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2 – WAY FLOW CONTROL VALVE

proportional solenoid – 210 bar
plate mounting NG 6 – hole pattern DIN 24 340 – G 6
nominal volume flow up to 25 l/min

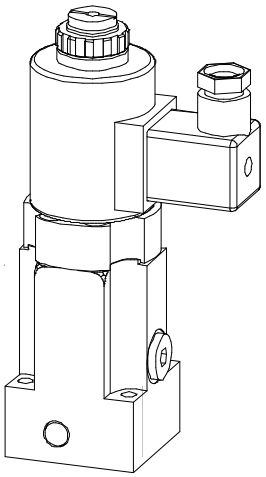
TYPE

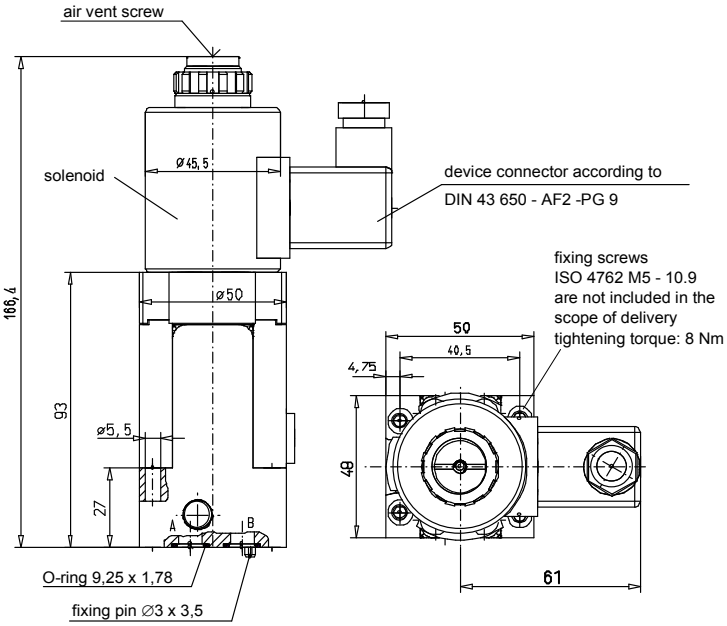
28 MP

2-way flow control valves are flow valves (throttle valves) with integrated pressure compensation. These valves control an adjustable volume flow independently of pressure changes in the inlet or outlet line.They can be mounted in the inlet or outlet side of the consumer.

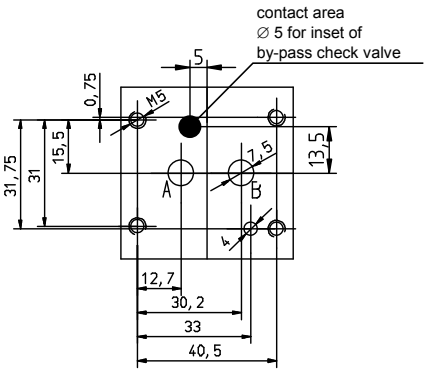
FEATURES

- hole pattern accordig to DIN 24 340 – G 6
- 7 nominal volume flow ranges up to 16 l/min
- proportional-magnetic control: 12 V, force controlled, pressure resistent coil exchangeable without opening the hydraulic system
- valves rest position: closed
- actuating time approx. 70 ms
- volume flow – signal characteristic: linear
- with by-pass check valve
- standard sealing material Buna N/NBR, other materials possible
- mounting on connection plates with pipe connection or control block possible





hole pattern



ORDER INFORMATION

The scope of delivery includes the O-rings as sealings of the connection holes and the connection plug.

NAME	2-way flow control valve	28	M	P	25	M..

type series
series code letter
actuation **P** = proportional solenoid
nom. volume flow **1 – 2,5 – 4 – 6,3 – 10 – 16 – 25** l/min
supplementary details for special modification
e.g. - special sealings Viton (FKM) = **M15**

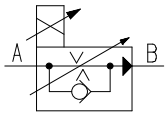
ACCESSORY

can be ordered seperately

control amplifier StA03-ES1:	see datasheet	9-74-003-3011
valve fixing screw set:	order code	44-020-00928
4 cylinder head screws M5 x 35 DIN 912 – 10.9		
connection plates:	see datasheet	9-74-030-2002
flow rectifier plate type 71 CZ:	see datasheet	9-74-071-0016
valve fixing screw set:	order code	44-020-00921
4 cyl.h. screws M5 x 35 DIN 912 – 10.9 f. combination w. flow rectifier plates		

CHARACTERISTICS

1. GENERAL

Symbol	
Design	adjusting orifice: trunk piston with rectangular opening pressure compensator: in downstream of the orifice
Weigth	approx. 1,7 kg
Mounting position	any, preferably vertical
Direction of volume flow	A to B controlled, B to A unthrottled return flow
Ambient temperature	-10 °C to +50 °C

2. HYDRAULIC CHARACTERISTICS

Nominal/max. pressure	210 bar for all connections
Hydraulic fluid	hydraulic oil according to DIN 51 524 (1,2)
Hydraulic fluid temperatur range	-20 °C to +70 °C
Range of viscosity	5 – 350 mm²/s
Nominal volume flow	1,0 – 2,5 – 4 – 6,3 – 10 – 16 - 25 l/min
Min. controllable volume flow	approx. 10 to 20 cm³/min; 1:25 related to the nominal flow volume
Max. return flow via check valve	40 l/min
Contamination level/filtering	class 16/13 according to ISO 4406 or 7 according to NAS 1638 (recommended filter: minimum retaining rate $\beta_{10\text{-}15} \geq 75$)

3. TYPE OF ACTUATION

electric: proportional solenoid

3.1 SOLENOID

design	single solenoid - pressing, pressure resistant
nominal voltage	12 V DC
nominal current	1,6 A
limiting current	1,9 A
min. current	approx. 400 mA
nominal resistance	R_{20} = 5,9 Ω
nominal power	15,1 W
duty cycle	100%
connection type	device plug connection according to DIN 43 650 – AF 2
protection class	IP 65 according to DIN 40050 (with plug connected)

4. DYNAMIC PERFORMANCE

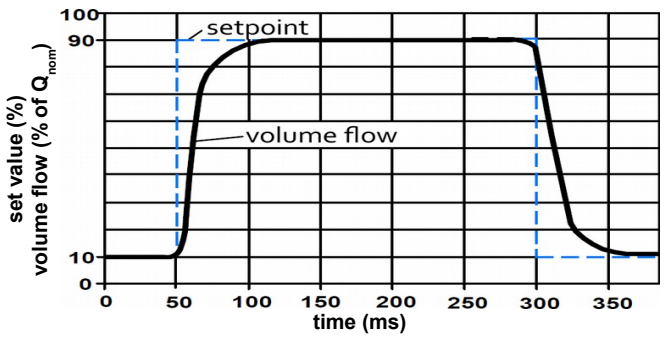
(definition according to DIN 24 311)

response sensitivity	approx. 1 %	of the nominal volume flow at Δp = 50 bar
repetition accuracy	approx. 1 %	
reversal range	approx. 1 %	
hysteresis	approx. 4 %	
volume flow – signal characteristics	see characteristic curves	
time response		

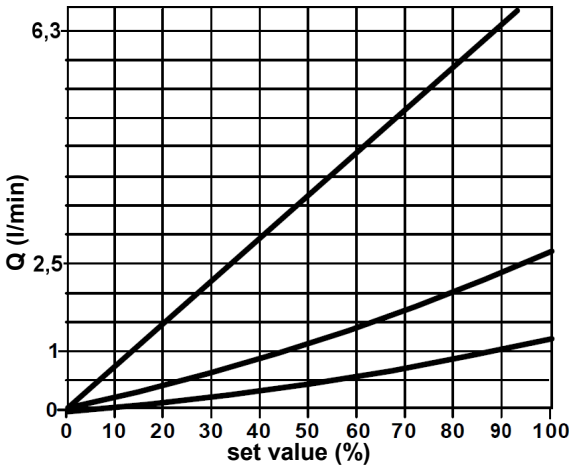
CHARACTERISTIC CURVES

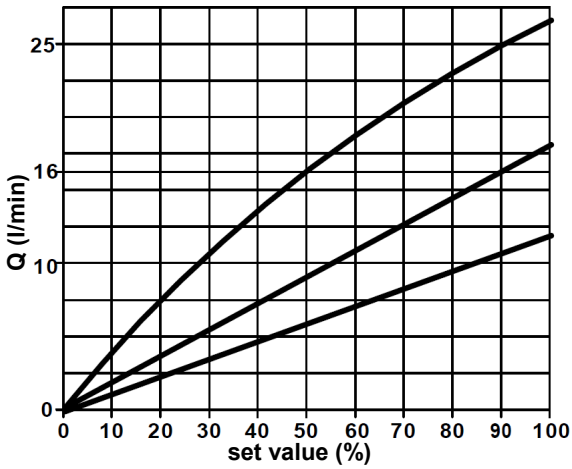
time response

Transition function or step response for a set value jump from 10% to 90% and vice versa.



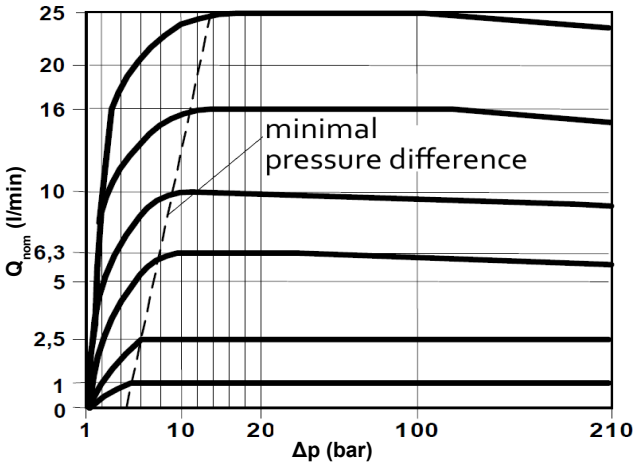
volume flow – signal function dependency of the volume flow ranges and electrical input signal





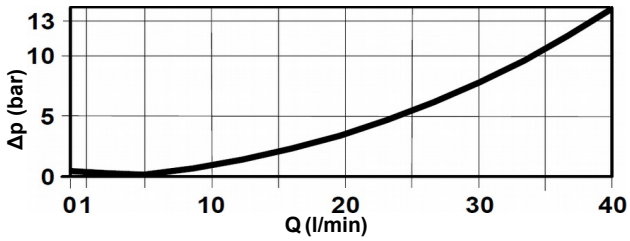
Q-Δp characteristic; Q = f(Δp)

Control behaviour of the valve for the volume flow direction A to B for several nominal volume flows as well as the minimal pressure difference required for the valves functionality.



Δp-Q characteristic; Δp = f(Q)

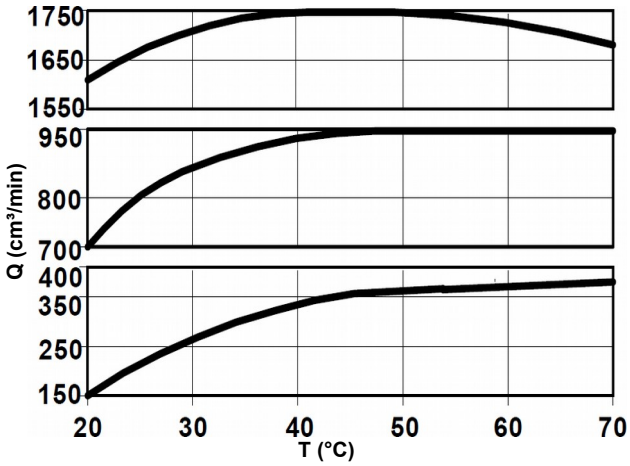
Pressure loss of the valve for the volume flow direction B to A via by-pass check valve at closed adjustment orifice.



Q-T characteristic; Q = f(T), P = 100 bar

Volume flow change for 3 different set values in dependence of the oil temperature at a constant pressure difference of 100 bar.
Measured with hydraulic oil HLP 46 (ISO-VG 46) v_{oil} = 46 mm²/s at 40 °C.

For larger volume flows the temperature influence becomes smaller.
For smaller volume flows low viscosity oils result in smaller volume flow deviations.



DESCRIPTION

1. VALVE

The valves automatically control an adjustable volume flow at constant level independent of pressure oscillations in the feed and outlet line. For proper functionality a minimal pressure difference for the orifice is needed.
The valves can be mounted on the forward or return side of the consumer.
The volume flow is setted continuously via a proportional solenoid, which is controlled by a electronic control amplifier. The proportional solenoid is a electromechanic transducer. Its output force is proportional to the electric current. The magnetic force acts against a counterforce-pressure spring via the valves trunk piston with the orifice opening. Because the cross section of the orifice opening increases linear to the solenoid stroke, the relation between solenoid current and volume flow is also almost linear. The solenoid is connected to the valve via a central thread. The solenoid can be turned 360° around the valves axis, so the decive plug connector can be directed to any desired position.
The pressure independency of the volume flow is reached by the pressure compensator. The pressure compensator provides a constant pressure difference at the orifice and is setted up downstream as a secondary regulator.
Due to the very compact design, the valve reacts to pressure oscillations within few milliseconds.
The pressure compensator is opened in rest position, which may lead to a starting jump, if it is switched on. The valves for feed regulation can be delivered with a modified control connection, which allows to close the pressure compensator, to prevent starting jumps (see additional information 9-74-020-0026).
The volume flow will be regulated in one flow direction. The type plate shows which direction is regulated. A by-pass check valve is installed for the opposite direction, to allow an unthrottled return flow with low pressure loss. It is designed as a spring-loaded ball seat valve.
Note!
We recommend to vent the valve when putting it into operation. The air vent screw can be found at the head of the solenoid (see dimension drawing).
Attention!
The valves should not be operated by the conroller electronic, if the hydraulic system is switched off. This can lead to internal damage.

2. MATERIAL

The valve parts are basically made of engineering steel. The external parts are burnished or galvanized. All wear parts are hardened. The solenoid parts which are in contact with the hydraulic fluid are made of steel, iron and brass. The solenoid coil is covered with plastic material.

For applications outside of the given specifications, please contact Schiedrum Hydraulik.

All given specifications are partially based on long-term experience and laboratory measurements. The data are typical for the valve, but can deviate in series. All measurements were performed on a test bench with a oil viscosity of 36 mm²/s and with a filter mesh < 10 µm. All given data should be used as description of the product only and are not to understand as warranty in the sense of law.