FMDR51

Forbes Marshall Direct Acting Pressure Reducing Valve

Description

The Forbes Marshall FMDR51 direct acting, compact and bellow operated pressure reducing valve with integral maintainable strainer, made up of steel body. These are used in small process equipments for steam applications.

Sizes and End Connections

DN15, 20 and 25
Screwed: BSPT / NPT / BSP*
Available with IBR certificate on request.

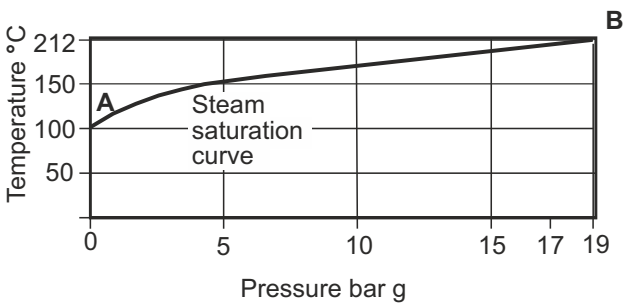
Limiting Conditions

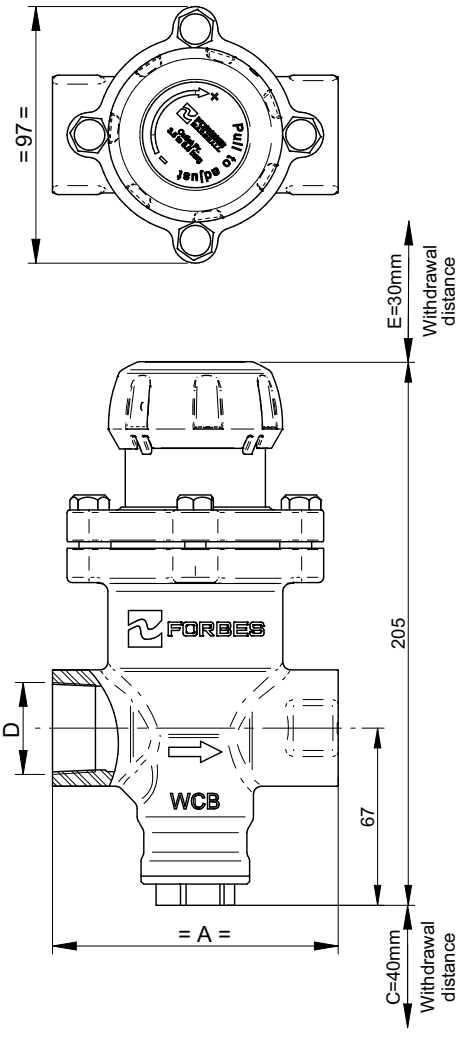
PMO-Maximum operating pressure		19 bar g @ 212°C
TMO-Maximum operating temperature		212°C @ 19 bar g
Cold Hydrostatic test pressure #		28.5 bar g
Minimum allowable temperature		-10°C
Minimum operating temperature		0°C
Maximum differential Pressure		19 bar g
Maximum recommended turndown ratio		10:1@ Max.flow
Max. down stream reduced pressure		8.6 bar g
Down stream pressure control range	Spring Colour code	Spring Range
	YELLOW	0.14 - 1.7 bar g
	GREEN	1.4 - 4.0 bar g
	ORANGE	3.5 - 8.6 bar g

Note:

1.FMDR51 pressure reducing valves are supplied with one of three colour coded springs which are identified by sticker on the adjustment handwheel.
2.Where control spring range overlaps always use the lower range to give better control.
3.With internals fitted, test pressure should not exceed 19 bar g.
* 4.For IBR certified valves FMDR51 with BSP screwed ends, operating pressure limited to 12 barg

Operating Range:



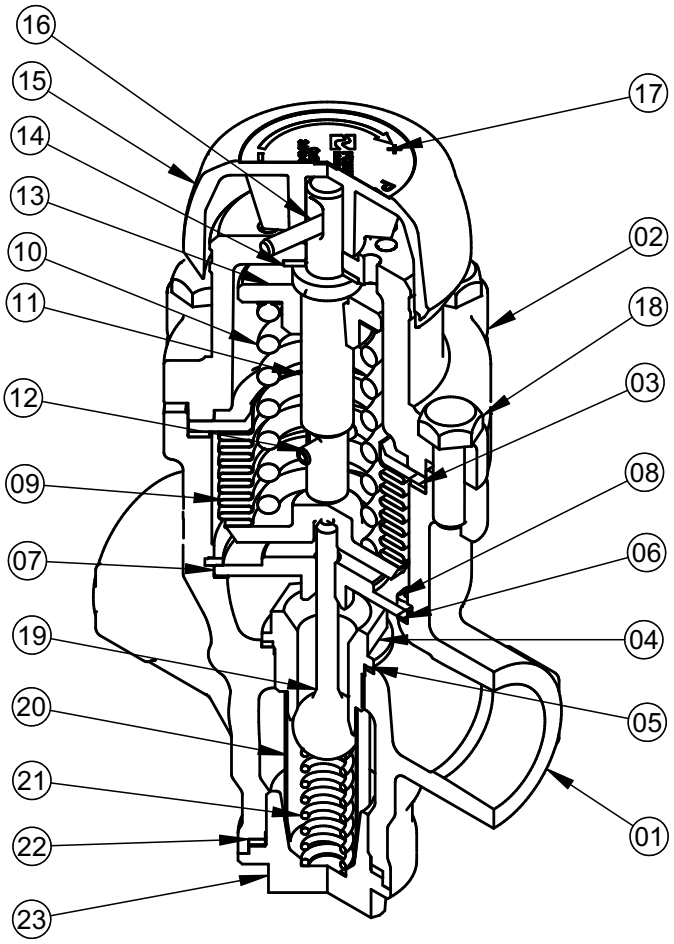


FMDR51 with Screwed ends

FMDR51 PRESSURE REDUCING VALVE DETAILS			
VALVE SIZE	D	A	WEIGHT
DN15	1/2" BSPT	83mm	2.1 kg
	1/2" BSP *		
	1/2" NPT		
DN20	3/4" BSPT	96mm	2.2 kg.
	3/4" BSP *		
	3/4" NPT		
DN25	1" BSPT	108mm	2.3 kg.
	1" BSP *		
	1" NPT		

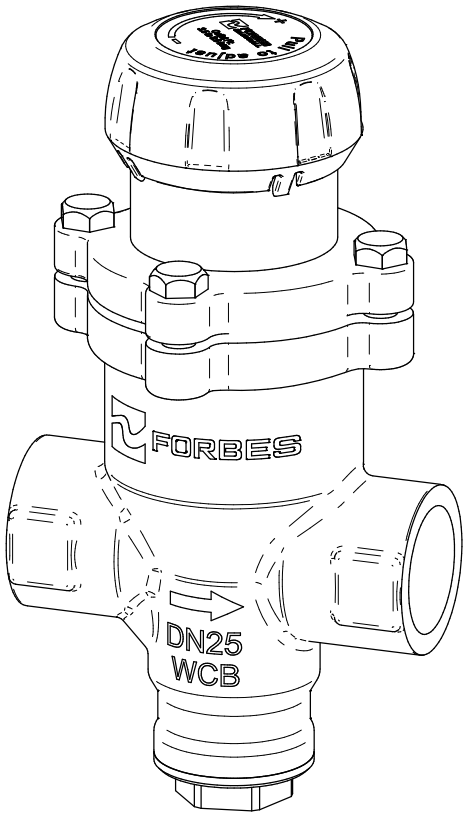
Materials

PART NO.	PART	MATERIAL	QTY.
1	BODY	ASTM A216 GR. WCB	1
2	BONNET	BS1490 LM24	1
3	BODY GASKET	SS 304 + GRAPHITE	1
4	SEAT	ASTM A276 TYPE 431	1
5	SEAT GASKET	SS 304 + GRAPHITE	1
6	SEAL RING	PTFE	1
7	PLUG GUIDE PLATE	ASTM A276 TYPE 431	1
8	CIRCLIP	ASTM A240 TYPE 304	1
9	BELLOW	ASTM A 276 TYPE 316L	1
10	SPRING	SPRING STEEL	1
11	SPINDLE	ASTM A276 TYPE 431	1
12	SPIRAL DOWEL PIN	SS 304	1
13	SPRING PLATE	IS 210 GR. Fg200	1
14	THRUST WASHER	STEEL+PTFE	1
15	HANDWHEEL	NYLON+30% GLASS FILLED	1
16	DOWEL PIN	SS 304	1
17	PRESSURE RANGE STICKER	NT- POLYSTER	1
18	HEX BOLT	ASTM A 193 GR. B7	4
19	PLUG	ASTM A276 TYPE 316	1
20	STRAINER SCREEN	ASTM A240 TYPE 304	1
21	PLUG SPRING	IS4454 PART-4 GR.3	1
22	STRAINER CAP GASKET	SS 304 + GRAPHITE	1
23	STRAINER CAP	ASTM A105	1



FMDR51 Sectional View

FMDR51



Steam Capacity Chart

From the Capacity chart, find the upstream pressure from row and required regulator downstream pressure from column. Follow this across chart to nearest capacity that meets requirements. Follow vertically up to determine appropriate valve size. when exact application values are not shown, interpolate between values. Select a model with the spring range that accommodates the required downstream set pressure.

FMDR51 Steam Flow Capacity Kg/hr

DOWNSTREAM PRESSURE barg (x100=kPa)

UPSTREAM PRESSURE barg (x100=kPa)		0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.6
2	DN15	14	23	29														
	DN20	18	29	37														
	DN25	25	40	51														
3	DN15	19	30	41	50	53												
	DN20	24	38	51	63	67												
	DN25	33	52	71	86	92												
4	DN15	23	38	49	60	66	70	70										
	DN20	29	48	62	75	83	88	88										
	DN25	40	66	85	104	114	121	121										
5	DN15	26	41	53	66	76	83	88	89	89								
	DN20	33	51	67	83	96	105	111	112	112								
	DN25	46	71	92	114	132	144	153	154	154								
6	DN15	30	44	60	71	83	91	99	103	103	103	103						
	DN20	38	56	75	90	105	115	125	130	130	130	130						
	DN25	52	77	104	124	145	158	172	179	179	179	179						
7	DN15	33	48	64	76	89	98	106	111	115	125	114	108	108				
	DN20	41	61	81	96	112	124	134	140	145	158	144	136	136				
	DN25	57	84	112	132	154	171	184	192	199	218	198	187	187				
8	DN15	38	52	70	83	95	106	115	121	127	132	133	131	127	127			
	DN20	48	66	88	105	120	134	145	153	160	167	168	165	160	160			
	DN25	66	91	121	144	165	184	199	211	220	230	231	227	220	220			
9	DN15	39	56	74	85	100	112	120	131	137	143	144	148	150	148	143	143	
	DN20	49	71	94	107	126	142	151	166	173	180	182	187	190	187	180	180	
	DN25	68	97	129	147	173	195	208	228	238	248	251	257	261	257	248	248	
10	DN15	40	58	77	88	102	114	125	134	144	152	156	160	164	165	165	166	165
	DN20	51	73	98	111	129	144	158	170	182	192	197	202	207	208	208	209	209
	DN25	70	100	134	153	178	198	217	233	250	264	271	278	284	286	286	288	288
11	DN15	43	61	81	92	109	122	136	147	159	169	176	182	187	193	197	200	200
	DN20	54	77	102	117	138	154	172	186	201	213	222	230	236	243	249	253	253
	DN25	74	106	140	160	190	212	237	256	277	293	305	316	324	335	342	352	352
12	DN15	45	64	84	96	114	127	143	154	166	176	185	192	198	204	210	216	220
	DN20	57	81	106	121	144	160	181	195	210	222	233	243	250	258	266	273	278
	DN25	79	111	146	166	198	220	249	268	289	305	321	334	344	355	365	375	382
13	DN15	48	67	88	100	117	133	148	160	174	185	194	202	211	219	226	233	239
	DN20	61	84	111	127	148	168	187	202	220	233	245	255	267	277	285	294	302
	DN25	84	116	153	174	204	231	257	278	303	321	337	351	367	381	392	404	415
17	DN15	51	71	90	105	123	139	154	166	181	193	205	215	225	234	242	250	257
	DN20	64	89	114	132	155	176	195	210	229	243	259	272	284	296	305	315	325
	DN25	88	123	157	182	213	242	268	289	315	335	356	374	390	407	420	434	447

NOTE-

1. Downstream pressure must not exceed 90% of upstream pressure.
2. Downstream pressure should not be less than 20% of upstream pressure (for better accuracy)
3. Maximum recommended turndown ratio 10:1
4. Select proper downstream pressure control range (Yellow: 0.14-1.7barg, Green:1.4-4barg, Orange: 3.5-8.6barg)
5.Where downstream pressure control range overlaps always use the lower range to give better control.

How to Use the Chart

A valve is required to pass maximum 115 kg/h steam from 6 barg to 3 barg, follow the steam capacity chart using a respective row for upstream pressure and a column for downstream pressure, to determine appropriate valve size.

Select DN20 FMDR51 with downstream pressure control range 0.14barg to 4 barg.

Superheated steam

Because of the higher specific volume of superheated steam a correction factor must be applied to the figure obtained from the chart above. For 55°C of superheat the factor is 0.95 and for 100°C of superheat the factor is 0.9 Using the example given for saturated steam, the DN20 valve would pass 135x0.95=128kg/hr. if the steam had 55°C superheat. It is still big enough to pass the required load of 115kg/hr.

KV Values

The Kv values are full capacities and should be used for safety valve sizing purpose only.

SIZE	DN15	DN20	DN25
Kvs	1.5	2.5	3.0

For conversion Cv (UK)=Kv x 0.963
Cv (US)=Kv x 1.156

How to Order

1 no.Forbes Marshall Direct Acting Pressure Reducing Valve, DN 20 FMDR51 having a 0.14-4.0 bar g spring range with BSPT screwed end.

Installation note

The direct acting pressure reducing valve should be installed in a horizontal pipeline, protected by a separator, with the direction of flow as indicated by the arrow on the valve body.

Safety Information, Installation and Maintenance

For full details see the user manual supplied with the product.

Spare Parts

For spares refer user manual.

Recommended Tightening Torques

Part No.	Part Name	Hex. A/F	Torque
4	Seat	24mm	40-45Nm
23	Strainer cap	27mm	45-50Nm
18	Hex. bolt M8	13mm	20-25Nm

FORBES MARSHALL

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