

XT42SI... - XT42SIH... - XTSOND/...

4-20 mA Transmitter for hazardous areas Temperature / Potentiometer and sensor



- Usable in hazardous areas, Gas or Dust : G or D according ATEX/94/9/CE
- 4-20 mA, 2-wire transmitter
- Inputs : RTD Pt100 to Pt1000, Ni100 to 1000, resistor 0 to 4,000 W
- J, K, T, E, S, W5 thermocouple input
- Potentiometer input
- Special linearization for level application
- Hart^a compatible
- Adjustable on large ranges
- Miniaturised and low cost due to SMT



XT42SI... and XT42SIH... transmitters for hazardous areas are based on modern Surface Mounted Technology (SMT) which allows cost and place reduction while producing an increase in performance: large range of calibration adjustments and linearization of sensors, RTD and thermocouples. **XT42SI** transmitters convert signals like temperature, level, potentiometer or resistor into a 4-20mA, 2-wire loop-powered output signal.

Zero and span adjustments are wide enough to be suitable to most requirements with only a unique model. **XT42SI** are linearized and offer 0.1% accuracy whatever the type is, analogic or programmable transmitter.

XT42SIH... transmitters according to HART[®] communication protocol are programmable by a PC equipped with our HCOM modem or by mean of a **Hand Held Communicator (HHC)**, see page 3). These transmitters offer all the advantages given by digital communication: adjustment by program without any restriction, supervision of errors, remote follow-up of the transmitter, predictive maintenance, follow-up of all your park of instruments, possibility to reverse 4 and 20mA process values, optional specific linearization on 45 segments.


XT42SI... series exist in several housings: standard version in a resin-module for sensor head terminal, IP65 housing, complete unit including temperature sensor or DIN rail housing 1 or 2 channels.

All electrical connections are done by screw terminals.

Special conditions for a safe use

XT42SI or **XT42SIH series** can be installed in any kind of hazardous areas This apparatus is a material in intrinsic safety or not.

See Chapter (categories according areas and types of power supplies)
It can be mounted in hazardous areas. N°LCIE 02 ATEX 6073X

General marking CE 0081  I/II M1/1, 2 or 3 G/D IP6X or IP5X
EEx ia I/IC T6, T5 or T4 T80°C or T95°C or T130°C
Ambient T° : -20°C ≤ Ta ≤ 50°C, 65°C or 80°C

Categories according areas and types of power supplies:

- **Powering by an intrinsic safety source, [ia] type:**
- **I M1 for firedamp mines**
 - > II 1G in presence of gases
 - > II 1D in presence of combustible and non-conductive dust
 - > II 1D-6X in presence of combustible and conductive dust
- **Powering by a non intrinsic safety source, 30VDC maximum:**
 - > II 2D-IP6X in presence of combustible dust or combustible and conductive dust
 - > II 3D-5X in presence of combustible and non conductive dust

Ordering Guide

XT42SI(H)-(1)-(2) / (3)

H for programmable models using HART protocol

(1) Input

Pt100 (P1, P2, P3 or P4 according range of XT42SI-...)

P,N,R Pt100 to Pt1000, Ni 100 to Ni1000, resistor 0 to 4,000 Ω

P on HART type

T Thermocouple (J,K,T,E,S,W5) except on XT42SIH-... type

NIV Potentiometer nominal value 900Ω to 100kΩ ()

(2) Housing

0 resin-moulded housing

30S DIN rail housing, single channel type

30D DIN rail housing, dual channel type

SOND Complete sensor (XT42SIH-...-SOND includes a transmitter)

(3) Complementary code

TI Industrial head for sensor mount

BCL IP65 housing, charged polyester

BAL IP 65 housing, aluminium alloy

AGR DIN rail clamp

LIN 45 points linearization on XT42SIH-... types

Installation in Dust area

For a use in presence of combustible dust or combustible and conductive dust, an envelope with a protection rated IP5X or IP6X and complying with the requirements of EN50281-1-1 is necessary.

Following conditions of installation shall be respected:

Max quantity of transmitters	Volume (dm ³)
1	0.19
2	0.40
4	1.65
8	8
24	22.60

Environmental

Operating temperature : -20 to +65°C (temporarily 80°C)

Cold junction compensation for model **XT42SI-T**: 0 to +50°C

Storage temperature : -40 to +80°C

Power supply

Loop powered 2-wire transmitter.

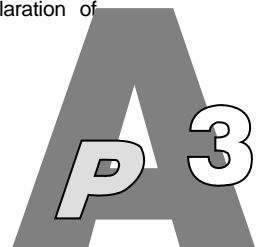
XT42SI : 10 to 30 VDC (P) 12 to 30VDC (T, NIV)

XT42SIH : 9 to 30 VDC **all types**

All power supplies from PROFSI37 series are fully compatible regarding intrinsic safety rules. On a functional point of view, model **PROFSI38-24075-A230-ISO** is the most suitable for **XT42SI** and **PROFSI38-24070-A230-ISOH** for the **XT42SIH**.

For a use in Dust area 21 or 22, a power supply non-intrinsically safe and max 30VDC can be used.

See "special conditions for a safe use" in the declaration of conformity.





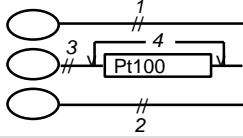
Technical specifications for analog transmitters XT42SI-...

RTD Pt100 transmitter

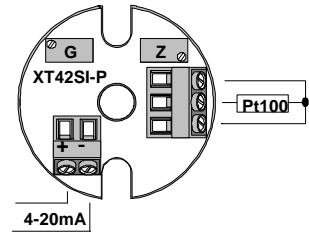
RTD 3 wire input; 4-20mA linearized output as per DIN 43760. Line compensated up to 10 Ω. On request, AP3 also realises: RTD sensors on 500 Ω or 1,000 Ω standards or various measuring ranges.

Model	Nominal range	Zero adjustment	Range adjustment	Accuracy	Thermal drift nominal range
XT42SI-P1	100°C	-50 to +15°C	50 to 100°C	0.13%	300 ppm/°C
XT42SI-P2	200°C	-50 to +20°C	100 to 200°C	0.15%	220 ppm/°C
XT42SI-P3	400°C	-50 to +20°C	200 to 400°C	0.20%	220 ppm/°C
XT42SI-P4	700°C	15 to +15°C	350 to 700°C	0.45%	220 ppm/°C
XT42SIH-P	400°C	-200 to 850°C		0.2°C	50 ppm/°C

Faults detection on sensor and on connections =>



Default	Type
1	wire 1 opened
2	wire 2 opened
3	sensor or wire 3 opened
4	sensor short circuited



Transmitter output
negative overflow => I out < 3mA
negative overflow => I out < 3mA
positive overflow => I out > 25mA
negative overflow => I out < 3mA

Thermocouple transmitter

J, K, T, E, S or W5 input

4-20mA linearized output as per NFC43321- IEC584.1 - DIN 43710

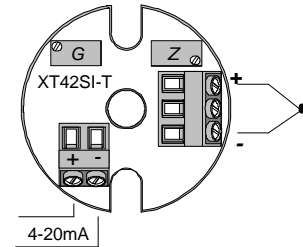
Cold junction for ambient temperature from 0 to +50°C

Model	Thermocouple input	Nominal range	Zero adjustment	Range adjustment	Accuracy
XT42-TJ1	J	350°C	fixed at	250 to 400°C	0.5%
XT42-TJ2	J	700°C	0	400 to 700°C	0.5%
XT42-TK2	K	700°C	other values	400 to 700°C	0.5%
XT42-TK3	K	1000°C	please contact us	750 to 1200°C	0.5%
XT42-TT	T	400°C		400°C	0.5%
XT42-TE	E	700°C		500 to 700°C	1.5%
XT42-TS	S	1600°C		1600°C	1%
XT42-TW5	W5	2100°C		2000 to 2300°C	3%

On request, AP3 can also provide other thermocouple inputs or various measuring ranges

Faults detection
Open thermocouple
Short-circuited thermocouple

positive overflow => I out > 25mA
I out = ambient temperature



Potentiometer transmitter

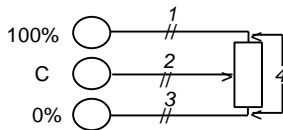
Very useful for level or displacement transmitters with potentiometer variation. This version is often used in speed variation, I/P converters, set-point generator or valve position feedback.

Maximum cursor resistance : 10 kΩ

Model	Nominal range	Zero adjustment	Range adjustment	Accuracy	Thermal drift nominal range
XT42SI-NIV	Min 0-1kΩ Max 0-100kΩ	± 5%	75 to 100% of potentiometer total value	0.15%	150 ppm/°C
XT42SI-NIV/SP100	Min 0-50Ω Max 0-950Ω	± 5%	75 to 100% of potentiometer total value	0.15%	150 ppm/°C
XT42SIH-NIV	Min 0-900Ω Max 0-100kΩ	± 100%	± 100%	0.15%	50 ppm/°C

Grey shaded types are commonly stock available

Faults detection of the sensor and of the connection



Default	Type	Transmitter output
1	wire 1 opened	I out ≈ 20mA
2	wire 2 opened	I out ≈ 25mA
3	wire 3 opened	I out < 4mA
4	no sensor	I out ≈ 25mA

Calibration procedure

XT42SI series are adjustable as per ranges in above tables.

To adjust the 4-20 mA output to the desired range, our transmitter needs to receive the exact images of the low process value corresponding to 4 mA and the high process value corresponding to 20 mA (resistor or μV).

1. Simulate the high process value on the XT42SI and adjust G potentiometer (span) to obtain a 20 mA output. For thermocouple, adjust full-scale output to 90% F.S. (except S type: 80% FS).
2. Simulate the low process value on the XT42SI and adjust Z potentiometer to obtain a 4-mA output
3. Repeat above operations until convenient accuracy is reached.

Unless otherwise specified, XT42SI Pt or TC transmitters are delivered as: 4mA => 0°C 20mA => nominal range (see tables).

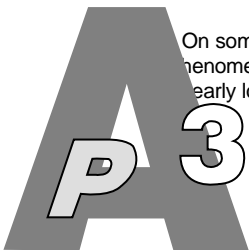


The equipment bears the CE mark, in accordance with directives 89-336/CEE and 73/23/CEE - electromagnetic compatibility. This system meets the following standards : EN50081-2, EN50081-2 and EN 50082-2.

To ensure a complete conformity the transmitters delivered in resin-moulded housing XT42SI(H)-.-0 must be mounted in a minimum IP20 enclosure.

This transmitter is guaranteed 1 year, parts and labour, for a product returned in our factory.

On some transmitters, a fallback on the current output might happen, when the gain is too high in comparison with the input temperature. This phenomena causes instability and non-linearity. In order to avoid it, first adjustment has to be done by setting the G potentiometer to a value nearly located under 20mA, then restart the adjustment increasing step by step.





Specifications of the programmable transmitters XT42SIH-...

Current output 4-20mA between 3.8 and 22 mA
Filter on the measure programmable between 0 and 60s
Accuracy 0.1% or 0.2°C. Thermal draft 50 ppm/°C
Acquisition : 10 measures / second
XT42SIH- provide the following features:

- inversion of the 4-20 mA signal into 20-4 mA (zero and full span)
- zero and span adjustable on the full range by programming
- direct display of the values in engineering units on the terminal or the PC equipped with the HCOM modem.
- Controlling the defaults programming the output at 3.8 or 22mA
 - Internal electronic circuits failure
 - Sensor short circuit or sensor broken wires
 - Fault on the potentiometer or its connections
- Tagging and predictive maintenance offered by the HART® protocol

Temperature transmitter XT42SIH-P

- **Inputs Pt100, Pt200, Pt500, Pt1000:** 3 or 2 wires, linearised output 4-20mA, according to NF EN 60751, measuring range : - 200°C to +850°C, accuracy 0.2°C
 - **Ni100 to Ni 1000 :** 3 or 2 wires, measuring range -60°C to +180°C accuracy 0.2°C
 - **Resistor input:** 0 to 4,000 ohm. Accuracy 0.1%
- Line compensation up to 100 Ohm without restriction on measuring span
Default configuration : input Pt100, 3 wires, range 0 to +400°C
Other input type or Pt100 or resistor difference configurable by the software "32H"

Potentiometer transmitter XT42SIH-NIV

Very useful for level or position transmitters using a potentiometer sensor, **XT42SIH-NIV** can also be used for speed variation controllers, I/P converters, setpoint generators or control valve position feed backs.

XT42SIH-NIV-.../LIN programmable transmitters enable access to a linearization chart such as to convert an horizontal cylindrical tank from a level transmitter that could be transformed in a volume measurement.

Zero and span programmable on full range of the potentiometer.
Maximal cursor resistor : 0.1% of full scale.

Model	Nominal range
XT42SIH-NIV-...	Min 900Ω Max 0-100kΩ
XT42SIH-NIV-.../LIN	Same transmitter with linearization on 45 segments

Programming tools

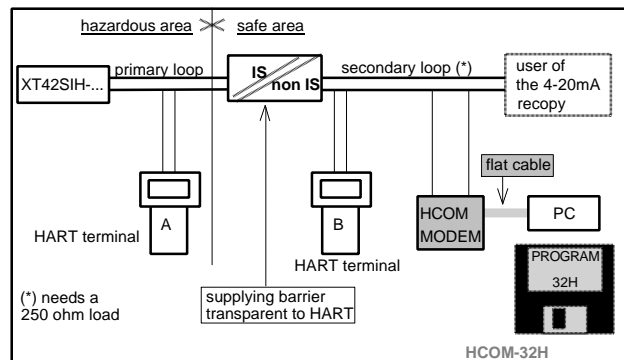
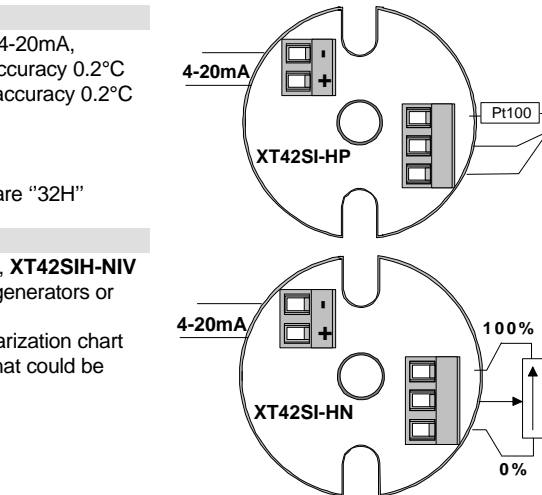
XT42SIH-... can be programmed on-line without opening the current loop. You can do it in 2 different modes :

- by mean of a Hand Held Computer (HHC)
- by mean of the HCOM modem made by a Puissance 3, connected to a PC on which you will start the "32H software"

The complete programming tool, called "HCOM-32H", includes a modem, the software and a flat cable.

HCOM-32H enables:

- the calibration and configuration of the transmitter,
- the choice of the input type: Pt100, Pt200, Pt500, Pt1000, Ni100 to Ni1000, resistor 0 to 4,000 ohm, potentiometer 0-100kΩ, differential Platinum or differential resistor.
- The connection type of the sensor: 2 wires, 3 wires or differential
- The damping factor
- The supervision of all defaults
- The reading of the connected transmitter
- The test of 4-20 mA loop
- The choice of tags and identifiers
- The programming and loading the linearization curves
- The unlimited record of linearization curves
- The availability of some DD files on request



A: Intrinsically Safe terminal (I.S.)

B: standard terminal (Non I.S.)

Terminal A cannot be connected on the secondary loop

Terminal B cannot be connected on the primary loop

XT42SIH-... transmitters must be supplied through an intrinsically safe barrier while configuration is in progress. If you connect the programming tool on the primary loop (intrinsically safe side circuit), the programming tool must be intrinsically safe.

Complete temperature sensors

XT42SI-...-SOND is a complete unit including temperature sensor equipped with the suitable transmitter.

XTSOND is the single sensor accessory that can be associated to any kind of housing of the **XT42SI** transmitter.

All kinds of mechanical assemblies and dimensional drawings are available.

To be specified :

- ➔ sensor RTD or thermocouple
- ➔ operating temperature range
- ➔ material
- ➔ sensor diameter
- ➔ sensor length
- ➔ sensor extension
- ➔ process connection

Please call our commercial department !

