

|  |   |                    |
|--|---|--------------------|
| <br>LDM, spol. s r.o.<br>Czech Republic | <b>INSTRUCTION FOR INSTALLATION AND SERVICE</b>                                     | <b>RV 113 M, S</b> |
|  | <b>THREE - WAY CONTROL VALVES</b><br>DN 15 - 40    PN 6<br>DN 15 - 150    PN 16, 25 |                    |

The instructions for installation and service of valve serie RV 113 M, S are binding for users to ensure proper function of valves. The user must keep the rules said here while servicing, installation and using.

## 1. TECHNICAL DESCRIPTION AND VALVE FUNCTION

### 1.1 Description

Control valves RV 113 M, S are flanged three - way valves, with mixing or diverting function with high tightness (type M - in both ports, type S - only in straight port) designed for regulation and closing of the medium flow. The valves are suitable for media such as water, air and other media compatible with material of body and internal parts in range +2 to +150°C.

The valves are not suitable for steam and steam condensate.

The body from grey cast iron or spheroidal cast iron. The inner parts are made of stainless steel. Flow characteristics, Kvs values and leakage are in accordance with international standart.

The valves type RV 113 M have connection to the following electric actuators: Siemens, Belimo, Ekorex.

The valves type RV 113 S have connection to the electrohydraulic actuators Siemens.

### 1.2 Application

The valves are designed for applications in heating and air-conditioning.

Valves are produced in silicon free version, the model number is designated SF. These valves are suitable for applications where the penetration of substances that reduce the quality of the paint must be eliminated.

Sealing surfaces of trim are resistant to common dirt and impurities in medium. However, for abrasive impurities it is recommended to pipe a strainer before the valve to ensure reliable function.

The valve must not work in conditions of cavitation.

### 1.3 Function

Control valves RV 113 M, S have plug with characteristic LDMspline<sup>®</sup> in straight way. Linear characteristic in angle way. Value  $\Delta p$  should not be higher than 1.6 MPa.

Used actuators allow 3-point or proportional controlling. They can be equipped with the signalization of end positions and transmitters of position.

### 1.4 Valve body specifications

| Series                | RV 113 M, S   |                     |                                 |
|-----------------------|---|---------------------|---------------------------------|
| Type of valve         | Three - way control valve   |                     |                                 |
| Nominal diameter DN   | DN 50 to 150  |                     |                                 |
| Nominal pressure PN   | DN 15 - 40    PN 6  | DN 15 -150    PN 16 | DN 15 - 150    PN 25            |
| Body material         | Grey cast iron EN-JL 1040   |                     | Spheroidal cast iron EN-JS 1025 |
| Plug material         | Stainless steel 1.4027  |                     |                                 |
| Stem material         | Stainless steel 1.4305  |                     |                                 |
| Packing in seat       | EPDM  |                     |                                 |
| Gland packing         | EPDM  |                     |                                 |
| Operating temperature | +2°C to +150°C  |                     |                                 |
| Connection            | Flanges type B1 (raised-faced) acc. to EN 1092-2 (04/2002)  |                     |                                 |
| Dimensions            | Series 1 acc. to EN 558 (09/2008)   |                     |                                 |
| Type of plug          | V-ported with soft seat sealing   |                     |                                 |
| Flow charakteristic   | LDMspline <sup>®</sup> in straight way, linear in angle way   |                     |                                 |
| Kvs values            | 0,63 to 360 m <sup>3</sup> /hod   |                     |                                 |
| Leakage               | Class IV. - S1 acc. to EN 1349 (5/2001) (<0.0005 % Kvs)<br>RV 113 S: in angle port not guaranteed (<2% Kvs) |                     |                                 |
| Rengeability r        | 50:1  |                     |                                 |

## 2. DIRECTIONS FOR INSTALLATION AND OPERATING OF VALVE

### 2.1 Preparation before installatio

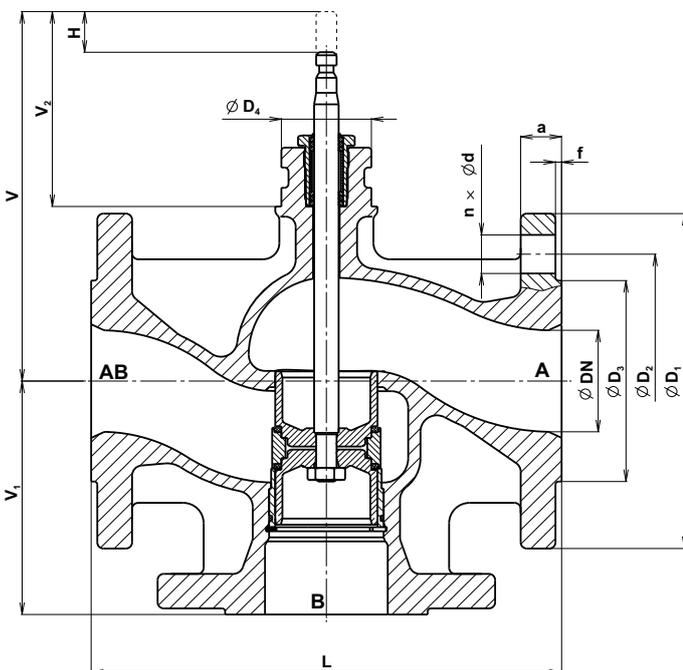
The valves are delivered completely assembled from the factory, adjusted and tested. Prior to the piping of the valve, it is necessary to compare the data on the valve tag with data from accompanying documents. The protective blinds must be removed from the valve. The valves shall be inspected against mechanical damage or being impurified, especially in the inner area and on sealing flanges. Also the piping system shall be cleared from all impurities that could cause damage of sealing surface and thus cause a loss of tightness of the valve.

### 2.2 Dimensions and weights of valve RV 113 M, S

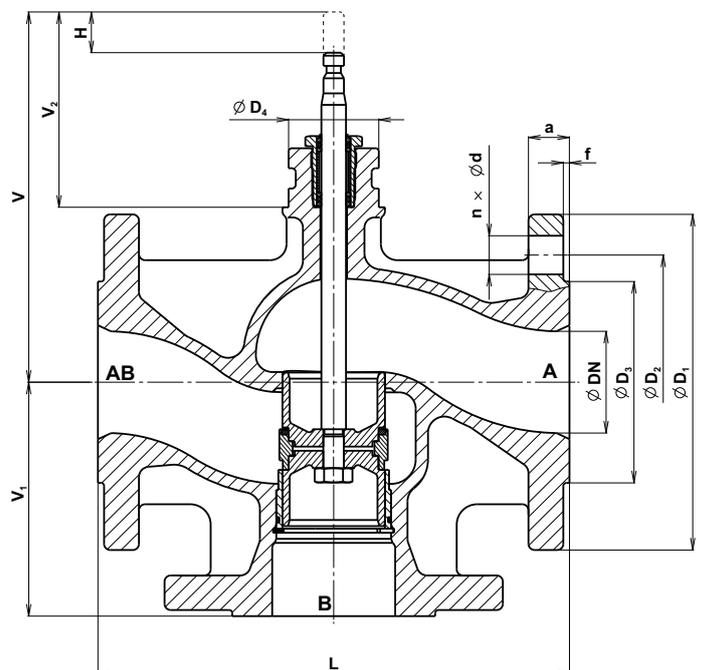
| DN  | PN 6           |                |                |     |     |     |     | PN 16          |                |                |    |    |    |      | PN 25          |                |                |    |    |    |      |    |
|-----|----------------|----------------|----------------|-----|-----|-----|-----|----------------|----------------|----------------|----|----|----|------|----------------|----------------|----------------|----|----|----|------|----|
|     | D <sub>1</sub> | D <sub>2</sub> | D <sub>3</sub> | d   | n   | a   | m   | D <sub>1</sub> | D <sub>2</sub> | D <sub>3</sub> | d  | n  | a  | m    | D <sub>1</sub> | D <sub>2</sub> | D <sub>3</sub> | d  | n  | a  | m    |    |
|     | mm             | mm             | mm             | mm  | mm  | mm  | kg  | mm             | mm             | mm             | mm | mm | mm | kg   | mm             | mm             | mm             | mm | mm | mm | mm   | kg |
| 15  | 80             | 55             | 38             | 11  | 4   | 12  | 2.6 | 95             | 65             | 46             | 14 | 4  | 14 | 3.5  | 95             | 65             | 46             | 14 | 4  | 14 | 3.5  |    |
| 20  | 90             | 65             | 48             | 11  | 4   | 14  | 3.5 | 105            | 75             | 56             | 14 | 4  | 16 | 4.6  | 105            | 75             | 56             | 14 | 4  | 16 | 4.6  |    |
| 25  | 100            | 75             | 58             | 11  | 4   | 14  | 4.1 | 115            | 85             | 65             | 14 | 4  | 16 | 5.4  | 115            | 85             | 65             | 14 | 4  | 16 | 5.4  |    |
| 32  | 120            | 90             | 69             | 14  | 4   | 16  | 6.3 | 140            | 100            | 76             | 19 | 4  | 18 | 8.5  | 140            | 100            | 76             | 19 | 4  | 18 | 8.5  |    |
| 40  | 130            | 100            | 78             | 14  | 4   | 16  | 7.9 | 150            | 110            | 84             | 19 | 4  | 18 | 10.5 | 150            | 110            | 84             | 19 | 4  | 18 | 10.5 |    |
| 50  | ---            | ---            | ---            | --- | --- | --- | --- | 165            | 125            | 99             | 19 | 4  | 20 | 13.0 | 165            | 125            | 99             | 19 | 4  | 20 | 13.0 |    |
| 65  | ---            | ---            | ---            | --- | --- | --- | --- | 185            | 145            | 118            | 19 | 4  | 20 | 18.3 | 185            | 145            | 118            | 19 | 8  | 20 | 18.3 |    |
| 80  | ---            | ---            | ---            | --- | --- | --- | --- | 200            | 160            | 132            | 19 | 8  | 22 | 24.1 | 200            | 160            | 132            | 19 | 8  | 22 | 24.1 |    |
| 100 | ---            | ---            | ---            | --- | --- | --- | --- | 220            | 180            | 156            | 19 | 8  | 24 | 33.8 | 235            | 190            | 156            | 23 | 8  | 19 | 33.1 |    |
| 125 | ---            | ---            | ---            | --- | --- | --- | --- | 250            | 210            | 184            | 19 | 8  | 26 | 49.3 | 270            | 220            | 184            | 28 | 8  | 19 | 46.9 |    |
| 150 | ---            | ---            | ---            | --- | --- | --- | --- | 285            | 240            | 211            | 23 | 8  | 26 | 69.3 | 300            | 250            | 211            | 28 | 8  | 20 | 66.7 |    |

| DN  | PN 6, 16, 25 |                |     |     |                |                |    |
|-----|--------------|----------------|-----|-----|----------------|----------------|----|
|     | f            | D <sub>4</sub> | L   | V   | V <sub>1</sub> | V <sub>2</sub> | H  |
|     | mm           | mm             | mm  | mm  | mm             | mm             | mm |
| 15  | 2            | 44             | 130 | 167 | 65             | 96             | 20 |
| 20  | 2            | 44             | 150 | 167 | 75             | 96             | 20 |
| 25  | 3            | 44             | 160 | 167 | 80             | 96             | 20 |
| 32  | 3            | 44             | 180 | 177 | 90             | 96             | 20 |
| 40  | 3            | 44             | 200 | 187 | 100            | 96             | 20 |
| 50  | 3            | 44             | 230 | 182 | 115            | 96             | 20 |
| 65  | 3            | 44             | 290 | 192 | 145            | 96             | 20 |
| 80  | 3            | 44             | 310 | 212 | 155            | 96             | 20 |
| 100 | 3            | 44             | 350 | 247 | 175            | 116            | 40 |
| 125 | 3            | 44             | 400 | 272 | 200            | 116            | 40 |
| 150 | 3            | 44             | 480 | 297 | 240            | 116            | 40 |

RV 113 M



RV 113 S



## 2.3 Installation of valve into pipeline

The valve in mixing function must be piped with the medium flow according to arrows indicated on the valve body (inlet ports A, B and outlet port AB). For diverting function the valve is to be piped vice versa (inlet port AB and outlet ports A, B) The valve can be piped in any position except when the actuator is under the valve body. In operating the valve for high temperatures, it is necessary to protect the actuator against radiating heat, for example by tilting it from vertical direction and carefully insulate the pipeline. In case the valve is mounted in vertical or in horizontal pipeline with actuator being positioned horizontally, the flexible support or hanging of the actuator is necessary.

For proper function of control valve, below-mentioned instructions must be obeyed :

- no excessive forces can be transferred from pipeline to valve.
- the valve can not be installed just behind the bend. Pipeline should be straight min. 6x DN in front of the valve.
- it is recommended to keep clean space around the valve for easy manipulation and service.
- the piping itself shall be carried out carefully with alternate tightening of the screws so as to prevent tension. Pipeline flanges must be coaxial with valve flanges.

### 2.3.1 Electric actuator or electrohydraulic actuator connection

These work may be carried out by trained personnel only. It is necessary to keep all safety rules relating to electric machines. Further it is necessary to follow installation instructions for maintenance of electric actuators issued by the producer. Resistance transmitter and signalisation switches, if part of delivery, are positioned under the actuator cover.

As the valve is delivered with its actuator as a complete from our company, the basic adjusting is carried out.

In both end positions is adjusted to stop of the actuator by torque switch, resp. force switch . For execution RV 113 S is adjusted to stop of the actuator in end position of angle way by limit switch.

In case of piping the valve or the actuator was removed from the valve, it is necessary to check this setting or check the actuator once again. In case of need, the assistance of our subsidiary LDM Service can be required.

The length of the actuator's cables shall be selected so that the actuator can be removed from the valve without disconnection from the terminal board.

**WARNING:** It's necessary to observe the mechanical stroke indicator placed at actuator's joke or directly at the electromotor, if the valve is operated (opened or closed) by hand wheel. The extra care must be taken near to OPEN and CLOSE position. Neither position nor torque switches are in function in such case and there is a danger of valve or actuator serious damage. It's strongly prohibited to use any mechanical tools (force boosters) for hand wheel operation.

### 2.3.2 Checking after installation

Piping system should be pressured after valve installation and then checked if there is not leak. Check the packing set tightness as well. Then check the proper function of actuator by doing a few strokes.

## 2.4 Operating and Service

### 2.4.1 Packing set

The valves are equipped with sealings O-rings EPDM, the packing does not require any maintenance and packing screw must not be tightened or loosened. If the leakage occurs, the O-rings shall be replaced.

### 2.4.2 Exchange of packing set

If there is need to exchange the O-rings because of high leakage, first the actuator must be dismantled and then the gland bolt must be screwed out. **The pipeline must not be under pressure during changing of packing set.** After this, there is need to check the state of stem surface and clean the inside of the packing box. The surface of stem must be smooth and not damaged. If necessary, the stem must be exchanged.

O-rings must be lubricated with special lubricant, recommended by the producer. **The spindle must not be greased during the operation!**

After exchange of packing set, the gland bolt must be tightened to the bottom of gland box:

After installation of actuator, it is necessary to make test as in 2.3.2.

### 2.4.3 Exchange of plug

When the valve is used for high differential pressures or for medium with high dirt-content, there is probability that sealing surface of plug will be wear out and leakage of valve will be too high (seat - plug leakage). In this case the professional service must be called.

### 2.4.4 Electric and electrohydraulic actuators

The actuators have to be operated according to instructions given in „Actuator manual “. In case of malfunction of actuator, see the instructions or ask for professional service.

## 2.5 Elimination of defects and malfunctions

If there is a fault detected on the valve (high leakage of valve, high leakage of packing set or gasket of cover etc.) , it is necessary to ensure its repairing as the damage of the sealing parts and surfaces exposed to the effect of the leaking medium can be non-reversibly caused.

### 2.5.1 High leakage of valve

High leakage can be caused:

- 1 - when the valve is used under the higher differential pressure than  $\Delta p_{max}$ .
- 2 - by insufficient thrust of actuator. There is need to test the function of actuator again.
- 3 - by damaged sealing surfaces of plug and seat. In this case the professional service must be called.

### 2.5.2 High leakage of packing set

In the case of high leakage of the packing set, points 2.4.2. must be done or professional service must be called.

## 2.6 Spare parts

Spare parts are not part of valve delivery. They must be ordered separately. When the spare parts are ordered, following data must be written: type of a valve, nominal diameter DN, serial number of valves, name of a spare part.

## 2.7 Guarantee conditions

The producer provides a 24-month warranty for this product starting with the date of dispatch from the factory. In case the claim is found relevant, the producer shall pay the cost of repair and transportation cost for sending it back to the customer. If the customer requires the service work directly at site, he shall be bound to pay the travel cost of the service personnel. If the claim is not found relevant, he is bound to pay all the cost arised.

The producer does not guarantee the product operation and safety if the product was used in other way than mentioned in this instructions for installation and service and catalogue data sheet. Any use of the product under different conditions must be consulted with the producer.

Defects of the valve caused by impurities in process medium shall be considered as out of guarantee terms.

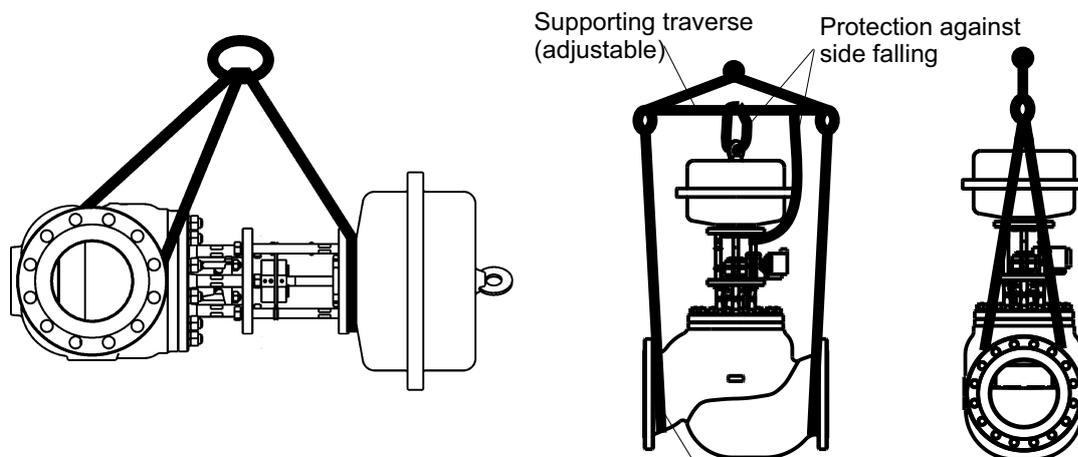
The producer does not take over the guarantee if any change was made by the user without prior written consent from the producer (except the packing tightening).

## 2.8 Transportation and storage

During transport and storage, the valve must not be exposed to water or placed in environment with relative humidity exceeding 90 %.

With respect to used actuators, the temperature during transport and storing shall be withing the range of -20 to 55°C. Inlet flanges must be protected with blinds (these are part of delivery) .

Suitable tools/devices should be used for valve lifting during the transport and installation (e.g. lifting harness entwinded around flanges, actuator yoke etc.). **Never lift the valve by the lifting device fixed on the actuator only!**



Example of lifting device usage.

Is necessary use slings protector against sharp edge.

It is necessary to make sure the valve can not be damaged during transport. **Special attention shall be paid to the valve stem, stroke indicator and outside accessories fixed to the actuator.** If the valves are stored for more than 3 years under these conditions, the producer recommends to carry out professional inspection of the valves.

## 2.9 Waste disposal

Packaging and the valves (after their scrapping) shall be disposed off in the common way, e.g. by handing over to a specialized company for a disposal (body and metal parts - metal scrap, packaging + other non-metallic parts - communal waste).

### Maxim. permissible working overpressures acc. to EN 1092-2 [MPa]

| Material                      | PN | Temperature[°C] |      |      |     |     |     |     |     |     |     |
|-------------------------------|----|-----------------|------|------|-----|-----|-----|-----|-----|-----|-----|
|                               |    | 100             | 120  | 150  | 200 | 250 | 300 | 350 | 400 | 450 | 500 |
| EN-JL 1040<br>(EN-GJL-250)    | 6  | 0.60            | 0.60 | 0.54 | --- | --- | --- | --- | --- | --- | --- |
|                               | 16 | 1.60            | 1.60 | 1.44 | --- | --- | --- | --- | --- | --- | --- |
| EN-JS 1025<br>(EN-GJS-400-18) | 25 | 2.50            | 2.50 | 2.43 | --- | --- | --- | --- | --- | --- | --- |

### The valve complete specification No. for ordering RV 113 M, S

|                         |   | XX | XXX | X | XX | XX | XX | / | XXX | -   | XXX | XX |
|-------------------------|---|----|-----|---|----|----|----|---|-----|-----|-----|----|
| 1. Valve                | Control valve                                   | RV |     |   |    |    |    |   |     |     |     |    |
| 2. Series               | Valves of cast iron                             |    | 113 |   |    |    |    |   |     |     |     |    |
| 3. Type of valve        | Three-way control valve                         |    |     | M |    |    |    |   |     |     |     |    |
|                         | Three-way cont. valve for electrohyd. actuators |    |     | S |    |    |    |   |     |     |     |    |
| 4. Execution            | Flanged, three-way mixing (diverting)           |    |     |   | 6  |    |    |   |     |     |     |    |
| 5. Body material        | Grey cast iron                                  |    |     |   | 3  |    |    |   |     |     |     |    |
|                         | Spheroidal cast iron                            |    |     |   | 4  |    |    |   |     |     |     |    |
| 6. Flow characteristic  | LDMspline®                                      |    |     |   |    | 3  |    |   |     |     |     |    |
| 7. Kvs                  | Column No. acc. to Kvs value table              |    |     |   |    |    | X  |   |     |     |     |    |
| 8. Nominal pressure PN  | PN 6 (only grey cast iron) DN15 to 40           |    |     |   |    |    |    |   | 06  |     |     |    |
|                         | PN 16   |    |     |   |    |    |    |   | 16  |     |     |    |
|                         | PN 25 (only spheroidal cast iron)               |    |     |   |    |    |    |   | 25  |     |     |    |
| 9. Max. temperature °C  | 150°C   |    |     |   |    |    |    |   |     | 150 |     |    |
| 10. Nominal diameter DN | DN 15 až 150                                    |    |     |   |    |    |    |   |     |     | XXX |    |
| 11. Execution           | Standard  |    |     |   |    |    |    |   |     |     |     |    |
|                         | Silicone-free                                   |    |     |   |    |    |    |   |     |     |     | SF |

### Ordering example: RV 113 M 6331 16/150-65

The actuator must be specified separately.



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