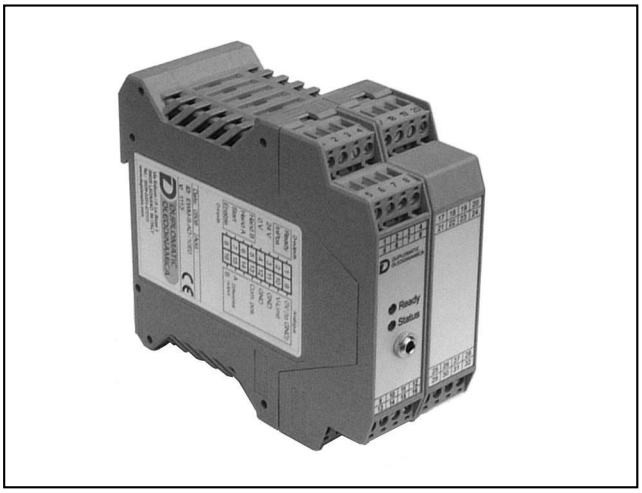


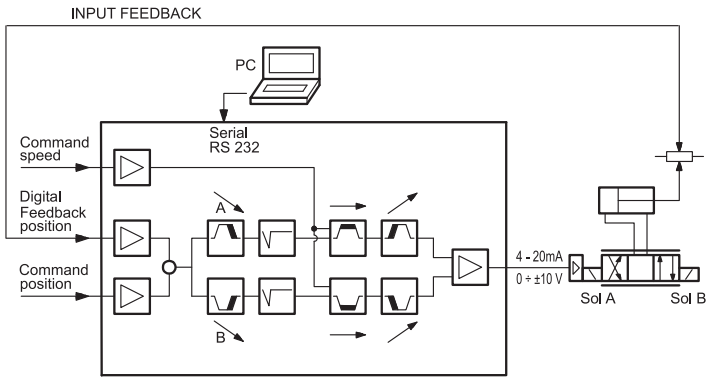
EWM-S-AD

ANALOGUE POSITIONING CARD FOR STROKE CONTROL IN CLOSED LOOP SYSTEMS WITH DIGITAL FEEDBACK AND SET-UP

SERIES 10

RAIL MOUNTING TYPE:
DIN EN 50022

OPERATING PRINCIPLE



— This card has been developed for closed loop positioning of hydraulics actuators where an high accuracy is needed, using a digital sensor with SSI interface to measure the position.

— Typical applications are positioning drives. The card controls a directional proportional valve with integrated electronics. The output value can be ±10V (E0) or 4 ÷ 20 mA current (E1). Internal function and failure are monitored with two digital output easy to read.

— The positioning control loop can be made in two ways: stroke depending deceleration or NC mode.

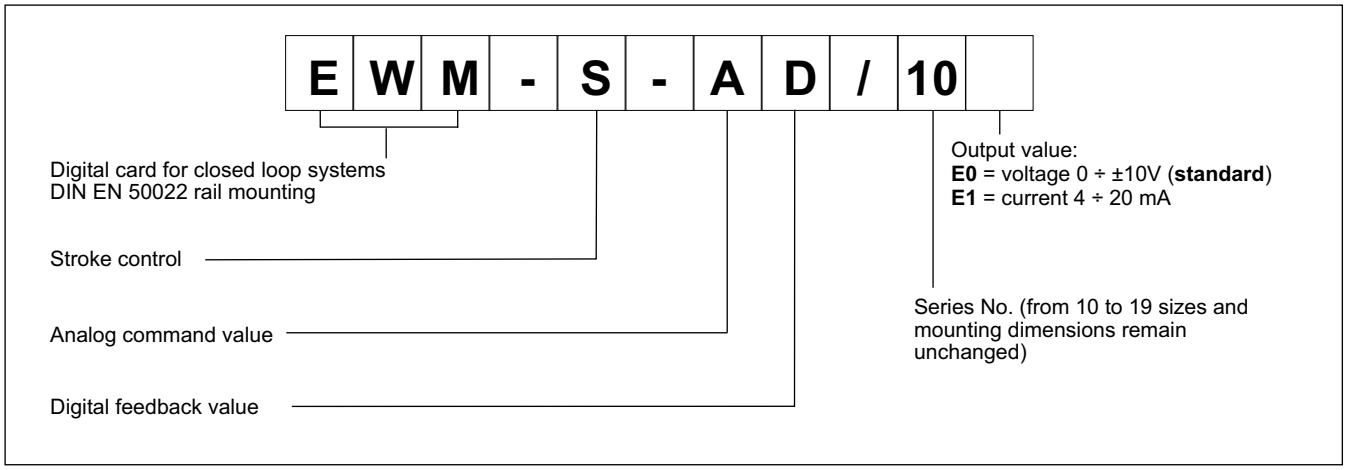
— The card allows an optimal use of overlapped and zero overlapped proportional valves.

— The card use the RS232C interface, and is settable via notebook, using the kit (EWMPC).

TECHNICAL CHARACTERISTICS

Power supply	V DC	12 ÷ 30 ripple included - external fuse 1,0 A
Current consumption	mA	400 + sensor power consumption
Command value	V mA	0 ÷ 10 (R_I = 33 kΩ) 4 ÷ 20 (R_I = 250 Ω)
Command speed	V	0 ÷ 10 (R_I = 33 kΩ)
Feedback value	SSI	digital sensor with any SSI interface
Output value: - E0 version - E1 version	V mA	±10 (max load 5 mA) 4 ÷ 20 (max load 390 Ω)
Position accuracy	%	± 2 bits of sensor resolution
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 46(w)
Connector		4x4 poles screw terminals - PE direct via DIN rail
Operating temperature range	°C	-20 / +60
Protection degree		IP 20

1 - IDENTIFICATION CODE

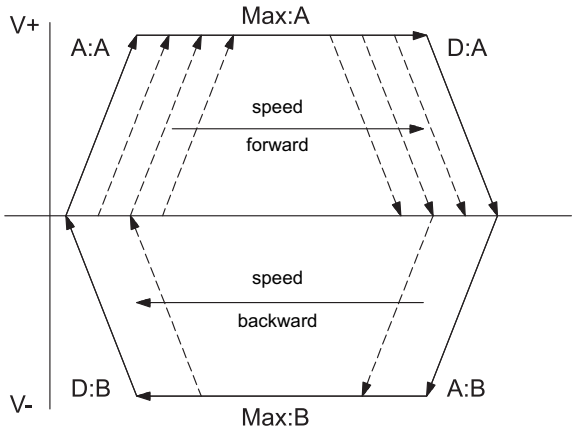


This module supports the simple point-to-point positioning with hydraulic drives. Two operating mode can be selected: stroke depending deceleration, that means the control gain will be adjusted with the parameters D:A and D:B, and NC mode, where the position value is generated from the following error.

The deceleration characteristics can be defined with the parameter CTRL linear (LIN) or nearly square root (SQRT1). By use of standard proportional valves, SQRT1 has to be chosen normally.

The positioning accuracy will almost be limited by the resolution of the transducer, and by the right size of the hydraulic valve. Therefore, the correct valve selection is the most important point. Additionally, two contradictory requirements (short positioning time and high accuracy) have to be considered in the system design.

flow (volume) P→A and B→T



The actuator position is measured by a digital transducer and compared with a specified target position. The target position is adjusted with an external potentiometer or preset by an analog input from an external controller (PLC). It's possible to define the axis speed by the input speed.

2 - FUNCTIONAL SPECIFICATIONS

2.1 - Power supply

This card is designed for 12 to 30 VDC (typical 24 V) of a 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 the sensors.

2.2 - Electrical protections

All inputs and outputs 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.

2.4 - Command value

The card accepts analogue input. The command value must be 0 ÷ 10 V (R_I = 33 kΩ) or 4 ÷ 20 mA. (R_I = 250 kΩ).

2.5 - Command speed

The card accept analog input. The command speed must be 0 ÷ 10 V (R_I = 33 kΩ).

2.6 - Input feedback values

The card accepts feedback input from a digital sensor with any SSI interface. The sensor parameters are settable via software (see parameters table).

2.7 - Output values

The card is designed for two type of output values, voltage ±10V (E0 version) or current 4 ÷ 20 mA (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.

3 - LED FUNCTIONS

There are two LED on the card: GREEN and YELLOW.

GREEN: Shows if the card is ready.

ON - The card is supplied
OFF - No power supply
FLASHING - Failure detected (internal or 4… 20 mA).
Only if SENS = 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 below) 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*.

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 mm^2, up to 20 m length and of 1.00 mm^2 up to 40m length, for power supply. For other connections it is recommended to use cables with a screened sheath connected to earth only on the card side.

EXAMPLE OF PARAMETERS TABLE

Commands	Parameter	Defaults	Units	Description
ain:i a b c x	i= W|X a= -10000… 10000 b= -10000… 10000 c= -10000… 10000 x= V|C	: 10000 : 10000 : 0 : V	- - 0,01% -	Analogue output selection. **W** and **X** 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= A|B x= 1… 2000	:A 100 :B 100	ms ms	Acceleration time depending on direction. **A** indicates analogue output 15 and **B** indicates analogue output 16. Normally **A** = flow p-A, B-T and **B** = flow P-B, A-T.
d:i x	i= A|B x= 10… 10000	:A 2500 :B 2500	0,01% 0,01%	Deceleration stroke depending on direction. The loop gain is calculated by the deceleration stroke. The shorter the higher. In case of instabilities longer deceleration stroke will be sufficient.
ctrl x	x= lin|sqrt1 |sqrt2	sqrt1	-	Selection of the control function: **lin** = standard linear P-control, **sqrt1** = progressive time optimized deceleration curve **sqrt2** = sqrt1 with a higher gain in position
ssistroke x	X= 2… 3000	500	mm	Sensor stroke.
ssioffset X	X= -30000… 30000	0	0,01 mm	Zero point adjustment of the sensor.
ssires X	X= 10… 1000	1000	ink/mm	Resolution of the sensor.
ssibits x	X= 8… 31	24	-	Bits of the data word.
ssicode x	X= GRAY|BIN	GRAY	-	Format of the data word.
ssipol x	X= +|-	+	-	Sensor polarity, attention: SSIOFFSET has to be set to compen-sate negative position values.
velo x	x= 1000… 10000	10000	0,01%	Internal limitation of the velocity. This limitation is active when command vs = off.
vs x	x= ext|int	int	-	Activates the external velocity limitation with the parameter EXT.
vramp x	x= 1… 2000	50	ms	Ramp time for velocity input.
vmode x	x= on|off	off	-	Activation of the NC-generator. The command position is generated by a velocity profile (internal or external preset of v). The axis drives more or less speed controlled.
th x	x= 100… 60000	5000	ms	Stroke time for 100% velocity and 100% nominal sensor stroke.
hand:i x	i= A|B x= -10000… 10000	:A 3300 :B -3300	0,01% 0,01%	Degree of output signal in manual mode
min:i x	i= A|B x= 0… 5000	:A 0 :B 0	0,01% 0,01%	Deadband compensation of positive overlapped proportional valves. Good adjustment will increase positioning accuracy.
max:i x	i= A|B x= 5000… 10000	:A 10000 :B 10000	0,01% 0,01%	Maximum output range for adapting control range to maximum flow range.
trigger x	x= 0… 2000	200	0,01%	Point to activate the deadband compensation (**min**). Also useful for reduced sensitivity in position with control valves.
inpos x	x= 2… 2000	200	0,01%	Range for the InPos signal (status output).
offset x	x= -2000… 2000	0	0,01%	The offset will be added to the command 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 E²PROM.
loadback	-	-	-	Reloading the parameter from E²PROM in working RAM
w, x, xw, u ,v	-	-	-	Actual signals: command value, actual value, process data, control divergence and reference value.
default	-	-	-	Preset values will be set.

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)

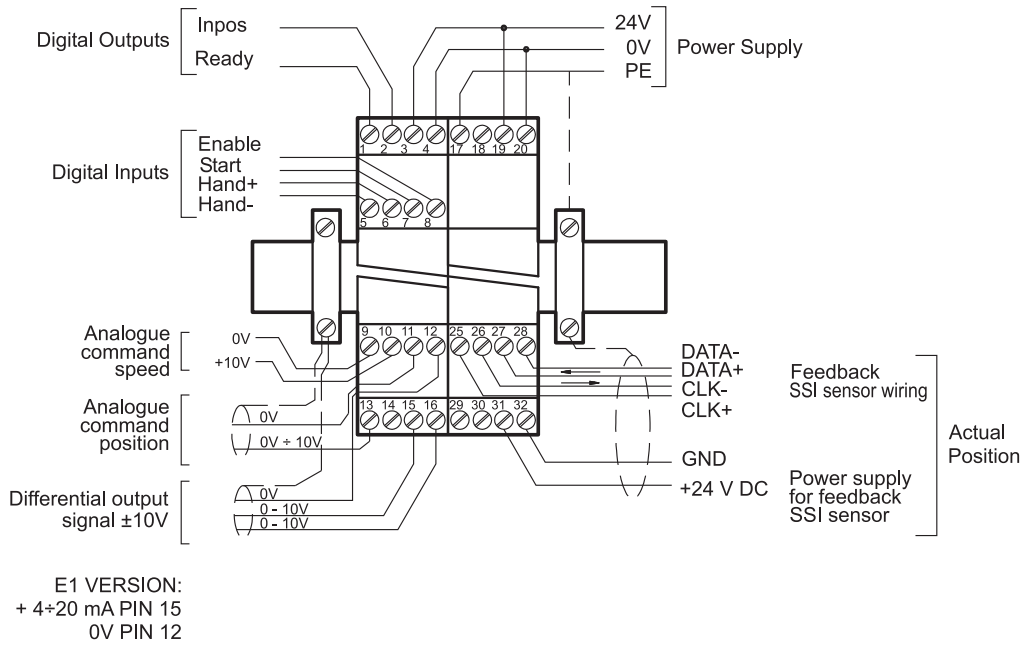
The software kit comprising a USB cable (2.70 mt lenght) to connect the card to a PC or notebook and the software.

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 (INPOS). Depending on the INPOS command, the status output will be deactivated, if the position difference is greater then the adjusted window.
The output is only active if START = ON.

PIN 5 — HAND- input
Hand mode (START = OFF), driving with the programmed velocity. After deactivation the actual value is taken over as command position.

PIN 6 — HAND+ input:
Hand mode (START = OFF), driving with the programmed velocity. After deactivation the actual value is taken over as command position.

PIN 7 — START input:
The positioning controller is active; the external analogue command position is taken over as command value. If the input is switched off during movement, the command position is set to the actual position plus a defined emergency deceleration stroke

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. Target position is set to actual position and the drive is closed loop controlled.

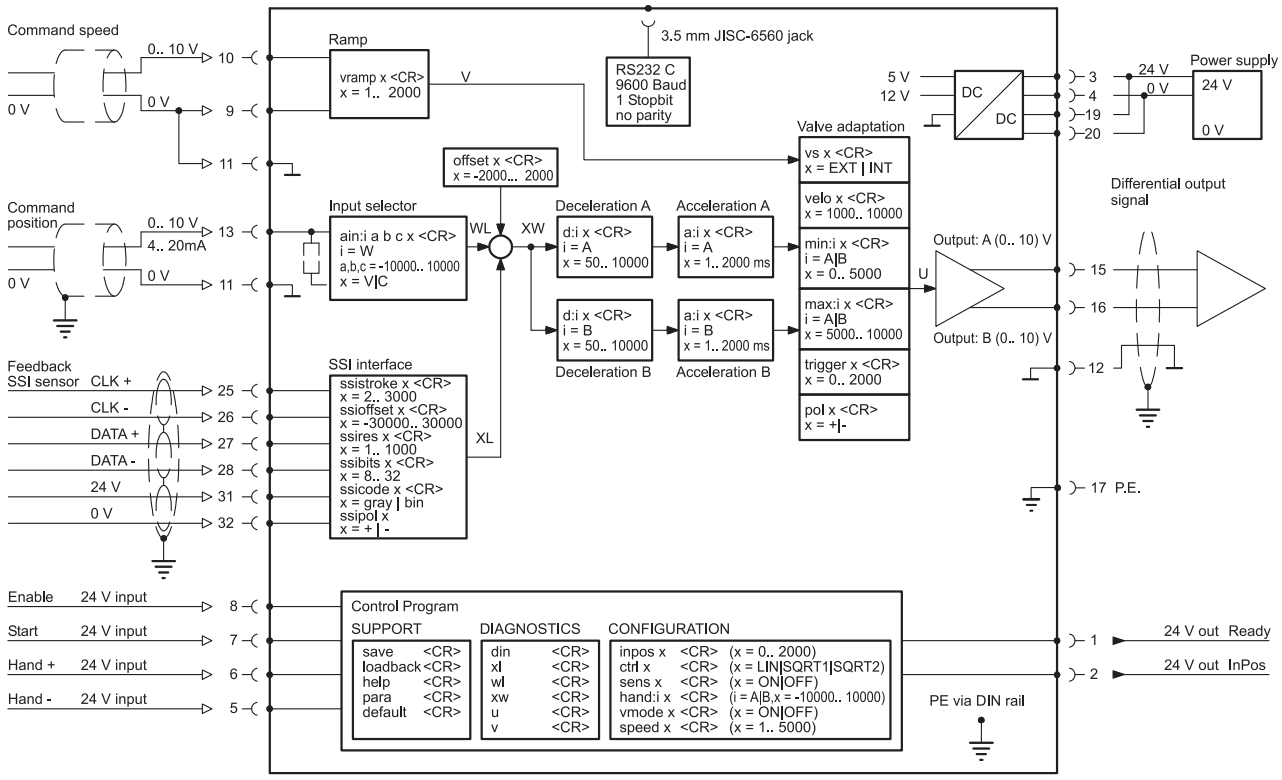
ANALOGUE INPUT AND OUTPUT

PIN 9/10 — External command speed (V), range 0 ÷ 100 % corresponds to 0 ÷ 10 V

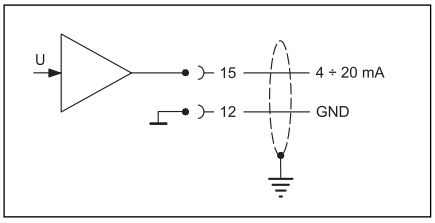
PIN 13 — Command position (W), range 0 ÷ 100% corresponds to 0 ÷ 10V or 4 ÷ 20 mA

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 11)

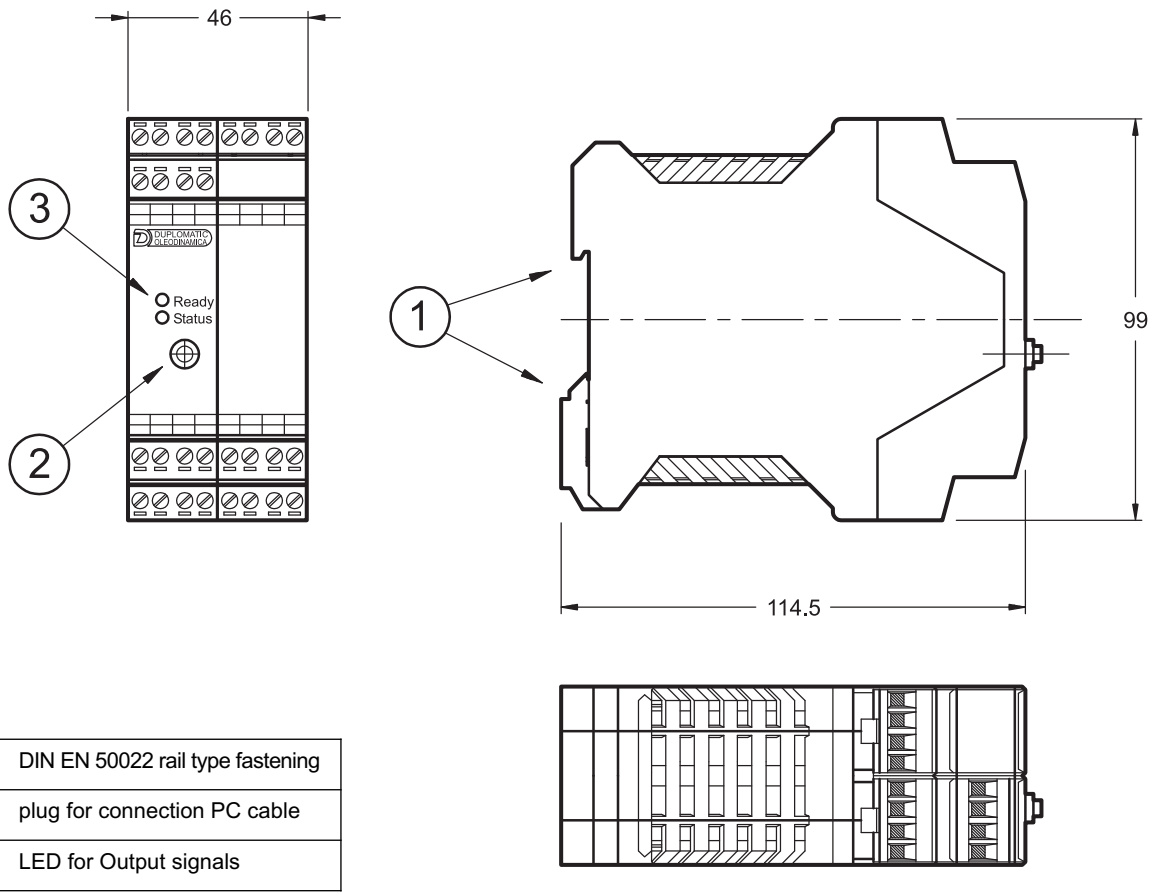
8 - CARD BLOCK DIAGRAM



OUTPUT SIGNAL - E1 VERSION



9 - OVERALL AND MOUNTING DIMENSIONS



1	DIN EN 50022 rail type fastening
2	plug for connection PC cable
3	LED for Output signals

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