

# FDF Series TWIN-ROD CYLINDER

# NEW PRODUCT



Conversions  
psi = kgf/cm<sup>2</sup> x 14.2  
psi = MPa x 145  
inch = mm x 0.0394  
lb force = N x 0.22

## Features

1. Magnetic piston is standard in all sizes.
2. Non-rotating design enables precision positioning.
3. Compact design saves space.
4. Suitable for multi-axis assemblies and design of robot arms.
5. Twin bore doubles thrust forces.
6. Easily adjustable sensors mount in linear slots in the housing.
7. Cylinders can be operated with or without lubrication.

## Specifications

100 psi max.

Model	FDF
Action	Double acting
Bore Size	ø10, ø16, ø20, ø25
Media	Compressed air
Min. operating pressure	0.1 MPa (1 kgf/cm <sup>2</sup> ) 14 psi
Max. operating pressure 100 psi	0.7 MPa (7 kgf/cm <sup>2</sup> ) 100 psi
Maximum speed	500mm/s (19.7 in/sec)
Ambient & media temperature	-10°C(14°F) ~ +70°C(158°F) filtered dry air required at temperatures below 0°C (32°F)
Lubrication	None required or use ISO VG32
Port size	ø10 ~ ø25: M5x0.8
Adjustable retract stroke	0 ~ 5mm
Cushion	Standard with rubber bumper (both sides)

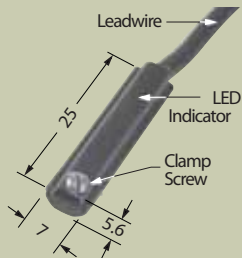
## How to order

Series	Bore	Stroke
FDF Standard Type	ø10	10~70mm
	ø16	10~100mm
	ø20	10~100mm
	ø25	10~100mm

## Price List

### Position Sensors

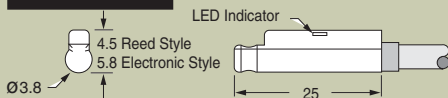
#### 9S49 Sensors



TYPE	Cylinder Stroke (mm)									
	10	20	30	40	50	60	70	80	90	100
FDF 10 x □	\$67.15	\$70.50	\$75.00	\$78.35	\$81.70	\$86.20	\$89.55	-	-	-
FDF 16 x □	78.35	79.45	88.00	96.65	106.85	109.70	113.95	\$118.25	\$123.95	\$128.20
FDF 20 x □	81.70	90.40	100.55	103.15	115.40	118.25	123.95	128.20	132.50	138.15
FDF 25 x □	92.90	95.15	104.85	116.20	118.85	124.05	142.45	146.70	152.40	156.70

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

#### 9C49 Sensors



All 9C49 sensors feature surge protection, polarity protection, LED indicator, and extremely fast switching speeds

Female Cord Sets	Part No.	Price
1 Meter	CFC-1M	\$14.35
2 Meters	CFC-2M	16.05
5 Meters	CFC-5M	20.30

7 mm wide	9S49 Sensor Selection Guide for all bore sizes ø16 ~ ø25				Prewired 9 ft. Leadwire		Quick Disconnect*	
	Sensor Type	Electrical Characteristics	Part No.	Price	Part No.	Price		
	Reed (LED)	5-120 VDC/VAC, 0.03 Amp max, 0.005 Amp min, 4 Watt max, 2.0 voltage drop	9S49-000-002 . . .	\$19.25	9S49-000-302 ..	\$21.75		
	Electronic (LED)	Sourcing PNP 5-28 VDC, 0.20 Amp max current, 0.5 voltage drop	9S49-000-031 . . .	32.30	9S49-000-331 .....	34.80		
Electronic (LED)	Sinking NPN 5-28 VDC, 0.20 Amp max current, 0.5 voltage drop	9S49-000-032 . . .	32.30	9S49-000-332 .....	34.80			

4 mm round	9C49 Sensor Selection Guide for bore size ø10				Prewired 9 ft. Leadwire		Quick Disconnect*	
	Sensor Type	Electrical Characteristics	Part No.	Price	Part No.	Price		
	Reed (LED)	5-120 VDC/VAC, 0.04 Amp Max current, 4 Watt Max., 2.5 voltage drop	9C49-000-002 . . .	\$19.30	9C49-000-302 ..	\$25.70		
	Electronic (LED)	Sourcing PNP 6-30 VDC, 0.2 Amp Max current, 6 Watt max., 1.5 voltage drop	9C49-000-031 . . .	27.30	9C49-000-331 .....	31.65		
Electronic (LED)	Sinking NPN 6-30 VDC, 0.2 Amp Max current, 6 Watt max., 1.5 voltage drop	9C49-000-032 . . .	27.30	9C49-000-332 .....	31.65			

\*Note: All quick disconnect style sensors are supplied with 6 inch pigtail with male connector. Specifications and prices subject to change without notice or incurring obligation.

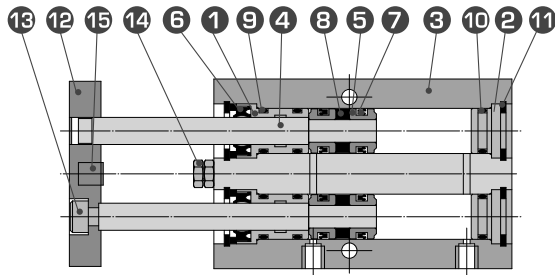
## Theoretical Output N (lbf)

\*Theoretical output (N)=Pressure (MPa) X Piston area (mm<sup>2</sup>)

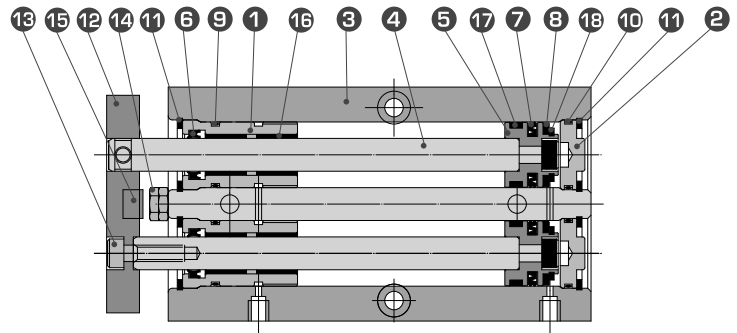
Bore size (mm)	Rod size (mm)	Operating direction	Piston area mm <sup>2</sup> (in <sup>2</sup> )	Operating pressure MPa (psi)						
				0.1(14.5)	0.2(29)	0.3(43)	0.4(58)	0.5(72)	0.6(87)	0.7(101)
FDF □ 10	6	Push	157(0.24)	15.7(3.5)	31.4(7)	47.1(10)	62.8(14)	78.5(17)	94.2(21)	110(24)
		Pull	100(0.15)	10.0(2.2)	20.0(4.3)	30.0(6.4)	40.0(8.7)	50.0(10)	60.0(13)	70.0(15)
FDF □ 16	8	Push	402(0.62)	40.2(9.0)	80.4(18)	120.6(26)	161(36)	201(44)	241(54)	281(62)
		Pull	301(0.46)	30.1(6.7)	60.2(13)	90.3(19)	120(26)	150(33)	181(40)	211(46)
FDF □ 20	10	Push	628(0.97)	62.8(14)	126(28)	188(41)	251(56)	314(70)	377(84)	440(98)
		Pull	471(0.73)	47.1(10.6)	94.2(21)	141(31)	188(42)	236(52)	283(63)	330(73)
FDF □ 25	12	Push	982(1.52)	98.2(22)	196(44)	295(65)	393(88)	491(109)	589(132)	687(153)
		Pull	756(1.17)	75.6(17)	151(34)	227(50)	302(68)	378(84)	454(101)	529(118)

## Construction

### FDF 10



### FDF 16 - 25



## Part lists

NO.	Description	Material	QTY
1	Front end cover	Anodized aluminum alloy	2
2	Rear end cover	Anodized aluminum alloy	2
3	Housing	Anodized aluminum alloy	1
4	Piston rod	Hard chrome plated stainless steel	2
5	Piston	∅10 Brass	4
		∅16~25 Aluminum alloy	2
6	Piston rod seal	Nitrile - Buna N	2
7	Piston seal	∅10 Nitrile - Buna N	4
		∅16~25 Nitrile - Buna N	2
8	Magnet	Rubber bonded barium ferrite	2
9	Front end cover seal	∅10 Nitrile - Buna N	4
		∅16~25 Nitrile - Buna N	2
10	Rear end cover seal	Nitrile - Buna N	2
11	Snap ring	Plated carbon steel	4
12	End plate	Plated steel	1
13	Set screw	Carbon steel	2
14	Nut	Carbon steel	2
15	Bumper	Acetal	1
16	Sleeve bearing	Oil filled, sintered bronze	2
17	Wear ring	Acetal	2
18	Washer	Stainless steel	2

## Seal lists

Description	6	7	9	10
Bore	Piston rod seal	Piston seal	Front end cover seal	Rear end cover seal
∅10	EL6	DYP10	SM8	SM8
∅16	DRP8	COP16	SM12	SM14
∅20	DRP10	COP20	SM16	SM16
∅25	DRP12	COP25	SM22	SM22

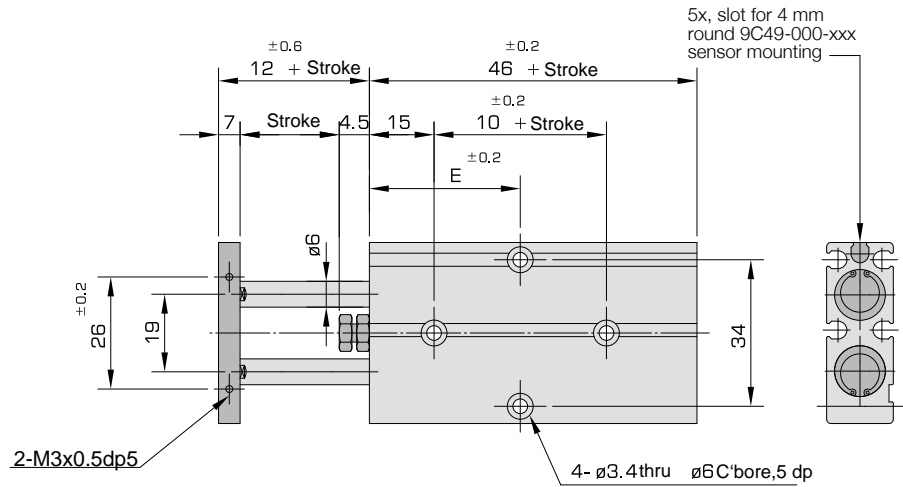
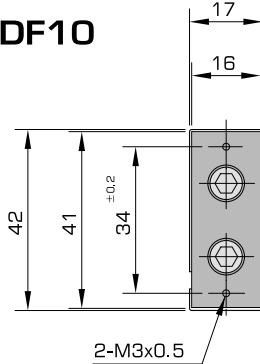
## Standard strokes (mm)

Bore	Stroke
∅10	10,20,30,40,50,60,70
∅16	10,20,30,40,50,60,70,80,90,100
∅20	10,20,30,40,50,60,70,80,90,100
∅25	10,20,30,40,50,60,70,80,90,100

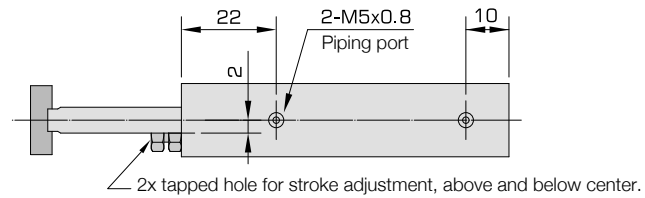
# FDF Series TWIN-ROD CYLINDER

## External Dimensions (mm)

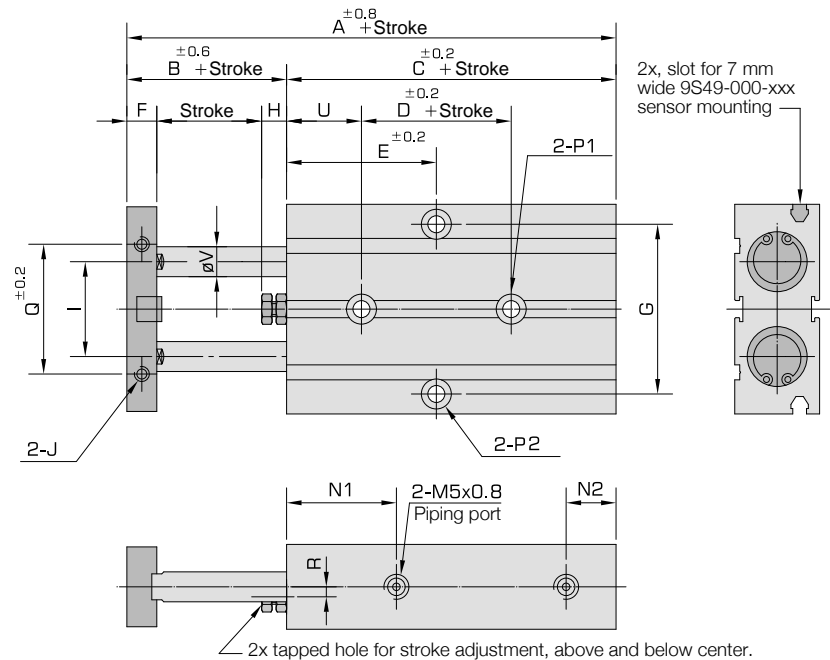
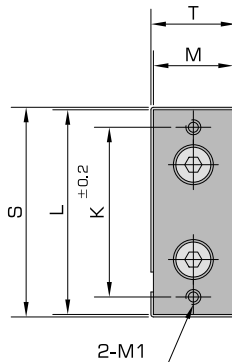
### ● FDF10



Dim. Stroke Bore	E						
	10	20	30	40	50	60	70
Ø10	30	30	35	40	45	50	55

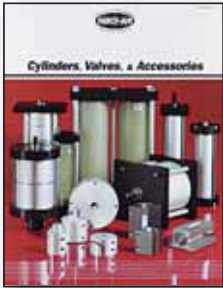


### ● FDF16~25

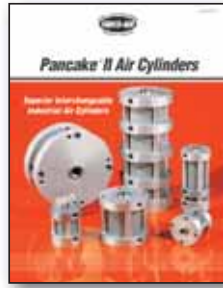


Stroke Bore	Dim.	A	B	C	D	E										F	G	H	I	J	K	L	M
						10	20	30	40	50	60	70	80	90	100								
Ø16		67	14	53	20	30	35	40	45	50	55	60	65	70	75	8	47	6	24	M4X0.7dp5	47	53	20
Ø20		75	17	58	20	35	35	40	45	50	55	60	65	70	75	10	55	6.5	28	M4X0.7dp5	55	61	24
Ø25		79.5	17.5	62	30	40	40	45	50	55	60	65	70	75	80	10	70	7.5	40	M5X0.8dp6	66	72	29

Bore	Dim.	M1	N1	N2	P1	P2	Q	R	S	T	U	V
Ø20	M4X0.7	24	12	φ4.5Thruφ8C'bore, dp 7.2	φ4.5Thruφ8C'bore, dp 4.4	44	6	65	25	15	10	
Ø25	M4X0.7	27	12	φ4.5Thruφ8C'bore, dp 7.2	φ4.5Thruφ8C'bore, dp 4.4	56	5	80	30	15	12	



*Cylinders, Valves and Accessories  
 Catalog #CV9*



*Pancake® II Air Cylinders  
 Catalog Pan2-2*



*Square Pancake® II Air Cylinders  
 Catalog # SqPan2*



*ISO 6431 Cylinders  
 Catalog # FAQR-09*



*Pneumatic Angular Motion Grippers  
 Catalog # FKA-09*



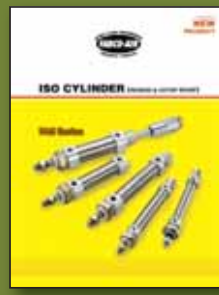
*Multi-Power® Air Presses  
 Catalog # FP16*



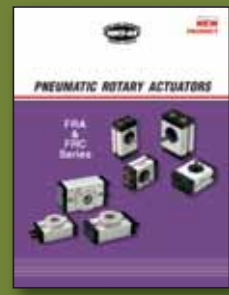
*Linear Slides - 6 Families  
 Catalog # LS-03*



*Pneumatic Grippers, Parallel Jaw and Angular Motion - Catalog # GR-8*



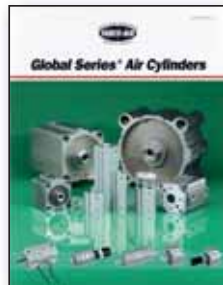
*ISO 6432 Cylinders  
 Catalog # FAE-09*



*Rotary Actuators, Pneumatic  
 Catalog # FRA.C-09*



*NFPA Interchangeable Air Cylinders - Catalog # NF-6*



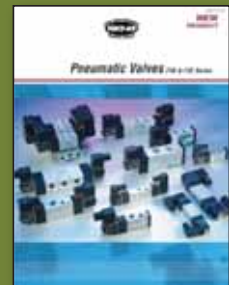
*Global Series™ Metric Air Cylinders - Catalog # GC-15*



*Swing Clamps Bulletin # SC-DB04*



*Manifold Solenoid Valves  
 Catalog # FVS.Y-09*



*Air Pilot & Solenoid Valves  
 Catalog # FVA.E-09*



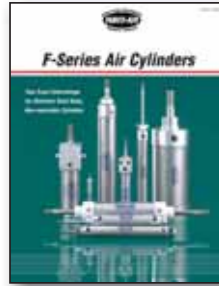
*Modular Air Preparation System - FRLs  
 Catalog # FRL-06*



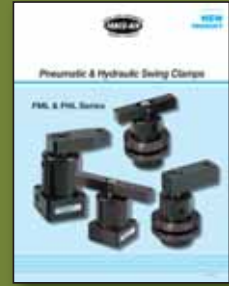
*Specialty & Control Valves  
 Catalog # 14CAN*



*Stopper Cylinders  
 Catalog # ST-SC*



*Stainless Steel Body Air Cylinders  
 Catalog # SSB-03*



*Pneumatic & Hydraulic Swing Clamps  
 Catalog # FML.H*

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