F3W-D

CSM_F3W-D_DS_F_1 ·

Compact, Resistant to Mutual Interference, and Ideal for Picking a Variety of Parts.

- Mounts to a parts rack and uses indicators to show parts picking procedures. Functions as a mistake-proofing Sensor.
- Models with direct UNI-WIRE connection are also available.
- Use either the built-in LED indicators or external picking indicators.



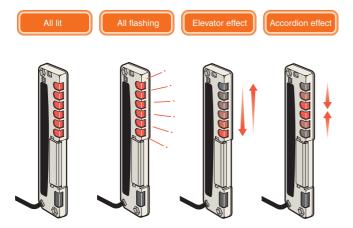
Be sure to read *Safety Precautions* on page 8.



Sensing Distance of 3 m

Selectable Display Mode: All Lighting, All Flashing, Elevator-like Lighting, Accordion-like Lighting

- Six picking indicators provide very clear displays.
- Selectable display speed (slow/fast)





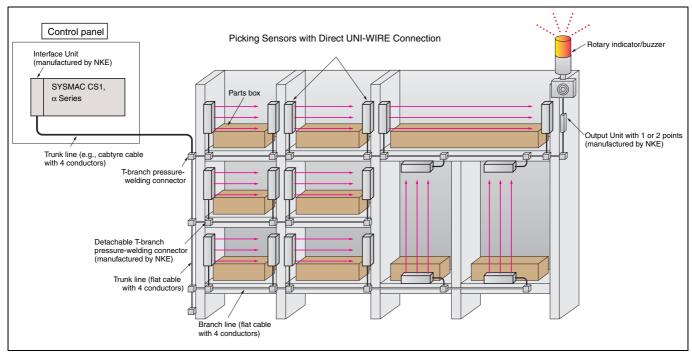
External Picking Indicators Can Be Connected

An external indicator can be directly connected to the Picking Sensor and mounted in an easy-to-see location.



Models with Direct UNI-WIRE Connection Enable Simplification of the Picking System Wiring

Up to 64 Picking Sensors can be connected to a single UNI-WIRE Interface Unit.



Ordering Information

Sensors

Sensing	_	Connection Sensing		ng Beams Sensing		_	External		
method	Appearance	method (cable length)	distance	Gap	Gap Qty width (mm)		Output type	indicator	Model
Through-beam		Pre-wired (5 m)		25 mm			NPN open		F3W-D052A *2
	Precor	Fie-wired (5 iii)	3 m					Possible	F3W-D052AP*2
		Pre-wired connector (2 m)					collector		F3W-D052B *2, 3
					5	5 100		Possible	F3W-D052BP*2, 3
		Pre-wired (2 m)					UNI-WIRE SYSTEM		F3W-D052U
		i ie-wiied (2 III)					direct connection *1	Possible	F3W-D052UP

Accessories (Order Separately)

Mounting Brackets

Appearance	Model	Qty	Remarks
	F39-L10	2	L-shaped Mounting Bracket (mounting screws included)
	F39-L11	2	Flat Mounting Bracket (mounting screws included)

Protective Bracket

Appearance	Model	Qty	
	F39-L12	One each for Emitter and Receiver (mounting screws included)	

^{*1.} The UNI-WIRE SYSTEM is a wire-saving system developed jointly by NKE Corporation and Kuroda Precision Industries, Ltd.
*2. Models with PNP outputs are also available. To order PNP Models, replace A with C in the model number for a Pre-wired Model and B with D in the model number for a Pre-wired Connector Model (Example: F3W-D052C).

^{*3.} The XS2F-D521-□G0 is the applicable connector cable. The colors of the external sheathes of the conductors, however, are different. Refer to the XS2.

Y-shaped Joint Plugs and Sockets (Cable with Connectors on Both Ends)

Appearance	Overall length	Model	Qty
100	2 m	XS2R-D526 -S001-2	1
00 OF	5 m	XS2R-D526 -S001-5	1

Y-shaped Joint Plugs and Sockets without Cable

Appearance	Model	Qty	Remarks
557	XS2R-D526 -S003	1	Connecting cable: Cable with connectors on both ends: XS2W Series Cable with connector on one end: XS2F Series 4-conductor models

UNI-WIRE Direct Connection Peripheral Devices

Name	Appearance	Model	Qty	Remarks
Flat cable		SCA1-4F10	1	4 × 0.75 mm ² 100 m
Extension IDC		SCN1-TH4E	1	
T-branch IDC		SCN1-TH4	1	

NKE UNI-WIRE System Peripheral Devices

Name	Appearance	Model	Remarks
C200H/CS1 UNI-WIRE Interface Unit		OMC02-HUW -Z285	Applicable PLCs: C200H/HS C200HE/HG/ HX CS1
1-point DC Input Unit		L6S-H1F2O -Z285	
2-point DC Input Unit		L6S-H2F2O -Z285	
1-point Transis- tor Output Unit		L6P-H1B2O -Z285	Small I/O Distribution
2-point Transis- tor Output Unit	7	L6P-H2B2O -Z285	Units
1-point DC Input/ 1-point Transis- tor Output Unit		L6X-H2FB2O -Z285	
		MAF-S407FO	
Detachable T-branch IDC	Terminator	MAF- S407FEO	
	Plug	MAF-P405CO	Plug for MAF-S407FO/ MAF-S407FEO

Note: Consult an NKE sales office for purchasing information.

Ratings and Specifications of NKE UNI-WIRE Interface Unit

Item Model	OMC02-HUW-Z285		
Transmission method	Bi-directional: Orthogonal frequency division multiplexing		
Synchronization method	Bit synchronization		
Transmission protocol	UNI-WIRE protocol		
Baud rate	7.35 kbps (Z12)		
Transmission distance	100 m (trunk line) + 20 m (branch line)		
Transmission delay	128 points: 66 ms max., 256 points: 120 ms max.		
Connection method	Multi-drop		
Number of I/O points	128 points or 256 points		
Number of connected units Picking Sensors: 64			
Connecting cable	D and G trunk lines: 2 mm² min. Branch lines: 0.75-mm² flat cable		

Note: Contacts for inquires regarding the UNI-WIRE Interface Unit

NKE Corporation

Sales office

Tokyo Sales Office, 2-12-2 Taito, Taito-ku, Tokyo 110-0016 (Fuji DIC

Building)

TEL(03)3833-5330 FAX(03)3833-5350

Osaka Sales Office, 1-2-13 (Shinmachi Building) Shinmachi, Nishi-ku,

Osaka 550-0013 TEL(06)6538-7136 FAX(06)6538-7138

Nagoya Sales Office, 2-13-22 Iseyama, Naka-ku, Nagoya 460-0026

(ITOH Building) TEL(052)322-3481 FAX(052)322-3483

Kyoto Sales Office, 336-1 Hazukashi Hishikawacho, Fushimi-ku, Kyoto 612-8487

TEL(075)924-3293 FAX(075)924-3290

Toll-free TEL number: 0120-77-2018 (Only in Japan)

Ratings and Specifications

Through-beam					
F3W-D052A (P) *1	F3W-D052B (P) *1	F3W-D052U (P) *1			
tchable between LONG mode	e (1 to 3 m) and SHORT mode: (0.05 t	o 1 m), factory-set to SHORT mode.			
5					
Standard sensing object Opaque, 35 mm dia. min.					
LED (860 nm)					
VDC±10% (ripple (p-p): 10%	max.)	24 VDC ±10%, ripple (p-p) 10% max. (supplied by UNI-WIRE SYSTEM, other power supply also possible)			
0.6 W max., Receiver: 0.7 W	max.	Emitter/Receiver: 0.6 W max.			
en collector with 100 mA max en collector output type I or Light-ON (selectable)	. at 30 VDC	Transmission output (output address set using DIP switch 3 control output address setting switch)			
llector with relay or transistor ON: Input voltage of 0 to 2 V OFF: Open (with leakage cu	, ·	Transmission input (input address set using DIP switch 2 instruction input address setting switch)			
Reverse-connection protection, output short protection, and mutual interference prevention function (set with frequency switch)					
Reset: 10 ms max.	Operate/release: 39 ms (64-bit), 66 ms (128-bit), or 120 ms (256-bit) max.*2				
Operation indicator (orange), stability indicator (green), and 6 picking indicators (orange), UNI-WIRE Direct Connection Models: Transmission indicator (orange) *3					
Power indicator (green), different frequency indicator (green), and 6 picking indicators (orange), UNI-WIRE Direct Connection Models: Transmission indicator (orange) *3					
Operating: -10° to 55°C, Storage: -25° to 70°C (with no icing or condensation)					
35% to 85% (with no condensation)					
20 M Ω min. (at 500 VDC)					
1,000 VAC 50/60 Hz for 1 min					
10 to 50 Hz, 1.5-mm double-amplitude for 2 hours each in X, Y and Z directions					
² , 3 times each in X, Y and Z	directions				
9: IP62 (with the operation co	over closed)				
d d cable length: 5 m *4	Pre-wired connector (M12 5-pin connector) Standard cable length: 2 m *4	Pre-wired Standard cable length: 2 m			
360 g	Approx. 230 g	Approx. 220 g			
in		1			
esin					
A6)					
on manual					
0	n manual	n manual			

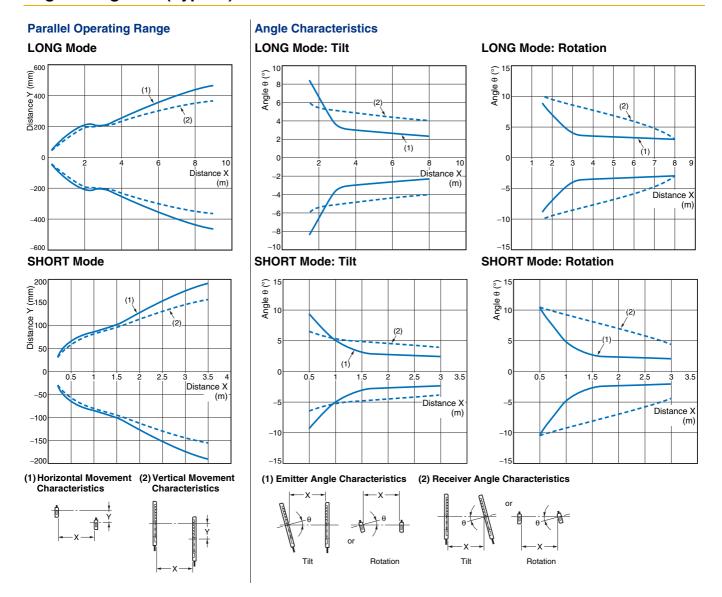
^{*1.} The F3W-D052 P Emitters are provided with the external picking indicator output line shown in the following table.

Item	F3W-D052AP, F3W-D052BP, F3W-D052UP
Connection method	Pre-wired (standard cable length: 300 mm)
Electrical specifications	Output current: 50 mA max. Output voltage: Fixed at Sensor power supply voltage

^{*2.} Response time includes transfer delay time.
*3. The transmission indicator indicates bus transmission status.
*4. The following cable lengths are also available.
F3W-D052A (P): 2 m, 7 m
F3W-D052B (P): 1 m, 3.5 m

F3W-D

Engineering Data (Typical)



I/O Circuits

NPN Open-collector Outputs

Model	Operation mode	Timing chart	Mode selector switch	Output circuit
F3W -D052A F3W -D052AP	Dark-ON mode ON: One beam or more is interrupted OFF: No beam is interrupted	Light No beam is interrupted incident One beam or more is interrupted Operation indicator (orange) OFF Control output OFF Load (relay, etc.) Operate Reset	D-ON (DARK ON)	F3W-D052A□-L/B□-L F3W-D052A□-L/B□-D F3W-D052A□-D/B□-D F3W-D052A□-DB□-D
F3W -D052B F3W -D052BP	Light-ON mode ON: No beam is interrupted OFF: One beam or more is interrupted	Light No beam is interrupted incident One beam or more is interrupted Operation indicator ON (orange) OFF ON Control output OFF Operate Load (relay, etc.)	L-ON (LIGHT ON)	D052AP-L/BP-L only. *2. The circled numbers represent external picking indicator output pin numbers. The following diagram shows the relationship between the picking instruction input, picking indicator status, and external picking indicator output. DIP switch 1 is used to switch the picking display mode between all lighting, all flashing, elevator-like lighting, and accordion-like lighting. It is also possible to switch the external picking indicator display mode between lighting and flashing. Picking instruction over the picking indicator over the picking indicator over the picking indicator over the picking display mode between lighting and flashing. Picking instruction over the picking indicator over the p

Model	Operation Mode	Timing chart	Mode selector switch	Output circuit
F3W -D052U F3W -D052UP	Dark-ON mode ON: One beam or more is interrupted OFF: No beam is interrupted	Light No beam is interrupted incident One beam or more is interrupted Operation indicator ON (orange) OFF UNI-WIRE output ON	D-ON (DARK ON)	F3W-D052U-L Different Trans- ploking Power Trans- indicator
	Light-ON mode ON: No beam is interrupted OFF: One beam or more is interrupted	Light No beam is interrupted incident One beam or more is interrupted Operation indicator ON (orange) OFF UNI-WIRE output OFF	L-ON (LIGHT ON)	*2. The circled numbers represent external picking indicator output pin numbers. The following diagram shows the relationship between the picking instruction input, picking indicator status, and external picking indicator output. DIP switch 1 is used to switch the picking display mode between all lighting, all flashing, elevator-like lighting, and accordion-like lighting. It is also possible to switch the external picking indicator display mode between lighting and flashing. The instruction input address is set with DIP switch 2. Picking instruction input (transmission input) OFF OFF ON

F3W-D

Setting Method

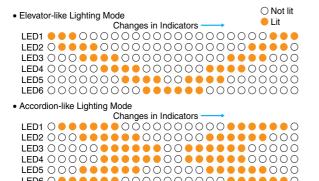
NPN Open-collector Output Models DIP Switch 1 Mode Switching

Emitters

DIP switch 1		Function	OFF(left) (■_)	ON(right) (□■)				
	1	Flash Pattern (picking display mode setting)	See table below. *1					
1 O O	3	Flash Time *2 (picking indicator flashing speed setting)	Slow	Fast				
4	4	External Flash Pattern (external picking display mode setting) *3	Lit	Flashing				
	5	Not used.						
	6	Frequency Setting *4	A (frequency A)	B (frequency B)				

*1. DIP Switch 1 Picking Display Mode Setting

DIP switch 1	SW 1-1	SW 1-2	Display mode
	OFF	OFF	All lighting (All six indicators light.)
1 0	ON	OFF	All flashing (All six indictors flash simultaneously.)
2 N 3 N 4 N 5 N	OFF	ON	Elevator-like lighting (Two adjacent indicators simultaneously light so that lighting moves up and down.)
<u> </u>	ON	ON	Accordion-like lighting (Some or all indicators simultaneously light so that lighting moves like an accordion.)



- LED6 •••••••

 *2. The flashing speed can be changed in picking display mode (all flashing, elevator-like lighting, or accordion-like lighting) or in external picking display mode. The flashing speed varies with each display mode.
- *3. This setting is supported for F3W-D052 P-L Emitters only.
- *4. Mutual Interference Prevention Function:

The frequency selector is used to switch the emitting frequency between A and B. Making the emitting frequencies of two Sensors different helps prevent malfunction caused by mutual interference.

Models with Direct UNI-WIRE Connection Setting Addresses

- (1) Set the picking instruction input address using DIP switch 2 on the Emitter and Receiver.
- (2) Set the control output addresses using DIP switch 3 on the Receiver.
- The total number of switch addresses set to ON determines the set address (e.g., address 22 in the diagram at right).
- Make sure that the addresses of the picking instruction inputs of the Emitter and the Receiver that are used as a set are the same.

Transmission Status

The transmission indicator indicates the status of bus transmission as follows:

Flashing: Normal operation
ON or OFF: Transmission error

Only one picking indicator flashing also indicates a transmission error.

Receivers

Function	OFF(left)	6 11/1 1 1
Function	(■ _)	ON(right) (□■)
Flash Pattern (picking display mode setting)	See table below. *1	
Flash Time *2 (picking indicator flashing speed setting)	Slow	Fast
Operation mode setting	Dark-ON	Light-ON
Sensing distance (sensitivity) setting	LONG mode (1 to 3 m)	SHORT mode (0.05 to 1 m)
Frequency Setting (F3W-D052U□ only) *4	A (frequency A)	B (frequency B)
	(picking display mode setting) Flash Time *2 (picking indicator flashing speed setting) Operation mode setting Sensing distance (sensitivity) setting Frequency Setting	(picking display mode setting) Flash Time *2 (picking indicator flashing speed setting) Operation mode setting Sensing distance (sensitivity) setting Frequency Setting See table Slow LONG mode (1 to 3 m) Frequency Setting A

Weight

The weight of the F3W-D052U in the UNI-WIRE SYSTEM is the weight of one terminal consisting of the Emitter and Receiver pair.

IDs

DIP switches

2 and 3

Number of addresses

2

4

8

16

32

64

IDs are set separately for the Emitter and the Receiver.

Emitter: The picking instruction input address setting is the ID address.

Receiver: The control output address setting is the ID address.

Note: The ID is an identification number for broken wire position detection.

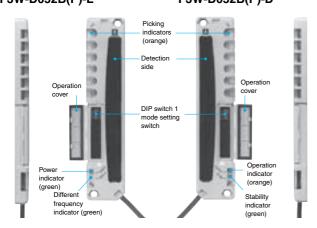
Power Supply

If a power voltage drop occurs in a remote section, consider using a local (separate) power supply.

Nomenclature

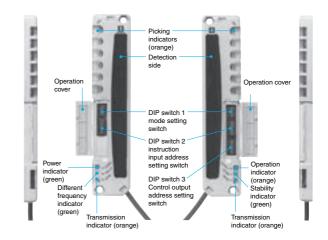
NPN Open Collector Output Models

Emitter Receiver F3W-D052A(P)-L F3W-D052A(P)-D F3W-D052B(P)-L F3W-D052B(P)-D



UNI-WIRE Direct Connection Models

Emitter Receiver F3W-D052U(P)-L F3W-D052U(P)-D



Safety Precautions

Refer to Warranty and Limitations of Liability.

MARNING

Do not apply the F3W-D as safety mechanisms used in pressing machines or any other safety mechanisms for protecting the human body from danger.



- (1) Do not apply the F3W-D as safety mechanisms used in pressing machines, shears, rolling machines, spinning machines, cotton mill machines, or robots for the protection of an operator's hands and body.
- (2) The F3W-D is designed for detection of the human body or moving objects in the detection area but not for protection against danger.
- (3) The F3W-D or any product incorporating the F3W-D may be exported to any country. Should the F3W-D cause any problem conflicting with local laws or related to product liability locally, however, OMRON shall, without exception, assume no responsibility for it.

A CAUTION

Before using more than one F3W-D Sensor in parallel or series, take necessary countermeasures against mutual interference so that the Sensors will not malfunction. Refer to *Mutual Interference Prevention Function* on the right.

Precautions for Safe Use

Operating Environment

- Do not use the Sensor in an environment containing flammable or volatile gases.
- Do not use the Sensor underwater.
- Do not disassemble, repair, or modify the Sensor.
- Always turn OFF the system power before installing or replacing the Sensor.

Precautions for Correct Use

Do not use the product in atmospheres or environments that exceed product ratings.

System Design

Mutual Interference Prevention Function

(1) Two Sets of Sensors:

Set these Sensors to different frequencies with the frequency selector. Refer to *DIP Switch 1 Mode Switching* on page 7. If the mutual interference prevention function is not used, and there are two Sensors with the same frequency setting, a beam from the Emitter of one Sensor may hit the Receiver of the other Sensor, resulting in malfunction.

This function cannot prevent mutual interference between the F3W-D Sensor and a Photoelectric Sensor of a different model.

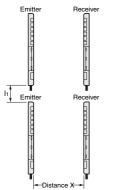
(2) Three or More Sets of Sensors:

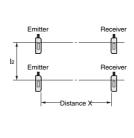
When 3 or more sets of Sensors are used in parallel, mutual interference may result in malfunction. Take the following measures to prevent mutual interference, and check for mutual interference. While in LONG mode, the Sensors are more easily affected by interference. Therefore, if the distance between the Emitter and Receiver of a Sensor is 1 m or less, use the SHORT mode.

• The distance between two adjacent sets of Sensors must be at least I₁ or I₂, which does not cause mutual interference between two Sensors with the same frequency setting. I₁ or I₂ is at least 1.5 times the distance shown in Parallel Operating Range of the Engineering Data.

Vertical Installation

Horizontal Installation





• Install a baffle so that there will not be mutual interference between Sensors with the same frequency setting. (See *Figure* 1.)

A light reflection from the wall or floor may go around a baffle and reach the Receivers. Install a baffle so that it will also block any light reflection. (See *Figure* 2.)

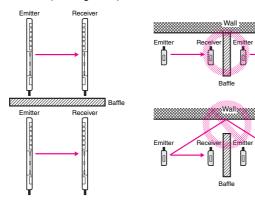


Figure 2

Wiring Precautions

Figure 1

Connection

- Before turning ON the power, make sure that the supply voltage is within the maximum allowable voltage range.
- Always connect the sync lines.
- Be very careful not to get metal chips in the connector, especially during wiring.
- Incorrect wiring may damage the equipment. Make sure that the cable length and routing are appropriate to prevent the connectors and cables from getting disconnected.
- Always leave the operation cover closed during operation.
- Applying excessive force to the mode switch may result in damage.
 Do not apply a force of more than 5 N.

Cables

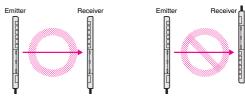
Make sure that the bending radius is 25 mm or more.

Installation Precautions

Installation

- Install the Sensor so that its sensing face will not receive light from the sun, fluorescent lamps, incandescent lamps, and other light sources.
- Do not strike the Sensor with a hammer or any other tool during installation, otherwise the internal circuits of the Sensor may be damaged.

• Install the Emitter and Receiver in the same orientation as shown in the following figure. (The cables must be in the same direction.)



- Use M4 screws to secure the Sensor body.
- Secure the case to a tightening torque of 1.2 N·m or less.

Reflection from Wall or Floor

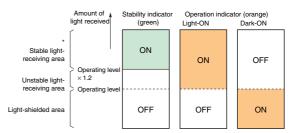
If the Emitter and Receiver are installed as shown in the following illustration, all the axes may not be interrupted due to light reflection from the floor or wall. Make sure that the Emitter and Receiver detect the sensing object properly before using the F3W-D in actual operation.

Side View Emitter Receiver Sensing object Floor Floor Floor Receiver

Adjustment

Operation and Stability Status Display

- The following illustration shows the indicator status corresponding to each incident level.
- Install the Receiver so that the green stability indicators are both ON in light receiving status.



* If the Receiver is set to the stable light-receiving area, it will become more resistant to environmental fluctuations such as temperature, voltage, dust, and setting deviation after installation. For applications where a stable light-receiving area is not obtained, attention must be paid to environmental fluctuations.

Error Display

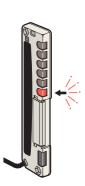
F3W-D052 Picking Sensors are provided with only one error display mode.

If an error occurs, the indicator on the Sensor's Receiver, as indicated by the arrow in the diagram on the right, will flash.

The error indicated in this example is a synchronization error.

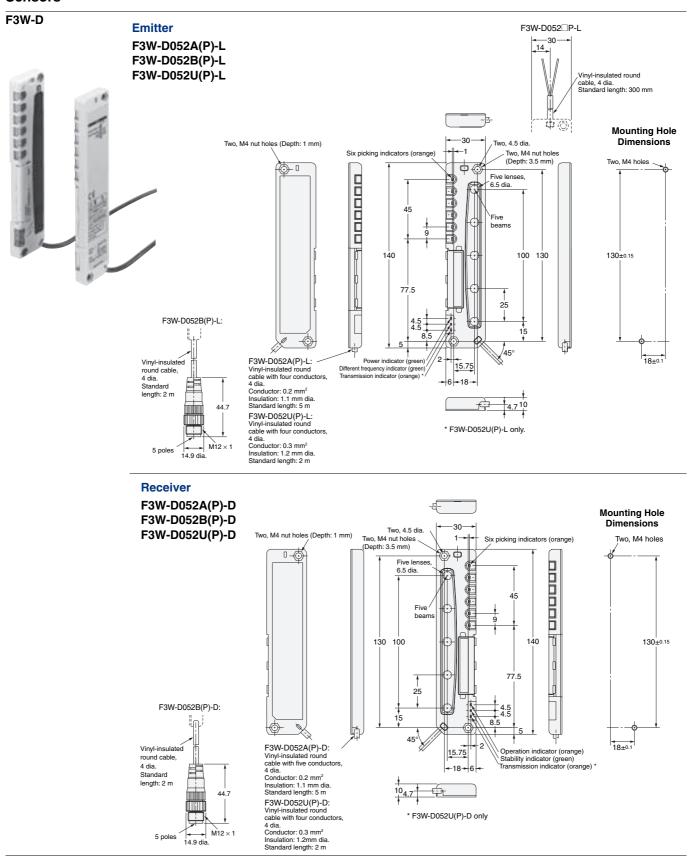
The possible causes are as follows:

- 1. The sync line is not connected.
- 2. The sync line is shorted with another line.
- UNI-WIRE communications are not being performed (when an F3W-D052U UNI-WIRE Direct Connection Model is being used).



Dimensions (Unit: mm)

Sensors



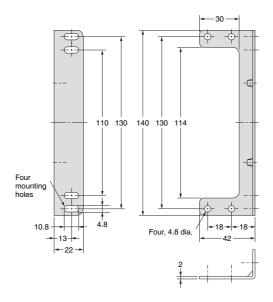
Accessories (Sold Separately)

Mounting Brackets

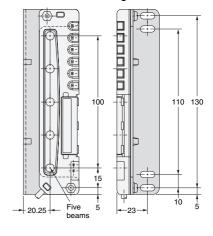
F39-L10(L-shaped)



Material: Iron (Thickness: 2 mm) Mounting screws provided.



F3W-D052A-D with Mounting Bracket



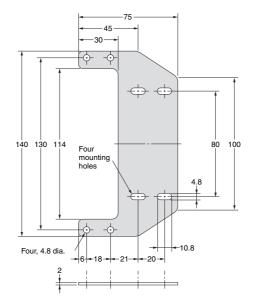


Mounting Brackets

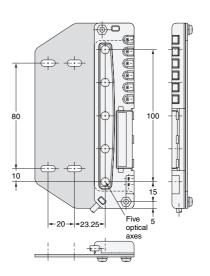
F39-L11(Flat)



Material: Iron (Thickness: 2 mm) Mounting screws provided.



F3W-D052A-D with Mounting Bracket



Protective Bracket

F39-L12(Receiver)



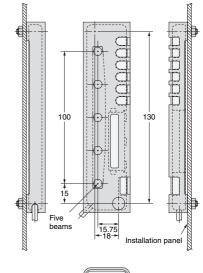
Material: Iron (Thickness: 1.6 mm) Mounting screws provided.

Note: The Emitter and Receiver are axially symmetrical.

Five, 10 dia. 10.6 144 130 100 40.5 77.5 12.7 15.75 Two, 9.5 dia. 14.2 14.2 14.2 14.1 14.2 15.75 Two, 9.5 dia. 8.1

35.2

F3W-D052A-D with Protective Bracket



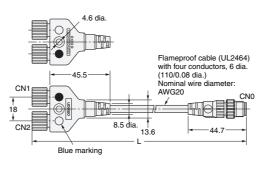


Y-shaped Joint Plugs and Sockets (Cable with Connectors on Both Ends)

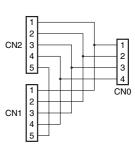
XS2R-D526-S001-2 (L=2,000 mm) XS2R-D526-S001-5 (L=5,000 mm)







Wiring Diagram

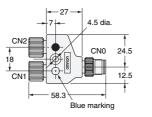


Y-shaped Joint Plugs and Sockets without Cable

XS2R-D526-S003







Wiring Diagram

