HYDAC INTERNATIONAL

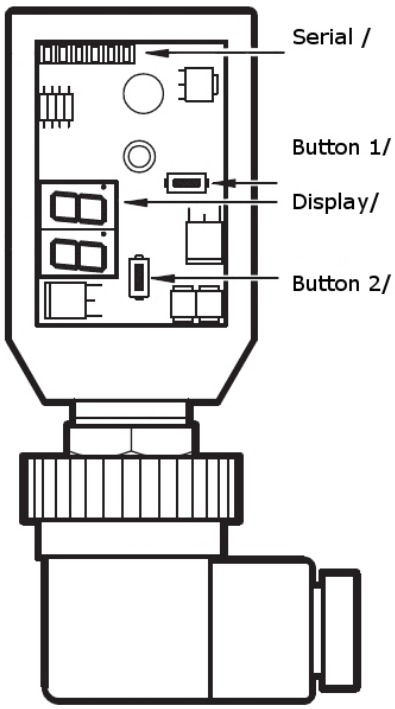
Digital plug amplifier for proportional valves PES-XD

GENERAL

- Digital amplifier in plug format
- Control of one proportional valve (open loop)
- Compact unit directly to mount at the solenoid group
- Simple and economic to mount
- Protection against reverse connection and short-circuit
- LED- display

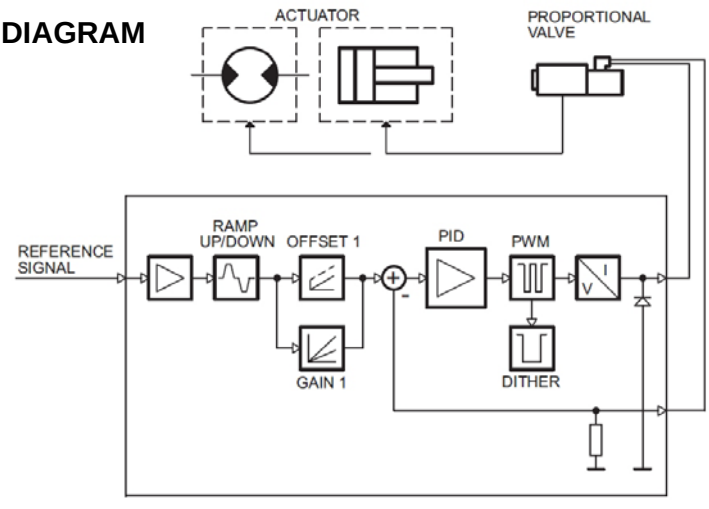
SPECIFICATIONS

Electrical supply*:	DC 10 - 30 VDC (rectified and filtered, small ripple) *must be > as voltage of the solenoids
Power:	min. 20 up to max. 40 W
Output current:	800 mA – 2600 mA
Setpoint signal:	
– Tension	+/- 10 V
– Current	4 up to 20 mA (By transmission of the setpoint signal by a potentiometer, the resistance of it shall not be smaller than 200 Ω!
Input Impedance of the setpoint signal:	0 to 10V Input Impedance max. 100 kΩ 0 to 5V Input Impedance max. 100 kΩ 4 to 20 mA Input Impedance max. 500 Ω
Ambient temperature:	-20°C to +70°C
Electro magnetic Capability (EMC):	
- Output	according to CEI EN 61000-6-4
- Capability	according to CEI EN 61000-6-2 according to 2004/108/CEE Standards
Protection:	Supply: Over-voltage and polarity protection Signal- in/output: reverse polarity protection to 33V Solenoid output: over-voltage protection
IP Rating:	IP65 IP67
Weight:	0,15 kg
Dimensions:	110 x 50 x 40 mm (L x B x H)
Fixation:	directly at proportional solenoid



The picture shows the open plug amplifier. Only in this mode it is possible to operate the buttons. The LED display is also visible with closed cover.

BLOCK DIAGRAM



1 - DESCRIPTION

The PES-XD amplifier is a digital amplifier to control proportional valves. The unit supplies a variable current proportionally to the setpoint signal and independently of temperature variations or load impedance, with a resolution of 1% on 2600 mA (full scale value).
The PWM stage on the solenoid power supply makes it possible to reduce the valve hysteresis thus optimising control precision. The amplifier is customizable with different maximum current sizes and switching frequencies (PWM), optimized according to the valve to be controlled.
Setting is possible by buttons and display inside the case, or with a notebook by RS232 with the software for PES-XD, (see par. 6.2)

2 - FUNCTIONAL SPECIFICATIONS

2.1 Electric power supply

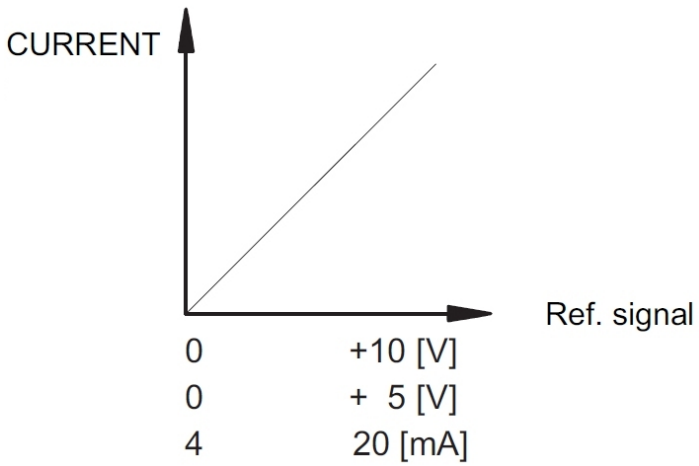
The amplifier requires a power supply of 10 to 30 V DC (terminals 1 and 2).
NOTE: The power supply voltage must be higher than the rated working voltage of the solenoid to be controlled.
The power supply voltage must be rectified and filtered, with maximum admissible ripple within the above voltage range.
The power required by the amplifier depends on the power supply voltage and on the maximum value of the supplied current (it is determined by the card version). In general a conservative value of the required power can be considered as the product of V x I. Example: an amplifier with a maximum current = 800 mA and a power supply voltage of 24 V DC requires a power of about 20W.

2.2 - Electrical protection

The connector is protected against over-voltage and polarity conversion.
On the output port a protection against any short circuit is foreseen.

2.3 - Setpoint signal

The connector accepts setpoint signals with 0 to 10V and 0 to 5V, in 4 to 20 mA current, from an external generator (PLC, CNC) or external potentiometer.
See paragraph 7 for electric connections referring to the different connector versions.



3 - SIGNALS

3.1 - POWER ON (Power supply)

Display indicates that the connector is ON and connected to +24V DC.

4 - ADJUSTMENTS

There are two ways of adjustment: variables view and parameters editing. The first one enables the real time monitoring of the control values, for both required and read current, on both channels. The second mode enables the operating parameters view and editing.

4.1 - Variables view

The amplifier is switched on at the variables view modality, and it shows the first variable value, that is the U1 parameter (setpoint signal).
Pushing button (1) the current of the solenoid is displayed.
By means of pressing (1) button, the different variables can be selected. Each time a variable is selected, its short name appears for approximately one second.
By briefly pressing the buttons, the current variable name appears for approximately one second.

The variables that can be selected are **U1** Setpoint signal:
0.0.. 10 at 0 … 10V
0.0.. 5.0 at 0 … 5V
02.. 10 at 4 to 20mA
C1: current required according to the applied setpoint signal, expressed in ampere, ranging between 0 and 2.6 A All the mentioned parameters can be viewed on the two digits display, located on the amplifiers front panel.
The selected value has to be read as follows (example for PES- XD-D*5* card):Imax = 2600mA.

REFERENCE (V)	REFERENCE (mA)	DISPLAY U1 (V)		DISPLAY C1 (Ampere)
0	4	0.0	2.0	40 (mA)
5	12	5.0	6.0	13 (A)
10	20	10.	10.	26 (A)

4.2 - PARAMETERS EDITING

To access the parameter editing, press the button (2) for at least 3 seconds.
The first parameter displayed is G1. To modify it, press the button (1) for two seconds, until the display starts blinking. Use the button (2) to increase the value and the button (1) to decrease it. To save the new value, press both buttons. The display stops blinking. Pressing the button (2) again is possible to scroll through all the parameters. To modify some parameters, repeat the steps above-mentioned for the G1 parameter. Following sequence is displayed G1 – o1 – u1 – d1 – Fr - return to basic mode and display of U1.

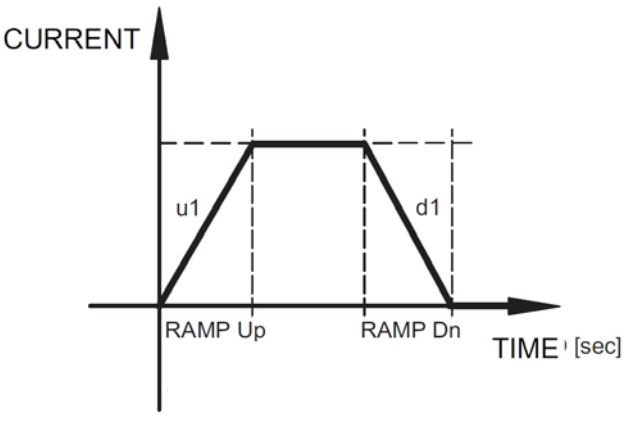
The parameters that can be selected are:
G1: “I Max” current, expressed in milliampere.
It sets the maximum current to the solenoid, when the setpoint signal is at the maximum value of +10 V (or 20 mA). It is used to limit the maximum value of the hydraulic size controlled by the valve.
Default value = Imax
Range = 50 ÷ 100% of Imax

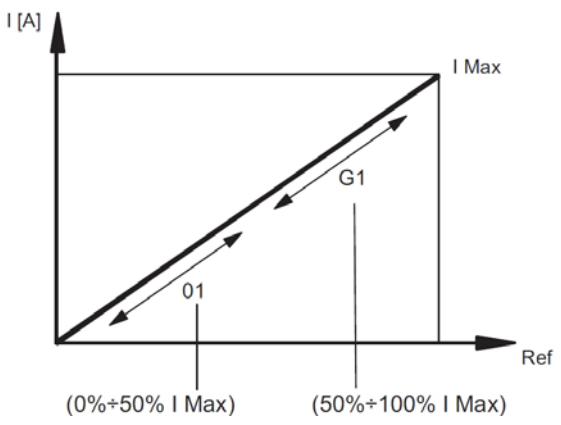
o1: “I Min” current, expressed in milliampere.
It sets the offset current to the solenoid, when the setpoint signal exceeds the limit of 0,1 V (or 0,1 mA). It is used to neutralize the insensitiveness area of the valve (dead band).
Default value = 0%
Range = 0 ÷ 50% of Imax

u1: “Ramp Up” increasing ramp time, expressed in seconds.
It sets the current ramp time, for a variation from 0 to 100% of the input reference. It is used to slow down the valve response time in the case of a sudden variation of the setpoint signal.
Default value = 00 sec.
Range = 00 ÷ 50 sec.

d1: “Ramp Dn” decreasing ramp time, expressed in seconds.
It sets the current ramp time, in a variation from 100% to 0 of the input reference. It is used to slow down the valve response time in the case of a sudden variation of the setpoint signal.
Default value = 00 sec.
Range = 00÷ 50 sec.

Fr: PWM frequency, in Hertz.
It sets the PWM frequency, which is the pulsating frequency of the control current. A PWM decrease improves the valve accuracy, decreasing the regulating stability. A PWM increase improves the regulation stability, causing a higher hysteresis.
Default value = PWM (according to version card)
Range = 50 ÷ 500Hz





4.3 - ERROR SIGNAL
EE: breakdown cable error on 4 to 20 mA signal (threshold 3 mA). Reset the alarm turning off the +24 V DC cable.

5 - INSTALLATION
The amplifier is suitable for direct assembly on the solenoid of the corresponding proportional valve. The 4-core connection cable (0,5 mm2 individual wire section) is supplied prewired and in a standard length of 2.5 m (DIN 47100 standard).
NOTE 1
To observe EMC requirements it’s important that the electrical connection is in compliance with the block diagram. As a general rule, the valve and the amplifier’s wires must be kept as far as possible from interference sources (e.g. power wires, electrical motors, inverters and electrical switches).
In environments where there are critical electromagnetic interferences, a complete protection of the connection wires can be required.

6 - START UP, CONTROL SETTINGS AND SIGNAL MEASUREMENT
6.1 - Set up
Settings can be changed by either acting on the (1) and (2) buttons located on the card front panel, or using the PES-PC hardware and software kit.

6.2 - PES-XD PC Software
The relevant hardware and software kit (to be ordered separately) allows to read the values and to set the connector easily.
The software communicates, through a flat cable, to the relevant connector placed in the PES-XD panel, behind the protecting gate.
The PC software compatibility is guaranteed only on Windows 2000 and Windows XP operating systems.

STANDARD MODELS	Part-No.
PES-XD-D011	3573612
PES-XD-D021	3573614
PES-XD-D111	3573639

Other types on request

MODEL CODE

PES-XD – D 0 1 1

Name
Amplifier for proportional valves
in plug format

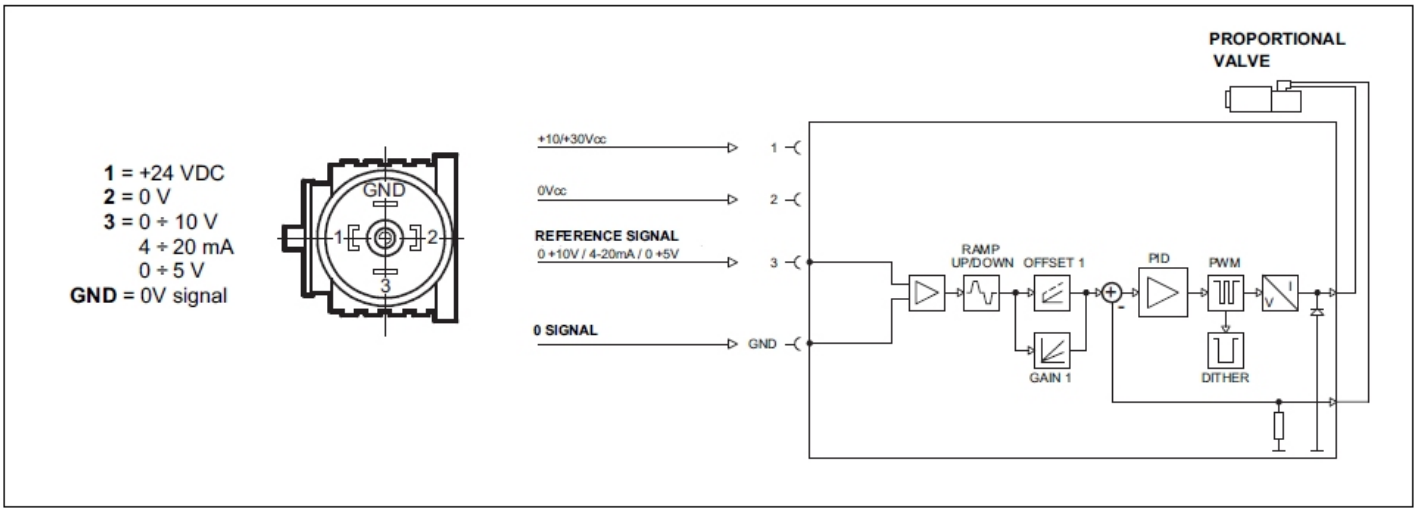
Parameterization
Digital to parameterize
without control option

Setpoint signal
0 = tension 0 up to +/-10V
1 = current 4 up to 20mA

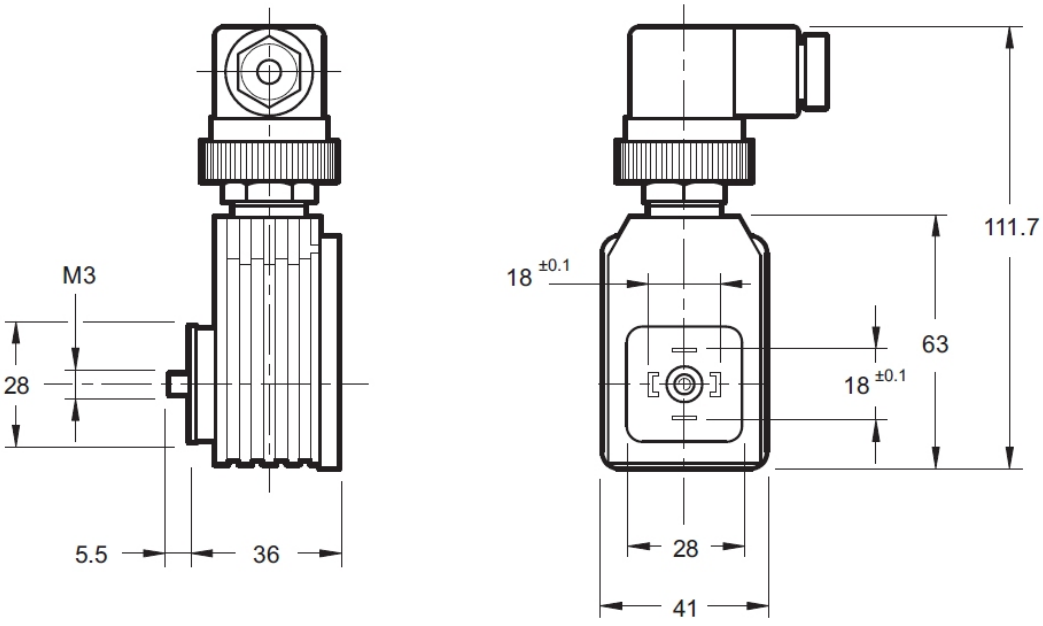
Max. current
1 = 860 mA
2 = 1200 mA
3 = 1600 mA
4 = 1880 mA
5 = 2600 mA

PWM frequency
01 = 100 Hz
02 = 200 Hz
03 = 300 Hz
04 = 400 Hz
05 = 500 Hz

BLOCK DIAGRAM



DIMENSIONS



Annotation
The technical information in this brochure are relating to the operating conditions and applications.
At deviant applications and/or operating conditions please contact the technical dept.
Technical information are subject to technical modifications.

HYDAC Fluidtechnik GmbH
Justus-von-Liebig-Str. 5
66280 Sulzbach / Saar
Tel.: 06897 / 509 -0
Fax: 06897 / 509 -598
Email: flutec@hydac.com