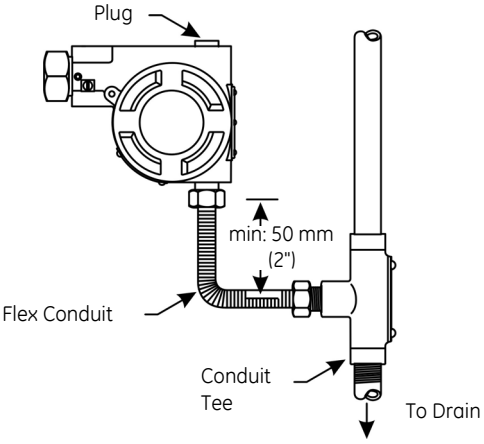
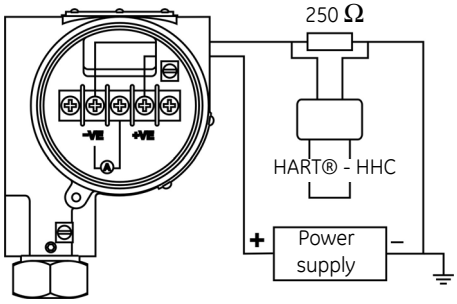



**Figure 3-6 Electrical conduit configuration**

**Electrical connections (Figure 3-7)**

The transmitter is a 2-wire loop powered device. The marks +ve and -ve identify the polarity of the connection terminals.

A label in the transmitter shows how to use the third terminal to measure the output current from the transmitter. In hazardous (classified) areas, do not use this third terminal.




*Note:*

*For HART® operation, the minimum loop resistance is 250* Ohm.

**Figure 3-7 Transmitter connections**

Because the transmitter circuit is isolated from the housing, one of the signal wires (+ve or -ve) can be earthed (grounded) if necessary. This may not be appropriate in hazardous (classified) areas.

## 3.10 System Checks

**Leak test**

Before the system is filled and/or commissioned, do a leak test with compressed air (or other inert compressed gas) or water. The minimum test pressure must be equal to the normal operating pressure. The maximum pressure is the MWP.

- Apply pressure at a convenient point on the system.
- Apply an applicable leak test solution to the impulse piping, valves, transmitter connections and joints.
- Look for a continuous stream of bubbles.
- Bleed the system.
- Do all the necessary repairs, and test the system again.
- Return the system to the original configuration.

**Transmitter test**

Connect the necessary instruments to monitor the pressure signal. If necessary, connect a milliammeter to measure the output from the transmitter.

- Apply power to the transmitter.
- Apply the applicable pressure.
- Monitor the pressure signal.

Refer to the 'Operation' section for the procedures to set up and operate the transmitter.

# 4 OPERATION

**WARNING:**
**IF THE EQUIPMENT IS CERTIFIED FOR USE IN EXPLOSIVE ATMOSPHERES, REFER TO THE SAFETY SECTION AT THE BEGINNING OF THIS DOCUMENT FOR ADDITIONAL DATA BEFORE PROCEEDING.**

## 4.1 General

**CAUTION:**

**DO NOT over-pressurise the system.**

**Pressure ranges**

The transmitter label shows the factory calibrated range and the Maximum Working Pressure (MWP).

**Start up procedure**

When power is supplied to the transmitter, the output is set to the applicable alarm level (Refer to Table 4-1). When the start up sequence is complete, the output changes to give the applicable process value.

During start up, the display (if applicable) shows the parameter data for the transmitter. This includes:

1. SOFTWARE: Software version
2. UNITS: Pressure units
3. URV: Upper Range Value + applicable units
4. LRV: Lower Range Value + applicable units
5. TRANSFER: Shows that the transmitter uses a linear transfer function
6. DAMPING: Damping value in seconds
7. EE PROTECT: Write protect status (on/off)
8. ALARM LEVEL: Specified alarm level (high: > 21 mA, low: < 3.6 mA)

When the start up sequence is complete, the display shows the PV value for the applied pressure and the applicable units (Figure 4-1).

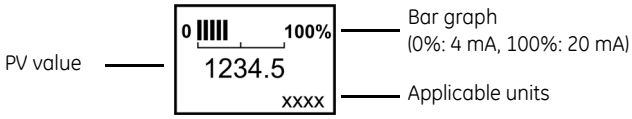



**Figure 4-1 Display - Normal operation**

**Alarm/Error conditions**

Refer to the 'Maintenance' section.

## 4.2 Manual Configuration Facilities (Figure 4-2)

The manual configuration facilities (DIP switches and push buttons) are in the electronics module. To get access to the electronics module:

1. Remove the end-cap (with access to the electronics module).
2. If applicable, release the LCD module to get access to the DIP switches.
   - Insert a suitable tool into the access hole, and release the first leg of the LCD module from the PCB. Then carefully release the remaining legs from the PCB.

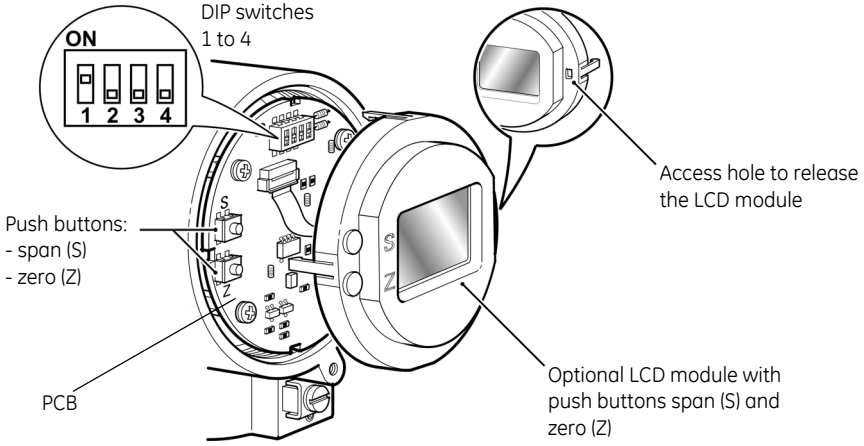



**Figure 4-2 Location of DIP switches and push buttons**

**Table 4-1 DIP switch operation**

| DIP Switch | Function | Set ON | Set OFF |
|---|---|---|---|
| 1 | Write Protection | To prevent accidental changes to the EEPROM values. | 1) To change values for span and zero.<br>2) To set up the display - if applicable. |
| 2 | Alarm level | To use the high NAMUR alarm (> 21 mA) when there is a transmitter fault. | To use the low NAMUR alarm (< 3.6 mA) when there is a transmitter fault. |
| 3 | Damping | To use the ON_Damping factor. Default = 1 s | To use the OFF_Damping factor. Default = 0.1 s |
| 4 | Not used | - | - |

## 4.3 Manual Configuration - Calibration

To get accurate results, do the calibration in conditions where the pressure and temperature are stable.

**Equipment**

- A precision pressure calibrator such as the Druck DPI611/612 or DPI620 series. The accuracy of the supplied pressure must be better than ±0.075%.
- In safe areas, a 12 to 35 Volt DC power supply (separate or part of another system).

- Fittings and tubing as required.

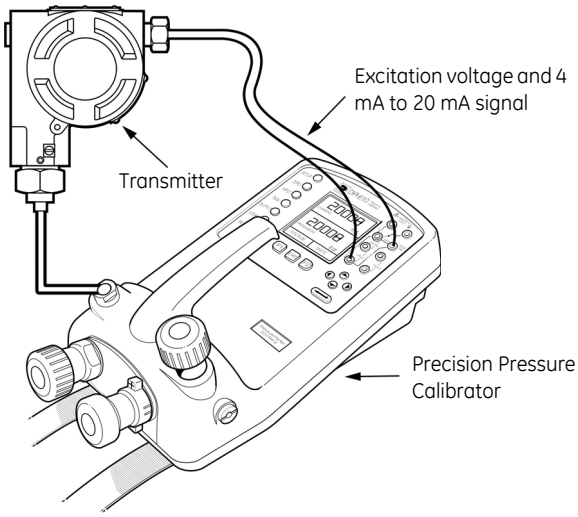



**Figure 4-3 Calibration set-up for safe areas**

**Calibration ranges**

Set any span value from 1 - 100% of the URL. Refer to the 'Technical Data' section.

**Procedure to adjust the range (No LCD)**

1. Set DIP switch 1 to OFF (write protect - OFF).
2. To set the pressure for the Lower Range Value (LRV):
   a. Press the S and Z buttons together, and supply the LRV pressure.
   b. To set the LRV, press the Z button.
3. To set the pressure for the Upper Range Value (URV):
   a. Press the S and Z buttons together, and supply URV pressure.
   b. To set the URV, press the S button.
4. To prevent accidental changes to the new values, set DIP switch 1 to ON.

To leave the set up procedure without saving a value:

- Press the S and Z buttons together OR
- Do not press the buttons for 25 seconds.

If a value is not in the applicable range, the value is ignored.

**Procedure to adjust the range (LCD option) - (Figure 4-4)**

***Note:*** *The push buttons on the LCD module only work when it is attached to the PCB.*

1. Set DIP switch 1 to OFF (write protect - OFF).
2. Press S and Z together:
3. Press Z:

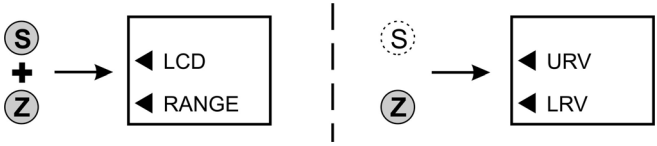



**Figure 4-4 LCD - Range selection**

4. To set the pressure for the Lower Range Value (LRV):
   a. Supply the applicable LRV pressure.
   b. Press the Z button.
5. To set the pressure for the Upper Range Value (URV):
   a. Supply the applicable URV pressure.
   b. Press the S button.
6. To prevent accidental changes to the new values, set DIP switch 1 to ON.

***Note:*** *The LCD shows the PV value for the applied pressure. The LCD value is not affected by the re-range facilities. Refer to the 'Description' section.*

To leave the set up procedure without saving a value:

- Press the S and Z buttons together OR
- Do not press the buttons for 25 seconds.

If a value is not in the applicable range, the display shows error code 00. The specified value is ignored.

## 4.4 Manual Configuration - LCD (Figure 4-5)

There are three items to set up for the optional LCD: the pressure units, the decimal point position, and the display contrast.

***Note:*** *The push buttons on the LCD module only work when it is attached to the PCB.*

1. Set DIP switch 1 to OFF (write protect - OFF).
2. Press S and Z together:
3. Press S:

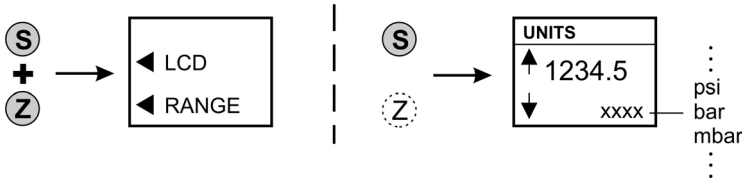



**Figure 4-5 Selection sequence - LCD configuration**

4. UNITS: Use the S and Z buttons to step through the available units.
   Wait 5 seconds or press S and Z together to go to the DECIMAL display.
5. DECIMAL: Use the S and Z buttons to move the decimal position. There is a maximum number of decimal places for each unit.
   Wait 5 seconds or press S and Z together to go to the CONTRAST display.
6. CONTRAST: Use the S and Z buttons to adjust the contrast.
   Wait 5 seconds or press S and Z together to return to normal operation.

To prevent accidental changes to the new values, set DIP switch 1 to ON.

# 5 MAINTENANCE

**WARNING:**
**IF THE EQUIPMENT IS CERTIFIED FOR USE IN EXPLOSIVE ATMOSPHERES, REFER TO THE SAFETY SECTION AT THE BEGINNING OF THIS DOCUMENT FOR ADDITIONAL DATA BEFORE PROCEEDING.**

## 5.1 General

The transmitter contains no moving parts and requires a minimum of maintenance.

**Visual inspection**

- Inspect the transmitter for damage and corrosion. Any damage to the transmitter must be assessed. If the housing is no longer sealed against water and/or dust, the transmitter must be replaced.

**Cleaning**

- Clean the transmitter case with a damp lint-free cloth and mild detergent.
- Corrosion must be removed and the area of corrosion cleaned and, if necessary, neutralised.
- If the product has been in contact with hazardous or toxic materials, obey all the applicable COSHH or MSDS references and precautions when handling.

## 5.2 Fault Finding

If the measured pressure goes above URV or goes below LRV, the output signal will saturate at the following values:

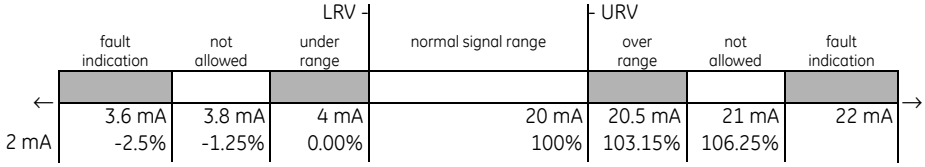



**Figure 5-1 Fault finding from the output signal**

**Fault indications**

If there is a specified fault condition, the transmitter output changes to the specified NAMUR alarm level. The alarm level is set by the position of DIP switch 2 (refer to table 4-1.

If applicable, the optional display shows an alarm code to help identify the fault. Table 5-1 shows some of the codes. If there are several fault conditions, the alarm code is the sum of all the applicable codes.

**Table 5-1 LCD alarm/error codes**

| Code | Possible cause | To correct the error |
|---|---|---|
| ⚠ 02 ALARM | Too much positive or negative pressure. | Supply pressure in the specified limits for the device. |
| | DPM error | Power off, wait 25 seconds, then power on again. |
| ⚠ 04 ALARM | DPM data not received | Power off, wait 25 seconds, then power on again. |
| | LCD adjustment has loosened the DPM cable connection on the PCB. | Examine the DPM cable connection (Figure 3-1). |
| ⚠ 08 ALARM | LCD adjustment has loosened the DPM cable connection on the PCB. | Examine the DPM cable connection (Figure 3-1). |
| ⚠ 00 ERROR | Configuration error. The range is not in the specified limits for the device. | Refer to section 2 for the specified range limits. |
| | Configuration error. DIP switch 1 set to ON (Write protect). | Set DIP switch 1 to OFF, then follow the procedures in Section 4. |

If you cannot identify the code or the fault condition does not change, contact an approved service agent.

**Over/under range**

If the measured pressure goes above or below the set range of the transmitter, the electronics module causes the transmitter output to change.

When the measured pressure is under range, the transmitter output continues below the 4.0 mA level until it reaches 3.8 mA (Figure 5-1). When the measured pressure is over range, the transmitter output continues above the 20.0 mA level until it reaches 20.5 mA (Figure 5-1).

If applicable, the optional display will also show a flashing pressure value.

## 5.3 Returned Goods Procedure

To repair or calibrate the transmitter, return it to the applicable GE Service Department.

Please contact our Service Department, and get a Return Authorisation number.

Please supply these details:

Product (i.e. RTX 1000H)

Pressure range

Serial number

Details of defect/work to be undertaken

Calibration traceability requirements

Operating conditions

### Safety Precautions

To prevent possible injury when we receive the product, you must also tell us if the product has been in contact with hazardous or toxic materials. Please supply the applicable COSHH or MSDS references and precautions.

### Important Notice

Service or calibration by unauthorised sources will affect the warranty and may not guarantee further performance. If the equipment has "Hazardous (Classified) area" approval, the approval will also be invalid.

**Customer service**
Visit our web site at:

www.gemeasurement.com

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