HART 7 temperature converter - isolated

3113

– Excellent accuracy, better than 0.05% of span
– Excellent EMC performance
– Selectable 60 ms / 60 s response time
– Pre-calibrated temperature ranges selectable via DIP switches
– Slimline 6.1 mm housing

Functional highlights

• Temperature converter which measures a standard Pt100, TC J and K temperature sensor, and provides an isolated active analog current and HART signal output.
• High 3-port isolation provides surge suppression that protects the control system from transients and noise and eliminates ground loops.
• All terminals are over-voltage protected, polarity protected and short-circuit protected.
• The device can be mounted in Safe area or in Zone 2 / Division 2 areas and is approved for marine applications.

Technical highlights

• Flexible 24 VDC (±30%) supply via power rail or connectors.
• Excellent conversion accuracy in all available ranges, better than 0.05% of span.
• Selectable internal / external CJC.
• 60 ms fast response time with simultaneous sensor error detection when selected.
• Meeting the NAMUR NE21 recommendations, this device ensures top measurement performance in harsh EMC environments.
• The device meets the NAMUR NE43 standard defining out of range and sensor error output values.
• Excellent signal / noise ratio > 60 dB.
• High galvanic isolation of 2.5 kVAC.
• A green front LED indicates normal operation, status of the input sensor and malfunction.
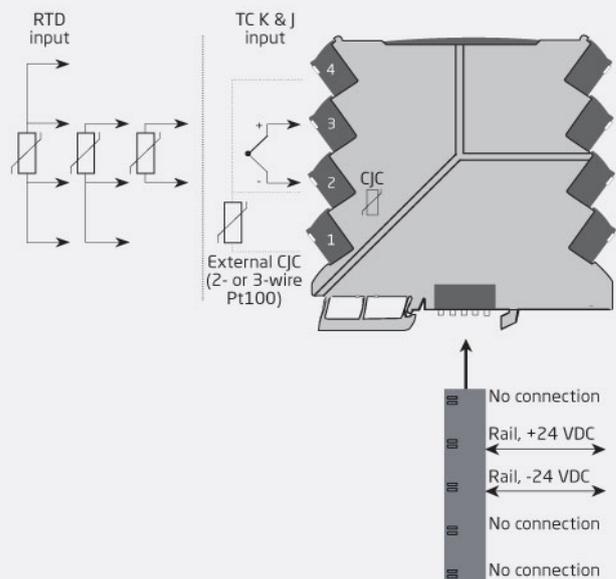• Wide ambient temperature range: -25...+70°C.

Programming

• Selectable DIP-mode for easy configuration of more than 1000 factory calibrated measurement ranges with HART read only feature.
• Selectable HART mode with HART 7 revision protocol enables extended device programming.
• Selectable HART-mode to enable full HART read-write capability.

Mounting / installation

• The narrow 6.1 mm housing allows up to 163 units per meter.
• Units can be mounted side by side, horizontally and vertically, without air gap on a standard DIN rail, even at 70°C ambient temperature.
• Units can be supplied separately or installed on PR 9400 power rail.

Applications

RTD input

TC K & J input

CJC

External CJC (2- or 3-wire Pt100)

No connection
Rail, +24 VDC
Rail, -24 VDC
No connection
No connection

Safe Area or Zone 2 & Cl. 1, Div. 2, gr. A-D

mA

HART
COMMUNICATION FOUNDATION

24 VDC nom. supply (16.8...31.2 VDC)
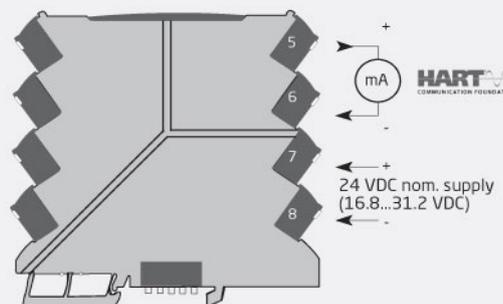
Order

Type	Version	
3113	With power rail connector / terminals	: -
	Supplied via terminals	: -N

Example: 3113-N

Environmental Conditions

Operating temperature....................................	-25°C to +70°C
Storage temperature.....................................	-40°C to +85°C
Calibration temperature................................	20...28°C
Relative humidity..	< 95% RH (non-cond.)
Protection degree...	IP20
Installation in...	Pollution degree 2 & meas. / overvoltage cat. II

Mechanical specifications

Dimensions (HxWxD)....................................	113 x 6.1 x 115 mm
Weight approx..	70 g
DIN rail type..	DIN EN 60715/35 mm
Wire size...	0.13...2.5 mm^2 / AWG 26...12 stranded wire
Screw terminal torque..................................	0.5 Nm
Vibration..	IEC 60068-2-6
2...25 Hz...	±1.6 mm
25...100 Hz..	±4 g

Common specifications

Supply

Supply voltage...	16.8...31.2 VDC
Max. required power.....................................	0.70 W
Max. power dissipation.................................	0.70 W

Isolation voltage

Isolation voltage, test / working..	2.5 kVAC / 300 VAC (reinforced)
Zone 2 / Div. 2...	250 VAC

Response time

HART mode, (0...90%, 100...10%)................	60 ms...60 s, programmable
DIP mode, (0...90%, 100...10%)...................	< 60 ms
Accuracy...	Better than 0.05% of selected range
Signal / noise ratio.......................................	Min. 60 dB
Long-term stability, better than...	±0.1% of span / year (±0.3% of span / 5 years)
Programming..	DIP switches
Signal dynamics, input.................................	23 bit
Signal dynamics, output................................	18 bit
EMC immunity influence................................	< ±0.5% of span
Extended EMC immunity: NAMUR NE21, A criterion, burst............................	< ±1% of span
Incorrect DIP-switch setting identification..	3.5 mA output; LED 0.5 s / 1 Hz

Input specifications

RTD input

Temperature range, Pt100............................	-200...+850°C
Min. measurement range (span)...................	10°C
Accuracy: the greater of...............................	Better than 0.05% of span or 0.1°C
Temperature coefficient: the greater of..	0.02°C/°C or ≤ ±0.01%/°C
Sensor current...	< 150 µA
Sensor cable resistance...............................	< 50 Ω per wire
Effect of sensor cable resistance (3-/4-wire)...	< 0.002 Ω / Ω
Sensor error detection..................................	Yes - selectable via DIP-switch
Broken sensor detection...............................	> 800 Ω
Shorted sensor detection..............................	< 18 Ω

TC input

Temperature range, TC J.............................	-100...+1200°C
Temperature range, TC K.............................	-180...+1372°C
Min. measurement range (span) - TC J & K...	50°C
Accuracy: the greater of...............................	Better than 0.05% of span or 0.5°C
Temperature coefficient: the greater of..	0.1°C/°C or ≤ ±0.01%/°C
Sensor cable resistance...............................	< 5 kΩ per wire
Cold junction compensation (CJC): Accuracy @ external Pt100 input..	Better than ±0.15°C
Cold junction compensation (CJC): Accuracy @ internal CJC..	Better than ±2.5°C
Internal CJC error detection..........................	Yes
External CJC error detection.........................	Yes - selectable via DIP-switch
Open Thermocouple detection......................	Yes - selectable via DIP-switch

Output specifications

Common output specifications

Updating time...	10 ms

Current output

Signal range..	0...23 mA
Programmable signal ranges........................	4...20 and 20...4 mA
Load (@ current output)................................	≤ 600 Ω
Load stability..	≤ 0.01% of span / 100 Ω
Sensor error indication.................................	3.5 mA or 23 mA / acc. to NAMUR NE43 or OFF
Open output...	< 20 V
HART protocol revisions...............................	HART 7

I.S. / Ex marking

ATEX..	II 3 G Ex ec IIC T4 Gc
IECEx...	Ex ec IIC T4 Gc
FM, US..	Cl. I, Div. 2, Gp. A, B, C, D T4 or Cl. I, Zone 2, AEx nA IIC T4
FM, CA..	Cl. I, Div. 2, Gp. A, B, C, D T4 or Cl. I, Zone 2, Ex nA IIC T4
EAC Ex...	2Ex nA IIC T4 Gc X

Observed authority requirements

EMC	2014/30/EU & UK SI 2016/1091
LVD	2014/35/EU & UK SI 2016/1101
ATEX	2014/34/EU & UK SI 2016/1107
RoHS	2011/65/EU & UK SI 2012/3032
EAC	TR-CU 020/2011
EAC Ex	TR-CU 012/2011

Approvals

ATEX	KEMA 10ATEX0147 X
IECEx	KEM 10.0068X
UKEX	DEKRA 21UKEX0055X
c FM us	FM17US0004X / FM17CA0003X
c UL us, UL 61010-1	E314307
EAC Ex	EAEU KZ 7500361.01.01.08756
DNV Marine	TAA00001RW