



# Operation Manual

Magnetic Field Resistant 2-color Indication Type  
Solid State Auto Switch

PRODUCT NAME

*D-P3DW\* Series*

MODEL/ Series

**SMC Corporation**

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## 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)<sup>\*1)</sup> and other safety regulations<sup>\*2)</sup>.

\*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.

## **Caution**

### **1. 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.<sup>\*3)</sup>  
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.

<sup>\*3)</sup> 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).

## Operator

- ◆ This operation manual is intended for those who have knowledge of machinery using pneumatic equipment, and have sufficient knowledge of assembly, operation and maintenance of such equipment.  
Only those persons are allowed to perform assembly, operation and maintenance.
- ◆ Read and understand this operation manual carefully before assembling, operating or providing maintenance to the product.

### Warning

- Do not disassemble, modify (including changing the printed circuit board) or repair.  
An injury or failure can result.
- Do not operate the product outside of the specifications.  
Do not use for flammable or harmful fluids.  
Fire, malfunction, or damage to the product can result.  
Verify the specifications before use.
- Do not operate in an atmosphere containing flammable or explosive gases.  
Fire or an explosion can result.  
This product is not designed to be explosion proof.
- If using the product in an interlocking circuit:
  - Provide a double interlocking system, for example a mechanical system.
  - Check the product regularly for proper operation.Otherwise malfunction can result, causing an accident.
- The following instructions must be followed during maintenance:
  - Turn off the power supply.
  - Stop the air supply, exhaust the residual pressure and verify that the air is released before performing maintenance work.Otherwise an injury can be caused.

### Caution

- Do not touch terminals and printed circuit board inside the product.  
Otherwise it can cause electric shock, malfunction or damage to the product can result.
- After maintenance is complete, perform appropriate functional inspections.  
Stop operation if the equipment does not function properly.  
Safety cannot be assured in the case of unexpected malfunction.

# NOTE

- Follow the instructions given below when designing, selecting and handling the product.

- The instructions on design and selection (installation, wiring, environment, adjustment, operation, maintenance, etc.) described below must also be followed.

- ◆ Product specifications

- The direct current power supply to combine should be UL approved as follows.

- (1) Limited voltage current circuit in accordance with UL508

A circuit which power is supplied by secondary coil of a transformer that meets the following conditions

- Maximum voltage (with no load) : less than 30Vrms (42.4V peak)

- Maximum current: (1) less than 8A (including when short circuited)

- (2) limited by circuit protector (such as fuse) with the following ratings

No-load voltage [V peak]	Max. current rating [A]
0 to 20 [V]	5.0
Above 20 to 30 [V]	100/peak voltage

- (2) Circuit (of class 2) which is of maximum 30Vrms (42.4V peak) or less, with UL 1310 class 2 power supply unit or UL 1585 class 2 transformer.

- Use the specified voltage.

Otherwise failure or malfunction can result.

- Do not place two or more actuators close together.

When using two or more actuators closely in parallel, keep a distance of at least 40mm between the actuator tubes to prevent magnetic interference from affecting the product, which can cause malfunction.

(If the distance is specified for the actuator, use that value.)

- Detection by an Auto switch mounted in a mid-stroke position depends on the piston speed. Conditions must satisfy the equation below.

Wherein;

Maximum detectable piston speed = V [mm/s]

$$V \text{ [mm/s]} = \frac{\text{Operating range of Auto switch [mm]}}{\text{Operating time of load [ms]}} \times 1000$$

- Design the product to prevent reverse current when the circuit is opened or the product is forced to operate for operational check.

Reverse current can cause malfunction or damage to the product.

- Reserve a space for maintenance.

Allow sufficient space for maintenance when designing the system.

- Product handling

- ◆ Installation

- Tighten to the specified tightening torque.

If the tightening torque is exceeded the mounting screws and brackets may be broken. If the tightening torque is insufficient, the product can be displaced.

(Refer to "Mounting and Installation".)

- Be sure to ground terminal FG when using a commercially available switch-mode power supply.

- Never mount an actuator equipped with Auto switch in a location that will be used as a foothold.

The product may be damaged if excessive force is applied by stepping or climbing onto it.

- Do not drop, hit or apply excessive shock (over 1000 m/s<sup>2</sup>) to the Auto switch.

Otherwise damage to the internal parts can result, causing malfunction.

- ◆ Cautions

- Welding current

This product has no immunity against D.C. magnetic fields, so it is not suitable for use in applications where welding takes place using D.C. inverter/rectified source. If using in conjunction with a D.C. welding application, use it at a distance from the conductor, as with ordinary switches.

Rough guide for distance from conductor to prevent malfunction (10,000A: 30cm or more).

- Effect of magnetization and demagnetization

In areas exceeding 10,000A, occasionally detection performance may become unstable due to demagnetization of the detection magnet (weakening of magnetic field) and magnetization of surrounding parts.

- ◆Wiring

- Do not pull hard on the lead wire. In particular, never lift an Auto switch actuator by holding the lead wires.

Otherwise damage to the internal parts can result, causing malfunction.

- Avoid repeatedly bending or stretching the lead wire, or placing heavy load on them.

Repetitive bending stress or tensile stress can cause the sheath of the wire to peel off, or breakage of the wire. If the lead wire can move, fix it near the body of the product.

The recommended bend radius is 40 to 80 mm. Contact SMC for details.

- Wire correctly.

Incorrect wiring can break the product.

- Do not perform wiring while the power is on.

Otherwise damage to the internal parts can result, causing malfunction.

- Do not route wires and cables together with power or high voltage cables.

Otherwise the product can malfunction due to interference of noise and surge voltage from power and high voltage cables to the signal line. Route the wires (piping) of the product separately from power or high voltage cables.

- Confirm proper insulation of wiring.

Poor insulation (interference from another circuit, poor insulation between terminals, etc.) can lead to excess voltage or current being applied to the product, causing damage.

- Design the system to prevent reverse current when the product is forced to operate for operational check.

Depending on the circuit used, insulation may not be maintained when operation is forced, allowing reverse current to flow, which can cause malfunction and damage the product.

- Keep wiring as short as possible to prevent interference from electromagnetic noise and surge voltage.

Do not use a cable longer than 100m.

- ◆Environment

- Pay attention to use the product in an atmosphere with accumulation of iron waste or close contact with magnetic substances.

When a large amount of iron waste such as machining chips or spatter has accumulated, or a magnetic substance (something attracted by a magnet) is brought into close proximity with the actuator, it may cause the Auto switch to malfunction due to weakening.

- Do not use the product in an environment that is constantly exposed to the splash of water.

This can cause insulation failure or malfunction due to swelling of the potting resin.

- Do not use in a place where the product could be splashed by oil or chemicals.

If the product is to be used in an environment containing oils or chemicals such as coolant or cleaning solvent, even for a short time, it may be adversely affected. (insulation failure, malfunction due to swelling of the potting resin, or hardening of the potting resin, or hardening of the lead wires)

- Do not use the product in an environment where corrosive gases or fluids could be splashed.

Otherwise damage to the product and malfunction can result.

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

If there is equipment which generates a large amount of surge (solenoid type lifter, high frequency induction furnace, motor, etc.) close to the actuator, this may cause deterioration or breakage of the internal circuit of the Auto switch. Avoid sources of surge generation and crossed lines.

- Do not use a load which generates surge voltage.

When a surge-generating load such as a relay or solenoid is driven directly, use an Auto switch with a built-in surge absorbing element.

- The product is CE marked, but not immune to lightning strikes. Take measures against lightning strikes in the system.

- Mount the product in a place that is not exposed to vibration or impact (over 1000m/s<sup>2</sup>).

Otherwise failure or malfunction can result.

- Do not use the product in an environment that is exposed to temperature cycle.  
Heat cycles other than ordinary changes in temperature can adversely affect the inside of the product.
- Do not expose the product to direct sunlight.  
If using in a location directly exposed to sunlight, shade the product from the sunlight. Otherwise failure or malfunction can result.
- Keep within the specified ambient temperature range.  
Otherwise malfunction can result.
- Do not operate close to a heat source, or in a location exposed to radiant heat.  
Otherwise malfunction can result.

#### ◆ Adjustment and Operation

- Adjust the Auto switch in the middle of the operating range and then fix it.  
Adjust the position of the Auto switch so that the piston stops in the middle of the operating area (where Auto switch is in ON status).  
Mounting the Auto switch close to the edge of the operating range can cause operation to be unstable.
- Turn the power on after connecting a load.  
If switched on with no load, excess current may flow, causing the product to break instantly.

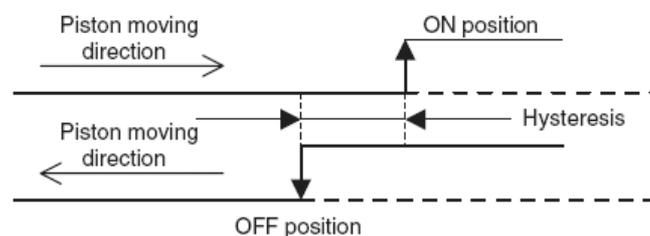
#### ◆ Maintenance

- Turn off the power supply, stop the supplied air, exhaust the residual pressure and verify the release of air before performing maintenance.  
There is a risk of unexpected malfunction.
- Perform regular maintenance and inspections.  
There is a risk of unexpected malfunction.
- Do not touch the terminals while the power is on.  
Otherwise malfunction and damage to the product can result.
- Do not use solvents such as benzene, thinner etc. to clean the Auto switch.  
They could damage the surface of the body and erase the markings on the body.  
Use a soft cloth to remove stains.  
For heavy stains, use a cloth soaked with diluted neutral detergent and fully squeezed, then wipe up the stains again with a dry cloth.

#### ◆ Other

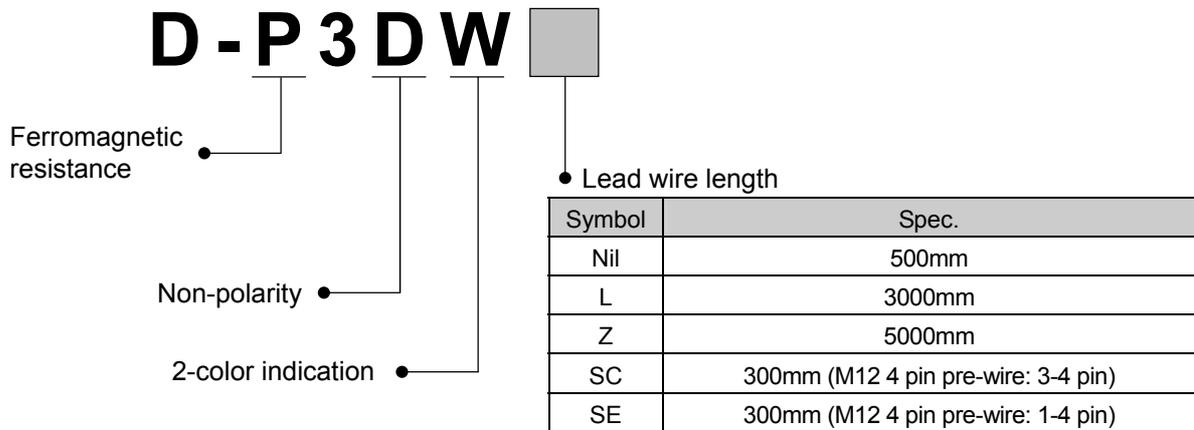
- Contact SMC for information regarding water resistance, lead wire bend resistance.
- Contact SMC if there is a problem with the product's ON/OFF positions (hysteresis).

#### Hysteresis



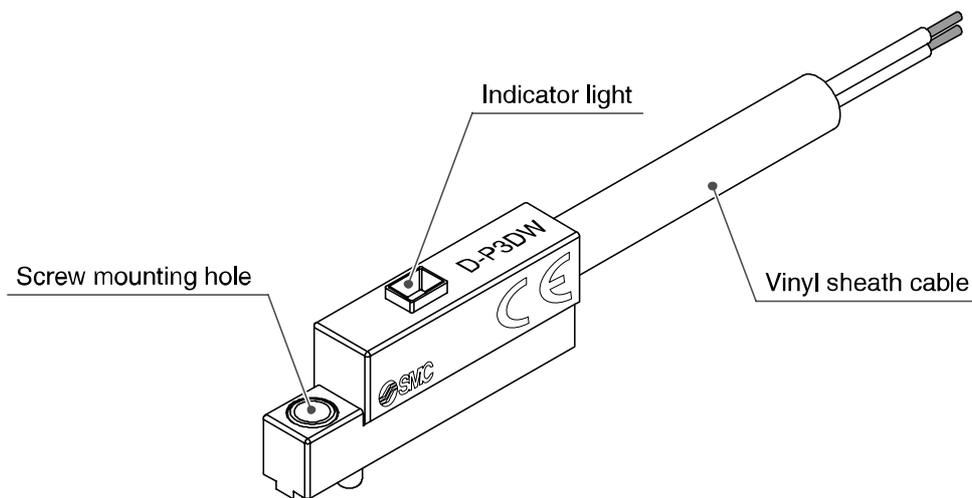
- There is larger current leakage than the existing models.  
If the Auto switch is used as a replacement with the existing model, the input device and PLC cannot detect the Auto switch turns off.  
<The OFF current of PLC is below the current leakage of the Auto switch [1mA]>  
Ex.) PLC that cannot use 2-wire type.
- The resin housing can be discolored due to operating environment.  
Due to the characteristics of the material used, the resin housing can be discolored by sunlight, but there is no effect in strength and other characteristics.

## Model Indication Method

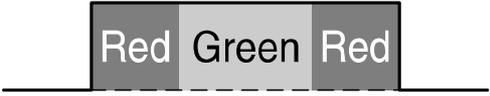
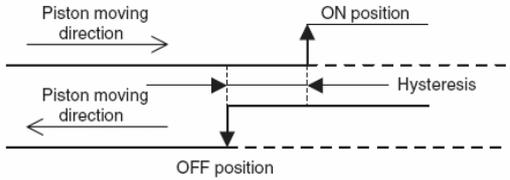


## Names and Functions of products

- Names of products



## ■ Definition and terminology

	Term	Meaning
2	2-color indication	<p>A type of indicating methods which lights up the red LED light up when the Auto switch comes to the operating position, and lights up the green LED when the Auto switch comes to the optimum operating position.</p> 
	2-wire Auto switch	Auto switch which has only signal line and COM line.
C	Current leakage	The current flowing to the load when the Auto switch turns off.
H	Hysteresis	<p>The difference between the points when the Auto switch turns on and off, which is provided to prevent chattering.</p> 
I	Internal voltage drop	The voltage applied between the COM and signal line when the Auto switch turns on.
L	Load current	The current flowing to the load when the Auto switch turns on.
M	Most sensitive position	The center position of the sensor unit (which gets the strongest reaction of the sensor unit), which means the center position of an operating range as well.
N	Non-polarity	A 2-wire type of connection which do not need care for polarity. Like 2-wire connection, it is necessary to put a load to either of (+) or (-).
S	Sequence controller (PLC)	The device to perform sequence control, which performs controlling such as receipt of inputs from the Auto switch along with programming and sending of the output to other machines.
	Solid state Auto switch	Auto switch which generates on and off outputs with or without mechanical contact such as a transistor.

# Mounting and Installation

## ■ installation

When mounting the Auto switch to actuator it should be done with mounting bracket for actuator.

“How to mount” depends on actuator type and tube I.D. Please refer the actuator catalogue.

When the Auto switch is mounted newly, please prepare the mounting bracket for actuator after confirms that the actuator built in magnet.

### •Proper tightening torque

The tightening torque for a hexagon socket head cap screw (M2.5 x 9L/ M2.5 x 6L) is 0.2 to 0.3N•m.

The tightening torque for a hexagon socket head cap screw with cone point (M4 x 8L) is 1 to 1.2N•m.

### •Setting the detecting position

Set the actuator at the stroke end. Set the Auto switch in the area to where the Auto switch red lamp light.

### (Detecting actuator end)

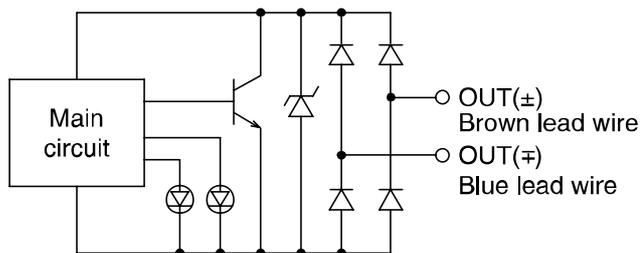
Based on A and B dimensions in the actuator catalogue, set the Auto switch.

For actual installation works, perform adjustment with checking the operating conditions of the Auto switch.

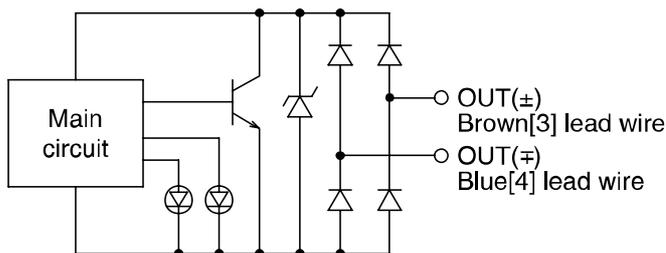
Air grippers and rotary actuators have their own setting method. Follow their instructions.

### •Internal circuit

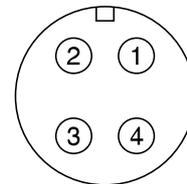
D-P3DW□



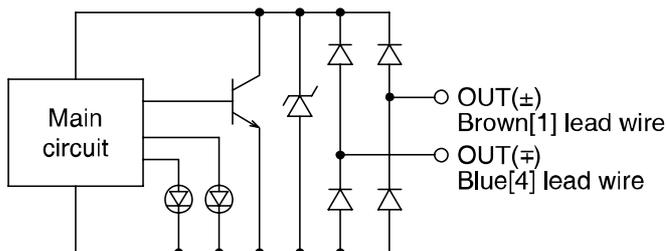
D-P3DWSC



Connector pin assignment



D-P3DWSE



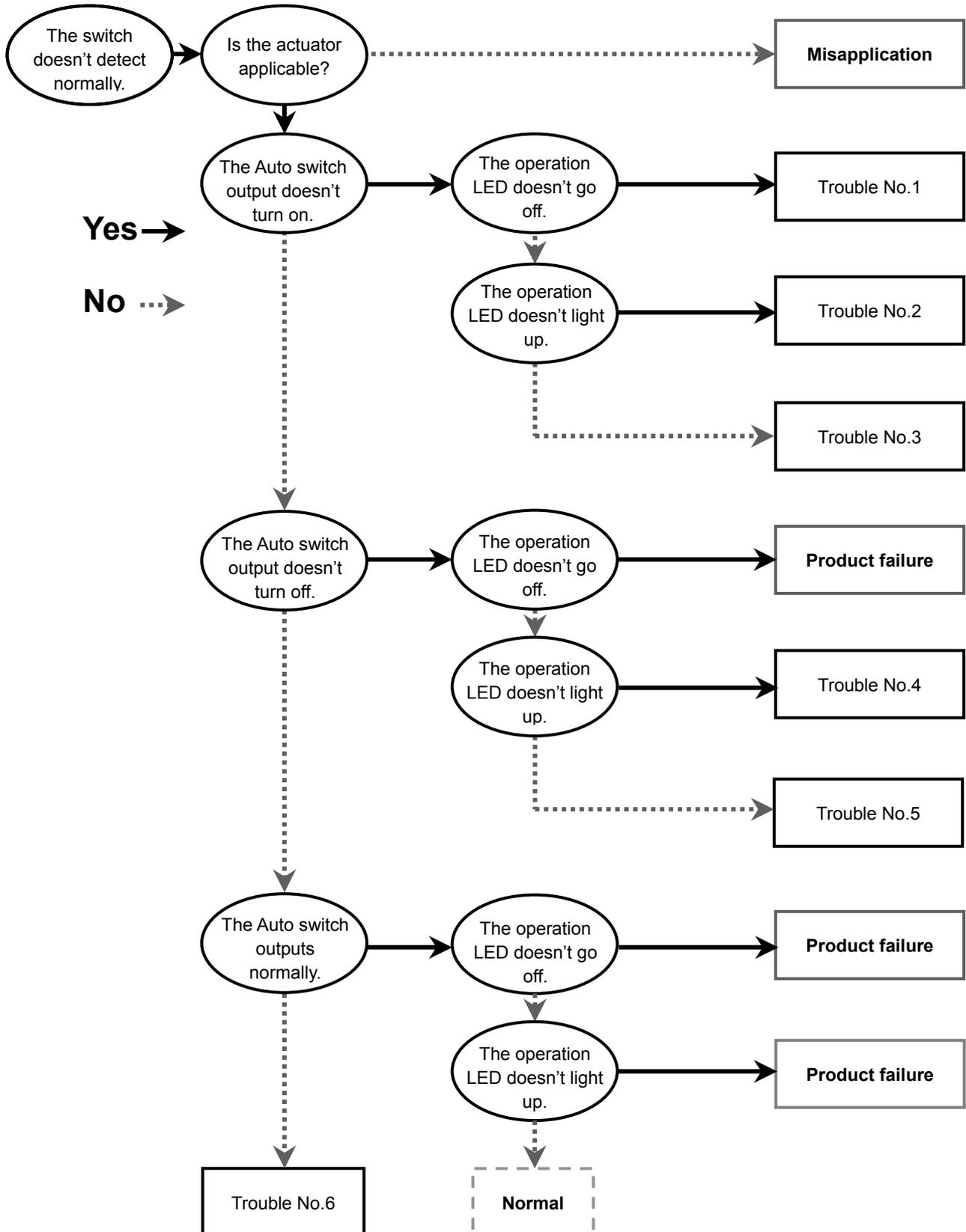
## Maintenance

### How to reset the product for power cut or forcible de-energizing

Regarding setting up, contents of program may be maintained by customer's application systems. Be sure to confirm safety when returning operation of the actuator because it could have been stopped in unstable condition.

# Troubleshooting

When the Auto switch falls in operation failure, identify the trouble with the following flow chart. A failure of the Auto switch might depend on operating environment (application etc.) and needs to be given a measure by contacting to us separately.



•Trouble list

Trouble No.	Trouble	Possible cause	Investigation to find possible cause	Countermeasure
1	The Auto switch output doesn't turn off. The operation LED doesn't go off.	Malfunction due to disturbance magnetic field	The effect of magnetic field generated by adjacent actuator	Place a magnetic shield plate to the actuator.
		Improper setting (mounting) position *Narrow angle	The presence of the following conditions - Auto switch operating angle - Actuator operating angle	Displace the Auto switch set position from the center of the actuator operating range.
2	The Auto switch output doesn't turn off. The operation LED doesn't light up.	Product failure	/	Replace the Product.
3	The Auto switch output doesn't turn off. The operation LED operates properly.	Mismatch the load current specification (2-wire)	Satisfaction of the following relations by the load current specification Load voltage is "ON" level > (Current leakage x n) x load resistance or Load current is "OFF" level > (Current leakage x n) n: The number of parallel connecting Auto switches	Reduce the number of switches.

Trouble No.	Trouble	Possible cause	Investigation to find possible cause	Countermeasure
4	The Auto switch output doesn't turn on. The operation LED doesn't light up.	Power supply failure	Power supply voltage (zero or extremely low)	Adjust power supply voltage to a given value. (Refer to page 16 "Power supply voltage or Load voltage" in Specifications.)
		Incorrect wiring	Voltage (load) applied to the Auto switch	Correct wiring. (Refer to page 10 "Internal circuit".)
		Improper setting (mounting) position	Detection close to the limit of Auto switch operating angle	Move the Auto switch to proper position (near the center of the Auto switch operating angle).
		Displacement from set position	Looseness of the Auto switch unit or Auto switch mounting screw	Fix to proper position at appropriate torque.
		Displacement of the actuator stopping angle	Deviation of the actuator stopping angle (position)	Stabilize stop position.
		Lowering of magnetic force for detection (demagnetization)	The presence of magnetic filed source near the actuator (electric welding machine conductor and strong magnet, etc.)	Place a magnetic shield plate between magnetic filed source and the actuator.
			The effect of magnetic field generated by adjacent actuator (placed within 20mm)	Separate the actuator (by 40mm or more). Place a magnetic shield plate.
			The presence of deposit of magnetic material (cutting chip) on the actuator	Remove the magnetic deposit.
Breakage of lead wire	The presence of repeated bending stress to a part of lead wire (bending radius, tensile force to the lead wire)	Correct wiring. (Adjust tensile force and enlarge bending radius.)		
5	The Auto switch output doesn't turn on. The operation LED operates properly.	Mismatch the load current specification (2-wire)	Satisfaction of the following relations by the load current specification Load voltage is "ON" level > Load voltage - (Internal voltage drop x n) n: The number of series connecting Auto switches	Reduce the number of switches.

Trouble No.	Trouble	Possible cause	Investigation to find possible cause	Countermeasure
6	The operation is unstable. (chattering)	Improper setting (mounting) position	Detection close to the limit of Auto switch operating angle	Move the Auto switch to proper position (near the center of the Auto switch operating angle).
		Displacement from set position	Looseness of the Auto switch unit or Auto switch mounting screw	Fix to proper position at appropriate torque.
		Incorrect wiring	Condition of connected part (connector contact pin and crimping terminal)	Correct wiring. (Perform wiring of connected part again.)
		Breakage of lead wire	The presence of repeated bending stress to a part of lead wire (bending radius, tensile force to the lead wire)	Correct wiring. (Adjust tensile force and enlarge bending radius.)
		Malfunction due to disturbance magnetic field	The presence of magnetic field source near the actuator (actuator, electric welding machine conductor, motor, magnet etc.)	Place a magnetic shield plate between magnetic field source and the actuator, or separate magnetic field source from the actuator.
	The Auto switch operates at multiple points.	Malfunction due to disturbance magnetic field	The effect of magnetic field generated by adjacent actuator	Place a magnetic shield plate to the actuator.
	The load doesn't work.	Operating angle range Detection at intermediate position	Satisfaction of the following relations by the actuator rotation speed Load operating time [s] < Auto switch operating angle range [mm]/Actuation operating speed [mm/s]	Decrease the actuating driving speed until specified relations can be satisfied.

# Specifications

## ■ Specification

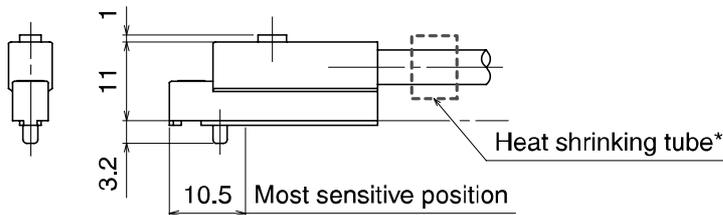
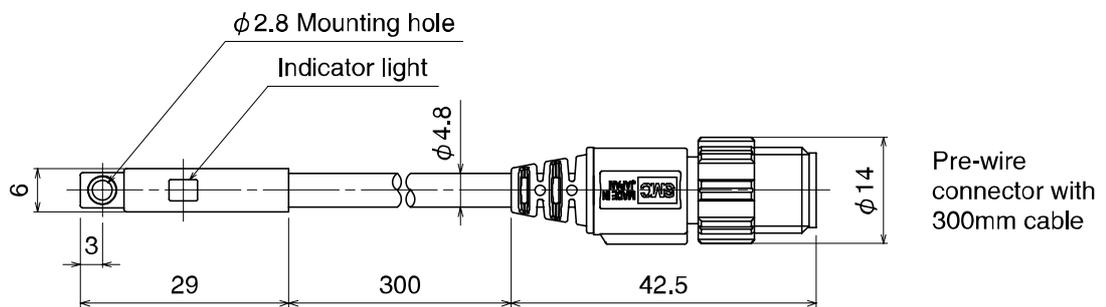
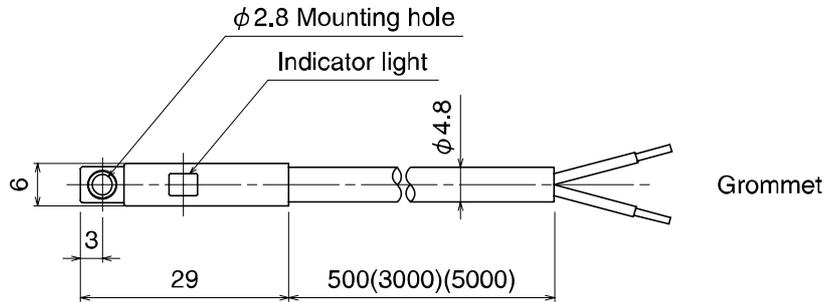
Auto switch model	D-P3DW□
Wiring	2-wire
Output	-
Applicable load	24VDC Relay/PLC
Load voltage	24VDC (20 to 28VDC)
Load current	6 to 40mA
Internal voltage drop	5V or less
Current leakage	1mA or less
Operating time	40ms or less
Indication light	Operating position: The red LED lights up. Optimum operating position: The Green LED lights up.
Electrical entry	Grommet
Lead wire	Vinyl sheath cable φ4.8, 0.5mm <sup>2</sup> , 2-wire
Impact proof	1000m/s <sup>2</sup>
Insulation resistance	50MΩ or more under the test voltage 500VDC (between case and cable)
Withstand voltage	1000VAC 1min (between case and cable)
Ambient temperature	-10 to 60°C
Enclosure	IEC60529 criteria IP67
Standards	CE, UL, RoHS

### •Magnetic field resistance

When the alternative welding current is below 16000A, it is not necessary to keep a distance between the actuator or Auto switch and the welding conductor (gun and cable). (Distance: 0mm) If the current exceeds 16000A, check the distance between them.

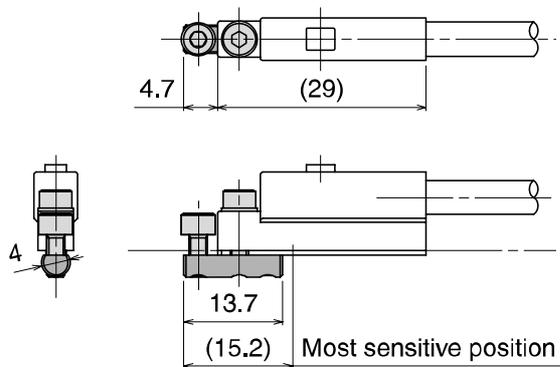
## ■Dimensions

### Body

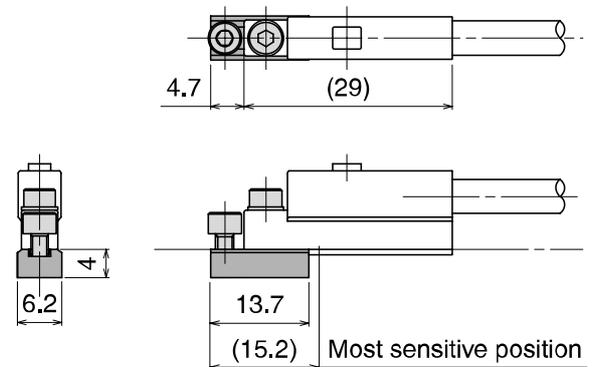


\*: Mounting the white heat shrinking tube with only D-P3DWSE.

### Mounting bracket for round groove (BQ3-032S)



### Mounting bracket for square groove (BMG5-025S)



\*: When you order the Auto switch independently, the Auto switch mounting bracket is not enclosed, and needs to be ordered separately.

## Applicable actuator

Applicable actuator	Product series	Bore size (mm)								Page
		25	32	40	50	63	80	100	125	
Clamp cylinder	CKG1			●	●	●				Page 19
Clamp cylinder with lock	CLK2G			●	●	●				Page 19
Air cylinder	MDB		●	●	●	●	●	●	●	Page 20
	CDA2			●	●	●	●	●		Page 22
Air cylinder with lock	MDNB		●	●	●	●	●	●		Page 20
	CDNA			●	●	●	●	●		Page 22
Compact cylinder	CDQS	●								Page 24
	CDQ2		●	●	●	●	●	●		Page 25
Compact cylinder with lock	CDLQ	●	●	●	●	●	●	●		Page 25
Compact guide cylinder	MGP	●	●	●	●	●	●	●		Page 26
	MGPS				●		●			Page 26
Compact guide cylinder with lock	MLGP	●	●	●	●	●	●	●		Page 26
Pin clamp cylinder	C(L)KQG				●					Page 27

### <Precaution for mounting each actuator>

- Proper Auto switch mounting position/height

The above show reference values when an auto switch is mounted for detection at the stroke end.  
For actual settings, adjust the position after checking the auto switch operating conditions.

- Auto switch operation range

The operating range is guide including hysteresis, but is not guaranteed.  
(Assuming approximately  $\pm 30\%$  dispersion)

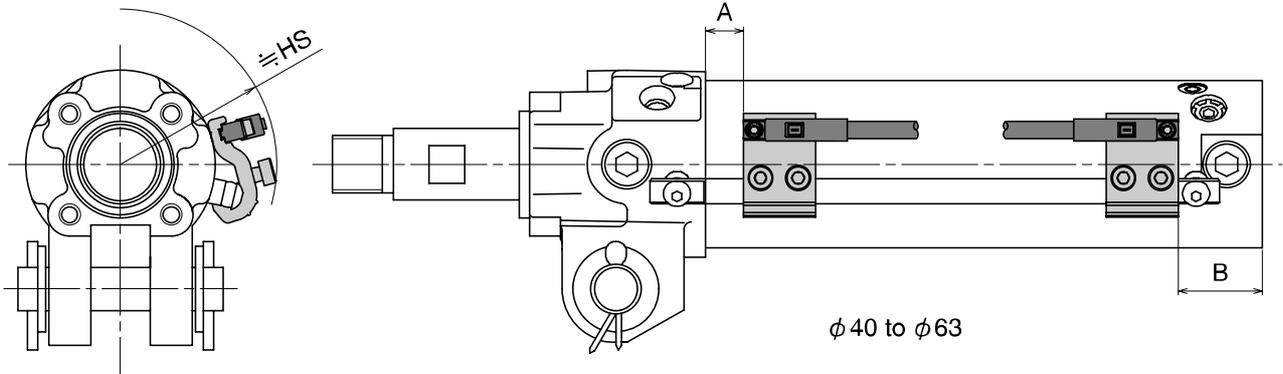
There may be varied substantially depending on the surrounding environment.

- Minimum stroke for mounting Auto switch

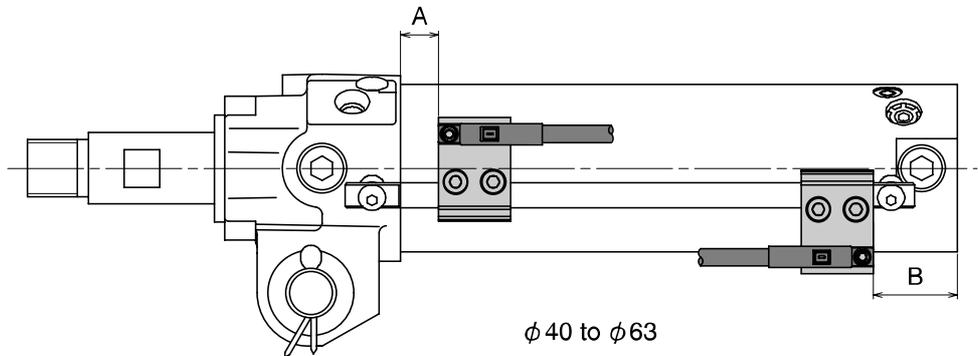
When a stroke smaller than the minimum feasible stroke for built-in magnet cylinders is required, conform to the feasible cylinder stroke.

## CKG1/CLK2G Series

Mounted on the same side



Mounted on different side



•Proper Auto switch mounting position/height (mm)

Actuator series	CKG1/CLK2G		
Bore size (mm)	A	B	Hs
40	10.5	23.5	43.5
50	7	30	49.5
63	7	30	56.5

•Auto switch operating range (mm)

Actuator series	Bore size (mm)		
	40	50	63
CKG1/CLK2G	4	5	6

•Minimum stroke for mounting Auto switch

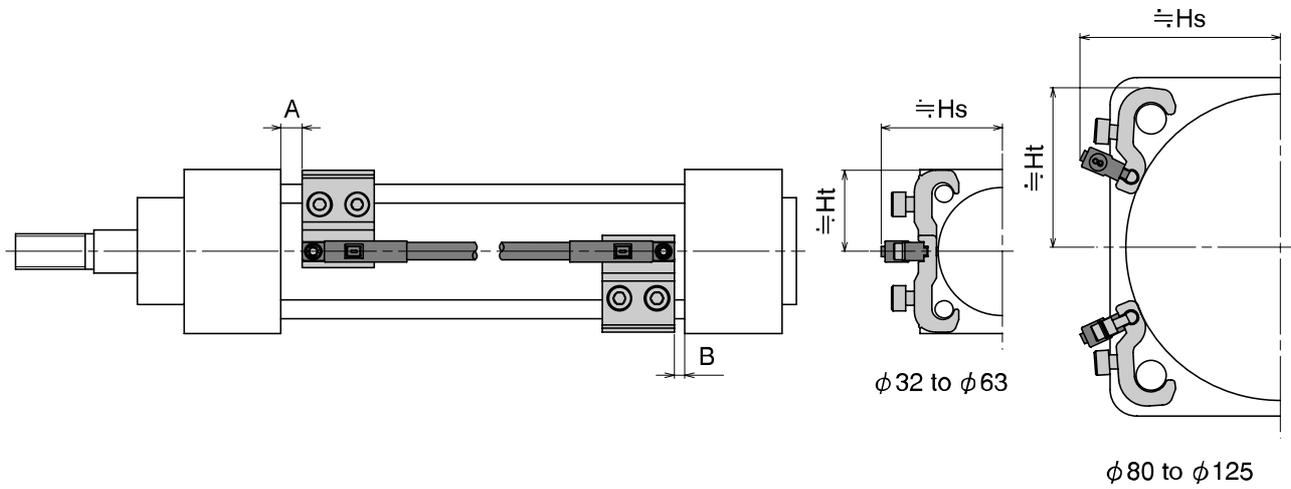
Applicable actuator: CKG1/CLK2G (mm)

No. of Auto switches mounted	Bore size (mm)
	φ40 to φ63
1pc. mounted	15
2 pcs. mounted on different side	30
2 pcs. mounted on the same side	75

The standard stroke of CKG1/CLK2G series are 50,75,100,125 and 150mm.

In case of mounting 2 Auto switches on the actuator of stroke 50mm, it's applicable to mounted on different side.

## **MDB/MDNB Series**



### •Proper Auto switch mounting position/height (mm)

Actuator series	MDB/MDNB			
	A	B	Hs	Ht
Bore size (mm)				
32	6	3	34	23
40	6	3	38	26
50	6	4	42	31
63	6	4	50	36
80	4.5	3	56	45
100	4.5	3	63.5	53.5
125	7	7	74.5	64.5

### •Auto switch operating range (mm)

Actuator series	Bore size (mm)						
	32	40	50	63	80	100	125
MDB/MDNB	4.5	5	5	5.5	4	6.5	8.5

•Minimum stroke for mounting Auto switch

Applicable actuator: MDB

(mm)

No. of Auto switches mounted	Support bracket other than center trunnion	
	Bore size (mm)	
	φ32 to φ125	
2 pcs. mounted (different side, same side) 1 pc. mounted	15	
n pcs.	$15 + 50 \frac{(n-2)}{2}$ n = 2, 4, 6, 8 ...	

(mm)

No. of Auto switches mounted	Center trunnion	
	Bore size (mm)	
	φ32	φ40 to φ50
2 pcs. mounted (different side, same side) 1 pc. mounted	80	85
n pcs.	$80 + 50 \frac{(n-4)}{2}$ n = 4, 8, 12, 16 ...	$85 + 50 \frac{(n-4)}{2}$ n = 4, 8, 12, 16 ...

(mm)

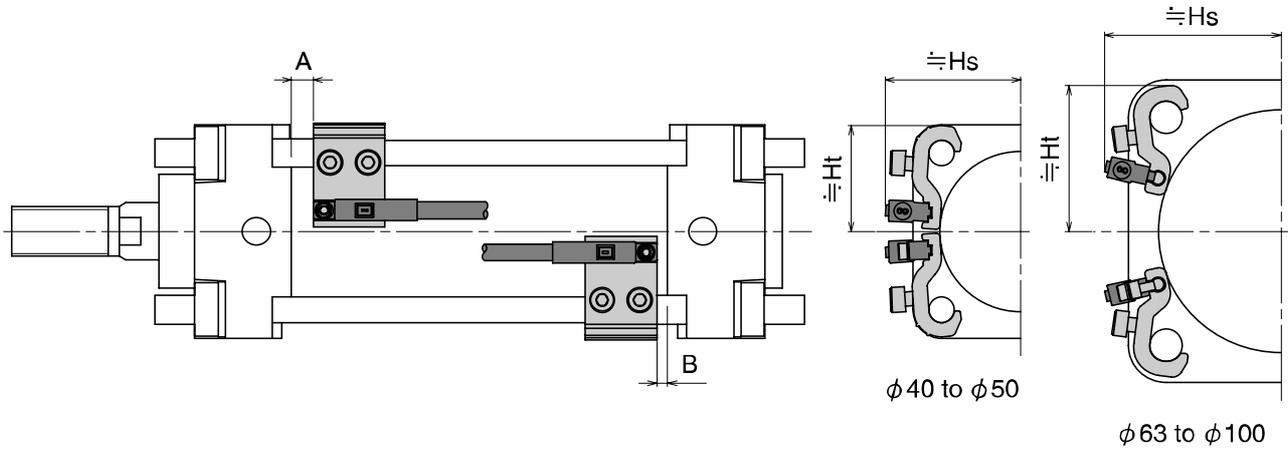
No. of Auto switches mounted	Center trunnion		
	Bore size (mm)		
	φ63 to φ80	φ100	φ125
2 pcs. mounted (different side, same side) 1 pc. mounted	90	95	100
n pcs.	$90 + 50 \frac{(n-4)}{2}$ n = 4, 8, 12, 16 ...	$95 + 50 \frac{(n-4)}{2}$ n = 4, 8, 12, 16 ...	$100 + 50 \frac{(n-4)}{2}$ n = 4, 8, 12, 16 ...

Applicable actuator: MDNB

(mm)

No. of Auto switches mounted	Support bracket (Without center trunnion)	
	Bore size (mm)	
	φ32 to φ100	
2 pcs. mounted (different side, same side) 1 pc. mounted	15	
n pcs.	$15 + 50 \frac{(n-2)}{2}$ n = 2, 4, 6, 8 ...	

## CDA2/CDNA Series



### •Proper Auto switch mounting position/height (mm)

Actuator series	CDA2				CDNA			
	Bore size (mm)	A	B	Hs	Ht	A	B	Hs
40	6	3	38	30	5.5	3.5	38	30
50	5.5	3.5	42	34	5.5	3.5	42	34
63	3.5	2	49	41	3	1.5	49	41
80	6.5	5	56	49	6.5	4	56	49
100	8.5	7	65	56	8	6.5	65	56

### •Auto switch operating range (mm)

Actuator series	Bore size (mm)				
	40	50	63	80	100
CDA2/CDNA	4.5	5	6	5.5	6

### •Minimum stroke for mounting Auto switch

Applicable actuator: CDA2

(mm)

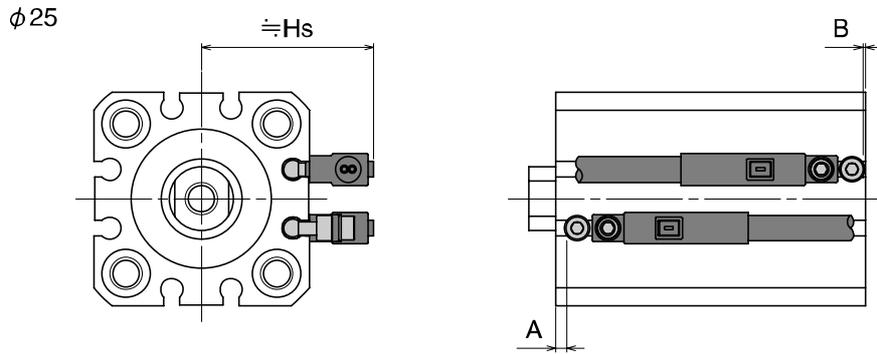
No. of Auto switches mounted	Support bracket other than center trunnion	Center trunnion
	Bore size (mm)	
	φ40 to φ100	φ40 to φ100
2 pcs. mounted (different side, same side) 1 pc. mounted	15	85
n pcs.	$15 + 50 \frac{(n-2)}{2}$ n = 2, 4, 6, 8 ...	$85 + 50 \frac{(n-4)}{2}$ n = 4, 8, 12, 16 ...

Applicable actuator: CDNA

(mm)

No. of Auto switches mounted	Support bracket other than center trunnion	Center trunnion			
	Bore size (mm)				
	φ40 to φ100	φ40 to φ63	φ80	φ100	
2 pcs. mounted (different side, same side) 1 pc. mounted	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 ...	

## CDQS Series



•Proper Auto switch mounting position/height (mm)

Actuator series	CDQS		
	A	B	Hs
Bore size (mm)			
25	2	0.5	32

•Auto switch operating range (mm)

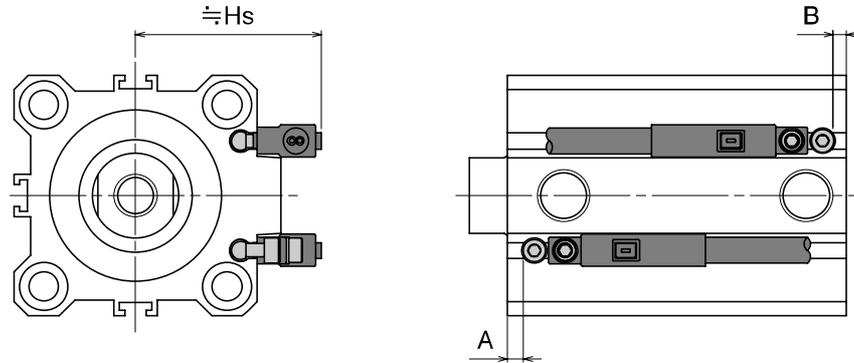
Actuator series	Bore size (mm)
CDQS	5.5

•Minimum stroke for mounting Auto switch (mm)

No. of Auto switches mounted	Applicable actuator
	CDQS φ25
1 pc.	15
2 pcs.	15

## CDQ2/CDLQ Series

φ 32 to φ 100



\*: In case of φ25 of bore size for CDLQ, see page 24.

### •Proper Auto switch mounting position/height (mm)

Actuator series	CDQ2*			CDLQ		
	Bore size (mm)	A	B	Hs	A	B
25	—	—	—	33	0.5	32
32	3	0	34.5	35	0	34.5
40	7	2.5	38	41	2.5	38
50	5	5	44	40	5	44
63	7.5	8	47.5	45.5	8	47.5
80	10.5	12.5	57.5	53.5	12.5	57.5
100	15	18	67.5	65	18	67.5

\*: Contact us when mounting the Auto switch on the end lock type of CDBQ2.

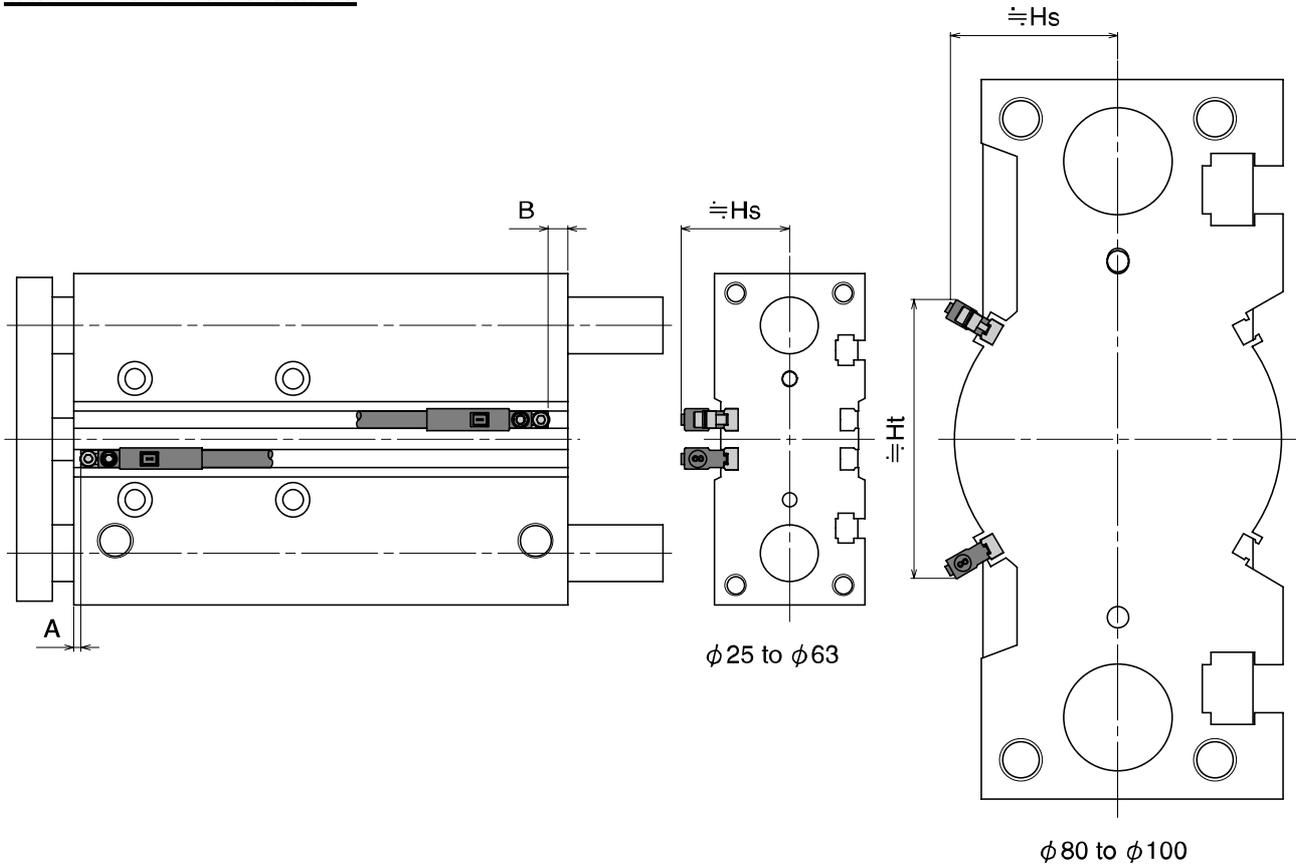
### •Auto switch operating range (mm)

Actuator series	Bore size (mm)						
	25	32	40	50	63	80	100
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

### •Minimum stroke for mounting Auto switch (mm)

No. of Auto switches mounted	Applicable actuator	
	CDQ2 φ32 to φ100	CDLQ φ25 to φ100
1 pc.	15	
2 pcs.	15	

## MGP/MLGP/MGPS Series



### •Proper Auto switch mounting position/height

(mm)

Actuator series	MGP*/MLGP				MGPS			
	A	B	Hs	Ht	A	B	Hs	Ht
25	2	5.5	30	—	—	—	—	—
32	3	4.5	33	—	—	—	—	—
40	7	7	37	—	—	—	—	—
50	5	9	42.5	—	4.5	8.5	42.5	—
63	7.5	11.5	49.5	—	—	—	—	—
80	10.5	16	48	78.5	10	14	48	78.5
100	15	21	58	90	—	—	—	—

\*: The end lock type of MGP cannot mount the Auto switch on the lock mechanism, and so mount the Auto switch into the groove at the back face.

### •Auto switch operating range

(mm)

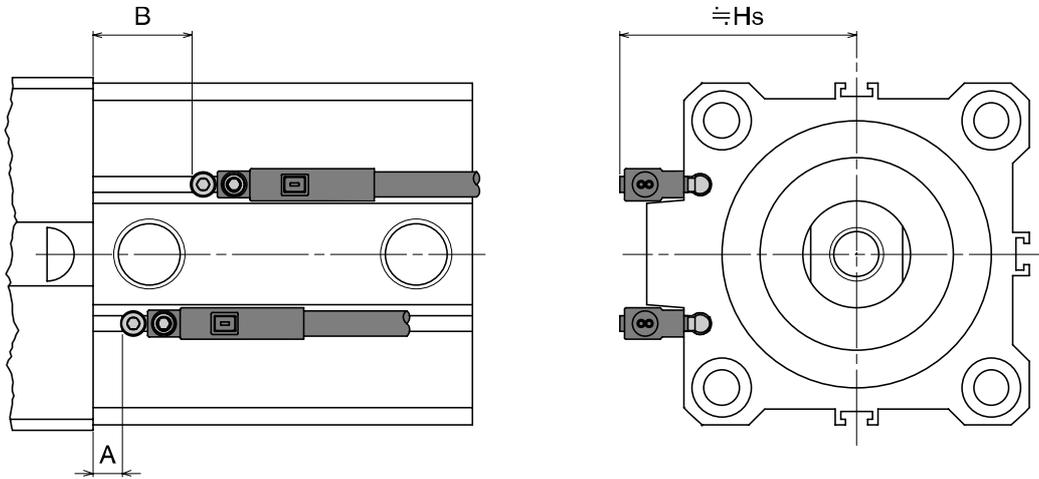
Actuator series	Bore size (mm)						
	25	32	40	50	63	80	100
MGP/MLGP	6	5.5	5.5	5.5	6.5	7.5	7.5
MGPS	—	—	—	5.5	—	7.5	—

### •Minimum stroke for mounting Auto switch

(mm)

No. of Auto switches mounted	Applicable actuator		
	MGP φ25 to φ100	MLGP φ25 to φ100	MGPS φ50 to φ80
1 pc.	15		
2 pcs.	15		

## CKQG/CLKQG Series



•Proper Auto switch mounting position/height (mm)

Actuator series	CKQG			CLKQG		
	A	B	Hs	A	B	Hs
50	5.5	18.5	44	40.5	50.5	44

•Auto switch operation range (mm)

Actuator series	Bore size (mm)
	CKQG/CLKQG

•Minimum stroke for mounting Auto switch (mm)

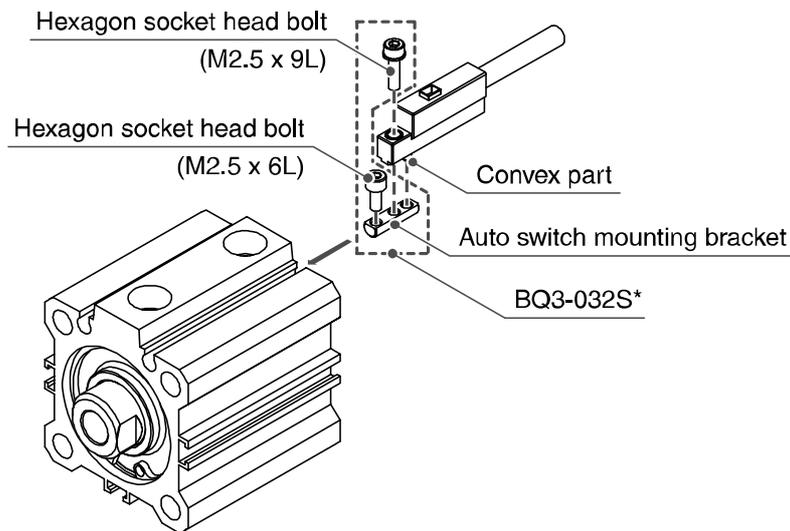
No. of Auto switches mounted	Applicable actuator
	CKQG/CLKQG φ50
1 pc.	15
2 pcs.	15

### Mounting and transfer of Auto switch

When you order the actuator with an Auto switch, the actuator, Auto switch and Auto switch mounting bracket (including screws) are enclosed.

When you order the Auto switch independently, the Auto switch mounting bracket is not enclosed, and needs to be ordered separately.

### Direct mounting to the round groove



Applicable actuator		Part number of the Auto switch mounting bracket
Compact cylinder	CDQS $\Phi$ 25	BQ3-032S
	CDQ2 $\Phi$ 32 to 100	
Compact cylinder with lock	CDLQ $\Phi$ 25 to 100	
Pin clamp cylinder	CKQG $\Phi$ 50	
Pin clamp cylinder with lock	CLKQG $\Phi$ 50	

\*: When you order the part number for Auto switch mounting bracket, all parts in a dashed line is enclosed.

### Mounting and transfer of D-P3DW□ Part 1\*

1. Insert the convex part at the back of the Auto switch to the mating part of the mounting bracket and fix them temporarily by tightening the hexagon socket head bolt (M2.5 x 9L) 1 to 2 turns.
2. Insert the temporarily tightened mounting bracket to the mating groove of the actuator, and slide the Auto switch onto the actuator through the groove.
3. Check the detecting position of the Auto switch and fix the Auto switch firmly by the hexagon socket head bolts (M2.5 x 9L/M2.5 x 6L).
4. If the detecting position is not as required, move back to step 2.

- \*:
- The hexagon socket head bolt (M2.5 x 6L) is used to fix the mounting bracket and actuator. This enables the replacement of Auto switch on the actuator without adjusting the Auto switch.
  - Ensure that the Auto switch is covered with the mating groove for the Auto switch to protect the Auto switch.
  - The torque for tightening the hexagon socket head bolt (M2.5 x 9L/M2.5 x 6L) is 0.2 to 0.3N·m.
  - The hexagon socket head bolt should be tightened evenly.

#### Precautions for mounting actuator

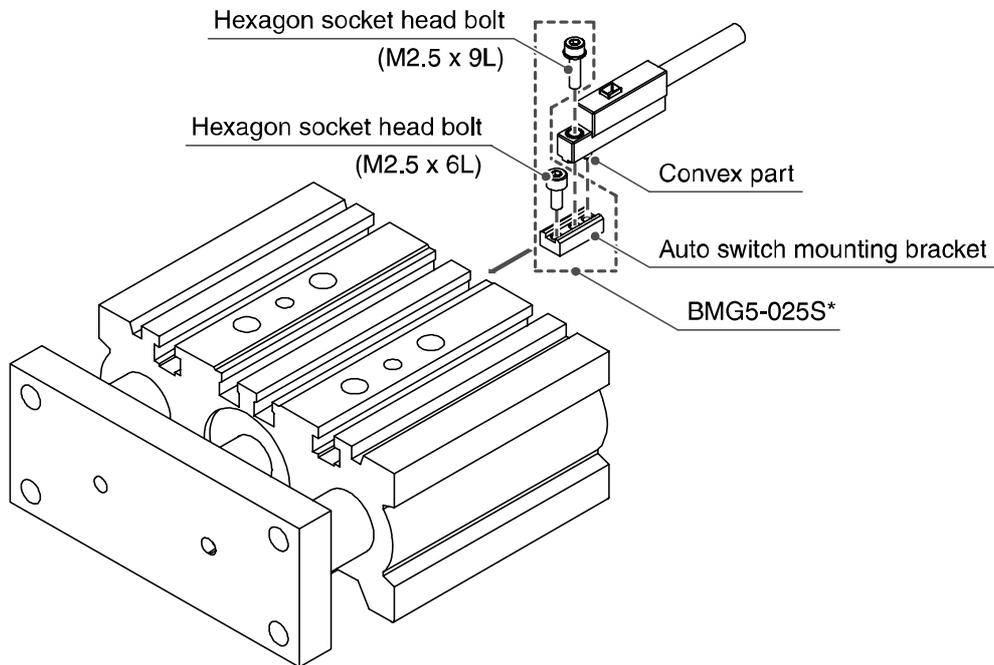
- \*1: When mounting the Auto switch on  $\phi$ 32 to 50 actuator, use the fitting with a spanner/wrench flat of not more than 12mm for  $\phi$ 32 and 40 and 14mm for  $\phi$ 50 to avoid mutual interference.

If the side of hexagon interferes with the housing of the Auto switch, adjust the tightened amount of the fitting to eliminate the interference. For the interference with an elbow type fitting, direct the port of the fitting to other parts than the Auto switch.

Such interference must be avoided for the speed controller or speed exhaust controller with a fitting when selected.

- \*2: In the  $\phi$ 25 CDQS, and CDLQ the Auto switch will interfere with the fitting if mounted on the ported face, and needs to be mounted on other faces.

## Direct mounting to the square groove



Applicable actuator		Part number of the Auto switch mounting bracket
Compact guide cylinder	MGP $\Phi$ 25 to 100	BMG5-025S
Compact guide cylinder with lock	MLGP $\Phi$ 25 to 100	
Compact guide cylinder	MGPS $\Phi$ 50	

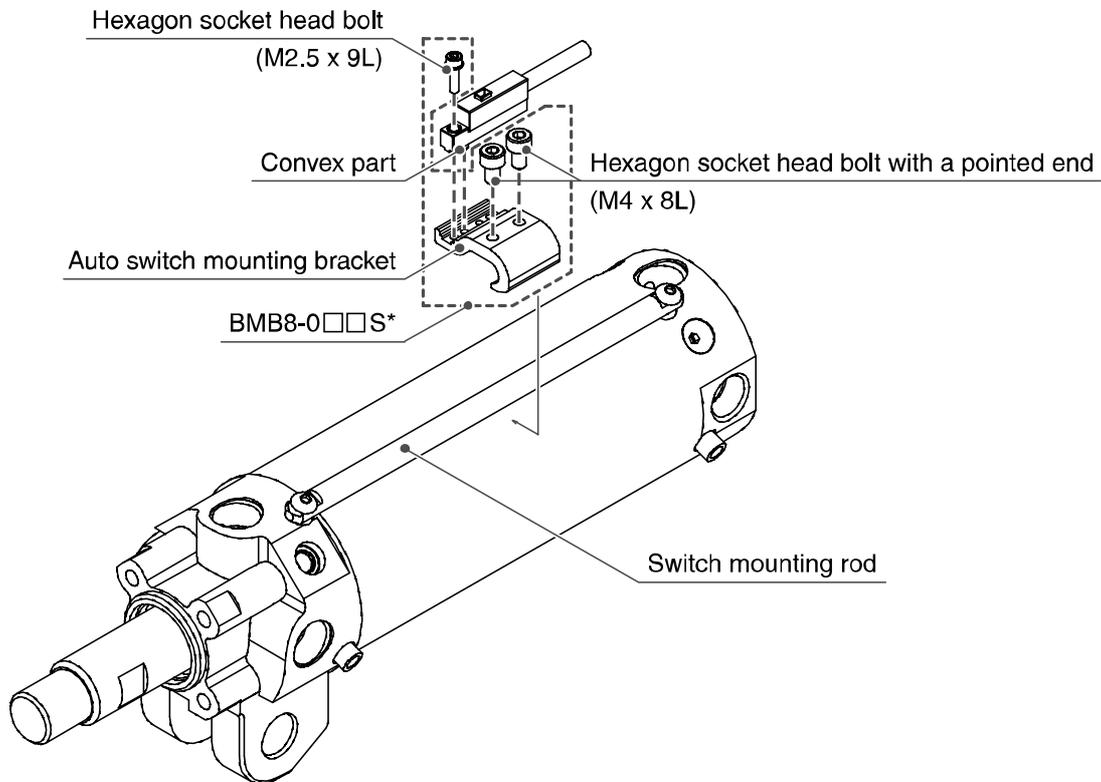
\*: When you order the part number for Auto switch mounting bracket, all parts in a dashed line is enclosed.

### **Mounting and transfer of D-P3DW□ Part 2\***

1. Insert the convex part at the back of the Auto switch to the mating part of the mounting bracket and fix them temporarily by tightening the hexagon socket head bolt (M2.5 x 9L) 1 to 2 turns.
2. Insert the temporarily tightened mounting bracket to the mating groove of the actuator, and slide the Auto switch onto the actuator through the groove.
3. Check the detecting position of the Auto switch and fix the Auto switch firmly by the hexagon socket head bolts (M2.5 x 9L/M2.5 x 6L).
4. If the detecting position is not as required, move back to step 2.

- \*:
- The hexagon socket head bolt (M2.5 x 6L) is used to fix the mounting bracket and actuator. This enables the replacement of Auto switch on the actuator without adjusting the Auto switch.
  - Ensure that the Auto switch is covered with the mating groove for the Auto switch to protect the Auto switch.
  - The torque for tightening the hexagon socket head bolt (M2.5 x 9L/M2.5 x 6L) is 0.2 to 0.3N•m.
  - The hexagon socket head bolt should be tightened evenly.

## Rod mounting type 1



Applicable actuator		Part number of the Auto switch mounting bracket
Clamp cylinder	CKG1 $\Phi$ 40 to 63	Refer to the mounting bracket on page 32.
Clamp cylinder with lock	CLK2G $\Phi$ 40 to 63	
Air cylinder	MDB $\Phi$ 32 to 63	
	CDA2 $\Phi$ 40 to 50	
Air cylinder with lock	MDNB $\Phi$ 32 to 63	
	CDNA $\Phi$ 40 to 50	

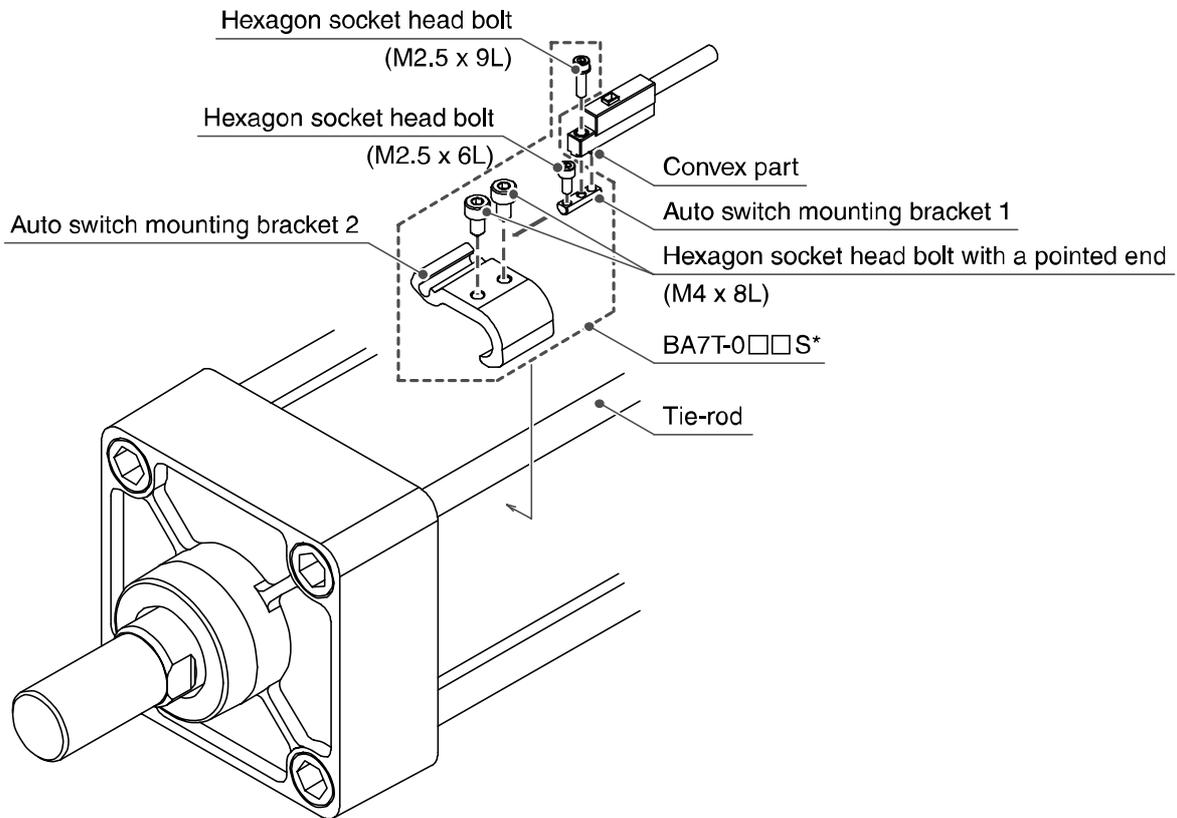
\*: When you order the part number for Auto switch mounting bracket, all parts in a dashed line is enclosed.

### Mounting and transfer of D-P3DW□ Part 3\*

1. Insert the convex part at the back of the Auto switch to the mating part of the mounting bracket and fix them temporarily by tightening the hexagon socket head bolt (M2.5 x 9L) 1 to 2 turns.
2. Install the mounting bracket on which the Auto switch is mounted to the mounting rod, and move the Auto switch with keeping firm contact between the bottom of the Auto switch and the actuator, and explore the detecting of position of the Auto switch.
3. Check the detecting position of the Auto switch and fix the Auto switch firmly by the hexagon socket head bolts with a pointed end (M4 x 8L).
4. If the detecting position is not as required, move back to step 2.

- \*:
- The torque for tightening the hexagon socket head bolt with a pointed end (M4 x 8L) is 1 to 1.2N•m.
  - The torque for tightening the hexagon socket head bolt (M2.5 x 9L) is 0.2 to 0.3N•m.
  - The hexagon socket head bolt should be tightened evenly.

## Rod mounting type 2



Applicable actuator		Part number of the Auto switch mounting bracket
Air cylinder	MDB $\Phi$ 80 to 125	Refer to the mounting bracket on page 32.
	CDA2 $\Phi$ 63 to 100	
Air cylinder with lock	MDNB $\Phi$ 80 to 100	
	CDNA $\Phi$ 63 to 100	

\*: When you order the part number for Auto switch mounting bracket, all parts in a dashed line is enclosed.

### Mounting and transfer of D-P3DW□ Part 4\*

1. Install the mounting bracket 2 to the tie rod, and fix the Auto switch with keeping firm contact between the bottom of the Auto switch and the actuator on approximate mounting position by the hexagon socket head bolt with a pointed end (M4 x 8L).
2. Insert the convex part at the back of the switch to the mating part of the mounting bracket 1 and fix them temporarily by tightening the hexagon socket head bolt (M2.5 x 9L) 1 to 2 turns.
3. Insert the temporarily tightened mounting bracket 1 to the mating groove of the mounting bracket 2, and check the detecting position of the Auto switch. Then, fix the Auto switch firmly by the hexagon socket head bolts (M2.5 x 9L/M2.5 x 6L).
4. If the detecting position is not as required, move back to step 1 or 3.

- \*: •Ensure that the Auto switch is covered with the mating slot for the Auto switch by a minimum of 15mm to protect the Auto switch.  
 •The torque for tightening the hexagon socket head bolt with a pointed end (M4 x 8L) is 1 to 1.2N•m.  
 •The torque for tightening the hexagon socket head bolt (M2.5 x 9L/M2.5 x 6L) is 0.2 to 0.3N•m.  
 •The hexagon socket head bolt should be tightened evenly.

Part number of the Auto switch mounting bracket for CK series (including brackets and screws)

Actuator series	Bore size (mm)		
	40	50	63
CKG1/CLK2G	BMB8-050S		

Part number of the Auto switch mounting bracket for CA series (including brackets and screws)

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

Part number of the Auto switch mounting bracket for MB series (including brackets and screws)

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

\*: The difference in the color and brightness of surface treatment to metal does not give any effect on performance.  
 Due to the characteristic of chromate (trivalent) applied to the whole body of the mounting bracket, there can be difference in its color for different manufacturing code. However, this will not degrade the corrosion resistance of the mounting bracket.

Revision history

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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.  
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