



## Preliminary remarks:

The documentation for the Protronic 100 / 500 / 550 includes the following parts:

<b>Installation Manual Protronic 100 / 500 / 550</b> .....	<b>42/62-50011</b>
Commissioning Manual: Configuration and parameter setting Protronic 100 / 500 / 550 / Digitric 500 .....	42/62-50012
Operating Manual Protronic 100 / 500 .....	42/62-50013
respective	
Operating Manual Protronic 550 .....	42/62-55013

Also available on request:

Description of interfaces (MODBUS) .....	42/62-50040
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## Important instructions! Please read and observe!

Correct and safe operation of the Protronic 100/500/550 calls for appropriate transportation and storage, expert installation and commissioning as well as correct operation and meticulous maintenance.

Only those persons conversant with the installation, commissioning, operation and maintenance of similar apparatuses and who possess the necessary qualifications are allowed to work on the Protronic 100/500/550.

Please take note of

- the contents of this Operating Manual,
- the safety regulations affixed to the Protronic 100/500/550 and
- the safety regulations pertaining to the installation and operation of electrical systems.

The directives, norms and guidelines mentioned in this Operating Manual are applicable in the Federal Republic of Germany. When using the Protronic 100/500/550 in other countries, please observe the national regulations prevailing in the respective country.

The Protronic 100/500/550 has been designed and tested in accordance with EN 61 010-1 = IEC 1010-1 = DIN VDE 0411 Part 1 "Protective measures for electrical, logic control and laboratory measuring instruments" and has been supplied in a safe condition. In order to retain this condition and to ensure safe operation, the safety instructions in this Operating Manual bearing the headline "Caution" must be observed. Otherwise, persons can be endangered and the Protronic 100/500/550 itself as well as other equipment and facilities can be damaged.

If the information in this Operating Manual should prove to be insufficient in any point, the A B B Service Department will be delighted to give you more information.

# Description and use

The Protronic 100/500/550 process controllers are instruments in the Protronic range which can be used universally. They can be operated as individual instruments under local control as well as with other Protronic controllers in system interconnection with other Protronic controllers, or interconnected to overlaid systems. Protronic 100 and Protronic 500/550 differ in their complementation, Protronic 100/500 differ in respect of their front panels.

## Protronic 100/500

This front panel indicates the current measured values and the operating modes qualitatively by LEDs from a long distance. All information is displayed clearly on an LC display for operating purposes.

## Protronic 550

Protronic 550 has a graphical front panel. Large volumes of different information can be displayed on a graphics display with 108 x 240 dots. A parallel display of several control channels or the changes with time of measured variables can be selected with keys.

## The basic models of Protronic 100/500/550 have...

... **a universal input.** Thermocouples, Pt100 resistance thermometers, as well as 0/4 to 20 mA standard analog signals, can be connected without changing the hardware of the unit. Linearization is performed in the controller if non-linearizing temperature transmitters are used. The linearization tables for all standard sensors are stored in the unit.

... **a mA input**, which can be used as disturbance variable or set point input. With step controllers, this input can be used for the position feedback signal.

... **a mA output** for the positioning signal or other values such as for set point or actual value.

... **four binary inputs/outputs.** These inputs/outputs can be configured by the user as inputs or outputs, so that they can be used optionally as controller outputs or alarm outputs, as well as inputs for transfers in the controller, such as from manual to automatic.

... **a front-panel TTL interface** for connecting a parameter-setting and configuring PC. This reduces the setting work during commissioning.

## The basic model of Protronic 100 has...

... **1 Module slot** for taking up the interface module.

## The basic models of Protronic 500/550 have...

... **7 Module slots** for expanding the function.

... **1 slot for a MEMORY-Card** (front panel).

## Front panel

The front panel provides information on the status of the process and makes possible selective intervention into the process action. Luminous pointers on the screen indicate the status of the process from a distance. Numerical displays and clear text information permit precise readout and setting of set point and correction values.

## Programmer

Every device includes a configurable programmer to preset a time-dependent set point. The Protronic can save up to 10 programs with 15 sections for each program.

## Controller outputs

**Z1** 2-point PID controller action with or without preliminary contact for strong-weak-off control.

**Z2** Controller for heat-off-cool optionally with two switching or one continuous and one switching output.

**S** Step controller.

**K** Continuous controller, also optionally split-range output with two continuous positioning signals.

## Parameter setting

The parameter-setting level is reached via the <Menu> key after entering a password. At this level it is possible to set parameters such as controller gain Kp or time constants for the existing equipment functions.

## Configuration

Configuration can be performed in two ways:

### List configuration

The password-protected configuration level is reached via the <Menu> key, and standard functions are selected at this level from a list available in the equipment. Alternatively to using the operator keyboard, it is also possible to make the selection via the **IBIS\_R** PC program. In this case the setting is particularly simplified if several units are to be set at one time (see Data Sheet 62-6.70 EN). The configuration of a Protronic 100 is acceptable by Protronic 500/550.

### Free configuration

(not Protronic 100)

Duly prepared Protronic 500/550 units permit customer-specific configuration, i.e. functions which go beyond the standard functions of the controller.

By adding binary inputs/outputs using the function plan editor (PC program **IBIS\_R+**, see Data Sheet 62-6.70 EN) it is for example possible to set up an additional logic control in the controller, which intervenes in both the controller and the process.

# Installation

## Front view

### Protronic 100 / 500

### Protronic 550

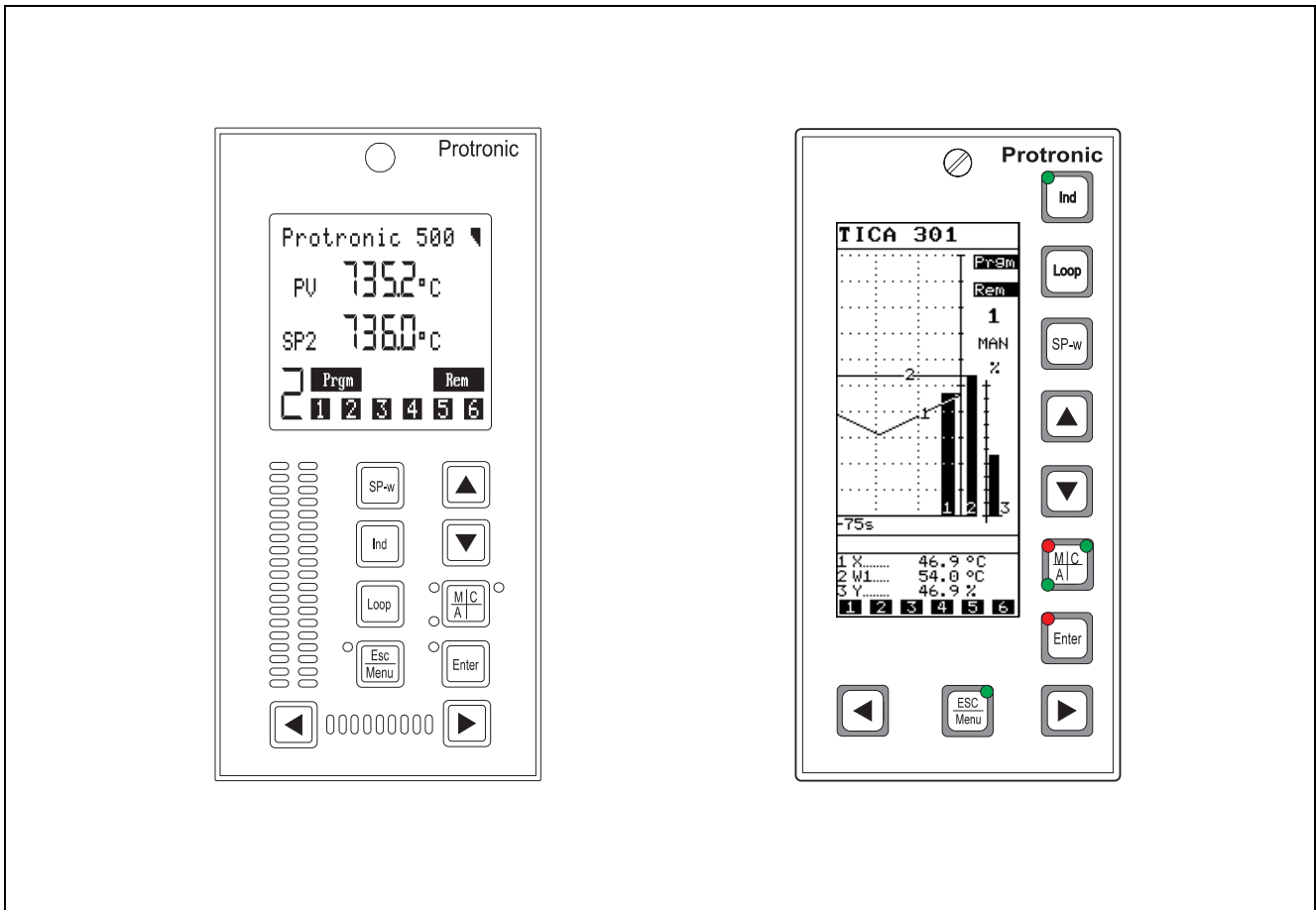


Fig. 1  
Z-19038, Z-19048

Protronic 100/500 (here: 500)

Protronic 550

## 1. Identification of the model

The rating plate is used to identify the model. It is located on the side of the case.

## 2. Installation site

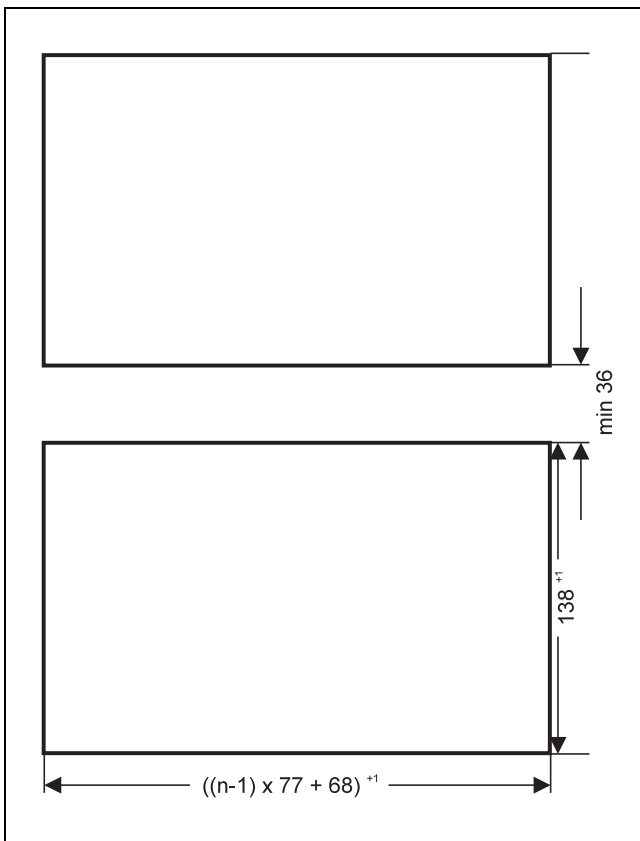
The Protronic 100/500/550 is suitable for front mounting in control rooms, control cabinets and machines.

It must be ensured when selecting the installation site that the limits of climatic and mechanical capability defined in the section "Technical Data" are not exceeded.

### **⚠ Caution**

To maintain protection against shocks, the device may only be operated when fully installed.

### 3. Mounting



**Fig. 2** Panel cutout (dimensions in mm)  
Z-19165

1. Panel cutout to DIN 43 700  $68^{+0.7}$ mm x  $138^{+1}$ mm.

With close-packed mounting  $((n-1) \times 72 + 68)^{+1} \times 138^{+1}$ .

A space of at least 36 mm top and bottom between the units must also be maintained.

**Note**

The space between the units is required for ventilation and must therefore not be encroached upon by wiring.

2. Slide the unit into the panel cutout from the front

**⚠ Caution**

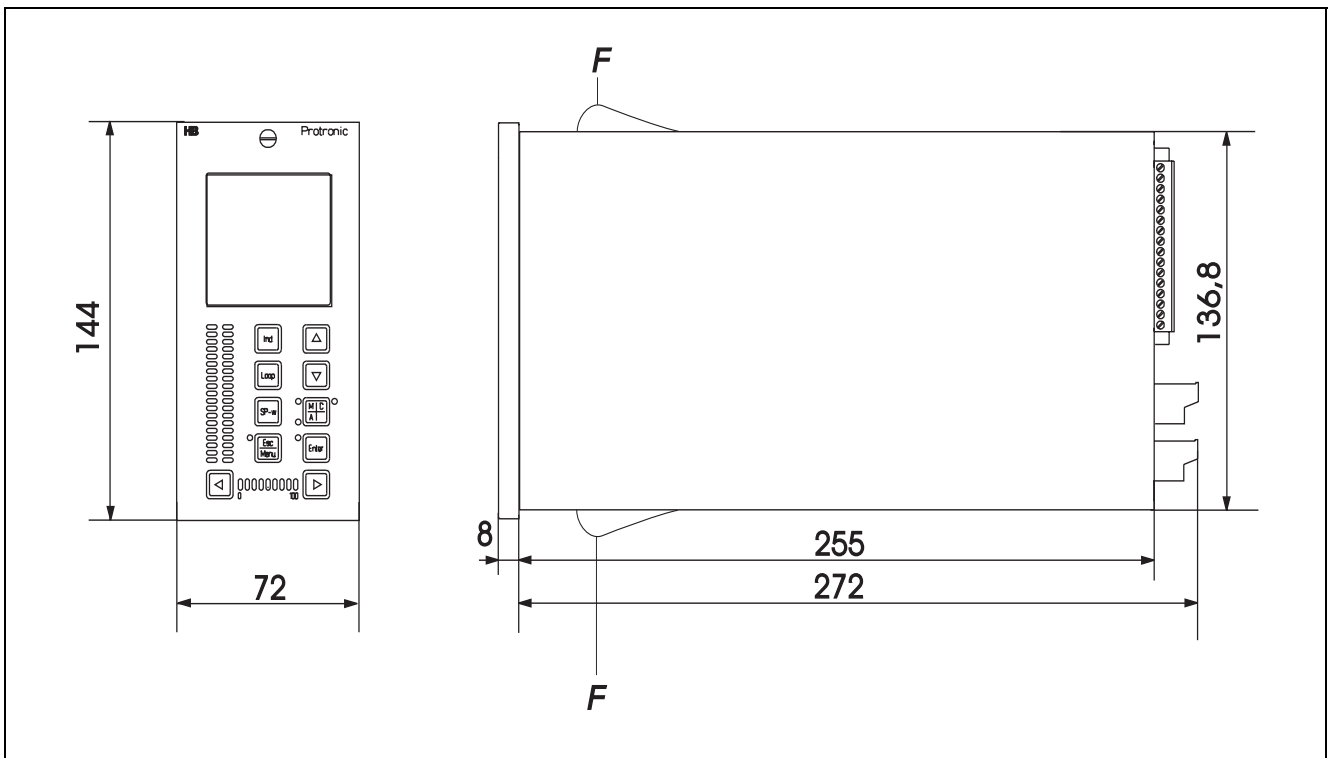
**Take care not to damage the spring contacts *F* when installing (or dismantling).**

and

3. affix with the screw brackets supplied in such way that conduction takes place between the case, screw brackets and panel via the spring contacts.

**Note**

The connected conductor serves to safeguard the EMC characteristics of the device.



**Fig. 3** Dimensional drawing (dimensions in mm)  
Z-19176 *F* Spring contacts

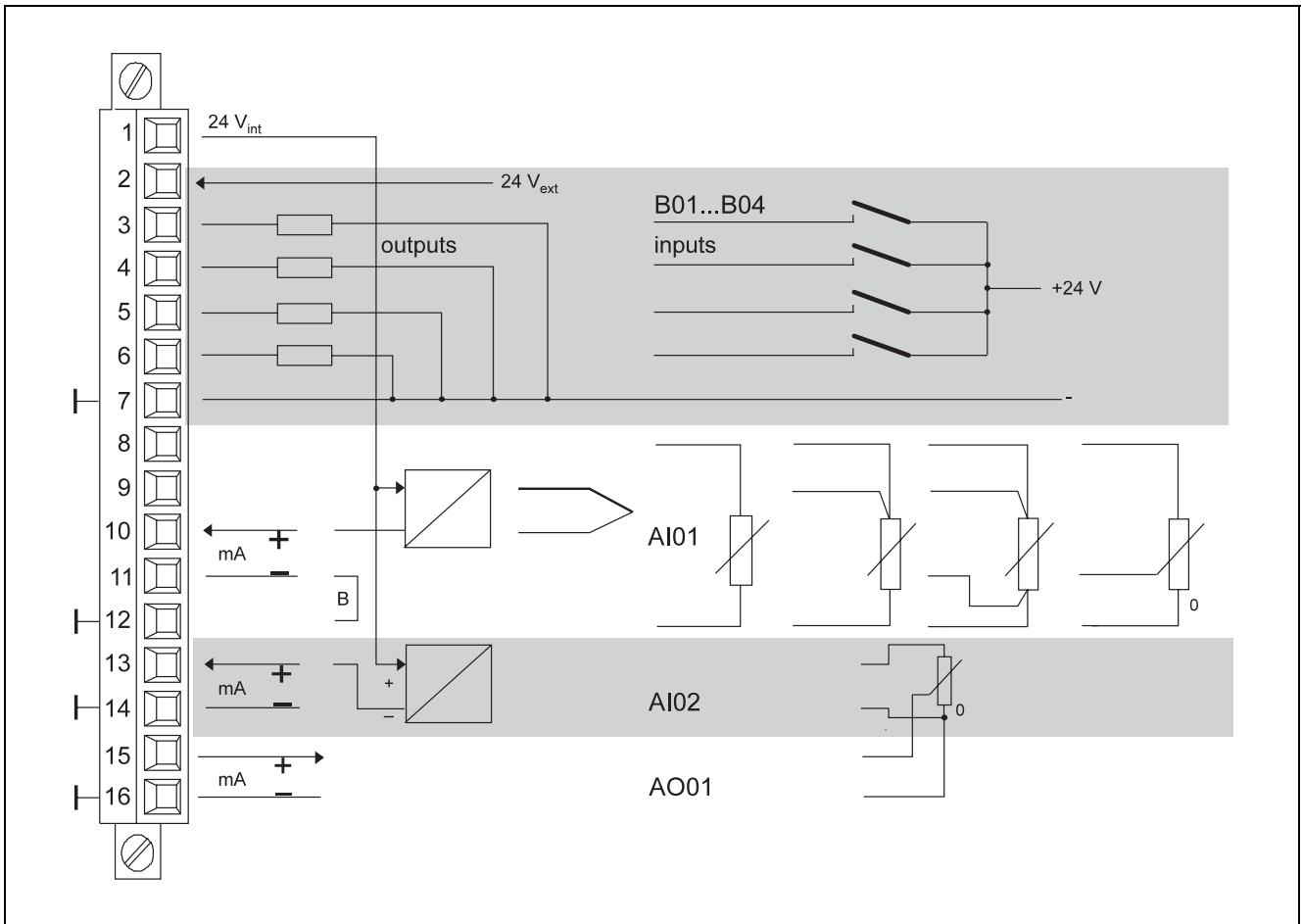
## 4. Connection

### Note

After the device has been switched on, some internal checks take place. These checks take about 15 s and are displayed.

### Signal connections, basic model

Connect with plug-in screw terminals for solid or stranded wire.  
Conductor cross-section up to 1.5 mm<sup>2</sup>.



**Fig. 4** Signal connections, basic model

Z-19159

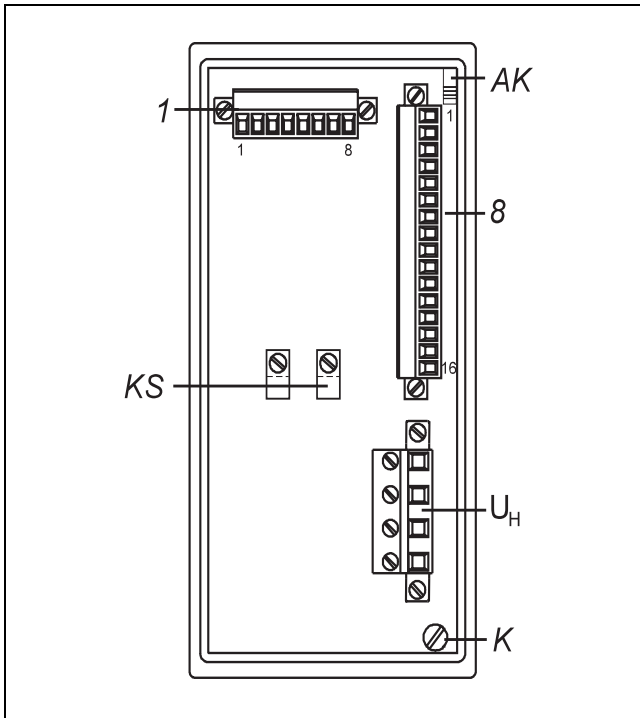
1	24 V <sub>int</sub>	8	Analog input 1	AA01	Analog output 1 (20 mA)
2	Input of power supply for binary outputs	9	Analog input 1	AE01	Universal input
3	Binary port 1 (a binary port can be used as binary input or binary output)	10	Analog input 1	AE02	Additional current input
4	Binary port 2	11	Analog input 1	B	Jumper in case transmitter is supplied by terminal 1
5	Binary port 3	12	Analog input 1	B01..	Binary inputs or outputs
6	Binary port 4	13	Analog input 2	..B04	
7	Zero potential	14	Analog input 2	FG	Teletransmitter connection (e.g. position feedback)
		15	Analog output 1		
		16	Analog output 1		

24-V<sub>int</sub>. Supply for 2-wire transmitter and/or binary inputs and outputs  
24-V<sub>ext</sub>. External power supply

## Signal connections, Modules

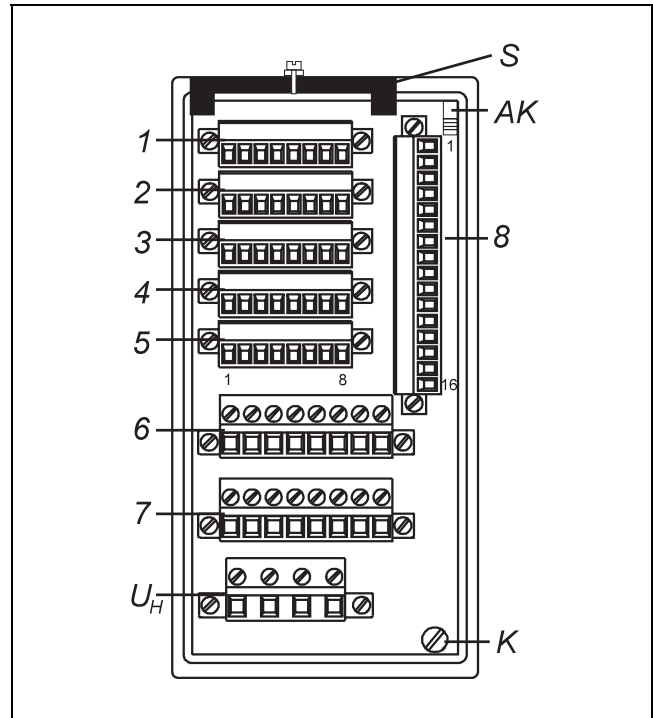
(not Protronic 100, except interface module, see page 12)

### Overview



**Fig. 5** Protronic 100, rear view with terminal strips

Z-19182	1	Module slot
	8	Signal connections basic model (1...16: terminals)
	AK	Stop catch
	K	Twist screw
	KS	Cable clamps (for connecting the cable shielding)
	U <sub>H</sub>	Power supply connection



**Fig. 6** Protronic 500/550, rear view with terminals

Z-19183	1 .. 7	module slots (1...8: terminals)
	8	signal connections basic model (1...16: terminals)
	AK	stop catch
	K	twist screw
	S	shielding connection panel
	U <sub>H</sub>	power supply connection

### PC connection frontside (configuration interface)

1. Loosen screw on the frontside.
2. Tilt the front forward and downward.

The PC interface can now be accessed.



## Modules

The **Protronic 500/550** process controllers can be equipped with the following modules. Seven card slots are available for these.

The assignment of the modules to the card slots is arbitrary (exception: interface and relays).

Total wattage of all modules may not be more than 7,7 W.

**Protronic 100** can be retrofitted with an interface module.

Connection with plug-in screw terminals for solid or stranded wire. Conductor cross-section up to 1.5 mm<sup>2</sup>, 2.5 mm<sup>2</sup> for relays.

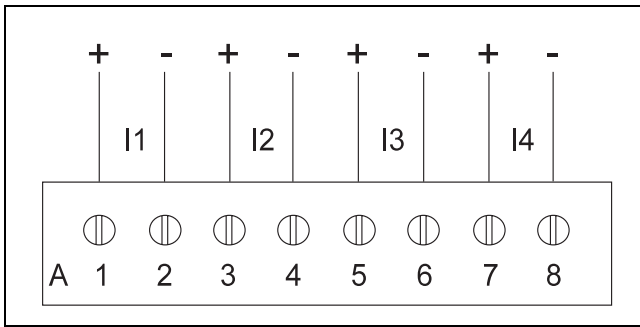
Module type	Technique	Wattage	Module code								see fig.
				1	2	3	4	5	6	7	
<b>Inputs</b>											
AE4_mV	quadruple thermocouple	E	0,38 W								10
AE2_mA/mV_TR	double thermocouple or mA with electrical isolation	B	0,52 W								9
AE4_PT_2L	quadruple Pt100 2 wire circuit	F	0,26 W								11
AE2_PT_3/4L	double Pt100 3/4 wire circuit	G	0,23 W								12
AE4_f/t <sup>1</sup>	quadruple frequency input	H	0,30 W								13
AE4_mA_MUS <sup>2</sup>	quadruple mA with transmitter supply	C	2,24 W								8
AE4_mA	quadruple mA with electrical isolation	A	0,22 W								7
<b>Binary inputs/outputs</b>											
BEA6_BIN	six-channel binary input/output	M	0,25 W								16
<b>Outputs</b>											
AA3_mA <sup>2</sup>	triple 20 mA	N	1,96 W								14
AA3_mV	triple 10 V	P	0,28 W								15
BA4_REL	quadruple relay	T	0,79 W								17
<b>Interfaces</b>											
RS 485 <sup>3</sup>	RS 485, independant from protocol, with bus capability, data rate 187500 Baud	U	0,52 W								18
RS 232	RS 232, independant from protocol, without bus capability	Y	0,53 W								18
PROFIBUS <sup>1</sup>	PROFIBUS DP (Slave)	Z	1,75 W								--

**Tab. 1** Module overview

- 1 only for devices delivered ex plant as from 01.98 or as from firmware version 01.190
- 2 for each device two modules maximum for any of the slots
- 3 for each device one module maximum

**AE4\_MA: Analog input module 4 x mA**

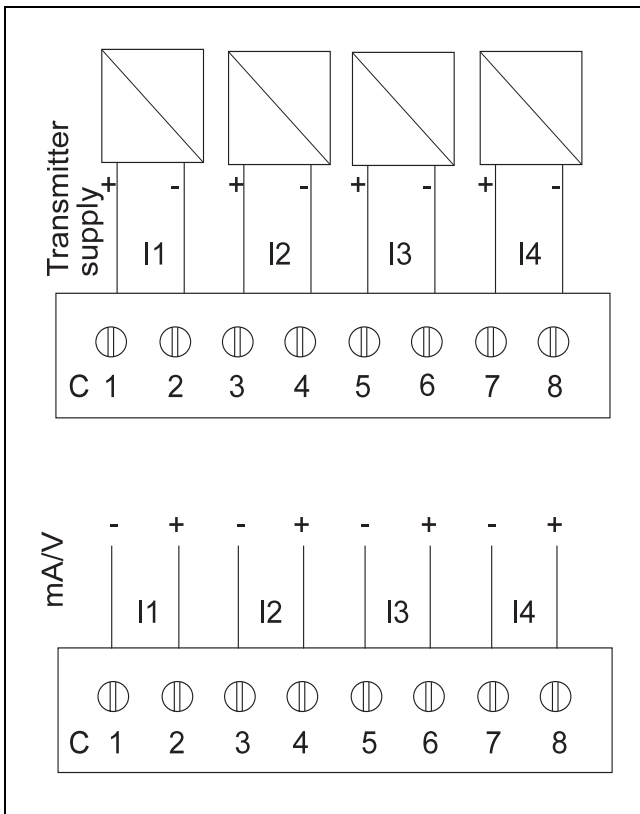
4 inputs 0/4...20 mA with electronic potential separation.



**Fig. 7** Analog input module 4 x mA  
Z-19152

**AE4\_MA-MUS: Analog input module 4 x mA with transmitter supply**

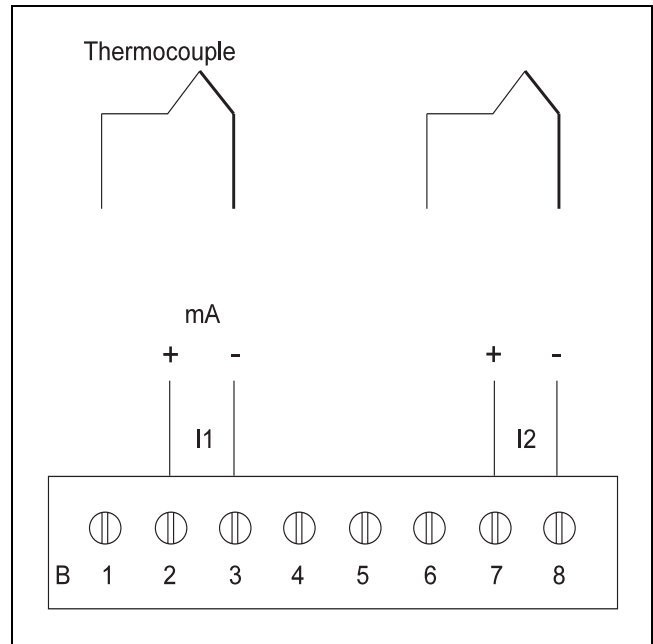
4 inputs 0/4...20 mA, switchable to 0/2...10 V with respect to reference.



**Fig. 8** Analog input module 4 x mA with transmitter supply  
Z-19154

**AE2\_MA/MV-TR: Analog input module 2 x mA or Thermocouple or mV**

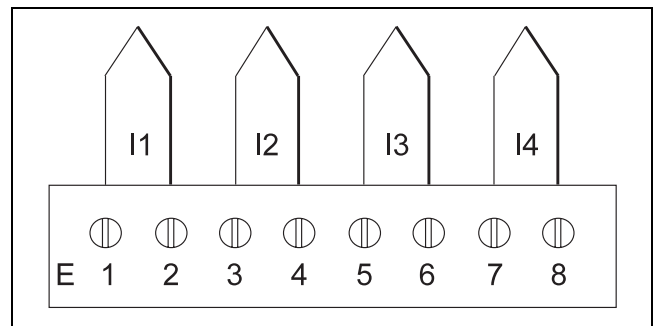
2 inputs 0/4...20 mA switchable to thermocouple and mV (-10...80 mV) with electrical isolation (see Chapter "Upgrading modules").



**Fig. 9** Analog input module 2 x mA or thermocouple or mV  
Z-19148

**AE4\_MV: Analog input module 4 x thermocouple**

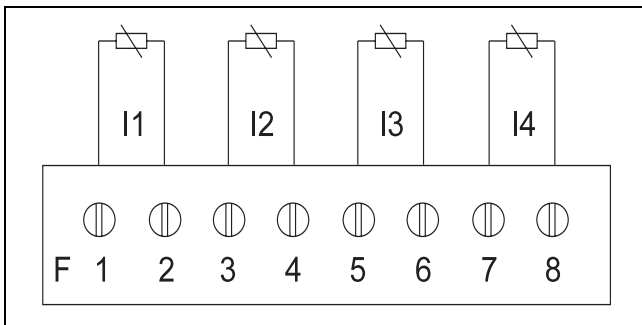
4 inputs -10...80 mV with electronic potential separation.



**Fig. 10** Analog input module 4 x thermocouple  
Z-19156

**AE4\_PT\_2L: Analog input module 4 x Pt 100 in 2-wire connection**

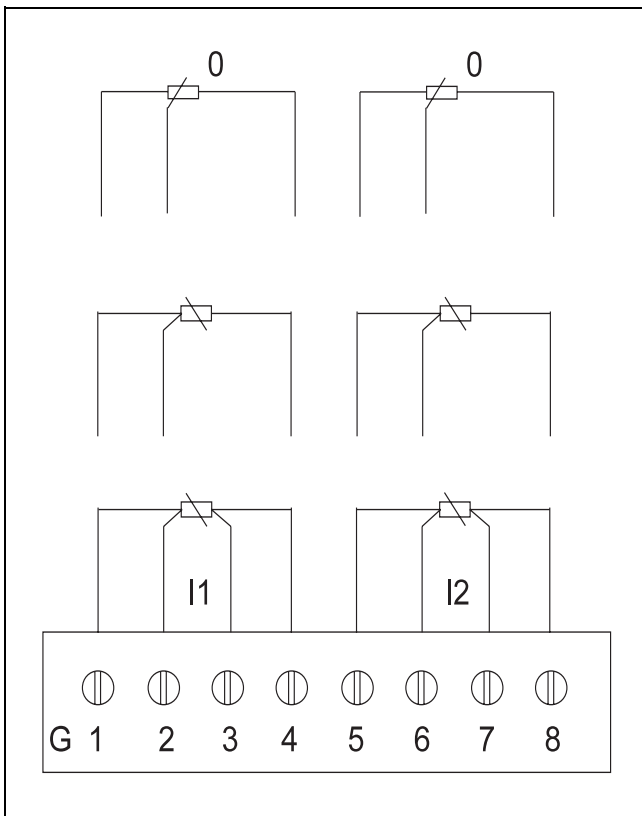
4 inputs for Pt 100 in 2-wire connection, linearization permanently programmed.



**Fig. 11** Analog input module 4 x Pt 100 in 2-wire connection  
Z-19155

**AE2\_PT\_3/4L: Analog input module 2 x Pt 100 in 3/4-wire connection**

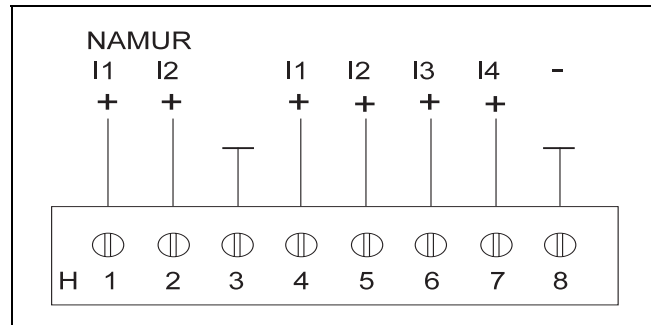
2 inputs for Pt 100 in 3- or 4-wire connection or teletransmitter.



**Fig. 12** Analog input module 2 x Pt100 in 3/4-wire connection or teletransmitter  
Z-19149

**AE4\_f/t: Frequency input module 4 x F**

4 frequency inputs



**Bild 13** Frequency input module 4 x F  
Z-19194

Input	Frequency measurement	Time measurement	Pulse counter	Increment	Increment with zero
I	Alx1 <sup>1</sup>	Alx1	Alx1	Alx1	Alx1
I	Alx2	Alx2	Alx2		Alx3
I	Alx3	Alx3	Alx3	Alx3	
I	Alx4	Alx4	Alx4		

**Tab. 2** 1 with 0...20 kHz only input 1

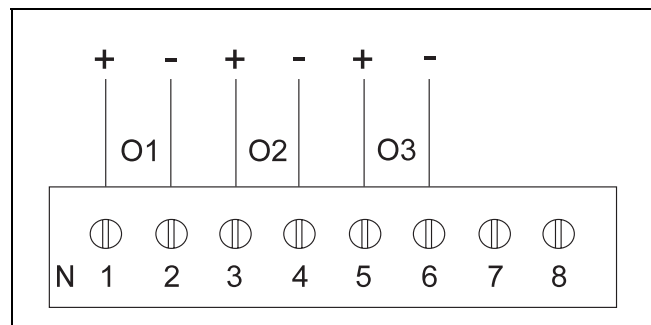
All four inputs of one module can only be operated under the same measuring task.

With incremental measurement, the direction of rotation/movement is recognized. For this, two inputs are linked to form one input.

With incremental measurement with zero recognition, the direction of rotation/movement is recognized and the measurement input is set to zero via a third input, if this input is set. Thus, an absolute displacement/angular position measurement is possible. For this, three inputs are linked to form one input. In this case, the fourth input can not be used.

**AA3\_MA: Analog output module 3 x mA**

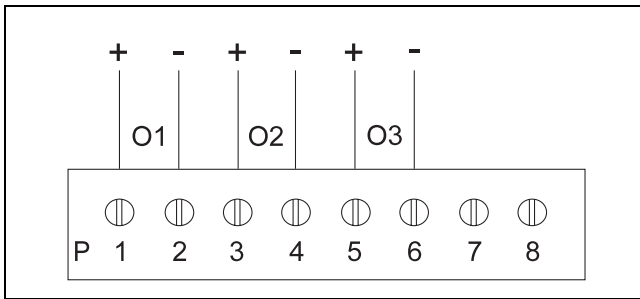
3 current outputs 0/4...20 mA at 750 Ω, short-circuit and open-circuit-proof.



**Fig. 14** Analog output module 3 x mA  
Z-19150

**AA3\_V: Analog output module 3 x V**

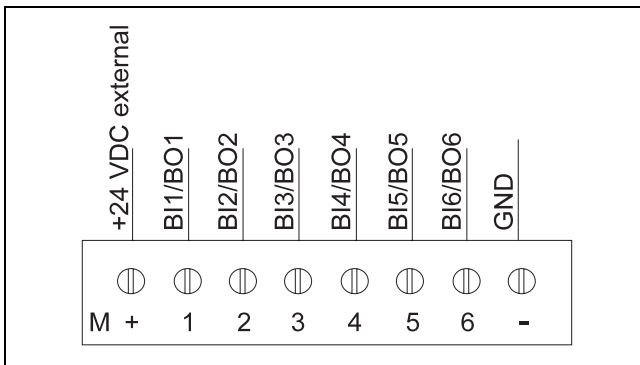
3 voltage outputs 0/2...10 V.



**Fig. 15** Analog output module 3 x V  
Z-19151

**BEA6\_BIN: Binary input/output module (with electri. isolation)**

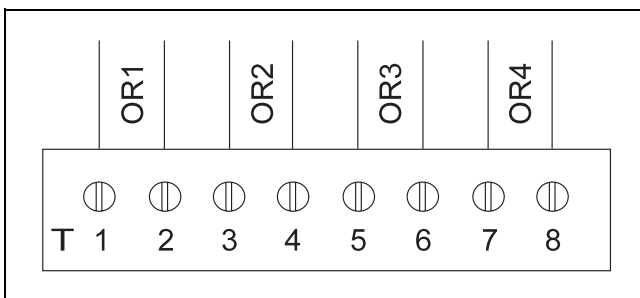
6 binary inputs/outputs. Operation as input or output configurable.



**Fig. 16** Digital input/output module 6 x binary  
Z-19158

**BA4\_REL: Binary output module 4 x relays**

Can only be used on slots 6 and 7. 4 relays with NO contact.



**Fig. 17** Digital output module 4 x relays  
Z-19157

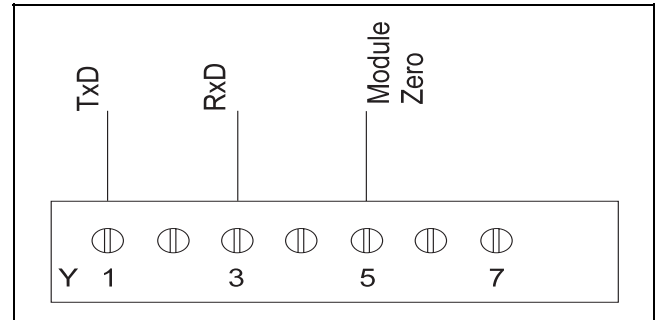
**⚠ Caution**

Maximum voltage 250 V AC, maximum current 1 A,  $\cos\phi = 0.9$ .

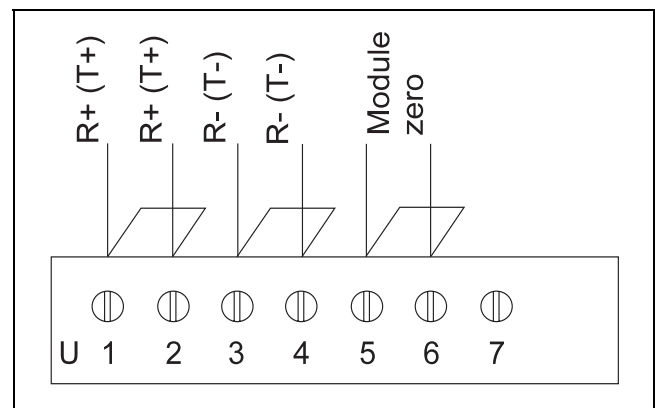
If small safety low voltages ( $\leq 50$  V) and mains voltages ( $\geq 100$  V) are to be switched on the same module, one relay must remain disconnected to comply with the creepage distances and clearances between different circuits called for in EN 61 010-1.

**RS-232 and RS-485: Interface module (with electrical isolation)**

Can only be used on card slot 2.



**Fig. 18** Interface module RS-232  
Z-19180



**Fig. 19** Interface module RS-485  
Z-19181 Jumpers are only necessary if the interface line is not to be broken when plug is withdrawn.

**Notes**

A shielded, minimum three-core cable with a twisted-core pair for signal transmission and an additional conductor for potential equalization between the "module zero" connection and all further electrically-isolated bus subscribers, is used as bus cable.

The shield of the data cable is necessary for compliance with the radio interference limits, and increases the interference immunity of the interface. For Protronic 100 connection is to the cable clamps *KS* (see Fig. 5, page 8) at the rear of casing, for Protronic 500 and 550 attachment is to the shielding connection plate *S* (see Fig. 24, page 15).

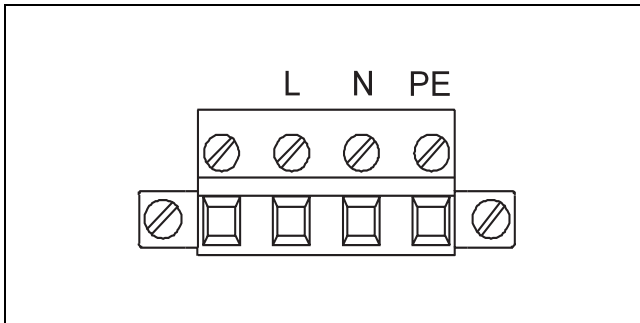
The additional insulated conductor in the data cable can only produce the potential equalisation necessary for the functioning of the interface, if all other bus subscribers (apart from the PC for example) are also electrically isolated.

An additional potential equalisation conductor of sufficiently large cross-section is normally required in parallel with the data cable for operation by non-electrically isolated bus subscribers.

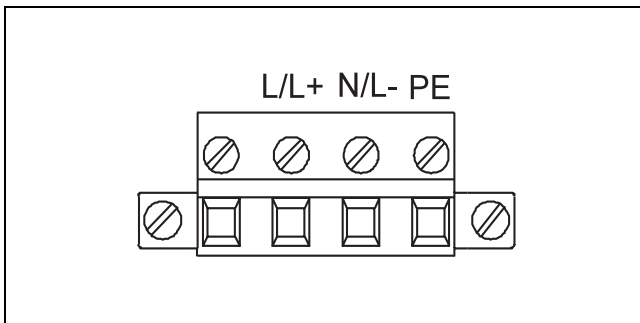
**PROFIBUS**

see Operating Instructions 42/62-50050

## Power supply



**Fig. 20** Connection of the 115/230 V AC power supply  
Z-19160 L Live conductor  
N Neutral conductor  
PE Grounding conductor



**Fig. 21** Connection of the 24 V UC power supply  
Z-19162 DC Plus to L+  
Zero to L-  
AC L and N  
PE Grounding conductor

## ⚠ Caution

When selecting the lead material as well as when installing and connecting the power leads, the specifications for installation of power current systems with rated voltages up to 1000 V (DIN VDE 0100) are to be observed.

Before any other connection is made the protective grounding conductor (PE) shall be connected to a suitable protective ground terminal as protection against electric shock.

### Note

It is also necessary to connect the grounding conductor (PE) when using a 24 V power supply.

## Connection of power supply

## ⚠ Caution

Switch off all voltages hazardous to touch (mains voltage at the power supply and at plug-in relay modules) before opening the device.

The input voltage for the unit is on the rating plate printed on the side of the case.

## ⚠ Caution

The 24 V UC version may only be connected to a power supply with safety extra-low voltage.

According to EN 61010-1, Section 6.12.2, it must be possible to switch off the unit using an externally assigned isolating device which must be installed.

The live mains connection "L" or "L/L+" is protected internally. The device does not require any external protection through fusing.

Connection with plug-in screw terminals for solid or stranded wire. Conductor cross-section up to 2.5 mm<sup>2</sup>.

## ⚠ Caution

Before switching on the apparatus make sure it is set to the voltage of the power supply.

The input voltage for the unit is on the rating plate printed on the side of the case.

### Note

After switching on the device, some internal checks take place. These checks take about 15 s and are displayed.

# Upgrading / Modification

## ⚠ Security advice according to DIN VDE

When the apparatus is connected to its supply, terminals may be live, and the opening of covers or removal of parts, except those to which access can be gained by hand, is likely to expose live parts. Interfaces may also be live.

The apparatus shall be disconnected from all voltage sources before it is opened for any operations. Operations on the opened apparatus under voltage must only be performed by an expert who is aware of the hazard involved.

Capacitors inside the apparatus may still be charged even if the apparatus has been disconnected from all voltage sources.

Whenever it is likely that protection has been impaired, the apparatus shall be made inoperative and be secured against any unintended operation.

It must be assumed that protection has been impaired when

- the apparatus has visible signs of damage;
- the apparatus no longer functions;
- the apparatus has been stored in unfavorable conditions for a long time;
- the apparatus has been subjected to adverse transport conditions.

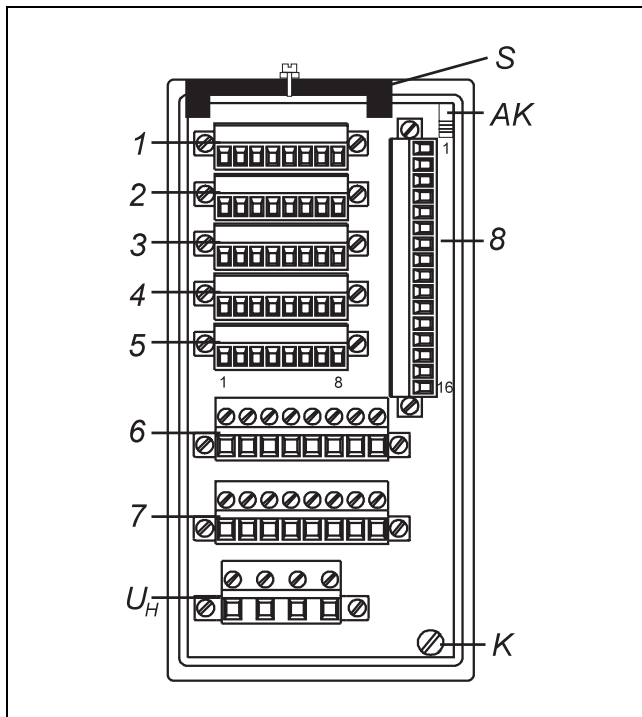
## Installing modules

### ⚠ Caution

All voltages hazardous to touch (mains voltage for the power supply and at relay plug-in modules, i.a. signal current circuits) must be disconnected before installing modules.

The sub-assembly must be slid into the case and interlocked with the twist screw during operation.

The supplied (and plugged) isolating plate must be installed between slots 6 and 7, if either a module is installed in slot 6 or 7 or in both slots. The supplied (and plugged) isolating plate below slot 7 must always be installed.



**Fig. 22** Rear view (here: Protronic 500/550)  
 Z-19183 1..7 Module slots  
 8 Signal connections to standard model (1..16 terminals)  
 AK Stop catch  
 K Twist screw  
 U<sub>H</sub> Power supply

1. Release sub-assembly: rotate twist screw a quarter turn anti-clockwise to position ①.

2. Press top stop catch downwards and slowly withdraw sub-assembly backwards until it engages.

The sub-assembly can be pulled out completely if required.

To do so, press the two stop catches inwards and withdraw the sub-assembly completely.

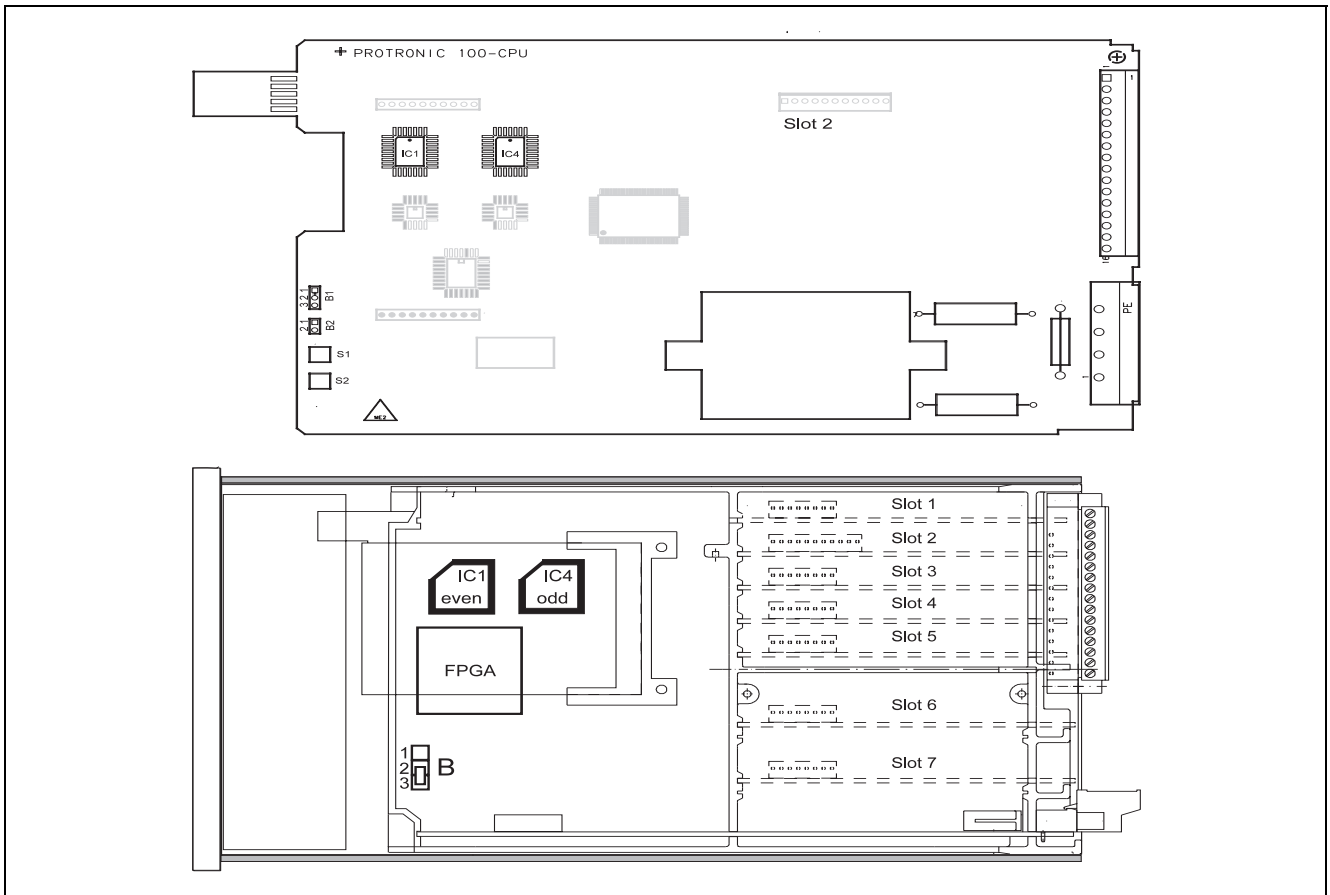
3. Insert or remove module (for slots see fig. 22 next page). When inserting the module, it must be ensured that it is carefully slid in up to the limit.

#### Note

When installing an interface module, the shielding connection plate supplied with the interface module must also be installed (see next page).

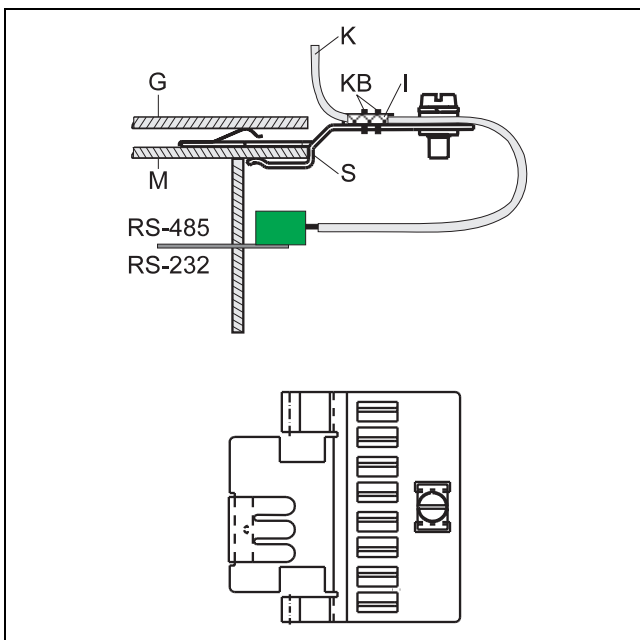
4. Slowly slide back sub-assembly until it engages in the case.

5. Lock sub-assembly: rotate twist screw clockwise a quarter turn to position ②.



**Fig. 23** above Protronic 100: Motherboard  
 Z-19177 below Protronic 500/550: Motherboard with slots  
 Z-19178

**Installing the shielding connection plate**  
 (not Protronic 100)



1. Clip shielding connection plate *S* (part of the supplied interface module) onto upper side of the module rack *M*.
2. About 10 cm before end of cable, remove the insulation to a length of about 15 mm.
3. Firmly attach the bare part of the cable with the two supplied cable straps onto the shielding connection plate, in such manner that the shielding is well contacted to the plate.
4. If the shielding has an extra wire, connect this to grounding screw of the shielding connection plate.
5. Connect the cables to the interface terminals.

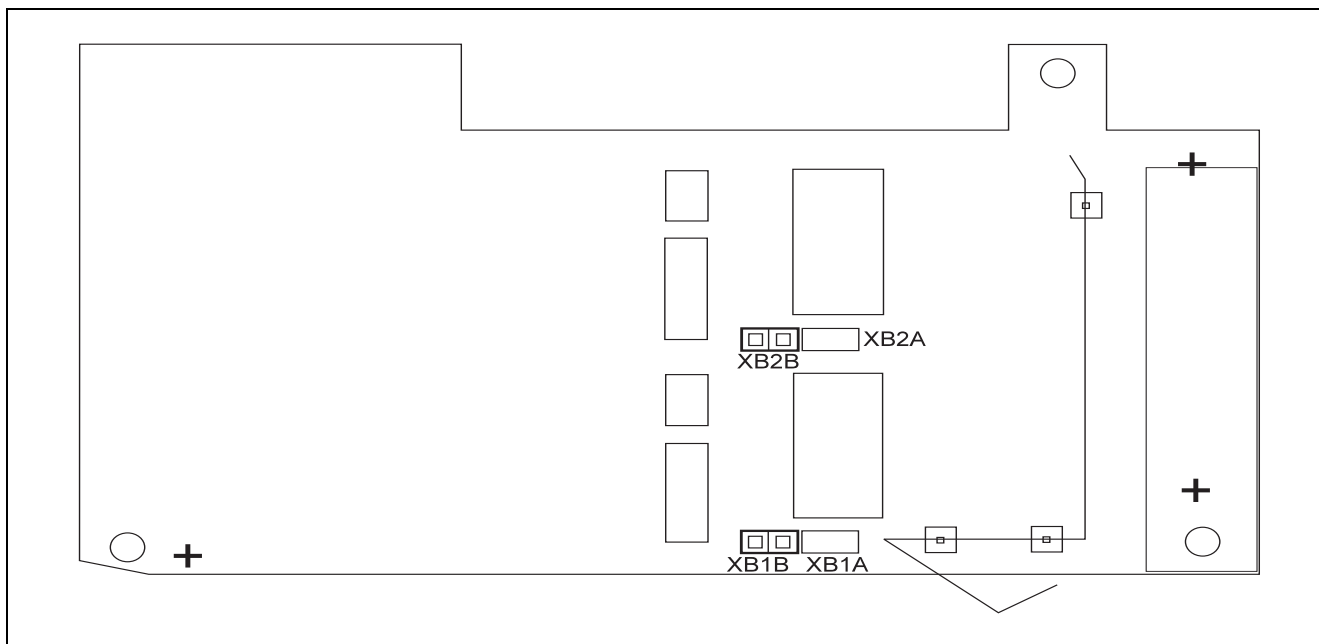
**Fig. 24** Shielding connection panel with interface cable  
 Z-19186

<i>G</i>	Housing
<i>I</i>	Cable without insulation
<i>K</i>	Cable
<i>Kb</i>	Cable straps
<i>M</i>	Sub-assembly
<i>RS-232</i>	
<i>RS-485</i>	Interface module
<i>S</i>	Shielding connection place

# Modification of modules

## Analog input module 2 x mA or thermocouple and mV

2 inputs 0/4...20 mA or thermocouple and mV (-10...60 mV) with electrical isolation.

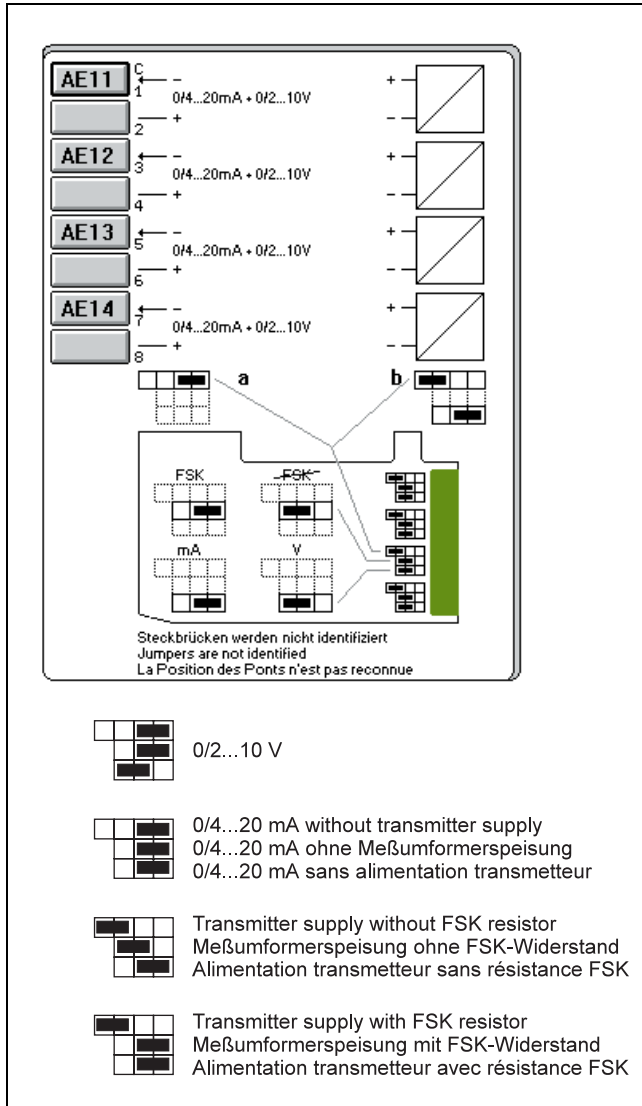


**Fig. 25** Analog input module 2 x mA or thermocouple and mV

Z-19185	Input 1:	Input 2:
	mA    XB1 bridged	mA    XB3 bridged
	mV    XB2 bridged	mV    XB4 bridged



## Analog input module 4 x mA with transmitter power supply



**Fig. 26** Analog input module 4 x mA with transmitter power supply  
Z-19153

The input card AE4\_MA-MUS can be matched to various measuring tasks by using plug-in jumpers.

Bridge	Function
a	The measuring signals come in as external current or voltage signals.
b	The transmitters are supplied from the input module.
FSK	In the mA-input of the module is a resistor active, which prevents FSK signals from being short-circuited.
FSK	The protective resistor is short-circuited
mA	Input 0/4...20 mA
V	Input 0/2...10 V

**Tab. 2** Measuring tasks

# Technical data

## Technical data for standard model Protronic 100 and 500/550

### Input

#### Common data

Electrical isolation  
none

Resolution  
12 bit

Measurement tolerance (related to nominal range)  
 $\leq 0.2\%$

Effect of temperature  
 $\leq 0.2\% / 10\text{ }^\circ\text{C}$

Hardware input filter limiting frequency  
7 Hz

#### Analog inputs

Universal input AE01

#### used for standard analog signal

0/4...20 mA at  $50\ \Omega \pm 1\%$

electronic potential separation

permissible common-mode voltage  
 $\leq \pm 4\text{ V}$

Overcurrent/wrong polarity protection  
up to  $\pm 40\text{ mA}$

Linearization, square root extraction  
configurable

Line break monitoring  
at 4...20 mA, response configurable

#### used for thermocouples

Types

J -200...1200 °C  
E -200...1000 °C  
K -200...1400 °C  
L -200...1000 °C  
U -200...600 °C  
R 0...1700 °C  
S 0...1800 °C  
T -200...400 °C  
B 0...1800 °C  
D 0...2300 °C

Reference junction compensation  
internal or external: 0, 20, 50 or 60 °C

Sensor break monitoring  
with configurable direction of control action

Electronic potential separation

Permissible common-mode voltage  
 $\leq \pm 4\text{ V}$  to device zero

#### used for Pt 100 DIN resistance thermometers

Measuring ranges  
-200.0...+200.0 °C  
-200.0...+800.0 °C

Measuring current  
 $\leq 1\text{ mA}$

Measurement circuit  
2-wire connection to  $250\ \Omega$  line resistance

Lead balancing  
by software

3-wire connection  
for symmetrical cables to  $3 \times 10\ \Omega$

4-wire connection

Sensor short circuit and break monitoring configurable

Direction of control action configurable

#### used for resistance teletransmitters

Measuring range  
 $150\ \Omega$  (75...200  $\Omega$ )  
 $1.5\ \text{k}\Omega$  (0.75...2  $\text{k}\Omega$ )

Measuring current  
 $\leq 1\text{ mA}$

otherwise as resistance thermometer

#### Analog input 2 (AE02)

Inputs for mA signals such as AE01, but with potential binding to device zero.

## 4 binary inputs/outputs

Direction of functioning  
configurable

Input DIN 19 240	Nominal signal	Voltage range	Current range
Nominal level	24 V DC	20.4...28.8 V	app. 1 mA
1-signal	24 V DC	13.0...30.2 V	app. 1 mA
0-signal	0 V DC	-3.0...5.0 V	< 0,1 mA

Tab. 3 Technical data when configured as input

Output DIN 19 240	Nominal signal	Voltage range	Current range
Nominal level	24 V DC ext.	20.4...28.8 V	100 mA
1-signal	24 V DC	13.0...30.2 V	0...max.
0-signal	0 V DC	-3.0...5.0 V	0...0.2 mA

Tab. 4 Technical data when configured as output

Switching frequency  
≤ 8 Hz

### Outputs

#### Analog outputs

##### As control or measurement data output

0/4...20 mA at max. 750 Ω protected against short circuit and open circuit

Control range  
0...≥21 mA

Load dependence  
0.1 % / 100 Ω

Resolution  
12 Bit

#### Binary outputs

see binary inputs

#### Transmitter supply voltage

Output voltage  
Protronic 100: 20...23 V DC, 80 mA, short-circuit-proof  
Protronic 500/550: 20...23 V DC, 140 mA, short-circuit-proof

Load monitoring  
Output switches off automatically in case of overload

## Programmer

saving 10 programs, every program:  
15 sections  
set point in physical units  
section time 0...99:99:99 hours, 4 control signal tracks

### Serial interfaces

TTL interface accessible after removal of the front module for coupling to the PC via TTL/RS232 converter (Cat. No. 62695-4-0346270) with fixed telegram format matching for parameter definition and configuration program **IBIS\_R** (see Data Sheet 10/62-6.70 EN).

Bus-capable RS-485 interface can be retrofitted (see modules).

### CPU Data

Measured and correction value resolution  
12 Bit

Cycle time  
≤ 80 ms

Data protection  
Flash EPROM, Option: memory card (not for Protronic 100)

### Power supply

#### Protronic 100

AC power supply

230, 115, 24 V AC  
Power consumption  
Power failure safety  
Power factor

+10...-15 %, 47...63 Hz  
14 VA (10 W)  
≥ 20 ms at  $U \geq 0.85 \times U_{Nenn}$   
 $\cos \phi = 0.7$

UC power supply

24 V AC  
24 V DC  
Power consumption  
Power failure safety  
 $U_{Nenn}$

+10...-15 %, 47...63 Hz  
+10...-25 %, residual ripple ≤ ±3 V<sub>ss</sub>  
max. 11 VA (8 W)  
≥ 20 ms bei  $U \geq 0.85 \times$

#### Protronic 500/550

115 to 230 V AC (90 to 260 V):  
Power consumption  
Protronic 500 without modules  
Protronic 550 without modules  
with maximum complementation  
Power failure safety

47...63 Hz  
9 VA (6 W)  
12 VA (9 W)  
+12 VA (9 W)  
≥ 150 ms at  $U \geq 180$  V AC

24 V UC  
24 V AC  
24 V DC  
Power consumption  
Protronic 500 without modules  
Protronic 550 without modules  
with maximum complementation  
Power failure safety

-15...+10 %, 47...63 Hz  
-25...+30 %, residual ripple ≤ ±3 V<sub>ss</sub>  
10 VA (7 W)  
13 VA (9 W)  
+13 VA (9 W)  
≥ 20 ms at  $U \geq 0.85 \times U_{Nenn}$

Power factor  $\cos \phi = 0.7$

Fusing (Protronic 100 and 500/550) see the following page:

### Fusing (Protronic 100 and 500/550)

The device does not require any external fusing. The built-in fuses may not be changed by user:  
24 V UC, 115/230 V AC: T2,5, 250V UL permitted!

### Ambient conditions

Climatic class

KWF to DIN 40 040

Ambient temperature

0...50 °C

Storage temperature

-20...70 °C

Humidity

relative humidity  $\leq 75\%$  on annual average, short-term up to 95%, infrequent and slight condensation permissible.

### Electromagnetic compatibility (EMC)

Satisfies protection requirement EMC Guideline 89/336/EEC, 5/89

Interference immunity EN 50 082-2 March 1995 (including IEC 801)

Interference immunity EN 50 081-1 1/92

(Reference to: EN 55 011 alarm class B, General approval)

Industrial standard to NAMUR NE Part 1, May 1993

### Connection, case, mounting and safety

Degree of protection to DIN 40 050

Front IP 65

Case IP 00

Terminals IP 20

### Electrical safety

Class of protection 1 to EN 61 010 T.1 (VDE 0411 T.1 march 1994)

Air and creepage distances to EN for overvoltage category 3, degree of contamination 2

With the exception of the power supply 230 V AC and the relay outputs, all other inputs and outputs including the interface are functional extra-low voltage circuits to DIN VDE 0100, Part 410. The safe isolation of these circuits meets the requirements of DIN VDE 0106, Part 101.

### Mechanical capability

to DIN IEC 68 part 2-27 and 68-2-6

Shock 30g / 18 ms; Vibration 2g / 0.15 mm / 5...150 Hz

Case dimensions

Front 72 mm x 144 mm

Installed depth 272 mm

### Panel cutout

68 mm x 138 mm to DIN 43 700

Mounting

in panel or Hartmann & Braun rack

Horizontally close-packed construction possible

Vertical clearance 36 mm

Fixing with clamping screws top and bottom

Mounting orientation

arbitrary

Weight

1 kg without modules

Modules, each approx. 40 g

Relay module approx. 80 g

### Electrical connections

Plug-in screw terminals

coded, for solid or stranded wire

up to 1.5 mm<sup>2</sup> for signal lines

up to 2.5 mm<sup>2</sup> for power supply

No shielded cables required, other than for interface cables.

### Scope of delivery

2 clamping screws, plug-in screw terminals and operating manual

# Technical data for modules

(nott Protronic 100, except interface module)

## Analog inputs

### Module AE4\_MA

4 Inputs  
0/4...20 mA with electronic potential separation

Input resistance  
approx. 50  $\Omega$

Signal resolution  
10000 LSB for 0...20 mA

Permissible common-mode parasitic voltage  
 $\pm 4$  V in relation to device zero

Surge immunity  
Input current < 50 mA  
Voltage between input and device zero  $\pm 50$  V

### Module AE4\_MA-MUS

(sum of all output currents  $\leq 300$  mA)

4 Inputs  
0/4...20 mA can be switched over individually to 0/2...10 V  
with respect to reference

Input resistance  
with mA input: approximately 50  $\Omega$   
with 10 V input: 20 k $\Omega$

Transmitter supply  
20 V, 82 mA

otherwise as module 4\_MA

### Module AE4\_MV (for thermocouple measurement)

4 Inputs  
-10...80 mV with electronic potential separation

Signal resolution  
20000 for -10...80 mV

Input resistance  
approx. 5 M $\Omega$

Permissible common-mode parasitic voltage  
 $\pm 4$  V in relation to device zero

Surge immunity  
Voltage at one input: 10 V  
Voltage between input and device zero: 50 V

Break monitoring  
Direction of control action configurable

Reference junction compensation  
configurable, internally or externally: 0, 20, 50 or 60  $^{\circ}\text{C}$

Linearization  
configurable

### Module AE2\_MA/MV-TR

2 Inputs  
0/4...20 mA or -10...80 mV with electrical isolation  
(changeable with jumpers)

Input resistance  
at 20 mA 50  $\Omega$   
at -10...80 mV approx. 5 M $\Omega$

Surge immunity of the input and output cables to one another  
and against grounding conductor  
Continuous operation: 45 V AC

otherwise as modules 4\_MV and 4\_MA

### Module AE4\_PT\_2L

4 Inputs  
for Pt 100 in 2-wire connection without electrical isolation

Range  
0...400  $\Omega$

Signal resolution  
10000 LSB for 400  $\Omega$

Measuring current  
1.5 mA

Measuring range  
configurable  
-200.0...+200.0  $^{\circ}\text{C}$   
0,0...+450.0  $^{\circ}\text{C}$   
-200...+800  $^{\circ}\text{C}$

Lead balancing  
by software

Sensor break and short-circuit monitoring  
response configurable

### Module AE2\_PT\_3/4L

2 Inputs  
2 for Pt 100 in three-wire or four-wire connection or teletransmitter

Ranges as module AE4\_PT\_2L

### Module AE4\_ft

1 to 4 inputs for frequency/period measuring, individual  
changeover via software

2 NAMUR inputs acc. to DIN 19 234  
4 inputs acc. to DIN 19 240 (0/24 V DC)  
4 binary inputs (0/5 V DC)

Measuring range  
Period 0...20 s  
Frequency 0...10 kHz  
when using only one input: 0...20 kHz

Signal resolution  
Period 1 ms  
Frequency 1 kHz

Error of measurement  
 $\pm 0,15$  % of measuring range  
 $\pm 0,05$  % of measured value  
 $\pm 1$  digit

## Binary inputs/outputs

### Module BEA6\_BIN

6 binary inputs/outputs with electrical isolation

Electrical isolation  
For continuous operation up to 30 V AC

Function  
Configurable as input or output. See operating manual to do this. Operating Manual 42/62-50012 EN "Commissioning".

Technical data as binary inputs/outputs of the basic model.

### Module BA4\_REL

(can only be used on card slots 6 and 7)

4 Relays  
with NO contacts for max. 250 V AC, 1 A,  $\cos\phi = 0.9$

Spark quenching  
built-in

If small voltages ( $\leq 50$  V) and mains voltages ( $\geq 100$  V) are to be switched on the same module, one relay must remain disconnected to comply with the creepage distances and clearances between different circuits called for in EN 61010-1.

## Analog outputs

### Module AA3\_mA

(sum of all output currents  $\leq 300$  mA)

Triple current output 0/4...20 mA at 750  $\Omega$

Signal resolution  
5000 LSB

Load dependence  
0.1 % / 100  $\Omega$ .

Output monitoring  
Function configurable

### Module AA3\_V

Triple voltage output 0/2...10 V  $\geq 5$  k $\Omega$

## Interface modules

### Module RS-485

(can only be used on card slot 2)

Interface module according to RS-485-specification

Electrical isolation

Not depending on a protocol (the protocol is configured by the Protronic).

### Module RS-232

(can only be used on card slot 2)

Interface module according to RS-232 specification

Electrical isolation

Not depending on a protocol (the protocol is configured by the Protronic).

## PROFIBUS

see Operating instructions 42/62-50050

## Memorycard

(not Protronic 100)

As an option a memory card according to the PCMCIA 2.0-Standard can be used. The memory card can be installed after opening the front. Used to store configuration and parameterization data.

Type: AmC001BFLKA  
1 MByte 5.0 – only Flash Memory PC card

## Packaging for transport or for return to manufacturer

If the original packing is no longer available the Protronic 100/500/550 must be wrapped in an insulating air foil or corrugated board and packed in a sufficiently large crate lined with shock absorbing material (foamed material or similar) for the transportation. The amount of cushioning must be adapted to the weight of the unit and to the mode of transport.

The crate must be labelled "Fragile".

For overseas shipment the unit must additionally be sealed airtight in 0.2 mm thick polyethylene together with a desiccant (e.g. silica gel). The quantity of the desiccant must correspond to the packing volume and the probable duration of transportation (at least 3 months). Furthermore, for this type of shipment the crate should be lined with a double layer of kraft paper.

## Accessoires

Accessories for the Protronic 100/500/550 (100: only in *italics*) are shown in the accessories list below. Please quote the designation and catalog numbers (Cat.No.) of the accessory when ordering. Also be sure to quote the serial and order numbers entered on the rating plate.

The designations in the accessories list, order confirmation, delivery note and invoice may differ from the function-related names used in this instruction manual.

**Only the catalog number is relevant!**

Designation		Catalog number
<b>Inputs</b>		
AE4_MV	quadruple thermocouple	62619-4-0346280
AE2_MA/MV-TR	double thermocouple or mA with electrical isolation	62619-4-0346250
AE4_PT_2L	quadruple Pt100 in 2-wire connection	62619-4-0346255
AE_PT_3/4L	double Pt100 in 3/4-wire connection	62619-4-0346281
AE4_MA-MUS	quadruple mA with transmitter supply	62619-4-0346441
AE4_MA	quadruple mA with electrical potential separation	62619-4-0346254
AE4_f/t	quadruple frequency input	62619-4-0346444
<b>Binary inputs/outputs</b>		
6_BIN_EA	6-fold binary input/output with electrical isolation	62619-4-0346282
<b>Outputs</b>		
AA3_MA	3-fold 20 mA	62619-4-0346252
AA3_V	3-fold 10 V	62619-4-0346253
BA4_REL	quadruple relay with NO contact	62619-4-0346263

Subject to technical changes.

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