Autonics



Dual Display
Fiber Optic Amplifiers

BFN Series

PRODUCT MANUAL

Be sure to follow the instructions and precautions in the instruction manual, other manuals, and the Autonics website.
The specifications, dimensions, and other information in this document are subject to change without notice for product improvement.
Certain models may be discontinued without notice.

CE UKCA cULus LISTED IO-Link

Safety Precautions

- 'Safety Precautions' are provided to ensure safe and proper use of the product and to prevent accidents or hazards. Please make sure to follow them carefully.
- ⚠ symbol indicates a caution, warning of potential hazards under certain conditions.

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

01. **Fail-safe device must be installed when using the product in applications that may cause serious injuries or property loss. (E.g. nuclear control systems, medical equipment, ships, vehicles, railroads, aircraft, combustion devices, safety devices, security systems, disaster prevention devices, etc.)**
    Failure to do so may result in personal injury, property loss or fire.
02. **Do not use or store the product in environments containing flammable, explosive, or corrosive gases, or in places exposed to high humidity, direct sunlight, radiant heat, vibration, shock, or salt.**
    Failure to do so may result in explosion or fire.
03. **When expanding amplifiers, be sure to mount the units on a DIN rail. Securely fix the fiber optic amplifier and communication converter on the DIN rail by attaching end plates on each end. If using third-party end plates, make sure it meets the manufacturer's specification requirements.**
    Failure to do so may result in fire or product malfunction due to poor contact of the side connectors.
04. **The side connectors of the amplifiers on each end or any unused amplifiers must be covered with side connector protective caps.**
    Failure to do so may result in electric shock or product damage.
05. **Do not disassemble, repair, or modify the product without authorization.**
    Failure to do so may result in fire or injury.
06. **Wait at least 3 seconds after applying power before using the product.**
07. **Do not connect, repair, or inspect the product while connected to a power source.**
    Failure to do so may result in fire.
08. **Check the connection diagram before wiring.**
    Failure to do so may result in fire or product damage.
09. **All unused input/output lines must be individually insulated.**
    Failure to do so may result in fire or product damage.
10. **Installation, configuration, and integration with machine control system must be performed by a qualified supervisory user who is:**
    - fully familiar with the installation, configuration, operation, and maintenance of the product.
    - fully familiar with national and regional standards, regulations, and laws applicable to the type of machine on which the product is installed.
    Installation or configuration by personnel other than a supervisory user may result in improper operation or increase the risk of accidents.
11. **After installing the product, check that the product's functions and settings are working as intended before the machine is in operation.**
    Improper configuration of the product may result in personal injury.
12. **This product is not a safety sensor and does not comply with any domestic or international safety standards.**
    Do not use the product in applications where personal injury, loss of life, or property damage may occur.

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

01. **Use the product within its rated specifications and performance limits.**
    Failure to do so may result in fire or product damage.
02. **Use a dry cloth to clean the product. Do not use water or organic solvents.**
    Failure to do so may result in fire.
03. **When the fiber optic unit connection terminal is not in use, prevent dust, debris, or other foreign substances from entering the terminal.**
04. **Prevent metal, dust, wiring debris, and other foreign material from entering the product.**
    Failure to do so may result in fire, product malfunction, or product damage.

Cautions During Use

- Make sure to follow the instructions in 'Cautions During Use'. Failure to do so may result in unexpected accidents.
- Power input should be supplied from an isolated and limited voltage/current source, or from a Class 2 or SELV power supply.
- When supplying power with an SMPS, ground the F.G. terminal and connect a noise suppression capacitor between the 0 V and F.G. terminals.
- When connecting inductive loads such as DC relays, use a diode, varistor, or similar component to suppress surges.
- To prevent surges and inductive noise, separate the wiring from high-voltage and power lines, and keep wiring lengths as short as possible.
- Do not use the product near devices that generate strong magnetic fields or high-frequency noise.
- To prevent malfunction caused by stray light (sunlight, fluorescent lamps, etc.), use a light shield, slit, or similar measures.
- When detecting at maximum sensitivity, variations in individual characteristics may cause deviations in detection distance.
- Turn off the power before connecting or disconnecting communication converter units to the product. Failure to do so may result in product damage.
- When connecting with the communication converter, connect the power supply only to the communication converter. Do not connect separate power supplies to the communication converter and the fiber optic amplifier.
- When using fiber optic units, please observe the following:
  - Refer to the fiber optic unit manual for the bending radius of the fiber optic cable.
  - Do not apply excessive physical stress such as pulling, compression, bending, or twisting to the fiber optic cable or hood.
  - Do not pull or forcibly move the fiber optic cable.
- When disposing of this product, treat it as industrial waste. For detailed information, refer to the applicable national and regional standards, regulations, and laws.
- This product may be used in the following environmental conditions.
  - Indoors (UL Type 1 Enclosure)
  - Altitude: up to 2,000 m
  - Pollution Degree 3
  - Installation Category II

Software

Download the installation file and the manuals from the Autonics website.

■ atIOLink

atIOLink with purposes for setting, diagnosis, and maintenance of IO-Link device via IODD file is provided as the Port and Device Configuration Tool (PDCT).

- IODD (IO Device Description)

This file contains information such as manufacturer information, process data, diagnostic data, and parameter setting of a sensor using IO-Link communication. By uploading the IODD file to PDCT Software, you can check the setting and communication data according to the user interface.
Download the IODD file from the Autonics website.

Ordering Information

For reference only. The actual product does not support all combinations.
To check all supported models, please refer to the Autonics website.

BFN	-	❶	❷	-	❸	-	❹	-	❺

❶ Display
D: FND display

❷ No. of outputs
No-mark: 1-Output
2: 2-Output

❸ Output type
No-mark: Digital output
A: Digital + Analog output (1 - 5 VDC)

❹ Connection
No-mark: Cable type
C: M8 connector type

❺ IO-Link communication (by model)
No-mark: Not supported (standard)
IL3: IO-Link COM 3 (advanced)

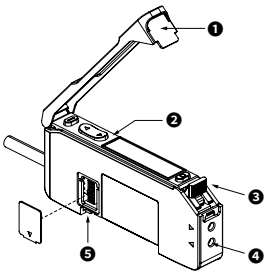
Product Components

- Product × 1
- Instruction manual × 1
- Expansion connector (12-pin) × 1

Sold Separately

- Communication converter: BFNC Series
- Bracket: BK-BFN-A
- M8 connector cable: C□D(H)408-□, C□D(H)4-□EB
- Fiber optic units
- End plate: BK-BFN-B

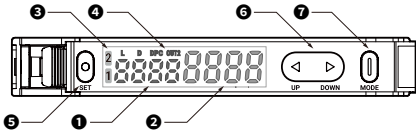
Unit Description



- Cable type shown as reference

❶ Protective cover
❷ Display / operation section
❸ Fiber optic unit locking lever
❹ Fiber optic unit connection terminal
❺ Side connector (+ protective cap)

■ Display / Operation



❶ SV display
Displays the set value for output ON/OFF reference. .

❷ PV display
Displays the current measured value of received light.

❸ Output indicator
Turns on when output 1 or output 2 is activated.

❹ Function indicator
Turns on when function is activated.
(L: Light ON / D: Dark ON / DPC / OUT2)

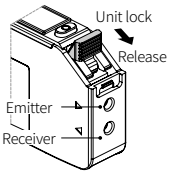
❺ [SET] key
Set sensitivity in run mode based on teaching mode. Supply power while holding to enter installation mode.

❻ [◀] [▶] (UP / DOWN) key
Adjust sensitivity in run mode, or change settings in various modes.

❼ [MODE] key
Press or hold to enter modes, e.g., incident light monitoring, program mode, data bank, and reset settings.

Connecting Fiber Optic Units

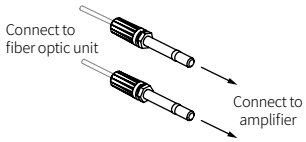
⚠
01. If a dedicated adapter is included with the fiber optic unit, attach the adapter before connecting it to the amplifier.
02. For coaxial fiber optic units, connect the single-core cable to the emitter terminal and the multi-core cable to the receiver terminal.
Failure to do so may compromise stable detection performance.



01. Open the protective cover.
02. Push the locking lever forward to release the lock.
03. Insert fiber optic units to the proper emitter/receiver connection terminals.
04. Pull the locking lever back to the lock position to secure the fiber optic units.
05. Close the protective cover.

■ Fiber Optic Unit Adapter

When attaching an adapter, make sure to use the appropriate adapter according to the fiber optic unit cable diameter.



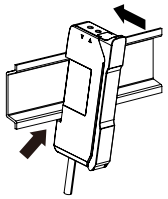
Fiber optic unit cable diameter	Adapter color
Ø 1.0 mm	Black
Ø 1.3 mm	Gray

Installing the Amplifier

■ DIN Rail Installation

Installation
01. Hook the DIN rail holder on the bottom onto the DIN rail.
02. Push the top part towards the DIN rail to lock it in place.

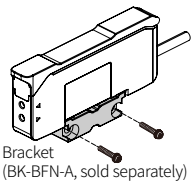
Removal
01. Push the bottom part of the amplifier upward and slightly lift it off the DIN rail.
02. Tilt the amplifier outward to remove it from the DIN rail.



- Install end plates (BK-BFN-B, sold separately) on each end to secure the amplifiers. When installing the screws, tighten with a torque less than 0.59 N•m.

■ Bracket Installation (BK-BFN-A, Sold Separately)

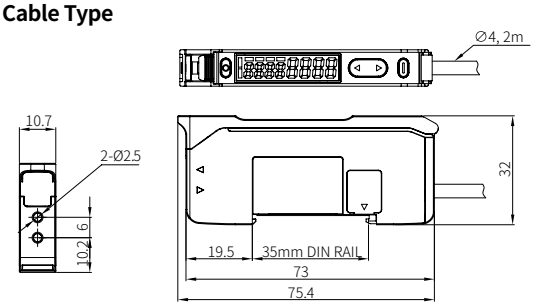
Brackets can be used to install the amplifiers in environments where DIN rail installation is not feasible.
01. Place the bracket at the installation location. The installation surface must be flat with minimal vibration.
02. Tighten M3 screws in the bracket holes and tighten with a torque less than 0.59 N•m to fix it in place. The screws can be inserted from the top of the bracket, or from the side of the bracket as shown in the image.
03. Align the DIN rail holder of the amplifier to the bracket groove and secure it in place.


Bracket
(BK-BFN-A, sold separately)

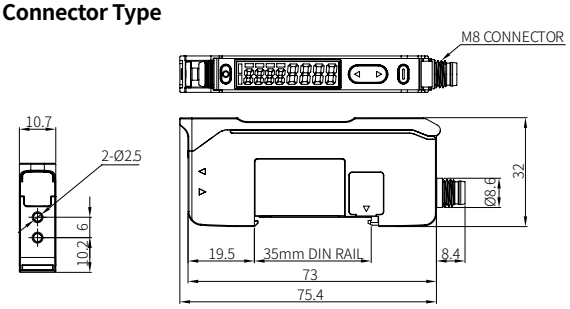
Dimensions

- Unit: mm (Refer to the CAD files from the Autonics website for exact dimensions)

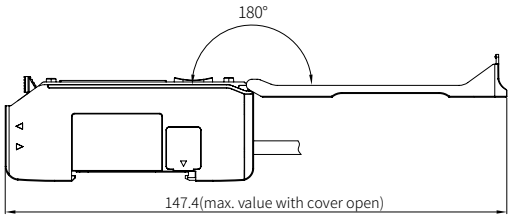
■ Cable Type



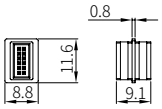
■ Connector Type



- With protective cover wide open (cable type shown)



■ Expansion Connector (12-Pin)

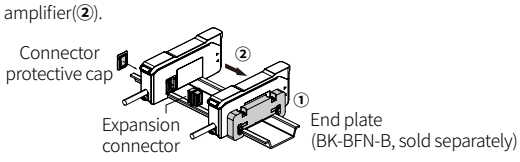


Expanding Amplifiers

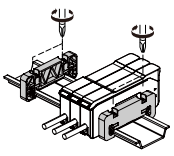
- You can expand multiple amplifiers using the side connectors. (up to 30 units)
- Power supplied to one amplifier will be distributed to all connected amplifiers.
- When power is supplied after connecting the amplifiers, mutual interference prevention function will be activated.

⚠
01. Turn off the power before amplifier expansion installation.
02. Do not apply excessive force to the side connector.
Failure to do so may result in damaging or bending the connector pins.
03. Make sure the side connector is tightly and securely connected.
Failure to do so may result in reduced performance or product malfunction.

01. Install the first amplifier on the DIN rail.
02. Install an end plate (BK-BFN-B, sold separately) next to the installed amplifier (①) to prevent the amplifier from moving.
03. Attach an expansion connector (accessory) to the side connector of the expansion amplifier(②).



04. Mount the expansion amplifier on the DIN rail, then push it toward the installed amplifier to connect.
05. Attach the connector protective cap to the last amplifier after expansion is complete.
06. Check that all amplifiers and connectors are tightly and securely connected.
07. Install an end plate next to the final expansion amplifier and tighten with screws with a torque less than 0.59 N•m to fix the position.



Specifications

Type	Advanced		Standard
Model	BFN-D□-□-IL3	BFN-D2-A-□-IL3	BFN-D-□
Display resolution	9999 (SV (Green) / PV (White): 4-digit, 7-segment)		
Communication	BFNC Series compatible, IO-Link		BFNC Series compatible
No. of outputs	1-Output, 2-Output models	2-Output	1-Output
Output	Digital (OUT 1), Digital (OUT 1/2) models	Digital (OUT 1) + Analog (OUT 2)	Digital (OUT 1)
Light source type	Red LED		
Light source wavelength	660 nm		
Operation mode	Light ON, Dark ON (parameter setting)		
Sensitivity setting	Teaching mode (1-point, 2-point, Auto, Area, Rising / Falling edge[01]) / Manual		
Response mode (Response time)	MFST: Mega fast (25 µs)[02] UFST: Ultra fast (50 µs) FST: Fast (150 µs)	STD: Standard (500 µs) LONG: Long (4 ms) ULOG: Ultra long (10 ms) MLOG: Mega long (20 ms)[02]	
Timer	ON Delay, OFF Delay, One Shot, ON/OFF Delay, One Shot ON Delay (parameter setting, time setting range: 1 to 9,999 msec)		
Maximum no. of expansion units	30 units		
Mutual interference prevention	YES (The number of supported units may differ by response mode and mutual interference prevention double settings.[03])		
Certification	CE UK CA UL IO-Link	CE UK CA UL IO-Link	CE UK CA UL
Unit weight (with packaging)	[Cable type] ≈ 74 g (≈ 139 g) [Connector type] ≈ 22 g (≈ 55 g)		

01) Rising / falling edge teaching mode is not supported in MFST response mode.
02) Only available for advanced type models.
03) Please refer to the user manual for detailed information.

Power supply	10 - 30 VDC⎓ (ripple P-P: ≤ 10%)		
Current consumption		10 VDC⎓	30 VDC⎓
	Normal	≤ 62 mA	≤ 30 mA
	Eco: HALF	≤ 55 mA	≤ 28 mA
	Eco: FULL	≤ 48 mA	≤ 26 mA
Digital output	[Advanced] Push-pull, NPN, PNP output (parameter setting) [Standard] NPN, PNP output (parameter setting)		
Load current	[Advanced: digital 1-output, standard models] ≤ 100 mA, when 4 or more units connected: ≤ 20 mA [Advanced: digital 2-output models] ≤ 50 mA, when 4 or more units connected: ≤ 10 mA each		
Load voltage	≤ 30 VDC⎓		
Residual voltage	NPN: ≤ 2 VDC⎓, PNP: ≤ 2 VDC⎓		
Analog output	[Advanced: digital + analog output models] only[01]		
Voltage output	1 - 5 VDC⎓, ± 5% F.S. (output resistance: 1 kΩ)		
Protection circuit	Reverse power protection circuit, output short overcurrent protection circuit, surge protection circuit		
Insulation resistance	≥ 20 MΩ (500 VDC⎓ megger)		
Dielectric strength	Between charging part and case: 1,000 VAC~ 50/60 Hz for 1 min		
Vibration resistance	1.5 mm double amplitude at frequency 10 to 55 Hz in each X, Y, Z direction for 2 hours		
Shock resistance	500 m/s² (≈ 50 G) in each X, Y, Z direction for 3 times		
Ambient illuminance (receiver)	Sunlight: ≤ 30,000 lx, incandescent lamp: ≤ 20,000 lx		
Ambient temp.[02]	-10 to 50 °C, storage: -20 to 70 °C (no freezing or condensation)		
Ambient humidity	35 to 85% RH, storage: 35 to 85% RH (no freezing or condensation)		
Protection rating	IP50 (IEC standard)		
Connection	Cable type, M8 connector type models		
Cable specifications	Ø 4 mm, 4-wire, 2 m		
Wire specifications	AWG23 (0.08 mm, 60-core), insulator diameter: Ø 1.28 ± 0.05 mm		
Material	Case, cover: PC		

01) Analog output is not supported in MFST/UFST response modes.
02) Ambient operating temperature is measured with the unit installed on a metal DIN rail. When installing the unit in an enclosed space, proper ventilation and temperature management is required.

Communication Interface

■ IO-Link

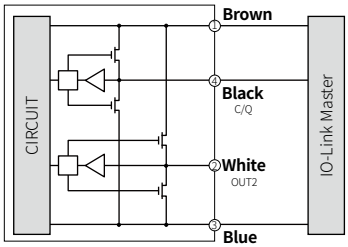
Version	Ver. 1.1.3
Class	Class A
Baud rate	COM3 (230.4 kbps)
Min. cycle time	500 µs
Data length	PD: 4-byte, OD: 1-byte (M-sequence: TYPE_2_V)
Vendor ID	899 (0x383)

Circuit / Wiring Diagram

Load connections differ by output method. Please refer to the diagrams below.

■ [Advanced Model] IO-Link Mode

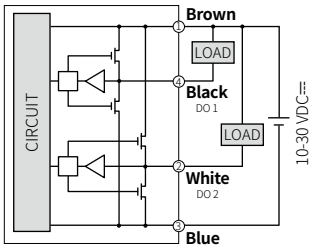
- [Advanced: digital 2-output model] shown as reference.
  The white wire retains OUT 2 output method of the model regardless of IO-Link mode.



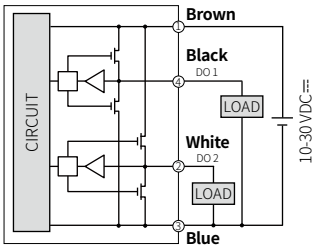
■ [Advanced: Digital 1,2-Output Model]

- [Advanced: digital 2-output model] shown as reference.
  The white wire is not supported in [advanced: digital 1-output model].

NPN setting



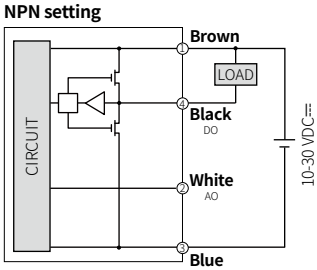
PNP setting



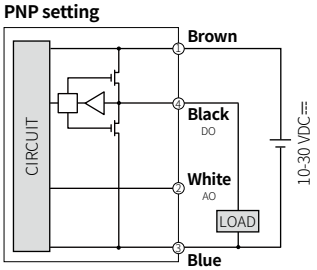
■ [Advanced: Digital + Analog Output Model]

- The black wire: digital output (DO) and white wire: analog output (AO, 1 - 5 VDC⎓) are fixed.

NPN setting

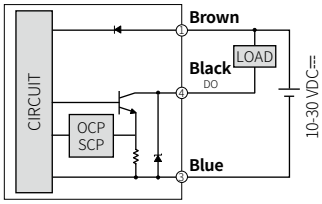


PNP setting

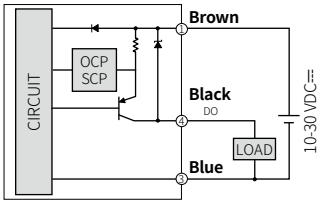


■ [Standard: Digital 1-Output Model]

NPN setting



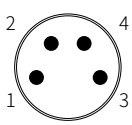
PNP setting



- The white wire is not used in this model. Do not connect the wire.
- OCP (over-current protection), SCP (short-circuit protection)
- If the control output terminal is short-circuited or a current exceeding the rated current is supplied, normal control signals will not be output due to the protection circuit.

Connector Wiring

- For load connections, please refer to the wiring diagram.
- Tighten the connector using the screw thread. (Tightening torque: 0.39 to 0.49 N m)
- In environments with vibration, use PTFE tape around the connector to strengthen the connection.



Pin	Color	Function	
		Advanced	Standard
①	Brown	L+	VCC
②	White	[Digital 1-output model] - [Digital 2-output model] Digital OUT 2 (DO 2) [Digital+analog output model] Analog OUT (AO)	-
③	Blue	L-	GND
④	Black	C/Q	OUT

Entering Settings

- Directions to enter each settings from run mode.
- Please refer to the dedicated section of the user manual for details on each settings.

Settings	Method	Description
Sensitivity settings	[SET] key for 0.5 secs or more	Set the sensitivity based on teaching mode. - Press for (0.5 sec): teach for set amount of time - Press for (≥ 0.5 sec): teach for duration of hold
Manual sensitivity settings	[◀ / ▶] key for over 0.5 secs	Fine tune the sensitivity manually after initial setting.
Anti-saturation function	[SET + ▶] keys for over 0.5 secs	Enable or disable anti-saturation function.
Zero shift function	[◀ + MODE] keys for over 0.5 secs	Enable or disable zero shift function.
Select digital output	[◀ + ▶] keys for over 2 secs	[Digital 2-output model] Select OUT1 or OUT2. Selection is synchronized with settings from program mode P-2 digital output selection.
Incident light level monitoring	[MODE] key for 0.5 secs	Displays max value, min value, or output count.
Program mode	[MODE] key for over 2 secs	Enter program mode.
Data bank	[MODE] key for over 5 secs	Set or execute data bank.
Reset settings	[MODE] key for over 7 secs	Reset to default settings.

Manual Sensitivity Setting

Adjust the sensitivity manually after setting the sensitivity based on teaching mode.
Press the [◀ / ▶] (UP / DOWN) keys during run mode to fine tune the sensitivity.
Press [MODE] key for 0.5 secs and the set value will flash twice and return to run mode.

- The supported min/max values differ depending on settings from program mode P-2-A Teaching mode and P-9 Hysteresis.

Hysteresis	Setting Range	
	1/2-Point, Auto, Area 01) Teaching	Rising / Falling Edge Teaching
LOW	10 to 9,980	150 to 9,999
MID	50 to 9,950	
HIGH	100 to 9,900	

01) Press the [MODE] key to switch between SV_H / SV_L and set sensitivity.

Incident Light Level Monitoring

Press the [MODE] key for 0.5 seconds in run mode to check incident light level value.

- [MODE] key: display next value / [SET] key: reset current display value

Display		Operation
SV	PV	
Run mode		Press the [MODE] key for 0.5 secs in run mode.
HPEU	5200	Displays the high peak (max.) value from measured data.
LPEU	200	Displays the low peak (min.) value from measured data.
Cnt	99	Displays output count. (Range: 0 to 9,999, then restarts from 0) Counts the number of times output changes from OFF → ON.
Run mode		Press the [MODE] key for 0.5 secs to return to run mode.

Reset to Default Settings

Reset SV1/SV2 and program mode settings to default settings.
Press the [MODE] key for over 7 seconds to enter reset settings menu.

Display		Operation
SV	PV	
Run mode		Press the [MODE] key for over 7 secs in run mode.
Init	nodE	SV display: INIT, PV display: MODE will flash twice.
Init	no	Press the [◀ / ▶] keys to select reset option (YES / NO). Press the [MODE] key to execute selection.
Init	Init	SV display: INIT, PV display: INIT will flash twice. The settings have been reset to default settings.
Run mode		Returns to run mode automatically.

Error Display

Display		Error	Troubleshooting
SV	PV		
PUEr	Err	Exceeds rated power supply range	Check the power supply voltage and adjust it to the specified rated range.
CH	Err	Unstable side expansion connection	Check the connections by referring to the 'Expanding Amplifiers' section.
o1oC	Err	Overcurrent in digital 1 output circuit	Remove the overload condition to eliminate the overcurrent.
o2oC	Err	Overcurrent in digital 2 output circuit	

Program Mode

- Press the [MODE] key for over 2 seconds from run mode to enter program mode. SV display: PROG, PV display: MODE will flash twice, then enter into settings.
- [MODE] key: save and move to next item / [SET] key: save and move to previous item [◀ / ▶] keys: change value / [MODE] key over 3 secs: save and return to run mode When idle for 120 seconds, the settings will be saved and return to run mode.
- Certain parameters may be enabled or disabled depending on the model or other parameter settings. Refer to the description on each item for details.
- Please refer to the dedicated section of the user manual for details on each settings.

Parameter		Display		Setting Range	Support Conditions
		SV	PV (default)		
P-1	Response mode [01]	rSPS	Std	MFST*: Mega fast (25 µs) [02] UFST: Ultra fast (50 µs) [02] FST: Fast (150 µs) STD: Standard (500 µs) LONG: Long (4 ms) ULOG: Ultra long (10 ms) MLOG*: Mega long (20 ms)	*Advanced model
P-2	Select digital output	SEL	oUt1	[Digital 2-output model] OUT1: Digital output 1 OUT2: Digital output 2 • Set parameters for (P-2-A to E) based on selected output.	
P-2-A	Teaching mode	SEnS	2Pnt	2PNT: 2-Point 1PNT: 1-Point AUTO: Auto AREA*: Area RISI**: Rising edge FALI**: Falling edge	*P-2 digital output: OUT1 **P-1 response mode: not MFST, P-2 digital output: OUT1, P-7 DPC: OFF
P-2-B	Operation mode	Ldon	L-on	L-ON: Light ON D-ON: Dark ON	
P-2-C	Output type	tYPE	nPn	NPN: NPN PNP: PNP P-P*: Push-pull	*Advanced model (IO-Link)
P-2-D	Timer	tmod	oFF	OFF: Disabled OND: ON Delay OFD: OFF Delay SHOT: One Shot ONOF: ON/OFF Delay SH-O: One Shot ON Delay	P-1 response mode: not MFST
P-2-E	Timer value	tIME	5	1 to 9,999 msec	P-1 response mode: not MFST P-2-D timer: not OFF
P-3	Analog output direction	ALoG	ASEn	[Digital + analog output model] ASEN: Ascend DSEN: Descend	
P-4	Enable zero shift	ZEro	----	DO: Enable zero shift CANC: Disable zero shift	P-6 Preset: OFF
P-5	Enable anti-saturation	SAtU	----	DO: Enable anti-saturation CANC: Disable anti-saturation	
P-6	Preset	PrSt	oFF	OFF: Disabled ON: Enabled • Set to ON before teaching. Incident light level is displayed as a percentage of preset value. (%=P)	P-7 DPC: OFF
P-7	DPC (Dynamic Power Control)	dPC	oFF	OFF: Disabled ON: Enabled	P-1 response mode: not MFST
P-8	Mutual interference prevention double	IntF	Std	STD: Standard DBLE*: Double (double the no. of mutual interference prevention units and response speed)	*P-1 response mode: not MFST, UFST
P-9	Hysteresis	HYS	Low	LOW, MID, HIGH • Set hysteresis where incident light fluctuates widely to increase output stability and accuracy. Output may malfunction when set to LOW.	
P-10	Display direction	dIr	1234	1234: Standard RIGH: Inverted	
P-11	Power-saving mode	ECo	oFF	OFF: Disabled HALF: When there is no key input for 1 min, only the output indicator and PV display are left ON. FULL: When there is no key input for 1 min, only the output indicator is left ON. • Set to lower current consumption.	
P-12	Disable communication	Comm	EnA	ENA: Run communication commands from master device. DISA: Blocks communication commands from master device. (only P-12/13 settings allowed)	
P-13	Lock	LoCt	oFF	OFF: Disabled LOC1: Only sensitivity and program mode check allowed LOC2: Only sensitivity check allowed	

01) When changed, sensitivity is reset, zero shift/anti-saturation are disabled, and P-6-Preset/P-7 DPC are turned OFF.
02) In digital + analog output models, analog output is not supported in MFST, UFST modes.

[Digital 2-Output Model] Select Digital Output

Select digital output 1 or 2 in run mode.
Set parameters for the following program modes based on selected output.
P-2-A Teaching mode P-2-B Operation mode P-2-C Output type
P-2-D Timer P-2-E Timer value

- OUT2 will be turned on in function indicator when set to output 2.
- Selection is synchronized with settings from program mode P-2 digital output selection.

Display		Operation
SV	PV	
Run mode		Press the [◀ + ▶] keys for over 2 secs in run mode.
SEL	oUt1	SV display: SEL, PV display: OUT1 will be displayed.
SEL	oUt1	Press the [◀ / ▶] keys to select OUT1 or OUT2.
SEL	oUt2	Press the [MODE] key to save settings. When OUT2 is selected, OUT2 will turn on in the function indicator and SV display: SEL, PV display: OUT2 will flash twice.
Run mode		Returns to run mode.

Mutual Interference Prevention

■ Mutual Interference Prevention

When multiple amplifiers are installed, the timing of signal emission from each sensor is controlled to avoid signal interference. Mutual interference prevention function is activated when power is supplied after amplifiers have been expanded.

■ Mutual Interference Prevention Double

Program mode P-8 mutual interference prevention double setting can be set to double the number of mutual interference prevention units and response speed.

- The function is not supported with program mode P-1 response speed set to MFST or UFST
- When program mode P-7 DPC is set to ON, it is applied at half the speed.
- When program mode P-2-A teaching mode is set to RISI or FALI, the measuring time for value change is increased by double.
- For digital + analog output models, analog output time is increased by double.

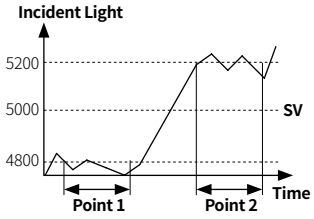
■ Mutual Interference Prevention by Response Mode

The number of mutual interference prevention supported units may differ by settings from program mode P-1 response mode.

Response Mode		MFST	UFST	FST	STD	LONG	ULOG	MLOG
No. of units supported	STD	-		4	8			
	DBLE			8	16			
Response speed	STD	25 µs	50 µs	150 µs	500 µs	4 ms	10 ms	20 ms
	DBLE	-		300 µs	1 ms	8 ms	20 ms	40 ms

Sensitivity Settings by Teaching Mode

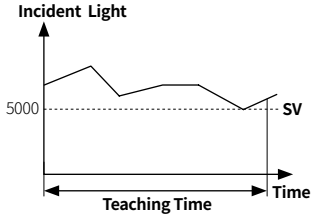
■ 2-Point Teaching



2-Point teaching is used when there is a clear difference in incident light level depending on object presence or absence. SV is set to the average value of teaching point 1 and point 2.

Display		Operation
SV	PV	
Program mode		Set P-2-A teaching mode to 2PNT.
Run mode		Enter run mode. Place the target object in point 1.
2Pnt	4800	Press the [SET] key. 2PNT will be shown on the SV display. - Press for (0.5 sec): point 1 will be measured for 100 ms. - Press for (≥ 0.5 sec): point 1 will be measured for the time holding the [SET] key while 2PNT is flashing.
2Pnt	4800	Place the target object in point 2.
2Pnt	5200	Press the [SET] key. - Press for (0.5 sec): point 2 will be measured for 100 ms. - Press for (≥ 0.5 sec): point 2 will be measured for the time holding the [SET] key while 2PNT is flashing.
5000	500	SV will be set to the average value of point 1 and point 2. E.g.: 5,000 = (point 1: 4,800 + point 2: 5,200) / 2 The set SV will flash twice on the SV display and return to run mode.

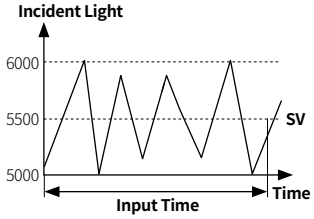
■ 1-Point Teaching



1-Point teaching is used in environments where incident light level may decrease due to dust or fluctuate widely due to vibration.
SV is set to the minimum measured value during teaching time.

Display		Operation
SV	PV	
Program mode		Set P-2-A teaching mode to 1PNT.
Run mode		Enter run mode. Place the target object.
1Pnt	5200	Press the [SET] key. 1PNT will be shown on the SV display. - Press for (0.5 sec): point 1 will be measured for 2 secs. - Press for (≥ 0.5 sec): point 1 will be measured for the time holding the [SET] key while 2PNT is flashing. (≥ 2 sec)
5000	500	SV will be set to the minimum measured value in point 1. The set SV will flash twice on the SV display and return to run mode.

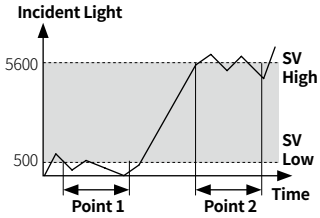
■ Auto Teaching



Auto teaching is used when the sensing target object is moving fast or cannot be moved.
SV is set to the average of the highest value and lowest value during the set teaching time.

Display		Operation
SV	PV	
Program mode		Set P-2-A teaching mode to AUTO.
Run mode		Enter run mode. Place the target object.
Auto	5000	Press the [SET] key. AUTO will flash on the SV display. - Press for (0.5 sec): incident light level will be measured for 2 secs. - Press for (≥ 0.5 sec): incident light level will be measured for the time holding the [SET] key. (≥ 2 sec)
5500	6000	SV will be set to the average of the highest and lowest value. The set SV will flash twice on the SV display and return to run mode.

■ Area Teaching



Area teaching is used to detect specific target objects from multiple objects. SV High and SV Low values are set by teaching 2 points. Only the objects between SV High and SV Low values are detected.

Display		Operation
SV	PV	
Program mode		Set P-2-A teaching mode to AREA.
Run mode		Enter run mode. Place the target object in point 1.
ArEA	5600	Press the [SET] key. AREA will be shown on the SV display. - Press for (0.5 sec): point 1 will be measured for 100 ms. - Press for (≥ 0.5 sec): point 1 will be measured for the time holding the [SET] key while AREA is flashing.
ArEA	500	Place the target object in point 2.
ArEA	500	Press the [SET] key. - Press for (0.5 sec): point 2 will be measured for 100 ms. - Press for (≥ 0.5 sec): point 2 will be measured for the time holding the [SET] key while AREA is flashing.
5600↔ 500	500	SV High and SV LOW will be set to the average value of each point. E.g.: SV High value = 5,600 / SV Low value = 500 The set SV will flash twice on the SV display and return to run mode.

■ Rising / Falling Edge Teaching

Rising / falling edge teaching is used when there may be environmental changes or light level changes during detection. Teaching is done without a target object, and SV is set to the maximum value of change during teaching + 150.
Rising edge uses the light increase level as the value of change.
Falling edge uses the light decrease level as the value of change.
Output is based on the edge value (internal variation) and is unrelated to PV value.

- Rising / falling edge teaching mode output condition
  Output ON: Change in light level > SV
  Output OFF: Change in light level < SV

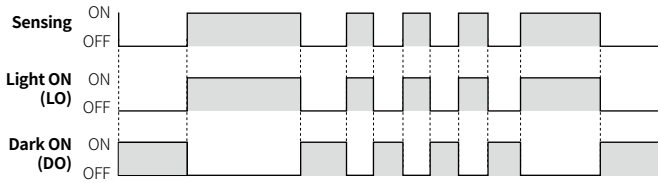
Display		Operation
SV	PV	
Program mode		Set P-2-A teaching mode to RISI or FALI.
Run mode		Enter run mode. Do not place a target object.
rISI	5600	Press the [SET] key. RISI or FALI will flash on the SV display. - Press for (0.5 sec): incident light level will be measured for 2 secs. - Press for (≥ 0.5 sec): incident light level will be measured for the time holding the [SET] key. (≥ 2 sec)
100	5600	SV is set to the maximum value of change during teaching +150. The set SV will flash twice on the SV display and return to run mode.

- The function is only supported for digital output 1.
- The function is not supported with program mode P-1 response mode set to MFST.
- The function is not supported when program mode P-6 preset or P-7 DPC is ON.

Timer

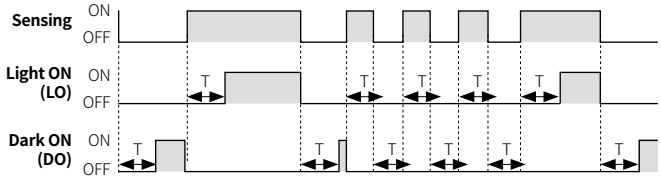
Control the output timing by setting program mode P-2-D timer and P-2-E timer value.
- P-2-E timer value setting range: 1 to 9,999 msec
- The function is not supported with program mode P-1 response mode set to MFST.

■ Timer OFF



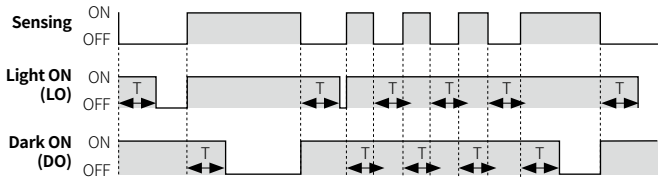
■ ON Delay

Delays the time of control output turning ON for the set timer value (T).



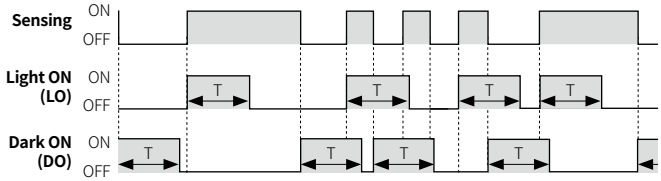
■ OFF Delay

Delays the time of control output turning OFF for the set timer value (T).



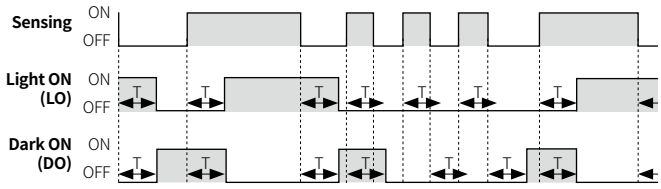
■ One Shot

Outputs the control output only for a set amount of time. Only applied when the object's detection status changes ON or OFF.



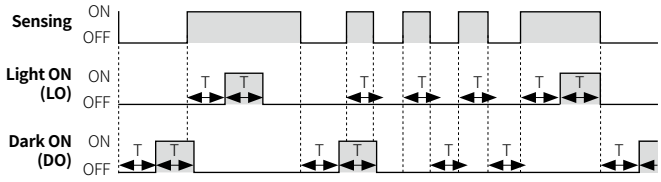
■ ON/OFF Delay

Delays the time of control output turning ON or OFF for the set timer value (T).



■ One Shot + ON Delay

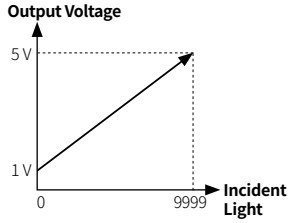
Delays and outputs the control output for a set amount of time. Only applied when the object's detection status changes ON or OFF.



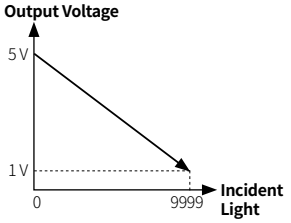
[Digital + Analog Output Model] Analog Output Direction

Incident light level (0 to 9,999) is converted and output as an analog output (1 - 5 VDC⎓). Use P-3 analog output direction to select whether output voltage increases or decreases as incident light level increases.
- Repeatability: ± 5% F.S. (±250 mVDC⎓)
- Analog output is not supported with program mode P-1 response speed set to MFST or UFST.

■ Output: Ascending



■ Output: Descending



Zero Shift

When using reflective type fiber optic units, the background may affect the incident light level of the target object. Zero shift function allows the PV to be displayed as 0.
- The maximum incident light level may decrease when incident light is zero shifted.
- The function is automatically disabled when program mode P-1 response mode settings are changed.
- The function is disabled when program mode P-6 preset is set to ON.

■ Enable Zero Shift

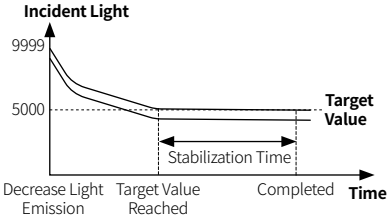
The function can be enabled by 2 different methods.
When enabled, SV display: ZERO, PV display: 0 will flash twice.
① Set program mode P-4 enable zero shift: DO
② Press [◀ + MODE] keys for over 0.5 secs in run mode

■ Disable Zero Shift

The function can be disabled by 2 different methods.
When disabled, SV display: ZERO, PV display: PV will flash twice.
① Set program mode P-4 enable zero shift: CANC
② Press [◀ + MODE] keys for over 0.5 secs in run mode

Anti-Saturation

The anti-saturation function is used in environments where the fiber optic units are installed at close distances and incident light level (received light) becomes excessive and saturated regardless of target objects. The function controls intensity of light emission to reduce the amount of received light.
When enabled, the light emission current is decreased until PV value reaches 5,000. When PV reaches the target value, current control is stopped.
- The function is automatically disabled when program mode P-1 response speed settings are changed.
- When program mode P-6 preset is turned ON, the function operates in the PV value before preset settings have been applied.



■ Enable Anti-Saturation

The function can be enabled by 2 different methods.
When enabled, SV display: P_ ⚌☰ (varies depending on light intensity), PV display: PV will flash twice.
① Set program mode P-5 enable anti-saturation: DO
② Press [SET + ▶] keys for over 0.5 secs in run mode

■ Disable Anti-Saturation

The function can be disabled. Returns to maximum light emission current.
When enabled, SV display: P_ ⚌☰, PV display: PV will flash twice.
① Set program mode P-5 enable anti-saturation: CANC
② Press [SET + ▶] keys for over 0.5 secs in run mode

Preset

Incident light level is displayed as a percentage in proportion to preset value. (%=P)
Set program mode P-6 to ON and complete teaching to display the value as a percentage.

- Teaching is reset when program mode P-1 response speed settings are changed. Re-teaching is required.
- The function is not supported when program mode P-7 DPC is ON.
- Zero shift function is disabled.

■ Preset Display

Current value is set as 110% when teaching.

- If PV exceeds 100%, the PV display will show 100P.
- If PV is below 100%, the PV display will show PV as a percentage of preset value.
- If the value when teaching is less than minimum incident light, it will be set to lower than 100%.
  e.g.) When teaching value: 100 and min. incident light: 200, the preset value is 200 and 50% will be displayed.

E.g.) Current value when teaching is 6,600

PV	Display	Description
7,000	100P	PV value exceeding 100% will be displayed as 100P.
6,600		
6,000		
5,400	90P	Incident light level will be displayed as a percentage of preset value.
3,000	50P	
0	0P	

■ Preset Teaching

Display SV	Display PV	Operation
Run mode		Set program mode P-6 preset to ON. Enter run mode. Place the target object.
PrSt	100P	Press the [SET] key. PRST will flash on the SV display.
50P	100P	Press the [SET] key. 50P (default) will be shown on the SV display. Press the [◀ / ▶] keys to change SV value. The set value will flash once and return to run mode.

DPC (Dynamic Power Control)

In usage environments where incident light level may gradually decrease, the DPC function can be used to automatically adjust the SV according to the reduced light . The DPC function is only valid when the PV value changes within ±500 from the PV value at the time of DPC ON setting.

- Only supported for output 1.
- DPC on function indicator will be turned on when program mode P-7 DPC is ON.
- The function is not supported with program mode P-1 response mode set to MFST.
- The function is not supported with program mode P-2-A teaching mode: RISI/FALI and P-6 preset settings.

■ DPC Warning

Warnings will be displayed when conditions for DPC function are not valid.

Display SV	Display PV	Warning Conditions
dPC	rAnG	PV value is out of DPC range (±500) for over 1 hour.
dPC	Loy	Adjusted sensitivity falls below 500 and additional adjustment is not possible.

Installation Mode

In installation mode, a visible red light will be shown to assist in precise installation of fiber optic unit heads and placement of target objects.

Display SV	Display PV	Operation
Supply power + [SET] key		Supply power to the unit while holding the [SET] key.
SEt	nodE	SV display: SET, PV display: MODE will flash for 10 secs. Press the [SET] key once to enter installation mode. (If [SET] key is not pressed for 10 secs, it will enter into run mode.)
SEt↔ nodE	0	Visible red light source will be emitted from the emitter. SET and MODE will flash alternately on the SV display, and incident light level will be shown on the PV display.
SEt↔ nodE	9000	The red light will TURN ON, FLASH, or TURN OFF depending on incident light level. - TURN ON: incident light level is over 9,000 - FLASHING: Incident light level is between 0 to 9,000 and red light will flash at 0.1 to 1 sec rate in proportion to intensity. - TURN OFF: No light received. Check and re-position the fiber optic units or target objects
Re-supply power		After installation, re-supply the power. Enters into run mode.

- Teaching and output operation is not supported in installation mode.
- Program modes can be set during installation mode. The settings are saved when returning to run mode.

Data Bank

Each amplifier has master unit functionality, which allows it to utilize the data bank to load, save, or copy settings across all amplifiers connected through expansion.

- When power is supplied, the channel number is shown on the PV display.
  If the amplifiers are expanded towards the right side, amplifier channel numbers are assigned automatically from the leftmost unit, beginning with CH1.

■ Operating Conditions

- On the expanded amplifiers, set program mode P-12 disable communication to ENA.
- On the expanded amplifiers, set program mode P-13 lock to OFF.
- All expanded amplifiers must be in run mode.

■ Operating Directions

01. In run mode, press the [MODE] key for over 5 secs to enter data bank.
    SV display: DATA, PV display: BANK will flash twice and automatically enter settings.
02. Press the [MODE] key to reach the desired menu.
03. Press the [◀ / ▶] keys to select the desired bank or channel then press the [MODE] key.
04. Press the [◀ / ▶] keys and select YES or NO for confirmation and press the [MODE] key.
05. SV display: MENU NAME, PV display: END will be displayed, and return to data bank mode.

Parameter		Display SV	Display PV (default)	Setting Range
B-1	Load	LoAd	- - - -	BNK0 to BNK2 • Loads the data bank and applies the settings to the amplifier.
B-2	Save	SAuE	- - - -	BNK0 to BNK2 • Saves amplifier settings to the data bank.
B-3	Copy	CoPY	- - - -	ALL, CH01 to CH30 (CH01 not displayed for single amplifier) • Copies amplifier settings to expanded amplifiers (1:1 or 1:ALL) .
B-4	Load all	LdAL	- - - -	BNK0 to BNK2 • Loads the saved data bank to all expanded amplifiers.
B-5	Save all	SuAL	- - - -	BNK0 to BNK2 • Saves the data bank settings to all expanded amplifiers.

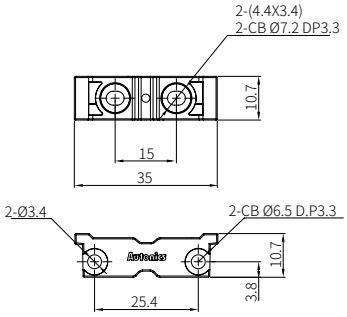
Segment Table

The actual display on the product represents the following letters and numbers on each type of segment display. The display may differ depending on the product.

7-Segment		11-Segment		12-Segment		16-Segment	
0	I	0	I	0	I	0	I
1	J	1	J	1	J	1	J
2	K	2	K	2	K	2	K
3	L	3	L	3	L	3	L
4	M	4	M	4	M	4	M
5	N	5	N	5	N	5	N
6	O	6	O	6	O	6	O
7	P	7	P	7	P	7	P
8	Q	8	Q	8	Q	8	Q
9	R	9	R	9	R	9	R
A	S	A	S	A	S	A	S
B	T	B	T	B	T	B	T
C	U	C	U	C	U	C	U
D	V	D	V	D	V	D	V
E	W	E	W	E	W	E	W
F	X	F	X	F	X	F	X
G	Y	G	Y	G	Y	G	Y
H	Z	H	Z	H	Z	H	Z

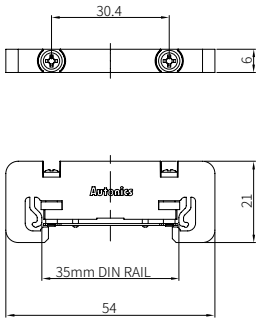
Sold Separately: Bracket (BK-BFN-A)

• Unit: mm (Refer to the CAD files from the Autonics website for exact dimensions).



Sold Separately: End Plate (BK-BFN-B)

• Unit: mm (Refer to the CAD files from the Autonics website for exact dimensions)



Sold Separately: M8 Connector Cable

• For more information, refer to the M8/M12 Connector Cable product manual.

Appearance	Power	Connector 1	Connector 2	Length	Feature	Model
	DC	M8 (Socket-Female) 4-pin	4-wire	2 m	PVC	CID408-2
				5 m		CID408-5
	DC	M8 (Socket-Female) 4-pin	4-wire	2 m	Oil resistant PVC	CIDH408-2
				5 m		CIDH408-5
	DC	M8 (Socket-Female) 4-pin, L type	4-wire	2 m	PVC	CLD408-2
				5 m		CLD408-5
	DC	M8 (Socket-Female) 4-pin, L type	4-wire	2 m	Oil resistant PVC	CLDH408-2
				5 m		CLDH408-5

Appearance	Power	Connector 1	Connector 2	Length	Feature	Model
	DC	M8 (Socket-Female) 4-pin	M12 (Plug-Male) 4-pin	2 m	PVC, black	C1D4-2EB
				5 m		C1D4-5EB
	DC	M8 (Socket-Female) 4-pin, L type	M12 (Plug-Male) 4-pin, L type	2 m	PVC, black	C2D4-2EB
				5 m		C2D4-5EB
	DC	M8 (Socket-Female) 4-pin	M12 (Plug-Male) 4-pin, L type	2 m	PVC, black	C3D4-2EB
				5 m		C3D4-5EB
	DC	M8 (Socket-Female) 4-pin, L type	M12 (Plug-Male) 4-pin	2 m	PVC, black	C4D4-2EB
				5 m		C4D4-5EB

Appearance	Power	Connector 1	Connector 2	Length	Feature	Model
	DC	M8 (Socket-Female) 4-pin	M12 (Plug-Male) 4-pin	2 m	Oil resistant PVC, dark gray	C1DH4-2EB
				5 m		C1DH4-5EB
	DC	M8 (Socket-Female) 4-pin, L type	M12 (Plug-Male) 4-pin, L type	2 m	Oil resistant PVC, dark gray	C2DH4-2EB
				5 m		C2DH4-5EB
	DC	M8 (Socket-Female) 4-pin	M12 (Plug-Male) 4-pin, L type	2 m	Oil resistant PVC, dark gray	C3DH4-2EB
				5 m		C3DH4-5EB
	DC	M8 (Socket-Female) 4-pin, L type	M12 (Plug-Male) 4-pin	2 m	Oil resistant PVC, dark gray	C4DH4-2EB
				5 m		C4DH4-5EB

Parameter Index

Only applies to IO-Link communication supported models.

■ Process Data

• Displays the current data value in real time.

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte0 (PD0)	Present value							
Byte1 (PD1)	Present value						Output 1	Output 2
Byte2 (PD2)	Error code							
Byte3 (PD3)	Warning code							

Parameter	Description	Setting Range	Type
Present Value	Displays the current incident light level.	0 to 9,999	Uinteger
Output 1	Displays output status of output 1	0: OFF 1: ON	Boolean
Output 2	Displays output status of output 2	0: OFF 1: ON	Boolean
Error Code	Displays error code when product error occurs	0: None 1: Memory error 2: Over current (OUT 1) 3: Over current (OUT 2) 4: Power error 5: Power error 6: Temperature error	Uinteger
Warning Code	Displays warning code, when product warning occurs	0: None 1: DPC Limit Warning 2: DPC Range Warning 3: Operation Time Alarm	Uinteger

■ Identification Menu (Product Information)

• Displays general manufacturer information and product details.
Includes additional information about manufacturers and products not covered by the IO-Link standard.

Index		Parameter	Description	Type	Access
hex.	dec.				
0x10	16	Vendor Name	Manufacturer name	String	RO
0x11	17	Vendor Text	Manufacturer description	String	RO
0x12	18	Product Name	Product name or model	String	RO
0x13	19	Product ID	Product model	String	RO
0x14	20	Product Text	Product description	String	RO
0x15	21	Serial Number	Product serial number	String	RO
0x16	22	H/W Version	Hardware version	String	RO
0x17	23	F/W Version	Firmware version	String	RO
0x18	24	Application specific tag	Application program tag	String	RW
0x19	25	Function Tag	Product function tag	String	RW
0x1A	26	Location Tag	Product location tag	String	RW

■ Observation Menu

• Displays the setting values of the product.

Index		Parameter	Description	Type	Access
hex.	dec.				
0x80	128	High Peak	Displays the maximum value (0 to 9,999)	UInteger	RO
0x81	129	Low Peak	Displays the minimum value (0 to 9,999)	UInteger	RO
0x82	130	Counter Value	Displays output count (0 to 9,999)	UInteger	RO
0x47	71	DPC Value	Displays DPC value (0 to 9,999)	UInteger	RO
0x83	131	Operating Hours	Displays time of operation (0 to 4,294,967,296)	UInteger	RO
0x84	132	Device Temperature	Displays product temperature (unit: 0.1 °C)	UInteger	RO
0x85	133	Voltage Monitoring	Displays product supply voltage (unit: 10 mV)	UInteger	RO

■ Parameter Menu

• Parmeter settings can be changed depending on usage environment.

Index		Parameter	Description	Setting Range	Default	Type	Access
hex.	dec.						
0x43	67	Set Value (Out1)	Output 1 SV	5 to 9,999	5,000	UInteger	RW
0x44	68	Set Value (Out2)	Output 2 SV	5 to 9,980	5,000	UInteger	RW
0x45	69	Set Value (Area High)	Area High SV	10 to 9,980	7,000	UInteger	RW
0x46	70	Set Value (Area Low)	Area Low SV	10 to 9,980	3,000	UInteger	RW
0x50	80	Response Speed Setting	Response mode	0 : Mega fast 1: Ultra fast 2: Fast 3: Standard 4: Long 5: Ultra long 6: Mega long	3	UInteger	RW
0x51	81	Select Out	Select digital output	0: Output 1 1: Output 2	0	UInteger	RW
0x52	82	OUT1 Teaching Setting	Output 1 teaching mode	0: 2-point 1: 1-point 2: Auto 3: Area 4: Rising 5: Falling	0	UInteger	RW
0x53	83	OUT1 L/D On Setting	Output 1 operation mode	0: Light On 1: Dark On	0	UInteger	RW
0x54	84	OUT1 Type Setting	Output 1 output type	0: NPN 1: PNP 2: Push-pull	0	UInteger	RW
0x55	85	OUT1 Timer Mode	Output 1 timer	0: OFF 1: ON Delay 2: OFF Delay 3: One Shot 4: ON/OFF Delay 5: One Shot ON Delay	0	UInteger	RW
0x56	86	OUT1 Timer Time	Output 1 timer value	1 to 9,999	5	UInteger	RW
0x57	87	OUT2 Teaching Setting	Output 2 teaching mode	0: 2-point 1: 1-point 2: Auto	0	UInteger	RW
0x58	88	OUT2 L/D On Setting	Output 2 operation mode	0: Light On 1: Dark On	0	UInteger	RW
0x59	89	OUT2 Type Setting	Output 2 output type	0: NPN 1: PNP 2: Push-pull	0	UInteger	RW
0x5A	90	OUT2 Timer Mode	Output 2 timer	0: OFF 1: ON Delay 2: OFF Delay 3: One Shot 4: ON/OFF Delay 5: One Shot ON Delay	0	UInteger	RW
0x5B	91	OUT2 Timer Time	Output 2 timer value	1 to 9,999	5	UInteger	RW
0x5C	92	Analog Out Setting	Analog output direction	0: Ascend 1: Descend	0	UInteger	RW
0x5D	93	Zero Shift Setting	Enable zero shift	0: None 1: Execute 2: Cancel	0	UInteger	RW
0x5E	94	Saturation Control	Enable anti-saturation	0: None 1: Execute 2: Cancel	0	UInteger	RW
0x5F	95	Preset Setting	Preset	0: OFF 1: ON	0	UInteger	RW
0x60	96	DPC Setting	DPC	0: OFF 1: ON	0	UInteger	RW
0x61	97	Interference Prevent	Mutual interference prevention double	0: Standard 1: Double	0	UInteger	RW
0x62	98	Hysteresis	Hysteresis	0: Low 1: Middle 2: High	0	UInteger	RW
0x63	99	Flip Display	Display direction	0: Normal 1: Reverse	0	UInteger	RW
0x64	100	Energy Save Setting	Power-saving mode	0: OFF 1: Half 2: Full	0	UInteger	RW
0x65	101	Communication Setting	Block communication	0: Enable 1: Disable	0	UInteger	RW
0x66	102	Lock Setting	Lock	0: Off 1: Lock 1 2: Lock 2	0	UInteger	RW
0x67	103	Operating Hours Alarm Setting	Operating hours alarm	1 to 262,800 (hours)	100,000	UInteger	RW

Index		Parameter	Description	Setting Range	Default	Type	Access
hex.	dec.						
0x70	112	Bank Load	Load data bank	0: None 1: Bank 1 2: Bank1 3: Bank2	0	UInteger	RW
0x71	113	Bank Save	Save data bank	0: None 1: Bank 1 2: Bank1 3: Bank2	0	UInteger	RW
0x72	114	Bank Copy	Copy settings	0: None 1: Ch. All 2: Ch. 01 to 31 : Ch. 30	0	UInteger	RW
0x73	115	Bank Load All	Load all	0: None 1: Bank 1 2: Bank1 3: Bank2	0	UInteger	RW
0x74	116	Bank Save All	Save all	0: None 1: Bank 1 2: Bank1 3: Bank2	0	UInteger	RW
0x91	145	Teaching (Set Key)	Teaching button	Teaching (Set Key)	-	UInteger	WO
0x90	144	Initialize	Reset parameters	Initialize	-	UInteger	WO

■ Diagnosis Menu

• Displays information about issues that occurred during product operation.

Index		Parameter		Description	Type	Access
hex.	dec.					
0x28	40	Process Data Input	Present Value	Displays the current incident light level.	Uinteger	RO
			Output 1	Displays output status of output 1	Boolean	RO
			Output 2	Displays output status of output 2	Boolean	RO
			Error Code	Displays error code when product error occurs	Uinteger	RO
			Warning Code	Displays warning code, when product warning occurs	Uinteger	RO
0x25	37	Detailed Device Status	-	Detailed status of the product	OctetString	RO

■ Events

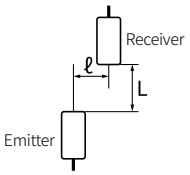
Code		Event	Description	Type
hex.	dec.			
0x1804	6148	Temperature Overrun	Overtemperature warning	Warning
0x1807	6151	Supply Under Voltage	Low voltage detection warning	
0x1815	6165	Operation Time Alarm	Operation time exceeded alarm	
0x1816	6166	EEPROM Error	EEPROM error warning	
0x1814	6164	Short Circuit	Output short-circuit / overcurrent error	Error

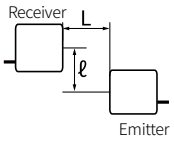
Product Characteristic Data

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)

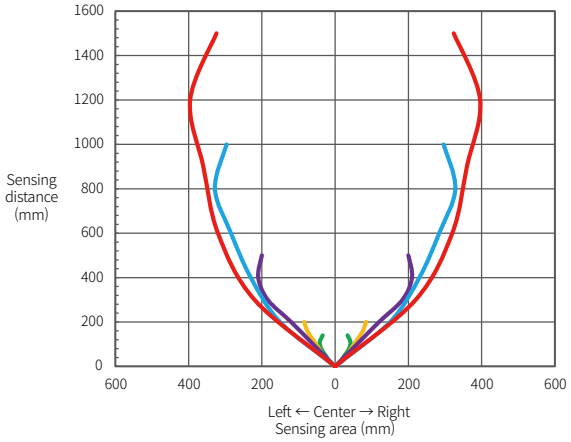




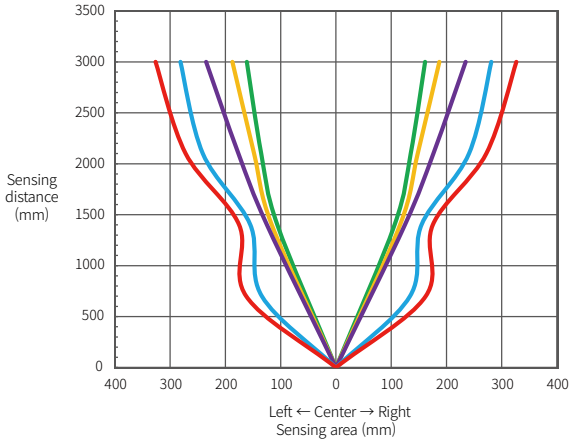
- Legend

MFST (25 µs)	UFST (50 µs)	STD (500 µs)	ULOG (10 ms)	MLOG (20 ms)

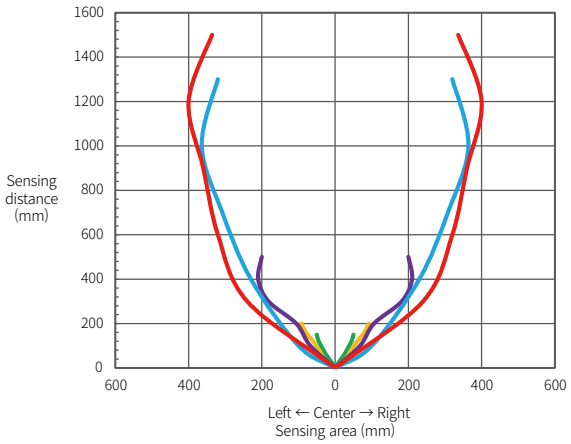
■ FT-310-05



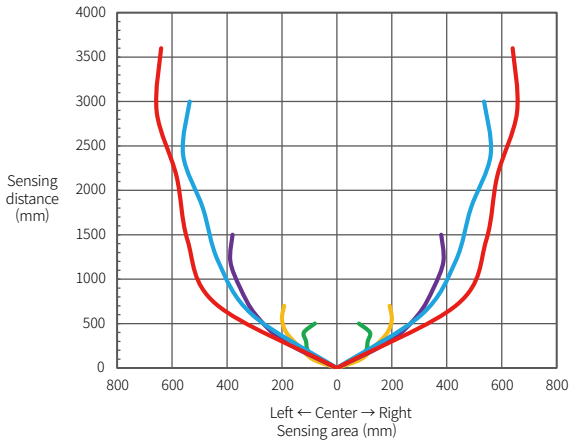
■ FT-420-10LN



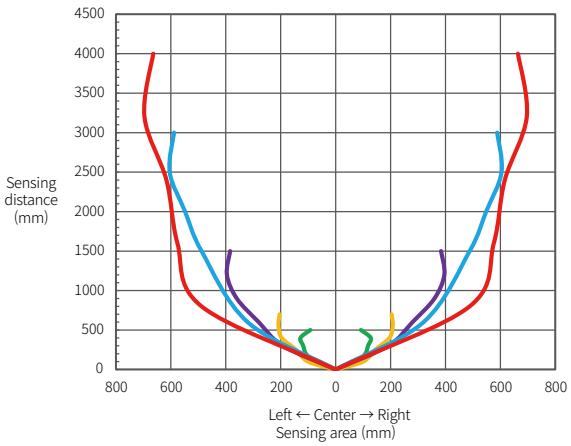
■ FT-320-05



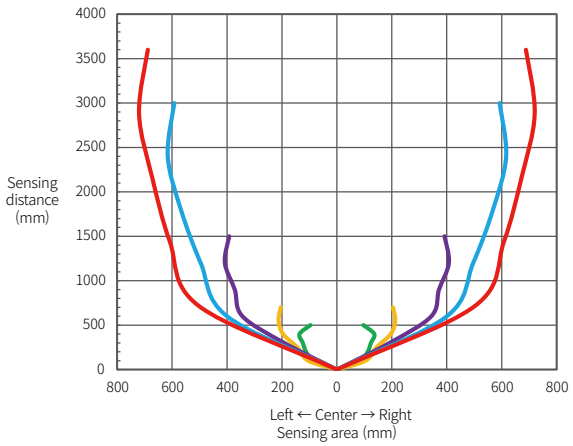
■ FT-420-10H



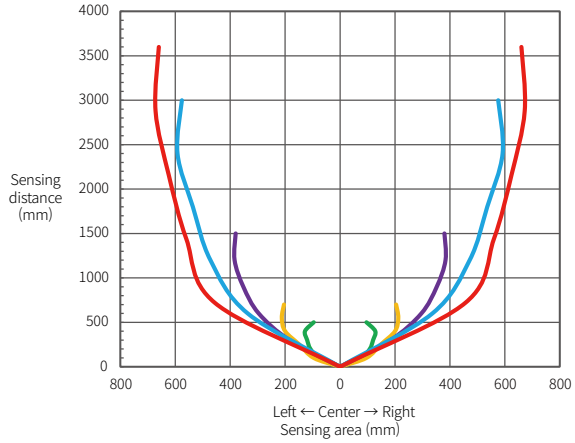
■ FT-420-10



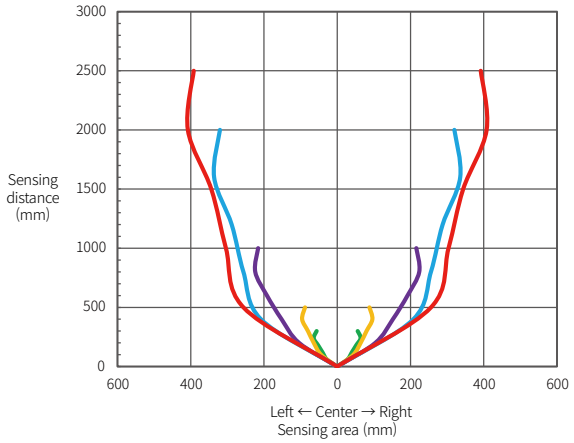
■ FT-420-15H1



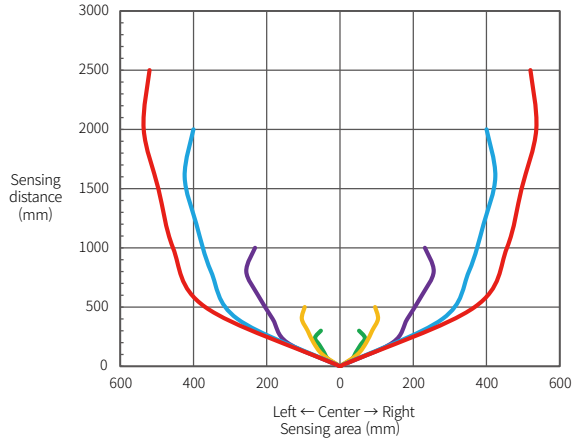
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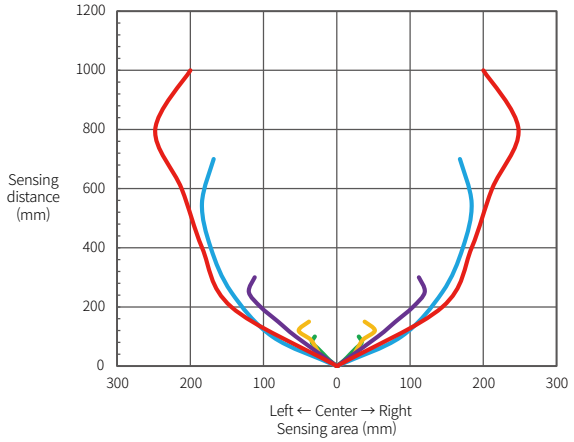
■ FT-420-13B



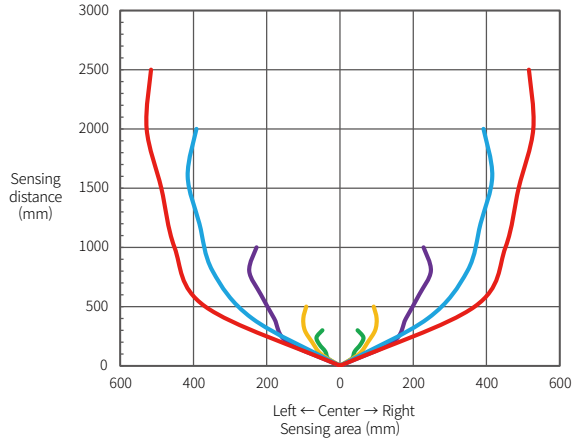
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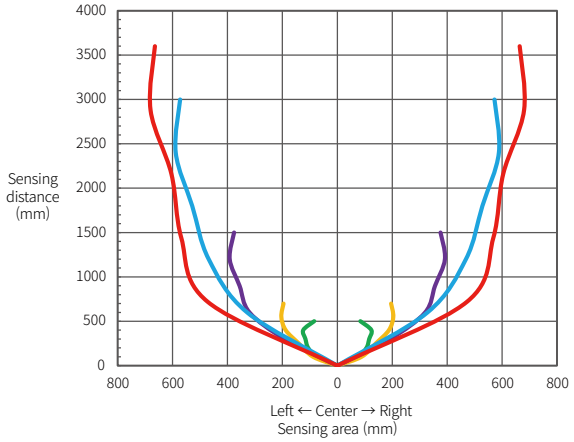
■ FT-320-05R



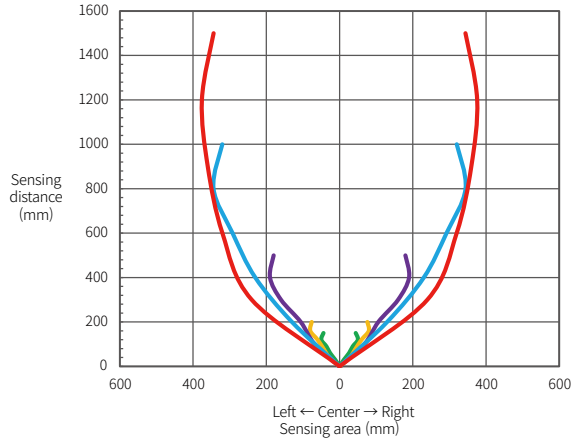
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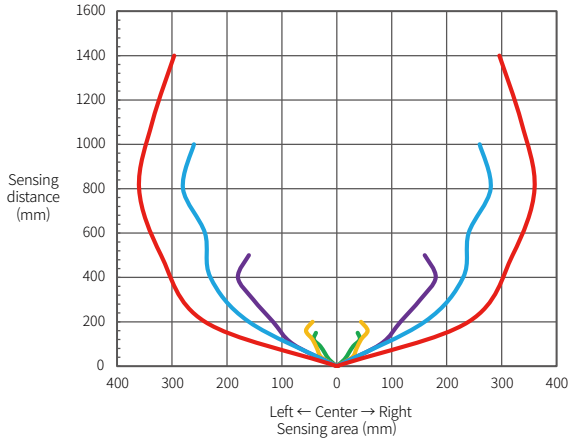
■ FT-420-10R



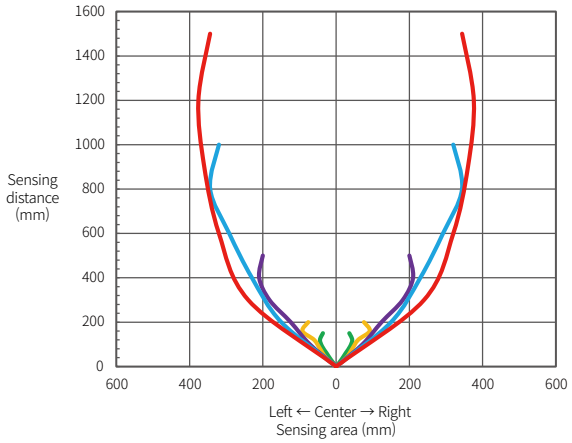
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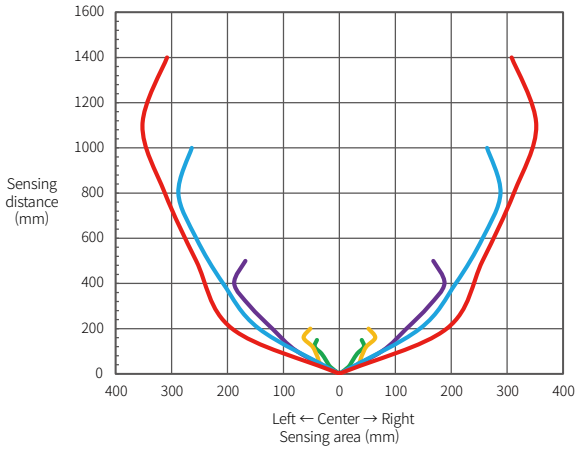
■ FTC-1520-05



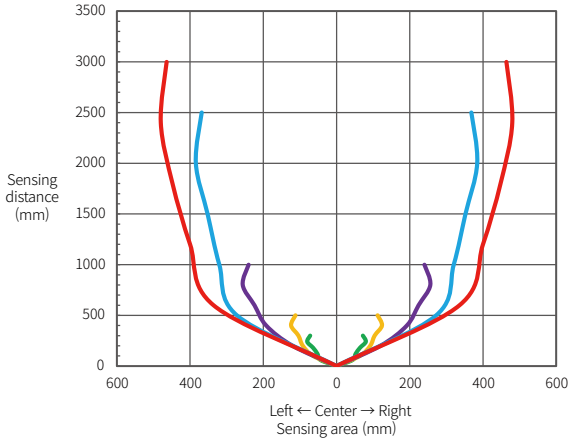
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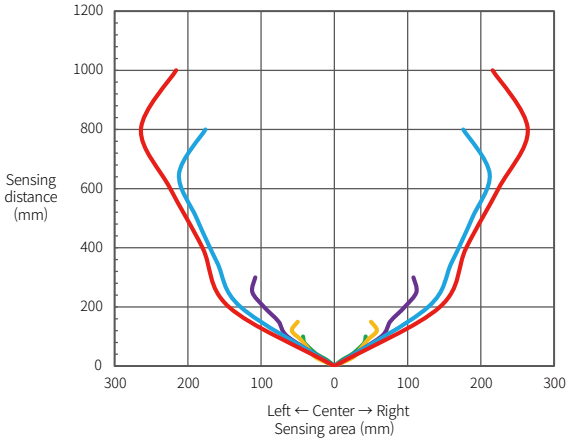
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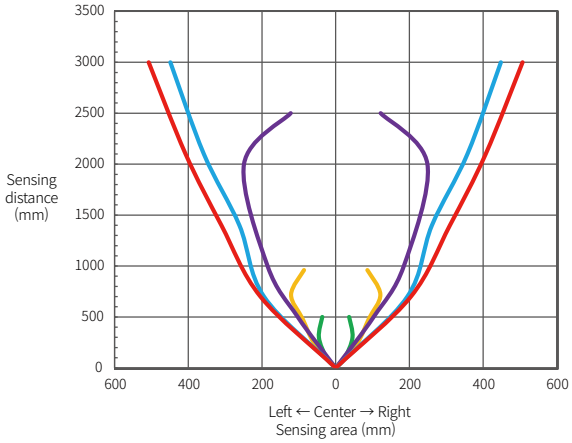
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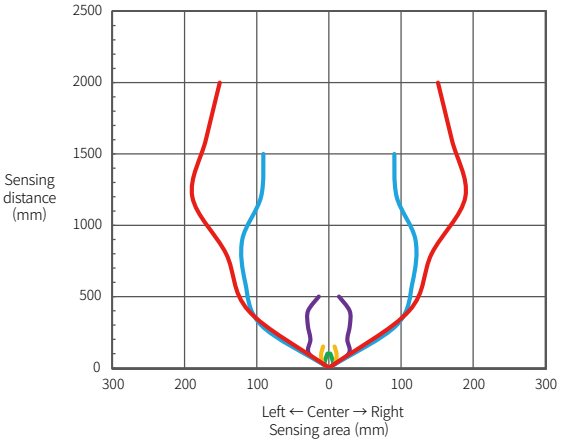
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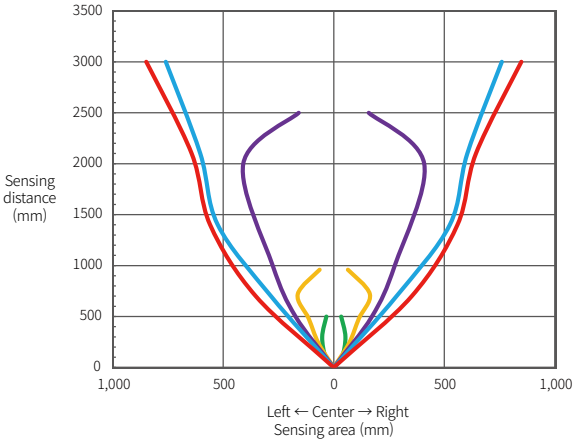
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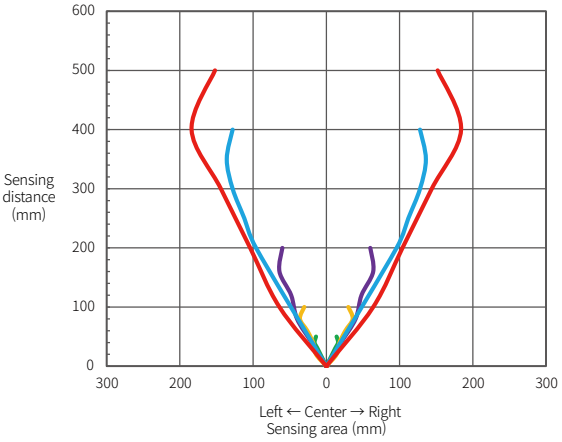
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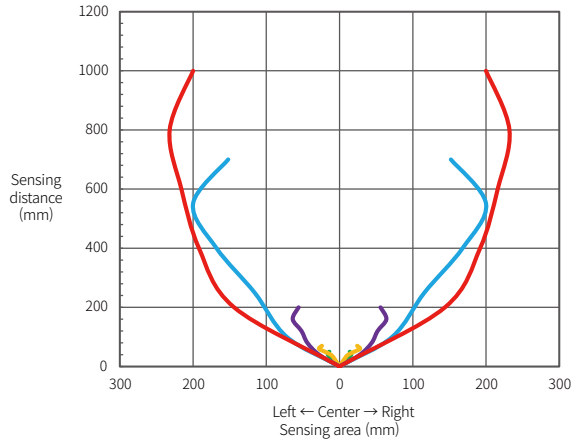
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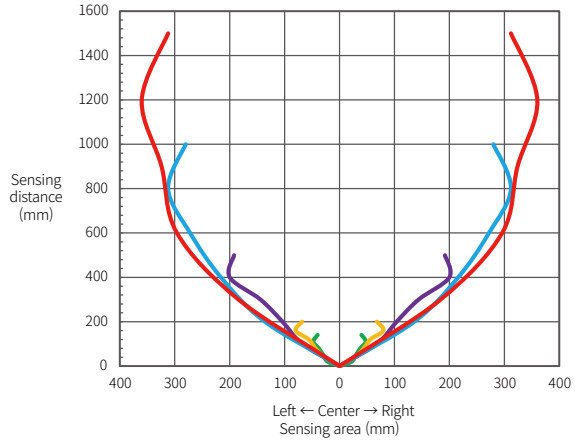
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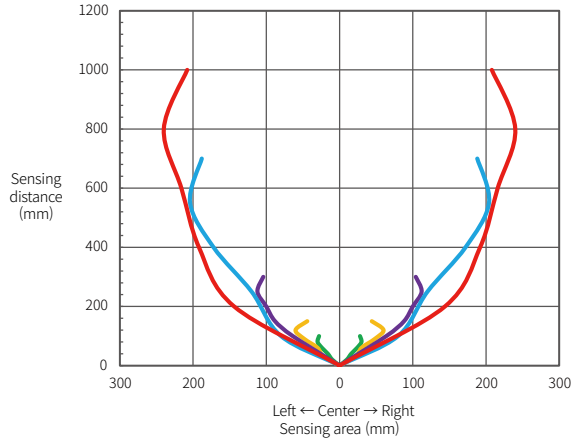
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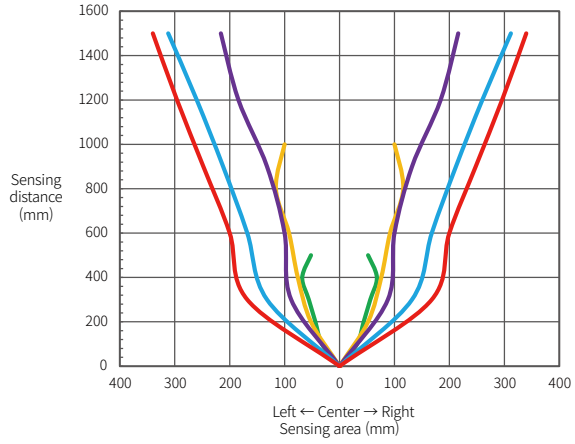
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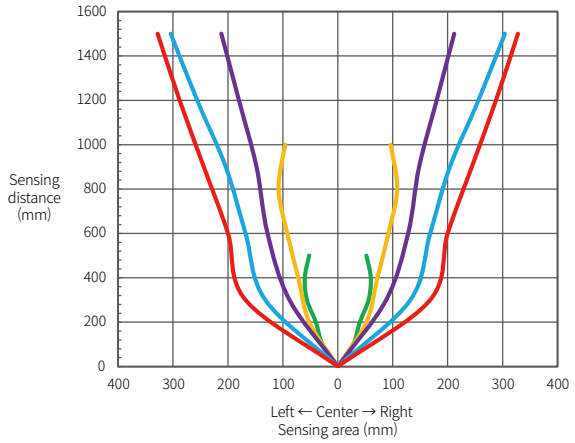
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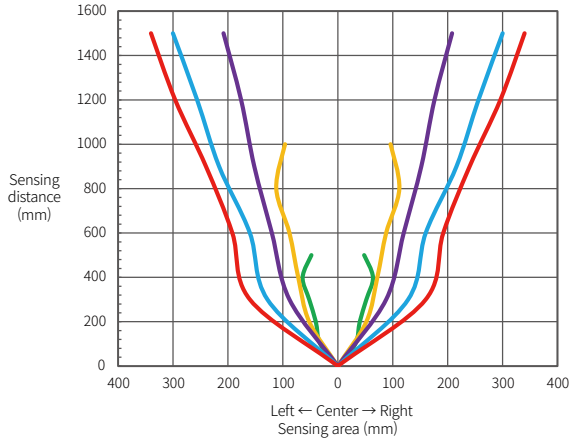
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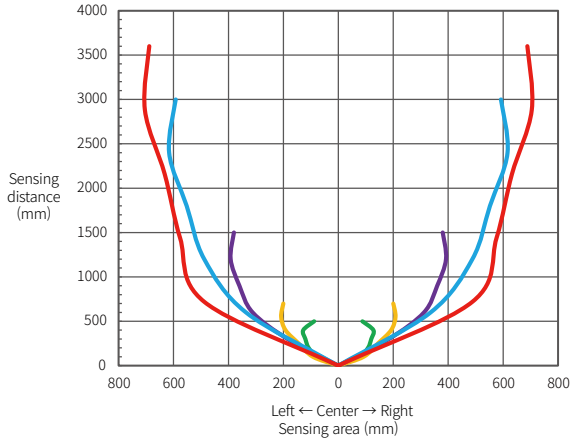
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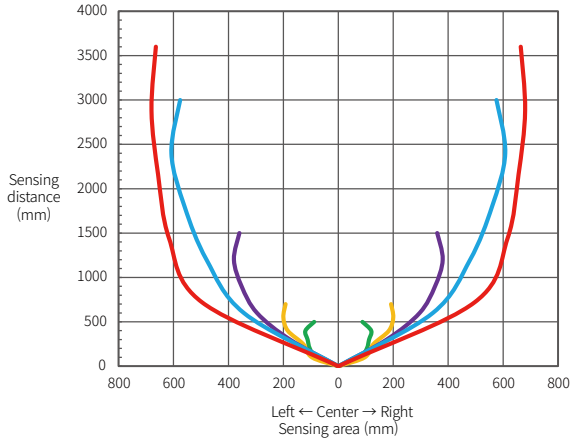
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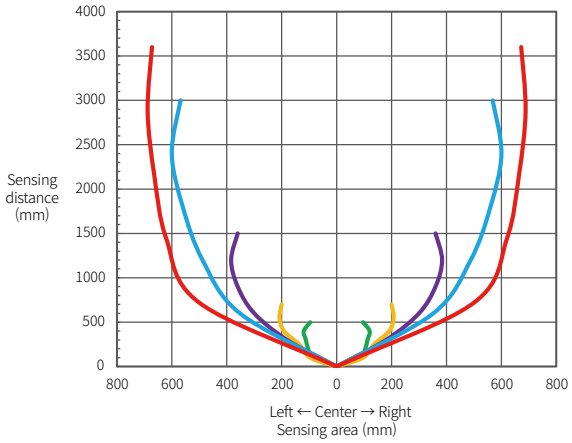
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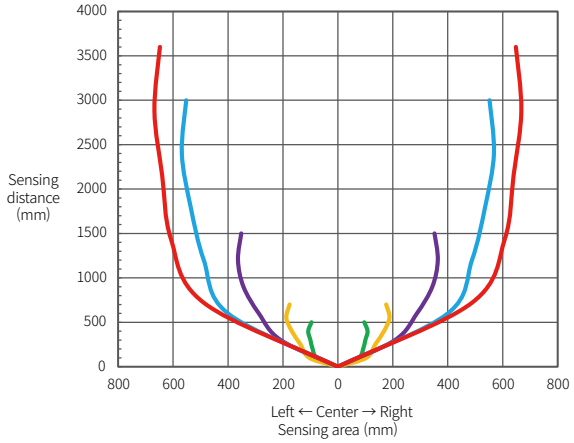
■ GTL-420-12H2



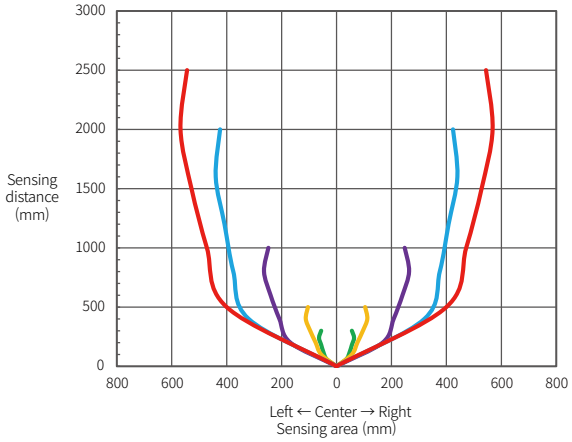
■ GTL-420-12H3



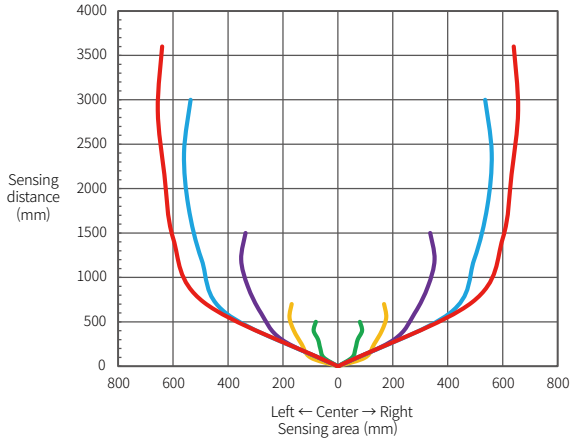
■ GTR-420-12H2



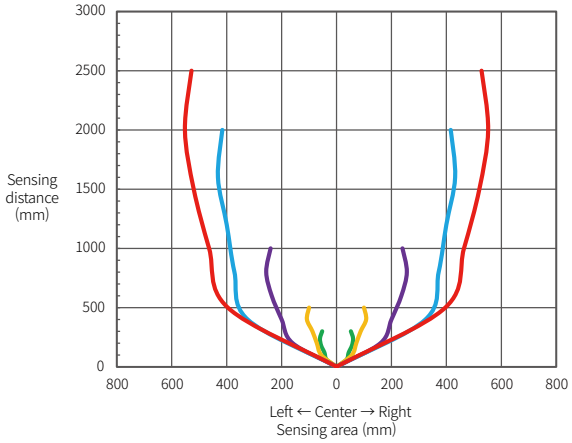
■ GTL-410-12V2 (VA01)



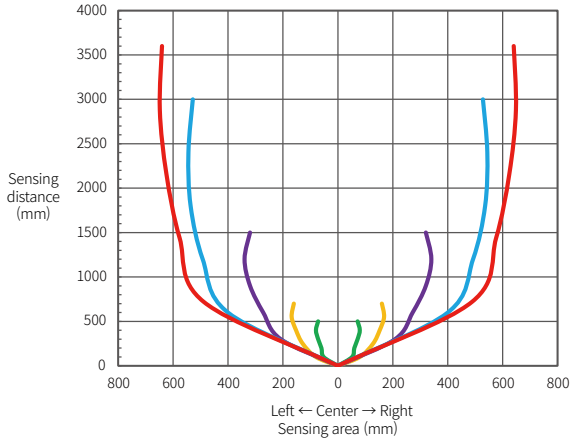
■ GTR-420-12H3



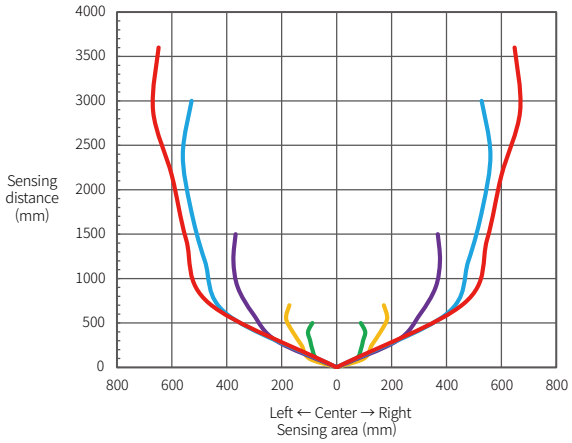
■ GTL-410-12V2 (VA02)



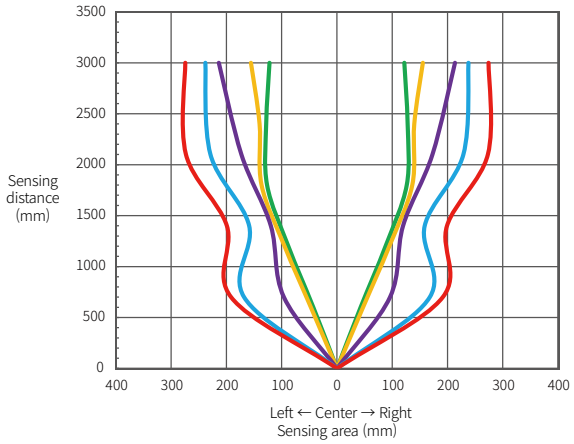
■ FTR-410-10R



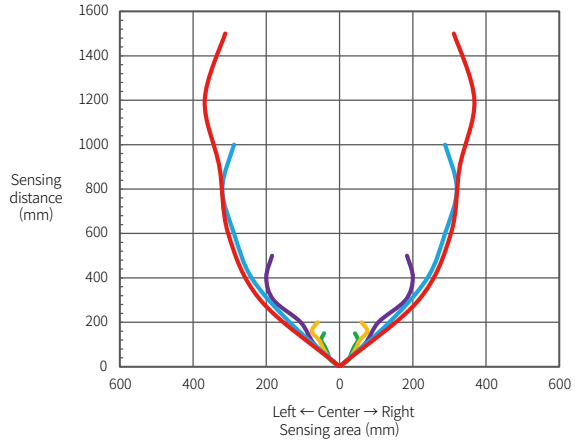
■ FTP-320-10



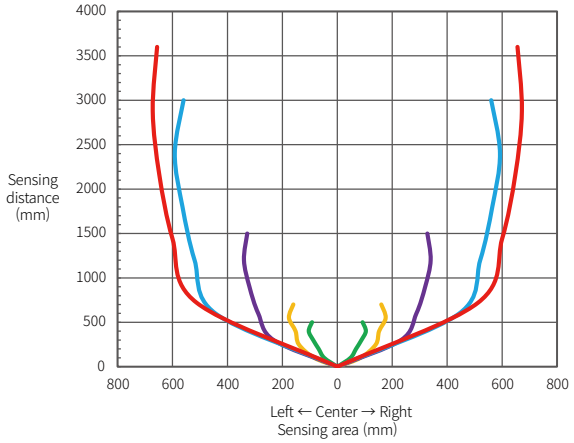
■ FTR-420-10RLN



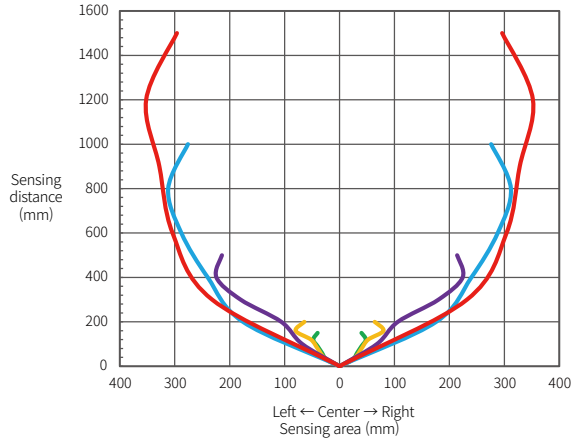
■ FTS-320-05



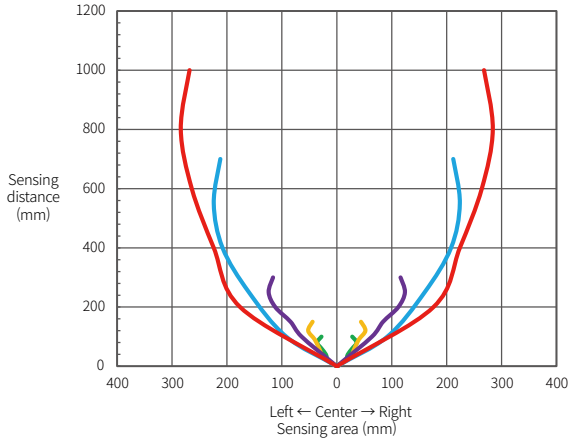
■ FTS2-420-10



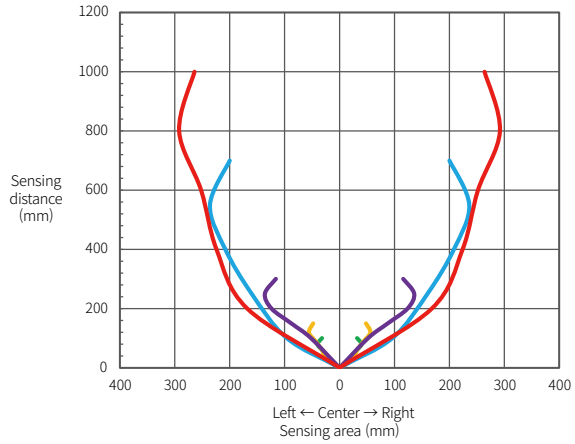
■ FTS1-320-05



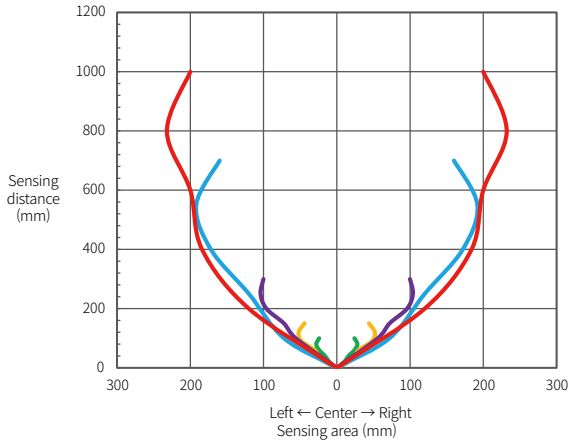
■ FTCS-220-05



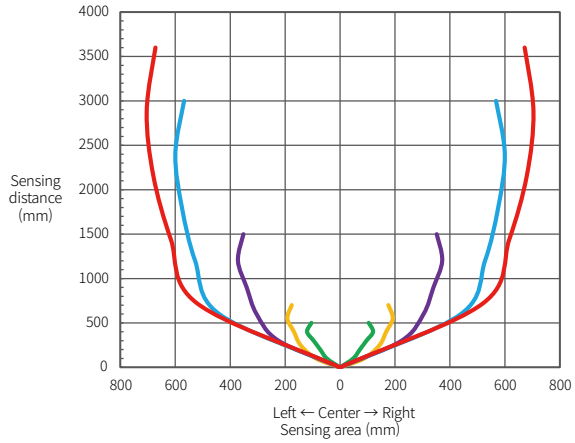
■ FTS2-320-05



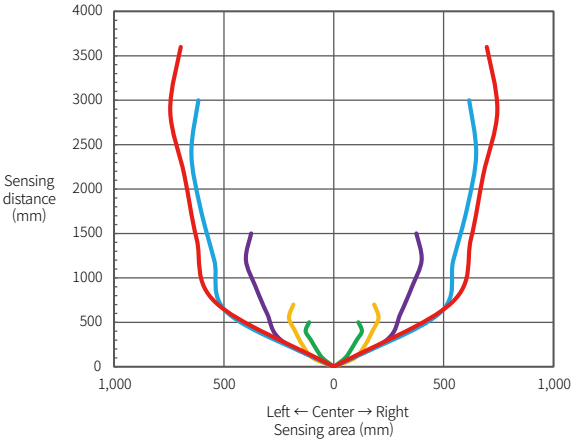
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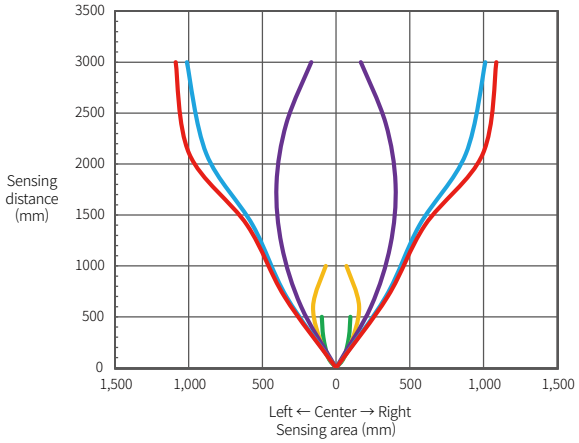
■ FTS-420-10



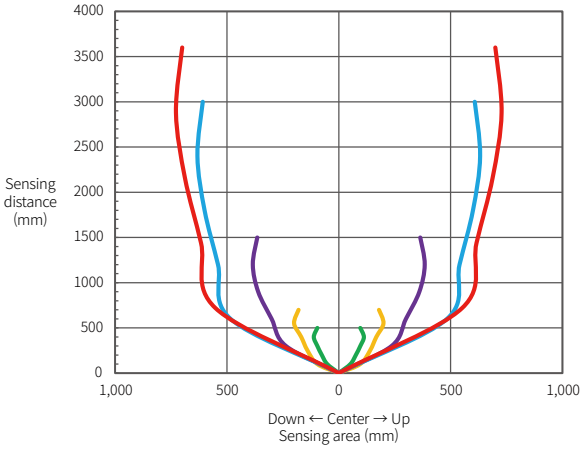
■ FTW5-320-02B (horizontal)



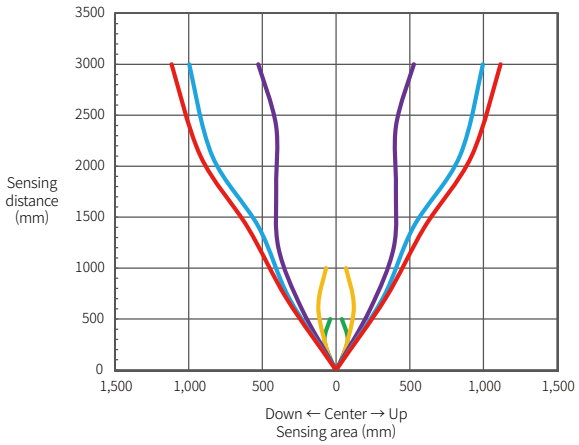
■ FTW40-320-02B (horizontal)



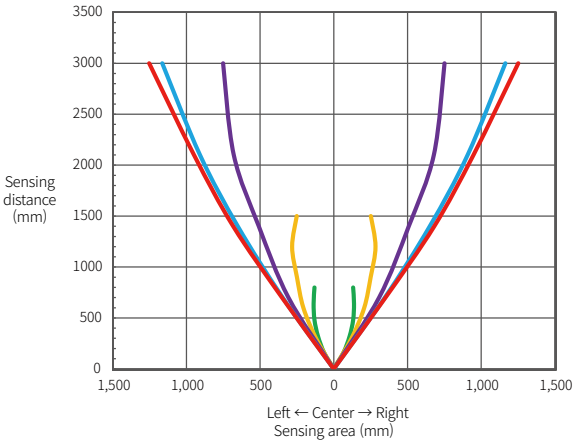
■ FTW5-320-02B (vertical)



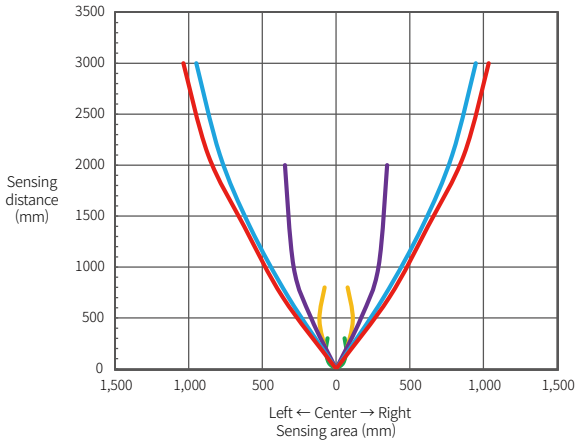
■ FTW40-320-02B (vertical)



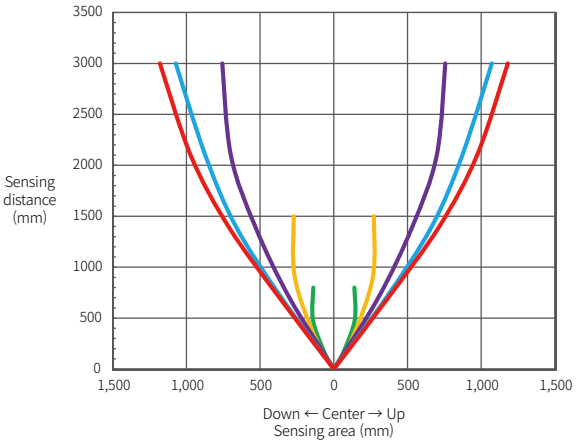
■ FTW20-320-02B (horizontal)



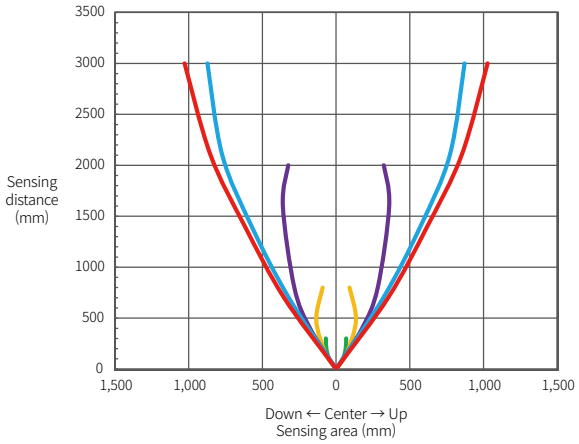
■ FTW60-320-02B (horizontal)



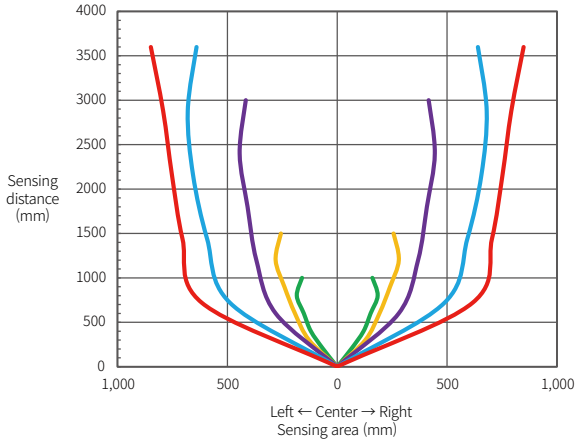
■ FTW20-320-02B (vertical)



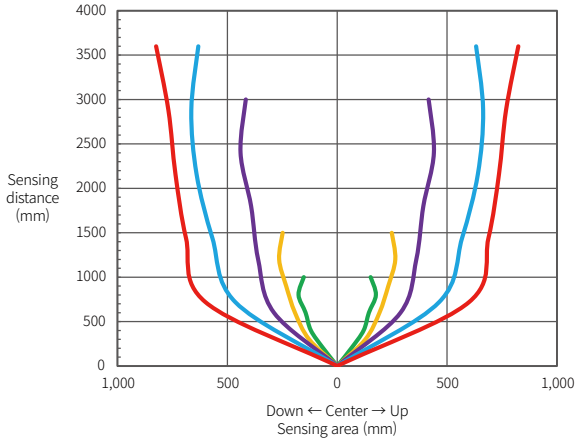
■ FTW60-320-02B (vertical)



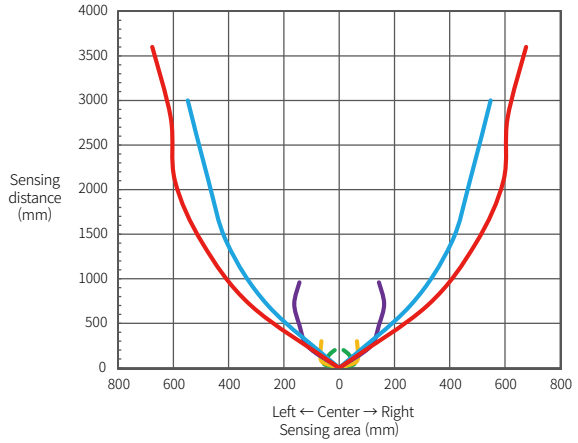
■ FTW11-210-10R (horizontal)



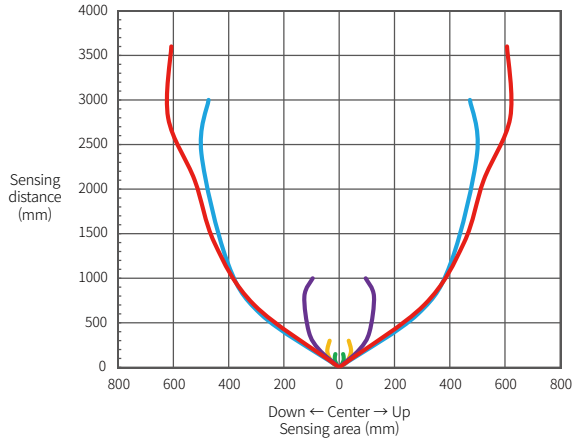
■ FTW11-210-10R (vertical)



■ FTW100-420-02R (horizontal)

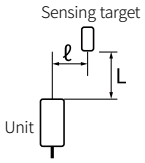


■ FTW100-420-02R (vertical)

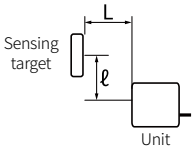


Detection Area Characteristics: Diffuse Reflective Type (TYPICAL)

• Horizontal shift (Left ← Center → Right)



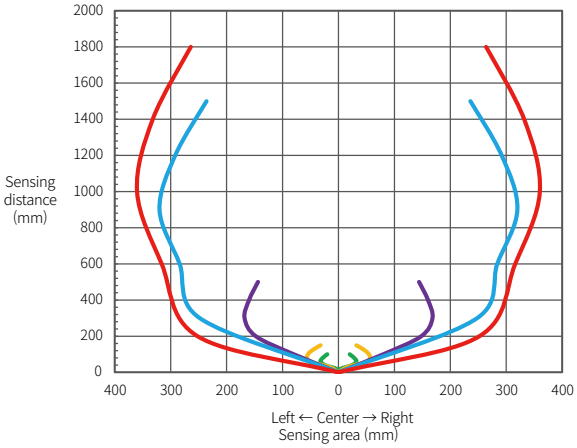
• Vertical shift (Down ← Center → Up)



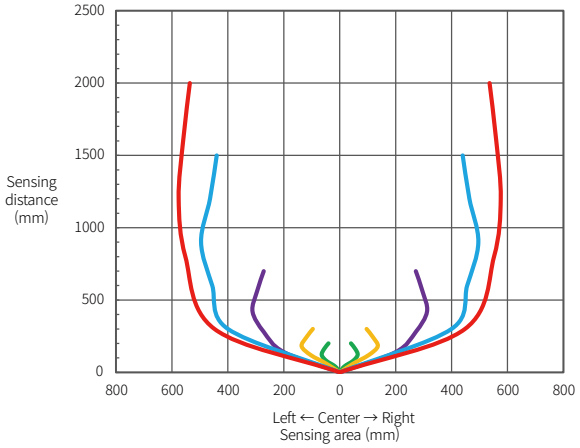
• Legend

MFST (25 µs)	UFST (50 µs)	STD (500 µs)	ULOG (10 ms)	MLOG (20 ms)

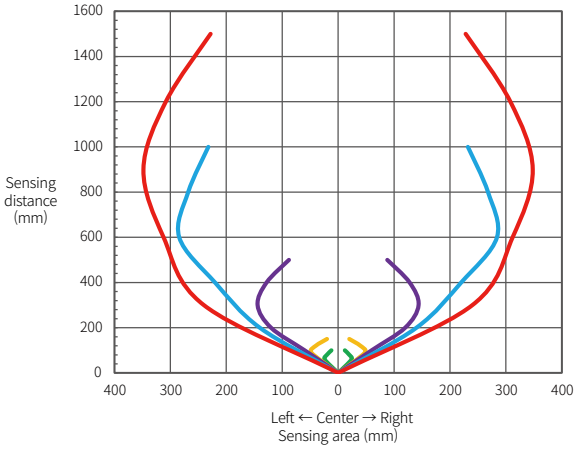
■ FD-310-05



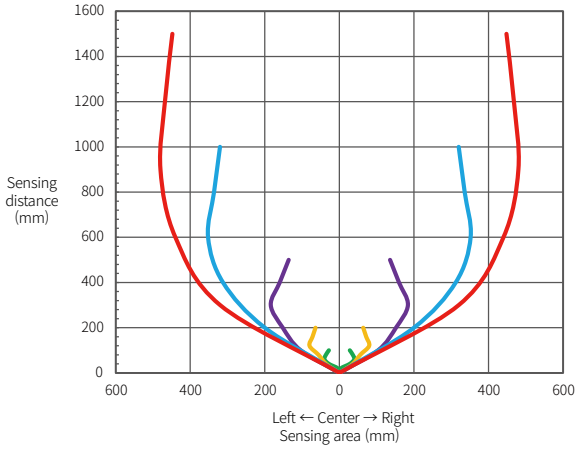
■ FD-620-10



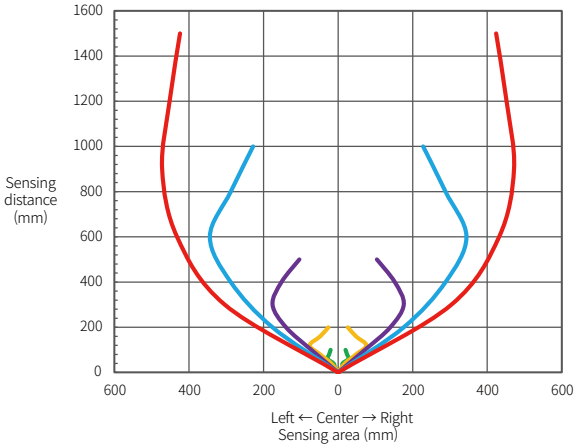
■ FD-320-05



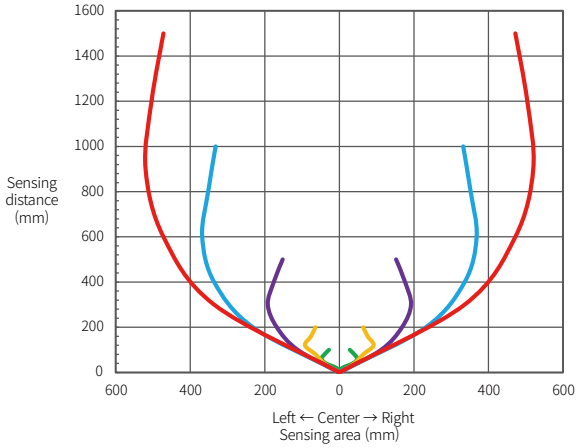
■ FD-320-F



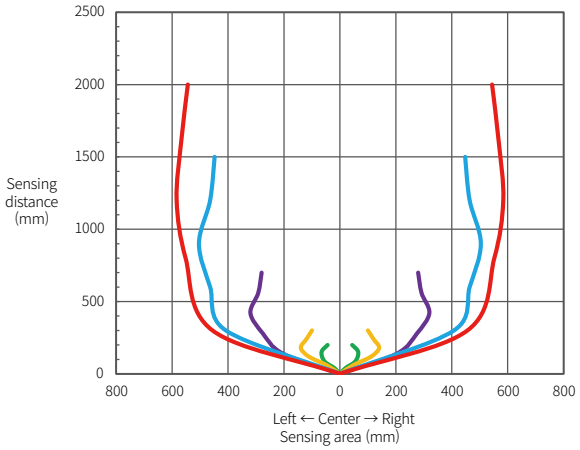
■ FD-420-05



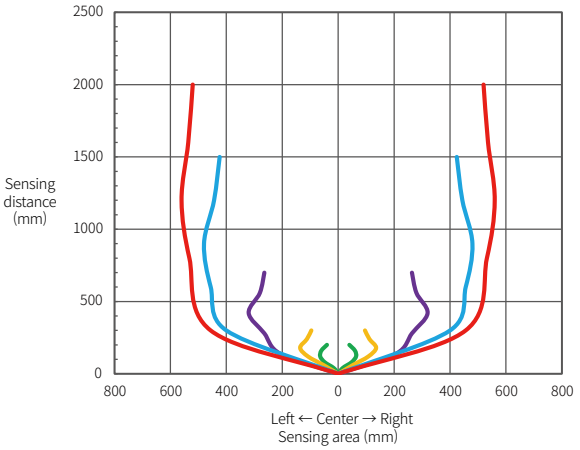
■ FD-320-F1



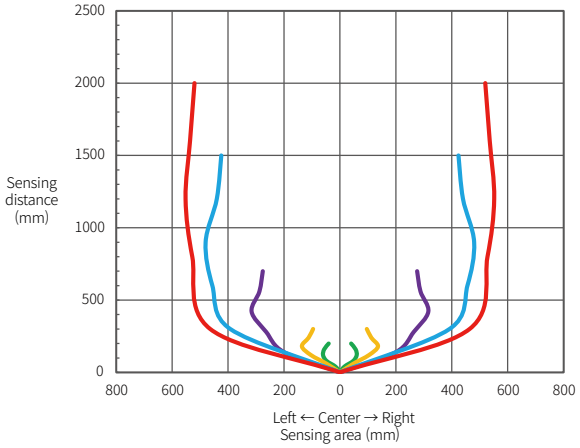
■ FD-620-F2



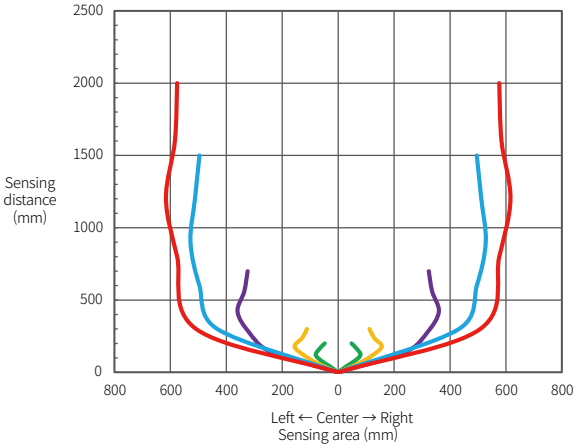
■ GD-620-20H2



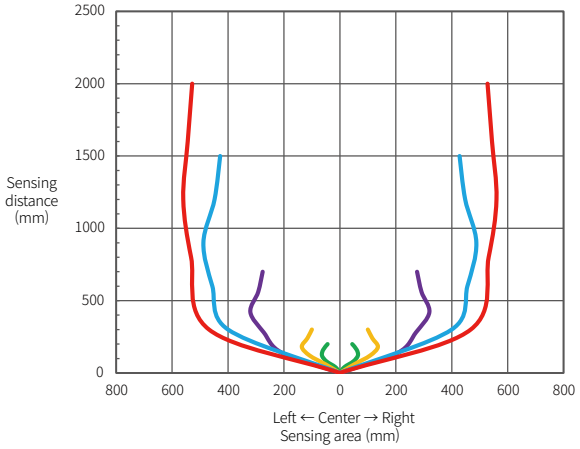
■ FD-620-10H



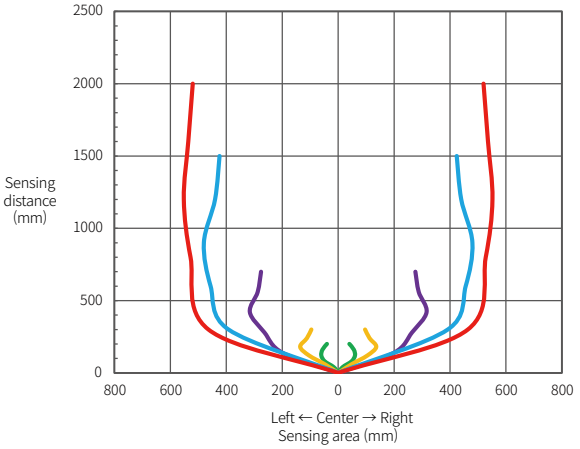
■ GD-620-12H3



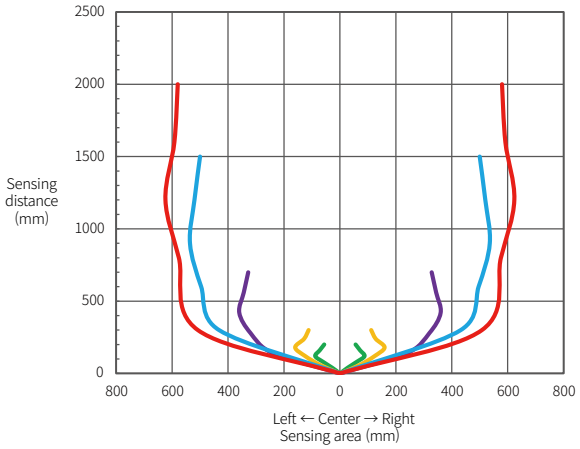
■ FD-620-15H1



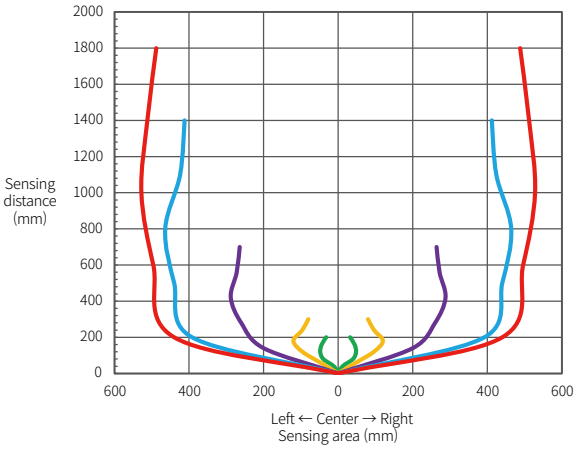
■ GD-610-12V2 (VA01)



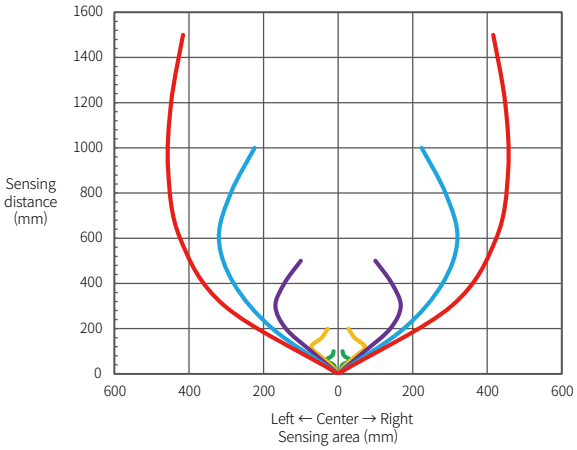
■ GD-420-20H2



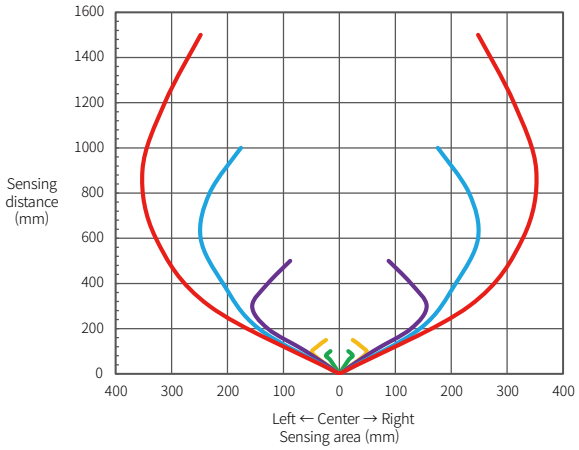
■ GD-610-12V2 (VA02)



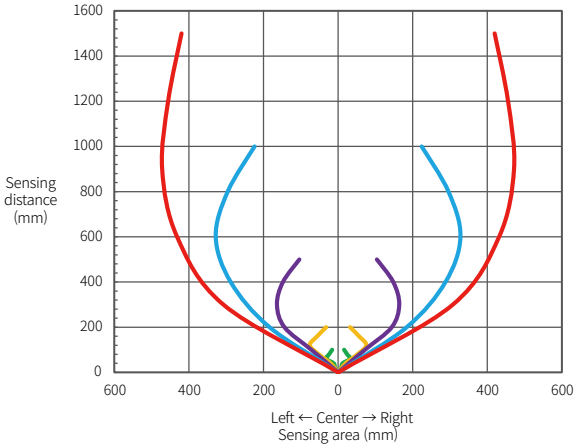
■ FD-320-06B



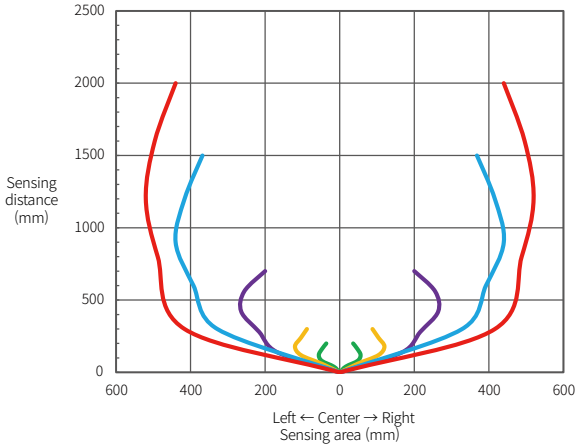
■ FD-420-05R



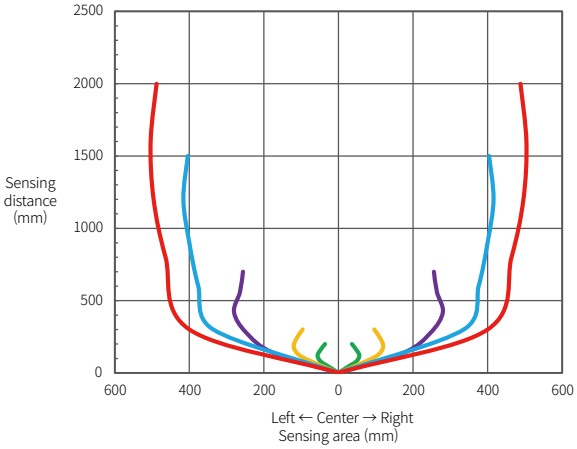
■ FD-420-06B



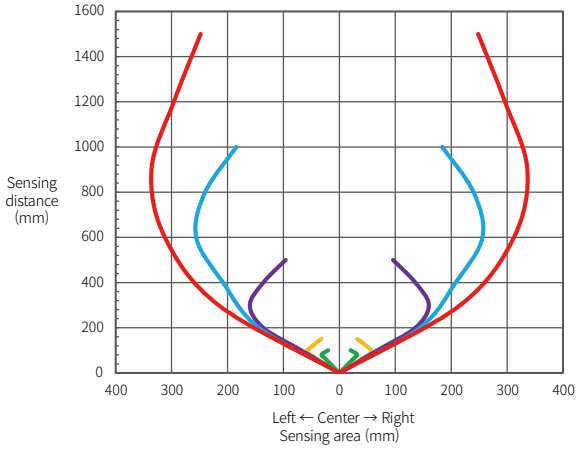
■ FD-620-10R



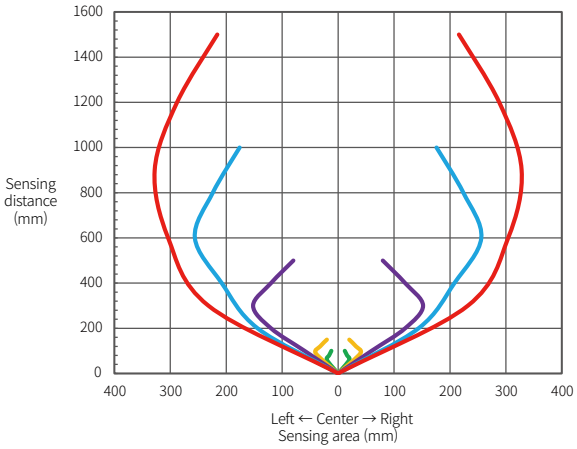
■ FD-620-13B



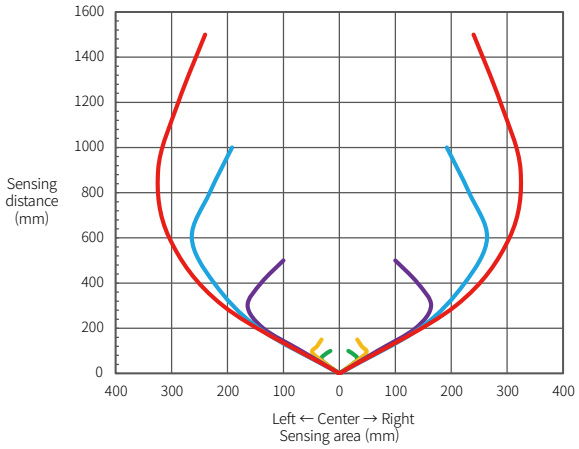
■ FDC-320-05



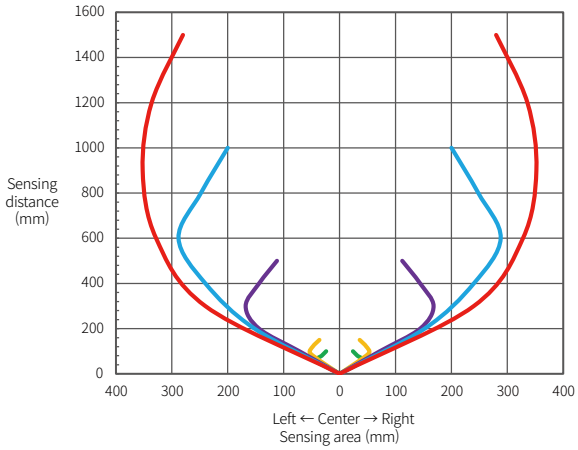
■ FD-320-05R



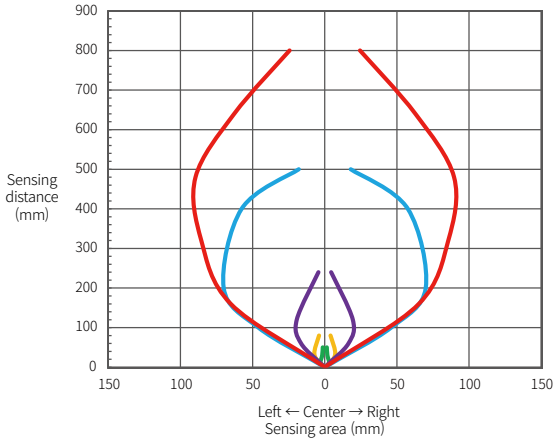
■ FDC-320-F



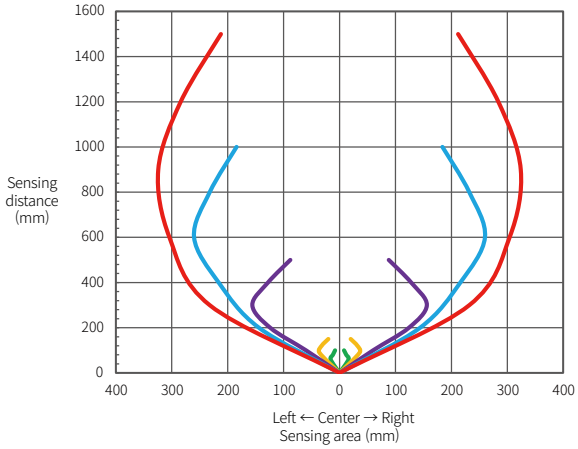
■ FDC-320-06B



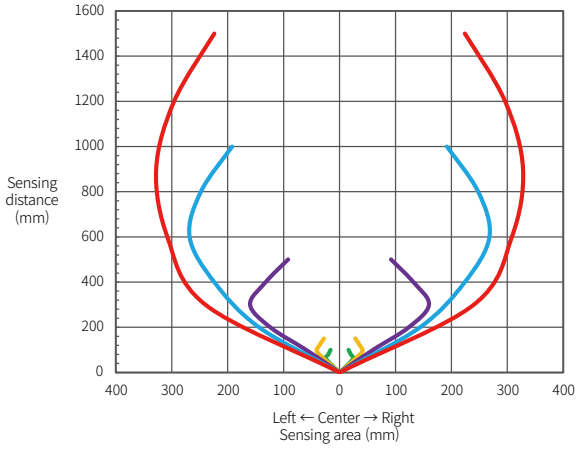
■ FDC-310-10R



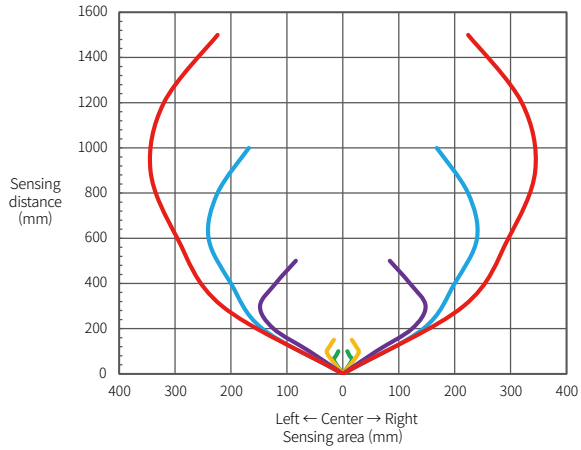
■ FDF-210-05R



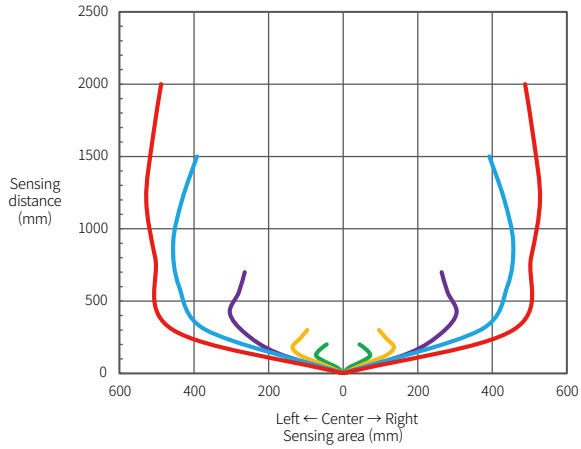
■ FDFN-210-05R



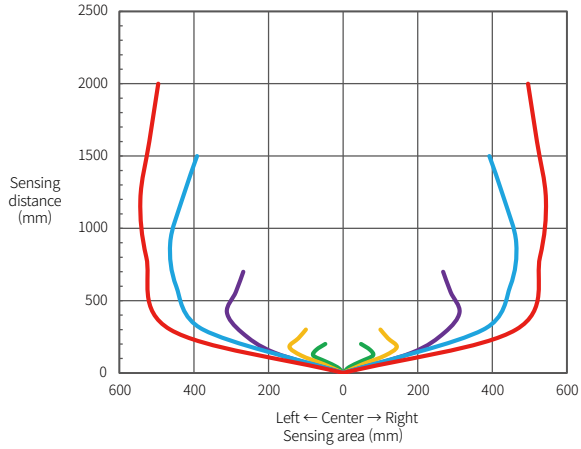
■ FDFU-210-05R



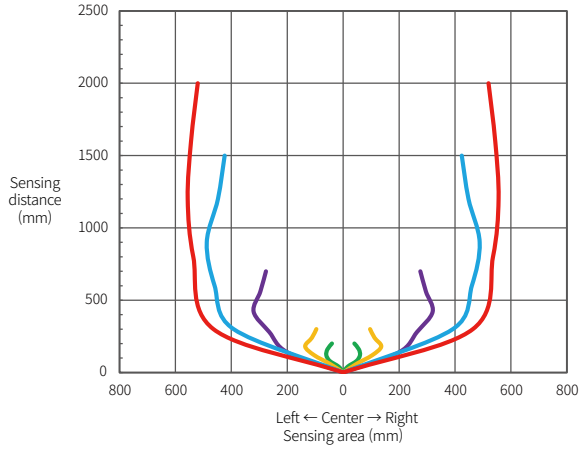
■ GDL-620-12H2



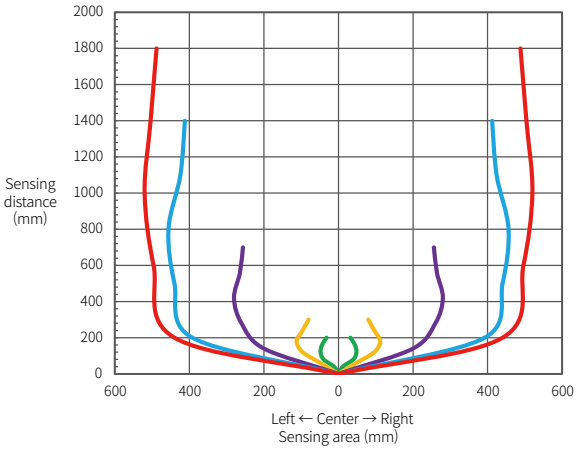
■ GDL-620-12H3



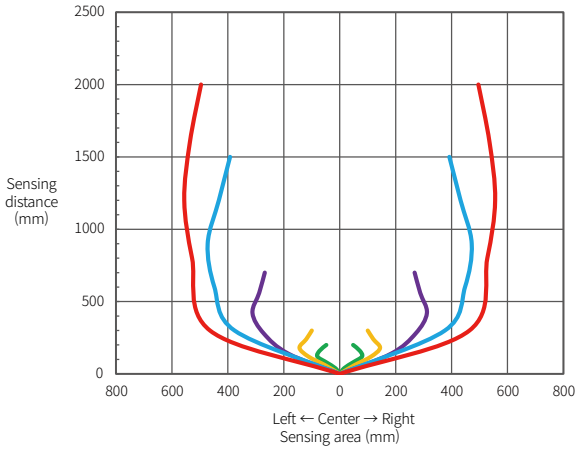
■ GDL-610-12V2 (VA01)



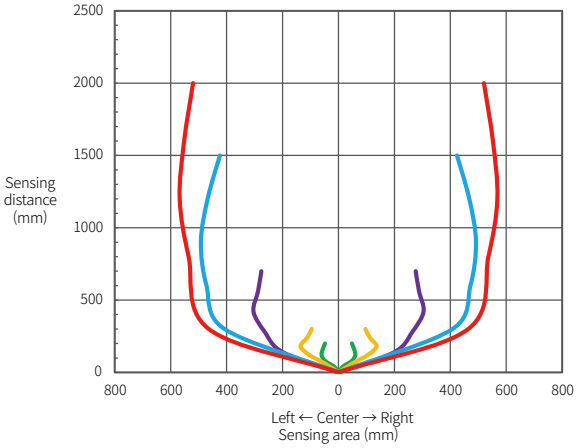
■ GDL-610-12V2 (VA02)



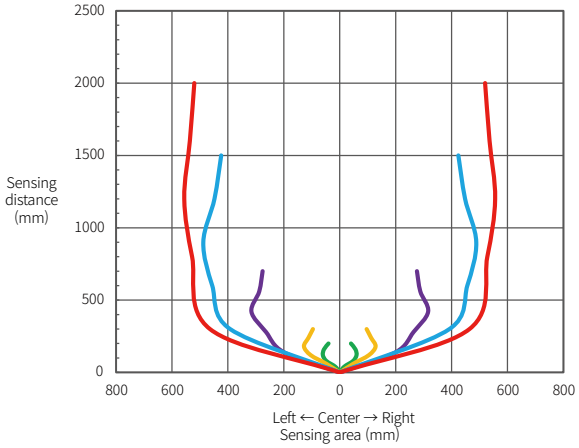
■ GDR-620-17H3



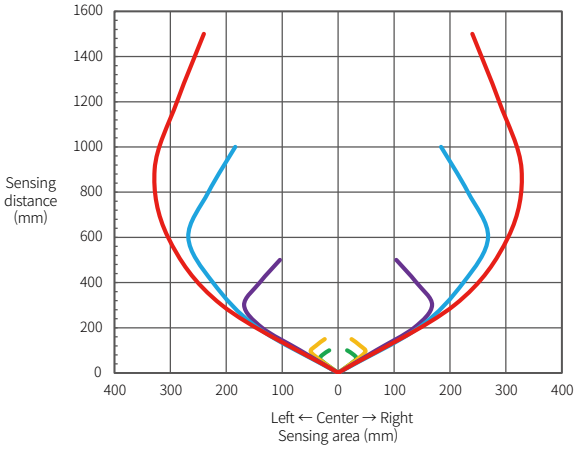
■ FDP-320-10



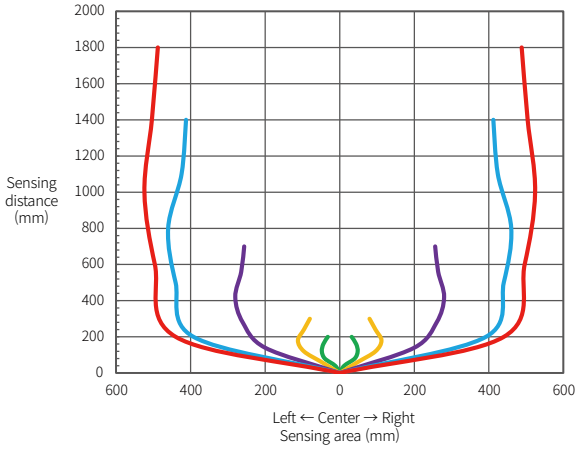
■ FDRT-420-02B



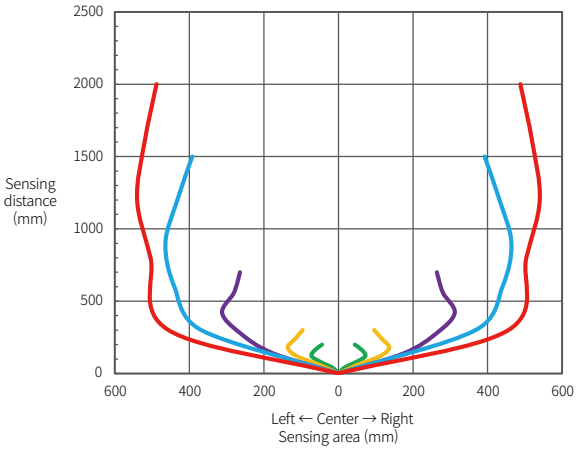
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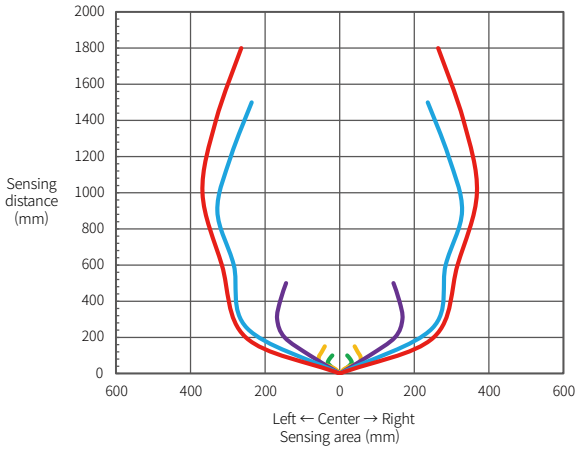
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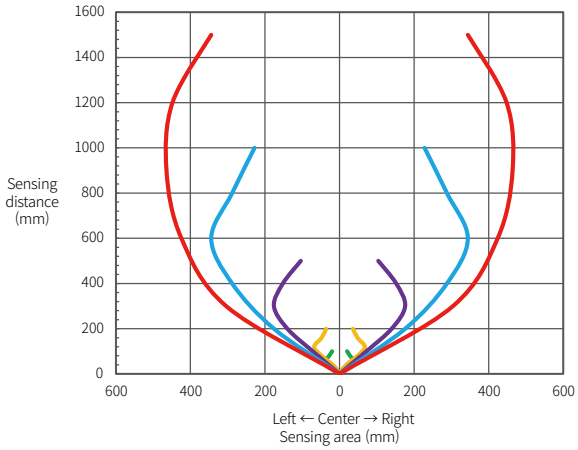
■ GDR-620-17H2



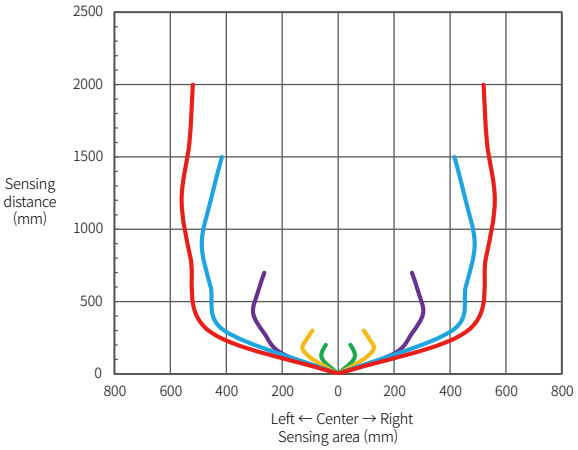
■ FDS-320-05



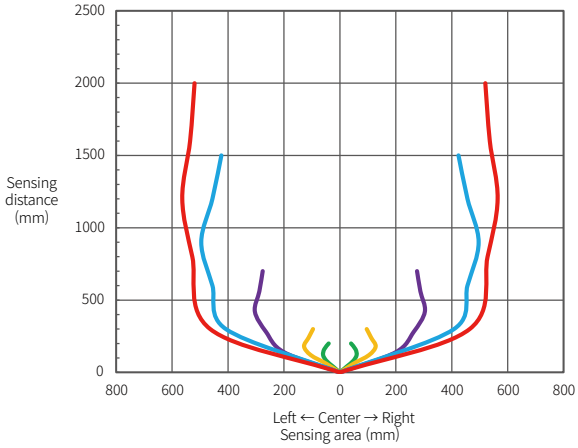
■ FDS-420-05



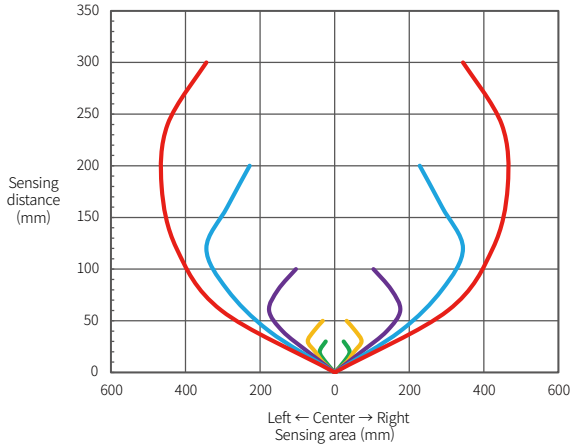
■ FDS2-620-10



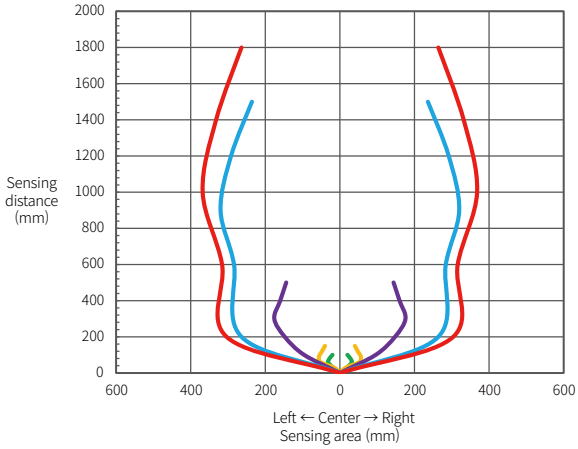
■ FDS-620-10



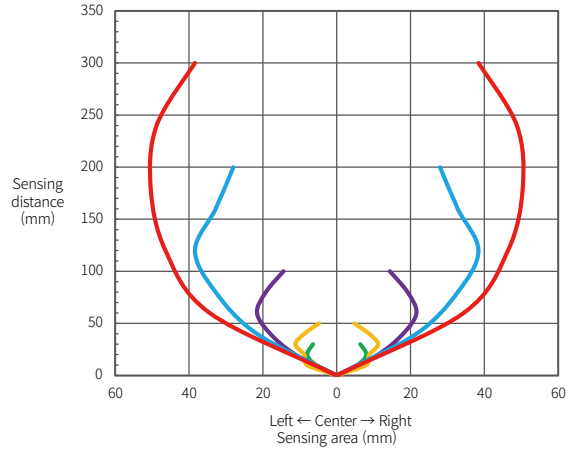
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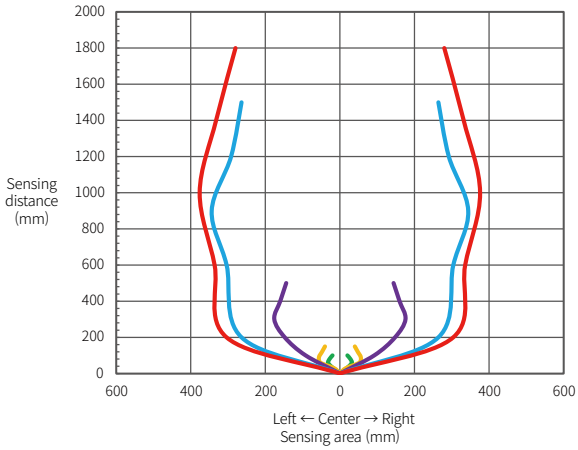
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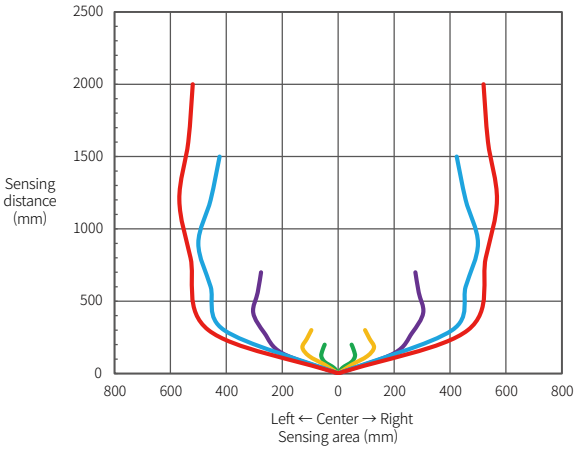
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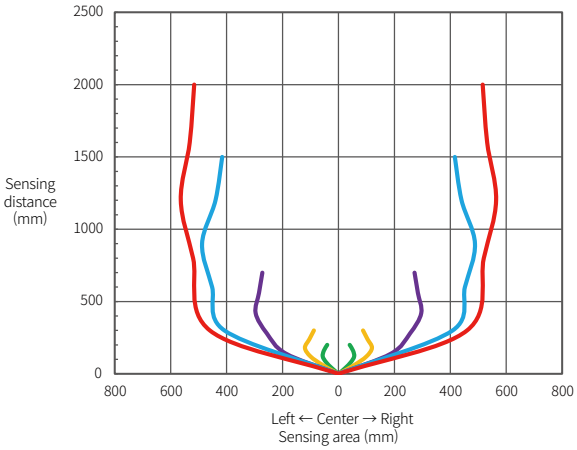
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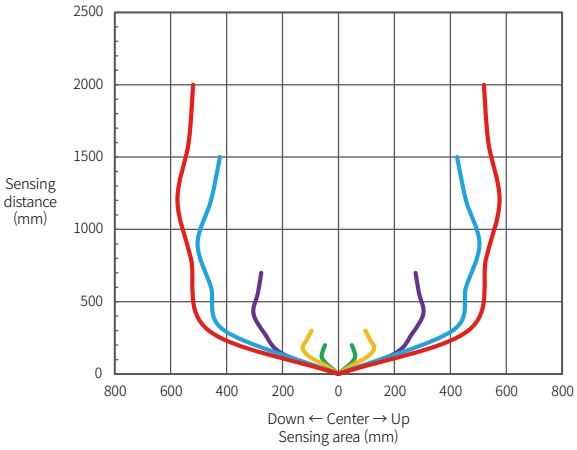
■ FDW10-320-02B



■ FDW10T-320-02B (horizontal)

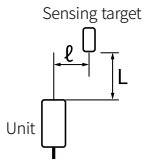


■ FDW10T-320-02B (vertical)

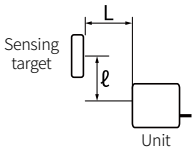


Detection Area Characteristics: Convergent Reflective Type (TYPICAL)

• Horizontal shift (Left ← Center → Right)



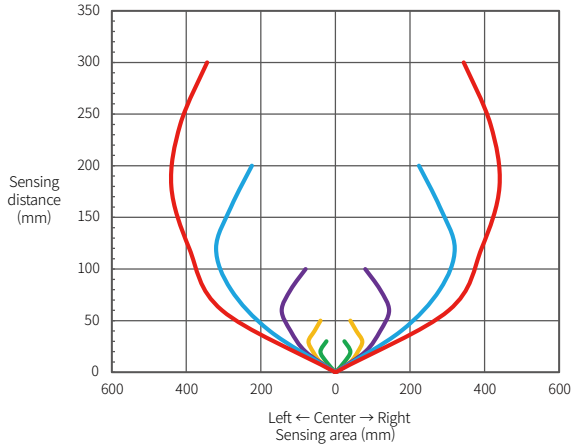
• Vertical shift (Down ← Center → Up)



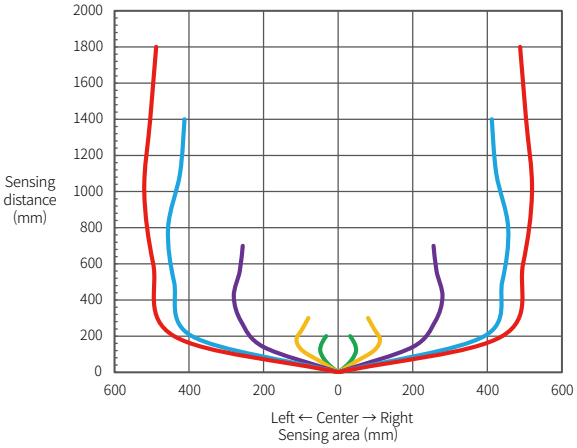
• Legend

MFST (25 µs)	UFST (50 µs)	STD (500 µs)	ULOG (10 ms)	MLOG (20 ms)

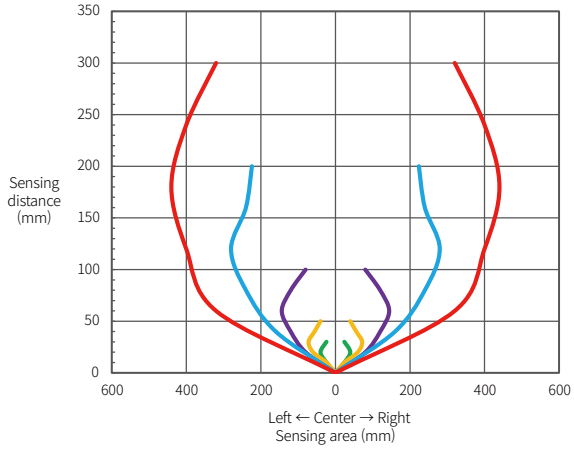
■ FLF-320-05



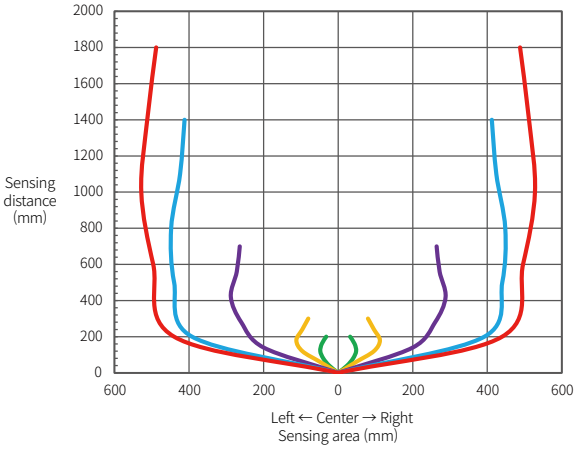
■ FLF-320-10H



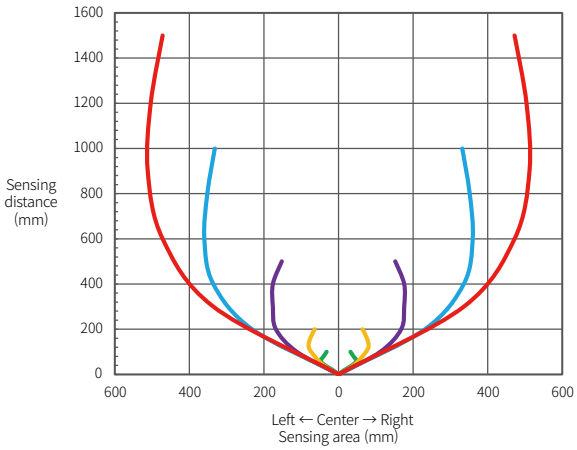
■ FLF-320-10



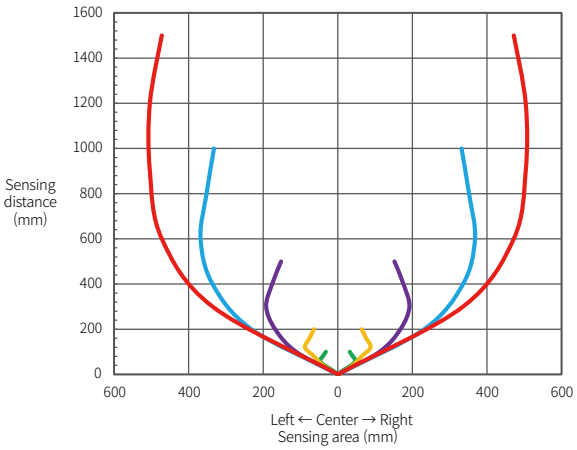
■ GLF-320-12H2L



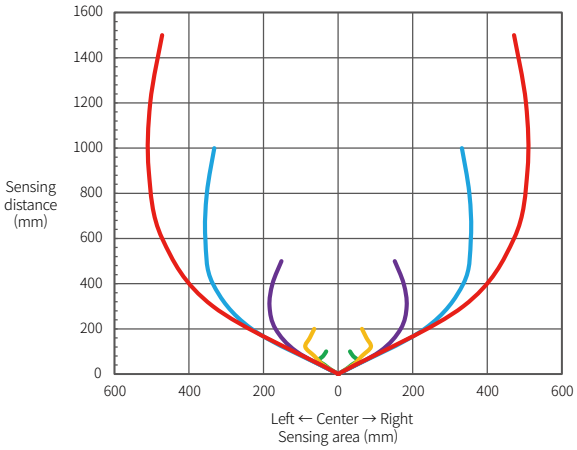
■ FLF-320-10A



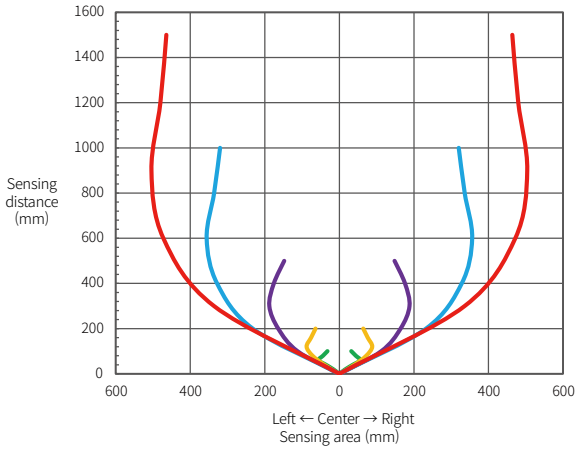
■ FLF-310-10V (VA01)



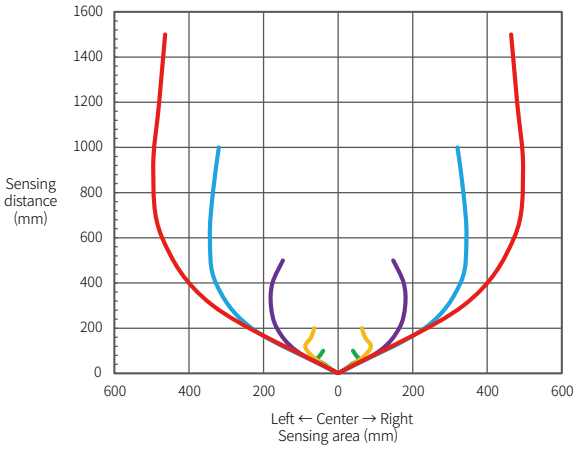
■ FLF-310-10V (VA02)



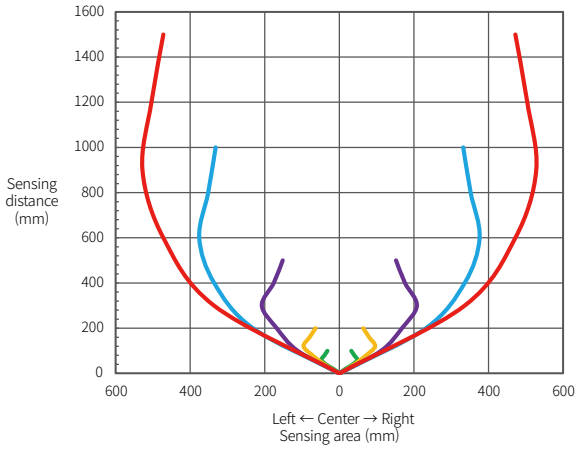
■ GLF-310-12V2L (VA02)



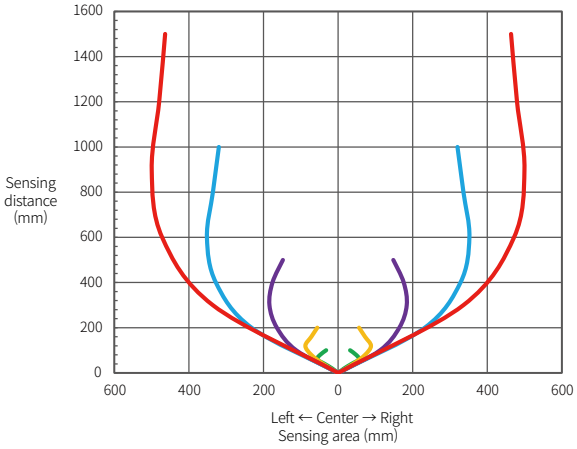
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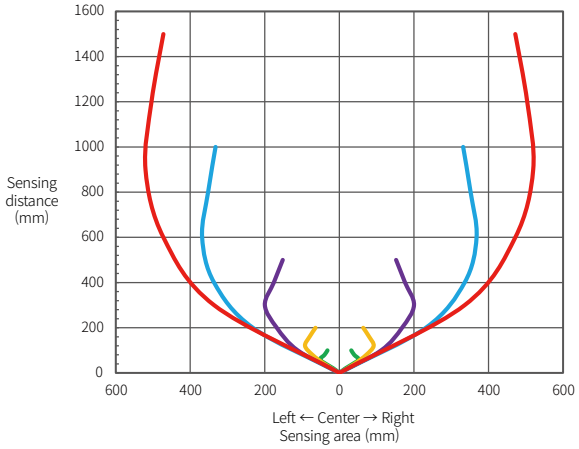
■ GLF-310-12V3L (VA01)



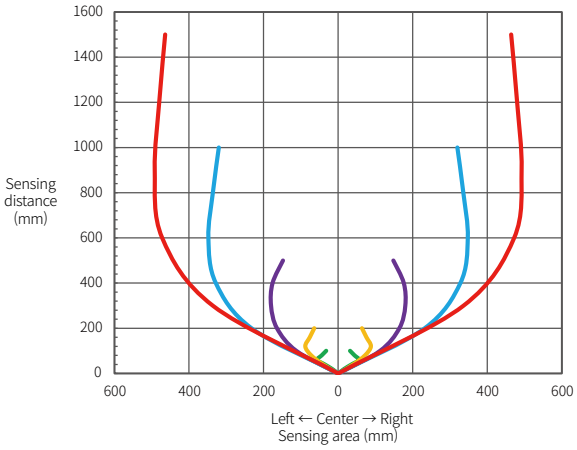
■ GLF-310-12V2 (VA02)



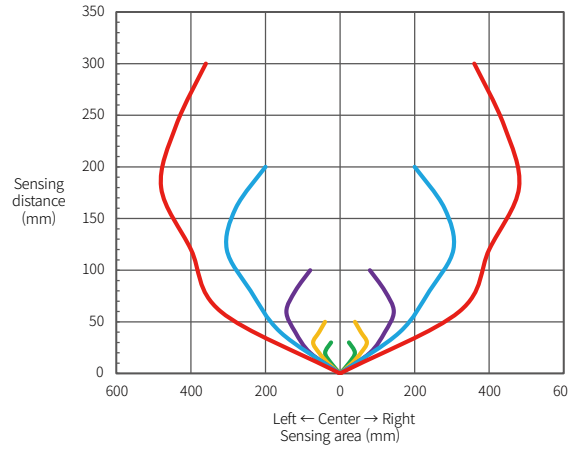
■ GLF-310-12V3L (VA02)



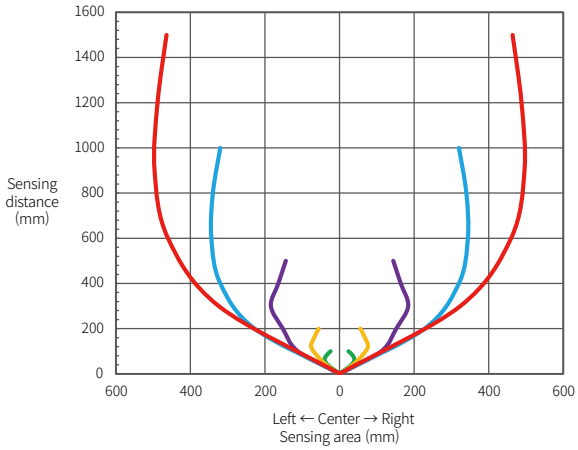
■ GLF-310-12V2L (VA01)



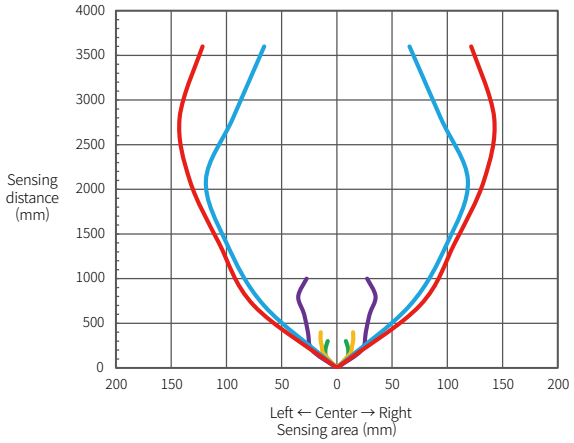
■ FLF-320-05R



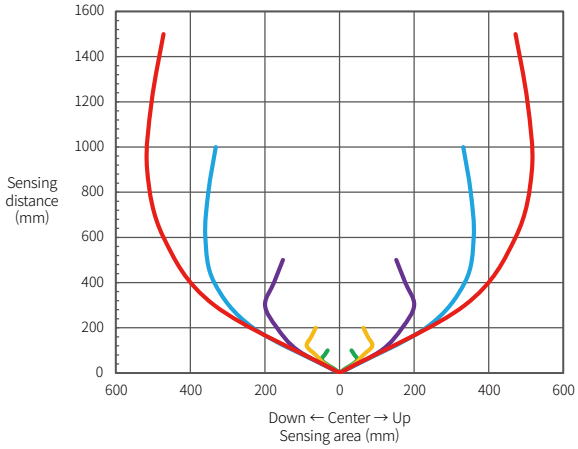
■ FLFU-320-10WP (horizontal)



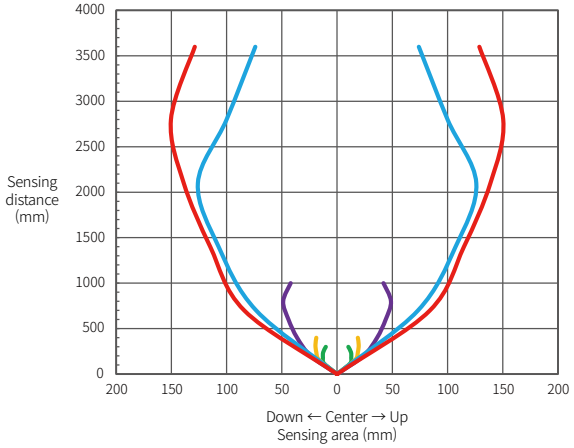
■ GLFU-320-12H3 (horizontal)



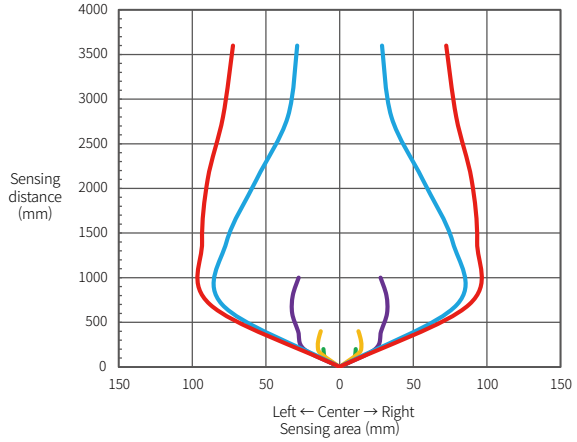
■ FLFU-320-10WP (vertical)



■ GLFU-320-12H3 (vertical)



■ GLFU-320-12H2 (horizontal)



■ GLFU-320-12H2 (vertical)

