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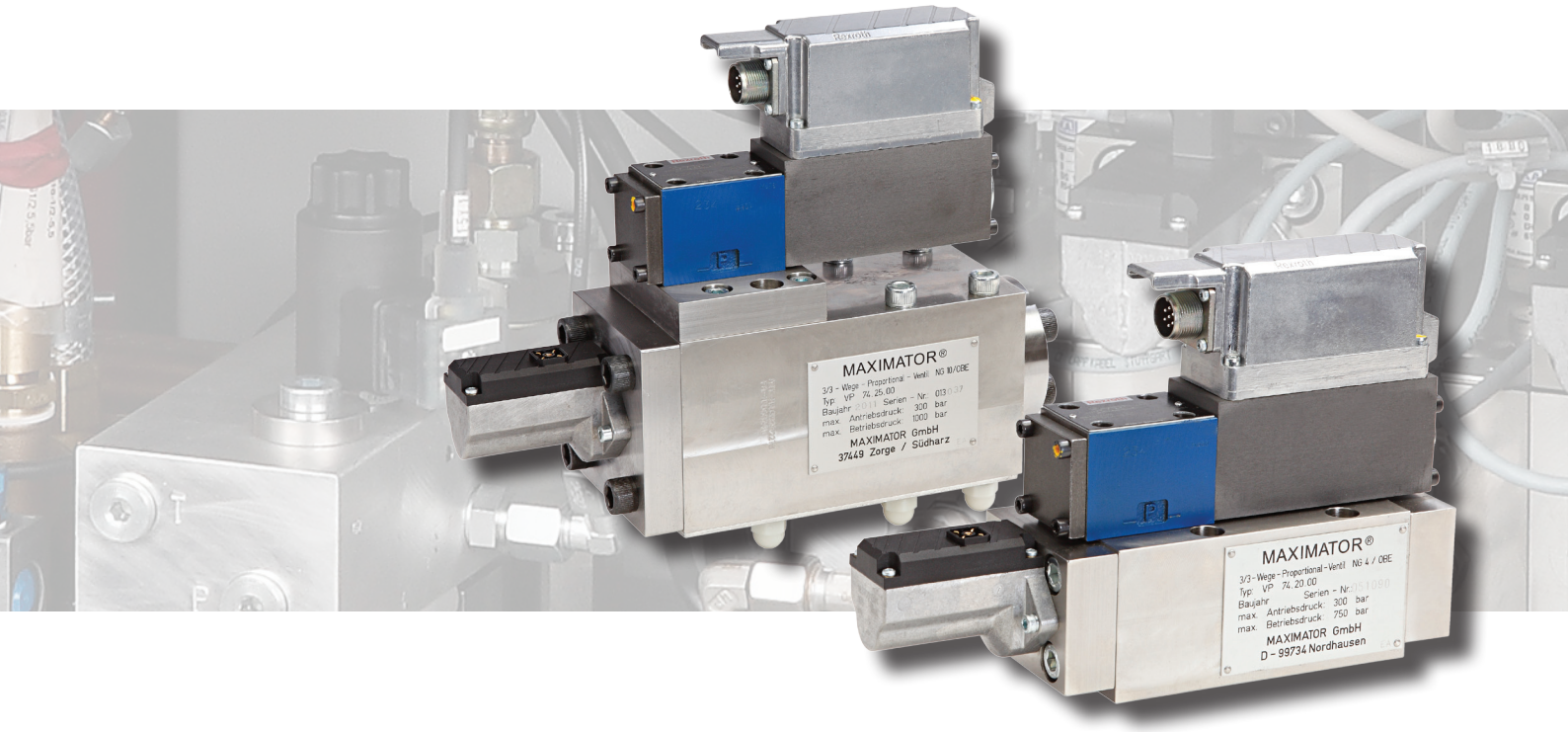

3/3-Way-Proportional Valve

Content

General Description

This proportional valve in combination with the electronic control system allow for easy, swift and continuous regulation of the variables flow and pressure in gases and fluids with a high level of repeating accuracy.

The valve is manufactured in sizes 10mm and 4mm which allows the application in a variety of control tasks in process engineering.

The 3/3-Way-proportional valve is pilot operated and can be supplied with or without integrated pilot control hydraulic supply.

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Design

The MAXIMATOR proportional valve consists of the following main elements:

- Valve box
- Attached control valve for actuation of the main valve
- Main valve unit with seals, piston and reset spring
- Pressure-resistant distance sensor to check main valve stroke
- Pressure transducer (external) optional
- Control electronics (external) optional

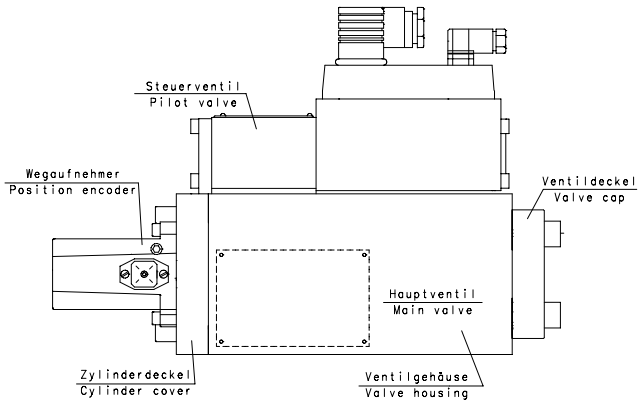

Figure: Assembly 3/3-Way Proportional Valve

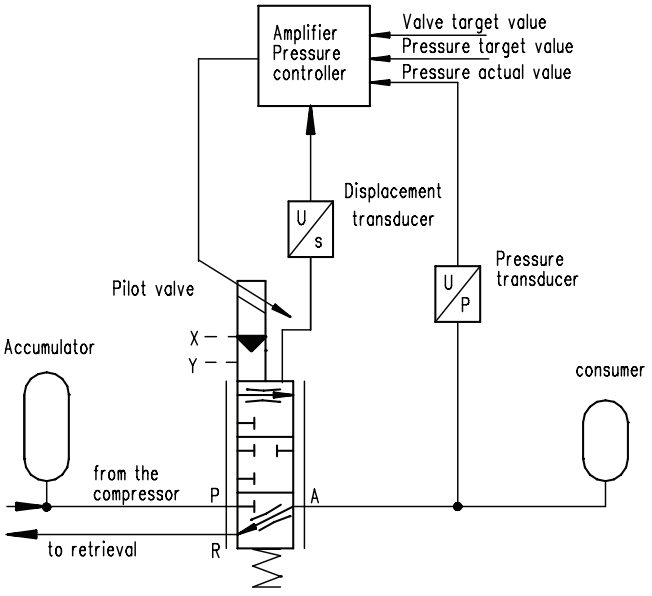

Figure: Block diagram 3/3-Way Proportional Valve

Function

The valve is a metallic seal 3/3 way - seat valve. The opening and closing of the valve takes place by means of a hydraulically actuated set piston.

An electrical signal is set by the control electronics as a reference. This target value may be the analog output of a process computer, a controller or a manually operated set point sensor.

The command signal causes the control electronics of the control valve to displace the piston against the direction of action of the spring.

The friction-locked valve cone is lifted through the spindle from the valve seat or rather the valve stem is moved to the opening of the relief connection. Thus the consumer can be supplied with gas or relieved.

The actual value of the pressure on the consumer side, which is measured by a pressure transducer, is taken into account of the position control loop of the valve as an analog value.

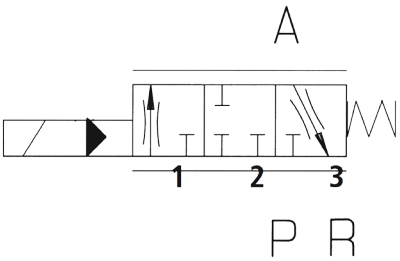

Figure: schematic diagram 3/3-Way Proportional Valve

Normal-Position
After switching on the hydraulic and electric supply the set piston moves into the normal position of the valve.
No pressure increasing takes place. **A to R open!**

Pressure increasing
The set piston moves to the right site and closes the R-Medium return line and opens the P-Medium Inlet.
The pressure increasing takes place. **from P to A!**

Pressure decreasing
The set piston moves to the left site and closes the P-Medium Inlet and opens the R-Medium Return.
The pressure decreasing takes place. **from A to R!**

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Technical Data

Type	NG 10				NG 4					
Design	seat valve stainless steel				seat valve stainless steel					
max. working pressure	750 bar		1000 bar		750 bar			1000 bar		
Servo valve	control card	OBE	control card	OBE	control card	OBE	IAC-R	control card	OBE	Atex
Weight	20,5 kg	20,9 kg	20,5 kg	20,9 kg	10,5 kg	12,7 kg	12,7 kg	10,5 kg	12,7 kg	12,7 kg
Nominal diameter	10 mm				4 mm					
max. valve travel	7 mm				4 mm					
admissible operating temperature	-10°C to +80°C				-10°C to +80°C					
installation position	any				any					
sealing	metallic				metallic					
protection class (plug connected)	IP 65				IP 65					
recommended filtration	60 micron				60 micron					
hydraulic drive pressure	160 bar				160 bar					
supply voltage	24 V DC ± 5% residual ripple				24 V DC ± 5% residual ripple					
connection target value	0-10 V differential input circuit				0-10 V differential input circuit					

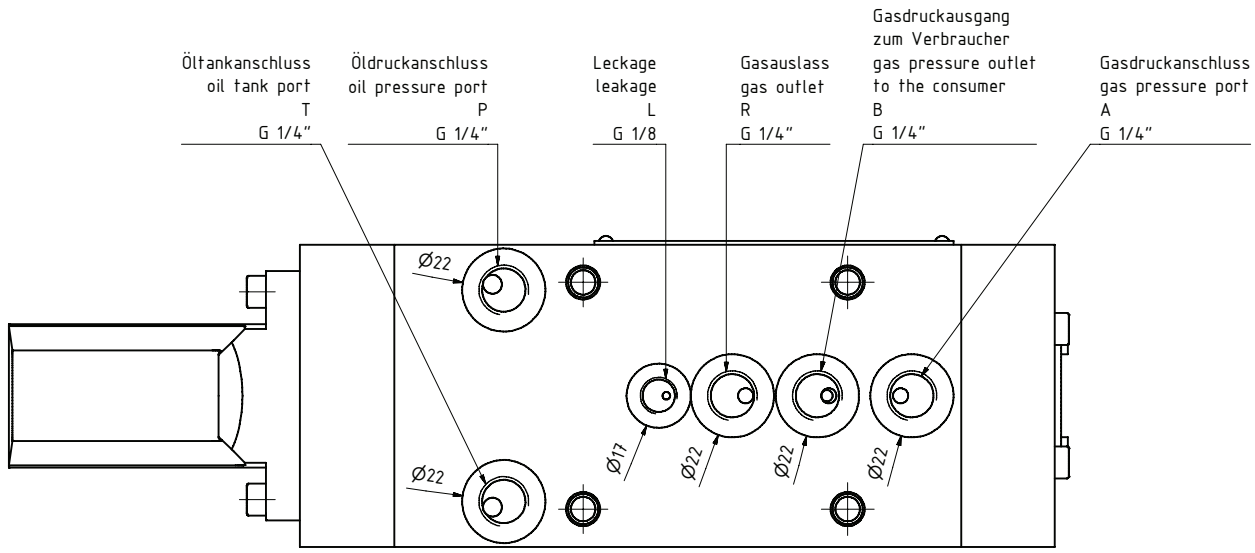

Figure: Connections 3/3-Way Proportional Valve

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Options

Servo valve with control card

The electronic control system with PID controller, actual value and setpoint input is supplied as a 19" card, tailored to the respective valve.

The 19" control card belonging to the valve contains the pressure and position controller for the valve and the amplifier for the pilot valve.

The reference inputs for pressure, valve opening and the actual value are present as differential inputs.

The characteristics of the PID controller is roughly set using a DIL switch on the card and fine adjustment on the front panel.

Servo valve with On-Board-Elektronic (OBE)

The pilot valve with integral position feedback and integrated valve electronics is calibrated at the factory.

For electrical connection a 6P+PE signal input with differential amplifier (interface A1 ±10V or F1 4...20 mA (Rs 200 Ω) is available.

IAC-R Servo valve

The servo valve with integrated digital axis controller (IAC-R) and field bus interface provides control functionality for:

- Volume flow control
- Position control
- Pressure control
- P/Q-Function
- Replacing position/pressure control and position/force control

The set point / actual value feedback can take place by analog (current or voltage) or via field bus.

ATEX approved version

Ex-protection-servo valves are direct operated proportional valves with electrical position control of the control piston.

For the drive a permanent magnet linear motor is used, which adjusts the control piston from the spring-centered centre position in both directions of work.

Position-control electronics and pulse-width modulated drive electronics are integrated in the pilot valve. This allows a direct control of the valve, for example, from the machine control without intervening electronics.

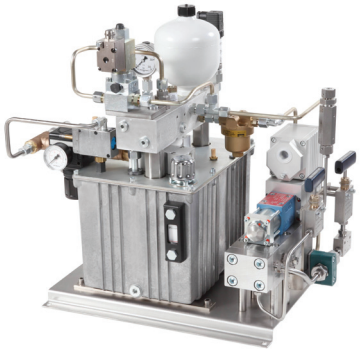

Figure: 3/3-Way Proportional Valve in Ex-protection design with pilot control hydraulic supply

Mounting versions

The 3/3-Way Proportional valve is available as a tube connection or a plate connection version.

The following figure shows the plate connection version of the 3/3-Way proportional valve mounted in a standard control block with pilot control hydraulic supply.

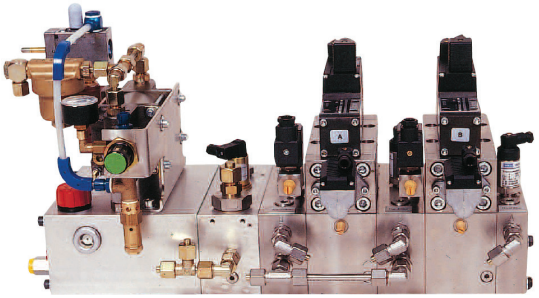

Figure: MAXIMATOR-control block with two proportional valves and pilot control hydraulic supply

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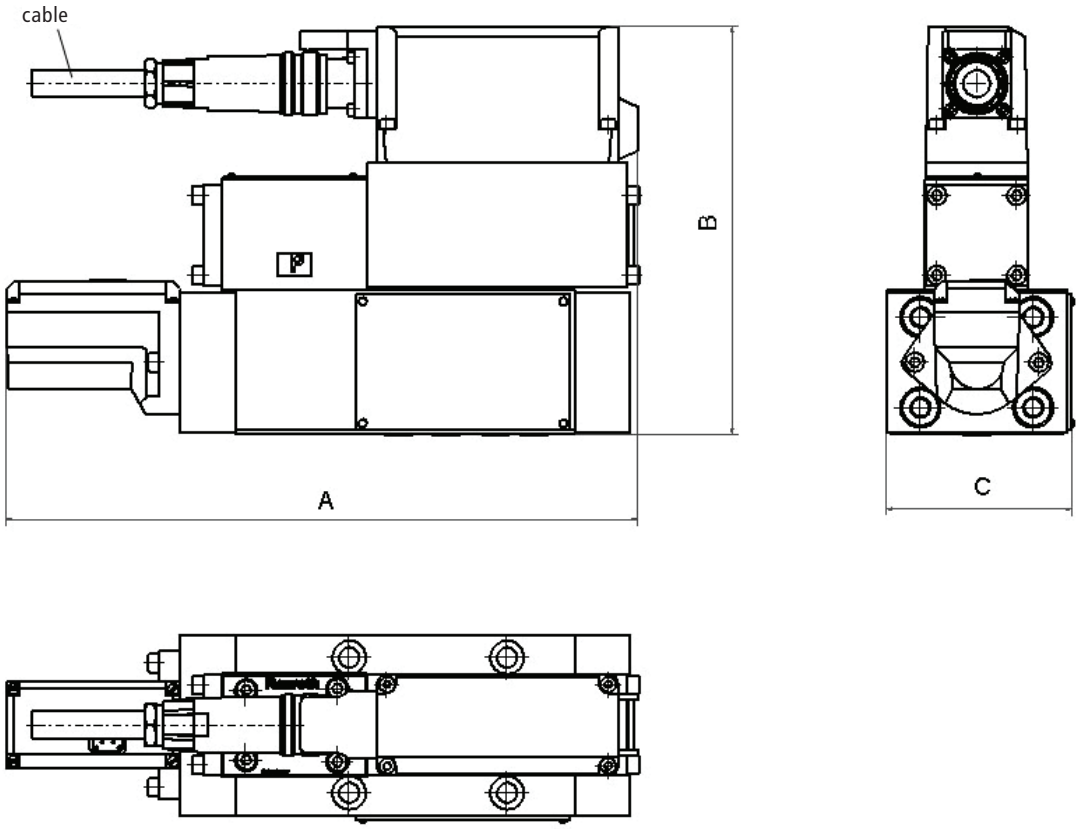

Figure: Dimensions 3/3-Way Proportional Valve

Type	Order Code	Pressure range	Connection (in mm)		
			A	B	C
NG 4 with control card, plate connection	3920.0261	750 bar	281	179	82
NG 4 with OBE, plate connection	3920.4242		285	181	82
NG 4 with control card, tube connection	3920.0804		281	184	82
NG 4 with OBE, tube connection	3920.3687		285	186	82
NG 4 with IAC-R servo valve, plate connection	3920.6240		285	213	80
NG 10 with control card, plate connection	3920.0994		316	238	102
NG 10 with OBE, plate connection	3920.5630		316	229	102
NG 4 with control card, plate connection	3920.2552	1000 bar	281	179	82
NG 4 with OBE, plate connection	3920.5859		285	181	82
NG 4 with ATEX approved Servo valve, plate connection	3920.6521		309	222	82
NG 10 with control card, plate connection	3920.2553		316	238	102
NG 10 with OBE, plate connection	3920.5177		316	229	102

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Accessories

Connection plate

Depending on the type (NG10 or NG4) and pressure range Maximator offers the right connection plate. The following table lists the order codes of the connecting plates.

Typ	750 bar	1000 bar
NG4	3920.1517	3920.7105
NG10	3520.0155	3920.0208

Hydraulic Units

As an auxiliary power, hydraulic actuating power is required. There should be a minimum pressure of 120 bar used. To control the valve large quantities of hydraulic oil may be required for a short time.

The flow rate depends on the task of regulation. Flow rates of up to 40 l/min may be required from the servo valve for a short time, but for each control cycle a maximum oil volume of approx. 56 cm^3 (NG 10) or 15 cm^3 (NG 4).

By using a hydraulic accumulator and depending on the control frequency the appropriate unit for the hydraulic drive can be selected.

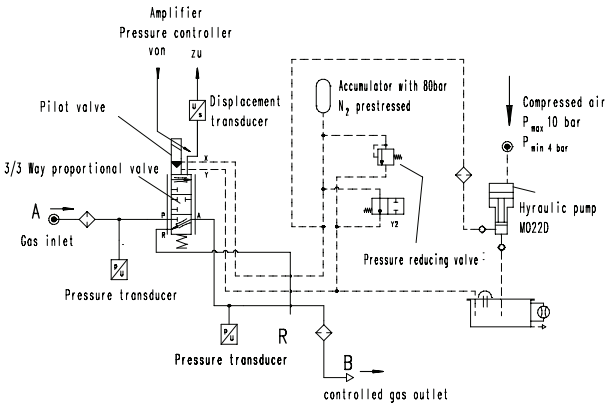
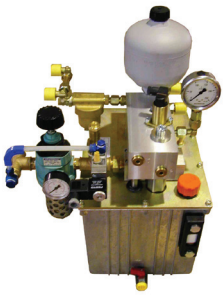


Figure: Block diagram control block with pilot control hydraulic supply

Type	MO22D	S35D	S35D complete with air filter
Figure			
Order Code	3920.0113	3920.1429	3920.2792

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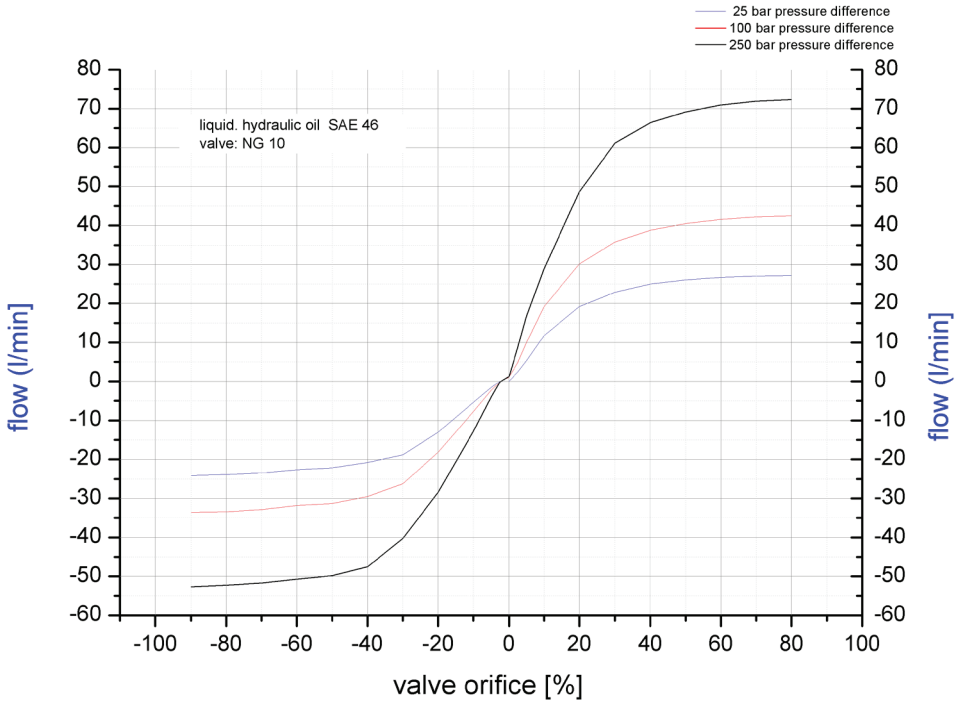
Characteristic curve NG4



Characteristic curve NG10