

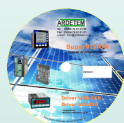
INTRINSIC SAFETY DIGITAL CONVERTERS

Programmable by μ Console or by PC software

Series TPI-SI/ μ C-SI

ARDETEM

SFERE



♦ This range is declined into 4 input versions, which can be combined with output extensions according to your requirements.

TPI-SI40/440/ μ C-SI32/322
TPI-SIPt100/ μ C-SIPt100
TPI-SI41/441/ μ C-SI31/321
TPI-SI50/ μ C-SI30I

Process - Option fast version
 Temperature: Pt 100 3 wire
 Universal - Option fast version
 Frequency

♦ Output options:

- A Isolated analog outputs: 1 or 2, active current output.
Return value in case of sensor break and/or self-diagnosis error.
- R Relay outputs: 2 (mode setpoint / window)
- N Isolated digital data link : RS485 2 wire (Modbus-Jbus)



This series has **intrinsic safety inputs**:

They are associated equipment, placed in safe area. They have input circuits for connection to a sensor placed in hazardous area, and output circuits for connection in safe area only.

These instruments have obtained a UE examination certificate of the type according to the prescriptions of the standards EN 60079-0 (2006), EN 60079-11 (2007), EN 60079-26 (2007), EN 61241-0 (2006) and EN 61241-11 (2006) in accordance with the directive ATEX 2014/34/UE:

marking 0344 Ex II(1)GD, [Ex ia] IIC and [Ex iaD].

Introduction

Retransmission of analog signals, or by RS485, local watching ...

A range of programmable converters which adapt closely to your applications.

They can be equipped with a μ Console, allowing a direct access to the programming.

♦ Programming by PC: Software SuperVISION (ARDETEM) or MCvision (SFERE)

Software for programming and analysis (Windows environment) allowing:

The storage of the configurations as files which can be consulted, modified, duplicated or loaded into the converters.

The files can be edited and printed with or without having a converter connected.

♦ Programming by μ Console

The series TPI-SI/ μ C-SI accepts 2 types of μ consoles:

- the old generation with 4 alphanumerical electroluminescent green digits,
- the new generation with graphical rear-lit LCD.

The LCD allows visualising 4 pieces of information:

- the value of the measure (5 mm high),
- the unit of the displayed measure, *
- the value of the anal. output or the name of the product (TAG)*
- the status of the relay outputs and the RS485 data link. *

*(3,5 mm high)

This μ console with LCD also allows showing these information vertically or horizontally, according to the sense in which the converter is mounted.

Functions

♦ Self-diagnosis:

- The instrument watches some of its parameters permanently. If an error is detected, it can be reported on the relays and on the analog outputs.

♦ Function simulation:

- Possibility to perform a simulation of the analog outputs and the measure in order to let the status of the analog outputs and the relays evolve and to validate the configuration of the instrument in the installation.

♦ Quick reading on the display:

- Of the min. and max., quick adjusting of the setpoints, visualisation of the input electrical value...

♦ Detection of the line or sensor rupture:

- Programming of the status on the relays.
- Return value programmable on the analog outputs in case of detection.
- Possibility of disconnection.

♦ Input scale overrange:

- The meter will indicate a caliber overrange by a blinking measure.

♦ Filtering of the measure:





- Programmable integration indice: allows stabilising the display in case of unsteady input.

♦ Access code:

- Possibility to protect the programming and to lock the access to some functions



Input features

Names of the converters		Types of INPUTS		Accuracy (of MR*)	Console resolution	Impe- dance	Features
<div>Universal</div> <div>TPI-SI 41/441 μC-SI 31/321</div> <div></div>	<div>Process</div> <div>TPI-SI 40/440 μC-SI 32/322</div> <div></div>	mA	± 22 mA	<±0.05%	10 μA	Drop 0.9V max	Programmable scale factor. Enlarging effect. Extraction of the √2. Input resolution 14 bits. Special linearisation on 20 points. Supply for 2 or 3-wire sensor: 14.0V min. (at 22 mA), 14.5V min.(at 20 mA) 23.1V max. Protection from short-circuits: 25 mA max. Sampling time 16.6 / 20 / 100ms. for a max. response time of 30 / 35 / 110 ms on the relays (fast version: F). Compensation of the drifts : zero and self-calibration. Overstepping ±5% of the MR.
		mV	± 110 mV		100 μV	≥ 1 MΩ	
		V	± 1.1 V		1 mV	≥ 1 MΩ	
			± 11 V				
	<div>Temperature</div> <div>TPI-SI PT100 μC-SI PT100</div> <div></div>	Sensor Pt100 Ω 3 wire		<±0.1%	0.1°C/ 0.1°F	Current 250μA	Influence of the line resistance in 3-wire measure inclu- ded in the grade for 0<RI<25Ω. Measure from -200/850°C and -328/1562°F. Thermic drift: 150ppm/°C Compensation of the drifts: zero and self-calibration. Sampling time: 100ms. Max. response time 410 ms on the relays.
		Standard IEC 751 (DIN 43760)					
		Sensor Ni100 Ω 3 wire		<±0.1%	0.1°C/ 0.1°F	Current 250μA	Measure from -60/260°C and -76/500°F. Line resistance <25Ω. Thermal drift: 150ppm/°C
		Differential measures from 2 sensors Pt100 Ω 2 wire Standard IEC 751		<±0.1%	0.1°C/ 0.1°F	Current 250μA	Measure from -200/270°C and -328/518°F. Line resistance <10Ω and Rmax. 400Ω. Thermal drift: 150ppm/°C
		Thermocouples Types J, K, N, S, B, W5, T, R, E, W, W3, L. Standard IEC 581		<±0.1%	0.1°C/ 0.1°F	≥ 1 MΩ	CJC efficiency: ±0.03°C/°C ±0.5°C from -5°C to 55°C Line resistance <25μV typical (50μV max.). Thermal drift: 150ppm/°C
		Resistive sensors		0.1% 0.5%	0.1Ω 1Ω	-	
0-400Ω and 0-2kΩ (0-8kΩ optional)							
Potentiometers from 100Ω to 10kΩ		0.1%	0.1%	-			
<div>Frequency</div> <div>TPI-SI50/μC-SI30I</div> <div></div>		Namur or contact: Supply 8.5 V (10 mA max)		0.025% of the measure	-	1KΩ	Frequency from 0.01Hz to 20 Hz in CONTACT input. Frequency from 0.01Hz to 50 kHz in NAMUR input. Programmable scale factor. Enlarging effect. Cut-off programmable. Special linearisation on 20 points on each input. Filtering of the measure: programmable integration indice, allows stabilising the display in case of unsteady input. Sampling time: 100ms + 1 period of the measured signal (min. measurable frequency programmable).

* MR : Measure range

ELECTRICAL PARAMETERS RELATED TO THE SAFETY							
	Terminals		Uo	Io	Po	Lo	Co
Sensor supply	E2 - E5		23.1V	100mA	578mW	4mH	138nF
Current (mA)	E2 - E3		6.5V	20.3mA	33mW	85mH	25μF
Voltage (mV)							
Thermocouple (tc)							
Voltage (1V, 10V)							
Resistance (440Ω)	E4 - E3						
Sensor (Ni100, Pt100, ΔPt100)	E2-E3- E4	E2-E4 E1-E4	13V	4.7mA	16mW	1.6H	1μF
Potentiometer							
Resistance (2kΩ, 8kΩ)	E1-E3- E4	E2-E3 E1-E3 E4-E3	6.5V	20.3mA	33mW	85mH	25μF
Um < 350 Vdc and Um < 265 Vac							

TPI-SI 50 / μ C-SI 30I (frequency input)						
ELECTRICAL PARAMETERS RELATED TO THE SAFETY						
	Terminals	Uo	Io	Po	Lo	Co
Contact / Namur	E1 - E2	9.6V	11.7mA	29mW	200mH	3.6 μ F
Um < 350 Vdc and Um < 265 Vac						

Options

Designation	Type	Features
Analog output A <div>mA/V</div>	Active current 0/4-20mA	Accuracy: 0.1% in relation to the display (at +25°C). Residual ripple $\leq 0.2\%$. Admissible load: $0\Omega < L_r < 600\Omega$. Programmable scale ratio with enlarging effect. Return value in case of sensor rupture and/or self-diagnosis error. Response time = 40ms.
Relay outputs R <div></div>	R: 2 independently programmable setpoint relays	Recording of the alarms. Alarm messages. Mode setpoint or window. Hysteresis independently programmable from 0 to 100% of the setpoint in the display unit. Time delay independently programmable from 0 to 25 sec. in 0.1 sec. increments NO contact: 5A - 250V on resistive load.
Digital data link N <div></div>	Digital data link RS 485 (2 wire) isolat. Protocoles Modbus Jbus (not available simultaneously with the relay outputs)	Slave number programmable from 1 to 255 with a transmission speed from 1200 to 19200 bauds.
Power supply 2 or 3	High voltage (2): 90 to 265 Vac and 88 to 350 Vdc Low voltage (3): 20 to 40 Vac and 20 to 64 Vdc (specify on order)	

Coding

	Available versions			
	1 analog A			2 analog
		+ 2 relays: R	+ digital: N	
Universal input	TPI-SI41/ μ C-SI31 A*	TPI-SI41/ μ C-SI31 AR* TPI-SI41/ μ C-SI31 R*	TPI-SI41/ μ C-SI31 AN* TPI-SI41/ μ C-SI31 N*	TPI-SI441/ μ C-SI321*
Process input	TPI-SI40/ μ C-SI32 A*	-	-	TPI-SI440/ μ C-SI322*
Pt 100 input	TPI-SIPt100/ μ C-SIPt100	-	-	-
Frequency input	TPI-SI50/ μ C-SI30I A	TPI-SI50/ μ C-SI30I AR	TPI-SI50/ μ C-SI30I AN	-
* Fast version F available as option: short response time (the letter F is encoded before the output).				
Example: For a converter with universal input in fast version with 1 analog and 2 relay outputs, powered in 230 V, request the reference: TPI-SI41/ μ C-SI31 AR-2 With process input, powered in 24 V with 1 analog and 2 relay outputs: TPI-SI40/ μ C-SI32 AR-3				

Description

Isolation:

1 kV-50Hz-1 min: Between analog and digital output, or between 2 analog outputs.

2 kV-50Hz-1min: Between supply and [analog output / relay contact]. Between analog outputs and relay contact.

3.8 kV -50Hz-1 min. : Between input and [supply / outputs].

Rejection rate:

Common mode: 130dB Serial mode 66dB 50/60Hz

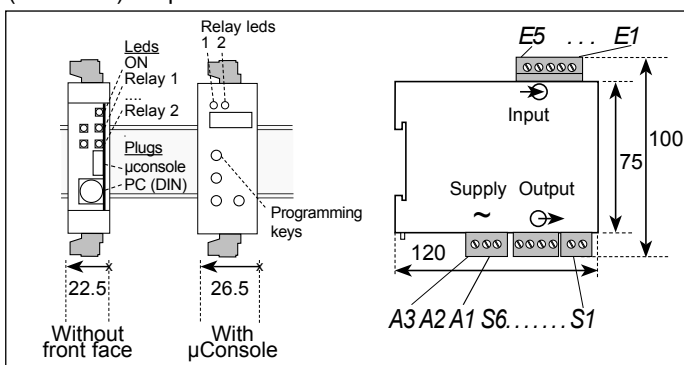
Power draw:

• 3.5W max. / 5.2VA max.

Environment:

- Operating temperature: -10°C to +50°C.
- Storage temperature: -20°C to +70°C.
- Relative dampness: 80% annual average.

Dimensions: Case: 75 x 22.5 x 120 mm
(H x L x D) μ Console: 80 x 26.5 x 120 mm



• **Protection:** Case / terminals: IP 20

• **Housing:** Self-extinguishing case of black UL94VO ABS
For latching on symmetrical DIN rail (mount the cases vertically, leaving a 10 mm space between each). Plug-off connectors for screwed connectings (2.5mm², flexible or rigid).

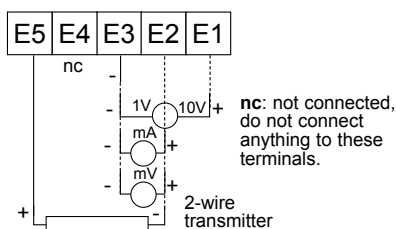
• **Weight:** 250g (with packaging)

• **Standards:** Complies with standards IEC 61000-6-4 on rejections and IEC 61000-6-2 immunity (in industrial environment) CE marking

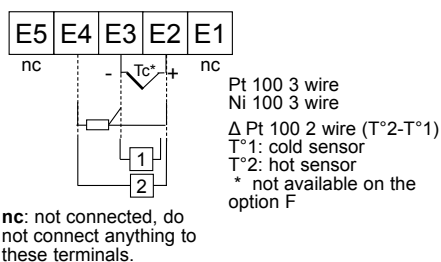
EN 60079-0 (2006), EN 60079-11 (2007), EN 60079-26 (2007), EN 61241-0 (2006) and EN 61241-11 (2006) according to the directive ATEX 2014/34/UE

Wiring

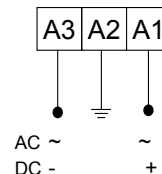
Process input



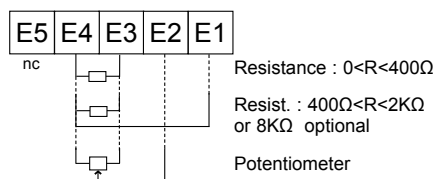
Temperature input



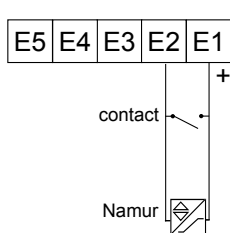
Supply



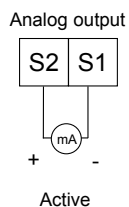
Resistance/potentiometer inputs



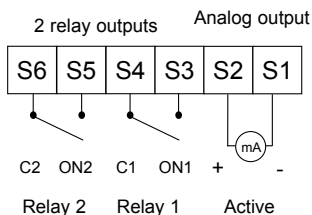
Frequency input



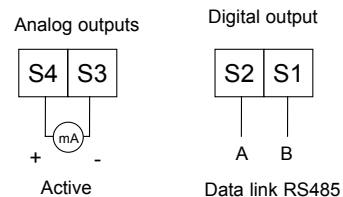
Outputs of the TPI-SI 40/41/50 A μ C-SI 32/31/30I A



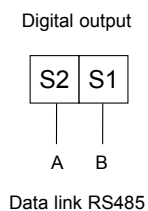
Outputs of the TPI-SI 41/50 AR μ C-SI 31/30I AR



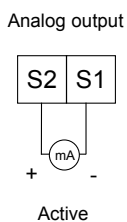
Outputs of the TPI-SI 41/50 AN μ C-SI 31/30I AN



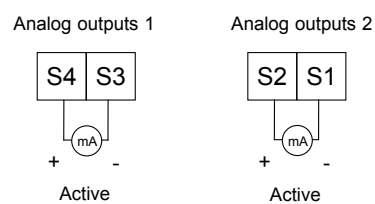
Outputs of the TPI-SI 41/50 N μ C-SI 31/30I N



Outputs of the TPI-SI PT100 μ C-SI PT100



Outputs of the TPI-SI 440/441 μ C-SI 322/321



This appliance is designed for industrial applications. It has to be installed in an electrical cabinet, or equivalent.



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