OMRON

Standard Flat Inductive Proximity Sensors



- Front and side facing surface
- IP67
- DC 2-wire and DC 3-wire models



Ordering Information

DC 2-wire Models

Shape Sensing distance			Mc	odel	
			Output and operating status		
				NO	NC
	5 m	im		TL-W5MD1 ^{*1}	TL-W5MD2 [™]

*1. Models with different response frequency are available. These model numbers take the form TL-W5MDD5 (e.g., TL-W5MD15)

DC 3-wire Models

	Sensing distance		Output	Model				
Shape			specifications	Output and operating status				
			specifications	PNP-NO	PNP-NC	NPN-NO	NPN-NC	
	1.5mm			TL-W1R5MB1		TL-W1R5MC1*1		
	3mm		DC 3-wire	TL-W3MB1	TL-W3MB2	TL-W3MC1 ^{*1}	TL-W3MC2	
	5mm			TL-W5MB1	TL-W5MB2	TL-W5MC1 ^{*1}	TL-W5MC2	
		20mm				TL-W20ME1 ^{*1}	TL-W20ME2 ^{*1}	
Shielded	5mm		DC 3-wire	TL-W5F1	TL-W5F2	TL-W5E1	TL-W5E2	

*1. Models with different response frequency are available. These model numbers take the form TL-W5MDD5 (e.g., TL-W5MD15)

Rating/Performance

DC 2-wire Models

Item	Model TL-W5MD						
Sensing distance			5 mm ±10%				
Setting distance			0 to 4 mm				
Differential of	distance		10% max.				
Sensing obj	ect		Ferrous metal(Sensitivity decreases with non-ferrous metals)				
Standard se	nsing objec	:t	Iron, 18 x 18 x 1 mm				
Response fr	requency		0.5 kHz				
Rated suppl (operating v	y voltage oltage)		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.				
Leakage cu	rrent		0.8 mA max.				
Control	Switching	capacity	3 to 100 mA				
output	Residual v	oltage	3.3 V max. (under load current of 100 mA with cable length of 2 m)				
Indicator lamp			D1 models: Operation indicator (Red LED), Operation set indicator (Green LED) D2 models: Operation indicator (Red LED)				
Operating status (with sensing object approaching)		proaching)	D1 models: NO D2 models: NC				
Protective circuits			Surge absorber, short-circuit protection				
Ambient ten	nperature		Operating/Storage: -25°C to 70°C (with no icing or condensation)				
Ambient hur	nidity		Operating/Storage: 35% to 95%RH (with no condensation)				
Temperature	e influence		$\pm 10\%$ max. of sensing distance at 23°C within a temperature range of -25°C and 70°C				
Voltage influ	lence		$\pm 2.5\%$ max. of Sensing distance within a rated voltage range $\pm 15\%$.				
Insulation re	sistance		50 M min. (at 500 VDC) between energized parts and case				
Dielectric st	rength		1,000 VAC for 1 min between energized parts and case				
Vibration res	sistance		10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions				
Shock resistance			Destruction: 500 m/s ² for 3 times each in X, Y, and Z directions				
Protective structure			IEC60529 IP67				
Connection method			Pre-wired models (standard length: 2 m)				
Weight (Packed state)			Approx. 45 g				
Material Case Sensing surface		Case Sensing surface	Heat-resistant ABS resin				
Accessories	;		Instruction manual				

* The response frequencies for DC switching are average values measured under the condition that the distance between each sensing object is twice as large as the size of the sensing object and the sensing distance set is half of the maximum sensing distance.

DC 3-wire Models

Model Item		TL-W1R5M□1	TL-W3M	TL-W5M	TL-W5E□/F□	TL-W20ME		
Sensing distance		1.5 mm ±10%	3 mm ±10%	5 mm ±10%		20 mm ±10%		
Setting distance 0 to 1.2 mm 0 to 2.4 mm		0 to 4 mm		0 to 16 mm				
Differentia	al distance	10% max.		1% to 15% of sensing distance				
Sensing of	object	Ferrous metal (ref	er to Engineering [Data for non-ferrous	ta for non-ferrous metal on page E-55)			
Standard sensing objectIron, 8 x 8 x 1 mmIron, 12 x 12 x 1 mmIron			Iron, 12 x 12 x 1 mm	lron, 18 x 18 x 1 n	x 1 mm Iron, 50 x 50 x 1 mm			
Response	e frequency	1 kHz min.	600 Hz min.	500 Hz min. 300 Hz min.		40 Hz min.		
Power supply (Operating voltage 12 to 24 VDC (10 to 30 VDC) ripple (p range)			to 30 VDC) ripple (p-p): 10% max.	10 to 30 VDC with a ripple (p-p) of 20% max.	12 to 24 VDC (10 to 30 VDC) ripple (p-p): 10% max.		
Current c	onsumption	15 mA max. at 24	VDC (no-load)	10 mA max.	15mA max. at 24 VDC (no-load)	8 mA at 12 VDC, 15 mA at 24 VDC		
Control output Switching capacity NPN open collector 100 mA max. (30 VDC max.)		NPN open col- lector 12 VDC 50 mA max. (30 VDC max.) 24 VDC 100 mA max. (30 VDC max.)	200 mA	12 VDC 100mA max., 24 VDC 200 mA max.				
	Residual voltage	1 V max. (under load current of 100 mA with cable length of 2 m)		1 V max. (under load current of 50 mA with cable length of 2 m)	2 V max. (under load current of 200 mA with cable length of 2 m)	1 V max. (under load current of 200 mA with ca- ble length of 2 m)		
Indicator	lamp	Detection indicato	r (red LED)					
Operating status (with sensing object approaching) NO C1 models: NO C2 type: NC			E1 models, F1 models: NO E2 models, F2 models: NC					
Protective circuits Reverse connection protection, surge absorb				e absorber				
Ambient t	temperature	Operating/Storage	e: -25°C to 70°^C (v	with no icing or con	densation)			
Ambient humidity Operating/Storage: 35% to 95%RH (with no condensation)				on)				
l emperat ence	ture influ-	±10% max. of ser	using distance at 23	S°C within the temp	erature range of -25°C and 70°C			
Voltage influence		$\pm 2.5\%$ max. of sensing distance within a range of $\pm 10\%$ of rated power supply voltage $\pm 2.5\%$ max. of sensing dis- tance within a range of $\pm 20\%$ of rated power supply voltage $\pm 2.5\%$ max. of sensing distance within a range of rated power supply voltage			n a range of ±10%			
Insulation	n resistance	50 M min. (at 50	0 VDC) between e	nergized parts and	case			
Dielectric	strength	1000 VAC 50/60 H	Hz for 1 min betwee	en energized part a	nd case			
Vibration resistance 10 to 55 Hz, 1.5 mm double amplitud Shock resistance Destruction: 500 m/s² for 3 times each		le for 2 hours each	In X, Y, and Z directions	Destruction: 500 m/s2 for 10 times each in X, Y, and Z direc- tions				
Protective structure IEC60529 IP67								
Connectio	on method	Pre-wired models	1					
Weight (Packed s	state)	30 g		Approx. 45 g	Approx. 70 g	Approx. 180 g		
Material	Case	Heat-resistant AB	S resin		Diecast aluminum	Heat-resistant ABS resin		
	Sensing surface	Heat-resistant AB	S resin					
Accessor	ies	Mounting bracket, instruction manua	al	Instruction manual				

Characteristic data (typical)

Sensing Distance vs. Sensing Object







TL-W5MB□/C□



TL-W5E /-W5F /-W5MD







Side length of sensing object d (mm)

Output Circuit Diagram

DC 2-wire Models



DC 3-wire Models



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Precautions

Design

Effects of Surrounding Metal

Provide a minimum distance between the Sensor and the surrounding metal as shown in the table below.

Front Surface Sensing Type (Not exceeding the sensor head height).





Effects of Surrounding Metal(Unit: mm)

	. .	,		
Model	Length	-	m	n
TL-W1R5M		2		8
TL-W3M□		3	0	12
TL-W5MD		E	0	20
TL-W5M		5		20
TL-W20ME		25	16	100
TL-W5ED/-W5FD		0	0	20

Mutual Interference

If two or more Sensors are mounted face to face or side by side, keep them separate at the following minimum distance.



Mutual Interference (unit: mm)

Model Ler	ngth	А	В	
TL-W1R5M		75 (50)	120(60)	
TL-W3MC		90 (60)	200(100)	
TL-W5MD		120(80)	60(20)	
TL-W5MC		120(00)	00(30)	
TL-W20ME		200(100)	200(100)	
TL-W5ED/-W5FD		50	35	

Note: The above values in parentheses are applicable when using two sensors with different frequencies.

Installation

- Use M3 flat-head screws to install TL-W1R5M□ and
- TL-W3M□.
- · Ensure that the resin cover should be tightened with
- a torque according to the following table.

Model	Tensile strength (torque)		
TL-W1R5MC1			
TL-W3MC	0.98 Nm		
TL-W5MD			
TL-W20M	1.5 Nm		

Adjustment

Power ON

Please note that the power injection AND connection generate an error pulse for approximately 1 ms.

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Dimensions (Unit: mm)

TL-W1R5MD1



Mounting Bracket (Attachment)



Mounting dimensions: 17±0.2





Note: Mounting dimensions: 17±0.2 insulation diameter: 0.9 mm); standard length: 2 m

TL-W5M

30.5 Sensing 8.5 surfa 4.5 ŧ K 18 12±0. +5 12.5 Indicator * 2

6 10 6.5 7.5 8

* 1. TL-W5MC1: VinyI-insulated round cable with three conductors, 4 dia. (conductor cross-sectional area: 0.2 mm²; insulation diameter: 1.2 mm); standard length: 2 m TL-W5MD□: VinyI-insulated round cable with two conductors, 4 dia. (conductor cross-sectional area: 0.3 mm²; insulation diameter: 1.3 mm); standard length: 2 m * 2. C type: Operation indicator (red)

D type: Operation indicator (red), Setting indicator (green)



TL-W3M



10

15±0.2 ŧ

Two, 4.5 dia.



TL-W20ME



ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. E221-E2-03-X

In the interest of product improvement, specifications are subject to change without notice.

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Omron: TL-W3MB2