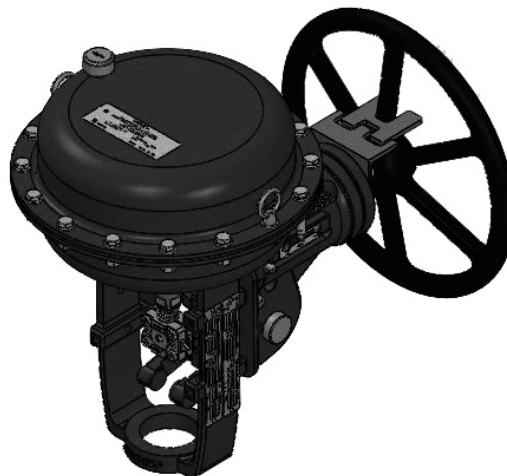


Series VD Pneumatic diaphragm actuators

Metso's Neles® series VD actuators are exclusively developed for linear valves. They provide safe and reliable operation and are well suited for many different kind of applications. The high performance internal coating resists wear and corrosion and the replaceable inner parts guarantee a long life cycle. The VDD/VDR series diaphragm actuator is well suited for most of the control applications.

Construction

- Excellent long lasting accuracy and reliability is achieved through the use of multiple springs and rolling diaphragm in the actuator.
- The use of involute rolling diaphragm permits long travel and excellent linearity without the need of expensive hardware normally associated with diaphragm actuators.
- A wide selection of spring ranges are available
- The actuator is field reversible between direct and reverse acting
- The rugged one piece yoke, pressed steel diaphragm case and special nylon reinforced diaphragm provide dependable, high thrust performance
- Optional handwheel for manual operation

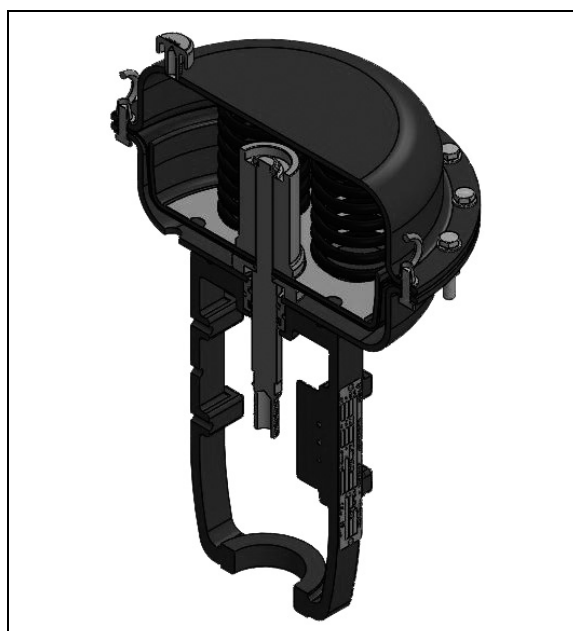


Simple and cost effective

- Simple and cost effective design guarantee increased life time and reliability. No accurately honed bores with delicate sealing systems are required
- Low cost, simple maintenance
- High performance, low friction rolling diaphragm gives good control performance



VDD, Direct
Air to stem extend
Field-reversible VDD



VDR, Reverse
Air to stem retract
Field-reversible VDR

VD Diaphragm actuators design details

VD specifications

Actuator size	Effect area		Volume		Actuator stem size (Φ)		Maximum stroke		Max. allowable pressure	
	cm ²	inch ²	dm ³	inch ³	mm	inch	mm	inch	bar	psi
VD_25	270	42	0.9	54.9	24.0	0.95	20	0.8	4.2	60
VD_29	390	60	1.8	109.8	24.0	0.95	40	1.6		
VD_37	640	99	3.5	213.5	24.0	0.95	50	2.0		
VD_48	1130	175	10.2	622.4	35.0	1.38	70	2.8		
VD_55	1520	236	18.2	1110.0	35.0	1.38	80	3.2		

VD Spring ranges and max. travel (stroke)

Actuator size	VDR (Air to open)						VDD (Air to close)					
	Spring range		Supply air set pressure		Max. travel		Spring range		Supply air set pressure		Max. travel	
	bar	psi	bar	psi	mm	inch	bar	psi	bar	psi	mm	inch
VD_25	0.8~2.6	11~37	3.2	46	20	0.8	0.8~2.6	11~37	3.2	46	20	0.8
	1.5~3.4	21~48	3.9	56			1.5~3.4	21~48	3.9	56		
VD_29	0.8~2.6	11~37	3.2	46	40	1.6	0.8~2.6	11~37	3.2	46	40	1.6
	1.5~3.4	21~48	3.9	56			1.5~3.4	21~48	3.9	56		
VD_37	0.8~2.6	11~37	3.5	50	50	2.0	0.8~2.6	11~37	3.5	50	50	2.0
	1.5~3.4	21~48	3.9	56			1.5~3.4	21~48	3.9	56		
VD_48	0.8~2.6	11~37	3.5	50	70	2.8	0.8~2.6	11~37	3.5	50	70	2.8
	1.5~3.4	21~48	3.9	56			1.5~3.4	21~48	3.9	56		
VD_55	0.8~2.6	11~37	3.5	50	80	3.2	0.8~2.6	11~37	3.5	50	80	3.2
	1.5~3.4	21~48	3.9	56			1.5~3.4	21~48	3.9	56		

VD Stroking times

Size	Stroke (mm)	ND model	Stroking time (sec.)			
			Case-1		Case-2	
			Load	Vent	Load	Vent
VD_25	20	ND 9202	4	5	4	5
	20	ND 9203	2	3	2	3
VD_29	20	ND 9203	4	5	4	5
	40	ND 9203	6	8	6	8
VD_37	20	ND 9203	7	9	7	9
	40	ND 9203	11	14	11	14
	50	ND 9203	12	17	12	17
VD_48	20	ND 9206	4	7	6	7
	40	ND 9206	5	9	8	9
	50	ND 9206	6	10	9	10
	60	ND 9206	7	11	10	11
	70	ND 9206	8	12	11	12
VD_55	20	ND 9206	6	9	8	9
	40	ND 9206	7	11	10	11
	50	ND 9206	11	13	12	13
	60	ND 9206	12	15	14	15
	70	ND 9206	13	17	16	17
	80	ND 9206	14	18	17	18

- Note :
1. Mounted with ND 9200 smart positioners
 2. Case-1 : when applied B72G-1AS-980 Air set
Case-2 : when applied YT-200BN210 Air set
 3. VD model & spring range : VDR, 0.8~2.6 bar
 4. Air supply pressure : 3.2 barg
 5. Stroking time accuracy : ± 10 %

VD Temperature ranges

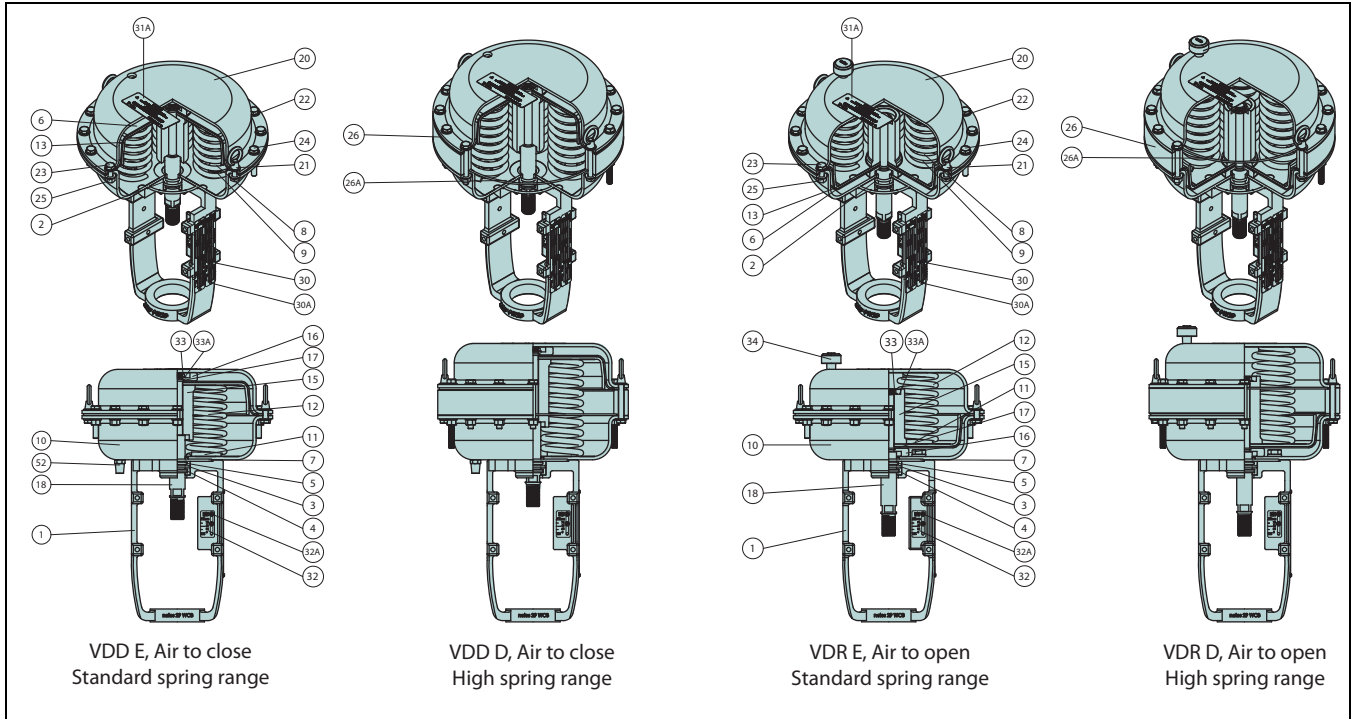
Description	Standard VD	Low. temp. VD	Arctic VD model
Temp. range	-20 °C to +85 °C	-40 °C to +70 °C	-53 °C to +70 °C
Type code ref. (sign 6-9)	AEAK	AELK	ASSK

- Note :
1. Temperature: Ambient temperature
 2. Type code reference: Please see in page 7 (materials).
 3. Other low temperature ranges: Please contact Metso.
 4. Arctic VD is available in control service only.

VD Air supply connections

Standard	1/4" NPT for all sizes
Optional	3/8", 1/2" NPT and others

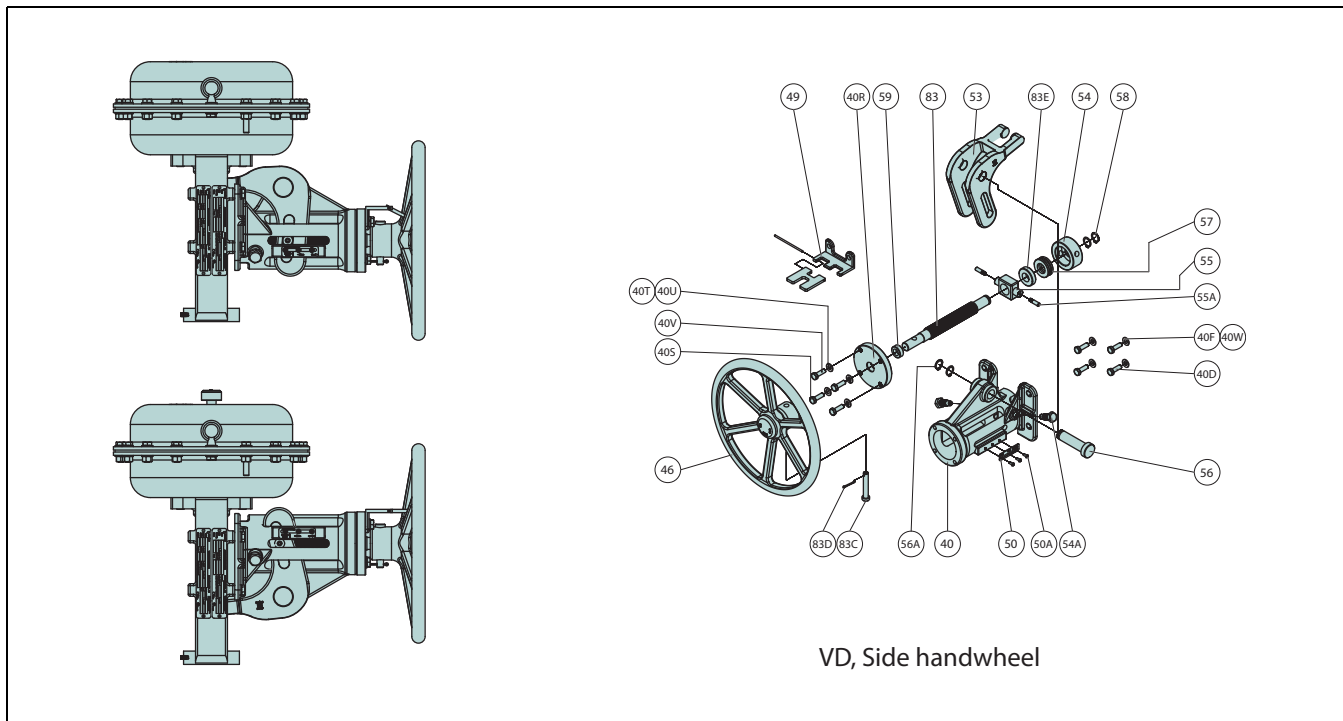
VD, Actuator constructions without handwheel



VD, Standard parts & materials without handwheel

Part No.	Description	Material
001	YOKE	ASTM A216 gr. WCB
002	STEM GUIDE	ASTM B209 ALLOY 6061 T6
003	O-RING	NITRILE, NBR
004	U-PACKING	NITRILE, NBR
005	O-RING	NITRILE, NBR
006	DIAPHRAGM	EPDM
007	O-RING	NITRILE, NBR
008	HEXAGON SCREW	ISO 3506 A2-70
009	WASHER	BRONZE
010	LOWER CASE	JIS G3101_SS400
011	SPRING SEAT	JIS G3101_SS400+Zn
012	SPRING	JIS G3560_SWOSC-B
013	DIAPHRAGM PLATE	JIS G3101_SS400
015	STOPPER	JIS G3101_SS400+Zn
016	STEM ROD PLATE	JIS G3101_SS400+Zn
017	O-RING	NITRILE, NBR
018	TOP STEM	AISI 304+HCr
020	UPPER CASE	JIS G3101_SS400
021	LIFTING EYE NUT	AISI 304
022	WASHER	AISI 304
023	HEXAGON SCREW	ISO 3506 A2-70+MoS2
024	HEXAGON SCREW	ISO 3506 A2-70
025	HEXAGON NUT	ISO 3506 A2-70+MoS2
026	SPACER RING	JIS G3101_SS400
026A	O-RING	NITRILE, NBR
030	IDENTIFICATION PLATE	AISI 304
030A	RIVET	AISI 304
031A	STICKER (WARNING)	
032	INDICATOR	AISI 304
032A	ROUND HEAD SCREW	AISI 304
033	STEM NUT	AISI 304
033A	LOCK WASHER	AISI 304
034	VENT CAP	ASTM A351 gr. CF8
052	SILENCER	STAINLESS STEEL

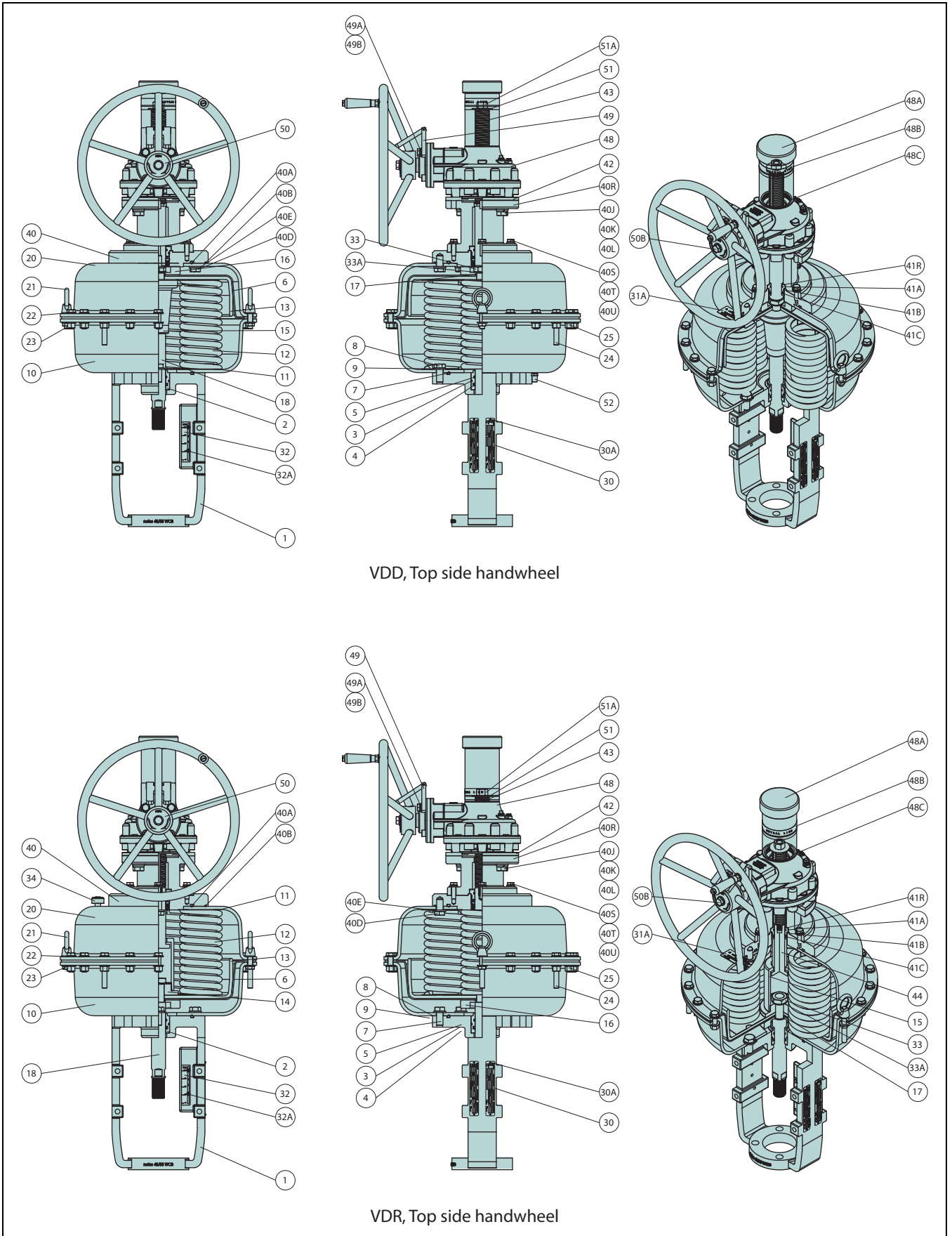
VD_25/29/37, Actuator constructions with handwheel



VD_25/29/37, Standard parts & materials with handwheel

Part No.	Description	Material
040	HANDLE BASE	ASTM A216 gr. WCB
040D	HEXAGON SCREW	ISO 3506 A2-70
040F	SPRING WASHER	AISI 304
040R	HANDLE BASE COVER	JIS G3101-SS400
040S	HEXAGON SCREW	ISO 3506 A2-70
040T	WASHER	AISI 304
040U	SPRING WASHER	AISI 304
040V	HEXAGON SCREW	ISO 3506 A2-70
040W	WASHER	AISI 304
046	HANDLE	ASTM B209 ALLOY 6061 T6
049	LOCKING HANDLE	AISI 304
050	HANDLE INDICATOR	ALUMINIUM
050A	ROUND HEAD SCREW	AISI 304
053	LEVER ARM	ASTM A747 gr. CB7Cu-1
054	BEARING FLANGE	AISI 304
054A	BEARING FLANGE SCREW	ISO 3506 A2-70
055	SHAFT FLANGE	JIS G4051-S45C
055A	SHAFT FLANGE SCREW	AISI 304
056	LEVER ARM SHAFT	AISI 304
056A	SNAP RING	AISI 304
057	THRUST BALL BEARING	JIS G3101-SS400
058	SNAP RING	AISI 304
059	DU DRY BEARING	AISI 304+PTFE+Pb
083	HANDLE SHAFT	JIS G4051-S45C
083C	SHAFT PIN	AISI 304
083D	SPLIT PIN	CARBON STEEL+ZINC
083E	SHAFT GUIDE	AISI 304

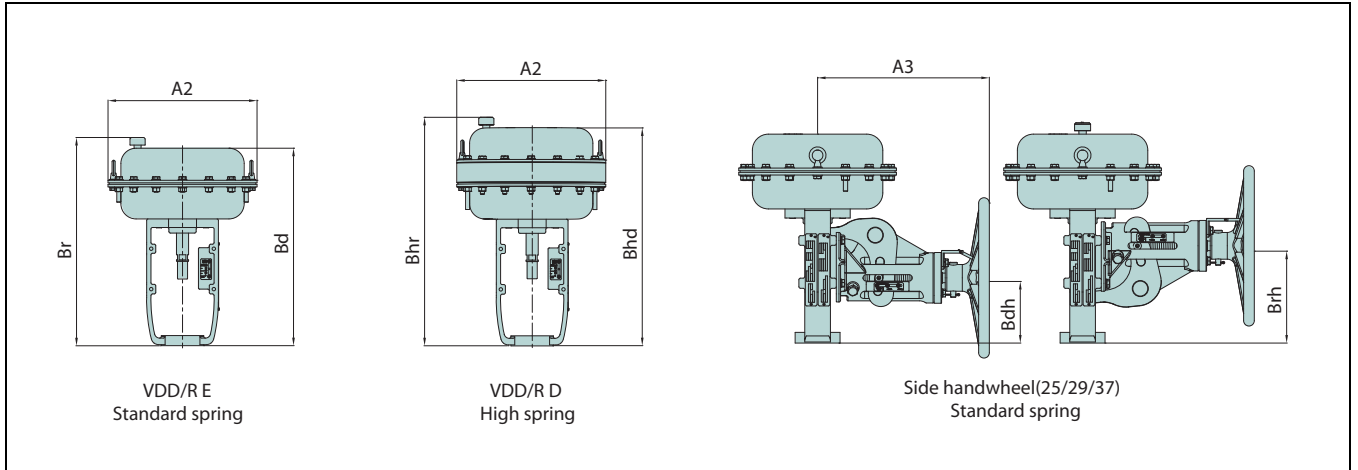
VD Diaphragm actuators



Part No.	Description	Material
040	HANDLE BASE	JIS G3101-SS400
040A	O-RING	NITRILE, NBR
040B	O-RING	NITRILE, NBR
040D	HEXAGON SCREW	ISO 3506 A2-70
040E	WASHER	BRONZE
040J	HEXAGON SCREW	ISO 3506 A2-70
040K	WASHER	AISI 304
040L	SPRING WASHER	ISO 3506 A2-70
040R	HAND WHEEL COVER	JIS G3101-SS400
040S	HEXAGON SCREW	ISO 3506 A2-70
040T	WASHER	AISI 304
040U	SPRING WASHER	AISI 304
041A	O-RING	NITRILE, NBR
041B	O-RING	NITRILE, NBR
041C	U-PACKING	NITRILE, NBR
041R	HANDLE GUIDE BUSH	BRASS
042	SCREW GUIDE PLATE	JIS G3101-SS400
043	HAND WHEEL SCREW	AISI 304
044	HAND WHEEL STEM	JIS G3101-SS400+Zn
048	GEAR BOX	DUCTILE IRON
048A	GEAR BOX CAP	PMMA
048B	STICKER	
048C	O-RING	NITRILE, NBR
049	LOCKING HAND WHEEL	JIS G3101-SS400
049A	HEXAGON SCREW	ISO 3506 A2-70
049B	SPRING WASHER	AISI 304
050	HANDLE WHEEL INDICATOR	ALUMINIUM
050B	HEXAGON SCREW	ISO 3506 A2-70
051	INDICATOR PLATE	AISI 304
051A	HEXAGON NUT	ISO 3506 A2-70

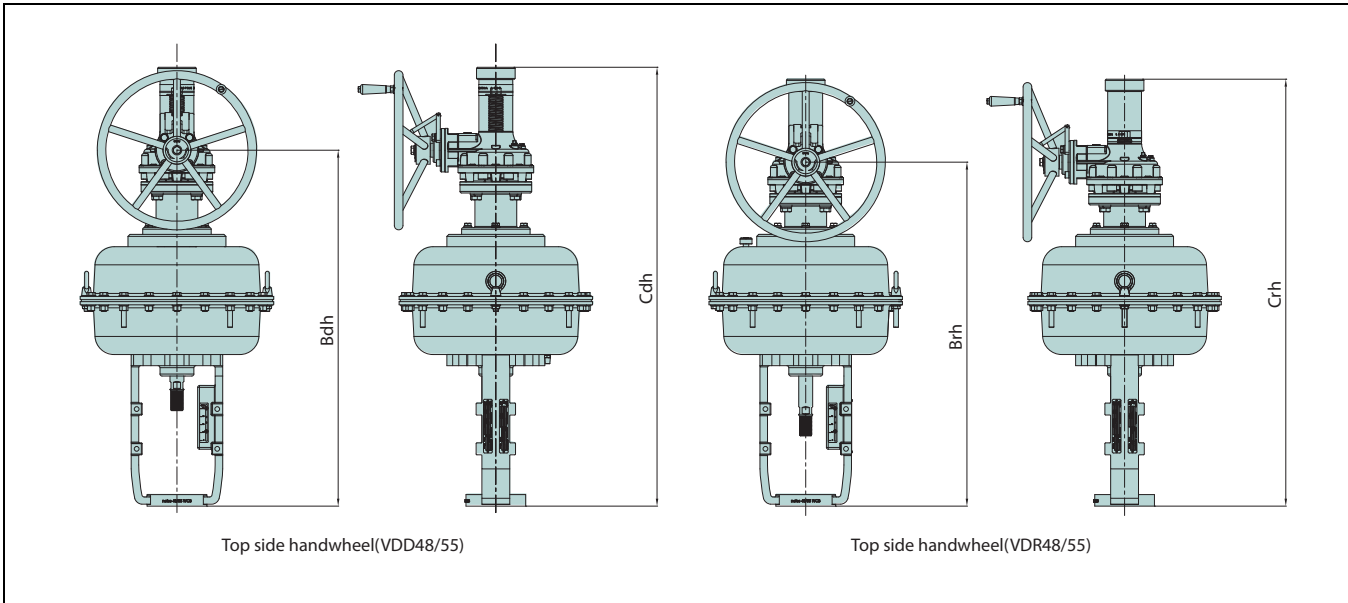
VD Diaphragm actuators

Actuators dimensions



Dimension (mm)	Without handwheel				With handwheel					
	Size (mm)	A2	Bd / Bhd	Br / Bhr	Weight (kg)	A2	A3	Bdh	Brh	Weight (kg)
VD_25 E		255	348	373	12	255	312	110	170	23
VD_25 D		255	373	395	17					
VD_29 E		295	391	416	18	295	312	122	182	29
VD_29 D		295	431	453	26					
VD_37 E		375	464	489	28	375	352	131	211	43
VD_37 D		375	514	535	46					

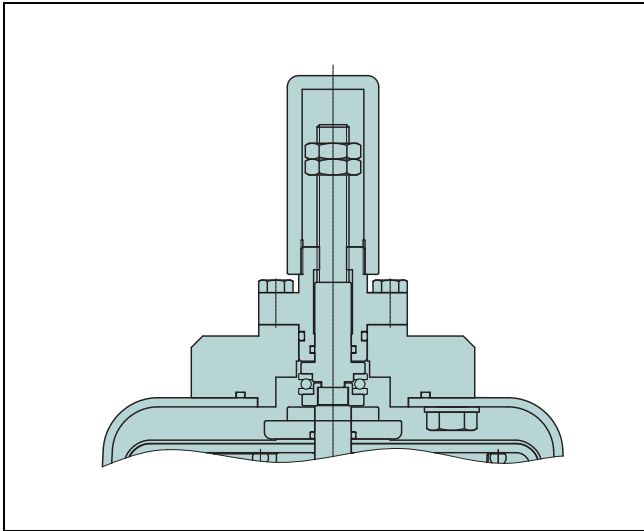
Dimension (inch)	Without handwheel				With handwheel					
	Size (inch)	A2	Bd / Bhd	Br / Bhr	Weight (lbs)	A2	A3	Bdh	Brh	Weight (lbs)
VD_25 E		10	14	15	26	10	12	4	7	51
VD_25 D		10	15	16	37					
VD_29 E		12	15	16	40	12	12	5	7	64
VD_29 D		12	17	18	57					
VD_37 E		15	18	19	62	15	14	5	8	95
VD_37 D		15	20	21	101					



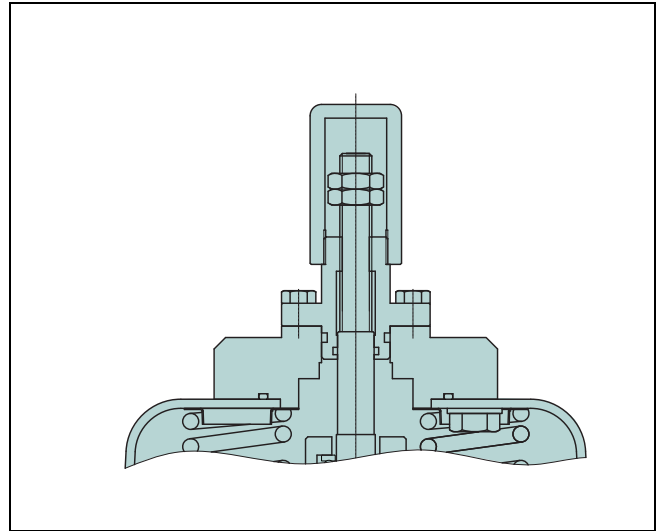
Dimension (mm)	Without handwheel				With handwheel					
	Size (mm)	A2	Bd / Bhd	Br / Bhr	Weight (kg)	Bdh	Brh	Cdh	Crh	Weight (kg)
VD_48 E		486	652	677	86	896	865	1102	1072	112
VD_48 D		486	702	724	118	946	915	1152	1122	144
VD_55 E		566	695	720	112	940	910	1145	1115	145
VD_55 D		566	745	767	152	990	960	1195	1165	185

Dimension (inch)	Without handwheel				With handwheel					
	Size (inch)	A2	Bd / Bhd	Br / Bhr	Weight (lbs)	Bdh	Brh	Cdh	Crh	Weight (lbs)
VD_48 E		19	26	27	190	35	34	43	42	247
VD_48 D		19	28	29	260	37	36	45	44	317
VD_55 E		22	27	28	247	37	36	45	44	320
VD_55 D		22	29	30	335	39	38	47	46	408

- NOTE
1. "E" refers to Spring range 0.8~2.6
 2. "D" refers to Spring range 1.5~3.4
 3. "Br / Bhr" refers to reverse acting actuator, VDR E / D
 4. "Bd / Bhd" refers to direct acting actuator, VDD E / D
 5. "Cdh / Crh" Top side handwheel actuator, VD_48/55

VD Actuator, max/min stop

Model VDD
Maximum stop
Optional adjustable limit stop



Model VDR
Minimum stop
Optional adjustable limit stop

HOW TO ORDER

Pneumatic diaphragm actuator, linear type, series VD

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
VD	D	25	E	020	A	E	A	K	X	X	A	X	R

ACTUATOR CONSTRUCTIONS

1.	ACTUATOR SERIES
VD	Pneumatic diaphragm actuator, linear type

2.	FUNCTION CODE		
	Direction	Spring to	Air to stem
D	Direct acting	Open	Extended
R	Reverse acting	Close	Retracted

3.	ACTUATOR SIZE	
	Outline dimension	
25	Ø255 mm	
29	Ø295 mm	
37	Ø375 mm	
48	Ø486 mm	
55	Ø566 mm	

4.	SPRING RANGE		
	bar	psi	Supply air press.
E	0.8 - 2.6	11 - 37	VD_25/29: 3.2 bar / 44 psi VD_37/48/55: 3.5 bar / 50 psi
Optional spring range			
D	1.5 - 3.4	21 - 48	3.9 bar / 55 psi
Y	Special	Special	Special

5.	STROKE					
	Desc.	VD_25	VD_29	VD_37	VD_48	VD_55
020	20 mm	STD	STD	STD	IQI	IQI
030	30 mm	N/A	STD	STD	IQI	IQI
040	40 mm	N/A	STD	STD	STD	STD
050	50 mm	N/A	N/A	STD	STD	STD
060	60 mm	N/A	N/A	N/A	STD	STD
070	70 mm	N/A	N/A	N/A	STD	STD
080	80 mm	N/A	N/A	N/A	N/A	STD
YYY	Special	Contact Metso for special stroke				

MATERIALS

6.	ACTUATOR CASE MATERIAL
A	JIS G3101-S5400 (ASTM A-36)
Y	Special

7.	DIAPHRAGM MATERIAL
E	EPDM
Optional diaphragm material	
S	Low temp. Silicone
Y	Special

8.	SEAL MATERIAL
A	Nitrile rubber
Optional seal application	
L	Low temp. NBR
S	Low temp. Silicone
Y	Special

9.	BOLTING MATERIAL
K	Stainless steel
Y	Special

OTHERS

10.	POSITION LIMITATION
X	Not applicable
Optional application	
M	Mechanical stopper
Y	Special

11.	EXTERNAL OVERRIDE OPTION
X	Not applicable
A	Side handwheel mounted (applicable 25/29/37 sizes only)
T	Top-side handwheel mounted (applicable 48/55 sizes only)
Y	Special mounting side or special H/W construction

* Handwheel is not applicable for 'D' spring option (sign 4).

12.	AIR SUPPLY CONNECTION	
	Connection size	Actuator size
A	1/4" NPT	VD_25/29/37/48/55
Y	Special	

13.	OPTIONS
X	Not applicable
Y	Special

14.	MODEL CODE
R	Model R

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