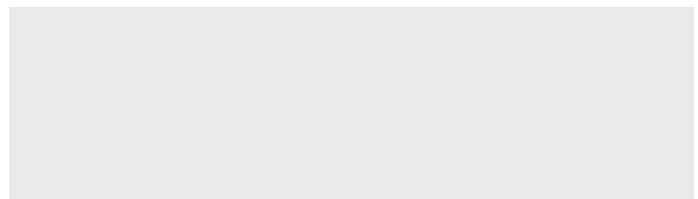
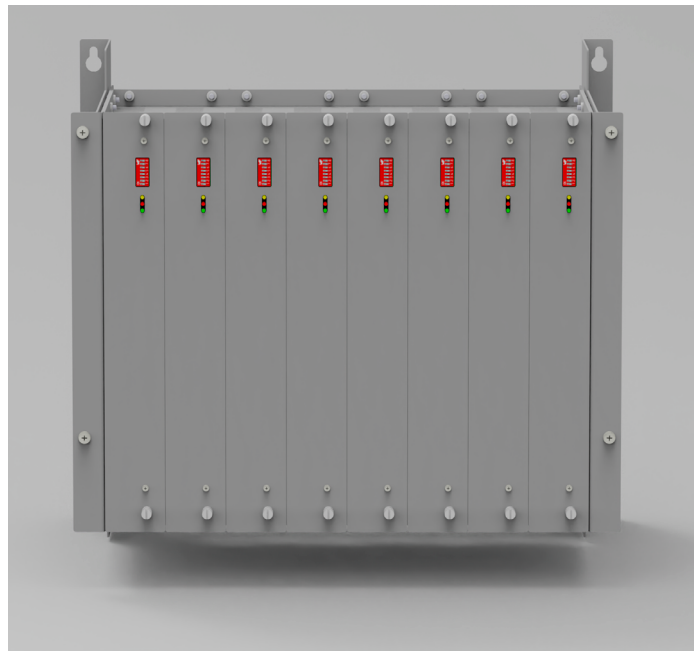


profiTEMP+ SYSTEM

INTEGRATABLE HOT RUNNER CONTROLLER

- » Modular hot runner controller for installation in the injection molding machine
- » From 6 to 192 control zones
- » Low space requirement due to extremely compact dimensions
- » Minimal wiring effort and extremely service-friendly
- » Identical range of functions to the profiTEMP+ hot runner controller
- » Innovative control algorithms tailored to the application
- » Complete integration into machines and machine operation thanks to the data interfaces, including via OPC 40082-2
- » Configuration and operation via the user interface familiar from profiTEMP+ via VNC
- » Smart Power Limitation limits power output to heating zones and protects against overloading the mains supply
- » cTUVus certification (UL) offers unrestricted direct use without special approval procedures for the USA and Canada.
- » Options offer individual design variants
 - › Savings on thermal cables by means of temperature measurement remote from the controller
 - › External reference junction when using copper cables instead of thermoelectric cables
 - › Additional measuring zones without heating outputs (e.g. with TCBOX)



SYSTEM COMPONENTS

Artikelnummer	Produkt	Bemerkung
RH 1600 /PNIO	pT+CUR /PNIO	Controller module with Profinet IO interface
RH 1600 /VARAN	pT+CUR /VARAN	Controller module with VARAN interface
RH 1600 /EC	pT+CUR /EtherCAT	Controller module with EtherCAT interface
RH 1610	pT+IO	Module with digital IOs and measuring inputs for residual current transformers
RH 1620 /02	pT+RACK /02	Rack with 2 slots
RH 1620 /04	pT+RACK /04	Rack with 4 slots
RH 1620 /06	pT+RACK /06	Rack with 6 slots
RH 1620 /08	pT+RACK /08	Rack with 8 slots
RHZ 1200/6/16/R	HTC 06/15	Plug-in card with heating outputs and temperature measuring inputs for 6 control zones

ACCESSORIES

Artikelnummer	Produkt	Bemerkung
RR 2100 /pTBC	flexoTEMP pTBC	Bus coupler between profiTEMP+ and flexoTEMP modules
RR 2100 /BE	flexoTEMP BE	Adapter module for system bus
RR 2300 /TCPT08	flexoTEMP TCPT 08	For options External temperature measurement and Additional measuring zones
RR 2300 /TC12	flexoTEMP TC 12	For options External temperature measurement and Additional measuring zones
RR 2300 /PT08-3	flexoTEMP PT 08-3	For options External temperature measurement and Additional measuring zones and External reference junction
RR 2300 /PT12-2	flexoTEMP PT 12-2	For options External temperature measurement and Additional measuring zones
RH 1640	pT+ERJ	For option External Referende Junction
RHZ 1600	RCT	Residual Current Transformer
RHZ 1610	CP	Blank covers for slots not used in the pT+rack (Cover Plate)
RRZ 1000/DSUB/9P/TS35	Fieldbus connector CANopen	

FUNCTIONS

Temperature control

PID control algorithm optimized for temperature control of hot runner systems.
Fully automatic autotuning function calculates the optimum control parameters during heat-up

Basic functions

Zone in closed-loop or open-loop operation
Temperature reduction by standby, temperature increase by boost (optionally time-controlled)
Zones can be switched in parallel - Guide zone operation in case of missing or defective sensor
Automatic guide zone operation after sensor breakage
Automatic controller operation after sensor break (with output level takeover)
Manual / time-controlled heating release after switch-on
Smart Power Limitation - Exact limitation of power output in case of mains overload

Sensor inputs

Thermocouple type J, L and K configurable
Resolution 0.1°F/0.1°C
Optional decentralized measured value acquisition (thermocouple type J, L and K or Pt100)

Heating outputs

Operation in pulse group mode or phase angle depending on operating status
Heating current display and monitoring
Optional residual current measurement
Zone-wise safety shutdown upon detection of a critical fault

Monitoring functions

Temperature alarm limits above and below setpoint (adjustable)
Overtemperature / undertemperature (adjustable)
Heating current outside tolerance band (adjustable)
Heating circuit interrupted
Short circuit in heating circuit
Fuse failure
Sensor break and polarity reversal, short circuit in sensor circuit
Fault current/leakage current measurement
Power controller in heating circuit permanently switched on
Early detection of leakage by process monitoring

Heating up

Classic start-up mode with preselectable start-up time for baking out the heaters
Heat'n'Dry - controlled, gentle heating to completely bake out the heaters (with control of the fault current)
Uniform, guided heating with automatic ramp
Staggered heating - heating up zones in groups one after the other

Diagnostic functions

MoldCheck - fully automatic check of the status of heaters and sensors in the hot runner, wiring check

Digital inputs & outputs

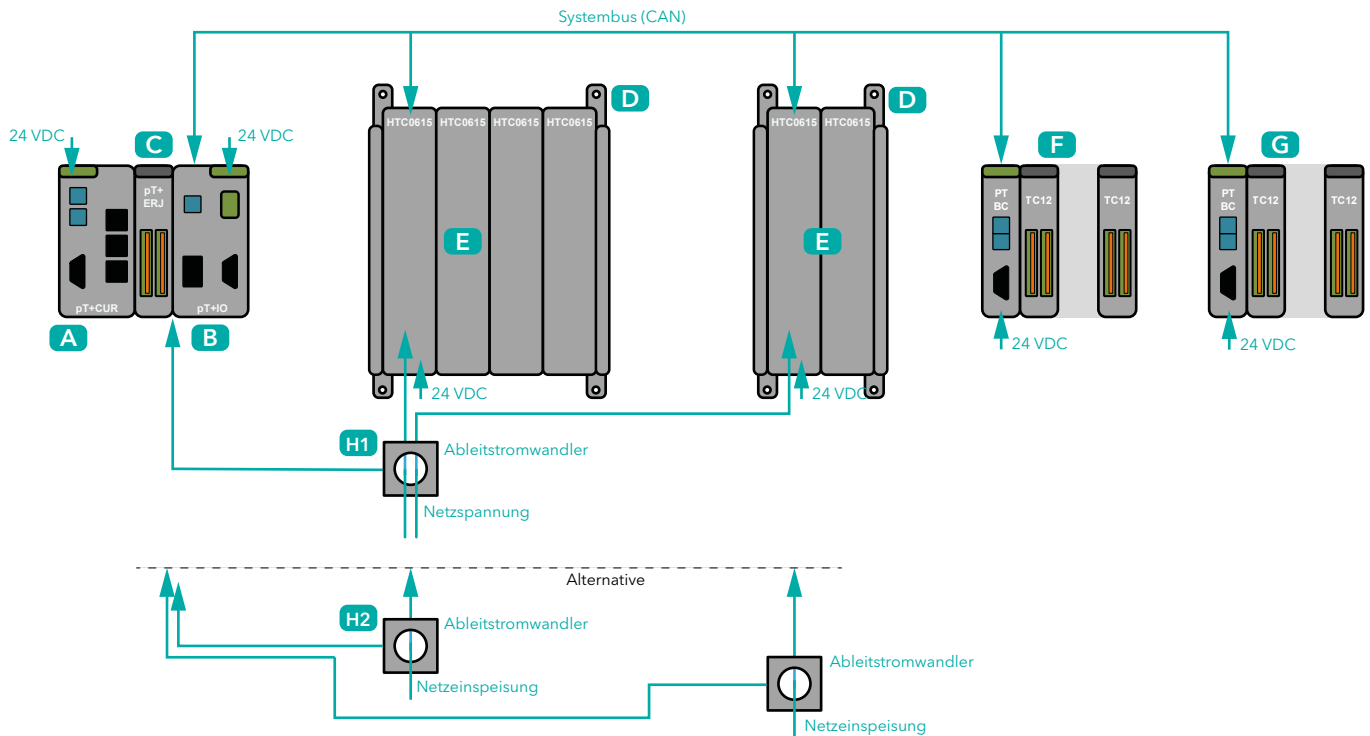
3 digital inputs (function adjustable)
1 function/alarm output designed as potential-free relay contact (function adjustable)

Data interfaces

Ethernet (among others OPC 40082-2, VNC, Modbus TCP)
CAN (CANopen)
RS485 (among others PSG II, MODBUS RTU)
RTE (VARAN, EtherCAT or Profinet IO)

SYSTEM OVERVIEW

With all options

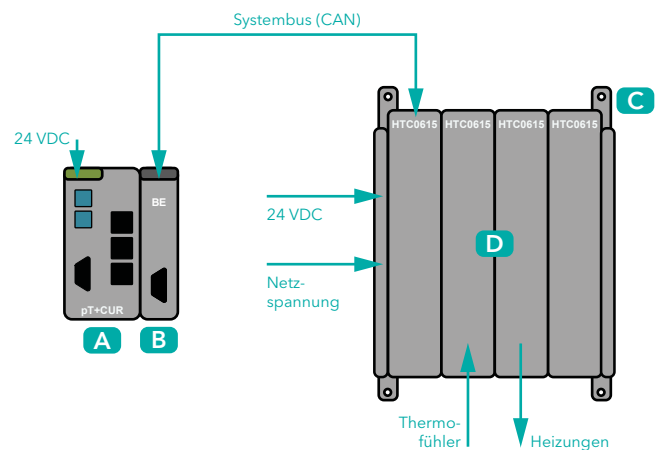


Bezeichnung		Bemerkung
A	pT+CUR	Temperature controller for a maximum of 192 control zones with data interfaces
B	pT+IO	optional Module with 2 measuring inputs for leakage current transformers, 3 digital inputs and one digital output (relay contact). The number of pT+IO depends on the number of RCT leakage current transformers used. A maximum of 8 pT+IO can be used.
C	pT+ERJ	optional Measuring inputs for external cold junction. Possibility to connect PTD cold junction sensors, if no thermoline is used as sensor lines.
D	pT+RACK	Rack with 2, 4, 6 or 8 slots for plug-in cards 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	HTC 06/15	Plug-in card with heating outputs and temperature measuring inputs for 6 control zones
F	External temperature measurement	optional Is used when the sensor lines are not to be connected to the rack but are to be connected decentrally close to the tool. Consisting of bus coupler ptBC and modules TC12, TC16, TCPT08, PT12, PT16 or pT1000.
G	Additional measuring zones	optional Is used for the acquisition of measuring zones used in addition to the control zones. Consisting of bus coupler pTBC, and modules TC12, TC16, TCpT+08, pT+12, pT+16 or pT+1000.
H	RCT	optional Current transformer for measuring leakage currents. When using several pT+racks, one leakage current transformer can be used per rack (H2) or one leakage current transformer for several racks (H1).

Minimal expansion

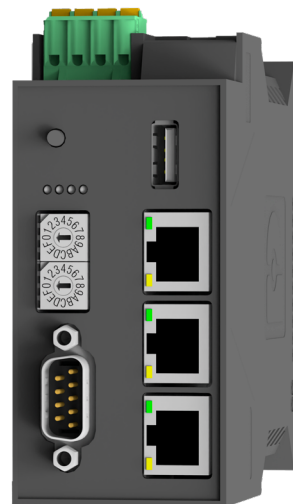
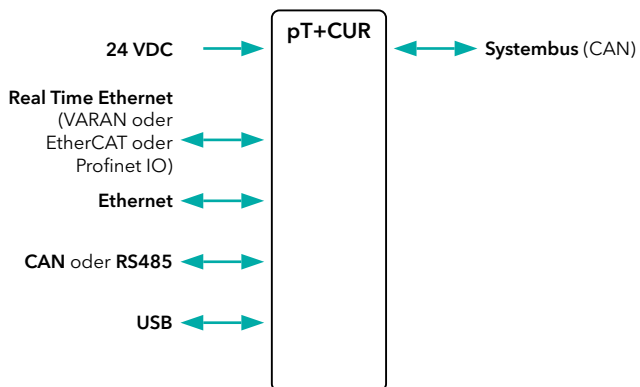
Only the following components are required for the minimum expansion of a control system:

Bezeichnung	Bemerkung	
A	pT+CUR	Temperature controller for a maximum of 192 control zones with data interfaces
B	flexoTEMP BE	Connection adapter for the system bus to the pTRacks
C	pT+RACK	Rack with 2, 4, 6 or 8 slots for plug-in cards 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).
D	HTC 06/15	Plug-in card with heating outputs and temperature measuring inputs for 6 control zones



- » Temperature controller up to 192 control zones
- » Flexible in use due to data interfaces already integrated in the standard version
- » USB port for data backup of setting parameters and for firm-ware updates

SCHEME



TECHNICAL DATA

Power supply

Supply voltage: 18 - 30 VDC (Class 2)
 Power consumption: max. 8 W
 Fuse protection: external 4 A M
 Protection: reverse polarity protection / overvoltage protection

Operation and display

Display: 4 status LEDs
 Operation: 1 push button

Interfaces/communication

RS485

Protocols: PSGII, MODBUS
 Address: configurable
 Transmission speed: 1200, 2400, 4800, 9600, 19200 Bit/s (configurable)
 Bus system: 4-wire
 Connector: 9-pin DSUB female
CAN (external)
 Transmission speed [kBit] / Max. permissible bus length [m]: 78/600, 100/500, 125/450, 250/250, 500/100, 800/50, 1000/30
 Connection: 9-pin DSUB connector

Ethernet

Protocols: OPC 40082-2, MODBUS TCP, VNC Server
 Address: configurable
 Connection: RJ45

Real Time Ethernet

Protocol: Profinet IO | EtherCAT | VARAN (according to device version)
 Connection: 2 x RJ45

CAN (system bus)

Transmission speed 250 kBit
 Max. permissible bus length: 250 m
 Connection: Socket on side of housing
 Bus termination: activated, as bus start

Storage media

2 x host USB 2.0 | USB plug type A

Electrical safety / EMC

Electrical safety: EN 61010-1
 EMC: EN 61326-1, industrial components
 Overvoltage category II
 Protection class II

Ambient temperature

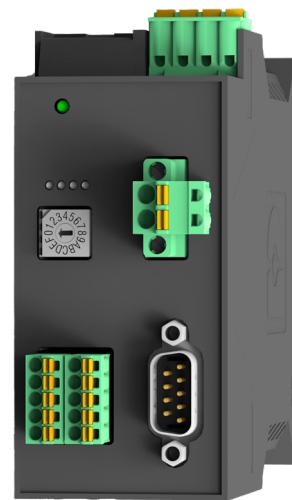
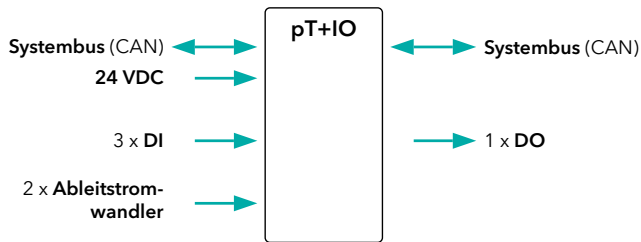
Operation 0 - 55 °C
 Transport, storage -25 - 70 °C
 Climatic application class
 Air pressure 860 - 1080 hPa
 Humidity at 25 °C / max. 95 %, at 50 °C / max. 50 %, linearly interpolated in between
 Sound pressure level: < 50 dB
 Pollution degree 2
 Installation altitude above sea level: max. 2000 m

Mechanics

Weight: 0.4 kg
 Dimensions (H x W x D): 99 x 45 x 114.5 mm
 Mounting type: snap-on on top-hat rail (DIN EN 50022)
 Mounting position: horizontal

- » IO extension (optional, if at least one of the following options is used in the control system)
 - › Detection and evaluation of leakage currents
 - › Digital inputs for easy control of functions (e.g. temperature reduction)
 - › Evaluation of status messages at digital output
- » The number of pT+IO per control system depends on the used leakage current transformer

SCHEME



TECHNICAL DATA

Power supply

Supply voltage 24 VDC ±10 %
Power consumption max. 6.5 W

Display / Operation

Display: 9 status LEDs

Digital output

Quantity: 1
Potential free relay contact 250 VAC / 1 A
Function Alarm output (configurable)

Digital input

Quantity: 3
Logic input, galvanic isolation
Nominal 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 (for provided leakage current transformer RCT)
Resolution 1 mA
Connection cable < 30 m

Communication

System bus (CAN)
Transmission speed 500 kBit
Max. permissible bus length 100 m
Connection: DSUB connector

Electr. safety / EMC

Electrical safety EN61010-1
EMC EN 61326-1:2013, industrial requirements
Overvoltage category II
Protection class II

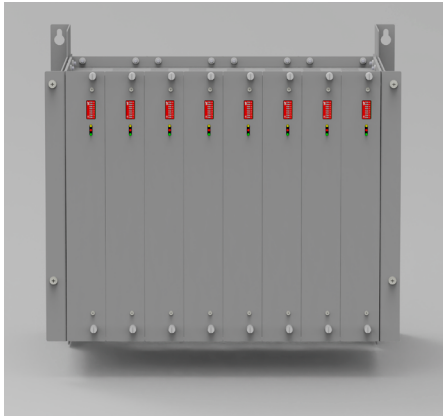
Ambient conditions

Operation: 0 - 45 °C
Transport, storage: -20 - 60 °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

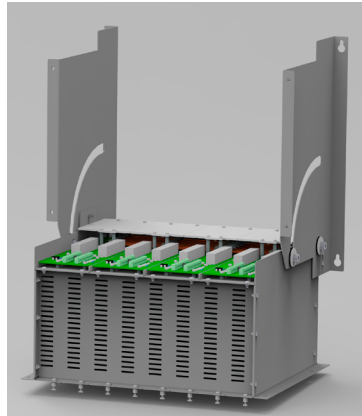
Mechanics

Weight: 0.3 kg
Dimensions (H × W × D): 99 × 22.5 × 114.5 mm
Mounting type: snap-on on top hat rail (DIN EN 50022)
Mounting position: horizontal

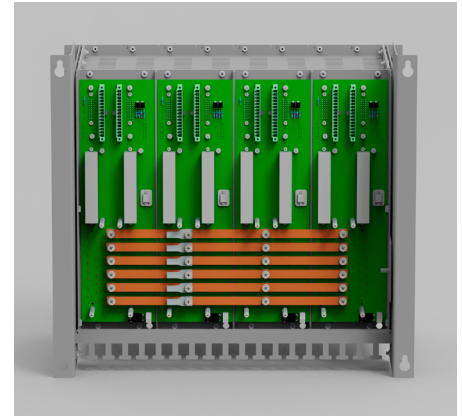
- » Very stable rack housing to accommodate the plug-in cards
Housing can be folded down for convenient installation and commissioning
- » Central supply of mains voltage for all plug-in cards via rear rail system
- » For higher zone numbers use of several racks



Frontansicht pT+RACK 08

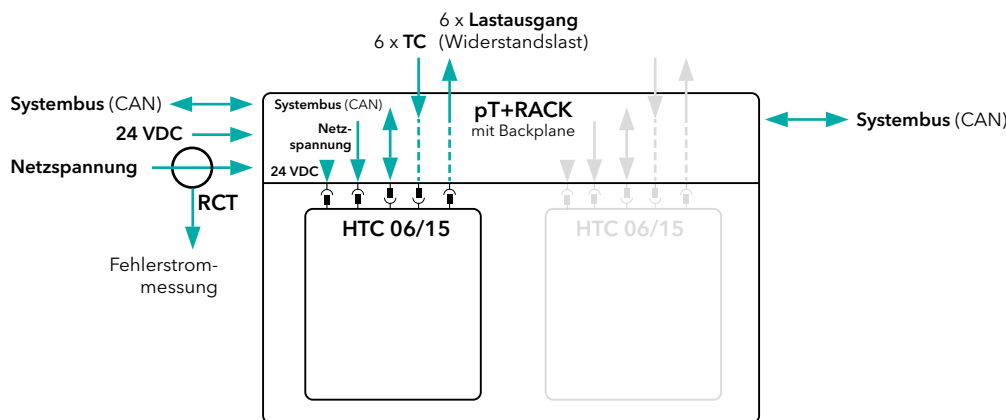


pT+RACK 08 folded



Rear view pT+RACK 08

SCHEME



TECHNICAL DATA

Power supply heating

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

Power supply electronics

24 VDC ±10% (PELV), external fuse max. 3.15 A F required (e.g. Siba 189000.3,15 / fuse must blow safely at 7.5 A in 120 s)
Fuse protection load circuit
External 3 x [see information under connection on type plate]; 3-pole automatic circuit breaker with characteristic B
Sound pressure level <50 dB

Connection cables

Electronics (Uel): Cable length < 30 m
Sensor cables: Cable length < 30 m; use shielded cables

Ambient conditions

Operation: 0-55 °C, transport, storage: -20 - 70 °C
Climatic application class
Operation: 0 - 90 % relative humidity, no condensation;
Transport, storage: 0 - 95 % relative humidity, no condensation

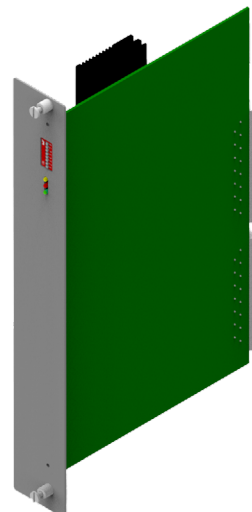
Standards

EN61010-1, UL61010-1

Mechanics

Dimensions (H × D): 390 × 280 mm
Width:
pT+RACK 02: 150 mm, pT+RACK 04: 240 mm
pT+RACK 06: 330 mm, pT+RACK 08: 424 mm
Weight:
pT+RACK 02: 5 kg, pT+RACK 04: 10 kg
pT+RACK 06: 15 kg, pT+RACK 08: 20 kg

» Plug-in card with heating outputs and temperature measuring inputs for 6 control zones



SCHEME

see pT+RACK

TECHNICAL DATA

Power supply

Mains voltage 230 VAC, 3~/N/PE, 50/60 Hz
230 VAC, 3~/PE, 50/60 Hz

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 cold junction

Measuring accuracy < 1 K

Protection: Overvoltage Temperature input: Electronic detection with signalization

Length of connecting cable < 30 m

Display / Operation

Display: 3 status LEDs

Power outputs

Power output 230 VAC, 15 A per zone

Power dissipation per zone: at 15 A max. 20 W

At ambient temperature ≤ 45 °C maximum output power 20 kW per HTC board

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

fuse protection on card: 2-pole; 6.3 x 32 mm

use ONLY fuses type SIBA FF 16A art.no. RHZ 1030/500/16/6x32/FF

Simultaneity factor: 100% duty cycle permanent at ambient temperature ≤ 25 °C

At ambient temperatures above 25 °C, the simultaneity factor can be reduced to up to 70 % 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 II

Protection class IP21

Mechanics

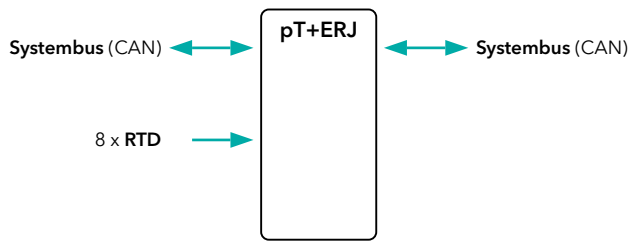
Weight: 2 kg

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

Mounting type: plug-in in pT+rack

- » IO expansion board (optional).
- » The internal reference junction ensures exact temperature values if the thermocouple cable matching the thermocouples is used.
- » If a copper cable is used, the reference junction must be relocated to the transfer point of the thermocouple cable to copper cable.
- » Use, for example, in drag chain operation, since thermocouple cable would be damaged by the permanent movement.

SCHEME



TECHNICAL DATA

Measurement inputs

Number: 8
 Resolution: AD conversion with 14 bit, temperature value resolved in 1/10 °K
 Sampling cycle: 500 ms / module
 Measuring accuracy < 1 K
 Measuring range: -50 - 550 °C
 Monitoring: sensor break

Data interfaces

CAN field bus for I/O and bus coupling modules
 Protocol: CANopen

Power supply

Nominal voltage / Max. Power consumption: 18 - 30 VDC / 2 W (internal via system bus)
 Fuse protection electronics: external via PCU

Environmental conditions

Permissible temperature
 Operation: 0 - 55 °C, Transport | Storage: -20 - 60 °C, limit operation: 0 - 60 °C
 Permissible humidity
 Operation: 0 - 90% relative humidity, no condensation | Transport, storage: 0 - 95% relative humidity, no condensation

Safety

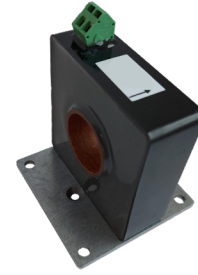
Electrical safety: Class 3, protective extra-low voltage; complies with EN61010
 Protection class housing and connections: IP20
 Standards: Meets EN 61326-1
 CE marking: The device complies with the directives for electromagnetic compatibility (meets EN 61326-1), on which the CE marking is based.

Mechanics

Mounting: Snap-on mounting on top-hat rail (DIN EN 50022)
 Mounting position: horizontal
 Dimensions (H x W x D): 99 x 22.5 x 114.5 mm
 Weight: 0.3 kg

RCT – RESIDUAL CURRENT TRANSFORMER

- » Detection of a residual current occurring due to an insulation fault
- » Evaluation in the IO module pT+IO
- » One or more residual current transformers can be used per control system



TECHNICAL DATA

Maximum primary current: 3 x 125 A

Cable entry diameter: 30 mm

Cable entry: vertical, can be converted to horizontal

Ambient conditions

Operation: 0 - 45 °C

Transportation, storage: -20 - 60 °C

Mechanics

Mounting: Can be snapped onto a top-hat rail (DIN EN 50022) or attached to a mounting plate

Installation position: horizontal

Dimensions (H x W x D):
80 x 70 x 70 mm (with base)

Weight: 0.3 kg

CP – COVER PLATE

- » Cover for slots not used in the pT+Rack
- » Handle protection

