

***FLEU***

**OPERATION MANUAL**

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# Sleeved Plug Valve

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### 1. Generalities

The following operation instructions are valid for FLEU-plug valves of the Fig.XXX•901, which serve to shut the flow of liquids, gases and steams in pipe lines, and of course to let it through, whenever they are in OPEN status.

By a correct assembling, maintenance or repair we guarantee an activity free of troubles. The manufacturer carries no responsibility for efficiency and safety of the valves, whenever these operating instructions are not observed and followed accurately.

**ATTENTION!** The valves must not be activated beyond the limits and rules indicated in the different documents (such as operation rules, purchase documents, datasheets). Operations beyond the indicated limits lead to overstrain which cannot be sustained by the valves.



A non-observance of this warning can cause injuries to persons and defects of the machines, such as:

- Injuries caused by escaped medium (cold/hot, toxic, under pressure),
- Affect in activity or damage of the valve.

The descriptions and rules included in this operation instruction refer to standard types but are also valid for alternatives.

These operation instructions do not take into consideration:

- Any accident and incident which can arise by assembling, operation or commissioning of the valves.
- Any safety rule in relation with the place where the valve is installed. The operator is responsible for the observation of the safety rules, - also by the assembling staff.

The connected loads prescribed for driven valves, as well as the instructions for assembling, commissioning and operation have absolutely to be observed.

**ATTENTION!**

It is essential that the valves are handled by skilled staff that must be aware of the interactions between the valves and the system in which they are installed.

An incorrect use of a valve may cause strong consequences to the complete system, such as:

- Escape of medium
- Stop of the unit
- Affects, decreases or increases of operation or work of a system or unit.

For any further inquiries or in case of damage, please contact SUZHOU FLEU VALVE CO.,LTD

In case of local inquiries or orders, especially for spare parts, please indicate the production or factory serial number, the type, the model version and possibly also the year of construction.

The technical data referring to the valves can be found in their technical documentations (paragraph 4).

In case of a return transport it has to be proceeded as explained in paragraph 3 <Transport>.

## 2. Safety

These operation instructions contain essential information that has to be observed by assembling, operation and commissioning of the valves.

For this reason they have to be read by the assembling staff, by the skilled staff and by the operator before the valve is assembled and put into operation and they should always be kept in the proximity of the valve.

Not only the general safety rules indicated in this main paragraph have to be observed, but also the other ones indicated in other paragraphs.

### 2.1 Indication of notes in the operation instructions

The safety warnings contained in this operation instruction, which have to be observed in order to avoid injuries to persons, are indicated by the following general and particular picot-graphs:

Warning!



Security signal acc. to DIN 4844 W 9

Beware of the electrical tension!



Security signal acc. to DIN 4844 - W 8

In order to avoid defects of valve efficiency and of its accessories the following warning mark has to be observed:

**ATTENTION!**

The signs marked directly on the valve (such as DN) have absolutely to be considered and kept in a readable condition.

## **2.2 Dangers that can result if safety instructions are not observed.**

If the safety instructions are not observed injuries to persons, environment and valve, or system can arise and the indemnity rights get lost.

In particular the non-observance of the safety notes can cause dangers such as:

- Break down of important functions of the valve or unit
- Failure of prescribed methods of commissioning and handling
- Danger to persons caused by electrical, mechanical and chemical impacts.
- Environmental injuries caused by a leakage of dangerous materials.

## **2.3 Working with safety consciousness**

The safety instructions included in this paper, the national regulations for prevention of accidents, as well as the internal regulations referring to work, operation and safety have to be observed by the operator.

## **2.4 Safety instructions for the operator / user**

- When ever some hot or cold valve parts (f. ex. Casing parts or handlever) may cause any danger, these parts have to be constructed in a way that they are protected from contacts.
- The contact protection for moving parts (such as coupling) must not be taken away while the machine is working.
- Leakages (f. ex. in spindle gaskets) of dangerous conveyed materials (explosive, toxic, hot) have to be removed in a way that no danger to persons or environment can arise. Legal de-terminations must be respected.
- Injuries by electrical energy have to be excluded (please find details to this point in the VDE and local power supply enterprise regulations).

## **2.5 Safety instructions for commissioning, inspection and assembly works.**

It must be provided that all commissioning, inspection and assembly works are executed by skilled staff, who must have previously studied these operation instructions.

Basically when any kind of work on a valve is executed, the valve has to be cooled down and free of pressure and the evaporation temperature of the medium must be lower than the temperature of all parts it gets in contact with.

Also basically, works on a valve have to be executed when it is stopped. The procedure to stop a valve operation is described in this paper and has absolutely to be observed.

Valves which get in touch with health injuring media have to be decontaminated.

Immediately after the work is done, all safety and protection devices have to be put into position or operation again. Before putting the valve into operation again, the points referring to paragraph 6 <putting into operation> have to be observed.

### **2.6 Arbitrary reconstruction and manufacture of spare parts**

Reconstructions or modifications of the valve are only accept-able under agreement with the manufacturer. The use of original spare parts and by the manufacturer authorized accessories promotes safety. If any damage is caused by using other parts the liability for the consequences can be cancelled.

### **2.7 Inadmissible operation modes**

A safe operation is only guaranteed if the valve is used according to the determinations included in the “generalities” of this operation instruction. The limits included in the technical documentation must not be exceeded.

## **3. Transport and storage**

### **3.1 Corrosion protection**

#### **3.1.1 Carbon steel valves**

Valves made out of unalloyed or low alloyed cast steel are painted with a hard sticking primer made of a 2-components colour based on epoxy resin paint. The minimum film thickness is 70 µm. The inner surfaces are free of paint and only coated with a temporary corrosion protection (e.g. oil). Machined flange facings are protected against outside influences with a strippable vanish.

#### **3.1.2 Stainless steel valves**

Valves made out of stainless steel will be delivered without coating.

### **3.2 Transport**

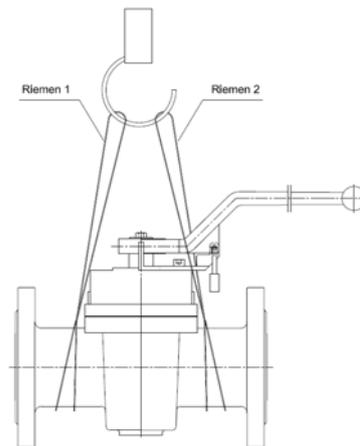
The valves are delivered in a closed condition and its connecting holes are shut up by cover caps.

Valves will be supplied as ready for operation.

**ATTENTION!** During transportation and storage valve have to be closed. Connecting holes have to be shut up by suitable means (cover caps, foils) in order to avoid any damage to the valve seats.

**ATTENTION!** In order to avoid damages the valves must not be hanging on the handlever, or on a possible connected mo-tor or on any other accessory.

**ATTENTION!** Transport or lifting a valve for installation in horizontal pipe lines as  
picture 1



Pic.1

The lifting belts 1 und 2 must be twisted round the body. In order to keep the valve in the shown position and to prevent falling vertically, the two lifting belts should lead to the hook through the handlever.



Valves must not be lifted by the handlever!

### 3.3 Storage

The storage has to be effected in a way that it can work perfectly even after a longer storage period.

For this purpose it is necessary

- To keep the valve open(in order to protect the seat facings)
- To take measures against soiling (dust, sand, mortar, respectively building materials), frost and corrosion using plastic foils.

When storing valves with soft gaskets (of elastomer) the storage regulations for elastomer have to be observed:

- The store must be dry, free of dust and moderately ventilated. Store temperature should not go over 25°C.,
- stocks on hand have to be used up in order to avoid long storage periods,
- As already mentioned above, plug valves have to be in “opened” position during the storage, in order to avoid a damage to the plug surface.

## 4. Description / documents

### 4.1 Structure and standards

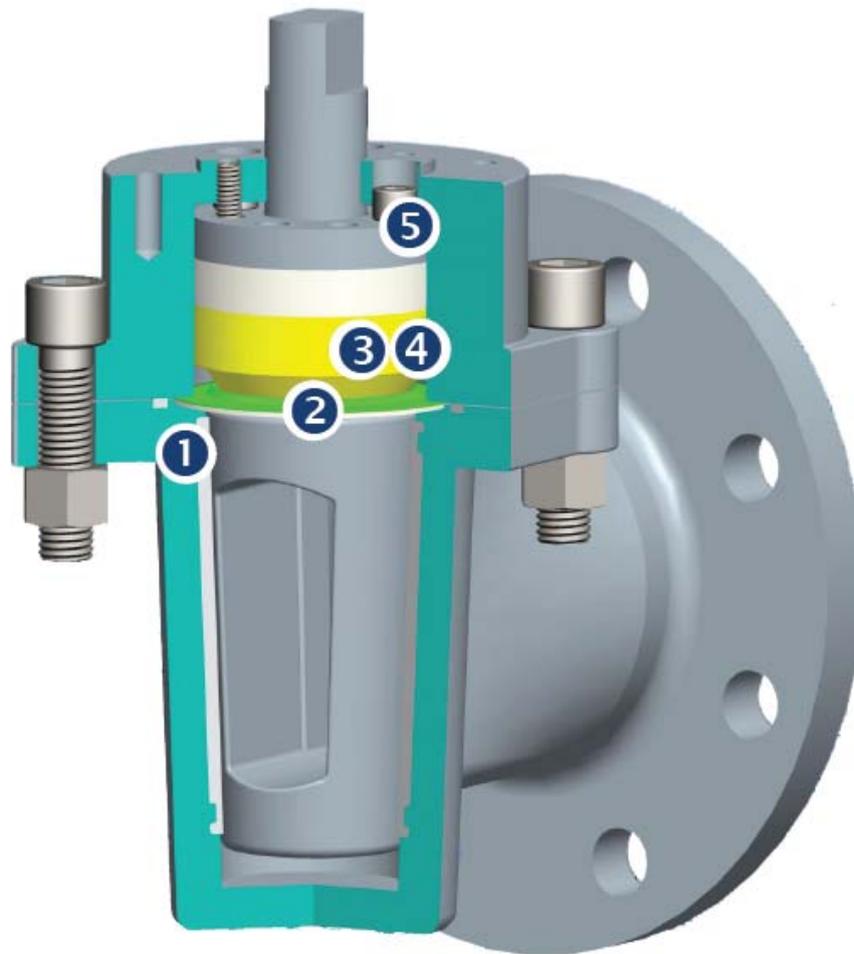
4.1.1 Basic design acc. to EN 12516

Flanges acc. to EN 1092-1 (for ANSI valves, acc. to ASME B16.5)

Face to face acc. to EN 558-1 (for ANSI valves, acc. to ASME B16.10)

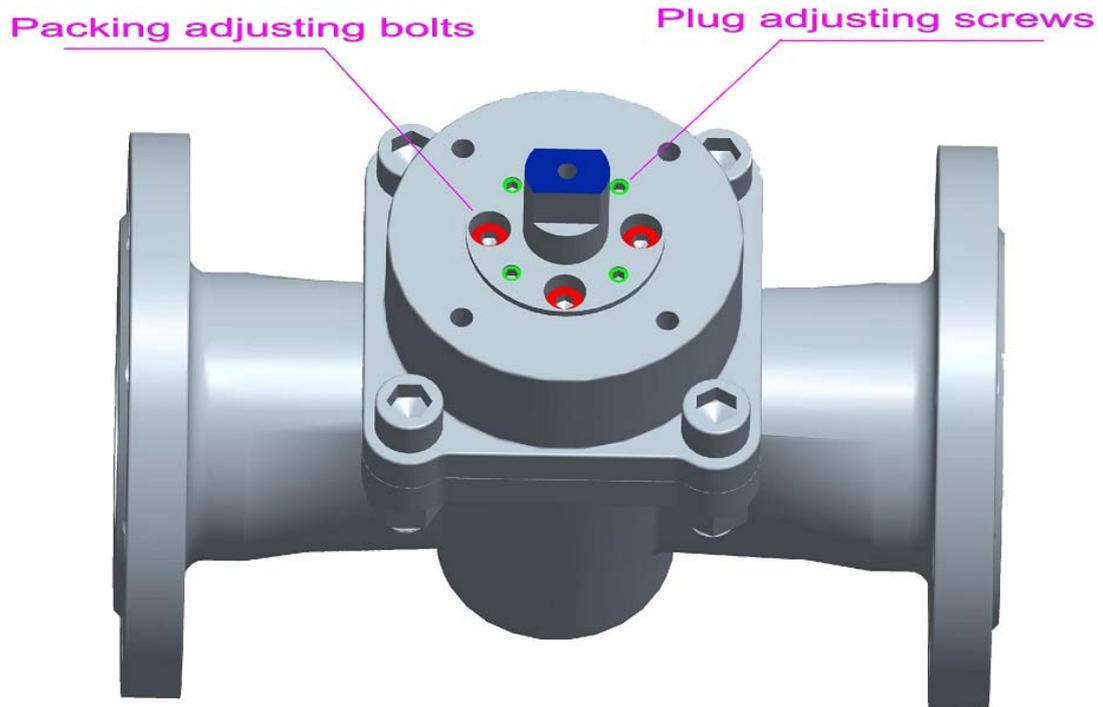
Test acc. to EN 12266-1 (for ANSI valves, acc. to API 598)

#### 4.1.2 FLEU 5S sealing system see pic.2



Pic. 2

- ① Primary Seal to Atmosphere  
360° port lips and high pressure ribs ensure the seat seal and primary seal to atmosphere. Plug is adjustable.
- ② Secondary Seal to Atmosphere  
Enabled ring and plastic diaphragm design ensuring 2. protection to stem seal and body cover joint.
- ③④ seal to atmosphere Patented live-loaded stem system  
Optimizes sealing integrity to Atmosphere. Stem packing depending on operating conditions. Various packing as PTFE PFA, Viton, Graphite
- ⑤ Packing adjustable if necessary



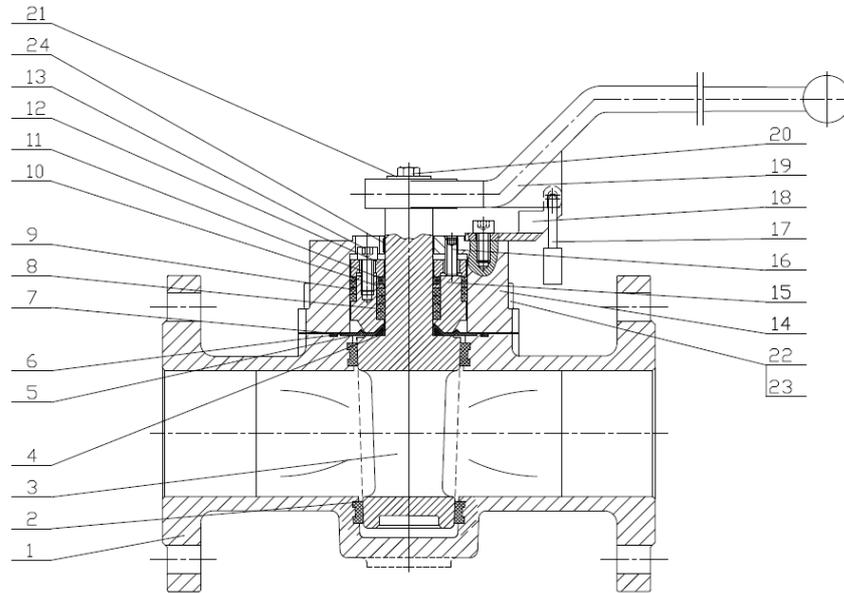
Pic. 3

The plug adjusting screws and packing adjusting bolts can be seen in pic.3

The plug adjusting screws should be gently, crosswise and evenly tightened to achieve to re-sealing effect and tight when there is dramatical decrease of operating torque and leakage of seat and the gap between body and bonnet..

Packing adjusting bots also can be tightened evenly when there is a lossening or leakage from the inside and outside clearance of the packing box.

## 4.2 General view and parts list



| NO. | Part                 | Material  |           |
|-----|----------------------|-----------|-----------|
| 1   | Body                 | 1.4408    | 1.0619N   |
| 2   | Sleeve               | PTFE      | PTFE      |
| 3   | Plug                 | 1.4308    | 1.4408    |
| 4   | Delta sealing ring   | PTFE      | PTFE      |
| 5   | Sealing diaphragm    | PTFE      | PTFE      |
| 6   | Metal diaphragm      | 1.4401    | 1.4401    |
| 7   | Sealing gasket       | PTFE      | PTFE      |
| 8   | Packing              | PTFE      | PTFE      |
| 9   | Outer packing        | PTFE      | PTFE      |
| 10  | Packing busher       | 1.4401    | 1.4401    |
| 11  | Belleville spring    | 17-7PH    | 17-7PH    |
| 12  | Packing gland        | 1.4401    | 1.4301    |
| 13  | Hexagon socket bolt  | A2-70     | A2-70     |
| 14  | Bonnet               | 1.4408    | 1.0619N   |
| 15  | Packing box          | 1.4401    | 1.4301    |
| 16  | Set screw            | A2-70     | A2-70     |
| 17  | Padlock              | Purchased | Purchased |
| 18  | Locking piece        | 1.4308    | 1.4308    |
| 19  | Handlever            | GGG 40.3  | GGG 40.3  |
| 20  | Lock nut             | A2-70     | A2-70     |
| 21  | Washer               | 1.4301    | 1.4301    |
| 22  | Hexagon socket screw | A4-70     | 1.7225    |
| 23  | Nut                  | A4        | 1.1181    |
| 24  | Bearing              | PTFE+30%C | PTFE+30%C |

## 4.3 Temperature

4.3.1 Body material suitable for Temperature as follow:

- a. Carbon steel 1.0619N:  $-29^{\circ}\text{C}\sim+425^{\circ}\text{C}$
- b. Carbon steel WCB:  $-29^{\circ}\text{C}\sim+425^{\circ}\text{C}$
- c. Stainless steel 1.4408:  $-196^{\circ}\text{C}\sim+540^{\circ}\text{C}$  (for flanged connection valves)  
+815 $^{\circ}\text{C}$  (for carbon content  $\geq 0.04\%$ )
- d. Stainless steel CF8M:  $-196^{\circ}\text{C}\sim+540^{\circ}\text{C}$  (for flanged connection valves)  
+815 $^{\circ}\text{C}$  (for carbon content  $\geq 0.04\%$ )

#### 4.3.2 Gasket material suitable for Temperature as follows:

- a. PTFE or RPTFE:  $-50^{\circ}\text{C}\sim+280^{\circ}\text{C}$
- b. Flexible graphite:  $-200^{\circ}\text{C}\sim+570^{\circ}\text{C}$  (Oxidizing medium)  
+800 $^{\circ}\text{C}$  (Non-oxidizing medium)
- c. Metal sealing circle the same as 4.3.1

#### 4.4 Medium

For carbon steel valves: non-corrosive, such as water, steam, and oil.

For stainless steel valves: can be corrosive,  $4.0 \leq \text{PH} \leq 10.0$



The valves should be operated during the limits range refer to par. 4.3 and 4.4.

## 5. Installation

### 5.1 Generalities

**ATTENTION!** The pipeline has to be installed in a way that injurious shearing and bending forces during installation and activity are kept away from the valve bodies. This is to avoid leakiness and destruction of the body.

**ATTENTION!** Before installation the cover caps have to be removed from the connecting holes.

The flange facings must be clean and undamaged.

The flange gaskets must be well centralized.

Only bolts and gaskets of admissible materials may be used.

For the flange connection all flange drill holes have to be used.



When varnishing the pipelines, no bolts and nuts, stems, stuffing boxes and accessories must be painted (function affects). During any construction work the valves have to be protected from dust, sand and any other construction material. (Please cover with suitable means).

Valve handlevers, by-passes and all other adjacent parts must not be used as steps.



Valves and pipe lines working in high temperatures ( $>50^{\circ}\text{C}$ ) or low ( $<0^{\circ}\text{C}$ ) must be protect from touch by insulating. Alternatively the danger must be indicated by warning boards on the valve side.

**ATTENTION!**

If in air-conditioning, cooling and refrigerating systems any condensation water, respectively danger of icing appears, a specialistic and diffusion-tight insulation of the whole valve, if necessary including the handlever, has to be provided.



If a plug valve is mounted in a pipe line as an end valve it has to be secured by convenient measures from an unauthorized or unintended opening. It can also be shut by a blind flange on the exit side, in order to prevent any injury to parts and / or persons.

## 5.2 Installation position

Plug valves can be installed with the plug in vertical or horizontal position, but preferably in vertical.

Usually, there is no prescribed flow direction for plug valves. They can be operated by changing flow direction. Some specially designed valves will be noted in the order document.

## 5.3 Valves with motor



All electric devices such as adjusters, switch boxes, magnetic valves, end switches, etc., have to be installed in dry rooms and safe from overflow. Tension and frequency have to correspond to the data on the factory label.

# 6. Operation / putting into and out of operation

## 6.1 Operation/putting into operation

### 6.1.1 Generalities

Before putting the valve into operation its material, pressure and temperature data have to be compared with the operation terms of the pipe line.



Eventually appearing shock pressures (water hammer) should not exceed the maximal admissible pressure. Protective measures have to be provided.

The line system of new plants and especially after repair works has to be flushed in order to remove harmful solid matters, respectively bead of weld.

## 6.2 Operation

Looked at from above the valves can be closed by a clockwise rotation of the handlever and opened by a counter-clockwise rotation. The valve can only open-close at 90 degrees of the limit device. Relative symbols are to be seen on the locking piece top.

**ATTENTION!**

The use of any auxiliary lever to turn the handlever is not admitted. Too big

forces could be injurious because their position indicating and locking system could be damaged.

Plug valves are applied in a way that they are either completely open or completely closed.

### **6.3 Function check up**

The following functions have to be checked up:

The shutting function of the installed valve must be checked up opening and closing it several times. plug adjusting screw and packing adjusting bolts

The stuffing box packing efficiency has to be checked up before the first loading by full operation pressure and temperature. If necessary the nuts on the stuffing box glands, respectively the stuffing box have to be evenly tightened.

The sealing efficiency of the bolted bonnet connections with the flat seal must be examined after the first loading/warming up of the valve. (Maintenance-free valves too!) If necessary the bolts connections have to be gently, crosswise and evenly tightened.

### **6.4 Putting out of operation**

During longer standstill periods liquids whose form can change in concentration due to polymerization, crystallization, solidification or the like, have to be let out of the line system. If necessary the line system has to be rinsed by completely open valve.

## **7. Commissioning / maintenance**

### **7.1 Safety notes**

During all commissioning and maintenance works on the valves the following safety notes as well as the general indications under paragraph 2 <safety> must be observed.

#### **ATTENTION!**

In any case, also in emergency, only suitable spare parts and tools have to be used, otherwise a perfect function is not guaranteed.

### **7.2 Valve disassembly**

Before dismounting from the pipe line or before commissioning and repair works are made directly on the valve, more precisely:

- before loosening the bolted bonnet
- before loosening the gland bolts, respectively the stem bushes or the stem nuts
- before dismounting the bonnet, respectively the yoke
- before disassembling a directly connected motor
- before loosening shutting, opening and pressure release threaded plugs

the valve has to be completely discharged from pressure and has to be cooled up until the evaporation temperature of the medium is lower than all the chambers getting in contact with it. Then any scald can be excluded.



Opening a valve under pressure is a lethal danger!

In case those toxic or easily inflammable mediums are conveyed, or mediums the residues of which in contact with humidity of the air can lead to corrosion damages, the valve has to

be drained and flushed, respectively ventilated.

If necessary protecting clothes and protective masks have to be worn.

Due to the installation position the residual liquid possibly remained in the valve have to be drained off and correctly disposed.

Before a possible transportation, the valves have to be carefully emptied and flushed.

### **7.3 Maintenance**

The valves are constructed in almost all of their parts maintenance-free. Materials for sliding parts are chosen which cause a very minimal wear. In order to improve operation safety and to minimize repair costs, all valves, specially those ones which are seldom put into operation or are hard to get to, should be regularly tested, that means, put into operation (OPEN – CLOSED) at least once or twice a year.

The plug valve is soft sealing valve, that the sealing efficiency may be decreased due to the wear of the sleeve , PTFE diaphragm and PTFE packing , so the plug adjusting screw and packing adjusting bolts should be evenly tightened if necessary , see par.4.1.2.

The operator is responsible to determine the convenient test and maintenance intervals depending on the application of the valve.

The durability of maintenance-free valves and not can be extended if:

- the stem and stuffing chamber surfaces are kept clean and undamaged;
- the mobile parts, such as stems and stuffing box bolts are greased (except oxygen valves) by using standard lubricants.
- the stuffing box is punctually additionally packed or the packing is renewed;
- the gasket is punctually renewed;
- the plug adjusting screw and packing adjusting bolts is punctually checked and adjusted;

The safety warnings in par. 2, 7.1 and in par. 8 must be observed.

## **8.Troubleshooting**

### **8.1 Generalities**

All repair and maintenance works have to be done with suitable tools and original spare parts. The safety notes in par.2 and 7 have to be observed.

### **8.2 Troubleshooting table**

| Description of trouble               | Probable cause  | Solution  |
|--------------------------------------|---|---|
| Leakage of packing                   | 1.Tightening of the packing not enough.<br>2. Insufficiency or failure of packing rings | 1.Retighten the packing adjusting bolts evenly.<br>2. Replace the packing set by new one. |
| Leakage between seat sealing surface | 1.Dirt on the sealing surface.<br>2.Damage of sealing surface                           | 1.Clean the dirt<br>2.repair the sealing surface of replace the plug and sleeve.          |

|   |   |  |
|---|---|--|
| Leakage at the connection of body and bonnet                          | <ol style="list-style-type: none"> <li>1.Untightening of connecting of it .</li> <li>2. Damage of the sealing surface of the body-bonnet flange</li> <li>3. Failure or damage of gasket</li> </ol>    | <ol style="list-style-type: none"> <li>1.Tighten the bolts uniformly .</li> <li>2. Repair the sealing surface of the body-bonnet flange</li> <li>3. Replace gasket</li> </ol>  |
| Handlever can't be turned flexibly or the plug can't be open or close | <ol style="list-style-type: none"> <li>1.Overtighten the plug .</li> <li>2.Damage of the plug shank or dirt on it .</li> <li>4.Wear ,puncture or jam of plug</li> <li>5.Bend of plug shank</li> </ol> | <ol style="list-style-type: none"> <li>1.Loose the plug adjusting bolts properly.</li> <li>2.Revise the shank of plug, and clean the dirt.</li> <li>4.Replace the plug</li> <li>5.Rectify or replace the plug</li> </ol> |
| Breakdown of electric   | See the instruction of electric actuator  | See the instruction of electric actuator   |

For any further information please contact SUZHOU FLEU VALVE CO., LTD

## 9. Guarantee

The warrantee for our product is one year after commissioning date, or 18 Months from shipment whichever happens earlier. In this period, If there is any damage caused by material defect, improper manufacture, and unreasonable design, or it takes place under the normal condition. Repair and replacement of part is free of charge.