CERTIFIED
ISO 9001 · ISO 14001
ISO 45001

LDM®

01 - 01.1
10.20.GB

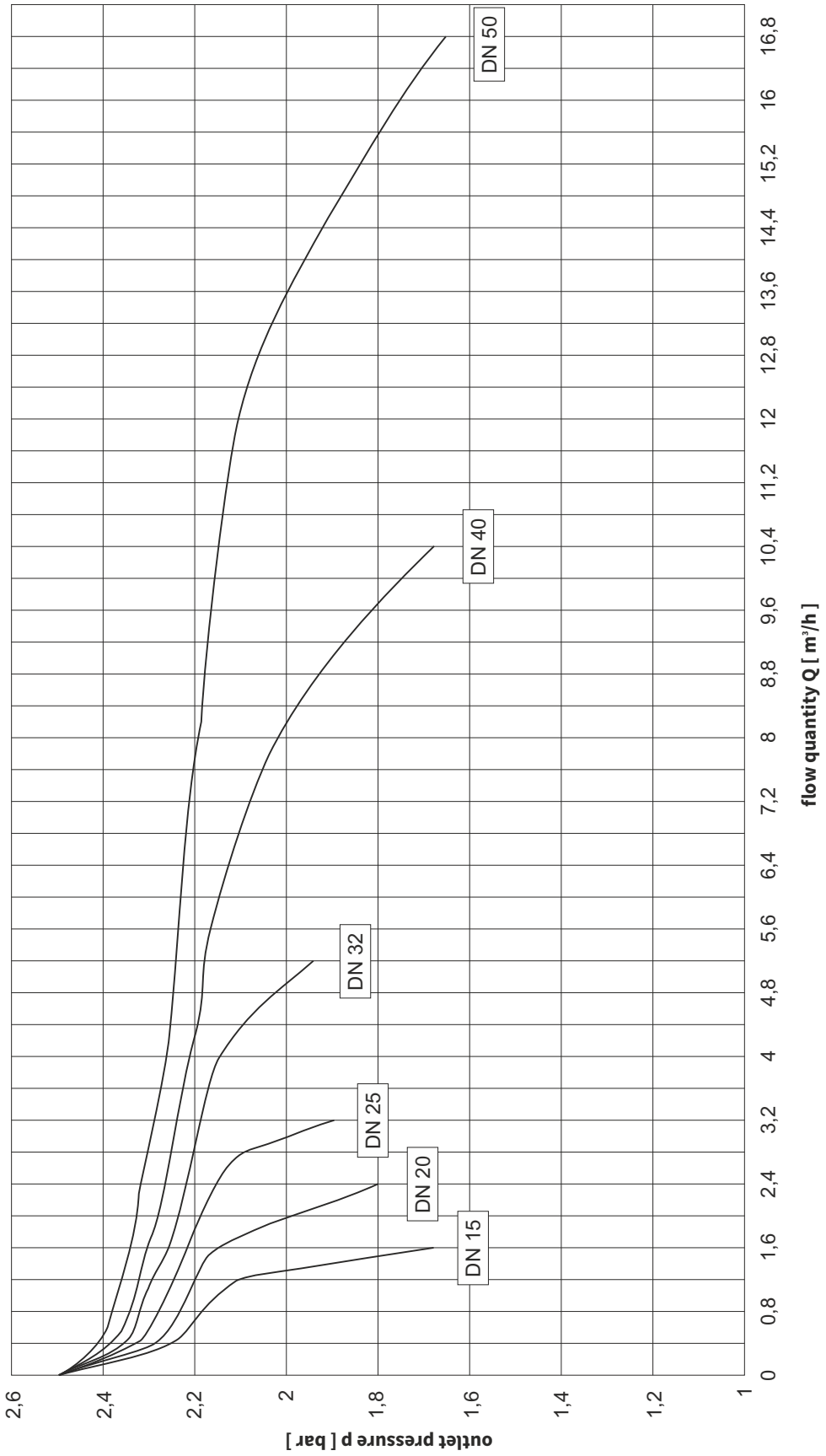
SELF-ACTING PRESSURE REGULATORS

RD 102 a RD 103

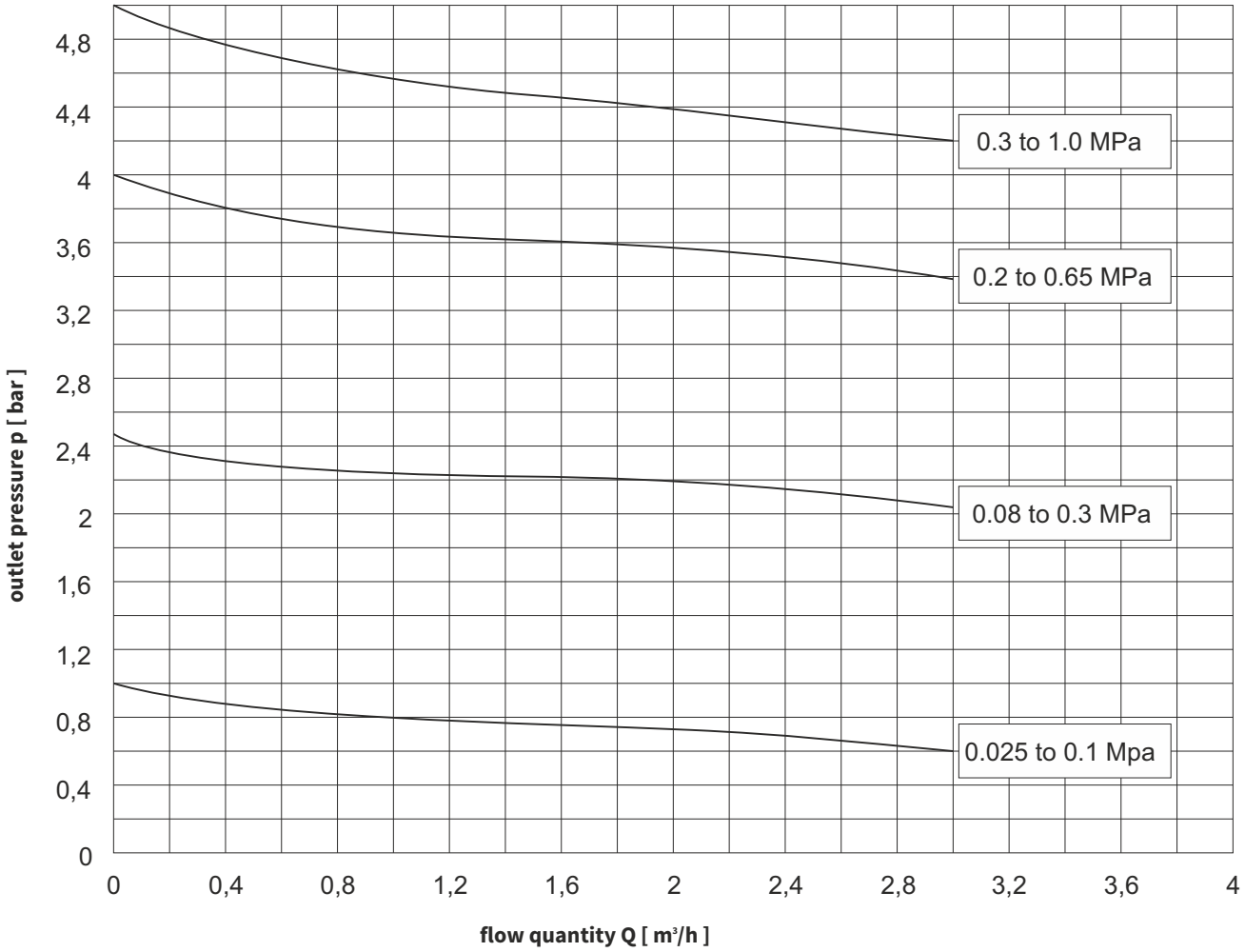
POWER THROUGH IDEAS
www.ldmvalves.com

Diagrams of flow through pressure reducing valve in relation to outlet press. drop

Valves DN 15 to 50 equipped with spring range 0.08 to 0.03 MPa
RD 102 V12 16/140-xx, inlet pressure 5,5 bar, outlet pressure adjusted to 2,5 bar, medium: water



Valve DN 25 equipped with springs for individual ranges
RD 102 V1x 16/140-25, inlet pressure 5,5 bar, medium: water



Maximal permissible operating pressures [Mpa]

Material	PN	Temperature [°C]										
		120	150	200	250	300	350	400	450	500	525	550
Brass 42 3135	16	1.60	1.14	---	---	---	---	---	---	---	---	---
Grey cast iron GG 25	16	1.60	1.44	---	---	---	---	---	---	---	---	---

Procedure for designing of pressure regulator (reducing valve)

Given: medium water, 10 °C, static pressure at piping spot p_1 = 900 kPa (9 bar), outlet pressure required p_2 = 600 kPa (6 bar), nominal pressure drop of the regulator Δp_{RTV} = 100 kPa (1 bar), nominal flow rate Q_{NOM} = 10 $m^3.h^{-1}$

First, we calculate kv value of the regulator according to the following equation:

$$Kv = \frac{Q_{NOM}}{\sqrt{\Delta p_{RTV}}} = \frac{10}{\sqrt{1}} = 10\ m^3.h^{-1}$$

Precautionary additions for process tolerances (provided that flow rate Q was not oversized):

$$Kvs = (1{,}1 \text{ to } 1{,}3) \,.\, Kv = (1{,}1 \text{ to } 1{,}3) \,.\, 10 = 11 \text{ to } 13\ m^3.h^{-1}$$

The calculation of kv was this time carried out for Δp_{RTV} = 1 baron purpose. Such modification of parametres ensures sufficient performance of the valve when inlet pressure fluctuates. In reality, kv can be determined acc. To a real value of Δp but in that case it is recommended to apply a higher precautionary addition.

Now we choose the nearest Kvs value from those available in our catalogue, i.e. Kvs = 12,5 $m^3.h^{-1}$. This value corresponds to nominal size of DN 40.

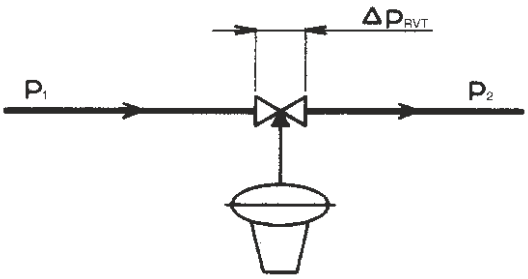
Then we choose flanged regulator of outlet pressure DN 40, PN 16, with reducing pressure setting range of 0,3 MPa to 1,0 MPa, with manometer and we will get the following specification code:

RD 103 V14 16/140-40

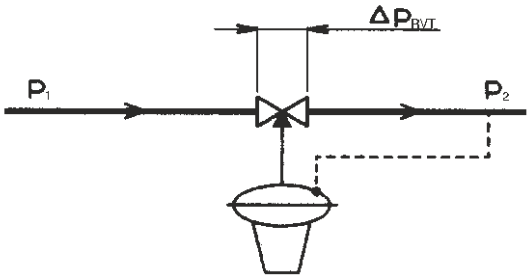
Required value of outlet pressure p is set with adjusting screw according to values on manometer when piping the valve.

Basic scheme of piping outlet pressure regulator

With direct inlet of reducing pressure



With inlet of reducing pressure from extraction from pipeline



Procedure for designing of differential pressure regulator

Given: medium water, 70 °C, static pressure at piping spot 800 kPa (8 bar), $\Delta p_{AVAIL.}$ = 110 kPa (1,1 bar), $\Delta p_{PIPELINE}$ = 10 kPa (0,1 bar), $\Delta p_{APPLIANCE}$ = 20 kPa (0,2 bar), Δp_{VALVE} = 30 kPa (0,3 bar), nominal flow rate $Q_{NOM} = 12\ m^3.h^{-1}$

First, we calculate kv value of differential pressure regulator according to the following equations:

$\Delta p_{RDT} = \Delta p_{AVAIL.} - \Delta p_{SET}$, where
$\Delta p_{SET} = \Delta p_{VALVE} + \Delta p_{APPLIANCE} + \Delta p_{PIPELINE}$
$\Delta p_{RDT} = 110 - (30 + 20 + 10) = 50$ kPa (0,5 bar)

$$Kvs = \frac{Q_{NOM}}{\sqrt{\Delta p_{RTV}}} = \frac{12}{\sqrt{0,5}} = 17\ m^3.h^{-1}$$

Precautionary additions for process tolerances (provided that flow rate Q was not oversized):

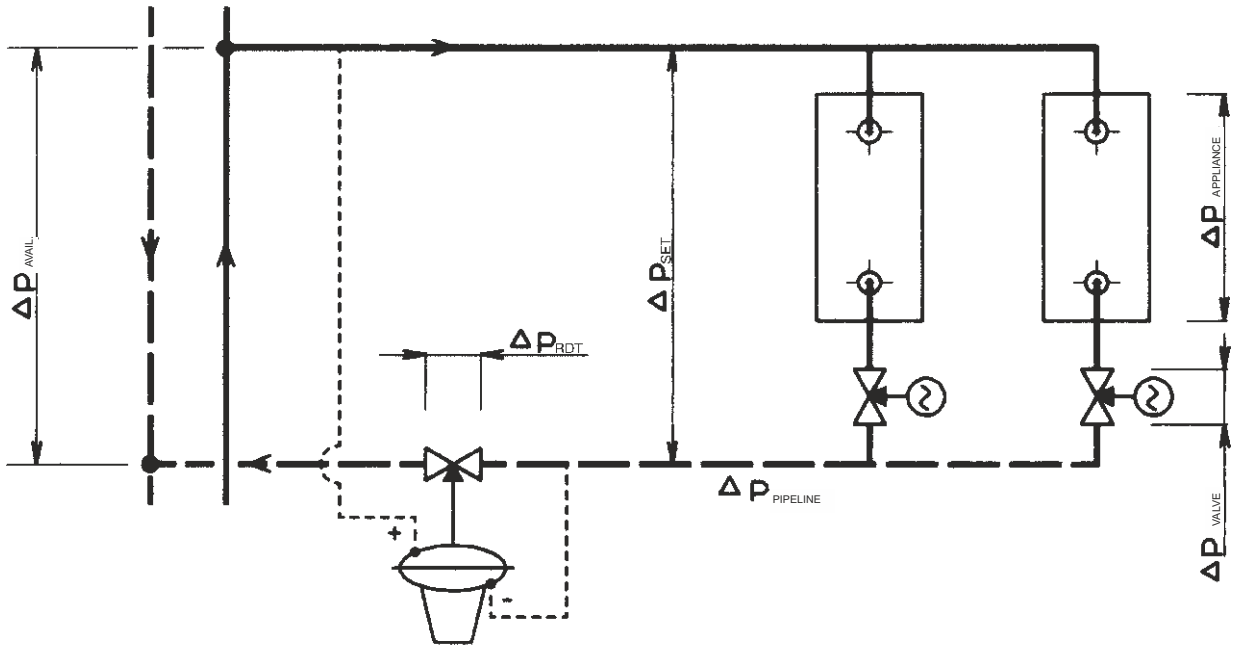
$Kvs = (1,1 \text{ to } 1,3) . Kv = (1,1 \text{ to } 1,3) . 17 = 18,7 \text{ to } 22,1\ m^3.h^{-1}$

Now we choose the nearest higher Kvs value from those available in our catalogue, i.e. Kvs = 20 $m^3.h^{-1}$. This value corres-ponds to nominal size of DN 50.
Then we select a required differential pressure value of the regulator; which is given by adding of pressure drops of the protected pipe section
$\Delta p_{SET} = \Delta p_{VALVE} + \Delta p_{APPLIANCE} + \Delta p_{PIPELINE} = 30 + 20 + 10 = 60$ kPa
Then we choose screwed pressure regulator DN 50, PN 16, with reducing pressure setting range 0,04 MPa to 0,1 MPa, with manometres and we will get the following specification code:

RD 102 D41 16/140-50

Differential pressure value Δp_{SET} required is set by adjusting screw according to the values on the manometer when piping the valve.

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



RD 102 D
RD 103 D

Self-acting control valve
of differential pressure

DN 15 to 50
PN 16

Self-acting control valves of differential pressure 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.

Application

These valves have a wide range of application in heating, water industry, air-conditioning and ventilation for temperature to140 C and to max. inlet pressure value of 1 MPa.

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

Installation

Basic operating position of regulator is when body is above controlling head that points downwards. This position must be kept especially when reducing steam pressure and temperature above 80 °C. For liguids and gases that have lower temperatures, the valve can be installed in any position.

Process media

Valves series RD 102 D, RD 103 D are designed for gases and liquids such as air, water, low-pressure 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. Medium acidity and alkalinity should not exceed range of pH 4.5 to 9.5

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

Technical data

Series	RD 102 D	RD 103 D
Function	Self-acting control valve of differential pressure	
Nominal size range	DN 15 to 50	
Nominal pressure	PN 16	
Body material	Brass 42 3135	Grey cast iron EN-JL 1040
Plug material	Brass 42 3234	
Plug - seat sealing	EPDM	
Diaphragm material	EPDM	
Process medium max. temperature	-5 to 130 °C, peaking up to 140 °C	
Face to face dimensions	Section M4 acc. to DIN 3202 (4/1982)	Section 1 acc. to ČSN-EN 558-1 (3/1997)
Connection	Internal threaded coupling	Flange type B1 (with raised face) Acc. to ČSN-EN 1092-1 (4/2002)
Type of plug	Parabolic, pressure-balanced	
Flow characteristic	Linear	
Kvs values	2 to 20 m^3 /h	
Adjustable range of diff. 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

Kvs values

DN	15	20	25	32	40	50
Kvs [m^3 /hod]	2	3.2	5	8	12.5	20

Maximal permissible inlet pressure values for RD 10x D

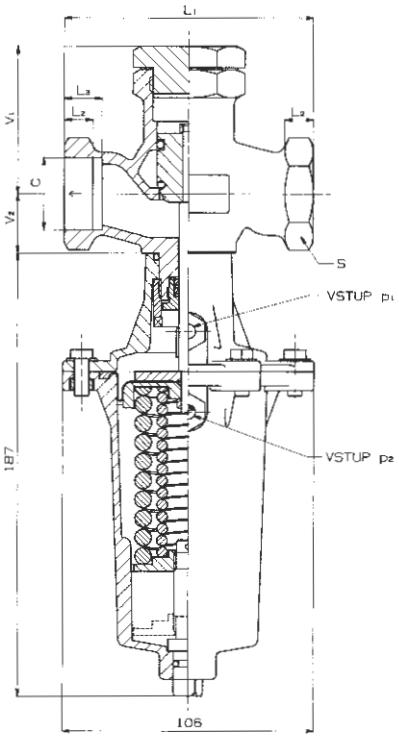
Range [MPa]	0.025 - 0.1	0.08 - 0.3	0.2 - 0.65	0.3 - 1.0
p_{1max}	0.6	0.9	1.0	1.0

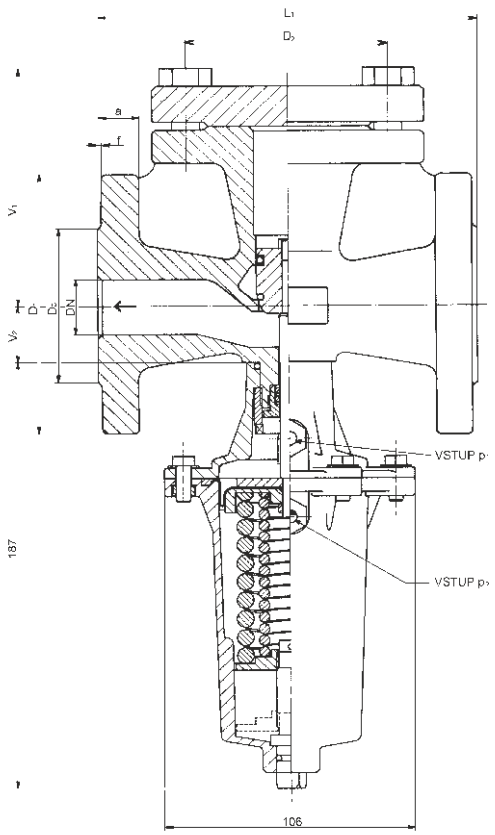
Dimensions and weights for RD 102

DN	C	L_1 mm	L_2 mm	L_3 mm	V_1 mm	V_2 mm	S mm	m 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

Dimensions and weights for RD 103

DN	D_1 mm	D_2 mm	D_3 mm	n x d mm	a mm	f mm	L_1 mm	V_1 mm	V_2 mm	m kg
15	95	65	45	4x14	16x4	2	130	89	25	5.7
20	105	75	58				150	101	25	6.8
25	115	85	68		18		160	106	25	7.8
32	140	100	78				180	118	35	10.2
40	150	110	88	4x18		3	200	128	35	11.0
50	165	125	102		20		230	145	42	14.4





Valve complete specification No. for ordering

		XX	XXX	XXX	-	XX	/	XXX	-	XX
1. Type of valve	Pressure reducing valve	**RD**								
2. Series	Valve made of brass - threaded		**102**							
	Valve made of grey cast iron - flanged		**103**							
3. Function	Differential pressure regulator			**D**						
4. Version	Without manometers			**3**						
	With manometers			**4**						
5. Reducing pressure setting range	0.04 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. Max. operating temp. °C								**140**		
8. Nominal size	DN									**XX**

Ordering example: Differential pressure regulator DN 25, PN 16, maximal temperature: 140 °C, body material: brass, connection: internal thread G 1, with spring range 0.2 to 0.65 MPa is specified as follows: **RD 102 D33-16/140-25**

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

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

tel.: +420 241 087 360
fax: +420 241 087 192
e-mail: sale@ldm.cz

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

tel.: +420 602 708 257
e-mail: tomas.kriz@ldm.cz

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

tel.: +420 465 502 411-3
fax: +420 465 531 010
e-mail: servis@ldm.cz

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

tel.: +421 2 43415027-8
fax: +421 2 43415029
e-mail: ldm@ldm.sk

LDM, Polska Sp. z o.o.
ul. Bednorza 1
40 384 Katowice
Poland

tel.: +48 32 730 56 33
fax: +48 32 730 52 33
mobile: +48 601 354 999
e-mail: ldmpolska@ldm.cz

LDM Armaturen GmbH
Wupperweg 21
D-51789 Lindlar
Germany

tel.: +49 2266 440333
fax: +49 2266 440372
mobile: +49 177 2960469
e-mail: ldmarmaturen@ldmvalves.com

OOO "LDM Promarmatura"
Jubilejniy prospekt,
dom.6a, of. 601
141400 Khimki Moscow Region
Russia

tel.: +7 4957772238
fax: +7 4956662212
mobile: +7 9032254333
e-mail: inforus@ldmvalves.com

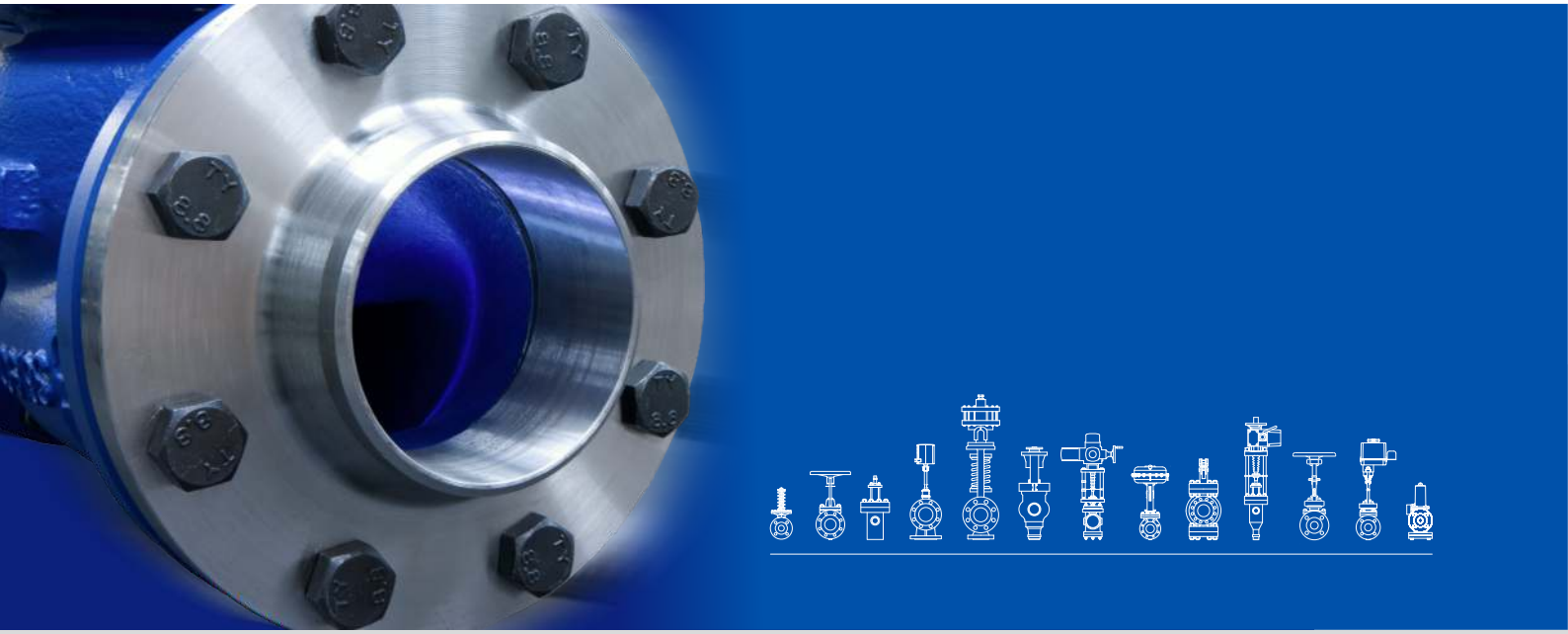
TOO “LDM”
Shakirova 33/1
kab. 103
100012 Karaganda
Kazakhstan

tel.: +7 7212 566 936
fax: +7 7212 566 936
mobile: +7 701 738 36 79
e-mail: sale@ldm.kz

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

tel.: +359 2 9746311
fax: +359 2 9746311
mobile: +359 888 925 766
e-mail: ldm.bg@ldmvalves.com

www.ldmvalves.com



POWER THROUGH IDEAS