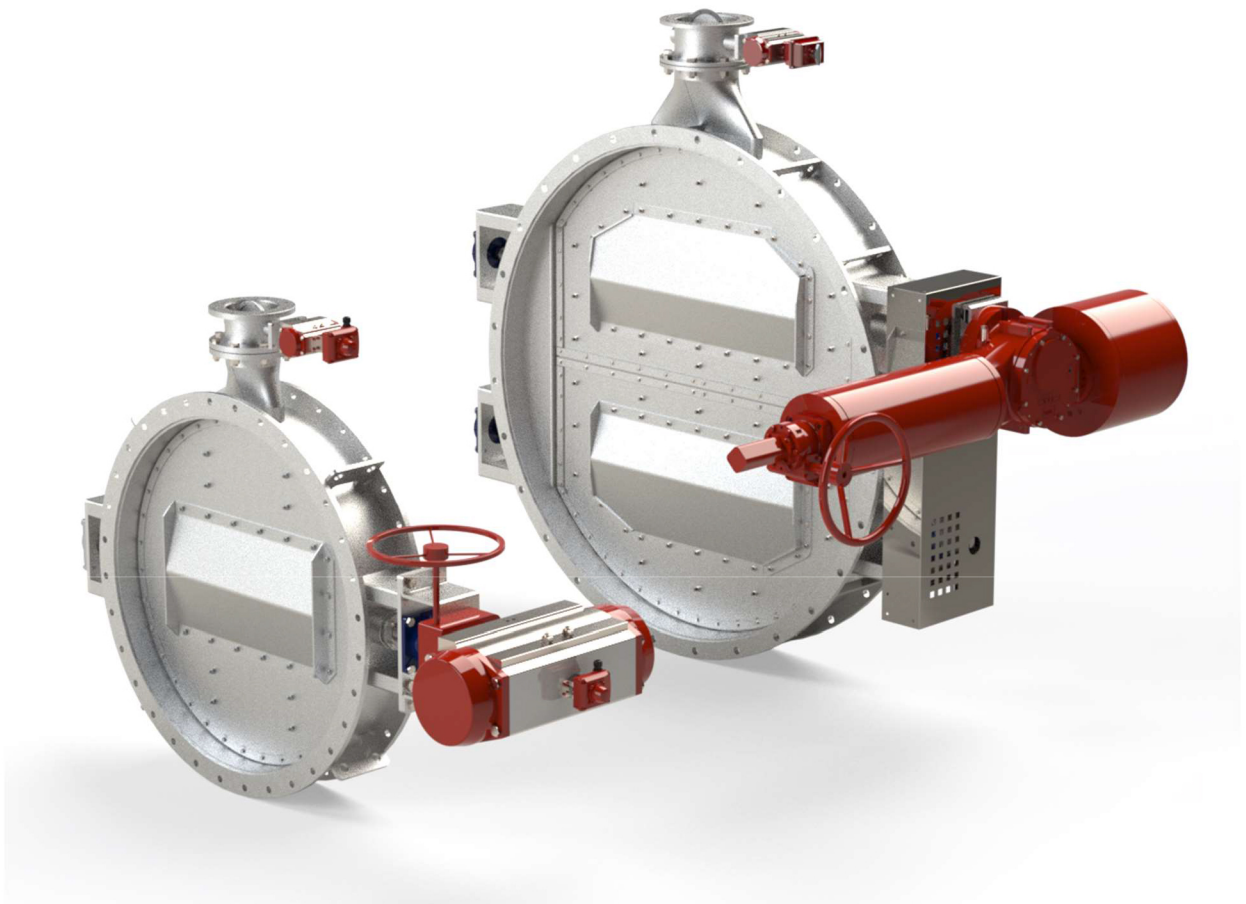


DAMPER VALVE

D1 Series

Installation, Maintenance and Operating Manual



FORENSERVTEK

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Read these Instructions first !

This manual provides information about safe handling and operation of the valve.

If you require additional assistance, please contact with the manufacturer or manufacturer's representative. Address and phone numbers are printed on the back cover.

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1. General

1.1. Introduction

This manual describes installation, operation and maintenance of new structure Damper valve D1 series.

D1 is an air sealing damper valve comprising of the following components:

- ✧ Valve body
- ✧ Double disc
- ✧ Spring return pneumatic actuator,
- ✧ Hand wheel
- ✧ Seal air on-off valve
- ✧ Air sweeping system (optional)

Further information on the installation, operation and maintenance of actuators, please refer to relevant manual on the basis of different models.

Note:

This manual can not cover all individual situation that may occur in the process of installation, operation and maintenance. In some specific applications, considering detailed aspects that we do not concerned is necessary. Please contact with Forenservtek if any question about this manual, because of the increasing developing and improving,.

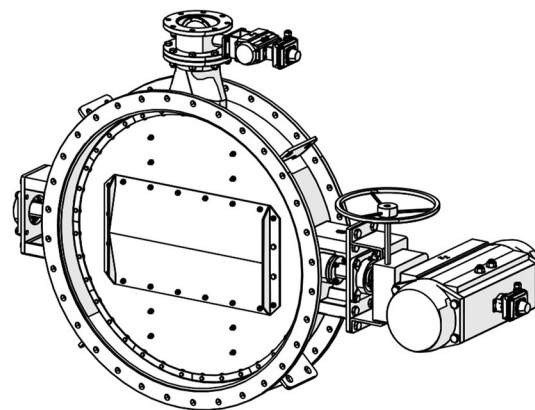


Fig 1 Air sealing damper valve (single stem)

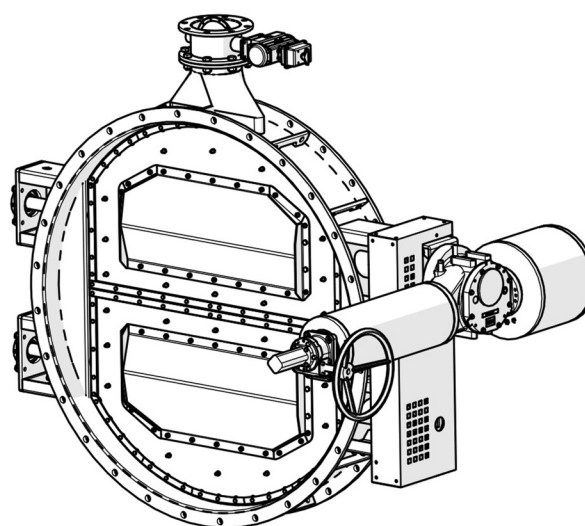


Fig 2 Air sealing damper valve (multi-stem)

1.2. Valve Structure

Air sealing type damper valve is one part of flue gas treatment device, used to switch the flue direction, to atmosphere or to the treatment device. Due to large amount of ash in flue (easy to stick on sealing face), swing through double flap structure air sealing and air sweeping unit are specially designed, which can ensure gas zero leakage and long-term reliable use.

Regarding operation of pneumatic actuator driving valve, there is no difference the conventional midline damper butterfly valve in body structure, and operation mode.

Detailed structure, refer to fig. 1、 2.

1.3. Markings

The markings on D1 are as below:

- ✧ Body Nameplate
- ✧ Actuator Label
- ✧ Pneumatic actuator piping description
- ✧ Safe Operation Warning
- ✧ Hand wheel operation indicator

Valve nameplate must be checked before using, to know some fundamental parameters, just as tag no, pressure rating, size specification, etc, these are helps for proper installation.

1.4. Technical Specification

Basic technical specifications and parameters of D1 are as below :

Size: DN80 ~ DN3200

Flange End Connection: CB/T 3766, DIN 86044

Pressure Rating: PN0.5, PN1, PN2.5

Body Materials: Q235B, Q345R, Corten, SS304

Structure size&Weight: See outline drawing

1.5. Safety Precaution

CAUTION:

Do not exceed the valve performance limitations!

Exceeding the limitations marked on the valve may cause damage and lead to uncontrolled pressure release. Damage or personal injury may result.

CAUTION:

Do not dismantle the valve or remove it from the pipeline while the valve is pressurized !

Dismantling or removing a pressurized valve will result in uncontrolled pressure release. Always isolate the relevant part of the pipeline, release the pressure from the valve and remove the medium before dismantling the valve. Meanwhile, be aware of temperature of medium. Protect yourself and the environment from any injury and damage caused by high temperature. If the valve is equipped with actuator, do not forget to close and detach the actuator pressure supply pipeline. Fail to do this may result in damage or personal injury.

CAUTION:

Be aware of overturn of butterfly flap !

Keep hands, other parts of the body, tools and other objects out of the open flow port. Leave no foreign objects inside the pipeline. When the valve is actuated, overturn of the flap will make the interval between flap excircle and pipeline minified. Close and detach actuator pressure supply pipeline for valve maintenance. Fail to do this may result in damage or personal injury.

CAUTION:

Protect yourself against burns from valve pipeline!

In the process of operating, the temperature of interior media reach to 450°C. Even with insulation layer, high surface temperature also exists in some parts. Protect yourself against burns.

2. Transportation and Storage

Check the valve and accessories for any damage that may occur during transportation. Store the valve carefully before installation, preferably indoors in dry place. Do not take the valve to the intended location and do not remove the protective device until the valve is installed. Since these two butterfly valves are with chain state, the acquiescent shipping status should be bypass close, main path open. Do not change before installation.

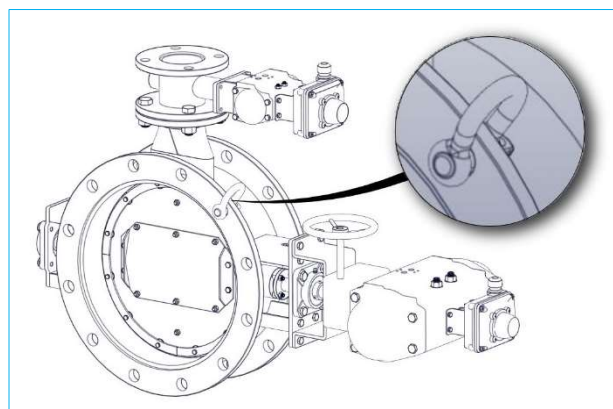
If it is stored more than one year, hardening and aging will occur in packing. Please open the package, loosen 2 circles of the tight hexagonal nuts. And keep this status for storage. When using, please tighten 2 circles of the tight hexagonal nuts. Then test the valve with air or water pressure from the position of pipeline connecting flange, if the leakage exist in packing, please replace the packing with new one. Regarding replacing instruction, please refer to that in Maintenance.

Note:

High humidity, or water entering in the valve interior, may result in rustiness on carbon steel body and tube interior.

CAUTION:

When hoisting, please use flange orifice in butterfly valve or dedicated hole for hoist. Never lift the valve by actuator、brackets or bypass piping (detailed in Fig.2). Please be noticed to avoid damaging on the valve body or end connection when lifting.



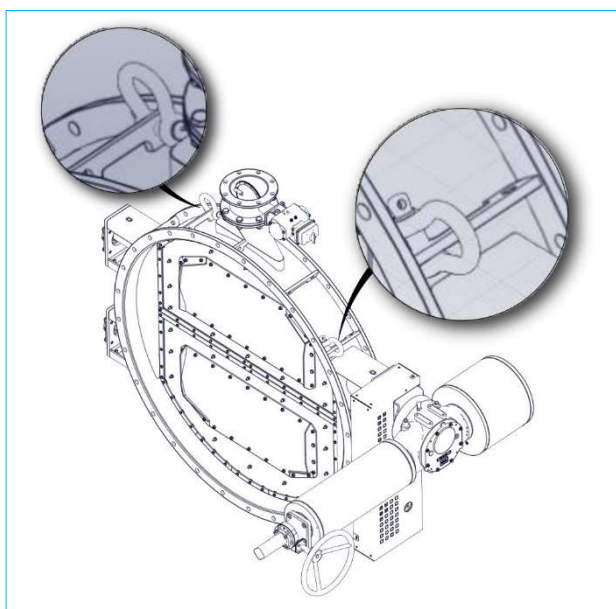
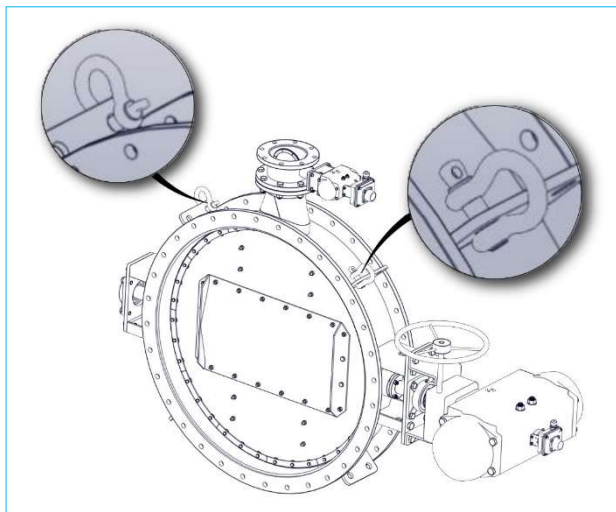


Fig-3 Hoisting schematic drawing of Damper valve

3. Installation in The Pipeline

Remove the protecting plates around the valve and check that the valve is clean. Flush and below the pipeline carefully before installing the valve. Foreign particles, such as sand or pieces of welding electrode, will damage the valve. Check that the pipeline is supported properly. Do not attempt to correct any pipeline misalignment by means of the flange bolting or welding of the valve.

3.1. Mounting Position

2-Way Damper has fixed mounting position, Piping layout and damper installation required to **keep damper shaft horizon.**

The damper valve should avoid the tensile stress from the

flange or pipe, so it is very important to ensure the two pipe flange faces are parallel.

Make sure the valve body is aligned with the flange and gasket, and check that the disc switches are smooth before fully securing the flange nut.

Under the condition of narrow installation position on board, if the length of straight pipe 3-5 times DN in front of the valve cannot be guaranteed, try to ensure that the valve stem is aligned with the elbow direction (as shown in figure 4), so as to reduce the unbalanced force caused by the impact of turbulent medium on one side of the valve plate in the pipeline.

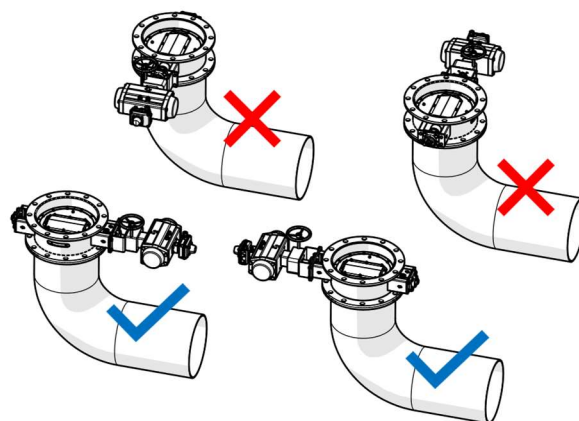


Fig-4 Installation position near the elbow

3.2. Maintenance Space and Equipment

Enough space should be required around the valve to dismantle actuator and valve, never remove valve from pipeline (see fig 5).

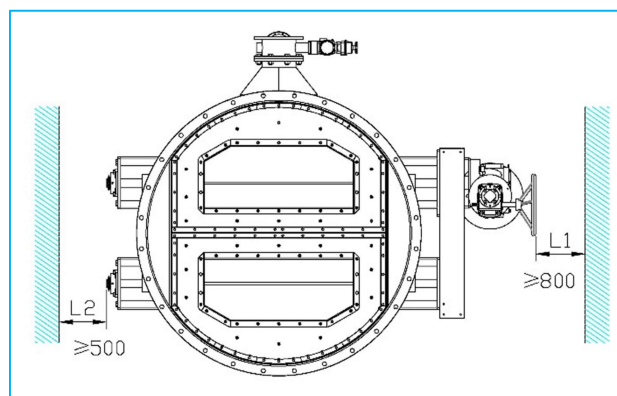


Fig.5 Maintenance space requirement

4. Commissioning

Check that the flow direction is mounted properly.

Operating air supply for actuator should be obtained from dry and clean air, which reduced to 0.55MPa(G), **The air supply pipeline must be purged strictly before use.**

All valves accept debugging before delivering. But in the process of transportation and installation, hit and fall are inevitably encountered. So after finishing installation, please readjust and correct.

After long-time storage of valve, leakage may occur on

sealing packing. If leaks, just press the sealing packing tightly and stably until the leak stops. Too tight will cause the excessive raise of valve torque.

5. Maintenance

CAUTION:

Observe the safety precautions listed in section of 1.5 before starting work.

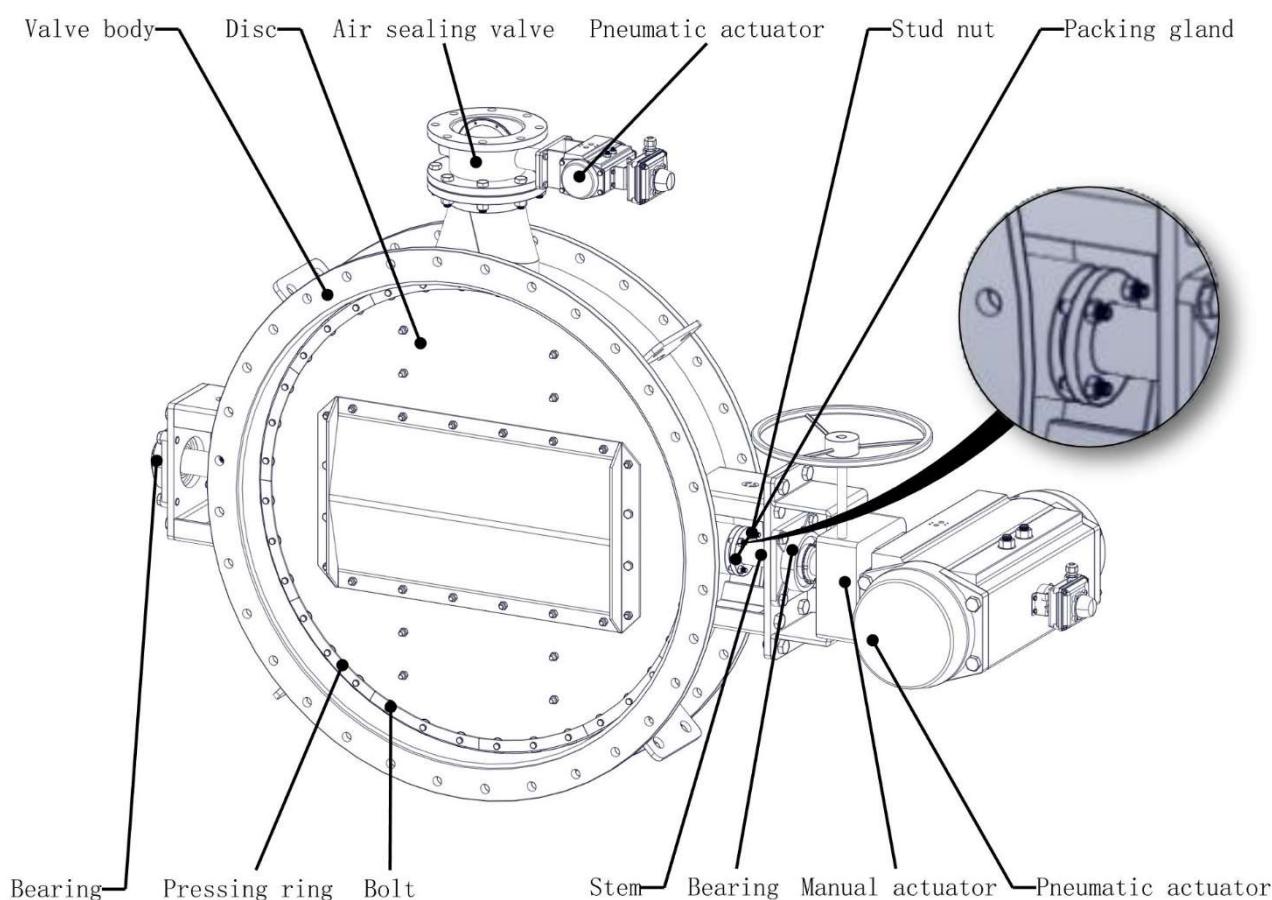


Fig.6 Air sealing valve components list

The valve can be serviced without removing it from pipeline. Servicing in a workshop is, however, recommended whenever possible.

If the valve is removed from the pipeline, the body must be supported for servicing with the stem standing horizontal.

The numbers in parentheses refer to the exploded view and the spare parts list, unless otherwise indicated.

Since the large quantity of assembly in Damper valve.

Describe the maintenance requirement respectively in the

sequence of butterfly valve、 actuator、 accessories、 seal gas system and other parts. The exploded view of 2-way damper valve components is in Fig.6.

5.1. Damper Valve

This valve is the main component exhaust gas diverter, In addition to the function of shut-off and conducting the flue gas in pipeline, air chamber can be formed by introduced

seal gas in the air inlet, between the double flap. This is the difference compared with common damper butterfly valve. Valve do not need to maintain in normal applications, If the flue gas leaks on the packing sealing in stem after long-time use, please tighten the nuts with hexagonal wrench to stop leakage. Please refer to the following steps if packing replacement is needed.

- ✧ Confirm the valve with non-pressure;
- ✧ Loosen nuts in packing gland, move out packing gland;
- ✧ Picking out the old graphite packing ring with screwdriver;
- ✧ Clean the orifices in packing box, load into packing ring with packing gland, each packing with 90°;
- ✧ Tight the packing gland Nuts uniformly, check any leakage when it is with pressure, if yes, tighten properly until without leakage.

Sealing fins will not be damaged during usage, as it is made of stainless steel, which is corrosive resistant and elastic. As a result of external force or debris blocking, the sealing ring will become deformed. In this case, plier is available to level deformations by itself. Please refer to the following steps, if changing seal ring is needed.

- ✧ Confirm the pipeline without pressure, dismantle connecting pipelines, move out the dampervave
- ✧ valve in fully closed state
- ✧ Loosen all bolts with cage wrench, remove pressing ring, remove old sealing fins
- ✧ Load sealing fins, load pressing ring, check that the clearance between the sealing disc and the inner wall of valve body is consistent before tighten the pressing ring
- ✧ Tighten bolts, finish changing sealing fin.

Bearing assembly has been filled grease before delivering.

You can fill moderate grease or other bearing grease again after 2 –year usage.

5.2. Pneumatic Actuator

Pneumatic actuator is the power supply for driving butterfly valve. Regarding requirement for operation and daily maintenance, please refer to relevant illustration.

5.3. Pneumatic Accessories

Pneumatic accessories include air supply treatment unit and solenoid valve that used to reverse gas line. They are selected as order needs. Regarding requirement for operation and daily maintenance, please refer to relevant illustration.

5.4. Seal Air System

Air supply for seal air system was provided by separated draught fan, after switching through Sealing air on-off vlave controlled by solenoid valve, and inputting to the inner of butterfly valve, air chamber will arise between double flap. Regarding requirement for operation and daily maintenance of draught fan and Sealing air on-off vlave, please refer to relevant illustration.

5.5. Other Parts

Other parts include control cabinet、 air sweeping assembly, etc.

Further detailed information, have to comply with customer's requirement. Regarding requirement for operation and maintenance, please refer to relevant illustration.

6. Failure Judgement and Measures

Reasons and treatment measures of various failures are as below:

Failure Status	Reasons	Measures
Valve do not work or move slowly	Low pressure of air supply	Check air supply, ensure the pressure to 0.55MPa(G)
	Air tube blocking or leakage	Clean tube, check and tighten joint
	Accessories abnormity	Introducing air to actuator without accessories, check work or not.
	Below-by in air tank	Change piston seal ring

Large seat leakage	Deformation of seal ring	Check and repair seal ring
	Seal air system work abnormally	Check if fan and sealing air on-off valve operate normally, seal air introduce closed valve or not.
Leakage in packing gland	Nuts loosened	tighten nuts
	Packing ageing and oxidize	change packing
Accumulation of ash in sealing area	Low air supply pressure	Check air supply to ensure pressure $\geq 0.6\text{Mpa(G)}$
	Sweep nozzle clogging	Check and unclog nozzle
	Sweep valve failure	Check solenoid valve and air valve, replace the fault valve.

7. Ordering Spare Parts

The list of spare parts and quick-wear parts are as follow:

Parts	Name (Material)	Quantity
Air sealing damper valve	Packing ring (Flexible graphite)	8
	Sealing fin (Stainless steel)	According specifications
Actuator	Seal ring (rubber)used in piston	2

For those optional parts and accessories, the spare parts and quick-wear parts should be considered by customer.

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