NE2 series

Embedded Amplifier Photo Sensors

- Standard embedded long range amplifier type with a focus on basic functionality and high quality
  - Longest detecting distance in this category
  - Through beam: 30m, 50m
  - Polarized retroreflective: 8m
  - Diffuse reflective: 1m
  - Background Suppression:500mm,700m
  - With light emission inhibit function, which is useful for operation check or start-up inspection (through beam type only)
  - IP67 protective construction
  - Polarized retroreflective and diffuse reflective types with mutual interference prevention (up to two sensors)
  - Polarizing filter (separately available) enables two sensors to be installed very closely (for NE2-T30R-2)
  - NPN/PNP dual output

Type

Detection method	Detecting distance	Model (*) Cable	Model (*) Connector	Output mode
Through beam	50 m	NE2-T50-2	NE2-T50-J2	Open collector dual output (NPN/PNP output)
	30 m	NE2-T30R-2	NE2-T30R-J2	
Polarized retroreflective	0.05 - 8 m	NE2-M10R-2	NE2-M10R-J2	
Diffuse reflective	1 m	NE2-R10-2	NE2-R10-J2	
Background Suppression	70 - 700 mm	NE2-D70-2	NE2-D70-J2	
	70 - 500 mm	NE2-D50R-2	NE2-D50R-J2	

(*) Models without the suffix "-2" are available with reverse pin assignment for PNP and NPN output.

Optional Parts

Type	Model	Applicable model	Description
Pinhole plate	NE2-P5	NE2-T50-2、NE2-T50-J2 NE2-T30R-2、NE2-T30R-J2	Pinhole diameter 5mm
	NE2-P3		Pinhole diameter 3mm
	NE2-P5×1		Pinhole diameter 5x1mm
			See page 221 about the detecting distance when mounted
Retroreflector	K-8	NE2-M10R-2、NE2-M10R-J2	Detecting distance: 0.05-10m
	K-71		Detecting distance: 0.05-4m
Interference immune filter	NE2-PFA	NE2-T30R-2、NE2-T30R-J2 (When mounted,the detecting distance is up to 15m.)	Longitudinal polarizing filter
	NE2-PFB		Transverse polarizing filter
Mounting bracket	NE-B1	All models	For vertical mounting (Material: SUS)
	NE-B2		For mounting on the back (Material: SUS)
	NE-B1C		For vertical mounting (Material: SPCC trivalent chromating)
	NE-B2C		For mounting on the back (Material: SPCC trivalent chromating)
Cable with connector	FAC-D4R2S	All connector type models (Two cables necessary when used for transmitter and receiver)	M12 straight type (2m)
	FAC-D4R5S		M12 straight type (5m)
	FAC-D4R2L		M12 angle type (2m)
	FAC-D4R5L		M12 angle type (5m)

Rating/Performance/Specification

Type	Attached cable	NE2-T50-2*	NE2-T30R-2*	NE2-M10R-2*	NE2-R10-2*	NE2-D70-2	NE2-D50R-2
	Connector	NE2-T50-J2*	NE2-T30R-J2*	NE2-M10R-J2*	NE2-R10-J2*	NE2-D70-J2	NE2-D50R-J2
Detection method		Through beam		Polarized retroreflective	Diffuse reflective	Limited Range Reflective (Background Suppression)	
Detecting distance		50m		0.05-8m (With reflector model K-7)	1m (With 200 x 200 mm white drawing paper)	70-700mm 120-700 mm (setting range)	70-500mm 120-500 mm (setting range)
Detection object		ϕ21mm or more Opaque		Mirror-like, opaque and translucent *1	Opaque, translucent and transparent *2	200 x 200 mm white card	
Power supply		12-24V DC ±10% / Ripple10% or less					
Current consumption		Transmitter: 22 mA or less Receiver: 17 mA or less		28mA or less	25mA or less	42mA or less	40mA or less
Output mode	Control output	NPN / PNP open collector dual output					
	Rating NPN type	Sink current 100 mA, (30 VDC) or less					
	Rating PNP type	Source current 100 mA, (30 VDC) or less					
Operation mode		Light ON/Dark ON selectable (with control lead)					
Light emission stop function		Provided (no-voltage input)		—			
Anti Interference feature		—	by using filters(for 2 sensors)	Provided (for 2 sensors)			
Response time		0.5ms or less					
Hysteresis		—			10% or less	5% or less	
Operating angle		5° (at receiver)		30° (reflector)	—		
Light source (light wavelength)		Infrared LED (880 nm)	Red LED (700 nm)	Red LED (700 nm)	Infrared LED (880 nm)	Infrared LED (880 nm)	Red LED (650 nm)
Indicator		Transmitter: Power indicator (orange LED) Receiver: Operation indicator (orange LED) Stability indicator (green LED)		Operation indicator (orange LED) Stability indicator (green LED)		Operation indicator (orange LED) Stability indicator (green LED)	
Volume (VR)		SENS: sensitivity adjustment (on receiver for through beam type)					
Switch		Dark ON / Light ON selector switch					
Short circuit protection		Output short circuit protection, protection against reverse connection, surge absorber					
Material		Case: Polycarbonate / Lens: acrylic					
Connection	Attached cable	Outer dimension: dia. 6mm Transmitter: 0.3 mm² 3 cores 2 m (gray) Receiver: 0.3 mm² 4cores 2 m (black)		Outer dimension: dia. 6mm, 0.3 mm² 4cores 2 m (black)		Outer dimension: dia. 6mm, 0.3 mm² 4cores 2 m (black)	
	Connector	M12 connector (90 degree adjustable)					
Weight	Attached cable	Approx. 125 g (transmitter/receiver)		Approx. 125 g		Approx. 130 g	
	Connector	Approx. 26 g (transmitter/receiver)		Approx. 26 g		Approx. 26 g	
Accessory		Operation manual (mounting bracket is not included)		K-7 reflector, Operation manual (mounting bracket is not included)	Operation manual (mounting bracket is not included)	Instruction manual (Bracket sold seperately)	

The detecting distance and detection object for retroreflective types varies, depending on reflector types combined with the sensor.
The detecting distance is the range which you can set for the reflector. The sensor can detect an object even at an extremely short range.
The detecting distance of the diffuse reflective type varies, depending on transmittance of the detection object. Please be sure to check the detection beforehand.

* Models without the suffix "-2" are available with reverse pin assignment for PNP and NPN output.

*1 Some materials do not allow stable detection. Some mirror-like objects wrapped in transparent film, glossy objects, laminated aluminum nameplates, etc., may inherently affect polarization. In such cases, the polarized waves of the sensor may be disturbed, which will cause unstable detection.

*2 Detecting objects with a higher transmission may offer shorter detection distances.

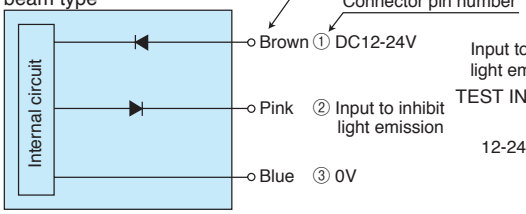
Environmental Specification

Ambient light	5000 lx or less
Ambient temperature	-25 - +55°C (storage: -40 - +70°C) (non-freezing)
Ambient humidity	35~85%RH (non-condensation)
Protective structure	IP67
Vibration	10-55 Hz / 1.5 mm double amplitude / 2 hours each in 3 direction
Shock	100 m/s² / 3 times each in 3 directions
Dielectric withstanding	1000 VAC for 1 minute
Insulation resistance	500 VDC 20 MΩ or higher

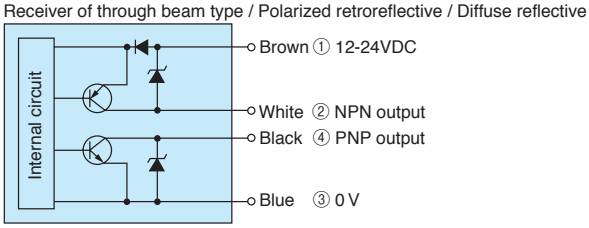
NE2

Input/Output Circuit and Connection

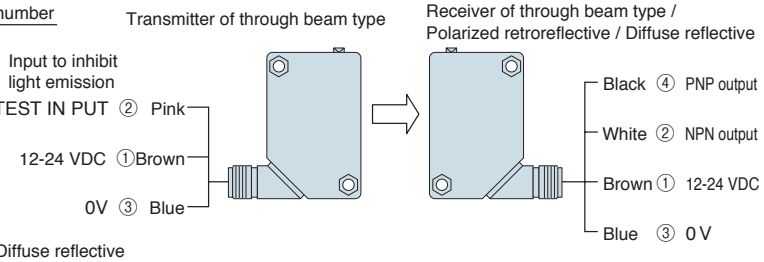
Transmitter of through beam type



Receiver of through beam type / Polarized retroreflective / Diffuse reflective



Connection



- If a load short circuit or overload occurs, the output transistor turns off. Check the load before restarting.
- Circled numbers show the pin number of M12 connector type.
- Models without the suffix "-2" are available with reverse pin assignment for PNP and NPN output.

Pin assignment and connection of M12 connector type

Pin assignment of sensor

	Pin	
Transmitter	1	12-24 VDC
	2	Input to inhibit light emission
	3	0V
	4	———

	Pin	
Receiver	1	12-24 VDC
	2	NPN output
	3	0V
	4	PNP output

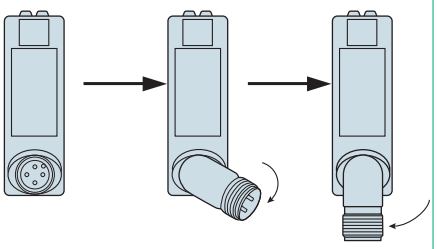
- When using connection cables with connector (common to transmitters, receivers or sensors), which is available separately.

Model: FAC-D4R2S 2m / FAC-D4R5S 5m (straight type); FAC-D4R2L 2m / FAC-D4R5L 5m (angle type)

When using as transmitter		
Pin	Lead color	
1	Brown	12-24 VDC
2	White	Input to inhibit light emission
3	Blue	0V
4	Black	———

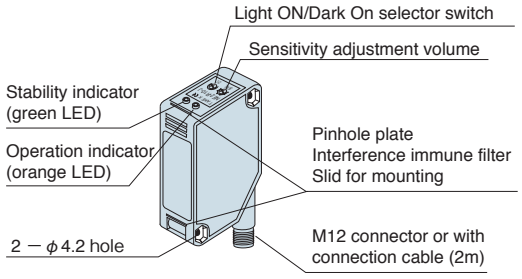
When using as receiver or sensor		
Pin	Lead color	
1	Brown	12-24 VDC
2	White	NPN output
3	Blue	0V
4	Black	PNP output

Connector: Angle adjustment within 90°



- The rotating direction of adjustment connector is fixed as shown in the figure above.
- If you rotate it in the opposite direction, the connector is damaged.

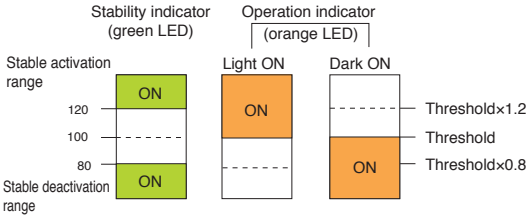
Panel and Indicators



The figure shows M12 connector type.

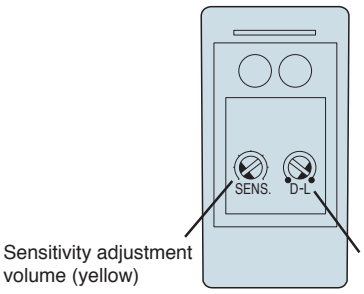
About Indicators

- Aligning the optical axis and adjusting the sensitivity are simple. Setting within the stable range increases reliability against differences in environment after installation.
- The operation indicator (orange LED) and stability indicator (green LED) each show different received light intensity levels as described in the figure.



The orange LED is the operation indicator.
In the Light ON mode, it turns on when the sensor receives the light.
In the Dark ON mode, it turns on when the sensor does not receive the light.

Light ON/Dark ON Selection and Sensitivity Adjustment



To select the Light ON mode, set it to L.

To select the Dark ON mode, set it to D.

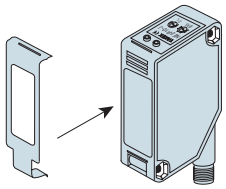
Sensitivity can be adjusted for detection with a through beam model in which blocking of the light beam is inadequate due to a translucent or small object or for detection with a reflective model in which any influence of the background should be avoided or the sensor must detect low intensity of reflected light. Turning the volume counterclockwise reduces the sensitivity.

How to mount the interference immune filters (optional)

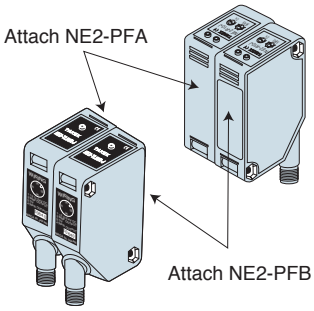
Model
NE2-PFA (longitudinal polarization type)
NE2-PFB (transverse polarization type)

Using the filters, you can install two through beam types in contact. One filter should be for longitudinal polarization, and the other for transverse polarization.

Filters can be mounted on NE2-T30R-2 or NE2-T30R-J2.When mounted,the detecting distance is up to 15m.



Insert the ends of the filter into the slits above and below the lens.

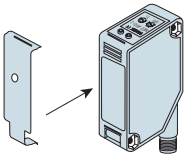


Note: Do not use the pinhole plate and the interference immune filter at the same time.

Pinhole plate (Optional)

The pinhole plate as below is separately available for the through beam type.
Pinhole plates allow the reduction of the minimum size of a detection object or the margin of movement.

Pinhole plate



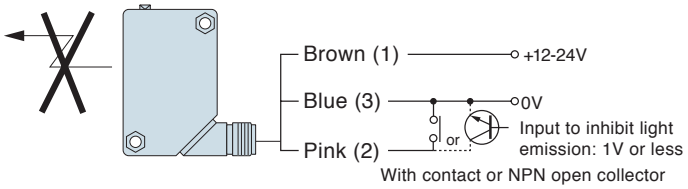
Note: Do not use the pinhole plate and the interference immune filter at the same time.

Detecting distance when mounted on both transmitters and receivers

Type	NE2-P3	NE2-P5	NE2-P5×1
Pinhole diameter	ϕ3mm	ϕ5mm	5×1mm
NE2-T50, NE2-T50-J2	5m	10m	3m
NE2-T30R, NE2-T30-J2	3m	7m	2m

About light emission inhibit function

Short-circuiting the blue and pink cables stops the light emission at any time.
Light emission inhibit: Connect to 0V (short)



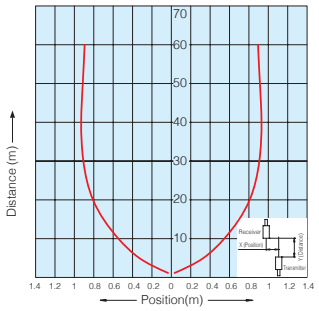
Note: Before using the light emission inhibit function, make sure a detection object does not shield the light emission from the sensor.

- When not using the light emission inhibit function, connect the pink cable to the brown terminal (12 to 24 VDC).

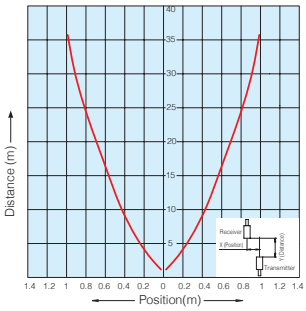
NE2

Response Curves: Beam Pattern (Typical)

NE2-T50-2

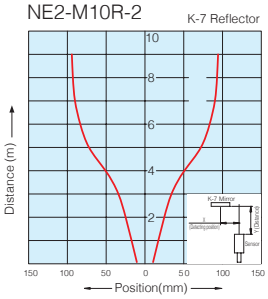


NE2-T30R-2

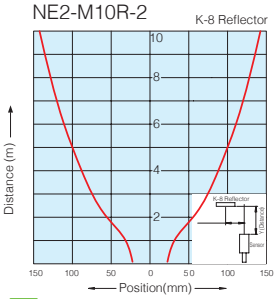


Response Curves: Beam pattern (Typical)

NE2-M10R-2 K-7 Reflector

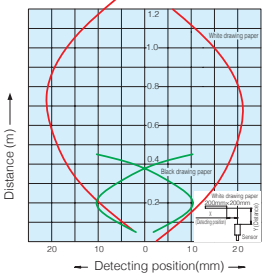


NE2-M10R-2 K-8 Reflector

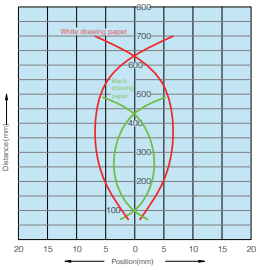


Response Curves: Detecting position (Typical)

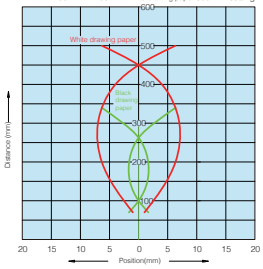
NE2-R10-2



NE2-D70 200 mm X 200 mm White drawing paper 700 mm setting

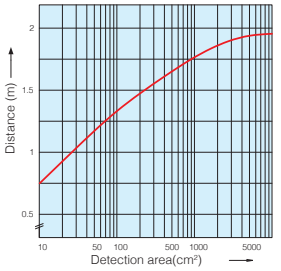


NE2-D50R 200 mm X 200 mm White drawing paper 500 mm setting



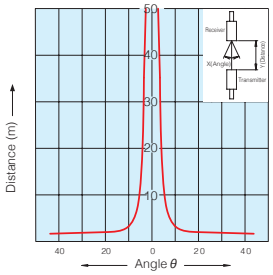
Response Curves: Target size (Typical)

NE2-R10-2

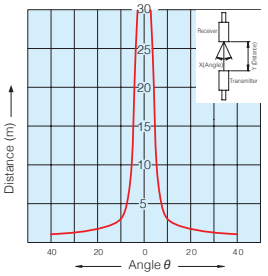


Response Curves: Tilt angle (Typical)

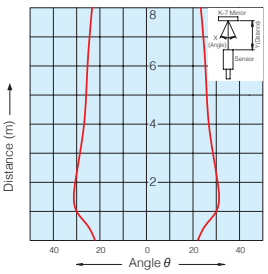
NE2-T50-2



NE2-T30R-2

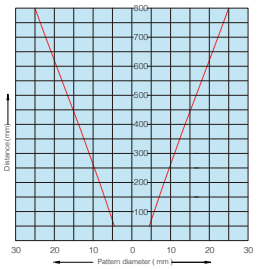


NE2-M10R-2

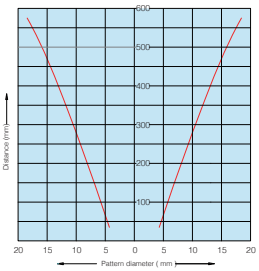


Response Curves: Beam pattrens (Typical)

NE2-D70 Series

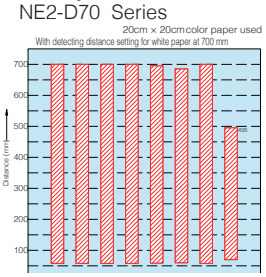


NE2-D50R Series

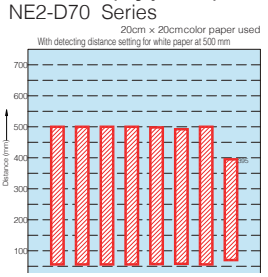


Response Curves:Color Cards(Typical)

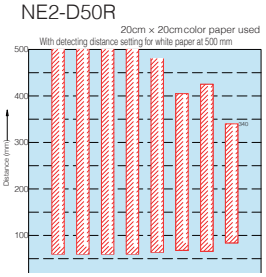
NE2-D70 Series



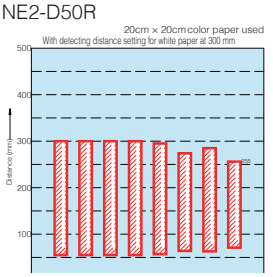
NE2-D70 Series



NE2-D50R

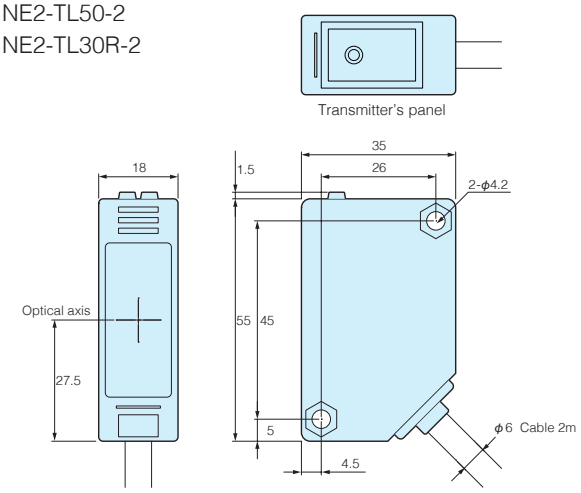


NE2-D50R

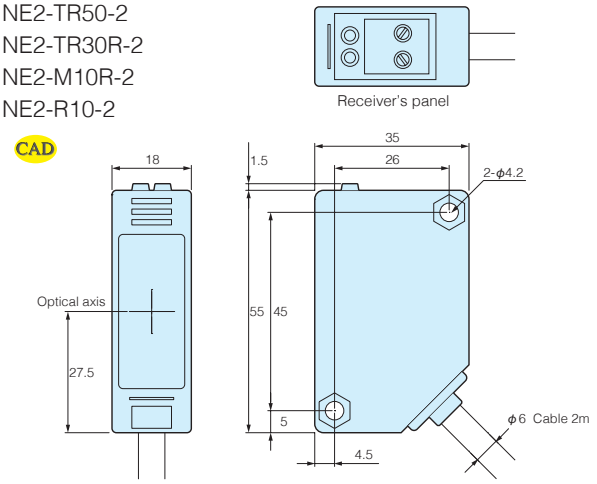


Dimensions (in mm)

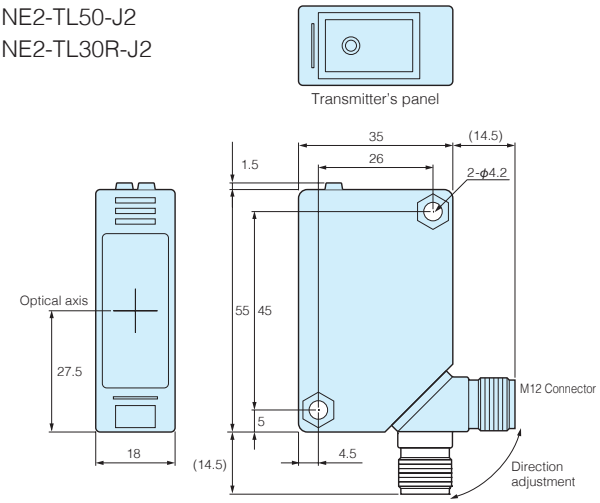
Cable type Transmitter
NE2-TL50-2
NE2-TL30R-2



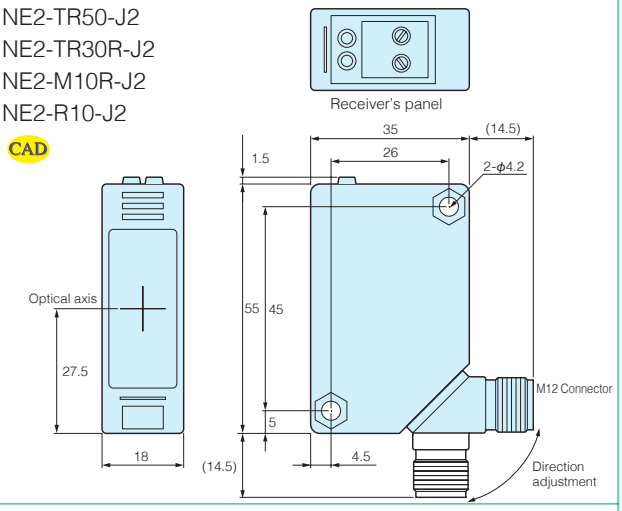
Cable type Receiver, polarized reflective type, diffuse reflective type
NE2-TR50-2
NE2-TR30R-2
NE2-M10R-2
NE2-R10-2



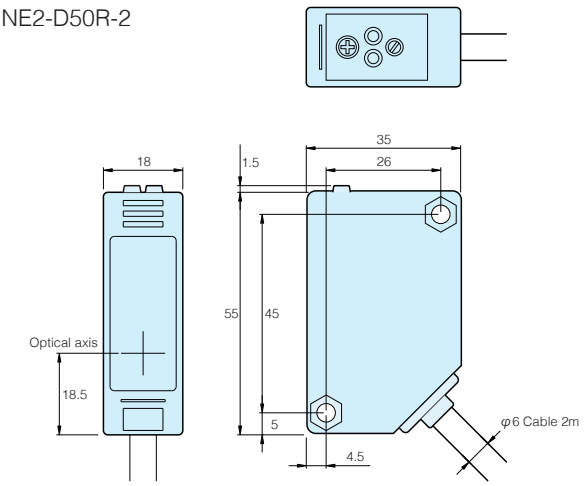
M12 Connector type Transmitter
NE2-TL50-J2
NE2-TL30R-J2



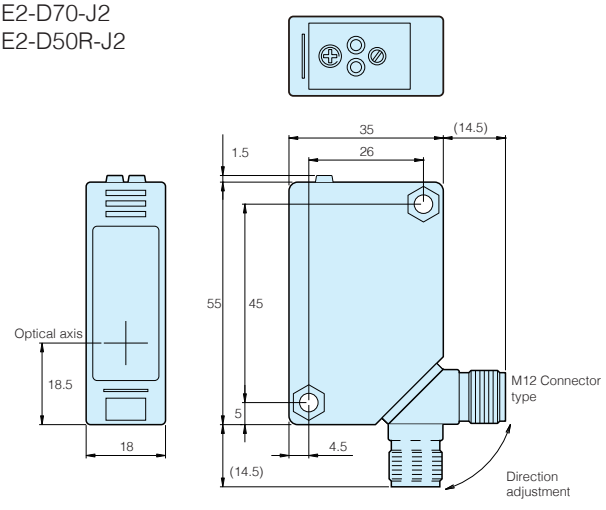
M12 Connector type Receiver, polarized reflective type, diffuse reflective type
NE2-TR50-J2
NE2-TR30R-J2
NE2-M10R-J2
NE2-R10-J2



Cable type
NE2-D70-2
NE2-D50R-2



Connector type
NE2-D70-J2
NE2-D50R-J2



CAD To download CAD data including dimensions, please visit www.takex-elec.co.jp/index_e.html.