

# Photoelectrics

## Laser, Diffuse-reflective (Colour Mark Sensor)

### Type LD32CND15

CARLO GAVAZZI



- Miniature sensor range
- Range: 150 mm
- Sensitivity adjustment by Teach-In programming
- Modulated, red laser light 650 nm (class 2)
- Supply voltage: 10 to 30 VDC
- Output: 100 mA, NPN or PNP preset
- Make and break switching function programmable
- LED for output indication, signal stability and power ON
- Protection: reverse polarity, short circuit and transients
- Excellent EMC performance
- Accurate detection of small printing marks



## Product Description

The LD32CND15 sensor family comes in a compact 12 x 32 x 20 mm reinforced PMMA/ABS-housing. The sensors are useful in applications where high-accuracy detection as well as small size is required. The Teach-In function for

adjustment of the sensitivity makes the sensors highly flexible. The output type is preset (NPN or PNP), and the output switching function is programmable (NO or NC). The small laser spot makes the diffuse-reflective sensor useful as colour mark sensor.

## Ordering Key

**LD32CND15PPM5T**

|                      |       |
|----------------------|-------|
| Type                 | _____ |
| Housing style        | _____ |
| Housing size         | _____ |
| Housing material     | _____ |
| Housing length       | _____ |
| Detection principle  | _____ |
| Sensing distance     | _____ |
| Output type          | _____ |
| Output configuration | _____ |
| Connection type      | _____ |
| Teach-In             | _____ |

## Type Selection

| Housing<br>W x H x D | Range<br>S <sub>n</sub> | Ordering no.<br>NPN & PNP cable<br>Make & break switching | Ordering no.<br>NPN & PNP plug<br>Make & break switching |
|----------------------|-------------------------|-----------------------------------------------------------|----------------------------------------------------------|
| 12 x 32 x 20 mm      | 150 mm                  | LD 32 CND 15 NPT<br>LD 32 CND 15 PPT                      | LD 32 CND 15 NPM5T<br>LD 32 CND 15 PPM5T                 |

## Specifications

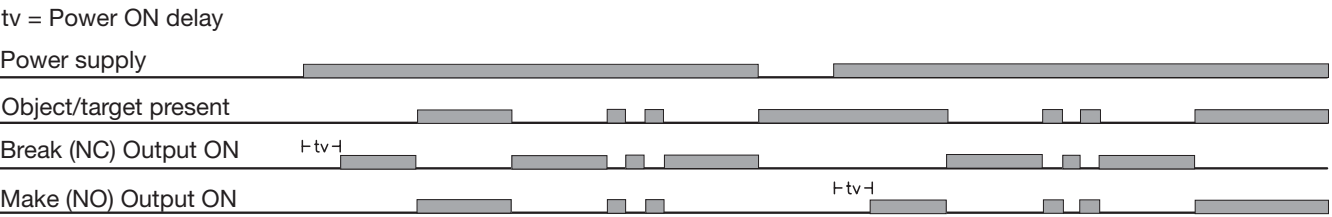
|                                                 |                                                                                                                                                            |                                                    |                                                |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|------------------------------------------------|
| <b>Rated operating distance (S<sub>n</sub>)</b> | Up to 150 mm, reference target Kodak test card R 27, white, 90% reflectivity, 100 x 100 mm<br>Optimal working distance as colour mark sensor is 70-100 mm. | <b>Minimum operational current (I<sub>m</sub>)</b> | 0.5 mA                                         |
| <b>Blind zone</b>                               | None                                                                                                                                                       | <b>OFF-state current (I<sub>r</sub>)</b>           | ≤ 100 µA                                       |
| <b>Sensitivity</b>                              | Adjustable by Teach-In (push button or wire)                                                                                                               | <b>Voltage drop (U<sub>d</sub>)</b>                | ≤ 2.4 VDC @ 100 mA                             |
| <b>Temperature drift</b>                        | ≤ 1%/°C                                                                                                                                                    | <b>Protection</b>                                  | Short-circuit, reverse polarity and transients |
| <b>Hysteresis (H) (differential travel)</b>     | ≤ 10%                                                                                                                                                      | <b>Laser protection class</b>                      | Class 2 - according to EN60825-1-3/97          |
| <b>Rated operational volt. (U<sub>B</sub>)</b>  | 10 to 30 VDC (ripple included)                                                                                                                             | <b>Average power</b>                               | < 1 mW                                         |
| <b>Ripple (U<sub>rip</sub>)</b>                 | ≤ 10%                                                                                                                                                      | <b>Pulse width</b>                                 | t = 3 µs                                       |
| <b>Output current</b>                           |                                                                                                                                                            | <b>Pulse repetition time</b>                       | f = 5 kHz                                      |
| Continuous (I <sub>a</sub> )                    | ≤ 100 mA                                                                                                                                                   | <b>MTBF</b>                                        | > 50'000 h @ T <sub>a</sub> = 40°C             |
| Short-time (I)                                  | ≤ 100 mA (max. load capacity 100 nF)                                                                                                                       | <b>Light source</b>                                | Laser, red light, 650 nm                       |
| <b>No load supply current (I<sub>o</sub>)</b>   | ≤ 25 mA @ 24 VDC                                                                                                                                           | <b>Light type</b>                                  | red, modulated                                 |
|                                                 |                                                                                                                                                            | <b>Sensing angle</b>                               | < 0.8°                                         |
|                                                 |                                                                                                                                                            | <b>Ambient light</b>                               | 5,000 lux                                      |
|                                                 |                                                                                                                                                            | <b>Light spot</b>                                  | < 0.7 mm @ focus                               |
|                                                 |                                                                                                                                                            | <b>Operating frequency</b>                         | 1000 Hz                                        |
|                                                 |                                                                                                                                                            | <b>Response time</b>                               |                                                |
|                                                 |                                                                                                                                                            | OFF-ON (t <sub>ON</sub> )                          | ≤ 0.5 ms                                       |
|                                                 |                                                                                                                                                            | ON-OFF (t <sub>OFF</sub> )                         | ≤ 0.5 ms                                       |
|                                                 |                                                                                                                                                            | <b>Power ON delay (t<sub>v</sub>)</b>              | ≤ 300 ms                                       |



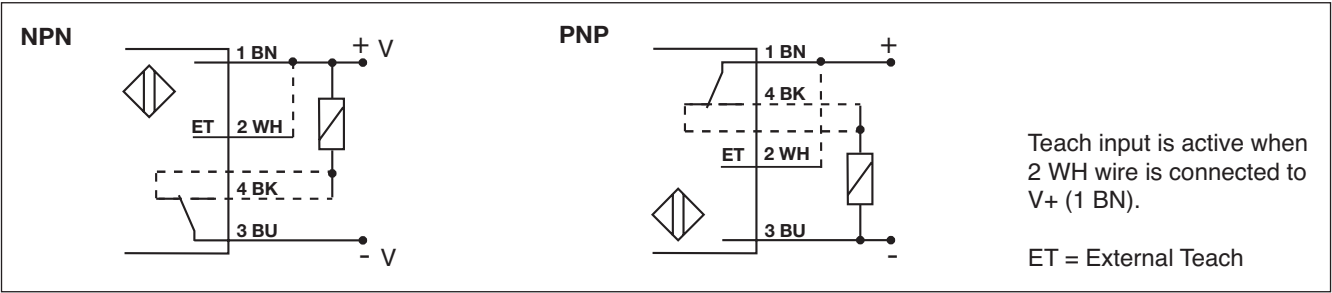
Specifications (cont.)

|                                                                                                          |                                                                |                                                   |                                                                       |
|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|---------------------------------------------------|-----------------------------------------------------------------------|
| <b>Output function</b><br>NPN and PNP<br>NO/NC switching function                                        | Preset<br>Set up by button                                     | <b>Vibration</b>                                  | 10 to 55 Hz, 0.5 mm/7.5 g<br>(IEC 60068-2-6)                          |
| <b>External Teach (ET)</b><br>Same function as button<br>Locked (disable teach button)<br>Operating mode | 10 to 30 VDC<br>0 to 2.5 VDC<br>Not connected                  | <b>Shock</b>                                      | 30 g/11 ms, 3 pos, 3 neg<br>per axis<br>(IEC 60068-2-6, 60068-2-32)   |
| <b>Indication</b><br>Output ON<br>Signal stability ON and power ON                                       | LED, yellow<br>LED, green                                      | <b>Rated insulation voltage</b>                   | 500 VAC (rms)                                                         |
| <b>Environment</b><br>Installation category                                                              | II (IEC 60664/60664A;<br>60947-1)                              | <b>Housing material</b><br>Body<br>Front material | ABS, black<br>PMMA, red                                               |
| Pollution degree                                                                                         | 3 (IEC 60664/60664A;<br>60947-1)                               | <b>Connection</b><br>Cable                        | PUR, black, 2 m<br>4 x 0.14 mm <sup>2</sup> , Ø = 3.6 mm<br>M8, 4-pin |
| Degree of protection                                                                                     | IP 67 (IEC 60529; 60947-1)                                     | Plug                                              |                                                                       |
| <b>Ambient temperature</b><br>Operating<br>Storage                                                       | -20 to +60° C (-4 to +140° F)<br>-20 to +80° C (-4 to +176° F) | <b>Weight</b>                                     | Cable type: 40 g<br>Plug type: 10 g                                   |
|                                                                                                          |                                                                | <b>CE-marking</b>                                 | Yes                                                                   |

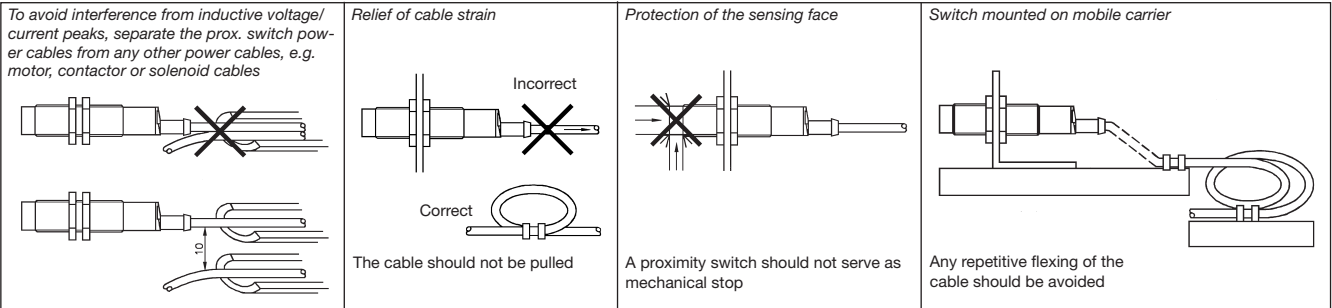
Operation Diagram



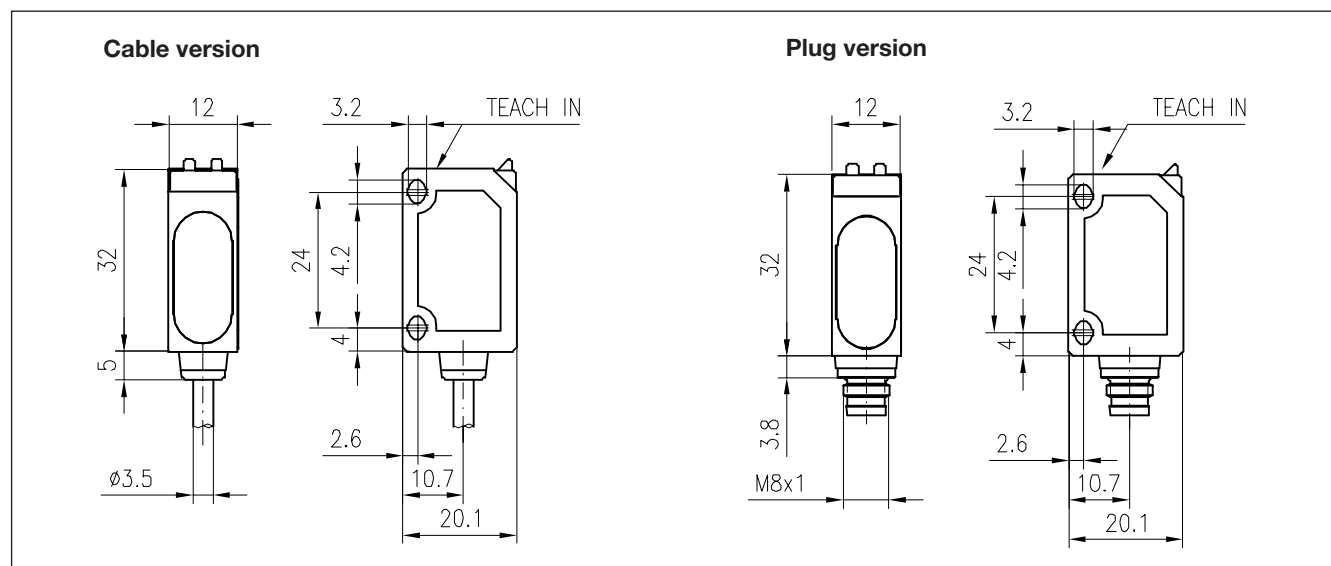
Wiring Diagrams



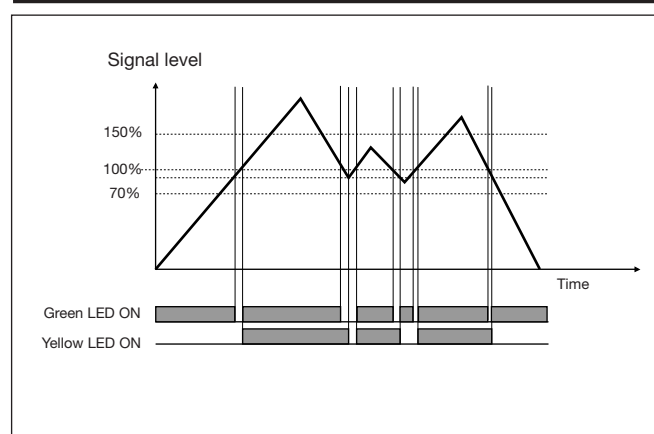
Installation Hints



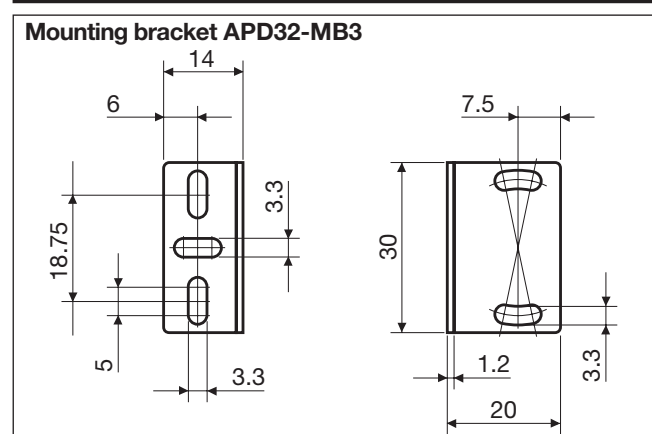
## Dimensions



## Signal Stability Indication



## Accessories



For further information refer to "Accessories"

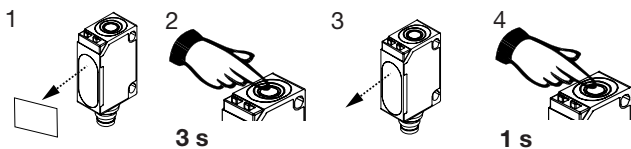
## Delivery Contents

- Photoelectric switch: LD 32 CND 15
- Installation instruction
- **Packaging:** Cardboard box

## Adjustment

### Sensitivity adjustment, with static object

1. Line up the sensor with the object. Yellow LED and green LED are ON.
2. Press the button for 3 s until both LED's flash simultaneously (the first switching point is stored).
3. Place the object outside the detection area.
4. Press the button for 1 s.
  - a) The green LED flashes and stays ON: the second switching point is stored, and the sensor is ready to operate.
  - b) Both LED's flash simultaneously: the sensor cannot detect the object, no switching points are stored.



### Sensitivity adjustment, with only one object

1. Line up the sensor with the object. Yellow LED and green LED are ON.
2. Press the button for 3 s until both LED's flash simultaneously (the first switching point is stored).
3. Leave the object in the detection area, press the button for 1 s. The green LED flashes and stays on: the second switching point is stored, and the sensor is ready to operate.

### Sensitivity adjustment, with a running process

1. Line up the sensor with the object. Green LED is ON. At this stage the status of the yellow LED can be ignored.
2. The running process must be the only "object" within the detection area. Press the button for 3 s until both LED's flash simultaneously.
  **3 s**
3. Press the button for at least the duration of one process cycle.
  **1 cycle**
  - a) The green LED flashes and stays ON: both switching points have been stored, and the sensor is ready to operate.
  - b) Both LED's flash simultaneously: the sensor cannot detect the object, no switching points are stored.

### Programming of make and break switching function

1. Press the button for 13 s.  **13 s**  
Both LED's flash alternately.
2. Release the button: the green LED flashes.
3. While the green LED flashes, the output is inverted each time the button is pressed. This is indicated by the yellow LED.  
When the button is not pressed for 10 s, the current output function is stored.  
The sensor is now ready for operation.

### Default setting

1. No object in the detection area: Press the button for 3 s, until both LED's flash simultaneously.  **3 s**
2. No object in the detection area: Press the button for 1 s.  **1 s**  
The sensor is set to maximum sensitivity.

**NB!** The Teach Input (2 WH) will work similarly to the push button, active High.