

KOGANEI

Air Cylinder

SENSOR SWITCH

INSTRUCTION MANUAL Ver.1.0

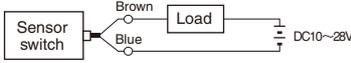
Points of Wiring Solid State Type Sensor Switches

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

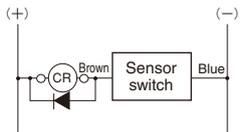
ZC153□, ZC253□, ZC353□, ZC653□
 ZE155□, ZE255□, ZE175□, ZE275□, ZG553□, CS9H□

● 2-lead wire type

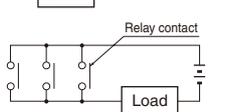
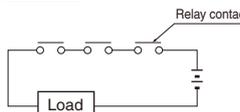
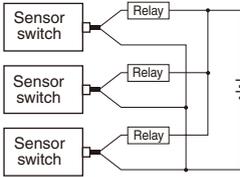
● Basic connection



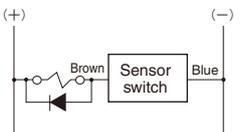
● Connecting with relays



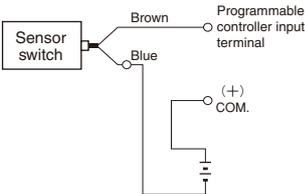
AND (series) connection and OR (parallel) connection



● Connecting with a solenoid valve

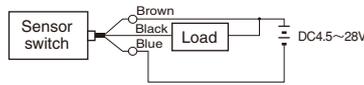


● Connecting with a programmable controller

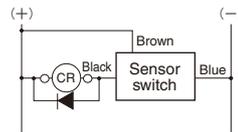


● 3-lead wire with NPN output

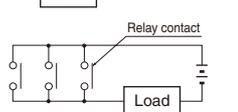
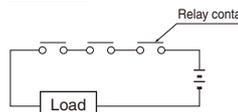
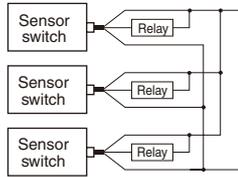
● Basic connection



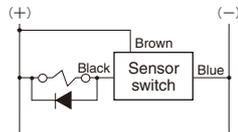
● Connecting with relays



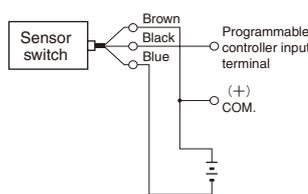
AND (series) connection and OR (parallel) connection



● Connecting with a solenoid valve

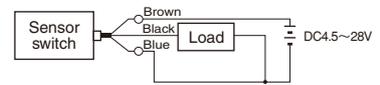


● Connecting with a programmable controller

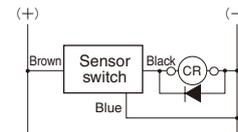


● 3-lead wire with PNP output

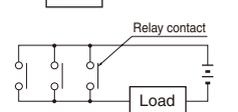
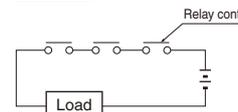
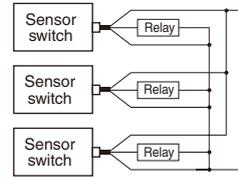
● Basic connection



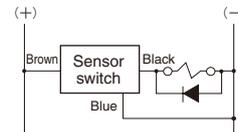
● Connecting with relays



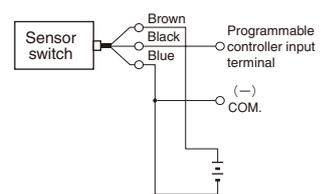
AND (series) connection and OR (parallel) connection



● Connecting with a solenoid valve



● Connecting with a programmable controller



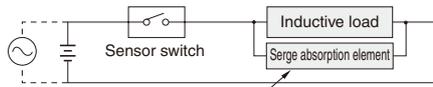
- Cautions:**
1. Connect the lead wires according to their color. Incorrect wiring will cause damage to the sensor switch since there is no overcurrent protection.
 2. With the inductive load of an electromagnetic relay, etc., the use of a surge protection diode is recommended.
 3. Avoid the use of AND (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.

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.

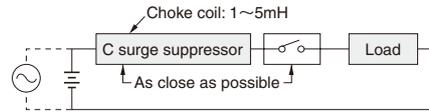
Reverse voltage should be peak inverse voltage that is 10 times or more of the circuit voltage.

CR: $C=0.01 \sim 0.1\mu\text{F}$

$R=1 \sim 4\text{k}\Omega$

● When capacity surge is generated.

(When lead wire length exceeds 10m.)



ZC130□, ZC153□

Products compliant with the EMC Directive



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

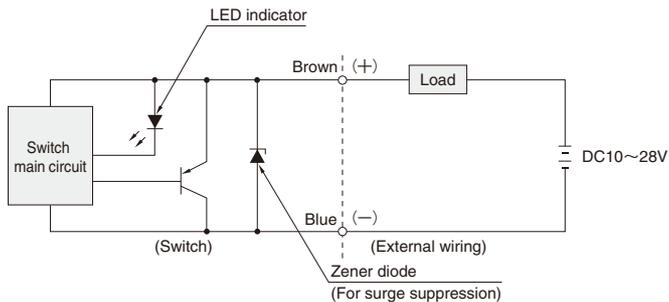
Specifications

| 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) | 50 μ A MAX. (DC24V) |
| Response time | | 1ms MAX. | |
| Insulation resistance | | 100M Ω 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 \times 2-lead \times ℓ | PVC 0.2SQ \times 3-lead \times 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) | |

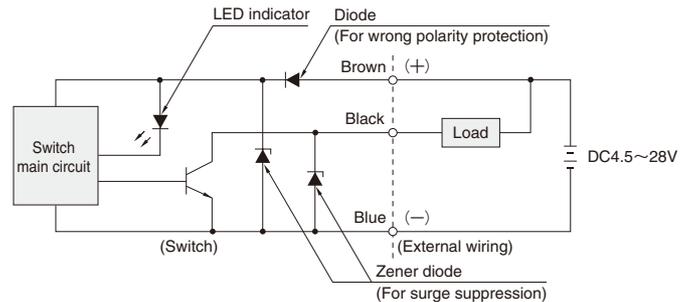
- Notes: 1. The internal voltage drop depends on load current.
 2. Measured by Koganei test standard.
 3. Lead wire length ℓ : A; 1000mm [39in.], B; 3000mm [118in.]

Internal Circuit

ZC130□

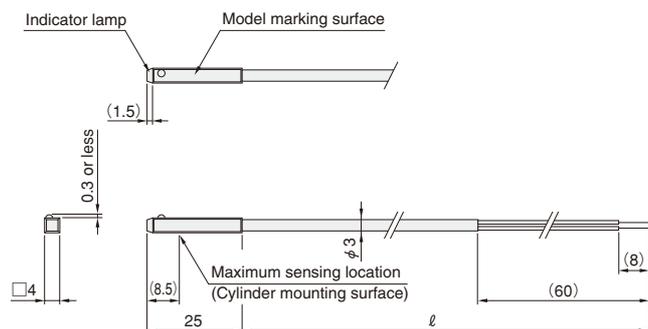


ZC153□

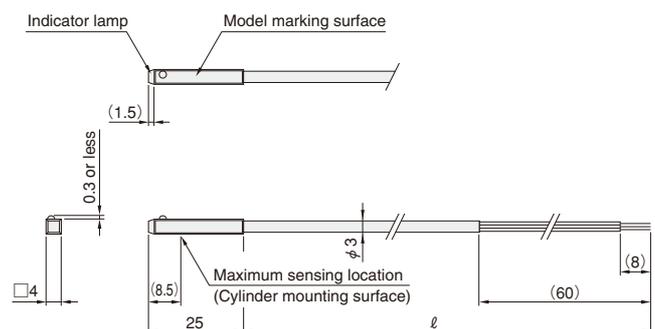


Dimensions (mm)

ZC130□



ZC153□



ZC230□, ZC253□

Products compliant with the EMC Directive



Solid State Type Sensor Switch

Applicable cylinders

- Pen cylinders

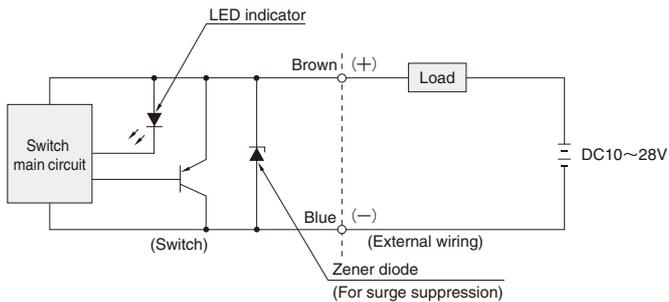
Specifications

| 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/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) | |

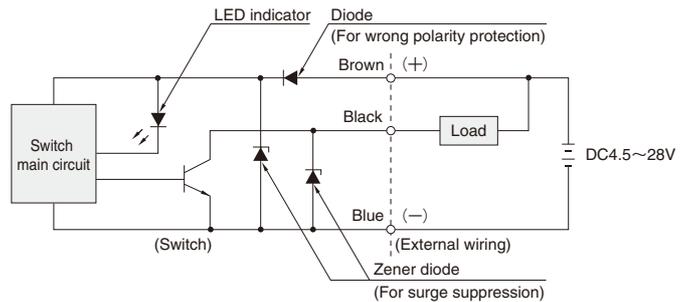
- Notes: 1. The internal voltage drop depends on load current.
 2. Measured by Koganei test standard.
 3. Lead wire length ℓ : A; 1000mm [39in.], B; 3000m [118in.]

Internal Circuit

ZC230□

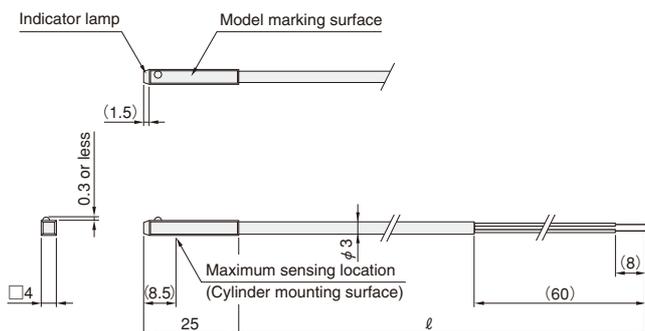


ZC253□

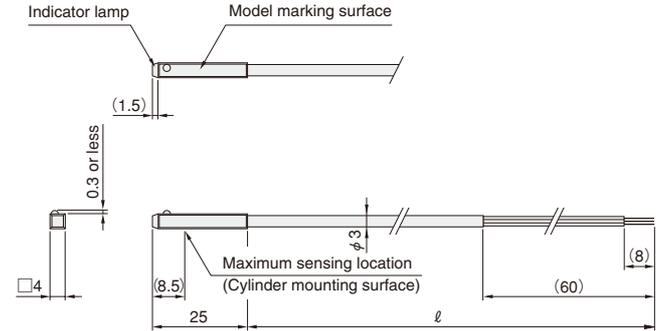


Dimensions (mm)

ZC230□



ZC253□



ZC330□, ZC353□

Products compliant with the EMC Directive



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/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) | |

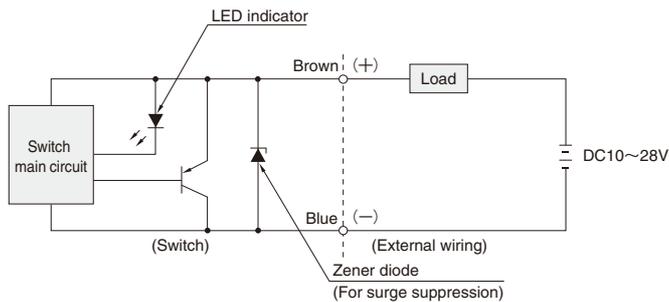
Notes: 1. The internal voltage drop depends on load current.

2. Measured by Koganei test standard.

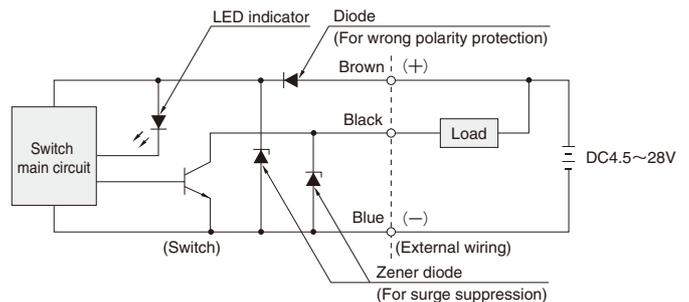
3. Lead wire length ℓ : A; 1000mm [39in.], B; 3000m [118in.]

Internal Circuit

ZC330□

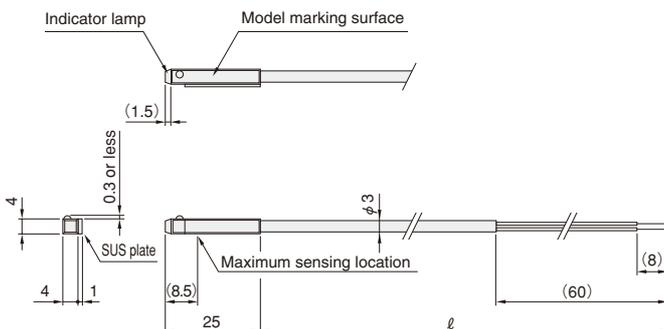


ZC353□

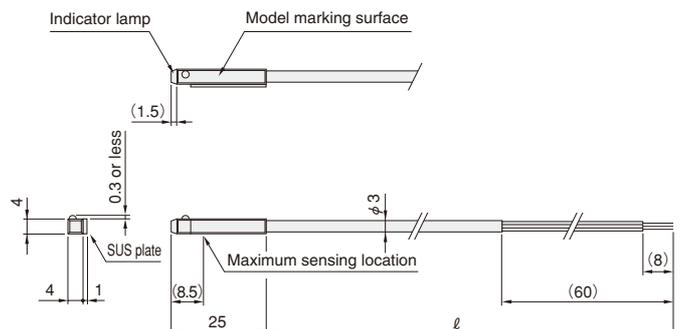


Dimensions (mm)

ZC330□



ZC353□



ZG530 □, ZG553 □

Products compliant with the EMC Directive



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]) | 50 μ A MAX. (DC24V) |
| Response time | | 1ms MAX. | |
| Insulation resistance | | 100M Ω 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 \times 2-lead \times ℓ | PVC 0.2SQ \times 3-lead \times 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) | |

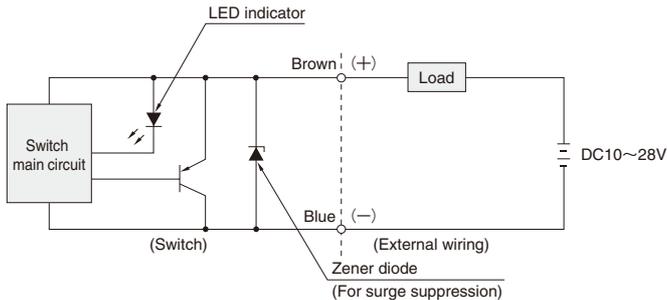
Notes: 1. The internal voltage drop depends on load current.

2. Measured by Koganei test standard.

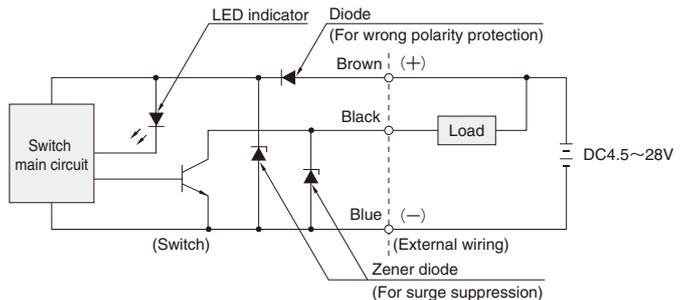
3. Lead wire length ℓ : A; 1000mm [39in.], B; 3000m [118in.]

Internal Circuit

ZG530 □

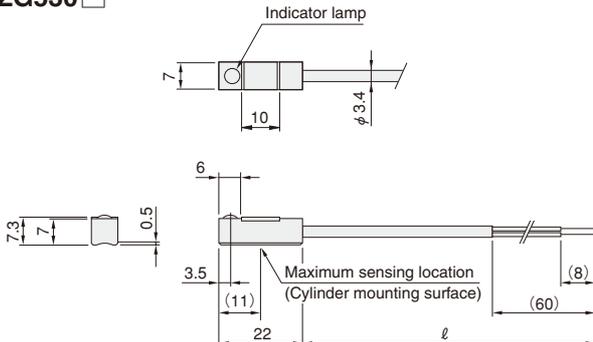


ZG553 □

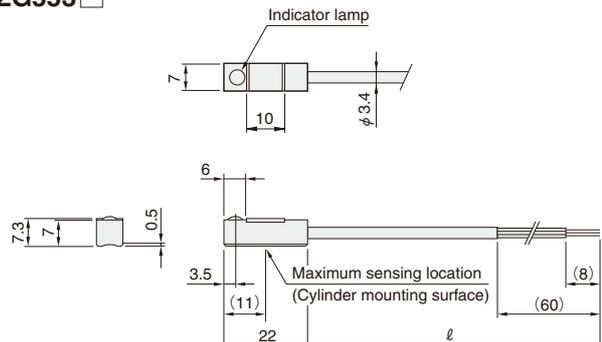


Dimensions (mm)

ZG530 □



ZG553 □



ZC630 □, ZC653 □

Products compliant with the EMC Directive



Solid State Type Sensor Switch

Applicable cylinders

- Axis cylinders

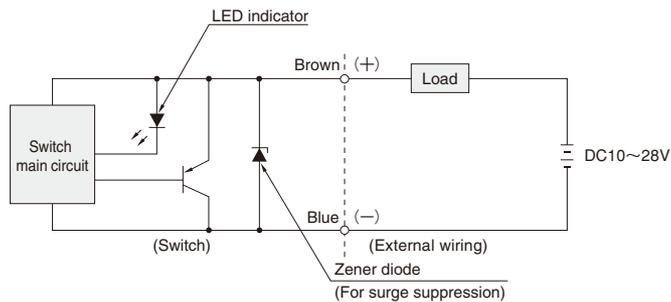
Specifications

| 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/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) | |

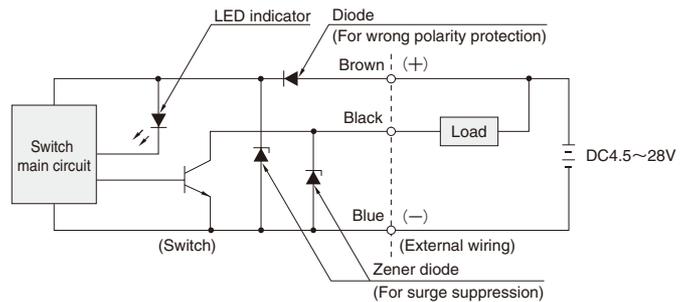
- Notes: 1. The internal voltage drop depends on load current.
 2. Measured by Koganei test standard.
 3. Lead wire length ℓ : A; 1000mm [39in.], B; 3000m [118in.]

Internal Circuit

ZC630 □

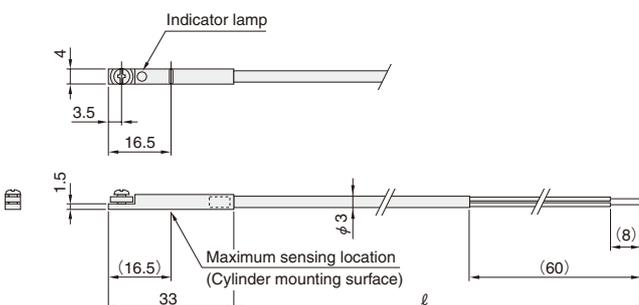


ZC653 □

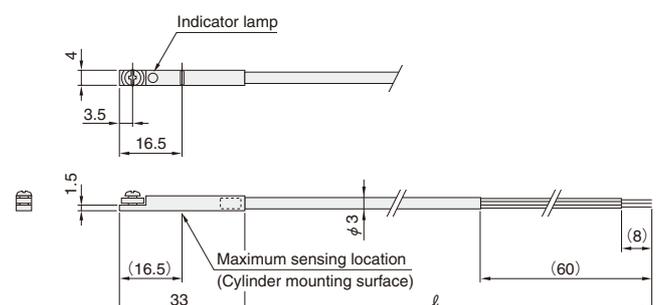


Dimensions (mm)

ZC630 □



ZC653 □



ZE135□, 155□, 235□, 255□

Products compliant with the EMC Directive



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

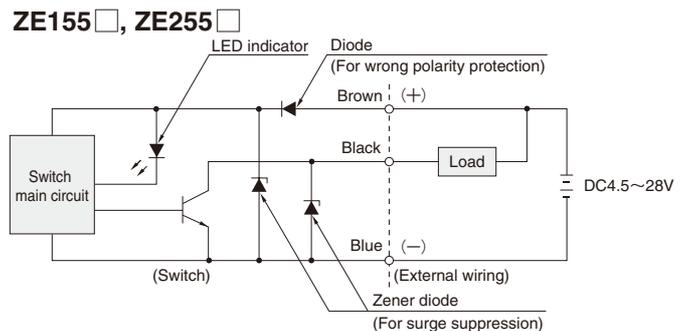
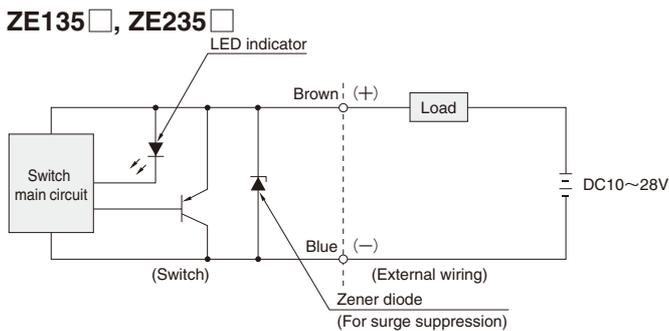
Notes: 1. Only the horizontal lead wire type 2. Only the vertical lead wire type

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/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} | | PCCV 0.2SQ X 2-lead (Brown and blue) X ℓ | PCCV 0.15SQ X 3-lead (Brown, blue, and black) X ℓ | PCCV 0.2SQ X 2-lead (Brown and blue) X ℓ | PCCV 0.15SQ X 3-lead (Brown, blue, and black) X 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) | | | |

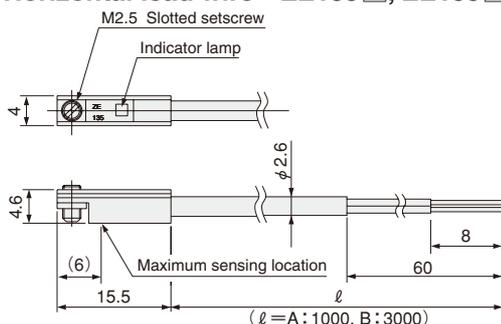
Notes: 1. The internal voltage drop depends on load current.
 2. Measured by Koganei test standard.
 3. Lead wire length ℓ : A; 1000mm [39in.], B; 3000m [118in.]

Internal Circuit

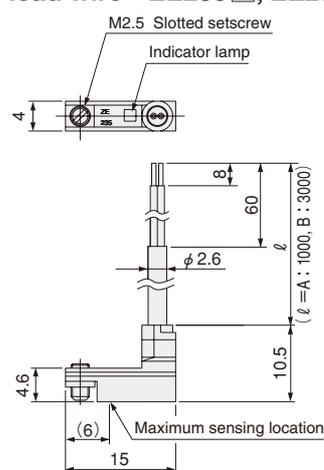


Dimensions (mm)

● Horizontal lead wire ZE135□, ZE155□



● Vertical lead wire ZE235□, ZE255□



ZE175□, ZE275□

3-lead Wire PNP Output Type Solid State Sensor Switches

Products compliant
with the EMC Directive



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

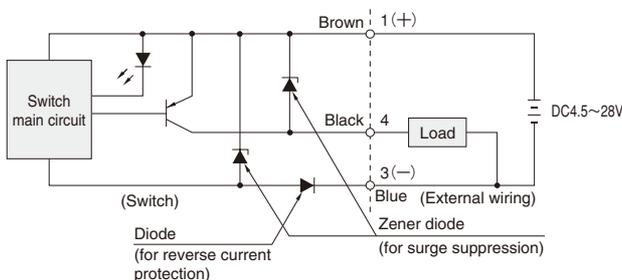
Specifications

| 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/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} | | 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

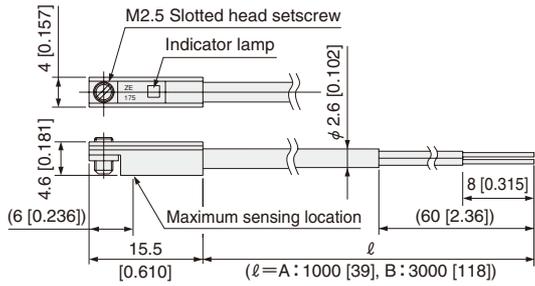
Internal Circuit

ZE175□, ZE275□

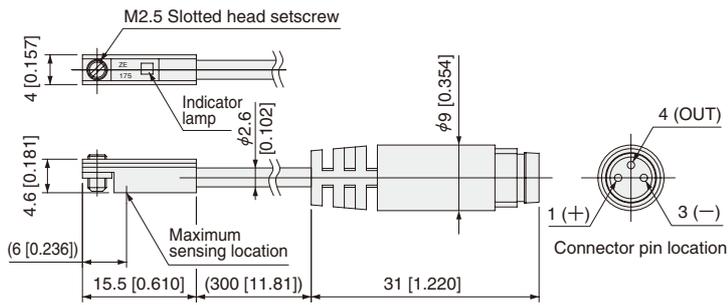


● Horizontal Lead Wire

ZE175A
ZE175B

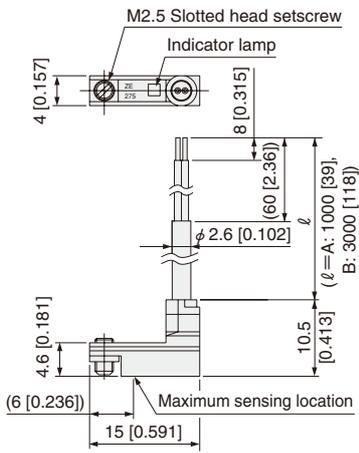


ZE175G

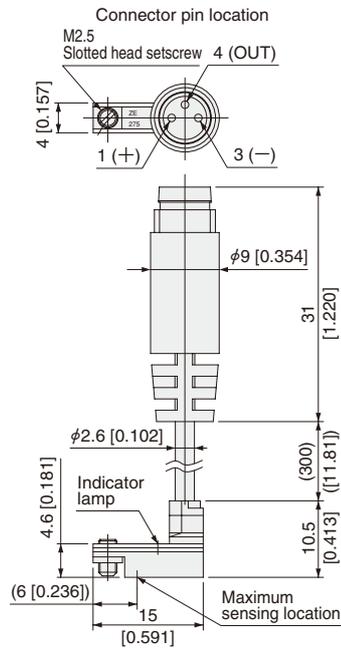


● Vertical Lead Wire

ZE275A
ZE275B



ZE275G



CS9H□, ZB430□

Products compliant with the EMC Directive



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

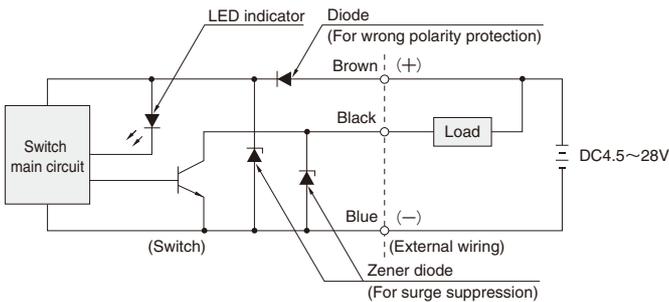
Specifications

| 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 | | 50 μ A MAX. (DC24V) | 1mA MAX. (DC24V at 25°C [77°F]) |
| Response time | | 1ms MAX. | |
| Insulation resistance | | 100M Ω 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×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) | |

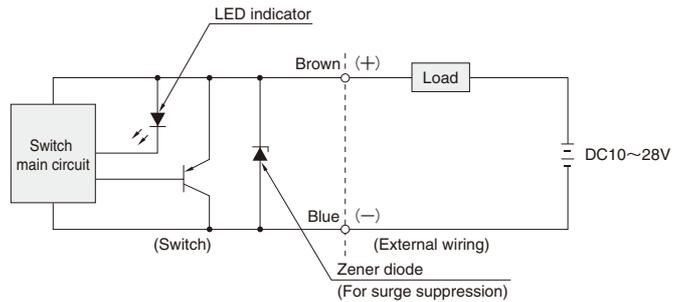
- Notes: 1. The internal voltage drop depends on load current.
 2. Measured by Koganei test standard.
 3. Lead wire length ℓ : A; 1000mm [39in.], B; 3000m [118in.]

Internal Circuit

CS9H□

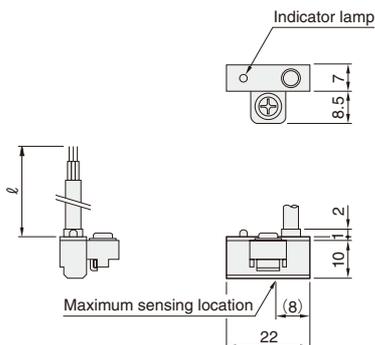


ZB430□

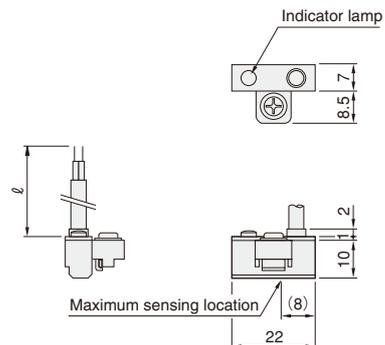


Dimensions (mm)

CS9H□



ZB430□



ZD136C

Strong Magnetic Field Resistant Sensor Switch



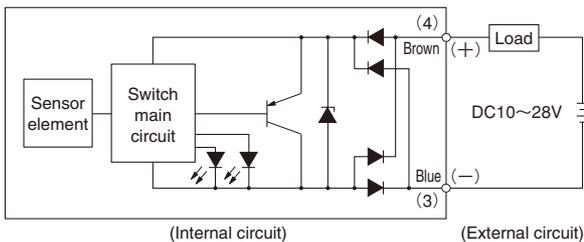
Applicable cylinders
 ● Jig cylinders JC series

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 | | 50ms MAX. 80ms MAX. |
| | | ON delay = 40ms TYP. OFF delay = 65ms TYP. 30ms MIN. 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 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 | Setting range | When ON: Green LED indicator lights up |
| | Unstable range | When ON: Red LED indicator lights up |
| Lead wire ^{Note 3} | | Oil-resistant, spatter-resistant cabtyre cable 2-lead, 0.5SQX ℓ |
| Magnetic field resistance ^{Note 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.]

Internal Circuit and Outline of Operations

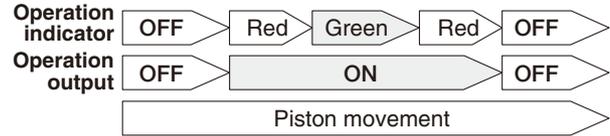


Caution: ZD136C is a non-polarity type. Connect either the brown or the blue lead wire to the load.

Outline of operations

| Sensor switch | Magnetic field | | Disturbance by an AC magnetic field | |
|----------------------|--|-------------|-------------------------------------|-------------|
| | No 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 |

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.

- 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.

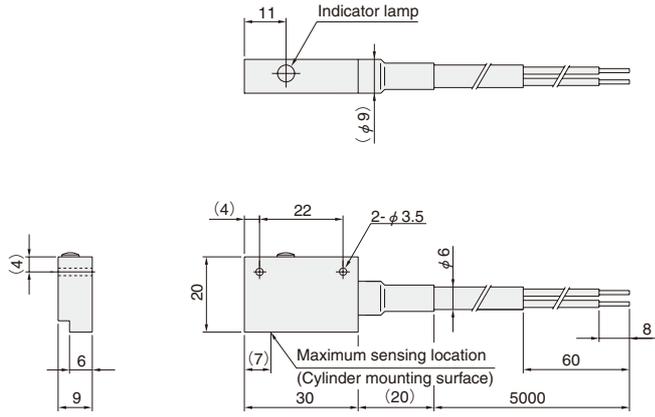
Caution: The sensor switch cannot be used in areas near DC welders (including inverters), because the magnetic fields generated by the DC welder remain constant.

- **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□

Products compliant with the EMC Directive



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 | | 100M Ω 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 \pm 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 \times 2-lead \times 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.

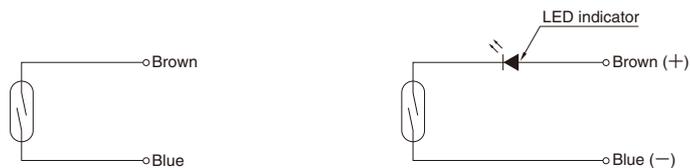
2. Measured by Koganei test standard.

3. Lead wire length ℓ : A; 1000mm [39in.], B; 3000mm [118in.]

Internal Circuit

CS5T□

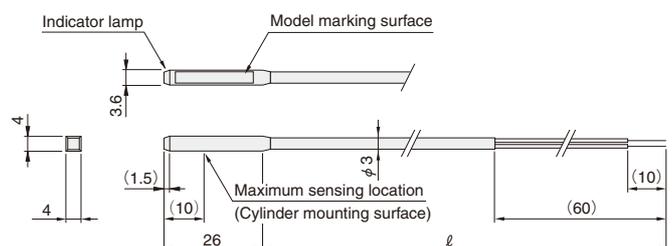
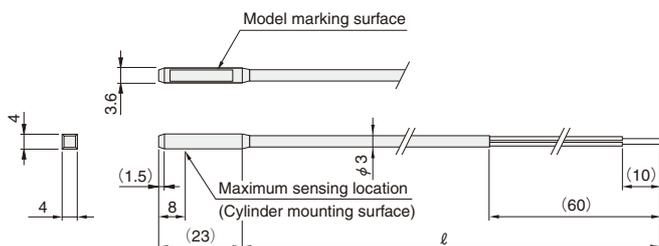
CS11T□



Dimensions (mm)

CS5T□

CS11T□



ZC201 □, ZC205 □

Products compliant with the EMC Directive



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) ^{Note1} |
| 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.

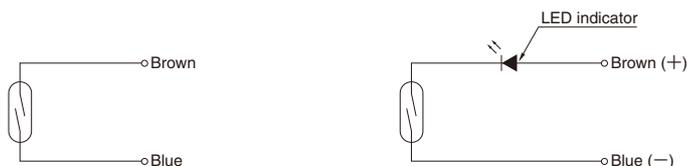
2. Measured by Koganei test standard.

3. Lead wire length ℓ : A; 1000mm [39in.], B; 3000mm [118in.]

Internal Circuit

ZC201 □

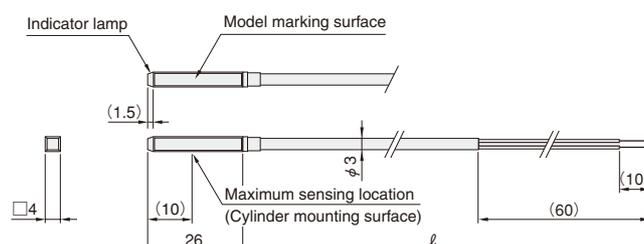
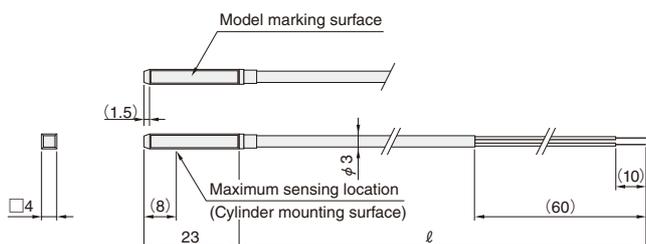
ZC205 □



Dimensions (mm)

ZC201 □

ZC205 □



CS3M□, 4M□, 5M□

Products compliant with the EMC Directive



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 | | 100M Ω 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 \pm 400Hz | | | | | |
| Operation indicator | | When ON: Red LED indicator lights up | | | | — | |
| Lead wire ^{Note 4} | | PVC 0.2SQ \times 2-lead \times 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]

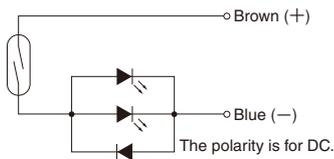
2. The internal voltage drop depends on load current.

3. Measured by Koganei test standard.

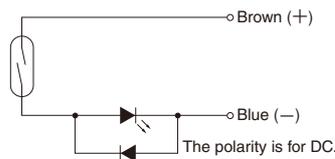
4. Lead wire length ℓ : A; 1000mm [39in.], B; 3000mm [118in.]

Internal Circuit

CS3M□



CS4M□

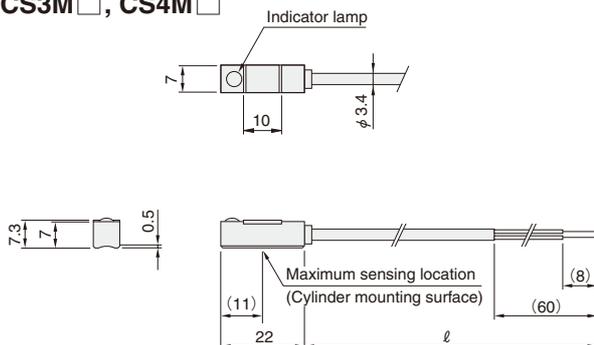


CS5M□

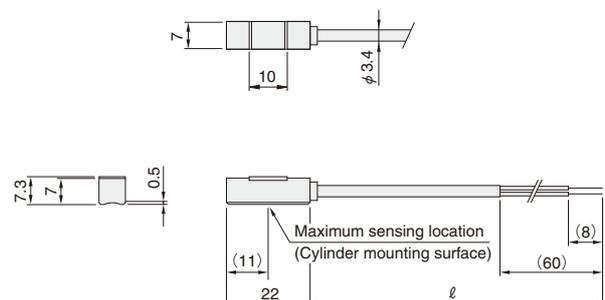


Dimensions (mm)

CS3M□, CS4M□

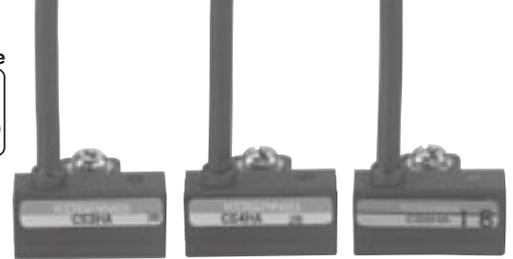


CS5M□



CS3H□, 4H□, 5H□

Products compliant with the EMC Directive



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 | | 100M Ω 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/s ² [30G] (Non-repeated shock) | | | | | |
| Vibration resistance ^{Note 3} | | 88.3m/s ² [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 \times 2-lead \times 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]

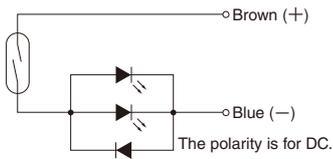
2. The internal voltage drop depends on load current.

3. Measured by Koganei test standard.

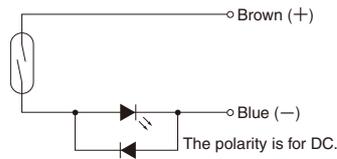
4. Lead wire length ℓ : A; 1000mm [39in.], B; 3000mm [118in.]

Internal Circuit

CS3H□



CS4H□

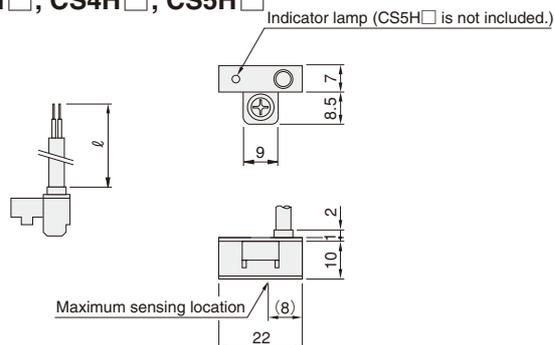


CS5H□



Dimensions (mm)

CS3H□, CS4H□, CS5H□



ZC301 □, ZC305 □

Products compliant with the EMC Directive



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.) |
| Load current | | 0.1~40mA | 5~40mA |
| Internal voltage drop ^{Note 1} | | 0.1V 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.

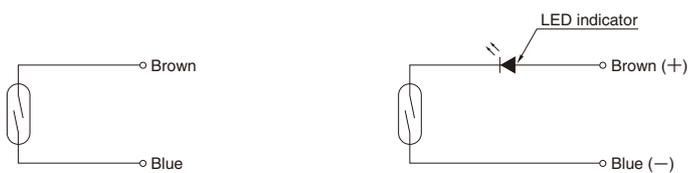
2. Measured by Koganei test standard.

3. Lead wire length ℓ : A; 1000mm [39in.], B; 3000mm [118in.]

Internal Circuit

ZC301 □

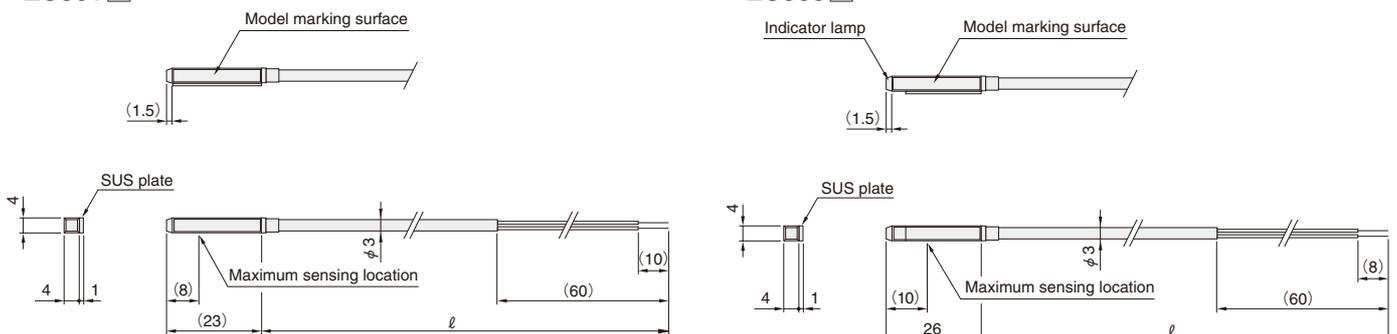
ZC305 □



Dimensions (mm)

ZC301 □

ZC305 □



ZC601 □, ZC605 □

Products compliant with the EMC Directive



Reed Switch Type Sensor Switch

Applicable cylinders

- Axis cylinders

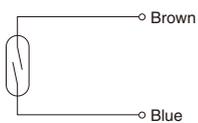
Specifications

| Item | Model | ZC601 □ | ZC605 □ |
|---|-------|--|--|
| Wiring type | | 2-lead wire | |
| Load voltage | | DC5~28V | AC85~115V (r.m.s.) |
| Load current | | DC0.1~40mA | AC2~25mA |
| Internal voltage drop ^{Note 1} | | 0.1V 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) | |

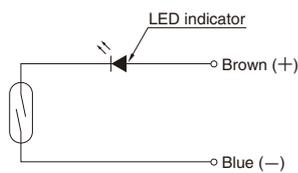
- Notes: 1. The internal voltage drop depends on load current.
 2. Measured by Koganei test standard.
 3. Lead wire length ℓ : A; 1000mm [39in.], B; 3000mm [118in.]

Internal Circuit

ZC601 □

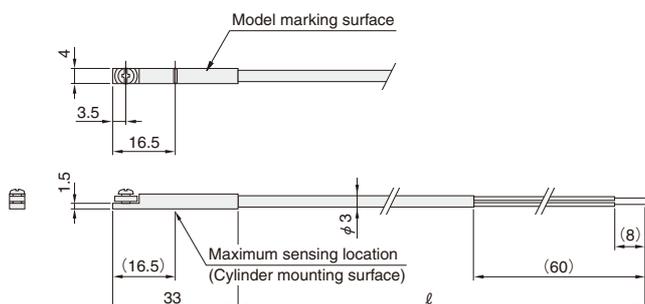


ZC605 □

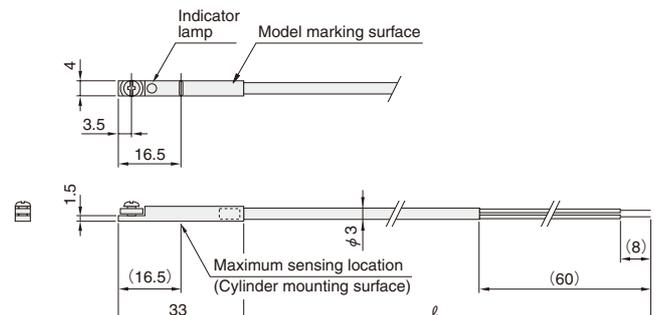


Dimensions (mm)

ZC601 □



ZC605 □

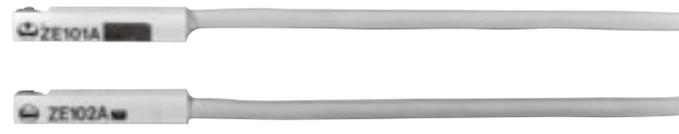


ZE101□, 102□, 201□, 202□

Products compliant with the EMC Directive



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.

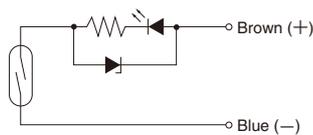
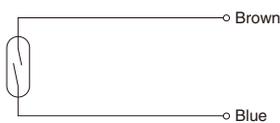
2. Measured by Koganei test standard.

3. Lead wire length ℓ : A; 1000mm [39in.], B; 3000mm [118in.]

Internal Circuit

ZE101□, ZE201□

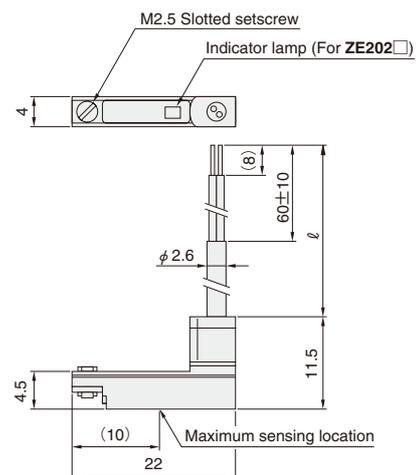
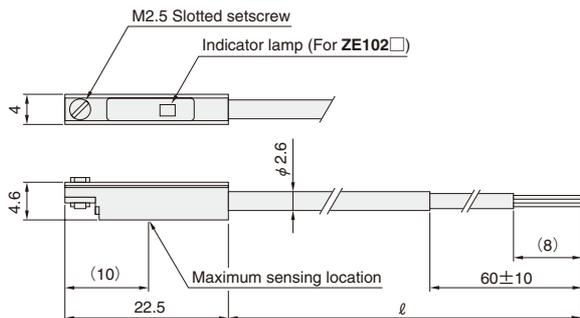
ZE102□, ZE202□



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 | | 100M Ω 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 \pm 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.] | | | |

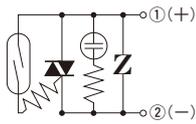
Notes: 1. Ta=37°C [98.6°F]

2. The internal voltage drop depends on load current.

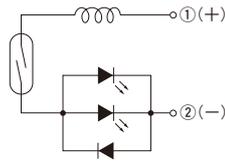
3. Measured by Koganei test standard.

Internal Circuit

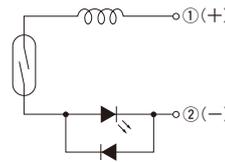
CS2F



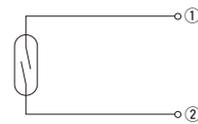
CS3F



CS4F



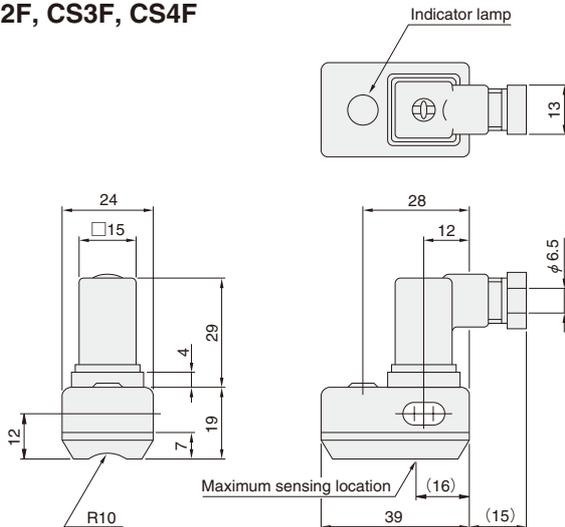
CS5F



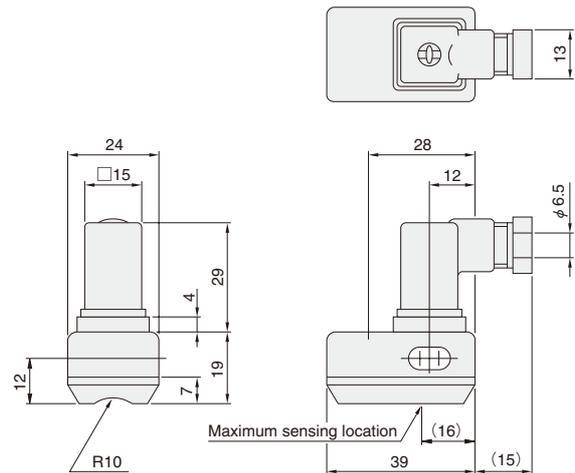
Dimensions (mm)

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

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/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 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.] | | | |

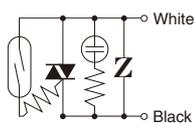
Notes: 1. Ta=37°C [98.6°F]

2. The internal voltage drop depends on load current.

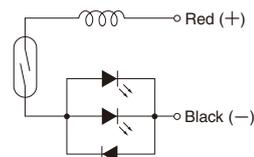
3. Measured by Koganei test standard.

Internal Circuit

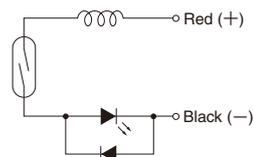
CS2B



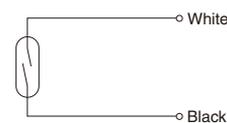
CS3B



CS4B

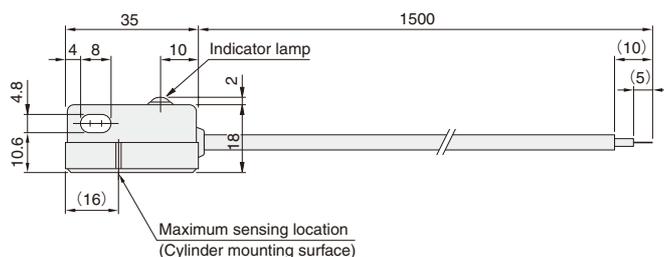


CS5B



Dimensions (mm)

CS2B, CS3B, CS4B



CS5B

