

Stainless Steel Cylinder / Non-adjustable Air Cushion Type

New

RoHS

ø20, ø25, ø32, ø40

All stainless steel specifications
(External parts: Stainless steel 304)

4 times better durability in environments where it may
come into contact with water droplets

Water-resistant construction by seals (Scraper, Tube gasket: FKM)

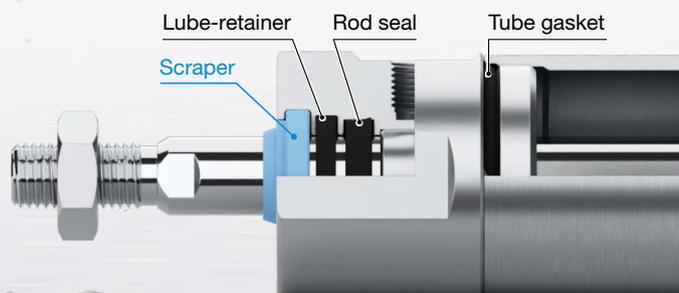
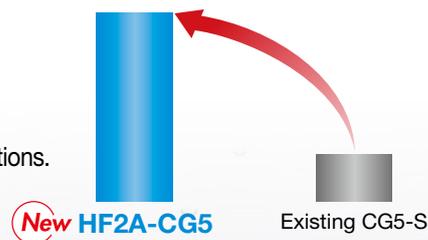
Scraper: Blue FKM

Using materials compliant with the US FDA.

The scraper material complies with regulation (EC) No. 1935/2004 for food contact applications.

Grease used: NSF H1 grease

* The durability test is conducted under SMC's test conditions.



* The rod seal is made of NBR.

Equipment for the
Food Manufacturing Industry

HF2A- Series

- Lubricants or rust proof agents are not used for the external parts. Otherwise, lubricants or rust proof agents for the food machinery are being used.
- US FDA compliant materials are used.

Non-adjustable air cushion

■ Smooth stopping at the end surface is realized resulting in reduced noise and impact at end of stroke.
(Compared with the rubber bumper)

■ Air cushion adjustment is not required.

Mounting interchangeability between the stainless steel
cylinder, CG5-S series



HF2A-CG5 Series



CAT.ES20-317A

Clean design

Adopts a smooth design for less residual liquid
Able to use in the food manufacturing process **p. 14**

Laser printed product label

* The image shows a product with a 50 mm stroke.

Scraper: Material compliant with the US FDA.
The scraper material complies with regulation (EC)
No. 1935/2004 for food contact applications.

Without cushion needle

The D-F6□ water-resistant solid state auto switch for clean design

A clearance provided between the switch rail and the cylinder tube prevents build-up of foreign matter.

Basic type

Rail plug

Plugs are provided for unused mounting threads to prevent residue build-up in the threads.
* In case the built-in magnet for auto switches are ordered

Plug bolt (in case of the basic type)

The integrated clevis type allows for the reduction in the outside diameter by up to 4.5 mm.

31 mm → **26.5 mm**

(Compared with the HF2A-CG5 with bore size 20)

No thread holes

Integrated clevis type

Due to the cover's reduced outer diameter, the outer surface is more even and there is less space for liquid to pool between the cylinder tube and the cover.

Corner parts have a curbed surface configuration.



Mounting Brackets

Axial foot bracket



Rod flange



Head flange

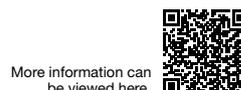


Integrated clevis



Equipment for the Food Manufacturing Industry

Lineup of equipment for various food production processes
Designed to help in meeting HACCP, PRP, and other standards, Applicable for a diverse range of food manufacturing processes, Possible to blow directly onto food



Equipment for the Food Manufacturing Industry

Bread Manufacturing Process



Related Products

Water Resistant Stainless Steel Speed Controller **HF2A-ASG-□V Series**

RoHS



More information
can be viewed here.

The water-resistant construction and the stainless steel external parts allow for the product to be used in environments where it may come into contact with water droplets.

- **Metal material: External metal parts stainless steel 316*1**
*1 Stainless steel 304 (external metal parts excluding body A)
- **Grease: NSF H1 grease**
- **Max. operating temperature: 150°C**



Clean Design Fittings/ US FDA Compliant Fittings

RoHS



More information
can be viewed here.

Clean Design Fittings

Hygienic Design

US FDA Compliant

Stainless Steel 316 Insert Fittings
KFG2H□-C Series



US FDA Compliant Fittings

US FDA Compliant



Stainless Steel 316 One-touch Fittings
KQG2-F Series



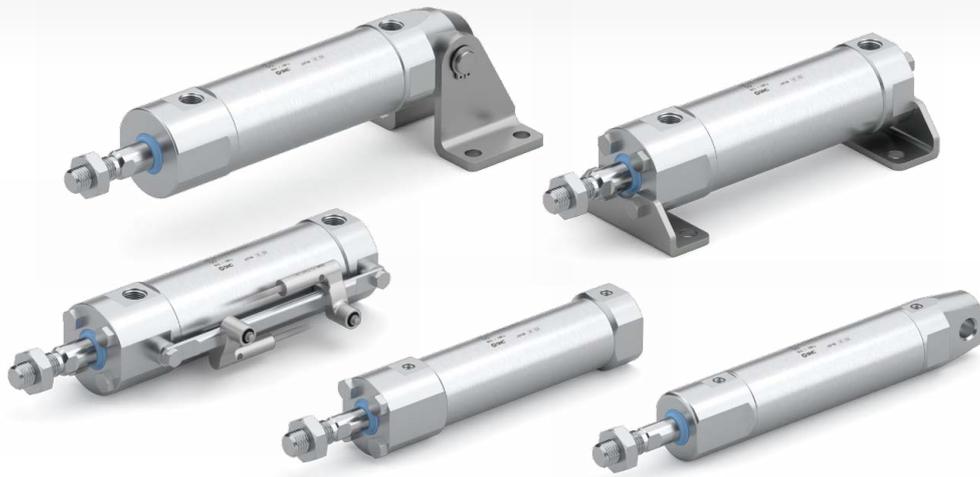
Metal One-touch Fittings
KQB2-F Series



Stainless Steel 316 Insert Fittings
KFG2-F Series

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Stainless Steel Cylinder / Non-adjustable Air Cushion Type *HF2A-CG5 Series*



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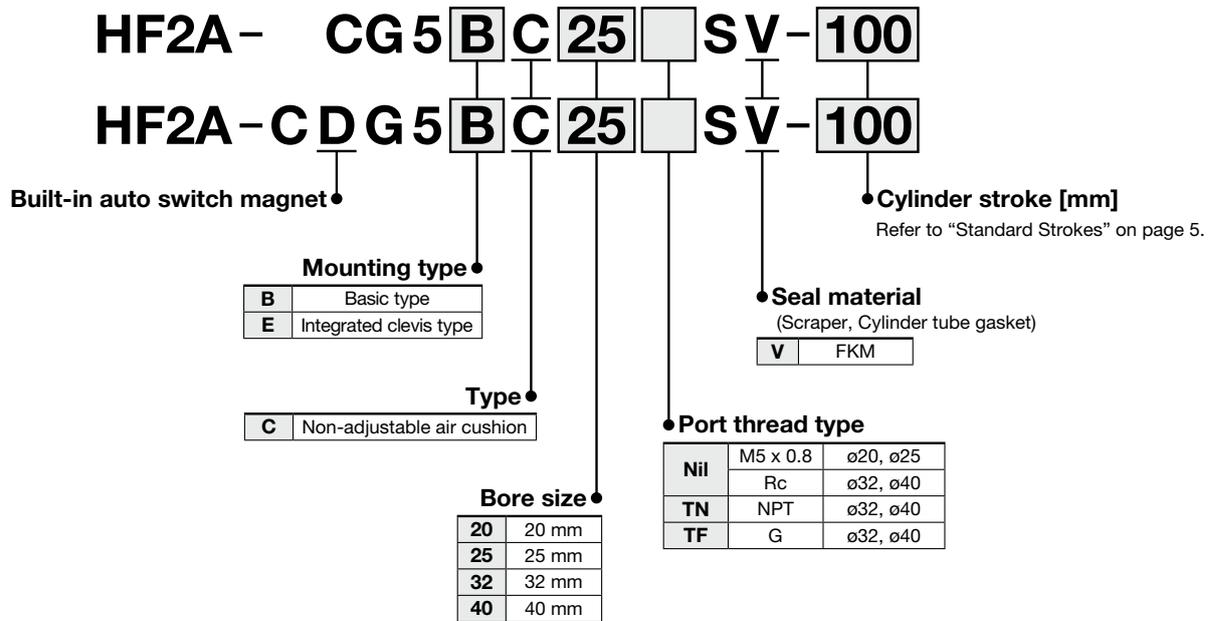
Stainless Steel Cylinder / Non-adjustable Air Cushion Type

HF2A-CG5 Series



ø20, ø25, ø32, ø40

How to Order



Accessory options

(To be ordered separately. For details ⇒ p. 6)

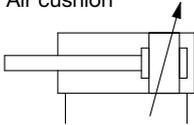
- Auto switches, Switch rail accessories
- Mounting brackets: Axial foot bracket, Rod flange, Head flange, Pivot bracket
- Plug bolt
- Rail plug

HF2A-CG5 Series

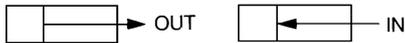


Symbol

Air cushion



Theoretical Output Table



Unit: N

Bore size [mm]	Rod size [mm]	Operating direction	Piston area [mm ²]	Operating pressure [MPa]		
				0.3	0.5	0.7
20	8	OUT	314	94.2	157	220
		IN	264	79.2	132	185
25	10	OUT	491	147	246	344
		IN	412	124	206	288
32	12	OUT	804	241	402	563
		IN	691	207	346	484
40	16	OUT	1260	378	630	882
		IN	1060	318	530	742

Specifications

Bore size [mm]	20	25	32	40
Action	Double acting, Single rod			
Fluid	Air			
Proof pressure	1.5 MPa			
Maximum operating pressure	1.0 MPa			
Minimum operating pressure	0.05 MPa			
Ambient and fluid temperature	Without auto switch: -10 to 70°C, With auto switch: -10 to 60°C			
Cushion	Non-adjustable air cushion + Bumper cushion			
Lubrication	Not required (Non-lube)			
Piston speed	50 to 500 mm/s			
Stroke length tolerance	Up to 1000 ^{st+1.4} ₀ mm			
Allowable kinetic energy [J]	0.28	0.41	0.66	1.20
Mounting type	Basic type, Integrated clevis type			

* An axial foot bracket, rod flange, head flange, and pivot bracket are available as optional parts. For details, refer to page 6.

Standard Strokes

[mm]

Bore size	Standard stroke	Maximum manufacturable stroke	Max. stroke for switch rail mounting
20	25, 50, 75, 100, 125, 150, 200	1000	600
25	25, 50, 75, 100, 125, 150, 200, 250, 300		
32			
40			

* Strokes other than the standard strokes, up to the max. manufacturable stroke, are produced upon receipt of order.

Manufacture of intermediate strokes in 1 mm increments is possible. (Spacers are not used.)

* Applicable strokes should be confirmed according to the usage. For details, refer to "Air Cylinders Model Selection" on **Web Catalog**. In addition, the products that exceed the standard stroke might not be able to fulfill the specifications due to the deflection etc.

* Using a stroke of a length which is smaller than the effective cushion length may result in reduced air cushion performance.

Bore size [mm]	20	25	32	40
Effective cushion length	11	14	10	13

Accessories / For details, refer to page 11.

●...Supplied with the product. ○...Please order separately.

Accessory		Basic	Integrated clevis
Mounting brackets	Standard equipment		
	Rod end nut	●	●
	Option		
	Single knuckle joint	○	○
	Double knuckle joint (With pin & retaining ring)	○	○
Plug bolt	Standard equipment (4 pcs. included)	●	—
Rail plug*1	Standard equipment (2 pcs. included)	●	●
Switch rail accessories*1	Option	○	○

*1 For built-in magnet type

Weight

[kg]

Bore size [mm]		20	25	32	40
Basic weight	Basic type (Without magnet/Built-in magnet)	0.32	0.39	0.58	0.93
	Integrated clevis type (Without magnet/Built-in magnet)	0.31	0.40	0.71	1.03
	Switch rail accessories	0.01	0.01	0.01	0.02
Single knuckle joint		0.04	0.07	0.07	0.11
Double knuckle joint (With pin and retaining ring)		0.05	0.09	0.09	0.18
Axial foot bracket		0.09	0.13	0.12	0.18
Flange		0.12	0.12	0.12	0.17
Pivot bracket		0.08	0.08	0.18	0.18
Plug bolt (4 pcs.)		0.01	0.01	0.01	0.02
Additional weight per each 50 mm of stroke (Cylinder)		0.07	0.10	0.14	0.18
Additional weight per each 50 mm of stroke (Switch rail)		0.01	0.01	0.01	0.01

Calculation: (Example) **HF2A-CDG5BC20SV-100**
 (Basic type ø20, 100 mm stroke)
 + Switch rail accessories
 + Axial foot bracket
 · Basic weight 0.32 kg + 0.01 kg + 0.09 kg
 · Additional stroke weight ... 0.07 kg + 0.01 kg/50 ST
 · Air cylinder stroke 100 ST
 (0.32 + 0.01 + 0.09) + (0.07 + 0.01) × 100/50 = 0.58 kg

Stainless Steel Cylinder / Non-adjustable Air Cushion Type **HF2A-CG5 Series**



Accessory Options (To Be Ordered Separately)

Applicable Auto Switches / Refer to the **Web Catalog** for further information on auto switches.

Type	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model	Lead wire length [m]*1			Pre-wired connector	Applicable load	
				DC			0.5 (Nil)	3 (L)	5 (Z)		IC circuit	Relay, PLC
Solid state auto switch	Grommet	Yes	3-wire (NPN)	24 V	5 V	D-F6N	●	●	○	○	-	Relay, PLC
			3-wire (PNP)		12 V	D-F6P	●	●	○	○		
			2-wire		12 V	D-F6B	●	●	○	○		

*1 Auto switches are shipped together with the product but do not come assembled.

* Lead wire length symbols 0.5 m.....Nil (Example) F6B * Auto switches marked with a "○" are produced upon receipt of order.
 3 m..... L (Example) F6BL
 5 m..... Z (Example) F6BZ

· For details on auto switches with pre-wired connectors, refer to the **Web Catalog**.

* The D-F6□ auto switch has an exterior configuration that reduces residual liquid; it does not feature improved water resistance.

Accessories / Part Nos.

Accessory	Min. order	Bore size [mm]				Description	
		20	25	32	40		
Mounting brackets	Axial foot bracket	2*1	CG-L020SUS	CG-L025SUS	CG-L032SUS	CG-L040SUS	Foot bracket x 2 Bracket mounting bolt x 4
	Flange	1	CG-F020SUS	CG-F025SUS	CG-F032SUS	CG-F040SUS	Flange x 1 Bracket mounting bolt x 4
	Pivot bracket	1	CG-E020SUS		CG-E032SUS		Pivot bracket x 2 Clevis pin x 1 Retaining ring x 2
Plug bolt set	1	HYB-H020SUS	HYB-H025SUS		HYB-H040SUS		Plug bolt x 4
Rail plug*2	1	CG5-RP				Rail plug x 1	

*1 When ordering the foot bracket, order 2 pcs. per cylinder.

*2 Order the required number of rail plugs.

* For detailed dimensions, refer to pages 7 to 11.

Switch Rail Accessories

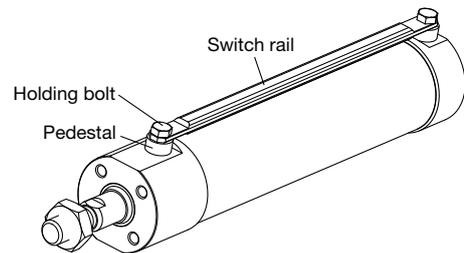
CG5 B 20 E - 100

Mounting type ●
 Bore size ●
 Stroke ●

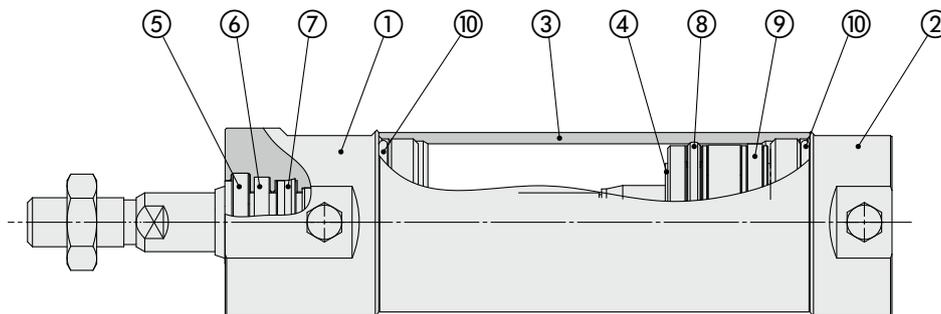
Refer to "Standard Strokes" on page 5.
 The max. manufacturable stroke is 600 mm.

Accessories

· Pedestal 2 pcs.
 · Holding bolt 2 pcs.



Replacement Parts



Component Parts

No.	Description
1	Rod cover
2	Head cover
3	Cylinder tube
4	Piston assembly
5	Scraper
6	Lube-retainer
7	Rod seal
8	Piston seal
9	Wearing
10	Cylinder tube gasket

Replacement Parts: Seal Kit

Bore size [mm]	Kit no.	Contents
20	CG5C20V-PS	Set of nos. ⑤, ⑥, ⑦, ⑧, ⑨, ⑩
25	CG5C25V-PS	
32	CG5C32V-PS	
40	CG5C40V-PS	

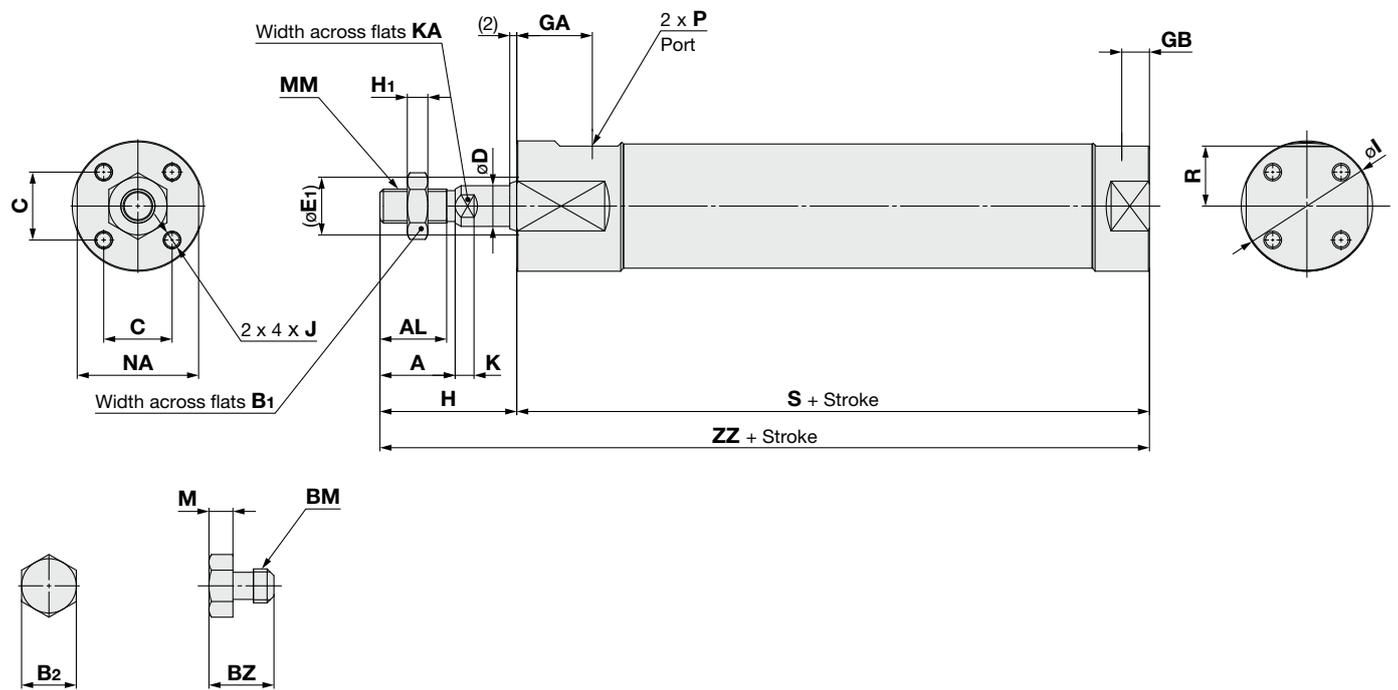
* The seal kit does not include a grease pack. Order with the following part number.
Grease pack part no.: GR-H-010 (10 g)

Refer to the operation manual for replacement procedures.

HF2A-CG5 Series

Dimensions

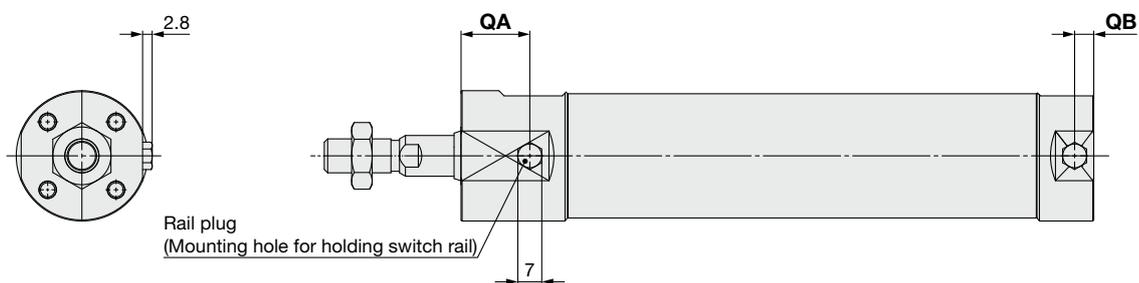
Basic type (B): HF2A-CG5B



* Plug bolt
(For 8 x J/4 pcs. included)

Bore size	Stroke range	A	AL	B ₁	B ₂	BM	BZ	C	D	E ₁	GA	GB	H	H ₁	I	J	K	KA	M	MM	NA	P			R	S	ZZ
																						Rc, NPT, G	R	S			
20	Up to 1000	18	15.5	13	7	M4 x 0.7	9	16.5	8	13	21.5	7	35	5	31	M4 x 0.7 depth 7	5	6	3	M8 x 1.25	29	M5 x 0.8	14.5	83	118		
25		22	19.5	17	8	M5 x 0.8	9.5	18.5	10	15	22	7	40	6	33	M5 x 0.8 depth 8	5.5	8	3.5	M10 x 1.25	29	M5 x 0.8	15.5	83	123		
32		22	19.5	17	8	M5 x 0.8	9.5	20	12	17	22.1	8.1	40	6	38.4	M5 x 0.8 depth 8	5.5	10	3.5	M10 x 1.25	35.5	1/8	17.8	85	125		
40		30	27	19	10	M6 x 1	12	26	16	21	23.5	8.4	50	8	47.2	M6 x 1 depth 12	6	14	4	M14 x 1.5	44	1/8	22	93	143		

Basic type (B): HF2A-CDG5B



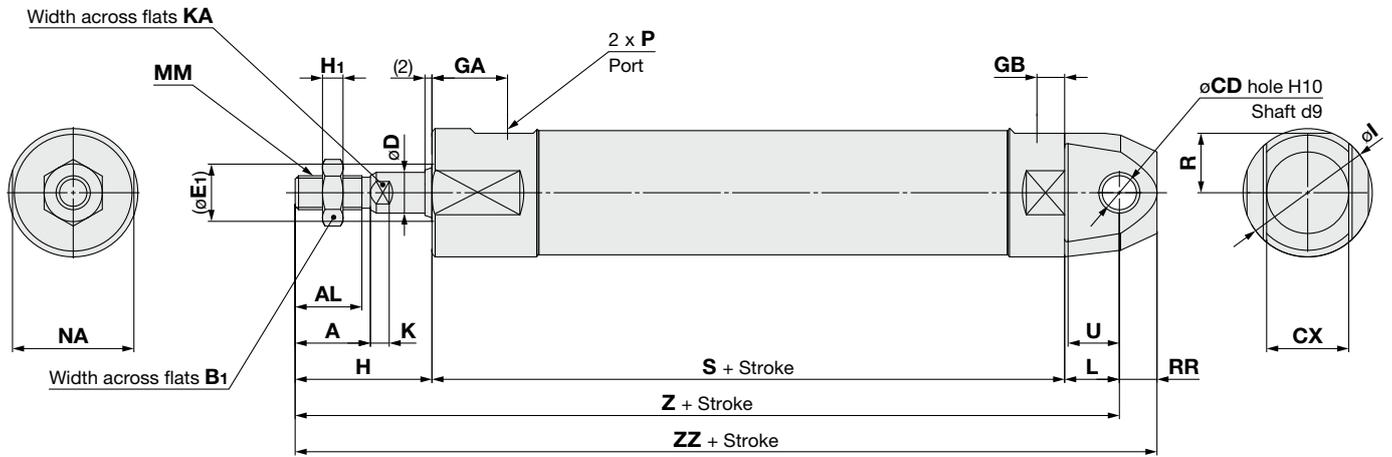
Bore size	Stroke range	[mm]	
		QA	QB
20	Up to 1000	17.9	5.8
25		18.3	5.4
32		20.2	5.6
40		21.7	5.3

* All dimensions excluding the rail plug are the same as those of the basic type (B)/HF2A-CG5B.

Stainless Steel Cylinder / Non-adjustable Air Cushion Type **HF2A-CG5 Series**

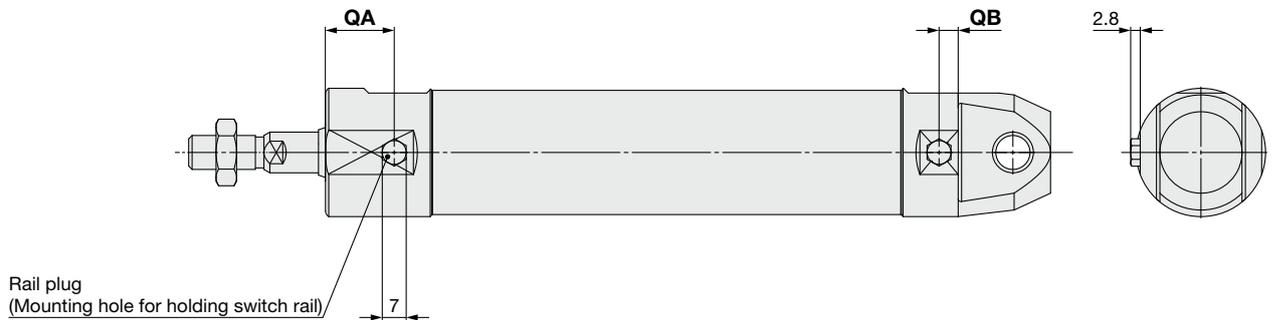
Dimensions

Clevis type (E): HF2A-CG5E



Bore size	Stroke range	A	AL	B1	CD		CX	D	E1	GA	GB	H	H1	I	K	KA	L	MM	NA	P		R	RR	S	U	Z	ZZ
					Hole	Shaft														Rc, NPT, G							
20	Up to 1000	18	15.5	13	8 ^{+0.058} ₀	8 ^{-0.040} _{-0.076}	16 ⁰ _{-0.2}	8	13	21.5	7	35	5	26.5	5	6	14	M8 x 1.25	24	M5 x 0.8	12.5	9	83	13	132	141	
25		22	19.5	17	8 ^{+0.058} ₀	8 ^{-0.040} _{-0.076}	16 ⁰ _{-0.2}	10	15	22	7	40	6	29	5.5	8	14	M10 x 1.25	25	M5 x 0.8	14	9	83	13	137	146	
32		10	22	19.5	17	10 ^{+0.058} ₀	10 ^{-0.040} _{-0.076}	24 ⁰ _{-0.2}	12	17	22.1	7.1	40	6	37.8	5.5	10	16	M10 x 1.25	35.5	1/8	17.5	11	85	15	141	152
40		10	30	27	19	10 ^{+0.058} ₀	10 ^{-0.040} _{-0.076}	24 ⁰ _{-0.2}	16	21	23.5	7.1	50	8	44	6	14	16	M14 x 1.5	40.5	1/8	20.6	11	93	15	159	170

Clevis type (E): HF2A-CDG5E



Bore size	Stroke range	[mm]	
		QA	QB
20	Up to 1000	17.9	5.8
25		18.3	5.4
32		20.2	5.6
40		21.7	5.3

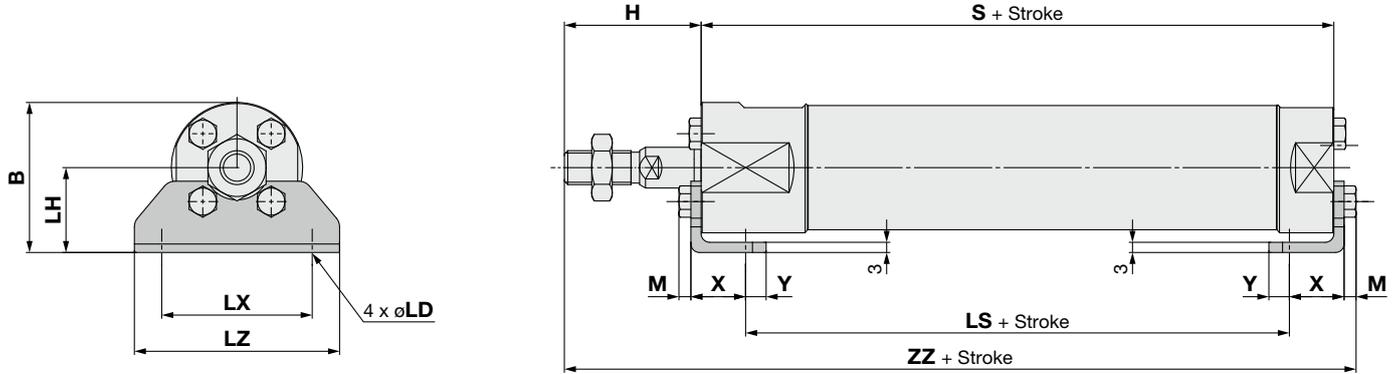
* All dimensions excluding the rail plug are the same as those of the clevis type (E)/HF2A-CG5E.

HF2A-CG5 Series

Accessory Options

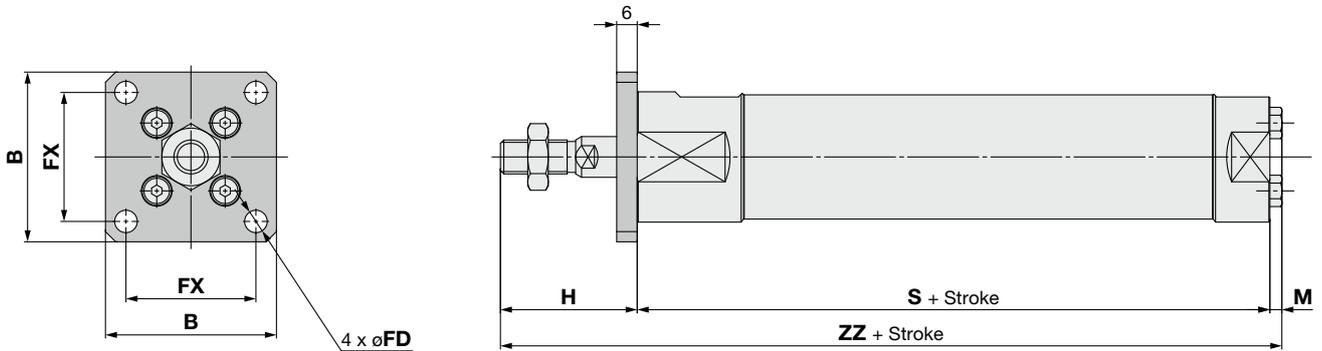
Dimensions (Dimensions when the mounting brackets are attached to the cylinder)

Axial foot bracket



Bore size	B	H	LD	LH	LX	LZ	M	X	Y	LS	S	ZZ
20	37.5	35	6	22	40	50	3	15	7	59	83	124
25	41.5	40	6	25	44	60	3.5	15	7	59	83	129.5
32	44	40	7.2	25	44	60	3.5	16	6	59	85	131.5
40	53.5	50	7.2	30	54	75	4	16.5	6.5	66	93	150

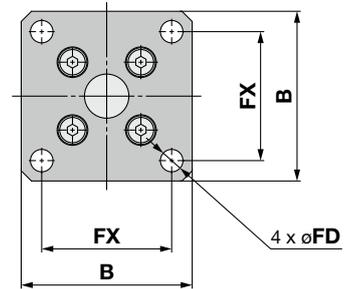
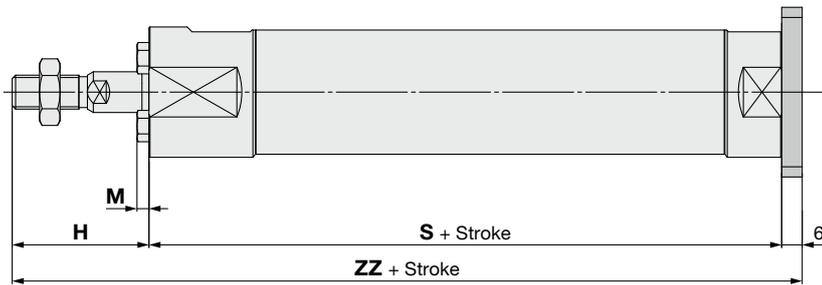
Rod flange



Bore size	B	FD	FX	H	M	S	ZZ
20	50	5.5	36	35	3	83	121
25	50	5.5	36	40	3.5	83	126.5
32	50	6.6	38	40	3.5	85	128.5
40	60	6.6	46	50	4	93	147

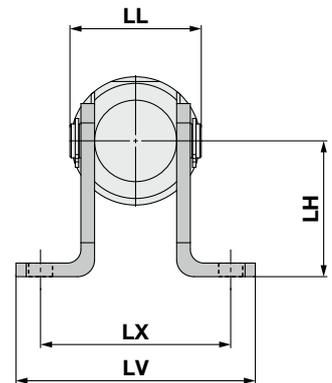
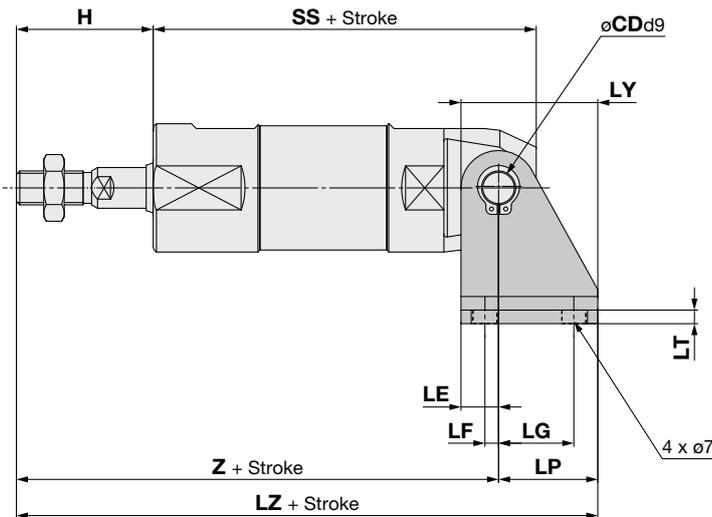
Dimensions (Dimensions when the mounting brackets are attached to the cylinder)

Head flange



Bore size	B	FD	FX	M	H	S	ZZ
20	50	5.5	36	3	35	83	124
25	50	5.5	36	3.5	40	83	129
32	50	6.6	38	3.5	40	85	131
40	60	6.6	46	4	50	93	149

Pivot bracket

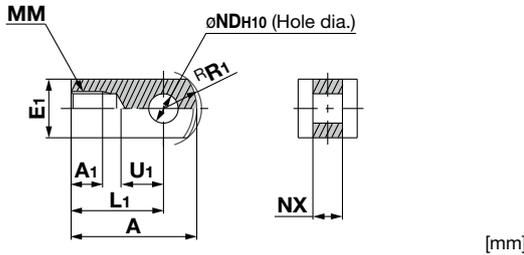


Bore size	H	SS	Z	CD	LE	LF	LG	LH	LL	LP	LT	LV	LX	LY	LZ
20	35	106	132	8 ^{-0.040} _{-0.076}	9	2	14	30	27.6	21	3	56.5	42	30	153
25	40	106	137	8 ^{-0.040} _{-0.076}	9	2	14	30	27.6	21	3	56.5	42	30	166
32	40	112	141	10 ^{-0.040} _{-0.076}	11	4	22	40	38.4	29	4	70.5	56	40	176
40	50	120	159	10 ^{-0.040} _{-0.076}	11	4	22	40	38.4	29	4	70.5	56	40	216

HF2A-CG5 Series Accessory Dimensions

Single Knuckle Joint

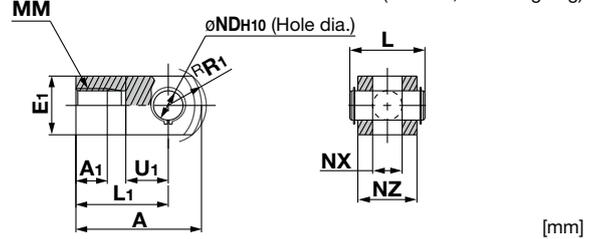
Material: Stainless steel 304



Part no.	Applicable bore size	A	A1	E1	L1	MM	NDH10	NX	R1	U1
I-G02SUS	20	34	8.5	16	25	M8 x 1.25	$8^{+0.058}_0$	$8_{-0.4}^{0.2}$	10.3	11.5
I-G03SUS	25, 32	41	10.5	20	30	M10 x 1.25	$10^{+0.058}_0$	$10_{-0.4}^{0.2}$	12.8	14
I-G04SUS	40	42	14	22	30	M14 x 1.5	$10^{+0.058}_0$	$18_{-0.5}^{0.3}$	12	14

Double Knuckle Joint

Material: Stainless steel 440 (Pin)
Stainless steel 304 (Bracket, Retaining ring)

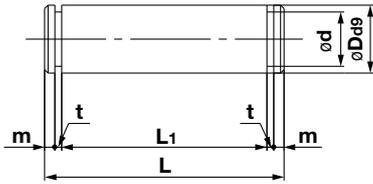


Part no.	Applicable bore size	A	A1	E1	L	L1	MM	NDH10	NX	NZ	R1	U1	Applicable pin no.
Y-G02SUS	20	34	8.5	16	21	25	M8 x 1.25	$8^{+0.058}_0$	$8_{-0.2}^{0.4}$	16	10.3	11.5	IY-G02SUS
Y-G03SUS	25, 32	41	10.5	20	25.6	30	M10 x 1.25	$10^{+0.058}_0$	$10_{-0.2}^{0.4}$	20	12.8	14	IY-G03SUS
Y-G04SUS	40	42	16	22	41.6	30	M14 x 1.5	$10^{+0.058}_0$	$18_{-0.3}^{0.5}$	36	12	14	IY-G04SUS

* Knuckle joint pins and retaining rings are included.

Knuckle Joint Pin

Material: Stainless steel 440 (Pin)
Stainless steel 304 (Retaining ring)

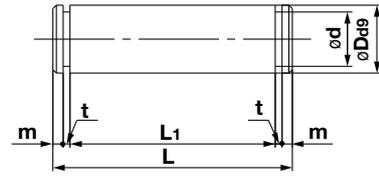


Part no.	Applicable bore size	Dd9	d	L	L1	m	t	Applicable retaining ring
IY-G02SUS	20	$8_{-0.076}^{-0.040}$	7.6	21	16.2	1.5	0.9	Type C 8 for axis
IY-G03SUS	25, 32	$10_{-0.076}^{-0.040}$	9.6	25.6	20.2	1.55	1.15	Type C 10 for axis
IY-G04SUS	40	$10_{-0.076}^{-0.040}$	9.6	41.6	36.2	1.55	1.15	Type C 10 for axis

* Retaining rings are included.

Clevis Pin

Material: Stainless steel 440 (Pin)
Stainless steel 304 (Retaining ring)

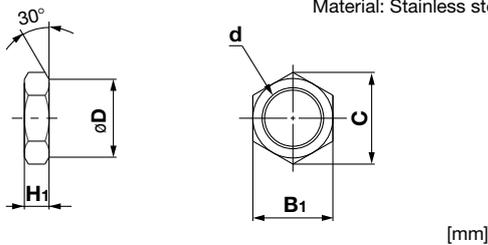


Part no.	Applicable bore size	Dd9	d	L	L1	m	t	Applicable retaining ring
CD-E02SUS	20, 25	$\phi 8_{-0.076}^{-0.040}$	7.6	27.6	22.8	1.5	0.9	Type C 8 for axis
CD-E03SUS	32, 40	$\phi 10_{-0.076}^{-0.040}$	9.6	38.4	33	1.55	1.15	Type C 10 for axis

* Retaining rings are included.

Rod End Nut

Material: Stainless steel 304

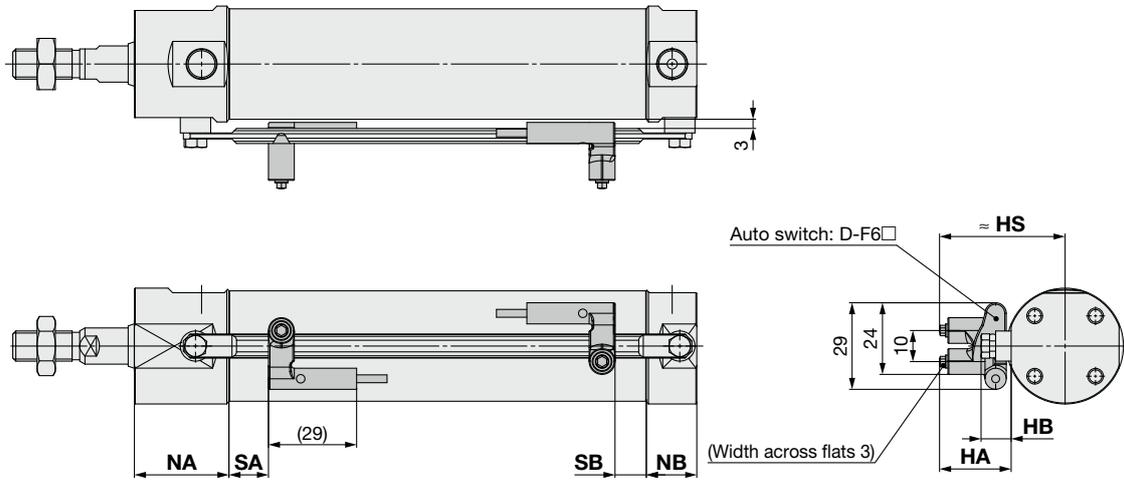


Part no.	Applicable bore size	B1	C	D	d	H1
NT-02SUS	20	13	(15)	12.5	M8 x 1.25	5
NT-03SUS	25, 32	17	(19.6)	16.5	M10 x 1.25	6
NT-G04SUS	40	19	(21.9)	18	M14 x 1.5	8

HF2A-CG5 Series Auto Switch Mounting

Auto Switch Proper Mounting Position (Detection at stroke end) and Switch Rail and Auto Switch Mounting Dimensions

D-F6□



Bore size	Stroke range	NA	NB	SA	SB	HS	HA	HB
20	Up to 600	29.5	15	10.5	11	34.8	20.3	6.6
25		30	15	11.5	12	37.5	23	9.3
32		31.1	16.6	13	10.3	41.4	23.6	9.9
40		33.5	17.1	14.2	14.3	45	23	9.3

* The values in the table above are to be used as a reference when mounting auto switches for stroke end detection. Adjust the auto switch after confirming the operating conditions in the actual setting.

Operating Range

Auto switch model	Bore size [mm]			
	20	25	32	40
D-F6□	7	6.5	7	6

* Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approx. ±30% dispersion) There may be the case to change substantially depending on an ambient environment.

Minimum Stroke for Auto Switch Mounting

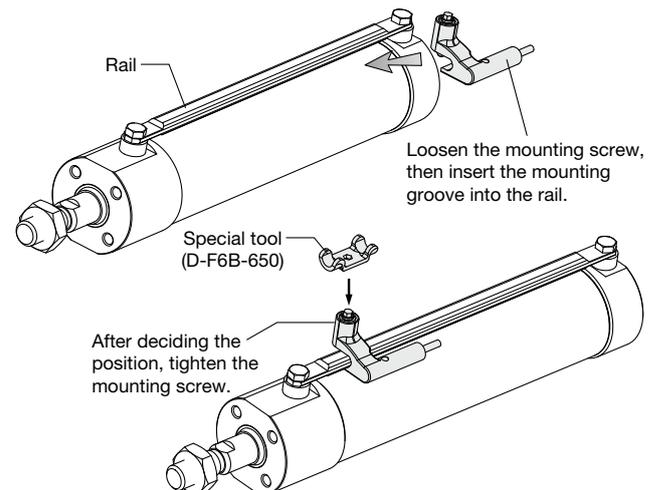
Auto switch model	With 1 pc.	With 2 pcs.
D-F6□	10	15

Auto Switch Mounting

Proper tightening torque

When the mounting screw is tightened, use a special tool (D-F6B-650) or torque wrench.

The tightening torque of the M3 mounting screw should be 0.8 to 1.4 N·m.



Tighten the screw within the following torque range when the auto switch mounting rail is installed during maintenance.

Screw size	Tightening torque [N·m]
M4	1.1 to 1.9

Tighten the screw within the following torque range when the auto switch is installed on the mounting rail.

Tightening torque [N·m]
0.8 to 1.4

Technical Data: Chemical Resistance Table

◎: No influence or almost no influence
 ○: Some influence, but operational depending on conditions
 △: Avoid use if possible
 ×: Substantial influence, not suitable for use
 -: Not tested

Chemical Resistance Table

Parts			Body		Seal	
Material			Stainless steel	Aluminum ^{*)}	Nitrile rubber ^{*)}	Fluororubber
Chemical (Concentration weight %, Temperature °C)			Stainless steel 304	Al	NBR (-10 to 60°C)	FKM (-40 to 150°C)
	Symbol					
Inorganic salt	1	Hydrochloric acid (20%, Room temperature)	×	×	○	◎
	2	Chromic acid (25%, 70°C)	○	×	×	◎
	3	Boric acid	○	×	◎	◎
	4	Sulfuric acid (30%, Room temperature)	×	×	◎	◎
	5	Phosphoric acid (50%, Room temperature)	○	×	◎	◎
Inorganic alkali	6	Ammonium hydroxide (28%)	○	○	○	×
	7	Sodium hydroxide (30%, Room temperature)	◎	×	◎	△
	8	Calcium hydroxide	△	×	◎	◎
	9	Magnesium hydroxide	○	○	◎	◎
Organic solvent	10	Acetylene	◎	◎	◎	◎
	11	Formic acid (25%, Room temperature)	○	△	×	△
	12	Citric acid	△	×	◎	◎
	13	Acetic acid (10%, Room temperature)	◎	△	△	○
	14	Lactic acid (5%, 20°C)	○	×	◎	◎
Others (oil, gas, etc.)	15	Linseed oil	◎	○	◎	◎
	16	Potassium chloride	○	△	◎	◎
	17	Calcium chloride	○	◎	◎	◎
	18	Mineral oil	◎	◎	◎	◎
	19	Sodium hypochlorite (2%, Room temperature)	○	×	×	◎
	20	Sodium chloride	○	-	◎	◎
	21	Carbon dioxide	◎	◎	◎	◎
	22	Natural gas	◎	◎	◎	◎
23	Boric acid	○	×	◎	◎	

* Unless noted otherwise, the solution concentration is in a saturated state.

* Chemical resistance is a guide that applies only to the stainless steel cylinder parts, and does not guarantee the performance of air cylinders (auto switches). Be sure to perform a verification test before operating.

*) Reference data



HF2A-CG5 Series

Specific Product Precautions

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For actuator and auto switch precautions, refer to the “Handling Precautions for SMC Products” and the “Operation Manual” on the SMC website: <https://www.smcworld.com>

Caution

1. When selecting equipment, carefully consider the application, required specifications, and operating conditions (fluid, pressure, flow rate, filtration, and environment), making sure not to exceed the specification range.
2. When the product is used as an air blower, install an appropriate filter to eliminate foreign matter in compressed air for air blowing. (Refer to the Web Catalog.)
3. Quality management relating to hygiene for food and medical treatment is not implemented for this product.
4. Compressed air hygiene should be managed in accordance with national and regional rules and regulations.
5. Grease
Fluid contact parts: NSF H1 grade grease
Part other than fluid contact parts:
NSF H1 grade grease or grease which is not NSF H1 grade
6. Equipment that comes into contact with food sold as a commercial product must use materials that comply with laws and regulations.
7. If used above food sold as a commercial product, there is a chance that grease, wear powder, etc., will fall on top of the product. Therefore, be sure to take appropriate preventive measures.
8. If food products sold as a commercial product or cleaning fluids come into contact with the equipment, it may result in corrosion or reduced lubrication, which may shorten the life of the equipment.
9. Please use the product in accordance with the specifications provided in the catalog/operation manuals. It is your responsibility to check the suitability of your workpiece and equipment.

Pressure Gauge Specific Product Precautions

Selection

Caution

1. Make sure that no direct impact or vibrations are applied to the body.
2. If operating under pressure pulsations or in high frequency operations, please contact SMC.

3/5-Port Solenoid Valve Specific Product Precautions

Caution

1. Wear powder is generated by the internal sliding parts of solenoid valves. When using solenoid valves for air blow applications, be sure to install a suitable filter (filtration rating: 0.01 μm) on the outlet side of the solenoid valve to prevent foreign matter from flowing out. In addition, be sure to preform regular inspections, element replacement, and maintenance in accordance with the filter (standard product) operation manual.
2. Very small amounts of non-H1 grade oil is used in SY, VP, ITV, and ZK series pilot valves. This oil may come out from the pilot exhaust port, solenoid valve EXH port, or exhaust port. If required, run piping so that the exhaust is released in a location where it will not cause any problems.

Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “**Caution**,” “**Warning**” or “**Danger**.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

 **Danger :** **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

 **Warning:** **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

 **Caution:** **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

*1) ISO 4414: Pneumatic fluid power - General rules and safety requirements for systems and their components
ISO 4413: Hydraulic fluid power - General rules and safety requirements for systems and their components
IEC 60204-1: Safety of machinery - Electrical equipment of machines - Part 1: General requirements
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots etc.

Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate machinery and equipment.

The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. SMC products cannot be used beyond their specifications. They are not developed, designed, and manufactured to be used under the following conditions or environments. Use under such conditions or environments is not allowed.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Use for nuclear power, railways, aviation, space equipment, ships, vehicles, military application, equipment affecting human life, body, and property, combustion equipment, entertainment equipment, emergency shut-off circuits, press clutches, brake circuits, safety equipment, etc., and use for applications that do not conform to standard specifications such as catalogs and operation manuals.
3. Use for interlock circuits, except for use with double interlock such as installing a mechanical protection function in case of failure. Please periodically inspect the product to confirm that the product is operating properly.

Caution

SMC develops, designs, and manufactures products to be used for automatic control equipment, and provides them for peaceful use in manufacturing industries.

Use in non-manufacturing industries is not allowed.

Products SMC manufactures and sells cannot be used for the purpose of transactions or certification specified in the Measurement Act of each country. The new Measurement Act prohibits use of any unit other than SI units in Japan.

Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.

Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*2) **Suction cups (Vacuum pads) are excluded from this 1 year warranty.**

A suction cup (vacuum pad) is a consumable part, so it is warranted for a year after it is delivered.

Also, even within the warranty period, the wear of a product due to the use of the suction cup (vacuum pad) or failure due to the deterioration of rubber material are not allowed by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Safety Instructions

Be sure to read the “Handling Precautions for SMC Products” (M-E03-3) and “Operation Manual” before use.