



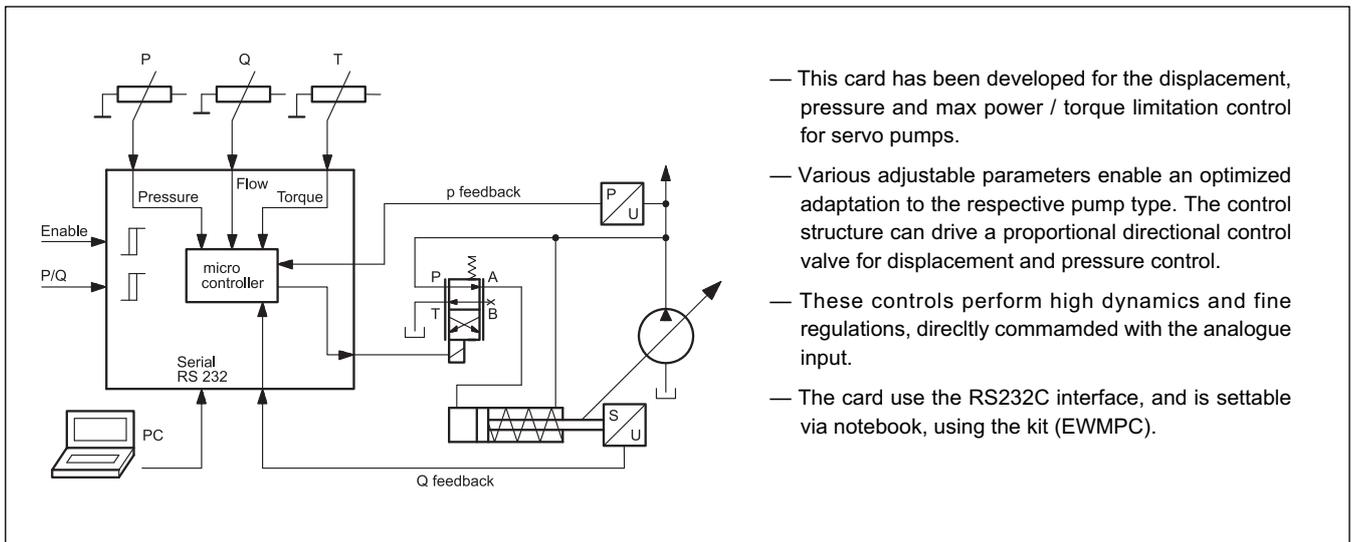
EWM-DP

CARD FOR DISPLACEMENT AND PRESSURE CONTROL ON PISTON PUMP IN CLOSED LOOP SYSTEMS

SERIES 10

RAIL MOUNTING TYPE:
DIN EN 50022

OPERATING PRINCIPLE

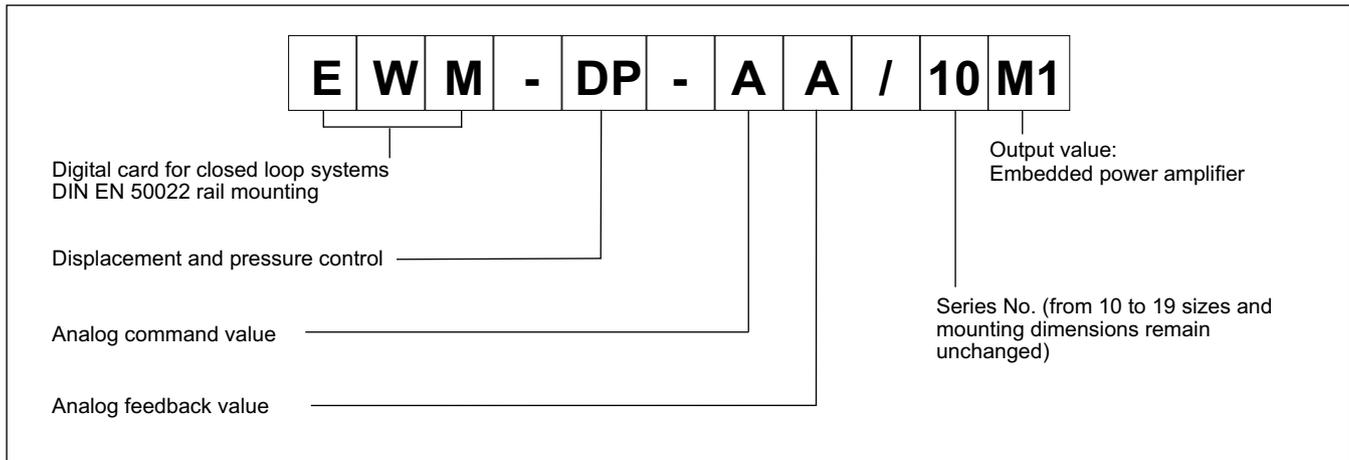


- This card has been developed for the displacement, pressure and max power / torque limitation control for servo pumps.
- Various adjustable parameters enable an optimized adaptation to the respective pump type. The control structure can drive a proportional directional control valve for displacement and pressure control.
- These controls perform high dynamics and fine regulations, directly commanded with the analogue input.
- The card use the RS232C interface, and is settable via notebook, using the kit (EWMPC).

TECHNICAL CHARACTERISTICS

Power supply	V DC	10 ÷ 30 ripple included - external fuse 5,0 A fast
Current consumption	mA	<100 + solenoid current
Pressure control command	V mA	0 ÷ 10 (R _I = 25 kΩ) 4 ÷ 20 mA (R _I = 250 Ω)
Flow control command	V	0 ÷ 10 (R _I = 25 kΩ)
Power limitation command	V	0 ÷ 10 (R _I = 25 kΩ)
Feedback values: - flow - pressure		0 ÷ 10V (R _I = 25 kΩ) 0 ÷ 10V (R _I = 25 kΩ) or 4 ÷ 20 mA (R _I = 250 Ω)
Output value:	A	1,0 - 1,6 - 2,6
Sensor resolution	%	0,0125
Interface		RS 232 C
Electromagnetic compatibility (EMC): according to 2004/108CE standards		Emissions EN 61000-6-3 Immunity EN 61000-6-2
Housing material		thermoplastic polyamide 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



The EWM-DP card integrates the combined pressure and flow regulation with the electronic max power limitation.

The digital drive regulates the pump swash position according to the flow reference signal, using the feedback signals coming from the pressure transducer (that must be installed on the system).

If the real value of the pressure remain below the relevant reference signal provided by the machine controller the EWM-DP regulates the pump swash position; when the real pressure raise the relevant reference signal, the card perform the close loop control on the pressure. This option allows to realize accurate dynamic pressure profiles.

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. All inputs are protected with suppressor diodes and RC-filters against transient overshoots. Low level: <4V, high level >10V, current < 0,1mA. See the block diagram at paragraph 8 for the electric connections.

2.4 - Flow command value

The card accepts analogue input. The command value must be $0 \div 10 \text{ V}$ ($R_1 = 25 \text{ k}\Omega$).

2.5 - Pressure command value

The card accepts analogue input. The command value must be $0 \div 10 \text{ V}$ ($R_1 = 25 \text{ k}\Omega$) or $4 \div 20 \text{ mA}$. ($R_1 = 250 \Omega$).

2.6 - Power limitation value

The card accepts analog input. The command value must be $0 \div 10 \text{ V}$ ($R_1 = 25 \text{ k}\Omega$).

2.7 - Input feedback values

The card accepts feedback analogue input. The value must be $0 \div 10 \text{ V}$ ($R_1 = 25 \text{ k}\Omega$) or $4 \div 20 \text{ mA}$. ($R_1 = 250 \Omega$) for the pressure feedback and a $0 \div -10 \text{ V}$ ($R_1 = 25 \text{ k}\Omega$) value for flow signal. The sensor parameters are settable via software (see parameters table).

2.8 - Output values

The output current value for this card is settable via software. The available values are 1,0 - 1,6 and 2,6 A.

2.9 - Digital Output

Two digital output are available, STATUS and READY, and their signals are displayed from the LEDs. The digital output must have a voltage from 12 to 24 V. All output are protected with suppressor diodes and RC-filters against transient overshoots. Low level: <4V, high level >10V, current max 50mA (with load 200Ω).

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: Shows the card status

ON - System is in power/torque limitation

OFF - Displacement and pressure control.

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 at 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*.



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. 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.

EXAMPLE OF PARAMETERS TABLE

Commands	Parameter	Defaults	Units	Description
ain:i a b c x	i= wq wp xq xp a= -10000... 10000 b= -10000... 10000 c= -10000... 10000 x= V C	: 1000 : 1000 : 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. Feedback signals can be used in V mode only.
aq:i x ap:i x	i= up down x= 5... 60000	1	ms	Ramp times aa for channel A and ab for channel B.
ctrl x	X = ON OFF	ON	-	Control mode
pl:i x	I = PL T1 EXT :PL 500... 10000 :T1 0... 2000 :EXT 0 1	10000 67 0	0,01% ms -	Power limitation.
cq1:i x	I= P I D T1 V p= 0... 20000 i= 5... 1900 d= 0... 100 t1= 0... 100 lim= 0... 10000	900 150 40 1 10000	0,01 ms ms ms 0,01%	Control parameter for the displacement controller.
cpl:i x	I= P I D T1 IC p= 0... 20000 i= 5... 1900 d= 0... 100 t1= 0... 100 IC= 0... 10000	1500 2047 30 1 2000	0,01 ms ms ms 0,01%	Control parameter for the pressure controller.
solenoid: x	single double	single	-	No. of solenoids.
offset: x	x=0... 10000	1800	0,01%	Current offset for single solenoid valves
out: x	x= on off	off	-	Output monitoring
minv:i x	i= A B x= 0... 3000	600	0,01%	Deadband compensation of positive overlapped proportional valves. Good adjustment will increase positioning accuracy
maxv:i x	i= A B x= 0... 10000	9500	0,01%	Maximum output range for adapting control range to maximum flow range.
trigger: x	x= 0... 10000	1	0,01%	Point to activate the deadband compensation (min). Also useful for reduced sensitivity in position with control valves.
current: x	x= 0, 1, 2	2		Output current range. 0 = 1,0 A range 1 = 1,6 A range 2 = 2,6 A range
damp1:i x	i= A B x= 0... 3000	700	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 B x= 60... 400	200	Hz	Preset of the dither frequency
pwm:i x	i= A B x= 100... 7700	3125	Hz	Preset of the PWM frequency
ppwm:i x	i= A B x= 1... 30	25	-	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
ipwm:i x	i= A B x= 1... 100	80	-	I-gain for control dynamics of the current control loop. Changing of these parameters should only be done by expert know how
sens x	x= on off	on	-	Activation of the sensor and internal failure monitoring.
wq, wp	-	-	-	Command signal
xq, xp	-	-	-	actual (feedback) signal
wl, xl	-	-	-	Power/torque control values
ia, ib	-	-	-	output current
default	-	-	-	Preset values will be set.

6 - SOFTWARE KIT EWMP/10 (code 3898401001)

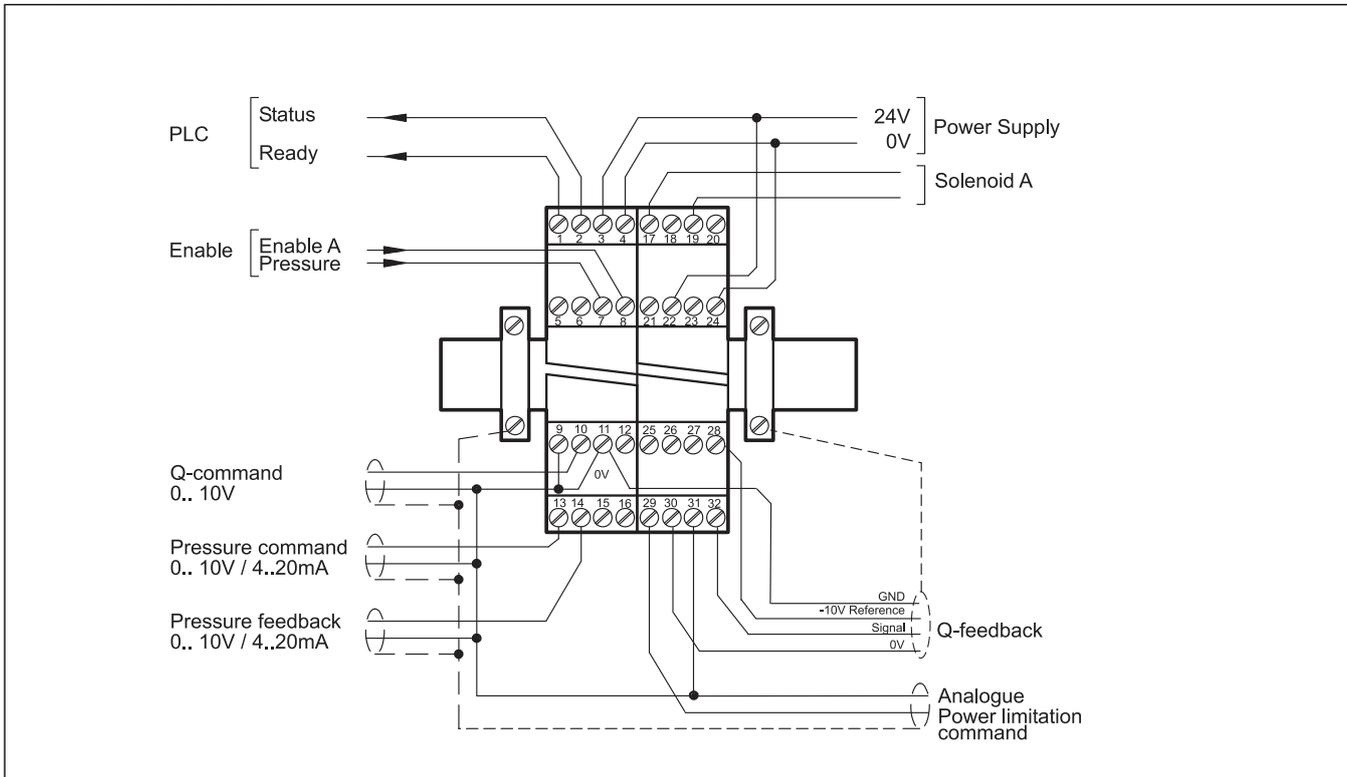
The software kit comprising a USB cable (2.70 mt length) to connect the card to a PC or notebook and the software.

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



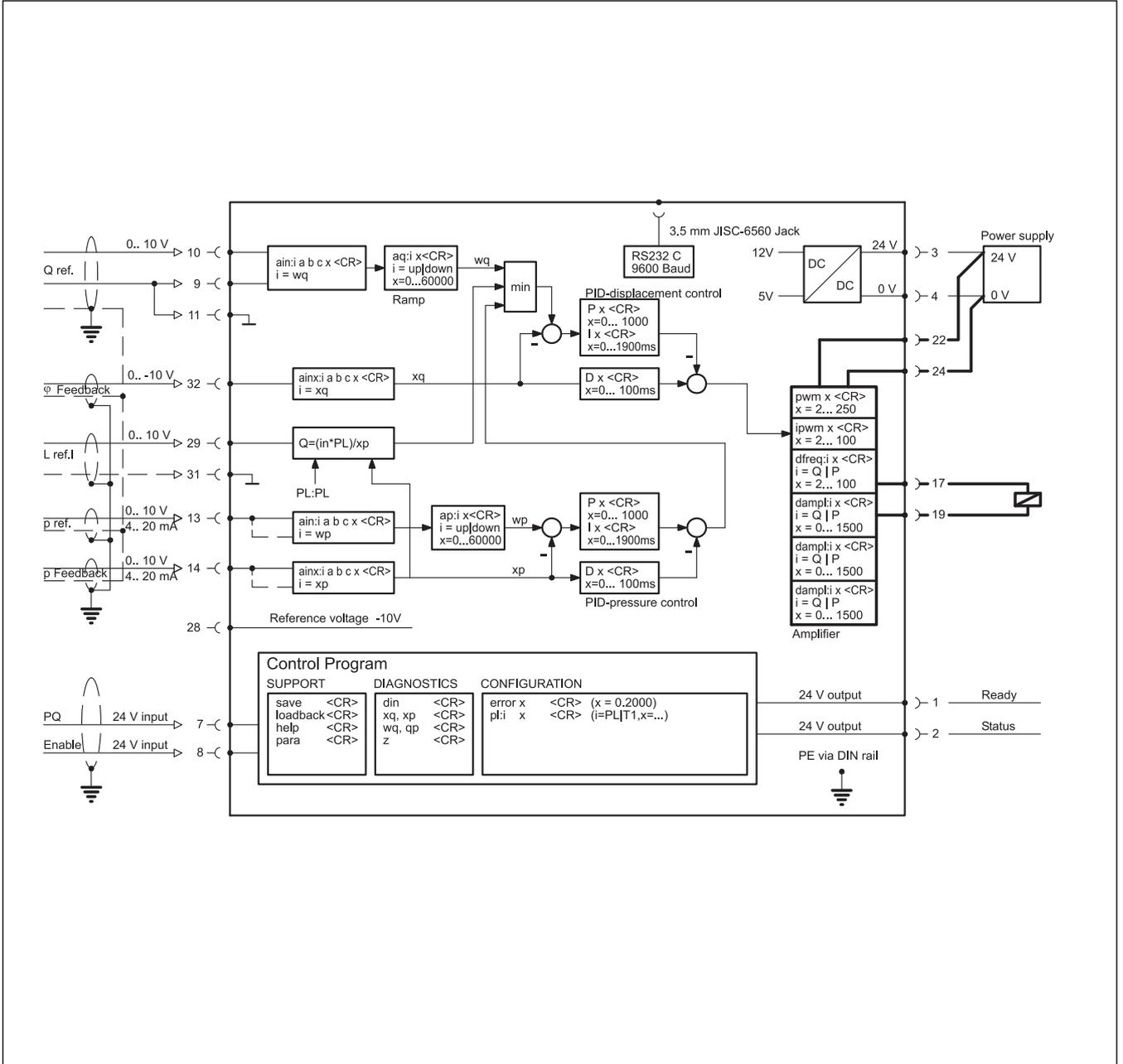
DIGITAL INPUT AND OUTPUT

- | | |
|-----|---|
| PIN | READY output. |
| 1 | General monitoring function. If a PWM output (solenoid of the valve) or a feedback signal failed, the READY output is switched off. The ready output is corresponding with the green LED. |
| PIN | STATUS output. |
| 2 | The system is in power (torque) limitation. |
| PIN | PQ input: |
| 7 | The pressure limitation control function is active. |
| PIN | ENABLE input: |
| 8 | This digital input signal initializes the application. The analogue output is active and the READY signal indicates that all components are working correctly. |

ANALOGUE INPUT AND OUTPUT

- | | |
|------|--|
| PIN | Displacement command (WQ), range 0 ÷ 100 % |
| 9/10 | corresponds to 0 ÷ 10 V |
| PIN | Pressure command position (WP), range 0 ÷ 100% |
| 13 | corresponds to 0 ÷ 10V or 4 ÷ 20 mA |
| PIN | Pressure Feedback (XP), range 0 ÷ 100% |
| 14 | corresponds to 0 ÷ 10V or 4 ÷ 20 mA |
| PIN | Displacement feedback (XQ), range 0 ÷ 100 % |
| 32 | corresponds to 0 ÷ -10 V |

8 - CARD BLOCK DIAGRAM



9 - OVERALL AND MOUNTING DIMENSIONS

