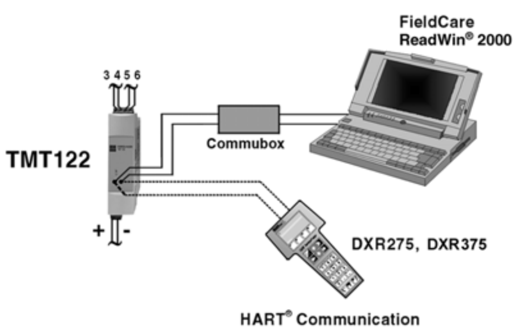
Level Pressure Flow Temperature Liquid Analysis Registration Systems Components Services Solutions

Functional safety manual

iTEMP® HART® TMT122 with 4...20 mA output signal

Temperature Transmitter



Application

Temperature measurements (e.g. protective function against exceeding or undercutting the process temperature when used in safety relevant applications) to satisfy particular safety systems requirements as per IEC 61508/ IEC 61511-1 (FDIS).

The measuring device fulfils the requirements concerning
- Functional safety as per IEC 61508-1999
- Explosion protection (depending on the version)
- Electromagnetic compatibility as per IEC 61326 and NAMUR recommendation NE 21.

Your benefits

- Used for limit temperature monitoring up to SIL 2, independently evaluated (Functional Assessment) by exida.com as per IEC 61508-1999
- Continuous measurement
- Easy commissioning

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SIL-03003a/09/e

SIL Declaration of Conformity

Functional safety of a temperature transmitter according to IEC 61508/IEC 61511

Endress+Hauser Wetzer GmbH+Co. KG, Obere Wank 1, 87484 Nesselwang

declares as manufacturer, that the temperature transmitter

iTEMP® HART® TMT 122

is suitable for the use in a safety-instrumented system according to standard IEC 61511-1, provided the relevant safety instructions are observed.

The FMEDA provides the following parameters:

SIL	2		
Proof test interval	1 year		
Device type	B		
HFT [1)]	0 (single channel use)		
SFF	> 75 %		
PFD_{AVG} [2)]	$4.82x10^{-4}$		
MTBF [3)]	232 years		
Safety function [4)] monitoring	low level	high level	range
λ_{sd}	26 FIT	124 FIT	141 FIT
λ_{su}	190 FIT	190 FIT	190 FIT
λ_{dd}	132 FIT	33 FIT	17 FIT
λ_{du}	110 FIT	110 FIT	110 FIT

1) according to clause 11.4.4 of IEC 61511-1
2) the value complies with SIL2 according to ISA S84.01 and IEC 61511-1
3) according to Siemens SN29500
4) assuming setting of 4 to 20 mA

The device including the modification process was assessed on the basis of prior use.

Nesselwang, 30 July 2003

Endress+Hauser Wetzer GmbH+Co. KG

General manager

Level
Pressure
Flow
Temperature
Liquid Analysis
Registration
Systems Components
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Introduction

Abbreviations, standards and terms

Abbreviations

Explanation to the abbreviations used can be found in the SIL-Brochure (SI002Z/11).

Relevant standards

Standard	Explanation
IEC 61508, Part 1 – 7	Functional safety of electrical/electronic/programmable electronic safety-related systems (Target group: Manufacturers and Suppliers of Devices)
IEC 61511 Part 1 – 3 (FDIS)	Functional safety – Safety Instrumented Systems for the process industry sector (Target group: Safety Instrumented Systems Designers, Integrators and Users)

Terms

Term	Explanation
Dangerous failure	Failure with the potential to put the safety-related system in a dangerous or non-functional condition.
Safety-related system	A safety-related system performs the safety functions that are required to achieve or maintain a safe condition e.g. in a plant. Example: temperature measuring device – logic unit (e.g. limit signal generator) – valve form a safety-related system.
Safety function	Defined function, which is performed by a safety-related system with the aim of achieving or maintaining a safe condition for the plant, considering a specified dangerous incident. Example: limit temperature monitoring

Determining the Safety Integrity Level (SIL)

The achievable Safety Integrity Level is determined by the following safety-related parameters:
- Average Probability of Failure on Demand (PFD_{AVG})
- Hardware Fault Tolerance (HFT) and
- Safe Failure Fraction (SFF).

The specific safety-related parameters for the TMT122, as a part of a safety function, are listed in the "Safety-related parameters" chapter.

The following table displays the dependence of the "Safety Integrity Level" (SIL) on the "Average Probability of Failure on Demand" (PFD_{AVG}). Here, the "Low demand mode" has been observed, i.e. the requirement rate for the safety-related system is maximum once a year.

Safety Integrity Level (SIL)	PFD_{AVG} (Low demand mode)
4	$\geq 10^{-5} ... < 10^{-4}$
3	$\geq 10^{-4} ... < 10^{-3}$
2	$\geq 10^{-3} ... < 10^{-2}$
1	$\geq 10^{-2} ... < 10^{-1}$

Sensor, logic unit and actuator together form a safety-related system, which performs a safety function. The "Average Probability of Failure on Demand" (PFD_{AVG}) is usually divided up into the sensor, logic unit and actuator sub-systems as per Figure 1.

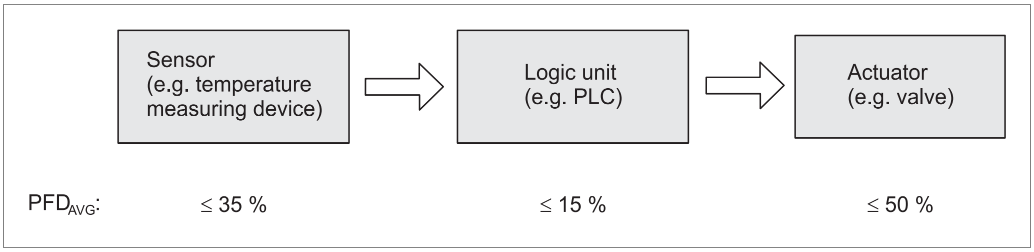

Fig. 1: Usual division of the "Average Probability of Failure on Demand" (PFD_{AVG}) into the sub-systems

Note!
This documentation considers the TMT122 as a component of a safety function.

Safety Integrity Level TMT122 (Type B)
The following table displays the achievable "Safety Integrity Level" (SIL) of the entire safety-related system for type B systems depending on the "Safe Failure Fraction" (SFF) and the "Hardware Fault Tolerance" (HFT). Type B systems are, for example, sensors with complex components such as ASICs (→ see also IEC 61508, Part 2).

Safe Failure Fraction (SFF)	**Hardware Fault Tolerance (HFT)**		
	0	**1 (0)[1]**	**2 (1)[1]**
< 60%	not permitted	SIL 1	SIL 2
60 ...< 90 %	SIL 1	**SIL 2**	SIL 3
90 ...< 99 %	SIL 2	SIL 3	–
≥ 99 %	SIL 3	–	–

1) In accordance with IEC 61511-1 (FDIS), Clause 11.4.4, the "Hardware Fault Tolerance" (HFT) can be reduced by one (values in brackets), if the following conditions are true for devices using sensors and actuators with complex components:
– The device is "proven in use".
– The device allows adjustment of process-related parameters only, e.g. measuring range, upscale or downscale failure direction, etc.
– The adjustment level of the process-related parameters of the device is protected, e.g. by jumper, password (here: numeric code or key combination)
– The function has a "Safety Integrity Level" (SIL) requirement less than 4.
All conditions are true for the iTEMP® HART® TMT122.

Safety function with TMT122

Safety function for limit temperature monitoring

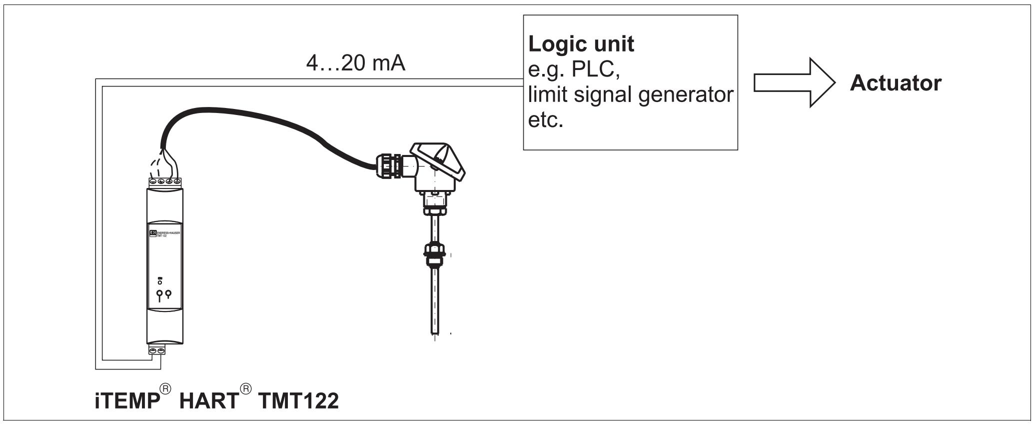

Fig. 2: Safety function (e.g. for limit temperature monitoring) with TMT122 as sub-system

The TMT122 transmitter generates an analog signal (4...20 mA) proportional to the temperature. The analog signal is fed to a downstream logic unit, such as a PLC or limit signal generator, and there it is monitored to determine whether it exceeds a maximum value. In order to monitor for faults, the logic unit must be able to detect both HI-alarms ≥ 21.6 mA and LO-alarms ≤ 3.6 mA.

Safety function data

Caution!
The data for the safety functions are listed in the "Safety-related parameters" chapter.

Note!
MTTR is set at eight hours.
Safety-related systems without a self-locking function must be monitored or set to an otherwise safe state after carrying out the safety function within MTTR.

Unit version

SIL from unit version: 1.00.06 to 1.00.10

Supplementary device documentation TMT122

Depending on the version, the following documentation must be available for the temperature transmitter iTEMP® HART® TMT122:

Explosion protection/Certificates	Operating instructions	Other Ex-Documentation
none	KA128R	none
ATEX II 2(1)G EEx ia IIC T4/T5/T6	KA128R	Safety instructions XA016R
ATEX II 3G EEx nA IIC T4/T5/T6	KA128R	Safety instructions XA019R

Explosion protection/ Certificates	Operating instructions	Control Drawings FM	Control Drawings CSA
none	KA128R	none	none
FM IS I/1+2/A-D CSA IS I/1+2/A-D	KA128R KA128R	14 14 01 111	 14 14 01 112

Caution!
- The installation and setting instructions, and the technical limit values must be observed in accordance with the Operating Instructions (KA128R and BA139R).
- For devices which are used in explosion-hazardous, the supplementary documentation (XA) resp. Control Drawings must also be used in accordance with the table.

iTEMP® HART® TMT122 supplementary documentation
For further information, see Technical Information TI090R.

Commissioning and iterative tests

Using the unit for continuous measurements

The operability of the safety installation must be tested at appropriate time intervals. It is the responsibility of the user to select the type of check and the intervals in the specified time frame. The test must be completed in such a way that the fault free function of the safety installation combined with all components can be vaildated.

Suggestion for the procedure for the iterative tests

Tools used for the iterative tests

Ampere meter, wire bridge

Test steps

1. With the connected sensor or a resistance simulator apply two points within the configured measurement range. Measure the output current with the ampere meter.
2. Disconnect the sensor from the input. Measure the output current.
3. Only if the transmitter is used with RTD: Make a shortcut at the sensor input (with the wire bridge) and measure the output current.

Classification of error

The table below helps to classify the results of the test steps 1-3. If the result of one of the test steps is „dangerous", the device has a dangerous error – the rest of the test steps may be skipped.

Test step	Test result Output current	Error classification
1	Error current	safe
1	Output current is relative to applied signals (according to specification in TI)	Normal function
1	Output current is not relative to applied signals	dangerous
2	Error current	safe
2	Any current different to error current	dangerous
3 (only RTD)	Error current	safe
3 (only RTD)	Any current different to error current	dangerous

Analysis

If one of the test steps gives a result "dangerous", the device has a dangerous error.

✎ Note!
In this case please inform Endress+Hauser, that a device in a safety related application shows a dangerous error.

Settings

Settings

It is possible to do various settings on the TMT122. For further information see the BA139R operating instructions.

Safety-related parameters

Specific safety-related parameters for TMT122

The table displays the specific safety-related parameters for the TMT122.

	TMT122
SIL	SIL 2
HFT	0
SFF	> 75 %
PFD_{AVG}	4.82×10^{-4}
TI [1]	annual

1) Complete function test

PFD_{AVG} dependent on selected maintenance interval

The following diagram presents the dependence of the PFD_{AVG} on the maintenance interval. The PFD_{AVG} increases as the maintenance interval increases.

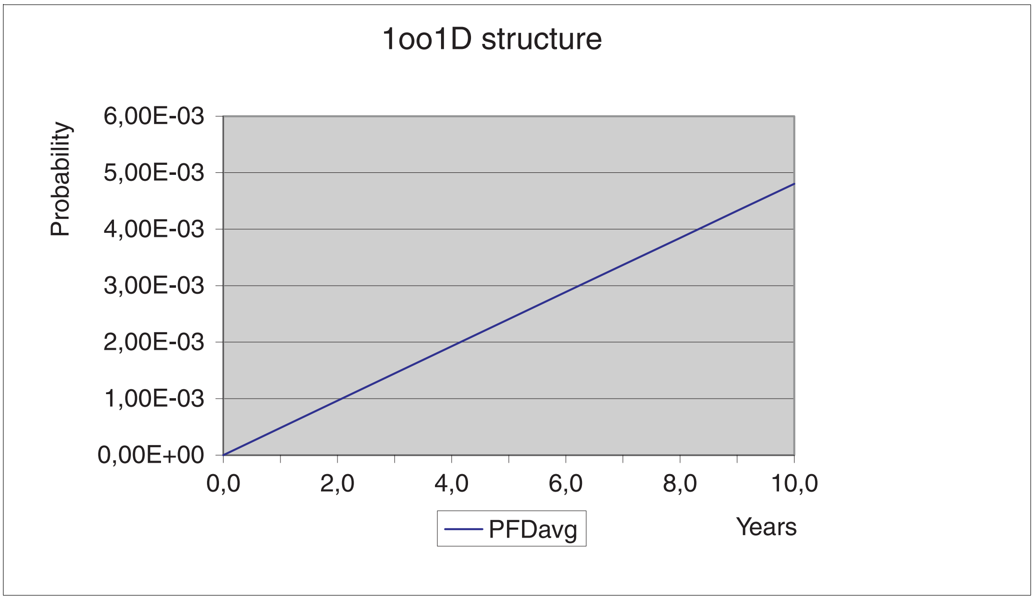

Fig. 4: "Average Probability of Failure on Demand" (PFD_{AVG}) dependent on the selected maintenance interval

Repair

Repair

Note!
Together with the failed, SIL-marked E+H device, having been operated in a functional safety application, the form "Declaration of Hazardous Material and De-Contamination" containing the appropriate information "☒ Used as SIL device in a Safety Instrumented System" has to be returned.
The "Declaration of Hazardous Material and De-Contamination" can be found in the Appendix at the end of this Functional Safety Manual.

Exida.com management summary

FMEDA and Proven-in-use Assessment

Project:
Temperature head transmitter iTEMP® HART® TMT 182 and
temperature transmitters iTEMP® HART® DIN rail TMT 122 and TMT 112

Customer:

Endress+Hauser Wetzer GmbH + Co. KG
Nesselwang
Germany

Contract No.: E+H 02/11-05
Report No.: E+H 02/11-05 R005
Version V2, Revision R1.0, April 2005
Stephan Aschenbrenner

Management summary

This report summarizes the results of the hardware assessment with proven-in-use consideration according to IEC 61508 / IEC 61511 carried out on the temperature head transmitter iTEMP® HART® TMT 182 with device version V1.02.08 and the temperature transmitters iTEMP® HART® DIN rail TMT 122 and TMT 112 with device version V1.00.06 and V1.00.04. Table 1 gives an overview of the different configurations which have been assessed.

The hardware assessment consists of a Failure Modes, Effects and Diagnostics Analysis (FMEDA). A FMEDA is one of the steps taken to achieve functional safety assessment of a device per IEC 61508. From the FMEDA, failure rates are determined and consequently the Safe Failure Fraction (SFF) is calculated for the device. For full assessment purposes all requirements of IEC 61508 must be considered.

Table 1: Configuration overview

	Configurations
[CONF 1]	Temperature head transmitter iTEMP® HART® TMT 182
[CONF 2]	Temperature transmitter iTEMP® HART® DIN rail TMT 122
[CONF 3]	Temperature transmitter iTEMP® HART® DIN rail TMT 112

The failure rates used in this analysis are the basic failure rates of the Siemens standard SN 29500.

According to table 2 of IEC 61508-1 the average PFD for systems operating in low demand mode has to be $\geq 10^{-3}$ to $< 10^{-2}$ for SIL 2 safety functions. A generally accepted distribution of PFD_{AVG} values of a SIF over the sensor part, logic solver part, and final element part assumes that 35% of the total SIF PFD_{AVG} value is caused by the sensor part. For a SIL 2 application the total PFD_{AVG} value of the SIF should be smaller than 1,00E-02, hence the maximum allowable PFD_{AVG} value for the sensor part would then be 3,50E-03.

The temperature head transmitter iTEMP® HART® TMT 182 and the temperature transmitters iTEMP® HART® DIN rail TMT 122 and TMT 112 are considered to be Type B[1] components. Both have a hardware fault tolerance of 0.

Type B components with a SFF of 60% to < 90% must have a hardware fault tolerance of 1 according to table 3 of IEC 61508-2 for SIL 2 (sub-) systems.

As the temperature head transmitter iTEMP® HART® TMT 182 and the temperature transmitters iTEMP® HART® DIN rail TMT 122 and TMT 112 are supposed to be proven-in-use devices, an assessment of the hardware with additional proven-in-use demonstration for the device and its software was carried out. Therefore according to the requirements of IEC 61511-1 First Edition 2003-01 section 11.4.4 and the assessment described in section 5.1 a hardware fault tolerance of 0 is sufficient for SIL 2 (sub-) systems being Type B components and having a SFF of 60% to < 90%.

Assuming that a connected logic solver can detect both over-range (fail high) and under-range (fail low), high and low failures can be classified as safe detected failures or dangerous detected failures depending on whether the temperature transmitters are used in an application for “low level monitoring”, “high level monitoring” or “range monitoring”. For these applications the following tables show how the above stated requirements are fulfilled.

[1] Type B component: “Complex” component (using micro controllers or programmable logic); for details see 7.4.3.1.3 of IEC 61508-2.

Table 2: Summary for TMT 182 – PFD_{AVG} values

T[Proof] = 1 year	T[Proof] = 5 years	T[Proof] = 10 years
PFD_{AVG} = 4,69E-04	PFD_{AVG} = 2,34E-03	PFD_{AVG} = 4,67E-03

Table 3: Summary for TMT 182 – Failure rates

Failure Categories	λ_{sd}	λ_{su}	λ_{dd}	λ_{du}	SFF	DC_S [2]	DC_D
$\lambda_{low} = \lambda_{sd}$ $\lambda_{high} = \lambda_{dd}$	26 FIT	165 FIT	108 FIT	107 FIT	> 73%	14%	50%
$\lambda_{low} = \lambda_{dd}$ $\lambda_{high} = \lambda_{sd}$	101 FIT	165 FIT	33 FIT	107 FIT	> 73%	38%	24%
$\lambda_{low} = \lambda_{sd}$ $\lambda_{high} = \lambda_{sd}$	117 FIT	165 FIT	17 FIT	107 FIT	> 73%	41%	14%

Table 4: Summary for TMT 122 – PFD_{AVG} values

T[Proof] = 1 year	T[Proof] = 5 years	T[Proof] = 10 years
PFD_{AVG} = 4,82E-04	PFD_{AVG} = 2,41E-03	PFD_{AVG} = 4,80E-03

Table 5: Summary for TMT 122 – Failure rates

Failure Categories	λ_{sd}	λ_{su}	λ_{dd}	λ_{du}	SFF	DC_S [2]	DC_D
$\lambda_{low} = \lambda_{sd}$ $\lambda_{high} = \lambda_{dd}$	26 FIT	190 FIT	132 FIT	110 FIT	> 75%	12%	55%
$\lambda_{low} = \lambda_{dd}$ $\lambda_{high} = \lambda_{sd}$	124 FIT	190 FIT	33 FIT	110 FIT	> 75%	39%	23%
$\lambda_{low} = \lambda_{sd}$ $\lambda_{high} = \lambda_{sd}$	141 FIT	190 FIT	17 FIT	110 FIT	> 75%	43%	13%

Table 6: Summary for TMT 112 – PFD_{AVG} values

T[Proof] = 1 year	T[Proof] = 5 years	T[Proof] = 10 years
PFD_{AVG} = 4,85E-04	PFD_{AVG} = 2,45E-03	PFD_{AVG} = 4,83E-03

Table 7: Summary for TMT 112 – Failure rates

Failure Categories	λ_{sd}	λ_{su}	λ_{dd}	λ_{du}	SFF	DC_S [2]	DC_D
$\lambda_{low} = \lambda_{sd}$ $\lambda_{high} = \lambda_{dd}$	25 FIT	183 FIT	128 FIT	111 FIT	> 75%	12%	55%
$\lambda_{low} = \lambda_{dd}$ $\lambda_{high} = \lambda_{sd}$	120 FIT	183 FIT	32 FIT	111 FIT	> 75%	39%	23%
$\lambda_{low} = \lambda_{sd}$ $\lambda_{high} = \lambda_{sd}$	136 FIT	183 FIT	17 FIT	111 FIT	> 75%	43%	13%

[2] DC means the diagnostic coverage (safe or dangerous) of the safety logic solver for the temperature transmitters.

A user of the temperature head transmitter iTEMP® HART® TMT 182 and the temperature transmitters iTEMP® HART® DIN rail TMT 122 and TMT 112 can utilize these failure rates in a probabilistic model of a safety instrumented function (SIF) to determine suitability in part for safety instrumented system (SIS) usage in a particular safety integrity level (SIL). A full table of failure rates is presented in section 5.2 to 5.4 along with all assumptions.

A complete temperature sensor assembly consisting of TMT 182, TMT 122 or TMT 112 and a closely coupled thermocouple or cushioned 4-wire RTD supplied with TMT 182, TMT 122 or TMT 112 can be modeled by considering a series subsystem where a failure occurs if there is a failure in either component. For such a system, failure rates are added.

Section 5.5 gives typical failure rates and failure distributions for thermocouples and RTDs which were the basis for the following tables.

Assuming that TMT 182, TMT 122 and TMT 112 are programmed to drive it's output high on detected failures of the thermocouple or RTD ($\lambda_{low} = \lambda_{dd}$, $\lambda_{high} = \lambda_{sd}$), the failure rate contribution or the PFD_{AVG} value for the thermocouple or RTD in a low stress environment is as follows:

Table 8: Summary for the sensor assembly TMT 182 / thermocouple in low stress environment

T[Proof] = 1 year	T[Proof] = 5 years	T[Proof] = 10 years	SFF
PFD_{AVG} = 1,56E-03	PFD_{AVG} = 7,80E-03	PFD_{AVG} = 1,56E-02	> 93%

λ_{sd} = 4,85E-06 1/h = 4851 FIT

λ_{su} = 1,65E-07 1/h = 165 FIT

λ_{dd} = 3,34E-08 1/h = 33 FIT

λ_{du} = 3,57E-07 1/h = 357 FIT

Table 9: Summary for the sensor assembly TMT 122 / thermocouple in low stress environment

T[Proof] = 1 year	T[Proof] = 5 years	T[Proof] = 10 years	SFF
PFD_{AVG} = 1,58E-03	PFD_{AVG} = 7,90E-03	PFD_{AVG} = 1,58E-02	> 93%

λ_{sd} = 4,87E-06 1/h = 4874 FIT

λ_{su} = 1,90E-07 1/h = 190 FIT

λ_{dd} = 3,34E-08 1/h = 33 FIT

λ_{du} = 3,60E-07 1/h = 360 FIT

Table 10: Summary for the sensor assembly TMT 112 / thermocouple in low stress environment

T[Proof] = 1 year	T[Proof] = 5 years	T[Proof] = 10 years	SFF
PFD_{AVG} = 1,58E-03	PFD_{AVG} = 7,91E-03	PFD_{AVG} = 1,58E-02	> 93%

λ_{sd} = 4,87E-06 1/h = 4870 FIT

λ_{su} = 1,83E-07 1/h = 183 FIT

λ_{dd} = 3,24E-08 1/h = 32 FIT

λ_{du} = 3,61E-07 1/h = 361 FIT

Table 11: Summary for the sensor assembly TMT 182 / 4-wire RTD in low stress environment

T[Proof] = 1 year	T[Proof] = 5 years	T[Proof] = 10 years	SFF
PFD_{AVG} = 5,56E-04	PFD_{AVG} = 2,78E-03	PFD_{AVG} = 5,56E-03	> 94%

λ_{sd} = 2,08E-06 1/h = 2081 FIT

λ_{su} = 1,65E-07 1/h = 165 FIT

λ_{dd} = 3,34E-08 1/h = 33 FIT

λ_{du} = 1,27E-07 1/h = 127 FIT

Table 12: Summary for the sensor assembly TMT 122 / 4-wire RTD in low stress environment

T[Proof] = 1 year	T[Proof] = 5 years	T[Proof] = 10 years	SFF
PFD_{AVG} = 5,69E-04	PFD_{AVG} = 2,85E-03	PFD_{AVG} = 5,69E-03	> 94%

λ_{sd} = 2,10E-06 1/h = 2104 FIT

λ_{su} = 1,90E-07 1/h = 190 FIT

λ_{dd} = 3,34E-08 1/h = 33 FIT

λ_{du} = 1,30E-07 1/h = 130 FIT

Table 13: Summary for the sensor assembly TMT 112 / 4-wire RTD in low stress environment

T[Proof] = 1 year	T[Proof] = 5 years	T[Proof] = 10 years	SFF
PFD_{AVG} = 5,74E-04	PFD_{AVG} = 2,87E-03	PFD_{AVG} = 5,74E-03	> 94%

λ_{sd} = 2,10E-06 1/h = 2100 FIT

λ_{su} = 1,83E-07 1/h = 183 FIT

λ_{dd} = 3,24E-08 1/h = 32 FIT

λ_{du} = 1,31E-07 1/h = 131 FIT

Table 14: Summary for the sensor assembly TMT 182 / 2/3-wire RTD in low stress environment

T[Proof] = 1 year	T[Proof] = 5 years	T[Proof] = 10 years	SFF
PFD_{AVG} = 2,22E-03	PFD_{AVG} = 1,11E-02	PFD_{AVG} = 2,22E-02	> 78%

λ_{sd} = 1,70E-06 1/h = 1701 FIT

λ_{su} = 1,65E-07 1/h = 165 FIT

λ_{dd} = 3,34E-08 1/h = 33 FIT

λ_{du} = 5,07E-07 1/h = 507 FIT

Table 15: Summary for the sensor assembly TMT 122 / 2/3-wire RTD in low stress environment

T[Proof] = 1 year	T[Proof] = 5 years	T[Proof] = 10 years	SFF
PFD_{AVG} = 2,23E-03	PFD_{AVG} = 1,12E-02	PFD_{AVG} = 2,23E-02	> 79%

λ_{sd} = 1,72E-06 1/h = 1724 FIT

λ_{su} = 1,90E-07 1/h = 190 FIT

λ_{dd} = 3,34E-08 1/h = 33 FIT

λ_{du} = 5,10E-07 1/h = 510 FIT

Table 16: Summary for the sensor assembly TMT 112 / 2/3-wire RTD in low stress environment

T[Proof] = 1 year	T[Proof] = 5 years	T[Proof] = 10 years	SFF
PFD_{AVG} = 2,24E-03	PFD_{AVG} = 1,12E-02	PFD_{AVG} = 2,24E-02	> 79%

λ_{sd} = 1,72E-06 1/h = 1720 FIT

λ_{su} = 1,83E-07 1/h = 183 FIT

λ_{dd} = 3,24E-08 1/h = 32 FIT

λ_{du} = 5,11E-07 1/h = 511 FIT

The boxes marked in yellow ( ) mean that the calculated PFD_{AVG} values are within the allowed range for SIL 2 according to table 2 of IEC 61508-1 but do not fulfill the requirement to not claim more than 35% of this range, i.e. to be better than or equal to 3,50E-03. The boxes marked in green ( ) mean that the calculated PFD_{AVG} values are within the allowed range for SIL 2 according to table 2 of IEC 61508-1 and table 3.1 of ANSI/ISA–84.01–1996 and do fulfill the requirement to not claim more than 35% of this range, i.e. to be better than or equal to 3,50E-03. The boxes marked in red ( ) mean that the calculated PFD_{AVG} values do not fulfill the requirements for SIL 2 according to table 2 of IEC 61508-1.

The hardware assessment has shown that the temperature head transmitter iTEMP® HART® TMT 182 and the temperature transmitters iTEMP® HART® DIN rail TMT 122 and TMT 112 with thermocouple or 4-wire RTD in low stress environment have a PFD_{AVG} within the allowed range for SIL 2 according to table 2 of IEC 61508-1 and table 3.1 of ANSI/ISA–84.01–1996 and a Safe Failure Fraction (SFF) of > 93%. Based on the verification of proven-in-use they can be used as a single device for SIL2 Safety Functions in terms of IEC 61511-1 First Edition 2003-01.

Appendix

Endress+Hauser
People for Process Automation

Declaration of Hazardous Material and De-Contamination
Erklärung zur Kontamination und Reinigung

RA No. ☐☐☐☐☐☐☐☐

Please reference the Return Authorization Number (RA#), obtained from Endress+Hauser, on all paperwork and mark the RA# clearly on the outside of the box. If this procedure is not followed, it may result in the refusal of the package at our facility.
Bitte geben Sie die von E+H mitgeteilte Rücklieferungsnummer (RA#) auf allen Lieferpapieren an und vermerken Sie diese auch außen auf der Verpackung. Nichtbeachtung dieser Anweisung führt zur Ablehnung ihrer Lieferung.

Because of legal regulations and for the safety of our employees and operating equipment, we need the "Declaration of Hazardous Material and De-Contamination", with your signature, before your order can be handled. Please make absolutely sure to attach it to the outside of the packaging.
Aufgrund der gesetzlichen Vorschriften und zum Schutz unserer Mitarbeiter und Betriebseinrichtungen, benötigen wir die unterschriebene "Erklärung zur Kontamination und Reinigung", bevor Ihr Auftrag bearbeitet werden kann. Bringen Sie diese unbedingt außen an der Verpackung an.

Type ofi nstrument / sensor
Geräte-/Sensortyp ____

Serial number
Seriennummer ________________________

☐ Used as SIL device in a Safety Instrumented System / *Einsatz als SIL Gerät in Schutzeinrichtungen*

Process data/ *Prozessdaten*

Temperature / *Temperatur* _________ [°C]
Pressure / *Druck* __________ [Pa]
Conductivity / *Leitfähigkeit* _________ [S]
Viscosity / *Viskosität* __________ [mm^2/s]

International Head Quarter

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FM+SGML 6.0 ProMoDo