

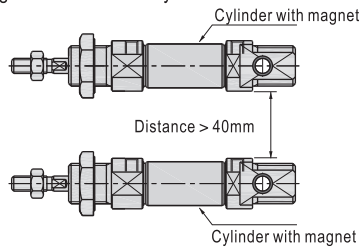
How to correctly select sensor switch

A. Confirmation of specification

Load current, voltage, temperature and impact performance beyond the scope of specification in product sample are not allowed to be used to avoid poor action or damage of magnetic switch.

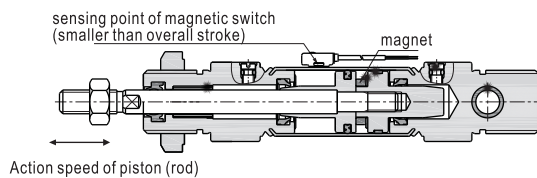
B. Confirmation of distance

The distance between two cylinders shall be longer than 40mm to prevent wrong action caused by magnetic interfere between two magnetic switches when the cylinders with magnet are horizontally used.



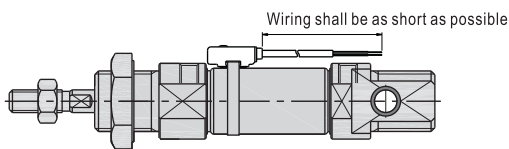
C. Confirmation of action speed of the cylinder

Magnetic switch is set in the middle position of the stroke. What shall be noticed is that maybe no drive load action exists if the speed of piston is too fast and the action duration of magnetic switch becomes shorter under the situation that load is driven by electrical signal sent by magnetic switch when piston passes through. If the speed of piston is higher than the maximum allowable speed, magnetic switch with time-extending function shall be selected.



D. Confirmation of the length of wiring

- ◆ Magnetic switch with contact
 - If the wiring that ends in load is too long, the service life will be shortened when the suddenly added current is increased as the switch is supplied with power.
 - 1) Contact protection box shall be adopted when the wiring is longer than 5m if the magnetic switch has no contact protection circuit.
 - 2) For the switch with contact protection circuit, the suddenly added current can not be fully absorbed and the service life will be shortened if the wiring is longer than 30m. To extend its service life, it is necessary to connect to contact protection box.
- ◆ Magnetic switch with no contact
 - The wiring which has no effect on the function shall be within 100m.



E. Confirmation of internal voltage drop of magnetic switch

- ◆ Magnetic switch with contact
 - 1) Switch with indicator
 - When switches are connected in series, as there is internal resistance in LED, pay attention to the raising of the voltage drop (when n switches are connected in series, the voltage drop is n times of the voltage of one switch). If the switch is used under the specified voltage, all magnetic switches can work normally, but load may not act. What must be affirmed is that the load voltage shall be above the lowest operating voltage, which shall meet the following formula:
internal voltage drop of power voltage switch > loaded lowest operating voltage.

2. Switches with no indicator lights can be chosen when the internal resistance in LED causes no action of the load

- ◆ Magnetic switch with no contact

The internal voltage drop of linear magnetic switch with no contact is generally larger than that of magnetic switch with contact. The attentions are the same with 1. In addition: DC12V relay is not used, please notice that.

Attention

F. Notice of the leaked current

- ◆ Magnetic switch with no contact

When all linear magnetic switches with no contact are disconnected, if the leaked current of internal circuit action passes through load, the requests are: load action current (cut current inputted into controller) > leaked current. If the request is not met, the switch will always stay in power supply situation and can not be cut off. In this situation, three-line switch shall be used. When N switches parallel, the leaked current that passes through load is n times of the leaked current of single switch.

G. Never directly use the load produced by overvoltage

- ◆ Magnetic switch with contact

Switch with contact protection circuit or contact protection box shall be used in the situation that drive relay occurs overvoltage load

- ◆ Magnetic switch with no contact

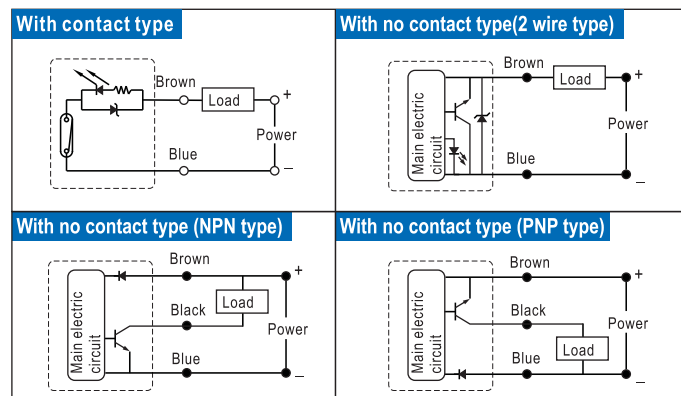
Though there is zener diode that is used for protection of overvoltage in the output part of magnetic switch with no contact, the repeated effect of pulse voltage may damage components. Overvoltage absorbing components shall be inserted in the situation that direct drive relay and electromagnetic valve occurs overvoltage load.

H. Situation that uses interlock circuit

Machinery type protection function is set to prevent faults. Machinery signal is turned into switch signal through sensor, which is used together with magnetic switch signal and forms dual interlock mode, whose credibility is higher. Maintenance and examination shall be carried out termly to make sure the action of interlock circuit is normal.

I. Ensure maintenance space

Wiring diagram of sensor switch



additional and adjustment of sensor switch

Attention

1. To avoid machinery damage

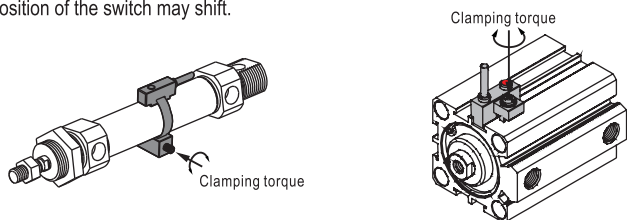
Switch shall not fall down or impact or bear over great impact (switch with contact shall be smaller than 300m/s^2) when it is installed. Though the nomenclon of the switch is not damaged, its inside may be damaged and occur wrong action.

2. The wire of the switch shall not move with the action of cylinder

The wire is easy to break, and if the force is added to the inside of the switch, the internal components of the switch may be damaged; therefore, the wire of the switch is absolutely not allowed to move with the action of cylinder.

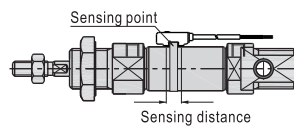
3. Clamping torque shall be within the allowable scope when the switch is installed

If the clamping torque is excessively high, the installed screw, accessories and switches may be damaged. If the clamping torque is insufficient, the additional position of the switch may shift.



4. Switch shall be installed in the middle position of the action scope

Action scope refers to the scope of the switch connection. Adjust the additional position of the magnetic switch as the piston is stopped in the center of the action scope. If the switch is installed near the two terminals of the action scope, Which is the limit of the on-off of the switch, the action of the switch is not steady.



Wiring of sensor switch

Warnings

1. Wire can not bear the repeated bend force and stretching force to prevent breakage.
2. Make sure that the power is supplied after connecting the load: for two-line type switch, the current will burn the switch instantly when the power is supplied if the load is not connected.
3. No poor insulation (joint with other circuits, poor earthing and terminal connection) in wire is allowed to prevent the damage to switch caused by the current passing through the switch.
4. It is no allowed to make a wiring with a parallel power line and high voltage line or use one wiring pipe to prevent wrong action of the magnetic switch caused by interfere of control circuit.
5. Short circuit is not allowed in the load of the switch
6. Please notice that never make a wrong wiring
 - ◆ Magnetic switch with contact
 - DC24V switch with indicator has polarity. Brown line or No. 1 terminal is "+", and blue line or No. 2 terminal is "-".
 - ① Once they are connected reversely, the switch acts, but the LED will not be on. In addition, once the current above stipulated number passes, the LED will be burned and the switch can not act.
 - ② However, the magnetic switch indicated by two colors will turn to normally opened state once it is reversely connected.
 - ◆ Magnetic switch with no contact

For three-line switch, there is protection for circuit once the power is reversely connected (that is the "+" and "-" of the power is mutually replaced). When "+" is connected with blue line and "-" is connected with black line, the switch will be damaged.

Application environment of sensor switch

Danger

1. Magnetic switch is absolutely not allowed to be used in the atmosphere with explosive gas as it has no anti-explosion structure.
2. Magnetic switch shall not be used in the situation with magnetism, otherwise it will cause wrong action of the switch or reduce the magnetism of the magnet ring in side of the cylinder
3. Magnetic switch shall not be used in the environment that is always eroded by water. Otherwise, the sealed resin inside the switch will expand due to poor insulation, which may cause wrong action.
4. Magnetic switch shall not be used in the environment that has coolant, detergent, oil or chemicals. Please contact the company if the switch is used in the environment that has oil or chemicals or in the situation that it will be badly influenced in a short time (such as poor insulation, wrong action caused by expanded seaed resin and induration of the wire).
5. Never use in the environment that the temperature changes in circle. Or it will has bad influence on the inner part of the switch. Common temperature change is exceptional.
6. Never use in the environment with excessively great impact.
 - ◆ Magnetic switch with contact
 - When magnetic switch with contact meets excessively great impact (over 300m/s^2), contact will wrongly act to send an instant (under 1ms) signal or may scrap.
7. Never use in the situation that has the source of electrical pulse
 - ◆ Magnetic switch with no contact
 - If the equipment produces higher electrical pulse (magnetic booster, high-frequency inductive furnace and motor) near the cylinder with magnetic switch with no contact, the internal circuit components of the switch may be degraded and damaged.
8. Notice the accumulation of iron powder and denseness of the magnetic object. The accumulation of iron powder such as chip powder and welding flame or the situation with the denseness of magnetic object around the cylinder with magnetic switch will weaken the magnetism in the cylinder and magnetic switch may not act.

Maintenance and service of sensor switch

Hint

Regularly maintain and examine the following points to prevent wrong action of the switch

1. The switch shall be adjusted to the right additional position to fasten the small screw when the installed small screw for tightening the switch is loose or the additional position shifts.
2. To examine whether the wire has damage. The damage to wire will cause poor insulation. If there is damage, the switch shall be changed or the wire shall be repaired.
3. To examine whether the green light in the switch indicated by two colors is on when the piston stops at the set position. If the red light is on in this position, which means that the position is not right and shall be rectified to make the switch shine in the set position.



Sensor switch

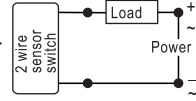


Connection method

A. 2 wire reed switch type connection

1. General connection:

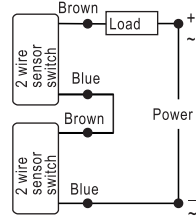
When connecting 2 wire switches, load must be connected in series with the sensor to prevent damaged. Connect the brown wire in series load with positive (+) and the blue wire to negative(-) of DC power source, otherwise the LED will not light.



2. Series connection(And)

When 2 wire switches in series(AND) use, the voltage drop will be added up. (Typical V drop about 2.5V per switch)

When series too many switches, excessive voltage drop will cause non-operation of the load. The quantity of switches in series due to the voltage of power source.

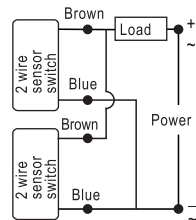


3. Parallel connection(OR)

When 2 wire switches in parallel(OR) use, the current flow to the switch will be shared when switches all in active.

When connection too many switches in parallel use, possible concurrent operation will cause dim or off LED due to lower current distribution.

The quantity of switches in parallel due to the current of load.

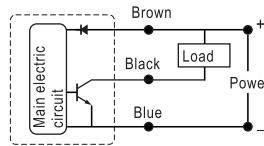


B. 3 wire solid state NPN type connection

1. General connection

When connecting 3 wire switches, it must connect to DC Power source. pay attention to the wiring of black wire. wrong connect will damage the switch.

Connect brown wire to the positive(+) and the blue to the negative(-). the black wire must series load and to positive(+) only.

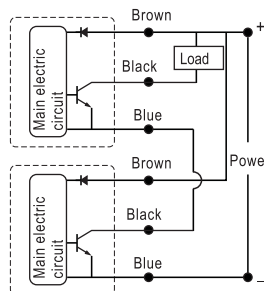


2. Series connection(And)

When 3 wire solid switches in series (AND) use. Voltage drop will be added up. (Typical V drop about 1.5V per switch)

When series too many switches, excessive voltage drop will cause non-operation of the load.

The quantity of switches in series due to the voltage of power source.

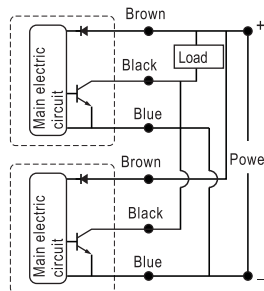


3. Parallel connection(OR)

When 3 wire solid state switches in parallel (OR) use. Leakage current will be added up.

When parallel too many switches in use, possibly cause wrong operation due to lower load current.

The quantity of switches in parallel due to the current of load.

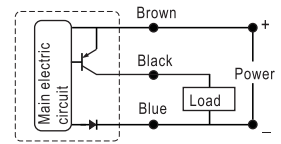


C. 3 wire solid state PNP type connection

1. General connection

When connecting 3 wire switches, it must connect to DC power source. pay attention to the wiring of black wire. Wrong connect will damage the switch.

Connect brown wire to the positive(+) and the blue to the negative(-). The black wire must series load and to negative(-) only.

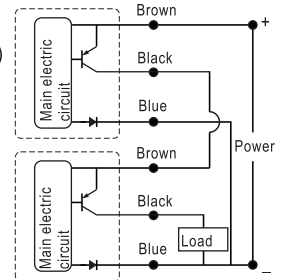


2. Series connection(And)

When 3 wire solid state switches in series(AND) use. Voltage drop will be added up. (Typical V drop about 1.5V per switch)

When series too many switches, excessive voltage drop will cause non-operation of the load.

The quantity of switches in series due to the voltage of power source.

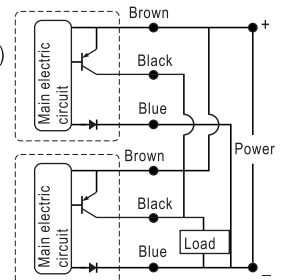


3. Parallel connection(OR)

When 3 wire solid state switches in parallel (OR) use. Leakage current will be added up.

When parallel too many switches in use, possibly cause wrong operation due to lower load current.

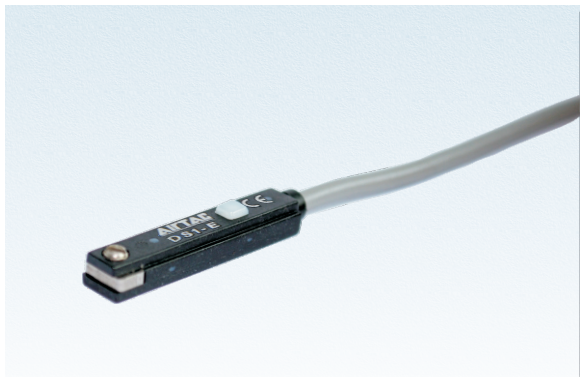
The quantity of switches in parallel due to the current of load.



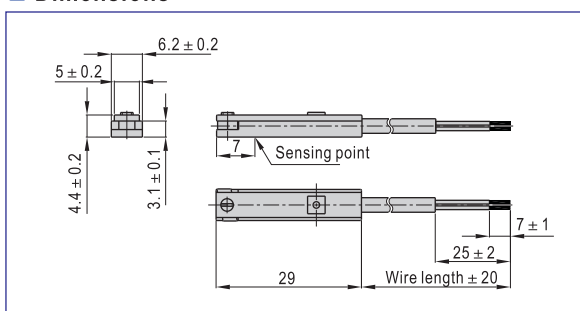
Sensor switch

Sensor switch

DS1-E Series



Dimensions



Specification

Item\Type	DS1-E	DS1-EN	DS1-EP
Switch logic	Transistor without contact, Normally opened type		
Switch type	Two lines type	NPN type	PNP type
Operating voltage(V)	10~28V DC	5~30V DC	
Max. Switching current(mA)	50	200	
Switching rating(W)	Max. 1.4	Max. 6	
Current consumption	12(40)uA Max. @24V	15mA Max. @24V	
Voltage drop	2.65V Max. @50mA DC	0.5V Max. @200mA DC	
Cable	Φ 2.8,2C Black oil resistant PVC	Φ 3.3,3C Black oil resistant PVC	
Indicator	Red LED		
Leakage current	20(90)uA Max. @28V	0.01mA Max.	
Sensitivity(Gauss)	25~700	45~55	
Max. Frequency(Hz)	1000		
Shock(m/s ²)	500		
Vibration(m/s ²)	90		
Temperature range(°C)	-10~70		
Enclosure classification	IP67(NEMA6)		
Protection circuit	Power reverse polarity, surge suppression		

Ordering code

DS1 E N 020

- Number of sensor switch**
DS1: Sensor switch
- Specification of sensor switch**

Specification	Product Series
E: E type	Use for SE, ACE series
- Connecting way** ①

C08: M8 quick joint, length of wire is 150mm
C12: M12 quick joint, length of wire is 150mm
020: length of wire is 2m
030: length of wire is 3m
050: length of wire is 5m
100: length of wire is 10m
- Model of sensor switch**

Blank: two-line /normally opened
N: three-line NPN with no contact (current flows in) / normally opened
P: three-line PNP with no contact (current flows out) / normally opened

① Note: The quick joint that is attached at the end of wire is three-needle-male joint-linear-rotary screw thread type. The female joint plug has to be ordered additionally. Please refer to P442 for the specific data.

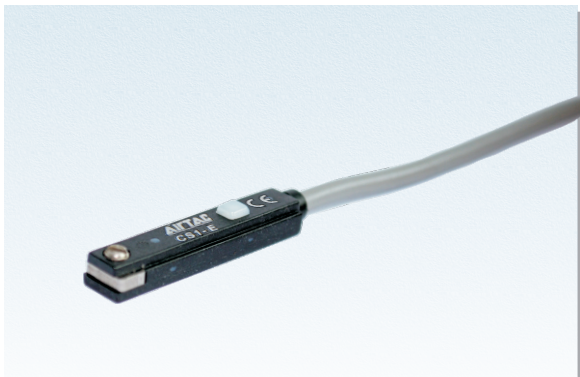
Mounting

Installation example	Installation method
<p>Sensor switch Body Installation groove</p>	<p>No additional accessories are necessary for the sensor switch of DS1-E (N, P) series. It can be directly fixed onto the groove of the cylinder, which is convenient and fast.</p> <p>1. Adjust the clamping screw on sensor switch. Then slide the sensor switch to the additional slot and adjust it to the proper position and tighten the clamping screw to fix.</p>
<p>Installation groove Sensor switch Body</p>	

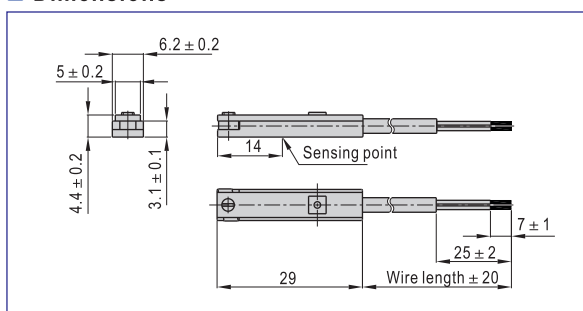


Sensor switch

CS1-E Series



Dimensions



Specification

Item/Type	CS1-E	CS1-EX
Switch logic	STSP Normally opened type	
Switch type	Reed switch with contact	
Operating voltage(V)	5~240V AC/DC	
Max. Switching current(mA)	100	
Switching rating(W)	Max. 10	
Current consumption	No	
Voltage drop	2.5V Max. @100mA DC	
Cable	Φ 2.8,2C Gray oil resistant PVC (Flame retarded)	
Indicator	Red LED	No
Leakage current	No	
Sensitivity(Gauss)	45-55	
Max. Frequency(Hz)	200	
Shock(m/s ²)	300	
Vibration(m/s ²)	90	
Temperature range(°C) ①	-10~70	
Enclosure classification	IP67(NEMA6)	
Protection circuit	No	

① Note: Please contact us for high temperature resistant(125°C),low temperature resistant(-40~-25°C) and explosion-proof sensor switch.

Ordering code

CS1 E X 020

- **Number of sensor switch**
CS1: Sensor switch
- **Specification of sensor switch**
Specification Product Series
E: E type Use for SE,ACE series
- **Model of sensor switch**
Blank: two-line magnetic spring pipe with contact/normally opened
X: two-line magnetic spring pipe with contact, without indicator light/normally opened
- **Connecting way** ①
C08: M8 quick joint, length of wire is 150mm
C12: M12 quick joint, length of wire is 150mm
020: length of wire is 2m
030: length of wire is 3m
050: length of wire is 5m
100: length of wire is 10m

① Note: The quick joint that is attached at the end of wire is three-needle-male joint-linear-rotary screw thread type. The female joint plug has to be ordered additionally. Please refer to P442 for the specific data.

Mounting

Installation example	Installation method
	<p>No additional accessories are necessary for the sensor switch of CS1-E, CS1-EX series. It can be directly fixed onto the groove of the cylinder, which is convenient and fast.</p> <p>1. Adjust the clamping screw on sensor switch slide the sensor switch into the installation slot and adjust it to the proper position and tighten the clamping screw to fix.</p>



Sensor switch

Joint attached to coil end of sensor switch

Male Straight Connector

Three Pin-male joint-linear-rotary thread

Note: There is no need to order it individually. What only needs to do is to choose the sensor switch with quick joint.

Three Pin-male joint-linear-rotary thread

Note: There is no need to order it individually. What only needs to do is to choose the sensor switch with quick joint.

Wiring diagram

Two needle-male joint

1 Brown(+), 3 Blue(-), 4 No wiring(NC)

Three needle-male joint

1 Brown(+), 3 Blue(-), 4 Black(OUT)

Female Connector

M83F 4 B 02 PVC

Joint type

- M83F: M8 × 1.0 three need-female joint (linear)
- M83FL: M8 × 1.0 three need-female joint (right angle)
- M123F: M12 × 1.0 three need-female joint (linear)
- M123FL: M12 × 1.0 three need-female joint (right angle)

Cable material

- PVC: PVC tegument
- PUR: PUR tegument

Wire length

- 02: Wire length is 2 m
- 03: Wire length is 3 m
- 05: Wire length is 5 m
- 10: Wire length is 10 m

Cable OD

- 2.9: OD 2.9mm
- 3.3: OD 3.3mm
- 4.0: OD 4.0mm
- 4.5: OD 4.5mm
- 5.2: OD 5.2mm

Cable color

- B: Black (three core)
- G: Grey (two core)

M83F(Three Pin-female joint-linear)

M83FL(three Pin-female joint-90° right angle)

M123F(Three Pin-female joint-linear)

M123FL(Three Pin-female joint-90° right angle)



Sensor switch

