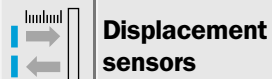


Scanner and measuring system in one

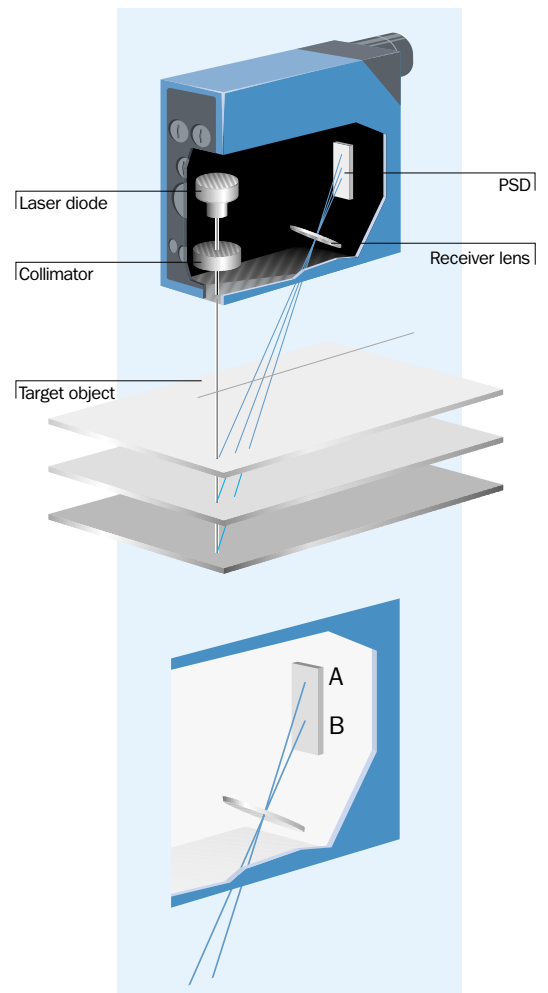


Displacement sensors



▼ All-in-one sensor with PSD technology:

Tried-and-tested triangulation measurement forms the physical basis of the OD displacement sensor. The optical, circuit and signal processing systems are designed for maximum resolution while simultaneously maintaining high linearity.



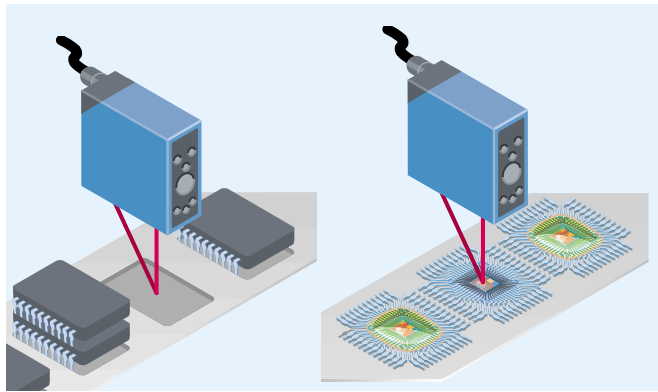
OD displacement sensors are a scanning and measuring system in one. Thanks to intelligent micro-controller technology, it is possible to integrate both functions in a single compact device: precise measurement and checking the presence of objects.

Calibration of the analogue output and adjustment of the scanning distance of the switching output is performed by means of user-friendly teach-in function.

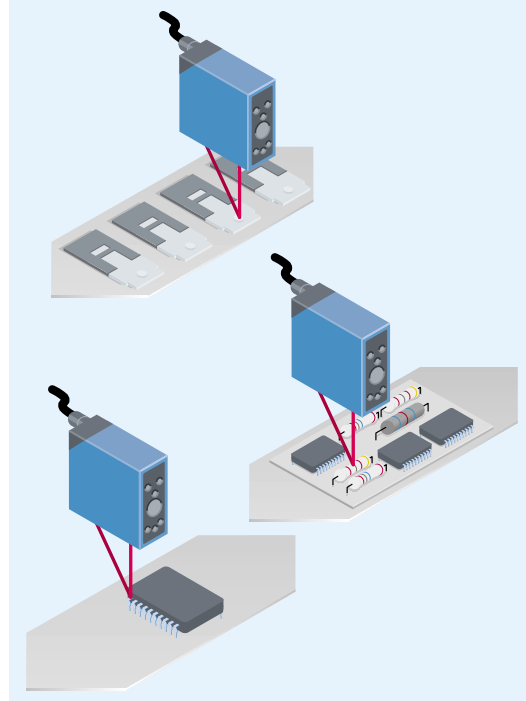
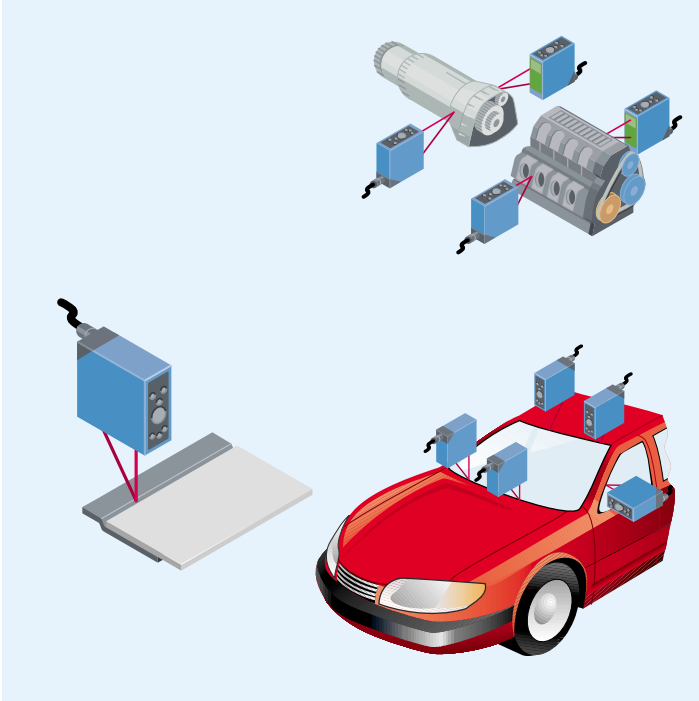
OD displacement sensors immediately detect minute variations, recesses or unevenness.

▲ **Triangulation measurements:** The position of the light spot on the PSD detector depends on the distance to the object that has been detected. Signals A and B change according to the position of the light spot. The signals are processed in the micro-controller to produce a linearised output signal according to the distance to the object.

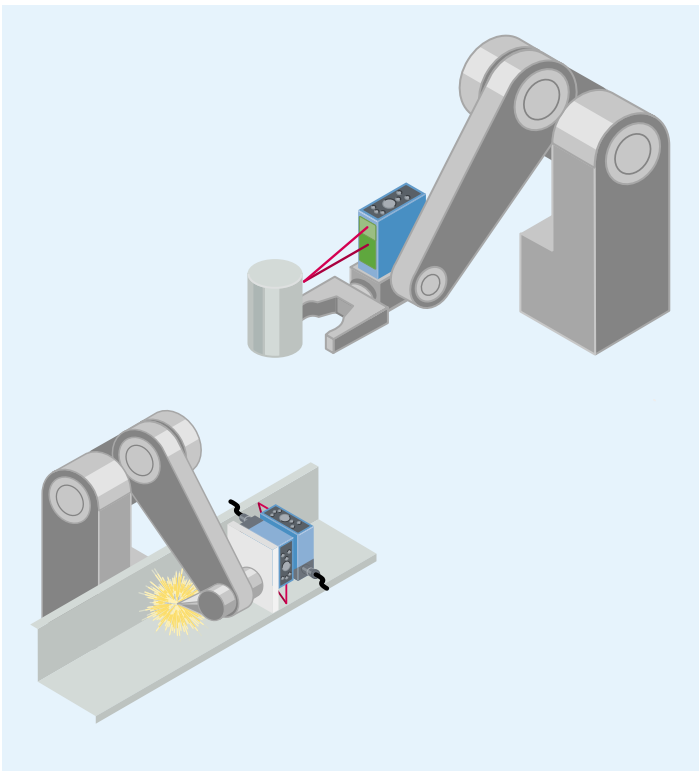
▼ **Automotive industry:** An OD displacement sensor used to measure coarse and low-reflective engine and transmission components. Location and checking of weld joints and body parts in serial vehicle production.



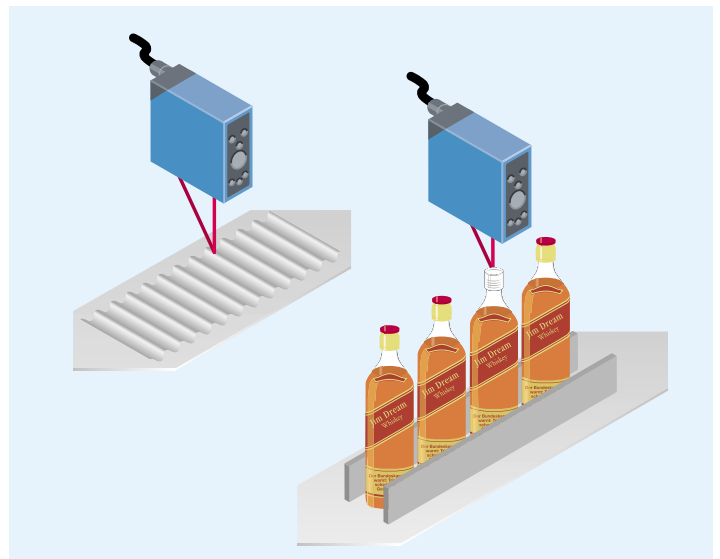
◀ **Semi-conductor industry:** An OD displacement sensor used to measure the epoxy resin coating in IC production. Missing ICs are detected during packaging in blister-pack covers.




◀ **Electronics industry:** An OD displacement sensor used to safeguard the switching performance of relay contacts and mechanical switches. Testing IC contacts before they are mounted on PCBs. Ensuring that electrical components are present.



▲ **Robotics:** OD displacement sensors for aligning and positioning robot arms and controlling welding robots used in constructing special-purpose machines or in serial production.



▲ **Paper and packaging industries:** Checking the shape and height of corrugations when manufacturing corrugated cardboard used for making cardboard boxes. The large light spot of the LED model enables coarse surfaces to be measured. Checking the presence of material and testing the arching of bottle tops and pot covers.

 **Measurement range**
 $25 \pm 5 / 50 \pm 10$ mm

Displacement sensors

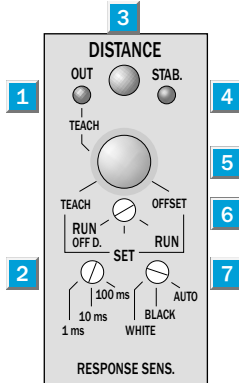
- Adjustment and calibration with teach-in
- Laser and LED models
- Blanking input for synchronisation for demanding measurement tasks



Description of control panel

Adjustments possible

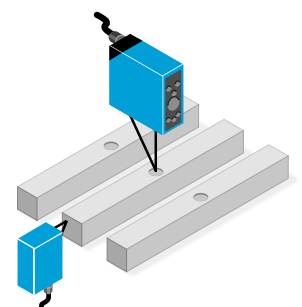
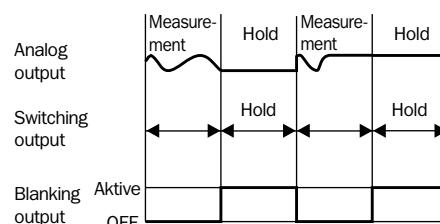
OD 25-05P132	OD 50-10P142
OD 25-05P830	OD 50-10P840
OD 25-05N132	OD 50-10N142
OD 25-05N830	OD 50-10N840



- 1** Teach-in indicator/output indicator
In the RUN mode the LED indicator shows "Open collector" status: orange – output ON, off: does not illuminate – output OFF.
- 2** Switch response time with 3 positions
Positions 100 ms, 10 ms or 1 ms are selected according to required response time and resolution – the longer the response time, the better the resolution.
- 3** Distance indicator
Display for the distance from the front of the sensor to the object. In scanning range: LED display lights red (closer than half-way), orange (half-way) or green (farther than half-way). The distance indicator blinks red-green, when the object is outside measurement range.
- 4** Stability indicator (STAB)
The LED indicator lights green when there is light reception with reserve. It does not light when there is insufficient reception and it lights red if reflection is too weak or too strong.
- 5** Teach-in button – Set Mode (during teach-in)
 - a) Setting the scanning distance: The LED lights green 1 x when the first distance is set and 2 x, when the second distance is set. In the event of an error, it lights red 1 x.
 - b) Setting offset: The LED lights green 3 x, when offset is set. In the event of an error, it lights red 1 x.
 - c) Resetting offset: The LED lights green 3 x, when the offset is reset.
- 6** Mode selector with 3 positions
Positions SET, RUN and RUN with OFF DELAY are required for the teach-in procedure.
- 7** Sensitivity selector with 3 positions
WHITE (white object), BLACK (black object) and AUTO (grey and/or multicoloured object).
When the selector is set to AUTO, WHITE or BLACK is selected depending on the reflection.

Description of the blanking input (SH)

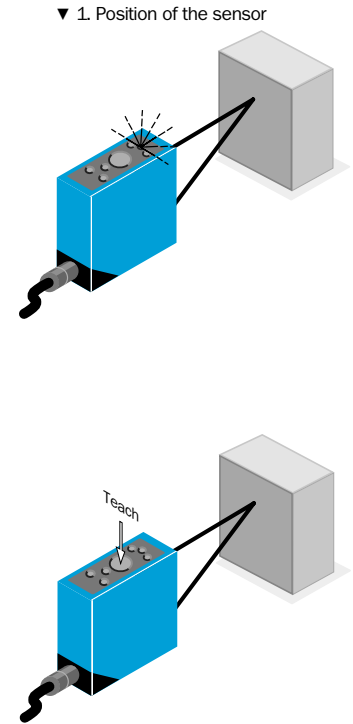
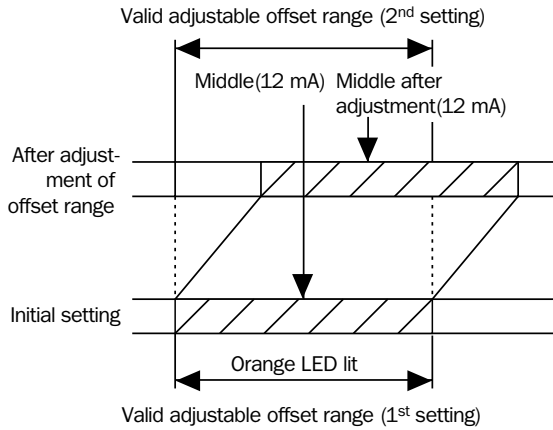
- When the blanking input is active, the control and analogue outputs retain their previous status (PNP type); active level is HIGH; NPN type; active level is LOW).



Description of the functions

Two steps for calibrating the analogue output

1. Position the object at the average scanning distance. The LED distance indicator lights orange.
2. Switch the mode selector to SET. Press the teach-in button for 2 to 5 seconds or trigger it via the connection cable. Teach-in signal lights green 3 x. Switch the mode selector to RUN or RUN with OFF DELAY; the calibration is adopted. The teach-in input is independent of the position of the mode selector.

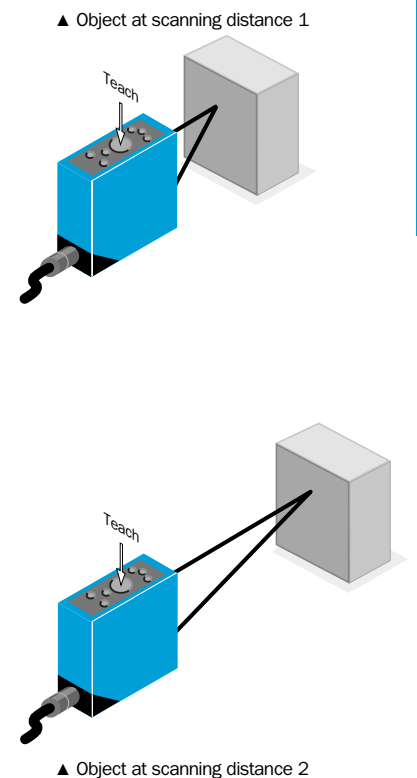
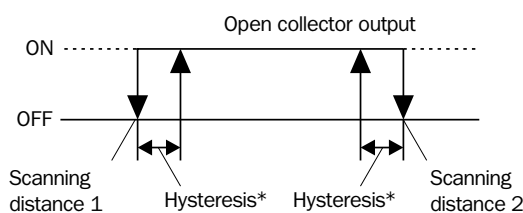


Two steps for resetting offset

1. Switch the mode selector to SET.
2. Press the teach-in button for longer than 5 seconds or trigger it via the connection cable.

Three steps for setting the switching control output

1. Switch the mode selector to SET. Position the object at scanning distance 1. Press the teach-in button for less than 2 seconds or trigger it via the connection cable.
2. Position the object at scanning distance 2. Press the teach-in button for less than 2 seconds or trigger it via the connection cable.
3. Switch the mode selector to RUN or RUN with OFF DELAY. The teach-in input is independent of the position of the mode selector.



* The hysteresis depends on the response time; the longer the response time the smaller the hysteresis. Fundamentally, the higher the reflectivity, the smaller the hysteresis.

OD Series Displacement sensors

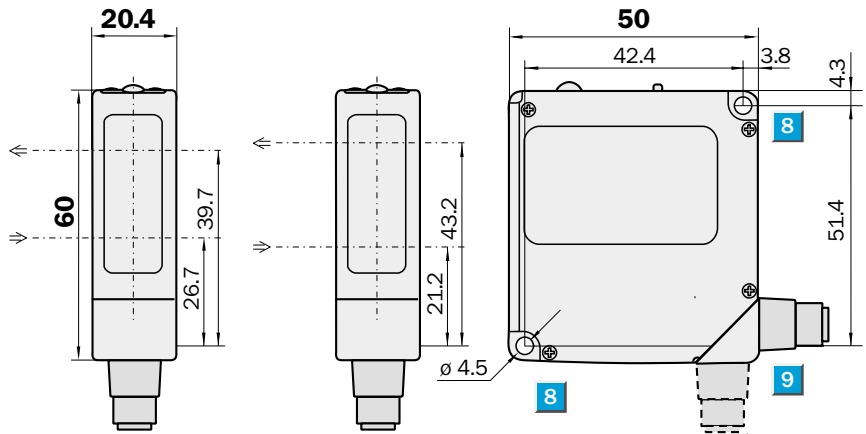
Measurement range
 $25 \pm 5 / 50 \pm 10$ mm

Displacement sensors

Dimensional drawing

OD 25

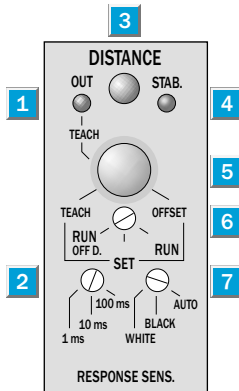
OD 50



Adjustments possible

OD 25-05P132	OD 50-10P142
OD 25-05P830	OD 50-10P840
OD 25-05N132	OD 50-10N142
OD 25-05N830	OD 50-10N840

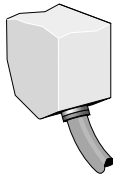
- 1 Teach-in indicator/output indicator
- 2 Response time selector
- 3 Distance indicator
- 4 Stability indicator
- 5 Teach-in button
- 6 Mode selector
- 7 Sensitivity selector
- 8 Mounting hole, ϕ 4.5 mm mounting hole
- 9 2 m cable (5 m option) or M 12 plug; 90° rotatable



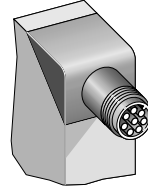
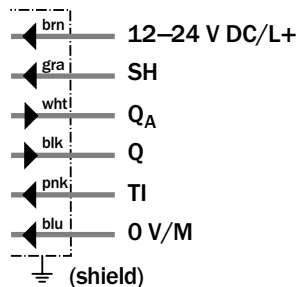
Connection types

OD 25-05P132	OD 50-10P142
OD 25-05N132	OD 50-10N142

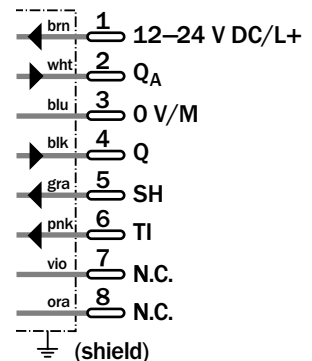
OD 25-05P830	OD 50-10P840
OD 25-05N830	OD 50-10N840



6 x 0.2 mm²



8-pin, M 12



Accessories	page
ODC evaluation units	464
Cable receptacles inc. cable	496

Technical Data		OD	25-05 P132	25-05 P830	25-05 N132	25-05 N830	50-10 P142	50-10 P840	50-10 N142	50-10 N840
Measurement range	25 ± 5 mm									
	50 ± 10 mm									
Light source	LED, red light									
	Laser category 2 IEC 60825: 1998									
Analogue output	4...20 mA, 0...300 Ω									
Switching outputs	PNP; 30 V/100 mA open collector									
	NPN; 30 V/100 mA open collector									
Accuracy	± 1% FS ¹⁾ /18%...90%, ± 4% FS ¹⁾ /6%									
Linearity	± 1% FS ¹⁾ /18%...90%, ± 3% FS ¹⁾ /6%									
Drift	± 0.05 %/°C FS ¹⁾									
	± 0.02 %/°C FS ¹⁾									
Resolution of analogue output	3/10/30 μm, 100/10/1 ms									
Hysteresis of control output	10/30/100 μm (90% remission)									
	30/120/500 μm (6% remission)									
Analogue output freq. response – 3 dB	100 ms...6.7/s, 10 ms...54/s, 1 ms...770/s									
Teach-in Input (TI)	NPN LOW = active, PNP HIGH = active									
Hold input (SH)	NPN LOW = active, PNP HIGH = active									
Timer	40 ms off delay									
VDE protection class	ⓘ									
Sensitivity to ambient light	10,000 lx (sun), 3000 lx (artificial light)									
Supply voltage V_S	DC 12...24 V, – 5 %/+10 %									
Current consumption ²⁾	120 mA (at 24 V)									
Warm-up time³⁾	15 min. max.									
EMC	EN 50081-1, EN 50082-2									
Enclosure rating	IP 67									
Circuit protection⁴⁾	A, B, D									
Ambient temperature⁵⁾	Operating – 10 °C...+ 40 °C									
	Storage – 20 °C...+ 60 °C									
Connection types	2 m cable ⁶⁾									
	Plug ⁷⁾									
Housing	PBT (housing), glass (window)									
	Zinc (housing), glass (window)									

1) FS = Full Scale = 10 mm/OD25, 20 mm/OD50

2) Without load

3) For applications with max. resolution and accuracy

4) A = Input and outputs reverse-polarity protected

B = Outputs short-circuit protected

D = Interference pulse suppression

5) Do not bend below 0 °C

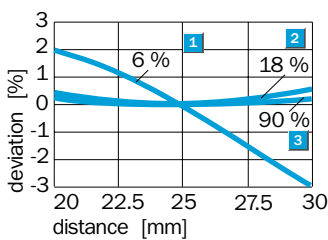
6) Available with 5 m cable on request

7) Prepared cable 2 m

Part no. 6 020 663

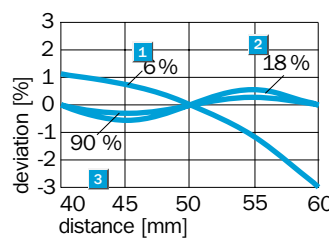
5 m available on request

Deviation OD 25-05 (LED)



- 1 Deviation on black
- 2 Deviation on grey
- 3 Deviation on white

Deviation OD 50-10 (laser)

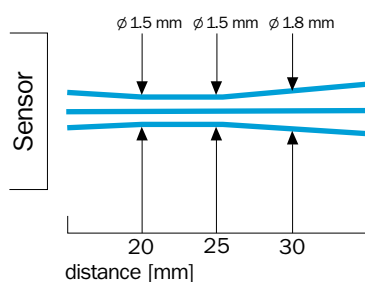


- 1 Deviation on black
- 2 Deviation on grey
- 3 Deviation on white

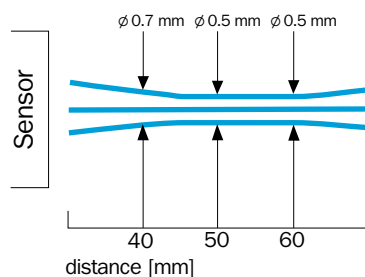
Order information

Type	Part no.
OD 25-05P132	6 020 643
OD 25-05P830	6 020 647
OD 25-05N132	6 020 642
OD 25-05N830	6 020 646
OD 50-10P142	6 020 637
OD 50-10P840	6 020 641
OD 50-10N142	6 020 636
OD 50-10N840	6 020 640

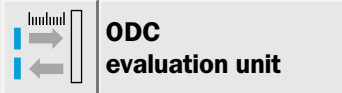
Light spot diameter OD 25-05 (LED)



Light spot diameter OD 50-10 (laser)



Industrial applications for decentralised automation



The ODC evaluation unit expands the functions of the OD series displacement sensors: decentralised automation with additional computing and processing functions.

An integrated Profibus DP Interface and an RS-232 interface provide simple connection to higher-ranking control systems.

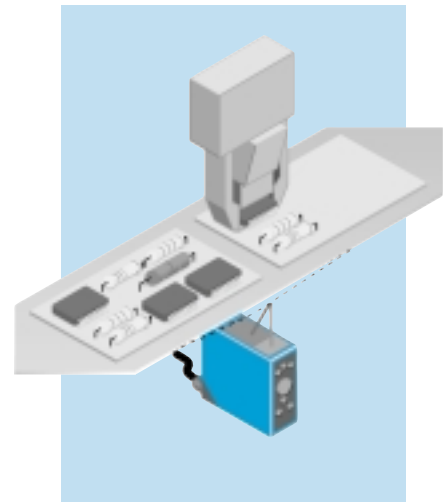
Thicknesses can be found directly using a combination of two OD displacement sensors and an ODC evaluation unit.

"Peak (bottom) hold", "Peak-to-peak", "Sample-and-hold", "Automatic peak and bottom value hold" and additional filter functions are features available when OD series displacement sensors are supplemented with the ODC evaluation unit.

User-friendly selection of the appropriate function is provided by a keyboard on the clearly structured display.

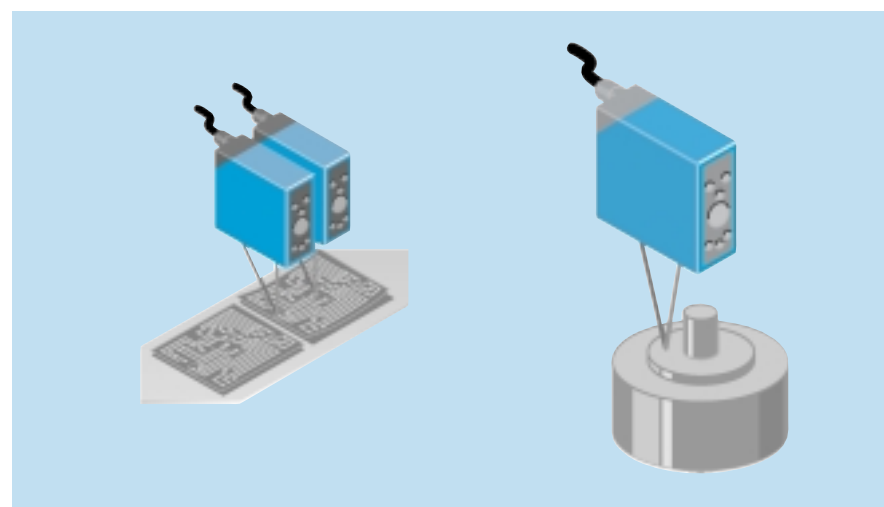
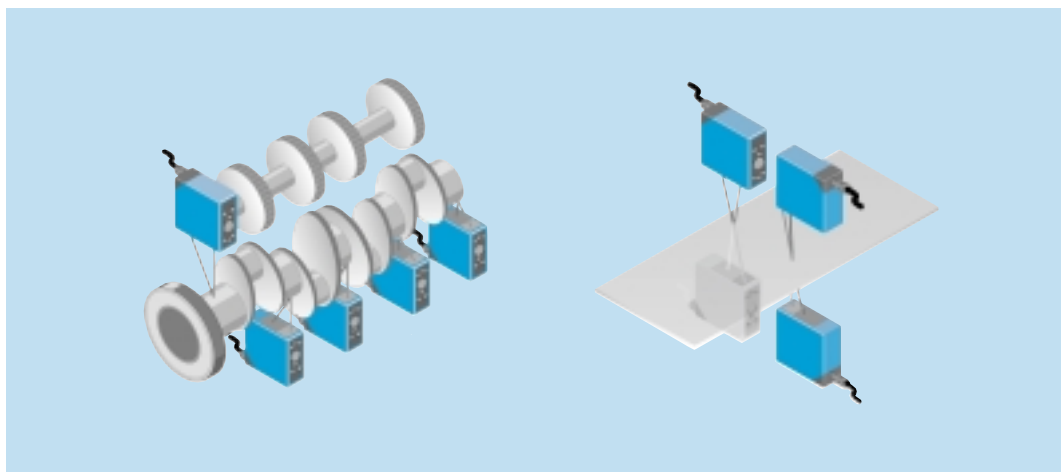
Coupled with the mounting sockets ODC-SOC or ODC-SOC65 (available as accessories), installation is fast and provides other benefits – replacement of the ODC evaluation unit without loosening the terminal connections, and the option of fitting the ODC evaluation unit at a later date (so as to avoid damage during installation).

Temperature ranges between 0 and 40 °C, humid and dusty environments are no longer a problem (IP 65).

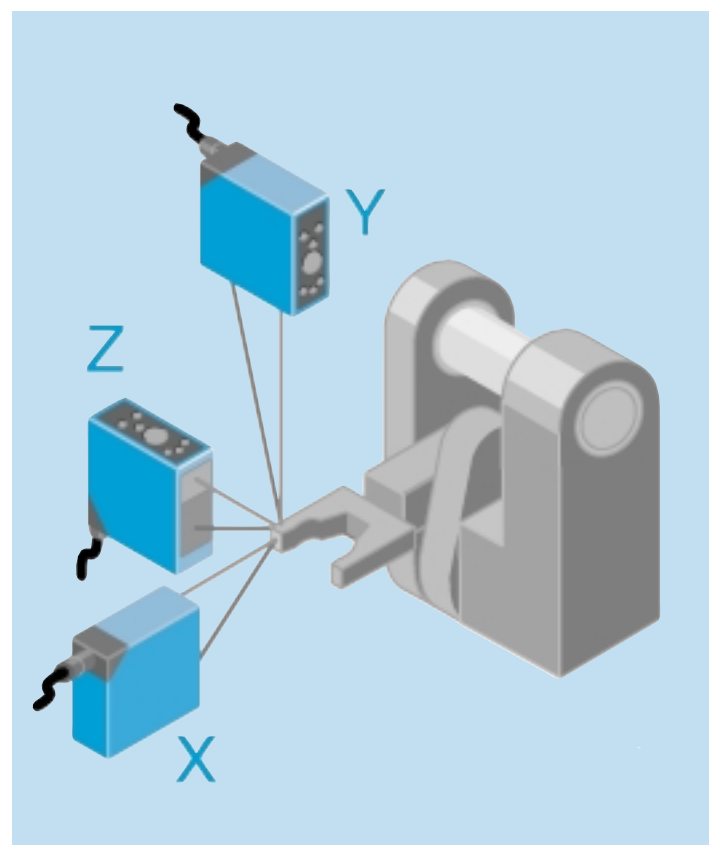


▲ **Electronics industry:** The OD ensures precise positioning of circuit boards during pick-and-place.

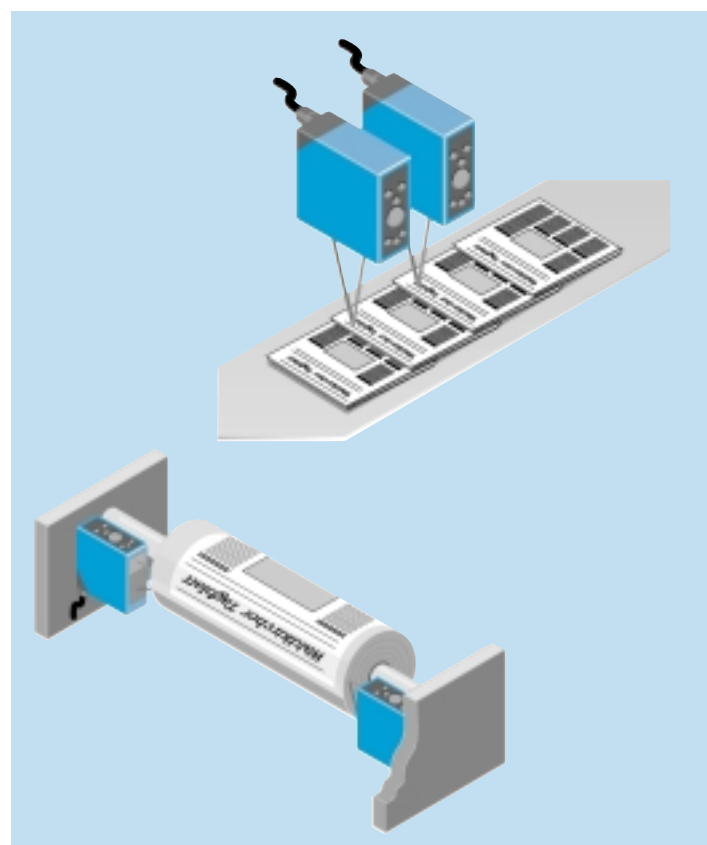
► **Automotive industry:** tolerance testing of cam and crank shafts using two or more OD displacement sensors and the ODC control equipment in an engine factory. The measured values – even in the μm range – are shown as absolute values on the ODC and are transmitted via the Profibus to the control. Typical applications are the evaluation of plate thicknesses of almost any standard material and control of coating units.



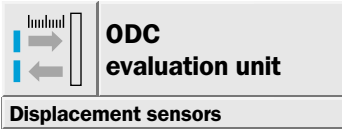
◀ **Electronics industry:** checking the bending of boards with a measurement arrangement consisting of two displacement sensors with an ODC control device in a motherboard design or assembly machine. Checking of tiny components in cassette recorders, Walkmans, CD players or memory drives, weakly reflective surfaces do not affect measurement.



▲ **Robots:** zero-point calibration and positioning control by robot arms in production lines with the OD displacement sensor and ODC control unit.

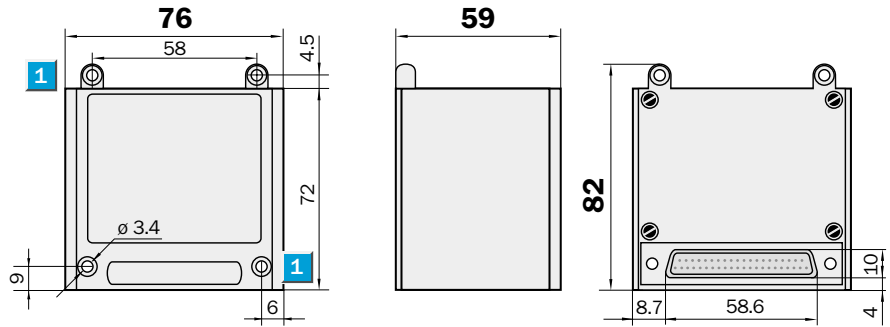


▲ **Paper and packaging industry:** Checking and counting magazines or (thin) brochures after the folding process. Checking centring of paper-feeding sheets and rollers in a print shop.



- Advanced digital signal processing
- Measured value processing for difficult applications
- RS 232 and Profibus

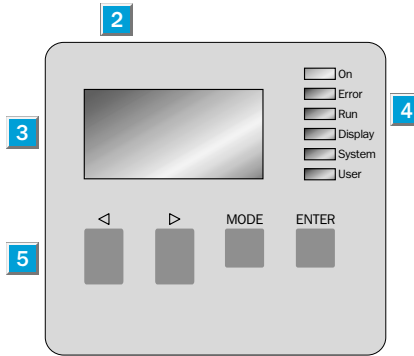
Dimensional drawing



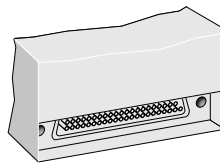
Adjustments possible

- ODC 100-P110
- ODC 100-N110

- 1 Mounting holes, $\phi 3.4$ mm
- 2 Electronics module
- 3 LC display
- 4 Status LEDs
- 5 Film keypad



Connection type 37-pin, sub D plug



Accessories	page
Mounting socket ODC-SOC	469
Mounting socket ODC-SOC65	469

1	+24 V/L+
2	PE
3	In-Sig. 2- (GND)
4	In-Sig. 2- (Q _A)
5	Shield 2
6	Q 2
7	Autozero
8	Teach-Sen. 2 (TI)
9	Hold-Sen. 2 (SH)
10	H
11	L
12	Error

13	RTS
14	T x D
15	+24 V/L+
16	PE
17	PE
18	+ 5 V
19	PB +
20	GND/M
21	PE
22	In-Sig. 1- (GND)
23	In-Sig. 1- (Q _A)
24	Shield 1

25	Q 1
26	Sync
27	Teach-Sen. 1 (TI)
28	Hold-Sen. 1 (SH)
29	HH
30	LL
31	Go
32	CTS
33	R x D
34	GND/M
35	PE
36	GND/M
37	PB -

Technical Data		ODC 100	-P 110	-N 110								
Analogue inputs	Two inputs, 0...20 mA (selectable depending on device type)											
Accuracy	± 0,05 % (full scale)											
Scanning frequency	2 kHz max.											
Measured value calculation	Linearisation, offset, autozero OD 25, OD 50, scale: offset, gain A, B, A + B, A - B, K - (A + B) ¹⁾											
Measurement functions	Peak/bottom/hold, Peak-to-peak/Hold, sample/hold, Automatic peak hold											
Filter functions	High pass, low pass, mean value creation											
Interfaces	RS 232 Profibus DP											
Switching outputs²⁾	PNP; 30 V/100 mA open collector NPN; 30 V/100 mA open collector											
Outputs	HH, H, Go, L, LL, PNP and NPN (can be selected according to device type) Error											
Inputs	Sync autozero											
Off delay	60 ms fixed for the outputs											
Supply voltage V_S	24 V DC ± 10 %											
EMC	EN 50081-1, EN 50082-2											
VDE protection class	⚡											
Enclosure rating	IP 20 (IP 65 as an option)											
Ambient temperature T_A	Operation 0 °C...+ 40 °C Storage - 30 °C...+ 60 °C											
Housing material	Zinc											

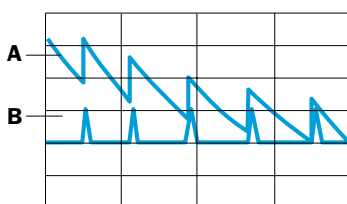
1) A = Sensor 1
B = Sensor 2

2) Total current for all outputs < 500 mA

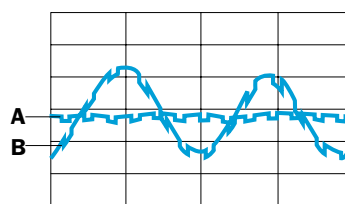
Technical features

High pass filter

Function: elimination of the low-frequency components from the analogue input signal.
Effect: gradual signal changes are ignored, i.e. only fast changes are recorded.



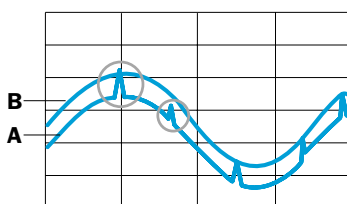
A Unfiltered data: height difference and height are displayed.
B Filtered data: only the height difference is displayed.



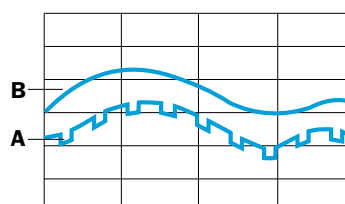
A Unfiltered data: number of grooves and the eccentricity are displayed.
B Filtered data: only the number is displayed.

Low pass filter

Function: elimination of the high-frequency components from the analogue input signal.
Effect: fast signal changes are ignored, i.e. only gradual changes are recorded.



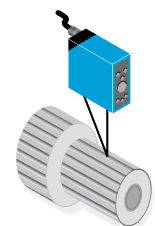
A Unfiltered data: interferences are displayed.
B Filtered data: measurement curve is displayed without interferences.



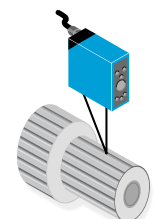
A Unfiltered data: grooves and eccentricity are displayed.
B Filtered data: only the eccentricity is displayed.

Order information

Type	Part no.
ODC 100-P110	6 020 889
ODC 100-N110	6 020 890



Measuring the groove depth or number of grooves

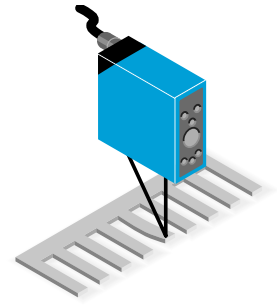
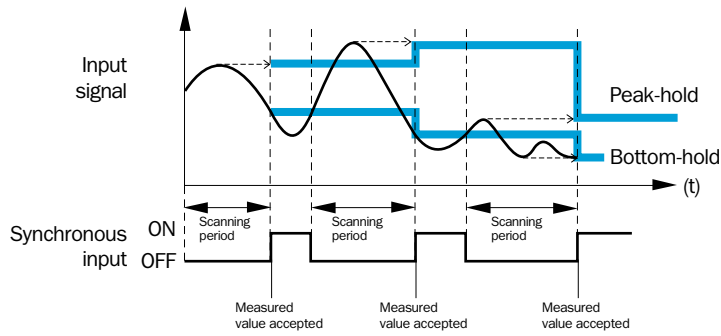


Confirming that the collector runs round

Time behaviour graphs

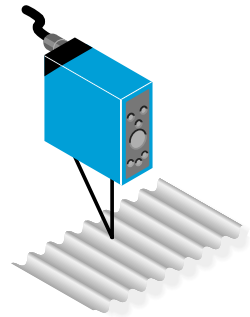
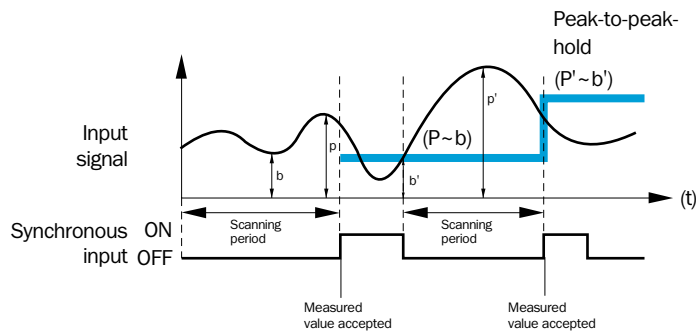
Peak-bottom-hold

The "Peak (bottom) hold" function is used to measure the highest (lowest) value during a specific time period.



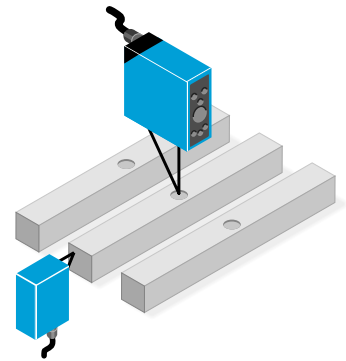
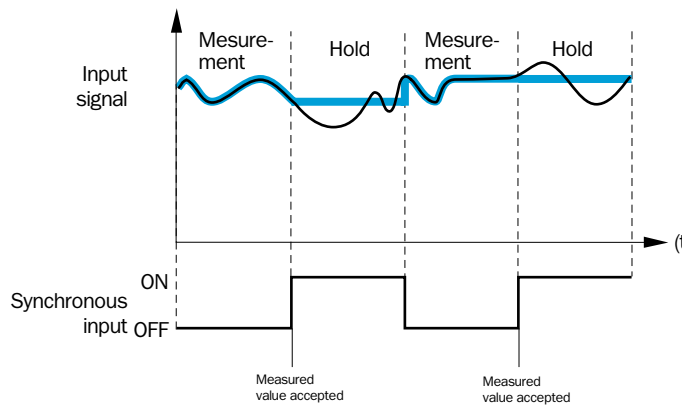
Peak-to-peak-hold

The "Peak-to-peak" function is used to measure the difference between the highest and lowest values during the pre-set time period.



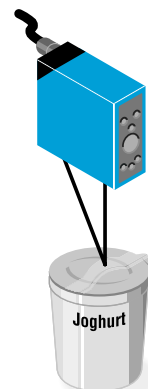
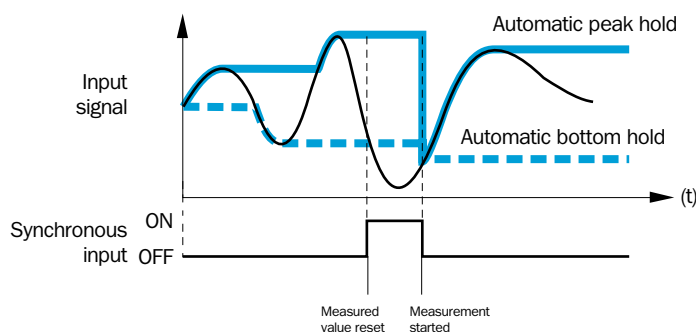
Sample/hold

The "Sample-and-hold" function is used to measure the value during a specific time period.



Automatic peak value hold

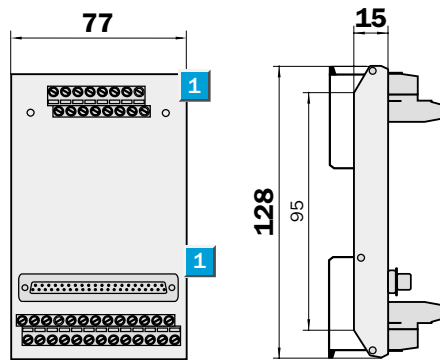
The "Automatic peak and bottom hold" function is used to measure the highest (lowest) value from the beginning of the measurement.



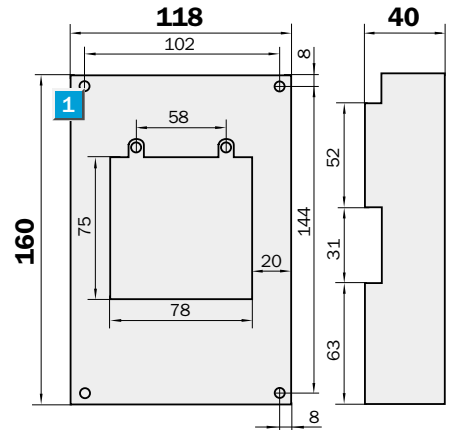
Measurement range
 $25 \pm 5 / 50 \pm 10 \text{ mm}$
Mounting socket ODC-SOC

- ODC-SOC: mounting socket for top hat profile rail mounting
- ODC-SOC65: mounting socket for enclosure rating IP 65

Dimensional drawing:
mounting socket ODC-SOC



Dimensional drawing:
mounting socket ODC-SOC65

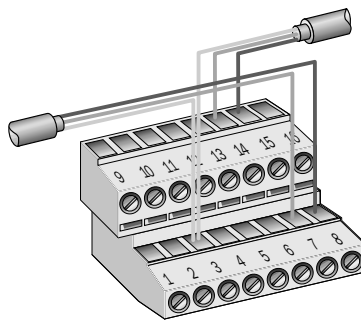


1 M3 threaded mounting hole for fixing the ODC evaluation unit



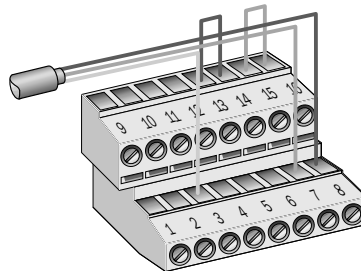
Terminal assignment X1

X1, module not connected to the end of the field bus cable



1	GND/M
2	GND/M
3	PE
4	GND/M
5	T x D
6	R x D
7	PB +
8	PB -
9	+ 24 V/L+
10	+ 24 V/L+
11	RTS
12	CTS
13	+ 5 V
14	PB +
15	PB -
16	GND/M

X1, module connected to the end of the field bus cable

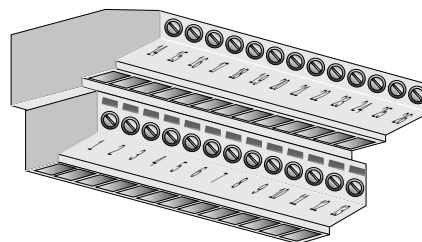


Order information

Type	Part no.
ODC-SOC	6 020 985
ODC-SOC65	6 020 986



Terminal assignment X2



1	+ 24 V/L+	14	+ 24 V/L+
2	GND/M (0 V)	15	GND/M (0 V)
3	In-Sig. 1- (GND)	16	In-Sig. 2- (GND)
4	In-Sig. 1- (QA)	17	In-Sig. 2- (QA)
5	Shield 1	18	Shield 2
6	Q 1	19	Q 2
7	Sync	20	Autozero
8	Teach-Sen. 1 (TI)	21	Teach-Sen. 2 (TI)
9	Hold-Sen. 1 (SH)	22	Hold-Sen. 2 (SH)
10	HH	23	H
11	LL	24	L
12	Go	25	Error
13	GND/M	26	+ 24 V/L+