

# Sensor switch

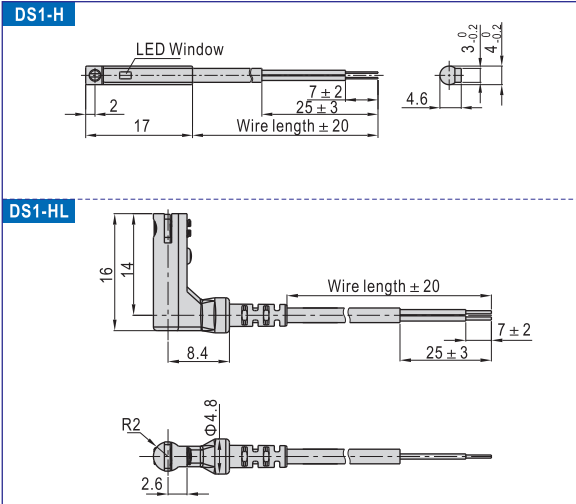
## DS1-H, DS1-HL Series



### Specification

Item\Type	DS1-H, DS1-HL	DS1-HN, DS1-HLN	DS1-HP, DS1-HLP
Switch logic	Transistor without contact, Normally opened type		
Switch type	Two lines type	NPN type	PNP type
Operating voltage(V)	10~28V DC	5~30V DC	
Max. Switching current(mA)	50	200	
Switching rating(W)	Max. 1.4	Max. 6	
Current consumption	12(40)uA Max. @24V	15mA Max. @24V	
Voltage drop	2.65V Max. @50mA DC	0.5V Max. @200mA DC	
Cable	Φ 2.8,2C Black oil resistant PVC	Φ 3.3,3C Black oil resistant PVC	
Indicator	Red LED		
Leakage current	20(90)uA Max. @28V	0.01mA Max.	
Sensitivity(Gauss)	25~700	60~75	
Max. Frequency(Hz)	1000		
Shock(m/s <sup>2</sup> )	500		
Vibration(m/s <sup>2</sup> )	90		
Temperature range(°C)	-10~70		
Enclosure classification	IP67(NEMA6)		
Protection circuit	Power reverse polarity, surge suppression		

### Dimensions



### Ordering code

**DS1 H N 020**

- Number of sensor switch**  
DS1: Sensor switch
- Connecting way** ①  
C08: M8 quick joint, length of wire is 150mm  
C12: M12 quick joint, length of wire is 150mm  
020: length of wire is 2m  
030: length of wire is 3m  
050: length of wire is 5m  
100: length of wire is 10m
- Specification of sensor switch**

Specification	Product Series
H: H type	HLH, HRQ, HFZ6(16~40), HFY6
HL: HL type	HFR10~25, HLQ/HLS, HFC
- Model of sensor switch**  
Blank: two-line /normally opened  
N: three-line NPN with no contact (current flows in) / normally opened  
P: three-line PNP with no contact (current flows out) / normally opened

① Note: The quick joint that is attached at the end of wire is three-needle-male joint-linear-rotary screw thread type. The female joint plug has to be ordered additionally. Please refer to P480 for the specific data.

### Mounting

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

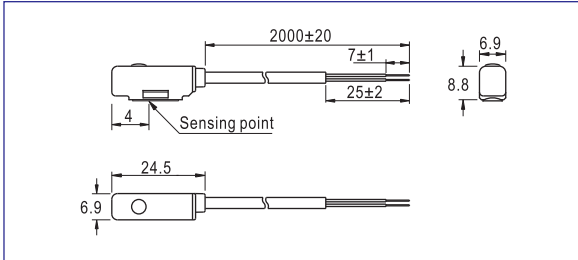


# Sensor switch

## DS1-M Series



### Dimensions



### Specification

Item/Type	DS1-M	DS1-MN	DS1-MP
Switch logic	Transistor without contact, Normally opened type		
Switch type	Two lines type	NPN type	PNP type
Operating voltage(V)	10~28V DC	5~30V DC	
Max. Switching current(mA)	50	200	
Switching rating(W)	Max. 1.4	Max. 6	
Current consumption	12(40)uA Max. @24V	15mA Max. @24V	
Voltage drop	2.65V Max. @50mA DC	0.5V Max. @200mA DC	
Cable	Φ 3.3,2C Black oil resistant PVC	Φ 3.3,3C Black oil resistant PVC	
Indicator	Red LED		
Leakage current	20(90)uA Max. @28V	0.01mA Max.	
Sensitivity (Gauss)	S06~S10: 25~700 S12~S16: 25~700 S20~S63: 25~700 A20~A40: 25~700	45~55 55~65 65~75 65~75	
Max. Frequency(Hz)	1000		
Shock(m/s <sup>2</sup> )	500		
Vibration(m/s <sup>2</sup> )	90		
Temperature range(°C)	-10~70		
Enclosure classification	IP67(NEMA6)		
Protection circuit	Power reverse polarity, surge suppression		

### Ordering code

**DS1 M N 020 S 06**

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

Specification	Product Series
M: M type	PB, MA, MAL, MI, MF, MBL
- Model of sensor switch**
  - Blank: two-line /normally opened
  - N: three-line NPN with no contact (current flows in)/ normally opened
  - P: three-line PNP with no contact (current flows out)/ normally opened
- Connecting way**
  - C08: M8 quick joint, length of wire is 150mm
  - C12: M12 quick joint, length of wire is 150mm
  - 020: length of wire is 2m
  - 030: length of wire is 3m
  - 050: length of wire is 5m
  - 100: length of wire is 10m
- Bore size**

Cylinder barrel material	Bore size
Aluminum alloy	20: Φ 20mm
	25: Φ 25mm
	32: Φ 32mm
	40: Φ 40mm
	06: Φ 6mm
	08: Φ 8mm
Stainless steel	10: Φ 10mm
	12: Φ 12mm
	16: Φ 16mm
	20: Φ 20mm
	25: Φ 25mm
	32: Φ 32mm
	40: Φ 40mm
50: Φ 50mm	
63: Φ 63mm	
- Cylinder Barrel material**
  - S: Stainless steel
  - A: Aluminum alloy

① Note: The quick joint that is attached at the end of wire is three-needle-male joint-linear-rotary screw thread type. The female joint plug has to be ordered additionally. Please refer to P480 for the specific data.

### Mounting

Installation example	Installation method
	<p>No additional accessories are necessary for the sensor switch of DS1-M, DS1-MN, DS1-MP series. It can be directly fixed onto the cylinder, which is convenient and fast.</p> <p>1. Strap band round the cylinder barrel. Snap the clamping screw into button orifice and adjust it to the proper position. Properly tighten the clamping screw to fix.</p>



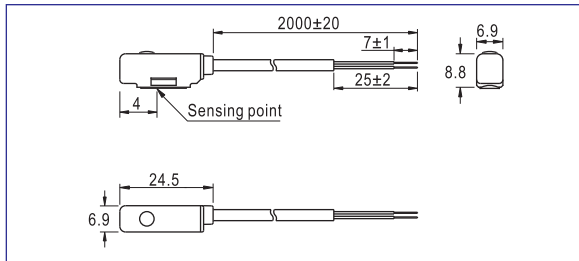
Sensor switch

# Sensor switch

## CS1-M Series



### Dimensions



### Specification

Item/Type	CS1-M	CS1-MX
Switch logic	STSP Normally opened type	
Switch type	Reed switch with contact	
Operating voltage(V)	5~240V AC/DC	
Max. Switching current(mA)	100	
Switching rating(W)	Max. 10	
Current consumption	No	
Voltage drop	2.5V Max. @100mA DC	
Cable	Φ3.3,2C Gray oil resistant PVC (Flame retarded)	
Indicator	Red LED	No
Leakage current	No	
Sensitivity(Gauss)	S06~S10	45~55
	S12~S16	55~65
	S20~S63	65~75
	A20~A40	65~75
Max. Frequency(Hz)	200	
Shock(m/s <sup>2</sup> )	300	
Vibration(m/s <sup>2</sup> )	90	
Temperature range(°C) ①	-10~70	
Enclosure classification	IP67(NEMA6)	
Protection circuit	No	

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

### Ordering code

**CS1 M X 020 S 06**

<p><b>Number of sensor switch</b></p> <p>CS1: Sensor switch</p>	<p><b>Specification of sensor switch</b></p> <table border="1"> <tr> <th>Specification</th> <th>Product Series</th> </tr> <tr> <td>M: M type</td> <td>PB, MA, MAL, MI, MF, MBL</td> </tr> </table>	Specification	Product Series	M: M type	PB, MA, MAL, MI, MF, MBL	<p><b>Model of sensor switch</b></p> <p>Blank: two-line magnetic spring pipe with contact/normally opened</p> <p>X: two-line magnetic spring pipe with contact, without indicator light/normally opened</p>	<p><b>① Connecting way</b></p> <table border="1"> <tr> <td>C08: M8 quick joint, length of wire is 150mm</td> </tr> <tr> <td>C12: M12 quick joint, length of wire is 150mm</td> </tr> <tr> <td>020: length of wire is 2m</td> </tr> <tr> <td>030: length of wire is 3m</td> </tr> <tr> <td>050: length of wire is 5m</td> </tr> <tr> <td>100: length of wire is 10m</td> </tr> </table>	C08: M8 quick joint, length of wire is 150mm	C12: M12 quick joint, length of wire is 150mm	020: length of wire is 2m	030: length of wire is 3m	050: length of wire is 5m	100: length of wire is 10m	<p><b>Bore size</b></p> <table border="1"> <tr> <th>Cylinder barrel material</th> <th>Bore size</th> </tr> <tr> <td rowspan="6">Aluminum alloy</td> <td>20: Φ20mm</td> </tr> <tr> <td>25: Φ25mm</td> </tr> <tr> <td>32: Φ32mm</td> </tr> <tr> <td>40: Φ40mm</td> </tr> <tr> <td>06: Φ6mm</td> </tr> <tr> <td>08: Φ8mm</td> </tr> <tr> <td rowspan="7">Stainless steel</td> <td>10: Φ10mm</td> </tr> <tr> <td>12: Φ12mm</td> </tr> <tr> <td>16: Φ16mm</td> </tr> <tr> <td>20: Φ20mm</td> </tr> <tr> <td>25: Φ25mm</td> </tr> <tr> <td>32: Φ32mm</td> </tr> <tr> <td>40: Φ40mm</td> </tr> <tr> <td>50: Φ50mm</td> </tr> <tr> <td>63: Φ63mm</td> </tr> </table> <p><b>Cylinder Barrel material</b></p> <p>S: Stainless steel A: Aluminum alloy</p>	Cylinder barrel material	Bore size	Aluminum alloy	20: Φ20mm	25: Φ25mm	32: Φ32mm	40: Φ40mm	06: Φ6mm	08: Φ8mm	Stainless steel	10: Φ10mm	12: Φ12mm	16: Φ16mm	20: Φ20mm	25: Φ25mm	32: Φ32mm	40: Φ40mm	50: Φ50mm	63: Φ63mm
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① Note: The quick joint that is attached at the end of wire is three-needle-male joint-linear-rotary screw thread type. The female joint plug has to be ordered additionally. Please refer to P480 for the specific data.

### Mounting

Installation example	Installation method
	<p>No additional accessories are necessary for the sensor switch of CS1-M, CS1-MX series. It can be directly fixed onto the cylinder, which is convenient and fast.</p> <p>1. Strap band round the cylinder barrel. Snap the clamping screw into button orifice and adjust it to the proper position. Properly tighten the clamping screw to fix.</p>



Sensor switch

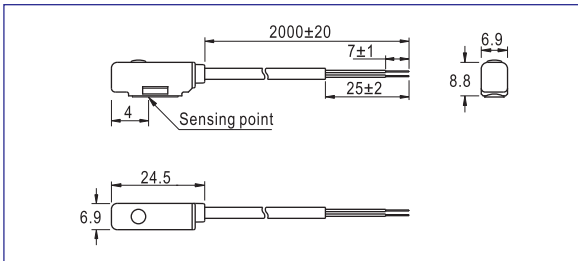


# Sensor switch

## CS1-T Series



### Dimensions



### Specification

Item\Type	CS1-T	CS1-TX
Switch logic	STSP Normally opened type	
Switch type	Reed switch with contact	
Operating voltage(V)	5~240V AC/DC	
Max. Switching current(mA)	100	
Switching rating(W)	Max. 10	
Current consumption	No	
Voltage drop	2.5V Max. @100mA DC	
Cable	Φ 3.3,2C Gray oil resistant PVC (Flame retarded)	
Indicator	Red LED	No
Leakage current	No	
Sensitivity(Gauss)	55~65	
Max. Frequency(Hz)	200	
Shock(m/s <sup>2</sup> )	300	
Vibration(m/s <sup>2</sup> )	90	
Temperature range(°C) ①	-10~70	
Enclosure classification	IP67(NEMA6)	
Protection circuit	No	

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

### Ordering code

**CS1 T X 020 A 32**

- **Number of sensor switch**
  - CS1: Sensor switch
- **Specification of sensor switch**

Specification	Product Series
T: T type	TWG
- **Model of sensor switch**

Blank: two-line magnetic spring pipe with contact/normally opened
X: two-line magnetic spring pipe with contact, without indicator light/normally opened
- **Bore size**

32: Φ 32mm
40: Φ 40mm
50: Φ 50mm
- **Cylinder Barrel material**
  - A: Aluminum alloy
- **Connecting way** ①
 

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

① Note: The quick joint that is attached at the end of wire is three-needle-male joint-linear-rotary screw thread type. The female joint plug has to be ordered additionally. Please refer to P480 for the specific data.

### Mounting

Installation example	Installation method
	<p>No additional accessories are necessary for the sensor switch of CS1-T, CS1-TX series. It can be directly fixed onto the cylinder, which is convenient and fast.</p> <ol style="list-style-type: none"> <li>1. Strap band round the cylinder barrel. Snap the clamping screw into button orifice and adjust it to the proper position. Properly tighten the clamping screw to fix.</li> </ol>



Sensor switch

# 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  $\phi$  6 [0.236in.]
- AMT ● ARTB ● ACY (For the intermediate stopper) ● ORV ● ORK  $\phi$  16 [0.630in.] ● RAP ● RAN ● Swing cylinders ● Air Hands CHDUL
- SHM

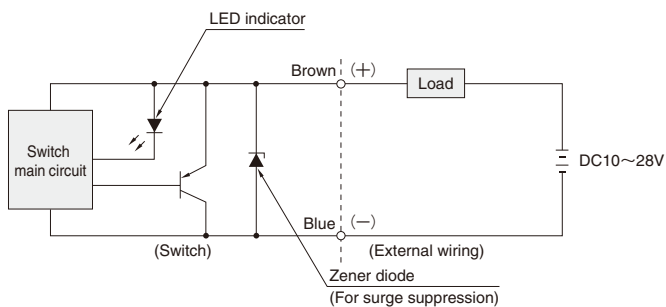
### Specifications

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 <sup>Note 1</sup>		3.5V MAX.	0.5V MAX. (At 50mA load current)
Leakage current		1mA MAX. (DC24V)	50 $\mu$ A MAX. (DC24V)
Response time		1ms MAX.	
Insulation resistance		100M $\Omega$ 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 <sup>Note 2</sup>		294.2m/s <sup>2</sup> [30G] (Non-repeated shock)	
Vibration resistance <sup>Note 2</sup>		88.3m/s <sup>2</sup> [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 <sup>Note 3</sup>		PVC 0.2SQ $\times$ 2-lead $\times$ $\ell$	PVC 0.2SQ $\times$ 3-lead $\times$ $\ell$
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)	

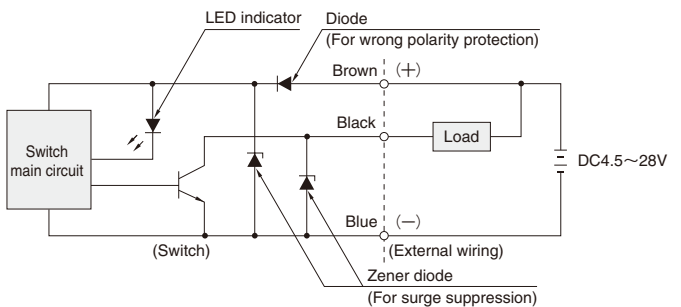
- Notes: 1. The internal voltage drop depends on load current.  
 2. Measured by Koganei test standard.  
 3. Lead wire length  $\ell$  : A; 1000mm [39in.], B; 3000mm [118in.]

### Internal Circuit

#### ZC130□

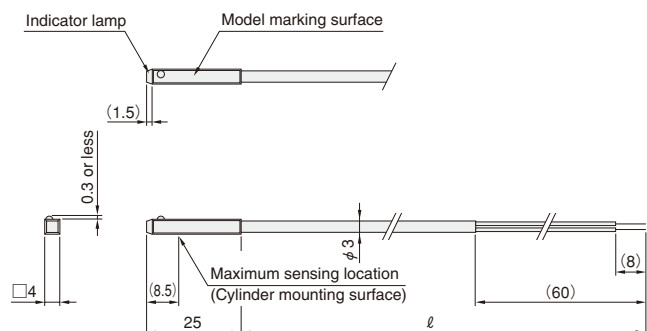


#### ZC153□

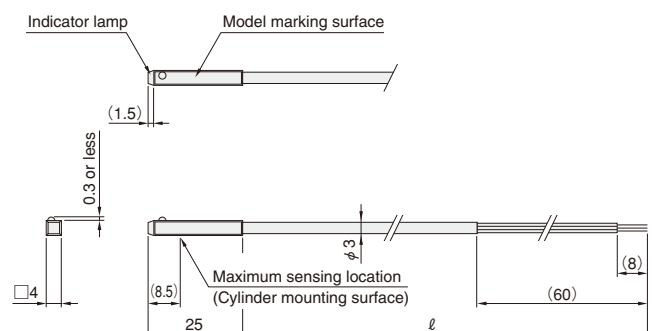


### Dimensions (mm)

#### ZC130□



#### ZC153□



# ZC230□, ZC253□

Products compliant with the EMC Directive



## Solid State Type Sensor Switch

### Applicable cylinders

- Pen cylinders

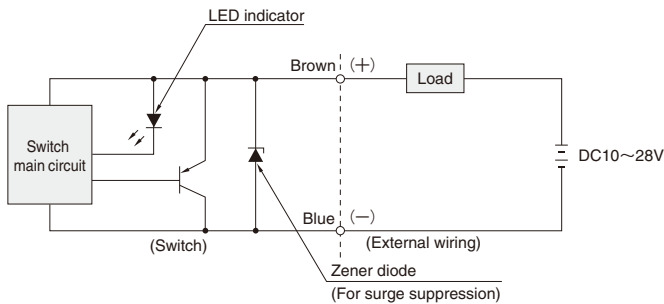
### Specifications

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 <sup>Note 1</sup>		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 <sup>Note 2</sup>		294.2m/s <sup>2</sup> [30G] (Non-repeated shock)	
Vibration resistance <sup>Note 2</sup>		88.3m/s <sup>2</sup> [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 <sup>Note 3</sup>		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)	

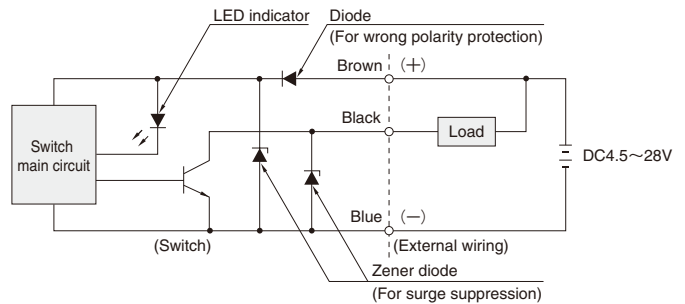
- Notes: 1. The internal voltage drop depends on load current.  
 2. Measured by Koganei test standard.  
 3. Lead wire length ℓ : A; 1000mm [39in.], B; 3000m [118in.]

### Internal Circuit

#### ZC230□

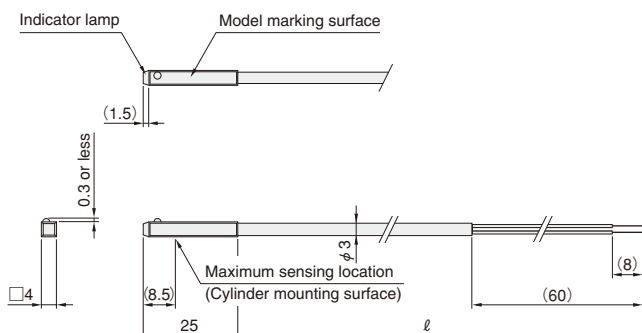


#### ZC253□

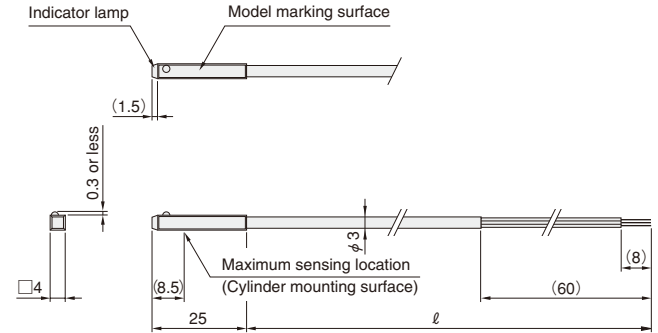


### Dimensions (mm)

#### 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 <sup>Note 1</sup>		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 <sup>Note 2</sup>		294.2m/s <sup>2</sup> [30G] (Non-repeated shock)	
Vibration resistance <sup>Note 2</sup>		88.3m/s <sup>2</sup> [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 <sup>Note 3</sup>		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)	

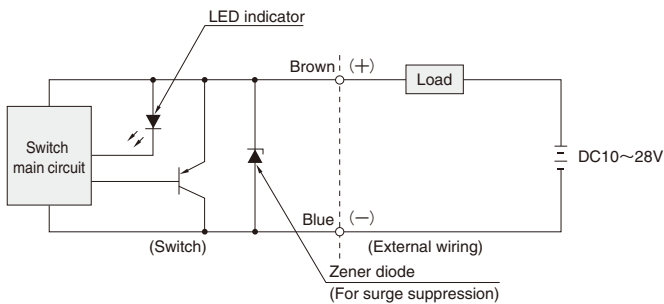
Notes: 1. The internal voltage drop depends on load current.

2. Measured by Koganei test standard.

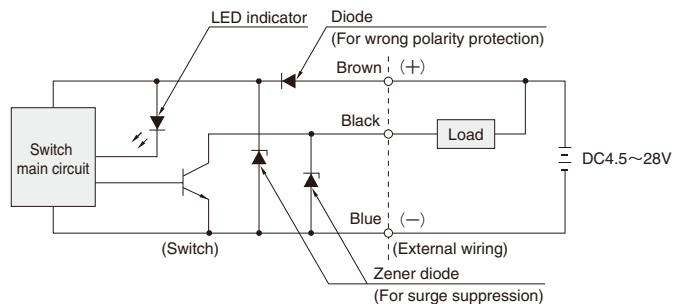
3. Lead wire length ℓ : A; 1000mm [39in.], B; 3000m [118in.]

### Internal Circuit

#### ZC330□

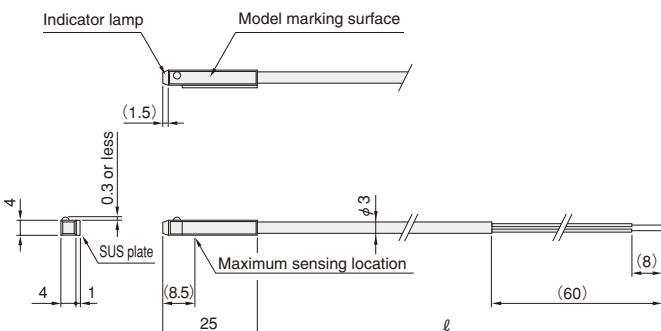


#### ZC353□

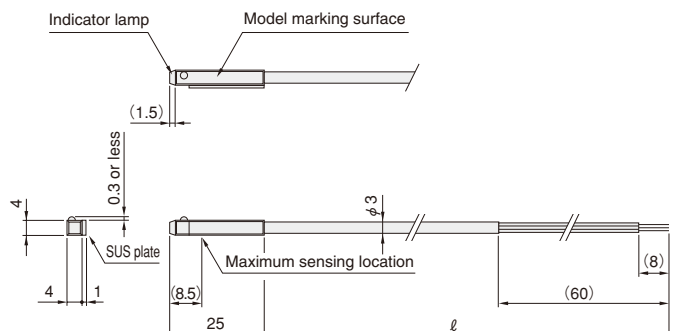


### Dimensions (mm)

#### 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<sup>Note</sup> ● MRG ● RAK
- Swing cylinders ● Twist cylinders

Note: Excluding ORK  $\phi$  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 <sup>Note 1</sup>		4.5V MAX.	0.5V MAX. (At 50mA load current)
Leakage current		1mA MAX. (DC24V at 25°C [77°F])	50 $\mu$ A MAX. (DC24V)
Response time		1ms MAX.	
Insulation resistance		100M $\Omega$ 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 <sup>Note 2</sup>		294.2m/s <sup>2</sup> [30G] (Non-repeated shock)	
Vibration resistance <sup>Note 2</sup>		88.3m/s <sup>2</sup> [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 <sup>Note 3</sup>		PVC 0.2SQ $\times$ 2-lead $\times$ $\ell$	PVC 0.2SQ $\times$ 3-lead $\times$ $\ell$
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)	

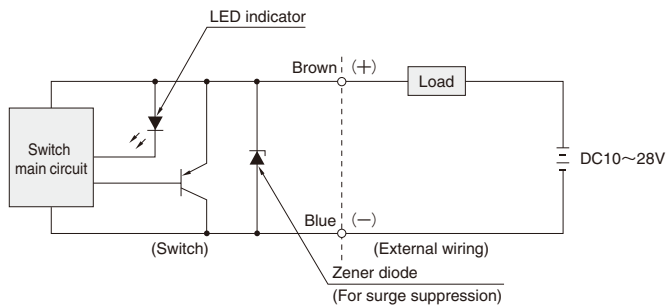
Notes: 1. The internal voltage drop depends on load current.

2. Measured by Koganei test standard.

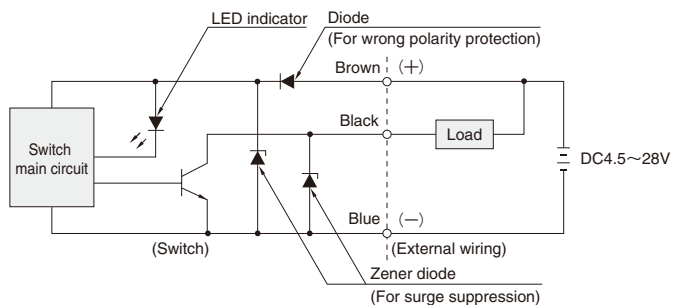
3. Lead wire length  $\ell$ : A; 1000mm [39in.], B; 3000m [118in.]

### Internal Circuit

#### ZG530 □

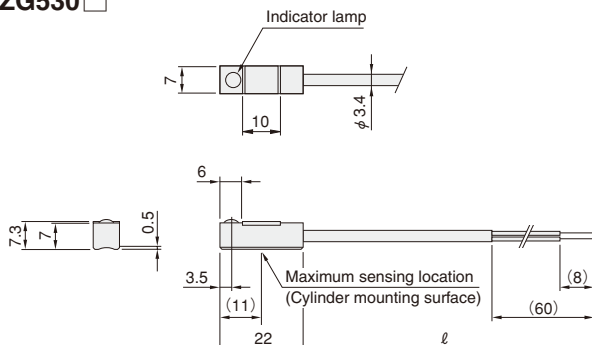


#### ZG553 □

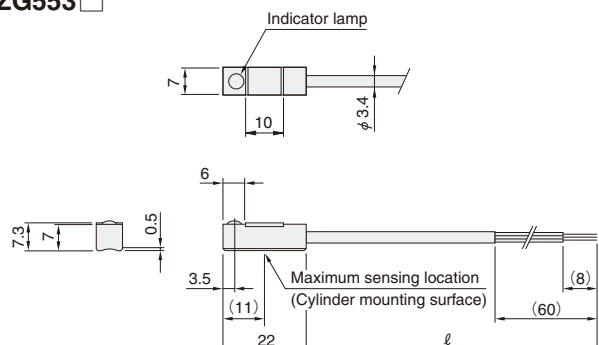


### Dimensions (mm)

#### ZG530 □



#### ZG553 □





# ZC630 □, ZC653 □

Products compliant with the EMC Directive



## Solid State Type Sensor Switch

### Applicable cylinders

- Axis cylinders

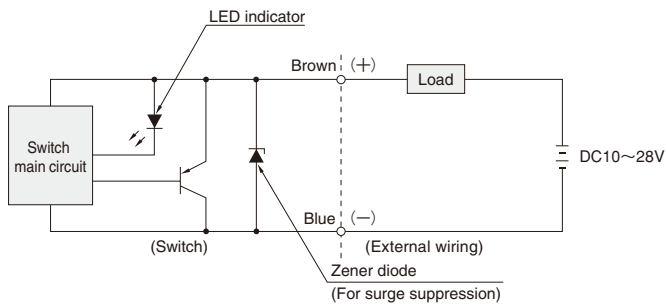
### Specifications

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 <sup>Note 1</sup>		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 <sup>Note 2</sup>		294.2m/s <sup>2</sup> [30G] (Non-repeated shock)	
Vibration resistance <sup>Note 2</sup>		88.3m/s <sup>2</sup> [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 <sup>Note 3</sup>		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)	

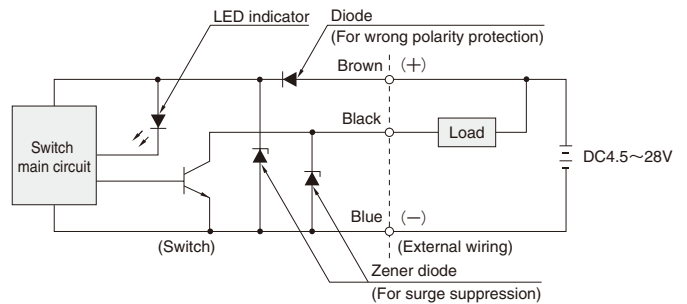
- Notes: 1. The internal voltage drop depends on load current.  
 2. Measured by Koganei test standard.  
 3. Lead wire length ℓ : A; 1000mm [39in.], B; 3000m [118in.]

### Internal Circuit

#### ZC630 □

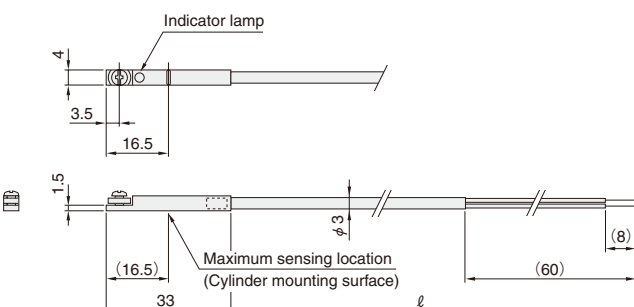


#### ZC653 □

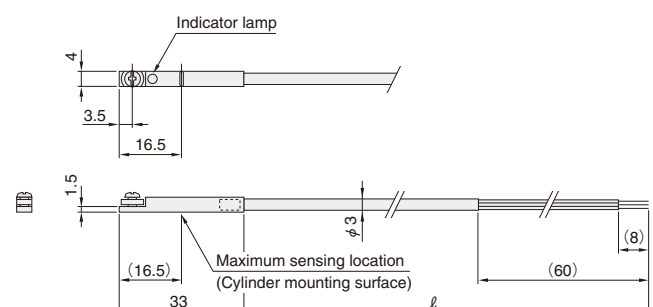


### Dimensions (mm)

#### 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<sup>Note1</sup> ● ACZ<sup>Note1</sup> ● Flat rodless cylinders<sup>Note1</sup> ● ORV<sup>Note1</sup> ● ORS, MRS<sup>Note1</sup> ● ORW, MRW<sup>Note1</sup> ● NHC1 series ● Air Hands NHB ● Wide type Air Hands WHDP<sup>Note2</sup>
- Flat type Air Hands ● RAG ● RAT ● DJ cylinders

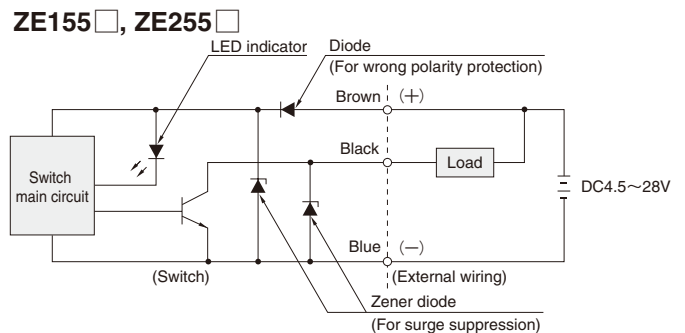
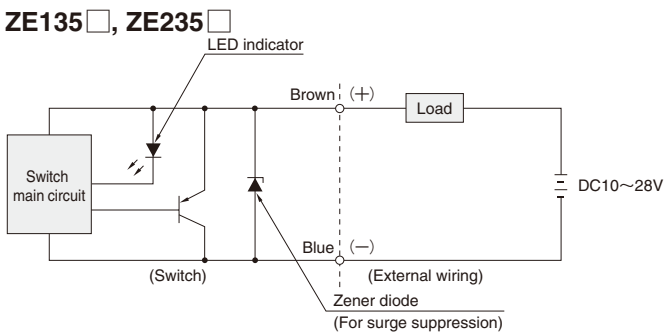
Notes: 1. Only the horizontal lead wire type 2. Only the vertical lead wire type

**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 <sup>Note 1</sup>		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 <sup>Note 2</sup>		294.2m/s <sup>2</sup> [30G] (Non-repeated shock)			
Vibration resistance <sup>Note 2</sup>		88.3m/s <sup>2</sup> [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 <sup>Note 3</sup>		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)			

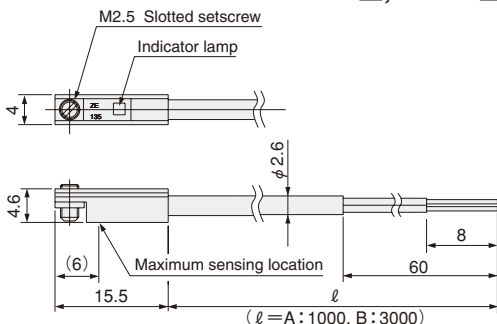
Notes: 1. The internal voltage drop depends on load current.  
 2. Measured by Koganei test standard.  
 3. Lead wire length ℓ : A; 1000mm [39in.], B; 3000m [118in.]

**Internal Circuit**

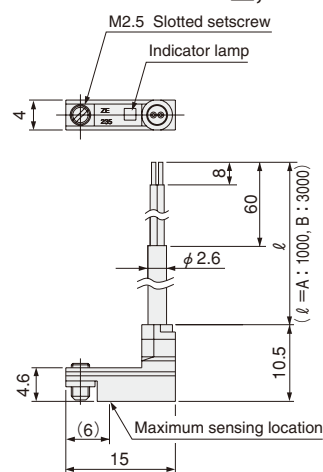


**Dimensions (mm)**

● **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<sup>Note 2</sup> ●ACZ<sup>Note 2</sup> ●Flat rodless cylinders<sup>Note 2</sup> ●ORV<sup>Note 2</sup> ●ORS, MRS<sup>Note 2</sup> ●ORW, MRW<sup>Note 2</sup> ●NHC1 series ●Air Hands NHB ●Wide type Air Hands WHDP<sup>Note 3</sup> ●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

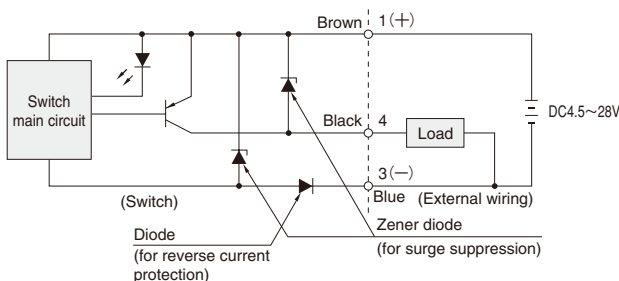
### Specifications

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 <sup>Note 1</sup>		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 <sup>Note 2</sup>		294.2m/s <sup>2</sup> [30G] (Non-repeated shock)	
Vibration resistance <sup>Note 2</sup>		88.3m/s <sup>2</sup> [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 <sup>Note 3</sup>		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

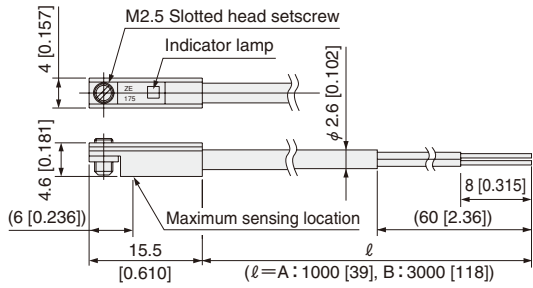
### Internal Circuit

#### ZE175□, ZE275□

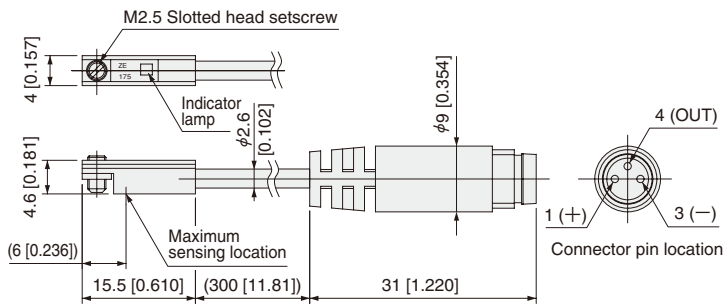


● Horizontal Lead Wire

**ZE175A**  
**ZE175B**

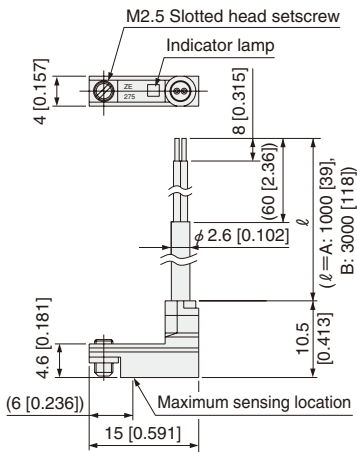


**ZE175G**

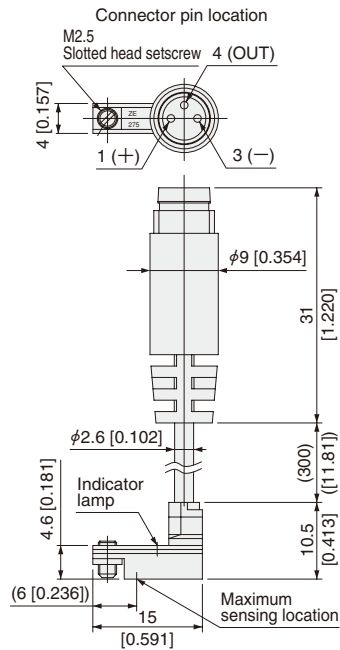


● Vertical Lead Wire

**ZE275A**  
**ZE275B**



**ZE275G**



# CS9H□, ZB430□

Products compliant with the EMC Directive



## Solid State Type Sensor Switch

### Applicable cylinders

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

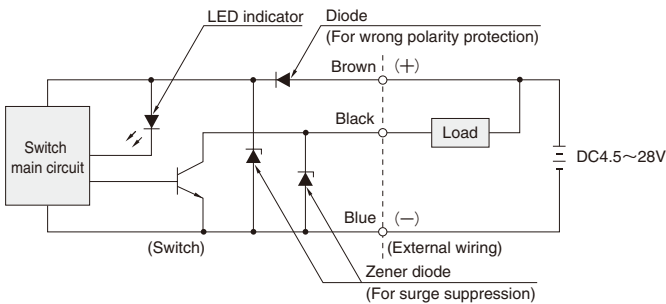
### Specifications

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 <sup>Note 1</sup>		0.8V MAX. (At 50mA load current)	4.5V MAX.
Leakage current		50 $\mu$ A MAX. (DC24V)	1mA MAX. (DC24V at 25°C [77°F])
Response time		1ms MAX.	
Insulation resistance		100M $\Omega$ 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 <sup>Note 2</sup>		294.2m/s <sup>2</sup> [30G] (Non-repeated shock)	
Vibration resistance <sup>Note 2</sup>		88.3m/s <sup>2</sup> [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 <sup>Note 3</sup>		PVC 0.2SQ×3-lead× $\ell$	PVC 0.2SQ×2-lead× $\ell$
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)	

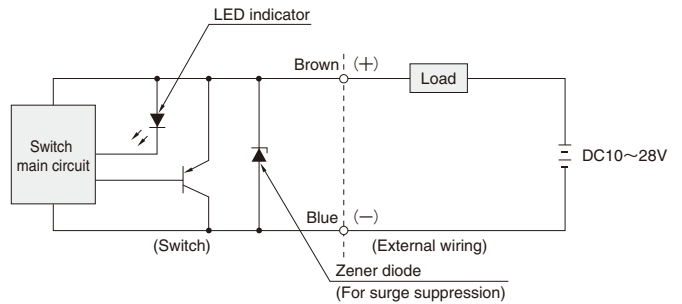
Notes: 1. The internal voltage drop depends on load current.  
 2. Measured by Koganei test standard.  
 3. Lead wire length  $\ell$ : A; 1000mm [39in.], B; 3000m [118in.]

### Internal Circuit

#### CS9H□

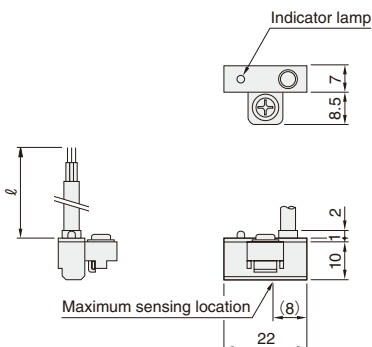


#### ZB430□

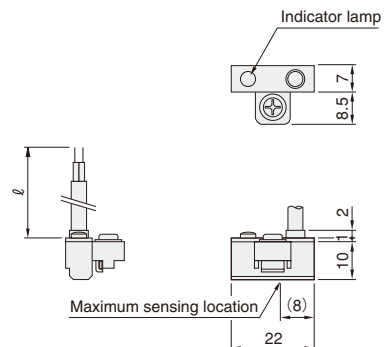


### Dimensions (mm)

#### CS9H□



#### ZB430□



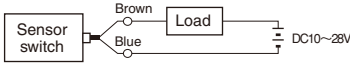
# Points of Wiring Solid State Type Sensor Switches

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

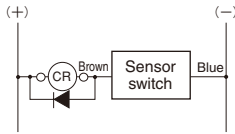
ZC153□, ZC253□, ZC353□, ZC653□  
 ZE155□, ZE255□, ZE175□, ZE275□, ZG553□, CS9H□

## ● 2-lead wire type

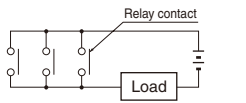
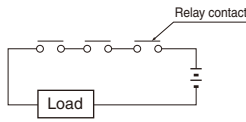
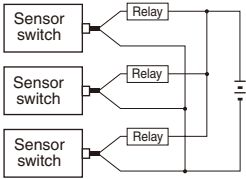
### ● Basic connection



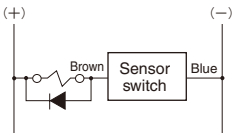
### ● Connecting with relays



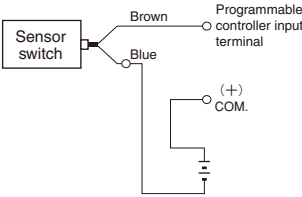
AND (series) connection and OR (parallel) connection



### ● Connecting with a solenoid valve

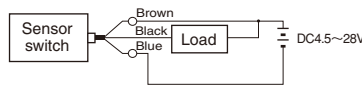


### ● Connecting with a programmable controller

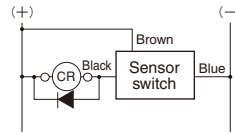


## ● 3-lead wire with NPN output

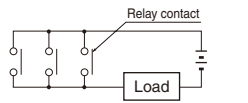
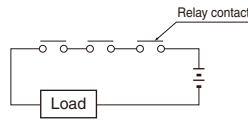
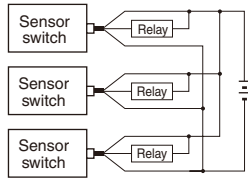
### ● Basic connection



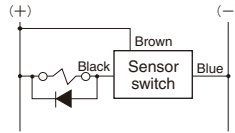
### ● Connecting with relays



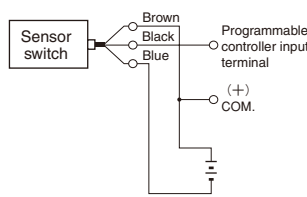
AND (series) connection and OR (parallel) connection



### ● Connecting with a solenoid valve

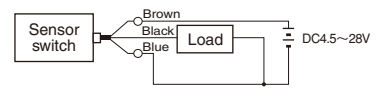


### ● Connecting with a programmable controller

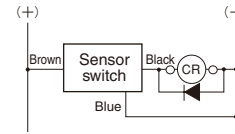


## ● 3-lead wire with PNP output

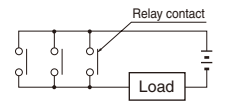
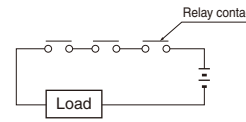
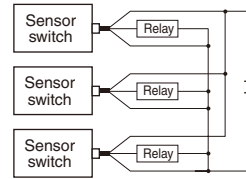
### ● Basic connection



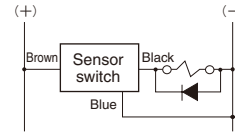
### ● Connecting with relays



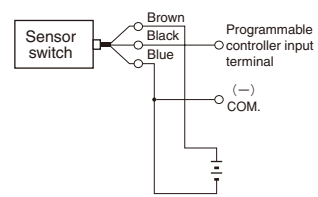
AND (series) connection and OR (parallel) connection



### ● 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.

# 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  $\phi$  6[0.236in.]
- AMT
- ARTB
- ACY (For the intermediate stopper)
- ORK  $\phi$  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 <sup>Note 1</sup>		0.1V MAX. (At 40mA load current)	2.1V MAX. (At 40mA load current)
Leakage current		0mA	
Response time		1ms MAX.	
Insulation resistance		100M $\Omega$ 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 <sup>Note 2</sup>		294.2m/s <sup>2</sup> [30G] (Non-repeated shock)	
Vibration resistance <sup>Note 2</sup>		88.3m/s <sup>2</sup> [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 <sup>Note 3</sup>		PVC 0.2SQ $\times$ 2-lead $\times$ $\ell$	
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.

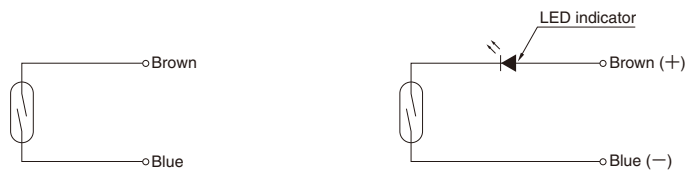
2. Measured by Koganei test standard.

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

### Internal Circuit

#### CS5T□

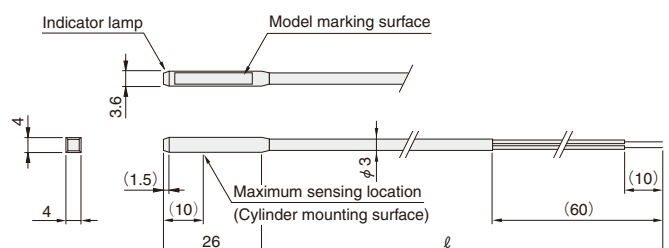
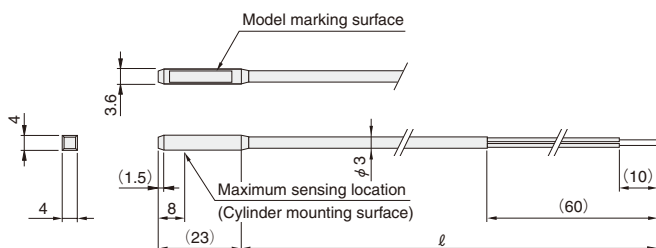
#### CS11T□



### Dimensions (mm)

#### CS5T□

#### CS11T□





# ZC201 □, ZC205 □

Products compliant with the EMC Directive



## Reed Switch Type Sensor Switch

### Applicable cylinders

- Pen cylinders

### Specifications

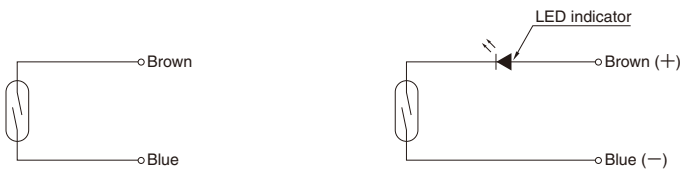
Item	Model	ZC201 □	ZC205 □
Wiring type		2-lead wire	
Load voltage		DC5~28V, AC85~115V (r.m.s.)	DC10~28V
Load current		DC0.1~40mA, AC2~25mA	DC5~40mA
Internal voltage drop <sup>Note 1</sup>		0.1V MAX. (At 40mA load current)	2.1V MAX. (At 40mA load current) <sup>Note1</sup>
Leakage current		0mA	
Response 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 <sup>Note 2</sup>		294.2m/s <sup>2</sup> [30G] (Non-repeated shock)	
Vibration resistance <sup>Note 2</sup>		88.3m/s <sup>2</sup> [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 <sup>Note 3</sup>		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 □

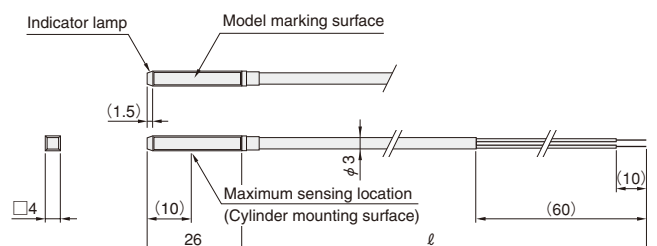
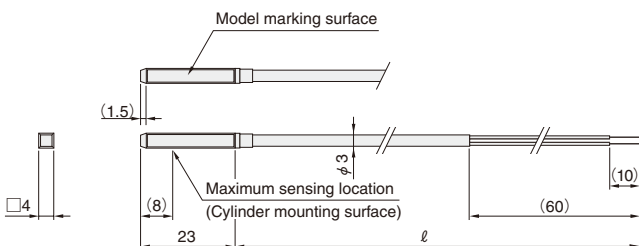
#### ZC205 □



### Dimensions (mm)

#### ZC201 □

#### ZC205 □



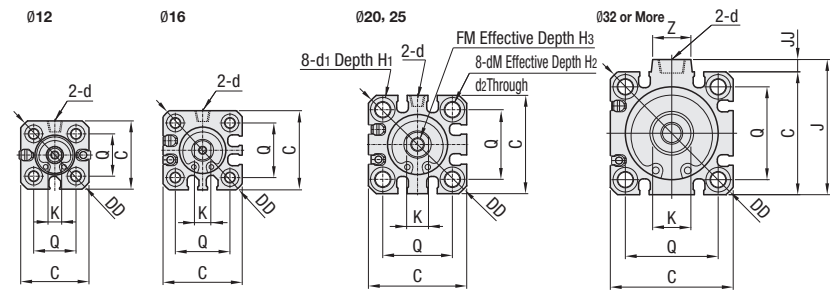
# Compact Cylinders



RoHS

Stroke	Rod Tip	Type	Features
Fixed	Tapped	MSCCN	Standard Stroke Type is available. In-stock items. Same day shipping is available. (Sensor for Cylinder, No Bracket)
	Threaded	MSCCA	
Configurable	Shape Selectable	MSCCS	Stroke and end shape are selectable in 1mm increments.

For Brackets for the Standard Stroke Cylinder, see P.1487, 1488



Operating Temp. Range: 5 ~ 60°C

Cylinder Body End  
Standard Type (Terminal)  
Rod Tip Tapped

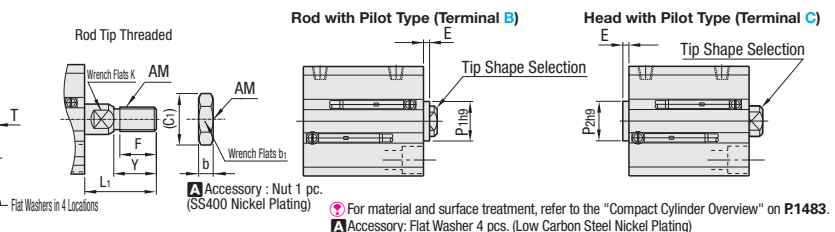
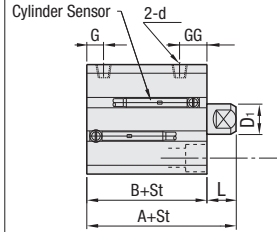


Table 1 Compact Cylinder Piston Rod Tip Shape

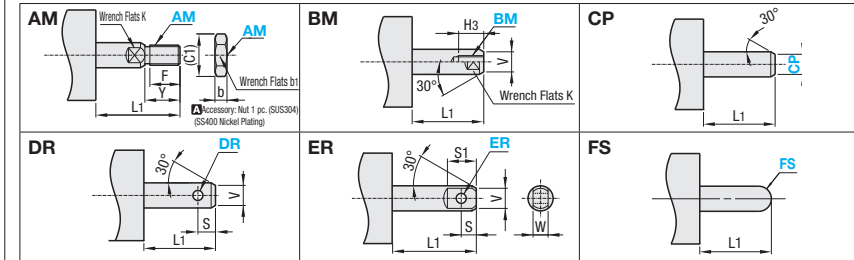


Table 2 Bracket Selection List  
(Refer to the part numbers on P.1487)

Foot Brackets	
Type	Applicable Part Number
KFB	CFKPB
KFM	CFKPM

U-Shaped Clevis Mount Brackets	
Type	Applicable Part Number
TKB	CTKB
TKM	CTKM

Tube I.D. (mm)	F	H3	K	* L1	S	S1	V	W	Y	AM	b	b1	(C1)	Nominal Thread Dia.	Threaded	Tapped
12	9	6	5	14(24)	4	8	5	4	10.5	M3x0.5	2.4	5.5	6.4	M3	M3x0.5	M3x0.5
16	10	8	6	15.5(25.5)	6	12	7	5	12	M4x0.7	3.2	7	8.1	M4	M4x0.7	M4x0.7
20	12	7	8	18.5(28.5)	8	16	8	6	14	M5x0.8	4	8	9.2	M5	M5x0.8	M5x0.8
25	15	12	10	22.5(32.5)	10	20	10	8	17.5	M6x1.0	5	10	11.5	M6	M6x1.0	M6x1.0
32	20.5	13	14	28.5(38.5)	12	24	14	10	23.5	M8x1.25	5	13	15	M8	M8x1.25	M8x1.25
40	20.5	13	14	28.5(38.5)	12	24	14	10	23.5	M10x1.25	6	17	19.6	M10	M10x1.25	M10x1.5
50	26	15	17	33.5(43.5)	14	28	18	12	28.5	M12x1.5	7	19	21.9	M12	M12x1.5	-
										M14x1.5	8	22	25.4	M14	M14x1.5	-
										M16x1.5	10	24	27.7	M16	M16x1.5	-
										M18x1.5	11	27	31.2	M18	M18x1.5	-

## External Dimensions for Compact Cylinders

Tube I.D. (mm)	A	B	C	D1	DD	d	d1	d2	H1	H2	dM	E	H3	G	GG	J	JJ	K	L	P1	P2	Q	T	Z	b	b1	C1	F	L1	Y	
12	25.5	22	25	6	32	M5x0.8	6.5	3.5	4	7	M4x0.7	1.5	6	5	7.5				5	3.5			15	6	15.5	4	8	9.2	9	14	10.5
16	34	29.5	36	10	47	M7x1.0	7	5.5	11				7	9				6	4.5	13	13	25.5	0.5		5	10	11.5	10	15.5	12	
20	37.5	32.5	40	12	52	M8x1.0	9	5.5	7	10	M6x1.0	2	12	11				10	5	15	15	28	1		6	17	19.6	15	22.5	17.5	
25	40	33	45	16	60	Rc1/8	11	7.5	10.5	49.5	4.5		13	11	57	5	14	7	21	21	34			14	8	22	25.4	20.5	28.5	23.5	
32	46.5	39.5	52	16	70	Rc1/4	11	6.6	8	14	M8x1.25		13	8	11	57	5	14	7	28	28	40			19	11	27	31.2	26	33.5	28.5
40	48.5	40.5	64	20	86	Rc1/4	14	9	10.5	18	M10x1.5		15	10.5	71	7	17	8				60			19	11	27	31.2	26	33.5	28.5
50	54	46	77	20	103	Rc1/4	14	9	10.5	18	M10x1.5		15	10.5	71	7	17	8				60			19	11	27	31.2	26	33.5	28.5

## Standard Stroke Type

Part Number	Stroke (mm)	Type	Rod Tip	Gasket	Unit Price																															
					MSCCN St Stroke (mm)										MSCCA St Stroke (mm)																					
					5	10	15	20	25	30	35	40	45	50	75	100	10	20	30	50	75	100														
MSCCN	12	5~30	A	NB	M3x0.5	M5x0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M4x0.7				M6x1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M5x0.8	M8x1.25	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M6x1.0	M10x1.25	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MSCCA	40	5~100	A	NB	M8x1.25	M14x1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	M10x1.5				M18x1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

## Configurable Stroke Type

Part Number	Stroke (mm)	Type	Tube I.D. (mm)	St Stroke (mm)	Cylinder Body End Shape	Piston Rod Tip Shape	Piston Rod Tip Shape (Table 1)						Gasket Selection	Bracket for Cylinder (Table 2)		
							AM (Thread Dia.)	BM (Thread Dia.)	CP 1mm Increment	DR Selection	ER Selection	FS (Arc Tip) Selection		Type	Qty.	
MSCCS	12	5~30	20	20	B	C	A	3 4 5	3	3-5	2 3	2 3	3	NB	(No Bracket)	0
	B						4 5 6	3 4	3-7	2 3 4	2 3 4	4				
	C						5 6 8	3 4 5	4-8	3 4 5	3 4 5	5	VT	(Foot)	1	
	DR						5 6 8 10	4 5 6	4-10	4 5 6	4 5 6	6				
	ER						6 8 10 12 14	5 6 8	5-14	5 6 8	5 6 8	8	TK	(Clevis Mount)	2	
FS	6 8 10 12 14	5 6 8	5-14	5 6 8	5 6 8	8										
50	10~100	10~100	50	50	B	C	DR	8 10 12 14 16 18	6 8 10	8~18	6 8 10	6 8 10	10	TKM	(Without TK bracket, specify 0.)	1

Cylinder brackets cannot be installed on the pilot side for the types with cylinder end Shapes B and C. Please purchase sensors separately (See below).

Ordering Example: MSCCN 20 - 35 - B - BM4 - VT - KFB 1

Alterations Example: MSCCS 20 - 50 - B - DR5 - NB - TK 0 - TH

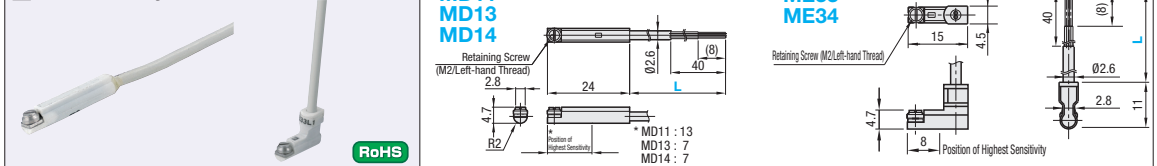
Code	Cold Weather Resistance Specification						Heat Resistance Specification					
	TC						TH					
Spec.	Usable in the ambient temperature range from -40°C to 60°C. Changes to low temp. resistant grease and low nitrile rubber gaskets. Low temp. resistant sensors for cylinders are not available.						Usable in the ambient temperature range from 5°C to 120°C. Changes to heat resistant grease, fluororubber gaskets and cylinder sensors are not available.					

Price Calculation Example: MSCCS20-38-A-AM5-VT-KFB1  
Cylinder Body Price + Surcharge for Cylinder Body End Shape + Surcharge for Piston Rod Tip Shape + Surcharge for Gasket + (Bracket Unit Price x Quantity)

Tube I.D. (mm)	MSCCN Body Price						Surcharge for Piston Rod Tip Shape (Body Price +)							
	5~10	11~20	21~30	31~40	41~50	51~75	76~100	AM	BM	CP	DR	ER	FS	
12														
16														
20														
25														
32														
40														
50														

Tube I.D. (mm)	Surcharge for Cylinder Body End Shape (Body Price +)			Surcharge for Gasket (Body Price +)		Bracket Unit Price (Body Price +)						
	A	B	C	NB	VT	TK	KFB	KFM	TKB	TKM		
12												
16												
20												
25												
32												
40												
50												

## Sensors for Cylinders



Part Number	Type	Line	Wire Exit	Unit Price
MD11	L1 (1m)	L3 (3m)	Rear	
MD13				
MD14				
ME33				
ME34			Top	

Operating Temp. Range : 0 ~ 60°C  
For detailed specifications of the Sensors, see P.1484.

Ordering Example: Part Number MD14.1

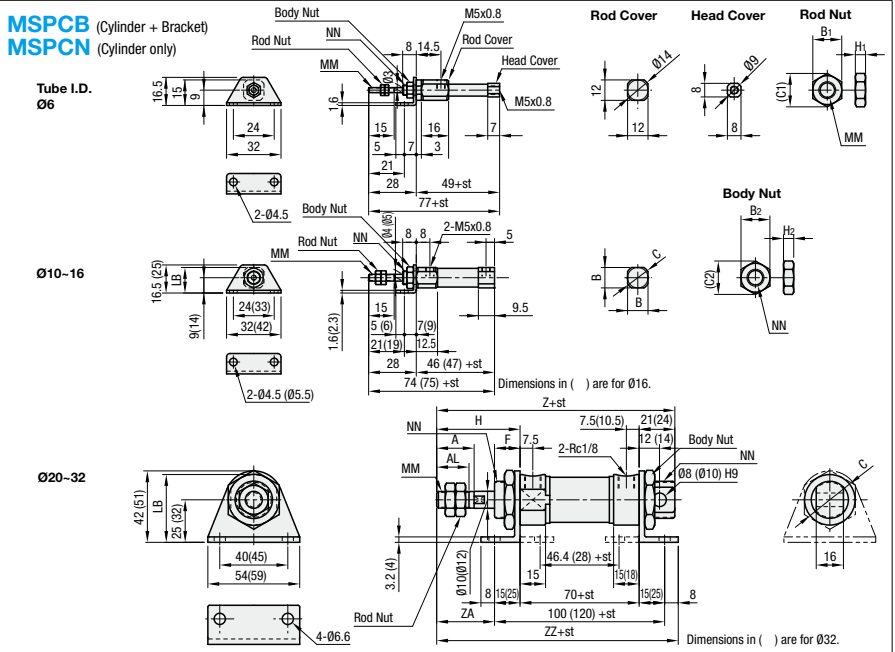
# Air Cylinders

## Pen-Style Type (Double Acting)

# Coupling Rods for Air Cylinders / Thread Conversion Adapters

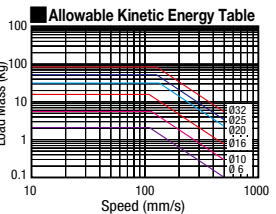
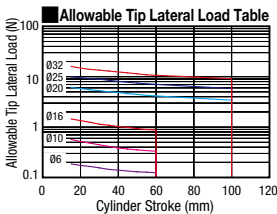
## L Selectable / L Configurable / L and F Configurable

### Pen-Style Type



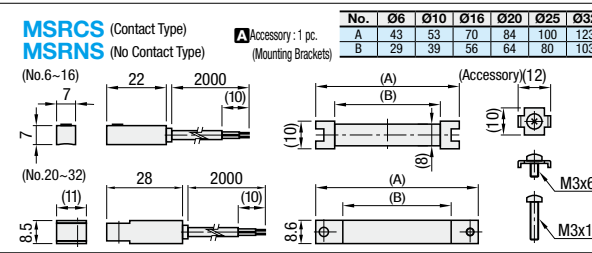
Tube I.D. (mm)	A	AL	B	B1	B2	C	C1	C2	F	H	H1	H2	LB	MM	NN	Z	ZA	ZZ
6	-	-	5.5	8	-	6.4	9.2	-	-	2.4	4	-	-	M3x0.5	M6x1.0	-	-	-
10	-	-	12	7	11	14	8.1	12.7	-	3.2	4	15	-	M4x0.7	M8x1.0	-	-	-
16	-	-	18	8	14	20	9.2	16.2	-	4	4	23	-	M5x0.8	M10x1.0	-	-	-
20	20	18	-	13	30	28	15	34.6	12	38	5	6	38.4	M8x1.25	M22x1.5	129	23	131
25	22	20	-	17	30	33.5	19.6	34.6	15	49	6	6	39.9	M10x1.25	M22x1.5	140	34	142
32	22	20	-	17	32	37.5	19.6	37	18	52	6	8	50	M10x1.25	M24x2.0	146	27	155

Part Number	Type	Tube I.D. (mm)	St. Stroke (mm)	MSPCB Unit Price							MSPCN Unit Price							
				15	25	30	45	50	60	100	15	25	30	45	50	60	100	
(Cylinder + Bracket)	MSPCB	6	15 30 45 60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		10	15 30 45 60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		16	15 30 45 60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(Cylinder only)	MSPCN	20	15 25 50 100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		25	15 25 50 100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		32	15 25 50 100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Tube I.D. (mm)	Operating Direction	Operating Pressure (MPa)						
		0.2	0.3	0.4	0.5	0.6	0.7	
6	Push	5.7	8.5	11.3	14.1	17	19.8	
	Pull	4.2	6.4	8.5	10.6	12.7	14.8	
10	Push	15.7	23.8	31.4	39.3	47.1	55	
	Pull	13.2	19.8	26.4	33	39.6	46.2	
16	Push	40	60	80	101	121	141	
	Pull	36	54	73	91	109	127	
20	Push	63	94	126	157	189	220	
	Pull	47	71	94	118	141	165	
25	Push	98	147	196	245	295	344	
	Pull	83	124	165	206	247	289	
32	Push	161	241	322	402	483	563	
	Pull	138	207	277	346	415	484	

### Pen-Style Sensors for Cylinders



Part Number	Type	Applicable Cylinder	Unit Price	
			MSRCS	MSRNS
6	MSPC	6	-	-
10	MSPC	10	-	-
16	MSPC	16	-	-
20	MSPC	20	-	-
25	MSPC	25	-	-
32	MSPC	32	-	-

Part Number	Stroke	Unit Price	
		MSRCS	MSRNS
MSPCB6	30	-	-
MSRCS10	30	-	-

### Extension Rod for Air Cylinders



Type	Material	Surface Treatment	Accessory
L Selectable	S45C Equivalent	Black Oxide	SS400 Trivalent Bright Chromate
L Configurable	SUS304	Electroless Nickel Plating	SUS304
L and F Configurable	SUS304	Electroless Nickel Plating	SUS304

Part Number	Type	M-Pitch	L		F		A	B	(C)	B' (C')	T	Qty.	Included Nut								Unit Price
			Selectable	Configurable (1mm Increment)	Standard	Configurable (1mm Increment)							FJEB	FJER	FJES	FJEB	FJER	FJES	FJEB	FJER	
L Selectable	FJEB	3-0.5	20 25 30 35 40 50 75 100	17.5	10-15	6	6.9	5.5	6.4	2.4	2 pcs.										
		4-0.7				8	9.2	8	8.1	3.2											
		5-0.8				10	11.5	10	11.5												
L Configurable	FJEB	8-1.0	*30 35 40 50 75 100 150 200	18	14-20	14(13)	16(21.5)	13	15	5											
		8-1.25				17	19.6	17	19.6	6											
		10-1.25*				21(19)	24(21.9)	19	21.9	7											
L and F Configurable	FJEB	12-1.25	*40 50 75 100 150 200	24	16-60	23(22)	26(25.4)	22	25.4	8											
		12-1.5				26(27)	30(31.2)	27	31.2	15											
		14-1.5*				30	34.6	30	34.6	16											
		18-1.5*				35	37	32	37	18											
		20-1.5				40															
		22-1.5				40															

### Thread Conversion Adapters

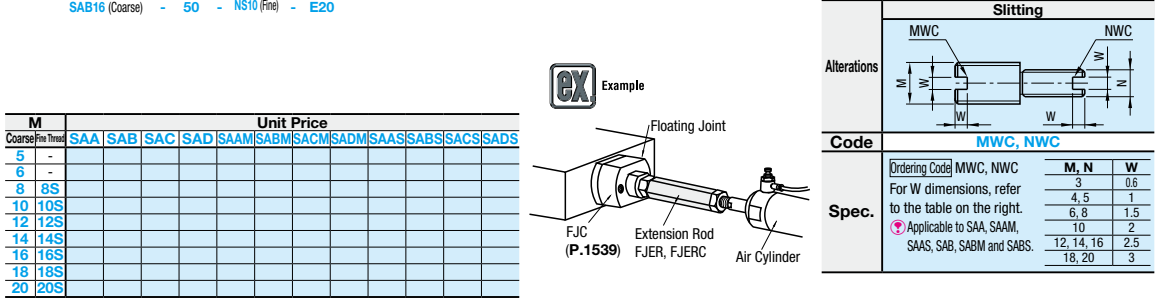


Type	Material	Surface Treatment
Full Thread Type	S45C Equivalent	Black Oxide
Stepped Thread Type	SUS304	Electroless Nickel Plating

Part Number	Type	M		L	M (Coarse)		NS (Fine)	E	H	B	(C)
		Coarse	Fine Thread		1mm Increment	1mm Increment					
5	SAA	-	-	20-100	3	4*	-	5-16	8	9.2	
6	SAB	-	-	20-100	3	4	-	6-20	3	10 11.5	
8	SAC	8S	M8x1.0	30-150	4	5	-	8-24	13	15	
10	SAAM	10S	M10x1.25	30-150	5	6*	8*	10-32	4	17 19.6	
12	SABM	12S	M12x1.25	40-200	6	8	10*	12-40	5	19 21.9	
14	SACM	14S	M14x1.5	40-200	6	8	10*	14-48	6	22 25.4	
16	SADM	16S	M16x1.5	40-200	8	10	12*	16-56	7	24 27.7	
18	SABM	18S	M18x1.5	50-200	10	12	14*	18-64	8	27 31.2	
20	SACM	20S	M20x1.5	50-200	10	12	14*	20-72	10	30 34.6	

\* marked dimensions are not available for SAA, SAAM and SAAS.  
 NS (Fine Thread) pitch is same as M Fine Thread (Nominal Thread Dia.).  
 SAA, SAAM, SAAS are L<sub>1</sub>Nx4 SAB, SABM, SABS are L<sub>2</sub>Mx2+E SAC, SACM, SACS are L<sub>2</sub>Mx2+E SAD, SADM, SADS are M+H+E<sub>1</sub>L<sub>2</sub>Mx4+H+(N)Sx4

Part Number	Type	Stroke	Unit Price										
			SAA	SAB	SAC	SAD	SAAM	SABM	SACM	SADM	SAAS	SABM	SACS
FJERC10-1.5	-	30	-	-	-	-	-	-	-	-	-	-	-
FJEBF14-1.5	-	100	-	-	-	-	-	-	-	-	-	-	-
SAB16 (Coarse)	-	50	-	-	-	-	-	-	-	-	-	-	-





# Rotary Clamp Cylinders - Overview

## Overview

The square and space-saving cylinders have built-in rotary (swing) clamping mechanisms. Suitable for clamping small workpieces such as electronic parts in limited spaces.

## Features

- Space Saving / Square**  
Sensors of all diameters (Contact / No Contact) are mountable to the cylinders.
- High Rigidity**  
For enhanced wear resistance, the cylinders are equipped with two guide grooves compatible with all diameters. In addition, each of the guide pins is outfitted with a roller (Ø32 - Ø50).

## Basic Specifications of Clamp Cylinders

Tube I.D. (mm)	25	32	40	50	
Operating Type	Double Acting				
Applicable Fluid	Compressed Air				
Max. Operating Pressure (MPa)	1.0				
Min. Operating Pressure (MPa)	0.2				
Guaranteed Withstand Pressure (MPa)	1.6				
Operating Temp. Range (°C)	-10 ~ 60 (Non-Freezing)				
Connection Dia.	M5	Rc1/8	Rc1/4		
Piston Speed (mm/s)	50~200				
Cushion Mechanism	With Cushion Rubber				
Lubrication	N/A				
Rotating Angle	90°±10°				
Rotating Direction	Right / Left				
Rod Non-rotating Accuracy (when Clamped): Initial Value	±1°	±0.9°		±0.7°	
Pressure Area (mm <sup>2</sup> )	Instroke Side	377	603	1055	1649
	Outstroke Side	490	804	1256	1963
Service Life	1 Million Times				

## Stroke

Tube I.D. (mm)	Stroke	Stroke on Rotating (mm)	Stroke on Clamping (mm)	Rotating Direction
Ø25	31	11	20	Counterclockwise Clockwise
Ø32	35	15	20	
Ø40	35	15	20	
Ø50	70	20	50	

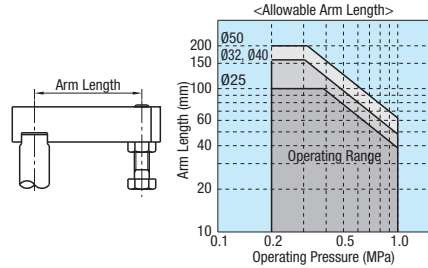
## Design / Selection

### NOTE

In operation, the piston rod of this cylinder strokes while rotates at 90°. Be sure that the arm mounted on the tip of the piston rod does not interfere with any external objects while rotating. Take precautions such as installing a protective cover if the pivoting arm mounted on the tip of the piston rod poses a hazard to human body.

### Arm Length & Operating Pressure

Set the arm length and the operating pressure to be within the ranges below.

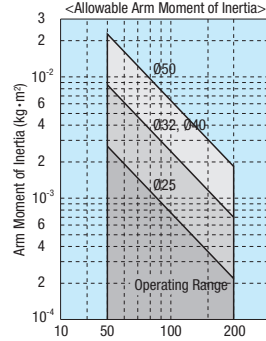


### Clamping Position

Do not clamp while the arm is rotating. For clamping, allow 3 mm or more before the stroke end.

### Arm Inertia Moment & Piston Speed

Set the arm inertia moment and the piston speed to be within the operating range as shown below.



Note) The Arm Allowable Inertia Moment Chart applies only to vertical actuation installations.

### Selection Example A

- <Requirements>
- Required Clamping Force : 500N
  - Operating Pressure: 0.5MPa
  - Piston Speed: 100mm/s
  - Arm Length: 80mm
  - Arm Inertia Moment: 2.0x10<sup>-3</sup>kg·m
- Calculate a required pressure area.  
Required Pressure Area (mm<sup>2</sup>) = Required Clamping Force (N) / Operating Pressure (MPa) = 500 / 0.5 = 1000 (mm<sup>2</sup>).
  - Select a cylinder size based on the list and the pressure area (instroke side).  
Ø40 Pressure Area: 1055 (mm<sup>2</sup>) > Required Pressure Area 1000 (mm<sup>2</sup>)
  - Make sure that the arm length and the operating pressure are within the operating ranges as shown in the applicable chart.  
Operating Pressure 0.5MPa - Arm Length 80mm: Within the Operating Range
  - Confirm that the arm inertia moment and the piston speed are within the operating ranges as shown in the chart.  
Lever Inertia Moment 2.0x10<sup>-3</sup>kg·m - Piston Speed 100mm/s: Within the Operating Range

## [IMPORTANT] Precautions for Handling Rotary Clamp Cylinders

### (Rotary Clamp Cylinders) CAUTION

Never touch any moving part while the cylinder is in operation. It is extremely dangerous because fingers may be caught between moving parts.

### (Rotary Clamp Cylinder) NOTE

- Protect the sliding sections of the piston rods and piston guide rods from being scratched and dented.
- Installing the Speed Controller  
Install the speed controller (meter out: throttle on the exhaust side) to the air pressure outlet side. The performance of the speed controller affects the operation of the cylinder. Use a speed controller with low cracking pressure.
- Installing Conditioning Equipment  
Cylinder failures are mostly caused by foreign materials in the atmosphere or drains. Protect the cylinder from trouble by installing an air dryer or air filter upstream.
- Space  
Provide sufficient space around the equipment to ensure easy handling.
- Flushing  
Before plumbing, flush the pipe thoroughly to protect it from solids or seal tape fragments.
- Ambient Environment  
Do not use the cylinder in the following environments:  
An area filled with oil or grease. (It may cause dust to adhere to the sliding section.)  
An area where intense vibrations may occur.  
An area where the equipment may be affected by chemicals.

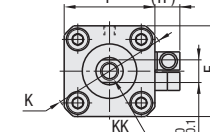
# Rotary Clamp Cylinders

## Rotary Clamp Cylinders

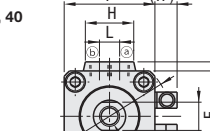


## MKRCA

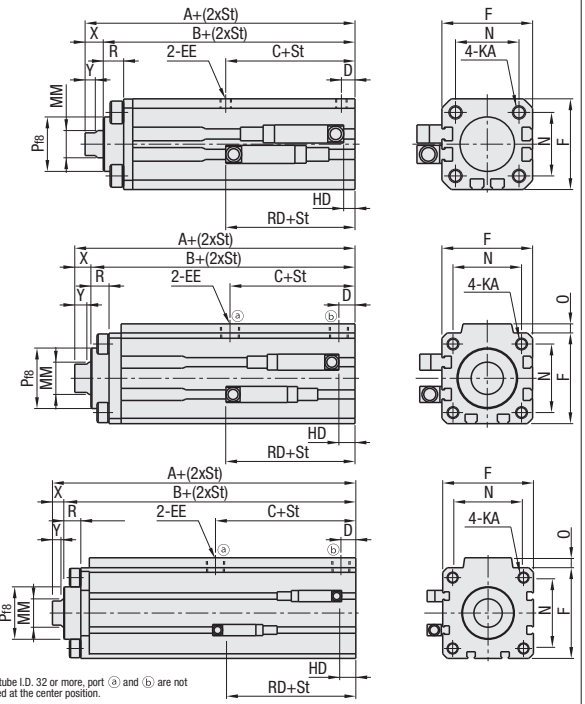
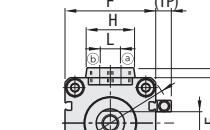
Ø25



Ø32, 40



Ø50



\* For tube I.D. 32 or more, port ③ and ④ are not located at the center position.

## Rotary Clamp Cylinder External Dimensions

Tube I.D. (mm)	A	B	C	D	EE	F	G	H	K	KA	KK	L	M	MM	N	O	P	R	X	Y
25	57	49	26	6	M5x0.8	40	-	-	51	M6 Depth 11	M8 Depth 15	-	10	12	28	-	24	9	8	4.5
32	69	61	27	8	Rc1/8	45	49.5	24	60	M6 Depth 11	M10 Depth 15	10	14	16	34	4.5	30	9	8	6
40	70	62	29	8.5	Rc1/8	52	57	24	69	M6 Depth 11	M10 Depth 15	10	14	16	40	5	35	9	8	6
50	74	66	29	10.5	Rc1/4	64	71	33	86	M8 Depth 13	M12 Depth 15	15	17	20	50	7	37	12	8	6

For selections, be sure to check the "Specifications" and "Precautions" on P1497.

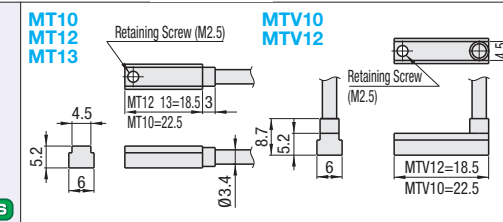
Part Number	Type	Tube I.D. (mm)	St Stroke	Rotating Direction	Stroke on Rotating (mm)	Stroke on Clamping (mm)	Unit Price
MKRCA		25	31	L	11	20	
		32	35	(Counterclockwise Rotation)	15	20	
		40	35	R	15	20	
		50	70	(Clockwise Rotation)	20	50	

## Rotary Clamp Cylinder External Dimensions

Tube I.D. (mm)	MT12, 13/MTV12			MT10/MTV10		
	HD	RD	(TP)	HD	RD	(TP)
25	6	25	0	5	26	0
32	9	28	0	8	29	0
40	10	29	0	9	30	0
50	11	30	0	10	31	0

Ordering Example: Part Number - St Stroke - Rotating Direction  
MKRCA25 - 31 - L

## Rotary Clamp Cylinder Sensors



Part Number	Type	L Selection	Load Voltage	Load Current	Sensor Type	Line	Wire Exit	Unit Price	
								L1 (1m)	L3 (3m)
MT10			12/24VDC 110VAC	5~50mA(DC) 7~20mA(AC)	Contact	2	Rear		
MT12			10~30VDC	*5~20mA	No Contact	2			
MT13	L1 (1m)	L3 (3m)	30VDC or Less	100Am or Less	No Contact	3			
MTV10			12/24VDC 110VAC	5~50mA(DC) 7~20mA(AC)	Contact	2	Top		
MTV12			10~30VDC	*5~20mA	No Contact	2			

The values of the maximum load current 20mA is for 25°C. When used in ambient temperature 25°C or higher, load current is lower than 20mA. (5 ~ 10mA when 60 °C)

The sensor used for this rotary clamp cylinder is applicable only for rotary clamp cylinders. It cannot be used for compact type, pen type or guide type cylinders.

Ordering Example: Part Number  
MT10L1

## Rotary Clamp Cylinder Sensors Specifications

Item	Contact Point 2 Wire Type		No Contact Point 2 Wire Type		No Contact Point 3 Wire Type	
	MT10, MTV10	MT12, MTV12	MT13			
Application	For PLC and Relays	For Controller (Dedicated)	For PLC and Relays			
Output Method					NPN Output	
Power Supply Voltage					10~28VDC	
Load Voltage	12/24VDC	110VAC	10~30VDC		30VDC or Less	
Load Current	5~50mA	7~20mA	*5~20mA		100mA or Less	
Consumption Current					24VDC, 10mA or lower	
Internal Voltage Drop	3V or Less	4V or Less	0.5V or Less			
Lamp	LED (Lights when ON)					
Leakage Current	0mA	1mA or Less	10µA or Less			
Lead Wire Length	1m (Oil Resistant Vinyl Cab Tire Cord 0.2mm <sup>2</sup> )					
Max. Impact	294m/s <sup>2</sup>	980m/s <sup>2</sup>				
Insulation Resistance	20MΩ or more with 500VDC high resistance meter					
Dielectric Strength Voltage	No anomaly to be recognized after application of 1000VAC for 1 minute.					
Ambient Temperature	-10 ~ +60°C					
Protection Structure	IEC Standards IP67 JIS C0920 (Water-resistant) Oil-proof					
Mass	1m:20g 3m:50g					
Circuit						