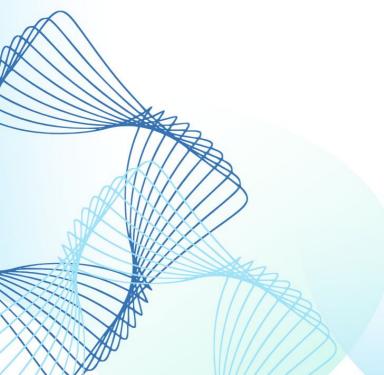


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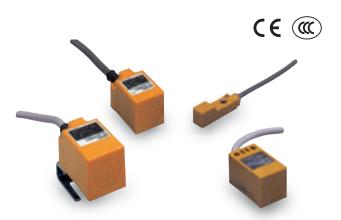
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## TL-N/TL-Q

CSM\_TL-N/TL-Q\_DS\_E\_14\_3

## A Wealth of Models for All Types of Applications

- Easy installation, high-speed pulse generator, high-speed rotation control, and more.
- Direct mounted to metal (-N Models).
- A wealth of models ideal for limit control, counting control, and other applications (-N Models).



For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

#### **Ordering Information**

#### Sensors [Refer to Dimensions on page 10.]

**DC 2-Wire Models** 

			Model
Appearance		Sensing distance	Operation mode
			NO NC
	17 × 17	5 mm	TL-Q5MD1 2M *1 *2 TL-Q5MD2 2M *1
Unshielded	25 × 25	7 mm	TL-N7MD1 2M *1 TL-N7MD2 2M *1
	30 × 30	12 mm	TL-N12MD1 2M *1 TL-N12MD2 2M *1
	40 × 40	20 mm	TL-N20MD1 2M *1 TL-N20MD2 2M *1

<sup>\*1.</sup> Models with a different frequency are available to prevent mutual interference. The model numbers are TL-N□MD□5 and TL-Q5MD□5 (e.g., TL-N7MD15).

#### DC 3-Wire and AC 2-Wire Models

Appearance		Sensing distance		Output configuration	Model Operation mode	
		Sensing dis	lance	Output configuration	NO	NC NC
	8 × 9	2 mm		DOO : NEW	TL-Q2MC1 2M	_
	47 47			DC 3-wire, NPN	TL-Q5MC1 2M *1 *2	TL-Q5MC2 2M
	17 × 17	5 mm	DC 3-wire, PNP		TL-Q5MB1 2M	_
				DC 3-wire, NPN	TL-N5ME1 2M *1 *2	TL-N5ME2 2M *1
Unshielded	25 × 25	5 mm		AC 2-wire	TL-N5MY1 2M *1	TL-N5MY2 2M *1
	30 × 30	10 mm		DC 3-wire, NPN	TL-N10ME1 2M *1 *2	TL-N10ME2 2M *1
1224				DC 3-wire, PNP	TL-N10MF1 2M *1	_
				AC 2-wire	TL-N10MY1 2M *1	TL-N10MY2 2M *1
	40 40		00	DC 3-wire, NPN	TL-N20ME1 2M *1 *2	TL-N20ME2 2M *1
	40 × 40		20 mm	AC 2-wire	TL-N20MY1 2M *1	TL-N20MY2 2M *1

<sup>\*1.</sup> Models with a different frequency are available to prevent mutual interference. The model numbers are TL-□□M□□5 (e.g., TL-N5ME15).

<sup>\*2.</sup> Models are also available with robotics (bend resistant) cables . Add "-R" to the model number. (e.g., TL-Q5MD1-R 2M)

<sup>\*2.</sup> Models are also available with robotics (bend resistant) cables . Add "-R" to the model number. (e.g., TL-Q5MC1-R 2M)

#### **Accessories (Order Separately)**

Mounting Brackets A Mounting Bracket is provided with the Sensor depending on the model number. Check the column for the applicable Sensor. [Refer to *Dimensions* on page 11.]

Туре	Model	Applicable Sensors		
Туре	Wodel	Provided with these Sensors	Order separately	
	Y92E-C5	TL-N5ME□, TL-N7MD□	TL-N5MY□	
Mounting Brackets	Y92E-C10	TL-N10ME□, TL-N12MD□, TL-N10MF1□	TL-N10MY□	
	Y92E-C20	TL-N20ME□, TL-N20MD□	TL-N20MY□	
Mounting Brackets for Conduits	Y92E-N5C15		TL-N5ME□, TL-N5MY□	
Modifiling Brackets for Conduits	Y92E-N10C15		TL-N10ME□, TL-N10MY□	

#### **Ratings and Specifications**

#### **DC 2-Wire Models**

Item	Model	TL-Q5MD□	TL-N7MD□	TL-N12MD□	TL-N20MD□		
Sensing d	listance	5 mm ±10%	7 mm ±10%	12 mm ±10%	20 mm ±10%		
Set distan	ice	0 to 4 mm	0 to 5.6 mm	0 to 9.6 mm	0 to 16 mm		
Differentia	al travel	10% max. of sensing distance					
Detectable	e object	Ferrous metal (The sensing distance decreases with non-ferrous metal. Refer to Engineering Data on page 5.)					
Standard object	sensing	Iron, 18 × 18 × 1 mm	Iron, 30 × 30 × 1 mm	Iron, 40 × 40 × 1 mm	Iron, 50 × 50 × 1 mm		
Response frequency		500 Hz			300 Hz		
Power sup (operating range)	pply voltage g voltage	12 to 24 VDC (10 to 30 VDC), rip	ple (p-p): 10% max.				
Leakage o	current	0.8 mA max.					
Control	Load current	3 to 100 mA					
output	Residual voltage	3.3 V max. (Load current: 100 mA	A, Cable length: 2 m)				
Indicators  D1 Models: Operation indicator (red), Setting indicator (green) D2 Models: Operation indicator (red)							
	ation mode sensing object backing)  D1 Models: NO D2 Models: NC Refer to the timing charts under I/O Circuit Diagrams on page 7 for details.						
Protection	n circuits	Load short-circuit protection, Surg	ge suppressor				
Ambient temperatu	ıre range	Operating/Storage: -25 to 70°C (	with no icing or condensation)				
Ambient humidity	range	Operating/Storage: 35% to 95% (	with no condensation)				
Temperate	ure influence	±10% max. of sensing distance a	t 23°C in the temperature range of	–25 to 70°C			
Voltage in	fluence	±2.5% max. of sensing distance a	at rated voltage in the rated voltage	±15% range			
Insulation	resistance	50 M $\Omega$ min. (at 500 VDC) betwee	n current-carrying parts and case	n current-carrying parts and case			
Dielectric	strength	1,000 VAC for 1 min between cur	rent-carrying parts and case				
Vibration resistance	9	Destruction: 10 to 55 Hz, 1.5-mm	double amplitude for 2 hours each	in X, Y, and Z directions			
Shock res	sistance	Destruction: 500 m/s <sup>2</sup> 3 times each in X, Y, and Z directions	Destruction: 1,000 m/s² 10 times	each in X, Y, and Z directions			
Degree of	protection	IEC 60529 IP67, in-house standa	rds: oil-resistant				
Connection	on method	Pre-wired Models (Standard cable	e length: 2 m)				
Weight (packed state)		Approx. 85 g	Approx. 165 g	Approx. 235 g	Approx. 330 g		
Case							
Materials	Sensing surface	Heat-resistant ABS					
Accessori	ies	Instruction manual	Mounting Bracket, Mounting phillips screws (M4×25), Instruction manual	Mounting Bracket, Mounting phillips screws (M4×30), Instruction manual	Mounting Bracket, Mounting phillips screws (M5×40), Instruction manual		
			1	1			

<sup>\*</sup> The response frequency is an average value.

Measurement conditions are as follows: standard sensing object, a distance of twice the standard sensing object, and a set distance of half the sensing distance.

#### **DC 3-Wire Models**

Sensing distance   2 mm +15%   5 mm +10%	Item	Model	TL-Q2MC1	TL-Q5MC□/TL-Q5MB1		
Differential travel   10% max. of sensing distance   10% max. of sensing distance decreases with non-ferrous metal. Refer to Engineering Data on page 6.)			2 mm ±15%	5 mm ±10%		
Detectable object   Standard   Iron, 8 × 8 × 1 mm   Iron, 15 × 15 × 15 × 1 mm   Iron, 15 × 15 × 15 × 15 × 15 × 15 × 15 × 15	Set dista	ince	0 to 1.5 mm	0 to 4 mm		
Standard sensing object   Fron, 8 × 8 × 1 mm   Iron, 15 × 15 × 1 mm	Different	ial travel	10% max. of sensing distance			
Iron, 10 × 10 × 1 mm   Iron, 10 × 10 × 10 × 1 mm   Iron, 10 × 10 × 10 × 1 mm   Iron, 10 × 10 × 10 mm   Iron, 10 × 10 × 10 × 10 mm   Iron, 10 × 10 × 10 mm   Iron, 10 × 10 × 10 mm   Iron, 10 mm	Detectab	ole object	Ferrous metal (The sensing distance decreases with non-fe	rrous metal. Refer to Engineering Data on page 6.)		
Response frequency '   500 Hz  Power supply voltage (aprage)   12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.   10 mA max. at 24 VDC   10 mA max. at 30 VDC max.   10 mA max.			Iron, 8 × 8 × 1 mm	Iron, 15 × 15 × 1 mm		
The power supply voltage (operating voltage range)	Respons	e time		2 ms max.		
age (operating voltage range)  Current consumption  Load NPN open collector 100 mA max. at 24 VDC (no-load)  TL-QSMCI: NPN open collector, 50 mA max. at 30 VDC max.  TL-QSMBI: PNP open collector, 50 mA max. at 20 VDC max.  TL-QSMBI: PNP open collector, 50 mA max. at 20 VDC max.  TL-QSMBI: PNP open collector, 50 mA max. at 20 VDC max.  TL-QSMBI: PNP open collector, 50 mA max. at 20 VDC max.  TL-QSMBI: PNP open collector, 50 mA max. at 20 VDC max.  TL-QSMBI: PNP open collector, 50 mA max. at 20 VDC max.  TL-QSMBI: PNP open collector, 50 mA max. at 20 VDC max.  TL-QSMBI: PNP open collector, 50 mA max. at 20 VDC max.  TL-QSMBI: PNP open collector, 50 mA max. at 20 VDC max.  TL-QSMBI: PNP open collector, 50 mA max. at 20 VDC max.  TL-QSMBI: PNP open collector, 50 mA max. at 20 VDC max.  TL-QSMBI: PNP open collector, 50 mA max. at 20 VDC max.			500	) Hz		
The first content of the fi	age (ope	rating volt-	12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.			
Control output   Cont		otion	15 mA max. at 24 VDC (no-load)	10 mA max. at 24 VDC		
Indicators   Detection indicator (red)				50 mA max. at 30 VDC max. TL-Q5MB□: PNP open collector,		
Operation mode (with sensing object approaching)  Refer to the timing charts under DC 3-Wire Models on page 7 for details.  Protection circuits  Reverse polarity protection, Surge suppressor  Operating/Storage: -10 to 60°C (with no icing or condensation)  Temperature range  Ambient humidity range  Operating/Storage: 35% to 95% (with no condensation)  Temperature range of -10 to 60°C  Voltage influence Insulation resistance  Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions  Degree of protection  Degree of protection  Pre-wired Models (Standard cable length: 2 m)  Weight (packed state)  Protection  Refer to the timing charts under DC 3-Wire Models on page 7 for details.  Protection Reverse polarity protection, Surge suppressor  Operating/Storage: -25 to 70°C (with no icing or condensation)  Operating/Storage: -25 to 70°C (with no icing or condensation)  Departing/Storage: -25 to 70°C (with no icing or condensation)  Departing/Storage: -25 to 70°C (with no icing or condensation)  Departing/Storage: -25 to 70°C (with no icing or condensation)  **Departing/Storage: -25 to 70°C (with no icing or condensation)  **Departing/Storage: -25 to 70°C (with no icing or condensation)  **Departing/Storage: -25 to 70°C (with no icing or condensation)  **Departing/Storage: -25 to 70°C (with no icing or condensation)  **Departing/Storage: -25 to 70°C (with no icing or condensation)  **Departing/Storage: -25 to 70°C (with no icing or condensation)  **Departing/Storage: -25 to 70°C (with no icing or condensation)  **Departing/Storage: -25 to 70°C (with no icing or condensation)  **Departing/Storage: -25 to 70°C (with no icing or condensation)  **Departing/Storage: -25 to 70°C (with no icing or condensation)  **Departing/Storage: -25 to 70°C (with no icing or condensation)  **Departing/Storage: -25 to 70°C (with no icing or condensation)  **Departing/Storage: -25 to 70°C (with no icing or condensation)  **Departing/Storage: -25 to 70°C (with no icing or condensation)  **Departing/Storage: -				,		
Refer to the timing charts under DC 3-Wire Models on page 7 for details.   Protection circuits   Reverse polarity protection, Surge suppressor	Indicator	rs	Detection indicator (red)			
Protection circuits   Reverse polarity protection, Surge suppressor	(with sen	sing object	NO			
Reverse polarity protection, Surge suppressor	approacl	hing)	Refer to the timing charts under <i>DC 3-Wire Models</i> on page 7 for details.			
temperature rangetion)tion)Ambient humidity rangeOperating/Storage: 35% to 95% (with no condensation)Temperature influence±10% max. of sensing distance at 23°C in the temperature range of -10 to 60°C±20% max. of sensing distance at 23°C in the temperature range of -25 to 70°CVoltage influence±2.5% max. of sensing distance at rated voltage in rated voltage ±10% rangeInsulation resistance50 MΩ min. (at 500 VDC) between current-carrying parts and case5 MΩ min. (at 500 VDC) between current-carrying parts and caseDielectric strength1,000 VAC for 1 min between current-carrying parts and case500 VAC, 50/60 Hz for 1 min between current-carrying parts and caseVibration resistanceDestruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directionsShock resistanceDestruction: 1,000 m/s² 10 times each in X, Y, and Z directionsDegree of protectionIEC 60529 IP67, in-house standards: oil-resistantIEC IP67Connection methodPre-wired Models (Standard cable length: 2 m)Approx. 90 gMaterialsCase SensingHeat-resistant ABS		on	Reverse polarity protection, Surge suppressor	ity protection, Surge suppressor		
humidity range         Operating/Storage: 35% to 95% (with no condensation)           Temperature influence         ±10% max. of sensing distance at 23°C in the temperature range of -10 to 60°C         ±20% max. of sensing distance at 23°C in the temperature range of -25 to 70°C           Voltage influence         ±2.5% max. of sensing distance at rated voltage in rated voltage ±10% range           Insulation resistance         50 MΩ min. (at 500 VDC) between current-carrying parts and case         5 MΩ min. (at 500 VDC) between current-carrying parts and case           Dielectric strength         1,000 VAC for 1 min between current-carrying parts and case         500 VAC, 50/60 Hz for 1 min between current-carrying parts and case           Vibration resistance         Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions           Shock resistance         Destruction: 1,000 m/s² 10 times each in X, Y, and Z directions         Destruction: 200 m/s² 10 times each in X, Y, and Z directions           Degree of protection         IEC 60529 IP67, in-house standards: oil-resistant         IEC IP67           Connection method         Pre-wired Models (Standard cable length: 2 m)         Approx. 90 g           Materials         Sensing         Heat-resistant ABS						
influencerange of -10 to 60°Crange of -25 to 70°CVoltage influence±2.5% max. of sensing distance at rated voltage in rated voltage ±10% rangeInsulation resistance50 MΩ min. (at 500 VDC) between current-carrying parts and case5 MΩ min. (at 500 VDC) between current-carrying parts and caseDielectric strength1,000 VAC for 1 min between current-carrying parts and case500 VAC, 50/60 Hz for 1 min between current-carrying parts and caseVibration resistanceDestruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directionsShock resistanceDestruction: 1,000 m/s² 10 times each in X, Y, and Z directionsDestruction: 200 m/s² 10 times each in X, Y, and Z directionsDegree of protectionIEC 60529 IP67, in-house standards: oil-resistantIEC IP67Connection methodPre-wired Models (Standard cable length: 2 m)Approx. 90 gWeight (packed state)Approx. 60 gApprox. 90 g			Operating/Storage: 35% to 95% (with no condensation)			
Insulation resistance50 MΩ min. (at 500 VDC) between current-carrying parts and case5 MΩ min. (at 500 VDC) between current-carrying parts and caseDielectric strength1,000 VAC for 1 min between current-carrying parts and case500 VAC, 50/60 Hz for 1 min between current-carrying parts and caseVibration resistanceDestruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directionsShock resistanceDestruction: 1,000 m/s² 10 times each in X, Y, and Z directionsDegree of protectionIEC 60529 IP67, in-house standards: oil-resistantIEC IP67Connection methodPre-wired Models (Standard cable length: 2 m)Approx. 90 gWeight (packed state)Approx. 60 gApprox. 90 g			$\pm 10\%$ max. of sensing distance at 23°C in the temperature range of –10 to 60°C			
resistanceand casecasecaseDielectric strength1,000 VAC for 1 min between current-carrying parts and case500 VAC, 50/60 Hz for 1 min between current-carrying parts and caseVibration resistanceDestruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directionsShock resistanceDestruction: 1,000 m/s² 10 times each in X, Y, and Z directionsDegree of protectionIEC 60529 IP67, in-house standards: oil-resistantIEC IP67Connection methodPre-wired Models (Standard cable length: 2 m)Weight (packed state)Approx. 60 gApprox. 90 gMaterialsSensingHeat-resistant ABS		9	$\pm 2.5\%$ max. of sensing distance at rated voltage in rated voltage $\pm 10\%$ range			
Vibration resistance  Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions  Shock resistance  Destruction: 1,000 m/s² 10 times each in X, Y, and Z directions  Degree of protection  IEC 60529 IP67, in-house standards: oil-resistant  Connection method  Pre-wired Models (Standard cable length: 2 m)  Weight (packed state)  Materials  Approx. 60 g  Heat-resistant ABS				, , , , , , , , , , , , , , , , , , , ,		
The struction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions  Shock resistance  Destruction: 1,000 m/s² 10 times each in X, Y, and Z directions  Degree of protection  Degree of protection  IEC 60529 IP67, in-house standards: oil-resistant  Connection method  Pre-wired Models (Standard cable length: 2 m)  Weight (packed state)  Approx. 60 g  Heat-resistant ABS  Heat-resistant ABS	Dielectri	c strength				
Degree of protection   IEC 60529 IP67, in-house standards: oil-resistant   IEC IP67    Connection method   Pre-wired Models (Standard cable length: 2 m)    Weight (packed state)   Approx. 60 g   Approx. 90 g    Materials   Sensing   Heat-resistant ABS			Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 ho	urs each in X, Y, and Z directions		
protection in-house standards: oil-resistant  Connection method Pre-wired Models (Standard cable length: 2 m)  Weight (packed state) Approx. 60 g Approx. 90 g  Materials Sensing Heat-resistant ABS	Shock resistance					
Weight (packed state)  Materials  Pre-wired Models (Standard cable length: 2 m)  Approx. 90 g  Approx. 90 g  Heat-resistant ABS						
(packed state) Approx. 60 g  Materials Case Sensing Heat-resistant ABS			Pre-wired Models (Standard cable length: 2 m)			
Materials Heat-resistant ABS		state)	Approx. 60 g	Approx. 90 g		
als   Sensing   Heat-resistant ABS	Matori	Case				
surface		Sensing surface	Heat-resistant ABS			
Accessories Instruction manual	Accesso	ries	Instruction manual			

<sup>\*</sup> The response frequency is an average value. Measurement conditions are as follows: standard sensing object, a distance of twice the standard sensing object, and a set distance of half the sensing distance.

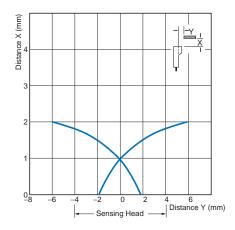
Item	Model	TL-N5ME□, TL-N5MY□	TL-N10ME□, TL-N10MY□, TL-N10MF1	TL-N20ME□, TL-N20MY□		
Sensing	distance	5 mm ±10%	10 mm ±10%	20 mm ±10%		
Set dista	nce	0 to 4 mm	0 to 8 mm	0 to 16 mm		
Differenti	ial travel	15% max. of sensing distance				
Detectab	le object	Ferrous metal (The sensing distance de	ecreases with non-ferrous metal. Refer to	Engineering Data on pages 6 and 7.)		
Standard sensing of		Iron, $30 \times 30 \times 1 \text{ mm}$	Iron, 40 × 40 × 1 mm	Iron, $50 \times 50 \times 1$ mm		
			E Models: 40 Hz Y Models: 10 Hz			
Power su voltage *: (operatin range)		E/F Models: 12 to 24 VDC (10 to 30 VD Y Models: 100 to 220 VAC (90 to 250 V				
Current consump	otion	E/F Models: 8 mA max. at 12 VDC, 15 r	mA max. at 24 VDC			
Leakage	current	Y Models: Refer to Engineering Data or	n page 5.			
Control	Load current	E/F Models: 100 mA max. at 12 VDC, 2 Y Models: 10 to 200 mA	00 mA max. at 24 VDC			
output	Residual voltage	E/F Models: 1 V max. (load current: 200 Y Models: Refer to <i>Engineering Data</i> or				
Indicator	s	E/F Models: Detection indicator (red) Y Models: Operation indicator (red)				
Operation mode (with sensing object approaching)		E1/F1/Y1 Models: NO E2/Y2 Models: NC Refer to the timing charts under I/O Circuit Diagrams on page 7 for details.				
Protection circuits E Models: Reverse polarity protection, Surge suppressor Y Models: Surge suppressor						
Ambient temperature range Operating/Storage: –25 to 70°C (with no icing or condensation)						
Ambient humidity	range	Operating/Storage: 35% to 95% (with no	o condensation)			
Temperatinfluence		±10% max. of sensing distance at 23°C	in the temperature range of –25 to 70°C			
Voltage i	nfluence		tance at rated voltage in rated voltage $\pm 1$ e at rated voltage in rated voltage $\pm 10\%$			
Insulation resistanc		50 M $\Omega$ min. (at 500 VDC) between curre	ent-carrying parts and case			
Dielectric	strength	E/F Models: 1,000 VAC, 50/60 Hz for 1 min between current-carrying parts and case Y Models: 2,000 VAC, 50/60 Hz for 1 min between current-carrying parts and case				
Vibration resistance		Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions				
Shock re	sistance	Destruction: 500 m/s <sup>2</sup> 10 times each in 2	X, Y, and Z directions			
Degree o protectio		IEC 60529 IP67, in-house standards: oil-resistant				
Connection method		Pre-wired Models (Standard cable lengt	th: 2 m)			
Weight (packed s	state)	Approx. 190 g	Approx. 240 g	Approx. 340 g		
Materi- als	Case Sensing surface	Heat-resistant ABS				
Accesso		E Models: Mounting Bracket, Mounting phillips screws (M4×25), Instruction manual Y Models: Instruction manual	E/F Models: Mounting Bracket, Mounting phillips screws (M4×30), Instruction manual Y Models: Instruction manual	E Models: Mounting Bracket, Mounting phillips screws (M5×40), Instruction manual Y Models: Instruction manual		

<sup>\*1.</sup> The response frequency is an average value. Measurement conditions are as follows: standard sensing object, a distance of twice the standard sensing object, and a set distance of half the sensing distance.
\*2. E Models (DC switching models): A full-wave rectification power supply of 24 VDC ±10% (average value) can be used.

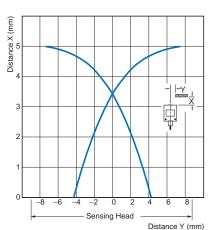
#### **Engineering Data (Reference Value)**

#### **Sensing Area**

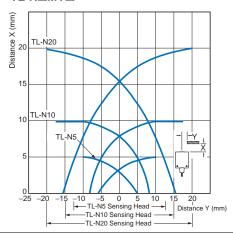
#### TL-Q2MC1



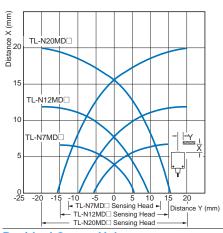
#### TL-Q5M□□



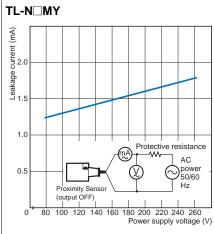
TL-N ME TL-N MY



#### $\mathsf{TL} ext{-}\mathsf{N}\square\mathsf{MD}\square$

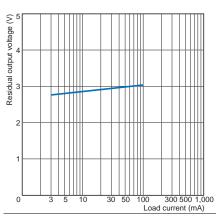


#### **Leakage Current**

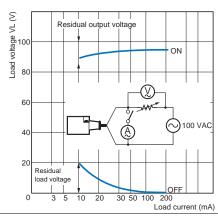


#### **Residual Output Voltage**

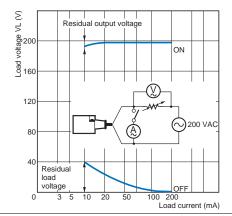
#### TL-N□MD



#### TL-N□MY at 100 VAC

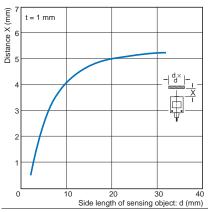


#### TL-N□MY at 200 VAC



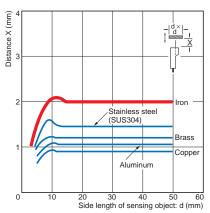
#### **Sensing Object Size vs. Sensing Distance**

#### TL-Q5MC□

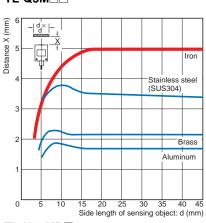


#### **Influence of Sensing Object Size and Material**

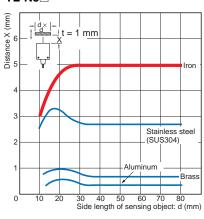
#### TL-Q2MC1



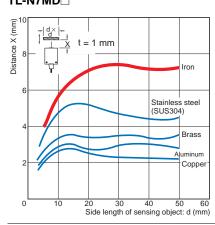
#### TL-Q5M□□



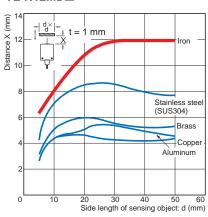
TL-N5□



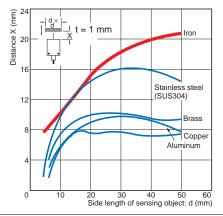
TL-N7MD



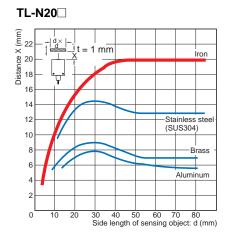
TL-N12MD□



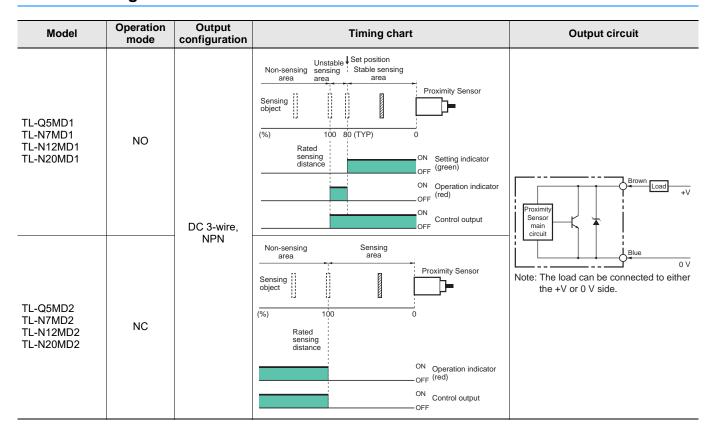
TL-N20MD□



# TL-N10 Example 10 The standard of the stand



#### I/O Circuit Diagrams



Model	Operation mode	Output configuration	Timing chart	Output circuit
TL-Q2MC1 TL-Q5MC1	NO NC	DC 3-wire, NPN	Sensing object  Not present  Not present  Output transistor (load)  Detection indicator (red)  Sensing object  Present Not present Output transistor (load)  OFF  ON OFF	Proximity Sensor main circuit  Load current: 100 mA max., TL-Q2MC1 Load current: 50 mA max., TL-Q5MC1
TL-Q5MB1	NO	DC 3-wire, PNP	Sensing object  Not present  Output transistor (load)  Detection indicator (red)  OFF	Brown  +V  Black  Main  Circuit  Load  * Load current: 50 mA max.
TL-N5ME1 TL-N10ME1 TL-N20ME1	NO	DC 3-wire,	Sensing object  Not present  Not present  Operate  and black leads)  Output voltage (between black and blue leads)  Detection indicator (red)  Present  Not present  Not present  Not present  Not present  Operate  Reset  OON  ON  OFF	$\begin{array}{c c} & & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & \\ & & \\ & & \\ & \\ & & \\ &$
TL-N5ME2 TL-N10ME2 TL-N20ME2	NC	NPN	Sensing object  Not present  Load (between brown and black leads)  Output voltage (between black and blue leads)  Detection indicator (red)  Present  Not present	*1. Load current: 200 mA max. *2. When a transistor is connected.
TL-N10MF1	NO	DC 3-wire, PNP	Sensing object  Not present  Not present  Load (between black and blue leads)  Output voltage (between brown and black leads)  Detection indicator (red)  Present  Not present  Operate  Reset  High  Low  ON  OFF	Brown  Proximity Sensor main circuit  4.7 k $\Omega$ Output  Load  100 $\Omega$ Blue  0 V  *1. Load current: 200 mA max. *2. When a transistor is connected.
TL-N5MY1 TL-N10MY1 TL-N20MY1	NO	- AC 2-wire	Sensing object  Not present  Load  Operate  Reset  Operation indicator (red)  OFF	Proximity Sensor
TL-N5MY2 TL-N10MY2 TL-N20MY2	NC		Sensing object  Not present  Load  Operate Reset  ON  OFF	main circuit Blue

#### **Safety Precautions**

#### Refer to Warranty and Limitations of Liability.

#### **MARNING**

This product is not designed or rated for ensuring safety of persons either directly or indirectly. Do not use it for such purposes.



- Do not short-circuit the load, otherwise the Sensor may be damaged.
- Do not supply power to the Sensor with no load, otherwise the Sensor may be damaged.
   Applicable Models: AC 2-Wire Models



#### **Precautions for Correct Use**

Do not use this product under ambient conditions that exceed the ratings.

#### Design

#### **Influence of Surrounding Metal**

When mounting the Sensor within a metal panel, ensure that the clearances given in the following table are maintained. Failure to maintain these distances may cause deterioration in the performance of the Sensor.



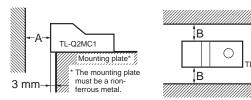




#### Influence of Surrounding Metal (Unit: mm)

Model Distance	Α	B *1
TL-Q5M□□, TL-Q5MB1	20	20
TL-N7MD□	40	35
TL-N12MD□	50	40
TL-N20MD□	70	60
TL-N5ME□, TL-N5MY□	20	23
TL-N10ME□, TL-N10MF1, TL-N10MY□	40	30
TL-N20ME□, TL-N20MY□	80	45

- \*1. The B dimension applies to the top, right-side, and left-side surfaces.
- \*2. The values for A or B for the TL-N apply when there is metal on only one side of the sensor. If there is metal on two or more sides of the sensor, the value must be multiplied by two or more.



#### Influence of Surrounding Metal (Unit: mm)

Model	Distance	Α	В
TL-Q2MC1		12	3

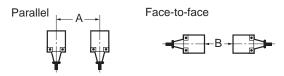
#### Mounting

When tightening the mounting screws, do not exceed the torque in the following table.

Model	Torque		
TL-Q2MC1	0.59 N·m		
TL-Q5M□□	0.59 11111		
TL-N\( M\)	0.9 to 1.5 N·m		

#### **Mutual Interference**

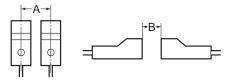
When installing Sensors face-to-face or side-by-side, ensure that the minimum distances given in the following table are maintained.



#### Mutual Interference (Unit: mm)

Model Distance	A *	B *
TL-Q5MC□, TL-Q5MB1	60 (17)	120 (60)
TL-Q5MD□	60 (30)	120 (80)
TL-N7MD	100 (50)	120 (60)
TL-N12MD□	120 (60)	200 (100)
TL-N20MD□	200 (100)	300 (150)
TL-N5ME□	80 (40)	80 (40)
TL-N5MY	80 (40)	90 (40)
TL-N10ME□, TL-N10MF1, TL-N10MY□	120 (60)	120 (60)
TL-N20ME□, TL-N20MY□	200 (100)	120 (60)

<sup>\*</sup> Values in parentheses apply to Sensors operating at different frequencies.



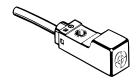
#### Mutual Interference (Unit: mm)

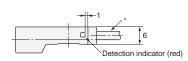
Model	Distance	A *	B*
TL-Q2MC1		30 (8)	90 (45)

<sup>\*</sup> Values in parentheses apply to Sensors operating at different frequencies.

#### **Sensors**

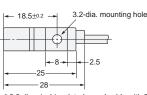
#### TL-Q2MC1





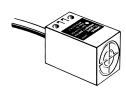
Sensing surface

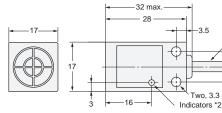


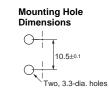


2.9-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section:  $0.15~\text{mm}^2,$  Insulator diameter: 0.9~mm), Standard length: 2~m

#### TL-Q5M□□







\*1. B/C Models: 4-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.2 mm², Insulator diameter: 1.2 mm), Standard length: 2 m

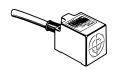
D Models: 4-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.3 mm²,

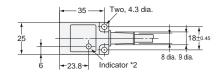
Insulator diameter: 1.3 mm), Standard length: 2 m

\*2. B/C Models: Detection indicator (red)

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

#### TL-N7MD□, TL-N5ME□





#### **Mounting Hole Dimensions**



Rubber bushing -38.5 1.5

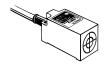
\*1. D Models: 6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m

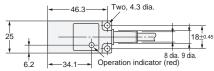
E Models: 6-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m

\*2. D1 Models: Operation indicator (red), Setting indicator (green)

D2 Models: Operation indicator (red) E Models: Detection indicator (red)

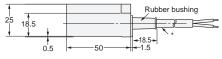
#### TL-N5MY





#### **Mounting Hole Dimensions**

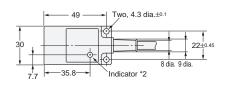




\* 6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m

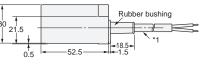
#### TL-N12MD□, TL-N10ME□, TL-N10MY





#### **Mounting Hole Dimensions**





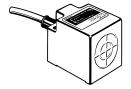
\*1. D/Y Models: 6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m E/Y Models: 6-dia. vinyl-insulated round cable with 3

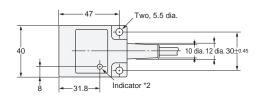
conductors (Conductor cross section: 0.5 mm2

Insulator diameter: 1.9 mm), Standard length: 2 m Operation indicator (red) and Setting indicator (green)

D2 Models: Operation indicator (red) E/Y Models: Detection indicator (red) Operation indicator (red)

#### $TL-N20MD\Box$ , $TL-N20ME\Box$ , $TL-N20MY\Box$





### **Mounting Hole Dimensions** Two, 5.5-dia. or M5 holes 30

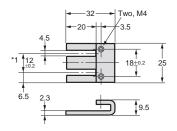
Rubber bushing

\*1. D/Y Models: 6-dia. vinyl-insulated round cable with 2 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m E Models: 6-dia. vinyl-insulated round cable with 3 conductors (Conductor cross section: 0.5 mm², Insulator diameter: 1.9 mm), Standard length: 2 m value of the conductor (red) and Setting indicator (green) D2 Models: Operation indicator (red) E Models: Operation indicator (red) Operation indicator (red)

#### **Accessories (Order Separately)**

#### **Mounting Bracket**

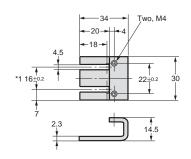
#### Y92E-C5



Applicable Models: TL-N5ME□ \*2 Applicable Models: TL-N5MY□ Applicable Models: TL-N7MD□ \*2 Material: Mounting Bracket: Zinc-plated iron Mounting Pan-head Phillips Screws:

Nickel-plated iron (Size: M4, Length: 25 mm)

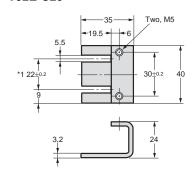
#### Y92E-C10



Applicable Models: TL-N10ME = \*2 Applicable Models: TL-N10MY□ Applicable Models: TL-N12MD□ \*2 Material: Mounting Bracket: Zinc-plated iron Mounting Pan-head Phillips Screws:

Nickel-plated iron (Size: M4, Length: 30 mm)

#### Y92E-C20

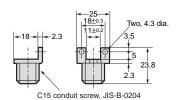


Applicable Models: TL-N20ME□ \*2 Applicable Models: TL-N20MY□ Applicable Models: TL-N20MD□ \*2 Material: Mounting Bracket: Zinc-plated iron Mounting Pan-head Phillips Screws: Nickel-plated iron (Size: M5, Length: 40 mm)

- \*1. These are the mounting dimensions of the base of the Mounting Bracket.

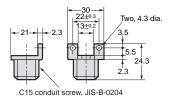
#### **Mounting Brackets for Wiring Conduit Use (Sold Separately)**

#### Y92E-N5C15



Applicable Models: TL-N5ME□ Applicable Models: TL-N5MY□
Applicable Models: TL-N7MD□ Material: Zinc-plated iron

#### Y92E-N10C15



Applicable Models: TL-N10ME□ Applicable Models: TL-N10MY□ Applicable Models: TL-N12MD□ Material: Zinc-plated iron

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