# Rosemount<sup>™</sup> 3144P Temperature Transmitter

with HART<sup>®</sup> Protocol and Rosemount X-well<sup>™</sup> Technology





## NOTICE

This guide provides basic guidelines for the Rosemount 3144P Transmitter. It does not provide instructions for detailed configuration, diagnostics, maintenance, service, troubleshooting, Explosion-proof, Flameproof, or intrinsically safe (I.S.) installations. Refer to the Rosemount 3144P Transmitter <u>Reference Manual</u> for more instruction. The manual and this guide are also available electronically on <u>Emerson.com/Rosemount</u>.

# **A**WARNING

#### Explosions could result in death or serious injury.

Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Review the approvals section of this manual for any restrictions associated with a safe installation.

#### Process leaks may cause harm or result in death.

- Install and tighten thermowells or sensors before applying pressure.
- Do not remove the thermowell while in operation.

#### Electrical shock can result in death or serious injury.

Avoid contact with the leads and the terminals. High voltage that may be present on leads can cause electrical shock.

#### Conduit/cable entries

- The conduit/cable entries in the transmitter housing use a <sup>1</sup>/2–14 NPT thread form.
- When installing in a hazardous location, use only appropriately listed or ex certified plugs, glands, or adapters in cable/conduit entries.

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# 1.0 System readiness

# 1.1 Confirm HART revision capability

- If using HART based control or asset management systems, confirm the HART capability of those systems prior to transmitter installation. Not all systems are capable of communicating with HART Revision 7 protocol. This transmitter can be configured for either HART Revision 5 or 7.
- For instructions on how to change the HART revision of your transmitter, refer to page 4.

Software	Identify device			Field device driver		Review instructions
release date	NAMUR software revision	NAMUR hardware revision	HART software revision	HART universal revision	Device revision	Manual document number
Dec 2012	1 7 1	1.0.0	3	7	7	00800 0100 4021
Dec-2012	1.2.1			5	5	00809-0100-4021
Mar 2012	111		2	7	6	00800 0100 4021
Widi-2012	5			5	5	00809-0100-4021
Feb-2007	N/A	N/A	1	5	4	00809-0100-4021

# 2.0 Verify configuration

The Rosemount 3144P Transmitter communicates using a Field Communicator (communication requires a loop resistance between 250 and 1100 ohms) or AMS Device Manager. Do not operate when power is below 12 Vdc at the transmitter terminal. Refer to the 3144P Transmitter <u>Reference Manual</u> and Field Communicator Reference Manual.

# 2.1 Update the Field Communicator software

The latest Field Communicator Field Device Revision Dev v5 or v7, DD v1 or greater is required to fully communicate with the Rosemount 3144P Transmitter. Rosemount 3144P Temperature Transmitters equipped with Rosemount X-well Technology require DD revision 3144P Dev. 7 Rev. 1 or higher to view Rosemount X-well functionality. The Device Descriptors are available with new communicators at <u>Emerson.com/Rosemount</u> or can be loaded into existing communicators at any Emerson Service Center.

The device descriptors are as follows:

Device in HART 5 mode: Device v5 DD v1

Device in HART 7 mode: Device v7 DD v1

Perform the following steps to determine if an upgrade is required. Refer to Figure 1 on page -4.

- 1. Connect the sensor (see the wiring diagram located on the inside of the housing cover).
- 2. Connect the bench power supply to the power terminals ("+" or "-").
- 3. Connect a Field Communicator to the loop across a loop resistor or at the power/signal terminals on the transmitter.

4. The following message will appear if the communicator has a previous version of the device descriptors (DDs):

NOTICE: Upgrade the communicator software to access new XMTR functions. Continue with old description?

Note

If this notice does not appear, the latest DD is installed.

If the latest version is not available, the communicator will communicate properly, but when the transmitter is configured some new capabilities may not be visible.

To prevent this from happening, upgrade to the latest DD or answer NO to the question and default to the generic transmitter functionality.



# 2.2 Switch HART revision mode

If the HART configuration tool is not capable of communicating with HART Revision 7, the Rosemount 3144P Transmitter will load a generic menu with limited capability. The following procedures will switch the HART revision mode from the generic menu:

- 1. Manual Setup > Device Information > Identification > Message.
  - a. To change to HART Revision 5, Enter: "HART5" in the Message field
  - b. To change to HART Revision 7, Enter: "HART7" in the Message field

Function	HART 5 Fast Keys	HART 7 Fast Keys
2-wire Offset Sensor 1	2, 2, 1, 5	2, 2, 1, 6
2-wire Offset Sensor 2	2, 2, 2, 5	2, 2, 2, 6
Alarm Values	2, 2, 5, 6	2, 2, 5, 6
Analog Calibration	3, 4, 5	3, 4, 5
Analog Output	2, 2, 5	2, 2, 5

Function	HART 5 Fast Keys	HART 7 Fast Keys
Average Temperature Setup	2, 2, 3, 3	2, 2, 3, 3
Burst Mode	N/A	2, 2, 8, 4
Comm Status	N/A	1,2
Configure additional messages	N/A	2, 2, 8, 4, 7
Configure Hot Backup	2, 2, 4, 1, 3	2, 2, 4, 1, 3
Date	2, 2, 7, 1, 2	2, 2, 7, 1, 3
Descriptor	2, 2, 7, 1, 3	2, 2, 7, 1, 4
Device Information	2, 2, 7, 1	2, 2, 7, 1
Differential Temperature Setup	2, 2, 3, 1	2, 2, 3, 1
Filter 50/60 Hz	2, 2, 7, 5, 1	2, 2, 7, 5, 1
Find Device	N/A	3, 4, 6, 2
First Good Temperature Setup	2, 2, 3, 2	2, 2, 3, 2
Hardware Revision	1, 8, 2, 3	1, 11, 2, 3
HART Lock	N/A	2, 2, 9, 2
Intermittent Sensor Detect	2, 2, 7, 5, 2	2, 2, 7, 5, 2
Lock Status	N/A	1, 11, 3, 7
Long Tag	N/A	2, 2, 7, 2
Loop Test	3, 5, 1	3, 5, 1
LRV (Lower Range Value)	2, 2, 5, 5, 3	2, 2, 5, 5, 3
Message	2, 2, 7, 1, 4	2, 2, 7, 1, 5
Open Sensor Holdoff	2, 2, 7, 4	2, 2, 7, 4
Percent Range	2, 2, 5, 4	2, 2, 5, 4
Sensor 1 Configuration	2, 2, 1	2, 2, 2
Sensor 1 Serial Number	2, 2, 1, 7	2, 2, 1, 8
Sensor 1 Setup	2, 2, 1	2, 2, 1
Sensor 1 Status	N/A	2, 2, 1, 2
Sensor 1 Type	2, 2, 1, 2	2, 2, 1, 3
Sensor 1 Unit	2, 2, 1, 4	2, 2, 1, 5
Sensor 2 Configuration	2, 2, 2	2, 2, 2
Sensor 2 Serial Number	2, 2, 2, 7	2, 2, 2, 8
Sensor 2 Setup	2, 2, 2	2, 2, 2
Sensor 2 Status	N/A	2, 2, 2, 2
Sensor 2 Type	2, 2, 2, 2	2, 2, 2, 3
Sensor 2 Unit	2, 2, 2, 4	2, 2, 2, 5
Sensor Drift Alert	2, 2, 4, 2	2, 2, 4, 2
Simulate Device Variables	N/A	3, 5, 2
Software Revision	1, 8, 2, 4	1, 11, 2, 4

Function	HART 5 Fast Keys	HART 7 Fast Keys
Tag	2, 2, 7, 1, 1	2, 2, 7, 1, 1
Terminal Temperature Units	2, 2, 7, 3	2, 2, 7, 3
URV (Upper Range Value)	2, 2, 5, 5, 2	2, 2, 5, 5, 2
Variable Mapping	2, 2, 8, 5	2, 2, 8, 5
Thermocouple Diagnostic	2, 1, 7, 1	2, 1, 7, 1
Min/Max Tracking	2, 1, 7, 2	2, 1, 7, 2
Rosemount X-well Configuration	N/A	2, 2, 1, 11

# 3.0 Set the switches

# 3.1 Configure alarms and lock device

The Rosemount 3144P Transmitter comes with hardware switches to configure alarms and lock the device. Use the following procedure to set the switches:

# Without a LCD display

- 1. Set the loop to manual (if applicable) and disconnect the power.
- 2. Remove the electronics housing cover.
- 3. Set the alarm and security switches to the desired position. Reattach housing cover.
- 4. Apply power and set the loop to automatic control.

# With a LCD display

- 1. Set the loop to manual (if applicable) and disconnect the power.
- 2. Remove the electronics housing cover.
- 3. Unscrew the LCD display screws and slide the meter straight off.
- 4. Set the alarm and security switches to the desired position.
- 5. Reattach the LCD display and electronics housing cover (consider LCD display orientation—rotate in 90 degree increments).
- 6. Apply power and set the loop to automatic control.

# 4.0 Mount the transmitter

Mount the transmitter at a high point in the conduit run to prevent moisture from draining into the transmitter housing.

# 4.1 Typical field mount installation

- 1. Mount the thermowell to the process container wall.
- 2. Install and tighten thermowells.
- 3. Perform a leak check.
- 4. Attach any necessary unions, couplings, and extension fittings. Seal the fitting threads with an approved thread sealant, such as silicone or PTFE tape (if required).

- 5. Screw the sensor into the thermowell or directly into the process (depending on installation requirements).
- 6. Verify all sealing requirements.
- 7. Attach the transmitter to the thermowell/sensor assembly. Seal all threads with an approved thread sealant, such as silicone or PTFE tape (if required).
- 8. Install field wiring conduit into the open transmitter conduit entry (for remote mounting) and feed wires into the transmitter housing.
- 9. Pull the field wiring leads into the terminal side of the housing.
- 10. Attach the sensor leads to the transmitter sensor terminals (the wiring diagram is located inside the housing cover).
- 11. Attach and tighten both transmitter covers.



- A. Thermowell
- B. Extension (nipple)
- C. Union or coupling
- D. Conduit for field wiring (DC power)
- E. Extension fitting length

## Typical remote mount installation

- 1. Mount the thermowell to the process container wall.
- 2. Install and tighten thermowells.
- 3. Perform a leak check.
- 4. Attach a connection head to the thermowell.
- 5. Insert sensor into the thermowell and wire the sensor to the connection head (the wiring diagram is located inside the connection head).
- 6. Mount the transmitter to a 2-in. (50 mm) pipe or a panel using one of the optional mounting bracket (B4 bracket is shown below).
- 7. Attach cable glands to the shielded cable running from the connection head to the transmitter conduit entry.
- 8. Run the shielded cable from the opposite conduit entry on the transmitter back to the control room.
- 9. Insert shielded cable leads through the cable entries into the connection head/transmitter. Connect and tighten cable glands.

 Connect the shielded cable leads to the connection head terminals (located inside the connection head) and to the sensor wiring terminals (located inside the transmitter housing).



- A. Cable gland
- B. Shielded cable from sensor to transmitter
- C. Shielded cable from transmitter to control room
- D. 2-in. (50 mm) pipe
- E. B4 mounting bracket

# 4.2 Rosemount X-well Installation

Rosemount X-well Technology is for temperature monitoring applications and is not intended for control or safety applications. It is available in the Rosemount 3144P Temperature Transmitter in a factory assembled direct mount configuration with a Rosemount 0085 Pipe Clamp Sensor. It cannot be used in a remote mount configuration. Rosemount X-well Technology will only work as specified with factory supplied and assembled Rosemount 0085 Pipe Clamp silver tipped single element sensor with an 80 mm extension length. It will not work as specified if used with other sensors. Installation and use of incorrect sensor will result in inaccurate process temperature calculations. It is extremely important that the above requirements and installation steps below are followed to ensure that Rosemount X-well Technology works as specified.

In general, pipe clamp sensor installation best practices shall be followed. See Rosemount 0085 Pipe Clamp Sensor <u>Quick Start Guide</u> with Rosemount X-well Technology specific requirements noted below:

- 1. Direct mounting of transmitter on pipe clamp sensor is required for Rosemount X-well Technology to properly function.
- 2. Assembly shall be installed away from dynamic external temperature sources such as a boiler or heat tracing.
- 3. It is extremely important that pipe clamp sensor tip makes direct contact with pipe surface for Rosemount X-well Technology. Moisture build-up between sensor and pipe surface, or sensor hang-up in assembly can cause inaccurate process temperature calculations. Refer to installation best practices in Rosemount 0085 Pipe Clamp Sensor <u>Quick Start Guide</u> to ensure proper sensor to pipe surface contact.
- 4. Insulation (1/2-in. thick minimum with a R-value of > 0.42 m<sup>2</sup> × K/W) is required over the sensor clamp assembly and sensor extension up to transmitter head to prevent heat loss. Apply a minimum of six inches of insulation on each side of the pipe clamp sensor. Care should be taken to minimize air gaps between insulation and pipe. See Figure 2 on page 9.

#### Note

DO NOT apply insulation over transmitter head as it will result in longer response times and may damage transmitter electronics.

5. Although it will come factory configured as such, ensure that pipe clamp RTD sensor is assembled in 4-wire configuration.

Figure 2. Rosemount 3144P Transmitter with Rosemount X-well Technology Installation Drawing



# 5.0 Wire and apply power

# 5.1 Wire the transmitter

Wiring diagrams are located inside the terminal block cover. See Figure 3.

### Figure 3. Rosemount 3144P Single-Sensor



- Rosemount provides 4-wire sensors for all single-element RTDs. You can use these RTDs in 3-wire configurations by leaving the unneeded leads disconnected and insulated with electrical tape.
- 2. Transmitter must be configured for a 3-wire RTD in order to recognize an RTD with a compensation loop.

#### Figure 4. Rosemount 3144P Dual-Sensor<sup>(1)</sup>



1. Rosemount provides 4-wire sensors for all single-element RTDs. You can use these RTDs in 3-wire configurations by leaving the unneeded leads disconnected and insulated with electrical tape.

# 5.2 Power the transmitter

An external power supply is required to operate the transmitter.



- A. Sensor terminal (1–5) B. Ground
- 1. Remove the terminal block cover.
- 2. Connect the positive power lead to the "+" terminal.
- 3. Connect the negative power lead to the "-" terminal.
- 4. Tighten the terminal screws.
- 5. Reattach and tighten the cover.
- 6. Apply power.

# 5.3 Load limitations

The power required across the transmitter power terminals is 12 to 42.4 Vdc (power terminals are rated to 42.4 Vdc). To prevent the possibility of damaging the transmitter, do not allow terminal voltage to drop below 12.0 Vdc when changing the configuration parameters.

## Figure 5. Load Limitation

Maximum load =  $40.8 \times (Supply voltage - 12.0)^{(1)}$ 



1. Without transient protection (optional).

# 5.4 Ground the transmitter

## Ungrounded thermocouple, mV, and RTD/ohm Inputs

Each process installation has different requirements for grounding. Use the grounding options recommended by the facility for the specific sensor type or begin with grounding Option 1 (most common).

## Option 1 (recommended for ungrounded transmitter housing)

- 1. Connect signal wiring shield to the sensor wiring shield.
- 2. Ensure the two shields are tied together and electrically isolated from the transmitter housing.
- 3. Ground shield at the power supply end only.
- Ensure that the sensor shield is electrically isolated from the surrounding grounded fixtures.



## Option 2 (recommended for grounded transmitter housing)

- 1. Connect sensor wiring shield to the transmitter housing (only if the housing is grounded).
- 2. Ensure the sensor shield is electrically isolated from surrounding fixtures that may be grounded.
- 3. Ground signal wiring shield at the power supply end.



A. Remote sensor housing



## Option 3

1. Ground sensor wiring shield at the sensor, if possible.

C. Sensor

- 2. Ensure the sensor wiring and signal wiring shields are electrically isolated from the transmitter housing and other fixtures that may be grounded.
- 3. Ground signal wiring shield at the power supply end.



A. Transmitter C. Sensor

B. Shield ground points

## Grounded thermocouple inputs

- 1. Ground sensor wiring shield at the sensor.
- 2. Ensure the sensor wiring and signal wiring shields are electrically isolated from the transmitter housing and other fixtures that may be grounded.
- 3. Ground signal wiring shield at the power supply end.



# 6.0 Perform a loop test

The loop test verifies transmitter output, loop integrity, and operation of any recorders or similar devices installed in the loop.

# 6.1 Device dashboard - device revision 5 and 7, DD v1

## Initiate a loop test

- 1. Connect an external ampere meter in series with the transmitter loop (so the power to the transmitter goes through the meter at some point in the loop).
- 2. From the *Home* screen, select **3 Service Tools**, **5 Simulate**, **1 Perform Loop Test**. The communicator displays the loop test menu.
- 3. Select a discreet milliampere level for the transmitter to output. At *Choose Analog Output* select **1 4 mA**, **2 20mA**, or select **4 Other** to manually input a value between 4 and 20 milliamperes. Select **Enter** to show the fixed output. Select **OK**.
- 4. In the test loop, check that the transmitter's actual mA output and the HART mA reading are the same value. If the readings do not match, either the transmitter requires an output trim or the current meter is malfunctioning.
- 5. After completing the test, the display returns to the loop test screen and allows the user to choose another output value. To end the loop test, Select **5 End** and **Enter**.

## Initiate simulation alarm

- 1. From the Home screen, select **3 Service Tools**, **5 Simulate**, **1 Perform Loop Test**, **3 Simulate Alarm**.
- 2. The transmitter will output the alarm current level based on the configured alarm parameter and switch settings.
- 3. Select **5 End** to return the transmitter to normal conditions.

# 7.0 Safety Instrumented System (SIS)

For safety certified installations, refer to the Rosemount 3144P <u>Reference</u> <u>Manual</u> The manual is available electronically on <u>Emerson.com/Rosemount</u> or by contacting an Emerson representative.

# 8.0 Product Certifications

Rev 1.15

# 8.1 European Directive Information

A copy of the EU Declaration of Conformity can be found at the end of the Quick Start Guide. The most recent revision of the EU Declaration of Conformity can be found at <u>Emerson.com/Rosemount</u>.

# 8.2 Ordinary Location Certification

As standard, the transmitter has been examined and tested to determine that the design meets the basic electrical, mechanical, and fire protection requirements by a nationally recognized test laboratory (NRTL) as accredited by the Federal Occupational Safety and Health Administration (OSHA).

## North America

- **E5** FM Explosionproof, Dust-Ignitionproof, and Nonincendive Certificate: FM16US0202X
  - Standards: FM Class 3600: 2011, FM Class 3611: 2004, FM Class 3615: 2006, FM Class 3810: 2005, NEMA-250: 1991, ANSI/ISA 60079-0: 2009, ANSI/ISA 60079-11: 2009
  - Markings: XP CL I, DIV 1, GP A, B, C, D; T5(-50 °C ≤  $T_a$  ≤ +85 °C); DIP CL II/III, DIV 1, GP E, F, G; T5(-50 °C ≤  $T_a$  ≤ +75 °C); T6(-50 °C ≤  $T_a$  ≤ +60 °C); when installed per Rosemount drawing 03144-0320; NI CL I, DIV 2, GP A, B, C, D; T5(-60 °C ≤  $T_a$  ≤ +75 °C); T6(-60 °C ≤  $T_a$  ≤ +50 °C); when installed per Rosemount drawing 03144-0321, 03144-5075;
- **I5** FM Intrinsic Safety and Nonincendive Certificate: FM16US0202X
  - Standards: FM Class 3600: 2011, FM Class 3610: 2010, FM Class 3611: 2004, FM Class 3810: 2005, NEMA-250: 1991, ANSI/ISA 60079-0: 2009, ANSI/ISA 60079-11: 2009
- **I6** CSA Intrinsic Safety and Division 2 Certificate: 1242650
  - Standards: CAN/CSA C22.2 No. 0-M91 (R2001), CAN/CSA-C22.2 No. 94-M91, CSA Std C22.2 No. 142-M1987, CAN/CSA-C22.2 No. 157-92, CSA Std C22.2 No. 213-M1987
  - Markings: Intrinsically Safe for Class I Groups A, B, C, D; Class II, Groups E, F, G; Class III; [HART only zone markings]: Intrinsically Safe for Class I Zone 0 Group IIC; T4(-50 °C  $\leq$  T<sub>a</sub>  $\leq$  +60 °C); Type 4X; Suitable for Class I, Div. 2, Groups A, B, C, D; [HART only zone markings]: Suitable for Class I Zone 2 Group IIC; T6(-60 °C  $\leq$  T<sub>a</sub>  $\leq$  +60 °C); T5(-60 °C  $\leq$  T<sub>a</sub>  $\leq$  +85 °C); when installed per Rosemount drawing 03144-5076

- K6 CSA Explosionproof, Intrinsic Safety and Division 2 Certificate: 1242650 Standards: CAN/CSA C22.2 No. 0-M91 (R2001), CSA Std C22.2 No. 30-M1986;
  - CAN/CSA-C22.2 No. 94-M91, CSA Std C22.2 No. 94-M91, CSA Std C22.2 No. 94-M91, CSA Std C22.2 No. 142-M1987, CAN/CSA-C22.2 No. 157-92, CSA Std C22.2 No. 213-M1987
  - Markings: Explosionproof for Class I, Groups A, B, C, D; Class II, Groups E, F, G; Class III; [HART only zone markings]: Suitable for Class I Zone 1 Group IIC; Intrinsically Safe for Class I Groups A, B, C, D; Class II, Groups E, F, G; Class III; [HART only zone markings]: Suitable for Class I Zone 0 Group IIC;  $T4(-50 \degree C \le T_a \le +60 \degree C)$ ; Type 4X; Suitable for Class I, Div. 2, Groups A, B, C, D; [HART only zone markings]: Suitable for Class I Zone 2 Group IIC;  $T6(-60 \degree C \le T_a \le +60 \degree C)$ ; T5(-60  $\degree C \le T_a \le +85 \degree C)$ ; when installed per Rosemount drawing 03144-5076

## Europe

- E1 ATEX Flameproof
  - Certificate: FM12ATEX0065X
  - Standards: EN 60079-0: 2012, EN 60079-1: 2007, EN 60529:1991 +A1:2000 Markings: II 2 G Ex d IIC T6...T1 Gb, T6(-50 °C ≤ T<sub>a</sub> ≤ +40 °C), T5...T1(-50 °C ≤ T<sub>a</sub> ≤ +60 °C)

See Table 1 at the end of the Product Certifications section for Process Temperatures.

### Special Conditions for Safe Use (X):

- 1. See certificate for ambient temperature range.
- 2. The non-metallic label may store an electrostatic charge and become a source of ignition in Group III environments.
- 3. Guard the LCD display cover against impact energies greater than 4 joules.
- 4. Flameproof joints are not intended for repair.
- 5. A suitable certified Ex d or Ex tb enclosure is required to be connected to temperature probes with Enclosure option "N".
- 6. Care shall be taken by the end user to ensure that the external surface temperature on the equipment and the neck of DIN Style Sensor probe does not exceed 130 °C.
- Non-Standard Paint options may cause risk from electrostatic discharge. Avoid installations that cause electrostatic build-up on painted surfaces, and only clean the painted surfaces with a damp cloth. If paint is ordered through a special option code, contact the manufacturer for more information.
- I1 ATEX Intrinsic Safety

Certificate: BAS01ATEX1431X [HART]; Baseefa03ATEX0708X [Fieldbus] Standards: EN 60079-0: 2012; EN 60079-11:2012 Markings: HART: ( $\bigcirc$ ) II 1 G Ex ia IIC T5/T6 Ga; T6(-60 °C  $\leq$  T<sub>a</sub>  $\leq$  +50 °C), T5(-60 °C  $\leq$  T<sub>a</sub>  $\leq$  +75 °C)

Fieldbus: 🐵 II 1 G Ex ia IIC T4 Ga; T4(-60 °C  $\leq$  T<sub>a</sub>  $\leq$  +60 °C)

See Table 2 at the end of the Product Certifications section for Entity Parameters.

## Special Conditions for Safe Use (X):

- 1. When fitted with the transient terminal options, the equipment is not capable of passing the 500 V insulation test. This must be taken into account during installation.
- 2. The enclosure may be made from aluminum alloy with a protective polyurethane paint finish; however, care should be taken to protect it from impact or abrasion when located in Zone 0.

#### N1 ATEX Type n

Certificate: BAS01ATEX3432X [HART]; Baseefa03ATEX0709X [Fieldbus] Standards: EN 60079-0:2012, EN 60079-15:2010 Markings: HART: II 3 G Ex nA IIC T5/T6 Gc; T6(-40 °C  $\leq T_a \leq +50$  °C), T5(-40 °C  $\leq T_a \leq +75$  °C) Fieldbus: II 3 G Ex nA IIC T5 Gc; T5(-40 °C  $\leq T_a \leq +75$  °C)

#### Special Condition for Safe Use (X):

- When fitted with the transient terminal options, the equipment is not capable of withstanding the 500 V electrical strength test as defined in clause 6.5.1 of EN 60079-15: 2010. This must be taken into account during installation.
- ND ATEX Dust

Certificate: FM12ATEX0065X

#### Special Conditions for Safe Use (X):

- 1. See certificate for ambient temperature range
- 2. The non-metallic label may store an electrostatic charge and become a source of ignition in Group III environments
- 3. Guard the LCD cover against impact energies greater than 4 joules
- 4. Flameproof joints are not intended for repair.
- 5. A suitable certified Ex d or Ex tb enclosure is required to be connected to temperature probes with Enclosure option "N".
- 6. Care shall be taken by the end user to ensure that the external surface temperature on the equipment and the neck of DIN Style Sensor probe does not exceed 130 °C.
- Non-Standard Paint options may cause risk from electrostatic discharge. Avoid installations that cause electrostatic build-up on painted surfaces, and only clean the painted surfaces with a damp cloth. If paint is ordered through a special option code, contact the manufacturer for more information.

## International

- E7 IECEx Flameproof
  - Certificate: IECEx FMG 12.0022X

Standards: IEC 60079-0:2011, IEC 60079-1:2007-04, IEC 60079-31:2008

Markings: Ex d IIC T6...T1 Gb, T6(-50 °C ≤  $T_a$  ≤ +40 °C), T5...T1(-50 °C ≤  $T_a$  ≤ +60 °C); Ex tb IIIC T130 °C Db, (-40 °C ≤  $T_a$  ≤ +70 °C); IP66

See Table 1 at the end of the Product Certifications section for Process Temperatures.

### Special Conditions for Safe Use (X):

- 1. See certificate for ambient temperature range.
- 2. The non-metallic label may store an electrostatic charge and become a source of ignition in Group III environments.
- 3. Guard the LCD display cover against impact energies greater than 4 joules.
- 4. Flameproof joints are not intended for repair.
- 5. A suitable certified Ex d or Ex tb enclosure is required to be connected to temperature probes with Enclosure option "N".
- 6. Care shall be taken by the end user to ensure that the external surface temperature on the equipment and the neck of DIN Style Sensor probe does not exceed 130 °C.

- 7. Non-Standard Paint options may cause risk from electrostatic discharge. Avoid installations that cause electrostatic build-up on painted surfaces, and only clean the painted surfaces with a damp cloth. If paint is ordered through a special option code, contact the manufacturer for more information.
- **I7** IECEx Intrinsic Safety

Certificate: IECEx BAS 07.0002X [HART]; IECEx BAS 07.0004X [Fieldbus] Standards: IEC 60079-0: 2011; IEC 60079-11: 2011; Markings: HART: Ex ia IIC T5/T6 Ga; T6(-60 °C  $\leq$  T<sub>a</sub>  $\leq$  +50 °C), T5(-60 °C  $\leq$  T<sub>a</sub>  $\leq$  +75 °C Fieldbus: Ex ia IIC T4 Ga; T4(-60 °C  $\leq$  T<sub>a</sub>  $\leq$  +60 °C) See Table 2 at the end of the Product Certifications section for Entity Parameters.

#### Special Conditions for Safe Use (X):

- 1. When fitted with the transient terminal options, the apparatus is not capable of withstanding the 500 V electrical strength test as defined in Clause 6.3.13 of IEC 60079-11: 2011. This must be taken into account during installation.
- 2. The enclosure may be made from aluminum alloy with a protective polyurethane paint finish; however, care should be taken to protect it from impact or abrasion when located in Zone 0.
- N7 IECEx Type n

Certificate: IECEx BAS 070003X [HART]; IECEx BAS 07.0005X [Fieldbus] Standards: IEC 60079-0:2011, IEC 60079-15:2010

Markings: HART: Ex nA IIC T5/T6 Gc; T6(-40 °C ≤  $T_a$  ≤ +50 °C), T5(-40 °C ≤  $T_a$  ≤ +75 °C) Fieldbus: Ex nA IIC T5 Gc; T5(-40 °C ≤  $T_a$  ≤ +75 °C)

## Brazil

## Special Conditions for Safe Use (X):

- 1. See product description for ambient temperature limits and process temperature limits.
- 2. The non-metallic label may store an electrostatic charge and become a source of ignition in Group III environments.
- 3. Guard the LCD display cover against impact energies greater than 4 joules.
- 4. Consult the manufacturer if dimensional information on the flameproof joints is necessary.
- INMETRO Intrinsic Safety [HART] Certificate: UL-BR 15.0088X Standards: ABNT NBR IEC 60079-0:2008 + Errata 1:2011, ABNT NBR IEC 60079-11:2009 Markings: Ex ia IIC T6 Ga (-60 °C ≤ T<sub>a</sub> ≤ +50 °C), Ex ia IIC T6 Ga (-60 °C ≤ T<sub>a</sub> ≤ +75 °C) See Table 2 at the end of the Product Certifications section for Entity Parameters.

#### Special Conditions for Safe Use (X):

 When fitted with the transient terminal options, the equipment is not capable of withstanding the 500 V electrical strength test as defined in ABNT NBR IEC60079-11. This must be taken into account during installation. 2. The enclosure may be made from aluminum alloy with a protective polyurethane paint finish; however, care should be taken to protect it from impact and abrasion when located in areas that require EPL Ga (Zone 0).

INMETRO Intrinsic Safety [Fieldbus/FISCO] Certificate: UL-BR 15.0030X Standards: ABNT NBR IEC 60079-0:2008 + Errata 1:2011, ABNT NBR IEC 60079-11:2009 Markings: Ex ia IIC T4 Ga (-60 °C  $\leq T_a \leq +60$  °C), See Table 2 at the end of the Product Certifications section for Entity Parameters.

### Special Condition for Safe Use (X):

- 1. When mounted with the terminal options with transient protection, the equipment is not capable of withstanding the dielectric strength test with 500 V as defined in ISO IEC 60079-11. This feature should be taken into account during installation.
- 2. The enclosure may be made from aluminum alloy with a protective polyurethane paint finish; however, care should be taken to protect it from impact and abrasion when located in areas that require EPL Ga (Zone 0).

## China

E3 China Flameproof Certificate: GYJ16.1339X Standards: GB3836.1-2010, GB3836.2-2010 Markings: Ex d IIC T5/T6 Gb

### Special Conditions for Safe Use (X):

- 1. Symbol "X" is used to denote specific conditions of use: For information on the dimensions of the flameproof joints the manufacturer shall be contacted. This shall be mentioned in the manual.
- 2. Relation between T code and ambient temperature range is:

T code	Ambient temperature
T6	-50 °C <b>≤</b> T <sub>a</sub> <b>≤</b> +40 °C
T5	-50 °C <b>≤</b> T <sub>a</sub> <b>≤</b> +60 °C

- 3. The earth connection facility in the enclosure should be connected reliably.
- 4. During installation, there should be no mixture harmful to flameproof housing.
- 5. During installation in hazardous location. Cable glands, conduits and blanking plugs, certified by state-appointed inspection bodies with Ex d IIC Gb degree, should be used.
- 6. During installation, use and maintenance in explosive gas atmospheres, observe the warning "Do not open when energized".
- 7. End users is not permitted to change any components insides, but to settle the problem in conjunction with manufacturer to avoid damage to the product.
- 8. When installation, use and maintenance of this product, observe following standards: GB3836.13-2013 "Electrical apparatus for explosive gas atmospheres Part 13: Repair and overhaul for apparatus used in explosive gas atmospheres" GB3836.15-2000 "Electrical apparatus for explosive gas atmospheres Part 15: Electrical installations in hazardous area (other than mines)" GB3836.16-2006 "Electrical apparatus for explosive gas atmospheres Part 16: Inspection and maintenance of electrical installation (other than mines)" GB50257-2014 "Code for construction and acceptance of electric device for explosion atmospheres and fire hazard electrical equipment installation engineering"

 China Intrinsic Safety Certificate: GYJ16.1338X Standards: GB3836.1-2010, GB3836.4-2010, GB3836.20-2010 Markings: Ex ia IIC T4/T5/T6

#### Special Conditions for Safe Use (X):

- 1. Symbol "X" is used to denote specific conditions of use:
  - a. The enclosure may contain light metal, attention should be taken to avoid ignition hazard due to impact or friction when used in Zone 0.
  - b. When fitted with the "Transient Terminal Option", this apparatus is not capable of withstanding the 500 V r.m.s. insulation test required by Clause 6.3.12 of GB3836.4-2010.
- 2. Relation between T code and ambient temperature range is:

Output	T code	Ambient temperature
	Т6	-60 °C ≤ T <sub>a</sub> ≤ +50 °C
HART	T5	-60 °C ≤ T <sub>a</sub> ≤ +75 °C
Fieldbus	T4	-60 °C ≤ T <sub>a</sub> ≤ +60 °C

### 3. Parameters:

Power/loop terminals (+ and -)

Output	Maximum input	Maximum input	Maximum input power: P <sub>i</sub>	Maximun paran	n internal neters
	voltage: U <sub>i</sub> (V)		(W)	C <sub>i</sub> (nF)	L <sub>i</sub> (μΗ)
HART	30	300	1	5	0
Fieldbus	30	300	1.3	2.1	0

#### Sensor terminal (1 to 5)

Output	Maximum input	Maximum input	Maximum input power:	Maximun param	n internal Neters
	voltage: U <sub>o</sub> (V)		P <sub>o</sub> (W)	C <sub>i</sub> (nF)	L <sub>i</sub> (μΗ)
HART	13.6	56	0.19	78	0
Fieldbus	13.9	23	0.079	7.7	0

Load connected to sensor terminals (1 to 5)

Output Croup	Croup	Maximum exte	nal parameters	
Output	Group	C <sub>o</sub> (μF)	L <sub>o</sub> (μΗ)	
	IIC	0.74	11.7	
HART	IIB	5.12	44	
	IIA	18.52	94	
	IIC	0.73	30.2	
Fieldbus	IIB	4.8	110.9	
	IIA	17.69	231.2	

Temperature transmitters comply to the requirements for FISCO field devices specified in GB3836.19-2010. FISCO parameters are as follows:

Maximum input	Maximum input	Maximum input	Maximun paran	n internal neters
voltage. O <sub>i</sub> (V)		power: P <sub>i</sub> (w)	C <sub>i</sub> (nF)	L <sub>i</sub> (μΗ)
17.5	380	5.32	2.1	0

- 4. The product should be used with Ex-certified associated apparatus to establish explosion protection system that can be used in explosive gas atmospheres. Wiring and terminals should comply with the instruction manual of the product and associated apparatus.
- The cables between this product and associated apparatus should be shielded cables (the cables must have insulated shield). The shielded has to be grounded reliably in non-hazardous area.
- 6. End users are not permitted to change any components insides, but to settle the problem in conjunction with manufacturer to avoid damage to the product.
- 7. When installation, use and maintenance of this product, observe following standards: GB3836.13-2013 "Electrical apparatus for explosive gas atmospheres Part 13: Repair and overhaul for apparatus used in explosive gas atmospheres" GB3836.15-2000 "Electrical apparatus for explosive gas atmospheres Part 15: Electrical installations in hazardous area (other than mines)" GB3836.16-2006 "Electrical apparatus for explosive gas atmospheres Part 16: Inspection and maintenance of electrical installation (other than mines)" GB3836.18-2010 "Explosive atmospheres Part 18: Intrinsically safe system" GB50257-2014 "Code for construction and acceptance of electric device for explosion atmospheres and fire hazard electrical equipment installation engineering"

### N3 China Type n

Certificate: GYJ15.1087X [Fieldbus]; GYJ15.1088X [HART] Standards: GB3836.1-2010, GB3836.8-2003 Markings: Ex nA nL IIC T5 Gc [Fieldbus]; Ex nA nL IIC T5/T6 GC [HART]

Output	T Code	Ambient temperature
Fieldbus	T5	–40 °C ≤ T <sub>a</sub> ≤+75 °C
HART	T6	–40 °C ≤ T <sub>a</sub> ≤+50 °C
	T5	–40 °C ≤ T <sub>a</sub> ≤ +75 °C

#### Special Conditions for Safe Use (X):

- 1. See certificate for special conditions of use.
- 2. Max Input Voltage: 42.4 VDC [Fieldbus]; 55VDC [HART]
- 3. When installation, use and maintenance of this product, observe following standards: GB3836.13-1997 "Electrical apparatus for explosive gas atmospheres Part 13: Repair and overhaul for apparatus used in explosive gas atmospheres" GB3836.15-2000 "Electrical apparatus for explosive gas atmospheres Part 15: Electrical installations in hazardous area (other than mines)" GB3836.6-2006 "Electrical apparatus for explosive gas atmospheres Part 16: Inspection and maintenance of electrical installation (other than mines)" GB50257-1996 "Code for construction and acceptance of electric device for explosion atmospheres and fire hazard electrical equipment installation engineering"

## EAC - Belarus, Kazakhstan, Russia

EM Technical Regulation Customs Union (EAC) Flameproof Certificate: RU C-US.GB05.B.00289 Markings: 1Ex d IIC T6...T1 Gb X

#### Special Condition for Safe Use (X):

- 1. See certificate for special conditions.
- IM Technical Regulation Customs Union (EAC) Intrinsic Safety Certificate: RU C-US.GB05.B.00289 Markings: [HART]: 0Ex ia IIC T5, T6 Ga X; [Fieldbus/PROFIBUS<sup>®</sup>]: 0Ex ia IIC T4 Ga X

#### Special Condition for Safe Use (X):

1. See certificate for special conditions.

## Japan

E4 TIIS Flameproof Certificate: TC21038, TC21039 Markings: Ex d IIC T5 (-20 °C  $\leq$  T<sub>a</sub>  $\leq$  +60 °C)

> Certificate: TC16127, TC16128, TC16129, TC16130 Markings: Ex d IIB T4 (-20 °C  $\leq T_a \leq +55$  °C)

# 8.3 Combinations

- K1 Combination of E1, I1, N1, and ND
- K2 Combination of E2 and I2
- K5 Combination of E5 and I5
- K7 Combination of E7, I7, N7
- KA Combination of K1 and K6
- **KB** Combination of K5, I6, and K6
- KM Combination of EM and IM

# 8.4 Tables

## Table 1. Process Temperature

		Т6	Т5	T4	Т3	T2	T1	T130
Max ambient		+ 40 °C	+ 60 °C	+ 60 °C	+ 60 °C	+ 60 °C	+ 60 °C	+ 70 °C
	Transmitter	with LCD dis	play					
	0-in.	55 °C	70 °C	95 ℃				
	3-in.	55 °C	70 °C	100 °C	100 °C	100 °C	100 °C	100 °C
sion	6-in.	60 °C	70 °C	100 °C	100 °C	100 °C	100 °C	100 °C
xten	9-in.	65 °C	75 °C	110°C	110°C	110 °C	110 °C	110°C
sore	Transmitter	without LCD	display					
Sen	0-in.	55 °C	70 °C	100 °C	170°C	280 °C	440 °C	100 °C
	3-in.	55 °C	70 °C	110°C	190°C	300 ℃	450 °C	110 °C
	6-in.	60 °C	70°C	120 °C	200 °C	300 ℃	450 °C	110°C
	9-in.	65 °C	75 ℃	130 °C	200°C	300 ℃	450 °C	120 °C

### Table 2. Entity Parameters

	HART	Fieldbus/PROFIBUS	FISCO	
Voltage U <sub>i</sub> (V)	30	30	17.5	
Current I <sub>i</sub> (mA)	300	300	380	
Power P <sub>i</sub> (W)	1	1.3	5.32	
Capacitance C <sub>i</sub> (nF)	5	2.1	2.1	
Inductance L <sub>i</sub> (mH)	0	0	0	

# 8.5 Additional Certifications

SBS American Bureau of Shipping (ABS) Type Approval Certificate: 02-HS289101-4-PDA Intended Use: Measurement of temperature for marine and offshore applications.

### SBV Bureau Veritas (BV) Type Approval

Certificate: 23154

Requirements: Bureau Veritas Rules for the Classification of Steel Ships Application: Class notations: AUT-UMS, AUT-CCS, AUT-PORT and AUT-IMS; Temperature transmitter type Rosemount 3144P cannot be installed on diesel engines

SDN Det Norske Veritas (DNV) Type Approval Certificate: A-14184 Intended Use: Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards Application:

Location classes			
Temperature	D		
Humidity	В		
Vibration	А		
EMC	А		
Enclosure	D		

SLL Lloyds Register (LR) Type Approval Certificate: 11/60002 Application: Environmental categories ENV1, ENV2, ENV3, and ENV5

EU Declarat No: RM	ion of Conformity AD 1045 Rev. I
We,	
Rosemount, Inc. 8200 Market Boulevard Chanhassen, MN 55317-9685 USA	
declare under our sole responsibility that the	e product,
Rosemount 3144P	Temperature Transmitter
manufactured by,	
Rosemount, Inc. 8200 Market Boulevard Chanhassen, MN 55317-9685 USA	
to which this declaration relates, is in confo Directives, including the latest amendments	rmity with the provisions of the European Union , as shown in the attached schedule.
Assumption of conformity is based on the a applicable or required, a European Union no schedule.	pplication of the harmonized standards and, when tified body certification, as shown in the attached
Ko Khi	Vice President of Global Quality
(signature)	(function)
Kelly Klein (name)	(date of issue)





	有害物质 / Hazardous Substances						
部件名称 Part Name	铅 Lead (Pb)	录 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr +6)	多溴联苯 Polybrominated biphenyls (PBB)	多溴联苯醚 Polybrominated diphenyl ethers (PBDE)	
电子组件 Electronics Assembly	х	0	о	ο	0	0	
壳体组件 Housing Assembly	0	0	0	х	0	0	
传感器组件 Sensor Assembly	х	0	о	0	0	0	

含有 China RoHS 管控物质超过最大浓度限值的部件型号列表 Rosemount 3144P
List of Rosemount 3144P Parts with China RoHS Concentration above MCVs

本表格系依据 SJ/T11364 的规定而制作.

This table is proposed in accordance with the provision of SJ/T11364.

O: 意为该部件的所有均质材料中该有害物质的含量均低于 GB/T 26572 所规定的限量要求.

O: Indicate that said hazardous substance in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.

X: 意为在该部件所使用的所有均质材料里,至少有一类均质材料中该有害物质的含量高于 GB/T 26572 所规定的限量要求. X: Indicate that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.

#### Quick Start Guide 00825-0100-4021, Rev LA January 2017

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