

High Accuracy Positioning Sensors EG Series



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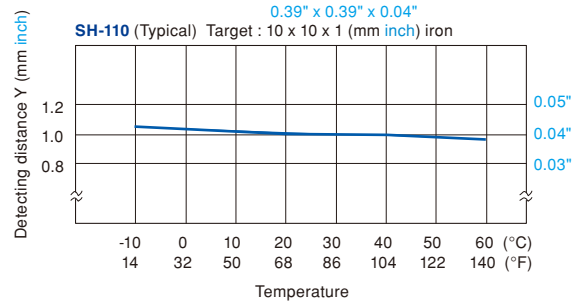
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Repeatability of 1 μm 0.04 Mil

The EG Series incorporates a highly stable amplifier circuit, providing a repeatability of 1 μm 0.04 Mil. This sensor is ideal for detecting slight differences in shape or for confirming die closure.

Stable detection in wide temperature range

KEYENCE's original built-in compensator circuit minimizes temperature-oriented sensitivity fluctuation. Once set, the sensitivity does not require adjustment.



Heat-resistant sensor head (SH-809, 816, and 822)

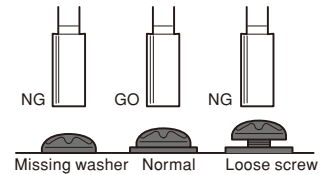
Heat-resistant sensor heads are available which withstand temperatures up to 200°C (392°F).

Oil-resistant cable

EG Series sensor heads employ oil-resistant cable to ensure extended usage.

Detection of tolerances with single sensor head (EG-547)

A single sensor can be used to detect missing/loose screws or washers.



Selection Chart

Sensor head

| Type | | Size | Appearance | Detecting distance | Model |
|------------------------|----------------------------|---|---------------------|----------------------------|--------------------------|
| Shielded | Cylindrical | 2.8 mm dia. 0.11" | | 0.6 mm 0.02" | SH-302 |
| | | 3.8 mm dia. 0.15" | | 0.8 mm 0.03" | SH-303A |
| | | 5.4 mm dia. 0.21" | | 1 mm 0.04" | SH-305 |
| | | 8 mm dia. 0.31" | | 2 mm 0.08" | SH-308 |
| | Threaded | M10 | | 2 mm 0.08" | SH-110 |
| | | M14 | | 5 mm 0.20" | SH-114 |
| | Thin | t=4.8 mm 0.19" | | 5 mm 0.20" | SH-614A |
| Threaded/Oil-resistant | M 8 | | 2 mm 0.08" | SH-108 | |
| Non-shielded | Cylindrical/Threaded | 14.5 mm dia. 0.57" | | 6 mm 0.24" | SH-416 |
| | | 22 mm dia. 0.87" | | 9 mm 0.35" | SH-422 |
| | | 30 mm dia. 1.18" | | 12 mm 0.47" | SH-430 |
| | | 40 mm dia. 1.57" | | 18 mm 0.71" | SH-440 |
| Shielded | Cylindrical | 90 mm dia. 3.54" | | 35 mm 1.38" | SH-290 |
| | Cylindrical/Heat-resistant | 9.4 mm dia. 0.37" | | 0.5 to 2 mm 0.02" to 0.08" | SH-809 |
| Shielded | Threaded/Heat-resistant | M16 | | 1 to 4 mm 0.04" to 0.16" | SH-816 |
| | Non-shielded | Cylindrical/Heat-resistant/ Threaded | 22 mm dia. 0.87" | | 2 to 8 mm 0.08" to 0.31" |

Amplifier

| Appearance | Power supply | Features | Output mode | Model |
|------------|-------------------------|--|--|---------------------|
| | 11 to 30 VDC | DC-driven | N.O./N.C. selectable NPN | EG-520 |
| | 12 to 24 VDC | DC-driven with disconnection Alarm output DIN-rail mountable | N.O./N.C. selectable NPN | EG-530 |
| | 110/120, 220/240 VAC | AC-driven | NPN SPDT 250 VAC 2A relay | EG-540 ¹ |
| | 110/120, 220/240 VAC | AC-driven Adjuster dial included | NPN SPDT 250 VAC 2A relay | EG-545 ¹ |
| | 110/120, 220/240 VAC | AC-driven Tolerance setting capability | SPST-NO 250 VAC 0.5A relay Analog voltage monitoring output | EG-547 ² |

1. This product does not comply with the EMC directive.
2. Please contact KEYENCE for information on products that comply with the EMC directive.

New Products

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3D Measurement
Systems



Specifications

PROXIMITY SENSORS

Sensor head

| Type | Standard | | | | | | | Oil-resistant ² |
|---|---|--------------------------|------------------------|--------------------------|---------------|-------------------------|----------------|----------------------------|
| | Shielded | | | | | | | Shielded |
| | Cylindrical | | | Threaded | | Thin | | Threaded |
| Model | SH-302¹ | SH-303A | SH-305 | SH-308 | SH-110 | SH-114 | SH-614A | SH-108 |
| Stable detecting range | 0 to 0.6 mm 0.02* | 0 to 0.8 mm 0.03* | 0 to 1 mm 0.04* | 0 to 2 mm 0.08* | | 0 to 5 mm 0.20* | | 0 to 2 mm 0.08* |
| Maximum detecting distance | 1.6 mm 0.06* | 2 mm 0.08* | 3 mm 0.12* | 5 mm 0.20* | | 10 mm 0.39* | | 3.5 mm 0.14* |
| Detectable object | Ferrous metal (see Characteristics for nonferrous metals) | | | | | | | |
| Standard target (iron, t=1 mm 0.04*) | 5 x 5 mm 0.20* | | | 10 x 10 mm 0.39* | | 15 x 15 mm 0.59* | | 10 x 10 mm 0.39* |
| Repeatability | 0.001 mm 0.00004* | | | 0.002 mm 0.00008* | | | | |
| Hysteresis | 0.03 mm 0.001* | 0.05 mm 0.002* | 0.01 mm 0.0004* | | | 0.015 mm 0.0006* | | 0.05 mm 0.002* |
| Temperature fluctuation | 0.3%/°C | | | 0.08%/°C | | 0.04%/°C | | 0.2%/°C |
| Enclosure rating | IP67 | | | | | | | |
| Ambient temperature | -10 to +60°C (14 to 140°F), No freezing | | | | | | | |
| Relative humidity | 35 to 85%, No condensation | | | | | | | |
| Vibration resistance | 10 to 55 Hz, 1.5 mm 0.06* double amplitude in X, Y, and Z directions, 2 hours respectively | | | | | | | |
| Weight (including nuts and 3-m 9.8' cable) | Approx. 30 g | Approx. 35 g | Approx. 45 g | Approx. 55 g | | Approx. 63 g | Approx. 60 g | Approx. 45 g |

Above values obtained when the detecting distance is set at 50% of the maximum stable detecting distance.

- The **SH-302** cannot be used in combination with the **EG-547**.
- Not designed for immersed use.

| Type | Standard | | | | | Heat-resistant ² | | |
|---|---|-------------------------|-------------------------|-------------------------|---------------------------|--|---------------------------------|---------------------------------|
| | Non-shielded | | | | | Shielded | | Non-shielded |
| | Cylindrical & Threaded | | | Cylindrical | Cylindrical | Threaded | Cylindrical & Threaded | |
| Model ¹ | SH-416 | SH-422 | SH-430 | SH-440 | SH-290 | SH-809 | SH-816 | SH-822 |
| Stable detecting range | 0 to 6 mm 0.24* | 0 to 9 mm 0.35* | 0 to 12 mm 0.47* | 0 to 18 mm 0.71* | 0 to 35 mm 1.38* | 0.5 to 2 mm 0.02* to 0.08* | 1 to 4 mm 0.04* to 0.16* | 2 to 8 mm 0.08* to 0.31* |
| Maximum detecting distance | 15 mm 0.59* | 22 mm 0.87* | 30 mm 1.18* | 40 mm 1.57* | 70 mm 2.76* | — | | |
| Detectable object | Ferrous metal (see Characteristics for nonferrous metals) | | | | | | | |
| Standard target (iron, t=1 mm 0.04*) | 20 x 20 mm 0.79* | 25 x 25 mm 0.98* | 30 x 30 mm 1.18* | 40 x 40 mm 1.57* | 150 x 150 mm 5.91* | 15 x 15 mm 0.59* | 20 x 20 mm 0.79* | 30 x 30 mm 1.18* |
| Repeatability | 0.005 mm 0.0002* | 0.008 mm 0.0003* | 0.01 mm 0.0004* | 0.015 mm 0.0006* | 0.03 mm 0.001* | 0.002 mm 0.00008* | 0.005 mm 0.0002* | 0.008 mm 0.0003* |
| Hysteresis | 0.015 mm 0.0006* | 0.02 mm 0.0008* | 0.03 mm 0.001* | 0.05 mm 0.0002* | 0.1 mm 0.004* | 0.04 mm 0.002* | | |
| Temperature fluctuation | 0.08%/°C | | | | | 0.2%/°C | | |
| Enclosure rating | IP67 | | | | | | | |
| Ambient temperature | -10 to +60°C (14 to 140°F), No freezing | | | | | -10 to +200°C (14 to 392°F), No freezing | | |
| Relative humidity | 35 to 85%, No condensation | | | | | | | |
| Vibration resistance | 10 to 55 Hz, 1.5 mm 0.06* double amplitude in X, Y, and Z directions, 2 hours respectively | | | | | | | |
| Weight (including nuts and 3-m 9.8' cable) | Approx. 73 g | Approx. 195 g | Approx. 225 g | Approx. 280 g | Approx. 650 g | Approx. 55 g | Approx. 83 g | Approx. 170 g |

Above values obtained when the detecting distance is set at 50% of the maximum stable detecting distance.

- The **EG-547(W)** cannot be used in combination with **SH-422, 430, 440, 290, 809, 816** and **822**.
- Precautions when using heat-resistant sensor head:
 - Use the sensor within the stable detecting range.
 - The heat-resistant sensor head is not waterproof; do not use this sensor head in a location directly exposed to liquid or steam.

Amplifier

| Type | DC | | AC | AC adj-dial | AC tolerance setting |
|----------------------------------|---|--|--|----------------------------|--|
| Model | EG-520 | EG-530 | EG-540² | EG-545² | EG-547^{1,4} |
| Operation mode | N.O./N.C. (switch-selectable) | | N.O./N.C. switch-selectable (contact output only) | | External synchronization, analog voltage switch-selectable |
| Sensitivity adjustment | 15-turn trimmer | | | 10-turn potentiometer dial | |
| Control output | Transistor ² (NPN) | 200 mA max. (40 V max.) Residual voltage: 1 V max. | 100 mA max. (40 V max.) Residual voltage: 1 V max. | | |
| | Relay contact | — | SPDT, 250 VAC, 2 A max. (resistive load) | | DPST (N.O.), 250 VAC, 0.5 A max. (resistive load) |
| Disconnection alarm output (NPN) | — | 100 mA max. (40 V max.) Residual voltage: 1 V max. | — | | |
| Response time | Transistor | 1 ms | | | |
| | Relay contact | — | 10 ms | | 3 ms |
| OFF delay time | — | | 65 ms (contact output only) | | — |
| Power supply | 11 to 30 VDC: 10% max. | 12 to 24 VDC: 10% max. | 110/120/220/240 VAC ±10%, 50/60 Hz | | |
| Power/current consumption | 100 mA max. | | 5 VA max. | | |
| Temperature fluctuation | 0.08%/°C | | | | |
| Ambient temperature | 0 to 50°C (32 to 122°F) | | | | |
| Relative humidity | 35 to 85%, No condensation | | | | |
| Vibration resistance | 10 to 55 Hz, 1.5 mm 0.06* double amplitude in X, Y, and Z directions, 2 hours respectively | | | | |
| Weight | Approx. 110 g | Approx. 75 g | Approx. 330 g | Approx. 350 g | Approx. 390 g |

Above values obtained when the detecting distance is set at 50% of the maximum stable detecting distance.

- The **EG-547(W)** cannot be used in combination with **SH-422, 430, 440, 290, 809, 816** and **822**.
- NPN output can easily be converted to PNP output by connecting the optional **OP-5148** PNP Output Converter.
- This product does not comply with EMC directives.
- Please contact KEYENCE for information on products that comply with the EMC directive.



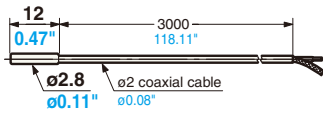
Dimensions

Unit: mm inch

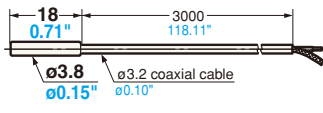
- EV
- EZ
- ED
- EM
- ES
- ET
- TA
- EG
- DD

Sensor heads

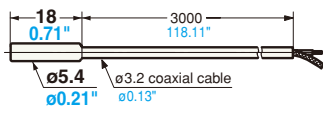
SH-302



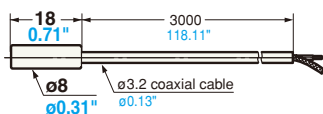
SH-303A



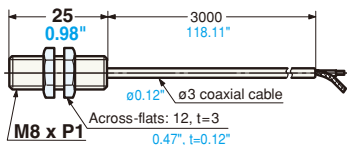
SH-305



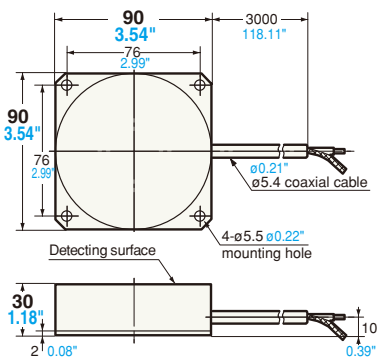
SH-308



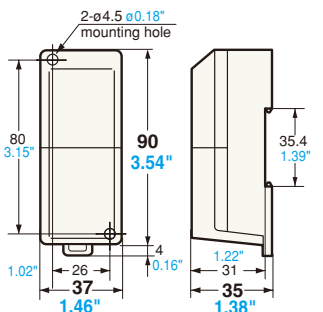
SH-108



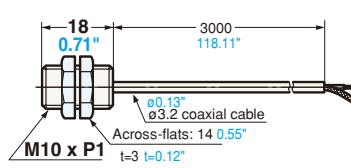
SH-290



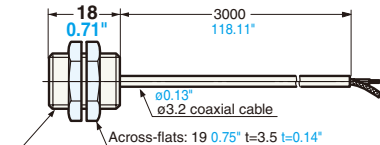
EG-530



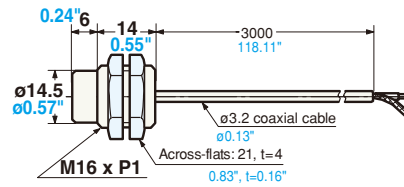
SH-110



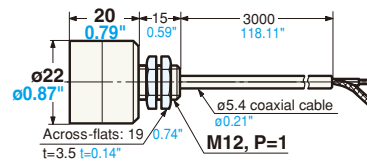
SH-114



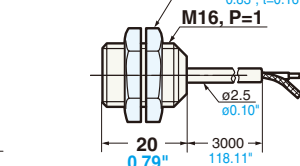
SH-416



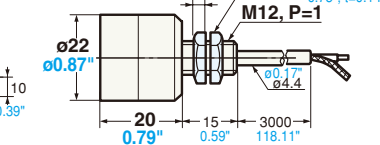
SH-422



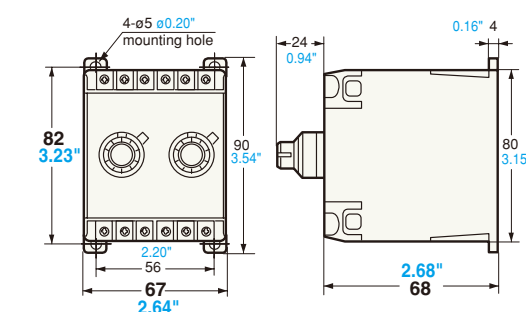
SH-816



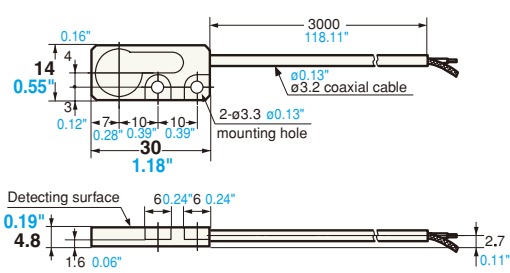
SH-822



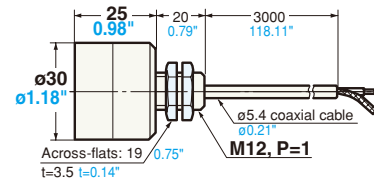
EG-540/545/547



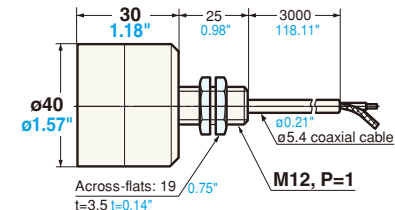
SH-614A



SH-430



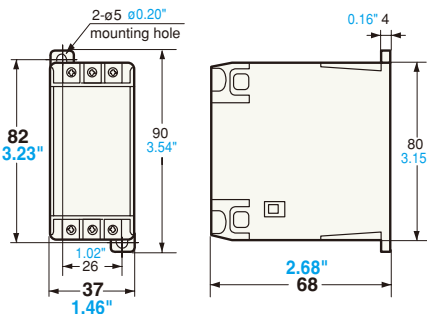
SH-440



SH-809



Amplifiers
EG-520



EG-540 has no dial.
EG-545 has one dial.
EG-547 has two dials.

