

Operating instructions Photoelectric distance sensor

OMH551 OMH553 OMH555

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1 Preliminary note

You will find instructions, technical data, approvals and further information using the QR code on the unit / packaging or at documentation.ifm.com.

1.1 Symbols used



- Instructions
- Reaction, result
- [...] Designation of keys, buttons or indications
- → Cross-reference
- Important note

Non-compliance may result in malfunction or interference.

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Information Supplementary note

1.2 Warnings used



ATTENTION

Warning of damage to property



CAUTION

Warning of personal injury

▷ Slight reversible injuries may result.

2 Safety instructions

- The unit described is a subcomponent for integration into a system.
 - The system architect is responsible for the safety of the system.
 - The system architect undertakes to perform a risk assessment and to create documentation in accordance with legal and normative requirements to be provided to the operator and user of the system. This documentation must contain all necessary information and safety instructions for the operator, the user and, if applicable, for any service personnel authorised by the architect of the system.
- Read this document before setting up the product and keep it during the entire service life.
- The product must be suitable for the corresponding applications and environmental conditions without any restrictions.
- Only use the product for its intended purpose ($\rightarrow \rightarrow$ Intended use).
- If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property may occur.
- The manufacturer assumes no liability or warranty for any consequences caused by tampering with the product or incorrect use by the operator.
- Installation, electrical connection, set-up, operation and maintenance of the product must be carried out by qualified personnel authorised by the machine operator.
- Protect units and cables against damage.



CAUTION

Exposure to radiation

- ▷ Use of controls or adjustments or procedures other than those specified herein may result in hazardous radiation exposure.
- Only use the operating and adjusting devices indicated in the operating instructions.



CAUTION

Visible laser light; LASER CLASS 1.

EN/IEC 60825-1 : 2007 and EN/IEC 60825-1 : 2014 complies with 21 CFR Part 1040 except for deviations pursuant to Laser Notice No. 50, dated June 2007.

Position of the product label

Warning sign





3 Intended use

The device is used as a photoelectric distance sensor.

The device continuously detects the distance to the object and generates output signals according to the parameter settings.

• The device has an analogue output (4...20mA / 0...10V) and a digital output that can be configured via IO-Link.

The device uses a laser diode as light source and creates a light spot. This makes it possible to detect small objects.



The light spot should hit the object or the background. Intermediate states may lead to faulty measured values

4 Function

4.1 Switching off the laser

The laser can be switched off via the input on pin 5 and via IO-Link.

Input signal on pin 5	Lanor		
PNP	NPN	Laser	
Low / not used	High / not used	On	
High	Low	Off	

4.2 Operating modes

4.2.1 Operation

The sensor measures the distance and outputs it as an analogue value. The measuring range is determined with two points. The start point of the measuring range is set to [MIN] and the end point of the measuring range is set to [MAX].

4.2.2 IO-Link

IO-Link is a communication system for connecting intelligent sensors and actuators to automation systems. IO-Link is standardised in the IEC 61131-9 standard.



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General information on IO-Link at io-link.ifm

Input Output Device Description (IODD) with all parameters, process data and detailed descriptions of the device at documentation.ifm.com

IO-Link offers the following advantages:

- · Interference-free transmission of all data and process values
- Parameter setting in the running process or presetting outside the application
- · Parameters for identifying the connected devices in the system
- Additional parameters and diagnostic functions
- Automatic backup and restore of parameter sets in case of device replacement (data storage)
- · Logging of parameter sets, process values and events
- Device description file (IODD Input Output Device Description) for easy project planning
- Standardised electrical connection
- Remote maintenance

5 Installation

5.1 Installation conditions

▶ Install the device so that the object to be detected is within the sensor's detection zone.



Reflecting objects in the direct beam path of the sensor – also outside the detection zone – are to be avoided by the customer (tilt the sensor by 10°). Otherwise the measured values can be ambiguous.

Detection zone \rightarrow Data sheet

5.2 Mounting accessories

The device is supplied without mounting accessories.

Suitable mounting accessories can be found at www.ifm.com.

5.3 Installation instructions

5.3.1 Avoidance of soiling and ambient light

Preferably align photoelectric sensors with the front lens facing downwards or parallel to the earth's surface.

Background:

- Photoelectric sensors are sensitive to direct radiation of light sources. Everyday light sources (lamps, sun) radiate from above.
- Photoelectric sensors react sensitively to soiling, as it reduces the excess gain.



Dust deposits can be reduced by downwards or sideways orientation. This allows for longer cleaning intervals.



Make sure that sensors installed with their front lens facing upwards are not oriented towards roof windows or ceiling lamps.

5.3.2 Avoidance of mutual interference

Photoelectric sensors should be installed with a sufficient distance between each other. This particularly applies if the detection range of the two sensors partly intersects.

The reason for this is:

Both sensors have a detection range. This means that the laser light spot of a sensor can be
received by its neighbouring sensor. This may lead to the falsification of the measured values and
result in incorrect switching.



Mutual interference can be avoided by placing the sensors slightly tilted. Align the light spots so that they impinge as far away from each other as possible.

5.3.3 Sensor alignment for a moving object

The sensor has to be installed in a way to ensure that the object is moved into the detection zone of the sensor from the side or from the front.

6 Electrical connection

The device must be connected by a qualified electrician.

- Observe the national and international regulations for the installation of electrical equipment.
- Ensure voltage supply according to SELV, PELV. OMHxxx: cULus, Supply Class 2
- Disconnect power.
- Connect the device as follows:



1: L+

- 2: OUT2: analogue output
- 3: L-

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- 4: OUT1: switching output or IO-Link
- 5: IN1: laser on / off

6.1 PNP/NPN selection

Pins 2 and 4 can be switched between PNP and NPN logic via IO-Link.

The setting cannot be made for individual pins, but applies to all pins.



1: L+

2: OUT2: analogue output

3: L-

- 4: OUT1: switching output or IO-Link
- 5: IN1: laser on / off

7 Operating and display elements

1:	1x LED yellow	Switching status OUT2			
2:	1x LED green	Status LED			
3:	1x LED white	[MIN] = start point of the measuring range			
4:	1x LED white	[MAX] = end point of the measuring range			
5:	1x LED white	[I] = analogue output (420 mA)			
6:	1x LED white	[U] = analogue output (030 V)			
7:	Programming button [•]	Set button			
8:	Programming button [▼]	Navigation button			

7.1 LED states

LED behaviour OUT2 Status LED		Description	Action	
		Description		
		Status LED is green	Device is connected to the voltage sup- ply and ready for operation	
		Status LED is green, OUT2 is yellow	Device OK, switching output OUT2 ac- tive	
*	₩	Status LED flashing red (1Hz), OUT2 flashing yel- low (4 Hz)	Short circuit OUT2 Troubleshooting (\rightarrow \square 22)	
	*	Status LED flashing red (1 Hz)	Error (correctable by the operator) Troubleshooting (\rightarrow \square 22)	
		Status LED is red	 Serious error ▶ Contact ifm support. Contact at www.ifm.com 	
₹¥.		Status LED is green, OUT2 (8 Hz) flashing	[Find me] Function	

7.2 LED states of the parameters

LED behaviour		Description		
I	U	Description		
		All LEDs are off	The device is in the Run mode.	
		[I] is white	Device is in Info mode. Analogue current output (420 mA) is activated.	

LED behaviour		Description	Action	
I	U	Description	Action	
		[U] is white	Device is in Info mode. Analogue voltage output (030 V) is ac- tivated.	

8 Set-up

The sensor needs a warm-up period of ≥ 20 min. The performance parameters specified in the data sheet only apply after this warm-up period.

On delivery, the parameters are set to the factory setting.

The device can also be configured using suitable IO-Link parameter setting software.

9 Parameter setting

The sensor can be configured via the [●] and [▼] buttons as well as via IO-Link.

During parameter setting the device remains internally in the operating mode. It continues its monitoring function with the existing parameters until the change has been completed.



The output logic (PNP/NPN) and the switching output [OUT1] can only be set via IO-Link. On delivery, the output logic PNP and the analogue output 4...20mA are set.

9.1 Set analogue output (I: 4...20 mA, U: 0...30 V)

9.1.1 Parameter setting via device buttons

- ▶ Press the button [●] to exit the Run mode.
- ▷ LED for [MIN] is white.
- ▶ Navigate via [▼] to [I] (analogue output: 4...20 mA) or [U] (analogue output: 0....30 V).
- \triangleright LED for [I] or [U] is white.
- Press and hold [•] for 2 seconds to set [I] or [U].
- ▷ LED for [I] or [U] flashes twice (50 Hz).
- \triangleright Sensor returns to the Run mode.

9.1.2 Parameter setting via IO-Link

- Select [Parameter] > [Output configuration].
- Select [ou2].
- Set [I / Analogue signal 4...20 mA] or [U / Analogue signal 0...10 V].

9.2 Teaching of analogue output

[min] / [ASP2] refers to the distance in relation to the minimum current / voltage value. [max] / [AEP2] refers to the distance in relation to the maximum current / voltage value. This allows the gradient of the analogue output to be influenced. Minimum distances ([min] / [ASP2] <-> [max] / [AEP2]) OMH551: 2 mm OMH553: 7 mm OMH555: 10 mm

9.2.1 Parameter setting via device buttons

Teach start point [MIN]:

- ▶ Press the button [●] to exit the Run mode.
- ▷ LED for [MIN] is white.
- Place the object for the analogue start point.
- Press and hold the [•] button for 2 seconds to teach [MIN].
- \triangleright LED for [MIN] flashes twice (50 Hz).

 \triangleright Sensor returns to the Run mode.

Teach end point [MAX]:

- ▶ Press the button [●] to exit the Run mode.
- \triangleright LED for [MAX] is white.
- Place the object for the analogue end point.
- Press and hold the [•] button for 2 seconds to teach [MAX].
- \triangleright LED for [MAX] flashes twice (50 Hz).
- \triangleright Sensor returns to the Run mode.

9.2.2 Parameter setting via IO-Link

Teach start point [ASP2]:

- Select [Parameter] > [Analog output 2].
- Select [ASP2].
- Enter the measured value for the start point in mm.

Alternatively, the measured value can be taught automatically.

- Place the object for the start point.
- Click on [Teach ASP2].

Teach end point [AEP2]:

- Select [Parameter] > [Analog output 2].
- Select [AEP2].
- Enter the measured value for the start point in mm.
- Alternatively, the measured value can be taught automatically.

Place the object for the end point.

Click on [Teach AEP2].

9.3 Activating OUT1

9.3.1 Parameter setting via IO-Link

- Call up [Parameters] > [Output configuration].
- Select [ou1].
- ▶ Set [SSC1.1].

9.4 Output logic (PNP/NPN)

Set the switching logic for all inputs and outputs.

9.4.1 Parameter setting via IO-Link

- ► Call up [Parameters] > [Basic settings].
- Select [P-n].
- ▶ Set [PnP] (positive switching) or [nPn] (negative switching).

9.5 Lock / unlock the device

9.5.1 Parameter setting via the device buttons

Locking:

- ▶ Press and hold [•] and [▼] simultaneously for 10 seconds.
- ▷ Green status LED flashes (1 Hz).
- \triangleright After 10 seconds, the green status LED flashes twice (50 Hz).
- \triangleright The sensor is locked and returns to the Run mode.

Unlocking:

- ▶ Press and hold [•] and [▼] simultaneously for 10 seconds.
- ▷ Green status LED flashes (1 Hz).
- \triangleright After 10 seconds, the green status LED flashes twice (50 Hz).
- \triangleright The sensor is unlocked and returns to the Run mode.



- Indication of device locking:
 - ▶ Press [•] or [▼].
 - \triangleright Green status LED goes out for 0.5 seconds.
 - > The device changes to Run mode and the green status LED is again lit permanently.

9.5.2 Parameter setting via IO-Link

- ► Call up [Parameters] > [Display settings].
- Select [Loc].
- Set [Loc] for locking and [uLoc] for unlocking.



Indication of device locking:

- Press [●] or [♥].
- \triangleright Green status LED goes out for 0.5 seconds.
- Dash The device changes to Run mode and the green status LED is again lit permanently.

9.6 Indication of current setting (Info mode)

- ▶ Press [▼] to change to the Info mode.
- \triangleright LEDs light up for 2 seconds depending on the setting at [I] / [U].
- \triangleright Sensor returns to the Run mode.

9.7 Reset to factory setting

9.7.1 Reset via device buttons

- Disconnect the voltage supply.
- ▶ Press and hold [▼] and restore the voltage supply.
- ▶ Release [▼] press [●].
- > Green status LED flashes twice confirming reset to factory setting.

9.7.2 Reset via IO-Link

- Call up [Parameters] > [Basic settings].
- Click on the system command [Reset application] or [Back-to-box].
- \triangleright The device is reset according to the selected reset method.

The two system commands reset the device in a different way.

[Reset application]: The parameters of the technology-specific application are set to default values. The identification parameters remain unchanged. An upload to the data memory of the master is carried out, if activated in the port configuration of the master.

[Back-to-box]: The parameters of the device are set to the factory settings and communication is blocked until the next time the device is switched off and on. Note: Disconnect the device directly from the master port!

9.8 Additional parameter settings via IO-Link

9.8.1 Switch-on delay

A switch-on delay can be set for both switching outputs (0...10s).

- Call up [Parameters] > [SSC1.1 / SSC1.2].
- Select [SSC1.1 / SSC1.2 Switch-on delay].
- Enter a switch-on delay between 0...10s.



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To set a switch-on delay for [SSC1.2], this output must first be activated.

9.8.2 Switch-off delay

A switch-off delay can be set for both switching outputs (0...10s).

- Call up [Parameters] > [SSC1.1 / SSC1.2].
- Select [SSC1.1 / SSC1.2 Switch-off delay].
- Enter a switch-off delay between 0...10s.



To set a switch-off delay for [SSC1.2], this output must first be activated.

9.8.3 Filter

Setting the filter property in relation to the detection speed. 4 options can be selected.

- [HIGH] (Slow detection, precision)
- [MEdi] (Standard)
- [LOW] (Average detection, filtering of individual interference pulses)
- [OFF] (Fast detection, without filtering)
- ► Call up [Parameters] > [Signal].
- Select [FILT].
- Set one of the options.

9.8.4 Transmitter configuration

Setting to activate and deactivate the transmitter.

4 options can be selected.

- [OFF / Off] (permanently off)
- [ON / On] (permanently on)
- [On_ExtActive / Switch on with external signal active] (via input IN1 at pin 5)
- [PDOut / Controlled by PDOut] (via IO-Link communication PDOut)
- ▶ Select [Parameter] > [Signal].
- Select [Transmitte configuration].
- Set one of the options.

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The operating state of the device can be changed with the help of control data via IO-Link (PDOut).

In case of a communication interruption (COMLOST), the device remains in the last operating state set by valid control data (PDOut).

9.8.5 Switching counter

Counts the number of detected objects.

- Call up [Parameters] > [Digital Output 1 / Digital Output 2].
- Select [SSC1.1 counter / SSC1.2 counter].
- Read the counter value.



The counter can be reset via the system command [Reset counter to zero].

The command resets all counters.

- ► Call up [Parameters] > [Counter configuration].
- Click on the system command [Reset counter to zero].
- > All counters (switching counters and memory Lo / Hi) are reset.

9.8.6 Operating modes

Setting the evaluation speed.

3 options can be selected:

- [Standard]
- [Power]
- · [Speed]
- Call up [Parameters] > [Basic settings].

- Select [ModE].
- Set one of the options.

Operating mode	Speed	Object colour (black)	
[Standard]	++	++	
[Power]	+	+++	
[Speed]	+++	+	



The table provides a preliminary assessment of different applications and the respective operating modes. The rating scale ranges from "+" (less suitable) to "+++" (very suitable).

10 Setting

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10.1 Setting the range via IO-Link

With "Switchpoint Logic = 1", "ON" and "OFF" can be seen reversed in the graphics.

10.1.1 Single point mode

SSC active: PDV ≥ SP1 SSC inactive: PDV ≤ SP1 + H

10.1.1.1 Single point mode to smart sensor profile



10.1.1.2 Single point mode to smart sensor profile - Two value teach



10.1.1.3 Single-point mode - position



SP1 SP2 + H

(Switch point logic = 0) Switch-on point Switch-off point

10.1.1.4 Background suppression



10.1.2 Window mode



10.1.2.1 Window Mode - Two value teach



10.1.3 Two point mode



11 Troubleshooting

Possible cause	Solution	
Short-circuit at switching output OUT1 / OUT2	Check the wiring	
Ambient temperature too high	 Reduce ambient temperature 	
Supply voltage outside the specification (\rightarrow technical data sheet)	 Adjust supply voltage 	

If the device behaves unexpectedly or incorrectly:

► Disconnect the device from the voltage supply (restart)

▶ Restore factory settings, i.e. delivery status (via IO-Link)

If the problems persist:

Contact the ifm support at www.ifm.com.

12 Maintenance, repair and disposal

Faulty sensors must only be repaired by the manufacturer.

- ▶ Keep the front lens of the sensor clean.
- After use dispose of the unit in an environmentally friendly way in accordance with the applicable national regulations.
- ▶ Do not open the module housing. There are no user-serviceable components inside.

13 Factory setting

IO-Link parameter	Parameter function	Setting range	Factory setting	Own setting
[P-n]	Output polarity	[PNP] [NPN]	PNP	
[Mode]	Operating mode	[Standard] [Power] [Speed]	Standard	
[SSC1.1 Param Sp1]	Switch point 1	(3000 8000) * 0.01 (OMH551) (5000 20000) * 0.01 (OMH553) (500 5000) * 0.1	8000 (OMH551) 20000 (OMH553) 5000 (OMH555)	
[SSC1.1 Param Sp2]	Switch point 2	(3000 8000) * 0.01 (OMH551) (5000 20000) * 0.01 (OMH553) (500 5000) * 0.1 (OMH555)	3000 (OMH551) 5000 (OMH553) 500 (OMH555)	
[SSC1.1 Config Logic]	Switching output logic	0: [High active] 1: [Low Active]	0	
[SSC1.1 Config Mode]	Switch point operating modes	0: [Deactivated] 1: [Single Point] 2: [Window] 3: [TwoPoint]	1	
[SSC1.1 Config Hyst]	Hysteresis	(10500) * 0.01 (OMH551) (10500) * 0.01 (OMH553) (10500) * 0.1 (OMH555)	20 (OMH551) 20 (OMH553) 20 OMH555)	
[SSC1.2 Param Sp1]	Setpoint 1	(3000 8000) * 0.01 (OMH551) (5000 20000) * 0.01 (OMH553) (500 5000) * 0.1 (OMH555)	8000 (OMH551) 20000 (OMH553) 5000 (OMH555)	
[SSC1.2 Param Sp2]	Switch point 2	(3000 8000) * 0.01 (OMH551) (5000 20000) * 0.01 (OMH553) (500 5000) * 0.1 (OMH555)	3000 (OMH551) 5000 (OMH553) 500 (OMH555)	
[SSC1.2 Config Logic]	Switching output logic	0: [High active] 1: [Low Active]	0	
[SSC1.2 Config Mode]	Switch point operating modes	0: [Deactivated] 1: [Single Point] 2: [Window] 3: [TwoPoint]	1	
[SSC1.2 Config Hyst]	Hysteresis	(10500) * 0.01 (OMH551) (10500) * 0.01 (OMH553) (10500) * 0.1 (OMH555)	20 (OMH551) 20 (OMH553) 20 OMH555)	
[SSC1.1 Switch-on de- lay]	Switch-on delay	(0 10000) * 0.001	0	
[SSC1.1 Switch-off de- lay]	Switch-off delay	(0 10000) * 0.001	0	

IO-Link parameter	Parameter function	Setting range	Factory setting	Own setting
[SSC1.2 Switch-on de- lay]	Switch-on delay	(0 10000) * 0.001	0	
[SSC1.2 Switch-off de- lay]	Switch-off delay	(0 10000) * 0.001	0	
[FILT]	Measured value filter- ing	0: [OFF] 1: [LOW] 2: [Medi] 3: [HIGH]	2	
[Loc]	Locking the ext. opera- tion	0: [Loc] 1: [uLoc]	1	
[ou2]	Output configuration	1: [Analogue signal 420mA] 2: [Analogue signal 0 10V]	1	
[ASP2]	Analogue start point	(3000 8000) * 0.01 (OMH551) (5000 20000) * 0.01 (OMH553) (500 5000) * 0.1 (OMH555)	3000 (OMH551) 5000 (OMH553) 500 (OMH555)	
[AEP2]	Analogue end point	(3000 8000) * 0.01 (OMH551) (5000 20000) * 0.01 (OMH553) (500 5000) * 0.1 (OMH555)	8000 (OMH551) 20000 (OMH553) 5000 (OMH555)	
[Transmitter configura- tion]	Control of the transmit- ter deactivation	0: [Off] 1: [On] 3: [On_ExtActive] 4: [PDOut]	4	