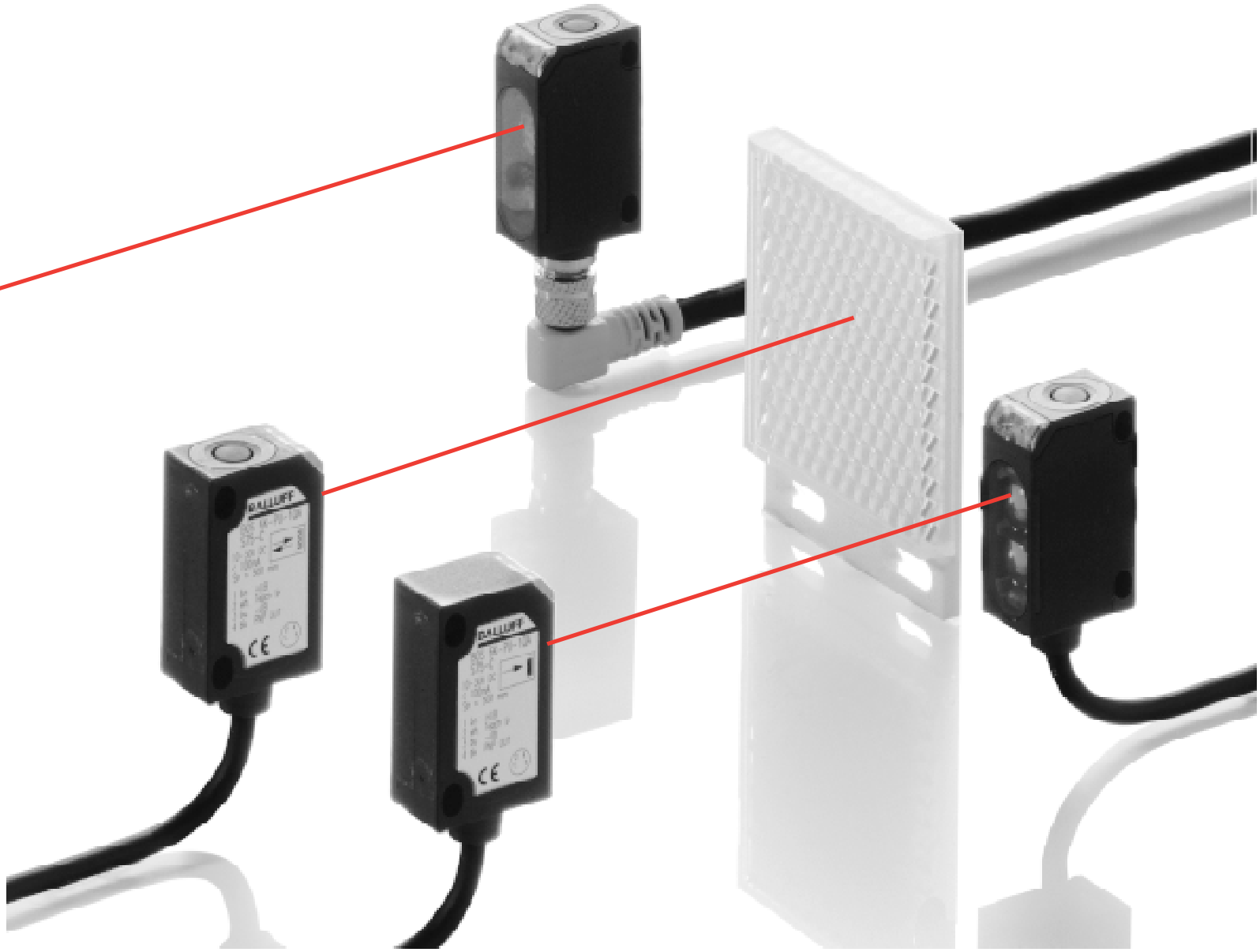
BALLUFF

# The 6K Series
# Redefining Smart Sensors

## Miniature Sensors with Advanced Teach-In



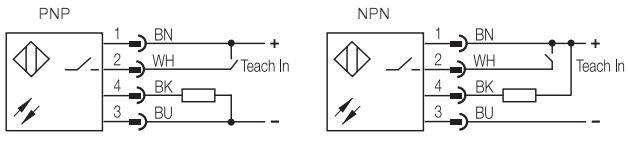
The **6K** optical sensors offer advanced teach-in capabilities in a surprisingly small housing. Innovative one button setup in a package this size puts the popular teach-in function in its place: anywhere you want it! Available with either PNP or NPN outputs and all popular sensing modes, the **6K** is the one sensor capable of solving a variety of complex applications.

Housed within each **6K** optical sensor is a microprocessor dedicated to automatically adjusting the sensor for perfect operation every time. Combine precise adjustment with advanced optical circuitry and you have an unbeatable sensing solution. A push of the button and the sensor automatically learns the target. Even if the target is moving at full production speed! We call this dynamic teach-in, our customers call it a dynamic improvement.

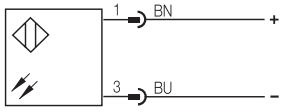
Small size enables mounting in any confined location. This can make the teach-in button difficult to get to, but no problem for the **6K**! A remote teach-in signal is available on all models. A PLC or locally mounted push-button can be used to set the range. Remote teach-in allows you to embed the sensor in a location that makes sense for you, not what works best for the sensor. Expect more: **6K**.

**Connection Diagrams:**

Diffuse, Retroreflective, Thru-Beam (Receiver)




Emitter




**Features**

- One button teach-in programmability
- Remote access to teach-in capabilities
- Dynamic Teach-in learns running processes
- Miniature housing with quick-disconnect or cable connections
- Visible red light source aids in alignment
- Highly visible status LEDs for output function and stability/contamination
- Programmable light-on or dark-on mode
- Sealed to IP 67 standards
- Complete short-circuit and reverse polarity protection
- Full range of sensing modes: Diffuse, Retroreflective and Thru-Beam
- Special versions for clear glass detection (1QA)
- Electronic background suppresion models for tight locations (1HA)

**Applications**

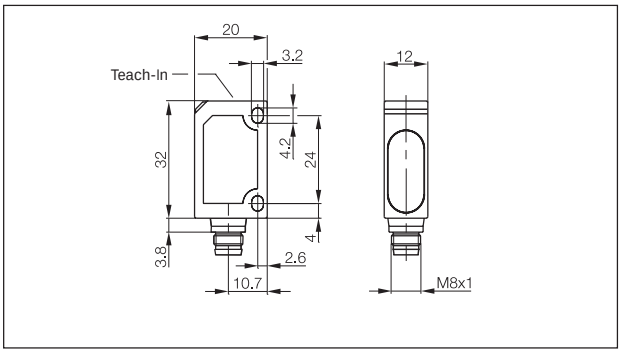
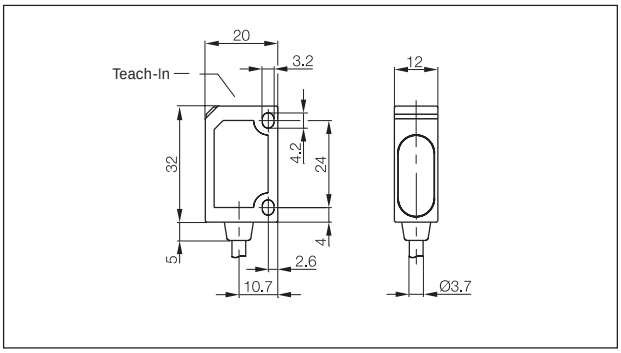
- Packaging machinery
- Assembly machinery
- Material handling equipment
- Paper/printing/bindery machinery

| Series | | | | |
|---|---|---|---|---|
| Diffuse | | | Sensing range | |
| Retroreflective | | | Sensing range | |
| Thru-Beam | | | Sensing range | |

| | | | | |
|---|---|---|---|---|
| **Diffuse** | | | | |
| PNP | O/● | 30...100 mm | Background suppression | |
| NPN | O/● | 30...100 mm | Background suppression | |
| PNP | O/● | 5...300 mm | energetic diffuse | |
| NPN | O/● | 5...300 mm | energetic diffuse | |
| **Retroreflective** | | | | |
| PNP | O/● | 0.5 m | Polarizing filter, glass detection | |
| NPN | O/● | 0.5 m | Polarizing filter, glass detection | |
| PNP | O/● | 2.5 m | Polarizing filter | |
| NPN | O/● | 2.5 m | Polarizing filter | |
| **Thru-Beam** | | | | |
| PNP | O/● | 6 m | Receiver | |
| NPN | O/● | 6 m | Receiver | |
| | | 6 m | Emitter | |

| | | |
|---|---|---|
| Electrical | Supply voltage $U_B$ | |
| | Voltage drop $U_d$ at $I_e$ | |
| | Rated isolation voltage $U_i$ | |
| | Rated operational current $I_e$ | |
| | No-load supply current $I_0$ | |
| | Protected against polarity reversal | |
| | Short circuit protected | |
| | Permissible capacitance | |
| | On/Off delay | |
| | Frequency of operating cycles f | |
| | Utilization category | |
| | Output | |
| | Output function | |
| | Permissible ambient light | |
| Sensing | Sensitivity/Range adjustment | |
| | Output function indication | |
| | Stability/Contamination indication | |
| | Emitter | |
| | Light spot diameter | |
| | Hysteresis (18 %/18 %) | |
| | Gray value shift (90 %/18 %) | |
| | Ambient temperature range $T_a$ | |
| Housing | Degree of protection per IEC 529 | |
| | Housing material | |
| | Material of sensing face | |
| | Connection | |
| | Weight | |
| | Recommended connector | |

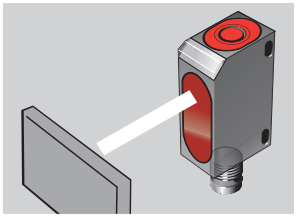
O /● = Light on/Dark on

| | BOS 6K<br>**30...100/5...300 mm**<br>**0.5 m/2.5 m**<br>**6 m** | BOS 6K<br>**30...100/5...300 mm**<br>**0.5 m/2.5 m**<br>**6 m** |
|---|---|---|
| |  |  |
| | BOS 6K-PU-1HA-S 75-C<br>BOS 6K-NU-1HA-S 75-C<br>BOS 6K-PU-1OC-S 75-C<br>BOS 6K-NU-1OC-S 75-C | BOS 6K-PU-1HA-C-02<br>BOS 6K-NU-1HA-C-02<br>BOS 6K-PU-1OC-C-02<br>BOS 6K-NU-1OC-C-02 |
| | BOS 6K-PU-1QA-S 75-C<br>BOS 6K-NU-1QA-S 75-C<br>BOS 6K-PU-1QC-S 75-C<br>BOS 6K-NU-1QC-S 75-C | BOS 6K-PU-1QA-C-02<br>BOS 6K-NU-1QA-C-02<br>BOS 6K-PU-1QC-C-02<br>BOS 6K-NU-1QC-C-02 |
| | BLE 6K-PU-1E-S 75-C<br>BLE 6K-NU-1E-S 75-C<br>BLS 6K-XX-1E-S 75-C | BLE 6K-PU-1E-C-02<br>BLE 6K-NU-1E-C-02<br>BLS 6K-XX-1E-C-02 |
| | 10...30 V DC | 10...30 V DC |
| | ≤ 2.4 V | ≤ 2.4 V |
| | 250 V DC | 250 V DC |
| | 100 mA | 100 mA |
| | ≤ 35 mA | ≤ 35 mA |
| | yes | yes |
| | yes | yes |
| | 0.33 µF | 0.33 µF |
| | 0.5 ms | 0.5 ms |
| | 1000 Hz | 1000 Hz |
| | DC 13 | DC 13 |
| | PNP/NPN | PNP/NPN |
| | O/● | O/● |
| | 5000 Lux | 5000 Lux |
| | Teach-In | Teach-In |
| | LED yellow | LED yellow |
| | LED green | LED green |
| | LED red 660 nm | LED red 660 nm |
| | see table below | see table below |
| | see table below | see table below |
| | < 10% (for 1HA only) | < 10% (for 1HA only) |
| | –20...+60 °C | –20...+60 °C |
| | IP 67 | IP 67 |
| | ABS impact resistant | ABS impact resistant |
| | PMMA | PMMA |
| | M8 connector (4-pin) | 2 m cable (4 × 26 AWG) |
| | 40 g | 40 g |
| | BKS-S 74/BKS-S 75 | |

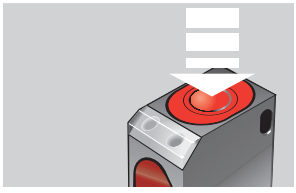
| | **1HA** | **1OC** | **1QA** | **1QC** |
|---|---|---|---|---|
| Light spot diameter | 5 × 5 mm<br>at 60 mm $s_n$ | 12 × 12 mm<br>at 160 mm $s_n$ | 20 × 20 mm<br>at 500 mm $s_n$ | 75 × 75 mm<br>at 2 m $s_n$ |
| Hysteresis | < 5 % | < 10 % | N/A | N/A |

Diffuse values referenced to Kodak gray card with 90 % reflection. Retroreflective values referenced to BOS-R-1 reflector.

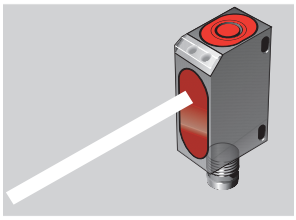
## Diffuse



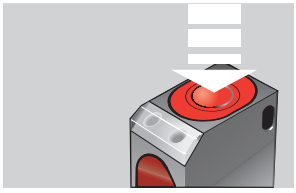
Direct sensor at object or running application



Hold button down for approx. 3 sec until both LEDs flash together.

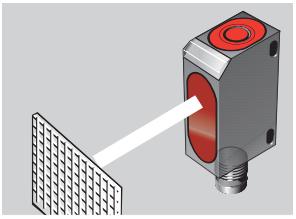


Remove objects from beam path or allow application to run a complete cycle

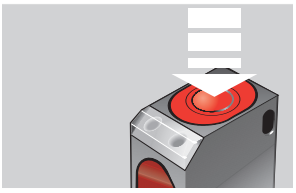


Hold button down for 1 sec. Green LED flashes briefly and then comes full on. Sensor is ready. If both LEDs flash together, repeat settings.

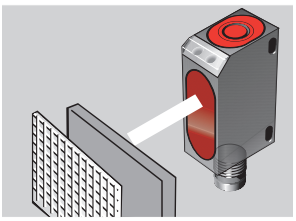
## Retroreflective/Thru-Beam



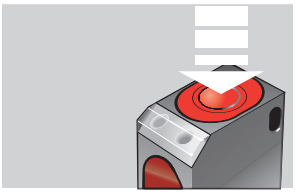
Direct sensor at reflector/ receiver.



Hold button down for approx. 3 sec until both LEDs flash together.



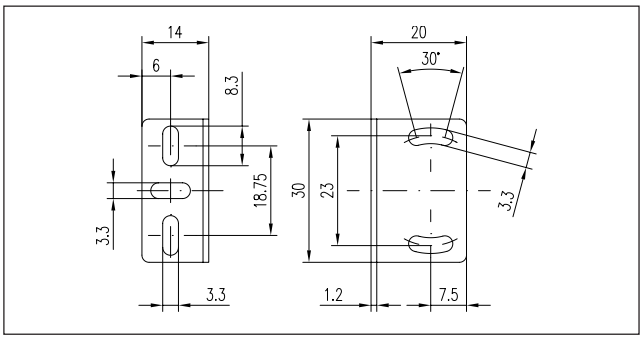
Bring object into beam path or allow application to run a complete cycle.

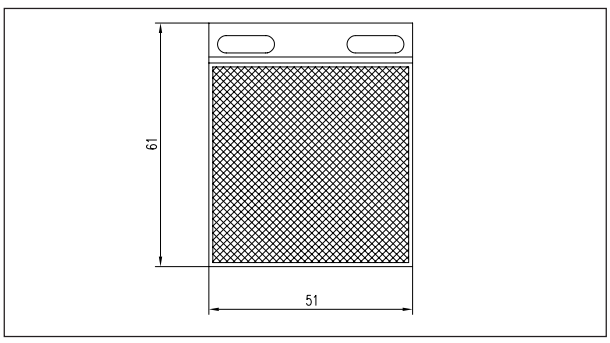


Hold button down for 1 sec. Green LED flashes briefly and then comes full on. Sensor is ready. If both LEDs flash together, repeat settings.

**Accessories:**

| | | | |
|---|---|---|---|
| Mounting bracket (sold seprately) | BOS6-HW-1 | Reflector | BOS-R-1 |

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