KOGANEI

ACTUATORS GENERAL CATALOG

SENSOR SWITCHES

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⚠ **Caution** **Before use, be sure to read the "Safety Precautions" on p. 57.**

ZC130□, ZC153□

Solid State Type Sensor Switch

Applicable cylinders

● **Knock cylinders double acting type** ● **Multi mount cylinders** ● **Pen cylinders** ● **DYNA cylinders** ● **SD cylinders** ● **TDA ϕ 6 [0.236in.]** ● **AMT** ● **ARTB** ● **ACY** (For the intermediate stopper) ● **ORV** ● **ORK ϕ 16 [0.630in.]** ● **RAP** ● **RAN** ● **Swing cylinders** ● **Air Hands CHDUL** ● **SHM**

Specifications

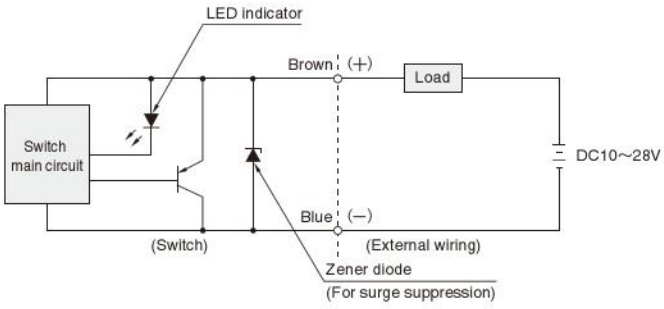
Item \ Model	ZC130□	ZC153□
Wiring type	2-lead wire	3-lead wire
Power supply voltage	—	DC4.5～28V
Load voltage	DC10～28V	DC4.5～28V
Load current	4～50mA	100mA MAX.
Consumption current	—	10mA MAX. (DC24V)
Internal voltage drop Note 1	3.5V MAX.	0.5V MAX. (At 50mA load current)
Leakage current	1mA MAX. (DC24V)	50μA MAX. (DC24V)
Response time	1ms MAX.	
Insulation resistance	100MΩ MIN. (At DC500V Megger, between case and lead wire end)	
Dielectric strength	AC500V (50/60Hz) in 1 minute (Between case and lead wire end)	
Shock resistance Note 2	294.2m/s² [30G] (Non-repeated shock)	
Vibration resistance Note 2	88.3m/s² [9G] (Total amplitude 1.5mm [0.06in.], 10～55Hz)	
Environmental protection	IP67 (IEC standard), JIS C0920 (Water-proof type)	
Operation indicator	When ON: Red LED indicator lights up	
Lead wire Note 3	PVC 0.2SQ×2-lead× ℓ	PVC 0.2SQ×3-lead× ℓ
Ambient temperature	0～60°C [32～140°F]	
Storage temperature range	−10～70°C [14～158°F]	
Mass	20g [0.71oz.] (For lead wire length A: 1000mm)	

Notes: 1. The internal voltage drop depends on load current.
2. Measured by Koganei test standard.
3. Lead wire length ℓ : A; 1000mm [39in.], B; 3000mm [118in.]

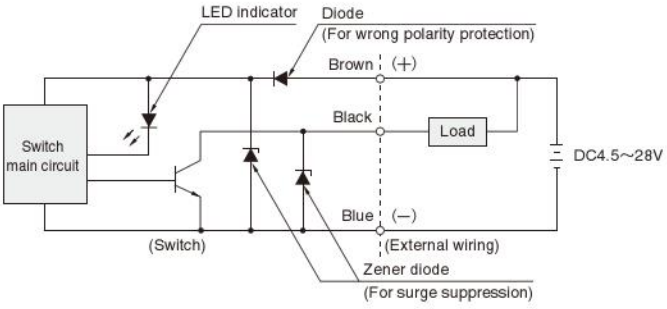
※ This product is not resistant to lightning surge of the EMC standard (EN61000-6-2・EN60947-5-2).
Prepare protection measures for lightning surge in the system.

Internal Circuit

ZC130□

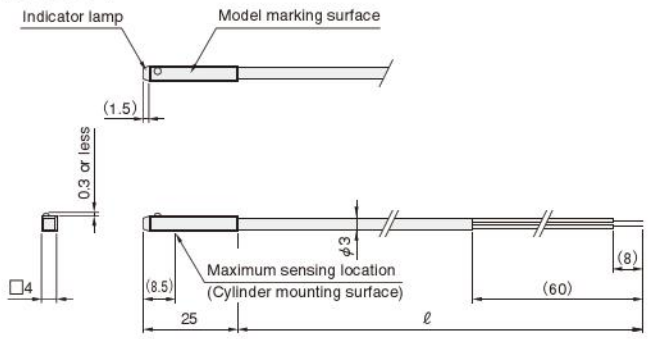


ZC153□



Dimensions (mm)

ZC130□



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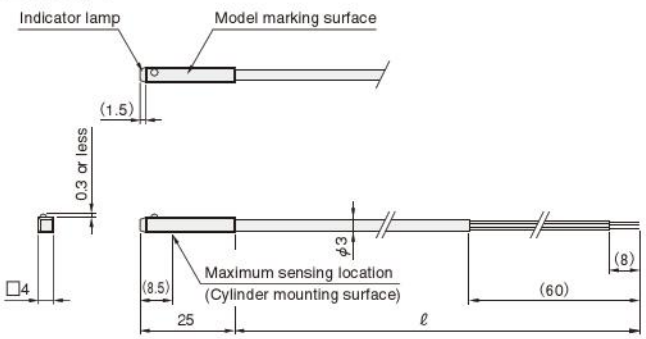


ZC230□, ZC253□

Solid State Type Sensor Switch

Applicable cylinders

●**Pen cylinders**

Specifications

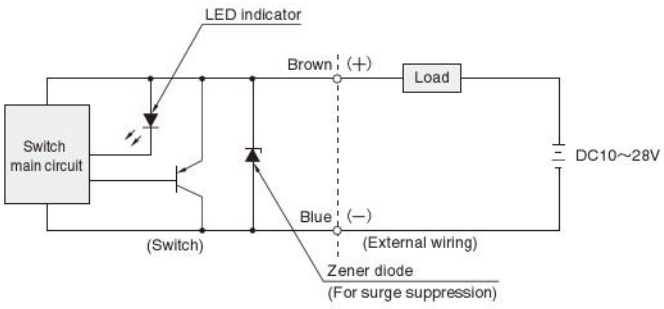
Item \ Model	ZC230□	ZC253□
Wiring type	2-lead wire	3-lead wire
Power supply voltage	—	DC4.5～28V
Load voltage	DC10～28V	DC4.5～28V
Load current	4～50mA	100mA MAX.
Consumption current	—	10mA MAX. (DC24V)
Internal voltage drop Note 1	3.5V MAX.	0.5V MAX. (At 50mA load current)
Leakage current	1mA MAX. (DC24V)	50μA MAX. (DC24V)
Response time	1ms MAX.	
Insulation resistance	100MΩ MIN. (At DC500V Megger, between case and lead wire end)	
Dielectric strength	AC500V (50/60Hz) in 1 minute (Between case and lead wire end)	
Shock resistance Note 2	294.2m/s² [30G] (Non-repeated shock)	
Vibration resistance Note 2	88.3m/s² [9G] (Total amplitude 1.5mm [0.06in.], 10～55Hz)	
Environmental protection	IP67 (IEC standard), JIS C0920 (Water-proof type)	
Operation indicator	When ON: Red LED indicator lights up	
Lead wire Note 3	PVC 0.2SQ×2-lead×ℓ	PVC 0.2SQ×3-lead×ℓ
Ambient temperature	0～60°C [32～140°F]	
Storage temperature range	−10～70°C [14～158°F]	
Mass	20g [0.71oz.] (For lead wire length A: 1000mm)	

Notes: 1. The internal voltage drop depends on load current.
2. Measured by Koganei test standard.
3. Lead wire length ℓ: A; 1000mm [39in.], B; 3000m [118in.]

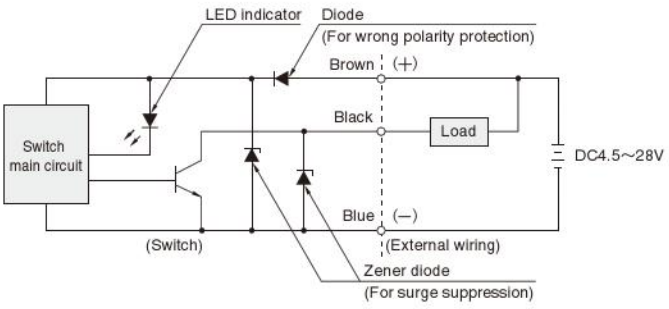
※ This product is not resistant to lightning surge of the EMC standard (EN61000-6-2・EN60947-5-2).
Prepare protection measures for lightning surge in the system.

Internal Circuit

ZC230□

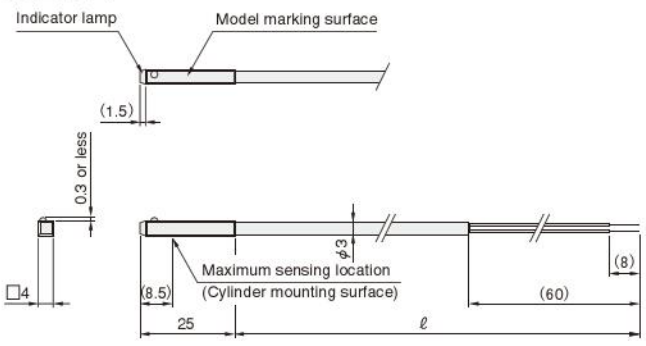


ZC253□

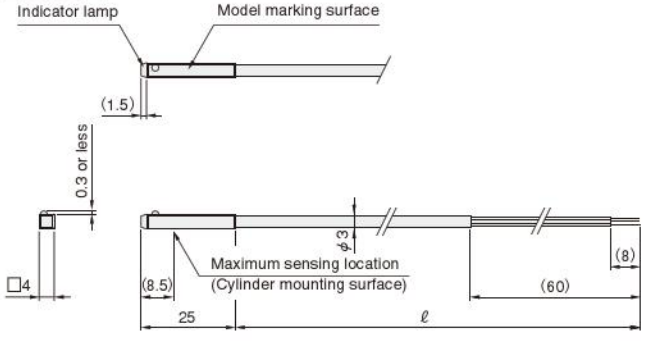


Dimensions (mm)

ZC230□



ZC253□



ZC330□, ZC353□

Solid State Type Sensor Switch

Applicable cylinders
●AGTB ●AGTC

Specifications

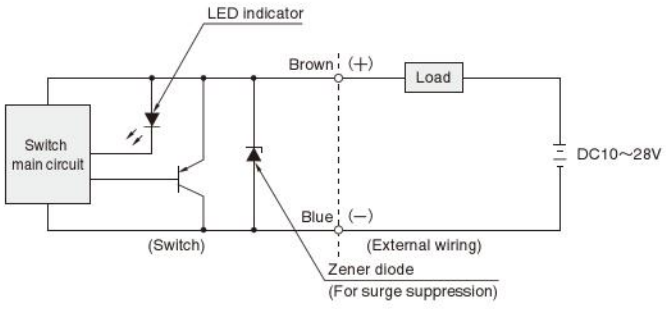
Item \ Model	ZC330□	ZC353□
Wiring type	2-lead wire	3-lead wire
Power supply voltage	—	DC4.5～28V
Load voltage	DC10～28V	DC4.5～28V
Load current	4～50mA	100mA MAX.
Consumption current	—	10mA MAX.(DC24V)
Internal voltage drop Note 1	3.5V MAX.	0.5V MAX. (At 50mA load current)
Leakage current	1mA MAX. (DC24V)	50μA MAX.(DC24V)
Response time	1ms MAX.	
Insulation resistance	100MΩ MIN. (At DC500V Megger, between case and lead wire end)	
Dielectric strength	AC500V (50/60Hz) in 1 minute (Between case and lead wire end)	
Shock resistance Note 2	294.2m/s² [30G] (Non-repeated shock)	
Vibration resistance Note 2	88.3m/s² [9G] (Total amplitude 1.5mm [0.06in.], 10～55Hz)	
Environmental protection	IP67 (IEC standard), JIS C0920 (Water-proof type)	
Operation indicator	When ON: Red LED indicator lights up	
Lead wire Note 3	PVC 0.2SQ×2-lead×ℓ	PVC 0.2SQ×3-lead×ℓ
Ambient temperature	0～60°C [32～140°F]	
Storage temperature range	−10～70°C [14～158°F]	
Mass	20g [0.71oz.] (For lead wire length A: 1000mm)	

Notes: 1. The internal voltage drop depends on load current.
2. Measured by Koganei test standard.
3. Lead wire length ℓ : A; 1000mm [39in.], B; 3000m [118in.]

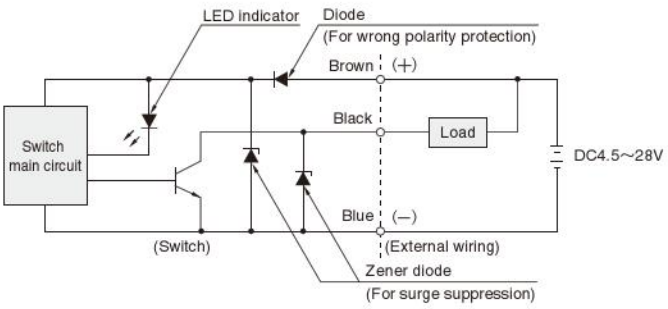
※ This product is not resistant to lightning surge of the EMC standard (EN61000-6-2・EN60947-5-2).
Prepare protection measures for lightning surge in the system.

Internal Circuit

ZC330□

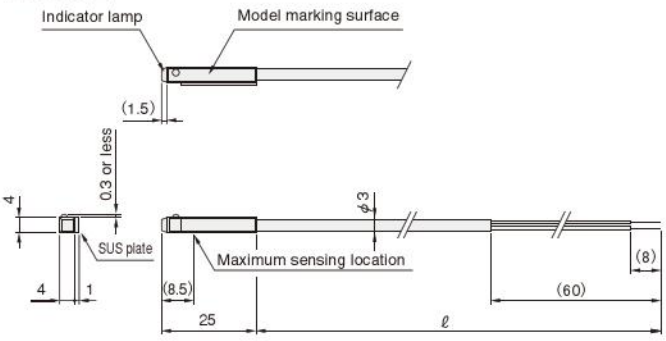


ZC353□

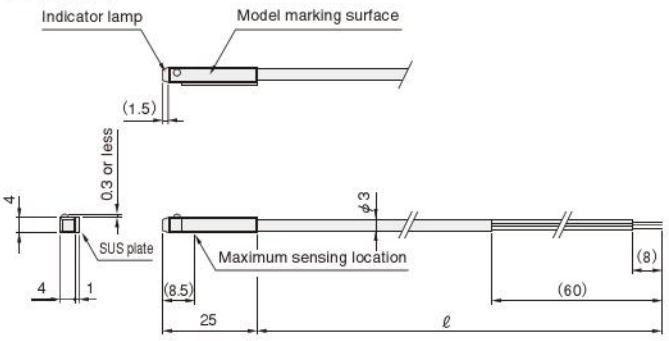


Dimensions (mm)

ZC330□



ZC353□



ZG530□, ZG553□

Solid State Type Sensor Switch

Applicable cylinders

● **Slim cylinders** ● **Twinport cylinders** ● **GA** ● **ORC** ● **ORCA** ● **ORGA** ● **ORK**Note ● **MRG** ● **RAK**
● **Swing cylinders** ● **Twist cylinders**

Note: Excluding ORK ϕ 16 [0.630in.].

Specifications

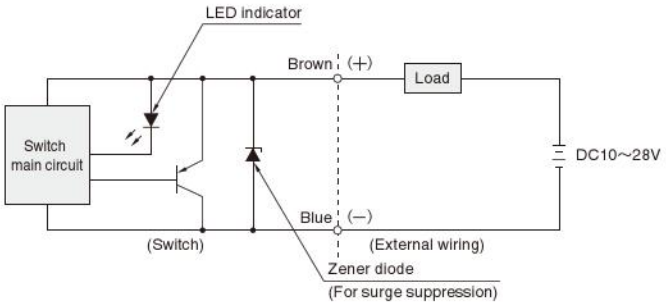
Item \ Model	ZG530□	ZG553□
Wiring type	2-lead wire	3-lead wire
Power supply voltage	—	DC4.5～28V
Load voltage	DC10～28V	DC4.5～28V
Load current	4～50mA	100mA MAX.
Consumption current	—	10mA MAX. (DC24V)
Internal voltage drop Note 1	4.5V MAX.	0.5V MAX. (At 50mA load current)
Leakage current	1mA MAX. (DC24V at 25°C [77°F])	50μA MAX. (DC24V)
Response time	1ms MAX.	
Insulation resistance	100MΩ MIN. (At DC500V Megger, between case and lead wire end)	
Dielectric strength	AC500V (50/60Hz) in 1 minute (Between case and lead wire end)	
Shock resistance Note 2	294.2m/s^2 [30G] (Non-repeated shock)	
Vibration resistance Note 2	88.3m/s^2 [9G] (Total amplitude 1.5mm [0.06in.], 10～55Hz)	
Environmental protection	IP67 (IEC standard), JIS C0920 (Water-proof type)	
Operation indicator	When ON: Red LED indicator lights up	
Lead wire Note 3	PVC 0.2SQ×2-lead×ℓ	PVC 0.2SQ×3-lead×ℓ
Ambient temperature	0～60°C [32～140°F]	
Storage temperature range	−10～70°C [14～158°F]	
Mass	20g [0.71oz.] (For lead wire length A: 1000mm)	

Notes: 1. The internal voltage drop depends on load current.
2. Measured by Koganei test standard.
3. Lead wire length ℓ: A; 1000mm [39in.], B; 3000m [118in.]

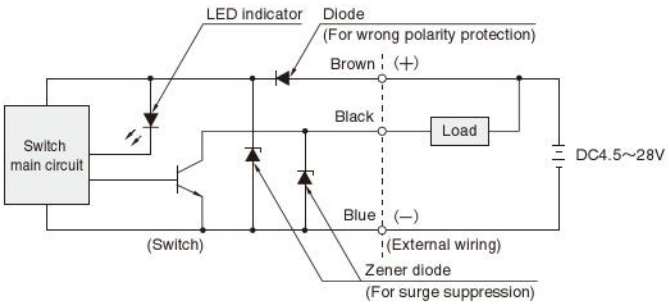
※ This product is not resistant to lightning surge of the EMC standard (EN61000-6-2・EN60947-5-2).
Prepare protection measures for lightning surge in the system.

Internal Circuit

ZG530□

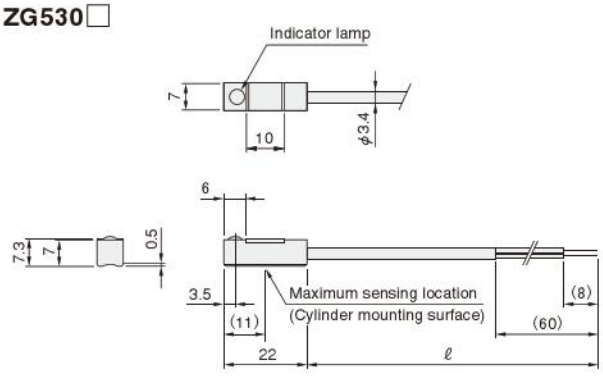


ZG553□

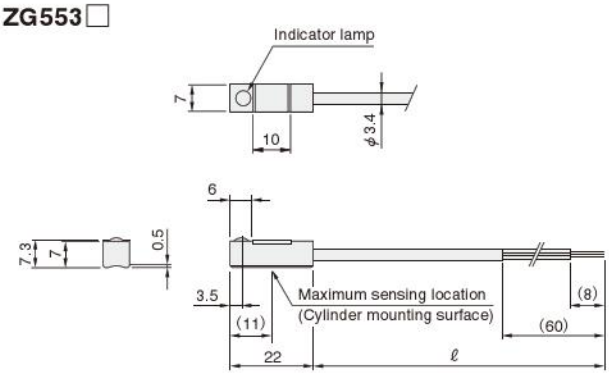


Dimensions (mm)

ZG530□



ZG553□



ZC630□, ZC653□

Solid State Type Sensor Switch

Applicable cylinders

●**Axis cylinders**

Specifications

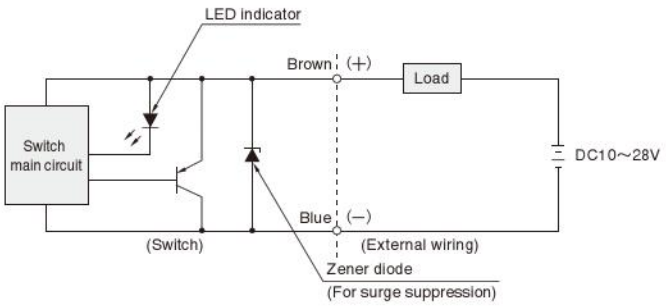
Item \ Model	ZC630□	ZC653□
Wiring type	2-lead wire	3-lead wire
Power supply voltage	—	DC4.5～28V
Load voltage	DC10～28V	DC4.5～28V
Load current	4～50mA	100mA MAX. (DC24V)
Consumption current	—	10mA MAX. (DC24V)
Internal voltage drop Note 1	3.5V MAX.	0.5V MAX. (At 50mA load current)
Leakage current	1mA MAX. (DC24V)	50μA MAX. (DC24V)
Response time	1ms MAX.	
Insulation resistance	100MΩ MIN. (At DC500V Megger, between case and lead wire end)	
Dielectric strength	AC500V (50/60Hz) in 1 minute (Between case and lead wire end)	
Shock resistance Note 2	294.2m/s² [30G] (Non-repeated shock)	
Vibration resistance Note 2	88.3m/s² [9G] (Total amplitude 1.5mm [0.06in.], 10～55Hz)	
Environmental protection	IP67 (IEC standard), JIS C0920 (Water-proof type)	
Operation indicator	When ON: Red LED indicator lights up	
Lead wire Note 3	PVC 0.2SQ×2-lead×ℓ	PVC 0.2SQ×3-lead×ℓ
Ambient temperature	0～60°C [32～140°F]	
Storage temperature range	−10～70°C [14～158°F]	
Mass	20g [0.71oz.] (For lead wire length A: 1000mm)	

Notes: 1. The internal voltage drop depends on load current.
2. Measured by Koganei test standard.
3. Lead wire length ℓ: A; 1000mm [39in.], B; 3000m [118in.]

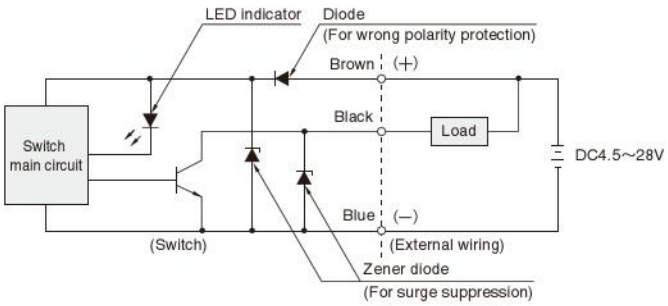
※ This product is not resistant to lightning surge of the EMC standard (EN61000-6-2・EN60947-5-2).
Prepare protection measures for lightning surge in the system.

Internal Circuit

ZC630□

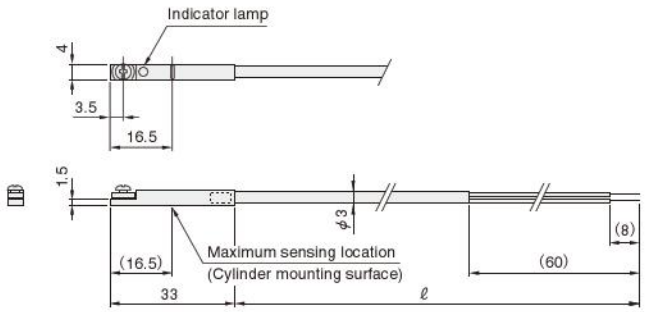


ZC653□

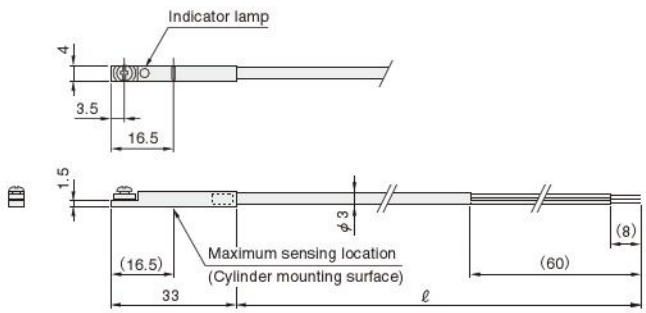


Dimensions (mm)

ZC630□



ZC653□



ZE135□, 155□, 235□, 255□

CE

Solid State Type Sensor Switch

Applicable cylinders

●**Mini bit cylinders** ●**Jig cylinders C series** ●**Jig cylinders JC series** ●**Mini guide sliders** ●**Jig cylinders with guides** ●**Twin rod cylinders B series** ●**Rod sliders** ●**Multi sliders** ●**Z sliders** ●**WS** ●**WT** ●**ACY**Note1 ●**ACZ**Note1 ●**Flat rodless cylinders**Note1 ●**ORV**Note1 ●**ORS, MRS**Note1 ●**ORW, MRW**Note1 ●**NHC1 series** ●**Air Hands NHB** ●**Wide type Air Hands WHDP**Note2 ●**Flat type Air Hands** ●**RAG** ●**RAT** ●**DJ cylinders**

Notes: 1. Only the horizontal lead wire type 2. Only the vertical lead wire type

Specifications

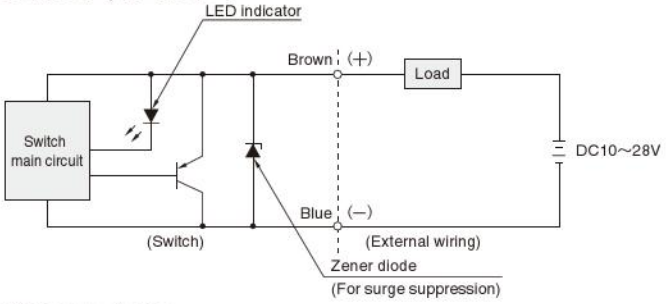
Item \ Model	ZE135□	ZE155□	ZE235□	ZE255□
Wiring type	2-lead wire	3-lead wire	2-lead wire	3-lead wire
Lead wire direction	Horizontal		Vertical	
Power supply voltage	—	DC4.5～28V	—	DC4.5～28V
Load voltage	DC10～28V	DC4.5～28V	DC10～28V	DC4.5～28V
Load current	4～20mA at 25°C [77°F], and 10mA at 60°C [140°F].	50mA MAX.	4～20mA at 25°C [77°F], and 10mA at 60°C [140°F].	50mA MAX.
Consumption current	—	8mA MAX. (DC24V)	—	8mA MAX. (DC24V)
Internal voltage drop Note 1	4V MAX.	0.5V MAX. (10V or less at 20mA)	4V MAX.	0.5V MAX. (10V or less at 20mA)
Leakage current	0.7mA MAX. (DC24V, 25°C [77°F])	50μA MAX. (DC24V)	0.7mA MAX. (DC24V, 25°C [77°F])	50μA MAX. (DC24V)
Response time	1ms MAX.			
Insulation resistance	100MΩ MIN. (At DC500V Megger, between case and lead wire end)			
Dielectric strength	AC500V (50/60Hz) in 1 minute (Between case and lead wire end)			
Shock resistance Note 2	294.2m/s² [30G] (Non-repeated shock)			
Vibration resistance Note 2	88.3m/s² [9G] (Total amplitude 1.5mm [0.06in.], 10～55Hz)			
Environmental protection	IP67 (IEC standard), JIS C0920 (Water-proof type)			
Operation indicator	When ON: Red LED indicator lights up			
Lead wire Note 3	PCCV 0.2SQ×2-lead (Brown and blue) × ℓ	PCCV 0.15SQ×3-lead (Brown, blue, and black) × ℓ	PCCV 0.2SQ×2-lead (Brown and blue) × ℓ	PCCV 0.15SQ×3-lead (Brown, blue, and black) × ℓ
Ambient temperature	0～60°C [32～140°F]			
Storage temperature range	−10～70°C [14～158°F]			
Mass	15g [0.53oz.] (For lead wire length A: 1000mm), 35g [1.23oz.] (For lead wire length B: 3000mm)			

Notes: 1. The internal voltage drop depends on load current.
2. Measured by Koganei test standard.
3. Lead wire length ℓ: A; 1000mm [39in.], B; 3000m [118in.]

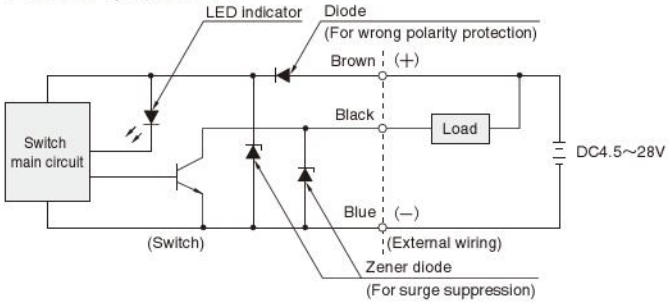
※ This product is not resistant to lightning surge of the EMC standard (EN61000-6-2・EN60947-5-2).
Prepare protection measures for lightning surge in the system.

Internal Circuit

ZE135□, ZE235□

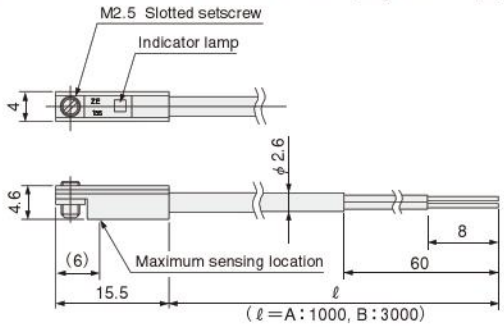


ZE155□, ZE255□

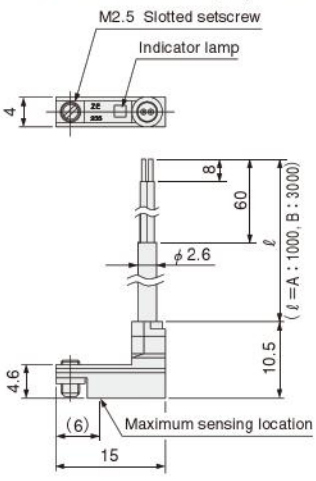


Dimensions (mm)

●Horizontal lead wire ZE135□, ZE155□



●Vertical lead wire ZE235□, ZE255□



ZE175□, ZE275□

3-lead Wire PNP Output Type
Solid State Sensor Switches

Applicable cylinders

●Mini bit cylinders ●Jig cylinders C series ●Jig cylinders JC series ●Mini guide sliders ●Jig cylinders with guides ●Twin rod cylinders B series ●Rod sliders ●Multi sliders ●Z sliders ●WS ●WT ●ACY[Note 2] ●ACZ[Note 2] ●Flat rodless cylinders[Note 2] ●ORV[Note 2] ●ORS, MRS[Note 2] ●ORW, MRW[Note 2] ●NHC1 series ●Air Hands NHB ●Wide type Air Hands WHDP[Note 3] ●Flat type Air Hands ●RAG ●RAT ●Three-finger Hands

Notes: 1. Because the same conductor as the robot cable is used, it exhibits superior bending resistance.
2. Horizontal lead wire only
3. Vertical lead wire only

Specifications

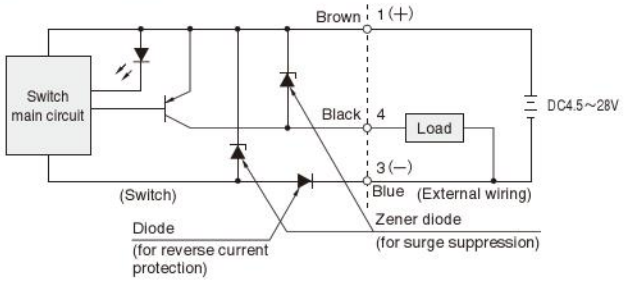
Item \ Model	ZE175□	ZE275□
Wiring type	3-lead wire PNP output	
Lead wire direction	Horizontal	Vertical
Power supply voltage	DC4.5～28V	
Load voltage	DC4.5～28V	
Load current	50mA MAX.	
Consumption current	10mA MAX.(DC24V)	
Internal voltage drop [Note 1]	0.5V MAX. (10V or less at 20mA)	
Leakage current	50 μA MAX.(DC24V)	
Response time	1ms MAX.	
Insulation resistance	100MΩ MIN. (At DC500V Megger, between case and lead wire end)	
Dielectric strength	AC500V (50/60Hz) in 1 minute (Between case and lead wire end)	
Shock resistance [Note 2]	294.2m/s² [30G] (Non-repeated shock)	
Vibration resistance [Note 2]	88.3m/s² [9G] (Total amplitude 1.5mm [0.06in.], 10～55Hz)	
Environmental protection	IP67 (IEC standard), JIS C0920 (Water-proof type)	
Operation indicator	When ON: Red LED indicator lights up	
Lead wire [Note 3]	PCCV 0.15SQ×3-lead (Brown, blue, and black) ×ℓ	
Ambient temperature	0～60°C [32～140°F]	
Storage temperature range	−10～70°C [14～158°F]	
Mass	15g [0.53oz.] (For lead wire length A: 1000mm [39in.]), 35g [1.23oz.] (For lead wire length B: 3000mm [118in.]), 15g [0.53oz.] (For lead wire length G: 300mm [11.8in.] with M8 connector)	

Notes: 1. The internal voltage drop depends on load current.
2. Measured by Koganei test standard.
3. Lead wire length ℓ: A; 1000mm [39in.], B; 3000mm [118in.], G; 300mm [11.8in.] with M8 connector

※ This product is not resistant to lightning surge of the EMC standard (EN61000-6-2 • EN60947-5-2).
Prepare protection measures for lightning surge in the system.

Internal Circuit

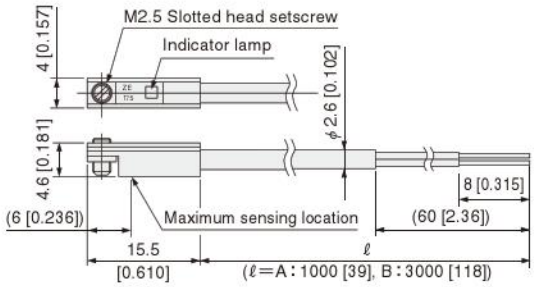
ZE175□, ZE275□



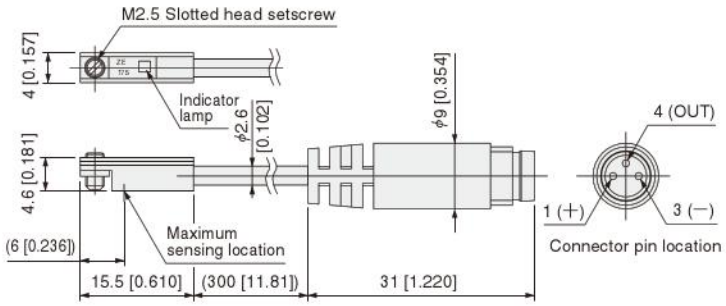
Dimensions mm [In.]

●Horizontal Lead Wire

ZE175A
ZE175B

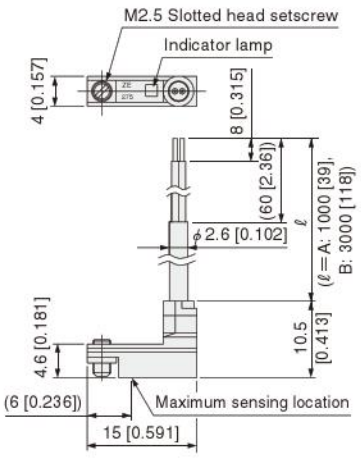


ZE175G

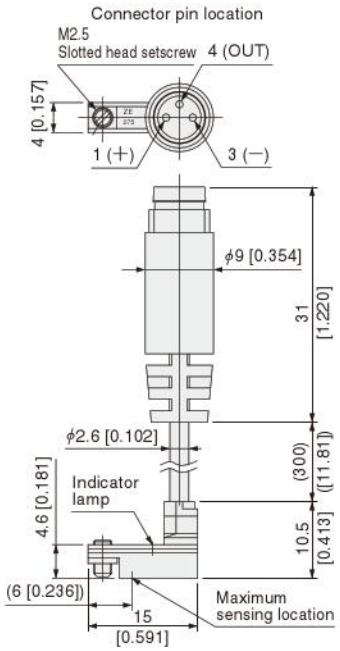


●Vertical Lead Wire

ZE275A
ZE275B



ZE275G



CS9H□, ZB430□

Solid State Type Sensor Switch

Applicable cylinders

● **Jig cylinders J series** ● **TDA ϕ 10[0.394in.]～ ϕ 32[1.260in.] (previous type)** ● **Slide Units** ● **SHM**

Specifications

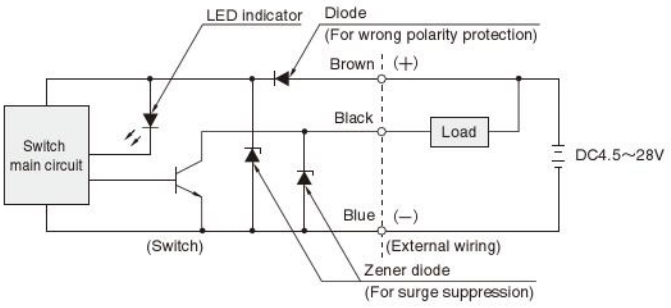
Item \ Model	CS9H□	ZB430□
Wiring type	3-lead wire	2-lead wire
Power supply voltage	DC4.5～28V	DC10～28V
Load voltage	DC4.5～28V	DC10～28V
Load current	100mA MAX.(Ta＝45°C [113°F])	4～50mA
Consumption current	15mA MAX. (DC24V)	—
Internal voltage drop Note 1	0.8V MAX. (At 50mA load current)	4.5V MAX.
Leakage current	50μA MAX. (DC24V)	1mA MAX. (DC24V at 25°C [77°F])
Response time	1ms MAX.	
Insulation resistance	100MΩ MIN. (At DC500V Megger, between case and lead wire end)	
Dielectric strength	AC500V (50/60Hz) in 1 minute (Between case and lead wire end)	
Shock resistance Note 2	294.2m/s² [30G] (Non-repeated shock)	
Vibration resistance Note 2	88.3m/s² [9G] (Total amplitude 1.5mm [0.06in.], 10～55Hz)	
Environmental protection	IP67 (IEC standard), JIS C0920 (Water-proof type)	
Operation indicator	When ON: Red LED indicator lights up	
Lead wire Note 3	PVC 0.2SQ×3-lead× ℓ	PVC 0.2SQ×2-lead× ℓ
Ambient temperature	0～60°C [32～140°F]	
Storage temperature range	−10～70°C [14～158°F]	
Mass (The mounting bracket is included.)	40g [1.41oz.] (For lead wire length A: 1000mm)	

Notes: 1. The internal voltage drop depends on load current.
2. Measured by Koganei test standard.
3. Lead wire length ℓ: A; 1000mm [39in.], B; 3000m [118in.]

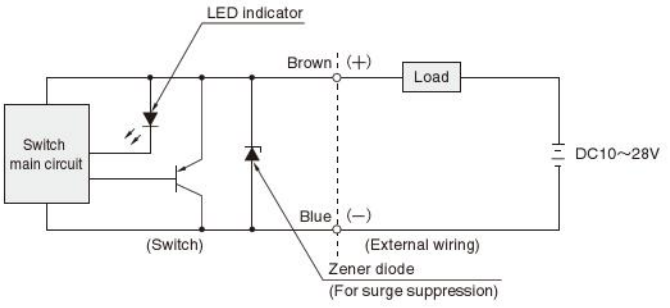
※ This product is not resistant to lightning surge of the EMC standard (EN61000-6-2・EN60947-5-2).
Prepare protection measures for lightning surge in the system.

Internal Circuit

CS9H□

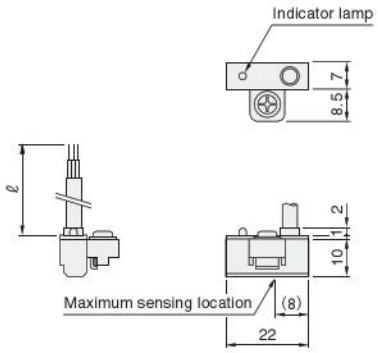


ZB430□

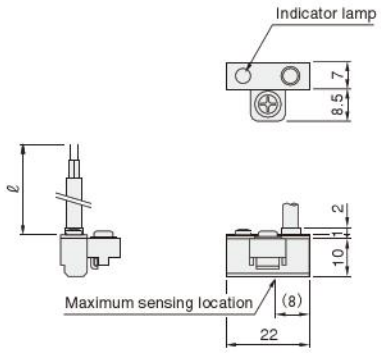


Dimensions (mm)

CS9H□



ZB430□



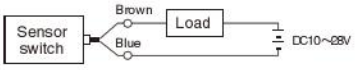
Points of Wiring Solid State Type Sensor Switches

ZC130□, ZC230□, ZC330□
ZC630□, ZE135□, ZE235□
ZG530□, ZD136C, ZB430□

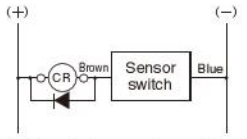
ZC153□, ZC253□, ZC353□, ZC653□
ZE155□, ZE255□, ZE175□, ZE275□, ZG553□, CS9H□

2-lead wire type

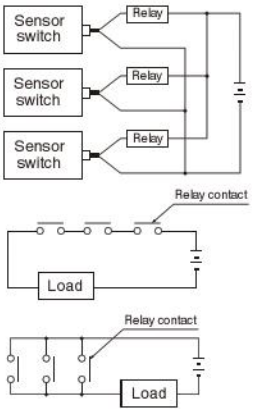
Basic connection



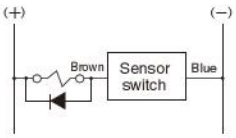
Connecting with relays



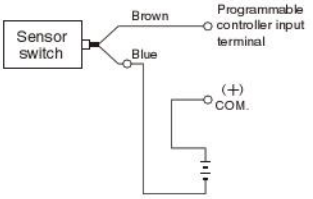
AND (series) connection and OR (parallel) connection



Connecting with a solenoid valve

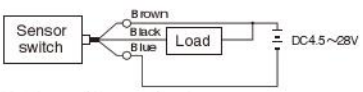


Connecting with a programmable controller

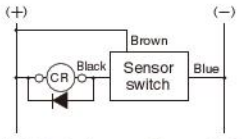


3-lead wire with NPN output

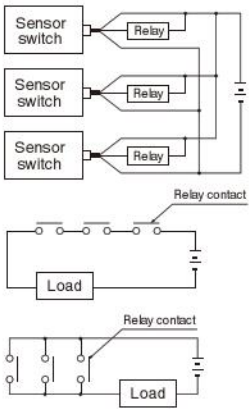
Basic connection



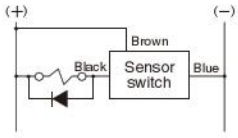
Connecting with relays



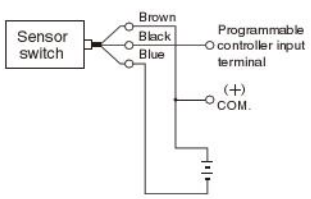
AND (series) connection and OR (parallel) connection



Connecting with a solenoid valve

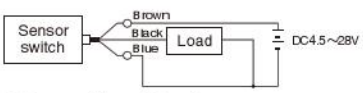


Connecting with a programmable controller

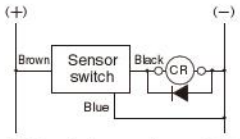


3-lead wire with PNP output

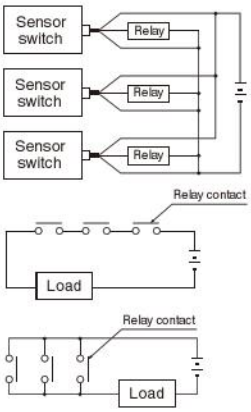
Basic connection



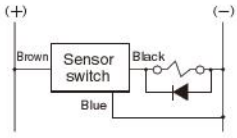
Connecting with relays



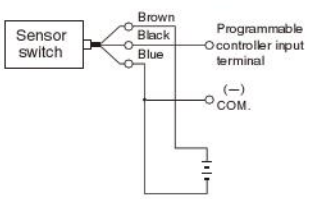
AND (series) connection and OR (parallel) connection



Connecting with a solenoid valve



Connecting with a programmable controller



Cautions:

1. Connect the lead wires according to their color. Incorrect wiring will cause damage to the sensor switch since there is no overcurrent protection.
2. With the inductive load of an electromagnetic relay, etc., the use of a surge protection diode is recommended.
3. Avoid the use of AND (series) connections because the circuit voltage will drop in proportion to the number of sensor switches.
4. When using an OR (parallel) connection, it is possible to connect sensor switch outputs directly (ex: using corresponding black lead wires). Be aware of load return errors since current leakage increases with the number of switches.
5. Because the sensor switches are magnetically sensitive, avoid using them in locations subject to strong external magnetic fields or bringing them in close proximity to power lines and areas where large electric currents are present. In addition, do not use magnetized materials for the mounting bracket, since this may cause erratic operation.
6. Do not excessively pull on or bend the lead wires.
7. Avoid using the sensor switches in environments where chemicals or gas are present.
8. Consult us for use in environments subject to water or oil.

ZD136C

Strong Magnetic Field Resistant Sensor Switch

Applicable cylinders

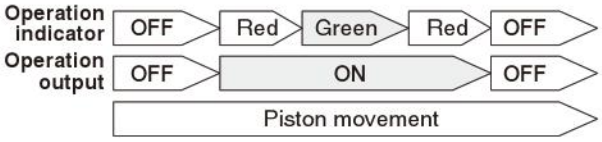
●**Jig cylinders JC series**

Specifications

Item \ Model	ZD136C
Wiring type	2-lead wire
Load voltage	DC10～28V
Load current	5～50mA
Internal voltage drop	5.0V MAX. (At load current 50mA)Note 1
Leakage current	1.0mA MAX
Response time	ON delay = 50ms MAX. 40ms TYP. 30ms MIN. OFF delay= 80ms MAX. 65ms TYP. 50ms MIN.
Insulation resistance	100MΩ MIN. (At DC500V Megger, between case and lead wire end)
Dielectric strength	AC500V (50/60Hz) in 1 minute (Between case and lead wire end)
Shock resistanceNote 2	294.2m/s² [30G] (Non-repeated shock)
Vibration resistanceNote 2	88.3m/s² [9G] (Total amplitude 1.5mm [0.06in.], 10～55Hz)
Environmental protection	IP67 (IEC standard), JIS C0920 (water-proof type)
Operation indicator (Setting range)	When ON: Green LED indicator lights up
Operation indicator (Unstable range)	When ON: Red LED indicator lights up
Lead wireNote 3	Oil-resistant, spatter-resistant cabtyre cable 2-lead, 0.5SQ×ℓ
Magnetic field resistanceNote 2	AC17000A
Ambient temperature	0～60°C [32～140°F]
Storage temperature range	−10～70°C [14～158°F]
Mass	270g [9.52oz.]

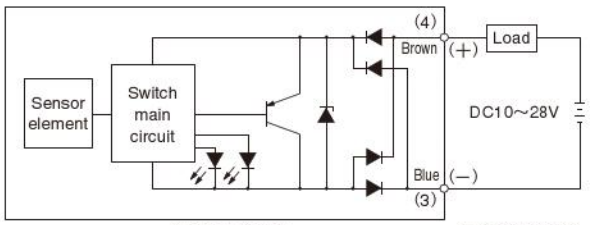
Notes: 1. When using a programmable controller with input voltage of 12V, care should be taken about the programmable controller's ON voltage. The sensor switch's internal voltage drop could prevent use of the device.
2. Measured by Koganei test standard.
3. Lead wire length ℓ : C; 5000mm [197in.]

Operation



In an unstable range, the red LED lights up, while the green LED lights up when in the setting range.
Operation output is ON whenever an LED is lighted.
There is no change in operating output (sensor switch output) between the setting range and unstable range.

Internal Circuit and Outline of Operations



Caution: **ZD136C** is a non-polarity type. Connect either the brown or the blue lead wire to the load.

Outline of operations

Magnetic field / Sensor switch	No disturbance by an AC magnetic field		Disturbance by an AC magnetic field	
	Without magnet	With magnet	Without magnet	With magnet
Sensor element	OFF	ON	OFF⟷ON	OFF⟷ON
Sensor switch output	OFF	ON	OFF	ON

●The strong magnetic field resistant sensor switch can be used in locations subjected to disturbance by AC magnetic fields (areas near AC welders, etc.).
The strong magnetic field resistant sensor switch has a function of changing its output only when the magnetic field is applied for a fixed period of time in an ON or OFF state.
Magnetic fields generated by welding currents at areas near the AC welder change the current at set intervals, and the magnetic field is not continuously generated longer than the time required for changing the sensor switch output.
Therefore, the sensor switch output is not affected by magnetic fields generated by welding current from AC welders.

Caution : The sensor switch cannot be used in areas near DC welders (including inverters), because the magnetic fields generated by the DC welder remain constant.

●In the case of no disturbance by an AC magnetic field

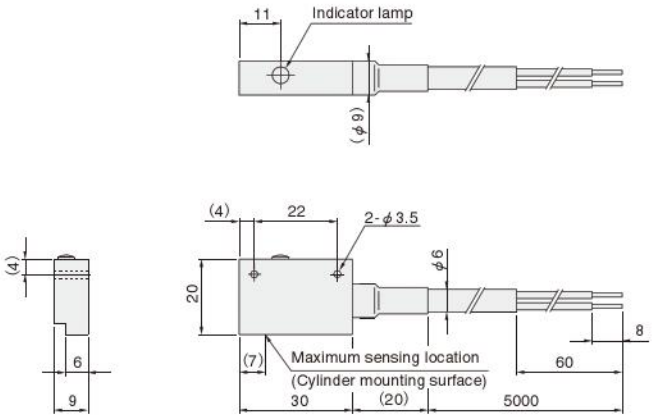
When a sensor element detects the magnetic field of a magnet, the sensor switch output changes to ON about 40ms later. When the magnetic field generated by the magnet disappears, sensor switch output returns to the OFF position about 65ms later.

●In the case of existing disturbance by an AC magnetic field

Disturbance by an AC magnetic field causes sensor elements to switch repeatedly from ON to OFF states regardless of whether there is a magnet or not. However, use of an ON delay or OFF delay circuit allows sensor switch output to proceed without effect from disturbances by the AC magnetic field.

Dimensions (mm)

●ZD136C



CS5T□, CS11T□

Reed Switch Type Sensor Switch

Applicable cylinders

●Knock cylinders double acting type ●Multi mount cylinders ●DYNA cylinders ●SD cylinders ●TDA ϕ 6[0.236in.] ●AMT ●ARTB ●ACY (For the intermediate stopper) **●ORK ϕ 16[0.630in.] ●RAP ●RAN ●Swing cylinders**

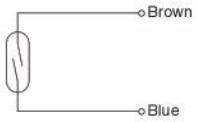
Specifications

Item \ Model	CS5T□	CS11T□
Wiring type	2-lead wire	
Load voltage	DC5～28V, AC85～115V (r.m.s.)	DC10～28V
Load current	DC0.1～40mA, AC2～25mA	DC5～40mA
Internal voltage drop Note 1	0.1V MAX. (At 40mA load current)	2.1V MAX. (At 40mA load current)
Leakage current	0mA	
Response time	1ms MAX.	
Insulation resistance	100MΩ MIN. (At DC500V Megger, between case and lead wire end)	
Dielectric strength	AC1500V (50/60Hz) in 1 minute (Between case and lead wire end)	AC1000V (50/60Hz) in 1 minute (Between case and lead wire end)
Shock resistance Note 2	294.2m/s² [30G] (Non-repeated shock)	
Vibration resistance Note 2	88.3m/s² [9G] (Total amplitude 1.5mm [0.06in.], 10～55Hz), Resonance frequency 2750±250Hz	
Environmental protection	IP67 (IEC standard), JIS C0920 (Water-proof type)	
Operation indicator	—	When ON: Red LED indicator lights up
Lead wire Note 3	PVC 0.2SQ×2-lead×ℓ	
Ambient temperature	0～60°C [32～140°F]	
Storage temperature range	−10～70°C [14～158°F]	
Contact protection	Required (See contact protection on p.1566.)	
Mass	20g [0.71oz.] (For lead wire length A: 1000mm)	

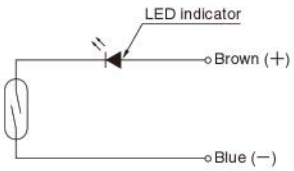
Notes: 1. The internal voltage drop depends on load current.
2. Measured by Koganei test standard.
3. Lead wire length ℓ: A; 1000mm [39in.], B; 3000mm [118in.]

Internal Circuit

CS5T□

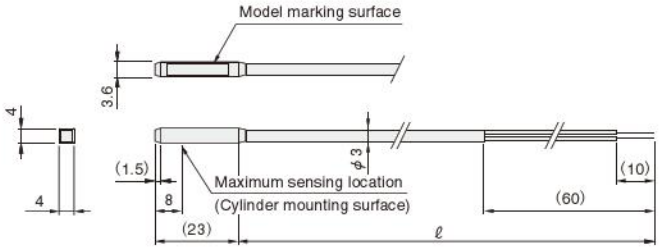


CS11T□

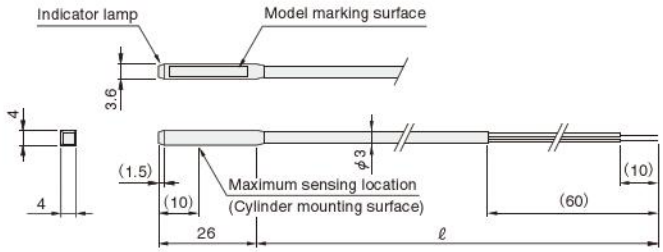


Dimensions (mm)

CS5T□



CS11T□



ZC201□, ZC205□

Reed Switch Type Sensor Switch

Applicable cylinders

●**Pen cylinders**

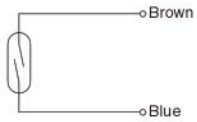
Specifications

Item \ Model	ZC201□	ZC205□
Wiring type	2-lead wire	
Load voltage	DC5～28V, AC85～115V (r.m.s.)	DC10～28V
Load current	DC0.1～40mA, AC2～25mA	DC5～40mA
Internal voltage drop[Note 1]	0.1V MAX. (At 40mA load current)	2.1V MAX. (At 40mA load current)[Note 1]
Leakage current	0mA	
Response time	1ms MAX.	
Insulation resistance	100MΩ MIN. (At DC500V Megger, between case and lead wire end)	
Dielectric strength	AC1500V (50/60Hz) in 1 minute (Between case and lead wire end)	AC1000V (50/60Hz) in 1 minute (Between case and lead wire end)
Shock resistance[Note 2]	294.2m/s^2 [30G] (Non-repeated shock)	
Vibration resistance[Note 2]	88.3m/s^2 [9G] (Total amplitude 1.5mm [0.06in.], 10～55Hz), Resonance frequency 2750±250Hz	
Environmental protection	IP67 (IEC standard), JIS C0920 (Water-proof type)	
Operation indicator	—	When ON: Red LED indicator lights up
Lead wire[Note 3]	PCCV 0.2SQ×2-lead×ℓ	
Ambient temperature	0～60°C [32～140°F]	
Storage temperature range	−10～70°C [14～158°F]	
Contact protection	Required (See contact protection on p.1566.)	
Mass	20g [0.71oz.] (For lead wire length A: 1000mm)	

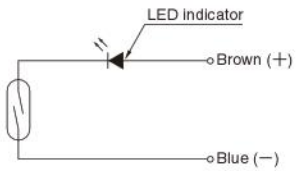
Notes: 1. The internal voltage drop depends on load current.
2. Measured by Koganei test standard.
3. Lead wire length ℓ: A; 1000mm [39in.], B; 3000mm [118in.]

Internal Circuit

ZC201□

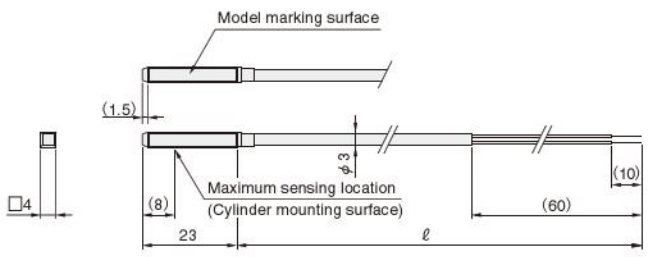


ZC205□

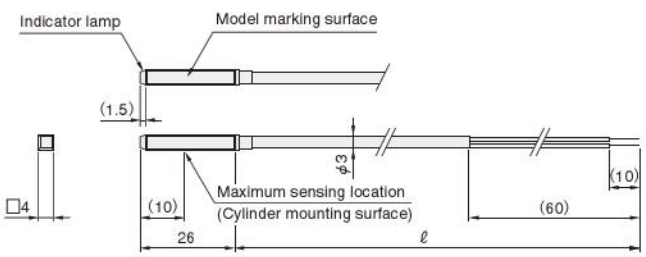


Dimensions (mm)

ZC201□



ZC205□



CS3M□, 4M□, 5M□

Reed Switch Type Sensor Switch

Applicable cylinders

● **Slim cylinders** ● **Twinport cylinders** ● **GA** ● **ORC** ● **ORCA** ● **ORGA** ● **ORK** Note
● **MRG** ● **RAK** ● **Swing cylinders** ● **Twist cylinders**

Note: Excluding ϕ 16 [0.630in.].

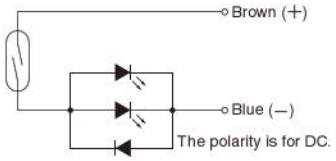
Specifications

Item \ Model	CS3M□		CS4M□		CS5M□	
Wiring type	2-lead wire					
Load voltage	DC10～30V	AC85～230V (r.m.s.)	DC10～30V	AC85～115V (r.m.s.)	DC3～30V	AC85～115V (r.m.s.)
Load current	10～50mA Note 1	10～50mA(AC85～115V) Note 1 5～15mA(AC115～230V) Note 1	5～25mA Note 1	5～20mA Note 1	0.1～60mA	2～25mA
Internal voltage drop Note 2	2.5V MAX. (At 50mA load current)		2.2V MAX. (At 25mA load current)		0.2V MAX. (At 60mA load current)	
Leakage current	0mA					
Response time	1ms MAX.					
Insulation resistance	100MΩ MIN. (At DC500V Megger, between case and lead wire end)					
Dielectric strength	AC2200V (50/60Hz) in 1 minute (Between case and lead wire end)		AC1500V (50/60Hz) in 1 minute (Between case and lead wire end)			
Shock resistance Note 3	294.2m/s^2 [30G] (Non-repeated shock)					
Vibration resistance Note 3	88.3m/s^2 [9G] (Total amplitude 1.5mm [0.06in.], 10～55Hz), Resonance frequency 5000±400Hz					
Operation indicator	When ON: Red LED indicator lights up				—	
Lead wire Note4	PVC 0.2SQ×2-lead×ℓ					
Ambient temperature	0～60°C [32～140°F]					
Storage temperature range	−10～70°C [14～158°F]					
Contact protection	Required (See contact protection on p.1566.)					
Mass	20g [0.71oz.] (For lead wire length A: 1000mm)					

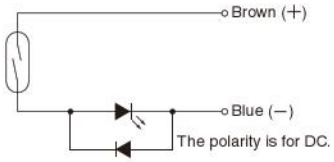
Notes: 1. Ta=37°C [98.6°F]
2. The internal voltage drop depends on load current.
3. Measured by Koganei test standard.
4. Lead wire length ℓ: A; 1000mm [39in.], B; 3000mm [118in.]

Internal Circuit

CS3M□



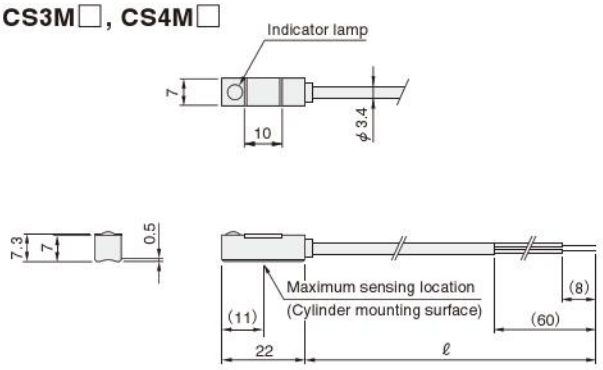
CS4M□



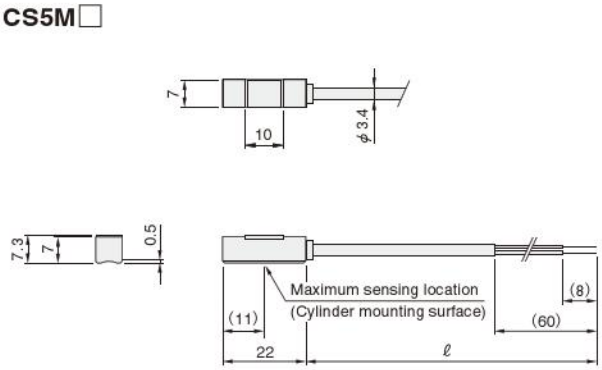
CS5M□

Dimensions (mm)

CS3M□, CS4M□



CS5M□



CS3H□, 4H□, 5H□

Reed Switch Type Sensor Switch

Applicable cylinders

● **Jig cylinders J series** ● **TDA ϕ 10[0.394in.]～ ϕ 32[1.260in.] (previous type)** ● **Slide Units**

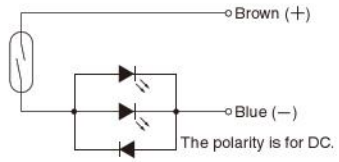
Specifications

Item \ Model	CS3H□		CS4H□		CS5H□	
Wiring type	2-lead wire					
Load voltage	DC10～30V	AC85～115V (r.m.s.)	DC10～30V	AC85～115V (r.m.s.)	DC3～30V	AC85～115V (r.m.s.)
Load current	10～50mA Note 1	10～50mA Note 1	5～25mA Note 1	5～20mA Note 1	0.1～60mA	2～25mA
Internal voltage drop Note 2	2.5V MAX. (At 50mA load current)		2.2V MAX. (At 25mA load current)		0.2V MAX. (At 60mA load current)	
Leakage current	0mA					
Response time	1ms MAX.					
Insulation resistance	100MΩ MIN. (At DC500V Megger, between case and lead wire end)					
Dielectric strength	AC1500V (50/60Hz) in 1 minute (Between case and lead wire end)					
Shock resistance Note 3	294.2m/s² [30G] (Non-repeated shock)					
Vibration resistance Note 3	88.3m/s² [9G] (Total amplitude 1.5mm [0.06in.], 10～55Hz)					
Environmental protection	—					
Operation indicator	When ON: Red LED indicator lights up				—	
Lead wire Note 3	PCCV 0.2SQ×2-lead×ℓ					
Ambient temperature	0～60°C [32～140°F]					
Storage temperature range	−10～70°C [14～158°F]					
Contact protection	Required (See contact protection on p.1566.)					
Mass	30g [1.06oz.] (For lead wire length A: 1000mm)					

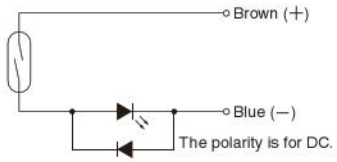
Notes: 1. Ta＝37°C [98.6°F]
2. The internal voltage drop depends on load current.
3. Measured by Koganei test standard.
4. Lead wire length ℓ: A; 1000mm [39in.], B; 3000mm [118in.]

Internal Circuit

CS3H□



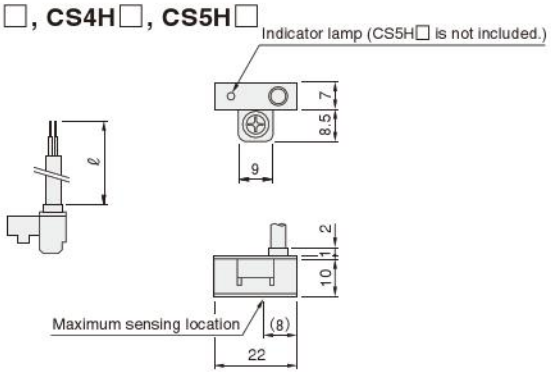
CS4H□



CS5H□

Dimensions (mm)

CS3H□, CS4H□, CS5H□



ZC301□, ZC305□

Reed Switch Type Sensor Switch

Applicable cylinders

●AGTB ●AGTC ●ORCJ ●MRC

Specifications

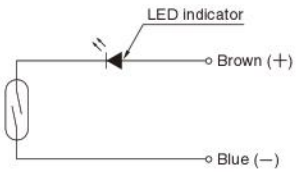
Item \ Model	ZC301□		ZC305□
Wiring type	2-lead wire		
Load voltage	DC5～28V	AC85～115V (r.m.s.)	DC10～28V
Load current	0.1～40mA	2～25mA	5～40mA
Internal voltage drop Note 1	0.1V MAX. (At 40mA load current)		2.1V MAX. (At 40mA load current)
Leakage current	0mA		
Response time	1ms MAX.		
Insulation resistance	100MΩ MIN. (At DC500V Megger, between case and lead wire end)		
Dielectric strength	AC1500V (50/60Hz) in 1 minute (Between case and lead wire end)		AC1000V (50/60Hz) in 1 minute (Between case and lead wire end)
Shock resistance Note 2	294.2m/s² [30G] (Non-repeated shock)		
Vibration resistance Note 2	88.3m/s² [9G] (Total amplitude 1.5mm [0.06in.], 10～55Hz), Resonance frequency 2750±250Hz		
Environmental protection	IP67 (IEC standard), JIS C0920 (Water-proof type)		
Operation indicator	—		When ON: Red LED indicator lights up
Lead wire Note 3	PCCV 0.2SQ×2-lead×ℓ		
Ambient temperature	0～60°C [32～140°F]		
Storage temperature range	−10～70°C [14～158°F]		
Contact protection	Required (See contact protection on p.1566.)		
Mass	20g [0.71oz.] (For lead wire length A: 1000mm)		

Notes: 1. The internal voltage drop depends on load current.
2. Measured by Koganei test standard.
3. Lead wire length ℓ : A; 1000mm [39in.], B; 3000mm [118in.]

Internal Circuit

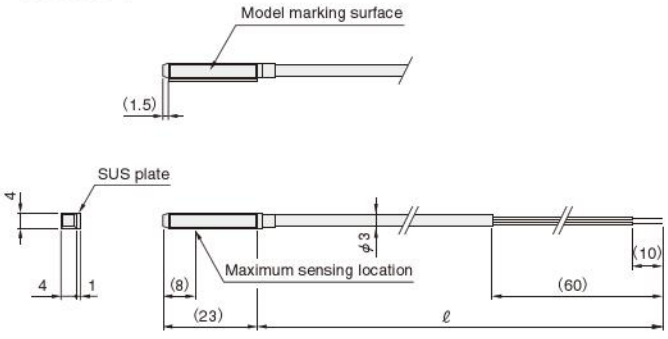
ZC301□

ZC305□

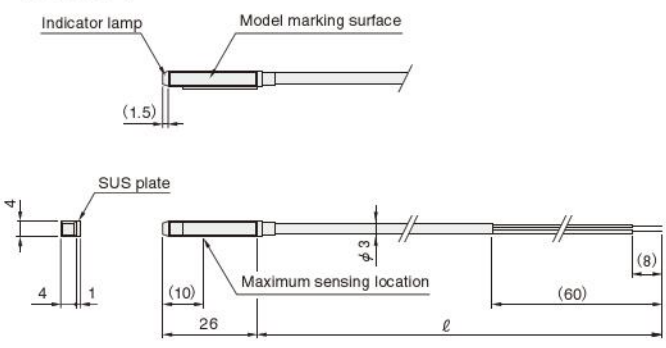


Dimensions (mm)

ZC301□



ZC305□



ZC601□, ZC605□

Reed Switch Type Sensor Switch

Applicable cylinders

●**Axis cylinders**

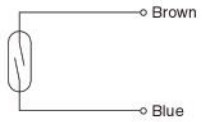
Specifications

Item \ Model	ZC601□		ZC605□
Wiring type	2-lead wire		
Load voltage	DC5～28V	AC85～115V (r.m.s.)	DC10～28V
Load current	DC0.1～40mA	AC2～25mA	DC5～40mA
Internal voltage drop Note 1	0.1V MAX. (At 40mA load current)		2.1V MAX. (At 40mA load current)
Leakage current	0mA		
Response time	1ms MAX.		
Insulation resistance	100MΩ MIN.(At DC500V Megger, between case and lead wire end)		
Dielectric strength	AC1500V (50/60Hz) in 1 minute (Between case and lead wire end)		AC1000V (50/60Hz) in 1 minute (Between case and lead wire end)
Shock resistance Note 2	294.2m/s^2 [30G] (Non-repeated shock)		
Vibration resistance Note 2	88.3m/s^2 [9G] (Total amplitude 1.5mm [0.06in.], 10～55Hz), Resonance frequency 2750±250Hz		
Environmental protection	IP67 (IEC standard), JIS C0920 (Water-proof type)		
Operation indicator	—		When ON: Red LED indicator lights up
Lead wire Note 3	PCCV 0.2SQ×2-lead×ℓ		
Ambient temperature	0～60°C [32～140°F]		
Storage temperature range	−10～70°C [14～158°F]		
Contact protection	Required (See contact protection on p.1566.)		
Mass	20g [0.71oz.] (For lead wire length A: 1000mm)		

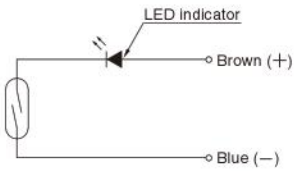
Notes: 1. The internal voltage drop depends on load current.
2. Measured by Koganei test standard.
3. Lead wire length ℓ: A; 1000mm [39in.], B; 3000mm [118in.]

Internal Circuit

ZC601□

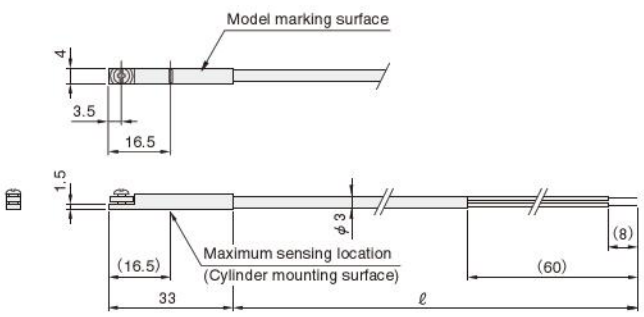


ZC605□

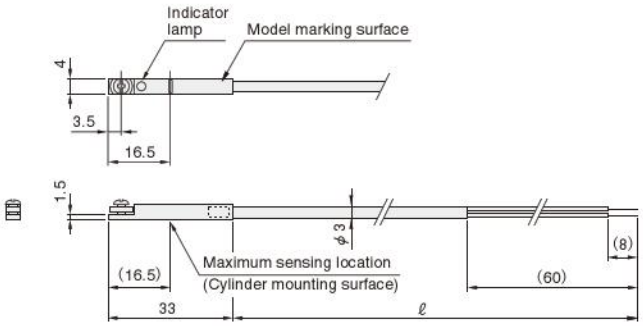


Dimensions (mm)

ZC601□



ZC605□



ZE101□, 102□, 201□, 202□

Reed Switch Type Sensor Switch

Applicable cylinders

●**Jig cylinders C series** ●**Jig cylinders JC series** ●**Mini guide sliders** ●**Jig cylinders with guides** ●**Twin rod cylinders B series** ●**Rod sliders** ●**Multi sliders** ●**WT** ●**ACY** Note ●**ACZ** Note ●**WS** ●**Flat rodless cylinders** ●**ORV** Note ●**ORS** Note ●**MRS** Note ●**ORW, MRW** ●**RAG** ●**RAT** ●**DJ cylinders**

Note: Only the horizontal lead wire type is available.

Specifications

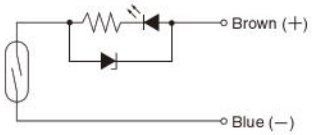
Item \ Model	ZE101□	ZE102□	ZE201□	ZE202□
Wiring type	2-lead wire			
Lead wire direction	Horizontal		Vertical	
Load voltage	DC5～28V, AC85～115V	DC10～28V, AC85～115V	DC5～28V, AC85～115V	DC10～28V, AC85～115V
Load current	DC40mA MAX., AC20mA MAX.	DC5～40mA, AC5～20mA	DC40mA MAX., AC20mA MAX.	DC5～40mA, AC5～20mA
Internal voltage drop Note 1	0.1V MAX. (At DC40mA load current)	3.0V MAX.	0.1V MAX. (At DC40mA load current)	3.0V MAX.
Leakage current	0mA			
Response time	1ms MAX.			
Insulation resistance	100MΩ MIN. (At DC500V Megger, between case and lead wire end)			
Dielectric strength	AC1500V (50/60Hz) in 1 minute (Between case and lead wire end)			
Shock resistance Note 2	294m/s^2 [30G] (Non-repeated shock)			
Vibration resistance Note 2	88.3m/s^2 [9G] (Total amplitude 1.5mm [0.06in.], 10～55Hz), Resonance frequency 2750±250Hz			
Environmental protection	IP67 (IEC standard), JIS C0920 (Water-proof type)			
Operation indicator	None	When ON: Red LED indicator lights up	None	When ON: Red LED indicator lights up
Lead wire Note 3	PCCV 0.2SQ×2-lead (Brown and blue)×ℓ			
Ambient temperature	0～60°C [32～140°F]			
Storage temperature range	−10～70°C [14～158°F]			
Contact protection	Required (See contact protection on p.1566.)			
Mass	15g [0.53oz.] (For lead wire length A: 1000mm), 35g [1.23oz.] (For lead wire length B: 3000mm)			

Notes: 1. The internal voltage drop depends on load current.
2. Measured by Koganei test standard.
3. Lead wire length ℓ: A; 1000mm [39in.], B; 3000mm [118in.]

Internal Circuit

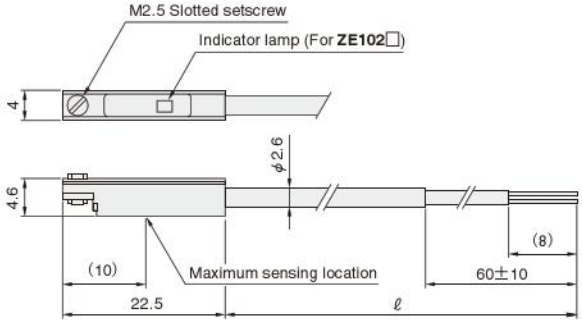
ZE101□, ZE201□

ZE102□, ZE202□

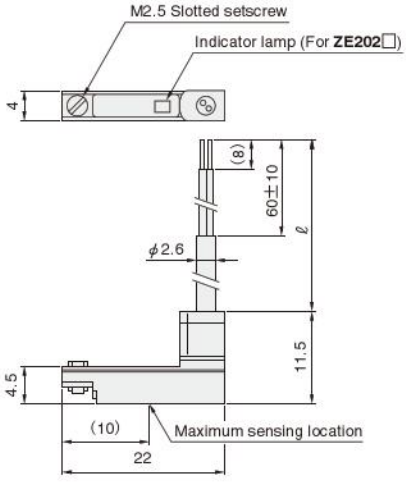


Dimensions (mm)

●Horizontal lead wire ZE101□, ZE102□



●Vertical lead wire ZE201□, ZE202□



CS2F, 3F, 4F, 5F

Reed Switch Type Sensor Switch

Applicable cylinders

● **Slim cylinders** Note ● **DYNA cylinders** ● **GA** ● **Swing cylinders**

Note: Excluding Slim block cylinder ϕ 16 [0.630in.]

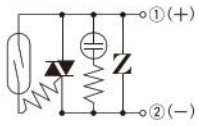
Specifications

Item \ Model	CS2F	CS3F	CS4F	CS5F
Wiring type	2-lead wire			
Load voltage	AC85～230V (r.m.s)	DC5～30V	DC5～30V	DC3～30V
Load current	2～200mA	10～46mA Note 1	5～25mA Note 1	0.1～80mA
Internal voltage drop	0.1V MAX. (At 200mA load current)	3V MAX. (At 46mA load current) Note 2	2.8V MAX. (At 25mA load current) Note 2	0.1V MAX. (At 80mA load current)
Leakage current	1mA MAX. (AC100V) 2mA MAX. (AC200V)	0mA		
Response time	2ms MAX.	1.2ms MAX.		
Insulation resistance	100MΩ MIN. (At DC500V Megger, between case and lead wire end)			
Dielectric strength	AC500V (50/60Hz) in 1 minute (Between case and lead wire end)			
Shock resistance Note 3	294.2m/s^2 [30G] (Non-repeated shock)			
Vibration resistance Note 3	88.3m/s^2 [9G] (Total amplitude 1.5mm [0.06in.], 10～55Hz), Resonance frequency 5000±400Hz			
Environmental protection	—			
Operation indicator	When ON: Red neon lamp turns off	When ON: Red LED indicator lights up		—
Method of wiring	With DIN connector (Cabtyre outer diameter ϕ 6.5 [0.256in.] MAX.,Wire ϕ 1.25SQ MAX.)			
Ambient temperature	0～60°C [32～140°F]			
Storage temperature range	−10～70°C [14～158°F]			
Contact protection	Not required	Required (See contact protection on p.1566.)		
Mass	40g [1.41oz.]			

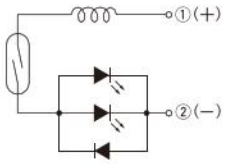
Notes: 1. Ta=37°C [98.6°F]
2. The internal voltage drop depends on load current.
3. Measured by Koganei test standard.

Internal Circuit

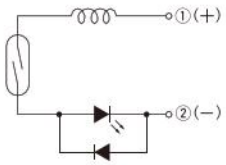
CS2F



CS3F



CS4F

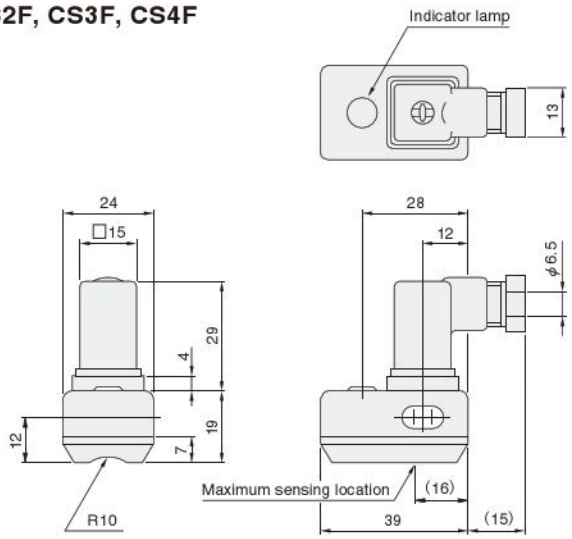


CS5F

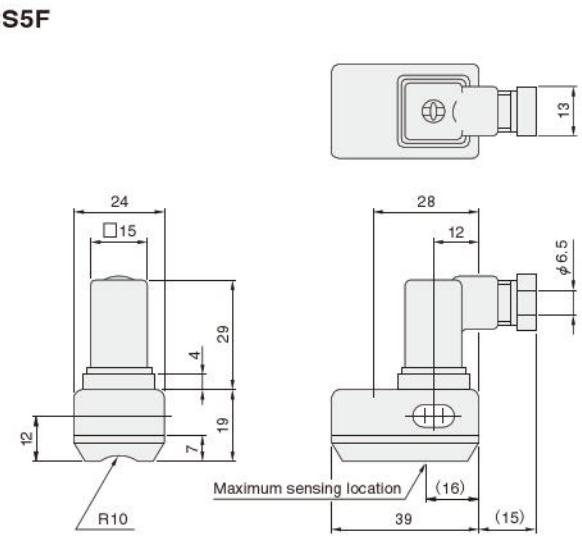
The numbers in circle show the terminal numbers of the F type connector.

Dimensions (mm)

CS2F, CS3F, CS4F



CS5F



CS2B, 3B, 4B, 5B

Reed Switch Type Sensor Switch

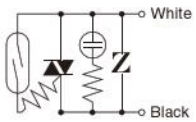
Specifications

Item \ Model	CS2B	CS3B	CS4B	CS5B
Wiring type	2-lead wire			
Load voltage	AC85～230V (r.m.s)	DC5～30V	DC5～30V	DC3～30V
Load current	2～200mA	10～46mA Note 1	5～25mA Note 1	0.1～80mA
Internal voltage drop	0.1V MAX. (At 200mA load current)	3V MAX. (At 46mA load current) Note 2	2.8V MAX. (At 25mA load current) Note 2	0.1V MAX. (At 80mA load current)
Leakage current	1mA MAX. (AC100V) 2mA MAX. (AC200V)	0mA		
Response time	2ms MAX.	1.2ms MAX.		
Insulation resistance	100MΩ MIN. (At DC500V Megger, between case and lead wire end)			
Dielectric strength	AC500V (50/60Hz) in 1 minute (Between case and lead wire end)			
Shock resistance Note 3	294.2m/s² [30G] (Non-repeated shock)			
Vibration resistance Note 3	88.3m/s² [9G] (Total amplitude 1.5mm [0.06in.], 10～55Hz), Resonance frequency 2200±300Hz			
Environmental protection	—			
Operation indicator	When ON: Red neon lamp turns off	When ON: Red LED indicator lights up		—
Lead wire	VCT 0.3SQ×2-lead×1500mm [59in.]			
Ambient temperature	0～60°C [32～140°F]			
Storage temperature range	−10～70°C [14～158°F]			
Contact protection	Not required	Required (See contact protection on p.1566.)		
Mass	60g [2.12oz.]			

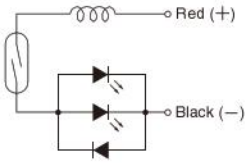
Notes: 1. Ta=37°C [98.6°F]
2. The internal voltage drop depends on load current.
3. Measured by Koganei test standard.

Internal Circuit

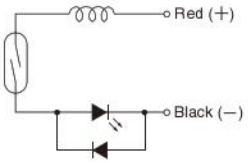
CS2B



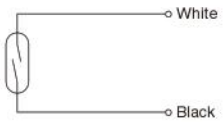
CS3B



CS4B

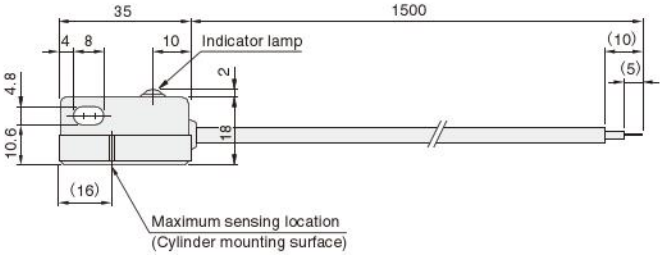


CS5B

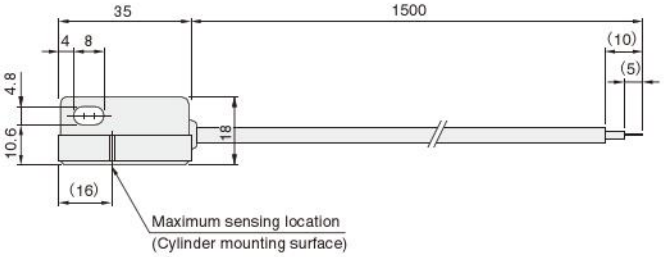


Dimensions (mm)

CS2B, CS3B, CS4B



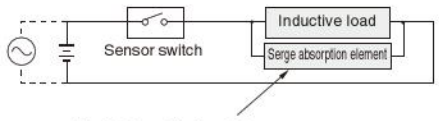
CS5B



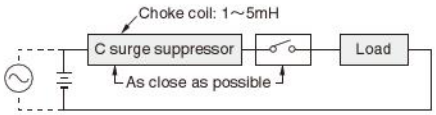
Contact Protection for Reed Switch Type Sensor Switches

In order to use the reed switch type sensor switches in a stable condition, take the following contact protection measures.

● When you connect inductive load (electromagnetic relay, etc.).



For DC··· Diode, CR, etc.
For AC··· CR, etc.
Diode: Forward current should be more than the circuit current.
Reverse voltage should be peak inverse voltage that is 10 times or more of the circuit voltage.
CR: C=0.01～0.1μF
R=1～4kΩ

● When capacity serge is generated.

(When lead wire length exceeds 10m.)