

Rosemount 144 PC-Programmable Temperature Transmitters

Product Discontinued



CE



ROSEMOUNT

www.rosemount.com



EMERSON
Process Management

Quick Installation Guide

00825-0100-4796, Rev CB

February 2004

Rosemount 144

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IMPORTANT NOTICE

This installation guide provides basic guidelines for the Rosemount 144. It does not provide instructions for detailed configuration, diagnostics, maintenance, service, troubleshooting, or installation. Refer to the 144 Reference Manual (document number 00809-0100-4796) for more instruction. The manual and this QIG are also available electronically on www.rosemount.com.

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. Please review the Product Certifications for any restrictions associated with a safe installation. In an Explosion-Proof/Flame-Proof installation, do not remove the transmitter covers when power is applied to the unit.

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 terminals. High voltage that may be present on leads can cause electrical shock.

Quick Installation Guide

00825-0100-4796, Rev CB

February 2004

Rosemount 144

STEP 1: CONFIGURE THE TRANSMITTER

The 144 is configured using a Microsoft Windows-compatible PC running the 144 configuration software program. For the configuration software to function properly, the following minimum PC requirements must be observed:

Hardware/Software	Minimum Requirements
IBM Compatible PC:	Pentium processor
Memory:	16 MB accessible memory
Hard Drive:	10 MB
Display (Monitor):	CGA, HCG, EGA, OR VGA
Resolution:	800 x 600
Operating System:	Microsoft® Windows® 95, Windows 98, or Windows NT
Printer (optional):	Epson or IBM compatible ASCII printer
Mouse (optional):	Microsoft compatible mouse
Language	English and German

The 144C Configuration Interface software makes the following parameters available:

- Sensor type
- Response time (damping)
- Sensor error action (failure mode)
- Linearization
- Upper and lower range values
- Transmitter tag number (electronic tag)
- Temperature units (Celsius, Fahrenheit, Kelvin, and Rankine)

For configuration, please refer to Figure 1 and the help function in the 144C Configuration Interface software.

Quick Installation Guide

00825-0100-4796, Rev CB

February 2004

Rosemount 144

STEP 1 CONTINUED...

Default Configuration

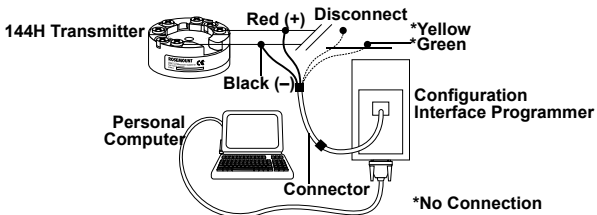
Unless ordered otherwise, the factory will configure the 144H temperature transmitter according to the following:

- Pt100
- 0 to 100 °C
- Output levels compliant with NAMUR Recommendations, NE43; set fail high (upscale) at factory.
- 5 seconds response time (damping)

Installing the 144 Configuration Software

1. Insert the 144C Configuration Interface software into the CD-ROM drive. Select the CD-ROM Drive.
2. Click "Install." On-screen guidelines guide through the installation.
3. If Auto-run is not activated in Windows 95/98/NT, click the "Start" button, select "Run," and type [Install.exe].
4. Configuration must occur in a non-hazardous environment.
5. Click the 144C Configuration Interface icon that has appeared on your desktop.
6. Configure the General, Input, Output, and Option screens.
7. From the Tools menu select "Download the configuration to the transmitter."

Figure 1. Transmitter Configuration System.



Quick Installation Guide

00825-0100-4796, Rev CB

February 2004

Rosemount 144

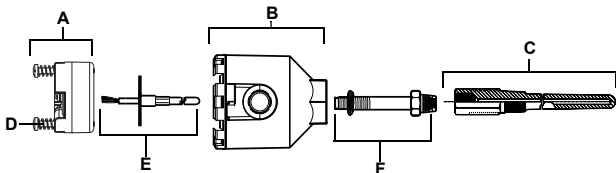
STEP 2: MOUNT THE TRANSMITTER

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

Typical Connection Head Installation

Head Mount Transmitter with DIN Plate Style Sensor

1. Attach the thermowell to the pipe or process container wall. Install and tighten the thermowell before applying process pressure.
2. Assemble the transmitter to the sensor. Push the transmitter mounting screws through the sensor mounting plate and insert the snap rings (optional) into the transmitter mounting screw groove.
3. Wire the sensor to the transmitter.
4. Insert the transmitter-sensor assembly into the connection head. Thread the transmitter mounting screw into the connection head mounting holes. Assemble the extension to the connection head. Insert the assembly into the thermowell.
5. Slip the shielded cable through the cable gland
6. Attach a cable gland into the shielded cable.
7. Insert the shielded cable leads into the connection head through the cable entry. Connect and tighten the cable gland.
8. Connect the shielded power cable leads to the transmitter power terminals. Avoid contact with sensor leads and sensor connections.
9. Install and tighten the connection head cover. Enclosure covers must be fully engaged to meet explosion-proof requirements.



A = 144 Transmitter

D = Transmitter Mounting Screws

B = Connection Head

E = Integral Mount Sensor with Flying Leads

C = Thermowell

F = Extension

Quick Installation Guide

00825-0100-4796, Rev CB

February 2004

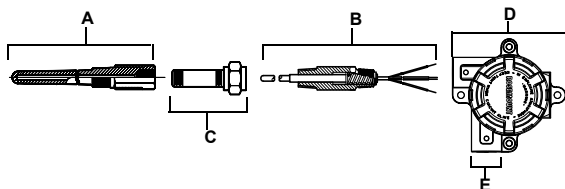
Rosemount 144

STEP 2 CONTINUED...

Typical Universal Head Installation

Head Mount Transmitter with Threaded Sensor

1. Attach the thermowell to the pipe or process container wall. Install and tighten thermowells before applying process pressure.
2. Attach necessary extension nipples and adapters to the thermowell. Seal the nipple and adapter threads with silicone tape.
3. Screw the sensor into the thermowell. Install drain seals if required for severe environments or to satisfy code requirements.
4. Pull the sensor wiring leads through the universal head and transmitter. Mount the transmitter in the universal head by threading the transmitter mounting screws into the universal head mounting holes.
5. Mount the transmitter-sensor assembly into the thermowell. Seal adapter threads with silicone tape.
6. Install conduit for field wiring to the conduit entry of the universal head. Seal conduit threads with silicone tape.
7. Pull the field wiring leads through the conduit into the universal head. Attach the sensor and power leads to the transmitter. Avoid contact with other terminals.
8. Install and tighten the universal head cover. Enclosure covers must be fully engaged to meet explosion-proof requirements.



A = Threaded Thermowell

D = Universal Head

B = Threaded Style Sensor

E = Conduit Entry

C = Standard Extension

STEP 3: CONNECT WIRING AND POWER

Power Supply

The 144H is capable of analog 2-wire current output of 4–20 mA. The output can be reversed to a 20–4 mA signal or set-up to supply a fixed mA signal (input is disabled). The maximum load is dependent on the supply voltages, as $R \text{ load}_{\text{max}} (\Omega) = (V_{\text{supply}} - 8 \text{ V}) / (0.023 \text{ A})$.

If the 144C Configuration Interface Programmer does not operate, the batteries may need to be replaced.

Table 1. Battery parameters

Battery Type:	9 volt
Dimensions:	26 x 17 x 66mm
Different names:	6GF122, MN1604, 6LR61, 6AM6, Eblock

NOTE

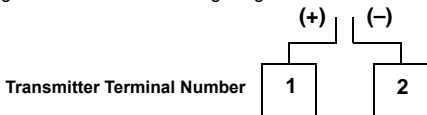
The 144C Configuration Interface Programmer is connected to hazardous electric voltages, so demounting the installed communication cable is required.

Wire the Transmitter

Use the following steps to wire the transmitter

1. Connect the positive lead from the power supply to transmitter terminal 1 and the negative lead to the transmitter terminal 2
2. Tighten the terminal compression screws to ensure adequate contact. No additional power wiring is required.
3. After making connections, recheck the polarity and correctness of the connections.
4. Apply power.

Figure 2. Transmitter Wiring Diagram



Quick Installation Guide

00825-0100-4796, Rev CB

February 2004

Rosemount 144

STEP 3 CONTINUED...

Sensor Connections

The 144H sensor connection is always a 3-wire connection with cable compensation of up to 10 Ω in each wire. For 2-wire connections, terminals three and four on the transmitter are short-circuited (no cable compensation). The 144H accepts a variety of 2- and 3-wire RTD inputs. Figure 3 provides instructions for proper sensor wiring.

Quick Installation Guide

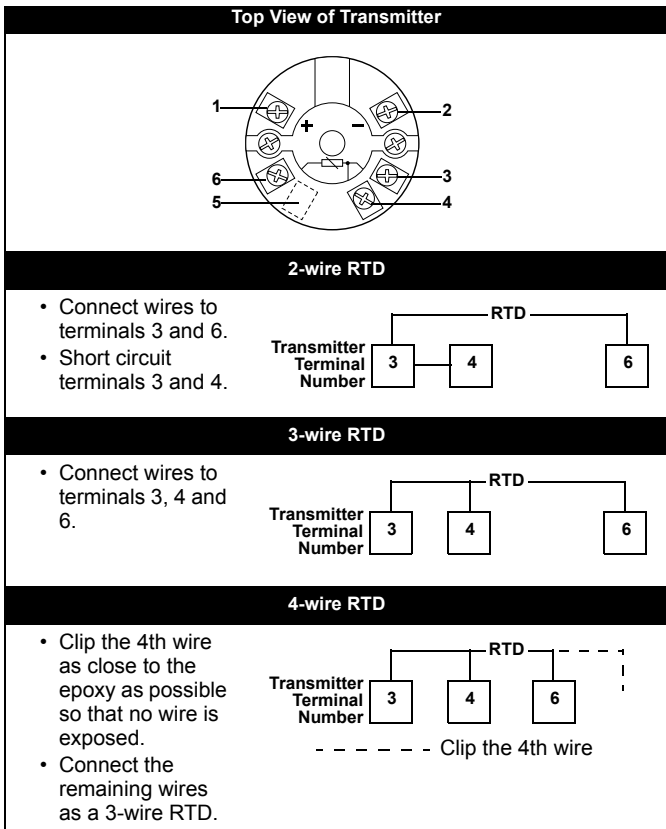
00825-0100-4796, Rev CB

February 2004

Rosemount 144

STEP 3 CONTINUED...

Figure 3. Wiring diagram



Quick Installation Guide

00825-0100-4796, Rev CB

February 2004

Rosemount 144

STEP 3 CONTINUED...

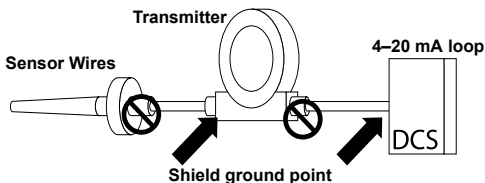
Ground the Transmitter

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 (the most common).

Option 1 (for grounded housing):

1. Connect sensor wiring shield to the transmitter housing.
2. Ensure the sensor shield is electrically isolated from surrounding grounded fixtures.
3. Ground signal wiring shield at the power supply end.



Quick Installation Guide

00825-0100-4796, Rev CB

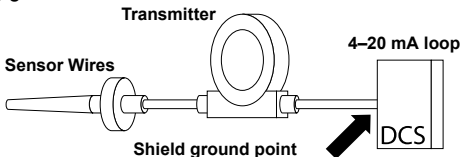
February 2004

Rosemount 144

STEP 3 CONTINUED...

Option 2 (for ungrounded housing):

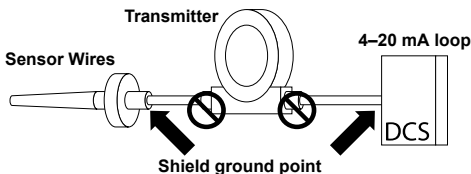
1. Connect signal wiring shield to the sensor wiring shield.
2. Ensure the two shields are tied together and electrically isolated from the housing.
3. Ground shield at the power supply end only.
4. Ensure the sensor shield is electrically isolated from the surrounding grounded fixtures.



Connect shields together, electrically isolated from the transmitter

Option 3 (for grounded or ungrounded housing):

1. Ground sensor wiring shield at the sensor, if possible.
2. Insure the sensor wiring and signal wiring shields are electrically isolated from the housing.
3. Do not connect the signal wiring shield to the sensor wiring shield.
4. Ground signal wiring shield at the power supply end.



PRODUCT CERTIFICATIONS

Approved Manufacturing Locations

Emerson Process Management Rosemount Division– Chanhassen,
Minnesota, USA

Rosemount Temperature GmbH – Germany

Emerson Process Management Asia Pacific – Singapore

European Union Directive Information

The EC declaration of conformity for all applicable European directives for this product can be found on the Rosemount website at www.rosemount.com. A hard copy may be obtained by contacting our local sales representative.

ATEX Directive (94/9/EC)

Rosemount Inc. complies with the ATEX Directive.

Electro Magnetic Compatibility (EMC) (89/336/EEC)

144H Temperature Transmitter and 144C Configuration Unit – EN 50081-1: 1992; EN 50082-2:1995;

Hazardous Locations Certificates

North American Certifications

Factory Mutual (FM) Approvals

- K5 Combination Factory Mutual Intrinsically safe and Explosion-proof Approvals
Intrinsically Safe for Class I, Division 1; Groups A, B, C, D.
Non-incendive for Class I, Division 2, Groups A, B, C, D when installed in accordance with Rosemount Installation Drawing 00144-0110. Ambient temperature limits are between –40 and 85 °C. FM Entity Parameters are listed on the installation drawing (00144-0110) identified on the transmitter approval label.

Quick Installation Guide

00825-0100-4796, Rev CB

February 2004

Rosemount 144

Explosion Proof for Class I, Division 1; Groups B, C, D. Dust ignition proof for Class II, Division 1, Groups E, F, and G. Dust ignition proof for Class III, Division 1 hazardous locations when installed in accordance with Rosemount drawing 00144-0130. A conduit seal is not required for compliance with NEC 501-5a(1).
T5 ($T_{amb} = -40$ to 85 °C)

NOTE

Approval K5 is only available with enclosure codes J5 or J6.

Canadian Standards Association (CSA) Approvals

C6 Combination of CSA Intrinsically Safe, Nonincendive, and Explosion-Proof: Explosion-Proof for Class I, Division 1, Groups 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 when installed in accordance with Rosemount Drawing 00144-0140 factory sealed. Suitable for Class I, Division 2, Groups A, B, C, and D.

Intrinsically Safe for Class 1, Division 1, Groups A, B, C, and D when installed per Rosemount drawing 00144-0120.

Temperature codes: T4 ($T_{amb} = -40$ to 85 °C);

T6 ($T_{amb} = -40$ to 60 °C)

NOTE:

Approval C6 is only available with enclosure codes J5 or J6.

Quick Installation Guide

00825-0100-4796, Rev CB

February 2004

Rosemount 144

European Certifications

CENELEC ATEX Approvals

I1 Intrinsically Safe Certification

DEMKO 00 ATEX 129255

ATEX Marking:  II 1 G

EEx ia IIC T6 ($T_{amb} = -40$ to 60 °C)

EEx ia IIC T4 ($T_{amb} = -40$ to 85 °C)

Entity Parameters: $U_i = 28$ VDC, $I_i = 120$ mA, $L_i = 10$ μ H, $C_i = 1$ nF, $P_i = 0.84$ W

Directives:

ATEX: 94/9/EC

EMC: 89/336EEC

Special Conditions for Safe Use (x):

1. For correct use and installation the manufacture's manual must be followed.
2. The apparatus must be installed in an enclosure with an Ingress Protection of at least IP20.
3. The terminals 1 and 2 of the equipment have to be electrically connected to a barrier located in the non-hazardous area.
4. The transmitter may only be used with transducers complying with "Simple Apparatus" according to EN 50020 Clause 5.4.

ED Flameproof Certification

KEMA 99 ATEX 8715

ATEX Marking:  II 2 G

EEx d IIC T6 ($T_{amb} = -40$ to 65 °C)

Maximum Input Voltage: 42.4 V

Directives:

ATEX: 94/9/EC

NOTE

Only available with enclosure codes J5 or J6.

Quick Installation Guide

00825-0100-4796, Rev CB

February 2004

Rosemount 144

Combination Approval

KC Combination Factory Mutual/CSA Intrinsically Safe Approval

Factory Mutual- Intrinsically Safe for Class I, II, III: Div. 1, Groups A, B, C, D. Non-incendive for Class I, Division 2, Groups A,B,C,D, when installed in accordance with Rosemount Installation Drawing 00144-0110. Ambient temperature limits are between -40 C and 85 °C. FM Entity Parameters are listed on the installation drawing.

CSA- Intrinsically Safe for Class I, Division 1, Groups A, B, C, D when connected in accordance with Rosemount Installation Drawing 00144-0120. T_4 ($-40\text{ °C} \leq T_a \leq 85\text{ °C}$), T_6 ($-40\text{ °C} \leq T_a \leq 60\text{ °C}$).

Quick Installation Guide

00825-0100-4796, Rev CB

February 2004

Rosemount 144
