2-WAY FLOW CONTROL VALVE

With integrated digital controller

Subplate mounting NG 6 – mounting surface DIN 24 340 - G 6

210 bar – up to 25 l/min

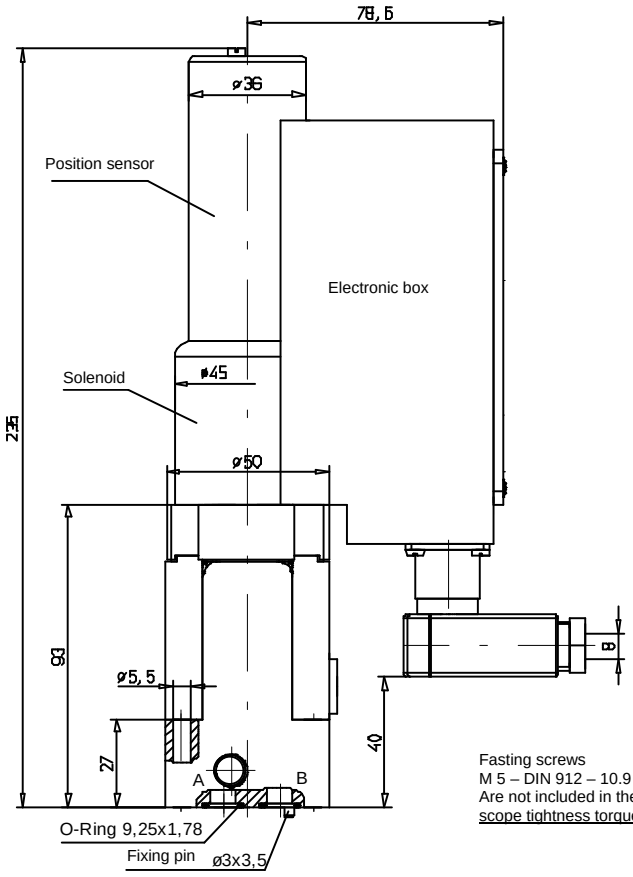
Type

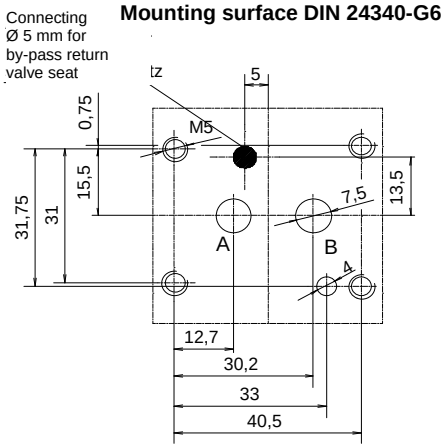
28 BD

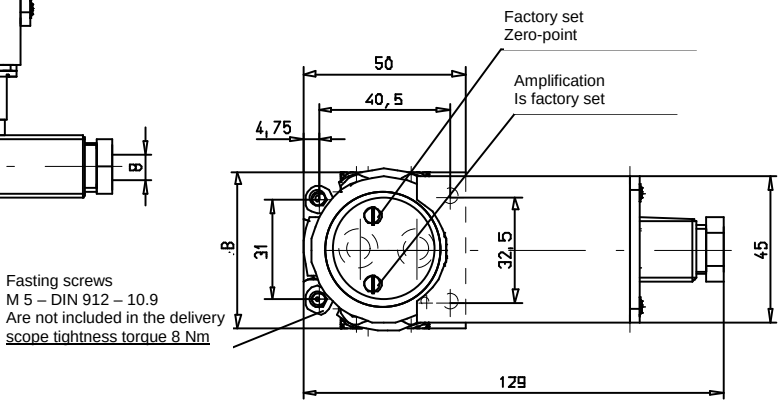
2-way flow control valves are flow valves (throttle valves) with integrated pressure balance. The valves automatically keep constant an adjustable flow independent of pressure variations in the inlet and outlet lines.

FEATURES

- Solenoid systems: force-controlled, pressure resistant
  Coil can be replaced without opening the system
- integrated digital controller
- Remote-controllable, programmable
- Valve neutral position: closed
- Floating time 70 ms
- Volume flow signal function: (optionally different characteristics possible)
- Assembly on connection plates with pipe joints or control block
- With by-pass check valve
- Standard sealing material Buna N / NBR
- specific solutions e.g. ramp function, switching on threshold etc. availed upon request







Fasting screws
M 5 – DIN 912 – 10.9
Are not included in the delivery
scope tightness torque 8 Nm

ORDER INFORMATION

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

Name	2-Way flow control valve	28	B	D	25	A	M15

Type series

Series code letter

Valve operating mode: digital control = **D**

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

Signalrange: 0…10 V = **A**; 0…20 mA = **B**; 4…20 mA = **C**

Supplementary data for special models

e.g. special sailings from Viton (FKM) = **M15**

ACCESSORY

set of valve fastenings. Order.-No.: 44-020-00928 (4 pces. cylinder head screw M6 x 35 DIN 912 – 10.9)

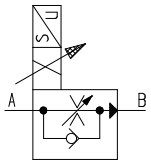
Connecting plates see dimension sheet 9-74-030-2002

Flow rectifier plates see dimension sheet 71 CCZ 9-74-071-0016

Valve fixing screw set: Order.-No.: 44-020-000921 (4 pces. cylinder head screw 5 x 75 DIN 912 - 10.9) for the combination with flow rectifier plates

CHARACTERISTICS

1.Allgemeines

Symbol	
Design	Adjustment throttle: trunk piston with rectangular opening Differential pressure valve: switched in downstream with the adjustment throttle Return valve: spring-loaded ball-valve
Weight	2.1 kg
Mounting position	any, preferably vertical
Direction of volume flow	A to B controlled; B to A unthrottled return flow
Ambient temperature range	-10℃ to +50℃

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℃ to +70℃
Viscosity range	5 - 350 mm^2/sec
Rated volume flow range	1,0; 2,5; 4,0 6,3; 10; 16; 25 l/min
Min. adjustable and controllable volume flow	approx. 10 - 20 cm^3/min, recommended control range 1 : 100 referred to the rated variable volume flow
Max. permissible volume flow via the 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 $\beta_{5\text{-}10} \geq 75$)

3. Type of actuation

electrical – proportional solenoid position sensor

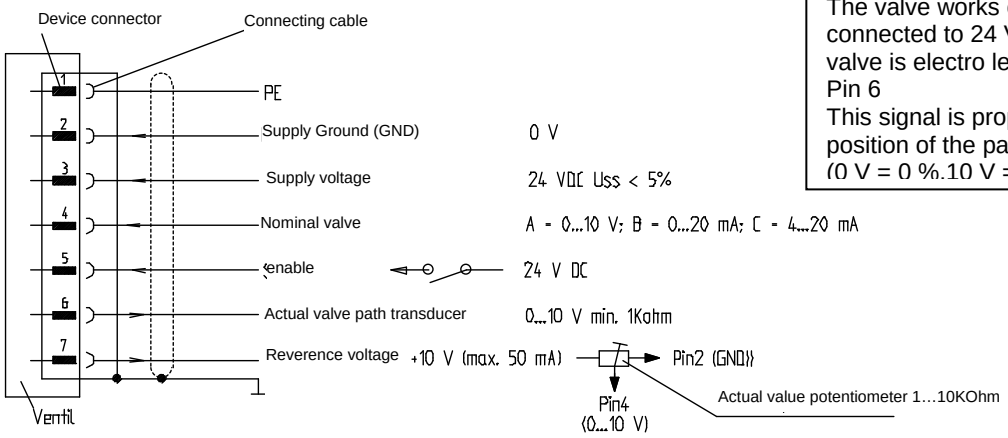
3.1 Solenoid

Type	Simple solenoid – pressure-tight, pressure resistant
Type of voltage	D.C. voltage
Rated voltage	12 V
Rated current	1.6 A
Limit current	1.9 A
Rated resistant	R_{20} = 5.7 Ohm
Rated power	14.6 W
ON period	100%

3.2 Position sensor

Type	Pressure resistant
Measuring system	inductive; principle – differential transformer
Sensitivity, adjustable	1.5 V/mm +/- 3%
Zero shift, electrically	+/- 1mm

Circuit diagram



Pin 5
The valve works only if the enable-pin is connected to 24 V DC. If no signals abut the valve is electro less in neutral position.
Pin 6
This signal is proportional to the actual position of the path sensor
(0 V = 0 %,10 V = 100 %)

3.4 Protective system (according to DIN EN 60529) IP 65

3.5 Type of connection

plug connection identical to C091 31F007 (by Amphenol Tuchel)
Cable box included in the scope of delivery

Cable diameter	max. 8 mm
Wire gauge	0.5 mm^2

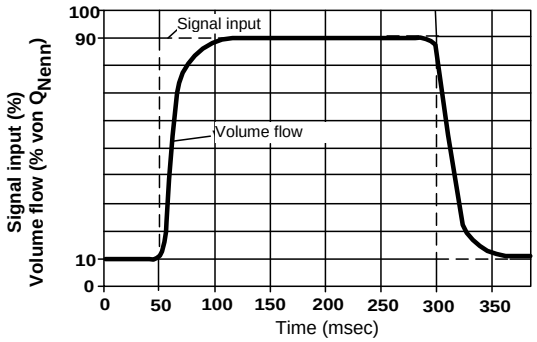
4. Response characteristics

(Definition according to DIN 24 311)

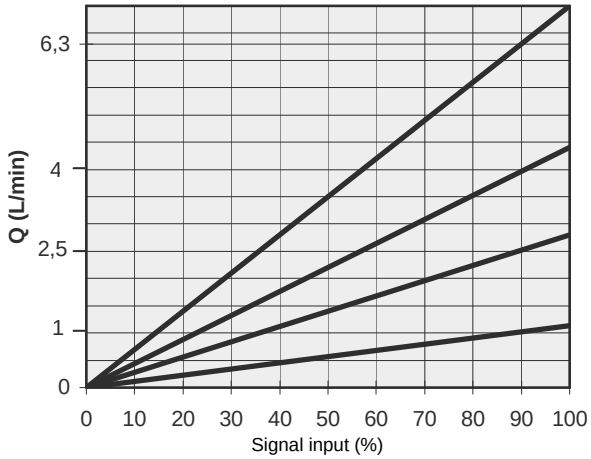
Sensitivity	<1%	From nominal signal Δ p 50 bar
Repeatability	<1%	
Reversal error	<1%	
Hysteresis	<1%	
Temperature drift (position sensor; Without viscosity influence)	<0,1% Δ Q/℃	
Volume flow signal function Time response	See Figures	

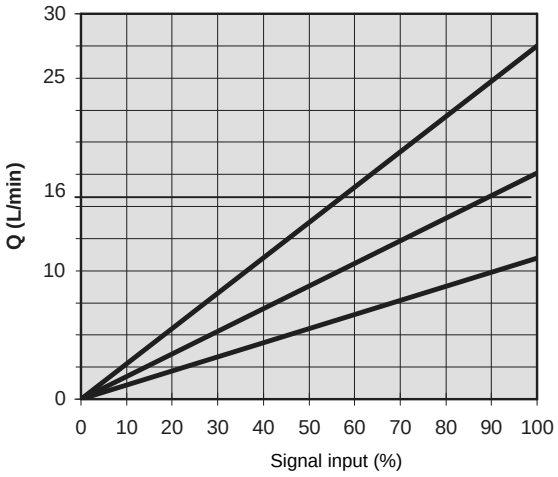
CHARACTERISTICS

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.

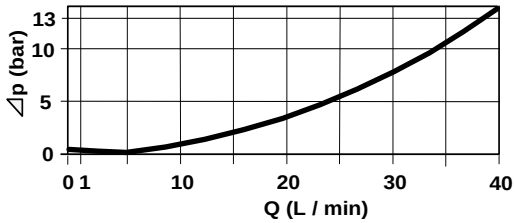


Volume flow signal function characteristics
Shows the dependency of the nominal volume flow ranges on the electrical input signal.

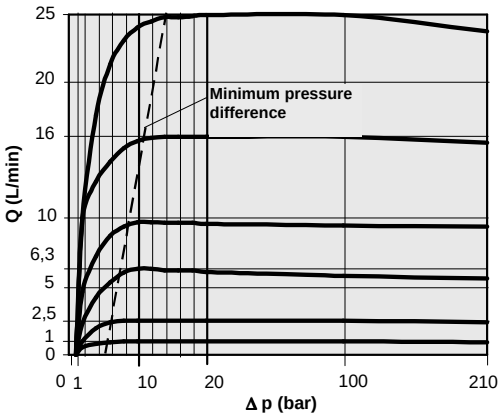




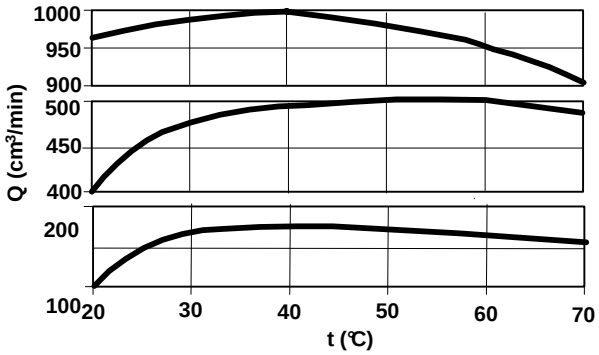
Δ p-Q-characteristic line; Δ p = f (Q)
Shows the pressure loss of the valve for the volume flow direction B to A through the by-pass return with the setting screen closed.



Q- Δ p-characteristic line; Q = f (Δ p)
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.



Q-t-characteristic line; Q = f (t, p = constant)
The volume 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) = 46 mm²/sec at 40℃.
For higher volume flows, the temperature influence becomes smaller. In case of smaller flow, low viscosity oil result in smaller volume flow deviations.



Description of the valve

1. valve

The valves automatically control an adjustable recharging flow constant within the function limits independently of pressure variations in this 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 integrated digital drive- and control amplifier. The proportional solenoid is an electric-mechanical transducer. Its output quantity force is proportional to the current. The magnetic force acts against a counter check pressure spring with the orifice opening. 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 digital 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. The path sensor converts the solenoid stroke in a proportional electrical output voltage. The operating principle is based on the principle of a differential transformer consisting of a primary and two secondary coils.

The electronic wiring is integrated into the sensor. Zero point and amplification can be adjusted via the potentiometer on the sensor. 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 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-passed 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 long be driven by the control range, valve damages cannot be excluded. By using the proportional amplifier, this shout be switched off by the Stop input by the mechanical control.

2. Werkstoffe

The housing and the other parts are made of steel. The electronic house is made of aluminium. All wear parts are hardened. The external valve parts are black-finished, the solenoid and senor coils are galvanized and chromized. The solenoid components in contact with the pressure medium are of steel, iron and brass.

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.