LDM, spol. s r.o. Czech Republic	INSTRUCTION FOR INSTALLATION AND MAINTENANCE CONTROL VALVE DN 15 - 50 PN 16	RV 102 RV 103 PM - 009/12/01/GB

The instructions for installation and maintenance of valves RV 102, 103 (further in text only RV10x) are binding for users to ensure proper function of valves. The user must keep the rules said here while installation, operation and maintenance. Technical details of individual execution are specified in catalogue data sheets.

1. TECHNICAL DESCRIPTION AND VALVE FUNCTION

1.1 Description

Control valves RV 102 are two-way or three-way valves with threaded connection. Valve body is made of bronze. Control valves RV 103 are two-way or three-way valves with flanged connection. Valve body is made of grey cast iron. Flow characteristics, Kvs values and leakage are acc. to international standards.

Valves can be used as :
- three-way control valve
- two-way control valve with reversing function
- two-way angular control valve

Valves RV 10x are designed for hand wheel (RV 10x R) or for electric and electrohydraulic actuators as Siemens (RV 10x EL, HL), Sauter (RV 10x ES, HS), Johnson Controls (RV 10x EC), Honeywell (RV 10x EH), Belimo (RV 10x EB) and Czech of producers as Ekorex+, ZPA Nová Paka (RV 10x ER, EN).

1.2 Application

The valves are designed for control circuits PN 16. The valves are accurately designed to regulate pressure and flow of liquids, gases and steams without abrasive particles as water (except of drinking water) low-pressure steam (only RV102) and air. Sort of operating medium has to be compatible with the material body. Acidity, resp. alkalinity of medium has to be in range from pH 4.5 to pH 9.5. For proper function the producer recommends to install a filtr into the pipeline in front of the valve .

The valve cannot work in cavitation conditions. RV 103 valves are not suitable for steam and steam condensate.

1.3 Function

Control Valves serie RV 10x can have equal percentage plug or linear plug. Used actuators allow 3-point controlling. They can be equipped with the signalization of end positions and transmitters of position.

1.4 Differential pressure

Value Δp_{max} is maximum differential pressure when on-off function is always guaranteed. Recommended constant pressure drop should not be higher than 0.6 MPa for valves RV 102. For valves RV 103 pressure drop should not be higher than 0,4 MPa.

1.5 Valve body specifications

Series	**RV 102**	**RV 103**
Type	Three-way control valve Two-way control valve with reversing function	
Nominal diameter DN	DN 15 - 50	
Nominal pressure PN	PN 16	
Body material	Bronze 42 3135 (CuSn5Pb5Zn5)	Grey cast iron EN-JL 1040
Plug material	Brass 42 3234 (CuZn40Pb2)	
Operating temperature	from 0°C to 150°C	
Building length	Acc. to DIN 3202 - M4	Acc. to ČSN EN 558-1 - F1
Connection	Socket with female thread Acc. to ČSN EN ISO 228-1	Flange with raise face, type B1 Acc. to ČSN EN 1092-1
Type of plug	V - ported	
Flow characteristic	Linear, equal percentage	
Kvs values	from 0.6 to 40 m^3/h	
Leakage	Class III. acc. to ČSN EN 1349 (<0.1% Kvs) in way A-AB	
Rangeability	50:1	
Packing set	O - ring EPDM	

2. DIRECTIONS FOR INSTALLATION

2.1 Preparation before installation

The valves are delivered from the company assembled, adjusted and tested. Before valve´s installation into pipiline you must check the data on the name-plate with data mentioned in accompanying documentation. Then check if the valve or the actuator are not damaged and dirty. Pay attention especially to inner spaces and packing surfaces of valve.

2.2 Dimensions and weights of valves RV 10x

RV 102

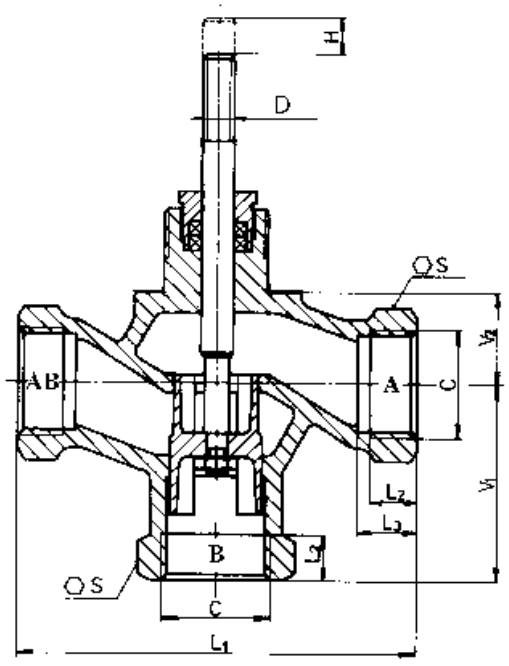
DN	C	L_1	L_2	L_3	V_1	V_2	S	H	H_S	$D_{L,B}$	D_S	D_C	$D_{H,E}$	m
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
15	G 1/2	85	9	12	43	25	27							0.55
20	G 3/4	95	11	14	48	25	32	10	10					0.65
25	G 1	105	12	16	53	25	41			8	M6	1/4´´UNF	M 8x1	0.80
32	G 1 1/4	120	14	18	66	35	50							1.40
40	G 1 1/2	130	16	20	70	35	58	16	14					2.00
50	G 2	150	18	22	80	42	70							2.95

$D_{L,B}$ -with actuators Siemens and Belimo
D_S -with actuators Sauter
D_C -with actuators Johnson Controls
$D_{H,E}$ -with actuators Honeywell,Ekorex+ and ZPA Nová Paka
H - with actuators Siemens, J.Controls, Honeywell, Belimo, Ekorex+and ZPA Nová Paka
H_S -with actuators Sauter

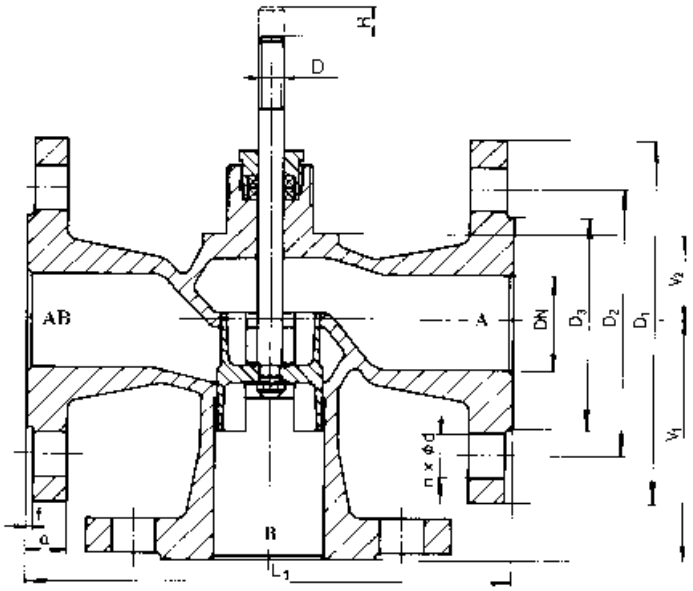
RV 103

																MIX.	2-cest.
DN	D_1	D_2	D_3	nxd	a	f	L_1	V_1	V_2	H	H_S	$D_{L,B}$	D_S	D_C	$D_{H,E}$	**m**	**m**
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg	kg
15	95	65	45		16		130	65	25							3.2	4.0
20	105	75	58	4 x 14		2	150	75	25	10	10					4.3	5.4
25	115	85	68		18		160	80	25							5.5	6.8
32	140	100	78				180	90	35			8	M6	1/4´´NF	M 8x1	7.7	9.7
40	150	110	88	4 x 18		3	200	100	35	16	14					8.5	10.9
50	165	125	102		20		230	115	42							11.9	15.6

RV 102



RV103



2.3 Installation of valve into pipeline

Valve must be installed into pipeline so that flow of medium is according to arrows on the body. The actuator can be installed in any position except the position below the valve body. Keep the rules in instalation and maintenance instructions of actuator too. Protection of actuator against the radiant heat can be necessary in case of high temperature application. As a basic provision can be made pipeline insulation, actuator turning aside from vertical position, etc..

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

- no excessive forces can be transfered from pipeline to valve.
- the pipeline must be cleaned from dirt before valve installation.
- the valve can not be installed just behind the bend. Pipeline should be straight min. 6xDN in front of the valve.
- it is recommended to keep clean space around the valve for easy manipulation and service.
- installation itself must be done precisely. Pipeline flanges must be coaxial with valve flanges.
- it is necessary to use connectioned pipe union for valves with threaded connection during its installation so that the dismantling of valve from the pipeline will be possible and can be carried out.

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 instructions for installation, operation and maintenance of electric actuators issued by the producer. Position transmitter and signalisation switches, if part of delivery, are positioned under the actuator cover.

Before valve commissioning, the data, given in the actuator ID plate (especially supply voltage and voltage of control signal), should be checked/compared with given specification and verify, that the actuator can be connected to superordinate regulator.

Regarding the fact the valve is delivered with its actuator as a complet, the basic adjusting is carried out. Switching off by torque or power switch is adjusted in upper position for the valves that are equipped only with the seat in straight way. In position when the straight way is open, the switching the actuator off is adjusted by limit switch or torque switch with the use of the stop.

In case the actuator is dismantled from the valve body for any reason such as the valve installation into pipeline etc., it is necessary to check the setting again after the assembly possibly to carry out the complete setting of actuator again. Producer does not take over the guarantee if the damage was caused by improper setting or adjusting of the actuator. In case of need, it is possible to ask for such service from service organization of the producer.

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.

2.3.2 Checking after installation

Piping system should be pressured after valve installation and the 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 Maintenance

2.4.1 Packing set

The packing set does not need a lot of servicing in the case that the valve has PTFE or O-ring EPDM packing set, and also in this case gland bolt may not be tightened nor loosen. If leakage is high, the packing set must be changed.

2.4.2 Exchange of packing set

If there is need to exchange the packing set because of high leakage, first the actuator must be dismantled and then the packing screw must be screwed out. **The pipeline may not be under pressure during changing of packing set.** After this, there is need to check the state of spindle surface and clean the inside of the packing box. The surface of spindle must be smooth and not damaged. If necessary, the spindle must be exchanged. Packing set is filled, by the producer, with a special lubricant acc. to the type of used packing. Such lubricant ensures the proper function of the packing rings within their service life. **The spindle may not be greased during the operation!**

After exchange of packing set, the gland bolt must be tightened to the bottom of packing box. After installation of actuator, there is necessary to make test as in 2.3.2.

2.4.3 Exchange of plug

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

2.4.4 Electric actuators
Electric 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 repair man.

2.5 Elimination of defects and malfunctions
If a defect is detected on the valve (leakage, leakage of packing or bonnet sealing, etc.), it is necessary to ensure its repair immediately otherwise a permanent damage may occur to sealing surfaces and other parts exposed to effects of leaking medium. **Prior to any repair work on the valve, make sure that piping system is free of pressure!**

2.5.1 High leakage of valve
High leakage can be caused:
1 - when the valve is used under the higher differential pressure than Δp_{max}.
2 - by insufficient thrust of actuator. There is need to test the function of actuator again.
3 - by damaged seating faces 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 2.4.1. and 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. For the spare parts order, following data must be written: type of a valve, nominal diameter DN, Serial valve´s number, name of a spare part.

2.7 Guarantee conditions
The producer does not guarantee the operation and safety of the product under conditions different from data given in the catalogue data sheet. Any using of the valve under different conditions shall 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.

2.8 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).

Valve complete specification No. for ordering RV 10x

			XX	XXX	XXX	XX	XX	XX	/	XXX	-	XX
1. Valve	Control valve		RV									
2. Type of valve	Valve from bronze - threaded			102								
	Valve from grey cast iron - flanged			103								
3. Actuator	Electric actuator				EXX							
	Electrohydraulic actuator				HXX							
	Hand wheel				RXX							
4. Connection	Two-way threaded					1						
	Two-way threaded angular	**RV 102**				2						
	Three-way threaded mixing (distributing)					3						
	Two-way flanged					4						
	Two-way flanged angular	**RV 103**				5						
	Three-way flanged mixing (distributing)					6						
5. Body material	Grey cast iron					3						
	Bronze					5						
6. Flow characteristic	Linear						1					
	Equal percentage						2					
7. Kvs values	Column number acc. to table Kvs values						X					
8. Nominal pressure PN	PN 16							16				
9. Operating temperat. °C										140		
										150		
10. Nominal diameter	DN											XX

Ordering example: Three-way valve DN 25, PN 16, with electric actuator SQX 32.00, body material bronzthreaded connection G 1, linear characteristic, Kvs = 10 m^3/h, is marked as: **RV 102 ELA 3511 16/140-25**

Maximum permissible working pressure [MPa]

Material	PN	Temperature [°C]				
		120	150	200	250	300
Grey cast iron EN-JL 1040	16	1.60	1.44	1.28	1.12	0.96
Bronze 42 3135	16	1.60	1.09	0.73	--	--

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