

Proportional Directional Control Valve, Pilot Operated

PRM8-10

Size 10 (D05) • Q_{max} 210 l/min (55.5 GPM) • p_{max} 350 bar (5100 PSI)



Technical Features

- › Pilot operated proportional directional control spool valve with high hydraulic power
- › Subplate mounting surface acc. to standard ISO 4401 (size 10), DIN 24340 (CETOP 05)
- › The valve is designed to control movement direction of actuator and continuous speed regulation proportionally to the input command signal
- › Valve can be controlled by integrated or external electronic control unit
- › Manual override of valve spool
- › Optional type of electric connector for the valve without integrated ECU
- › Adjustable position of coil connector suitable for mounting, achievable by turning the coil after loosening the fastening nut
- › In the standard version, the valve is zinc-coated for 520 h salt spray protection acc. to ISO 9227

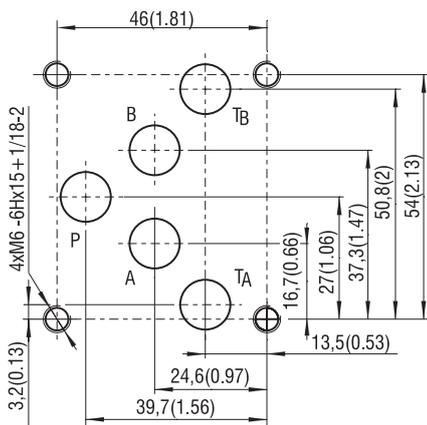
Functional Description

The proportional directional control spool valve is designed to control the movement direction, control the speed and position of the rod of hydraulic cylinder or shaft of hydraulic motor. The speed of movement corresponds to the volumetric flow through the valve, which is continuously controlled by a throttle on the control edge of the spool, proportional to the control signal. The pilot operated directional control valve has a hydraulically operated main spool, which follows the position of the control spool, operated by solenoids. The hydraulic control of the main spool allows high hydraulic power to be controlled, as the power curve of the valve is not limited by hydrodynamic forces.

The valve can be controlled by electronic control unit EL-7, which converts an input command signal into output PWM current signal for solenoid coils. The electronic control unit EL7 is available as external for connection to a DIN rail (EL7-E, see datasheet HA 9152) or integrated on the valve in a form of connector plug (EL7-I, see datasheet HA 9151).

Technical Data

ISO 4401-05-04-0-05



Ports P, A, B, T - max. \varnothing 11.2 mm (0.44 in)

Valve size		10 (D05)	
Max. operating pressure at ports P, A, B	bar (PSI)	350 (5100)	
Max. operating pressure at port T	bar (PSI)	210 (3050)	
Maximal flow at pressure 350 bar (5100 PSI)	l/min (GPM)	210 (55.5)	
Fluid temperature range (NBR)	°C (°F)	-30 ... +80 (-22 ... +176)	
Fluid temperature range (FPM)	°C (°F)	-20 ... +80 (-4 ... +176)	
Ambient temperature range	°C (°F)	-30 ... +50 (-22 ... +122)	
Nominal flow rate Q_n at $\Delta p=10$ bar (145 PSI)	l/min (GPM)	65 (17.2)	
Hysteresis	%	< 6	
Weight	kg (lbs)	4.9 (10.8)	
Technical data of proportional solenoid			
Nominal supply voltage	V	12 DC	24 DC
Limit current	A	3	2.4
Mean resistance value at 20 °C (68 °F)	Ω	2.8	3.8
Technical data of electronic control unit EL-7			
Operating supply voltage U_{cc}	V DC	9 ... 32	
Reference voltage U_{ref}	V DC	5	
Max. current at U_{ref}	mA	20	
Types of input command signal, when EL7 is used		see datasheet EL7*	
Max. output current / 1 coil	A	3	
PWM frequency	Hz	80 ... 1 000	
Resolution of A/D converters	bit	12	
Ramp function	s	0 ... 45	
Dither – amplitude*	% from I_{max}	0 ... 30 % from I_{max}	
Dither – frequency*	Hz	60 ... 300	
*When the dither is activated, the PWM frequency is automatically set to 15 kHz			
		Datasheet	Type
General information		HA 0060	products and operat. conditions
Coil types		HA 8007	C22B*
Connectors		HA 8008	K*
Electronics		HA 9151 HA 9152	
Mounting interface		HA 0019	Size 10
Studkits for CETOP		HA 0020	Size 10
Spare parts		HA 8010	

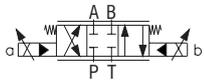
Ordering Code

PRM8-10 [] / 65 - [] [] [] [] [] - **B**

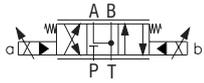
Proportional Directional Control Valve, Pilot Operated

Valve size

Spool symbols



3Z11



3Y11

Nominal flow rate at $\Delta p=10$ bar (145 PSI)
65 l/min (17.2 GPM)

Rated supply voltage of solenoid
(at the coil terminal)

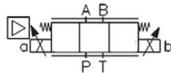
12 V DC
24 V DC

12
24

Integrated electronic control unit
(standardly on the solenoid „a“)

Electronic control unit EL7-IA with an analogue input command signal
Electronic control unit EL7-IC for connection to the CAN bus

EL7-A
EL7-C



Surface treatment
zinc-coated (ZnNi), ISO 9227 (520 h)

Seals
NBR
FPM (Viton)

Manual override
standard (operated by pin)
cap nut covered
rubber boot protected

Connector plug acc. to EN 175301-803-A
valve with integrated electronic control unit
connector plug EN 175301-803-A without rectifier for the valve without integrated ECU and with coils E1 or E2

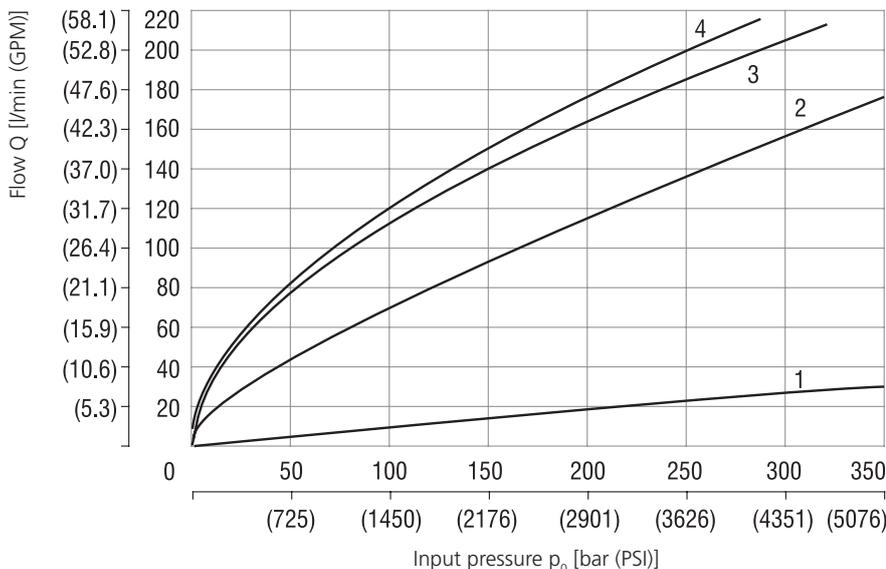
Connector
(only for valves without EL7-I)
EN 175301-803-A
E1 with quenching diode
AMP Junior Timer - axial direction (2 pins; male)
E3A with quenching diode
loose conductors (two insulated wires)
E8 with quenching diode
Deutsch DT04-2P - axial direction (2 pins; male)
E12A with quenching diode

- For proportional valves with two solenoids, single solenoid must be de-energized before the other solenoid can be charged.
- The solenoid operated valves are delivered without connectors. For available connectors see data sheet K_8008.
- Mounting screws for steel plates M6x45 DIN 912-10.9 (see datasheet HA 8010) or studs (see datasheet HA 0020) must be ordered separately. Tightening torque is 14+1 Nm (10.3+0.7 lbf.ft).
- Besides the shown, commonly used valve versions other special models are available. Contact our technical support for their identification, feasibility and operating limits.

Characteristics measured at $v = 32 \text{ mm}^2/\text{s}$ (156 SUS)

Operating limits:

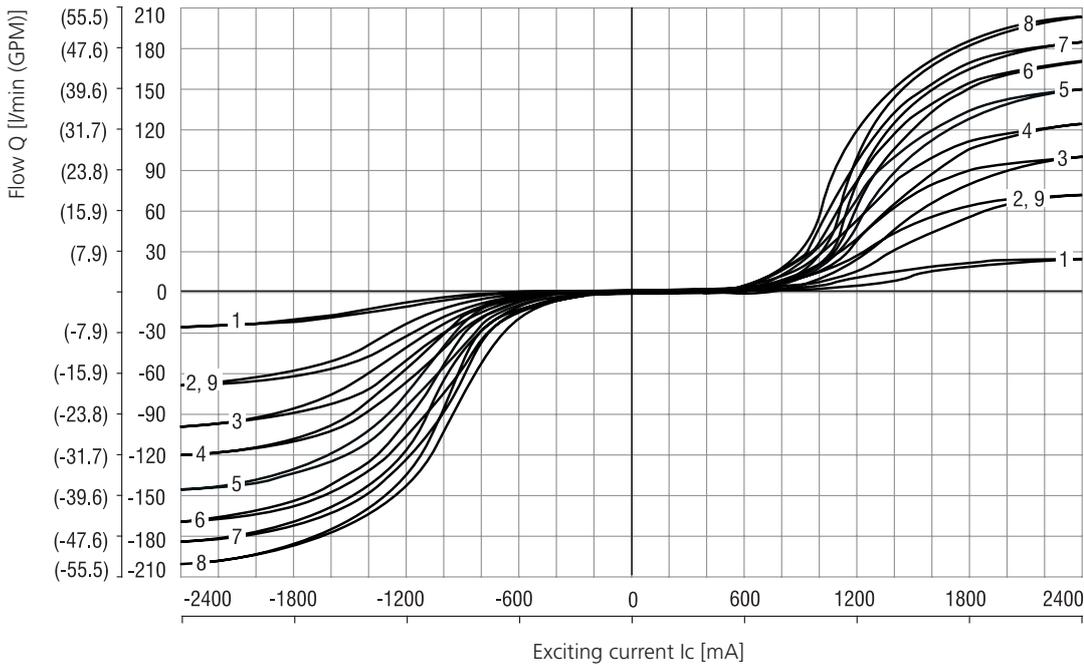
Flow direction P → A / B → T or P → B / A → T



Solenoid current:

1	40 %
2	60 %
3	80 %
4	100 %

Volumetric flow rate depending on the current passing through the coil



1	$p_{in} = 10 \text{ bar (145 PSI)}$	4	$p_{in} = 150 \text{ bar (2176 PSI)}$	7	$p_{in} = 300 \text{ bar (4351 PSI)}$
2	$p_{in} = 50 \text{ bar (725 PSI)}$	5	$p_{in} = 200 \text{ bar (2901 PSI)}$	8	$p_{in} = 350 \text{ bar (5076 PSI)}$
3	$p_{in} = 100 \text{ bar (1450 PSI)}$	6	$p_{in} = 250 \text{ bar (3626 PSI)}$	9	$\Delta p = 10 \text{ bar (145 PSI)}$

The coil current which initializes the flow through the proportional directional valve can differ due to the production tolerances about in a range of $\pm 6\%$ of the limit current.

Electronic control unit EL7

The ECU EL7 allows direct independent control of the valve with an analogue input command signal or connection of the valve to the CANBus control system of machine.

Proportional valve with external electronic control unit EL7-E

The valve can be controlled by external ECU EL7-E designed for connection to a DIN rail. The user electrically connects the ECU to the valve with a cable.



Selection and setting of ECU parameters is described in datasheet HA 9152

Valve with integrated ECU EL7-I*-2-145

The ECU in the form of connector plug is simply mounted on the socket of connector EN 175301-803-A of solenoid coil and fastened with a fixing screw. The second solenoid is connected to the ECU with a cable. If the integrated ECU EL7-I is ordered separately, the length of cable must be specified. The length of cable is defined as a distance between fastening screws of ECU and connector plug.



Selection and setting of ECU parameters is described in datasheet HA 9151

Solenoid Coil in millimeters (in)

E1, E2 Protection Degree IP65	E3A, E4A Protection Degree IP67	E8, E9	E12A, E13A Protection Degree IP67 / 69K
		<p>Note: A = Standard 300 mm (11.8 in), other lengths on demand</p>	

The specified IP rating applies only in the case of correctly connected connectors (male + female) with the corresponding IP rating.

Details of the coil type (coil connector type) of the electromagnet can be found in datasheet HA 8007.

Manual Override in millimeters (in)

No Designation - Standard (operated by pin)	Designation N1 - Cap Nut Covered	Designation N2 - Rubber Boot Protected

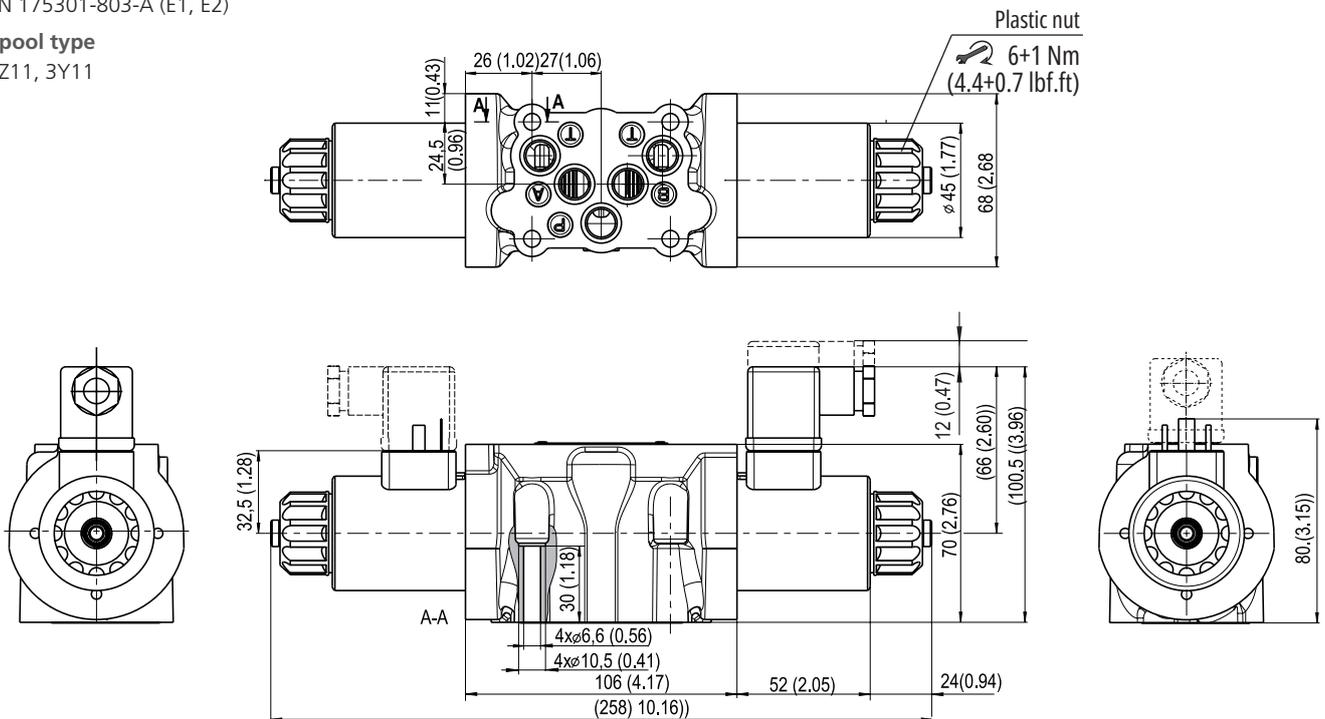
In case of solenoid malfunction or power failure, the spool of valve can be shifted with a manual override under condition that the P channel is pressurized. The main spool is operated hydraulically after shifting the control spool with the manual override. The pressure in T port does not exceed 25 bar (363 PSI). For alternative manual overrides contact our technical support.

Dimensions in millimeters (in)

PRM8-103*/65-*E1*

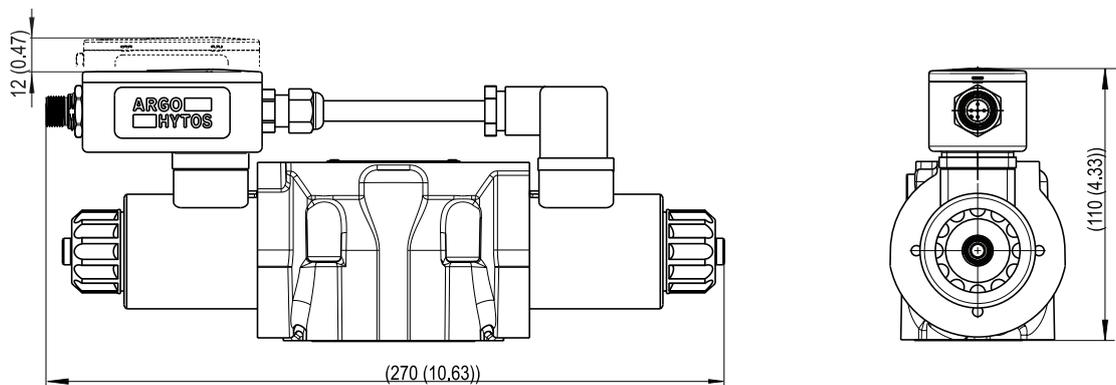
Example with electrical terminal
EN 175301-803-A (E1, E2)

Spool type
3Z11, 3Y11



PRM8-103*/65-*EL7*

Valve with integrated electronic control unit EL-I*-2-145



Mounting screws M6x45 DIN 912-10.9
14+1 Nm (10.3+0.7 lbf.ft)



Proper function of the valve is guaranteed only if the supply pressure in the "P" channel is present and exceeds always the pressure in the "T" channel.