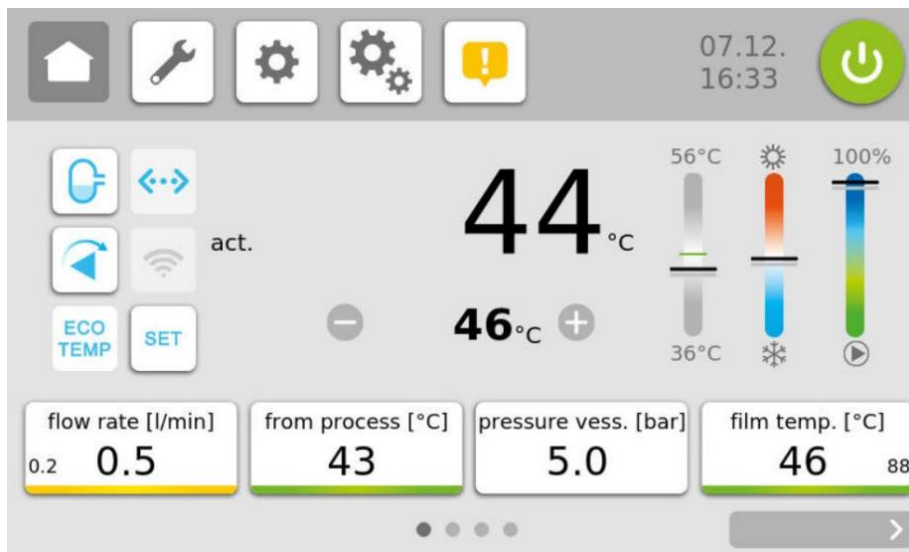


Description
Data Transmission

Single Protocol



Single Smart Controller - SSC



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SINGLE Temperiertechnik GmbH
Ostring 17-19
D - 73269 Hochdorf
FON +49 7153 3009 0 FAX: +49 7153 3009 50
www.single-temp.de

Preface

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1 Interface, general description

The microprocessor-based controller of the **SSC-T series** is optionally equipped with a serial interface (RS-485 or TTY 0/20 mA). This works in half duplex mode. It is possible to monitor and manage the controller by a computer (e.g. an industrial or personal computer or SPS).

The process of a communication is always controlled by the computer ("master"). The controller works as a "slave".

It waits from the moment it is switched on for the computer to address it.

It is addressed via the controller address (1...255), which must be set in the menu "Setting: Interface" with the parameter "Interface address".

If the controller detects transmission errors or plausibility errors (e.g. exceeding of range limits), it will not accept these data.

The previously existing, valid data remain unchanged.

All data is transmitted in hexadecimal, ASCII-coded format.

- test criteria:
1. only ASCII-Codes from 0...9 or A...F ?
Except start and stop characters.
 2. Data format (Parity) o.K. ?
 3. Checksum o.K. ?

RS 485 interface data:

Number of drivers/receivers:	32
Transmission type:	balanced
Max. cable length:	1200 m

Protocol type:	Single Standard
----------------	-----------------

2 Interface parameter

The following parameters must be set in the "Setting: Interface" menu of the SSC control. See also SSC operating instructions.

2.1 Interface address:

The computer addresses the controller under this address. Each controller has its own address (address space: 1...255). Up to 32 controllers can be addressed.

2.2 Baudrate:

The baud rate describes the transmission speed with which a bit is transferred from the transmitter to the receiver.

1 Baud = 1 bit/s.

setting: 1,2 kBaud
 2,4 kBaud
 4,8 kBaud
 9,6 kBaud (factory setting)
 19,2 kBaud
 38,4 kBaud

2.3 Data format:

To ensure that a serial data word is correctly understood by the receiver, a defined format must be selected. It is fixed. Both sender and receiver are bound to this format.

Einstellung: Format:

7E1	7 Data bit, Parity: Even, 1 Stopbit	(factory setting)
7O1	7 Data bit, Parity: Odd, 1 Stopbit	
7E2	7 Data bit, Parity: Even, 2 Stopbit	
7O2	7 Data bit, Parity: Odd, 2 Stopbit	
7N2	7 Data bit, Parity: None, 2 Stopbit	
8E1	8 Data bit, Parity: Even, 1 Stopbit	
8O1	8 Data bit, Parity: Odd, 1 Stopbit	
8N1	8 Data bit, Parity: None, 1 Stopbit	
8N2	8 Data bit, Parity: None, 2 Stopbit	

2.3.1 Startbit:

At the beginning of the transmission a start bit (log. "0") is sent first. This does not contain any data information. It serves to synchronize the data transfer.

2.3.2 Data bit:

This is followed by 7 or 8 data bits, starting with the least significant bit.

2.3.3 Parity bit:

A parity bit follows

The parity bit is formed from the cross sum of the data bits.

The parity bit serves the receiver to detect transmission errors.

A distinction is made between:

EVEN parity: The number of transmitted ones (including parity bit) must be even.

ODD Parity: The number of transmitted ones (incl. parity bit) must be odd.

None Parity: No parity bit is formed and transmitted.

2.3.4 Stopbit:

The transmission of a data word is terminated with 1 or 2 stop bits (log. "1").

This serves to establish a minimum distance between two directly consecutive data words.

example (to 7E1) : 1 Startbit 7 data bit Parity (EVEN) 1 Stopbit

Data word:		111 1100		
Transmission:	0	0011 111	1	1

example (to 801) : 1 Startbit 8 data bit Parity (ODD) 1 Stopbit

Data word:		1111 1100		
Transmission:	0	0011 1111	1	1

3 Data transmission / protocol

All data (hex bytes) are transmitted in ASCII format (text characters).

The following characters are permitted: 30H ... 39H, 41H ...46H, 0AH, 0DH

e.g.: Hex-Byte **2FH** -> "2" comply. 32H (ASCII)
"F" comply. 46H (ASCII)

All other signs are ignored.

For each hex byte 2 ASCII characters are required.

Excluded are: the start character (0AH = line feed, LF) and
the end character (0DH = carriage return, CR).

Commands or parameters are passed in both directions via defined data blocks.

Terms

Start character:	Initiates the transmission of a data block. (1 ASCII) All characters before the start character are ignored.
Controller address:	indicates the addressed controller (2 ASCII)
Constant:	30H, 31H (place holder) (2 ASCII)
Command code:	"tells" controller what it has to "do" (2 ASCII)
Parameter code:	designates each individual parameter that can be called up in the controller (2 ASCII)
Parameter group code *):	Certain parameters are combined into parameter groups (e.g.: the feedback parameters Xp, Tv, Tn and the switching cycle time). All parameters of a parameter group can be requested from the computer with one command. (2 ASCII) see also the page below
Parameter value:	specifies the value of a parameter (6 ASCII)
Response:	Acknowledgement message of the assembly on a command of the computer. Acknowledge or error message (2 ASCII)
Checksum:	Is the two's complement of the sum of all hex bytes of a data block without start and end mark. The checksum is used to detect transmission errors. (2 ASCII)
end signal:	ends the transmission of a data block (1 ASCII)

***) Please note the following when using parameter groups:**

To achieve the greatest possible compatibility when using parameter groups, the following should be observed when using parameter group codes:

1. In principle, up to 16 parameters can be present in a group.
Therefore, a sufficiently large receive buffer of at least 138 bytes must be provided.
2. When using parameter groups, it is not possible to assume a constant length of a group, since a group can increase in size when the device functionality is extended.
(If, for example, a device without setpoint ramp function is extended by this function, setpoint group 2 is increased by 2 parameters)
3. The number of received parameters (N) is calculated as follows

$$N = \frac{\text{Number of receiving bytes} - 7 \text{ Byte} - 3 \text{ Byte}}{8 \text{ Byte}}$$

Start sequence = 7 Byte

End sequence = 3 Byte

4. The order of the group elements (parameters) can change.
This is not critical, because each transferred parameter can be uniquely identified by its parameter code.

4 Command and Response

The computer can send the following commands to the controller:

- ◆ send parameter: command code 10 H (see **Fehler! Verweisquelle konnte nicht gefunden werden.**)
- ◆ send Parameter group: command code 15 H (see **Fehler! Verweisquelle konnte nicht gefunden werden.**)
- ◆ accept parameters: command code 20 H (see **Fehler! Verweisquelle konnte nicht gefunden werden.**)
- ◆ accept parameters and store power-failure-proof: save command code 21 H (see **Fehler! Verweisquelle konnte nicht gefunden werden.**)

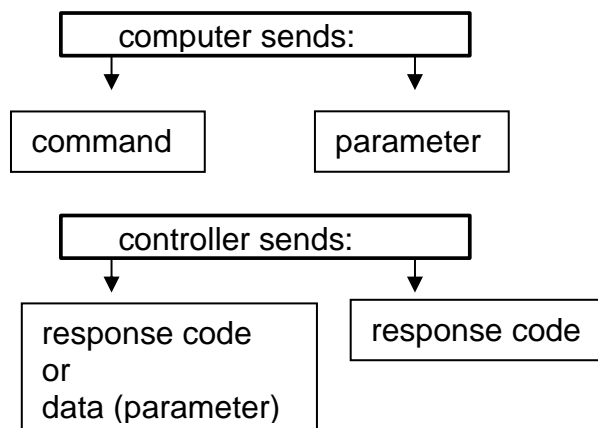
Note:

The power-failure-proof semiconductor memory (EEPROM, E2ROM) allows a maximum of 100,000 write cycles.

Provided it has "understood" the command, the controller always responds by transmitting a complete data block.

The time between computer request and response (time-out) is typically 50 milliseconds
The controller repeats the received command code.

4.1 Command



4.2 Replies (with error code)

- 00 H - acknowledge (no fault)
- 02 H - Checksum error
- 03 H - Procedure error
- 04 H - Range specification not fulfilled
- 05 H - constant uneven 30H,31H
- 06 H - the addressed parameter is a "read only parameter"
- FEH - Error while writing into the power failure protected memory

5 Parameter values

The parameter value consists of three data bytes:
2 Databyte (Mantisse), 1 Databyte (Exponent to base 10).

examples:	Dez.	Hex.	Mantisse	Exp.	ASCII
actual value (°C):	215	00D7	00D7	00	30 30 44 37 30 30
set point (°C):	230	00E6	00E6	00	30 30 45 36 30 30
output, "cool" (%)	-16	FFF0	FFF0	00	46 46 46 30 30 30
Sollwertrampe (K/min):	2,2	0016	0016	FF	30 30 31 36 46 46
	The parameter value is calculated as follows: Dec :2,2 = 22 x 10 Exp. -1 Hex.: = 0016 (Mantisse) = FF (Exponent= - 1)				
Status word	1	0001	0001	00	30 30 30 31 30 30

Negative mantissa/negative exponent: formed by the binary 2's complement.

6 Checksum

The checksum is formed by subtracting the hex data of a data block (without start and end characters) from 00H (two's complement of the sum). Carryovers are not considered.

Beispiel:

Regleradresse = 14dez.: 0E: 00-0E = F2

Konstante: 01: F2-01 = F1

Befehlscode: 10: F1-10 = E1

Parametercode: 10: E1-10 = D1

Parameterwert: 00C8.00: D1-00 = D1
 D1-C8 = 09
 09-00 = 09

Prüfsumme: 09: 09-0 = 00

7 Parametercodes

X = Vorhanden **O** = Optional vorhanden

Param.-Code (HEX)	Parameter	window /menu	display	Attribute	R8400
0x01	type of device		8401	ro	X
0x02	Software version	Info	SW: xx/xx	ro	X
0x04	operating hours	Info	act. value is limited to 65535 h	ro	X
0x10	act. value	Expert and Cockpit	act.value	ro	X
0x12	act. return temperature	Expert	return	ro	O
0x14	act. film temperature	Expert	film temperature	ro	X
0x15	act. flow rate	Expert und Grundbild	flow rate	ro	O
0x16	act. pressure	Expert	forward pressure	ro	O
0x1b	°C -°F - 1/10°C	Parameter Basic	Temperature unit	rw	X
0x20	act. setpoint	Expert and Cockpit	setpoint	ro	X
0x21	setpoint 1	Parameter Temperature + Analog	1. setpoint	rw	X
0x22	setpoint 2	Parameter Temperature + Analog	2. setpoint	rw	X
0x2b	Lower setpoint limitation	Parameter Temperature + Analog	Lower setpoint limitation		
0x2c	Upper setpoint limitation	Parameter Temperature + Analog	Upper setpoint limitation	rw	X
0x2e	setpoint ramp falling	Parameter Temperature + Analog	setpoint ramp falling	rw	X
0x2f	setpoint ramp rising	Parameter Temperature + Analog	setpoint ramp rising	rw	X
0x33	Pre-flow-alarm value (external)	Parameter Alarm	cascade control	rw	O
0x34	configuration Limit-Alarm	Parameter Alarm	Konfiguration Alarmausgang	rw	X
0x38	Alarm value 1	Gerätefunktionen	Alarm Limit	rw	X
0x39	filmalarm value	Parameter Alarm	Film temperature limit	rw	X
0x3b	Flow alarm	Parameter Alarm	Alarm Flow	rw	O
0x3c	return alarm value	Parameter Alarm	limit return	rw	O
0x3e	Pressure alarm High	Parameter Alarm	Alarm pressure too high	rw	O
0x3f	Pressure alarm Low	Parameter Alarm	Alarm pressure low	rw	O
0x40	Proportional band xp heat	Parameter Temperature + Analog	XP-heat	rw	X

Param - Code (HEX)	Parameter	window/menu	display	Attribute	R8400
0x41	derivative time Tv (heat)	Parameter Temperature + Analog	TV-heat	rw	X
0x42	Reset time Tn (heating)	Parameter Temperature + Analog	TN-heat	rw	X
0x43	cycle time heat	Parameter Temperature + Analog	cycle time heat	rw	X
0x46	Deadband	Parameter Temperature + Analog	Switching hysteresis heating/cooling	rw	X
0x50	Proportional -range (cooling)	Parameter Temperature + Analog	XP-cool	rw	X
0x51	Derivative time (cooling)	Parameter Temperature + Analog	TV-cool	rw	X
0x52	Reset time (Cooling)	Parameter Temperature + Analog	TN-cool	rw	X
0x53	cycle time (cooling)	Parameter Temperature + Analog	cycle time cool	rw	X
0x59	Hyst. 2 point – cool off	Parameter Temperature + Analog	Hyst. switch off cooling	rw	0 2PK
0x5a	on	Parameter Temperature + Analog	Hyst. switch on cooling	rw	0 2PK
0x60	act. output level	Expert	output level	ro	X
0x64	output level limit (heat)	Parameter Temperature + Analog	output level limit heat	rw	X
0x69	output level (cool)	Parameter Temperature + Analog	output level cool	rw	X
0x70	status word 1		-	ro	X
0x78	status word 2		-	rw	X
0x85	Block parameters	Parameter Basic	Parameter lock	rw	X
0x88	optimization	device functions	self-optimization	rw	X
0x8f	device on/off	Cockpit	-	rw	X
0x90	Restart lock	Parameter device	Restart lock	rw	X
0x93	cooling temperature.	Parameter device	Switch-off temperature	rw	X
0xa0	Aquatimer	Parameter device	Aquatimer	rw	X
0xa1	Change Time	Parameter device	Drain time	rw	X
0xa2	System closure temperature	Parameter Temperature + Analog	System closure temperature	rw	X
0xa3	Alarm delta T	Parameter device	Alarm Δ T	rw	X
0xa9	Start time Aquatimer	Parameter device	Aquatimer Start time	rw	

8 Parametercode by Groups

X = available **O** = Optional available

Parameter	display Menu: Text	Parameter- Code (HEX)	Parameter -Code (DEZ)	R8400
group 0				
Software version	Info: manufacturer Service: SW: xx/xx	0x00 0x02	0 2	X
device type	8401	0x01	1	X
group 1				
act. value	Expert and Cockpit	0x01 0x10	1 16	X
°C -°F - 1/10°C	Parameter Basic	0x1b	27	X
act. return temperature	Expert and Cockpit	0x12	18	X
act. film temperature	Expert	0x14	20	X
act. flow rate	Expert and Cockpit	0x15	21	O
act. pressure	Expert	0x16	22	O
group 2				
setpoint 1	1. setpoint	0x02 0x21	2 33	X
setpoint 2	Parameter Temperature + Analog	0x22	34	X
Upper setpoint limit	Parameter Temperature + Analog	0x2c	44	X
lower setpoint limit	Parameter Temperature + Analog	0x2b		
setpoint ramp rising	Parameter Temperature + Analog	0x2f	47	X
setpoint ramp falling	Parameter Temperature + Analog	0x2e	46	X
act. setpoint	Expert	0x20	32	X

Parameter	display	Parameter-Code (HEX)	Parameter-Code (DEZ)	R8400
group 3		0x03	3	
Alarm value 1	device functions	0x38	56	X
flow rate alarm	Parameter Alarm	0x3b	59	O
pressure alarm High	Parameter Alarm	0x3e	62	O
pressure alarm Low	Parameter Alarm	0x3f	63	O
filmlarm value	Parameter Alarm	0x39	57	X
return-alarm value	Parameter Alarm	0x3c	60	O
Flow alarm value (external)	Parameter Alarm	0x33	51	O
Alarm Limit Configuration	Parameter Alarm	0x34	52	X
Group 4		0x04	4	
Proportional band xp (heating)	Parameter Temperature + Analog	0x40	64	X
derivative time Tv (Heating)	Parameter Temperature + Analog	0x41	65	X
Reset time Tn (heating)	Parameter Temperature + Analog	0x42	66	X
Dead Band	Parameter Temperature + Analog	0x46	70	X
cycle time (heat)	Parameter Temperature + Analog	0x43	67	X
group 5		0x05	5	
Proportional range (cooling)	Parameter Temperature + Analog	0x50	80	X
Derivative time (cooling)	Parameter Temperature + Analog	0x51	81	X
Reset time (Cooling)	Parameter Temperature + Analog	0x52	82	X
cycle time (cool)	Parameter Temperature + Analog	0x53	83	X
Hyst. 2 point cool on	Parameter Temperature + Analog	0x5a	90	O 2PK
Hyst. 2 point cool off	Parameter Temperature + Analog	0x59	89	O 2PK

Parameter	display	Parameter-code (HEX)	Parameter-code (DEZ)	R8400
group 6		0x06	6	
act. output level	Expert	0x60	96	X
output level -limit (heat)	Parameter Temperature + Analog	0x64	100	X
output level -limit (cool)	Parameter Temperature + Analog	0x69	105	X
group 7		0x07	7	
Status word 1	-	0x70	112	X
Status word 2	-	0x78	120	X
group 10 (0x0a)		0x0a	10	
act. value	Expert + Cockpit	0x10	16	X
act. setpoint	Expert + Cockpit	0x20	32	X
act. setpoint	Expert	0x60	96	X
Status word 1	-	0x70	112	X

9 Configuration code

Parameters that do not have a direct numerical value as input (e.g. Off, On) are configured using a code number.

This code number always starts at 0 and ends according to the setting options.

Please refer to the operating instructions of the corresponding device

Parameter	display	Parameter-code (HEX)	Parameter - code (DEZ)	Attribute	R8400
Operating lock	lock	0x85	133	rw	X
Code:		behaviour			
0	OFF	no operating lock			
1	Device only On/Off adjustable	All parameters except keys On/Off are locked.			
2	On/Off only + Set point dist.	All parameters except setpoint and on/off are locked.			
self-optimization	Opt	0x88	136	rw	X
Code:		behaviour:			
0	off	Self-optimization out of order			
1	on	one-time optimization on demand			

10 Status word

Each controller has 2 status words for control and monitoring.
These are 8 bits long.

Status word 1, parameter code 70H
Reports detected alarm conditions or errors.

7 6 5 4 3 2 1 0:

- Bit 0 = 1 → System error
 - Bit 1 = 1 → sensor error
 - Bit 2 = x → no significance
 - Bit 3 = 1 → reset-control.
If a reset is triggered during interface operation, this bit is set to 1.
It is automatically reset to 0 once the status word 1 has been read out by the computer.
 - Bit 4 = 1 → collective alarm „on“ (Out 7)
 - Bit 5 = 1 → Alarm 1 „on“ (Limit comparator, temperature)
 - Bit 6 = 1 → Alarm 2 „on“ (film temperature)
 - Bit 7 = 1 → setpoint ramp active
- Status word 2, Parameter code 78H
read and write parameter.

7 6 5 4 3 2 1 0:

- Bit 0 = 0 → controller operation „Remote off“ (local)
- Bit 0 = 1 → controller operation „Remote active“
muss beim netzausfallsichereschreiben gesetzt sein)
- Bit 1 = 0 → no significance
- Bit 1 = 1 → no significance
- Bit 2 = 0 → Self-optimization „off“
- Bit 2 = 1 → Self-optimization „on“
- Bit 3 = 0 → SBC-T „off“
- Bit 3 = 1 → SBC-T „on“
- Bit 4 = 0 → no significance
- Bit 4 = 1 → no significance
- Bit 5 = 0 → setpoint 1 „off“
- Bit 5 = 1 → setpoint 1 „active“
- Bit 6 = 0 → setpoint 2 „off“
- Bit 6 = 1 → setpoint 2 „active“
- Bit 7 = 0 → setpoint extern / analog „off“
- Bit 7 = 1 → setpoint extern / analog „active“

11 Data block structure

Computer sends "command", command code: 10H, 15H

Start	→	0A	→	xx xx	→	30 31	→	xx xx	→	xx xx	→	xx xx
		Lf		controller address		constant		command code		parameter code		checksum

→	0D	→	End
	CR		

Computer sends „parameter“, command code: 20H, 21H

Start	→	0A	→	xx xx	→	30 31	→	xx xx	→	xx xx	→	xx xx xx xx	xx xx
		Lf		controller address		constant		command code		parameter code		Mantissa	Exp.

→	xx xx	→	0D	→	End
	checksum		CR		

Controller sends "answer" to computer:

Start	→	0A	→	xx xx	→	30 31	→	xx xx	→	xx xx	→	xx xx
		Lf		controller address		constant		answer code =command code		answer =e.g. error message		checksum

→	0D	→	End
	CR		

Controller sends "single parameter" or "parameter group" to computer (data transfer)

Start	→	0A	→	xx xx	→	30 31	→	xx xx	→	xx xx	→	xx xx xx xx	xx xx
		Lf		controller address		constant		answer code =command code		parameter-code 1		mantissa =parameter code 1	Exp.

→	xx xx	→	xx xx xx xx	xx xx	→	xx xx	→	0D	→	End
	parameter code n		mantissa =parameter value n	Exp.		checksum		CR		

12 Transmission examples

12.1 Transmission example, command code 10 H

Controller No. 5 should send the parameter (actual value, 10 H) to the computer.

computer to controller: Dez. Hex ASCII (Hex)

start signal				0A
controller address:	5	05	→	30 35
constant:		01	→	30 31
send parameter:		10	→	31 30
parameter code (act. value):		10	→	31 30
checksum:		DA	→	44 41
end signal:				0D

Transmission to controller: 0A 30 35 30 31 31 30 31 30 44 41 0D

controller to computer: Dez. Hex ASCII

start signal				0A
controller address:	5	05	→	30 35
constant:		01	→	30 31
send parameter (repeat command):		10	→	31 30
parameter code (act. value):		10	→	31 30
parameter value:	225	00E1.00	→	30 30 45 31 30 30
checksum:		F9	→	46 39
end signal:				0D

Transmission to computer: 0A 30 35 30 31 31 30 31 30 30 30 45 31 30 30 46 39 0D

12.2 Transmission example, command code 15 H

Controller No. 12 should send the parameter group 0AH to the computer.

computer to controller:	Dez.	Hex		ASCII (Hex)
start signal				0A
controller:	12	0C	→	30 43
constant:		01	→	30 31
sends parameter group:		15	→	31 35
Parameter group code (0AH):		0A	→	30 41
checksum:		D4	→	44 34
end signal:				0D

Transmission to controller: 0A 30 43 30 31 31 35 30 41 44 34 0D

controller to computer :	Dez.	Hex		ASCII
start signal				0A
controller address:	12	0C	→	30 43
constant:		01	→	30 31
sends Parameter group (repeat command):		15	→	31 35
1.parameter code, act. value:		10	→	31 30
Parameter value	248	00F8.00	→	30 30 46 38 30 30
2.Parametercode, act. value:		20	→	32 30
Parameter value	250	00FA.00	→	30 30 46 41 30 30
3.Parametercode, setpoint, actual:		60	→	36 30
Parameter value	42	002A.00	→	30 30 32 41 30 30
4.Parametercode, Status word 1:		70	→	37 30
Parameter value	00	0000.00	→	30 30 30 30 30 30
checksum:		C2	→	43 32
end signal:				0D

Transmission to computer:

0A 30 43 30 31 31 35 31 30 30 30 46 38 30 30 32 30 30 30 46 41 30 30
36 30 30 30 32 41 30 30 37 30 30 30 30 30 30 43 32 0D

12.3 Transmission example, command code 20 H

Controller No. 27 receives the command:

"Accept parameter 1 P (xp-heating, parameter code: 40H) into the data memory (RAM)".

computer to controller:	Dez.	Hex		ASCII
start signal:				0A
controller address:	27	1B	→	31 42
constant:		01	→	30 31
command code:		20	→	32 30
Parameter code (xp-heat):		40	→	34 30
Parameter value:	5	0005.00	→	30 30 30 35 30 30
checksum:		7F		37 46
end signal:				0D

Transmission to controller: 0A 31 42 30 31 32 30 34 30 30 30 30 35 30 30 37 46 0D

controller to computer:	Dez.	Hex		ASCII
start signal				0A
controller address:	27	1B	→	31 42
constant:		01	→	30 31
command code (repeat command):		20	→	32 30
answer* (here: acknowledged) :		00	→	30 30
checksum:		C4	→	43 34
end signal:				0D

Transmission to computer: 0A 31 42 30 31 32 30 30 30 43 34 0D

* If the controller has "understood" the command from the computer, it responds with 00 H (acknowledge). In case of transmission or other (e.g. formal) errors, the controller responds at this point with a corresponding error code.

12.4 Transmission example, command code 21 H

Controller No. 2 receives the command:

"Accept parameter SP1 (setpoint 1, parameter code: 21 H) and store power failure-proof".

<u>computer to assembly:</u>	<u>Dez.</u>	<u>Hex</u>		<u>ASCII</u>
start signal				0A
controller address:	2	02	→	30 32
constant:		01	→	30 31
command code:		21	→	32 31
Parameter code (setpoint):		21	→	32 31
Parameter value:	80	0050.00	→	30 30 35 30 30 30
checksum:		6B	→	36 42
end signal:				0D

Transmission to controller: 0A 30 32 30 31 32 31 32 31 30 30 35 30 30 30 36 42 0D

<u>controller to computer:</u>	<u>Dez.</u>	<u>Hex</u>		<u>ASCII</u>
start signal				0A
controller address:	2	02	→	30 32
constant:		01	→	30 31
command code (repeat command):		21	→	32 31
answer * (here: acknowledged):		00	→	30 30
checksum:		DC	→	44 43
end signal:				0D

Transmission to computer: 0A 30 32 30 31 32 31 30 30 44 43 0D

* If the controller has "understood" the command of the computer, it answers with 00 H (acknowledge).in case of transmission or other (e.g. formal) errors, the controller answers at this point with a corresponding error code.

13 Error messages

00 H - acknowledge (no error)

02 H - Checksum error

03 H - Procedure error

The controller reports "procedure error" if unknown command, parameter or group code is used.

04 H - Range specifications not met

The controller signals "Range specifications not adhered to" if, for example:

1. Mess- and control range: 0 ... 400°C or -30...400°C.
A target value of 430°C should be specified.

05 H - constant not equal to 30H,30H or 30H,31H

06 H - Parameter is a "read only parameter "

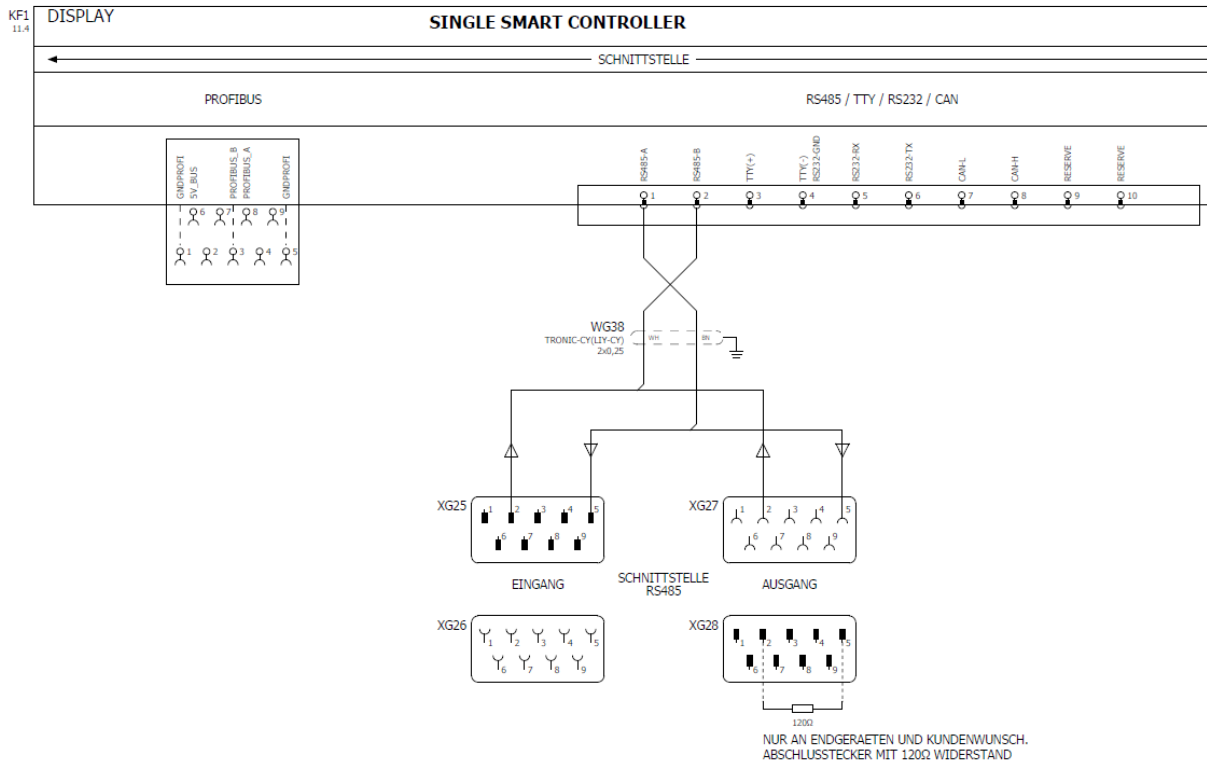
The controller reports "Parameter is only read parameter" if a read parameter is to be changed via the computer.
for example:

1. The computer wants to change the degree of control (parameter 60 H).
2. The computer wants to end status word 1 (parameter 70 H) to the controller.
3. The computer wants to preset the actual value.
4. The computer wants to preset the current setpoint (parameter code 20 H).

FE H - Error while writing into the power failure protected memory

14 Connection example

14.1 RS485



14.2 RS232

