

Integrated hot runner controller
profiTEMP+ SYSTEM

Start-up and service manual

INHALT

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1 PREFACE

1.1 VERSIONS DOCUMENTATION

Datum	Version	Änderung
08.04.2024	0.00.04	Corrections
15.02.2024	0.00.03	Corrections
05.06.2023	0.00.02	Pre-release with corrections

1.2 INFORMATION ABOUT THIS MANUAL

This technical information is primarily intended for designers, project engineers and device developers. It does not provide any information on delivery options. Changes, omissions and errors excepted. Illustrations similar.

1.2.1 DISCLAIMER

These instructions have been carefully prepared and checked. Observance of the operating manual is a basic prerequisite for safe operation of the appliance and for achieving the specified product properties and performance characteristics. Meusburger Georg GmbH & Co KG accepts no liability for personal injury, property damage or financial loss caused by failure to observe the operating manual. Liability for material defects is excluded in such cases.

This device has been safely designed and built by us and has left the factory in a technically safe condition. To maintain this condition and ensure safe operation, the user must observe the instructions and warnings contained in this operating manual (ä 1.3.4 Safety instructions).

As compliance with the safety regulations is beyond our control, we cannot accept any liability for damage resulting from non-compliance with one or more of these regulations. The list of safety regulations cannot be exhaustive. Failure to mention one of these regulations does not mean that they do not apply.

Commissioning, maintenance and servicing work may only be carried out by persons who are recognised as specialists in accordance with the regulations (VDE regulations, Equipment Safety Act, accident prevention regulations of the employers' liability insurance associations, etc.).

Meusburger Georg GmbH & Co KG reserves the right to make changes to this manual or the product described in it without prior notice if these serve to improve the product and/or technical progress.

We are grateful for any suggestions for improvement that will help to make our appliances even more efficient products in the future.

1.2.2 TERMS OF DELIVERY

The general terms and conditions of sale and service of Meusburger Georg GmbH & Co KG apply.

1.2.3 WARRANTY CONDITIONS

This product is subject to the statutory warranty periods for faults or defects in manufacture.

If a malfunction occurs due to manufacturing, the manufacturer/supplier will repair or replace the faulty product at its own discretion.

The following repairs are not covered by the warranty and are subject to a charge:

- » Malfunctions after the statutory periods have expired
- » Malfunctions caused by incorrect operation and/or incorrect parameterisation by the user (if the device is not operated as described in the commissioning and service manual)
- » Malfunctions caused by other devices
- » Modifications or damage to the device not caused by the manufacturer/supplier

If you wish to make a claim under this warranty, please contact the manufacturer/supplier..

1.3 SECURITY

These operating instructions contain information that you must observe for your personal safety and to prevent damage to property when working with the Meusburger product.

**DANGER**

All instructions in this manual must be read and followed in full.

1.3.1 TARGET GROUP OF THESE INSTRUCTIONS

These operating instructions contain the necessary information for the intended use of the product described. It is intended for specialised personnel involved in design, project planning, service and commissioning. Comprehensive knowledge of automation technology is required for correct understanding and error-free implementation of the technical descriptions, operating information and, in particular, hazard and warning notices.

1.3.2 INTENDED USE

profitemp+ SYSTEM is intended exclusively for the temperature-dependent control of electric heaters. It is intended exclusively for installation in a switch cabinet that may only be opened by specialised personnel using tools or keys. The switch cabinet must be constructed in such a way that protection against electric shock and fire protection in accordance with UL 61010 and CSA C22.2 No. 61010 is guaranteed.

Project planning and commissioning must be carried out using Meusburger's own project planning and configuration tool flexotempMANAGER. The installer of the system is responsible for parameterising the functions required by the customer. The system offers extensive error messages and safety functions, which can and must be used by the installer of the system under his own responsibility. The system is operated via a PC with Meusburger Georg GmbH & Co KG's own PC software installed (flexotempMANAGER project planning and configuration tool or TEMPSoft2 operating software) or via a bus connection to the machine control system. In addition, the use of spare parts from third parties and the application of non-described maintenance activities are not part of the intended use.

Uses other than those listed above are considered improper use and exclude the liability of the manufacturer/supplier for any resulting personal injury, property damage and consequential damage.

1.3.3 DANGER AND WARNING NOTICES

Please pay particular attention to the additional instructions that we have labelled with symbols in these operating instructions. Some of these notes draw attention to dangers, others are more for the reader's guidance.

The following safety-relevant and informative symbols and conventions are used in this commissioning and service manual:

**DANGER**

The DANGER sign indicates an immediately dangerous situation which will inevitably lead to a serious or fatal accident if the warning is ignored.

**WARNING**

The WARNING indicates a potentially hazardous situation which, if not avoided, could result in a serious or fatal accident or damage to this appliance or other appliances.

**CAUTION**

The CAUTION notice indicates a potentially dangerous situation which may lead to an accident or damage to this appliance or other appliances if the notice is ignored.

**NOTE**

A NOTICE indicates a potentially hazardous situation which, if ignored, may result in damage to this appliance or other appliances.

1.3.3.1 OTHER NOTES

**REFERENCE**

A REFERENCE draws attention to additional information relating to the use of the product described. It can also be a cross-reference to information that can be found elsewhere (e.g. in other manuals).

1.3.4 SAFETY INSTRUCTIONS

**DANGER**

Please observe the following safety instructions for protection against electric shock, risk of injury and fire. Local safety regulations and safety instructions must be observed during commissioning.

All persons involved in the installation/commissioning/operation/maintenance/maintenance of this appliance must

- » be appropriately qualified
- » follow this commissioning and service manual carefully
- » regard the commissioning and service manual as part of the product
- » retain the commissioning and service manual during the service life of the product
- » pass the commissioning and service manual on to any subsequent owner or user of the product
- » ensure that any additions received are included in the commissioning and service manual.

Please observe the following safety instructions for protection against electric shock, risk of injury and fire.

Local safety regulations and safety instructions must be observed before commissioning.

Do not leave packaging material lying around carelessly, plastic film/styrofoam parts etc. could be dangerous to people.

The appliance must be installed as described in chapter 4 Installation and commissioning. Protect the appliance from moisture.

Do not use in areas with high humidity.

Check that the voltage on the rating plate is identical to the local mains voltage.

Make sure that the connected injection molding tool, for example, is connected to the protective earth conductor.

Do not place any containers filled with liquids on the appliance, otherwise a dangerous situation may arise.

The clearances for supply and exhaust air must be maintained around all components in accordance with the specifications in the technical data. Do not insert any objects into the fans.

1.3.5 TRANSPORTATION AND STORAGE

1.3.5.1 TRANSPORT

The profiTEMP+ SYSTEM (all individual components together) is supplied in a sturdy, shockproof cardboard box. This normally guarantees sufficient protection.

1.3.5.2 UNPACKING

Check the packaging and then the profiTEMP+ SYSTEM for visible transport damage. If damage is visible, please contact the transport company.

1.3.5.3 STORAGE

If the unpacked profiTEMP+ SYSTEM is not put into operation immediately, it must be stored away from dirt and moisture. The conditions set out in the technical data apply.

1.3.6 LIFTING AND CARRYING

A fully assembled profiTEMP+ SYSTEM may weigh more than 18 kg. For this reason, the profiTEMP+ SYSTEM is supplied in individual components. These must be transported individually. When assembling the system, make sure that the pT+Rack is assembled first in accordance with chapter 3 Assembly and connections. It can then be fitted with the individual components. A fully assembled rack must be dismantled into individual components before transportation.

1.3.7 DISPOSAL

Meusburger Georg GmbH & Co KG as a manufacturer within the meaning of the ElektroG (Electrical and Electronic Equipment Act), which transposes the European WEEE Directive 2002/96/EC into German law, is registered under the number WEEE registration number DE 66448978. The components of the profiTEMP+ SYSTEM are also taken into account.

1.3.8 MAINTENANCE

Special maintenance of the profiTEMP+ SYSTEM is not necessary. Make sure the surfaces are clean. Use a slightly damp cloth for cleaning. Avoid the use of solvents, cleaning agents and abrasives.

1.3.9 SERVICE

We can help you quickly and cost-effectively at any time. Please send us the device well packaged with a repair order and as precise a description of the fault as possible. We will prepare a cost estimate and carry out the repair after your approval.

2 PRODUCT DESCRIPTION

2.1 GENERAL DESCRIPTION

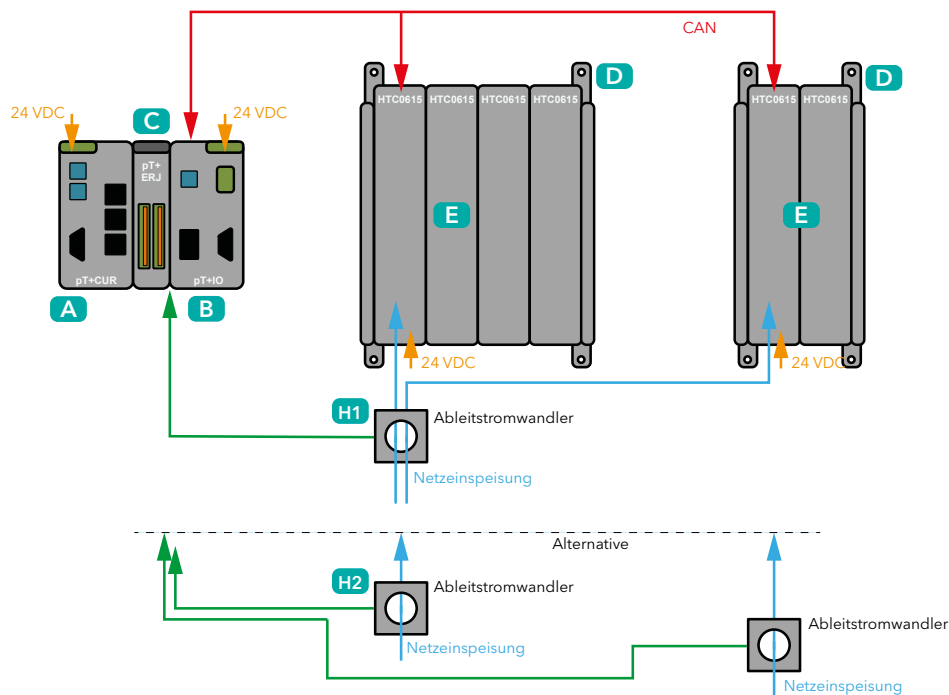
profiTEMP+ SYSTEM is suitable for heating hot runner tools in injection molding machines. For this purpose, the integrable hot runner controller is connected directly to the hot runner in the injection mold via connecting cables.

profiTEMP+ SYSTEM supplies an electric current to the hot runner heaters in the injection mold during operation. The heating current enables an adjustable temperature increase of the heaters and thus also of the mold. In parallel, continuous temperature monitoring takes place via connected thermocouples. In the event of deviations between a currently recorded temperature and the target temperature set on the hot runner controller, the output level is automatically readjusted until both temperatures are the same.

profiTEMP+ SYSTEM has a modular design and enables a version that is optimally adapted to the application.

2.2 COMPONENTS / SYSTEM STRUCTURE

With the help of profiTEMP+ SYSTEM components, the hot runner controller can be adapted to the requirements of the hot runner to be controlled in the injection mold. The system has a modular design and some of the functions are optional. If these are not used, the associated components do not need to be installed.



A pT+CUR Temperature controller for a maximum of 192 control zones with fieldbus interface.

B pT+IO (optional) IO module with 2 measuring inputs for leakage current transformers, 3 digital inputs and one digital output (relay contact). The number of pT+IO depends on the number of RCT leakage current transformers used. A maximum of 8 pT+IO can be used.

C pT+ERJ (optional, measuring inputs for external cold junction) Pt 100 cold junction sensors can be connected if no thermocouple compensation cable is used as sensor cables.

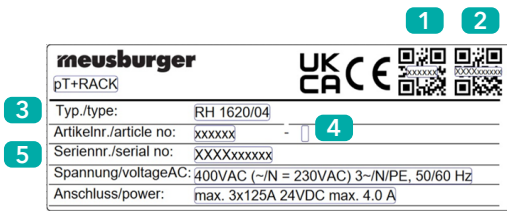
D pT+RACK with 2, 4, 6 or 8 slots for plug-in cards pT+HTC 06/15. Depending on the number of zones, several racks must be used, the maximum number of slots is 32 in total (corresponding to 192 control zones).

E pT+HTC 06/15 Plug-in card with heating outputs and temperature measurement inputs for 6 control zones.

H RCT (optional): Current transformer for detecting leakage currents. If several pT+ racks are used, one leakage current transformer can be used per rack (H2) or one leakage current transformer for several racks (H1).

2.2.1 LABELING

2.2.1.1 TYPE PLATE



1 QR code shows the article number.

2 QR code shows the serial number.

3 The type designation provides information about the device version

4 Article number

5 Serial number The number combination of the serial number consists of the production date and a consecutive number. The number combination allows Meusburger Georg GmbH & Co KG to clearly identify the device version, software and hardware version and is used for traceability purposes.

2.2.2 SCOPE OF DELIVERY

The scope of delivery of all components consists of:

» Device (in ESD-compliant bag)

3 STRUCTURE AND CONNECTIONS



DANGER

In all cases where the adjacent symbol appears on the device, it is essential to observe the safety instructions for the profiTEMP+ SYSTEM marked with this symbol/sign/sticker. This commissioning and service manual must be consulted in all cases.

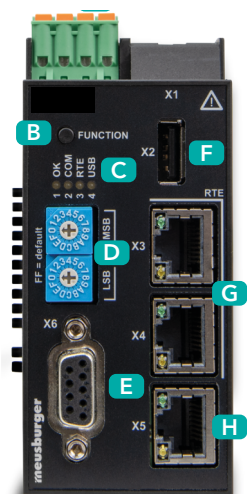


WARNING

The system may only be connected by authorized and trained specialist personnel. Incorrect connection can destroy the individual components, connected heaters or sensors!

Due to the modular design, the connections are located on the components of the control system. Some functions are optional. If these functions are not used, the components with the associated inputs and outputs do not need to be used.

3.1 pT+CUR



- A** X1 | 24VDC Power supply
- B** Button
- C** LEDs
- D** Rotary switch (addressing)
- E** X6 | RS485 or CAN depending on the device version
- F** USB (Memory stick)
- G** X3 & X4 | Real Time Ethernet (Profinet or EtherCAT)
- H** X5 | Ethernet

3.1.1 POWER SUPPLY

The device must be supplied with 24 VDC in accordance with the technical data (see below). Reverse polarity protection is included in the device. The supply voltage (24 VDC) of the device must be fused externally. The specifications in the technical data must be observed. The 24VDC circuit is to be regarded as a "limited energy" circuit due to the external fuse protection in accordance with the technical data. The power supply unit has built-in reverse polarity protection. The supply line and the power supply unit must be protected with external short-circuit and overload protection with a tripping current of max. 4 A.

Plug	Pin	Function	Remark
X1	1	U1	24 VDC, internally bridged with X1.2
X1	2	U2	24 VDC, internally bridged with X1.1
X1	3	0V1	internally bridged with X1.4
X1	4	0V2	internally bridged with X1.3

3.1.2 ETHERNET

The Ethernet interface enables the network connection. The "LNK" and "RCV" status LEDs provide information about a successful network connection.

Plug	Pin	Function
X5	1	TX+
X5	2	TX-
X5	3	RX+
X5	4	75 Ohm
X5	5	75 Ohm
X5	6	RX-
X5	7	75 Ohm

Plug	Pin	Function
X5	8	75 Ohm
LED LNK	green	Connection data
LED RCV	yellow	Transmission speed / activity



WARNING

When integrating into publicly accessible networks, suitable measures must be taken to prevent unauthorized access

3.1.3 FIELDBUS (OPTIONAL)

3.1.3.1 PROFINET

The optional PROFINET interface connects profiTEMP+ SYSTEM with the industrial fieldbus standard for automation. In the PROFINET IO context, pT+CUR represents the connected control zones as a decentralized field device and thus assumes the role of an IO device for the system.

Plug	Pin	Function
X3/X4	1	Transmit Data +
X3/X4	2	Transmit Data -
X3/X4	3	Receive Data +
X3/X4	4	NC
X3/X4	5	NC
X3/X4	6	Receive Data -
X3/X4	7	NC
X3/X4	8	NC
LED LNK	green	shows the connection to the physical network.
LED RCV	yellow	indicates network activity.

3.1.3.2 ETHERCAT

The optional EtherCAT interface connects profiTEMP+ SYSTEM with the industrial fieldbus standard for automation. The connector X3 represents the EtherCAT IN, X4, EtherCAT OUT, is intended for forwarding the fieldbus system. The functions of profiTEMP+ SYSTEM are stored in the device description. Configuration is carried out via the EtherCAT configurator of the control system.

Plug	Pin	Function
X3/X4	1	Transmit Data +
X3/X4	2	Transmit Data -
X3/X4	3	Receive Data +
X3/X4	4	NC
X3/X4	5	NC
X3/X4	6	Receive Data -
X3/X4	7	NC
X3/X4	8	NC
LED LNK	green	shows the connection to the physical network.
LED RCV	yellow	indicates network activity.

3.1.4 CANOPEN/RS485

Depending on the device version, either CANopen or an RS485 interface is available.

Plug	Pin	Function CAN (Pin)	Function RS485 (Socket)
X6	1		TX+
X6	2	CAN-L	TX-
X6	3		
X6	4		
X6	5		RX-
X6	6		RX+
X6	7	CAN-H	
X6	8		
X6	9		0V



3.1.5 TECHNICAL DATA

Power supply

Supply voltage: 24VDC \pm 10% (PELV), external fuse max. 3.15A F required (e.g. Siba 189000.3,15 / fuse must blow safely at 7.5A in 120 s)

Power consumption: max. 8 W

Fuse protection: external 4A M

Operation and displays

Display: 4 status LEDs

Operation: 1 button for address scan and firmware update

Data interfaces/communication

RS485

Transmission speed: 1200, 2400, 4800, 9600, 19200 bit/s (configurable)

Bus system: 4-wire

Connection: 9-pin DSUB socket

CANopen (external)

Transmission speed [kbit]/maximum permissible bus length [m]: 100/500,125/450,250/250,500/100,800/50,1000/30 kBit (configurable)

Connection: 9-pin DSUB plug

Ethernet

Address: configurable

Connection: RJ45

Real Time Ethernet

Connection: 2 x RJ45

Protocol: Profinet IO | EtherCAT

CAN (system bus)

Transmission speed 250 kBit

Max. permissible bus length: 250 m

Connection: Socket on the side/bottom of the housing

Bus termination: activated, as start of bus

Storage media

USB, front

Electrical safety / EMC

IEC 61010-1:2010/AMD1:2016/AC:2019

EN 61010-1:2010/A1:2019+ A1:2019/AC:2019

UL 61010-1:2012 R7.19

CAN/CSA-C22.2 NO. 61010-1-12 + GI1 + GI2 (R2017) + A1

EMC_ EN 61326-1, industrial requirements

Overvoltage category III

Protection class II

Ambient temperature

Operation 0-45 °C

Transport, storage -25-70 °C

Climatic application class

Air pressure 860...1080 hPa

Humidity at 25°C / max.95%, at 50°C / max. 50%, linearly interpolated in between

Sound pressure level: < 50 dB

Pollution degree 2

Installation altitude above sea level: max. 2000 m

Mechanics

Weight: 0.4 kg

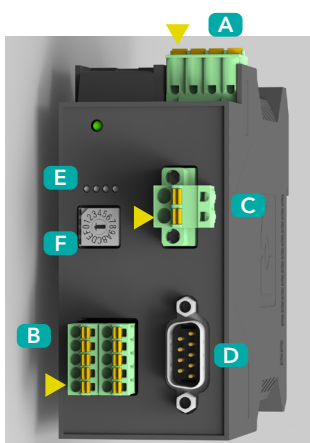
Dimensions (H x W x D): 99 x 45 x 114.5 mm

Mounting type: snap-on to top-hat rail (DIN EN 50022), horizontal installation position

To ensure adequate ventilation, the minimum distance of 50 mm upwards and 50 mm downwards to neighboring devices and switch cabinet surfaces must be maintained. The lateral distance to external devices and switch cabinet surfaces must not be less than 20 mm.

3.2 pT+IO

Use of the module is optional. It is used when status information is to be evaluated via a digital output, when functions are to be controlled via digital inputs and leakage currents are to be detected.



- A** X1 | 24VDC Power Supply
- B** Digital inputs / Input Residual current measuring
- C** Digital output
- D** CAN
- E** LEDs
- F** Rotary switch

3.2.1 POWER SUPPLY

The device must be supplied with 24 VDC in accordance with the technical data (see below). Reverse polarity protection is included in the device. The supply voltage (24 VDC) of the device must be fused externally. The specifications in the technical data must be observed. The 24 VDC circuit is to be regarded as a "limited energy" circuit due to the external fuse protection in accordance with the technical data.

Plug	Pin	Function	Remark
X1	1	U1	24 VDC, internally bridged with X1.2

Plug	Pin	Function	Remark
X1	2	U2	24 VDC, internally bridged with X1.1
X1	3	0V1	internally bridged to X1.4
X1	4	0V2	internally bridged to X1.3

3.2.2 MEASURING INPUTS FOR LEAKAGE CURRENT TRANSFORMERS

Plug	Pin	Function	Remark
X3	6	RC11	Leakage current transformer 1
X3	7	RC12	
X3	8	nc	
X3	9	RC21	Leakage current transformer 2
X3	10	RC22	

3.2.3 DIGITAL INPUTS

Plug	Pin	Function	Remark
X3	1	D0V	
X3	2	D+U	
X3	3	DI1	Digital input 1
X3	4	DI2	Digital input 2
X3	5	DI3	Digital input 3

3.2.4 DIGITAL OUTPUT

Plug	Pin	Function
X2	1	13
X2	2	14

3.2.5 TECHNICAL DATA

Power supply

Supply voltage: 24 VDC ±10% (PELV), external fuse max. 3.15A F required (e.g. Siba 189000.3,15 / fuse must blow safely at 7.5A in 120 s)

Power consumption 3 W

Display / operation

9 x LED for status display

Digital output

Quantity: 1

Potential-free relay contact 250 VAC/ 1 A

Alarm output function (configurable)

Digital input

Quantity: 3

Logic input, galvanic isolation

Rated input voltage 0-30 VDC

Rated input current <10 mA at 24 VDC

Connection cable < 30 m

Measuring input leakage current

Quantity: 2

Measuring range 0-100 mA (with provided leakage current transformers)

Resolution 1 mA

Connection cable < 30 m

Interfaces/communication

CAN to pT+RACK

Transmission speed 500 kBit

Max. permissible bus length 100 m

Connection: Terminal

Electrical safety / EMC

IEC 61010-1:2010/AMD1:2016/AC:2019

EN 61010-1:2010/A1:2019+ A1:2019/AC:2019

UL 61010-1:2012 R7.19

CAN/CSA-C22.2 NO. 61010-1-12 + GI1 + GI2 (R2017) + A1

EMC EN 61326-1:2013, industrial requirements

Overvoltage category III

Protection class II

Ambient conditions

Operation: 0-45 °C

Transport, storage: -25-70 °C

Climatic application class

Relative humidity < 75 % annual average, no condensation

Sound pressure level: < 50 dB

Pollution degree 2

Installation altitude above sea level max. 2000 m

Mechanics

Weight: 0.4 kg

Mounting: Can be snapped onto top-hat rail (DIN EN 50022); horizontal

Installation position

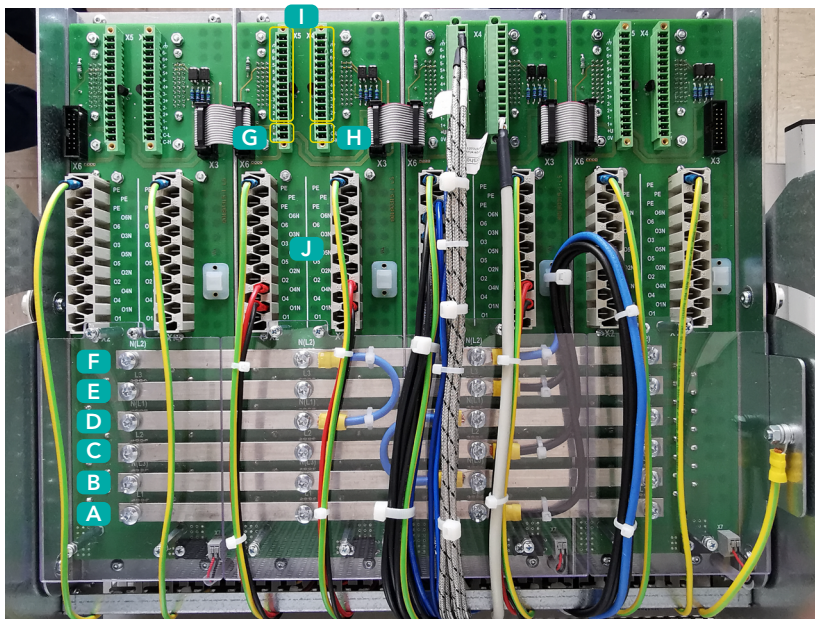
Dimensions: 99 x 22.5 x 114.5 (H x W x D in mm)

To ensure adequate ventilation, the minimum distance of 50 mm upwards and 50 mm downwards to neighboring devices and switch cabinet surfaces must be maintained. The lateral distance to external devices and switch cabinet surfaces must not be less than 20 mm.



3.3 pT+RACK

The pT+RACK is the frame for holding the pT+HTC 06/15 plug-in cards. Racks are available to accommodate 2, 4, 6 and 8 plug-in cards. Heaters and thermal sensors are not connected directly to the plug-in cards but to the connections on the backplane of the pT+RACK. The connections are shown using a plug-in card as an example.



- A** Power supply L1
- B** Power supply N(L3)
- C** Power supply L2
- D** Power supply N(L1)
- E** Power supply L3
- F** Power supply N(L2)
- G** X5 | Power supply Elektronik
- H** X4 | CAN
- I** X4 & X5 | Thermocouple inputs
- J** X1 & X2 | Heating outputs

3.3.1 CAN (SYSTEM BUS)

The CAN must only be connected once per rack. The terminating resistor must be activated on the inside of the backplane of the pT+RACK at the last plug-in card.

Plug	Pin	Function
X4	14	CAN-L
X4	15	CAN-H

3.3.2 POWER SUPPLY ELECTRONICS

Die Spannungsversorgung ist pro Rack einmalig anzuschliessen (Technische Daten beachten).

Plug	Pin	Function
X5	14	U
X5	15	0V

3.3.3 POWER SUPPLY FOR HEATERS

Busbar connection	400 VAC N PE (~-/N = 230 VAC)	230 VAC 3P PE
L1	L1	L1
N (L3)	N	L3
L2	L2	L2
N (L1)	N	L1
L3	L3	L3
N (L2)	N	L2

3.3.4 HEATING OUTPUTS

The resulting zone number of a heating output is determined by the address (node ID) of the associated plug-in card pT+HTC 06/15.

Plug	Pin	Function	Remark
X1 X2	4	O1	Heating output 1
X1 X2	6	O1N	

Plug	Pin	Function	Remark
X1 X2	8	O4	Heating output 4
X1 X2	10	O4N	
X1 X2	12	O2	Heating output 2
X1 X2	14	O2N	
X1 X2	16	O5	Heating output 5
X1 X2	18	O5N	
X1 X2	20	O3	Heating output 3
X1 X2	22	O3N	
X1 X2	24	O6	Heating output 6
X1 X2	26	O6N	
X1 X2	28	PE	One of the connections must be connected to PE.
X1 X2	30	PE	
X1 X2	32	PE	

3.3.5 THERMOCOUPLE INPUTS

Stecker	Pin	Function	Bemerkung
X4 X5	13	1+	Thermocouple input 1
X4 X5	12	1-	
X4 X5	11	2+	Thermocouple input 2
X4 X5	10	2-	
X4 X5	9	3+	Thermocouple input 3
X4 X5	8	3-	
X4 X5	7	4+	Thermocouple input 4
X4 X5	6	4-	
X4 X5	5	5+	Thermocouple input 5
X4 X5	4	5-	
X4 X5	3	6+	Thermocouple input 6
X4 X5	2	6-	
X4 X5	1	HF	

3.3.6 TECHNICAL DATA

Power supply for heating

400 VAC (~N = 230 VAC) 3~N/PE TN/TT, 50 Hz/60 Hz, +29 %, -14 %, max 3 x 125 A

or

230 VAC 3~/PE TN/TT, 50 Hz/60 Hz, +29 %, -14 %, max 3 x 125 A

Power supply electronics

24 VDC ±10 % (PELV)

Power consumption (with fully equipped pT+RACK)

pT+RACK 02: 2 x 2 W + 4.3 W = 8.3 W

pT+RACK 04: 4 x 2 W + 2 x 4.3 W = 16.3 W

pT+RACK 06: 6 x 2 W + 3 x 4.3 W = 24.9 W

pT+RACK 08: 8 x 2 W + 4 x 4.3 W = 33.2 W

Fuse protection load circuit

External 3 x [see information under connection on rating plate]; 3-pole automatic circuit breaker with characteristic B

Sound pressure level <50 dB

Connection cables

Power supply electronics (Uel): Cable length < 30 m

Sensor cables and power outputs: see 7 3.4.1 Technical data for pT+HTC 06/15.

Ambient conditions

Operation: 0-55 °C, transportation,

Storage: -20 -70 °C

Climatic application class

Operation: 0-90 % relative humidity, no condensation;

Transport, storage: 0-95 % relative humidity, no condensation

Standards

EN61010-1, UL61010-1

Dimensions (H x W x D in mm)

pT+RACK 02: 390 x 150 x 280

pT+RACK 04: 390 x 240 x 280

pT+RACK 06: 390 x 330 x 280

pT+RACK 08: 390 x 424 x 280

To ensure adequate ventilation, the minimum distance of 50 mm upwards and 50 mm downwards to neighboring devices and enclosure surfaces must not be exceeded.

3.4 pT+HTC 06/15

The pT+HTC 06/15 plug-in card has no connections.

3.4.1 TECHNICAL DATA

Power supply for heating

230 VAC, 50 Hz/60 Hz, +29 %, -14 %

Power supply electronics

24 VDC ±10 % (PELV), external fuse protection



Power consumption 2 W

Sensor inputs

Thermocouple type: Fe CuNi type J (-35-500 °C), Fe CuNi type L (-30-500 °C), Ni CrNi type K (-35-900 °C)

with internal reference junction

Measuring accuracy < 1 K

Protective device: Overvoltage Temperature input: Electronic detection with signaling

Connection cable length < 30 m, use shielded cable

Power outputs

Power output 230 VAC, 15 A per zone

Power loss per zone at 15 A max. 20 W

At ambient temperature <= 45 °C maximum output power 20 kW per pT+HTC06/15 card

Output signal: Phase angle control or pulse group output / zero crossing switching

Fuse protection on card: 2-pole; 6.3 x 32 mm, ONLY use fuses of type SIBA FF 16A art. no. 7012540.16

Simultaneity factor

100% duty cycle permanently at ambient temperature <= 25 °C

At ambient temperatures above 25 °C, the simultaneity factor can be reduced to up to 85 % depending on the average output levels and their duration.

Length of connecting cable < 30 m

Ambient temperature

Operation 0 - 45 °C

Transport, storage -20 - 70 °C

Climatic application class

Humidity < 75 % annual average, no condensation

Electrical safety / EMC

Protection class I

Overvoltage category III

Mechanics

Plug-in card

Weight: 2 kg

Dimensions (H x W x D in mm): 99 x 45 x 114.5

Mounting type: Insertion in slot with pT+RACK

3.5 PT+ERJ

The use of the component is optional.

Great care is required when using thermocouples for temperature measurement in order to achieve accurate results. If it is not possible to use the internal reference junction (in the profITEMP+ SYSTEM on the pT+RACK) for design or safety reasons, an external reference junction must be used.

For example, if a copper cable is used instead of a compensating cable. In this case, a resistance thermometer must be attached to the new external cold junction (transition point from thermocouple cable to copper cable). The external cold junction sensors are connected to the optional pT+ERJ. Up to 8 resistance thermometers can be used per system. The assignment to an external cold junction is made per pT+HTC 06/15 plug-in card.

3.5.1 MEASURING INPUTS EXTERNAL COLD JUNCTION

Plug	Pin	Function	Remark
X1 X2	1	1+ 5+	Measurement inputs 1 5
X1 X2	2	1- 5-	
X1 X2	3	1 5	
X1 X2	4	2+ 6+	Measurement inputs 2 6
X1 X2	5	2- 6-	
X1 X2	6	2 6	
X1 X2	7	3+ 7+	Measurement inputs 3 7
X1 X2	8	3- 7-	
X1 X2	9	3 7	
X1 X2	10	4+ 8+	Measurement inputs 4 8
X1 X2	11	4- 8-	
X1 X2	12	4 8	

3.5.2 TECHNICAL DATA

Measuring inputs

Number: 8

Resolution: AD conversion with 14 bits, temperature value resolved in 1/10 °K

Sampling cycle: 500 ms / module

Measuring accuracy < 1 K

Resistance thermometer

Pt100 (-50-550°C)

Monitoring: sensor breakage

Data interfaces

CAN fieldbus for I/O and bus coupling modules

Node ID: 50, cannot be changed

Transmission speed: 500 KByte fixed

Max. permissible bus length: 100 m

Device-internal terminating resistor: Automatic

Protocol: CANopen

Power supply

Nominal voltage / Max. Power consumption: 24 VDC ±10 % 2 W (internal via system bus)

Fuse protection electronics: external via pT+CUR

Power consumption 2 W

Electrical safety

Electrical safety: Class 3, safety extra-low voltage; complies with EN61010



Protection class Housing and connections: IP20

Standards

Complies with EN 61326-1

CE marking: The device complies with the directives for electromagnetic compatibility (complies with EN 61326-1) on which the CE marking is based.

Ambient conditions

Operation: 0-45 °C Transportation

Storage: -20-70 °C

Climatic application class

Operation: 0-90 % relative humidity, no condensation | Transport, storage: 0-95 % relative humidity, no condensation

Mechanics

Mounting: Can be snapped onto top-hat rail (DIN EN 50022); horizontal installation position

Dimensions (HxWxD in mm): 99 x 22.5 x 114.5

Weight: 0.3 kg

To ensure sufficient ventilation, the minimum distance of 50 mm upwards and 50 mm downwards to neighboring devices and control cabinet surfaces must not be exceeded.



4 INSTALLATION AND START-UP

The basic system structure is generally explained in the commissioning and service manual using a pT+RACK with 4 slots. The design with regard to the number of zones may vary.

The following work must be carried out before commissioning the system.



DANGER

In all cases where the adjacent symbol appears on the appliance, it is essential that you observe the safety instructions for the profiTEMP+ SYSTEM marked with this symbol/sign/sticker. This commissioning and service manual must be consulted in all cases.



CAUTION

If the profiTEMP+ SYSTEM is integrated into a system, responsibility for the safety of the system lies with the installer of the system. The installer of the system is responsible for parameterizing the functions required by the customer.



WARNING

Work, such as maintenance, repair and the like, on the profiTEMP system may only be carried out by authorized and trained specialist personnel. The profiTEMP system may only be used by qualified personnel who are familiar with it and have been instructed about the dangers. The relevant accident prevention regulations and other generally recognized occupational health and safety rules must be observed.



DANGER

Before working on the profiTEMP+ SYSTEM, always disconnect it from the supply voltage or ensure that the profiTEMP+ SYSTEM is de-energized. Secure the supply voltage before switching it on again.



WARNING

Before switching on the control zones, ensure that the profiTEMP+ SYSTEM is configured for the application (see 1.3.2 Intended use). Incorrect configuration can result in damage to the controlled system or injury to persons.



CAUTION

Individual components may only be replaced with components of the same type (see type plate). When replacing components, ensure that the settings (e.g. parameterization) are adopted.



NOTE

The instructions for handling ESD components must be observed!
Electrostatic sensitive components!

4.1 SCHEMATIC REPRESENTATION

4.2 MECHANICAL INSTALLATION

The device is intended for vertical installation in the switch cabinet.



CAUTION

The switch cabinet / appliance connection box must comply with the regulations for electrical fire protection enclosures.

When installing the system in the control cabinet / appliance connection box, it should be noted that the LEDs on the individual components are only visible during commissioning. For this reason, it may be necessary to visualize error and status messages via the process control system. When connecting the cables to the components, ensure that there is sufficient strain relief. This applies in particular to cables routed out of the control cabinet / appliance connection box.



CAUTION

Material damage due to overheating It is essential to comply with all the installation requirements listed in these instructions and the ambient and operating conditions specified in the technical data. Failure to do so may result in damage to the appliance due to malfunctions or overheating.

INSTALLATION POSITION

To ensure adequate ventilation, the minimum distance of 50 mm upwards and 50 mm downwards to neighboring devices and switch cabinet surfaces must be maintained. The lateral distance to external devices and switch cabinet surfaces must not be less than 20 mm. The distance is measured from the top and bottom edges of the rack.

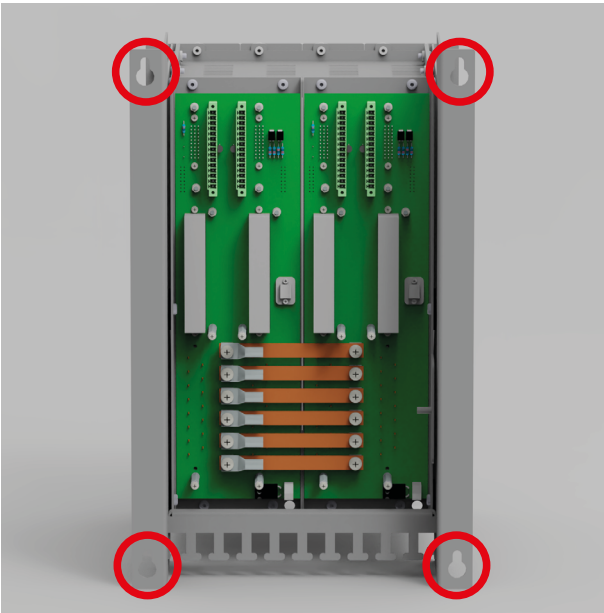
4.2.1 pT+RACK INSTALLATION IN CONTROL CABINET

The pT+Rack is the frame for holding the pT+HTC 06/15 control cards.

ASSEMBLY/INSTALLATION MATERIAL

- » Four screws (M6 hexagon socket head cap screws to DIN EN ISO 4762, M5 pan-head screws with cross recess to DIN EN ISO 7045, M5 hexagon head screws to DIN EN ISO 401) (not included)
- » Four washers (not included in the scope of delivery)

MONTAGE



When installing the pT+RACK in the control cabinet, the requirements of DIN EN 61439-1:2012-06; VDE 0660-600-1:2012-06 DIN EN 50274 VDE 0660-514 must be observed by the installer of the system.

External dimensions and installation position of the pT+RACK can be found in chapter 3.3.5 Technical data.

The ventilation or air conditioning of the control cabinet must be set up in such a way that the ambient conditions of the components are maintained during continuous operation.



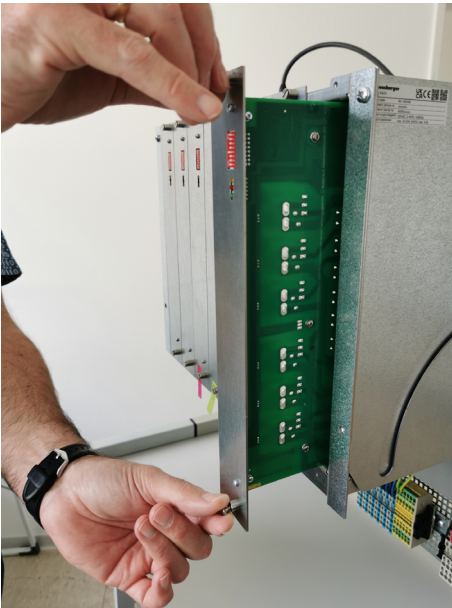
NOTE

The type plate is located on the top right-hand side of the pT+RACK.



4.2.2 SLIDE-IN CARDS PT+HTC 06/15 / FITTING COVER PLATES

4.2.2.1 SLIDE-IN CARD pT+HTC 06/15



Step 1 Insert the pT+HTC 06/15 plug-in cards into the pT rack in the guide brackets at the top/bottom. Ensure that the plug connectors engage.

Step 2 Lock the pT+HTC 06/15 plug-in card at the top and bottom.

Step 3 Subsequently fit and lock additional pT+HTC 06/15 controller cards on the right.



NOTE

The type plate is located on the circuit board



NOTE

For service and maintenance procedures, please refer to the chapter [7.2.3 pT+HTC 06/15/15](#)

4.2.2.2 COVER PLATES



NOTE

The pT+RACK must be completely closed at the front.
Unused slots must be covered with suitable cover plates (7.2 Accessories), which must be locked in the frame.

4.2.3 pT+CUR

Snap module onto mounting rail

4.2.4 pT+IO

Snap the module onto the mounting rail and connect it to the pT+CUR via the rear cross-connection.

The use of the pT+IO module is optional. If it is not used, a flexoTEMP BE must be provided to connect the pT+RACKS to the pT+CUR via the system CAN bus.

4.2.5 pT+ ERJ

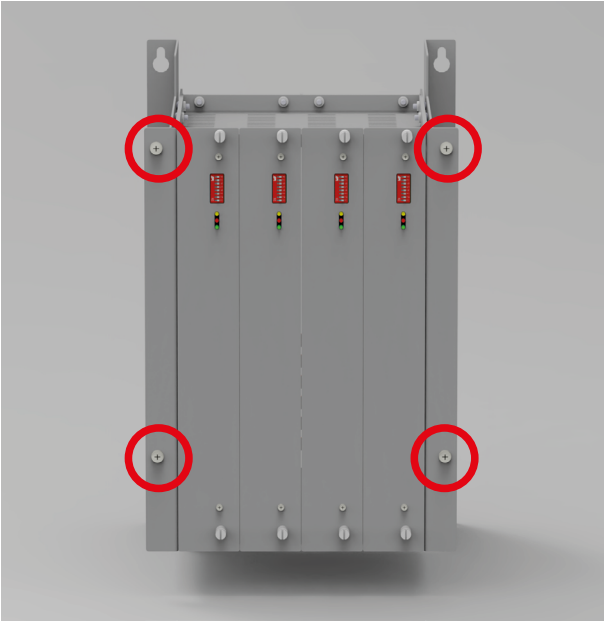
Snap the module onto the mounting rail and connect it to the pT+CUR via the rear cross-connection.

4.2.6 RESIDUAL CURRENT TRANSFORMER RCT

Content follows

4.3 ELECTRICAL INSTALLATION

4.3.1 PREPARATION PT+RACK FOR WIRING



Once all the required cards and any blanking plates have been installed and locked in place, the wiring must be carried out. To do this, remove the locking screws from the pT+RACK and fold the pT+RACK forwards.



Loosen, remove and store the four locking screws for the moving part of the pT+RACK.



CAUTION

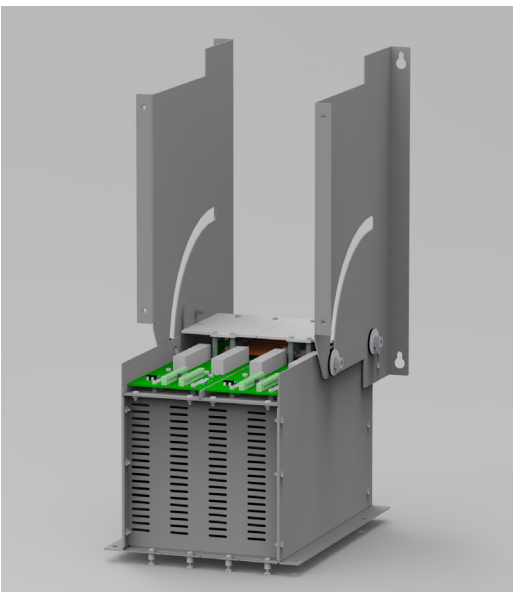
Before folding out the movable part of the pT+RACK, make sure that all slide-in cards and cover plates are locked in the frame.



CAUTION

Danger from moving parts.

Moving parts can pinch fingers. Keep your fingers away from the side panels and the side frame or wear gloves when unfolding/folding the pT+RACK. Unfold/unfold the pT+RACK slowly and carefully.



Fold out the movable part of the pT+RACK and bring it into the end position.

4.3.2 POWER LOSS

When designing and planning the control cabinet or the appliance connection box, the power loss of the installed components of the profiTEMP+ SYSTEM system must always be taken into account. This is mainly calculated from the plug-in cards pT+06/15 as follows:

$$P_{\text{VerlustAusgang}}(x) = (I_{\text{Ausgang}})^2 \times 0,07 \, \Omega + I_{\text{Ausgang}} \times 1,2 \, \text{V}$$

$$P_{\text{Verlust}} = P_{\text{VerlustAusgang}}(1) + \dots + P_{\text{VerlustAusgang}}(n) + 2 \, \text{W}$$

4.3.3 POWER SUPPLY ELECTRONICS

ASSEMBLY/INSTALLATION MATERIAL

Install the supply voltage according to the specifications in chapter 3.3.5 Technical data.

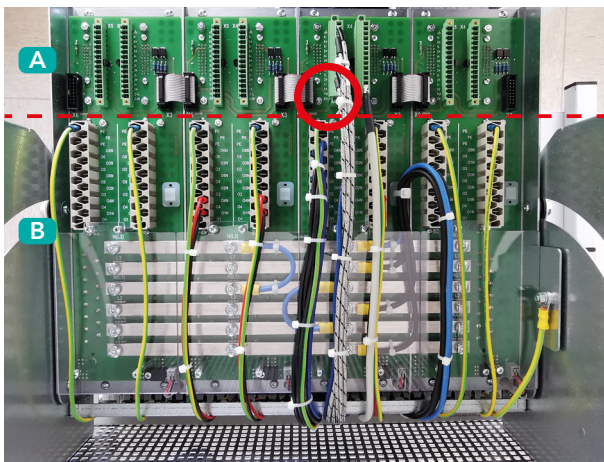


WARNING

The power supply for the electronics may only be connected when the profiTEMP+ SYSTEM is de-energized.

4.3.3.1 pT+CUR & pT+IO

The power supply must be connected to terminal X1 in accordance with § 3.1.5 Technical data and § 3.2.5 Technical data. pT+RACK



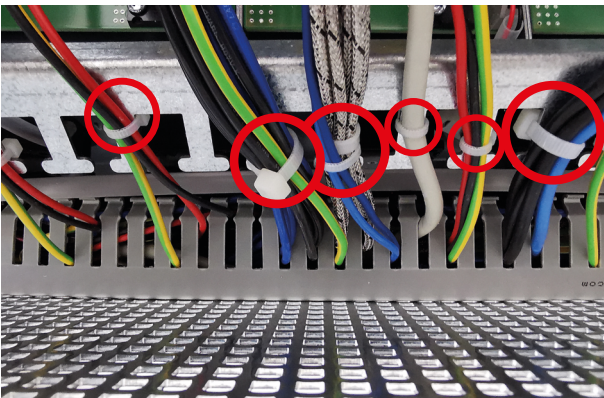
The power supply for the electronics (UEL) must be connected to the rear of the pT+RACK.

The connection cables for the power supply for the electronics must be connected to one of the middle backplanes at the rear of the pT+RACK.

The cables used must be approved for the operating voltage of the rack and meet the requirements of the control cabinet.

STRAIN RELIEF

The cable lengths and strain reliefs must be designed in such a way that connections on the low-voltage side A (e.g. sensors, etc.) cannot touch connections or contacts on the power section B after disconnection and vice versa.



The connecting cables of the power supply for the electronics must be tied together with cable ties and fixed to the rear cable fastening bar of the pT+RACK.

4.3.4 MAINS VOLTAGE FOR HEATING OUTPUTS

When installing the profiTEMP+ SYSTEM pT+RACK in the switch cabinet, a disconnecting device for the mains voltage must be provided in the form of a switch or circuit breaker. This disconnecting device must be suitably positioned and must be easily accessible to the user. It must be labeled in such a way that it can be clearly assigned to the pT+RACK and clearly identified by the user.

- » An external fuse (3-pole automatic circuit breaker with characteristic B, see information under Connection on the § 2.2.1.1 rating plate) must be provided.
- » The external fuse protection must be designed in accordance with the national standards applicable in the respective country for the cable/power used, maximum 3 x [see information under Connection on the § 2.2.1.1 rating plate].

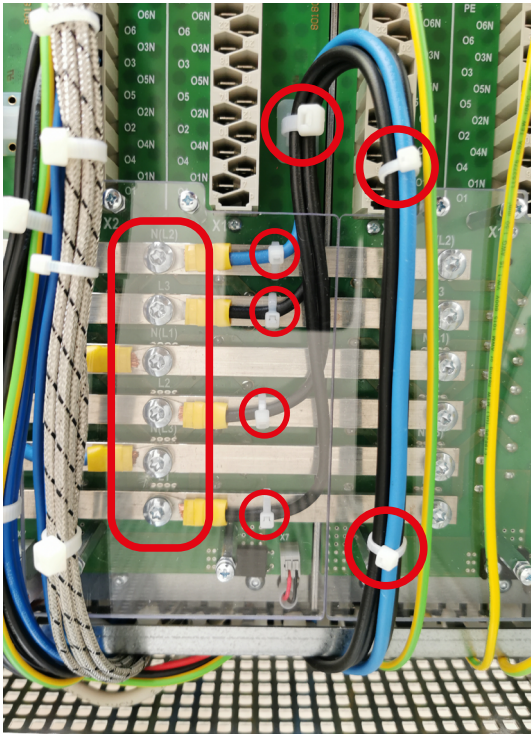
» The cable cross-sections of all connecting cables must be designed in accordance with the national standards applicable in the respective country for the corresponding installation type and location. The maximum ambient temperature must be taken into account when selecting the cables.



CAUTION

The mains voltage may only be connected when the profiTEMP+ SYSTEM is de-energized.

MONTAGE



Schritt 1 Schrauben der Plexiglasabdeckung lösen, entfernen; Plexiglasabdeckung vorsichtig herausheben.

Schritt 2 Anschlussleitungen der Netzspannung (Phasen L1, L2, L3; Neutralleiter N) an der Rückseite des pT-Rack an Stromschiene L1, L2, L3 und an Stromschiene N **mittig** anschliessen.

Schritt 3 Plexiglasabdeckung nach Montage der Anschlussleitungen wieder vorsichtig einsetzen. Schrauben der Plexiglasabdeckung einsetzen und festziehen.

Drehmoment zur Montage der Netzzuleitungen am Stromschienenverteiler: 2 Nm. Schrauben M5.



CAUTION

Observe the safety instructions on the Plexiglas cover.

Standard wiring 400VAC Y (3~/N/PE) or 230 VAC Δ (3~/+/PE)

STRAIN RELIEF

The cable lengths and strain reliefs must be designed in such a way that connections on the low-voltage side (e.g. sensors, etc.) cannot touch connections/contacts on the power section after disconnection and vice versa.

The mains voltage connection cables must be tied together with a cable tie and fixed to the cable fastening bar of the pT+RACK.

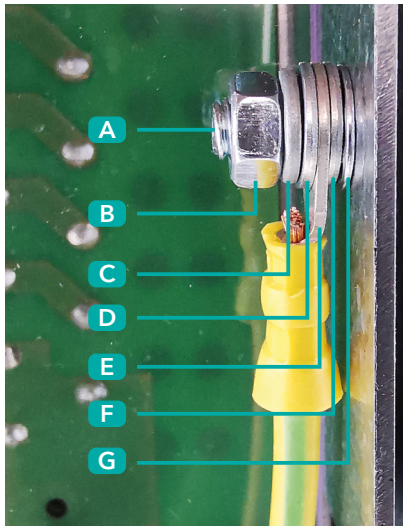
4.3.5 PROTECTIVE GROUND

The pT+RACK must be earthed at the designated points on the fixed part and fold-down part.

MONTAGE

» The protective earthing is connected in accordance with the national standards applicable in the respective country.

» The cable cross-sections of all connecting cables must be designed in accordance with the national standards applicable in the respective country for the corresponding installation type and location. The maximum ambient temperature must be taken into account when selecting the cables.



The protective earth connection must be located close to the mains voltage connection.

Connect the protective earthing to the pT+RACK and to the moving part at the bolt marked with the earthing symbol.

Earth the pT rack frame and moving part via bolts.

- A** Bolt
- B** Nut
- C** Spring washer
- D** Washers
- E** Cable lug
- F** Spring washer
- G** Spring washer

Torque for mounting the protective earthing: 2 Nm.

STRAIN RELIEF



CAUTION

The protective conductor connection is permanent. In the event of damage, the protective conductor connection must only be the last to come loose. The strain relief must be designed in such a way that the protective conductor connection is the last to break under mechanical stress.

The cable lengths and strain reliefs must be designed in such a way that connections on the low-voltage side (e.g. sensors, etc.) cannot touch connections/contacts on the power section after disconnection and vice versa.

4.4 SENSOR / HEATING CONNECTION

Backplanes are permanently installed in the pT+ racks. The backplanes have the following connections / have the following task.

- » Holds 2 plug-in cards each pT+HTC 06/15
- » Mains voltage connection via busbars (pre-assembled)
- » Connection for the electronics
- » CAN bus distribution and termination
- » Connection of sensor inputs
- » Connection for heating outputs
- » Fan connection (pre-assembled and wired)

4.4.1 SENSOR CONNECTION CABLE

Each backplane is designed to accommodate two pT+HTC 06/15 controller cards. Therefore, 6 sensor inputs can be connected twice on the rear of each backplane.

MOUNTING/INSTALLATION MATERIAL

The connecting cable of the sensors must be shielded and must not be longer than 30 m.

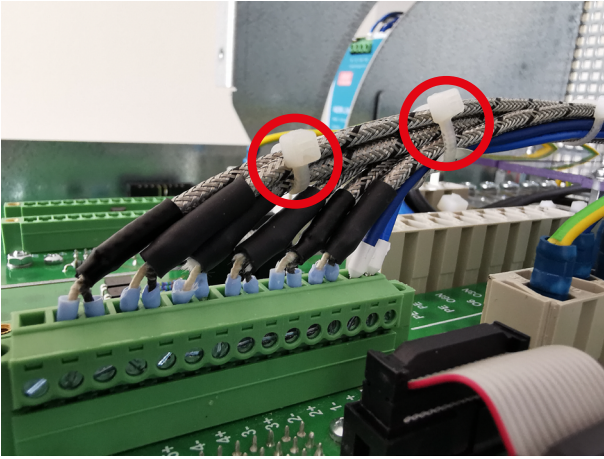
Internal cold junction When using the cold junction on the backplane (standard), the sensors are connected with the corresponding compensating cable of the corresponding thermocouple (observe polarity).

External cold junction If an external cold junction is used (connection to pT+ERJ), copper cables with a minimum cross-section of 0.25 mm² and shielding must be used.

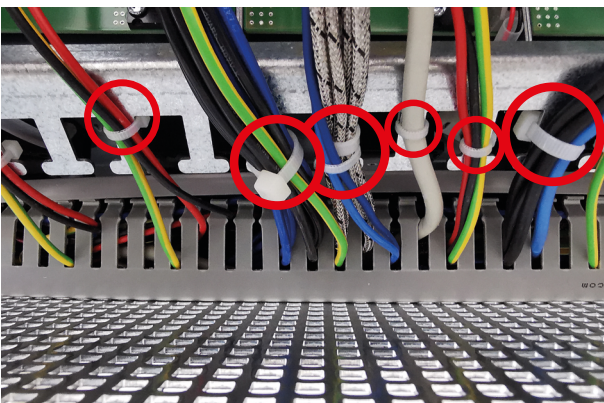
Connect sensors to backplanes. The zones are numbered consecutively (1...192dec) according to the NodeID setting of the DIP switch (1...127dec) on the controller card pT+HTC 06/15.

Connect the sensor connection cables to terminal X1 and/or X2 on each backplane.

STRAIN RELIEF



The cable lengths and strain reliefs must be designed in such a way that connections on the low-voltage side (e.g. sensors, etc.) cannot touch connections/contacts on the power section after disconnection and vice versa.



The connecting cables of the sensors of a pT+HTC 06/15 plug-in card must be tied together with a cable tie and fixed to the cable fastening bar of the pT+Rack.

SHIELDING

The shielding of the sensor cables is brought together here at the cable fastening bar of the pT+RACK. Terminals X1 | X2 Pin13 can also be used for shielding. Keep the cable to the shielding as short as possible.

4.4.2 HEATING CONNECTION CABLE

Each backplane is designed to accommodate two pT+HTC 06/15 controller cards. Therefore, two 6 heating outputs can be connected to the rear of each backplane.

MONTAGE-/INSTALLATIONSMATERIAL

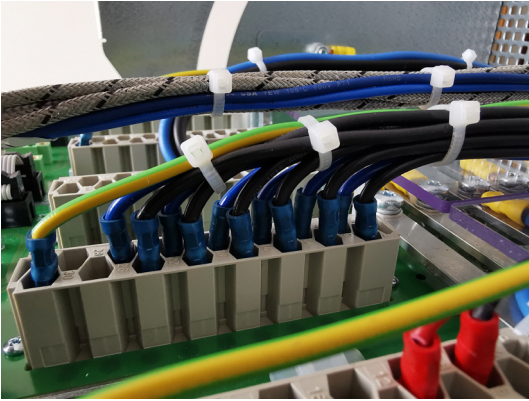
- » The cable cross-sections of all connecting cables must be designed in accordance with the national standards applicable in the respective country for the corresponding installation type and location. The maximum ambient temperature must be taken into account when selecting the cables.
- » Cable with blade receptacle 6.3/0.8; fully insulated for connection to Faston blade terminals



DANGER

The connection cables for the heaters may only be connected when the profiTEMP+ SYSTEM is de-energized.

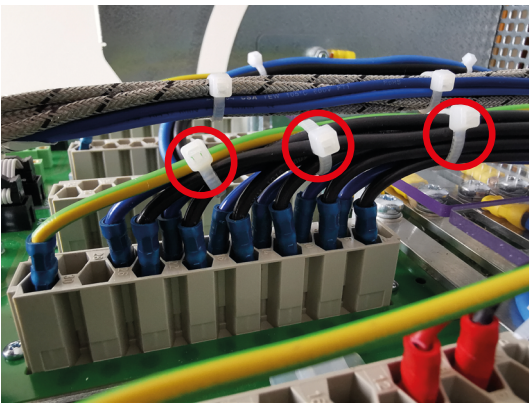
MONTAGE



Connect the heating connection cables to Faston blade terminals O1-O6, O1N- O6N and/or O7-O12, O7N-O12N for each backplane.

The zones are numbered consecutively according to the setting of the DIP switch (1...32dec) on the controller card pT+HTC 06/15 (chapter ä 7.1 Addressing the components with CAN interface).

STRAIN RELIEF



The connection cables of the heaters of a pT+HTC 06/15 plug-in card must be tied together with three cable ties over the flat connectors.

The connecting cables of the heaters of a pT+HTC 06/15 plug-in card must be joined together with a cable tie and fixed to the cable fastening bar of the pT+Rack.

The cable lengths and strain reliefs must be designed in such a way that connections on the low-voltage side (e.g. sensors, etc.) cannot touch connections/contacts on the power section after disconnection and vice versa.



DANGER

Pay attention to the safety notice on the Plexiglas cover.

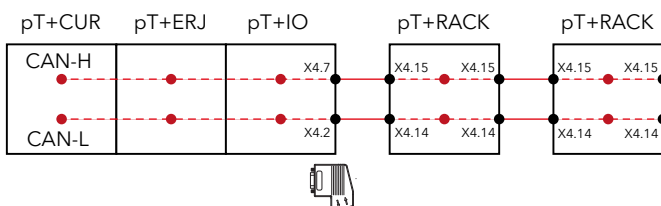
4.4.3 CAN-BUS (INTERN)

The CAN bus is used for internal system communication. All components are connected to each other via the CAN bus.

According to ISO 11898, the bus line must comply with the following parameters so that the specified transmission properties can be maintained

- » Characteristic impedance: 95 - 140Ω (120Ω)
- » Operating capacitance max. 60 nF/km
- » Conductor resistance (loop) 70mΩ/m
- » Shielding: braided copper shield or braided shield and foil shield

In some cases, the CAN bus runs internally within the device, in which case no bus cable needs to be laid between the components. These connections are shown as dotted lines in the following diagram. Bus cables to be laid between the components are shown with a solid line.



The pT+CUR is a terminal device in the line topology of the CAN bus.

Starting from the pT+CUR, the CAN bus is forwarded directly to the plugged-in components pT+ ERJ (optional) and pT+IO (optional) via the rear cross-connection. If no pT+IO is provided, an adapter module BE must be used.

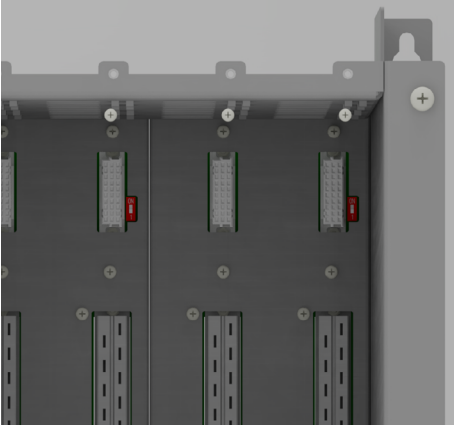
The CAN bus is output on the pT+IO via a CANopen connector (DSUB, 9-pin, see ä 7.2 Accessories).

On the pT+RACK, the rear backplanes are connected to each other via ribbon cables. The terminal connections for CAN-IN on the backplanes are located on the backplane furthest to the right on X4.15 and X4.14. CAN-OUT to other components (e.g. another pT+RACK) is made on the terminal connections of the backplane furthest to the left on X4.15 and X4.14.

4.4.3.1 TERMINATING RESISTOR

In the CAN bus, the bus termination takes place in a line topology with 120 ohms at both ends of the network. The termination is permanently installed in the pT+CUR; the pT+CUR is therefore intended as a terminal device in the line topology.

The other bus termination on the CAN bus is located on the other end device of the line topology of the CAN bus.



» If one of the pT+HTC 06/15 plug-in cards is the terminal device, the termination is carried out via the DIP switch of the corresponding pT+HTC 06/15 plug-in card located on the inside of the backplane.



5 SETUP AND SERVICE



DANGER

In all cases where the adjacent symbol appears on the appliance, it is essential that you observe the safety instructions for the profiTEMP+ SYSTEM marked with this symbol/sign/sticker.

This commissioning and service manual must be consulted in all cases.

When installing and replacing individual components during servicing, ä 1.3.4 Safety instructions must be observed!



WARNING

Work such as installation, maintenance, repair and similar work on the profiTEMP+ SYSTEM may only be carried out by authorized and trained specialist personnel. The profiTEMP+ SYSTEM may only be used by qualified personnel who are familiar with it and have been instructed about the dangers. The relevant accident prevention regulations and other generally recognized occupational health and safety regulations must be observed.



WARNING

Before working on the profiTEMP+ SYSTEM, disconnect it from the supply voltage or ensure that the profiTEMP+ SYSTEM is de-energized. Secure the supply voltage before switching it on again.



WARNING

Individual components may only be replaced with components of the same type (see type plate). When replacing components, ensure that the settings (e.g. parameterization) are adopted.



WARNING

Before switching on the control zones, ensure that the profiTEMP system is configured for the application (see 1.3.2 Intended use). Incorrect configuration can lead to damage to the controlled system or injury to persons.



NOTE

The instructions for handling ESD components must be observed!

Electrostatic sensitive components!

5.1 INSTALLATION AND SETUP

5.1.1 PT+IO

» Install component(s) in accordance with the instructions in chapters ä 2.2 Components / structure and ä 4 Installation and commissioning.

» Carry out CAN addressing in accordance with chapter 7.1 Addressing the components with CAN interface.

5.1.2 PT+ERJ

» Install the component in accordance with the instructions in chapters 7.2 Components / Structure and 7.4 Installation and commissioning.

» Carry out CAN addressing in accordance with chapter 7 Appendix.

5.1.3 pT+HTC 06/15

» Install the component in accordance with the instructions in chapters 7.2 Components / structure and 7.4 Installation and commissioning.

» Carry out CAN addressing in accordance with chapter 7.1 Addressing the components with CAN interface.

5.1.4 pT+CUR

» Install the component in accordance with the instructions in chapter ä 4 Installation and commissioning.

» After installing all other components of the control system, switch on the supply voltage.

» Determine configuration

- › Press and hold the FUNCTION button (approx. 3 seconds) until the OK and USB LEDs light up continuously. Then release the button.
 - › Press and hold the FUNCTION button again for three seconds. Then release the button. A scan of the components connected to the system bus is performed. During the scan, the OK and COM LEDs flash alternately. The pT+CUR determines the connected components and saves the configuration found.
- » Carry out the parameterization of the system settings and the range of functions (e.g. using the flexoTEMPMANAGER tool). It is recommended to save the settings after completing the parameterization.

5.2 REPLACING INDIVIDUAL COMPONENTS AND SETUP

According to the messages

- » in the flexotempMANAGER project planning and configuration tool or via the bus connection on the machine controller
- » as a status display via the status LEDs on pT+CUR, pT+IO and pT+HTC 06/15

and the proposed measures for a 6.2 Cause of error and troubleshooting, components may need to be replaced. Please contact the manufacturer/supplier first for advice.

In all other cases not described here, the profiTEMP+ SYSTEM must be sent in for repair.

5.2.1 pT+CUR

Step 1 Disconnect the plug connector and carefully separate the device from the other modules on the side and remove it from the top-hat rail.

Step 2 Mount the replacement device on the top-hat rail and connect it to the modules on the side.

Step 3 Determine configuration

- › Press and hold the FUNCTION button (approx. 3 seconds) until the OK and USB LEDs light up continuously. Then release the button.
- › Press and hold the FUNCTION button again for three seconds. Then release the button. A scan of the components connected to the system bus is performed. During the scan, the OK and COM LEDs flash alternately. The pT+CUR determines the connected components and saves the configuration found.

Step 4 Import the parameterization of the communication parameters, system parameters and zone parameters into the device using the flexoTEMPMANAGER.

5.2.2 pT+IO

Step 1 Disconnect the plug connector Carefully disconnect the device from other laterally connected modules and remove it from the top-hat rail.

Step 2 Mount the replacement device on the top-hat rail and connect it to the modules on the side. Insert and lock the plug connector.

Step 3 Set the address using the rotary switch as before.

5.2.3 pT+HTC 06/15

Step 1 Release the card lock

Carefully pull the card out of the slot.

Carefully insert the replacement card into the free slot in the guide brackets at the top/bottom and ensure that the connectors engage.

Step 2 Tighten the card lock

Step 3 Carry out addressing on the DIP switch.

Step 4 After switching the power supply back on and waiting for the start-up time of all components, neither the the LED displays (see chapter 7 6 Troubleshooting)

- » the flexotempMANAGER project planning and configuration tool
- » the visualization of the machine control system

to check that the profiTEMP+ SYSTEM is running properly again after replacing the component.



5.2.4 CHANGE THE FUSE TO PT+HTC 06/15



NOTE

Only use fuses of type SIBA FF 16A / 500 V (RHZ 5000 / 500/ 16/FF)!

Step 1 Release the card lock and carefully pull the card out of the slot.

Step 2 Remove the defective fuse(s) and replace with a new fuse(s).

Step 3 Carefully insert the plug-in card into the guide brackets at the top/bottom of the slot and make sure that the connectors click into place.

5.2.5 Add pT+HTC 06/15 (extend number of zones)

The control system can be expanded with additional pT+HTC06/15.

If there are still free slots in the existing pT+RACKs, these can be used, otherwise a pT+RACK must be added. Install the component in accordance with the instructions in chapter 4 Installation and commissioning.

» After installation, switch on the supply voltage.

» Press the FUNCTION button on pT+CUR. An address scan of the components connected to the internal CAN bus is performed. The pT+CUR determines the connected components and saves the new configuration.

» Carry out the parameterization of the system settings and the range of functions (e.g. using the flexoTEMPMANAGER tool).

» It is advisable to save the settings after completing the parameterization.

5.2.6 REMOVE HTC 06/16/S (REDUCE NUMBER OF ZONES)

The number of zones can be reduced by removing a pT+HTC 06/15.

Remove the component in accordance with the instructions in chapter 4 Installation and commissioning.

» After uninstalling, switch on the supply voltage.

» Press the FUNCTION key on pT+CUR. An address scan of the components connected to the internal CAN bus is performed. The pT+CUR determines the connected components and saves the new configuration.

» Carry out the parameterization of the system settings and the scope of functions (for example, using the flexoTEMPMANAGER tool).

» It is recommended to save the settings after the parameterization is completed.

5.3 FIRMWARE UPDATE

The range of functions of the profiTEMP+ SYSTEM is continuously being developed. Updates are installed using the flexoTEMPMANAGER project planning and configuration tool or USB. Proceed as follows.

5.3.1 UPDATE VIA flexoTEMPMANAGER

Step 1 Load the current firmware from the Meusburger website www.meusburger.com or via the auto-update function of the flexoTEMPMANAGER.

Step 2 Read out the project from pT+CUR.

Step 3 Select the components to be updated and carry out the update.

5.3.2 UPDATE VIA USB

Step 1 Download the latest firmware from the Meusburger website www.meusburger.com and copy it to the USB stick.

Step 2 De-energize the control system

Step 3 Press and hold the button when switching on the supply voltage. The firmware update of the components whose firmware is stored on the USB memory stick is started.






6 TROUBLESHOOTING AND ELIMINATION

6.1 OVERVIEW OF STATUS DISPLAY

The pT+IO has 4 LEDs (ERR1 to ERR4). The status of the profiTEMP+ SYSTEM can be read off using a flashing code. The blink code indicates how often the LED flashes within a fixed time frame, the frequency indicates the priority of the displayed error.

	Blinkcode	
	1	Highest priority
	2	
	3	
	4	
	5	Lowest priority

This results in the following status displays.

LED	Blinkcode 1 	Blinkcode 2 	Blinkcode 3 	Blinkcode 4 	Blinkcode 5 
ERR1 Error project planning slaves	Timeout / slave does not answer	Timeout Nodeguarding	Incorrect slave type in project planning		
ERR 2 Heating error	Phase/Fuse-error	Residual current	Current too high (heater with too high output / short circuit in the heating circuit)	Thyristor alarm	Complete heater failure / heater not connected
ERR3 Sensor error	Potential error	Sensor break	Sensor polarity reversal	Sensor alarm (short circuit in the sensor circuit)	
ERR4 Actuator switched off	pT+CUR OUT	Actuator switched off	Heat sink temperature too high		

6.2 CAUSE OF ERROR AND TROUBLESHOOTING

6.2.1 TIMEOUT/SLAVE DOES NOT RESPOND

The pT+CUR cannot reach at least one slave contained in the project planning because it is not responding or reacting.

Reason	Inspection/elimination
Slave does not answer	Check green LED for pT+HTC 06/15 Flashing at 1 Hz: Plug-in card in boot mode - Wait Flashing at 2 Hz: Plug-in card in pre-operational mode - Wait
Slave does not respond	Check green LED in pT+HTC 06/15 LED off: e.g. not supplied with voltage, other defect Check wiring Check whether CAN controller is defective

6.2.2 TIMEOUT NODEGUARDING

The pT+CUR monitors the connected slaves via NodeGuarding. At least one slave cannot be reached.

Reason	Inspection/elimination
Slave does not answer	Check green LED for pT+HTC 06/15 Flashing at 1 Hz: Plug-in card in boot mode - Wait Flashing at 2 Hz: Plug-in card in pre-operational mode - Wait
Slave does not respond	Check green LED in pT+HTC 06/15 LED off: e.g. not supplied with voltage, other defect Check wiring Check whether CAN controller is defective

6.2.3 INCORRECT SLAVE TYPE IN PROJECT PLANNING

The pT+CUR detects that a component other than the one included in the project planning is registered in the slot.



Reason	Inspection/elimination
False Slavetype	Check project planning Check address settings Perform setup

6.2.4 PHASE/FUSE FAULTS

The hot runner controller monitors the status of the fuses in the heating circuits. A phase failure is also detected and signaled.

Reason	Inspection/elimination
Fuse defective	Check fuses on controller cards and replace if necessary
Phase missing	Check mains voltage before fuses Check circuit breaker Check control fuse

6.2.5 RESIDUAL CURRENT

The set leakage current limit was exceeded and the heaters assigned to the residual current transformer were de-energized (relay on controller card off).

Reason	Inspection/elimination
Moist tool	Check tool for moisture (current flows against earth due to moisture)
Limit value too low	Check setting for limit value and adjust if necessary

6.2.6 CURRENT TOO HIGH

A short circuit has been detected at the heating output. The heating current is checked when the control zone is switched on. If this exceeds a defined limit, there may be a short circuit. The heating circuit is de-energized (relay on controller card off).

Reason	Inspection/elimination
Heating overloaded	Check heating Check wiring

6.2.7 THYRISTOR ALARM

The thyristor alarm indicates a defect in the thyristor on the HTC 06/15 plug-in card.

As this is a critical fault that could result in damage to the heating circuit due to overheating, the heating circuit is immediately de-energized (relay on controller card off).

Reason	Inspection/elimination
Baugruppe defekt	Austausch Reglerkarte, zur Reparatur einschicken

6.2.8 COMPLETE FAILURE OF HEATER

The message is issued in addition to a current alarm if an interruption is detected in the heating circuit of a zone, i.e. if no heating current is measured.

Reason	Inspection/elimination
Wiring	Check wiring
Heating	Check heating, measure resistance

6.2.9 POTENTIAL ERROR

Too high a voltage was detected at the sensor input.

For protection, all zones are de-energized (relay on plug-in card off), including the zones on the other controller cards, as the voltage can come from any zone.

Reason	Inspection/elimination
Tool fault	Check sensor input Check grounding of tool/sensor

6.2.10 SENSOR BREAK

In the event of a sensor break, there is an interruption in the sensor circuit at a point between the sensor and controller. Once the fault has been detected, the heating in the corresponding zone is switched off (output level = 0 %).

Reason	Inspection/elimination
Sensor break	Checking the connected sensor Check the connection cable on the hot runner controller Check sensor input

6.2.11 SENSOR POLARITY REVERSAL

Sensor polarity reversal refers to a fault in which the thermocouple is connected to the controller with the wrong polarity. Due to the incorrect wiring, the controller measures an incorrect actual value. The fault cannot be detected when the tool is not heated up. Only when the control zone is heated up is the error detected immediately and an error message is issued.

Reason	Inspection/elimination
Sensor polarity reversal	Checking the connected sensor Check sensor connections +/-

6.2.12 SENSOR SHORT CIRCUIT

We understand a sensor short circuit to be a fault in which

- » the sensor cable is pinched at any point between the sensor and the controller, resulting in a short circuit
- » the sensor is not in the intended position (removed or swapped with another sensor).

The defect in the cable causes the controller to believe that the temperature value is too low. The real temperature is higher than the measured temperature. If the measured temperature value does not rise as expected within a period of time that depends on the zone type (taking nozzles and manifolds into account), a sensor alarm is displayed to the operator. To prevent damage to the corresponding zone, the heating is switched off (output level = 0).

A sensor alarm can be triggered incorrectly if the heating power of the zone is set too low. An identical error pattern is displayed.

Reason	Inspection/elimination
Short circuit in the sensor circuit	Checking the connected sensor Check the connection cable on the heating channel controller
Sensor position	Check position

6.2.13 pT+CUR SWITCHED OFF

All heating outputs are switched off. No more alarms are processed.

6.2.14 ACTUATOR SWITCHED OFF

Triggered by a digital input. All heating outputs are switched off. No more alarms are processed.

6.2.15 HEAT SINK TEMPERATURE TOO HIGH

The heat sink temperature has exceeded the limit value. All outputs on the controller card are switched off (output level = 0).

Reason	Inspection/elimination
High temperature at the storage location	Check the ambient temperature of the installation site
Overload	Check: Simultaneity factor = 100% ED permanently at ambient temperature $\leq 25^{\circ}\text{C}$; at ambient temperatures from 25°C to 45°C , the simultaneity factor can be reduced to up to 70% depending on the average output levels and their duration.
Plug connection to fan faulty	Check plug connection/connecting cable, replace if necessary
Mechanischer Defekt am Lüfter	Check fan







7 APPENDIX

7.1 ADDRESSING THE COMPONENTS WITH CAN INTERFACE

The CAN bus is used to transmit information between the components of the system. Each CAN component has a node ID, which is set via DIPs or rotary switches, depending on the component.

Only the addressing possible on the component according to the coding switch is entered in the table.

DIP			DIP 7 and DIP 8 are always in switch position off,
1 Rotary switch			
2 Rotary switch	 		To convert a decimal node ID into a hexadecimal node ID, divide the decimal node ID by 16. The integer quotient is set with SW1, the integer division remainder in hexadecimal format with SW2.

Für alle in profITEMP+ SYSTEM verwendeten Komponenten gilt folgende Definition:

Node ID	Component	DIP						1 Rotary switch	2 Rotary switch		Remark
		1	2	3	4	5	6		LSB	MSB	
1	pT+HTC 06/15#1	on	off	off	off	off	off				Zones 1 to 6
2	pT+HTC 06/15#2	off	on	off	off	off	off				Zones 7 to 12
3	pT+HTC 06/15#3	on	on	off	off	off	off				Zones 13 to 18
4	pT+HTC 06/15#4	off	off	on	off	off	off				Zones 19 to 24
5	pT+HTC 06/15#5	on	off	on	off	off	off				Zones 25 to 30
6	pT+HTC 06/15#6	off	on	on	off	off	off				Zones 31 to 36
7	pT+HTC 06/15#7	on	on	on	off	off	off				Zones 37 to 42
8	pT+HTC 06/15#8	off	off	off	on	off	off				Zones 43 to 48
9	pT+HTC 06/15#9	on	off	off	on	off	off				Zones 49 to 54
10	pT+HTC 06/15#10	on	on	off	on	off	off				Zones 55 to 60
11	pT+HTC 06/15#11	off	on	off	on	off	off				Zones 61 to 66
12	pT+HTC 06/15#12	on	off	on	on	off	off				Zones 67 to 72
13	pT+HTC 06/15#13	off	off	on	on	off	off				Zones 73 to 78
14	pT+HTC 06/15#14	on	on	on	on	off	off				Zones 79 to 84
15	pT+HTC 06/15#15	off	on	on	on	off	off				Zones 85 to 90
16	pT+HTC 06/15#16	on	off	off	off	on	off				Zones 91 to 96
17	pT+HTC 06/15#17	off	off	off	off	on	off				Zones 97 to 102
18	pT+HTC 06/15#18	on	on	off	off	on	off				Zones 103 to 108
19	pT+HTC 06/15#19	on	on	off	off	on	off				Zones 109 to 114
20	pT+HTC 06/15#20	off	off	on	off	on	off				Zones 115 to 120
21	pT+HTC 06/15#21	on	off	on	off	on	off				Zones 121 to 126
22	pT+HTC 06/15#22	off	on	on	off	on	off				Zones 127 to 132
23	pT+HTC 06/15#23	on	on	on	off	on	off				Zones 133 to 138
24	pT+HTC 06/15#24	off	off	on	on	on	off				Zones 139 to 144
25	pT+HTC 06/15#25	on	off	off	on	on	off				Zones 145 to 150
26	pT+HTC 06/15#26	off	on	off	on	on	off				Zones 151 to 156
27	pT+HTC 06/15#27	on	on	off	on	on	off				Zones 157 to 162
28	pT+HTC 06/15#28	on	off	on	on	on	off				Zones 163 to 168
29	pT+HTC 06/15#29	off	off	on	on	on	off				Zones 169 to 174
30	pT+HTC 06/15#30	on	on	on	on	on	off				Zones 175 to 180
31	pT+HTC 06/15#31	off	on	on	on	on	off				Zones 181 to 186
32	pT+HTC 06/15#32	on	off	off	off	off	on				Zones 187 to 192
33 ¹	pT+IO#1							1			Address offset 32



Node ID	Component	DIP						1 Rotary switch	2 Rotary switch		Remark
		1	2	3	4	5	6		LSB	MSB	
34 ¹	pT+IO#2							2			Address offset 32
35 ¹	pT+IO#3							3			Address offset 32
36 ¹	pT+IO#4							4			Address offset 32
37 ¹	pT+IO#5							5			Address offset 32
38 ¹	pT+IO#6							6			Address offset 32
39 ¹	pT+IO#7							7			Address offset 32
40 ¹	pT+IO#8							8			Address offset 32
50	pT+ERJ										Node ID cannot be changed

7.2 ACCESSORIES

Item number	Designation	Bemerkung
	CANopen Stecker	

7.3 DECLARATION OF CONFORMITY

All products have been developed and manufactured in compliance with applicable European standards and directives. The declaration of conformity can be requested from Meusburger Georg GmbH & Co KG.

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Subject to technical changes

meusbürger

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