NEW LINEUP
Intelligent Sensor
-
SERIES

Multi-Purpose CCD Laser Micrometer
IG Series

Thrubeam Type Laser Detection Sensor
IB Series

NEW

Make Sensing Easy:
FROM SIMPLE DIFFERENTIATION TO HIGH SPEED,
HIGHLY ACCURATE DETECTION

Low-cost High Performance
Detection of presence/absence

Low cost

Thrubeam Type Laser Detection Sensor IB Series

**Light volume differentiated with high-accuracy**

Light-receiving element PD

Through high-accuracy differentiation of the volume of light received, the photoelectric sensor allows a multitude of previously impossible applications to be achieved.

A PD (Photo Diode) is used within the light-receiving element. Even very small changes in received light intensity are sensed, making this sensor incredibly versatile.

**Main applications**

- Detecting cap tightness
- Differentiation of different films
- Determining chip gradient
- Liquid turbidity

**High-Accuracy Differentiation Made Easy without being Influenced by the Target**
High-accuracy measurements
High end

Multi-Purpose CCD Laser Micrometer IG Series

High-accuracy differentiation using edge position

Light-receiving element: CCD

Achieving high-accuracy differentiation without being influenced by the total light volume

A CCD (Charge Coupled Device) is used in the light-receiving element. High-accuracy differentiation is achieved by capturing the edge of the thrubeam laser light rather than the volume of received light.

Main applications:
- Transparent glass edge detection
- Outer diameter high-accuracy differentiation
- Sheet edge control
- Roller gap measurement

Intelligent Sensor SERIES
Supports everything from simple differentiation to high-accuracy detection

Industrial application examples

**Liquid Crystal Industry**
Detection of presence/absence of liquid crystal glass

Within the various manufacturing processes of liquid crystal, the presence or absence of a glass plate is detected during transportation. As the light volume can be differentiated with high-accuracy, stable detection is possible.

**Electronic Industry**
Detection of chip components

This device definitively detects the chip gradient and/or the presence of a chip on even minute targets during the mounting process. Furthermore, as the sampling occurs at 80 µs, detections on high-speed lines are also possible.

**Electric Industry**
Printer paper feed orientation detection

By sensing two locations simultaneously, the device detects the orientation of the paper feed and/or the skew angle during transportation. Continuous measurement is possible with the small type head and high-speed sampling.

**Metal Industry**
Differentiation of different metal shafts

Detects differences in various shafts within metal workings or during the assembly process. By using the included Hold function, this can be determined without stopping the target.

**Plastics Industry**
Differentiation of different films

By sensing the thrubeam volume of laser light, the device definitively captures any differences in the transparent film. Furthermore, by aligning multiple devices along the width, continuous detection of uneven coating over multiple points is possible.

**Factories**
Turbidity detection of factory waste water

By sensing the thrubeam volume of laser light through glass, the turbidity of factory waste water can be determined. Furthermore, judgment values can be set between 0 and 100%.

**Food and Pharmaceutical Industry**
Bottle-neck diameter judgments and detection of cap tightness

Detects the diameter and cap tightness when adding the caps onto the bottles. Due to high-speed sampling, detection can be conducted on the conveyor without stopping the target.

**Food and Pharmaceutical Industry**
Detecting the liquid level of test tubes

By sensing thrubeam volumes of the laser light, the liquid level can be detected with high accuracy. Furthermore, by using a compact head the device can be positioned in even the narrowest of spaces.
Detects the notch position of a wafer with high accuracy. The device exhibits a repeat accuracy of 5 μm and the differential ability that is top of its class.

Conducts high-accuracy transport position determination of liquid crystal glass. Incorporating a new algorithm, stable detection of even transparent materials is possible.

Conducts edge control during the winding process of electrode sheets, achieving uniform rolling.

Differentiates the coating line diameter immediately after extrusion. By calculating the roundness differentiation between X-Y, this can be conducted simultaneously without external software.

Differentiates the positioning of the target during pressing. The device is IP-67 rated, with the ability to withstand use in unfavorable environments over a long period of time.

Measures the internal diameter or gaps of pressed parts. By using the various Hold functions you can also measure the maximum internal diameter.

Conducts the edge control of film during winding processes, and achieves a uniform roll. The level of shielded light can be changed at will, allowing for the high-accuracy determination of thin film.

Monitors the gap of thin plate cold rolling. Mounting in narrow spaces is also possible thanks to a compact head.
Achieving the Best Stability
Multi-Purpose CCD Laser Micrometer

**IG Series**

**Wide Variety of Application Modes**

**Edge Control Mode**

The distance from the end of the measurement range to the edge of a target is measured.

**Outer Diameter Measurement Mode**

The outer diameter or width of a target is measured.

**Key Features**

- **Repeatability of 5 μm**
- **Linearity of ± 0.1% (IG-028)**
- **New function: Position Monitor**

![IG Series components](image)
Large Distance between the Transmitter and Receiver

- **IG-028** Max. 1500 mm
- **IG-010** Max. 1000 mm

**Edge Detection of Transparent Targets**

Measures a transparent edge like glass

**Inner Diameter/Gap Measurement Mode**

The inner diameter of a target or a gap between targets is measured.
Three Concepts

Intelligent
High accuracy was achieved by using the technology and functions developed for high-accuracy measuring instruments.

Tough
Developed for use in harsh environments, the I Series was designed with a strong structure.

Easy
Excellent usability makes it possible to quickly and easily perform stable measurements without any difficult adjustments and settings.

The intelligent I-Series consists of a high-accuracy sensor lineup that realizes low-cost high performance with only the most advanced functions for on-site operations.

High Stability and Measurement Accuracy are Achieved with the Newly Developed Optical System

Multi-Wavelength Laser + I-DSP

With conventional lasers, the transmission spot produces a patchy pattern (as shown in the figure to the right). This is a laser-specific interference problem caused by the laser having a single wavelength. The IG Series sensor overcomes this problem by using a multi-wavelength laser. Because shadows are formed on the CCD more clearly, the sensor remains highly stable, even with targets that are conventionally difficult to detect (e.g., transparent objects). With the I-DSP (a parallel computing chip) incorporated in the receiver, the sensor can perform data processing at high speed, reducing noise to a minimum.

Repeatability of 5 µm

Linearity of ±0.1%

Stable Detection of Transparent & Mesh Targets

The L-CCD makes it possible to detect a target based on its position. Edge control and positioning of transparent and mesh targets can be performed stably.
Extremely easy to use due to the built-in position monitor

Determining the Part of a Target to be Measured

The position monitor on the IG Series sensors makes it possible to visually check how a target is detected. The user can prevent mounting or setting errors by observing the red lights that indicate the received light position and the green lights that indicate the measurement position.

Easier Optical Axis Alignment

The position monitor makes it easier to align the optical axis. Easily perform optical axis alignment by adjusting the sensor head so that all of the position monitor lights turn red.

Easy to maintain thanks to excellent environment resistance

Key Point: Less Sensitive to Dirt

Because it uses an L-CCD, the IG Series is less sensitive to materials such as dirt than a sensor that uses a photodiode (PD) as the light-receiving element.

Example

- Prevent dust or oil from adhering to the measurement unit, which can cause an abnormal measurement value.
- Detect the intrusion of a different type of target.
- Check that a measurement target falls within the measurement range.

Although dirt reduces the total amount of light received, the measurement position is the same. The shadow of a target is shown.

Edge Check Function

The user can check whether a measurement is performed correctly by verifying the number of edges in the field of view.

Flexible Free-Cut Cable

The sensor head cable is a robot cable that withstands repeated bending. The cable can be used safely in a position requiring repeated motion.

IP67 Protection

The enclosure satisfies the IP67 rating based on the IEC standards and remains watertight even after being held at a depth of one metre for 30 minutes. The enclosure is resistant to adverse environments and offers long-term durability.
1. The DL-RS1A communication unit is required.  
2. The screws for connecting the sensor head and bracket are included.  
3. The cable is common to the transmitter and receiver, and can be used with either of them.

**IG Series**

<table>
<thead>
<tr>
<th>Cable length</th>
<th>Model</th>
<th>Weight</th>
<th>Piece</th>
<th>Option</th>
</tr>
</thead>
</table>
| 2 m          | OP-87056| Approx. 90g | 1 cable Included | Sensor head cables 3. Select when a longer cable is required.  
Approx. 50 g | IG-TB01 | Connected connector with indicator
Approx. 40 g | IG-TB02 | This connector is required if the cable is cut.

EVEN MORE USEFUL WHEN CONNECTED TO A PC

The configuration software, IG Configurator, allows for a wide range of settings to be made including the monitoring of the waveforms of received light and the measurement modes.

Reading and Writing Settings

The user can enter all settings including the measurement modes into a PC and then transfer them to the sensor. The management of setting data is simple and very convenient when two or more sensors are used.

Monitoring Function

Measurement conditions such as the waveforms of received light can be displayed in real time. The mounting and sensitivity settings can also be adjusted more precisely.

Calculation Function

**Addition mode** (if a measurement target is large)

**Subtraction mode** (to measure the difference in level or inclination)

Sensitivity Setting

The set value used to judge whether light enters or is blocked, based on the amount of light received by the CCD, is called the binarization level. The amount of light received when the reference waveform is registered is regarded as the 100% level. The light is judged to be blocked if the amount of light is less than the specified binarization level. The IG Series initially sets a binarization level of 25% and the user can change the level according to the application.

Zero Shift Function

This function shifts an internal measurement value to 0 (to offset the value). When the target value is changed, this function can be used to shift an internal measurement value to the new target value.

Option

PC software 1. IG-H1

Sensor head mounting brackets for IG-010 2. IG-TB01

Sensor head mounting brackets for IG-028 2. IG-TB02

Sensor head cables 3. Select when a longer cable is required.

1. The DL-RS1A communication unit is required.  
2. The screws for connecting the sensor head and bracket are included.  
3. The cable is common to the transmitter and receiver, and can be used with either of them.
4. Two cables are included with a sensor head.

RS-232C communication unit
Specifications

Sensor heads

**Model**
- IG-010
- IG-028

**Operation principle**
- CCS method

**Light source**
- Visible light semiconductor laser (Wavelength: 660 nm)
- Class 1

**Mounting distance**
- 2 to 1500 mm
- Class 1

**Measurement range**
- 10 mm
- 28 mm

**Sampling rate**
- 990 µs (When the number of times for averaging is set to [hsp]: 490 µs)

**Minimum detectable object**
- High sensitivity mode: ±0.2 mm (Setting distance: 40 mm or less), ±0.7 mm (Setting distance: 100 mm)
- Standard mode: ±0.2 mm (Setting distance: 40 mm or less), ±0.5 mm (Setting distance: 100 mm)

**Repeatability**
- ±0.1 µm (Setting distance: 100 mm)
- ±0.5 µm (Setting distance: 500 mm)
- ±0.7 µm (Setting distance: 1000 mm)

**Linearity**
- ±0.2% of F.S. (±28 µm)
- ±0.5% of F.S. (±42 µm)

**Power consumption**
- 2200 mW (at 30 V: 74 mA or less)
- 2300 mW (at 30 V: 77 mA or less)

**Power supply voltage**
- 10-30 VDC, Ripple (P-P): 10% included, Class 2 or LPS

**Analogue output**
- Yes
- No

**Main unit**
- Expansion unit

**Display unit (amplifier)**
- Display resolution
  - Voltage output: ±5 V (full scale 10V)
  - Current output: 4-20 mA (full scale 16 mA)

**Operation indicator**
- Transmitter: Optical axis alignment indicator: Green LED / Power indicator: Green LED
- Receiver: Optical axis alignment indicator: Green LED / Position monitor: Dual bar LED (Red, Green)

**Environment resistance**
- Ambient temperature: -10 to +40°C (No condensation)
- Ambient humidity: 35 to 85% RH (No condensation)
- Ambient light: Incandescent lamp: 5000 lux Sunlight: 5000 lux

**Material**
- Case: Flame retardant: Polypropylene (POM), Metal: SUS304 (Metallic part)
- Lens cover: Glass
- Cabinet: PVC

**Supplied item**
- Transmitter × 1, Receiver × 1, Sensor head cables (2 m) × 2

**Weight (including supplied items)**
- Approx. 380 g
- Approx. 500 g

Display unit (amplifier)

**Model**
- IG-1000
- IG-1050
- IG-1500
- IG-1550

**Appearance**
- DIN rail mount
- Panel mount

**Main unit/Expansion unit**
- Yes
- No
- Yes
- No

**Power supply voltage**
- 10-30 VDC, Ripple (P-P): 10% included, Class 2 or LPS

**Power consumption**
- 2700 mW or less (at 30 V: 90 mA or less)
- 2800 mW or less (at 30 V: 96 mA or less)

**Output resistance**
- 100 Ω

**Output accuracy**
- ±0.05% of F.S.

**Environmental resistance**
- Ambient temperature: -10 to +55°C (No freezing)
- Ambient humidity: 35 to 85% RH (No condensation)

**Vibration**
- 10 to 55 Hz Double amplitude: 1.5 mm (1.5 mm)

**Pollution degree**
- 2

**Material**
- Case: Flame retardant: Polycarbonate, Key top: Polyacetal, Cable: PVC

**Supplied item**
- Main body × 1, Instruction manual × 1 (only for main unit)
- Expansion cable (50 mm) × 1 (only for expansion unit), Instruction manual × 1 (only for main unit)

**Weight (including supplied items)**
- Approx. 150 g
- Approx. 140 g
- Approx. 170 g
- Approx. 165 g

1. When expansion units are added: Max. 20 mA/ch
2. For more details, refer to the User’s Manual.
3. When the analogue output is used, the margin of error of analogue output is added.
4. When adding an expansion unit, the consumed electrical power is equal to the total value of the consumed electrical power of all amplifiers.
Achieving an Endless Amount of Applications Unable to be Detected by Using a Fibre Sensor

Thrubeam Type Laser Detection Sensor

IB Series

- High-speed sampling of 80 µs
- High-accuracy differentiation of 5 µm
- New function: Auto adjustment included
1 device, 3 roles. 3 step output of presence and size

Upper/lower output-equipped as standard. Not only presence/absence is detected, but size judgments can also be conducted using this single device. A timing sensor is also not required due to the presence of the Auto timing function.

Photoelectric sensor

Digital laser sensor

3 devices are required each for presence/absence, height and timing detections

All detections conducted using a single device

Not influenced by passage position

According to the parallel laser light, no matter where the target is positioned, the judgment values will remain the same. This makes high-accuracy differentiation possible anywhere on the detection area.

As the position changes, the thrubeam light volume changes

Regardless of position, the thrubeam light volume remains the same

No concern of position misalignment even in wide areas

As the maximum width of the optical axis is 30 mm, stable detection is possible even if the target is shaking.

Detection is not possible when strayed off the linear optical axis

Definitive detection in a wide detection area

High-accuracy detection even in transparent bodies

In addition to detecting the presence of transparent targets, detections such as those of single/double transparent films, density differentiation, and the turbidity of liquids is also possible. Furthermore, using the percentage display function the thrubeam rate judgment is also possible.

Does not stabilise due to the subtle difference in thrubeam light volume

Definitive determination of even the most minute thrubeam light volume difference

Not affected by dirt or temperature changes

By incorporating a Light intensity correction function, the numerical margin of error caused by aging variation can be cancelled. Possible to always achieve stable, high-accuracy judgments.

Sensitivity changes according to the influence of dirt, etc

Dirt is eliminated using the Light intensity correction function
The intelligent I-Series consists of a high-accuracy sensor lineup that realises low-cost high performance with only the most advanced functions for on-site operations.

Intelligent
High accuracy was achieved by using the technology and functions developed for high-accuracy measuring instruments.

Tough
Developed for use in harsh environments, the I Series was designed with a strong structure.

Easy
Excellent usability makes it possible to quickly and easily perform stable measurements without any difficult adjustments and settings.

Adopting the newly developed optical system used in the IG Series

Multi-Wavelength Laser Beam + High-sensitivity PD
Normal lasers are single wavelength, therefore due to friction, the pattern becomes patchy, as shown in the diagram on the right. This problem is rectified in the IB Series by utilising laser light with multiple wavelengths. Targets with a high level of difficulty can still be detected with a high degree of stability. Furthermore, by incorporating a high-sensitivity PD within the light receiving section data can be processed at high speeds, reducing the extraneous fluctuations to the absolute limit.

<table>
<thead>
<tr>
<th>High-accuracy differentiation of 5 µm</th>
<th>Ultra-long distance of 2 m</th>
</tr>
</thead>
</table>

Mechanism behind stable detection

**Light-receiving element (high-sensitivity PD)**

**Protective glass**

**Light-receiving lens**

**SPOT IMAGE**

- Multi-wavelength laser (IB): Due to the multi-wavelength laser used, the beam pattern has a more uniform intensity distribution.
Simple positioning according to the alignment LED

Easy to align the optical axis
As the optical axis of the laser align, the flash frequency of the laser transmitter indicator quickens. Even without looking at the amplifier unit, the optimum position can be achieved easily.

- If the optical axis is not aligned the LED turns off
- When the optical axis begins to align, the flashing frequency of the LED quickens
- High-speed flashing when the optical axis is aligned

Maintenance-saving according to the Auto adjustment function

Long-term, stable detection even in environments where the device becomes dirty easily
In the IB Series, should the received light volume decrease according to such things as dirt on the front of the sensor head, by using the adjustment input, the received light volume is adjusted to standard values during input. In addition, the Auto adjustment function recognises that this adjustment input has no measurement target, and therefore is executed regularly automatically. Even when used in environments where the device becomes dirty easily, stable measurements and a high degree of maintenance-saving has been achieved by the device automatically correcting itself.

Using the transmission lens, after the laser light emitted as a parallel beam passes through the light receiving lens, the light is then converged to the light-receiving element (high-sensitivity PD). When the measurement target interrupts this parallel beam, this beam is in proportion to the volume of interrupted light and the light entering the received light element reduces. When this occurs, by capturing the light volume in the light-receiving element (high-sensitivity PD), the size and transparency of the target can be measured.
Specifications

Sensor head

<table>
<thead>
<tr>
<th>Model</th>
<th>IB-01</th>
<th>IB-05</th>
<th>IB-10</th>
<th>IB-30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light source</td>
<td>Visible semiconductor laser</td>
<td>Wavelength: 660 nm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laser Class</td>
<td>Class 1 (IEC60825-1, FDA (CDRH) Part 1040.10)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mounting distance</td>
<td>0 to 300 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement range</td>
<td>Ø1 mm (installation distance 5 to 160 mm) Ø0.2 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ø1 mm (installation distance 5 to 300 mm) Ø0.05 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sampling rate</td>
<td>5 kHz (60 words/sec.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum detectable object</td>
<td>5 µm (distance 0 to 300 mm) 5 µm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>5 µm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature characteristics</td>
<td>±0.2% of F.S./°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation indicator</td>
<td>Laser emission warning indicator: Green LED</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental resistance</td>
<td>Ambient luminance: Incandescent lamp: 5000 lux Solar light: 5000 lux</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>0 to +40°C (no freezing) 0 to +50°C (no freezing)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>3 to 85%RH (no condensation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration</td>
<td>10 to 55 Hz, double amplitude 1.1 mm X 1.1 each axis, 2 hours</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>Case: PBT Laser emission warning indicator: Green LED, Others: Green LED x 4, red LED x 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lens cover</td>
<td>Glass</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable</td>
<td>PVC (2m)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>±140 g Approx. 160 g Approx. 180 g Approx. 320 g</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td>1950 mW or less (at 30 V, 65 mA max.) 2100 mW or less (at 30 V, 70 mA max.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>10 to 35 VDC, including ripple (P-P) 10% Class 2 or LPS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental resistance</td>
<td>Ambient temperature: 0 to +50°C (no freezing)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambience humidity</td>
<td>35 to 85%RH (no condensation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pollution degree</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>Case/face panel: polycarbonate, keypad: polyacetal, cable: PVC</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Amplifier unit

<table>
<thead>
<tr>
<th>Model</th>
<th>IB-1000</th>
<th>IB-1500</th>
<th>IB-1050</th>
<th>IB-1550</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amplifier type</td>
<td>ON call mount</td>
<td>Panel mount</td>
<td>ON call mount</td>
<td>Panel mount</td>
</tr>
<tr>
<td>Main unit/Expansion unit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Display resolution</td>
<td>Dual 7-segment display</td>
<td>Dual 7-segment display</td>
<td>Dual 7-segment display</td>
<td>Dual 7-segment display</td>
</tr>
<tr>
<td>Display range</td>
<td>–99999 to 99999, –9999 to 9999, –999 to 99.9, –99 to 9.9, –9 to 9.9</td>
<td>–99999 to 99999, –9999 to 9999, –999 to 99.9, –99 to 9.9, –9 to 9.9</td>
<td>–99999 to 99999, –9999 to 9999, –999 to 99.9, –99 to 9.9, –9 to 9.9</td>
<td>–99999 to 99999, –9999 to 9999, –999 to 99.9, –99 to 9.9, –9 to 9.9</td>
</tr>
<tr>
<td>Operation indicator</td>
<td>Judgment indicator: 2-colour (green/red), LED (HI, GO, LO), Laser emission warning indicator: Green LED, Others: Green LED x 4, red LED x 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analogue voltage output</td>
<td>±15 V to ±5 V, 0 to ±5 V (output impedance 1000)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analogue current output</td>
<td>±1 mA/20 mA (Maximum load resistance 35Ω)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control input</td>
<td>Bank switch input</td>
<td>Non-voltage input</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control output</td>
<td>Judgment output</td>
<td>Open collector (NPN/PNP switchable, N.O./N.C. switchable)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>4 to 20 mA (maximum load resistance 35Ω)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td>1950 mW or less (at 30 V, 65 mA max.) 2100 mW or less (at 30 V, 70 mA max.)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. ±0.2% of F.S./°C |
2. ±0.1% of F.S./°C
3. ±0.1% of F.S./°C
4. ±0.1% of F.S./°C
5. ±10 µm
DATA COMMUNICATION (Common to IG/IB)

Amplifier Function

**NPN/PNP Output Selection (judgment selection)**

Both NPN and PNP outputs are supported. The outputs are set the first time the user turns on the power. These settings can subsequently be changed. Judgments are output as HIGH, GO, or LOW.

**Analogue Output Selection**

The following four types of analogue outputs can be selected. The output is selected the first time the user turns on the power.

<table>
<thead>
<tr>
<th>Setting value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>Not output</td>
</tr>
<tr>
<td>0 to 5 V</td>
<td>Analogue output after the judgement value is converted to the range from 0 to 5 V.</td>
</tr>
<tr>
<td>±5 V</td>
<td>Analogue output after the judgement value is converted to the range of ±5 V.</td>
</tr>
<tr>
<td>1 to 5 V</td>
<td>Analogue output after the judgement value is converted to the range from 1 to 5 V.</td>
</tr>
<tr>
<td>4 to 20 mA</td>
<td>Analogue output after the judgement value is converted to the range from 4 to 20 mA.</td>
</tr>
</tbody>
</table>

The setting can be changed.

**Bank Function**

The bank function can register up to four patterns of specific settings. For example, in response to a measurement target changeover, this function allows the user to easily switch between the patterns of registered settings.

1. HIGH setting value, LOW setting value, binarization level, shift target value, etc.

Communication Unit

**DL-RB1A** BCD output unit

Use this unit when retrieving numerical data from the IG/IB Series to an external device as digital data. A single communication unit can retrieve data from up to four IG/IB Series display units in BCD.

**DL-RS1A** RS-232C communication unit

Use this unit when outputting digital data to an external device with RS-232C signals. It is necessary to connect it to a PC when using the startup support software, IG Configurator. A single communication unit can retrieve data from up to four IG/IB Series display units.

<table>
<thead>
<tr>
<th>Models</th>
<th>Communication method</th>
<th>Connection device</th>
<th>Read judgment results</th>
<th>Read measurement values</th>
<th>Control input</th>
<th>Change tolerance values</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>DL-RS1A</td>
<td>RS-232C</td>
<td>PLC PCs of various companies</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Uses no control sequence communication. Communicates by using a communication program.</td>
</tr>
<tr>
<td>DL-RB1A</td>
<td>BCD output</td>
<td>PLC PCs of various companies</td>
<td>X</td>
<td>✓</td>
<td>X</td>
<td>X</td>
<td>Measurement values are updated by synchronising with the input terminals. Furthermore, updates automatically occur using a timer. Readouts are created by synchronising with the strobe output.</td>
</tr>
</tbody>
</table>
Dimensions

**IG Series Sensor head**

**IG-010**

Transmitter

- 2-ø4.5 (Mounting hole)
- Transmission spot centre
- 3-M5 Valid screw depth 4
- Base level
- 2-M4 Valid screw depth 5.3

Receiver

- 2-ø3.4 (Mounting hole)
- Transmission centre
- 3-M3 Valid screw depth 4
- Base level
- 2-M4 Valid screw depth 5.2

**IG-028**

Transmitter

- ø4.8
- Cable length 170
- Edge M8 connector
- Transmission spot centre
- 3-M5 Valid screw depth 5.5
- Base level
- 3-M5 Valid screw depth 5.2

Receiver

- ø4.8
- Cable length 170
- Edge M8 connector
- Transmission centre
- 3-M3 Valid screw depth 5.5
- Base level
- 2-M5 Valid screw depth 5.2

**IG Series Sensor head mounting bracket**

**IG-TB01 + IG-010**

- 2-ø4.5 Drilled through hole
- ø8.5 Spot facing depth 4

**IG-TB02 + IG-028**

- 2-ø4.5 Drilled through hole
- ø8.5 Spot facing depth 4

Material: Aluminium

**Unit**: mm
**IB Series Sensor head**

**IB-01**
- **Receiver**
  - Slit (1×5)
  - Transmission spot (reference value) (6×8 ellipse)
- **Transmitter**
  - Slit (1×10)
  - Transmission spot (reference value) (7×13 ellipse)

**IB-05**
- **Receiver**
  - Slit (1×5)
  - Transmission spot (reference value) (6×8 ellipse)
- **Transmitter**
  - Slit (1×30)
  - Transmission spot (reference value) (6×36 rectangle)

**IB-10**
- **Receiver**
  - Slit (1×10)
  - Transmission spot (reference value) (6×8 ellipse)
- **Transmitter**
  - Slit (1×30)
  - Transmission spot (reference value) (6×36 rectangle)

**IB-30**
- **Receiver**
  - Slit (1×30)
  - Transmission spot (reference value) (6×36 rectangle)
- **Transmitter**
  - Slit (1×30)
  - Transmission spot (reference value) (6×36 rectangle)

**Sensor amplifier (DIN rail mount type)**

**IG (IB)-1000/IG (IB)-1050**
- **IG (IB)-1000**
  - Sensor amplifier
  - Cable diameter ø4.7
  - Cable length 2 m

**IG (IB)-1050**
- **Sensor amplifier**
  - Cable diameter ø4.7
  - Cable length 2 m

**Sensor amplifier (Panel mount type)**

**IG (IB)-1500/IG (IB)-1550**
- **IG (IB)-1500**
  - Sensor amplifier
  - Cable diameter ø4.7
  - Cable length 2 m

**IG (IB)-1550**
- **Sensor amplifier**
  - Panel thickness 1 to 6 mm
  - Panel thickness: X = 48 x (number of amplifiers) - 3

**Dimensions**

Unit: mm
Dimensions

Communication unit (BCD output type)

**DL-RB1A**
- DIN-rail mount
- 34-pin MIL connector

**Communication unit (RS-232C communication type)**

**DL-RS1A**
- DIN-rail mount

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**SAFETY INFORMATION**
Please read the instruction manual carefully in order to safely operate any KEYENCE product.

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**KEYENCE**

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