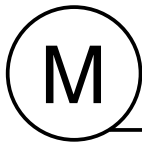


# Control Systems DATASHEET

JUNHO 2013

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## MPC<sup>net</sup> Multi-Channel Control System

### Description

MPC<sup>net</sup> is a versatile and flexible system for controlling and monitoring electric trace heating applications.

The construction of the control system is based on standard I/O bus systems and was developed specially to meet the demands of electric trace heating. The system is modular and can be adapted to the respective application's specific requirements by combining individual modules.

MPC<sup>net</sup> enables solutions extending from simple temperature recording systems to centrally controlled temperature regulation, limitation and monitoring.

The system is easy to plan and configure. PLC programming skills are not necessary. The software and touch panel make it simple for the operator to set parameters for the individual heating circuits.

### Construction

The system is modular in construction and can therefore be adapted flexibly to the respective requirements of the plant or equipment.

Diverse function modules are available to allow its operation as a two-state controller. They register temperature, load and residual current and diverse control signals, e.g. output signals from limiters.

An output module provides floating contacts to emit alarms. It is also used to actuate the external contactor for switching the heating circuits.

Independent complete modules are available for each heating circuit to allow its operation as a proportional controller. These regulate the outputted heating power as well as the holding temperature. The load and residual current are registered for that purpose. The heating circuits are activated through an integrated triac then.

The MC32 controller module accesses the various modules through the system bus. A controller module provides up to 32 heating circuits. This number can be increased by adding more modules to the bus.

### Features

- Simple system design
- Unlimited number of controllable heating circuits
- Predictive maintenance
- Stepless power setpoint adjustment from 10 % to 100 %
- Cuttable to specific lengths: EKL and EMK, similar to BARTEC's SLHBs
- Programming skills not necessary

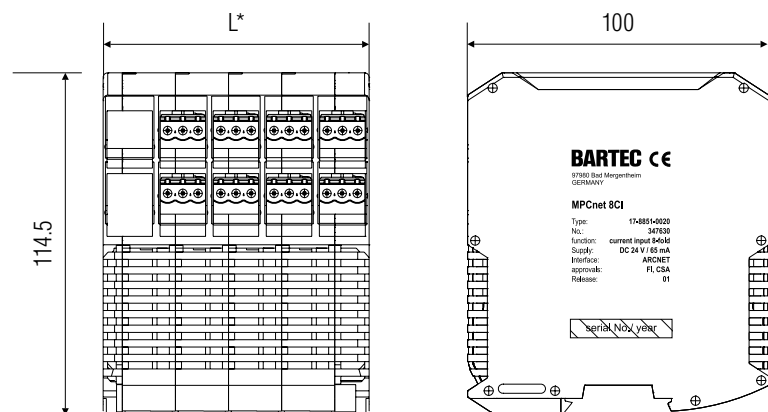
An optional gateway ensures communication to the higher-ranking control system and to the touch panel. The parameters for the modules can be set by means of software or a touch panel.

### Function

The load and residual current monitor constantly checks the entire heating system and ensures that the heating cables and temperature sensors always function reliably. Alarms are given if values exceed or fall below the pre-defined load or leakage-current limits.

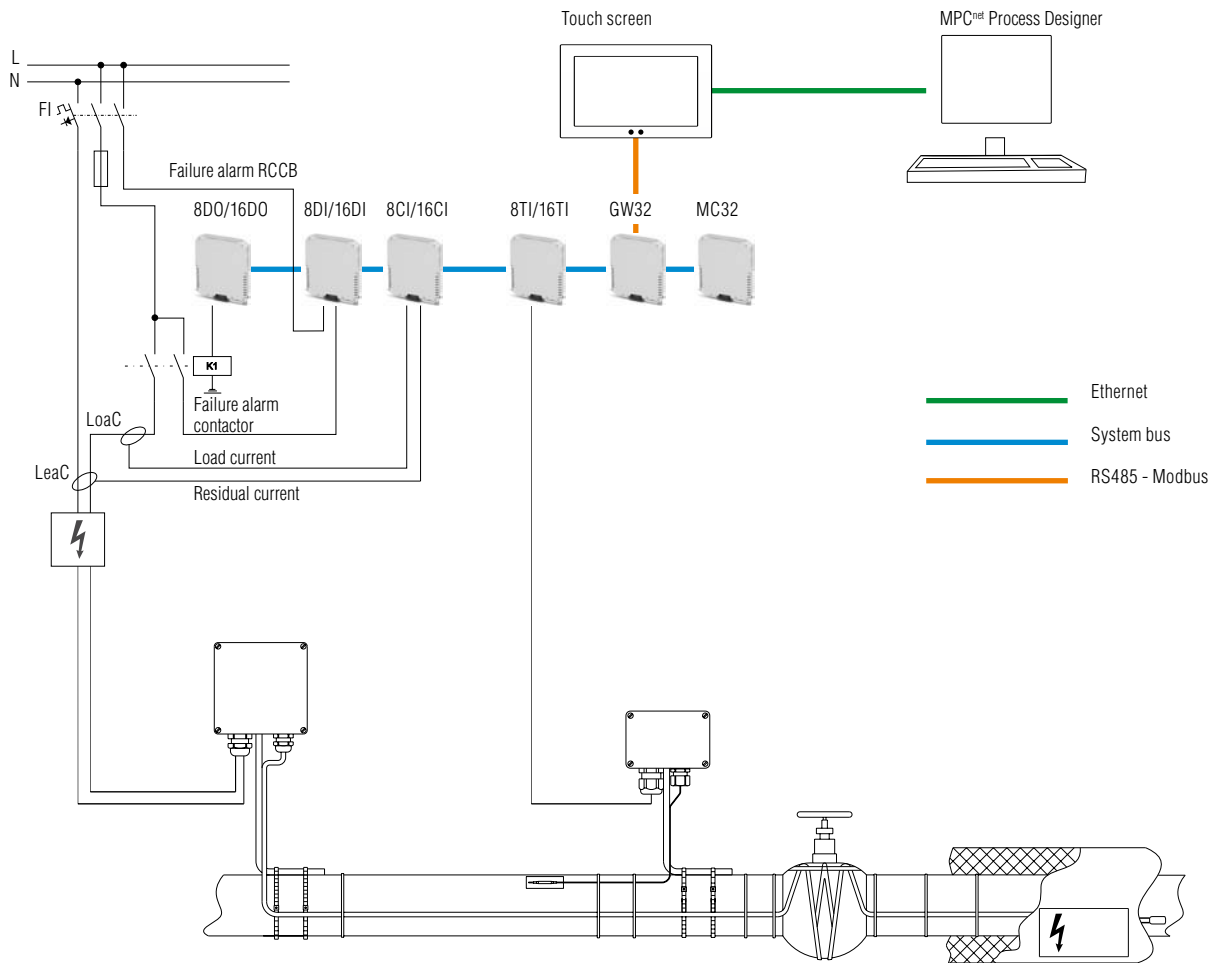
The MPC<sup>net</sup> Process Designer software can be adapted individually to the user's requirements and constantly show the state of the heating system. Statistical data on the current and energy consumption are determined by means of the integrated data logger. This provides information on the condition and ageing status of the material that is being used.

### Dimensions

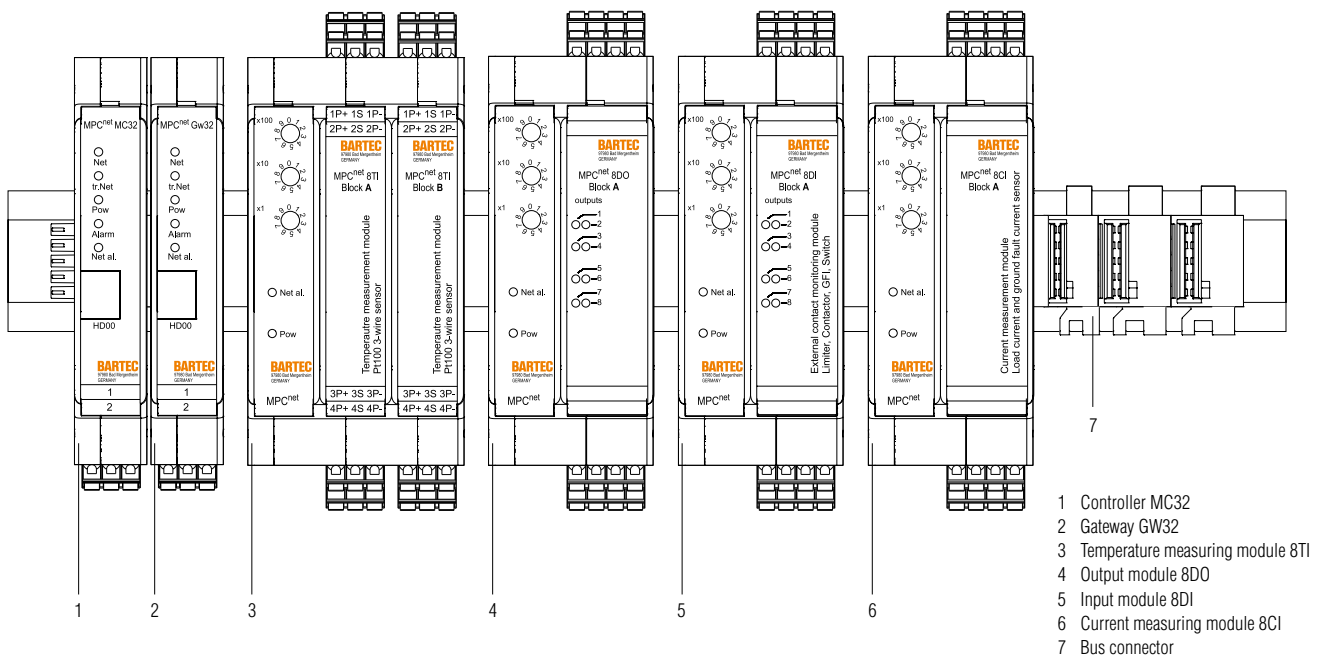


\* = Please refer to the data sheets for the modules

### System configuration



### Example of installation





## MC32 Controller Module

### Features

- Regulation of up to 32 heating circuits or modules
- User-defined group alarms
- Number of heating circuits extendable at will

### Description

The MC32 controller module regulates and monitors up to 32 heating circuits. It flexibly accesses the individual remote I/O modules by means of the bus system integrated in the DIN rail.

By inserting more MC32 modules into the bus, the number of heating circuits to be monitored can be increased at will. Two setpoint values can be assigned to each heating circuit and changed by means of an external switching contact.

The MC32 monitors parameters, such as temperature, overheating, load current, residual current, and external status signals such as rccb auxiliary contacts, limiter alarms, manual switches etc. for each of the 32 heating circuits individually.

Up to three temperature sensors per circuit are monitored, whereby the controlled variable is fixed in relation to one sensor. The other sensors serve to monitor a high and a low alarm value.

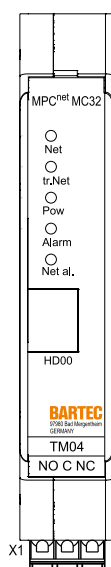
Individual upper and lower limits can be assigned to each monitored value and individual alarms emitted by means of the MPCnet control system's digital outputs.

In addition, all individual alarms can be emitted through the MC32 module's group alarm contact to an indicator light or suchlike. The bus status signals and alarms are also indicated by means of LEDs.

Connecting the GW32 gateway and PA00 touch-panel allows a transfer not only of the setpoint and actual values but also of all alarms into a higher ranking control. All of the control system's parameters and alarms can be altered or acknowledged from the control centre.

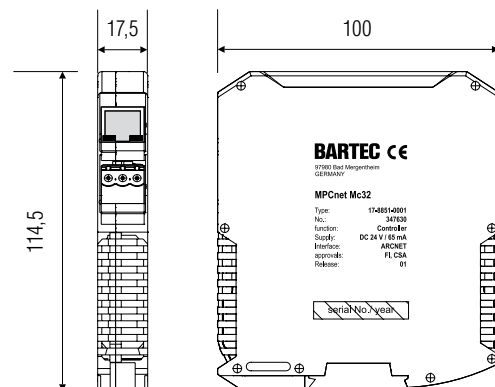
See System Description for the Installation Instructions.

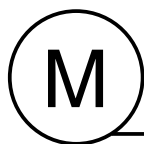
### Wiring diagram/terminal assignment



Terminal block	Terminal	Description
X1	NO	normally open contact
	C	common
	NC	normally closed contact

### Dimensions





## ➤ Technical data

### Enclosure material

Polyamide PA

### Protection class (EN 60529)

IP 20

### Electrical connections

plug-in screw-type terminal, 3-pole  
terminal range 0.2 to 2.5 mm<sup>2</sup>  
RJ45 jack

### Fastening to mounting rail

TH 35-15 DIN EN 60715 (metal)

### Dimensions (W x H x D)

17.5 mm x 100 mm x 114.5 mm

### Weight

108 g

### Storage and transport temperature

-30 °C to +70 °C

### Operating temperature

0 °C to +60 °C

### Degree of contamination

2

## ■ Electrical data

### Voltage supply

DC 24 V by means of an internal bus

### Current consumption

65 mA

## Displays

LEDs in the front of the enclosure:

Bus status, TRIAC status, alarm, power

## Standards

EN 61000-6-2, EN 61000-6-4

## Approvals

CB FI 5591 M1

CSA 2172627

## ■ Bus connection

### Module inputs

Temperature	32 inputs controller 32 inputs limiter
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### Digital inputs

in each case 32 inputs for setpoint selection,  
alarm suppression, contactor and rccb  
auxiliary contact, heating power reduction,  
heating disconnection, limiter monitoring,

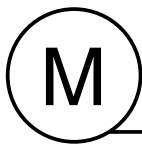
current measurement 32 inputs each for  
load current (phase 1)  
load current (phase 2)  
load current (phase 3)  
residual current

### Module outputs

power contactor	32 controller outputs 32 limiter outputs or
-----------------	--

TRIAC	32 controller outputs 32 limiter outputs or
-------	--

any combination of power contactor  
and TRIAC: max. 32 heating circuits



## GW32 Gateway

### Features

- Connection of touch panel
- Communication with software
- MPC<sup>net</sup> Process Manager
- Integration in a control system via MODBUS

### Description

The GW32 gateway connects the MC32 modules, which operate independently of each other, into a complete system. It serves as an interface between the controller hardware and the MPCnet Process Manager software.

The PA00 touch panel also accesses the control system's parameters through the gateway. The physical connection is established by means of the RS232 interface.

In conjunction with the PA00 touch panel, the GW32 also establishes communication between a higher-ranking control system and the MPC<sup>net</sup>. The PA00 touch panel serves as the interface here.

See the System Description for the Installation Instructions.

### Technical data

#### Enclosure material

Polyamide PA

#### Protection class (EN 60529)

IP 20

#### Electrical connections

RJ-45 plug connectors, RS-232

#### Fastening onto mounting rail

TH 35-15 DIN EN 60715 (metal)

#### Dimensions (W x H x D)

17.5 mm x 100 mm x 114.5 mm

#### Weight

108 g

#### Storage and transport temperature

-30 °C to +70 °C

#### Operating temperature

0 °C to +60 °C

#### Degree of contamination

2

### Electrical data

#### Interface

RS232 via RJ45 connectors

#### Voltage supply

DC 24 V through internal bus

#### Current consumption

65 mA

#### Displays

LEDs in the front of the enclosure:  
Operation voltage OK, alarm, network error,  
Data transfer, data receiving

#### Standards

EN 61000-6-2

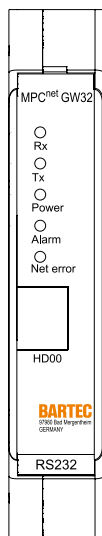
EN 61000-6-4

#### Approvals

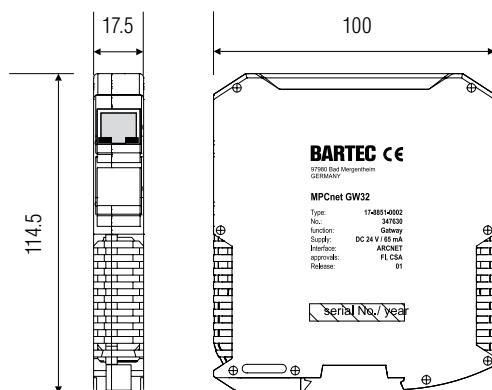
CB FI 5591 M1

CSA 2172627

### Wiring diagram/terminal assignment



### Dimensions





## MPC<sup>net</sup> 8DO/16DO

### Features

- 8 and 16 floating N/O contacts
- Galvanic isolation between the inputs and the system
- Activation of power contactors/SSRs
- Output of alarms

### Description

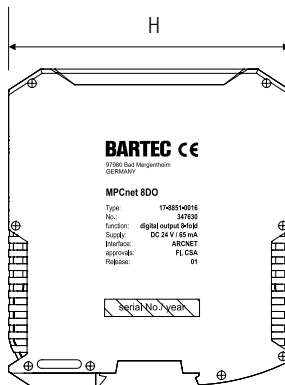
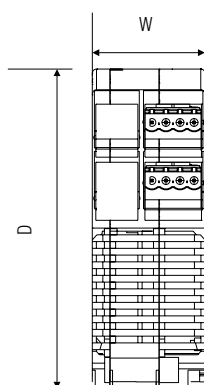
The 8DO and 16DO output modules are suitable for directly switching heating cables or indirectly switching them by means of a power contactor.

They are operated and supplied with the aid of the MC32 controller. The internal, galvanically isolated bus connection is established by simply joining the modules together.

LEDs display the bus status signals and the status signals per channel.

See System Description for Installation Instructions.

### Dimensions (in mm)



	W	H	D
8 DO	41,0	100	114,5
16 DO	63,5	100	114,5

### Technical data

#### Enclosure material

Polyamide PA

#### Protection class (EN 60529)

IP 20

#### Electrical connections

plug-in screw-type terminal, 3-pole  
terminal range 0.2 to 2.5 mm<sup>2</sup> numbered

#### Attachment to mounting rail

TH 35-15 DIN EN 60715 (metal)

#### Dimensions (W x H x D)

8DO 41.0 mm x 100 mm x 114.5 mm  
16DO 63.5 mm x 100 mm x 114.5 mm

#### Weight

8DO 253 g  
16DO 368 g

#### Storage and transport temperature

-40 °C to +70 °C

#### Operating temperature

-40 °C to +46 °C

#### Degree of contamination

2

### Electrical data

#### Number of Channels

8DO 8 outputs  
16DO 16 outputs  
floating contacts in each case

#### Contact rating

direct switching 4 A - AC 1, 250 V  
by means of power contactor 0.5 A - AC 15, 230 V

#### Voltage supply

DC 24 V through internal bus

#### Current consumption

8DO max. 169 mA  
16DO max. 273 mA

#### Displays

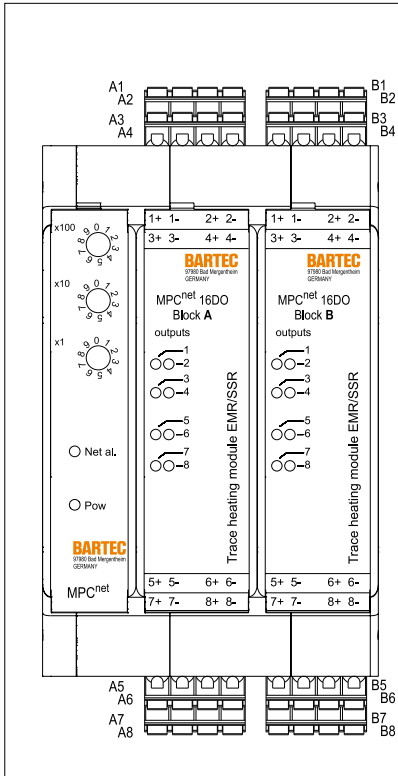
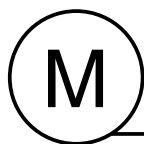
LEDs in the front of the enclosure  
Status Net al. Pow. Output status

#### Standards

EN 61000-6-2  
EN 61000-6-4

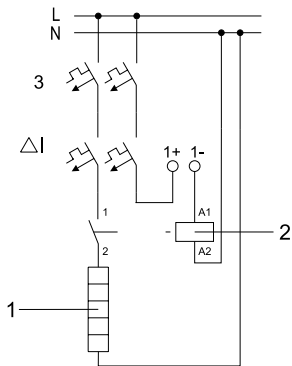
#### Approvals

CB FI 21915  
CSA 2172627



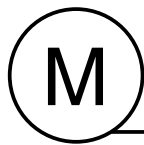
Terminal block	Terminal	Description	Terminal block	Terminal	Description
A1	1+	load/relay +	B1	1+	load/relay +
	1-	load/relay -		1-	load/relay -
A2	2+	load/relay +	B2	2+	load/relay +
	2-	load/relay -		2-	load/relay -
A3	3+	load/relay +	B3	3+	load/relay +
	3-	load/relay -		3-	load/relay -
A4	4+	load/relay +	B4	4+	load/relay +
	4-	load/relay -		4-	load/relay -
A5	5+	load/relay +	B5	5+	load/relay +
	5-	load/relay -		5-	load/relay -
A6	6+	load/relay +	B6	6+	load/relay +
	6-	load/relay -		6-	load/relay -
A7	7+	load/relay +	B7	7+	load/relay +
	7-	load/relay -		7-	load/relay -
A8	8+	load/relay +	B8	8+	load/relay +
	8-	load/relay -		8-	load/relay -

Example of connection



- 1 Heating tape
- 2 Power contactor, 0.5 A to AC 15, 250 V
- 3 Power circuit breaker, C characteristics





## MPC<sup>net</sup> 8DI/16DI

### Features

- Up to 16 inputs
- Galvanic isolation between the inputs and the system
- Monitoring of safety temperature limiters
- Monitoring of rcbs, contactors etc.

### Description

The 8DI and 16DI digital input modules register and monitor diverse status signals. The inputs are floating, and this means that non-floating contacts are required for transmitting signals.

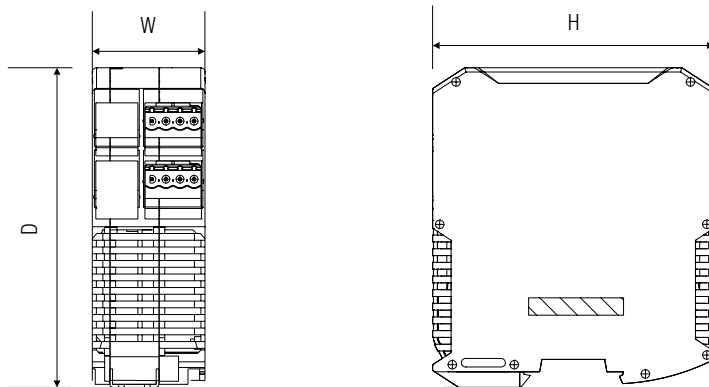
They are operated and supplied through the MC32 controller.

The internal, galvanically isolated bus connection is established by simply joining the modules together.

LEDs display the bus status messages and other status messages per channel.

See the System Description for the Installation Instructions.

#### Dimensions (in mm)



	W	H	D
8 DI	41.0	110	114.5
16 DI	63.5	110	114.5

### Technical data

#### Enclosure material

Polyamide PA

#### Protection class (EN 60529)

IP 20

#### Electrical connections

plug-in screw-type terminal, 3-pole  
Terminal range 0.2 to 2.5 mm<sup>2</sup> numbered

#### Attachment to mounting rail

TH 35-15 DIN EN 60715 (metal)

#### Dimensions (W x H x D)

8DI 41.0 mm x 100 mm x 114.5 mm

16DI 63.5 mm x 100 mm x 114.5 mm

#### Weight

8DI 220 g

16DI 304 g

#### Storage and transport temperature

-40 °C to +70 °C

#### Operating temperature

-40 °C to +60 °C

#### Degree of contamination

2

### Electrical data

#### Number of channels

8DI 8 inputs

16DI 16 inputs

each for connecting  
non-floating auxiliary contacts for  
rcbs, contactors, limiters, buttons etc.

#### Input loading capability

AC/DC 22 - 280 V, CAT III

#### Galvanic isolation

between inputs and internal bus

#### Voltage supply

DC 24 V through internal bus

#### Current consumption

8DI 43 mA

16DI 65 mA

#### Displays

LEDs in The front of the enclosure:  
Status Net al. Pow. Input status

#### Standards

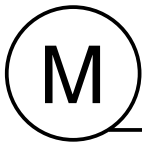
EN 61000-6-2

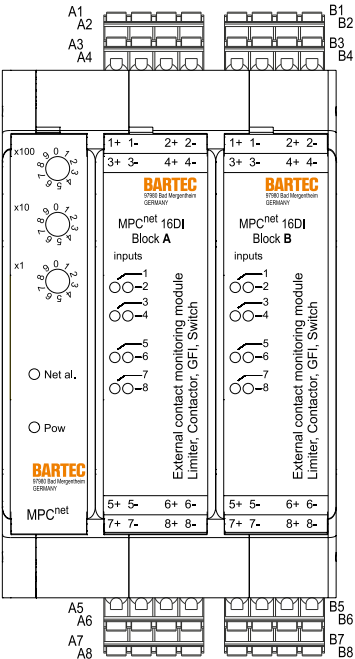
EN 61000-6-4

#### Approvals

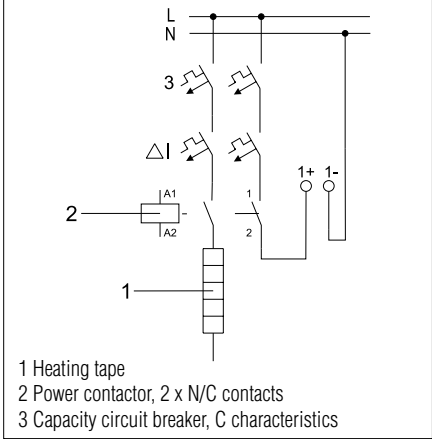
CB FI 21915

CSA 2172627



				Terminal block	Terminal	Description	Terminal block	Terminal	Description
				A1	1+	L/signal +	B1	1+	L/signal +
					1-	N/signal -		1-	N/signal -
				A2	2+	L/signal +	B2	2+	L/signal +
					2-	N/signal -		2-	N/signal -
				A3	3+	L/signal +	B3	3+	L/signal +
					3-	N/signal -		3-	N/signal -
				A4	4+	L/signal +	B4	4+	L/signal +
					4-	N/signal -		4-	N/signal -
				A5	5+	L/signal +	B5	5+	L/signal +
					5-	N/signal -		5-	N/signal -
				A6	6+	L/signal +	B6	6+	L/signal +
					6-	N/signal -		6-	N/signal -
				A7	7+	L/signal +	B7	7+	L/signal +
					7-	N/signal -		7-	N/signal -
				A8	8+	L/signal +	B8	8+	L/signal +
					8-	N/signal -		8-	N/signal -

Example of connection





## MPC<sup>net</sup> 8TI/16TI

### Features

- Up to 16 temperature inputs
- 2- or 3-wire Pt100
- Galvanic isolation between the inputs and the system
- Open-circuit/short-circuit detection

### Description

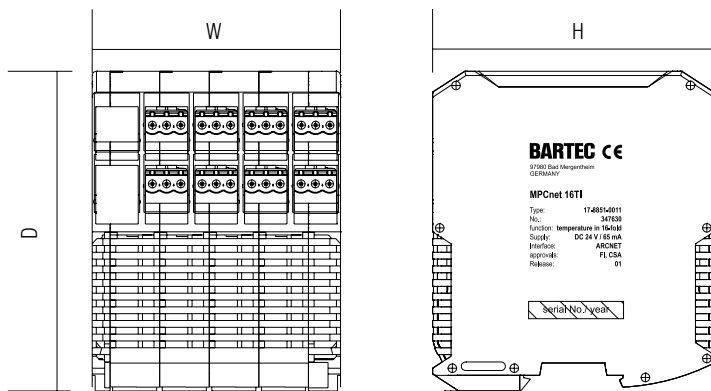
The 8TI and 16TI temperature registering modules are suitable for the direct connection of 2 and 3-wire Pt100 temperature sensors, resistors or potentiometers.

They are operated and supplied by means of the MC32 controller. The internal, galvanically isolated bus connection is established by simply joining the modules.

The modules feature line break/open-circuit monitoring. LEDs display the bus status messages and fault signals.

See System Description for the Installation Instructions.

### Dimensions (in mm)



	W	H	D
8 TI	54.0	100	114.5
16 TI	88.0	100	114.5

### Technical data

#### Enclosure material

Polyamide PA

#### Protection class (EN 60529)

IP 20

#### Electrical connections

plug-in screw-type terminal, 3-pole  
Terminal range 0.2 to 2.5 mm<sup>2</sup> numbered

#### Attachment to mounting rail

TH 35-15 DIN EN 60715 (metal)

#### Dimensions (W x H x D)

8TI 54.0 mm x 100 mm x 114.5 mm  
16TI 88.0 mm x 100 mm x 114.5 mm

#### Weight

8TI 274 g  
16TI 398 g

#### Storage and transport temperature

-30 °C to +70 °C

#### Operating temperature

0 °C to +60 °C

#### Degree of contamination

2

### Electrical data

#### Number of channels

8TI 8 inputs  
16TI 16 inputs  
for 3-wire Pt100 in each case

#### Measuring range

-49 °C to +650 °C

#### Galvanic isolation

between inputs and internal bus

#### Line break/short circuit

per channel  
automatic reporting by means of controller

#### Voltage supply

DC 24 V by means of an internal bus

#### Current consumption

8TI 91 mA  
16TI 117 mA

#### Displays

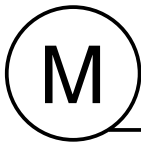
LEDs in the front of the enclosure:  
Status Net al. Pow.

#### Standards

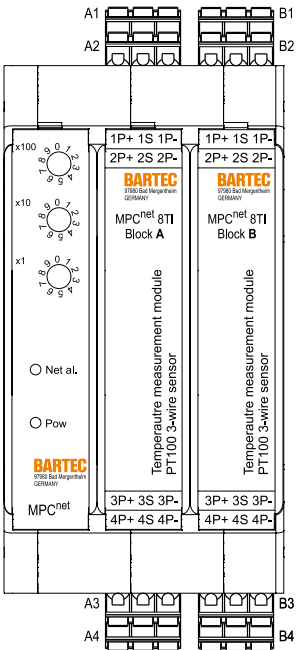
EN 61000-6-2  
EN 61000-6-4

#### Approvals

CB FI 5591 M1  
CSA 2172627

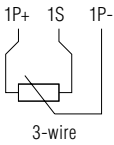
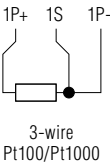
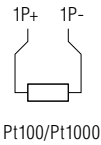


Wiring diagram/terminal assignment



Terminal block	Terminal	Description	Terminal block	Terminal	Description
A1	1P+	Supply +	B1	1P+	Supply +
	1S	Signal		1S	Signal
	1P-	Supply -		1P-	Supply -
A2	2P+	Supply +	B2	2P+	Supply +
	2S	Signal		2S	Signal
	2P-	Supply -		2P-	Supply -
A3	3P+	Supply +	B3	3P+	Supply +
	3S	Signal		3S	Signal
	3P-	Supply -		3P-	Supply -
A4	4P+	Supply +	B4	4P+	Supply +
	4S	Signal		4S	Signal
	4P-	Supply -		4P-	Supply -

Example of connections





## MPCnet 8CI/16CI

### Features

- Up to 16 inputs
- Measurement of load or residual current up to 100 A
- Galvanic isolation between the inputs and the system
- Monitoring of up to three phases

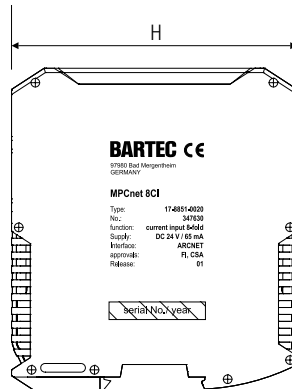
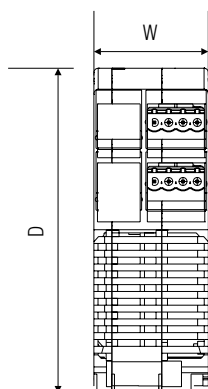
### Description

The 8CI and 16CI current measuring modules register load and residual currents in conjunction with the LoaC and LeaC measuring transducers. Up to three phases and the total current can be monitored for each heating circuit. The individual inputs are assigned and configured either by means of the MPCnet Process Manager software or by the touch panel.

The modules are operated and supplied through the MC32 controller. The internal, galvanically isolated bus connection is established by simply joining the modules together.

See the System Description for the Installation Instructions.

### Dimensions (in mm)



	W	H	D
8 CI	41.0	110	114.5
16 CI	63.5	110	114.5

### Technical data

#### Enclosure material

Polyamide PA

#### Protection class (EN 60529)

IP 20

#### Electrical connections

plug-in screw-type terminal, 3-pole  
terminal range 0.2 to 2.5 mm<sup>2</sup> numbered

#### Fastened to mounting rail

TH 35-15 DIN EN 60715 (metal)

#### Dimensions (W x H x D)

8CI 41,0 mm x 110 mm x 114.5 mm

16CI 63.5 mm x 110 mm x 114.5 mm

#### Weight

8CI 274 g

16CI 398 g

#### Storage and transport temperature

-30 °C to +70 °C

#### Operating temperature

0 °C to +60 °C

#### Degree of contamination

2

### Electrical data

#### Number of channels

8CI 8 inputs

16CI 16 inputs

each LoaC and LeaC measuring transducers

#### Measuring range

LoaC 0 to 70 A

LeaC 0 to 700 mA

#### Galvanic isolation

between inputs and internal bus

#### Voltage supply

DC 24 V through internal bus

#### Current consumption

8CI 91 mA

16CI 117 mA

#### Displays

LEDs in The front of the enclosure:  
Status Net al. Pow.

#### Standards

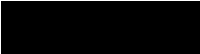
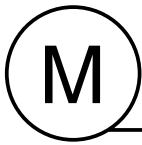
EN 61000-6-2

EN 61000-6-4

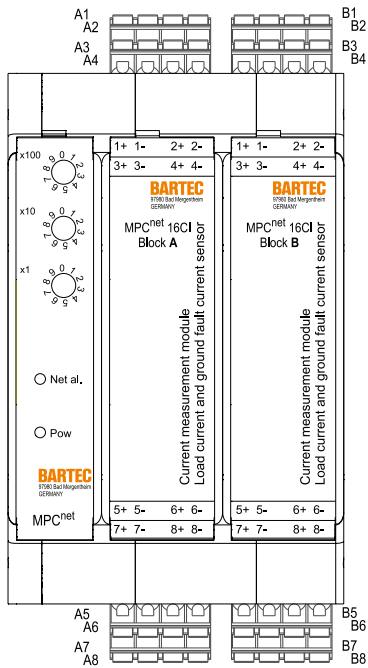
#### Approvals

CB FI 5591 M1

CSA 2172627

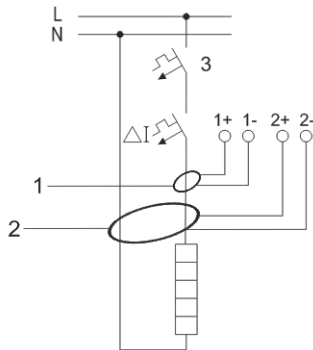


Wiring diagram/terminal assignment



Terminal block	Terminal	Description	Terminal block	Terminal	Description
A1	1+	current transformer +	B1	1+	current transformer +
	1-	current transformer -		1-	current transformer -
A2	2+	current transformer +	B2	2+	current transformer +
	2-	current transformer -		2-	current transformer -
A3	3+	current transformer +	B3	3+	current transformer +
	3-	current transformer -		3-	current transformer -
A4	4+	current transformer +	B4	4+	current transformer +
	4-	current transformer -		4-	current transformer -
A5	5+	current transformer +	B5	5+	current transformer +
	5-	current transformer -		5-	current transformer -
A6	6+	current transformer +	B6	6+	current transformer +
	6-	current transformer -		6-	current transformer -
A7	7+	current transformer +	B7	7+	current transformer +
	7-	current transformer -		7-	current transformer -
A8	8+	current transformer +	B8	8+	current transformer +
	8-	current transformer -		8-	current transformer -

Example of connection



- 1 Load current transformer Loac
- 2 Total current transformer LeaC
- 3 Power circuit breaker, C characteristics



## MPC<sup>net</sup> TM04/TS04

### Features

- Integration of the TR16, TR36 and TR38 modules into the MPC<sup>net</sup>
- Up to 4 power modules for each communication module
- Easily extendable by adding more modules

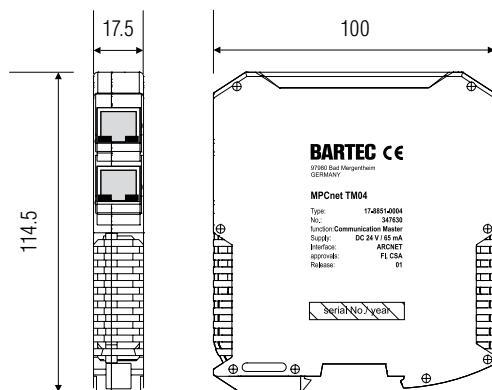
### Description

The TR16, TR26 and TR38 power modules are integrated into the MPCnet network architecture by means of the TM04 and TS04 communication modules, whereby up to 4 power modules can be connected to each communication module.

The communication between the individual power modules and the MC32 controller is established by means of the TM04 master module. By inserting more TS04 communication modules into the bus, the number of connectable power modules can be extended to 32.

See System Description for the Installation Instructions.

### Dimensions (in mm)



### Technical data

#### Enclosure material

Polyamide PA

#### Protection class (EN 60529)

IP 20

#### Electrical connections

RJ-45 connectors, RS-485

#### Fastening to mounting rail

TH 35-15 DIN EN 60715 (metal)

#### Dimensions (W x H x D)

17.5 mm x 100 mm x 114.5 mm

#### Weight

148 g

#### Storage and transport temperature

-40 °C to +70 °C

#### Operating temperature

-40 °C to +60 °C

#### Degree of contamination

2

### Electrical data

#### Total number of communication modules

8 modules

#### Total number of power modules

32 modules

#### Connection power modules

via 8-pole RJ-45 plug-in connector

#### Connection of TM04 and TS04 modules

via bus connectors integrated into the DIN rail

#### Voltage supply

DC 24 V by means of an internal bus

#### Current consumption

65 mA

#### Displays

LEDs in the front of the enclosure:  
TM04: Port status, error, MC32 error  
TS04: Port status, error

#### Standards

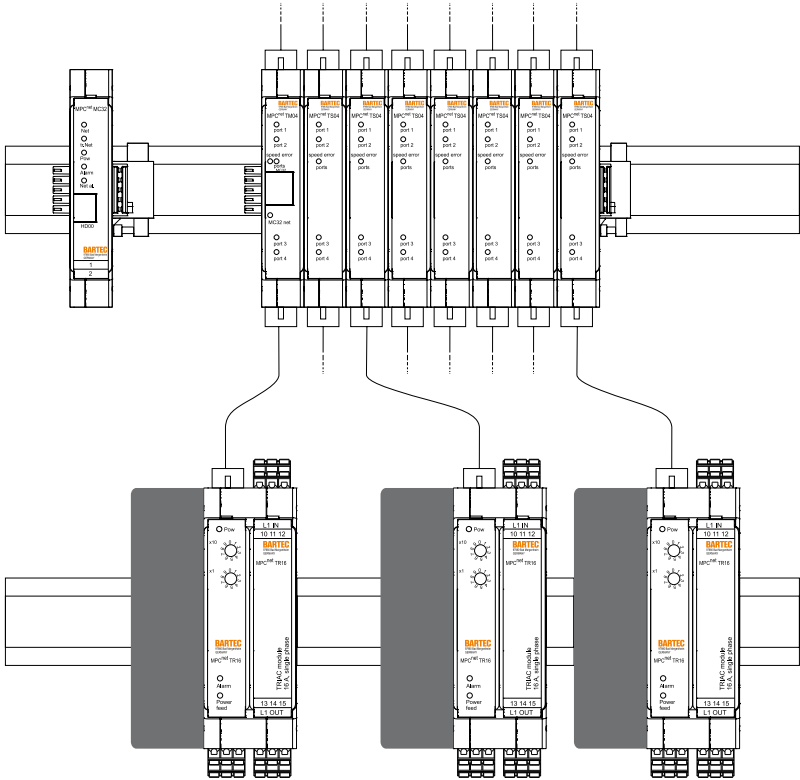
EN 61000-6-2  
EN 61000-6-4

#### Approvals

CB FI 5591 M1  
CSA 2172627



Examples of connections







## MPC<sup>net</sup> TR16/TR36

### Features

- Temperature monitoring and power setpoint adjustment in one module
- Measurement of load or residual current up to 16 A
- Power setpoint adjustment 1- and 3-phase
- Recording of up to two temperatures

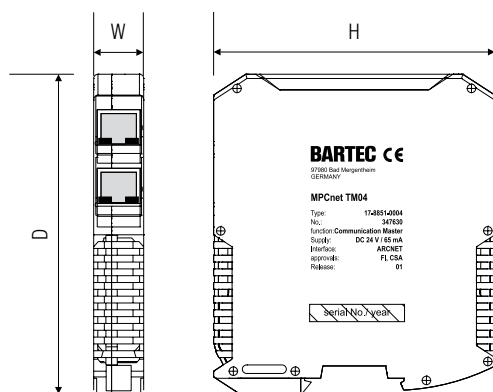
### Description

The TR16 and TR36 power modules combine the functions of all MPC<sup>net</sup> I/O modules in one single module. Each module has two Pt100 inputs and digital inputs for monitoring RCCBs and limiters. For each heating circuit the heating power can be adjusted steplessly between 10 % and 100 % for up to three phases, whereby the load and total current are monitored.

The modules are operated and supplied via the TM04 or TS04 power module controllers. The set point value is determined by the MC32 controller.

The internal, galvanically isolated bus connection is established by simply joining the modules together by means of RJ-45 plug connectors.

### Dimensions (in mm)



	W	H	D
TR16	62.5	110	114.5
TR36	126	110	114.5

### Technical data

#### Enclosure material

Polyamide PA

#### Protection class (EN 60529)

IP 20

#### Electrical connections

plug-in screw-type terminals, 3-pole  
terminal range 0.2 to 2.5 mm<sup>2</sup> numbered  
plug connectors RJ-45, RS485

#### Fastening onto mounting rail

TH 35-15 DIN EN 60715 (metal)

#### Abmessungen (W x H x D)

TR16 62,5 mm x 110 mm x 114,5 mm  
TR36 126 mm x 110 mm x 114,5 mm

#### Masse

TR16 410 g  
TR36 775 g

#### Lager- und Transporttemperatur

-30 °C bis +70 °C

#### Betriebstemperatur

0 °C bis +45 °C

#### Verschmutzungsgrad

2

### Electrical data

#### Number of channels

TR16 1 x L (1-phase)  
TR36 1 x L1, 1 x L2, 1 x L3  
each AC 230 V/16 A

#### Inputs

2 x Pt100 (controllers and limiters)  
2 x digital input  
(RCCB and limiter monitoring)  
Load input L1, L2, L3 and N

#### Galvanic isolation

between inputs and internal bus

#### Voltage supply

DC 24 V through RJ45 cable, RS485

#### Current consumption

TR16 91 mA  
TR36 91 mA

#### Displays

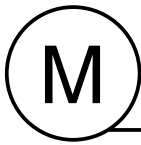
LEDs in the front of enclosure:  
Status, net alarm, power

#### Standards

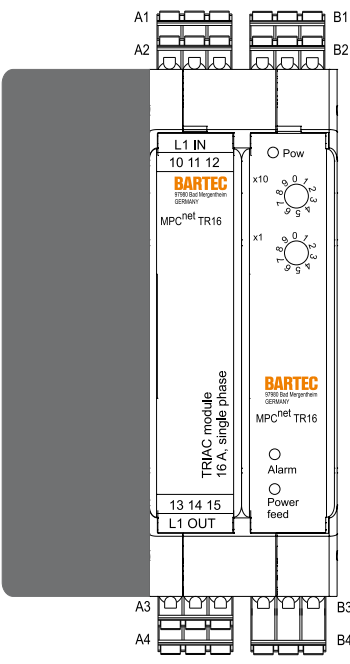
EN 61000-6-2  
EN 61000-6-4

#### Approvals

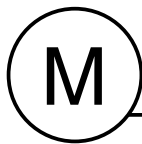
CB FI 5591 M1  
CSA 2172627



Wiring diagram/Terminal assignment



Terminal block	Terminal	Description	Terminal block	Terminal	Description
A1 (C1/D1 in TR36)	L1 (2/3) IN	Supply L	B1	1	Supply +
	L1 (2/3) IN	Supply L		2	Signal
	L1 (2/3) IN	Supply L		3	Supply -
A2	10	N	B2	4	Supply +
	11	Supply +		5	Signal
	12	not assigned		6	Supply -
A3	13	Limiter monitoring	B3	RJ45	Connection of TM04
	14	Limiter monitoring			
	15	Limiter monitoring			
A4 (C4/D4 in TR36)	L1 (2/3) OUT	Heating cable L	B4	7	Connection of FI
	L1 (2/3) OUT	Heating cable L		8	Connection of FI
	L1 (2/3) OUT	Heating cable L		9	not assigned



## *MPC II Multi-Channel Control System*

### ■ MPC II Standard

Excellent compact controller at an attractive price

### ■ MPC II Comfort

Compact controller for controlling complex heating systems

### ■ MPC II Professional

Complete solution in a high-end version

## Features

- Economical  
one device regulates up to 24 heating circuits
- Easy integration  
into existing control technology
- Top functional reliability  
thanks to constant monitoring of the load  
and leakage currents
- Top system safety  
due to tracking of faults and alarms
- Easy programming  
by PC/software via Ethernet

## Description

The new MPC II control system is a multi-channel two-point controller for electrical trace heating.

The controller is characterised by high cost effectiveness. One device regulates up to 24 heating circuits safely and reliably.

The MPC II system is suitable for setting up compact control cabinet solutions and can be integrated into existing controls too.

The MPC II is available in three different versions to meet the requirements of a wide variety of applications and tasks.

## Construction

The MPC II is fitted directly into the front panel of a control cabinet. The advantage here is that the actual values and states can be read comfortably and safely on the large LCD displays. The displayed information can be compiled individually.

Depending on the equipment variant, the MPC II has up to 24 status and alarm LED displays and 8 separate status LED displays for the relay outputs.

Connections for temperature sensors, current and voltage transducers are located on the back of the device. The heating circuits are switched by external electromechanical contractors or semi-conductor relays. All connections are wired by means of a pre-assembled cable included in the scope of supply.

The parameters are set locally by means of the intuitive user menu or a PC. Remote querying or configuration through the RS485 interface is possible.

## Function

The setpoints set on the device are constantly compared with the temperature levels measured on the heating circuit.

If there are deviations, the external relays are triggered accordingly. The temperature deviation is 1 K at most. An alarm is triggered if the temperature drops below or exceeds a set limit. The alarm message is also displayed on the LED display.

The load and leakage current and the heat output can be monitored also.

## ➔ Technical data

### Working temperature range

0 °C to +55 °C

### Dimensions (height x width x depth)

72 mm x 144 mm x 250 mm

### Installation

Front panel (cut-out 68.5 mm x 137 mm)

### Protection class

IP 54/EN 60529

### Weight

1 kg

### Connections

Pre-assembled supply cable to connect the contactor, temperature sensors and measuring transducers 0.5 mm<sup>2</sup>

### Enclosure material

Aluminium, black anodised

## ■ Electrical data

### Control characteristics

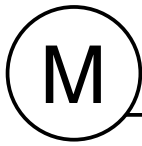
Two positions (on/off)

### Nominal voltage

AC 90 V to 260 V  
50/60 Hz  
AC/DC 24 V

### Power consumption

max. 10 VA



## MPC II Standard

### Features

- Economical solution for max. 8 heating circuits
- Inputs for temperature measurement with default parameter settings
- Easy start  
immediate commissioning after input of setpoints

### Description

The MPC II Standard is the ideal solution for compact control cabinets and can regulate up to 8 heating circuits.

The inputs have been preconfigured completely and each is permanently assigned to one output.

Thanks to the easy-start function, it can be put into operation as soon as the temperature setpoints and alarm values have been entered.

Alternatively, the inputs and outputs can be programmed on site by means of the clearly organised and user-friendly control menu.

### Technical data

#### Inputs

8 sensor inputs, pre-configured for Pt100, alternatively reprogrammable  
0 to 5 V, 1 to 5 V

#### Input impedance

1 M $\Omega$

#### Measuring current (Pt100)

1 mA

#### Measuring range

-199.9 °C to 850 °C for Pt100  
-1999 to +9999 counters for  
current and voltage measurement

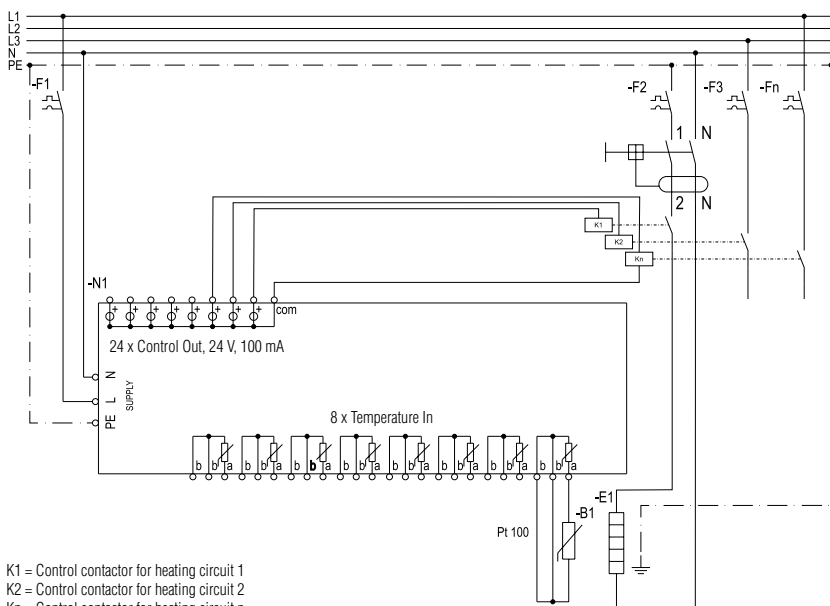
#### Measuring accuracy

$\pm 0.1\%$  of the display range  $\pm 1$  digit

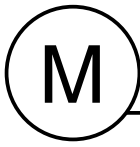
#### Outputs

24 logic outputs to actuate the relay  
(contactor with integrated varistor/SSR)  
DC 24 V, 100 mA

### Wiring diagram for the MPC II Standard



K1 = Control contactor for heating circuit 1  
K2 = Control contactor for heating circuit 2  
Kn = Control contactor for heating circuit n  
F1, F2, Fn = breaker for regulators, heating, etc.  
B1 = Pt100 for heating circuit 1



## MPC II Comfort

### Features

- Cost-effective solution for max. 16 heating circuits
- Inputs for temperature measurement and current monitoring with default parameter setting
- RS485 interface for integrating into the process control technology
- Easy-Start: three measuring inputs are directly assigned to each output, commissioning directly after input of setpoints

### Description

The MPC II Comfort is designed as an entry-level solution for regulating temperature in compact trace heating solutions with up to 16 heating circuits.

The inputs are preconfigured here for the operation and current monitoring of 5 heating circuits, alternatively all inputs can also be programmed exclusively for managing temperature.

Alternatively, inputs and outputs can be programmed locally through the clearly organised and user-friendly control menu.

### Technical data

#### Inputs

16 sensor inputs, pre-configured  
each 5 x Pt100,  
load current transformer and leakage current  
transformer,  
1 x voltage converter

#### Input impedance

1 M $\Omega$

#### Measuring current (Pt100)

1 mA

#### Measuring range

-199.9 °C to 850 °C for Pt100  
-1999 to +9999 counters for current  
and voltage measurement

#### Measuring accuracy

$\pm 0.1\%$  of the display range  $\pm 1$  digit

#### Outputs

24 logic outputs for relay actuation  
(contactor with integrated varistor/SSR)  
DC 24 V, 100 mA

8 relay outputs  
N/C contact for triggering alarms,  
(2 A - AC 1, 230 V)

#### Interface

RS485 (optically isolated)

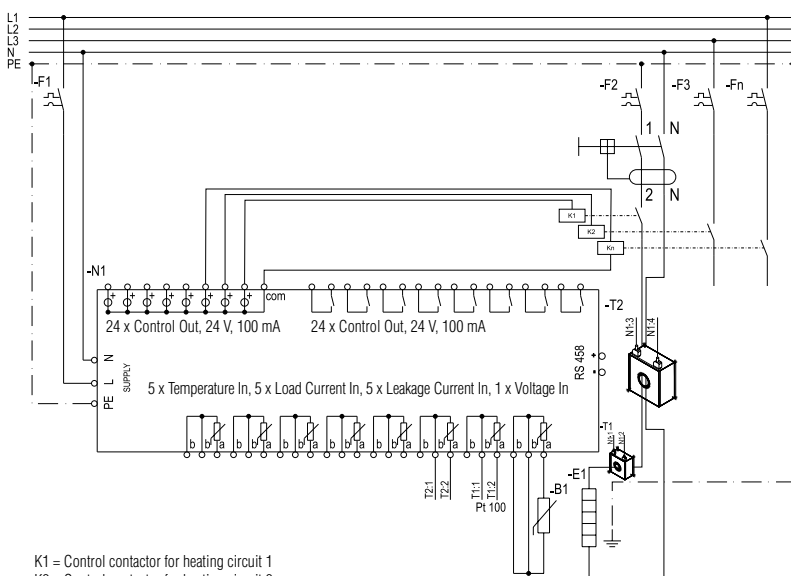
#### Communication protocol

Modbus RTU

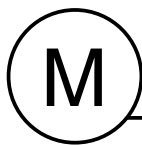
#### Speed

1200 to 38400 bauds

### Wiring diagram for MPC II Comfort



K1 = Control contactor for heating circuit 1  
K2 = Control contactor for heating circuit 2  
Kn = Control contactor for heating circuit n  
F1, F2, Fn = breaker for regulators, heating, etc.  
B1 = Pt100 for heating circuit 1



## MPC II Professional

### Features

- Cost-effective solution for max. 24 heating circuits
- Inputs for temperature measurement and current monitoring with default parameter settings
- Datalogger for tracing heating cable functioning
- Easy-Start: three measuring inputs are directly assigned to each output, commissioning directly after input of setpoints

### Description

The MPC II Professional, as the highest configuration level, rounds off the MPC II family. The device is pre-configured for monitoring 8 heating circuits but the temperature regulation of up to 24 heating circuits can be enabled by reprogramming the inputs.

Alternatively, the MPC II Professional has an Ethernet interface for local programming and can be programmed directly via software. The RS485 interface allows easy integration into the process control technology.

In addition to the LED displays, status messages and fault alarms are emitted through the additional relay outputs.

### Technical data

#### Inputs

16 sensor inputs,  
pre-configured each 8 x Pt100,  
load current transformer and leakage current  
transformer

#### Input impedance

1 M $\Omega$

#### Measuring current (Pt100)

1 mA

#### Measuring range

-199.9 °C to 850 °C for Pt100  
-1999 to +9999 counters for  
current and voltage measurement

#### Measuring accuracy

$\pm 0.1\%$  of the display range  $\pm 1$  digit

#### Outputs

24 logic outputs for relay actuation  
(contactor with integrated varistor/SSR)  
DC 24 V, 100 mA

8 relay outputs N/C contacts,  
to emit alarms, (2 A - AC 1, 230 V)

#### Interface

2 x RS485 (optically isolated)  
1 x RJ45

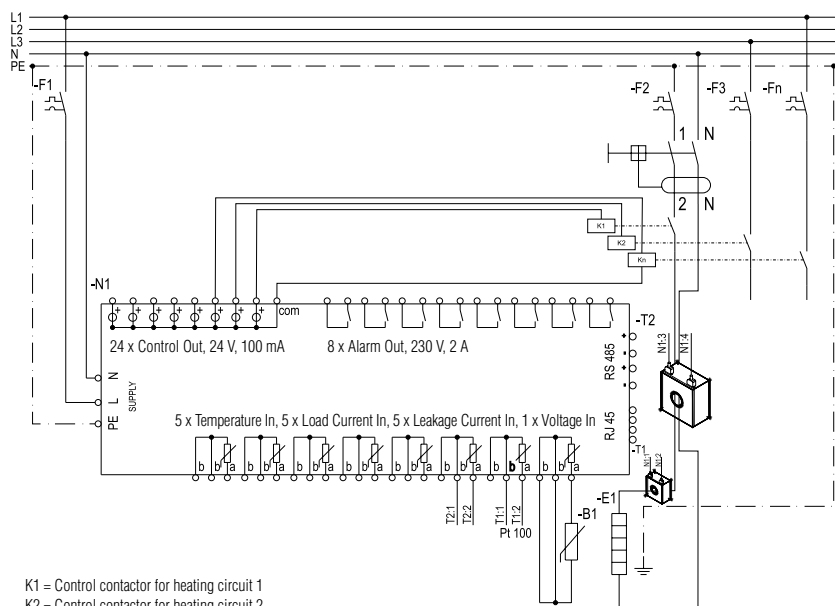
#### Communication protocol

Modbus RTU  
Ethernet TCP/IP

#### Speed

1200 to 19200 bauds

### Wiring diagram MPC II Professional



K1 = Control contactor for heating circuit 1  
K2 = Control contactor for heating circuit 2  
Kn = Control contactor for heating circuit n  
F1, F2, Fn = breaker for regulators, heating, etc.  
B1 = Pt100 for heating circuit 1



## STW capillary tube thermostat

### Features

- Extremely compact
- Different temperature range combinations available in one enclosure
- Suitable for use in Zone 1 areas
- Temperature can be set in Zone 1 areas
- Alternative versions available

### Description

The 5 A capillary tube thermostat, STW, is a compact change-over controller housed in an EEx e certified polyester enclosure.

Heaters, fans, motors and other equipment are energised and de-energised by means of this thermostat when specific temperature ranges are exceeded. This device can also be used to control the temperature in air or on various surfaces.

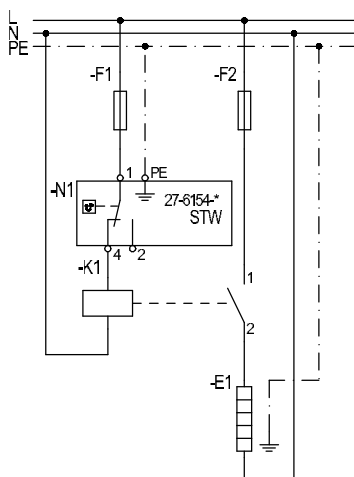
### Function

Any change in temperature at the sensor bulb causes a change in the volume of fluid in the measuring system, which in turn results in a movement of the diaphragm membrane. This membrane is connected to a mechanical device that activates a microswitch. If the temperature at the sensor bulb exceeds the pre-set value, terminals 1 and 4 are opened. If there is a rupture or break in the sensor tube (leakage), then the switch remains permanently open (fail-safe). If the temperature falls below the minimum setting, the autocontrol opens the circuit but closes again on temperature rise.

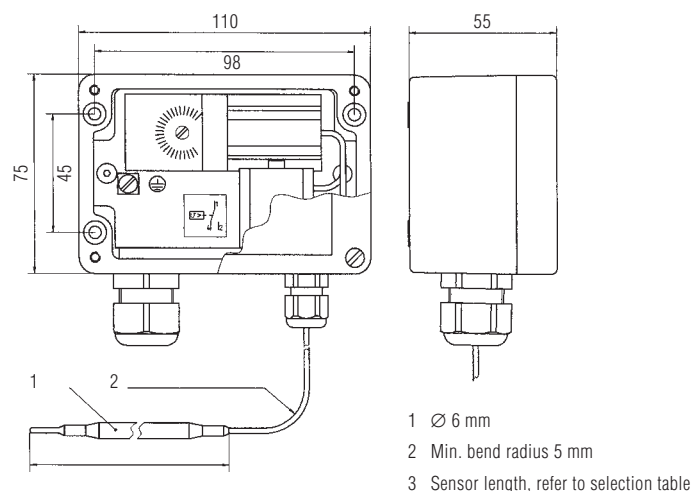
### Application example

The STW thermostat can directly switch temperature-dependent equipment loads (heaters etc.) of up to 5 A. Higher rated currents can be switched by means of a contactor; the STW switches the contactor coil. If an interlock is installed by means of an additional relay (according to DIN VDE 0116), the STW can also be used as a limiter.

### Connection diagram



### Dimensions





## Explosion protection

### Ex protection type

Ex II 2G EEx ed IIC T6

### Certification

PTB 01 ATEX 1114

## Technical data

### Protection class

IP 65/EN 60529

### Min. storage temperature

-40 °C

### Ambient temperature

-20 °C up to +50 °C

### Min. sensor temperature

-20 °C (Safety cut-out)

### Capillary tube

length 1000 mm  
OD sensor line 1.5 mm  
min. bend radius 5 mm  
Sensor bulb diameter 6 mm  
Sensor material stainless steel SS 1.4571

### Enclosure sizes (in mm)

single unit 110 x 75 x 55  
single unit, special size 122 x 120 x 90  
double unit 220 x 120 x 90

### Weight

single unit 550 g

## Electrical data

### Switching capacity

5 A

### Rated voltage

maxi. AC 250 V  
50/60 Hz

### Contacts

1 change-over contact

### Terminals

3 x 2.5 mm<sup>2</sup> + 1 PE

### Cable glands

1 x M20, cable diameter 6 up to 12 mm

## Temperature ranges

Temperature setting range	fail-safe	20 °C up to +50 °C	0 °C up to +50 °C	0 °C up to +120 °C	+50 °C up to +300 °C
Switching accuracy	STW	-0 K +3.5 K	-0 K +2.5 K	-0 K +6 K	-0 K +12.5 K
Switching differential	STW = 5 up to 7 % of the scale range				
operating limits					
Max. sensor temperature (DIN 3440)		+60 °C	+60 °C	+140 °C +200 °C <sup>2)</sup>	+345 °C
Min. sensor temperature (DIN 3440)	STW	-30 °C	-10 °C	-10 °C	-15 °C
Max. temperature at switch		+50 °C	+50 °C	+50 °C	+50 °C
Capillary		+50 °C	+50 °C	+50 °C	+50 °C
Min. temperature at switch		-20 °C	-20 °C	-20 °C	-15 °C
Capillary		-40 °C	-40 °C	-40 °C	-15 °C
Mean influence of ambient temperature as % of scale range <sup>1)</sup>	STW	Switch 0.17 % K			0.13 % K
		capillary 0.054 % K m			0.11 % K m

<sup>1)</sup> Switching point accuracy with reference to a room temperature of +22 °C.

<sup>2)</sup> Steam cleaning allowed (not DIN).





## Safety temperature monitor and limiter

### Features

- Direct connection of self-limiting heating tapes by means of BARTEC's cold-applied technology reduces wiring and materials
- Switching voltage up to 400 V and 2 M20 x 1.5 boreholes as standard for an enhanced operation of EKL heating circuits
- Safety cut-out temperature -45 °C or -55 °C for reliable operation, even in very cold conditions
- Minimum operating temperature -55 °C for all standard variants for use all over the world without restrictions
- Wide regulating range from -20 °C to +500 °C, depending on the switch insert

### Description

BSTW II 25-A Ex temperature monitors and BTB II/BSTB II temperature limiters are two-state controllers in Ex e-certified polyester enclosures.

In addition to the use of conventional wiring by means of a sheathed cable, the BSTW II and BTB II/BSTB II are suitable and approved for the direct connection of self-limiting BARTEC heating systems in the enclosure. As a result, a verification of thermal safety and a further acceptance test by a capable person is no longer necessary.

The benefit for the customer is obvious. The direct connection of self-limiting heating tapes does away with the need for junction boxes and considerably reduces the extent of wiring required.

BSTW II and BTB II/BSTB II can monitor the ambient temperature but also the different surface temperatures. In conformance to EN 60079-30-1, the BTB II and BSTB II fail-safe temperature limiters are designed to switch off and remain switched off when the preset limit temperature is reached. The restart lockout requires manual resetting directly in the device.

### Function

Any change in temperature in the sensor causes a change in the volume in the liquid-filled measuring system, which in turn results in a movement of the diaphragm membrane, which is connected to a transmission mechanism, and this opens a microswitch.

If the sensor temperature exceeds the set value, the contacts 1 and 2 remain continuously open. The contacts in the BTB II/BSTB II remain continuously open until there is a manual intervention.

### Explosion protection

#### Ex protection type

Ex II 2 G Ex de IIC T6, T5, T4, T3

#### Certification

EPS 11 ATEX 1356 X

### Technical data

#### Protection class

IP 65/EN 60529

#### Min. ambient temperature

-55 °C (Standard)

#### Max. ambient temperature

depends on the type of heating cable connection

#### Storage temperature

-55 °C to +65 °C

#### Capillary tube

Length	1000 mm
OD sensor line	1,5 mm
Min. bend radius	5 mm
Sensor bulb diameter	6 mm
Sensor material	SS 1.4571

#### Contacts 1 change-over contact

Contact decks 1 - 2:  
AC 400 V/16 A, AC 230 V/25 A

Contact decks 1 - 4:  
AC 400 V/6,3 A, AC 230 V/6,3 A

#### Switching hysteresis

approx. 7 %

### BSTW II

fail-safe safety temperature monitor

- Falling calibration to maintain the temperature during the process
- Turns on and off automatically whenever the temperature exceeds or drops below the setpoint value

### BTB II

fail-safe temperature limiter

- Rising calibration to limit temperature during the process
- switches off and remains switched off once the limit temperatures are reached

### BSTB II

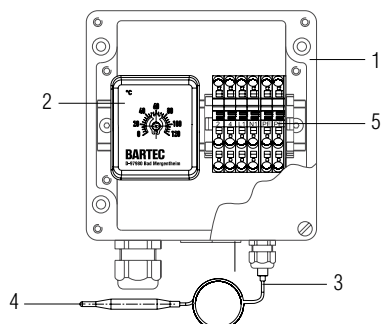
fail-safe safety temperature limiter

- The BSTB II functions in the same manner as the BTB II temperature limiter, whereby the setting range is limited here to 0 °C to 130 °C or 130 °C to 190 °C based on the temperature classes T3 and T4.



**Device for 1 heating circuit**

(Heating cable connection direct via sheathed cable/Plexo or cold lead)



- 1 Enclosure
- 2 Switch insert
- 3 Capillaries
- 4 Sensor
- 5 Rail-mounted terminals
- 6 Blind plug M20

**Technical data**

**Dimensions**

160 mm x 160 mm x 90 mm

**Terminals**

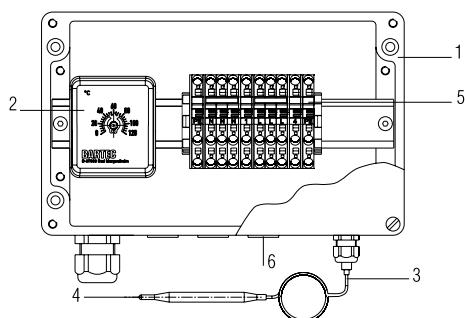
4 x 6 mm<sup>2</sup> + 2 x PE

**Heating cable connections**

2 x M20, closed with blind plug

**Device for 1 to 3 heating circuits**

(Heating cable connection direct, via sheathed cable/Plexo or cold lead)



- 1 Enclosure
- 2 Switch insert
- 3 Capillaries
- 4 Sensor
- 5 Rail-mounted terminals
- 6 Blind plug M20

**Technical data**

**Dimensions**

260 mm x 160 mm x 90 mm

**Terminals**

8 x 6 mm<sup>2</sup> + 3 x PE

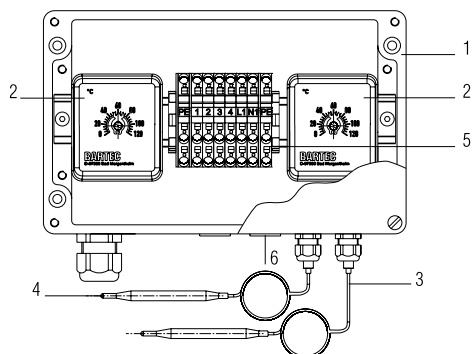
**Heating cable connections**

3 x M20, closed with blind plug

Load side connection variant heating circuits	Fuse (C characteristics)	Ambient temperature	Temperature class
PSBL system 27-1580-.910/....	1 x 16 A	-55 °C to +50 °C	T5
PSB system 27-1680-.910/....	1 x 25 A	-55 °C to +40 °C	T6
	1 x 25 A	-55 °C to +50 °C	T5
MSB system 27-1980-.910/....	1 x 25 A	-55 °C to +50 °C	T4
HSB system 27-1780-.910/....	1 x 25 A	-55 °C to +50 °C	T3
Sheathed cable/ PLEXO or cold lead	1 x 16 A	-55 °C to +50 °C	T5
	1 x 20 A	-55 °C to +40 °C	T5
	1 x 25 A	-55 °C to +40 °C	T4



**Combination unit** Safety temperature monitor and limiter  
(Heating cable connection direct via sheathed cable/Plexo or cold lead)



- 1 Enclosure
- 2 Switch insert
- 3 Capillaries
- 4 Sensor
- 5 Rail-mounted terminals
- 6 Blind plug M20

## Technical data

### Dimensions

260 mm x 160 mm x 90 mm

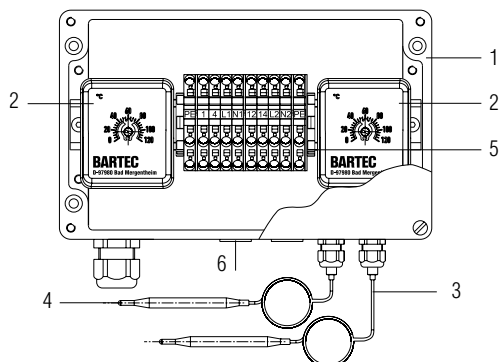
### Terminals

6 x 6 mm<sup>2</sup> + 3 x PE

### Heating cable connections

2 x M20, closed with blind plug

**Combination unit** Safety temperature monitor  
(Heating cable connection direct, via sheathed cable/Plexo or cold lead)



- 1 Enclosure
- 2 Switch insert
- 3 Capillaries
- 4 Sensor
- 5 Rail-mounted terminals
- 6 Blind plug M20

## Technical data

### Dimensions

260 mm x 160 mm x 90 mm

### Terminals

8 x 6 mm<sup>2</sup> + 3 x PE

### Heating cable connections

2 x M20, closed with blind plug

Load side connection variant heating circuits	Fuse (C characteristics)	Ambient temperature	Temperature class	Fuse (C characteristics)	Ambient temperature	Temperature class
PSBL system 27-1580-.910/....	1 x 16 A	-55 °C up to +50 °C	T5	2 x 16 A	-55 °C up to +50 °C	T5
PSB system 27-1680-.910/....	1 x 25 A	-55 °C up to +40 °C	T6	2 x 25 A	-55 °C up to +40 °C	T6
	1 x 25 A	-55 °C up to +50 °C	T5	2 x 25 A	-55 °C up to +40 °C	T5
MSB system 27-1980-.910/....	1 x 25 A	-55 °C up to +50 °C	T4	2 x 25 A	-55 °C up to +40 °C	T4
HSB system 27-1780-.910/....	1 x 25 A	-55 °C up to +50 °C	T3	2 x 25 A	-55 °C up to +40 °C	T3
Sheathed cable/ PLEXO or cold lead	1 x 16 A	-55 °C up to +50 °C	T5	2 x 16 A	-55 °C up to +50 °C	T5
	1 x 20 A	-55 °C up to +40 °C	T5	-	-	-
	1 x 25 A	-55 °C up to +40 °C	T4	-	-	-



## *BSTW Safety Temperature Monitor*

## *BTB/BSTB Safety Temperature Limiter*

### Features

- 16 A switching capacity
- Pre-set limit point for BSTB
- Suitable for use in Zone 1 + Zone 2 areas
- Temperature setting directly in Zone 1, Zone 21 and 22 areas possible
- Resettable lockout on the device
- Direct heating circuit connection via sheathed cable/cold lead
- Temperature ranges from -20 °C up to +500 °C possible

### Application example

The BTB, BSTB and BSTW thermostats can directly switch temperature-dependent equipment loads (heaters etc.) of up to 16 A. Higher switching currents of 3-phase applications are switched by means of a contactor.

### Key to the type designations

#### BSTW

Fail-safe safety temperature monitor

#### BTB

Fail-safe temperature limiter

#### BSTB

Fail-safe safety temperature limiter

### Description

The 16 A Ex temperature monitor BSTW/temperature limiter BTB/BSTB are change-over controllers housed in an Ex e certified polyester enclosure.

Heaters, fans, motors and other equipment are energised and de-energised by means of this thermostat when specific temperature ranges are exceeded.

These devices can also be used to control the temperature in air or on various surfaces. The fail-safe temperature limiter BTB and the fail-safe temperature limiter BSTB are produced with restart lockout, resetting (reopening) is only possible at the device.

### Function

Any change in temperature at the sensor bulb causes a change in the volume of fluid in the measuring system, which in turn results in a movement of the diaphragm membrane. This membrane is connected to a mechanical device that activates a microswitch.

If the temperature at the sensor bulb exceeds the pre-set value, terminals 1 and 4 are opened.

The BTB and BSTB devices 'lock-out' permanently if the set temperature is exceeded. After a temperature decrease of about 9 % below the set value, both BTB and BSTB can be re-set manually. If there is a rupture or break in the sensor tube (leakage), then the switch remains permanently open (fail-safe). If the temperature falls below the minimum setting, the autocontrol opens the circuit but closes again on temperature rise.

### Explosion protection

#### Ex protection type

- Ex II 2G Ex ed IIC T6 or T5
- Ex II 2D tD A21 IP 65 T 95 °C, T 80 °C

#### Certification

PTB 03 ATEX 1180

### Technical data

#### Protection class

IP 65/EN 60529

#### Min. Ambient temperature

- 20 °C standard
- 40 °C/-55 °C on request

#### Min. storage temperature

-50 °C

#### Max. storage temperature

+65 °C

#### Capillary tube

Length	1000 mm
OD sensor line	1.5 mm
min. bend radius	5 mm
sensor bulb diameter	6 mm
sensor material	stainless steel SS 1.4571

#### Enclosure sizes

Single unit	122 x 120 x 90 mm
Double unit	220 x 120 x 90 mm

#### Weight

Single unit	1.1 kg
Double unit	2.0 kg

### Electrical data

#### Contacts

1 change-over contact

#### Terminals

4 with 2.5 mm<sup>2</sup> + 1 PE

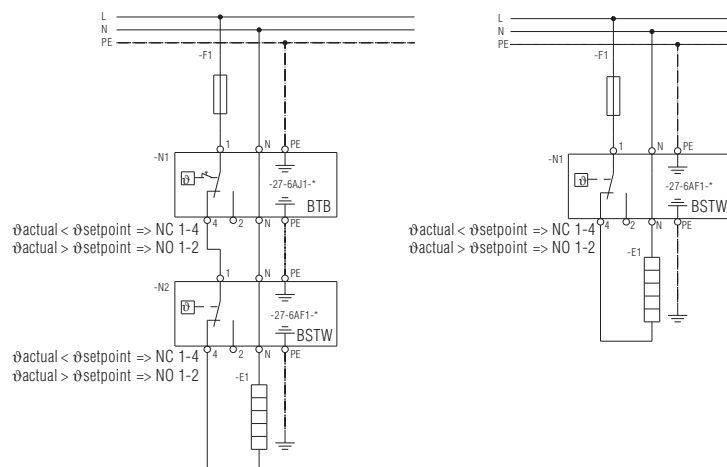
#### Cable glands

2 x M25

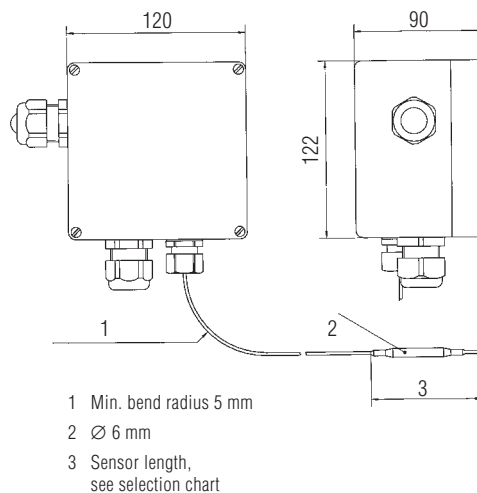
	Switching capacity	Control current	
Opener	16 A, AC-1	2 A, AC-15	0,25 A, DC-13
Closer	10 A, AC-1	1,5 A, AC-15	0,25 A, DC-13
Rated voltage			
	AC 250 V/50 Hz	AC 230 V/50 Hz	DC 250 V



### Wiring diagram



### Dimensions



Temperatures ranges		-20 °C up to +50 °C	0 °C up to +200 °C	+50 °C up to +300 °C
Switching accuracy in the lower third of the scale range	BSTW	-0 K up to +3.5 K	-0 K up to +10 K	-
	BTB	-	+0 K up to -10 K	-
Switching accuracy in the upper third of the scale range	BSTW	-	-	0 K up to +12.5 K
	BTB	-	-	0 K up to -12.5 K
Max. sensor temperature	BSTW/BTB	+60 °C	+230 °C	+345 °C
Sensor length	BSTW/BTB	130 mm	71 mm	57 mm



## DTW/DTB Flame-proof temperature monitor/limiter

### Features

- 22 A switching capacity
- Can be used directly in Zone 1 and 2
- Direct heating circuit connection
- Flame-proof enclosure
- ATEX, UL, CSA, FM Approval

### Description

The flame-proof encapsulated temperature controllers/limiters (DTW/DTB) are designed for (trace)-heating applications in the Ex area. They can be used both for protection against frost and for maintenance temperature applications.

Heating units and other operating equipment are switched on and off by means of the temperature controller when the temperature is too high or too low.

The DTB temperature limiter is designed with resetting lockout; resetting (restarting) is only possible on the device.

Can be used for monitoring temperature in the air or on surfaces.

### Function

A change in temperature in the sensor causes a change in volume in the fluid filled in the measuring system, which in turn results in a movement of a membrane, which is connected to transmission mechanics and activates a microswitch. If the sensor temperature exceeds the pre-set level, the contact is actuated.

The temperature limiter switches off permanently if the temperature is exceeded. Once the temperature drops, the temperature limiter can be unlocked manually.

If there is a break in the measuring system (leakage), the circuit remains open permanently.

### Application example

DTW and DTB switch temperature-dependent equipment (heating units) of up to 22/16 A directly. Higher switching currents or 3-phase applications are switched by means of a contactor.

### ➔ Explosion protection

#### Ex protection type

- Ex II 2G Ex d IIC T6
- Ex II 2D tD A21 IP 6X T 80°C

#### Certification

LCIE 08 ATEX 6073 X

Other variants available for:  
USA, Canada

### ➔ Technical data

#### Temperature setting range

-4 °C up to +163 °C

#### Ambient temperature device

-40 °C up to +60 °C

#### Operating temperature sensor

-40 °C up to +215 °C

#### Storage temperature

-40 °C up to +60 °C

#### Repeat accuracy

±1.7 K

#### Switching differential temperature controller

5 K

#### Switching hysteresis temperature limiter

10 K

#### Switching point accuracy

±4.5 °C at 50 °C sensor temperature and  
21 °C ambient temperature (falling)

#### Capillary tube

made of stainless steel	
Length	3000 mm
Diameter	2 mm
Bending radius	15 mm
Operating temperature range	-50 °C up to +215 °C



### Sensor

made of stainless steel  
Length 203 mm  
Diameter 8 mm  
Operating temperature range -50 °C up to +215 °C

### Weight

1.7 kg

### Protection class

IP 65/NEMA 4, 7, 9

### Terminals

Terminal screws 4/2.5 mm<sup>2</sup>  
AWG 10-14

### Cable entries

2 x M25 borehole

### Enclosure

Aluminium die-casting, lacquered,  
with internal lid seal

### Electrical data

#### Rated voltage

AC 6/12/24/125/250/480 Volt,  
50/60 Hz

#### Switching current for monitor

22 A at AC 6/12/24/125/250/480 Volt

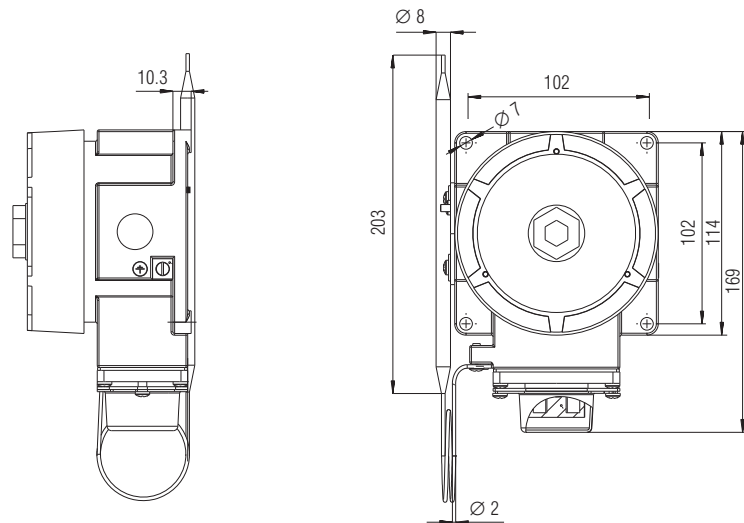
#### Switching current for limiter

16 A at AC 6/12/24/125/250 Volt,  
15 A at AC 480 Volt

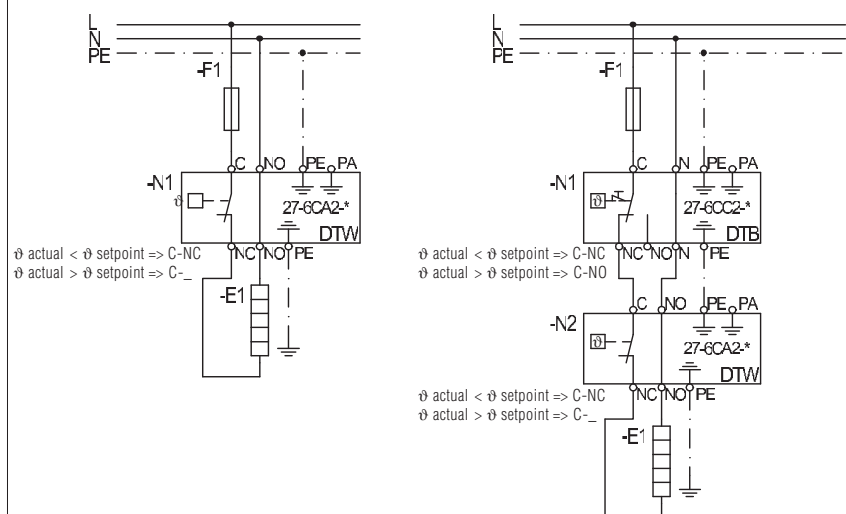
### Contact

1 change-over contact  
100,000 switching cycles

### Dimensions



### Circuit diagram





## MTE Mini-thermostat

### Features

- Little space needed thanks to its small compact construction
- High switching capacity
- Extremely adaptable to the surrounding conditions
- Protection class IP 66

### Description

This Mini-thermostat is used to detect external ambient temperatures heating systems as well as for the control of internal temperatures inside protective transmitter boxes or control and switchgear cabinets. In addition, it can be used for the control (signalling) of too low or too high a temperature or as an alarm contact.

### Structure

A temperature sensor is encapsulated in an explosion-proof metal tube. The standard version features an external M20 thread. You can choose either a version with a cast rubber cord or one that is directly mounted to an Ex terminal box.

A special version is also available with a flange fixing.

### Explosion protection

#### Ex protection type

EEx d IIC T6 resp. T5  
EEx de IIC T6 resp. T5

#### Certification

PTB 03 ATEX 1026

#### Ambient temperature

-20 °C up to +40 °C

### Technical data

#### Version with external thread or flange mounting

##### Protection class

IP 66/EN 60529

##### Supply cable

H05VV-F 3G 0.75  
(AD 7.2 ± 0.8 mm)  
standard length 1 m

##### Enclosure material

nickel plated brass

##### Max. temperature at the connection

+70 °C

#### Electrical data

##### Switching capacity

AC 230 V/6 A

##### Switch contacts

1 normally closed contact as standard version  
(opens as the temperature rises)  
alternative configurations on request

#### Version with junction box

##### Supply cable cross section

2.5 mm<sup>2</sup>

##### Material

junction box of polyester, black, glass-fibre reinforced

##### Protection class

IP 65/EN 60529

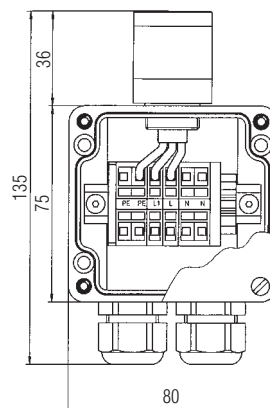
#### Electrical data

##### Temperature switch tolerances

14 °C ± 5 K  
4 °C ± 3 K  
25 °C ± 3.5 K  
15 °C ± 3.5 K

### Dimensions

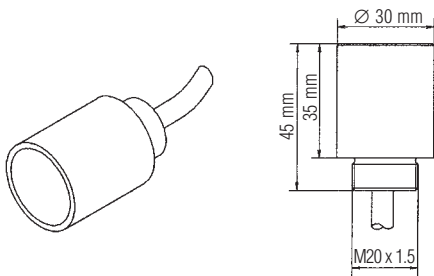
2 x cable entries M20 x 1.5  
cable diameter D = 6 - 12 mm



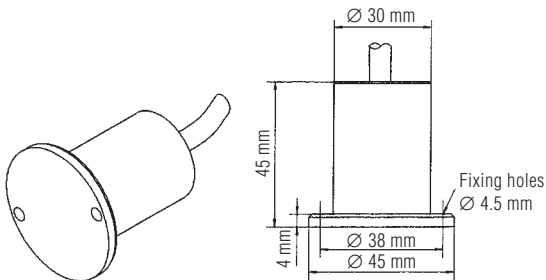




**Dimensions**  
with external thread



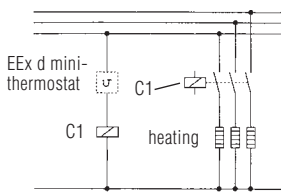
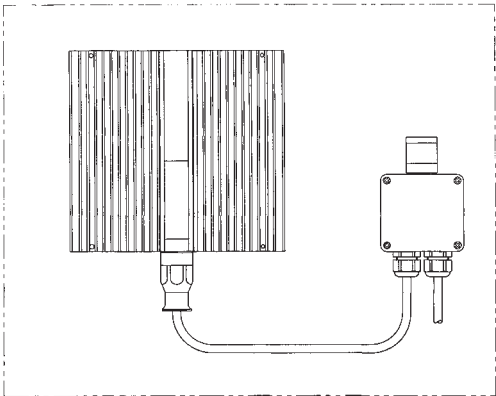
flange mounted



**Typical application**

Temperature sensor for Ex heating system  
in a control panel/enclosure

Frost control in an Ex area





## KTE-m Cable thermostat

### Features

- Very small construction
- ATEX gas and dust approval
- High switching current
- Wide operating temperature range
- Ready for connection, maintenance-free

### Description

The extremely compact BARTEC bimetallic thermostat integrated in a cable is mostly used in hazardous (potentially explosive) areas for applications in which devices are to be protected against frost. This thermostat can be used to regulate internal temperatures of switch and control cabinets, transmitter protection boxes, measuring equipment etc.

It can also be used to monitor (indicate) excessively high or low temperatures or also as an alarm contact.

The application assures the greatest possible reliability because of the conformance to the required minimum temperatures.

### Structure

The thermostat is built into a casting element and can be mounted either over the borehole in the mounting sheet or suspended freely in the air.

### Function

The ambient temperature is measured through the surface of the thermostat. The integrated, explosion-proof bimetallic thermostat switches the connected heating in accordance with this ambient temperature.

### Explosion protection

#### Ex protection type

Ex II 2G EEx m II T6  
Ex II 2D IP 68 T 80 °C

#### Certification

PTB 04 ATEX 2113 X

### Technical data

#### Thermostat connection points

10 °C ON/18 °C OFF (+/-3 ° K)  
(others on request)

#### Operating temperature range

-50 °C up to +80 °C

#### Ambient temperature range

-50 °C up to +80 °C

#### Switching voltage

max. AC 250 V  
(others on request)

#### Switching current

AC 10 A

#### Connection

Flexible cable EWKF 2 x 1.5 mm<sup>2</sup>;  
Ø 8.1 mm

#### Mounting

Through hole d = 6.2 mm at  
Fixing plate resp. loose

#### Material

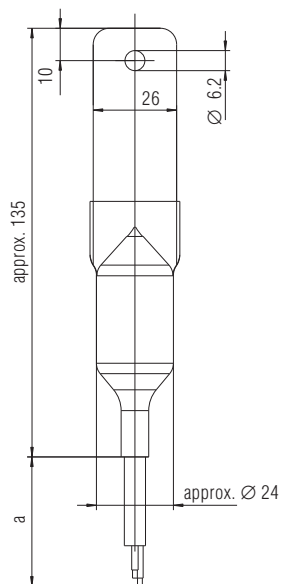
Casting cylinder, shrink fitting

#### Protection class

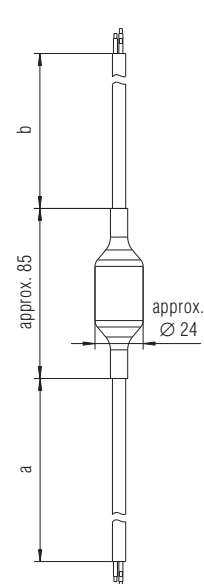
IP 65

### Dimensions KTE-m (mm)

Picture 1

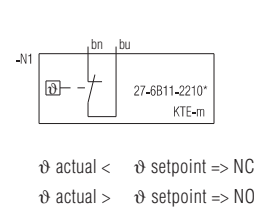


Picture 2

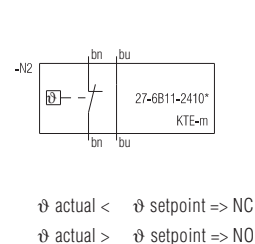


### Circuit diagram

Picture 1



Picture 2





## KTE-d Cable thermostat

### Features

- Very small construction
- ATEX gas and dust approval
- High switching current
- Wide operating temperature range
- Ready for connection, maintenance-free

### Description

The compact BARTEC bimetallic thermostat integrated in a cable is mostly used in hazardous (potentially explosive) areas for applications in which devices are to be protected against frost. This thermostat can be inserted both for the outside temperature monitoring and for the regulation of interior temperatures of switch and control cabinets, transmitter protection boxes, measuring equipment etc. It can also be used to monitor (indicate) excessively high or low temperatures or also as an alarm contact. The application assures the greatest possible reliability because of the conformance to the required minimum temperatures.

### Structure

The thermostat is built into an aluminum body. The thermostat can be installed either over the mounting hole with M6 thread or with the M20 connecting thread.

### Function

The ambient temperature is measured through the surface of the thermostat. The integrated, explosion-proof bimetallic thermostat switches the connected heating in accordance with this ambient temperature.

### Explosion protection

#### Ex protection type

- Ex II 2G EEx d IIC T6
- Ex II 2D IP 68 T 80 °C

#### Certification

PTB 04 ATEX 1064 X

### Technical data

#### Thermostat connection points

10 °C ON/18 °C OFF (+/- 3 ° K)  
(others on request)

#### Operating temperature range

-50 °C up to +180 °C

#### Ambient temperature range

-50 °C up to +60 °C

#### Switching voltage

max. AC 250 V (others on request)

#### Switching current

AC 10 A

#### Connection

Flexible cable EWKF 3 x 1.5 mm<sup>2</sup>;  
Ø 8.1 mm or single cores

#### Mounting

M6 internal thread/  
Through hole d = 5 mm  
or M20 connection thread

#### Material

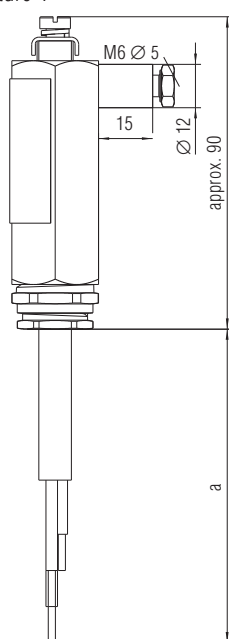
black anodised aluminium,  
seawater proof

#### Protection class

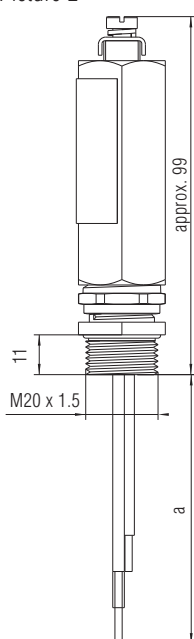
IP 68

### Dimensions KTE-d

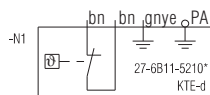
Picture 1



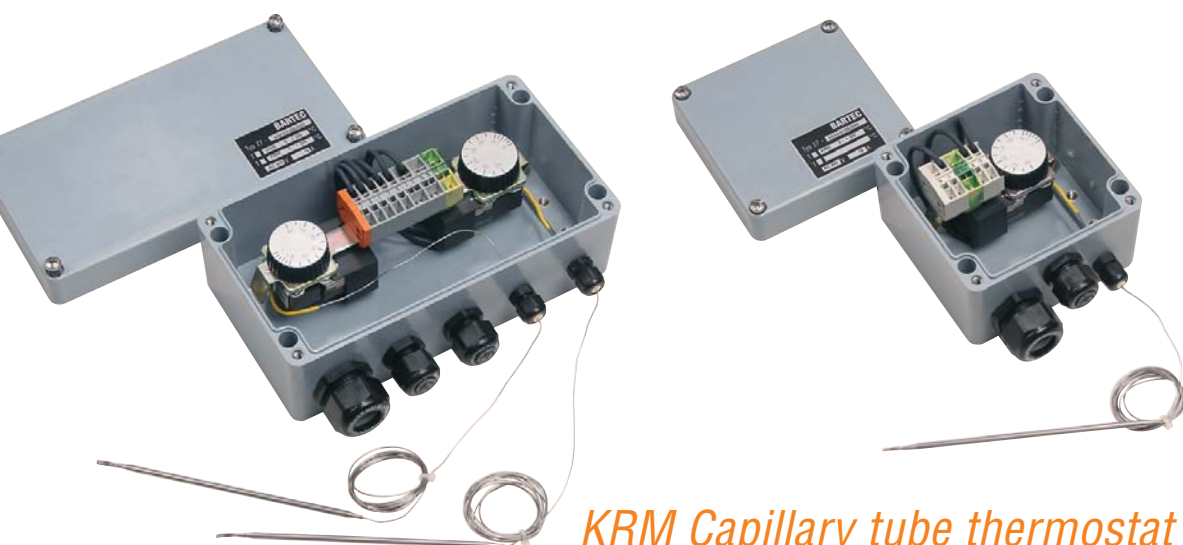
Picture 2



### Circuit diagram



- ϑ actual < ϑ setpoint => NC
- ϑ actual > ϑ setpoint => NO

*KRM Capillary tube thermostat 16 A*

## Features

- 16 A switching capacity
- Capillary tube length of 1600 mm giving installation flexibility
- Compact enclosure
- Double units are standard

## Description

The weather-proof capillary tube thermostat, KRM, is a mechanical change-over controller housed in a polyester enclosure. Heaters, fans, motors and other equipment are energised and de-energised when temperatures fall below or rise above certain limits. It can also be used to control the temperature in air, liquids and on various surfaces.

### Function

Any change in temperature at the sensor causes a change in the volume of fluid in the measuring system, which in turn results in a movement of the diaphragm membrane. This membrane is connected to a mechanical device that activates a microswitch. If the temperature at the sensor bulb exceeds the pre-set value, terminals 1 and 2 are opened. If the temperature falls below the minimum setting, the contacts automatically close.

### Application example

The KRM thermostat can directly switch temperature-dependent equipment loads (heaters etc.) of up to 16 A. Higher switching currents of 3-phase applications are switched by means of a contactor.

## Technical data

Temperature setting range	0 °C up to +100 °C	0 °C up to +300 °C
Rated voltage	AC 400 V/50 Hz	AC 400 V/50 Hz
Switching capacity	AC 230 V/16 A AC 400 V/10 A	AC 230 V/16 A AC 400 V/10 A
Supply cable, cross section	2.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>
Protective earth terminal	4 x 2.5 mm <sup>2</sup>	4 x 2.5 mm <sup>2</sup>
Switching differential	ca. 3 K	ca. 8 K
Protection class according to EN 60529	IP 65	IP 65
Capillary tube length	1600 mm	1600 mm
Min. bend radius	20 mm	20 mm
Max. sensor temperature	+115 °C	+345 °C
Min. sensor temperature	-40 °C	-15 °C
Sensor diameter	6 mm	4 mm
Sensor length	140 mm	165 mm
Cable glands	1 x M25, clamping range 9 to 16 mm 1 x M20, clamping range 6 to 12 mm	
Cable glands KRM, single	1 x M25, 1 x M20	
KRM combination	1 x M25, 2 x M20 2 x M20 blanking plug included	

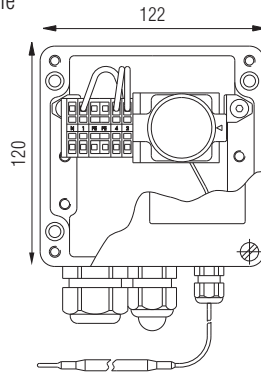
### Electrical data

Contacts	1 change-over contact
Terminals	4 x 2.5 mm <sup>2</sup> + 2 PE
Application temperature range	-20 °C up to +65 °C

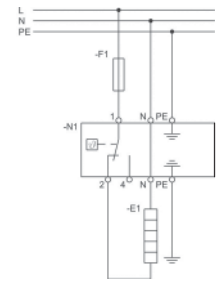


**Dimensions (mm)**

KRM, single



**Circuit diagram**

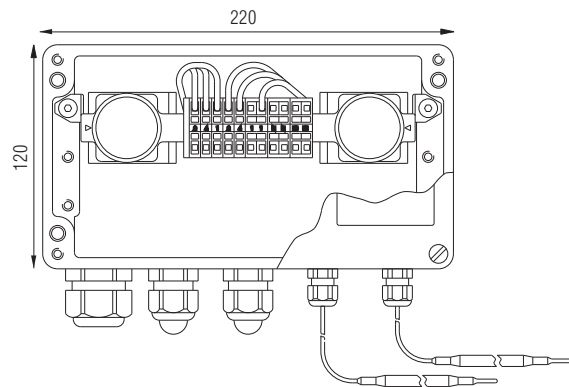


$\vartheta_{\text{actual}} < \vartheta_{\text{setpoint}} \Rightarrow \text{NC 1-4}$

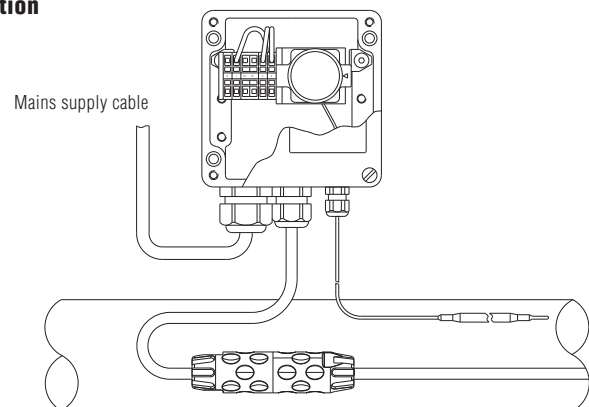
$\vartheta_{\text{actual}} > \vartheta_{\text{setpoint}} \Rightarrow \text{NO 1-2}$

**Dimensions (mm)**

KRM, double



**Typical installation**





## DEPU – Complete Digital Solution

### Features

- Complete solution for tubular steam trace heaters-controllers, limiters and power setpoint adjusters all in one unit
- Alteration of adjusting parameters also possible in potentially explosive areas
- Current carrying capacity 25 A
- Fault-free full wave control
- Sensor input, intrinsically safe
- Allows easy output adaptation to heating circuit changes

### Description

A complete solution for DEPU tubular steam trace heaters is provided by temperature control, limitation and power setpoint adjustment, all in one unit. DEPU is ATEX-certified and approved for use in potentially explosive areas.

### Structure

All functional units are integrated in a standard casing of aluminium. The connecting lines up to 6 mm<sup>2</sup> are contacted with cage tension spring clamps.

### Function

The controller is designed as a two point controller and measures the temperature by means of a Pt100.

The limiter works as an independent system and measures the temperature at the hot spot with its own Pt100. If the temperature exceeds the limit value the limiter interrupts the heater permanently and a fault signal is given.

All fault alarms are indicated by a master fault contact. Resetting can be carried out directly on the unit or externally with a key.

The power setpoint adjuster works as a fault-free full wave control by means of a semi-conductor relay.

A 7-segment display guarantees good readability of the temperature values of controller and limiter through the viewing plate.

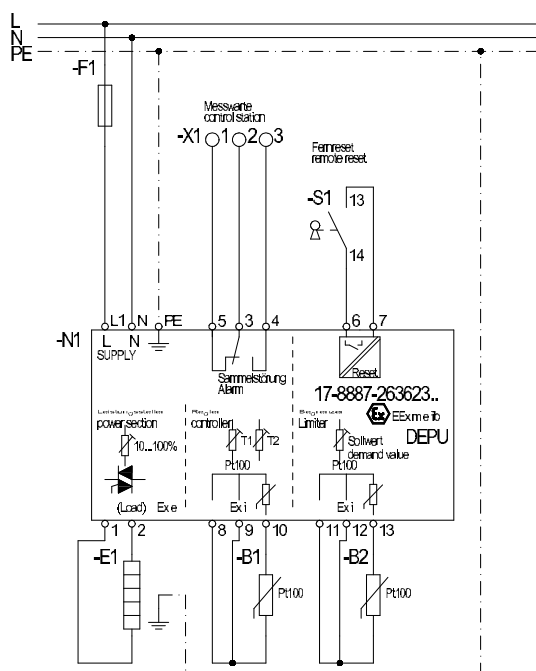
### Additional products

3-wire Pt100

up to 200 °C Order no. 03-9040-0006

up to 400 °C Order no. 03-9040-0016

### Circuit diagram





## ➤ Explosion protection

### Ex protection type

⊕ II 2G EEx m e ib [ib] IIC T4

### Certification

TÜV 03 ATEX 2088

## ➤ Technical data

### Enclosure/Enclosure material

Standard enclosure of aluminium, grey

### Protection class

IP 65

### Terminals

Wago cage clamp

### Cable entries

Mains supply line 1 x M25 (M32 opt.)

Heating cable/cold end 1 x M20

Fault alarm 1 x M20

Remote reset 1 x M20

Sensor 2 x M16

### Storage temperature

-30 °C up to +70 °C

### Ambient temperature

-20 °C up to +40 °C

### Weight

6 kg

## Guidelines/norms/certifications

Directive 94/9/EC

NAMUR NE 21

EN 50020, EN 50019, EN 50028, EN 50014

## ■ Electrical data

### Supply voltage

AC 230 V +10 %/-15 % (50 up to 60 Hz)  
(special voltage 254 V on request)

### Rated current - power setpoint adjuster

max. 25 A

### Power consumption

no load:  $P = 11$  VA

full load:  $P_{\max} = 5.7$  kVA

### Relay outputs

Master fault control-1 changeover contact  
250 V/5 A

### Measuring input (intrinsically safe)

Pt100 (2 or 3 conductors)

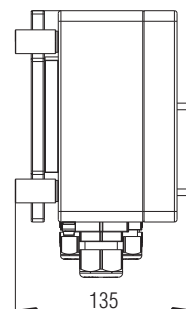
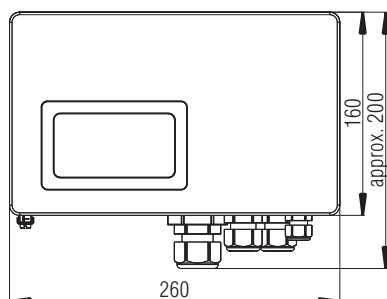
### Measuring range Pt100

0 °C up to +450 °C

### Resolution/measuring accuracy

1 K

## Dimensions (mm)



Technical data subject to change without notice.



## DPC<sub>front</sub> Temperature control device family

### DPC<sub>front</sub> Standard

- Pre-parameterisation as two-position controller
- Also usable as a PID controller
- Pt100, mV standard signals, thermocouples

### DPC<sub>front</sub> Komfort

- Pre-parameterisation as a PID controller
- Also usable as a two-position controller
- Pt100, mV standard signals, thermocouples
- Process-value feedback through 4 - 20 mA analog output

### DPC<sub>front</sub> Monitor

- Pre-parameterisation as a PID controller
- Monitor version with heating current monitoring
- Universal measuring input
- Process-value feedback through 4 - 20 mA analog output
- RS485-interface/Modbus RTU

## Description

The new DPC<sub>front</sub> temperature control device series currently consists of three standardised temperature control devices that are adapted to the (trace) heating applications.

Thanks to the use of a dual display the two important temperature readings (setpoint and actual value) can be seen at a glance. At the touch of a button, the regulation's output power is displayed. This function allows an evaluation of the heating circuit quality.

The control devices can function as two-point ON/OFF control devices or PID control devices. If desired, the autotuning function in all devices will automatically determine the optimum (PID) adjusting parameters for the control path. In all models the regulation can be switched off for maintenance work by pressing a button.

On account of the wide-range voltage input the devices can be used almost everywhere in the world.

## Assembly

The control device is fitted into the front panel. The compact dimensions of the front (48 x 48 mm) allow a space-saving control cabinet design. The electrical connection is set up through terminal screws on the rear.

## Function

Temperature alterations in the sensor being used are evaluated in the DPC<sub>front</sub> and shown as temperature readings on the top LED display. If the reading falls short of or exceeds the temperature value that can be seen in the bottom LED display, the output being used will automatically switch itself on or off or set the manipulated variable to the required value. To monitor the temperature, a high & low alarm function is pre-programmed.

The devices detect malfunctioning at the sensor and in the control circuit and report these as faults. Each type of alarm is signalled as a group alarm via a relay.

## Features

- Dual display (setpoint/actual value display)
- Wide-range voltage input
- Sensor monitoring
- Programmable with CodeKey
- Can be used in conjunction with Pt100 Ex, for temperature regulation in explosion-protected heating circuits

## Technical data

**Operating temperature range**  
0 °C up to +50 °C

**Storage temperature**  
-10 °C up to +60 °C

**Dimensions** (length x width x depth)  
48 mm x 48 mm x 108 mm

**Installation**  
Front panel  
(Cut-out 45.5 mm x 45.5 mm)

**Weight**  
180 g

**Protection class**  
IP 54 or IP 65 with installation sealing

**Terminals**  
Terminal screws 2 x 1.5 mm<sup>2</sup>

**Enclosure material**  
Plastic UL 94 V0

## Electrical data

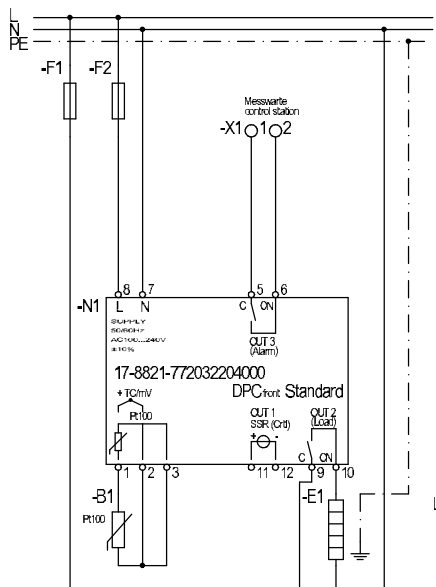
**Nominal voltage**  
AC 100 V to AC 240 V +/- 10 %  
50/60 Hz



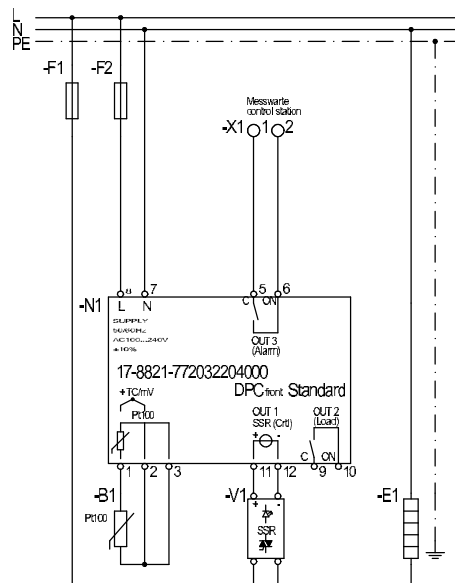


## DPC<sub>front</sub> Standard

Circuit diagram DPC<sub>front</sub> Standard as ON/OFF control device



Circuit diagram DPC<sub>front</sub> Standard as PID control device



## Features

- Pre parameterisation as ON/OFF control devices
- Can also be used as PID control devices
- Easy Setup

## Description

Basic control devices that can be used in the factory setting as ON/OFF control devices with two relay outputs for regulation and alarm signalling for normal applications. Due to the factory basic setting only the setpoint and the alarm value(s) need to be set. The Easy Start-up function makes this extremely user-friendly. As an alternative, the same device can also be used as a control device with PID control characteristics and an external semi-conductor relay.

## Technical data

**Control characteristics** two-position ON/OFF, alternatively PID

**Sensor input** Pt100, mV standard signals, thermocouple J,K,S

**Input impedance** at mV: 1 MΩ

**Measuring ranges** depending on the sensor version

**Measuring accuracy** **in resistance thermometers** ±0.5 % of the actual value or ±1 °C; the higher value applies ±1 digit

**in thermocouples** ±0.5 % of actual value or ±1 °C; the higher value applies ±1 digit (see also reference junction accuracy)

**in standard signals** (±0.5 % of actual value ) ±1 digit

**Accuracy of the reference junction in thermocouple measurements** 0.04 °C for each °C operating temperature of the control device (after 20 min. operating time of the control device)

**Sampling frequency at the sensor input** 7.5 Hz

**Output 1** Logic output for SSR control (DC 11 V/20 mA)

**Output 2** Relay output 1 normally open contact (8 A - AC 1, 250 V)

**Output 3** Relay output 1 normally open contact (5 A - AC 1, 250 V)

**Electrical service life of the relay outputs** at least 100.000 switching cycles

**Protection class** II

**Power consumption** max. 5 SS (depending on connection of outputs)

**Weight** 0.2 kg

## DPC<sub>front</sub> Komfort



### Features

- Convenience version of the temperature control devices with process-value feedback over 4 to 20 mA analog output
- Logic output for SSR
- Universal measuring input
- Pre-parameterisation as PID control device
- Very good measuring accuracy

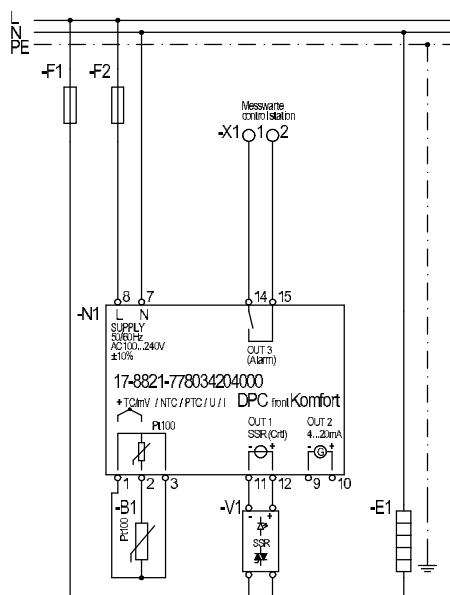
### Description

The DPC<sub>front</sub> Komfort temperature control device is designed with extra convenient features. In the factory setting it works as a PID Control device with a logic output and a relay output. As an alternative, the same device can also be used as a ON/OFF controller.

For regulation the device uses a logic output for solid state relays. The relay output is used for alarm signalling. The functions high and low alarm, sensor monitoring and heating circuit monitoring offer additional safety for the temperature regulation.

When using the device with the factory setting, a simple setup with just a few buttons is used to start operation for the first time. It is only necessary to set the setpoint, analog output limits, low alarm, and if required, high alarm.

### Circuit diagram



### Technical data

**Control characteristics** PID; alternatively two-position (ON/OFF)

**Sensor input** Pt100, NTC, PTC  
Standard signals 4 to 20 mA;  
0/1 to 5 V, 0/2 to 10 V  
Standard signals 0 to 50 mV, 0 to 60 mV,  
12 to 60 mV  
Thermocouple J, K, S (etc.)

**Input impedance** at 4 to 20 mA 51  $\Omega$   
at mV 1 M $\Omega$

**Measuring ranges** depending on the sensor version

**Measuring accuracy** **with resistance thermometers**  
 $\pm 0.15$  % of actual value or  $\pm 1$  °C;  
(the higher value applies)  $\pm 1$  digit

**with thermocouples**  
 $\pm 0.15$  % of actual value or  $\pm 1$  °C;  
(the higher value applies)  $\pm 1$  digit  
(see in addition reference junction  
accuracy)

**with standard signals**  
 $\pm 0.15$  % of actual value  $\pm 1$  digit

**Accuracy of reference junction with thermocouple  
measurements** 0.04 °C for each °C of the control device's  
operating temperature (after 20 min. of the  
control device's operating time)

**Sampling frequency at the sensor input**  
7.5 Hz

**Output 1** Logic output for SSR control  
(DC 20 V/20 mA)

**Output 2** Analog output 4 to 20 mA,  
maximum load: 300  $\Omega$

**Output 3** Relay output 1 normally open contact  
(5 A - AC 1, 250 V)

**Output auxiliary supply** DC 12 V/max. 20 mA

**Electrical service life of the relay outputs**  
at least 100.000 switching cycles

**Protection class** II

**Power consumption** max. 5 SS  
(depending on connection of outputs)

**Weight** 0.2 kg

## DPC<sub>front</sub> Monitor



### Features

- Monitor version with heating current monitoring
- Process-value feedback over 4 to 20 mA analog output
- Logic output for SSR
- Universal measuring input
- Pre-parameterisation as PID control devices
- Interface
- Very good measuring accuracy

### Description

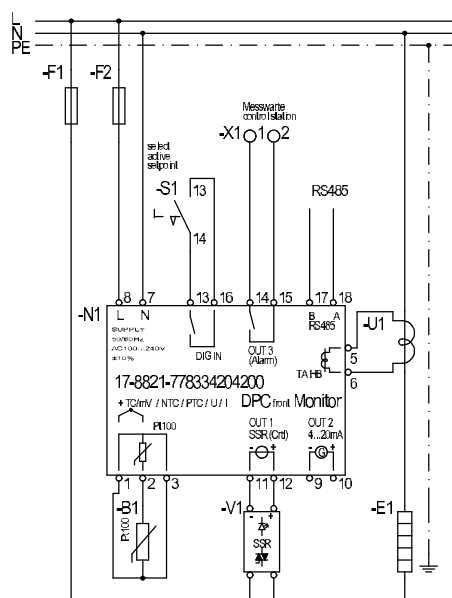
The DPC<sub>front</sub> Monitor temperature control device is designed as a control device with special functions: heating current monitoring, external setpoint switching and communication through RS 485. It works in the factory setting as a PID control device with a logic output and a relay output.

As an alternative, the same device can also be used as a ON/OFF control device. The device is used to regulate a logic output for solid state relays. The relay output is used for alarm signalling. In addition a digital input can be used to choose between different setpoints.

The functions high and low alarm, sensor monitoring, heating circuit monitoring and heating current monitoring offer additional safety for temperature regulation.

When using the device with the factory setting, a simple setup is used for putting into operation for the first time. For example the setpoint, analog output limits, heating currents, low alarm, and if desired, the high alarm must be set.

### Circuit diagram



### Technical data

**Control characteristics** PID; alternatively two-position (ON/OFF)

**Sensor input** Pt 100, NTC, PTC  
Standard signals 4 to 20 mA;  
0/1 to 5 V, 0/2 to 10 V  
Standard signals 0 to 50 mV, 0 to 60 mV,  
12 to 60 mV  
Thermocouple J, K, S (etc.)

**Input impedance** at 4 to 20 mA 51  $\Omega$   
at mV 1 M $\Omega$

**Measuring ranges** depending on the sensor version

**Measuring accuracy** **with resistance thermometers**  
 $\pm 0.15$  % of actual value or  $\pm 1$  °C  
the higher value applies  $\pm 1$  digit

**Measuring accuracy** **with thermocouples**  
 $\pm 0.15$  % of actual value or  $\pm 1$  °C  
the higher value applies  $\pm 1$  digit  
(see in addition reference junction accuracy)

**at standard signals**  
 $\pm 0.15$  % of actual value  $\pm 1$  digit

**Accuracy of the reference junction with thermocouple measurements**  
0.04 °C for each °C of the control device's  
operating temperature (20 min. of the control  
device's operating time)

**Sampling frequency at the sensor input** 7.5 Hz

**Current transformer input** max. 50 mA

**Digital input** on-floating, i. e. floating contact required

**Output 1** Logic output for SSR control  
(DC 20 V/20 mA)

**Output 2** Analog output 4 to 20 mA,  
maximum load: 300  $\Omega$

**Output 3** Relay output 1 normally open contact  
(5 A - AC 1, 250 V)

**Output auxiliary supply** DC 12 V/max. 20 mA

**Electrical service life of the relay outputs**  
At least 100.000 switching cycles

**Interface** RS485 (optically isolated)

**Communication protocol** Modbus RTU

**Transmission speed** 1200 to 38400 bauds

**Protection class** II

**Power consumption** max. 9 SS  
(depending on connection of outputs)

**Weight** 0.2 kg



## Features

- Optimised for trace heating applications
- Wide-range voltage input
- Sensor monitoring
- Programmable with CodeKey
- Can be used in conjunction with Pt100 Ex for temperature regulation in explosion-protected heating circuits

## Temperature control device family DPC III

### DPC III Standard

### DPC III Monitor

## Description

The new DPC III temperature controller series currently consists of several standardised temperature controllers which are suited to (trace) heating applications.

The Digital Controller monitors measuring circuits for sensor failures, interruption or short circuit and under-range and over-range measurements in order to ensure process reliability.

The DPC III can be used universally as an ON/OFF (two-position) or PID controller. The integrated power pack with wide-range voltage allows the devices to be used practically anywhere in the world.

## Assembly

Like the predecessor model DPC, the DPC III is integrated in a snap-on housing for TS 35 DIN rail mounting. Pt100 resistance thermometers and thermocouples are connected at the measuring input.

The controller is equipped with a 16 A load relay for two-position control, an 8 A group error message relay, a logical voltage output for the PID control and two settable digital inputs.

The voltage for the controller is supplied through an integrated power pack with wide-range voltage. The electrical connection is established with terminal screws operating on the screw cage clamp principle. The DPC III Controller is completely downwardly compatible with the previous DPC Controller.

## Function

Changes in temperature in the Pt100 sensor are evaluated in the DPC III and are visible as temperature readings on the LED display. If a deviation from the preset level is detected, the device regulates the heating circuit of the trace heating in accordance with the pre-selected control characteristic (ON/OFF or PID).

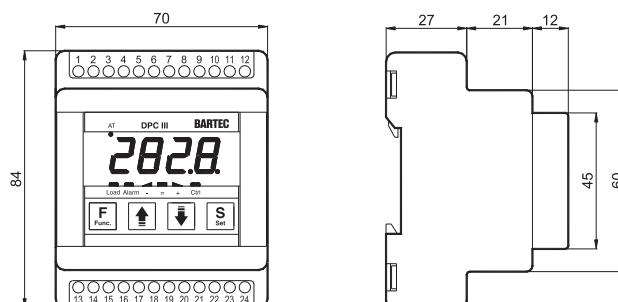
An auto-tuning function is available for the PID control and this analyses the control path (heating circuit) and automatically determines and saves the PID control parameters. The control's output power can be displayed at the touch of a button. One of the benefits of this function is the possibility of evaluating the quality of the heating circuit.

There are more factory-fitted switching points for use as alarms for too-high or too-low temperatures.

When servicing the heating circuit, the control output can be switched off at the touch of a button on the device or through digital input and there is the option of disabling the temperature alarms. The process reliability is further enhanced by the control circuit's additional monitoring functions and the connected measurement sensor. The programming interface allows the device parameters to be read out with a code key and transferred to other controllers.

For effective parameter protection a multi-stage password management system can be activated. Furthermore, the manual control or soft start functions can be activated for the system start-up.

## Dimensions (mm)





## DPC III Standard

### Features

- Pre-defined parameters for two-position controller
- Can also be used as a PID controller
- Easy setup for very short commissioning times
- Load relay/alarm relay/logic output for semi-conductor relay

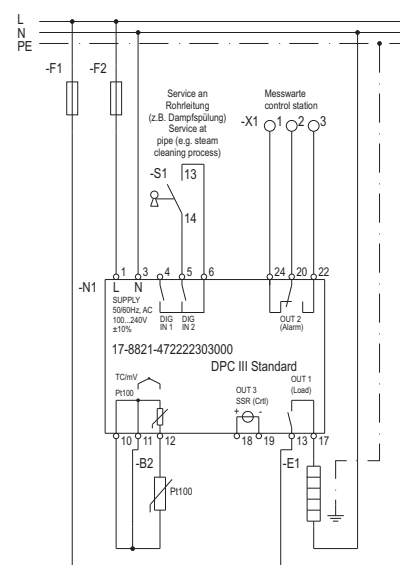
### Description

The DPC III Standard Temperature Controller is a basic controller, which in the factory setting can be used as a two-position controller with two-relay outputs for control and alarm signalling for standard applications. Due to the default basic setting only the setpoint and the alarm level(s) need to be set.

The easy start-up function makes this extremely user-friendly. As an alternative, the same device can also be used as a controller with PID control characteristics and an external semi-conductor relay.

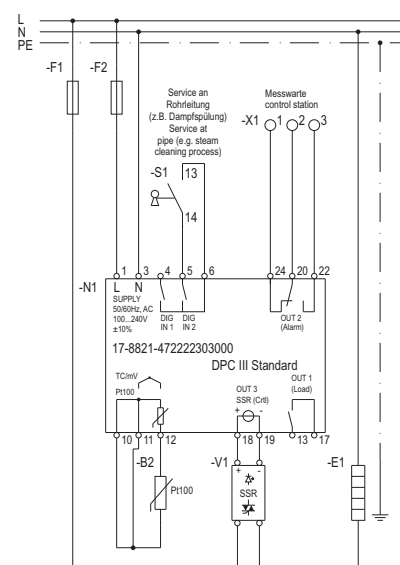
#### Circuit diagram

DPC III Standard as two-position controller



#### Circuit diagram

DPC III Standard as PID controller



### Technical data

#### Control characteristic

Two-position (ON/OFF), PID

#### Sensor input

Pt100, mV Standard signals  
Thermocouple J, K, S

#### Inputs impedance

at mV: 1 MΩ

#### Measuring ranges

depending on the sensor version

#### Measuring accuracy

**with resistance thermometers**  
(±0.5 % of the actual level or ±1°C;  
the higher level applies) ±1 digit

#### with thermocouples

(±0.5 % of the actual level or ±1°C;  
the higher level applies) ±1 digit  
(see additional reference junction accuracy)

#### Accuracy of the reference junction with thermocouple measurement

0.04 °C for each °C of the controller's  
operating temperature  
(after 20 min. of controller operating time)

#### Sampling frequency at the sensor input

7.5 Hz

#### Ambient temperature range

0 °C to +50 °C

#### Weight

0.2 kg

### Electrical data

#### Digital input

two, non-floating,  
i. e. floating contact(s) required

#### Output 1

Relay output 1 normally open contact  
(16 A - AC 1, 250 V)

#### Output 2

Relay output 1 change-over contact  
(8 A - AC 1, 250 V)

#### Output 3

Logic output for SSR control  
(DC 11 V/20 mA)

#### Electrical service life of the relay outputs

At least 100,000 switching cycles

#### Protection class

II

#### Power consumption

max. 5 SS  
(depending on the output connection)



DPC III Monitor

## Features

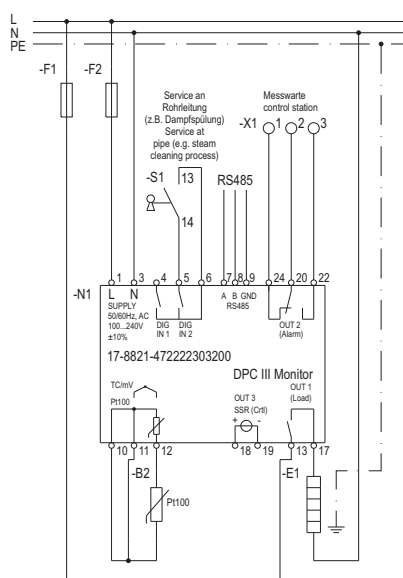
- Pre-defined parameters for two-position controller
- Can also be used as a PID controller
- Easy setup for very short commissioning time
- Load relay/alarm relay/logic output for semi-conductor relay
- RS485

## Description

The DPC III Standard Temperature Controller is a basic controller which in the factory setting can be used as a two-position controller with two relay outputs for control and alarm signalling for standard applications. Due to the default basic setting only the setpoint and the alarm level(s) need to be set. The easy start-up function makes this extremely user-friendly. As an alternative, the same device can also be used as a controller with PID control characteristics and an external semi-conductor relay. The monitor version is equipped with an RS485 interface and MODBUS protocol.

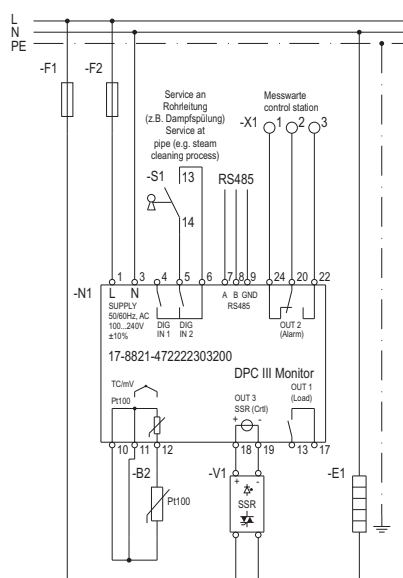
### Circuit diagram

DPC III Monitor as two-position controller



### Circuit diagram

DPC III Monitor as PID Controller



## Technical data

### Control characteristic

Two-position (ON/OFF), PID

### Sensor input

Pt100, mV Standard signals  
Thermocouple J,K,S

### Inputs impedance

at mV: 1 M $\Omega$

### Measuring ranges

depending on the sensor version

### Measuring accuracy

at resistance thermometers  
( $\pm 0.5\%$  of the actual level or  $\pm 1^\circ\text{C}$ ;  
the higher level applies)  $\pm 1$  digit

### with thermocouples

( $\pm 0.5\%$  of the actual level or  $\pm 1^\circ\text{C}$ ;  
the higher level applies)  $\pm 1$  digit  
(see additional reference junction accuracy)

### Accuracy of the reference junction

with thermocouple measuring  
0.04  $^\circ\text{C}$  for each  $^\circ\text{C}$  of the controller's  
operating temperature  
(after 20 min. of controller operating time)

### Sampling frequency at the sensor input

7.5 Hz

### Electrical data

#### Ambient temperature

0  $^\circ\text{C}$  up to +50  $^\circ\text{C}$

#### Weight

0.2 kg

### Digital input

two, non-floating,  
i. e. floating contact(s) required  
(Contact loadability at least 5 V, 5 mA)

#### Output 1

Relay output 1  
normally open contact (16 A - AC 1, 250 V)

#### Output 2

Relay output 1 change-over contact  
(8 A - AC 1, 250 V)

#### Output 3

logic output for SSR control  
(DC 11 V/20 mA)

### Electrical service life of the relay outputs

At least 100.000 switching cycles

### Protection class

II

### Power consumption

Max. 5 SS  
(depending on the connection  
of the outputs)

### Interface

RS 485 (optically isolated)

### Communication protocol

MODBUS RTU

### Transmission speed

1200 to 38400 bauds





DTL III Ex

## Description

The new DTL III Ex digital temperature limiter, which is adapted to (trace) heating applications, serves to monitor heating and heating circuits. The device is installed in the non-hazardous area. The heating or heating circuits can be installed both in media-protected and also in hazardous areas.

Thanks to their integrated power supply unit with wide-range voltage, the devices can be used almost everywhere in the world.

### Function

If the temperature at the Pt100 exceeds the set limit value, the DTL II Ex permanently interrupts the normally closed 16 A switch contact. This situation is detected by a volt-free alarm contact (change-over contact) and passes on the signal to the control panel. After a temperature drop of 5 K below the limit set point, or after a fault has been remedied, the limiter can be re-activated by means of a re-set button on the device itself or via a remote re-set control. The DTL will also interrupt the switch contact in the event of a sensor open or short circuit.

Process reliability is increased by additional monitoring functions such as supply voltage

## Features

- ATEX approval
- Optimised for trace heating applications (with service entry)
- Wide-range voltage input
- Sensor surveillance
- In conjunction with Pt100 Ex, it can be used for monitoring temperature in explosion-protected heating circuits

monitoring, pre-alarm, measuring circuit monitoring for sensor break, interruption and short-circuit as well as undershooting/overshooting of the measuring range.

A multi-stage password management is available for effective parameter protection. When doing service work on the heating circuit, the load output can be turned off by means of a digital input and the temperature alarms can be disabled.

Using the programming interface, the device parameters can be read out with a programming key and transmitted to other devices.

### Structure

The DTL III Ex is integrated in a latch-on enclosure for TS 35 mounting rails. The alarm relay is produced as a change-over contact and the limit relay as a normally open contact.

The voltage is supplied to the control device through an integrated power supply unit with wide-range voltage. The electrical connection is established with terminal screws operating on the screw cage clamp principle, ensuring a safe connection that is gentle on conductors.

## Explosion protection

### Ex protection type

Ex II (2)GD [Ex e II]

### Certification

TÜV 08 ATEX 554871

## Technical data

### Mode of Operation

limiting function

### Sensor input

Pt100

### Measuring range

-200 °C up to +850 °C

### Measuring accuracy

(± 0.5 % of the actual value or ± 1 °C; the higher level applies) ± digit

### Sampling frequency at the sensor input

7.5 Hz

### Ambient temperature range

0 °C up to +50 °C

### Weight

0.2 kg

## Electrical data

### Digital inputs

Input 1: remote RESET

Input 2: SERVICE

Non-floating, i. e.

floating contact(s) required

(contact loadability minimum 5 V, 5 mA)

### Output 1 (load output)

Relay output 1 normally open contact

(AC 250 V, 16 A - cos φ = 1)

### Output 2 (alarm output)

Relay output 1 change-over contact

(AC 250 V, 8 A - cos φ = 1)

### Electrical service life of the relay outputs

Minimum of 100.000 switching cycles

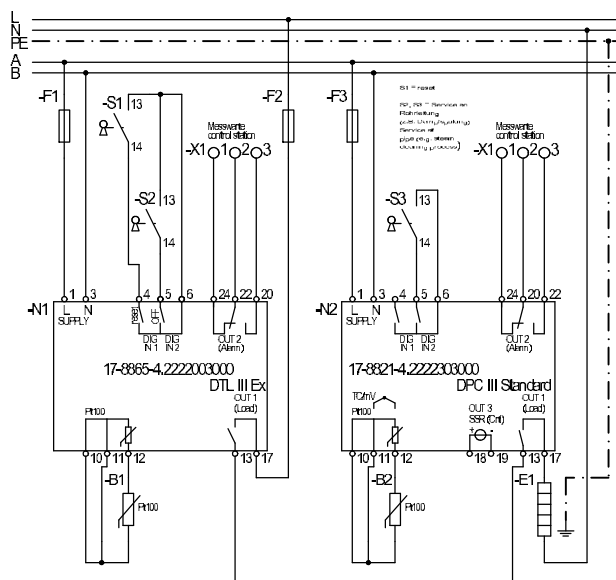
### Protection class

II

### Power consumption

Max. 4 SS

### Circuit diagram



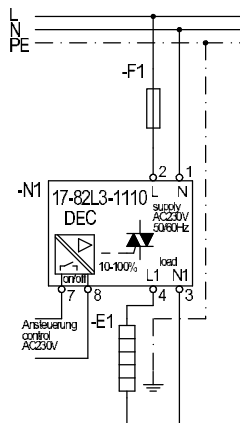


## DEC Digital energy controller

### Features

- AC 230 V control
- AC 230 V supply voltage
- Can be snapped on DIN rail
- Adjustable power output from 10 % up to 100 % in steps of 10
- Switching capacity AC 230 V, 20 A
- Display: supply voltage, heating on

### Circuit diagram



### Description

The DEC is an adjustable energy controller. It allows perfect adaption of the power output from 10 % to 100 % in 10 %-steps. Combined with the DPC-Family, the DTL III Ex and Pt100 Ex, the DEC can also be used to control heating systems in hazardous (potentially explosive) areas.

### Structure

The DEC case can be snapped onto a DIN rail allowing quick and easy installation. The energy controller is energised via 230 V mains supply voltage.

The terminals can accommodate conductors with a cross section of up to 2.5 mm<sup>2</sup>. DEC control via AC 230 V. The front fascia of the case provides a 10-step switch for the power adaption from 10 % to 100 %. An LED on the front fascia indicates whether supply voltage is applied to the DEC. A second LED signals an active/non active DEC output.

### Function

The DEC is controlled via a AC 230 V supply periodic group control is activated via a 10-step switch and the output power of the DEC adjusted from 10 % to 100 %.

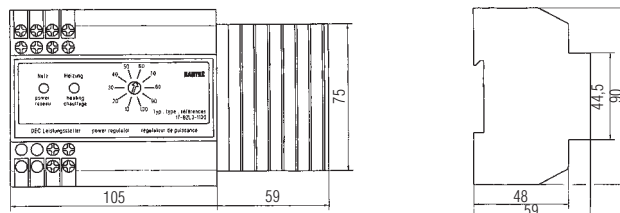
### Additional products

DPC III, Digital programmable controller  
Type 17-8821-4.22/22303.00

DTL III Ex, Digital temperature limiter  
Type 17-8865-4.22/22003000

Pt100 Ex, explosion protected  
Type 27-71...-13.....

### Dimensions (mm)







## Technical data

### Protection class

IP 20

### Min. ambient temperature

0 °C

### Max. ambient temperature

+40 °C

### LED displays

Supply voltage ON

Heating ON

### Mounting

snaps onto TS 35 (DIN rail)

### Enclosure material

ABS plastic

### Dimensions (without heat-sink)

Length (105 mm) 164 mm

Width 90 mm

Depth 59 mm

### Weight

520 g

## Electrical data

### Rated voltage

AC 230 V/50 Hz

### Switching capacity

max. switched current AC 20 A

max. voltage AC 250 V

min. AC 230 V

min. 50 mA

### Control

AC 230 V

### Adjustable power output

from 10 % up to 100 % in steps of 10

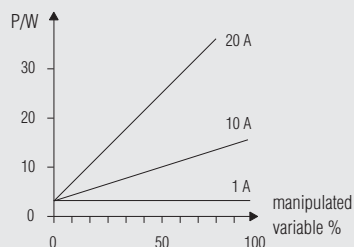
### Terminals

2.5 mm<sup>2</sup> solid or

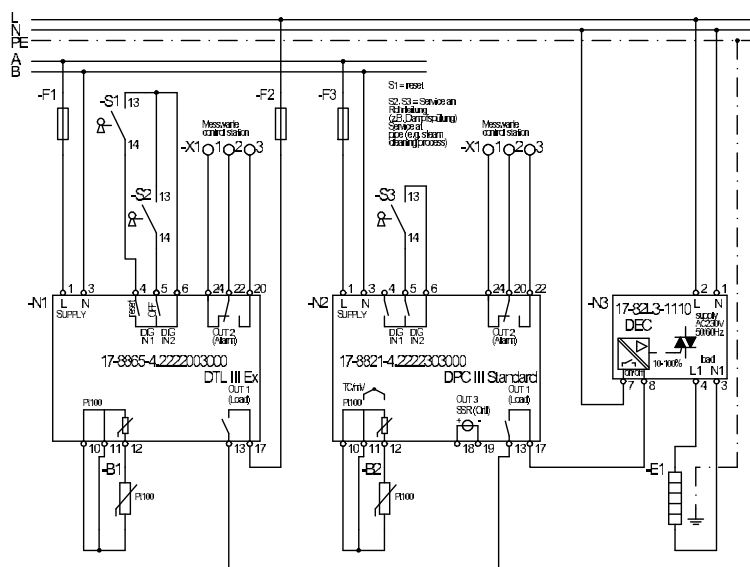
1.5 mm<sup>2</sup> stranded with sleeve

### Power dissipation

dependent of the manipulated variable



## System circuit diagram



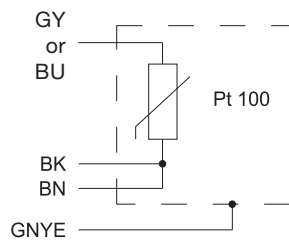


## Pt100 Ex Resistance thermometer

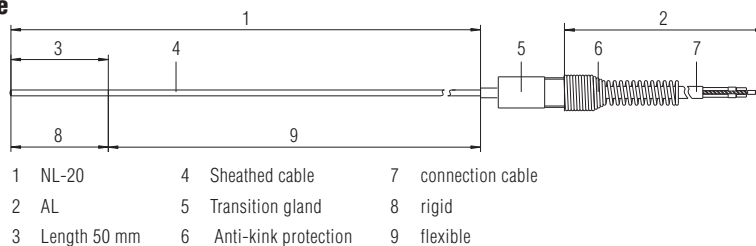
### Features

- Very fast response time
- Compact dimensions, compact design
- Extensive temperature range
- Flexible supply cable

#### Electrical connection 3-wire



#### Structure



### Description

This Pt100 Ex sheathed resistance thermometer has been particularly designed for use in potentially explosive areas. As it meets the requirements of the EEx m type of protection, intrinsically safe circuits can be dispensed with. Thanks to the pliable part of the resistance thermometer, the device is excellently suitable for application areas requiring a high degree of flexibility and replaceability (e.g. chemical and power plants).

#### Structure

The resistance thermometer is made of a 3 mm thick light plastic-sheathed cable with different lengths. This light plastic-sheathed cable is filled with magnesium oxide.

The pliable part of the resistance thermometer starts after 50 mm. Via a transition gland, the connection to a flexible supply cable is created.

#### Function

Metals increase the electrical resistance with rising temperatures. The platinum element of the resistance thermometer has a resistance of 100  $\Omega$  at 0 °C. This characteristic is used for this type of resistance thermometers to get an image of the temperature. The resistance changes of the Pt 100 Ex are converted into a temperature value and displayed by a control unit.

### Explosion protection

#### Ex protection type

- II 2G EEx m II T6
- II 2D Ex mbD 21 T 80 °C

#### Certification

PTB 03 ATEX 2152 X

### Technical data

#### Transducer

in 3-wire circuit

#### Temperature range

-50 °C up to +600 °C or  
-200 °C up to +600 °C  
tolerances: class B (EN 60751)

#### Ambient temperature range

-20 °C up to +60 °C or  
-50 °C up to +70 °C

#### Dimensions

sensor tube diameter	3 mm
sensor length	280 resp. 980 mm
active sensor length	50 mm
flexible part	230 resp. 930 mm
bending radius	min. 20 mm

#### Sheath material

stainless steel 1.4541

#### Connection cable

Rubber or silicone hose  
4 x 0.75 mm<sup>2</sup>

#### Protection class

IP 65/EN 60529

### Electrical data

#### Operating voltage

max. AC/DC 60 V

#### Signal circuit

max. AC/DC 6 V  
max. AC/DC 10 mA  
max. AC/DC 60 mW



## Junction boxes for Pt100 Ex

### Description

The Pt100 Ex junction boxes allow one or more two-wire or three-wire Pt100 resistance thermometers to be connected to the signal line.

The enclosures have the appropriate terminals and the required cable glands.

Aluminium junction boxes are available upon request.

### ➤ Explosion protection

#### Ex protection type

- Ex II 2G Ex e II T6 or T5
- Ex II 2D Ex tD A21 IP 6x T 95 °C
- Ex II 2D Ex tD A21 IP 6x T 80 °C

#### Certification

PTB 08 ATEX 1064  
IBExU00ATEX1081

More versions are available for:  
USA, Canada, Russia

### ➤ Technical data

#### Protection class according to EN 60529

Cover gasket IP 65  
Cable gland for power supply cables IP 67

#### Nominal voltage

max. AC 60 V

#### Supply cable, cross section

2.5 mm<sup>2</sup>

#### Impact resistance

7 Nm

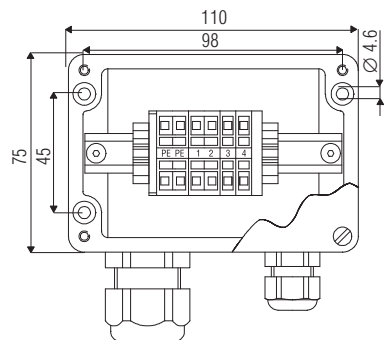
#### Material

polyester, glass-fibre reinforced

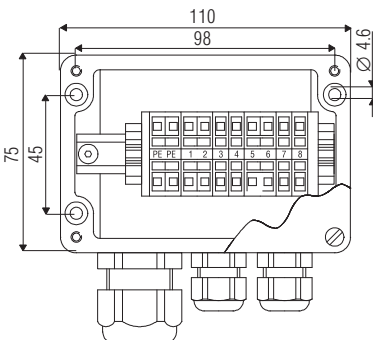
#### Ambient temperature range

-20 °C up to +40 °C T6  
-20 °C up to +55 °C T5

Junction box single



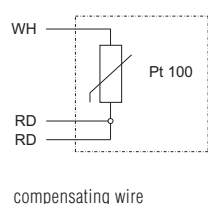
Junction box double





## Pt100 M Resistance thermometer

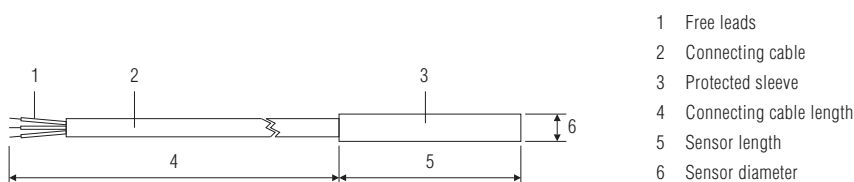
### Electrical connection



### Features

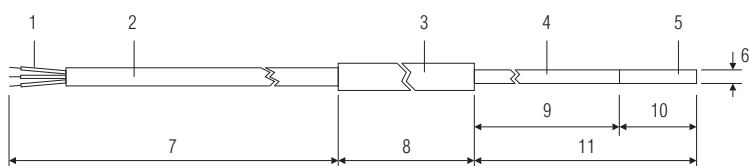
- Fast response time
- Flexible connection cable for easy installation
- Compact dimensions, compact design
- Suitable for use at high temperatures

### Structure Picture 1



- 1 Free leads
- 2 Connecting cable
- 3 Protected sleeve
- 4 Connecting cable length
- 5 Sensor length
- 6 Sensor diameter

### Structure Picture 2



- |                     |                    |                                   |                                  |
|---------------------|--------------------|-----------------------------------|----------------------------------|
| 1 Free leads        | 4 Sheathed cable   | 7 Connection cable length         | 10 Protected sleeve, rigid 30 mm |
| 2 Connection cable  | 5 Protected sleeve | 8 Connection sleeve, length 35 mm | 11 Sensor length                 |
| 3 Connection sleeve | 6 Diameter         | 9 Sheathed cable, flexible 970 mm |                                  |

### Description

For applications in non-hazardous areas, the Pt100 M resistance-measuring sensor is also available as an industrial version. We also supply different versions to suit various temperature requirements. For the different temperature areas you can choose between several versions in three-wire-connection.

### Structure

The Pt100 M sensor is embedded in a stainless steel sleeve. A temperature-resistant supply cable runs into the sleeve.

We offer three sleeve versions with different temperature ranges.

### Technical data

#### Transducer

in 3-wire circuit

#### Measuring range/Operating temperature

See Selection Chart

#### Measuring tolerance

Class B in conformance to EN 60751

#### Dimensions

See Selection Chart

#### Supply cable

See Selection Chart

#### Protection class

See Selection Chart

#### Electrical data

##### Capacity (silicone cable)

$\leq 50$  pF/m

##### Inductance (silicone cable)

$\leq 2$   $\mu$ H/m



## Junction boxes for Pt100 M

### Technical data

**Protection class** according to EN 60529

Cover gasket IP 65

Cable gland for power supply cables IP 67

**Nominal voltage**

max. AC 60 V

**Supply cable, cross section**

2.5 mm<sup>2</sup>

**Impact resistance**

7 Nm

**Material**

polyester, glass-fibre reinforced

**Ambient temperature range**

-20 °C up to +70 °C

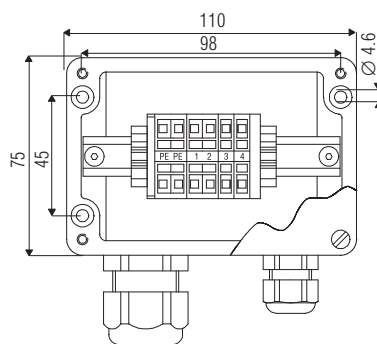
### Description

The polyester junction boxes allow one or more two-wire or three-wire Pt100 M resistance thermometers to be connected to the signal line.

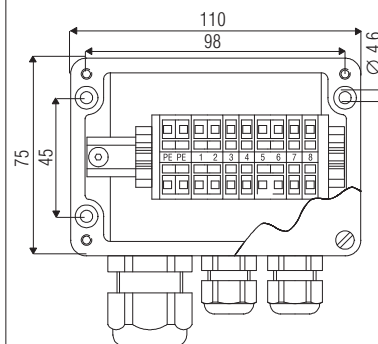
The enclosures have the appropriate terminals and the required cable glands.

Aluminium junction boxes are available upon request.

Junction box single



Junction box double



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