	<b>INSTRUCTION FOR INSTALLATION AND MAINTENANCE</b>	<b>RD 102 D RD 103 D</b>
	<b>DIFFERENTIAL PRESSURE REGULATOR DN 15 - 50 PN 16</b>	
	PM - 040/12/01/GB	

The instructions for installation and maintenance of valves RD 102 D, 103 D (further in text only RD 10x D ) are binding for users to ensure proper function of valves. The user must keep the rules said here while installation, operation and maintenance.

## 1. TECHNICAL DESCRIPTION AND VALVE FUNCTION

### 1.1 Description

Differential pressure regulator RD 102 D and RD 103 D are valves designed for keeping constant differential pressure or constant flow quantity (when orifice plate is used) at given device. Such function is ensured by diaphragm exposed to influence of inlet and outlet pressure of given device or throttling orifice plate. Diaphragm's deflection transfers to valve plug and when pressure difference is increased, then valve closing is induced. Owing to pressure-balanced plug, value of differential pressure is not influenced by pressure ratios within valve.

Regulator can be equipped with manometers, from which it is possible to read actual values of inlet and outlet pressure and according to which required value of pressure difference can be adjusted (within range of used spring). Standard version is without manometers and regulator must be adjusted according to pressure values, possibly flow quantity values, measured directly at given device.

In case when required value of differential pressure is within range of two spring ranges, it is more suitable to choose the range with lower values to ensure sensitivity of regulator.

Connecting impulse pipes are supplied with valves as standard.

### 1.2 Application

These valves have a wide range of application in heating, water industry, air-conditioning.

They can be installed in regulation circuits, where constant differential pressure or flow at device without energy supply must be secured.

### 1.3 Operating pressures

The maximum pressure in circuits, where the valves are used, is limited to value 1.0 MPa. The pressure difference at the given device is limited by valve's spring range, i.e. from 0.025 to 1.0 MPa. The pressure difference at the valve is limited to value 0.6 MPa for RD 102 respectively to value 0.4 MPa for RD 103.

### 1.4 Process media

Valves series RD 102 D, RD 103 D are designed for gases and liquids such as air, water, water steam (it applies to RD 102 only) and other media compatible with material of the valve inner parts (especially body, plug and diaphragm). This valve is not suitable for oil.

To ensure long-term tightness of valve, producer recommends to pipe a strainer in front of the valve into pipeline.

### 1.5 Technical data

Series	RD 102 D	RD 103 D
Type	Self-acting control valve of differential pressure	
Nominal diameter DN	DN 15 - 50	
Nominal pressure PN	PN 16	
Maximum working pressure	1 MPa	
Body material	Bronze 42 3135	Grey cast iron EN-JL 1040
Plug material	Brass 42 3234	
Plug - seat sealing	EPDM	
Diaphragm material	EPDM	
Operating temperature	-5 to 130°C, peaking up to 140°C	
Building length	Acc. to DIN 3202 - M4	Acc. ČSN-EN 558-1 series1
Connection	Internal threaded coupling	Flange with raise face, type B1 Acc. to ČSN EN 1092-1
Type of plug	Parabolic, pressure balanced	
Flow characteristic	Linear	
Kvs values	2 to 20 m <sup>3</sup> /hod	
Adjustable range of outlet pressure values	0.025 to 0.1; 0.08 to 0.3; 0.2 to 0.65; 0.3 to 1.0 MPa	

Tolerance of setting of edge range values is 10% from appropriate nominal edge value of the setting range.

## 1.6 Maximum inlet pressures of valves RD 10x D

Range [MPa]	0.025 - 0.1	0.08 - 0.3	0.2 - 0.65	0.3 - 1.0
$p_{1max}$	0.6	0.9	1.0	1.0

## 2. DIRECTIONS FOR INSTALLATION AND OPERATING OF VALVE

### 2.1 Preparation before installation

The valves are delivered from the company assembled, adjusted and tested. Before valve's installation into pipeline 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.

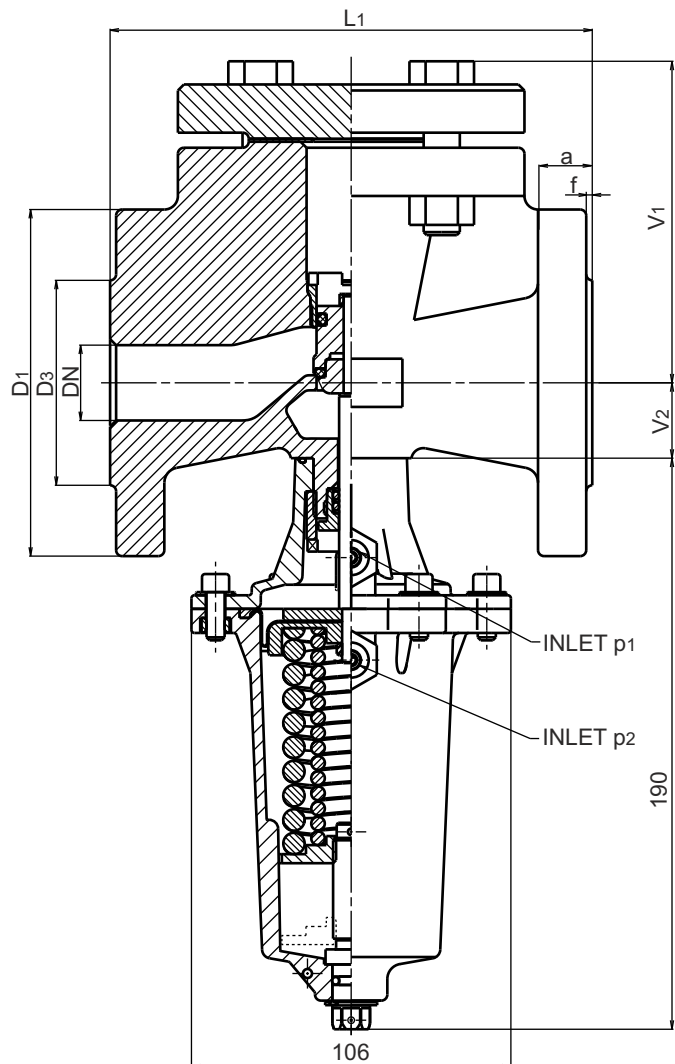
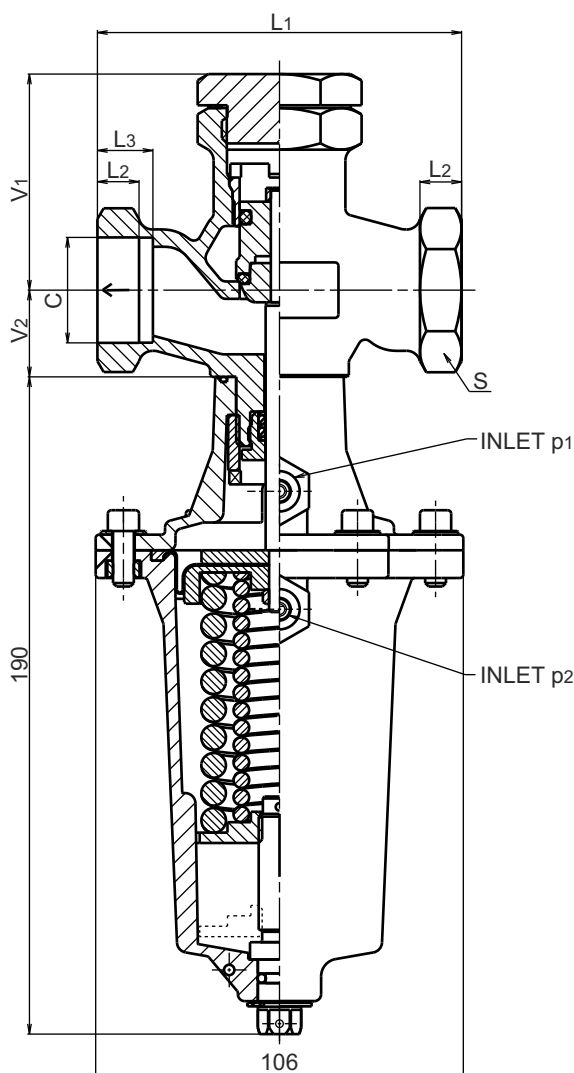
### 2.2 Dimensions and weights of valves RD 10xD

#### RD 102 D

DN	C	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	V <sub>1</sub>	V <sub>2</sub>	S	m
		mm	mm	mm	mm	mm	mm	kg
15	G 1/2	85	9	12	50	25	27	3.1
20	G 3/4	95	11	14	55	25	32	3.2
25	G 1	105	12	16	62	25	41	3.4
32	G 1 1/4	120	14	18	75	35	50	4.0
40	G 1 1/2	130	16	20	79	35	58	4.5
50	G 2	150	18	22	89	42	70	5.5

#### RD 103 D

DN	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	nxd	a	f	L <sub>1</sub>	V <sub>1</sub>	V <sub>2</sub>	m
	mm	mm	mm	mm	mm	mm	mm	mm	mm	kg
15	95	65	45	4 x 14	16x4	2	130	89	25	5.7
20	105	75	58		180		101	25	6.8	
25	115	85	68	4 x 18	18	2	160	106	25	7.8
32	140	100	78				180	118	35	10.2
40	150	110	88		200	128	35	11.0		
50	165	125	102	20	3	230	145	42	14.4	



## **2.3 Installation of valve into pipeline**

### **2.3.1 Mounting positions**

Valve must be installed into pipeline so that flow of medium is according to arrows on the body. Basic operating position of regulator is when the valve body is above controlling head and the control head is downward. It is necessary to keep this position namely during reducing of steam pressure and for temperatures above 80°C. For liquids and gases that have lower temperatures, the valve can be installed in any position.

### **2.3.2 Installation of valve**

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

- no excessive forces can be transferred from pipeline to valve.
- the pipeline must be cleaned from dirt before valve installation.
- the valve can not be installed just behind the bend. The 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. The pipeline flanges must be coaxial with valve flanges.

### **2.3.3 Connection of impulse pipeline**

Connecting of diaphragm space with inlet and outlet pipeline facilities is practised with a copper impulse pipes connecting with the aid of pipe union. This pipes is included in the supply of the valve (see article 2.10, 2.11).

### **2.3.4 Checking after installation**

The piping system should be pressured after valve installation and then checked if there is no leak.

## **2.4 Differential pressure setting**

Setting of differential pressure is carried out by tensioning the spring with adjusting bolt. The direction of turning for the bolt is designated on the bonnet as follows:  
turning right (in direction of +) ... pressure increases  
turning left (in direction of -) ... pressure decreases

The best way how to set the regulator is to use the values of pressure, taken directly at the inlet and outlet of given device. Other possibility is to use the Working diagrams, shown at pages 6 and 7.  
After the setting, the setting screw can be sealed in it's relevant position.

## **2.5 Operating and Maintenance**

The valve in operation does not require service, however, it is advisable to check each 6 months the proper function of the valve i.e. if the set value of differential pressure corresponds to the required one.

## **2.6 Defects and malfunctions**

### **2.6.1 Damaged diaphragm**

The damage manifests so that the regulator works badly or not at all. The cause of such a damage is obviously damaged diaphragm which must be replaced at once.

The repairs should be done by the producer or service organizations cooperating with the producer. In guarantee period, the user should not carry out any modification or repair except differential pressure setting.

### **2.7 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, registration valve's number, name of a spare part.

### **2.8 Guarantee conditions**

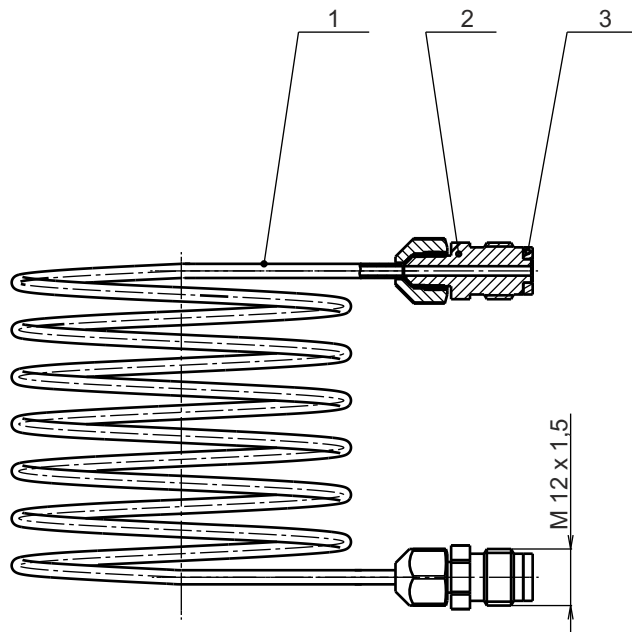
The producer does not guarantee the service and safety of the product under conditions different from this instructions and catalogue data sheet. Any using of the valve under different conditions shall be consulted with the producer.

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

### 2.9 2.9 Waste disposal

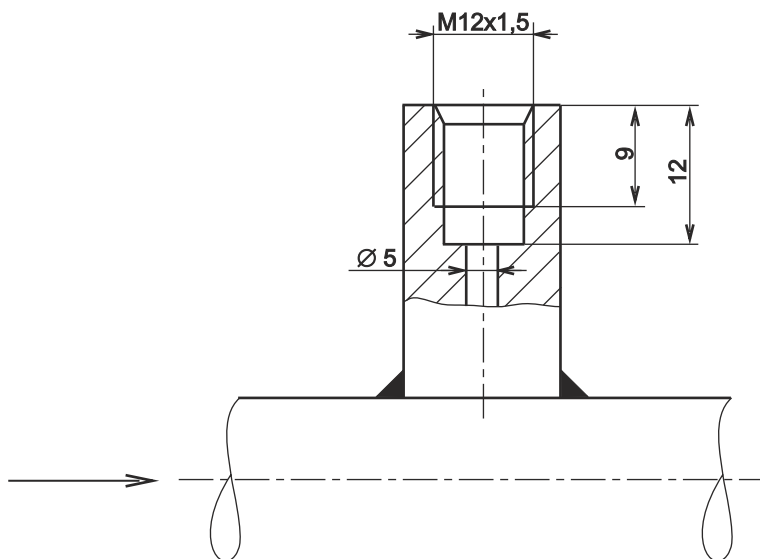
Packaging and the valves (after their scrapping) shall be disposed off in the common way, e.g. by handing over to a specialized company for a disposal (body and metal parts - metal scrap, packaging + other non-metallic parts - communal waste).

### 2.10 The impulse pipeline for the supply of pressure impulse into regulator

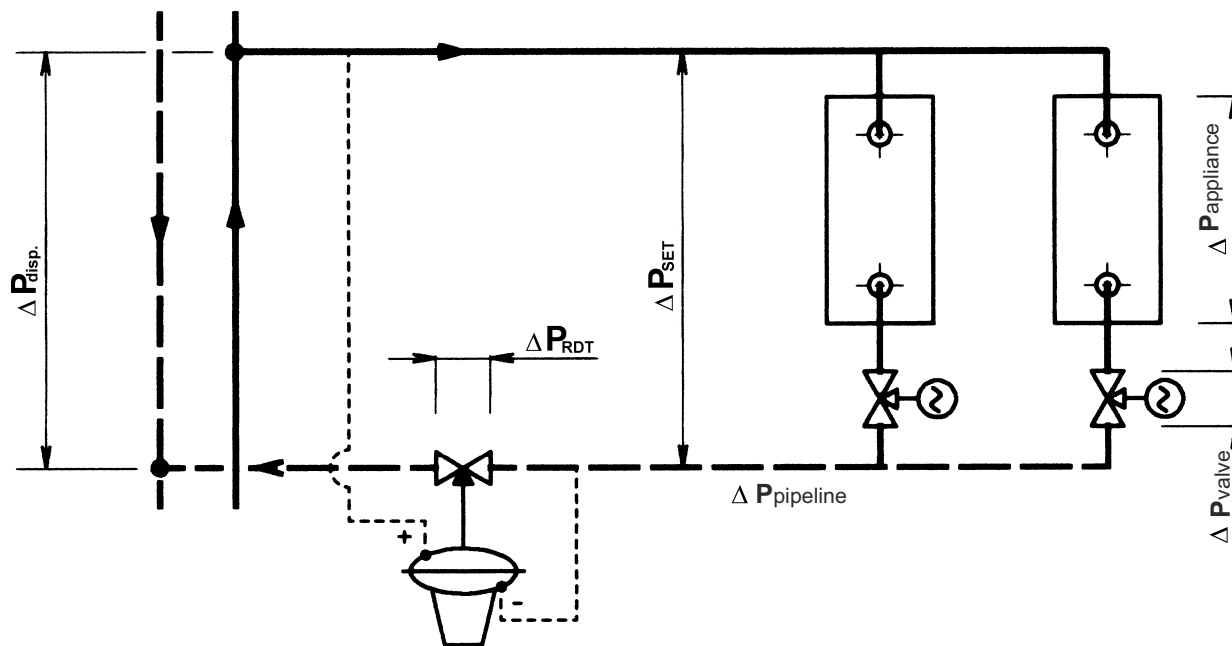


- 1 - impulse pipeline
- 2 - flare
- 3 - sealing PTFE

### 2.11 The socket for connecting of impulse pipeline flare



## 2.12 Typical scheme of regulation loop with differential pressure regulator at secondary side

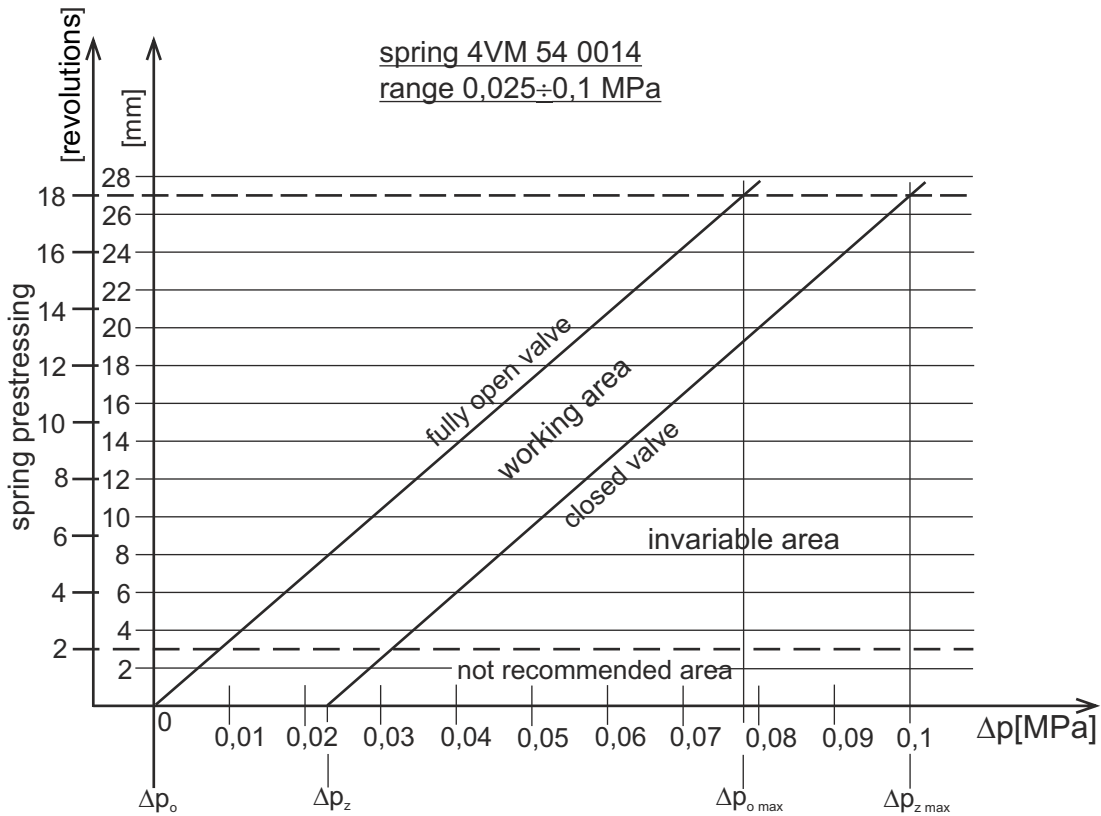


### Valve complete specification No. for ordering RD 10x D:

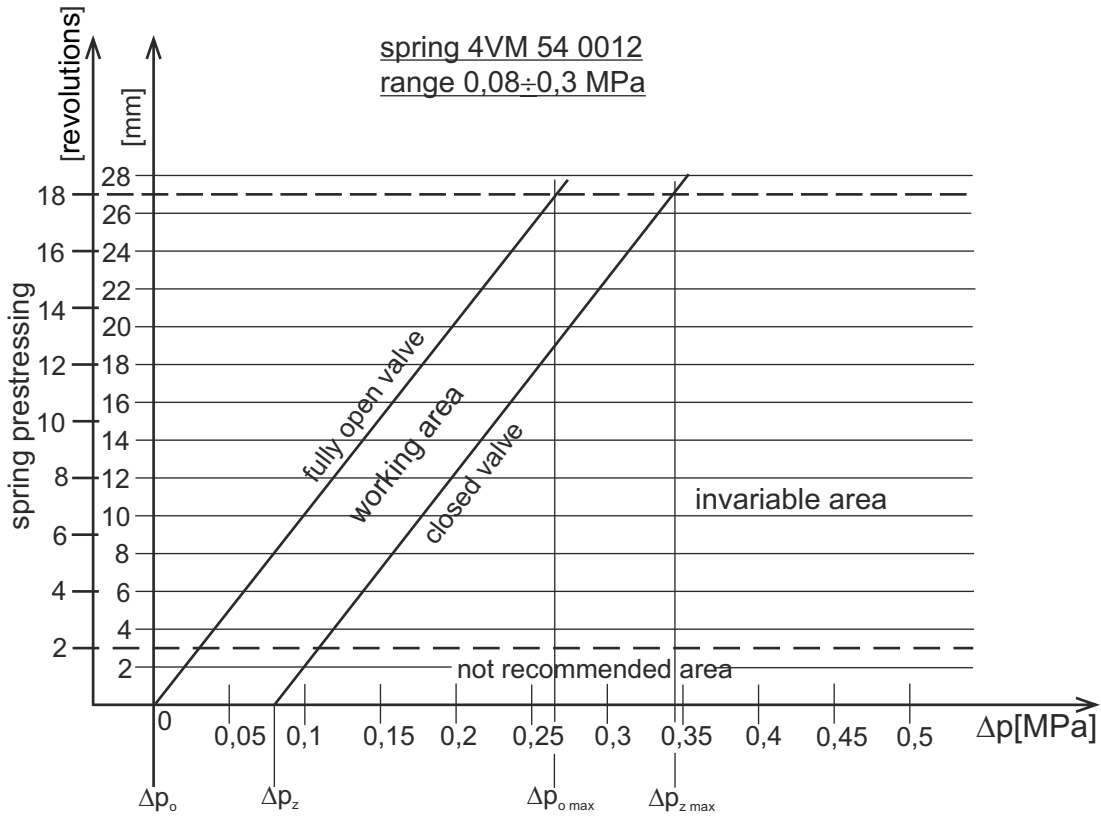
		XX	XXX	XXX	-	XX	/	XXX	-	XX
1. Valve	Pressure reducing valve	RD								
2. Type of valve	Valve from brass - threaded		102							
	Valve from grey cast iron - flanged		103							
3. Function	Differential pressure regulator			D						
4. Version	Without manometers			3						
	With manometers			4						
5. Reducing pressure setting range	0.025 to 0.1 MPa			1						
	0.08 to 0.3 MPa			2						
	0.2 to 0.65 MPa			3						
	0.3 to 1.0 MPa			4						
6. Nominal pressure PN	PN 16					16				
7. Operat. temperature °C								140		
8. Nominal diameter	DN									XX

**Ordering example:** Differential pressure regulator DN 25, PN 16, max. temperature 140°C, material brass, connection: internal thread G 1, with spring range 0,2 to 0.65 MPa is marked as: **RD 102 D33-16/140-25**

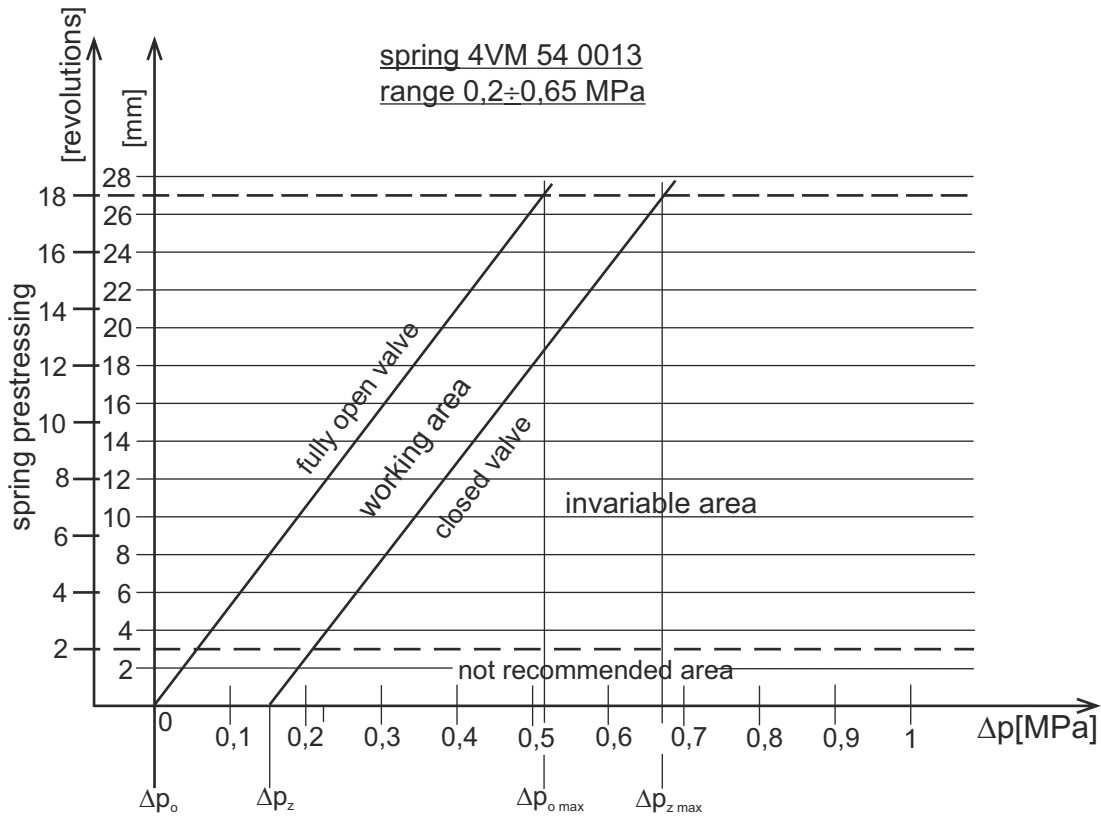
**Working diagrams of differential pressure regulator RD 102, RD 103**



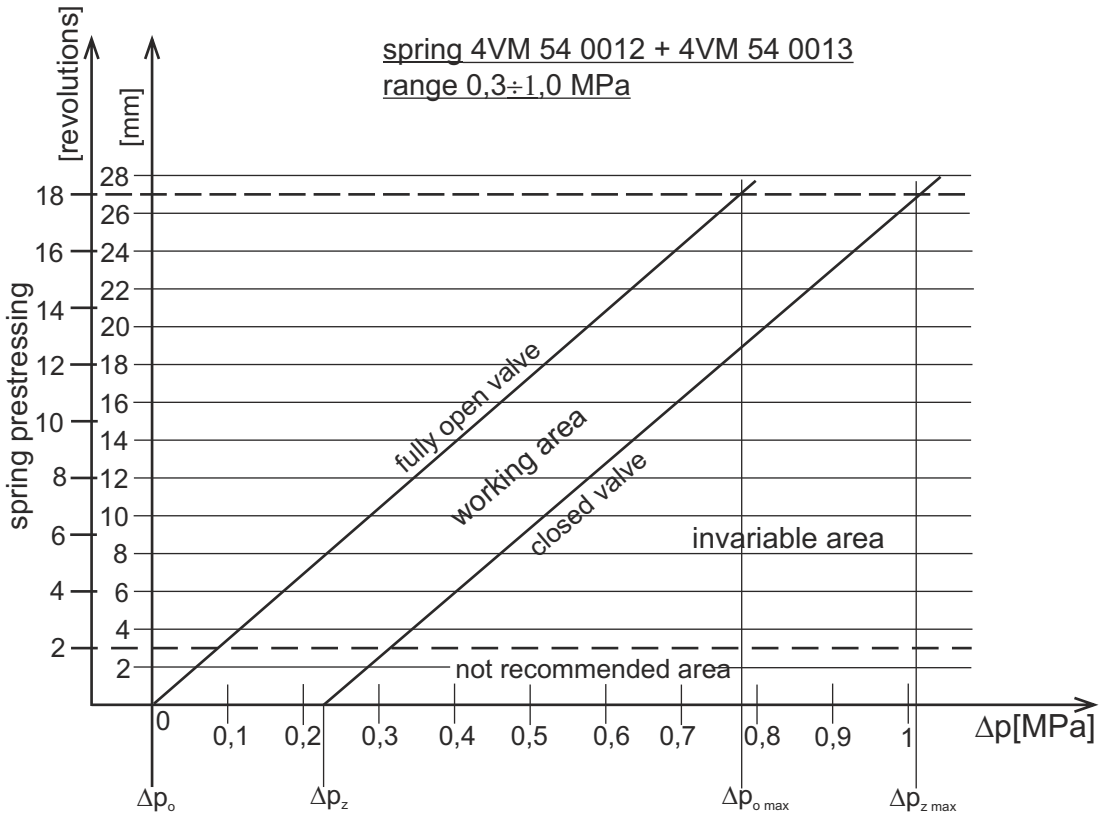
Change of setting at one revolution:  $\Delta p = 0,00434$  MPa



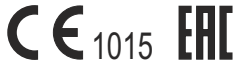
Change of setting at one revolution:  $\Delta p = 0,0147$  MPa



Change of setting at one revolution:  $\Delta p = 0,0286$  MPa



Change of setting at one revolution:  $\Delta p = 0,0433$ MPa



## ADDRESS OF FACTORY

LDM, spol. s r.o.  
Litomyšlská 1378  
560 02 Česká Třebová  
Czech Republic

tel.: +420 465 502 511  
fax: +420 465 533 101  
E-mail: sale@ldm.cz  
<http://www.ldmvalves.com>

## REGIONAL OFFICES

LDM, spol. s r.o.  
Office in Prague  
Podolská 50  
147 01 Praha 4  
Czech Republic

tel.: +420 241087360  
fax: +420 241087192  
E-mail: tomas.suchanek@ldm.cz

LDM, spol. s r.o.  
Office in Ústí nad Labem  
Ladova 2548/38  
400 11 Ústí nad Labem - Severní Terasa  
Czech Republic

tel.: +420 602708257  
E-mail: tomas.kriz@ldm.cz

## SERVICE ORGANIZATION

LDM servis, spol. s r.o.  
Litomyšlská 1378  
560 02 Česká Třebová  
Czech Republic

tel: +420 465502411-13  
fax: +420 465531010  
E-mail: servis@ldm.cz

## LDM SUBSIDIARIES ABROAD

OOO "LDM Promarmatura"  
Jubilejnyi prospekt, dom.6a, of. 601  
141407 Khimki  
Moscow Region  
Russia

tel.: +7 495 7772238  
fax: +7 495 7772238  
mobile: +7 9032254333  
e-mail: inforus@ldmvalves.com

TOO "LDM"  
Shakirova 33/1, kab. 103  
100012 Karaganda  
Kazachstan

tel.: +7 7212566936  
fax: +7 7212566936  
mobile: +7 7017383679  
e-mail: sale@ldm.kz

LDM, Bratislava s.r.o.  
Mierová 151  
821 05 Bratislava  
Slovakia

tel: +421 243415027-8  
fax: +421 243415029  
E-mail: ldm@ldm.sk  
<http://www.ldm.sk>

LDM Armaturen GmbH  
Wupperweg 21  
D-51789 Lindlar  
Deutschland

tel: +49 2266 440333  
fax: +49 2266 440372  
mobile: +49 1772960469  
E-mail: ldmarmaturen@ldmvalves.com

LDM, Polska Sp. z o.o.  
ul. Modelarska 12  
40-142 Katowice  
Polska

tel: +48 327305633  
fax: +48 327305233  
mobile: +48 601354999  
E-mail: ldmpolska@ldm.cz

LDM Bulgaria Ltd.  
z.k.Mladost 1  
bl.42, floor 12, app.57  
1784 Sofia  
Bulgaria

tel: +359 2 9746311  
fax: +359 2 8771344  
mobile: +359 888925766  
E-mail: ldm.bg@ldmvalves.com

[www.ldmvalves.com](http://www.ldmvalves.com)

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