

EWM-PQ-AA

DIGITAL CARD

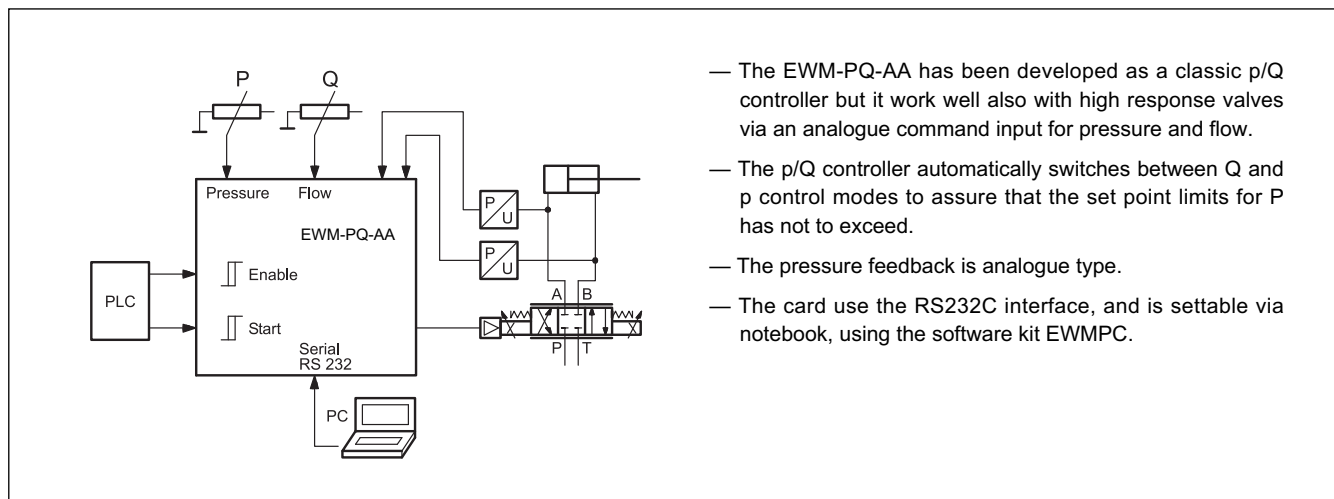
FOR PRESSURE/FLOW CONTROL

IN CLOSED LOOP SYSTEMS

SERIES 10

RAIL MOUNTING TYPE:
DIN EN 50022

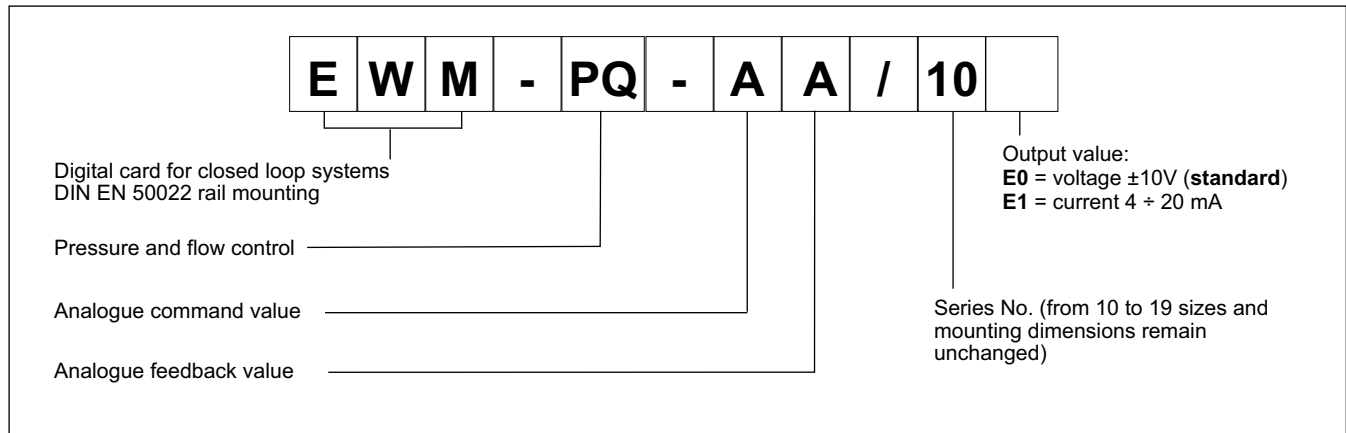
OPERATING PRINCIPLE



TECHNICAL CHARACTERISTICS

Power supply	V DC	12 ÷ 30 ripple included external fuse 1,0 A
Current consumption	mA	100
Command value	V mA	0 ÷ 10 ($R_I = 33 \text{ k}\Omega$) 4 ÷ 20 ($R_I = 250 \text{ }\Omega$)
Speed input (Q input)	V	± 10 ($R_I = 90 \text{ k}\Omega$)
Feedback value	V mA	0 ÷ 10 ($R_I = 33 \text{ k}\Omega$) 4 ÷ 20 ($R_I = 250 \text{ }\Omega$)
Output value: - E0 version - E1 version	V mA	± 10 (max load 5 mA) 4 ÷ 20 (max load 390 Ω)
Sensor resolution for command and feedback value, and for speed (Q) input	%	0,012
Interface		RS 232 C
Electromagnetic compatibility (EMC): according to 89/336 CEE standards		Emissions EN 61000-6-2:8/2002 Immunity EN 61000-6-3:8/2005
Housing material		thermoplastic polyammide PA6.6 combustibility class V0 (UL94)
Housing dimensions	mm	120 (d) x 99(h) x 23(w)
Connector		4x4 poles screw terminals - PE direct via DIN rail
Operating temperature range	°C	-20 / +60
Protection degree		IP 20

1 - IDENTIFICATION CODE



For p/Q control a dynamic zero-overlapped control valve is necessary. If the B-side of the cylinder can not be relieved, pressure in both cylinder sides has to be measured.

The cylinder can be driven in both directions (flow control in open loop) with the analogue Q command input value ($\pm 10V$) and limits the max velocity. The pressure limitation control function is only active with a positive Q signal with a closed loop function.

The P command value pre-sets the max differential pressure. If this pressure (or force) exceeds, the controller reduces the output signal to the valve (also in the negative range), so that the preset pressure will be kept. To go backwards for keeping the force is possible.

The process is controlled by different digital input and output.

2 - FUNCTIONAL SPECIFICATIONS

2.1 - Power supply

This card is designed for 12 to 30 VDC (typical 24 V) of power supply. This power supply must correspond to the actual EMC standards.

All inductivities at the same power supply (relays, valves) must be provided with an over voltage protection (varistors, free-wheel diodes).

It is recommended to use a regulated power supply (linear or switching mode) for the card supply and for the sensors.

2.2 - Electrical protections

All input and output are protected against overvoltage and have filters.

2.3 - Digital input

The card accepts digital input. The digital input must have a voltage from 12 to 24 V with current $< 0,1A$. See the block diagram at paragraph 8 for the electric connections.

Low level $< 4V$ High level $> 12V$

2.4 - Command input

The command input it's analogue type and must be $0 \div 10V$ ($R_i = 33k\Omega$) or $4 \div 20$ mA ($R_i = 250\Omega$)

2.5 - Input feedback values

The card accepts analogue feedback input. The feedback value must be $0 \div 10V$ ($R_i = 33k\Omega$) or $4 \div 20$ mA ($R_i = 250\Omega$).

2.6 - Command speed (Q) input

The speed input it's analogue type and must be $\pm 10V$ ($R_i = 90k\Omega$).

2.7 - Output values

The card is designed for two type of output values, voltage $\pm 10V$ with max load 5 mA (E0 version) or current $4 \div 20$ mA with max load 390Ω (E1 version); standard output value is E0 type.

2.8 - Digital Output

Two digital output are available, INPOS and READY, and their signals are displayed from the leds.

Low level $< 4V$ High level $> 10V$ (I max 50 mA with load of 200Ω)

3 - LED SIGNALS

There are two leds on the card:

GREEN: Shows if the card is ready.

ON - The card is supplied or ENABLE is inactive.

OFF - No power supply

FLASHING - Failure detected (internal or $4 \div 20$ mA)
only if SENS parameter is ON

YELLOW: Is the signal of the control error monitoring.

ON - No control error

OFF - Error detected, depending of a parameter error.

4 - ADJUSTMENTS

On the EWM card family, the adjustment setting is possible only via software. Connecting the card to the PC, the software automatically recognises the card model, and shows a table (see example on next page) with all the available parameters, with their commands, the default setting, the measuring unit and an explanation of the command and its uses.

The parameters changes depending on the card model, and they are fully described in the *Overhaul manual*.



EXAMPLE OF PARAMETERS TABLE

Commands	Parameter	Defaults	Units	Description
ain:i a b c x	i= W X1 X2 a= -10000... 10000 b= -10000... 10000 c= -10000... 10000 x= V C	: 10000 : 10000 : 0 : V	- - 0,01% -	Analogue output selection. W , X1 and X2 for the inputs and V = voltage, C = current. With the parameters a , b and c the inputs can be scaled (output = a / b * (input - c)). Because of the programming of the x-value (x = C) the corresponding input will be switched over to current automatically.
a:i x	i= UP DOWN x= 0..60000	:UP 100 :DOWN 100	ms ms	Ramp times for pressure UP and DOWN.
c:i x	i= P I D T1 IC :P x= 0... 10000 :I x= 2... 2050 :D x= 0... 120 :T1 x= 0... 100 :SC x= 0... 10000	:P 50 :I 400 :D 0 :T1 1 :SC 10000	0,01 ms ms ms 0,01%	PID-compensator for pressure limitation: P -gain, 50 corresponded with a nominal gain of 0,5. I -gain, integrator time in ms, >2010 for deactivation. D -gain, T1 -time for damping of the D part. SC command signal scaling (direct control of the output).
error x	x= 2... 2000	200	0,01%	Range for the error window (status output).
foffset	X= -5000... 5000	0	0,01%	The offset will be added to the actual value.
pol x	x= + -	+	-	For changing the output polarity. All A and B adjustments depend on the output polarity. The right polarity should be defined first.
sens x	x= on off	on	-	Activation of the sensor and internal failure monitoring.
save	-	-	-	Storing the programmed parameter in E ² PROM.
loadback	-	-	-	Reloading the parameter from E ² PROM in working RAM
help	-	-	-	Help to the commands, for terminal programs only
para	-	-	-	Parameter list with programmed data, for terminal programs only
din	-	-	-	Status of the digital inputs.
w, x, xw, u, v	-	-	-	Actual signals: command value, actual value, process data, control divergence and reference value.
default	-	-	-	Preset values will be set.

5 - INSTALLATION

The card is designed for rail mounting type DIN EN 50022.

The wiring connections are on the terminal strip located on the bottom of the electronic control unit. It is recommended to use cable sections of 0.75 mm², up to 20 m length and of 1.00 mm² up to 40m length, for power supply and solenoid connections on version M2. For other connections it is recommended to use cables with a screened sheath connected to earth only on the card side.

NOTE 1

To observe EMC requirements it is important that the control unit electrical connection is in strict compliance with the wiring diagram.

As a general rule, the valve and the electronic unit connection wires must be kept as far as possible from interference sources (e.g. power wires, electric motors, inverters and electrical switches).

In environments that are critical from the electromagnetic interference point of view, a complete protection of the connection wires can be requested.

6 - SOFTWARE KIT EWMPC/10 (code 3898401001)

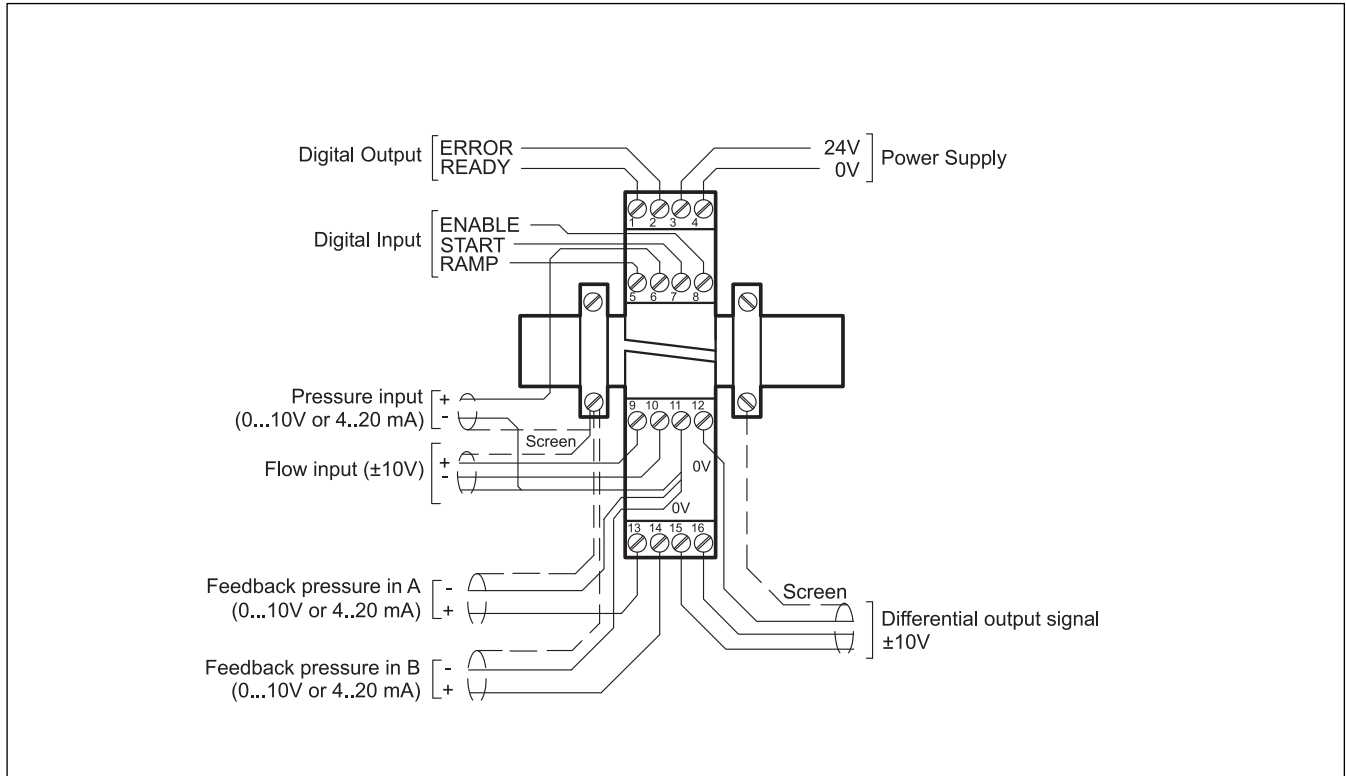
The software kit includes a USB cable (2.70 mt lenght) to connect the card to a PC or notebook and the software.

During the identification all information are read out of the module and the table input will be automatically generated.

Some functions like baud rate setting, remote control mode, saving of process data for later evaluation are used to speed up the installation procedure.

The software is compliant with Microsoft XP[®] operating systems.

7 - WIRING DIAGRAM



DIGITAL INPUT AND OUTPUT

- PIN 1** READY output:
General operationality, ENABLE is active and there is no sensor error (by use of 4... 20 mA sensors). This output corresponds with the green LED.
- PIN 2** STATUS output:
Monitoring of the control error (ERROR). Depending on the ERROR command, the status output will be deactivated, if the control difference is greater then the adjusted window.
- PIN 5** RAMP- input:
The ramp times for pressure up and down will be activated.
- PIN 7** START input:
The controller is active; the external analogue command signal is taken over as command value.
- PIN 8** ENABLE input:
This digital input signal initializes the application. The analogue output is active and the READY signal indicates that all components are working correctly. The Q command signal is controlling the output.

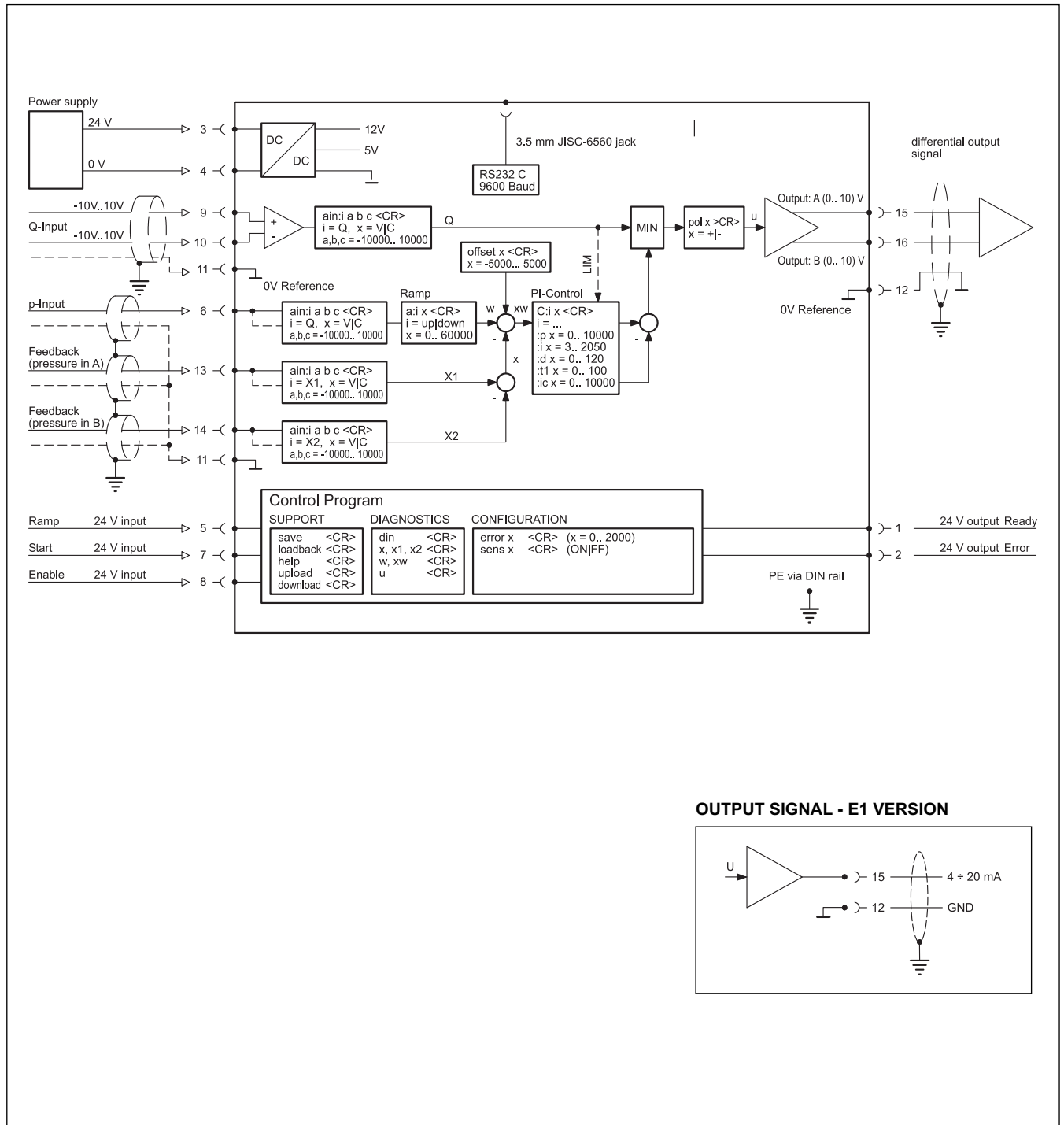
ANALOGUE INPUT

- PIN 6** Command pressure / force (W)
range 0 ÷ 100% corresponds to 0 ÷ 10V or 4 ÷ 20 mA
- PIN 9/10** External command speed (Q)
range ±100 % corresponds to ± 10 V
- PIN 13** Actual (feedback) value (X1)
range 0 ÷ 100% corresponds to 0 ÷ 10V or 4 ÷ 20 mA
- PIN 14** Actual (feedback) value (X2)
range 0 ÷ 100% corresponds to 0 ÷ 10V or 4 ÷ 20 mA

ANALOGUE OUTPUT

- PIN 15/16** Differential output (U) ± 100% corresponds to ± 10V differential voltage,
optionally (E1-version) current output ±100% corresponds to 4 ÷ 20 mA (PIN 15 to PIN 12)

8 - CARD BLOCK DIAGRAM

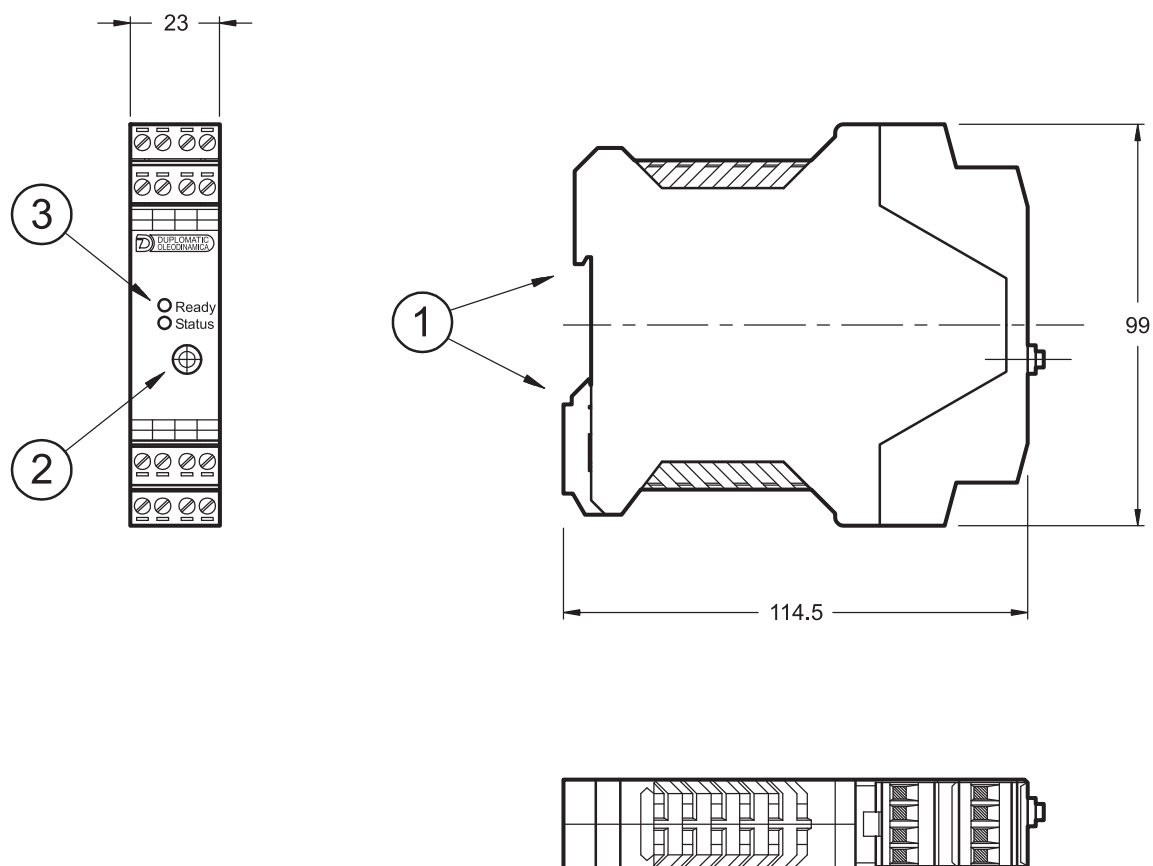




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9 - OVERALL AND MOUNTING DIMENSIONS



1	DIN EN 50022 rail type fastening
2	Plug for connection PC cable
3	LED for OUTPUT signal



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