Digitric 500

Controllers for industry

Installation

Manual   42/61-50011 EN   Rev. 03

ABB

Preliminary remarks:

The documentation for the Digitric 500 includes the following parts:

Z-19063

Table of contents

Important instructions! Please read and observe!

Correct and safe operation of the Digitric 500 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 Digitric 500.

Please take note of
– the contents of this Operating Manual,
– the safety regulations affixed to the Digitric 500 and
– the safety regulations pertaining to the installation and operation of electrical systems.

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

The Digitric 500 has been designed and tested in accordance with EN 61 010-1 = DIN VDE 0411 Part 1 "Protective measures for electronic 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 apparatus 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 ABB Service Department will be delighted to give you more information.

Description and use

Description

The industrial controller Digitric 500 is a compact controller used for the instrumentation of single control loops to the automation of small- and medium-scale processes. It is universally applicable and designed to accomplish both simple and complex control tasks.

Basic version

One universal input for the controlled variable. Without having to change the module hardware, thermocouples, resistance thermometer Pt100, teletransmitter and standard signals 0/4...20 mA can be connected. 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.

1 Input for mA and teletransmitter, which can be used as a feed forward or set point value input. With step controllers, this input can be used for the position feedback signal.

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

2 binary inputs/outputs, which 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.

2 Relays for the actuating signal, alarm outputs or fault reporting.

4 Module slots for expanding the function.

Front panel

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

Programmer

Every Digitric 500 includes a configurable programmer to preset a time-dependent set point. The Digitric can save up to 10 programs with 15 sections 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 a menu key after entering a password. At this level it is possible to set parameters such as controller gain G 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 a 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).

Free-style configuration

Duly prepared Digitric 500 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

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 Digitric 500 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

(see fig. 1 and 2)

Panel cutout
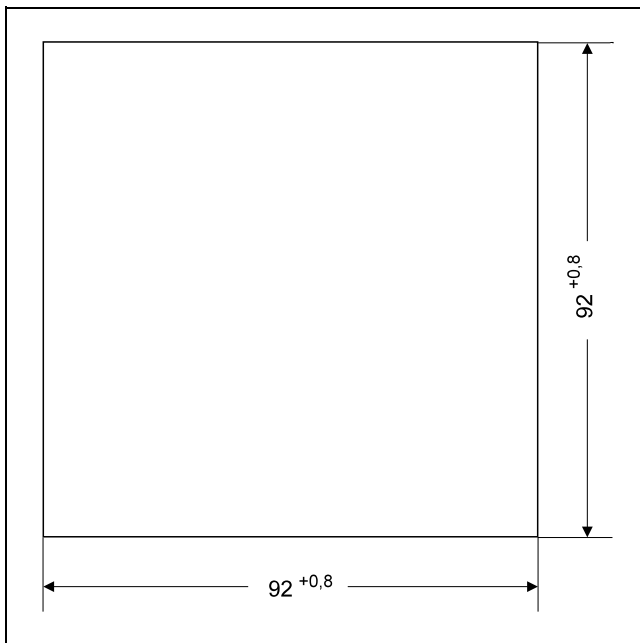
- Panel cutout to DIN 43 700:
  $92^{+0.8}$mm $\times$ $92^{+0.8}$mm

- With close-packed horizontal mounting:
  bar width min. 10 mm.

- Leave sufficient space above and underneath the units for ventilation:
  min 40 mm.

  Note
  The space between the units must not be encroached upon by wiring.

Fig. 1   Panel cutout (Dimensions in mm)
Z-19166

Installation
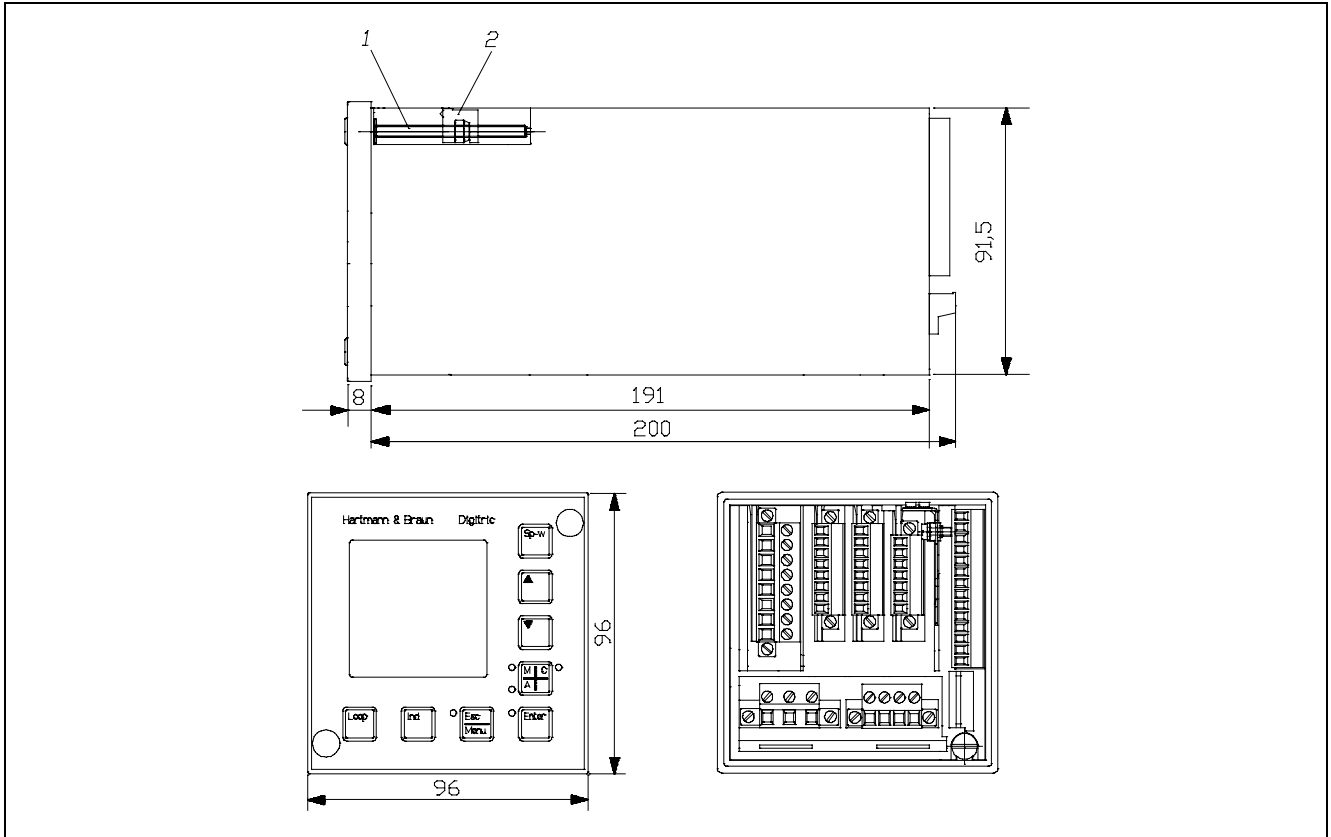
Fig. 2 Dimensional drawing (Dimensions in mm)
Z-19168 *1*   Clamping claw screw
        2   Clamping claws

1. Remove the blanking caps on the front.

2. Turn the clamping claw screw *1* anti-clockwise until the clamping claws *2* can snap into place behind panel.

3. Push module into the front panel cutout.

4. Turn the clamping claw screw *1* clockwise until the clamping claws *2* snap into place behind the panel and module is firmly fixed.

5. Replug the blanking caps.

4. Connection

Note

After the Digitric 500 has been switched on, some internal checks take place. These checks need about 15 s and are displayed.

Signal connections, basic model
(see fig. 3 and 4)

Connections with plug-in screw terminals for solid or stranded wire. Conductor cross-section up to 1.5 mm^2, Relay up to 2,5 mm^2.
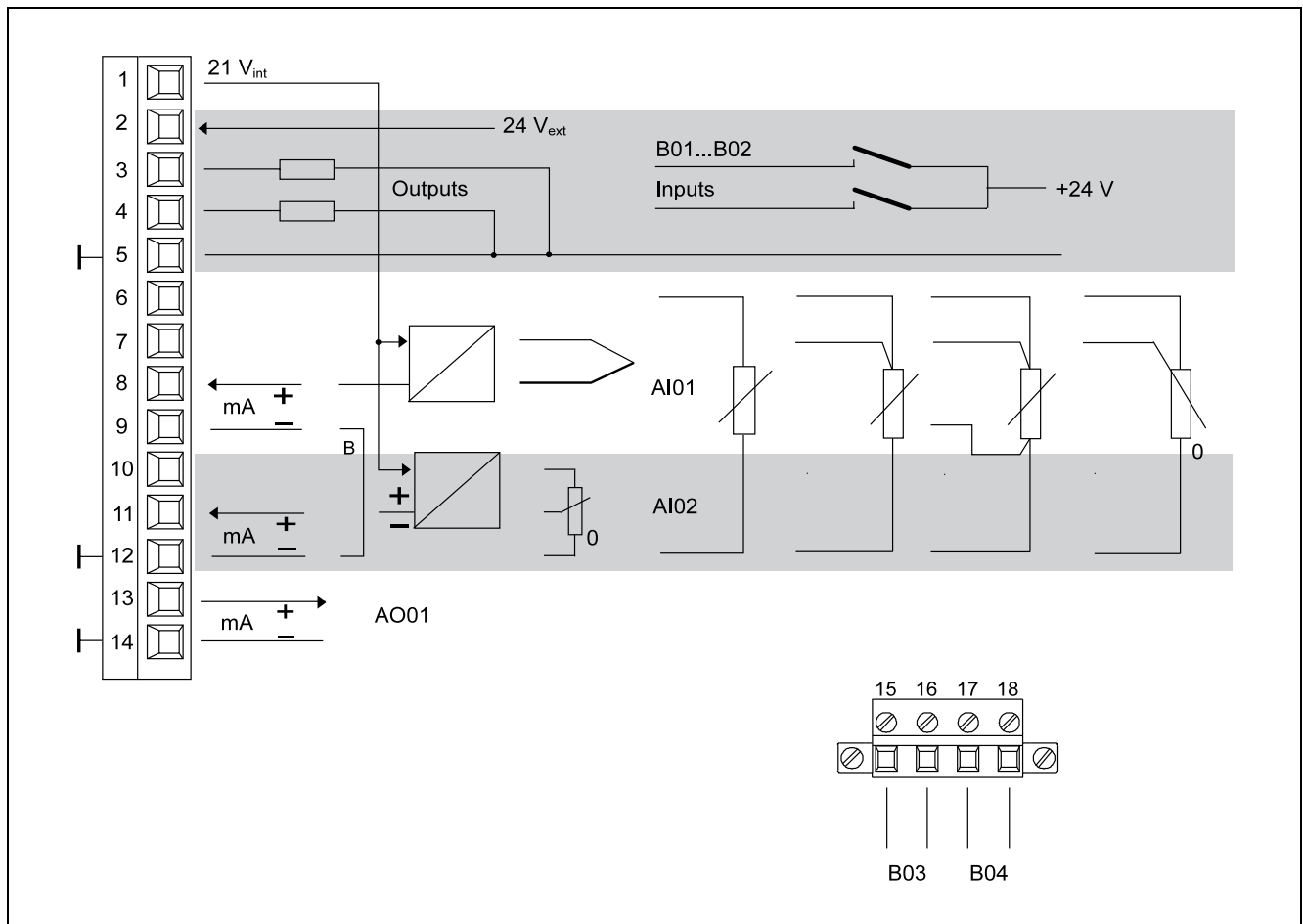

Fig. 3 Signal connections, basic model
Z-19164

1	21 V$_{int}$	8	Analog input 1	AO01	Analog output 1 (0/4...20 mA)
2	Input of power supply for binary outputs	9	Analog input 1	AI01	Universal input
3	Binary port 1 (a binary port can be used as binary input or binary output)	10	Analog input 2	AI02	additional current input
		11	Analog input 2	B	Jumper in case transmitter is supplied by terminal 1
4	Binary port 2	12	Analog input 2	B01,02	Binary inputs or outputs
5	Zero potential	13	Analog output 1	B03,04	Relay outputs (NO contact) max. 250V AC, max. 1A, cosϕ = 0.9
6	Analoginput 1	14	Analog output 1		
7	Analoginput 1				

21-V$_{int.}$ Supply for 2-wire transmitter and/or binary inputs and outputs
24-V$_{ext.}$ External power supply

Signal connections, modules and PC
(see fig. 4)

Overview

Fig. 4   Digitric 500, rear view with terminal strips
  1 .. 4   Module slots
  5   Shield terminal board
  6   Signal connections, basic model
  7   PC port (configuration interface)
  8   Relayoutputs
  9   Power supply
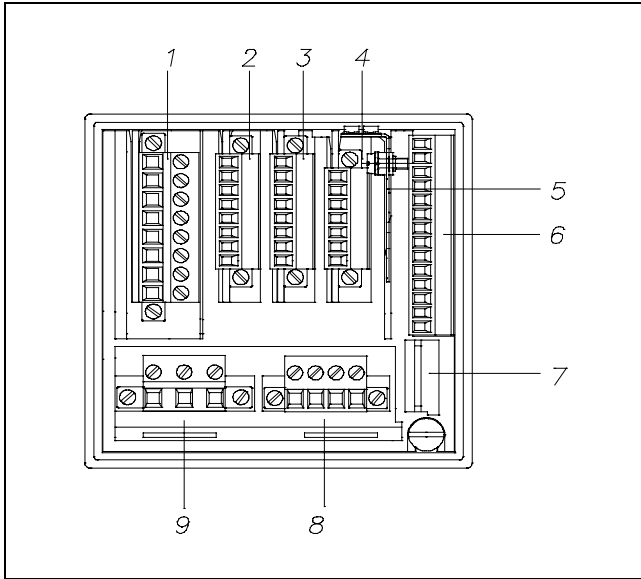
Z-19174

Table of modules

The Digitric 500 can be equipped with the following modules. Four module slots are available for these.

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

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

Module type	Technique	Wattage	Module code	1	2	3	4	5	6	7	see fig.
Inputs											
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[1]	quadruple frequency input	H	0,30 W								13
AE4_mA_MUS[2]	quadruple mA with transmitter supply	C	2,24 W								8
AE4_mA	quadruple mA with electrical isolation	A	0,22 W								7
Binary inputs/outputs											
BEA6_BIN	six-channel binary input/output	M	0,25 W								16
Outputs											
AA3_mA[2]	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
Interfaces											
RS 485[3]	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[1]	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

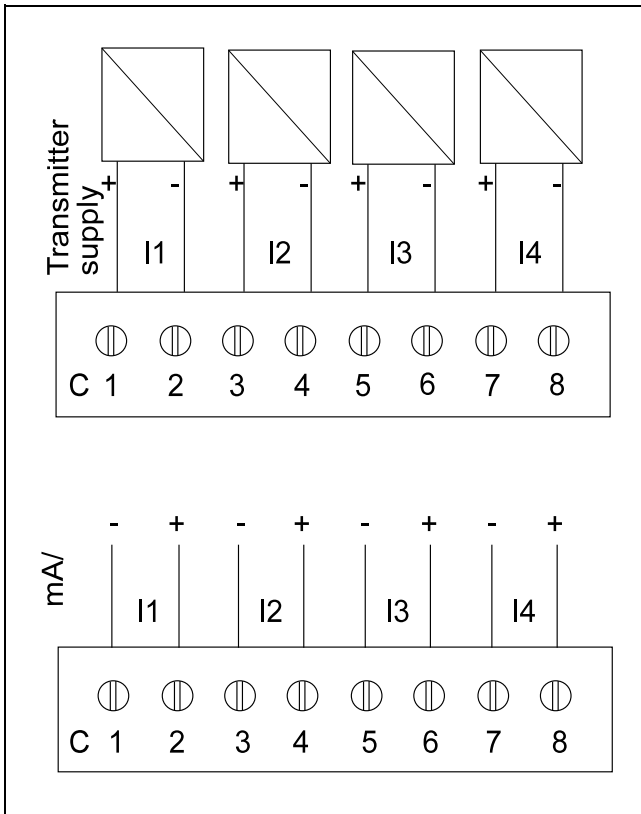**AE4_MA: Analog input module 4 × mA**
(see fig. 5)

4 inputs 0/4...20 mA with electronic potential separation.
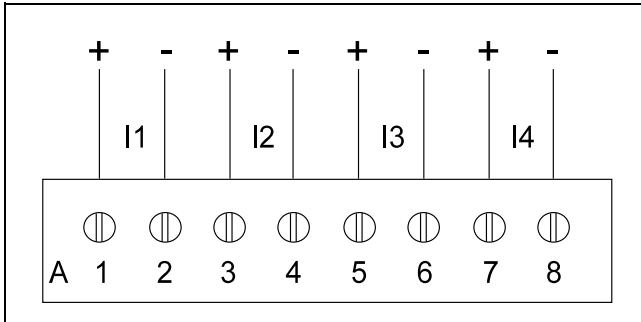
Fig. 5   Analog input module 4 × mA
Z-19152

AE4_MA-MUS: Analog input module 4 × mA with transmitter supply
(see fig. 6)

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

Fig. 6   Analog input module 4 × mA with transmitter supply
Z-19154

AE2_MA/MV-TR: Analog input module 2 × mA or Thermocouple or mV
(see fig. 7)

2 inputs 0/4...20 mA switchable to thermocouple and mV (–10...80 mV) with electrical isolation (see Chapter "Upgrading modules").
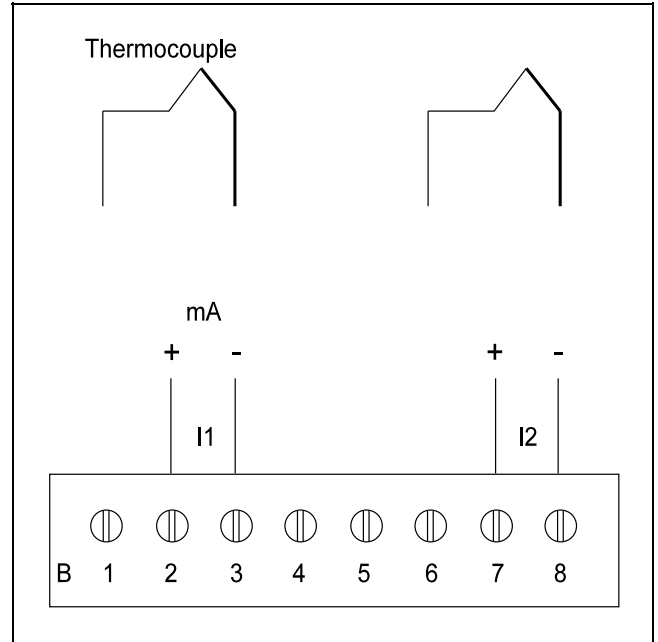
Fig. 7   Analog input module 2 × mA or thermocouple or mV
Z-19148

AE4_MV: Analog input module 4 × thermocouple
(see fig. 8)

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

Fig. 8   Analog input module 4 × thermocouple
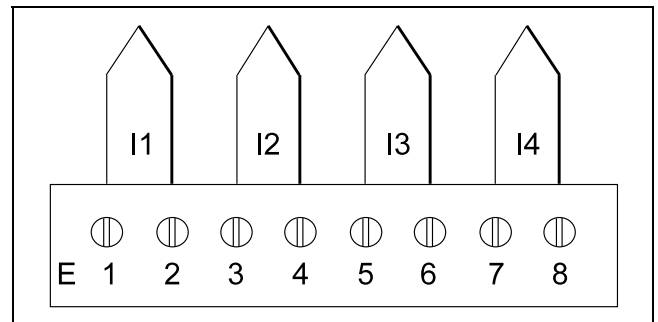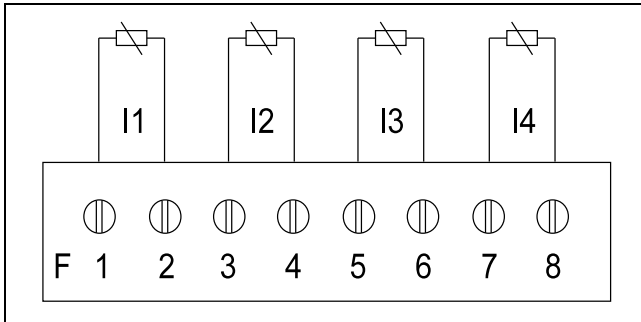Z-19156

AE4_PT_2L: Analog input module 4 × Pt 100 in 2-wire connection
(see fig. 9)

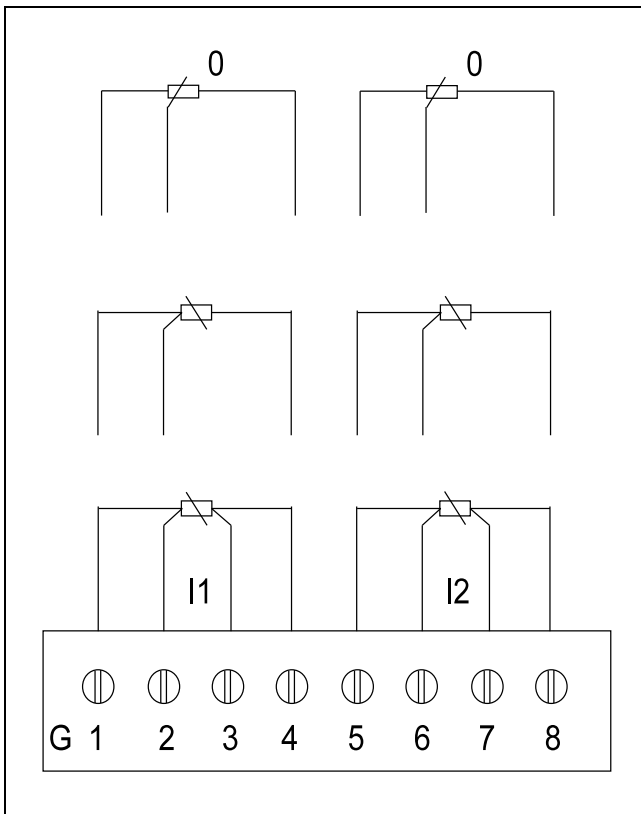4 inputs for Pt 100 in 2-wire connection, linearization permanently programmed.

Fig. 9   Analog input module 4 × Pt 100 in 2-wire connection
Z-19155

AE2_PT_3/4L: Analog input module 2 × Pt 100 in 3/4-wire connection
(see fig. 10)
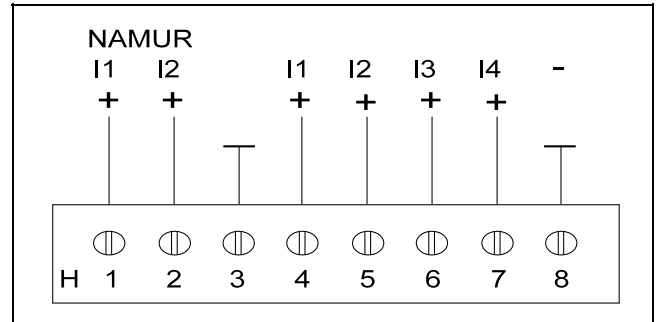
2 inputs for Pt 100 in 3- or 4-wire connection or teletransmitter.

Fig. 10   Analog input module 2 × Pt100 in 3/4-wire connection or
Z-19149   teletransmitter

AE4_f/t: Frequency input module 4 × F

4 frequency inputs

Fig. 11   Frequency input module 4 × F
Z-19194

Input	Frequency measure-ment	Time measure-ment	Pulse counter	Increment	Incement with zero
I	AIx1[1]	AIx1	AIx1	AIx1	AIx1
I	AIx2	AIx2	AIx2		
I	AIx3	AIx3	AIx3	AIx3	Zero
I	AIx4	AIx4	AIx4		blocked

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 × mA
(see fig. 12)

3 current outputs 0/4...20 mA at 750 Ω, short-circuit and open-circuit proof.
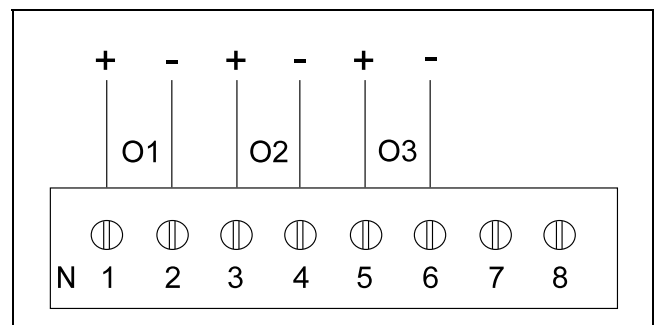
Fig. 12   Analog output module 3 × mA
Z-19150

AA3_V: Analog output module 3 × V
(see fig. 13)

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

```
      +    -    +    -    +    -

        O1        O2        O3

     ⊕    ⊕    ⊕    ⊕    ⊕    ⊕    ⊕    ⊕
     P    1    2    3    4    5    6    7    8
```

Fig. 13   Analog output module 3 × V
Z-19151

BEA6_BIN: Digital input/output module 6 × binary
(with electrical isolation) (see fig. 14)

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

```
  +24 VDC external
        BI1/BO1
        BI2/BO2
        BI3/BO3
        BI4/BO4
        BI5/BO5
        BI6/BO6
        GND

     ⊕    ⊕    ⊕    ⊕    ⊕    ⊕    ⊕    ⊕
     M    +    1    2    3    4    5    6    -
```
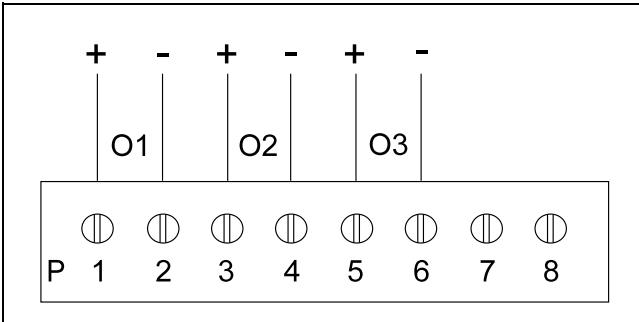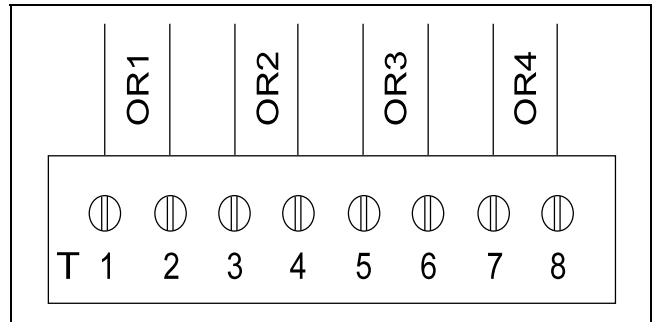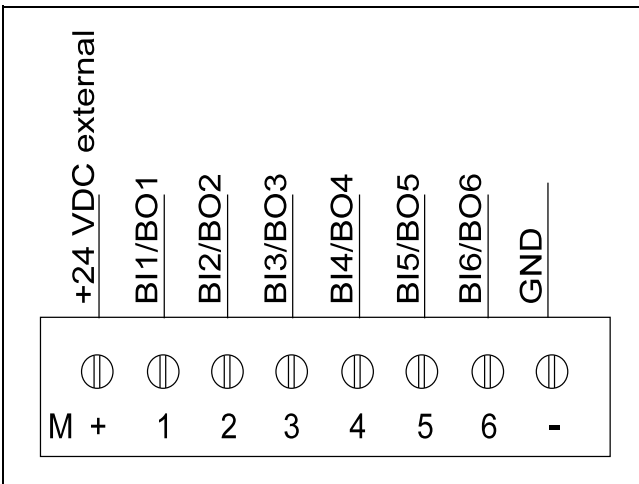
Fig. 14   Digital input/output module 6 × binary
Z-19158

BA4_REL: Digital output module 4 × relays
(see fig. 15)

Can only be used on card slot 1. 4 relays with normally-open (NO) contact.

```
        OR1        OR2        OR3        OR4

     ⊕    ⊕    ⊕    ⊕    ⊕    ⊕    ⊕    ⊕
     T    1    2    3    4    5    6    7    8
```

Fig. 15   Digital output module 4 × relays
Z-19157

⚠ Caution

Maximum switching voltage 250 V AC, maximum switching current 1 A, cosϕ = 1.

If safety-low voltages (≤ 50 V) and mains voltages (≥ 100 V) are to be fed into the same module, a relay must remain open-circuited between the two different cuircuits in order to meet the air and creepage distance requirement stated in EN 61 010-1.

RS-232: Interface module RS-232 (see fig. 16, 17 and 18)

Can only be used on card slot 4.

```
                              Module
        TxD        RxD        Zero

     ⊕    ⊕    ⊕    ⊕    ⊕    ⊕    ⊕
     Y    1         3         5         7
```
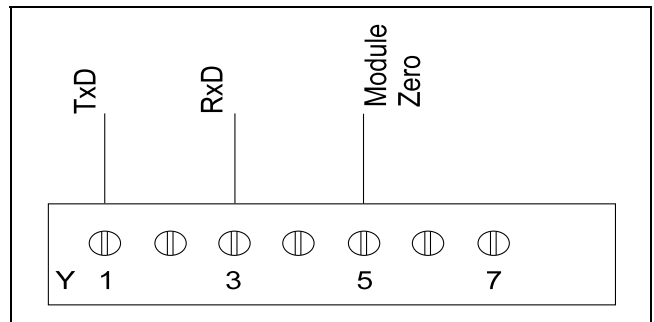
Fig. 16   Interface module RS-232
Z-19180

RS-485: Interface module RS-485 (with electrical isolation) (see fig. 17, 18 and 19)

PROFIBUS

Can only be used on card slot 4.

see Operating Instructions 42/62-50050

Fig. 17   Interface module RS-485
Z-19181   *   The jumpers are only necessary if the interface line is not to be broken when the plug is withdrawn.

Notes

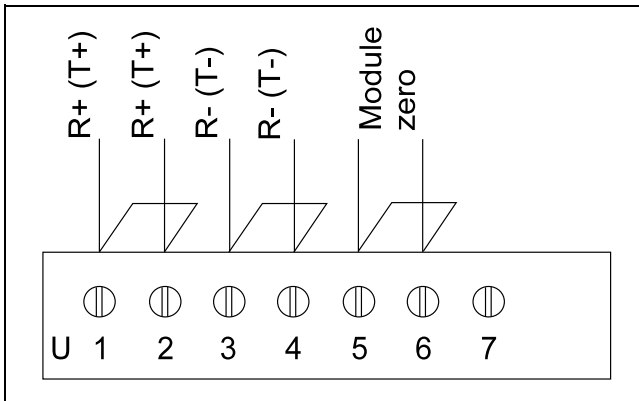For a bus cable leading to all other electrically isolated bus subscribers, use a shielded line, at least 3-core, with a twirled pair of conductors for signal transmission and an additional insulated line for equipotential bonding between the „module zero" connections.

The shield of the data cable is required in order to maintain the radio interference limit and increases the interference immunity of the port. The shield is connected to the shield terminal board. (see next page)

The additionally insulated line of the data cable can only effect an equipotential bonding of the port when all other bus subscribers (except e.g. PC) are also electrically separated.

As a rule, an additional line for equipotential bonding running parallel to the data cable and with an adequate cross-section is required for bus subscribers without electrical isolation.

Install and connect shield terminal board (see fig. 18 and 19)
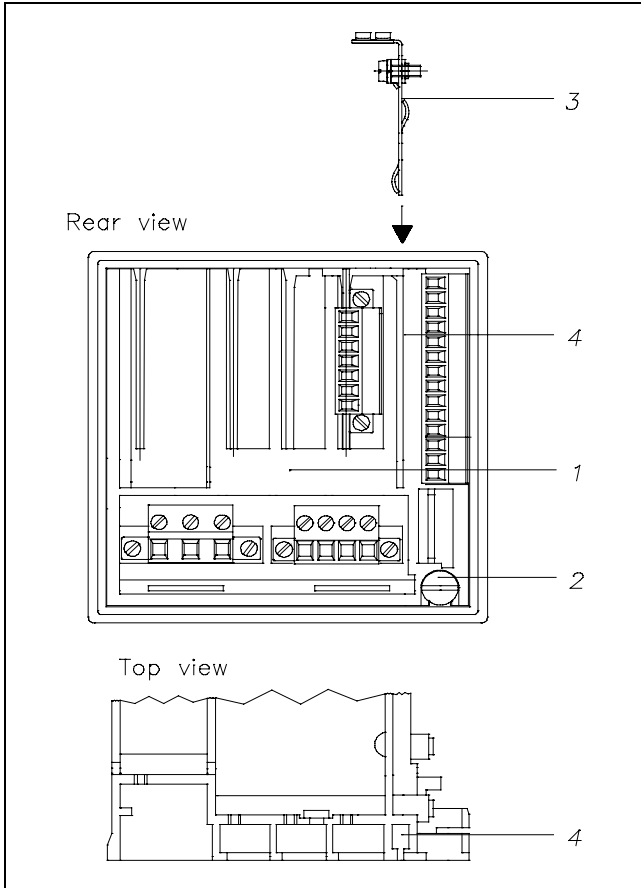
Fig. 18   Rear view
Z-19169   ↓   Direction of insertion
          1   Backplane
          2   Twist screw
          3   Shield terminal board
          4   Groove

Installation

1. Loosen the backplane *1*: turn twist screw *2* a quarter of a revolution anti-clockwise into position ◐.

2. Carefully pull off backplane *1* to the back.

3. Fit in shield terminal board *3* (enclosed in the delivery) from above into the groove *4* of the backplane *1*, as shown in fig. 18.

4. Slowly push back backplane *1* into the case.

5. Lock the backplane *1*: turn twist screw *2* a quarter of a revolution clockwise into position ⊜.
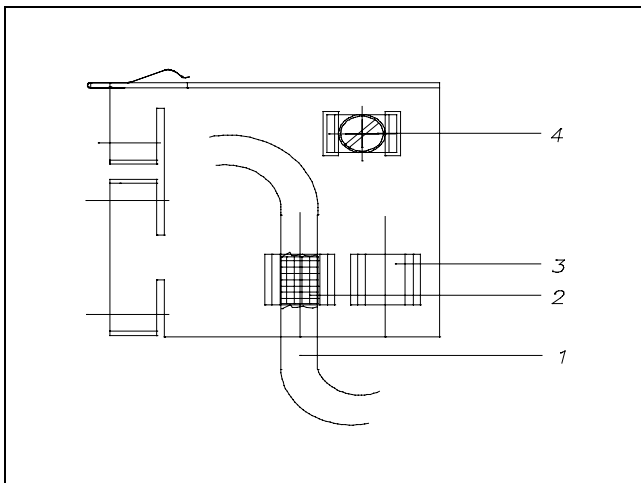
Fig. 19   Shield terminal board S
Z-19172   1   Data cable
          2   blank shield
          3   Contact surface
          4   Terminal 2

Connection

1. Insulate data cable *1* to approx. 10 mm.

2. Place the blank shield *2* on the contact surface *3* and fix with the supplied cable straps.

3. If the shield has a supplementary wire, connect this to terminal 2 *4*.

Power supply
(see fig. 5, 20 and 21)

```
        L    N    PE
      ⊘    ⊘    ⊘
  ⊘  [ ]  [ ]  [ ]  ⊘
```
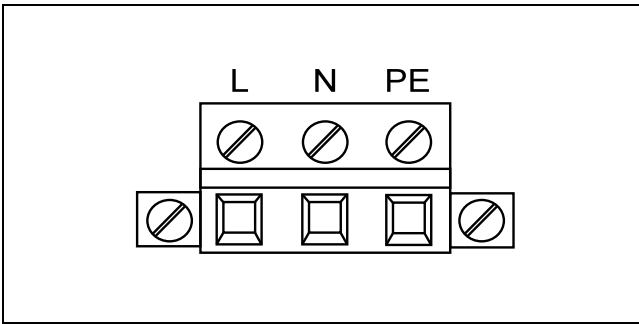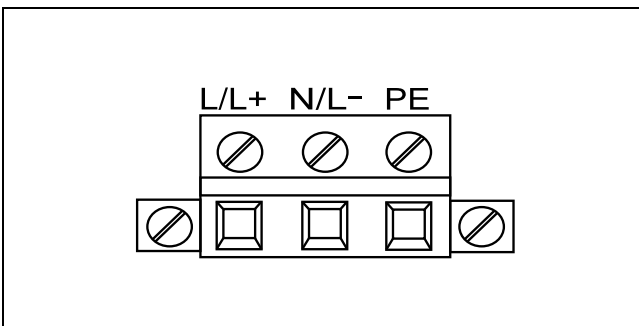
Fig. 20   Connection of the 115/230 V AC power supply
Z-19161   P   Live conductor
          N   Neutral conductor
          PE   Grounding conductor

```
       L/L+  N/L-  PE
      ⊘    ⊘    ⊘
  ⊘  [ ]  [ ]  [ ]  ⊘
```

Fig. 21   Connection of the 24 V UC power supply
Z-19163   DC   Live condutor to L/L+
                 Neutral conductor to N/L–
          AC   Live conductor and neutral conductor are arbitrary

          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 or equivalent local rules) are to be observed.

Before any other connection is made the protective grounding conductor 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.

Connect 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 equipment.

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 61 010-1, 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^2.

⚠ 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.

After the Digitric 500 has been switched on, some internal checks take place. These checks take about 15 s and are displayed.

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.

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.

Only fuses of the specified type and rated current may be used as replacements. Makeshift fuses may not be used. The fuse-holder may not be short-circuited.

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 the 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;
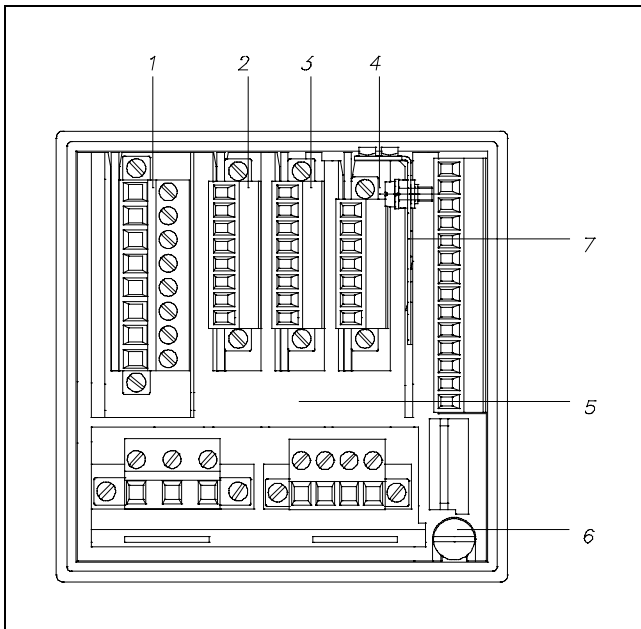- the apparatus has been subjected to adverse transport conditions.

Installing modules

⚠ Caution

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

Installing modules
(see fig. 22 and 23)

Fig. 22 Rear view
Z-19175 1 .. 4 Module slots (1...8: terminals)
         5   Backplane
         6   Twist screw
         7   Shield terminal board

The sub-assembly must be slid into the case and interlocked with the twist screw 6 during operation.

Note
In case no module is installed and one or more modules are to be installed, the bus p.c.b. must be ordered with the modules (see chapter on „Accessories", page 22). The bus p.c.b. must be mounted, before installing the first module (see next page).

1. Release sub-assembly *5*: rotate twist screw a quarter turn anti-clockwise to position ◑ .

2. Slowly withdraw sub-assembly *5* backwards.

3. Insert module from above into the guide groove and carefully fit onto the bus p.c.b. to the limit.

Notice
In case the interface module RS-485 or RS-232 is to be installed, the delivered shield terminal board must also be incorporated (see page 12).

4. Slowly slide back sub-assembly *5* into the case.

5. Lock sub-assembly *5*: rotate twist screw *6* clockwise a quarter turn to position ⊖ .

6. Module connection: refer to the section on modules on pages 9 to 12.
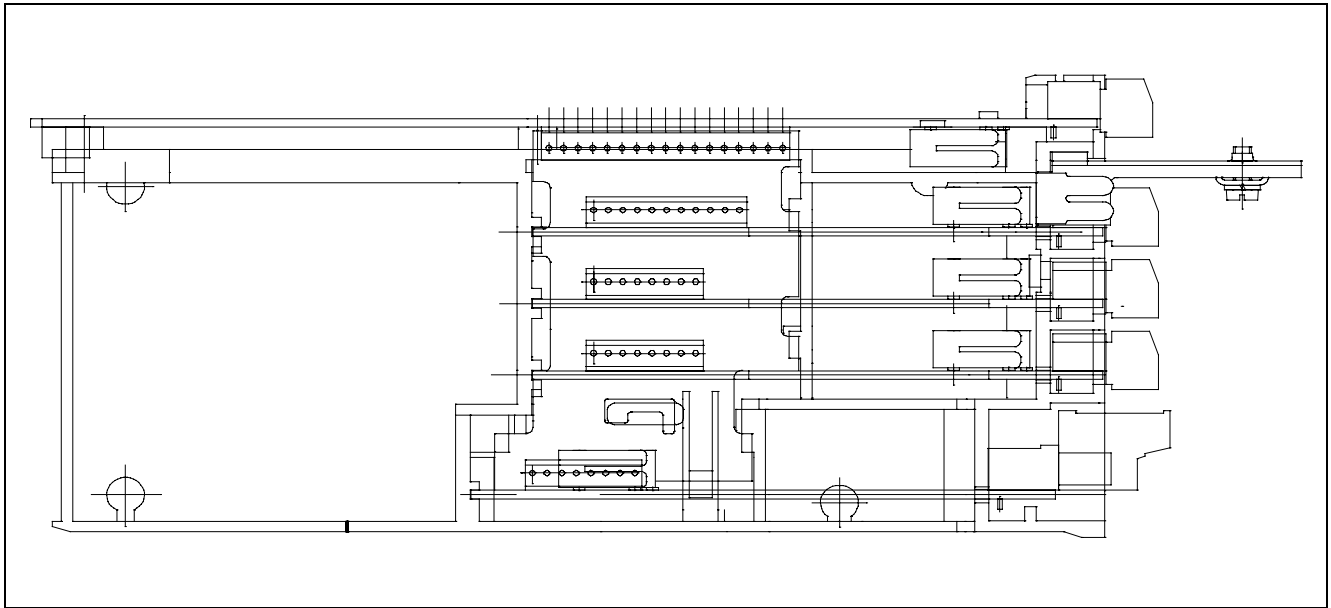
Fig. 23   Backplane with installed modules and shield motherboard
Z-19173

Installing or removing bus p.c.b.
(see fig. 24 and 25)

Fig. 24   Installing the bus p.c.b.
Z-19167   *1*   Bus p.c.b.
           2   Backplane
           3   Mating plug
           4   Root (for the screw driver)
           5   Latch

1. Insert bus p.c.b. *1* into backplane *2* from above *2* and allign to the mating plug *3*.

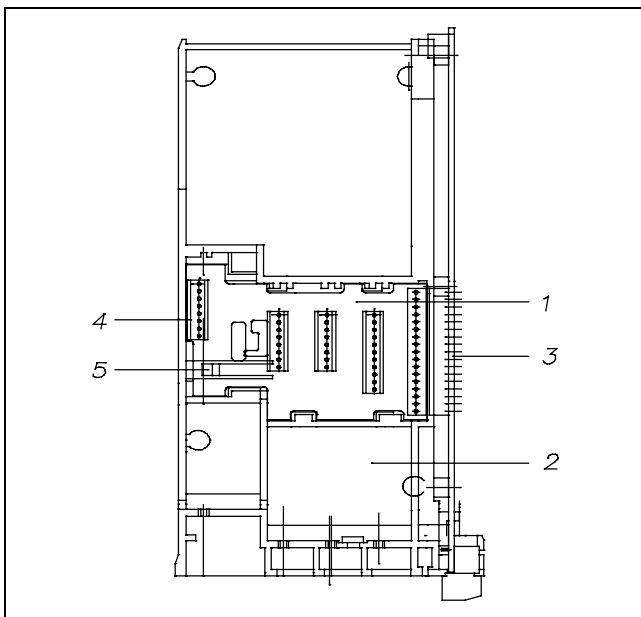2. Place screwdriver with broad blade on point *4* between backplane *2* and bus p.c.b. *1*.

3. Press the bus p.c.b. *1* into the mating plug *3* by turning the screwdriver around its longitudinal axis until the latch snaps fit.
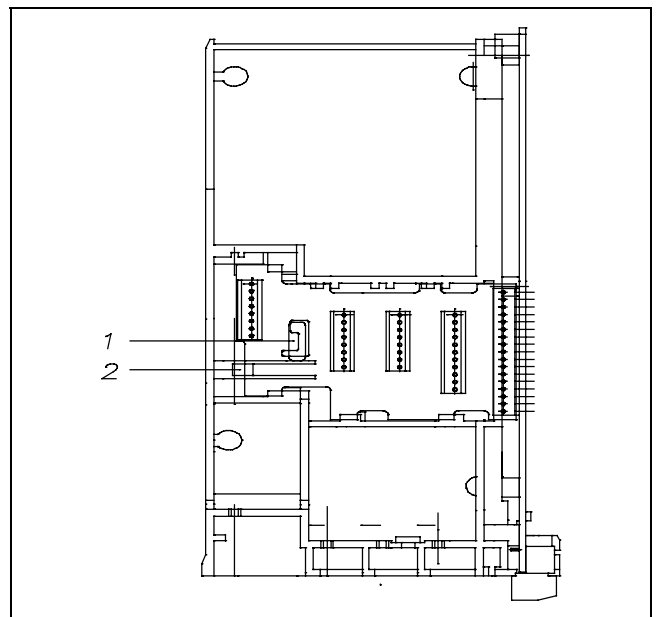
Fig. 25   Removing the bus p.c.b.
Z-19170   *1*   Recess
           2   Latch

1. Place the screwdriver with braod blade into the recess *1*.

2. Press the latch *2* down.

3. Pull out the bus p.c.b. from the mating plug by turning the screwdriver around its longitudinal axis.

4. Remove the bus p.c.b. by pulling it out of the backplane from above.

Upgrading modules

Analog input module 2 × mA or thermocouple and mV

2 inputs 0/4...20 mA or thermocouple and mV (–10...60 mV) with electrical isolation.
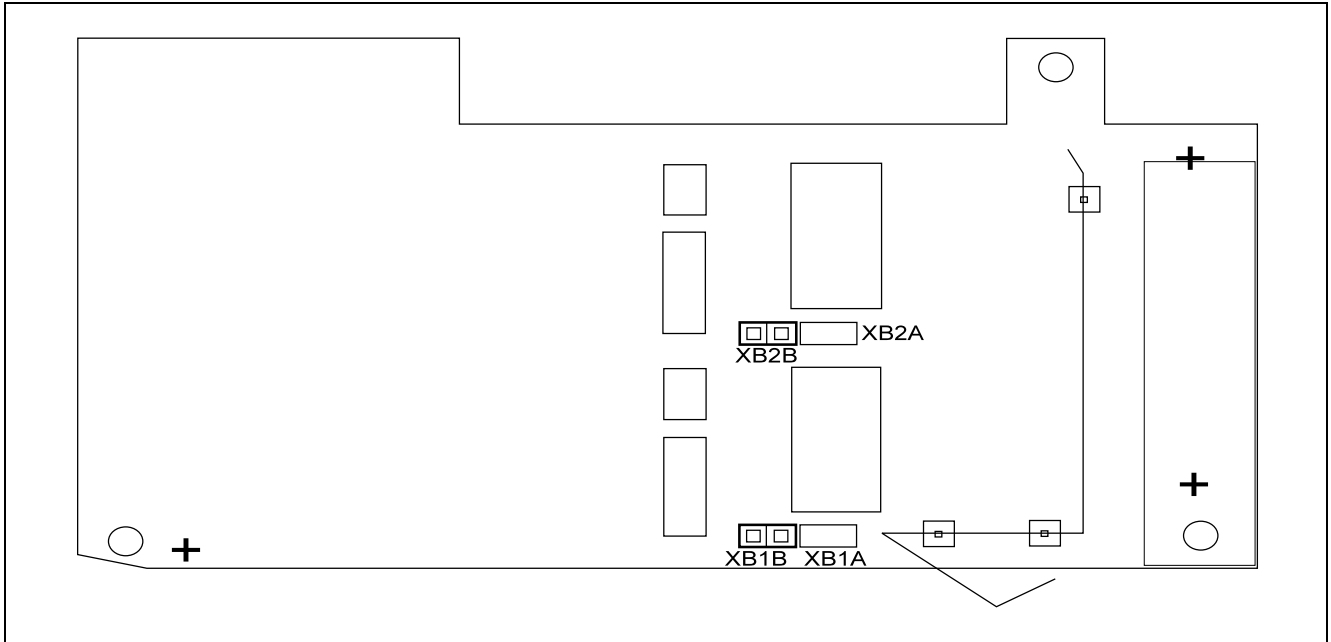
Fig. 26 Analog input module 2 × mA or thermocouple and mV

Z-19185

Input 1:		Input 2:	
mA	XB1A bridged	mA	XB2A bridged
mV	XB1B bridged	mV	XB2B bridged

Analog input module 4 × mA with transmitter power supply

Fig. 27   Analog input module 4 × mA with transmitter power supply

Z-19153
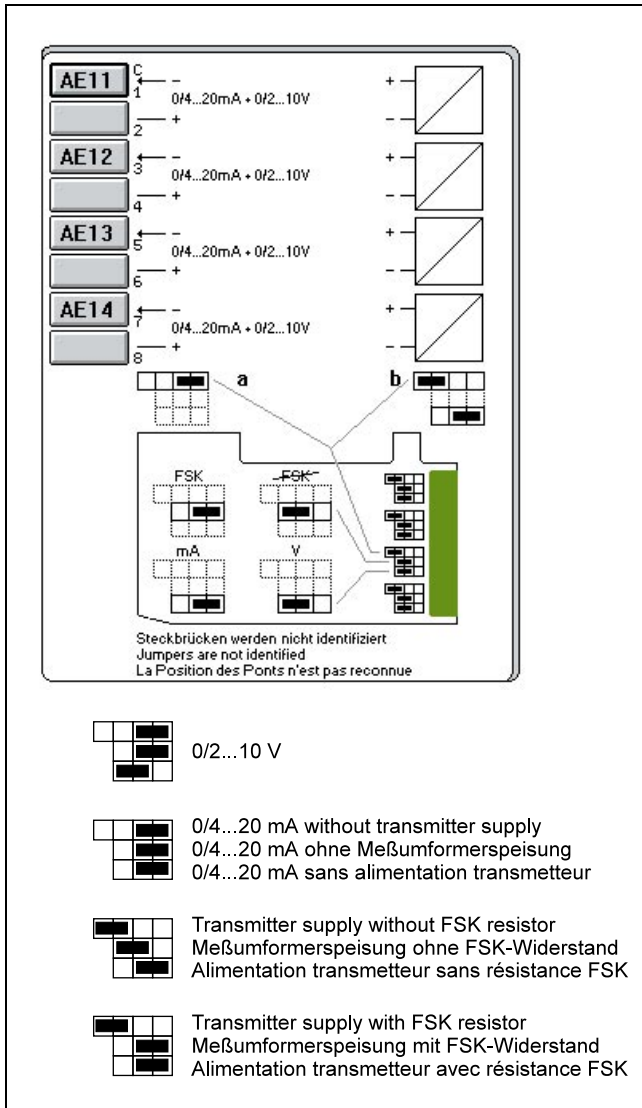
The input card AE4_MA-MUS can be matched to various measuring tasks by using plug-in jumpers.

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

Upgrading the firmware

(see fig. 28)

Fig. 29 Motherboard with slots

Z-19179	*4*	Free configuration CONFI-IC	*IC even*	Firmware IC
	5	Password jumper	*IC odd*	Firmware IC

To update the firmware, exchange the two old ICs *IC even* and
IC odd with their corresponding new types.

Enabling free configuration

(see fig. 28)

To enable free configuration the IC *4* must be used.

Deleting lost password

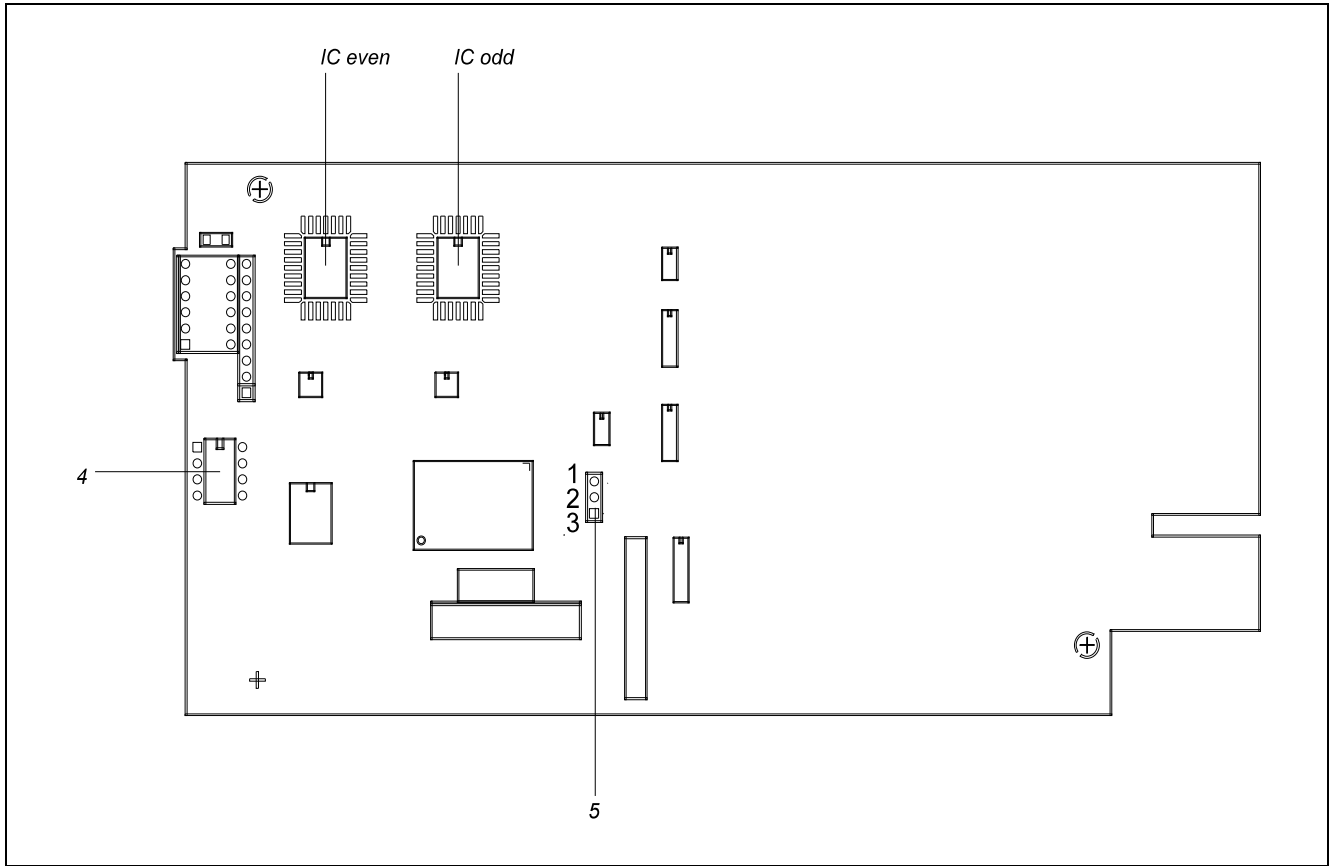(see fig. 28)

1. Switch off the power supply.

2. Remove apparatus and open it.

If the plug-in jumper *5* is linked to the terminal posts 1 and 2, the
set password will be valid. If the plug-in jumper is shifted to the
terminal posts 2 and 3, the set password will cease to be valid.

3. Readjust the jumper *5*.

4. Close apparatus and install.

5. Switch on power supply.

The levels protected with the password should be freely
accessible.

6. Read the password and change if need be (see Operating
   Manual 42/62-50012 EN).

7. Readjust the plug-in jumpers as instructed in steps 1. - 5.

Technical data

Technical data basic model

Input

Common data

Electrical isolation
none

Resolution
12 bit

Measurement tolerance (related to nominal range)
≤ 0.2 %

Effect of temperature
≤ 0.2 % / 10 °C

Hardware input filter limiting frequency
7 Hz

Analog inputs

Universal input AI01

used for standard analog signal

0/4...20 mA at 50 Ω ± 1 %, electronic potential separation

permissible common-mode voltage (in relation to device zero)
≤ ±5 V

Overcurrent/wrong polarity protection
up to ±40 mA

Linearization, square root extraction
configurable by software

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

Permissible common-mode voltage
≤± 5 V

Permissible anti-mode voltage
≤± 5 V

used for Pt 100 DIN resistance thermometers

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

Measuring current
≤ 1 mA

Measurement circuit
2-wire connection to 40 Ω line resistance

Lead balancing
by software

3-wire connection
for symmetrical cables to 3 × 10 Ω

4-wire connection

sensor short circuit and break monitoring configurable

direction of control action configurable

used for resistance teletransmitters

Measuring range
150 Ω (75...200 Ω)
1,5 kΩ (0,75...2 kΩ)

Measuring current
≤ 1 mA

otherwise as resistance thermometer

Analog input 2 (AI02)

Inputs for mA signals such as AE01, but not floating with referred to device zero.

Teletransmitter as AI01

Binary inputs/outputs

Direction of functioning
    configurable

Input DIN 19240	Nomianal signal	Voltage range	Current range
Nominal level	24 V DC	20,4...28,8 V	approx. 1 mA
1-signal	24 V DC	13,0...30,2 V	approx. 1 mA
0-signal	0 V DC	-3,0...5,0 V	< 0,1 mA

Tab. 2   Technical data when configured as input

Output DIN 19240	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. 3   Technical data when configured as output

Switching frequency
    $\leq$ 8 Hz

Outputs

Analog outputs

As controller or measurement data output

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

Control range
    0...$\geq$ 21 mA

Load dependence
    0.1 % / 100 Ω

Resolution
    12 bit

Binary outputs

B03 and B04 relay outputs (NO contact)
    max. 250V AC, max. 1A, $\cos\phi$ = 0.9

Intrinsically safe isolation required between the relay circuits for voltages less than 100 V AC. No intrinsically safe isolation between the relay circuits is required for the exclusive switching of main circuits.

otherwise as binary inputs

Transmitter supply voltage

Output voltage
    24$\pm$4 V DC, 100 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...99:59:59 hours, 4 control signal tracks

Serial interfaces

TTL interface for coupling to the PC via TTL/RS232 transformer with fixed telegram format matching for parameter definition and configuration program **IBIS_R** (see Data Sheet 10/62-6.70 EN).

Catalog No. for cable and transformer: 62695-4-0346270

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

CPU Data

Measured and correction value resolution
    12 bit

Cycle time
    50 ms

Data protection
    Flash-EEPROM

Power supply

115 to 230 V AC (90 to 260 V), 47...63 Hz
    Power consumption
    Digitric 500 without modules   9 VA (6 W)
    with maximum comp. compl.   +7 VA (5 W)
    Power failure monitoring $\geq$ 150 ms at 180 V AC

24 V UC
    24 V DC   +30 %...-25 % residual
                ripple $\leq$ $\pm$3 Vss
    24 V AC   +10...-15 %, 47 ... 63 Hz
    Power consumption
    Digitric 500 without modules   10 VA (7 W)
    with maximum comp. compl.   +7,5 VA (5,5 W)
    Power failure monitoring $\geq$ 20 ms at 0.85 $\times$ U$_{nom.}$

Power factor $\cos \phi$ = 0.7

Internal protection
    115 à 230 V AC   T2,5A 250V
    24V UC   T2,5A 250V

⚠ Caution

The built-in fuses may not be changed by user. A failure of the fuses indicates a fatal error of the device.

External protection
    The device does not require any external protection through fusing.

Ambient conditions

Climatic class
   KWF to DIN 40 040

Ambient temperature
   0...50 °C

Storage temperature
   –20...70 °C

Humidity
   relative humidity ≤ 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 95 (including IEC 801)

Interference immunity EN 50 081-1 1/92
   (Reference to: EN 55 011 and 55 022 DIN VDE 0875 T.11 7/92, 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 30

Terminals IP 20

Electrical safety

Class of protection 1 to EN 61 010 Part 1 (VDE 0411 Part 1 March 1994)

Clearances and creepage distances according to EN for:
   Degree of contamination 2
   Overvoltage category 3 (115 to 230 V AC)
   Overvoltage category 2 (24 V UC)

All 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

Testing
   to DIN IEC 68 Part 2-27 and 68-2-6
   Shock 30 g / 18 ms, Vibration 2 g / 0.15 mm / 5...150 Hz

Case dimensions
   Front 96 mm $\times$ 96 mm
   Installed depth 200 mm

Panel cutout
   92 mm $\times$ 92 mm to DIN 43 700

Mounting
   in panel or H&B rack
   Fixing with clamping screws top and bottom
   see section "3. Mounting"

Mounting orientation
   as required

Weight
   1 kg without modules
   Modules, each approximately 40 g
   Relay module approximately 80 g

Electrical connections

Plug-in screw terminals
   for solid or stranded wire, coded
   up to 1,5 mm^2 for signal lines
   up to 2,5 mm^2 for power supply

No shielded cables required, other than for interface cables.

Scope of delivery

Controller including fasteners and Operating Manual

Technical data modules

Analog inputs

Standard analog signal

Module AE4_MA

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

Input resistance
  approx. 50 Ω

Signal resolution
  10,000 LSB for 0...20 mA

Permissible common-mode parasitic voltage
  ±4 V in relation to device zero

Surge immunity
  Input current <50 mA
  Voltage between input and device zero ±50 V

Modul AE4_MA-MUS

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 Ω
  with 10 V input: 200 kΩ

Transmitter supply
  20 V, 82 mA

otherwise as module AE4_MA

AE4_MV (for thermocouple measurement)

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

Signal resolution
  20,000 for –10...80 mV

Input resistance
  approx. 5 MΩ

Permissible common-mode parasitic voltage
  ±4 V with referred 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 °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 Ω
  at –10...80 mV: approximately 5 MΩ

Surge immunity of the input and output cables to one another
and against grounding conductor
  Test voltage: 500 V AC
  Continuous operation: 45 V AC

otherwise as modules AE4_MV and AE4_MA

Module AE4_PT_2L

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

Range
  0...400 Ω

Signal resolution
  10.000 LSB for 400 Ω

Measuring current
  1.5 mA

Measuring range
  configurable
        –200.0...+200.0 °C
          0.0...+450.0 °C
        –200...+800 °C

Lead balancing
  by software

Sensor break and short-circuit monitoring
  response configurable

Module AE4_PT_3/4L

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

Ranges as module AE4_PT_2L

Module AE4_f/t

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
    ±0,15 % of measuring range
    ±0,05 % of measured value
    ±1 digit

Binary inputs/outputs

Module BEA6_BIN

6 binary inputs/outputs

Function
    Configurable as input or output. See Operating Manual to do this.

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

Module BA4_REL
(can only be used on card slot 1)

Relay
    4 NO (normally open) contacts for max. 250 V AC, 1 A resistive load

Spark quenching feature
    built-in

For max. 250 V, max. 1 A at $\cos\phi = 0.9$

Analog outputs

Module AA3-MA
(total sum of all output currents ≤ 300 mA)

Triple current output 0/4...20 mA at 750 Ω

Signal resolution
    5000 LSB

Load dependence
    0.1 % / 100 Ω.

Output monitoring
    Function is configurable

Module AA3-V

Triple voltage output 0/2...10 V ≥ 5 kΩ

Interface modules

Modul LATCOM
(can only be used on card slot 4)

The module for lateral communication permits high-speed, direct data exchange between up to six devices. It enables the basis of inputs/outputs to be expanded and redundancy can be achieved in a simple way with two controllers.

Rate
    approx. 1 MBaud

Connection
    via optical fiber

Protocol
    company-specific, not published

RS-485 Module
(can only be used on card slot 4)

Interface module according to RS-485-specification

electrical isolation

Independent of protocol (the protocol is configured by the Digitric).

RS-232 Module
(can only be used on card slot 2)

PROFIBUS

see Operating instructions 42/62-50050

Packaging for transport or for return to manufacturer

If the original packing is no longer available the Digitric 500 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 Digitric 500 are shown in the accessories list below. Please quote the designation and catalog numbers of the accessory when ordering. Also be sure to quote the serial (F-No.) 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
Modules	

Note
If a retrofitting module has been ordered and there is none available, the bus p.c.b. must also be ordered with it.
The bus p.c.b. is required only once for each apparatus, if modules are to be slotted in.

Bus p.c.b.	61619-4-0346840

Inputs

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 quadruple 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

Designation	Catalog number

Binary inputs/outputs

6_BIN_EA
sextuple binary input/output — 62619-4-0346282

Outputs

AA3_MA
triple 20 mA — 62619-4-0346252

AA3_V
triple 10 Volt — 62619-4-0346253

BA4_REL
quadruple relay with NO (normally open) contact — 62619-4-0346263

Interfaces

RS-485 with electrical isolation
for Modbus, H&B instrument bus — 62619-4-0346841

RS-232 with electrical isolation
for Modbus, H&B instrument bus — 62619-4-0346845

PROFIBUS
electrically isolated — 62619-4-0346470

Bus terminating adapter — 62619-4-0346488

IBIS_R:

IBIS_R
PC program for parameter definition
and configuration
(see Data Sheet 62-6.70EN)

PC cable with adapter
for connection to the interface — 62695-4-0346270

Adapter without PC cable — 62695-4-0346267

IC for Free-style-configuration
CONFI-IC — 62619-4-0346845

Subject to technical changes.

ABB