

Vtek

Controls

VRD SERIES

Rotary Spring Diaphragm



Design Specifications

- High Control Accuracy
- Compact & Light
- Long Service Life
- Integrated Output Shaft: Features ISO 5211 compliant connection
- Ambient / High / Low Temperature Applications
- Quality Assurance: ISO 9001

Features:

The VRD series provides high performance, high power diaphragm actuators with inner and outer springs type that are compact and light. The unit balances the force created when diaphragm is pressurized and the force compresses the springs, so that the drive shaft is controlled and placed at a set position. Combined with rotary type control valves, the actuators of this series are suited for modulating and on-off services.

- **High Control Accuracy**— The Diaphragm structure features no sliding friction on moving parts, with fast diaphragm response and high control precision; the crank-slider mechanism converts linear motion into rotary rotation, offering high matching accuracy and low friction coefficient, making it suitable for regulation applications demanding high control precision.
- **Long Service Life** — Rugged thick-walled cold stamping case and ductile iron construction provides increased stability, corrosion protection, and protection from deformation should over-pressurization occur. Diaphragm Structure – Features anti-fatigue (long life) and stable operation. Crank-Slider Mechanism – Contact surfaces undergo specialized hardening treatment, resulting in low friction coefficient, minimal wear, and high structural stability.
- **High Output Torque Capability** — The molded diaphragm and cold stamping case allows high pressure supply and maximum thrust for each given diaphragm size.
- **Cold Service Application** — Enhanced product specification for all sizes of VRD100RA diaphragm actuators allow performance to -58F (-50°C) if required.
- **Reliable Connection** — Integrated Output Shaft: Features ISO 5211-compliant connection dimensions for easy installation and dependable linkage. Enhanced Precision: Monolithic design significantly reduces feedback deviation.
- **Compact & Light** — With Inner and Outer springs (in combination), and a high air supply pressure, the VRD Series are much more compact and light as compared with conventional actuators.
- **Manual Override** — On Loss of air supply a manual override is an essential option. Available for all Sizes in the VRD series.

Used with Series:

VSG Segmented / Series VRG Rotary Globe / Series VHP High Performance Butterfly Valves / Series 2F V-Balls / Series 32 V-Balls / and Others

Materials & Data:

Engineering Data

Series	VR D100RA
Type	Inner and outer springs type
Size	VRD1 -220, 270, 350, 450S, 450L
Output Type	Rotary stem motion type
Function	
	Direct Action (DA) : Air to clockwise drive shaft rotation
	Reverse Action (RA) : Air to counter-clockwise drive shaft rotation
Output Thrust	See Table 1.
Stroke	See Table 2.
Air Supply	58 PSIG Max.
Spring Range	17 - 40 PSI G
Air Connection	Size: 220, 270, 350: 1/4 FNPT Size: 450S, 450L: 3/8 FNPT (See page 9-18)
Performance	Hysteresis: with positioner, Less than 1.0% of full stroke Linearity: with positioner, Less than $\pm 2.0\%$ of full stroke * The above hysteresis and linearity vary depending on the material of gland packing and seal ring for control valves.
Ambient Temperature	Standard type : 14~158F : -10~+70°C High temperature service (option) : 32~+212F : 0~+100°C Low temperature service (option) : -40~+104F : -40~+40°C
Paint Color	RAL5015 (polyurethanes group) Color Options Available
Accessories	Air-set, Positioner, Solenoid Valve, Booster relay, Air-valve, Lock-up valve, Speed controller, Relief valve, Limit switch, Positioner transmitter, etc.
Option	Manual handwheel, Case and Yoke material, Full Travel stops, Low temperature service, High temperature service, Salty Environment proof, Non-standard painting, etc.

VRD100RA Parts Material

Diaphragm Case	Carbon Steel
Diaphragm	Cloth embedded EPDM (woven)
Drive shaft	A564-630/ H1100
O Ring	NBR or VITON
Yoke & Case	Ductile Q450-10 / Ductile Iron: A5056BE-H112
Bolts & Nuts	Austenitic stainless steel

Torque:

Table 1. Torque Output

Model	Effective Diaphragm Area Sq.In.	Air Supply PSI G	Spring Range PSI G	(@50 ° Rotation) Torque Output (In-Lbs)					
				BTO	RTO	ETO	BTC	RTC	ETC
VRD122RA	29	58	17-40	2221	1389	938	2221	1398	938
VRD127RA	48	58	17-40	5602	3513	2380	5602	3513	2380
VRD135RA	86	58	17-40	13506	8487	5726	13506	8487	5726
VRD14SRA	148	58	17-40	22542	13134	9497	22542	14134	9497
VRD14LRA	148	58	17-40	33872	21312	14355	33872	21312	14355

Model	Effective Diaphragm Area Sq.In.	Air Supply PSI G	Spring Range PSI G	(@60° Rotation) Torque Output (In-Lbs)					
				BTO	RTO	ETO	BTC	RTC	ETC
VRD122RA	29	58	17-40	1929	1115	814	1929	1115	814
VRD127RA	48	58	17-40	4859	2823	2062	4859	2823	2062
VRD135RA	86	58	17-40	11709	6815	4956	11709	6815	4956
VRD14SRA	148	58	17-40	19515	11479	8187	19515	11479	8186
VRD14LRA	148	58	17-40	29331	17099	12400	29331	17099	12400

Model	Effective Diaphragm Area Sq.In.	Air Supply PSI G	Spring Range PSI G	(@70° Rotation) Torque Output (In-Lbs)					
				BTO	RTO	ETO	BTC	RTC	ETC
VRD122RA	29	58	17-40	1734	911	725	1734	911	725
VRD127RA	48	58	17-40	4381	2310	1858	4381	2310	1858
VRD135RA	86	58	17-40	10558	5584	4460	10558	5584	4460
VRD14SRA	148	58	17-40	17559	9240	7346	17559	9240	7346
VRD14LRA	148	58	17-40	26401	13984	11151	26401	13984	11151

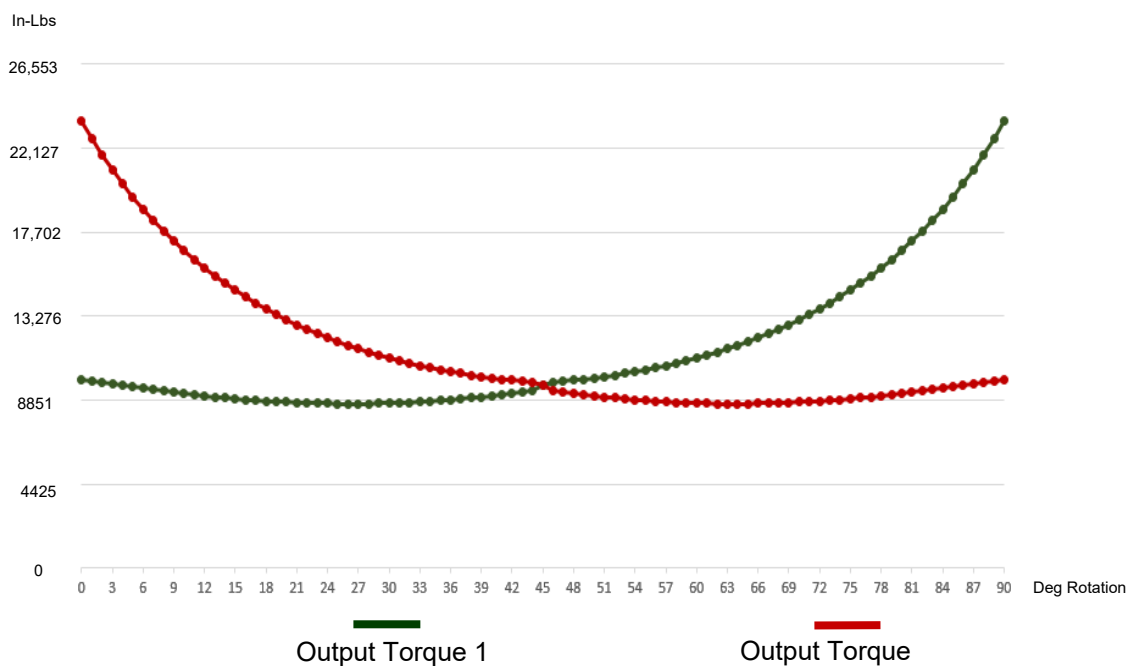
Model	Effective Diaphragm Area Sq.In.	Air Supply PSI G	Spring Range PSI G	(@90° Rotation) Torque Output (In-Lbs)					
				BTO	RTO	ETO	BTC	RTC	ETC
VRD122RA	29	58	17-40	/	/	/	/	/	/
VRD127RA	48	58	17-40	3920	1593	1655	3920	1593	1655
VRD135RA	86	58	17-40	9452	3850	3982	9452	3850	3982
VRD14SRA	148	58	17-40	/	/	/	/	/	/
VRD14LRA	148	58	17-40	23578	9611	9904	23578	9611	9904

Note:

BTO: Beginning Torque Open ; **RTO:** Rotating Torque Opening ; **ETO:** End Torque Opening

BTC: Beginning Torque Closed ; **RTC:** Rotating Torque Closing ; **ETC:** End Torque Closing

Data:



Output Torque Curve for the VRD100RA (VRD14LRA @90°)

Table 2. Volume and Weight

Model	VRD122RA	VRD127RA	VRD135RA	VRD14SRA	VRD14LRA
Actuator Size	220	270	350	450S	450L
Volume (Cu. Ft)	0.04	0.087	0.19	0.34	0.48
Weight (Lb)	51	66	200	332	507
Weight w/ Handwheel (Lb)	55	93	242	397	551

Fig 1 Assembly Construction

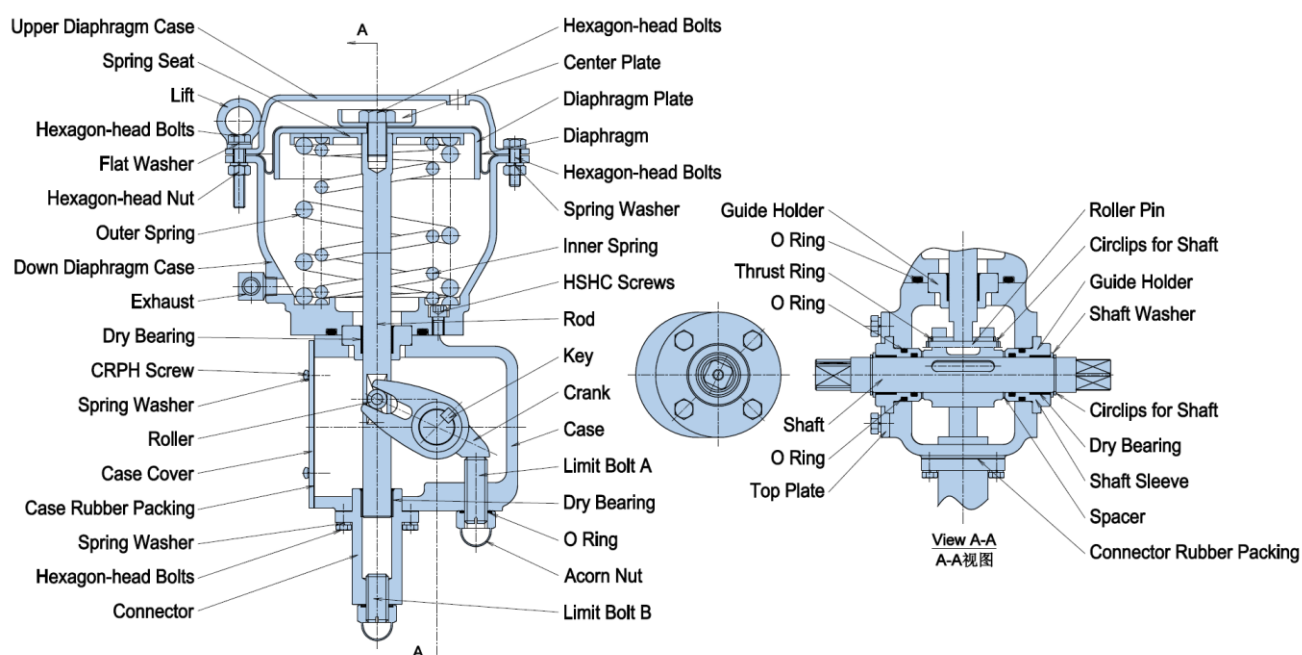


Fig.1-1 VRD220 / 270 without handwheel

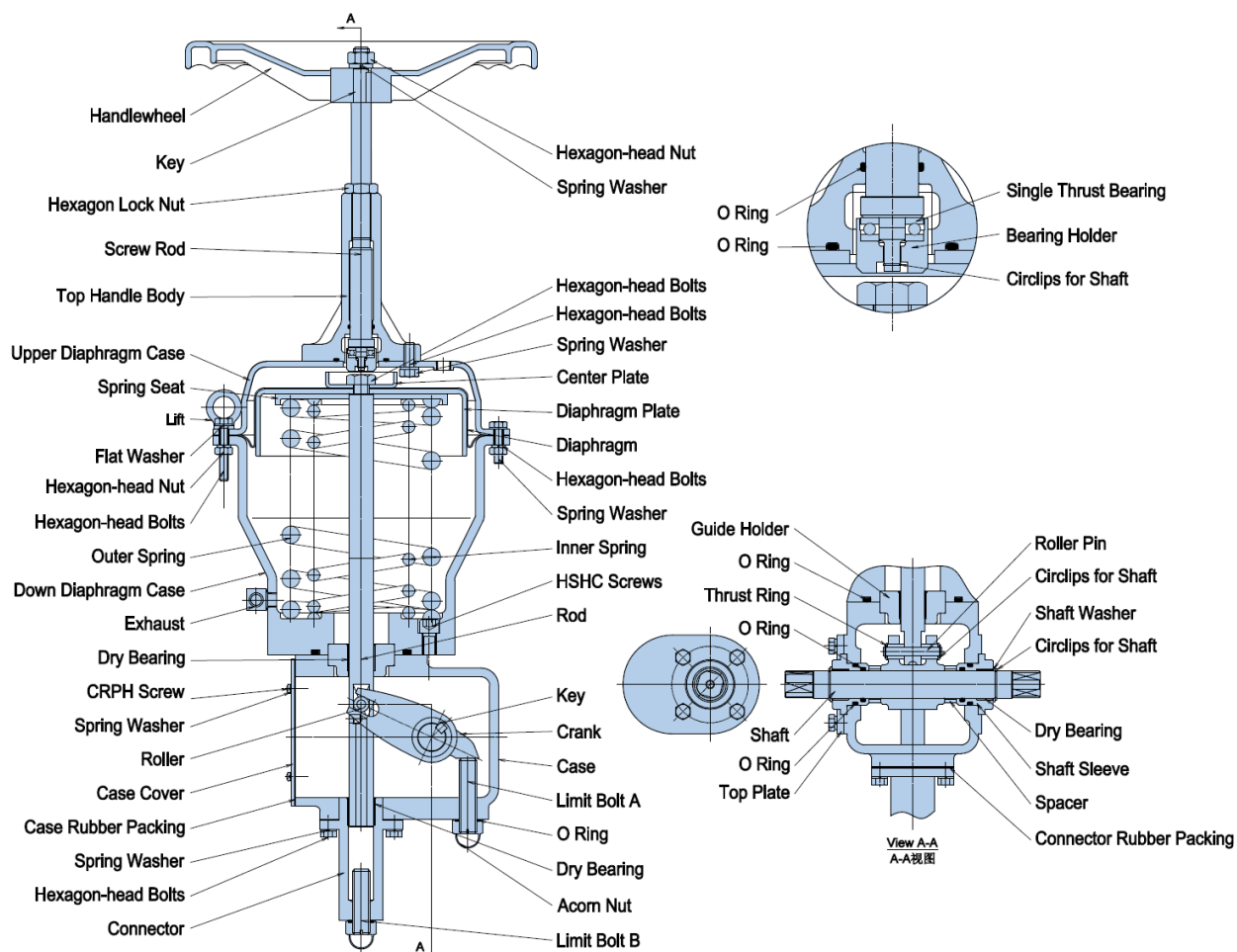


Fig.1-2 VRD220 / 270 with handwheel

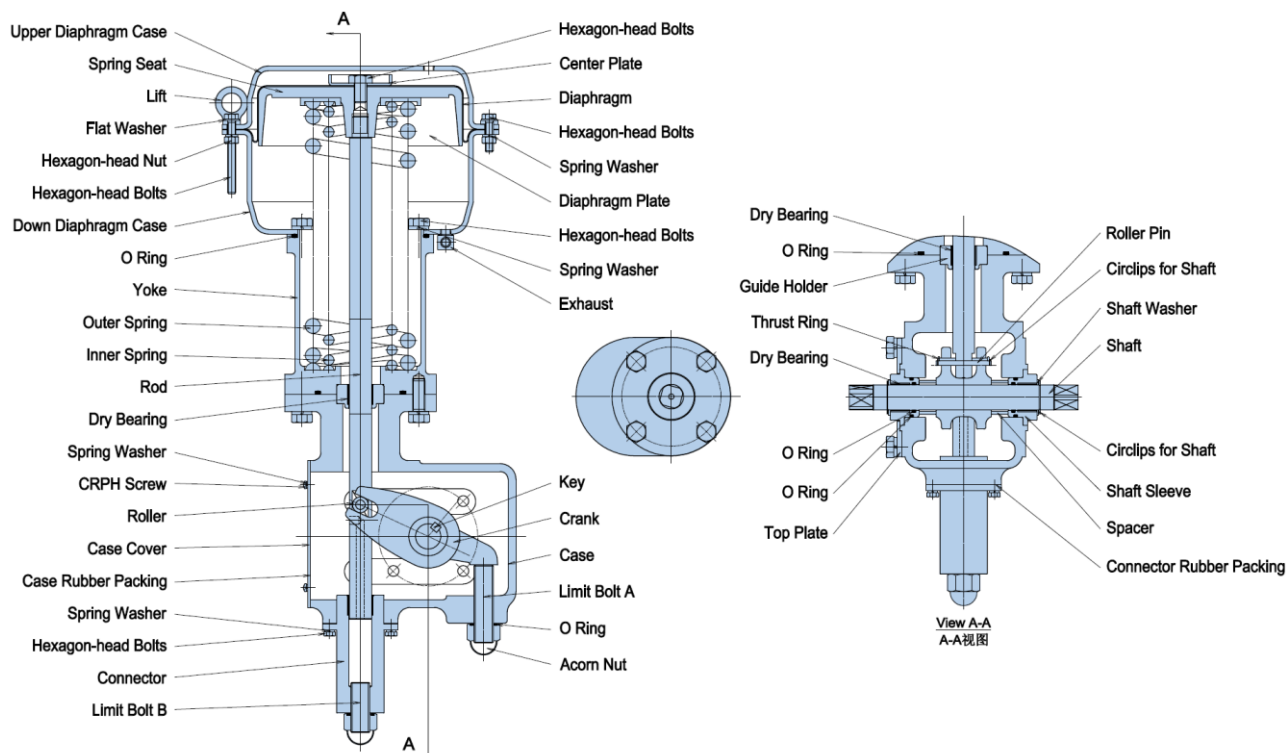


Fig.1-3 VRD350 without handwheel

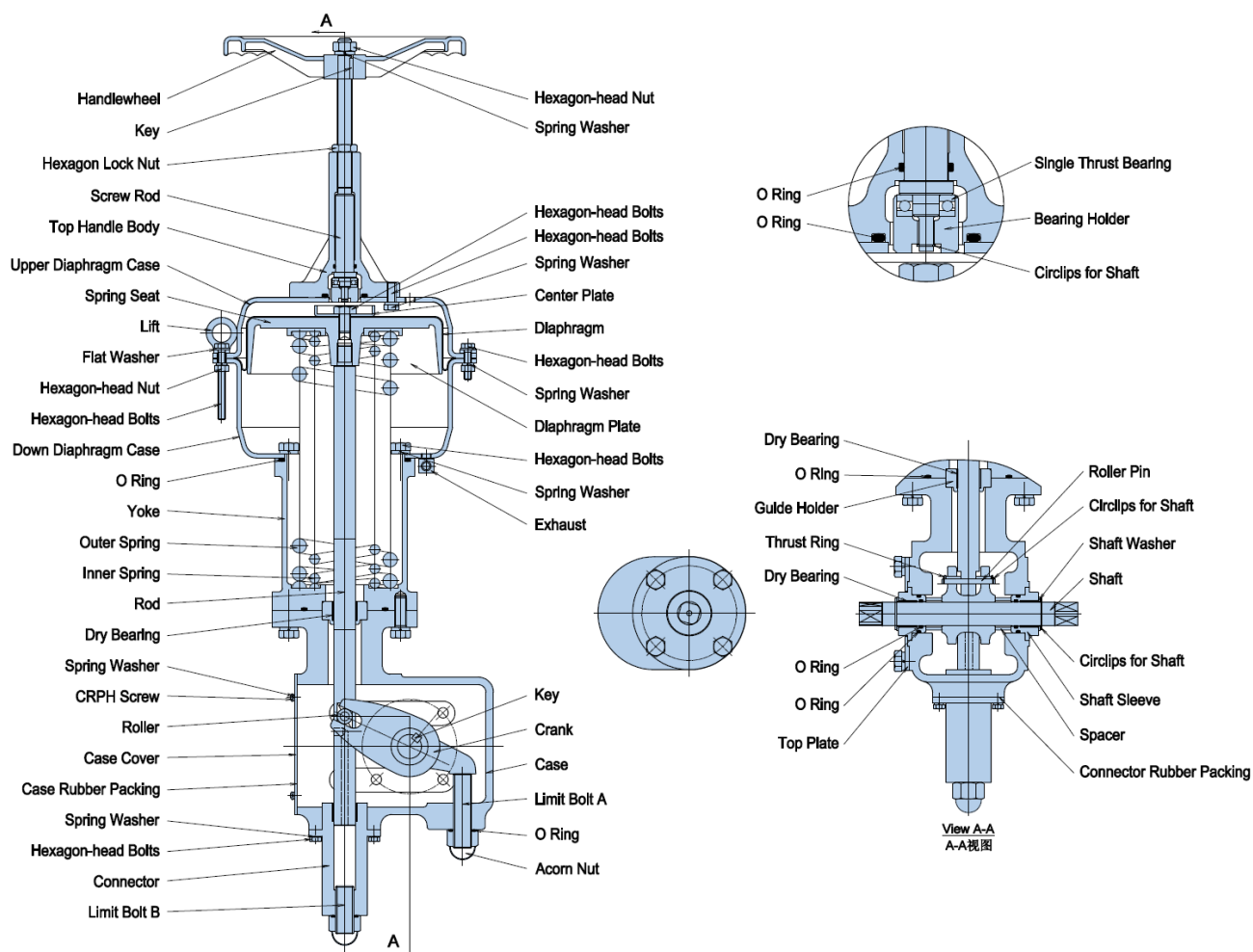


Fig.1-4 VRD350 with handwheel

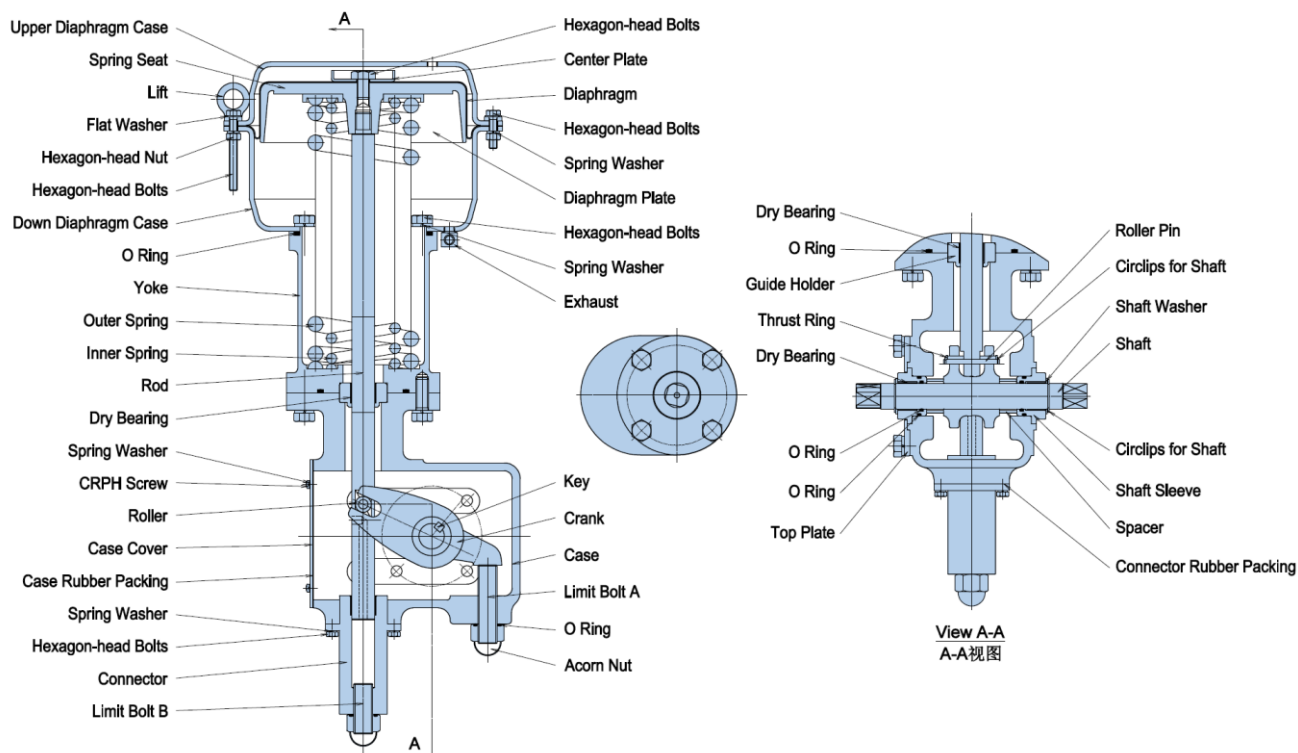


Fig.1-5 VRD450S / 450L without handwheel

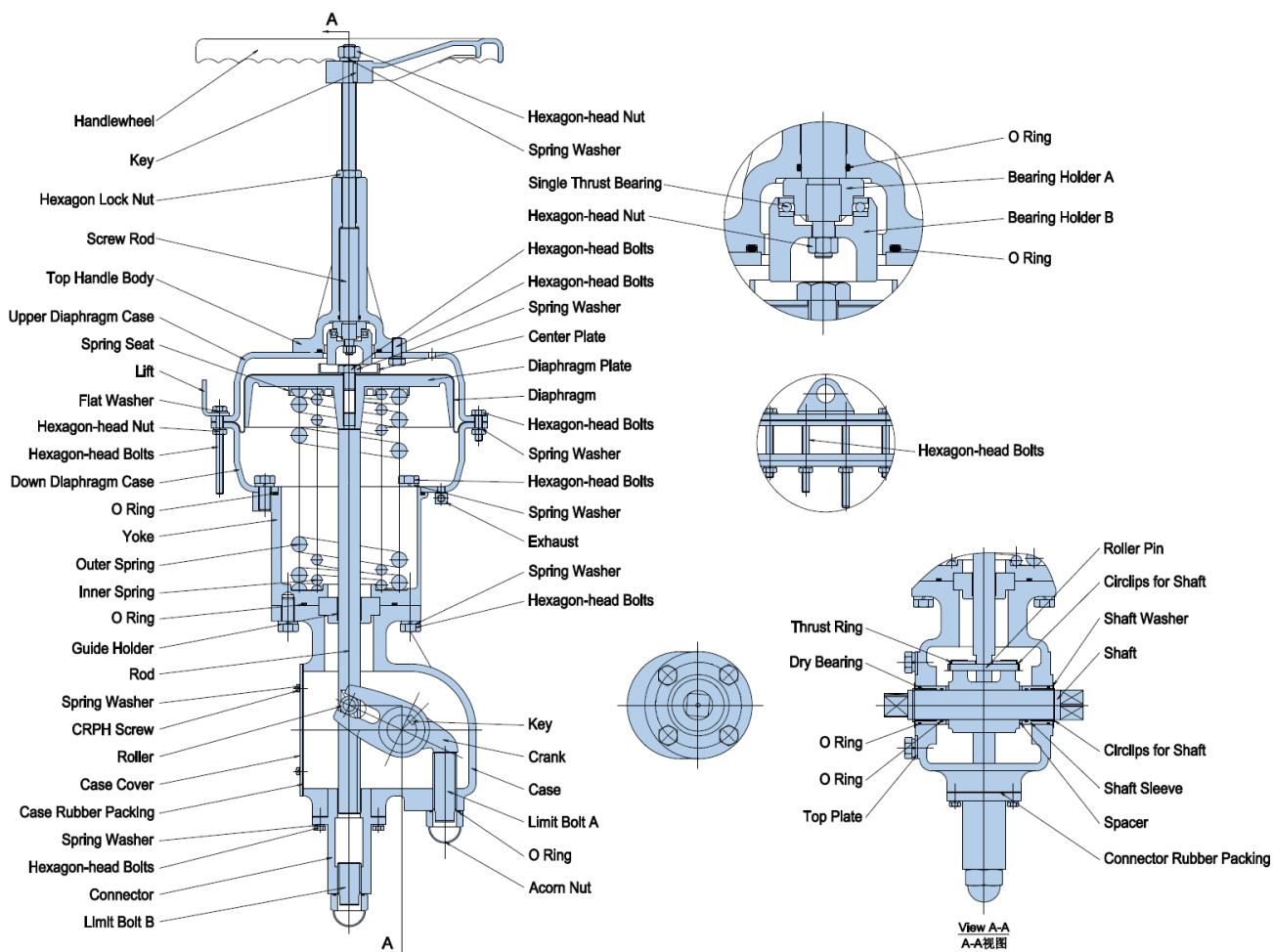
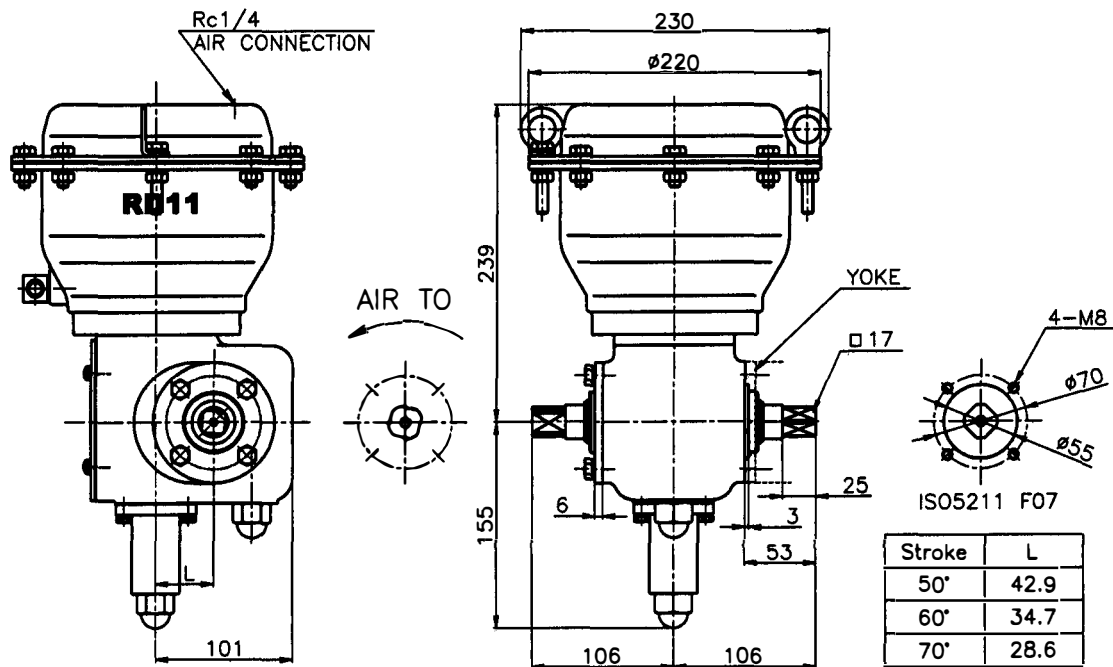


Fig.1-6 VRD450 / 450L with handwheel

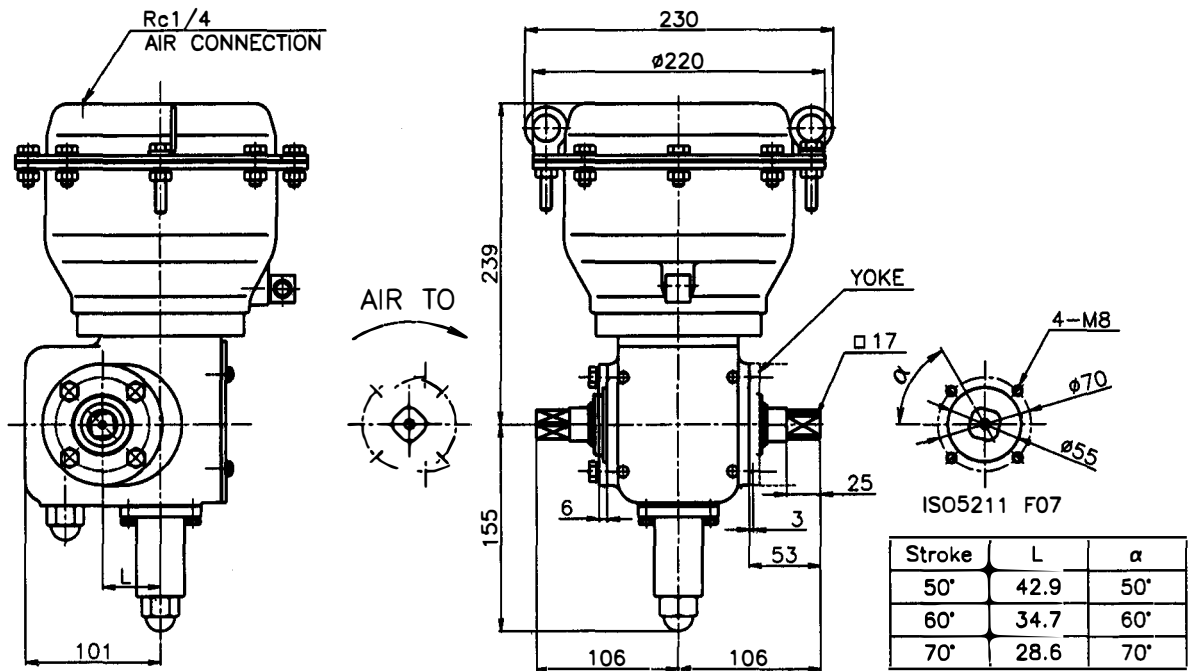
DIAPHRAGM ACTUATOR

UNIT:mm

□ REVERSE ACTION



□ DIRECT ACTION

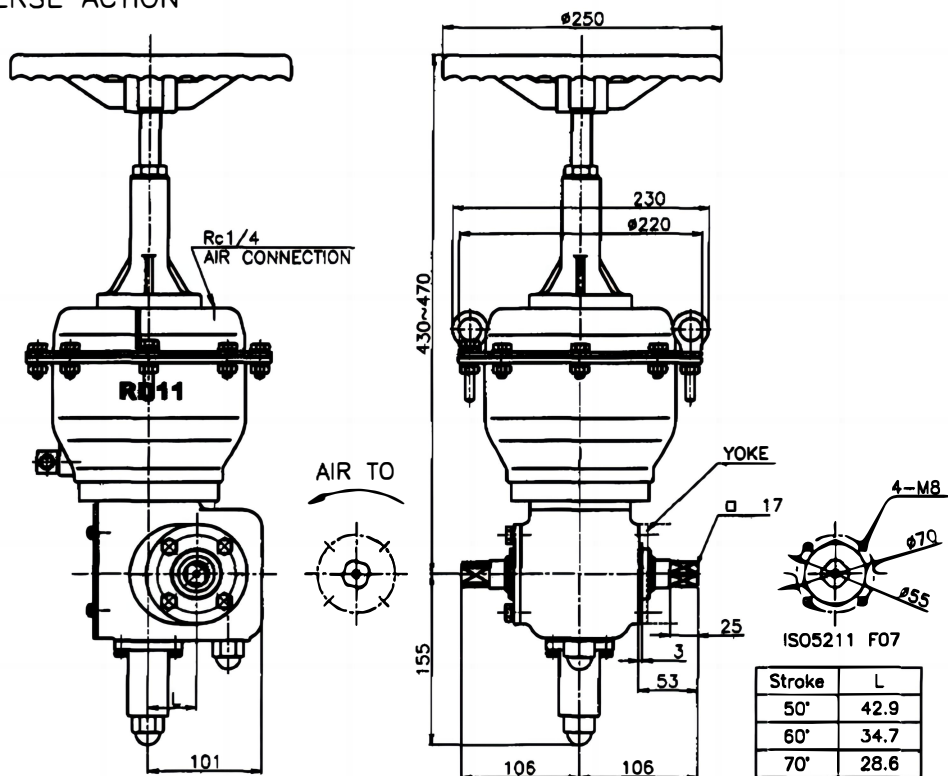


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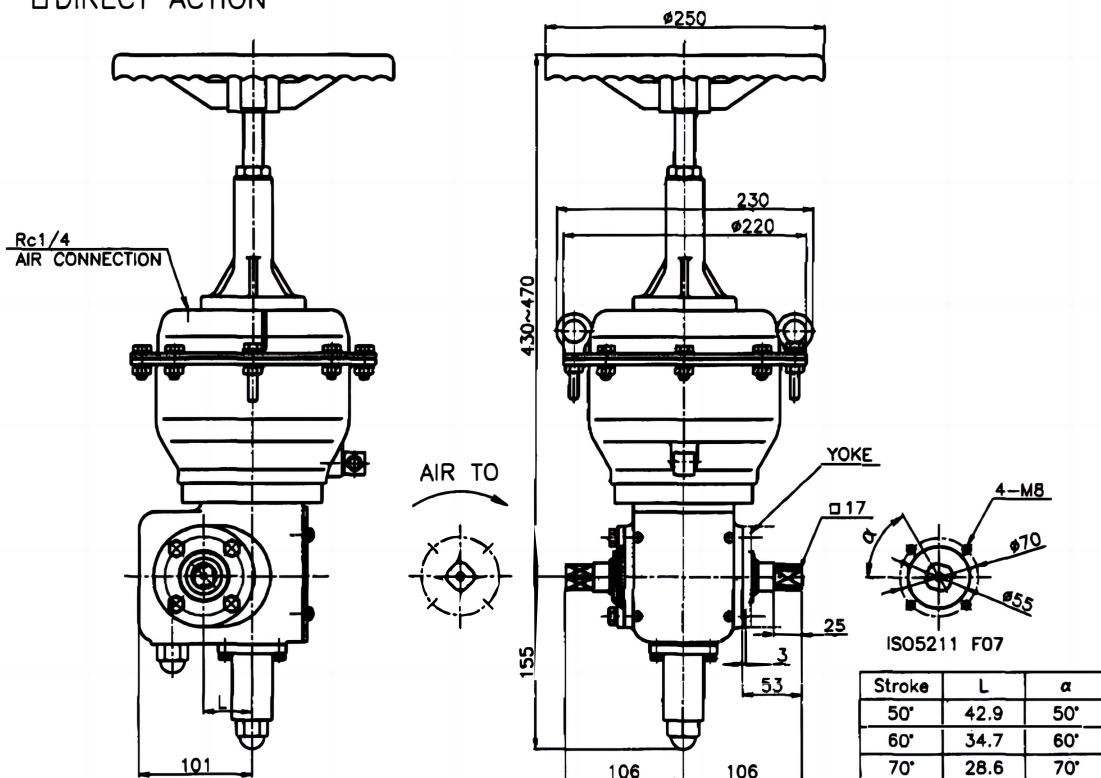
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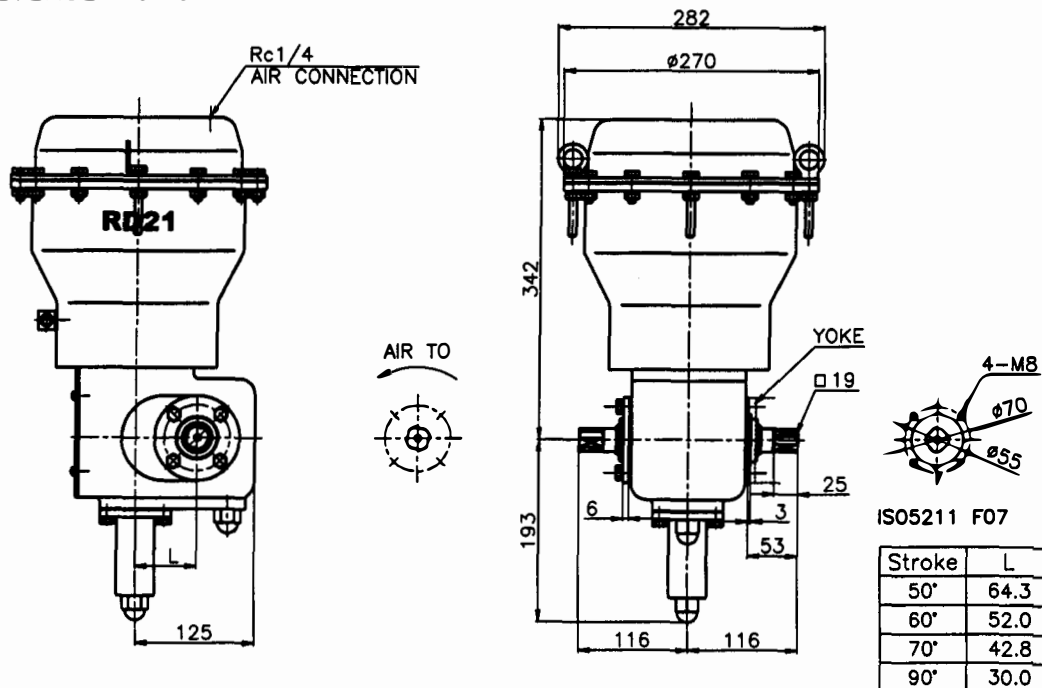


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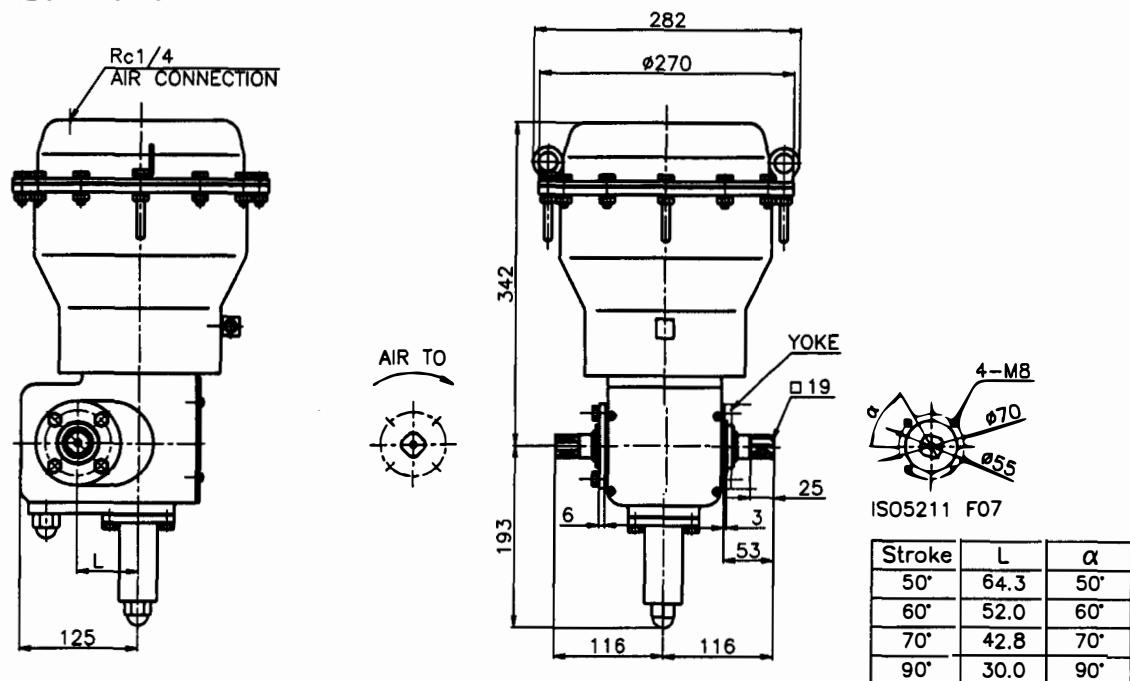
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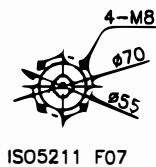
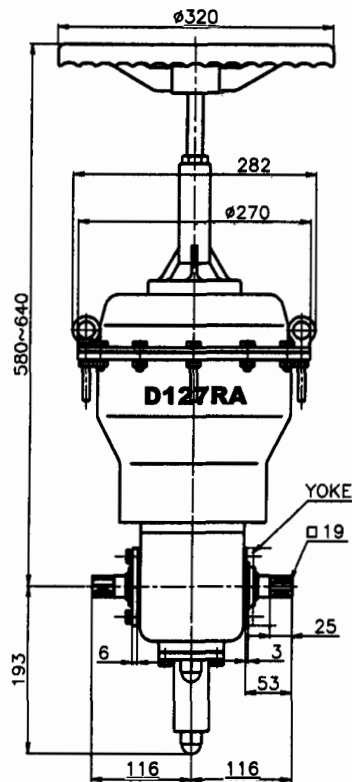
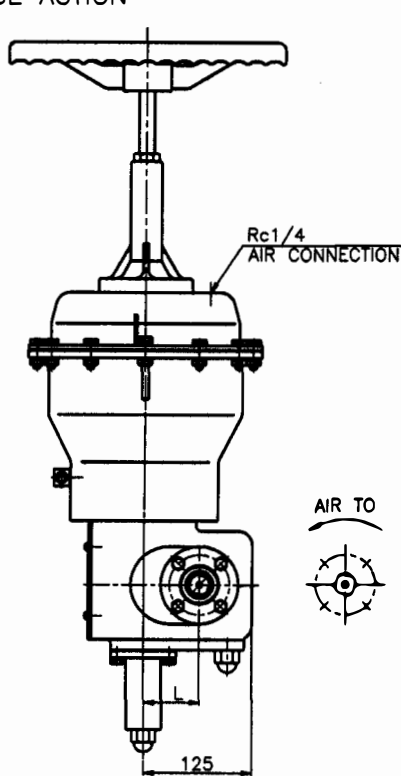
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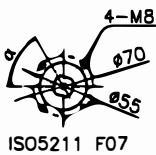
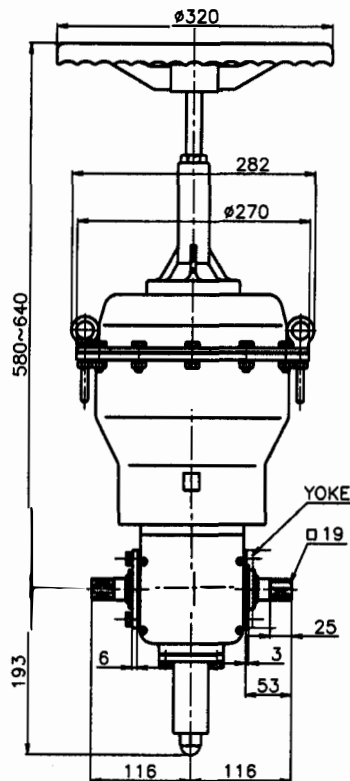
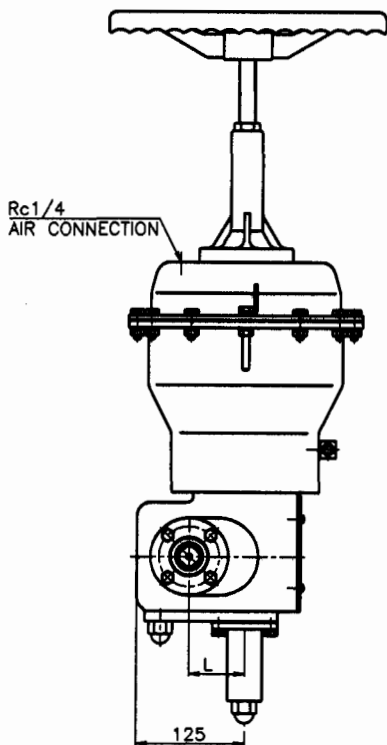
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Stroke	L
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60°	52.0
70°	42.8
90°	30.0

□ DIRECT ACTION



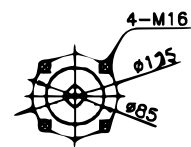
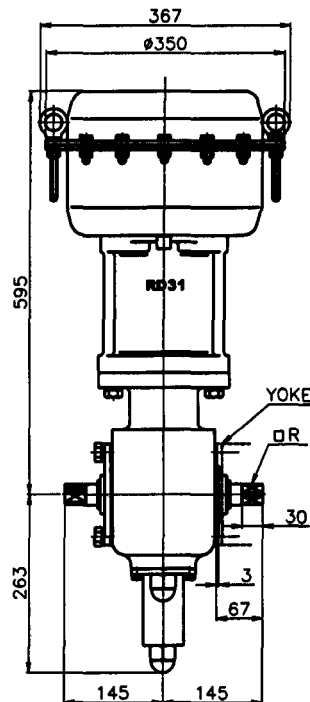
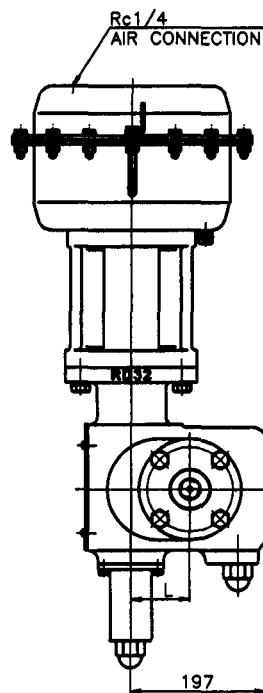
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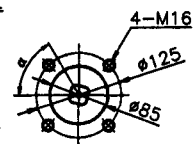
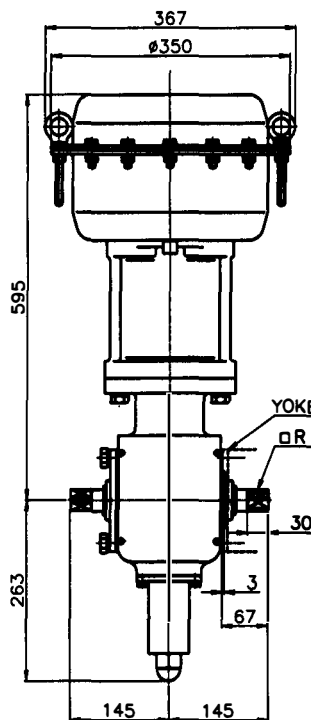
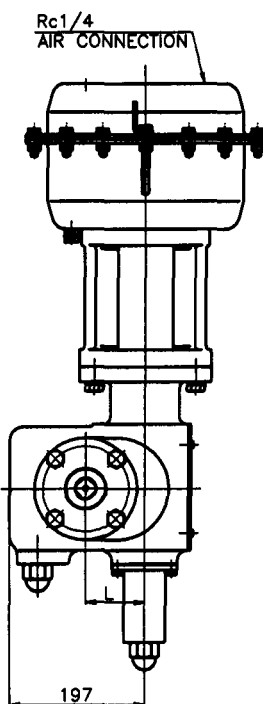
□ REVERSE ACTION



ISO5211 F12

Stroke	L	DR
50°	85.8	27
60°	69.3	
70°	57.1	
90°	40.0	

□ DIRECT ACTION



ISO5211 F12

Stroke	L	α	DR
50°	85.8	50°	27
60°	69.3	60°	
70°	57.1	70°	
90°	40.0	90°	

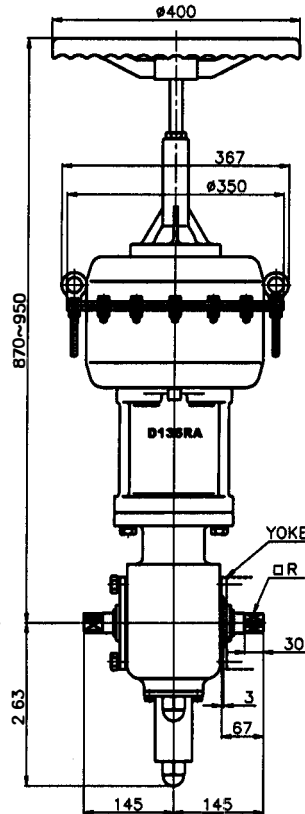
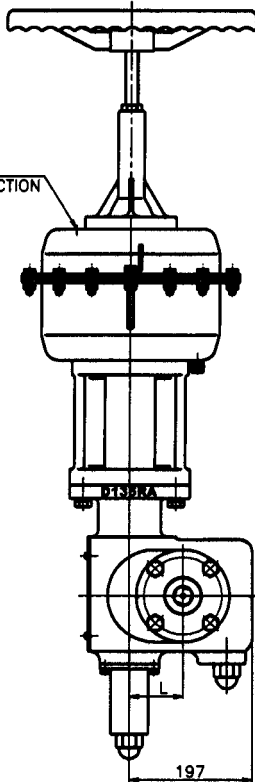
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DIAPHRAGM ACTUATOR

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UNIT:mm

Rc1/4
AIR CONNECTION

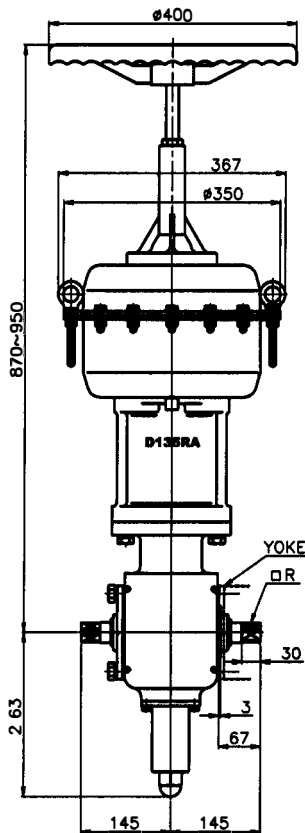
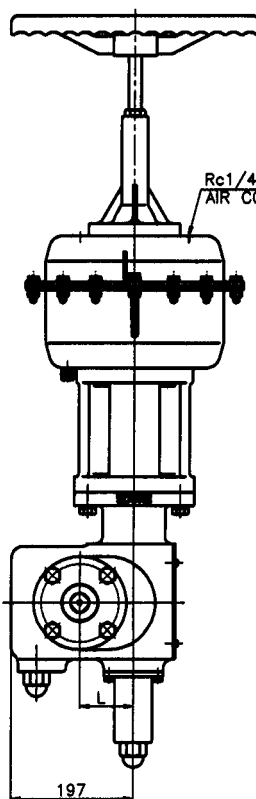


ISO5211 F12

Stroke	L	□ R
50°	85.8	
60°	69.3	27
70°	57.1	
90°	40.0	22

□ DIRECT ACTION

Rc1/4
AIR CONNECTION



ISO5211 F12

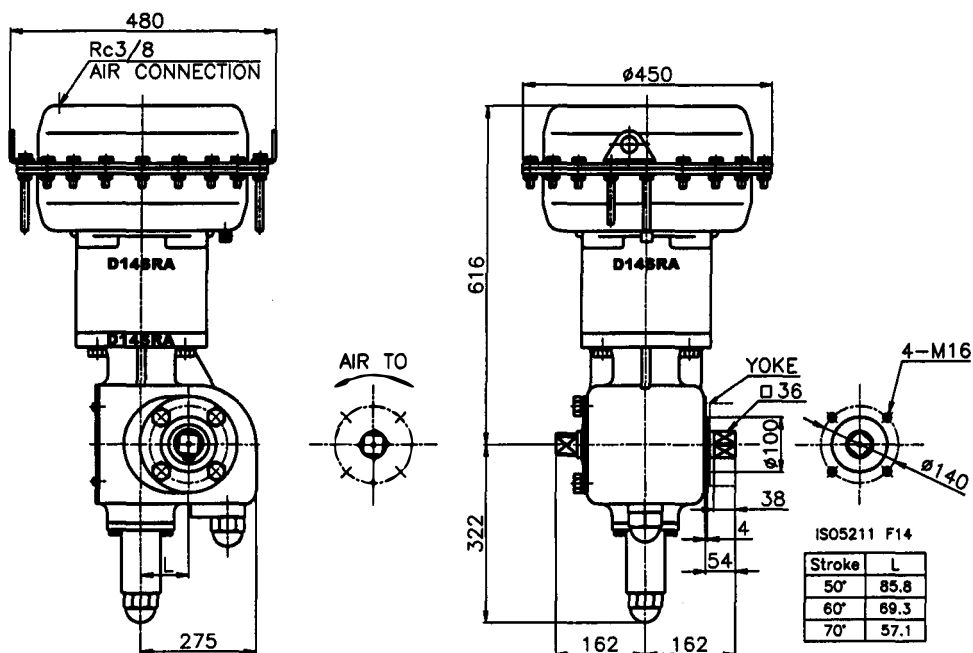
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70°	57.1	70°	
90°	40.0	90°	22

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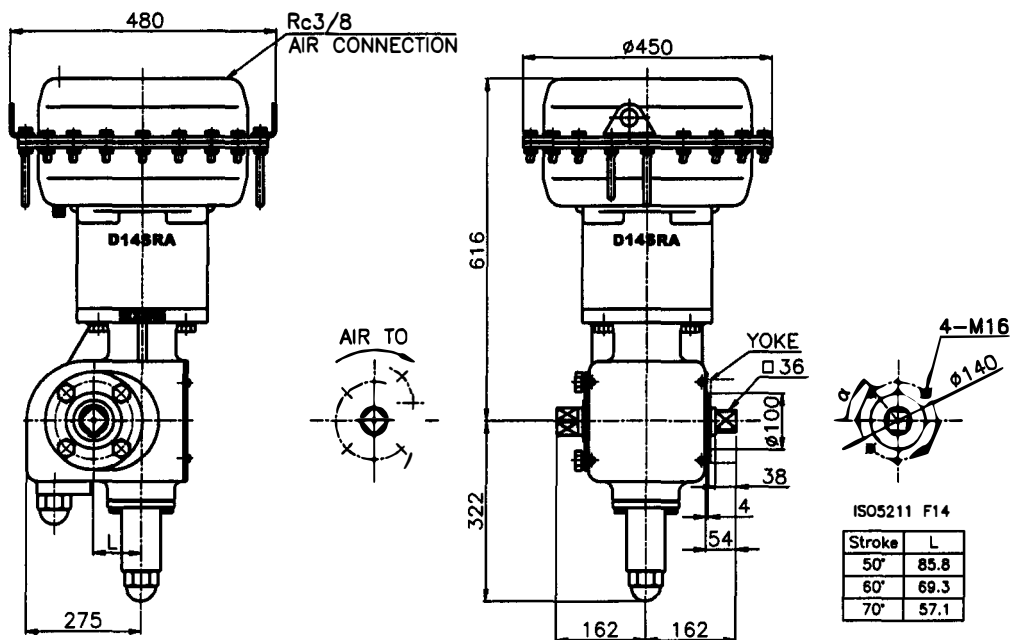
DIAPHRAGM ACTUATOR

UNIT:mm

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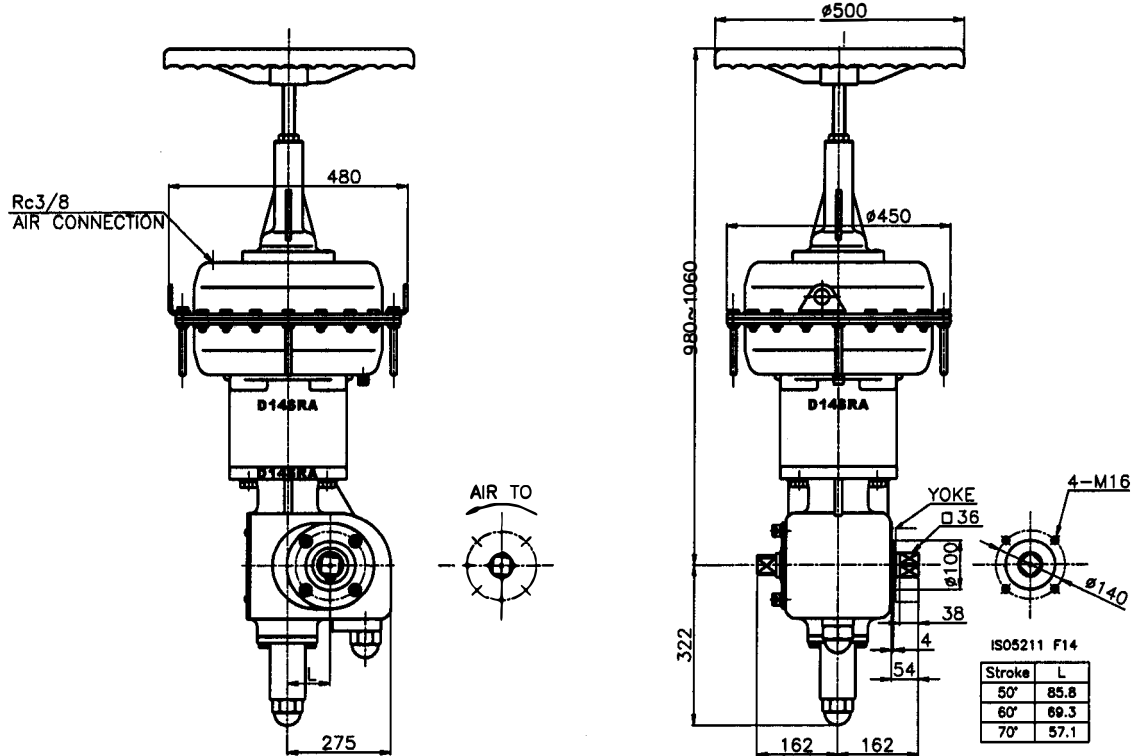


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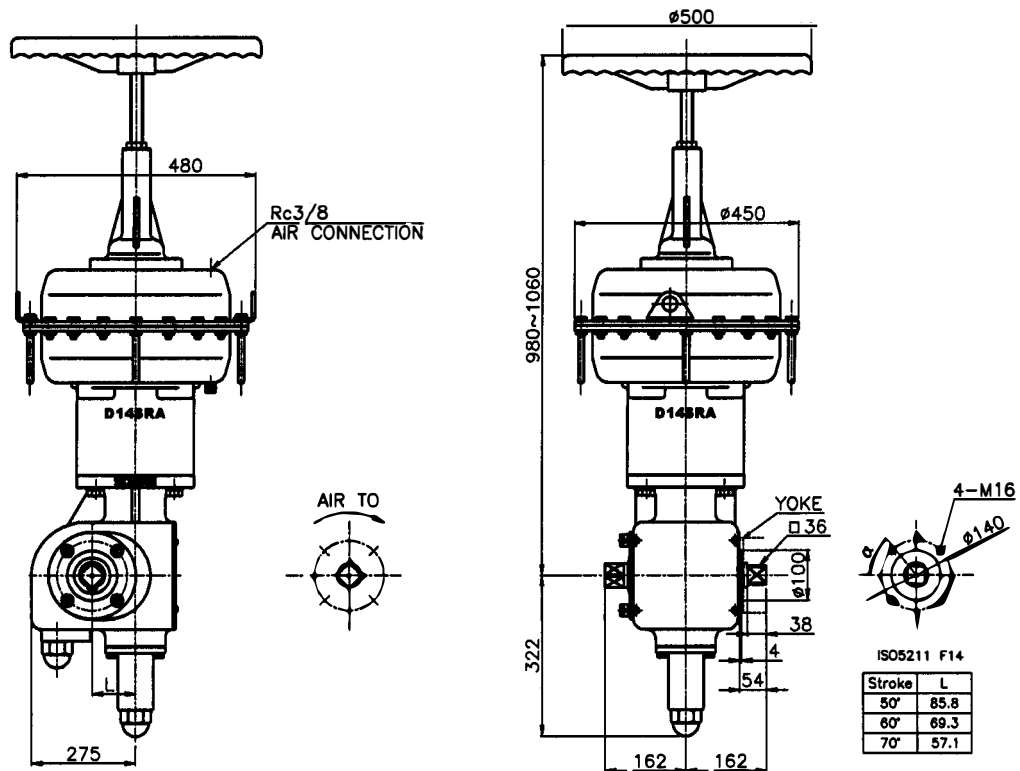
DIAPHRAGM ACTUATOR

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UNIT:mm



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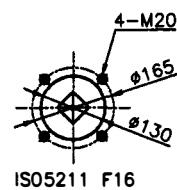
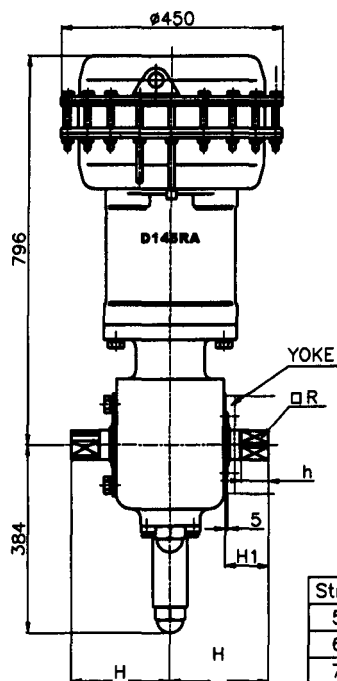
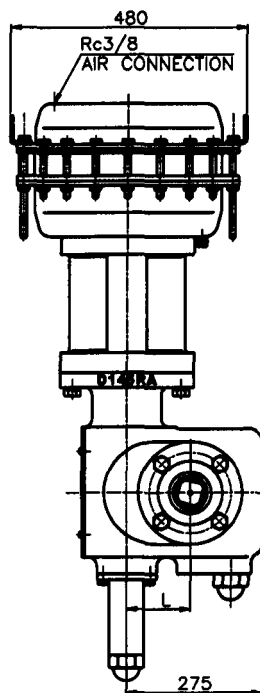
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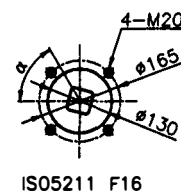
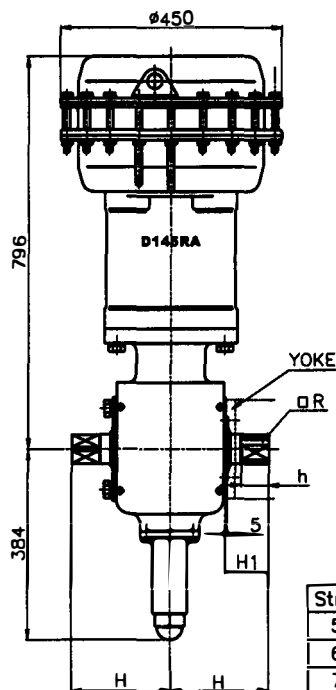
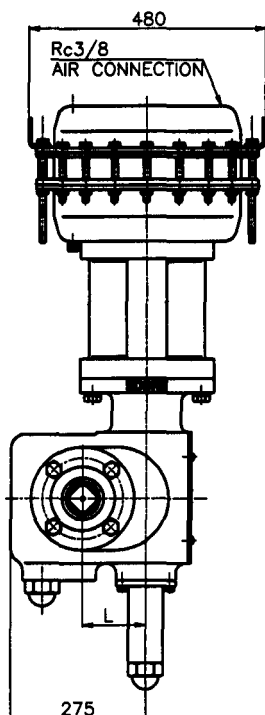
UNIT:mm

□ REVERSE ACTION



Stroke	L	H	H1	h	□R
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60°	103.9				
70°	85.6				
90°	60.0	188	76	40	36

□ DIRECT ACTION



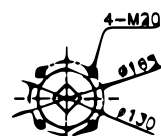
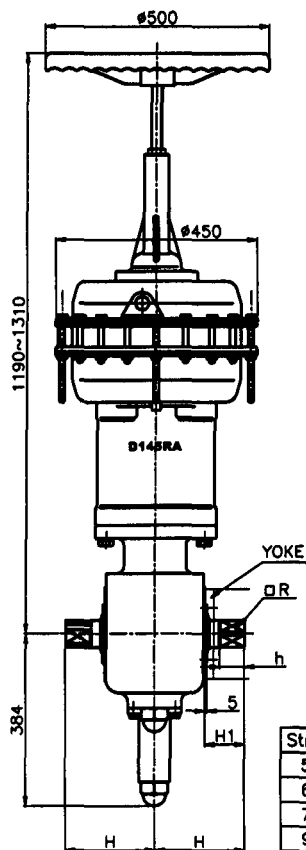
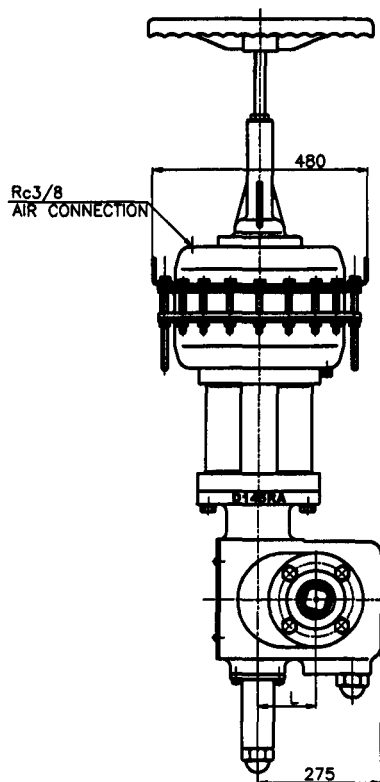
Stroke	L	α	H	H1	h	□R
50°	128.6	50°	200	88	55	46
60°	103.9	60°				
70°	85.6	70°				
90°	60.0	90°	188	76	40	36

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DIAPHRAGM ACTUATOR

□ REVERSE ACTION

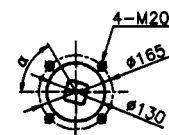
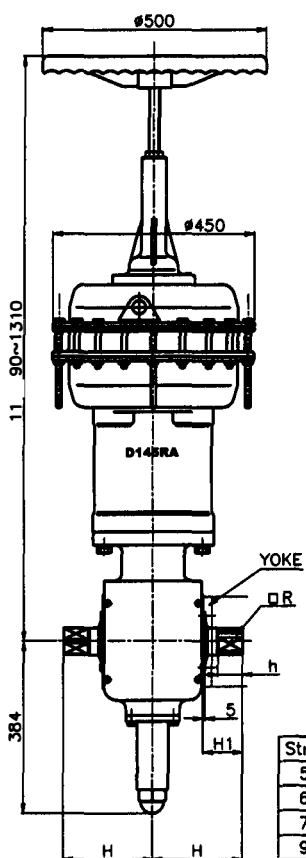
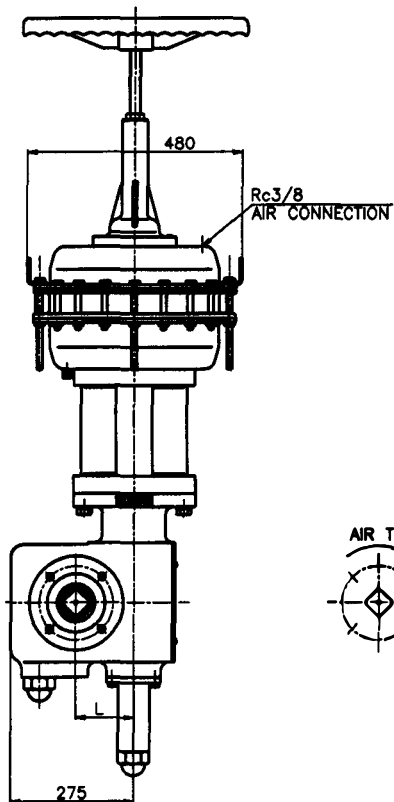
UNIT:mm



ISO5211 F16

Stroke	L	H	H1	h	4R
50°	128.6				
60°	103.9	200	88	55	46
70°	85.6				
90°	60.0	188	76	40	36

□ DIRECT ACTION



ISO5211 F16

Stroke	L	α	H	H1	h	4R
50°	128.6	50°				
60°	103.9	60°	200	88	55	46
70°	85.6	70°				
90°	60.0	90°	188	76	40	36

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No.	DESCRIPTION	REV. BY	CH	APP	DATE	APP	Lin	REV.	
REVISIONS						DATE	2025.1.18	B	

Vtek

Ordering Code:

Model Code

VR	D	1						—							D100RA
Size			2	2											220
			2	7											270
			3	5											350
			4	S											450 Standard stroke
			4	L											450 Long stroke
Output Type				R										Rotary Stem Motion type	
				X										Special	
Style Code				A										Model change code	
Drive shaft rotation								D						Air to clockwise rotation Direct Action (DA) :	
								R						Air to counter-clockwise rotation Reverse Action (RA) :	
								X						Special	
Manual Override								N						None	
								S						Top handle type.	
								X						Special	
Ambient Temperature								1						Standard type : 14~158F : -10~+70℃	
								3						High temperature service : 32~+212F : 0~+100℃	
								5						Low temperature service : -40~+104F : -40~+40℃	
Air Supply / Spring Range								4						58 PSIG / 17- 40 PSIG	
								X						Special	
Option								N						None	
								0						Adjustable min. travel stopper: 0~100%	
								1						Adjustable max. travel stopper: 100~0%	
								X						Special	
Degrees of Drive shaft rotation												50	50°		
												60	60°		
												70	70°		
												90	90°		
												X	Special		



Vtek Controls, LLC reserves the right to make revisions to its products, specifications, literature, and related information without notice. Please visit our Website for the latest information and updates.

Vtek Controls, LLC
420-H Wards Corner Rd
Loveland, OH 45140
Ph 513-928-3630
www.vtekcontrols.com