

# ***FABCO-AIR***

## ***PNEUMATIC ROTARY ACTUATORS***

**FRA  
&  
FRC  
Series**





### Features

1. Magnetic pistons are standard on all models.
2. Compact design saves space.
3. Rectangular body design has end caps with ports in one end and adjusting screws at opposite end.
4. Rack and pinion mechanism designed to minimize backlash.
5. Adjustments for rotation angles to fit your application.

### Specifications

100 psi max.

Model	FRA			
Action	Double acting with magnetic piston			
Bore Size	ø16	ø20	ø25	
Media	Compressed air			
Min. operating pressure	1.5 kgf/cm <sup>2</sup> (0.15 Mpa) 21psi	0.6 kgf/cm <sup>2</sup> (0.06 Mpa) 9psi		
Max. operating pressure	7 kgf/cm <sup>2</sup> (0.7 Mpa) 100 psi			
Typ. rotational speed	(at 71 psi - no load) 0.2~1 sec/90°			
Temperature range	-10°C(14°F) ~ +70°C(158°F) filtered dry air			
Lubrication	None required			
Output torque	See chart on page 3			
Allowable kinetic energy	0.03kgf.cm(0.026lbf.in)	0.08kgf.cm(0.069lbf.in)	0.15kgf.cm(0.130lbf.in)	
Weight	300g	355g	431g	515g 682g 824g

Conversions  
psi = kgf/cm<sup>2</sup> x 14.2  
psi = MPa x 145

inch = mm x 0.0394  
ounceforce-in = kgf.cm x 13.9  
ounce = g x 0.035


### Price List

Rotation Angle	FRA16	FRA20	FRA25
90°	-	-	-
180°	-	-	-
Seal Kit	FRA16-SK	FRA20-SK	FRA25-SK

Sensor Selection Guide		Prewired 9 ft. Leadwire Part No.	Quick Disconnect* Part No.
Reed (LED)	5-120 VDC/VAC, 0.03 Amp Max current, 4 Watt Max., 2.0 voltage drop	9P49-000-002. . . . .-	9P49-000-302 .....-
Electronic (LED)	Sourcing PNP 5-28 VDC, 0.20 Amp Max current, 1.0 voltage drop	9P49-000-031. . . . .-	9P49-000-331.....-
Electronic (LED)	Sinking NPN 5-28 VDC, 0.20 Amp Max current, 1.0 voltage drop	9P49-000-032. . . . .-	9P49-000-332.....-

\*Note: Quick disconnect styles are supplied with 6 inch pigtail with male connector.

### How to order

<b>FRA</b>	<b>20</b>	<b>X</b>	<b>90</b>
Series	Bore	Rotation angle	
FRA standard type 	ø16 ø20 ø25	90° 180°	

### Position Sensors

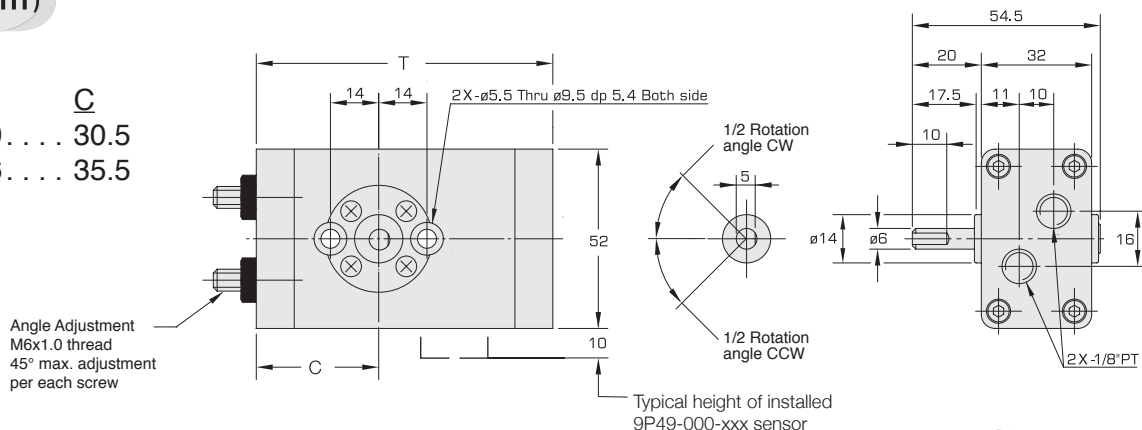


See specifications in the sensor selection guide below. Please order sensors and female cordsets separately from charts below.

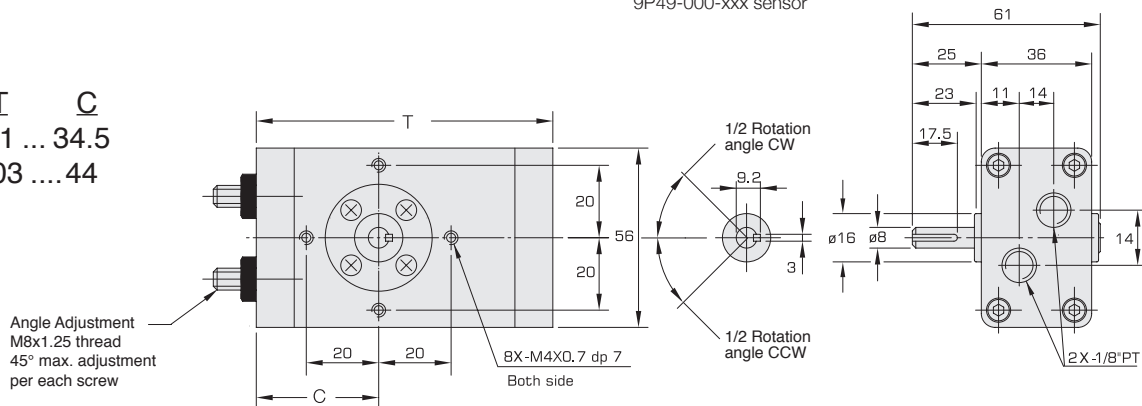
Female Cord Sets	Part No.	Price
1 Meter	CFC-1M	-
2 Meters	CFC-2M	-
5 Meters	CFC-5M	-

## Dimensions (mm)

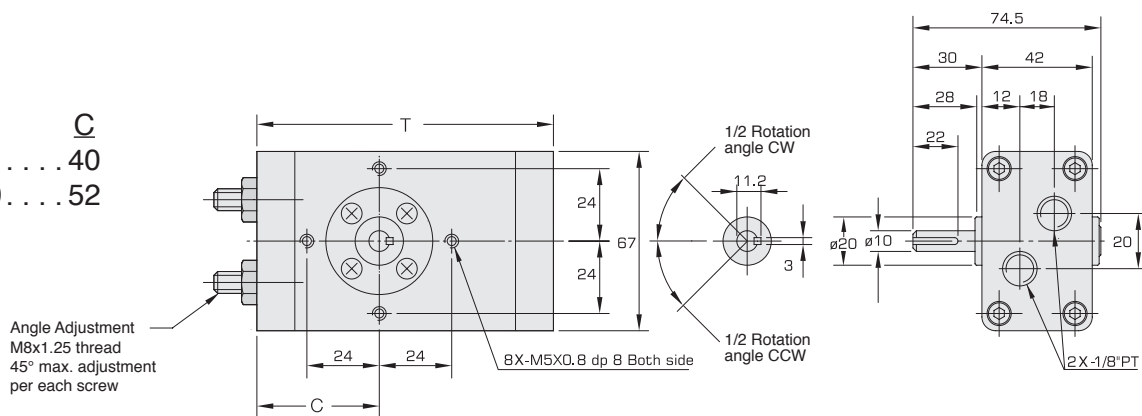
	I	C
FRA16x90	70	30.5
FRA16x180	86	35.5



	I	C
FRA20x90	81	34.5
FRA20x180	103	44



	I	C
FRA25x90	94	40
FRA25x180	120	52



## Output

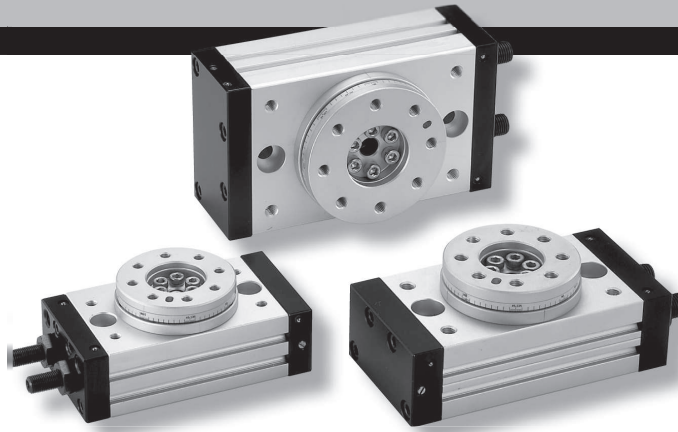
lbf-in  
(kgf-cm)

Bore	16	20	25
50psi (0.35MPa)	3.0 (3.4)	6.1 (7.0)	12.2 (14.0)
71psi (0.5MPa)	4.3 (5)	8.7 (10)	17.4 (20)
100psi (0.7MPa)	6.0 (6.9)	12.2 (14.0)	24.5 (28.2)

Conversions:  
MPa = psi x 0.7  
kgf-cm = lbf-in x 1.15

# FABCO-AIR

## FRC Series ROTARY ACTUATOR



1. **Magnetic pistons are standard on all models.**
2. Compact design saves space.
3. Rectangular body design has end caps with ports and adjusting screws.
4. Rack and pinion mechanism designed to minimize backlash.
5. Rotation adjustment screws are standard.
6. **Adjustable air cushions are standard on all models.**
7. Cushioning with shock absorbers is available.

### Specifications

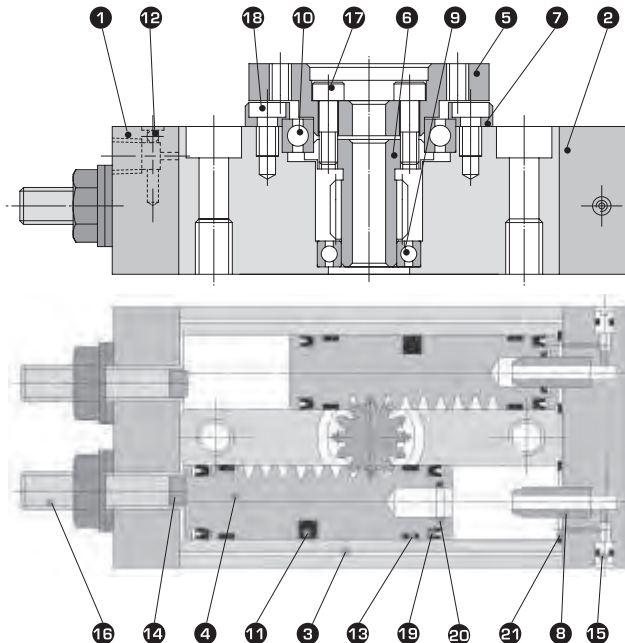
150 psi max.

Model	FRC				
Action	Double acting with magnetic piston				
Bore Size	ø16	ø20	ø25	ø32	ø40
Media	Compressed air				
Max. operating pressure	10.2 kgf/cm <sup>2</sup> (1Mpa) 150 psi				
Min. operating pressure	1 kgf/cm <sup>2</sup> (0.1Mpa) 15 psi				
Adjustable rotation	0° ~ 190°				
Max. rotation angle	190°				
Temperature range	0°C(32°F) ~ +60°C(140°F)				
Lubrication	None required				
Typical rotational speed	(No load - 71 psi) 0.2 ~ 1 Sec/90°				
Output torque	See chart on page 6				
Weight (g)	1100	1400	2200	3800	6200

psi = kgf/cm<sup>2</sup> x 14.2  
psi = MPa x 145  
inch = mm x 0.0394

ounceforce-in = kgf-cm x 13.9  
ounce = g x 0.035

### Construction



- 15 Adjustable air cushions are standard on all models. Engagement is approximately 45° before each end of full 180° rotation on all bore sizes.

**ADJUSTING SCREWS ARE NOT RETAINED.  
USE CAUTION WHEN MAKING ADJUSTMENTS.**

- 16 Shock absorbers can be substituted in place of the adjustable screws on all bore sizes and used as hard stops for rotational adjustment. See "How to Order" page 5 for shock absorber selection.

### Part lists

NO	Description	Material	Qty
1	Front end cover	Aluminum black anodized	1
2	Rear end cover	Aluminum black anodized	1
3	Housing	Hard anodized aluminum alloy	1
4	Rack	Stainless steel	2
5	Gear cover	Aluminum alloy	1
6	Pinion	Case hardened alloy steel	1
7	Bearing cover	Aluminum alloy	1
8	Rear cushion spear	Aluminum alloy	2
9	Ball bearing	High carbon - high chrome bearing steel	1
10	Ball bearing	High carbon - high chrome bearing steel	1
11	Magnet	Magnet material	4
12	Steel ball	Medium carbon steel	4
13	Wear ring	Fluoride resin	4
14	Bumper	Plastic	2
15	Cushion needle screw	Stainless steel	2
16	Adjustable screw	Medium carbon steel	2
17	Hexagon screw	Medium carbon steel	8
18	Screw	Medium carbon steel	6


## How to order

**FRC** Series

**20** Bore

**180** Rotation angle

**FRC Standard type**



∅16  
 ∅20  
 ∅25  
 ∅32  
 ∅40

180°

## Pricing

Rotation Angle	FRC16	FRC20	FRC25	FRC32	FRC40
180°	\$315.05	\$350.50	\$396.20	\$508.90	\$705.90
Shock Absorber	FSA1007-AN \$34.90	FSA1007-AN \$34.90	FSA1412-AN \$48.00	FSA1412-AN \$48.00	FSA2015-AN \$55.15

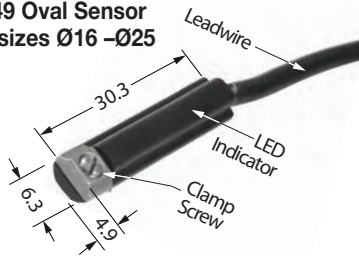
These shock absorbers are sized for general conditions and should be suitable for a wide variety of applications. Extreme loads or speeds may require other shock absorbers sizes.

Seal Kits	FRC16	FRC20	FRC25	FRC32	FRC40
	FRC16-SK \$23.10	FRC20-SK \$32.55	FRC25-SK \$28.35	FRC32-SK \$20.65	FRC40-SK \$38.50

## Position Sensors

Please order sensors and female cordsets separately.

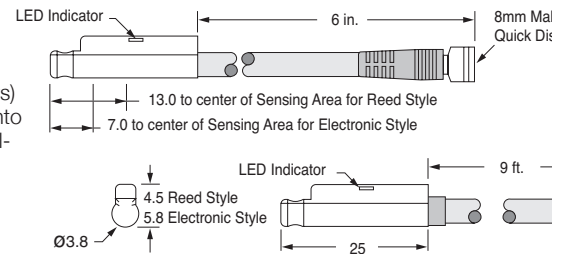
### 9Q49 Oval Sensor for sizes ∅16 - ∅25



### 9C49 Round Sensor for all sizes

Using 9C49 Sensors requires use of an adapter #TD11047 (included with 9C49-200-xxx sensors) which allows fitting these 4mm round sensors into any of the sensor slots. The adapter is also available separately at no charge.

Female Cord Sets	Part No.	Price
1 Meter	CFC-1M	\$15.05
2 Meters	CFC-2M	16.85
5 Meters	CFC-5M	21.30



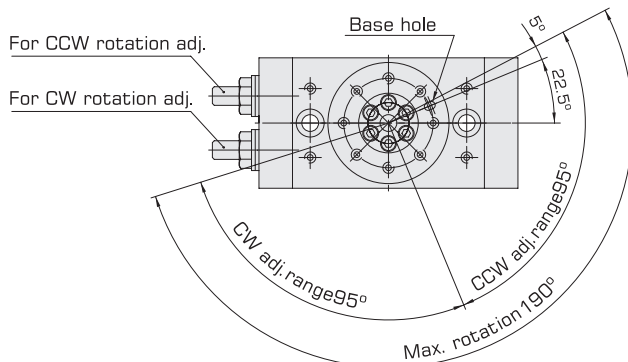
9Q49 4mm Round Sensor Selection Guide for All Sizes		Prewired 9 ft. Leadwire Part No.	Price	Quick Disconnect* Part No.	Price
Reed (LED)	5-120V AC/DC, 0.04 Amp Max current, 4 Watt Max, 2.5 voltage drop	9C49-200-002	.. \$20.25	9C49-200-302	..\$27.00
Electronic (LED)	Sourcing PNP 6-30 VDC, 0.2 Amp Max current, 6 Watt max., 1.5 voltage drop	9C49-200-031	... 28.65	9C49-200-331	....33.25
Electronic (LED)	Sinking NPN 6-30 VDC, 0.2 Amp Max current, 6 Watt max., 1.5 voltage drop	9C49-200-032	... 28.65	9C49-200-332	....33.25

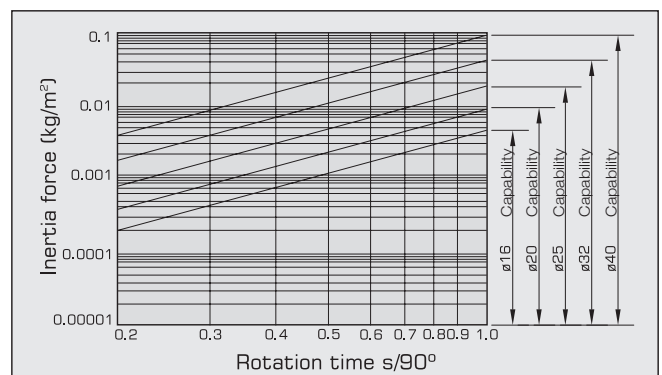
9Q49 6.3mm Oval Sensor Selection Guide for Sizes ∅16 - ∅25		Prewired 9 ft. Leadwire Part No.	Price	Quick Disconnect* Part No.	Price
Reed (LED)	5-120V AC/DC, 0.03 Amp Max current, 4 Watt Max, 2.0 voltage drop	9Q49-000-002	.. \$20.20	9Q49-000-302	..\$22.85
Electronic (LED)	Sourcing PNP 5-28 VDC, 0.20 Amp Max current, 0.5 Voltage Drop	9Q49-000-031	... 33.90	9Q49-000-331	....36.55
Electronic (LED)	Sinking NPN 5-28 VDC, 0.20 Amp Max current, 0.5 Voltage Drop	9Q49-000-032	... 33.90	9Q49-000-332	....36.55

\*Note: Quick disconnect styles are supplied with 6 inch pigtail with male connector.

## Rotation direction & adjusting instruction



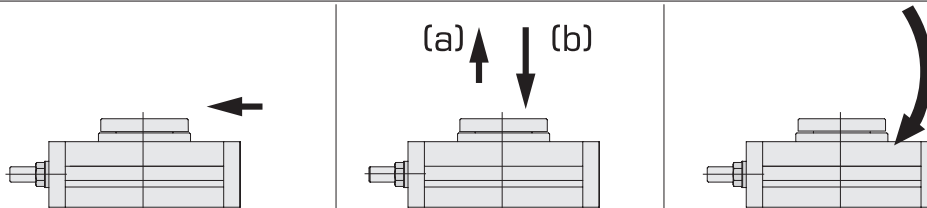
## Inertia force and rotation time





### Allowable load

Conversions:  
 $lb = N \times 0.224$   
 $lbf\cdot ft = N\cdot m \times 0.738$



Bore mm	Allowable side load on shaft N (lb)	Allowable axial load N (lb)		Allowable moment N·m (lbf·ft)
		(a)	(b)	
16	88(19)	84(18.8)	88(19)	2.7(1.99)
20	178(40)	179(40)	330(74)	3.9(2.87)
25	314(70)	296(66)	451(101)	9.7(7.15)
32	390(87)	493(110)	708(159)	18(13.2)
40	543(122)	740(166)	1009(226)	25(18.4)

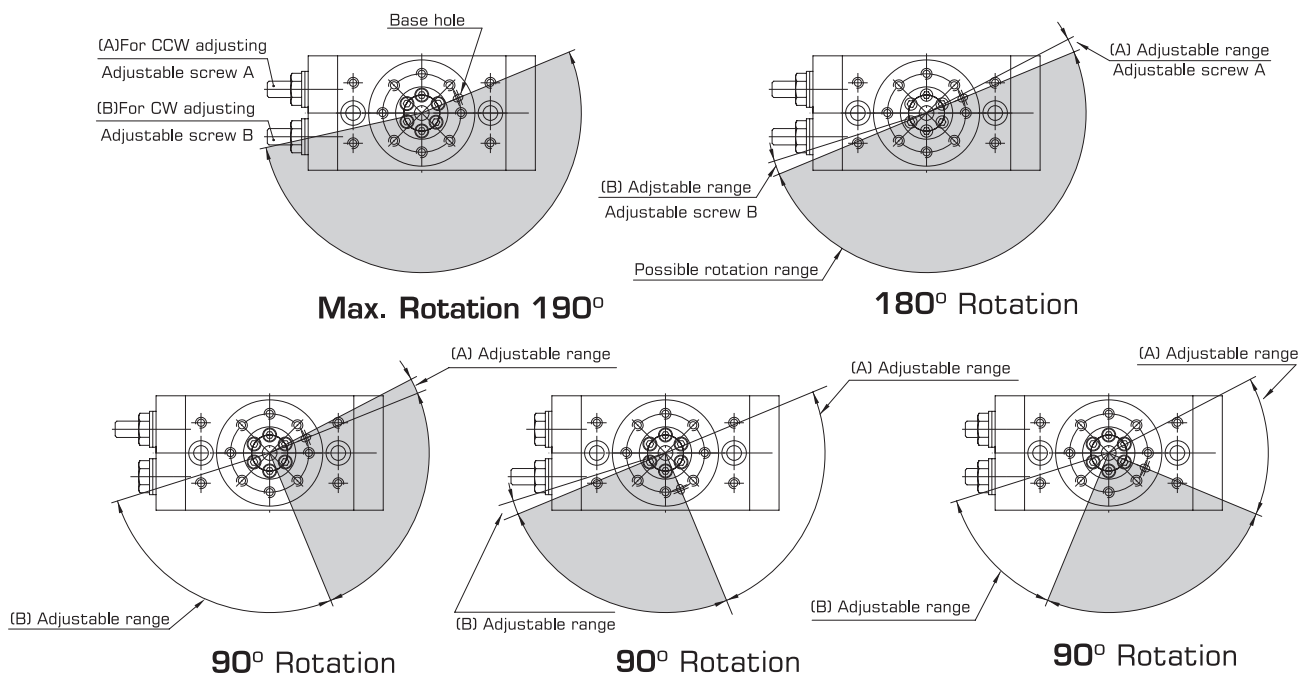
### Output

lbf-in  
(kgf-cm)

Bore	16	20	25	32	40
50 psi (0.35MPa)	9 (10.4)	16.5 (19.0)	27 (31.0)	54 (62.2)	112 (129)
100 psi (0.7MPa)	18 (20.8)	33 (38.0)	54 (62.1)	108 (124.4)	225 (259)

Conversions:  
 $MPa = psi \times 0.7$   
 $kgf\cdot cm = lbf\cdot in \times 1.15$

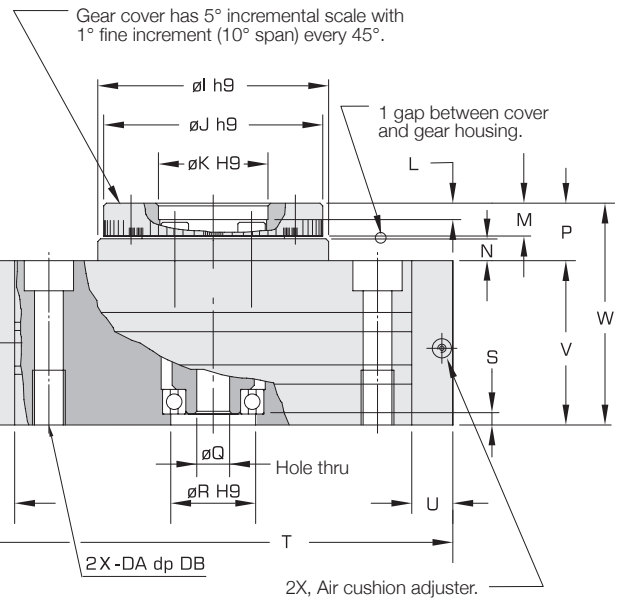
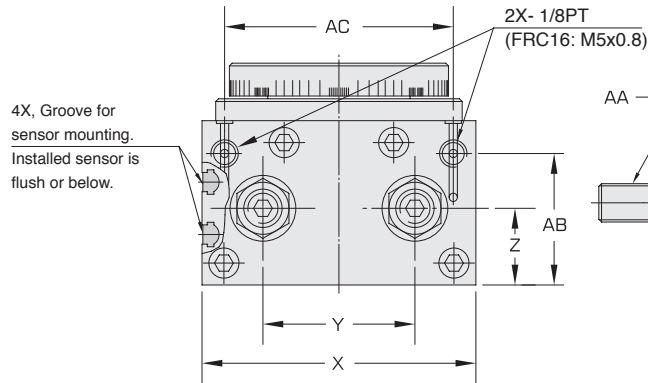
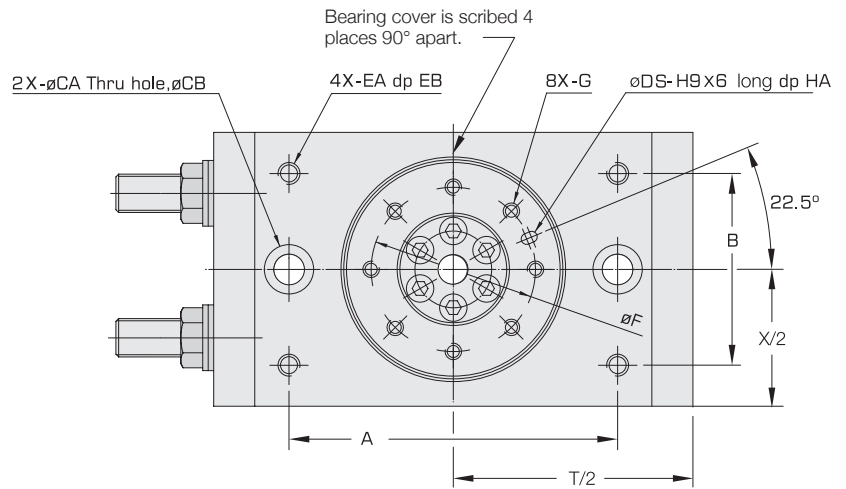
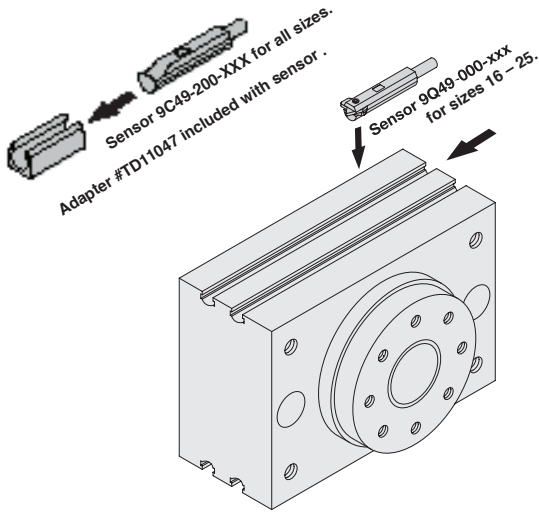
### Rotation adjusting range



# FABCO-AIR ROTARY ACTUATOR

## FRC Series

### Dimensions (mm)



Model	A	B	CA	CB	DA	DB	DS	EA	EB	øF	G	HA	øI	øJ	øK	L
FRC16	76	34	8.6	14	M10X1.5	15	4	M6X1.0	8	43	M6X1.0	4.5	61	60	27	6
FRC20	84	37	8.6	14	M10X1.5	15	4	M6X1.0	8	48	M6X1.0	4.5	67	65	32	4.5
FRC25	100	50	10.2	18	M12X1.75	15	5	M8X1.25	8	55	M8X1.25	6	77	75	35	5.5
FRC32	120	70	10.2	18	M12X1.75	20	4	M8X1.25	8	70	M8X1.25	6	92	90	40	6
FRC40	140	80	10.2	18	M12X1.75	20	4	M8X1.25	12	80	M8X1.25	6	102	100	45	6

Model	M	N	P	øQ	øR	S	T	U	V	W	X	Y	Z	AA	AB	AC
FRC16	10	6	17	9	17	2	119	13	37	54	65	27.5	15.5	M10X1.0	28.5	50
FRC20	10	6	17	9	22	2	131	14	40	57	70	29	18.5	M10X1.0	32	50
FRC25	12	7	20	10	26	3.5	157	18	46	66	80	36	22	M14X1.5	37.5	63
FRC32	12	8	21	12	31	4	175	15	60	81	100	50	28	M14X1.5	48	83.5
FRC40	12	8	21	18	36	4	195	15	70	91	122	65	33	M20X1.5	58	100

# FABCO-AIR

## Product Catalog Library

oem NFPA Air Cylinders  
Catalog #FCQN-OEM



Stopper Cylinders  
Catalog #ST-SC



Cylinders, Valves and Accessories  
Catalog #CV9



Pancake® II Air Cylinders  
Catalog #Pan2-2



Square Pancake® II Air Cylinders  
Catalog #SqPan2



ISO 6431 Cylinders  
Catalog #FAQ2R-14



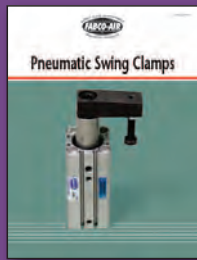
Twin Rod, Non-Rotating  
Air Cylinders - Catalogs  
#FDX-09 & #FDX-09



High Closing Force  
Angular Grippers  
Catalog #FKHC-10



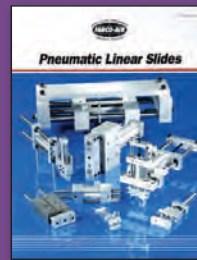
Multi-Power® Air Presses  
Catalog #FP16



Swing Clamps  
Catalog #SC-DB04



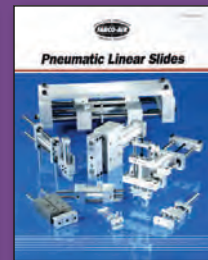
Modular Air Prep System  
FRLs Catalog #FRL-06



Compact Finger Slides  
Catalog #FDH-10



ISO 6432 Cylinders  
Catalog #FAE-09



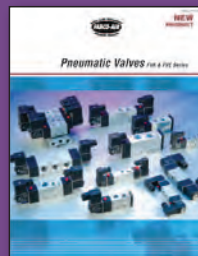
Linear Slides - 6 Families  
Catalog #LS-03



NAMUR Solenoid Valves  
Catalog #FVEN-10



Global Series™ Metric  
Air Cylinders  
Catalog #GC-15



Air Pilot and  
Solenoid Valves  
Catalog #FVA.E-09



Air Table Slides  
Catalog #FGXS-10



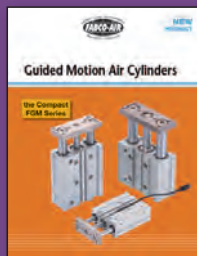
Wide & Narrow Parallel  
Grippers - Catalogs  
#FKHZ-10 & #FKHQ-10



Toggle Type  
Angular Grippers  
Catalog #FKHT-10



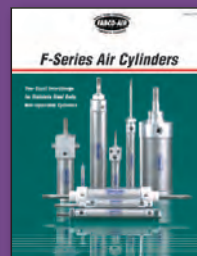
NFPA Interchangeable  
Air Cylinders  
Catalog #NF-6



Guided Motion  
Air Cylinders  
Catalog #FGM-10



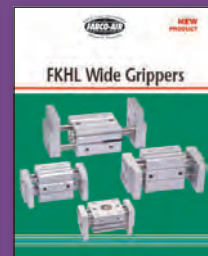
Pneumatic Rotary  
Actuators  
Catalog #FRB-14



Stainless Steel Body  
Air Cylinders  
Catalog #SSB-03



Pneumatic & Hydraulic  
Swing Clamps  
Catalog #FML.H



Wide Opening  
Parallel Grippers  
Catalog #FKHL-10



Original Pancake®  
Air Cylinders  
Catalog #CV9



Pneumatic  
Crimping Tools  
Catalog #FCT-JY07



Magnetically Coupled  
Rodless Air Cylinders  
Catalog #FGYBR-11



Magnetically Coupled  
Rodless Slides  
Catalog #FGYS-11



Angular Grippers  
Catalog #FKA-09



3 Series of Angular &  
Parallel Motion Grippers  
Catalog #GR8

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