The Smartest RGB Sensor in the Industry
Two new sensor head models have been added to the product line

RGB Digital Fibreoptic Sensors
CZ-V20 Series

- CZ-H37S: Luster-cancel, small beam spot sensor head
- CZ-H35S: Lustre-cancel, colour detection sensor head
- CZ-H32: Adjustable spot, colour detection sensor head
- CZ-H52: Fluorescence detection UV sensor head
The two new sensor heads will further expand the range of applications for the SUPER RGB sensor.

Four types of sensor heads selectable according to target conditions and size.

The lustre-cancel type cancels the influence of the lustre of a target. The adjustable spot type allows adjustment of the beam spot size according to the target. The fluorescence detection type can detect fluorescent materials. These sensor heads offer highly stable detection while solving conventional problems.

Small beam spot type unaffected by lustre

Lustre-cancel, small beam spot sensor head CZ-H37S

Shape, position, inclination, and surface lustre

Less affected by changes in target condition

World’s first
Extremely high power
Utilises the world’s first hybrid structure
The SUPER RGB sensor was developed by a dramatic redesign of the sensor head structure to improve overall performance. The transmitter uses an optical fibre, which creates an incredibly uniform beam spot and helps reduce the size of the sensor head. The light-receiving circuit is built into the sensor head, enhancing its detection ability and improving stability.
RGB light source for triple 16-bit calculation
Three-colour light source for accurate target recognition
The SUPER RGB sensor incorporates three separate colour LED’s. The signal from each colour is converted into 16-bit data in the receiver to enable colour recognition. This ensures accurate detection regardless of target vibration.

Simple sensitivity adjustment
One-touch calibration
The SUPER RGB sensor can be calibrated with the push of a button. This simple approach eliminates variation between operators and ensures continuous, stable detection.

Beam spot adjustable in 3 sizes
Versatile detection from a long distance

UV light application
Detecting fluorescent materials and marks

Adjustable spot, colour detection sensor head
CZ-H32

Fluorescence detection
UV sensor head
CZ-H52

Fluorescence detection
UV sensor not affected by patterns or colours

Fluorescence detection
UV sensor head
CZ-H52

Emits UV light to detect fluorescent materials and marks.

RGB light source for triple 16-bit calculation
Operating principle of the RGB light source
Green light source
Blue light source
Red light source
Special half mirror
The beams of three colours are brought into a straight line.

Simple sensitivity adjustment
One-touch calibration
The SUPER RGB sensor can be calibrated with the push of a button. This simple approach eliminates variation between operators and ensures continuous, stable detection.

Dual Digital display, amplifier
CZ-V21A(P)/V22A(P)
Choose the sensor head that is right for your application

CZ-H35S Lustre-cancel, reflective type

The CZ-H35S/CZ-H37S incorporates a polarizing filter which cancels the reflection from the glossy section and only recognises targets by their colour components. The CZ-H35S/CZ-H37S maintains accurate detection despite changing target conditions.

**What is “lustre”?**
As the picture on the right shows, depending on the illumination some sections on a pepper’s surface can appear white. Like human eyes, conventional sensors can not recognise the correct colours of such a target.

CZ-H37S Small beam spot type
The beam spot is as small as 1 mm in diameter at an operating distance of 16 mm. This ensures reliable detection of objects and components smaller than those detectable with conventional models.

<table>
<thead>
<tr>
<th>Distance vs. beam spot diameter (Typical)</th>
<th>Unit: mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance</td>
<td>12</td>
</tr>
<tr>
<td>Beam spot diameter</td>
<td>2.9</td>
</tr>
<tr>
<td></td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

Long detecting range of 50 to 95 mm
Detection is available within a range of 50 to 95 mm. The sensor can be mounted at a long distance and is less affected by changes in target position.

CZ-H32 Adjustable spot, reflective type

Three beam spot sizes can be easily selected by adjusting the slide switch, allowing a wide range of targets to be inspected.

<table>
<thead>
<tr>
<th>Distance vs. beam spot diameter (Typical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beam spot diameter</td>
</tr>
<tr>
<td>Distance (mm)</td>
</tr>
<tr>
<td>Large</td>
</tr>
<tr>
<td>Medium</td>
</tr>
<tr>
<td>Small</td>
</tr>
</tbody>
</table>
Detecting the presence/absence of grease
By canceling the influence of surface lustre and target position, the CZ-V20 reliably detects grease, despite its non-uniform shape and position.

Differentiation between the front and back sides of chips after being sealed in embossed tape
The lustre-cancel type, which cancels the influence of specular reflection, stably differentiates between the front and back sides of chips even through a transparent film.

Detecting marks on bags printed with multiple colours
The lustre-cancel type stably detects marks on bags even when the background of the mark vibrates or has lustre. The small beam spot ensures reliable detection of even small marks.

Detecting the seam on a spray can
Even when patterns are printed on spray cans, the sensor detects only the seam.

Checking parts assembly
The enhanced detection ability ensures stable detection of dark-coloured targets.

Detecting improperly positioned labels
Detection is stable because the colour recognition is not affected by the change in bottle colours. The interference prevention function assures successful detection when two sensor heads are mounted in close proximity.

Detecting caps of different colours
The CZ-V20 Series stably detects subtle colour differences that are difficult to detect with conventional sensors. Since detection is based on RGB components, it is less affected by target position or vibration.
High resolution amplifier for triple 16-bit calculation

RGB light source for diversified target recognition

The SUPER RGB sensor enables stable detection by using a three-colour light source.

**Advantage of the RGB light source 1**  
**Accurate target recognition**

*Single-colour light source*

Almost no difference is recognized between certain colours, resulting in unstable detection.

*Three-colour light source*

The received light quantity is converted into a ratio of three colours, and the target is recognized by its colour. This ensures accurate detection.

**Advantage of the RGB light source 2**  
**Less affected by changes in target position**

*Single-colour light source*

When the target position changes, the received light quantity changes according to the distance between the target and the sensor head, resulting in unstable detection.

*Three-colour light source*

Even when the target position changes and the received light quantity changes, the ratio of the three colours does not change. Stable detection is ensured.

**Dual digital display & Direct access**

Both the current value and set value are displayed simultaneously. Sensitivity and fine adjustment can also be done manually.

**CZ-V21A(P)/V22A(P) Digital display amplifier**

1-line connection supported. Interference prevention for up to 2 amplifiers

Power is supplied through the connector on the side, saving connection cables.
Detections that were once difficult can easily and reliably be achieved. (Super I Mode)

**World’s First** Automatic selection of 7 different light combinations (Patent pending)

In the Super I mode, the sensor detects the received light quantity and automatically selects the most stable light from seven patterns. (There is no need for complicated settings because the light source is automatically selected during the sensitivity setting.)*

*In reality, the colour of the emitted light does not change because the light combination is selected by the receiver.*

The combination of the SUPER mode + 3 high-intensity LEDs has achieved unrivaled detection power. Even dark-coloured targets can be reliably inspected.

Three detection modes for every target

**Super I**
- Detects the received light quantity

**C**
- Detects the colour components

**C+I**
- Detects the colour components and received light quantity
Advanced features that provide 100% reliability

Four independent outputs
This function is useful for target differentiation. The sensor stores data of four types of targets simultaneously and allows the setting and output for each target independently. When the C or C+I mode is used, the bank function enables differentiation of up to eight different types of targets.

Shift function
This function is useful for detecting subtle colour difference. When there is a change in the surrounding environment over time, the displayed value can be compensated with the external shift input. (Patent pending)

When the difference in sensitivity between the target and the background is small, providing shift inputs periodically will compensate for data variations.

External calibration function
The sensitivity can be adjusted by using an external device such as a PLC.

Specifications

<table>
<thead>
<tr>
<th>Sensor head</th>
<th>Adjustable spot</th>
<th>Lustre cancel</th>
<th>Lustre-cancel, small beam spot</th>
<th>Fluorescence detection UV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>CZ-H52</td>
<td>CZ-H56S</td>
<td>CZ-H57S</td>
<td>CZ-H58</td>
</tr>
<tr>
<td>Detection range</td>
<td>50 to 95 mm</td>
<td>28 to 52 mm</td>
<td>11 to 20 mm</td>
<td>25 to 55 mm</td>
</tr>
<tr>
<td>(Recommended: 70 mm)</td>
<td>(Recommended: 40 mm)</td>
<td>(Recommended: 15 mm)</td>
<td>(Recommended: 35 mm)</td>
<td></td>
</tr>
<tr>
<td>Smallest spot diameter</td>
<td>Small: 3 mm dia.</td>
<td>Medium: 4.5 mm dia.</td>
<td>Large: 5.5 mm dia.</td>
<td>4.5 mm dia. at reference distance of 40 mm</td>
</tr>
<tr>
<td>Light source</td>
<td>Red LED (665 nm)/Green LED (520 nm)/Blue LED (465 nm)</td>
<td>—</td>
<td>—</td>
<td>UV (ultraviolet) LED (375 nm)</td>
</tr>
<tr>
<td>Minimum bend radius of fibre</td>
<td>25 mm</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Ambient light</td>
<td>In incandescent lamp: 10,000 lux max., Sunlight: 20,000 lux max.</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>10 to +55°C, No condensation</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Vibration</td>
<td>10 to 55 Hz, 0.06&quot; (1.5 mm) double amplitude in X, Y, and Z directions, 2 hours respectively</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Material</td>
<td>Housing, cover: Polycarbonate</td>
<td>Fibreglass reinforced plastic</td>
<td>Tricelate, Polyarylate</td>
<td>Glass</td>
</tr>
<tr>
<td>Lens cover</td>
<td>Polyarylate</td>
<td>(Metal section: TYPE 304 stainless steel)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Weight (with 2-m cable)</td>
<td>Approx. 40 g</td>
<td>Approx. 45 g</td>
<td>Approx. 40 g</td>
<td>Approx. 40 g</td>
</tr>
</tbody>
</table>

1. Reference distance: 65 mm for Small, 60 mm for Medium, and 50 mm for Large
2. The CZ-H52 emits ultraviolet light from the transmitter. Do not directly look at the light source while in operation.

Amplifier

<table>
<thead>
<tr>
<th>Model</th>
<th>NPN</th>
<th>Model</th>
<th>NPN</th>
</tr>
</thead>
<tbody>
<tr>
<td>CZ-V21A</td>
<td>—</td>
<td>CZ-V21AP</td>
<td>—</td>
</tr>
<tr>
<td>Unit type (Main/Expansion)</td>
<td>Main unit</td>
<td>Expansion unit</td>
<td></td>
</tr>
<tr>
<td>Response time</td>
<td>200 µs (HIGH SPEED)/1 ms (FINE)/4 ms (TURBO)/8 ms (SUPER)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control output</td>
<td>NPN (PNP) open-collector x 4 channels, 40 VDC (30 VDC) max., Up to 100 mA for one output, Up to 200 mA in total of 4 outputs, Residual voltage: 1.0 V max.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection circuit</td>
<td>Reverse-polarity protection, overcurrent protection, surge absorber</td>
<td></td>
<td></td>
</tr>
<tr>
<td>External calibration input</td>
<td>Input time: 20 ms min.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>External bank switch input (C+C+I mode), External shift input (Super 1 mode)</td>
<td>Input time: 20 ms min.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Timer function</td>
<td>Timer OFF/OFF-delay/OFF-delay/One-shot, Timer time: 1 to 1,000 ms adjustable (for each bank respectively)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>24 VDC, Ripple (P-P): 10% max.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current consumption</td>
<td>Normal mode: 1.5 W (82.5 mA max.), Eco-mode: 1 W (42.0 mA max.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>10 to +55°C, No condensation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>Housing, cover: Polycarbonate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (with 2-m cable)</td>
<td>Approx. 110 g</td>
<td>Approx. 100 g</td>
<td></td>
</tr>
</tbody>
</table>

1. 20 mA max. when several units are connected.
2. When several units are connected, the acceptable ambient temperature varies depending on the conditions given below. To connect several units, be sure to mount them to a DIN rail and to limit the output current to a maximum of 20 mA. When 1 or 2 units are connected, it must be at 10 to +50°C.
3. When 3 units connected, it must be at -10 to +45°C.
4. The CZ-V20 Series cannot be connected to the main unit of the CZ-V20 Series. To connect the FS and CZ Series units, connect the expansion unit of the CZ-V20 Series to the main unit of the FS-V20 Series.

Automatic calibration adjustment
After the sensitivity setting is complete, the set value can be finely adjusted by detecting actual acceptable or unacceptable targets and adding (increasing) or excluding (decreasing) the set value. (Patent pending)

Attenuation function
When the reflection from a target is too strong, the attenuation function can be used to decrease the sensitivity.

Three types of timer functions
Three types of timers are available: ON-delay, OFF-delay, and One-shot. The timer value can be set between 1 ms and 1,000 ms.
Fluorescence detection UV sensor suitable for the detection of fluorescent materials and paints

CZ-H52

Detection/operation indicators
The detection and operation indicators show the current status of the detection.

UV ON indicator
Detection indicator

Detecting fluorescent marks without being affected by patterns or colours
The CZ-H52 emits UV light from the transmitter and detects the reflected light which was converted into visible light by the fluorescent material. Fluorescent materials and paints are normally invisible, however, they reflect visible light when UV light is applied.

Targets which may contain fluorescent materials/paints
- Fluorescent label
- Fluorescent chalk
- Fluorescent lubricant
- Fluorescent dye
- Paper
- Adhesive
- Marking tool/ink-jet printer
- Fluorescent colour
- Label
- Sticker
- Optically bright materials
- Transparent film
- Marking ink
- Grease
- Ink and varnish/lacquer
- Felt-tip pen
- Printing ink
- And so on

The CZ-H52 may be effective for detecting the above targets.

Super-small head for space saving
The small sensor head measures only (15 (W) x 33 (H) x 24 (D) mm). It can be easily mounted in tight spaces.

Applications
Many targets contain fluorescent materials or paints. The fluorescence detection UV sensor may be able to detect targets which cannot be detected with photoelectric sensors. Try your target in an actual situation.

Detecting labels on white containers
The fluorescent component contained in a label is detected to check for the presence/absence of the label. Since the detection uses the fluorescent components, it can stably detect even white labels on white containers.

Detection of presence/absence of invisible print
The CZ-H52 detects the presence or absence of the print in invisible ink which contains a fluorescent component. The fluorescence detection UV sensor can stably detect print which cannot be detected with reflective type photoelectric sensors.

Detection of presence/absence of instruction sheets (package insert)
The CZ-H52 detects the fluorescent component contained in paper to check whether the instruction sheet (package insert) is properly inserted into each medicine package.

Checking grease application on ball bearings
The grease application is checked by detecting the presence/absence of the fluorescent component contained in it. Even glossy metal targets can be stably detected by ignoring the influence of specular reflection.
Dimensions

CZ-H37S

Indicator

Centre of emitted light

Centre of received light

When a mounting bracket is attached

Material: TYPE 304 stainless steel

\( t = 1.5 \)

The figures in parentheses apply to CZ-H37S only.

Supplied screw: 20 x M3 screws (2)

CZ-H52

Indicator

Centre of emitted light

Centre of received light

When a mounting bracket is attached

Material: TYPE 304 stainless steel

\( t = 1.2 \)

Supplied screw: 20 x M3 screws (2)

CZ-H32

Indicator

Centre of emitted light

Centre of received light

When a mounting bracket is attached

Material: TYPE 304 stainless steel

\( t = 1.5 \)

Supplied screw: 20 x M3 screws (2)

CZ-H35S

Indicator

Centre of emitted light

Centre of received light

When a mounting bracket is attached

Material: TYPE 304 stainless steel

\( t = 1.5 \)

Supplied screw: 20 x M3 screws (2)

Mounting bracket

(Supplied with the CZ-H32, H35S, and H37S)

Material: TYPE 304 stainless steel

Supplied screw: 22 x M3 screws (2)

Mounting bracket

(Supplied with the CZ-H52)

Material: TYPE 304 stainless steel

\( t = 1.5 \)

Supplied screw: 22 x M3 screws (2)
When a mounting bracket is attached (supplied with the CZ-V21A/V21AP)

End unit (supplied with the CZ-V22A/V22AP)

When several units are connected

Input/output circuit diagram

Connection

Output circuit

Input circuit

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CZ-V21A/CZ-V21AP

- Ø4.5, 8-core x Purple/Pink/Orange/Gray/White/Black 0.25 mm²
- Cable length: 2 m

CZ-V22A/CZ-V22AP

- Ø4.5, 5-core x Purple/Orange/Gray/White/Black 0.25 mm²
- Cable length: 2 m

Note: When connecting expansion units, be sure to use the end units.