



**Temperature Transmitter
SITRANS TH400**

7NG3214 SITRANS TH400 with PROFIBUS PA
7NG3215 SITRANS TH400 with FOUNDATION Fieldbus

sitrans

SIEMENS

SIEMENS

SITRANS T

Temperature transmitter SITRANS TH400




Operating Instructions

<u>Introduction</u>	1
<u>General safety notes</u>	2
<u>Description</u>	3
<u>Assembly</u>	4
<u>Connecting</u>	5
<u>Functions</u>	6
<u>Service and maintenance</u>	7
<u>Technical data</u>	8
<u>Dimension drawings</u>	9

7NG3214 SITRANS TH400 with PROFIBUS PA
7NG3215 SITRANS TH400 with FOUNDATION fieldbus

Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

 Danger
indicates that death or severe personal injury will result if proper precautions are not taken.
 Warning
indicates that death or severe personal injury may result if proper precautions are not taken.
 Caution
with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.
Caution
without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.
Notice
indicates that an unintended result or situation can occur if the corresponding information is not taken into account.


If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel**. Within the context of the safety notes in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

 Warning
This device may only be used for the applications described in the catalog or the technical description and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens. Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

Trademarks

All names identified by ® are registered trademarks of the Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Table of contents

1	Introduction	7
1.1	Purpose of this documentation	7
1.2	History	7
1.3	Further information.....	8
2	General safety notes	9
2.1	General information	9
2.2	Correct usage.....	9
2.3	Laws and directives	9
2.4	Measures	10
2.5	Qualified Personnel.....	11
3	Description	13
3.1	Summary.....	13
3.2	Application range	13
3.3	Product features.....	13
3.4	Type plate structure	14
3.5	Mode of operation	15
3.6	System communication.....	16
4	Assembly	17
5	Connecting	19
5.1	Bus installation	19
5.2	General connection notes.....	20
5.3	Connection in hazardous zones with explosive atmospheres	21
5.4	Connection assignments.....	23
5.5	Options for sensor connection assignments.....	24
6	Functions	27
6.1	Summary.....	27
6.2	Device address	27
6.2.1	SITRANS TH400 PROFIBUS PA	27
6.2.2	SITRANS TH400 FOUNDATION field bus	28
6.3	Device delivery condition	29
6.4	Simulation mode	30
6.4.1	Simulation mode in PROFIBUS PA	30
6.4.2	Simulation mode with FOUNDATION fieldbus	30

7	Service and maintenance	31
8	Technical data	33
9	Dimension drawings	41
	Index.....	43

Introduction

1.1 Purpose of this documentation

These instructions contain all the information you need for commissioning and using the device.

It is aimed both at persons mechanically installing the device, connecting it electronically, configuring the parameters and commissioning it as well as service and maintenance engineers.

1.2 History

This history establishes the correlation between the current documentation and the valid firmware of the device.

The documentation of this edition is applicable for the following firmware variants:

Edition	Firmware identification type plate	System integration	Installation path for PDM
PROFIBUS PA version:			
01 02/2007	FW: V2.03	PDM V6.0 DD rev. 1.00	SITRANS TH400
FOUNDATION fieldbus version:			
01 02/2007	FW: V2.03	Standard fieldbus compatible control systems	Not relevant.

The most important changes in the documentation when compared with the respective previous edition are given in the following table.

Edition	Remarks
01 02/2007	First edition

1.3 Further information

Information

The contents of these instructions shall not become part of or modify any prior or existing agreement, commitment or legal relationship. All obligations on the part of Siemens AG are contained in the respective sales contract which also contains the complete and solely applicable warranty conditions. Any statements contained herein do not create new warranties or modify the existing warranty.

The content reflects the technical status at the time of printing. We reserve the right to make technical changes in the course of further development.

Worldwide contact person

If you need more information or have particular problems which are not covered sufficiently by the operating instructions, get in touch with your contact person. You can find contact information for your local contact person in the Internet.

Product information on the Internet

The Programming Manual is an integral part of the companion CD, which may be ordered separately. In addition, the Programming Manual is available on the Internet on the Siemens homepage.

On the CD you will also find the technical data sheet containing the ordering data, the Device Install software for SIMATIC PDM for subsequent installation and the required software.

See also

Instructions and Manuals (<http://www.siemens.com/processinstrumentation/documentation>)

Product information on SITRANS T in the Internet (<http://www.siemens.com/sitranst>)

Contacts (<http://www.siemens.com/processinstrumentation/contacts>)

General safety notes

2.1 General information

This device left the factory free from safety problems. In order to maintain this status and to ensure safe operation of the device, please observe the safety information and warnings contained in these instructions.

2.2 Correct usage

The device may only be used for the purposes specified in these instructions.

Insofar as they are not expressly stated in these instructions, all changes to the device are the sole responsibility of the user.

2.3 Laws and directives

The regulations of the test certification valid in your country are to be observed.


Electrical connection in hazardous zones with explosive atmospheres


The national directives and laws for hazardous areas valid in your country must be observed for electrical connection. For example, in Germany these are:


- Operational safety regulations
- Directive for the installation of electrical systems in hazardous areas DIN EN 60079-14 (previously VDE 0165, T1)

2.4 Measures

For the sake of safety, the following precautions must be observed:

 Warning
<p>Type of protection "pressure-proof encapsulation"</p> <p>Devices with "pressure-proof encapsulation" protection may only be opened when off circuit.</p> <p>"Intrinsically safe" protection type</p> <p>"Intrinsically-safe" devices lose their certification as soon as they are operated on circuits which do not correspond with the test certification valid in their country.</p> <p>Protection type "limited energy" nL (zone 2)</p> <p>Devices with "limited energy" may be connected and disconnected while in operation.</p> <p>Protection type "non-sparking" nA (zone 2)</p> <p>Devices with "non-sparking" protection may only be connected and disconnected when off circuit.</p>

 Warning
<p>Exposure to aggressive and hazardous media</p> <p>The device can be operated both at high pressure and with aggressive and hazardous media. Therefore, improper use of this device may lead to serious injury and or considerable damage to property. Above all, it must be noted when the device was in use and is to be exchanged.</p>

 Caution
<p>Electrostatic Sensitive Devices (ESD)</p> <p>This device contains electrostatic sensitive devices. Electrostatic sensitive devices may be destroyed by voltages that are undetectable to a human. Voltages of this kind occur as soon as a component or an assembly is touched by a person who is not grounded against static electricity. The damage to a module as a result of overvoltage cannot usually be detected immediately. It may only become apparent after a long period of operation.</p>

2.5 Qualified Personnel

Qualified personnel are people who are familiar with the installation, mounting, commissioning, and operation of the product. These people have the following qualifications:

- They are authorized, trained or instructed in operating and maintaining devices and systems according to the safety regulations for electrical circuits, high pressures and aggressive as well as hazardous media.
- For explosion-proof devices: They are authorized, trained, or instructed in carrying out work on electrical circuits for hazardous systems.
- They are trained or instructed in maintenance and use of appropriate safety equipment according to the safety regulations.
- They should be trained in first aid.

Description

3.1 Summary

The temperature transmitter SITRANS TH400 is available in to basic versions for the fieldbus protocols:

- PROFIBUS PA (7NG3214 ...)
- FOUNDATION fieldbus (7NG3215 ...)

3.2 Application range

- Linearized temperature measurement with a resistance thermometer or thermocouple;
- Difference, mean value, or redundant temperature measurement with resistance thermometer or thermocouple;
- Linear resistance and bipolar millivolt measurements;
- Difference, mean value or redundant resistance and bipolar millivolt measurement.

Install and operate the explosion-proof transmitter in hazardous areas according to the specifications of the EC-type examination certificate per ATEX and these Operating Instructions or the inspection certificate valid in your country.

3.3 Product features

- Installation in the type B connection head per DIN 43729 or a larger connection head.
- Transmitter with PROFIBUS PA communication
- Transmitter with FOUNDATION fieldbus communication
- Capable of communication via PROFIBUS PA and FOUNDATION fieldbus. For example, sensor activation and measuring range can be programmed with it.
- Configuration via PROFIBUS PA with SIMATIC PDM (SITRANS TH400 as PROFIBUS PA version) or via FOUNDATION fieldbus with Emerson AMS, handheld 375 (SITRANS TH400 as FOUNDATION fieldbus version).
- The simulation mode in FOUNDATION fieldbus is activated with a magnetic pin.
- Polarity-independent bus connection
- 24 bit analog-to-digital converter for a high resolution

3.4 Type plate structure

- PROFIBUS PA function blocks: Two analog
- FOUNDATION fieldbus function blocks: Two analog and one PID
- FOUNDATION fieldbus functionality: Basic or LAS.
- Galvanical isolation
- Intrinsically safe version for use in hazardous areas
- Special characteristic curve

3.4 Type plate structure

The type plate is located on the housing and carries the order number and other important product information; see following example.

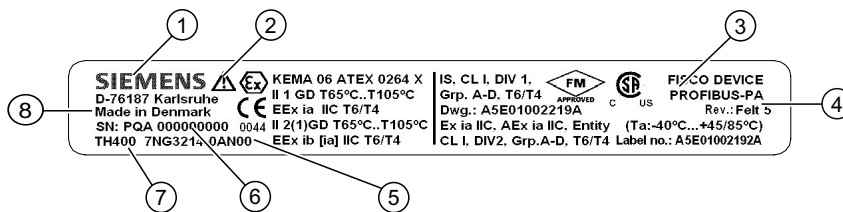


Figure 3-1 Example: Type plate

- | | | | |
|---|---|---|--|
| ① | Manufacturer | ⑤ | Order number |
| ② | Pay attention to the Operating Instructions | ⑥ | Serial number with coded production year and production month. |
| ③ | Version; PROFIBUS PA or FOUNDATION fieldbus | ⑦ | Type designation |
| ④ | Hardware and firmware revision | ⑧ | Place of manufacture |

3.5 Mode of operation

In what follows, the mode of operation of the transmitter is explained using the function block diagram.

The two versions of the SITRANS TH400 (7NG3214 ... and 7NG3215 ...) are distinguished solely by the type of the fieldbus protocols (PROFIBUS PA or FOUNDATION fieldbus).

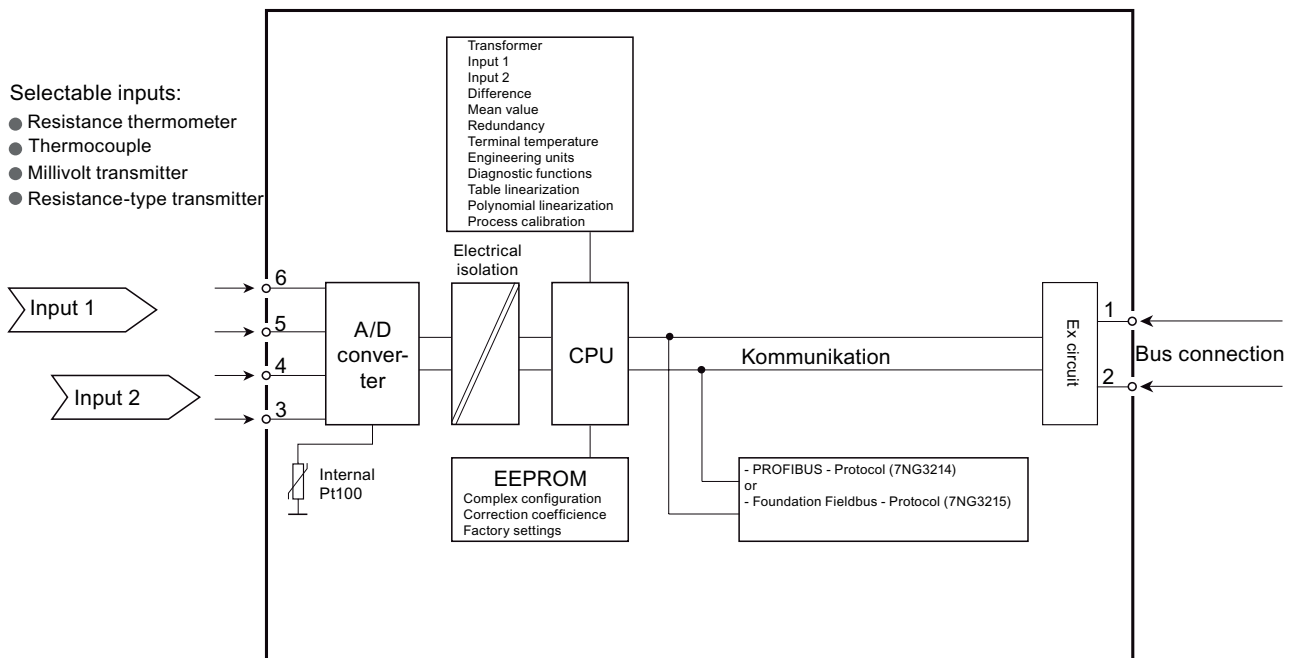


Figure 3-2 Function block diagram SITRANS TH400

3.6 System communication

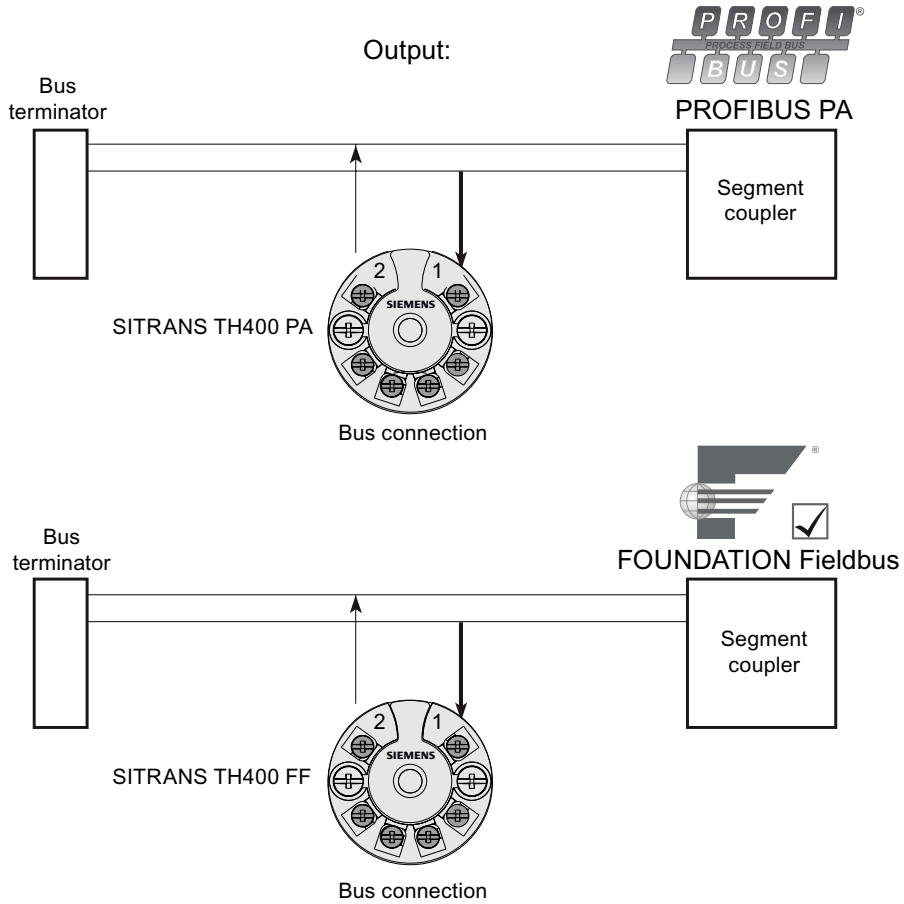


Figure 3-3 Communications interface

Assembly

Notice

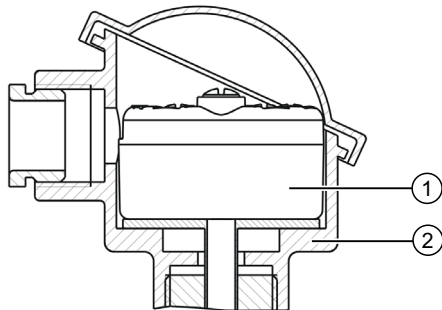
The transmitter is intended only for installation in the type B connection head or larger.

Caution

Before assembling the head-mounted transmitter, observe the following notes:

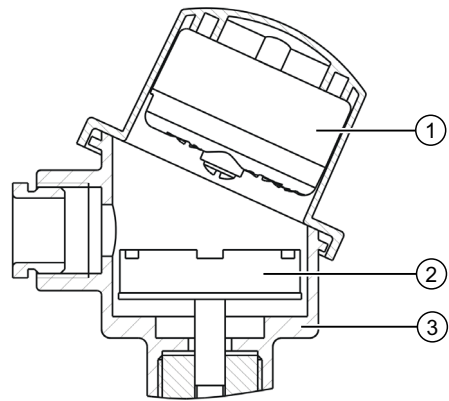
- Install the SITRANS TH400 transmitter in a suitable housing.
- Adapt the degree of protection and the housing material to the specific requirements.
- Comply with the ambient conditions specified in the technical data.

- Springs and fixing screw for the transmitter are included in the delivery.
- The transmitter may be secured optionally in the base of the connection head or in the raised cover of the connection head.



Securing the transmitter in the connection head base

- ① Transmitter
- ② Connection head



Securing the transmitter in the connection head cover

- ① Transmitter
- ② Ceramic base of the measuring element
- ③ Connection head

Connecting

5.1 Bus installation

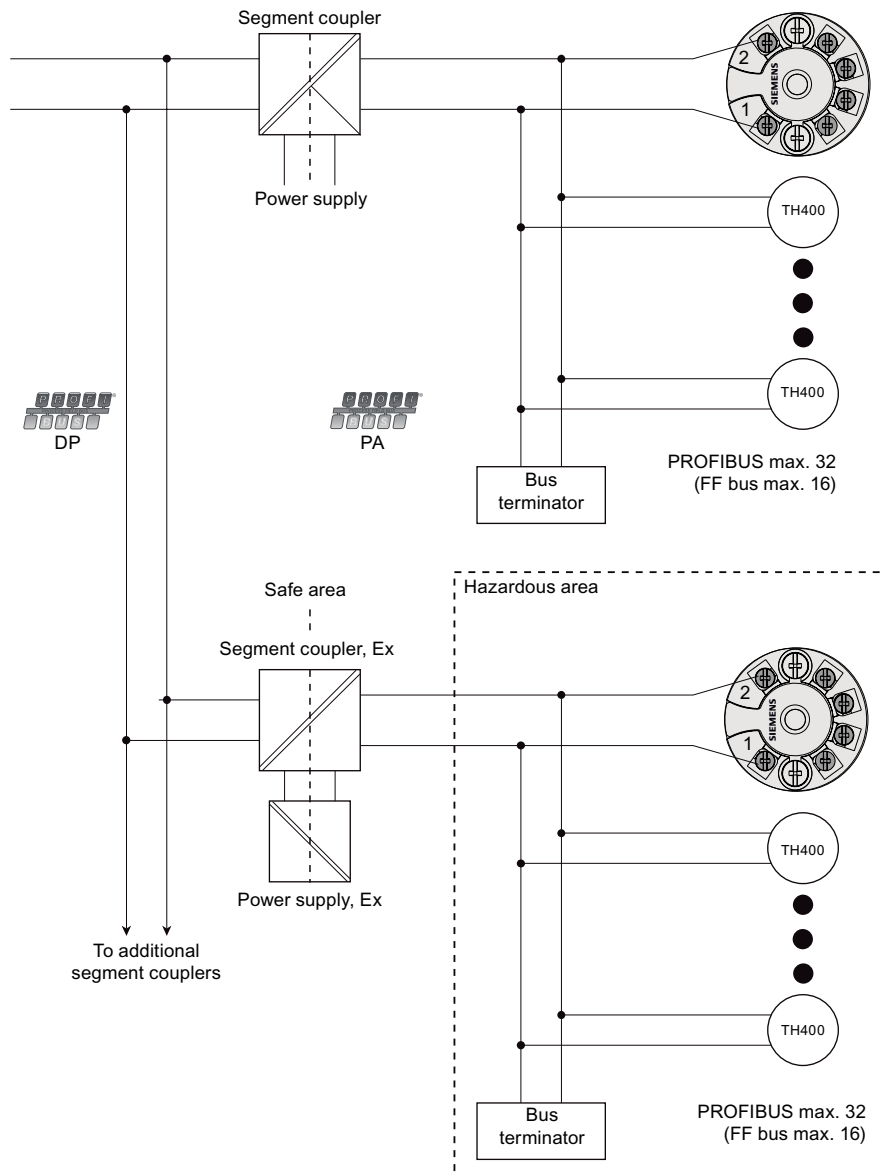


Figure 5-1 Bus installation using PROFIBUS PA as an example. The FOUNDATION fieldbus should be connected correspondingly.

5.2 General connection notes

 **Warning**

Electrical connection in hazardous zones with explosive atmospheres

For electrical connection, observe the national directives and laws for hazardous areas valid in your country. For example, in Germany, the following hold:

- the working reliability regulation;
- the directive for the installation of electrical systems in hazardous areas, DIN EN 60079 - 14 (previously VDE 0165, T1)
- the EC-type examination certificate.

If a power supply is required, check to see if the specifications on power supply agree with those on the type plate and the inspection certificate valid in your country.

- Connecting the sensor, cf. chapter: Options for sensor connection assignments (Page 24)
- Bus connection:
The transmitter is connected with its connecting terminals "1" and "2" to the segment coupler. The transmitter acts independent of polarity.
- Connection cable:
 - Max. cable cross-section 2.5 mm²;
 - Install the signal cable separately from cables with voltages of $U > 60$ V;
 - Use cable with twisted wires;
 - Avoid getting too close to large electrical systems or use shielded cables;
 - Full specification according to PROFIBUS PA or FOUNDATION fieldbus only with shielded cables;
 - Use only cable entries and covers that are approved for the relevant use;
 - At an ambient temperature of $T \geq 60^{\circ}\text{C}$, use heat-resistant cables approved at least for an ambient temperature at least 20 K higher.

5.3 Connection in hazardous zones with explosive atmospheres

 Warning
--

When installing the device in hazardous areas, use housings with the degree of protection corresponding to the inspection certificate valid in your country. Observe the specifications of the EC-type examination certificate or the inspection certificate valid in your country.

The bus input circuit and sensor circuit are galvanically isolated and tested with a test voltage of AC 500 V/1 minute. According to the intrinsic safety rules of explosion protection, the requirements for separating the bus input circuit from the ground are met.

The galvanical isolation does not meet the requirements for an "infallible galvanical isolation" in the sense of the intrinsic safety standards EN 50020 or IEC 60079-11. Be sure to observe the construction directives valid at the construction location for electrical resources in hazardous areas. In Europe, this is the standard EN 60079-14.

Use only cable entries and covers that are approved for the relevant use.

At an ambient temperature $\geq 60^{\circ}\text{C}$, use heat-resistant cables approved at least for an ambient temperature at least 20 K higher.

Zone 0 and Zone 1

- Only connect the transmitter to devices that are certified as intrinsically safe in accordance with the EC-type examination certificate. Be sure to comply with the parameters and limits listed there.
- If the connection head is made of aluminum, the requirements of EN 50284, section 4.3.1 must be observed for uses where the device category 1 G is required.

Zone 2 in type of protection "nL" - limited energy

- Install the SITRANS TH400 transmitter in a housing meeting the protection IP54 per EN 60529, e.g. in a type B connection head per DIN 43729.
- Only connect the transmitter to the following devices:
 - Devices that are certified as intrinsically safe in category 1 or 2.
 - "nL" certified devices (limited energy) in category 3.
- The maximum approved input voltage is $U_i = \text{DC } 30 \text{ V}$. Observe the relevant permitted values for external capacitance and inductance. You can find the permissible values in the chapter "Technical data".

Zone 2 in type of protection "nA" - non-sparking

- Install the SITRANS TH400 transmitter in a housing meeting the protection IP54 per EN 60529, e.g. in a type B connection head per DIN 43729.
- Adhere to the conditions for installers applicable to this type of protection.
- The maximum approved input voltage is $U_m = DC 32 V$.
- Take measures to ensure that the supply voltage does not rise above 40% of the rated voltage.

Additional requirements for use in dust explosion protected areas

- Only use the transmitter in a potentially explosive atmosphere with flammable dust when the following points are ensured:
 - The transmitter is installed in a form B metal head in accordance with DIN 43729. The metal head must have a protection of at least IP6X in accordance with EN 60529.
 - The transmitter is approved for use in an explosive atmosphere with flammable dust.
- For a dust layer up to 5 mm thick a surface temperature of the housing 20 K above the ambient temperature is permissible.
- If the transmitter is used in a potentially explosive atmosphere consisting of an air/dust mixture and the housing used is made of aluminum, observe the requirements from chapter 6.2.1 of IEC 61241-0.

5.4 Connection assignments

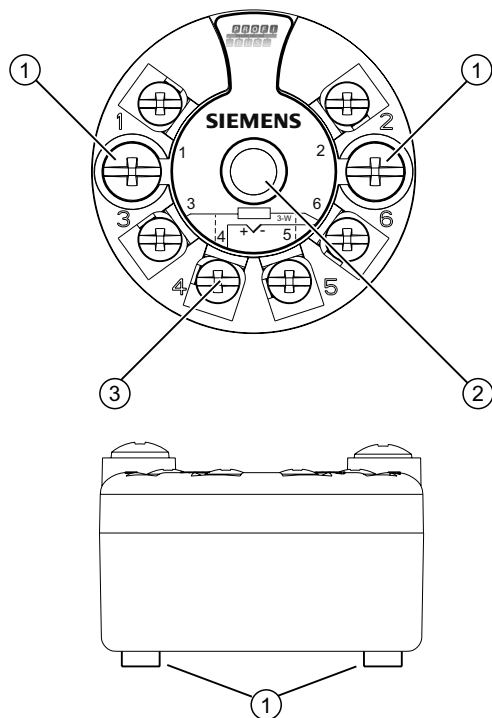
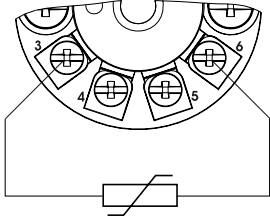
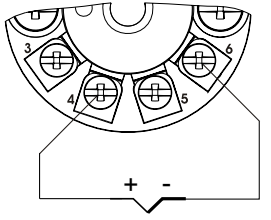
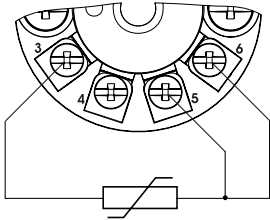
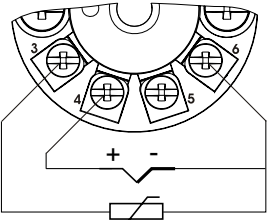
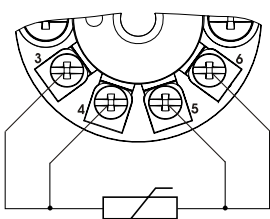
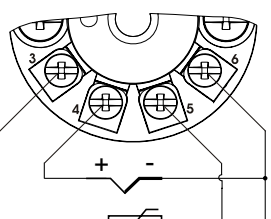
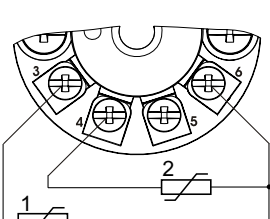
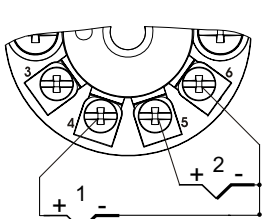


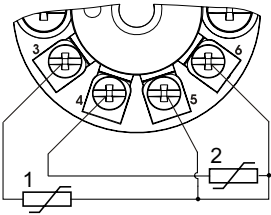
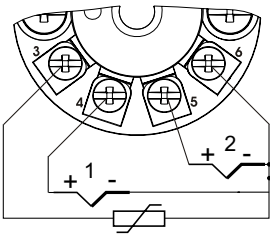
Figure 5-2 SITRANS TH400 connections

- ① Fixing screw M4x30
- ② Inside diameter of center hole 6.3 mm (0.25 inch)
- ③ Fixing screws for the connecting cables 1 to 6

5.5 Options for sensor connection assignments

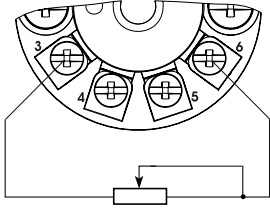
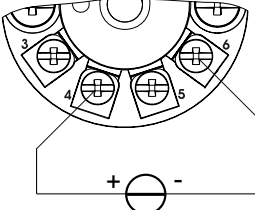
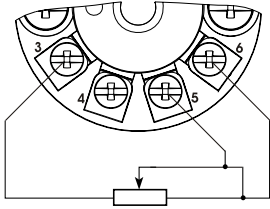
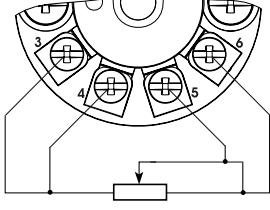
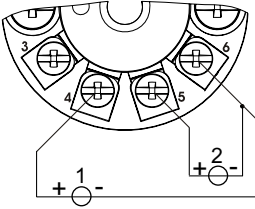
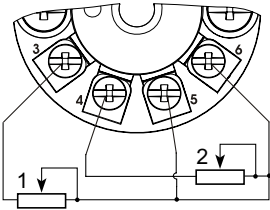
Resistance thermometer	Thermocouple
	
Two-wire input ¹⁾	Cold junction compensation, internal
	
Three-wire input	Cold junction compensation with external Pt100 in two-wire input ¹⁾
	
Four-wire input	Cold junction compensation with external Pt100 in three-wire input
	
Determination of mean value, difference, or redundancy, 2 two-wire inputs ¹⁾	Determination of mean value/difference with internal cold junction compensation

¹⁾ Line resistance to the correction can be programmed

Resistance thermometer	Thermocouple
	
<p>Determination of mean value, difference, or redundancy:</p> <ul style="list-style-type: none"> • One sensor in two-wire input ¹⁾ • One sensor in three-wire input 	<p>Determination of mean value, difference, or redundancy and cold junction compensation with external Pt100 in two-wire input ¹⁾</p>

¹⁾ Line resistance to the correction can be programmed

Further connection assignments are found on the next page.

Resistance	Voltage measurement
	
<p data-bbox="523 636 703 667">Two-wire input ¹⁾</p> 	
<p data-bbox="523 934 703 965">Three-wire input</p>	<p data-bbox="1082 934 1246 965">A power supply</p>
	
<p data-bbox="533 1236 699 1267">Four-wire input</p> 	
<p data-bbox="384 1532 847 1592">Determination of mean value, difference, or redundancy</p> <ul data-bbox="347 1599 762 1688" style="list-style-type: none"> • One resistance in two-wire input ¹⁾ or • One resistance in three-wire input 	<p data-bbox="959 1532 1374 1592">Measuring mean value, difference, and redundancy using two power supplies</p>

¹⁾ Line resistance to the correction can be programmed

Functions

6.1 Summary

You can find detailed information about the software of the SITRANS TH400 - PA/FF for PROFIBUS PA or FOUNDATION fieldbus in the following Programming Manual:

- SITRANS TH400 PROFIBUS PA: Configuration manual, document number A5E01039143;
- SITRANS TH400 FOUNDATION field bus: Configuration manual, document number A5E01039144.

You can find both documents on the "sitrans t - temperature transmitters" CD, ordered separately, order number A5E00364512 or on the Internet at www.siemens.de/sitranst.

6.2 Device address

6.2.1 SITRANS TH400 PROFIBUS PA

Note

- Before operating two or more field devices, make sure that the device addresses are set on the bus.
 - Assign each address only once, so that the addresses are allocated uniquely.
-

- The address range is from 1 to 125.
- From the warehouse, the SITRANS TH400-PA is set to the address 126.
- Normally in the PROFIBUS PA systems the masters are assigned the lower addresses.
- Begin the address assignment at 30.

6.2.2 SITRANS TH400 FOUNDATION field bus

Note

- The following points are necessary for the SITRANS TH400-FF to function properly:
 - a unique node address;
 - a physical device identifier for the fieldbus.
 - The node address must be unique within the link (segment), while the physical device identifier must be unique within the entire network.
-
- When delivered, the SITRANS TH400-FF has a unique physical device identifier.
 - The device identifier is a concatenation of the string "SITRANS TH400" and part of the serial number.
 - The node address is set to "22".
 - In the unit configuration, set the node address to a value that is unique within the link.
 - To avoid address conflicts, the SITRANS TH400-FF automatically sets its address to one of the temporary standard addresses between 248 and 251 as soon as it recognizes another device with the same node address.

6.3 Device delivery condition

The device parameters of the SITRANS TH400 - PA/FF are set to default values. You will find the default settings in the relevant "Configuration Manuals".

When the SITRANS TH400 is delivered, the following parameters are set differently from the default assignment:

Parameter	Set value
SITRANS TH400-PA (7NG3214)	
Break monitoring, channel 1	ON
Short circuit monitoring, channel 1	OFF
SITRANS TH400-FF (7NG3215)	
Break monitoring, channel 1	ON
Short circuit monitoring, channel 1	OFF

Excerpt of important default values for SITRANS TH400-PA and SITRANS TH400-FF	
Sensor	Pt100 (IEC)
Connection type	Three-wire input
Unit	°C
Failure behavior	Last valid value
Filter time	0 s
Only for SITRANS TH400-PA devices	
PA address	126
PROFIBUS identification number	Manufacturer-specific
Only for SITRANS TH400-FF devices	
Node address	22

6.4 Simulation mode

6.4.1 Simulation mode in PROFIBUS PA

The simulation mode of the PROFIBUS PA has no simulation write protection.

6.4.2 Simulation mode with FOUNDATION fieldbus

Note

- To use the simulation mode in SITRANS TH400 FOUNDATION fieldbus you need a special magnetic pin to enable the software simulation mode.
 - You can obtain this magnetic pin from technical support in the Internet at <http://www.siemens.de/automation/support-request>.
-

- To switch to the software simulation mode in the SITRANS TH400 FOUNDATION fieldbus version, place to the connecting terminals 1 and 2 on the special magnetic pin; see the following picture.

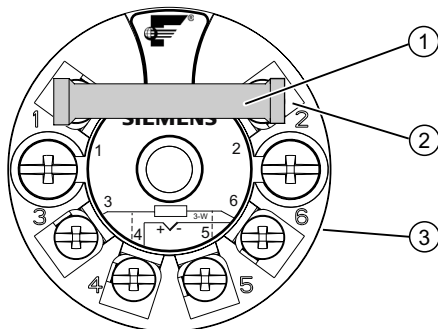


Figure 6-1 Activation of reed contact in SITRANS TH400 FF

- ① Magnetic pin
- ② Connecting terminal
- ③ SITRANS TH400 FF

- As long as the device is operated in simulation mode, the magnetic pin must be located on the device.

Service and maintenance

The device is maintenance-free

Technical data

Input

Measurement rate of the analog-to-digital conversion	< 50 ms
Resolution of the analog-to-digital conversion	24 Bit

Resistance thermometer and linear resistance input:

Resistance thermometer	Min. value	Max. value	Standard
Pt25 ... Pt1000	-200°C	+850°C	IEC60751/JIS C 1604
NI25 ... Ni1000	-60°C	+250°C	DIN 43760
Cu10 ... Cu1000	-50°C	+200°C	$\alpha = 0.00427$

Line resistance per sensor cable	Max. 50 Ω
Sensor current	Nominal 0.2 mA

Sensor fault recognition

Sensor break recognition	Yes
Sensor short circuit recognition	Yes
Short circuit recognition	< 15 Ω

Input of resistance-type transmitter

Resistance-type transmitter	Min. value	Max. value
Resistance-type transmitter	0 Ω	10 k Ω

Line resistance per sensor cable	Max. 50 Ω
Sensor current	Nominal 0.2 mA

Sensor fault recognition

Sensor break recognition	Yes
Sensor short circuit recognition	Yes
Short circuit recognition	< 15 Ω

Thermocouple input:			
Type	Min. value	Max. value	Standard
B	+400°C	+1820°C	IEC584
E	-100°C	+1000°C	IEC 584
J	-100°C	+1000°C	IEC 584
K	-100°C	+1200°C	IEC 584
L	-200°C	+900°C	DIN 43710
N	-180°C	+1300°C	IEC 584
R	-50°C	+1760°C	IEC 584
S	-50°C	+1760°C	IEC 584
T	-200°C	+400°C	IEC 584
U	-200°C	+600°C	DIN 43710
W3	0°C	+2300°C	ASTM E988-90
W5	0°C	+2300°C	ASTM E988-90
External cold junction compensation	-40°C	+135°C	IEC 60751

Sensor fault recognition	
Sensor break recognition	Yes
Sensor short circuit recognition	Yes
Short circuit recognition	< 3 mV
Sensor current in case of break monitoring	4 µA

Millivolt transmitter - voltage input	
Measuring range	-800 ... +800 mV
Input resistance	10 MΩ

Output

Filter time (programmable)	0 ... 60 s
Updating time	< 400 ms


Power supply

Supply voltage:	
• Standard	DC 9.0 ... 32 V
• ATEX, FM, UL, and CSA	DC 9.0 ... 30 V
• In FISCO installation	DC 9.0 ... 17.5 V

Supply voltage:

Power consumption	< 11 mA
Max. increase of power consumption in case of fault	< 7 mA

Ambient condition

	Warning
Explosion hazard	
The specifications of the permissible ambient temperatures are not valid for use in hazardous areas. Observe the approvals and certificates.	

Permissible ambient temperature	-40 ... +85°C (-40 to +185°F)
Permissible storage temperature	-40 ... +85°C (-40 to +185°F)
Relative humidity	≤ 98%, condensing

Dielectric strength

Test voltage	AC 500 V for 60 s
Continuous operation	AC 50 V/DC 75 V

Mechanical testing

Vibrations (DIN class B)	IEC 60068-2-6 and IEC 60068-2-64 4 g/2 ... 100 Hz
--------------------------	--

Measuring accuracy

The accuracy is defined as the higher value of **general values** and **basic values**.

General values		
Input type	Absolute accuracy	Temperature coefficient
All	≤±0.05% of measured value	≤±0.002% of measured value / °C

Basic values		
Input type	Basic accuracy	Temperature coefficient
Pt100 and Pt1000	≤ ±0.1°C	≤ ±0.002°C / °C
Ni100	≤ ±0.15°C	≤ ±0.002°C / °C

Basic values		
Cu10	$\leq \pm 1.3^{\circ}\text{C}$	$\leq \pm 0.02^{\circ}\text{C} / ^{\circ}\text{C}$
Resistance-type transmitter	$\leq \pm 0.05 \Omega$	$\leq \pm 0.002 \Omega / ^{\circ}\text{C}$
Voltage sensor	$\leq \pm 10 \mu\text{V}$	$\leq \pm 0.2 \Omega / ^{\circ}\text{C}$
Thermocouple type: E, J, K, L, N, T, U	$\leq \pm 0.5^{\circ}\text{C}$	$\leq \pm 0.010^{\circ}\text{C} / ^{\circ}\text{C}$
Thermocouple type: B, R, S, W3, W5	$\leq \pm 1^{\circ}\text{C}$	$\leq \pm 0.025^{\circ}\text{C} / ^{\circ}\text{C}$
Cold junction compensation	$< \pm 0.5^{\circ}\text{C}$	
Reference conditions		
• Heat-up time		30 s
• Signal-to-noise ratio		Min. 60 dB
• Calibration condition		20 ... 28°C

EMC

EMC of interference voltage influence	$< \pm 0.1\%$ of the measuring span
Extended EMC interference immunity: NAMUR NE 21, criterion A, burst	$< \pm 1\%$ of the measuring span

Regulations observed	Standard
EMC 2004/108/EC Emission and interference immunity	EN 61326

Approvals

Regulations observed	Standard
ATEX 94/9/EC	EN 50014, EN 50020, EN 60079-15, EN 50284, IEC 60079-27 (FISCO)
FM	3600, 3610, 3611
CSA, CAN/CSA	C22.2 No. 142, No. 157, No. 213
CAN/CAS	E79-0, -11, -15

Construction

Dimensions	$\varnothing 44 \times 26.3 \text{ mm}$
Degree of protection (transmitter housing/terminal)	IP40/IP00
Weight	55 g

Certificates and approvals

Notice
For uses in hazardous areas, only the specifications of the inspection certificates valid in your country apply.

Approval for operation in hazardous areas zone 0 and zone 1	SITRANS TH400 7NG3214-0AN00 or SITRANS TH400 7NG3215-0AN00
KEMA 06 ATEX 0264 X	II 1 GD or II 2 (1) GD, T65°C ... T105°C EEx ia IIC or EEx ib [ia] IIC T4 ... T6

Electrical specifications				
	Intrinsically safe supply voltage at $P_o < 0.84 \text{ W}$	Intrinsically safe supply voltage at $P_o < 1.3 \text{ W}$	Use in FISCO systems at $U_o = 17.5 \text{ V}$	Use in FISCO systems at $U_o = 15 \text{ V}$
Input parameters: Terminals 1 and 2				
U_i	DC 30 V	DC 30 V	DC 17.5 V	DC 15 V
I_i	AC 120 mA	AC 300 mA	AC 250 mA	AC 900 mA
P_i	0.84 W	1.3 W	2.0 W	5.32 W
L_i	1 μH	1 μH	1 μH	1 μH
C_i	2.0 nF	2.0 nF	2.0 nF	2.0 nF
Output parameters: Terminals 3, 4, 5, and 6				
U_o	5.7 V			
I_o	8.4 mA			
P_o	12 mW			
L_o	200 mH			
C_o	40 μF			
Permissible ambient temperature				
Temperature class T1 ... T4	-40 ... +85°C	-40 ... +75°C	-40 ... +85°C	-40 ... +85°C
Temperature class T5	-40 ... +70°C	-40 ... +65°C	-40 ... +60°C	-40 ... +60°C
Temperature class T6	-40 ... +60°C	-40 ... +45°C	-40 ... +45°C	-40 ... +45°C

Approval for operation in hazardous areas zone 2	SITRANS TH400 7NG3214-0NN00 SITRANS TH400 7NG3215-0NN00
KEMA 06 ATEX 0263 X	EEx nA [nL] II C T4 ... T6
Input parameters: Terminals 1 and 2 in the degree of protection "nA"	
U _i	DC 32 V
Permissible ambient temperature	
Temperature class T1 ... T4	-40 ... +85°C
Temperature class T5	-40 ... +75°C
Temperature class T6	-40 ... +60°C
Input parameters: Terminals 1 and 2 in the degree of protection "nL" FNICO	
U _i	17.5 V
L _i	1 µH
C _i	2.0 nF
Permissible ambient temperature	
Temperature class T1 ... T4	-40 ... +85°C
Temperature class T5	-40 ... +60°C
Temperature class T6	-40 ... +45°C
Output parameters: Terminal 3, 4, 5, and 6 for connecting thermocouples and resistance thermometer in the degrees of protection "nA" and "nL":	
U _o	DC 5.7 V
I _o	8.4 mA
P _o	12 mW
L _o	200 mH
C _o	40 µF

FM approvals for USA	SITRANS TH400 7NG3214-0AN00 SITRANS TH400 7NG3215-0AN00
FM 3015609	<ul style="list-style-type: none"> • IS Class I, Div 1, Groups A, B, C, D T4/T5/T6, FISCO • IS Class I, Zone 0, AEx ia, IIC T4/T5/T6, FISCO • NI Class I, Div 2, Groups A, B, C, D T4/T5/T6, FNICO

FM approvals for USA	SITRANS TH400 7NG3214-0NN00 SITRANS TH400 7NG3215-0NN00
FM 3015609	NI Class I, Div 2, Groups A, B, C, D T4/T5/T6, FNICO

The complete parameters (entity) and rated conditions can be found in the FM certificate of compliance no. 3015609 and the installation drawing A5E01002219 A.

CSA approvals for Canada	SITRANS TH400 7NG3214-0AN00 SITRANS TH400 7NG3215-0AN00
CSA 1418937	<ul style="list-style-type: none"> • IS Class I, Groups A, B, C, D T4/T5/T6 • Ex ia IIC T4/T5/T6 and Ex ib [ia] IIC T4/T5/T6

CSA approvals for Canada	SITRANS TH400 7NG3214-0NN00 SITRANS TH400 7NG3215-0NN00
CSA 1418937	<ul style="list-style-type: none"> • Class I, Div 2, Groups A, B, C, D T4/T5/T6 • Ex nA II T4/T5/T6 and Ex ib [ia] IIC T4/T5/T6

The complete parameters (entity) and rated conditions can be found in the CSA certificate of compliance no. 1861385 and the installation drawing A5E01002219 A.

Parameter assignment interface

PROFIBUS PA connection:	
PROFIBUS PA protocol	A&D profile, ver. 3.0
PROFIBUS PA protocol standard	EN 50170 vol. 2
PROFIBUS PA address (on delivery)	126
PROFIBUS PA function blocks	Two analog

FOUNDATION fieldbus connection	
FOUNDATION fieldbus protocol	FF protocol
FOUNDATION fieldbus protocol standard	FF design regulations
FOUNDATION fieldbus functionality	Basic or LAS
FOUNDATION fieldbus version	ITK 4.6
FOUNDATION fieldbus function blocks	Two analog and one PID

Dimension drawings

Dimension drawing for SITRANS TH400

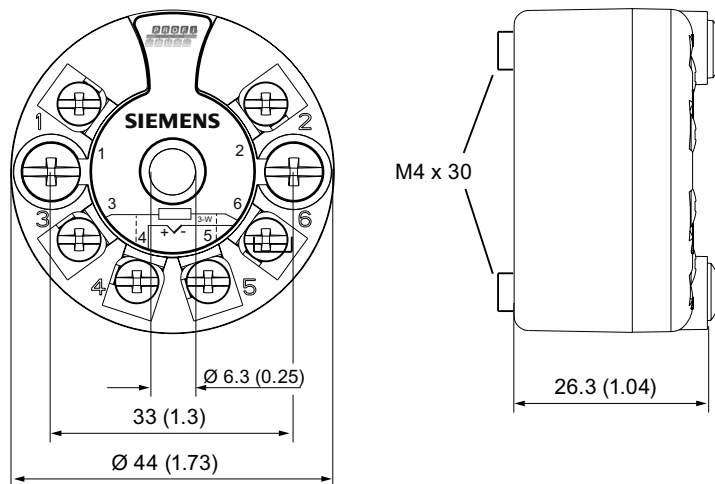


Figure 9-1 SITRANS TH400 dimensions

Note

The dimensions hold for SITRANS TH400 PROFIBUS PA and SITRANS TH400 FOUNDATION fieldbus.

Index

C

Componentry
 At electrostatic risk, 10
Correct usage, 9

E

Electrical connection
 Hazardous area, 9

F

Firmware, 7
Firmware identification
 Type plate, 7
Flameproof enclosure, 10

H

Hazardous area
 Electrical connection, 9
History, 7

I

Installation path
 PDM, 7
Intrinsic safety, 10

M

More information, 8

P

Precautions, 10
Product information on the Internet, 8

Q

Qualified personnel, 11

S

Standard fieldbus, 7
System integration, 7

T

Type of protection
 Flameproof enclosure, 10
 Intrinsic safety, 10
 Limited energy nL (zone 2), 10
 Non-sparking nA (zone 2), 10

W

Working reliability regulation, 9
worldwide
 Contact person, 8
Worldwide contact person, 8

Z

Zone 2, 10



A5E01018688

A5E01018688-01

Siemens Aktiengesellschaft

Automation and Drives (A&D)

Sensors and Communication

Process Sensors

76181 KARLSRUHE

GERMANY

www.siemens.com/processinstrumentation