Sewi KNX T

Room Temperature Sensor

Item numbers 70392 (white), 70692 (jet black)

elsner elektronik

Installation and Adjustment

Installation, inspection, commissioning and troubleshooting of the device must only be carried out by a competent electrician.

This manual is amended periodically and will be brought into line with new software releases. The change status (software version and date) can be found in the contents footer. If you have a device with a later software version, please check **www.elsner-elektronik.de** in the menu area "Service" to find out whether a more up-to-date version of the manual is available.

Clarification of signs used in this manual

Safety advice.

Safety advice for working on electrical connections, components, etc.

DANGER! ... indicates an immediately hazardous situation which will lead to death or severe injuries if it is not avoided.

WARNING! ... indicates a potentially hazardous situation which may lead to death or severe injuries if it is not avoided.

CAUTION! ... indicates a potentially hazardous situation which may lead to trivial or minor injuries if it is not avoided.

ATTENTION! ... indicates a situation which may lead to damage to property if it is not avoided.

ETS In the ETS tables, the parameter default settings are marked by underlining.

1. Description

The **Temperature Sensor Sewi KNX T** for the KNX bus system measures the room temperature. Via the bus, the sensor can receive an external temperature value and process it further with its own data to a total value (mixed value, e.g. room average).

The measurement value can be used for the control of limit-dependent switching outputs. States can be linked via AND logic gates and OR logic gates. Multi-function modules change input data as required by means of calculations, querying a condition, or converting the data point type. In addition, an integrated manipulated variable comparator can compare and output variables that were received via communication objects. An integrated PI controller controls heating and cooling according to temperature.

Functions:

- Measuring the **Temperature** with a **mixed value calculation**. The share of internal measurement value and external value can be set as a percentage
- **Threshold values** can be adjusted per parameter or via communication objects
- **PI-controller for heating** (one or two-stage) and **cooling** (one or two-stage) according to temperature. Regulation according to separate setpoints or basic setpoint temperature
- **8 AND and 8 OR logic gates**, each with 4 inputs. All switching events as well as 16 logic inputs (in the form of communications objects) can be used as inputs for the logic gates. The output of each gate can be configured optionally as 1-bit or 2 x 8-bit
- **8 multi-function modules** (computers) for changing the input data by calculations, by querying a condition or by converting the data point type
- **4 manipulated variable comparators** to output minimum, maximum or average values. 5 inputs each for values received via communication objects
- **Summer compensation** for cooling systems. A characteristic curve matches the target temperature in the room to the external temperature and sets the minimum and maximum target temperature values

Configuration is made using the KNX software ETS. The **product file** can be downloaded from the Elsner Elektronik website on **www.elsner-elektronik.de** in the "Service" menu.

1.0.1. Scope of delivery

- Temperature sensor

1.1. Technical data

Housing	Plastic
Colours	• White similar to signal white RAL 9003 (skirting)/ grey white RAL 9002 (cover) • Jet black RAL 9005
Assembly	Surface, wall or ceiling installation

Protection category	IP 30
Dimensions	Ø approx. 105 mm, height approx. 32 mm
Total weight	approx. 45 g
Ambient temperature	Operation -25…+80°C, storage -30…+85°C
Ambient humidity	max. 95% RH, avoid condensation
Operating voltage	KNX bus voltage
Bus current	max. 10 mA
Data output	KNX +/- bus plug-in terminal
BCU type	Integrated microcontroller
PEI type	0
Group addresses	max. 2000
Assignments	max. 2000
Communication objects	237
Temperature sensor:	
Measurement range	-25°C … +80°C
Resolution	0.1°C
Accuracy*	±0,8°C at -20...-10°C ±0,5°C at -10...+80°C

* Follow the instructions on *Measuring accuracy*.

The product conforms with the provisions of EU directives.

1.1.1. Measuring accuracy

Deviations in measured values due to interfering sources (see chapter *installation location*) must be corrected in the ETS in order to achieve the specified accuracy of the sensor (offset).

During the **Temperature measurement**, the self-heating of the device is taken into consideration by the electronics. It is compensated by the software, therefore the displayed/output indoor temperature measuring value is correct.

2. Installation and start-up

2.1. Installation notes

Installation, testing, operational start-up and troubleshooting should only be performed by an electrician.

CAUTION!
Live voltage!
There are unprotected live components inside the device.
- National legal regulations are to be followed.

- Ensure that all lines to be assembled are free of voltage and take precautions against accidental switching on.
- Do not use the device if it is damaged.
- Take the device or system out of service and secure it against unintentional use, if it can be assumed, that risk-free operation is no longer guaranteed.

The device is only to be used for its intended purpose. Any improper modification or failure to follow the operating instructions voids any and all warranty and guarantee claims.

After unpacking the device, check it immediately for possible mechanical damage. If it has been damaged in transport, inform the supplier immediately.

The device may only be used as a fixed-site installation; that means only when assembled and after conclusion of all installation and operational start-up tasks and only in the surroundings designated for it.

Elsner Elektronik is not liable for any changes in norms and standards which may occur after publication of these operating instructions.

2.2. Installation location

Install and use only in dry interior rooms! Avoid condensation.

The **Temperature Sensor Sewi KNX T** is installed surface mounted on walls or ceilings.

When selecting an installation location, please ensure that the measurement results are affected as little as possible by external influences. Possible sources of interference include:
- Direct sunlight
- Drafts from windows and doors
- Draughts from ducts coming from other rooms or the outdoors
- Warming or cooling of the building structure on which the sensor is mounted, e.g. due to sunlight, heating or cold water pipes
- Connection lines and empty ducts which lead from warmer or colder areas to the sensor

Measurement variations from such sources of interference must be corrected in the ETS in order to ensure the specified accuracy of the sensor (offset).

2.3. Construction of the sensor

2.3.1. Housing from the outside

Fig. 1
A Recess to open the housing. When closing the housing, the recess aligns to the marking on the skirting

2.3.2. Printed circuit boards / connections

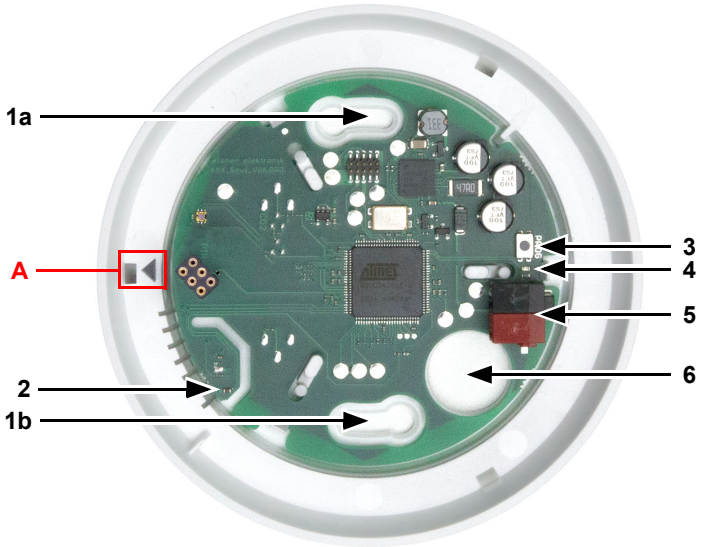

Fig. 2
1 a+b Long holes for mounting (hole distance 60 mm)

2 Sensor for temperature
3 Programming button
4 Programming LED
5 KNX-terminal BUS +/-
6 Cable bushing
A Mark for aligning the cover

2.4. Assembly

Fig. 3

Open the housing. To do this, carefully lift the cover from the skirting. Start at the recess (Fig. 1: A).

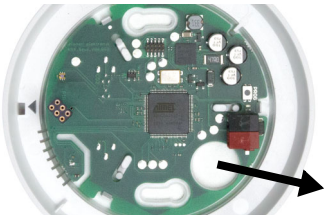

Fig. 4

Lead the bus cable through the cable bushing in the skirting.

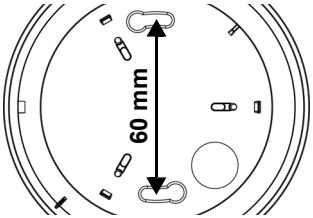

Fig. 5

Screw the skirting to the wall or the ceiling.

Hole distance 60 mm.

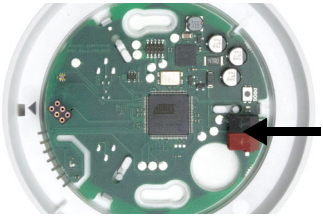

Fig. 6

Connect the KNX bus to the KNX terminal.

Fig. 7

Close the housing by positioning the cover and snapping it into place. To do this, align the recess on the cover to the marking on the skirting (Fig. 1+2: A).

2.5. Notes on mounting and commissioning

Never expose the device to water (e.g. rain) or dust. This can damage the electronics. You must not exceed a relative humidity of 95%. Avoid condensation.

The air slots on the side must not be closed or covered.

After the bus voltage has been applied, the device will enter an initialisation phase lasting a few seconds. During this phase no information can be received or sent via the bus.

3. Addressing the equipment

The equipment is delivered with the bus address 15.15.255. You can program a different address in the ETS by overwriting the address 15.15.255 or by teaching the device via the programming button.

The programming button is on the inside of the housing (Fig. 2: No. 3).

4. Maintenance

The air slots on the side must not get dirty or covered. As a rule, it is sufficient to wipe the device with a soft, dry cloth twice a year.

5. Transfer protocol

Units:

Temperatures in degrees Celsius
Variables in %

5.1. List of all communication objects

Abbreviation flags:

C Communication
R Read
W Write
T Transfer
U Update

No.	Text	Function	Flags	DPT type	Size
1	Software version	Output	R-CT	[217.1] DPT_Version	2 bytes
41	Temperature sensor: Malfunction	Output	R-CT	[1.1] DPT_Switch	1 bit
42	Temperature sensor: External measurement	Input	-WCT	[9.1] DPT_Value_Temp	2 bytes
43	Temperature sensor: Measured value	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
44	Temperature sensor: Total measurement	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
45	Temperature sensor: Min./Max. measurement query	Input	-WC-	[1.017] DPT_Trigger	1 bit
46	Temperature sensor: Minimum measurement	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
47	Temperature sensor: Maximum measurement	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
48	Temperature sensor: Min./Max. measurement reset	Input	-WC-	[1.017] DPT_Trigger	1 bit
51	Temp. threshold value 1: Absolute value	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
52	Temp. threshold value 1: (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
53	Temp. threshold value 1: Switching delay from 0 to 1	Input	-WC-	[7.5] DPT_TimePeriodSec	2 bytes
54	Temp. threshold value 1: Switching delay from 1 to 0	Input	-WC-	[7.5] DPT_TimePeriodSec	2 bytes
55	Temp. threshold value 1: Switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
56	Temp. threshold value 1: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit

No.	Text	Function	Flags	DPT type	Size
58	Temp. threshold value 2: Absolute value	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
59	Temp. threshold value 2: (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
60	Temp. threshold value 2: Switching delay from 0 to 1	Input	-WC-	[7.5] DPT_TimePeriodSec	2 bytes
61	Temp. threshold value 2: Switching delay from 1 to 0	Input	-WC-	[7.5] DPT_TimePeriodSec	2 bytes
62	Temp. threshold value 2: Switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
63	Temp. threshold value 2: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
65	Temp. threshold value 3: Absolute value	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
66	Temp. threshold value 3: (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
67	Temp. threshold value 3: Switching delay from 0 to 1	Input	-WC-	[7.5] DPT_TimePeriodSec	2 bytes
68	Temp. threshold value 3: Switching delay from 1 to 0	Input	-WC-	[7.5] DPT_TimePeriodSec	2 bytes
69	Temp. threshold value 3: Switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
70	Temp. threshold value 3: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
72	Temp. threshold value 4: Absolute value	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
73	Temp. threshold value 4: (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
74	Temp. threshold value 4: Switching delay from 0 to 1	Input	-WC-	[7.5] DPT_TimePeriodSec	2 bytes
75	Temp. threshold value 4: Switching delay from 1 to 0	Input	-WC-	[7.5] DPT_TimePeriodSec	2 bytes
76	Temp. threshold value 4: Switching output	Output	R-CT	[1.1] DPT_Switch	1 bit
77	Temp. threshold value 4: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 bit
481	Temp. controller: HVAC mode (priority 1)	Input	-WC-	[20.102] DPT_HVACMode	1 byte
482	Temp. controller: HVAC mode (priority 2)	Input	RWCT	[20.102] DPT_HVACMode	1 byte
483	Temp. controller: Mode frost/heat protection activation	Input	RWCT	[1.1] DPT_Switch	1 bit
484	Temp. controller: Block (1 = Blocking)	Input	-WC-	[1.1] DPT_Switch	1 bit
485	Temp. controller: Current setpoint	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes

No.	Text	Function	Flags	DPT type	Size
486	Temp. controller: Switching (0: Heating | 1: Cooling)	Input	-WC-	[1.1] DPT_Switch	1 bit
487	Temp. controller: Setpoint comfort heating	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
488	Temp. controller: Setpoint comfort heating (1:+ | 0: -)	Input	-WC-	[1.1] DPT_Switch	1 bit
489	Temp. controller: Setpoint comfort cooling	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
490	Temp. controller: Setpoint comfort cooling (1:+ | 0: -)	Input	-WC-	[1.1] DPT_Switch	1 bit
491	Temp. controller: Basic 16-bit setpoint shift	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
492	Temp. controller: Setpoint standby heating	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
493	Temp. controller: Setpoint standby heating (1:+ | 0: -)	Input	-WC-	[1.1] DPT_Switch	1 bit
494	Temp. controller: Setpoint standby cooling	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
495	Temp. controller: Setpoint standby cooling (1:+ | 0: -)	Input	-WC-	[1.1] DPT_Switch	1 bit
496	Temp. controller: Setpoint eco heating	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
497	Temp. controller: Setpoint, eco heating (1:+ | 0: -)	Input	-WC-	[1.1] DPT_Switch	1 bit
498	Temp. controller: Setpoint eco cooling	Input/ Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
499	Temp. controller: Setpoint, eco cooling (1:+ | 0: -)	Input	-WC-	[1.1] DPT_Switch	1 bit
500	Temp. controller: Control variable, heating (level 1)	Output	R-CT	[5.1] DPT_Scaling	1 byte
501	Temp. controller: Control variable, heating (level 2)	Output	R-CT	[5.1] DPT_Scaling	1 byte
502	Temp. controller: Control variable, cooling (level 1)	Output	R-CT	[5.1] DPT_Scaling	1 byte
503	Temp. controller: Control variable, cooling (level 2)	Output	R-CT	[5.1] DPT_Scaling	1 byte
504	Temperature controller: Variable for 4/6-way valve	Output	R-CT	[5.1] DPT_Scaling	1 byte
505	Temp. controller: Status heating level 1 (1:ON | 0:OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit
506	Temp. controller: Status heating level 2 (1:ON | 0:OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit

No.	Text	Function	Flags	DPT type	Size
507	Temp. controller: Status cooling level 1 (1:ON | 0:OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit
508	Temp. controller: Status cooling level 2 (1:ON | 0:OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit
509	Temp. controller: Comfort extension status	Input/ Output	RWCT	[1.1] DPT_Switch	1 bit
510	Temp. controller: Comfort extension time	Input	RWCT	[7.5] DPT_TimePeriodSec	2 bytes
515	European Summer Time: Outside temperature	Input	-WCT	[9.1] DPT_Value_Temp	2 bytes
516	European Summer Time: Setpoint value	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
517	European Summer Time: Block (1 = Blocking)	Input	-WC-	[1.1] DPT_Switch	1 bit
1111	Control variable comparator 1: Input 1	Input	-WC-	[5.1] DPT_Scaling	1 byte
1112	Control variable comparator 1: Input 2	Input	-WC-	[5.1] DPT_Scaling	1 byte
1113	Control variable comparator 1: Input 3	Input	-WC-	[5.1] DPT_Scaling	1 byte
1114	Control variable comparator 1: Input 4	Input	-WC-	[5.1] DPT_Scaling	1 byte
1115	Control variable comparator 1: Input 5	Input	-WC-	[5.1] DPT_Scaling	1 byte
1116	Control variable comparator 1: Output	Output	R-CT	[5.1] DPT_Scaling	1 byte
1117	Control variable comparator 1: Block: block)	Output	-WC-	[1.2] DPT_Bool	1 bit
1118	Control variable comparator 2: Input 1	Input	-WC-	[5.1] DPT_Scaling	1 byte
1119	Control variable comparator 2: Input 2	Input	-WC-	[5.1] DPT_Scaling	1 byte
1120	Control variable comparator 2: Input 3	Input	-WC-	[5.1] DPT_Scaling	1 byte
1121	Control variable comparator 2: Input 4	Input	-WC-	[5.1] DPT_Scaling	1 byte
1122	Control variable comparator 2: Input 5	Input	-WC-	[5.1] DPT_Scaling	1 byte
1123	Control variable comparator 2: Output	Output	R-CT	[5.1] DPT_Scaling	1 byte
1124	Control variable comparator 2: Block (1: block)	Output	-WC-	[1.2] DPT_Bool	1 bit

No.	Text	Function	Flags	DPT type	Size
1125	Control variable comparator 3: Input 1	Input	-WC-	[5.1] DPT_Scaling	1 byte
1126	Control variable comparator 3: Input 2	Input	-WC-	[5.1] DPT_Scaling	1 byte
1127	Control variable comparator 3: Input 3	Input	-WC-	[5.1] DPT_Scaling	1 byte
1128	Control variable comparator 3: Input 4	Input	-WC-	[5.1] DPT_Scaling	1 byte
1129	Control variable comparator 3: Input 5	Input	-WC-	[5.1] DPT_Scaling	1 byte
1130	Control variable comparator 3: Output	Output	R-CT	[5.1] DPT_Scaling	1 byte
1131	Control variable comparator 3: Block (1: block)	Output	-WC-	[1.2] DPT_Bool	1 bit
1132	Control variable comparator 4: Input 1	Input	-WC-	[5.1] DPT_Scaling	1 byte
1133	Control variable comparator 4: Input 2	Input	-WC-	[5.1] DPT_Scaling	1 byte
1134	Control variable comparator 4: Input 3	Input	-WC-	[5.1] DPT_Scaling	1 byte
1135	Control variable comparator 4: Input 4	Input	-WC-	[5.1] DPT_Scaling	1 byte
1136	Control variable comparator 4: Input 5	Input	-WC-	[5.1] DPT_Scaling	1 byte
1137	Control variable comparator 4: Output	Output	R-CT	[5.1] DPT_Scaling	1 byte
1138	Control variable comparator 4: Block (1: block)	Output	-WC-	[1.2] DPT_Bool	1 bit
1141	Computer 1: Input I1	Input	RWCT	Depending on setting	4 bytes
1142	Computer 1: Input I2	Input	RWCT	Depending on setting	4 bytes
1143	Computer 1: Input I3	Input	RWCT	Depending on setting	4 bytes
1144	Computer 1: Output O1	Output	R-CT	Depending on setting	4 bytes
1145	Computer 1: Output O2	Output	R-CT	Depending on setting	4 bytes
1146	Computer 1: Condition text	Output	R-CT	[16.0] DPT_String_ASCII	14 bytes
1147	Computer 1: Monitoring status	Output	R-CT	[1.1] DPT_Switch	1 bit
1148	Computer 1: Block (1: block)	Input	-WC-	[1.1] DPT_Switch	1 bit

No.	Text	Function	Flags	DPT type	Size
1149	Computer 2: Input I1	Input	RWCT	Depending on setting	4 bytes
1150	Computer 2: Input I2	Input	RWCT	Depending on setting	4 bytes
1151	Computer 2: Input I3	Input	RWCT	Depending on setting	4 bytes
1152	Computer 2: Output O1	Output	R-CT	Depending on setting	4 bytes
1153	Computer 2: Output O2	Output	R-CT	Depending on setting	4 bytes
1154	Computer 2: Condition text	Output	R-CT	[16.0] DPT_String_ASCII	14 bytes
1155	Computer 2: Monitoring status	Output	R-CT	[1.1] DPT_Switch	1 bit
1156	Computer 2: Block (1: block)	Input	-WC-	[1.1] DPT_Switch	1 bit
1157	Computer 3: Input I1	Input	RWCT	Depending on setting	4 bytes
1158	Computer 3: Input I2	Input	RWCT	Depending on setting	4 bytes
1159	Computer 3: Input I3	Input	RWCT	Depending on setting	4 bytes
1160	Computer 3: Output O1	Output	R-CT	Depending on setting	4 bytes
1161	Computer 3: Output O2	Output	R-CT	Depending on setting	4 bytes
1162	Computer 3: Condition text	Output	R-CT	[16.0] DPT_String_ASCII	14 bytes
1163	Computer 3: Monitoring status	Output	R-CT	[1.1] DPT_Switch	1 bit
1164	Computer 3: Block (1: block)	Input	-WC-	[1.1] DPT_Switch	1 bit
1165	Computer 4: Input I1	Input	RWCT	Depending on setting	4 bytes
1166	Computer 4: Input I2	Input	RWCT	Depending on setting	4 bytes
1167	Computer 4: Input I3	Input	RWCT	Depending on setting	4 bytes
1168	Computer 4: Output O1	Output	R-CT	Depending on setting	4 bytes
1169	Computer 4: Output O2	Output	R-CT	Depending on setting	4 bytes
1170	Computer 4: Condition text	Output	R-CT	[16.0] DPT_String_ASCII	14 bytes
1171	Computer 4: Monitoring status	Output	R-CT	[1.1] DPT_Switch	1 bit
1172	Computer 4: Block (1: block)	Input	-WC-	[1.1] DPT_Switch	1 bit

No.	Text	Function	Flags	DPT type	Size
1173	Computer 5: Input I1	Input	RWCT	Depending on setting	4 bytes
1174	Computer 5: Input I2	Input	RWCT	Depending on setting	4 bytes
1175	Computer 5: Input I3	Input	RWCT	Depending on setting	4 bytes
1176	Computer 5: Output O1	Output	R-CT	Depending on setting	4 bytes
1177	Computer 5: Output O2	Output	R-CT	Depending on setting	4 bytes
1178	Computer 5: Condition text	Output	R-CT	[16.0] DPT_String_ASCII	14 bytes
1179	Computer 5: Monitoring status	Output	R-CT	[1.1] DPT_Switch	1 bit
1180	Computer 5: Block (1: block)	Input	-WC-	[1.1] DPT_Switch	1 bit
1181	Computer 6: Input I1	Input	RWCT	Depending on setting	4 bytes
1182	Computer 6: Input I2	Input	RWCT	Depending on setting	4 bytes
1183	Computer 6: Input I3	Input	RWCT	Depending on setting	4 bytes
1184	Computer 6: Output O1	Output	R-CT	Depending on setting	4 bytes
1185	Computer 6: Output O2	Output	R-CT	Depending on setting	4 bytes
1186	Computer 6: Condition text	Output	R-CT	[16.0] DPT_String_ASCII	14 bytes
1187	Computer 6: Monitoring status	Output	R-CT	[1.1] DPT_Switch	1 bit
1188	Computer 6: Block (1: block)	Input	-WC-	[1.1] DPT_Switch	1 bit
1189	Computer 7: Input I1	Input	RWCT	Depending on setting	4 bytes
1190	Computer 7: Input I2	Input	RWCT	Depending on setting	4 bytes
1191	Computer 7: Input I3	Input	RWCT	Depending on setting	4 bytes
1192	Computer 7: Output O1	Output	R-CT	Depending on setting	4 bytes
1193	Computer 7: Output O2	Output	R-CT	Depending on setting	4 bytes
1194	Computer 7: Condition text	Output	R-CT	[16.0] DPT_String_ASCII	14 bytes
1195	Computer 7: Monitoring status	Output	R-CT	[1.1] DPT_Switch	1 bit
1196	Computer 7: Block (1: block)	Input	-WC-	[1.1] DPT_Switch	1 bit

No.	Text	Function	Flags	DPT type	Size
1197	Computer 8: Input I1	Input	RWCT	Depending on setting	4 bytes
1198	Computer 8: Input I2	Input	RWCT	Depending on setting	4 bytes
1199	Computer 8: Input I3	Input	RWCT	Depending on setting	4 bytes
1200	Computer 8: Output O1	Output	R-CT	Depending on setting	4 bytes
1201	Computer 8: Output O2	Output	R-CT	Depending on setting	4 bytes
1202	Computer 8: Condition text	Output	R-CT	[16.0] DPT_String_ASCII	14 bytes
1203	Computer 8: Monitoring status	Output	R-CT	[1.1] DPT_Switch	1 bit
1204	Computer 8: Block (1: block)	Input	-WC-	[1.1] DPT_Switch	1 bit
1391	Logic input 1	Input	-WC-	[1.2] DPT_Bool	1 bit
1392	Logic input 2	Input	-WC-	[1.2] DPT_Bool	1 bit
1393	Logic input 3	Input	-WC-	[1.2] DPT_Bool	1 bit
1394	Logic input 4	Input	-WC-	[1.2] DPT_Bool	1 bit
1395	Logic input 5	Input	-WC-	[1.2] DPT_Bool	1 bit
1396	Logic input 6	Input	-WC-	[1.2] DPT_Bool	1 bit
1397	Logic input 7	Input	-WC-	[1.2] DPT_Bool	1 bit
1398	Logic input 8	Input	-WC-	[1.2] DPT_Bool	1 bit
1399	Logic input 9	Input	-WC-	[1.2] DPT_Bool	1 bit
1400	Logic input 10	Input	-WC-	[1.2] DPT_Bool	1 bit
1401	Logic input 11	Input	-WC-	[1.2] DPT_Bool	1 bit
1402	Logic input 12	Input	-WC-	[1.2] DPT_Bool	1 bit
1403	Logic input 13	Input	-WC-	[1.2] DPT_Bool	1 bit
1404	Logic input 14	Input	-WC-	[1.2] DPT_Bool	1 bit
1405	Logic input 15	Input	-WC-	[1.2] DPT_Bool	1 bit
1406	Logic input 16	Input	-WC-	[1.2] DPT_Bool	1 bit
1411	AND logic 1: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
1412	AND logic 1: 8-bit output A	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1413	AND logic 1: 8-bit output B	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1414	AND logic 1: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
1415	AND logic 2: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
1416	AND logic 2: 8-bit output A	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1417	AND logic 2: 8-bit output B	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte

No.	Text	Function	Flags	DPT type	Size
1418	AND logic 2: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
1419	AND logic 3: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
1420	AND logic 3: 8-bit output A	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1421	AND logic 3: 8-bit output B	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1422	AND logic 3: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
1423	AND logic 4: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
1424	AND logic 4: 8-bit output A	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1425	AND logic 4: 8-bit output B	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1426	AND logic 4: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
1427	AND logic 5: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
1428	AND logic 5: 8-bit output A	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1429	AND logic 5: 8-bit output B	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1430	AND logic 5: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
1431	AND logic 6: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
1432	AND logic 6: 8-bit output A	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1433	AND logic 6: 8-bit output B	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1434	AND logic 6: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
1435	AND logic 7: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
1436	AND logic 7: 8-bit output A	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1437	AND logic 7: 8-bit output B	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1438	AND logic 7: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
1439	AND logic 8: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
1440	AND logic 8: 8-bit output A	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1441	AND logic 8: 8-bit output B	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1442	AND logic 8: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
1443	OR logic 1: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
1444	OR logic 1: 8-bit output A	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1445	OR logic 1: 8-bit output B	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte

No.	Text	Function	Flags	DPT type	Size
1446	OR logic 1: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
1447	OR logic 2: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
1448	OR logic 2: 8-bit output A	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1449	OR logic 2: 8-bit output B	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1450	OR logic 2: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
1451	OR logic 3: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
1452	OR logic 3: 8-bit output A	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1453	OR logic 3: 8-bit output B	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1454	OR logic 3: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
1455	OR logic 4: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
1456	OR logic 4: 8-bit output A	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1457	OR logic 4: 8-bit output B	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1458	OR logic 4: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
1459	OR logic 5: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
1460	OR logic 5: 8-bit output A	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1461	OR logic 5: 8-bit output B	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1462	OR logic 5: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
1463	OR logic 6: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
1464	OR logic 6: 8-bit output A	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1465	OR logic 6: 8-bit output B	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1466	OR logic 6: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
1467	OR logic 7: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
1468	OR logic 7: 8-bit output A	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1469	OR logic 7: 8-bit output B	Output	R-CT	[5.010] DPT_-Value_1_Ucount	1 byte
1470	OR logic 7: Block	Input	-WC-	[1.1] DPT_Switch	1 bit
1471	OR logic 8: 1-bit switching output	Output	R-CT	[1.2] DPT_Bool	1 bit
1472	OR logic 8: 8-bit output A	Output	R-CT		1 byte
1473	OR logic 8: 8-bit output B	Output	R-CT		1 byte
1474	OR logic 8: Block	Input	-WC-	[1.1] DPT_Switch	1 bit

6. Parameter setting

6.1. Behaviour on power failure/ restoration of power

Behaviour following a failure of the bus power supply:

The device sends nothing.

Behaviour on bus restoration of power and following programming or reset:

The device sends all outputs according to their send behaviour set in the parameters with the delays established in the "General settings" parameter block.

6.2. General settings

Set basic characteristics for the data transfer.

Send delay after power-up and programming for:	
Measured values	5 s • ... • 2 h
Threshold values and switching outputs	5 s • ... • 2 h
Controller objects	5 s • ... • 2 h
Comparator and computer objects	5 s • ... • 2 h
Logic objects	5 s • ... • 2 h
Maximum telegram rate	• 1 message per second • ... • 5 messages per second • ... • 20 messages per second

6.3. Temperature Measurement

Select, whether a **malfunction object** is to be sent if the sensor is faulty.

Use malfunction object	No • Yes

Use **Offsets** to adjust the readings to be sent.

Offset in 0.1°C	-50…50; 0

The unit can calculate a **mixed value** from its own reading and an external value. Set the mixed value calculation if desired. If an external portion is used, all of the following settings (threshold values, etc.) are related to the overall reading.

Use external measured value	No • Yes
Ext. Reading proportion of the total reading	5% • 10% • ... • 50% • ... • 100%

Sending pattern for internal and total measured value	• never • periodically • on change • on change and periodically
At and above change of *(if sent on change)*	0.1°C • 0.2°C • 0.5°C • ... • 5.0°C
Send cycle *(if sent periodically)*	5 s • 10 s • ... • 2 h

The **minimum and maximum readings** can be saved and sent to the bus. Use the "Reset temperature min/max. value" objects to reset the values to the current readings. The values are not retained after a reset.

Use minimum and maximum value	No • Yes

6.4. Temperature threshold values

Activate the required temperature threshold values. The menus for setting the threshold values are displayed.

Use threshold value 1/2/3/4	Yes • No

6.4.1. Threshold value 1, 2, 3, 4

Threshold value

Set, in which cases **threshold values and delay times** received via object are to be retained. The parameter is only taken into consideration if the setting via object is activated below. Please note that the setting "After power supply restoration and programming" should not be used for the initial start-up, as the factory settings are always used until the first communication (setting via objects is ignored).

Maintain the	
threshold values and delays received via communication objects	• never • after power supply restoration • after power supply restoration and programming

Set the threshold value directly in the application program using parameters, or define them via the bus using a communication object.

Threshold value setting via parameter:

Set the threshold values and hysteresis directly.

Threshold value setting via	**Parameter** • Communication objects
Threshold value in 0.1°C	-300 … 800; 200

Threshold value setting via a communication object:

Define, how the threshold value is to be received from the bus. Basically, a new value can be received, or simply a command to increase or decrease.

During initial commissioning, a threshold value must be defined, which will be valid until the first communication with a new threshold value. For units which have already been taken into service, the last communicated threshold value can be used. Basically, a temperature range is given, in which the threshold value can be changed (object value limit).

A set threshold value will be retained until a new value or a change is transferred. The current value is saved, so that it is retained in the event of a power supply failure and will be available once the power supply is restored.

Threshold value setting via	Parameter • **Communication objects**
Start threshold value in 0.1°C valid until first communication	-300 ... 800; 200
Object value limit (min) in 0.1°C	-300...800
Object value limit (max) in 0.1°C	-300...800
Type of threshold value change	Absolute value • Increase/decrease
Increment *(upon increase/decrease change)*	0.1°C • ... • 5°C

Set the **hysteresis** independent of the type of threshold value specification.

Hysteresis setting	in % • absolute
Hysteresis in 0.1°	0...1100; 50
Hysteresis in % of the threshold value	0 ... 50; 20

Switching output

Set the behaviour of the switching output when a threshold value is exceeded/undercut. The output switching delay can be set using objects or directly as a parameter.

When the following conditions apply, the output is (TV = Threshold value)	• TV above = 1 | TV - hyst. below = 0 • TV above = 0 | TV - hyst. below = 1 • TV below = 1 |TV + hyst. above = 0 • TV below = 0 |TV + hyst. above = 1
Delays can be set via objects (in seconds)	No • Yes
Switching delay from 0 to 1 *(If delay can be set via objects: valid until 1st communication)*	None • 1 s • 2 s • 5 s • 10 s • ... • 2 h
Switching delay from 1 to 0 *(If delay can be set via objects: valid until 1st communication)*	None • 1 s • 2 s • 5 s • 10 s • ... • 2 h

Switching output sends	• on change • on change to 1 • on change to 0 • on change and periodically • on change to 1 and periodically • on change to 0 and periodically
Cycle *(only if sending periodically is selected)*	5 s • 10 s • 30 s... • 2 h

Block

The switching output can be blocked using an object.

Use switching output block	No • Yes

If the block is activated, define specifications here for the behaviour of the output when blocked.

Analysis of the blocking object	• At value 1: block | At value 0: release • At value 0: block | At value 1: release
Blocking object value before 1st communication	0 • 1
Behaviour of the switching output	
On block	• Do not send message • send 0 • send 1
On release (with 2 seconds release delay)	[Dependent on the "Switching output sends" setting]

The behaviour of the switching output on release is dependent on the value of the parameter "Switching output sends" (see "Switching output")

Switching output sends on change	• Do not send message • Send switching output status
Switching output sends on change to 1	• Do not send message • if switching output = 1 ➔ send 1
Switching output sends on change to 0	• Do not send message • if switching output = 0 ➔ send 0
Switching output sends on change and periodically	Send switching output status
Switching output sends on change to 1 and periodically	if switching output = 1 ➔ send 1
Switching output sends on change to 0 and periodically	if switching output = 0 ➔ send 0

6.5. Temperature PI control

Activate the control if you want to use it.

Use control	No • Yes

General control

Set, in which cases **setpoint values and extension time** received via object are to be retained. The parameter is only taken into consideration if the setting via object is activated below. Please note that the setting "After power supply restoration and programming" should not be used for the initial start-up, as the factory settings are always used until the 1st communication (setting via objects is ignored).

Maintain the	
Target values and extension time received via communication objects	• never • after power supply restoration • after power supply restoration and programming

For an adequate regulation of the ambient temperature, comfort, standby, eco and building protection modes may be used.
Comfort when present,
Standby during short absences,
Eco as a night-time mode and
Frost/heat protection (building protection) e. g. with the window open.

The settings for the temperature control include the setpoint temperatures for the individual modes. Objects are used to determine which mode is to be selected. A change of mode may be triggered manually or automatically (e.g. by a timer, window contact).

The **mode** may be switched with two 8 bit objects of different priority. Objects
„... HVAC mode (Prio 2)“ for switching in everyday operation and
„... HVAC mode (Prio 1)“ for central switching with higher priority.
The objects are coded as follows:
0 = Auto
1 = Comfort
2 = Standby
3 = Eco
4 = Building Protection

Alternatively, you can use three objects, with one object switching between eco and standby mode and the two others activating comfort mode and frost/heat protection mode respectively. The comfort object blocks the eco/standby object, and the frost/heat protection object has the highest priority. Objects
„... Mode (1: Eco, 0: Standby)“,
„... comfort activation mode" and
„... frost/heat protection activation mode"

Switch mode via	• two 8 Bit objects (HVAC Modes) • three 1 bit objects

Select the **mode to be activated after reset** (e.g. power failure, reset of the line via the bus) (Default).
Then configure a temperature control **block** via the blocking object.

Mode after reset	• Comfort • Standby • Eco • Building protection
Behaviour of the blocking object with value	• 1 = Block | 0 = release • 0 = block | 1 = release
Value of the blocking object after reset	0 • 1

Specify when the current **control variables** of the controller are to be **sent** to the bus. Periodic sending is safer, in case a message does not reach a recipient. You may also set up periodical monitoring by the actuator with this setting.

Send control variable	• on change • on change and periodically
from change (in % absolute)	1...10; 2
Cycle *(if sent periodically)*	5 s • ... • 5 min • ... • 2 h

The **status object** reports the current status of the control variables (0% = OFF, >0% = ON) and may for example be used for visualisation, or to switch off the heating pump as soon as the heating is switched off.

Send status objects	• on change • on change to 1 • on change to 0 • on change and periodically • on change to 1 and periodically • on change to 0 and periodically
Cycle *(if sent periodically)*	5 s • ... • 5 min • ... • 2 h

Then define the **type of control**. Heating and/or cooling may be controlled in two levels.

Type of control	• Single level heating • Dual-level heating • Single-level cooling • Dual-level cooling • Single-level heating + single-level cooling • Dual-level heating + single-level cooling • Dual-level heating + dual-level cooling

General setpoint values

You may enter separate setpoint values for each mode or use the comfort setpoint as a basic value.

If you are using the control for both heating *and* cooling, you may also select the setting "separately with switching object". Systems used for cooling in summer and for heating in winter can thus be switched from one to the other.
If you are using the basic value, only the deviation from the comfort setpoint value is listed for the other modes (e.g, 2°C less for standby mode).

Setting the setpoint values	• with separate setpoint values with Switching object • with separate setpoint values without Switching object • with comfort setpoint as a basis with Switching object • with comfort setpoint as a basis without Switching object
Behaviour of the switching object at value *(with switching object)*	• 0 = Heating | 1 = Cooling • 1 = Heating | 0 = Cooling
Value of the switching object after reset *(with switching object)*	0 • 1

The **increment** for the setpoint changes is predefined. Whether the change only remains temporarily active (not saved) or is also retained after power supply restoration (and programming), is specified in the first section of "General control". This also applies to a comfort extension.

Increment for setpoint changes (in 0.1 °C)	1... 50; 10

The control may be reset to comfort mode from eco mode, which is used as night mode, via the comfort extension. This allows the user to maintain the comfort setpoint value for a longer time, e.g. when having guests. The duration of this comfort extension period is set. After the comfort extension period expires, the system returns to eco mode.

Comfort extension time in seconds (can only be activated from eco mode)	1...36000; 3600

Comfort Setpoint

Comfort mode is usually used for daytime mode when people are present. A starting value is defined for the comfort setpoint as well as a temperature range in which the setpoint value may be modified.

Starting heating/cooling setpoint (in 0.1 °C) valid until 1st communication *(not upon saving the setpoint value after programming)*	-300...800; 210

If setpoint values are entered separately:

Min. object value heating/cooling (in 0.1 °C)	-300...800; 160

Max. object value heating/cooling (in 0.1 °C)	-300…800; 280

If the comfort setpoint value is used as a basis:

If the comfort setpoint value is used as a basis, the reduction/increment of the value is set.

Minimum base setpoint (in 0.1°C)	-300…800; 160
Maximum base setpoint (in 0.1°C)	-300…800; 280
Reduction by up to (in 0.1°C)	0…200; 50
Increase by up to (in 0.1°C)	0…200; 50

If the comfort setpoint is used as the basis without a switching object, a dead zone is specified for the control mode "heating *and* cooling" to avoid direct switching from heating to cooling.

Dead zone between heating and cooling *(only if both heating AND cooling are used)*	1…100; 50

Standby setpoint

Standby mode is usually used for daytime mode when people are absent.

If setpoint values are entered separately:

A starting setpoint value is defined as well as a temperature range in which the setpoint value may be changed.

Starting heating/cooling setpoint (in 0.1 °C) valid until 1st communication	-300…800; 210
Min. object value heating/cooling (in 0.1 °C)	-300…800; 160
Max. object value heating/cooling (in 0.1 °C)	-300…800; 280

If the comfort setpoint value is used as a basis:

If the comfort setpoint value is used as a basis, the reduction/increment of the value is set.

Reduce heating setpoint (in 0.1°C) *(for heating)*	0…200; 30
Increase cooling setpoint (in 0.1°C) *(for cooling)*	0…200; 30

Eco setpoint

Eco mode is usually used for night mode.

If setpoint values are entered separately:

A starting setpoint value is defined as well as a temperature range in which the setpoint value may be changed.

Starting heating/cooling setpoint (in 0.1 °C) valid until 1st communication	-300…800; 210
Min. object value heating/cooling (in 0.1 °C)	-300…800; 160
Max. object value heating/cooling (in 0.1 °C)	-300…800; 280

If the comfort setpoint value is used as a basis:

If the comfort setpoint value is used as a basis, the reduction/increment of the value is set.

Reduce heating setpoint (in 0.1°C) *(for heating)*	0…200; 50
Increase cooling setpoint (in 0.1°C) *(for cooling)*	0…200; 60

Setpoint values for frost/heat protection (building protection)

The building protection mode is for example used as long as windows are opened for ventilation. Setpoints for frost protection (heating) and heat protection (cooling) are determined which may not be modified from outside (no access via operating devices etc.). The building protection mode may be activated with delay, which allows you to leave the building before the controls switch to frost/heat protection mode.

Setpoint frost protection (in 0.1°C)	-300…800; 70
Activation delay	less than • 5 s • ... • 5 min • ... • 2 h
Setpoint heat protection (in 0.1°C)	-300…800; 350
Activation delay	less than • 5 s • ... • 5 min • ... • 2 h

General control variables

This setting appears for the control types "Heating *and* Cooling" only. Here, you can decide whether to use a common control variable for heating and cooling. If the 2nd level has a common control variable, you also determine the control mode of the 2nd level here.

For heating and cooling	• separate control variables are used • common control variables are used for Level 1 • common control variables are used for Level 2 • common control variable are used for Level 1+2
Use control variable for 4/6-way valve *(only for common control variables in level 1)*	No • Yes
Control type *(for level 2 only)*	• 2-point-control • PI control

Control variable of the 2nd Level is on *(only for level 2 with 2 point controlling)*	• 1 bit object • 8 bit object

When using the control variable for a 4/6 way valve, the following applies:
0%...100% heating = 66%...100% control variable
OFF = 50% control variable
0%...100% cooling = 33%...0% control variable

6.5.1. Heating control level 1/2

If a heating control mode is configured, one or two setting sections for the heating levels are displayed.

In the 1st level, heating is controlled by a PI control, which allows to either enter control parameters or select predetermined applications.

In the 2nd level (therefore only in case of 2-level heating), heating is controlled via a PI or a 2-point-control.
In level 2, the setpoint difference between the two levels must also be specified, i.e. below which setpoint deviation the second level is added.

Setpoint difference between 1st and 2nd level (in 0.1°C) *(for level 2)*	0...100; 40
Control type *(for level 2, no common control variables)*	• 2-point-control • PI control
Control variable is a *(for level 2 with 2-point controlling, no common control variables)*	• 1 bit object • 8 bit object

PI control with control parameters:

This setting allows individual input of the parameters for PI control.

Control type	• **PI control**
Setting of the controller by	• **Controller parameter** • specified applications

Specify the deviation from the setpoint value at which the maximum control variable value is reached, i.e. the point at which maximum heating power is activated.
The reset time shows how quickly the controller responds to deviations from the setpoint value. In case of a short reset time, the control responds with a fast increase of the control variable. In case of a long reset time, the control responds somewhat less urgently and needs longer until the necessary control variable for the setpoint value deviation is reached.
You should set the time appropriate to the heating system at this point (observe manufacturer's instructions).

Maximum control variable is reached at setpoint/actual difference of (in °C)	0...5
Reset time (in min.)	1...255; 30

Now specify what should be sent when the control is blocked. Set a value greater 0 (=OFF) to receive a basic heating level, e.g. for floor heating.
On release, the control variable follows the rule again.

When blocked, the control variable shall	• not be sent • send a specific value
Value (in %) *(if a value is sent)*	0...100

In case of a common control variable for heating and cooling, 0 is always transmitted as a fixed value.

PI control with predetermined application:

This setting provides fixed parameters for frequent applications.

Control type	• **PI control**
Setting of the controller by	• Controller parameter • **specified applications**
Application	• Warm water heating • Floor heating • Convection unit • Electric heating
Maximum control variable is reached at setpoint/actual difference of (in °C)	Warm water heating: 5 Floor heating: 5 Convection unit: 4 Electric heating: 4
Reset time (in min.)	Warm water heating: 150 Floor heating: 240 Convection unit: 90 Electric heating: 100

Now specify what should be sent when the control is blocked. Set a value greater 0 (=OFF) to receive a basic heating level, e.g. for floor heating.
On release, the control variable follows the rule again.

When blocked, the control variable shall	• not be sent • send a specific value
Value (in %) *(if a value is sent)*	0...100

In case of a common control variable for heating and cooling, 0 is always transmitted as a fixed value.

2-point-control (only level 2):

2-point-control is used for systems which are only set to ON or OFF.

Control type *(is determined at a higher level for common control variables)*	• **2-point-control**

Enter the hysteresis that prevents frequent on/off switching of temperatures in the threshold range.

Hysteresis (in 0.1°C)	0...100; 20

If separate control variables are used, select whether the control variable of the 2nd level is a 1 bit object (on/off) or an 8 bit object (on with percentage/off).

Control variable is a	• 1 bit object • 8 bit object
Value (in %) *(for 8 bit object)*	0...100

Now specify what should be sent when the control is blocked. Set a value greater 0 (=OFF) to receive a basic heating level, e.g. for floor heating. On release, the control variable follows the rule again.

When blocked, the control variable shall	• not be sent • send a specific value
Value (in %) *only if a value is sent*	0...100

6.5.2. Cooling control level 1/2

If a cooling control mode is configured, one or two setting sections for the cooling levels are displayed.

In the 1st level, cooling is controlled by a PI control in which either control parameters can be entered or predetermined applications can be selected.

In the 2nd level (therefore only for 2-level cooling), cooling is controlled via a PI or a 2-point-control.
In level 2, the setpoint deviation between the two levels must also be specified, i.e. above which setpoint value deviation the second level is added.

Setpoint difference between 1st and 2nd level (in 0.1°C) *(for level 2)*	0...100; 40
Control type *(for level 2, no common control variables)*	• 2-point-control • PI control
Control variable is a *(for level 2 with 2-point controlling, no common control variables)*	• 1 bit object • 8 bit object

PI control with control parameters:

This setting allows individual input of the parameters for PI control.

Control type	• **PI control**
Setting of the controller by	• **Controller parameter** • specified applications

Specify the deviation from the setpoint value which reaches maximum variable value, i.e. the point at which maximum cooling power is activated.
The reset time shows how quickly the controller responds to deviations from the setpoint value. In case of a short reset time, the control responds with a fast increase of the control variable. In case of a long reset time, the control responds somewhat less urgently and needs longer until the necessary control variable for the setpoint value deviation is reached. You should set the time appropriate to the cooling system at this point (observe manufacturer's instructions).

Maximum control variable is reached at setpoint/actual difference of (in °C)	0...5
Reset time (in min.)	1...255; 30

Now specify what should be sent when the control is blocked.
On release, the control variable follows the rule again.

When blocked, the control variable shall	• not be sent • send a specific value
Value (in %) *(if a value is sent)*	0...100

In case of a common control variable for heating and cooling, 0 is always transmitted as a fixed value.

PI control with predetermined application:

This setting provides fixed parameters for a cooling ceiling

Control type	• **PI control**
Setting of the controller by	• Controller parameter • **specified applications**
Application	• Cooling ceiling
Maximum control variable is reached at setpoint/actual difference of (in °C)	Cooling ceiling: 5
Reset time (in min.)	Cooling ceiling: 30

Now specify what should be sent when the control is blocked.
On release, the control variable follows the rule again.

When blocked, the control variable shall	• not be sent • send a specific value
Value (in %) *(if a value is sent)*	0...100

2-point-control (only level 2):

2-point-control is used for systems which are only set to ON or OFF.

Control type *is determined at a higher level for common variables*	• **2-point-control**

Enter the hysteresis that prevents frequent on/off switching of temperatures in the threshold range.

Hysteresis (in 0.1°C)	0...100; 20

If separate control variables are used, select whether the control variable of the 2nd level is a 1 bit object (on/off) or an 8 bit object (on with percentage/off).

Control variable is a	• 1 bit object • 8 bit object
Value (in %) *(for 8 bit object)*	0...100

Now specify what should be sent when the control is blocked.
On release, the control variable follows the rule again.

When blocked, the control variable shall	• not be sent • send a specific value
Value (in %) *(if a value is sent)*	0...100

In case of a common control variable for heating and cooling, 0 is always transmitted as a fixed value.

6.6. Summer Compensation

With the summer compensation the target value for the room temperature can automatically be adapted by cooling at higher outdoor temperatures. The objective is to prevent a too great a difference between indoor and outdoor temperature in order to keep the energy consumption low.

Activate the summer compensation.

Use summer compensation	No • **Yes**

Using the points 1 and 2, define the outdoor temperature range in which the target value for the indoor temperature is to be adapted linearly. Then, specify which indoor temperature target values are to be valid below point1 and above point 2.

Standard values according to DIN EN 60529

Point 1: External temperature = 20°, Target value = 20°C.
Point 2: External temperature = 32°, Target value = 26°C.

Characteristic curve description:	
External temperature point 1 (in 0.1°C increments)	0 ... 500 ; 200
Outdoor temperature point 2 (in 0.1°C increments)	0 ... 500 ; 320

below point 1 the target value is (in 0.1°C)	0 ... 500 ; 200
above point 2 the target value is (in 0.1°C)	0 ... 500 ; 260

Set the send pattern for the summer compensation.

Send pattern	• periodically • on change • on change and periodically
on change of *(if sent on change)*	0.1°C • 0.2°C • 0.5°C • 1°C • 2°C • 5°C
Send cycle *(if sent periodically)*	5 s ... 2 h; 1 min

If necessary, activate the block for the summer compensation and set what a 1 or 0 at the block input means and what happens in the event of a block.

Use block	No • Yes
Analysis of the blocking object	• At value 1: block | At value 0: release • At value 0: block | At value 1: release
Blocking object value before first call	0 • 1
Action when locking	• do not send • Send value
Value (in increments of 0.1°C) *(if a value is sent during blocking)*	0 ... 500; 200

6.7. Variable comparator

The integrated variable comparators can output maximum, minimum and average values.

Use comparator 1/2/3/4	No • Yes

6.7.1. Control variable comparator 1/2/3/4

Determine what the control variable comparator should output, and activate the input objects to be used. Transmission patterns and blocks can also be set.

Output delivers	• Maximum value • Minimum value • Average value
Use input 1 / 2 / 3 / 4 / 5	No • Yes

Output sends	• on change of output • on change of output and periodically • when receiving an input object • when receiving an input object and periodically
Send cycle *(if sent periodically)*	5 s • 10 s • 30 s • ... • 5 min • ... • 2 h
At and above change of *(if sent on change)*	1% • 2% • 5% • 10% • 20% • 25% • 50%
Analysis of the blocking object	• at value 1: block | at value 0: release • at value 0: block | at value 1: release
Blocking object value before 1st communication	0 • 1
Behaviour of the switching output	
On block	• do not send message • Send value
Sent value in %	0 ... 100
output sends on release (with 2 seconds release delay)	• the current value • the current value after receipt of an object

6.8. Computer

Activate the multi-functional computer, with which the input data can be changed by calculation, querying a condition or converting the data point type. The menus for the further setting of the computer are then displayed.

Computer 1/2/3/4/5/6/7/8	No • Yes

6.8.1. Computer 1-8

Set, in which cases input values received are to be kept per object. Please note that the setting "After power restoration and programming" should not be used for the initial start-up, as the factory settings are always used until the first call (setting via objects is ignored).

Maintain the	
input values received via communication objects	• never • after power supply restoration • after power supply restoration and programming

Select the function set the input mode and starting values for input 1 and input 2.

Function (I = Input)	• Prerequisite: E1 = E2 • Prerequisite: E1 > E2 • Prerequisite: E1 >= E2 • Prerequisite: E1 < E2 • Prerequisite: E1 <= E2 • Prerequisite: E1 - E2 >= E3 • Prerequisite: E2 - E1 >= E3 • Prerequisite: E1 - E2 amount >= E3 • Calculation: E1 + E2 • Calculation: E1 - E2 • Calculation: E2 - E1 • Calculation: E1 - E2 Amount • Calculation: Output 1 = E1 × X + Y | Output 2 = E2 × X + Y | • Transformation: General
Tolerance for comparison *(in the case of prerequisite E1 = E2)*	0 ... 4,294,967,295
Input type	[Selection options depending on the function] • 1 bit • 1 byte (0...255) • 1 byte (0%...100%) • 1 byte (0°...360°) • 2 byte counter without math. symbol • 2 byte counter with math. symbol • 2 byte floating point • 4 byte counter without math. symbol • 4 byte counter with math. symbol • 4 byte floating point
Starting value E1 / E2 / E3	[Input range depending on the type of input]

Prerequisites

When querying the prerequisites set the output type and output values at different statuses:

Output type	• 1 bit • 1 byte (0...255) • 1 byte (0%...100%) • 1 byte (0°...360°) • 2 byte counter without math. symbol • 2 byte counter with math. symbol • 2 byte floating point • 4 byte counter without math. symbol • 4 byte counter with math. symbol • 4 byte floating point
Output value *(if applicable output value A1 / A2)*	

if the condition is met	0 [Input range depending on the type of output]
if the condition is not met	0 [Input range depending on the type of output]
if the monitoring time period is exceeded	0 [Input range depending on the type of output]
if blocked	0 [Input range depending on the type of output]

Set the output send pattern.

Output sends	• on change • on change and after reset • on change and periodically • when receiving an input object • when receiving an input object and periodically
Type of change *(is only sent if "on change" is selected)*	• on each change • on change to condition met • on change to condition not met
Send cycle *(if sent periodically)*	5 s ... 2 h; 10 s

Set the text to be displayed for conditions met / not met.

Text if the condition is met	[Free text max. 14 chars.]
Text if the condition is not met	[Free text max. 14 chars.]

If applicable set the send delays.

Send delay in the event of change to the condition is met	none • 1 s • ... • 2 h
Send delay in the event of change to the condition is not met	none • 1 s • ... • 2 h

Calculations and transformation

For calculations and transformations set the output values to the various conditions:

Output value (if applicable A1 / A2)	
if the monitoring time period is exceeded	0 [Input range depending on the type of output]
if blocked	0 [Input range depending on the type of output]

Set the output send pattern.

Output sends	• on change • on change and after reset • on change and periodically • when receiving an input object • when receiving an input object and periodically
on change of *(only if calculations are transmitted for changes)*	1 ... [Input range depending on the type of input]
Send cycle *(if sent periodically)*	5 s ... 2 h; 10 s

For **Calculations of the form output 1 = E1 × X + Y | output 2 = E2 × X +Y** define the variables X and Y. The variables can have a positive or negative sign, 9 digits before and 9 digits after the decimal point.

Formula for output A1: A1 = E1 × X + Y	
X	1.00 [free input]
Y	0.00 [free input]
Formula for output A2: A2 = E2 × X + Y	
X	1.00 [free input]
Y	0.00 [free input]

Further settings for all formulas

If necessary, activate the input monitoring. Set which inputs are to be monitored, at which intervals the inputs are to be monitored and what value the "monitoring status" should have, if the monitoring period is exceeded without feedback.

Use input monitoring	No • Yes
Monitoring of	• E1 • E2 • E3 • E1 and E2 • E1 and E3 • E2 and E3 • E1 and E2 and E3 [depending on the function]
Monitoring period	5 s • ... • 2 h; 1 min
Value of the object "monitoring status" if period is exceeded	0 • 1

If necessary, activate the computer block and set what a 1 or 0 at the block entry means and what happens in the event of a block.

Use block	No • Yes
Analysis of the blocking object	• At value 1: block | At value 0: release • At value 0: block | At value 1: release

Value before first call	0 • 1
Output pattern On block	• do not send anything • send value
On release	• as send pattern [see above] • send current value immediately

6.9. Logic

The device has 16 logic inputs, eight AND and eight OR logic gates.

Activate the logic inputs and assign object values up to first call.

Use logic inputs	Yes • No
Object value prior to first call for:	
- Logic input 1	0 • 1
- Logic input ...	0 • 1
- Logic input 16	0 • 1

Activate the required logic outputs.

AND logic

AND logic 1	not active • active
AND logic ...	not active • active
AND logic 8	not active • active

OR logic

OR logic 1	not active • active
OR logic ...	not active • active
OR logic 8	not active • active

6.9.1. AND logic 1-8 and OR logic outputs 1-8

The same setting options are available for AND and OR logic.

Each logic output may transmit one 1 bit or two 8 bit objects. Determine what the out put should send if logic = 1 and = 0.

1. / 2. / 3. / 4. Input	• do not use - Logic inputs 1...16 - Logic inputs 1...16 inverted • all switching events that the device provides (see *Connection inputs of the AND/OR logic*)
Output type	• a 1-Bit-object • two 8-bit objects

If the **output type is a 1-bit object**, set the output values for the various conditions.

Output value if logic = 1	1 • 0
Output value if logic = 0	1 • 0
Output value If block is active	1 • 0
Output value if monitoring period is exceeded	1 • 0

If the **output type is two 8-bit objects**, set the type of object and the output values for the various conditions.

Object type	• Value (0…255) • Percent (0…100%) • Angle (0…360°) • Scene call-up (0…127)
Output value object A if logic = 1	0 … 255 / 100% / 360° / 127; 1
Output value object B if logic = 1	0 … 255 / 100% / 360° / 127; 1
Output value object A if logic = 0	0 … 255 / 100% / 360° / 127; 0
Output value object B if logic = 0	0 … 255 / 100% / 360° / 127; 0
Output value object A if block is active	0 … 255 / 100% / 360° / 127; 0
Output value object B if block is active	0 … 255 / 100% / 360° / 127; 0
Output value object A if monitoring period is exceeded	0 … 255 / 100% / 360° / 127; 0
Output value object B if monitoring period is exceeded	0 … 255 / 100% / 360° / 127; 0

Set the output send pattern.

Send pattern	• on change of logic • on change of logic to 1 • on change of logic to 0 • on change of logic and periodically • on change of logic to 1 and periodically • on change of logic to 0 and periodically • on change of logic+object receipt • on change of logic+object receipt and periodically
Send cycle *(if sent periodically)*	5 s • 10 s • ... • 2 h

Block

If necessary, activate the block for the logic output and set what a 1 or 0 at the block input means and what happens in the event of a block.

Use block	No • Yes
Analysis of the blocking object	• At value 1: block | At value 0: release • At value 0: block | At value 1: release
Blocking object value before first call	0 • 1
Output pattern On block	• Do not send message • Transmit block value [see above, Output value if blocking active]
On release (with 2 seconds release delay)	[send value for current logic status]

Monitoring

If necessary, activate the input monitoring. Set which inputs are to be monitored, at which intervals the inputs are to be monitored and what value the "monitoring status" should have, if the monitoring period is exceeded without a feedback being given.

Use input monitoring	No • Yes
Input monitoring	• 1 • 2 • 3 • 4 • 1 + 2 • 1 + 3 • 1 + 4 • 2 + 3 • 2 + 4 • 3 + 4 • 1 + 2 + 3 • 1 + 2 + 4 • 1 + 3 + 4 • 2 + 3 + 4 • 1 + 2 + 3 + 4
Monitoring period	5 s • ... • 2 h; 1 min
Output behaviour on exceeding the monitoring time	• Do not send message • Send value exceeding [= value of the parameter "monitoring period"]

6.9.2. AND logic connection inputs

Do not use
Logic input 1
Logic input 1 inverted
Logic input 2
Logic input 2 inverted
Logic input 3
Logic input 3 inverted
Logic input 4
Logic input 4 inverted
Logic input 5
Logic input 5 inverted
Logic input 6
Logic input 6 inverted
Logic input 7
Logic input 7 inverted

Logic input 8
Logic input 8 inverted
Logic input 9
Logic input 9 inverted
Logic input 10
Logic input 10 inverted
Logic input 11
Logic input 11 inverted
Logic input 12
Logic input 12 inverted
Logic input 13
Logic input 13 inverted
Logic input 14
Logic input 14 inverted
Logic input 15
Logic input 15 inverted
Logic input 16
Logic input 16 inverted
Temperature sensor malfunction ON
Temperature sensor malfunction OFF
Switching output 1 Temperature
Switching output 1 Temperature inverted
Switching output 2 Temperature
Switching output 2 Temperature inverted
Switching output 3 Temperature
Switching output 3 Temperature inverted
Switching output 4 Temperature
Switching output 4 Temperature inverted
Comfort temperature controller active
Comfort temperature controller inactive
Standby temperature controller active
Standby temperature controller inactive
Eco temperature controller active
Eco temperature controller inactive
Frost protection temperature controller active
Frost protection temperature controller inactive
Heating 1 temperature controller active
Heating 1 temperature controller inactive
Heating 2 temperature controller active
Heating 2 temperature controller inactive
Cooling 1 temperature controller active
Cooling 1 temperature controller inactive
Cooling 2 temperature controller active
Cooling 2 temperature controller inactive

6.9.3. Connection inputs of the OR logic

The OR logic connection inputs correspond to those of the AND logic. In addition, the following inputs are available for the OR logic:

Switching output AND logic 1
Switching output AND logic 1 inverted
Switching output AND logic 2
Switching output AND logic 2 inverted
Switching output AND logic 3
Switching output AND logic 3 inverted
Switching output AND logic 4
Switching output AND logic 4 inverted
Switching output AND logic 5
Switching output AND logic 5 inverted
Switching output AND logic 6
Switching output AND logic 6 inverted
Switching output AND logic 7
Switching output AND logic 7 inverted
Switching output AND logic 8
Switching output AND logic 8 inverted

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