neusburger

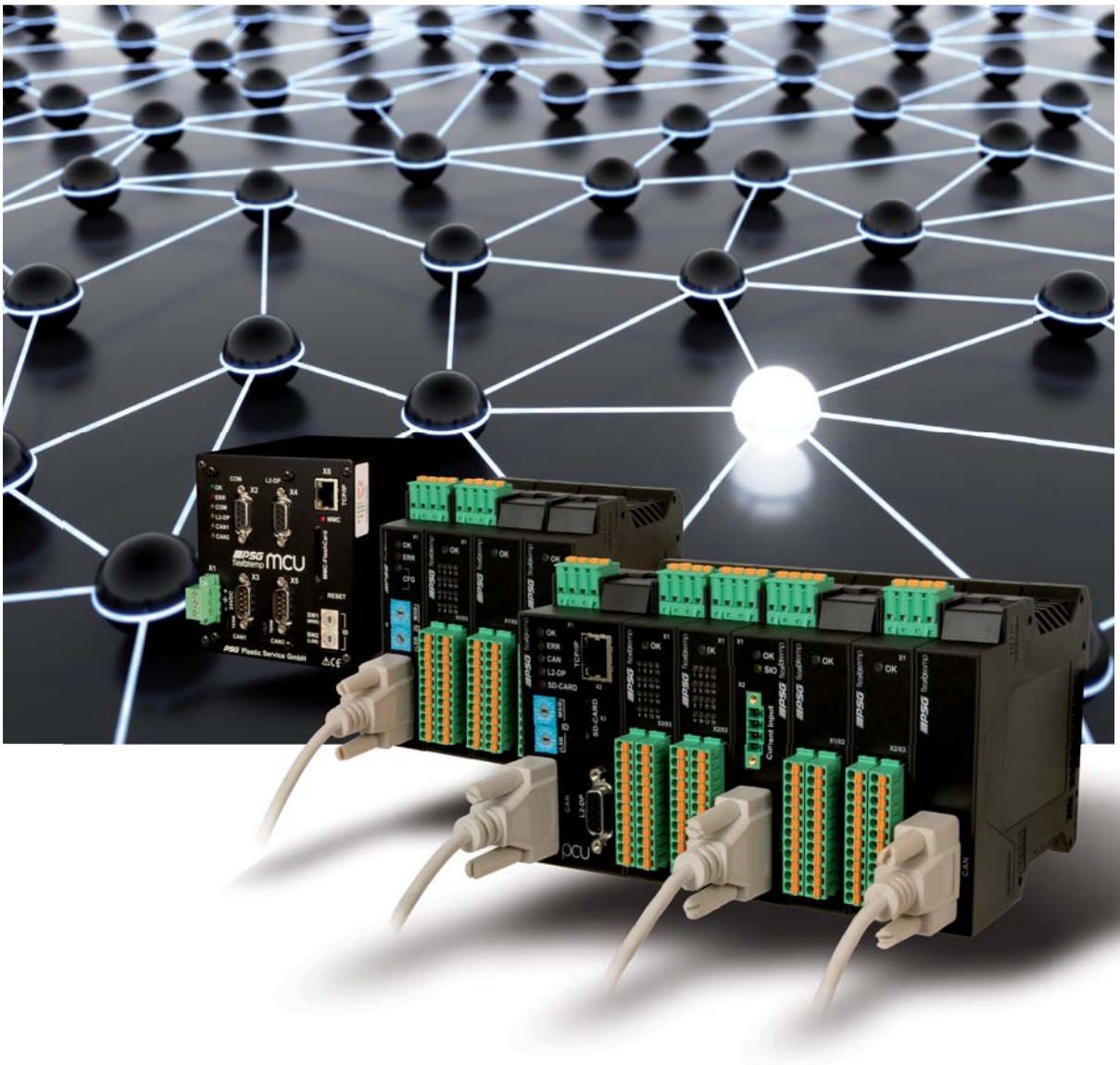
PSG

Operating Instructions

Parameters

Temperature Control System

flexotemp



CE

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Translation of original
operating instructions

1 Introduction

In this document the parameters of the flexotemp® components

MCU128	flexotemp® Multi Loop Control Unit 128 Zones
PCU024	flexotemp® Multi Loop Control Unit 24 Zones
PCU048	flexotemp® Multi Loop Control Unit 48 Zones
PCU128	flexotemp® Multi Loop Control Unit 128 Zones
PCU024PNIO	flexotemp® Multi Loop Control Unit with PROFINET IO 24 Zones
PCU048PNIO	flexotemp® Multi Loop Control Unit with PROFINET IO 48 Zones
PCU128PNIO	flexotemp® Multi Loop Control Unit with PROFINET IO 128 Zones
PCU024HA	flexotemp® Multi Loop Control Unit 24 Zones Home Automation
PCU048HA	flexotemp® Multi Loop Control Unit 48 Zones Home Automation
PCU128HA	flexotemp® Multi Loop Control Unit 128 Zones Home Automation
MPI 05 PNIO	flexotemp® Melt Pressure Interface with PROFINET IO
HPCBC	flexotemp® Heating Power Card Bus Coupler Activation of flexotemp® Heating Power Card HPC 24/08

are described, as well as the system parameters and parameters of components.

1.1 Additional and continuative documents

	System configuration & project setup	Information on this topic are in the operating instructions **Temperature control system flexotemp® System Configuration & Project Setup**
	Operation	Information on this topic are in the operating instructions **Project Setup and Configuration Tool flexotempMANAGER Operation**
	Protocol PSG II	Information on this topic are in the protocol description **PSG II** and the corresponding object lists.
	Protocol PSG II Ethernet (ASCII)	Information on this topic are in the protocol description **PSG II Ethernet (ASCII)** and the corresponding object lists.
	Protocol Profibus DP	Information on this topic are in the protocol description **Profibus DP** and the corresponding object lists.
	Protocol Modbus	Information on this topic are in the protocol description **Modbus** and the corresponding object lists.
	Protocol Modbus/TCP	Information on this topic are in the protocol description **Modbus/TCP** and the corresponding object lists.
	Protocol Profibus DPEA	Information on this topic are in the protocol description **Profibus DPEA** and the corresponding object lists.
	Protocol PROFINET IO	Information on this topic are in the protocol description **PROFINET IO** and the corresponding object lists.
	Protocol CANopen	Information on this topic are in the protocol description **CANopen** and the corresponding object lists.
	Installation and Handling CoDeSys	Information on this topic are in the description of Installation and Handling of **Temperature Control System flexotemp® CoDeSys**

1.2 Typographical Conventions

Symbols and conventions are used in this manual for faster orientation for you.

Symbols

	Caution	With this symbol, references and information are displayed which are decisive for the operation of the device. In case of non-compliance with or inaccurate compliance there can result damage to the device or injuries to persons.
	Note	The symbol refers to additional information and declarations, which serve for improved understanding.
	Example	With the symbol, a function is explained by means of an example.
	Reference	With this symbol, information in another document is referred to.
	FAQ	Here ↗FAQ (page 142) (Frequently Asked Questions) are answered.
↗		Cross references are marked with this character. In the pdf version of the document the objective of the cross reference is reached via the link.
`Equations`		Calculation specifications and examples are represented in this way.
<View>		Menu points (e.g. view) are represented in this way.
|Project|		Windows (e.g. project) are represented in this way.
n.a.		Not applicable, not existing

For some parameters the following text is shown. It should be noted that the parameter in the flexotemp environment is different from the one in the TEMPSoft2 environment.

Using PCU/MCU as hot runner controller, the parameter in the operation software **TEMPSoft2** is named:

[****] <Different parameter label>

1.3 User interface in flexotempMANAGER

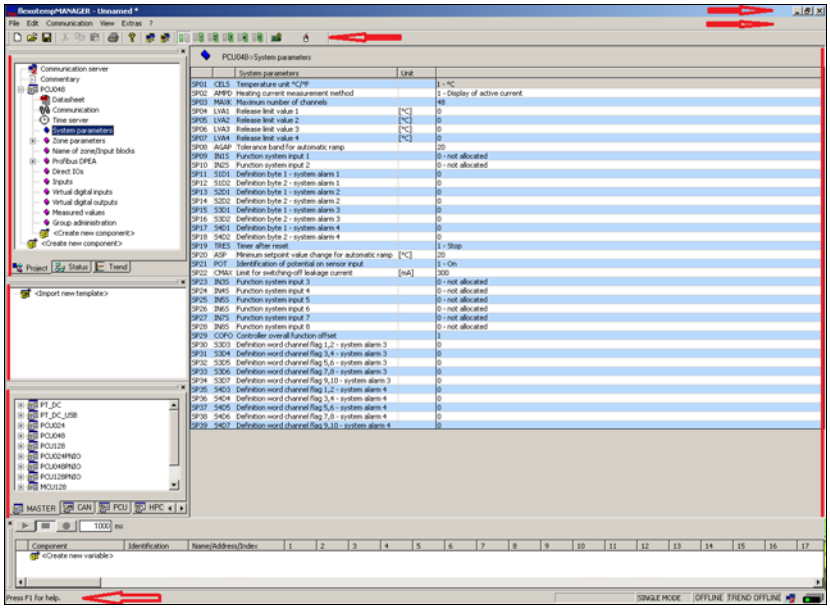
flexotempMANAGER is

- a project setup and configuration tool
- for visualization of parameters and status in form of value and graphic displays

for the following specified components.

The segmentation of the user interface depends on the views to be displayed. When all views are selected, the default user interface appears as follows.

View
Symbol bar
Project
Template
Components
Data recording
Status bar



Header
Menu bar
Selection dependent content

The views can be switched on and/or off by menu item <View> in the menu bar. Each view (except status bar) can be positioned to any position on the operator interface per drag&drop.

2 Parameters

In this chapter all parameters of the flexotemp® components are described.

2.1 Employed data types

Size (Bit)	Identification	Description	Value range
8	CHAR	signed char	-128 … 127
8	BYTE	unsigned char	0 … 255
16	INT	short integer	-32,768 … 32,767
16	WORD	unsigned short integer	0 … 65,535
32	LONG	long	-2,147,483,648 … 2,147,483,647
32	ULONG	unsigned long	0 … 4,294,967,295
32	FLOAT	Single (floating-point number with single precision)	-3,402823E38 … -1,401298E-45 for negative values; 1,401298E-45 … 3,402823E38 for positive values

2.2 Configuration and setting

With the configuration system parameters and zone parameters are distinguished between. System parameters are zone independent for the whole controller, zone parameters are separately adjustable for each zone of the controller.

Parameters are functionally collated in the description. The identification of a parameter is implemented over the following

- the **designation/ characteristic analog** of the configuration parameters as system - [SP**], zone - [P***], [CP**] communication and/or [M***] module parameter analog the identification of the parameter in the parameter lists of the project planning and configuration tool flexotempMANAGER
- the **parameter mnemonics** (English), which are employed for the identification in the operating and display units BA and in the project planning and configuration tool flexotempMANAGER

- the **parameter label**
- the **data type** (Bit, Byte, Char, Word, Integer) and bytes occupied by the data type
- the **setting range** over the interfaces and over the operating and display units BA (if these are identical, the setting range is indicated only once) and a multiplication factor that is to be considered at communication by interface
- a **unit** (when existent)

- The ex-works basic setting of a parameter is identified through a bracket (e.g. [on]).
- The handling of, as well as the access to, the parameters over the data interfaces (COM [serial interface PSGII, MODBUS RTU], CAN1/2 [CANopen], L2-DP [Profibus DP and DPEA], TCP-IP Ethernet) are to be taken from the protocol descriptions, as well as from the relevant parameter - and object lists.
- The maximum setting range of a parameter is specified through its data format. In general, the maximum possible setting range is functionally limited. This is indicated as a setting range for the interfaces.
- The detailed information on the data formats and ranges of values of the parameters are also to be found in the object lists to the interfaces.

Between system - and zone parameters can be navigated in the window |Project| (see chapter ↗User interface in flexotempMANAGER (page 6)). The system parameters are combined in one view. For the zone parameters exists an overall view and predefined views, which show parts of zone parameters grouped, e.g. setpoint value, current, configuration, etc. By <Create new zone parameter view> the operator can create his own new views at any time.

2.3 System Parameters

[SP01] CELS – Temperature Unit °C/°F

Using PCU/MCU as hot runner controller, the parameter in the operation software **TEMPSoft2** is named:

[SP01] Temperature Unit

Data type	Byte
Adjustment range interfaces	0, [1]
Adjustment range BA	0 - 999 °F/°C
Unit	n.a.

Setting	Description
0 - Off	°F (unit Fahrenheit)
[1] - On	°C (unit Celsius)

Unit of temperature values of all zones and configuration parameters (e.g. alarm limits).

[SP02] AMPD – Heating Current Measurement Method

Data type	Byte
Adjustment range interfaces	0...[1]...3
Adjustment range BA	0...[1]...3
Unit	n.a.

Setting	Description
0	Current measurement passive
[1]	Display of active current ↗[P002] OPWR – Degree of Operation (page 53) > 0%: display of the currently measured current value. ↗[P002] OPWR – Degree of Operation (page 53) <= 0%: Display 0
2	Display of current with switched on heating ↗[P002] OPWR – Degree of Operation (page 53) > 0%: display of the currently measured current value. ↗[P002] OPWR – Degree of Operation (page 53) > 0%: display of the last measured current value.
3	Display of current with switched off heating Display of the measured current at ↗[P002] OPWR – Degree of Operation (page 53) = 0% (power controller defective)

Specification of measurement method and/or display mode of heating currents of all zones belonging to the controller.

A detailed description of the heating current monitoring see chapter ↗Heating Current Measuring and Heating Current Monitoring (page 83).

[SP03] MAXK – Maximum Number of Channels

Data type	Byte
Adjustment range interfaces/ multiplier	0…[128] / 1 and/or 0...[48] / 1 and/or 0…[24] / 1
Adjustment range BA	0…[128] and/or 0…[48]…128 and/or 0…[24]…128
Unit	n.a.

The parameter specifies the zone number for which the regulation is processed, starting from the first zone. The reduction of the zone number does not have any effect on the cycle duration in case of recording of the measured values.

[SP04] LVA1 – Release Limit Value 1

Data type	Integer
Adjustment range interfaces/ multiplier	[0]…1999 / 10
Adjustment range BA	[0]…999
Unit	°C

The release limit value defines the temperature limit, which leads to the release of all zones of one release group.

A detailed description of the group functions see chapter ↗Group Function (Function Groups) (page 83).

[SP05] LVA2 – Release Limit Value 2

Data type	Integer
Adjustment range interfaces/ multiplier	[0]…1999 / 10
Adjustment range BA	[0]…999
Unit	°C

See parameter ↗[SP04] LVA1 – Release Limit Value 1 (page 10)

[SP06] LVA3 – Release Limit Value 3

Data type	Integer
Adjustment range interfaces/ multiplier	[0]…1999 / 10
Adjustment range BA	[0]…999
Unit	°C

See parameter ↗[SP04] LVA1 – Release Limit Value 1 (page 10)

[SP07] LVA4 – Release Limit Value 4

Data type	Integer
Adjustment range interfaces/ multiplier	[0]…1999 / 10
Adjustment range BA	[0]…999
Unit	°C

See parameter ↗[SP04] LVA1 – Release Limit Value 1 (page 10)

[SP08] AGAP – Tolerance Band for Automatic Ramp

Data type	Byte
Adjustment range interfaces/ multiplier	1…[20.0]…25.5 / 10
Adjustment range BA	0…[20]…26
Unit	n.a.

Specification of the temperature tolerance band indicating how much the measured values of the zones may differ in automatic ramp operation.
Zones, whose actual value is outside of the tolerance band, are trimmed in the output value.

A detailed description of the automatic ramp function see chapter ↗Automatic ramp (page 86).

[SP09] IN1S – Function System Input 1,

Using PCU/MCU as hot runner controller, the parameter
↗[SP09] IN1S – Function System Input 1, (page 11)
in the operation software **TEMPSoft2** is set by **Input1**.

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Specification of the function, that the controller executes for all zones of the system, when the digital input is activated.
To use the function, at least one I/O component, with a digital input, must exist in the control system. The allocation of digital input and the function to be executed, is done in the flexotempMANAGER for the appropriate controller under menu item <Inputs> | <System> | <System Input 1>.

Setting	Description
[0]	Without function
1	Absolute reduction to 2. setpoint value
2	Absolute reduction to 3. setpoint value
3	Absolute reduction to 4. setpoint value
4	Relative reduction by 2. setpoint value
5	Relative reduction by 3. setpoint value
6	Relative reduction by 4. setpoint value
7	Relative increasing by 2. setpoint value
8	Relative increasing by 3. setpoint value
9	Relative increasing by 4. setpoint value
10	Percentage reduction/increasing by 2. setpoint value
11	Percentage reduction/increasing by 3. setpoint value
12	Percentage reduction/increasing by 4. setpoint value
13	Absolute reduction to 2. setpoint value, if 2SW<SW
14	Absolute reduction to 3. setpoint value, if 3SW<SW

15	Absolute reduction to 4. setpoint value, if 4SW<SW
16	Disconnect actuator
17	Passivate all zones
18	Activate input block
19	Reset-acknowledge zone alarms
20	Reset-acknowledge all alarms
21	Output degree of operation of 100% for 10 sec (edge triggered)
22	Bypass group release
23	Switch to 2. control parameter set
24	Set I channel in controller to 0
25	Start timer 1
26	Start timer 2
27	Start timer 3
28	Start timer 4
29	Switch to 2. control parameter set / actual value of control = measured value 2
30	Deactivate Smart Power Limitation (SPL)
31	Activate process monitoring
32	Start learning phase of process monitoring
33	Degree of operation absolute reduction to 2. setpoint value
34	Degree of operation absolute reduction to 3. setpoint value
35	Degree of operation absolute reduction to 4. setpoint value
36	Degree of operation relative reduction by 2. setpoint value
37	Degree of operation relative reduction by 3. setpoint value
38	Degree of operation relative reduction by 4. setpoint value
39	Degree of operation relative increasing by 2. setpoint value
40	Degree of operation relative increasing by 3. setpoint value
41	Degree of operation relative increasing by 4. setpoint value
42	Cancel Heating limitation of degree of operation for zones in control mode
43	Absolute reduction by 2. setpoint value without cooling (energy saving option)
44	Relative reduction by 2. setpoint value without cooling (energy saving option)
45-128	<n.a.>
129	Absolute reduction to 2. setpoint value (inverted)
130	Absolute reduction to 3. setpoint value (inverted)
131	Absolute reduction to 4. setpoint value (inverted)
132	Relative reduction by 2. setpoint value (inverted)
133	Relative reduction by 3. setpoint value (inverted)
134	Relative reduction by 4. setpoint value (inverted)
135	Relative increasing by 2. setpoint value (inverted)
136	Relative increasing by 3. setpoint value (inverted)
137	Relative increasing by 4. setpoint value (inverted)
138	Percentage reduction/increasing by 2. setpoint value (inverted)
139	Percentage reduction/increasing by 3. setpoint value (inverted)
140	Percentage reduction/increasing by 4. setpoint value (inverted)
141	Absolute reduction to 2. setpoint value, if 2SW<SW (inverted)

142	Absolute reduction to 3. setpoint value, if 3SW<SW (inverted)
143	Absolute reduction to 4. setpoint value, if 4SW<SW (inverted)
144	Disconnect actuator (inverted)
145	Passivate zone (inverted)
146	Activate input block (inverted)
147	Reset-acknowledge zone alarms (inverted)
148	Reset-acknowledge all alarms (inverted)
149	Output degree of operation of 100% for 10 sec's (inverted)
150	Bypass group release (inverted)
151	Switch to 2. control parameter set (inverted)
152	Set I channel in controller to 0 (inverted)
153	Start timer 1 (inverted)
154	Start timer 2 (inverted)
155	Start timer 3 (inverted)
156	Start timer 4 (inverted)
157	Switch to 2. control parameter set / actual value of control = measured value 2 (inverted)
158	Deactivate Smart Power Limitation (SPL) (inverted)
159	Activate process monitoring (inverted)
160	Start learning phase of process monitoring (inverted)
161	Degree of operation absolute reduction to 2. setpoint value (inverted)
162	Degree of operation absolute reduction to 3. setpoint value (inverted)
163	Degree of operation absolute reduction to 4. setpoint value (inverted)
164	Degree of operation relative reduction by 2. setpoint value (inverted)
165	Degree of operation relative reduction by 3. setpoint value (inverted)
166	Degree of operation relative reduction by 4. setpoint value (inverted)
167	Degree of operation relative increasing by 2. setpoint value (inverted)
168	Degree of operation relative increasing by 3. setpoint value (inverted)
169	Degree of operation relative increasing by 4. setpoint value (inverted)
170	Cancel Heating limitation of degree of operation for zones in control mode (inverted)
171	Absolute reduction by 2. setpoint value without cooling (energy saving option) (inverted)
172	Relative reduction by 2. setpoint value without cooling (energy saving option) (inverted)
173-255	<n.a.>

[SP10] IN2S – Function System Input 2

Using PCU/MCU as hot runner controller, the parameter
↗[SP10] IN2S – Function System Input 2 (page 14)
in the operation software **TEMPSoft2** is set by **Input2**.

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Specification of the function, that the controller executes for all zones of the system, when one digital input is activated.
To use the function, at least one I/O component, with a digital input, must exist in the control system. The allocation of digital input and the function to be executed, is done in the flexotempMANAGER for the appropriate controller under menu item <Inputs> | <System> | <System Input 2>.
See parameter ↗[SP09] IN1S – Function System Input 1, (page 11)

Definition Byte 1 & 2 for System Alarms

[SP11] S1D1 – Definition Byte 1 – System Alarm 1

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

The control system has 4 system alarms overall. Each system alarm is specified by 2 definition bytes. The respective first definition byte together with the appropriate second definition byte defines a filter, which alarm values lead to an activation of a system alarm. All zones are considered for alarm calculation.
To output the status of the system alarm, at least one I/O component, with a digital output, must exist in the control system. The allocation of digital output and system alarm, is done in the flexotempMANAGER under the I/O component with the setting <Type = Digital output> and <Definition = System alarm 1>

A detailed description of the alarm management see chapter ↗Alarm management (page 87).

Setting			Description
hexadecimal	decimal	Bit	
0x01	1	0	Thyristor alarm (I-)
0x02	2	1	Current tolerance alarm (CTA)
0x04	4	2	LI1 (storing by LI1D)
0x08	8	3	LI2 (storing by LI2D)
0x10	16	4	LI3 (storing by LI3D)
0x20	32	5	LI4 (storing by LI4D)
0x40	64	6	LI5 (storing by LI5D)
0x80	128	7	LI6 (storing by LI6D)

The setting can be combined optionally with each other. The setting value for the parameter is decimal presented and is equivalent the sum of all setting values.

Setting value 3_{dec}:
For thyristor alarm (I-) ($0x01_{hex}$ and/or 1_{dec}) and current tolerance alarm (CTA) ($0x02_{hex}$ and/or 2_{dec}) system alarm 1 is output.

[SP12] S1D2 – Definition Byte 2 – System Alarm 1

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

See parameter ↗[SP11] S1D1 – Definition Byte 1 – System Alarm 1 (page 15)

A detailed description of the alarm management see chapter ↗Alarm management (page 87).

Setting			Description
hexadecimal	decimal	Bit	
0x01	1	0	Sensor alarm (SAL) (always storing)
0x02	2	1	Sensor break (tCb)/sensor incorrect polarity (tCp)/ sensor 1 (not storing)
0x04	4	2	Sensor break (tCb)/sensor incorrect polarity (tCp)/ sensor 2 (not storing)
0x08	8	3	Heat sink temperature alarm
0x10	16	4	<n.a.>
0x20	32	5	Project setup or zone not started
0x40	64	6	System-/Channel data error
0x80	128	7	Error CAN / Slave error

The setting can be combined optionally with each other. The setting value for the parameter is decimal presented and is equivalent the sum of all setting values.

Setting value 9_{dec}:
For sensor alarm (SAL) ($0x01_{hex}$ and/or 1_{dec}) and heat sink temperature alarm ($0x08_{hex}$ and/or 8_{dec}) system alarm 1 is output.

[SP13] S2D1 – Definition Byte 1 – System Alarm 2

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

See parameter ↗[SP11] S1D1 – Definition Byte 1 – System Alarm 1 (page 15)

[SP14] S2D2 – Definition Byte 2 – System Alarm 2

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

See parameter ↗[SP11] S1D1 – Definition Byte 1 – System Alarm 1 (page 15)

[SP15] S3D1 – Definition Byte 1 – System Alarm 3

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

See parameter ↗[SP11] S1D1 – Definition Byte 1 – System Alarm 1 (page 15)

[SP16] S3D2 – Definition Byte 2 – System Alarm 3

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

See parameter ↗[SP11] S1D1 – Definition Byte 1 – System Alarm 1 (page 15)

[SP17] S4D1 – Definition Byte 1 – System Alarm 4

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

See parameter ↗[SP11] S1D1 – Definition Byte 1 – System Alarm 1 (page 15)

[SP18] S4D2 – Definition Byte 2 – System Alarm 4

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

See parameter ↗[SP11] S1D1 – Definition Byte 1 – System Alarm 1 (page 15)

[SP19] TRES – Timer after Reset

Data type	Byte
Adjustment range interfaces	0...[1]...2
Adjustment range BA	0...[1]...2
Unit	n.a.

A reset is caused by a sensor break, after setpoint value = 0°C/0°F or a zone passivation.

Setting	Description
0 - Run	Timer keeps on running.
[1] - Stop	Timer is stopped and reset.

2 - Auto	Timer is stopped, reset and after reset started again, in case of t*d2 (see chapter ↗View Timer (page 75)) Auto and/or A**.

A detailed description of the timer function see chapter ↗Timer (page 90).

[SP20] ASP – Minimum Setpoint Value Change for Automatic Ramp

Data type	Integer
Adjustment range interfaces/ multiplier	0…[20]…1000 / 10
Adjustment range BA	0…[20]…999
Unit	°C

Specification of the limit, for which value at setpoint value change the automatic ramp function should be started. For a setpoint value change less than the here set value, a setpoint value jump on the new setpoint value happens, for a setpoint value change greater/equal the here set value, the zones, activated for the automatic ramp function, are ramped on the new setpoint value.

Refer also to parameter ↗[SP08] AGAP – Tolerance Band for Automatic Ramp (page 11) and parameter ↗[P018] ARMP – Automatic Ramp (page 56).

[SP21] POT – Identification of Potential on Sensor Input

Data type	Byte
Adjustment range interfaces	0...[1]
Adjustment range BA	0...[1]
Unit	n.a.

Parameter only relevant for power controller card CANPC.

Setting	Description
0 - Off	Identification of potential switched off.
[1] - On	Identification of potential switched on.

[SP22] CMAX – Limit for Switching-off Leakage Current

Data type	Word
Adjustment range interfaces/ multiplier	0…[300]…999 / 1
Adjustment range BA	0…[300]…999
Unit	n.a.

Parameter only relevant for power controller card CANPC.
The limit value is valid per power controller card.

[SP23] IN3S – Function System Input 3

Using PCU/MCU as hot runner controller, the parameter
↗[SP23] IN3S – Function System Input 3 (page 19)
in the operation software **TEMPSoft2** is set by **Input3**.

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Specification of the function, that the controller executes for all zones of the system, when one digital input is activated.
To use the function, at least one I/O component, with a digital input, must exist in the control system. The allocation of digital input and the function to be executed, is done in the flexotempMANAGER for the appropriate controller under menu item <Inputs> | <System> | <System Input 3>.

See parameter ↗[SP09] IN1S – Function System Input 1, (page 11).

[SP24] IN4S – Function System Input 4

Using PCU/MCU as hot runner controller, the parameter
↗[SP24] IN4S – Function System Input 4 (page 19)
in the operation software **TEMPSoft2** is set by **Input4**.

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Specification of the function, that the controller executes for all zones of the system, when one digital input is activated.
To use the function, at least one I/O component, with a digital input, must exist in the control system. The allocation of digital input and the function to be executed, is done in the flexotempMANAGER for the appropriate controller under menu item <Inputs> | <System> | <System Input 4>.

See parameter ↗[SP09] IN1S – Function System Input 1, (page 11).

[SP25] IN5S – Function System Input 5

Using PCU/MCU as hot runner controller, the parameter
↗[SP25] IN5S – Function System Input 5 (page 19)
in the operation software **TEMPSoft2** is set by **Input5**.

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Specification of the function, that the controller executes for all zones of the system, when one digital input is activated.
To use the function, at least one I/O component, with a digital input, must exist in the control system. The allocation of digital input and the function to be executed, is done in the flexotempMANAGER for the appropriate controller under menu item <Inputs> | <System> | <System Input 5>.

See parameter ↗[SP09] IN1S – Function System Input 1, (page 11).

[SP26] IN6S – Function System Input 6

Using PCU/MCU as hot runner controller, the parameter ↗[SP26] IN6S – Function System Input 6 (page 20) in the operation software **TEMPSoft2** is set by **Input6**.

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Specification of the function, that the controller executes for all zones of the system, when one digital input is activated.
To use the function, at least one I/O component, with a digital input, must exist in the control system. The allocation of digital input and the function to be executed, is done in the flexotempMANAGER for the appropriate controller under menu item <Inputs> | <System> | <System Input 6>.

See parameter ↗[SP09] IN1S – Function System Input 1, (page 11).

[SP27] IN7S – Function System Input 7

Using PCU/MCU as hot runner controller, the parameter ↗[SP27] IN7S – Function System Input 7 (page 20) in the operation software **TEMPSoft2** is set by **Input7**.

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Specification of the function, that the controller executes for all zones of the system, when one digital input is activated.
To use the function, at least one I/O component, with a digital input, must exist in the control system. The allocation of digital input and the function to be executed, is done in the flexotempMANAGER for the appropriate controller under menu item <Inputs> | <System> | <System Input 7>.

See parameter ↗[SP09] IN1S – Function System Input 1, (page 11).

[SP28] IN8S – Function System Input 8

Using PCU/MCU as hot runner controller, the parameter
↗[SP28] IN8S – Function System Input 8 (page 22)
in the operation software **TEMPSoft2** is set by **Input8**.

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Specification of the function, that the controller executes for all zones of the system, when one digital input is activated.
To use the function, at least one I/O component, with a digital input, must exist in the control system. The allocation of digital input and the function to be executed, is done in the flexotempMANAGER for the appropriate controller under menu item <Inputs> | <System> | <System Input 8>.

See parameter ↗[SP09] IN1S – Function System Input 1, (page 11).

[SP29] COFO – Controller Overall Function Offset

Data type	Unsigned Integer
Adjustment range interfaces/ multiplier	[0]…999 / 1
Adjustment range BA	[0]…999
Unit	n.a.

Specification of a channel number independent logical zone numbering.
The parameter defines the zone number of the first zone of the controller, the zone numbers for the following zones of the controller are consecutively. By the zone number the controller overall zone specific communication of certain functions is done.
The following functions are supported:

↗[P020] NrCO – Leading Zone (page 57)

Together with the parameter ↗[SP03] MAXK – Maximum Number of Channels (page 10) the zone numbering can be specified very flexible.

Example

At two MCU 128 60 control channels each were used.
The zone numbering should be done consecutively from 1 to 120.

Implementation

MCU 128 #1 ↗[SP29] COFO – Controller Overall Function Offset (page 22) = 1
MCU 128 #1 ↗[SP03] MAXK – Maximum Number of Channels (page 10) = 60
MCU 128 #2 ↗[SP29] COFO – Controller Overall Function Offset (page 22) = 61
MCU 128 #2 ↗[SP03] MAXK – Maximum Number of Channels (page 10) = 60

Definition word 3, 4, 5, 6 & 7 for system alarm 3 & 4

The parameter SD3X complements the definition of the system alarms ↗[SP15] S3D1 – Definition Byte 1 – System Alarm 3 (page 16) and ↗[SP16] S3D2 – Definition Byte 2 – System Alarm 3 (page 17).

The parameter SD4X complements the definition of the system alarms ↗[SP17] S4D1 – Definition Byte 1 – System Alarm 4 (page 17) and ↗[SP18] S4D2 – Definition Byte 2 – System Alarm 4 (page 17).

By the parameters, single bits/status for each zone of the existing channel flags can be output as system alarm 3 and/or 4.

For the system alarms a disjunction of all status of each single zone is done. A system alarm is generated, when the defined bit / the defined bits are pending in a single or several zones.

The assignment of the single bits equals the assignment of the channel flags 1…10.

To output the status of the system alarm, at least one I/O component, with a digital output, must exist in the control system. The allocation of digital output and system alarm, is done in the flexotempMANAGER under the I/O component with the setting <Type = Digital output> and <Definition = System alarm 1>.

[SP30] S3D3 – Definition Word Channel Flag 1, 2 – System Alarm 3

Data type	Unsigned Integer
Adjustment range interfaces/ multiplier	[0]…65535 / 1
Adjustment range BA	[0]…999
Unit	n.a.

A detailed description of the alarm management see chapter ↗Alarm management (page 87).

Setting			
hexadecimal	decimal	Bit	**Description**
0x0001	1	0	Sensor Incorrect Polarity Sensor 2
0x0002	2	1	Sensor Break Sensor 2
0x0004	4	2	Thyristor alarm (I-)
0x0008	8	3	Current tolerance alarm (CTA)
0x0010	16	4	Temperature alarm
0x0020	32	5	Sensor Short Circuit SAL
0x0040	64	6	Sensor incorrect polarity
0x0080	128	7	Sensor break
0x0100	256	8	Limit value 1
0x0200	512	9	Limit Value 2
0x0400	1024	10	Limit value 3
0x0800	2048	11	Limit value 4
0x1000	4096	12	Limit value 5
0x2000	8192	13	Limit value 6
0x4000	16384	14	Limit Value Plus
0x8000	32768	15	Limit Value Minus

The setting can be combined optionally with each other. The setting value for the parameter is decimal presented and is equivalent the sum of all setting values.

[SP31] S3D4 – Definition Word Channel Flag 3, 4 – System Alarm 3

Data type	Unsigned Integer
Adjustment range interfaces/ multiplier	[0]…65535 / 1
Adjustment range BA	[0]…999
Unit	n.a.

A detailed description of the alarm management see chapter ↗Alarm management (page 87).

Setting			
hexadecimal	decimal	Bit	**Description**
0x0001	1	0	Alarm 1
0x0002	2	1	Alarm 2
0x0004	4	2	Alarm 3
0x0008	8	3	Alarm 4
0x0010	16	4	System alarm 1
0x0020	32	5	System alarm 2
0x0040	64	6	System alarm 3
0x0080	128	7	System alarm 4
0x0100	256	8	Zone Input 1
0x0200	512	9	Zone Input 2
0x0400	1024	10	System Input 1
0x0800	2048	11	System Input 2
0x1000	4096	12	Reduction 1
0x2000	8192	13	Reduction 2
0x4000	16384	14	Software reduction 1
0x8000	32768	15	Software reduction 2

The setting can be combined optionally with each other. The setting value for the parameter is decimal presented and is equivalent the sum of all setting values.

[SP32] S3D5 – Definition Word Channel Flag 5, 6 – System Alarm 3

Data type	Unsigned Integer
Adjustment range interfaces/ multiplier	[0]…65535 / 1
Adjustment range BA	[0]…999
Unit	n.a.

A detailed description of the alarm management see chapter ↗Alarm management (page 87).

Setting			
hexadecimal	decimal	Bit	**Description**
0x0001	1	0	Timer 1 active
0x0002	2	1	Timer 2 active
0x0004	4	2	Timer 3 active
0x0008	8	3	Timer 4 active
0x0010	16	4	Automatic ramp
0x0020	32	5	CAN Error Measured Value 1
0x0040	64	6	CAN Error Measured Value 2
0x0080	128	7	Fan alarm/heat sink temperature The alarm here means, when an actuator module with heat sink temperature control is configured in the system, that this module (e.g. SMA09G) outputs an alarm, when the maximal heat sink temperature exceeds and forces a switch off of the actuator.
0x0100	256	8	Setpoint value reached
0x0200	512	9	Identification Heating
0x0400	1024	10	Identification Cooling
0x0800	2048	11	Manual temperature ramp active
0x1000	4096	12	Actuator deactivated
0x2000	8192	13	Actuator deactivated by limit value
0x4000	16384	14	2. Control parameter set
0x8000	32768	15	Leading zone active

The setting can be combined optionally with each other. The setting value for the parameter is decimal presented and is equivalent the sum of all setting values.

[SP33] S3D6 – Definition Word Channel Flag 7, 8 – System Alarm 3

Data type	Unsigned Integer
Adjustment range interfaces/ multiplier	[0]…65535 / 1
Adjustment range BA	[0]…999
Unit	n.a.

A detailed description of the alarm management see chapter ↗Alarm management (page 87).

Setting			
hexadecimal	decimal	Bit	**Description**
0x0001	1	0	Group Release
0x0002	2	1	Group wide reduction
0x0004	4	2	Error in configuration table CANCT

0x0008	8	3	Slave interface error CANCT By this bit an error on the RS485 interface below the CANCT or a BACI is signalized. Is below the CANCT e.g. a SMA09 configured and this module is not recognized, in this bit an error is signalizes.
0x0010	16	4	Smart Power Limitation (SPL) inactive
0x0020	32	5	Start-up mode by timer
0x0040	64	6	Zone passive
0x0080	128	7	Zone in control mode
0x0100	256	8	System data error Check sum/EEPROM error of system parameters.
0x0200	512	9	Channel data error Check sum/EEPROM error of channel parameters.
0x0400	1024	10	Leakage current error CANPC CANPC is a power controller card that monitors the residual current by a current transformer. A maximum permissible limit (in mA) for the residual current can be adjusted on this controller card. Is the limit exceeded, an error is signalized. Is no CANPC configured, this error is not signalized.
0x0800	2048	11	Potential error CANTC CANTC is a card in the rack system to register the temperatures of thermocouples. This module detects when a too high potential on a sensor input (e.g. a mains phase is connected to the sensor input). In this case an potential error is signalized. Is no CANTC configured, this error is not signalized.
0x1000	4096	12	Phase error CANPC CANPC is a power controller card, that detects, the mains phases are connected. Is a mains phase missing, an error is signalized. Is no CANPC configured, this error is not signalized.
0x2000	8192	13	IKMAX error CANPC CANPC is a power controller card, that detects, a too big load and/or the existence of a short circuit. Is no CANPC configured, this error is not signalized.
0x4000	16384	14	Limit value band at startup operation o.k.
0x8000	32768	15	Error CANPC This bit signalizes an error when a configured CANPC power controller card is missing. Is no configured, this bit is not set.

The setting can be combined optionally with each other. The setting value for the parameter is decimal presented and is equivalent the sum of all setting values.

[SP34] S3D7 – Definition Word Channel Flag 9, 10 – System Alarm 3

Data type	Unsigned Integer
Adjustment range interfaces/ multiplier	[0]…65535 / 1
Adjustment range BA	[0]…999
Unit	n.a.

A detailed description of the alarm management see chapter ↗Alarm management (page 87).

Setting			
hexadecimal	decimal	Bit	**Description**
0x0001	1	0	Identification Heating o.k.
0x0002	2	1	Identification Cooling o.k.
0x0004	4	2	System Input 3
0x0008	8	3	System Input 4
0x0010	16	4	System Input 5
0x0020	32	5	System Input 6
0x0040	64	6	System Input 7
0x0080	128	7	System Input 8
0x0100	256	8	Heat sink temperature limit value For each CANCT or BACI a heat sink temperature limit value can be set. All modules below CANCT/BACI, which measure a heat sink temperature, report this to CANCT/BACI. Is the set limit value exceeded, an error is signalized and written into the corresponding control channel.
0x0200	512	9	Fuse defective HPC (on Heating Power Card)
0x0400	1024	10	Phase error HPC (on Heating Power Card)
0x0800	2048	11	Without function
0x1000	4096	12	Without function
0x2000	8192	13	Without function
0x4000	16384	14	Without function
0x8000	32768	15	Without function

The setting can be combined optionally with each other. The setting value for the parameter is decimal presented and is equivalent the sum of all setting values.

[SP35] S4D3 – Definition Word Channel Flag 1, 2 – System Alarm 4

Data type	Unsigned Integer
Adjustment range interfaces/ multiplier	[0]…65535 / 1
Adjustment range BA	[0]…999
Unit	n.a.

See parameter ↗[SP30] S3D3 – Definition Word Channel Flag 1, 2 – System Alarm 3 (page 23)

[SP36] S4D4 – Definition Word Channel Flag 3, 4 – System Alarm 4

Data type	Unsigned Integer
Adjustment range interfaces/ multiplier	[0]…65535 / 1
Adjustment range BA	[0]…999
Unit	n.a.

See parameter ↗[SP31] S3D4 – Definition Word Channel Flag 3, 4 – System Alarm 3 (page 24)

[SP37] S4D5 – Definition Word Channel Flag 5, 6 – System Alarm 4

Data type	Unsigned Integer
Adjustment range interfaces/ multiplier	[0]…65535 / 1
Adjustment range BA	[0]…999
Unit	n.a.

See parameter ↗[SP32] S3D5 – Definition Word Channel Flag 5, 6 – System Alarm 3 (page 24)

[SP38] S4D6 – Definition Word Channel Flag 7, 8 – System Alarm 4

Data type	Unsigned Integer
Adjustment range interfaces/ multiplier	[0]…65535 / 1
Adjustment range BA	[0]…999
Unit	n.a.

See parameter ↗[SP33] S3D6 – Definition Word Channel Flag 7, 8 – System Alarm 3 (page 25)

[SP39] S4D7 – Definition Word Channel Flag 9, 10 – System Alarm 4

Data type	Unsigned Integer
Adjustment range interfaces/ multiplier	[0]…65535 / 1
Adjustment range BA	[0]…999
Unit	n.a.

See parameter ↗[SP34] S3D7 – Definition Word Channel Flag 9, 10 – System Alarm 3 (page 27)

[SP40] PMOD – Process Monitoring Mode

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…3 / 1
Adjustment range BA	[0]…3
Unit	n.a.

Setting	Description	
[0]	passive	Function is deactivated.
1	Fully-automatic	Process monitoring starts automatically following the automatic started learning phase with the set values for ↗[P097] PTOL – Tolerance of Process (page 61).

2	Manual	Process monitoring starts automatically following the manual started learning phase with the set values for ↗[P097] PTOL – Tolerance of Process (page 61).
3	Intelligent	Process monitoring starts automatically following the manual started learning phase with the calculated values during learning phase for ↗[P097] PTOL – Tolerance of Process (page 61). The determined value for ↗[P099] POP – Operating point of process monitoring (page 61) during learning phase is stored.

A detailed description of the function see chapter ↗Process Monitoring (page 97).

[SP48] S1Dt - System Alarm 1 Delay Time

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	s

The corresponding system alarm is delayed by the time set here. Is the reason for the alarm already gone, no system alarm is generated.

[SP49] S2Dt - System Alarm 2 Delay Time

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	s

See parameter ↗[SP48] S1Dt - System Alarm 1 Delay Time (page 29)

[SP50] S3Dt - System Alarm 3 Delay Time

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	s

See parameter ↗[SP48] S1Dt - System Alarm 1 Delay Time (page 29)

[SP51] S4Dt - System Alarm 4 Delay Time

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	s

See parameter ↗[SP48] S1Dt - System Alarm 1 Delay Time (page 29)

2.4 Time Server

The time server, a PC equipped with the Network Time Protocol, where the project setup - and configuration tool flexotempMANAGER is running, provides the clients (master components MCU, PCU) with the current time stamp on request. Thus the master components are synchronized.

The function is supported by the master components (MCU, PCU) from software version …0910A.

All necessary settings for the time server can be done by BA as well.

Also official time servers are supported, when there IP address specified.

[SP41] tS – Time Synchronization

Data type	Byte
Adjustment range interfaces	[0], 1
Adjustment range BA	[0]…1
Unit	n.a.

Setting	Description
[0] - Off	Function is deactivated.
1 - On	Function is activated.

[SP42] tS1 – IP Address 1. Octet

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

1. Octet of IP address of time server (**XXX**.***.***.***).

[SP43] tS2 – IP Address 2. Octet

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

2. Octet of IP address of time server (***.**XXX**.***.***).

[SP44] tS3 – IP Address 3. Octet

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

3. Octet of IP address of time server (***.***.**XXX**.***).

[SP45] tS4 – IP Address 4. Octet

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

4. Octet of IP address of time server (***.***.***.**XXX**).

[SP46] tSMt – Time Zone

Data type	Word
Adjustment range interfaces	(GMT-12:00) International dateline (West) … [(GMT+01:00) Amsterdam, Berlin, Bern, Stockholm, Vienna)] … (GMT+12:00) Fiji, Kamchatka, Marshall Islands
Adjustment range BA	[0]…91
Unit	n.a.

The setting and display of the time zone, which is used for time synchronization of the master components, is done by this parameter. For further processing the parameter ↗[SP47] tSTz – Time Zone (internal) (page 31) is used and derived from this parameter.

[SP47] tSTz – Time Zone (internal)

The parameter is not displayed in flexotempMANAGER.

Data type	Char
Adjustment range interfaces	-127…[0]…127
Adjustment range BA	[0]…127
Unit	0.25 h (15 minutes)

A communication with the master components read/write is done by parameter ↗[SP47] tSTz – Time Zone (internal) (page 31). For plain text display the content of the parameter ↗[SP47] tSTz – Time Zone (internal) (page 31) is converted to parameter ↗[SP46] tSMt – Time Zone (page 31) and displayed in flexotempMANAGER.

The parameter ↗[SP47] tSTz – Time Zone (internal) (page 31) presents always the value, that is/will be stored in the master component. For discrepancies between the content of parameter [SP46] and [SP47], the value of [SP47] is used and tried to be displayed for [SP46].

In case no valid value can be determined out of the list of value for parameter [SP46], it shows:

(GMT<Value parameter [SP47]) invalid time zone

2.5 Zone Parameters

In the window |Project| below the component under <Zone parameter> all zone parameters are listed consecutively with their parameter label / characteristic analog.
For the zone parameters exist predefined (standard) views, where the zone parameters are functionally and/or application specific grouped displayed.
For clarity, the zone parameters of the single available standard views are described.

2.5.1 View Setpoint Value

In this view all zone parameters are concentrated, concerning settings for setpoint values.

[P001] SP – Setpoint Value

Data type	Integer
Adjustment range interfaces/ multiplier	-30.0…[0.0]…1999.0 / 10
Adjustment range BA	-30...[0]…999
Unit	°C

Main setpoint value on which control is implemented when 2., 3. or 4. setpoint value not active.
With setpoint value 0°C/≤32°F, the zone is passivated and the control algorithm is reinitialized.
With active manual mode, the setpoint value is without function.

[P009] SP2 – 2. Setpoint / 2. Lowering/Reduction Value

Using PCU/MCU as hot runner controller, the parameter in the operation software **TEMPSoft2** is named:

[P009] Standby setpoint

Data type	Integer
Adjustment range interfaces/ multiplier	[0.0]…1999.0 / 10
Adjustment range BA	[0]…999
Unit	°C

The second setpoint value and/or second lowering/reduction value is activated by a digital input.
Depending on the function definition of the digital input, it is activated system wide, group dependent or zone specific. By the definition is also specified, whether the setpoint value acts as absolute value or as setpoint value increase/ -reduction.

See also:
Parameter ↗[SP09] IN1S – Function System Input 1, ff.
Parameter ↗[SP082] IN1C – Function Zone Input 1 ff.
Parameters↗[P084] GPIN – Input Group

[P010] SP3 – 3. Setpoint / 3. Lowering/Reduction Value

Using PCU/MCU as hot runner controller, the parameter in the operation software **TEMPSoft2** is named:

[P010] Boost setpoint

Data type	Integer
Adjustment range interfaces/ multiplier	[0.0]…1999.0 / 10
Adjustment range BA	[0]…999
Unit	°C

The third setpoint value and/or third lowering/reduction value is activated by a digital input.
Depending on the function definition of the digital input, it is activated system wide, group dependent or zone specific. By the definition is also specified, whether the setpoint value acts as absolute value or as setpoint value increase/ -reduction.

See also:
Parameter ↗[SP09] IN1S – Function System Input 1, ff.
Parameter ↗[SP082] IN1C – Function Zone Input 1 ff.
Parameters↗[P084] GPIN – Input Group

[P011] SP4 – 4. Setpoint / 4. Lowering/Reduction Value

Data type	Integer
Adjustment range interfaces/ multiplier	[0.0]…1999.0 / 10
Adjustment range BA	[0]…999
Unit	°C

The fourth setpoint value and/or fourth lowering/reduction value is activated by a digital input.
Depending on the function definition of the digital input, it is activated system wide, group dependent or zone specific. By the definition is also specified, whether the setpoint value acts as absolute value or as setpoint value increase/ -reduction.

See also:
Parameter ↗[SP09] IN1S – Function System Input 1, ff.
Parameter ↗[SP082] IN1C – Function Zone Input 1 ff.
Parameters↗[P084] GPIN – Input Group

[P012] SPLO – Lower Setpoint Value Limit

Data type	Integer
Adjustment range interfaces/ multiplier	-30.0…[0.0]…1999.0 / 10
Adjustment range BA	-30...[0]…999
Unit	°C

Lower input limitation for all temperature setpoints. The value should be adjusted dependent on the measurement range of the used thermocouple TC/ resistance thermometer Pt100.

[P013] SPHI – Upper Setpoint Value Limit

Data type	Integer
Adjustment range interfaces/ multiplier	-30.0…[0.0]…1999.0 / 10
Adjustment range BA	-30...[0]…999
Unit	°C

Upper input limitation for all temperature setpoints. The value should be adjusted dependent on the measurement range of the used thermocouple TC/ resistance thermometer Pt100.

2.5.2 View Current

In this view all zone parameters are concentrated, concerning settings for heating current.

[P004] CurS – Current Setpoint Value

Data type	Word
Adjustment range interfaces/ multiplier	[0.0]…999.0 / 10
Adjustment range BA	[0.0]…99.9
Unit	A

Current value, where the measured heating current is compared with.
Input of the value manual or by automatic current transfer.
A current alarm is generated, when the measured heating current is outside the current tolerance band around the current setpoint value.

[P005] CurT – Current Tolerance

Data type	Word
Adjustment range interfaces/ multiplier	0.0…[20.0]…100.0 / 10
Adjustment range BA	0…[20.0]…99.9
Unit	%

Current tolerance band around the ↗[P004] CurS – Current Setpoint Value for monitoring of heating current.

↗[P005] CurT – Current Tolerance is limitated below as follows.
↗[P005] CurT – Current Tolerance * ↗[P004] CurS – Current Setpoint Valuecurrent setpoint value [A] must be greater than 0.5 A.
The minimal current tolerance value is therefore dependent on the current setpoint value.

Please note, that ↗[P005] CurT – Current Tolerance is always sufficiently dimensioned, so that current changes caused by voltage fluctuations do not cause "false alarms".

2.5.3 View Configuration

In this view all zone parameters are concentrated, concerning settings for configuration.

[P006] ZONE – Zone

Data type	Bit
Adjustment range interfaces	0, [1]
Adjustment range BA	off, [on]
Unit	n.a.

Setting	Description
0 - Off	At control outputs no actuating signals are output. No alarms are calculated.
[1] - On	At the control output in accordance with operating mode (control/manual mode) actuating signals are output. All alarms are calculated.

[P007] ZTYP – Type of Zone

Data type	Byte
Adjustment range interfaces	[0]...2
Adjustment range BA	[Ctr], MSR
Unit	n.a.

Setting	Description
[0]	Zone in control mode (Ctr)
1	Zone in measuring mode (MSR)
2	Additional zone

For zone in measuring mode no degree of operation is output.

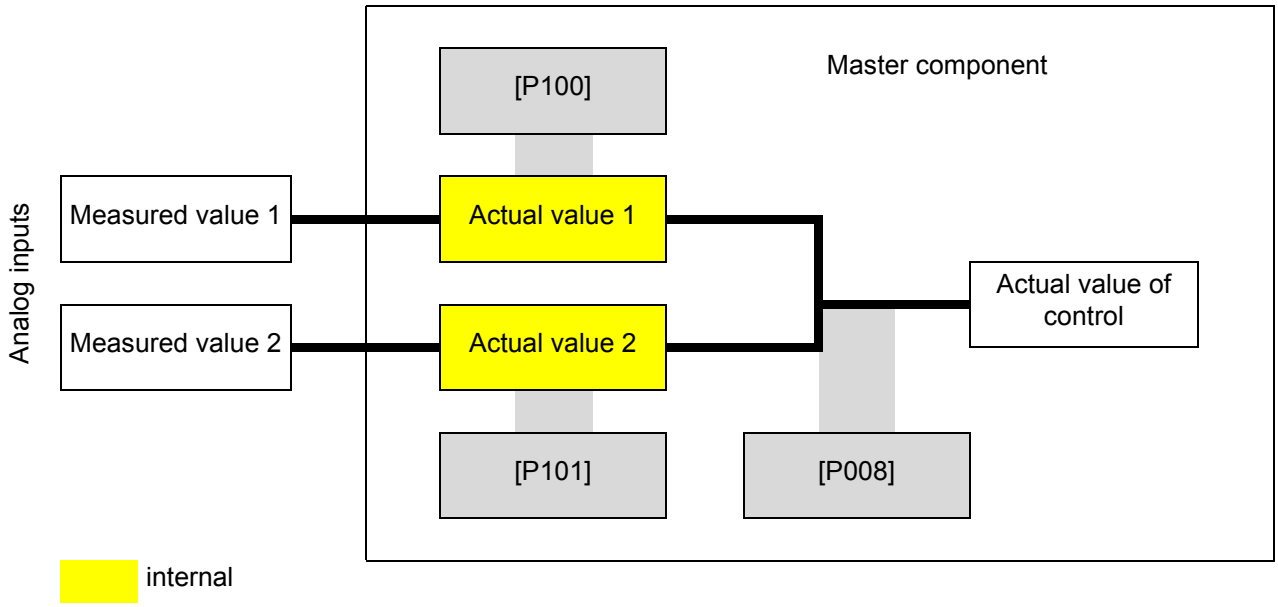
Additional zones are control zones in the hot runner controller, which are functional not equate to the zones of the hot runner controller, that means that they are not considered at hot runner controller functions like startup operation, Standby, Boost etc. The additional zones may for example be used to control the temperature of the control cabinet or to control a water/oil temperate device.
Additional zones are specified by parameter ↗[P007] ZTYP – Type of Zone as additional zones, starting from the last zone sequential. As soon as a gap is detected (zone not marked as additional zone), all further zones marked as additional are refused.

Use of PCU048
Parameter ↗[SP03] MAXK – Maximum Number of Channels = 48
For zone 48, zone 47, zone 45: parameter ↗[P007] ZTYP – Type of Zone = 2
Determination of zones for hot runner control =46
Determination of additional zones = 2
(Explanation: starting from the last zone (48), zone 48 and zone 47 are sequential and stated as additional zones. Zone 46 is no additional zone and the determination is terminated, with the result 2 additional zones)

[P008] SEnC – Actual Value of Control

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…5 / 1
Adjustment range BA	[0]…5
Unit	n.a.

Setting	Description
[0]	Measured value 1
1	Measured value 2
2	Measured value 1- measured value 2
3	Measured value1=actual value of control / measured value2 = Max. Temp. Alarm
4	Measured value1=actual value of control / measured value2 = Max. Temp. Alarm + limit value
5	(Measured value 1 + measured value 2) /2
6	Actual value of control = Actual value 1, limit value 6 [P071],[P072] = abs (actual value 1 - actual value 2); Limit value 1,2,3,4,5 = actual value 1
7	Actual value of control = Actual value 1, limit value 6 [P071],[P072] = actual value 2; limit value 1,2,3,4,5 = actual value 1



See parameter ↗[P100] OFF1 – Temperature offset actual value 1
See parameter ↗[P101] OFF2 – Temperature offset actual value 2

[P022] APPL – Application

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

By means of the parameter, extended customer-specific functions or adaptations to pre-determined applications can be connected to the standard functions.

Setting	Description
11	Passive automatic ramp Activated and ↗[P018] ARMP – Automatic Ramp = 1, the zone, in automatic ramp mode, is heated up, but is not considered as slowest zone (= reference zone). The function is canceled, when there is no more reference zone available.
12	Activated and ↗[P018] ARMP – Automatic Ramp = 1, then this zone must not be leading in automatic ramp mode, and no cooling degree of operation is output.
13	Activated and ↗[P018] ARMP – Automatic Ramp = 1, then this zone must not output a cooling degree of operation.

[P023] OUTH – Heating Degree of Operation Damping

Data type	Char
Adjustment range interfaces/ multiplier	0…[100] / 1
Adjustment range BA	0…[100]
Unit	%

The parameter has 2 functions. It defines,

- whether the control module Heating is used for the zone
- whether the Heating degree of operation is output damped.

Setting	Description
= 0	The control module Heating is not used.
> 0	The control module Heating is used.

Definition for correction of the Heating degree of operation:

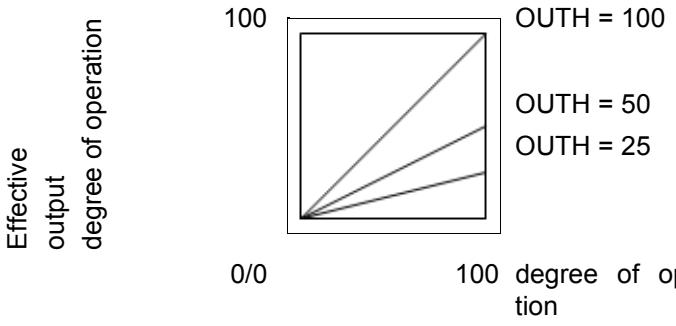
```
Corrected degree of operation = degree of operation x 0.01 x setting value
```

Setting value OUTH = 75

Uncorrected degree of operation = 85%

Corrected degree of operation = 85% x 0.01 x 75 = 63% (rounded)

Over the complete range of degree of operation, a reduced, corrected degree of operation is output.



[P024] OUTC – Cooling Degree of Operation Damping

	Standard	Only PCU***HA
Data type	Char	Char
Adjustment range interfaces/ multiplier	[-100]…0 / 1	-100…[0] / 1
Adjustment range BA	[-100]…0	-100...[0]
Unit	%	%

The parameter has 2 functions. It defines,

- whether the control module Cooling is used for the zone
- whether the Cooling degree of operation is output damped.

Setting	Description
= 0	The control module Cooling is not used.
> 0	The control module Cooling is used.

Definition for correction of the Cooling degree of operation:

```
Corrected degree of operation = degree of operation x 0.01 x setting value
```

Setting value OUTC = 75

Uncorrected degree of operation = -40%

Corrected degree of operation = -40% x 0.01 x |-75| = 30% (rounded)

[P026] RELH – Heating Relay Output

Data type	Bit
Adjustment range interfaces	[0]…1
Adjustment range BA	[off], on
Unit	n.a.

Specifies the manner in which the actuating signal is output at the Heating control output.
Through this, an adaptation of the actuating signal to the actuator (SSR, relay) is possible.

Setting	Description
[0] - Off	Output of the actuating variable through fast clocked pulse groups (e.g. for the output to solid state relay). The minimum pulse width is 40 ms.
1 - On	Output of the actuating variable through fast clocked pulse groups (e.g. for the output to solid state relay). The minimum pulse width is 40 ms. The ↗[P045] CTH – Heating Sampling Time and ↗[P053] CTH2 - Heating Sampling Time 2 are minimum 10 seconds.

A detailed description of the control output signals see chapter ↗Control output signals.

[P027] RELC – Cooling Relay Output

Data type	Bit
Adjustment range interfaces	0…[1]
Adjustment range BA	off, [on]
Unit	n.a.

Specifies the manner in which the actuating signal is output at the Cooling control output.
Through this, an adaptation of the actuating signal to the actuator (SSR, relay) is possible.

Setting	Description
0 - Off	Output of the actuating variable through fast clocked pulse groups (e.g. for the output to solid state relay). The minimum pulse width is 40 ms.
[1] - On	Output method is suitable for operation of mechanical relays as actuators. Per sampling cycle (corresponds to sampling time) the actuating variable Cooling is output in the block (one-time switching on and off of the setting output). The operating time is proportional to the degree of operation with reference to the sampling time. The ↗[P049] CTC – Cooling Sampling Time and ↗[P057] CTC2 – Cooling Sampling Time 2 are minimum 10 seconds.

A detailed description of the control output signals see chapter ↗Control output signals.

[P028] PCLG – Pulse Cooling

Data type	Bit
Adjustment range interfaces	[0]…1
Adjustment range BA	[off], on
Unit	n.a.

Setting	Description
[0] - Off	Conventional output percentage output A PWM signal, proportional to the degree of operation, is output at the Cooling control output. Refer also to parameter ↗[P027] RELC – Cooling Relay Output.
1 - On	In case of the pulse cooling (also: impulse cooling), the pulse duration is constant at the Cooling control output and the pause duration (between 2 impulses) is variable. The degree of operation is generated by the variable pause between to the constant pulses. The pause length is limited by the parameter ↗[P030] PMIN – Minimum Pause Duration and ↗[P031] PMAX – Maximum Pause Duration . The mandatory pause adjustable through the parameter ↗[P030] PMIN – Minimum Pause Duration and should prevent the transition from evaporating to continuous water flow. PMIN should correspond to a cooling pulse in about the reaction time of the route sections. Changes of the degree of operation are incorporated only on completion of the current pulse separation. The relationship between pulse width and maximum pause duration determines the real degree of operation resolution. For a one-percent degree of operation resolution ↗[P031] PMAX – Maximum Pause Duration at least the hundred-fold time value of ↗[P029] PULS – Pulse Duration is to be to set adjusted (please be sure to consider the different units of the parameters).

Prerequisite for the pulse cooling is that ↗[P024] OUTC – Cooling Degree of Operation Damping is set to -100.

A detailed description of the control output signals see chapter ↗Control output signals.

[P029] PULS – Pulse Duration

Data type	Word
Adjustment range interfaces/ multiplier	4…[20]…500 / 1
Adjustment range BA	4…[20]…500
Unit	10 ms

Defines the duration of an impulse at the control output Cooling in case of active ↗[P028] PCLG – Pulse Cooling.

Be sure to consider that the pulse duration is 10x the setting value.

The setting value should

- be long enough so that the actuator (e.g. solenoid valve) can act properly
- be large enough to determine a change of the actual value.

The setting value should be selected so, that the actual value changes with an individual pulse only insignificantly.

In case of changes of the parameters of the pulse cooling, it is absolutely necessary that the control parameters be adapted to cooling.

A detailed description of the control output signals see chapter ↗Control output signals.

[P030] PMIN – Minimum Pause Duration

Data type	Word
Adjustment range interfaces/ multiplier	0.0…[50.0]…999.0 / 1
Adjustment range BA	0.0…[50.0]…999.0
Unit	s

Minimum duration between two pulses in case of active ↗[P028] PCLG – Pulse Cooling

A detailed description of the control output signals see chapter ↗Control output signals.

[P031] PMAX – Maximum Pause Duration

Data type	Word
Adjustment range interfaces/ multiplier	0.0…[200.0]…999.0 / 1
Adjustment range BA	0.0…[50.0]…999.0
Unit	s

Maximum duration between two pulses in case of active ↗[P028] PCLG – Pulse Cooling

A detailed description of the control output signals see chapter ↗Control output signals.

[P100] OFF1 – Temperature offset actual value 1

Data type	Word
Adjustment range interfaces/ multiplier	-99.9…[0.0]…99.0 / 10
Unit	K

The actual value 1 is corrected as follows:

```
Corrected actual value 1 = actual value 1 + temperature offset actual value 1
```

From HEX file version xx4310

[P101] OFF2 – Temperature offset actual value 2

Data type	Word
Adjustment range interfaces/ multiplier	-99.9…[0.0]…99.0 / 10
Unit	K

The actual value 1 is corrected as follows:

```
Corrected actual value 2 = actual value 1 + temperature offset actual value 2
```

From HEX file version xx4310

2.5.4 View Control Parameters

In this view all zone parameters are concentrated, concerning settings for control.

A detailed description about all around the theme calculation of control parameters see chapter ↗Auto Tuning (Identification).

[P032] IDEH – Heating Identification

Using PCU/MCU as hot runner controller, the parameter in the operation software **TEMPSoft2** is named:

[P032] Identification

	Standard	Only PCU***HA
Data type	Bit	Bit
Adjustment range interfaces	0…[1]	[0]…1
Adjustment range BA	off, [on]	off, [on]
Unit	n.a.	n.a.

Setting	Description
0 - Off	The controller controls with the fix adjusted control parameter set Heating. At no phase are the control parameters Heating newly calculated.
1 - On	After a zone reset, i.e. ▪ controller is switched on ▪ zone was passivated and is activated ▪ setpoint value less than or equal to 0°C / 32 K the Heating control parameters, for the active control parameter set, are calculated automatically during the first setpoint value increase greater than 45 K while heating-up.

[P033] IDEL – Loop Control in Case of Identification

Using PCU/MCU as hot runner controller, the parameter in the operation software **TEMPSoft2** is named:

[P033] Loop control

Data type	Bit
Adjustment range interfaces	0…[1]
Adjustment range BA	off, [on]
Unit	n.a.

Setting	Description
0 - Off	Function is deactivated.

[1] - On	During the identification phase Heating, shortly before reaching the setpoint value, the control characteristic is considered and if necessary a correction of the control parameters Heating of the active control parameter set is made.

[P034] IDCH – Cooling Identification after Heating Identification

Data type	Bit
Adjustment range interfaces	[0]…1
Adjustment range BA	[off], on
Unit	n.a.

Setting	Description
[0] - Off	After the sequence identification Heating no identification Cooling is executed.
1 - On	The control parameters Cooling of the active control parameter set are determined automatically direct after completion of the ↗[P032] IDEH – Heating Identification. Therefore the lowest degree of operation (according to the setting ↗[P024] OUTC – Cooling Degree of Operation Damping) is output and the control parameter Cooling is calculated according to the actual value trend. After end of the calculation of the control parameters, the active setting value is controlled again.

The function only operates for ↗[P024] OUTC – Cooling Degree of Operation Damping < 0.

[P035] SPCb – Setpoint Value Cutback

Using PCU/MCU as hot runner controller, the parameter in the operation software **TEMPSoft2** is named:

[P035] Cutback

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…200 / 1
Adjustment range BA	[0]…200
Unit	n.a.

The setpoint value cutback function is used to prevent an overshooting during identification phase. Therefore the calculation of the control parameters Heating of the active control parameter set is executed on a temperature setpoint value reduced by the setpoint value cutback. After determination and verification of the control parameters, it is immediately controlled on the final setpoint value.

The function only operates for the setting ↗[P033] IDEL – Loop Control in Case of Identification = On.

[P036] CFIX – Cooling Parameter fixed (Heating Identification)

Data type	Bit
Adjustment range interfaces/ multiplier	[0]…1
Adjustment range BA	[off], on
Unit	n.a.

In case the dimension of heating and cooling power for the zone matches, in general the control parameters Cooling could be deduced from the control parameters Heating.

Setting	Description
[0] - Off	The control parameters Cooling of the active control parameter set are recalculated for identification heating without carrying out an adaptation Cooling. Basis for the control parameters Cooling are the control parameters Heating.
1 - On	The control parameters Cooling are not modified through a Heating identification.

[P037] IDEC – Cooling Identification

Data type	Bit
Adjustment range interfaces/ multiplier	0…[1]
Adjustment range BA	off, [on]
Unit	n.a.

Setting	Description
0 - Off	At no phase are the control parameters Cooling newly calculated.
[1] - On	At a setpoint value jump > -30K the control parameters Cooling of the active control parameter set are determined automatically.

The function only operates for ↗[P024] OUTC – Cooling Degree of Operation Damping < 0.

[P038] ALGO – Algorithm

Data type	Bit
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Specification, which control algorithm is used for control.

Setting	Description
[0]	Standard - dynamic control algorithm for temperature zones
1	Standard slow
2	Standard slower
3	Standard quick
4	Standard quicker

10	Customer specific DB
16	Main controller cascade
17	Auxiliary controller cascade
32	Simple PID
128	Standard without correction of operating point shift
129	Standard slow without correction of operating point shift
130	Standard slower without correction of operating point shift
131	Standard quick without correction of operating point shift
132	Standard quicker without correction of operating point shift

Information on "correction of operating point shift"

The control algorithm can identify a changing operating point of a zone. That means for example the starting and/or shutdown of a plant or for extruders the increase of the RPM to increase the capacity.

Additional to control the controller supervises the operating point as standard and corrects by interaction of output value. In some applications these interaction are not wanted. Therefore the control can work without correction of operating point shift.

[P039] KNr – Cascade - Zone Number of Main Controller

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…128 / 1
Adjustment range BA	[0]…128
Unit	n.a.

Detailed information on cascade control see chapter ↗Cascade Control.

[P040] KSP- – Cascade - Setpoint Value of Auxiliary Controller for Degree of Operation =0/-100%

Data type	Integer
Adjustment range interfaces/ multiplier	-1000…[0]…1000 / 1
Adjustment range BA	-1000…[0]…1000
Unit	n.a.

Detailed information on cascade control see chapter ↗Cascade Control.

[P041] KSP+ – Cascade - Setpoint Value of Auxiliary Controller for Degree of Operation = 100%

Data type	Integer
Adjustment range interfaces/ multiplier	-1000…[0]…1000 / 1
Adjustment range BA	-1000…[0]…1000
Unit	n.a.

Detailed information on cascade control see chapter ↗Cascade Control.

[P042] XPH – Heating Proportional Band

Using PCU/MCU as hot runner controller, the parameter in the operation software **TEMPSoft2** is named:

[P042] Proportional band

Data type	Word
Adjustment range interfaces/ multiplier	0.0…[9.9]…250.0 / 10
Adjustment range BA	[0]…250.0
Unit	%

The P content changes the output of the PID controller proportional to the deviation between setpoint and actual value.

The proportional band is the range of the process variable, in which this linear reinforcement occurs before the output achieves its maximum or minimum. This range is indicated in percent of the measuring range. In order that the adjusted proportional band is independent of the sensor type and/or measuring range, the controller measuring range in case of PSG controllers is assumed at 500°C (1% corresponds to 5 K).

The amplification of the controller decreases with increasing proportional band, and increases with decreasing proportional band. In case of a proportional band selected too small, the controller reacts to small deviations so severely that the control system oscillates. On the other hand, a proportional band which is selected too large makes the regulation very slow. The controller no longer reacts adequately to faults.

In case of utilization of pure proportional band controllers in the control system, the deviation cannot be eliminated fully. There results the so-called permanent deviation.

[P043] TDH – Heating Derivative Time

Using PCU/MCU as hot runner controller, the parameter in the operation software **TEMPSoft2** is named:

[P043] Derivative time

Data type	Word
Adjustment range interfaces/ multiplier	0…[255]…65535 / 1
Adjustment range BA	[0]…999
Unit	s

The differential content (D content) of the PID controller reacts in a leading way to the rate of change of the deviation or the actual value.

The differential content then supplies only a actuating variable, if the deviation or the actual value is changed. Therefore it cannot be used in order to stabilize a constant control deviation. That also explains the utilization of the D regulator only in association with P or PI characteristic.

The importance of the differential content in practice lies in the fact that the controller supplies actuating variables when the deviation first arises. The D characteristic makes the controller more rapid than a pure P or PI controller.

However, the D characteristic cannot distinguish between real deviations and so-called hum disturbances, i.e. higher frequency superpositions on the measurement variable. A differential content which is set adjusted too large reacts to the disturbances with fast changes of the actuating variable, through which the control system becomes very unsteady.

[P044] TIH – Heating Integral Time

Using PCU/MCU as hot runner controller, the parameter in the operation software **TEMPSoft2** is named:

[P044] Integral time

Data type	Word
Adjustment range interfaces/ multiplier	0…[500]…65535 / 1
Adjustment range BA	[0]…999
Unit	s

With the integral content (I content) of the controller, a continuous change of the controller output value is achieved until the permanent deviation is stabilized to zero. With this, a permanent deviation is prevented.

The speed with which the stabilizing of the deviation happens and/or the influence of the I content on the actuating signal, is a function of the integral time (also: Integral time). A short integral time means a great influence of the I content on the setting value, i.e. it is integrated fast. A large integral time performs in reverse.

If the proportional band is changed, this also means a changed time-related characteristic with unchanged integral time.

[P045] CTH – Heating Sampling Time

Using PCU/MCU as hot runner controller, the parameter in the operation software **TEMPSoft2** is named:

[P045] Sampling time

Data type	Word
Adjustment range interfaces/ multiplier	0.0…[1.0]…6553.5 / 10
Adjustment range BA	[0]…90
Unit	s

The sampling time defines a time period after which a ↗[P002] OPWR – Degree of Operation, which is recalculated from the control algorithm is output at the control output.

[P046] XPC – Cooling Proportional Band

Data type	Word
Adjustment range interfaces/ multiplier	0.0…[9.9]…250.0 / 10
Adjustment range BA	[0]…250.0
Unit	%

See parameter ↗[P042] XPH – Heating Proportional Band.

[P047] TDC – Cooling Derivative Time

Data type	Word
Adjustment range interfaces/ multiplier	0…[255]…65535 / 1
Adjustment range BA	[0]…999
Unit	s

See parameter ↗[P043] TDH – Heating Derivative Time.

[P048] TIC – Cooling Integral Time

Data type	Word
Adjustment range interfaces/ multiplier	0…[500]…65535 / 1
Adjustment range BA	[0]…999
Unit	s

See parameter ↗[P044] TIH – Heating Integral Time.

[P049] CTC – Cooling Sampling Time

Data type	Word
Adjustment range interfaces/ multiplier	0.0…[10.0]…6553.0 / 10
Adjustment range BA	0...[10]…90
Unit	s

See parameter ↗[P045] CTH – Heating Sampling Time.

[P050] XPH2 - Heating Proportional Band 2

Data type	Word
Adjustment range interfaces/ multiplier	0.0…[9.9]…250.0 / 10
Adjustment range BA	[0]…250.0
Unit	%

Parameter of the second parameter set.
Changeover e.g. by activation of an adequate parameterized digital input
See parameter ↗[P042] XPH – Heating Proportional Band.

[P051] TDH2 – Heating Derivative Time 2

Data type	Word
Adjustment range interfaces/ multiplier	0…[255]…999 / 1
Adjustment range BA	[0]…999
Unit	s

See parameter ↗[P050] XPH2 - Heating Proportional Band 2.
See parameter ↗[P043] TDH – Heating Derivative Time.

[P052] TIH2 – Heating Integral Time 2

Data type	Word
Adjustment range interfaces/ multiplier	0…[500]…999 / 1
Adjustment range BA	[0]…999
Unit	s

See parameter ↗[P050] XPH2 - Heating Proportional Band 2.
See parameter ↗[P044] TIH – Heating Integral Time.

[P053] CTH2 - Heating Sampling Time 2

Data type	Word
Adjustment range interfaces/ multiplier	0.0…[1.0]…900.0 / 10
Adjustment range BA	[0]…999
Unit	s

See parameter ↗[P050] XPH2 - Heating Proportional Band 2.
See parameter ↗[P045] CTH – Heating Sampling Time.

[P054] XPC2 – Cooling Proportional Band 2

Data type	Word
Adjustment range interfaces/ multiplier	0.0…[9.9]…250.0 / 10
Adjustment range BA	[0]…250.0
Unit	%

See parameter ↗[P050] XPH2 - Heating Proportional Band 2.
See parameter ↗[P046] XPC – Cooling Proportional Band

[P055] TDC2 – Cooling Derivative Time 2

Data type	Word
Adjustment range interfaces/ multiplier	0…[255]…999 / 1
Adjustment range BA	[0]…999
Unit	s

See parameter ↗[P050] XPH2 - Heating Proportional Band 2.
See parameter ↗[P047] TDC – Cooling Derivative Time

[P056] TIC2 – Cooling Integral Time 2

Data type	Word
Adjustment range interfaces/ multiplier	0…[500]…999 / 1
Adjustment range BA	[0]…999
Unit	s

See parameter ↗[P050] XPH2 - Heating Proportional Band 2.
See parameter ↗[P048] TIC – Cooling Integral Time

[P057] CTC2 – Cooling Sampling Time 2

Data type	Word
Adjustment range interfaces/ multiplier	0.0…[1.0]…900.0 / 10
Adjustment range BA	[0]…999
Unit	s

See parameter ↗[P050] XPH2 - Heating Proportional Band 2.
See parameter ↗[P049] CTC – Cooling Sampling Time

2.5.5 View Function

In this view all zone parameters are concentrated, concerning settings for special functions.

[P002] OPWR – Degree of Operation

Using PCU/MCU as hot runner controller, the parameter in the operation software **TEMPSoft2** is named:

[P002] Output value

Data type	Char
Adjustment range interfaces/ multiplier	-99.9…[0]…100.0 / 1
Adjustment range BA	-99…[0]…99
Unit	%

Actuating variable.
Calculated in the standard operation through controllers. In the manual mode, the specification is implemented manually by the operator.
See parameter ↗[P003] MANU – Manual Mode.

[P003] MANU – Manual Mode

Data type	Bit
Adjustment range interfaces	[0]...1
Adjustment range BA	[off], on
Unit	n.a.

Setting	Description
[0] - Off	Regulation active. Degree of operation is calculated from the control algorithm.
1 - On	Regulation deactivated. Manual specification of the ↗[P002] OPWR – Degree of Operation. In manual mode, a zone, e.g. in case of a defect of the measuring means (e.g. sensor break with thermocouple) can be further operated in emergency operation. In manual mode the alarms are further monitored and the heating current monitoring also continues to function.

[P014] TCAL – Monitoring of Sensor SAL

Data type	Bit
Adjustment range interfaces/ multiplier	[0]…1
Adjustment range BA	[off], on
Unit	n.a.

Setting	Description
[0] - Off	Function is deactivated.
1 - On	Sensor short circuit monitoring deactivated. The functionality depends on ↗[P015] TCAT – Time for Monitoring of Sensors.

Complex, dynamic monitoring function of the measuring element (sensor). The function helps to identify (as well as the static monitoring on sensor break and sensor incorrect polarity) to avoid additional error states in the area of the sensor and damage to the zone e.g. through overheating.

An FAL alarm is output,

- when no identification is running
- at active heating current monitoring (↗[SP02] AMPD – Heating Current Measurement Method <> 0; ↗[P004] CurS – Current Setpoint Value <> 0; ↗[P005] CurT – Current Tolerance <> 0)
- for zones without current measurement (from MCU/PCU-HEX-File version xx4312A), when ↗[SP02] AMPD – Heating Current Measurement Method = 0; ↗[P004] CurS – Current Setpoint Value = 0)
- when no current alarm is pending

Two causes can result in a SAL alarm:

- If the difference between two successive actual values is greater than 30 K, then a SAL alarm is immediately triggered after a pre-determined number of control cycles, since, with this actual value characteristic, it must involve a defect on the sensor line or on the sensor.
- If the temperature actual value does not increase by 4 K in standard operation in case of maximum degree of operation (↗[P023] OUTH – Heating Degree of Operation Damping) within a pre-determined time, then a FAL alarm is triggered.

The response time of the sensor short-circuit monitoring can be

- specified manually (↗[P015] TCAT – Time for Monitoring of Sensors) or
- is derived automatically from the sampling time of the zone.

  - in setpoint value band

    ```
    SAL response time = 30 x sampling time Heating of active parameter set
    ```

  - outside setpoint value band

    ```
    SAL response time = 20 x sampling time Heating of active parameter set
    ```

  The setpoint value band (SVB) is directly deduced from the proportional band of the active parameter set:

  ```
  SWB = XPH x 4
  ```

  or

  ```
  SWB = XPH2 x 4
  ```

[P015] TCAT – Time for Monitoring of Sensors

Data type	Word
Adjustment range interfaces/ multiplier	[0]…999 / 1
Adjustment range BA	[0]…999
Unit	s

Setting	Description
[0]	A SAL alarm is output after a control parameter dependent check time. See parameter ↗[P014] TCAL – Monitoring of Sensor SAL.
> 0	A SAL is output after the set time.

[P016] TC-A – Manual Mode after Sensor Break

Data type	Bit
Adjustment range interfaces	[0]…1
Adjustment range BA	[off]/on
Unit	n.a.

Specifies the characteristic behavior of the zone in the case of a sensor break.

Setting	Description
[0] - Off	Function deactivated.
1 - On	At sensor break it is automatically switch to manual mode. The output value is calculated dependent on the mean output value from the last cycles before sensor break.

Sensor break during heating-up can lead to overheating when automatic transfer of output value, because in this phase the maximal output value is output. A limitation for the degree of operation in manual mode can be set by parameter ↗[P025] OUT% – Maximum Degree of Operation in Manual Mode.

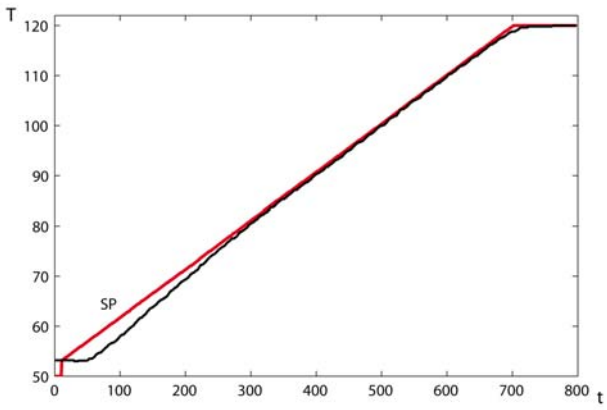
[P017] TRMP – Temperature Ramp

Data type	Integer
Adjustment range interfaces/ multiplier	[0.0]…1999.0 / 10
Adjustment range BA	[0]…1999.0
Unit	°C/min

Setting	Description
[0.0]	In case of setpoint value jump with setpoint value increases and setpoint value reduction.
> 0.0	In case of setpoint value increases, the setpoint value is ramped with the setting value to the final setpoint value, starting from the current actual value. Setpoint value jump at setpoint reduction.
< 0.0	In case of setpoint value increases and setpoint value reduction, the setpoint value is ramped with the setting value to the final setpoint value starting from the current actual value.

Example

Temperature trend at setpoint value jump from 50°C to 120°C with activated temperature ramp with 10°C/minute.



[P018] ARMP – Automatic Ramp

Data type	Bit
Adjustment range interfaces	[0]…1
Adjustment range BA	[off]/on
Unit	n.a.

Setting	Description
[0] - Off	In the case of the zone, the automatic ramp operation is deactivated.
1 - On	In the case of the zone, the automatic ramp operation is activated.

The automatic ramp function is used for uniform heating-up of active zones corresponding to function groups (↗[P058] GPNr – Group Number). By this, mechanical stresses through large temperature differences between zones of different rate of rise can be avoided.
The automatic ramp requires one (at least once) executed identification Heating.

See chapter ↗Automatic ramp.

[P019] K-CO – Amplification Factor for Zone in Leading Mode

Using PCU/MCU as hot runner controller, the parameter in the operation software **TEMPSoft2** is named:

[P019] Leading zone correction

Data type	Char
Adjustment range interfaces/ multiplier	-99…[0]…100 / 1
Adjustment range BA	-99…[0]…100
Unit	n.a.

Enables the adaptation of the leading degree of operation to the factors of the zone in leading manual mode.

```
Corrected leading degree of operation = leading degree of operation + (1 + (0.01 x
K-CO))
```

The leading degree of operation should basically be increased by 10%: K-CO = 10
In the case of a leading degree of operation of 50%, the following corrected degree of operation is calculated:
`Corrected leading degree of operation = 50% + (1 + (0.01 x 10)) = 55%`

See parameter ↗[P020] NrCO – Leading Zone.

[P020] NrCO – Leading Zone

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…128 / 1
Adjustment range BA	[0]…128
Unit	n.a.

Function used to control the zone with the degree of operation of another zone.
Function is used e.g. in case of defect of the measuring element corresponding to the zone (e.g. sensor break). In order to maintain the operation of the zone in spite of that, the zone in the leading zone operation is operated with the degree of operation of a similar zone.

Setting	Description
[0]	Leading zone operation deactivated. Zone employs its own degree of operation calculated through the regulation or specified manually.
> 0	The zone employs the degree of operation of the zone specified in the setting value. For a zone with defective sensor the degree of operation of the fifth zone of the controller should be used as leading zone: NoCO = 5 The degree of operation output is completely synchronous, if ↗[P019] K-CO – Amplification Factor for Zone in Leading Mode is set to 0. If this condition is not fulfilled, an asynchronous output of the degree of operation signal is then implemented. A cascading of the leading zone is not permissible. In case of invalid inputs (when e.g. a zone is entered as a leading zone which itself has a reference to a leading zone), the setting value is set automatically to 0.

[P021] DIAT – Time for Diagnostics

Using PCU/MCU as hot runner controller, the parameter in the operation software **TEMPSoft2** is named:

[P021] MoldCheck max. wait time.

Data type	Byte
Adjustment range interfaces/ multiplier	0.1…[2.0]…25.5 / 1
Adjustment range BA	0.1…[2.0]…25.5
Unit	min

The parameter is only relevant for the MoldCheck function and activated diagnostics by code number 600. It specifies the time, when a temperature rise > 10K for a specific zone must have been detected.

[P025] OUT% – Maximum Degree of Operation in Manual Mode

Data type	Char
Adjustment range interfaces/ multiplier	-100…[100] / 1
Adjustment range BA	-100…[100]
Unit	%

Limitation of the maximum heating degree of operation in manual mode.
Can be set e.g. as a safety function for the function ↗[P016] TC-A – Manual Mode after Sensor Break.

[P058] GPNr – Group Number

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…32 / 1
Adjustment range BA	[0]…32
Unit	n.a.

Assigns the zone to a group with the here provided group number.
Setting value = 0 means that the zone is not assigned to any group.

A detailed description of the group functions see chapter ↗Group Function (Function Groups).

[P059] GPF – Group Release by

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…96
Unit	n.a.

Setting	Description
[0]	No group release The zone does not require any release from another group, i.e. the zone starts immediately.
1...32	Group 1…32 Specifies the group from which the release is given.
33...64	Group 1…32 + Input Group Release Group 1…32 Specifies the group (=setting value - 32) and the digital input, from which a release is given. I.e. release is only enabled, when the allocated digital input is activated to. The allocation of the digital input is done by flexotempMANAGER for controller under <Inputs> | <Groups> | <Input Group Release>.
65...96	Input Group Release Group 1…32 Release for the group (= setting value – 64) is only enabled by the allocated digital input. The allocation of the digital input is done by flexotempMANAGER for controller under <Inputs> | <Groups> | <Input Group Release>.

A detailed description of the group functions see chapter ↗Group Function (Function Groups).

[P060] GPM – Group Mode

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Specifies the condition whereby the release group issues a release or defines the function that is executed for all zones of a group and/or the function which is executed for all zones by the function group.

Setting	Description
[0]	Release, when lower temperature limit reached
1	Release, when ↗[SP04] LVA1 – Release Limit Value 1 reached
2	Release, when ↗[SP05] LVA2 – Release Limit Value 2 reached
3	Release, when ↗[SP06] LVA3 – Release Limit Value 3 reached
4	Release, when ↗[SP07] LVA4 – Release Limit Value 4 reached
5	Transfer of group setpoint value
6...9	<n.a.>
10	Release, when lower temperature limit reached with maintain reduction mode
11	Release, when ↗[SP04] LVA1 – Release Limit Value 1 reached with maintain reduction mode
12	Release, when ↗[SP05] LVA2 – Release Limit Value 2 reached with maintain reduction mode
13	Release, when ↗[SP06] LVA3 – Release Limit Value 3 reached with maintain reduction mode
14	Release, when ↗[SP07] LVA4 – Release Limit Value 4 reached with maintain reduction mode
15...19	<n.a.>
20	Release, when lower temperature limit reached and group release
21	Release, when ↗[SP04] LVA1 – Release Limit Value 1 reached and group release
22	Release, when ↗[SP05] LVA2 – Release Limit Value 2 reached and group release
23	Release, when ↗[SP06] LVA3 – Release Limit Value 3 reached and group release
24	Release, when ↗[SP07] LVA4 – Release Limit Value 4 reached and group release
25...29	<n.a.>
30	Release, when lower temperature limit reached with maintain reduction mode and group release
31	Release, when ↗[SP04] LVA1 – Release Limit Value 1 reached with maintain reduction mode and group release
32	Release, when ↗[SP05] LVA2 – Release Limit Value 2 reached with maintain reduction mode and group release
33	Release, when ↗[SP06] LVA3 – Release Limit Value 3 reached with maintain reduction mode and group release
34	Release, when ↗[SP07] LVA4 – Release Limit Value 4 reached with maintain reduction mode and group release

A detailed description of the group functions see chapter ↗Group Function (Function Groups).

[P097] PTOL – Tolerance of Process

Using PCU/MCU as hot runner controller, the parameter in the operation software **TEMPSoft2** is named:

[P097] Process monitoring tolerance

Parameter only visible, when in flexotempMANAGER under <EXTRAS> – <OPTIONS> – <SWITCH PROJECT VIEWS ON/OFF> – <HOT RUNNER APPLICATION> is selected.

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…100 / 1
Adjustment range BA	[0]…100
Unit	%

A detailed description of the function see chapter ↗Process Monitoring.

[P098] HnD – Heat ’n’ Dry

Parameter only visible, when in flexotempMANAGER under <EXTRAS> – <OPTIONS> – <SWITCH PROJECT VIEWS ON/OFF> – <HOT RUNNER APPLICATION> is selected.

Data type	Bit
Adjustment range interfaces/ multiplier	[0]…1
Adjustment range BA	[off], on
Unit	n.a.

Setting	Description
[0] - Off	For the zone the function Heat ’n’ Dry is deactivated.
1 - On	For the zone the function Heat ’n’ Dry is activated.

A detailed description of the function see chapter ↗Heat'n'Dry.

[P099] POP – Operating point of process monitoring

Parameter only visible, when in flexotempMANAGER under <EXTRAS> – <OPTIONS> – <SWITCH PROJECT VIEWS ON/OFF> – <HOT RUNNER APPLICATION> is selected.

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	-100…[0]…100 / 1
Adjustment range BA	-99…[0]…100
Unit	%

A detailed description of the function see chapter ↗Process Monitoring.

[P102] FCON – Forced Cooling ON (Impulse Duration)

Data type	Word
Adjustment range interfaces/ multiplier	[0]…999 / 1
Unit	s

Is the parameter not equal 0 a forced cooling is executed. There is no limitation of output value at forced cooling. See parameter ↗[P103] FCCD – Forced Cooling Cycle Duration.

From HEX file version xx4310

[P103] FCCD – Forced Cooling Cycle Duration

Data type	Word
Adjustment range interfaces/ multiplier	[0]…99.9 / 10
Unit	h

Is the parameter not equal 0 a forced cooling is executed. There is no limitation of output value at forced cooling. See parameter ↗[P102] FCON – Forced Cooling ON (Impulse Duration).

From HEX file version xx4310

[P104] Cur% - Scaling of Heating Current

Data type	Byte
Adjustment range interfaces/ multiplier	0...[100]…255 / 1
Unit	%

All measured currents (e.g. by IO-component DIO16CI, BACI, CANCT, etc.) are scaled in the master component (MCU, PCU).

```
Scaled current = Current IO-Component * [Cur%] / 100.0
```

On the status page of the master component the currents are scaled, on the other hand the currents on the status page of the single IO-components are not scaled.

From HEX file version xx2215A
flexotempMANAGER from software version 1.03.05

2.5.6 View Alarm

In this view all zone parameters are concentrated, concerning settings for alarms.

A detailed description of the alarm management see chapter ↗Alarm management.

[P061] LI1 – Limit Value 1

Data type	Integer
Adjustment range interfaces/ multiplier	-999…[5]…1999 / 10
Adjustment range BA	-999…[5]…1999
Unit	Unit of the measurement input

The zone can be monitored by six temperature limit values.
In the limit value definitions belonging to the six limit values the function of the limit values is specified.

[P062] LI1D – Limit Value Definition 1

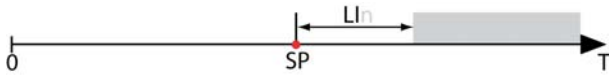
Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Specification, how the associated set ↗[P061] LI1 – Limit Value 1 has to be interpreted.

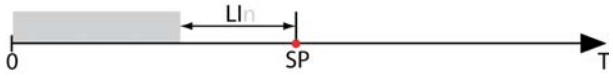
Setting			Description	
hexadecimal	decimal	Bit	**Relative**	**Absolute**
0x01	0/1	0	☐ Relative limit value *) = 0	☑ Absolute limit value = 1
0x02	2	1	Alarm calculation after exceeding of limit value (relative)	Alarm calculation after exceeding of limit value (absolute)
0x04	4	2	Relative limit value band around current control sepoint (only for relative alarms)	Error on actual value > limit value (absolute)
0x08	8	3	Limit value also for setpoint value = 0°C/0°F (relative)	Limit value also for setpoint value = 0°C/0°F (absolute)
0x10	16	4	For limit value alarm, switch OFF actuator	For limit value alarm, switch OFF actuator
0x20	32	5	Limit value alarm is storing	Limit value alarm is storing
0x40	64	6	Limit value around main setpoint value (relative)	<n.a.>
0x80	128	7	Alarm calculation after exceeding of limit value (relative), when limit is once exceeded after setpoint value change	Alarm calculation after exceeding of limit value (absolute), when limit is once exceeded after setpoint value change

*) Dependent on Bit0 the descriptions for Bit1 to Bit7 are adapted.

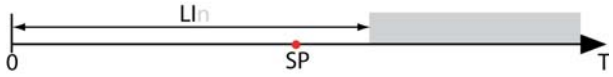
Notes on Temperature Limit Value Alarms



Limit value relative to setpoint value (Bit 0 = 0).
Alarm range above setpoint value, when the limit value LIn is greater than 0.



Limit value relative to setpoint value (Bit 0 = 0).
Alarm range below setpoint value, when the limit value LIn is less than 0.



Absolute limit value (Bit 0 = 1)
Alarm range above limit value, when alarm at actual value > limit value (Bit 2 = 1).

Absolute limit value (Bit 0 = 1)
Alarm range below limit value, when alarm at actual value < limit value (Bit 2 = 0).

The setting can be combined optionally with each other. The setting value for the parameter is decimal presented and is equivalent the sum of all setting values.

Setting value 33_{dec}:
↗[P061] LI1 – Limit Value 1 is about an absolute limit value ($0x01_{hex}$ and/or 1_{dec}) and the limit value is stored ($0x20_{hex}$ and/or 32_{dec}).

[P063] LI2 – Limit Value 2

Data type	Integer
Adjustment range interfaces/ multiplier	-999…[-5]…1999 / 10
Adjustment range BA	-999…[-5]…1999
Unit	Unit of the measurement input

Settings see Parameter ↗[P061] LI1 – Limit Value 1.

[P064] LI2D – Limit Value Definition 2

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Settings see Parameter ↗[P062] LI1D – Limit Value Definition 1.

[P065] LI3 – Limit Value 3

Data type	Integer
Adjustment range interfaces/ multiplier	-999…[0]…1999 / 10
Adjustment range BA	-999…[0]…1999
Unit	Unit of the measurement input

Settings see Parameter ↗[P061] LI1 – Limit Value 1.

[P066] LI3D – Limit Value Definition 3

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Settings see Parameter ↗[P062] LI1D – Limit Value Definition 1.

[P067] LI4 – Limit Value 4

Data type	Integer
Adjustment range interfaces/ multiplier	-999…[0]…1999 / 10
Adjustment range BA	-999…[0]…1999
Unit	Unit of the measurement input

Settings see Parameter ↗[P061] LI1 – Limit Value 1.

[P068] LI4D – Limit Value Definition 4

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Settings see Parameter ↗[P062] LI1D – Limit Value Definition 1.

[P069] LI5 – Limit Value 5

Data type	Integer
Adjustment range interfaces/ multiplier	-999…[0]…1999 / 10
Adjustment range BA	-999…[0]…1999
Unit	Unit of the measurement input

Settings see Parameter ↗[P061] LI1 – Limit Value 1.

[P070] LI5D – Limit Value Definition 5

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Settings see Parameter ↗[P062] LI1D – Limit Value Definition 1.

[P071] LI6 – Limit Value 6

Data type	Integer
Adjustment range interfaces/ multiplier	-999…[0]…1999 / 10
Adjustment range BA	-999…[0]…1999
Unit	Unit of the measurement input

Settings see Parameter ↗[P061] LI1 – Limit Value 1.

[P072] LI6D – Limit Value Definition 6

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Settings see Parameter ↗[P062] LI1D – Limit Value Definition 1.

[P073] A1D1 – Definition Byte 1 – Alarm 1

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

A detailed description of the alarm management see chapter ↗Alarm management.

Setting			
hexadecimal	decimal	Bit	**Description**
0x01	1	0	Thyristor alarm (I-)
0x02	2	1	Current tolerance alarm (CTA)
0x04	4	2	LI1 (storing by LI1D)
0x08	8	3	LI2 (storing by LI2D)
0x10	16	4	LI3 (storing by LI3D)
0x20	32	5	LI4 (storing by LI4D)
0x40	64	6	LI5 (storing by LI5D)

0x80	128	7	LI6 (storing by LI6D)

The setting can be combined optionally with each other. The setting value for the parameter is decimal presented and is equivalent the sum of all setting values.

[P074] A1D2 – Definition Byte 2 – Alarm 1

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

A detailed description of the alarm management see chapter ↗Alarm management.

Setting			
hexadecimal	decimal	Bit	**Description**
0x01	1	0	Sensor alarm (SAL) (always storing)
0x02	2	1	Sensor break (tCb)/sensor incorrect polarity (tCp)/ sensor 1 (not storing)
0x04	4	2	Sensor break (tCb)/sensor incorrect polarity (tCp)/ sensor 2 (not storing)
0x08	8	3	Heat sink temperature alarm
0x10	16	4	Heat sink temperature limit value exceeded
0x20	32	5	Project setup or zone not started
0x40	64	6	<n.a.>
0x80	128	7	<n.a.>

The setting can be combined optionally with each other. The setting value for the parameter is decimal presented and is equivalent the sum of all setting values.

[P075] A2D1 – Definition Byte 1 – Alarm 2

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Settings see Parameter ↗[P073] A1D1 – Definition Byte 1 – Alarm 1.

[P076] A2D2 – Definition Byte 2 – Alarm 2

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Settings see Parameter ↗[P074] A1D2 – Definition Byte 2 – Alarm 1.

[P077] A3D1 – Definition Byte 1 – Alarm 3

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Settings see Parameter ↗[P073] A1D1 – Definition Byte 1 – Alarm 1.

[P078] A3D2 – Definition Byte 2 – Alarm 3

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Settings see Parameter ↗[P074] A1D2 – Definition Byte 2 – Alarm 1.

[P079] A4D1 – Definition Byte 1 – Alarm 4

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Settings see Parameter ↗[P073] A1D1 – Definition Byte 1 – Alarm 1.

[P080] A4D2 – Definition Byte 2 – Alarm 4

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Settings see Parameter ↗[P074] A1D2 – Definition Byte 2 – Alarm 1.

[P081] GPAL – Alarm Group

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…32 / 1
Adjustment range BA	[0]…32
Unit	n.a.

2.5.7 View Inputs

In this view all zone parameters are concentrated, concerning settings for zone specific and group specific functions, linked to digital inputs.

Two inputs can be allocated to each zone. Per zone the effect of the inputs on the zone can be configured by parameter ↗[SP082] IN1C – Function Zone Input 1 for the first and by parameter ↗[P083] IN2C – Function Zone Input 2 for the second input

Is the zone allocated to an input group (↗[P084] GPIN – Input Group), this configuration is also valid for the two inputs of the group.

[SP082] IN1C – Function Zone Input 1

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Specification of the function, that the controller executes, when the digital input 1 is activated.
The function is also valid for the digital input of the allocated group.

Setting	Description
[0]	Without function
1	Absolute reduction to 2. setpoint value
2	Absolute reduction to 3. setpoint value
3	Absolute reduction to 4. setpoint value
4	Relative reduction by 2. setpoint value
5	Relative reduction by 3. setpoint value
6	Relative reduction by 4. setpoint value
7	Relative increasing by 2. setpoint value
8	Relative increasing by 3. setpoint value
9	Relative increasing by 4. setpoint value
10	Percentage reduction/increasing by 2. setpoint value
11	Percentage reduction/increasing by 3. setpoint value
12	Percentage reduction/increasing by 4. setpoint value
13	Absolute reduction to 2. setpoint value, if 2SW<SW
14	Absolute reduction to 3. setpoint value, if 3SW<SW
15	Absolute reduction to 4. setpoint value, if 4SW<SW
16	Disconnect actuator
17	Passivate all zones
18	Activate input block
19	Reset-acknowledge zone alarms
20	Reset-acknowledge all alarms
21	Output degree of operation of 100% for 10 sec (edge triggered)
22	Bypass group release
23	Switch to 2. control parameter set
24	Set I channel in controller to 0

25	Start timer 1
26	Start timer 2
27	Start timer 3
28	Start timer 4
29	Switch to 2. control parameter set / actual value of control = measured value 2
30	Deactivate Smart Power Limitation (SPL)
31	Activate process monitoring
32	Start learning phase of process monitoring
33	Degree of operation absolute reduction to 2. setpoint value
34	Degree of operation absolute reduction to 3. setpoint value
35	Degree of operation absolute reduction to 4. setpoint value
36	Degree of operation relative reduction by 2. setpoint value
37	Degree of operation relative reduction by 3. setpoint value
38	Degree of operation relative reduction by 4. setpoint value
39	Degree of operation relative increasing by 2. setpoint value
40	Degree of operation relative increasing by 3. setpoint value
41	Degree of operation relative increasing by 4. setpoint value
42	Cancel Heating limitation of degree of operation for zones in control mode
43	Absolute reduction by 2. setpoint value without cooling (energy saving option)
44	Relative reduction by 2. setpoint value without cooling (energy saving option)
45-128	<n.a.>
129	Absolute reduction to 2. setpoint value (inverted)
130	Absolute reduction to 3. setpoint value (inverted)
131	Absolute reduction to 4. setpoint value (inverted)
132	Relative reduction by 2. setpoint value (inverted)
133	Relative reduction by 3. setpoint value (inverted)
134	Relative reduction by 4. setpoint value (inverted)
135	Relative increasing by 2. setpoint value (inverted)
136	Relative increasing by 3. setpoint value (inverted)
137	Relative increasing by 4. setpoint value (inverted)
138	Percentage reduction/increasing by 2. setpoint value (inverted)
139	Percentage reduction/increasing by 3. setpoint value (inverted)
140	Percentage reduction/increasing by 4. setpoint value (inverted)
141	Absolute reduction to 2. setpoint value, if 2SW<SW (inverted)
142	Absolute reduction to 3. setpoint value, if 3SW<SW (inverted)
143	Absolute reduction to 4. setpoint value, if 4SW<SW (inverted)
144	Disconnect actuator (inverted)
145	Passivate zone (inverted)
146	Activate input block (inverted)
147	Reset-acknowledge zone alarms (inverted)
148	Reset-acknowledge all alarms (inverted)
149	Output degree of operation of 100% for 10 sec's (inverted)
150	Bypass group release (inverted)
151	Switch to 2. control parameter set (inverted)

152	Set I channel in controller to 0 (inverted)
153	Start timer 1 (inverted)
154	Start timer 2 (inverted)
155	Start timer 3 (inverted)
156	Start timer 4 (inverted)
157	Switch to 2. control parameter set / actual value of control = measured value 2 (inverted)
158	Deactivate Smart Power Limitation (SPL) (inverted)
159	Activate process monitoring (inverted)
160	Start learning phase of process monitoring (inverted)
161	Degree of operation absolute reduction to 2. setpoint value (inverted)
162	Degree of operation absolute reduction to 3. setpoint value (inverted)
163	Degree of operation absolute reduction to 4. setpoint value (inverted)
164	Degree of operation relative reduction by 2. setpoint value (inverted)
165	Degree of operation relative reduction by 3. setpoint value (inverted)
166	Degree of operation relative reduction by 4. setpoint value (inverted)
167	Degree of operation relative increasing by 2. setpoint value (inverted)
168	Degree of operation relative increasing by 3. setpoint value (inverted)
169	Degree of operation relative increasing by 4. setpoint value (inverted)
170	Cancel Heating limitation of degree of operation for zones in control mode (inverted)
171	Absolute reduction by 2. setpoint value without cooling (energy saving option) (inverted)
172	Relative reduction by 2. setpoint value without cooling (energy saving option) (inverted)
173-255	<n.a.>

See parameter ↗[SP09] IN1S – Function System Input 1,.

[P083] IN2C – Function Zone Input 2

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

Specification of the function, that the controller executes, when the digital input 2 is activated.
The function is also valid for the digital input of the allocated group.

Settings see Parameter ↗[SP082] IN1C – Function Zone Input 1.

[P084] GPIN – Input Group

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…32 / 1
Adjustment range BA	[0]…32
Unit	n.a.

Zones are allocated to a input group by this parameter. Is the group activated by the digital input 1 and/or digital input 2, the function, configured by parameter ↗[SP082] IN1C – Function Zone Input 1 and/or parameter ↗[P083] IN2C – Function Zone Input 2, is executed for all zones, which are allocated to the group.

2.5.8 View Timer

In this view all zone parameters are concentrated, concerning settings for timer. The controller has four timers overall, with which complex function chains can be realized.

A detailed description of the timer functions see chapter ↗Timer.

[P085] t1 – Timer 1

Data type	Word
Adjustment range interfaces/ multiplier	[0]…9999 / 1
Adjustment range BA	[0]…9999
Unit	s

With this parameter the time of the timer is specified. The function of the timers as well as their characteristics is defined by the two configuration parameters ↗[P086] t1d1 – Timer 1 Definition 1 and ↗[P087] t1d2 – Timer 1 Definition 2.

[P086] t1d1 – Timer 1 Definition 1

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…25 / 1
Adjustment range BA	[0]…25
Unit	n.a.

With this configuration parameter is specified, how the timer is started and which actions are executed after expiration of the timer.

Setting		Description
Mnemonic		
0	OFF	Without function
1	A .	Auto start after reset
2	A .1	Auto start after reset; Starts timer 1, if elapsed
3	A. 2	Auto start after reset; Starts timer 2, if elapsed
4	A .3	Auto start after reset; Starts timer 3, if elapsed
5	A.4	Auto start after reset; Starts timer 4, if elapsed
6	AL.1	Auto start after reset + band; Starts timer 1, if elapsed
7	AL.2	Auto start after reset + band; Starts timer 2, if elapsed
8	AL.3	Auto start after reset + band; Starts timer 3, if elapsed
9	AL.4	Auto start after reset + band; Starts timer 4, if elapsed
10	AL.	Auto start after reset + band
11	.1	No auto start; Starts timer 1, if elapsed
12	.2	No auto start; Starts timer 2, if elapsed
13	.3	No auto start; Starts timer 3, if elapsed
14	.4	No auto start; Starts timer 4, if elapsed
15	IN.	Starts by input

16	AA.	Auto start with conditions of start-up mode
17	AA.1	Auto start with conditions of start-up mode; Starts timer 1, if elapsed
18	AA.2	Auto start with conditions of start-up mode; Starts timer 2, if elapsed
19	AA.3	Auto start with conditions of start-up mode; Starts timer 3, if elapsed
20	AA.4	Auto start with conditions of start-up mode; Starts timer 4, if elapsed
21	L.1	No auto start after reset + band; Starts timer 1, if elapsed
22	L.2	No auto start after reset + band; Starts timer 2, if elapsed
23	L.3	No auto start after reset + band; Starts timer 3, if elapsed
24	L.4	No auto start after reset + band; Starts timer 4, if elapsed
25	L.	No auto start after reset + ban d

Setting	Description
Auto start after reset	The timer starts automatically after a reset of the control system.
Auto start after reset + band	The timer starts automatically, when the actual value reaches the setpoint value band after a reset.
No auto start	The timer starts not automatically after a reset of the control system.
Starts by input	The timer after activation of a digital input. The configuration is done by the specification of the function of the digital input.
Auto start with conditions of start-up mode	Application specific function (hot runner control)

[P087] t1d2 – Timer 1 Definition 2

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…18 / 1
Adjustment range BA	[0]…18
Unit	n.a.

With this configuration parameter is specified, which function is executed, when the timer is active.

Setting		
Mnemonic		**Description**
0	OFF	Without function
1	P.0	Passivate control system
2	P.I	Activate control system
3	S2.A	Setpoint Value 2 absolute
4	S3.A	Setpoint Value 3 absolute
5	S4.A	Setpoint value 4 absolute
6	S2.+	Increase set point value 2 relative
7	S3.+	Increase set point value 3 relative
8	S4.+	Increase set point value 4 relative
9	S2.-	Reduce set point value 2 relative
10	S3.-	Reduce set point value 3 relative
11	S4.-	Reduce set point value 4 relative

12	S2.p	Increase set point value 2 relative percentage
13	S3.p	Increase set point value 3 relative percentage
14	S4.p	Increase set point value 4 relative percentage
15		Disconnect actuator
16		Switch to 2. control parameter set
17		Output degree of operation of 100% for 10 sec
18		Activate input block
19	H.0	Switch off Heating output (from software version xx1212A)
20	H.I	Switch on Heating output (from software version xx1212A)
21	C.0	Switch off Cooling output (from software version xx1212A)
22	C.I	Switch on Cooling output (from software version xx1212A)

[P088] t2 – Timer 2

Using PCU/MCU as hot runner controller, the parameter in the operation software **TEMPSoft2** is named:

[P088] Boost time

Data type	Word
Adjustment range interfaces/ multiplier	[0]…9999 / 1
Adjustment range BA	[0]…9999
Unit	s

Settings see Parameter ↗[P085] t1 – Timer 1.

[P089] t2d1 – Timer 2 Definition 1

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…25 / 1
Adjustment range BA	[0]…25
Unit	n.a.

Settings see Parameter ↗[P086] t1d1 – Timer 1 Definition 1.

[P090] t2d2 – Timer 2 Definition 2

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…18 / 1
Adjustment range BA	[0]…18
Unit	n.a.

Settings see Parameter ↗[P087] t1d2 – Timer 1 Definition 2.

[P091] t3 – Timer 3

Using PCU/MCU as hot runner controller, the parameter in the operation software **TEMPSoft2** is named:

[P091] Start-up time

Data type	Word
Adjustment range interfaces/ multiplier	[0]…9999 / 1
Adjustment range BA	[0]…9999
Unit	s

Settings see Parameter ↗[P085] t1 – Timer 1.

[P092] t3d1 – Timer 3 Definition 1

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…25 / 1
Adjustment range BA	[0]…25
Unit	n.a.

Settings see Parameter ↗[P086] t1d1 – Timer 1 Definition 1.

[P093] t3d2 – Timer 3 Definition 2

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…18 / 1
Adjustment range BA	[0]…18
Unit	n.a.

Settings see Parameter ↗[P087] t1d2 – Timer 1 Definition 2.

[P094] t4 – Timer 4

Using PCU/MCU as hot runner controller, the parameter in the operation software **TEMPSoft2** is named:

[P094] Boost time at start-up mode

Data type	Word
Adjustment range interfaces/ multiplier	[0]…9999 / 1
Adjustment range BA	[0]…9999
Unit	s

Settings see Parameter ↗[P085] t1 – Timer 1.

[P095] t4d1 – Timer 4 Definition 1

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…25 / 1
Adjustment range BA	[0]…25
Unit	n.a.

Settings see Parameter ↗[P086] t1d1 – Timer 1 Definition 1.

[P096] t4d2 – Timer 4 Definition 2

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…18 / 1
Adjustment range BA	[0]…18
Unit	n.a.

Settings see Parameter ↗[P087] t1d2 – Timer 1 Definition 2.

2.5.9 Home Automation View

The application Home Automation affects temperature control in rooms with infrared heating elements. Room zones (zones which are responsible for the temperature regulation of the room) and panel zones (zones which are responsible for the temperature control of the infrared heating element) are distinguished. An analog setpoint selection can be made by potentiometer.

Project setup and parameterization of application Home Automation is described in a separate document.

The most important parameters for the setting of the application are summarized in the view of Home Automation. The parameters of the default parameter list is identical for all flexotemp components. The parameters specifically for Home Automation products are described individually.

List of Standard Parameter of Controller	Application
See ↗[P001] SP – Setpoint Value	Base setpoint value of room temperature wanted
See ↗[P006] ZONE – Zone	ON at used zones/ Off at not used zones
See ↗[P032] IDEH – Heating Identification	OFF at room zones
See ↗[P042] XPH – Heating Proportional Band	See separate documentation
See ↗[P043] TDH – Heating Derivative Time	
See ↗[P044] TIH – Heating Integral Time	
See ↗[P045] CTH – Heating Sampling Time	
See ↗[P038] ALGO – Algorithm	See separate documentation
See ↗[P039] KNr – Cascade - Zone Number of Main Controller	
See ↗[P040] KSP- – Cascade - Setpoint Value of Auxiliary Controller for Degree of Operation =0/-100%	
See ↗[P041] KSP+ – Cascade - Setpoint Value of Auxiliary Controller for Degree of Operation = 100%	

List of Standard Parameter of Measurement Inputs ↗PT1000_12 - Thermocouple Interface	Application
See ↗[M2329] RELH - Heating Relay Output	OFF for control of solid state relays / ON in control of the contactors / relays
See ↗[M2330] CDRH - Cycle duration Heating Relay Output	Period of slow switching, in case of ↗[M2329] RELH - Heating Relay Output = ON

Please note that the following parameters are valid only for the PCU**HA component.

[P028] HASC - Scheduler

Data type	Bit
Adjustment range interfaces	[0]…1
Adjustment range BA	[off], on
Unit	n.a.

Setting	Description
[0] - Off	Deactivated
1 - On	Activated

This parameter activates / deactivates the scheduler. With the scheduler per zone per weekday, 4 different times can be specified, where a setpoint value set, is valid.

The settings for the scheduler (zone, weekday, time, setpoint value) are described in a separate document.

[P029] HATI - Validation period for setpoint selection via measured value 2

Data type	Word
Adjustment range interfaces/ multiplier	[0.0]…99.9 / 10
Adjustment range BA	[0.0]…99.9
Unit	h

Setting	Description
[0.0]	By potentiometer recorded value is added to ↗[P001] SP – Setpoint Value.
> 0.0	By potentiometer recorded value is added to ↗[P001] SP – Setpoint Value for the time here set.

Is the setpoint value recorded by potentiometer (allocation to room zones by measured values | measured value 2), here is defined, how long the analog setpoint value presetting is valid.

[P030] HALO - Lower setpoint value limit for setpoint selection via measured value 2

Data type	Integer
Adjustment range interfaces/ multiplier	-9.9…[-5.0]…99.9 / 10
Adjustment range BA	-9.9…[-5.0]…99.9
Unit	°C

Is the setpoint value defined by potentiometer, here the lower setpoint value limit is defined for this value.

[P031] HAHI - Upper setpoint value limit for setpoint selection via measured value 2

Data type	Integer
Adjustment range interfaces/ multiplier	-9.9…[5.0]…99.9 / 10
Adjustment range BA	-9.9…[5.0]…99.9
Unit	°C

Is the setpoint value defined by potentiometer, here the higher setpoint value limit is defined for this value.

Depending on the potentiometer setting range, the values are to spread.

3 Function Description

3.1 Heating Current Measuring and Heating Current Monitoring

The objective of heating current measuring and monitoring is:

- to determine heating currents quantitatively by measuring
- to compare measured values with setpoint values for heating current (tolerance)
- to execute plausibility checks e.g. detection of defective actuators

For the inductive measurement method PSG current transformer are employed (standardized output signal 42 mV_{eff} per Ampere; see data sheets).

Only feed lines of heating and cooling outputs, which are configured in the flexotemp® component must be lead through the current transformer, connected to the flexotemp® component.

flexotemp® components for heating current measuring and monitoring are:

- flexotemp® CANCT- Current Transducer Interface
- flexotemp® BACI - Bus Actuator Interface, Current Input
- flexotemp® DIO16CI- Digital In-/Output Interface, Current Input

The current measuring process depends on the current measuring cycle specified for the component.

Without ↗[P004] CurS – Current Setpoint Value (page 36), and/or without current transfer (first), the current measuring is not activated.

3.2 Group Function (Function Groups)

The purpose of allocation zones to function groups is:

- consideration of zone when executing a certain action
- consideration of zone when certain functions are executed

Every zone can be assigned to a function group. 32 function groups are available overall. The allocation of the zone to a function group is done in the flexotempMANAGER for the controller directly on the page group administration or in the parameter ↗[P058] GPNr – Group Number (page 59) on page Zone parameter | Function.

3.2.1 Linked Heating-Up

In practice, the function groups facilitate, for example, the sequential heating-up of certain plant equipment. The plant equipment is only brought to setpoint value, when all zones of the other plant equipment have reached a defined temperature value.

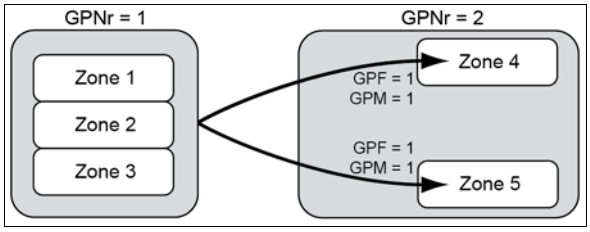
Via ↗[P059] GPF – Group Release by (page 59) is specified, from which function group the release is enabled, via ↗[P060] GPM – Group Mode (page 60) the condition foe enabling is specified for the release group. Only when the enabling conditions for all zones of the previous group are fulfilled, the enabling of the succeeding group occurs, so that it can then further enable succeeding groups, etc.

The specification for the temperature limit values, where the enabling occurs is set in the system parameter ↗[SP04] LVA1 – Release Limit Value 1 (page 10) to ↗[SP07] LVA4 – Release Limit Value 4 (page 10). They are valid for all zones.

Function groups allow building simple or complex function chains.

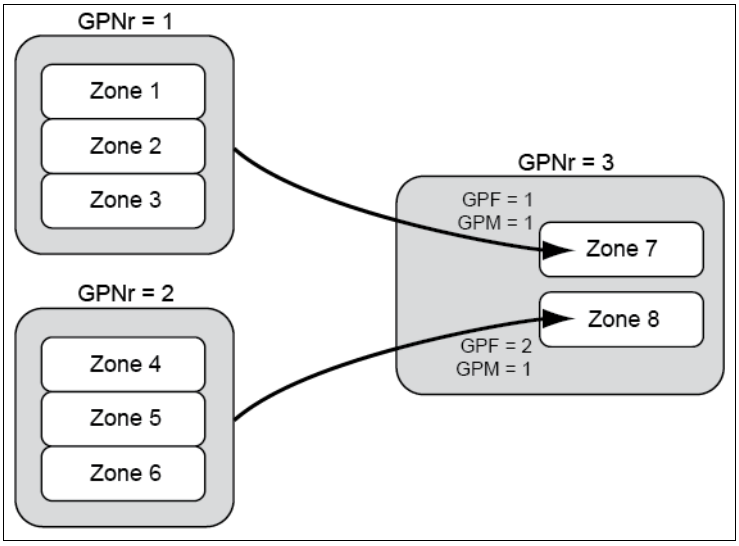
Example 1: Simple linking of two function groups

The heating-up of the zones of group 2 is only started, when the actual values of all zones of group 1 have exceeded the release limit value ↗[SP04] LVA1 – Release Limit Value 1 (page 10) (GPM = 1).



Example 2: Configuration with three function groups

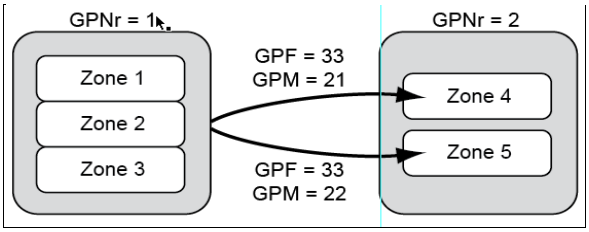
Heating-up of the zones of group 3 is only started, when the actual values of all zones of group 1 have exceeded the release limit value 1 (GPM = 1) and all zones of group 2 have exceeded the release limit value ↗[SP04] LVA1 – Release Limit Value 1 (page 10) (GPM = 1).



The sequence of function groups is executed after each reset of the control system.

Example 3: Simple linking of two function groups with release

The heating-up of the zones of group 2 is only started, when the actual values of all zones of group 1 have exceeded the release limit value ↗[SP04] LVA1 – Release Limit Value 1 (page 10) (GPM = 21, see ↗[P060] GPM – Group Mode (page 60)) and the release of group 1 and digital input (GPF = 33; see ↗[P059] GPF – Group Release by (page 59)) for group 2 is done.



Settings for Linked Heating-Up

Allocate zones to function groups	↗[P058] GPNr – Group Number (page 59)
Specifies the group from which a release is given.	↗[P059] GPF – Group Release by (page 59)
Specifies the conditions for the release	↗[P060] GPM – Group Mode (page 60)
Specify release limit values	↗[SP04] LVA1 – Release Limit Value 1 (page 10) to ↗[SP07] LVA4 – Release Limit Value 4 (page 10)

3.2.2 Further Functions

For the following functions zones must be allocated to function groups:

- Chapter ↗Automatic ramp (page 86)
- For adjustment of a setpoint value for a zone of the function group Transfer of setpoint value for all zones of the function group (↗[P060] GPM – Group Mode (page 60) = 5)

3.3 Automatic ramp

The uniform heating-up of zones of one function group prevents mechanical tensions occurring from large temperature differences between zones resulting from different rates of rise.

All active zones in a function group (↗[P058] GPNr – Group Number (page 59)), where the automatic ramp is activated, are automatically heated up at the rate of rise of the slowest zone, when at setpoint value change the actual value is in the set band around the setpoint value (↗[SP20] ASP – Minimum Setpoint Value Change for Automatic Ramp (page 18)). The slowest zone with the lowest rate of rise is called the reference zone.

The maximal temperature difference of each zone based on the reference zone during heating-up is configurable (↗[SP08] AGAP – Tolerance Band for Automatic Ramp (page 11)). In the event a zone exceeds this limit the output value will be corrected.

A zone is taken off the link of the automatic ramp, if

- a sensor error (e.g. FAL) occurs in the zone
- the zone is in manual mode
- the manual temperature ramp is active
- the zone is passive

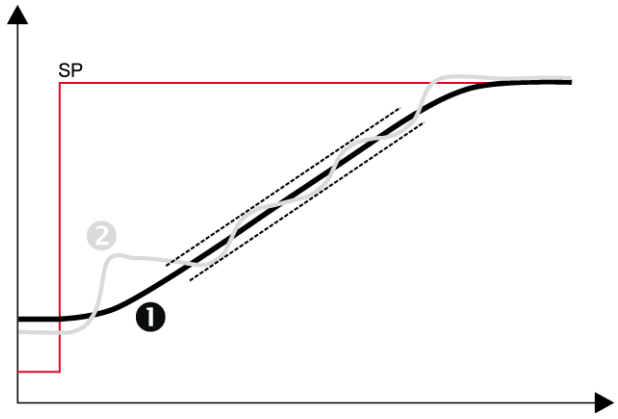
The automatic ramp function is triggered 5 K before reaching the setpoint values; the zones heat up to the final setpoint value without any output value intervention.

Setting	
Allocate zones to function groups	↗[P058] GPNr – Group Number (page 59)
Specifies the minimum setpoint value increase to start the automatic ramp function.	↗[SP20] ASP – Minimum Setpoint Value Change for Automatic Ramp (page 18)
Specifies the maximum difference between the actual values and reference zone.	↗[SP08] AGAP – Tolerance Band for Automatic Ramp (page 11)

Example

Temperature trend of two zones with different rate of rise with activated automatic ramp.

After Heating identification of zone 2, both zones are heated-up together to the final setpoint value.



3.4 Alarm management

Each zone monitors

- the heating current (tolerance and thyristor error) (optional, when heating current monitoring available)
- maximal 6 temperature limit values
- the measuring circuit (sensor break, -polarity)

The alarm status (channel flag register) of each zone can be queried via interface.

So-called alarm definition bytes create a filter for the calculation of alarm flags.
Overall there are

- four system flags
- 128 group flags (32 groups à 4 flags)
- maximal 512 zone flags (128 zones à 4 flags) or <number> zones à 4 flags

available.

- A system flag is set when a configured alarm for at least one zone of the control system is active.
- A group flag is set when a configured alarm for at least one zone allocated to an alarm group is active.
- A zone flag is set when a configured alarm for the corresponding zone is active.

These alarm flags can be used for output of alarm status on digital outputs. The allocation is done in flexotempMANAGER in the I/O module directly on the control output (type Digital output | Definition alarm).

Settings for Zone Specific Alarm

Specifies the alarm status to be output on the four alarm flags.	↗[P073] A1D1 – Definition Byte 1 – Alarm 1 (page 67) to ↗[P080] A4D2 – Definition Byte 2 – Alarm 4 (page 69)
Specifies the output to relay the status of the alarm flag.	Define in flexotempMANAGER on the I/O component a channel as <Digital output> | <Alarm X> | <Group Y>.

Additional settings when a temperature alarm should be output.	Specify alarm limits: ↗[P061] LI1 – Limit Value 1 (page 64) to ↗[P071] LI6 – Limit Value 6 (page 67) Specifies the functioning method of alarm limits: ↗[P062] LI1D – Limit Value Definition 1 (page 64) to ↗[P072] LI6D – Limit Value Definition 6 (page 67)

Settings for Output of Group Specific Alarm

Group specific alarms differ from zone specific alarms in the way that the zones are additionally allocated to alarm groups. A group specific alarm flag is set when the alarm flag of one of the zones is set.

Allocate zone to an alarm group	↗[P081] GPAL – Alarm Group (page 70)
Specifies the alarm status of the zone to be output on one of the four zone specific alarm flags.	↗[P073] A1D1 – Definition Byte 1 – Alarm 1 (page 67) to ↗[P080] A4D2 – Definition Byte 2 – Alarm 4 (page 69)
Specifies the output to relay the status of the alarm flag.	Define in flexotempMANAGER on the I/O component a channel as <Digital output> | <Alarm X> | <Channel Y>.
Additional settings when a temperature alarm should be output.	Specify alarm limits: ↗[P061] LI1 – Limit Value 1 (page 64) to ↗[P071] LI6 – Limit Value 6 (page 67) Specifies the functioning method of alarm limits: ↗[P062] LI1D – Limit Value Definition 1 (page 64) to ↗[P072] LI6D – Limit Value Definition 6 (page 67)

Settings for Output of System Alarms

A system alarm flag is set when the alarm flag of one of the zones is set.

Specify the alarm status to be output on one of the four system alarm flags.	↗[SP11] S1D1 – Definition Byte 1 – System Alarm 1 (page 15) to ↗[SP18] S4D2 – Definition Byte 2 – System Alarm 4 (page 17)
Specifies the output to relay the status of the alarm flag.	Define in flexotempMANAGER on the I/O component a channel as <Digital output> | <Alarm X> | <Channel Y>.
Additional settings when a temperature alarm should be output.	Specify alarm limits: ↗[P061] LI1 – Limit Value 1 (page 64) to ↗[P071] LI6 – Limit Value 6 (page 67) Specifies the functioning method of alarm limits: ↗[P062] LI1D – Limit Value Definition 1 (page 64) to ↗[P072] LI6D – Limit Value Definition 6 (page 67)

Using PCU/MCU as hot runner controller, the parameters in the operation software **TEMPSoft2**
↗[SP11] S1D1 – Definition Byte 1 – System Alarm 1 (page 15)
↗[SP12] S1D2 – Definition Byte 2 – System Alarm 1 (page 15)
are combined and set by **Output1**.

↗[SP13] S2D1 – Definition Byte 1 – System Alarm 2 (page 16)
↗[SP14] S2D2 – Definition Byte 2 – System Alarm 2 (page 16)
are combined and set by **Output2**.

↗[SP15] S3D1 – Definition Byte 1 – System Alarm 3 (page 16)
↗[SP16] S3D2 – Definition Byte 2 – System Alarm 3 (page 17)
are combined and set by **Output3**.

↗[SP17] S4D1 – Definition Byte 1 – System Alarm 4 (page 17)
↗[SP18] S4D2 – Definition Byte 2 – System Alarm 4 (page 17)
are combined and set by **Output4**.

3.5 Timer

The controller has four timers overall, with which complex function chains can be realized.

The function of the timers as well as their characteristics is defined by the two configuration parameters.

Specify time for timer	↗[P085] t1 – Timer 1 (page 75)
Specifies when the timer is started and which actions are executed after expiration of the timer.	↗[P086] t1d1 – Timer 1 Definition 1 (page 75) to ↗[P095] t4d1 – Timer 4 Definition 1 (page 78)
Specify, which function is executed, when the timer is active.	↗[P087] t1d2 – Timer 1 Definition 2 (page 76) to ↗[P096] t4d2 – Timer 4 Definition 2 (page 79)

Example

Start-up function for hot runner application

Function Description

After switch-on of the control system, in start-up operation, the zones with actual value less than 70°C should be heated up on setpoint value of 100 °C for an adjustable duration.

After expiration, control is executed on a choke setpoint value, a setpoint value above the real setpoint value, for an adjustable duration.

Only after expiration of the time, the real setpoint value gets controlled.

Settings

↗[P086] t1d1 – Timer 1 Definition 1 (page 75) = 18 ↗[P087] t1d2 – Timer 1 Definition 2 (page 76) = 0 ↗[P085] t1 – Timer 1 (page 75) = 600	Before switch-on is checked, whether the start-up conditions (actual value < 70°C) are fulfilled. Then the zones are heated up to start-up setpoint value of 100°C. Timer 1 is started when all zones have reached the temperature band of 5K around the start-up setpoint value. Then Timer 1 expires after 600 seconds. After expiration of Timer 1, Timer 2 is started.
↗[P088] t2 – Timer 2 (page 77) = 300 ↗[P089] t2d1 – Timer 2 Definition 1 (page 77) = 0 ↗[P090] t2d2 – Timer 2 Definition 2 (page 77) = 6 ↗[P010] SP3 – 3. Setpoint / 3. Lowering/Reduction Value (page 34) = 20	For the duration of 300 seconds control is executed on a 20 °C higher setpoint value.

Using PCU/MCU as hot runner controller, the parameters in the operation software **TEMPSoft2**:
↗[P092] t3d1 – Timer 3 Definition 1 (page 78)
↗[P093] t3d2 – Timer 3 Definition 2 (page 78)
↗[P095] t4d1 – Timer 4 Definition 1 (page 78)
↗[P096] t4d2 – Timer 4 Definition 2 (page 79)
are combined in parameter:

[P092] [P093] [P095] [P096] Start-up mode

The parameter can be in status ON and/or OFF.
Start-up Mode = ON means:
↗[P092] t3d1 – Timer 3 Definition 1 (page 78) = 20_{dec}
↗[P093] t3d2 – Timer 3 Definition 2 (page 78) = 0_{dec}
↗[P095] t4d1 – Timer 4 Definition 1 (page 78) = 25_{dec}
↗[P096] t4d2 – Timer 4 Definition 2 (page 79) = 7_{dec}
Start-up Mode = OFF means:
↗[P092] t3d1 – Timer 3 Definition 1 (page 78) = 0_{dec}
↗[P093] t3d2 – Timer 3 Definition 2 (page 78) = 0_{dec}
↗[P095] t4d1 – Timer 4 Definition 1 (page 78) = 0_{dec}
↗[P096] t4d2 – Timer 4 Definition 2 (page 79) = 0_{dec}

3.6 Control output signals

The actuating variable (degree of operation) calculated by a control algorithm or manually set, is for output converted by the I/O module as PWM signal and output on a digital output.

Actuating variables on Heating control outputs are always PWM signals with a minimum pulse width of 20 and/or 40 ms (dependent on the output module). This method is suitable for control of Solid State Relays.

For actuating variable on Cooling control outputs 3 different methods are available:

- Output as PWM signal with minimal pulse width of 20 and/or 40 ms (dependent on the output module). This method is suitable for control of Solid State Relays.
- Output of a PWM signal, where in a cycle of minimal 10 seconds only once is switched on and/or off (delivery status). After the first identification ↗[P049] CTC – Cooling Sampling Time (page 50) is used for cycle duration. This method is suitable for control of mechanical relays.
- Output as pause variant signal with constant pulse width. This method is used to output the actuating signal on the Cooling control output for the targeted evaporating of limited cooling water quantities ("evaporative cooling").

Setting	
Specifies whether a relay is connected to the Heating control output.	↗[P026] RELH – Heating Relay Output (page 40)
Specifies whether a relay is connected to the Cooling control output.	↗[P027] RELC – Cooling Relay Output (page 41)
Settings when an evaporate cooling is used for Cooling control output	Specify evaporate cooling: ↗[P028] PCLG – Pulse Cooling (page 41) Specify pulse duration of cooling impulse: ↗[P029] PULS – Pulse Duration (page 42) Specify minimal pause duration between two cooling impulses: ↗[P030] PMIN – Minimum Pause Duration (page 42) Specify maximal pause duration between two cooling impulses: ↗[P031] PMAX – Maximum Pause Duration (page 43)

3.7 Auto Tuning (Identification)

The controller offers methods, with which

the Heating control parameters (↗[P032] IDEH – Heating Identification (page 44) = on) after the first setpoint value jump of > +50 K

- after a zone reset
- or after switch-on of controller
- or after setpoint value 0°C/32K

the Cooling control parameters (↗[P037] IDEC – Cooling Identification (page 46) = on) after each setpoint value jump > -50 K

can be automatically calculated and the controller is adapted to the factors of the connected control system.
Both methods are named Heating identification and Cooling identification. Heating identification and Cooling identification can be activated independent of each other.

Setting	
Specify Heating identification	↗[P032] IDEH – Heating Identification (page 44)
Specifies whether the Cooling control parameters are derived from the Heating control parameters after Heating identification.	↗[P036] CFIX – Cooling Parameter fixed (Heating Identification) (page 46)
Specifies whether the calculated heating control parameters during identification are directly checked with the setpoint value and whether they are to be corrected.	↗[P033] IDEL – Loop Control in Case of Identification (page 44)
Specifies whether this check is made directly for the setpoint value or below the setpoint value.	↗[P035] SPCb – Setpoint Value Cutback (page 45)
Specifies. whether a Cooling identification should be automatically executed after a Heating identification.	↗[P034] IDCH – Cooling Identification after Heating Identification (page 45)
Specify Cooling identification	↗[P037] IDEC – Cooling Identification (page 46)

1 After a setpoint value jump from 0°C to 140°C the Heating control parameters are recalculated during heating-up.

↗[P032] IDEH – Heating Identification (page 44) = on

↗[P036] CFIX – Cooling Parameter fixed (Heating Identification) (page 46) = on

↗[P033] IDEL – Loop Control in Case of Identification (page 44) = on

2 20°C (setpoint value cutback) before reaching the setpoint value of 140°C the calculation of the heating control parameters is finished.

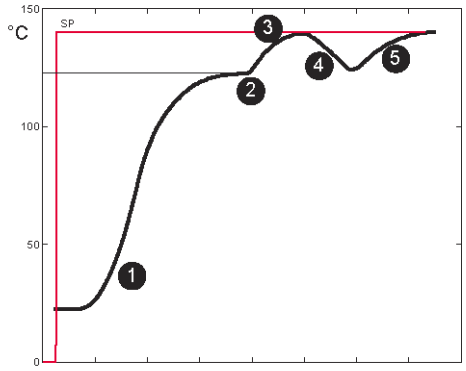
↗[P035] SPCb – Setpoint Value Cutback (page 45) = 20

3 Control is executed on the specified setpoint value.

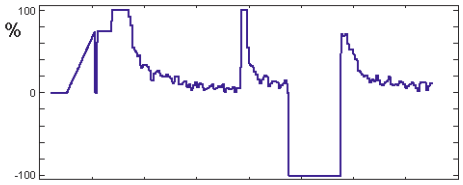
4 After the actual value has reached the specified setpoint value, the calculation of the Cooling control parameters is started.

↗[P034] IDCH – Cooling Identification after Heating Identification (page 45) = on

5 After the Cooling control parameters are calculated, control is executed on the specified setpoint value again.



Setpoint value / actual value



Degree of operation

3.8 Cascade Control

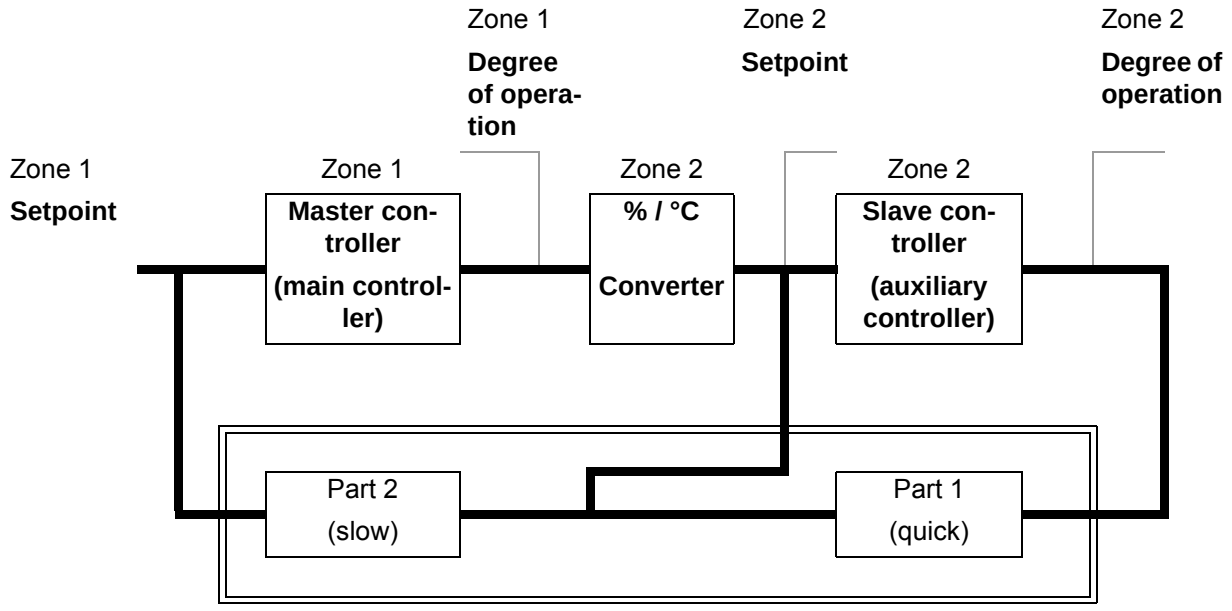
With a cascade control, a process with long dead times can be controlled so that changes in the process, including the setpoint value changes are corrected quickly with little overshoot. The cascade control is a combination of two PID controllers, which set the output of the master controller to the setpoint for the slave controller. Typical applications include industrial furnaces with large delay times between heating, interior room and the treated product / material.

The controller supports a simple cascading. The „auxiliary control system“ should be faster than the „main control system“. The main process is controlled by the "main controller". The output of the "main controller" defines the setpoint value for the auxiliary controller.

The flexotemp® controllers provide additionally to the standard cascade control the possibility of an identification of both PID controllers involved in cascade control. The identification of both control parameter sets is carried out by the heating-up of the controlled system.

The in-principle design of the cascade control (zone 1 = main controller, zone 2 = auxiliary controller) looks as follows

Zone 1 = Master controller (main controller)
Zone 2 = Slave controller (auxiliary controller)



Controlled system

To use the two zones for cascade control the following parameter settings must be done.

Settings for Main Controller (Zone 1)

Parameters	Example	Description
↗[P038] ALGO – Algorithm (page 46)	16	Setting of the control algorithm for this zone. The zone works as main controller.

↗[P039] KNr – Cascade - Zone Number of Main Controller (page 47)	0	By this parameter the two zones, which work as main/auxiliary controller, are linked to each other. For the main controller 0 must be set here.
↗[P041] KSP+ – Cascade - Setpoint Value of Auxiliary Controller for Degree of Operation = 100% (page 48)	0	For the master without function.
↗[P040] KSP- – Cascade - Setpoint Value of Auxiliary Controller for Degree of Operation =0/ -100% (page 47)	0	For the master without function.

Settings for Auxiliary Controller (Zone 2)

Parameters	Example	Description
↗[P038] ALGO – Algorithm (page 46)	17	Setting of the control algorithm for this zone. The zone works as auxiliary controller.
↗[P039] KNr – Cascade - Zone Number of Main Controller (page 47)	1	By this parameter the two zones, which work as main/auxiliary controller, are linked to each other. For the auxiliary controller the zone number of the main controller must be set.
↗[P041] KSP+ – Cascade - Setpoint Value of Auxiliary Controller for Degree of Operation = 100% (page 48)	250	Setting of the conversion of the degree of operation of the main controller into the setpoint value of the auxiliary controller. The setpoint value is specified, that the auxiliary controller receives, when the degree of operation of the main controller is 100%.
↗[P040] KSP- – Cascade - Setpoint Value of Auxiliary Controller for Degree of Operation =0/ -100% (page 47)	0	Setting of the conversion of the degree of operation of the main controller into the setpoint value of the auxiliary controller. The setpoint value is specified that the auxiliary controller receives when the degree of operation of the main controller is 0% for 2-point and is -100% for 3-point zones.

3.8.1 Important Notes

Identification

The identification of the main controller and the auxiliary controller is running in parallel from the cascade control. In order for the identification to function, the main zone must be slower than the auxiliary zone. The identification provides for both controllers start values, with which the control can take place. When heating-up, a transient behavior is shown in dependency of the controlled system, which depends on many factors. Both the setting of the parameters KSP+ and KSP- and the difference of the delay time between the main and auxiliary control loop play a role.

The transient behavior can be manipulated by manual interaction of the following parameters:

KSP+/KSP-	By adjustment of these parameters, the operating point of the main controller is moved. This results in a more or less integration of the I channel of the controller until it reaches the operating point and has influence on the transient time. In the subordinate control circuit KSP+ must be greater than 100, otherwise the identification Heating does not start.
XPH,...	The control parameters of the main controller mainly determine the Heating up behavior. A slower-acting controller dampens the oscillation.

Current measuring

To have a working current measuring for cascade control, the output value of the main zone must not be output on an I/O module. Only the degree of operation of the auxiliary controller is output.

Degree of operation

In case the degree of operation is too volatile it can be improved through slower control parameters of the auxiliary controller.

3.9 Process Monitoring

The process monitoring function is supposed to prevent leakages in hot runner applications. Leakages lead to unintentional discharge of molten material and can result in production stop.

Unfortunately, leakages cannot always be avoided in hot runner systems. They could be caused by construction or production faults or by incorrect installation, leading at last to production breakdown and expensive repair. The process monitoring function can be used without any additional installation effort. The user-friendly function can be configured by only one parameter.

With the process monitoring function, the status of the zone is determined by the available process factors (actual value and degree of operation) in a complex calculation. The function is self learning. An upcoming leakage is early detected and can be responded to quickly. The alarm caused by the process monitoring function can be used as feedback for the system or the machine for example.

The sequence of the function is determined by parameter ↗[SP40] PMOD – Process Monitoring Mode (page 28). In the parameter ↗[P097] PTOL – Tolerance of Process (page 61) the deviation of the control behavior in percent is specified. The parameter ↗[P099] POP – Operating point of process monitoring (page 61) represents the operating point that is determined at the end of the learning phase in percent.

For further details see function process monitoring in the operating instructions of the hot runner controllers.

3.10 Heat'n'Dry

When molds are stored for a longer time, the insulating material for the electrical heating elements can draw moisture. This moisture leads to leakage currents with connected protective conductors, that cause fault-current circuit breakers to disconnect and prevents the heating-up.

Heat ’n’ Dry executes a gentle heating-up with stepwise increasing of the power supply. The leakage current is permanently checked. The moisture is completely dried by a setpoint value of 110C.

The heating-up on the final setpoint value starts first, when it is assured, that

- the error current lies below a adjustable limit value
- in the heating elements is no longer moisture.

The function Heat’n’Dry is started, when the start conditions

- Actual value < 90°C (194 °F)
- Setpoint value > 110°C (230 °F)
- Heat’n’Dry is enabled by parameter

are met.

During heating-up of the zones with active Heat’n’Dry function, also the inactive zones for Heat’n’Dry are adjusted to 110°C. After the zones with active Heat’n’Dry are adjusted to 110°C, all zones are adjusted to their preset setpoint values.

While the Heat’n’Dry function is running, no current measuring is executed.

By the system parameter (see ↗[SP22] CMAX – Limit for Switching-off Leakage Current (page 18)) the maximum admissible value for the leakage current is set.

The function can be activated/deactivated by the parameter (↗[P098] HnD – Heat ’n’ Dry (page 61)).
For further details see function Heat 'n' Dry in the operating instructions of the hot runner controllers.

4 Code numbers

Behind code numbers are complex system-specific or process-specific functions, which simplify the handling of certain functions with the controller or which repair exception states in which the controller finds itself e.g. after faults or alarms.

Code numbers can be activated over all interfaces (see corresponding protocol descriptions) and the operating and visual display units.

decimal	hexadecimal	Function	Information on the function
50	32	Zone locking on	Protocol independent
51	33	Zone locking off	Protocol independent
60	3C	Store recipe 1 to storage card (RCP_0.EXP)	For further details please see the the operating manual for temperature control system flexotemp® , system structure & project setup, memory cards.
61	3D	Store recipe 2 to storage card (RCP_1.EXP)	
62	3E	Store recipe 3 to storage card (RCP_2.EXP)	
63	3F	Store recipe 4 to storage card (RCP_3.EXP)	
64	40	Store recipe 5 to storage card (RCP_4.EXP)	
65	41	Store recipe 6 to storage card (RCP_5.EXP)	
66	42	Store recipe 7 to storage card (RCP_6.EXP)	
67	43	Store recipe 8 to storage card (RCP_7.EXP)	
68	44	Store recipe 9 to storage card (RCP_8.EXP)	
69	45	Store recipe 10 to storage card (RCP_9.EXP)	
70	46	Load recipe 1 from storage card (RCP_0.EXP)	For further details please see the the operating manual for temperature control system flexotemp® , system structure & project setup, memory cards.
71	47	Load recipe 2 from storage card (RCP_1.EXP)	
72	48	Load recipe 3 from storage card (RCP_2.EXP)	
73	49	Load recipe 4 from storage card (RCP_3.EXP)	
74	4A	Load recipe 5 from storage card (RCP_4.EXP)	
75	4B	Load recipe 6 from storage card (RCP_5.EXP)	
76	4C	Load recipe 7 from storage card (RCP_6.EXP)	
77	4D	Load recipe 8 from storage card (RCP_7.EXP)	
78	4E	Load recipe 9 from storage card (RCP_8.EXP)	
79	4F	Load recipe 10 from storage card (RCP_9.EXP)	
80	50	Load controller configuration dependent on rotary switch from controller and store in the configuration file on memory card CFG_x.EXP.	For further details please see the the operating manual for temperature control system flexotemp® , system structure & project setup, memory cards.
81	51	Load controller configuration dependent on rotary switch from the configuration file on memory card CFG_x.EXP into the controller. An existing file is overwritten directly.	
90	5A	Enable storage card	
91	5B	Start firmware from storage card	
93	5D	Format storage card	
94	5E	Format storage card + attach auto load file for coding switch FF	
98	62	Delete error storage	See context menu of master component
99	63	Disable storage card	

100	64	Activate time synchronization	
111	6F	Start automatic cooling adaptation	
177	B1	Activate current transfer	
179	B3	Current measurement activated for HPC24	
440	1B8	Reset-acknowledging alarms	
441	189	Reset channel flag storage	Customer-specific function
445	1BD	End identification	Customer-specific function
600	258	Start diagnostic function for sensor allocation	See Chapter↗Diagnostic function (code number 600) - Allocation of Sensor and Heating (page 100)
602	25A	End diagnostic function for sensor allocation	
605	25D	Start MoldCheck	Analysis of wiring errors, connected power and leakage current
606	25E	End MoldCheck	
700	2BC	Start address scan	
907	28B	Take over data into EEProm	
976	3D0	Stop project setup	Stop activation of CAN slaves
977	3D1	Start project setup	Start activation of CAN slaves

4.1 Diagnostic function (code number 600) - Allocation of Sensor and Heating

The controller has a complex automated function to check the allocation of sensors and Heating. The function checks, whether sensors and Heating are allocated and wired correctly.

The function uses the configuration parameter ↗[P021] DIAT – Time for Diagnostics (page 57). By this, a zone specific testing period is specified. The testing period defines the time, the zone should react on a trigger by an output value.

For an optimal diagnostic process, the diagnostic function should be executed, when the control zones are in cold condition.

- Specify a setpoint value for the zone that is smaller than the actual value
- Check the configuration parameter ↗[P021] DIAT – Time for Diagnostics (page 57)
- Passive zones are not included in the diagnostics

The diagnostic function is basically executed until the end, even when errors are recognized. It is only interrupted, when a temperature rise for a degree of operation = 0% is detected, i.e. the actuator is defective, what can lead to an overheating of the control zone.

The check routine is started by entry of code number 600 and runs in two phases.

Phase 1: Complete Check of all Zones together

In phase 1 the degree of operation

- of all active zones,
- whose setpoint value is greater than 0°C

is set to 0% and all actual value are monitored. Using the operating and display unit BA, in the zone display of the zones, relevant for diagnostic process, the message dIA is output. The zone display for the other zones is dimmed.

Rises the actual value of any zone at least 5°C in between the testing period, in the zone display for this zone dE and 888 is displayed alternately and the check routine is completely stopped. The stopped check routine must be acknowledged by code number 602.

Phase 2: Single Check

After termination of phase 1 (takes as long, as the maximal specified value for ↗[P021] DIAT – Time for Diagnostics (page 57)) a single check of each zone, consecutive for each zone, is started.

For this, the degree of operation of one zone is set to 100% and monitored, whether a temperature rise of 5°C in between the specified testing period is detected. Using the operating and display unit BA, in the zone display the message dIA is output.

After termination of the single check for all zones, the diagnostic result is immediately displayed in the zone display for the relevant zones. Alternately dE (DiagnosticResult) and a number are displayed, where the diagnostic result could easily be deduced.

Message BA at Diagnostic End		Meaning
dE	0	Zone OK
dE	1_<Number of zones>	The sensor to this zone is wrongly connected to channel x
dE	- 1_<Number of zones>	The sensor to this zone is wrongly connected to channel x and with reversed polarity
dE	999	Sensor break
dE	888	Temperature rise in spite of degree of operation 0%
dE	777	No temperature rise during diagnostic period detected

After termination of the diagnostics the check routine must be acknowledged by code number 602. With the same code number the check routine can be stopped.

5 System Parameter and Parameter of Components

Due to the fact, that the physical in- and outputs in flexotemp® are connected by the components, the components have system parameters and parameters, that can be configured.

The system parameters and parameters of the components are specified by designation/characteristic analog [M***] per component.

A display of the system parameters and parameters by a BA (operating and display unit) is not available.

5.1 Analog inputs

5.1.1 TCPT08 - Thermocouple Interface

Module with 8 analog inputs.

[M2100] SEN1 – Sensor Type for AI 1…4

[M2101] SEN2 – Sensor Type for AI 5…8

Data type	Byte
Adjustment range interfaces	0...[1]...4
Unit	n.a.

The parameter specifies the type of the sensors which are connected to the measurement inputs AI 1…4 and 5…8.

Setting	Description
0	L (FE-L)
[1]	J (FE-J)
2	K (NiCrNi)
3	PT100
4	N (NiCrSi)

5.1.2 TC12 - Thermocouple Interface

Module with 12 analog inputs.

[M2100] SEN1 – Sensor Type for AI 1…4

[M2101] SEN2 – Sensor Type for AI 5…8

[M2102] SEN3 – Sensor Type for AI 9…12

Data type	Byte
Adjustment range interfaces	0...[1]...2.4
Unit	n.a.

The parameter specifies the type of the sensors which are connected to the measurement inputs AI 1…4 , 5…8 and 9…12.

Setting	Description
0	L (FE-L)
[1]	J (FE-J)
2	K (NiCrNi)
3	n.a.
4	N (NiCrSi)

5.1.3 TC16 - Thermocouple Interface

Module with 16 analog inputs.

[M2100] SEN1 – Sensor Type for AI 1…4

[M2101] SEN2 – Sensor Type for AI 5…8

[M2102] SEN3 – Sensor Type for AI 9…12

[M2103] SEN4 – Sensor Type for AI 13…16

Data type	Byte
Adjustment range interfaces	0...[1]...2.4
Unit	n.a.

The parameter specifies the type of the sensors which are connected to the measurement inputs AI 1…4 , 5…8, 9…12 and 13...16.

Setting	Description
0	L (FE-L)
[1]	J (FE-J)
2	K (NiCrNi)
3	n.a.
4	N (NiCrSi)

[M2112…M227] TO01…TO12 – Temperature Offset for AI 1…16

Data type	Integer
Adjustment range interfaces/ multiplier	-999.9…[0]…999.9 / 10
Unit	n.a.

The parameter specifies the value by which the measured value on the measurement inputs AI 1…16 is corrected.

5.1.4 PT08 - Thermocouple Interface

Module with 8 analog inputs. Sensor type specified as Pt100.

[M2112…M2119] TO01…TO12 – Temperature Offset for AI 1…8

Data type	Integer
Adjustment range interfaces/ multiplier	-999.9…[0]…999.9 / 10
Unit	n.a.

The parameter specifies the value by which the measured value on the measurement inputs AI 1…8 is corrected.

5.1.5 PT12 - Thermocouple Interface

Module with 12 analog inputs. Sensor type specified as Pt100.

[M2112…M2123] TO01…TO12 – Temperature Offset for AI 1…12

Data type	Integer
Adjustment range interfaces/ multiplier	-999.9…[0]…999.9 / 10
Unit	n.a.

The parameter specifies the value by which the measured value on the measurement inputs AI 1…12 is corrected.

5.1.6 PT1000_12 - Thermocouple Interface

Module with 12 analog inputs. Sensor type specified as Pt1000.

[M2112…M2123] TO01…TO12 – Temperature Offset for AI 1…12

Data type	Integer
Adjustment range interfaces/ multiplier	-999.9…[0]…999.9 / 10
Unit	n.a.

The parameter specifies the value by which the measured value on the measurement inputs AI 1…12 is corrected.

5.1.7 PT16 - Thermocouple Interface

Module with 16 analog inputs. Sensor type specified as Pt100.

[M2112…M2127] TO01…TO12 – Temperature Offset for AI 1…16

Data type	Integer
Adjustment range interfaces/ multiplier	-999.9…[0]…999.9 / 10
Unit	n.a.

The parameter specifies the value by which the measured value on the measurement inputs AI 1…16 is corrected.

5.1.8 CANTC12 - Thermocouple Card

Module with 12 measurement inputs thermocouple TC.

[M7200] SEN1 – Sensor Type for AI 1…6

[M7201] SEN2 – Sensor Type for AI 7…12

Data type	Byte
Adjustment range interfaces	0...[1]...5
Unit	n.a.

The parameter specifies the type of the sensors which are connected to the measurement inputs AI 1…6 and 7…12.

Setting	Description
0	L (FE-L)
[1]	J (FE-J)
2	K (NiCrNi)
3	L (FE-L) (external reference junction)
4	L (FE-J) (external reference junction)
5	K (NiCrNi) (external reference junction)

5.1.9 CANTC24 - Thermocouple Card

Module with 24 measurement inputs thermocouple TC.

[M7200] SEN1 – Sensor Type for AI 1…6

[M7201] SEN2 – Sensor Type for AI 7…12

[M7202] SEN3 – Sensor Type for AI 13…18

[M7203] SEN4 – Sensor Type for AI 19…24

Data type	Byte
Adjustment range interfaces	0...[1]...5
Unit	n.a.

The parameter specifies the type of the sensors which are connected to the measurement inputs AI 1…6, 7…12, 13…18 and 19…24.

Setting	Description
0	L (FE-L)
[1]	J (FE-J)
2	K (NiCrNi)
3	L (FE-L) (external reference junction)
4	L (FE-J) (external reference junction)
5	K (NiCrNi) (external reference junction)

5.2 Analog inputs/outputs

5.2.1 AIO04 - Analog In-/Output Interface

Module with 4 analog in- / outputs.

5.2.1.1 Analog inputs

[M2200] RANGE – Range for AI 1…4

Data type	Byte
Adjustment range interfaces	[0]...3
Unit	n.a.

The parameter specifies the range for a standard signal U or I on analog input AI 1…4.

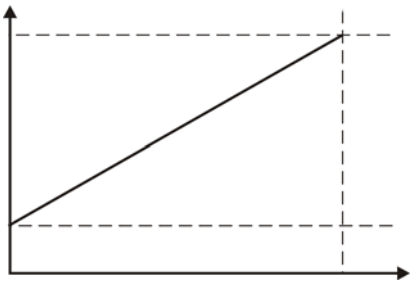
Setting	Description
[0]	0…10 V
1	2…10 V
2	0…20 mA
3	4…20 mA

The parameters ↗[M2201] LSc – Low Scale for AI 1…4 (page 106) and ↗[M2202] FSc – Full Scale for AI 1…4 (page 106) define the characteristic curve, with its help the display values are calculated as follows:

```
Display value = 0.1 * (FSc - LSC) / measured range*measured value + 0.1 * LSc
```

FSc = 1000; LSc = 0
Measured range = 20 mA (0...20 mA)
Measured value = 10 mA
Display value example 1
= 0.1*(1000-0)/20mA*10mA+0.1*0 = 50.0

FSc = 1000; LSc = 0
Measured range = 16 mA (4...20 mA)
Measured value = 6 mA (= 10 mA - 4 mA$_{\#}$)
Display value example 2
= 0.1*(1000-0)/16mA*6mA+0.1*0 = 37.5



the lower value of ↗[M2200] RANGE – Range for AI 1…4 (page 106) <> 0, that is why the measured value must be subtracted

[M2201] LSc – Low Scale for AI 1…4

Data type	Integer
Adjustment range interfaces/ multiplier	-32766…[0]…32767 / 1
Unit	n.a.

The parameter specifies the value which is displayed in case of a measured value equal to 0/2VDC and/or 0/4 mA.

[M2202] FSc – Full Scale for AI 1…4

Data type	Integer
Adjustment range interfaces/ multiplier	-32766…[1000]…32767 / 1
Unit	n.a.

The parameter specifies the value which is displayed in case of a measured value equal to 10VDC and/or 20 mA.

5.2.1.2 Analog outputs

[M2203] RANGE – Range for AI 1…4

Data type	Byte
Adjustment range interfaces	0...[1]
Unit	n.a.

The parameter specifies the range for a standard signal U or I on analog output AO.

Setting	Description
[0]	0…10 V/0…20 mA
1	2…10 V/4…20 mA

[M2204] LSc – Low Scale for AO 1…4

Data type	Float
Adjustment range interfaces/ multiplier	-32766…[0]…32767 / 1
Unit	n.a.

The parameter specifies the value which matches a measured value equal to 0/2VDC and/or 0/4 mA.

[M2205] FSc – Full Scale for AO 1…4

Data type	Float
Adjustment range interfaces/ multiplier	-32766…[100.0]…32767 / 1
Unit	n.a.

The parameter specifies the value which matches a measured value equal to 10 VDC and/or 20 mA.

5.2.2 HC06_16 - Hot Runner Card

[M6520] SEN – Sensor Type

Data type	Byte
Adjustment range interfaces	0...[1]...5
Unit	n.a.

The parameter specifies the type of the sensors which are connected to the measurement inputs AI 1…6.

Setting	Description
0	L (FE-L)
[1]	J (FE-J)
2	K (NiCrNi)
3	L (FE-L) (external reference junction)
4	L (FE-J) (external reference junction)
5	K (NiCrNi) (external reference junction)

[M6507] HSLI - Heat Sink Temperature Limit Value

Data type	Char
Adjustment range interfaces	0…[85]…99
Unit	°C

The heat sink temperature registered by the component is transferred and monitored on the here specified limit value.
Definition of the reaction for exceeding the limit value see
↗[SP12] S1D2 – Definition Byte 2 – System Alarm 1 (page 15)
↗[SP32] S3D5 – Definition Word Channel Flag 5, 6 – System Alarm 3 (page 24)
↗[SP34] S3D7 – Definition Word Channel Flag 9, 10 – System Alarm 3 (page 27)
↗[P074] A1D2 – Definition Byte 2 – Alarm 1 (page 68)

5.2.3 MPI02 - Melt Pressure Input

Pressure sensor module. Parameter per input.

[M2210] PressRng – Pressure Range

Data type	Integer
Adjustment range interfaces/ multiplier	-3000.0…[500.0]...3000.0 / 10
Unit	bar

The pressure range of the connected pressure transducer is specified.

[M2211] Sensi – Sensitivity

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	1.0…[3.3]…5.0 / 10
Unit	mV/V

Setting of the sensitivity of the measuring bridge.

[M2212] Shunt – Shunt Existing

Data type	Byte
Adjustment range interfaces	0...[1]
Unit	n.a.

Specification whether a shunt is available for the measuring bridge.

Setting	Description
0	Off
[1]	On

[M2213] CalV – Calibration Value

Data type	Integer
Adjustment range interfaces/ multiplier	40.0…[80.0]…100.0 / 10
Unit	%

As calibration value for the pressure transducer, the percentage part is used, based on the full scale range.

[M2214] Cha – Channel

Data type	Byte
Adjustment range interfaces	0...[1]
Unit	n.a.

Specify, whether a pressure transducer is connected to the channel of the module.

Setting	Description
0	Active
[1]	Passive

[M2215] Filter – Filter

Data type	Byte
Adjustment range interfaces	[0]...1
Unit	n.a.

The filter set, leads to a stabilization of the measured value.

Setting	Description
[0]	Off
1	On

[M2216] Offset – Offset

Data type	Integer
Adjustment range interfaces/ multiplier	-3000.0…[0.0]...3000.0 / 10
Unit	bar

The offset, specified here, is added to the measured value.

5.2.3.1 Alarm Output

In the module MPI02 generated alarms, module wide or channel/input specific, like e.g. limit value violations, sensor break, etc. can be output by relay outputs as signal and be continued processing.

[M2240] AlDef - Alarm Definition Output Relay 1...4

Data type	Long
Adjustment range interfaces	0x00000000
Unit	n.a.

Setting hexadecimal	**Description of System Alarms**
0x00000001	Error in system data
0x00000002	Error CAN
0x00000004	Limit value 1
0x00000008	Limit Value 2
0x00000010	Limit value 3
0x00000020	Limit value 4
0x00000040	Limit value 5
0x00000080	Limit value 6
0x00000100	Limit value 7
0x00000200	Limit value 8
0x00000400	n.a.
0x00000800	n.a.
0x00001000	n.a.
0x00002000	n.a.
0x00004000	Storing
0x00008000	Inverted
Setting hexadecimal	**Description Alarms Channel/Input 1**
0x00010000	Sensor break
0x00020000	Current Loop
0x00040000	Calibration error
0x00080000	Channel active
0x00100000	Calibration active
0x00200000	n.a.
0x00400000	n.a.
0x00800000	n.a.
Setting hexadecimal	**Description Alarms Channel/Input 2**
0x01000000	Sensor break
0x02000000	Current Loop
0x04000000	Calibration error
0x08000000	Channel active

0x10000000	Calibration active
0x20000000	n.a.
0x40000000	n.a.
0x80000000	n.a.

The setting can be combined optionally with each other.

5.2.3.2 Analog Value Output

[M2203] RANGE – Range for AI 1…2

Data type	Byte
Adjustment range interfaces	[0]...1
Unit	n.a.

The parameter specifies the range for a standard signal I on analog output AO.

Setting	Description
[0]	0…20 mA
1	4…20 mA

[M2204] LSc – Low Scale for AO 1…2

Data type	Integer
Adjustment range interfaces/ multiplier	-3000.0…[0.0]...3000.0 / 10
Unit	bar

The parameter specifies the value which matches a measured value equal to 0/4 mA.

[M2205] FSc – Full Scale for AO 1…2

Data type	Integer
Adjustment range interfaces/ multiplier	-3000.0…[500.0]...3000.0 / 1
Unit	bar

The parameter specifies the value which matches a measured value equal to 20 mA.

[M2206] Src – Signal Source

Data type	Byte
Adjustment range interfaces	[0]...4
Unit	n.a.

As signal source for the analog value output, a single input, as well as the difference out of two inputs can be defined.

Setting	Description
[0]	passive
1	Input AI 1
2	Input AI 2

3	Input AI 1 – Input AI 2
4	Input AI 2 – Input AI 1

5.2.3.3 System Parameters

[M2220…M2220+2…] LV1…LV8 – Limit Value 1…8

Data type	Integer
Adjustment range interfaces/ multiplier	-3000.0…[0.0]...3000.0 / 10
Unit	bar

Specification of limit values.

[M2221…M2221+2…] ALSrc1…8 – Signal Source 1…8

Data type	Byte
Adjustment range interfaces	[0]...4
Unit	n.a.

Allocation of limit value to signal source.

Setting	Description
[0]	passive
1	Input AI 1
2	Input AI 2
3	Input AI 1 – Input AI 2
4	Input AI 2 – Input AI 1

[M2236] Hyst - Hysteresis

Data type	Integer
Adjustment range interfaces/ multiplier	-3000.0…[1.0]...3000.0 / 10
Unit	bar

Based on the input size variant delayed response of the output size.

5.3 Digital Outputs, Analog Inputs

5.3.1 VC02 - Valve Control Module

Module to control 2 servo valves.

[M2310] VSB1 – Behavior on position indicator error

[M2311] VSB2 – Behavior on position indicator error

Data type	Byte
Adjustment range interfaces	[0]...2
Unit	n.a.

For a sensor break, the behavior of the valve can be specified.

Setting	Description
[0]	Close valve
1	Open valve
2	Do not change valve

[M2321] HYS1 - Hysteresis

[M2322] HSY2 - Hysteresis

Data type	Integer
Adjustment range interfaces	50...[100]...900
Unit	n.a.

Hysteresis band for setting of target position.

[M2325] CHA1 - Channel

[M2326] CHA2 - Channel

Data type	Byte
Adjustment range interfaces	[0]...1
Unit	n.a.

Passivate the single actuator outputs of VC.

For a passive output there is no alarm calculation, no control of the valve and no tune by key available.

Setting	Description
[0]	Passive
1	Active

5.3.2 VC04- Valve Control Module

Module to control 4 servo valves.

[M2310] VSB1 – Behavior on position indicator error

[M2311] VSB2 – Behavior on position indicator error

[M2312] VSB3 – Behavior on position indicator error

[M2313] VSB4 – Behavior on position indicator error

Data type	Byte
Adjustment range interfaces	[0]...2
Unit	n.a.

For a sensor break, the behavior of the valve can be specified.

Setting	Description
[0]	Close valve
1	Open valve
2	Do not change valve

[M2321] HYS1 - Hysteresis

[M2322] HSY2 - Hysteresis

[M2323] HSY3 - Hysteresis

[M2324] HSY4 - Hysteresis

Data type	Integer
Adjustment range interfaces	50...[100]...900
Unit	n.a.

Hysteresis band for setting of target position.

[M2325] CHA1 - Channel

[M2326] CHA2 - Channel

[M2327] CHA3 - Channel

[M2328] CHA4 - Channel

Data type	Byte
Adjustment range interfaces	[0]...1
Unit	n.a.

Passivate the single actuator outputs of VC.
For a passive output there is no alarm calculation, no control of the valve and no tune by key available.

Setting	Description
[0]	Passive
1	Active

5.4 Digital In-/Outputs

5.4.1 DIO16_CI - Digital In-/Output Interface, Current Input

Module with 16 digital in- / outputs.

[M2300] CUMC - Cycle of Current Measurement

Data type	Unsigned integer
Adjustment range interfaces/ multiplier	[30]…9999 / 1
Unit	s

The parameter defines in which cycle the heating current measurement is executed.

[M2308] Sensi – Sensitivity

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	0…[42]…255 / 1
Unit	mV/A

Setting of sensitivity of current transformer, i.e. proportion input (measured current) to output signal (output voltage).

[M2314] HCSF1 - Heating Current Scaling Factor 1

Data type	Unsigned short
Adjustment range interfaces/ multiplier	0.0…[100.0]…999.9 / 10
Unit	%

The parameter specifies, whether a current transformer is connected in series to the heating current monitoring measurement inputs 1-3.

[M2315] HCSF2 - Heating Current Scaling Factor 2

Data type	Unsigned short
Adjustment range interfaces/ multiplier	0.0…[100.0]…999.9 / 10
Unit	%

See parameter ↗[M2314] HCSF1 - Heating Current Scaling Factor 1 (page 116)

[M2316] HCSF3 - Heating Current Scaling Factor 3

Data type	Unsigned short
Adjustment range interfaces/ multiplier	0.0…[100.0]…999.9 / 10
Unit	%

See parameter ↗[M2314] HCSF1 - Heating Current Scaling Factor 1 (page 116)

[M2329] RELH - Heating Relay Output

Data type	Short Integer
Adjustment range interfaces/ multiplier	[0]…1
Unit	n.a.

All heating outputs of the module output a PWM signal as standard. Should a relay output with selectable cycle duration be defined for all heating outputs (see ↗[M2330] CDRH - Cycle duration Heating Relay Output (page 117)) the parameter must be set to ON.

Setting	Description
[0]	Off; Output signal PWM; See setting ↗[P026] RELH – Heating Relay Output (page 40)
1	On; Relay output

[M2330] CDRH - Cycle duration Heating Relay Output

Data type	Byte
Adjustment range interfaces/ multiplier	[2.0]…25.5 / 10
Unit	s

The cycle duration for ↗[M2329] RELH - Heating Relay Output (page 117) is stipulated.

5.4.2 DIO32_CI - Digital In-/Output Interface, Current Input

Module with 4 digital inputs and 32 digital outputs.

[M2300] CUMC - Cycle of Current Measurement

Data type	Unsigned integer
Adjustment range interfaces/ multiplier	[30]…9999 / 1
Unit	s

The parameter defines in which cycle the heating current measurement is executed.

[M2308] Sensi – Sensitivity 1

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	0…[42]…255 / 1
Unit	mV/A

Setting of sensitivity of current transformer, i.e. proportion input (measured current) to output signal (output voltage).

[M2314] HCSF1 - Heating Current Scaling Factor 1/1

Data type	Unsigned short
Adjustment range interfaces/ multiplier	0.0…[100.0]…999.9 / 10
Unit	%

The parameter specifies, whether 1-3 current transformers are connected in series to the heating current monitoring measurement inputs C1*.

[M2315] HCSF2 - Heating Current Scaling Factor 1/2

Data type	Unsigned short
Adjustment range interfaces/ multiplier	0.0…[100.0]…999.9 / 10
Unit	%

See parameter ↗[M2314] HCSF1 - Heating Current Scaling Factor 1 (page 116)

[M2316] HCSF3 - Heating Current Scaling Factor 1/3

Data type	Unsigned short
Adjustment range interfaces/ multiplier	0.0…[100.0]…999.9 / 10
Unit	%

See parameter ↗[M2314] HCSF1 - Heating Current Scaling Factor 1 (page 116)

[M2331] Sensi2 - Sensitivity 2

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	0…[42]…255 / 1
Unit	mV/A

Setting of sensitivity of current transformer, i.e. proportion input (measured current) to output signal (output voltage).

[M2332] HCSF4 - Heating Current Scaling Factor 2/1

Data type	Unsigned short
Adjustment range interfaces/ multiplier	0.0…[100.0]…999.9 / 10
Unit	%

The parameter specifies, whether 1-3 current transformers are connected in series to the heating current monitoring measurement inputs C2*.

[M2333] HCSF5 - Heating Current Scaling Factor 2/2

Data type	Unsigned short
Adjustment range interfaces/ multiplier	0.0…[100.0]…999.9 / 10
Unit	%

See parameter ↗[M2314] HCSF1 - Heating Current Scaling Factor 1 (page 116)

[M2324] HCSF6 - Heating Current Scaling Factor 2/3

Data type	Unsigned short
Adjustment range interfaces/ multiplier	0.0…[100.0]…999.9 / 10
Unit	%

See parameter ↗[M2314] HCSF1 - Heating Current Scaling Factor 1 (page 116)

[M2329] RELH - Heating Relay Output

Data type	Short Integer
Adjustment range interfaces/ multiplier	[0]…1
Unit	n.a.

All heating outputs of the module output a PWM signal as standard. Should a relay output with selectable cycle duration be defined for all heating outputs (see ↗[M2330] CDRH - Cycle duration Heating Relay Output (page 119)) the parameter must be set to ON.

Setting	Description
[0]	Off; Output signal PWM; See setting ↗[P026] RELH – Heating Relay Output (page 40)
1	On; Relay output

[M2330] CDRH - Cycle duration Heating Relay Output

Data type	Byte
Adjustment range interfaces/ multiplier	[2.0]…25.5 / 10
Unit	s

The cycle duration for ↗[M2329] RELH - Heating Relay Output (page 117) is stipulated.

5.5 Digital outputs

Function in flexotempMANAGER from software version 1.3.2.

5.5.1 DIO16 - Digital Output Interface

Module with 16 digital outputs.

[M2329] RELH - Heating Relay Output

Data type	Short Integer
Adjustment range interfaces/ multiplier	[0]…1
Unit	n.a.

All heating outputs of the module output a PWM signal as standard. Should a relay output with selectable cycle duration be defined for all heating outputs (see ↗[M2330] CDRH - Cycle duration Heating Relay Output (page 119)) the parameter must be set to ON.

Setting	Description
[0]	Off; Output signal PWM; See setting ↗[P026] RELH – Heating Relay Output (page 40)
1	On; Relay output

[M2330] CDRH - Cycle duration Heating Relay Output

Data type	Byte
Adjustment range interfaces/ multiplier	[2.0]…25.5 / 10
Unit	s

The cycle duration for ↗[M2329] RELH - Heating Relay Output (page 119) is stipulated.

5.5.2 DIO16_CI_SPL- Digital In-/Output Interface, Current Input with Smart Power Limitation SPL

Module with 15 digital in- / outputs and energy management Smart Power Limitation SPL.

Information on Smart Power Limitation SPL please see PSG brochure Pulse Generator.

Smart Power Limitation SPL on module DIO16_CI_SPL

- avoids unnecessary simultaneous turn-on pulses of the zones involved
- limits the feeding phase current

The function ↗Heating Current Measuring and Heating Current Monitoring (page 83) (by external current transformer) is required. Signal input for phase transit detection by module flexotemp ZCD Zero Crossing Detection available.

[M2300] CUMC - Cycle of Current Measurement

Data type	Unsigned integer
Adjustment range interfaces/ multiplier	[30]…9999 / 1
Unit	s

The parameter defines in which cycle the heating current measurement is executed.

[M2301] CUL1 - Current Limit L1

[M2302] CUL2 - Current Limit L2

[M2303] CUL3 - Current Limit L3

Data type	Unsigned integer
Adjustment range interfaces/ multiplier	0.0…[1.0]…999.9 / 10
Unit	A

Limit value of the phase current, which can be maximal switched by DIO16_CI_SPL at any time. Smart Power Limitation SPL interferes, when the limit value is exceeded.

[M2306] SPR – Smart Peak Reduction

Data type	Byte
Adjustment range interfaces	0...[1]
Unit	n.a.

Actuator impulses are controlled in that way, that there is a uniform current drain from the grid (works below the specified current limit values for Smart Power Limitation SPL).

Setting	Description
0	Off
[1]	On

[M2308] Sensi – Sensitivity

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	0…[42]…255 / 1
Unit	mV/A

Setting of sensitivity of current transformer, i.e. proportion input (measured current) to output signal (output voltage).

[M2314] HCSF1 - Heating Current Scaling Factor 1

Data type	Unsigned short
Adjustment range interfaces/ multiplier	0.0…[100.0]…999.9 / 10
Unit	n.a.

The parameter specifies, whether a current transformer is connected in series to the heating current monitoring measurement inputs 1-3.

[M2315] HCSF2 - Heating Current Scaling Factor 2

Data type	Unsigned short
Adjustment range interfaces/ multiplier	0.0…[100.0]…999.9 / 10
Unit	n.a.

See parameter ↗[M2314] HCSF1 - Heating Current Scaling Factor 1 (page 121)

[M2316] HCSF3 - Heating Current Scaling Factor 3

Data type	Unsigned short
Adjustment range interfaces/ multiplier	0.0…[100.0]…999.9 / 10
Unit	n.a.

See parameter ↗[M2314] HCSF1 - Heating Current Scaling Factor 1 (page 121)

5.6 Components for connection of I/O modules to PSG bus

5.6.1 BACI - Bus Actuator Interface, Current Input

Bus coupler for peripheral I/O nodes

[M1307] HSLI - Heat Sink Temperature Limit Value

Data type	Char
Adjustment range interfaces	0…[60]…99
Unit	°C

The heat sink temperature registered by the RS485 component SMA06G and SMA09G is transferred and monitored on the here specified limit value.
Definition of the reaction for exceeding the limit value see
↗[SP12] S1D2 – Definition Byte 2 – System Alarm 1 (page 15)
↗[SP32] S3D5 – Definition Word Channel Flag 5, 6 – System Alarm 3 (page 24)
↗[SP34] S3D7 – Definition Word Channel Flag 9, 10 – System Alarm 3 (page 27)
↗[P074] A1D2 – Definition Byte 2 – Alarm 1 (page 68)

[M1308] Sensi – Sensitivity

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	0…[42]…255 / 1
Unit	mV/A

Setting of sensitivity of current transformer, i.e. proportion input (measured current) to output signal (output voltage).

From HEX file version xx4110

[M1300] CUMC - Cycle of Current Measurement

Data type	Unsigned integer
Adjustment range interfaces/ multiplier	[30]…9999 / 1
Unit	s

The parameter defines in which cycle the heating current measurement is executed.

5.6.2 CANCT - Current Transducer Interface

Bus coupler for peripheral I/O nodes.

[M3107] HSLI - Heat Sink Temperature Limit Value

Data type	Char
Adjustment range interfaces	0…[60]…99
Unit	°C

The heat sink temperature registered by the RS485 component SMA06G and SMA09G is transferred and monitored on the here specified limit value.
Definition of the reaction for exceeding the limit value see
↗[SP12] S1D2 – Definition Byte 2 – System Alarm 1 (page 15)
↗[SP32] S3D5 – Definition Word Channel Flag 5, 6 – System Alarm 3 (page 24)
↗[SP34] S3D7 – Definition Word Channel Flag 9, 10 – System Alarm 3 (page 27)

↗[P074] A1D2 – Definition Byte 2 – Alarm 1 (page 68)

[M3100] CUMC - Cycle of Current Measurement

Data type	Unsigned integer
Adjustment range interfaces/ multiplier	[30]…9999 / 1
Unit	s

The parameter defines in which cycle the heating current measurement is executed.

5.6.3 CANCT_SPL - Current Transducer Interface with Smart Power Limitation SPL

Bus coupler for peripheral I/O nodes with energy management Smart Power Limitation SPL.

Information on Smart Power Limitation SPL please see PSG brochure Pulse Generator.

Smart Power Limitation SPL on HPC-Card

- avoids unnecessary simultaneous turn-on pulses of the zones involved
- limits the feeding phase current

The function ↗Heating Current Measuring and Heating Current Monitoring (page 83) is already integrated on the component. Signal input for phase transit detection by module flexotemp ZCD Zero Crossing Detection available.

[M3107] HSLI - Heat Sink Temperature Limit Value

Data type	Char
Adjustment range interfaces	0…[60]…99
Unit	s

The heat sink temperature registered by the RS485 component SMA06G and SMA09G is transferred and monitored on the here specified limit value.
Definition of the reaction for exceeding the limit value see
↗[SP12] S1D2 – Definition Byte 2 – System Alarm 1 (page 15)
↗[SP32] S3D5 – Definition Word Channel Flag 5, 6 – System Alarm 3 (page 24)
↗[SP34] S3D7 – Definition Word Channel Flag 9, 10 – System Alarm 3 (page 27)
↗[P074] A1D2 – Definition Byte 2 – Alarm 1 (page 68)

[M3101] CUL1 - Current Limit L1

[M3102] CUL2 - Current Limit L2

[M3103] CUL3 - Current Limit L3

Data type	Unsigned integer
Adjustment range interfaces/ multiplier	0.0…[1.0]…999.9 / 10
Unit	A

Limit value of the phase current, which can be maximal switched by CANCT_SPL at any time. Smart Power Limitation SPL interferes, when the limit value is exceeded.

[M3106] SPR – Smart Peak Reduction

Data type	Byte
Adjustment range interfaces	0...[1]
Unit	n.a.

Actuator impulses are controlled in that way, that there is a uniform current drain from the grid (works below the specified current limit values for Smart Power Limitation SPL).

Setting	Description
0	Off
[1]	On

[M3100] CUMC - Cycle of Current Measurement

Data type	Unsigned integer
Adjustment range interfaces/ multiplier	[30]…9999 / 1
Unit	S

The parameter defines in which cycle the heating current measurement is executed.

5.7 Power Controller for Heating

Prerequisite is the previous project setup of the bus coupler HPCBCCAN where the power controller for the Heating HPC can be connected.

5.7.1 HPC - Heating Power Card

Heating controller for 24 channels with 8 A each.

[M6201] CUL1 - Current Limit L1

[M6202] CUL2 - Current Limit L2

[M6203] CUL3 - Current Limit L3

Data type	Word
Adjustment range interfaces/ multiplier	0.0…[1.0]…32.0 / 10
Unit	A

Limit value of the phase current, which can be maximal switched by CANCT at any time. Smart Power Limitation SPL interferes, when the limit value is exceeded.

[M6204] U-C – Supply Voltage Compensation

Data type	Byte
Adjustment range interfaces	[0]...1
Unit	n.a.

Is the supply voltage compensation active (On), voltage-dependent current fluctuations are eliminated. Before each measurement of heating currents, a measurement of the supply voltage is executed. For a measured mV voltage, proportional to the supply voltage, of +/- 30% around the base (see ↗[M6205] U-N – Rated Voltage (page 125)), the current value is corrected, otherwise not.

Setting	Description
[0]	Off
1	On

[M6205] U-N – Rated Voltage

Data type	Word
Adjustment range interfaces/ multiplier	0…[240]…999 / 1
Unit	V

The parameter defines the base for the parameter ↗[M6204] U-C – Supply Voltage Compensation (page 125).

[M6206] SPR – Smart Peak Reduction

Data type	Byte
Adjustment range interfaces	0...[1]
Unit	n.a.

Setting	Description
0	Off
[1]	On

Actuator impulses are controlled in that way, that there is a uniform current drain from the grid (works below the specified current limit values for Smart Power Limitation SPL).

[M6207] HSLI - Heat Sink Temperature Limit Value

Data type	Char
Adjustment range interfaces	0…[60]…99
Unit	°C

The heat sink temperature registered by the HPC is transferred and monitored on the here specified limit value.
Definition of the reaction for exceeding the limit value see
↗[SP12] S1D2 – Definition Byte 2 – System Alarm 1 (page 15)
↗[SP32] S3D5 – Definition Word Channel Flag 5, 6 – System Alarm 3 (page 24)
↗[SP34] S3D7 – Definition Word Channel Flag 9, 10 – System Alarm 3 (page 27)
↗[P074] A1D2 – Definition Byte 2 – Alarm 1 (page 68)

[M6200] CUMC - Cycle of Current Measurement

Data type	Unsigned integer
Adjustment range interfaces/ multiplier	[30]…9999 / 1
Unit	s

The parameter defines in which cycle the heating current measurement is executed.

[M6217] SPL - Smart Power Limitation

Data type	Unsigned char
Adjustment range interfaces/ multiplier	[0]…1 / 1
Unit	n.a.

Setting	Description
[0]	Off
1	On

Information on Smart Power Limitation SPL please see PSG brochure Pulse Generator.

Smart Power Limitation SPL on HPC-Card
- avoids unnecessary simultaneous turn-on pulses of the zones involved
- limits the feeding phase current

The function ↗Heating Current Measuring and Heating Current Monitoring (page 83), as well as the phase transit detection are already integrated on the component.

[M6218] CUM - Current measurement

Data type	Unsigned char
Adjustment range interfaces/ multiplier	[0]…2 / 1
Unit	n.a.

Setting	Description

[0]	cyclically
1	Triggered by code number 179
2	Deactivated

[M6219] IMSM - Inhibit error message „Mains synchronization Lx missing“

Data type	Unsigned char
Adjustment range interfaces/ multiplier	[0]…2 / 1
Unit	n.a.

Setting	Description
[0]	deactivated
1	Input DI 4 (X7.9.I4) active high
2	Input DI 4 (X7.9.I4) active low

The error message can be inhibited by low/ high signal on digital input 4 (DI 4).

5.8 Further Components

The following flexotemp® components can not be specified by system parameters and parameters.

DO08R	flexotemp® Digital Output Interface Relay
CANBC	Bus Coupler
CANBE	flexotemp® CAN-Bus Extension Interface
CANBEG	flexotemp® CAN-Bus Extension Interface G
CANAIN08	flexotemp® / sysTemp® Analog Input Interface
CANPC03	flexotemp® Power Card
CANPC06	flexotemp® Power Card
CANPC12	flexotemp® Power Card
CANVT	flexotemp® Voltage Transducer Interface
CANIO08	flexotemp® Digital In-/Output Interface

5.8.1 ... described separately

For the following flexotemp® components are separate descriptions, e.g. operating instructions, service- and start-up manuals, etc. available. Parameters of the components are described there.

MPI 05 PNIO	flexotemp® Melt Pressure Input with PROFINET IO interface

6 Communication parameter

The communication parameters specify the setting for the interfaces, by which the controller communicates.

The description of the communication protocols, as well as the specification of the configuration parameters, is to be taken from the protocol descriptions and the parameter/object lists.

Set both rotary switches (LSB, MSB) on the device to **F**, set device ID in flexotempMANAGER to **DEFAULT,** that means

Interface Ethernet IP1-IP4=192.168.0.220	Parameter [CP18]-[CP21]
Serial interface SADR(Software address) =0	Parameter [CP01]
Interface CAN CADR (NodeID)=100	Parameter [CP07]

6.1 Ethernet interface

The resulting IP of the controller is a combination of the interface depending base part and the device ID. The base part is configured, the device ID is set by rotary switch on the controller.

```
Resulting Address/NodeID          Base part of Address/NodeID
                            IP = IP1.IP2.IP3.
                                          IP4                + device ID
```

6.1.1 IP Address

[CP18] IP1 – IP Address 1. Octet

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	0…[192]…255 / 1
Adjustment range BA	0…[192]…255
Unit	n.a.

1. Octet of the Base IP address (**XXX**.***.***.***).

[CP19] IP2 – IP Address 2. Octet

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	0…[168]…255 / 1
Adjustment range BA	0…[168]…255
Unit	n.a.

2. Octet of the Base IP address (***.**XXX**.***.***).

[CP20] IP3 – IP Address 3. Octet

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

3. Octet of the Base IP address (***.***.**XXX**.***).

[CP21] IP4 – IP Address 4. Octet

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	0…[220]…255 / 1
Adjustment range BA	0…[220]…255
Unit	n.a.

4. Octet of the Base IP address (***.***.***.**XXX**).

6.1.2 Subnet mask

The subnet mask is a bit mask. It specifies in IPv4 networks, how many bits make up the network prefix in an IP address. Together with the IP address it defines the address of a device on the network. The network prefix part shows which devices are in a network. This network portion must be the same for all devices in the network.

A subnet mask consists of 32 Bit and is always used in combination with the IP address.

[CP22] SUB1 – Subnet Mask of 1. Octet

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	0…[255] / 1
Adjustment range BA	0…[255]
Unit	n.a.

1. Octet of the subnet mask (**XXX**.***.***.***).

[CP23] SUB2 – Subnet Mask of 2. Octet

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	0…[255] / 1
Adjustment range BA	0…[255]
Unit	n.a.

2. Octet of the subnet mask (***.**XXX**.***.***).

[CP24] SUB3 – Subnet Mask of 3. Octet

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	0…[255] / 1
Adjustment range BA	0…[255]
Unit	n.a.

3. Octet of the subnet mask (***.***.**XXX**.***).

[CP25] SUB4 – Subnet Mask of 4. Octet

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

4. Octet of the subnet mask (***.***.***.**XXX**).

6.1.3 Gateway

The gateway in an IP configuration does route not subnet relevant network requests to another subnet.

[CP26] GWY1 – Gateway Address 1. Octet

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	0…[192]…255 / 1
Adjustment range BA	0…[192]…255
Unit	n.a.

1. octet of the gateway address (**XXX**.***.***.***)

[CP27] GWY2 – Gateway Address 2. Octet

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	0…[168]…255 / 1
Adjustment range BA	0…[168]…255
Unit	n.a.

2. octet of the gateway address (***.**XXX**.***.***)

[CP28] GWY3 – Gateway Address 3. Octet

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

3. octet of the gateway address (***.***.**XXX**.***)

[CP29] GWY4 – Gateway Address 4. Octet

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	0…[1]…255 / 1
Adjustment range BA	0…[1]…255
Unit	n.a.

4. octet of the gateway address (***.***.***.**XXX**)

6.1.4 Port

[CP15] PRT1 – Port 1

Data type	Unsigned Short
Adjustment range interfaces/ multiplier	0…[5000]…9999 / 1
Adjustment range BA	0…999
Unit	n.a.

By the respective port number, the protocol switch-over in the controller is done.

Setting	Description	
[5000]	Binary Ethernet Protocol + CoDeSys Protocol	For the simultaneous communication by flexotempMANAGER and CoDeSys at least 2 ports must be set to 5000.
5001 4000...4999	Text based Ethernet Protocol + CoDeSys Protocol	
2005...2015 5005...5015	Send/Receive Protocol (see chapter ↗Send/Receive interface (page 139))	To use the Send/Receive protocol, 1 port must be set to 5005. Are several ports set to 5005, only the first one is connected with the control.
80	HTML	For the web-based operation of the controller at least one port must be set to 80. Due to the fact, that the web based operation is built on several frames, it is recommended to set more than one port to 80, to guarantee a trouble-free use. On each port only one connection can be build at a time.

[CP16] PRT2 – Port 2

Data type	Unsigned Short
Adjustment range interfaces/ multiplier	0…[5000]…9999 / 1
Adjustment range BA	0…999
Unit	n.a.

See parameter ↗[CP15] PRT1 – Port 1 (page 132).

[CP17] PRT3 – Port 3

Data type	Unsigned Short
Adjustment range interfaces/ multiplier	0…[80]…9999 / 1
Adjustment range BA	0…999
Unit	n.a.

See parameter ↗[CP15] PRT1 – Port 1 (page 132).

6.2 Serial interface

[CP01] SADR – Software Base Address

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

The resulting software address of the controller is a combination of the interface depending base part and the device ID. The base part is configured, the device ID is set by rotary switch on the controller.

```
Resulting Address/NodeID          Base part of Address/NodeID
                Software Address = SADR                          + device ID
```

[CP02] PROT – Protocol

Data type	Byte
Adjustment range interfaces	[0]…2
Adjustment range BA	[0]…2
Unit	n.a.

Setting	Description
[0]	PSG (PSG II)
1	rtu (Modbus)
2	HRS (PSG-II with interlocking of start)

Protocol for communication over serial data interface.
*) For operation in PSG control cabinets with PC operator interface.

[CP03] BAUD – Baud Rate

Data type	Byte
Adjustment range interfaces	0...[4]
Adjustment range BA	0...[4]
Unit	n.a.

Setting	Description
0	1200
1	2400
2	4800
3	9600
[4]	19200

[CP04] STOP – Number of Stop Bits

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…1
Adjustment range BA	[0]…1
Unit	n.a.

Setting	Description
[0]	1 Stop bit
1	2 Stop bits

Number of the stop bits with communication over the serial data interface.

[CP05] PARI – Parity

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…2
Adjustment range BA	[0]…2
Unit	n.a.

Setting	Description
[0]	oFF
1	Even
2	Odd

Parity bit for communication over serial data interface.

6.3 CAN interface

The resulting NodeID of the controller is a combination of the interface depending base part and the device ID. The base part is configured, the device ID is set by rotary switch on the controller.

```
Resulting Address/NodeID          Base part of Address/NodeID
                          NodeID = CADR                          + device ID
```

[CP07] CADR – Base NodeID

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	[0]…127 / 1
Adjustment range BA	[0]…127
Unit	n.a.

[CP08] CBD1 – CAN Baud Rate

Data type	Byte
Adjustment range interfaces	0...[3]…6
Adjustment range BA	0...[3]…6
Unit	n.a.

Setting	Description
0	78k
1	100k
2	125k
[3]	250k
4	500k
5	800k
6	1M

[CP11] CANT – Timeout CAN (Zone off)

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	[0]…120 / 1
Adjustment range BA	[0]…120
Unit	ms

Specifies the time within which communication over the CAN-Bus must occur. If no communication is determined, no actuating signal is output to the control outputs.
Setting value = 0 deactivates the function.

[CP10] A-OP – Auto Operational Modus CANopen

Data type	Byte
Adjustment range interfaces	0…[1]
Adjustment range BA	0…[1]
Unit	n.a.

Setting	Description
0 - Off	The components on the CAN-Bus are provided with the "Auto-operational" command from a CA-Nopen Master.
[1] - On	The controller, as well as that relevant CAN peripheral components, are functional in CAN-open operation, also without CAN-open masters. For this, the controller sends the "Auto-operational Mode On" command.

6.4 CAN field bus

[CP09] CBD2 – CAN Baud Rate

Data type	Byte
Adjustment range interfaces	0...[3]…6
Adjustment range BA	0...[3]…6
Unit	n.a.

Setting	Description
0	78k
1	100k
2	125k
[3]	250k
4	500k
5	800k
6	1M

6.5 Interface Modbus

The resulting Modbus address of the controller is a combination of the interface depending base part and the device ID. The base part is configured, the device ID is set by rotary switch on the controller.

```
Resulting Address/NodeID          Base part of Address/NodeID
                  Modbus address = MADR                          + device ID
```

[CP06] MADR – Modbus Base Address

Data type	Byte
Adjustment range interfaces	0...[1]…255
Adjustment range BA	0...[1]…255
Unit	n.a.

Valid only in case of ↗[CP02] PROT – Protocol (page 133) = rtu.

Determines the address. Specifies the Modbus address of the first zone of the controller. The MODBUS addresses of the following controller zones are sequential.

All further settings of the interface are identical with the settings for the serial interface (see chapter ↗Serial interface (page 133)).

6.6 Profibus DP interface

The resulting Profibus DP slave address of the controller is a combination of the interface depending base part and the device ID. The base part is configured, the device ID is set by rotary switch on the controller.

```
Resulting Address/NodeID          Base part of Address/NodeID
       Profibus DP slave address = DPAD                          + device ID
```

[CP12] DPAD – Profibus DP Base Slave Address

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	0…[30]…255 / 1
Adjustment range BA	0…[30]…255
Unit	n.a.

[CP13] DPEA – DPEA Protocol

Data type	Byte
Adjustment range interfaces	0…[1]
Adjustment range BA	0…[1]
Unit	n.a.

Setting	Description
0	Off
[1]	On

Specifies the protocol, that is communicated over the Profibus.

[CP14] DP-T – Timeout DP (Zone off)

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	[0]…120 / 1
Adjustment range BA	[0]…120
Unit	ms

Specifies the time within which communication over the CAN Bus must occur. If no communication is determined, no actuating signal is output to the control outputs.
Setting value = 0 deactivates the function.

6.7 Send/Receive interface

For connection of the controller with a S7 control system, Ethernet can be used. For this the Send/Receive protocol is available.

Using PCU/MCU as hot runner controller, the parameters for the Send/Receive interface are not available in the operation software **TEMPSoft2**.

To use the Send/Receive protocol, the parameter ↗[CP15] PRT1 – Port 1 (page 132) must be set to 5005.

[CP30] SR – Active

Data type	Byte
Adjustment range interfaces/ multiplier	[0]…1
Adjustment range BA	[0]…1
Unit	n.a.

Setting	Description
[0]	Off
1	On

The interface can be activated by this parameter.

[CP31] SR1 – IP Address 1. Octet

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

1.Octet of IP address of S7 (**XXX**.***.***.***).

[CP32] SR2 – IP Address 2. Octet

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

2.Octet of IP address of S7 (***.**XXX**.***.***).

[CP33] SR3 – IP Address 3. Octet

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

3.Octet of IP address of S7 (***.***.**XXX**.***).

[CP34] SR4 – IP Address 4. Octet

Data type	Unsigned Char
Adjustment range interfaces/ multiplier	[0]…255 / 1
Adjustment range BA	[0]…255
Unit	n.a.

4.Octet of IP address of S7 (***.***.***.**XXX**).

[CP35] SRP – Port

Data type	Unsigned Short
Adjustment range interfaces/ multiplier	[0]…9999 / 1
Adjustment range BA	0…999
Unit	n.a.

Port of S7.

[CP36] SRBR – Size of Receiving Buffer

Data type	Unsigned Short
Adjustment range interfaces/ multiplier	[0]…512 / 1
Adjustment range BA	[0]…512
Unit	WORD

Specification of the length of the data block, that was configured for sending to S7 (received by controller).

[CP37] SRBS – Size of Sending Buffer

Data type	Unsigned Short
Adjustment range interfaces/ multiplier	[0]…512 / 1
Adjustment range BA	[0]…512
Unit	WORD

Specification of the length of the data block, that was configured for receiving by S7 (send by controller).

[CP38] SRST – Sending Cycle

Data type	Unsigned Short
Adjustment range interfaces/ multiplier	[0]…512 / 1
Adjustment range BA	[0]…512
Unit	ms

Sending cycle of controller.

For long S7 processing cycles, which are caused by the process of CoDeSys programs, the sending cycle of the controller could be increased.

Example for a connection of PCU048 to S7

IP of PCU048 192.168.0.150/Port 5005
IP of S7 192.168.0.159/Port 5004
Length data block Send/Receive 128

↗[CP15] PRT1 – Port 1 (page 132)	5005
↗[CP30] SR – Active (page 139)	ON
↗[CP31] SR1 – IP Address 1. Octet (page 139)	192
↗[CP32] SR2 – IP Address 2. Octet (page 139)	168
↗[CP33] SR3 – IP Address 3. Octet (page 140)	0
↗[CP34] SR4 – IP Address 4. Octet (page 140)	159
↗[CP35] SRP – Port (page 140)	5004
↗[CP36] SRBR – Size of Receiving Buffer (page 140)	128
↗[CP37] SRBS – Size of Sending Buffer (page 140)	128
↗[CP38] SRST – Sending Cycle (page 141)	0...999

7 FAQ

Here a set of frequently asked questions and the corresponding answers on different topics.

Difference between parameter Actual Setpoint Value and [P001] Setpoint Value at read and write?	
	Writing can be done for the Actual Setpoint Value as well as for the [P001] Setpoint Value. Both values are assumed to the setpoint value. For reading the setpoint value it is recommended to read the Actual Setpoint Value, to get the actual controlled setpoint value (e.g. in reduction mode,...). In parameter [P001] Setpoint Value you always get the values of parameter Setpoint Values.

Exists there an EEPROM error in the channel flag register?	
	In channel flag register CF7/8 Bit 8 an "System data error" is signalized. In channel flag register CF7/8 Bit 9 an "Channel data error" is signalized.

Meaning of Alarm 1 to 4 and system alarm 1 to 4 in system parameter [SP31]?	
	In channel flag 3 the "Alarm Status" (not the status of the alarm output) is shown. Alarm 1...4 is the status of the "Channel Alarms". System alarm 1...4 is the status of the "System Alarms".

Can the Setpoint Values and the Release Limit Values always be written? Disadvantages?	
	Yes. No, because it is checked, whether the values changes.

How to access the values of MPI02 with PROFINET?	
	To access the values of MPI02 the so called "Direct IO's" must be used in the project setup of flexotempMANAGER. The Direct IO's are then available for PROFINET.

How can the signal "Heating Contactor ON" be controlled by PROFINET?	
	Use a virtual digital input. That can be set/reset by PROFINET. Combine the virtual digital input in the project setup with e.g. a system input and configure it, that it switches the Heating outputs on/off.

How you receive information in the control about the controller inputs?	
	The status of the controller inputs can be read by the channel flags.

Can the handshake bits 13 and 14 in PROFINET be left pending? Disadvantages?	
	The handshake bits may be set to "1" when it is ensured, that the data in the write objects is correct.

Writing the limit values into the controller and having the alarm evaluation (temperature) running in the controller: Which limit values should be used?	
	You can use any of the limit values.

How reacts the PCU/MCU when the same setpoint value is written?	
	The change of the written values is checked, that why nothing happens.

With which parameter the zone can be passivated? Zone=OFF?	
	With parameter [P006] Zone.

A zone is passivated by?	
	Setpoint value = 0
	Zone = Off
	Missing Group Release
	Potential error
	Channel data error
	System data error

Set device ID by rotary switch	
	Is the rotary switch set to FF, the project setup is not started. Display by double-flash.

Behavior in case of defective or not connected Pt100 sensors	
	Wire break on connector F+ => Display 1999.9 °C (sensor break active) Wire break on connector F- => Display 1999.9 °C (sensor break active) Wire break on connector 0V => Display -35 °C (sensor break and TCAL active)
	Conductor fault on connector F+/0V => Display -35 °C (TCAL active) Conductor fault on connector F+/F- => Display -35 °C (TCAL active) Conductor fault on connector F-/0V => No effect due to 3-wire connection
Prerequisite	↗[P014] TCAL – Monitoring of Sensor SAL (page 53)=ON ↗[P015] TCAT – Time for Monitoring of Sensors (page 54): value dependent on zone behavior
	*) Negative values can differ.

Treatment actual value 0°C?	
	If a sensor module reports an actual value of exactly 0.0°C via the CAN-BUS, the previous actual value deviating from 0.0°C is valid for max. 3 sec. An entry is made in the error memory of the controller. - Error 100 at 0°C at PNIO; the corresponding channel is in the NodeID - Error 101 at 0°C at the CAN-BUS; the corresponding channel is in the NodeID

Can actual values PCU/MCU be set via any interface?	
	[Since firmware version 1010A] If actual values (whether actual value 1 or actual value 2) are written to the zones via interface, these are used by the controller. Timeout time is 15 seconds, i.e. if no new process value is written within 15 seconds, the process value evaluation configured by default takes place.

8 Appendix

8.1 Version History

Version	Date	Changes
1.02.18	5/7/2019	Amendment of operating instructions flexotempMANAGER from software version 1.03.06 In detail the following amendments were made: ■ [P008] in table 6 and 7 added ■ [P062],[P064],[P066],[P068],[P070],[P072] Limit value definition Bit 0x04 added
1.02.17	2/5/2019	Amendment of operating instructions flexotempMANAGER from software version 1.03.06 In detail the following amendments were made: ■ [P014] specified ■ [P013] specified ■ [P008] specified ■ [P028] specified ■ [M6219] Bit 1/2 changed ■ Component TC16, DIO32CI new ■ FAQ added ■ Dependence [P026] and [M2329]
1.02.16	8/28/2015	Amendment of operating instructions flexotempMANAGER from software version 1.03.04 & 1.03.05 In detail the following amendments were made: ■ Module MPI05PNIO removed; Reference to a separate document ■ [P104] added
1.02.15	12/11/2014	Amendment of operating instructions flexotempMANAGER from software version 1.03.03 In detail the following amendments were made: ■ [P022] 12, 13 added ■ Module MPI05PNIO added ■ Parameter Module MPI02 specified ■ [P039] for main controller 0 mandatory ■ Parameter [M2201]; [M2202] specified ■ Component PT1000_12 new ■ Home Automation; Parameter [P028], [P029], [P030], [P031] ■ Parameter component DO16 described (from fM V 1.3.2) ■ HPC24 [M6219] new
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