

# Angle Seat Valve Type 3353



Fig. 1 · Type 3353

## Mounting and operating instructions

**EB 8139 EN**

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**General safety instructions**



- ▶ *The control valve may only be assembled, started up or serviced by experienced personnel familiar with the product. Employees or third persons must not be exposed to any danger.*
- ▶ *The control valve fulfills the requirements of the European Pressure Equipment Directive 97/23/EC. Valves with a CE marking have a declaration of conformity that includes information on the applied conformity assessment procedure. The declaration can be found in the appendix of these instructions.*
- ▶ *For appropriate operation, make sure that the control valve is only used in areas where the operating pressure and temperatures do not exceed the operating values based on the valve sizing data submitted in the order. The manufacturer rejects any responsibility for damage caused by external forces or any other external influence!*  
*Any hazards which could be caused in the control valve by the process medium, operating pressure or signal pressure are to be prevented by means of the appropriate measures.*
- ▶ *Proper shipping and appropriate storage are assumed.*
- ▶ **Caution!** *For installation and maintenance work on the valve, make sure the relevant section of the pipeline is relieved of pressure and, depending on the process medium used, drained as well. If necessary, allow the control valve to cool down or warm up to reach ambient temperature prior to starting any work on the valve.*
- ▶ *When working on the valve, make sure that the pneumatic air supply as well as the control signal are disconnected to prevent any hazards due to moving parts.*

## 1. Design and principle of operation

The pneumatic control valve consists of a angle seat valve that has a plug with soft sealing and a pneumatic piston actuator. Depending on the version, the actuator can be equipped with a mechanical manual override or an electric limit switch. The control valve is designed for on/off control in process engineering and plants with industrial requirements. It is suitable for liquids, vapors and gases at temperatures from  $-10$  to  $180\text{ }^{\circ}\text{C}$  and a nominal pressure of PN 40.

The process medium flows through the valve in the direction indicated by the arrow. The signal pressure applied to the piston actuator determines the position of the plug and thus the cross-sectional area of flow between the seat and plug.

The actuator stem (2) is sealed at the valve end by a self-adjusting packing consisting of PTFE V-rings (4.4) and at the actuator end by a shaft sealing ring (4.1).

### Fail-safe position:

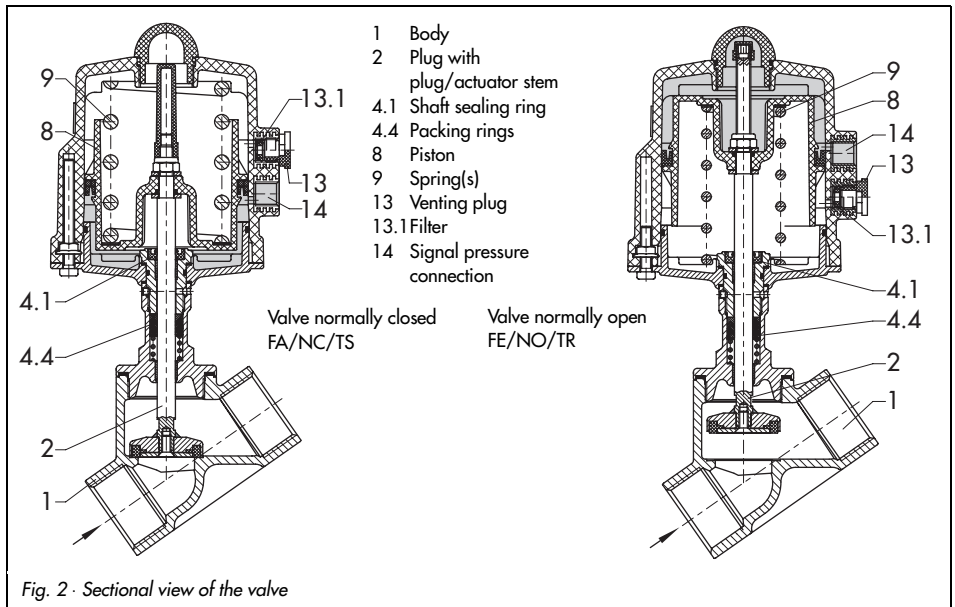
The fail-safe position of the control valve when the air supply fails is determined by how the piston and spring are arranged in the actuator.

### Valve CLOSED (actuator stem extends)

The actuator spring closes the valve upon air supply failure. The valve opens as the signal pressure increases.

### Valve OPEN (actuator stem retracts)

The actuator spring opens the valve upon air supply failure. The valve closes as the signal pressure increases.



## 2. Installation

Any mounting position is possible, but we recommend mounting the valve in a horizontal pipeline with actuator facing upwards.

The direction of flow must coincide with the direction of the arrow on the valve body.

### NOTE!

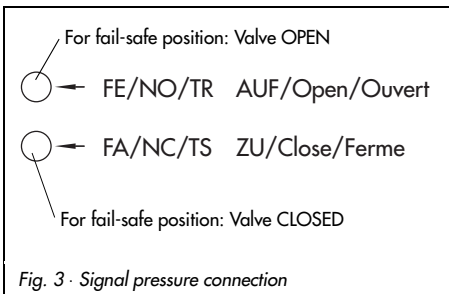
*The valve must be installed in a location with the least amount of vibration possible and without stress. If necessary, support the pipeline near to the end connections.*

Since sealing parts, globules and other impurities carried along by the medium may impair the tight shut-off of the seat and plug, flush out the pipeline thoroughly prior to installing the valve in the pipeline.

### 2.1 Signal pressure connection

The signal pressure connection and venting are designed as boreholes with a G1/4 female thread.

The venting borehole must be fitted with a replaceable filter (13.1) with order no. 0550-0213. This filter can be removed by first unscrewing the venting plug (13).



The signal pressure connection also allows the attachment of an adapter plate that complies with VDI/VDE 3845 for mounting a solenoid valve.

The actuator can be turned as required to connect the signal pressure line.

Customary pipe couplings can be used for metal and copper pipes or plastic tubes.

Prior to connecting the supply air lines, blow through them to make sure they are not blocked.

## 3. Maintenance – Replacing parts

The control valve is subject to normal wear especially at the seat, plug and packing. Depending on the application conditions, check the valve at regular intervals to prevent possible failure before it can occur.

If the valve does not close tightly, this may be caused by dirt lodged between the seat and plug or due to a damaged plug seal.

If the valve leaks, this may be due to a defective body gasket (3.1), or if the medium leaks out of the borehole (3.2) at the side, there may possibly be a leak in the packing (4.4).

We recommend removing the parts, cleaning them, and, if necessary, replacing them with new ones.



**NOTE!**

Remove the valve from the pipeline to perform any assembly work. First relieve pressure from the part of the plant to be worked on and drain it. If applicable, let the part of the plant to be worked on first cool down before starting!

**3.1 Plug seal**

1. Position a 26 mm open-end wrench on the valve bonnet and unscrew the entire actuator including the valve bonnet from the valve body.

2. Clean the valve body, paying particular attention to the seat bore.
  2. Unscrew the countersunk screw (2.1) using a 3 mm hex screwdriver, while holding the plug/actuator stem at the flattened part stationary with a 8 mm open-end wrench.
  3. Remove the PTFE seal (2.2) and plug disk (2.3).
  4. Thoroughly clean all the parts and replace the PTFE seal with a new one.
  5. Assemble in the reverse order, replacing the body gasket (3.1) at the valve bonnet with a new one.
- The tightening torques required for the valve bonnet are listed in the table, Fig. 4.

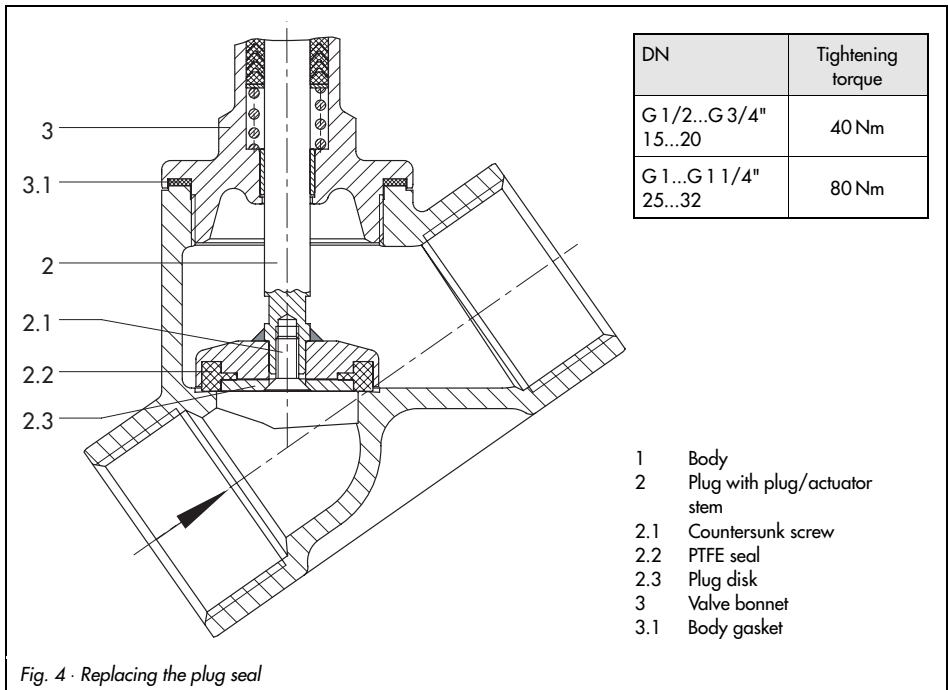


Fig. 4 - Replacing the plug seal

## 3.2 Packing

1. Position a 26 mm open-end wrench at the valve bonnet and unscrew the entire actuator including the valve bonnet from the valve body.
2. Unthread the screws (6) in an even pattern and lift off the actuator cover (7).

### Valve normally CLOSED (FA)

3. Lift off the spring(s) (9) first and then remove the cap (10).
4. Unscrew the nut (11) from the actuator stem using a socket wrench, while holding the plug/actuator stem at the flattened part stationary with a 8 mm open-end wrench.
5. Remove the flat washer (12), piston (8) including the lip ring (8.1) and disk (9.1).
6. Remove the O-ring (8.2) and washer (8.3) from the actuator stem.

### Valve normally OPEN (FE)

Disassemble as previously described, but lift off the flat washer and O-ring with the piston and then remove the disk (9.1) and spring (9).

7. Pull the actuator/plug stem down out of the valve bonnet (3).
8. Remove the retaining screw (4.2) at the side using a 2 mm hex screwdriver, then unscrew the guided bushing (4) including the actuator base (5) from the valve bonnet (3) using a 24 mm open-end wrench.  
If necessary, press the guided bushing out of the base and replace the top and bottom disk(s) (5.2) with new ones.

9. Pull the entire packing out of the valve bonnet using an appropriate tool.  
Carefully clean all the parts and renew the packing (4.4).
10. Insert the actuator/plug stem into the valve bonnet (3).
11. Slide the packing parts in sequence starting with the spring (4.5), washer (4.3) and packing rings (4.4) over the actuator stem into the valve bonnet.
12. Place the top disk (5.2) in the actuator base. Attach the O-ring (5.3) and insert the guided bushing (4) into the actuator base.
13. Place the bottom disk (5.2) on the valve bonnet.  
Thread the guided bushing with the actuator base over the actuator stem onto the valve bonnet (3).  
Tighten the guided bushing only to the point where the actuator base (5) can still be twisted over the disks.  
Screw tight the retaining screw (4.2) at the side to fix the guided bushing into place.
14. **Valve normally CLOSED (FA)**  
First slide the washer (8.3) and the O-ring (8.2) onto the actuator stem, then put on the piston (8) including the lip ring (8.1) and flat washer (12).  
Insert the disk (9.1) and spring (9) into the piston.  
**Valve normally OPEN (FE)**  
First place the washer (8.3) on the actuator stem, then put the spring (9) with disk (9.1) on the actuator base (5).  
Slide the piston (8) including the lip ring (8.1) over the actuator stem, then put on the O-ring (8.2) and flat washer (12).

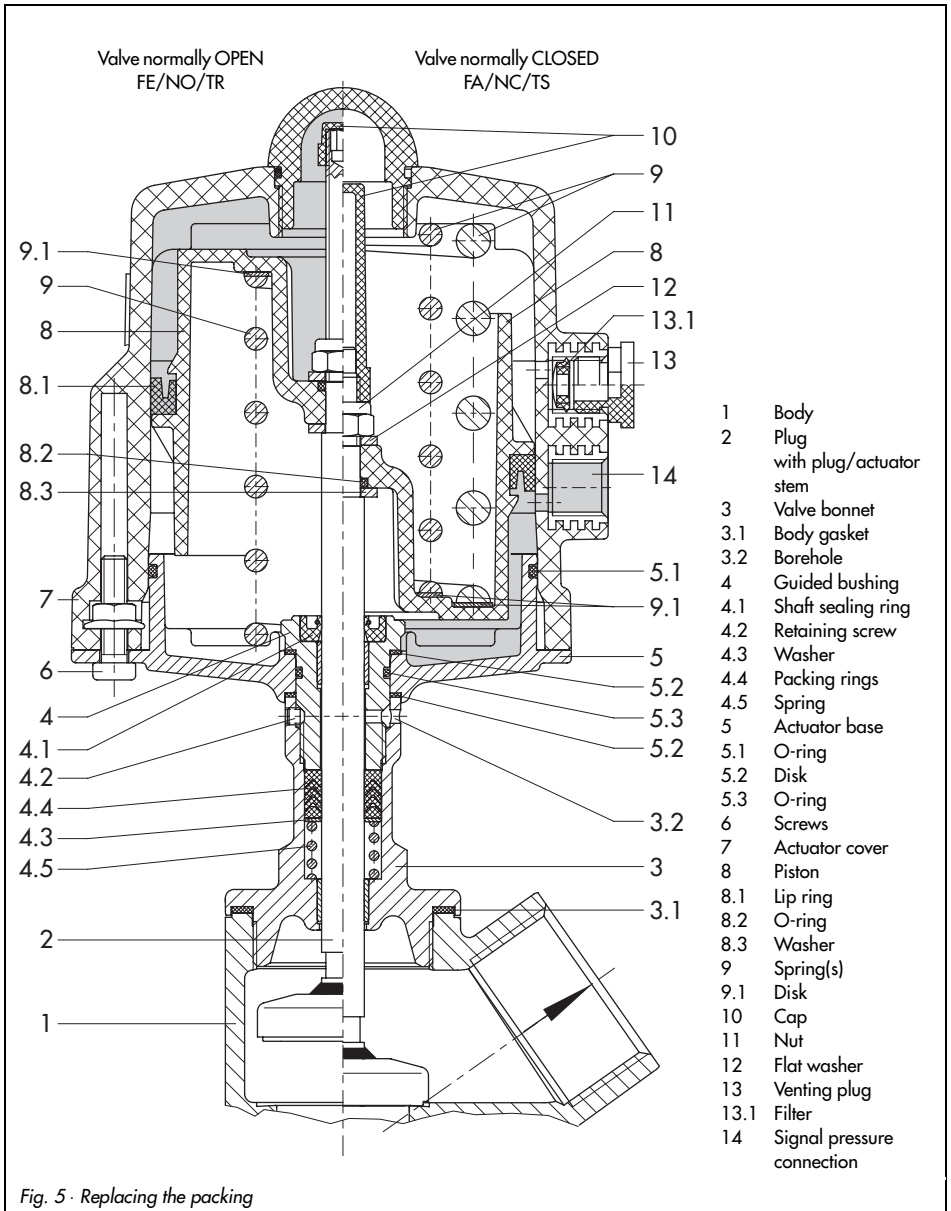


Fig. 5 - Replacing the packing

15. Tighten nut (11) intended for fastening the piston, while holding the plug/actuator stem at the flattened part stationary with a 8 mm open-end wrench.  
Screw on cap (10).
16. Put on actuator cover (7) and fasten tight onto the actuator base by screwing evenly on the screws (6).
17. Place the valve bonnet including the actuator onto the valve body and screw tight. If necessary, renew body gasket (3.1).  
Refer to the table in Fig. 4 for tightening torque for valve bonnet.

#### 4. Altering the spring force

Control valves that are normally CLOSED in the fail-safe position (FA/NC/TS) and have the nominal sizes DN 40 and 50 (1 1/2 and 2") with 90 cm<sup>2</sup> actuator can be fitted with one or two actuator springs (marked on the nameplate with I or II).

By adding a spring or removing the inside spring, the permissible differential pressure and associated signal pressure can be changed.

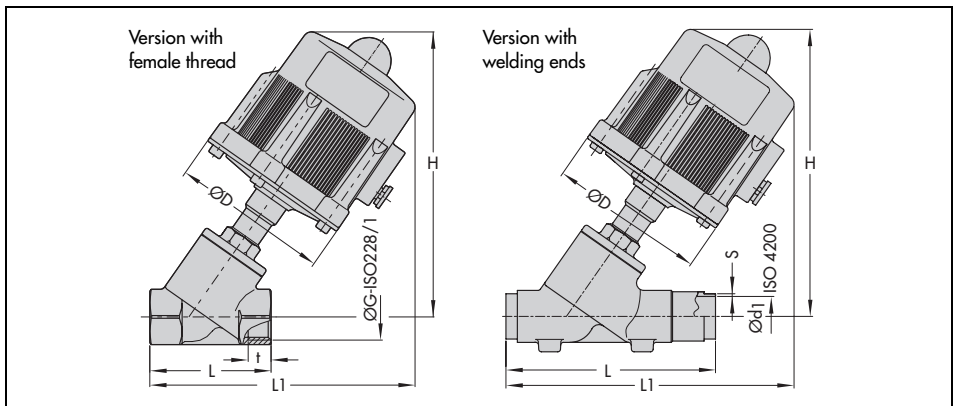
Actuator cm <sup>2</sup>	Version	Spring force	Quantity	Signal pressure bar
90	FA/NC/TS	1140 N	1	3.8
		2160 N	2	5.4

For assembly or disassembly, proceed as described in chapter 3.



## 5. Dimensions in mm

Nominal size	DN	15 (1/2")	20 (3/4")	25 (1")	32 (1 1/4")	40 (1 1/2")	50 (2")
Installation length L	mm	65	75	90	110	120	150
End-to-end length L1	mm	170	175	197	205	210	226
Height inc. actuator H	mm	193	194	211	212	224	226
Body connection	G	G 1/2	G 3/4	G 1	G 1 1/4	G 1 1/2	G 2
Thread length t	mm	15	16	19	22	22	26
Valve weight	kg	0.28	0.33	0.64	0.8	1.3	1.9
Version with welding ends							
Nominal size	DN	15 (1/2")	20 (3/4")	25 (1")	32 (1 1/4")	40 (1 1/2")	50 (2")
Installation length L	mm	100	120	150	160	180	190
End-to-end length L1	mm	187	197	227	218	230	241
Height inc. actuator H	mm	197	199	214	223	230	229
∅ d1 connection	mm	18.1	23.7	29.7	38.4	44.3	55.1
Wall thickness S	mm	1.6		2		2.6	
Valve weight	kg	0.28	0.33	0.64	0.8	1.3	1.9
Pneumatic piston actuator							
Version	Effective area/∅	30 cm <sup>2</sup> / ∅ 63		60 cm <sup>2</sup> / ∅ 90 (1 spring)		60 cm <sup>2</sup> / ∅ 90 (2 springs)	
Body diameter ∅D	mm	100		127			
Signal pressure connection		G 1/4					
Weight	kg	1.35		2.2		2.75	



## **6. Customer inquiries**

Should you have any inquiries, please submit the following details:

- ▶ Order number
- ▶ Type, product number, nominal size and version of the valve
- ▶ Pressure and temperature of the process medium
- ▶ Flow rate in m<sup>3</sup>/h
- ▶ Signal pressure of the actuator
- ▶ Installation drawing



# Declaration of Conformity

## Number 73

For the following pressure equipment

**Bevel-Valves Product number 3353  
DIN-Version  
With Steel-Body**

We declare conformity with the demands of the

**Pressure Equipment Directive** 97 / 23 / EG of May 1997  
**Applied Conformity Assessment Procedure**  
**For fluids acc. to art.3 para.1 1.3.b and 1.3.a second line** **Module A**

**The Manufacturer's Quality Assurance System is monitored by following Notified Body:**

**Bureau Veritas S. A.**

The Design is based on the methods of prEN 12 516-2  
and DIN 3840

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Frankfurt, 19.7.2002

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