

Volume Adjustment Fiber Optic Amplifiers

BF3 Series

PRODUCT MANUAL

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.
The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ⚠ symbol indicates caution due to special circumstances in which hazards may occur.

⚠ Warning Failure to follow instructions may result in serious injury or death.

01. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss.(e.g., nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)
Failure to follow this instruction may result in personal injury, economic loss or fire.

02. Do not use or store the unit in the place where flammable/explosive/ corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact or salinity may be present.
Failure to follow this instruction may result in explosion or fire.

03. Install the unit on DIN rail or panel to use.
Failure to follow this instruction may result in fire.

04. Do not disassemble or modify the unit.
Failure to follow this instruction may result in fire.

05. Do not connect, repair, or inspect the unit while connected to a power source.
Failure to follow this instruction may result in fire.

06. Check 'Connections' before wiring.
Failure to follow this instruction may result in fire.

⚠ Caution Failure to follow instructions may result in injury or product damage.

01. Use the unit within the rated specifications.
Failure to follow this instruction may result in fire or product damage.

02. Use a dry cloth to clean the unit, and do not use water or organic solvent.
Failure to follow this instruction may result in fire.

Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- When connecting an inductive load such as a DC relay, remove surge by using a diode or varistor.
- Use the product after 3 sec of the power input.
- The power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- Wire as short as possible and keep it away from high voltage lines or power lines to prevent surge and inductive noise.
- When using switching mode power supply (SMPS), ground F.G. terminal and connect a condenser between 0V and F.G. terminal to remove noise.
- Since external disturbance light (sunlight, fluorescent lighting, etc.) can cause product malfunction, use the product with a light shield or slit.
- When sensing an object with the maximum sensitivity, an error of sensing distance can occur due to the deviation of each feature.
- Turn off the power of the fiber optic amplifier before installation or removal.
- When installing the fiber optic unit, check the bend radius of each unit written on the product manual. If the installed unit that has the bend radius under the rated range, causing optical loss so the sensing distance is shortened.
- Be sure not to scratch the surface of the fiber optic unit.
- Do not pull the cable of the fiber optic unit that is connected to the amplifier.
- This unit may be used in the following environments.
  - Indoors (in the environment condition rated in 'Specifications')
  - Altitude max. 2,000 m
  - Pollution degree 2
  - Installation category III

EAC

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

BF3 ❶ - ❷

❶ Light source
RX: Red LED

❷ Control output
No mark: NPN open collector output
P: PNP open collector output

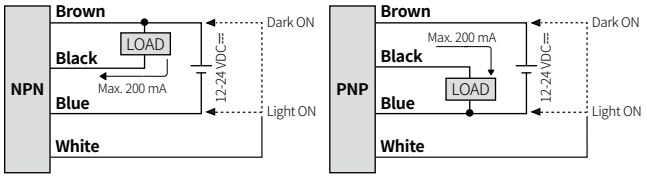
Product Components

- Product
- Bracket
- Adjustment screwdriver
- Instruction manual
- Bolt / Nut × 2

Sold Separately

- Fiber optic units (except GT-420-13H2 model)

Connections

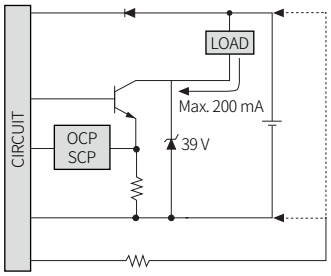


■ Selectable operation mode

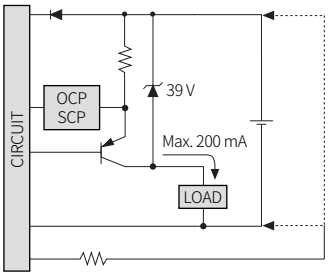
Operation mode	Connection
Light ON	(White) control wire connects with (Blue) 0 V
Dark ON	(White) control wire connects with (Brown) + V

Circuit

■ NPN open collector output



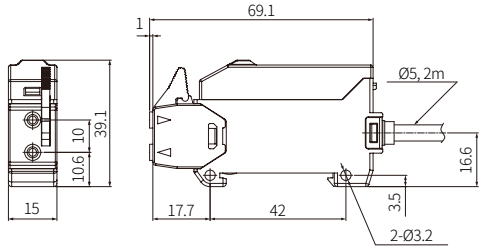
■ PNP open collector output



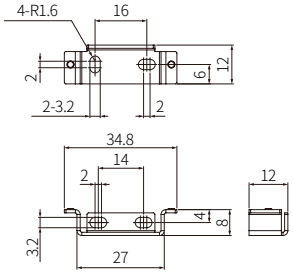
- OCP (over current protection), SCP (short circuit protection)

Dimensions

- Unit: mm, For the detailed drawings, follow the Autonics website.



■ Bracket



Specifications

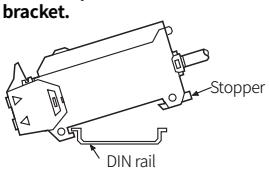
Model	BF3RX-□
Light source	Red LED
Peak emission wavelength	660 nm, modulated
Response time	≤ 1 ms
Sensitivity setting	Manual sensitivity setting (adjuster)
Operation mode	Light ON / Dark ON selectable (control wire)
Indicator	Operation indicator (red)
Approval	EAC
Unit weight	≈ 90 g

Power supply	12-24 VDC⎓ ±10% (ripple P-P: ≤ 10%)
Current consumption	≤ 40 mA
Control output	NPN open collector output / PNP open collector output model
Load voltage	≤ 30 VDC⎓
Load current	≤ 200 mA
Residual voltage	NPN: ≤ 1 VDC⎓, PNP: ≤ 2.5 VDC⎓
Protection circuit	Reverse power protection circuit, output short overcurrent protection circuit
Insulation resistance	≥ 20 MΩ (500 VDC⎓ megger)
Noise immunity	±240 VDC⎓ the square wave noise (pulse width: 1 μs) by the noise simulator
Dielectric strength	Between the charging part and the case : 1,000 VAC~ 50 / 60 Hz for 1 min
Vibration	1.5 mm double amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 2 hours
Shock	500 m/s² (≈ 50 G) in each X, Y, Z direction for 3 times
Ambient illuminance (receiver)	Sunlight: ≤ 11,000 lx, incandescent lamp: ≤ 3,000 lx
Ambient temperature	-10 to 50 °C, storage: -25 to 70 °C (no freezing or condensation)
Ambient humidity	35 to 85%RH, storage: 35 to 85%RH (no freezing or condensation)
Cable spec.	Ø 5 mm, 4-wire, 2 m
Wire spec.	AWG24 (0.08 mm, 40-core), insulator outer diameter: Ø 1 mm
Material	Case: ABS, cover: PC

Mount and Removal of Amplifier

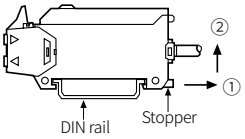
■ Mount

01. Hang up the holder on the front part of the amplifier to the DIN rail or bracket.
02. Press the stopper at the rear part of the amplifier on the DIN rail or bracket.



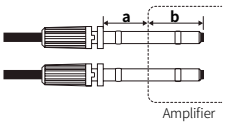
■ Removal

01. Pull the stopper at the rear part of the amplifier via a screwdriver toward direction ①.
02. Lift the rear part of the amplifier toward direction ②.



Insert Fiber Optic Unit

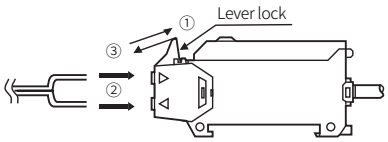
01. Lower down the lever lock.
02. Insert the cable of the fiber optic unit to the slot completely.
(▷ : receiver part, ◁ : emitter part)



Length (mm)	Receiver part	Emitter part
a 01)	0	1
b	21	

01) With the adaptor attached

03. Lift the lever lock to fix the fiber optic unit.



Operation timing chart and Indicators

Operation mode	Light ON	Dark ON
Received light	Received / Interrupted 	Received / Interrupted 
Operation indicator (red)	ON / OFF 	ON / OFF 
Transistor output	ON / OFF 	ON / OFF 

Sensitivity Adjustment

Use the offered adjustment screwdriver. Do NOT turn with excessive force to prevent product damage.

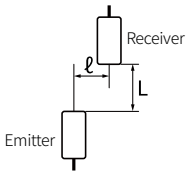
STEP	Status	Adjuster		Descriptions
		COARSE	FINE	
01	-			Fix the COARSE adjuster at MIN and fix the FINE adjuster at center (▼).
02	Received			Turn the COARSE adjuster to the right and fix it where the operation indicator lights up.
03	Received			Turn the FINE adjuster to (-) direction and check the position where the operation indicator turns OFF. Turn the FINE adjuster again to (+) direction and check the position (A) where the operation indicator lights up.
04	Interrupted			Turn the FINE adjuster to (+) direction and check the position where the operation indicator lights up. Turn the FINE adjuster again to (-) direction and check the position (B) where the operation indicator turns OFF. If the operation indicator does NOT light up: MAX = (B).
05	-			Set the adjuster at the mid position between (A) and (B) for optimal sensitivity.
06	Received			If you cannot adjust as above, set the FINE adjuster at MAX and follow the step again.

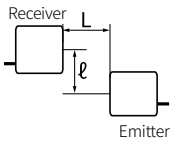
Product Characteristic Data

This data is based on internal testing and for reference only. The measurements are based on non-glossy white paper. Performance may vary by installation and usage environment. Product testing prior to use is recommended. The sensing distance of each product varies depending on the fiber optic unit used. Please refer to the fiber optic unit product manual.

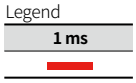
Detection Area Characteristics: Through-Beam Type (TYPICAL)

- Horizontal shift (Left ← Center → Right)
- Vertical shift (Down ← Center → Up)

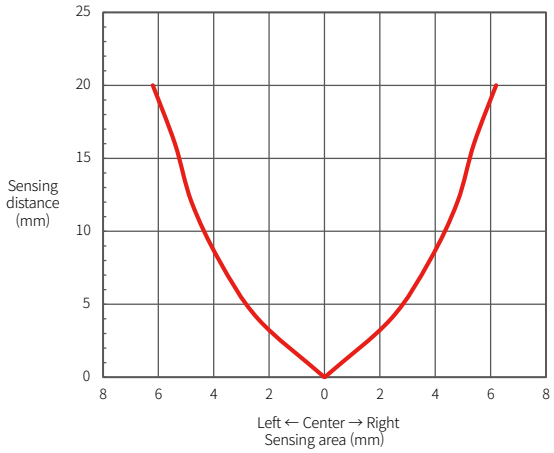




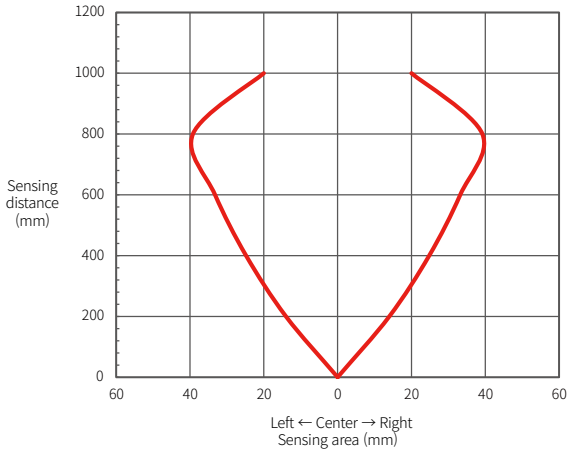
- Legend



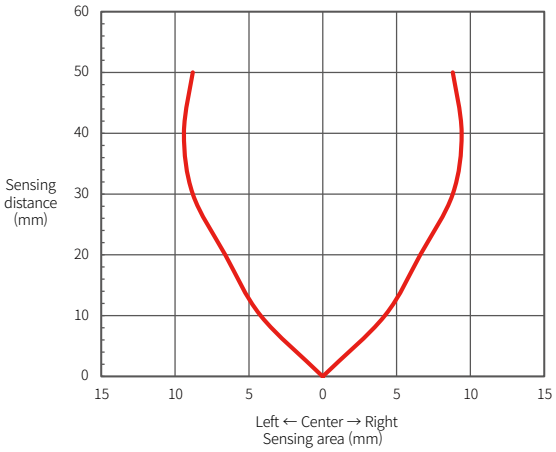
■ FT-310-05



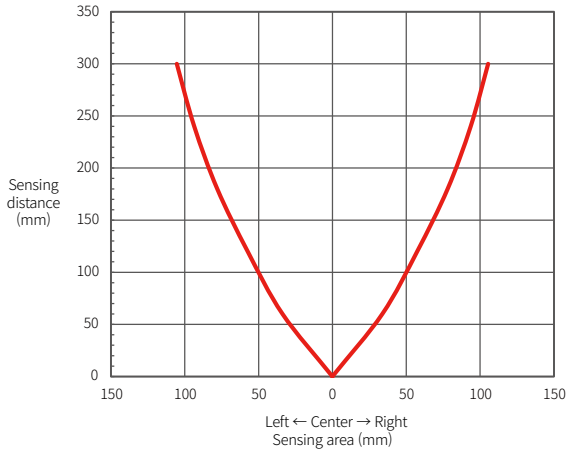
■ FT-420-10LN



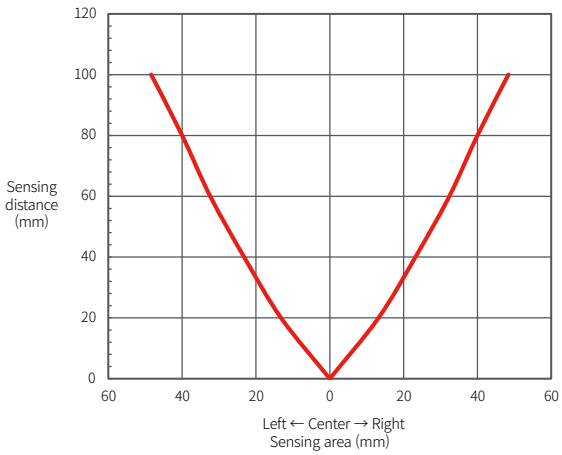
■ FT-320-05



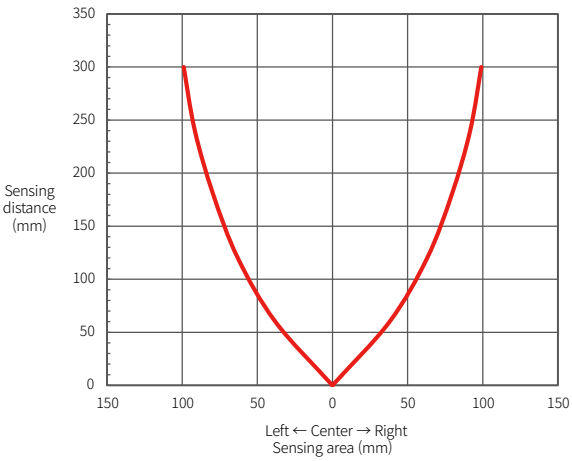
■ FT-420-10H



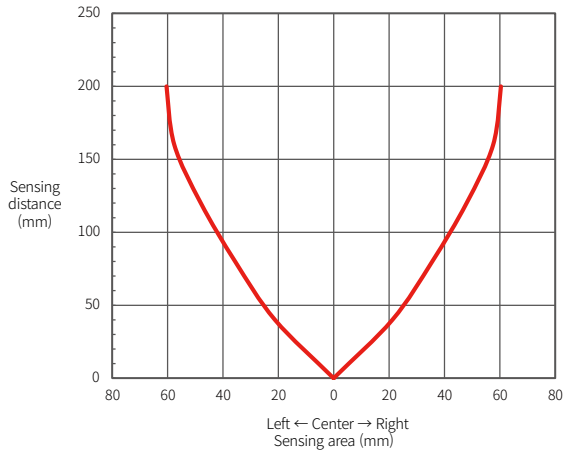
■ FT-420-10



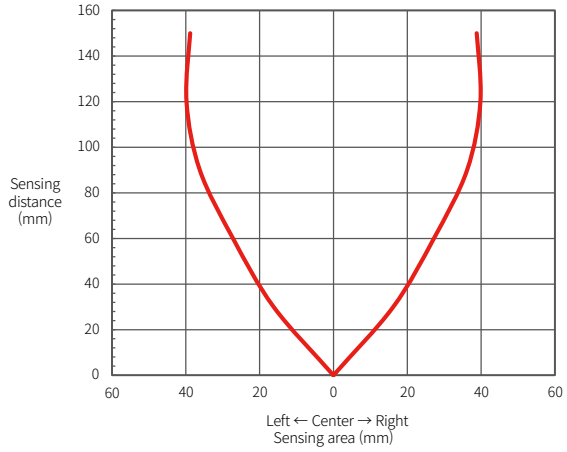
■ FT-420-15H1



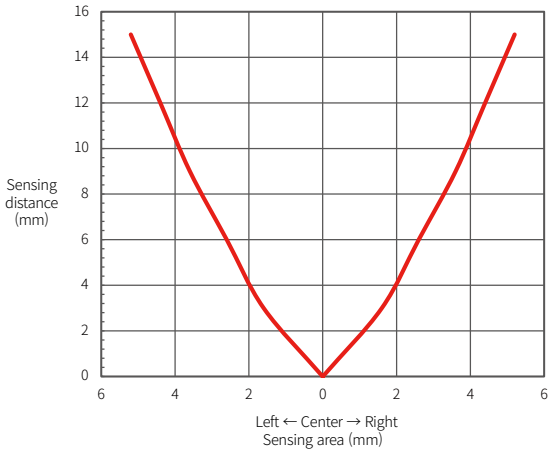
■ GT-410-12V2 (VA01)



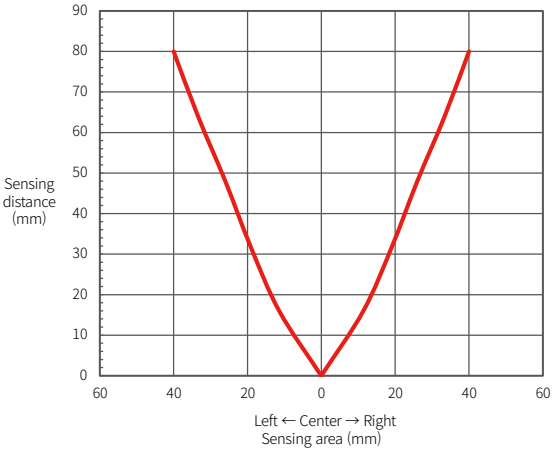
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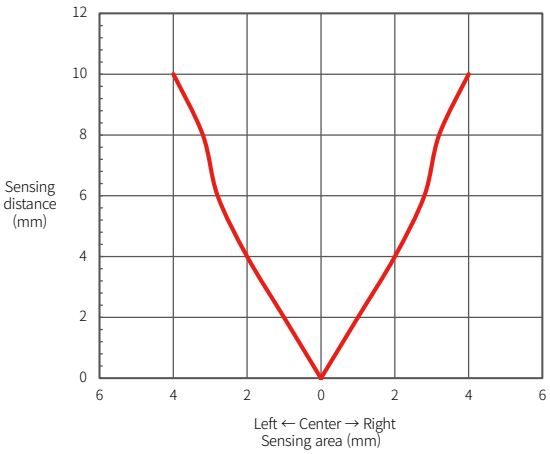
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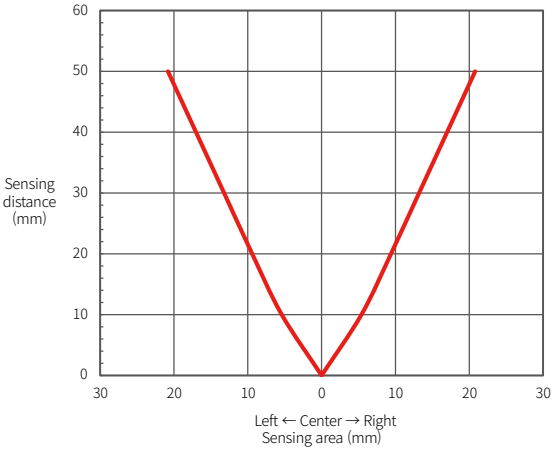
■ FT-420-13B



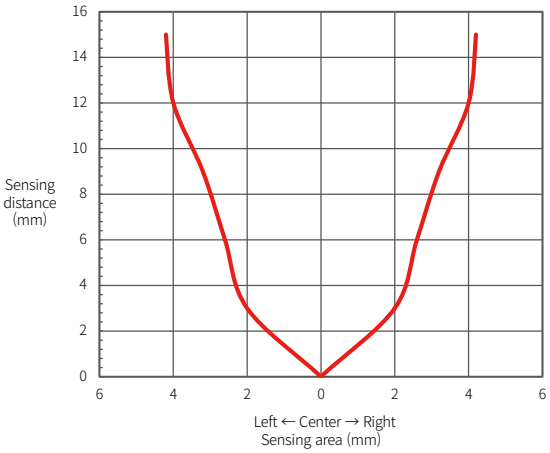
■ FT-320-05R



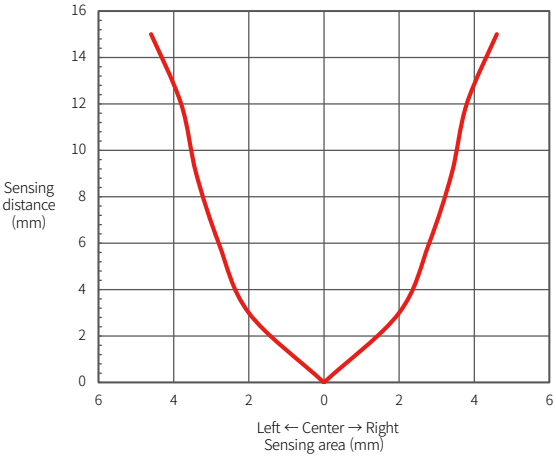
■ FT-420-10R



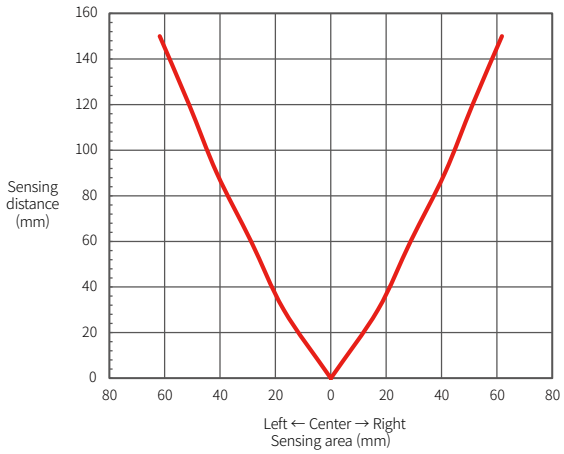
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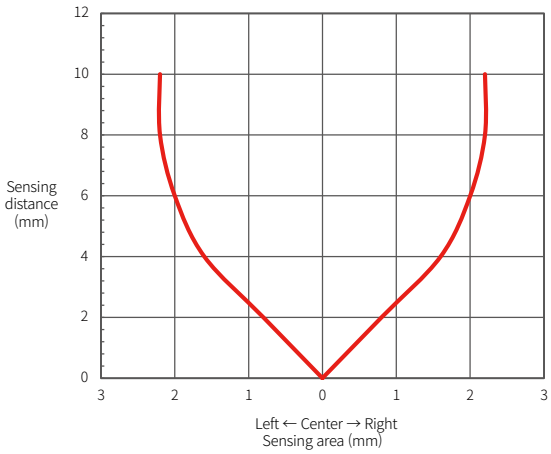
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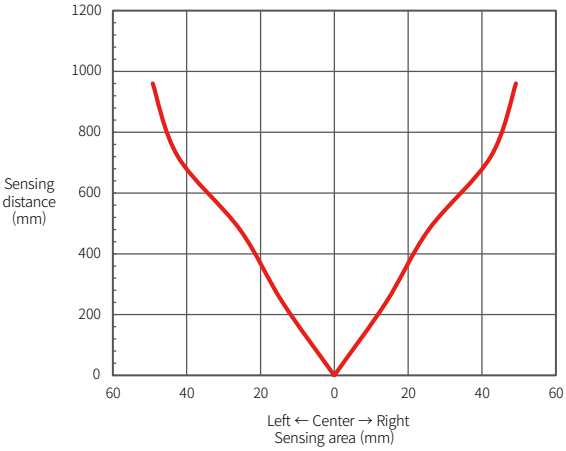
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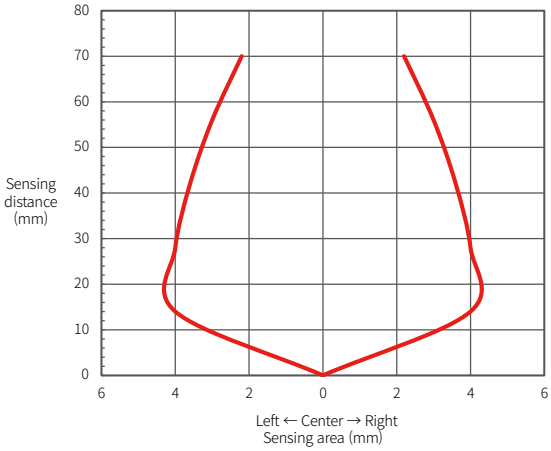
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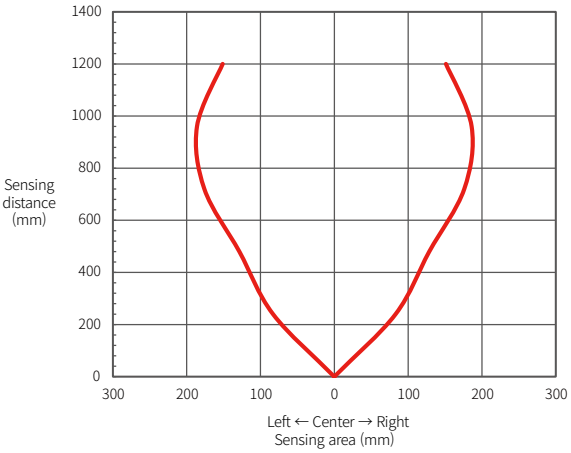
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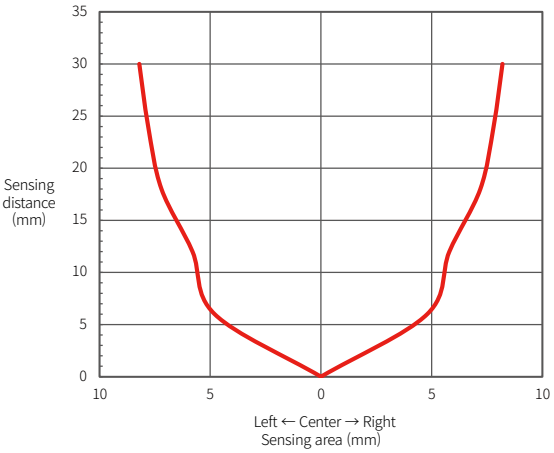
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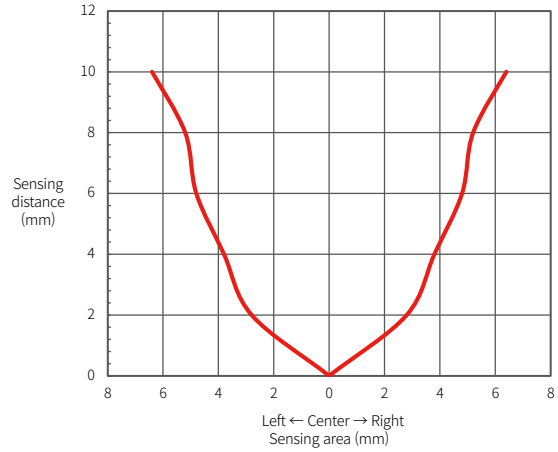
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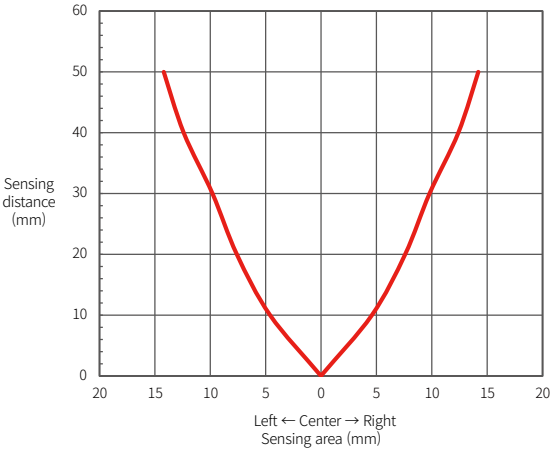
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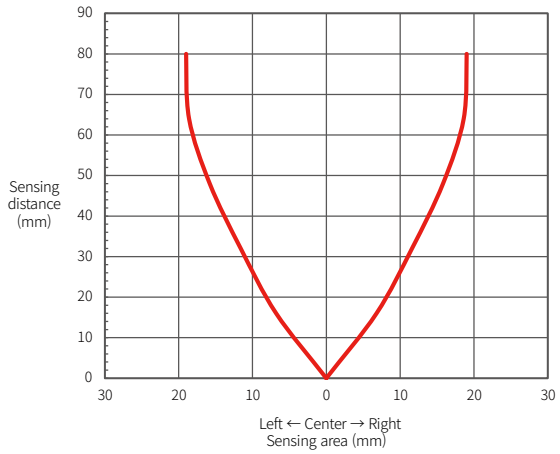
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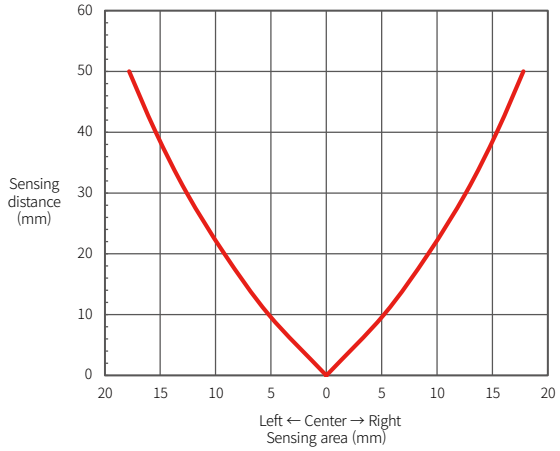
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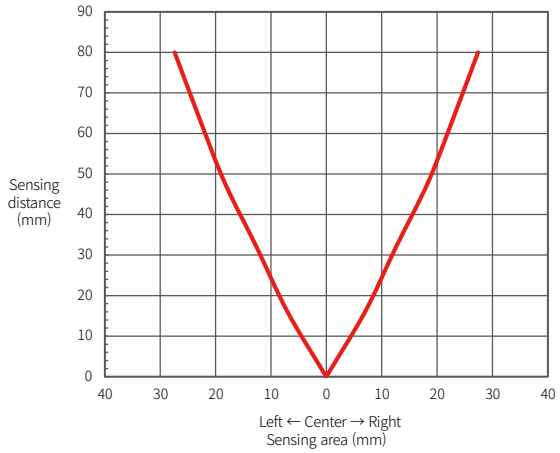
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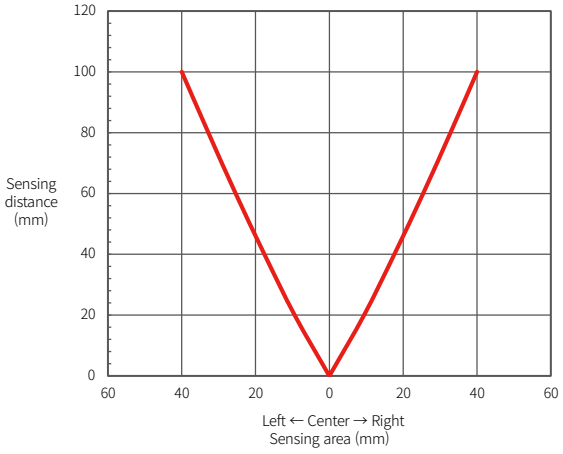
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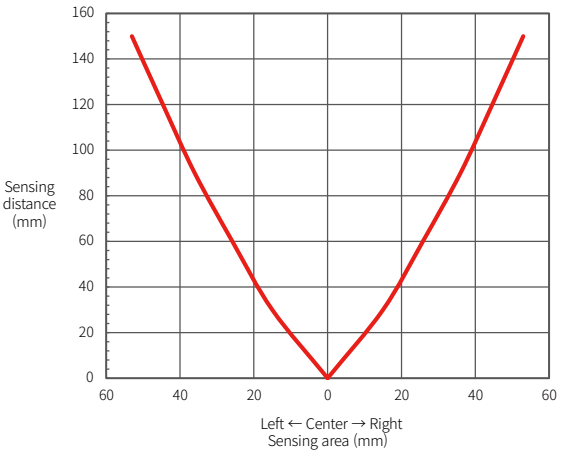
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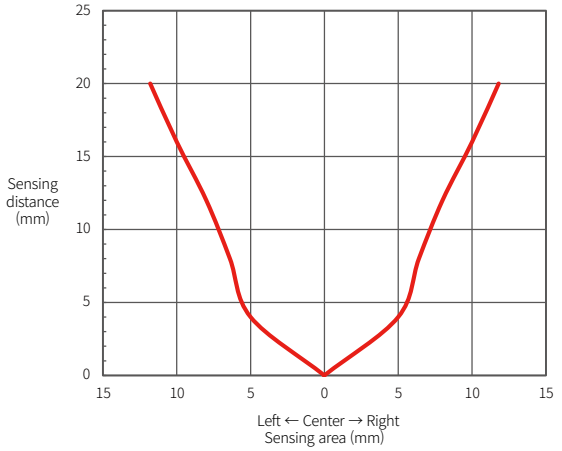
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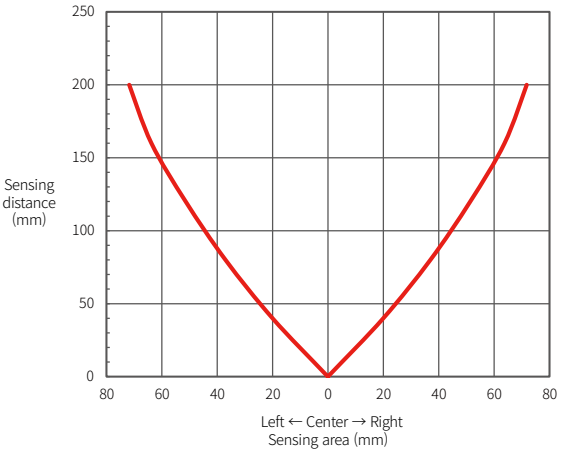
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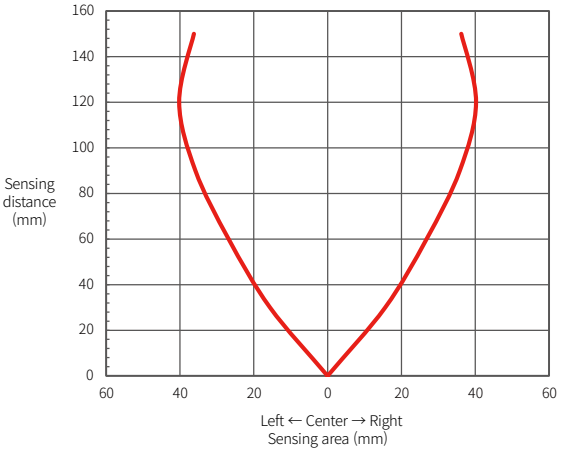
■ FTL-420-10



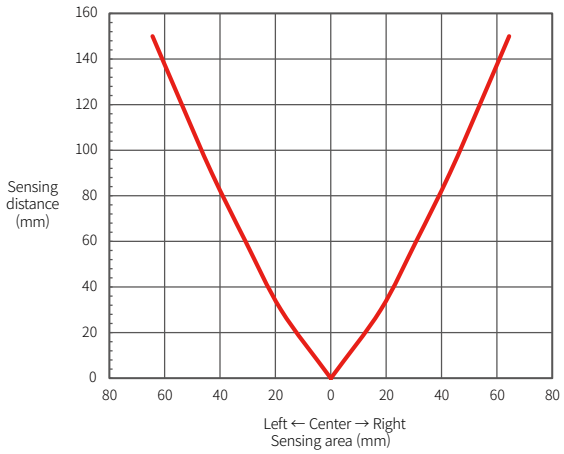
■ GTL-410-12V2 (VA01)



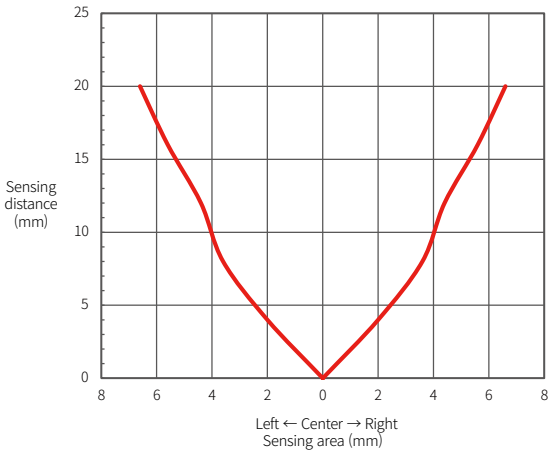
■ GTL-410-12V2 (VA02)



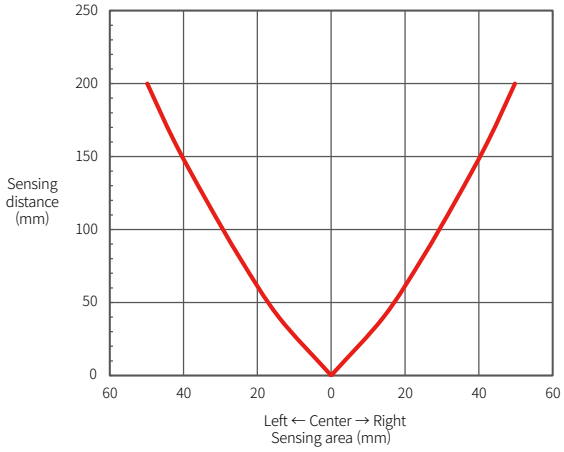
■ FTP-320-10



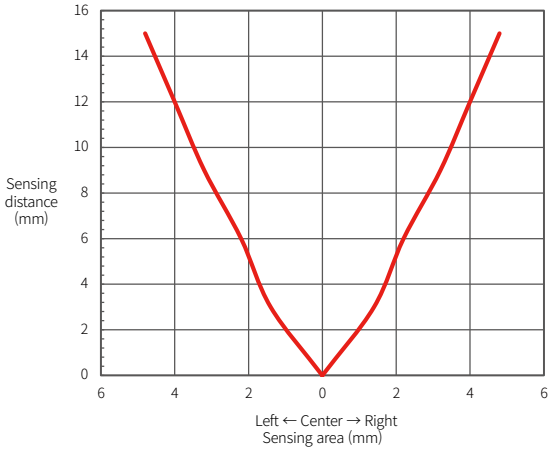
■ FTS1-320-05



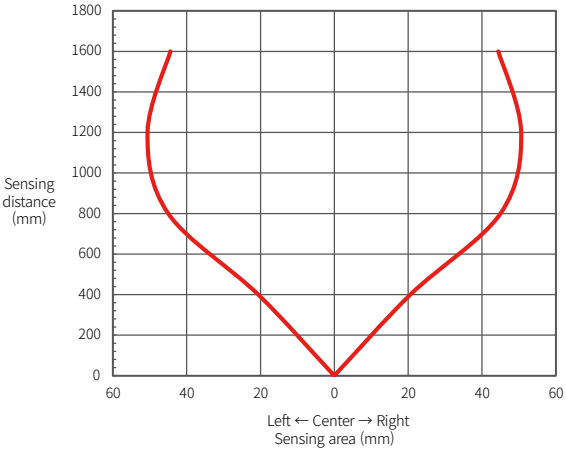
■ FTR-410-10R



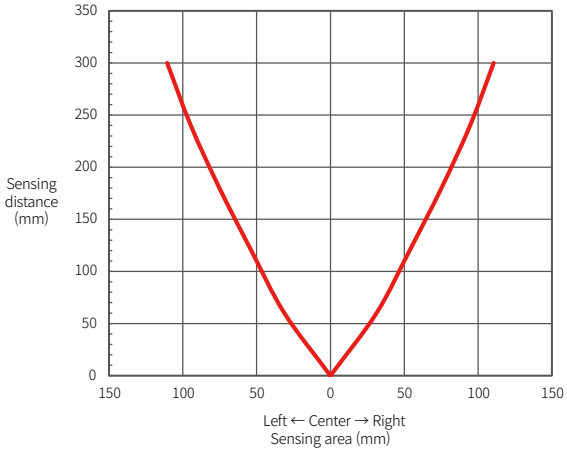
■ FTS2-320-05



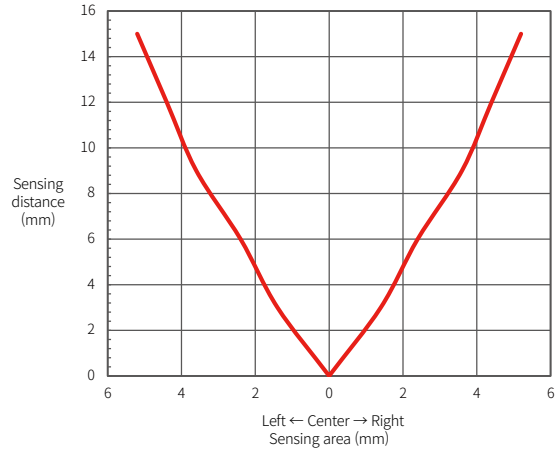
■ FTR-420-10RLN



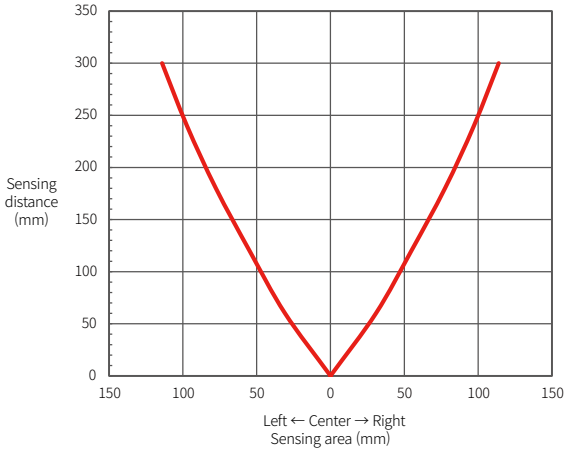
■ FTS-420-10



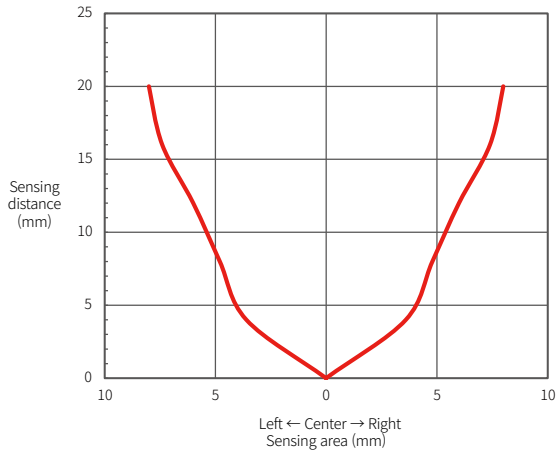
■ FTS-320-05



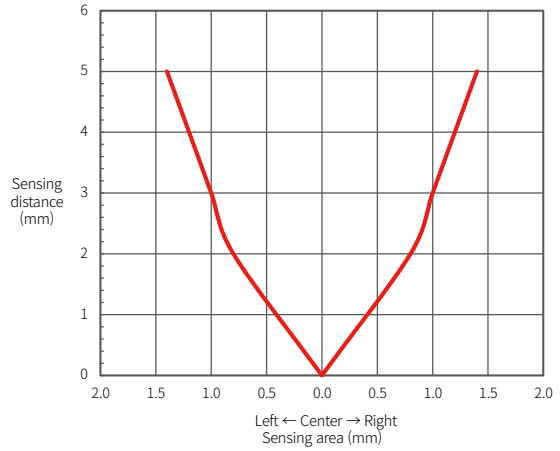
■ FTS2-420-10



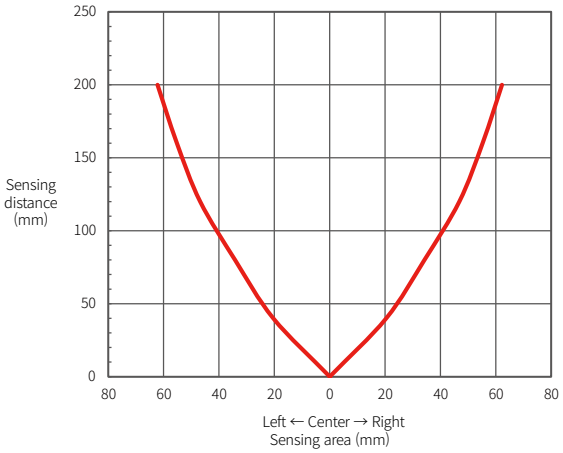
■ FTCS-220-05



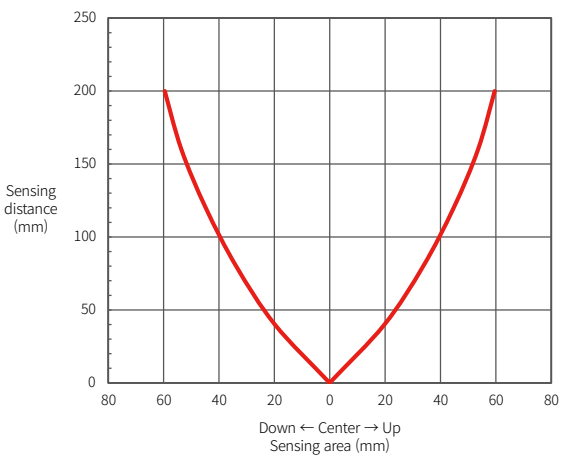
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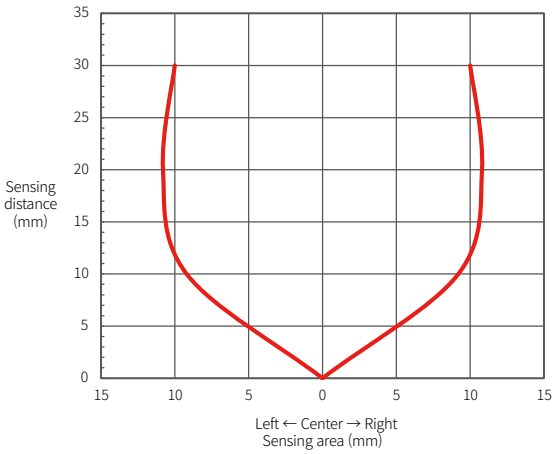
■ FTW5-320-02B (수평)



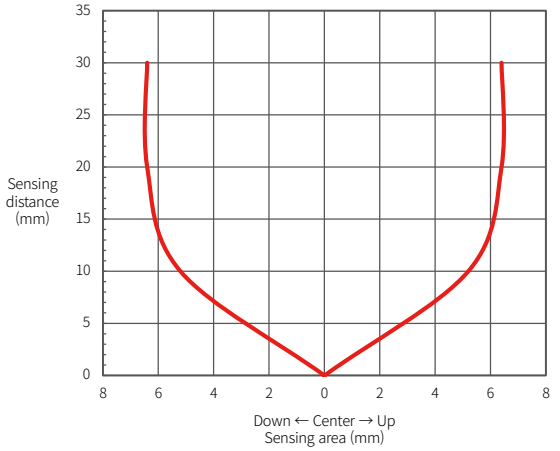
■ FTW5-320-02B (수직)



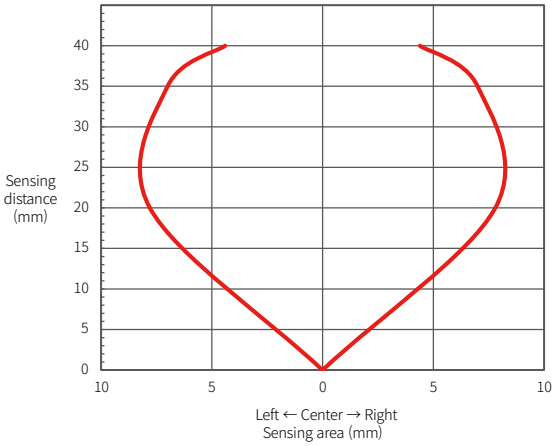
■ FTW20-320-02B (수평)



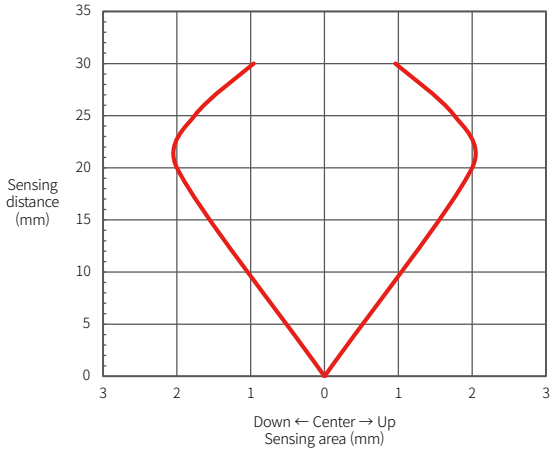
■ FTW20-320-02B (수직)



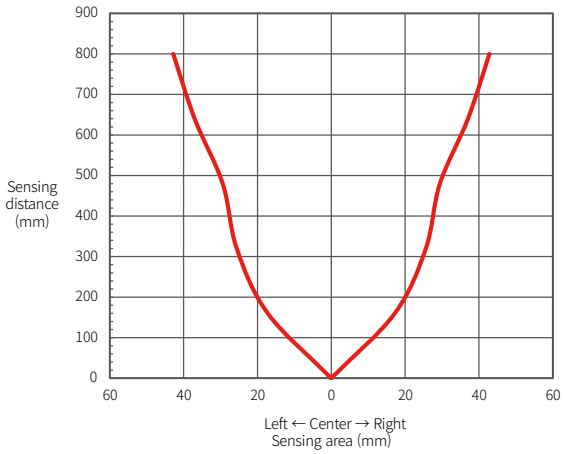
■ FTW40-320-02B (수평)



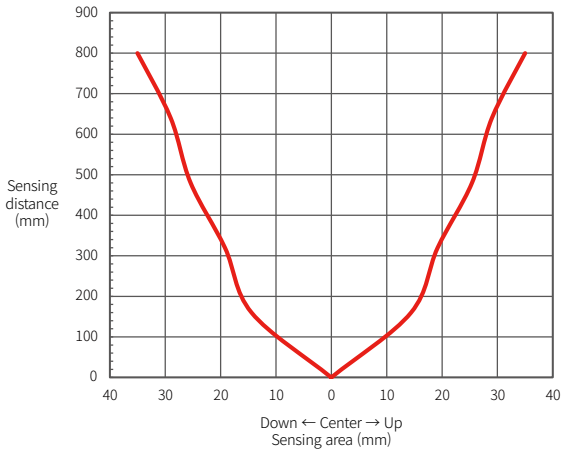
■ FTW40-320-02B (수직)



■ FTW11-210-10R (수평)

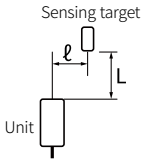


■ FTW11-210-10R (수직)

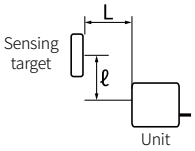


Detection Area Characteristics: Diffuse Reflective Type (TYPICAL)

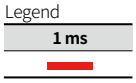
• Horizontal shift (Left ← Center → Right)



• Vertical shift (Down ← Center → Up)



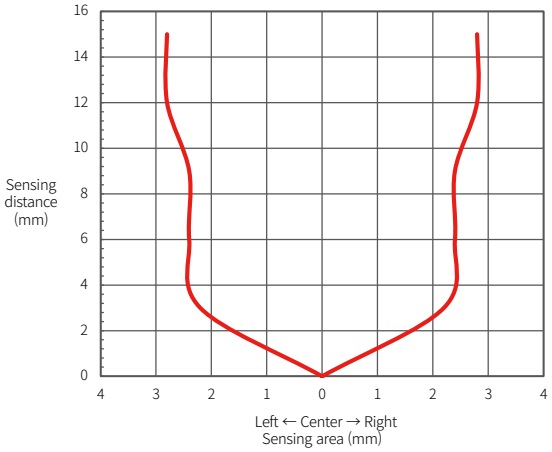
• Legend



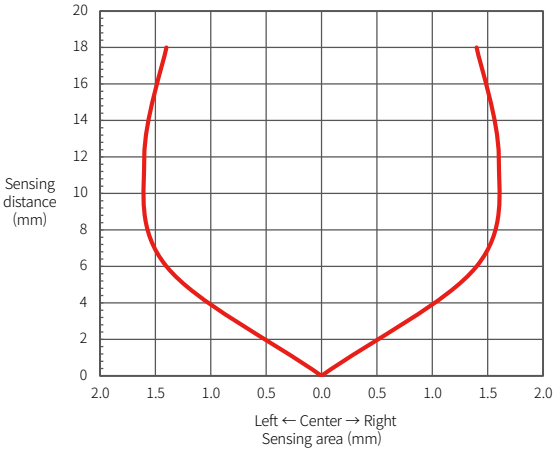
■ FD-310-05



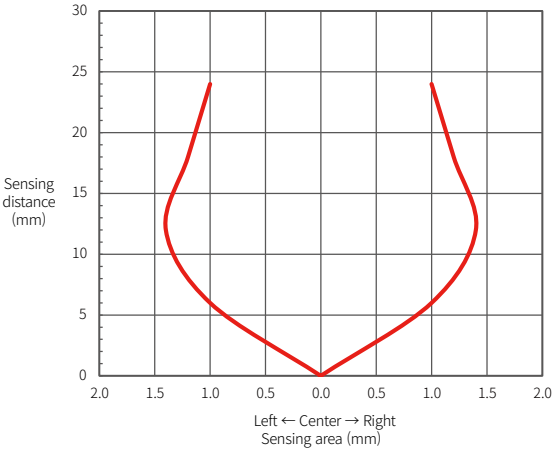
■ FD-620-10



■ FD-320-05



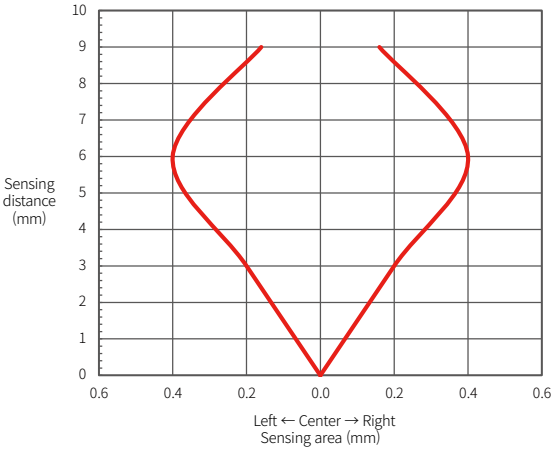
■ FD-320-F



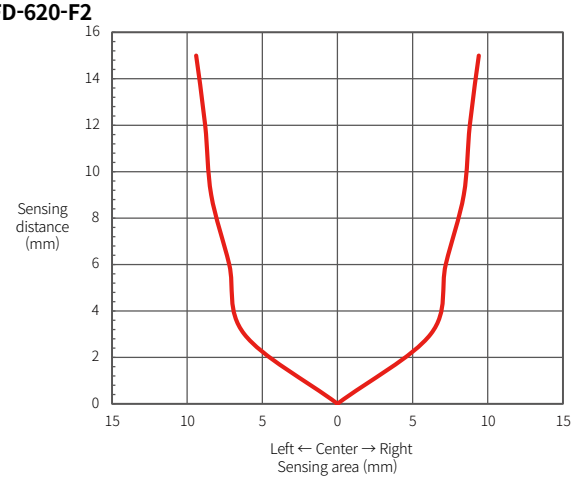
■ FD-420-05



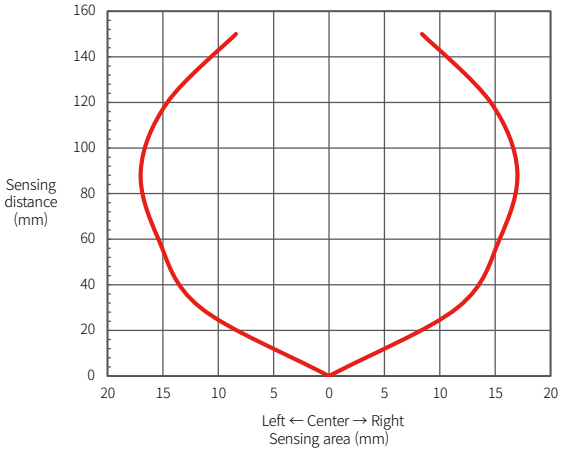
■ FD-320-F1



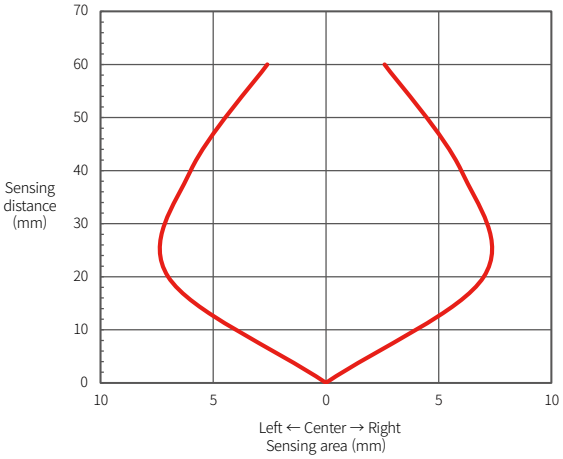
■ FD-620-F2



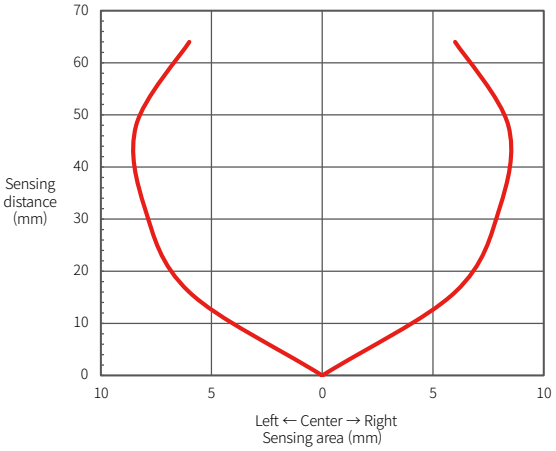
■ FD-620-10H



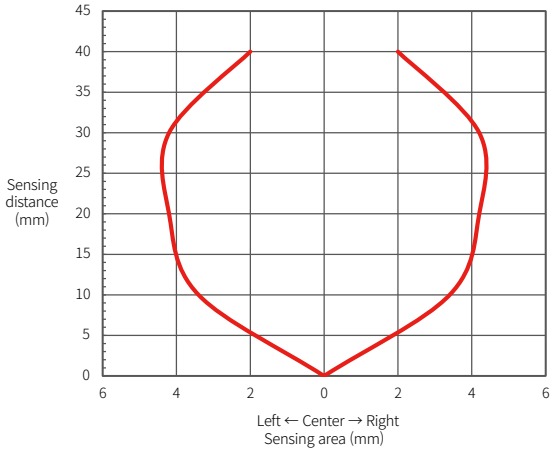
■ FD-620-15H1



■ GD-610-12V2 (VA01)



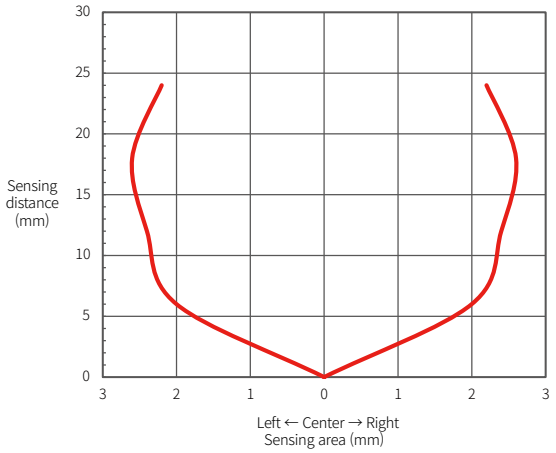
■ GD-610-12V2 (VA02)



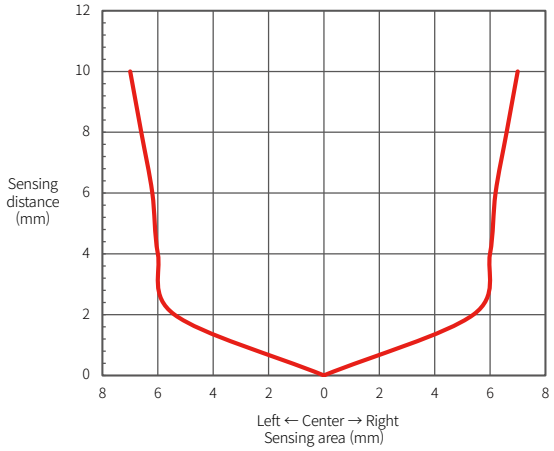
■ FD-320-06B



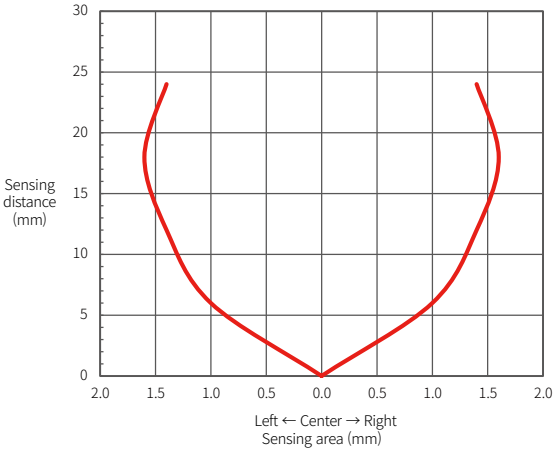
■ FD-420-06B



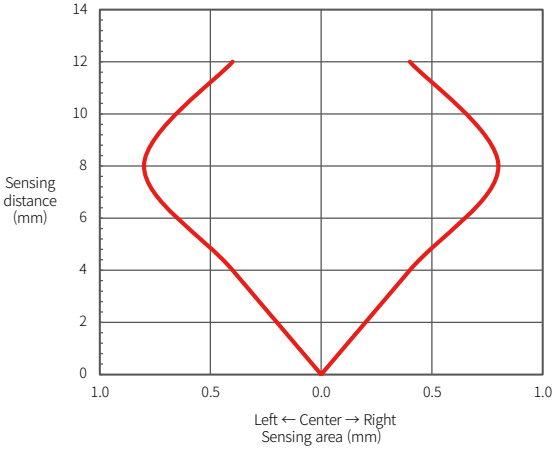
■ FD-620-13B



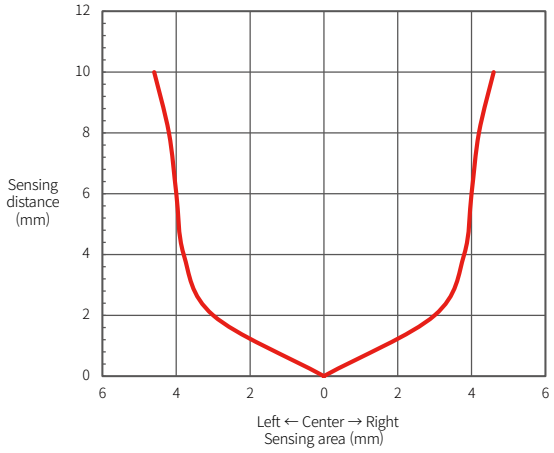
■ FD-320-05R



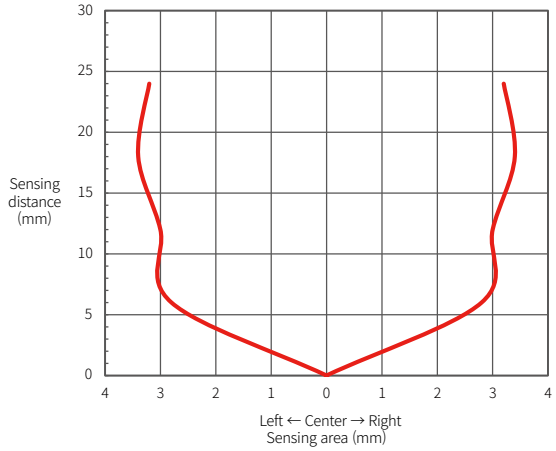
■ FD-420-05R



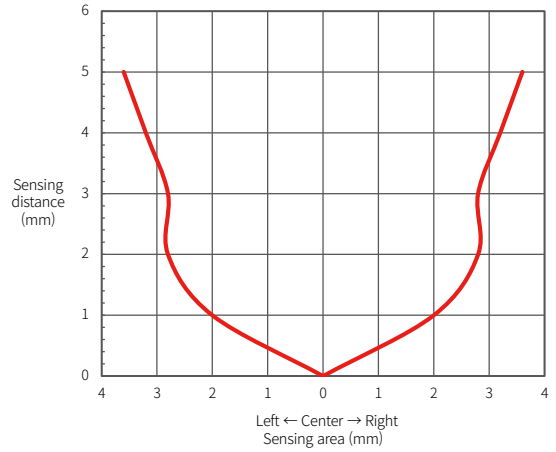
■ FD-620-10R



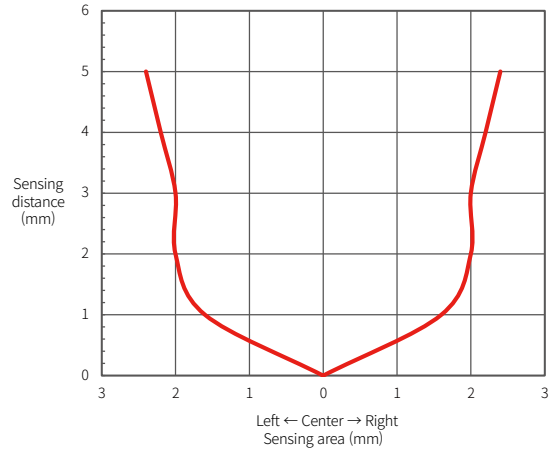
■ FDC-320-05



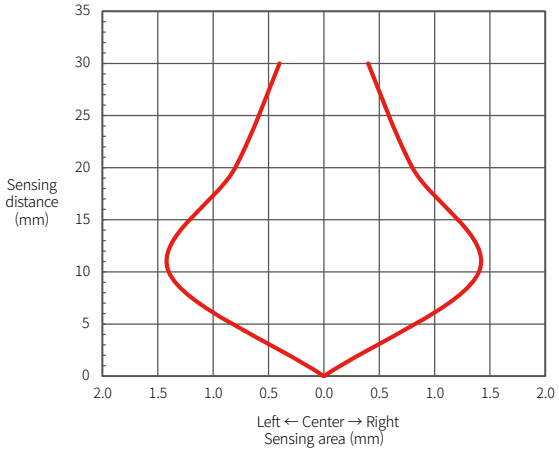
■ FDC-320-F



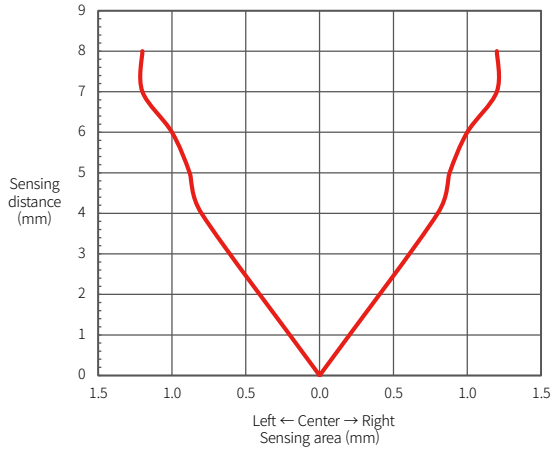
■ FDC-320-06B



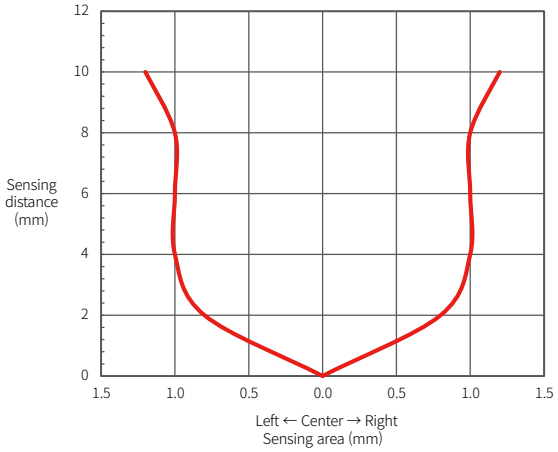
■ FDC-310-10R



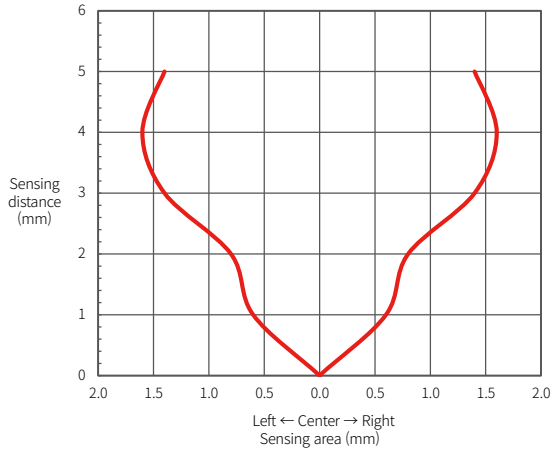
■ FDF-210-05R



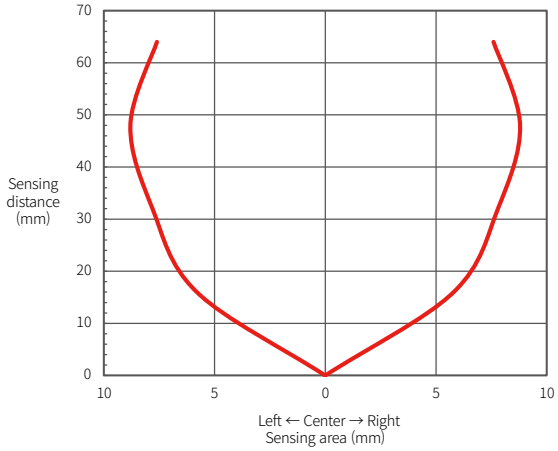
■ FDFN-210-05R



■ FDFU-210-05R



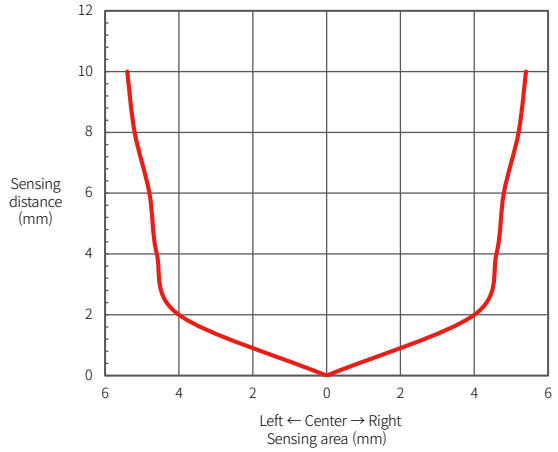
■ GDL-610-12V2 (VA01)



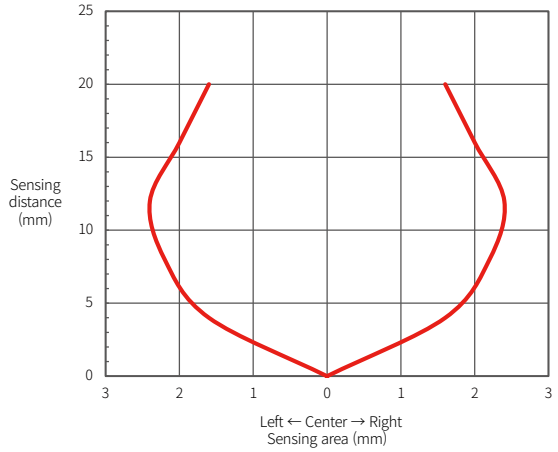
■ GDL-610-12V2 (VA02)



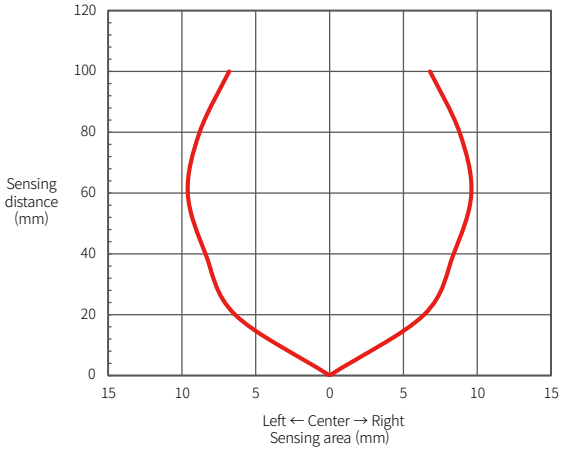
■ FDP-320-10



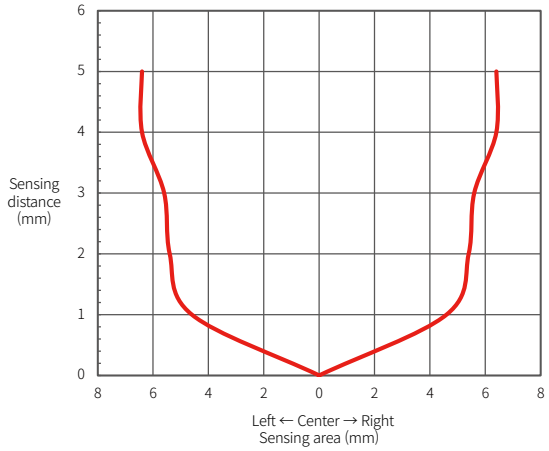
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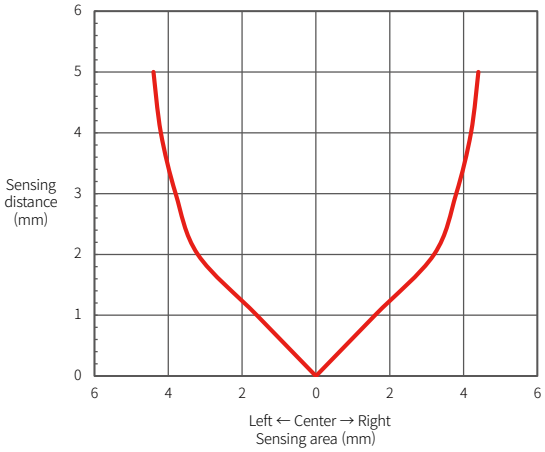
■ FDRT-420-02B



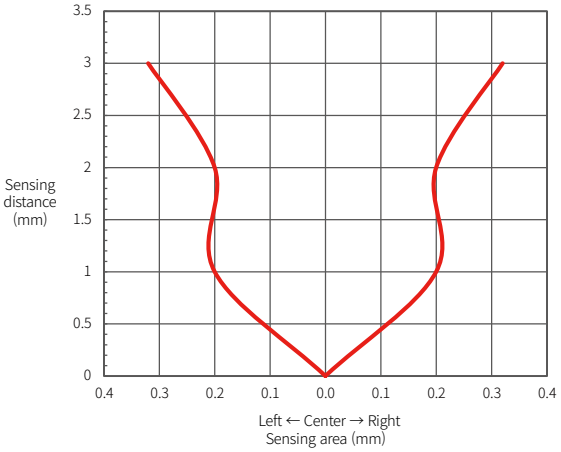
■ FDS-620-10



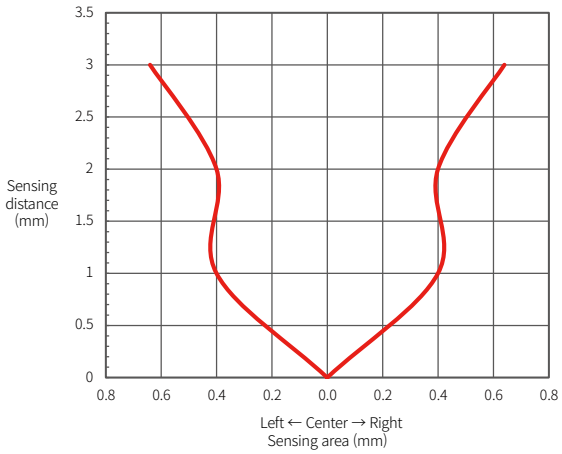
■ FDR-610-10R



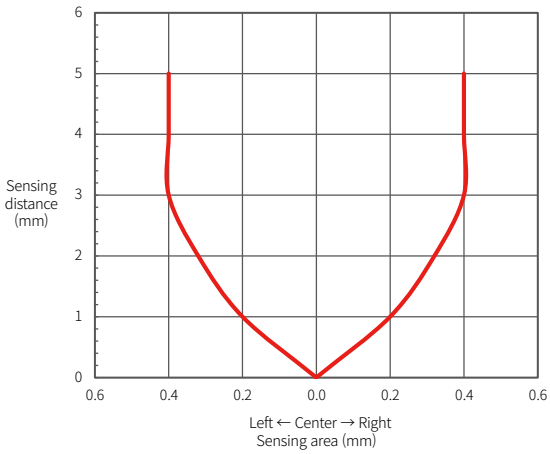
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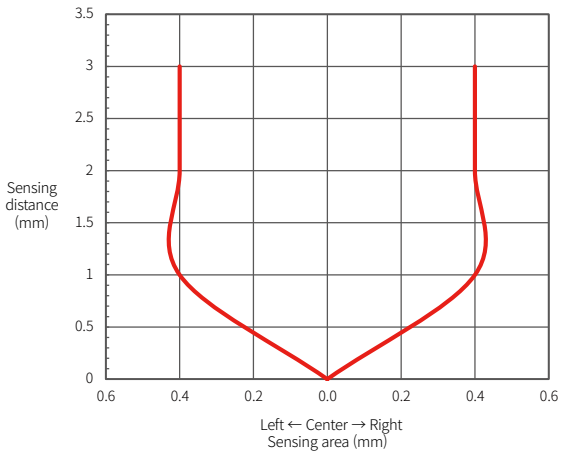
■ FDS-320-05



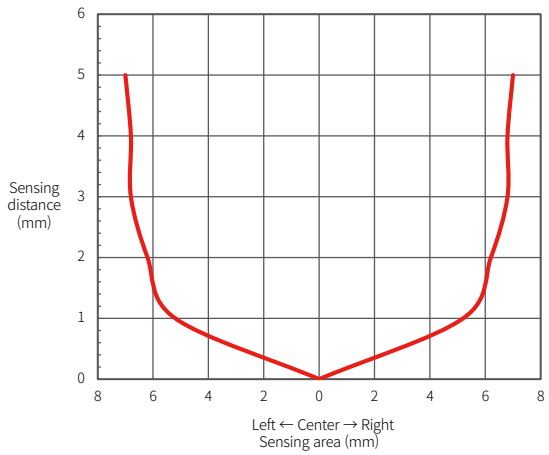
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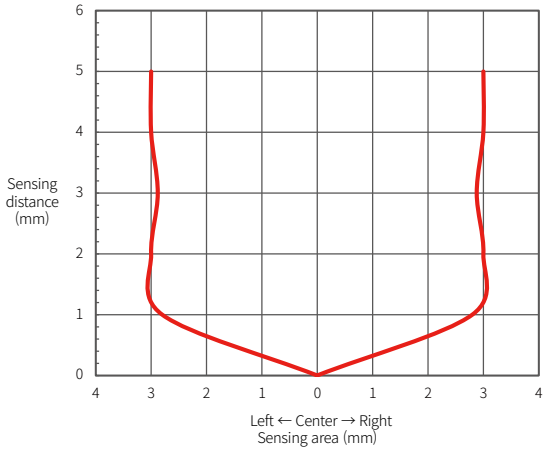
■ FDS-420-05



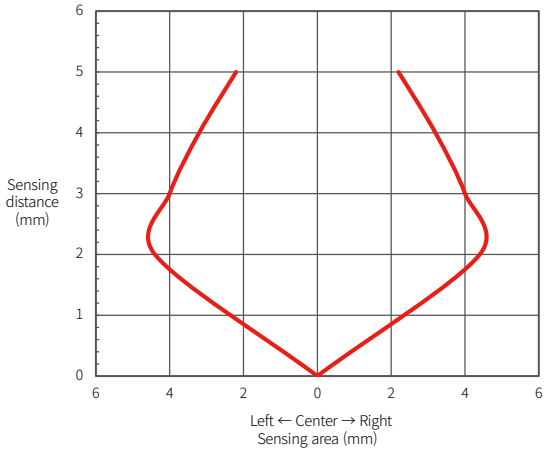
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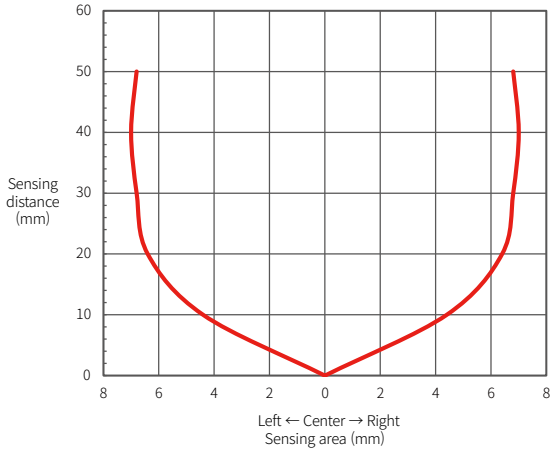
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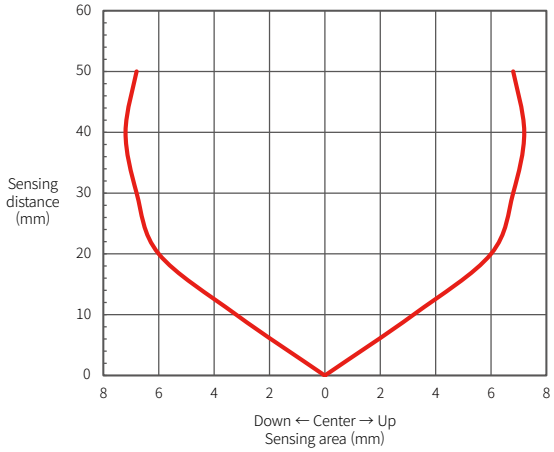
■ FDCSN-320-05



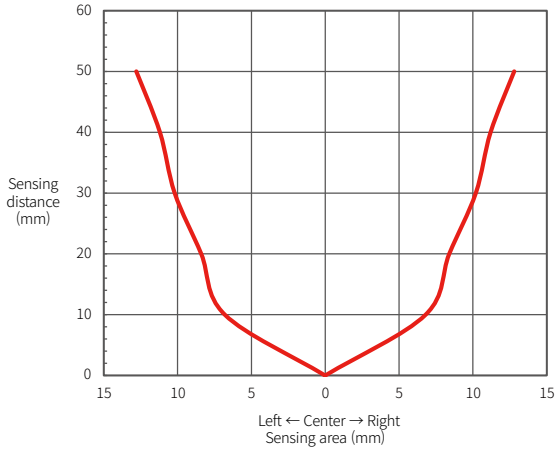
■ FDW10-320-02B (수평)



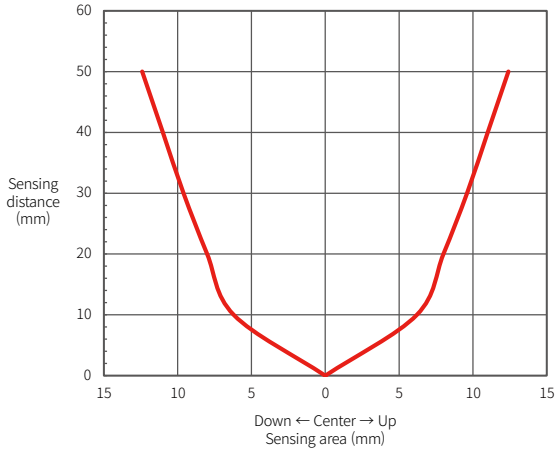
■ FDW10-320-02B (수직)



■ FDW10T-320-02B (수평)

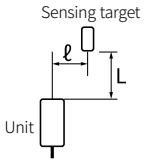


■ FDW10T-320-02B (수직)

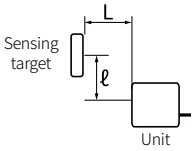


Detection Area Characteristics: Convergent Reflective Type (TYPICAL)

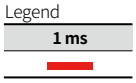
• Horizontal shift (Left ← Center → Right)



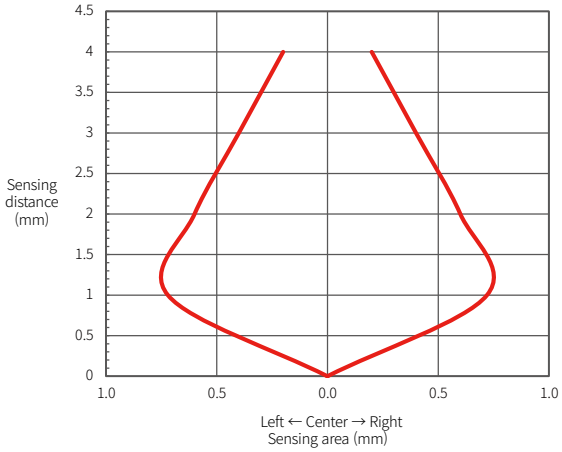
• Vertical shift (Down ← Center → Up)



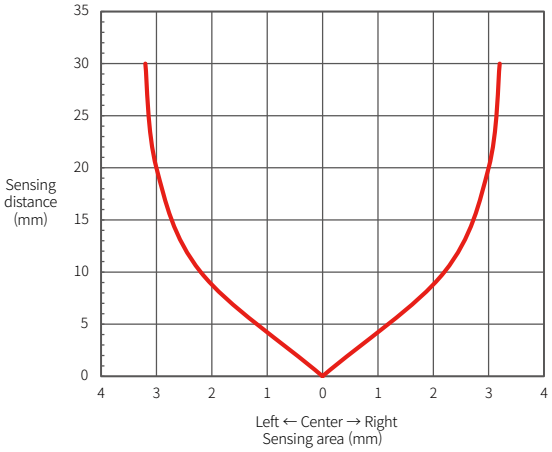
• Legend



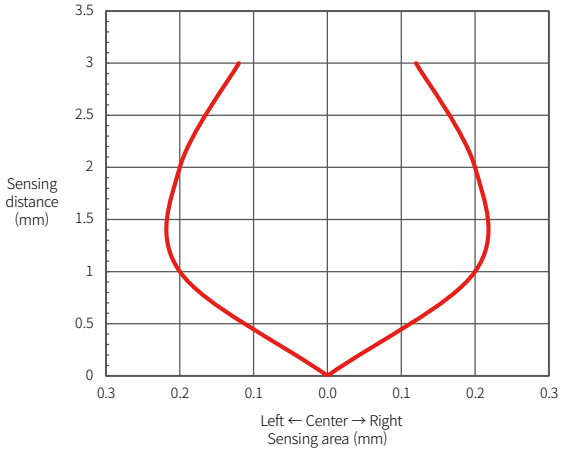
■ FLF-320-05



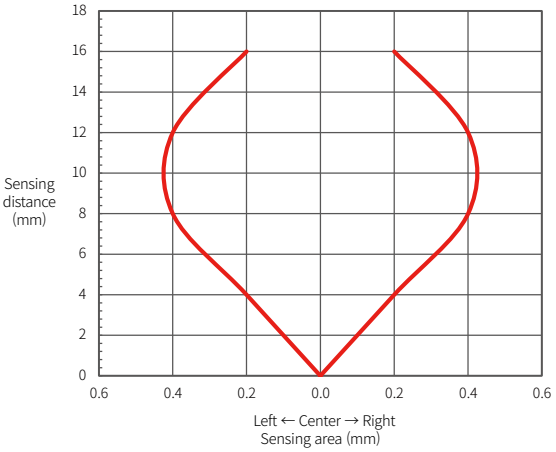
■ FLF-320-10H



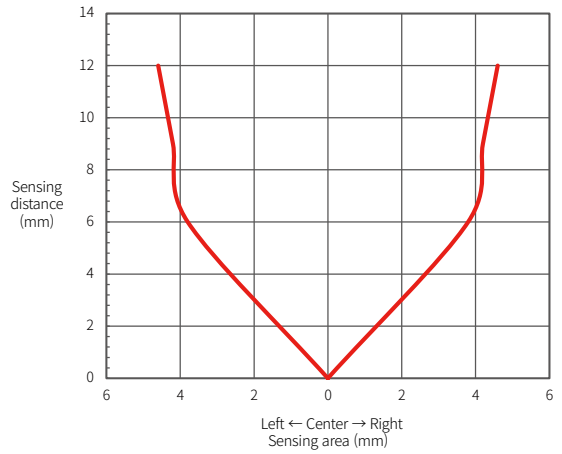
■ FLF-320-10



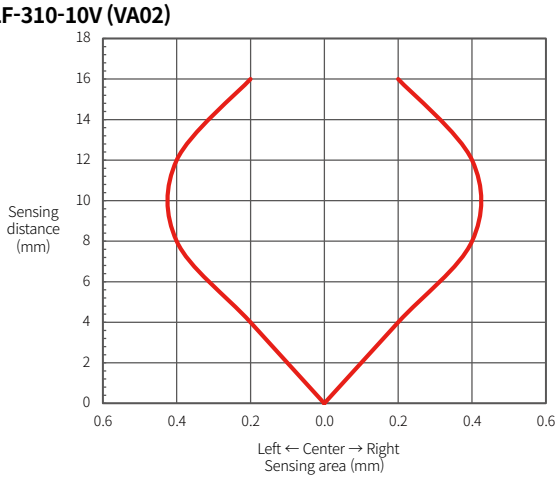
■ FLF-310-10V (VA01)



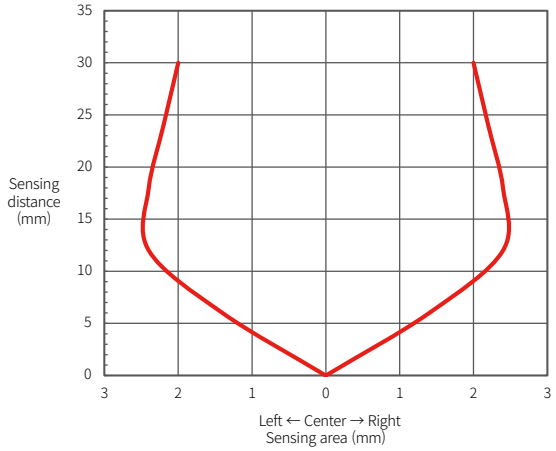
■ FLF-320-10A



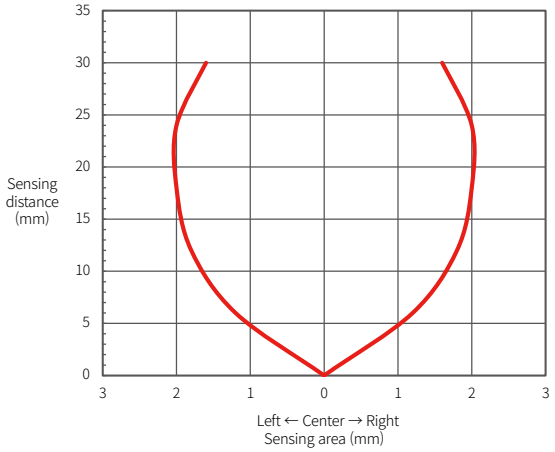
■ FLF-310-10V (VA02)



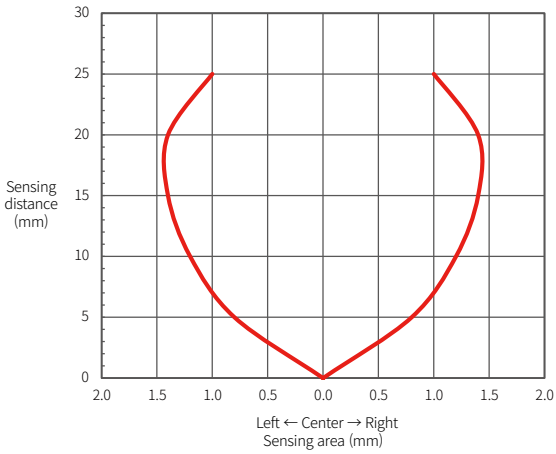
■ GLF-310-12V2 (VA01)



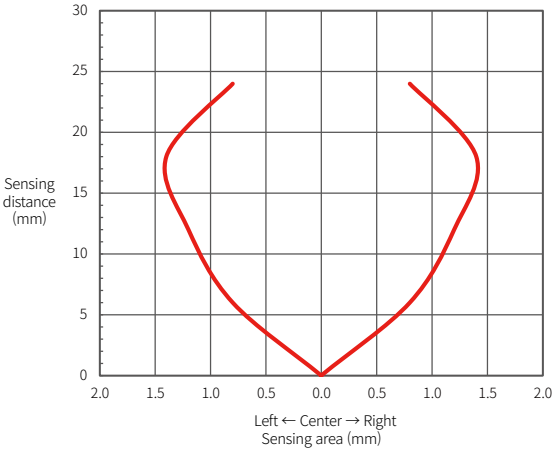
■ GLF-310-12V3L (VA01)



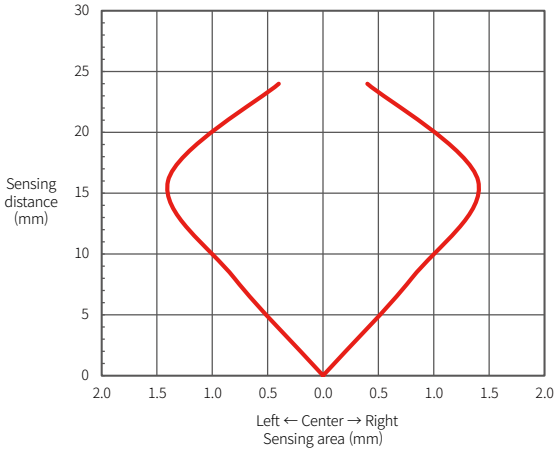
■ GLF-310-12V2 (VA02)



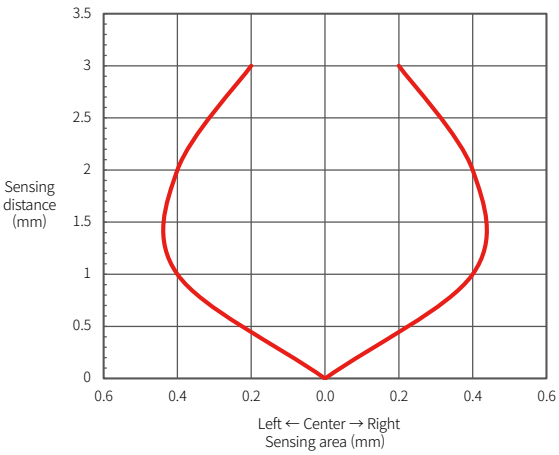
■ GLF-310-12V3L (VA02)



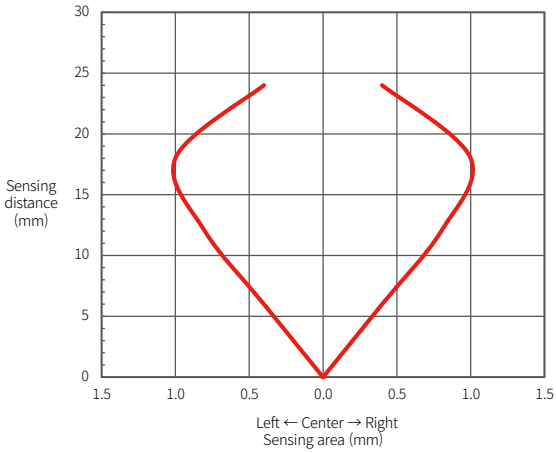
■ GLF-310-12V2L (VA01)



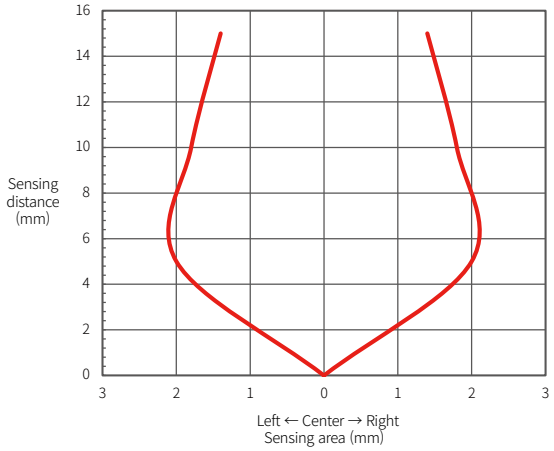
■ FLF-320-05R



■ GLF-310-12V2L (VA02)



■ **FLFU-320-10WP (수평)**



■ **FLFU-320-10WP (수직)**

