

2-way flow control valves are flow valves (throttle valves) with integrated pressure balance. The valves automatically control an adjustable volume flow independently of pressure variations in the supply or discharge line to make it constant.

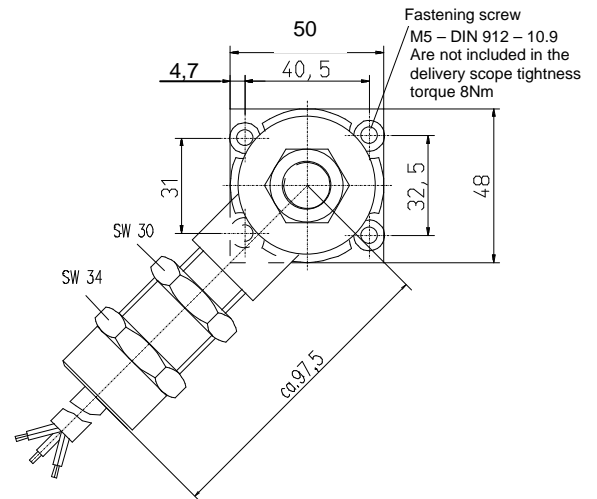
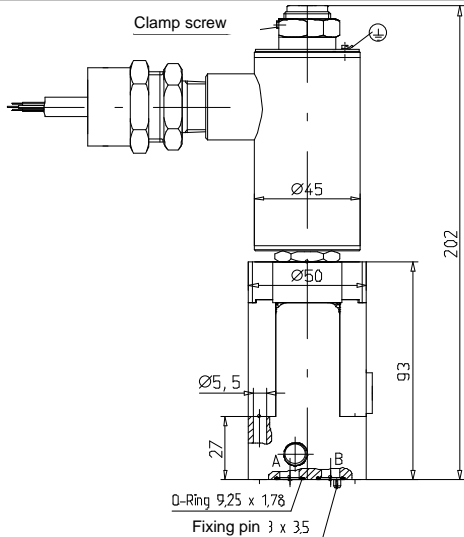
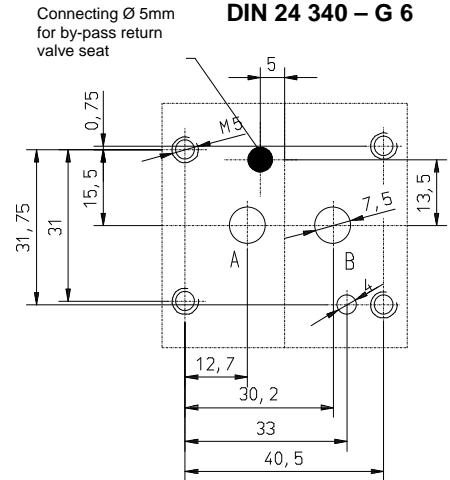
FEATURES

- Solenoid system: Path-controlled, pressure resistant.
- Coil can be replaced without opening the hydraulic system
- Remote-controllable, programmable
- Valve neutral position: closed
- Floating time 70 msec.
- Volume flow signal function: linear
- Mounting surface according to DIN 24 340 - G 6
- Assembly on connection plates with pipe joints or control panel
- With by-pass check valve
- Standard sealing material Buna N / NBR

MODIFICATIONS special model

- **Marking: CE 0722(Ex) II 2GD Ex d IIC T5 C**
- For explosive areas, cluster II. class **2G 2D**
 Type of protection **Ex d IIC T5** according to
 EN 60679-0 : 2006 EN 60079-1 : 2004
 EN 61241-0 : 2006 EN 61241-1 : 2004
 Certificate of conformity: **INERIS 05ATEX0028X**
INERIS 05ATEX0028X/1

**Valve mounting surface
 DIN 24 340 - G 6**



ORDER INFORMATION

The scope of the throttle valve includes the O-rings for sealing the connecting drill holes and the certification of conformity.

Name **2-way flow control valve 28 L P 25 M602**

Type series

Series code letter

Valve operating mode P = proportional solenoid

Rated adjustment volume flow: in l/min 1; 2,5; 4,0; 6,3; 10; 16; 25

Supplementary data for special models

e.g. Explosion protection according to ATEX 95 = **M 602**

ACCESSORY

Set of valve fastenings:

Order.-No.: 44-020-00928

(4 pcs. Socket head screw M 5 x 35 DIN 912 - 10.9)

Connecting plates

see dimension sheet 9-74-030-2002

Control amplifier type:

StA 03 - ES (No Ex-authorization)
 see dimension sheet: 9-74-003-2014

Flow rectifier plates:

see dimension sheet 71 CZ - 9-74-071-1010

Valve fixing screw set:

for the combination with flow rectifier plates:

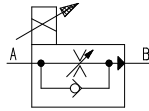
Order.-No.: 44-020-00921

(4 pcs. Cylinder head screws M 5 x 75 DIN 912 - 10.9)

CHARACTERISTICS

1. General

Symbol



Design

Adjustment throttle: hollow piston with rectangular opening
 Differential pressure valve: switched in downstream with the adjustment throttle
 Check valve: spring-loaded ball valve

Weight

2,0 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

Rated pressure / max. pressure

210 bar for all connections

Hydraulic fluid

Hydraulic oil according to DIN 51 524 (1,2)

Hydraulic fluid temperature range

-20°C to +60°C

Viscosity range

5 - 350 mm²/sec.

Rated volume flow range

1,0; 2,5; 6,3; 4,0; 10; 16; 25 l/min

Min. adjustable and controllable volume flow

approx. 10 - 20 cm³/min, recommended control range 1 : 25 referred to the rated variable flow

Max. permissible volume flow via the check valve

40 l/min

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, simple solenoid

3.1 Solenoid

Design

pressure-tight, pressure-resistant, explosion protection device

Current supply / nominal voltage

D.C. voltage / 24 V

Rated current / cur off

0.4 A (effective)

Nominal resistance P_{20} / cut off P_{warm}

9.5 W / max.

Relative switch-on time

100%

Type of protection

IP 67 according to EN DIN 60529

4. Response characteristics

(Definition according to DIN 24 311)

Sensitivity

ca. 1 %

Repeatability

ca. 1 %

from nominal signal

Range of inversion

ca. 1 %

on Δp 50 bar

Hysteresis

ca. 4 %

Volume flow signal function

see Fig.. 2 and 3

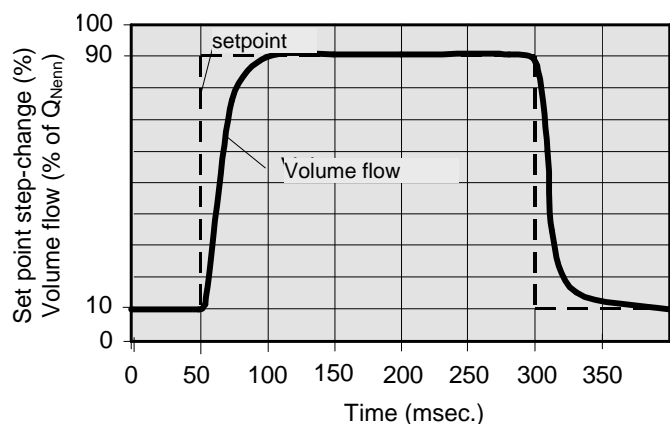
Time response

see Fig. 1

CHARACTERISTIC

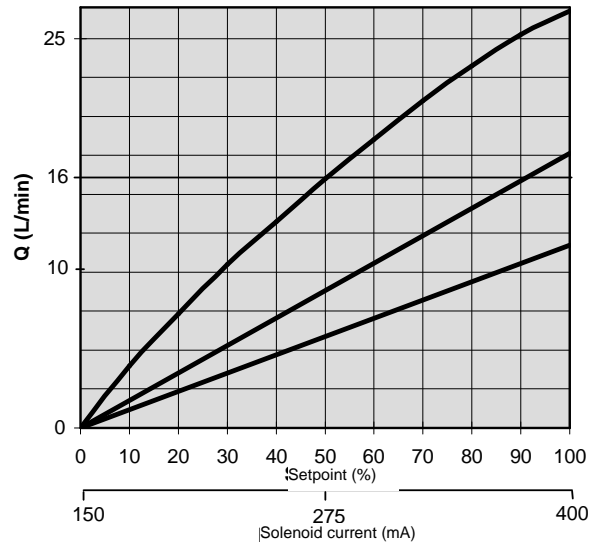
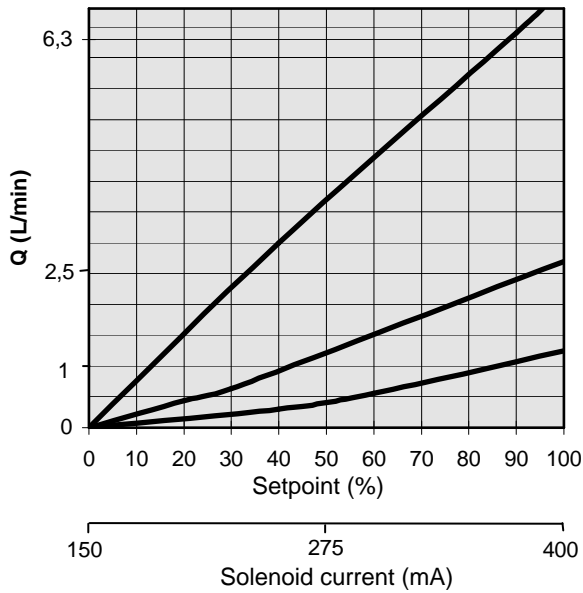
Time response

Fig. 1 shows the frequency response or step response in case of a set point step change from 10% to 90% and inversely.



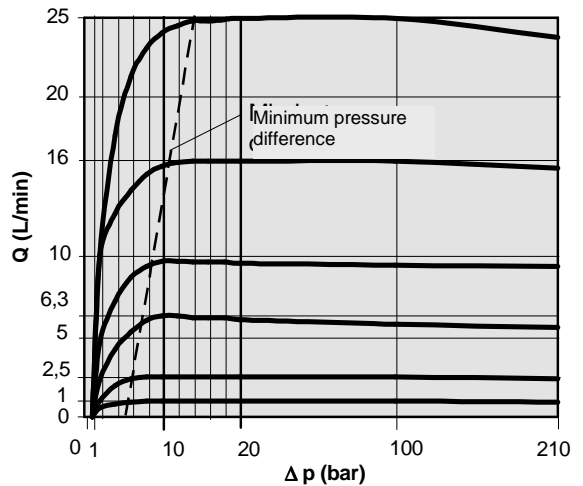
Volume flow signal function characteristics $Q = f(U)$

Fig. 2 and 3 show the dependency of the nominal volume flow range on the input signal.



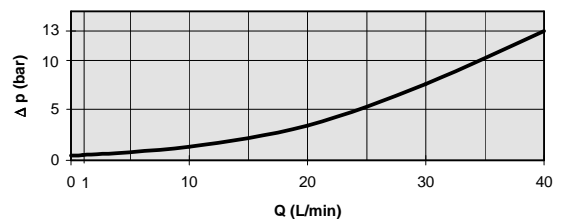
Q- Δp -characteristic; $Q = f(\Delta p)$

Fig. 4 shows the control behaviour of the valve for the volume flow direction A to B for the various rated flow volume ranges as well as the minimum pressure difference required of the function.



Δp -Q-characteristic; $\Delta p = f(Q)$

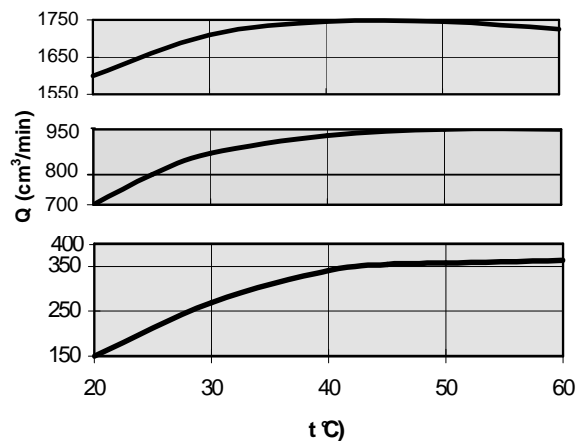
Fig. 5 shows the pressure loss of the valve for the volume flow direction B to A through the bypass return with the setting screen is closed.



Q-t-characteristic; $Q = f(t, p = \text{constant})$

Fig. 6 shows the flow change depending on the oil temperature at a constant pressure difference of 100 bar for three different setting values. The measurement is carried out with hydraulic oil HLP 46 (ISO - VG 46) = 46mm²/sec. at 40°C.

For higher volume flows the temperature influence becomes smaller. In case of smaller flow, low viscosity oil result in smaller volume flow deviations.



The construction of operating solenoids is conforming to the rules of EN 60079-0 and 60079-1 and was released for manufacturing by “Institut National de l’EnviRonnement industriel et des riSques” (INERIS)

The number of certification, manufacturer’s serial number and the date of outgoing goods control of the solenoid are labelled on the surface of the solenoid.

Before mounting and start-up please mind the following points:

1. The valves have to be treated and stored with care.
2. The information of the performance data on the solenoid must be observed, also never remove the labelling of the solenoids.
3. The safety regulations of the manufacturer must be observed by the user.
4. The flange face of the valve has to be free of oil before mounting.

Valve description

1. Valve

The valves automatically control an adjustable discharging flow constant within the function limits independently of pressure variations in the supply or discharge line. They may be integrated at the supply or discharge side of the consumer. The volume flow adjustment is infinitely variable through the proportional solenoid which is controlled by an electronic control amplifier. The proportional solenoid is an electric-mechanical transducer. Its output quantity force is proportional to the flow. The magnetic force acts against a counter check pressure spring with the orifice opening. As the orifice section increases linearly over the solenoid stroke there is also a linear relation between nominal value and volume flow.

The coils can be rotated by 360° so that the plug connections can be brought into virtually any position. The pressure independence of the volume flow is obtained by means of the differential pressure valve (pressure regulator). It guarantees a constant pressure difference at

the setting orifice and is switched in series with the latter (secondary controller). Due to the extremely compact design, extremely short control times of few msec are obtained in case of pressure variations. The pressure regulator is open in its neutral position. This may lead to a starting jump when switching on the valve. The valves can be delivered optionally with a modified control port via which the pressure regulator can be closed in its neutral position (see additional information 9-74-020-0026). The volume flow is controlled in one flow direction only. The control direction can be gathered from the name plate. In reverse flow direction, 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 ! We recommend to air bleed the valve before starting operation. The air bleed screw you will find on the front side of the solenoid (shown on the drawing).

2. Materials

The housing is made of cast iron, the other parts are made of steel. All wear parts are hardened. The valve housing and the cover are black-burnished. The solenoid components in contact with the pressure medium are of steel, iron and brass. The exterior of the coil is zinc plated and the coil holder is black-burnished.

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

All specified parameters are partially based on long years of experience. The data are typical and may slightly deviate depending on the valve series. All measurements were carried out on a test stand with an oil viscosity of 36 mm²/s, a filter mesh of < 10 µm and an optimally adjusted electronic control system. All data given here should be used as description for the product only and they are not to understand as warranty in the sense of law.