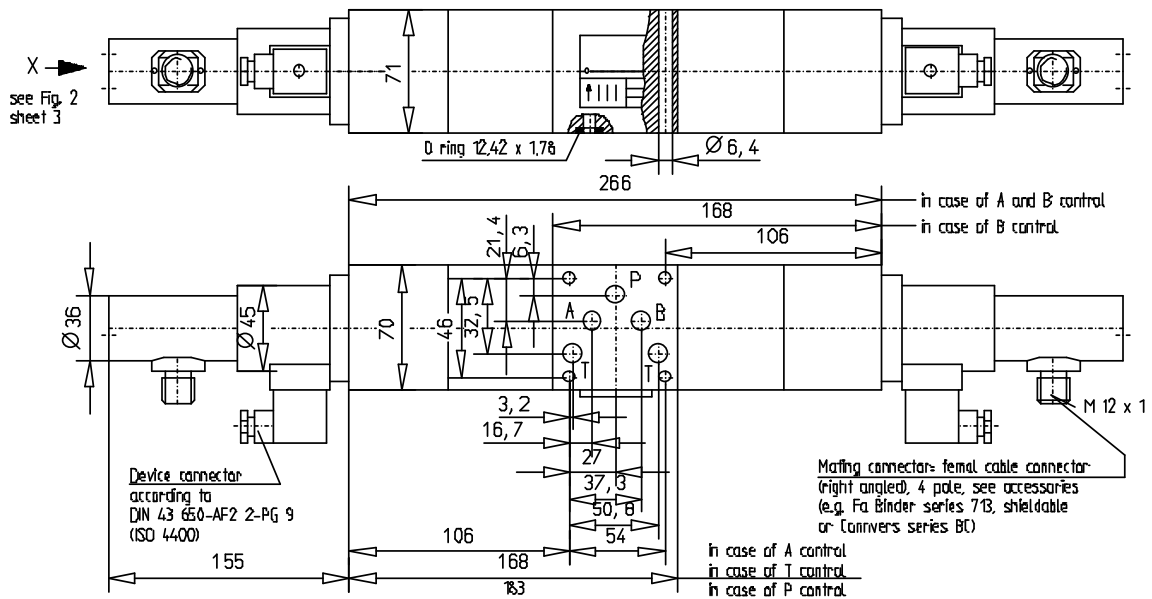


2-way flow control valves are flow valves (throttle valves) with integrated pressure balance. The valves automatically keep constant an adjustable outlet flow independent of pressure variations in the inlet and outlet lines.

FEATURES

- Modular stack valve for height linkage
- Flow control function at connection A or B; A and B; P or T
- Forward or return flow
- Solenoid system: with position control, pressure resistant, coil exchangeable without opening the hydraulic system
- Position measuring system: pressure-resistant, inductive with integrated carrier frequency instrument amplifier in the enclosed metal housing.
- EMV - the regulations by law concerning electro-magnetic compatibility of devices (EMVG) are fulfilling in case of proper installation.
- Remote -controllable, programmable
- Valve neutral position: closed
- Acting time 70 ms
- Volume flow signal function: linear
- With bypass check valve
- Standard sealing material Buna N (NBR)



ORDERING DATA

The O-rings for sealing the connection holes and the solenoid device connectors are part of the scope of supply.

Description	2-wav flow control valve	280	C	R	63	L	A	V	Z	M15
Type series										
Series code letter										
Type of valve actuation: R = proportional control solenoid										
Rated volume flow rate: 25; 40; 63 L/min										
Volume flow signal function: L-linear										
Type of flow control function:										
A or B = flow control at connection A or B										
A/B = flow control at connection A and B										
P or T = flow control at connection P or T										
V = forward flow only in case of type A or B or A/B										
R = return flow										
Z = modular stack valve										
Additional data for special design										
e. g. special seals made from Viton (FKM) = M 15										

ACCESSORIES

Control amplifier type StRA 03 - ES - 2 see dimension drawing 9-74-003-0026
Mating connector position Sensor Suitable for an installation according to the EMVG regulations.
 Order No.: angle box 44-028-00536
 (Dimension drawing 9-74-028-0009)

CHARACTERISTICS

1. General

Symbol				
Type designation	280 CR -.LAVZ	280 CR -.LBVZ	280 CR -.LA/BVZ	280 CR -.LTZ
Symbol				
Type designation	280 CR -.LARZ	280 CR -.LBRZ	280 CR -.A/BRZ	280 CR -.LPZ
Design		Set throttle:	hollow piston with rectangular opening	
		Differential pressure valve:	downstream the set throttle	
		Check valve:	spring-loaded ball seated valve	
		Single solenoid type:	6,6 kg	
Weight		Any		
Mounting position		A controlled after B; B after A unthrottled return flow		
Direction of volume flow		-10 °C to +50 °C		
Ambient temperature				

2. Hydraulic characteristics

Rated pressure / max. pressure	210 bar for all connections
Hydraulic fluid	Hydraulic oil according to DIN 51 524 (1,2)
Temperature range of hydraulic fluid	20°C to +70° C
Viscosity range	5 - 350 mm ² /sec
Rated volume flow range	25; 40; 63 L/min
Min. settable and controllable volume flow	approx. 200 cm ³ /min, recommended control range 1:100 referred to the rated set volume flow
Max. volume flow via check valve	65 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 with position sensor

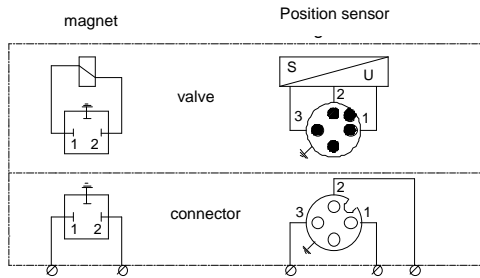
3.1 Solenoid

Design	Single solenoid – pressure-tight, pressure-resistant
Voltage	direct current
Rated Voltage	12 V
Rated current	1,6 A
Max. current	1,9 A
Min. current (basic current)	approx. 400 mA
Nominal resistance	$R_{20} = 5,7 \text{ Ohm}$
Coil inductively	
Nominal output	14,6 W
pulse duty factor	100%
Type of connection	Device plug-and socket connection according to DIN 43 650 - AF 2
Type of protection	IP 65 according to DIN 40 050 (with installed mating connector)

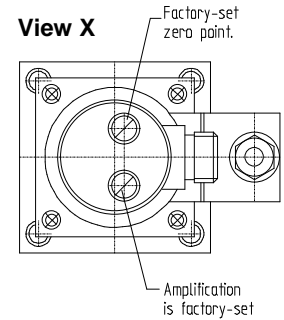
3.2 Position sensor

Type	Pressure sealed
Measuring system	Inductive; principle - differential transformer
Supply voltage	24 V DC +/-20%, polarized
Permissible ripple	USS $\leq 5\%$
Power consumption	$\leq 40 \text{ mA}$
Output voltage	approx. 7,5 - 11 V; ripple 5 30 mV, valve-specific compensation
Max. output voltage load	$>10K \text{ Ohm}$
Sensitivity, adjustable	1,5 V/mm +/- 15%
Zero shift, electrically	+/- 1mm
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 characteristic

(Definition according DIN 24 311)

Sensitivity	< 1%		from Rated volume flow rate at Δp 50 bar
Repeatability	< 1%		
Range of inversion	< 1%		
Hysteresis	< 1%		
Temperature drift (position sensor, without viscosity influence)	< 0,1% $\Delta Q/^\circ C$		
Volume flow signal function	see Fig. 4		
Time response	see Fig. 3		

CHARACTERISTICS

Time characteristic

Fig. 3 shows the transient function or step response in case of a set point step change from 10% to 90% and vice versa.

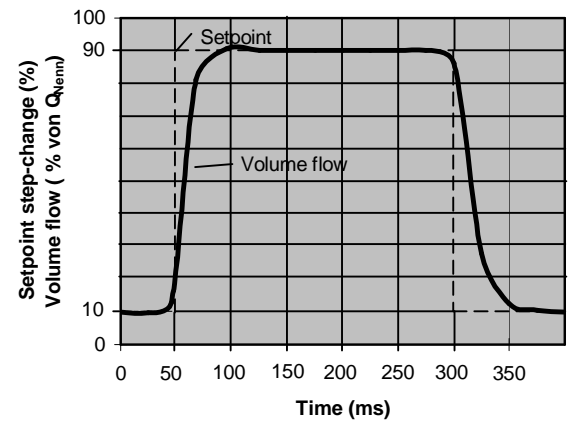


Fig. 3

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

Fig. 4 shows the volume flow dependent on the set voltage.

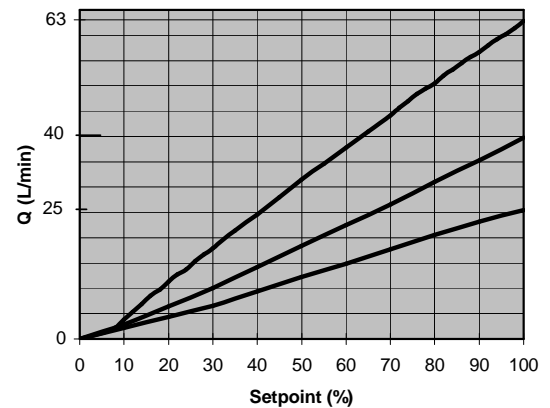


Fig. 4

Δp -Q-characteristic

Fig. 5 shows the pressure loss dependent on the flow for the reversed flow direction via the bypass check valve with closed orifice and flow through all ducts. The characteristic applies for valves with flow control at connection A or B.

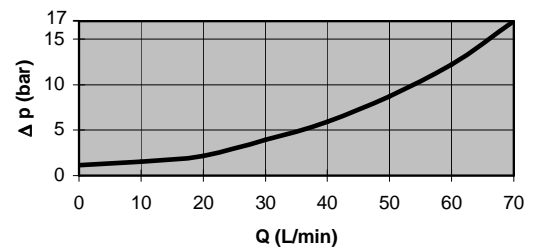
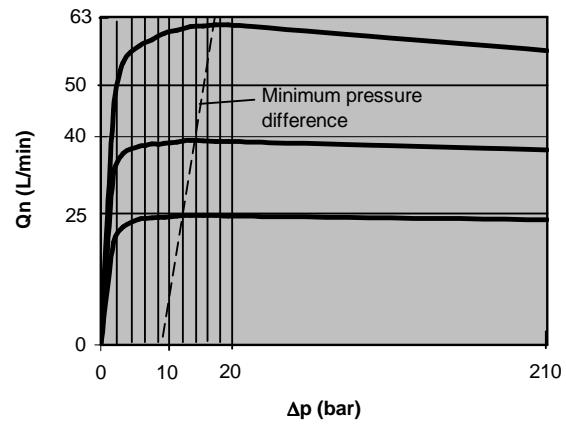


Fig. 5

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

Fig. 6 shows the control response of the valve for the different rated flow ranges dependent on pressure difference as well as the minimum pressure difference required for operation. The pressure losses in the ducts carrying oil only are not taken into consideration.

Fig. 6



Description of the valve

1. valve

The valves automatically keep constant an adjustable outlet flow independent of pressure variations in the inlet and outlet line within their functional limits. Depending on the design, control can be on the forward or return flow side of the consumer. The volume flow can be controlled infinitely by means of the proportional solenoid which is actuated by a control amplifier. The proportional solenoid is an electro-magnetic transformer. Its output variable force is proportional to the flow. The magnetic force acts via a valve actuator piston with the orifice against a counterforce compression spring. The magnet is connected to the valve via a central thread. For increasing the setting accuracy and reducing the influence of disturbing forces, the proportional magnet is coupled to a position measuring system. Thus, the magnet or the piston can be actuated by means of the orifice according to the given setpoint via the control electronics in the position control circuit and be brought to the correct position. By means of this, large hysteresis errors are prevented. Since the cross section of the orifice increases linearly compared to the magnetic stroke and the position sensor gives a linear output signal, there is also a linear relation between the setpoint and the volume flow. Position sensor and magnet form an inseparable and rugged unit. Magnet and sensor coil are exchangeable without opening the hydraulic system. The coils can be rotated by 360° so that the plug connections can be brought to 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 volume flow is made independent of the pressure by means of the differential pressure valve (pressure balance). It provides a constant pressure difference at the setting orifice and is arranged downstream of the orifice (secondary control). Due to the very compact design, the volume flow can be adjusted within msec in case of pressure changes. The pressure balance is open in its normal position. Thus, there may be a starting step-change when switching on the valve.

The volume flow is controlled in one direction of flow only. The direction of the control is indicated by the symbol on the name plate. In the opposite direction of flow, there is a bypass check valve for an unthrottled returnflow at a very low loss of pressure. It is designed as a spring-loaded ball seated 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. Material

The valve parts are made from engineering steel. All wear parts are surface-hardened. The external valve parts are burnished, the magnet and sensor coil is galvanized and chromized.

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.