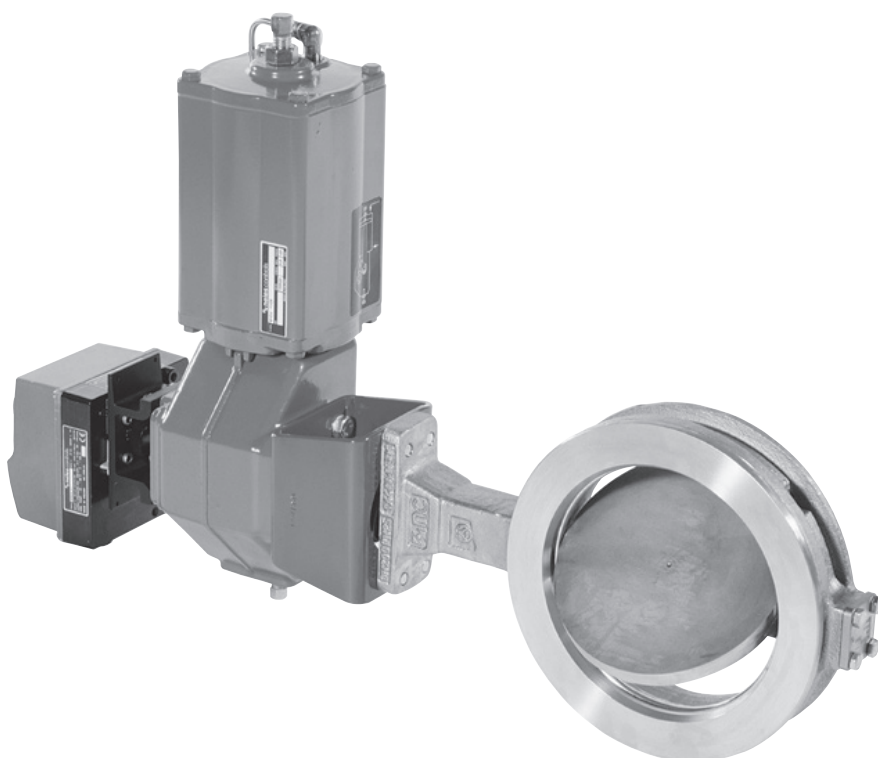


# Neles™ Neldisc™ high performance butterfly valves

Series LW, LG

Installation, maintenance and  
operating instructions



# Table of contents

|   |           |                                   |           |
|---|-----------|-----------------------------------|-----------|
| <b>GENERAL</b>                                | <b>4</b>  | <b>TROUBLE SHOOTING</b>           |           |
| Scope of this manual                          | 4         | <b>TABLE</b>                      | <b>19</b> |
| Description                                   | 4         | <b>TOOLS</b>                      | <b>19</b> |
| Valve markings                                | 4         | <b>ORDERING SPARE PARTS</b>       | <b>19</b> |
| Technical specifications                      | 5         | <b>EXPLODED VIEW</b>              |           |
| Valve approvals                               | 5         | <b>AND PARTS LIST</b>             | <b>23</b> |
| CE and ATEX marking                           | 5         | <b>DIMENSIONS</b>                 |           |
| Recycling and disposal                        | 5         | <b>AND WEIGHTS</b>                | <b>24</b> |
| Safety Precautions                            | 5         | Flange drilling and compatibility | 28        |
| Welding notes                                 | 6         | <b>TYPE CODE</b>                  | <b>29</b> |
| <b>TRANSPORTATION,</b>                        |           | <b>GENERAL SAFETY</b>             |           |
| <b>RECEPTION AND</b>                          |           | <b>WARNINGS AND</b>               |           |
| <b>STORAGE</b>                                | <b>6</b>  | <b>DISCLAIMERS</b>                | <b>31</b> |
| Unpacking                                     | 6         | General safety warnings           | 31        |
| <b>INSTALLATION</b>                           | <b>6</b>  | General disclaimers               | 31        |
| General                                       | 6         |                                   |           |
| Installing in the pipeline                    | 7         |                                   |           |
| Valve insulation                              | 11        |                                   |           |
| Actuator                                      | 11        |                                   |           |
| <b>COMMISSIONING</b>                          | <b>11</b> |                                   |           |
| <b>MAINTENANCE</b>                            | <b>11</b> |                                   |           |
| General                                       | 11        |                                   |           |
| Removing the valve from the pipeline          | 12        |                                   |           |
| Replacing the gland packing                   | 12        |                                   |           |
| Valve leakage                                 | 13        |                                   |           |
| Replacing the seat ring                       | 13        |                                   |           |
| Replacing the disc, shafts and bearings       | 14        |                                   |           |
| <b>INSTALLING AND</b>                         |           |                                   |           |
| <b>DETACHING THE</b>                          |           |                                   |           |
| <b>ACTUATOR</b>                               | <b>16</b> |                                   |           |
| General                                       | 16        |                                   |           |
| Installing the B1 series actuator             | 16        |                                   |           |
| Detaching the B1 series actuators             | 16        |                                   |           |
| Detaching and installing other actuator types | 16        |                                   |           |
| Stop screw adjustment                         | 17        |                                   |           |

Subject to change without notice.

All trademarks are property of their respective owners.



This product meets the requirements set by the Customs Union of the Republic of Belarus, the Republic of Kazakhstan and the Russian Federation.

#### **READ THESE INSTRUCTIONS FIRST!**

These instructions provide information about safe handling and operation of the valve.

If you require additional assistance, please contact the manufacturer or manufacturer's representative.

#### **SAVE THESE INSTRUCTIONS!**

Addresses and phone numbers are printed on the back cover.

# L series Neles™ Neldisc™ high performance butterfly valves

These instructions provide the customer/operator with important information in addition to the customer/operator's normal operation and maintenance procedures. Since operation and maintenance philosophies vary, Valmet does not attempt to dictate specific procedures, but to provide basic limitations and requirements created by the type of equipment provided.

These instructions assume that operators already have a general understanding of the requirements for safe operation of mechanical and electrical equipment in potentially hazardous environments. Therefore, these instructions should be interpreted and applied in conjunction with the safety rules and regulations applicable at the site and the particular requirements for operation of other equipment at the site.

These instructions do not intend to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the customer/ operator's purposes the matter should be referred to Valmet.

The rights, obligations and liabilities of Valmet and the customer/operator are strictly limited to those expressly provided in the contract relating to the supply of the equipment. No additional representations or warranties by Valmet regarding the equipment or its use are given or implied by the issue of these instructions.

These instructions contain proprietary information of Valmet and are furnished to the customer/operator solely to assist in the installation, testing, operation, and/or maintenance of the equipment described. This document shall not be reproduced in whole or in part nor shall its contents be disclosed to any third party without the written approval of Valmet.

# INTRODUCTION

## READ THESE INSTRUCTIONS FIRST!

These instructions provide information about safe handling and operation of the valve. If you require additional assistance, please contact the manufacturer or manufacturer's representative. Addresses and phone numbers are printed on the back cover. See also [www.valmet.com/flowcontrol/valves](http://www.valmet.com/flowcontrol/valves) for the latest documentation.

## SAVE THESE INSTRUCTIONS!

The following instructions should be thoroughly reviewed and understood prior to installing, operating or performing maintenance on this equipment. Throughout the text, safety and/or caution notes will appear and must be strictly adhered to, otherwise, serious injury or equipment malfunction could result.

Valmet has highly skilled personnel available for startup, maintenance and repair of our valves and component parts. Arrangements for this service can be made through your local Valmet representative or sales department. When performing maintenance use only Valmet replacement parts. Parts are obtainable through your local representative or spare parts department.

When ordering parts, always include Model and Serial Number of the unit being repaired.

## 1. GENERAL

These installation and maintenance instructions apply to 3"-40" (DN 80-1000), pressure class 150 and 300 LW, LG series valves regardless of the type of material used. The L series valves are designed with built in versatility making them well-suited to handle a wide variety of process applications.

Recommended spare parts required for maintenance refer to section 9. The model number, size, rating and serial number of the valve are shown on the identification tag located on the valve.

### 1.1 Scope of this manual

This installation, operation and maintenance manual provides essential information on the L series Neldisc triple eccentric disc valves. The actuators and instrumentation to be used with the L series valves are also discussed briefly. Refer to the separate actuator and control equipment instruction manuals for further information.

For valves in oxygen service, please see also the separate installation, maintenance and operating instructions for oxygen service (see Neles document id: 10O270EN.pdf).

### 1.2 Description

Neles™ Neldisc™ series L is a metal seated triple eccentric butterfly valve available in wafer and lugged styles. The valve operates both in control and shut-off applications.

### Offset Design

The disc is elliptical and has a triple eccentric mounting. When the valve is closed, the elliptical disc at the major axis displaces the seat ring outward, causing the seat ring to contact the disc at the minor axis. When the valve is opened, the contact is released, and the seat ring returns to its original circular shape (see Figure 1).

The disc is connected to the shafts with pins and there are no holes through the disc. Construction details of individual valves are included in the type code shown on the valve identification plate.

To interpret the type code, please refer to Section 12. The valve Operates both in control and shut-off applications.

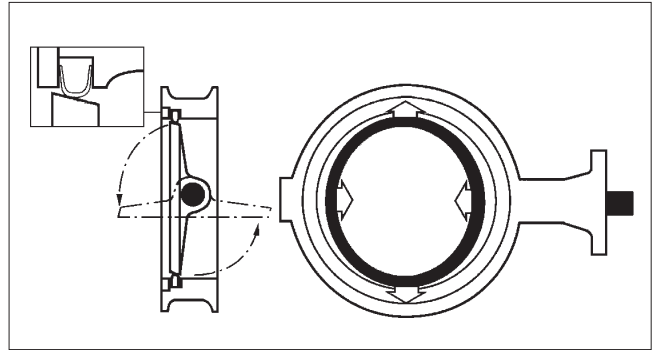


Fig. 1 Construction of a triple eccentric disc valve

### 1.3 Valve markings

Body markings are cast or stamped on the body.

The valve also has an identification plate attached to it (see Fig. 2).

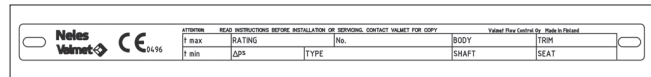


Fig. 2 Identification plate

Identification plate marking:

1. Size
2. Pressure class
3. Type code
4. Body material
5. Seat material
6. Model number
7. Date
8. Trim material
9. Shaft material
10. Maximum shut-off pressure
11. Maximum temperature
12. Certification and approvals, eg. CE, Atex etc.

## 1.4 Technical specifications

|                    |   |
|--------------------|---|
| Type:              | metal seated triple eccentric disc valve<br>LW: wafer type<br>LG: lug type  |
| Pressure class     |   |
| Body:              | LW6L, LW7L, LG6L, LG7L:<br>PN 25, ISO PN 20, ASME150<br>LW8M, LG8M, LW5M, LG5M:<br>PN 40, ISO PN 50, ASME300                      |
| Trim:              | LW6L, LW7L, LG6L, LG7L:<br>Sizes DN 80-150: PN 25<br>Sizes DN 200 - 600: ISO PN 20<br>LW8M, LG8M, LW5M, LG5M:<br>PN 40, ISO PN 50 |
| Body & trim:       | LW8C, LG8C:<br>Sizes DN700 - DN1000: ASME 150   |
| Temperature range: | -200 °C... +600 °C<br>(over 600 °C, please contact the manufacturer)  |
| Flow direction:    | Free  |
| Dimensions:        | See Section 11  |
| Weights:           | See Section 11  |

## 1.5 Valve approvals

API 607 Fire Test for Quarter-turn Valves and Valves Equipped with Nonmetallic Seats

ISO 15848 INDUSTRIAL VALVES. MEASUREMENT, TEST AND QUALIFICATION PROCEDURES FOR FUGITIVE EMISSIONS Group II Category 2 according to directive 2014/34/EU (ATEX). NACE MR0103 & MR0175.

## 1.6 CE and ATEX marking

The valve meets the requirements of the European Directive 2014/68/EU relating to pressure equipment, and has been marked according to the Directive.

When applicable, the valve meets the requirements of the European Directive 2014/34/EU relating to equipment and protective systems intended for use in potentially explosive atmospheres, and has been marked according to the Directive.

## 1.7 Recycling and disposal

Most valve parts can be recycled if sorted according to material.

Most parts have material marking. A material list is supplied with the valve. In addition, separate recycling and disposal instructions are available from the manufacturer. A valve can also be returned to the manufacturer for recycling and disposal against a fee.

## 1.8 Safety Precautions

### WARNING:

#### DO NOT EXCEED THE VALVE PERFORMANCE LIMITATIONS!

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

### WARNING:

#### SEAT AND BODY RATINGS!

The practical and safe use of this product is determined by both the seat and body ratings. Read the identification plate and check both ratings. This product is available with a variety of seat materials. Some of the seat materials have pressure ratings that are less than the body ratings. All of the body and seat ratings are dependent on valve type and size, seat material, and temperature. Do not exceed these ratings!

### WARNING:

#### 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.

Be aware of the type of medium involved. Protect people and the environment from any harmful or poisonous substances. Make sure that no medium can enter the pipeline during valve maintenance. Failure to do this may result in damage or personal injury.

### WARNING:

#### BEWARE OF DISC MOVEMENT!

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, the disc functions as a cutting device. Disconnect any pneumatic supply lines, any electrical power sources and make sure springs in spring-return actuators are in the full extended/relaxed state before performing any valve maintenance. Failure to do this may result in damage or personal injury!

### WARNING:

#### WHEN HANDLING THE VALVE OR VALVE/ACTUATOR ASSEMBLY, TAKE ITS WEIGHT INTO ACCOUNT!

Never lift the valve or valve/actuator assembly by the actuator, positioner, limit switch or their piping. Place lifting devices securely around the valve body. Failure to follow these instructions may result in damage or personal injury from falling parts.

Please consult separate document: instructions for lifting Neles products. (See Neles document id: 10LIFT70EN.PDF).

### CAUTION:

#### BEWARE OF NOISE EMISSIONS!

The valve may produce noise in the pipeline. The noise level depends on the application. Observe the relevant work environment regulations on noise emission. This can be measured or calculated using Neles™ Nelprof™ software.

### CAUTION:

#### BEWARE OF A VERY COLD OR HOT VALVE!

The valve body may be very cold or very hot during use. Protect yourself against cold injuries or burns.

### NOTE:

Do not turn the disc more than 90° as this could damage the seat. The valve is so constructed that the disc operates only between 0-90°.

## ATEX/Ex Safety

### CAUTION:

Potential electrostatic hazard, ensure the protection (grounding, etc.) in the process.

### CAUTION:

The actual surface temperature of valve is dependent on the process temperature. The protection from high or low temperature must be considered by the end user before valve is put into service.

### CAUTION:

Ensure the general process and worker protection from static electricity in the facilities.

**Note!** Within series there is possibility to Category 2, Category 3 and non-ATEX valve.

## 1.9 Welding notes

### WARNING:

Welding and/or grinding stainless steel and other alloys containing chromium metal may cause the release of hexavalent chromium. Hexavalent chromium(VI) or Cr(VI), is known to cause cancer. Be sure to use all appropriate personal protective equipment (PPE) when welding metals containing chromium.

### NOTE:

A qualified welder must do the installation welding. The welder and welding procedure should be qualified in accordance with the ASME Boiler and Pressure Vessel Code Section IX or other applicable regulation.

### CAUTION:

To prevent damage to the seat and seals, do not allow the temperature of the seat and body seal area to exceed 94 °C (200 °F). It is recommended that thermal chocks be used to check the temperature in these areas during welding.

### CAUTION:

Ensure that any weld splatter does not fall onto the valve closing members eg. trim or seats. This may damage critical seating surfaces and cause leaks.

## 2. TRANSPORTATION, RECEPTION AND STORAGE

Check the valve and the accompanying devices for any damage that may have occurred during transport.

Store the valve carefully before installation, preferably indoors in a dry place.

Do not remove the flow port protectors until installing the valve. Move the valve to its intended location just before installation. The valve is usually delivered in the closed position. A valve equipped with a spring-return actuator is delivered in a position determined by the spring. During storage the valve must be lightly closed. If the valve(s) are to be stored for a long duration, follow the recommendations of M-1147-En.

### 2.1 Unpacking

Care must be exercised when unpacking the valve to prevent damage to the accessories and component parts. Contact the local Valmet Sales office or Service Center with any issues or problems. Be sure to note the valve model number and serial number in all correspondence.

## 3. INSTALLATION

1. Read all **WARNINGS!**
2. **IMPORTANT:** Only operating handle stops or actuator stop screws must be used to stop the disc position.
3. The valve must be centered between flanges to avoid disc-pipe contact which could damage the disc and shaft. Any flange or pipeline welding should be done prior to installation of the valves. If this is impossible, protective covering or shields must be placed in the pipeline between the valve and the area being welded prior to welding. Not only must the valve be protected against weld slag, but also against any excessive heat, which could cause seat damage. It is essential that all weld slag, rods, debris, tools, etc., be removed from the pipeline before valves are installed or cycled.
4. It is not recommended to install the valve with the stem on the underneath side because dirt in the pipeline may then enter the body cavity and potentially damage the stem packing (see Figure 3).
5. For installation of the cryogenic extension to the valve, the extension and the valve should be typically in vertical position. For installation of the valve in cryogenic applications the valve package as a whole should be typically in vertical position.

### 3.1 General

Remove the flow port protectors and check that the valve is undamaged and clean inside.

Before installing the valve in the line, clean piping and valve of all foreign material such as welding chips, scale, oil, grease or dirt. Gasket surfaces should be thoroughly cleaned to ensure leak-proof joints.

### 3.2 Installing in the pipeline

**WARNING:**

The valve should be tightened between flanges using appropriate gaskets and fasteners compatible with the application, and in compliance with applicable piping codes and standards. Center the flange gaskets carefully when fitting the valve between flanges. Do not attempt to correct pipeline misalignment by means of flange bolting!

Flush or blow the pipeline carefully before installing the valve. Foreign particles, such as sand or pieces of welding electrode, will damage the disc sealing surface and seat.

The valve may be installed in any position and offers tightness in both directions except shown in Figure 3.

Install the valve in the pipeline so that the shaft is horizontal if possible. However, Valmet does not recommend installing the valve with the actuator on the underside because dirt in the pipeline may then enter the body cavity and damage the gland packing.

If the valve is equipped with a flow balancing trim (type code S-...), it must be on the down stream side of the valve body. The valve must be mounted so that the perforated plate will not collect any impurities in the pipeline (see Fig. 4).

Select flange gaskets according to the operating conditions.

Do not attempt to correct pipeline misalignment by means of flange bolting.

It may be necessary to firmly support the pipeline to protect the valve from excess stress. Sufficient support will also reduce pipeline vibrations and this ensures proper functioning of the positioner. Do not fasten supports to the flange bolting or to the actuator.

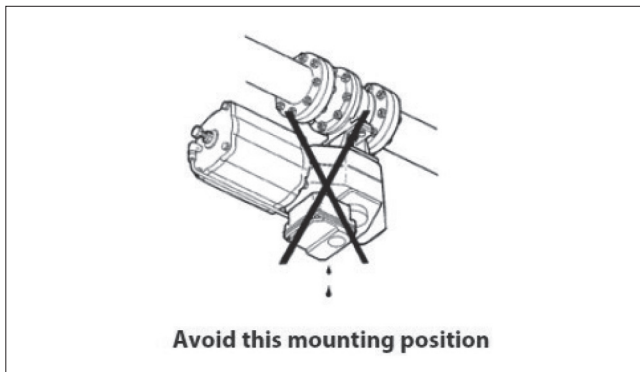


Fig. 3 Avoid this mounting position

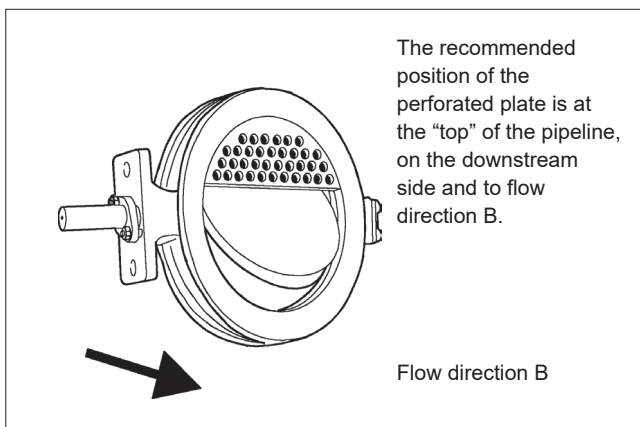


Fig. 4 Position of the flow balancing trim

It is recommended that the length of any straight pipe preceding the control valve is at least 2 x pipe diameter.

The flow causes a so-called dynamic torque against the valve disc which attempts to close the valve. In a pipe elbow the pressure on the outer edge is higher than on the inner edge.

When installing the triple eccentric disc valve immediately after a pipe elbow, the valve shaft must be directed toward the center point of the pipe (see Fig. 5). This is especially important when the valve is used as a control valve.

The shaft of a valve mounted after the centrifugal pump must be perpendicular to the pump shaft (see Fig. 6). When thus installed, the valve disc will be more evenly loaded and vibrations otherwise possible in the intermediate positions will be eliminated.

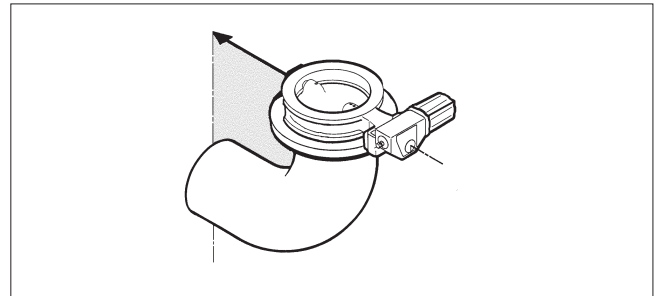


Fig. 5 Mounting after a pipe elbow

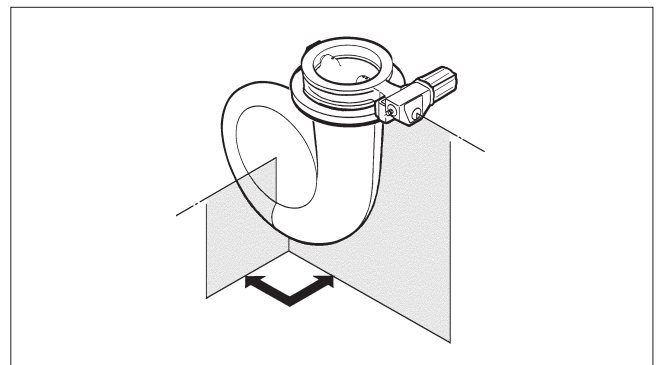


Fig. 6 Mounting after the centrifugal pump



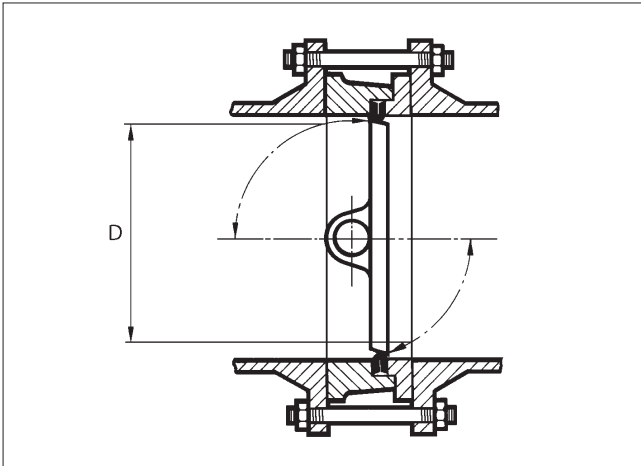


Fig. 7 Minimum pipe inside dimensions

Table 1 Minimum pipe inside dimensions (mm)

| Valve size<br>DN / NPS | D  |  |
|------------------------|--|--|
|                        | LW6L, LW7L,<br>LG6L, LG7L<br>(mm / inch) | LW8M, LG8M,<br>LW5M, LG5M<br>(mm / inch) |
| 80 / 3                 | 69 / 2.71                                | 69 / 2.72                                |
| 100 / 4                | 90 / 3.54                                | 90 / 3.54                                |
| 125 / 5                | 112 / 4.41                               | 112 / 4.41                               |
| 150 / 6                | 144 / 5.67                               | 143 / 5.63                               |
| 200 / 8                | 193 / 7.60                               | 190 / 7.48                               |
| 250 / 10               | 243 / 9.56                               | 241 / 9.49                               |
| 300 / 12               | 290 / 11.42                              | 287 / 11.30                              |
| 350 / 14               | 329 / 12.95                              | 321 / 12.64                              |
| 400 / 16               | 374 / 14.72                              | 315 / 12.40                              |
| 450 / 18               | 422 / 16.61                              | 335 / 13.19                              |
| 500 / 20               | 464 / 18.27                              | 385 / 15.16                              |
| 600 / 24               | 565 / 22.24                              | 425 / 16.73                              |
| 700 / 28               |  | 520 / 20.47                              |
| 750 / 30               |  | 635 / 25.00                              |
| 800 / 32               |  | 685 / 26.97                              |
| 900 / 36               |  | 735 / 28.94                              |
| 1000 / 40              |  | 825 / 32.48                              |

Note: Sizes DN 700/28" ... DN 1000/40", available only for types LW8C and LG8C.

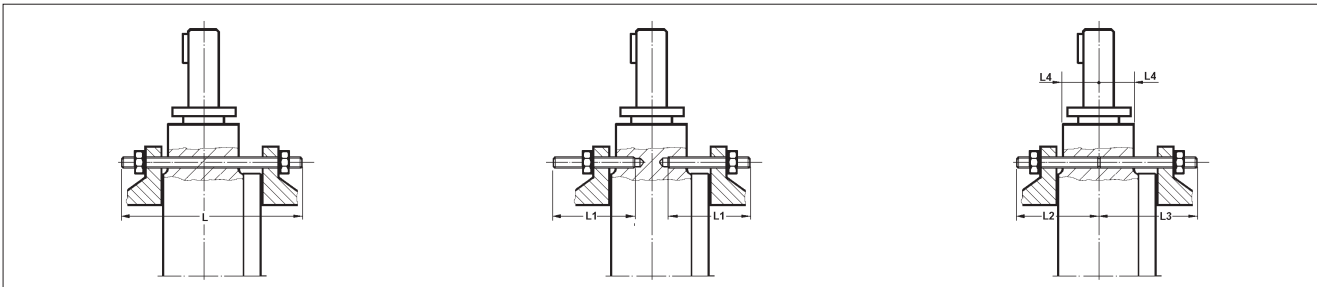


Fig. 8 Stud bolt length

Table 2 Stud bolt dimensions, DIN flanges (mm)

| LW6L<br>DN | DIN PN 10 flange |     |     |  | DIN PN 16 flange |     |     |  | DIN PN 25 flange |     |     |  | DIN PN 20 flange |     |     |  |
|------------|------------------|-----|-----|--|------------------|-----|-----|--|------------------|-----|-----|--|------------------|-----|-----|--|
|            | Thread           | L   | Qty |  | Thread           | L   | Qty |  | Thread           | L   | Qty |  | Thread           | L   | Qty |  |
| 80         | M16              | 130 | 8   |  | M16              | 130 | 8   |  | M16              | 150 | 8   |  | M16              | 140 | 4   |  |
| 100        | M16              | 140 | 8   |  | M16              | 140 | 8   |  | M20              | 170 | 8   |  | M16              | 150 | 8   |  |
| 125        | M16              | 150 | 8   |  | M16              | 150 | 8   |  | M24              | 190 | 8   |  | M20              | 160 | 8   |  |
| 150        | M20              | 160 | 8   |  | M20              | 160 | 8   |  | M24              | 200 | 8   |  | M20              | 160 | 8   |  |
| 200        | M20              | 170 | 8   |  | M20              | 170 | 12  |  | M24              | 210 | 12  |  | M20              | 170 | 8   |  |
| 250        | M20              | 180 | 12  |  | M24              | 180 | 12  |  | M27              | 220 | 12  |  | M24              | 200 | 12  |  |
| 300        | M20              | 190 | 12  |  | M24              | 200 | 12  |  | M27              | 230 | 16  |  | M24              | 210 | 12  |  |
| 350        | M20              | 190 | 16  |  | M24              | 200 | 16  |  | M30              | 260 | 16  |  | M27              | 220 | 12  |  |
| 400        | M24              | 220 | 16  |  | M27              | 240 | 16  |  | M33              | 270 | 16  |  | M27              | 250 | 16  |  |

| DN  | DIN PN 10 flange |     |     |     |     |  | DIN PN 16 flange |     |     |     |     |  | DIN PN 25 flange |     |     |     |     |  | DIN PN 20 flange |     |     |     |     |  |
|-----|------------------|-----|-----|-----|-----|--|------------------|-----|-----|-----|-----|--|------------------|-----|-----|-----|-----|--|------------------|-----|-----|-----|-----|--|
|     | Thread           | L   | Qty | L1  | Qty |  | Thread           | L   | Qty | L1  | Qty |  | Thread           | L   | Qty | L1  | Qty |  | Thread           | L   | Qty | L1  | Qty |  |
| 450 | M24              | 240 | 16  | 120 | 8   |  | M27              | 270 | 16  | 130 | 8   |  | -                | -   | -   | -   | -   |  | M30              | 280 | 16  | -   | -   |  |
| 500 | M24              | 260 | 16  | 120 | 8   |  | M30              | 310 | 16  | 140 | 8   |  | M33              | 320 | 16  | 150 | 8   |  | M30              | 310 | 16  | 140 | 8   |  |
| 600 | M27              | 310 | 16  | 120 | 8   |  | M33              | 360 | 16  | 160 | 8   |  | M36              | 380 | 16  | 170 | 8   |  | M33              | 360 | 16  | 150 | 8   |  |

| LW7L<br>DN | DIN PN 10 flange |     |     |  | DIN PN 16 flange |     |     |  | DIN PN 25 flange |     |     |  | DIN PN 20 flange |     |     |  |
|------------|------------------|-----|-----|--|------------------|-----|-----|--|------------------|-----|-----|--|------------------|-----|-----|--|
|            | Thread           | L   | Qty |  | Thread           | L   | Qty |  | Thread           | L   | Qty |  | Thread           | L   | Qty |  |
| 80         | M16              | 130 | 8   |  | M16              | 130 | 8   |  | M16              | 150 | 8   |  | M16              | 140 | 4   |  |
| 100        | M16              | 140 | 8   |  | M16              | 140 | 8   |  | M20              | 170 | 8   |  | M16              | 150 | 8   |  |
| 125        | M16              | 150 | 8   |  | M16              | 150 | 8   |  | M24              | 190 | 8   |  | M20              | 170 | 8   |  |
| 150        | M20              | 170 | 8   |  | M20              | 170 | 8   |  | M24              | 200 | 8   |  | M20              | 180 | 8   |  |
| 200        | M20              | 180 | 8   |  | M20              | 180 | 12  |  | M24              | 210 | 12  |  | M20              | 180 | 8   |  |
| 250        | M20              | 190 | 12  |  | M24              | 190 | 12  |  | M27              | 220 | 12  |  | M24              | 200 | 12  |  |
| 300        | M20              | 200 | 12  |  | M24              | 210 | 12  |  | M27              | 230 | 16  |  | M24              | 210 | 12  |  |
| 350        | M20              | 200 | 16  |  | M24              | 210 | 16  |  | M30              | 260 | 16  |  | M27              | 230 | 12  |  |
| 400        | M24              | 220 | 16  |  | M27              | 240 | 16  |  | M33              | 270 | 16  |  | M27              | 250 | 16  |  |

| DN  | DIN PN 10 flange |     |     |     |     |  | DIN PN 16 flange |     |     |     |     |  | DIN PN 25 flange |     |     |     |     |  | DIN PN 20 flange |     |     |     |     |  |
|-----|------------------|-----|-----|-----|-----|--|------------------|-----|-----|-----|-----|--|------------------|-----|-----|-----|-----|--|------------------|-----|-----|-----|-----|--|
|     | Thread           | L   | Qty | L1  | Qty |  | Thread           | L   | Qty | L1  | Qty |  | Thread           | L   | Qty | L1  | Qty |  | Thread           | L   | Qty | L1  | Qty |  |
| 450 | M24              | 240 | 16  | 120 | 8   |  | M27              | 270 | 16  | 130 | 8   |  |                  |     |     |     |     |  | M30              | 280 | 16  |     |     |  |
| 500 | M24              | 260 | 16  | 120 | 8   |  | M30              | 310 | 16  | 140 | 8   |  | M33              | 320 | 16  | 150 | 8   |  | M30              | 310 | 16  | 140 | 8   |  |
| 600 | M27              | 310 | 16  | 120 | 8   |  | M33              | 360 | 16  | 160 | 8   |  | M36              | 380 | 16  | 170 | 8   |  | M33              | 360 | 16  | 150 | 8   |  |



Table 2 Continued

| LW8M<br>LW5M<br>DN | DIN PN 25 flange |     |     |  |     | DIN PN 40 flange |     |     |  |     | DIN PN 50 flange |     |     |  |     |
|--------------------|------------------|-----|-----|--|-----|------------------|-----|-----|--|-----|------------------|-----|-----|--|-----|
|                    | Thread           | L   | Qty | L1   | Qty | Thread           | L   | Qty | L1   | Qty | Thread           | L   | Qty | L1   | Qty |
| 80                 | M16              | 180 | 8   | Stud bolts pass the body in the neck area (length L) | 8   | M16              | 180 | 8   | Stud bolts pass the body in the neck area (length L) | 8   | M20              | 190 | 8   | Stud bolts pass the body in the neck area (length L) | 8   |
| 100                | M20              | 190 | 8   |  |     | M20              | 180 | 8   |  |     | M20              | 200 | 8   |  |     |
| 125                | M24              | 210 | 8   |  |     | M24              | 200 | 8   |  |     | M20              | 210 | 8   |  |     |
| 150                | M24              | 220 | 8   |  |     | M24              | 210 | 8   |  |     | M20              | 220 | 12  |  |     |
| 200                | M24              | 230 | 12  |  |     | M27              | 240 | 12  |  |     | M24              | 250 | 12  |  |     |
| 250                | M27              | 270 | 12  |  |     | M30              | 280 | 12  |  |     | M27              | 300 | 12  |  |     |
| 300                | M27              | 270 | 12  | 140  | 8   | M30              | 290 | 12  | 150  | 8   | M30              | 310 | 12  | 160  | 8   |
| 350                | M30              | 300 | 12  | 150  | 8   | M33              | 320 | 12  | 160  | 8   | M30              | 330 | 16  | 160  | 8   |
| 400                | M33              | 320 | 12  | 160  | 8   | M36              | 350 | 12  | 170  | 8   | M33              | 350 | 16  | 160  | 8   |

| DN  | DIN PN 25 flange |     |     |     |     | DIN PN 40 flange |     |     |     |     | DIN PN 50 flange |     |     |     |     |
|-----|------------------|-----|-----|-----|-----|------------------|-----|-----|-----|-----|------------------|-----|-----|-----|-----|
|     | Thread           | L   | Qty | L1  | Qty | Thread           | L   | Qty | L1  | Qty | Thread           | L   | Qty | L1  | Qty |
| 450 | M33              | 340 | 16  | 150 | 8   | M36              | 370 | 16  | 160 | 8   | M33              | 380 | 20  | 160 | 8   |
| 500 | M33              | 360 | 16  | 150 | 8   | M39              | 390 | 16  | 170 | 8   | M33              | 400 | 20  | 170 | 8   |
| 600 | M36              | 410 | 16  | 165 | 8   | M45x4            | 460 | 16  | 200 | 8   | M39              | 440 | 20  | 185 | 8   |

| LG6L<br>DN | DIN PN 10 flange |     |     |     |     | DIN PN 16 flange |     |     |     |     | DIN PN 25 flange |     |     |     |     | DIN PN 20 flange |     |     |     |     | L4 |
|------------|------------------|-----|-----|-----|-----|------------------|-----|-----|-----|-----|------------------|-----|-----|-----|-----|------------------|-----|-----|-----|-----|----|
|            | Thread           | L2  | Qty | L3  | Qty | Thread           | L2  | Qty | L3  | Qty | Thread           | L2  | Qty | L3  | Qty | Thread           | L2  | Qty | L3  | Qty |    |
| 80         | M16              | 60  | 8   | 70  | 8   | M16              | 60  | 8   | 70  | 8   | M16              | 65  | 8   | 75  | 8   | M16              | 65  | 4   | 75  | 4   | 16 |
| 100        | M16              | 65  | 8   | 75  | 8   | M16              | 65  | 8   | 75  | 8   | M20              | 75  | 8   | 85  | 8   | M16              | 70  | 8   | 80  | 8   | 19 |
| 125        | M16              | 70  | 8   | 80  | 8   | M16              | 70  | 8   | 80  | 8   | M24              | 80  | 8   | 90  | 8   | M20              | 75  | 8   | 85  | 8   | 20 |
| 150        | M20              | 75  | 8   | 85  | 8   | M20              | 75  | 8   | 85  | 8   | M24              | 85  | 8   | 95  | 8   | M20              | 75  | 8   | 85  | 8   | 20 |
| 200        | M20              | 80  | 8   | 90  | 8   | M20              | 80  | 12  | 90  | 12  | M24              | 90  | 12  | 100 | 12  | M20              | 80  | 8   | 90  | 8   | 23 |
| 250        | M20              | 85  | 12  | 95  | 12  | M24              | 85  | 12  | 95  | 12  | M27              | 95  | 12  | 105 | 12  | M24              | 95  | 12  | 105 | 12  | 26 |
| 300        | M20              | 90  | 12  | 100 | 12  | M24              | 95  | 12  | 105 | 12  | M27              | 105 | 16  | 115 | 16  | M24              | 100 | 12  | 110 | 12  | 30 |
| 350        | M20              | 90  | 16  | 100 | 16  | M24              | 95  | 16  | 105 | 16  | M30              | 110 | 16  | 120 | 16  | M27              | 105 | 12  | 115 | 12  | 35 |
| 400        | M24              | 100 | 16  | 120 | 16  | M27              | 110 | 16  | 130 | 16  | M33              | 125 | 16  | 145 | 16  | M27              | 115 | 16  | 135 | 16  | 38 |

| DN  | DIN PN 10 flange |     |     |     |     | DIN PN 16 flange |     |     |     |     | DIN PN 25 flange |     |     |     |     | DIN PN 20 flange |     |     |     |     | L4 |
|-----|------------------|-----|-----|-----|-----|------------------|-----|-----|-----|-----|------------------|-----|-----|-----|-----|------------------|-----|-----|-----|-----|----|
|     | Thread           | L2  | Qty | L3  | Qty | Thread           | L2  | Qty | L3  | Qty | Thread           | L2  | Qty | L3  | Qty | Thread           | L2  | Qty | L3  | Qty |    |
| 450 | M24              | 105 | 20  | 125 | 20  | M27              | 125 | 20  | 145 | 20  |                  |     |     |     |     | M30              | 135 | 16  | 155 | 16  | 47 |
| 500 | M24              | 105 | 20  | 125 | 20  | M30              | 135 | 20  | 155 | 20  | M33              | 150 | 20  | 170 | 20  | M30              | 135 | 20  | 155 | 20  | 54 |
| 600 | M27              | 120 | 20  | 145 | 20  | M33              | 155 | 20  | 180 | 20  | M36              | 165 | 20  | 190 | 20  | M33              | 150 | 20  | 175 | 20  | 63 |

| LG7L<br>DN | DIN PN 10 flange |     |     |     |     | DIN PN 16 flange |     |     |     |     | DIN PN 25 flange |     |     |     |     | DIN PN 20 flange |     |     |     |     | L4 |
|------------|------------------|-----|-----|-----|-----|------------------|-----|-----|-----|-----|------------------|-----|-----|-----|-----|------------------|-----|-----|-----|-----|----|
|            | Thread           | L2  | Qty | L3  | Qty | Thread           | L2  | Qty | L3  | Qty | Thread           | L2  | Qty | L3  | Qty | Thread           | L2  | Qty | L3  | Qty |    |
| 80         | M16              | 60  | 8   | 70  | 8   | M16              | 60  | 8   | 70  | 8   | M16              | 65  | 8   | 75  | 8   | M16              | 65  | 4   | 75  | 4   | 16 |
| 100        | M16              | 65  | 8   | 75  | 8   | M16              | 65  | 8   | 75  | 8   | M20              | 75  | 8   | 85  | 8   | M16              | 70  | 8   | 80  | 8   | 19 |
| 125        | M16              | 65  | 8   | 85  | 8   | M16              | 65  | 8   | 85  | 8   | M24              | 80  | 8   | 100 | 8   | M20              | 75  | 8   | 95  | 8   | 20 |
| 150        | M20              | 75  | 8   | 95  | 8   | M20              | 75  | 8   | 95  | 8   | M24              | 85  | 8   | 105 | 8   | M20              | 80  | 8   | 100 | 8   | 20 |
| 200        | M20              | 80  | 8   | 100 | 8   | M20              | 80  | 12  | 100 | 12  | M24              | 90  | 12  | 110 | 12  | M20              | 80  | 8   | 100 | 8   | 23 |
| 250        | M20              | 85  | 12  | 105 | 12  | M24              | 85  | 12  | 105 | 12  | M27              | 95  | 12  | 115 | 12  | M24              | 90  | 12  | 110 | 12  | 26 |
| 300        | M20              | 90  | 12  | 110 | 12  | M24              | 95  | 12  | 115 | 12  | M27              | 105 | 16  | 125 | 16  | M24              | 95  | 12  | 115 | 12  | 30 |
| 350        | M20              | 90  | 16  | 110 | 16  | M24              | 95  | 16  | 115 | 16  | M30              | 110 | 16  | 130 | 16  | M27              | 105 | 12  | 125 | 12  | 35 |
| 400        | M24              | 100 | 16  | 120 | 16  | M27              | 110 | 16  | 130 | 16  | M33              | 125 | 16  | 145 | 16  | M27              | 115 | 16  | 135 | 16  | 38 |

| DN  | DIN PN 10 flange |     |     |     |     | DIN PN 16 flange |     |     |     |     | DIN PN 25 flange |     |     |     |     | DIN PN 20 flange |     |     |     |     | L4 |
|-----|------------------|-----|-----|-----|-----|------------------|-----|-----|-----|-----|------------------|-----|-----|-----|-----|------------------|-----|-----|-----|-----|----|
|     | Thread           | L2  | Qty | L3  | Qty | Thread           | L2  | Qty | L3  | Qty | Thread           | L2  | Qty | L3  | Qty | Thread           | L2  | Qty | L3  | Qty |    |
| 450 | M24              | 105 | 20  | 125 | 20  | M27              | 125 | 20  | 145 | 20  |                  |     |     |     |     | M30              | 135 | 16  | 155 | 16  | 47 |
| 500 | M24              | 105 | 20  | 125 | 20  | M30              | 135 | 20  | 155 | 20  | M33              | 150 | 20  | 170 | 20  | M30              | 135 | 20  | 155 | 20  | 54 |
| 600 | M27              | 120 | 20  | 145 | 20  | M33              | 155 | 20  | 180 | 20  | M36              | 165 | 20  | 190 | 20  | M33              | 150 | 20  | 175 | 20  | 63 |

| LG8M<br>LG5M<br>DN | DIN PN 25 flange |     |     |     |     | DIN PN 40 flange |     |     |     |     | DIN PN 50 flange |     |     |     |     | L4 |
|--------------------|------------------|-----|-----|-----|-----|------------------|-----|-----|-----|-----|------------------|-----|-----|-----|-----|----|
|                    | Thread           | L2  | Qty | L3  | Qty | Thread           | L2  | Qty | L3  | Qty | Thread           | L2  | Qty | L3  | Qty |    |
| 80                 | M16              | 65  | 8   | 95  | 8   | M16              | 65  | 8   | 95  | 8   | M20              | 75  | 8   | 105 | 8   | 16 |
| 100                | M20              | 70  | 8   | 100 | 8   | M20              | 70  | 8   | 100 | 8   | M20              | 75  | 8   | 105 | 8   | 19 |
| 150                | M24              | 85  | 8   | 115 | 8   | M24              | 85  | 8   | 115 | 8   | M20              | 85  | 12  | 115 | 12  | 25 |
| 200                | M24              | 90  | 12  | 120 | 12  | M27              | 100 | 12  | 130 | 12  | M24              | 105 | 12  | 135 | 12  | 34 |
| 250                | M27              | 110 | 12  | 140 | 12  | M30              | 120 | 12  | 150 | 12  | M27              | 125 | 16  | 155 | 16  | 42 |
| 300                | M27              | 110 | 16  | 140 | 16  | M30              | 120 | 16  | 150 | 16  | M30              | 135 | 16  | 165 | 16  | 45 |
| 350                | M30              | 125 | 16  | 155 | 16  | M33              | 135 | 16  | 165 | 16  | M30              | 145 | 20  | 175 | 20  | 50 |
| 400                | M33              | 135 | 16  | 165 | 16  | M36              | 150 | 16  | 180 | 16  | M33              | 155 | 20  | 185 | 20  | 55 |

| DN  | DIN PN 25 flange |     |     |     |     | DIN PN 40 flange |     |     |     |     | DIN PN 50 flange |     |     |     |     | L4   |
|-----|------------------|-----|-----|-----|-----|------------------|-----|-----|-----|-----|------------------|-----|-----|-----|-----|------|
|     | Thread           | L2  | Qty | L3  | Qty | Thread           | L2  | Qty | L3  | Qty | Thread           | L2  | Qty | L3  | Qty |      |
| 450 | M33              | 150 | 20  | 160 | 20  | M36              | 165 | 20  | 175 | 20  | M33              | 160 | 24  | 170 | 24  | 70.5 |
| 500 | M33              | 150 | 20  | 160 | 20  | M39              | 175 | 20  | 185 | 20  | M33              | 165 | 24  | 175 | 24  | 73   |
| 600 | M36              | 165 | 20  | 185 | 20  | M45x4            | 205 | 20  | 225 | 20  | M39              | 185 | 24  | 205 | 24  | 78   |

Table 3 Stud bolt dimensions, ASME flanges (inch/mm)

| LW<br>NPS / DN | LW6L, LW7L, ASME 150 flange |             |     | LW5M, LW8M, ASME 300 flange |             |     |  | L1 | Qty |
|----------------|-----------------------------|-------------|-----|-----------------------------|-------------|-----|--|----|-----|
|                | Thread                      | L           | Qty | Thread                      | L           | Qty |  |    |     |
| 3 / 80         | 5/8 UNC                     | 6.30 / 160  | 4   | 3/4 UNC                     | 7.87 / 200  | 8   | Stud bolts pass the body in the neck area (length L) |    |     |
| 4 / 100        | 5/8 UNC                     | 6.69 / 170  | 8   | 3/4 UNC                     | 8.26 / 210  | 8   |  |    |     |
| 5 / 125        | 3/4 UNC                     | 7.48 / 190  | 8   | 3/4 UNC                     | 8.66 / 220  | 8   |  |    |     |
| 6 / 150        | 3/4 UNC                     | 7.87 / 200  | 8   | 3/4 UNC                     | 9.05 / 230  | 12  |  |    |     |
| 8 / 200        | 3/4 UNC                     | 7.87 / 200  | 8   | 7/8 UNC                     | 10.23 / 260 | 12  |  |    |     |
| 10 / 250       | 7/8 UNC                     | 8.66 / 220  | 12  | 1 UNC                       | 11.81 / 300 | 12  |  |    |     |
| 12 / 300       | 7/8 UNC                     | 9.05 / 230  | 12  | 1 1/8-8 UN                  | 12.20 / 310 | 12  | 5.91 / 150   | 8  |     |
| 14 / 350       | 1 UNC                       | 9.84 / 250  | 12  | 1 1/8-8 UN                  | 12.99 / 330 | 16  | 6.30 / 160   | 8  |     |
| 16 / 400       | 1 UNC                       | 10.63 / 270 | 16  | 1 1/4-8 UN                  | 14.17 / 360 | 16  | 6.69 / 170   | 8  |     |

| NPS / DN | LW6L, LW7L, ASME 150 flange |           |     |          |     | LW5M, LW8M, ASME 300 flange |           |     |          |     |
|----------|-----------------------------|-----------|-----|----------|-----|-----------------------------|-----------|-----|----------|-----|
|          | Thread                      | L         | Qty | L1       | Qty | Thread                      | L         | Qty | L1       | Qty |
| 18/450   | 1 1/8-8UN                   | 11.42/290 | 16  |          |     | 1 1/4-8UN                   | 14.96/380 | 20  | 6.30/160 | 8   |
| 20/500   | 1 1/8-8UN                   | 12.60/320 | 16  | 5.51/140 | 8   | 1 1/4-8UN                   | 15.75/400 | 20  | 6.69/170 | 8   |
| 24/600   | 1 1/4-8UN                   | 14.17/360 | 16  | 5.91/150 | 8   | 1 1/2-8UN                   | 17.72/440 | 20  | 7.28/185 | 8   |

| LG<br>NPS / DN | LG6, LG7L, ASME 150 flange |            |     |            |     | LG5M, LG8M, ASME 300 flange |            |            |    |            |    |           |
|----------------|----------------------------|------------|-----|------------|-----|-----------------------------|------------|------------|----|------------|----|-----------|
|                | Thread                     | L2         | Qty | L3         | Qty | Thread                      | L2         | Qty        | L3 | Qty        | L4 |           |
| 3 / 80         | 5/8 UNC                    | 2.36 / 60  | 4   | 3.15 / 80  | 4   | 0.63 / 16                   | 3/4 UNC    | 2.75 / 70  | 8  | 3.54 / 90  | 8  | 0.63 / 16 |
| 4 / 100        | 5/8 UNC                    | 2.56 / 65  | 8   | 3.34 / 85  | 8   | 0.75 / 19                   | 3/4 UNC    | 2.95 / 75  | 8  | 3.74 / 95  | 8  | 0.75 / 19 |
| 5 / 125        | 3/4 UNC                    | 2.75 / 70  | 8   | 3.54 / 90  | 8   | 0.78 / 20                   | -          | -          | -  | -          | -  | -         |
| 6 / 150        | 3/4 UNC                    | 2.75 / 70  | 8   | 3.54 / 90  | 8   | 0.78 / 20                   | 3/4 UNC    | 3.54 / 90  | 12 | 3.93 / 100 | 12 | 0.98 / 25 |
| 8 / 200        | 3/4 UNC                    | 2.95 / 75  | 8   | 3.74 / 95  | 8   | 0.90 / 23                   | 7/8 UNC    | 4.33 / 110 | 12 | 4.33 / 110 | 12 | 1.34 / 34 |
| 10 / 250       | 7/8 UNC                    | 3.34 / 85  | 12  | 4.13 / 105 | 12  | 1.02 / 26                   | 1 UNC      | 4.92 / 125 | 16 | 4.92 / 125 | 16 | 1.65 / 42 |
| 12 / 300       | 7/8 UNC                    | 3.54 / 90  | 12  | 4.33 / 110 | 12  | 1.18 / 30                   | 1 1/8-8 UN | 5.31 / 135 | 16 | 5.31 / 135 | 16 | 1.77 / 45 |
| 14 / 350       | 1-8 UN                     | 4.13 / 105 | 12  | 4.92 / 125 | 12  | 1.37 / 35                   | 1 1/8-8 UN | 5.51 / 140 | 20 | 5.51 / 140 | 20 | 2.20 / 56 |
| 16 / 400       | 1-8 UN                     | 4.52 / 115 | 16  | 5.31 / 135 | 16  | 1.49 / 38                   | 1 1/4-8 UN | 6.30 / 160 | 20 | 6.69 / 170 | 20 | 2.40 / 61 |

| NPS / DN | LG6, LG7L, ASME 150 flange |          |     |          |     | LG5M, LG8M, ASME 300 flange |           |          |    |          |    |           |
|----------|----------------------------|----------|-----|----------|-----|-----------------------------|-----------|----------|----|----------|----|-----------|
|          | Thread                     | L2       | Qty | L3       | Qty | Thread                      | L2        | Qty      | L3 | Qty      | L4 |           |
| 18/450   | 1 1/8-8UN                  | 5.12/130 | 16  | 5.91/150 | 16  | 1.85/47                     | 1 1/4-8UN | 6.50/165 | 24 | 6.69/170 | 24 | 2.78/70.5 |
| 20/500   | 1 1/8-8UN                  | 5.31/135 | 20  | 6.10/155 | 20  | 2.13/54                     | 1 1/4-8UN | 6.69/170 | 24 | 7.09/180 | 24 | 2.87/73   |
| 24/600   | 1 1/4-8UN                  | 6.10/155 | 20  | 7.09/180 | 20  | 2.48/63                     | 1 1/2-8UN | 7.68/195 | 24 | 8.46/215 | 24 | 3.07/78   |

| NPS / DN | LW8CB ASME 150 flange <sup>1)</sup> |           |     |           |     |
|----------|-------------------------------------|-----------|-----|-----------|-----|
|          | Thread                              | L2        | Qty | L3        | Qty |
| 28/700   | 3/4 UNC                             | 5.118/130 | 4   | 5.512/140 | 4   |
| 30/750   | 3/4 UNC                             | 4.330/110 | 8   | 5.512/140 | 8   |
| 32/800   | 3/4 UNC                             | 4.724/120 | 8   | 5.299/160 | 8   |
| 36/900   | 7/8 UNC                             | 5.118/130 | 8   | 5.299/160 | 8   |
| 40/1000  | 1 UNC                               | 6.299/160 | 8   | 7.480/190 | 8   |

| NPS / DN | LG8CB ASME 150 flange <sup>1)</sup> |           |     |           |     |
|----------|-------------------------------------|-----------|-----|-----------|-----|
|          | Thread                              | L2        | Qty | L3        | Qty |
| 28/700   | 3/4 UNC                             | 3.937/100 | 40  | 5.118/130 | 40  |
| 30/750   | 3/4 UNC                             | 3.937/100 | 44  | 5.118/130 | 44  |
| 32/800   | 3/4 UNC                             | 4.330/110 | 48  | 5.905/150 | 48  |
| 36/900   | 7/8 UNC                             | 4.724/120 | 44  | 5.905/150 | 44  |
| 40/1000  | 1 UNC                               | 5.118/130 | 44  | 7.086/180 | 44  |

1) ASME B16.47 series B class 150

Table 4 Stud bolt dimensions, ISO flanges (mm)

| LW<br>DN | LW6L, ISO PN 20 flange |     |     | LW5M, ISO PN 50 flange |     |     |  | L1 | Qty |
|----------|------------------------|-----|-----|------------------------|-----|-----|--|----|-----|
|          | Thread                 | L   | Qty | Thread                 | L   | Qty |  |    |     |
| 80       | M16                    | 140 | 4   | M20                    | 160 | 8   | Stud bolts pass the body in the neck area (length L) |    |     |
| 100      | M16                    | 150 | 8   | M20                    | 170 | 8   |  |    |     |
| 125      | M20                    | 160 | 8   | -                      | -   | -   |  |    |     |
| 150      | M20                    | 160 | 8   | M20                    | 190 | 12  | Stud bolts pass the body in the neck area (length L) |    |     |
| 200      | M20                    | 170 | 8   | M24                    | 220 | 12  |  |    |     |
| 250      | M24                    | 190 | 12  | M27                    | 250 | 14  |  |    |     |
| 300      | M24                    | 200 | 12  | M30                    | 270 | 12  |  |    |     |
| 350      | M27                    | 230 | 12  | M30                    | 280 | 16  |  |    |     |
| 400      | M27                    | 250 | 16  | M33                    | 330 | 16  | 140  | 8  |     |

| DN  | LW6L, ISO PN 20 flange |     |     |     |     | LW5M, ISO PN 50 flange |     |     |     |     |
|-----|------------------------|-----|-----|-----|-----|------------------------|-----|-----|-----|-----|
|     | Thread                 | L   | Qty | L1  | Qty | Thread                 | L   | Qty | L1  | Qty |
| 450 | M30                    | 290 | 16  |     |     | M33                    | 380 | 20  | 160 | 8   |
| 500 | M30                    | 320 | 16  | 140 | 8   | M33                    | 400 | 20  | 170 | 8   |
| 600 | M33                    | 360 | 16  | 150 | 8   | M39                    | 440 | 20  | 185 | 8   |

| LG<br>DN | LG6L, ISO PN 20 flange |     |     |     |     | LG5M, ISO PN 50 flange |     |     |    |     |    |    |
|----------|------------------------|-----|-----|-----|-----|------------------------|-----|-----|----|-----|----|----|
|          | Thread                 | L2  | Qty | L3  | Qty | Thread                 | L2  | Qty | L3 | Qty | L4 |    |
| 80       | M16                    | 60  | 4   | 80  | 4   | 16                     | M20 | 70  | 8  | 90  | 8  | 16 |
| 100      | M16                    | 65  | 8   | 85  | 8   | 19                     | M20 | 75  | 8  | 95  | 8  | 19 |
| 125      | M20                    | 70  | 8   | 90  | 8   | 20                     | -   | -   | -  | -   | -  | -  |
| 150      | M20                    | 70  | 8   | 90  | 8   | 20                     | M20 | 90  | 12 | 100 | 12 | 25 |
| 200      | M20                    | 75  | 8   | 95  | 8   | 23                     | M24 | 110 | 12 | 110 | 12 | 34 |
| 250      | M24                    | 85  | 12  | 105 | 12  | 26                     | M27 | 125 | 16 | 125 | 16 | 42 |
| 300      | M24                    | 90  | 12  | 110 | 12  | 30                     | M30 | 135 | 16 | 135 | 16 | 45 |
| 350      | M27                    | 105 | 16  | 125 | 16  | 35                     | M30 | 140 | 20 | 140 | 20 | 56 |
| 400      | M27                    | 115 | 16  | 135 | 16  | 38                     | M33 | 160 | 20 | 170 | 20 | 61 |

| DN  | LG6L, ISO PN 20 flange |     |     |     |     | LG5M, ISO PN 50 flange |     |     |    |     |    |      |
|-----|------------------------|-----|-----|-----|-----|------------------------|-----|-----|----|-----|----|------|
|     | Thread                 | L2  | Qty | L3  | Qty | Thread                 | L2  | Qty | L3 | Qty | L4 |      |
| 450 | M30                    | 135 | 16  | 155 | 16  | 47                     | M33 | 160 | 24 | 170 | 24 | 70.5 |
| 500 | M30                    | 135 | 20  | 155 | 20  | 54                     | M33 | 165 | 24 | 175 | 24 | 73   |
| 600 | M33                    | 150 | 20  | 175 | 20  | 63                     | M39 | 185 | 24 | 205 | 24 | 78   |

When mounting the valve it must be in a closed position and be carefully centred between the pipe flanges so that the turning disc does not touch the pipe edge or flange gaskets.

Use caution when installing valve with Spring-to-open actuator. Valve must be in closed position during installation if the disc exceeds the Face-to-face length. Energy supply for the actuator must be safely fastened and it cannot suffer damage or break off during the installation.

In case of sudden shutdown of the energy supply the valve will open unexpectedly due to pre-stressed spring package. This may cause significant harm to people and material around the valve.

In valves with certain nominal sizes some flange bolts do not pass the valve body. The valve body is thus equipped with holes, see Fig. 8 and Tables 2...4.

Ensure that the disc can turn to the open position after preliminary tightening of the flange bolts. The actuators of control valves can be equipped with position stops which usually only allow the disc to open 80°.

See Figure 8 and Tables 2...4, length of stud bolts are based on:

- gasket thickness of 3 mm
- heavy nuts with washers
- flange thickness of weldneck flanges per DIN or ISO

### 3.3 Valve insulation

If necessary, the valve may be insulated. Insulation must not continue above the upper level of the valve body, see Figure 9.

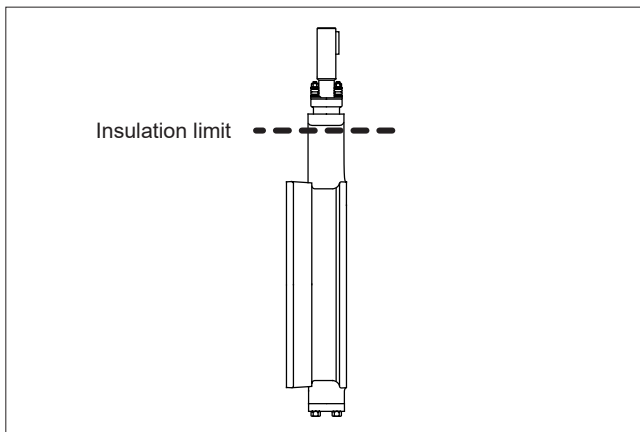


Fig. 9 Insulation of the valve

### 3.4 Actuator

When installing the actuator on the valve, make sure that the valve package functions properly. See instructions for installing in Section 6.

Observe the space needed for removal of the actuator. The actuator should be installed in a manner that allows plenty of room for its removal.

**CAUTION:**

The actuator must not touch the pipeline, because pipeline vibration may damage it or interfere with its operation. In some certain cases, when a large-size actuator is used, extended stems are required or when the pipeline vibrates heavily, supporting the actuator is recommended.

The upright position is recommended for the actuator cylinder.

The actuator must not touch the pipeline, because pipeline vibration may damage it or interfere with its operation.

In some cases, e.g. when a large-size actuator is used or when the pipeline vibrates heavily, supporting the actuator is recommended.

Please contact Valmet for further information.

## 4. COMMISSIONING

Ensure that no dirt or foreign objects are left inside the valve or pipeline. Flush the pipeline carefully. Keep the valve 30-40° open during flushing.

When starting up the pump, ensure that the valve in the pipeline is closed or, at the very most, 20° open.

A waterhammer, which follows the start-up of high-capacity pumps, creates a torque peak in the disc. This can damage the pin connection between disc and shaft when the valve is 30-90° open.

The packing construction is live loaded. So tightening the packing screws during service is not necessary.

## 5. MAINTENANCE

**CAUTION:**

**Observe the safety precautions mentioned in Section 1.8 before maintenance!**

**CAUTION:**

**When handling the valve or the valve package as a whole, bear in mind the weight of the valve or the entire package.**

**CAUTION:**

For safety reasons the retaining plates **MUST** always be installed according to Section 5.3.



### 5.1 General

Although Neles valves are designed to work under severe conditions, proper preventative maintenance can significantly help to prevent unplanned downtime and in real terms reduce the total cost of ownership. Valmet recommends inspecting the valves at least every five (5) years. The inspection and maintenance interval depends on the actual application and process condition. The inspection and maintenance intervals can be specified together with your local Valmet experts. During this periodic inspection the parts detailed in the Spare Part Set should be replaced. Time in storage should be included in the inspection interval.

Maintenance can be performed as presented below. For maintenance assistance, please contact your local Valmet office. The part numbers in the text refer to the exploded view and to the parts list in Section 9, unless otherwise stated.

**WARNING:**

**FOR YOUR SAFETY IT IS IMPORTANT THE FOLLOWING PRECAUTIONS BE TAKEN PRIOR TO REMOVAL OF THE VALVE FROM THE PIPELINE OR BEFORE ANY DISASSEMBLY:**

1. Wear any protective clothing or equipment normally required when working with the fluid involved.
2. Depressurize the pipeline and cycle the valve as follows:
  - Place the valve in the open position and drain the pipeline.After removal and before any disassembly, cycle the valve again several times.

**NOTE:**

When sending goods to the manufacturer for repair, do not disassemble them. Clean the valve carefully and flush the valve internals.

For safety reasons, inform the manufacturer of the type of medium used in the valve (include material safety datasheets (MSDS).)

**NOTE:**

In order to ensure safe and effective operation, always use original spare parts to make sure that the valve functions as intended.

**NOTE:**

For safety reasons, replace pressure retaining bolting if the threads are damaged, have been heated, stretched or corroded.

## 5.2 Removing the valve from the pipeline

It is generally most convenient to detach the actuator and its auxiliary devices before removing the valve from the pipeline. If the valve package is small or if it is difficult to access, it may be more practical to remove the entire assembly.

**NOTE:**

To ensure proper reassembly, observe the position of the actuator and positioner/limit switch with respect to the valve before detaching the actuator.

**WARNING:**

Always disconnect the actuator from its power source, pneumatic, hydraulic or electrical, before attempting to remove it from the valve!

**WARNING:**

Do not remove a spring-return actuator unless a stop-screw is carrying the spring force!

1. Detach the air supply, electrical supply, hydraulic supply and control signal cables or pipes from their connectors.
2. Unscrew the actuator mounting bracket screws.
3. Lift the actuator straight up in line with the valve stem until the coupling between actuator drive and valve stem is completely disengaged.
4. Place actuator in a safe location to avoid damage or personal injury.

**WARNING:**

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

**CAUTION:**

Valve must be fully closed before removing it from the pipeline.

**CAUTION:**

Valves equipped with spring-to-open (air-to-close) actuators must be disconnected from the actuators and then closed.

Ensure that the valve is not pressurized and the pipeline is empty. Ensure that the medium cannot flow into the section where servicing is to take place. Support the valve carefully with a hoist.

Place ropes carefully and unscrew the pipe flange bolts. Ensure that the ropes are positioned correctly.

## 5.3 Replacing the gland packing

**CAUTION:**

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

PTFE V-rings are used as a standard gland packing and graphite rings for high temperature constructions. The packing construction is live loaded as standard.

The gland packing (20) must be changed if leakage occurs even after the hex nuts (25) have been tightened as recommended.

- Make sure the valve is not pressurized.
- Unfasten the nuts (25) and remove the disc spring (TA-Luft) sets (44), the retaining plates (42) and the gland (9).
- Remove old packing rings (20). Do not damage the surfaces of the packing ring counterbore and shaft. It is not necessary to change anti-extrusion ring (22).
- Ensure that there are no burrs in the keyway groove which could damage the packing. Clean the gland packing and packing ring counterbore. Install new set of packings (V-ring or graphite). Slip the rings onto the shaft.
- Install the gland.
- Mount the retaining plates with the text UPSIDE on top (see Fig. 10).

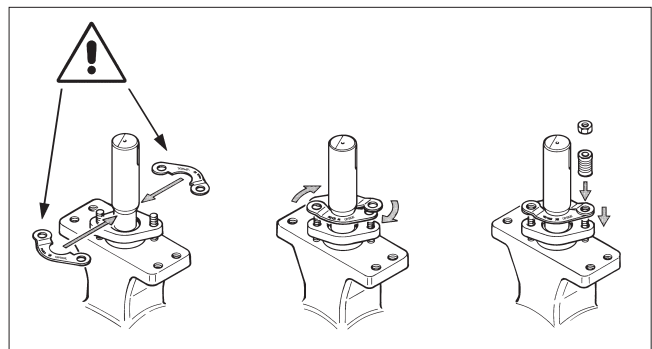


Fig. 10 Mounting the retaining plate

- Mount the disc spring sets.
- Place the nuts on the studs.
- Pre-compress the gland packing by tightening the nuts with a tool until the disc springs have value of compression ( $h_1-h_2$ ) as in Table 5.
- Carry out 3...5 operation cycles with the valve. Suitable range of movement is about 80 %.
- It is not necessary to fully close or open the valve during the operation.
- Unfasten the nuts and disc springs.

- Measure the height  $h_1$  of the disc springs and use these values as a basis when defining the final height of the springs (as compressed condition).
- Re-install the disc springs and tighten the nuts with the tool. Tighten the nuts until the set value of compression ( $h_1-h_2$ ) of disc springs is achieved, see Table 5.

Table 5 Tightening of gland packing

| LW6L,<br>LG6L,<br>LW7L,<br>LG7L | LW8M,<br>LG8M,<br>LW5M,<br>LG5M | Spring set<br>dia | Thread | Compression ( $h_1-h_2$ ), mm |      |
|---------------------------------|---------------------------------|-------------------|--------|-------------------------------|------|
|                                 |                                 |                   |        | Packing ring material         |      |
| DN                              | DN                              | mm                | M      | Graphite +<br>PTFE            | PTFE |
| 80                              | 80                              | 20                | M8     | 2.0                           | 1.0  |
| 100, 125, 150                   | 100, 125                        | 20                | M8     | 2.5                           | 1.5  |
| 200                             | 150                             | 25                | M10    | 2.5                           | 1.5  |
| 250                             |                                 | 25                | M10    | 3.0                           | 1.5  |
| 300                             | 200                             | 25                | M10    | 3.0                           | 2.0  |
| 350                             |                                 | 25                | M10    | 3.0                           | 2.0  |
| 400                             | 250                             | 35.5              | M14    | 4.0                           | 3.0  |
|                                 | 300                             | 35.5              | M14    | 4.5                           | 3.0  |
|                                 | 350, 400                        | 35.5              | M14    | 4.5                           | 3.0  |
| 450                             |                                 | 35.5              | M14    | 4.5                           | 2.5  |
| 500                             |                                 | 35.5              | M14    | 4.5                           | 3.0  |
| 600                             | 450, 500                        | 40                | M16    | 5.0                           | 3.0  |
|                                 | 600                             | 40                | M16    | 5.5                           | 3.5  |

| LW8CB,<br>LG8CB | --- | Spring set<br>dia | Thread | Compression ( $h_1-h_2$ ), mm |      |
|-----------------|-----|-------------------|--------|-------------------------------|------|
|                 |     |                   |        | Packing ring material         |      |
| DN              | DN  | mm                | M      | Graphite +<br>PTFE            | PTFE |
| 700             | --  | 40                | M18    | 5.0                           | 3.0  |
| 750             | --  | 40                | M18    | 5.0                           | 3.0  |
| 800             | --  | 40                | M18    | 5.5                           | 3.5  |
| 900             | --  | 50                | M20    | 6.0                           | 4.0  |
| 1000            | --  | 50                | M20    | 6.5                           | 4.0  |

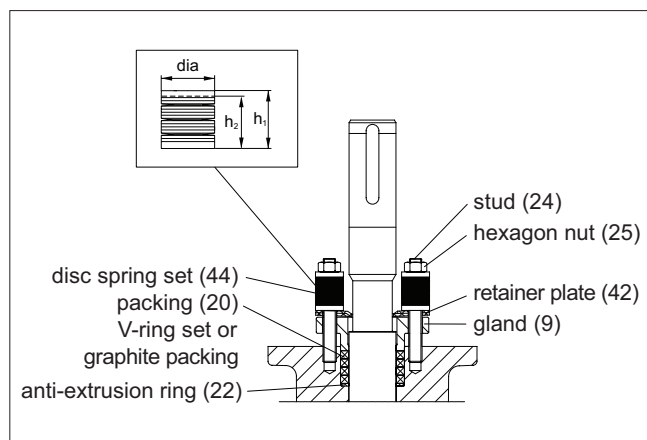


Fig. 11 Gland packing

- If the leakage still occurs when the valve is pressurized, re-tighten the nuts but don't exceed the values in the Table 5 by 50 % or do not fully compress the disc springs.

## 5.4 Valve leakage

Valve leakage is not always caused by a damaged seat ring or disc. The reason can also be that the disc is not in the closed position.

- Check the position of the actuator relative to the valve. The screws may be loose or the bracket damaged.
- Check the adjustment in the closed position (see Section 6.5).

The marking line parallel to the disc on the valve shaft head shows roughly the closed position of the disc (see Fig. 12).

Pressure shocks can cause loosening of the pin connection between disc and shaft; consequently the shaft moves while the disc remains in place and this prevents full closing of the disc.

If the reason for the leakage does not become apparent after doing the above, the valve must be disassembled for replacing the parts.

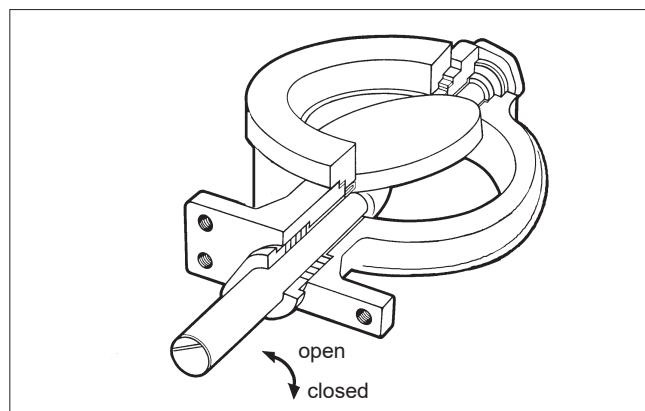


Fig. 12 Open and closed positions of the valve

## 5.5 Replacing the seat ring

### CAUTION:

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

- Ensure that the valve is not pressurized.
- Remove the valve from the pipeline. The valve must be in a closed position during removal.
- Remove the clamp ring (2) by untightening the screws (27).
- Remove the old body seal (19) and the seat ring (4). Change the seat ring if it is damaged.
- Clean all the surfaces of the seats and check the surface of the seat ring.
- Check also the condition of the disc. A damaged disc must be changed (see Section 5.6).
- Check the condition of the pin connection. Repair it if necessary (see Section 5.6).
- Mount a new, self-adhesive body seal (19) into the body. The surface must be clean and free of grease. Handle the ends of the seal according to Fig. 13.
- Spray a thin layer of dry lubricating fluid, e.g. Molykote 321R or equivalent, into the seat groove, surfaces of the clamp ring and seat ring.
- Centre the seat ring (4) carefully into its groove and turn the disc to maintain light contact with the seat.

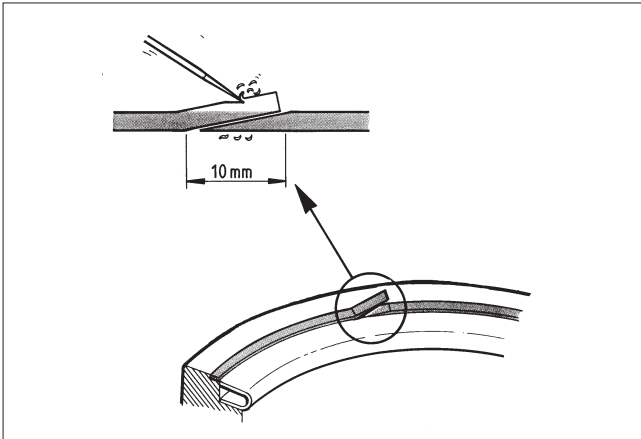


Fig. 13 Mounting the body seal

- Mount the clamp ring and tighten the screws (27) lightly.
- Turn the disc slightly open and pull it back to set the seat into the proper position.
- Tighten the screws (27) crosswise and evenly. Recommended torque values for screws are listed in Table 6. An unevenly tightened flange may damage the seat ring. The screw heads must be below the flange surface in lug type valves.
- Check the position between the seat ring and the disc. The valve closes clockwise (see Fig. 12).
- Mount the actuator into the valve. Adjust the closed position limit and check the open position limit (see Section 6.4).

Table 6 Clamp ring/blind flange screw torque, Nm +/- 10 %

| TORQUE FOR A2/A4-70 |             | TORQUE FOR B8M CL1 |             | TORQUE FOR L7M   |             | TORQUE FOR GR. 660 |             | TORQUE FOR N10276 |             | TORQUE FOR S31254 |             | Convert          |
|---------------------|-------------|--------------------|-------------|------------------|-------------|--------------------|-------------|-------------------|-------------|-------------------|-------------|------------------|
| Thread size [mm]    | Torque [Nm] | Thread size [mm]   | Torque [Nm] | Thread size [mm] | Torque [Nm] | Thread size [mm]   | Torque [Nm] | Thread size [mm]  | Torque [Nm] | Thread size [mm]  | Torque [Nm] | Thread size [in] |
| M5                  | 5           | M5                 | 3           | M5               | 6           | M5                 | 7           | M5                | 3           | M5                | 3           | -                |
| M6                  | 9           | M6                 | 5           | M6               | 10          | M6                 | 11          | M6                | 5           | M6                | 6           | 1/4 UNC          |
| M8                  | 21          | M8                 | 11          | M8               | 25          | M8                 | 27          | M8                | 13          | M8                | 14          | 5/16 UNC         |
| M10                 | 41          | M10                | 22          | M10              | 50          | M10                | 53          | M10               | 26          | M10               | 28          | 3/8 UNC          |
| M12                 | 70          | M12                | 38          | M12              | 85          | M12                | 91          | M12               | 44          | M12               | 47          | 1/2 UNC          |
| M14                 | 110         | M14                | 61          | M14              | 140         | M14                | 150         | M14               | 71          | M14               | 76          | 9/16 UNC         |
| M16                 | 170         | M16                | 95          | M16              | 210         | M16                | 230         | M16               | 110         | M16               | 120         | 5/8 UNC          |
| M20                 | 340         | M20                | 190         | M20              | 420         | M20                | 440         | M20               | 220         | M20               | 230         | 3/4 UNC          |
| M24                 | 590         | M24                | 320         | M24              | 720         | M24                | 770         | M24               | 370         | M24               | 400         | 1 UNC (-8UN)     |
| M30                 | 1200        | M30                | 650         | M30              | 1400        | M30                | 1500        | M30               | 750         | M30               | 800         | 1-1/8-8UN        |
| M36                 | 2100        | M36                | 1100        | M36              | 2500        | M36                | 2700        | M36               | 1300        | M36               | 1400        | 1-3/8-8UN        |

## 5.6 Replacing the disc, shafts and bearings

### Disassembling the valve

The pin connection of the disc must be opened by drilling for changing the disc (3), shafts (5) and bearings (11).

- Remove the valve from the pipeline and the actuator from the valve.
- Remove the clamp ring (2) and seat ring (4) according to section 5.
- Set the valve horizontally on a sturdy surface so that the flat side of the disc lays against the surface (see Fig. 14).

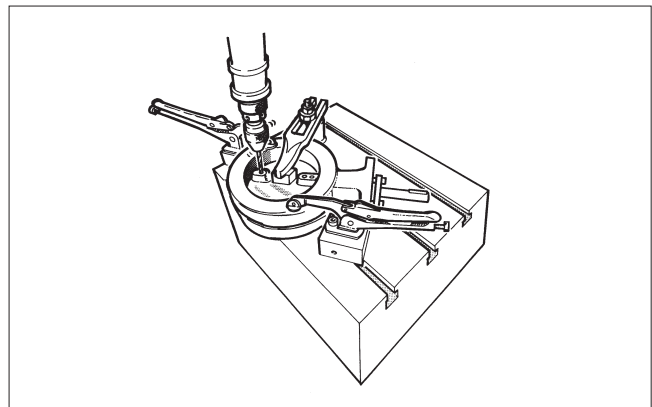


Fig. 14 Drilling the pins



- Drill the holes carefully to the center of the pins (16). Choose a drill 0.2-0.5 mm smaller than the diameter of the pin.
- Drill the holes deep, but not enough to reach the disc.
- Pull the pins out.
- Dismantle the gland packing including anti-extrusion ring (23) according to Section 5.3.
- Detach the screws (44) and the blind flange (8) and remove the gasket (31).
- Place rubber strips or other protection between the disc edge and the body and remove the shafts (see Fig 15).
- Remove the bearings (11).
- Clean and check all parts carefully.

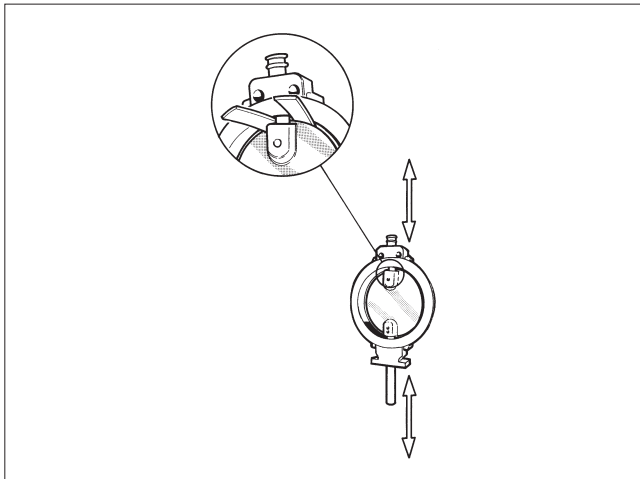


Fig. 15 Protecting the disc during disassembly and assembly

## Checking Parts

1. Clean all disassembled parts.
2. Check the shaft (5) and disc (3) for damage. Pay particular attention to the sealing areas.
3. Check all sealing and gasket surfaces of the body (1) and clamp ring (2).
4. Replace any damaged parts.

**NOTE:** When ordering spare parts, always include the following information:

- Valve catalog code from Identification plate,
- If the valve is serialized – the serial number (stamped on the valve body)

## Assembling the valve

- Replace damaged parts with new ones.
- Set the disc (3) and the shaft (5 & 6) together beforehand. In case the pin holes have been damaged during removal of the old pins the holes can be drilled to a larger pin size. File off any burrs from the shafts.
- Mount the bearings (11) into the body (1) from flow port side.
- High temperature-construction: Spray a thin layer of dry lubricating fluid, e.g. Molykote 321R or equivalent, into the inside surface of the bushing and the shaft bearing area. Mount the bearing on the shaft. Press the bushing with a tightening clamp on the shaft's bearing area and fit the shaft with the bearings carefully into the body.
- Place thrust bearings (12) at the end of the shaft

- Place the disc horizontally on a surface so that the flat side of the disc lays against the surface. Lift the body around the disc so that the shaft bores are aligned with the bores in the disc. Protect the disc (see Fig. 15).
- Press the shafts into the disc drillings. Align the pin holes. The shaft (5) position against the disc must be according to Figure 12.

### NOTE:

Use only pins supplied by the manufacturer!

### NOTE:

The pins must be pressed with enough force to deform them so that the connection will be free from backlash.

- Support the disc well in a horizontal position during mounting of the pins. Push the new pins into the holes and press them in a press to final form (see Fig. 16). Use slightly larger pressing tool than the pin diameter. See Table 7 for forces.

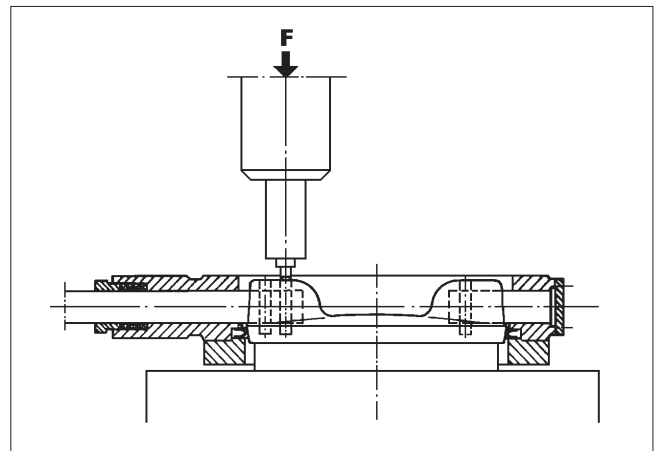


Fig. 16 Pressing the pins

Table 7 Pin Pressing force, kN

| PIN material            | DIAMETER OF PIN (mm)  |    |     |     |     |     |     |      |      |      |
|-------------------------|---|----|-----|-----|-----|-----|-----|------|------|------|
|                         | 5   | 6  | 8   | 10  | 12  | 15  | 20  | 25   | 30   | 35   |
|                         | DIA OF PRESSING TOOL<br>(TOOL MUST BE SAME AS PIN OR SIZE BIGGER) |    |     |     |     |     |     |      |      |      |
|                         | 6   | 8  | 10  | 12  | 15  | 20  | 25  | 30   | 35   | 40   |
| PIN PRESSING FORCE (kN) |   |    |     |     |     |     |     |      |      |      |
| 1.4460 / 1.4462         | 32  | 46 | 82  | 128 | 184 | 287 | 511 | 798  | 1149 | 1563 |
| 17-4PH H1150M           | 39  | 56 | 100 | 156 | 224 | 350 | 623 | 973  | 1401 | 1907 |
| NIMONIC 80A             | 46  | 66 | 117 | 183 | 263 | 411 | 730 | 1141 | 1643 | 2237 |
| XM-19HS, NITRONIC 50    | 49  | 71 | 126 | 196 | 283 | 442 | 785 | 1227 | 1767 | 2239 |
| UNS S31254, SMO 254     | 33  | 48 | 85  | 134 | 192 | 300 | 534 | 834  | 1202 | 1636 |
| UNS N10276, HAST-C276   | 34  | 49 | 87  | 135 | 195 | 305 | 542 | 847  | 1219 | 1660 |

- Install the gasket (18) and the blind flange (10). Screws of the blind flange must be tightened evenly. An unevenly tightened flange will damage the seat.
- Install the seat ring. See details in Section 5.5.
- Install the body gasket (19) and the clamp ring (2). See details in Section 5.5.
- Install the gland packing (see Section 5.3).
- Check the contact line between the seat ring and the disc (see Fig. 12).



## 6. INSTALLING AND DETACHING THE ACTUATOR

### 6.1 General

**WARNING:**

Before installing the valve and actuator, be sure that the indicator pointer on top of the actuator is correctly indicating the valve position. Failure to assemble these products to indicate correct valve position could result in damage or personal injury.

**CAUTION:**

When installing a linkage or servicing a valve/ actuator assembly, the best practice is to remove the entire assembly from service.

**CAUTION:**

An actuator should be remounted on the valve from which it was removed. The actuator must be readjusted for proper open and close position each time it is remounted.

**WARNING:**

The linkage has been designed to support the weight of the Neles actuators and recommended accessories. Use of this linkage to support additional equipment such as people, ladders, etc. may result in the failure of the linkage, valve or actuator and may cause personal injury.

**CAUTION:**

Before dismantling, carefully observe the position of the valve with respect to the actuator and positioner/limit switch so as to ensure that the package can be properly reassembled. Mounting an open actuator to a closed valve may result in valve stem damage.

**CAUTION:**

When handling the valve or the valve package, bear in mind its weight!

**WARNING:**

Do not detach a spring-return actuator unless a stopscrew is carrying the spring force!

**CAUTION:**

Do not turn the disc more than 90° as this could damage the seat. The valve is so constructed that the disc operates only between 0-90°.

**NOTE:**

When Valmet supplies whole valve-actuator assembly, the actuator is mounted at Valmet factory on the valve and the stroke limit stops are adjusted by Valmet.

### 6.2 Installing the B1 series actuator

- Turn the valve to the closed position before mounting the actuator.
- Clean the shaft and the shaft bore and file off any burrs which could interfere with mounting. Protect the joint surfaces from corrosion, e.g. with Cortec VCI 369.
- If a bushing is required between the actuator shaft bore and the valve shaft, mount it first in the actuator shaft bore.
- The valve keyway is on the side opposite the flat side of the disc. The actuator shaft bore has two keyways set 90° apart.
- For double-acting cylinder actuator, B1C, and spring-return cylinder actuator, B1J (spring-to-close), choose the keyway which establishes the piston in its upper position (at the top end of the cylinder) when the valve is closed.
- In the spring-return cylinder actuator B1JA (spring-to-open), choose the keyway which establishes the piston in its lower position when the valve is open.
- Check visually that the actuator is correctly positioned relative to the valve. Tighten all the fastening screws.
- Adjust the stop screws to the closed position (see Section 6.5).
- The opening angle in a control valve can be limited by a stop screw to 80°. The opening angle of a shut-off valve is 90°.
- When a shaft extension is required, the sizing of the shaft extension must be discussed with the valve manufacturer.

### 6.3 Detaching the B1 series actuators

- Disconnect the actuator from its power source; detach the air supply pipe and control signal cables or pipes from their connectors.
- Unscrew the bracket screws.
- Detach the actuator using a suitable extractor. The correct tool can be ordered from the manufacturer (see Fig. 17).
- Remove the bracket and coupling, if any.

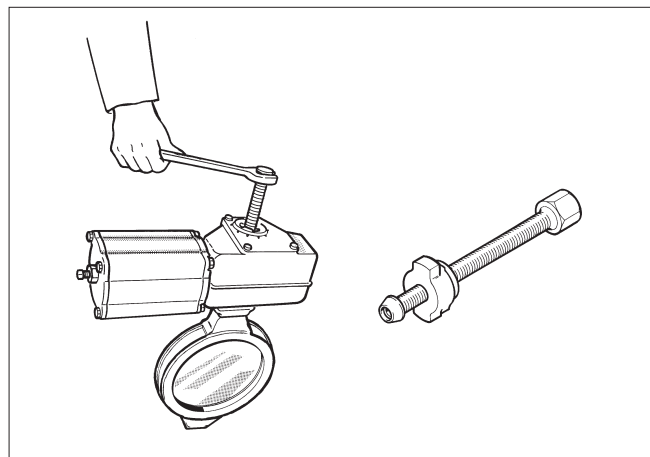


Fig. 17 Actuator removal, B1 series

### 6.4 Detaching and installing other actuator types

See actuator's manual for details.

## 6.5 Stop screw adjustment

### General

Close the metal seated triple eccentric disc valve by turning the disc with a torque against the seat. Choose the torque from Tables 10 and 11 for adjusting the stop screw to the closed position of the actuator. Try not to exceed the given values since excessive torque would strain the seat and the joint between the disc and the shaft. Always readjust the stop screw after changing the seat and after mounting the actuator.

### Actuators other than tabulated

Close the valve as per the tabulated torque  $M_c$  and adjust the stops accordingly. Note the increased torque created by the actuator while the valve is closed.

#### NOTE:

Valmet accepts no responsibility for compatibility of actuators not installed by Valmet.

### Changing the mounting position

#### WARNING:

The actuator must not be removed from the valve in a pipeline under pressure as it will result dynamic torque!

Always remove the actuator from the valve shaft before mounting it into another key area. Readjust the closed position limit as instructed.

If manually operated, the valve should close when the handwheel is turned clockwise. In a double-action cylinder, the piston must be in the upper position of the cylinder when the valve is closed. In this position the actuator creates maximum torque. **Do not turn the disc more than 90° as this could damage the seat.**

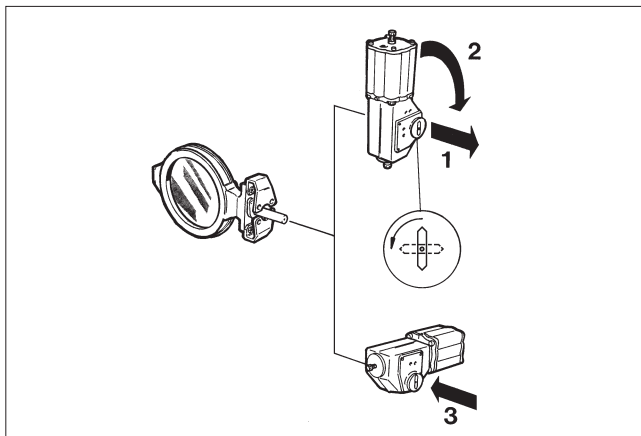


Fig. 18 Changing the mounting position

### Double-acting cylinder actuator B1C

- Apply the tabulated shut-off pressure  $P_c$  to the air connection at the cylinder base.
- With the stop screw removed, check through the air connection hole that the piston does not touch the cylinder end. If it does, loosen the bracket screws and turn the actuator clockwise to increase the adjusting margin.

- Turn the closed position stop screw until it touches the piston, then turn back 1/4 turn and lock up. An O-ring is used for leakproofing the stop screw.
- An extra long screw is needed for opening angles  $< 80^\circ$ .

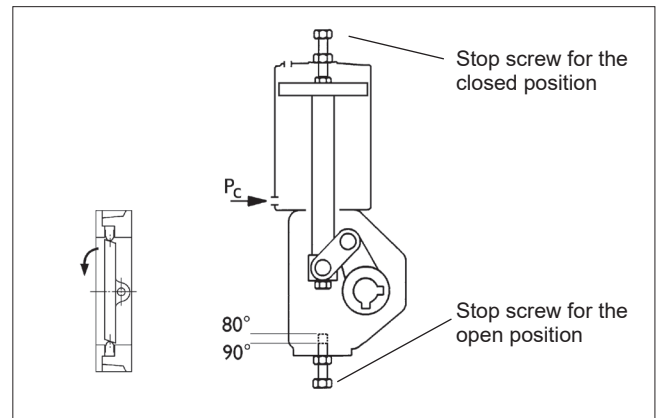


Fig. 19 Cylinder actuator, series B1C

### Spring-return cylinder actuator B1J

#### “Spring-to-close”

- Before mounting the cylinder, screw in the closed position stop screw completely.
- The table indicates \*) spring when the spring-created torque does not exceed the maximum permitted closing torque  $M_c$ . Otherwise, apply the tabulated pressure  $P_c$  into the air connection at the cylinder end against the spring force. **The stop screw must not be removed when the cylinder is pressurized!** Open the stop screw until it does not touch the piston.
- Turn the closed position stop screw until it touches the piston, then turn back 1/4 turn and lock up. An O-ring is used for leakproofing the stop screw.
- After adjusting, check the adjusting margin through the air connection hole. The piston must not touch the cylinder end. If necessary, increase the margin by loosening the bracket screws and turning the actuator clockwise.
- An extra long screw is needed for opening angles  $< 80^\circ$ .

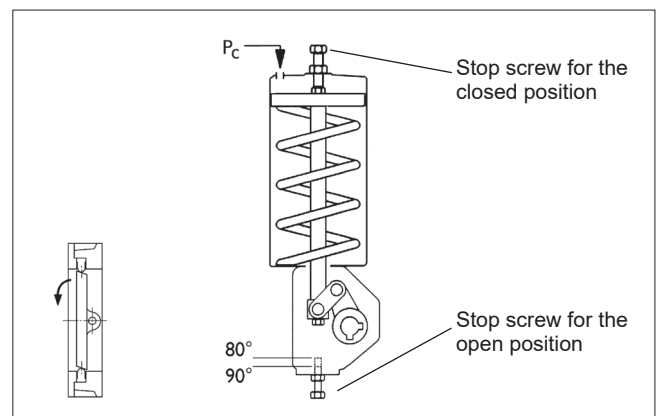


Fig. 20 Cylinder actuator, series B1J

## Spring-return cylinder actuator B1JA

### “Spring-to-open”

- The actuator being unpressurized the valve is open. Unscrew the close limit stop screw (actuator housing). Apply tabulated shut-off pressure  $P_c$  to the air connection at the cylinder bottom end against the spring force to close the valve.
- Check through the stop screw hole that the piston rod does not touch the cylinder top end. If it does, loosen the bracket screws and turn the actuator clockwise to increase the adjusting margin.
- Turn the closed position stop screw until it touches the piston, then turn back 1/4 turn and lock up. An O-ring is used for leakproofing the stop screw.
- An extra long screw is needed for opening angles  $< 80^\circ$ .

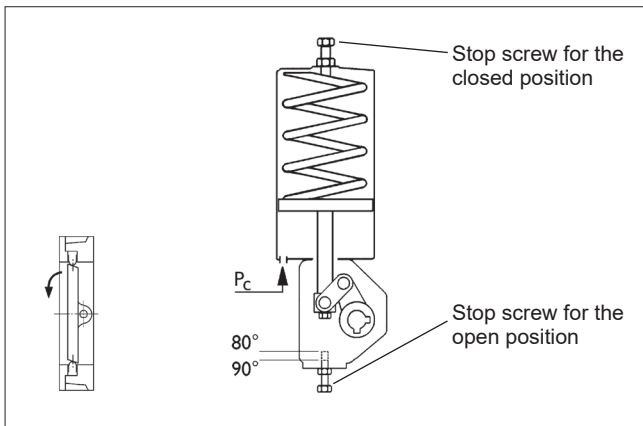


Fig. 21 Cylinder actuator, series B1JA

## Hand lever RH

- Mount the hand lever on the valve, but do not fasten hex screws (A). Turn the lever using force  $F$  in Table 8.
- When closing torque is applied, turn the housing (B) cog of the closing limit to contact with the lever arm. Fasten hex screws (A).

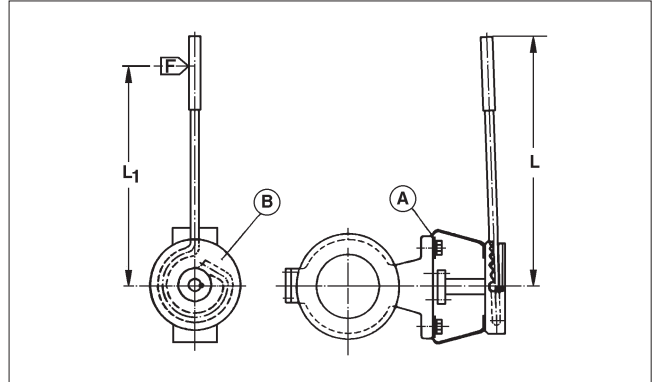


Fig. 23 Hand lever, series RH

Table 8 Hand lever RH, adjustment values

| Size<br>DN | L<br>mm | L1<br>mm | Torque |        | Force |     |
|------------|---------|----------|--------|--------|-------|-----|
|            |         |          | Nm     | Lbf ft | N     | Lbf |
| 80         | 400     | 350      | 40     | 30     | 115   | 26  |
| 100        | 400     | 350      | 70     | 52     | 200   | 45  |
| 125        | 400     | 350      | 100    | 74     | 285   | 63  |
| 150        | 500     | 450      | 135    | 100    | 300   | 67  |

## M-series operator

- Close the valve as per the tabulated primary torque  $M_1$  (handwheel torque) given in Tables 10 and 11.
- Tighten the closed position stop screw until it touches the linkage, then turn back 1/4 turn and lock up with Loctite locking glue.

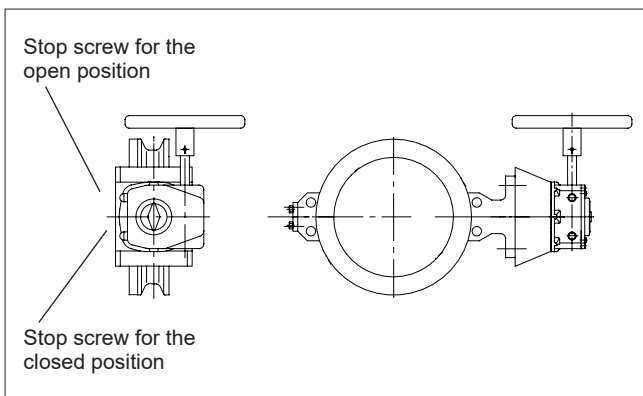


Fig. 22 Actuator, series M

## 7. TROUBLE SHOOTING TABLE

Table 9 Trouble shooting

| Symptom                        | Possible fault  | Recommended action                                 |
|--------------------------------|---|--|
| Leakage through a closed valve | Wrong stop screw adjustment of the actuator                 | Adjust the stop screw for closed position          |
|                                | Faulty zero setting of the positioner                       | Adjust the positioner                              |
|                                | Damaged seat  | Replace seat                                       |
|                                | Damaged closing member                                      | Replace the closing member                         |
|                                | Closing member in a wrong position relative to the actuator | Select the correct keyway in the actuator          |
| Leakage through body joint     | Damaged gasket  | Replace the gasket                                 |
|                                | Loose body joint  | Tighten the nuts or screws                         |
| Irregular valve movements      | Actuator or positioner malfunction                          | Check the operation of the actuator and positioner |
|                                | Process medium accumulated on the sealing surface           | Clean the sealing surfaces                         |
|                                | Closing member or seat damaged                              | Replace the closing member or seat                 |
|                                | Crystallizing medium has entered the bearing spaces         | Flush the bearing spaces                           |
| Gland packing leaking          | Gland packing worn or damaged                               | Replace the gland packing                          |
|                                | Loose packing   | Tighten the packing nuts                           |

## 8. TOOLS

No special tools are needed for servicing the valve. However, we recommend an extractor tool (ID-code table in actuator's IMO) for removing the actuator from the valve. The tool can be ordered from the manufacturer.

## 9. ORDERING SPARE PARTS

When ordering spare parts, always include the following information:

- type code, sales order number, serial number (stamped on a valve body)
- number of the parts list, part number, name of the part and quantity required

This information can be found from the identification plate or documents.

Table 10 Series LW6L, LW7L, LG6L and LG7L, closing torques

| LW7,<br>LW6<br>DN /<br>SIZE | Mc   | Mc       | BC and BJ |       | BC pc |          | BJ pc |       | BJA **) pc |          | BJK pc |          | BJKA **) pc |          | BJV pc   |       | BJVA **) pc |       |       |  |
|-----------------------------|------|----------|-----------|-------|-------|----------|-------|-------|------------|----------|--------|----------|-------------|----------|----------|-------|-------------|-------|-------|--|
|                             | (Nm) | (lbf ft) | SIZE      | (bar) | (psi) | (bar)    | (psi) | (bar) | (psi)      | (bar)    | (psi)  | (bar)    | (psi)       | (bar)    | (psi)    | (bar) | (psi)       | (bar) | (psi) |  |
| 80<br>3"                    | 45   | 33       | 6         | 2,5   | 36    | 0,1      | 1,45  | 3,8   | 55         | *)spring |        | 3,3      | 48          | 0,5      | 7,251887 | 4,5   | 65          |       |       |  |
|                             |      |          | 8         | 2,1   | 30    | 0,7      | 10    | 3,3   | 48         | 0,3      | 4      | 2,8      | 41          | 1,1      | 16       | 4     | 58          |       |       |  |
|                             |      |          | 10        | 1,6   | 23    | 1,1      | 16    | 2,8   | 41         | 0,7      | 10     | 2,2      | 32          | 1,6      | 23       | 3,4   | 49          |       |       |  |
| 100<br>4"                   | 75   | 55       | 6         | 4,1   | 59    | *)spring |       | 4,7   | 68         | *)spring |        | *)spring |             | *)spring |          | 5,4   | 78          |       |       |  |
|                             |      |          | 8         | 3,4   | 49    | 0,2      | 3     | 3,8   | 55         | *)spring |        | 3,3      | 48          | 0,6      | 9        | 4,6   | 68          |       |       |  |
|                             |      |          | 9         | 2,1   | 30    |          |       |       |            |          |        |          |             |          |          |       |             |       |       |  |
|                             |      |          | 10        | 1,9   | 28    | 0,9      | 13    | 3,1   | 45         | 0,5      | 7      | 2,6      | 38          | 1,4      | 20       | 3,7   | 54          |       |       |  |
| 125<br>5"                   | 110  | 80       | 11        | 1,1   | 16    |          |       |       |            |          |        |          |             |          |          |       |             |       |       |  |
|                             |      |          | 6         | 6     | 87    |          |       |       |            |          |        |          |             |          |          |       |             |       |       |  |
|                             |      |          | 8         | 5     | 72    | *)spring |       | 4,5   | 65         |          |        | 3,8      | 55          | *)spring |          | 5,3   | 77          |       |       |  |
|                             |      |          | 9         | 3     | 43    |          |       |       |            |          |        |          |             |          |          |       |             |       |       |  |
|                             |      |          | 10        | 2,4   | 35    | 0,6      | 9     | 3,4   | 49         | 0,2      | 3      | 2,9      | 42          | 1,1      | 16       | 4     | 58          |       |       |  |
| 150<br>6"                   | 150  | 110      | 11        | 1,5   | 22    |          |       |       |            |          |        |          |             |          |          |       |             |       |       |  |
|                             |      |          | 12        | 1,3   | 19    | 1,1      | 16    | 3     | 43         | 0,7      | 10     | 2,2      | 32          | 1,6      | 23       | 3,7   | 54          |       |       |  |
|                             |      |          | 6         | 8,2   | 119   |          |       |       |            |          |        |          |             |          |          |       |             |       |       |  |
|                             |      |          | 9         | 4,1   | 59    |          |       |       |            |          |        |          |             |          |          |       |             |       |       |  |
|                             |      |          | 10        | 3,3   | 48    | 0,2      | 3     | 3,8   | 55         | *)spring |        | 3,2      | 46          | 0,8      | 12       | 4,3   | 62          |       |       |  |
| 200<br>8"                   | 300  | 220      | 11        | 2,1   | 30    |          |       |       |            |          |        |          |             |          |          |       |             |       |       |  |
|                             |      |          | 12        | 1,6   | 23    | 0,9      | 13    | 3,1   | 45         | 0,5      | 7      | 2,6      | 38          | 1,5      | 22       | 3,9   | 57          |       |       |  |
|                             |      |          | 10        | 6,5   | 94    | *)spring |       | 5     | 72         |          |        | 4,4      | 64          | *)spring |          | 5,6   | 81          |       |       |  |
|                             |      |          | 11        | 4,2   | 61    |          |       |       |            |          |        |          |             |          |          |       |             |       |       |  |
|                             |      |          | 12        | 3,3   | 48    | 0,2      | 3     | 3,8   | 55         | *)spring |        | 3,2      | 46          | 0,8      | 12       | 4,6   | 68          |       |       |  |
| 250<br>10"                  | 500  | 370      | 13        | 2,1   | 30    |          |       |       |            |          |        |          |             |          |          |       |             |       |       |  |
|                             |      |          | 16        | 1,6   | 23    | 0,9      | 13    | 3,1   | 45         | 0,5      | 7      | 2,6      | 38          | 1,3      | 19       | 3,8   | 55          |       |       |  |
|                             |      |          | 12        | 5,5   | 80    | *)spring |       | 4,6   | 67         |          |        | 4        | 58          | *)spring |          | 5,5   | 80          |       |       |  |
|                             |      |          | 13        | 3,5   | 51    |          |       |       |            |          |        |          |             |          |          |       |             |       |       |  |
| 300<br>12"                  | 825  | 610      | 16        | 2,8   | 41    | 0,5      | 7     | 3,6   | 52         | 0        | 3      | 43       | 1           | 14       | 4,3      | 62    |             |       |       |  |
|                             |      |          | 17        | 1,8   | 26    |          |       |       |            |          |        |          |             |          |          |       |             |       |       |  |
|                             |      |          | 13        | 5,8   | 84    |          |       |       |            |          |        |          |             |          |          |       |             |       |       |  |
|                             |      |          | 16        | 4,5   | 65    | *)spring |       | 4,2   | 61         |          |        | 3,6      | 52          | 0,3      | 4        | 5     | 73          |       |       |  |
| 350<br>14"                  | 1160 | 860      | 17        | 3     | 43    |          |       |       |            |          |        |          |             |          |          |       |             |       |       |  |
|                             |      |          | 20        | 2,3   | 33    | 0,6      | 9     | 3,4   | 49         | 0,2      | 3      | 2,8      | 41          | 1,1      | 16       | 3,9   | 57          |       |       |  |
|                             |      |          | 16        | 6,4   | 93    | *)spring |       | 4,9   | 71         |          |        | 4,3      | 62          | *)spring |          | 5,7   | 83          |       |       |  |
|                             |      |          | 17        | 4,2   | 61    |          |       |       |            |          |        |          |             |          |          |       |             |       |       |  |
| 400<br>16"                  | 1650 | 1220     | 20        | 3,3   | 48    | 0,3      | 4     | 3,7   | 54         | *)spring |        | 3,1      | 45          | 0,8      | 12       | 4,2   | 61          |       |       |  |
|                             |      |          | 25        | 1,7   | 25    | 0,9      | 13    | 3,1   | 45         | 0,5      | 7      | 2,6      | 38          | 1,4      | 20       | 3,6   | 52          |       |       |  |
|                             |      |          | 16        | 9,5   | 138   |          |       | 5,9   | 86         |          |        | 5,2      | 75          | *)spring |          | 6,8   | 99          |       |       |  |
|                             |      |          | 17        | 6     | 87    |          |       |       |            |          |        |          |             |          |          |       |             |       |       |  |
| 450<br>18"                  | 2200 | 1620     | 20        | 4,7   | 68    | *)spring |       | 4,2   | 61         |          |        | 3,6      | 52          | 0,3      | 4        | 4,7   | 68          |       |       |  |
|                             |      |          | 25        | 2,4   | 35    | 0,6      | 9     | 3,4   | 49         | 0,2      | 3      | 2,8      | 41          | 1,1      | 16       | 3,9   | 57          |       |       |  |
|                             |      |          | 20        | 6,3   | 91    | *)spring |       | 4,8   | 70         |          |        | 4,2      | 61          | *)spring |          | 5,3   | 77          |       |       |  |
| 500<br>20"                  | 2700 | 1990     | 25        | 3,2   | 46    | 0,4      | 6     | 3,7   | 54         | *)spring |        | 3,1      | 45          | 0,9      | 13       | 4,2   | 61          |       |       |  |
|                             |      |          | 32        | 1,6   | 23    | 0,9      | 13    | 3,1   | 45         | 0,5      | 7      | 2,5      | 36          | 1,4      | 20       | 3,7   | 54          |       |       |  |
|                             |      |          | 25        | 3,9   | 57    | 0,1      | 1,45  | 3,9   | 57         | *)spring |        | 3,3      | 48          | 0,6      | 9        | 4,4   | 64          |       |       |  |
| 600<br>24"                  | 4400 | 3240     | 32        | 1,9   | 28    | 0,8      | 12    |       |            | 0,4      | 6      | 2,7      | 39          | 1,3      | 19       | 3,8   | 55          |       |       |  |
|                             |      |          | 25        | 6,4   | 93    | *)spring |       | 4,8   | 70         |          |        | 4,2      | 61          | *)spring |          | 5,3   | 77          |       |       |  |
|                             |      |          | 3,2       | 46    | 0,4   | 6        | 3,7   | 54    | *)spring   |          | 3,1    | 45       | 0,8         | 12       | 4,3      | 62    |             |       |       |  |

\*) spring = spring torque not adequate to reach tightness according to ISO 5208 Rate D, BS 6755 Part 1 Rate D, ANSI/FCI 70.2 Class V, IEC 534-4 or MSS-SP72/1970  
 \*\*) Adjust the supply pressure regulator to the pressure below. Do not exceed given value.

Table 11 Series LW8M, LG8M, LW5M and LG5M, closing torques

| L8M,<br>L5M | Mc<br>(Nm) | Mc<br>(lbf ft) | BC and BJ<br>SIZE | BC pc |       | BJ pc    |       | BJA **) pc |       | BJK pc   |       | BJKA **) pc |       | BJV pc   |       | BJVA **) pc |       |  |
|-------------|------------|----------------|-------------------|-------|-------|----------|-------|------------|-------|----------|-------|-------------|-------|----------|-------|-------------|-------|--|
|             |            |                |                   | (bar) | (psi) | (bar)    | (psi) | (bar)      | (psi) | (bar)    | (psi) | (bar)       | (psi) | (bar)    | (psi) | (bar)       | (psi) |  |
| 80<br>3"    | 45         | 33             | 6                 | 2,5   | 36    | 0,1      | 1,45  | 3,8        | 55,1  | *)spring |       | 3,3         | 48    | 0,5      | 7,2   | 4,5         | 65    |  |
|             |            |                | 8                 | 2,1   | 30    | 0,7      | 10    | 3,3        | 48    | 0,3      | 4     | 2,8         | 41    | 1,1      | 16    | 4           | 58    |  |
|             |            |                | 10                | 1,6   | 23    | 1,1      | 16    | 2,8        | 41    | 0,7      | 10    | 2,2         | 32    | 1,6      | 23    | 3,4         | 49    |  |
| 100<br>4"   | 75         | 55             | 6                 | 4,1   | 59    | *)spring |       | 4,7        | 68,2  | *)spring |       | *)spring    |       | *)spring |       | 5,4         | 78    |  |
|             |            |                | 8                 | 3,4   | 49    | 0,2      | 3     | 3,8        | 55    | *)spring |       | 3,3         | 48    | 0,6      | 9     | 4,6         | 68    |  |
|             |            |                | 9                 | 2,1   | 30    |          |       |            |       |          |       |             |       |          |       |             |       |  |
|             |            |                | 10                | 1,9   | 28    | 0,9      | 13    | 3,1        | 45    | 0,5      | 7     | 2,6         | 38    | 1,4      | 20    | 3,7         | 54    |  |
| 125<br>5"   | 110        | 80             | 11                | 1,1   | 16    |          |       |            |       |          |       |             |       |          |       |             |       |  |
|             |            |                | 6                 | 6     | 87    |          |       |            |       |          |       |             |       |          |       |             |       |  |
|             |            |                | 8                 | 5     | 72    | *)spring |       | 4,5        | 65    |          |       | 3,8         | 55    | *)spring |       | 5,3         | 77    |  |
|             |            |                | 9                 | 3     | 43    |          |       |            |       |          |       |             |       |          |       |             |       |  |
|             |            |                | 10                | 2,4   | 35    | 0,6      | 9     | 3,4        | 49    | 0,2      | 3     | 2,9         | 42    | 1,1      | 16    | 4           | 58    |  |
| 150<br>6"   | 230        | 170            | 11                | 1,5   | 22    |          |       |            |       |          |       |             |       |          |       |             |       |  |
|             |            |                | 12                | 1,3   | 19    | 1,1      | 16    | 3          | 43    | 0,7      | 10    | 2,2         | 32    | 1,6      | 23    | 3,7         | 54    |  |
|             |            |                | 10                | 5     | 72    | *)spring |       | 4,4        | 64    |          |       | 3,8         | 55    | 0,1      | 1     | 5           | 73    |  |
|             |            |                | 11                | 3,2   | 46    |          |       |            |       |          |       |             |       |          |       |             |       |  |
|             |            |                | 12                | 2,5   | 36    | 0,5      | 7     | 3,5        | 51    | 0,1      | 1     | 2,9         | 42    | 1,1      | 16    | 4,3         | 62    |  |
|             |            |                | 13                | 1,6   | 23    |          |       |            |       |          |       |             |       |          |       |             |       |  |
| 200<br>8"   | 460        | 340            | 16                | 1,3   | 19    | 0,9      | 13    | 3          | 43    | 0,6      | 9     | 2,3         | 33    | 1,5      | 22    | 3,7         | 54    |  |
|             |            |                | 11                | 6,4   | 93    |          |       |            |       |          |       |             |       |          |       |             |       |  |
|             |            |                | 12                | 5     | 72    | *)spring |       | 4,4        | 64    |          |       | 3,8         | 55    | 0,1      | 1     | 5,3         | 77    |  |
|             |            |                | 13                | 3,2   | 46    |          |       |            |       |          |       |             |       |          |       |             |       |  |
| 250<br>10"  | 800        | 590            | 16                | 2,5   | 36    | 0,5      | 7     | 3,5        | 51    | 0,1      | 1     | 2,9         | 42    | 1,1      | 16    | 4,2         | 61    |  |
|             |            |                | 17                | 1,7   | 25    |          |       |            |       |          |       |             |       |          |       |             |       |  |
|             |            |                | 20                | 1,4   | 20    | 1        | 14    | 2,9        | 42    | 0,6      | 9     | 2,3         | 33    | 1,5      | 22    | 3,5         | 51    |  |
|             |            |                | 13                | 5,6   | 81    |          |       |            |       |          |       |             |       |          |       |             |       |  |
|             |            |                | 16                | 4,4   | 64    | *)spring |       | 4,2        | 61    |          |       | 3,6         | 52    | 0,4      | 6     | 4,9         | 71    |  |
| 300<br>12"  | 1250       | 920            | 17                | 2,9   | 42    | 0,7      | 10    | 3,3        | 48    | 0,3      | 4     | 2,8         | 41    | 1,2      | 17    | 3,8         | 55    |  |
|             |            |                | 20                | 2,3   | 33    |          |       |            |       |          |       |             |       |          |       |             |       |  |
|             |            |                | 17                | 4,6   | 67    |          |       |            |       |          |       |             |       |          |       |             |       |  |
|             |            |                | 20                | 3,6   | 52    | 0,2      | 3     | 3,8        | 55    | *)spring |       | 3,2         | 46    | 0,7      | 10    | 4,3         | 62    |  |
| 350<br>14"  | 1750       | 1290           | 25                | 1,8   | 26    | 0,8      | 12    | 3,2        | 46    | 0,4      | 6     | 2,6         | 38    | 1,3      | 19    | 3,7         | 54    |  |
|             |            |                | 32                | 1     | 15    |          |       |            |       |          |       |             |       |          |       |             |       |  |
|             |            |                | 17                | 6,4   | 93    |          |       |            |       |          |       |             |       |          |       |             |       |  |
|             |            |                | 20                | 5     | 72    | *)spring |       | 4,3        | 62    |          |       | 3,7         | 54    | 0,2      | 3     | 4,8         | 70    |  |
|             |            |                | 25                | 2,6   | 38    | 0,6      | 9     | 3,4        | 49    | 0,2      | 3     | 2,9         | 42    | 1,1      | 16    | 3,9         | 57    |  |
| 400<br>16"  | 2500       | 1840           | 32                | 1,3   | 19    | 1        | 14    | 2,9        | 42    | 0,6      | 9     | 2,3         | 33    | 1,5      | 22    | 3,6         | 52    |  |
|             |            |                | 25                | 3,6   | 52    | 0,2      | 3     | 3,8        | 55    | *)spring |       | 3,2         | 46    | 0,7      | 10    | 4,3         | 62    |  |
|             |            |                | 32                | 1,8   | 26    | 0,8      | 12    | 3,2        | 46    | 0,4      | 6     | 2,5         | 36    | 1,3      | 19    | 3,8         | 55    |  |
|             |            |                | 40                | 0,9   | 13    |          |       |            |       |          |       |             |       |          |       |             |       |  |
| 450<br>18"  | 3400       | 2510           | 25                | 4,9   | 71    | *)spring |       | 4,3        | 62    |          |       | 3,7         | 54    | 0,2      | 3     | 4,8         | 70    |  |
|             |            |                | 32                | 2,4   | 35    | 0,6      | 9     | 3,4        | 49    | 0,2      | 3     | 2,8         | 41    | 1,1      | 16    | 4           | 58    |  |
|             |            |                | 322               |       |       | 1        | 15    | 2,9        | 42    | 0,6      | 9     | 2,2         | 32    | 1,5      | 22    | 3,4         | 49    |  |
|             |            |                | 40                | 1,2   | 17    |          |       |            |       |          |       |             |       |          |       |             |       |  |
| 500<br>20"  | 3400       | 2510           | 25                | 5,2   | 75    | *)spring |       | 4,2        | 61    | *)spring |       | 3,6         | 52    | *)spring |       | 4,7         | 68    |  |
|             |            |                | 32                | 2,6   | 38    | 0,6      | 9     | 3,4        | 49    | *)spring |       | 2,7         | 39    | 1        | 15    | 3,9         | 57    |  |
|             |            |                | 322               |       |       | 1        | 15    | 3          | 44    | 0,6      | 9     | 2,3         | 33    | 1,4      | 20    | 3,5         | 51    |  |
|             |            |                | 40                | 1,3   | 19    |          |       |            |       |          |       |             |       |          |       |             |       |  |
| 600<br>24"  | 4100       | 3020           | 32                | 3,1   | 45    | 0,4      | 6     | 3,6        | 52    | *)spring |       | 2,9         | 42    | 0,8      | 12    | 4,1         | 59    |  |
|             |            |                | 40                | 1,5   | 22    |          |       |            |       |          |       |             |       |          |       |             |       |  |
|             |            |                | 322               |       |       | 0,9      | 13    | 3,1        | 45    | 0,5      | 7     | 2,4         | 35    | 1,4      | 20    | 3,5         | 51    |  |
|             |            |                | 0,8               | 12    |       |          |       |            |       |          |       |             |       |          |       |             |       |  |

| L 8CB       | Mc<br>(Nm) | Mc<br>(lbf ft) | BC and BJ<br>SIZE | BC pc |       | BJ pc    |       | BJA **) pc |       | BJK pc   |       | BJKA **) pc |       | BJV pc   |       | BJVA **) pc |       |
|-------------|------------|----------------|-------------------|-------|-------|----------|-------|------------|-------|----------|-------|-------------|-------|----------|-------|-------------|-------|
|             |            |                |                   | (bar) | (psi) | (bar)    | (psi) | (bar)      | (psi) | (bar)    | (psi) | (bar)       | (psi) | (bar)    | (psi) | (bar)       | (psi) |
| 700<br>28"  | 4400       | 3240           | 25                | 6,7   | 97    | *)spring |       | 4,8        | 70    |          |       | 4,2         | 61    | *)spring |       | 5,3         | 77    |
|             |            |                | 32                | 3,3   | 48    | 0,4      | 6     | 3,7        | 54    | *)spring |       | 3,1         | 45    | 0,8      | 12    | 4,3         | 62    |
|             |            |                | 40                | 1,6   | 23    |          |       |            |       |          |       |             |       |          |       |             |       |
| 750<br>30"  | 6500       | 4790           | 32                | 4,9   | 71    | *)spring |       | 4,2        | 61    |          |       | 3,6         | 52    | 0,3      | 4     | 4,8         | 70    |
|             |            |                | 322               |       |       | 0,6      | 9     |            |       | 0,2      | 3     |             |       |          |       |             |       |
|             |            |                | 40                | 2,4   | 35    |          |       |            |       |          |       |             |       |          |       |             |       |
| 800<br>32"  | 8000       | 5900           | 50                | 1,2   | 17    |          |       |            |       |          |       |             |       |          |       |             |       |
|             |            |                | 32                | 6,1   | 88    |          |       | 4,6        | 67    |          |       | 4           | 58    | *)spring |       | 5,2         | 75    |
|             |            |                | 322               |       |       | 0,5      | 7     |            |       | *)spring |       |             |       |          |       |             |       |
| 900<br>36"  | 9400       | 6930           | 40                | 2,9   | 42    |          |       |            |       |          |       |             |       |          |       |             |       |
|             |            |                | 50                | 1,5   | 22    |          |       |            |       |          |       |             |       |          |       |             |       |
|             |            |                | 322               |       |       | 0,3      | 4     |            |       | *)spring |       |             |       |          |       |             |       |
| 1000<br>40" | 12600      | 9290           | 40                | 3,5   | 51    |          |       |            |       |          |       |             |       |          |       |             |       |
|             |            |                | 50                | 1,8   | 26    |          |       |            |       |          |       |             |       |          |       |             |       |
|             |            |                | 322               |       |       | *)spring |       |            |       |          |       |             |       |          |       |             |       |
|             |            |                | 40                | 4,6   | 67    |          |       |            |       |          |       |             |       |          |       |             |       |
|             |            |                | 50                | 2,4   | 35    |          |       |            |       |          |       |             |       |          |       |             |       |

\*) spring = spring torque not adequate to reach tightness according to ISO 5208 Rate D, BS 6755 Part 1 Rate D, ANSI/FCI 70.2 Class V, IEC 534-4 or MSS-SP72/1970

\*\*) Adjust the supply pressure regulator to the pressure below. Do not exceed given value.

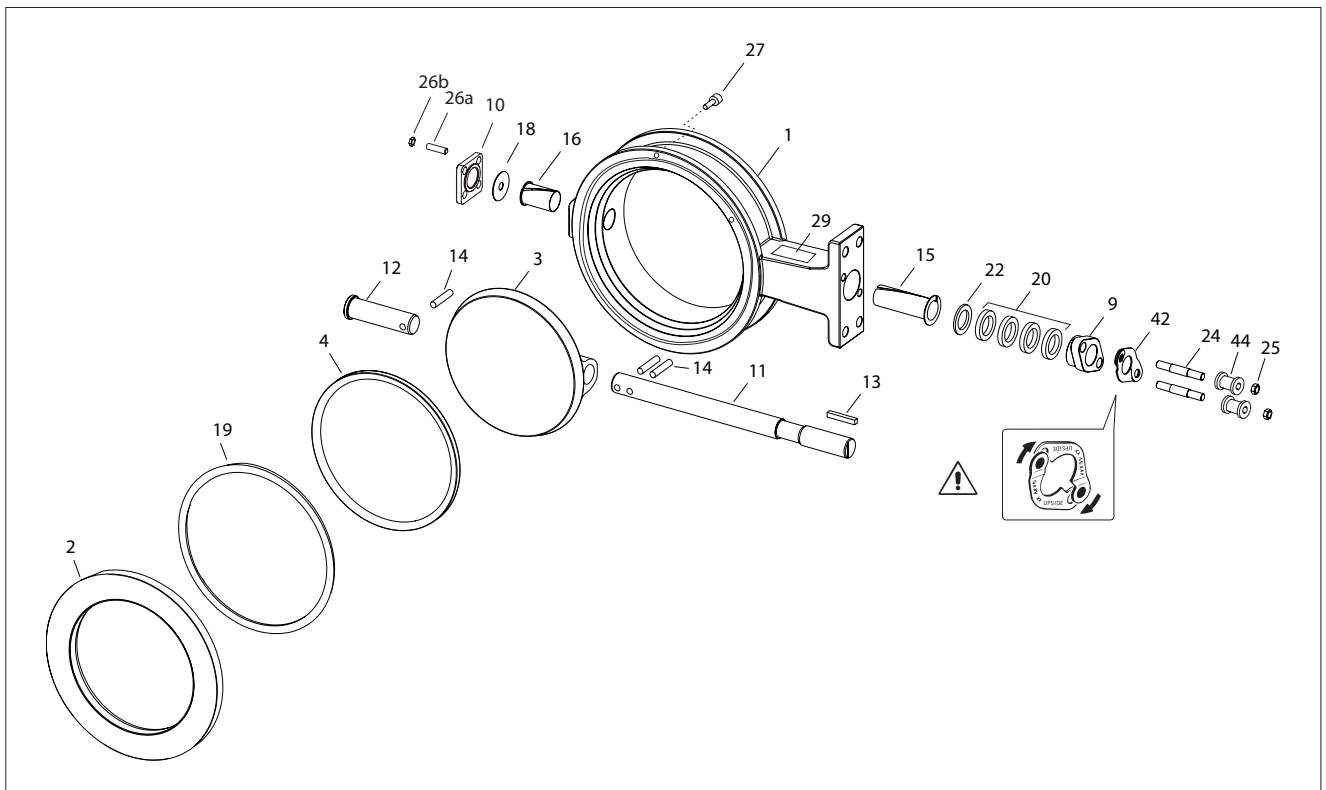
| L_8CB       | Manual operator | Input torque M1 |          |
|-------------|-----------------|-----------------|----------|
|             |                 | (Nm)            | (lbf ft) |
| 700<br>28"  | M16             | 166             | 122      |
|             |                 | 190             | 140      |
| 750<br>30"  | M25             | 244             | 180      |
|             |                 |                 |          |
| 800<br>32"  | M25             | 103             | 76       |
|             |                 |                 |          |
| 900<br>36"  |                 |                 |          |
| 1000<br>40" |                 |                 |          |

| LW7, LW6   | Mc   | Mc       | Q-P      | spring close |       | **) spring open |       | Manual operator | Input torque M1 |          |
|------------|------|----------|----------|--------------|-------|-----------------|-------|-----------------|-----------------|----------|
| DN / SIZE  | (Nm) | (lbf ft) | actuator | (bar)        | (psi) | (bar)           | (psi) |                 | (Nm)            | (lbf ft) |
| 80<br>3"   | 45   | 33       | QP2C     | 0,6          | 9     | 3,6             | 52    | M07             | 4               | 3        |
|            |      |          | QP3C     | 1,1          | 16    | 3,2             | 46    |                 |                 |          |
| 100<br>4"  | 75   | 55       | QP2C     |              |       | 4,3             | 62    | M07             | 7               | 5        |
|            |      |          | QP3C     | 0,8          | 12    | 3,5             | 51    |                 |                 |          |
| 125<br>5"  | 110  | 80       | QP3C     | 0,3          | 4     | 3,9             | 57    | M07             | 10              | 7        |
|            |      |          | QP4C     | 1            | 14    | 3,3             | 48    |                 |                 |          |
| 150<br>6"  | 150  | 110      | QP3C     |              |       | 4,3             | 62    | M07             | 14              | 10       |
|            |      |          | QP4C     | 0,8          | 12    | 3,5             | 51    |                 |                 |          |
| 200<br>8"  | 300  | 220      | QP4C     |              |       | 4,3             | 62    | M07             | 26              | 19       |
|            |      |          | QP5C     | 0,8          | 12    | 3,5             | 51    | M10             | 27              | 20       |
| 250<br>10" | 500  | 370      | QP5C     | 0,1          | 1     | 4,1             | 59    | M10             | 43              | 32       |
|            |      |          |          |              |       |                 |       | M12             | 44              | 32       |
| 300<br>12" | 825  | 610      |          |              |       |                 |       | M12             | 69              | 51       |
|            |      |          |          |              |       |                 |       | M14             | 51              | 38       |
|            |      |          |          |              |       |                 |       | M14             | 72              | 53       |
| 350<br>14" | 1160 | 860      |          |              |       |                 |       |                 |                 |          |
|            |      |          |          |              |       |                 |       |                 |                 |          |
| 400<br>16" | 1650 | 1220     |          |              |       |                 |       | M14             | 125             | 92       |
|            |      |          |          |              |       |                 |       | M15             | 80              | 59       |
| 450<br>18" | 2200 | 1620     |          |              |       |                 |       | M15             | 107             | 79       |
|            |      |          |          |              |       |                 |       | M16             | 83              | 61       |
| 500<br>20" | 2700 | 1990     |          |              |       |                 |       | M16             | 102             | 75       |
|            |      |          |          |              |       |                 |       | M25             | 98              | 72       |
| 600<br>24" | 4400 | 3240     |          |              |       |                 |       | M16             | 166             | 122      |

| L8M, L5M   | Mc   | Mc       | Q-P      | spring close |       | **) spring open |       | Manual operator | Input torque M1 |          |
|------------|------|----------|----------|--------------|-------|-----------------|-------|-----------------|-----------------|----------|
| DN/SIZE    | (Nm) | (lbf ft) | actuator | (bar)        | (psi) | (bar)           | (psi) |                 | (Nm)            | (lbf ft) |
| 80<br>3"   | 45   | 33       | QP2C     | 0,6          | 9     | 3,6             | 52    | M07             | 4               | 3        |
|            |      |          | QP3C     | 1,1          | 16    | 3,2             | 46    |                 |                 |          |
| 100<br>4"  | 75   | 55       | QP2C     |              |       | 4,3             | 62    | M07             | 7               | 5        |
|            |      |          | QP3C     | 0,8          | 12    | 3,5             | 51    |                 |                 |          |
| 125<br>5"  | 110  | 80       | QP3C     | 0,3          | 4     | 3,9             | 57    | M07             | 10              | 7        |
|            |      |          | QP4C     | 1            | 14    | 3,3             | 48    |                 |                 |          |
| 150<br>6"  | 230  | 170      | QP4C     | 0,3          | 4     | 3,9             | 57    | M07             | 20              | 15       |
|            |      |          | QPC5     | 1            | 14    | 3,3             | 48    | M10             | 21              | 15       |
| 200<br>8"  | 460  | 340      | QPC5     | 0,3          | 4     | 3,9             | 57    | M10             | 40              | 29       |
|            |      |          |          |              |       |                 |       | M12             | 38              | 28       |
|            |      |          |          |              |       |                 |       | M14             | 28              | 21       |
| 250<br>10" | 800  | 590      |          |              |       |                 |       | M14             | 49              | 36       |
| 300<br>12" | 1250 | 920      |          |              |       |                 |       | M15             | 61              | 45       |
|            |      |          |          |              |       |                 |       | M16             | 44              | 32       |
| 350<br>14" | 1750 | 1290     |          |              |       |                 |       | M15             | 85              | 63       |
|            |      |          |          |              |       |                 |       | M16             | 62              | 46       |
| 400<br>16" | 2500 | 1840     |          |              |       |                 |       | M16             | 94              | 69       |
|            |      |          |          |              |       |                 |       | M25             | 91              | 67       |
| 450<br>18" | 3400 | 2510     |          |              |       |                 |       | M16             | 128             | 94       |
| 500<br>20" | 3400 | 2510     |          |              |       |                 |       |                 |                 |          |
|            |      |          |          |              |       |                 |       | M16             | 128             | 94       |
| 600<br>24" | 4100 | 3020     |          |              |       |                 |       |                 |                 |          |
|            |      |          |          |              |       |                 |       | M16             | 155             | 114      |
|            |      |          |          |              |       |                 |       | M25             | 149             | 110      |



## 10. EXPLODED VIEW AND PARTS LIST



| Item | Qty   | Description          | Spare part category |
|------|-------|----------------------|---------------------|
| 1    | 1     | Body                 |                     |
| 2    | 1     | Clamp ring           |                     |
| 3    | 1     | Disc                 | 3                   |
| 4    | 1     | Seat ring            | 2                   |
| 9    | 1     | Gland                |                     |
| 10   | 1     | Blind flange         |                     |
| 11   | 1     | Drive shaft          | 3                   |
| 12   | 1     | Shaft                | 3                   |
| 13   | 1     | Key                  | 3                   |
| 14   | 3     | Pin                  | 3                   |
| 15   | 1     | Bearing              | 3                   |
| 16   | 1     | Bearing              | 3                   |
| 18   | 1     | Gasket               | 1                   |
| 19   | 1     | Body seal            | 1                   |
| 20   | 1 set | Gland packing        | 1                   |
| 22   | 1     | Anti-extrusion ring  |                     |
| 24   | 2     | Stud                 |                     |
| 25   | 2     | Hexagon nut          |                     |
| 26a  |       | Stud                 |                     |
| 26b  |       | Hexagon nut          |                     |
| 27   |       | Hexagon socket screw |                     |
| 29   | 1     | Identification plate |                     |
| 42   | 2     | Retaining plate      |                     |
| 44   | 2     | Disc spring set      |                     |

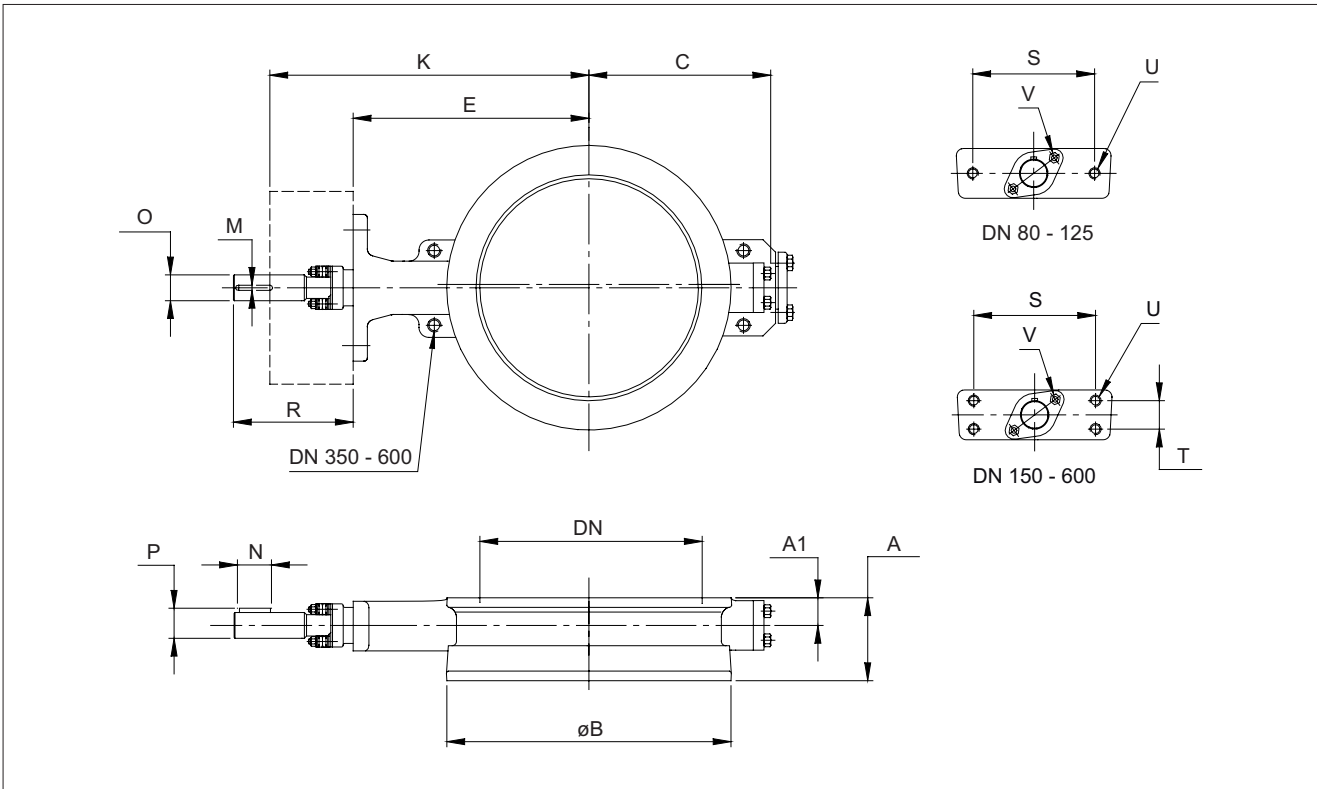
Spare part set category 1: Recommended soft parts, always needed for the repair. Delivered as a set.

Spare part category 2: Parts for replacing of the seat

Spare part category 3: Parts for replacing of the closing element

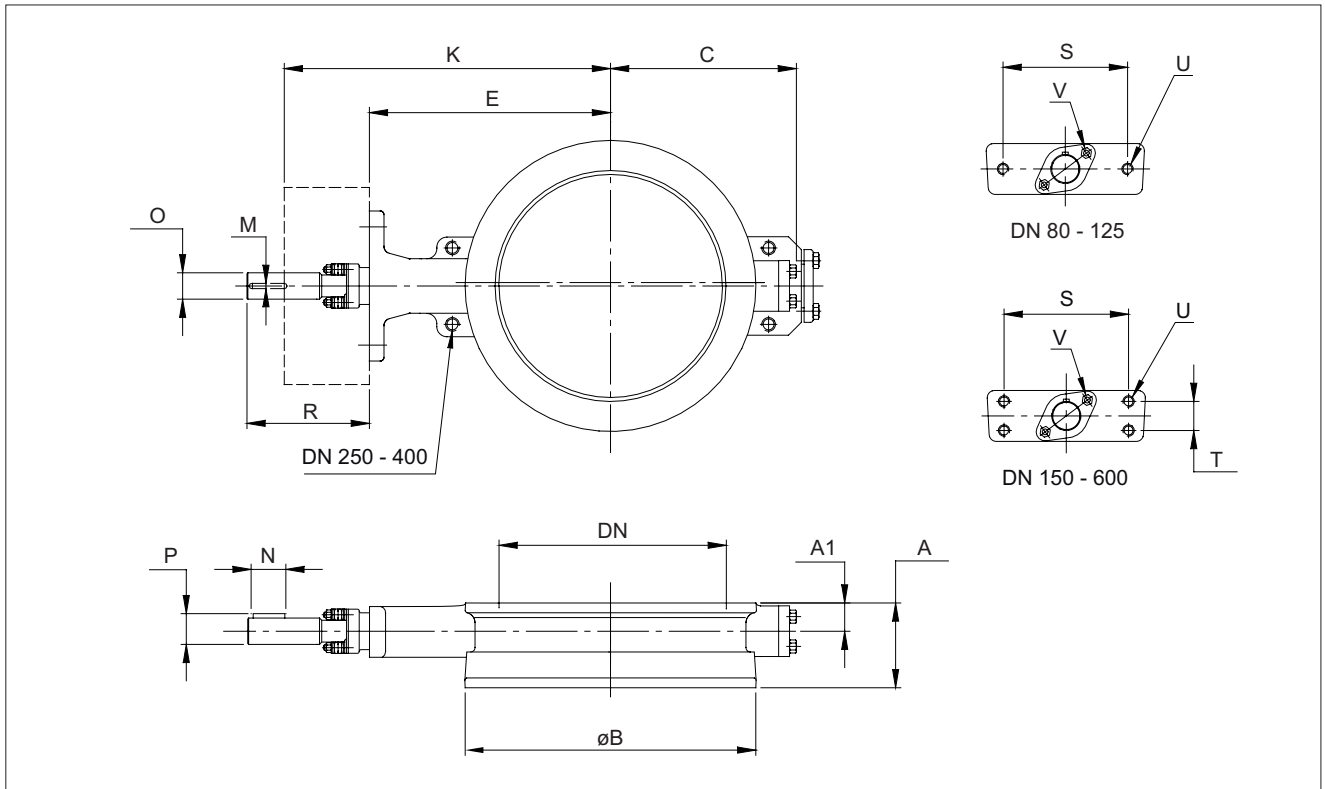
Spares for the full overhaul: All parts from the categories 1, 2 and 3

# 11. DIMENSIONS AND WEIGHTS



## LW6LB & LW7LB, DN 80 – 600, DIMENSIONS

| DN  | Dimensions, mm |                  |              |     |     |     |     |     |    |          | Dimensions, mm |    |     |       |     |       | Weight kg |
|-----|----------------|------------------|--------------|-----|-----|-----|-----|-----|----|----------|----------------|----|-----|-------|-----|-------|-----------|
|     | A1             | LW6LB A (K1/API) | LW7LB A (K2) | ØB  | C   | E   | K   | S   | T  | U Thread | V Thread       | O  | R   | M     | N   | P     |           |
| 80  | 18             | 46/48            | 49           | 128 | 80  | 168 | 248 | 70  | -  | M10      | M8             | 15 | 105 | 4.76  | 25  | 17.0  | 4         |
| 100 | 20             | 52/54            | 56           | 158 | 100 | 182 | 272 | 90  | -  | M12      | M8             | 20 | 125 | 4.76  | 35  | 22.2  | 6         |
| 125 | 22             | 56/-             | 64           | 190 | 135 | 205 | 295 | 90  | -  | M12      | M8             | 20 | 125 | 4.76  | 35  | 22.2  | 9         |
| 150 | 23             | 56/57            | 70           | 212 | 150 | 227 | 317 | 110 | 32 | M12      | M8             | 20 | 125 | 4.76  | 35  | 22.2  | 15        |
| 200 | 24             | 60/64            | 71           | 268 | 160 | 257 | 347 | 110 | 32 | M12      | M10            | 25 | 135 | 6.35  | 46  | 27.8  | 20        |
| 250 | 29             | 68/71            | 76           | 320 | 210 | 290 | 400 | 130 | 32 | M12      | M10            | 30 | 160 | 6.35  | 51  | 32.9  | 30        |
| 300 | 32             | 78/81            | 83           | 378 | 275 | 320 | 430 | 130 | 32 | M12      | M10            | 35 | 160 | 9.52  | 58  | 39.1  | 45        |
| 350 | 36             | 92/92            | 92           | 438 | 290 | 355 | 475 | 160 | 40 | M16      | M10            | 40 | 188 | 9.52  | 68  | 44.2  | 70        |
| 400 | 44             | 102/102          | 102          | 485 | 320 | 405 | 525 | 160 | 40 | M16      | M14            | 45 | 200 | 12.7  | 80  | 50.4  | 95        |
| 450 | 47             | 114/114          | 114          | 532 | 375 | 380 | 520 | 160 | 55 | M20      | M14            | 50 | 230 | 12.7  | 90  | 55.5  | 130       |
| 500 | 56             | 127/127          | 127          | 585 | 415 | 440 | 580 | 160 | 55 | M20      | M14            | 55 | 230 | 12.7  | 90  | 60.6  | 175       |
| 600 | 72             | 154/154          | 154          | 685 | 465 | 505 | 685 | 230 | 90 | M20      | M14            | 70 | 300 | 19.05 | 119 | 78.15 | 305       |

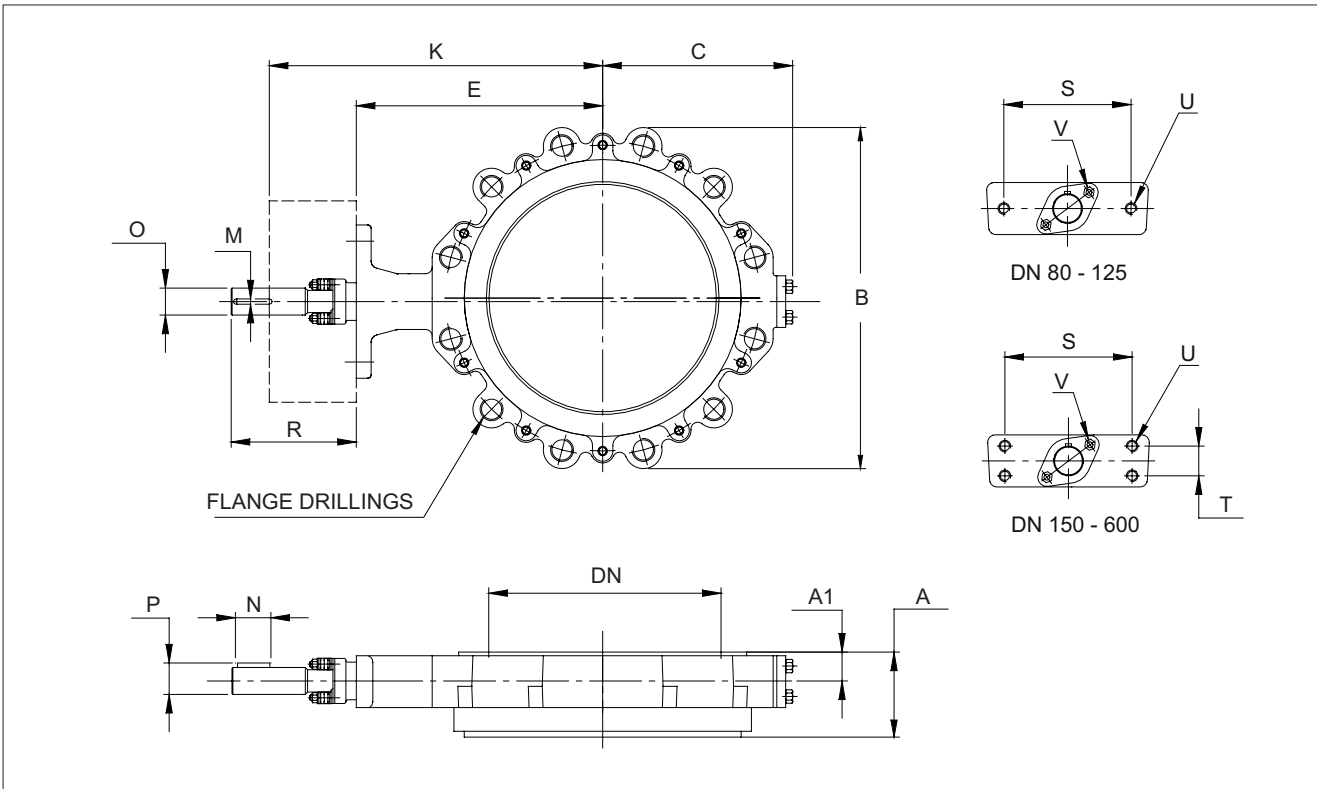


### LW8MB, LW5MB, DN 80 – 600, DIMENSIONS

| DN  | Dimensions, mm |             |              |     |     |     |     |     |    |          | Dimensions, mm |    |     |        |     |        | Weight kg |
|-----|----------------|-------------|--------------|-----|-----|-----|-----|-----|----|----------|----------------|----|-----|--------|-----|--------|-----------|
|     | A1             | LW8M A (K3) | LW5M A (API) | ØB  | C   | E   | K   | S   | T  | U Thread | V Thread       | O  | R   | M      | N   | P      |           |
| 80  | 18             | 64          | 48           | 128 | 80  | 168 | 248 | 70  | -  | M10      | M8             | 15 | 105 | 4.76   | 25  | 17.0   | 4         |
| 100 | 20             | 64          | 54           | 158 | 100 | 182 | 272 | 90  | -  | M12      | M8             | 20 | 125 | 4.76   | 35  | 22.2   | 6         |
| 125 | 20             | 70          | 56           | 158 | 100 | 182 | 272 | 90  | -  | M12      | M8             | 20 | 125 | 4.76   | 35  | 22.2   | 6         |
| 150 | 27             | 76          | 59           | 218 | 145 | 232 | 322 | 110 | 32 | M12      | M10            | 25 | 135 | 6.35   | 46  | 27.8   | 20        |
| 200 | 34             | 89          | 73           | 276 | 205 | 274 | 384 | 130 | 32 | M12      | M10            | 35 | 165 | 9.52   | 58  | 39.1   | 38        |
| 250 | 41             | 114         | 83           | 335 | 260 | 320 | 440 | 160 | 40 | M16      | M14            | 45 | 200 | 12.7   | 80  | 50.4   | 60        |
| 300 | 46             | 114         | 92           | 395 | 300 | 360 | 500 | 160 | 55 | M20      | M14            | 50 | 230 | 12.7   | 90  | 55.5   | 85        |
| 350 | 57             | 127         | 117          | 450 | 330 | 400 | 540 | 160 | 55 | M20      | M14            | 55 | 230 | 12.7   | 90  | 60.6   | 105       |
| 400 | 66             | 140         | 133          | 505 | 370 | 440 | 580 | 160 | 55 | M20      | M14            | 55 | 230 | 12.7   | 90  | 60.6   | 125       |
| 450 | 72             | 152         | 149          | 554 | 410 | 415 | 595 | 230 | 90 | M24      | M16            | 70 | 299 | 19.05  | 119 | 78.25  | 225       |
| 500 | 73             | 152         | 159          | 610 | 445 | 440 | 620 | 230 | 90 | M24      | M16            | 70 | 298 | 19.05  | 119 | 78.25  | 255       |
| 600 | 83             | 178         | 181          | 700 | 520 | 500 | 680 | 230 | 90 | M24      | M16            | 85 | 326 | 22.225 | 146 | 94.625 | 405       |

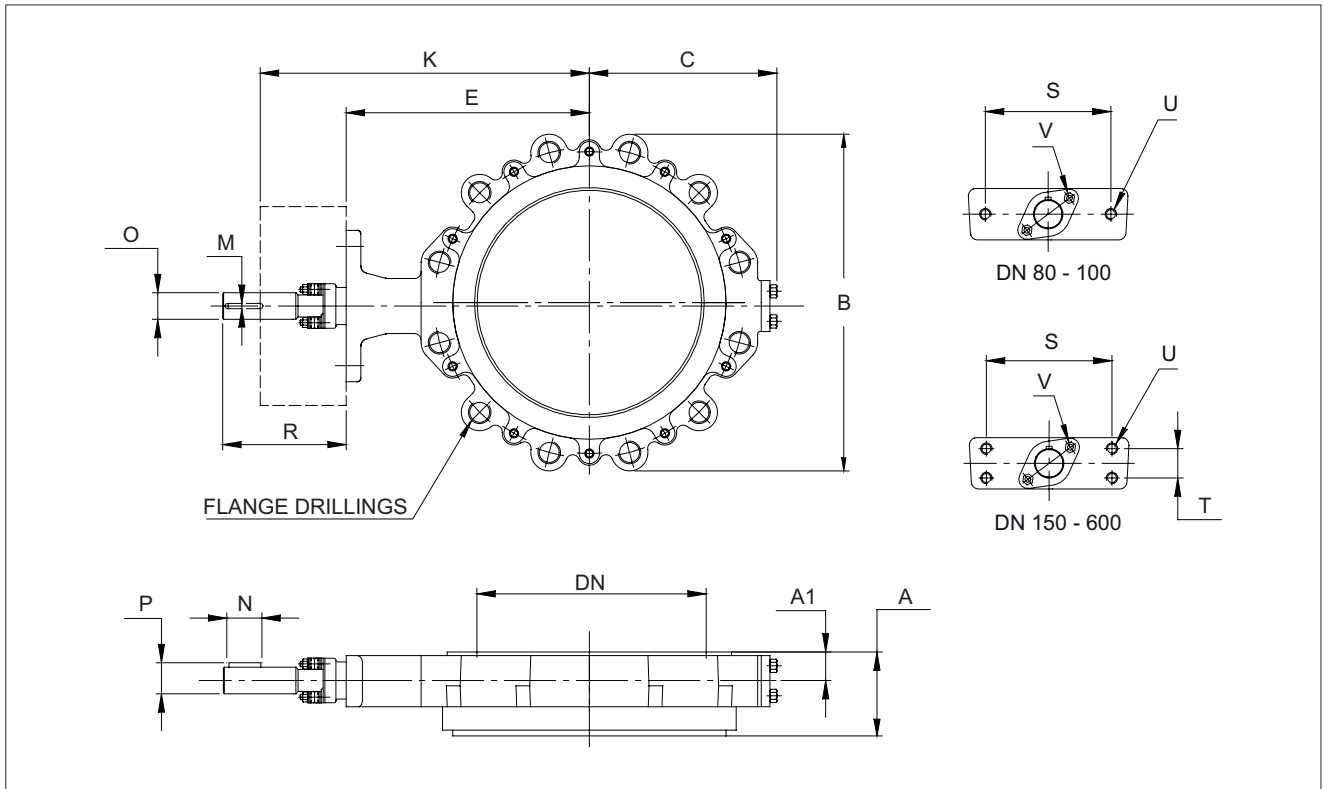
### LW8C

| LW8CB NPS/DN | A1  | LW8CB A(K3) |   | ØB   | C   | E   | K   | S   | T   | U   | V   | O   | R   | M     | N   | P     | Weight kg |
|--------------|-----|-------------|---|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|-----|-------|-----------|
| 28/700       | 115 | 229         | - | 762  | 510 | 505 | 685 | 230 | 90  | M24 | M16 | 70  | 399 | 19,05 | 119 | 78,2  | 360       |
| 30/750       | 102 | 229         | - | 813  | 530 | 575 | 755 | 230 | 90  | M24 | M16 | 85  | 326 | 22,23 | 146 | 94,6  | 470       |
| 32/800       | 102 | 241         | - | 864  | 615 | 600 | 780 | 230 | 90  | M24 | M16 | 85  | 326 | 22,23 | 146 | 94,6  | 540       |
| 36/900       | 107 | 241         | - | 972  | 655 | 630 | 850 | 330 | 120 | M30 | M24 | 95  | 376 | 22,23 | 156 | 104,8 | 730       |
| 40/1000      | 135 | 300         | - | 1080 | 745 | 724 | 944 | 330 | 120 | M30 | M24 | 105 | 400 | 25,4  | 180 | 116,1 | 1030      |



### LG6LB & LG7LB, DN 80 - 600, DIMENSIONS

| DN  | Dimensions, mm |                        |                    |     |     |     |     |     |    |             | Flange drillings |        |     |        |     |        |     |          | Dimensions, mm |    |     |       |     | Weight<br>kg |     |
|-----|----------------|------------------------|--------------------|-----|-----|-----|-----|-----|----|-------------|------------------|--------|-----|--------|-----|--------|-----|----------|----------------|----|-----|-------|-----|--------------|-----|
|     | A1             | LG6LB<br>A<br>(K1/API) | LG7LB<br>A<br>(K2) | B   | C   | E   | K   | S   | T  | U<br>Thread | V<br>Thread      | PN10   |     | PN16   |     | PN25   |     | ISO PN20 |                | O  | R   | M     | N   |              | P   |
|     |                |                        |                    |     |     |     |     |     |    |             |                  | Thread | Qty | Thread | Qty | Thread | Qty | Thread   | Qty            |    |     |       |     |              |     |
| 80  | 17             | 46/48                  | 49                 | 205 | 120 | 168 | 248 | 70  | -  | M10         | M8               | M16    | 8   | M16    | 8   | M16    | 8   | M16      | 4              | 15 | 105 | 4.76  | 25  | 17.0         | 9   |
| 100 | 21             | 52/54                  | 56                 | 235 | 135 | 182 | 272 | 90  | -  | M12         | M8               | M16    | 8   | M16    | 8   | M20    | 8   | M16      | 8              | 20 | 125 | 4.76  | 35  | 22.2         | 14  |
| 150 | 22             | 56/57                  | 70                 | 300 | 160 | 227 | 317 | 110 | 32 | M12         | M8               | M20    | 8   | M20    | 8   | M24    | 8   | M20      | 8              | 20 | 125 | 4.76  | 35  | 22.2         | 24  |
| 200 | 25             | 60/64                  | 71                 | 360 | 185 | 257 | 347 | 110 | 32 | M12         | M10              | M20    | 8   | M20    | 12  | M24    | 12  | M20      | 8              | 25 | 135 | 6.35  | 46  | 27.8         | 34  |
| 250 | 28             | 68/71                  | 76                 | 425 | 220 | 290 | 400 | 130 | 32 | M12         | M10              | M20    | 12  | M24    | 12  | M27    | 12  | M24      | 12             | 30 | 160 | 6.35  | 51  | 32.9         | 43  |
| 300 | 32             | 78/81                  | 83                 | 485 | 275 | 320 | 430 | 130 | 32 | M12         | M10              | M20    | 12  | M24    | 12  | M27    | 16  | M24      | 12             | 35 | 160 | 9.52  | 58  | 39.1         | 75  |
| 350 | 36             | 92/92                  | 92                 | 555 | 310 | 355 | 475 | 160 | 40 | M16         | M10              | M20    | 16  | M24    | 16  | M30    | 16  | M27      | 16             | 40 | 188 | 9.52  | 68  | 44.2         | 95  |
| 400 | 41             | 102/102                | 102                | 610 | 340 | 405 | 525 | 160 | 40 | M16         | M14              | M24    | 16  | M27    | 16  | M33    | 16  | M27      | 16             | 45 | 200 | 12.7  | 80  | 50.4         | 150 |
| 450 | 49             | 114/114                | 114                | 640 | 370 | 380 | 520 | 160 | 55 | M20         | M14              | M24    | 20  | M27    | 20  | -      | -   | M30      | 16             | 50 | 230 | 12.7  | 90  | 55.5         | 205 |
| 500 | 56             | 127/127                | 127                | 730 | 415 | 440 | 580 | 160 | 55 | M20         | M14              | M24    | 20  | M30    | 20  | M33    | 20  | M30      | 20             | 55 | 230 | 12.7  | 90  | 60.6         | 297 |
| 600 | 65             | 154/154                | 154                | 835 | 465 | 505 | 685 | 230 | 90 | M20         | M14              | M27    | 20  | M33    | 20  | M36    | 20  | M33      | 20             | 70 | 300 | 19.05 | 119 | 78.15        | 446 |



### LG8M, LG5M DN80 - 600, DIMENSIONS

| DN     | Dimensions, mm |                    |                    |        |     |     |     |     |    |             |             |                  |    |       |    |          |    |    |     | Weight<br>kg |     |        |     |
|--------|----------------|--------------------|--------------------|--------|-----|-----|-----|-----|----|-------------|-------------|------------------|----|-------|----|----------|----|----|-----|--------------|-----|--------|-----|
|        | A1             | LG8MB<br>A<br>(K3) | LG5M<br>A<br>(API) | B      | C   | E   | K   | S   | T  | U<br>Thread | V<br>Thread | Flange drillings |    |       |    |          |    | O  | R   |              | M   | N      | P   |
|        |                |                    |                    |        |     |     |     |     |    |             |             | PN25             |    | PN40  |    | ISO PN50 |    |    |     |              |     |        |     |
| Thread | Qty            | Thread             | Qty                | Thread | Qty |     |     |     |    |             |             |                  |    |       |    |          |    |    |     |              |     |        |     |
| 80     | 17             | 64                 | 48                 | 205    | 120 | 168 | 248 | 70  | -  | M10         | M8          | M16              | 8  | M16   | 8  | M20      | 8  | 15 | 105 | 4.76         | 25  | 17.0   | 9   |
| 100    | 21             | 64                 | 54                 | 235    | 135 | 182 | 272 | 90  | -  | M12         | M8          | M20              | 8  | M20   | 8  | M20      | 8  | 20 | 125 | 4.76         | 35  | 22.2   | 14  |
| 150    | 24             | 76                 | 59                 | 290    | 160 | 232 | 322 | 110 | 32 | M12         | M10         | M24              | 8  | M24   | 8  | M20      | 12 | 25 | 135 | 6.35         | 46  | 27.8   | 25  |
| 200    | 34             | 89                 | 73                 | 365    | 205 | 274 | 384 | 130 | 32 | M12         | M10         | M24              | 12 | M27   | 12 | M24      | 12 | 35 | 165 | 9.52         | 58  | 39.1   | 48  |
| 250    | 41             | 114                | 83                 | 435    | 260 | 320 | 440 | 160 | 40 | M16         | M14         | M27              | 12 | M30   | 12 | M27      | 16 | 45 | 200 | 12.7         | 80  | 50.4   | 90  |
| 300    | 46             | 114                | 92                 | 500    | 300 | 360 | 500 | 160 | 55 | M20         | M14         | M27              | 16 | M30   | 16 | M30      | 16 | 50 | 230 | 12.7         | 90  | 55.5   | 150 |
| 350    | 57             | 127                | 117                | 565    | 330 | 400 | 540 | 160 | 55 | M20         | M14         | M30              | 16 | M33   | 16 | M30      | 20 | 55 | 230 | 12.7         | 90  | 60.6   | 200 |
| 400    | 62             | 140                | 133                | 649    | 370 | 440 | 580 | 160 | 55 | M20         | M33         | M14              | 16 | M36   | 16 | M33      | 20 | 55 | 230 | 12.7         | 90  | 60.6   | 290 |
| 450    | 72.5           | 152                | 149                | 710    | 410 | 415 | 595 | 230 | 90 | M24         | M16         | M33              | 20 | M36   | 20 | M33      | 24 | 70 | 299 | 19.05        | 119 | 78.25  | 382 |
| 500    | 75             | 152                | 159                | 770    | 445 | 440 | 620 | 230 | 90 | M24         | M16         | M33              | 20 | M39   | 20 | M33      | 24 | 70 | 298 | 19.05        | 119 | 78.25  | 445 |
| 600    | 80             | 178                | 181                | 915    | 520 | 500 | 680 | 230 | 90 | M24         | M16         | M36              | 20 | M45x4 | 20 | M39      | 24 | 85 | 326 | 22.225       | 146 | 94.625 | 725 |

### LG8C

| NPS/DN  | A1  | A(K3) |   | oB   | C   | E   | K   | S   | T   | U   | V   | O   | R   | M     | N   | P     | Weight<br>kg |
|---------|-----|-------|---|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|-----|-------|--------------|
| 28/700  | 115 | 229   | - | 835  | 510 | 505 | 685 | 230 | 90  | M24 | M16 | 70  | 399 | 19,05 | 119 | 78,2  | 550          |
| 30/750  | 102 | 229   | - | 885  | 530 | 575 | 755 | 230 | 90  | M24 | M16 | 85  | 326 | 22,23 | 146 | 94,6  | 590          |
| 32/800  | 102 | 241   | - | 940  | 615 | 600 | 780 | 230 | 90  | M24 | M16 | 85  | 326 | 22,23 | 146 | 94,6  | 600          |
| 36/900  | 107 | 241   | - | 1055 | 655 | 630 | 850 | 330 | 120 | M30 | M24 | 95  | 376 | 22,23 | 156 | 104,8 | 790          |
| 40/1000 | 135 | 300   | - | 1175 | 745 | 724 | 944 | 330 | 120 | M30 | M24 | 105 | 400 | 25,4  | 180 | 116,1 | 1150         |

## 11.1 Flange drilling and compatibility

- = No marking allowed / Fits without extra machining. Rating is always the highest possible.  
 Date e.g. /K = Valve needs extra machining to fit the specified flange drilling. Code needed at the end of the Type code.  
 NA = Not available (The drilling is not possible to do or is not logic).

| LW6L, 7L | DIN PN 10 | DIN PN 16 | DIN PN 25 | DIN PN 40 | ISO PN 20 | ISO PN 50 | ASME 150 | ASME 300 | JIS 10K | JIS 16K | JIS 20K | JIS 30K |
|----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|----------|---------|---------|---------|---------|
| DN 080   | --        | --        | --        | --        | --        | --        | --       | --       | --      | --      | --      | --      |
| DN 100   | --        | --        | --        | --        | --        | --        | --       | --       | --      | --      | --      | --      |
| DN 125   | --        | --        | --        | --        | --        | --        | --       | --       | --      | --      | --      | --      |
| DN 150   | --        | --        | --        | N/A       | --        | N/A       | --       | N/A      | --      | N/A     | N/A     | N/A     |
| DN 200   | --        | --        | --        | N/A       | --        | N/A       | --       | N/A      | --      | N/A     | N/A     | N/A     |
| DN 250   | --        | --        | --        | N/A       | --        | N/A       | --       | N/A      | --      | N/A     | N/A     | N/A     |
| DN 300   | --        | --        | --        | N/A       | --        | N/A       | --       | N/A      | /R      | /S      | /T      | N/A     |
| DN 350   | /J        | /K        | /L        | N/A       | /X        | N/A       | /C       | N/A      | N/A     | N/A     | N/A     | N/A     |
| DN 400   | /J        | /K        | /L        | N/A       | /X        | N/A       | /C       | N/A      | /R      | N/A     | N/A     | N/A     |
| DN 450   | /J        | /K        | N/A       | N/A       | /X        | N/A       | /C       | N/A      | /R      | N/A     | N/A     | N/A     |
| DN 500   | /J        | /K        | /L        | N/A       | /X        | N/A       | /C       | N/A      | /R      | N/A     | N/A     | N/A     |
| DN 600   | /J        | /K        | /L        | N/A       | /X        | N/A       | /C       | N/A      | N/A     | N/A     | N/A     | N/A     |

| LW5M, 8M | DIN PN 10 | DIN PN 16 | DIN PN 25 | DIN PN 40 | ISO PN 20 | ISO PN 50 | ASME 150 | ASME 300 | JIS 10K | JIS 16K | JIS 20K | JIS 30K |
|----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|----------|---------|---------|---------|---------|
| DN 080   | --        | --        | --        | --        | --        | --        | --       | --       | --      | --      | --      | --      |
| DN 100   | --        | --        | --        | --        | --        | --        | --       | --       | --      | --      | --      | --      |
| DN 125   | --        | --        | --        | --        | --        | --        | --       | --       | --      | --      | --      | --      |
| DN 150   | --        | --        | --        | --        | --        | --        | --       | --       | N/A     | --      | --      | --      |
| DN 200   | N/A       | N/A       | /L        | /M        | /X        | /Z        | /C       | /D       | N/A     | /S      | /T      | /U      |
| DN 250   | N/A       | N/A       | /L        | /M        | /X        | /Z        | /C       | /D       | N/A     | /S      | /T      | /U      |
| DN 300   | N/A       | N/A       | /L        | /M        | /X        | /Z        | /C       | /D       | N/A     | /S      | /T      | /U      |
| DN 350   | N/A       | N/A       | /L        | /M        | /X        | /Z        | /C       | /D       | N/A     | /S      | /T      | /U      |
| DN 400   | N/A       | N/A       | /L        | /M        | /X        | /Z        | /C       | /D       | N/A     | /S      | /T      | /U      |
| DN 450   | N/A       | N/A       | /L        | /M        | N/A       | /Z        | N/A      | /D       | N/A     | /S      | /T      | N/A     |
| DN 500   | N/A       | N/A       | /L        | /M        | N/A       | /Z        | N/A      | /D       | N/A     | /S      | /T      | N/A     |
| DN 600   | N/A       | N/A       | /L        | /M        | N/A       | /Z        | N/A      | /D       | N/A     | /S      | /T      | N/A     |

| LG6L, 7L | DIN PN 10 | DIN PN 16 | DIN PN 25 | DIN PN 40 | ISO PN 20 | ISO PN 50 | ASME 150 | ASME 300 | JIS 10K | JIS 16K | JIS 20K | JIS 30K |
|----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|----------|---------|---------|---------|---------|
| DN 080   | --        | --        | --        | /M        | /X        | /Z        | /C       | /D       | N/A     | /S      | /T      | /U      |
| DN 100   | /J        | /K        | --        | /M        | /X        | /Z        | /C       | /D       | N/A     | /S      | /T      | /U      |
| DN 150   | /J        | /K        | --        | N/A       | /X        | N/A       | /C       | N/A      | /R      | N/A     | N/A     | N/A     |
| DN 200   | /J        | /K        | --        | N/A       | /X        | N/A       | /C       | N/A      | /R      | /S      | /T      | N/A     |
| DN 250   | /J        | /K        | --        | N/A       | /X        | N/A       | /C       | N/A      | /R      | /S      | /T      | N/A     |
| DN 300   | /J        | /K        | --        | N/A       | /X        | N/A       | /C       | N/A      | N/A     | /S      | /T      | N/A     |
| DN 350   | /J        | /K        | --        | N/A       | /X        | N/A       | /C       | N/A      | N/A     | /S      | /T      | N/A     |
| DN 400   | /J        | /K        | --        | N/A       | /X        | N/A       | /C       | N/A      | /R      | /S      | /T      | N/A     |
| DN 450   | /J        | /K        | N/A       | N/A       | /X        | N/A       | /C       | N/A      | /R      | N/A     | N/A     | N/A     |
| DN 500   | /J        | /K        | /L        | N/A       | /X        | N/A       | /C       | N/A      | /R      | N/A     | N/A     | N/A     |
| DN 600   | /J        | /K        | /L        | N/A       | /X        | N/A       | /C       | N/A      | /R      | N/A     | N/A     | N/A     |

| LG5M   | DIN PN 10 | DIN PN 16 | DIN PN 25 | DIN PN 40 | ISO PN 20 | ISO PN 50 | ASME 150 | ASME 300 | JIS 10K | JIS 16K | JIS 20K | JIS 30K |
|--------|-----------|-----------|-----------|-----------|-----------|-----------|----------|----------|---------|---------|---------|---------|
| DN 080 | --        | --        | --        | --        | /X        | /Z        | /C       | /D       | N/A     | /S      | /T      | /U      |
| DN 100 | /J        | /K        | --        | --        | /X        | /Z        | /C       | /D       | N/A     | /S      | /T      | /U      |
| DN 150 | /J        | /K        | --        | --        | /X        | /Z        | /C       | /D       | N/A     | N/A     | N/A     | N/A     |
| DN 200 | N/A       | N/A       | N/A       | N/A       | N/A       | /Z        | N/A      | /D       | N/A     | N/A     | N/A     | N/A     |
| DN 250 | N/A       | N/A       | N/A       | N/A       | N/A       | /Z        | N/A      | /D       | N/A     | N/A     | N/A     | N/A     |
| DN 300 | N/A       | N/A       | N/A       | --        | N/A       | /Z        | N/A      | /D       | N/A     | N/A     | N/A     | N/A     |
| DN 350 | N/A       | N/A       | N/A       | --        | N/A       | /Z        | N/A      | /D       | N/A     | N/A     | N/A     | N/A     |
| DN 400 | N/A       | N/A       | N/A       | --        | N/A       | /Z        | N/A      | /D       | N/A     | N/A     | N/A     | N/A     |
| DN 450 | N/A       | N/A       | /L        | /M        | N/A       | /Z        | N/A      | /D       | N/A     | /S      | /T      | N/A     |
| DN 500 | N/A       | N/A       | /L        | /M        | N/A       | /Z        | N/A      | /D       | N/A     | /S      | /T      | N/A     |
| DN 600 | N/A       | N/A       | /L        | /M        | N/A       | /Z        | N/A      | /D       | N/A     | /S      | /T      | N/A     |

| LG8M   | DIN PN 10 | DIN PN 16 | DIN PN 25 | DIN PN 40 | ISO PN 20 | ISO PN 50 | ASME 150 | ASME 300 | JIS 10K | JIS 16K | JIS 20K | JIS 30K |
|--------|-----------|-----------|-----------|-----------|-----------|-----------|----------|----------|---------|---------|---------|---------|
| DN 080 | --        | --        | --        | --        | /X        | /Z        | /C       | /D       | /R      | /S      | /T      | /U      |
| DN 100 | /J        | /K        | --        | --        | /X        | /Z        | /C       | /D       | /R      | /S      | /T      | /U      |
| DN 150 | /J        | /K        | --        | --        | /X        | /Z        | /C       | /D       | N/A     | N/A     | N/A     | N/A     |
| DN 200 | N/A       | N/A       | /L        | --        | N/A       | /Z        | N/A      | /D       | N/A     | N/A     | N/A     | N/A     |
| DN 250 | N/A       | N/A       | /L        | --        | N/A       | /Z        | N/A      | /D       | N/A     | N/A     | N/A     | N/A     |
| DN 300 | N/A       | N/A       | /L        | --        | N/A       | /Z        | N/A      | /D       | N/A     | N/A     | N/A     | N/A     |
| DN 350 | N/A       | N/A       | /L        | --        | N/A       | /Z        | N/A      | /D       | N/A     | N/A     | N/A     | N/A     |
| DN 400 | N/A       | N/A       | /L        | --        | N/A       | /Z        | N/A      | /D       | N/A     | N/A     | N/A     | N/A     |
| DN 450 | N/A       | N/A       | /L        | /M        | N/A       | /Z        | N/A      | /D       | N/A     | /S      | /T      | N/A     |
| DN 500 | N/A       | N/A       | /L        | /M        | N/A       | /Z        | N/A      | /D       | N/A     | /S      | /T      | N/A     |
| DN 600 | N/A       | N/A       | /L        | /M        | N/A       | /Z        | N/A      | /D       | N/A     | /S      | /T      | N/A     |

## 12. TYPE CODE

| Neles™ Neldisc™ high performance butterfly valves.<br>Series LW and LG |    |    |    |    |    |     |    |    |     |     |     |     |     |   |
|--|----|----|----|----|----|-----|----|----|-----|-----|-----|-----|-----|---|
| 1.   | 2. | 3. | 4. | 5. | 6. | 7.  | 8. | 9. | 10. | 11. | 12. | 13. | 14. |   |
|  | LW | 6  | L  | B  | A  | 300 | P  | A  | J   | A   | T   | /   | 03  | K |

| 1. | S-DISC CONSTRUCTION  |
|----|--|
| S- | Flow balancing trim on down stream side of body flow port.<br>Not available with LW6 or LG6. |

| 2. | PRODUCT SERIES / DESIGN                             |
|----|---|
| LW | Wafer type, full bore, metal seated butterfly valve |
| LG | Lug type, full bore, metal seated butterfly valve   |

| 3. | FACE-TO-FACE LENGTH   |
|----|---|
| 6  | EN 558-Part 1, Table 5 / Basic series 20, (DIN 3202-K1).<br>API 609 class 150 category B ( 4.sign is L) |
| 7  | EN 558-Part 1, Table 5 / Basic series 25, (DIN 3202-K2).  |
| 8  | EN 558-Part 1, Table 5 / Basic series 16, (DIN 3202-K3).  |
| 5  | API 609, category B, class 300 ( 4.sign is M)   |
| 2  | Face to face acc. to L2-series (Used LG2 for replacing old L2)  |
| Y  | Special   |

| 4. | PRESSURE RATING & DRILLING (DN80 – 600)                             |
|----|---|
| C  | ASME 150<br>Example LW7CBA350PAJAG (old type code LW7LBA350PAJAG/C) |
| D  | ASME 300  |
| J  | PN 10   |
| K  | PN 16   |
| L  | PN 25   |
| M  | PN40  |
| X  | ISO PN 20   |
| Z  | ISO PN 50   |
| R  | JIS10K  |
| S  | JIS16K  |
| T  | JIS20K  |
| U  | JIS30K  |
| Y  | Special, to be defined  |

Other pressure ratings, flange drilling and compatibility, see Section 10.4

| 5. | VALVE - ACTUATOR CONNECTION                                    |
|----|--|
| B  | Drive shaft with two key ways / bracket manufacturer standard. |

| 6. | CONSTRUCTION  |
|----|---|
| A  | STANDARD (-50 °C...+260 °C)<br>- bearings AISI 316 + PTFE<br>- body and blind flange gaskets graphite<br>- live loaded TA-Luft packing  |
| C  | CRYOGENIC (min. -200 °C)<br>- extended bonnet and drive shaft<br>- otherwise as construction A  |
| N  | EXTENDED SERVICE (max. +425 °C), valve (ATEX II 2 G c).<br>- shaft bearings surfaces nitrated<br>- bearings cobalt based alloy<br>- body and blind flange gaskets graphite<br>- live loaded TA-luft packing |
| H  | HIGH TEMPERATURE, valve (ATEX II 2 G c)<br>- shaft bearings surfaces celsit coated<br>- bearings cobalt based alloy<br>- body and blind flange gaskets graphite<br>- live loaded TA-luft packing            |
| 1C | CRYOGENIC (Optional Cryo extension)<br>- extended bonnet and drive shaft<br>T = + 230 °C to -50 °C...-100 °C.   |
| 2C | CRYOGENIC (Optional Cryo extension)<br>- extended bonnet and drive shaft<br>T = + 230 °C to -200 °C.  |
| S  | STEAM JACKET (only for LW), valve (ATEX II 2 G c).  |
| E  | EROSION CONSTRUCTION (ONLY FOR LW), valve (ATEX II 2 G c).  |
| T  | HIGH CYCLING (only for LW5M / LW8M), valve (ATEX II 2 G c).   |
| B  | BEARING PROTECTION  |
| 1B | BEARING PROTECTION (higher temperature)   |
| P  | POLISHED (ONLY FOR LW), polished flow port and disc.  |
| 1A | PTFE SOFT PARTS (GRAPHITE FREE)<br>- anti static device, ( ATEX II 3 G c )  |
| 2A | STANDARD, anti static device<br>(ATEX II 3 G c, with Teflon packing, "T", "T2")<br>(ATEX II 2 G c, with gr. packing, "G", "G2")   |
| 3A | PTFE SOFT PARTS (GRAPHITE FREE) against the flow media<br>Graphite SOFT PARTS to enable the fire safe.<br>- anti static device, (ATEX II 2 G c, with PTFE/graphite packing, "TG")                           |
| 3N | PTFE SOFT PARTS (GRAPHITE FREE) against the flow media<br>Graphite SOFT PARTS to enable the fire safe.<br>(ATEX II 2 G c, with PTFE/graphite packing, "TG")   |
| V  | STANDARD + stop screw for disc (only for LW)  |
| 1V | EXTENDED SERVICE + stop screw for disc<br>(only for LW), (max. +425 °C).  |
| Z  | OXYGEN CONSTRUCTION<br>- BAM tested non-metallic materials<br>- T= +200 °C to -50 °C, Oxygen cleaning acc. to Neles procedure.  |
| X  | LOW EMISSION, otherwise as construction N.  |
| Y  | Special   |

### Note!

Only Z constructions available for oxygen flow media, (See IMO 100270en.pdf)

| 7. | SIZE  |
|----|---|
|    | 080, 100, 125 (LW only), 150, 200, 250, 300, 350, 400, 450, 500 and 600 |



| MATERIALS |                                   |    |   |  |
|-----------|-----------------------------------|----|---|--|
| 8.        | BODY                              | 9. | DISC  | 10. SHAFT & PINS                               |
| A         | CF8M/1.4408                       | A  | CF8M/F316                                   | J SS 329 (SIS 2324) only L_6L and L_7L         |
| P         | WCB/1.0619                        | -  | -   | C Gr. 630 (17-4PH)                             |
| -         | -                                 | -  | -   | H Nimonic 80A                                  |
| -         | -                                 | -  | -   | N XM-19 (Nitronic 50)                          |
| C         | ASTM A351 gr CG8M/AISI 317        | C  | ASTM A351 gr CG8M/AISI 317                  | -  |
| B         | EN 10213-4.1.4581                 | G  | EN 10213-4.1.4581                           | -  |
| N         | ASTM A217 gr. WC6                 | N  | ASTM A217 gr. WC6                           | -  |
| U         | ASTM A351 gr. CK3MCuN (SMO254)    | U  | ASTM A351 gr. CK3MCuN (SMO254)              | U UNS31254 (SMO254)                            |
| S         | ASTM A217 gr C5                   | S  | ASTM A217 gr C5                             | -  |
| F         | ASTM A352 gr. LCC                 | -  | -   | -  |
| -         | -                                 | K  | EN 10213. 1.4408 (or eq. 1.4401) / CF8M     | -  |
| -         | -                                 | B  | CF8M / F316+cobalt based alloy on disc edge | -  |
| H         | ASTM A494 gr. CW-6M (Hastelloy C) | H  | ASTM A494 gr. CW-6M (Hastelloy C)           | H1 HAST C Only soft bearings, "A"-construction |

| SEAT MATERIALS |  |     |   |
|----------------|--|-----|---|
| 11.            | STANDARD   | 11. | NON-STANDARD  |
| A              | Incoloy 825, hard chrome plated. (Nace MR 0103)<br>T = -200 °C to +500 °C. | H   | Nimonic 80A, hard chrome plated (Not Nace)<br>T = -200 °C to +650 °C.   |
|                |  | K   | 2.4681, UNS R31233 (ULTIMET), (Nace MR 0103)<br>T = -200 °C to +600 °C. |

| 12. | DESIGN OPTIONS  |
|-----|---|
| T   | Live loaded PTFE V-ring packing   |
| G   | Live loaded graphite packing. Fire safe construction (ATEX II 3 G c, with soft bearings)              |
| TG  | Live loaded PTFE V-ring packing + Live loaded graphite packing. - Firesafe by design, (ATEX II 2 G c) |
| Y   | Special   |

| 13. | FLANGE FACING   |
|-----|---|
| -   | Standard (Ra 3.2 - 6.3), without sign<br>Covering:<br>EN 1092-1 Type B1 (Ra 3.2 - 12.5)<br>ASME B16.5 (Ra 3.2 - 6.3, Smooth finish, AARRH125-250)<br>DIN 2526 Form E (Ra 4) |
| Y   | Special   |

| 14. | FLANGE DRILLING*   |
|-----|--|
| -   | Without sign:<br>L_6L, L_7L LW5M, LW8M multiple flange drillings available.<br>LG5M, LG8M flange drilling according to PN 40 |
| C   | ASME 150 (20 bar)(available with LW_L and LG_L valves)   |
| D   | ASME 300 (50 bar) (available with LW_M and LG_M valves)  |
| J   | PN 10 (available with LW_L and LG_L valves)  |
| K   | PN 16 (available with LW_L and LG_L valves)  |
| L   | PN 25 (available with LW_M and LG_M valves)  |
| M   | PN 40 (available with LW_M and LG_M valves)  |
| X   | ISO PN 20 (available with LW_L and LG_L valves)  |
| Z   | ISO PN 50 (available with LW_M and LG_M valves)  |
| R   | JIS 10K (14 bar) (available with LW6L or LW7L)   |
| S   | JIS 16K (27 bar) (available with LW6L, LW7L or LW8M, LW5M)   |
| T   | JIS 20K (34 bar) (available with LW8M or LW5M)   |
| U   | JIS 30K (51 bar) (available with LW8M or LW5M)   |
| Y   | Special  |

\*) See section in 10.4 for flange drilling and compatibility.  
Note: DIN/EN PN drilling (J, K, L, M) is not possible in LG5M-series (API face to face).

# 13. GENERAL SAFETY WARNINGS AND DISCLAIMERS

## General safety warnings (Only for Neles Neldisc™ L-series)

### Lifting

1. Always use a lifting plan created by a qualified person to lift this equipment. Lifting guidance is provided in this IMO (Installation, Maintenance and Operation manual) to assist in lifting plan development. Think about the center of gravity (CG) of the equipment being lifted. Make sure the CG is always under the central lifting point.
2. Valves may be equipped with lifting threads on the body or on the flanges. These are intended to be used with the lifting plan.
3. Use only correct and approved lifting devices. Ensure that lifting devices and straps are securely attached to the equipment prior to lifting.
4. Check, that lifting devices are not damaged and in good condition with a valid check stamp prior to use.
5. Workers must be trained for lifting and handling valves.
6. Never lift an assembly by the instrumentation (solenoid, positioner, limit switch, etc.) or by the instrumentation piping. Straps and lifting devices should be fitted to prevent damage to instrumentation and instrumentation piping. Failure to follow the lifting guidance provided may result in damage and personal injury from falling objects.

### Work activities on the valve

1. Wear your personal safety equipment. Personal safety equipment includes but is not limited to protective shoes, protective clothing, safety glasses, helmet, hearing protection and working gloves.
2. Always follow the local safety instructions in addition to the Valmet instructions. If Valmet instructions conflict with local safety instructions, stop work and contact Valmet for more information.
3. Before beginning service on the equipment, make sure that the actuator is disconnected from any kind of power source (pneumatic, hydraulic, and/or electric), and no stored energy is applied on the actuator (compressed spring, compressed air volumes, etc.). Do not attempt to remove a spring return actuator unless the stop screw is carrying the spring force.
4. Make sure that there is a LOTOTO (Lock Out / Tag Out / Try Out) procedure in place for the system in which the valve is installed and strictly follow it.
5. Always make sure that the pipeline is depressurized and in ambient temperature condition before maintenance work is started.
6. Keep hands and other body parts out of the flow port when the valve is being serviced and the actuator is connected to the valve. There is a high risk of serious injury to hands and/or fingers due to malfunction if the valve suddenly starts to operate.
7. Beware of Trim (Disc, Ball or Plug) movement even when the valve is disassembled. Trim may move simply due to the weight of the part or change in position of the valve. Keep hands or other body parts away from locations where they may be injured by movement of the trim. Do not leave objects near or in the valve port which may fall in and need to be retrieved.

## General disclaimers

### Receiving, handling and unpacking.

1. Respect the safety warnings above!
2. Valves are critical components for pipelines to control high pressure fluids and must therefore be handled with care.
3. Store valves and equipment in a dry and protected area until the equipment is installed.
4. Do not exceed the maximum storage temperatures given in the IMO (installation, maintenance, and operating instructions).
5. Keep the original packaging on the valve as long as possible to avoid environmental contamination by dust, water, dirt, etc.
6. Remove the valve endcaps just before mounting into the pipeline.
7. FOR YOUR SAFETY IT IS IMPORTANT TO FOLLOW THESE PRECAUTIONS BEFORE REMOVAL OF THE VALVE FROM THE PIPELINE OR ANY DISASSEMBLY:
  - Be sure you know what flow medium is in the pipeline. If there is any doubt, confirm with the proper supervisor.
  - Wear any personal protective equipment (PPE) required for working with the flow medium involved in addition to any other PPE normally required.
  - Depressurize the pipeline, bring to ambient temperature, and drain the pipeline flow medium.
  - Cycle the valve to relieve any residual pressure in the body cavity.
  - After removal but before disassembly, cycle the valve again until no evidence of trapped pressure remains.
  - The valves with offset shaft (Butterfly, eccentric rotary plug) have greater trim area on one side of the shaft. This will cause the valve to open when pressurized from the FTO direction.
  - **WARNING:** DO NOT PRESSURIZE THE ECCENTRIC VALVE WITHOUT A HANDLE OR AN ACTUATOR MOUNTED ON IT!
  - **WARNING:** DO NOT REMOVE A HANDLE OR AN ACTUATOR FROM AN ECCENTRIC VALVE WHILE PRESSURIZED!
  - Before installing the eccentric valve in or remove it from the pipeline, cycle the valve closed. Eccentric valves must be in the closed position to bring the trim within the face to face of the valve. Failure to follow these instructions will cause damage to the valve and may result in personal injury.

### Operating

8. The identification plate (ID-plate, type plate, nameplate, or engraved markings) on the valve gives the information of max. process conditions to the valve.
9. (For soft seats) The practical and safe use of this product is determined by both the temperature and pressure ratings of the seat and body. Read the identification plate and check both ratings. This product is available with a variety of seat materials. Some seat materials have pressure ratings that are lower than the body ratings. All body and seat ratings are dependent on the valve type, size and material of the body and seat. Never exceed the marked rating.
10. Temperatures and pressures must never exceed values marked on the valve. Exceeding these values may cause uncontrolled release of pressure and process medium. Damage or personal injury may result.

11. The operating torque of the valve may rise over time due to wear, particles or other damage of the seat. Never exceed the actuator torque preset values (air supply, position). Application of excessive torque may cause damage to the valve.
12. Valmet valves typically are designed to be used in atmospheric conditions. Do not use valves under external pressurized conditions unless specifically designed and explicitly marked for this service.
13. Avoid Pressure shocks or water hammer. Systems with high pressure valves should be equipped with a bypass to reduce the differential pressure before opening the valve to avoid pressure shock.
14. Avoid thermal shock. High temperature, Low temperature and cryogenic valves should be operated in a way that limits the rate of increase or decrease in temperature. The valve should be thermally stabilized before being pressurized.
15. Materials of the valve are carefully selected for the process conditions. Changes to the process media can have a major impact on function and safety of the valve. Always confirm the materials are suitable for the service prior to installation.
16. As the use of the valve is application specific, several factors should be considered when selecting a valve for a given application. Therefore, some situations in which the valves are used are outside the scope of this manual.
17. It is the end user's responsibility to confirm compatibility of the valve materials with the intended service, however if you have questions concerning the use, application, or compatibility of the valve for the intended service, contact Valmet for more information.
18. Never use a valve with enriched or pure oxygen if the valve is not explicitly designed and cleaned for oxygen. Selected materials and design have a major impact on the safety to operate the valve with oxygen.
19. Valves intended for use in or with explosive atmospheres must be equipped with a grounding device and marked according ATEX (or equivalent international standards).
20. Manual handles are available for specific butterfly valve sizes and maximum line pressures. Do not operate a valve with a handle or wrench outside the size and pressure limits stated in the IMO. High line pressure may create a large enough force to pull the handle from the operator's hands. Damage or personal injury may result.
27. All pressure containing parts must be inspected visually for damage or corrosion. Damaged parts must be replaced.
28. Valve pressure retaining parts and all internals must be inspected for corrosion or erosion which may result in reduced wall thickness on pressure retaining parts. Damaged pressure retaining parts must be replaced with original equipment manufacturer's (OEM) replacement parts or repaired to factory specifications by an authorized Valmet service partner in order to maintain the warranty.
29. Do not use sharp tools, grinding machines, or files to work on functional surfaces such as sealing, seating or bearing surfaces as this can damage these surfaces.
30. Check the condition of sealing surfaces on the seats, trim (disc, ball, plug, etc.), body and body cap. Replace parts if there are significant wear, scratches, or damage.
31. Check the wear of bearings and bearing contact surfaces on the shaft and replace damaged parts if necessary.
32. Do not weld on pressure retaining parts without an ASME and PED qualified procedure and personnel.
33. Pressure retaining parts of valves in high temperature applications must be carefully examined for the effects of material creep and fatigue.
34. Make sure that the valve is positioned in the correct flow direction into the pipeline.
35. If the valves are marked to be suitable for explosive atmospheres, the correct function of the discharging device must be tested before returning to service.
36. Always work in a clean environment. Avoid getting particles inside the valve due to machining, grinding, or welding nearby.
37. Never store a valve in maintenance without flow port protection.
38. When pressure testing valve seats, never exceed the maximum operating pressure of the system or the maximum shut-off pressure marked on the valve identification plate.
39. Actuator mounting and unmounting:
  - Before installing the actuator on to the valve, be sure the actuator is properly indicating the valve position. Failure to assemble these to indicate correct valve position may result in damage or personal injury.
  - When installing or removing a linkage kit, best practice is to remove the entire linkage assembly, including couplings which may fall off the valve during lifting or when position changes.
  - Mounting sets have been designed to support the weight of the Valmet actuator and recommended accessories either as is or with additional actuator support. Use of the linkage to support additional equipment or additional weight such as people, ladders, etc. may result in equipment damage or personal injury.

## Maintenance

21. Respect the safety warnings above!
22. Plan service and maintenance actions, that spare parts, lifting devices and service personnel is available.
23. Maintain the valve within the recommended minimum maintenance intervals or within the recommended maximum operating cycles.
24. Always make sure that the valve and the pipeline is depressurized before starting any kind of maintenance work at a valve.
25. Always check the position of the valve before starting maintenance work. Follow the Lock out /tag out (LOTO) rules at the site before starting any maintenance activity.
  - See IMO for the correct stem position.
  - Consider that the positioner may give the wrong signals.
26. Sealing materials (soft sealing parts) should be changed when the valve is in maintenance. Always use original equipment manufacturers (OEM) spare parts to ensure proper performance of the repaired valve.
40. The valve should be installed between flanges using appropriate gaskets and fasteners that are compatible with the application, and in compliance with applicable piping codes and standards. Center the gaskets carefully when fitting the valve between the flanges. Do not attempt to correct pipeline misalignment by means of the flange bolting.

41. Repairs on valves for special service like Oxygen, Chlorine, and Peroxide, have special requirements.
- Parts must be cleaned appropriate to the service and protected from contamination prior to assembly.
  - Assembly areas and tools must be clean and dry to prevent contamination of the parts during assembly.
  - Test equipment must be clean and dry to prevent contamination during testing. This includes the test equipment internals that may allow particles or other contamination into the test medium during the test.
  - Lubrication shall be used only if specifically required in the instructions. Where lubrication is required, the lubricant must be approved for the service by the end user.





**Valmet Flow Control Oy**

Vanha Porvoontie 229, 01380 Vantaa, Finland.

Tel. +358 10 417 5000.

[www.valmet.com/flowcontrol](http://www.valmet.com/flowcontrol)

Subject to change without prior notice.

Neles, Neles Easyflow, Jamesbury, Stonel, Valvcon and Flowrox, and certain other trademarks, are either registered trademarks or trademarks of Valmet Oyj or its subsidiaries in the United States and/or in other countries.

