

### ■ ELECTRONIC TEMPERATURE MEASUREMENT

- HART Protocol
- Universally programmable for RTDs
  - Thermocouples
  - Resistance-sensor
  - mV-sensor
- Output liner to temperature with input signal from RTDs and thermocouples
- Custom specific linear isolation with max. 32 points for sensors with  $\Omega$ - or mV -output
- Analogue output 4...20mA, invertible, 2 wire design
- Signalling individually configurable for possible errors of the sensor system
- Ex class protection, intrinsically safe
  - : II 1G EEx ia IIB/IIC T4/T5/T6
  - : II 2G EEx ib IIB/IIC T4/T5/T6
- EMC Conformity per
  - : DIN EN 50 081-1
  - : DIN EN 50 082-2
  - : NAMUR NE 21
- Isolation voltage 1500VAC between sensor and current loop

### ■ STANDARD MODEL : ST-32.10.000

- Ex-class protection : EEx ia Model : ST-32.10.002
- Ex-class protection : EEx ib Model : ST-32.10.004

### ■ GENERAL FEATURE

- 100% Rh protection, moisture condensation permissible
- Increased ambient temperature
- Configurable via
  - : HART Communicator
  - : PC. Windows-programme
- Terminal connections with captive screws
- CE-Conformity

### ■ IMPORTANT FEATURES

#### ■ THE ST32-HART TRANSMITTER RANGE

The digital temperature transmitter ST-32 range is designed for universal use in the process industry. Comprehensive individual configuration possibilities like, for example, type of sensor, measuring range and error signalling, high accuracy, galvanic isolation and excellent EMI protection characterize these transmitters. The compact head mounting case fits in almost any DIN connecting head with form B.

During configuration, by means of HART communicator model 275 or a FSK modem(eg VIATOR) via the RS 232-C of a standard DOS PC, any one of 15 types of sensors can be selected.

Measured temperatures are from -270°C up to 1820°C.

The transmitters are delivered with a basic configuration (see order information). Alternatively, upon request, transmitter can be delivered with a customized configuration within the given limits



### ■ INTRODUCTION ABOUT SENSOR CONNECTION

- RTDs per EN 60 71 resp. DIN 43 760 in 2-, 3- and 4-lead connection, the connection-system used is configurable and ensures an optimal lead wire compensation.
- Thermocouple per IEC 584 resp. DIN 43 710 cold junction compensation (CJC) is built-in, the use of an external CJC is selectable via configuration.
- Resistance-sensor up to 5000 $\Omega$  in 2-, 3- and 4-lead connection, configurable compensation of the connection cable
- mV-sensors up to 1200mV

### ■ ORDERING INFORMATION

#### ■ BASIC CONFIGURATION

Input signal	Pt 100 in 3-lead connection
Measuring range	0~150°C
Output signal	4~20mA
Output limits	NAMUR (lower limit : 3.8mA upper limits : 20.5mA)
Damping	1 s
Mains	50MHz
Signalling of sensor error	NAMUR down scale (<3.6mA)



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SHICO.

MODEL : ST-32 Series

## DIGITAL TEMPERATURE TRANSMITTER(SMART TYPE)

## ■ SPECIFICATION

■ INPUT CONFIGURABLE : type of sensor and measuring range

Description	Material	Spec	max. measuring rang	minimum measuring span
RTDs	Pt 100	EN 60 751	-200 ~ + 850 °C <sup>(1)</sup>	10K or 3.8Ω, whichever is greater
	JPt 100	JIS Z 8751	-200 ~ + 500 °C	
	Ni 100	DIN 43760 : 1987-09	-60 ~ + 250 °C	
Thermocouple	type T, Cu-CuNi	IEC 584	-270 ~ + 400 °C	50K or 2mV whichever is greater
	type E, NiCr-CuNi	IEC 584	-270 ~ + 1000 °C	
	type J, Fe-CuNi	IEC 584	-210 ~ + 1200 °C	
	type L, Fe-CuNi	DIN 43710 : 1985-12	-200 ~ + 900 °C	
	type K, NiCr-Ni	IEC 584	-270 ~ + 1372 °C	
	type N, NiCrSi-NiSi	IEC 584	-270 ~ + 1300 °C	
	type U, Cu-CuNi	DIN 43710 : 1985-12	-200 ~ + 600 °C	
	type R, PtRh-Pt	IEC 584	-50 ~ + 1768 °C	
	type S, PtRh-Pt	IEC 584	-50 ~ + 1768 °C	
type B, PtRh-PtRh	IEC 584	0 ~ + 1820 °C		
resistance-sensor			0~700Ω / 5000Ω	4Ω / 32Ω
mV-sensor			-400~+1200mV	2mV up to 32mV

■ RTDs/resistance-sensor

• Measuring deviation per DIN IEC 770, 23°C±5K

RTDs		±0.08K
Resistance-sensor		±0.03Ω or ±0.006% FS in Ω, whichever is greater
Sensor current		approx. 0.2mA
Temperature coefficient $T_c$	RTDs	±(0.02% FS + 0.09)K / 10K <sub>Tamb</sub>
	resistance-sensor	±(0.02% FS + 0.01)Ω / 10K <sub>Tamb</sub>
Lead wire connection		configurable : 2-lead, 3-lead symmetric
Connection leads	effect	±0.02Ω / 10Ω
	max. permissible resistance	30Ω each lead, 3-lead symmetric
Signalling of sensor error		configurable

■ Thermocouples

measuring deviation per DIN IEC 770, 23°C±5K		±0.3K or ±5μV, whichever is greater
cold junction compensation at 23°C±5K		±0.8K
temperature coefficient $T_c$ of cold junction compensation		±0.1K / 10K <sub>Tamb</sub>
temperature coefficient $T_c$	type T, E, J, L, K, N, U	±(0.03% FS + 0.07)K / 10K <sub>Tamb</sub>
	type R, S, B	±(0.03% FS + 0.4)K / 10K <sub>Tamb</sub>
connection leads	effect	±0.1μV / 10Ω
	max. permissible resistance	250Ω
signalling of sensor error		configurable

■ mV-sensor

measuring deviation per DIN IEC 770, 23°C±5K		±5μV or ±0.006% FS in mV, whichever is greater
temperature coefficient $T_c$		±(0.03% FS + 0.002)K / 10K <sub>Tamb</sub>
connection leads	effect	±0.1μV / 10Ω
	max. permissible resistance	250Ω
Total measuring deviation		sum of input + output per DIN IEC 770, 23°C ± 5K
Signalling at analogue output		with sensor error and internal malfunction
NAMUR NE 43	up scale	> 21.0mA
	down scale	< 3.6mA
Configurable	up scale	12mA up to 22.5mA
	down scale	3.5mA up to 12mA



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**SHICO.**

MODEL : ST-32 Series

**DIGITAL TEMPERATURE TRANSMITTER(SMART TYPE)****▣ OPERATING SPECIFICATION**

Analogue output for measuring range	configurable : 4 ... 20mA or 20 ... 4mA, 2 wire design
with type of sensor RTDs	linear to temperature per EN 60 751 / DIN 43 760 : 1987 - 09
with type of sensor thermocouple	linear to temperature per ICE 584 / DIN 437 710 : 1985 - 12
by simulation mode	independent from input signal, simulation value configurable from 3.5mA up to 22.5mA

**▣ OUTPUT LIMITS CONFIGURABLE**

NORMAL SPECIFICATION	lower limit : from 3.6mA up to 4.0mA
	upper limit : from 20.0mA up to 21.5mA
NAMUR NE 43	lower limit : 3.8mA upper limit : 20.5mA
Not active	lower limit : 3.6mA upper limit : 21.5mA
Load $R_A$	$R_A \leq (U_B - 12V) / 0.022A$ with $R_A$ in $\Omega$ and $U_B$ in V
Load effect	no measurable effect
Measuring deviation per DIN IEC 770, 23°C $\pm 5K$	$\pm 0.04\%$ of measurable effect
Temperature coefficient $T_c$	$\pm 0.1\%$ of measuring span / $10K_{T_{amb}}$
Damping	configurable : minimal 0.5s, 1s upto 60s
Measured value update	approx. 3/s
Power supply effect	no measurable effect

**▣ Special features**

Isolation voltage (input versus analog output)	1500VAC, 60s
Ambient and storage temperature	
Standard range	-40 ... +85°C
Option : increased range	min. -50°C max. +105°C <sup>1)</sup>
Climate application class	GPA DIN 40040
Maximum permissible humidity	100% relative humidity (unlimited with isolated sensor connection wires), moisture condensation permissible DIN IEC 68 2-30 Var.2
Vibration	10 ... 2000 Hz 5g DIN IEC 68 2-6
Shock	DIN IEC 68 2-27 $g_N = 30$
Salt fog	DIN IEC 68 2-11
Configuration and calibration data	permanently stored in EEPROM
Testing current to monitor sensor	nom, 1 $\mu$ A during testing cycle, otherwise 0 $\mu$ A
Self-monitoring	automatic execution of initial test after connection to power supply, thereafter monitoring due to internal male-function
Warm-up time	approx. 5 Min
Communication	HART Protocol
Guarantee	5 years for performance with standard range of ambient temperature, legal warranty with increased range of ambient temperature

**▣ Power supply  $U_B$** 

Model ST32.10.000(without Ex-protection)	DC 12 ... 42V
Model ST32.10.002, ST32.10.004(with Ex-protection)	DC 12 ... 30V
Input power supply protection	reverse polarity

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# SHICO.

MODEL : ST-32 Series

## DIGITAL TEMPERATURE TRANSMITTER(SMART TYPE)

### PROTECTION SPECIFICATION

Ex-protection	EC Type Test DMT 98 ATEXE 007X		
Model ST32.10.002	II 1 G EEx ia IIB / IIC T4 / T5 / T6		
Model ST32.10.004	II 2 G EEx ib IIB / IIC T4 / T5 / T6		
Permissible ambient temperature	-50~+85°C with T4 -50~ +75°C with T5 -50~ +60°C with T6		
Maximum values for connection of the Current loop circuit (connections + and -)	$U_i = 30V$ $C_i = 7.8nF$	$I_i = 130mA$ $L_i = 100\mu F$	$P_i = 800mW$
Maximum values for connection of the Sensor circuit (connections 1 up to 4)	$U_o = 11.5V$ Group IIB : Group IIC :	$I_o = 5.2mA$ $C_o = 11\mu F$ $C_o = 1.6\mu F$	$P_o = 15mW$ $L_o = 1mH$ $L_o = 1mH$
Electromagnetic compatibility (EMC)	CE - Conformity per DIN EN 50081-1 (March 93) and DIN EN 50082-2(February 96) NAMUR NE 21 (May 93)		

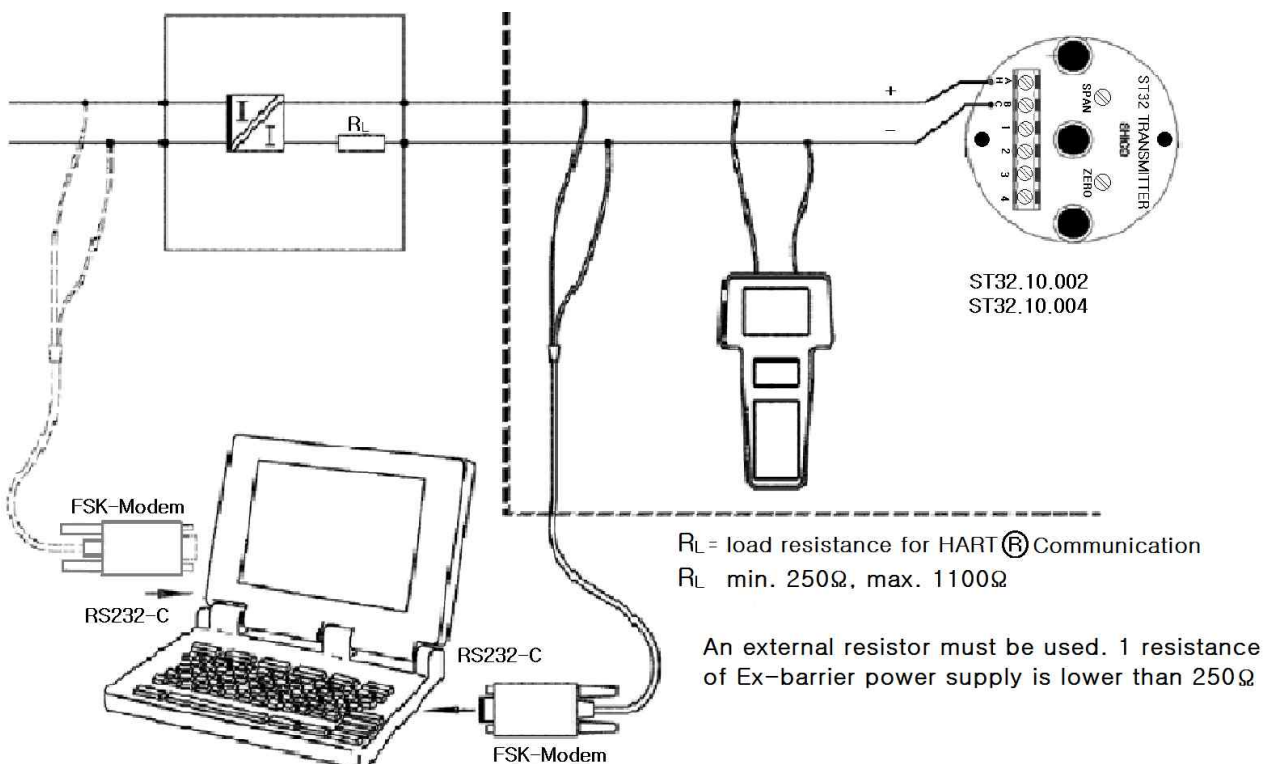
### CASE SPECIFICATION

Material	plastic		
Degree of protection	Case	IP 66 EN 60529 / IEC 529	
	Terminal connections	IP 00 EN 60529 / IEC 529	
Cross section of terminal connections	max. 1.5mm <sup>2</sup> , screws captive		
Weight	approx. 70g		
Dimension	see drawings		

### WIRING SCHEME

Following must be observed, particularly with applications in hazardous area :

- The wiring scheme
- The total of all output values of all simultaneously connected in instruments (Ex-barrier, FSK, modem, HART communicator) must not exceed the permissible maximum values of the ST32.



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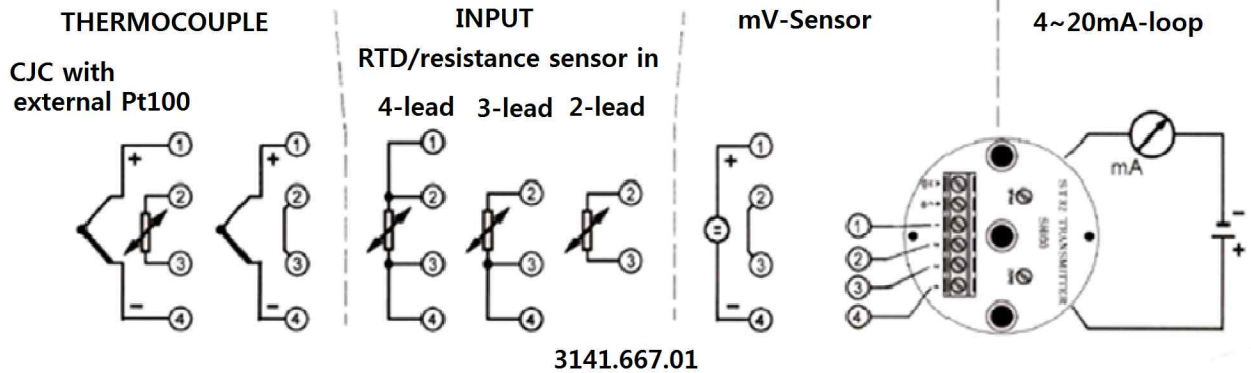
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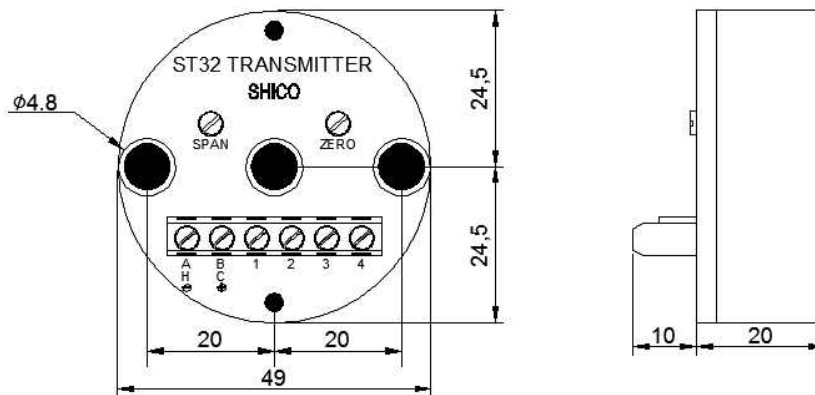
# SHICO. DIGITAL TEMPERATURE TRANSMITTER(SMART TYPE)

MODEL : ST-32 Series

## DESIGNATION OF TERMINAL CONNECTIONS



## DIMENSION



## CONFIGURATION-SET (ACCESSORY)

The Configuration-Set contains

- Configuration Software (3/5"disk, Online Help)
- HART adapter(modem)
- plug adapter (9-pin/25pin plug)

## ORDERING INFORMATION

Order code per price list

Input signal	Pt 100 in 3-lead connection	Signaling of sensor error	NAMUR down scale (<3.6mA)
Measurement range	0~150°C	Damping	1s
Output signal	4~20mA	Mains	50Hz
Output limits	NAMUR (lower limit : 3.8mA upper limit : 20.5mA)		

\* Use the sheet "customer's specification" of the price list, when ordering temperature transmitter configured to customer specification. Parameters which are not given will be set corresponding to the basic configuration.



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