

Hygienic Design Cylinder Round Type

Series *HYB*

∅20, ∅25, ∅32, ∅40, ∅50, ∅63, ∅80, ∅100

How to Order

Without auto switch

HYB 20 □ R — 50 F

With auto switch

HYDB 20 □ R — 50 F — H7BAL □

Bore size

20	20 mm
25	25 mm
32	32 mm
40	40 mm
50	50 mm
63	63 mm
80	80 mm
100	100 mm

Port thread type

Nil	M thread	∅20, ∅25
	Rc	
TN	NPT	∅32 to ∅100
TF	G	

Sealant material

R	NBR
H	External FKM ^{Note)}

Note) External seal material: Rod scraper, tube gasket, and rod seal are made from FKM.

Auto switch

Nil	Without auto switch (Built-in magnet)
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Refer to table below for selection of applicable auto switch. Auto switch is shipped not assembled with the cylinder.

Grease

Nil	Standard grease (for non-food)
F	Grease for food

Note) Select grease for food for use in a water dispersion environment or when washing a product with water. (Water resistance is insufficient with standard grease.)

Number of auto switches

Nil	2 pcs.
S	1 pc.
n	"n" pcs.

Cylinder stroke

Refer to the next page for the standard stroke.

< Mounting bracket > Foot and flange (Rod end)
 < Option parts > Plug bolt
 Please place an order for above mentioned parts separately, please refer to page 32 to 36 for details.

Applicable Auto Switches/Refer to page 37 for detailed auto switch specifications.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model		Lead wire length (m)*		Pre-wired connector	Applicable load
					DC		∅20 to ∅63	∅80, ∅100	3 (L)	5 (Z)		
Solid state switch	Water resistance improvement product (2-color display)	Grommet	Yes	2-wire	24 V	12 V	H7BA	G5BA	●	○	○	Relay, PLC

* Lead wire length symbols 3 m..... L (Example) H7BAL * Auto switches marked with a "○" symbol are produced upon receipt of orders.
 5 m..... Z (Example) H7BAZ

• Refer to "SMC Best Pneumatics" catalog vol. 10, page 10-20-66 for detailed specifications about the auto switch with pre-wired connector.



Specifications

Bore size (mm)	20	25	32	40	50	63	80	100
Action	Double acting, Single rod							
Fluid	Air							
Minimum operating pressure	0.2 MPa		0.15 MPa			0.07 MPa		
Maximum operating pressure	1.0 MPa							
Proof pressure	1.5 MPa							
Ambient and operating fluid temperature	Without auto switch 0 to 70°C							
	With auto switch 0 to 60°C							
Lubrication	Not required							
Piston speed	50 to 500 mm/s (With pressure at 1.0 MPa) ^{Note)}							
Cushion	Rubber bumper							
Stroke length tolerance	$+1, -0.4$ mm							
Piston rod material	Stainless steel 304 / Hard chrome plated							

Note) Use a cylinder below the allowable kinetic energy. Refer to page 3 for the allowable kinetic energy.

Standard Stroke

Bore size (mm)	Standard stroke (mm)
20	25, 50, 75, 100, 125, 150, 200
25 to 100	25, 50, 75, 100, 125, 150, 200, 250, 300

* Intermediate strokes of 1 mm each can be produced. (The spacer is not used.)

Weight

Without auto switch

Unit: kg

Bore size (mm)	Stroke (mm)									
	25	50	75	100	125	150	175	200	250	300
20	0.15	0.17	0.18	0.20	0.22	0.24	0.26	0.27	—	—
25	0.20	0.22	0.24	0.27	0.29	0.31	0.34	0.36	0.40	0.45
32	0.26	0.29	0.32	0.35	0.38	0.41	0.44	0.47	0.53	0.59
40	0.50	0.55	0.59	0.64	0.68	0.73	0.78	0.82	0.91	1.01
50	0.88	0.95	1.02	1.09	1.15	1.22	1.29	1.35	1.49	1.62
63	1.21	1.29	1.38	1.47	1.55	1.64	1.72	1.81	1.98	2.15
80	2.01	2.13	2.24	2.35	2.47	2.58	2.69	2.81	3.03	3.26
100	3.52	3.68	3.84	3.99	4.15	4.31	4.47	4.63	4.95	5.27

With auto switch (Built-in magnet)

Unit: kg

Bore size (mm)	Stroke (mm)									
	25	50	75	100	125	150	175	200	250	300
20	0.15	0.17	0.19	0.21	0.22	0.24	0.26	0.28	—	—
25	0.20	0.22	0.25	0.27	0.29	0.32	0.34	0.36	0.41	0.46
32	0.28	0.31	0.33	0.36	0.39	0.42	0.45	0.48	0.54	0.60
40	0.51	0.56	0.61	0.65	0.70	0.74	0.79	0.83	0.93	1.02
50	0.90	0.97	1.03	1.10	1.17	1.23	1.30	1.37	1.50	1.64
63	1.23	1.32	1.40	1.49	1.58	1.66	1.75	1.83	2.00	2.17
80	2.04	2.16	2.27	2.38	2.50	2.61	2.72	2.84	3.06	3.29
100	3.55	3.71	3.87	4.03	4.19	4.35	4.51	4.67	4.98	5.30

Theoretical Output

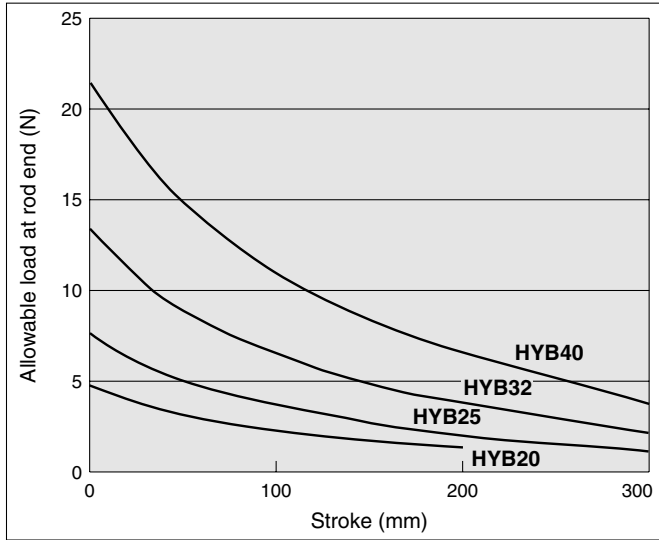
Unit: N

Bore size (mm)	Operating direction	Operating pressure (MPa)		
		0.3	0.5	0.7
20	OUT	94.2	157	220
	IN	79.2	132	185
25	OUT	147	246	344
	IN	124	206	288
32	OUT	241	402	563
	IN	207	346	484
40	OUT	378	630	882
	IN	318	530	742
50	OUT	588	980	1370
	IN	495	825	1160
63	OUT	936	1560	2180
	IN	840	1400	1960
80	OUT	1510	2520	3520
	IN	1360	2270	3180
100	OUT	2360	3930	5500
	IN	2150	3580	5010

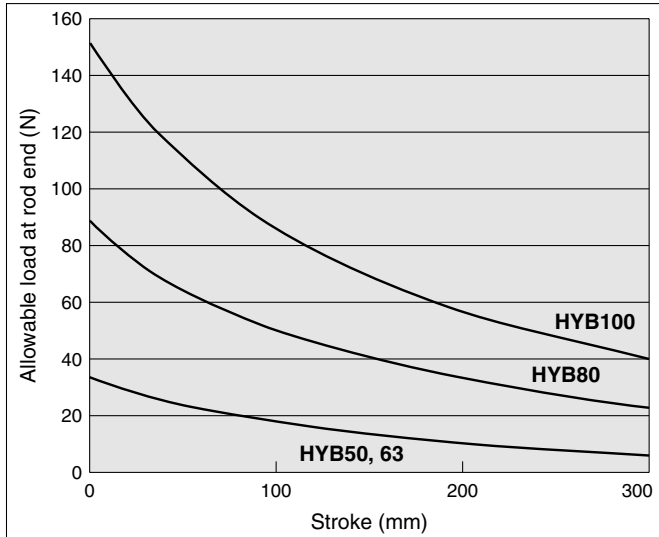
Series HYB

Allowable Load at Rod End

ø20, ø25, ø32, ø40

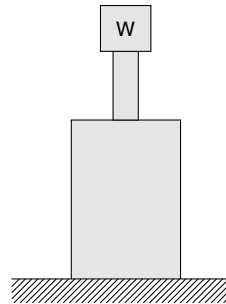
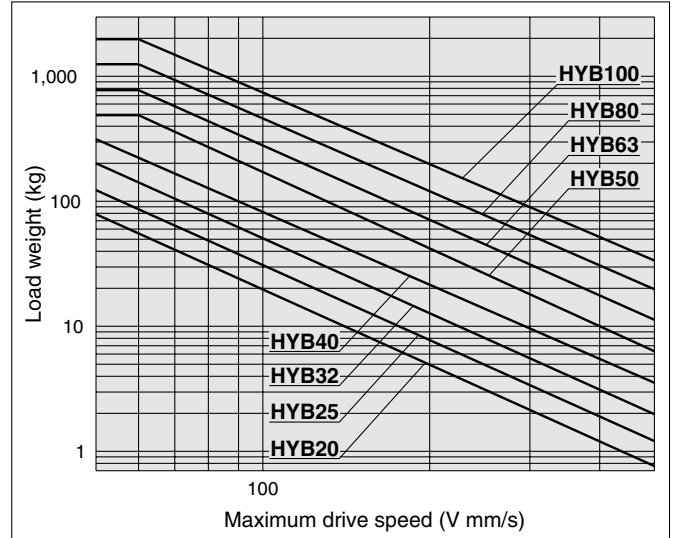


ø50, ø63, ø80, ø100

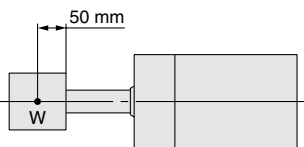


Allowable Kinetic Energy

(Supply pressure: at P = 0.5 MPa)

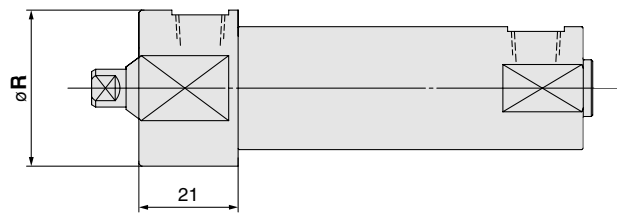
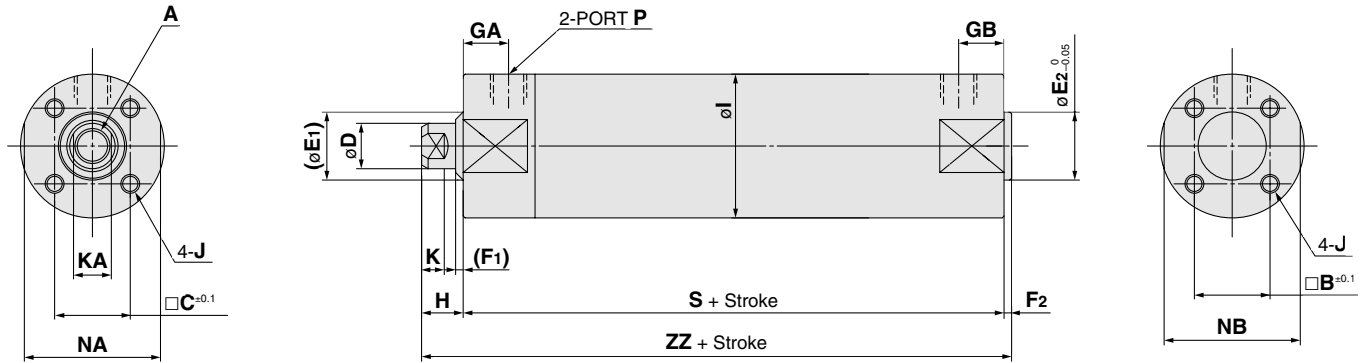


• A case where the center of gravity of the load rests 50 mm from the rod end.



Dimensions

HY□B20 to 100



ø20, 25

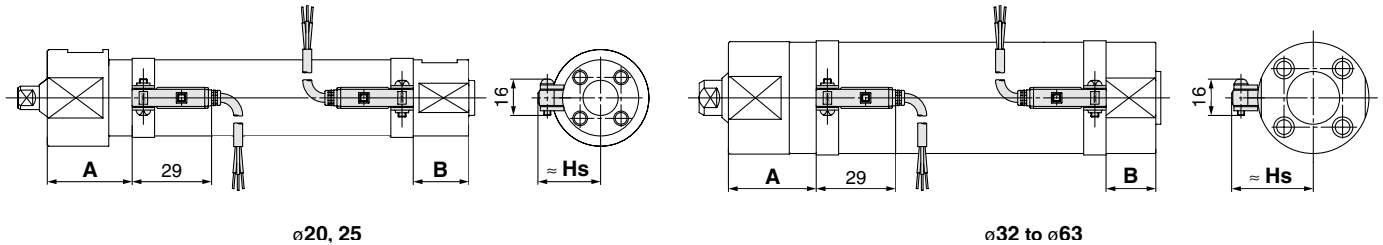
Bore size (mm)	A	B	C	D	E ₁	E ₂	F ₁	F ₂	GA		GB	H	I	J
									Port: M5, Rc, NPT	Port: G				
20	M4 x 0.7 depth 8	14	18.5	8	18	12	3	2	13		10	10	26	M4 x 0.7 depth 7
25	M5 x 0.8 depth 10	16.5	18.5	10	18	14	3	2	13		10	10	31	M5 x 0.8 depth 7.5
32	M6 x 1.0 depth 12	20	20	12	20	18	3	2	12	11	10	10	38	M5 x 0.8 depth 8
40	M8 x 1.25 depth 13	26	26	16	26	25	3	2	13	10	10	15	47	M6 x 1.0 depth 12
50	M10 x 1.5 depth 15	32	32	20	32	30	3	2	14	14	12	15	58	M8 x 1.25 depth 16
63	M10 x 1.5 depth 15	38	38	20	32	32	3	2	14	12	12	15	72	M10 x 1.5 depth 16
80	M16 x 2.0 depth 21	50	50	25	37	40	3	3	20	17	16	20	89	M10 x 1.5 depth 22
100	M20 x 2.5 depth 27	60	60	30	42	50	3	3	20	17	16	20	110	M12 x 1.75 depth 22

Bore size (mm)	K	KA	NA	NB	P	R	S	ZZ
20	5	6	30	24	M5	33	69	81
25	5	8	30	29	M5	33	69	81
32	6	10	35.5	35.5	1/8	—	71	83
40	6.5	13	44	44	1/8	—	78	95
50	8	16	55	55	1/4	—	90	107
63	8	16	69	69	1/4	—	90	107
80	9.5	22	80	80	3/8	—	108	131
100	11.5	27	100	100	1/2	—	108	131

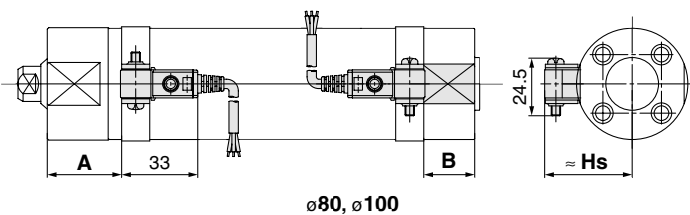
Auto Switch Proper Mounting Position (Detection at stroke end) and Its Mounting Height

HYB

D-H7BA



D-G5BA



(mm)

Bore size	D-H7BA			D-G5BA		
	A	B	Hs	A	B	Hs
20	29	19.5	24.5	—	—	—
25	29	19.5	27	—	—	—
32	30	20.5	30.5	—	—	—
40	34.5	22.5	35	—	—	—
50	42	27.5	40.5	—	—	—
63	42	27.5	47.5	—	—	—
80	—	—	—	48	32	59
100	—	—	—	48	32	69.5

Note) The above values are a guide in the stroke end detection of the mounting position of the auto switch. Please adjust in an actual setting after confirming the operating state of the auto switch.

Operating Range

Auto switch model	Bore size							
	20	25	32	40	50	63	80	100
D-H7BA	4	4	4.5	5	6	6.5	—	—
D-G5BA	—	—	—	—	—	—	6.5	7

* Since this is a guideline including hysteresis, it is not meant to be guaranteed. There may be substantial variation depending on the surrounding environment (assuming approximately ±30% dispersion).

Minimum Stroke of Auto Switch Mounting

Auto switch model	1 pc.	2 pcs.
D-H7BA	10	15
D-G5BA	10	15

Auto Switch Mounting Bracket/Part No.

Auto switch model	Bore size (mm)							
	20	25	32	40	50	63	80	100
D-H7BA	BMA2-020	BMA2-025	BMA2-032	BMA2-040	BMA2-050	BMA2-063	—	—
D-G5BA	—	—	—	—	—	—	BA-08	BA-10

* An iron screw is attached when the above mounting bracket is ordered on its own. Please use the provided stainless steel screws, attached below the switch, for final assembly
 Mounting screws set made of stainless steel
 BBA3: for D-G5BA
 BBA4: for G-H7BA

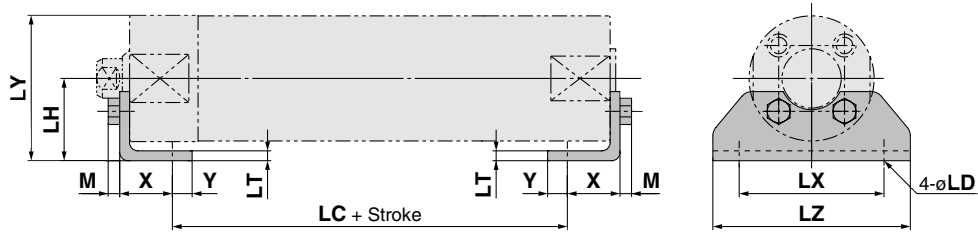
• D-G5BA and D-H7BA switches are set on the cylinder with the stainless steel screws above when shipped. When the switches are shipped as individual parts, the BBA3 or BBA4 is included.

• Refer to “SMC Best Pneumatics” catalog vol. 10 for auto switch mounting.

Mounting Brackets

Foot Bracket

HYB



Foot bracket material: Stainless steel

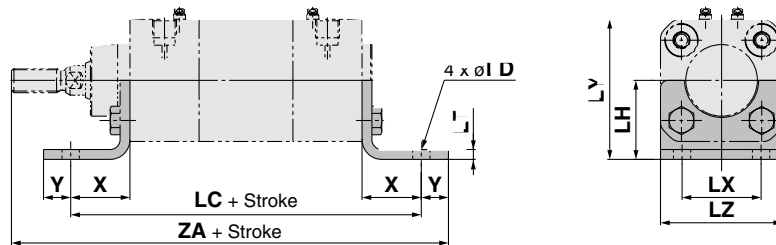
Bore size	Bracket part no.	Weight (g)	X	Y	LD	LH	LC	LT	LX	LY	LZ	M	Mounting bolt
32	CG-L032SUS	0.06	16	6	7.2	25	45	3	44	44	60	3.5	M5 x 0.8
40	CG-L040SUS	0.08	16.5	6.5	7.2	30	51	3	54	53.5	75	4	M6 x 1.0
50	CG-L050SUS	0.17	21.5	11.5	10	40	55	4	66	69	90	5.5	M8 x 1.25
63	CG-L063SUS	0.23	21.5	11.5	12	45	55	4	82	81	110	7	M10 x 1.5
80	CG-L080SUS	0.36	28	17	12	55	60	4	100	99.5	130	7	M10 x 1.5
100	CG-L100SUS	0.69	30	15	14	70	60	6	120	125	160	8	M12 x 1.75

Note 1) One mounting bracket is attached with one foot bracket and two mounting bolts.

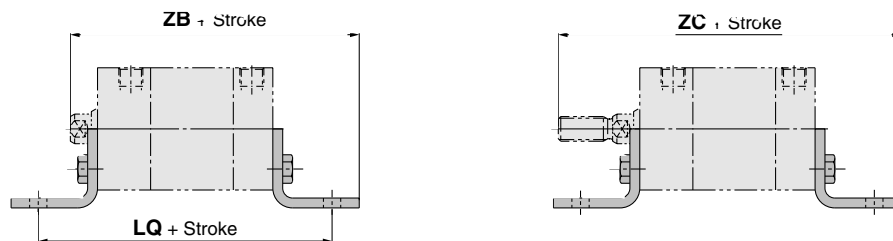
Note 2) Order two foot brackets per cylinder.

Note 3) Contact SMC for HYB ø20, ø25.

HYC



HYQ



Foot bracket material: Stainless steel (mm)

Bore size	Bracket part no.	Weight (g)	X	Y	LD	LH	LC	LQ	LT	LX	LY	LZ	HYC	HYQ Without auto switch		HYDQ With auto switch		Mounting bolt
														ZA	ZB	ZC	ZB	
32	HY-L032SUS	100	24	11	7	32	142	109	4	32	57	49.5	177	107	129	122	144	M6 x 1 x 18L
40	HY-L040SUS	120	28	10	9	36	161	121.5	4	36	65	57.5	198	115.5	139.5	130.5	154.5	M6 x 1 x 18L
50	HY-L050SUS	210	32	11	9	45	170	140.5	5	45	80	69	218	133.5	165.5	148.5	180.5	M8 x 1.25 x 20L
63	HY-L063SUS	260	32	11	9	50	185	141	5	50	92	84	233	134	166	149	181	M8 x 1.25 x 20L

Note 1) One mounting bracket is attached with one foot bracket and two mounting bolts.

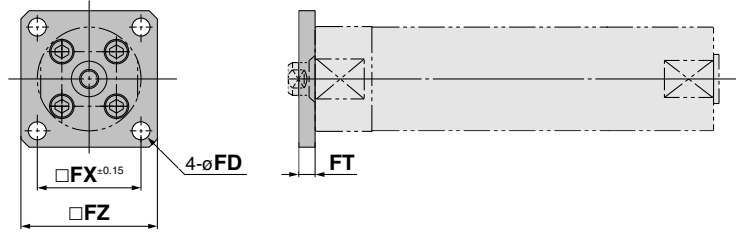
Note 2) Two foot brackets per cylinder should be ordered.

Note 3) Contact SMC for HYQ ø20, ø25.

Flange Bracket

HYB (Rod end)

Rod end flange bracket (Material: Stainless steel)



Flange bracket material: Stainless steel

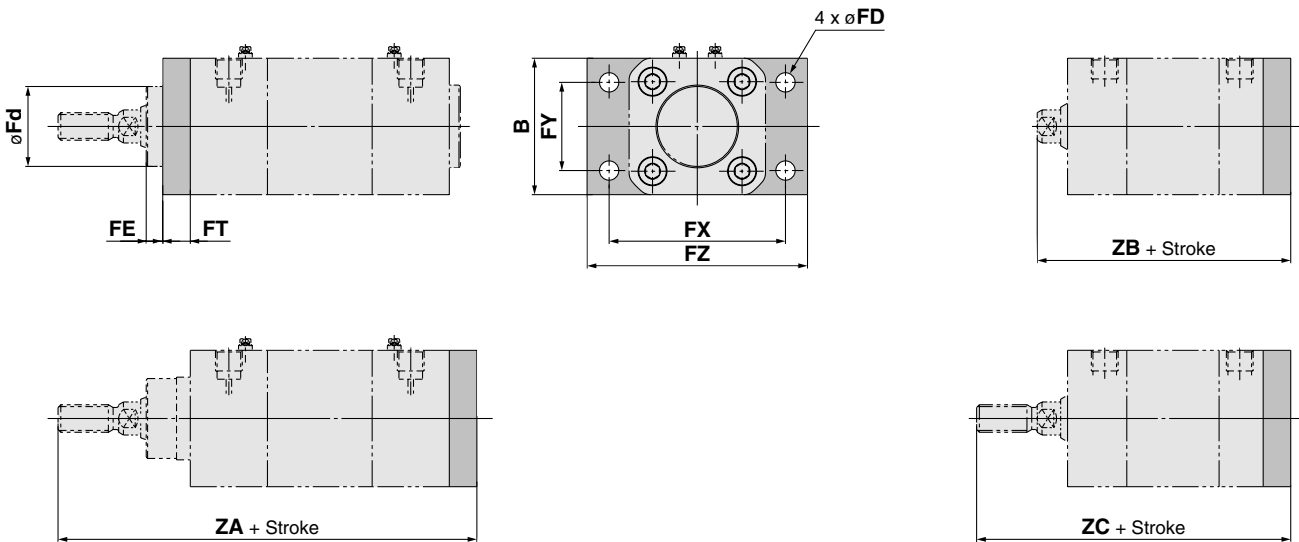
Bore size	Bracket part no.	Weight (g)	FT	FX	FZ	FD
32	CG-F032SUS	0.10	6	38	50	6.6
40	CG-F040SUS	0.15	6	46	60	6.6
50	CG-F050SUS	0.26	9	58	75	9
63	CG-F063SUS	0.52	9	70	90	11
80	CG-F080SUS	0.66	9	82	100	11
100	CG-F100SUS	1.16	10	100	125	14

Note 1) One mounting bracket is attached with one flange bracket and four mounting bolts.

Note 2) Contact SMC for HYB ø20, ø25.

HYC (Rod end and head end are common.)

HYQ



Flange bracket material: Stainless steel (mm)

Bore size	Bracket part no.	Weight (g)	B	FD	FE	FT	FX	FY	FZ	Fd	HYC		HYQ		HYDQ		Mounting bolt
											Without auto switch	With auto switch	Without auto switch	With auto switch			
32	HY-F032SUS	260	49.5	7	6	10	64	32	80	29	152	82	104	97	119	M6 x 1 x 18L	
40	HY-F040SUS	320	57.5	9	8.5	10	72	36	90	34	169	87.5	111.5	102.5	126.5	M6 x 1 x 18L	
50	HY-F050SUS	580	69	9	11	12	90	45	110	39	187	102.5	134.5	117.5	149.5	M8 x 1.25 x 20L	
63	HY-F063SUS	770	82	9	11	12	100	50	120	44	202	103	135	118	150	M8 x 1.25 x 20L	

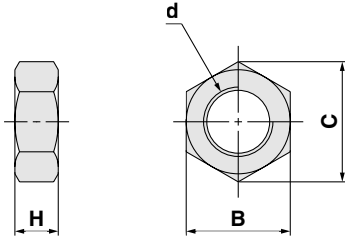
Note 1) One mounting bracket is attached with 4 mounting bolts

Note 2) Contact SMC for HYQ ø20, ø25.

Options

Rod End Nut

HYQ, HYC

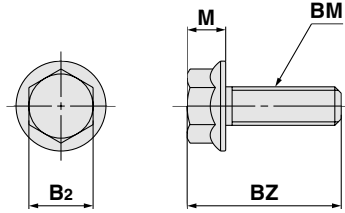


Material: Stainless steel
(mm)

Part no.	Applicable bore size	d	H	B	C
NTH-02SUS	20	M6 x 1.0	3.6	10	11.5
NT-02SUS	25	M8 x 1.25	5	13	15
NT-03SUS	32	M10 x 1.25	6	17	19.6
NTH-04SUS	40	M12 x 1.25	7	19	21.9
NTH-05SUS	50, 63	M16 x 1.5	10	24	27.7

Plug Bolt

HYC

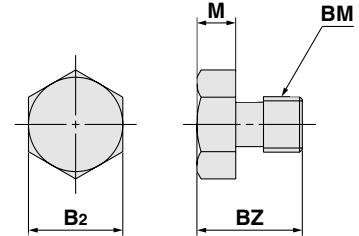


Material: Stainless steel
(mm)

Part no.	Applicable bore size	B2	BM	BZ	M
HYC-H03SUS	32, 40	10	M6 x 1.0	22	6
HYC-H05SUS	50, 63	12	M8 x 1.25	24	8

Note) The above part number is attached with 4 bolts.

HYB, HYG



Material: Stainless steel
(mm)

Part no.	Applicable bore size	B2	BM	BZ	M
HYB-H020SUS	20	7	M4 x 0.7	9	3
HYB-H025SUS	25	8	M5 x 0.8	9.5	3.5
	32	8	M5 x 0.8	9.5	3.5
HYB-H040SUS	40	10	M6 x 1.0	12	4
HYB-H050SUS	50	13	M8 x 1.25	15.5	5.5
HYB-H063SUS	63	17	M10 x 1.5	19	7
	80	17	M10 x 1.5	19	7
HYB-H100SUS	100	19	M12 x 1.75	24	8

Note) The above part number is attached with 4 bolts.

HYG (mm)

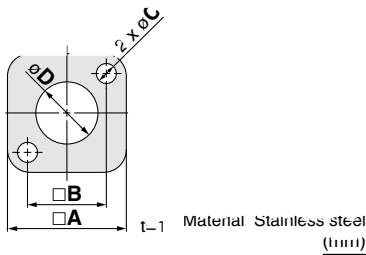
Part no.	B2	BM	BZ	M
HYG-H020SUS	8	M5 x 0.8	9.5	3.5
HYG-H025SUS	10	M6 x 1.0	12	4
HYG-H032SUS	13	M8 x 1.25	15.5	5.5
HYG-H050SUS	17	M10 x 1.5	19	7

Note) The above part number is attached with 4 bolts.

External Cover

HYQ: $\varnothing 20, \varnothing 25$

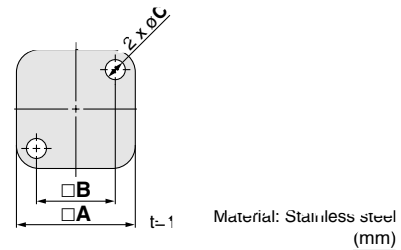
Rod end



Part no.	A	B	C	D	Installation bolt
HYQ-HA020SUS	32.2	22	5.5	18.5	M5 x 0.8 x 10L
HYQ-HA025SUS	39.2	26	6.6	20.5	M6 x 1.0 x 10L

Note) One mounting bracket is attached with two mounting bolts.

Head end

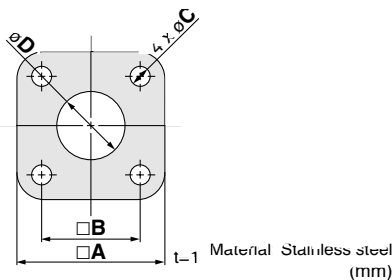


Part no.	A	B	C	Installation bolt
HYQ-HB020SUS	32.2	22	5.5	M5 x 0.8 x 10L
HYQ-HB025SUS	39.2	26	6.6	M6 x 1.0 x 10L

Note) One mounting bracket is attached with two mounting bolts.

HYQ: $\varnothing 32$ to $\varnothing 63$

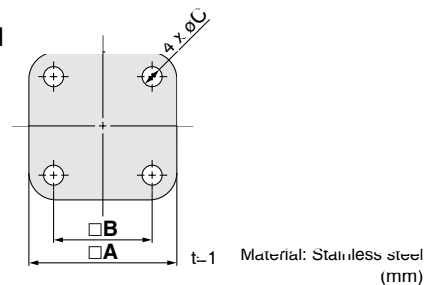
Rod end



Part no.	A	B	C	D	Installation bolt
HYQ-HA032SUS	48.8	32.5	6.6	22.5	M6 x 1.0 x 10L
HYQ-HA040SUS	56.8	38	6.6	26.5	M6 x 1.0 x 10L
HYQ-HA050SUS	68.2	46.5	8.8	32.5	M8 x 1.25 x 10L
HYQ-HA063SUS	83.2	56.5	8.8	32.5	M8 x 1.25 x 10L

Note) One mounting bracket is attached with four mounting bolts.

Head end



Part no.	A	B	C	Installation bolt
HYQ-HB032SUS	48.8	32.5	6.6	M6 x 1.0 x 10L
HYQ-HB040SUS	56.8	38	6.6	M6 x 1.0 x 10L
HYQ-HB050SUS	68.2	46.5	8.8	M8 x 1.25 x 10L
HYQ-HB063SUS	83.2	56.5	8.8	M8 x 1.25 x 10L

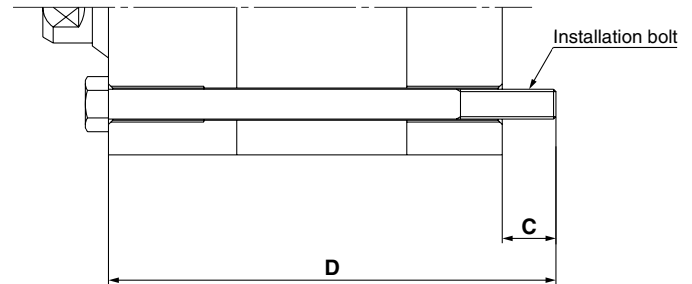
Note) One mounting bracket is attached with four mounting bolts.

Mounting Bolt

Mounting method Mounting bolt for through-hole type HYQB is available.

How to Order Add "HY-" to the head of the bolt.

Example) Prepare the mounting bolt of cylinder model "HYQB20-5"
The part no. is "HY-M4 x 65L" 2 pcs.



HYQ/Without built-in magnet

Model	C	D	Mounting bolt
HYQB20-5	10	65	HY-M4 x 65L
-10		70	x 70L
-15		75	x 75L
-20		80	x 80L
-25		85	x 85L
-30		90	x 90L
-35		95	x 95L
-40		100	x 100L
-45		105	x 105L
-50		110	x 110L
HYQB25-5	9	65	HY-M5 x 65L
-10		70	x 70L
-15		75	x 75L
-20		80	x 80L
-25		85	x 85L
-30		90	x 90L
-35		95	x 95L
-40		100	x 100L

Model	C	D	Mounting bolt
HYQB32-5	9	75	HY-M5 x 75L
-10		80	x 80L
-15		85	x 85L
-20		90	x 90L
-25		95	x 95L
-30		100	x 100L
-35		105	x 105L
-40		110	x 110L
-45		115	x 115L
-50		120	x 120L
HYQB40-5	9.5	80	HY-M5 x 80L
-10		85	x 85L
-15		90	x 90L
-20		95	x 95L
-25		100	x 100L
-30		105	x 105L
-35		110	x 110L
-40		115	x 105L
-45		120	x 120L
-50		125	x 125L
-75	150	x 150L	
-100	175	x 175L	

Material: Stainless steel

Model	C	D	Mounting bolt
HYQB50-10	13.5	100	HY-M6 x 100L
-15		105	x 105L
-20		110	x 110L
-25		115	x 115L
-30		120	x 120L
-35		125	x 125L
-40		130	x 130L
-45		135	x 135L
-50		140	x 140L
-75		165	x 165L
-100	190	x 190L	
HYQB63-10	13	100	HY-M6 x 100L
-15		105	x 105L
-20		110	x 110L
-25		115	x 115L
-30		120	x 120L
-35		125	x 125L
-40		130	x 130L
-45		135	x 135L
-50		140	x 140L
-75		165	x 165L
-100	190	x 190L	

HYDQ/With built-in magnet

Model	C	D	Mounting bolt
HYDQB20-5	10	75	HY-M4 x 75L
-10		80	x 80L
-15		85	x 85L
-20		90	x 90L
-25		95	x 95L
-30		100	x 100L
-35		105	x 105L
-40		110	x 110L
-45		115	x 115L
-50		120	x 120L
HYDQB25-5	9	75	HY-M5 x 75L
-10		80	x 80L
-15		85	x 85L
-20		90	x 90L
-25		95	x 95L
-30		100	x 100L
-35		105	x 105L
-40		110	x 110L

Model	C	D	Mounting bolt
HYDQB32-5	9	90	HY-M5 x 90L
-10		95	x 95L
-15		100	x 100L
-20		105	x 105L
-25		110	x 110L
-30		115	x 115L
-35		120	x 120L
-40		125	x 125L
-45		130	x 130L
-50		155	x 155L
-75	180	x 180L	
-100	185	x 185L	
HYDQB40-5	9.5	95	HY-M5 x 95L
-10		100	x 100L
-15		105	x 105L
-20		110	x 110L
-25		115	x 115L
-30		120	x 120L
-35		125	x 125L
-40		130	x 130L
-45		135	x 135L
-50		140	x 140L
-75	165	x 165L	
-100	190	x 190L	

Model	C	D	Mounting bolt
HYDQB50-10	13.5	115	HY-M6 x 115L
-15		120	x 120L
-20		125	x 125L
-25		130	x 130L
-30		135	x 135L
-35		140	x 140L
-40		145	x 145L
-45		150	x 150L
-50		155	x 155L
-75		180	x 180L
-100	205	x 205L	
HYDQB63-10	13	115	HY-M6 x 115L
-15		120	x 120L
-20		125	x 125L
-25		130	x 130L
-30		135	x 135L
-35		140	x 140L
-40		145	x 145L
-45		150	x 50L
-50		155	x 155L
-75		180	x 180L
-100	205	x 205L	

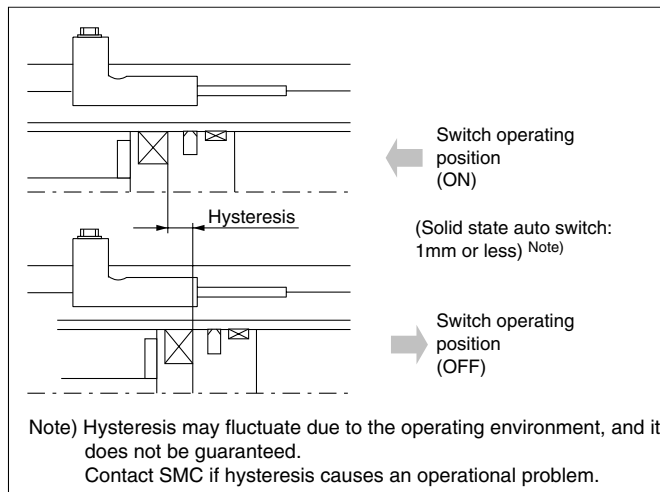
Auto Switch Specifications

Specifications

Type	Solid state switch
Leakage current	3-wire: 100 μ A or less 2-wire: 0.8 mA or less
Operating time	1 ms or less
Impact resistance	1000 m/s ²
Insulation resistance	50 M Ω or more at 500 VDC Mega (between lead wire and case)
Withstand voltage	1000 VAC for 1 minute (between lead wire and case)
Ambient temperature	-10 to 60°C
Enclosure	IEC529 standard IP67, JIS C 0920 waterproof construction

Hysteresis

Hysteresis is the distance between the position at which piston movement operates an auto switch and the position at which reverse movement turns the switch off. This hysteresis is included in a part of the operating range (one side)



Lead Wire Length

Lead wire length indication

(Example) D-F6P L



Lead wire length

Nil	0.5 m
L	3 m
Z	5 m

Note 1) Applicable auto switch with 5 m lead wire "Z"

Solid state switch: All types are manufactured upon receipt of order (as standard).

Note 2) The standard lead wire length of solid state switch with water resistant 2-color indication is 3 meters. (0.5 m is not available.)

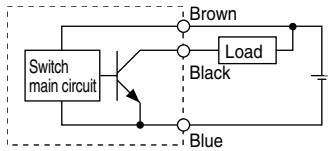
Series HY

Auto Switch

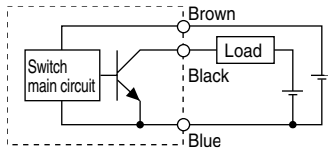
Connections and Examples

Basic Wiring

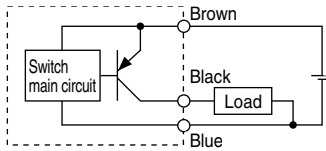
Solid state 3-wire, NPN



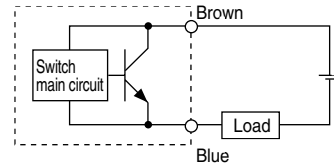
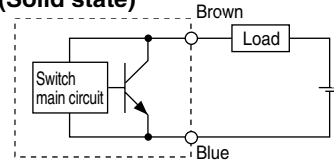
(The switch power supply and the load power supply are another cases)



Solid state 3-wire, PNP

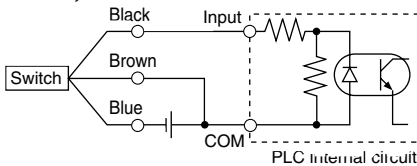


2-wire (Solid state)

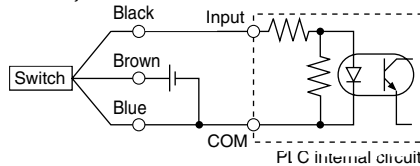


Example of Connection to PLC

• Sink input specifications 3-wire, NPN

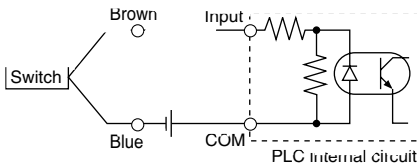


• Source input specifications 3-wire, PNP

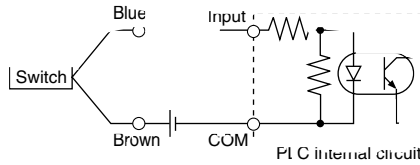


Connect according to the applicable PLC input specifications, since the connection method will vary depending on the PLC input specifications.

2-wire



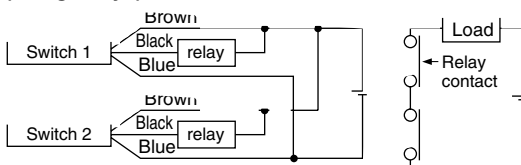
2-wire



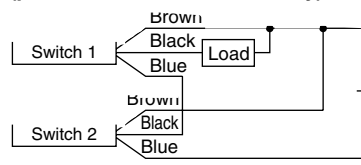
Example of AND (Series) and OR (Parallel) Connection

• 3-wire

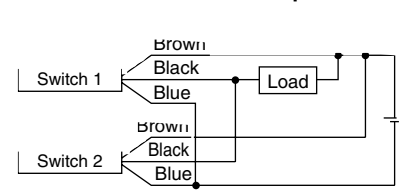
AND connection for NPN output (using relays)



AND connection for NPN output (performed with switches only)

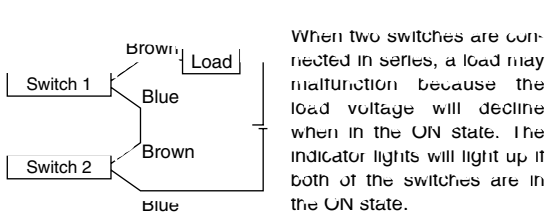


OR connection for NPN output



The indicator lights will illuminate when both switches are turned ON.

2-wire with 2 switches AND connection



When two switches are connected in series, a load may malfunction because the load voltage will decline when in the ON state. The indicator lights will light up if both of the switches are in the ON state.

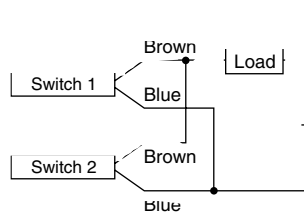
$$\text{Load voltage at ON} = \frac{\text{Power supply voltage}}{\text{Internal voltage drop} \times 2} \times 2$$

$$= \frac{24 \text{ V} - 4 \text{ V}}{2} \times 2$$

$$= 16 \text{ V}$$

Example : Power supply voltage is 24 V DC
Internal voltage drop in switch is 4 V.

2-wire with 2 switches OR connection



(Solid state)
When two switches are connected in parallel, malfunction may occur because the load voltage will increase when in the OFF state.

$$\text{Load voltage at OFF} = \frac{\text{Leakage current} \times 2 \text{ pcs.} \times \text{Load impedance}}{\text{Leakage current} \times 2 \text{ pcs.} \times \text{Load impedance}}$$

$$= \frac{1 \text{ mA} \times 2 \text{ pcs.} \times 3 \text{ k}\Omega}{2 \text{ pcs.} \times 3 \text{ k}\Omega}$$

$$= 6 \text{ V}$$

Example : Load impedance is 3 kΩ
Leakage current from switch is 1 mA.

Water Resistance 2-color Indication Type Solid State Switch: Band Mounting Style D-H7BAL



Grommet

Water (coolant) resistant type

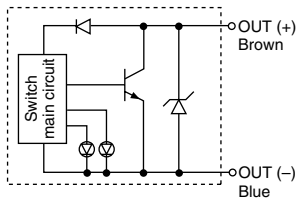


Caution

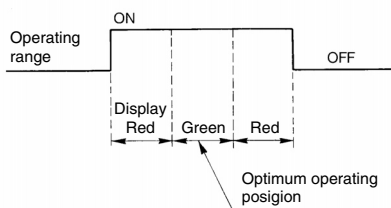
Operating Precautions

Please consult with SMC if using coolant liquid other than water based solutions.

Auto Switch Internal Circuit



Indicator light / Display method



Auto Switch Specifications

PLC: Programmable Logic Controller

D-H7BAL (With indicator light)	
Auto switch part no.	D-H7BAL
Wiring type	2-wire
Output type	—
Applicable load	24 VDC relay, PLC
Power supply voltage	—
Current consumption	—
Load voltage	24 VDC (10 to 28 VDC)
Load current	5 to 40 mA
Internal voltage drop	4 V or less
Leakage current	0.8 mA or less at 24 VDC
Indicator light	Operating position Red LED illuminates when ON. Optimum operating position Green LED illuminates when ON.

- Lead wires Oilproof vinyl heavy-duty cord: $\phi 3.4$, 0.2 mm², 2 cores (brown, blue), 3 m (standard)

Note 1) Refer to page 37 for solid state switch common specifications.

Note 2) Refer to page 37 for lead wire lengths.

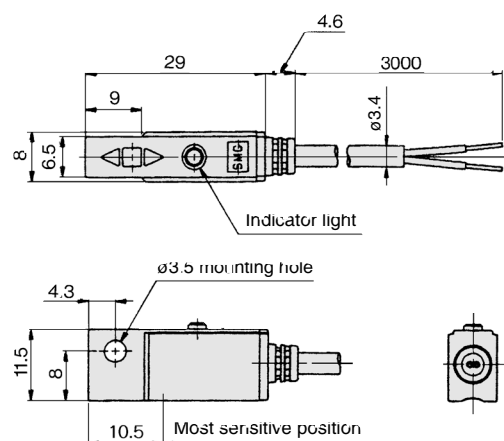
Weight

Unit g

Auto switch part no.		D-H7BA
Lead wire length (m)	0.5	—
	3	50
	5	81

Dimensions

Unit : mm



Water Resistance 2-color Indication Type Solid State Switch: Band Mounting Style D-G5BAL



Grommet

Water (coolant) resistant type

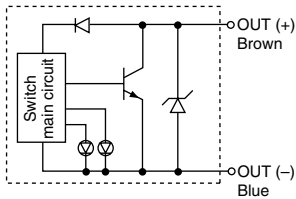


Caution

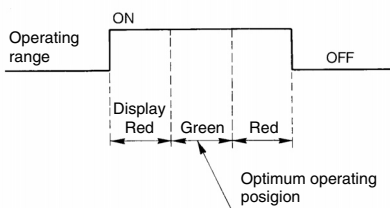
Operating Precautions

Please consult with SMC if using coolant liquid other than water based solutions.

Auto Switch Internal Circuit



Indicator light / Display method



Auto Switch Specifications

PLC: Programmable Logic Controller

D-G5BAL (With indicator light)	
Auto switch part no.	D-G5BAL
Wiring type	2-wire
Output type	—
Applicable load	24 VDC relay, PLC
Power supply voltage	—
Current consumption	—
Load voltage	24 VDC (10 to 28 VDC)
Load current	5 to 40 mA
Internal voltage drop	4 V or less
Leakage current	0.8 mA or less at 24 VDC
Indicator light	Operating position Red LED illuminates when ON. Optimum operating position Green LED illuminates when ON.

- Lead wires Oilproof vinyl heavy-duty cord: $\phi 4$, 0.3 mm² 2 cores (brown, blue), 3 m (standard)

Note 1) Refer to page 37 for solid state switch common specifications.

Note 2) Refer to page 37 for lead wire lengths.

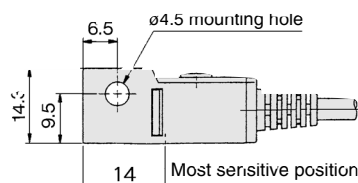
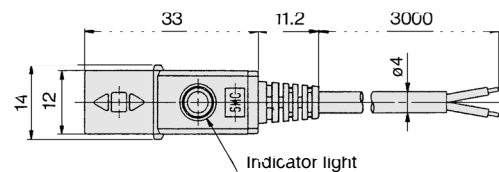
Weight

Unit g

Auto switch part no.	D-G5BA	
Lead wire length (m)	0.5	—
	3	68
	5	108

Dimensions

Unit : mm



Solid State Switch: Direct Mounting Style D-F6N/D-F6P/D-F6B



Grommet

- 2-wire load current is reduced (2.5 to 40 mA)
- UL certified (style 2844) lead cable is used
- For RoHS



Auto Switch Specifications

PLC: Programmable Logic Controller

D-F6□ (With indicator light)			
Auto switch part no.	D-F6N	D-F6P	D-F6B
Electrical entry direction	In-line		
Wiring type	3-wire		2-wire
Output type	NPN	PNP	—
Applicable load	IC circuit, relay, and PLC		24 VDC relay, PLC
Power supply voltage	5, 12, 24 VDC (4.5 to 28 V)		—
Current consumption	10 mA or less		
Load voltage	28 VDC or less	—	24 VDC (10 to 28 VDC)
Load current	40 mA or less		2.5 to 40 mA
Internal voltage drop	0.8 V or less		4 V or less
Leakage current	100 μA or less at 24 V DC		0.8 mA or less
Indicator light	Red LED illuminates when ON.		

- Lead wires Oilproof vinyl heavy-duty cord: 2.7 x 3.2 ellipse
D-F6B 0.15 mm² x 2 cores
D-F6N, D-F6P: 0.15 mm² x 3 cores

Note 1) Refer to page 37 for solid state switch common specifications.

Note 2) Refer to page 37 for lead wire lengths.

Caution

Operating Precautions

Fix the switch with the existing screw installed on the switch body. The switch may be damaged if a screw other than the one supplied, is used.

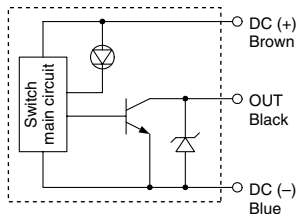
Weight

Unit g

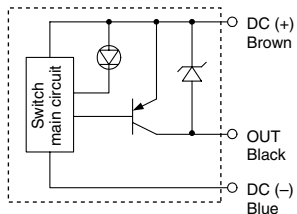
Auto switch part no.	D-F6N	D-F6P	D-F6B
Lead wire length (m)	0.5	20	19
	3	53	50
	5	80	75

Auto Switch Internal Circuit

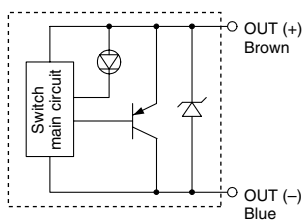
D-F6N



D-F6P



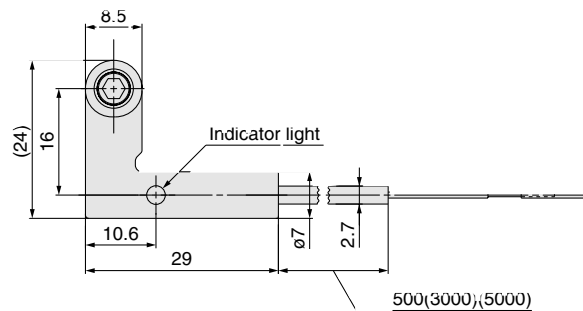
D-F6B



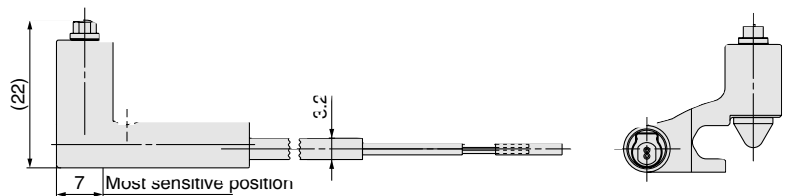
Dimensions

Unit mm

D-F6□



D-F6B



D-F6N/F6P

