



# EDM-M\*

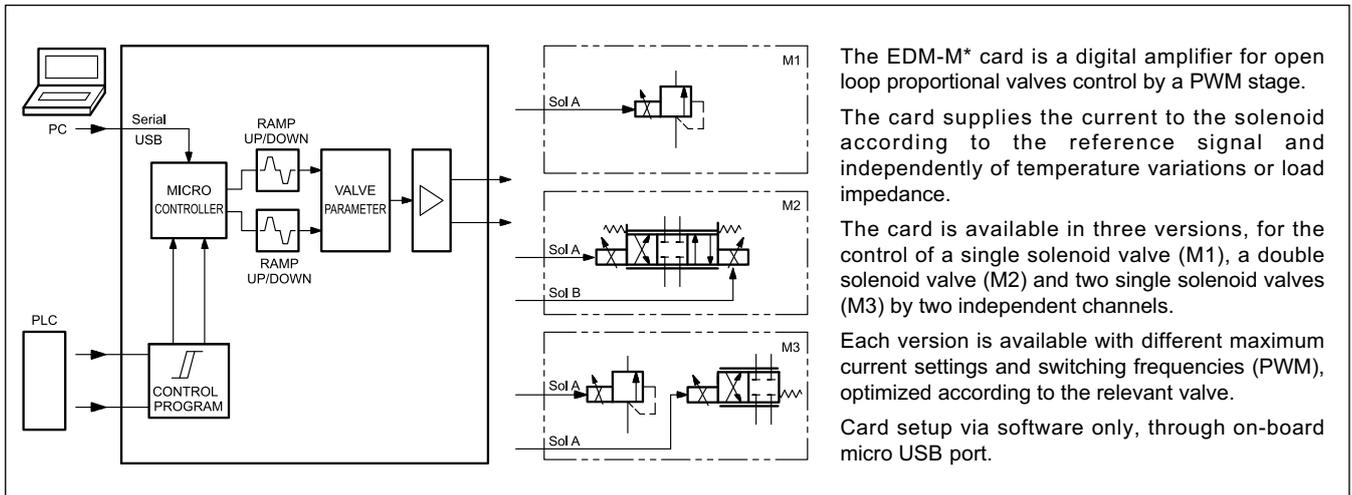
## DIGITAL AMPLIFIER FOR OPEN LOOP PROPORTIONAL VALVES

### SERIES 30

- EDM-M1** single solenoid
- EDM-M2** double solenoid
- EDM-M3** two single solenoids  
independent channels

**RAIL MOUNTING TYPE: DIN EN 50022**

### OPERATING PRINCIPLE



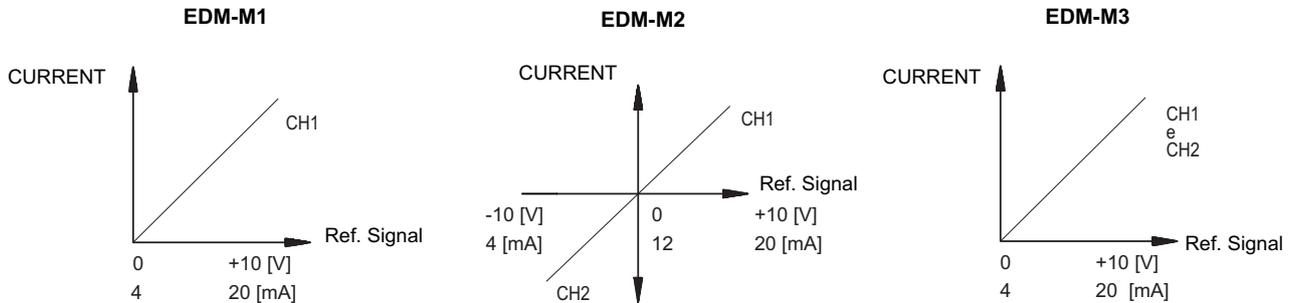
### TECHNICAL CHARACTERISTICS

Operating voltage ( $U_b$ )	V DC	9 ÷ 36 ripple included
Fuse, external	A	6A, medium time lag
Power consumption	W	min 20 - max 60 (see paragraph 5.2)
Output current	A	maximum 4.5 (see paragraph 5.2)
Power supply electrical protections		overload, polarity inversion
Output electrical protections		short-circuit
Available reference signals	V mA	$\pm 10, 0 \div 10$ (input resistance 11 kohm) $4 \div 20$ (input resistance 56 ohm)
Additional output aux voltages to external potentiometer	V	+10V DC (50 mA) -10V DC (50 mA)
Electromagnetic compatibility (EMC)		according to 2014/30/EU standards
Housing material		ABS
Housing dimensions	mm	23x98x122
Connector		Plug-in terminal block with tightening screws: 15 poles
Operating temperature range	°C	-20 / +70
Mass	kg	0,15
Protection degree		IP 20



### 3.5 - Reference signals

The card accepts voltage reference signals 0 + 10 V and ± 10 V, current reference signal 4 + 20 mA, coming from an external generator (PLC, CNC) or from an external potentiometer powered by the card itself. The reference value depends on the card version as stated in diagrams here below.



### 4 - EDM-M, DUPLOMATIC VALVES AND DEFAULT SETTINGS

The card is preset at factory. The following table shows the default settings for the EDM-M standard versions and the Duplomatic valve to be coupled with. As shown in section 1, different settings are possible. Apply for them at our technical dept.

#### CARDS FOR 24V SOLENOIDS

CARD				COUPLING VALVES (you can find matches between valves names / catalogue numbers in the group 8 index)		
Name	I Min [mA]	I Max [mA]	PWM [Hz]	Name	single coil	double coil
EDM-M111	200	860	100	DSPE*, RPCED1, RPCED1-T3, RPCE2, RPCE3, BLS6, ZDE3, QDE3	▪	
EDM-M112	200	860	200	DSE3, DSE3B, CRE, PRE*, PRE3, PRED3, MZE, DZCE*, PZE3	▪	
EDM-M131	200	1600	100	DSE5, QDE5	▪	
EDM-M211	200	860	100	DSPE*, ZDE3, BLS6		▪
EDM-M212	200	860	200	DSE3, DSE3B		▪
EDM-M231	200	1600	100	DSE5		▪
EDM-M31111	200 200	860 860	100 100	DSPE*, RPCED1, RPCED1-T3, RPCE2, RPCE3, BLS6, ZDE3, QDE3	▪ ▪	
EDM-M31122	200 200	860 860	200 200	DSE3, DSE3B, CRE, PRE*, PRE3, PRED3, MZE, DZCE*, PZE3	▪ ▪	
EDM-M33112	200 200	1600 860	100 200	VPPM-*PQCE, regulator (DSE5 + CRE)	▪ ▪	

#### CARDS FOR 12V SOLENOIDS

CARD				COUPLING VALVES (you can find the matches between valves names and catalogue numbers in the group 8 index)		
Name	I Min [mA]	I Max [mA]	PWM [Hz]	Name	single coil	double coil
EDM-M141	300	1880	100	DSPE*, BLS6	▪	
EDM-M142	300	1880	200	DSE3, DSE3B, CRE, PRE*, PRE3, PRED3, MZE, DZCE*, ZDE3, QDE3, PZE3	▪	
EDM-M151	500	2600	100	DSE5, QDE5	▪	
EDM-M241	300	1880	100	DSPE*, BLS6		▪
EDM-M242	300	1880	200	DSE3, DSE3B, ZDE3		▪
EDM-M251	500	2600	100	DSE5		▪

## 5 - INSTALLATION

### 5.1 - Wires sizing

Suggested cable cross sections for solenoid supply are shown in the table below. However, the sizing has to ensure a voltage to the coil of not less than 90% of its nominal value.

#### Suggested cable cross sections for solenoid supply [mm<sup>2</sup>]

Card supply voltage	Coil type	Cable length		
		< 10 m	10 to 20 m	20 to 30 m
24V	860 mA - 24V	0,5	0,75	1
	1600 mA - 24V	0,5	1	1,5
	1880 mA - 12V	0,5	1	2
	2600 mA - 12V	0,75	1,5	2,5
12V	1880 mA - 12V	0,75	1,5	2
	2600 mA - 12V	1	2	2,5

For signal cables we suggest a cross section of 0.25 mm<sup>2</sup>, up to 10 meter.

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

Complete protection of the connection wires can be requested in environments with critical electromagnetic interferences.

### 5.2 - Card power consumption

The power required by the card depends on output current to be supplied (determined by the card version) and on the nominal voltage of the coil to be feed.

A conservative value of the required power can be considered as the product of  $V \times I$ .

Examples:

an EDM-M111 card with maximum current 860 mA coupled with a coil with nominal voltage 24V requires 20W power.

an EDM-M35411 card with maximum current 4500 mA coupled with a coil with nominal voltage 12V requires 54W power.

The maximum power consumption of the card is 60 W.

### 5.3 - Start-up

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

A star orientated ground connection should be used when other power consumers are sharing the same power supply. Following points have to be taken in account for wiring:

- Signal cable and power cable have to be wired separately.
- Analogue signal cables must be shielded.
- Other cables should be shielded in case of strong electrical disturbance (power relays, frequency controlled power driver) or at cable length > 3 meters.



**WARNING! Plugs with free-wheeling diodes and LED indicators cannot be used with current controlled power outputs. They interfere with the current control and can destroy the output stage.**

With high frequency EMI inexpensive ferrite elements can be used.

Take in account a separation between the power part (power cables) and signal part when arrange the areas inside the electrical cabinet. Experience shows us that the area next to the PLC (24 V area) is suitable for the installation of this card.

Low impedance between PE "protected earth" and DIN-Rail should be used. Transient interference voltages at the terminals are discharged via DIN-Rail to the local PE. The screens at both cable ends have to be connected directly next to the module via PE terminals.

The power supply should be carried out voltage regulated (i. e. PWM controlled). The low impedance of controlled power supplies facilitates improved interference damping, therefore the signal resolution will be increased.

Switched inductance (relays and solenoids) operating from the same power supply has to be damped by surge protection elements directly by the inductance.



**WARNING! plug / unplug the terminal strip only when the control board is switched-off. Otherwise, the card may be damaged, even important.**

## 6 - DEVICE SETUP

Card set-up is possible via software only.

### 6.1 - EBC Software

The software EBC can be easily downloaded from the Diplomatic Oleodinamica website in the section SOFTWARE DOWNLOAD.

To connect the card to a PC or notebook is necessary a micro USB cable (type USB A – micro USB B).

Once connected, the software automatically recognizes the card model and shows a table with all the available commands, their parameters, the default setting, the measuring unit and a brief explanation for correct set-up.

The software is compliant with Microsoft OS Windows 7, 8 and 10.

### 6.2 - Parameters table

The parameters table is available in English. The parameter setting can be done at different user access levels.

For a complete list of parameters and their settings please refer to the *Technical Manual 89251 ETM*.

### 7 - MAIN FEATURES

#### 7.1 - Diagnostics

Activates / deactivates the error detection. Off is useful in troubleshooting tasks.

parameter DIAGNOSTICS (ON|OFF|AUTO)  
default: auto

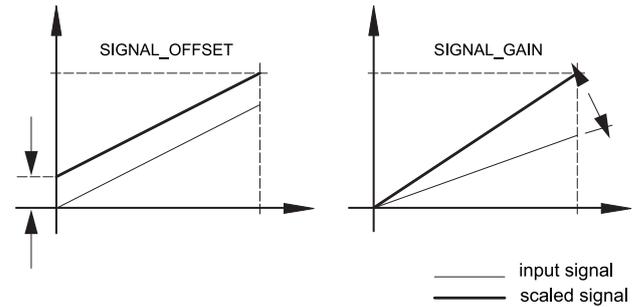
#### 7.3 - Input signal scaling

Set the coefficients for offset and gain of the input signal.

EDM-M1	EDM-M2	EDM-M3
SIGNAL_OFFSET	SIGNAL_OFFSET	SIGNAL1_OFFSET SIGNAL2_OFFSET
range: E0: -2 ... 2V default: 0.00	E1: -4 ... +4 mA	
SIGNAL_GAIN	SIGNAL_GAIN	SIGNAL1_GAIN SIGNAL2_GAIN
range: 0.80 ... 10.00 default: 1.00		

#### 7.2 - Enable (version A only)

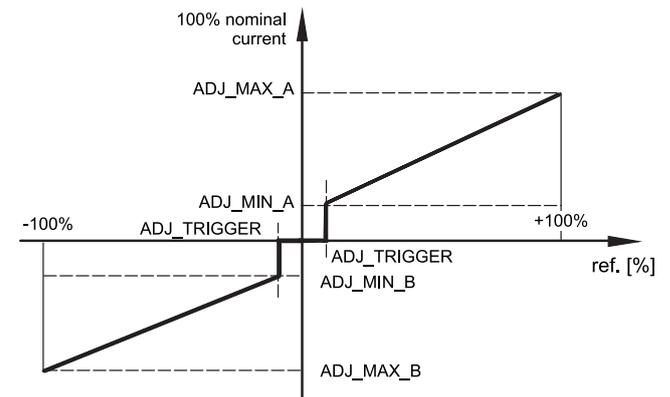
Activates / deactivates the external enable.  
parameter ENABLE (INT|EXT)  
default: EXT



#### 7.4 - Curve adaption

Deadband compensation and current input scaling are customizable. Values in percent.

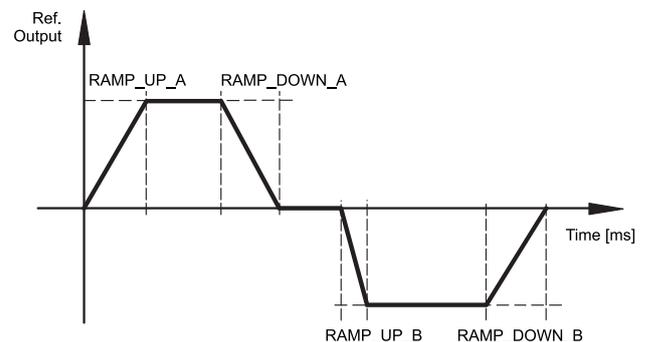
EDM-M1	EDM-M2	EDM-M3
ADJ_MIN	ADJ_MIN_A ADJ_MIN_B	ADJ1_MIN ADJ2_MIN
range: 0 ... 50% default: according to the card version		
ADJ_MAX	ADJ_MAX_A ADJ_MAX_B	ADJ1_MAX ADJ2_MAX
range: ADJ_min ... 100% default: 100		
ADJ_TRIGGER	ADJ_TRIGGER	ADJ1_TRIGGER ADJ2_TRIGGER
range: 0... 20% default: 1.5%		



#### 7.5 - Ramps

Parameters for ramp up and ramp down can be set in milliseconds. A and B tag the quadrants. These values set the amount of time that the command signal will take to follow a step change in the reference signal 0 ÷ 100.

EDM-M1	EDM-M2	EDM-M3
RAMP_UP	RAMP_UP_A RAMP_DOWN_A	RAMP1_UP RAMP1_DOWN
RAMP_DOWN	RAMP_UP_B RAMP_DOWN_B	RAMP2_UP RAMP2_DOWN
range: 0 ... 20000 ms default: 0		



#### 7.6 - PWM

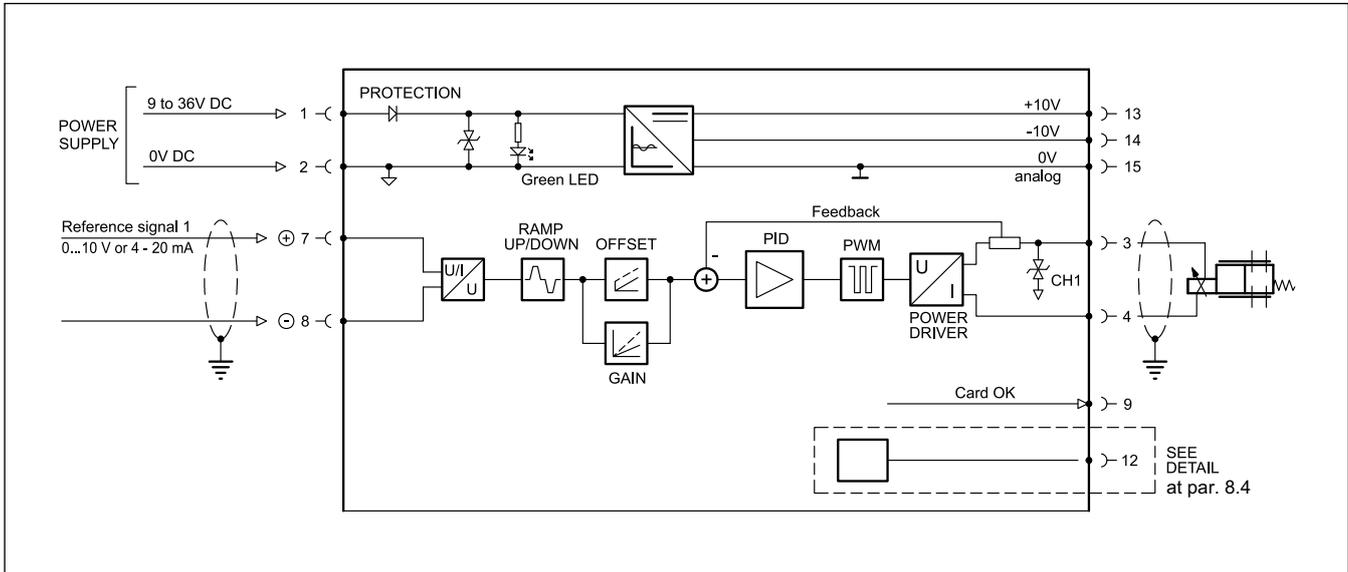
Pwm frequencies for current output.

EDM-M1	EDM-M2	EDM-M3
PWM	PWM	PWM1 PWM2
range: 70 ... 500 Hz default: preset value, according to the card version		

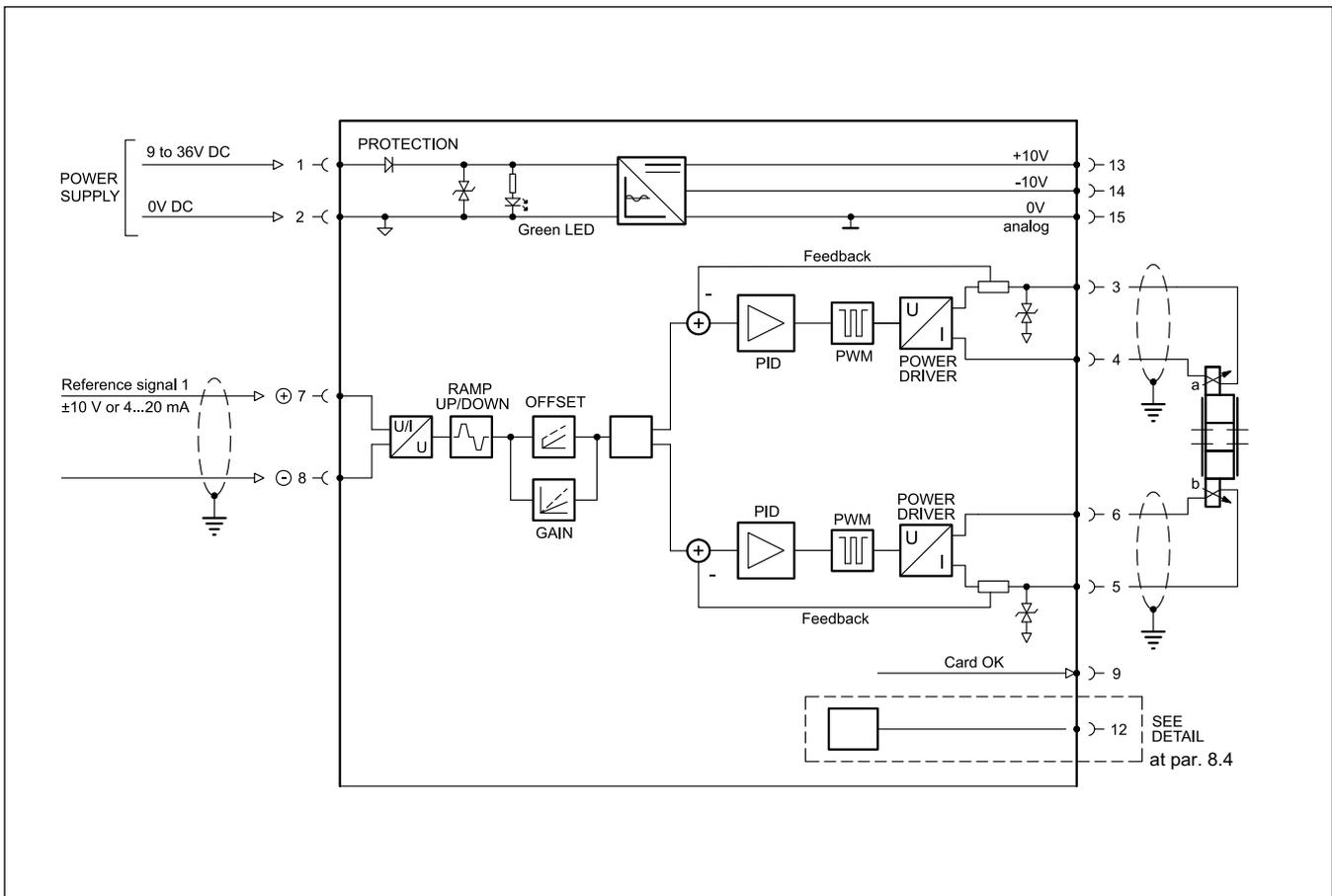
## 8 - CARDS BLOCK DIAGRAMS

The function of PIN12 varies depending on the card version. It can be either ENABLE input (A version) or an auxiliary voltage output (B version).

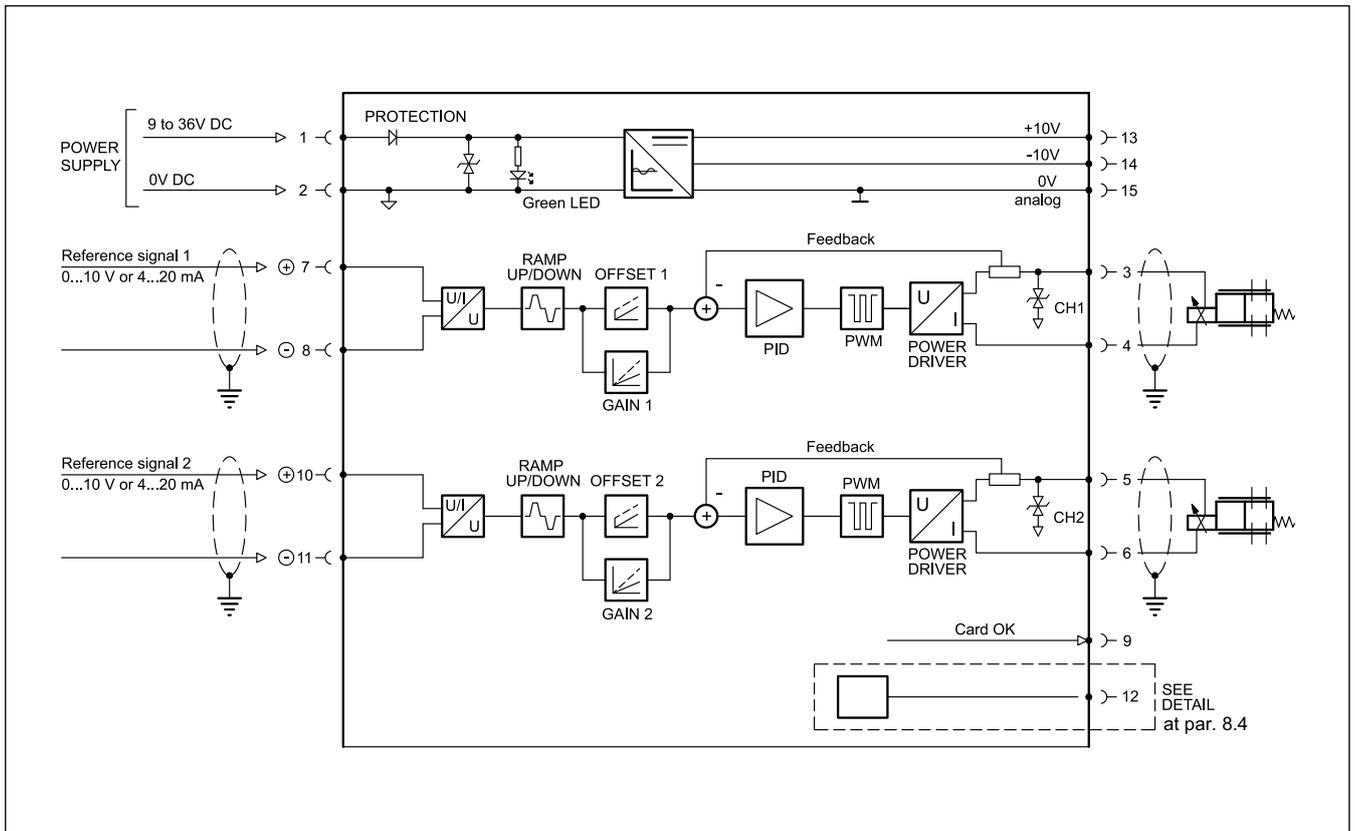
### 8.1 - EDM-M1



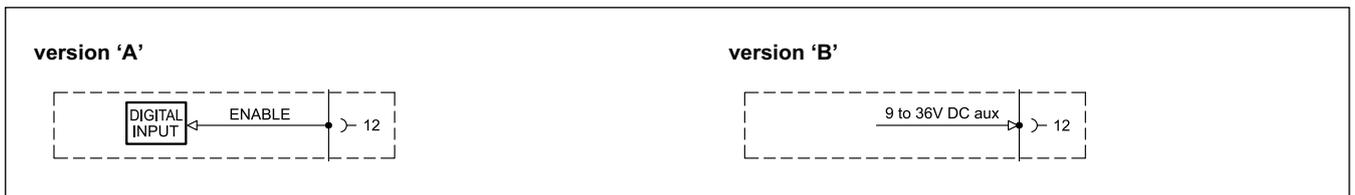
### 8.2 - EDM-M2



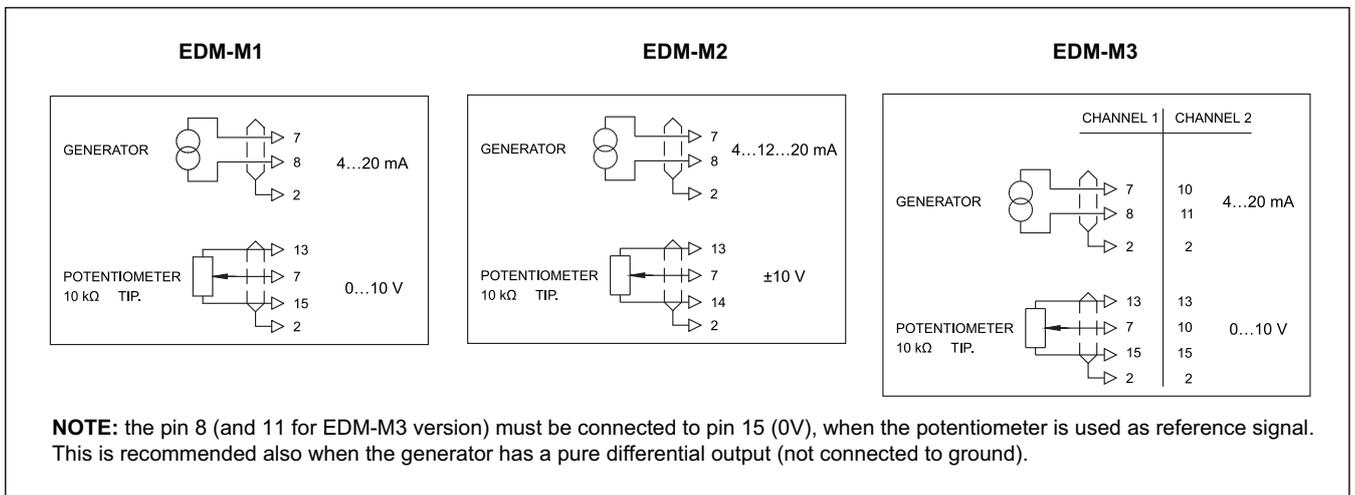
### 8.3 - EDM - M3



### 8.4 - Function of PIN 12

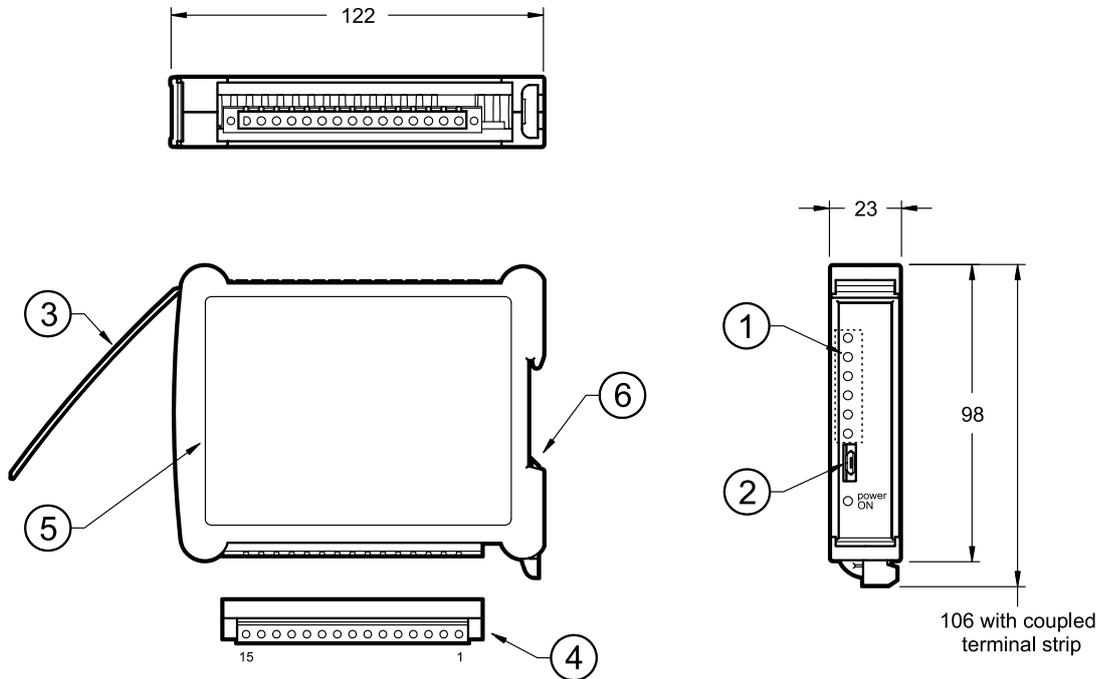


## 9 - WIRING



## 10 - OVERALL AND MOUNTING DIMENSIONS

dimensions in mm



1	LED interface
2	Micro USB socket
3	Protection flap
4	Terminal strip, plug-in, 15-pole with downwards cables output and fastening bolts
5	Label with circuit and wiring
6	DIN rail clip