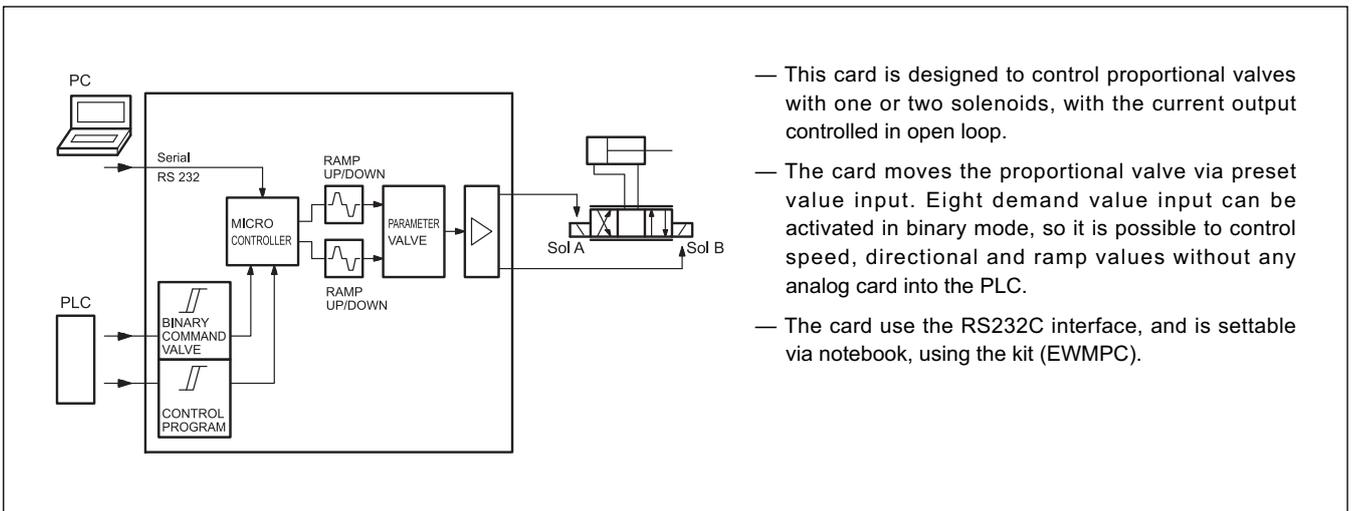# DUPLOMATIC OLEODINAMICA

EWM-RL
DIGITAL CARD FOR FAST/SLOW SPEED CONTROL IN OPEN LOOP SYSTEMS
SERIES 10

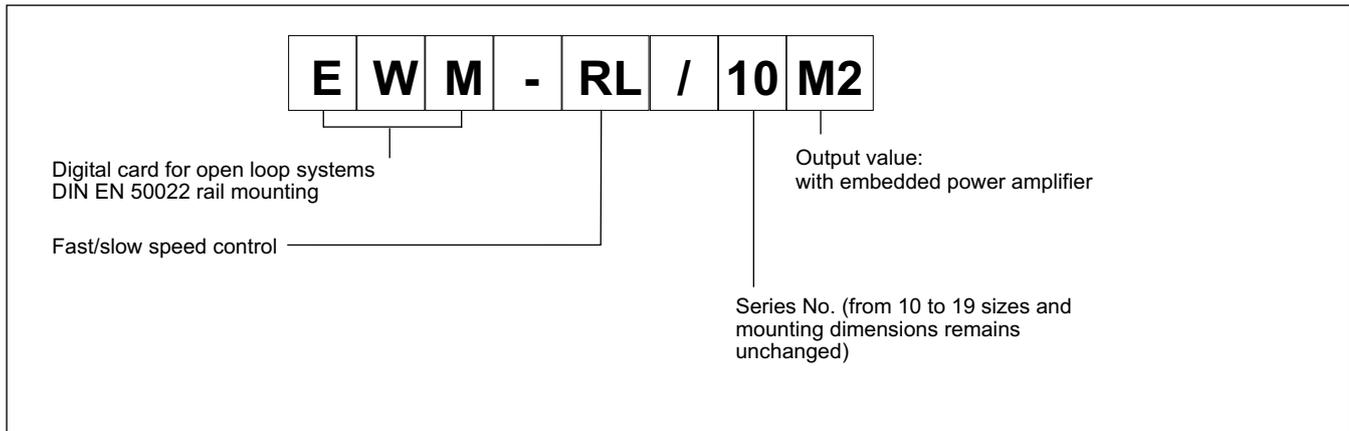## RAIL MOUNTING TYPE:
DIN EN 50022

OPERATING PRINCIPLE

— This card is designed to control proportional valves with one or two solenoids, with the current output controlled in open loop.

— The card moves the proportional valve via preset value input. Eight demand value input can be activated in binary mode, so it is possible to control speed, directional and ramp values without any analog card into the PLC.

— 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 5 A
Current consumption:	mA	100 + solenoid current consumption
Command value		binary command with 8 bit
Output current:	A	max 2,6
Interface		RS 232 C
Electromagnetic compatibility (EMC): according to 2004/108/CE standards		Emissions EN 61000-6-3 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

| E | W | M | - | RL | / | 10 | M2 |

Digital card for open loop systems
DIN EN 50022 rail mounting

Fast/slow speed control

Output value:
with embedded power amplifier

Series No. (from 10 to 19 sizes and
mounting dimensions remains
unchanged)

The power amplifier is controlled by an enable input and three switch signals. Therefore 8 demand values can be activated binary.

In case of direct control (non binary) it is par example possible to preset the directions with two inputs and to switch over between rapid and slow speed with the third input.

The output current is closed loop controlled and therefore independent from the supply voltage and the solenoid resistance.
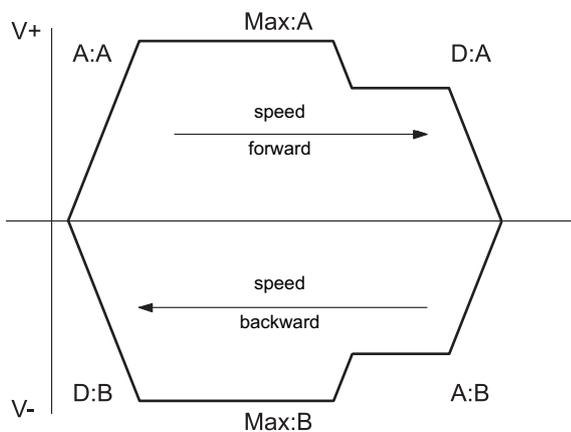
2 - FUNCTIONAL SPECIFICATIONS

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 against overvoltage and have filters.

2.3 - Reference signal

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.

2.5 - Output values

The card has output values in current, settable via software between 1, 1,6 and 2,6 A.

2.6 - Digital Output

The digital output is READY signal, displayed from the green led.

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
Only if SENS = ON

YELLOW: Indicates the intensity of the output current.

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 x= 0..10000	– :0	– 0,01%	Definition of the target positions. The value **i** is related to the input selection (SEL1, SEL2 and SEL4; binary coded).
rmode x	x= SD|4Q	SD	–	Ramp function: **SD** = ramp time related to the setpoint value **4Q** = Four quadrants ramp, ramp-variable RA:1 to RA:4 is used
ra:i x	i= 0… 7 x= 0..600000	100	ms	**4Q** Ramp **RA:1** up (solenoid A), **RA:2** down (solenoid A) **RA:3** up (solenoid B), **RA:4** down (solenoid B) **SD** Ramp **RA:0** to **RA:7**
mode x	x= on|off	off	–	Activation or deactivation of the linearization defined by the CC command.
cc:i x y	i= –10… 10 x –10000… 10000 y –10000… 10000	5000	 0,01% 0,01%	Characteristic linearization.
rcurr x	i= A|B x= –10000… 10000	off	–	Real current input. **MIN** and **MAX** will be typed in, in mA. If *rcurr* = on; the command "current" should not be used.
min:i x	i= A x= 0… 5000	0	0,01% / mA	Deadband compensation of positive overlapped proportional valves.
max:i x	i= A x= 300..10000	10000	0,01% / mA	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.
sens x	x= ON|OFF	ON	–	Activation of the sensor and internal failure monitoring.
solenoids x	x= 1|2	2	–	Number of used solenoids. Two for directional valves, one for pressure or throttle valves.
current:i x	i= A x= 0, 1, 2	0	–	Output current range. **0** = 1,0 A range **1** = 1,6 A range **2** = 2,6 A range DO NOT USE THIS COMMAND IF *rcurr* = ON.
dampl:i x	i= A x= 0..2000	400	0,01%	Parametering of the dither amplitude in 0,01 % units of the nominal current range. Typical values between 500 and 1200 (with 700 we always had good experience).
dfreq:i x	i= A x= 60… 400	120	Hz	Preset of the dither frequency
pwm:i x	i= A x= 100..7700	2600	Hz	Preset of the PWM frequency
ppwm:i x ipwm:i x	x= 1… 20 x= 5… 100	7 40	–	P-gain for control dynamics of the current control loop. Changing of these parameters should only be done by expert know how. A higher P-gain increases the control dynamics of the current control and also the effect of the dither adjustment. I-gain for control dynamics of the current control loop. Changing of these parameters should only be done by expert know how.
cmode x	X= ON|OFF	ON	–	Function of the output stage: OFF: function for closed loop positioning drives, ON: standard and for only one return line by two solenoids
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.
id	–	–	–	Display the module type, version and revision.
w, c, u, ia, ib	–	–	0,01%	Actual signals: command value, actual value, process data…
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 versions 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 length) 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
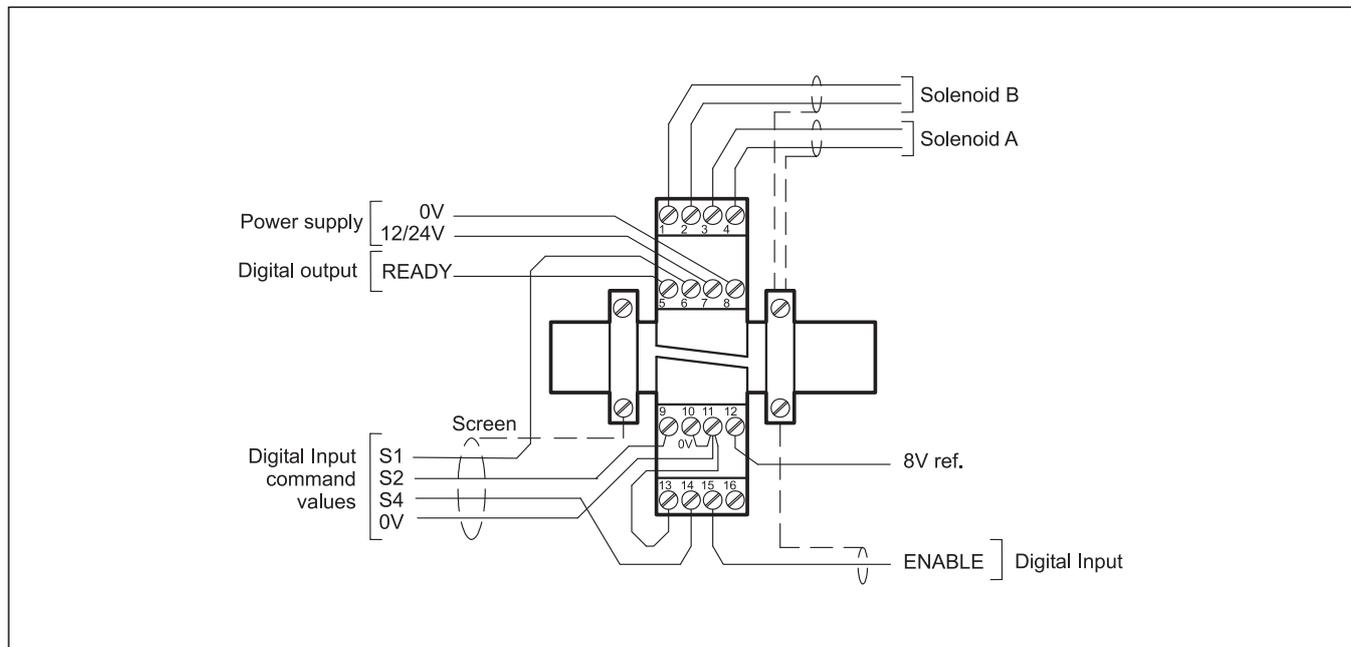
DIGITAL INPUT AND OUTPUT

PIN 1/2   PWM outputs for solenoid control. Solenoid B

PIN 3/4   PWM outputs for solenoid control. Solenoid A STATUS output.

PIN 5   READY output.
This output is high when ENABLE is active and there is no sensor error. This output corresponds with the green LED.

PIN 15   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. Error conditions are disabling by the ENABLE command.

PIN 6 9 14   Digital control inputs to retrieve the appropriate setpoints. All setpoints, in a storage area be deposited, can be linked binary. S1: Pin 6, S2: Pin 9, S4: Pin 14.
see the 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

8 - CARD BLOCK DIAGRAM

Card block diagram showing:

- 3.5 mm JISC-6560 Jack
- RS232 C / 9600 Baud
- Power supply 12 / 24 V, 0 V
- DC/DC converter: 8V, 5V inputs; 24 V (7), 0 V (8) outputs
- Values: s:i x / i = 1... 7 / x = 10000... 10000 (W)
- Ramps: ra:i x / i = 1... 7 / x = 5... 60000
- Linearisation CC:i x y (C) / Mode = ON
- min:i x <CR> / i = A | B / x = 0... 5000
- max:i x <CR> / i = A | B / x = 5000... 10000
- trigger x <CR> / x = 0... 2000
- pwm x <CR> / x = 80... 3900
- ipwm x <CR> / x = 2... 100
- ppwm x <CR> / x = 0... 7
- dfreq:i x <CR> / i = A | B / x = 60... 400
- dampl:i x <CR> / i = A | B / x = 0... 1500
- current: x / x = 0|1|2
- Power Stage — ia (3, 4), ib (2, 1), Solenoid A, Solenoid B
- Reference voltage 8V (12)
- Auswahl

Control Program:

SUPPORT	DIAGNOSTICS	CONFIGURATION
save <CR>	din <CR>	mode x <CR> (x = ON|OFF)
loadback <CR>	w, c <CR>	cmode x <CR> (x = ON|OFF)
help <CR>	u <CR>	rmode x <CR> (x = SD/4Q)
para <CR>	ia, ib <CR>	rcurr x <CR> (x = ON|OFF)
default <CR>		sens x <CR> (x = ON|OFF)
id <CR>		solenoids x<CR> (1/2)

Inputs: 13, 10, 11, 12

- S1 Digital input — 6
- S2 Digital input — 9
- S4 Digital input — 14
- Enable Digital input — 15
- Ready output — 5
- PE via DIN rail

9 - OVERALL AND MOUNTING DIMENSIONS

23

99

114.5

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

Ready
Status