




TWIN-ROD CYLINDER

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.

Conversions
 psi = kgf/cm² x 14.2
 psi = MPa x 145
 inch = mm x 0.0394
 lb force = N x 0.22

How to order

DFD	20 X 50
Series	Bore
DFD Standard Type	Stroke
	ø10 ø16 ø20 ø25
	10~70mm 10~100mm 10~100mm 10~100mm

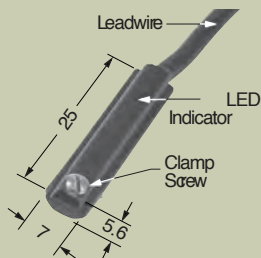
Specifications

100 psi max.

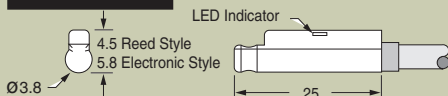
Model	DFD
Action	Double acting
Bore Size	ø10, ø16, ø20, ø25
Media	Compressed air
Min. operating pressure	0.1 MPa (1 kgf/cm ²) 14 psi
Max. operating pressure 100 psi	0.7 MPa (7 kgf/cm ²) 100 psi
Maximum speed	500mm/s (19.7 in/sec)
Ambient & media temperature	-10°C(14°F) ~ +70°C(158°F) filtered dry air 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)

Position Sensors

9S49 Sensors



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	-
2 Meters	CFC-2M	-
5 Meters	CFC-5M	-

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	-	9S49-000-302	-
	Electronic (LED)	Sourcing PNP 5-28 VDC, 0.20 Amp max current, 0.5 voltage drop	9S49-000-031	-	9S49-000-331	-
	Electronic (LED)	Sinking NPN 5-28 VDC, 0.20 Amp max current, 0.5 voltage drop	9S49-000-032	-	9S49-000-332	-

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	-	9C49-000-302	-
	Electronic (LED)	Sourcing PNP 6-30 VDC, 0.2 Amp Max current, 6 Watt max., 1.5 voltage drop	9C49-000-031	-	9C49-000-331	-
	Electronic (LED)	Sinking NPN 6-30 VDC, 0.2 Amp Max current, 6 Watt max., 1.5 voltage drop	9C49-000-032	-	9C49-000-332	-

*Note: All quick disconnect style sensors are supplied with 6 inch pigtail with male connector.

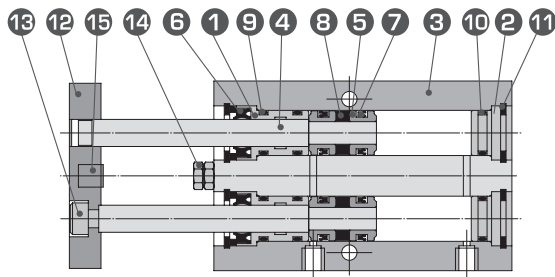
Theoretical Output N (lbf)

*Theoretical output (N)=Pressure (MPa) X Piston area (mm²)

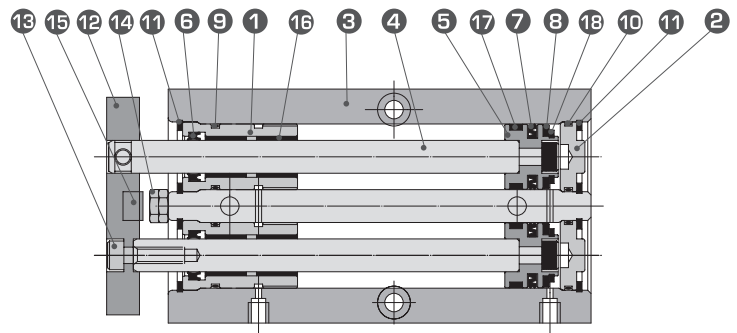
Bore size (mm)	Rod size (mm)	Operating direction	Piston area mm ² (in ²)	Operating pressure MPa (psi)						
				0.1(14.5)	0.2(29)	0.3(43)	0.4(58)	0.5(72)	0.6(87)	0.7(101)
FDF □ 10	6	Push	157(0.24)	15.7(3.5)	31.4(7)	47.1(10)	62.8(14)	78.5(17)	94.2(21)	110(24)
		Pull	100(0.15)	10.0(2.2)	20.0(4.3)	30.0(6.4)	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 Kits

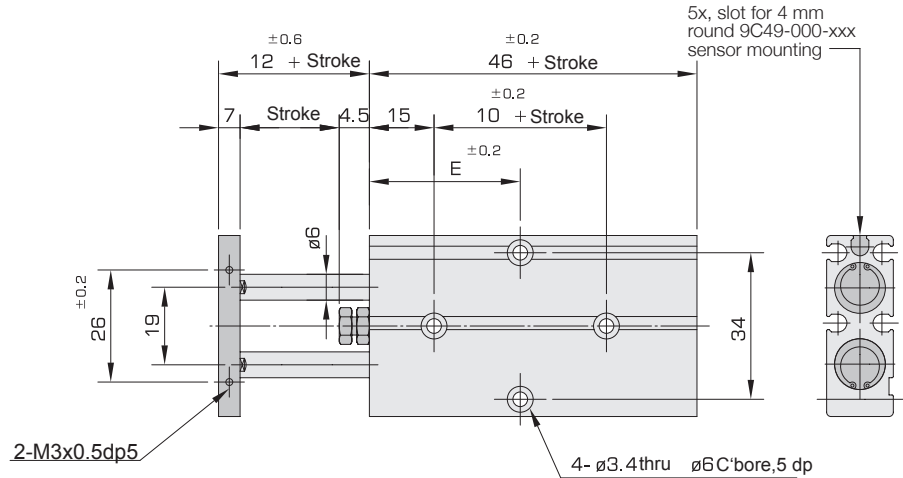
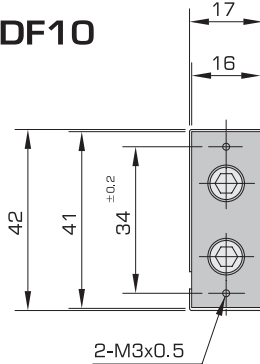
Bore	Part Number	Price
10	FDF10-SK	\$22.25
16	FDF16-SK	\$12.30
20	FDF20-SK	\$12.60
25	FDF25-SK	\$13.65

Standard strokes (mm)

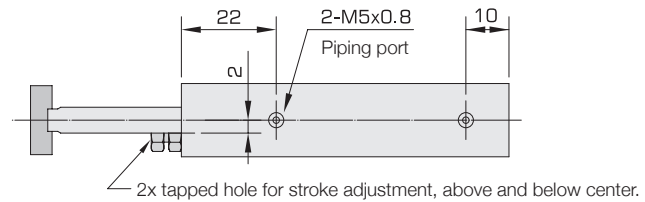
Bore	Stroke
∅10	10,20,30,40,50,60,70
∅16	10,20,30,40,50,60,70,80,90,100
∅20	10,20,30,40,50,60,70,80,90,100
∅25	10,20,30,40,50,60,70,80,90,100

External Dimensions (mm)

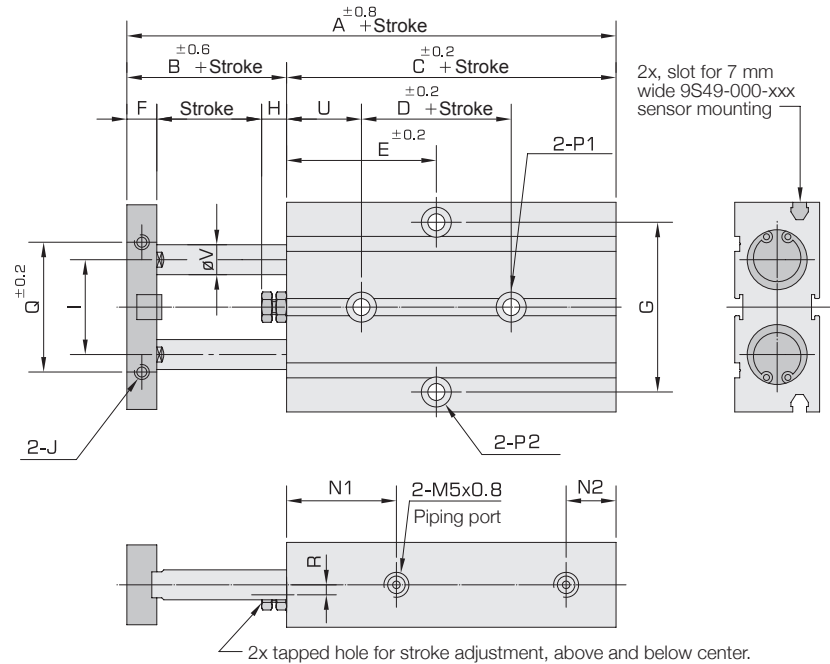
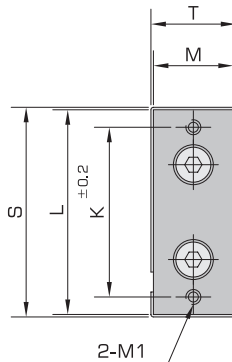
● FDF10



Stroke Bore	Dim.	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	ø4.5Thruø8C'bore,dp 7.2	ø4.5Thruø8C'bore,dp 4.4	44	6	65	25	15	10	
Ø25	M4X0.7	27	12	ø4.5Thruø8C'bore,dp 7.2	ø4.5Thruø8C'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



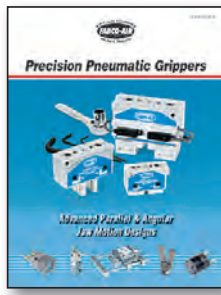
Pneumatic Angular Motion Grippers
Catalog # FKA-09



Multi-Power® Air Presses
Catalog # FP16



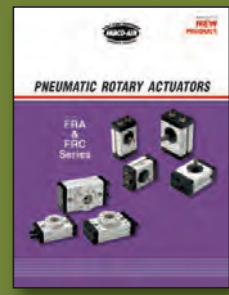
Linear Slides - 6 Families
Catalog # LS-03



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



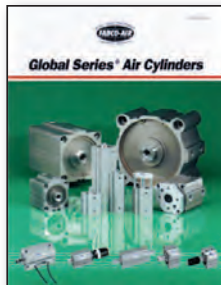
ISO 6432 Cylinders
Catalog # FAE-09



Rotary Actuators, Pneumatic
Catalog # FRA.C-09



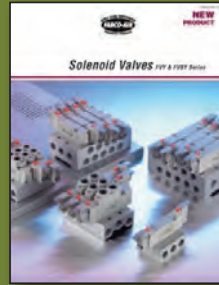
NFPA Interchangeable Air Cylinders - Catalog # NF-6



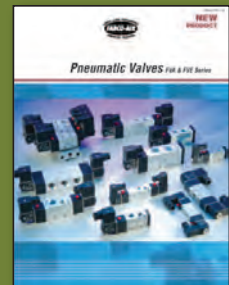
Global Series™ Metric Air Cylinders - Catalog # GC-15



Swing Clamps Bulletin # SC-DB04



Manifold Solenoid Valves
Catalog # FVS.Y-09



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



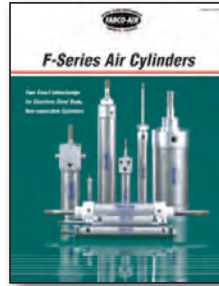
Modular Air Preparation System - FRLs
Catalog # FRL-06



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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