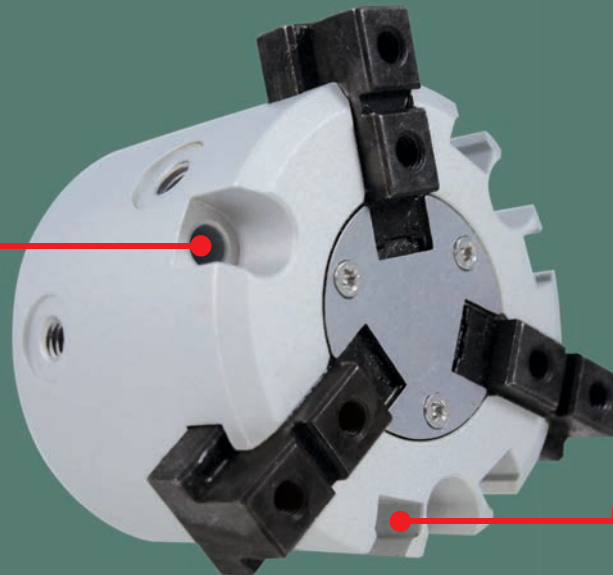


FABCO-AIR

FKHS Series *3 Jaw Parallel Motion Pneumatic Grippers*

Mounting Hole

Can be mounted from
the gripper side

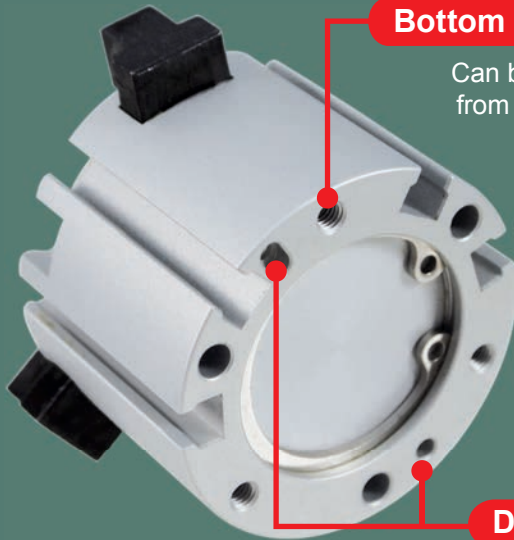


Mounting slot for easy
sensor installation

Sensor Capable

Bottom tapped holes

Can be mounted
from the bottom



Easy alignment
when mounting.

Dowel Hole & Slot



Features

- Three (3) jaw gripping.
- Top & bottom mounting.
- Dowel pin hole and mounting slot registration.
- Reduced weight.
- Magnetic piston is standard feature.
- Adding optional sensors enables "open" and "close" position sensing.
- Compact design make grippers ideal for handling small parts in confined areas.



How to Order

FKHS

-

50

D

Series

Bore

Action type

Ø25 D Double acting

Ø32

Ø40

Ø50

Ø63

Ø80

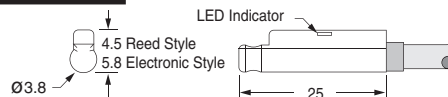
Prices

Model	Price
FKHS-25D	\$ 278.35
FKHS-32D	300.00
FKHS-40D	328.35
FKHS-50D	361.70
FKHS-63D	416.70
FKHS-80D	560.00

Sensors

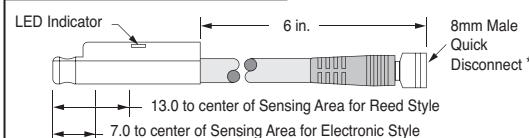
See specifications and pricing on pages 6 and 7.

9C49 Sensors

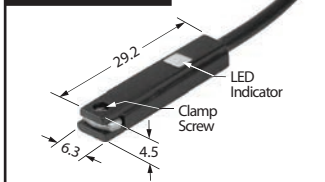


All 9C49 sensors feature surge protection, polarity protection, LED indicator, and extremely fast switching speeds.

Quick Disconnect Sensors



9G49 Sensors



Female Cord Sets

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

Specifications

Series		FKHS					
Action		Double acting					
Bore		Ø25	Ø32	Ø40	Ø50	Ø63	Ø80
Operating fluid		Compressed air					
Operating pressure		0.2~0.6MPa(2.0~6.1kgf/cm ²)	0.1~0.6MPa(1.0~6.1kgf/cm ²)				
Temperature range		-10°C (14°F) to 60°C (140°F)					
Lubrication		None required or use ISO VG32					
Repeatability		±0.01mm					
(Note 1) Effective grip force(N) at 0.5 MPa	External grip	42	74	118	187	335	500
	Internal grip	47	82	130	204	359	525
Max. operating frequency		120 C.P.M	60 C.P.M				30 C.P.M
Opening / Closing stroke (Diameter change)		6	8	8	12	16	20
Weight (g)		140	237	351	541	992	1850

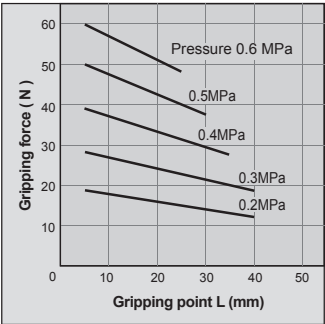
(Note 1) Values for Ø25 are with gripping point L = 20 mm. • For Ø32 to Ø63 with gripping point L = 30 mm.
• For Ø80 mm with gripping point L = 50 mm. Refer to grip force charts on page 3.

Conversions

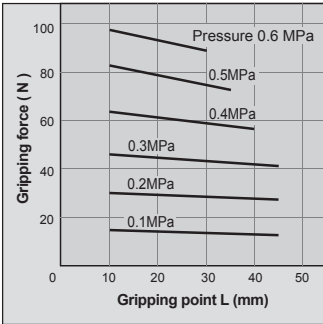
Grip force lbf = N x 0.224	0.1 MPa = 15 psi	0.4 MPa = 58 psi
	0.2 MPa = 29 psi	0.5 MPa = 72 psi
	0.3 MPa = 43 psi	0.6 MPa = 87 psi

External Grip Forces

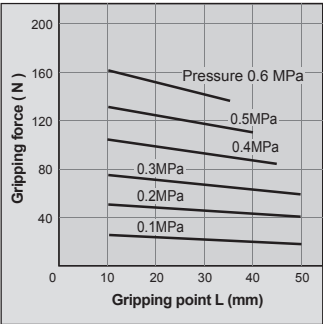
FKHS-25D



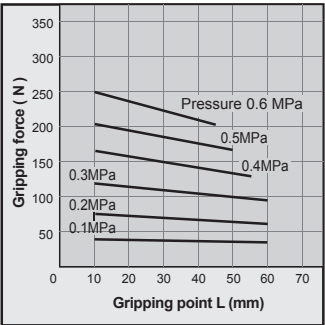
FKHS-32D



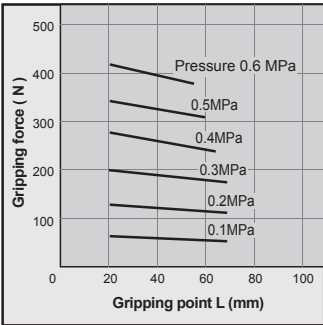
FKHS-40D



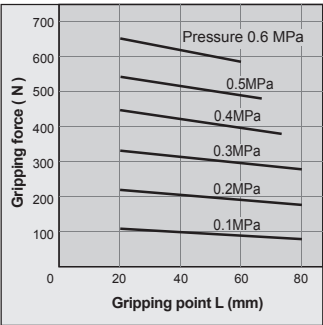
FKHS-50D



FKHS-63D

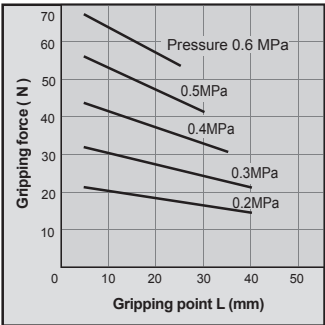


FKHS-80D

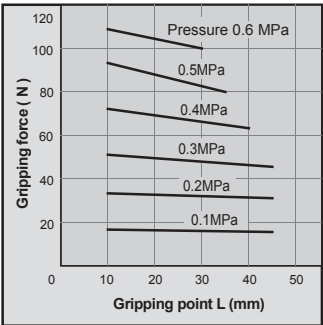


Internal Grip Forces

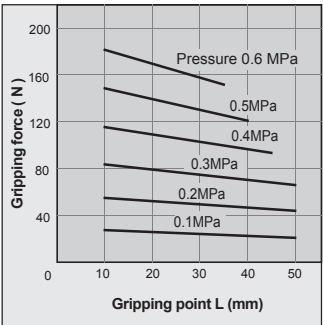
FKHS-25D



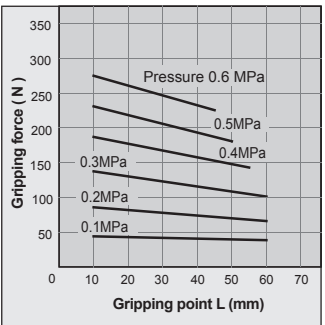
FKHS-32D



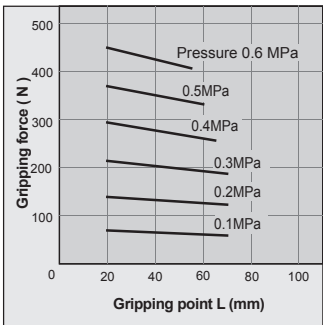
FKHS-40D



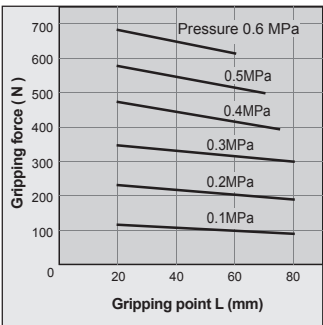
FKHS-50D



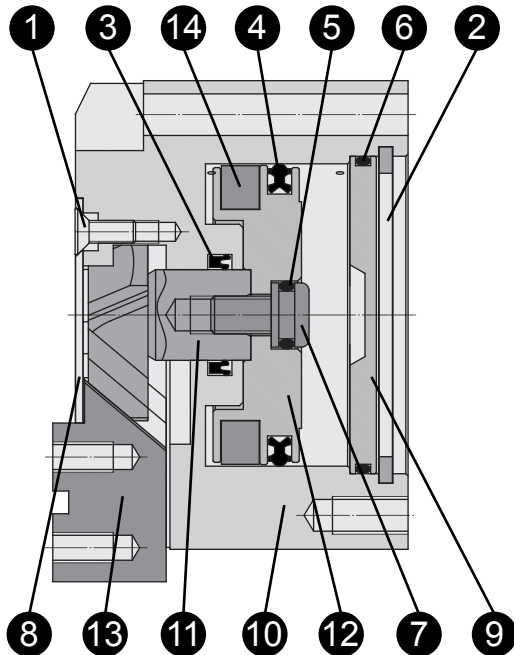
FKHS-63D



FKHS-80D



Construction



Parts List

NO.	Description	Material	Qty
①	Phillips screw	Carbon steel	3
②	Snap ring	Carbon steel	1
③	Piston seal	NBR	1
④	Piston seal	NBR	1
⑤	O-ring	NBR	1
⑥	O-ring	NBR	1
⑦	Piston bolt	Stainless steel	1
⑧	Front end cover	Stainless steel	1
⑨	Rear end cover	Aluminum alloy	1
⑩	Barrel	Aluminum alloy	1
⑪	Piston rod	Alloy steel	1
⑫	Piston	Aluminum alloy	1
⑬	Finger	Medium carbon steel	3
⑭	Magnet	Rubber bonded barium ferrite	1

Model Selection

Known Conditions:

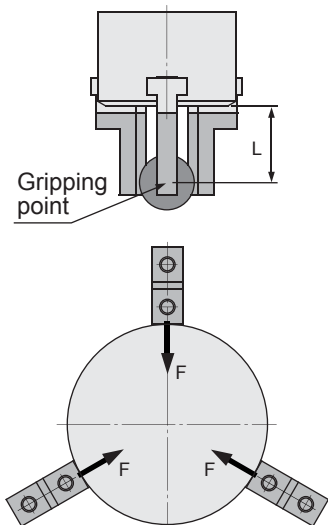
(a) Workpiece mass

(b) External or internal grip

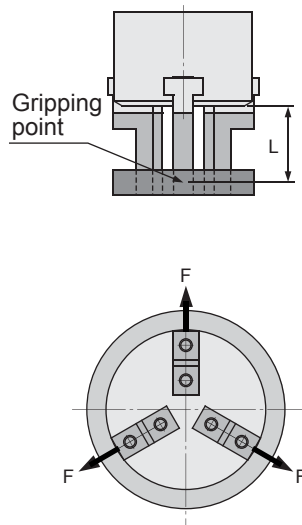
(c) Gripping point

(d) Operating pressure

External Grip



Internal Grip



Gripping point

The workpiece gripping point distance should be within the ranges given for each pressure in the effective gripping force graphs. See page 3.

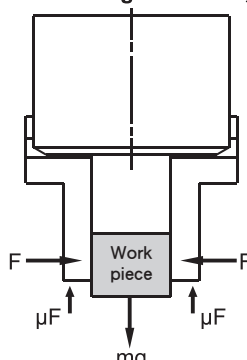
If operated with the workpiece gripping point beyond the indicated ranges, an excessive offset load will be applied to the sliding section of the fingers, which can have an adverse effect on the service life of the product.

Effective gripping force

The effective gripping force shown in the graphs on page 3 is expressed as F, which is the thrust of one finger when all 3 of the fingers and attachments are in full contact with the workpiece as shown in the figures on the left.

Model Selection (continued)

As this figure shows, when gripping a workpiece,



n : Constant 3 (Number of fingers)
 F : Gripping force (N)
 μ : Coefficient of friction between attachments and workpiece
 m : Workpiece mass (kg)
 g : Gravitational acceleration ($= 9.8 \text{ m/s}^2$)
 mg : Workpiece weight (N),

The conditions under which the workpiece will not drop are

$$n \times \mu F > mg \Rightarrow F > \frac{mg}{3 \times \mu}$$

With "a" as the safety margin, F is determined as follows:

$$F = \frac{mg}{3 \times \mu} \times a$$

Guidelines for selection of the gripper with respect to workpiece weight.

Review the following calculations to consider acceleration and slight impacts which occur during normal transfer, etc., using a safety margin of $a = 4$.

7 x workpiece weight	13 x workpiece weight
When $\mu = 0.2$	When $\mu = 0.1$
$F = \frac{mg}{3 \times 0.2} \times 4$ $= 6.67 \times mg$ <p>approx. $= 7 \times mg$</p>	$F = \frac{mg}{3 \times 0.1} \times 4$ $= 13.3 \times mg$ <p>approx. $= 13 \times mg$</p>

- Even in cases where the coefficient of friction is greater than $\mu = 0.2$, for safety reasons, it is recommended to select a gripping force which is at least 7 to 13 times the workpiece weight.
- If high acceleration, deceleration or impact forces are encountered during motion, a greater margin of safety should be considered.

Example

Given

- Workpiece mass = 0.6 kg
- External grip method
- Gripping point = 40mm from face of gripper
- Operating pressure = 0.4MPa

Calculation

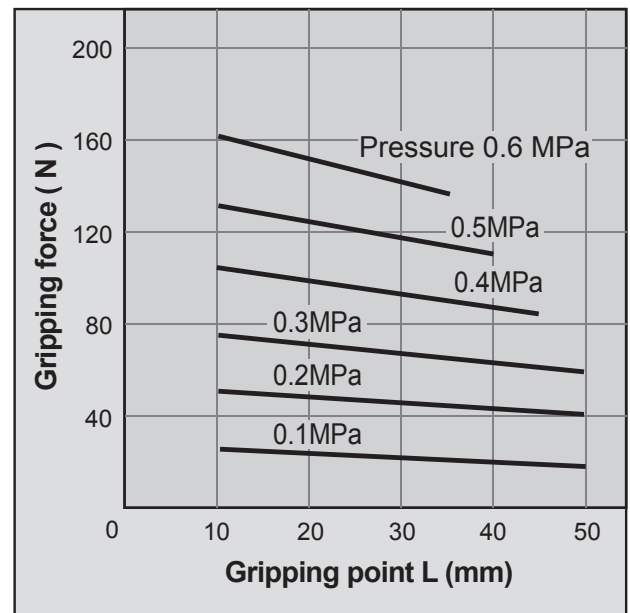
For a safety factor of 4 and setting the gripping force to be at least 13 times the workpiece weight;

$$\begin{aligned}
 \text{Required gripping force } F &= 13 \times mg \\
 &= 13 \times 0.6 \times 9.8 \text{ m/s}^2 \\
 &= 76.4\text{N minimum}
 \end{aligned}$$

Using the External Grip Force graph for FKHS-40D from page 3, a gripping force of 87N is obtained from the intersection of the gripping point distance $L = 40\text{mm}$ and a pressure of 0.4MPa.

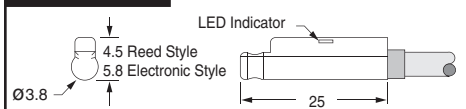
Select model #FKHS-40D because the graph value is greater than grip force required. The graph value for the smaller FKHS-32D is approximately 56N, less than required, therefore inadequate.

FKHS-40D



Sensor Specifications & Prices for FKHS-25D

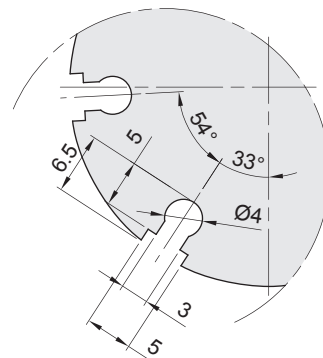
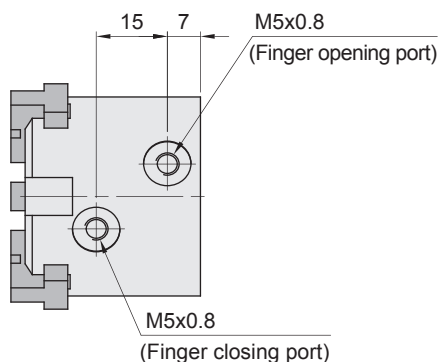
9C49 Sensors



4 mm round	9C49 Sensor Selection Guide		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 . .	\$20.25	9C49-000-302	\$27.00
	Electronic (LED)	Sourcing PNP 5-28 VDC, 0.2 Amp Max current, 6 Watt max., 0.5 voltage drop	9C49-000-031 . . .	28.65	9C49-000-331....	33.25
	Electronic (LED)	Sinking NPN 5-28 VDC, 0.2 Amp Max current, 6 Watt max., 0.5 voltage drop	9C49-000-032 . . .	28.65	9C49-000-332 ...	33.25

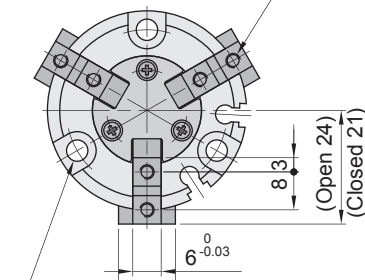
Using 9C49 Sensors on ø32 or larger requires use of an adapter #TD11046 (included with 9C49-300-xxx sensors) which allows fitting these 4mm round sensors into any of the sensor slots. The adapter is also available separately at no charge. See page 7.

ø25 Dimensions (mm)

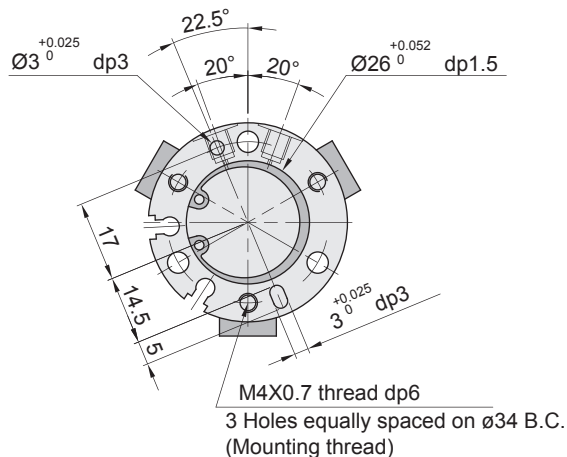
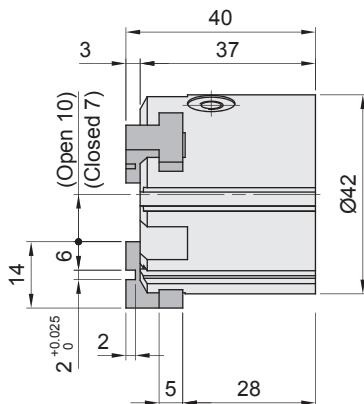


Sensor mounting slot dimensions for 9C49-000-xxx sensors

6-M3x0.5 thread dp6
(Attachment mounting thread)



Ø4.5 through 8 counterbore dp10
3 Holes equally spaced on ø34 B.C.
(Mounting hole)

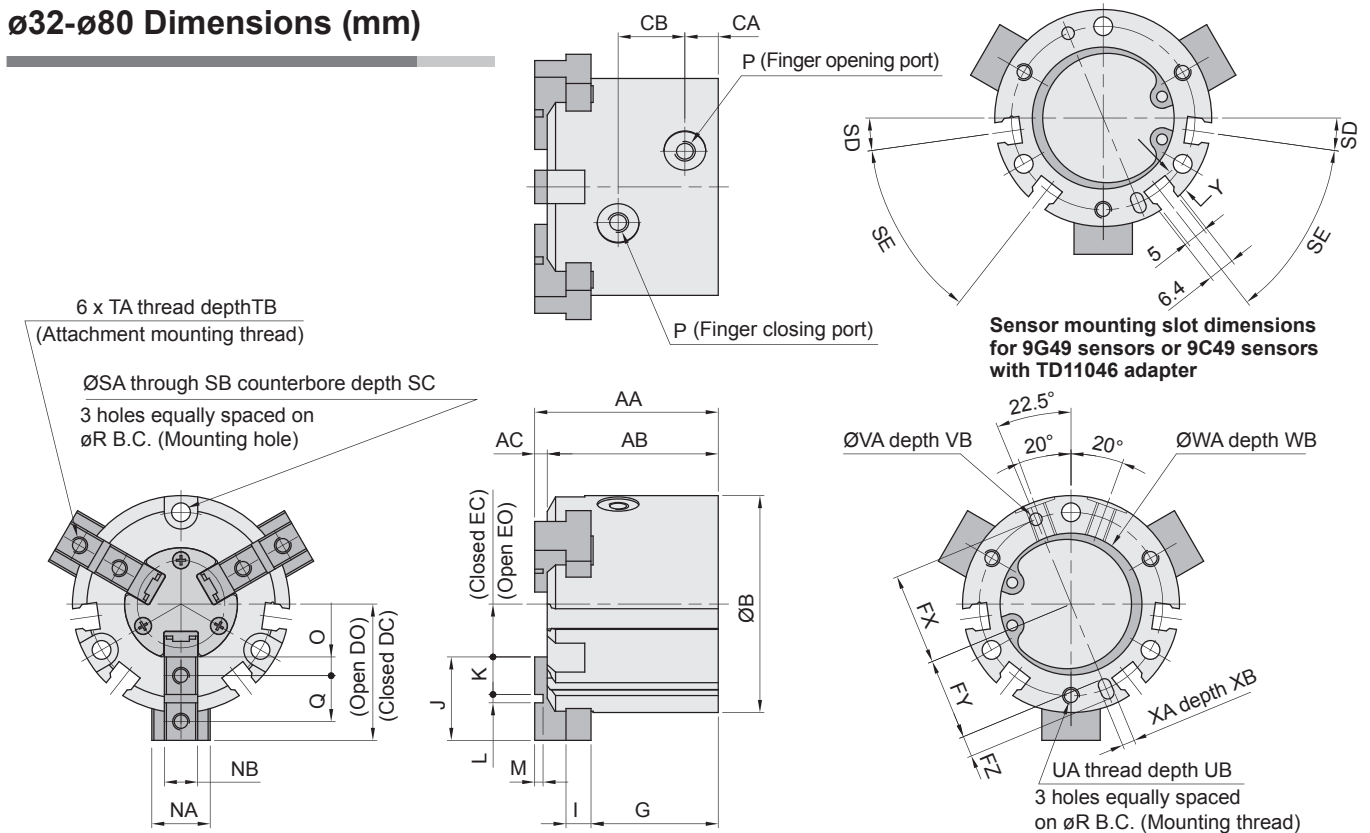


Sensor Specifications & Prices for FKHS-32D Gripper and larger

6.3 mm wide	9G49 Sensor Selection Guide for bore sizes ø32 ~ ø80		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	9G49-000-002 . .	\$14.70	9G49-000-302 .	\$17.35
	Electronic (LED)	Sourcing PNP 5-28 VDC, 0.20 Amp max current, 1.5 voltage drop	9G49-000-031 . . .	28.80	9G49-000-331	31.45
	Electronic (LED)	Sinking NPN 5-28 VDC, 0.20 Amp max current, 1.5 voltage drop	9G49-000-032 . . .	28.80	9G49-000-332	31.45
4 mm round	9C49 Sensor Selection Guide		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	9C49-300-002 . .	\$20.25	9C49-300-302	\$27.00
	Electronic (LED)	Sourcing PNP 5-28 VDC, 0.2 Amp Max current, 6 Watt max., 0.5 voltage drop	9C49-300-031 . . .	28.65	9C49-300-331	33.25
	Electronic (LED)	Sinking NPN 5-28 VDC, 0.2 Amp Max current, 6 Watt max., 0.5 voltage drop	9C49-300-032 . . .	28.65	9C49-300-332	33.25

Using 9C49 Sensors on ø32 or larger requires use of an adapter #TD11046 (included with 9C49-300-xxx sensors) which allows fitting these 4mm round sensors into any of the sensor slots. The adapter is also available separately at no charge.

Ø32-Ø80 Dimensions (mm)



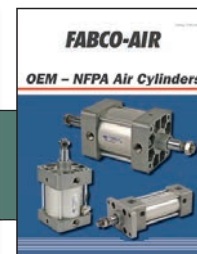
Model	AA	AB	AC	B	CA	CB	DC	DO	EC	EO	FX	FY	FZ	G	I	J	K	L	M	NA	NB
FKHS-32D	44	41	3	52	8	16	28	32	8	12	22	19.5	5	30.5	6	20	9	2H9 ^{+0.025}	2	14	8h9 ^{0_{-0.036}}
FKHS-40D	47	44	3	62	9	17	31	35	10	14	26.5	23.5	6	32	7	21	9	3H9 ^{+0.025}	2	16	8h9 ^{0_{-0.036}}
FKHS-50D	55	52	3	70	9	20	35	41	11	17	31	28	6	37.5	9	24	10	4H9 ^{+0.03}	2	18	10h9 ^{0_{-0.036}}
FKHS-63D	66	62	4	86	12	22	43	51	15	23	38	34.5	7	44	11	28	11	6H9 ^{+0.03}	3	24	12h9 ^{0_{-0.043}}
FKHS-80D	82	77	5	106	13.5	27	53.5	63.5	21.5	31.5	47.5	43.5	8	56	12	32	12	8H9 ^{+0.036}	4	28	14h9 ^{0_{-0.043}}

Model	O	P	Q	R	SA	SB	SC	SD	SE	TA	TB	UA	UB	VA	VB	WA	WB	XA	XB	Y
FKHS-32D	4.5	M5 x 0.8	11	44	4.5	8	9	8°	44°	M4 x 0.7	8	M4 x 0.7	6	3H9 ^{+0.025} ₀	3	34H9 ^{+0.062} ₀	2	3H9 ^{+0.025} ₀	3	6
FKHS-40D	4.5	M5 x 0.8	12	53	5.5	9.5	9	10°	40°	M4 x 0.7	8	M5 x 0.8	7.5	4H9 ^{+0.03} ₀	4	42H9 ^{+0.062} ₀	2	4H9 ^{+0.03} ₀	4	8
FKHS-50D	5	M5 x 0.8	14	62	5.5	9.5	12	10°	40°	M5 x 0.8	10	M5 x 0.8	10	4H9 ^{+0.03} ₀	4	52H9 ^{+0.074} ₀	2	4H9 ^{+0.03} ₀	4	7
FKHS-63D	5.5	M5 x 0.8	17	76	6.6	11	14	10°	40°	M5 x 0.8	10	M6 x 1	9	5H9 ^{+0.03} ₀	5	65H9 ^{+0.074} ₀	2.5	5H9 ^{+0.03} ₀	5	7.5
FKHS-80D	6	RC(PT)1/8"	20	95	6.6	11	19	10°	40°	M6 x 1	12	M6 x 1	12	6H9 ^{+0.03} ₀	6	82H9 ^{+0.087} ₀	3	6H9 ^{+0.03} ₀	6	8

FABCO-AIR

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oem NFPA Air Cylinders
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Cylinders, Valves
and Accessories
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Pancake® II Air Cylinders
Catalog #Pan2-2



Square Pancake® II
Air Cylinders
Catalog #SqPan2



ISO 6431 Cylinders
Catalog #FAQ2R-09



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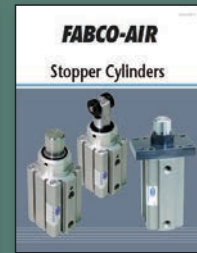
Modular Air Prep System
FRLs Catalog #FRL-06



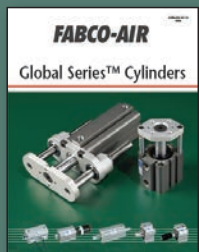
Compact Finger Slides
Catalog #FDH-10



ISO 6432 Cylinders
Catalog #FAE-09



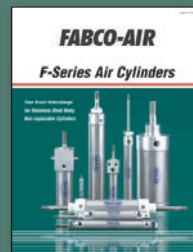
Stopper Cylinders
Catalog #ST-SC



Global Series™ Metric
Air Cylinders
Catalog #GC-15



NAMUR Solenoid Valves
Catalog #FVEN-10



Stainless Steel Body
Air Cylinders
Catalog #SSB-03



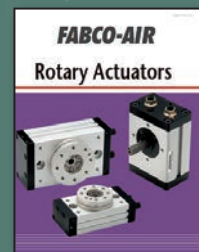
Air Table Slides
Catalog #FGXS-10



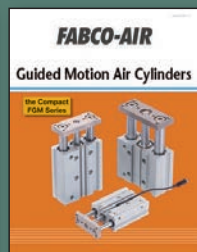
Wide & Narrow Parallel
Grippers - Catalogs
#FKHZ-10 & #FKHQ-10



Toggle Type
Angular Grippers
Catalog #FKHT-10



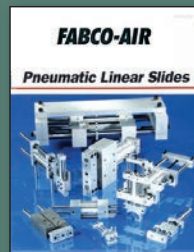
Pneumatic Rotary
Actuators
Catalog #FRA-C-09



Guided Motion
Air Cylinders
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Rodless Slides
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Catalog #GR8

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