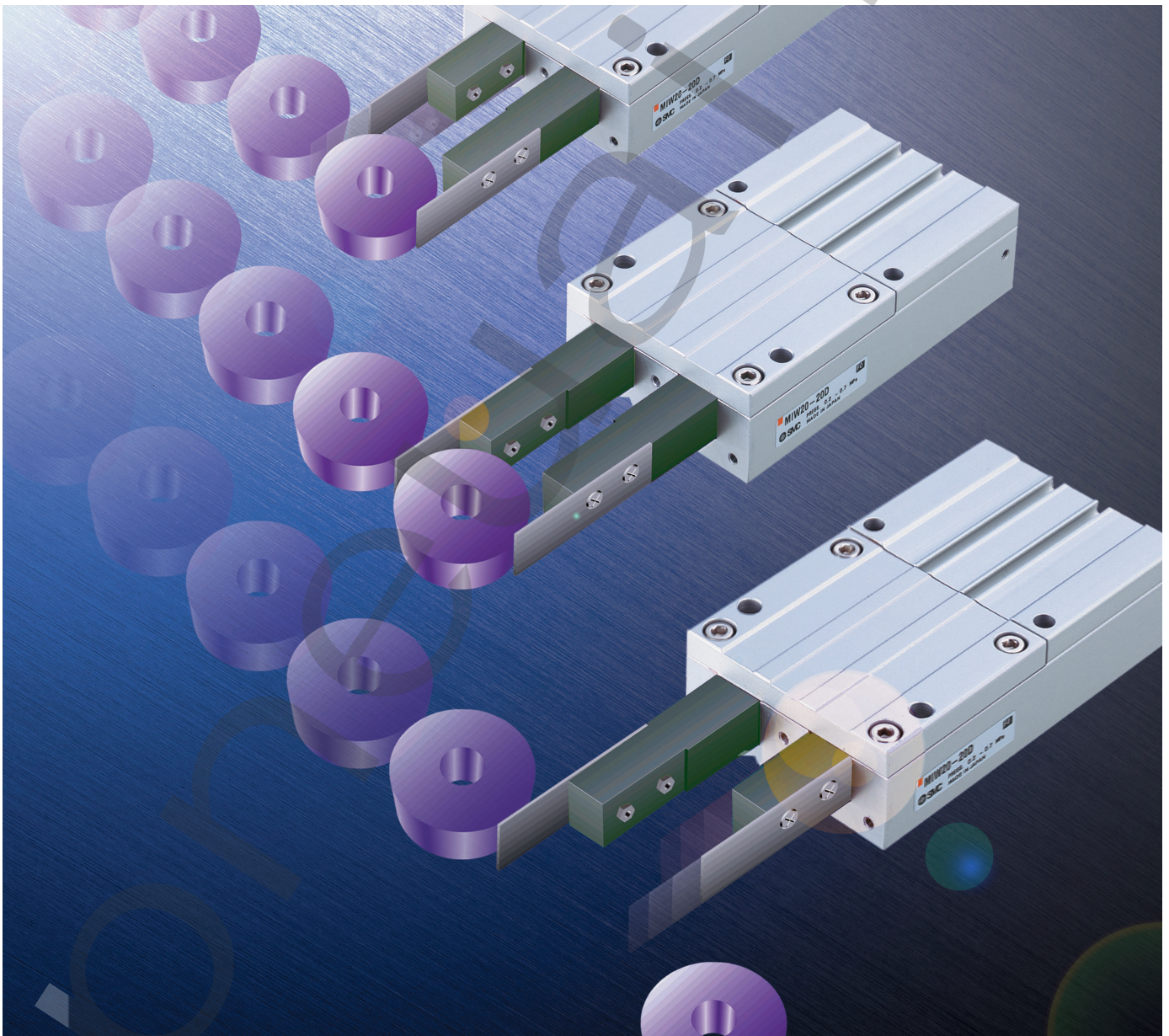




Escapements
Series MIW/MIS
ø12, ø20

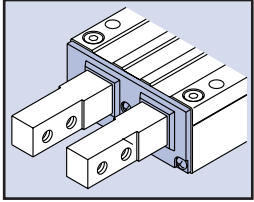


Ideal for separating and feeding individual parts from vibratory feeders, magazines, and hoppers.

Ideal for separating and from vibratory feeders,

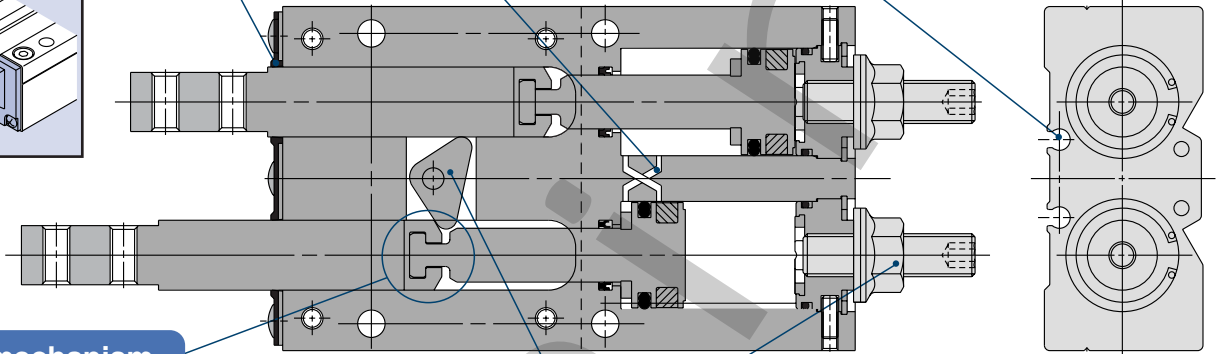
Scraper (optional)

Optional scraper prevents entry of dust to protect internal components.



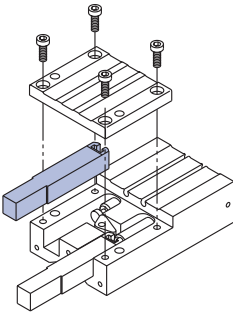
Air passage

Auto switch capable



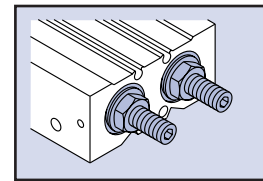
Floating mechanism

Improves life of the escapement by preventing eccentric loads causing damage to the piston and the seals. As this mechanism separates the fingers from the internal construction, it is possible to replace the fingers with ease when required.



Stroke adjuster (optional)

Optional stroke adjuster for precise adjustment of the retracted position of each piston rod.



Interlocking

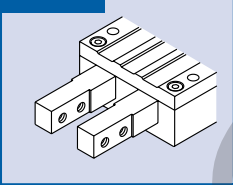
Provides reliable performance of the escapement by interlocking the two piston rods with a cam mechanism and control of air passage to the pistons.

Three variations of fingers

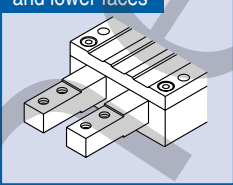
Flexibility in mounting the finger options.

Finger options

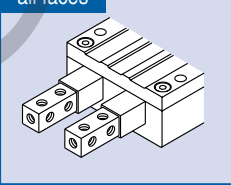
Basic type



Tapped on upper and lower faces

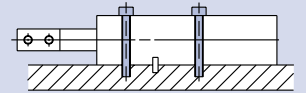


Tapped on all faces

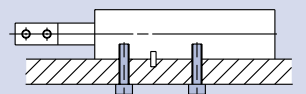


Mounting is possible from 2 directions.

Using through holes from top face



Using tapped holes in the body from bottom face



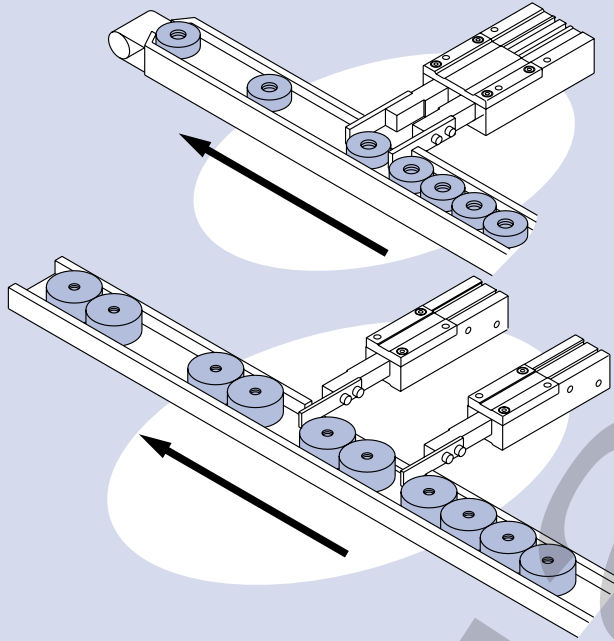
Positioning pin holes allow for easy mounting.

Series variations

Series	Bore size mm	Stroke mm				Finger option	Stroke adjuster	Scraper
		10	12	20	30			
MIW	12		●			●	●	●
	20			●		●	●	●
MIS	12	●		●	●	●	●	●
	20	●		●	●	●	●	●

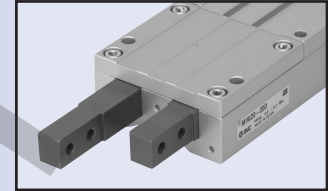
feeding individual parts magazines, and hoppers.

Application examples



MIW Double finger type

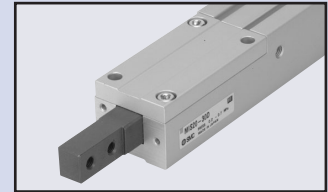
Single valve operation easily separates and feed each work piece.



MIS Single finger type

Operating speed and mounting position can be set according to the size of work piece and its operating condition.

Supply ports provided on both sides allow selection of piping direction.

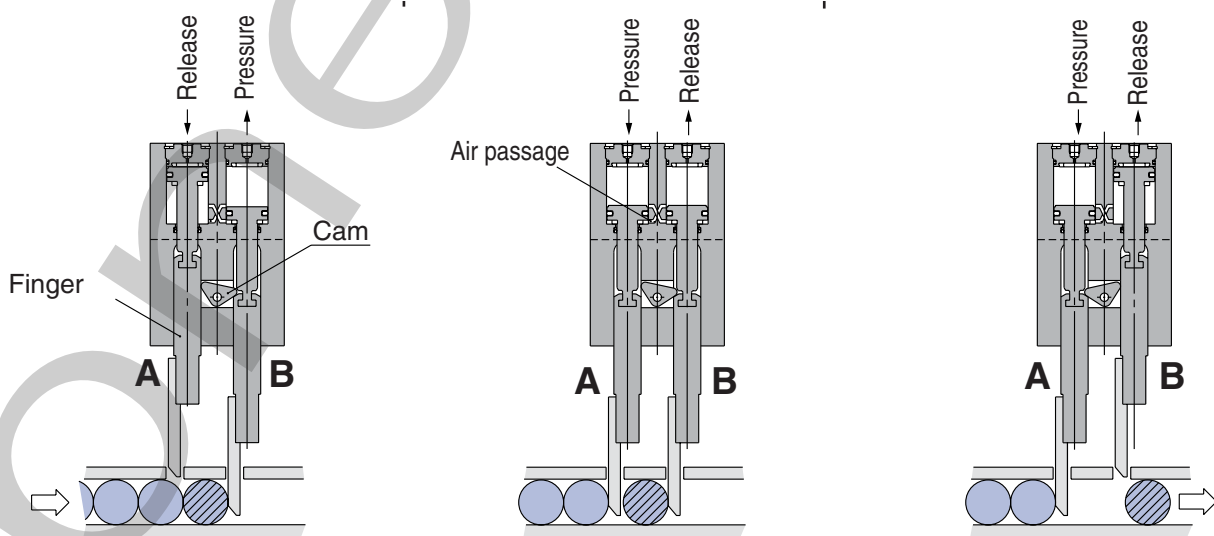


Working principle

The cam locks Finger B.

When Finger A is extended to reach the stroke end, air is supplied to retract Finger B.

Extension of Finger A rotates the cam to unlock Finger B and lock finger A to allow retraction of Finger B.



Insertion

Separation

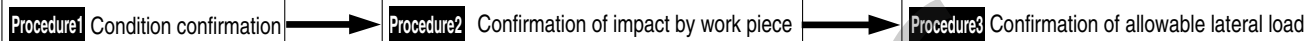
Release



Series MIW/MIS Model Selection

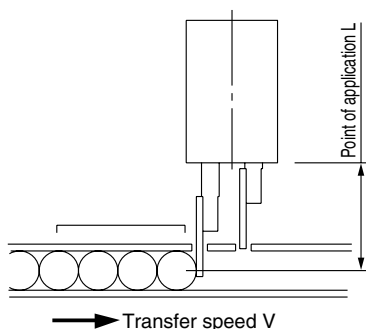
Model Selection

Selection procedure



Procedure1 Confirmation of conditions

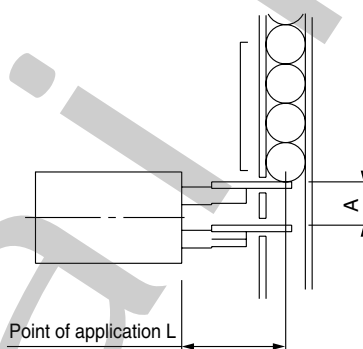
●The work piece moves horizontally on the conveyor.



Operation conditions

- Operating pressure P (MPa)
- Work piece weight m (Kg)
- Work piece quality x (Qty.)
- Point of application L (mm)
- Work piece transfer speed V (m/min)
- Coefficient of friction between the work piece and conveyor μ

●When the work piece drops vertically from a shooter, etc.



Operation conditions

- Operating pressure P (MPa)
- Work piece weight m (Kg)
- Work piece quality x (Qty.)
- Point of application L (mm)
- Distance of work piece drop H (m/min)
- Gravitational acceleration g (m/s²)

Procedure2 Confirmation of impact

From the graph of operating range, obtain the point of intersection of the total weight of the work piece xm (kg) indicated by the axis of ordinates and the transfer speed V (m/min) indicated by the axis of abscissas. Select a model so that the intersection will fall below the point of application L indicated by a line.

1. Calculation of work piece collision speed
The collision speed V is calculated from the distance of work piece fall V.

$$\text{Work piece collision speed } V = \sqrt{2gH/1000} \times 60 \text{ (m/min)}$$

2. From the graph of operating range, obtain the intersection of the total weight of the work piece xm (kg) indicated by the axis of ordinates and the collision speed V (m/min) obtained by calculation. Select a model so that the intersection will fall below the point of application L indicated by a line.

Procedure3 Confirmation of allowable lateral load

1. Calculation of applied lateral load F
The lateral load F equals the coefficient between the work piece and the conveyor. Thus, from the total amount of the work piece and coefficient of friction,
 $F = \mu \cdot x \cdot m \cdot g \text{ (N)}$

1. Calculation of applied lateral load
The lateral load F equals the total load of the work piece.
Thus, $F = x \cdot m \cdot g \text{ (N)}$

2. From the graph of allowable lateral load, obtain the allowable lateral load F max from the intersection of the operating pressure and the point of application L indicated by the axis of abscissas. Select a model so that the value will be larger than the lateral load F applied in real operation.



Series MIW/MIS Model Selection

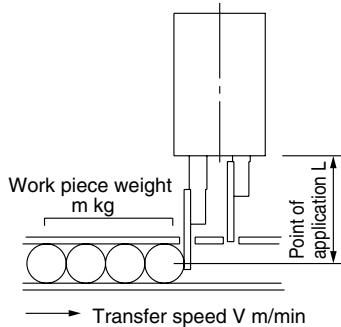
Model Selection

Operating range

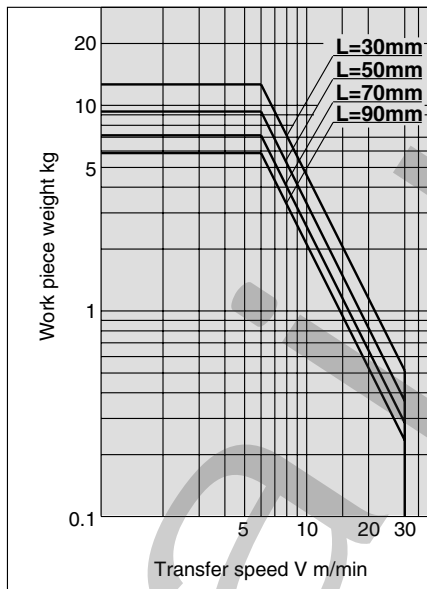
Procedure1 Condition confirmation	
<p>●The work piece moves horizontally on the conveyor.</p> <p>Operating conditions</p> <p>Operating pressure P = 0.4MPa Work piece weight m = 0.1kg Work piece quantity x = 10 Point of application L = 50mm Work piece transfer speed V = 12m/min Coefficient of friction between the work piece and conveyor $\mu = 0.2$</p>	<p>●When the work piece drops vertically from a shooter, etc.</p> <p>Operating conditions</p> <p>Operating pressure P = 0.4MPa Work piece weight m = 0.05kg Work piece quantity x = 5 Point of application L = 60mm Distance of work piece drop H = 15mm Gravitation acceleration g = 9.8m/s</p>
Procedure2 Confirmation of impact	
<p>· Obtain the total amount of the work piece. Total weight $m = 10 \times 0.1$ (kg) = 1 (kg)</p> <p>· Obtain the intersection of the transfer speed V and the total weight of work piece m. Confirm that the value is within the operating range of the point of application $L = 50$mm</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> <p>$\phi 12$</p> </div> <div> <p>Work piece weight (kg)</p> <p>Transfer speed (m/min) 12m/min</p> </div> </div>	<p>· Obtain the total amount of the work piece. Total weight $m = 5 \times 0.05$ (kg) = 0.25 (kg)</p> <p>· Obtain the collision speed of the work piece V.</p> $V = \sqrt{2gH/1000 \times 60}$ $= \sqrt{2 \times 9.8 \times 15/1000 \times 60}$ $= 32.5 \text{ (m/min)}$ <p>· Obtain the intersection of the collision speed V and the total weight of the work piece m. Confirm that the value is within the operating range of the point of application $L = 60$mm.</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> <p>$\phi 20$</p> </div> <div> <p>Work piece weight (kg)</p> <p>Transfer speed (m/min) 32.5m/min</p> </div> </div>
Procedure3 Confirmation of allowable lateral load	
<p>1. Calculation of applied lateral load F</p> $F = \mu \cdot N \cdot m \cdot g \text{ (N)}$ $= 0.2 \times 10 \times 0.1 \times 9.8$ $= 2.1 \text{ (N)}$ <p>2. Confirmation of allowable lateral load</p> <p>From the graph, the allowable lateral load at $L=50$mm and $P=0.4$MPa is 18N.</p> <p>Because $2.1\text{N} < 18\text{N}$, it is applicable.</p>	<p>1. Calculation of applied lateral load</p> <p>The lateral load F equals the total load of the work piece. Thus,</p> $F = 5 \times 0.05 \times 9.8$ $= 2.5 \text{ (N)}$ <p>2. Confirmation of allowable lateral load</p> <p>In the same way, the lateral load at $L=50$mm and $P=0.4$MPa is 48N from the graph. Because $2.5\text{N} < 48\text{N}$, it is applicable.</p>
<p>Therefore select MIW (MIS) 12.</p>	<p>Therefore select MIW (MIS) 20.</p>

Operating range

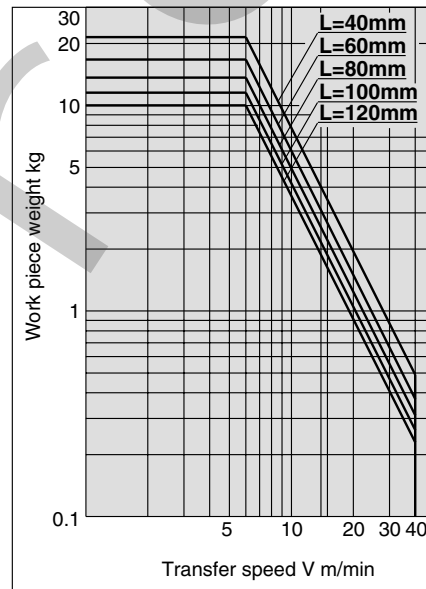
The graph at right shows conditions of the work piece to be stopped; that is, the weight, transfer speed and the operating range of the point of application L.



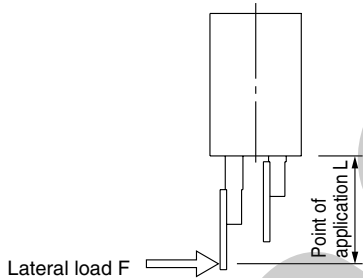
**MIW12
MIS12**



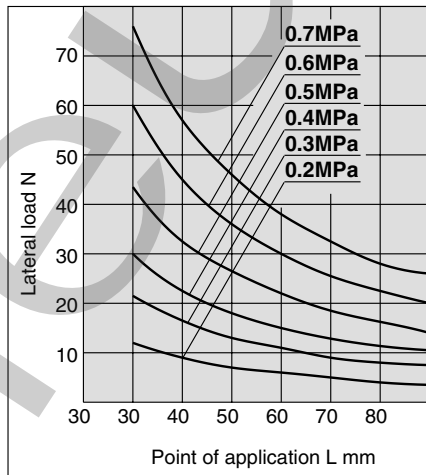
**MIW20
MIS20**



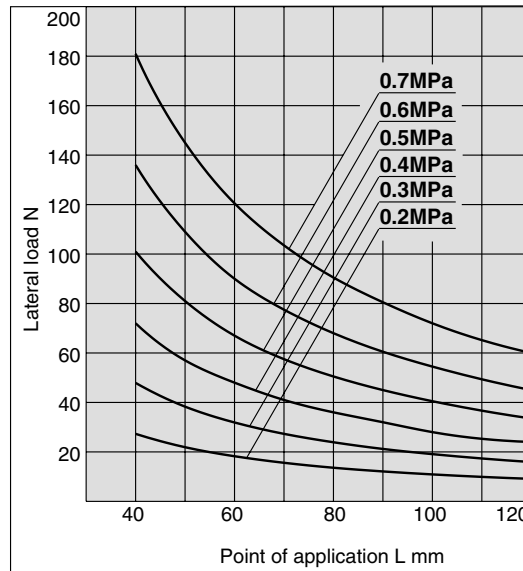
Allowable lateral load



**MIW12
MIS12**



**MIW20
MIS20**



Escapements

Series MIW/MIS

ø12, ø20

How to Order

Stroke

ø12	12	12mm
ø20	20	20mm

*MIW only accommodates a stroke of the same length as the cylinder diameter.

Finger options

Nil: Basic type (Standard type)	1: Tapped on upper and lower faces	2: Tapped on all faces (5 surfaces including end surface)

Double finger type MIW 12-12 D 1 A S - F9NV S

Single finger type MIS 20-30 D 1 A S - F9BV S

Cylinder bore

12	12mm
20	20mm

Stroke

10	10mm
20	20mm
30	30mm

Scraper

Nil	No
S	Yes

Stroke adjuster

Nil	No
A	Yes

Number of auto switches

Nil	2 pcs.
S	1 pc.

Type of auto switch

Nil	Without auto switch (built-in magnet)
-----	---------------------------------------

*Refer to the table below for auto switch part numbers.

Finger options

Nil: Basic type (Standard type)	1: Tapped on upper and lower faces	2: Tapped on all faces (5 surfaces including end surface)

Applicable auto switches/Refer to pages 14 through 18 for detailed specifications of auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (output)	Load voltage		Auto switch model		Lead wire length (m) *			Flexible lead wire (-X61)	Applicable load		
					DC	AC	Electrical entry direction	Perpendicular	In-line	0.5 (Nil)	3 (L)			5 (Z)	
Solid state (switch)	—	Grommet	Yes	3-wire (NPN)	24V	12V	—	F9NV	F9N	●	●	—	○	Relay PLC	
				F8N				—	●	●	○	○			
				F9PV				F9P	●	●	—	○			
				F8P				—	●	●	○	○			
				F9BV				F9B	●	●	—	○			
				F8B				—	●	●	○	○			
	Diagnostic indication (2-color display)	—	—	—	3-wire (NPN)	—	—	—	F9NWV	F9NW	●	●	○	○	—
					F9PWV				F9PW	●	●	○	○		
					F9BWB				F9BW	●	●	○	○		
					—				—	—	—	—	—		

*Lead wire length symbols: 0.5m..... Nil (Example) F9N

3m..... L (Example) F9NL

5m..... Z (Example) F9NZ

*Auto switches marked with a "○" symbol are produced upon receipt of order.

Specifications



Series	MIW (Double finger)	MIS (Single finger)
Fluid	Air	
Operating pressure	0.2 to 0.7MPa	
Ambient temperature and fluid temperature	- 10 to 60°C	
Lubrication	Non-lube	
Action	Double acting	
Auto switch (optional) ^{Note)}	Solid state switch (3-wire, 2-wire)	
Stroke length tolerance	+1 0 mm	

Note) Refer to pages 14 through 18 for auto switch specification.

Options

Finger options	Standard, Tapped on upper and lower faces, Tapped on all faces (5 surfaces including end surface)
Stroke adjuster (Rear end stroke only)	MI□12: Arrangement range 6mm MI□20: Arrangement range 12mm
Scraper	Can be mounted on standard products

Theoretical Outputs

Unit: N

Bore size (mm)	Rod size (mm)	Operating direction	Piston area (mm ²)	Operating pressure MPa					
				0.2	0.3	0.4	0.5	0.6	0.7
12	6	OUT	113	23	34	45	57	68	79
		IN	85	17	26	34	43	51	60
20	10	OUT	314	63	94	126	157	188	220
		IN	236	47	71	94	118	142	165

Weights

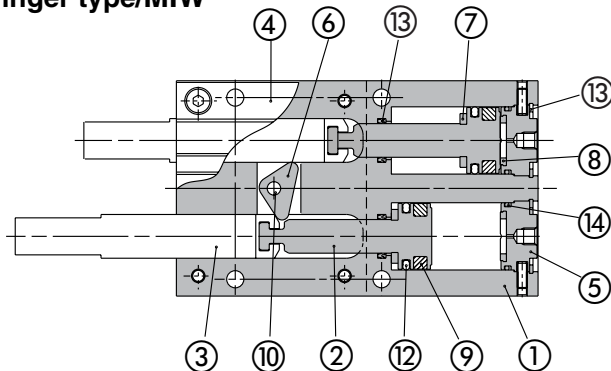
Unit: g

Model	Model	Stroke mm	Weight g	Increase by stroke adjuster	Increase by scraper
MIW	MIW12-12D	12	240	10	5
	MIW20-20D	20	650	30	10
MIS	MIS12-10D	10	130	5	3
	MIS12-20D	20	160		
	MIS12-30D	30	190		
	MIS20-10D	10	300	15	5
	MIS20-20D	20	355		
	MIS20-30D	30	410		

Series MIW/MIS

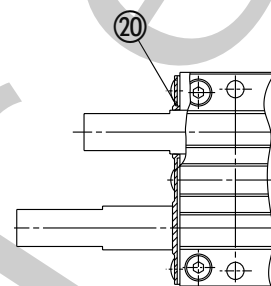
Construction

Double finger type/MIW

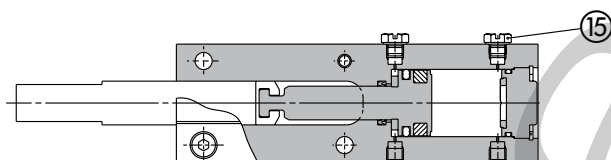


Option

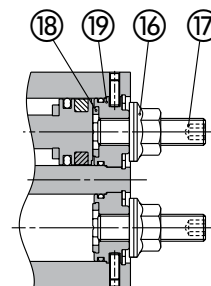
With scraper



Single finger type/MIS



With stroke adjuster



Parts list: Standard

No.	Description	Material	Note
1	Body	Aluminium alloy	Hard anodized
2	Piston	Stainless steel	
3	Finger	Carbon steel	Heat treatment/Special treatment
4	Cover	Aluminium alloy	Hard anodized
5	Cap	Aluminium alloy	White anodized
6	Cam	Stainless steel	Heat treatment, For MIW only
7	Bumper	Urethane rubber	
8	Head bumper	Urethane rubber	
9	Rubber magnet	Synthetic rubber	
10	Needle roller	High carbon chromium bearing steel	For MIW only
11	R shape snap ring	Carbon steel	
12	Piston seal	NBR	
13	Rod seal	NBR	
14	Gasket	NBR	Nickel plated
15	Plug		M-5P, For MIS only

Parts list: Option/With stroke adjuster

No.	Description	Material	Note
16	Hexagon nut with flange	Carbon steel	Nickel plated
17	Adjustment bolt	Carbon steel	Nickel plated
18	Adjustment bumper	Urethane rubber	
19	Adjustment cap	Aluminium alloy	Clear anodized

Parts list: option/With stroke scraper

No.	Description	Material	Note
20	Scraper	Stainless steel + NBR	

Replacement parts/MIW

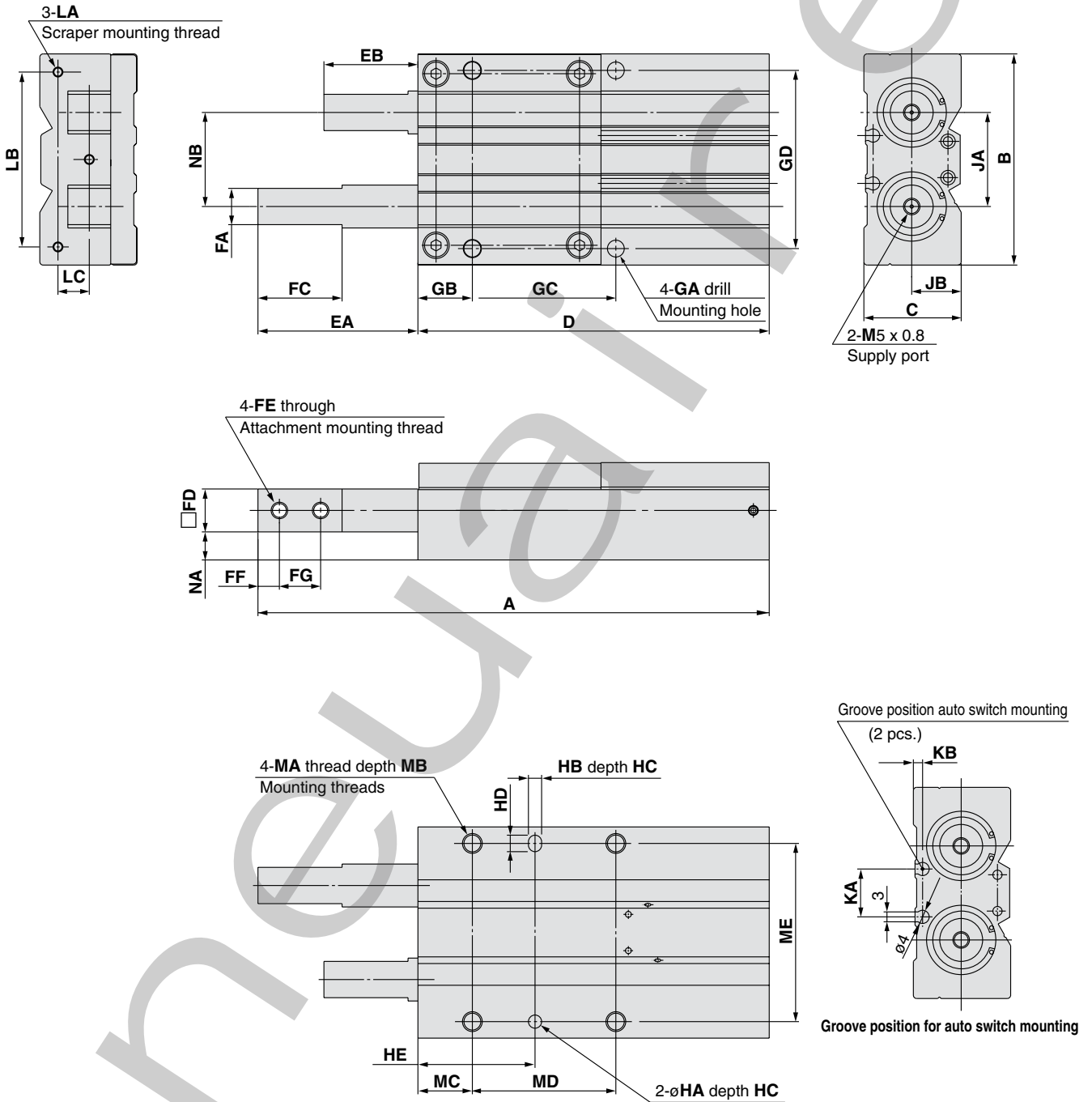
Description	Part no.		Kit components	
	MIW12-12D	MIW20-20D		
Finger	Standard	MI-A1201-12	MI-A2001-20	3
	Tapped on upper and lower faces	MI-A1202-12	MI-A2002-20	
	Tapped on all faces	MI-A1203-12	MI-A2003-20	
Seal kit (NBR)		MIW12-PS	MIW20-PS	12
				13
				14
Scraper assembly	MIW-A1204	MIW-A2004	20	
Grease pack	MH-G01 (contents quantity 30g)		—	

Replacement parts/MIS

Description	Order no.							Kit components	
	MIS12-10D	MIS12-20D	MIS12-30D	MIS20-10D	MIS20-20D	MIS20-30D			
Finger	Standard	MI-A1201-10	MI-A1201-20	MI-A1201-30	MI-A2001-10	MI-A2001-20	MI-A2001-30	3	
	Tapped on upper and lower faces	MI-A1202-10	MI-A1202-20	MI-A1202-30	MI-A2002-10	MI-A2002-20	MI-A2002-30		
	Tapped on all faces	MI-A1203-10	MI-A1203-20	MI-A1203-30	MI-A2003-10	MI-A2003-20	MI-A2003-30		
Seal kit (NBR)		MIS12-PS			MIS20-PS			12	
								13	
								14	
Scraper assembly		MIS-A1204			MIS-A2004			20	
Grease pack		MH-G01 (contents quantity 30g)							—

Dimensions

MIW□-□D

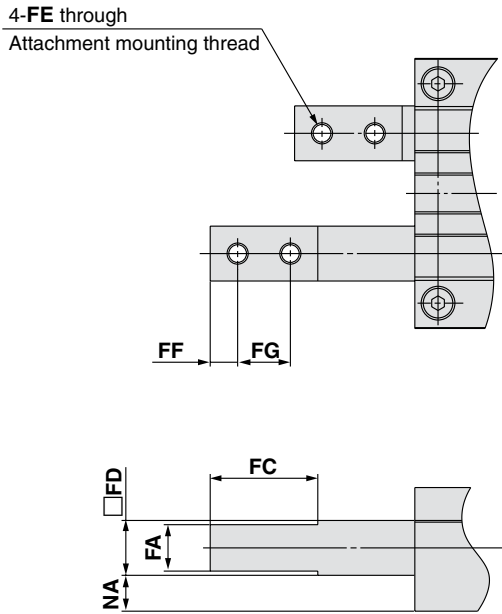


Model	A	B	C	D	EA	EB	FA	FB	FC	FD	FE	FF	FG	FH	GA	GB	GC	GD
MIW12-12	111	44	21	76	35	23	8	8	19	10	M3 x 0.5	4.5	9.5	6 (Effective depth 3)	3.3	12.5	34	37
MIW20-20	155	64	29.5	106.5	48.5	28.5	11	11	25.5	13	M5 x 0.8	6.5	12.5	10 (Effective depth 4)	5.1	16.5	43.5	54
Model	HA, HB	HC	HD	HE	JA	JB	KA	KB	LA	LB	LC	MA	MB	MC	MD	ME	NAB	NB
MIW12-12	2.5H9 ^{+0.025} ₀	4	3.5	25	19	11	7.6	2.2	M2.6x0.45	37	7.5	M4 x 0.7	6	12.5	34	37	6	19
MIW20-20	4H9 ^{+0.030} ₀	5	5	35.5	28.5	15	14.5	2.8	M3x0.5	53	9.5	M6 x 1	9	16.5	43.5	54	8.5	28.5

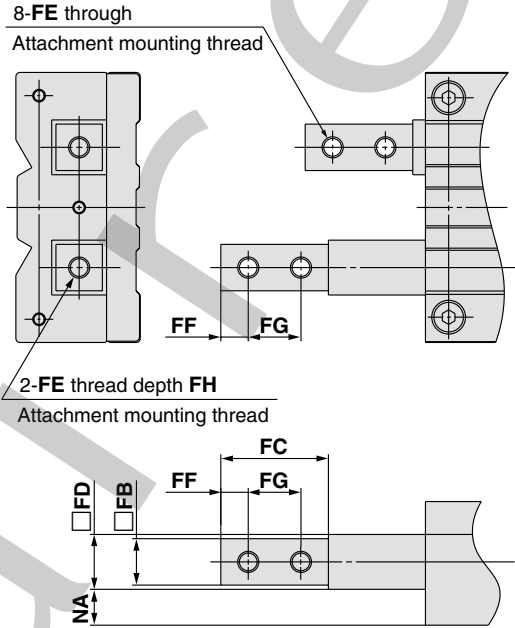
Series MIW/MIS

Finger options

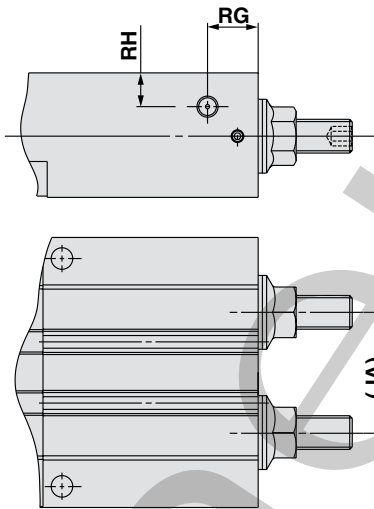
Tapped on upper and lower faces



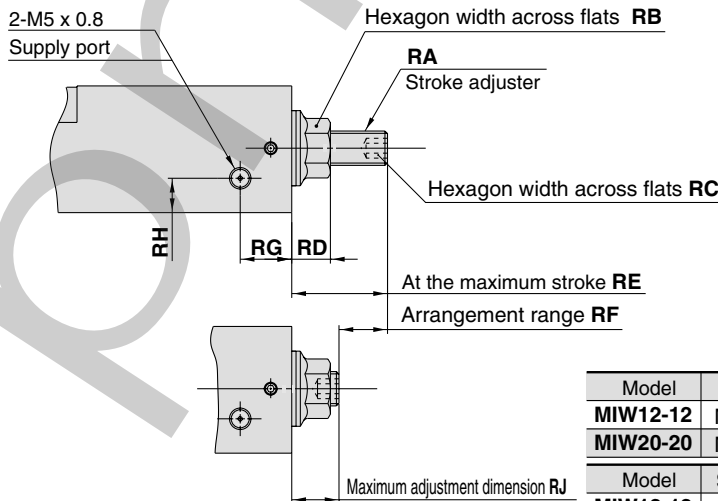
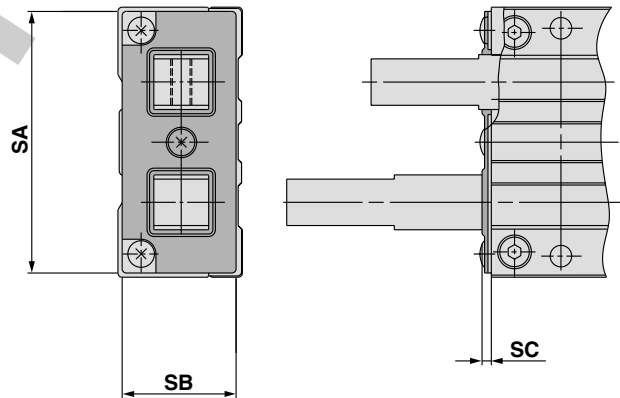
Tapped on all faces



Stroke adjuster



Scraper

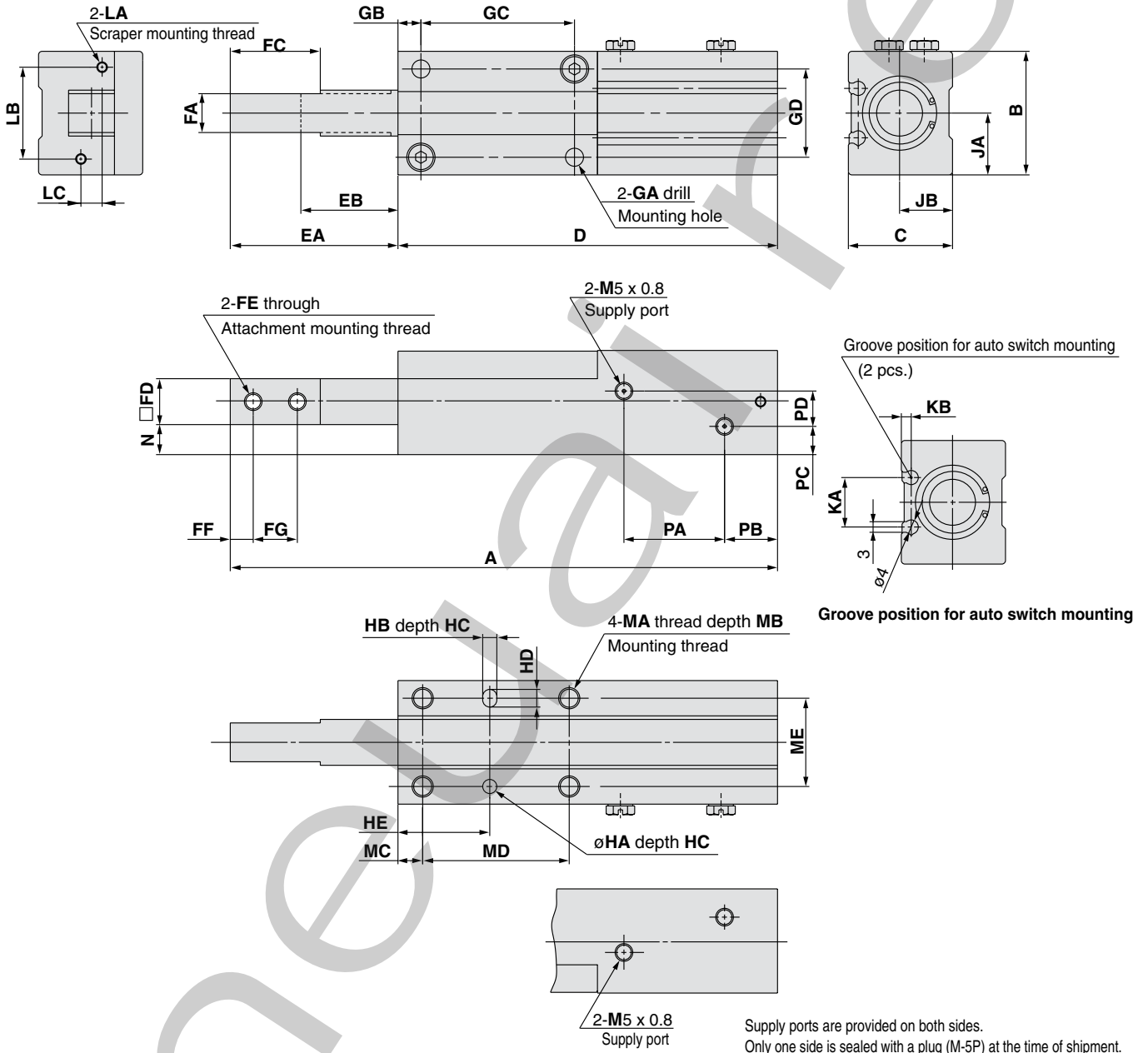


Model	RA	RB	RC	RD	RE	RF	RG	RH	RJ	
MIW12-12	M5 x 0.8	8	2.5	6	14	6	10	6	8	
MIW20-20	M8 x 1	12	4	9	22.5	12	12	8	10.5	
Model	SA	SB	SC							
MIW12-12	43	18.5	1.8							
MIW20-20	62	27	2.2							

Note) Observe the specified adjustment range when adjusting with a stroke adjuster.

Dimensions

MIS□-□D



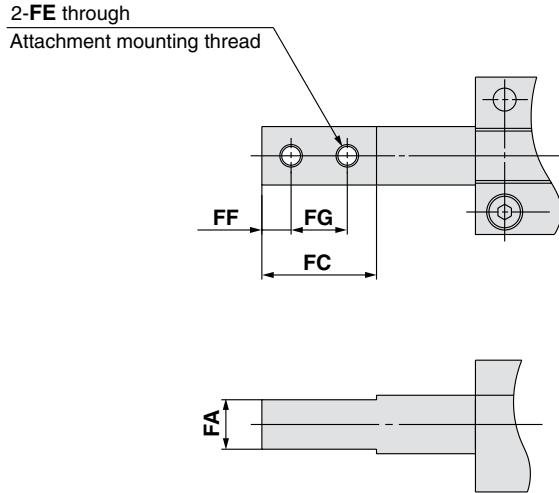
Model	A	B	C	D	EA	EB	FA	FB	FC	FD	FE	FF	FG	FH	GA	GB	GC	GD
MIS12-10	105			72	33													28
MIS12-20	135	26	21	92	43	23	8 ⁰ _{-0.1}	8 ⁰ _{-0.1}	19	10	M3 x 0.5	4.5	9.5	6 (Effective depth 3)	3.3	5	38	18
MIS12-30	165			112	53													48
MIS20-10	125			86.5	38.5													32
MIS20-20	155	35	29.5	106.5	48.5	28.5	11 ⁰ _{-0.1}	11 ⁰ _{-0.1}	25.5	13	M5 x 0.8	6.5	12.5	10 (Effective depth 4)	5.1	7	42	25
MIS20-30	185			126.5	58.5													52

Model	HA, HB	HC	HD	HE	JA	JB	KA	KB	LA	LB	LC	MA	MB	MC	MD	ME	N	PA	PB	PC	PD
MIS12-10															28			19			
MIS12-20	∅2.5H9 ^{+0.025} ₀	4	3.5	17.5	13	11	11.6	2.3	M2.6 x 0.45	19	4	M4 x 0.7	6	5	38	18	6	29	10	6	7
MIS12-30															48			39			
MIS20-10															32			20.5			
MIS20-20	∅4H9 ^{+0.030} ₀	5	5	26	17.5	15	14	2.8	M3 x 0.5	26	6	M6 x 1	9	7	42	25	8.5	30.5	12	8	10
MIS20-30															52			40.5			

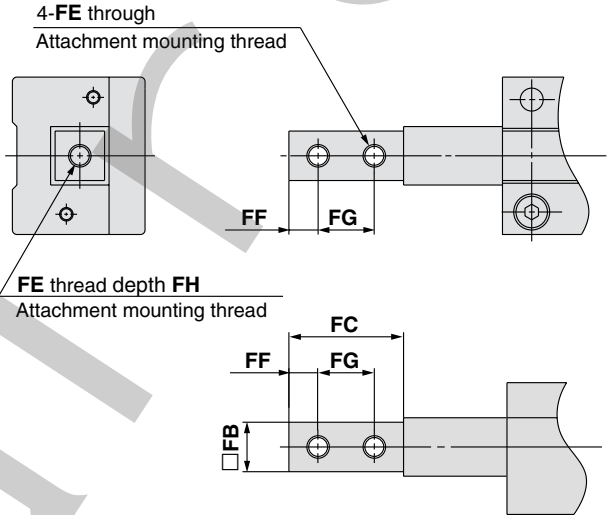
Series MIW/MIS

Finger options

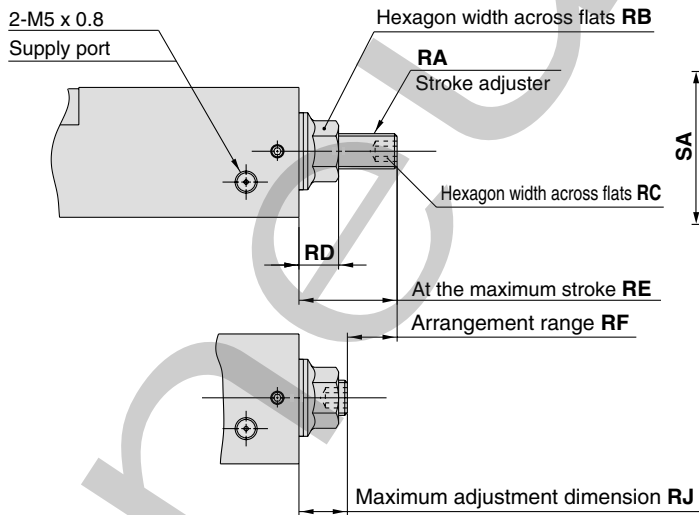
Tapped on upper and lower faces



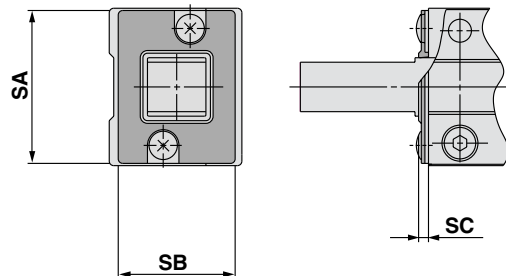
Tapped on all faces



With adjuster



With scraper



Note) Observe the specified adjustment range when adjusting with a stroke adjuster.

Model	RA	RB	RC	RD	RE	RF	RJ	SA	SB	SC
MIS12-10										
MIS12-20	M5 x 0.8	8	2.5	6	14	6	8	24	18	1.8
MIS12-30										
MIS20-10										
MIS20-20	M8 x 1	12	4	9	22.5	12	10.5	34	26	2.2
MIS20-30										

Series MIW/MIS

Auto Switch Mounting

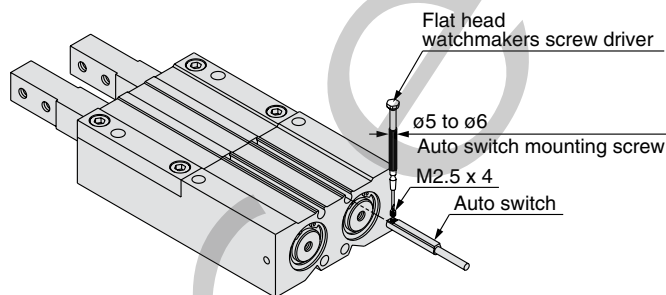
When mounting an auto switch, insert the switch in the switch mounting groove on the escapement from the bottom. Having set the mounting position, tighten the attached switch mounting screws with a flat head watchmakers screw driver.

*When adjusting the auto switch mounting screws, use a flat head watchmakers screw driver.

(This is to prevent fracture due to an excessive torque.)

The guideline of the tightening torque is 0.05 to 0.1Nm.

Turn another 90° from the position where tightening is felt by hand.



Proper mounting position for stroke end detection

Model	Electrical entry is in the → direction	Electrical entry is in the ← direction
F9□(V) F9□W(V)		
F8□		

(mm)

Model	Proper mounting position			Sensitivity range	Model	Proper mounting position			Sensitivity range
	D-F9□ D-F9□W	D-F9□V D-F9□WV	D-F8□			D-F9□ D-F9□W	D-F9□V D-F9□WV	D-F8□	
MIW12-12D	A	18.5	20.5	2.5	MIW20-20D	A	20.5	22.5	4
	B	31	33			B	41	43	
	C	6.5	4.5			C	8.5	6.5	
	D	—	17			D	—	27	
	E	6	4			E	4	2	
MIS12-10D	A	18.5	20.5		MIS20-10D	A	20.5	22.5	
	B	29	31			B	31	33	
	C	6.5	4.5			C	8.5	6.5	
	D	—	15			D	—	17	
	E	6	4			E	4	2	
MIS12-20D	A	18.5	20.5	MIS20-20D	A	20.5	22.5		
	B	39	41		B	41	43		
	C	6.5	4.5		C	8.5	6.5		
	D	—	15		D	—	27		
	E	6	4		E	4	2		
MIS12-30D	A	18.5	20.5	MIS20-30D	A	20.5	22.5		
	B	49	51		B	51	53		
	C	6.5	4.5		C	8.5	6.5		
	D	—	35		D	—	37		
	E	6	4		E	4	2		

Series MIW/MIS Auto Switch Common Specifications

Auto Switch Common Specifications

Type	Solid state switch
Operating time	1ms or less
Impact resistance	1000m/s ²
Insulation resistance	50MΩ or more at 500VDC (between lead wire and case)
Withstand voltage	1000VAC for 1min. (between lead wire and case)
Ambient temperature	-10 to 60°C
Enclosure	IEC529 standard IP67 JISC0920 watertight construction

Lead Wire Lengths

Lead wire length indication

(Example)

D-F9P **L**

• Lead wire length

Nil	0.5m
L	3m
Z	5m

- Note 1) Lead wire length Z: Auto switch applicable to 5m length
Solid state switches: All models produced upon receipt of order (standard procedure).
- Note 2) The water resistant 2-color solid state switch uses a 3 m lead wire as standard.
(0.5 m is not available.)
- Note 3) For solid state with flexible wire specification, add "-61" after the lead wire length.

(Example) D-F9PL-**61**

• Flexible specification

Lead Wire Color Changes

Lead wire colors of P/ATT auto switches have been changed as shown in the tables below starting from production in September 1996, in order to meet the IEC947-5-2 standard.

Take special care regarding wire polarity during the time when the old colors still coexist with the new colors.

2-wire

	Old	New
Output (+)	Red	Brown
Output (-)	Black	Blue

3-wire

	Old	New
Power supply +	Red	Brown
Power supply GND	Black	Blue
Output	White	Black

Solid state with diagnostic output

	Old	New
Power supply +	Red	Brown
Power supply GND	Black	Blue
Output	White	Black
Diagnostic output	Yellow	Orange

Solid state with latch type diagnostic output

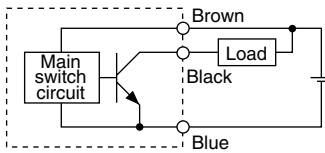
	Old	New
Power supply +	Red	Brown
Power supply GND	Black	Blue
Output	White	Black
Latch type diagnostic output	Yellow	Orange

Series MIW/MIS

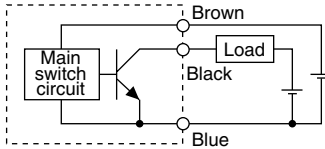
Auto Switch Connections and Examples

Basic Wiring

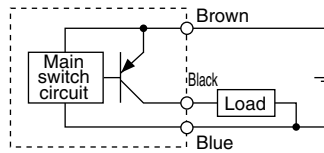
Solid state 3-wire, NPN



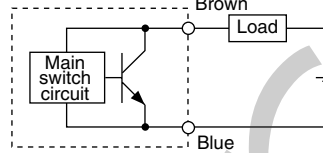
(Power supplies for switch and load are separate.)



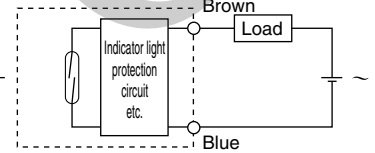
Solid state 3-wire, PNP



2-wire <Solid state>

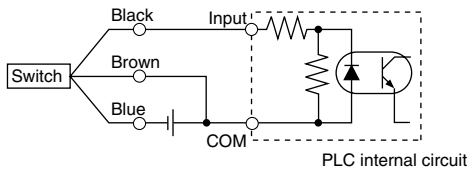


2-wire <Reed switch>

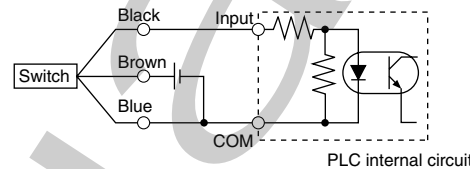


Examples of Connection to PLC

Sink input specification 3-wire, NPN

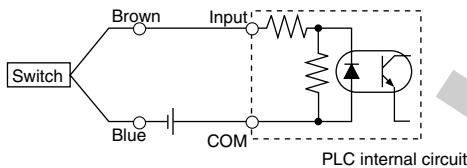


Source input specification 3-wire, PNP

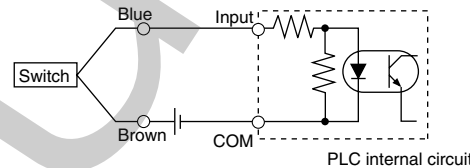


Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

2-wire

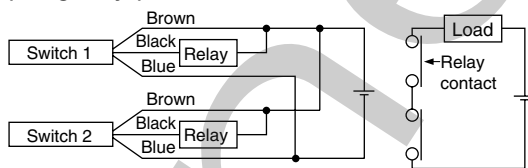


2-wire

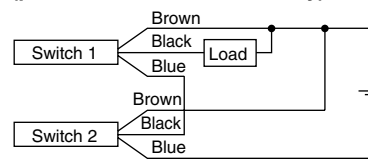


Connection Examples for AND (Series) OR (Parallel)

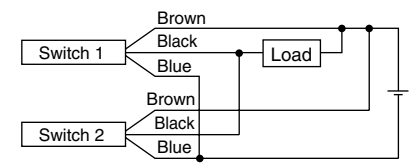
3-wire AND connection for NPN output (using relays)



AND connection for NPN output (performed with switches only)

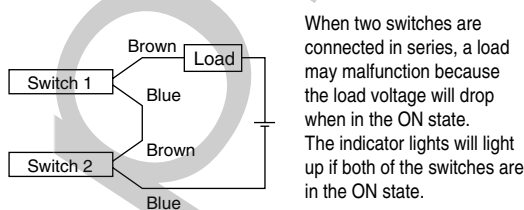


OR connection for NPN output



The indicator lights will light up when both switches are turned ON.

2-wire with 2 switch AND connection

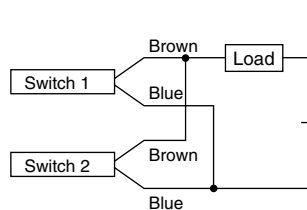


When two switches are connected in series, a load may malfunction because the load voltage will drop when in the ON state. The indicator lights will light up if both of the switches are in the ON state.

$$\begin{aligned} \text{Load voltage at ON} &= \text{Power supply voltage} - \text{Voltage drop} \times 2 \text{ pcs.} \\ &= 24\text{V} - 4\text{V} \times 2 \text{ pcs.} \\ &= 16\text{V} \end{aligned}$$

Example: Power supply is 24VDC
Voltage drop in switch is 4V

2-wire with 2 switch OR connection



<Solid state switch>

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

<Reed switch>

Because there is no current leakage, the load voltage will not increase when turned OFF. However, depending on the number of switches in the ON state, the indicator lights may sometimes get dark or not light up, because of dispersion and reduction of the current flowing to the switches.

$$\begin{aligned} \text{Load voltage at OFF} &= \text{Leakage current} \times 2 \text{ pcs.} \times \text{Load impedance} \\ &= 1\text{mA} \times 2 \text{ pcs.} \times 3\text{k}\Omega \\ &= 6\text{V} \end{aligned}$$

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

Solid State Switches/Direct Mount Type D-F8N, D-F8P, D-F8B

Grommet



⚠ Caution

Operation Instructions

Be sure to use the attached fixing screws to secure the auto switch.
Use of screws beyond the specified range can damage the switch.

Auto Switch Specifications

Auto switch part no.	D-F8N	D-F8P	D-F8B
Electrical entry direction	Perpendicular	Perpendicular	Perpendicular
Wiring type	3-wire		2-wire
Output type	NPN	PNP	—
Applicable load	IC circuit, 24VDC relay, PLC		24VDC relay, PLC
Power supply voltage	5, 12, 24VDC (4.5 to 28V)		—
Current consumption	10mA or less		—
Bad voltage	28VDC or less	—	24V DC (10 to 28V)
Bad current	40mA or less	80mA or less	2.5 to 40mA
Internal voltage drop	1.5V or less (0.8V or less at 10mA load current)	0.8V or less	4V or less
Leakage current	100μA or less at 24VDC		0.8mA or less at 24VDC
Indicator light	Red LED light when ON		

● Lead wire — Heavy duty oil resistant vinyl cord, $\phi 2.7$, 0.5m

D-F8N, D-F8P 0.15mm² x 3 wire (Brown, Black, Blue)

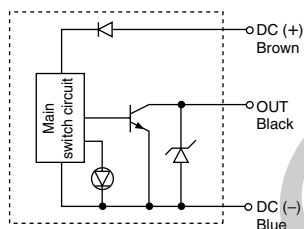
D-F8B 0.18mm² x 2 wire (Brown, Blue)

Note 1) Refer to page 14 for auto switch common specifications.

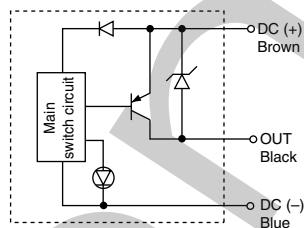
Note 2) Refer to page 14 for lead wire lengths.

Auto Switch Internal Circuits

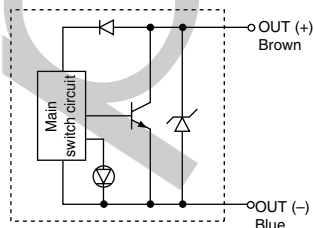
D-F8N



D-F8P



D-F8B



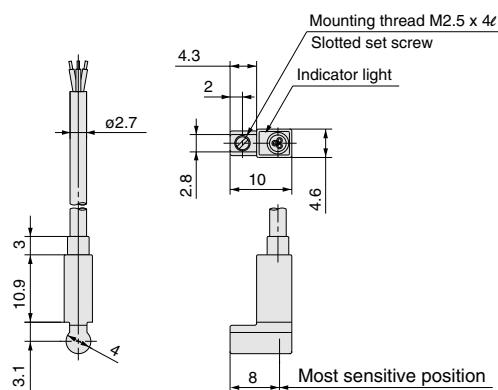
Auto Switch Weights

Unit: g

Model		D-F8N	D-F8P	D-F8B
Lead wire length (m)	0.5	7	7	7
	3	32	32	32
	5	52	52	52

Auto Switch Dimensions

D-F8N, D-F8P, D-F8B



Solid State Switches/Direct Mount Type D-F9N(V), D-F9P(V), D-F9B(V)

Grommet



⚠ Caution

Operation Instructions

Be sure to use the attached fixing screws to secure the auto switch.
Use of screws beyond the specified range can damage the switch.

Auto Switch Specifications

D-F9□, D-F9□V (with indicator light)						
Auto switch part no.	D-F9N	D-F9NV	D-F9P	D-F9PV	D-F9B	D-F9BV
Electrical direction	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Wiring type	3-wire				2-wire	
Output type	NPN		PNP		—	
Applicable load	IC circuit, Relay, PLC				DC24V relay, PLC	
Power supply voltage	5, 12, 24VDC (4.5 to 28V)				—	
Current consumption	10mA or less				—	
Load voltage	28VDC or less		—		24VDC (10 to 28V)	
Load current	40mA or less		80mA or less		5 to 40mA	
Internal voltage drop	1.5V or less (0.8V or less at 10mA load current)		0.8V or less		4V or less	
Leakage current	100μA or less at 24VDC				0.8mA or less	
Indicator light	Red LED lights when ON					

●Lead wire — Oil proof heavy duty vinyl cable, $\phi 2.7$, 3 cores (brown, black, blue), 0.15mm², 2 cores (brown, blue), 0.18mm², 0.5m

Note 1) Refer to page 14 for solid state switch common specifications.

Note 2) Refer to page 14 for lead wire lengths.

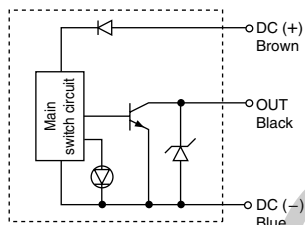
Auto Switch Weights

Unit: g

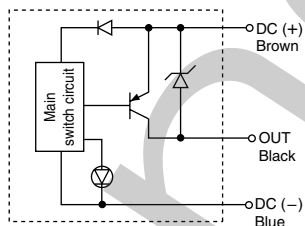
Model	D-F9N(V)	D-F9P(V)	D-F9B(V)	
Lead wire length (m)	0.5	7	7	6
	3	37	37	31
	5	61	61	51

Auto Switch Internal Circuits

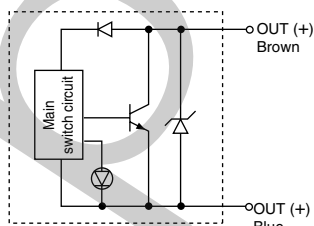
D-F9N, F9NV



D-F9P, F9PV

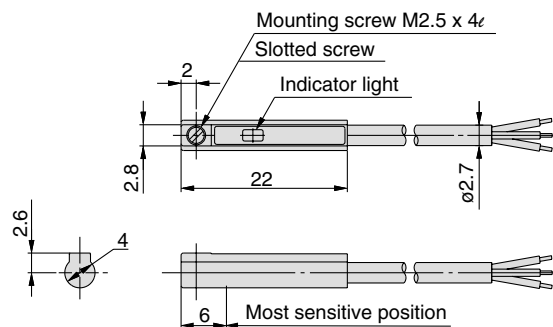


D-F9B, F9BV

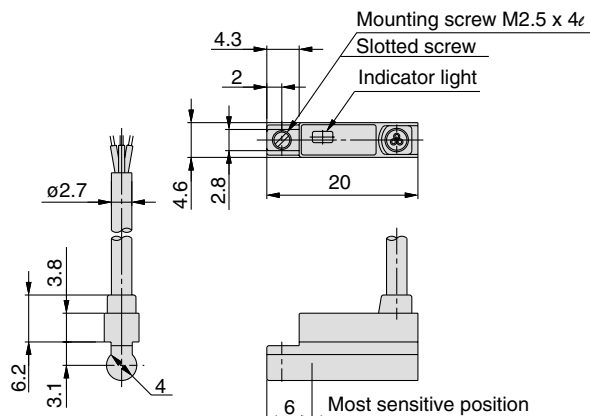


Auto Switch Dimensions

D-F9□



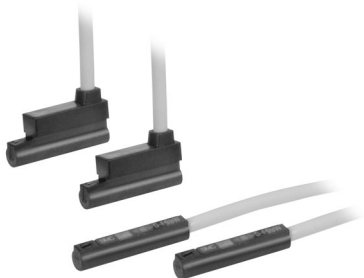
D-F9□V



2-Color Display Solid State Auto Switches/Direct Mount Type D-F9NW(V), D-F9PW(V), D-F9BW(V)

Auto Switch Specifications

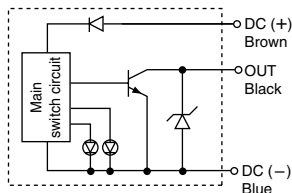
Grommet



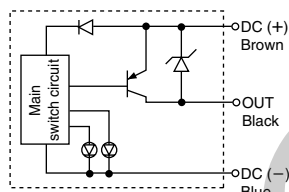
D-F9□W, D-F9□WV (with indicator light)						
Auto switch part no.	D-F9NW	D-F9NWV	D-F9PW	D-F9PWV	D-F9BW	D-F9BWV
Electrical entry direction	In-line	Perpendicular	In-line	Perpendicular	In-line	Perpendicular
Wiring type	3-wire			2-wire		
Output type	NPN		PNP		—	
Applicable load	IC circuit, Relay IC, PLC				24VDC, Relay, PLC	
Power supply voltage	5, 12, 24VDC (4.5 to 28V)					—
Current consumption	10mA or less					—
Load voltage	28VDC or less		—		24VDC (10 to 28V)	
Load current	40mA or less		80mA or less		5 to 40mA	
Internal voltage drop	1.5V or less (0.8V or less at 10mA load current)		0.8V or less		4V or less	
Leakage current	100μA or less at 24VDC				0.8mA or less	
Indicator light	Operating position Red LED lights up Optimum operating position Green LED lights up					

Auto Switch Internal Circuits

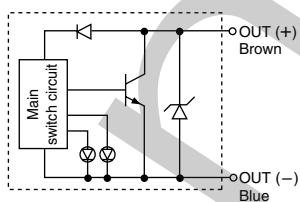
D-F9NW, F9NWV



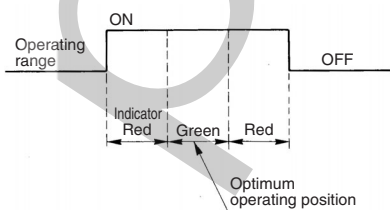
D-F9PW, F9PWV



D-F9BW, F9BWV



Indicator light/Display method



●Lead wire — Oil proof heavy duty vinyl cable, $\phi 2.7$, 3 cores (brown, black, blue), 0.15mm², 2 cores (brown, blue), 0.18mm², 0.5m

Note 1) Refer to page 14 for solid state switch common specifications.

Note 2) Refer to page 14 for lead wire length.

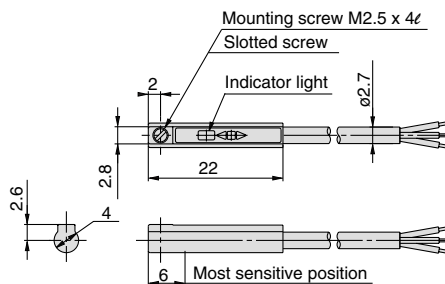
Auto Switch Weights

Unit : g

Model		D-F9NW(V)	D-F9PW(V)	D-F9BW(V)
Lead wire length (m)	0.5	7	7	7
	3	34	34	32
	5	56	56	52

Auto Switch Dimensions

D-F9□W



D-F9□WV

