

- **1-channel, fixed value, ratio controller**
 - with P, PI, PD or PID characteristic
- **2-channel cascade or override controller**
 - with 1 control output
- **Dead time algorithm (Smith predictor)**
- **Spray-water protected front panel IP 65**
- **Clearly laid-out LCD with color change (red/green)**
 - analog displays for process variable, set point and controller output
- **2 analog inputs, 1 analog output, 4 binary inputs/outputs**
- **Universal input for temperature sensor**
- **Filtering, linearization and square-rooting**
- **Ramp rate for set point and output signal**
- **Programmer and program controller**
- **High and low limitation for set point and output signal**
- **Preconfigured input signal connections**
- **Analog or switching controller output**
 - (two-position controller, step controller, continuous controller, configurable without hardware modification)
- **Self-setting of parameters and parameter control**
- **Access bar for 'Parameter setting' and 'Configuration' by means of password or digital output**
- **Serial interface**
 - for parameter setting and configuration as standard
- **Bus capable RS 485 interfaces**
 - for Modbus or PROFIBUS for connection to higher-level systems, optional



Intelligent,
compact and efficient

Description

The P100 process controller is the basic model of the Protrenic series. It can be operated as a process-specific single unit or in conjunction with higher-level systems.

The front panel distinctly shows the current measured values and operating modes, from a long distance, in illuminated displays. For operation, all information is clearly presented on an LC display.

In the basic model the P100 has ...

... **an universal input**. Without modification of the unit hardware, thermocouples, Pt100 resistance thermometers, and also standard signals 0/4...20 mA can be connected. When non-linearized temperature transmitters are used, linearization is carried out in the controller. The linearization tables for all standard sensors are stored in the unit.

... **an mA input**, which is usable as a disturbance variable or set point input. In step controllers this input can be used for position feedback signal.

... **an mA output** for the positioning signal or other values, e.g. for set point and actual value.

... **four binary inputs/outputs**. These inputs/outputs are user-configurable as inputs or outputs. They are therefore optionally usable as controller outputs or alarm value outputs, but also as inputs for switchovers in the controller (e.g. manual/automatic).

... **an front panel TTL interface** for connection of a parameter setting and configuration PC. This facilitates the necessary adjustments in commissioning.

... **an slot** for connection of an RS 485, RS 232 or PROFIBUS interface module.

Front control panel

The front control panel gives information on the state of the process and permits specifically-targeted intervention in the process sequence. Illuminated displays, which can also be seen from a distance, indicate the process state. Digital displays and clear-text information permit precise reading and accurate setting of set point and correction values.

Programmer

Every unit has a configurable programmer which provides a time-dependent set point. Up to 10 programs with 15 segments each can be stored in the unit.

Controller outputs

Two-position controller, PID characteristic without or with leading contact for high/low/off levelling.

Controller for heating/off/cooling, optionally with two switching or one continuous and one switching output.

Step controller

Continuous controller

Parameter setting

After entering a password, the user accesses the parameter setting level by means of a menu key. At the parameter setting level parameters for the available functions, such as controller gain K_p or time constants, can be set.

Configuration

The menu key accesses the password-protected configuration level. There the standard functions are selected from a list provided in the unit. As an alternative to the user keyboard, the selection can also be made by way of the PC program **IBIS-R**.

This especially simplifies the setting procedure if several units are to be set at the same time (see Data Sheet ENA62-6.70 EN).

The configuration of a P100 can be adopted onto the process controller P500/P550.

Technical data

Inputs

Common data:

without electrical isolation
Resolution $\leq 0.01\%$
Measured error (referred to nominal range) $\leq 0.2\%$
Temperature effects $\leq 0.2\%/10\text{ }^{\circ}\text{C}$
Hardware input filter limit frequency 7 Hz

Permissible common-mode voltage against device ground
 $\leq \pm 4\text{ V DC}$

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

Analog:

Universal input AI01

used for standard signal

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

Overcurrent/polarity reversal protection

up to $\pm 40\text{ mA}$

Linearization, square-rooting

configurable

at 4...20 mA

Line break monitoring with configurable reaction

used for thermocouples

Types	Temperature range	Voltage range	Typical meas. error
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

150 Ω, (75...200 Ω);
1500 Ω (750...2000 Ω)

Measuring current: ≤ 1 mA
other data as resistance thermometer

Universal input 2 (AI02)

Input for mA signals, technical data as AI01, but without
electrically isolation.

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

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 %

Only short version (210 mm) after Q2/2002:

Analog output is electrical isolated

binary:

see inputs

Transmitter feed

Output voltage

20...24 V DC, 50 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, 4 control signal tracks

CPU data

Measured value and correction value resolution

≤ 0.01 %

Cycle time

≥ 100 ms

Data backup

Flash-EPROM

Power supply

Short version (210 mm) after Q2/2002

115...230 V AC (90...260 V), 47...63 Hz

Power consumption
P100 without module 7.5 VA (5 W)
P100 with module max. 11.3 VA (7.5 W)
Power failure bridging ≥ 120 ms at ≥ 180 V AC

24 V UC

24 V DC
-25 %...+30 %; 47...63 Hz
Residual ripple ≤ 3 V_{ss}
-15 %...+10 %; 47...63 Hz
24 V AC
Power consumption
P100 without module 9 VA (6 W)
P100 with module max. 12.8 VA (8.5 W)
Power failure bridging ≥ 20 ms at U ≥ 0.85 x U_{Nenn}
Power factor cosφ = 0.7

Safety

The device needs no external safety of power supply

Environmental conditions

Climatic class: 3K3 to EN 60721-3-3

Ambient temperature: 0...50 °C

Storage and transport temperature: -20...70 °C

Relative humidity

< 85 %, short-term to 95 %, no condensation

Minimum air pressure

80 kPa

Electromagnetic compatibility

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

Interference resistance EN 61326, May 2004

interference emission EN 61000-6-3, June 2005

(referred to: EN 55011, August 2003, class B)

Industry standard to NAMUR NE 2, February 2004

Maximum immunity if assembled in metallic panel

Connection, case, safety

Degree of protection to DIN EN 60529

Front panel: IP 65

Case: IP 30

Terminals: IP 20

Electrical safety

Meets requirements to EN 61010-1 (VDE 0411, part 1) August 2002,

Class of protection 1

Clearances and creepage distances as per EN for overvoltage

category 3, degree of contamination 2

All inputs and outputs, including the interface are functional extra-low

voltage circuits to DIN VDE 0100 part 410.

Mechanical stress capabilities

to EN 60068-2-27, March 1995 and EN 60068-2_6, May 1996

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 short version: 210 mm

Panel cutout

68 mm x 138 mm to DIN IEC 61554

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 mm², coded; power supply: 2.5 mm²

No shielded cables required - except for interface leads

Mounting orientation

any

Weight

1 kg without modules;

interface module approx. 40 g

Scope of supply and delivery

2 straining screws, operating manual and

plug-in screw terminals

Serial interfaces

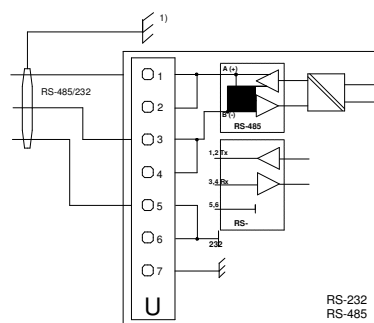
TTL interface accessible after removing front panel module for connection to PC via TTL/RS 232 converter (Catalog No. 62695-0346270) with fixed telegram format matching parameter setting and configuration program **IBIS-RS** (see Data Sheet 62-6.70 EN).

Interface module

Modul RS 485 or RS 232

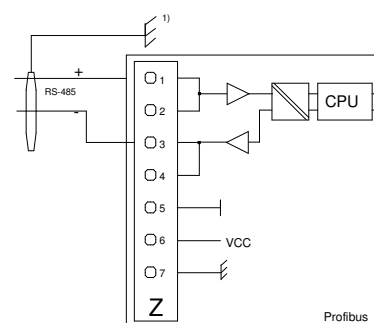
Interface module as per RS 485 or RS 232 specification. Electrically isolated.

The used protocol is MODBUS-RTU.



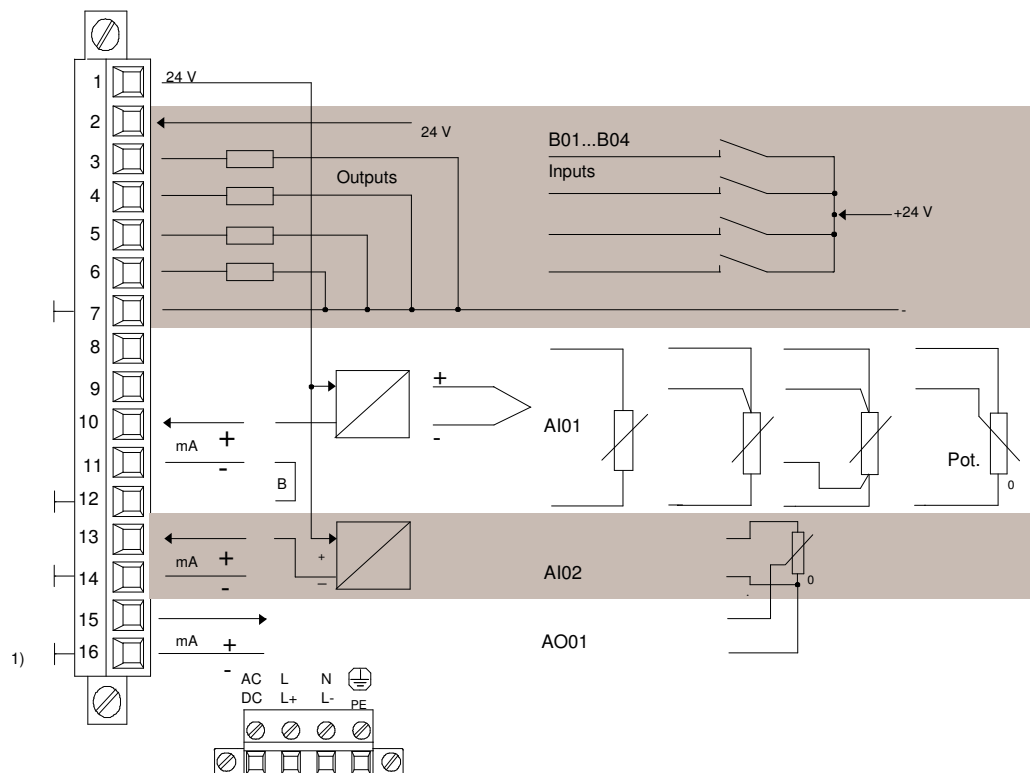
Module PROFIBUS

Module with the full functionality acc. to DIN 19245, parts 1 to 4



1) Shield connection plate

Connection diagram



AI01	Universal input
AI02	Additional current input
B01...B04	Binary inputs or outputs, Function configurable
AO01	Analog output 1 (20 mA)
24 V	Feed for 2-wire transmitter and/or binary inputs and outputs
B	Jumper only power feed to transmitter from terminal 1

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Ordering information

	Catalog No.	Code		
Standard model Protrenic 100 pre-configured as single-channel continuous controller	V62611A-			
Power supply 115-230 V AC 24 V UC				
Front colours Grey, RAL 7032 with keys in yellow, green and grey				
Attached manual German, English on CD				

Special features

	Code		
Configuration entered at position of current order Input 2 (AE02) for 0/2...10 V instead of 0/4...20 mA	301 310		

Retrofit modules

	Catalog No.	Code		
Interfaces				
RS 485	RS 485 for Modbus-RTU Baudrate up to 187.500 Baud (including shield connection plate)	62619-0346257		
RS 232	RS 232 for Modbus-RTU (including shield connection plate)	62619-0346456		
PROFIBUS ⁴⁾	RS 485 for PROFIBUS DP/DPV1 (slave) (including shield connection plate)	62619-0346470		
Accessories				
GSD Device master data file for PROFIBUS DP	62695-3601109			
Bus terminating adapter for PROFIBUS DP	62619-0346488			
Passive display unit (dummy)	62608-9760231			

Ordering information

List configuration	Catalog No.	Code		
Customer-specific configuration as separate item (please enclose task definition in clear text)	V62675A-			
List configuration List configuration Adopted from previous order (see Code No. 302)				
Delivery Stored in unit (see Code No. 301) 3.5 inch. disk by E-Mail				
Configuration Entered at position of current order Adopted from order number and position of previous order	(clear text) (clear text)	301 302		

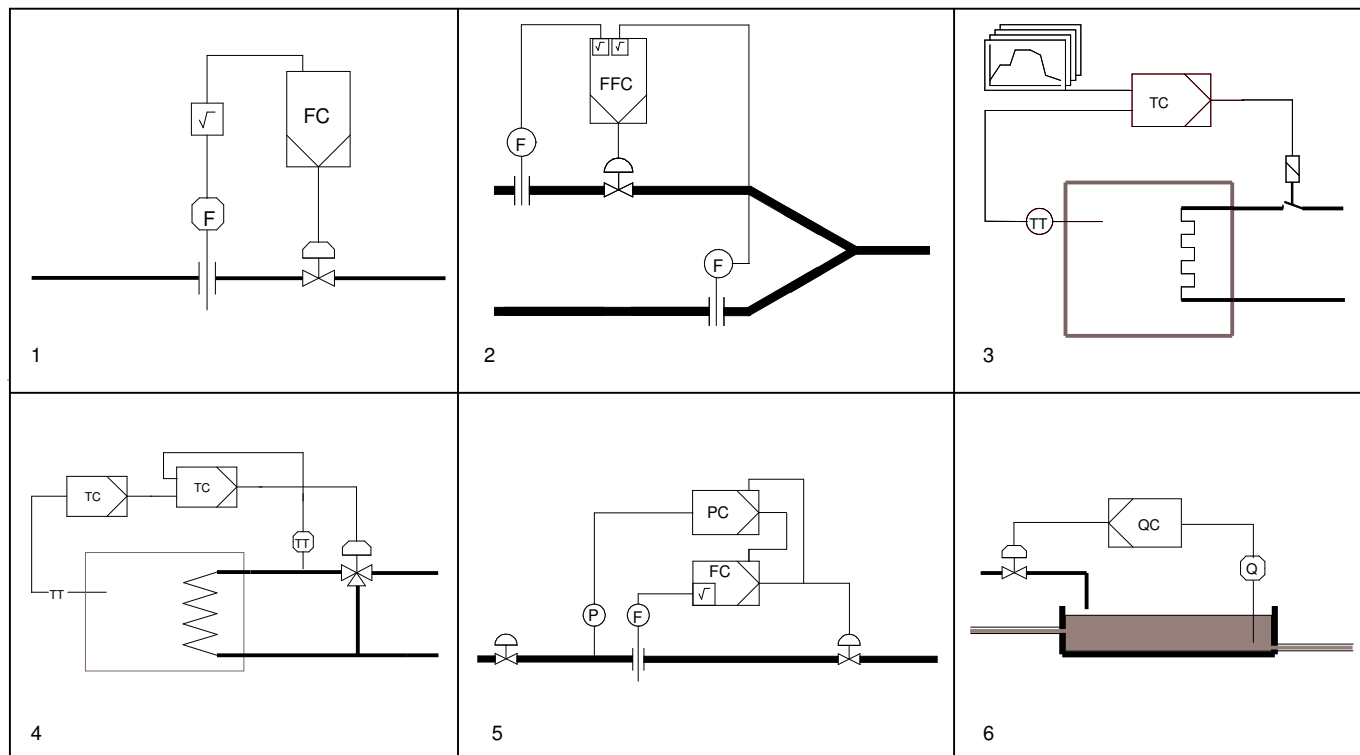
Documentation on the configuration is in German (1 copy is provided); other languages on request!

Special features

	Catalog No.	Code		
Spare parts Protrenic 100				
CPU circuit board	with 115-230 V AC power supply with 24 V UC power supply	62608-0346343 62608-0346344		
Display unit Protr. 100/500 (Grey, RAL 7032 with keys in yellow, green and grey)		62619-9760225		
Casing (for Protrenic 100 short, 210 mm)		62608-0346345		
EPROM set		62608-0346325		

(Further spare parts on request)

Applications



- 1 Fixed value control, e.g. flow control
- 2 Ratio control or summation control
- 3 Program control with up to 10 programs
- 4 Cascade control
- 5 Override control
- 6 Neutralization control (controlled system with dead time, controller with Smith predictor)

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