4 Technical data

4.1 Technical data Protronic 500/550

Inputs

Common data:
without electronical isolation
Resolution ≤ 0.01 %
Accuracy (referred to nominal range) ≤ 0.2 %
Temperature effects ≤ 0.2 %/10 °C
Hardware input filter limit frequency 7 Hz

Permissible common-mode voltage against device ground
≤ ± 4 V DC

Permissible differential-mode voltage U_{ss} (50 Hz):
50 mV_{ss}

Analog:
Universal input AI01
used for standard signal
0/4...20 mA at 50 Ω ±1 %

Overcurrent/polarity reversal protection
up to ± 40 mA

Linearization, square-rooting
configurable

at 4...20 mA
Line break monitoring with configurable reaction

used for thermocouples

Types	Temperature range	Voltage range	Typical accuracy
J	-200...1200 °C	77.43 mV	≤ 0.2 %
E	-200...1000 °C	85.18 mV	≤ 0.2 %
K	-200...1400 °C	61.53 mV	≤ 0.2 %
L	-200...1000 °C	78.21 mV	≤ 0.2 %
U	-200... 600 °C	40.00 mV	≤ 0.3 %
R	0...1700 °C	20.22 mV	≤ 0.5 %
S	0...1800 °C	18.72 mV	≤ 0.5 %
T	-200... 400 °C	26.47 mV	≤ 0.4 %
B	0...1800 °C	13.24 mV	≤ 0.6 %
D	0...2300 °C	36.92 mV	≤ 0.4 %

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

Internal reference junction
Error limit   ± 1 °C/10 K
Reference temperature   22 °C ± 1 °C
Ambient temperature   0...50 °C

Sensor break monitoring
with configurable reaction

Used for resistance thermometer Pt100 DIN

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

Measuring current
≤ 1 mA

Measuring circuit: 2-wire circuit to 40 Ω line resistance
Line balancing: by software

3-wire circuit: for symmetrical lines up to 3 x 10 Ω

4-wire circuit: sensor short-circuit and break monitoring
with configurable reaction

used for resistance teletransmitter (potentiometer)
Measuring ranges
75...200 Ω; 750...2000 Ω

Measuring current
≤ 1 mA
other data as resistance thermometer

Analog input 2 (AI02)
Input for mA signals, technical data as AI01, but without
electronical isolation.
0...10 V as option (see Code No. 310).

binary:
4 binary inputs/outputs
Direct/reverse function configurable

Input DIN 19240	Rated signal V DC	Voltage range (V)	Current range
Rated level	24	20.4...28.8	approx. 1 mA
1-signal	24	13.0...30.2	approx. 1 mA
0-signal	0	- 3.0... 5.0	< 0.2 mA

Output DIN 19240	Rated signal V DC	Voltage range (V)	Current range
Rated level	24 ext.	20.4...28.8	100 mA
1-signal	24	13.0...30.2	0...max. mA
0-signal	0	- 3.0... 5.0	0...0.15 mA

Switches off in case of overload.
Switching frequency ≤ 8 Hz

Outputs

Analog:
Control output or retransmission
0/4...20 mA at max. 750 Ω, short-circuit and open-circuit proof

Control range
0...≥ 21 mA

Load-dependency
0.1 %/100 Ω

Resolution
≤ 0.01 %

binary:
see inputs

Transmitter feed:

Output voltage
20...24 V DC, 100 mA, short-circuit proof

Load monitoring
Output automatically cuts off on overload

Programmer

10 programs can be stored
each program:
15 segments
Set point in physical units
Segment time 0...99:59:59 hours, four digital tracks

Serial interfaces

TTL interface accessible after removing front panel module for connection to PC via TTL/RS 232 converter (Catalog Number 62695-0346270) with fixed telegram format matching parameter setting and configuration program IBIS-R+ (see Data Sheet 62-6.70 EN).

Bus capable RS 485 interface retrofittable (see modules)

CPU data

Measured value and correction value resolution
≤ 0.01 %
Cycle time
Protronic 500 $\geq$ 45 ms (master setting without add. modules)
Protronic 550 $\geq$ 50 ms (master setting without add. modules)
Data backup
Flash-EPROM; optionally on memory card

Power supply

115 to 230 V AC (90...260 V), 47...63 Hz
Power consumption:
Protronic 500 without modules   9 VA (6 W)
Protronic 550 without modules 12 VA (9 W)
Max. component mounting   + 12 VA (9 W)
Power failure bridging $\geq$ 150 ms at $\geq$ 180 V AC
24 V UC
24 V DC   -25...+30 %,
                               Residual ripple $\leq \pm 3$ V_{ss}
24 V AC   -15...+10 %, 47...63 Hz
Power consumption:
Protronic 500 without modules 10 VA (7 W)
Protronic 550 without modules 13 VA (9 W)
Max. component mounting   + 13 VA (9 W)
Power failure bridging $\geq$ 20 ms at 0.85 x U_{Nenn}

Power factor $\cos\varphi = 0.7$

Fusing
The device does not require any external fusing.

Environmental conditions

Climatic class
3K3 to EN 60721-3-3 (KWF to DIN 40040)
Ambient temperature
0...50 °C
Storage and transport temperature
-20...70 °C
Relative humidity
< 85 %, short-term to 95 %, no condensation
Minimum atmospheric pressure: 80 kPa

Electromagnetic compatibility

Meets protection requirements of EMC directive 89/336/EEC, 5/89

Interference resistance EN 50082-2, March 1995 (i.a. IEC 801)

Interference emission EN 50081-1, 1/92
(referred to: EN 55011, class B)

Industry standard to NAMUR NE 21 T.1, May 1993

Maximum immunity if assembled in metallic panel.

Connection, case, safety

Degree of protection to DIN EN 60529
Front panel: IP 65
Case: IP 20
Terminals: IP 20

Electrical safety

Class of protection 1 to EN 61010 T.1 (VDE 0411 T.1, March 1994)

Clearances and creepage distances as per EN for overvoltage category 3, degree of contamination 2

All inputs and outputs, including the interface and the transmitter feed are functional extra-low voltage circuits to DIN VDE 0100, part 410. The safe isolation of these circuits meets the requirements to DIN VDE 0106, part 101.

Mechanical stress features

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 panel 72 mm x 144 mm
Installed depth 272 mm
Panel cutout
68 mm x 138 mm to DIN 43700
Mounting
in panel
Horizontal high-density construction possible
Vertical spacing 36 mm
Fixing with straining screws at top and bottom

Electrical connections

Plug-in screw terminals
for wire or stranded wire to 1.5 mm^2, coded
Power supply
2.5 mm^2
No shielded cables required – except for interface leads
Mounting orientation
any
Weight
1 kg without modules
each module approx. 40 g,
Relay module approx. 80 g

Scope of supply and delivery

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

Modules

With few exceptions, the modules can be run at all slots. The controllers identify the inserted modules automatically.

Analog inputs

Module AE4_MA for standard signals

4 inputs
0/4...20 mA with electronical isolation

Input resistance approx. 50 Ω

Signal resolution $\leq$ 0.01 % for 20 mA

Permissible common-mode voltage $\leq \pm$ 4 V against device ground

Permissible differential-mode voltage 50 mV$_{ss}$

Destruction proof
Input current < 50 mA
Voltage between input and ground $\pm$ 50 V

Module AE4_MA-MUS
for mA or V signals, integrated transmitter feed
(pay attention to maximum power consumption, page 11)

4 inputs
0/4...20 mA, indiv. switchable to 0/2...10 V with common ground

Input resistance at
mA input: approx. 50 Ω; 10 V input: 20 kΩ

Transmitter feed 20 V, 82 mA

Other data as module 4_MA

Example of an input configuration

Module 4_MV for thermocouples

4 inputs
-10...80 mV, with electronical isolation

Signal resolution
20.000 for -10...80 mV

Input resistance
approx. 5 MΩ

Permissible common-mode voltage $\leq \pm$ 4 V against device ground

Permissible differential-mode voltage 50 mV$_{ss}$

Destruction proof
Voltage at one input $\pm$ 10 V
Voltage between input and ground $\pm$ 50 V

Break monitoring
configurable reaction

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

Linearization configurable like AI01

Module AE2_MA/MV-TR
for mA signals or thermocouple with galvanical isolation

2 inputs with galvanical isolation
0/4...20 mA or -10...80 mV (changeable by means of jumpers)

Input resistance at
20 mA: 25 Ω; -10...80 mV: approx. 5 MΩ

Dielectric strength of input and output leads against each other and against grounded conductor:
Test voltage   500 V AC
Continuous operation   45 V AC

Technical data as modules 4_MV or 4_MA

Module AE4_PT_2L for RTD 2-wires

4 inputs
for Pt100 in 2-wire circuit

Range: 0...400 Ω

Permissible differential mode voltage: : 100 mV$_{ss}$

Signal resolution $\leq$ 0.01 % for 400 Ω

Measuring current $\leq$ 1.5 mA

Measuring range configurable
-200.0...+200.0 °C
0.0...+450.0 °C
-200.0...+800.0 °C

Line balancing by software

Sensor break and short-circuit monitoring
configurable reaction

Module AE2_PT-3/4L for RTD 3-/4-wires

2 inputs
for Pt100 in 3- or 4-wire circuit or potentiometer

Technical data for Pt100 as module **AE4_PT_2_L**

Potentiometer R150: 0...150 Ω

Series resistance: 0...500 Ω

Measuring current < 1.5 mA

Potentiometer R1500: 0...1500 Ω

Series resistance: 0...1500 Ω
Measuring current < 0.5 mA

Binary inputs/outputs

Module BEA6-BIN

6 binary inputs/outputs, galvanical isolation
Function configurable as input or output, direct or reverse action

Input DIN 19240	Rated signal V DC	Voltage range (V)	Current range
Rated level	24	20.4...28.8	approx. 3 mA
1-signal	24	13.0...30.2	approx. 3 mA
0-signal	0	-3.0...5.0	≤ 0.1 mA

Output DIN 19240	Rated signal V DC	Voltage range (V)	Current range
Rated level	24 ext	20.4...28.8	100 mA
1-Signal	24	13.0...30.2	0...max. mA
0-Signal	0	-3.0...5.0	0...0.1 mA

Real time clock

Module BEA4_RTC

Real time clock with date, weekday and time

Daylight saving time and leap year switching

Year2000 compatible

Synchronisation by digital input

Battery buffer or capacitor buffer (> 72 h)

4 digital I/O, galvanical isolated, function configurable as inputs or outputs (technical data see Module BEA6-BIN)

Module BA4_REL
(only usable at slot 6 and 7)

4 relays
with NO contact for max. 250 V AC, 1 A resistive load

Built-in spark-quenching: 0.022 μF + 100 Ω

For max. 250 V, max. 1 A at $\cos\varphi = 0.9$
Contact material AgCdO

Module AE4_F

4 inputs for:

Frequency (1/4 inputs)
  Range 1 input   0...20 kHz
  Range 4 inputs   0...10 kHz
  Signal resolution   1 Hz
Periode (1-4 inputs)
  Range   0...20 s
  Signal resolution   1 ms
Impulses (1-4 inputs)/incremental angle (2 inputs)
  Range: 0...20.000 impulses/cycletime
  min. impulse length: 50 μs
Absolute incremental angle (1 input)
  Range: 0...20.000 impulses
  min. impulse length/distance: 50 μs

Types of input signals:

Max. 2 Namur inputs according to DIN 19234
  Open circuit voltage $U_i = 9.5$ V
  Internal resistance $R_i = 1$ kΩ
  Signal range   L = 0...1.2 mA/H = 2.1...4.0 mA
Max. 4 digital inputs according to DIN 19240 (0/24 V DC)
  Input resistance $R_E > 6$ kΩ
  Signal range   L = -3...5 V/H = 13...20.2 V
Max. 4 digital inputs TTL (0/5 V DC)
  Input resistance $R_E > 6$ kΩ
  Signal range   L = 0...0.8 V/H = 3.5...24 V
Accuracy: ± 0.1 %

Analog outputs

Module AA3_MA

Triple current output 0/4...20 mA at 750 Ω
Signal resolution $\leq$ 0.02 % for 20 mA
Load dependency 0.1 %/100 Ω
Output monitoring, reaction configurable

Module AA3_V

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

Interface modules

Module RS 485 or RS 232
(can only be used in slot 2)

Interface module in accordance with RS 485 or RS 232 specification. Electrically isolated. Not dependent on protocol (the protocol used is configured in the controller. Standard protocol: MODBUS-RTU. The RS 485 module also allows rapid, direct data exchange for lateral communication between up to 6 devices. Thus it is possible to expand the basis for inputs/outputs and also realise redundancy with to controllers in simple fashion. Transmission rate up to 187.5 kBaud (ABB-specific, not published protocol). In case of Modbus RTU up to 38.44 kBaud.

Module PROFIBUS-DP/DPV1 (Slave)

Can be used in all slots 1...7. Module with the full functional capabilities of DIN 19245, parts 1 to 4. Maximum 1 module can be used in the device. Transmission rate up to 1.5 MBaud.
Bus terminating adapter is available as accessory with Order No. 62619-0346488.