

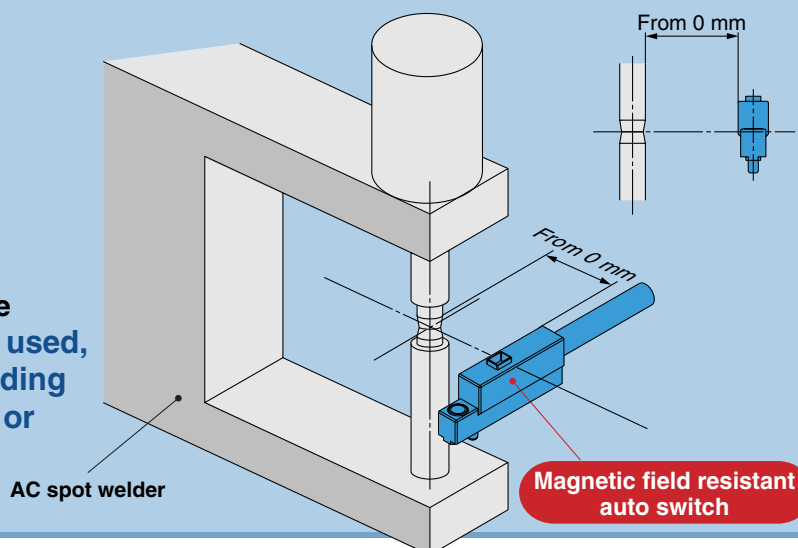
Magnetic Field Resistant 2-Color Display Solid State Auto Switch



It is possible to use in an environment which generates a magnetic field disturbance (AC magnetic field).

For use with
AC spot welders,
which generate strong
magnetic field.

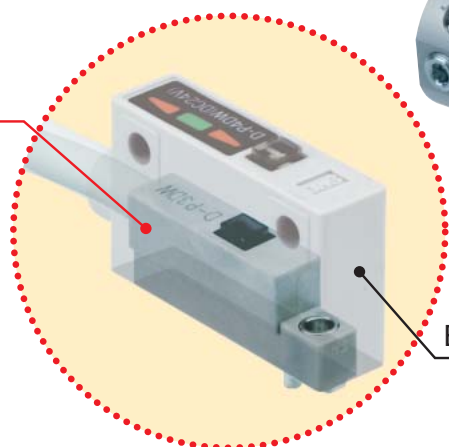
If the current of the AC welding machine is 16000 A or lower, the switch can be used, even if the distance between the welding conductor and the cylinder/actuator or auto switch is 0 mm.



Volume is reduced by **70%** (compared to existing switches)



D-P3DW



■ **RoHS compliant**

Can be mounted on **bore size**
ø25 or ø32 cylinder/actuator.

Miniaturization of the auto switch has made it possible to mount onto cylinders/actuators with small bore sizes (ø25 and ø32).



Series D-P3DW □

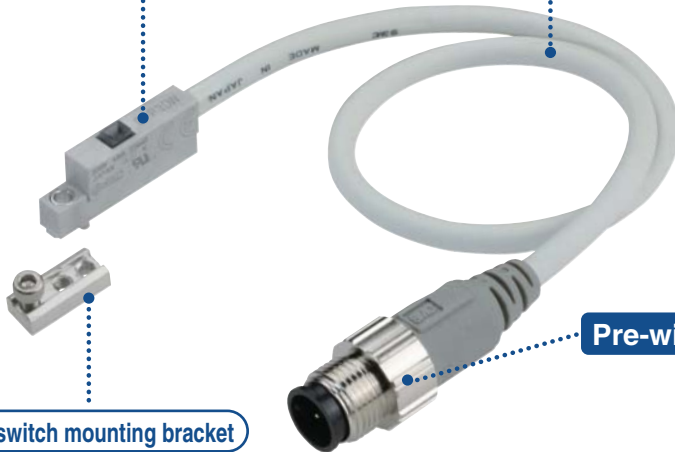


CAT.ES20-201A

When the AC welding current is 16000 A or less, the operational distance between the welding conductor and the cylinder/actuator or auto switch can be 0 mm.

2-color display solid state auto switch

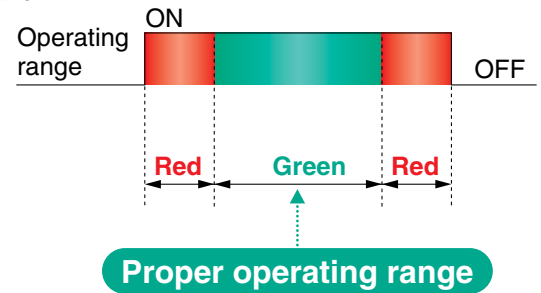
Use of Spatter proof flame resistant cable



Auto switch mounting bracket

Pre-wired connector (M12) Standard

Mounting position can be easily adjusted with 2-color indication.



Non-polar type, with Short-circuit protection

Improved maintenance ability

As an auto switch mounting bracket is fixed on the cylinder/actuator side, the position does not need to be readjusted when the auto switch is replaced.

Auto switch mounting bracket Fixed on the cylinder

Only the auto switch can be replaced.

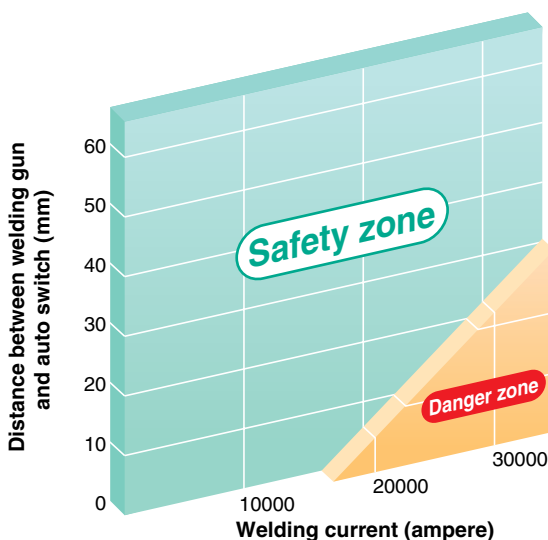
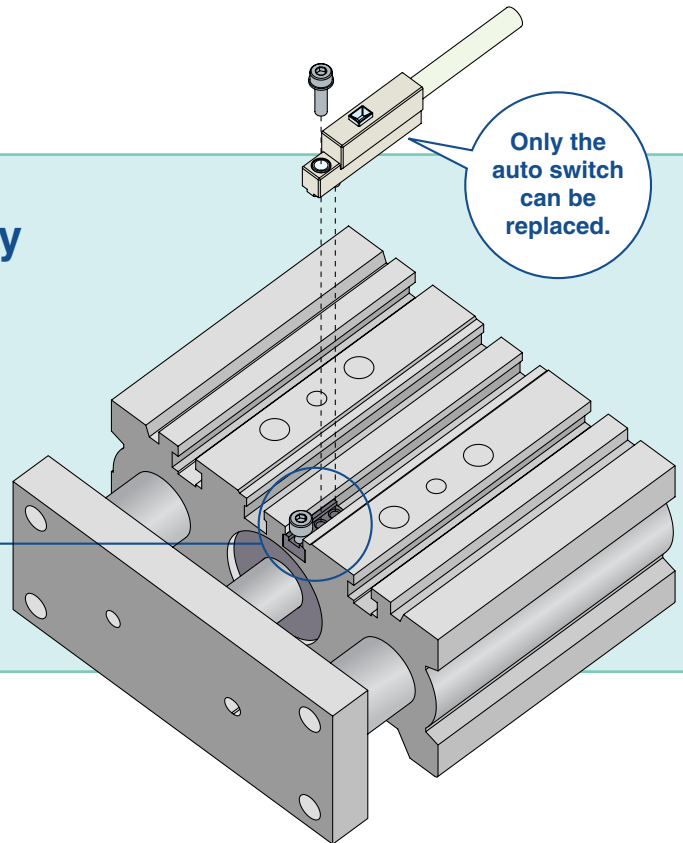


Image of welding current and safety zone

Image of danger zone
If the current to be used is 16000 A or more, please contact SMC.

For use with single-phase AC welders. If it is used for current inverter welders (including rectifying type) and condenser type welders, the magnetic field resistance is reduced. Please contact SMC regarding the performance.

Applicable Cylinders/Actuators

Applicable cylinder/actuator	Series	Bore size (mm)							
		25	32	40	50	63	80	100	125
Clamp cylinder	CKG1			◆	◆	◆			
Clamp cylinder with lock	CLK2G			◆	◆	◆			
Compact cylinder	CDQS	●							
	CDQ2		●	◆	◆	◆	◆	◆	
Compact cylinder with lock	CDLQ	●	●	◆	◆	◆	◆	◆	
Compact guide cylinder	MGP	●	●	◆	◆	◆	◆	◆	
	MGPS			◆			◆		
Compact guide cylinder with lock	MLGP	●	●	◆	◆	◆	◆	◆	
Air cylinder	MDB		◆	◆	◆	◆	◆	◆	◆
	CDA2			◆	◆	◆	◆	◆	
Air cylinder with lock	MDNB		◆	◆	◆	◆	◆	◆	
	CDNA			◆	◆	◆	◆	◆	
Pin clamp cylinder	C(L)KQG				◆				

This auto switch can be mounted onto other cylinders/actuators in addition to the above-mentioned models. Please contact SMC.

● Newly available
◆ Already available with conventional models

How to Order Cylinder/Actuator with Auto Switch (Example)

CKG1A40-100Y- **P3DWSC**

Auto switch

Nil	None
-----	------

* For auto switch model, refer to How to Order.

Number of auto switches

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

- * When cylinders/actuators are ordered with an auto switch, the cylinder/actuator, auto switch and auto switch mounting bracket (including screws) are enclosed.
- * When the auto switch is ordered on its own, the auto switch mounting bracket is not included. In that case, please order it separately.

How to Order

D-P3DW **SC**

Lead wire length

SC	0.3 m (M12 connector type: 3 to 4 pins)
SE	0.3 m (M12 connector type: 1 to 4 pins)
Nil	0.5 m
L	3 m
Z	5 m

Magnetic Field Resistant 2-Color Display Solid State Auto Switch

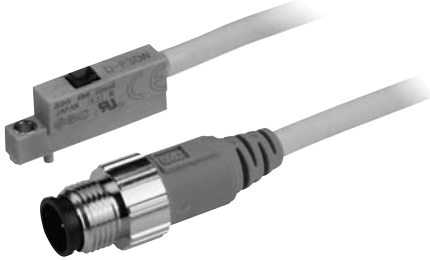
D-P3DWSC/D-P3DWSE

(Electrical entry: Pre-wired connector)



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- It is possible to use in an environment which generates a magnetic field disturbance (AC magnetic field).
- The proper operating range can be determined by the color of the light.
(Red → Green ← Red)



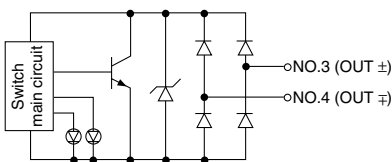
Caution

Precautions

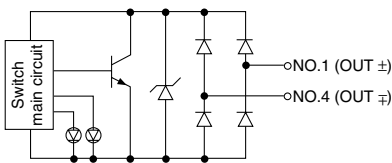
For single-phase AC welding machines
If it is used for current inverter welders (including rectifying type) and condenser type welders, the magnetic field resistance is reduced. Please contact SMC regarding the performance.

Auto Switch Internal Circuit

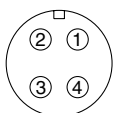
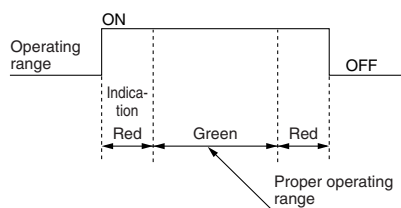
D-P3DWSC



D-P3DWSE



Indicator light/Display method



Connector pin assignment

Auto Switch Specifications

PLC: Programmable Logic Controller

D-P3DWSC/E (With indicator light)		
Auto switch model	D-P3DWSC	D-P3DWSE
Applicable load	24 VDC relay, PLC	
Load voltage	24 VDC (20 to 28 VDC)	
Load current	6 to 40 mA	
Internal voltage drop	5 V or less	
Leakage current	1 mA or less at 24 VDC	
Operating time	40 ms or less	
Indicator light	Operating range.....Red LED illuminates. Proper operating range.....Green LED illuminates.	
Standards	CE marking, UL (CSA), RoHS	

- Lead wire — Oilproof heavy-duty vinyl cable, $\phi 4.8$, 0.5 mm², 2 cores
- Impact resistance — Switch: 1000 m/s², Connector: 300 m/s²
- 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 — IEC60529 standard IP67
- Polarity: Non-polar

Magnetic Field Resistance

If the current of the AC welding machine is 16000 A or lower, the auto switch can be used, even if the distance between the welding conductor (gun cable) and the cylinder/actuator or auto switch is 0 mm. Please contact SMC when the AC welding current exceeds 16000 A.

Mass

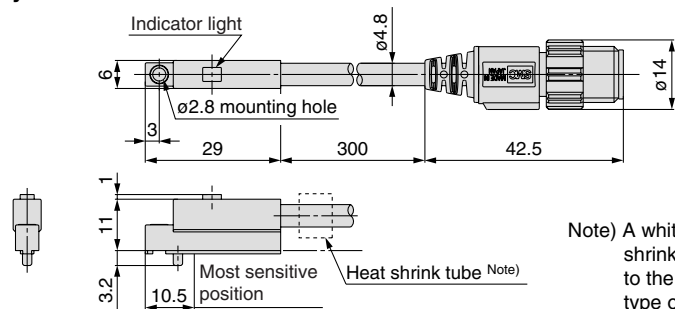
Unit: g

Auto switch model	D-P3DWSC	D-P3DWSE
Lead wire length (m)	0.3	23

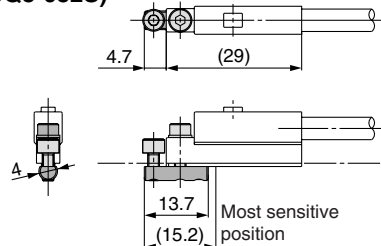
Dimensions

Unit: mm

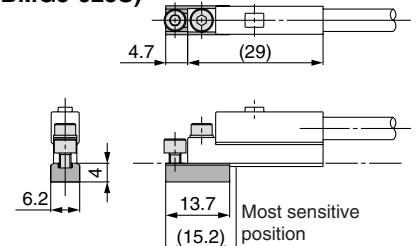
Body



Auto switch mounting bracket (For round groove mounting: BQ3-032S)



Auto switch mounting bracket (For square groove mounting: BMG5-025S)



* When the auto switch is ordered on its own, the auto switch mounting bracket is not enclosed. In that case, please order it separately.



Magnetic Field Resistant 2-Color Display Solid State Auto Switch

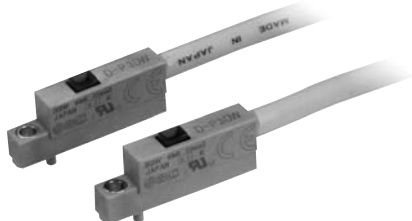
D-P3DW/L/Z

(Electrical entry: Grommet)



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(Red → Green ← Red)



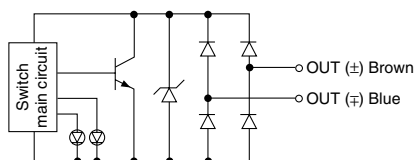
Caution

Precautions

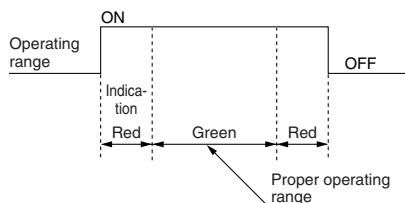
For single-phase AC welding machines
If it is used for current inverter welders (including rectifying type) and condenser type welders, the magnetic field resistance is reduced. Please contact SMC regarding the performance.

Auto Switch Internal Circuit

D-P3DW/L/Z



Indicator light/Display method



Auto Switch Specifications

PLC: Programmable Logic Controller

D-P3DW/L/Z (With indicator light)	
Auto switch model	D-P3DW/L/Z
Applicable load	24 VDC relay, PLC
Load voltage	24 VDC (20 to 28 VDC)
Load current	6 to 40 mA
Internal voltage drop	5 V or less
Leakage current	1 mA or less at 24 VDC
Operating time	40 ms or less
Indicator light	Operating range.....Red LED illuminates. Proper operating range.....Green LED illuminates.
Standards	CE marking, UL (CSA), RoHS

- Lead wire — Oilproof heavy-duty vinyl cable, $\phi 4.8$, 0.5 mm², 2 cores,
D-P3DW: 0.5 m, D-P3DWL: 3 m, D-P3DWZ: 5 m
- Impact resistance — Switch: 1000 m/s²
- 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 — IEC60529 standard IP67
- Polarity: Non-polar

Magnetic Field Resistance

If the current of the AC welding machine is 16000 A or lower, the auto switch can be used, even if the distance between the welding conductor (gun cable) and the cylinder/actuator or auto switch is 0 mm. Please contact SMC when the AC welding current exceeds 16000 A.

Mass

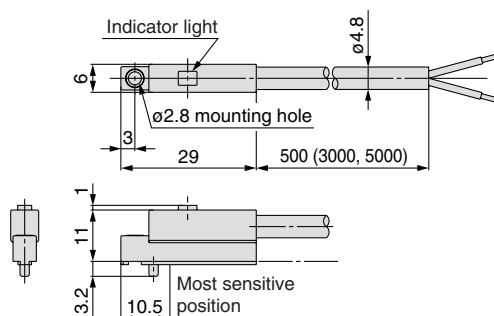
Unit: g

Auto switch model	D-P3DW/L/Z	
Lead wire length (m)	0.5	20
	3	102
	5	168

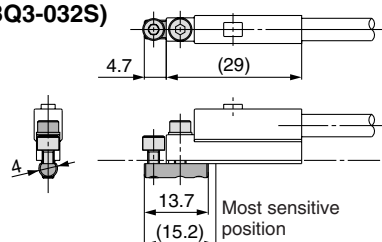
Dimensions

Unit: mm

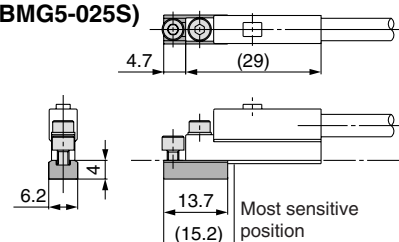
Body



Auto switch mounting bracket (For round groove mounting: BQ3-032S)



Auto switch mounting bracket (For square groove mounting: BMG5-025S)



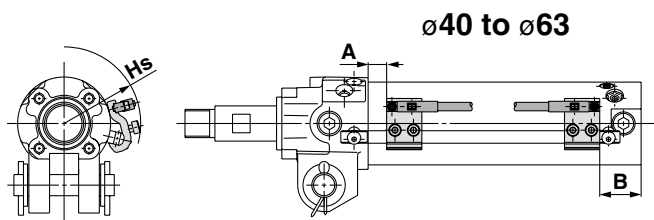
* When the auto switch is ordered on its own, the auto switch mounting bracket is not enclosed. In that case, please order it separately.



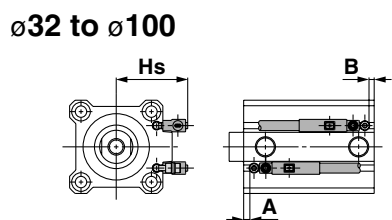
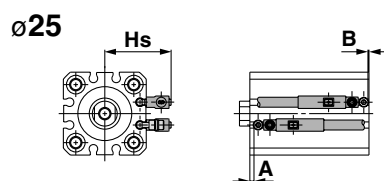
Series **D-P3DW** □

Auto Switch Proper Mounting Position and Its Mounting Height

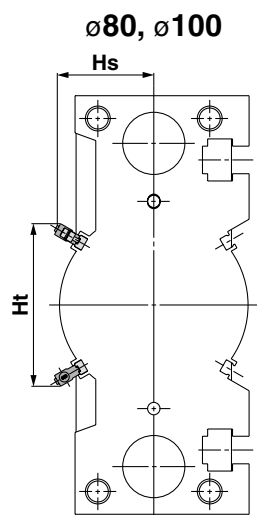
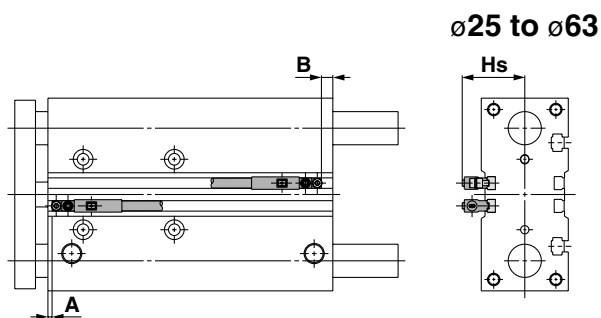
CKG1, CLK2G



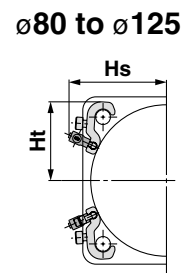
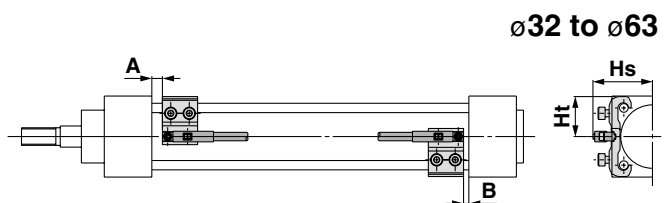
CDQS, CDQ2, CDLQ



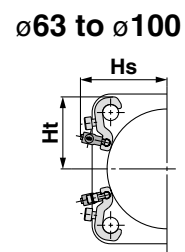
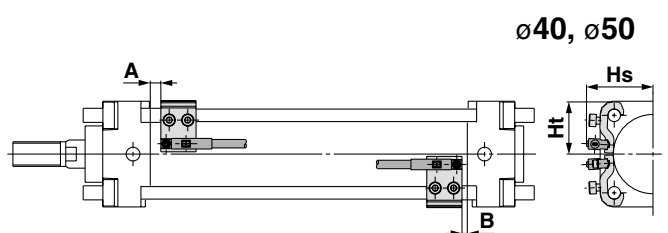
MGP, MLGP, MGPS



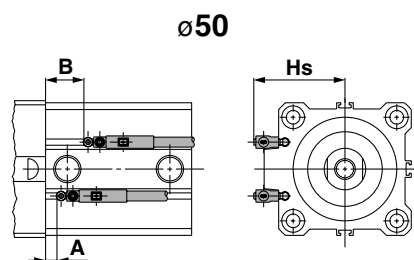
MDB, MDNB



CDA2, CDNA



CKQG, CLKQG



CKG1, CLK2G (mm)

Bore size (mm)	A	B	Hs
40	10.5	23.5	43.5
50	7	30	49.5
63	7	30	56.5

CDQS (mm)

Bore size (mm)	A	B	Hs
25	1.5	0.0	32

CDQ2 (mm)

Bore size (mm)	A	B	Hs
32	2.5	0	34.5
40	6.5	2	38
50	4.5	4.5	44
63	7	7.5	47.5
80	10	12	57.5
100	14.5	17.5	67.5

CDLQ (mm)

Bore size (mm)	A	B	Hs
25	32.5	0	32
32	34.5	0	34.5
40	40.5	2	38
50	39.5	4.5	44
63	45	7.5	47.5
80	53	12	57.5
100	64.5	17.5	67.5

MGP, MLGP (mm)

Bore size (mm)	A	B	Hs	Ht
25	1.5	5	30	—
32	2.5	4	33	—
40	6.5	6.5	37	—
50	4.5	8.5	42.5	—
63	7	11	49.5	—
80	10	15.5	48	78.5
100	14.5	20.5	58	90

MGPS (mm)

Bore size (mm)	A	B	Hs	Ht
50	4	8	42.5	—
80	9.5	13.5	48	78.5

MDB, MDNB (mm)

Bore size (mm)	A	B	Hs	Ht
32	6	3	34	23
40	6	3	38	26
50	6	4	42	31
63	6	4	50	36
80	4	2.5	56	45
100	4	2.5	63.5	53.5
125	6.5	6.5	74.5	64.5

CDA2 (mm)

Bore size (mm)	A	B	Hs	Ht
40	6	3	38	30
50	5.5	3.5	42	34
63	3	1.5	49	41
80	6	4.5	56	49
100	8	6.5	65	56

CDNA (mm)

Bore size (mm)	A	B	Hs	Ht
40	5.5	3.5	38	30
50	5.5	3.5	42	34
63	3	1.5	49	41
80	6.5	4	56	49
100	8	6.5	65	56

CKQG (mm)

Bore size (mm)	A	B	Hs
50	5	18	44

CLKQG (mm)

Bore size (mm)	A	B	Hs
50	40	50	44

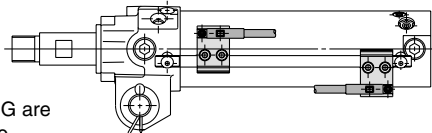
Note) The mounting position should be referred for reference only for the auto switch mounting position at the stroke end detection. Adjust the auto switch after confirming the operation to set actually.

Minimum Stroke for Auto Switch Mounting

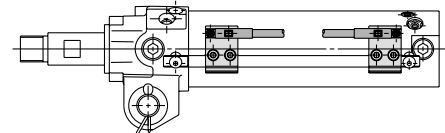
CKG1, CLK2G (mm)	
Number of auto switches	ø40 to ø63
1 pc.	15
2 pcs. (Different sides)	30
2 pcs. (Same side)	75

Note) The standard strokes of the CKG1 and CLK2G are 50, 75, 100, 125 and 150 mm. When two auto switches are mounted onto a cylinder with stroke 50 mm, mount the auto switches on different sides.

CKG1, CLK2G/Two switches mounted on different sides



CKG1, CLK2G/Two switches mounted on the same side (75 mm strokes or more)



CDQS, CDQ2, CDLQ, CKQG, CLKQG (mm)

Number of auto switches	CDQS ø25	CDQ2 ø32 to ø100	CDLQ ø25 to ø100	CKQG, CLKQG ø50
1 pc.	15			
2 pcs.	15			

MGP, MLGP, MGPS (mm)

Number of auto switches	MGP ø25 to ø100	MLGP ø25 to ø100	MGPS ø50, ø80
1 pc.	15		
2 pcs.	15		

MDB (mm)

Number of auto switches	Support brackets other than center trunnion	Center trunnion				
	ø32 to ø125	ø32	ø40, ø50	ø63, ø80	ø100	ø125
2 pcs. (Different sides, Same side) 1 pc.	15	80	85	90	95	100
n pcs.	$15 + 50 \frac{(n-2)}{2}$ n = 2, 4, 6, 8 ...	$80 + 50 \frac{(n-4)}{2}$ n = 4, 8, 12, 16 ...	$85 + 50 \frac{(n-4)}{2}$ n = 4, 8, 12, 16 ...	$90 + 50 \frac{(n-4)}{2}$ n = 4, 8, 12, 16 ...	$95 + 50 \frac{(n-4)}{2}$ n = 4, 8, 12, 16 ...	$100 + 50 \frac{(n-4)}{2}$ n = 4, 8, 12, 16 ...

MDNB (mm)

Number of auto switches	Support brackets (No center trunnion)
	ø32 to ø100
2 pcs. (Different sides, Same side) 1 pc.	15
n pcs.	$15 + 50 \frac{(n-2)}{2}$ n = 2, 4, 6, 8 ...

CDA2 (mm)

Number of auto switches	Support brackets other than center trunnion	Center trunnion
	ø40 to ø100	ø40 to ø100
2 pcs. (Different sides, Same side) 1 pc.	15	85
n pcs.	$15 + 50 \frac{(n-2)}{2}$ n = 2, 4, 6, 8 ...	$85 + 50 \frac{(n-4)}{2}$ n = 4, 8, 12, 16 ...

CDNA (mm)

Number of auto switches	Support brackets other than center trunnion	Center trunnion		
	ø40 to ø100	ø40 to ø63	ø80	ø100
2 pcs. (Different sides, Same side) 1 pc.	15	85	95	100
n pcs.	$15 + 50 \frac{(n-2)}{2}$ n = 2, 4, 6, 8 ...	$85 + 50 \frac{(n-4)}{2}$ n = 4, 8, 12, 16 ...	$95 + 50 \frac{(n-4)}{2}$ n = 4, 8, 12, 16 ...	$100 + 50 \frac{(n-4)}{2}$ n = 4, 8, 12, 16 ...

Note) When a shorter stroke than the minimum feasible stroke is required for cylinder/actuator with built-in magnet, the stroke conforms to the feasible cylinder/actuator stroke.

Operating Range of Auto Switch

(mm)

Series	Bore size (mm)							
	25	32	40	50	63	80	100	125
CKG1	—	—	4	5	6	—	—	—
CLK2G	—	—	4	5	6	—	—	—
CDQS	5.5	—	—	—	—	—	—	—
CDQ2	—	6.5	6.5	5.5	7.5	7	8.5	—
CDLQ	4.5	4.5	6.5	5.5	7.5	7	8.5	—
MGP MLGP	6	5.5	5.5	5.5	6.5	7.5	7.5	—
MGPS	—	—	—	5.5	—	7.5	—	—
MDB MDNB	—	4.5	5	5	5.5	4	6.5	8.5
CDA2 CDNA	—	—	4.5	5	6	5.5	6	—
C(L)KQG	—	—	—	5.5	—	—	—	—

Note) Since this is a guideline including hysteresis, not meant to be guaranteed. (Assuming approximately $\pm 30\%$ dispersion.) Value may greatly change depending on the surrounding environment.

Mounting and Moving Method of Auto Switch

Direct Mounting to the Round Groove

Applicable cylinder/actuator		Auto switch mounting bracket part no.
Compact cylinder	CDQS $\phi 25$	BQ3-032S
	CDQ2 $\phi 32$ to $\phi 100$	
Compact cylinder with lock	CDLQ $\phi 25$ to $\phi 100$	
Pin clamp cylinder	CKQG $\phi 50$	
Pin clamp cylinder with lock	CLKQG $\phi 50$	

Note) When the auto switch is mounted onto the CDBQ2 end lock type, please contact SMC.

Mounting and Moving Method of D-P3DW□ (1)

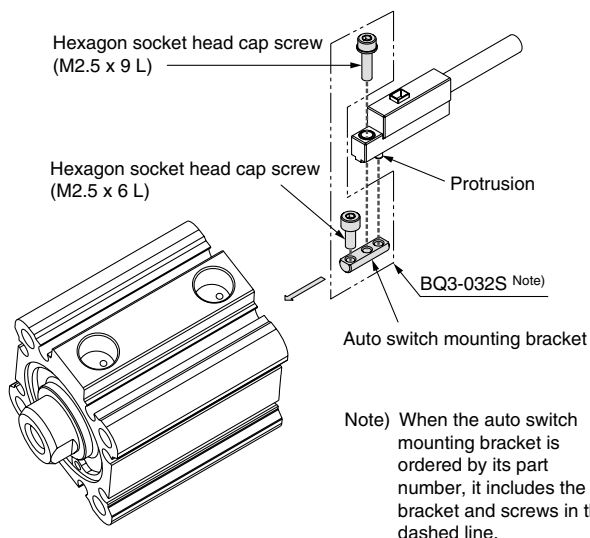
- ① Insert the protrusion on the bottom of the auto switch into the mating part of the auto switch mounting bracket and fix the auto switch and the auto switch mounting bracket temporarily by tightening the hexagon socket head cap screw (M2.5 x 9 L) 1 to 2 turns.
- ② Insert the temporarily tightened mounting bracket into the mating groove of the cylinder/actuator, and slide the auto switch onto the cylinder/actuator through the groove.
- ③ Check the detecting position of the auto switch and fix the auto switch firmly with the hexagon socket head cap screw (M2.5 x 6 L, M2.5 x 9 L).*
- ④ If the detecting position is changed, go back to step ②.

* The hexagon socket head cap screw (M2.5 x 6 L) is used to fix the mounting bracket and cylinder/actuator. This enables the replacement of the auto switch without adjusting the auto switch position.

Note 1) Ensure that the auto switch is covered with the mating groove to protect the auto switch.

Note 2) The torque for tightening the hexagon socket head cap screw (M2.5 x 6 L, M2.5 x 9 L) is 0.2 to 0.3 N·m.

Note 3) Tighten the hexagon socket head cap screws evenly.



Caution for the Cylinder/Actuator Mounting

* When mounting the D-P3DW onto a cylinder/actuator with $\phi 32$ to $\phi 50$, to avoid mutual interference, use a fitting with width across flats 12 mm or less for $\phi 32$ and $\phi 40$, and use a fitting with width across flats 14 mm or less for $\phi 50$. Also, if the corner of the fitting interferes with the housing of the auto switch, adjust the tightening of the fitting to eliminate the interference. In the case of interference with an elbow type fitting, direct the port of the fitting away from the auto switch. Such interference must be avoided especially when a speed controller and speed exhaust controller with a fitting are selected.

* In the CDQS $\phi 25$ and CDLQ $\phi 25$, the auto switch will interfere with the fitting if mounted onto the face with the port, so it needs to be mounted on a different face.

Direct Mounting to the Square Groove

Applicable cylinder/actuator		Auto switch mounting bracket part no.
Compact guide cylinder	MGP $\phi 25$ to $\phi 100$	BMG5-025S
	MGPS $\phi 50, \phi 80$	
Compact guide cylinder with lock	MLGP $\phi 25$ to $\phi 100$	

Note) For the MGP end lock type, as the auto switch cannot be mounted onto the lock mechanism face, mount it to the groove on the bottom of the lock mechanism face.

Mounting and Moving Method of D-P3DW□ (2)

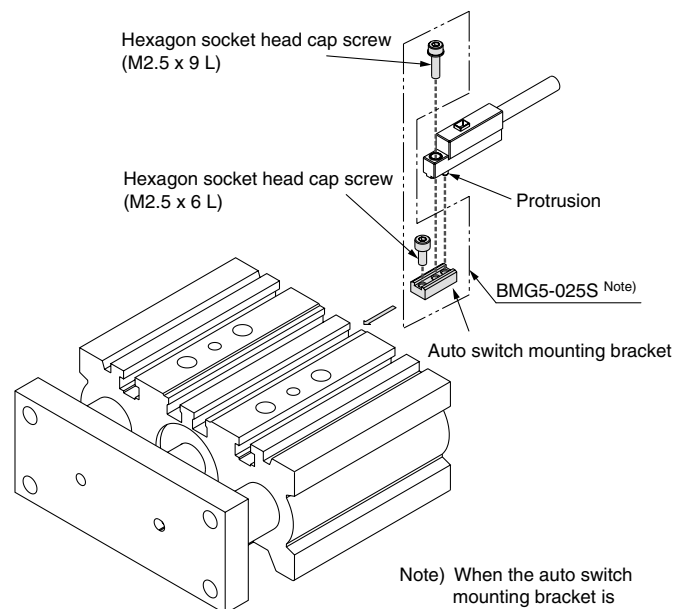
- ① Insert the protrusion on the bottom of the auto switch into the mating part of the auto switch mounting bracket and fix the auto switch and the auto switch mounting bracket temporarily by tightening the hexagon socket head cap screw (M2.5 x 9 L) 1 to 2 turns.
- ② Insert the temporarily tightened mounting bracket into the mating groove of the cylinder/actuator, and slide the auto switch onto the cylinder/actuator through the groove.
- ③ Check the detecting position of the auto switch and fix the auto switch firmly with the hexagon socket head cap screw (M2.5 x 6 L, M2.5 x 9 L).*
- ④ If the detecting position is changed, go back to step ②.

* The hexagon socket head cap screw (M2.5 x 6 L) is used to fix the mounting bracket and cylinder/actuator. This enables the replacement of the auto switch without adjusting the auto switch position.

Note 1) Ensure that the auto switch is covered with the mating groove to protect the auto switch.

Note 2) The torque for tightening the hexagon socket head cap screw (M2.5 x 6 L, M2.5 x 9 L) is 0.2 to 0.3 N·m.

Note 3) Tighten the hexagon socket head cap screws evenly.



Note) When the auto switch mounting bracket is ordered by its part number, it includes the bracket and screws in the dashed line.

Rod Mounting Type 1

Applicable cylinder/actuator	
Clamp cylinder	CKG1 $\phi 40$ to $\phi 63$
Clamp cylinder with lock	CLK2G $\phi 40$ to $\phi 63$
Air cylinder	MDB $\phi 32$ to $\phi 63$
	CDA2 $\phi 40, \phi 50$
Air cylinder with lock	MDNB $\phi 32$ to $\phi 63$
	CDNA $\phi 40, \phi 50$

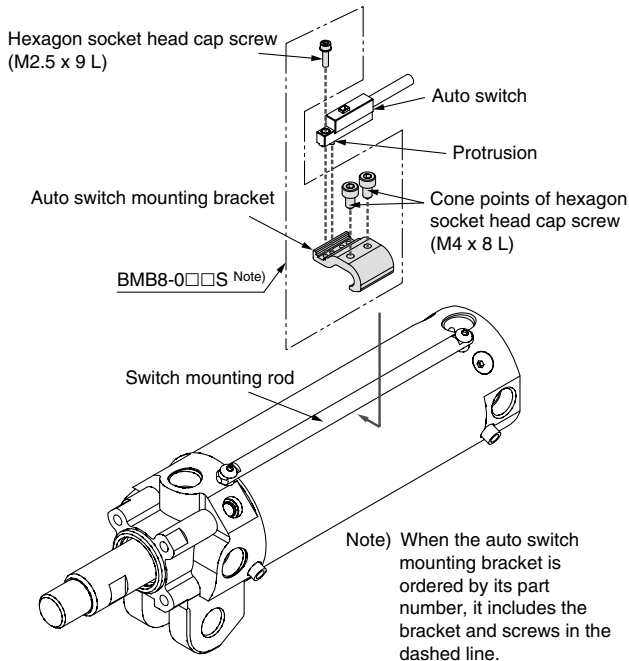
Mounting and Moving Method of D-P3DW □ (3)

- ① Insert the protrusion on the bottom of the auto switch into the mating part of the mounting bracket and fix the auto switch by tightening the hexagon socket head cap screw (M2.5 x 9 L).
- ② Install the mounting bracket on which the auto switch is mounted to the switch mounting rod, and move it to find the detecting position while keeping firm contact between the bottom of the auto switch mounting bracket and the cylinder tube.
- ③ After checking the detecting position, fix the auto switch mounting bracket to the detecting position with the cone points of hexagon socket head cap screw (M4 x 8 L).
- ④ If the detecting position is changed, go back to step ②).

Note 1) When tightening the cone points of hexagon socket head cap screw (M4 x 8 L), keep the tightening torque within 1 to 1.2 N·m.

Note 2) The torque for tightening the hexagon socket head cap screw (M2.5 x 9 L) is 0.2 to 0.3 N·m.

Note 3) Tighten the hexagon socket head cap screws evenly.



Auto Switch Mounting Bracket Part No. for CK Series (Including Bracket and Screws)

Series	Bore size (mm)		
	40	50	63
CKG1 CLK2G	BMB8-050S		

Auto Switch Mounting Bracket Part No. for CA Series (Including Bracket and Screws)

Series	Bore size (mm)				
	40	50	63	80	100
CDA2 CDNA	BMB8-050S		BA7T-063S		BA7T-080S

Rod Mounting Type 2

Applicable cylinder/actuator	
Air cylinder	MDB $\phi 80$ to $\phi 125$
	CDA2 $\phi 63$ to $\phi 100$
Air cylinder with lock	MDNB $\phi 80$ to $\phi 100$
	CDNA $\phi 63$ to $\phi 100$

Mounting and Moving Method of D-P3DW □ (4)

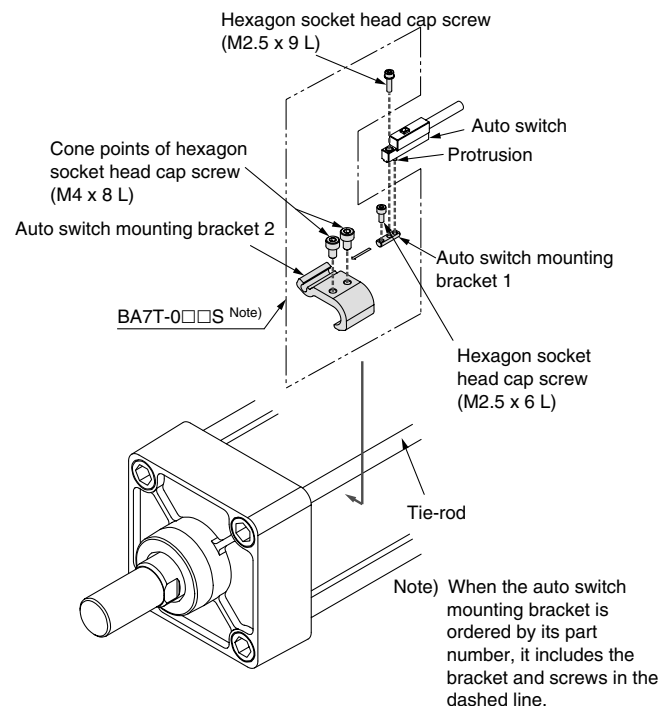
- ① Install the auto switch mounting bracket 2 to the tie-rod, and fix it to the approximate mounting position with the cone points of hexagon socket head cap screw (M4 x 8 L) while keeping firm contact between the bottom of the auto switch mounting bracket 2 and the cylinder tube.
- ② Insert the protrusion on the bottom of the auto switch into the mating part of the auto switch mounting bracket 1 and fix the auto switch and the auto switch mounting bracket 1 temporarily by tightening the hexagon socket head cap screw (M2.5 x 9 L) 1 to 2 turns.
- ③ Insert the temporarily tightened mounting bracket 1 to the mating groove of the mounting bracket 2, and fix the auto switch by tightening the hexagon socket head cap screw (M2.5 x 6 L and M2.5 x 9 L) after checking the detecting position.
- ④ If the detecting position is changed, go back to step ① or ③).

Note 1) Ensure that the auto switch is covered with the mating groove by a minimum of 15 mm to protect the auto switch.

Note 2) When tightening the cone points of hexagon socket head cap screw (M4 x 8 L), keep the tightening torque within 1 to 1.2 N·m.

Note 3) The torque for tightening the hexagon socket head cap screw (M2.5 x 6 L, M2.5 x 9 L) is 0.2 to 0.3 N·m.

Note 4) Tighten the hexagon socket head cap screws evenly.



Auto Switch Mounting Bracket Part No. for MB Series (Including Bracket and Screws)

Series	Bore size (mm)						
	32	40	50	63	80	100	125
MDB MDNB (32 to 100)	BMB8-032S		BMB8-050S		BA7T-063S		BA7T-080S

* Differences in color and glossiness of the metal surface treatment do not affect the performance. Due to the characteristics of the chromate treatment (trivalent) applied to the whole body of the auto switch mounting bracket, the color may be slightly different between manufacturing lots. However, this will not reduce the corrosion resistance.



Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “**Caution**,” “**Warning**” or “**Danger**.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC), Japan Industrial Standards (JIS)*1) and other safety regulations*2).

- * 1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1992: Manipulating industrial robots -Safety.
JIS B 8370: General rules for pneumatic equipment.
JIS B 8361: General rules for hydraulic equipment.
JIS B 9960-1: Safety of machinery – Electrical equipment of machines. (Part 1: General requirements)
JIS B 8433-1993: Manipulating industrial robots - Safety.
etc.
- * 2) Labor Safety and Sanitation Law, etc.

⚠ Caution: Operator error could result in injury or equipment damage.

⚠ Warning: Operator error could result in serious injury or loss of life.

⚠ Danger : In extreme conditions, there is a possibility of serious injury or loss of life.

⚠ Warning

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

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

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

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

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

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

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.



Safety Instructions

Caution

The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.

If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary. If anything is unclear, contact your nearest sales branch.

Limited Warranty and Disclaimer/Compliance Requirements

The product used is subject to the following “Limited Warranty and Disclaimer” and “Compliance Requirements”. Read and accept them before using the product.

Limited Warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.*3)

Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.

This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

* 3) Vacuum pads are excluded from this 1 year warranty.

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

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

Compliance Requirements

When the product is exported, strictly follow the laws required by the Ministry of Economy, Trade and Industry (Foreign Exchange and Foreign Trade Control Law).



Magnetic Field Resistant 2-Color Display Solid State Auto Switch Specific Product Precautions 1

Be sure to read this before handling. Refer to back pages 1 and 2 for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for Auto Switches Precautions.

Design / Selection

⚠ Warning

1. Confirm the specifications.

Read the specifications carefully and use this product appropriately. The product may be damaged or malfunction if it is used outside the specification range for load current, voltage, temperature or impact, etc.

2. Cautions for use in an interlock circuit

When a magnetic field resistant 2-color display solid state auto switch is used for an interlock signal requiring high reliability, provide a mechanical function or device a double interlock system by using another switch (sensor) together with the auto switch to avoid trouble.

Also, perform periodic maintenance and confirm proper operation.

⚠ Caution

1. Do not use a load that generates surge voltage.

Although a surge protection varistor is connected to the output of the magnetic field resistance 2-color display solid state auto switch, it may be damaged if surge is repeatedly applied. When loads such as relay or solenoid valves that generate surge are directly operated, use loads that incorporate a surge absorption element.

2. Take precautions when multiple cylinders/actuators are used close together.

When multiple magnetic field resistant 2-color display solid state auto switch cylinders/actuators are used in close proximity, magnetic field interference may cause the auto switches to malfunction. Maintain a minimum cylinder separation of 40 mm. (When the allowable interval is specified for each cylinder series, use the indicated value.)

The auto switches may malfunction due to the interference from the magnetic fields.

3. Pay attention to the internal voltage drop of the auto switch.

Generally, the internal voltage drop will be greater with a 2-wire solid state auto switch than with a reed auto switch. Take note that a 12 VDC relay is not applicable.

- In the same way, when operating under a specified voltage, although an auto switch may operate normally, the load may not operate. Therefore, the formula below should be satisfied after confirming the minimum operating voltage of the load.

$$\text{Supply voltage} - \text{Internal voltage drop of auto switch} > \text{Minimum operating voltage of load}$$

4. Pay attention to leakage current.

<Solid state/2-wire type>

Current (leakage current) flows to the load to operate the internal circuit even when in the OFF state.

Operating current of load (OFF condition) > Leakage current

If the criteria given in the above formula are not met, it will not reset correctly (stays ON).

Moreover, leakage current flow to the load will be "n" times larger when "n" auto switches are connected in parallel.

5. Ensure sufficient clearance for maintenance activities.

When designing an application, be certain to allow sufficient clearance for maintenance.

Mounting / Adjustment

⚠ Caution

1. Do not drop or bump.

Do not drop, bump or apply excessive impacts (1000 m/s² or more) while handling. Although the body of the auto switch may not be damaged, the inside of the auto switch could be damaged and cause malfunction.

2. Observe the proper tightening torque for mounting an auto switch.

When an auto switch is tightened beyond the range of tightening torque, auto switch mounting screws, auto switch mounting brackets or auto switch may be damaged.

On the other hand, tightening below the range of tightening torque may allow the auto switch to slip out of position.

3. Do not carry a cylinder/actuator by the auto switch lead wires.

Never carry a cylinder/actuator by its lead wires. This may not only cause broken lead wires, but it may cause internal elements of the auto switch to be damaged by the stress.

Wiring

⚠ Caution

1. Confirm proper insulation of wiring.

Be certain that there is no faulty wiring insulation (contact with other circuits, ground fault, improper insulation between terminals, etc.). Damage may occur due to excess current flow into a switch.

2. Do not wire with power lines or high voltage lines.

Wire separately from power lines or high voltage lines, avoiding parallel wiring or wiring in the same conduit with these lines. Control circuits containing auto switches may malfunction due to noise from these other lines.

3. Avoid repeatedly bending or stretching lead wires.

Broken lead wires will result from repeatedly applying bending stress or stretching force to the lead wires.

4. Do not allow the load to be short circuited.

A protective circuit shuts off the output when overcurrent flows due to load short circuit, etc. In that case, shut off the power supply and eliminate the cause of the overcurrent. Then, apply the power supply again.



Magnetic Field Resistant 2-Color Display Solid State Auto Switch Specific Product Precautions 2

Be sure to read this before handling. Refer to back pages 1 and 2 for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for Auto Switches Precautions.

Operating Environment

⚠ Warning

1. Never use in an atmosphere of explosive gases.

The structure of magnetic field resistant 2-color display solid state auto switches is not intended to prevent explosion. Never use in an atmosphere with an explosive gas since this may cause a serious explosion, and therefore, should absolutely not be used under these conditions.

⚠ Caution

1. Do not use around direct current welders.

Magnetic field resistant 2-color display solid state auto switches will malfunction or magnets inside cylinders/actuators will become demagnetized.

2. Do not use in an environment where the auto switch will be continually exposed to water.

Although the sensor unit of magnetic field resistant 2-color display solid state auto switches satisfies IEC standard IP67 construction, do not use auto switches in applications where continually exposed to water splash or spray. Poor insulation or swelling of the potting resin inside auto switches may cause malfunction.

3. Do not use in an environment with oil or chemicals.

Please consult with SMC if auto switches will be used in an environment with coolant, cleaning solvent, various oils or chemicals. If magnetic field resistant 2-color display solid state auto switches are used under these conditions for even a short time, they may be adversely affected by improper insulation, malfunction due to swelling of the potting resin, or hardening of the lead wires.

4. Do not use in an environment with temperature cycles.

Please consult with SMC if magnetic field resistant 2-color display solid state auto switches are used where there are temperature cycles other than normal temperature changes, as there may be adverse effects inside the auto switches.

5. Do not use in an area where surges are generated.

When there are units (solenoid type lifter, high frequency induction furnace, motor, etc.) which generate a large amount of surge in the area around cylinders/actuators with magnetic field resistant 2-color display solid state auto switches, this may cause deterioration or damage to the auto switch's internal circuit elements. Avoid sources of surge generation and disorganized lines.

6. Avoid accumulation of iron waste or close contact with magnetic substances.

When a large amount of iron waste such as machining chips or spatter is accumulated, or a magnetic substance (something attracted by a magnet) is brought into close proximity with a cylinder/actuator with auto switches, it may cause the magnetic field resistant 2-color display solid state auto switch to malfunction due to a loss of the magnetic force inside the cylinder/actuator.

Maintenance

⚠ Caution

1. Perform the following maintenance periodically in order to prevent possible danger due to unexpected magnetic field resistant 2-color display solid state auto switch malfunction.

- 1) Secure and tighten magnetic field resistant 2-color display solid state auto switch mounting screws.
If screws become loose or the mounting position is dislocated, retighten them after readjusting the mounting position.
- 2) Confirm that there is no damage to lead wires.
To prevent faulty insulation, replace auto switches or repair lead wires, etc., if damage is discovered.

Others

⚠ Caution

1. Leakage current is larger than the conventional models.

When this auto switch is used to replace a conventional model, input devices sometimes cannot detect the OFF of the auto switch.

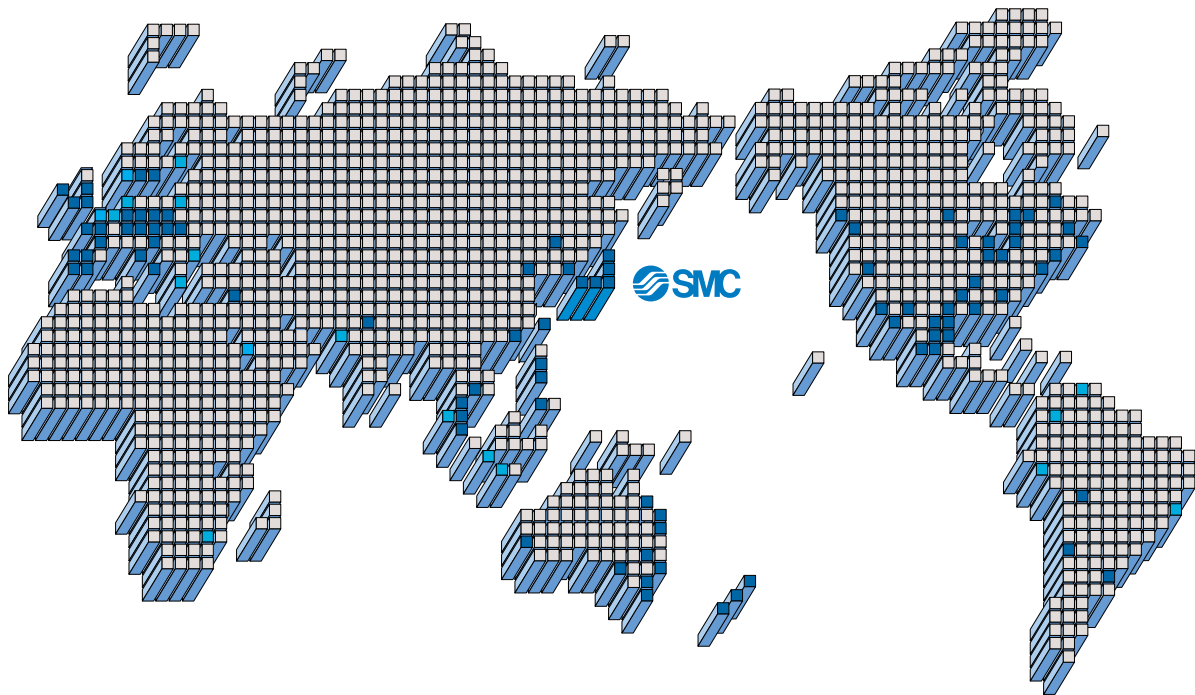
- When OFF current of PLC is less than the auto switch leakage current 1 [mA]
Example) PLC that cannot use 2-wire type

2. Please contact SMC for information about water resistance and flexibility of lead wires.

3. The resin case may discolor depending on the operating environment.

Although the resin case may be discolored by sunlight due to the characteristics of its material, it does not affect the strength and other characteristics.

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Safety Instructions

Be sure to read "Handling Precautions for SMC Products" (M-E03-3) before using.

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