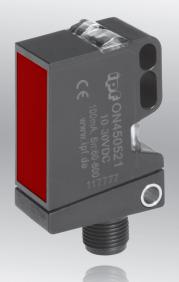
# optical sensors



### diffuse reflection sensor, retro-reflective sensor, auto-reflective sensor 2250

dimensions 18 x 56.2 x 32.2mm

dif. reflection sensor up to 600mm sensing range retro-reflective sensor operating range up to 7.5m auto-reflective sensor operating range up to 600mm



- ✓ plastic housing, compact design
- ✓ setting via teach-in
- ✓ LED-display with setting control
- ✓ retro-reflective sensor with polarizing filter
- ✓ auto-reflective sensor functions without retro-reflector
- √ suppression of mutual interference
- √ M12-connector 4-pin

wear-free teach-in function 1 housing: 3 sensor principles











#### description

The sensors of the **45** series are characterized by a convenient and reliable teach process and simple operation. One housing shape with three different sensor principles.

1. Diffuse reflection sensor with background suppression

- for precise and color-independent detection. 2. Retro-reflective sensor with large operating range, also
- for the recognition of objects with reflective surfaces.
- 3. Auto-reflective sensor without reflector. The operating principle of these devices is similar to that of a retroreflective sensor, except that instead of a reflector that is sensitive to soiling, an arbitrary, diffuse-reflecting object is used as reference surface. A metal part is best suited for this.

With these sensors, a new, convenient and wear-free teach process is presented.

To teach the sensors, it suffices to touch with any ferromagnetic tool.

A blue LED light provides clear optical feedback. To prevent tampering, the function locks automatically after 5 minutes.

Expanded performance reserves for reliable operation under demanding conditions ensure reliable start up.

A pin-point-LED (point-shaped) is used as transmitting element on some devices. This makes the sensors suitable for the precise positioning and detection of small parts.

Optoelectronic sensors are indispensable components in all automated production processes. They are used in all applications where parts are to be detected, counted or positioned in a way which does not involve contact and which is reliable and fast.

To avoid mutual optical interference, the devices feature interference suppression. As a result, it is possible to mount sensor upon sensor without causing erroneous operations.

### application examples

- distance control
- position recognition
- color-independent object recognition
- recognition of transparent objects







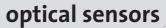
# optical sensors

## 2250 diffuse reflection sensor, retro-reflective sensor, auto-reflective sensor



article-no. version	OT450520 diffuse reflection sensor	OT450521  diffuse reflection sensor
sensing range	background suppression 30 600mm	background suppression, point-shaped 30 400mm
	18 4.3 LED 27 19 19 19 19 19 19 19 19 19 19 19 19 19	18 4.3 LED 19 19 19 19 19 19 19 19 19 19 19 19 19
TECHNICAL DATA	20 (00)	20 400
sensing range output signal	30 600mm push-pull, light-on/dark-on mode	30 400mm push-pull, light-on/dark-on mode
	10 30V DC	10 30V DC
operating voltage current consumption (w/o load)	10 30V DC ≤ 30mA	10 30V DC ≤ 30mA
output current (max. load)	100mA	100mA
voltage drop (max. load)	3.0V DC	3.0V DC
transmitting element (pulsed)	LED, red light	LED, red light, point-shaped
wavelength	630nm	630nm
response/decay time	1.0ms	0.5ms
sampling frequency	500Hz	1kHz
display (operation)	green LED	green LED
display (signal)	yellow LED	yellow LED
display (alignment mark)	yellow LED, flashing	yellow LED, flashing
display (teach)	blue LED	blue LED
switch-point setting	with the help of a ferromagnetic tool -	with the help of a ferromagnetic tool external
short-circuit protection	+	+
reverse polarity protection	+	+
interference suppression	+	+
dimensions	18x56.2x32.2mm	18x56.2x32.2mm
housing material	plastic (ASA, MABS)	plastic (ASA, MABS)
front screen material operating temperature	PMMA -25 +60°C	PMMA -25 +60°C
degree of protection (EN 60529)	1P67	-23 +60 C IP67
connection connection accessories	M12-connector, 4-pin e.g. <b>VK200325</b>	M12-connector, 4-pin e.g. <b>VK200325</b>
accessories (universal holder)	AY000138	AY000138
(22.)		







optical sellsors		
dechouic diffuse	reflection sensor, retro-reflective sens	or, auto-reflective sensor 2250
article-no. version	OR450521 retro-reflective sensor polarizing filter, point-shaped	ON450521 auto-reflective sensor no reflector, point-shaped
TECHNICAL DATA	7.5m	60 600mm  18  18  19  18  18  18  18  19  10  11  12  12  32.2
sensing range	7.5m	60 600mm
	and will light on their on one de	accele and Balt on Manhaman and

sensing range 0.5m 60600mm output signal push-pull, light-on/dark-on mode push-pull, light-on/dark-on mode operating voltage 1030V DC 1030V DC 1030V DC 1030V DC 20mpt output current (max. load) 100mA 1			
operating voltage 1030V DC 1030V DC current consumption (w/o load) \$\leq \text{30mA}\$ \$30mA \$\leq \text{30mA}\$ \$100mA \$\leq \text{30mA}\$ \$100mA \$\leq \text{30mA}\$ \$100mA \$\leq \text{30mA}\$ \$\leq \text{30mD}\$ \$\leq \text{630mD}\$ \$\leq \text{63play}\$ \$\leq \text{610mD}\$ \$\leq \tex	sensing range	7.5m	60 600mm
current consumption (w/o load) output current (max. load) 100mA 100mA 100mA voltage drop (max. load) 100mA 3.0V DC 100mA	output signal	push-pull, light-on/dark-on mode	push-pull, light-on/dark-on mode
output current (max. load)100mA100mAvoltage drop (max. load)3.0V DC3.0V DCtransmitting element (pulsed)LED, red lightLED, red light, point-shapedwavelength630nm630nmresponse/decay time0.5ms0.5mssampling frequency1kHz1kHzdisplay (operation)green LEDgreen LEDdisplay (signal)yellow LED, flashingyellow LED, flashingdisplay (teach)blue LEDblue LEDswitch-point settingwith the help of a ferromagnetic tool externalwith the help of a ferromagnetic tool externalshort-circuit protection++reverse polarity protection++interference suppression++dimensions18x56.2x32.2mmhousing materialplastic (ASA, MABS)plastic (ASA, MABS)front screen materialPMMAPMMAoperating temperature-25 +60°C-25 +60°Cdegree of protection (EN 60529)IP67IP67connectionM12-connector, 4-pinM12-connector, 4-pinconnection accessoriese.g. VK200325e.g. VK200325	operating voltage	10 30V DC	10 30V DC
voltage drop (max. load)3.0V DCtransmitting element (pulsed)LED, red lightLED, red light, point-shapedwavelength630nm630nmresponse/decay time0.5ms0.5mssampling frequency1kHz1kHzdisplay (operation)green LEDgreen LEDdisplay (signal)yellow LEDyellow LEDdisplay (alignment mark)yellow LED, flashingyellow LED, flashingdisplay (teach)blue LEDblue LEDswitch-point settingwith the help of a ferromagnetic tool externalwith the help of a ferromagnetic tool externalshort-circuit protection++reverse polarity protection++dimensions18x56.2x32.2mm18x56.2x32.2mmhousing materialplastic (ASA, MABS)plastic (ASA, MABS)front screen materialPMMAPMMAoperating temperature-25+60°C-25+60°Cdegree of protection (EN 60529)IP67IP67connectionM12-connector, 4-pinM12-connector, 4-pinconnection accessoriese.g. VK200325e.g. VK200325	current consumption (w/o load)	≤ 30mA	≤ 30mA
transmitting element (pulsed)  Wavelength 630nm 630nm 630nm response/decay time 0.5ms Sampling frequency 1kHz 1kHz 1kHz display (operation) display (signal) display (signal) display (teach) Switch-point setting Switch-point setting Short-circuit protection + reverse polarity protection + tinterference suppression 18x56.2x32.2mm housing material housing material PMMA Operating temperature -25 +60°C degree of protection (EN 60529) PM 1kHz 1kHz 1kHz 1kHz 1kHz 1kHz 1kHz 1kHz	output current (max. load)	100mA	100mA
wavelength630nm630nmresponse/decay time0.5ms0.5mssampling frequency1kHz1kHzdisplay (operation)green LEDgreen LEDdisplay (signal)yellow LED, flashingyellow LED, flashingdisplay (alignment mark)yellow LED, flashingyellow LED, flashingdisplay (teach)blue LEDblue LEDswitch-point settingwith the help of a ferromagnetic tool externalwith the help of a ferromagnetic tool externalshort-circuit protection++reverse polarity protection++interference suppression++dimensions18x56.2x32.2mm18x56.2x32.2mmhousing materialplastic (ASA, MABS)plastic (ASA, MABS)front screen materialPMMAPMMAoperating temperature-25 +60°C-25 +60°Cdegree of protection (EN 60529)IP67IP67connectionM12-connector, 4-pinM12-connector, 4-pinconnection accessoriese.g. VK200325e.g. VK200325	voltage drop (max. load)	3.0V DC	3.0V DC
response/decay time 0.5ms 0.5ms  sampling frequency 1kHz 1kHz  display (operation) green LED green LED  display (signal) yellow LED yellow LED  display (alignment mark) yellow LED, flashing yellow LED, flashing yellow LED  switch-point setting with the help of a ferromagnetic tool external  short-circuit protection + + + + + + + + + + + + + + + + + + +	transmitting element (pulsed)	LED, red light	LED, red light, point-shaped
sampling frequency1kHz1kHzdisplay (operation)green LEDgreen LEDdisplay (signal)yellow LEDyellow LEDdisplay (alignment mark)yellow LED, flashingyellow LED, flashingdisplay (teach)blue LEDblue LEDswitch-point settingwith the help of a ferromagnetic tool externalwith the help of a ferromagnetic tool externalshort-circuit protection++reverse polarity protection++interference suppression++dimensions18x56.2x32.2mm18x56.2x32.2mmhousing materialplastic (ASA, MABS)plastic (ASA, MABS)front screen materialPMMAPMMAoperating temperature-25 +60°C-25 +60°Cdegree of protection (EN 60529)IP67IP67connectionM12-connector, 4-pinM12-connector, 4-pinconnection accessoriese.g. VK200325e.g. VK200325	wavelength	630nm	630nm
display (operation)green LEDgreen LEDdisplay (signal)yellow LEDyellow LEDdisplay (alignment mark)yellow LED, flashingyellow LED, flashingdisplay (teach)blue LEDblue LEDswitch-point settingwith the help of a ferromagnetic tool externalwith the help of a ferromagnetic tool externalshort-circuit protection++reverse polarity protection++interference suppression++dimensions18x56.2x32.2mm18x56.2x32.2mmhousing materialplastic (ASA, MABS)plastic (ASA, MABS)front screen materialPMMAPMMAoperating temperature-25 +60°C-25 +60°Cdegree of protection (EN 60529)IP67IP67connectionM12-connector, 4-pinM12-connector, 4-pinconnection accessoriese.g. VK200325e.g. VK200325	response/decay time	0.5ms	0.5ms
display (signal)yellow LEDyellow LEDdisplay (alignment mark)yellow LED, flashingyellow LED, flashingdisplay (teach)blue LEDblue LEDswitch-point settingwith the help of a ferromagnetic tool externalwith the help of a ferromagnetic tool externalshort-circuit protection++reverse polarity protection++interference suppression++dimensions18x56.2x32.2mm18x56.2x32.2mmhousing materialplastic (ASA, MABS)plastic (ASA, MABS)front screen materialPMMAPMMAoperating temperature-25 +60°C-25 +60°Cdegree of protection (EN 60529)IP67IP67connectionM12-connector, 4-pinM12-connector, 4-pinconnection accessoriese.g. VK200325e.g. VK200325	sampling frequency	1kHz	1kHz
display (alignment mark)yellow LED, flashingyellow LEDdisplay (teach)blue LEDblue LEDswitch-point settingwith the help of a ferromagnetic tool externalwith the help of a ferromagnetic tool externalshort-circuit protection++reverse polarity protection++interference suppression++dimensions18x56.2x32.2mm18x56.2x32.2mmhousing materialplastic (ASA, MABS)plastic (ASA, MABS)front screen materialPMMAPMMAoperating temperature-25 +60°C-25 +60°Cdegree of protection (EN 60529)IP67IP67connectionM12-connector, 4-pinM12-connector, 4-pinconnection accessoriese.g. VK200325e.g. VK200325	display (operation)	green LED	green LED
display (teach)blue LEDblue LEDswitch-point settingwith the help of a ferromagnetic tool externalwith the help of a ferromagnetic tool externalshort-circuit protection++reverse polarity protection++interference suppression++dimensions18x56.2x32.2mm18x56.2x32.2mmhousing materialplastic (ASA, MABS)plastic (ASA, MABS)front screen materialPMMAPMMAoperating temperature-25 +60°C-25 +60°Cdegree of protection (EN 60529)IP67IP67connectionM12-connector, 4-pinM12-connector, 4-pinconnection accessoriese.g. VK200325e.g. VK200325	display (signal)	yellow LED	yellow LED
switch-point setting with the help of a ferromagnetic tool external with the help of a ferromagnetic tool external  short-circuit protection + + + + + + + + + + + + + + + + + + +	display (alignment mark)	yellow LED, flashing	yellow LED, flashing
external  short-circuit protection + + + + + + + + + + + + + + + + + + +	display (teach)	blue LED	blue LED
reverse polarity protection + + + + + + + + + + + + + + + + + + +	switch-point setting	1	
interference suppression + + + + + + + + + + + + + + + + + + +	short-circuit protection	+	+
dimensions 18x56.2x32.2mm 18x56.2x32.2mm housing material plastic (ASA, MABS) plastic (ASA, MABS) front screen material PMMA PMMA operating temperature -25 +60°C -25 +60°C degree of protection (EN 60529) IP67 IP67 connection M12-connector, 4-pin M12-connector, 4-pin connection accessories e.g. VK200325 e.g. VK200325	reverse polarity protection	+	+
housing material plastic (ASA, MABS) plastic (ASA, MABS)  front screen material PMMA PMMA  operating temperature -25 +60°C  degree of protection (EN 60529) IP67 IP67  connection M12-connector, 4-pin M12-connector, 4-pin  connection accessories e.g. VK200325  e.g. VK200325	interference suppression	+	+
front screen material PMMA PMMA operating temperature -25 +60°C degree of protection (EN 60529) IP67 IP67  connection M12-connector, 4-pin M12-connector, 4-pin connection accessories e.g. VK200325  PMMA PMMA PMMA PMMA PMMA PMMA PMMA PM	dimensions	18x56.2x32.2mm	18x56.2x32.2mm
operating temperature -25 +60°C -25 +60°C degree of protection (EN 60529) IP67 IP67  connection M12-connector, 4-pin M12-connector, 4-pin connection accessories e.g. VK200325 e.g. VK200325	housing material	plastic (ASA, MABS)	plastic (ASA, MABS)
degree of protection (EN 60529)IP67IP67connectionM12-connector, 4-pinM12-connector, 4-pinconnection accessoriese.g. VK200325e.g. VK200325	front screen material	PMMA	PMMA
connection M12-connector, 4-pin M12-connector, 4-pin connection accessories e.g. VK200325 e.g. VK200325	operating temperature	-25 +60°C	-25 +60°C
connection accessories e.g. VK200325 e.g. VK200325	degree of protection (EN 60529)	IP67	IP67
-6	connection	M12-connector, 4-pin	M12-connector, 4-pin
accessories (universal holder) AY000138 AY000138	connection accessories	e.g. <b>VK200325</b>	e.g. <b>VK200325</b>
	accessories (universal holder)	AY000138	AY000138





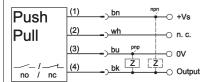
# optical sensors

### 2250 diffuse reflection sensor, retro-reflective sensor, auto-reflective sensor



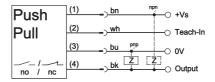
#### connection

standard version



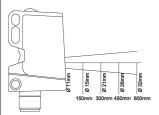
wire colors: bn = brown (1), wh = white (2), bu = blue (3), bk = black (4) do not connect pnp / npn simultaneously!

version with teach-in by wire

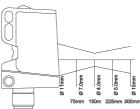


### beam path

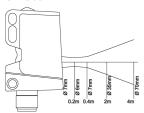
#### OT450520



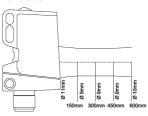
### OT450521



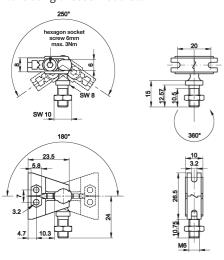
#### OR450521



ON450521



# universal holder AY000118 consisting of base module ...



... and fitting panel



#### **ACCESSORIES**

article-no.	description	note
AY000088	base module *	jaw: stainless steel, ball pin: galvanized steel
AY000138	mounting kit for sensors in design 45	stainless steel

\* The AY000088 base module is contained in every mounting kit. Material of bolts and nuts: galvanized steel.

This data sheet contains the standard versions only. Kindly request the availability of other output- and connection functions.

We will be pleased to supply the matching cable socket for your devices with connector. Please refer to the list in catalog chapter "accessories" under "cable sockets ipf-SENSORFLEX®" or search our website for "VK".

Warning: Never use these devices in applications where the safety of a person depends on their functionality.

### This data sheet as well as your personal contact can be found at www.ipf-electronic.com



