Product Data Sheet
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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

EMERSON.
Process Management

Rosemount 644 Family of Transmitters

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

- DIN Head mount and Rail mount form factors
- 4-20 mA /HART® with Selectable Revisions, FOUNDATION Fieldbus or Profibus PA Protocol support
- SIL 2 certified to IEC 61508
- 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

- Single or Dual sensor inputs for RTD, Thermocouple, mV and Ohm
- DIN A Head mount transmitter
- SIL 2 certified to IEC 61508
- 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 and optimized wiring diagram

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

- Keep your process up and running with Hot Backup™ 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 proactively 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 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)

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						
Standard						Standard
H	DIN A Head Mount - Single Sensor Input					★
R	Rail Mount - Single Sensor Input					★
S	DIN A Head Mount - Dual Sensor Input (HART only)					★
Output		Head			Rail	
Standard						Standard
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[1])		A	F	W	A	
Standard						Standard
NA	No approval	●	●	●	●	★
E5	FM Explosion-proof; Dust Ignition-proof	●	●	●	–	★

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		Head			Rail	
		A	F	W	A	
Standard						Standard
I5	FM Intrinsically Safe; Non-incendive	●	●	●	●	★
K5	FM Explosion-proof; Intrinsically Safe; Non-incendive; Dust Ignition-proof	●	●	●	–	★
NK	IECEx Dust	●	–	–	–	★
KC	FM and CSA Intrinsically Safe and Non-incendive	–	–	–	●	★
KB	FM and CSA: Explosion-proof; Intrinsically Safe; Non-incendive; Dust Ignition-proof	●	–	–	–	★
KD	FM, CSA and ATEX Explosion-proof, Intrinsically Safe	●	●	●		★
I6	CSA Intrinsically Safe	●	●	●	●	★
K6	CSA Explosion-proof; Intrinsically Safe; Non-incendive; Dust Ignition-proof	●	●	●	–	★
I3	China Intrinsic Safety	●	–	–	–	★
E3	China Flameproof	●	●	●	–	★
N3	Chine 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: Explosion-proof; 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	●	●	●	–	★

Options

		Head			Rail	
		A	F	W	A	
PlantWeb Control Functionality						
Standard						Standard
A01	FOUNDATION fieldbus Advanced Control Function Block Suite	–	●	–	–	★
PlantWeb Standard Diagnostic Functionality						
Standard						Standard
DC	Diagnostics: Hot Backup and Sensor Drift Alert	●	–	–	–	★
PlantWeb Advanced Diagnostic Functionality						
Standard						Standard
DA1	HART Sensor and Process Diagnostic Suite: Thermocouple Diagnostic and Min/Max Tracking	●	–	–	–	★

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.**

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Enclosure Options					Head			Rail	
					A	F	W	A	
Standard									Standard
	Housing Style	**Material**	**Entry Size**	**Diameter**					
J5 (2) (3)	Universal Junction Box, 2 entries	Aluminum	M20 X 1.5	3 in (76 mm)	●	●	●	–	★
J6(3)	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(2)	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)	●	●	●	–	★
Expanded									
J3(2)	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(2)(3)	Universal Junction Box, 2 entries	Cast SST	M20 X 1.5	3 in (76 mm)	●	●	●	–	
J8(3)	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									
Standard									Standard
B4(4)	316 SST U-bolt Mounting Bracket, 2-in pipe mount, 2g vibration rating with SST enclosure				●	●	●	–	★
B5(4)	“L” Mounting Bracket for 2-inch pipe or panel mounting, SST, 2g vibration rating				●	●	●	–	★
Display and Interface Options									
Standard									Standard
M4	LCD Display with Local Operator Interface				●	–	–	–	★
M5	LCD Display				●	●	●	–	★
Software Configuration									
Standard									Standard
C1	Custom Configuration of Date, Descriptor and Message (Requires CDS with order)				●	●	●	●	★
Enhanced Performance									
Standard									Standard
P8(5)	Enhanced Transmitter Accuracy and Stability				●	–	–	–	★
Alarm Level Configuration									
Standard									Standard
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)				●	–	–	●	★

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Line Filter		Head			Rail	
Standard						Standard
F5	50 Hz Line Voltage Filter	●	●	●	●	★
F6	60 Hz Line Voltage Filter	●	●	●	●	★
Sensor Trim						
		A	F	W	A	
Standard						Standard
C2	Transmitter-Sensor Matching - Trim to Specific Rosemount RTD Calibration Schedule (CVD constants)	●	●	●	●	★
5-Point Calibration Option						
Standard						Standard
C4	5-point calibration. *Use option code Q4 to generate a calibration certificate*	●	●	●	●	★
Calibration Certificate						
Standard						Standard
Q4	Calibration certificate. *3-Point calibration with certificate*	●	●	●	●	★
QP	Calibration Certification & Tamper Evident Seal	●	●	●	–	★
Quality Certification for Safety						
Standard						Standard
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						
Standard						Standard
G1	External ground lug assembly (see "External Ground Screw Assembly" on page 9)	●	●	●	–	★
Transient Protection						
Standard						Standard
T1[(6)]	Integral Transient Protector	●	–	–	–	★
Cable Gland Option						
Standard						Standard
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						
Standard						Standard
G3	Cover chain	●	●	●	–	★

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Conduit Electrical Connector						
Standard						Standard
GE[7]	M12, 4-pin, Male Connector (eurofast®)	●	●	●	–	★
GM[7]	A size Mini, 4-pin, Male Connector (minifast®)	●	●	●	–	★
External Label						
Standard						Standard
EL	External label for ATEX Intrinsic Safety	●	●	●	–	★
HART Revision Configuration		Head			Rail	
		A	F	W	A	
Standard						Standard
HR5	Configured for HART Revision 5	●	–	–	–	★
HR7[8]	Configured for HART Revision 7	●	–	–	–	★
Assemble To Options						
Standard						Standard
XA	Sensor Specified Separately and Assembled to Transmitter	●	●	●	–	★
Typical Rail Mount Model Number: 644 R A I5 **Typical Head Mount Model Number: 644 S A I5 DC DA1 J5 M5**						

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

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

(3) Enclosure ships equipped with 50.8 mm (2-in) SST pipe bracket for mounting.

(4) Bracket assembly only available with 3-Conduit housings J1 and J2.

(5) See Table 10 on page 21 for Enhanced Accuracy specifications.

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

(7) 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.

(8) 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), please 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
E5	FM Explosion-proof; Dust Ignition-proof	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8
I5	FM Intrinsically Safe; Non-incendive	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8
K5	FM Explosion-proof; Intrinsically Safe; Non-incendive; Dust Ignition-proof	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8
NK	IECEx Dust	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8
KC	FM and CSA Intrinsically Safe and Non-incendive	Only available with Rail mount device
KB	FM and CSA: Explosion-proof; Intrinsically Safe; Non-incendive; Dust Ignition-proof	J2, J4, R2, R4, J6, J8
KD	FM, CSA and ATEX Explosion-proof, Intrinsically Safe	J2, J4, R2, R4, J6, J8
I6	CSA Intrinsically Safe	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8
K6	CSA Explosion-proof; Intrinsically Safe; Non-incendive; Dust Ignition-proof	J2, J4, R2, R4, J6, J8
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
N1	ATEX Type n	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8
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
ND	ATEX Dust Ignition-Proof	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8
KA	CSA and ATEX: Explosion-proof; Intrinsically Safe; Non-incendive	J2, J4, R2, R4, J6, J8
I1	ATEX Intrinsic Safety	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8, S1, S2, S3, S4
E7	IECEx Flameproof	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8
I7	IECEx Intrinsic Safety	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8, S1, S2, S3, S4
N7	IECEx Type n	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8
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
I2	INMETRO Intrinsic Safety	J1, J2, J3, J4, R1, R2, R3, R4, J5, J6, J7, J8
E4	TIIS Flameproof	J6
E2	INMETRO Flameproof	R1, R2, R3, R4, J5, J6, J7, J8
K2	INMETRO Flameproof, Intrinsic Safety	R1, R2, R3, R4, J5, J6, J7, J8

Tagging

Hardware

- 13 characters total
- Tags are adhesive 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
Universal Head, Aluminum, Standard cover, 3-conduit - M20 entries	00644-4439-0001
Universal Head, Aluminum, Display cover, 3-conduit - M20 entries	00644-4439-0101
Universal Head, Aluminum, Standard cover, 3-conduit - 1/2 - 14 NPT entries	00644-4439-0002
Universal Head, Aluminum, Display cover, 3-conduit - 1/2 - 14 NPT entries	00644-4439-0102
Universal Head, SST, Standard cover, 3-conduit - M20 entries	00644-4439-0003
Universal Head, SST, Display cover, 3-conduit - M20 entries	00644-4439-0103
Universal Head, SST, Standard cover, 3-conduit - 1/2 - 14 NPT entries	00644-4439-0004
Universal Head, SST, Display cover, 3-conduit - 1/2 - 14 NPT entries	00644-4439-0104

Table 4. Display Kit Spares

Description	Part Number
Display only	
644 HART LCD Display (option M5)	00644-7630-0001
644 HART Local Operator Interface (option M4)	00644-7630-1001
644 FOUNDATION Fieldbus LCD Display (option M5)	00644-4430-0002
644 Profibus PA LCD Display (option M5)	00644-4430-0002
644 HART Legacy display Kit (option M5 - Device Rev 7)	00644-4430-0002
Display with Aluminum Meter Cover	
Rosemount 644 HART LCD Display (option M5)(1)	00644-7630-0011
Rosemount 644 HART LCD Display (option M5)(2)	00644-7630-0111

Table 4. Display Kit Spares

Display with Aluminum Cover	
Rosemount 644 HART Local Operator Interface (option M4)(1)	00644-7630-1011
Rosemount 644 HART Local Operator Interface (option M4)(2)	00644-7630-1111
Rosemount 644 FOUNDATION Fieldbus LCD Display (option M5)(1)	00644-4430-0001
Rosemount 644 Profibus PA LCD Display (option M5)(1)	00644-4430-0001
Rosemount 644 HART Legacy display Kit (option M5)(1)	00644-4430-0001
Display with SST Meter Cover	
Rosemount 644 HART LCD Display (option M5)(1)	00644-7630-0021
Rosemount 644 HART LCD Display (option M5)(2)	00644-7630-0121
Rosemount 644 HART Local Operator Interface (option M4)(1)	00644-7630-1021
Rosemount 644 HART Local Operator Interface (option M4)(2)	00644-7630-1121
Rosemount 644 FOUNDATION Fieldbus LCD Display (option M5)(1)	00644-4430-0011
Rosemount 644 Profibus PA LCD Display (option M5)(1)	00644-4430-0011
Rosemount 644 HART Legacy display Kit (option M5)(1)	00644-4430-0011

(1) Covers provided are compatible with the 3-in (76 mm) Universal Junction Box and Rosemount Connection Head enclosure styles.

(2) Cover provided is compatible with the 3.5-in (89 mm) Universal Junction Box enclosure style.

Table 5. Transient Protection Spares

Description	Part Number
Transient Protector without Enclosure	00644-4437-0001
Transient Protector with Universal Head, Aluminum, Standard cover, 3-conduit - M20	00644-4438-0001
Transient Protector with Universal Head, Aluminum, Display cover, 3-conduit - M20	00644-4438-0101
Transient Protector with Universal Head, Aluminum, Standard cover, 3-conduit - $^1/_2$ NPT	00644-4438-0002
Transient Protector with Universal Head, Aluminum, Display cover, 3-conduit - $^1/_2$ NPT	00644-4438-0102
Transient Protector with Universal Head, SST, Standard cover, 3-conduit - M20	00644-4438-0003
Transient Protector with Universal Head, SST, Display cover, 3-conduit - M20	00644-4438-0103
Transient Protector with Universal Head, SST, Standard cover, 3-conduit - $^1/_2$ NPT	00644-4438-0004
Transient Protector with Universal Head, SST, Display cover, 3-conduit - $^1/_2$ NPT	00644-4438-0104

Table 6. Miscellaneous Accessories

Description	Part Number
Ground Screw Assembly Kit	00644-4431-0001
Mounting Screws and Springs	00644-4424-0001
Hardware Kit for mounting a Rosemount 644 Head mount to a DIN rail (includes clips for symmetrical and asymmetrical rails)	00644-5301-0010
U-Bolt mounting Kit for Universal Housing	00644-4423-0001
Universal Clip for Rail or Wall Mount	03044-4103-0001
24 Inches of Symmetric (Top Hat) Rail	03044-4200-0001
24 Inches of Asymmetric (G) Rail	03044-4201-0001
Ground Clamp for symmetric or asymmetric rail	03044-4202-0001
Snap Rings Kit (used for assembly to a DIN sensor)	00644-4432-0001
Cover Clamp Assembly	00644-4434-0001
Terminal Block, 13mm M4 Mounting Screws	00065-0305-0001
U-bolt Mounting Bracket, 2-in pipe mount, 2g vibration rating with SST enclosure - 316 SST (option B4)	00644-7610-0001
L - Mounting Bracket for 2-inch pipe or panel mounting, SST, 2g vibration rating (option B5)	00644-7611-0001

Specifications

HART, FOUNDATION Fieldbus, and Profibus PA

Functional Specifications

Inputs

User-selectable; sensor terminals rated to 42.4 Vdc. See "Accuracy" on page 17 for sensor options.

Output

Single 2-wire device with either 4–20 mA/HART, linear with temperature or input; or completely digital outputs with FOUNDATION fieldbus communication (ITK 5.01 compliant), or PROFIBUS PA (compliant with profile 3.02).

Isolation

Input/output isolation tested to 600 Vrms.

Local Display Options

LCD Display

An optional 11 digit, 2 line integral LCD display operates with a floating or fixed decimal point. It displays engineering units (°F, °C, °R, K, Ohms and mV), mA, and percent of range. The display can be configured to alternate between selected display options. Display settings are pre-configured at the factory according to the standard transmitter configuration. They can be re-configured in the field using either HART, FOUNDATION fieldbus, or Profibus PA communications.

LCD Display with Local Operator Interface

An optional 14 digit, 2 line integral LCD display operates with a floating or fixed decimal point. The LOI includes all features and functionality available in the regular display with an added 2-button configuration capability directly at the display interface. The LOI also has optional Password Protection for secure operations. The LOI is only available on the 644 HART Head mount product.

For more information on the LOI configuration options or further functionality that the LOI offers, see Appendix D: Local Operator Interface (LOI) in the Rosemount 644 Temperature Transmitter Product Manual (00809-0200-4728), available on Rosemount.com.

Humidity Limits

0–95% relative humidity

Update Time

≤ 0.5 sec. Per Sensor

Accuracy (default configuration) PT 100

HART Standard: ±0.15 °C
HART Enhanced: ±0.1 °C
FOUNDATION fieldbus: ±0.15 °C
Profibus PA: ±0.15 °C

Physical Specifications

Electrical Connections

Model	Power and Sensor Terminals
644 Head (HART)	Captivated screw terminals permanently fixed to terminal block
644 Head (FF/Profibus)	Compression screw terminals permanently fixed to the terminal block
644 Rail (HART)	Compression screw permanently fixed to front panel

Field Communicator Connections

Communication Terminals	
644 Head	Clips permanently fixed to terminal block
644 Rail	Clips permanently fixed to front panel

Materials of Construction

Electronics Housing and Terminal Block	
644 Head mount	*Noryl*® glass reinforced
644 Rail mount	*Lexan*® polycarbonate
Enclosure (Options J1, J2, J5, J6, R1, and R2)	
Housing	Low-copper aluminum
Paint	Polyurethane
Cover O-ring	Buna-N

Materials of Construction (Stainless Steel Housing for Biotechnology, Pharmaceutical Industries, and Sanitary Applications)

Housing and Standard Meter Cover

- 316 SST

Cover O-Ring

- Buna-N

Mounting

The 644R attaches directly to a wall or a DIN rail. The 644H installs in a connection head or universal head mounted directly on a sensor assembly, apart from a sensor assembly using a universal head, or to a DIN rail using an optional mounting clip.

Special Mounting Considerations

See "Mounting Kits for 644H" on page 31 for the special hardware that is available to:

- Mount a 644H to a DIN rail. (see Table 3 on page 10)
- Retrofit a new 644H to replace an existing 644H transmitter in an existing threaded sensor connection head. (see Table 3 on page 10)

Weight

Code	Options	Weight
644H	HART, Head Mount Transmitter	95 g (3.39 oz)
644H	FOUNDATION fieldbus, Head Mount Transmitter	92 g (3.25 oz)
644H	Profibus PA Head Mount Transmitter	92 g (3.25 oz)
644R	HART, Rail Mount Transmitter	174 g (6.14 oz)
M5	LCD Display	35 g (1.34 oz)
M4	LCD Display with Local Operator Interface	35g (1.34 oz)
J1, J2	Universal Head, 3-conduits, Standard Cover	200 g (7.05 oz)
J1, J2	Universal head, 3-conduits, Meter Cover	307 g (10.83 oz)
J3, J4	Cast SST Universal head, 3-conduits, Standard Cover	2016 g (71.11 oz)
J3, J4	Cast SST Universal head, 3-conduits, Meter Cover	2122 g (74.85 oz)
J5, J6	Aluminum 2-conduits, Universal Head, Standard Cover	577 g (20.35 oz)
J5, J6	Aluminum 2-conduits, Universal Head, Meter Cover	667 g (23.53 oz)
J7, J8	Cast SST Universal Head 2-conduits, Standard, Cover	1620 g (57.14 oz)
J7, J8	Cast SST Universal Head 2-conduits, Meter Cover	1730 g (61.02 oz)
R1, R2	Aluminum Connection Head, Standard Cover	523 g (18.45 oz)
R1, R2	Aluminum Connection Head, Meter Cover	618 g (21.79 oz)
R3, R4	Cast SST Connection Head, Standard Cover	1615 g (56.97 oz)
R3, R4	Cast SST Connection Head, Meter Cover	1747 g (61.62 oz)

Weight (Stainless Steel Housing for Biotechnology, Pharmaceutical Industries, and Sanitary Applications)

Option Code	Standard Cover	Meter Cover
S1	840 g (27 oz)	995 g (32 oz)
S2	840 g (27 oz)	995 g (32 oz)
S3	840 g (27 oz)	995 g (32 oz)
S4	840 g (27 oz)	995 g (32 oz)

Enclosure Ratings (644H)

All available enclosures are Type 4X, IP66, and IP68.

Sanitary Housing Surface

Surface finish is polished to 32 RMA. Laser etched product marking on housing and standard covers.

Performance Specifications

EMC (ElectroMagnetic Compatibility) NAMUR NE 21 Standard

The 644H HART meets the requirements for NAMUR NE 21 Rating.

Susceptibility	Parameter	Influence
		HART
ESD	■ 6 kV contact discharge ■ 8 kV air discharge	None
Radiated	■ 80 – 1000 MHz at 10 V/m AM	< 1.0%
Burst	■ 1 kV for I.O.	None
Surge	■ 0.5 kV line–line ■ 1 kV line–ground (I.O. tool)	None
Conducted	■ 10 kHz to 80 MHz at 10 V	< 1.0%

CE Electromagnetic Compatibility Compliance Testing

The 644 is compliant with Directive 2004/108/EC. Meets the criteria under IEC 61326:2006, IEC 61326-2-3:2006

Power Supply Effect

Less than ±0.005% of span per volt

Stability

RTDs and thermocouples have a stability of ±0.15% of output reading or 0.15 °C (whichever is greater) for 24 months

When ordered with the P8 option code:

- RTDs: ±0.25% of reading or 0.25 °C, whichever is greater, for 5 years
- Thermocouples: ±0.5% of reading or 0.5 °C, whichever is greater, for 5 years

Self Calibration

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

Vibration Effect

The 644 HART is tested to the following specifications with no effect on performance per IEC 60770-1, 2010:

Frequency	Vibration
10 to 60 Hz	0.35 mm displacement
60 to 1000 Hz	5 g (50 m/s^2) peak acceleration

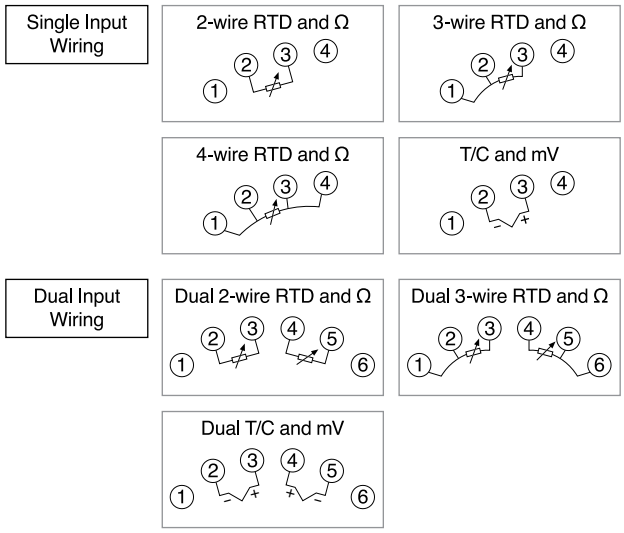
The 644 Fieldbus and Profibus are tested to the following specifications with no effect on performance per IEC 60770-1: 1999

Frequency	Vibration
10 to 60 Hz	0.21 mm displacement
60 to 2000 Hz	3 g peak acceleration

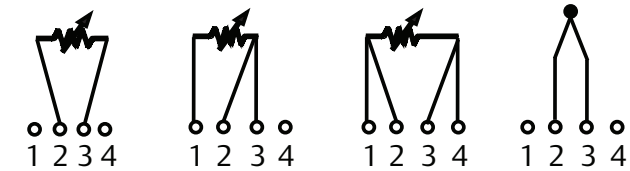
Rosemount 644 Sensor Connections Diagrams

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

HART head mount



- HART rail mount
- Fieldbus
- Profibus



FOUNDATION Fieldbus Specifications

Function Blocks

Resource Block

- The resource block contains physical transmitter information including available memory, manufacture identification, device type, software tag, and unique identification.

Transducer Block

- The transducer block contains the actual temperature measurement data, including sensor 1 and terminal temperature. It includes information about sensor type and configuration, engineering units, linearization, reranging, damping, temperature correction, and diagnostics.

LCD Block

- The LCD block is used to configure the local display, if an LCD Display is being used.

Analog Input (AI)

- Processes the measurement and makes it available on the fieldbus segment
- Allows filtering, alarming, and engineering unit changes.

PID Block

- The transmitter provides control functionality with one PID function block in the transmitter. The PID block can be used to perform single loop, cascade, or feedforward control in the field.

Block	Execution Time (milliseconds)
Resource	–
Transducer	–
LCD Block	–
Analog Input 1	45
Analog Input 2	45
PID 1	60

Turn-on Time

Performance within specifications in less than 20 seconds after power is applied, when damping value is set to 0 seconds.

Status

If self-diagnostics detect a sensor burnout or a transmitter failure, the status of the measurement will be updated accordingly. Status may also send the AI output to a safe value.

Power Supply

Powered over FOUNDATION fieldbus with standard fieldbus power supplies. The transmitter operates between 9.0 and 32.0 Vdc, 12 mA maximum.

Alarms

The AI function block allows the user to configure the alarms to HI-HI, HI, LO, or LO-LO with hysteresis settings.

Backup Link Active Scheduler (LAS)

The transmitter is classified as a device link master, which means it can function as a Link Active Scheduler (LAS) if the current link master device fails or is removed from the segment.
The host or other configuration tool is used to download the schedule for the application to the link master device. In the absence of a primary link master, the transmitter will claim the LAS and provide permanent control for the H1 segment.

FOUNDATION fieldbus Parameters

Schedule Entries	25
Links	16
Virtual Communications Relationships (VCR)	12

Profibus PA Specifications

Function Blocks

Physical Block

- The Physical Block contains physical transmitter information including manufacturer identification, device type, software tag, and unique identification.

Transducer Block

- The Transducer Block contains the actual temperature measurement data, including sensor 1 and terminal temperature. It includes information about sensor type and configuration, engineering units, linearization, re-ranging, damping, temperature correction, and diagnostics.

Analog Input Block (AI)

- The Analog Input Block processes the measurement and makes it available on the Profibus segment. Allows filtering, alarming, and engineering unit changes.

Turn on time:

Performance within specifications in less than 20 seconds after power is applied, when damping value is set to 0 seconds.

Power Supply:

Powered over Profibus with standard fieldbus power supplies. The transmitter operates between 9.0 and 32.0 Vdc,12 mA maximum.

Alarms

The AI function block allows the user to configure the alarms to HI-HI, HI, LO, or LO-LO with hysteresis settings.

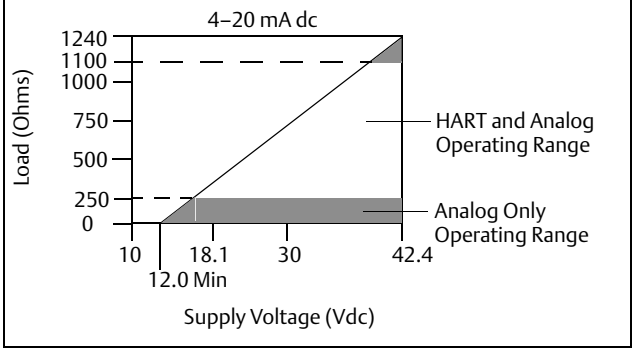
4–20 mA / HART Specifications

Power Supply

External power supply required. Transmitters operate on 12.0 to 42.4 Vdc transmitter terminal voltage (with 250 ohm load, 18.1 Vdc power supply voltage is required). Transmitter power terminals rated to 42.4 Vdc.

Load Limitations

Maximum Load = 40.8 X (Supply Voltage - 12.0)(1)



(1) Without transient protection (optional).

NOTE
HART Communication requires a loop resistance between 250 and 1100 ohms. Do not communicate with the transmitter when power is below 12 Vdc at the transmitter terminals.

Temperature Limits

	Operating Limit	Storage Limit
With LCD(1)	–40 to 185 °F –40 to 85 °C	–50 to 185 °F –45 to 85 °C
Without LCD	–40 to 185 °F –40 to 85 °C	–60 to 248 °F –50 to 120 °C

(1) LCD may not be readable and display updates will be slower at temperatures below -22 °F (-30 °C).

Hardware and Software Failure Mode

The 644 features software driven alarm diagnostics and an independent circuit which is designed to provide backup alarm output if the microprocessor software fails. The alarm direction (HI/LO) is user-selectable using the failure mode switch. If failure occurs, the position of the switch determines the direction in which the output is driven (HI or LO). The switch feeds into the digital-to-analog (D/A) converter, which drives the proper alarm output even if the microprocessor fails. The values at which the transmitter software drives its output in failure mode depends on whether it is configured to standard, custom, or NAMUR-compliant (NAMUR recommendation NE 43, June 1997) operation. Table 7 shows the configuration alarm ranges.

Table 7. Available Alarm Range(1)

	Standard	NAMUR- NE 43 Compliant
Linear Output:	$3.9 \leq I^{(2)} \leq 20.5$	$3.8 \leq I \leq 20.5$
Fail High:	$21.75 \leq I \leq 23$	$21.5 \leq I \leq 23$
Fail Low:	$3.5 \leq I \leq 3.75$	$3.5 \leq I \leq 3.6$

(1) Measured in mA.

(2) I = Process Variable (current output).

Custom Alarm and Saturation Level

Custom factory configuration of alarm and saturation level is available with option code C1 for valid values. These values can also be configured in the field using a Field Communicator.

Turn-on Time

Performance within specifications in less than 5.0 seconds after power is applied, when damping value is set to 0 seconds.

External Transient Protection

The Rosemount 470 Transient Protector prevents damage from transients induced by lightning, welding, or heavy electrical equipment. For more information, refer to the Rosemount 470 Transient Protector Product Data Sheet (document number 00813-0100-4191).

Transient Protection (option code T1)

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 external ground lug assembly (code G1) is included with the Transient Protector. The transient protector has been tested per the following standard:

- IEEE C62.41-1991 (IEEE 587)/ Location Categories B3. 6kV/3kA peak (1.2 50 Ωs Wave 8 20 Ωs Combination Wave) 6kV/0.5kA peak (100 kHz Ring Wave) EFT, 4kVpeak, 2.5kHz, 5*50nS
- Loop resistance added by protector: 22 ohms max.
- Nominal clamping voltages: 90 V (common mode), 77 V (normal mode)

Accuracy

Table 8. Rosemount 644 Transmitter Accuracy.

Sensor Options	Sensor Reference	Input Ranges		Recommended Min. Span[1]		Digital Accuracy[2]		D/A Accuracy[3]
2-, 3-, 4-wire RTDs		°C	°F	°C	°F	°C	°F	
Pt 100 (α = 0.00385)	IEC 751	–200 to 850	–328 to 1562	10	18	± 0.15	± 0.27	±0.03% of span
Pt 200 (α = 0.00385)	IEC 751	–200 to 850	–328 to 1562	10	18	± 0.15	± 0.27	±0.03% of span
Pt 500 (α = 0.00385)	IEC 751	–200 to 850	–328 to 1562	10	18	± 0.19	± 0.34	±0.03% of span
Pt 1000 (α = 0.00385)	IEC 751	–200 to 300	–328 to 572	10	18	± 0.19	± 0.34	±0.03% of span
Pt 100 (α = 0.003916)	JIS 1604	–200 to 645	–328 to 1193	10	18	± 0.15	± 0.27	±0.03% of span
Pt 200 (α = 0.003916)	JIS 1604	–200 to 645	–328 to 1193	10	18	± 0.27	± 0.49	±0.03% of span
Ni 120	Edison Curve No. 7	–70 to 300	–94 to 572	10	18	± 0.15	± 0.27	±0.03% of span
Cu 10	Edison Copper Winding No. 15	–50 to 250	–58 to 482	10	18	±1.40	± 2.52	±0.03% of span
Pt 50 (α = 0.00391)	GOST 6651-94	–200 to 550	–328 to 1022	10	18	± 0.30	± 0.54	±0.03% of span
Pt 100 (α = 0.00391)	GOST 6651-94	–200 to 550	–328 to 1022	10	18	± 0.15	± 0.27	±0.03% of span
Cu 50 (α = 0.00426)	GOST 6651-94	–50 to 200	–58 to 392	10	18	±1.34	± 2.41	±0.03% of span
Cu 50 (α = 0.00428)	GOST 6651-94	–185 to 200	–301 to 392	10	18	±1.34	± 2.41	±0.03% of span
Cu 100 (α = 0.00426)	GOST 6651-94	–50 to 200	–58 to 392	10	18	±0.67	± 1.20	±0.03% of span
Cu 100 (α = 0.00428)	GOST 6651-94	–185 to 200	–301 to 392	10	18	±0.67	± 1.20	±0.03% of span
Thermocouples[4]								
Type B[5]	NIST Monograph 175, IEC 584	100 to 1820	212 to 3308	25	45	± 0.77	± 1.39	±0.03% of span
Type E	NIST Monograph 175, IEC 584	–200 to 1000	–328 to 1832	25	45	± 0.20	± 0.36	±0.03% of span
Type J	NIST Monograph 175, IEC 584	–180 to 760	–292 to 1400	25	45	± 0.35	± 0.63	±0.03% of span
Type K[6]	NIST Monograph 175, IEC 584	–180 to 1372	–292 to 2501	25	45	± 0.50	± 0.90	±0.03% of span
Type N	NIST Monograph 175, IEC 584	–200 to 1300	–328 to 2372	25	45	± 0.50	± 0.90	±0.03% of span
Type R	NIST Monograph 175, IEC 584	0 to 1768	32 to 3214	25	45	± 0.75	± 1.35	±0.03% of span
Type S	NIST Monograph 175, IEC 584	0 to 1768	32 to 3214	25	45	± 0.70	± 1.26	±0.03% of span
Type T	NIST Monograph 175, IEC 584	–200 to 400	–328 to 752	25	45	± 0.35	± 0.63	±0.03% of span
DIN Type L	DIN 43710	–200 to 900	–328 to 1652	25	45	± 0.35	± 0.63	±0.03% of span
DIN Type U	DIN 43710	–200 to –600	–328 to 1112	25	45	± 0.35	± 0.63	±0.03% of span
Type W5Re/W26Re	ASTM E 988-96	0 to 2000	32 to 3632	25	45	± 0.70	± 1.26	±0.03% of span
GOST Type L	GOST R 8.585-2001	–200 to 800	–328 to 1472	25	45	± 1.00	± 1.26	±0.03% of span
Other Input Types								
Millivolt Input		–10 to 100 mV				±0.015 mV		±0.03% of span
2-, 3-, 4-wire Ohm Input		0 to 2000 ohms				±0.45 ohm		±0.03% of span

(1) No minimum or maximum span restrictions within the input ranges. Recommended minimum span will hold noise within accuracy specification with damping at zero seconds.

(2) The published digital accuracy applies over the entire sensor input range. Digital output can be accessed by HART or FOUNDATION fieldbus Communications or Rosemount control system.

(3) Total Analog accuracy is the sum of digital and D/A accuracies. This is not applicable for FOUNDATION fieldbus.

(4) Total digital accuracy for thermocouple measurement: sum of digital accuracy +0.5 °C. (cold junction accuracy).

(5) Digital accuracy for NIST Type B T/C is ±3.0 °C (±5.4 °F) from 100 to 300 °C (212 to 572 °F).

(6) Digital accuracy for NIST Type K T/C is ±0.70 °C (±1.26 °F) from –180 to –90 °C (–292 to –130 °F).

Accuracy Example (HART devices)

When using a Pt 100 (α = 0.00385) sensor input with a 0 to 100 °C span:

- Digital accuracy = ±0.15 °C
- D/A accuracy = ±0.03% of 100 °C or ±0.03 °C
- Total accuracy = ±0.18 °C.

Accuracy Example (FOUNDATION fieldbus and Profibus PA devices)

When using a Pt 100 (α = 0.00385) sensor input:

- Total accuracy = ±0.15 °C.
- No D/A accuracy effects apply

Ambient Temperature Effect

Table 9. Ambient Temperature Effect

Sensor Options	Sensor Reference	Input Range (°C)	Temperature Effects per 1.0 °C (1.8 °F) Change in Ambient Temperature[1]	Range	D/A Effect[2]
2-, 3-, 4-wire RTDs					
Pt 100 (α = 0.00385)	IEC 751	-200 to 850	0.003 °C (0.0054 °F)	Entire Sensor Input Range	0.001% of span
Pt 200 (α = 0.00385)	IEC 751	-200 to 850	0.004 °C (0.0072 °F)	Entire Sensor Input Range	0.001% of span
Pt 500 (α = 0.00385)	IEC 751	-200 to 850	0.003 °C (0.0054 °F)	Entire Sensor Input Range	0.001% of span
Pt 1000 (α = 0.00385)	IEC 751	-200 to 300	0.003 °C (0.0054 °F)	Entire Sensor Input Range	0.001% of span
Pt 100 (α = 0.003916)	JIS 1604	-200 to 645	0.003 °C (0.0054 °F)	Entire Sensor Input Range	0.001% of span
Pt 200 (α = 0.003916)	JIS 1604	-200 to 645	0.004 °C (0.0072 °F)	Entire Sensor Input Range	0.001% of span
Ni 120	Edison Curve No. 7	-70 to 300	0.003 °C (0.0054 °F)	Entire Sensor Input Range	0.001% of span
Cu 10	Edison Copper Winding No. 15	-50 to 250	0.03 °C (0.054 °F)	Entire Sensor Input Range	0.001% of span
Pt 50 (α = 0.00391)	GOST 6651-94	-200 to 550	0.004 °C (0.0072 °F)	Entire Sensor Input Range	0.001% of span
Pt 100 (α = 0.00391)	GOST 6651-94	-200 to 550	0.003 °C (0.0054 °F)	Entire Sensor Input Range	0.001% of span
Cu 50 (α = 0.00426)	GOST 6651-94	-50 to 200	0.008 °C (0.0144 °F)	Entire Sensor Input Range	0.001% of span
Cu 50 (α = 0.00428)	GOST 6651-94	-185 to 200	0.008 °C (0.0144 °F)	Entire Sensor Input Range	0.001% of span
Cu 100 (α = 0.00426)	GOST 6651-94	-50 to 200	0.004 °C (0.0072 °F)	Entire Sensor Input Range	0.001% of span
Cu 100 (α = 0.00428)	GOST 6651-94	-185 to 200	0.004 °C (0.0072 °F)	Entire Sensor Input Range	0.001% of span
Thermocouples					
Type B	NIST Monograph 175, IEC 584	100 to 1820	0.014 °C	T ≥ 1000 °C	0.001% of span
			0.032 °C – (0.0025% of (T – 300))	300 °C ≤ T < 1000 °C	0.001% of span
			0.054 °C – (0.011% of (T – 100))	100 °C ≤ T < 300 °C	0.001% of span
Type E	NIST Monograph 175, IEC 584	-200 to 1000	0.005 °C + (0.0043% of T)	All	0.001% of span
Type J	NIST Monograph 175, IEC 584	-180 to 760	0.0054 °C + (0.00029%of T)	T ≥ 0 °C	0.001% of span
			0.0054 °C + (0.0025% of absolute value T)	T < 0 °C	0.001% of span
Type K	NIST Monograph 175, IEC 584	-180 to 1372	0.0061 °C + (0.0054% of T)	T ≥ 0 °C	0.001% of span
			0.0061 °C + (0.0025% of absolute value T)	T < 0 °C	0.001% of span
Type N	NIST Monograph 175, IEC 584	-200 to 1300	0.0068 °C + (0.00036% of T)	All	0.001% of span
Type R	NIST Monograph 175, IEC 584	0 to 1768	0.016 °C	T ≥ 200 °C	0.001% of span
			0.023 °C – (0.0036% of T)	T < 200 °C	0.001% of span
Type S	NIST Monograph 175, IEC 584	0 to 1768	0.016 °C	T ≥ 200 °C	0.001% of span
			0.023 °C – (0.0036% of T)	T < 200 °C	0.001% of span
Type T	NIST Monograph 175, IEC 584	-200 to 400	0.0064 °C	T ≥ 0 °C	0.001% of span
			0.0064 °C +(0.0043% of absolute value T)	T < 0 °C	0.001% of span
DIN Type L	DIN 43710	-200 to 900	0.0054 °C + (0.00029% of T)	T ≥ 0 °C	0.001% of span
			0.0054 °C + (0.0025% of absolute value T)	T < 0 °C	0.001% of span
DIN Type U	DIN 43710	-200 to 600	0.0064 °C	T ≥ 0 °C	0.001% of span
			0.0064 °C + (0.0043% of absolute value T)	T < 0 °C	0.001% of span
Type W5Re/W26Re	ASTM E 988-96	0 to 2000	0.016 °C	T ≥ 200 °C	0.001% of span
			0.023 °C – (0.0036% of T)	T < 200 °C	0.001% of span

Table 9. Ambient Temperature Effect

Sensor Options	Sensor Reference	Input Range (°C)	Temperature Effects per 1.0 °C (1.8 °F) Change in Ambient Temperature(1)	Range	D/A Effect(2)
GOST Type L	GOST R 8.585-2001	-200 to 800	0.007 °C	T ≥ 0 °C	0.001% of span
			0.007 °C – (0.003% of absolute value T)	T < 0 °C	0.001% of span
Other Input Types					
Millivolt Input		-10 to 100 mV	0.0005 mV	Entire Sensor Input Range	0.001% of span
2-, 3-, 4-wire Ohm		0 to 2000 Ω	0.0084 Ω	Entire Sensor Input Range	0.001% of span

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

(2) Does not apply to FOUNDATION fieldbus.

Temperature Effects Example (HART devices)

When using a Pt 100 (α = 0.00385) sensor input with a 0–100 °C span at 30 °C ambient temperature:

- Digital Temperature Effects: 0.003 °C x (30 - 20) = 0.03 °C
- D/A Effects: [0.001% of 100] x (30 - 20) = 0.01 °C
- Worst Case Error: Digital + D/A + Digital Temperature Effects + D/A Effects = 0.15 °C + 0.03 °C + 0.03 °C + 0.01 °C = 0.22 °C
- Total Probable Error: $\sqrt{0.15^2 + 0.03^2 + 0.03^2 + 0.01^2} = 0.16°C$

Temperature Effects Examples (FOUNDATION fieldbus devices and Profibus PA)

When using a Pt 100 (α = 0.00385) sensor input at 30 °C span at 30 °C ambient temperature:

- Digital Temperature Effects: 0.003 °C x (30 - 20) = 0.03 °C
- D/A Effects: No D/A effects apply
- Worst Case Error: Digital + Digital Temperature Effects = 0.15 °C + 0.03 °C = 0.18 °C
- Total Probable Error: $\sqrt{0.15^2 + 0.03^2} = 0.153°C$

Table 10. Transmitter Accuracy when ordered with option code P8

Sensor Options	Sensor Reference	Input Ranges		Minimum Span[1]		Digital Accuracy[2]		D/A Accuracy[3][4]
2-, 3-, 4-wire RTDs		°C	°F	°C	°F	°C	°F	
Pt 100 (α = 0.00385)	IEC 751	–200 to 850	–328 to 1562	10	18	± 0.10	± 0.18	±0.02% of span
Pt 200 (α = 0.00385)	IEC 751	–200 to 850	–328 to 1562	10	18	± 0.22	± 0.40	±0.02% of span
Pt 500 (α = 0.00385)	IEC 751	–200 to 850	–328 to 1562	10	18	± 0.14	± 0.25	±0.02% of span
Pt 1000 (α = 0.00385)	IEC 751	–200 to 300	–328 to 572	10	18	± 0.10	± 0.18	±0.02% of span
Pt 100 (α = 0.003916)	JIS 1604	–200 to 645	–328 to 1193	10	18	± 0.10	± 0.18	±0.02% of span
Pt 200 (α = 0.003916)	JIS 1604	–200 to 645	–328 to 1193	10	18	± 0.22	± 0.40	±0.02% of span
Ni 120	Edison Curve No. 7	–70 to 300	–94 to 572	10	18	± 0.08	± 0.14	±0.02% of span
Cu 10	Edison Copper Winding No. 15	–50 to 250	–58 to 482	10	18	±1.00	± 1.80	±0.02% of span
Pt 50 (α=0.00391)	GOST 6651-94	–200 to 550	–328 to 1022	10	18	±0.20	±0.36	±0.02% of span
Pt 100 (α=0.00391)	GOST 6651-94	–200 to 550	–328 to 1022	10	18	±0.10	±0.18	±0.02% of span
Cu 50 (α=0.00426)	GOST 6651-94	–50 to 200	–58 to 392	10	18	±0.34	±0.61	±0.02% of span
Cu 50 (α=0.00428)	GOST 6651-94	–185 to 200	–301 to 392	10	18	±0.34	±0.61	±0.02% of span
Cu 100 (α=0.00426)	GOST 6651-94	–50 to 200	–58 to 392	10	18	±0.17	±0.31	±0.02% of span
Cu 100 (α=0.00428)	GOST 6651-94	–185 to 200	–301 to 392	10	18	±0.17	±0.31	±0.02% of span
Thermocouples[5]								
Type B[6]	NIST Monograph 175, IEC 584	100 to 1820	212 to 3308	25	45	± 0.75	± 1.35	±0.02% of span
Type E	NIST Monograph 175, IEC 584	–200 to 1000	–328 to 1832	25	45	± 0.20	± 0.36	±0.02% of span
Type J	NIST Monograph 175, IEC 584	–180 to 760	–292 to 1400	25	45	± 0.25	± 0.45	±0.02% of span
Type K[7]	NIST Monograph 175, IEC 584	–180 to 1372	–292 to 2501	25	45	± 0.25	± 0.45	±0.02% of span
Type N	NIST Monograph 175, IEC 584	–200 to 1300	–328 to 2372	25	45	± 0.40	± 0.72	±0.02% of span
Type R	NIST Monograph 175, IEC 584	0 to 1768	32 to 3214	25	45	± 0.60	± 1.08	±0.02% of span
Type S	NIST Monograph 175, IEC 584	0 to 1768	32 to 3214	25	45	± 0.50	± 0.90	±0.02% of span
Type T	NIST Monograph 175, IEC 584	–200 to 400	–328 to 752	25	45	± 0.25	± 0.45	±0.02% of span
DIN Type L	DIN 43710	–200 to 900	–328 to 1652	25	45	± 0.35	± 0.63	±0.02% of span
DIN Type U	DIN 43710	–200 to 600	–328 to 1112	25	45	± 0.35	± 0.63	±0.02% of span
Type W5Re/W26Re	ASTM E 988-96	0 to 2000	32 to 3632	25	45	± 0.70	± 1.26	±0.02% of span
GOST Type L	GOST R 8.585-2001	–200 to 800	–392 to 1472	25	45	± 0.25	± 0.45	±0.02% of span
Other Input Types								
Millivolt Input		–10 to 100 mV		3 mV		±0.015 mV		±0.02% of span
2-, 3-, 4-wire Ohm Input		0 to 2000 ohms		20 ohm		±0.35 ohm		±0.02% of span

(1) No minimum or maximum span restrictions within the input ranges. Recommended minimum span will hold noise within accuracy specification with damping at zero seconds.

(2) Digital accuracy: Digital output can be accessed by the Field Communicator.

(3) Total Analog accuracy is the sum of digital and D/A accuracies.

(4) Applies to HART / 4-20 mA devices.

(5) Total digital accuracy for thermocouple measurement: sum of digital accuracy +0.25 °C (0.45 °F) (cold junction accuracy).

(6) Digital accuracy for NIST Type B is ±3.0 °C (±5.4 °F) from 100 to 300 °C (212 to 572 °F).

(7) Digital accuracy for NIST Type K is ±0.50 °C (±0.9 °F) from –180 to –90 °C (–292 to –130 °F).

Reference Accuracy Example (HART only)

When using a Pt 100 (α = 0.00385) sensor input with a 0 to 100 °C span: Digital Accuracy would be ±0.10 °C, D/A accuracy would be ±0.02% of 100 °C or ±0.02 °C, Total = ±0.12 °C.

Differential Capability Exists Between Any Two Sensor Types (dual-sensor option)

For all differential configurations, the input range is X to Y where:

- X = Sensor 1 minimum – Sensor 2 maximum *and*
- Y = Sensor 1 maximum – Sensor 2 minimum.

Product Certifications

Rosemount 644 with HART

European Directive Information

The EC declaration of conformity can be found in the Rosemount 644 Temperature Transmitter Quick Installation Guide. The most recent revision can be found at www.emersonprocess.com.

Ordinary Location Certification from FM Approvals

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

Hazardous Locations Certifications

North American Certifications

FM Approvals

I5 Intrinsically Safe and Non-Incendive
Certificate No: 3044581
Applicable Standards: Class 3600:2011, Class 3610:2010, Class 3611:2004, Class 3810:2005, ANSI/NEMA 250:2003, ANSI/IEC 60529:2004, ANSI/ISA 60079-0:2009, ANSI/ISA 60079-11:2009

Markings (without enclosure):
INT. SAFE CL I, GP ABCD, T6...T4
IS CL I Zone 0, AEx ia IIC; T6...T4 Ga
NI CL I, DIV.2, GP ABCD, T5
INSTALL PER DRAWINGS 00644-2071

Markings (with enclosure):
IS CL I,II,III, GP ABCDEFG
NI CL I, DIV.2, GP ABCD T5
INSTALL PER DRAWINGS 00644-2071
ENCLOSURE TYPE 4X, IP66/68

E5 Explosion-Proof and Dust Ignition Proof
Certificate No: 3006278
Applicable Standards: Class 3600:2011, Class 3611:2004, Class 3615:2006, Class 3616:2011, Class 3810:2005, ANSI/NEMA 250:2003, ANSI/IEC60529:2004

Markings:EXPLOSIONPROOF FOR CL. I, DIV. 1, GP BCD
DUST-IGNITIONPROOF FOR CL. II & III, DIV. 1, GP EFG
NON-INCENDIVE FOR CL. I, DIV 2, GP ABCD
WHEN INSTALLED PER ROSEMOUNT DRAWING 00644-1049
CONDUIT SEAL NOT REQUIRED;
ENCLOSURE TYPE 4X, IP66

CSA International

I6 Intrinsically Safe
Certificate No.: 1091070
Applicable Standards: CSA Std. C22.2 No. 142 – M1987, CSA Std. C22.2 No. 157 – 92

Markings (without enclosure):
Ex ia
INTRINSICALLY SAFE, CLASS I, GROUPS A, B, C, D, T4/T5/T6
CLASS I, ZONE 0, IIC
SUITABLE FOR CLASS I DIV 2, GROUPS A, B, C, D
INSTALL PER DRAWING 00644-2072.

Markings (with enclosure):
Ex ia
CLASS I, GRPS A,B,C,D, T4/T6, CLASS I, ZONE 0, IIC
WHEN INSTALL PER DRAWING 00644-1064 or 0644-2072
SUITABLE CLASS I DIV 2, WITH NON-INCENDIVE OUTPUT WHEN
INSTALL PER DRAWING 00644-2072
ENCLOSURE TYPE 4X

K6 Explosion-Proof, Dust Ignition Proof, Intrinsically Safe and Suitable for Class I Division 2
Certificate No.: 1143113
Applicable Standards: CSA Std. C22.2 No. 142 – M1987, CSA Std. C22.2 No. 30 – M1986, CSA Std. C22.2 No. 213 – M1987, ANSI/ISA 12.27.02-2003

Markings:CL I, GP B, C, D; CL I, Zone 1, GP IIB+H2;
CL II, GP E, F, G; CL. III;
SUITABLE FOR CL I, DIV. 2, GP A, B,C, D; OR CL I, ZONE 2, GP IIC;
INSTALL PER DRAWING 00644-1059
ENCLOSURE TYPE 4X IP66/68; SEAL NOT REQUIRED,

Ex ia, CL I, GP A, B, C, D, T4/T6; CL I, ZONE 0, IIC; WHEN INSTALLED PER DRAWING 00644-1064 or 00644-2072.
SUITABLE FOR CL I DIV 2, WITH NONINCENDIVE OUTPUT WHEN INSTALLED PER DRAWING 00644-2072.

European Certifications

I1 ATEX Intrinsic Safety
Certificate No.: Baseefa 12ATEX0101X
Applicable Standards: IEC 60079-0: 2011, EN60079-11: 2012
Markings: Category II 1 G, Ex ia IIC T6...T4 Ga;
See Certificate (Table 11 on page 24)
CE 1180

Special Conditions for Safe Use (X)
The apparatus must be installed in an enclosure which affords a degree of protection of at least IP20.

Non-metallic enclosures must have a surface resistance of less than 1GΩ.
Light alloy or zirconium enclosures must be protected from impact and friction when installed.

Table 11. Input Parameters

Loop	
U_i = 30 V	
I_i = 150 mA	Ta < 60°
= 170 mA	Ta < 70°
= 190 mA	Ta < 80°
Pi = 0.67 W	T6 (-60 °C ≤ Ta ≤ 40 °C), T5 (-60 °C ≤ Ta ≤ 50 °C)
= 0.8 W	T5 (-60 °C ≤ Ta ≤ 40 °C), T4 (-60 °C ≤ Ta ≤ 80 °C)
Ci = 3 nF	
Li = 0	
Sensor	
U_o = 13.6 V	
I_o = 80 mA	
P_o = 80 mW	
C_i = 0.075 µF	C_o = 0.73 µF Group IIC
	C_o= 5.12 µF Group IIB
	C_o = 18.52 µF Group IIA
L_i = 0	L_o = 5.8 mH Group IIC
	L_o = 23.36 mH Group IIB
	L_o= 48.06 mH Group IIA

N1 ATEX Type n (with enclosure)
Certification No.: BAS 00ATEX3145
Applicable Standards: EN 60079-0: 2006, EN60079-15: 2005
Markings: Category II 3 G, Ex nL IIC T5 (-40 °C ≤ Ta ≤ 70 °C)

Specific Conditions for Safe Use (X):
1. The apparatus is not capable of withstanding the 500 V insulation test required by Clause 6.8.1 of EN 60079-15:2005. This must be taken into account when installing the apparatus.

NC ATEX Type n (without enclosure)
Certificate No.: Baseefa12ATEX0102U
Applicable Standards: EN 60079-0: 2011, EN60079-15: 2010
Markings: Category II 3 G, Ex nA IIC T6...T5 Gc
Temperature Classification Limits – T6 (-60 °C ≤ Ta ≤ 40 °C), T5 (-60 °C ≤ Ta ≤ 85 °C)

Schedule of Limitations:
The component must be installed in a suitably certified enclosure such that it is afforded a degree of protection of at least IP54 in accordance with IEC 60529, IEC 60079-0 & IEC 60079-15

E1 ATEX Flameproof (Enclosures Types J5, J6, J7, J8, R1, R2, R3, R4)
Certification No.: KEMA 99ATEX8715X
Applicable Standards: EN60079-0: 2009, EN60079-1: 2007
Markings: Category II 2 G, Ex d IIC T6 (-50 °C ≤ Ta ≤ 65 °C)
CE 1180

Special Conditions for Safe Use (X):
For information on the dimensions of the flameproof joints the manufacture shall be contacted.

E1 ATEX Flameproof (Enclosures Types J1, J2, J3, J4)
Certification No.: FM12ATEX0065X
Applicable Standards: EN60079-0: 2006, EN60079-1: 2007
Markings: Category II 2 G, Ex d IIC T6 Gb (-50 °C ≤ Ta ≤ 60 °C)
CE 1180

Special Conditions for Safe Use (X):
Consult the manufacturer if dimensional information on the flameproof joints is necessary.

ND ATEX Dust (Enclosures Types J5, J6, J7, J8, R1, R2, R3, R4)
Certification No.: KEMA 99ATEX8715X
Applicable Standards: EN 61241-0:2006, EN 61241-1:2004
Markings: Category II 1 D, Ex tD A20 IP66 T95°C
CE 1180

Special Conditions for Safe Use (X): None

ND ATEX Dust (Enclosures Types J1, J2, J3, J4)
Certification No.: FM12ATEX0065X
Applicable Standards: EN 60079-0:2009, EN 60079-31:2009 and EN 60529:1991+A1:2000
Markings: Category II 1 D, Ex tb IIIC T95°C Db Tamb = -40 °C to +70 °C
CE 1180

Special Conditions for Safe Use (X): None

IECEx Certifications

I7 IECEX Intrinsic Safety
Certificate No.: IECEx BAS 12.0069X
Applicable Standards: IEC 60079-0: 2011, IEC 60079-11: 2007
Markings: Ex ia IIC T6...T4 Ga
See Certificate (Table 11)

Special Conditions for Safe Use (X)
The apparatus must be installed in an enclosure which affords a degree of protection of at least IP20.
Non-metallic enclosures must have a surface resistance of less than 1GΩ.
Light alloy or zirconium enclosures must be protected from impact and friction when installed.

N7 IECEX Type n (with enclosure)
Certification No.: IECEx BAS 07.0055
Applicable Standards: IEC 60079-0: 2004, EN60079-15: 2005
Markings: Ex nA IIC T5 Gc (-40 °C ≤ Ta ≤ 70 °C)

NG IECEX Type n (without enclosure)
Certificate No.: IECEx BAS 12.0070U
Applicable Standards: IEC 60079-0: 2011, IEC 60079-15: 2010
Markings: Ex nA IIC T6...T5 Gc

Temperature Classification Limits – T6 (-60 °C ≤ Ta ≤ 40 °C), T5 (-60 °C ≤ Ta ≤ 85 °C)

Schedule of Limitations:
The component must be installed in a suitably certified enclosure such that it is afforded a degree of protection of at least IP54 in accordance with IEC 60529, IEC 60079-0 & IEC 60079-15.

E7 IECEx Flameproof
Certification No.: IECEx KEM 09.0015X (Enclosures Types J5, J6, J7, J8, R1, R2, R3, R4)
Applicable Standards: IEC 60079-0: 2006, IEC 60079-1: 2007
Markings: Ex d IIC T6 Gb (-40 °C ≤ Ta ≤ 65 °C)

Special Conditions for Safe Use (X):
For information on the dimensions of the flameproof joints the manufacture shall be contacted.

IECEx Flameproof
Certification No.: IECEx FMG 12.0022X (Enclosures Types J1, J2, J3, J4)
Applicable Standards: IEC 60079-0: 2011, IEC 60079-1: 2007
Markings: Ex d IIC T6 Gb (-40 °C ≤ Ta ≤ 65 °C)

Special Conditions for Safe Use (X):
Consult the manufacturer if dimensional information on the flameproof joints is necessary.

NK IECEX Dust
Certification No.: IECEx KEM 09.0015X (Enclosures Types J5, J6, J7, J8, R1, R2, R3, R4)
Applicable Standards: EN 61241-0:2004, EN 61241-1:2004
Markings: Ex tD A20 IP66 T95°C

Special Conditions for Safe Use (X): None

Certification No.: IECEx FMG 12.0022X (Enclosures Types J1, J2, J3, J4)
Applicable Standards: IEC 60079-0: 2011, IEC 60079-31: 2008
Markings: Ex tb IIIC T95°C Db (-40°C Ta 70°C); IP66

Special Conditions for Safe Use (X): None

Brazil Certifications

E2 INMETRO Flameproof
Certification No.: CEPEL 02.0095X
Applicable Standards: ABNT NBR IEC 60079-0:2008, ABNT NBR IEC 60079-1:2009,
ABNT NBR IEC 60079-26: 2008, ABNT NBR IEC 60529:2009,
Markings: Ex d IIC T6 Gb IP66W
Tamb: -40°C a +65°C

Special Conditions for Safe Use (X): See certificate

I2 INMETRO Intrinsic Safety
Certification No.: CEPEL 02.0096X
Applicable Standards: ABNT NBR IEC 60079-0:2008, ABNT NBR IEC 60079-11:2009,
ABNT NBR IEC 60529:2009,
Markings: Ex ia IIC T* Ga IP66W
Tamb: -60 °C a +80 °C

Special Conditions for Safe Use (X):

(See Certificate for temperature limits(*) and parameters)

Chinese Certifications

E3 NEPSI Flameproof and Dust Ignition-proof
Certification No.: GYJ111385X
Applicable Standards: GB3836.1-2000, GB3836.2-2000, GB12476.1-2000
Markings: Ex d IIC T6
DIP A20 T_A 95°C IP66

Special Conditions for Safe Use (X):

(See Manual)

I3 NEPSI Intrinsic Safety
Certification No.: GYJ081077X (Manufactured in Chanhassen USA) GYJ111384X (Manufactured in Singapore)
Applicable Standards: GB3836.1-2000, GB3836.4-2000, GB12476.1-2000
Markings: Ex ia IIC T4 DIP A21 TA T5 IP66 (GYJ081077)
Ex ia IIC T4 IP66 (GYJ111384X)

Special Conditions for Safe Use (X):
(See Manual)

N3 NEPSI Intrinsic Safety
Certification No.: GYJ101421
Applicable Standards: GB3836.1-2000, GB3836.8-2003
Markings: Ex nA nL IIC T5

Special Conditions for Safe Use (X):
(See Manual)

Japanese Certifications

E4 TIIS Flameproof
Certification No.: TC15744 – 644H with meter, no sensor
TC15745 – 644H without meter, no sensor
TC15910 – 644H without meter, thermocouple sensor
TC15911 – 644H with meter, thermocouple sensor
TC15912 – 644H without meter, RTD sensor
TC15913 – 644H with meter, RTD sensor

Markings: (TC 1591x) d IIB+H_2 T4
(TC1574x) IIC T6

Combinations of Certifications

Stainless steel certification tag is provided when optional approval is specified. Once a device labeled with multiple approval types is installed, it should not be reinstalled using any other approval types. Permanently mark the approval label to distinguish it from unused approval types.

K1 Combination of **E1**, **I1**, **N1**, and **ND**
K2 Combination of **E2** and **I2**
K5 Combination of **E5** and **I5**
K6 Combination of **E6** and **I6**
K7 Combination of **E7**, **I7**, and **N7**
KA Combination of **E1**, **I1**, **E6**, and **I6**
KB Combination of **E5**, **I5**, **I6**, and **E6**
KC Combination of **E5**, **E1**, **I5**, and **I1**
KD Combination of **E5**, **I5**, **E6**, **I6**, **E1**, and **I1**

Other Certifications

Shipboard

SBS American Bureau of Shipping (ABS)
Certificate No.: 00-HS145383/1-PDA
Applicable Standards: ABS Rules:2008 Steel Vessels Rules 1-1-4/7.7, 4-8-3/1.7
Intended Service: Measurement of Pressure, Flow and Level for Liquid, Gas and Vapor Applications on ABS Classed Vessels, Marine and Offshore Installations

SBV Bureau Veritas
Certificate No.: 26325/A1 BV
Type Approval Certificate: Bureau Veritas Rules for the Classification of Steel Ships
File Number AP 4247, Product Code 3812H

SDN Det Norske Veritas
Certificate No.: A-12802
Type Approval Certificate: Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas Offshore Standards
Location Classes: Temperature D; Humidity B; Vibration A; EMC A;
Enclosure B (IP66: Al), or C (IP66: SST)

SLL Llyod's Register
Certificate No.: 11/60002(E1)
Specified Standards: Lloyd's Register Test Specifications Number 1, 2002
Type Approval Certificate: For use in environmental categories ENV1, ENV2, ENV3 and ENV5

Rosemount 644 with FOUNDATION Fieldbus and Profibus PA

Hazardous Locations Certificates

North American Certifications

Factory Mutual (FM) Approvals

I5 FM Intrinsically Safe
Intrinsically Safe FISCO for use in Class I, II, III, Division 1, Groups A, B, C, D, E, F, and G; when installed per control drawing 00644-2075.
Temperature Code: T4A (T_{amb} = – 50 °C to 60 °C).

Nonincendive for use in Class I, Division 2, Groups A, B, C, and D.
Temperature Code: T5 (T_{amb} = – 50 °C to 85 °C);
T6 (T_{amb} = – 50 °C to 70 °C)

When installed per Rosemount control drawing 00644-2075

E5 FM Explosion Proof
Explosion Proof for Class I, Division 1, Groups B, C, and D.
Nonincendive for use in Class 1, Division 2, Groups A, B, C, and D.
Temperature Code: T5 (T_{amb} = – 50 °C to 85 °C)
When installed per Rosemount control drawing 00644-1049
Dust Ignition Proof for Class II/III, Division 1, Groups E, F, G.
Temperature Code: T5 (T_a = – 50 °C to 85 °C)
When installed per Rosemount drawing 00644-1049. (J5, J6, and J8 options only.)

Canadian Standards Association (CSA) Approvals

I6 CSA Intrinsically Safe
Intrinsically Safe and FISCO for Class I, Division 1, groups A, B, C, and D when connected per Rosemount drawing 00644-2076.

Temperature code: T4 (T_{amb} = – 50 °C to 60 °C);

Suitable for Class I, Division 2, groups A, B, C, and D (must be installed in a suitable enclosure)

K6 CSA Intrinsically Safe, Explosion-proof
Includes Intrinsically Safe "I6" and 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
Seal not required.
CSA Enclosure Type 4X

Temperature Code: T4 (T_{amb} = – 50 °C to 60 °C);
T5 (T_{amb} = – 50 °C to 85 °C)

NOTE:
(For J5 and J6 enclosure options only)

European Certifications

E1 ATEX Flame-Proof
Certificate Number: KEMA99ATEX8715X
ATEX Marking: ⟨Ex⟩ II 2 G
CE 1180
Ex d IIC T6 (–50 °C ≤ T_{amb} ≤ 65 °C)
U_i = 32 Vdc

Special Conditions for Safe Use (X):
For information on the dimensions of the flameproof joints the manufacturer shall be contacted.

I1 ATEX Intrinsic Safety
Certificate Number: Baseefa03ATEX0499X
ATEX Marking: ⟨Ex⟩ II 1 G
CE 1180
Ex ia IIC T4 (-50 °C ≤ T_{amb} ≤ 60 °C)

Table 12. Entity Parameters

I.S. Loop/Power Terminals
U_i = 30 V
I_i = 300 mA
P_i = 1.3 W
C_i = 2.1 nF
L_i = 0
FISCO Loop/Power Terminals
U_i = 17.5 V
I_i = 380 mA
P_i = 5.32 W
C_i = 2.1 nF
L_i = 0
Sensor Terminals
U_o = 13.9 V
I_o = 23 mA
P_o = 79 mW
C_i = 7.7 nF
L_i = 0

Special Conditions for Safe Use (X):
The apparatus must be installed in an enclosure which affords it a degree of protection of at least IP20.
Non-metallic enclosures must have a surface resistance of less than 1GΩ, light alloy or zirconium enclosures must be protected from impact and friction when installed.

N1 ATEX Type n
Certificate Number: BAS00ATEX3145
ATEX Marking: ⟨Ex⟩ II 3 G
Ex nL IIC T5 (-40 °C ≤ T_{amb} ≤ 70 °C)
Max Input Voltage: U_i = 42.4 Vdc

NC ATEX Type n Component
Certificate Number: BAS99ATEX3084U
ATEX Marking: ⟨Ex⟩ II 3 G
Ex nL IIC T5 (-40 °C ≤ T_{amb} ≤ 70 °C)
Max Input Voltage: U_i = 42.4 Vdc

NOTE:
The equipment must be installed in an enclosure meeting the requirements of IP54 and the requirements of the impact tests described in EN60079-15.

ND ATEX Dust Ignition-Proof
Certificate Number: KEMA99ATEX8715X
ATEX Marking: ⟨Ex⟩ II 1 D
Ex tD A20 T95°C (-50 °C ≤ T_{amb} ≤ 85 °C)
CE 1180
IP66

Special Conditions for Safe Use (X):

For information on the dimensions of the flameproof joints the manufacturer shall be contacted.

IECEx Certifications

E7 IECEx Flameproof and Dust
Certificate Number: IECEx KEM 09.0015X
Ex d IIC T6 (Flameproof) -40 °C < T_{amb} < 65 °C
Ex tD A20 IP 66 T 95 °C (Dust)
Vmax = 42.4 V

Special Conditions for Safe Use (X):
For information on the dimensions of the flameproof joints the manufacturer shall be contacted.

Table 13. Electrical Data

Transmitter	Sensor
V_{max} = 32 Vdc	U_{max} = 5 Vdc
I_{max} = 24.0 mA	I_{max} = 2.0 mA

I7 IECEx Intrinsic Safety
Certificate Number: IECEx BAS 07.0053X
Ex ia IIC T4/T5/T6

Table 14. Temperature Classification

$P_{i\ (W)}$	Temperature Class	T_{amb}
1.3	T4	-50 °C to 60 °C
5.32 (FISCO Group IIC)	T4	-60 °C to 60 °C

Special Conditions for Safe Use (X):

1. The apparatus must be installed in an enclosure which affords it a degree of protection of at least IP20.
2. Non-metallic enclosures must have a surface resistance of less than 1 GΩ; light alloy or zirconium enclosures must be protected from impact and friction when installed.

Table 15. Entity Parameters

Transmitter (I.S.)	Transmitter (FISCO)	Sensor
U_i = 30 Vdc	U_i = 17.5 Vdc	U_o = 13.9 Vdc
I_i = 300 mA	I_i = 380 mA	I_o = 23 mA
P_i = 1.3 W	P_i = 5.32 W	P_o = 79 mW
C_i = 2.1 nF	C_i = 2.1 nF	C_i = 7.7 nF
L_i = 0 mH	L_i = 0 mH	L_i = 0 mH

N7 IECEx Type n
Certificate Number: IECEx BAS 07.0055
Ex nA nL IIC T5 (-40 °C ≤ T_{amb} ≤ 70 °C)

Table 16. Electrical Data

Transmitter	Sensor	
	RTD	Thermocouple
U_i = 32 V	U_i = 5 V	U_i = 0

NG IECEx Type n Component
Certificate Number: IECEx BAS 07.0054U
Ex nA nL IIC T5 (-40 °C ≤ T_{amb} ≤ 75 °C)
Input Parameter: Ui = 32 Vdc

Schedule of Limitations:

The component must be housed in a suitably certified enclosure that provides a degree of protection of at least IP54.

Japanese Certifications

Japanese Industrial Standard (JIS) Approvals

E4 JIS Explosion Proof

Table 17. Certificate and Description

Certificate	Description	Approval Group	Temp Code
C15744	644H with meter and no sensor	Ex d II C	T6
C15745	644H without meter and no sensor	Ex d II C	T6
C15749	644H without meter and with RTD	Ex d II B	T4
C15750	644H without meter and with thermocouple	Ex d II B	T4
C15751	644H with meter and thermocouple	Ex d II B	T4
C15752	644H with meter and RTD	Ex d II B	T4
C15910	644H without meter and with thermocouple	Ex d II B + H2	T4
C15911	644H with meter and thermocouple	Ex d II B + H2	T4
C15912	644H without meter and with RTD	Ex d II B + H2	T4
C15913	644H with meter and RTD	Ex d II B + H2	T4

Combination Approvals

Stainless steel certification tag is provided when optional approval is specified. Once a device labeled with multiple approval types is installed, it should not be reinstalled using any other approval types. Permanently mark the approval label to distinguish it from unused approval types.

K5 Combination of I5 and E5.

K1 Combination of E1, I1, N1, and ND

Russian GOST Certifications

PPC BA-13006:

0 Ex ia IIC T4/T5/T6

Kazakhstan GOST

Pattern approval Certificate for Measuring Instruments

See Certificate

Ukraine GOST

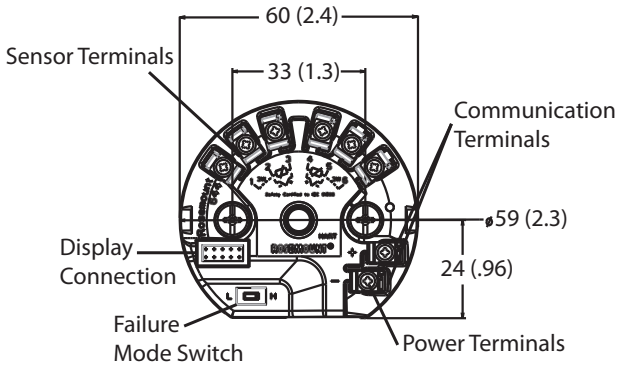
Pattern Approval for Measuring Instruments

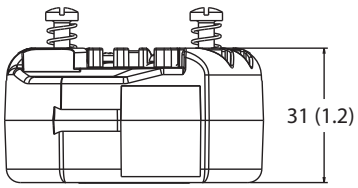
See Certificate

Dimensional drawings

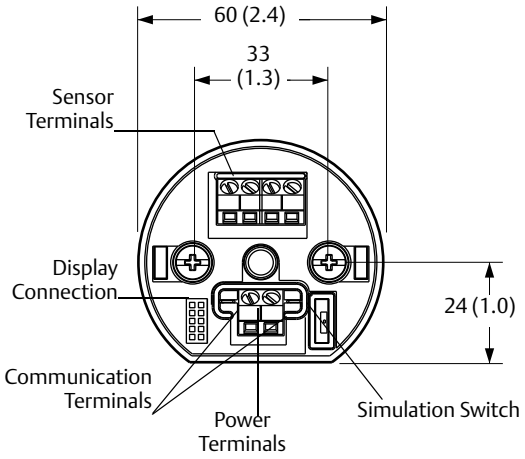
644H (DIN A Head Mount)

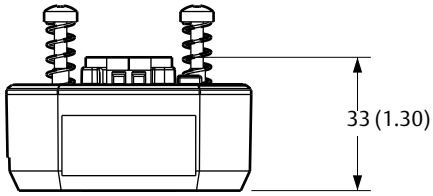
HART device shown with captivated screw terminals





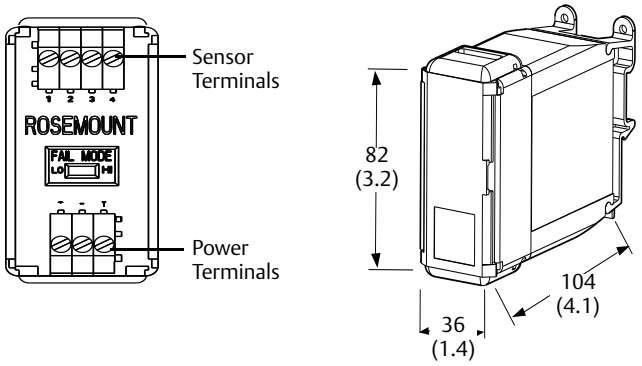
FOUNDATION fieldbus and Profibus device shown with Standard Compression Screw Terminals





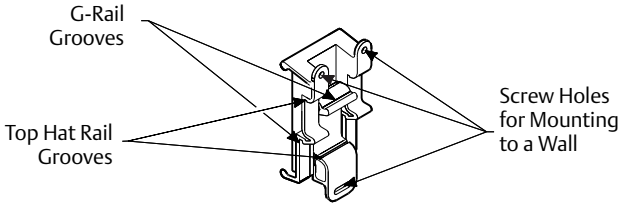
Dimensions are in millimeters (inches)

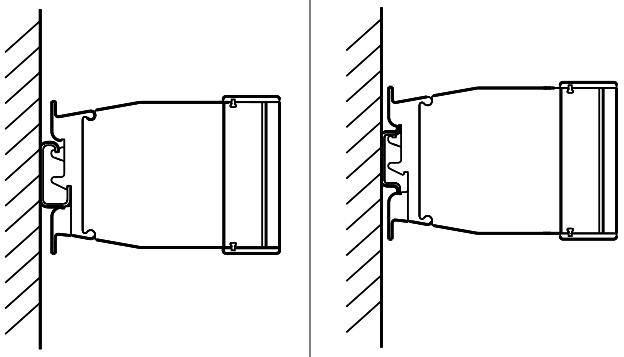
644 Rail Mount



Mounting Kits for 644H

644R Rail & Walls Clips

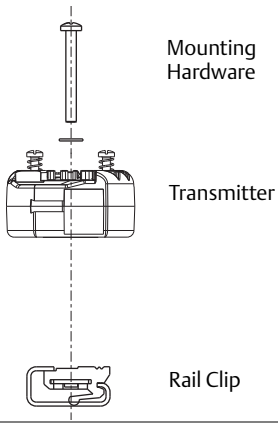




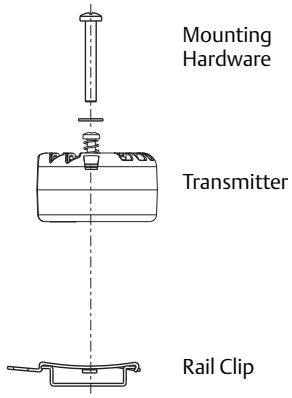
(part number 03044-4103-0001)

644H Rail Clips

G-Rail (asymmetric)

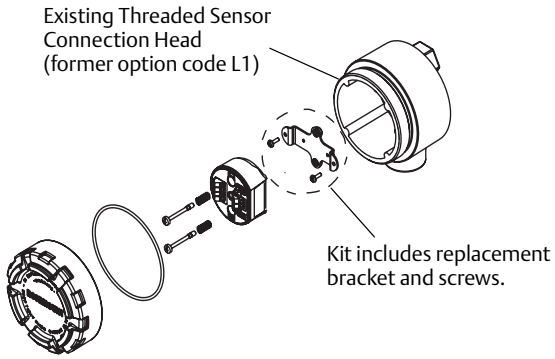


Top Hat Rail (symmetric)



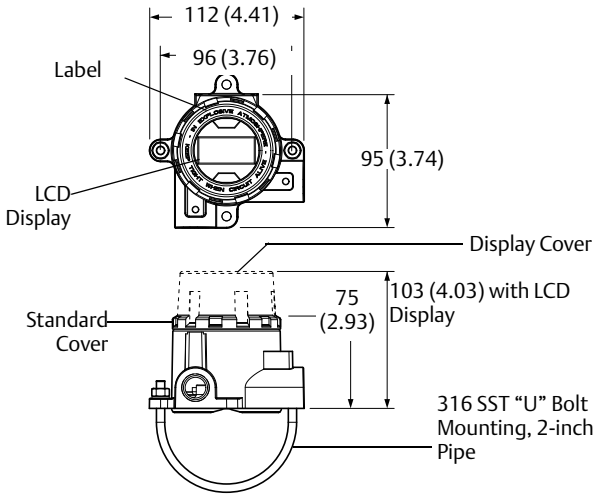
Note: Kit (part number 00644-5301-0010) includes mounting hardware and both types of rail kits.

644H Retrofit Kit

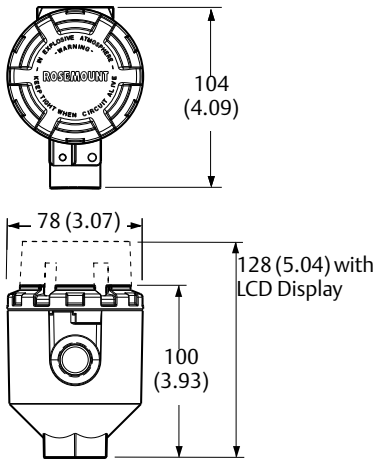


Note: Kit (part number 00644-5321-0010) includes a new mounting bracket and the hardware necessary to facilitate the installation.

Threaded-Sensor Universal Head (Option code J5, J6, J7 or J8)



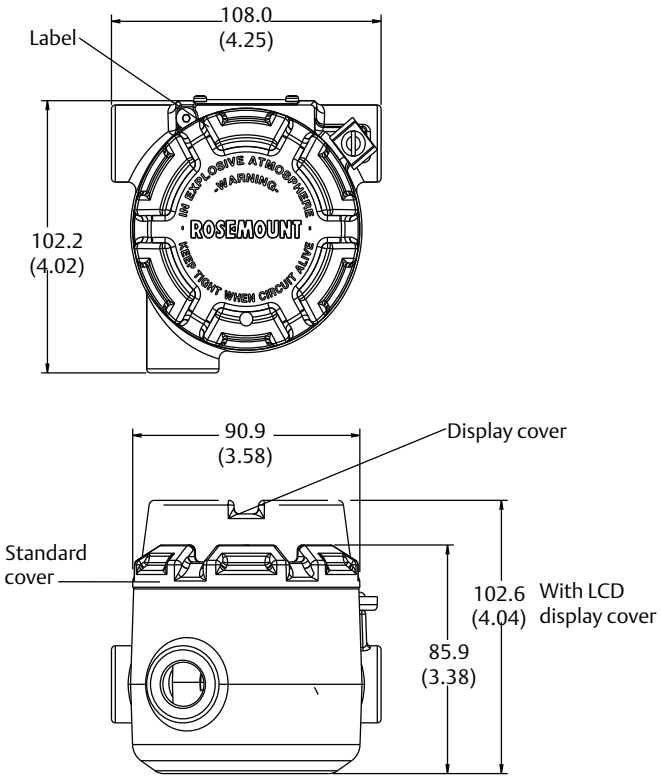
DIN Style Sensor Connection Head (Option code R1, R2, R3 or R4)



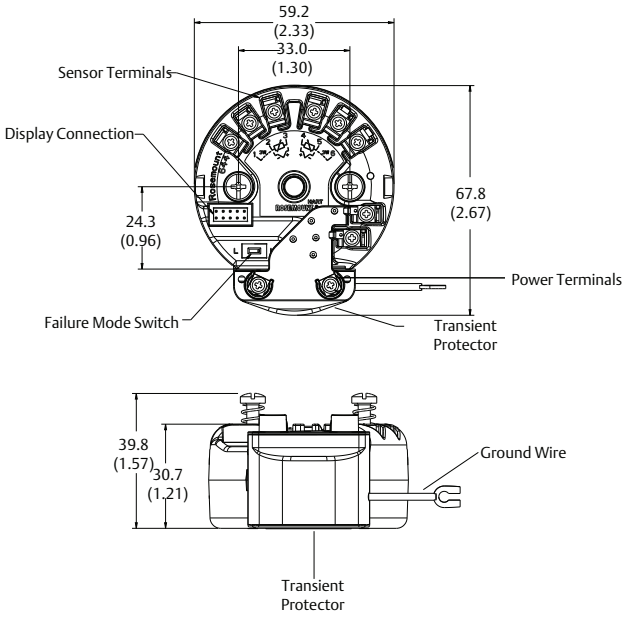
Note: A "U" Bolt is shipped with each head unless assembly option XA is ordered.

Dimensions are in millimeters (inches)

Threaded Sensor Universal Head, 3-conduit (Option code J1 or J2)



Rosemount 644 with Transient Protector (Option code T1)



Note: Option code T1 requires the use of J1, J2, J3 or J4 enclosure option.

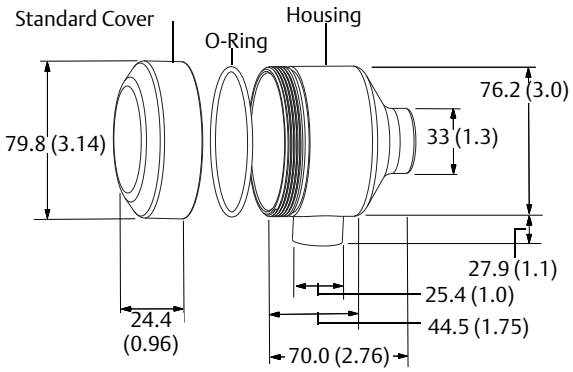
Dimensions are in millimeters (inches)

Dimensional Drawings

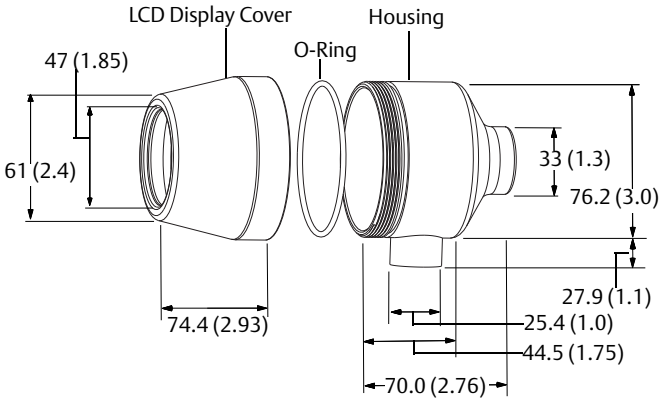
Stainless Steel Housing for Biotechnology, Pharmaceutical Industries, and Sanitary Applications

Sanitary Housing (Option Code S1, S2, S3, S4)

Standard Cover

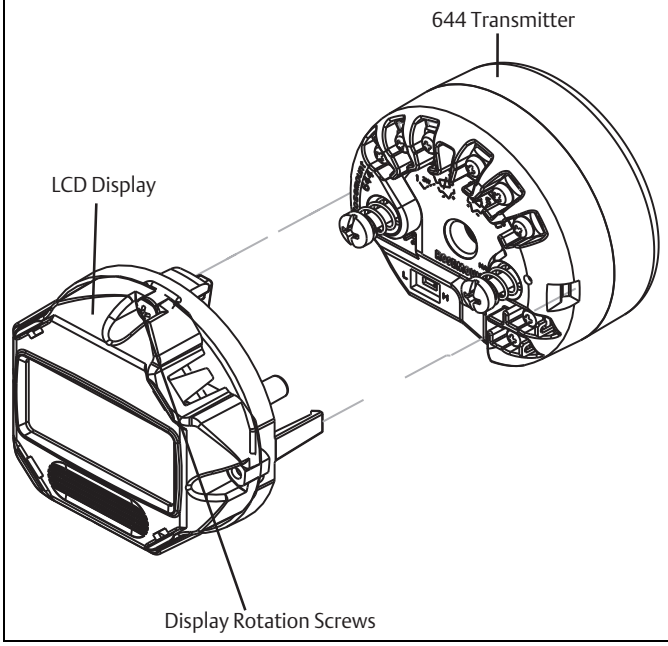
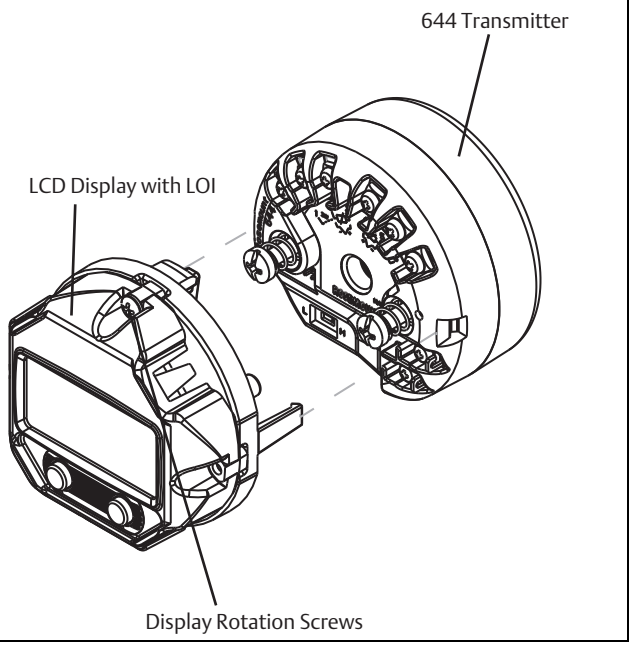


LCD Display Cover



Dimensions are in millimeters (inches)

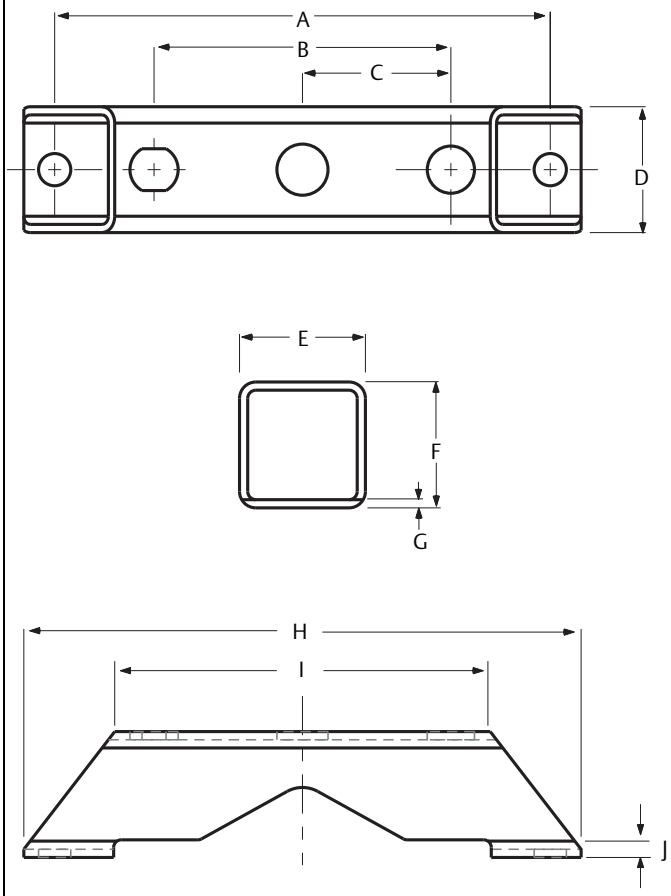
Display drawings

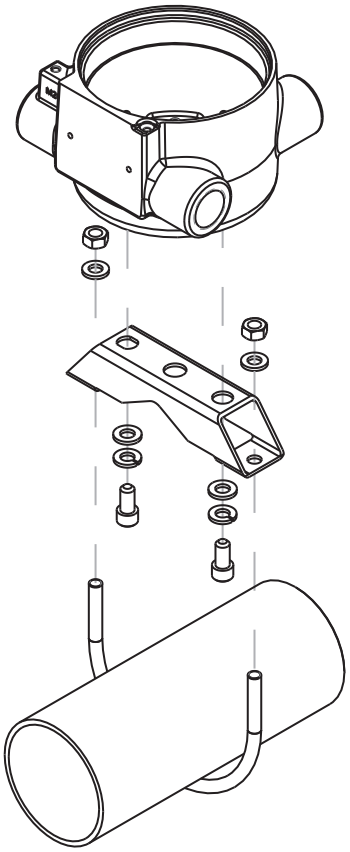
LCD Display	Enhanced Display with Local Operator Interface
	

Optional mounting brackets

Optional Transmitter Mounting Brackets

Option Code B4 Bracket

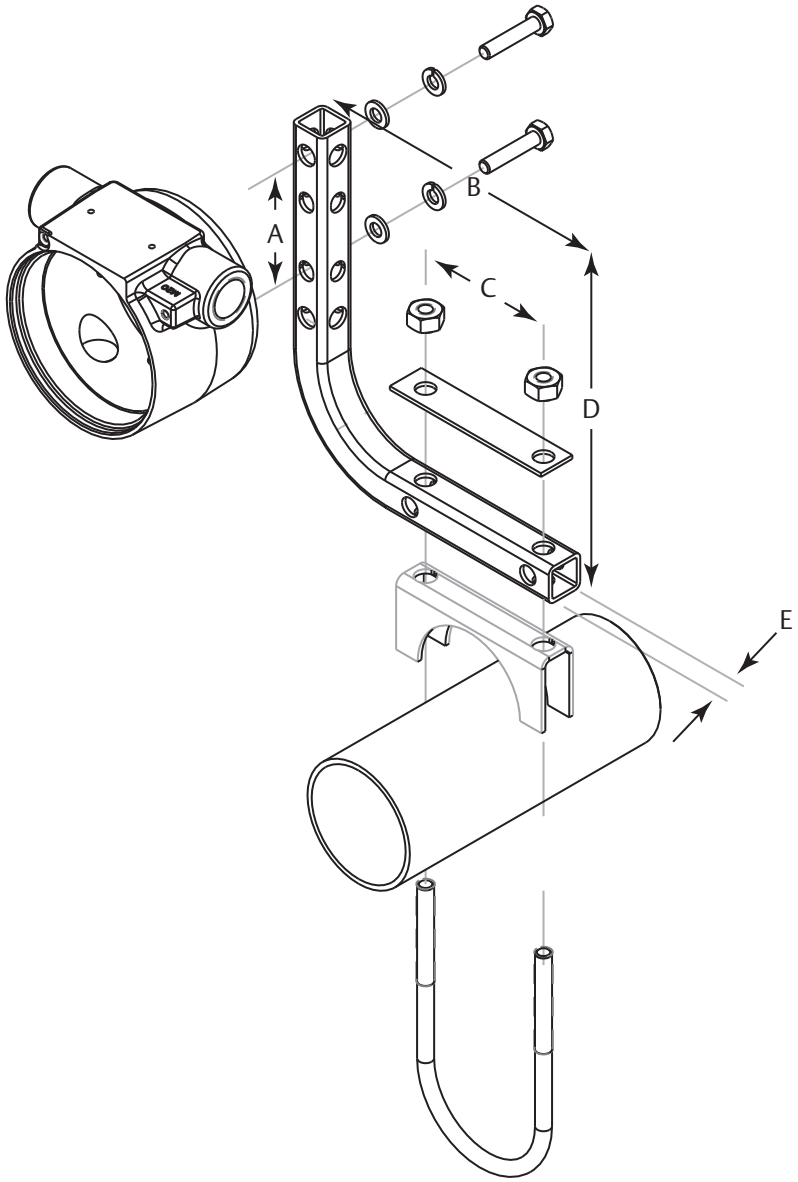




A. 100.00 (3.94)
B. 59.89 (2.358)
C. 29.95 (1.18)
D. 25.4 (1.00)
E. 25.4 (1.00)
F. 25.4 (1.00)
G. 1.65 (0.065)
H. 112.45 (4.43)
I. 75.77 (2.98)
J. 3.56 (0.14)

Dimensions are in millimeters (inches)

Option Code B5 Bracket



A. 59.89 (2.358)
B. 156.2 (6.15)
C. 71.4 (2.81)
D. 175.3 (6.9)
E. 19.05 (.75)

Dimensions are in millimeters (inches)

Configuration

Transmitter Configuration

The transmitter is available with standard configuration setting for either HART (see Standard HART Configuration), FOUNDATION fieldbus (see Standard Foundation fieldbus Configuration) or Profibus PA (see Standard Profibus PA Configuration). The configuration settings and block configuration may be changed in the field with Emerson's DeltaV®, AMS™ Suite, Handheld Field Communicator or other host or configuration tool.

Standard HART Configuration

Unless specified, the transmitter will be shipped as follows:

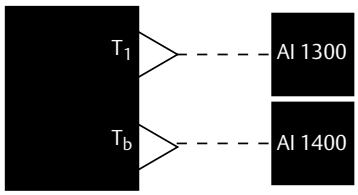
Sensor Type	RTD, Pt 100 (α=0.00385, 4-wire)
4 mA Value	0 °C
20 mA Value	100 °C
Output	Linear with temperature
Saturation Levels	3.9 / 20.5 mA
Damping	5 sec.
Line Voltage Filter	50 Hz
Alarm	High (21.75 mA)
LCD (when installed)	Engineering Units and mA
Tag	See "Tagging" on page 9

Standard FOUNDATION fieldbus Configuration

Unless otherwise specified, the transmitter will be shipped as follows:

Sensor Type: RTD, Pt 100 (α=0.00385, 4-wire)
Damping: 5 sec.
Units of Measurement: °C
Line Voltage Filter: 50 Hz
Software Tag: See Tagging
Function Blocks Tags: ■ Resource Block: Resource ■ Transducer Block: Transducer ■ LCD Block: LCD ■ Analog Input Blocks: AI 1300, AI 1400 ■ PID Block: PID 1500
Alarm Limits of AI 1300, AI 1400 ■ HI-HI: Infinity ■ HI: Infinity ■ LO: Infinity ■ LO-LO: Infinity
Local Display (when installed): Engineering Units of Temperature

Standard Block Configuration



Note:
T_1 = Sensor Temperature
T_b = Terminal Temperature

Final Station

AI Blocks are scheduled for 1 second. AI Blocks are linked as shown above.

Standard Profibus PA Configuration

Unless specified, the transmitter will be shipped as follows:

Device Address: 126
Sensor Type: RTD, Pt 100 (α=0.00385, 4-wire)
Damping: 5 sec.
Units of Measurement: °C
Line Voltage Filter: 50 Hz
Software Tag: See Tagging
Alarm Limits: ■ HI-HI: Infinity ■ HI: Infinity ■ LO: - Infinity ■ LO-LO: Infinity
Local Display (when installed): Engineering Units of Temperature

Custom Configuration

Custom configurations are to be specified when ordering. This configuration must be the same for all sensors. The following table lists the necessary requirements to specify a custom configuration.

	Option Code	Customization Available
HART	**C1**: Factory Configuration Data (CDS required) Also needs option code: **...DC** **...DC** **...M4 or M5**	■ **Date**: day/month/year ■ **Descriptor**: 8 alphanumeric characters ■ **Message**: 32 alphanumeric characters ■ **Hardware Tag**: 13 Characters ■ **Software Tag**: 8 Characters ■ Sensor Type and Connection ■ Measurement Range and Units ■ Damping Value ■ **Failure Mode:** High or Low ■ **Hot Backup:** Mode and PV ■ **Sensor Drift Alert:** Mode, Limit and Units ■ **Display Configuration**: Choose what will be shown on the LCD display ■ **Custom Alarm and saturation levels**: Choose custom High and Low Alarm and Saturation levels ■ **Security information:** Write Protection, HART Lock and Local Operator Interface Password
	C2:Transmitter – Sensor Matching	■ The transmitters are designed to accept Callendar-Van Dusen constants from a calibrated RTD. Using these constants, the transmitter generates a custom curve to match the sensor-specific curve. Specify a Series 65, 65, or 78 RTD sensor on the order with a special characterization curve (V or X8Q4 option). These constants will be programmed into the transmitter with this option.
	A1, CN, or C8: Alarm Level Configuration	■ **A1:** NAMUR Alarm and Saturation Levels, with High Alarm configured ■ **CN:** NAMUR Alarm and Saturation Levels, with Low Alarm configured ■ **C8:** Low Alarm (Standard Rosemount Alarm and Saturation Values)
	Q4: Three-Point Calibration with Certificate	■ Calibration certificate. Three-Point calibration at 0, 50 and 100% with certificate.
	C4: Five-Point Calibration	■ Will include five-point calibration at 0, 25, 50, 75, and 100% analog and digital output points. Use with Calibration Certificate Q4
	HR7: HART Revision configuration	■ Your 644 Head mount device is HART revision selectable. Order the HR7 code to configure your device to operate in HART Revision 7 mode. Your device is also configurable in the field. Refer to the 644 Quick Installation Guide or Reference Manual for more instructions. ■ **Long Software Tag:** 32 Characters

	Option Code	Requirements/ Specification
FOUNDATION Fieldbus	C1: Factory Configuration Data (CDS required)	Date: day/month/year Descriptor: 16 alphanumeric characters Message: 32 alphanumeric characters
	C2:Transmitter – Sensor Matching	The transmitters are designed to accept Callendar-Van Dusen constants from a calibrated RTD. Using these constants, the transmitter generates a custom curve to match the sensor-specific curve. Specify a Series 65, 65, or 78 RTD sensor on the order with a special characterization curve (V or X8Q4 option). These constants will be programmed into the transmitter with this option.
	C4: Five-Point Calibration	Will include five-point calibration at 0, 25, 50, 75, and 100% analog and digital output points. Use with Calibration Certificate Q4.
	Q4: Three-Point Calibration with Certificate	Calibration certificate. *Three-Point calibration with certificate.*

	Option Code	Requirements/ Specification
Profibus PA	C1: Factory Configuration Data (CDS required)	Date: day/month/year Descriptor: 16 alphanumeric characters Message: 32 alphanumeric characters
	C2:Transmitter – Sensor Matching	The transmitters are designed to accept Callendar-Van Dusen constants from a calibrated RTD. Using these constants, the transmitter generates a custom curve to match the sensor-specific curve. Specify a Series 65, or 78 RTD sensor on the order with a special characterization curve (V or X8Q4 option). These constants will be programmed into the transmitter with this option.
	C4: Five-Point Calibration	Will include five-point calibration at 0, 25, 50, 75, and 100% analog and digital output points. Use with Calibration Certificate Q4.
	Q4: Three-Point Calibration with Certificate	Calibration certificate. *Three-Point calibration with certificate.*

Specifications and Reference Data for 644 HART (Device revision 7 or previous)

Functional Specifications

Inputs
User-selectable; sensor terminals rated to 42.4 Vdc. See "Accuracy" on page 17 for sensor options.

Output
Single 2-wire device with either 4-20 mA/HART, linear with temperature or input. Device supports protocol revision HART 5.

Isolation
Input/output isolation tested to 600 Vrms.

Local Display
The optional five-digit integral LCD Display includes a floating or fixed decimal point. It can also display engineering units (°F, °C, °R, K, Ω, and mV), mA, and percent of span. The display can be configured to alternate between selected display options. Display settings are preconfigured at the factory according to the standard transmitter configuration. They can be reconfigured in the field using a compliant Field Communicator.

Humidity Limits
0–95% relative humidity

Update Time
≤ 0.5 sec.

Accuracy (default configuration) PT 100
HART (0-100 °C): ±0.18 °C

Table 18. 644 HART legacy display kits

	Kit Part number
Display Only	00644-4430-0002
Display and Aluminum, Housing Cover(1)	00644-4430-0001
Display and SST Housing Cover(1)	00644-4430-0011

(1) Covers provided are compatible with the 3 in (76mm) Universal Junction Box and Rosemount Connection Head enclosure styles.

Physical Specifications

Electrical Connections

Model	Power and Sensor Terminals
644H	Compression screws permanently fixed to terminal block

Field Communicator Connections

Communication Terminals	
644H	Clips permanently fixed to terminal block

Materials of Construction

Electronics Housing and Terminal Block	
644H	*Noryl*® glass reinforced
Enclosure (Options J5, J6)	
Housing	Low-copper aluminum
Paint	Polyurethane
Cover O-ring	Buna-N

Materials of Constructions (Stainless Steel Housing for Biotechnology, Pharmaceutical Industries, and Sanitary Applications)
Housing and Standard Meter Cover

- 316 SST

Cover O-Ring

- Buna-N

Mounting
The 644H installs in a connection head or universal head mounted directly on a sensor assembly, apart from a sensor assembly using a universal head, or to a DIN rail using an optional mounting clip.

Special Mounting Considerations
See "Mounting Kits for 644H" on page 31 for the special hardware that is available to:

- Mount a 644H to a DIN rail. (see page 30)
- Retrofit a new 644H to replace an existing 644H transmitter in an existing threaded sensor connection head.(see Table 3 on page 10)

Weight

Code	Options	Weight
644H	HART, Head Mount Transmitter	95 g (3.39 oz)
644H	FOUNDATION fieldbus, Head Mount Transmitter	92 g (3.25 oz)
644H	Profibus PA Head Mount Transmitter	92 g (3.25 oz)
644R	HART, Rail Mount Transmitter	174 g (6.14 oz)
M5	LCD Display	35 g (1.34 oz)
J5, J6	Universal Head, Standard Cover	577 g (20.35 oz)
J5, J6	Universal Head, Meter Cover	667 g (23.53 oz)
J7, J8	SST Universal Head, Std. Cover	1620 g (57.14 oz)
J7, J8	SST Universal Head, Meter Cover	1730 g (61.02 oz)

Weight (Stainless Steel Housing for Biotechnology, Pharmaceutical Industries, and Sanitary Applications)

Option Code	Standard Cover	Meter Cover
S1	840 g (27 oz)	995 g (32 oz)
S2	840 g (27 oz)	995 g (32 oz)
S3	840 g (27 oz)	995 g (32 oz)
S4	840 g (27 oz)	995 g (32 oz)

Enclosure Ratings (644H)

All available enclosures are Type 4X, IP66, and IP68.

Sanitary Housing Surface

Surface finish is polished to 32 RMA. Laser etched product marking on housing and standard covers.

Performance Specifications

EMC (ElectroMagnetic Compatibility) NAMUR NE 21 Standard

The 644H HART meets the requirements for NAMUR NE 21 Rating.

Susceptibility	Parameter	Influence
		HART
ESD	■ 6 kV contact discharge ■ 8 kV air discharge	None
Radiated	■ 80 – 1000 MHz at 10 V/m AM	< 1.0%
Burst	■ 1 kV for I.O.	None
Surge	■ 0.5 kV line–line ■ 1 kV line–ground (I.O. tool)	None
Conducted	■ 100 kHz to 80 MHz at 10 V	< 1.0%

CE Electromagnetic Compatibility Compliance Testing

The 644 is compliant with Directive 2004/108/EC. Meets the criteria under IEC 61326:2006

Power Supply Effect

Less than ±0.005% of span per volt

Stability

RTDs and thermocouples have a stability of ±0.15% of output reading or 0.15 °C (whichever is greater) for 24 months

Self Calibration

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

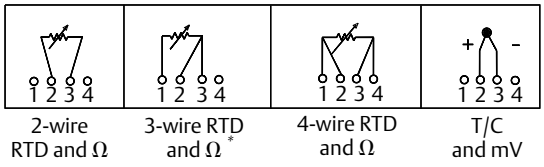
Vibration Effect

The 644 is tested to the following specifications with no effect on performance per IEC 60770-1, 1999:

Frequency	Vibration
10 to 60 Hz	0.21 mm displacement
60 to 2000 Hz	3 g peak acceleration

Sensor Connections

644 Sensor Connections Diagram



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

Tagging

Hardware

- 13 characters total
- Tags are adhesive labels affixed to the side of the transmitter
- Permanently attached to transmitter
- Character height is 1/16-in (1.6 mm)

Software

- The transmitter can store up to 8 characters for the HART protocol
- Order Software Tag with C1 option code

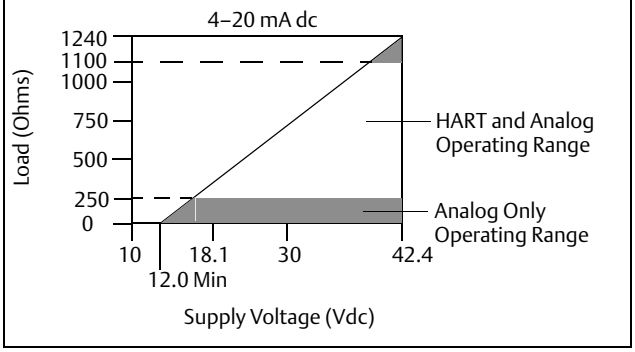
4–20 mA / HART Specifications

Power Supply

External power supply required. Transmitters operate on 12.0 to 42.4 Vdc transmitter terminal voltage (with 250 ohm load, 18.1 Vdc power supply voltage is required). Transmitter power terminals rated to 42.4 Vdc.

Load Limitations

Maximum Load = 40.8 X (Supply Voltage - 12.0)(1)



(1) Without transient protection (optional).

NOTE
HART Communication requires a loop resistance between 250 and 1100 ohms. Do not communicate with the transmitter when power is below 12 Vdc at the transmitter terminals.

Temperature Limits

	Operating Limit	Storage Limit
With LCD(1)	–40 to 185 °F –40 to 85 °C	–50 to 185 °F –45 to 85 °C
Without LCD	–40 to 185 °F –40 to 85 °C	–60 to 248 °F –50 to 120 °C

(1) LCD may not be readable and display updates will be slower at temperatures below -4 °F (-20 °C).

Hardware and Software Failure Mode

The 644 features software driven alarm diagnostics and an independent circuit which is designed to provide backup alarm output if the microprocessor software fails. The alarm direction (HI/LO) is user-selectable using the failure mode switch. If failure occurs, the position of the switch determines the direction in which the output is driven (HI or LO). The switch feeds into the digital-to-analog (D/A) converter, which drives the proper alarm output even if the microprocessor fails. The values at which the transmitter software drives its output in failure mode depends on whether it is configured to standard, custom, or NAMUR-compliant (NAMUR recommendation NE 43, June 1997) operation. Table 7 shows the configuration alarm ranges.

Table 19. Available Alarm Range(1)

	Standard	NAMUR- NE 43 Compliant
Linear Output:	$3.9 \leq I^{(2)} \leq 20.5$	$3.8 \leq I \leq 20.5$
Fail High:	$21.75 \leq I \leq 23$	$21.5 \leq I \leq 23$
Fail Low:	$3.5 \leq I \leq 3.75$	$3.5 \leq I \leq 3.6$

(1) Measured in mA.

(2) I = Process Variable (current output).

Custom Alarm and Saturation Level

Custom factory configuration of alarm and saturation level is available with option code C1 for valid values. These values can also be configured in the field using a Field Communicator.

Turn-on Time

Performance within specifications in less than 5.0 seconds after power is applied, when damping value is set to 0 seconds.

Transient Protection

The Rosemount 470 Transient Protector prevents damage from transients induced by lightning, welding, or heavy electrical equipment. For more information, refer to the Rosemount 470 Transient Protector Product Data Sheet (document number 00813-0100-4191).

Accuracy

For complete accuracy tables by sensor type, see Table 8 on page 17. For ambient temperature effects by sensor type, see Table 9 on page 19. For Enhanced Accuracy specifications, see Table 10 on page 21.

Configuration

For standard and custom configuration information, see “Configuration” on page 37.

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.

CE Electromagnetic Compatibility Compliance Testing

The 644 meets the criteria under IEC 61326:2006

Hazardous Locations Certifications

North American Certifications

Factory Mutual (FM) Approvals

I5 FM Intrinsically Safe and Non-incendive

Intrinsically Safe for Class I/II/III, Division 1, Groups A, B, C, D, E, F, and G.
Non-incendive for Class I, Division 2, Groups A, B, C, and D.
Temperature Code: T5 (Ta = – 50 °C to 85 °C)

When installed in accordance with Rosemount drawing 00644-0009.

Table 20. Temperature Code

Pi	Temperature Code
0.67 W	T5 (T_{amb} = – 50 °C to 50 °C)
0.67 W	T6 (T_{amb} = – 50 °C to 40 °C)
1.0 W	T4 (T_{amb} = – 50 °C to 80 °C)
1.0 W	T5 (T_{amb} = – 50 °C to 40 °C)

E5 FM Explosion Proof
Explosion Proof for Class I, Division 1, Groups B, C, and D.

Nonincendive for use in Class 1, Division 2, Groups A, B, C, and D.

Temperature Code: T5 (Tamb = – 50 °C to 85 °C)
When installed per Rosemount control drawing 00644-1049

Dust Ignition Proof for Class II/III, Division 1, Groups E, F, G.
Temperature Code: T5 (Ta = – 50 °C to 85 °C)
When installed per Rosemount drawing 00644-1049.
(J5, J6 and J8 options only.)

K5 Combination of I5 and E5.

Note
K5 is only available with 644H option code J6.

Canadian Standards Association (CSA) Approvals

I6 CSA Intrinsically Safe
Intrinsically Safe for Class I, Division 1, Groups A, B, C, and D when installed in accordance with Rosemount drawing 00644–1064.

Table 21. Temperature Code

Pi	Temperature Code
0.67 W	T6 (T_{amb} = – 50 °C to 40 °C)
0.67 W	T5 (T_{amb} = – 50 °C to 60 °C)
1.0 W	T4 (T_{amb} = – 50 °C to 80 °C)

K6 CSA Intrinsically Safe, Explosion–Proof, and Non-incendive
Combination of I6 and 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; Class III, Division 1 hazardous locations, when installed in accordance with Rosemount drawing 00644–1059. Suitable for Class I, Division 2, Groups B, C, and D when installed in a suitable enclosure.

Temperature Code: Ambient Limits –50 °C to 85 °C.

Note
K6 is only available with 644H option code J6.

European Certifications

I1 ATEX Intrinsic Safety
Certificate Number: BAS00ATEX1033X
ATEX Marking: ⟨Ex⟩ II 1 G Ex ia IIC T4/T5/T6
CE 1180

Table 22. Temperature Code

Pi	Temperature Code
0.67 W	T6 (– 60 °C ≤ T_{amb} ≤ 40 °C)
0.67 W	T5 (– 60 °C ≤ T_{amb} ≤ 50 °C)
1.0 W	T5 (– 60 °C ≤ T_{amb} ≤ 40 °C)
1.0 W	T4 (– 60 °C ≤ T_{amb} ≤ 80 °C)

Table 23. Entity Parameters

Loop/Power	Sensor
U_i=30 V	U_o = 13.6 V
I_i=200 mA	I_o = 80 mA
P_i=0.67W or 1.0 W	P_o = 80 mW
C_i = 10 nF	C_i = 75 nF
L_i = 0	L_i = 0

Special Conditions for Safe Use (X)

The transmitter must be installed so that its external terminals and communication pins are protected to at least IP20.

Non-metallic enclosures must have a surface resistance of less than 1G?. Light alloy or zirconium enclosures must be protected from impact and friction when installed.

E1 ATEX Flame-Proof
Certificate Number: KEMA99ATEX8715X
ATEX Marking: ⟨Ex⟩ II 2 G Ex d IIC T6
CE 1180

Temperature Code: T6 (–50 °C ≤ T_{amb} ≤ 65 °C)
Max Input Voltage: Ui = 42.4 Vdc

Specific Conditions for Safe Use (X):

For information on the dimensions of the flameproof joints the manufacturer shall be contacted.

N1 ATEX Type n
Certificate Number: BAS00ATEX3145
ATEX Marking: ⟨Ex⟩ II 3 G Ex nL IIC T5
Temperature Code: T5 (–40 °C ≤ T_{amb} ≤ 70 °C)
Max Input Voltage: U_i= 42.4 Vdc

NC ATEX Type n Component
Certificate Number: BAS99ATEX3084U
ATEX Marking: ⟨Ex⟩ II 3 G Ex nL IIC T5
Temperature Code: T5 (–40 °C ≤ T_{amb} ≤ 70 °C)
Max Input Voltage: U_i= 42.4 Vdc

Note
The equipment must be installed in an enclosure meeting the requirements of IP54 and the requirements of the impact tests described in EN50021.

ND ATEX Dust Ignition-Proof
Certificate Number: KEMA99ATEX8715X
ATEX Marking: ⟨Ex⟩II 1 D
tD A20 T95 C (-50 °C = Tamb = +85 °C)
IP 66

Special Conditions for Safe Use (X):

For information on the dimensions of the flameproof joints the manufacturer shall be contacted.

IECEx Certifications

E7 IECEx Flameproof and Dust
Certificate Number: IECEx KEM 09.0015X
Ex d IIC T6 (Flameproof)
Ex tD A20 IP 66 T 95 °C (Dust)
Vmax = 42.4 V

Special Conditions for Safe Use (X)

For information on the dimensions of the flameproof joints the manufacturer shall be contacted.

Table 24. Electrical Data

Transmitter	Sensor
U_{max} = 42.4 Vdc	U_{max} = 5 Vdc
I_{max} = 24.0 mA	I_{max} = 2.0 mA

I7 IECEx Intrinsic Safety
Certificate Number: IECEx BAS 07.0053X
Ex ia IIC T4/T5/T6

Table 25. Electrical Data

$P_{i\ (W)}$	Temperature Class	T_{amb}
0.67	T6	-60 °C to 40 °C
0.67	T5	-60 °C to 50 °C
1.0	T5	-60 °C to 40 °C
1.0	T4	-60 °C to 80 °C

Special Conditions for safe use (x):

1. The apparatus must be installed in an enclosure which affords it a degree of protection of at least IP20.
2. Non-metallic enclosures must have a surface resistance of less than 1 G; light alloy or zirconium enclosures must be protected from impact and friction when installed.

Table 26. Entity Parameters

Loop/Power	Sensor
U_i=30 Vdc	U_o = 13.6 Vdv
I_i=200 mA	I_o = 80 mA
P_i=0.67W or 1.0 W	P_o = 80 mW
C_i = 10 nF	C_i = 75 nF
L_i = 0 mH	L_i = 0 mH

N7 IECEx Type n
Certificate Number: IECEx BAS 07.0055
Ex nA nL IIC T5 (-40 °C ≤ T_{amb} ≤ 70 °C)

Table 27. Entity Parameters

Transmitter	Sensor	
	RTD	Thermocouple
U_i=42.4 V	U_i = 5 V	U_i = 0

NG IECEx Type n Component
Certificate Number: IECEx BAS 07.0054U
Ex nA nL IIC T5 (-40 °C ≤ T_{amb} ≤ 75 °C)
Input Parameter: Ui = 42.4 Vdc

Schedule of Limitations:

The component must be housed in a suitably certified enclosure that provides a degree of protection of at least IP54.

Brazilian Certifications

Centro de Pesquisas de Energia Eletrica (CEPEL) Approval

I2 CEPEL Intrinsic Safety. Not available, consult factory

Russian Certifications

Gostandart

Tested and approved by the Russian Metrological Institute GOSTANDART.

Japanese Certifications

Japanese Industrial Standard (JIS) Approvals

E4 JIS Explosion-Proof

Table 28. Certificate of Description

Certificate	Description	Approval Group	Temp Code
C15744	644H with meter and no sensor	Ex d II C	T6
C15745	644H without meter and no sensor	Ex d II C	T6
C15749	644H without meter and with RTD	Ex d II B	T4
C15750	644H without meter and with thermocouple	Ex d II B	T4
C15751	644H with meter and thermocouple	Ex d II B	T4
C15752	644H with meter and RTD	Ex d II B	T4
C15910	644H without meter and with thermocouple	Ex d II B + H2	T4
C15911	644H with meter and thermocouple	Ex d II B + H2	T4
C15912	644H without meter and with RTD	Ex d II B + H2	T4
C15913	644H with meter and RTD	Ex d II B + H2	T4

Note
Explosion Proof certification is only available as a complete assembly with Rosemount universal head – option codes J5, J6, J7, and J8.

Slovak Republic Certification

Ex ia IIC T4 & T5
See Intrinsic Safety Certificate

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