



USER INSTRUCTIONS

Kämmer® SmallFlow™ - Series 080000 / 081000

Low and Micro Flow Valves

FCD KMENIM8001-01 08/11

***Installation
Operation
Maintenance***



Experience In Motion

Index	
1	Using Kämmer valves and actuators correctly.
2	Unpacking
3	Installation
4	Quick check
5	Maintenance
6	Remove and install actuator
7	Disassemble and assemble valve

1 USING KÄMMER VALVES AND ACTUATORS CORRECTLY

1.1 General

The following instructions are designed to assist in unpacking, installing and performing maintenance as required on Kämmer products. Product users and maintenance personnel should thoroughly review this bulletin prior to installing, operating or performing any maintenance.

In most cases Kämmer valves and actuators are designed for specific applications (e.g. with regard to medium, pressure, temperature). For this reason they should not be used in other applications without first contacting the manufacturer.

1.2 Terms concerning safety

The safety terms **DANGER**, **WARNING**, **CAUTION** and **NOTE** are used in these instructions to highlight particular dangers and/or to provide additional information on aspects that may not be readily apparent.



DANGER: indicates that death, severe personal injury and/or substantial property damage **will** occur if proper precautions are not taken.



WARNING: indicates that death, severe personal injury and/or substantial property damage **can** occur if proper precautions are not taken.



CAUTION: indicates that minor personal injury and/or property damage can occur if proper precautions are not taken.



NOTE: indicates and provides additional technical information, which may not be very obvious even to qualified personnel.

Compliance with other, not particularly emphasised notes, with regard to transport, assembly, operation and maintenance and with regard to technical documentation (e.g. in the operating instruction, product documentation or on the product itself) is essential, in order to avoid faults, which in themselves might directly or indirectly cause severe personal injury or property damage.

1.3 Protective clothing

Kämmer products are often used in problematic applications (e.g. extremely high pressures, dangerous, toxic or corrosive mediums). In particular valves with bellows seals point to such applications. When performing service, inspection or repair operations always ensure, that the valve and actuator are depressurised and that the valve has been cleaned and is free from harmful substances. In such cases pay particular attention to personal protection (protective clothing, gloves, glasses etc.).

1.4 Qualified personnel

Qualified personnel are people who, on account of their training, experience and instruction and their knowledge of relevant standards, specifications, accident prevention regulations and operating conditions, have been authorised by those responsible for the safety of the plant to perform the necessary work and who can recognise and avoid possible dangers.

1.5 Installation

Before installation check the order-no, serial-no. and/or the tag-no. to ensure that the valve/actuator is correct for the intended application.

Do not insulate extensions that are provided for hot or cold services.

Pipelines must be correctly aligned to ensure that the valve is not fitted under tension.

1.6 Spare parts

Use only Kämmer original spare parts. Kämmer cannot accept responsibility for any damages that occur from using spare parts or fastening materials from other manufactures. If Kämmer products (especially sealing materials) have been on store for longer periods check these for corrosion or deterioration before using these products. Fire protection for Kämmer products must be provided by the end user.

1.7 Service / repair

To avoid possible injury to personnel or damage to products, safety terms must be strictly adhered to. Modifying this product, substituting nonfactory parts, or using maintenance procedures other than outlined in this instruction could drastically affect performance and be hazardous to personnel and equipment, and may void existing warranties. Between actuator and valve there are moving parts. To avoid injury Flowserve provides pinch-point-protection in the form of cover plates, especially where side-mounted positioners are fitted. If these plates are removed for inspection, service or repair special attention is required. After completing work the cover plates must be refitted. Apart from the operating instructions and the obligatory accident prevention directives valid in the country of use, all recognised regulations for safety and good engineering practices must be followed.



WARNING: Before products are returned to Kämmer for repair or service Kämmer must be provided with a certificate which confirms that the product has been decontaminated and is clean. Kämmer will not accept deliveries if a certificate has not been provided (a form can be obtained from Kämmer).

1.8

Storage

In most cases Kämmer Products are manufactured from stainless steel. Products not manufactured from stainless steel are provided with an epoxy resin coating. This means that Kämmer products are well protected from corrosion. Nevertheless Kämmer products must be stored adequately in a clean, dry environment. Plastic caps are fitted to protect the flange faces to prevent the ingress of foreign materials. These caps should not be removed until the valve is actually mounted into the system.

1.9

Valve and actuator variations

These instructions cannot claim to cover all details of all possible product variations, nor in particular can they provide information for every possible example of installation, operation or maintenance. This means that the instructions normally include only the directions to be followed by qualified personal where the product is being used for its defined purpose. If there are any uncertainties in this respect particularly in the event of missing product-related information, clarification must be obtained via the appropriate FLOWSERVE sales office.

2

UNPACKING

2.1

Each delivery includes a packing slip. When unpacking, check all delivered valves and accessories using this packing slip.

2.2

Larger valves can be lifted using slings on the yoke rods or, if present, on the lugs provided for this purpose. If slings are used, attach them so that the outer tubing or attaching parts are not damaged.



WARNING: If slings are used, be aware that the centre of gravity of the valve may be above the lifting point. In this case, secure or support the valve against rotating, to prevent damage or personnel injury.

2.3

Report transport damage to the carrier immediately.

2.4

In case of discrepancies, contact your nearest FLOWSERVE sales office.

3 **INSTALLATION**

3.1

Clean tubing prior to installing.

3.2

If possible, install the valve in an upright position (actuator on top), to ease maintenance. An upright installation position is important with low-temperature applications, in order to keep the distance between the packing material and the medium as large as possible. The packing material then retains the ambient temperature as much as possible.



WARNING: Do not insulate extension bonnets that are provided for hot or cold services

3.3

Make sure that sufficient overhead clearance above the actuator is maintained, to allow for disassembly of plug from the valve body (see following table).

Actuator size	Clearance (mm)	Actuator size	Clearance (mm)
37/47	95	P1	90
38/48	140	P2	140

3.4

After installing, check direction of flow again. The direction of flow is shown by the arrow on the housing.

3.5

If the valve is to be welded into the line, make sure that the valve is shielded from excessive heat.

3.6

Connect supply pressure and signal lines. Control valves are usually supplied with a positioner. The end connections for supply pressure and signal are clearly marked. Actuator and positioner are suitable for max. 4.2 bar (60 psi) supply pressure. If the supply pressure exceeds the pressure specified on the nameplate, a pressure reducing station is required. If instrument air is not available, install an oil separator/air filter in the air inlet line. All connections must be leak free. Please also observe the User instructions for I/P actuators.

4

QUICK CHECK:

Before operating, check the valve as follows:

4.1

Open and close the valve, and observe the movement of the actuator stem. The movement must be smooth and linear.

4.2

Check for maximum stroke through change of signal (for pneumatic positioners, 0.2 - 1.0 bar or corresponding split-range values; for IP positioners, 4-20 or 0-20 mA).

- 4.3 Check all air connections for leaks.
- 4.4 Tighten packing nut (see table 1)

Thread	Torque in Nm	
	PTFE	Graphit
M20 x 1,5	1	3
M30 x 1,5	6	15
M38 x 1,5	15	35
M45 x 1,5	17	40

Table 1



NOTE: *An excessively tightened packing nut can cause excessive packing wear and can hinder the free movement of the plug stem.*

- 4.5 Check fail-safe position. To do this, close supply pressure and observe whether the valve opens or closes as defined.
- 4.6 After use at fluctuating temperatures, re-tighten all bolt connections and check for leaks.

5 MAINTENANCE

Check valves for correct functioning at regular intervals (at least once every 6 months) as follows. This check can be made when installed and in many cases without interrupting production. If internal defects are suspected, see section „Disassembly and Assembly of Valve“.

- 5.1 Examine gaskets for leaks and if necessary re-tighten bolts.
- 5.2 Check bellows gasket and test connection - if present - for external leaks.
- 5.3 Check valve for damage caused by corrosive residues or corrosive vapours.
- 5.4 Clean valves and if necessary repaint.



WARNING: *To prevent a buildup of electrostatic charge clean the actuator/valve with a damp cloth only.*

- 5.5 Check packing nuts for correct torque (see table 1).



NOTE: *An excessively tightened packing nut can cause excessive packing wear and can hinder the free movement of the plug stem.*

- 5.6 If possible, open and close valve and check for maximum stroke and smooth movement of the plug stem. Irregular movement of the plug stem may indicate internal defects.



NOTE: With graphite packing, irregular movement of the plug stem is normal.



WARNING: *Keep hands, hair, clothing, etc. away from all moving parts. Failure to do so can lead to serious injury.*

- 5.7 Check all accessories for firm seating.
- 5.8 If possible, close supply pressure and check the fail-safe position.
- 5.9 Check stem boot, if present, for wear.
- 5.10 Check actuator for leaks. To do this, spray housing, air connections and plug stem guide with leak spray and check for any bubble formation.
- 5.11 Clean plug stem.
- 5.12 Check air filter, if present, and if necessary replace insert.

6 REMOVE AND INSTALL ACTUATOR

General Information

We recommend separating the actuator from the valve during all repair work. However, many maintenance and adjusting operations can be carried out in an installed condition.

6.1 Remove series 4 actuator

(see Figs 1 + 2)

6.1.1 Disconnect air supply.



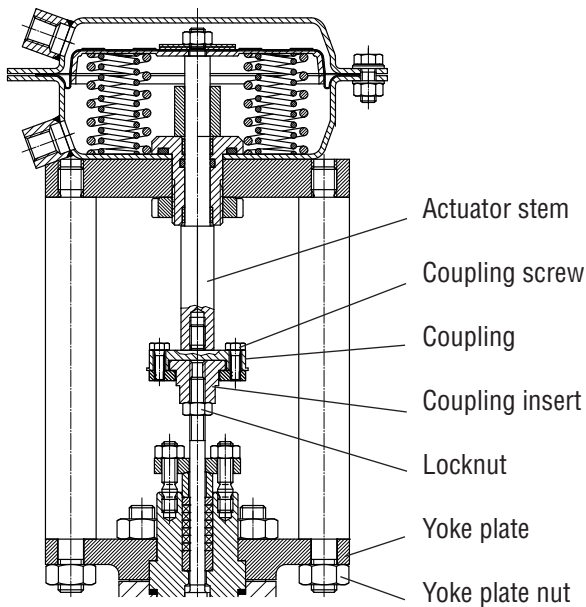
DANGER: *As poisonous or hazardous mediums may be present, the system must be depressurized and all process materials drained. If necessary, decontaminate the valve. Keep hands, hair and clothing well away from moving parts. Wear face and eye protectors. Failure to do so can lead to serious injury.*

- 6.1.2 As required remove all tubing.
- 6.1.3 Remove two coupling screws.
- 6.1.4 Loosen and remove all yoke rod nuts and carefully lift off actuator.
- 6.1.5 Loosen coupling locknut and remove coupling half and locknut:

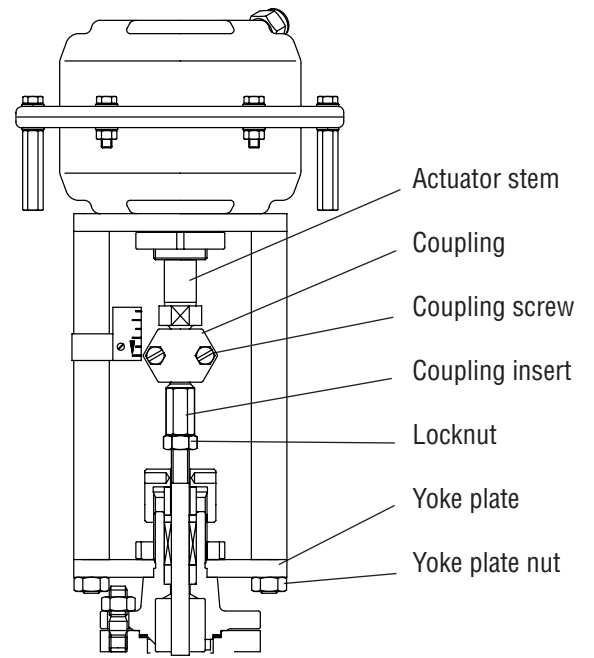
NOTE: *Never rotate the plug or perform any service on the valve while the plug is seated in the seat ring. Doing so may cause irreparable damage to the trim set. To ensure against this, always hold the plug out of the seat while working on the valve assembly.*

6.2 Install actuator

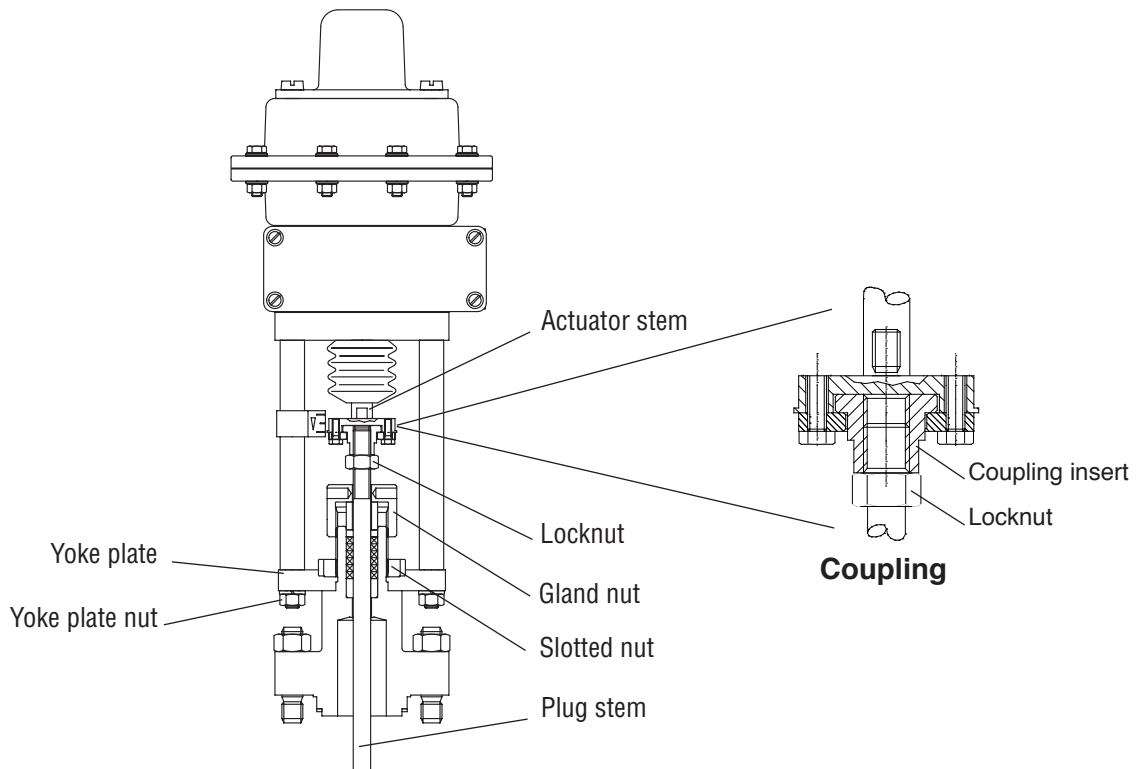
The actuator stem must be fully extended:
 Actuators with air-to open action must be fully vented. Actuators with air-to-close apply supply pressure. Manually depress the plug stem to ensure the plug is fully seated.



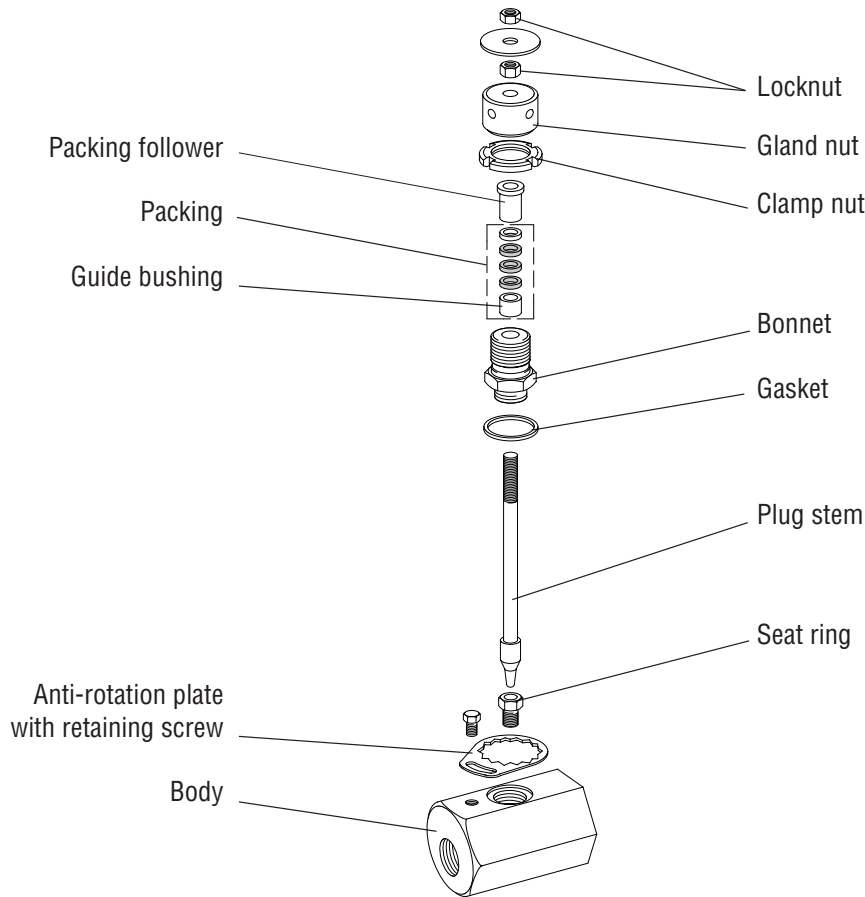
Actuator series 2, type P1
Fig. 1



Actuator series 2, Types P2, P3, P4
Fig. 1a



Actuator series 4
Fig. 2

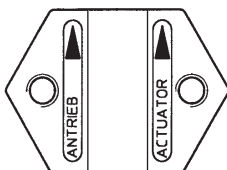


Typical valve configuration
Fig. 3

- 6.2.1 Screw coupling insert locknut and coupling insert as far as possible onto plug stem.
- 6.2.2 Place the actuator assembly on the valve engaging the yoke rod threads in the lower yoke plate and ensuring the actuator faces in the correct direction.
- 6.2.3 Unscrew the coupling insert until the yoke rods are raised from the lower yoke plate by around 2 mm.

! **NOTE:** Ensure that the plug assembly is not rotated with the plug seated. This may cause irreparable damage to the seating faces.

- 6.2.4 **Coupling for actuator series 2**
Refit the coupling, ensuring that the arrows, embossed on the coupling halve, points upward towards the actuator, and secure with 2 retaining screws.



- 6.2.5 **Coupling for actuator series 4**
Insert and tighten coupling screws.
- 6.2.6 Apply supply pressure resp. vent actuator to half stroke and refit and tighten yoke rod retaining nuts.
- 6.2.7 Connect all tubing.

7 DISASSEMBLE AND ASSEMBLE VALVE

General Information

We recommend separating the actuator from the valve during all repair work.

However, many maintenance and adjusting operations can be carried out in installed condition.

! **NOTE:** Never turn plug or perform any service on assembly while the plug is in the seat ring. Doing so may cause irreparable damage to the trim set. To ensure against this, always hold the plug out of the seat while working on the valve assembly.

- 7.1 **Disassemble valve**
 - 7.1.1 Disconnect actuator from valve body
 - 7.1.2 Remove the anti-rotation plate.
 - 7.1.3 Hold the plug out of the seat. Using a 24 mm wrench

loosen and unscrew the bonnet assembly from the valve.



- 7.1.4 Carefully remove the plug from the bonnet. Note that the threaded section of the plug stem is slightly smaller in diameter than the guided section, this helps prevent damage to the packing when removing the plug from the bonnet.
- 7.1.5 If the packing is to be replaced, remove the existing packing rings and guide bushing and clean the packing chamber.
- 7.1.6 Remove the gasket.
- 7.1.7 Using a ¼" drive 10 mm socket remove the seat from the body. **Note:** The O.D. of some sockets may be too large to fit inside the valve body, it may be necessary to turn down the O.D. to fit the body
- 7.1.8 Clean and inspect all parts.

7.2 Assemble valve



NOTE: All worn or damaged parts must be replaced. Reusable parts must be clean.

- 7.2.1 Coat the seat ring with a small amount of lubrication (process permitting).
- 7.2.2 Thread the seat into the body and torque to 400 Ncm.
DO NOT OVERTORQUE
- 7.2.3 Bubble test seat by plugging the seat ring with a pencil eraser and applying 2 bar to the upstream port of the valve body. If leakage exists retorquing the seat ring and repeat the bubble test.

- 7.2.4 Replace the gasket.
 - 7.2.5 Insert the plug into the bonnet. Install the guide bushing into the packing chamber with bevelled end facing down.
 - 7.2.6 Coat the bonnet threads with a small amount of lubricant (process permitting). Hold the plug stem fully retracted in the bonnet and thread the bonnet assembly into the body. Using a 24 mm torque wrench torque the bonnet to 80 Nm.
 - 7.2.7 Replace packing by inserting packing rings one at a time tapping each one down with a suitable bushing.
-  **NOTE:** ensure that the gaps in the packing rings are distributed evenly around the circumference in the packing box (gaps not in line).
-  **NOTE:** different packings and fitting sequences are shown in the spare parts list.
- 7.2.8 Insert packing follower. Fit gland nut for transport purposes only. Gland nut to be fitted correctly and tightened down (see table 1) when the actuator is mounted.
 - 7.2.9 Manually stroke the assembly for alignment. If misaligned, remove the bonnet and repeat the tightening procedure until proper alignment is achieved.
 - 7.2.10 Refit the anti-rotation plate.

8 Medium temperatures

Bonnet / Extension	Packing / Stem	Body gasket	Bellows seal	Medium temperature range	Temperature class
Normal design	PTFE Compound	Stainless steel	N/A	-30 .. 60°C -30 .. 75°C -30 .. 110°C -30 .. 175°C -30 .. 175°C	T6 T5 T4 T3 T2
Normalising fins extension	Graphite	Stainless steel	N/A	-30 .. 60°C -30 .. 75°C -30 .. 110°C -30 .. 175°C -30 .. 270°C -30 .. 400°C	T6 T5 T4 T3 T2 T1
Bellows seal extension	PTFE Compound	Stainless Steel	PTFE Compound	-30 .. 60°C -30 .. 75°C -30 .. 110°C -30 .. 175°C -30 .. 200°C	T6 T5 T3 T3 T2
Bellows seal extension	Graphite	Stainless steel	Graphite	-60 .. 60°C -60 .. 75°C -60 .. 110°C -60 .. 175°C -60 .. 270°C -60 .. 400°C -196 .. 75°C -196 .. 100°C -196 .. 175°C -196 .. 200°C	T6 T5 T4 T3 T2 T1 T5 T4 T3 T2



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