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ISO 45001

LDM®

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10.20.GB

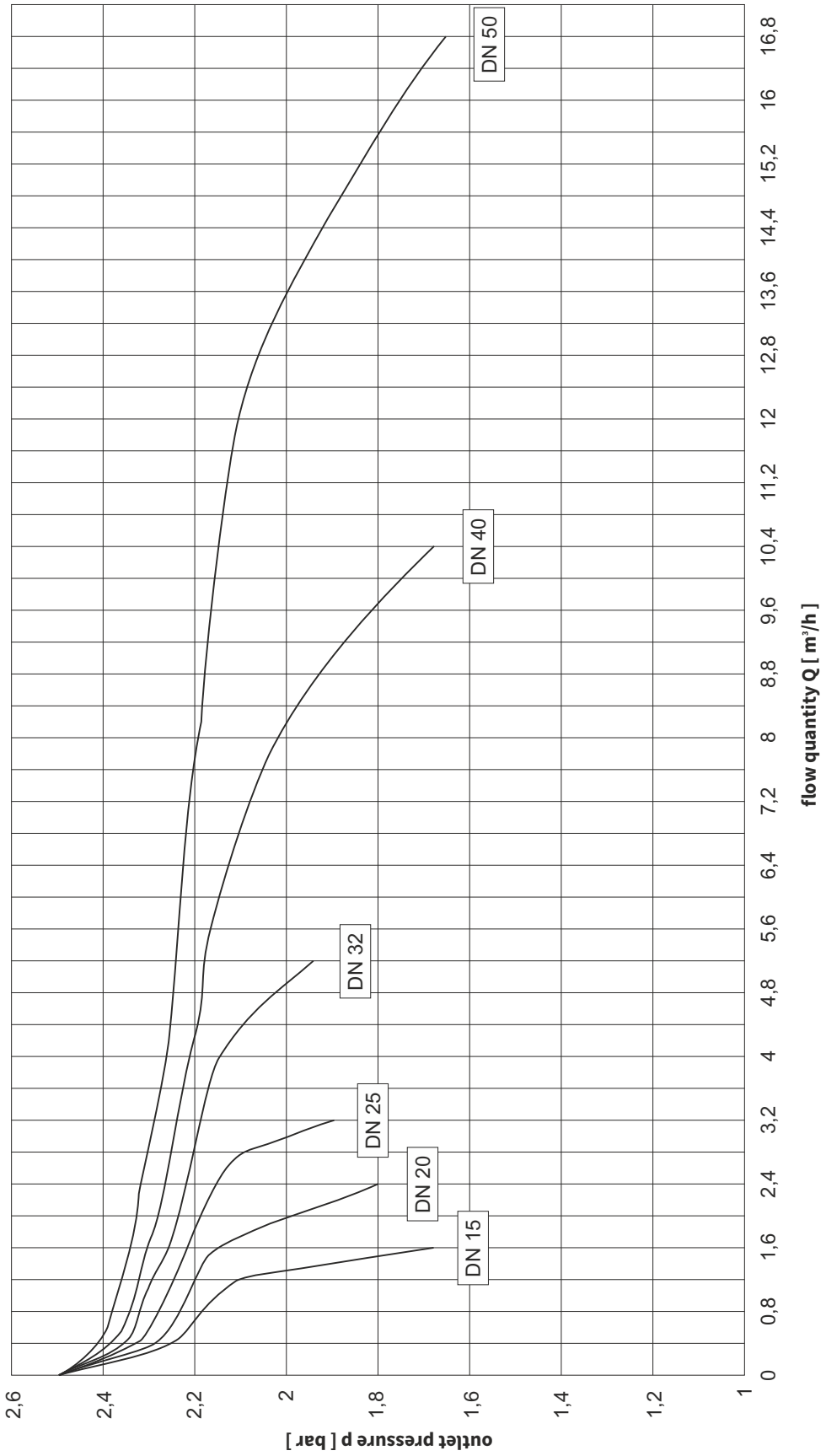
SELF-ACTING PRESSURE REGULATORS

RD 102 a RD 103

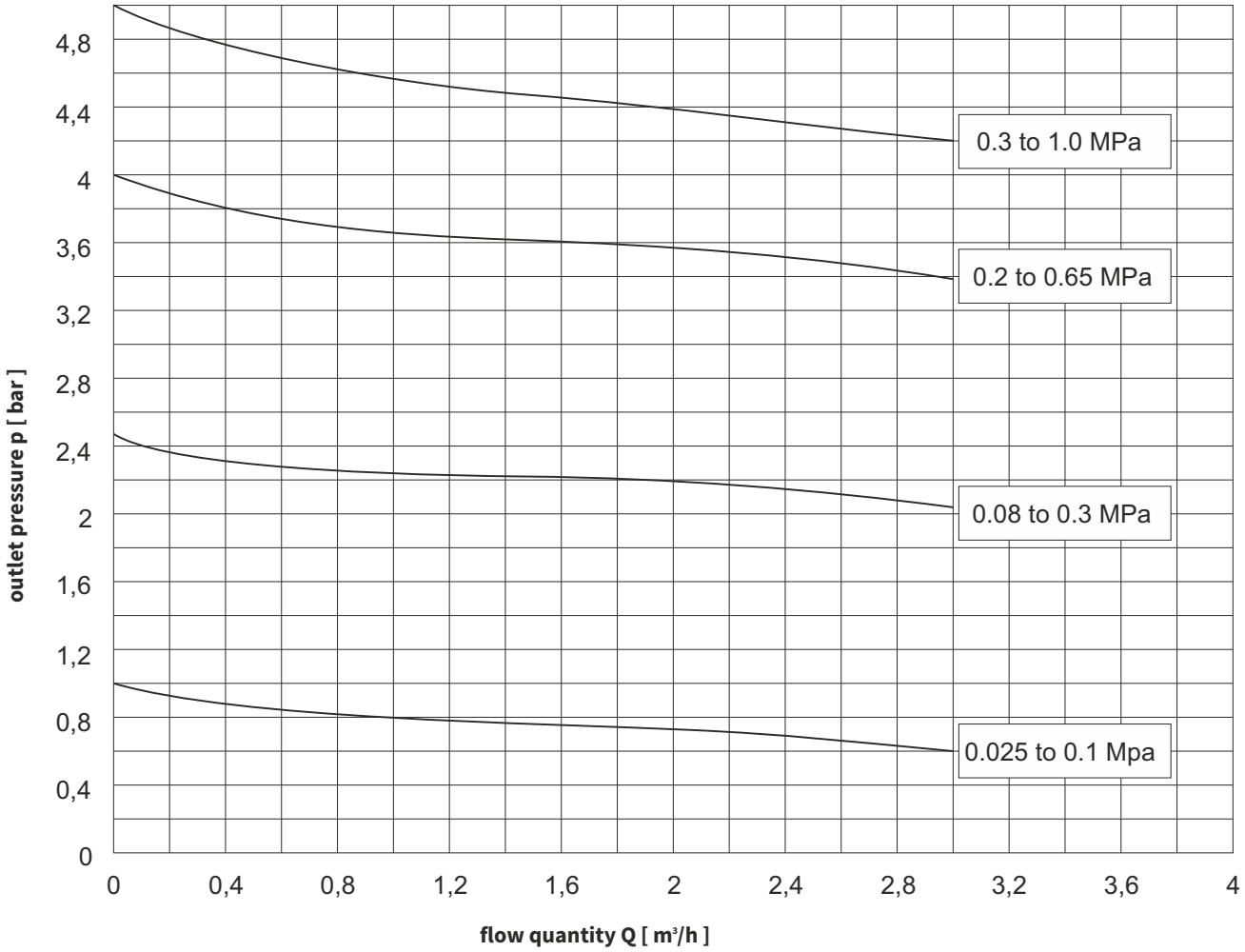
POWER THROUGH IDEAS
www.ldmvalves.com

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.

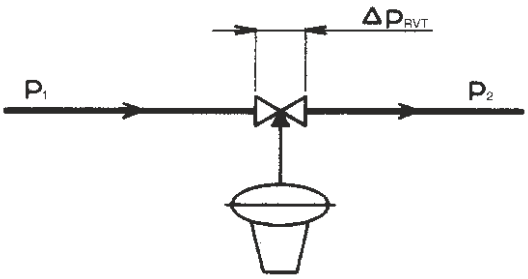
Then we choose flanged regulator of outlet pressure DN 40, PN 16, with reducing pressure setting range of 0,3 MPa to 1,0 MPa, with manometer and we will get the following specification code:

RD 103 V14 16/140-40

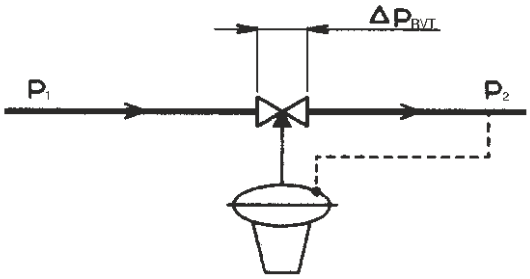
Required value of outlet pressure p is set with adjusting screw according to values on manometer when piping the valve.

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):

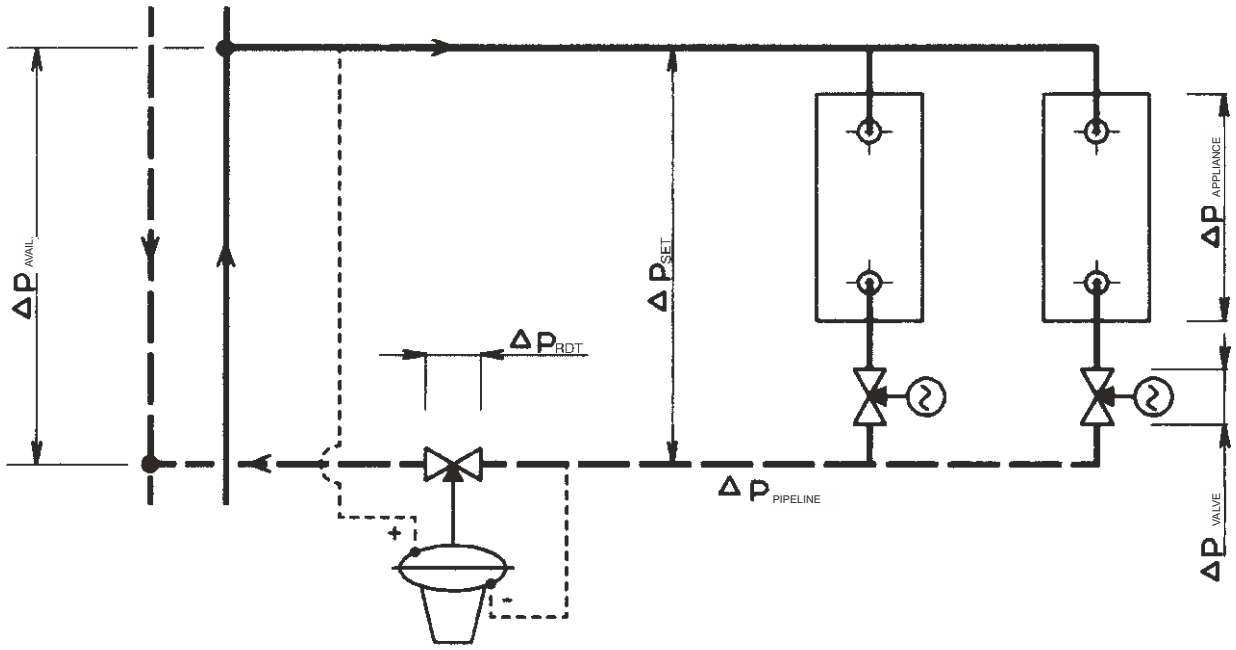
$Kvs = (1,1 \text{ to } 1,3) . Kv = (1,1 \text{ to } 1,3) . 17 = 18,7 \text{ to } 22,1\ m^3.h^{-1}$

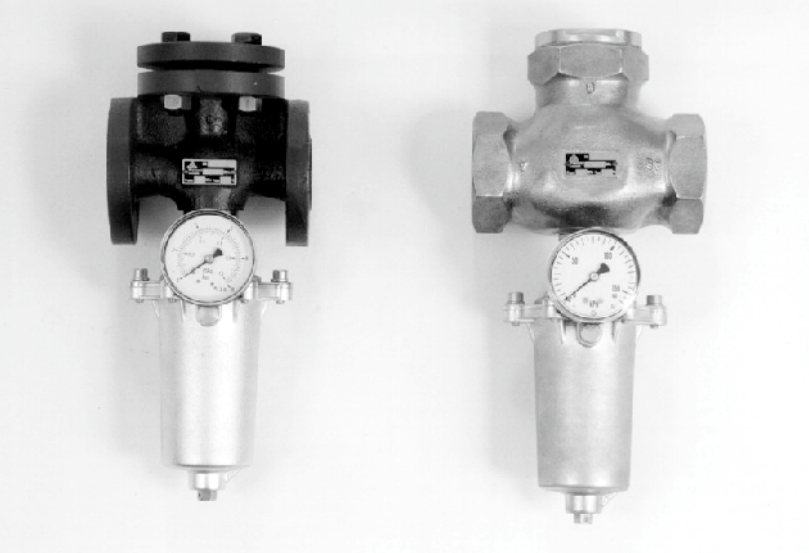
Now we choose the nearest higher Kvs value from those available in our catalogue, i.e. Kvs = 20 $m^3.h^{-1}$. This value corres-ponds to nominal size of DN 50.
Then we select a required differential pressure value of the regulator; which is given by adding of pressure drops of the protected pipe section
$\Delta p_{SET} = \Delta p_{VALVE} + \Delta p_{APPLIANCE} + \Delta p_{PIPELINE} = 30 + 20 + 10 = 60$ 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 V
RD 103 V

Self-acting control valve
of outlet pressure

DN 15 to 50
PN 16

Self-action control valves of outlet pressure RD 102 V and RD 103 V are valves designed for medium pressure reducing and keeping it at required value. Such function is ensured by diaphragm exposed to infuence of observed pressure from one side and controlled by spring from the other side. Diaphragm´s deflection transfers to valve plug and when pressure drops in relation to increase of medium bleeding, then closing of valve is induced. Owing to pressure-balanced plug, value of outlet pressure is not influenced by changes of inlet pressure value.

Regulator is equipped with manometers, according to which required outlet pressure value can be directly adjusted (within range of used spring) and read its actual value when operating.

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

Version with inlet of reducing pressure from extraction from pipeline is supplied with impulse pipe.

Application

These valves have a wide range of application in heating, water industry, air-conditioning and ventilation for temperature to 140 °C. They can be installed in regulation circuits, where reduction of medium pressure must be secured without the necessity of application of any other measuring device and energy supply.

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 V, RD 103 V 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 the valve, producer recom-mends to pipe a strainer in front of the valve into pipeline. In application where increase of reducing pressure above adjusted value could cause a considerable breakdown of a system, producer recommends to pipe a safety valve behind pressure regulator into pipeline.

Technical data

Series	RD 102 V	RD 103 V
Function	Self-acting control valve of outlet 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	Acc. to DIN 3202 (4/1982) - M4	Acc. to ČSN-EN 558-1 (3/1997)
Connection	Internal threaded coupling	Flange type B1 (with raised face)
	Acc. to ČSN-EN ISO 228-1 (9/2003)	Acc. to ČSN-EN 1092-1 (4/2002)
Type of plug	Parabolic, pressure-balanced	
Flow characteristic	Linear	
Kvs values	2 to 20 m^3/hour	
Adjustable range of outlet pressure values	0.04 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 /h]	2	3.2	5	8	12.5	20

Maximal permissible inlet pressure values for RD 10x V

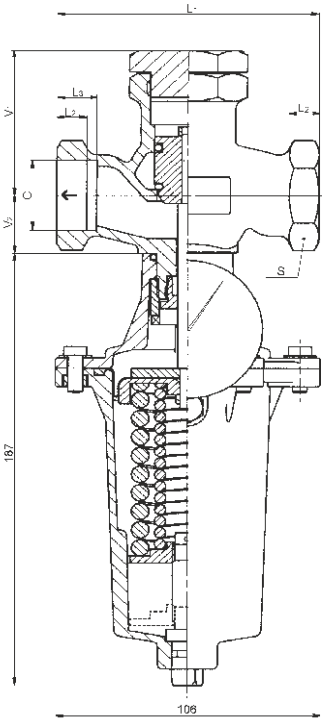
Range [MPa]	**0.025 - 0.1**	**0.08 - 0.3**	**0.2 - 0.65**	**0.3 - 1.0**
p_{1max}	0.6	0.9	1.2	1.6

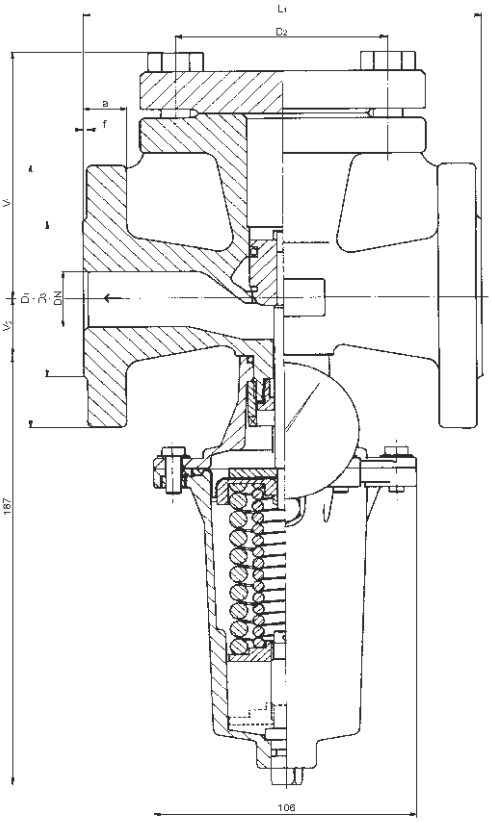
Dimensions and weights for RD 102

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	Outlet pressure regulator			**V**						
4. Version	With direct inlet of reducing pressure			**1**						
	With inlet of reducing press. from extraction from pipeline			**2**						
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: Outlet pressure regulator DN 25, PN 16, maximal temperature: 140 °C, body material: brass, connection: internal thread G 1, with direct inlet of reducing pressure, with spring range 0.2 to 0.65 MPa is specified as follows:
RD 102 V13-16/140-25

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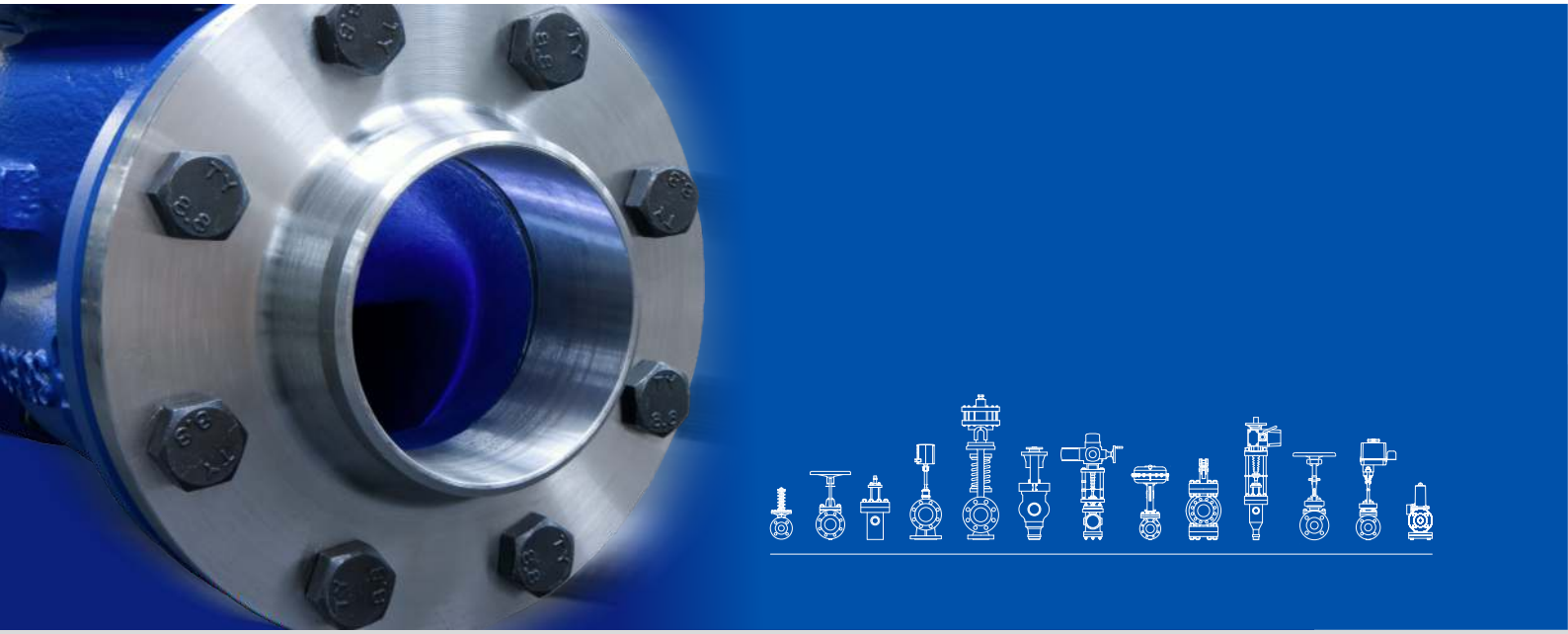

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