Reference Manual
00809-0100-4799, Rev BA
September 2002

Model 3244MV™ MultiVariable Temperature Transmitter with Profibus-PA

(Device Revision 2)

Profibus-PA

ROSEMOUNT®

www.rosemount.com

EMERSON™
Process Management

Model 3244MV MultiVariable Temperature Transmitter with Profibus-PA

NOTICE

Read this manual before working with the product. For personal and system safety, and for optimum product performance, make sure to thoroughly understand the contents before installing, using, or maintaining this product.

The United States has two toll-free assistance numbers and one International number.

Customer Central
1-800-999-9307
(7:00 a.m. to 7:00 P.M. CST)

International
1-(952) 906-8888

National Response Center
1-800-654-7768
(24 hours a day)
Equipment service needs

⚠CAUTION

The products described in this document are NOT designed for nuclear-qualified applications. Using non-nuclear qualified products in applications that require nuclear-qualified hardware or products may cause inaccurate readings.

For information on Rosemount nuclear-qualified products, contact a local Rosemount Sales Representative.

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Section 1 Introduction

USING THIS MANUAL

This manual is intended to assist in installing, operating, and maintaining Rosemount® Model 3244MV MultiVariable Temperature Transmitters with Profibus-PA.

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OVERVIEW

Transmitter

Enhanced measurement capability allows the Model 3244MV to communicate multiple variables to a Profibus-PA host or configuration tool. This temperature transmitter has the ability to accept simultaneous inputs from two temperature sensing elements. The differential temperature measurement capability can be used to detect sensor drift in a dual-element sensor. The Model 3244MV with Profibus-PA combines the effects of transmitter drift, sensor interchangeability error, temperature effects, and reference accuracy to better account for actual process conditions and to assure maximum accuracy.

The Model 3244MV with Profibus-PA provides superior performance in non-critical applications involving basic process monitoring as well as simultaneous measurement of separate and independent temperature points with one transmitter. With this feature instrument costs are reduced by as much as 50 percent. In addition, the multi-drop capability of Profibus-PA results in additional savings through reduced wiring costs.

PROFIBUS Technology

Profibus-PA is an all digital, serial, two-way communication system that interconnects field equipment such as sensors, actuators, and controllers. Profibus-PA is a Local Area Network (LAN) for instruments used in both process and manufacturing automation. The profibus environment is the base level group of digital networks in the hierarchy of plant networks.

Profibus-PA communication retains the desirable features of the 4–20 mA analog system, including a standardized physical interface to the wire, bus-powered devices on a single pair of wires, and intrinsic safety options. It also enables additional capabilities, such as the following:

- increased capabilities due to full digital communications
- reduced wiring and wire terminations due to multiple devices on one pair of wires
- increased selection of suppliers due to interoperability
- reduced loading on control room equipment with the distribution of some control and input/output functions to field devices

Section 2 Installation

SAFETY MESSAGES

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that raises potential safety issues is indicated by a warning symbol (⚠). Please refer to the following safety messages before performing an operation preceded by this symbol.

Warnings

⚠WARNING

Failure to follow these installation guidelines could result in death or serious injury:

- Make sure only qualified personnel perform the installation.

Explosions could result in death or serious injury:

- Do not remove the transmitter cover in explosive atmospheres when the circuit is live.
- Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.
- Both transmitter covers must be fully engaged to meet explosion-proof requirements.

Electrical shock could cause death or serious injury. If the sensor is installed in a high-voltage environment and a fault condition or installation error occurs, high voltage may be present on transmitter leads and terminals.

- Use extreme caution when making contact with the leads and terminals.

Process leaks could result in death or serious injury:

- Install and tighten thermowells or sensors before applying pressure, or process leakage may result.
- Do not remove the thermowell while in operation. Removing while in operation may cause process fluid leaks.

CONSIDERATIONS

General

Electrical temperature sensors such as RTDs and thermocouples produce low-level signals proportional to temperature. The Model 3244MV temperature transmitter converts the analog sensor signal to a digital signal that is relatively insensitive to lead length and electrical noise. This current signal is then transmitted over the bus to the configuration device and the control room.

Electrical

Proper electrical installation is necessary to prevent errors due to sensor lead resistance and electrical noise. Shielded, twisted cable should be used for best results in electrically noisy environments. Refer to “Sensor Connections” on page 2-9 for more information.

Power Supply

The transmitter requires between 9 and 32 V dc to operate and provide complete functionality. The dc power supply should provide power with less than 2% ripple.

Power Filter

A profibus segment requires a power conditioner to isolate the power supply filter and decouple the segment from other segments attached to the same power supply.

Mechanical

The Model 3244MV transmitter can be mounted directly to the sensor or apart from the sensor using an optional mounting bracket. Using the bracket, the transmitter can be mounted either to a flat surface or to a 2-inch diameter pipe (see “Mounting Brackets” on page A-7).

Mounting

The transmitter may require supplementary support under high-vibration conditions, particularly if used with extensive thermowell lagging or long extension fittings. Pipe-stand mounting, using one of the optional mounting brackets, is recommended for use in high-vibration applications.

Access Requirements

When choosing an installation location and position, take into account the need for access to the transmitter.

Electronics Housing
Mount the transmitter so the terminal side and terminal side is accessible. Be sure to allow adequate clearance for cover removal. When adding a LCD meter, mount the circuit-side of the transmitter in a visible position.

Tagging

Commissioning Tag
The Model 3244MV has been supplied with a removable commissioning tag that contains both the Device ID and a space to record the device tag. The Device ID is a unique code that identifies a particular device in the absence of a device tag. The device tag is used as an operational identification for the device and is usually defined by the Piping and Instrumentation Diagram (P & ID).

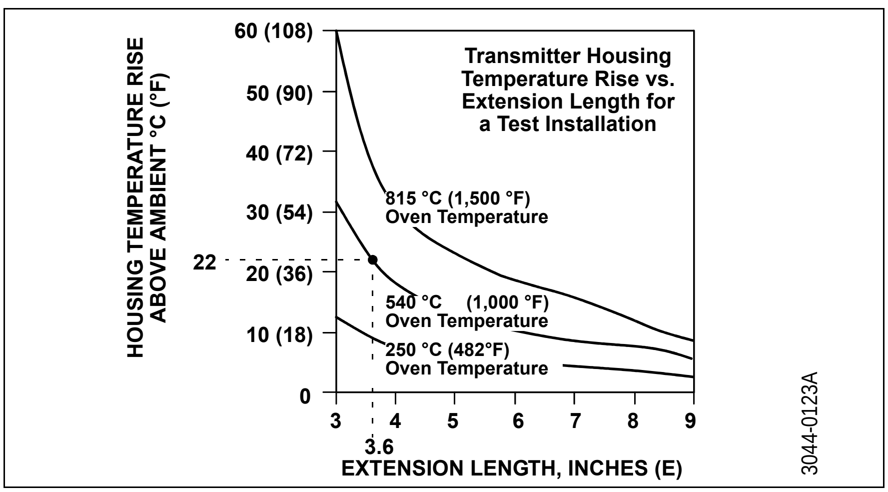
When commissioning more than one device on a profibus segment, it can be difficult to identify which device is at a particular location. The removable tag provided with the transmitter can aid in this process by linking the Device ID and a physical location. The installer should note the physical location in both places on the removable commissioning tag and tear off the bottom portion. This should be done for each device on the segment. The bottom portion of the tags can be used for commissioning the segment in the control system.

Environmental

Temperature Environments

The transmitter will operate within specifications for ambient temperatures between –40 and 185 °F (–40 and 85 °C).In a direct mounting configuration, heat from the process is transferred from the thermowell to the transmitter housing. If the expected process temperature is near or beyond the specification limits, consider the use of additional thermowell lagging, an extension nipple, or a remote mounting configuration to isolate the transmitter from these excessive temperatures. Figure 2-1 provides an example of the relationship between transmitter housing temperature rise and extension length. Use Figure 2-1 and the accompanying example to determine adequate thermowell extension length.

Figure 2-1. Transmitter Housing Temperature Rise



EXAMPLE:
The rated temperature specification is 85 °C. If the maximum ambient temperature is 40 °C and the temperature to be measured is 540 °C, the maximum allowable housing temperature rise is the rated temperature specification limit minus the existing ambient temperature (85 – 40), or 45 °C.

As shown in Figure 2-1, an extension (E) dimension of 3.6 inches will result in a housing temperature rise of 22 °C. An “E” dimension of 4 inches would therefore be the minimum recommended length and would provide a safety factor of about 25 °C. A longer “E” dimension, such as 6 inches, would be desirable in order to reduce errors caused by transmitter temperature effect, although in that case the transmitter would probably require extra support. If a thermowell with lagging is used, the “E” dimension may be reduced by the length of the lagging.

Moist or Corrosive Environments

The Model 3244MV has a highly reliable, dual-compartment housing designed to resist moisture and corrosives. The electronics module assembly is mounted in a compartment that is isolated from the terminal side conduit entries. O-ring seals protect the interior of each compartment from the environment when the covers are installed. In humid environments it is possible for moisture to accumulate in conduit lines and drain into the housing.

Proper installation of the transmitter can ensure maximum operation and service life. It can also have a significant impact on preventing moisture from accumulating in the housing. Refer to Figures 2-2 and 2-3 before mounting the transmitter.

Mount the transmitter at a high point in the conduit run so moisture from the conduits will not drain into the housing. If the transmitter is mounted at a low point in the conduit run the terminal compartment could fill with water. In some instances the installation of a poured conduit seal, such as the one pictured in Figure 2-3, is advisable. Remove the terminal compartment cover periodically and inspect the transmitter for moisture damage and corrosion.

Figure 2-2. Incorrect Conduit Installation

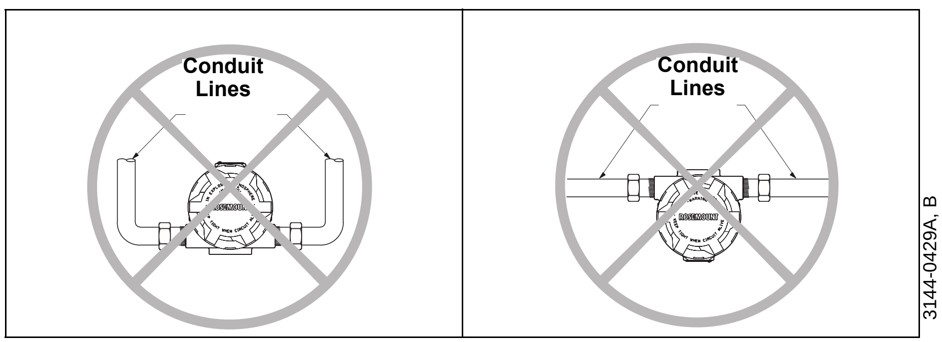
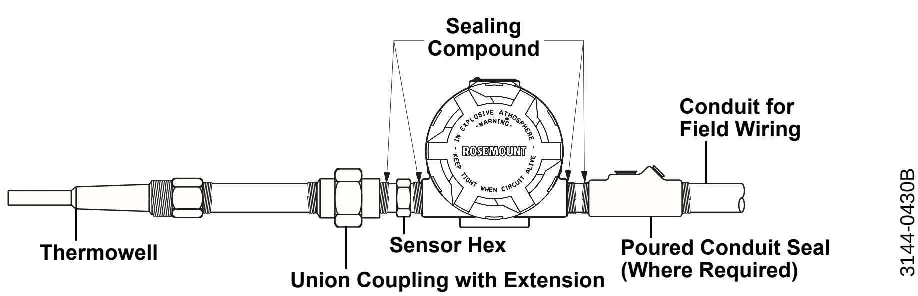


Figure 2-3. Process Mounting with Drain Seal



MOUNTING AND INSTALLATION

Installation consists of mounting the transmitter and sensor and making electrical connections.

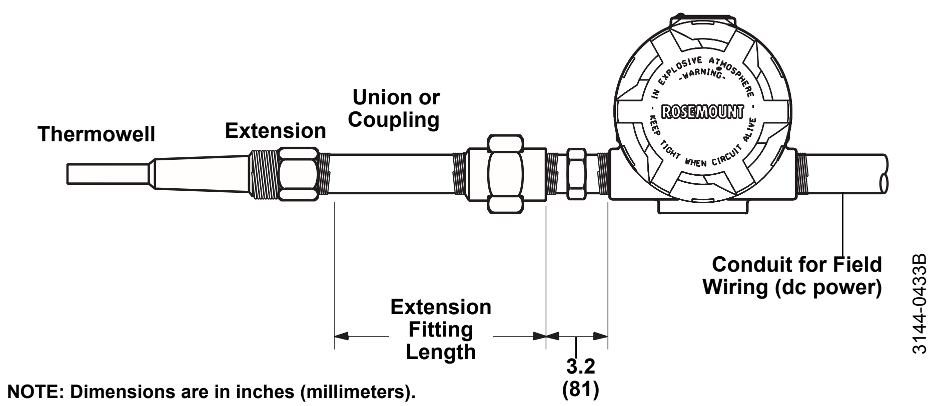
Use the typical North American process mounting configuration illustrated in "Typical North American Installation" on page 2-5 or the typical European process mounting configuration illustrated in "Typical European Installation" on page 2-6.

For transmitter locations remote from the sensor, use conduit or suitable shielded cable and cable glands between the sensor and transmitter. The transmitter accepts male conduit fittings with 1/2–14 NPT, M 20 × 1.5 (CM 20), PG 13.5 (PG 11), or JIS G 1/2 threads.

Typical North American Installation

1. Mount the thermowell to the pipe or process container wall. Be sure to tighten thermowells and sensors. Perform a leak check before starting the process.
2. Attach any necessary unions, couplings, and extension fittings. Be sure to seal the fitting threads with silicone or tape (if required).
3. Screw the sensor into the thermowell or directly into the process (depending on installation requirements).
4. Verify all sealing requirements for severe environments or to satisfy code requirements.
5. Attach the transmitter to the thermowell/sensor assembly. Be sure to seal all threads with silicone or tape (if required).
6. Pull sensor leads through the extensions, unions, or couplings into the terminal side of the transmitter housing.
7. Install field wiring conduit to the remaining transmitter conduit entry.
8. Pull the field wiring leads into the terminal side of the transmitter housing. Avoid contact with the leads and terminals.
9. Attach the sensor leads to the transmitter sensor terminals. Attach the power leads to the transmitter power terminals. Avoid contact with the leads and terminals.
10. Attach and tighten both transmitter covers. Both transmitter covers must be fully engaged to meet explosion-proof requirements.

Figure 2-4. Typical North American Mounting Configuration.

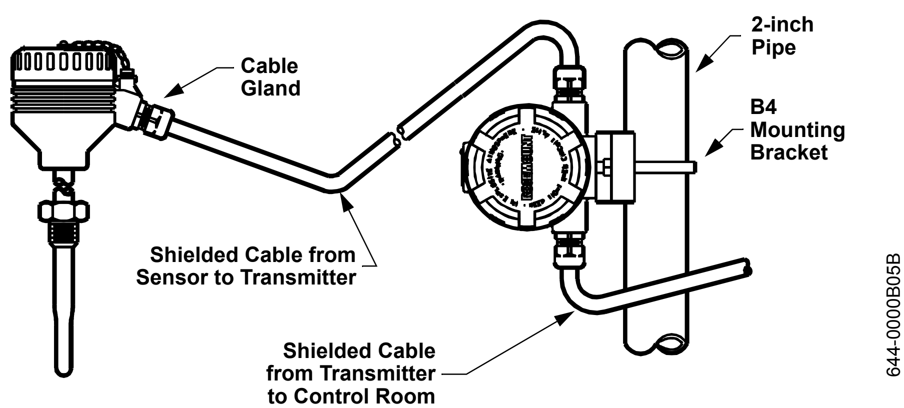


NOTE
The National Electrical Code requires that a barrier or seal be used in addition to the primary (sensor) seal to prevent process fluid from entering the electrical conduit and continuing to the control room. Professional safety assistance is recommended for installation in potentially hazardous processes.

Typical European Installation

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

Figure 2-5. Typical European Process Mounting Configuration.



CONNECT THE WIRING AND POWER UP

Field Wiring

⚠ All power to the transmitter is supplied over the signal wiring. Signal wiring should be shielded, twisted pair for best results. Do not run unshielded signal wiring in conduit or open trays with power wiring or near heavy electrical equipment. Do not remove the transmitter cover in explosive atmospheres when the circuit is live.

⚠ If the sensor is installed in a high-voltage environment and a fault condition or installation error occurs, the sensor leads and transmitter terminals could carry lethal voltages. Use extreme caution when making contact with the leads and terminals.

NOTE
Do not apply high voltage (e.g. ac line voltage) to the transmitter terminals. Abnormally high voltage can damage the unit. (Sensor and transmitter power terminals are rated to 42.4 V dc.)

Power Connections

Use ordinary copper wire of sufficient size to ensure that the voltage across the transmitter power terminals does not drop below 9 V dc. To power the transmitter, connect the power leads to the terminals marked "+" and "T" as shown in Figure 2-7. The power terminals are polarity insensitive, which means the electrical polarity of the power leads does not matter when connecting to the power terminals. When wiring to screw terminals, the use of crimped lugs is recommended. Tighten the terminal screws to ensure adequate contact. No additional power wiring is needed.

Figure 2-6. Hardware Setup

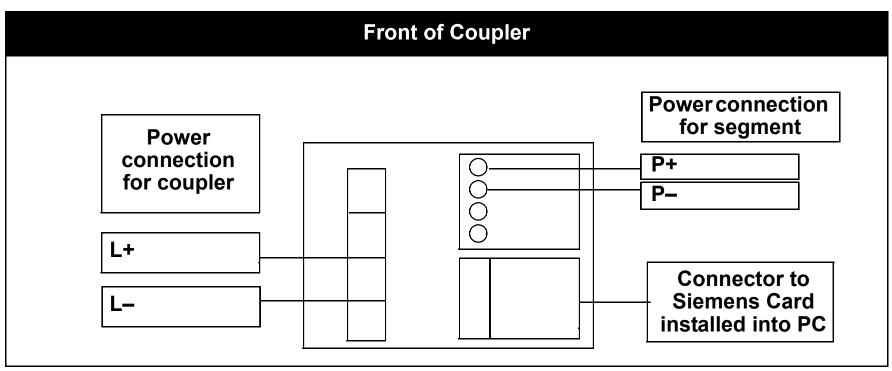
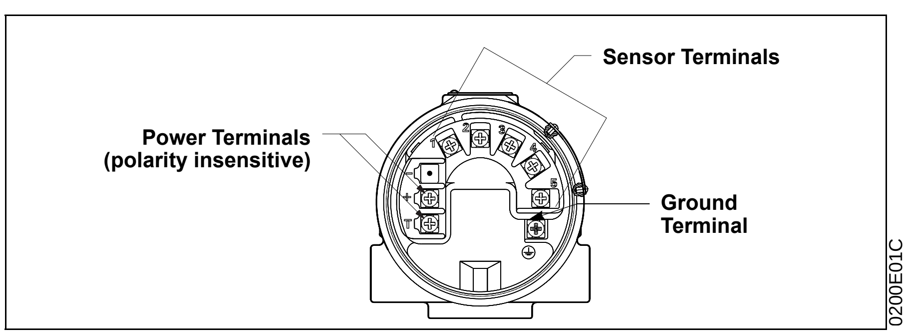


Figure 2-7. Transmitter Terminal Block



Grounding

Transmitters are electrically isolated to 500 V ac rms. Ground the signal wiring at any single point, if desired. When using a grounded thermocouple, the grounded junction serves as this point.

NOTE
Do not ground the signal wire at both ends.

Shielded Wire

Recommended grounding techniques for shielded wire usually call for a single grounding point for each shielded wire to avoid grounding the loop. The following two examples employ the single point grounding technique:

Example 1

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

Example 2

1. Connect the sensor wiring shield to the ground terminal (located inside the terminal compartment of the transmitter housing).
2. Cut the signal wiring shield and isolate from the transmitter housing.
3. Grounded the shield at the power supply end only. Never connect the shield for the signal wiring to the ground terminal inside the transmitter housing.

Transmitter Housing

Ground the transmitter housing in accordance with local electrical requirements. The internal ground terminal is standard. An optional external ground lug assembly (option code G1) can also be ordered if needed. This external grounding method is recommended when using the optional transient protector (option code T1).

Surges/Transients

The transmitter will withstand electrical transients usually encountered in static discharges or induced switching transients. However, high-energy transients, such as those induced in wiring from nearby lightning strikes, can damage both the transmitter and the sensor.

A transient protection will be available at a later date for adding to the Model 3244MV with Profibus-PA.

Sensor Connections

⚠ The Model 3244MV transmitter is compatible with many RTD and thermocouple sensor types. Figure 2-8 shows the correct sensor terminal input connections on the transmitter. To ensure an adequate sensor connection, anchor the sensor lead wires beneath the flat washer on the terminal screw.

⚠ If the sensor is installed in a high voltage environment and a fault condition or installation error occurs, the sensor leads and transmitter terminals could carry lethal voltages. Use extreme caution when making contact with the leads and terminals.

RTD or Ohm Inputs

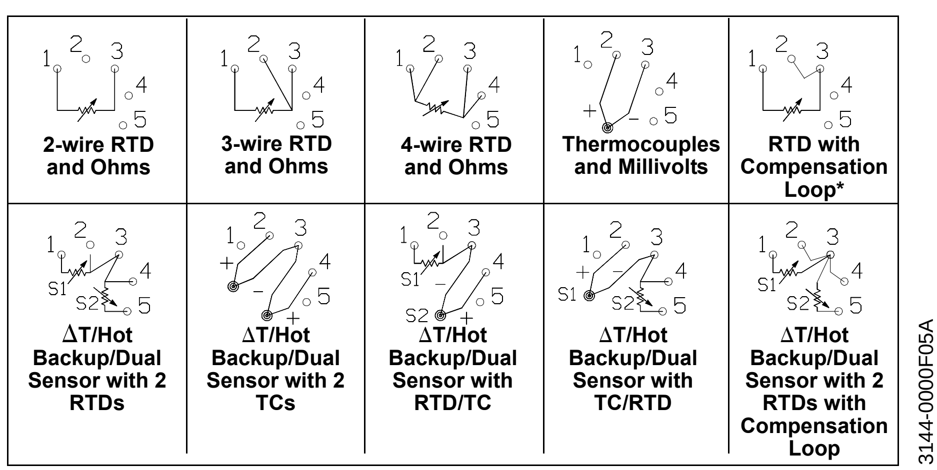
Various RTD configurations, including 2-wire, 3-wire, 4-wire, and compensation loop designs, are used in industrial applications. If the transmitter is mounted remotely from a 3- or 4-wire RTD, it will operate within specifications, without recalibration, for lead wire resistances of up to 10 ohms per lead (equivalent to 1,000 feet of 20 AWG wire). In this case, the leads between the RTD and transmitter should be shielded. If using only two leads (or a compensation loop lead wire configuration), both RTD leads are in series with the sensor element, so significant errors can occur if the lead lengths exceed one foot of 20 AWG wire.

Thermocouple or Millivolt Inputs

For direct-mount applications, connect the thermocouple directly to the transmitter. If mounting the transmitter remotely from the sensor, use appropriate thermocouple extension wire. Make connections for millivolt inputs with copper wire. Use shielding for long runs of wire.

NOTE
The use of two grounded thermocouples with a Model 3244MV is not recommended. For applications in which the use of two thermocouples is desired, connect either two ungrounded thermocouples, one grounded and one ungrounded thermocouple, or one dual element thermocouple.

Figure 2-8. Transmitter Sensor Wiring.



* The transmitter must be configured for a 3-wire RTD in order to recognize an RTD with a compensation loop.

SET THE SWITCHES

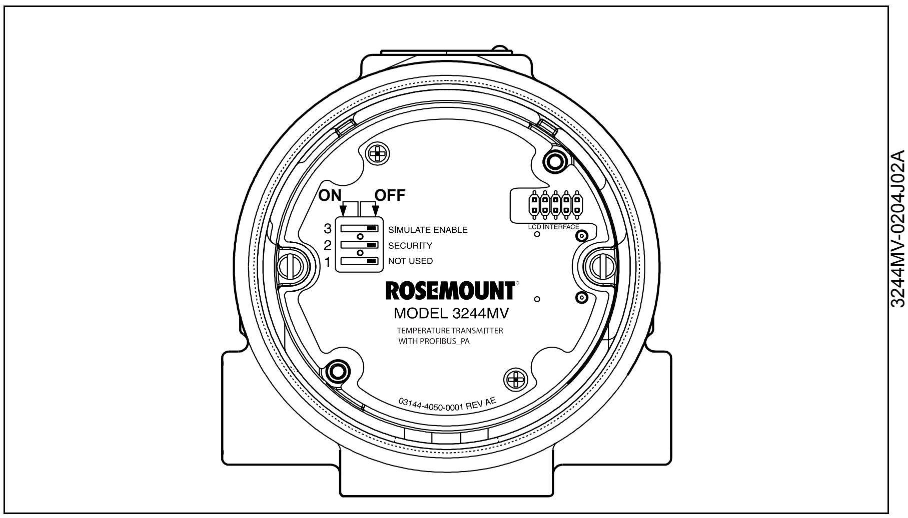
Security

After the transmitter is configured, it is possible to protect the configuration data from unwarranted changes. Each transmitter is equipped with a security switch that can be positioned “ON” to prevent the accidental or deliberate change of configuration data. The switch is located on the front side of the electronics module and is labeled SECURITY (see Figure 2-9).

Simulate

The simulate switch is used in conjunction with the Analog Input (AI) function block. This switch is used to simulate the temperature measurement and is used as a lock-out feature for the AI function block. To enable the simulate feature, the switch must transition from “OFF” to “ON” *after* power is applied to the transmitter (see Figure 2-9). This feature prevents the transmitter from being accidentally left in simulator mode.

Figure 2-9. Transmitter Switch Locations.



Section 3 Commissioning

SAFETY MESSAGES

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that raises potential safety issues is indicated by a warning symbol (⚠). Please refer to the following safety messages before performing an operation preceded by this symbol.

Warnings

⚠WARNING

Failure to follow these installation guidelines could result in death or serious injury:

- Make sure only qualified personnel perform the installation.

Explosions could result in death or serious injury:

- Do not remove the transmitter cover in explosive atmospheres when the circuit is live.
- Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.
- Both transmitter covers must be fully engaged to meet explosion-proof requirements.

Electrical shock could cause death or serious injury. If the sensor is installed in a high-voltage environment and a fault condition or installation error occurs, high voltage may be present on transmitter leads and terminals.

- Use extreme caution when making contact with the leads and terminals.

Process leaks could result in death or serious injury:

- Install and tighten thermowells or sensors before applying pressure, or process leakage may result.
- Do not remove the thermowell while in operation. Removing while in operation may cause process fluid leaks.

INSTALLATION PROCEDURE

Specific installation procedures use Siemens' PDM Configuration tool as a reference. For other configuration tools, use that products reference manual.

All devices are shipped with a default address of 126.

Profibus Device Description and GSD File

Use the following steps to install the Profibus Device Description and GSD file.

1. Go to the Rosemount web site, located at <http://www.rosemount.com/products/temperature/m3244pa.html>.
2. Download the Rosemount 3244 DD zip file.
3. Read the “read me” file on how to install DDs and GSD files. (It is important to read this file because it is unique to each Profibus- PA interface tool.)
4. Click the “Next” button when the program begins.
5. Provide the path “c:\Temp\3244MVM.devices at the appropriate prompt.
6. Select “Search in” and click Next
7. Indicate the device where the DD is to be installed (in this case select 3244MVM(PA).
8. Click “Finish.”
9. Close the application when installation is completed.

Changing the Mode of a Block

Use the following steps to change the mode of a block.

1. Select “Device Mode,” located under the “Device” pull-down menu.
2. Choose “Out of Service (O/S)” to change parameter settings.
3. Indicate the mode desired for the block and press the download button.
4. Select the “Load into PG/PG” option, located under the “Device” pull-down menu.
5. Upon completion, the block will be in the mode set.

NOTE
Changing the mode of one transducer block changes all the transducer blocks to that same mode.

CONFIGURATION

Physical Block

1. Place the physical block into “Out of Service (O/S)” mode.
2. Select the “Display” mode, located under the “Device” pull-down menu.
3. Turn on the valves to be displayed. Set the desired decimal place.
4. Download the device.
5. Select the “Load into PG/PG” option (UPLOAD), located under the “Device” pull-down menu.
6. Place the Physical Block into Auto mode.

Transducer Block

1. Select the “Master Reset” option, located under the “Device” pull-down menu.
2. Input the following as desired
   - **1** to select restart with defaults
   - **4** to restart processor
3. Click “download” to download the device.
4. Once the device has restarted, click close.
5. Select “Change Sensor Type,” method located under the “Device” pull-down menu. When this method begins, select the desired sensor type and the connection.
6. Perform step five for all sensors.
7. Select the “Load into PG/PG” option (UPLOAD), located under the “Device” pull-down menu.
8. Place the transducer block into “Out of Service (O/S)” mode. Set the filter time constant to the desired value (perform for all transducer blocks).
9. Select the “Load into PG/PG” option (UPLOAD), located under the “Device” pull-down menu.
10. Place the Transducer block into Auto mode.

AI blocks

1. Place the AI block into “Out of Service (O/S)” mode and then UPLOAD.
2. Configure the channel for each block by right-clicking on the parameter for each block. Select “On-line Option” and then the channel. Choose a option and UPLOAD.
3. Right-click on the “Process Scale Variable” parameter. Indicate the desired upper, lower and unit values. Download these parameters onto the device (performed for each block). UPLOAD.
4. Right-click on the “Output Signal” parameter. Indicate the desired upper, lower and unit values. Download these parameters onto the device (performed for each block).
5. Select the “Load into PG/PG” option (UPLOAD), located under the “Device” pull-down menu.
6. To set User Warning and Alarm Limits, right-click on “Upper Limit Alarm,” “Upper lImit Warning,” “Lower Limit Warning,” and “Lower Limit Alarm.” Select values and UPLOAD.
7. Place the AI block into Auto mode.

CALIBRATION

2-point trim

The following provide the steps necessary to calibrate the transmitter:

1. Place the sensor transducer blocks into “Out of Service (O/S)” mode.
2. Select the “Calibration” option, located under the “Device” pull-down menu.
3. Choose the sensor to calibrate and click the calibrate button.
4. Select the “USER_cal” option in the Input window. Click OK.
5. Read the instructions. Click OK.
6. Set the new value for the “Lower_cal point.” Click OK.
7. Repeat steps 4 – 6 to perform the same task for the “Upper_cal point.”
8. Close the calibration window when finished performing calibrations.

NOTE
To perform a single-point calibration, click the cancel button when the two Upper_cal point windows are open.

PARAMETER BLOCKS

The following tables provide information regarding

- AI block (Slots 6, 7, 8)
- Physical blocks (Slot 2)
- Transducer 1 (Sensor 1 – slot 3) and Transducer 2 (Sensor 2 – slot 4) Blocks
- Transducer 3 (Differential) Block (Slot 5)

AI Block (Slots 6, 7, 8)

PA Index Number	Parameter	Description	Access	Data Type/ Structure	Size – Bytes
0.1	BLOCK_OBJECT.Reserved	Contains the characteristics of the blocks.	R	Unsigned8	1
0.2	BLOCK_OBJECT.Block Object	Contains the characteristics of the blocks.	R	Unsigned8	1
0.3	BLOCK_OBJECT.Parent Class	Contains the characteristics of the blocks.	R	Unsigned8	1
0.4	BLOCK_OBJECT.Class	Contains the characteristics of the blocks.	R	Unsigned8	1
0.5	BLOCK_OBJECT.DD Reference	Contains the characteristics of the blocks.	R	Unsigned32	4
0.6	BLOCK_OBJECT.DD Revision	Contains the characteristics of the blocks.	R	Unsigned16	2
0.7	BLOCK_OBJECT.Profile	Contains the characteristics of the blocks.	R	Unsigned16	2
0.8	BLOCK_OBJECT.Profile Revision	Contains the characteristics of the blocks.	R	Unsigned16	2
0.9	BLOCK_OBJECT.Execution Time	Contains the characteristics of the blocks.	R	Unsigned8	1
0.10	BLOCK_OBJECT.Highest_Rel_Offset	Contains the characteristics of the blocks.	R	Unsigned16	2
0.11	BLOCK_OBJECT.Index View_1	Contains the characteristics of the blocks.	R	Unsigned16	2
0.12	BLOCK_OBJECT.Num. Of Views	Contains the characteristics of the blocks.	R	Unsigned8	1
1	ST_REV	A block has static block parameters that are not changed by the process. Values are assigned to this parameter during the configuration or optimization. The value of ST_REV must increase by 1 after every change of a static block parameter. This provides a check of the parameter revision.	R	Unsigned16	2
2	TAG_DESC	Every block can be assigned a textural TAG description. The TAG_DESC is the address of the block. The TAG_DESC must be unambiguous and unique in the Profibus system.	R/W	Octet(32)	32

PA Index Number	Parameter	Description	Access	Data Type/ Structure	Size – Bytes
3	STRATEGY	Grouping of Function Block. The STRATEGY field can be used to group blocks.	R/W	Unsigned16	2
4	ALERT_KEY	This parameter contains the identification number of the plant unit. It helps to identify the location (plant unit) of an event (crossing a limit).	R/W	Unsigned8	1
5	TARGET_MODE	The TARGET_MODE parameter contains desired mode normally set by a control application or an operator.	R/W	Unsigned8	1
6.2	MODE_BLK.actual	These blocks contain the actual, permitted and normal modes of the block	R	DS-37	3
6.3	MODE_BLK.permitted				
6.4	MODE_BLK.normal				
7	ALARM_SUM	This parameter contains the current state of the block alarms	R	DS-42	8
10	OUT	Value and status of the block output	R/W	DS-33	5
11	PV_SCALE	Conversion of the Process Variable into percent using the hand low scale values, engineering units code and number of digits tot he right of the decimal point. The engineering unit of PV_SCALE must be the same as the one of the related Transducer Block	R/W	DS-36	11
12	OUT_SCALE	The high and low scale values, units code, and number of digits to the right of the decimal point associated with OUT.	R/W	DS-36	11
14	CHANNEL	Reference to the active Transducer Block which provides the measurement value to the Function Block	R/W	Unsigned16	2
16	PV_FTIME	Filter time of the Process Variable	R/W	Float	4
19	ALARM_HYS	The amount the alarm value must return within the alarm limit before the associated active alarm condition clears.	R/W	Float	4
21	HI_HI_LIM	The setting of the alarm limit used to detect the HI HI alarm condition	R/W	Float	4
23	HI_LIM	The setting of the alarm limit used to detect the HI alarm condition	R/W	Float	4
25	LO_LIM	The setting of the alarm limit used to detect the LO alarm condition	R/W	Float	4
27	LO_LO_LIM	The setting of the alarm limit used to detect the LO LO alarm condition	R/W	Float	4
30	HI_HI_ALARM	The HI HI alarm data	R	DS-39	16
31	HI_ALARM	The HI alarm data	R	DS-39	16
32	LO_ALARM	The LO alarm data	R	DS-39	16
33	LO_LO_ALARM	The LO LO alarm data	R	DS-39	16
34	SIMULATE.	Simulate Status	R/W	DS-50	6

Physical Block (Slot 2)

PA Index Number	Parameter	Description	Access	Data Type/ Structure	Size – Bytes
0.1	BLOCK_OBJECT.Reserved	Contains the characteristics of the blocks.	R	Unsigned8	1
0.2	BLOCK_OBJECT.Block Object	Contains the characteristics of the blocks.	R	Unsigned8	1
0.3	BLOCK_OBJECT.Parent Class	Contains the characteristics of the blocks.	R	Unsigned8	1
0.4	BLOCK_OBJECT.Class	Contains the characteristics of the blocks.	R	Unsigned8	1
0.5	BLOCK_OBJECT.DD Reference	Contains the characteristics of the blocks.	R	Unsigned32	4
0.6	BLOCK_OBJECT.DD Revision	Contains the characteristics of the blocks.	R	Unsigned16	2
0.7	BLOCK_OBJECT.Profile	Contains the characteristics of the blocks.	R	Unsigned16	2
0.8	BLOCK_OBJECT.Profile Revision	Contains the characteristics of the blocks.	R	Unsigned16	2
0.9	BLOCK_OBJECT.Execution Time	Contains the characteristics of the blocks.	R	Unsigned8	1
0.10	BLOCK_OBJECT.Highest_Rel_Offset	Contains the characteristics of the blocks.	R	Unsigned16	2
0.11	BLOCK_OBJECT.Index View_1	Contains the characteristics of the blocks.	R	Unsigned16	2
0.12	BLOCK_OBJECT.Num. Of Views	Contains the characteristics of the blocks.	R	Unsigned8	1
1	ST_REV	A block has static block parameters that are not changed by the process. Values are assigned to this parameter during the configuration or optimization. The value of ST_REV must increase by 1 after every change of a static block parameter. This provides a check of the parameter revision.	R	Unsigned16	2
2	TAG_DESCRIPTION	Every block can be assigned a textural TAG description. The TAG_DESC is the address of the block. The TAG_DESC must be unambiguous and unique in the Profibus system.	R/W	Octet(32)	32
3	STRATEGY	Grouping of Function Block. The STRATEGY field can be used to group blocks.	R/W	Unsigned16	2
4	ALERT_KEY	This parameter contains the identification number of the plant unit. It helps to identify the location (plant unit) of an event (crossing a limit).	R/W	Unsigned8	1
5	TARGET_MODE	The TARGET_MODE parameter contains desired mode normally set by a control application or an operator.	R/W	Unsigned8	1
6.1	MODE_BLK.actual	These blocks contain the actual, permitted and normal modes of the block	R	DS-37	3
6.2	MODE_BLK.permitted				
6.3	MODE_BLK.normal				
7	ALARM_SUM	This parameter contains the current state of the block alarms	R	4*Octet(2)	8
8	SOFTWARE_REVISION	Software revision, includes a major, minor, and build revisions	R	Octet(16)	16
9	HARDWARE_REVISION	Hardware revision	R	Octet(16)	16
10	DEVICE_MAN_ID	Identification code of the field device manufacturer. 38 = Rosemount	R	Unsigned16	2
11	DEVICE_ID	Identification of the device: 3244 = Rosemount Model 3244 Temperature Transmitter	R	Octet(16)	16
12	DEVICE_SER_NUM	Serial number of the device (output board serial number)	R	Octet(16)	16
13	DIAGNOSIS	Detailed information of the device, bitwise coded. More than one message possible at once. If MSB of byte 4 is set to 1 than more diagnosis information is available in the DIAGNOSIS_EXTENSION parameter	R	Octet(4)	4
14	DIAGNOSIS_EXTENSION	Additional manufacturer specific information of the device, bitwise coded. More than one message possible at once.	R	Octet(6)	6
15	DIAGNOSIS_MASK	Definition of supported DIAGNOSIS information bits: 0 = not supported, 1 = supported	R	Octet(4)	4

PA Index Number	Parameter	Description	Access	Data Type/ Structure	Size – Bytes
16	DIAGNOSIS_MASK_EXTENSION	Definition of supported DIAGNOSIS_EXTENSION information bits: 0 = Not supported 1 = Supported	R	Octet(6)	6
17	DEVICE_CERTIFICATION	Certification of the field device	R/W	Octet(16)	16
18	SECURITY_LOCKING	Storage location for a password used by the host software to check if the device parameter is accessible – default value 0x2457	R/W	Unsigned16	2
19	FACTORY_RESET	Command for restarting device: 1 = Restart with default, 4 = Restart processor	W	Unsigned16	2
20	DESCRIPTOR	User-definable text to describe the device	R/W	Octet(32)	32
21	DEVICE_MESSAGE	user-definable message to the device or application in plant	R/W	Octet(32)	32
22	DEVICE_INSTALL_DATE	Date of installation of the device	R/W	Octet(8)	8
45	FINAL_ASSEMBLY_NUMBER	Final Assembly Number – Number that is used for identification purposes and is associated with the overall Field Devices	R/W	Unsigned32	4
22	DOWNLOAD_MODE	Gives access to the boot block code for the over-the-wire downloads	R/W	Unsigned8	1
47	DISPLAY_MODE	Provides interface to configure LCD display	R/W	Octet(1)	1

Transducer 1 (Sensor 1) and Transducer 2 (Sensor 2) Block (Slots 3 and 4)

PA Index Number	Parameter	Description	Access	Data Type/ Structure	Size – Bytes
0.1	BLOCK_OBJECT.Reserved	Contains the characteristics of the blocks.	R	Unsigned8	1
0.2	BLOCK_OBJECT.Block Object	Contains the characteristics of the blocks.	R	Unsigned8	1
0.3	BLOCK_OBJECT.Parent Class	Contains the characteristics of the blocks.	R	Unsigned8	1
0.4	BLOCK_OBJECT.Class	Contains the characteristics of the blocks.	R	Unsigned8	1
0.5	BLOCK_OBJECT.DD Reference	Contains the characteristics of the blocks.	R	Unsigned32	4
0.6	BLOCK_OBJECT.DD Revision	Contains the characteristics of the blocks.	R	Unsigned16	2
0.7	BLOCK_OBJECT.Profile	Contains the characteristics of the blocks.	R	Unsigned16	2
0.8	BLOCK_OBJECT.Profile Revision	Contains the characteristics of the blocks.	R	Unsigned16	2
0.9	BLOCK_OBJECT.Execution Time	Contains the characteristics of the blocks.	R	Unsigned8	1
0.10	BLOCK_OBJECT.Highest_Rel_Offset	Contains the characteristics of the blocks.	R	Unsigned16	2
0.11	BLOCK_OBJECT.Index View_1	Contains the characteristics of the blocks.	R	Unsigned16	2
0.12	BLOCK_OBJECT.Num. Of Views	Contains the characteristics of the blocks.	R	Unsigned8	1
1	ST_REV	A block has static block parameters that are not changed by the process. Values are assigned to this parameter during the configuration or optimization. The value of ST_REV must increase by 1 after every change of a static block parameter. This provides a check of the parameter revision.	R	Unsigned16	2
2	TAG_DESC	Every block can be assigned a textural TAG description. The TAG_DESC is the address of the block. The TAG_DESC must be unambiguous and unique in the Profibus system.	R/W	Octet(32)	32
3	STRATEGY	Grouping of Function Block. The STRATEGY field can be used to group blocks.	R/W	Unsigned16	2
4	ALERT_KEY	This parameter contains the identification number of the plant unit. It helps to identify the location (plant unit) of an event (crossing a limit).	R/W	Unsigned8	1

PA Index Number	Parameter	Description	Access	Data Type/ Structure	Size – Bytes
5	TARGET_MODE	The TARGET_MODE parameter contains desired mode normally set by a control application or an operator.	R/W	Unsigned8	1
6.2	MODE_BLK.actual	These blocks contain the actual, permitted and normal modes of the block	R	DS-37	3
6.3	MODE_BLK.permitted				
6.4	MODE_BLK.normal				
7	ALARM_SUM	This parameter contains the current states of the block alarms	R	DS-42	8
8	MEAS_VALUE	Main measuring value, function of sensors/asic, corrected by BIAS_1/2	R	DS-33	5
11	SENSOR_MEAS_TYPE	Mathematical function: Normal, average, differential form channel 1 and 2	R/W	Unsigned8	1
13	SENSOR_TYPE	Select the type of sensor (Code) for Thermocouples, Rrd., Pyrometers or linear	R/W	Unsigned8	1
20	TEMPERATURE_UNIT	Select the unit of the temperature. (Example: °C, °F, °K, %...), Coding according HCF	R	Unsigned16	2
21	UPPER_SENSOR_LIMIT	Maximum sensor temperature: Physical upper limit function of sensor. (Example: PT 100 = 850 °C)	R	Float	4
22	LOWER_SENSOR_LIMIT	Minimum sensor temperature: Physical lower limit function of sensor. (Example: PT 100 = –200 °C)	R	Float	4
23	MEASURE_FILTER	Measuring filter parameter to suppress noise in process temperature.	R/W	Float	4
24	INPUT_FAULT	Used to indicate memory ASIC, communication, or material failures.	R/W	Unsigned8	1
25	RJ_TEMP	Reference junction temperature	R	Float	4
26	RJ_TYPE	Select reference junction from internal to fixed value	R/W	Unsigned8	1
27	RJ_VALUE	Fixed temperature value I, in degree, of reference junction	R/W	Float	4
28	SENSOR_CONNECTION	The number of wires for the temperature probe. Valid values are: 0 = 2 wire sensor, 1 = 3 wire sensor, 2 = 4 wire sensor	R/W	Unsigned8	1
40	CAL_POINT_HI	The value of the Primary Value Measurement used for the high calibration point.	R/W	Float	4
41	CAL_POINT_LO	The value of the Primary Value Measurement used for the low calibration point.	R/W	Float	4
42	CAL_MIN_SPAN	The minimum span that must be used between the calibration high and low points	R	Float	4
43	CAL_UNIT	The units used for the calibration inputs. Valid calibration units are the following: 35 = K 32 = °C 33 = °F 34 = °R 36 = mV 37 = Ohm 57 = Percent 250 = Not used	R/W	Unsigned16	2
44	SENSOR_SN	Serial number of the sensor	R/W	Octet(32)	32
45	SENSOR_CAL_METHOD	The last method used to calibrate the device. (Example: Factory calibration or user specified): 103 = Factory trip standard, 104 = User trim standard	R/W	Unsigned8	1
46	SENSOR_CAL_LOC	The last location of the calibrated sensor	R/W	Octet(32)	32

PA Index Number	Parameter	Description	Access	Data Type/ Structure	Size – Bytes
47	SENSOR_CAL_DATE	The last date on which the calibration was performed	R/W	Date	7
48	SENSOR_CAL_WHO	The name of the person responsible for the last sensor calibration	R/W	Octet(32)	32
49	SPECIAL_SENSOR_RO	Special sensor matching coefficients – Ro Value (Callendar-Van Dusen sensor matching)	R/W	Float	4
50	SPECIAL_SENSOR_A	Special sensor matching coefficients – A Value (Callendar-Van Dusen sensor matching)	R/W	Float	4
51	SPECIAL_SENSOR_B	Special sensor matching coefficients – B Value (Callendar-Van Dusen sensor matching)	R/W	Float	4
52	SPECIAL_SENSOR_C	Special sensor matching coefficients – C Value (Callendar-Van Dusen sensor matching)	R/W	Float	4
53	A2D_CONVERSION_INFO	Indicate whether the input power has 60 Hz or 50 Hz line cycle 0 = “60 Hz,” Choose this if the input power has 60 Hz line cycle 1 = “50 Hz,” Choose this if the input power has 50 Hz line cycle	R/W	Unsigned8	1
54	RJ_UNIT	Unit of the reference junction temperature	R/W	Unsigned16	2
55	MODULE_SN	The A/D module serial number	R	Octet(32)	32
56	TB_COMMAND_STATUS	Transducer board command status 0 = no Command Active 1 = Command Executing 2 = Command Done 3 = Command Done: Errors	R	Unsigned8	1
57	A2D_BRD_SN	A/D board serial number	R	Unsigned32	4
58	A2D_BRD_HARDWARE_REV	A/D hardware revision	R	Unsigned8	1
59	A2D_BRD_SOFTWARE_NUM	A/D software revision number	R	Unsigned32	4
60	A2D_SOFTWARE_REV	Software revision	R	Octet(48)	48
61	CJC_CALIBRATION	The CJC calibration value	R/W	Float	4
62	RTD_OFFSET_COMPENSATION	RTD offset compensation 0 = “Disabled,” Choose this if you want offset compensation disabled 1 = "Enabled," Choose this for normal operation and the best open sensor diagnostics.	R/W	Unsigned8	1
63	CALIBRATOR_MODE	Calibrator mode. Used to determine the mode of the calibration logic 0 = "Disabled," Choose this if you are doing an input trim to minimize interaction between the device and the calibration hardware. 1 = "Enabled," Choose this or normal operation and the best open sensor diagnostics	R/W	Unsigned8	1

Transducer 3 (Differential) Block (Slot 5)

PA Index Number	Parameter	Description	Access	Data Type/ Structure	Size – Bytes
0.1	BLOCK_OBJECT.Reserved	Contains the characteristics of the blocks.	R	Unsigned8	1
0.2	BLOCK_OBJECT.Block Object	Contains the characteristics of the blocks.	R	Unsigned8	1
0.3	BLOCK_OBJECT.Parent Class	Contains the characteristics of the blocks.	R	Unsigned8	1
0.4	BLOCK_OBJECT.Class	Contains the characteristics of the blocks.	R	Unsigned8	1
0.5	BLOCK_OBJECT.DD Reference	Contains the characteristics of the blocks.	R	Unsigned32	4
0.6	BLOCK_OBJECT.DD Revision	Contains the characteristics of the blocks.	R	Unsigned16	2
0.7	BLOCK_OBJECT.Profile	Contains the characteristics of the blocks.	R	Unsigned16	2
0.8	BLOCK_OBJECT.Profile Revision	Contains the characteristics of the blocks.	R	Unsigned16	2
0.9	BLOCK_OBJECT.Execution Time	Contains the characteristics of the blocks.	R	Unsigned8	1
0.10	BLOCK_OBJECT.Highest_Rel_Offset	Contains the characteristics of the blocks.	R	Unsigned16	2
0.11	BLOCK_OBJECT.Index View_1	Contains the characteristics of the blocks.	R	Unsigned16	2
0.12	BLOCK_OBJECT.Num. Of Views	Contains the characteristics of the blocks.	R	Unsigned8	1
1	ST_REV	A block has static block parameters that are not changed by the process. Values are assigned to this parameter during the configuration or optimization. The value of ST_REV must increase by 1 after every change of a static block parameter. This provides a check of the parameter revision.	R	Unsigned16	2
2	TAG_DESC	Every block can be assigned a textural TAG description. The TAG_DESC is the address of the block. The TAG_DESC must be unambiguous and unique in the Profibus system.	R/W	Octet(32)	32
3	STRATEGY	Grouping of Function Block. The STRATEGY field can be used to group blocks.	R/W	Unsigned16	2
4	ALERT_KEY	This parameter contains the identification number of the plant unit. It helps to identify the location (plant unit) of an event (crossing a limit).	R/W	Unsigned8	1
5	TARGET_MODE	The TARGET_MODE parameter contains desired mode normally set by a control application or an operator.	R/W	Unsigned8	1
6.2	MODE_BLK.actual	These blocks contain the actual, permitted and normal modes of the block	R	DS-37	3
6.3	MODE_BLK.permitted				
6.4	MODE_BLK.normal				
7	ALARM_SUM	This parameter contains the current states of the block alarms	R	DS-42	8
8	MEAS_VALUE	Main measuring value, function of sensors/asic, corrected by BIAS_$^{1}/_{2}$	R	DS-33	5
11	SENSOR_MEAS_TYPE	Mathematical function: Normal, average, differential form channel 1 and 2	R/W	Unsigned8	1
13	SENSOR_TYPE	Select the type of sensor (Code) for Thermocouples, Rrd., Pyrometers or linear	R/W	Unsigned8	1

PA Index Number	Parameter	Description	Access	Data Type/ Structure	Size – Bytes
20	TEMPERATURE_UNIT	Select the unit of the temperature. (Example: °C, °F, °K, %...), Coding according HCF	R	Unsigned16	2
21	UPPER_SENSOR_LIMIT	Maximum sensor temperature: Physical upper limit function of sensor. (Example: PT 100 = 850 °C)	R	Float	4
22	LOWER_SENSOR_LIMIT	Minimum sensor temperature: Physical lower limit function of sensor. (Example: PT 100 = –200 °C)	R	Float	4
23	MEASURE_FILTER	Measuring filter parameter to suppress noise in process temperature.	R/W	Float	4
24	INPUT_FAULT	Used to indicate memory, ASIC, communication, or material failures.	R/W	Unsigned8	1
25	RJ_TEMP	Reference junction temperature	R	Float	4
54	RJ_UNit	Unit for the reference junction temperature	R/W	Unsigned16	2

PV STATUS BYTE CODES

Hex values are in parenthesis.

		Limit			
Quality	**Quality Sub-Status**	**Not Limited**	**LO**	**HI**	**Constant**
BAD	Non-specific	0 (0)	1 (1)	2 (2)	3 (3)
BAD	Configuration error	4 (4)	5 (5)	6 (6)	7 (7)
BAD	Not connected	8 (8)	9 (9)	10 (a)	11 (b)
BAD	Device failure	12 (c)	13 (d)	14 (e)	15 (f)
BAD	Sensor failure	16 (10)	17 (11)	18 (12)	19 (13)
BAD	No comm, with LUV	20 (14)	21 (15)	22 (16)	23 (17)
BAD	No comm, no LUV	24 (18)	25 (19)	26 (1a)	27 (1b)
BAD	Out of Service	28 (1c)	29 (1d)	30 (1e)	31 (1f)
UNCERTAIN	Non-specific	64 (40)	65 (41)	66 (42)	67 (43)
UNCERTAIN	Last usable value	68 (44)	69 (45)	70 (46)	71 (47)
UNCERTAIN	Substitute/Manual entry	72 (48)	73 (49)	74 (4a)	75 (4b)
UNCERTAIN	Initial value	76 (4c)	77 (4d)	78 (4e)	79 (4f)
UNCERTAIN	Sensor conversion not accurate	80 (50)	81 (51)	82 (52)	83 (53)
UNCERTAIN	Engineering unit range violation	84 (54)	85 (55)	86 (56)	87 (57)
UNCERTAIN	Sub-normal	88 (58)	89 (59)	90 (5a)	91 (5b)
Good (NC)	Non-specific	128 (80)	129 (81)	130 (82)	131 (83)
Good (NC)	Active block alarm	132 (84)	133 (85)	134 (86)	135 (87)
Good (NC)	Active advisory alarm	136 (88)	137 (89)	138 (8a)	139 (8b)
Good (NC)	Active critical alarm	140 (8c)	141 (8d)	142 (8e)	143 (8f)
Good (NC)	Unack block alarm	144 (90)	145 (91)	146 (92)	147 (93)
Good (NC)	Unack advisory alarm	148 (94)	149 (95)	150 (96)	151 (97)
Good (NC)	Unack critical alarm	152 (98)	153 (99)	154 (9a)	155 (9b)
Good (C)	Non-specific	192 (c0)	193 (c1)	194 (c2)	195 (c3)
Good (C)	Initialization acknowledge	196 (c4)	197 (c5)	198 (c6)	199 (c7)
Good (C)	Initialization request	200 (c8)	201 (c9)	202 (ca)	203 (cb)
Good (C)	Not invited	204 (cc)	205 (cd)	206 (ce)	207 (cf)
Good (C)	Not selected	208 (d0)	209 (d1)	210 (d2)	211 (d3)
Good (C)	Do not select	212 (d4)	213 (d5)	214 (d6)	215 (d7)
Good (C)	Local override	216 (d8)	217 (d9)	218 (da)	219 (db)
Good (C)	Fail safe active	220 (dc)	221 (dd)	222 (de)	223 (df)
Good (C)	Initiate fail safe	224 (e0)	225 (e1)	226 (e2)	227 (e3)

PV status is an 8-bit enumeration with three separate incorporated into the signal byte value. For example:

Quality	Sub-status	Limit

Section 4 Maintenance

SAFETY MESSAGES

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that raises potential safety issues is indicated by a warning symbol (⚠). Please refer to the following safety messages before performing an operation preceded by this symbol.

Warnings

⚠WARNING

Failure to follow these installation guidelines could result in death or serious injury:

- Make sure only qualified personnel perform the installation.

Explosions could result in death or serious injury:

- Do not remove the transmitter cover in explosive atmospheres when the circuit is live.
- Verify that the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.
- Both transmitter covers must be fully engaged to meet explosion-proof requirements.

Electrical shock could cause death or serious injury. If the sensor is installed in a high-voltage environment and a fault condition or installation error occurs, high voltage may be present on transmitter leads and terminals.

- Use extreme caution when making contact with the leads and terminals.

Process leaks could result in death or serious injury:

- Install and tighten thermowells or sensors before applying pressure, or process leakage may result.
- Do not remove the thermowell while in operation. Removing while in operation may cause process fluid leaks.

HARDWARE

Diagnostics

If a malfunction is suspected, despite the absence of diagnostic messages, follow the procedures described in Table 4-1 to verify that transmitter hardware and process connections are in good working order. Under each of four major symptoms, specific suggestions are offered for solving problems. Always address the most likely and easiest-to-check conditions first.

Table 4-1. Troubleshooting.

Symptom	Potential Source	Corrective Action
Transmitter does not communicate with the Configuration Interface	Loop Wiring	• Check for adequate voltage to the transmitter. The transmitter requires between 9.0 and 32.0 V at the terminals to operate and provide complete functionality • Check for intermittent shorts, open circuits, and multiple grounds.
High Output	Sensor Input Failure or Connection	• Enter the transmitter test mode to isolate a sensor failure. • Check for a sensor open circuit. • Verify the process variable is not out of range.
	Loop Wiring	• Check for dirty or defective terminals, interconnecting pins, or receptacles.
	Power Supply	• Check for adequate voltage to the transmitter. The transmitter requires between 9.0 and 32.0 V at the terminals to operate and provide complete functionality
	Electronics Module	• Enter the transmitter test mode to isolate a module failure. • Check the sensor limits to ensure calibration adjustments are within the sensor range.
Erratic Output	Loop Wiring	• Check for adequate voltage to the transmitter. The transmitter requires between 9.0 and 32.0 V at the terminals to operate and provide complete functionality • Check for intermittent shorts, open circuits, and multiple grounds.
	Electronics Module	• Enter the transmitter test mode to isolate module failure.
Low Output or No Output	Sensor Element	• Enter the transmitter test mode to isolate a sensor failure. • Verify the process variable is not out of range.
	Loop Wiring	• Check for adequate voltage to the transmitter. The transmitter requires between 9.0 and 32.0 V at the terminals to operate and provide complete functionality • Check for shorts and multiple grounds. • Check the loop impedance. • Check wire insulation to detect possible shorts to ground.
	Electronics Module	• Check the sensor limits to ensure calibration adjustments are within the sensor range. • Enter the transmitter test mode to isolate an electronics module failure.

Maintenance

The Model 3244MV transmitter has no moving parts and requires a minimum amount of scheduled maintenance. The transmitter features a modular design for easy maintenance. If a malfunction is suspected, check for an external cause before performing the diagnostics presented below.

Sensor Checkout

⚠ If the sensor is installed in a high-voltage environment and a fault condition or installation error occurs, the sensor leads and transmitter terminals could carry lethal voltages.

To determine whether the sensor is causing the malfunction, either replace it with another Rosemount sensor or connect a test sensor locally at the transmitter. This can be very useful, especially when checking the wiring for a remote mounted sensor. Please consult a Rosemount representative for more information.

ELECTRONICS HOUSING

Disassembly

The transmitter is designed with a dual-compartment housing; one compartment contains the Profibus-PA electronics module assembly and the other contains all sensor, power/communication, and internal ground lug terminals.

The transmitter's electronics module assembly is located in the compartment opposite the terminal block.

Removing the Profibus-PA Electronics Module Assembly

Use the following procedure to remove the Profibus-PA electronics module assembly:

NOTE
Part of the electronics are sealed in a moisture-proof plastic enclosure referred to as the electronics module. The module is a non-repairable unit; if a malfunction occurs the entire unit must be replaced.

---

1. Disconnect the power to the transmitter.
2. ⚠ Remove the cover from the electronics side of the transmitter housing. Do not remove any covers in explosive atmospheres when the circuit is live.
3. Loosen the two screws that anchor the electronics module assembly to the transmitter housing.
4. Firmly grasp the screws and assembly and pull it straight out of the housing, taking care not to damage the interconnecting pins.

NOTE
Note the transmitter's security switch position (ON or OFF). If the electronics module is being replaced with a new one, ensure the security switch is set in the same position (see "Security" on page 2-10).

Assembly

Replacing the Profibus-PA Electronics Module Assembly

Use the following procedure to reassemble the Profibus-PA electronics module assembly.

1. Ensure that the transmitter security switch on the electronics module assembly is in the same position as the one that is being replaced.
2. Carefully insert the electronics module assembly to mate the interconnecting pins with the necessary receptacles on the electronics board attached to the housing.
3. Tighten the two mounting screws.
4. ⚠ Replace the cover. Tighten the cover $^1/_6$ of a revolution after the cover begins to compress the o-ring. Both transmitter covers must be fully engaged to meet explosion-proof requirements.

Appendix A Specifications and Reference Data

SPECIFICATIONS

Functional

Inputs
User-selectable. See "Accuracy" on page A-3
(Sensor terminals are rated to 42.4 V dc.)

Outputs
Manchester-encoded digital signal that conforms to IEC 1158-2 and ISA 50.02

Isolation
Input/output isolation tested to 500 V rms (707 V dc)

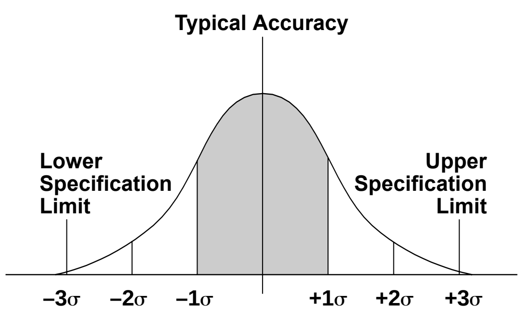
Power Supply
External power supply is required. Transmitter operation is between 9.0 and 32.0 V dc, 17.5 mA maximum. (Transmitter power terminals are rated to 42.4 V dc.)

Rosemount Conformance to Specification

You can be confident that a Rosemount product not only meets our published specifications, but most likely exceeds them. Our advanced manufacturing techniques and use of Statistical Process Control provide specification conformance to at least ± 3σ(1). In addition, our commitment to continual improvement ensures that product design, reliability, and performance get better every year.

For example, the Reference Accuracy distribution for the Model 3244MV MultiVariable Temperature Transmitter with Profibus-PA is shown to the right. Our Specification Limits are ± 0.10 °C, but, as the shaded area shows, approximately 68% of the units perform three times better than the limits. Therefore, it is very likely that you will receive a device that performs much better than our published specifications.

Conversely, a vendor who "grades" product without using Process Control, or who is not committed to ± 3σ performance, will ship a much higher percentage of units that are barely within (or even outside of) advertised specification limits.



(1) Sigma (σ) is the Standard Deviation of a statistical distribution, and describes the dispersion (spread) of the distribution.

Profibus-PA

Table A-1. Block Information

Block	Execution Time (milliseconds)	Slot Number
Physical (PB)	—	2
Transducer (TB)	—	3, 4, 5,
Transducer (TB)	—	3, 4, 5,
Transducer (TB)	—	3, 4, 5,
Analog Input 1 (AI1)	50	6
Analog Input 2 (AI2)	50	7
Analog Input 3 (AI3)	50	8

Temperature Limits

Ambient

- –40 to 185 °F (–40 to 85 °C).

Storage

- –60 to 250 °F (–50 to 120 °C).

Transient Protection Option (available at a later date)

The transient protector helps to prevent damage to the transmitter from transients induced on the loop wiring by lightning, welding, heavy electrical equipment, or switch gears. The transient protection electronics are contained in an add-on assembly that attaches to the standard transmitter terminal block. The transient protector is tested per the following standard:

ANSI/IEEE C62.41-1991 (IEEE 587), Location Categories A2, B3.
1kV peak (10 × 1000 μS Wave)
6kV / 3kA peak (1.2 × 50 μS Wave 8 × 20 μS Combination Wave)
6kV / 0.5kA peak (100 kHz Ring Wave)
4kV peak EFT (5 × 50 nS Electrical Fast Transient)

Nominal clamping voltages:

- 77 V (normal mode)
- 90 V (common mode)

Alarms

The AI block allows the user to configure the alarm to HI-HI, HI, LO, or LO-LO, with a variety of priority levels and hysteresis

Status

If self-diagnostics detect a sensor burnout or a transmitter failure, the status of the measurement will be updated accordingly.

Humidity Limits

0–100% relative humidity.

Turn-on Time

Performance within specifications is achieved less than 10.0 seconds after power is applied to the transmitter.

Update Time

Approximately 0.5 seconds for a single sensor (1.0 second for two sensors).

Performance

The Model 3244MV with Profibus-PA maintains a specification conformance of at least 3σ.

Accuracy

Sensor Options	Input Ranges		Accuracy[1]	
2-, 3-, 4-Wire RTDs	°C	°F	°C	°F
Pt 100 (α = 0.00385)[2]	200 to 850	–328 to 1562	± 0.10	± 0.18
Pt 100 (α = 0.003916)[3]	200 to 645	–328 to 1193	± 0.10	0.18±
Pt 200[2]	200 to 850	–328 to 1562	± 0.22	± 0.40
Pt 500[2]	200 to 850	–328 to 1562	0.14	± 0.25
Pt 1000[2]	200 to 300	–328 to 572	± 0.08	± 0.14
Ni 120[4]	200 to 300	–94 to 572	± 0.08	± 0.14
Cu 10[5]	200 to 250	–58 to 482	± 1.00	± 1.80
Thermocouples	°C	°F	°C	°F
NIST Type B[6] [7] [8]	212 to 3308	100 to 1820	± 0.75	± 1.35
NIST Type E[5] [8]	–58 to 1832	–50 to 1000	± 0.20	± 0.36
NIST Type J[6] [8]	–292 to 1400	–180 to 760	± 0.25	± 0.45
NIST Type K[6] [8]	–292 to 2502	–180 to 1372	± 0.50	± 0.90
NIST Type N[6] [8]	32 to 2372	0 to 1300	± 0.40	± 0.72
NIST Type R[6] [8]	32 to 3214	0 to 1768	± 0.60	± 1.08
NIST Type S[6] [8]	32 to 3214	0 to 1768	± 0.50	± 0.90
NIST Type T[6] [8]	–328 to 752	–200 to 400	± 0.25	± 0.45
Millivolt Input[9]	–10 to 100 mV		± 0.015 mV	
2-, 3-, 4-Wire Ohm Input	0 to 2000 ohms		±0.35 ohm	

(1) The transmitter's accuracy is valid for the entire input range of the sensor.
(2) IEC 751; α = 0.00385, 1995.
(3) JIS 1604, 1981.
(4) Edison Curve No. 7.
(5) Edison Copper Winding No. 15.
(6) NIST Monograph 175.
(7) Accuracy for NIST Type B T/C is ±3.0 °C (5.4 °F) from 100 to 300 °C (212 to 572°F).
(8) Total accuracy for thermocouple only: sum of accuracy +0.25 °C (cold junction accuracy).
(9) Millivolt inputs are not approved for use with CSA option code I6.

Stability

±0.1% of reading or 0.1 °C, whichever is greater, for 24 months for RTDs.

±0.1% of reading or 0.1 °C, whichever is greater, for 12 months for thermocouples.

Sensor Lead Wire Resistance Effect

RTD Input

When using a 4-wire RTD, the effect of lead resistance is eliminated and has no impact on accuracy. However, a 3-wire sensor will not fully cancel lead resistance error because it cannot compensate for imbalances in resistance between the lead wires. A 2-wire sensor will produce the largest error because it directly adds the lead wire resistance to the sensor resistance. For 2- and 3-wire RTDs, an additional lead wire resistance error is induced with ambient temperature variations. Table A-2 and the examples shown below help quantify these errors.

Table A-2. RTD Sensor Input Approximate Basic Error

Sensor Input	Approximate Basic Error
4-wire RTD	None (independent of lead wire resistance)
3-wire RTD	± 1.0 Ω in reading per ohm of unbalanced lead wire resistance(1)
2-wire RTD	1.0 Ω in reading per ohm of lead wire resistance

(1) Unbalanced lead wire resistance = maximum imbalance between any two leads.

Examples of Approximate Basic Error Calculation:

Given:

- Total cable length = 150 m
- Unbalance of the lead wires @ 20 °C = 0.5 Ω
- Resistance/length (18 AWG Cu) = 0.025 Ω/m
- Temperature Coefficient (Cu) = 0.0039 Ω/Ω/ °C
- Approximate Pt 100 resistance variation with temperature = 0.39 Ω/ °C

Pt 100 3-wire RTD:

- Lead wire resistance seen by the transmitter = 0.5 Ω
- Basic error = 0.5 Ω/(0.39 Ω/ °C) = 1.3 °C
- Error due to an ambient temperature variation of ± 25 °C = ± 0.13 °C

Pt 100 2-wire RTD:

- Lead wire resistance seen by the transmitter = 150 m × 2 wires × 0.025 Ω/m = 7.5 Ω
- Basic error = 7.5 Ω/(0.39 Ω/°C) = 19.2 °C
- Error due to an ambient temperature variation of ± 25 °C = ± 1.9 °C

Thermocouple and Millivolt Input

- dc input impedance > 10M ohms.

Example of Approximate Error Calculation:

$$\text{Approx. Error} = \left(\frac{\text{Total Sensor Lead Resistance}}{\text{10M ohms}}\right) \times \text{Absolute Value of Reading in mV}$$

RFI Effect

Worst case RFI Effect is equivalent to the transmitter's nominal accuracy specification per "Accuracy" on page A-3 when tested in accordance with EN 61000-4-3, 10 V/m, 80 to 1000 MHz, and 30 V/m, 26-500 MHz (Increased NAMUR), with twisted shielded cables (Type A Profibus type).

Vibration Effect

Transmitters tested to the following specifications with no effect on performance:

<u>FrequencyAcceleration</u>
10–60 Hz0.21 mm peak displacement
60–2000 Hz3 g's

Self Calibration

The transmitter's analog-to-digital circuitry automatically self-calibrates for each temperature update by comparing the dynamic measurement to extremely stable and accurate internal reference elements.

Ambient Temperature Effect

Transmitters may be installed in locations where the ambient temperature is between –40 and 85 °C. Each transmitter is individually characterized over this ambient temperature range at the factory in order to maintain excellent accuracy performance in dynamic industrial environments. This special manufacturing technique is accomplished through extreme hot and cold temperature profiling with individual adjustment factors programmed into each transmitter. Transmitters automatically adjust for component drift caused by changing environmental conditions.

Sensor Options	Accuracy per 1.0 °C (1.8 °F) Change in Ambient(1)
2-, 3-, 4-Wire RTDs	
Pt 100 (α = 0.00385)	0.0015 °C
Pt 100 (α = 0.003916)	0.0015 °C
Pt 500	0.0023 °C
Pt 200	0.0015 °C
Pt 1000	0.0015°C
Ni 120	0.0010 °C
Cu 10	0.015 °C
Thermocouples	
NIST Type B	0.014 °C if reading ≥ 1000 °C 0.029 °C – 0.0021% of (reading–300) if 300 °C ≤reading < 1000 °C 0.046 °C – 0.0086% of (reading–100) if 100 °C ≤reading < 300 °C
NIST Type E	0.004 °C + 0.00043% of reading
NIST Type J	0.004 °C + 0.00029% of reading if reading ≥ 0 °C 0.004 °C + 0.0020% of abs. val. reading if reading < 0 °C
NIST Type K	0.005 °C + 0.00054% of reading if reading ≥ 0 °C 0.005 °C + 0.0020% of abs. val. reading if reading < 0 °C
NIST Type N	0.005 °C + 0.00036% of reading
NIST Type R	0.015 °C if reading ≥ 200 °C 0.021 °C – 0.0032% of reading if reading < 200 °C
NIST Type S	0.015 °C if reading ≥ 200 °C 0.021 °C – 0.0032% of reading if reading < 200 °C
NIST Type T	0.005 °C if reading ≥ 0 °C 0.005 °C + 0.0036% of abs. val. reading if reading < 0 °C
Millivolt Input	0.00025 mV
2-, 3-, 4-Wire Ohm Input	0.007 Ω

(1) Change in ambient is in reference to the calibration temperature of the transmitter (20 °C (68 °F) typical from factory).

Temperature Effects Example

When using a PT 100 (α = 0.00385) sensor input with a 30 °C ambient temperature, the:

- Temp Effects would be: 0.0015 °C x {3930 – 20)} = 0.015 °C.
- Worst Case Error: Sensor Accuracy + Temperature Effects = 0.10 °C + 0.015 °C = 0.115 °C
- Total Probably Error

$$= (\sqrt{0.10^2 + 0.015^2} = 0.101^\circ C)$$

Physical

Conduit Connections

$^1/_2$–14 NPT, PG13.5 (PG11), M20 3 1.5 (CM20), or JIS G $^1/_2$ conduit.

Materials of Construction

Electronics housing

- Low-copper aluminum or CF-8M (cast version of 316 Stainless Steel).

Paint

- Polyurethane.

Cover o-rings

- Buna-N.

Mounting

Transmitters may be attached directly to the sensor. Optional mounting brackets permit remote Mounting (see Figure 2-5 and Figure 2-6 on page 2-7).

Weight

Aluminum:2.5 lb (1.1 kg).
Stainless Steel:7.2 lb (3.3 kg).
Add 1.0 lb (0.5 kg) for bracket options.

Enclosure Ratings

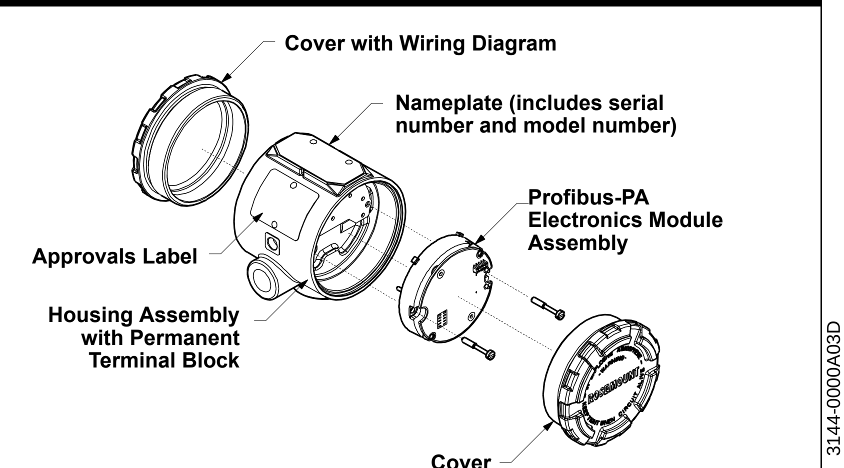
NEMA 4X and CSA Enclosure Type 4X, IP66, IP68.

DIMENSIONAL DRAWINGS

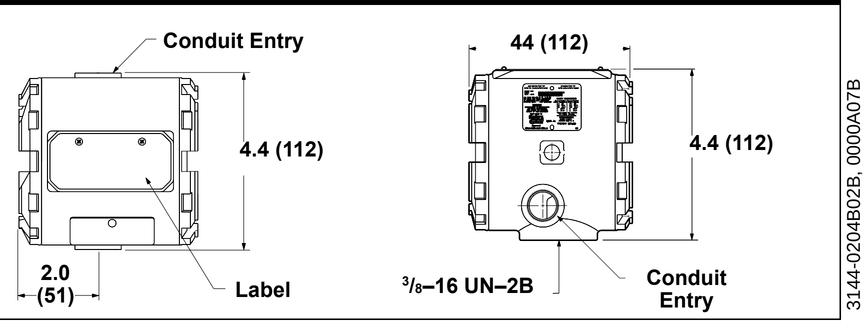
.

Transmitter

Exploded View

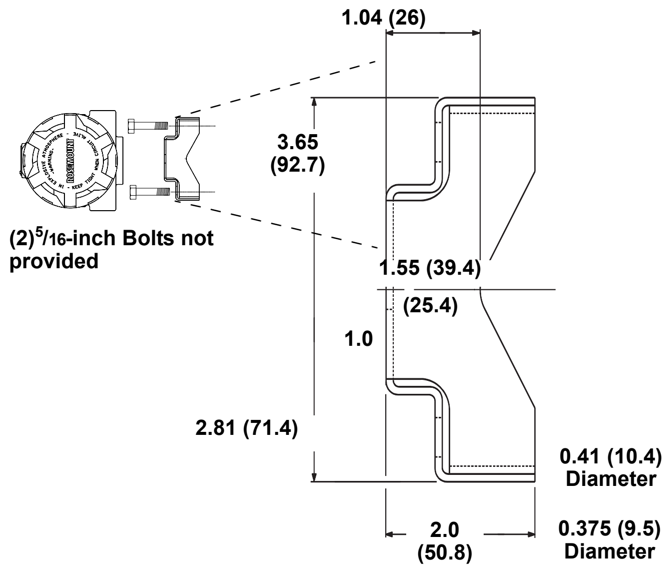
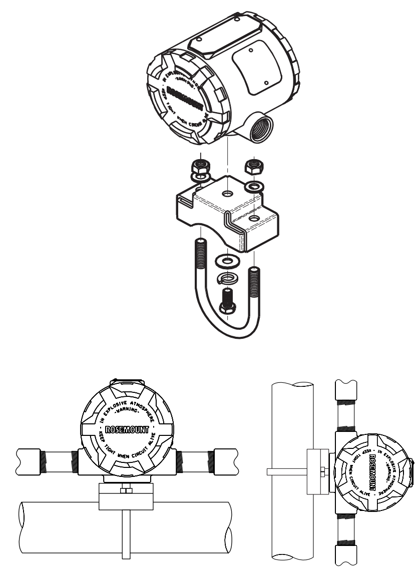


Top View **Side View**



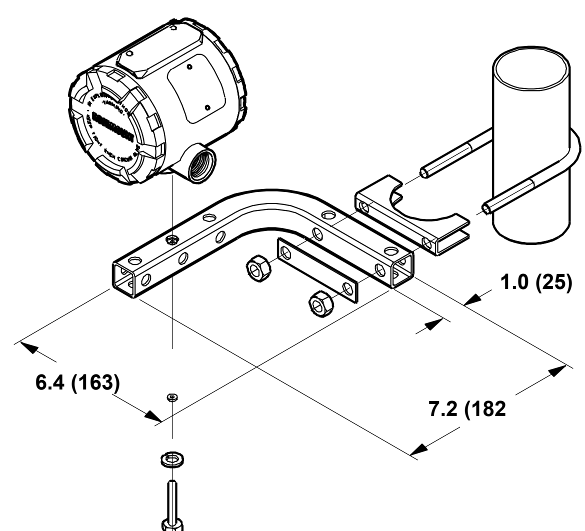
Mounting Brackets

Option Code B4

Panel Mount	Pipe Mount (2-in. Pipe stand)
	

Dimensions are in inches (millimeters)

Option Code B5



Dimensions are in inches (millimeters)

ORDERING INFORMATION

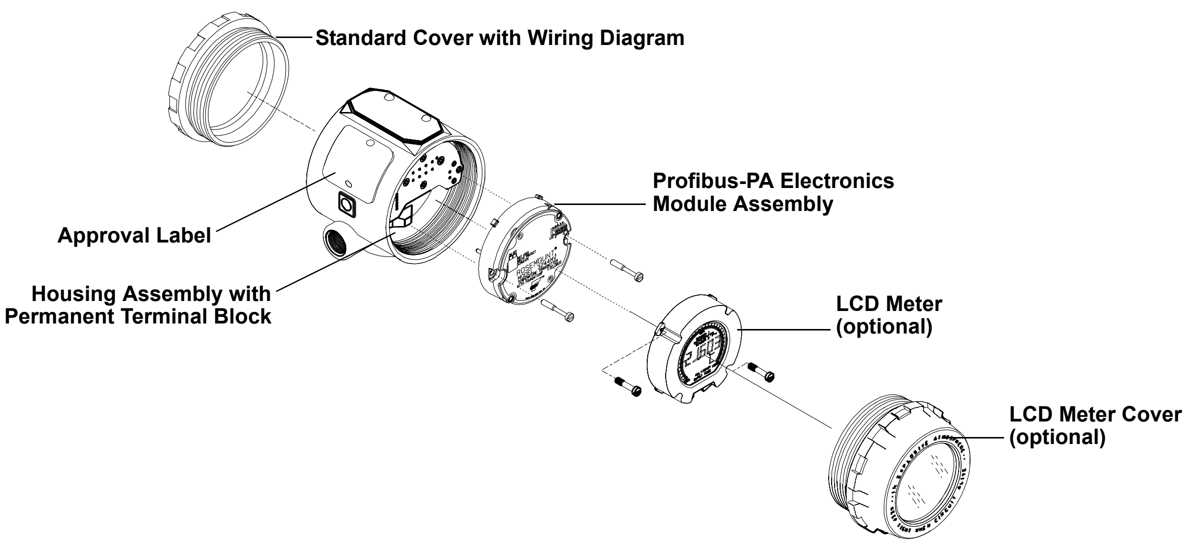
Transmitter

Model	Product Description	
3244MVW	Temperature Transmitter with Dual Sensor Input and Profibus-PA Digital Signal	
Code	**Housing**	**Conduit Thread**
1	Aluminum	½–14 NPT
2	Aluminum	M20 × 1.5 (CM20)
3	Aluminum	PG 13.5 (PG 11)
4	Aluminum	JIS G ½
5	SST	½–14 NPT
6	SST	M20 × 1.5 (CM20)
7	SST	PG 13.5 (PG 11)
8	SST	JIS G ½
Code	**Hazardous Locations Certifications(1)**	
NA	No Approval Required	
E5	FM Explosion-Proof and Non-Incendive Approval	
E6	CSA Explosion-Proof and Non-Incendive Approval	
E9	ISSeP/CENELEC Flame-Proof Approval	
N1	BASEEFA/CENELEC Type n Approval	
I1	BASEEFA/CENELEC Intrinsic Safety Approval	
I6	CSA Intrinsic Safety and Non-Incendive Field Circuit Approval	
C6	CSA Explosion-Proof and Intrinsic Safety Approval	
Code	**Options**	
	Accessory	
B4	Universal Mounting Bracket for 2-inch Pipe Mounting and Panel Mounting—SST Bracket and Bolts	
B5	Universal "L" Mounting Bracket for 2-inch Pipe Mounting—SST Bracket and Bolts	
M5	LCD Meter	
G1	External Ground Lug Assembly	
T1	Transient Protector	
	Custom Configuration	
U4	Two Independent Sensors	
U5	Differential Temperature	
C1	Factory Configuration of Date, Descriptor, and Message Fields–CDS required	
C2	Transmitter-Sensor Matching - Trim to Specific Rosemount RTD Calibration Schedule	
C4	5-Point Calibration (use option code Q4 to generate a Calibration Certificate)	
F5	50 Hz Line Voltage Filter	
	Assembly	
X1(2)	Assemble Transmitter to a Sensor Assembly (hand tight, *Teflon*® (PTFE) tape where appropriate, fully wired)	
X2	Assemble Transmitter to a Sensor Assembly (hand tight, no *Teflon* (PTFE) tape, unwired)	
X3(2)	Assemble Transmitter to a Sensor Assembly (wrench tight, *Teflon* (PTFE) tape where appropriate, fully wired)	
	Calibration Certification	
Q4	Calibration Certificate (3-Point standard; use C4 with Q4 option for a 5-Point Calibration Certificate)	
Typical Model Number: 3244MVW 1 NA B4 M5 X1		

(1) Additional approvals available or pending. Contact Rosemount Customer Central for more information.
(2) Option codes X1 and X3 are no available with CSA approvals

Spare Parts List

Part Description	Part Number
Profibus-PA foundation electronics module assembly	03144-4230-0001
LCD Meter (includes meter display, captive mounting hardware, and 10-pin inter-connection header)	03144-3020-1002
Meter Cover Kit (includes O-ring)	
Aluminum Meter Cover Kit	03144-1043-0001
Stainless Steel Meter Cover Kit	03144-1043-0011
LCD Meter with Meter Cover Kit (includes meter display, captive mounting hardware, 10-pin inter-connection, header, and cover kit)	
LCD Meter with Meter Cover Kit – Aluminum	03144-3020-1001
LCD Meter with Meter Cover Kit – Stainless Steel	03144-1043-1011
Mounting Bracket Kit	
B4 Mounting Bracket Kit	03044-2131-0001
B5 Mounting Bracket Kit	03044-1080-0011
Housing Cover (includes O-ring and wiring diagram label)	
Aluminum Standard Cover	03144-4223-0001
Stainless Steel Standard Cover	03144-4223-0011
O-ring for cover (package of 12)	01151-0033-0003
Housing Kit (does not include covers)	
Aluminum Housing Kit	03144-4224-0001
Aluminum Housing Kit with External Ground Lug Assembly	03144-4224-0002
Stainless Steel Housing Kit	03144-4224-0011
Stainless Steel Housing Kit with external Ground Lug Assembly	03144-4224-0012
Screw/Washer Combination for Sensor/Power Terminals (package of 12)	03144-1044-0001
External Ground Lug Assembly (package of 12)	03144-1047-0001



TAGGING

Hardware Tag

- no charge
- tagged in accordance with customer requirements
- stainless steel construction
- permanently attached to transmitter
- character height is $^1/_{16}$-in. (1.6 mm)

Software Tag

- no charge
- transmitter can store up to 30 characters. If no such characters are specified, the first 30 characters of the hardware tag are used as the default.

OPTIONS

Custom Transmitter Configuration (Option Code C1)

Option code C1 allows you to specify the following data in addition to the standard configuration parameters.

- Date: day, month, year
- Descriptor: 16 alphanumeric characters
- Message: 32 alphanumeric characters

Trim to Specific Rosemount RTD Calibration Schedule (Transmitter-to-Sensor Matching) (option code C2)

Option code C2 allows you to order the transmitter trimmed to a specific calibration schedule. This option requires that you order a Rosemount Series 65, 68, or 78 RTD sensor with a special calibration schedule. For information on ordering sensors calibrated to specific calibration schedules, refer to the Rosemount Sensors Product Data Sheets, publication number 00813-0100-2654 (Volume 1) or publication number 00813-0101-2654 (Volume 2).

Five Point Calibration (option code C4)

Option code C4 specifies that the transmitter be calibrated and verified at five-points: 0, 25, 50, 75, and 100% digital output points.

Trim to Special non-Standard Sensor (option code C7)

You may order the transmitter with option code C7 when connecting non-standard sensors, adding a special sensor, or expanding input ranges on a standard sensor. Refer to Table 7-1 on page 7-1 for a list of standard sensor types.

A characterization schedule for any RTD can be entered using Callandar-Van Dusen constants with a Profibus configuration tool. The constants can be entered on site or at the factory. For information on ordering sensors matched to the transmitter using Callandar-Van Dusen constants, refer to the Rosemount Sensors Product Data Sheet 00813-0100-2654 (Volume 1) or 00813-0101-2654 (Volume 2).

When a non-standard sensor is used as the input to the transmitter, the resistance versus temperature curve for a non-standard RTD, or the millivolt versus temperature curve for a non-standard thermocouple, is stored in the transmitter memory. This process is performed at the factory. The transmitter must be configured for a “special” sensor calibration to access the special curve, but you may use any standard input when the transmitter is configured for a “standard” sensor.

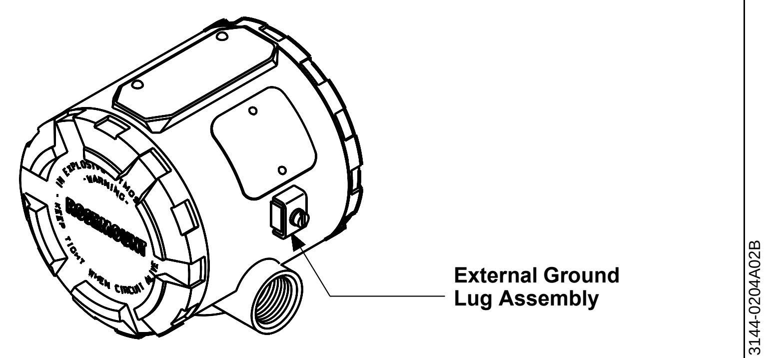
Mounting Brackets (option codes B4 and B5)

The transmitter can be mounted directly to the sensor, or in a remote location with one of two stainless steel mounting brackets. Refer to Figures 2-5 and 2-6 on page 2-7. The brackets facilitate mounting to a panel or a 2-inch pipe, and include stainless steel bolts. When installing the transmitter with a bracket, torque the bolts to 125 in-lb (14 n-m).

External Ground Lug Assembly (option code G1)

The external ground-lug assembly provides an auxiliary grounding point for the transmitter housing. The lug attaches to either side of the housing. See Figure A-1.

Figure A-1. External Ground-Lug Assembly Installed on a Model 3244MV Transmitter.



Appendix B Approvals

HAZARDOUS LOCATIONS CERTIFICATIONS

Institut Scientifique de Service Public (ISSeP)/CENELEC Flame-proof Approval

E9 EEx d IIC T6 (T_{amb} = –20 to 60 °C).
Certificate: 95D.103.1211

Certificate implies Flame-Proof approval of the following:

1. Transmitter with Rosemount "E9" sensor installed per drawing 003144-0224
2. Transmitter with remote mounted Flame-Proof sensor and connection head assembly installed per drawing 3144-0224.

British Approvals Service for Electrical Equipment in Flammable Atmospheres (BASEEFA) Approvals

N1 Type n Approval,
EEx nL IIC T5 (T_{amb} = –40 to 70 °C)
Certificate: ExBAS98ATEX3358X
ATEX Marking: Ex II 3 G
Maximum Input Voltage: 55 Vdc

Special Conditions for Safe Use (x):
The transmitter is not capable of withstanding the 500V insulation test required by EN50021:1998. This must be taken into account when installing the apparatus.

I1 CENELEC Intrinsic Safety,
EEx ia IIC T4 (T_{amb} = –60 to 60 °C)
Certificate: ExBAS98ATEX1357X
ATEX Marking: Ex II 1 G

Input Entity Parameters:
Power/Loop
$U_{max:in}$ = 30 V dc
$I_{max:in}$ = 300 mA
$P_{max:in}$ = 1.3 W
C_i = 0.005 µF
L_i = 20 µH

Special Conditions for Safe Use (x):
The apparatus is not capable of withstanding the 500V insulation test required by Clause 6.4.12 of EN 50020: 1994. This must be taken into account when installing the apparatus.

Factory Mutual

E5 Explosion-Proof for Class I, Division 1, Groups A, B, C, and D. Dust-Ignition-Proof for Class II, Division 1, Groups E, F, and G. Dust-Ignition-Proof for Class III, Division 1 hazardous locations. Non-Incendive for Class I, Division 2, Groups A, B, C, and D (T_4A). Indoor and outdoor use. Ambient Temperature Limit: –50 to 85 °C. Explosion-Proof approval only when installed per Rosemount drawing 03144-0220. For Group A, seal all conduits within 18-inches of enclosures; otherwise, conduit seal not required for compliance with NEC 501-5a(1).

Canadian Standards Association (CSA) Approvals

E6 Explosion-Proof for Class I, Division 1, Groups A, B, C, and D; Class II, Division 1, Groups E, F, and G; Class III, Division 1 hazardous locations. Suitable for Class I, Division 2, Groups A, B, C, and D. Conduit seal not required. Ambient Temperature Limit: –50 to 85 °C.

I6 Intrinsically Safe for Class I, Division 1, Groups A, B, C, and D; Class II, Division 1, Groups E, F, G; Class III, Division 1 hazardous locations when installed per Rosemount drawing 03144-0222. Ambient Temperature Limit: – 60 to 60 °C.

C6 Combination of E6 and I6.

INSTALLATION DRAWINGS

Rosemount Drawing 03144-0220 Rev D, 1 Sheet:
Factory Mutual Explosion-proof Installation Drawing.

Rosemount Drawing 03144-0221 Rev AE, 4 Sheets:
Factory Mutual Intrinsic Safety and Nonincendive Field Circuit Configuration Installation Drawing.

Rosemount Drawing 03144-0222 Rev AB, 2 Sheets:
CSA Intrinsic Safety Approval Configuration Installation Drawing.

Rosemount Drawing 03144-0224 Rev C, 1 Sheet:
ISSEP/CENELEC Flame-proof Temperature Measurement Assembly Installation Drawing.

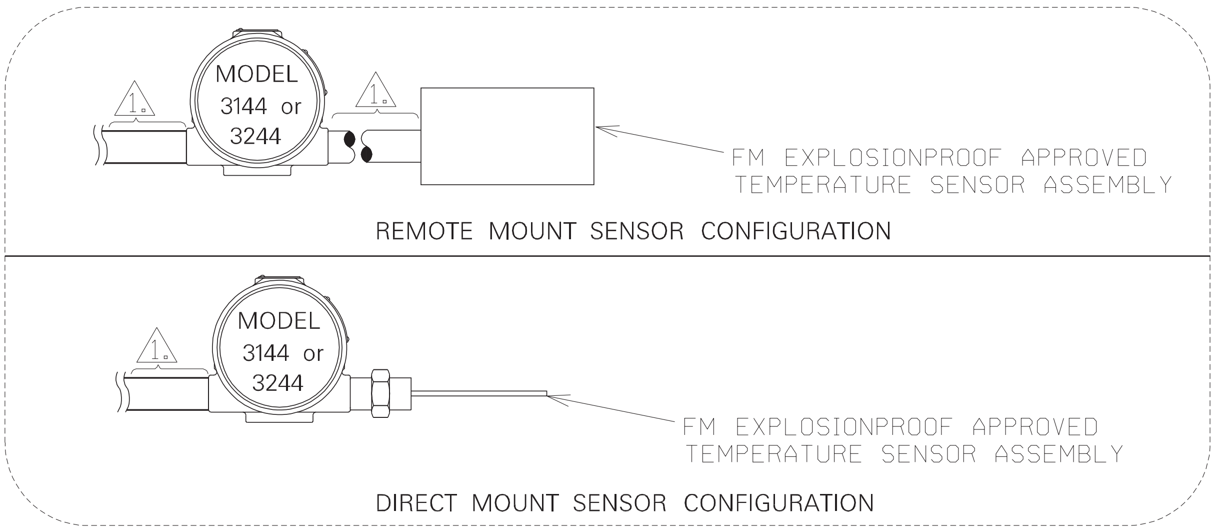
IMPORTANT
Once a device labeled with multiple approval types is installed, it should not be reinstalled using any of the other labeled approval types. To ensure this, the approval label should be permanently marked to distinguish the used from the unused approval type(s).

Figure B-1. SAA Flame-Proof Installation Drawing 03144-0220, Rev D. Page 1 of 1

PROPRIETARY INFORMATION IS CONTAINED HEREIN AND MUST BE HANDLED ACCORDINGLY
BY ______________ DATE ______________

REVISIONS				
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
D	CHG 544 TO 3244, NOTE 1.	665976	J.D.J.	4/19/95

HAZARDOUS (CLASSIFIED) LOCATION



5. MODEL 3144 AND MODEL 3244 FM APPROVAL CLASSIFICATION:
EXPLOSION PROOF FOR CLASS I, DIV. 1, GROUPS A, B, C, & D
DUST-IGNITION PROOF FOR CLASS II/III, DIV. 1, GROUPS E, F, & G;
NONINCENDIVE FOR CLASS I, DIV. 2, GROUPS A, B, C, & D (T4A).
NEMA ENCLOSURE TYPE 4X
AMBIENT TEMP. LIMITS: -50°C TO +85°C.

4. FOR FIELD WIRING CONNECTIONS IN AMBIENT TEMPERATURES ABOVE 60°, USE WIRING RATED FOR AT LEAST 90°C.

3. TEMPERATURE SENSOR ASSEMBLY MUST BE FM APPROVED FOR APPROPRIATE AREA CLASSIFICATION.

2. ALL CONDUIT THREADS MUST BE ASSEMBLED WITH A MINIMUM OF FIVE FULL THREADS ENGAGEMENT.

⚠ 1. INSTALL PER NATIONAL ELECTRICAL CODE (NEC). FOR GROUP A, SEAL ALL CONDUITS WITHIN 18 INCHES OF ENCLOSURE; OTHERWISE, CONDUIT SEAL NOT REQUIRED FOR COMPLIANCE WITH NEC 501-5a(1).

THIS DRAWING WAS CREATED ON CAD. DRAWING IS ARCHIVED ON MAGNETIC TAPE FOR ECO CHANGES.

NOTES:

ROSEMOUNT® Measurement Control Analytical Valves
Rosemount Inc.
12001 Technology Drive
Eden Prairie, MN 55344 USA

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES. REMOVE ALL BURRS AND SHARP EDGES. MACHINE SURFACE FINISH 125

- TOLERANCES -

DECIMALS	FRACTIONS
.X±.1	±1/32
.XX±.02	ANGLES
.XXX±.010	±2°

DO NOT SCALE PRINT

CONTRACT NO.		
DR. C. SCRIBNER	8/1/94	
CHK'D		
APP'D. J. D. JOHNSON	9/9/94	
APP'D. GOVT.		

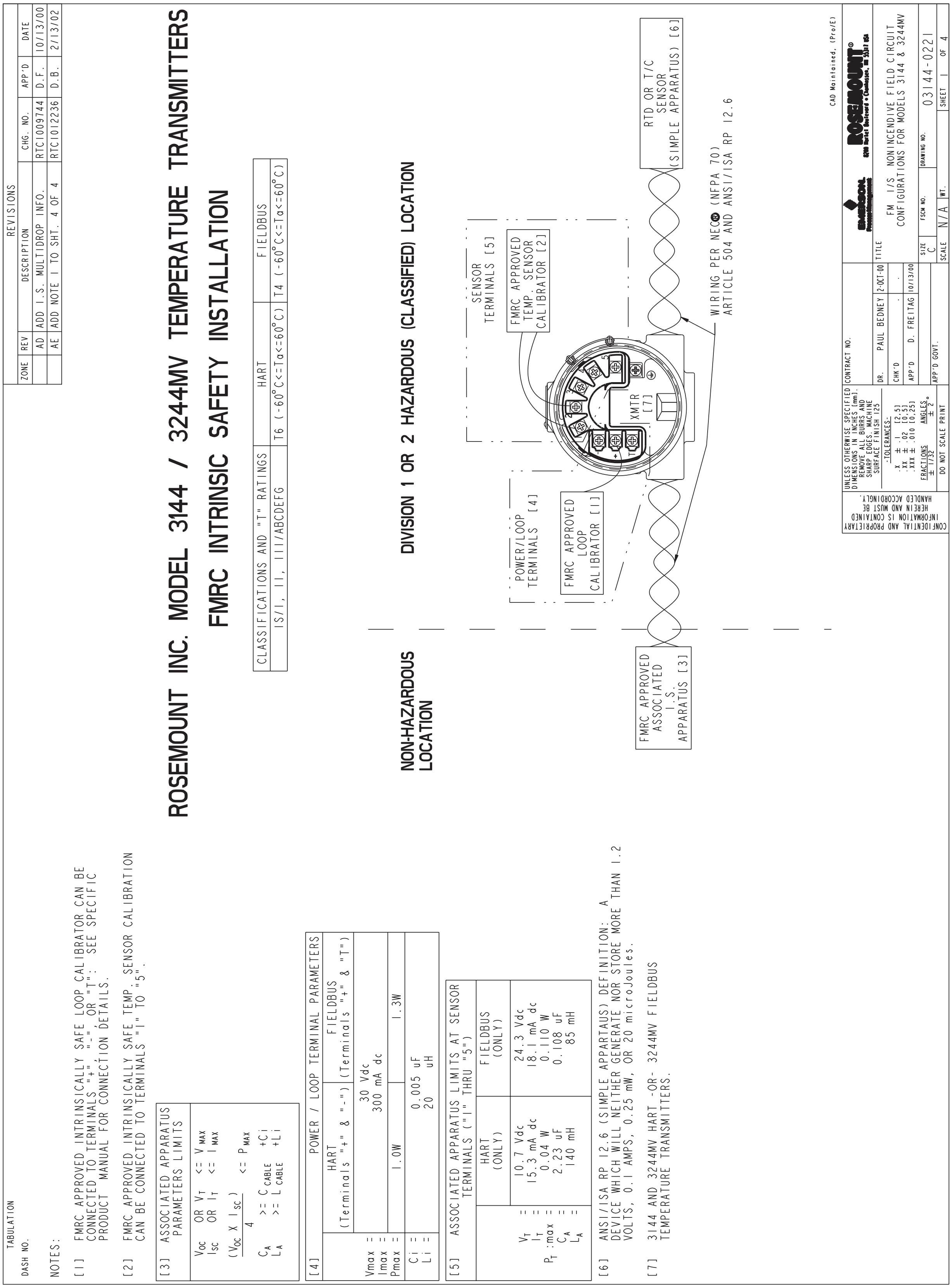
TITLE INSTALLATION DRAWING: MODEL 3144 & 3244, FACTORY MUTUAL (FM) EXPLOSIONPROOF

SIZE	FSCM NO	DWG NO.
A		03144-0220

SCALE N/A | WT. ——— | SHEET 1 OF 1

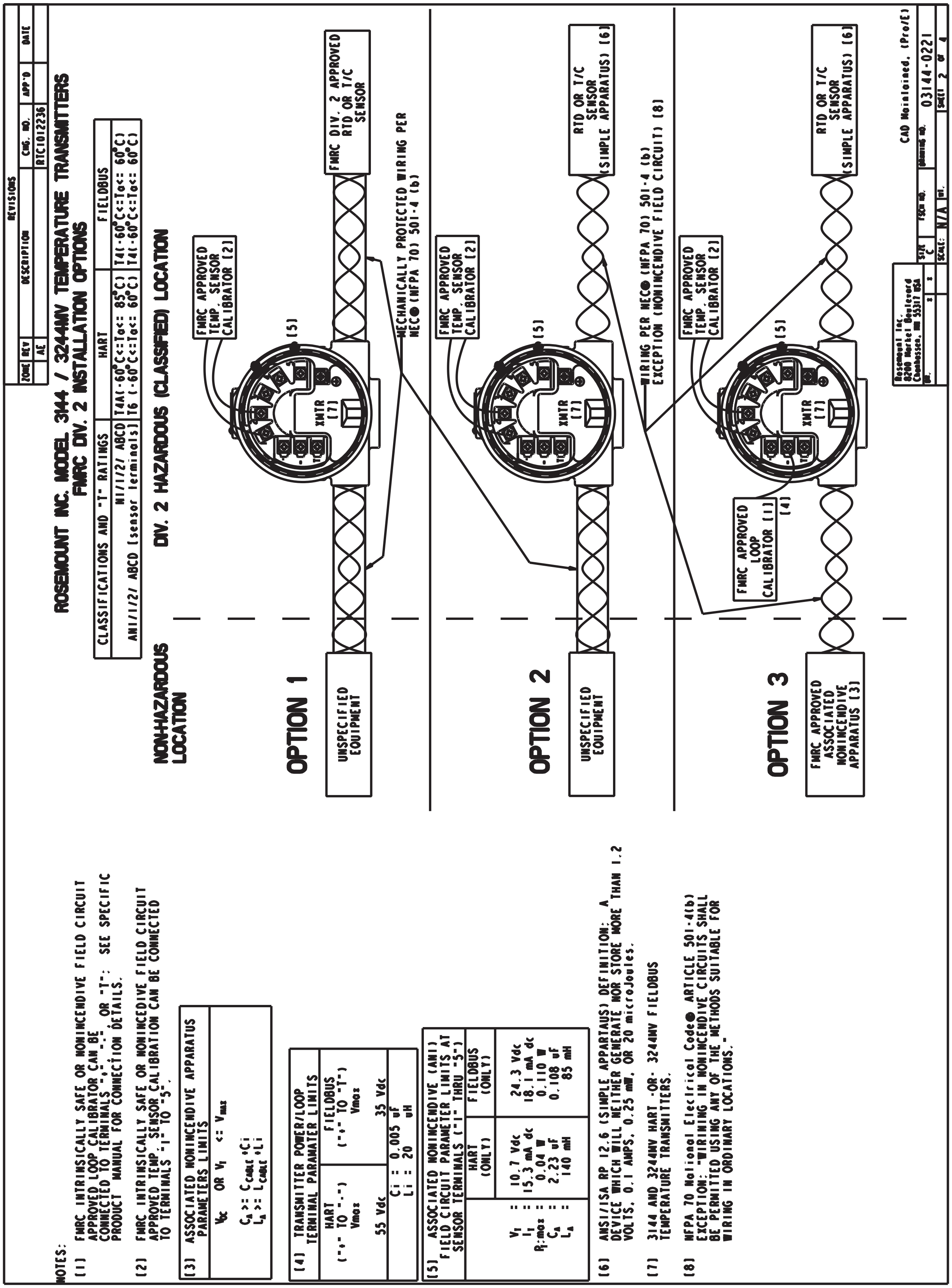
3244_03144-0220

Figure B-2. FM Intrinsic Safety and Non-Incendive Installation Drawing 03144-0221, Rev AE. Page 1 of 4



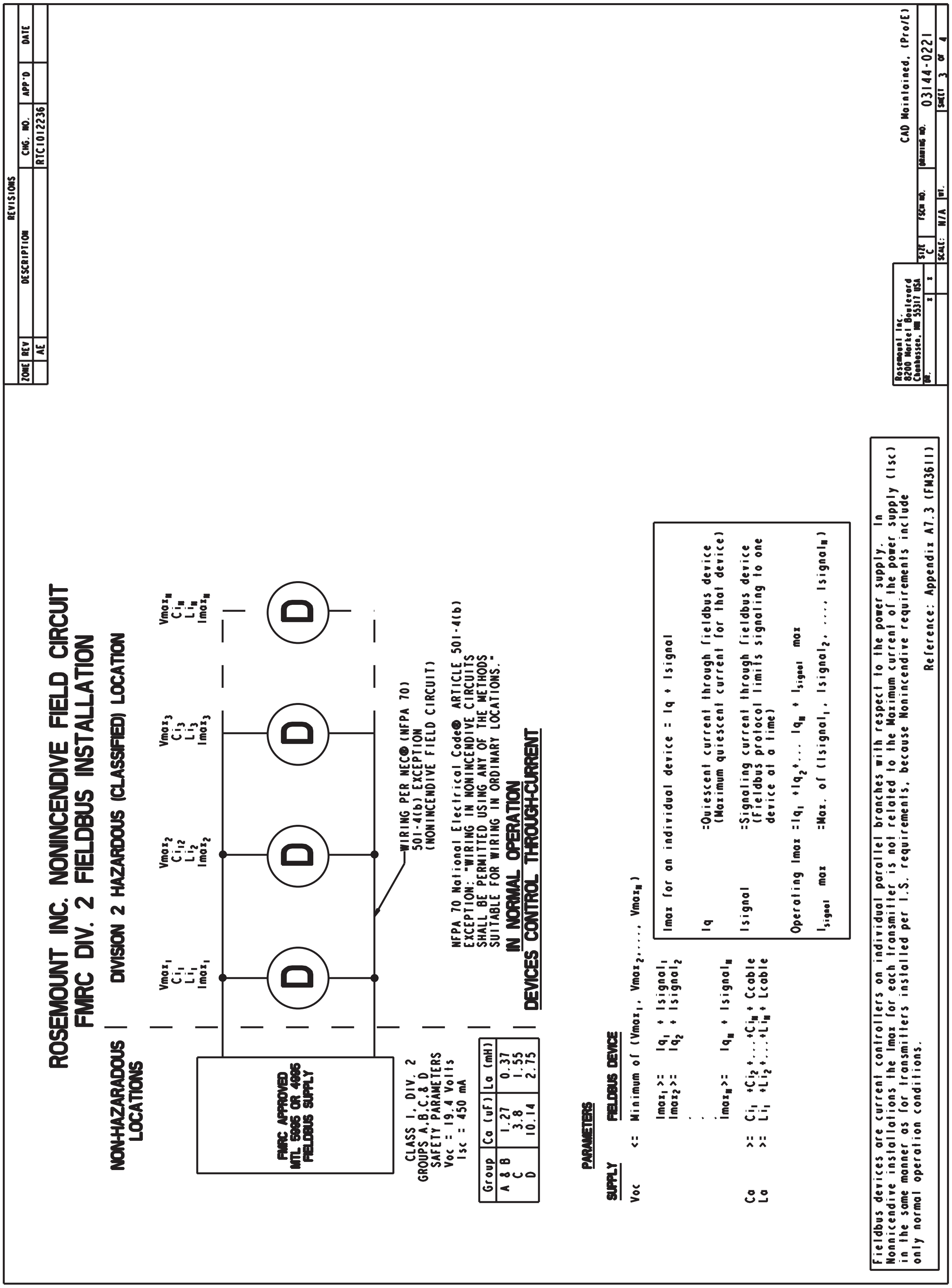
3244_03144-0221-1

Figure B-3. FM Intrinsic Safety and Non-Incendive Installation Drawing 03144-0221, Rev AE. Page 2 of 4



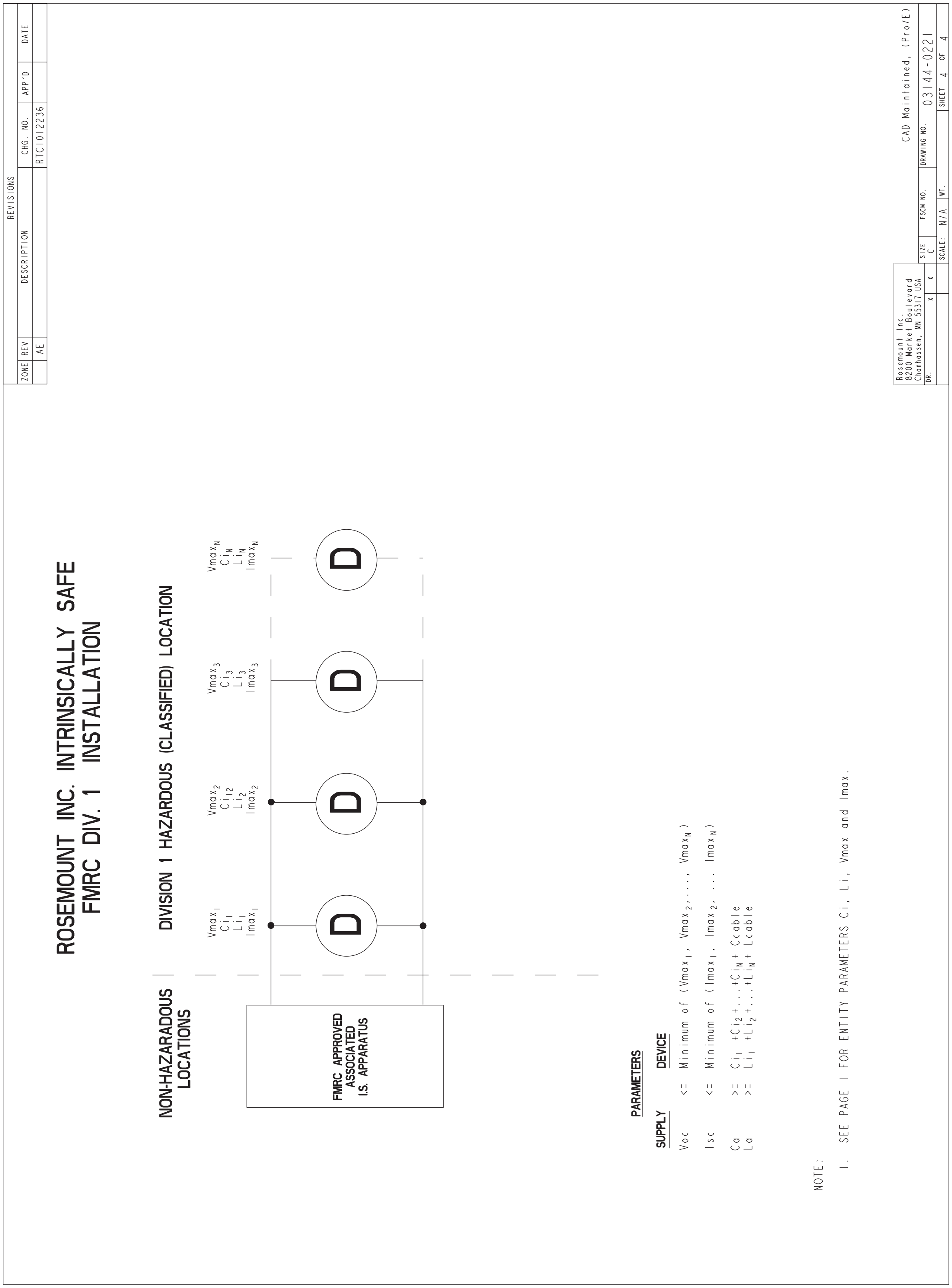
3244_03144-0221-2

Figure B-4. FM Intrinsic Safety and Non-Incendive Installation Drawing 03144-0221, Rev AE. Page 3 of 4



3244_03144-0221-3

Figure B-5. FM Intrinsic Safety and Non-Incendive Installation Drawing 03144-0221, Rev AE. Page 4 of 4



3244_03144-0221-4

Figure B-6. CSA Intrinsic Safety Installation Drawing 03144-0222, Rev AB. Page 1 of 2

CONFIDENTIAL AND PROPRIETARY INFORMATION IS CONTAINED HEREIN AND MUST BE HANDLED ACCORDINGLY

REVISIONS

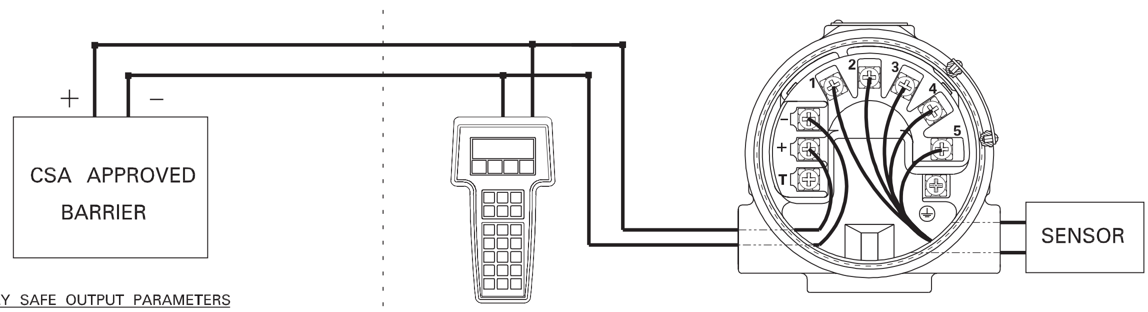
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AA	ADD FIELDBUS PAGE 2	RTC1005145	D.S.	10/13/98
AB	ADD PROFIBUS	RTC1009855	D.F.	10/24/00

CSA INTRINSIC SAFETY APPROVAL CONFIGURATION

3144 & 3244MV CIRCUIT CONNECTION
WITH CSA APPROVED BARRIER
Exia
Intrinsically Safe/Sécurité Intrinsèque

NON–HAZARDOUS AREA

HAZARDOUS AREA



INTRINSICALLY SAFE OUTPUT PARAMETERS

30 V or less
330 ohms or more
28 V or less
300 ohms or more
25 V or less
200 ohms or more
22 V or less
180 ohms or more

CLASS I, DIV.1, GROUPS A,B,C,D
CLASS II, DIV.1, GROUPS E,F,G
CLASS III, DIV.1, HAZARDOUS LOCATIONS

30 V or less
150 ohms or more

CLASS I, DIV.1, GROUPS C,D
CLASS II, DIV. 1, GROUPS E,F,G
CLASS III, DIV.1, HAZADOUS LOCATIONS

ROSEMOUNT 268
OR 275 SMART
FAMILY INTERFACE

NOTE: CSA CERTIFIED FOR CLASS I, DIV. 1, GROUPS A, B, C, D ONLY

ROSEMOUNT MODEL 3144 & 3244MV

INTRINSIC SAFETY FOR:
CLASS I, DIV. 1, GROUPS A, B, C, D
CLASS II, DIV. 1, GROUPS E, F, G
CLASS III, DIV. 1 HAZARDOUS LOCATIONS
AMBIENT TEMPERATURE LIMIT: -50°C TO +85°C

(HART ONLY)

WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFTEY.
AVERTISSEMENT: La Substitution de compsants peut compromettre la securite intrinseque.

CAD Maintained, (MICROSTATION)

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES [mm]. REMOVE ALL BURRS AND SHARP EDGES. MACHINE SURFACE FINISH 125

-TOLERANCE-
.X ± .1 [2,5]
.XX ± .02 [0,5]
.XXX ± .010 [0,25]
FRACTIONS ± 1/32
ANGLES ± 2°

DO NOT SCALE PRINT

CONTRACT NO.
DR. C.SCRIBNER 11/28/94
CHK'D
APP'D. J.EHRESMANN 2/8/95
APP'D. GOVT.

ROSEMOUNT® MEASUREMENT
FISHER-ROSEMOUNT
Rosemount Inc.
12001 Technology Drive
Eden Prairie, MN 55344 USA

TITLE INSTALLATION DRAWING FOR:
CSA INTRINSIC SAFETY APPROVAL
CONFIGURATIONS for MODELS 3144 & 3244MV

SIZE A | FSCM NO | DWG NO. 03144-0222
SCALE N/A | WT. | SHEET 1 OF 2

3244_03144-0222-1

Figure B-7. CSA Intrinsic Safety Installation Drawing 03144-0222, Rev AB. Page 2 of 2

REVISIONS				
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AB		RTC1009855		

CSA INTRINSIC SAFETY APPROVAL CONFIGURATION

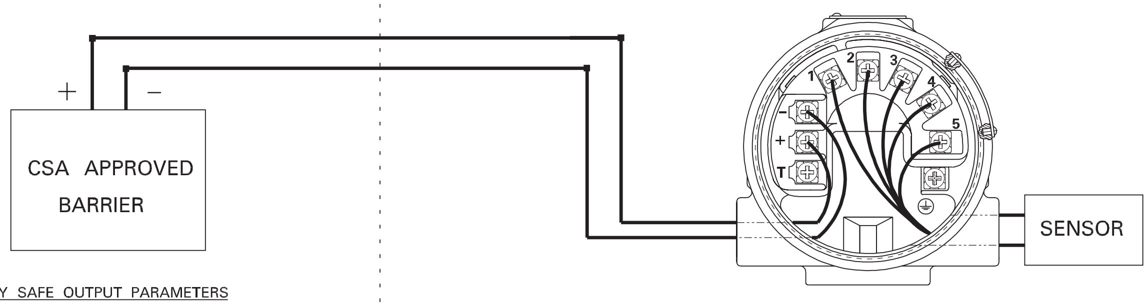
3244MV (FIELDBUS/PROFIBUS) CIRCUIT CONNECTION WITH CSA APPROVED BARRIER

Exia

Intrinsically Safe/Sécurité Intrinsèque

NON–HAZARDOUS AREA

HAZARDOUS AREA



ROSEMOUNT MODEL 3244MV (FIELDBUS/PROFIBUS)

INTRINSICALLY SAFE OUTPUT PARAMETERS

30 V or less 300 ohms or more 28 V or less 235 ohms or more 25 V or less 160 ohms or more 22 V or less 100 ohms or more	CLASS I, DIV.1, GROUPS A,B,C,D CLASS II, DIV.1, GROUPS E,F,G CLASS III, DIV.1, HAZADOUS LOCATIONS

INTRINSIC SAFETY FOR:
CLASS I, DIV. 1, GROUPS A, B, C, D
CLASS II, DIV. 1, GROUPS E, F, G
CLASS III, DIV. 1 HAZARDOUS LOCATIONS

AMBIENT TEMPERATURE LIMIT: -50°C TO +85°C

(FIELDBUS/PROFIBUS ONLY)

WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFTEY.
AVERTISSEMENT: La Substitution de compsants peut compromettre la securite intrinseque.

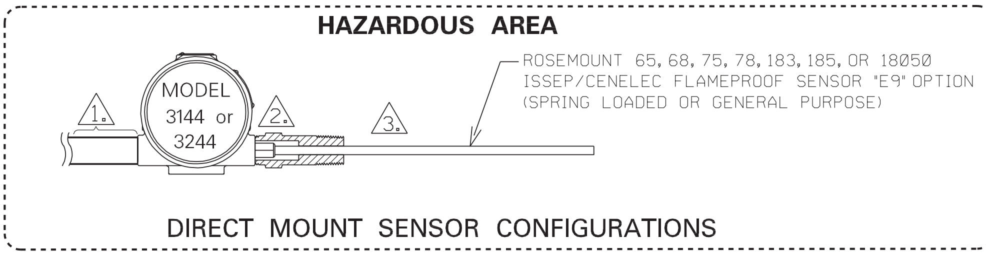
Rosemount Inc. 12001 Technology Drive Eden Prairie, MN 55344 USA	CAD Maintained, (MICROSTATION)			
DR.	SIZE A	FSCM NO	DWG NO. 03144-0222	
ISSUED	SCALE N/A	WT. ————	SHEET 2 OF 2	

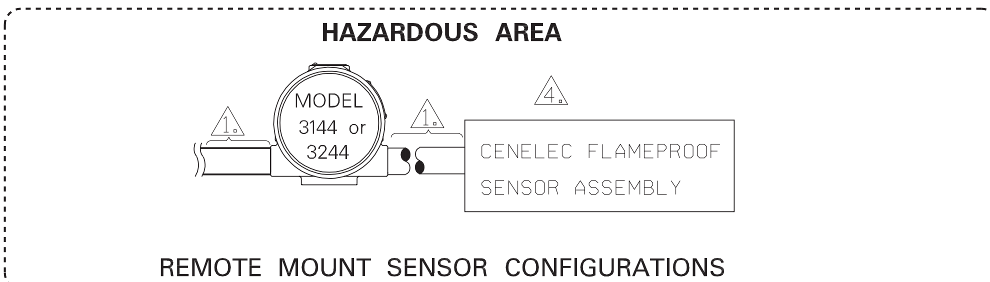
3244_03144-0222-2

Figure B-8. ISSEP/CENELEC Flame-Proof Installation Drawing 03144-0224, Rev C. Page 1 of 1

CONFIDENTIAL AND PROPRIETARY INFORMATION IS CONTAINED HEREIN AND MUST BE HANDLED ACCORDINGLY

REVISIONS				
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
C	CHANGE NOTE 5, APPROVAL DESCRIPTION	669944	J.D.J.	11/1/95
AA	ADD SENSOR MODEL NUMBERS	RTC1000500	M.G.R.	3/12/97





7. WAIT 10 SECONDS AFTER DISCONNECTING POWER BEFORE REMOVING COVER.

6. A CONDUIT PLUG MUST BE INSTALLED INTO ANY UNUSED CONDUIT ENTRIES.

5. ROSEMOUNT MODELS 3144 & 3244 ISSEP/CENELEC FLAMEPROOF APPROVAL DESCRIPTION: EEx d IIC T6 (Tamb= -20°C TO +60°C). IP65

△4. TEMPERATURE SENSOR ASSEMBLY MUST BE CENELEC APPROVED FOR APPROPRIATE AREA CLASSIFICATION.

△3. SPRING LOADED SENSORS MUST USE A THERMOWELL ASSEMBLY.

△2. THREADS MUST BE ASSEMBLED WITH LOCTITE THREAD SEALANT AND HAVE A MINIMUM OF FIVE FULL THREADS ENGAGEMENT AND 8 mm AXIAL LENGTH ENGAGEMENT.

△1. INSTALL PER LOCAL INSTALLATION CODES.
CENELEC APPROVED CABLE ENTRY OR STOPPING BOX REQUIRED.

CAD Maintained, (MICROSTATION)

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES [mm]. REMOVE ALL BURRS AND SHARP EDGES. MACHINE SURFACE FINISH 125

-TOLERANCE-
.X ± .1 [2,5]
.XX ± .02 [0,5]
.XXX ± .010 [0,25]

FRACTIONS ± 1/32 ANGLES ± 2°

DO NOT SCALE PRINT

CONTRACT NO.

DR.	C. SCRIBNER	9/2/94
CHK'D		
APP'D.	JACK D. JOHNSON	2/15/95
APP'D. GOVT.		

ROSEMOUNT® MEASUREMENT
FISHER-ROSEMOUNT

Rosemount Inc.
12001 Technology Drive
Eden Prairie, MN 55344 USA

TITLE INSTALLATION DRAWING: ISSEP/CENELEC FLAMEPROOF TEMPERATURE MEASUREMENT ASSEMBLY (E9)

SIZE	FSCM NO	DWG NO.
A		03144-0224

SCALE NONE WT. ——— SHEET 1 OF 1

3244_03144-0224-1

Index

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Emerson Process Management

Rosemount Inc.
8200 Market Boulevard
Chanhassen, MN 55317 USA
T (U.S.) 1-800-999-9307
T (International) (952) 906-8888
F (952) 949-7001

www.rosemount.com

Rosemount Temperature GmbH
Frankenstrasse 21
63791 Karlstein
Germany
T 49 (6188) 992 0
F 49 (6188) 992 112

Emerson Process Management Asia Pacific Private Limited
1 Pandan Crescent
Singapore 128461
T (65) 777 8211
F (65) 777 0947
AP.RMT-Specialist@emersonprocess.com

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