

Rosemount 644 Temperature Transmitter



The most versatile temperature transmitter

Reduce complexity and simplify the day to day operations of your diverse temperature applications with the versatile Rosemount 644 family of temperature transmitters. Make better decisions for your process with the new and easy to use Rosemount 644 Transmitter capabilities including: diagnostics, safety certification, integral transient protection and display options.

Rosemount 644 Family of Transmitters

Fit your needs within one model family with a customizable transmitter design



- DIN Head mount, field mount, and rail mount form factors
- 4-20 mA /HART® with Selectable Revisions, FOUNDATION™ fieldbus or PROFIBUS® PA Protocol support
- SIL3 Capable: IEC 61508 certified by an accredited 3rd party agency for use in safety instrumented systems up to SIL 3 [Minimum requirement of single use (1oo1) for SIL 2 and redundant use (1oo2) for SIL 3]
- Enhanced display with Local Operator Interface
- LCD display
- Integral Transient Protection
- Enhanced accuracy and stability
- Transmitter-Sensor Matching with Callendar Van Dusen constants
- Variety of enclosures

Rosemount 644 Selection Guide

Rosemount 644 HART Transmitters



HART head mount and field mount

- Single or Dual sensor inputs for RTD, Thermocouple, mV and Ohm
- DIN A Head mount and Field mount transmitters
- SIL3 Capable: IEC 61508 certified by an accredited 3rd party agency for use in safety instrumented systems up to SIL 3 (Minimum requirement of single use [1oo1] for SIL 2 and redundant use [1oo2] for SIL 3)
- LCD display
- Enhanced display with Local Operator Interface
- Integral Transient Protection
- Diagnostic Suite
- Enhanced accuracy and stability
- Transmitter-Sensor Matching with Callendar Van Dusen constants



HART rail mount

- Single sensor input for RTD, Thermocouple, mV and Ohm
- Custom alarm and saturation levels
- Transmitter-Sensor Matching with Callendar Van Dusen constants
- Hardware alarm switch



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Rosemount 644 FOUNDATION fieldbus

- Single sensor input for RTD, Thermocouple, mV and Ohm
- DIN A Head mount transmitter
- Standard function blocks: 2 Analog Inputs, 1 PID and 1 Backup Link Active Scheduler (LAS)
- LCD Display
- ITK 5.01 Compliant
- Transmitter Sensor Matching with Callendar Van Dusen constants



Rosemount 644 PROFIBUS PA

- Single sensor input for RTD, Thermocouple, mV and Ohm
- DIN A Head mount transmitter
- Standard function blocks: 1 physical, 1 Transducer, and 1 Analog Out
- LCD Display
- Compliant to PROFIBUS PA Profile 3.02
- Transmitter-Sensor Matching with Callendar Van Dusen constants



Easy to use human-centered designs to make your job simple

- Diagnostic information and process health at your finger tips with intuitive Device Dashboards.
- Communication clips are easily accessible when an LCD display is attached.
- Easy wiring practices with captive sensor screw terminals, an optimized wiring diagram, and field mount enclosure option.

Optimize plant efficiency and increase visibility into the process with an expansive diagnostic offering

- Keep your process up and running with the Hot Backup™ feature where if your primary sensor fails, a second sensor seamlessly takes over and prevents the measurement failure.
- Tighten control with Sensor Drift Alert that detects drifting sensors and pro-actively notifies the user.
- Enable predictive maintenance practices with Thermocouple Degradation Diagnostic that monitors the health of the thermocouple loop.
- Improve quality with Minimum and Maximum Temperature Tracking that records temperature extremes of the process and the ambient environment.

Ordering Information

The Rosemount 644 is a Versatile Temperature Transmitter that delivers field reliability and advanced accuracy and stability to meet demanding process needs.



Transmitter features include:

- HART/4-20 mA with Selectable Revision 5 and 7 selectable (Option Code A), FOUNDATION fieldbus (Option Code F) or PROFIBUS PA (Option Code W)
- DIN A Head Mount, Field Mount, or Rail Mount transmitter styles
- Dual Sensor Input (Option Code S)
- SIS SIL 2 Safety Certification (Option Code QT)
- LCD Display (Option Code M5)
- Local Operator Interface (Option Code M4)
- Advanced Diagnostics (Option Codes DC and DA1)
- Enhanced Transmitter Accuracy and Stability (Option Code P8)
- Transmitter-Sensor Matching (Option Code C2)

Specification and selection of product materials, options, or components must be made by the purchaser of the equipment. See [page 14](#) for more information on Material Selection.

Table 1. Rosemount 644 Smart Temperature Transmitter Ordering Information

★ The Standard offering represents the most common models and options. These options should be selected for best delivery.

The Expanded offering is manufactured after receipt of order and is subject to additional delivery lead time.

● = Available
 – = Not Available

Model	Product description				
644	Temperature Transmitter				
Transmitter type					
H	DIN A Head Mount - Single Sensor Input				★
R	Rail Mount - Single Sensor Input				★
S	DIN A Head Mount - Dual Sensor Input (HART only)				★
F ⁽¹⁾	Field Mount - Single Sensor Input (HART only)				★
D ⁽¹⁾	Field Mount - Dual Sensor Input (HART only)				★
Output		Head		Rail	
A	4–20 mA with digital signal based on HART protocol	●	●	●	★
F	FOUNDATION fieldbus digital signal (includes 2 AI function blocks and Backup Link Active Scheduler)	●	–	–	★
W	PROFIBUS PA digital signal	●	–	–	★
Product certifications		Head		Rail	
Hazardous locations certificates (consult factory for availability ⁽²⁾)		A	F	W	A
NA	No approval	●	●	●	●
E5	FM Explosion-proof; Dust Ignition-proof	●	●	●	–

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		Head			Rail	
		A	F	W	A	
I5	FM Intrinsically Safe; Non-incendive	●	●	●	●	★
K5	FM Explosionproof; Intrinsically Safe; Non-incendive; Dust Ignition-proof	●	●	●	–	★
NK	IECEX Dust	●	–	–	–	★
KC	FM and CSA Intrinsically Safe and Non-incendive	–	–	–	●	★
KB	FM and CSA: Explosionproof; Intrinsically Safe; Non-incendive; Dust Ignition-proof	●	–	–	–	★
KD	FM, CSA and ATEX Explosionproof, Intrinsically Safe	●	●	●		★
I6	CSA Intrinsically Safe	●	●	●	●	★
K6	CSA Explosionproof; Intrinsically Safe; Non-incendive; Dust Ignition-proof	●	●	●	–	★
I3	China Intrinsic Safety	●	–	–	–	★
E3	China Flameproof	●	●	●	–	★
N3	China Type n	●	–	–	–	★
E1	ATEX Flameproof	●	●	●	–	★
N1	ATEX Type n	●	●	●	–	★
NC	ATEX Type n Component	●	●	●	●	★
K1	ATEX Flameproof; Intrinsic Safety; Type n; Dust	●	●	●		★
ND	ATEX Dust Ignition–Proof	●	●	●	–	★
KA	CSA and ATEX: Explosionproof; Intrinsically Safe; Non-incendive	●	–	–	–	★
I1	ATEX Intrinsic Safety	●	●	●	●	★
E7	IECEX Flameproof	●	●	●	–	★
I7	IECEX Intrinsic Safety	●	●	●	●	★
N7	IECEX Type n	●	●	●	–	★
NG	IECEX Type n Component	●	●	●	●	★
K7	IECEX Flameproof; Intrinsic Safety; Type n; Dust	●	–	–	–	★
I2	INMETRO Intrinsic Safety	●	–	–	–	★
E4	TIIS Flameproof	●	●	–	–	★
E2	INMETRO Flameproof	●	●	●	–	★
EM	Technical Regulations Customs Union (EAC) Flameproof	●	●	●	–	★
IM	Technical Regulations Customs Union (EAC) Intrinsic Safety	●	●	●	–	★
KM	Technical Regulations Customs Union (EAC) Flameproof, Intrinsic Safety	●	●	●	–	★

Options

		Head			Rail	
		A	F	W	A	
PlantWeb standard diagnostic functionality						
DC	Diagnostics: Hot Backup and Sensor Drift Alert	●	–	–	–	★

Table 1. Rosemount 644 Smart Temperature Transmitter Ordering Information

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PlantWeb advanced diagnostic functionality									
DA1	HART Sensor and Process Diagnostic Suite: Thermocouple Diagnostic and Min/Max Tracking				●	–	–	–	★
Enclosure options					Head			Rail	
					A	F	W	A	
	Housing style	Material	Entry size	Diameter					
J5 ⁽³⁾⁽⁴⁾	Universal Junction Box, 2 entries	Aluminum	M20 X 1.5	3 in (76 mm)	●	●	●	–	★
J6 ⁽⁴⁾	Universal Junction Box, 2 entries	Aluminum	1/2–14 NPT	3 in (76 mm)	●	●	●	–	★
R1	Rosemount Connection Head, 2 entries	Aluminum	M20 X 1.5	3 in (76 mm)	●	●	●	–	★
R2	Rosemount Connection Head, 2 entries	Aluminum	1/2–14 NPT	3 in (76 mm)	●	●	●	–	★
J1 ⁽³⁾	Universal Junction Box, 3 entries	Aluminum	M20 X 1.5	3.5 in (89 mm)	●	●	●	–	★
J2	Universal Junction Box, 3 entries	Aluminum	1/2–14 NPT	3.5 in (89 mm)	●	●	●	–	★
D1 ⁽¹⁾⁽³⁾⁽⁵⁾	Field Mount Housing, Separate Terminal Compartment	Aluminum	M20 X 1.5	3.5 in (89 mm)	–	–	–	–	★
D2 ⁽¹⁾⁽⁵⁾	Field Mount Housing, Separate Terminal Compartment	Aluminum	1/2–14 NPT	3.5 in (89 mm)	–	–	–	–	★
J3 ⁽³⁾	Universal Junction Box, 3 entries	Cast SST	M20 X 1.5	3.5 in (89 mm)	●	●	●	–	
J4	Universal Junction Box, 3 entries	Cast SST	1/2–14 NPT	3.5 in (89 mm)	●	●	●	–	
J7 ⁽³⁾⁽⁴⁾	Universal Junction Box, 2 entries	Cast SST	M20 X 1.5	3 in (76 mm)	●	●	●	–	
J8 ⁽⁴⁾	Universal Junction Box, 2 entries	Cast SST	1/2–14 NPT	3 in (76 mm)	●	●	●	–	
R3	Rosemount Connection Head, 2 entries	Cast SST	M20 X 1.5	3 in (76 mm)	●	●	●	–	
R4	Rosemount Connection Head, 2 entries	Cast SST	1/2–14 NPT	3 in (76 mm)	●	●	●	–	
S1	Connection Head, 2 entries	Polished SST	1/2–14 NPT	3 in (76 mm)	●	●	●	–	
S2	Connection Head, 2 entries	Polished SST	1/2–14 NPSM	3 in (76 mm)	●	●	●	–	
S3	Connection Head, 2 entries	Polished SST	M20 X 1.5	3 in (76 mm)	●	●	●	–	
S4	Connection Head, 2 entries	Polished SST	M20 X 1.5, M24 X 1.4	3 in (76 mm)	●	●	●	–	
Mounting bracket									
B4 ⁽⁶⁾	316 SST U-bolt Mounting Bracket, 2-in pipe mount				●	●	●	–	★
B5 ⁽⁶⁾	“L” Mounting Bracket for 2-inch pipe or panel mounting				●	●	●	–	★
Display and interface options									
M4	LCD Display with Local Operator Interface				●	–	–	–	★
M5	LCD Display				●	●	●	–	★
Software configuration									
C1	Custom Configuration of Date, Descriptor and Message (requires CDS with order)				●	●	●	●	★
Enhanced performance									
pg ⁽⁷⁾	Enhanced Transmitter Accuracy and Stability				●	–	–	–	★

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– = Not Available

Alarm level configuration						
A1	NAMUR alarm and saturation levels, high alarm	●	–	–	●	★
CN	NAMUR alarm and saturation levels, low alarm	●	–	–	●	★
C8	Low Alarm (Standard Rosemount Alarm and Saturation Values)	●	–	–	●	★
Line filter		Head			Rail	
F5	50 Hz Line Voltage Filter	●	●	●	●	★
F6	60 Hz Line Voltage Filter	●	●	●	●	★
Sensor trim						
		A	F	W	A	
C2	Transmitter-Sensor Matching - Trim to Specific Rosemount RTD Calibration Schedule (CVD constants)	●	●	●	●	★
5-point calibration option						
C4	5-point calibration (use option code Q4 to generate a calibration certificate)	●	●	●	●	★
Calibration certificate						
Q4	Calibration certificate (3-Point calibration with certificate)	●	●	●	●	★
QP	Calibration Certification & Tamper Evident Seal	●	●	●	–	★
Quality certification for safety						
QT	Safety Certified to IEC 61508 with certificate of FMEDA data	●	–	–	–	★
Shipboard certification						
SBS	American Bureau of Shipping (ABS) Type Approval	●	●	●	–	★
SBV	Bureau Veritas (BV) Type Approval	●	●	●	–	★
SDN	Det Norske Veritas (DNV) Type Approval	●	●	●	–	★
SLL	Lloyd's Register (LR) Type Approval	●	●	●	–	★
External ground						
G1	External ground lug assembly (see “External ground screw assembly” on page 11)	●	●	●	–	★
Transient protection						
T1 ⁽⁸⁾	Integral Transient Protector	●	–	–	–	★
Cable gland option						
G2	Cable gland (7.5 mm - 11.99 mm)	●	●	●	–	★
G7	Cable gland, M20x1.5, Ex e, Blue Polyamide (5 mm - 9 mm)	●	●	●	–	★
Cover chain option						
G3	Cover chain	●	●	●	–	★
Conduit electrical connector						
GE ⁽⁹⁾	M12, 4-pin, Male Connector (eurofast [®])	●	●	●	–	★
GM ⁽⁹⁾	A size Mini, 4-pin, Male Connector (minifast [®])	●	●	●	–	★

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– = Not Available

External label						
EL	External label for ATEX Intrinsic Safety	●	●	●	–	★
HART revision configuration		Head			Rail	
		A	F	W	A	
HR5	Configured for HART Revision 5	●	–	–	–	★
HR7 ⁽¹⁰⁾	Configured for HART Revision 7	●	–	–	–	★
Assemble to options						
XA	Sensor Specified Separately and Assembled to Transmitter	●	●	●	–	★
Extended product warranty						
WR3	3-year limited warranty	●	●	●	●	★
WR5	5-year limited warranty	●	●	●	●	★
Typical rail mount model number: 644 R A I5 Typical head mount model number: 644 S A I5 DC DA1 J5 M5 Typical field mount model number: 644 F A I5 DC DA1 D1 M4 T1						

(1) Consult factory on availability.

(2) See Table 2 for the validity of enclosures with individual approval options.

(3) When ordered with XA, 1/2-in. NPT enclosure will come equipped with an M20 adapter with the sensor installed as a process ready.

(4) Enclosure ships equipped with 50.8 mm (2-in) SST pipe "U" bolt mounting kit.

(5) Available with Transmitter Type 644F or 644D only.

(6) Bracket assembly only available with J1, J2, J3, J4, D1, and D2.

(7) See Table 10 for Enhanced Accuracy specifications.

(8) Transient Protection option requires the use of J1, J2, J3, J4, D1, or D2.

(9) Available with Intrinsically Safe approvals only. For FM Intrinsically Safe or non-incendive approval (option code I5), install in accordance with Rosemount drawing 03151-1009.

(10) Configures the HART output to HART Revision 7. The device can be field configured to HART Revision 5 if needed.

Note

For additional options (e.g. "K" codes), contact your local Emerson Process Management representative.

Table 2. 644 Enclosure Options Valid with Individual Approval Codes

Code	Hazardous location approval description	Enclosure options valid with approval
NA	No approval	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8, S1, S2, S3, S4, D1, D2
E5	FM Explosionproof; Dust Ignition-proof	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8, D1, D2
I5	FM Intrinsically Safe; Non-incendive	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8, D1, D2
K5	FM Explosionproof; Intrinsically Safe; Non-incendive; Dust Ignition-proof	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8, D1, D2
NK	IECEx Dust	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8, D1, D2
KC	FM and CSA Intrinsically Safe and Non-incendive	Only available with Rail mount device
KB	FM and CSA: Explosionproof; Intrinsically Safe; Non-incendive; Dust Ignition-proof	J2, J4, R2, R4, J6, J8, D2
KD	FM, CSA and ATEX Explosionproof, Intrinsically Safe	J2, J4, R2, R4, J6, J8, D2
I6	CSA Intrinsically Safe	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8, D1, D2
K6	CSA Explosionproof; Intrinsically Safe; Non-incendive; Dust Ignition-proof	J2, J4, R2, R4, J6, J8, D2
I3	China Intrinsic Safety	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8
E3	China Flameproof	R1, R2, R3, R4, J5, J6, J7, J8
N3	China Type n	R1, R2, R3, R4, J5, J6, J7, J8
E1	ATEX Flameproof	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8, D1, D2
N1	ATEX Type n	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8, D1, D2
NC	ATEX Type n Component	None
K1	ATEX Flameproof; Intrinsic Safety; Type n; Dust	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8, D1, D2
ND	ATEX Dust Ignition-Proof	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8, D1, D2
KA	CSA and ATEX: Explosionproof; Intrinsically Safe; Non-incendive	J2, J4, R2, R4, J6, J8, D2
I1	ATEX Intrinsic Safety	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8, S1, S2, S3, S4, D1, D2
E7	IECEx Flameproof	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8, D1, D2
I7	IECEx Intrinsic Safety	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8, S1, S2, S3, S4, D1, D2
N7	IECEx Type n	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8, D1, D2
NG	IECEx Type n Component	None
K7	IECEx Flameproof; Intrinsic Safety; Type n; Dust	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8, D1, D2
I2	INMETRO Intrinsic Safety	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8
E4	TIIS Flameproof	J2, J6
E2	INMETRO Flameproof	R1, R2, R3, R4, J5, J6, J7, J8
KM	Technical Regulations Customs Union (EAC) Flameproof, Intrinsic Safety	J1, J2, J3, J4, J5, J6, J7, J8, R1, R2, R3, R4, S1, S2, S3, S4
IM	Technical Regulations Customs Union (EAC) Intrinsic Safety	J1, J2, J3, J4, J5, J6, J7, J8, R1, R2, R3, R4, S1, S2, S3, S4
EM	Technical Regulations Customs Union (EAC) Flameproof	J1, J2, J3, J4, J5, J6, J7, J8, R1, R2, R3, R4, S1, S2, S3, S4
K2	INMETRO Flameproof, Intrinsic Safety	R1, R2, R3, R4, J5, J6, J7, J8

Tagging

Hardware

- 13 characters total
- Tags are adhesive or metal labels
- Tag is permanently attached to transmitter

Software

- The transmitter can store up to 13 characters for FOUNDATION fieldbus and PROFIBUS PA or 8 for HART protocol. If no characters are specified, the first 8 characters of the hardware tag are the default. An optional 32 character Long Software Tag is available when option code HR7 is ordered.

Considerations

External ground screw assembly

The external ground screw assembly can be ordered by specifying code G1 when an enclosure is specified. However, some approvals include the ground screw assembly in the transmitter shipment, hence it is not necessary to order code G1. The table below identifies which approval options include the external ground screw assembly and which do not.

Option code	External ground screw assembly included?
E5, I1, I2, I5, I6, I7, K5, K6, NA, I3, KB	No—Order option code G1
E1, E2, E3, E4, E7, K7, N1, N7, ND, K1, K2, KA, NK, N3, KD, T1	Yes

Table 3. Enclosure Spares

Description	Part number
Universal Head, Aluminum, Standard cover, 2-conduit - M20 entries	00644-4420-0002
Universal Head, Aluminum, Display cover, 2-conduit - M20 entries	00644-4420-0102
Universal Head, Aluminum, Standard cover, 2-conduit - 1/2 - 14 NPT entries	00644-4420-0001
Universal Head, Aluminum, Display cover, 2-conduit - 1/2 - 14 NPT entries	00644-4420-0101
Universal Head, SST, Standard cover, 2-conduit - M20 entries	00644-4433-0002
Universal Head, SST, Display cover, 2-conduit - M20 entries	00644-4433-0102
Universal Head, SST, Standard cover, 2-conduit - 1/2 - 14 NPT entries	00644-4433-0001
Universal Head, SST, Display cover, 2-conduit - 1/2 - 14 NPT entries	00644-4433-0101
Connection Head, Aluminum, Standard cover, 2-conduit - M20 x 1/2 ANPT entries	00644-4410-0021
Connection Head, Aluminum, Display cover, 2-conduit - M20 x 1/2 ANPT entries	00644-4410-0121
Connection Head, Aluminum, Standard cover, 2-conduit - 1/2 - 14 NPT x 1/2 ANPT entries	00644-4410-0011
Connection Head, Aluminum, Display cover, 2-conduit - 1/2 - 14 NPT x 1/2 ANPT entries	00644-4410-0111
Connection Head, SST, Standard cover, 2-conduit - M20 X 1/2 ANPT entries	00644-4411-0021
Connection Head, SST, Display cover, 2-conduit - M20 X 1/2 ANPT entries	00644-4411-0121
Connection Head, SST, Standard cover, 2-conduit - 1/2 - 14 NPT x 1/2 ANPT entries	00644-4411-0011
Connection Head, SST, Display cover, 2-conduit - 1/2 - 14 NPT x 1/2 ANPT entries	00644-4411-0111
Connection Head, Polished SST, Standard cover, 2-conduit - M20 x 1.5 entries	00079-0312-0033
Connection Head, Polished SST, Display cover, 2-conduit - M20 x 1.5 entries	00079-0312-0133
Connection Head, Polished SST, Standard cover, 2-conduit - M20 x 1.5 / M24 x 1.5 entries	00079-0312-0034
Connection Head, Polished SST, Display cover, 2-conduit - M20 x 1.5 / M24 x 1.5 entries	00079-0312-0134
Connection Head, Polished SST, Standard cover, 2-conduit - 1/2 - 14 NPT entries	00079-0312-0011
Connection Head, Polished SST, Display cover, 2-conduit - 1/2 - 14 NPT entries	00079-0312-0111
Connection Head, Polished SST, Standard cover, 2-conduit - 1/2 - 14 NPSM entries	00079-0312-0022
Connection Head, Polished SST, Display cover, 2-conduit - 1/2 - 14 NPSM entries	00079-0312-0122