Throttle Valve

Valve regulation with proportional control solenoid
Subplate mounting NG 6 – mounting surface to DIN 24 340 -G 6
210 bar – up to 25 l/min

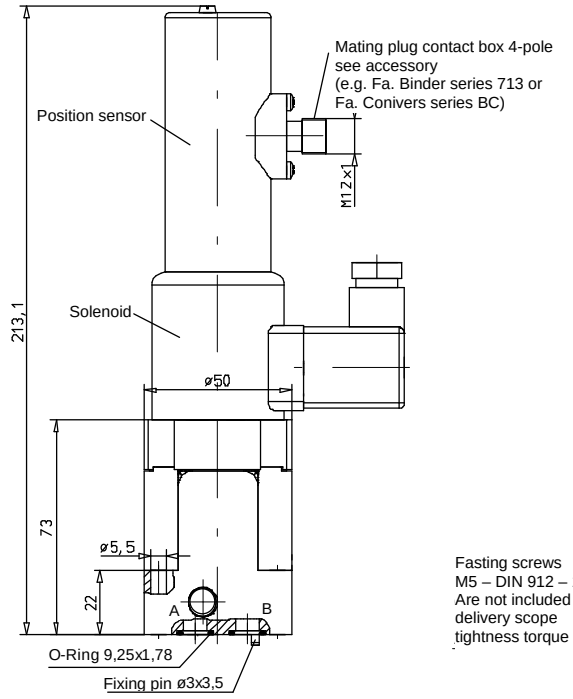
Type

108 LR

Throttle valves are flow valves in which the volume flow depends on the throttle valve cross section and differential pressure. The control valve can be adjusted by means of orifice to ensure that, as far as possible, the equipment's efficiency by viscosity.

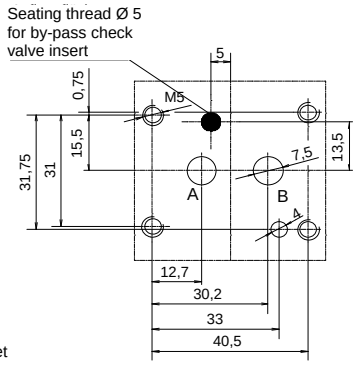
FEATURES

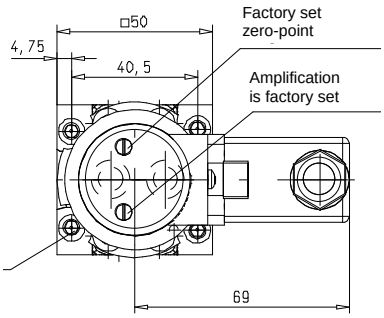
- Solenoid system: path-controlled, pressure resistant
  Coil is exchangeable without open the hydraulic systems
- Path measuring system: pressure resistant, inductive with integrated carrier frequency measure amplifier in an enclosed metal housing
- EMV - the regulations by law concerning electro-magnetic compatibility of devices (EMVG) are fulfilling in case of proper installation.
- Volume flow signal function: linear
- Remote -controllable, programmable
- Valve neutral position: closed
- Acting time 100 ms
- 6 orifice size to set
- Assembly on connection plates with pipe joints or control block
- With or without bypass check valve
- Standard sealing material Buna N (NBR)



Fasting screws
M5 – DIN 912 – 10.9
Are not included in the
delivery scope
tightness torque 8Nm

Mounting surface DIN 24340-G6





ORDER DATA

The scope of delivery of the flow control valve includes the o-rings for sealing of the connecting holes and the connecting plugs.

Name ——— **Throttle valve** | **108** | **L** | **R** | **2** | **R** | **M15**

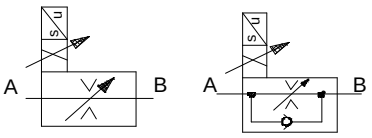
Type series
Series code letter
Valve operating mode R = proportional solenoid
Orifice size 2 to 7 (see Fig. 3 to 8)
check valve:
R = with; **without** = without Code
Supplementary data for special models
e.g. special sealings from Viton (FKM) = **M 15**

ACCESSORY

Control amplifier type STRA03-ES-1	see dimension sheet 9-74-003-3011
Mating connector position Sensor	Order-No.: angle box 44-028-00536 (dimension sheet 9-74-028-0009) Suitable for an installation according to the EMVG regulations
Valve fixing screw set	Order-No.: 44-020-00078 (4 pces. Socket head screws M6 x 30 DIN 912 – 10.9)
Connecting plates	see dimension sheet 9-74-030-2002

CHARACTERISTICS

1.General

Symbol	
Design	Adjustment throttle: hollow piston with rectangular opening check valve: spring-loaded ball-valve
Weight	2,1 kg
Mounting position	any, preferably vertical
Direction of volume flow	A to B throttled; B to A unthrottled return flow with check valve
Ambient temperature	-10℃ to +50℃

2. Hydraulic characteristics

Rated pressure / max. pressure	210 bar for all connections
max. permitted pressure	100 bar; limit see Fig. 3 to 8
max. permitted flow from A to B	30 l/min; limit see Fig. 3 to 8
Volume flow signal function	See Fig. 3 to 8
Orifice size	6 orifice size to set
Max. permissible volume flow via the check valve	40 l/min
Leak volume flow	approx. 200 cm^3/min(Δ p100 bar, rated valve 0 Volt, oil viscosity 36mm^2/s)
Hydraulic fluid	Hydraulic oil according to DIN 51 524 (1,2)
Hydraulic fluid temperature range	-20℃ to +70℃
Viscosity range	5 - 350 mm^2/s
Contamination level / filtering	General permit table class 16/13 according to ISO 4406 or 7 according to NAS 1638 (recommended filter: minimum retaining rate $\beta_{5-10} \geq 75$)

3. Type of actuation

electrical – proportional solenoid with position sensor

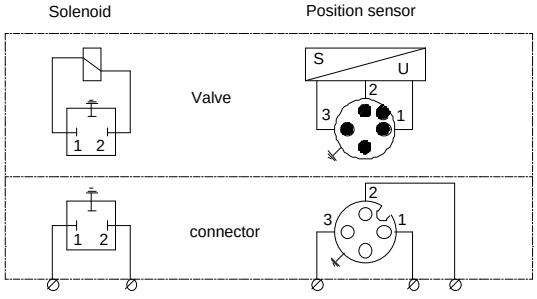
3.1 Solenoid

Design	Single solenoid - pressing, pressure sealed
Type of Voltage	D.C. voltage
Rated voltage	12 V
Rated current	1,6 A
Max. current	1,9 A
Min. current (basic current)	approx. 400 mA
Nominal resistance	R_{20} = 5,7 Ohm
Rated power	14,6 W
ON period	100%
Type of connection	Device plug and socket connecting according to DIN 43 650 - AF 2
Type of protection	IP 54 according to DIN 40 050 (with installed mating connector)

3.2 Position sensor

Design	pressure-tight
Measuring system	Inductive; principle - differential transformer
Supply voltage	24 V DC +/- 20%, polarized
Permissible ripple	$U_{SS} \leq 5\%$
Power consumption	≤ 40 mA
Output voltage	ca. 7,5 - 11V; ripple ≤ 20 mV_{SS}, valve-specific compensation
Max. output voltage load	>10 K Ohm
Sensitivity, adjustable	1,5 V/mm +/- 15%
Zero shift, electrically	+/- 1 mm
Type of connection	Device plug-and-socket connection M 12 x 1 - 4 pole
Type of protection	IP 65 according to DIN 40 050 (with installed mating connector)

Terminal assignment



Terminal assignment Position sensor	
PIN	
1	Output Voltage
2	Supply Voltage
3	0 V

4. Response characteristics (definition according to DIN 24 311)

Sensitivity	<1%	from nominal signal on Δ p 10 bar
Repeatability	<1%	
Range of inversion	<1%	
Hysteresis	<1%	
Temperature drift (position sensor, without viscosity influence)	<0,1% Δ Q/℃	
Volume flow signal function	see diagrams	
Time response	see diagrams	

CHARACTERISTIC

Time response
Fig. 1 measure with orifice size 4
Δ p 40 bar (constant). The response function will change under different operating conditions.

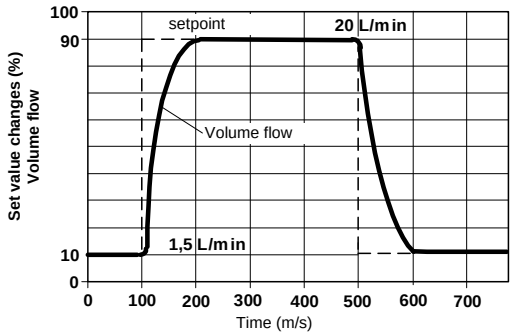


Fig. 1

Δ p-Q-characteristic line; Δ p = f (Q)
Fig. 1 the pressure drop in relation to the flow from connection B to A via check valve with the orifice restrictor closed.

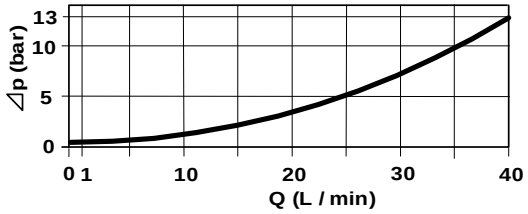


Fig. 2

Volume flow signal function characteristics; Q = f (U; Δ p = const.)
The curve with the highest figure confined the operational area with max. volume flow and max. permitted pressure for named orifice size.

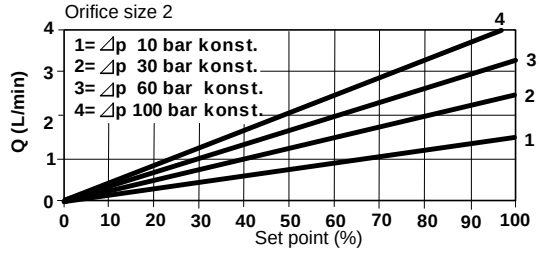


Fig. 3

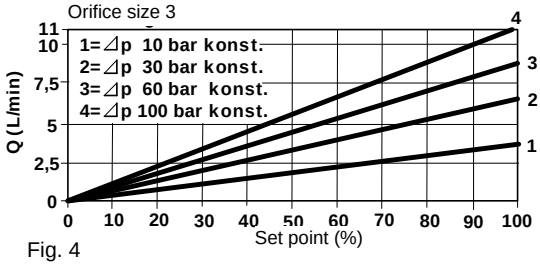


Fig. 4

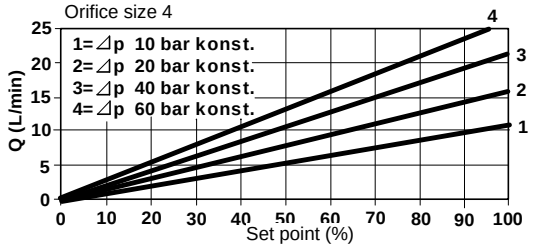


Fig. 5

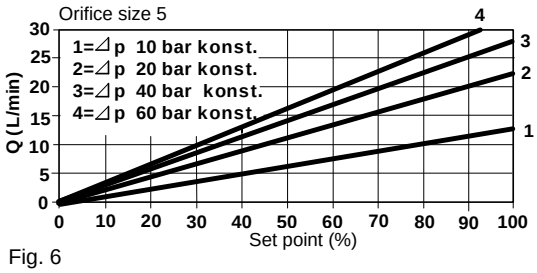


Fig. 6

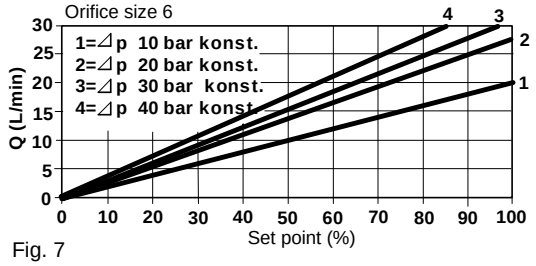


Fig. 7

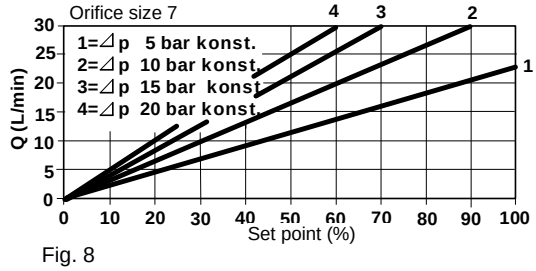


Fig. 8

1. Valve

The flow valve can be used to adjust the throttle section progressively. It can be installed either at the input or output of the system. The flow adjustment is by means of a proportional solenoid that is powered by an electric amplifier proportionally to a specified electric nominal valve signal. The proportional solenoid is an electro-mechanical transducer. Its initial force is proportional to the magnetic current. The magnetic force operates via a slidegate valve piston with the throttle opening against an opposing force pressure spring in such a way that the system operated with a controlled force. Proportionally to Kraft behaves also the stroke of the slidegate valve piston, in addition, on the throttle opening and the flow. The flow will depend on the size of the throttle section and the pressure difference at this point. The solenoid is linked to the valve via a central thread. To increase the setting accuracy and to reduce the influence of disturbances, the proportional solenoid is coupled to a path measuring system. In this way, the solenoid of the piston can be switched with the orifice opening in accordance with the given nominal value via the electronic control system in the position circuit and therefore be positioned precisely. This measure for instance eliminates large hysteresis errors among others. As the orifice section increases linearly of the solenoid stroke and as the path sensor supply a linear output signal there is also a linear relation between nominal value and volume flow. Path sensor and solenoid together form an inseparable and rigid unit. Solenoid and sensor coil can be replaced without opening the hydraulic system. The coils can be rotated by 360° so that the plug connections can be brought into virtually any position.

The position sensor converts the magnetic stroke into an electric output voltage. Its type of action is based on the principle of a differential transformer consisting of a primary and two secondary coils. The electronic protective circuit is integrated in an enclosed metal housing in the sensor. Zero point and amplification can be adjusted by means of potentiometers at the sensor. The sensor design complies with the regulations by law concerning the electromagnetic compatibility of devices (EMVG) (see installation regulation 9-84-028-0049).

The flow will depend on the size of the throttle section and the pressure difference at this point. If the pressure difference remains constant, the flow will be constant.

The throttling is by means of an orifice and is thus not affected, in general, by the viscosity of the pressure medium. The connection of the flow for the throttle is from connection A to B. In reverse flow direction, optionally a by-pass check valve is integrated which allows for an unrestricted return flow at low pressure loss. It is designed as spring loaded ball seat valve.

Attention!

The valve must not be driven by the electronic, when the hydraulic is shut down. Internal valve damages cannot be excluded. For this case the proportional amplifier StRA03-ES enable signal (connector Pin Z6) or the supply voltage should be disabled.

2. Materials

The housing is made of cast iron, the other parts are made of engineering steel. All wear parts are hardened. The Externals components are bronzed. The magnet components in contact with the pressure medium are of steel, iron and brass. The solenoid coil and the sensor coil are galvanized, the solenoid holder is bronzed.

For applications in excess of the given specification, please contact Schiedrum.

All specified parameters are partially based on long user's experience and partly on measurements made in laboratories. The data are typical of the valve and can deviate in series. All measurements were carried out on a test stand with an oil viscosity of 36mm²/sec and a filter mesh of < 10 µm. All data given here should be used as description of the product only and they are not to understand as warranty in the sense of law.