

HE 5840 RTD

HIMOD® function module



Operating instructions

(English)

LEGAL NOTICE

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1 General

The HE5840 temperature input module provides the HIMOD system with four measured values from resistance thermometers. The module communicates with the fieldbus coupler via an asynchronous serial RS485 connection (T-Bus). The module can be unplugged or plugged in during operation (Hot Swap). The connection of the sensors in 3-wire technology compensates for the influence of the cable length. Each input is equipped with an adjustable 1st order filter to stabilise the measured value. The measurement inputs are galvanically isolated from the logic. They are galvanically connected to each other.

Influences of the installation location can be compensated for with an offset value.

To ensure reliable process control in the event of an error, the modules continue to work with error values. These values can be freely defined, which means that not only can the process sequence continue in a controlled manner, but dangerous situations can also be avoided.

1.1 Features

- 4 x temperature inputs for resistance thermometers
- Galvanic isolation of the inputs
- Transducer resolution 16 bit
- Measuring cycle 160 ms
- Pt 100/1000 -200...850 °C
- Ni 100/1000 - 60...300 °C
- KTY 11-6 - 50...125 °C
- Accuracy ≤ 1 K
- Temperature drift ≤ 0.08 %/10 K

1.2 Block diagram

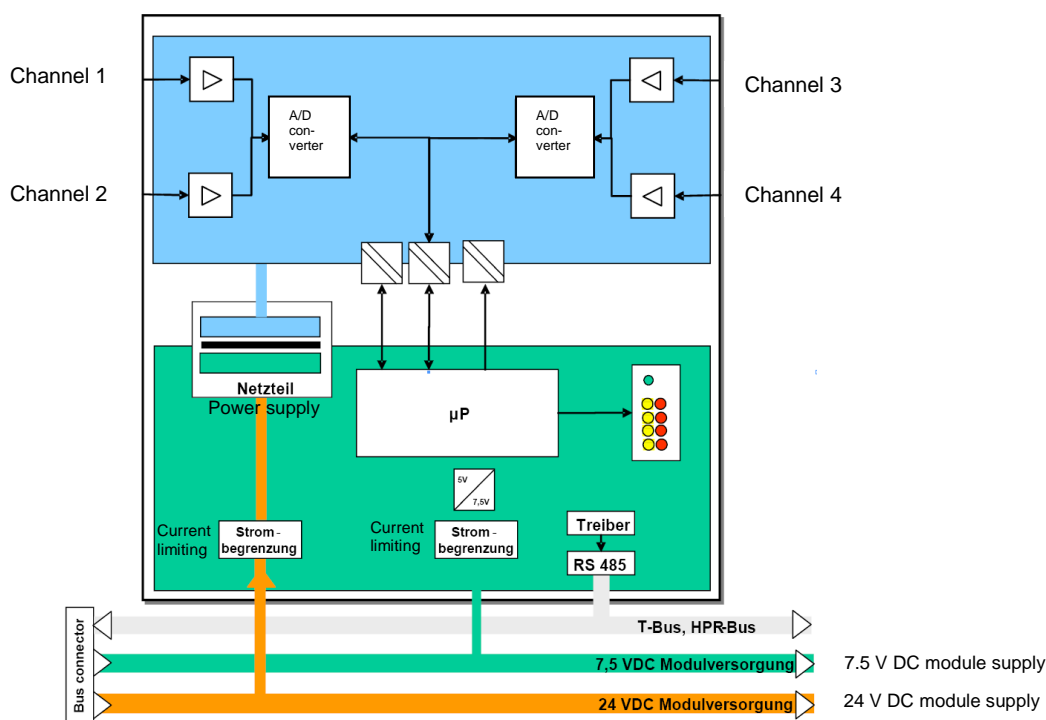


Fig. 1 block diagram HE 5840



Fig. 2 HIMOD – module diagram

HIMOD is an intelligent I/O system for all common fieldbus standards. Each function module provides the fieldbus coupler with process values. The built-in module processor relieves the fieldbus coupler of measured value calculations.

The 'SmartControl' system software is used to parameterise the outputs and inputs of a module, as well as to configure the module within a fieldbus device, i.e. a fieldbus coupler and the plugged-in function modules.

2 Safety Information

This device has been built and tested in accordance with VDE 0411-1 / EN 61010-1 and has left the factory in a technically safe condition.

The device complies with the European Directive 89/336/EEC (EMC) and is labelled with the CE mark.

The device was tested before delivery and has passed the tests specified in the test plan. To maintain this condition and ensure safe operation, the user must observe the instructions and warnings contained in these operating instructions and operate the device in accordance with the operating instructions.



The device is intended exclusively for use as a measuring and control device in technical installations.



Warning

If the device shows signs of damage that indicate that it cannot be operated safely, it must not be put into operation.

ELECTRICAL CONNECTION

The electrical cables must be laid according to the respective national regulations (in Germany VDE 0100). The measuring cables must be laid separately from the signal and mains cables.

A switch or circuit breaker must be provided for the device in the installation and labelled as such. The switch or circuit breaker must be located near the appliance and be easily accessible to the user.

COMMISSIONING

Before switching on the appliance, ensure that the following points have been observed:

- Ensure that the supply voltage corresponds to the specification on the type plate.
- All covers required for protection against accidental contact must be in place.
- If the device is interconnected with other devices and/or equipment, the effects must be considered before switching on and appropriate precautions taken.
- The unit may only be operated when installed.
- The temperature limitations specified for the use of the device must be complied with before and during operation.



Warning

The ventilation slots of the housing must not be covered during operation.

The measurement inputs are designed for measurement from circuits that are not directly connected to the mains supply (CAT I).



The measuring inputs are designed for transient overvoltage up to 800V against PE.

DECOMMISSIONING

If the device is to be decommissioned, all poles of the power supply must be switched off. The device must be secured against unintentional operation. If the device is interconnected with other devices and/or equipment, the effects must be considered before switching off and appropriate precautions taken.

2.1 Maintenance, Repair, Retrofitting

The appliances do not require any special maintenance. There are no operable elements inside the appliance, so the user must not open the appliance. Retrofitting, maintenance and repair work may only be carried out by trained, specialised and competent persons.

**Warning**

When opening the appliances or removing covers and parts, live parts that are dangerous to touch may be exposed. Connection points may also be live.

**Caution**

When opening the appliances, components that are sensitive to electrostatic discharge (ESD) may be exposed.

2.2 Cleaning



The housing and the front of the appliance can be cleaned with a dry, lint-free cloth.

3 Assembly

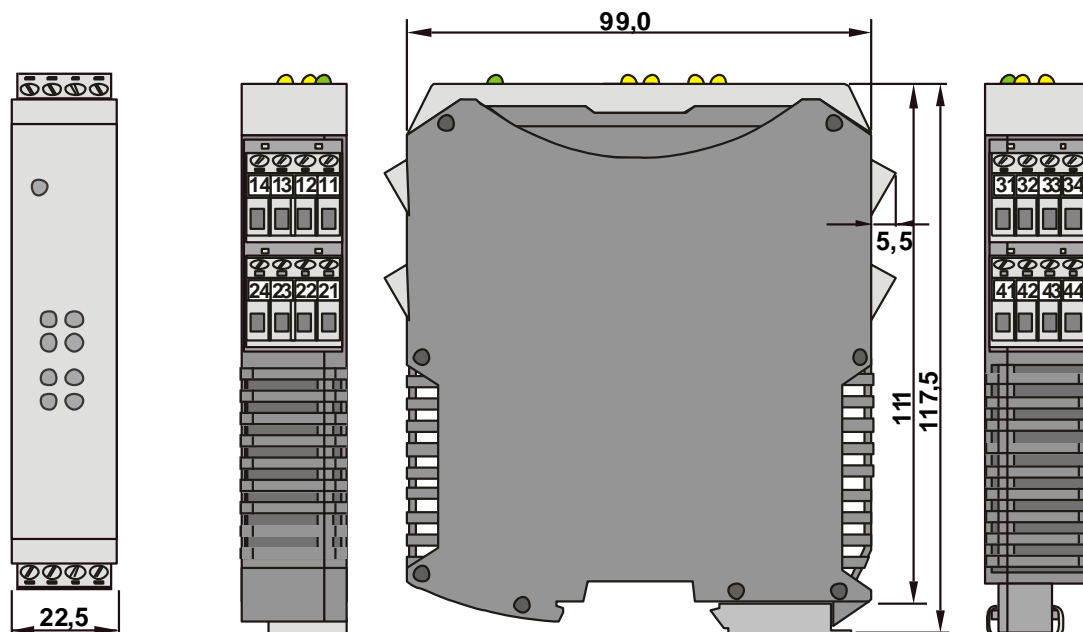


Fig. 3 Dimensions

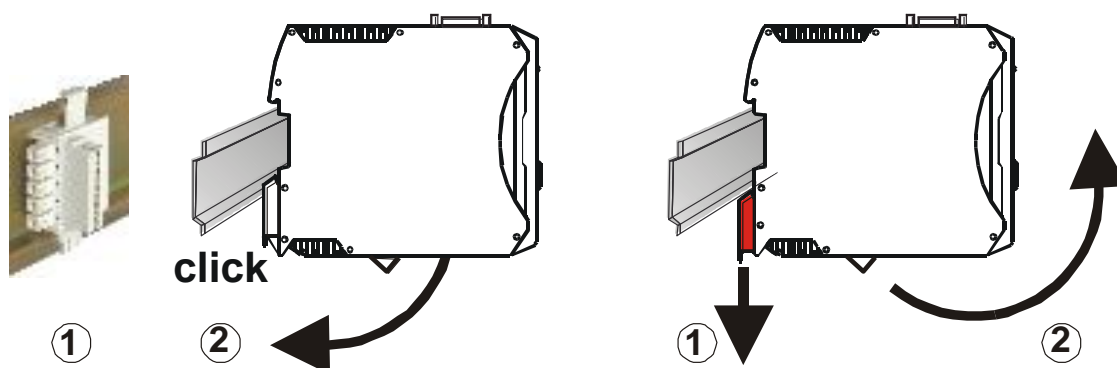


Fig. 4 Assembly / disassembly

The device is designed for vertical mounting on 35 mm top-hat rails in accordance with EN 50022. Devices of the HIMOD family can be mounted directly next to each other. A clearance of at least 8 cm must be maintained above and below the device for installation and removal.

To mount the device, simply swivel it onto the top-hat rail from above and audibly snap it into place. To remove, pull the foot latch downwards with a screwdriver and swivel the device upwards to remove it.

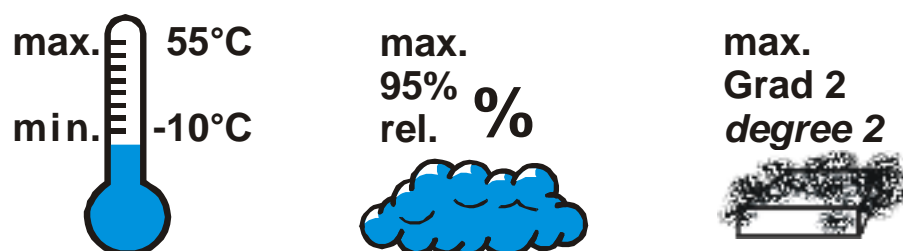


Fig. 5 Environmental conditions

The installation location should be as free as possible from vibrations, aggressive media (such as acids, alkalis), liquids, dust or other suspended matter.



The module does not contain any parts that require maintenance and does not need to be opened by the customer.



The device may only be used in environments with the approved degree of protection.



The ventilation slots of the housing must not be covered.



In systems in which transient overvoltages can occur, the devices must be equipped with additional overvoltage filters or limiters for protection!



Attention! The device contains ESD-sensitive components.



Please observe the safety instructions (section 2).



In order to maintain pollution degree 2 in accordance with EN 61010-1, the appliance must not be installed under contactors or similar devices from which conductive dust or parts could trickle out.

3.1 Connection plugs

The up to four device connection terminals are pluggable. They must be plugged into the housing from above or below (audible click). The plugs are released by levering them out with a screwdriver. Two types are available:

- Screw terminals for conductor cross-sections up to 2.5 mm²
- Spring-loaded terminals for conductor cross-sections up to 2.5 mm²



The plugs can only be operated without power.

Screw terminals must be tightened with a tightening torque of 0.5 - 0.6 Nm.

With spring-loaded terminals, rigid conductors and flexible conductors with ferrules can be inserted directly into the clamping point. To release, press the (orange) lever opener.



Protection against accidental contact: Terminal blocks that are not connected must be left in the slot.

3.2 Front view and displays

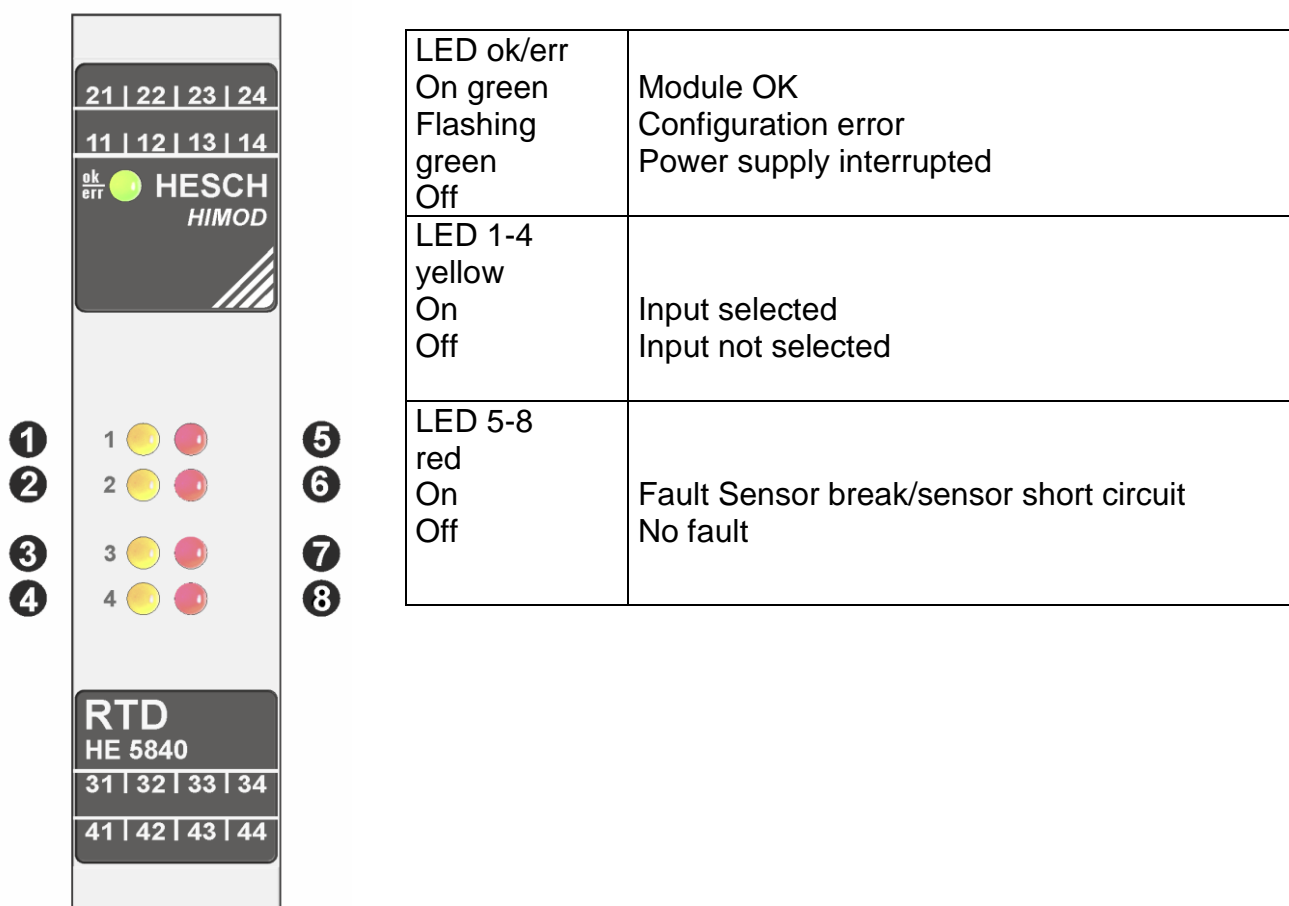


Fig. 6 HE 5840 front view

4 Power Connection

4.1 Connection diagram

The 4-pin device connectors are used for the module function.

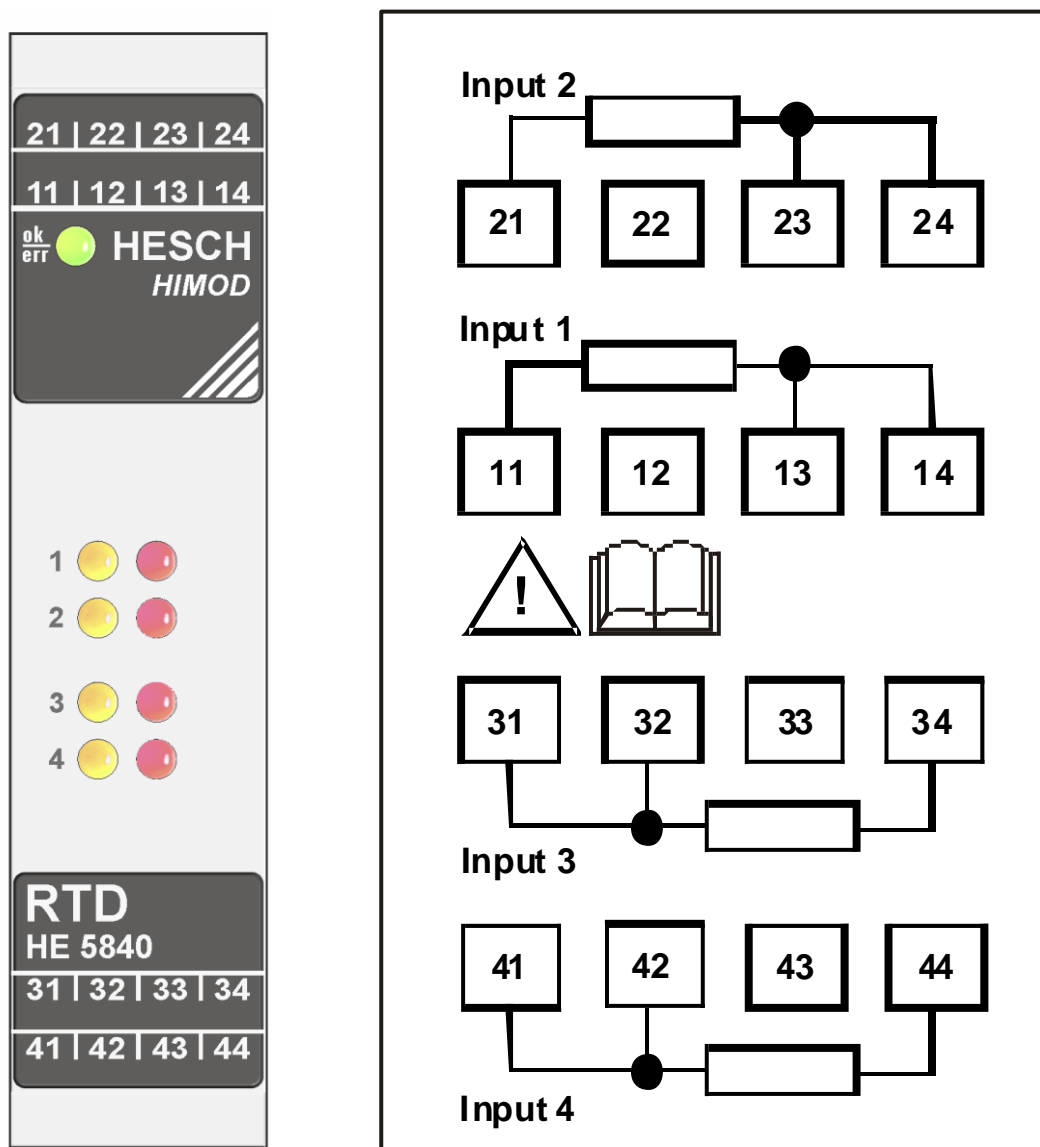
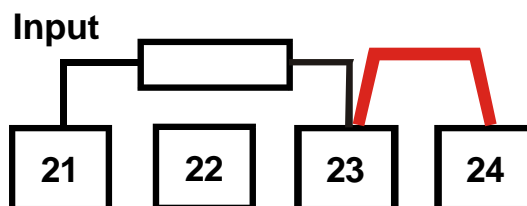


Fig. 7 Front view and pin assignment

Connection in 2-wire technology without line compensation:
The compensation input must be wired.



Incorrect connection can lead to destruction of the device!

5 Functional description

The HE 5840 module provides the HIMOD bus coupler with four inputs. The functions of the module are parameterised in the device using the 'SmartControl' software tool.

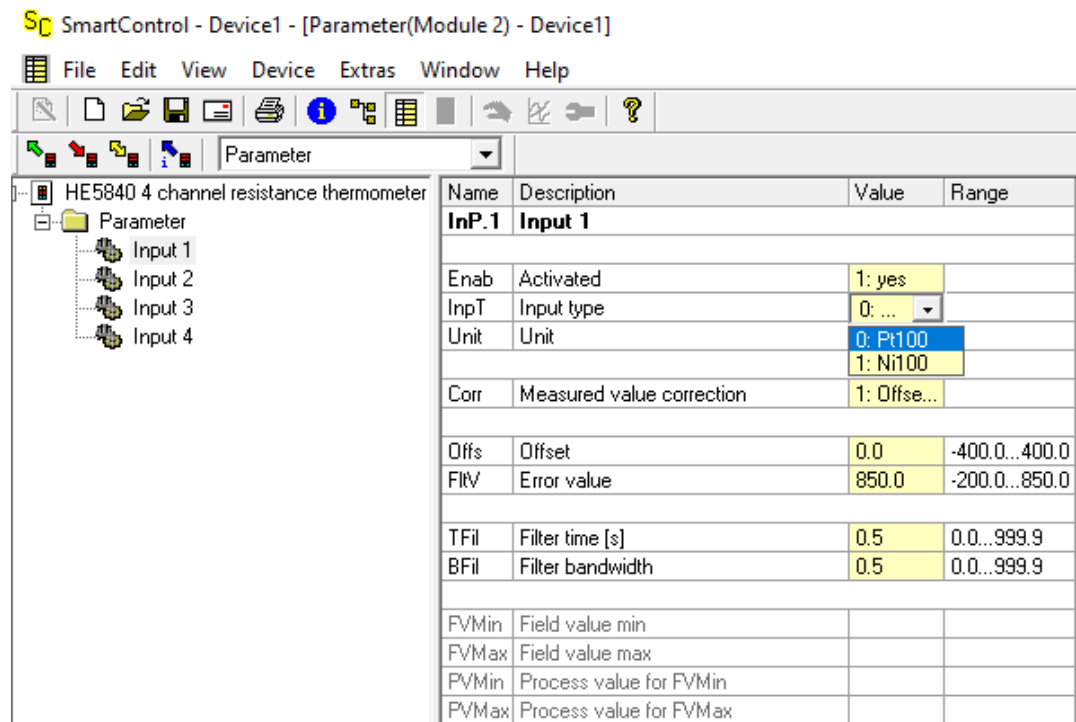


Fig. 8 Screen Parameterisation Module function Input variants

The HE 5840 module is available in different input variants.

5.1 Table Parameterisation of module functions

Abbreviation	Name	Mod Adr	Value	Meaning	Range
Enab	Enabled	401	0	No	
			1	Yes	
InpT	InputType	400		58400000 58401000 58402000	
			0	Pt100 Pt1000 Pt100	
			1	Ni100 Ni1000 Pt1000	
			2	KTY Ni100	
			3	Ni1000	
			4	KTY	
Unit	Unit	402	0	°C	
			1	°F	
Offs	Offset	403	0.0	is added to the measured value	-400.0 to 400.0
FltV	Error value	404	0.0	is output in the event of an error	-200.0 to 850.0
TFil	Filter time	405	0.5 s		0.0 to 999.9
BFil	Filter bandwidth	406	0.5		0.0 to 999.9

The MOD addresses (HEX) are valid for channel 1. The following channels have an offset of 100 (HEX). Channel 2: 500...Channel 3: 600...

5.1.1 Filter for input signals

A mathematical first-order filter is built in. It is adjustable with time constant and bandwidth.

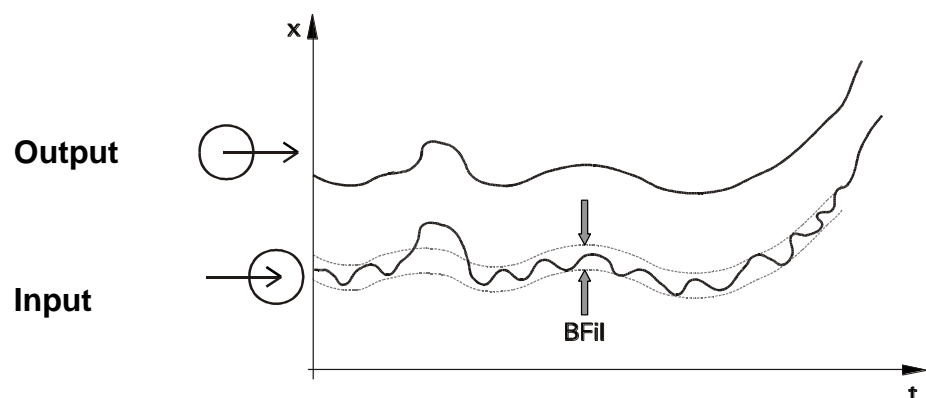


Fig.10 Effect of the filter parameters

The filter bandwidth BFil is the adjustable tolerance around the measured value in which the filter is active. Measured value changes greater than the set bandwidth are passed on unfiltered.

5.2 Error handling

The 'Error behaviour' parameter defines the behaviour in the event of a bus failure or failure of an input, but depending on the error value defined at device level for this module.

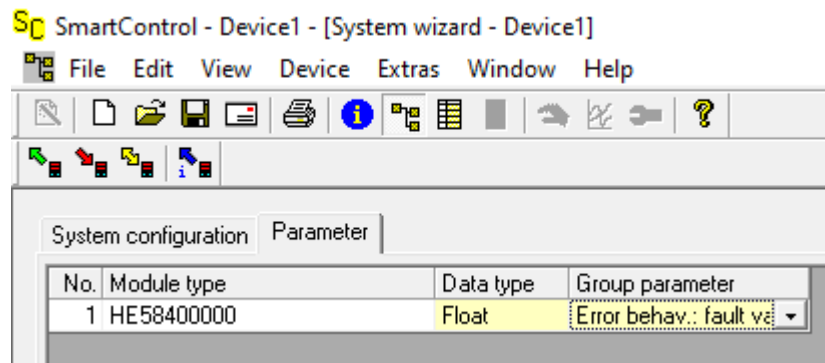


Fig. 11 Screen Parameterisation Data type, Error behaviour

If the fault behaviour for the module is selected with **fault value**, the predefined input values from the **FltV** parameter apply.

5.2.1 Data type

The data type of the measured process values can be selected as 'Integer' or 'Float'. Floating point representation is appropriate for analogue measured values with 16-bit resolution, but this must be supported by the subsequent protocols and programs.

5.3 Meaning of the module status information

The module status is mapped in the status byte. Each bit represents a piece of information. The meaning of the individual bits can be found in the table.

Bit	Meaning	Comment
0	Alarm 0 Bit is set if an analogue input has an error (sensor break, sensor short circuit, overload) and the channel is activated.	Is accepted by the module
1	Alarm 1 Bit is not used	
2	Status 1 Bit is set if an EEPROM error is detected.	
3	Wrong Output Value Bit is not used	
4	No communication with the module (module has failed)	Is set by the coupler
5	Module does not match the configuration	
6	Reserve	
7	Reserve	

6 SmartControl – Engineering Tool

The 'SmartTool' engineering tool parameterises the function modules of a HIMOD® device and configures the device system. The physical connection is established by a PC with RS232 interface and a special cable at the 'SmartPort' front interface on the fieldbus coupling module:

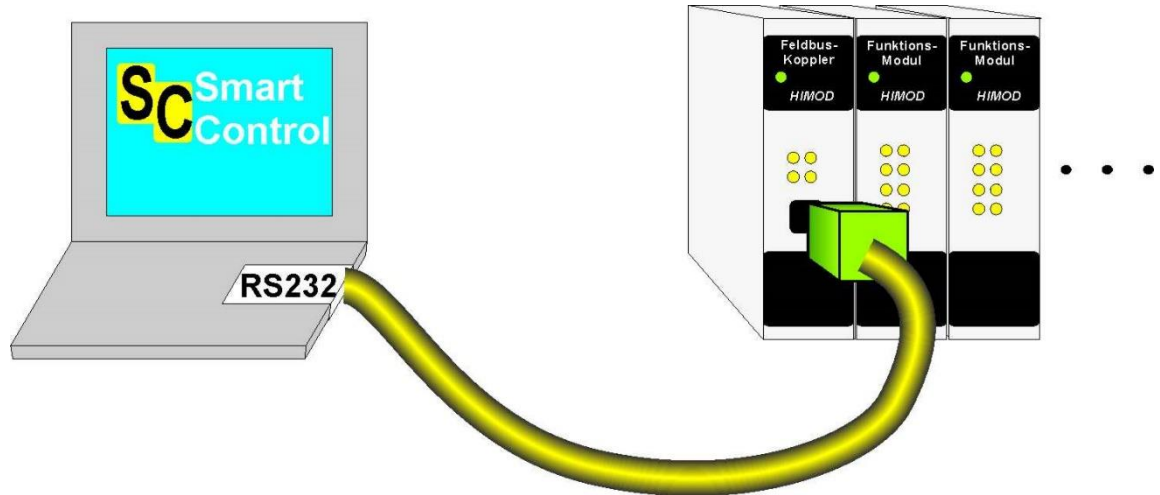


Fig. 12 'SmartControl' connection

6.1 Order numbers SmartControl components

SmartControlExpert Software	58510000
HIMOD Programming adapter	58511000

6.2 Functionality of the SmartControl software

- Setting the parameters and configuration parameters
- Download: Transferring an engineering to the module
- Online mode / visualisation
- Basic diagnostic function
- Save file, parameterisation
- Print function
- Online documentation / help
- Data acquisition and trend recording
- Network / multiple licence
- Assistant function

7 Technical Data

7.1 Module function

Module type:	Temperature measuring module for HIMOD systems, 4 x resistance thermometers, RTD 3-wire connection			
Inputs:	58400000	58401000	58402000	Measuring range
	Pt100	Pt1000	Pt100/1000	-200...850°C
	Ni100	Ni1000	Ni100/1000	- 60...300°C
		KTY 11-6	KTY 11-6	- 50...125°C
Measuring current:	Pt100/Ni100	I<0,5 mA		
	Pt1000/ Ni 1000	I< 50 µA		
	KTY 11-6	I< 50 µA		
Transducer resolution:	16 Bit			
Accuracy:	≤ 1K			
Cycle time:	160 ms			
Temperature influence:	≤ 0.08 %/10K			
Fail-Safe:	The behaviour in the event of bus failure can be set for each input.			
Displays:	1 LED green/red	Module function and configuration		
	4 LED yellow	Input status (activated)		
	4 LED red	Fault status (break, short circuit)		

7.2 Environmental conditions

Environmental temperature:	Operation: -10 .. 55°C Storage: -25 .. 60°C Transport: -25 .. 85°C
Humidity:	KUF DIN 40040, max ≤95% rel. humidity 75% rel. humidity on annual average, no condensation
Ice formation:	Not permitted
Air pressure:	Operation and storage: 80 kPa to 106 kPa Transport 70 kPa to 106 kPa
Electrical isolation:	The supply voltage, field bus, logic and input areas are each electrically isolated from each other in accordance with EN 61010-1: Working voltage: 300 V Overvoltage category II Pollution degree 2

The inputs are at the same potential.

Vibration: in accordance with EN 60068-2-6, sinusoidal vibrations
Load: 5g, 2 h per room direction

Shock: according to EN 60068-2-27
Load: 25g over 11 ms, half sine wave

EMC: Emission: DIN EN 61000-6-3
Immision: DIN EN 61000-6-2

Protection type: Housing front: IP 20
Housing: IP 20
Connections: IP 20

7.3 Mounting and connection

Mounting: on 35mm top-hat rails to EN 50022
Locking via metal foot latch
Operating position: vertical

Housing Material: Polyamide PA 6.6
Flammability class: V0 (UL 94)
Dimensions: 22.5 x 99 x 117.5 mm (W x H x D)
Weight: 125 kg

Connection technology: Connector plug, pluggable Alternatively available:
Screw terminals for conductor cross-sections from 0.2 to 2.5 mm²
(AWG 24-12)
Spring terminals for conductor cross-sections from 0.2 to 2.5 mm²
(AWG 24-12)

Connection Power supply and communication bus via T-bus connector
mounted in the mounting rail.
Current consumption 7.5V: 55 mA
Current consumption 24V: 50 mA

Subject to technical changes