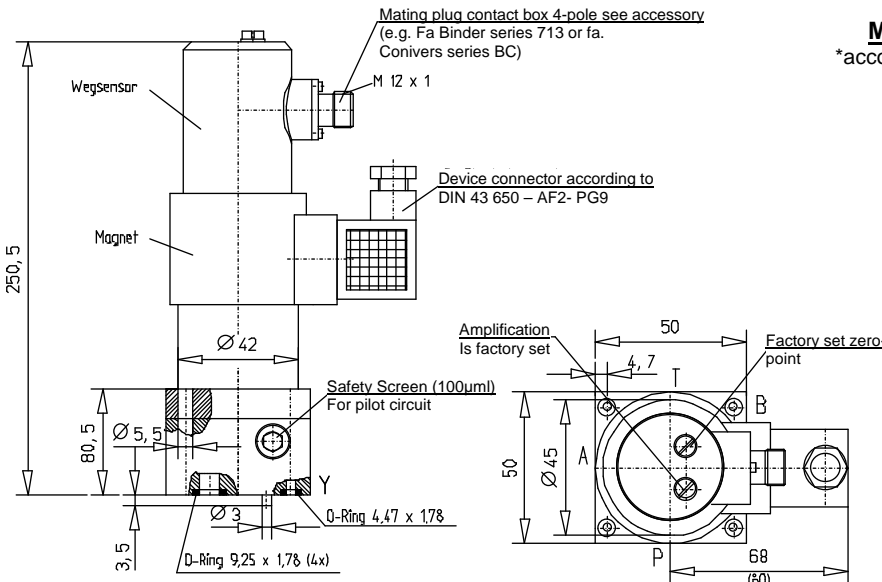


3-way pressure control valves control and limit an infinitely adjustable pressure in the outlet flow. These valves are equipped with a secondary pressure protection, i.e. a pressure increase on the consumer side is compensated.

FEATURES

- 4 set pressure ranges
- Minimum set pressure for setting ranges < 1bar
- With secondary pressure protection
- With control port for remote control or pressure unloading of port A (must be locked, if the function is not required)
- Assembly on sub plates with pipe connections or control block
- If desired, with external control oil drain (mounting surface to DIN 24 340 - A6 - 1)
- Standard sealing material Viton (FKM)
- 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
- remote control, programmable
- Neutral position of the valve: connection A to T; P locked
- Floating time approx. 70 ms



Mounting surface DIN 24 340 – C6 – 1
 *according to DIN 24 340 – A6 – 1 for valve type „Y“

ORDER INFORMATION

The O rings for sealing the connection holes, four fastening bolts M 5 x 55 DIN 912 - 12.9, tightening torque 9,5 Nm and the device plug and socket connection are part of the scope of supply.

Name — **3- way pressure control valve 686 C R 70 Y M...**

Type series _____

Series code letter _____

Valve operating mode **R = proportional solenoid**

Rated setting pressure in bar: **70; 140; 210; 300**

Valve variant control oil drain (see symbol)

Control oil drain, intern = **without** Code

*Control oil drain external = **Y**

Supplementary data for special models = **M...**

ACCESSORY

Must be order separately.

Connection plates

* in case of valve type Y

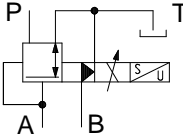
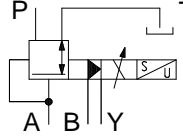
Control amplifier type StRA03-ES-9

Mating connector position sensor

see dimension sheet 9-74-030-2002
 see dimension sheet 9-74-686-0007
 see dimension sheet 9-74-003-0026
 Suitable for an installation according to the EMVG regulations
 Order.-No.: 44-028-00536

CHARACTERISTICS

1. General

Symbol		
Type	686 CR	686 CR ... Y
Design	Pilot-operated	pilot control = seat valve main control = piston-type valve
Weight	2.8 kg	
Mounting position	any, preferably vertical	
Direction of volume flow	P to A or A to T	
Ambient temperature range	-10°C to +50°C	

2. Hydraulic characteristics

Rated pressure / max. pressure	Connection P, A and B = 315 bar Connection T = 70 bar in case of external control oil drain Connection T = In case of internal control oil drain, depressurized and separately to the tank
Min. pressure difference P to A	15 bar
Setting pressure range	70 bar; 140 bar; 210 bar; 300 bar
Min. setting pressure	< 1 bar
Rated volume flow	30 l/min
Pressure volume flow function	see Fig. 3
Hydraulic fluid	Hydraulik oil according to DIN 51 524 (1,2)
Temperature range of hydraulic fluid	-20°C to +70° C
Viscosity range	15 - 350 mm ² /sec
Control volume flow	approx. 400 cm ³ /min
Contamination level / filtering	Class 16/13 according to ISO 4406 or 7 according to NAS 1638 (recommended filter: min. retaining rate $\beta_{5-10} \geq 75$)

3. Type of actuation

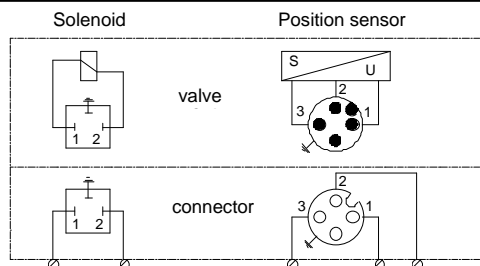
3.1 Solenoid

Type	Simple solenoid - pressing, pressure resistant
Type of voltage / Rated voltage	D.C. voltage / 12V
Rated current	1,6 A
Limit current	1,9 A
Rated resistance	R ₂₀ = 5,7 Ohm
Rated power	14,6 W
ON period	100%
Type of connection	Device plug according to DIN 43 050 – AF 2
Type of protection	IP 65 according to DIN 40 050 (with installed mating connector)

3.2 Position sensor

Type	pressure tight
Measuring system	inductive; principle – differential transformer
Supply voltage	24 V DC +/- 20%, polarized
Permissible ripple	U _{SS} ≤ 5%
Power consumption	≤ 40 mA
Output voltage	approx. 7,5 – 11 V; 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)

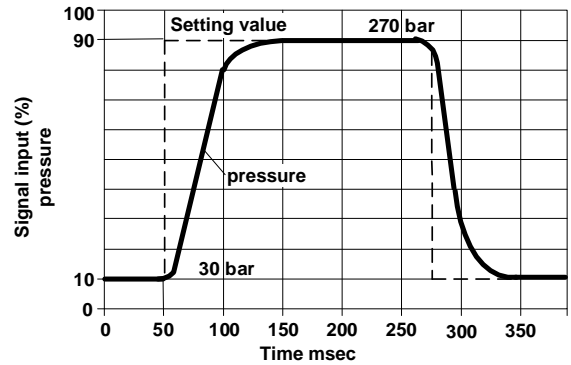
Sensitivity	< 1%	} from nominal signal
Repeatability	< 1%	
Range of inversion	< 1%	
Hysteresis	< 1%	
Temperature drift (position sensor)		
Without viscosity influence	<0,1% $\Delta p/^\circ\text{C}$	
Time response	see Fig. 1	
Pressure signal function	see Fig. 2	

CHARACTERISTICS

Time response

Fig. 1 shows the step-function response of the pressure signal to a setting value jump of 10% to 90% and vice versa. Measured at a volume flow of 20 l/min. The values are extremely system-dependent.

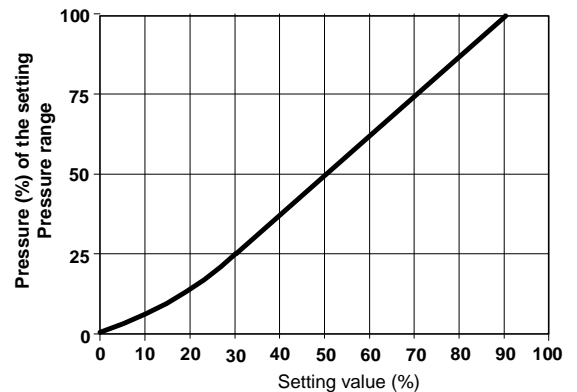
Fig. 1



Characteristic of the pressure signal function

Fig. 2 shows the characteristic typical of the valve for the function pressure setting value. It gives information on the linearity and the hysteresis.

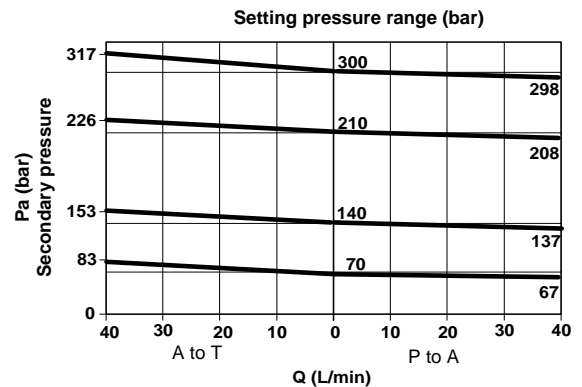
Fig. 2



pa-Q-characteristic

Fig.3 shows the control response of the valve for the secondary pressure at the different setting pressure ranges, dependent on the variable volume flow, at a primary pressure of 20 bar each above the setting pressure.

Fig. 3



Description of the valve

1. Valve

These valves are double-stage valves, consisting mainly of the main control part which is controlled by a pilot valve with the proportional actuating solenoid. Due to the pilot control, the pressure is controlled or limited almost independent of the volume flow. The control oil for the pilot control is taken from the inlet side and kept as concept by a flow controller.

The control circuit is protected against large contamination's by a filter (100 µm). In case of perturbations, the filter can easily be dismantled and cleaned.

The pressure setting is done infinitely by the proportional solenoid which is actuated by an electronic control amplifier.

The proportional solenoid is an electro-mechanic converter. Its output variable force is proportional to the input signal current. 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 set point 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 set point and the pressure. 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 magnetic force acts via a pressure spring valve cone upon the anticipatory control valve seat, against the hydraulic force of the hydraulic liquid in the control circuit. The resulting pressure is stamped on the control piston in the main valve as reference pressure. The control piston is used as a pressure maintaining valve which controls the pressure in the control circuit to the pilot pressure.

The valve is equipped with four or five ports, the main ports **P** and **A** for in- and outlet, port **T** for the protection of the secondary circuit, port **B** and if desired **Y** for the separate control oil drain. For the valve type **internal control oil drain**, the control oil is let via **T**. In order to prevent valve oscillations, we recommend - according to the chosen control oil outlet - to conduct the corresponding line depressurized and trouble free, separately to the tank. We recommend the valve type with external control oil drain since it is the best guarantee for a trouble free function.

Via port **B**, the valve can be unloaded and operated by external remote control; **it must locked if the function is not required**. Yet, we recommend to provide this port in control blocks or sub plates, because the dampening characteristics of the valve can be changed via this port in case of system vibrations.

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.