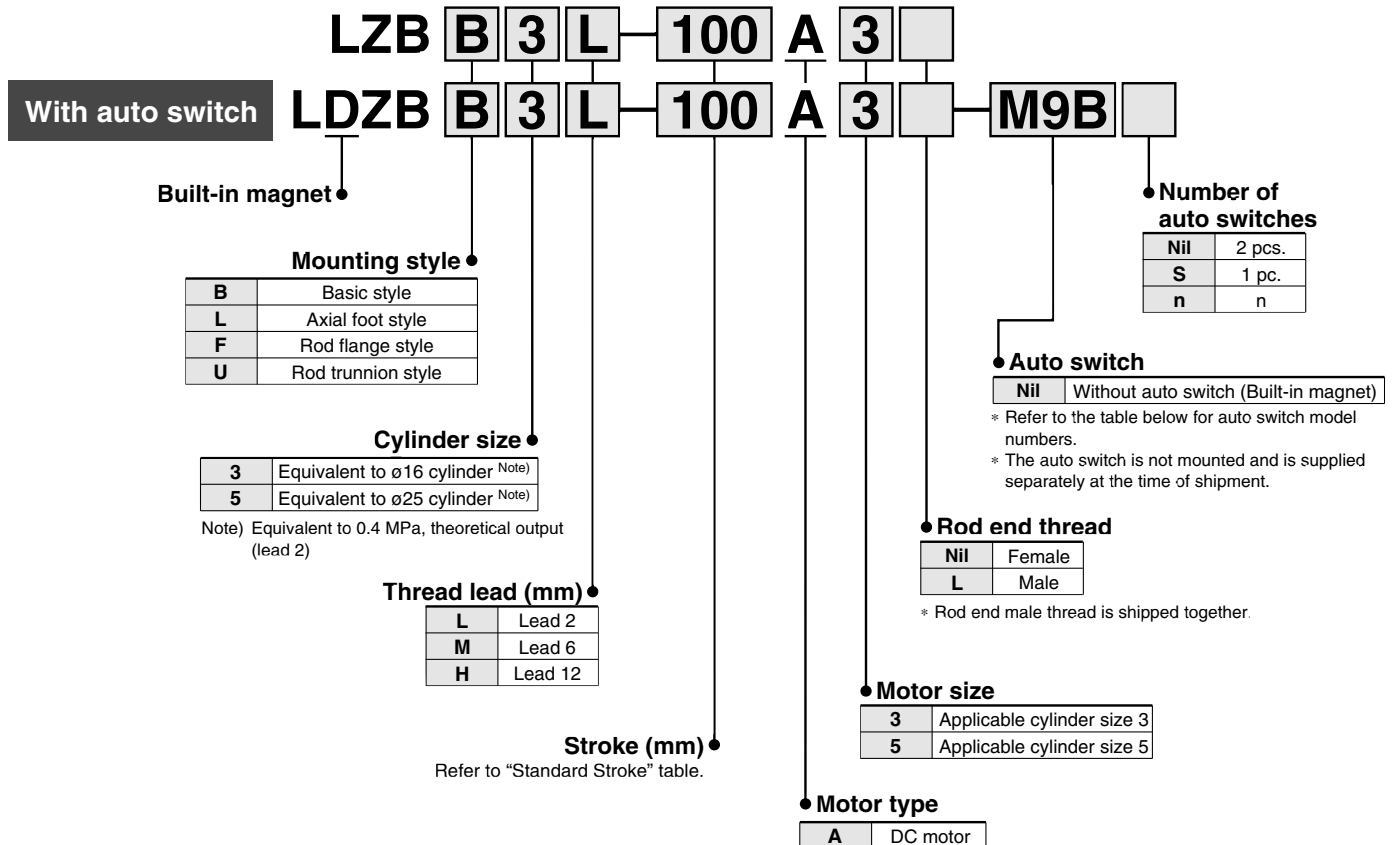


Electric Cylinder Series **LZB**



How to Order



Standard Stroke

Cylinder size	Standard stroke (mm) *
3, 5	25, 40, 50, 100, 200

* Other intermediate strokes can be manufactured upon receipt of order.

(Maximum manufacturable stroke: 200 mm)

Conditions for using a trunnion bracket are as follows:

- Maximum stroke: 150 mm
- Thread lead L (lead 2 mm) only

Applicable Auto Switches/For detailed auto switch specifications, refer to page 16 through to 18.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage		Auto switch model	Lead wire length (m) *			Pre-wired connector	Applicable load	
					DC	AC		0.5 (Nil)	3 (L)	5 (Z)		IC circuit	Relay PLC
Solid state switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V	M9N	●	●	○	○		
				3-wire (PNP)		12 V		●	●	○			
				2-wire		12 V		●	●	○			

* Lead wire length symbols: 0.5 m Nil (Example) M9N
3 m L M9NL
5 m Z M9NZ

* Solid state switches marked "○" are produced upon receipt of order.

Specifications



Model	L□ZB□3L	L□ZB□3M	L□ZB□3H	L□ZB□5L	L□ZB□5M	L□ZB□5H
Size	3 (Equivalent to ø16 cylinder) ^{Note 1)}			5 (Equivalent to ø25 cylinder) ^{Note 1)}		
Lead screw	Thread diameter					
	ø8			ø12		
	Lead (mm)					
	2	6	12	2	6	12
Rated speed with no load (mm/s)	33	100	200	33	100	200
Rated thrust (N)	80	43	24	196	117	72
Stroke (mm)	25, 40, 50, 100, 200					
Main body (kg)*	0.67 + (0.07/50 stroke)			1.74 + (0.16/50 stroke)		
Operating ambient temperature (°C)	5 to 40 (with no condensation)					
Tolerance of rod end thread	JIS class 2					
Allowable tolerance of stroke	+1 0					
Motor	DC motor					
Applicable directional control driver model	LC3F212-5A3□			LC3F212-5A5□		
Applicable auto switch model	D-M9N, M9P, M9B					

Note 1) Equivalent to 0.4 MPa, theoretical output (lead 2)

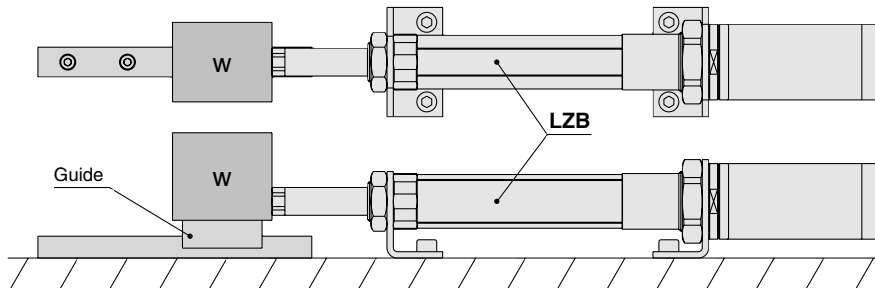
Note 2) In the table speeds are shown without a load, as rated speed, and thrusts are shown as rated thrust based on the pressure force.

Note 3) Speed will vary as they are affected by a load. Refer to page for model selection.

* Refer to page 13 for mounting bracket weight.

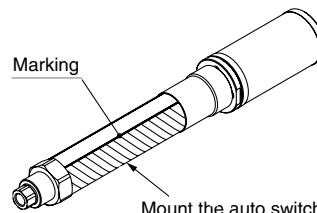
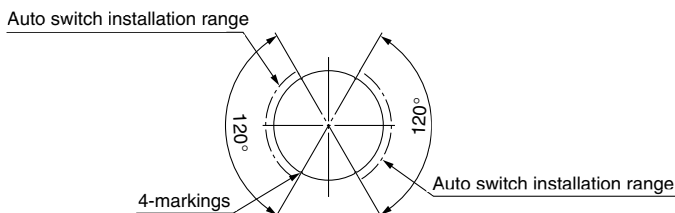
⚠ Specific Product Precautions

- 1 Do not apply any load to the rod end of the LZB series. When applying a load, use a guide to avoid the load from being applied to the rod end.



2 Auto switch mounting

There are 4 markings on the outside surface of the cylinder tube, indicating the auto switch installation range. Mount the auto switches within the range shown below.

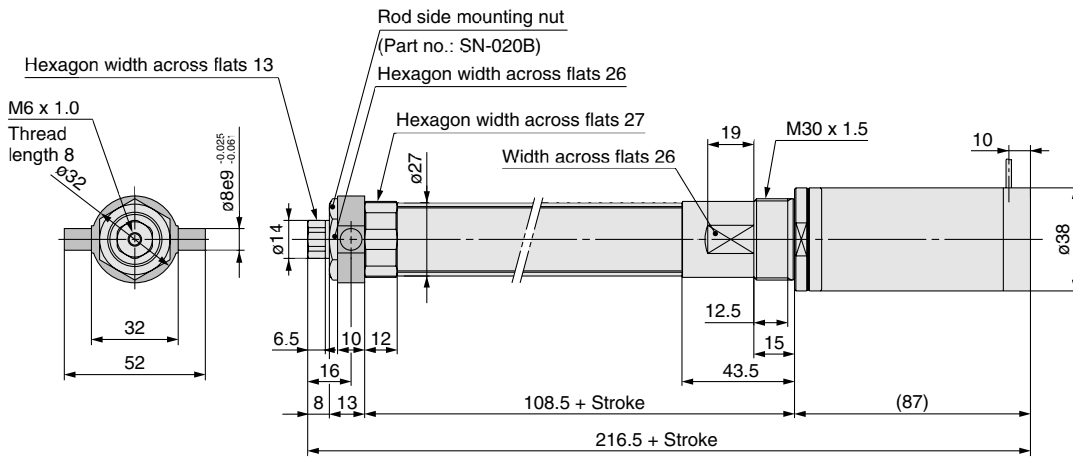


Mount the auto switch within the installation range (shadow portion). Otherwise, the auto switch may not activate.

* Refer to page 15 for information on mounting an auto switch.

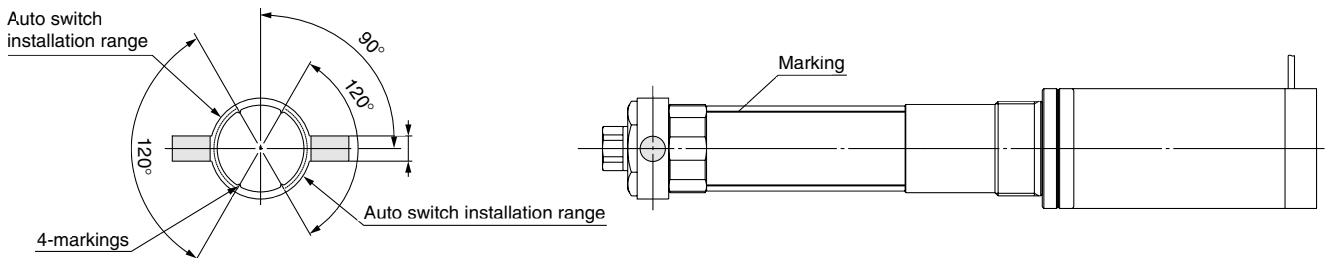
Dimensions

Rod trunnion style/L(D)ZBU3□



⚠ Caution for using a trunnion bracket

In the event of mounting a trunnion bracket, fix it to the position illustrated below before using



* Conditions for using a trunnion bracket are as follows:

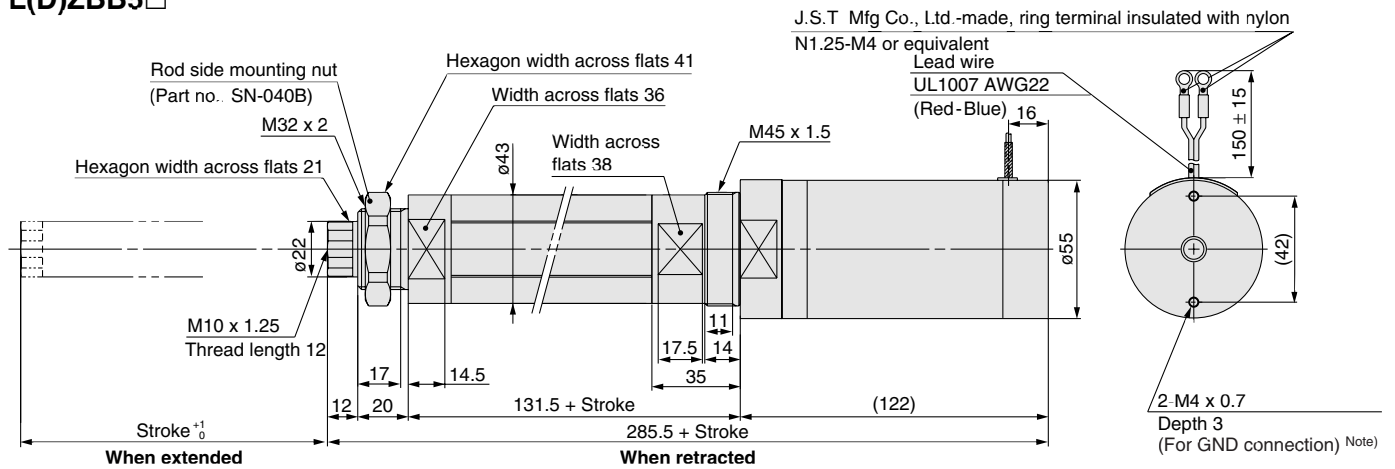
- Maximum stroke: 150 mm
- Thread lead L (lead 2 mm) only

Series LZB

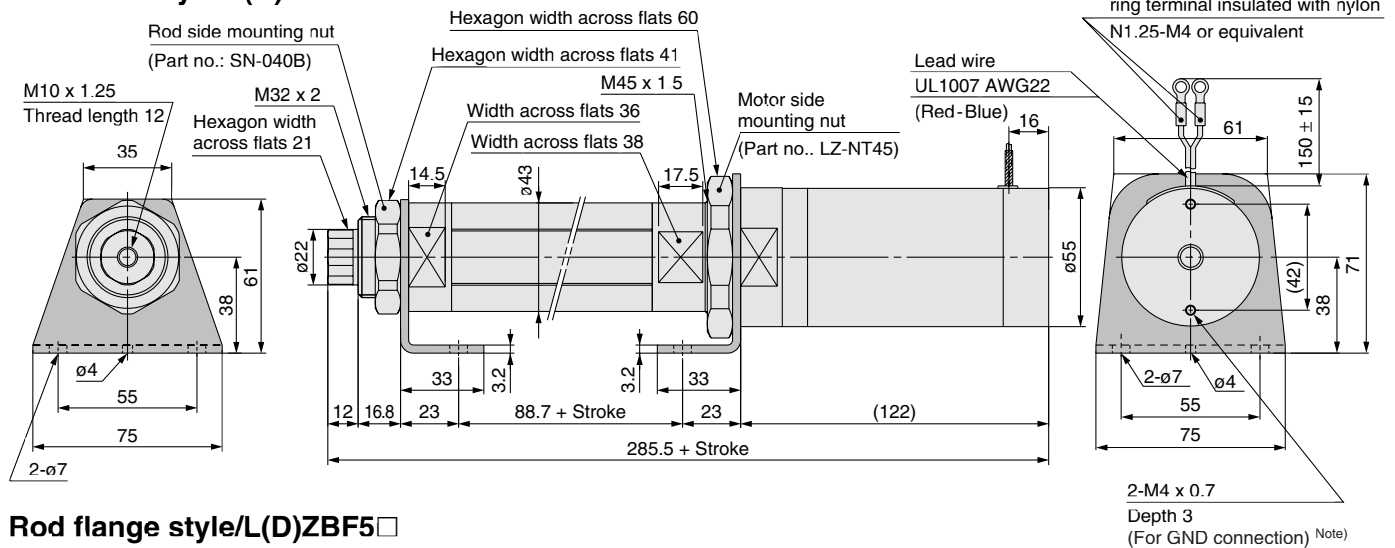
Dimensions Note) Grounding must be performed. For details, refer to the back of page 2.

L(D)ZBB5□

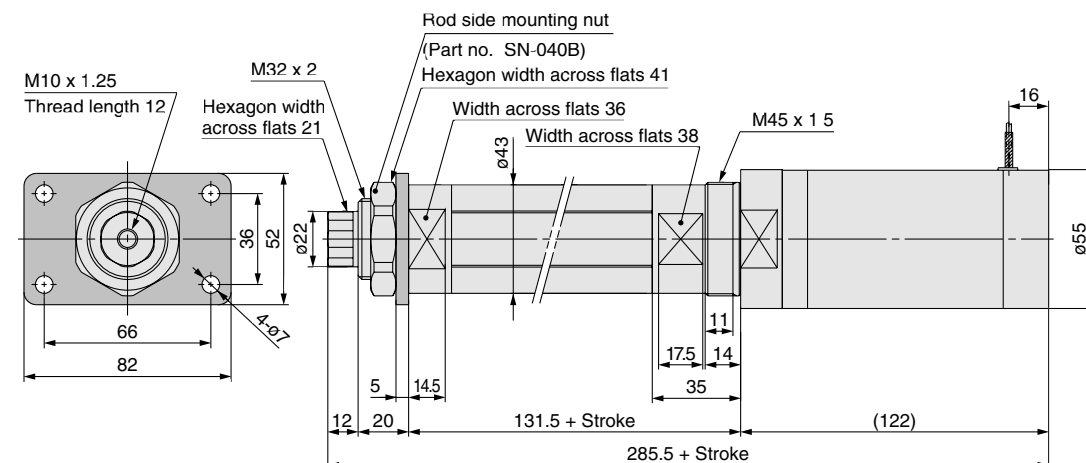
* The electrical entry direction is different depending on a product.



Axial foot style/L(D)ZBL5□

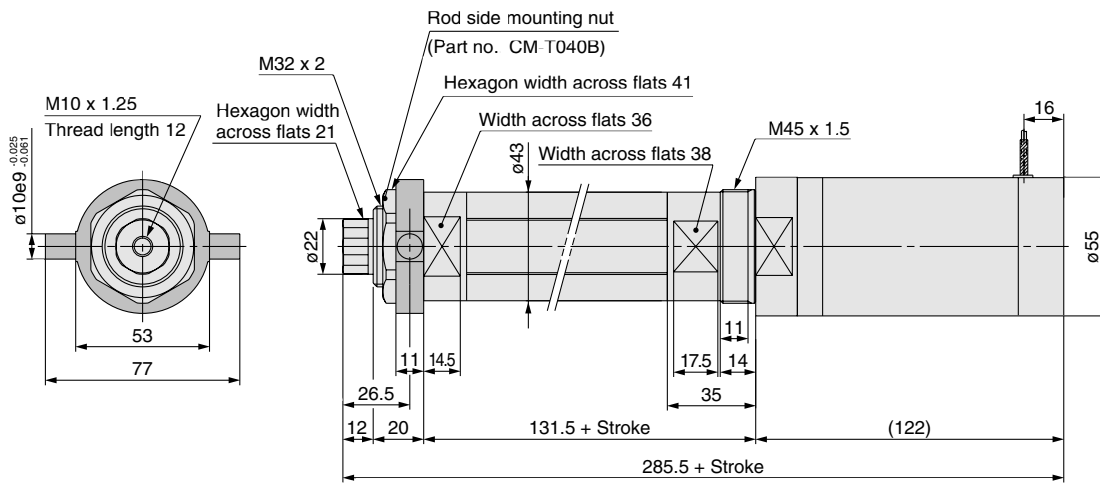


Rod flange style/L(D)ZBF5□



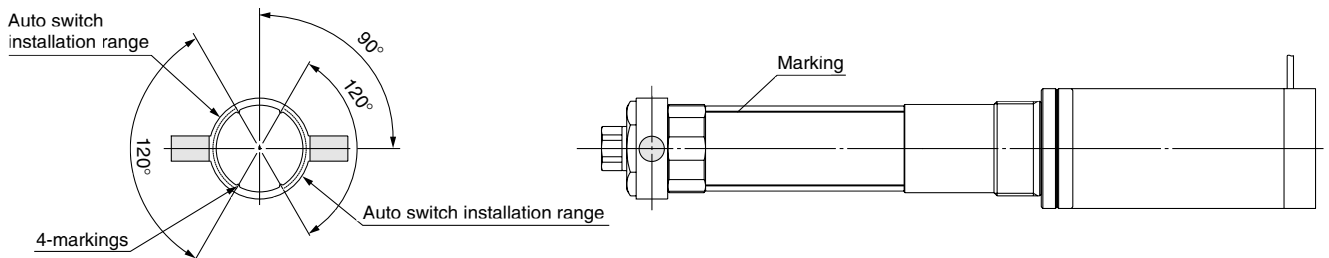
Dimensions

Rod trunnion style/L(D)ZBU5□



⚠ Caution for using a trunnion bracket

In the event of mounting a trunnion bracket, fix it to the position illustrated below before using



* Conditions for using a trunnion bracket are as follows:

- Maximum stroke: 150 mm
- Thread lead L (lead 2 mm) only

Series LZB/LZC

LZB/C Vertical Application Specifications

Some of the LZ series can be used in vertical applications.
However, please check before using vertically.

Never apply a force exceeding the prescribed force.

When a force exceeding the transfer thrust is applied, the cylinder and directional control driver (LC3F2) may be damaged.

Model which can be used vertically

- L(D)ZB□3L-□A3□-□□
- L(D)ZC□3L-□A3□□-□□
- L(D)ZB□5L-□A5□-□□
- L(D)ZC□5L-□A5□□-□□

Specifications

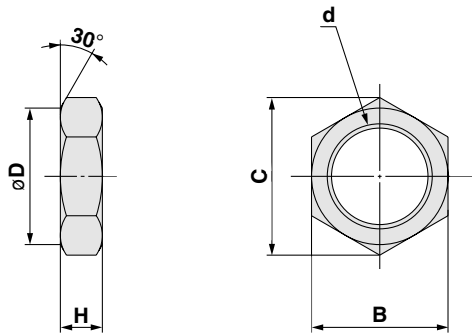
Model	L(D)ZB□3L	L(D)ZC□3L	L(D)ZB□5L	L(D)ZC□5L
Speed (mm/s)	P.1 Refer to the graph on speed – thrust.			
Transfer thrust (Vertically) (N)	40		100	
Holding force* (N)	40		100	
Standard stroke (mm)	25, 40, 50, 100, 200			
Operating ambient temperature (°C)	5 to 40 (with no condensation)			
Motor	DC motor			
Applicable directional control driver model	LC3F212-5A3□		LC3F212-5A5□	
Applicable auto switch model	D-M9N, D-M9P, D-M9B			

* Holding force

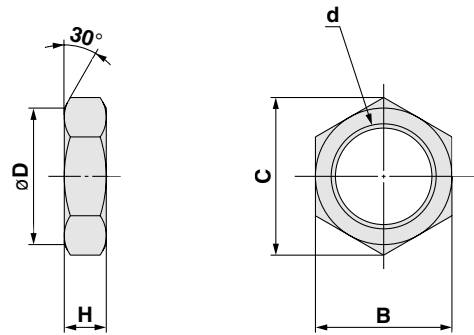
Holding force means the force which cannot be dropped even if a load should be applied vertically when a cylinder is stopped.
Therefore, for example, holding is not possible when turning off the power supply once a cylinder has been activated.
Additionally, a load may be dropped due to external impacts or vibrations.

Accessory Bracket

Mounting nut



Rod end nut



(mm)							
Name	Part no.	Applicable series	B	C	D	d	H
Rod side mounting nut	SN-020B	LZB3	26	30	25.5	M20 x 1.5	^c
Motor side mounting nut	LZ-NT30	LZB3	38	42	38	M30 x 1.5	10
Rod side mounting nut	SN-040B	LZB5	41	47.3	40.5	M32 x 2.0	1 ^c
Motor side mounting nut	LZ-NT45	LZB5	60	64	60	M45 x 1.5	10

(mm)						
Part no.	Applicable series	B	C	D	d	H
NT-015A	LZ□3	10	11.5	9.8	M6 x 1.0	^F
NT-03	LZ□5	17	19.6	16.5	M10 x 1.25	6

Mounting Bracket/Part No.

Series	LZB3	LZB5
Rod side foot	LZB-LR3 (64 g)	LZB-LR5 (112 g)
Motor side foot	LZB-LM3 (64 g)	LZB-LM5 (126 g)
Flange	LZB-F3 (40 g)	LZB-F5 (120 g)
Rod side trunnion	CM-T020B (40 g)	CM-T040B (100 g)

(): Weight for bracket

Series	LZC3	LZC5
Rod side foot	LZC-LR3 (21 g)	LZC-LR5 (71 g)
Motor side foot	LZC-LM3 (10 g)	LZC-LM5 (27 g)

(): Weight for bracket

Note) Bolt needs to be supplied by customer.

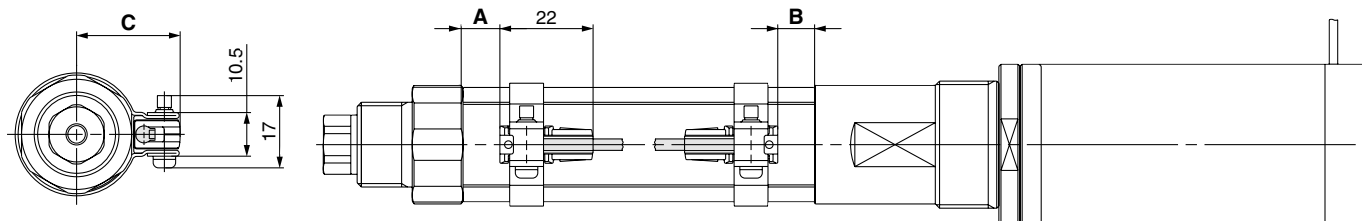
Series LZB/LZC

Auto Switch Proper Mounting Position for Stroke End Detection and Mounting Height

Solid state auto switch

D-M9□

LDZB



Auto Switch Mounting Position/Height

Model	A	B	C
LDZB□3	20	19	24
LDZB□5	33	33	32

Operating Range of Auto Switch *

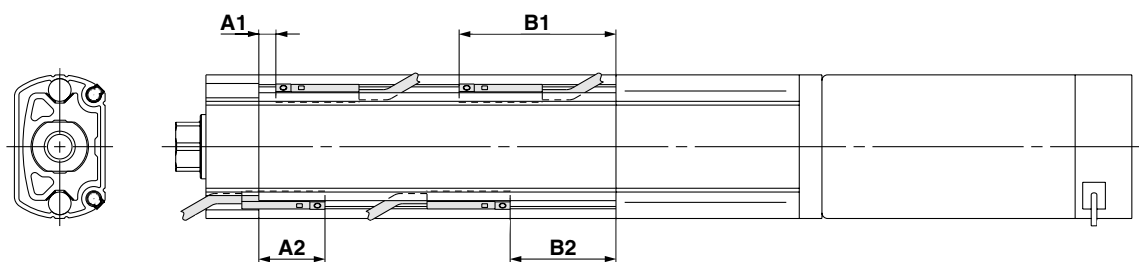
Model	A
LDZB□3	3
LDZB□5	5

* The operating range is a guide including hysteresis, but is not guaranteed. There may be substantial variation depending on the surrounding environment (assuming approximately ±30% dispersion).

Minimum Stroke for Auto Switch Mounting

Model	1 pc.	2 pcs. (Different sides)	2 pcs. (Same sides)
LDZB□3	10	15	45
LDZB□5	10	15	45

LDZC



Auto Switch Mounting Position for Stroke End Detection

Model	A1	A2	B1	B2
LDZC□3	4.5	17.5	41.5	28
LDZC□5	7	57	20	44

Operating Range of Auto Switch *

Model	A
LDZC□3	2
LDZC□5	2

* The operating range is a guide including hysteresis, but is not guaranteed. There may be substantial variation depending on the surrounding environment (assuming approximately ±30% dispersion).

Minimum Stroke for Auto Switch Mounting

Model	1 pc.	2 pcs.
LDZC□3	5	10
LDZC□5	5	10

Mounting and Moving Auto Switches (Series LDZB Only)

Mounting the Auto Switch

1. Attach a switch bracket to the switch holder.
(Fit the switch bracket to the switch holder.)
2. Mount an auto switch mounting band to the cylinder tube.
3. Set the switch holder ① between the reinforcing plates of the band mounted to the cylinder.
4. Insert a switch mounting screw in the hole of the reinforcing plate through the switch holder, and thread it into the other plate. Tighten the screw temporarily.
5. Remove the set screw attached to the auto switch.
6. Attach a switch spacer to the auto switch.
7. Insert the auto switch with the switch spacer from the back of the switch holder.
(Insert the auto switch with an angle of approximately 10 to 15°. See figure 1.)
8. To secure the auto switch, tighten the switch mounting screw with the specified torque (0.8 N·m to 1.0 N·m).

Adjusting the Switch Position

1. Unloosen the switch mounting screw 3 turns to adjust the switch set position.
2. Tighten the screw as described above (8.) after adjustment.

Removing the Auto Switch

1. Remove the switch mounting screw from the switch holder.
2. Move the switch back towards the position where it stops at the lead wire side.
3. Hold up the lead wire side of the switch at the angle of around 45°.
4. Maintain the angle, and pull back the switch obliquely at the same angle.

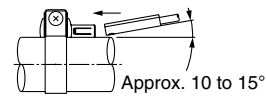
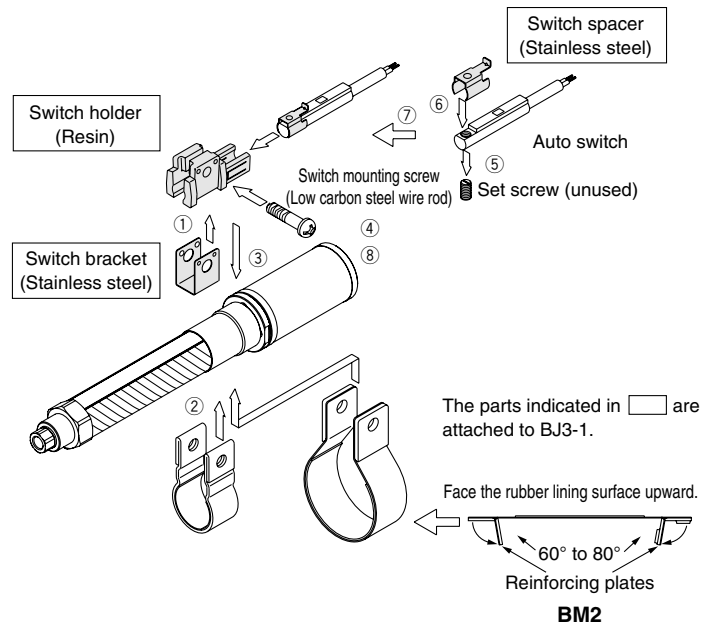


Figure 1. Switch insert angle



Auto Switch Mounting Bracket/Part No.

Applicable series	Mounting bracket	Mounting band
LDZB□3	BJ3-1	BM2-025
LDZB□5	(Switch holder Switch spacer Switch bracket)	L1ZB45-0318

Order one mounting bracket and one mounting band per one switch.

⚠ Specific Product Precautions

Be sure to read before handling. Refer to “SMC Best Pneumatics 2004” catalog Vol. 6/7/8/9/10/11/12 for Safety Instructions and Auto Switches Precautions.

⚠ Caution

1. **Mount the auto switches at the center of the operating range.**
Check ON and OFF points before setting auto switches so that positions can be detected at the center of the operating range.
If mounted at the end of the operating range, the signal detection will be unstable.
2. **Be aware of the environment temperature and thermal cycle.**
Operate auto switches and auto switch cylinders within the operating temperature range.
The reliability of the auto switches may be adversely affected, especially, when they are exposed to thermal shock, severe temperature and humidity cycle etc.
3. **Be aware of the suitability of oil, chemicals etc.**
Resin and rubber materials are used for the auto switches and switch mounting brackets. Therefore, if there are chemicals such as oil or organic solvents in the environment, the resin and rubber materials may be adversely affected.

4. **During maintenance, securely tighten the switch mounting screws periodically.**
Use switch mounting brackets with the proper tightening torque. In addition, securely tighten the switch mounting screws periodically.
5. **Be careful not to pull or strain the lead wires.**
Be careful not to apply excess tensile force (over 10 N) to the auto switches. Also, adjust the position of the auto switches by sufficiently loosening the screws (3 turns or more).
6. **Do not use the auto switches in environments with strong vibration and impact.**
Do not use the auto switches in environments where excess vibration and impact force outside of the specifications are applied.
7. **Be sure to use a switch spacer and a switch bracket.**
Confirm that a switch spacer is mounted to the end of the auto switch before fastening the auto switch. If the switch bracket is not mounted, the auto switch may move after installation.

Series LZB/LZC

Auto Switch Specifications

Auto Switch Common 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

Lead Wire Length

Lead wire length indication

(Example) D-M9P **L**

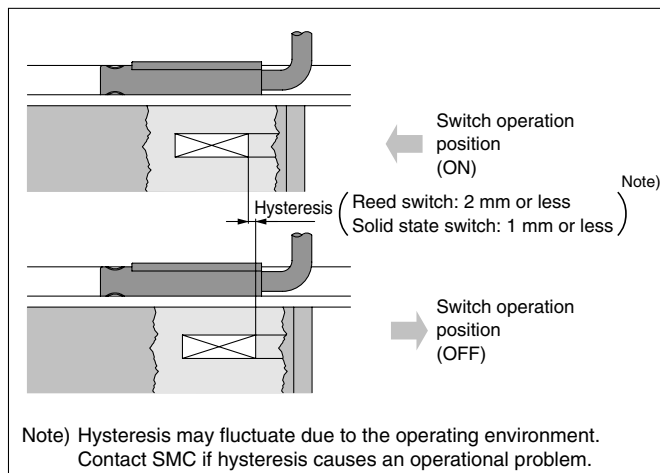
Lead wire length

Nil	0.5 m
L	3 m
Z	5 m

Note 1) Applicable auto switch with 5 m lead wire "Z"
Solid state switch. Manufactured upon receipt of order as standard.

Auto Switch Hysteresis

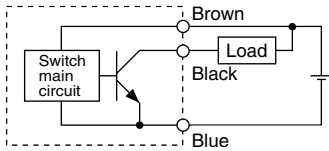
The hysteresis is the difference between the position of the auto switch as it turns "on" and as it turns "off". A part of operating range (one side) includes this hysteresis.



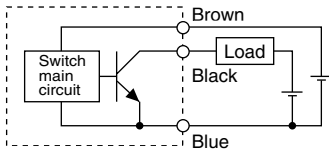
Series LZB/LZC Auto Switch Connections and Examples

Basic Wiring

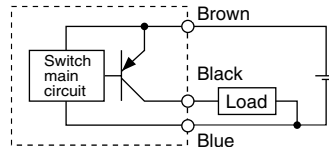
Solid state 3-wire, NPN



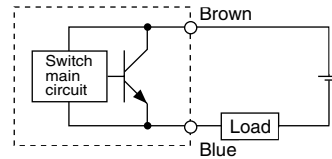
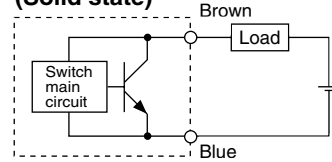
(Power supplies for switch and load are separate.)



Solid state 3-wire, PNP

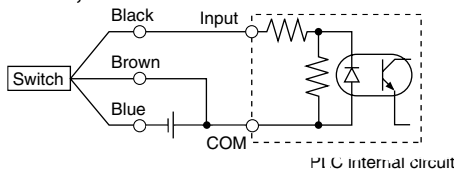


2-wire (Solid state)

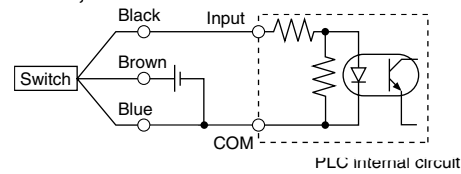


Example of Connection to PLC (Programmable Logic Controller)

• Sink input specifications 3-wire, NPN

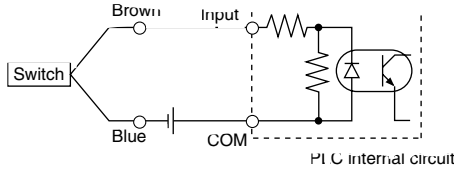


• Source input specifications 3-wire, PNP

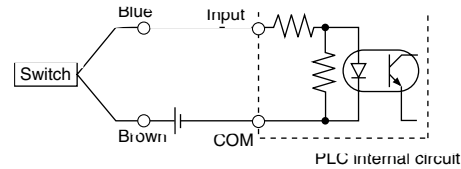


Connect according to the applicable PLC input specifications, as the connection method will vary depending on the PLC input specifications.

2-wire



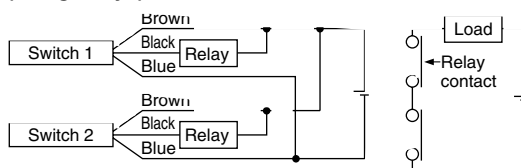
2-wire



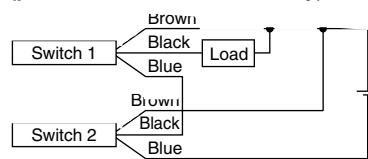
Example of AND (Serial) and OR (Parallel) Connection

• 3-wire

AND connection for NPN output (using relays)

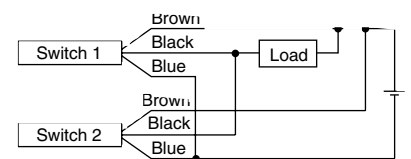


AND connection for NPN output (performed with switches only)

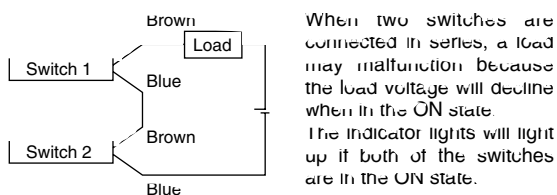


The indicator lights will light up when both switches are turned ON.

OR connection for NPN output



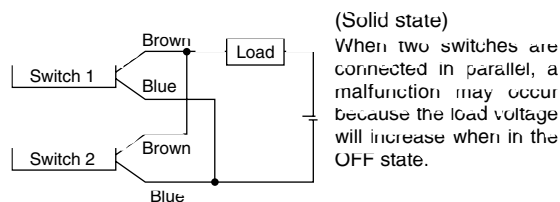
2-wire with 2-switch AND connection



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

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

2-wire with 2-switch OR connection



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

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

Solid State Switch: Direct Mounting Style D-M9N/D-M9P/D-M9B



For details about certified products conforming to international standards, visit us at www.smcworld.com.

Auto Switch Specifications

PLC: Programmable Logic Controller

D-M9□ (With indicator light)			
Auto switch part no.	D-M9N	D-M9P	D-M9B
Electrical entry direction	In-line		
Wiring type	3-wire		2-wire
Output type	NPN	PNP	—
Applicable load	IC circuit, Relay, 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 VDC		0.8 mA or less
Indicator light	Red LED illuminates when ON.		

Grommet

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



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.

Lead wires

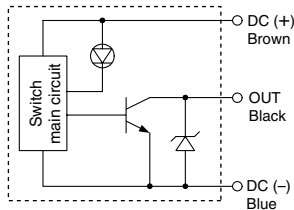
- Oilproof heavy duty vinyl cable: $\varnothing 2.7 \times 3.2$ ellipse, 0.15 mm²,
D-M9B 0.15 mm² x 2 cores
D-M9N, D-M9P 0.15 mm² x 3 cores

Note 1) Refer to page 16 for solid state switch common specifications.

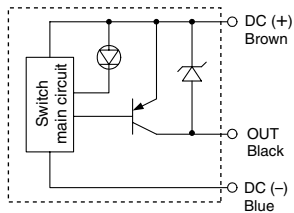
Note 2) Refer to page 16 for lead wire lengths.

Auto Switch Internal Circuit

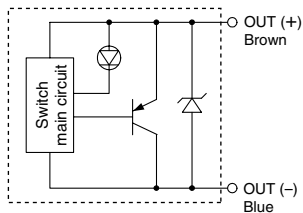
D-M9N



D-M9P



D-M9B



Weight

Unit: g

Auto switch part no.	D-M9N	D-M9P	D-M9B	
Lead wire length (m)	0.5	8	8	7
	3	41	41	38
	5	68	68	63

Dimensions

Unit: mm

D M9□

