

◆ Precautions for Use

- This product must be handled by qualified personnel with expertise in electrical and mechanical engineering.
- This product is designed for use with our positioning stages. Do not use it for detection applications in other industrial equipment. We shall not be liable for any damage resulting from failure to comply with this warning.

⚠ WARNING

- Never disassemble or modify this product. Malfunction or improper operation may result in stage damage, equipment damage, or personal injury.
- Always use controllers and motor drivers that meet the specified ratings. Operation outside the specified ratings may result in serious accidents, including electric shock or fire.

⚠ CAUTION

- Check the specifications before wiring. Incorrect wiring may result in product malfunction or equipment damage.
- Do not disconnect the connector on the sensor board or the connector of any connected device while the controller power is ON. This may cause malfunction or damage.
- Do not adjust the sensor while the power is ON.
- Adjust the sensor position using the sensor dog. Do not adjust the sensor by moving the sensor board itself. Also, take care not to drop screws or other small parts during installation.
- If any abnormal condition such as unusual noise, odor, or smoke occurs, immediately stop operation, turn OFF the power supply, and contact your distributor or our sales department.
- Do not use the product in the following environments:
 - ① Locations exposed to excessive dust, oil mist, or corrosive gases
 - ② Locations exposed directly or indirectly to water, oil, or chemicals
 - ③ Locations exposed to radiation

◆ Ratings and Sensor Specifications

Common Specifications

Operating Environment:

Temperature: 0 to 40°C, Humidity: 30 to 85% RH (non-condensing)

Output Type: NPN Open-Collector Output

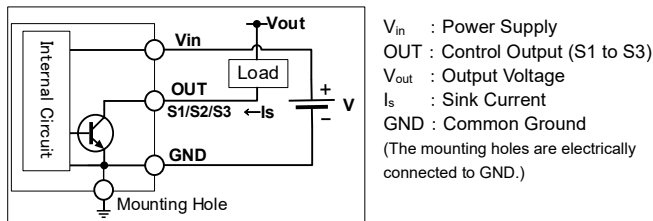
Product Specifications

Model	Power Supply		Control Output		Output Polarity (Light Blocked)		
	Voltage	Current	Output Voltage	Sink Current	S1	S2	S3
F-101	DC 5V	30mA	DC 5V	15mA	H	L	H
F-102	DC12V	30mA	DC12V		L	L	L
F-103	DC24V	30mA	DC24V		H	H	H
F-104		15mA			H	-	-
F-105		15mA			L	-	-
F-107		15mA			H	-	-
F-108		15mA			L	-	-
F-106(R)		25mA	DC 5V	5 mA	H	H	H
F-113		15mA	DC12V		H	-	-
F-115(R)		25mA			H	H	H
F-116(R)		25mA			H	H	H

* The sensor output "-" indicates a 1-sensor(S1) board, so there is no S2/S3.

*(R) indicates a mirror-image version of the sensor.

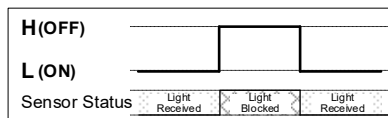
Output Circuit Diagram



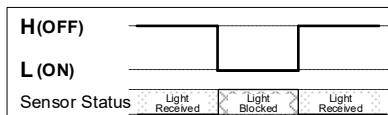
* Refer to the product specifications for electrical ratings.

Sensor Timing Chart

Output = "H" when light is blocked



Output = "L" when light is blocked



◆ Wiring Specifications

•3-Sensor Board Models (S1/S2/S3)

F-101、F-102、F-103

Connector : S5B-EH _JST
 Mating Connector : EHR-5 _JST
 Contact : SEH-001T-P0.6 _JST

F-115(R)、F-116(R)

Connector : SM05B-SHLS-TF _JST
 Mating Connector : SHLP-05V-S-B _JST
 Contact : SSSL-003T-P0.2 _JST

F-106(R)

Solder Connection Specifications

Connector Pin Assignment

No.	Signal
1	Power Supply
2	S1 Sensor Output
3	S2 Sensor Output
4	S3 Sensor Output
5	GND

•1-Sensor Board Models (S1)

F-104、F-105

Connector : S3B-EH _JST
 Mating Connector : EHR-3 _JST
 Contact : SEH-001T-P0.6 _JST

F-107、F-108、F-113

Solder Connection Specifications

Connector Pin Assignment

No.	Signal
1	Power Supply
2	S1 Sensor Output
3	GND

<Precautions for Wiring>

Electrical ratings vary by model. Refer to the product specifications before wiring. For 3-sensor boards, CW and CCW sensor positions vary by stage. Wire the sensors according to the stage configuration. Incorrect wiring may cause improper sensor operation, stage malfunction, or damage. Do not insert or remove connectors while power is ON. Turn the power OFF before connecting the sensor to the controller.

<Changing Sensor Output Polarity>

For the sensor groups listed below, the output polarity can be changed by replacing the sensor board with a corresponding model.

- F-101/F-102/F-103
- F-104/F-105
- F-107/F-108

For sensors other than those listed above, the output cannot be changed because their mounting dimensions and connector specifications differ.

◆ Installation and Adjustment Procedures

Use the screws listed in the table below when mounting the photo sensor.

Applicable Boards	Screw Size
F-101/F-102/F-103/F-104/F-105	M3
F-106(R)/ F-107/F-108/ F-115(R)/ F-116(R)	M2
F-113	M1.7

< Precautions for installation and adjustment>

- Installation

This product is a precision device. Take appropriate electrostatic discharge (ESD) protection measures during installation. Before installation, verify the specifications of the mounting stage and securely mount the sensor, ensuring that no warping, deformation, or misalignment is introduced. Note that each sensor has a protrusion of up to 2.5 mm on its bottom side. Take this into consideration when mounting the sensor.

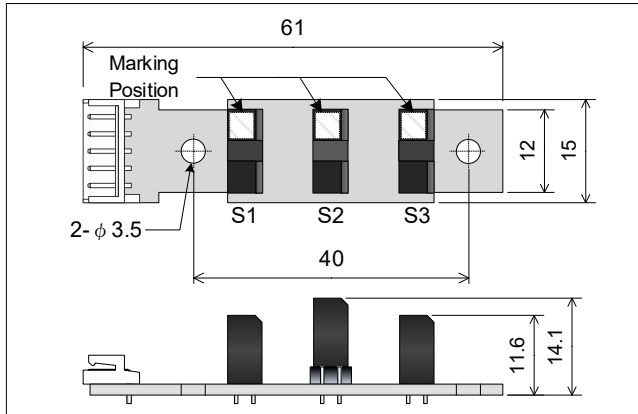
- Adjustment

Always turn the power OFF before adjusting the sensor and perform all adjustments on the sensor dog side. When operating the motor automatically during adjustment, use a low speed and take precautions to prevent overrunning. Ensure that the stage travel remains within the specified range. Since the stopping distance after sensor detection varies depending on the controller and drive speed, confirm that the overrun distance is acceptable before making the adjustment.

◆ Dimensions [Unit: mm]

•3-Sensor (S1/S2/S3) Boards

F-101、F-102、F-103 Dimensions



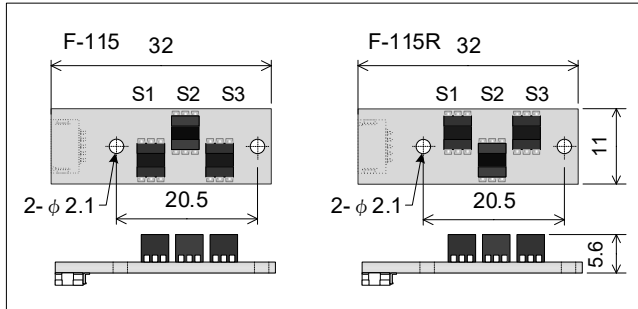
*Marking

F-101: Only S2 has white markings

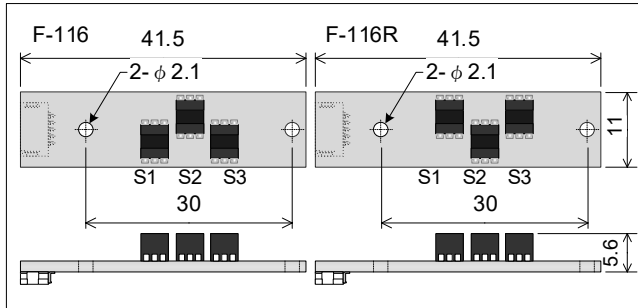
F-102: S1/S2/S3 All marked with white text

F-103: None

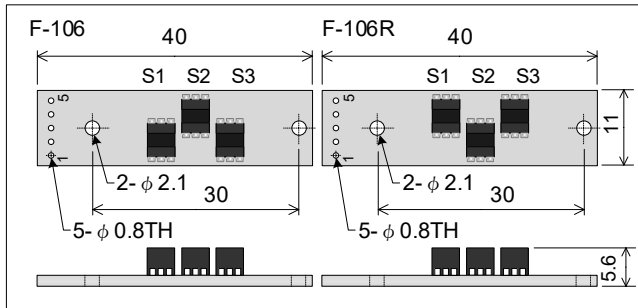
F-115、F-115R Dimensions



F-116、F-116R Dimensions

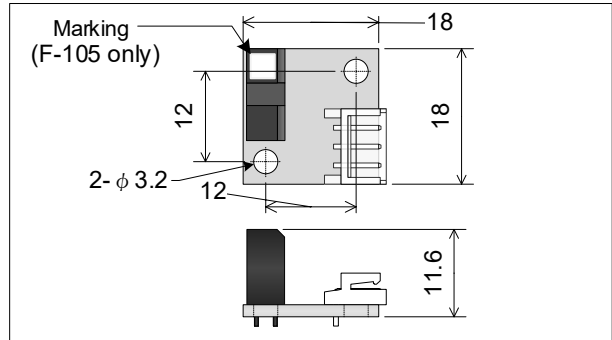


F-106、F-106R Dimensions

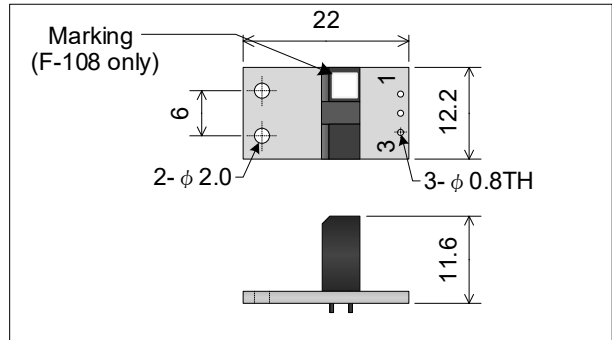


•1-Sensor (S1) Boards

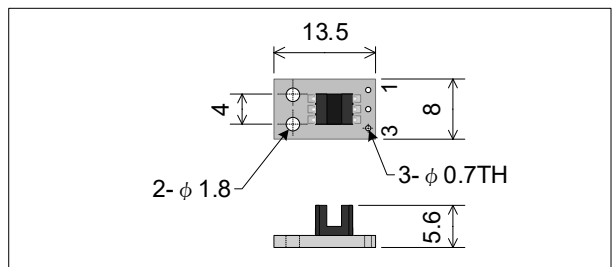
F-104、F-105 Dimensions



F-107、F-108 Dimensions



F-113 Dimensions



◆ Product Warranty

The product warranty period is one year from the factory shipment date. The warranty details are based on the instructions in the product User Manual, product label on the product body, or the handling instructions in the catalog. If a defect or malfunction occurs under normal use, we will replace the product or repair it free of charge. However, consequential damages caused by defects or failures after product delivery are excluded from the warranty coverage. Also, even within the warranty period, the following cases will not be covered by the product warranty.

- Disassembly or modification of the product
- Damage caused by impact or mishandling
- Misuse, abuse, or careless handling
- Use contrary to the User Manual or catalog specifications
- Breakdowns or damage caused by natural disasters

◆ Contact Information

For inquiries, contact our Sales Department.

Kohzu Precision Co., Ltd.

2-6-15 Kurigi, Asao-ku, Kawasaki-shi, Kanagawa, 215-8521 Japan

Tel: +81-44-981-2131

www.kohzuprecision.com/