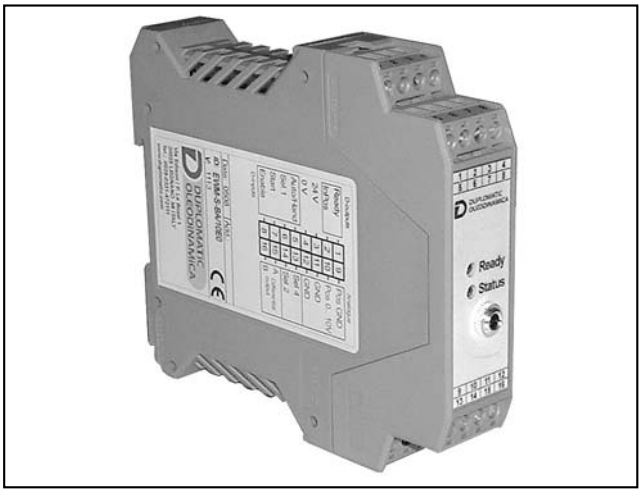


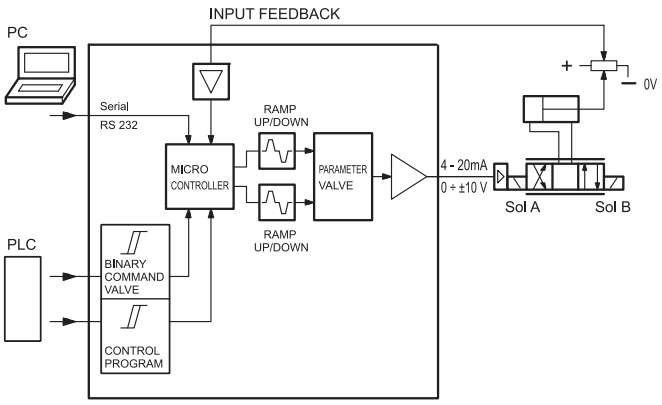
# EWM-S-B*

## DIGITAL CARD FOR STROKE CONTROL IN CLOSED LOOP SYSTEMS

### SERIES 10

### RAIL MOUNTING TYPE: DIN EN 50022

## OPERATING PRINCIPLE




— This card is designed for an easy stroke control of hydraulic actuators connected to a simple PLC with only I/O functions. The target position can be selected by a binar input up to 8 different position.

— Typical applications are positioning drives, handling axis and fast transportable drives (adaptation of non-linear valve characteristics).The card controls a directional proportional valve with integrated electronics. As option, an integrated power amplifier is available.

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

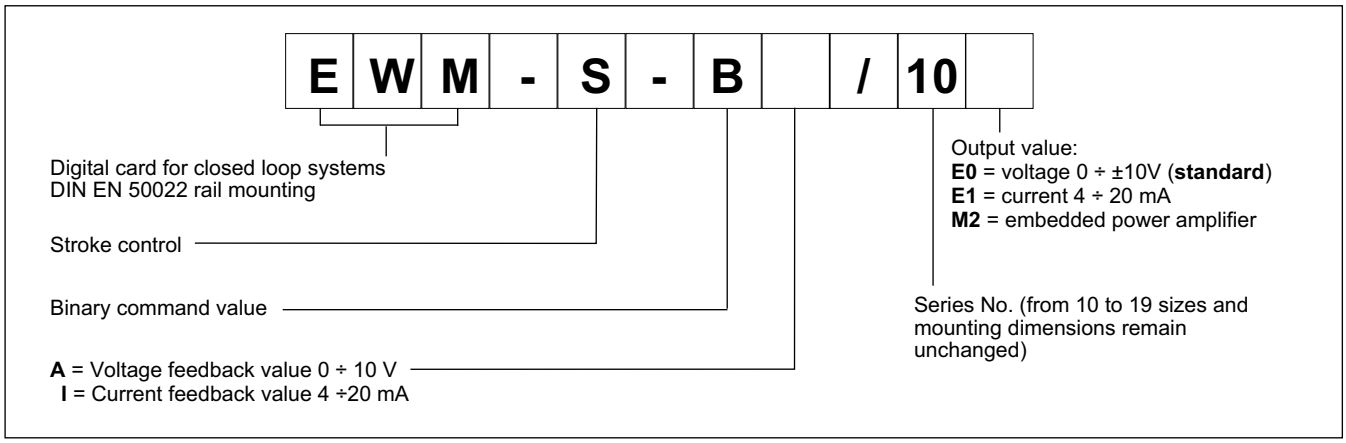
— Internal function and failure are monitored with two digital output easy to read.

— 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<br>external fuse 1,0 A (5 A for M2 version) |
| Current consumption: - E0 and E1 version<br>- M2 version | mA<br>A | 100 + sensor power consumption<br>depending from solenoid current |
| Command value | | binary command with 3 bit |
| Feedback value: - BA version<br>- BI version | V<br>mA | 0 ÷ 10 ($R_I$ = 90 kΩ)<br>4 ÷ 20 ($R_I$ = 250 kΩ) |
| Output value: - E0 version<br>- E1 version<br>- M2 version | V<br>mA<br>A | ±10 (max load 5 mA)<br>4 ÷ 20 (max load 390 Ω)<br>1,0 ÷ 2,6 |
| Position accuracy | % | 0,01 |
| Interface | | RS 232 C |
| Electromagnetic compatibility (EMC)<br>according to 2004/108/CE | | Emissions EN 61000-6-3<br>Immunity EN 61000-6-2 |
| 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 |

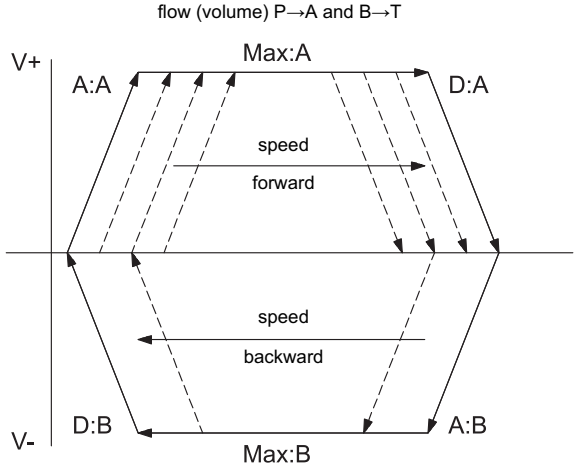
## 1 - IDENTIFICATION CODE




This module supports the simple point-to-point positioning with hydraulic drives. Two operating modes 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.




## 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.

**NOTE: in the type M2 the value of the power supply voltage on the card must not be lower than the rated working voltage of the solenoid to be controlled.**

### 2.2 - Electrical protections

All inputs and outputs are protected with suppressor diodes and RC-filters against transient overshoots.

### 2.3 - Digital Input

The card accepts digital input. The digital input must have a voltage from 12 to 24 V , Low level: <4V, high level >12V with current <0,1A. See the block diagram at paragraph 8 for the electric connections.

### 2.4 - Input feedback values

The card accepts analogue feedback input. The feedback value must be 0 ÷ 10 V for EWM-S-BA*, and 4 ÷ 20 mA for EWM-S-BI* version.

### 2.5 - Output values

The card is designed for two type of output values, voltage 0 ÷ ±10V (E0 version) or current 4 ÷ 20 mA (E1 version); standard output value E0 type. The embedded power stage is available on version M2 and the power stage is adjustable via software, from 1 to 2,6 A.

### 2.6 - Digital Output

Two digital output are available, INPOS and READY, and their signals are displayed from the leds.
Low level <4V High Level > 10 V Max 50 mA (with load 200 Ohm)

## 3 - LED FUNCTIONS

There are two leds 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 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 |
|---|---|---|---|---|
| **s:i x** | i= 0..7<br>x= 0..10000 | -<br>:0 | -<br>0,01% | Definition of the target positions. The value **i** is related to the input selection (SEL1, SEL2 and SEL4; binary coded). |
| **vc:i x** | i= 0..7<br>x= 0..10000 | -<br>:5000 | -<br>0,01% | Definition of the target speeds. The value i is related to the input selection (SEL1, SEL2 and SEL4; binary coded). |
| **dsel x** | x= on\|off | off | - | Mode of the digital selection inputs.<br>OFF: activation of the target position by a signal change (low to high) of the START input.<br>ON: direct activation by the SELx inputs. |
| **a:i x** | i= A\|B<br>x= 1… 2000 | :A 100<br>:B 100 | ms<br>ms | Acceleration time depending on direction.<br>**A** indicates analogue output 15 and **B** indicates analogue output 16.<br>Normally **A** = flow p-A, B-T and **B** = flow P-B, A-T. |
| **d:i x** | i= A\|B<br>x= 10… 10000 | :A 2500<br>:B 2500 | 0,01%<br>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<br>\|sqrt2 | sqrt1 | - | Selection of the control function: **lin** = standard linear P-control,<br>**sqrt1** = progressive time optimized deceleration curve<br>**sqrt2** = sqrt1 with a higher gain in position |
| **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<br>x= -10000… 10000 | :A 3300<br>:B -3300 | 0,01%<br>0,01% | Degree of output signal in manual mode |
| **min:i x** | i= A\|B<br>x= 0… 5000 | :A 0<br>:B 0 | 0,01%<br>0,01% | Deadband compensation of positive overlapped proportional valves.<br>Good adjustment will increase positioning accuracy. |
| **max:i x** | i= A\|B<br>x= 5000… 10000 | :A 10000<br>:B 10000 | 0,01%<br>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**).<br>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. |
| **save** | - | - | - | Storing the programmed parameter in E²PROM. |
| **loadback** | - | - | - | Reloading the parameter from E²PROM 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 mm$^2$, up to 20 m length and of 1.00 mm$^2$ 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)

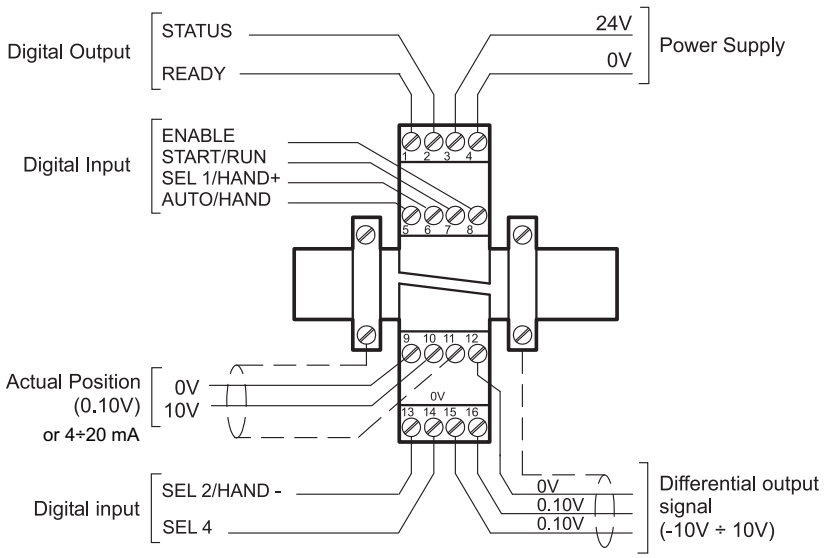
The software kit includes a USB cable (2.70 mt lenght) to connect the card to a PC or notebook and the software.

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 OF EWM-S-B*




### DIGITAL INPUT AND OUTPUT

PIN 1 — READY output.
This output is high when 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 — AUTO/HAND input
ACTIVATED = automatic mode
DEACTIVATED = hand mode.

PIN 6 — SEL 1/HAND+ input:
SEL 1 = Selection input 1
HAND+ = Hand mode (START = OFF), the axis drives with the programmed speed (parameter HAND:A). After the deactivation the command position is set to the actual position.

PIN 7 — START (RUN) 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.

PIN 13 — SEL 2 / HAND- input:
SEL 2 = Selection input 2
HAND- = (START = OFF), the axis drives with the programmed speed (parameter HAND:B). After the deactivation the command position is set to the actual position.

PIN 14 — SEL 4- input:
Selection input 4 - See schemes in the BINARY TABLE below

| Address | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| SEL 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| SEL 2 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 |
| SEL 4 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |

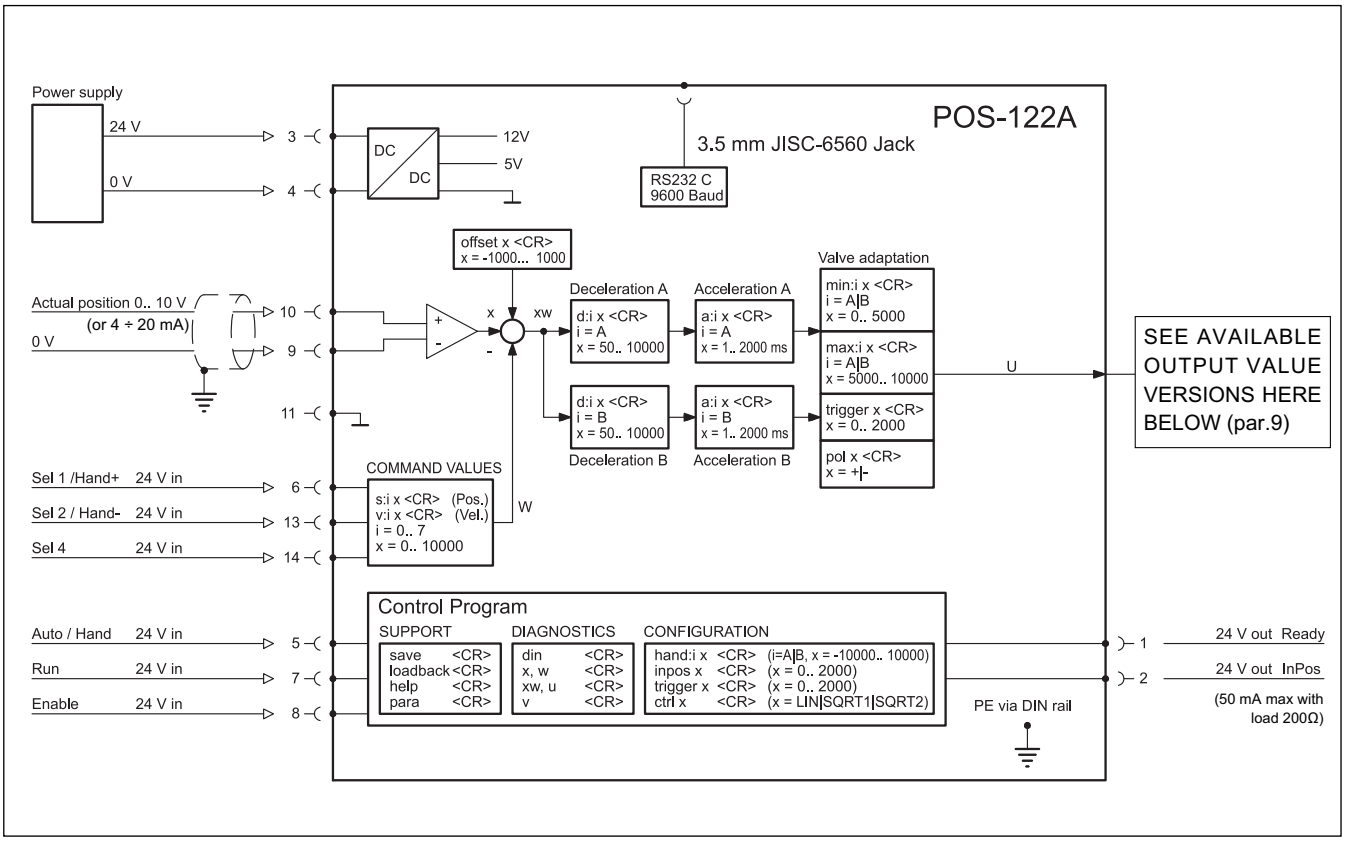
### ANALOGUE INPUT

PIN 9/10 — Actual position (feedback) value (X)
range 0 ÷ 100% corresponds to 0 ÷ 10V (or 4 ÷ 20 mA)

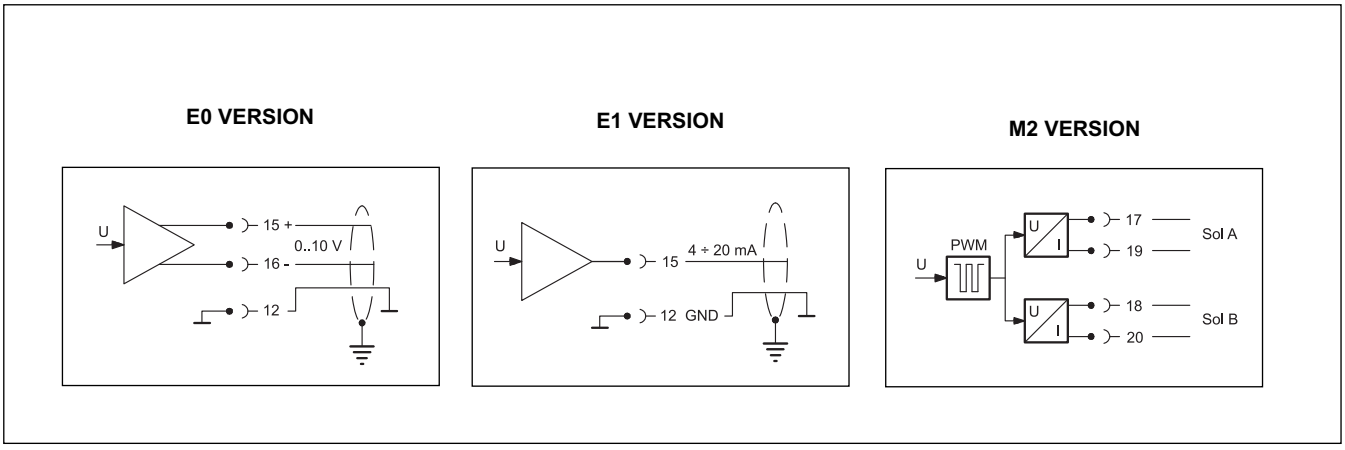
### ANALOGUE OUTPUT

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

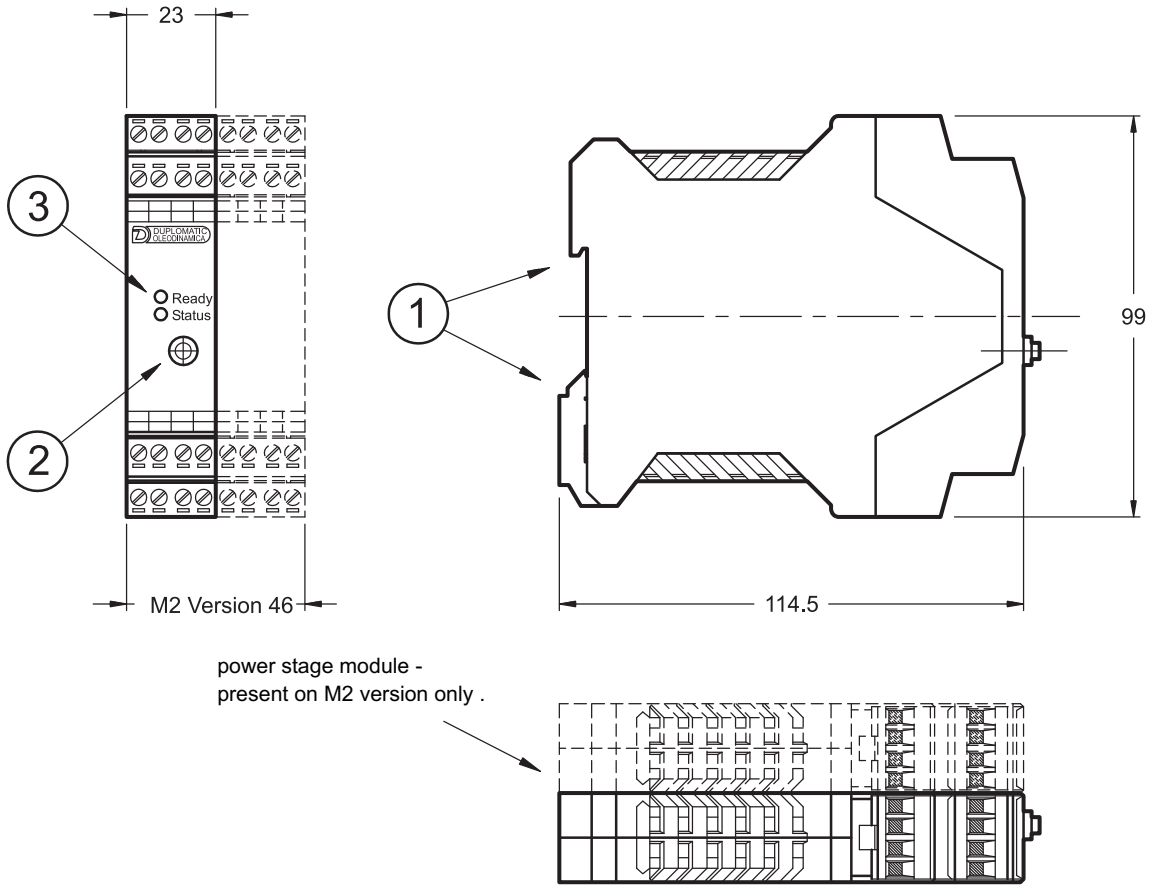
## 8 - CARD BLOCK DIAGRAM




## 9 - AVAILABLE OUTPUT VALUE VERSIONS



## 10 - OVERALL AND MOUNTING DIMENSIONS




| | |
|---|---|
| 1 | DIN EN 50022 rail type fastening |
| 2 | Plug for PC cable connection |
| 3 | LED for output signals |

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