Preliminary remarks:
The documentation for the Digitric 500 includes the following parts:

**Installation manual** Digitric 500 ....................................................... 42/61-50011

Commissioning manual: Configuration and parameter setting Protronic 100 / 500 / 550 • Digitric 500 ...... 42/62-50012

**Operating manual** Digitric 500 ......................................................... 42/61-50013

Also available on request:

**Description of interfaces (MODBUS)** ..................................................... 42/62-50040
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.

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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 × 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.
Installation

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 mm², Relay up to 2.5 mm².

---

Fig. 3  Signal connections, basic model
Z-19164

1 21 V, Input of power supply for binary outputs
2 9 Analog input 1
3 10 Analog input 2
4 11 Analog input 2
5 12 Analog input 2
6 13 Analog output 1
7 14 Analog output 1
8 8 Analog input 1
9 9 Analog input 1
10 10 Analog input 2
11 11 Analog input 2
12 12 Analog input 2
13 13 Analog output 1
14 14 Analog output 1
15 AO01 Analog output 1 (0/4...20 mA)
16 AI01 Universal input
17 AI02 additional current input
18 B Jumper in case transmitter is supplied by terminal 1
19 B01,02 Binary inputs or outputs
20 B03,04 Relay outputs (NO contact) max. 250V AC, max. 1A, cos ϕ = 0.9
21 21-V, Supply for 2-wire transmitter and/or binary inputs and outputs
22 24-V, External power supply

---

Installation  7
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

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 mm², 2.5 mm² for relays.
<table>
<thead>
<tr>
<th>Module type</th>
<th>Technique</th>
<th>Wattage</th>
<th>Module code</th>
<th>see fig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Inputs</strong></td>
<td></td>
<td></td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>AE4_mV</td>
<td>quadruple thermocouple</td>
<td>E</td>
<td>0.38 W</td>
<td>10</td>
</tr>
<tr>
<td>AE2_mA/mV_TR</td>
<td>double thermocouple or mA with electrical isolation</td>
<td>B</td>
<td>0.52 W</td>
<td>9</td>
</tr>
<tr>
<td>AE4_PT_2L</td>
<td>quadruple Pt100 2 wire circuit</td>
<td>F</td>
<td>0.26 W</td>
<td>11</td>
</tr>
<tr>
<td>AE2_PT_3/4L</td>
<td>double Pt100 3/4 wire circuit</td>
<td>G</td>
<td>0.23 W</td>
<td>12</td>
</tr>
<tr>
<td>AE4_f/t1</td>
<td>quadruple frequency input</td>
<td>H</td>
<td>0.30 W</td>
<td>13</td>
</tr>
<tr>
<td>AE4_ma_MUS2</td>
<td>quadruple mA with transmitter supply</td>
<td>C</td>
<td>2.24 W</td>
<td>8</td>
</tr>
<tr>
<td>AE4_ma</td>
<td>quadruple mA with electrical isolation</td>
<td>A</td>
<td>0.22 W</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td><strong>Binary inputs/outputs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BEA6_BIN</td>
<td>six-channel binary input/output</td>
<td>M</td>
<td>0.25 W</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td><strong>Outputs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AA3_mA2</td>
<td>triple 20 mA</td>
<td>N</td>
<td>1.96 W</td>
<td>14</td>
</tr>
<tr>
<td>AA3_mV</td>
<td>triple 10 V</td>
<td>P</td>
<td>0.28 W</td>
<td>15</td>
</tr>
<tr>
<td>BA4_REL</td>
<td>quadruple relay</td>
<td>T</td>
<td>0.79 W</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td><strong>Interfaces</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RS 4853</td>
<td>RS 485, independant from protocol, with bus capability, data rate 187500 Baud</td>
<td>U</td>
<td>0.52 W</td>
<td>18</td>
</tr>
<tr>
<td>RS 232</td>
<td>RS 232, independant from protocol, without bus capability</td>
<td>Y</td>
<td>0.53 W</td>
<td>18</td>
</tr>
<tr>
<td>PROFIBUS1</td>
<td>PROFIBUS DP (Slave)</td>
<td>Z</td>
<td>1.75 W</td>
<td>--</td>
</tr>
</tbody>
</table>

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**  
(see fig. 5)

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

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

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

**AE2_MA/MV-TR: Analog input module 2 x 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”).

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

4 inputs −10...80 mV with electronic potential separation.
**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](image)

**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 teletransmitter Z-19149](image)

**AE4_f/t**: Frequency input module 4 × F

4 frequency inputs

![NAMUR](image)

<table>
<thead>
<tr>
<th>Input</th>
<th>Frequency measurement</th>
<th>Time measurement</th>
<th>Pulse counter</th>
<th>Increment</th>
<th>Increment with zero</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>AIx1</td>
<td>AIx1</td>
<td>AIx1</td>
<td>AIx1</td>
<td>AIx1</td>
</tr>
<tr>
<td>I</td>
<td>AIx2</td>
<td>AIx2</td>
<td>AIx2</td>
<td>AIx3</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>AIx3</td>
<td>AIx3</td>
<td>AIx3</td>
<td>AIx3</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>AIx4</td>
<td>AIx4</td>
<td>AIx4</td>
<td>AIx4</td>
<td></td>
</tr>
</tbody>
</table>

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

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

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

![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.

![Fig. 14 Digital input/output module 6 × binary](Z-19158)

Caution
Maximum switching voltage 250 V AC, maximum switching current 1 A, \( \cos \phi = 1 \).

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 circuits in order to meet the air and creepage distance requirement stated in EN 61010-1.

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.

![Fig. 15 Digital output module 4 × relays](Z-19157)

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

Can only be used on card slot 4.

![Fig. 16 Interface module RS-232](Z-19180)
RS-485: Interface module RS-485 (with electrical isolation) (see fig. 17, 18 and 19)

Can only be used on card slot 4.

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)

**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.

**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)

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 mm².

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.

⚠️ 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)

![Diagram](image)

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

1. Insert bus p.c.b. 1 into backplane 2 from above 2 and align 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. 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. Place the screwdriver with broad 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.

Fig. 25  removing the bus p.c.b.
Z-19170
1 Recess
2 Latch
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

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

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

Tab. 2 Measuring tasks
Upgrading the firmware
(see fig. 28)

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.
3. Readjust the jumper 5.
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

<table>
<thead>
<tr>
<th>Input DIN 19240</th>
<th>Nominal signal</th>
<th>Voltage range</th>
<th>Current range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal level</td>
<td>24 V DC</td>
<td>20,4...28,8 V</td>
<td>approx. 1 mA</td>
</tr>
<tr>
<td>1-signal</td>
<td>24 V DC</td>
<td>13,0...30,2 V</td>
<td>approx. 1 mA</td>
</tr>
<tr>
<td>0-signal</td>
<td>0 V DC</td>
<td>-3,0...5,0 V</td>
<td>&lt; 0,1 mA</td>
</tr>
</tbody>
</table>

Tab. 2 Technical data when configured as input

<table>
<thead>
<tr>
<th>Output DIN 19240</th>
<th>Nominal signal</th>
<th>Voltage range</th>
<th>Current range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal level</td>
<td>24 V DC ext.</td>
<td>20,4...28,8 V</td>
<td>100 mA</td>
</tr>
<tr>
<td>1-signal</td>
<td>24 V DC</td>
<td>13,0...30,2 V</td>
<td>0...max.</td>
</tr>
<tr>
<td>0-signal</td>
<td>0 V DC</td>
<td>-3,0...5,0 V</td>
<td>0...0,2 mA</td>
</tr>
</tbody>
</table>

Tab. 3 Technical data when configured as output

Switching frequency

≤ 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...≥ 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, cosφ = 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±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 ≥ 150 ms at 180 V AC

24 V UC

24 V DC +30 %...-25 % residual ripple ≤ ±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 ≥ 20 ms at 0.85 × U_{nom.}

Power factor cos φ = 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 50082-2 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

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

Case dimensions
Front 96 mm × 96 mm
Installed depth 200 mm

**Panel cutout**

92 mm × 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 mm² for signal lines
up to 2.5 mm² 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

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
</table>
| **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 |
| **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

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
</table>
| 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 |

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
</table>
| **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 |
| **AE4_PT_3/4L** | Inputs 2 for Pt 100 in three-wire or four-wire connection or teletransmitter  
Ranges as module AE4_PT_2L |
| **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 \( \leq 300 \) mA)
Triple current output 0/4...20 mA at 750 \( \Omega \)
Signal resolution
5000 LSB
Load dependence
0.1 % / 100 \( \Omega \).
Output monitoring
Function is configurable

Module AA3-V
Triple voltage output 0/2...10 V \( \geq 5 \) k\( \Omega \)

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 Digi-tric).

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

PROFIBUS
see Operating instructions 42/62-50050

Technical data
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.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Catalog number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Modules</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Note</strong></td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>Bus p.c.b.</td>
<td>61619-4-0346840</td>
</tr>
<tr>
<td><strong>Inputs</strong></td>
<td></td>
</tr>
<tr>
<td>AE4_MV</td>
<td>62619-4-0346280</td>
</tr>
<tr>
<td>quadruple thermocouple</td>
<td></td>
</tr>
<tr>
<td>AE2_MA/MV-TR</td>
<td>62619-4-0346250</td>
</tr>
<tr>
<td>double thermocouple or mA with electrical isolation</td>
<td></td>
</tr>
<tr>
<td>AE4_PT_2L</td>
<td>62619-4-0346255</td>
</tr>
<tr>
<td>quadruple Pt100 in 2-wire connection</td>
<td></td>
</tr>
<tr>
<td>AE_PT_3/4L</td>
<td>62619-4-0346281</td>
</tr>
<tr>
<td>quadruple Pt100 in 3/4-wire connection</td>
<td></td>
</tr>
<tr>
<td>AE4_MA-MUS</td>
<td>62619-4-0346441</td>
</tr>
<tr>
<td>quadruple mA with transmitter supply</td>
<td></td>
</tr>
<tr>
<td>AE4_MA</td>
<td>62619-4-0346254</td>
</tr>
<tr>
<td>quadruple mA with electrical potential separation</td>
<td></td>
</tr>
<tr>
<td>AE4_f/t</td>
<td>62619-4-0346444</td>
</tr>
<tr>
<td>quadruple frequency input</td>
<td></td>
</tr>
</tbody>
</table>
### Binary inputs/outputs

<table>
<thead>
<tr>
<th>Designation</th>
<th>Catalog number</th>
</tr>
</thead>
<tbody>
<tr>
<td>6_BIN_EA</td>
<td>62619-4-0346282</td>
</tr>
<tr>
<td>sextuple binary input/output</td>
<td></td>
</tr>
</tbody>
</table>

### Outputs

<table>
<thead>
<tr>
<th>Designation</th>
<th>Catalog number</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA3_MA</td>
<td>62619-4-0346252</td>
</tr>
<tr>
<td>triple 20 mA</td>
<td></td>
</tr>
<tr>
<td>AA3_V</td>
<td>62619-4-0346253</td>
</tr>
<tr>
<td>triple 10 Volt</td>
<td></td>
</tr>
<tr>
<td>BA4_REL</td>
<td>62619-4-0346263</td>
</tr>
<tr>
<td>quadruple relay with NO (normally open) contact</td>
<td></td>
</tr>
</tbody>
</table>

### Interfaces

<table>
<thead>
<tr>
<th>Designation</th>
<th>Catalog number</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS-485 with electrical isolation for Modbus, H&amp;B instrument bus</td>
<td>62619-4-0346841</td>
</tr>
<tr>
<td>RS-232 with electrical isolation for Modbus, H&amp;B instrument bus</td>
<td>62619-4-0346845</td>
</tr>
<tr>
<td>PROFIBUS electrically isolated</td>
<td>62619-4-0346470</td>
</tr>
<tr>
<td>Bus terminating adapter</td>
<td>62619-4-0346488</td>
</tr>
</tbody>
</table>

### 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
    -Catalog number: 62695-4-0346270
  - Adapter without PC cable
    -Catalog number: 62695-4-0346267
  - IC for Free-style-configuration
    -Catalog number: 62619-4-0346845