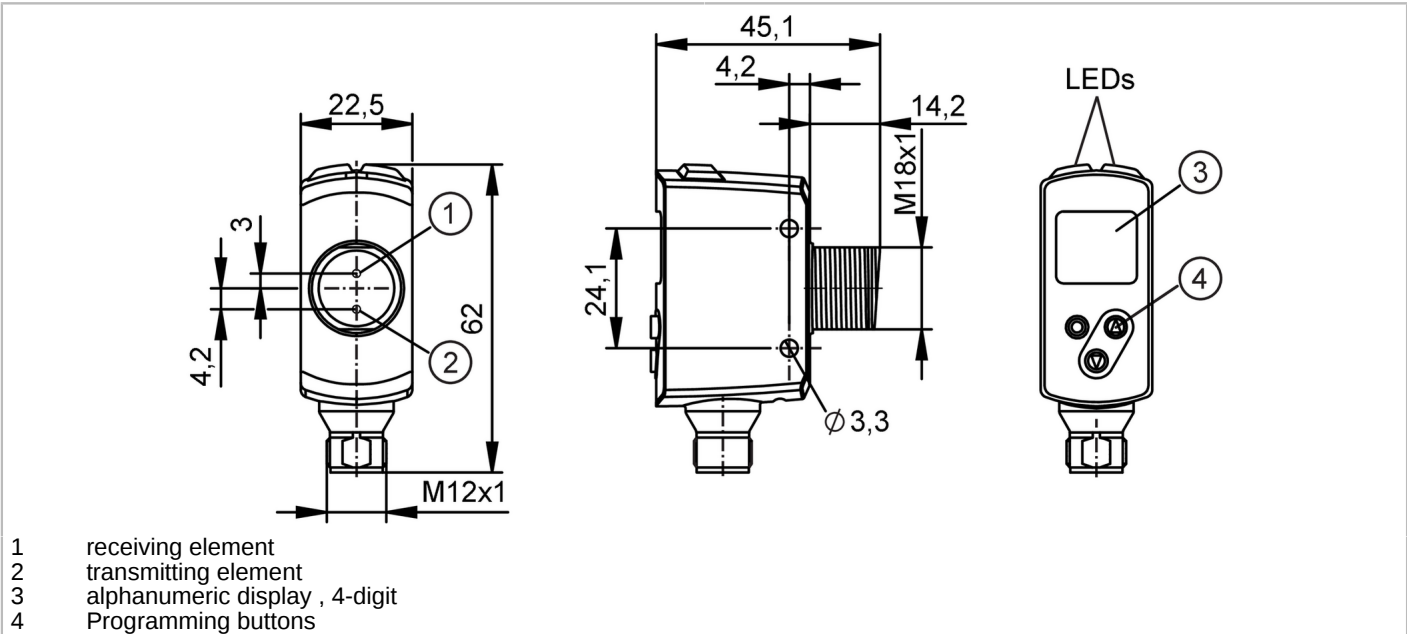


# OGD251



## Laser distance sensor

OGDLF8KG/IO-LINK/US



### Product characteristics

|                        |                             |
|------------------------|-----------------------------|
| Type of light          | red light                   |
| Laser protection class | 1                           |
| Housing                | rectangular with M18 thread |

### Application

|             |                         |
|-------------|-------------------------|
| Application | Industrial applications |
|-------------|-------------------------|

### Electrical data

|                             |      |                                               |
|-----------------------------|------|-----------------------------------------------|
| Operating voltage           | [V]  | 18...30 DC; (cULus - Class 2 source required) |
| Current consumption         | [mA] | 45; (24 V)                                    |
| Protection class            |      | III                                           |
| Reverse polarity protection |      | yes                                           |
| Type of light               |      | red light                                     |
| Wave length                 | [nm] | 650                                           |

### Inputs / outputs

|                              |                                                           |
|------------------------------|-----------------------------------------------------------|
| Number of inputs and outputs | Number of digital outputs: 2; Number of analog outputs: 1 |
|------------------------------|-----------------------------------------------------------|

### Inputs

|        |               |
|--------|---------------|
| Inputs | Laser On/ Off |
|--------|---------------|

### Outputs

|                                   |                                                     |
|-----------------------------------|-----------------------------------------------------|
| Total number of outputs           | 2                                                   |
| Electrical design                 | PNP/NPN; (configurable)                             |
| Number of digital outputs         | 2                                                   |
| Output function                   | 2 x normally open / normally closed; (configurable) |
| Max. current load per output [mA] | 100                                                 |
| Number of analog outputs          | 1                                                   |
| Analog current output [mA]        | 4...20; (IEC 61131-2)                               |



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|                                   |              |                                                                                                                                                                     |
|-----------------------------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Max. load                         | [Ω]          | 500                                                                                                                                                                 |
| Analog voltage output             | [V]          | 0...10; (IEC 61131-2)                                                                                                                                               |
| Min. load resistance              | [Ω]          | 2500                                                                                                                                                                |
| Short-circuit protection          |              | yes                                                                                                                                                                 |
| Type of short-circuit protection  |              | yes (non-latching)                                                                                                                                                  |
| Overload protection               |              | yes                                                                                                                                                                 |
| Operating mode: FINE              |              |                                                                                                                                                                     |
| Switching frequency DC            | [Hz]         | 20                                                                                                                                                                  |
| Operating mode: STD               |              |                                                                                                                                                                     |
| Switching frequency DC            | [Hz]         | 40                                                                                                                                                                  |
| Operating mode: FAST              |              |                                                                                                                                                                     |
| Switching frequency DC            | [Hz]         | 60                                                                                                                                                                  |
| Monitoring range                  |              |                                                                                                                                                                     |
| Max. light spot diameter          | [mm]         | 5                                                                                                                                                                   |
| Light spot dimensions refer to    |              | at maximum range                                                                                                                                                    |
| Background suppression            | [m]          | < 20                                                                                                                                                                |
| Measuring/setting range           |              |                                                                                                                                                                     |
| Setting range object reflectivity | [%]          | 6...900; (reflectivity; 6 % black paper; 100 % white paper)                                                                                                         |
| Operating mode: FINE              |              |                                                                                                                                                                     |
| Measuring range                   | [m]          | 0.05...2                                                                                                                                                            |
| Sampling rate                     | [Hz]         | 60                                                                                                                                                                  |
| Operating mode: STD               |              |                                                                                                                                                                     |
| Measuring range                   | [m]          | 0.05...2                                                                                                                                                            |
| Sampling rate                     | [Hz]         | 120                                                                                                                                                                 |
| Operating mode: FAST              |              |                                                                                                                                                                     |
| Measuring range                   | [m]          | 0.05...1                                                                                                                                                            |
| Sampling rate                     | [Hz]         | 180                                                                                                                                                                 |
| Software / programming            |              |                                                                                                                                                                     |
| Parameter setting options         |              | Distance / reflectivity; hysteresis / window; sequence modulation to avoid mutual interference between up to 5 similar devices; sensitivity; current/voltage output |
| Interfaces                        |              |                                                                                                                                                                     |
| Communication interface           |              | IO-Link                                                                                                                                                             |
| Transmission type                 |              | COM2 (38,4 kBaud)                                                                                                                                                   |
| IO-Link revision                  |              | 1.1.3                                                                                                                                                               |
| SDCI standard                     |              | IEC 61131-9                                                                                                                                                         |
| Profiles                          | Common - I&D | Identification and Diagnosis                                                                                                                                        |
|                                   | Function     | Locator                                                                                                                                                             |
|                                   | Function     | ProductURI                                                                                                                                                          |
| SIO mode                          |              | yes                                                                                                                                                                 |
| Required master port class        |              | A                                                                                                                                                                   |
| Min. process cycle time           | [ms]         | 5                                                                                                                                                                   |



## Laser distance sensor

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|                                    |                                                                             |                   |
|------------------------------------|-----------------------------------------------------------------------------|-------------------|
| IO-Link process data<br>(cyclical) | <b>Function</b>                                                             | <b>bit length</b> |
|                                    | process value                                                               | 2 x 16            |
|                                    | device status                                                               | 4                 |
|                                    | binary switching information                                                | 2                 |
| IO-Link functions (acyclical)      | application specific tag; operating hours counter; switching cycles counter |                   |
| Supported DeviceIDs                | <b>Type of operation</b>                                                    | <b>DeviceID</b>   |
|                                    | default                                                                     | 1582              |
| Note                               | For further information please see the IODD PDF file at "Downloads"         |                   |

| Operating conditions        |      |                                                               |
|-----------------------------|------|---------------------------------------------------------------|
| Ambient temperature         | [°C] | -25...50                                                      |
| Note on ambient temperature |      | In ambient temperatures < -10 °C a warm-up time is necessary. |
|                             |      | Laser is off.                                                 |
| Storage temperature         | [°C] | -30...80                                                      |
| Protection                  |      | IP 65; IP 67                                                  |

| Tests / approvals         |                |                                                                                                                                     |
|---------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------|
| EMC                       | EN 60947-5-2   |                                                                                                                                     |
| Laser protection class    |                | 1                                                                                                                                   |
| Notes on laser protection | Caution:       | Laser light                                                                                                                         |
|                           | laser class:   | 1                                                                                                                                   |
|                           |                | EN / IEC60825-1:2007                                                                                                                |
|                           |                | EN / IEC60825-1:2014                                                                                                                |
|                           |                | Complies with 21 CFR 1040.10 except for conformance with IEC 60825-1 Ed. 3, as described in Laser Notice No. 56, dated May 8, 2019. |
| MTTF                      | [years]        | 258                                                                                                                                 |
| UL approval               | Ta             | -25...60 °C                                                                                                                         |
|                           | Enclosure type | Type 1                                                                                                                              |
|                           | voltage supply | Class 2                                                                                                                             |
|                           | File number UL | E174191                                                                                                                             |

| Mechanical data    |      |                                                            |
|--------------------|------|------------------------------------------------------------|
| Weight             | [g]  | 53.4                                                       |
| Housing            |      | rectangular with M18 thread                                |
| Dimensions         | [mm] | 62 x 22.5 x 45.1                                           |
| Thread designation |      | M18 x 1                                                    |
| Material           |      | housing: PPSU; ABS; PMMA; PBT / PC; EPDM; front lens: PMMA |
| Lens alignment     |      | Side sensing                                               |

| Displays / operating elements |                  |                                   |
|-------------------------------|------------------|-----------------------------------|
| Display                       | Switching status | 2 x LED, yellow                   |
|                               |                  | 1 x alphanumeric display, 4-digit |
| Operating elements            | 3                | pushbuttons                       |

| Accessories    |  |              |
|----------------|--|--------------|
| Items supplied |  | lock nuts: 2 |

| Remarks       |  |        |
|---------------|--|--------|
| Pack quantity |  | 1 pcs. |

# OGD251

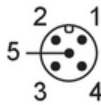


## Laser distance sensor

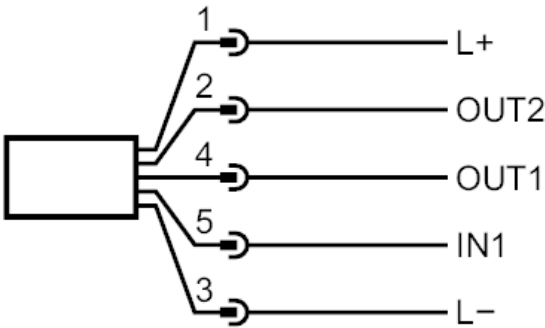
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### Electrical connection - plug

Connector: 1 x M12; coding: A; Contacts: 5



### Connection



- |         |                                   |
|---------|-----------------------------------|
| 1 L+    |                                   |
| 2 OUT 2 | switching output or analog output |
| 3 L-    |                                   |
| 4 OUT 1 | switching output or IO-Link       |
| 5 IN 1  | Laser On/ Off                     |



## Laser distance sensor

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| Other data            |                                                                 |                 |
|-----------------------|-----------------------------------------------------------------|-----------------|
| Parameter             | Setting range                                                   | Factory setting |
| SEL1                  | Dist / Refl                                                     | Dist            |
| OU1                   | Hno, Hnc, Fno, Fnc.OFF                                          | Hno             |
| SP1 [mm]              | 50...2000                                                       | 1000            |
| SP1 [%]               | 6...900                                                         | 10              |
| nSP1 [mm]             | 50...2000                                                       | 900             |
| FSP1 [mm]             | 50...2000                                                       | 1100            |
| SF1 [mm]              | 10...500                                                        | 50              |
| bSP1 [%]              | 6...900                                                         | 40              |
| dSP1 [%]              | 6...900                                                         | 30              |
| SF1 [%]               | 1...100                                                         | 10              |
| dS1 [s]               | 0...0.1...5                                                     | 0               |
| dr1 [s]               | 0...0.1...5                                                     | 0               |
| SEL2                  | Dist / Refl                                                     | Dist            |
| OU2                   | Hno, Hnc, Fno, Fnc, OFF                                         | Hno             |
| SP2 [mm]              | 50...2000                                                       | 2000            |
| SP2 [%]               | 6...900                                                         | 6               |
| ASP [mm]              | 0...2200                                                        | 0               |
| ASP [%]               | 0...999                                                         | 0               |
| AEP [mm]              | 0...2200                                                        | 2000            |
| AEP [%]               | 0...999                                                         | 100             |
| nSP2 [mm]             | 50...2000                                                       | 1800            |
| FSP2 [mm]             | 50...2000                                                       | 2000            |
| SF2 [mm]              | 10...500                                                        | 50              |
| bSP2 [%]              | 6...900                                                         | 20              |
| dSP2 [%]              | 6...900                                                         | 10              |
| SF2 [%]               | 1...100                                                         | 10              |
| dS2 [s]               | 0...0.01...5                                                    | 0               |
| dr2 [s]               | 0...0.01...5                                                    | 0               |
| dSO [s]               | 0...0.01...5                                                    | 0.1             |
| diS                   | On / OFF                                                        | On              |
| colr                  | rEd; GrEn; r1ou; G1ou; r2ou; G2ou; r-12; G-ou                   | G1ou            |
| P-n                   | PNP,NPN                                                         | PNP             |
| OPEr (operating mode) | FINE,STD, FAST                                                  | FINE            |
| SEQ                   | auto; S1...S5                                                   | auto            |
| CMPT                  | 251 / 580 / 581 / 585 / 586 / 592 / 593 / 596 / 597 / 582 / 583 | 251             |

# OGD251



## Laser distance sensor

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### repeatability: $\pm 3 \sigma$

| Operating mode: FINE              | Repeatability of the measured values |                       |
|-----------------------------------|--------------------------------------|-----------------------|
| distance                          | white (90 % remission)               | black (6 % remission) |
| 50...300                          | $\pm 2 \text{ mm}$                   | $\pm 3 \text{ mm}$    |
| 300...500                         | $\pm 2 \text{ mm}$                   | $\pm 3 \text{ mm}$    |
| 500...1000                        | $\pm 3 \text{ mm}$                   | $\pm 5 \text{ mm}$    |
| 1000...2000                       | $\pm 5 \text{ mm}$                   | $\pm 8 \text{ mm}$    |
| Operating mode: STD               | Repeatability of the measured values |                       |
| 50...300                          | $\pm 4 \text{ mm}$                   | $\pm 5 \text{ mm}$    |
| 300...500                         | $\pm 4 \text{ mm}$                   | $\pm 5 \text{ mm}$    |
| 500...1000                        | $\pm 4 \text{ mm}$                   | $\pm 5 \text{ mm}$    |
| 1000...2000                       | $\pm 8 \text{ mm}$                   | $\pm 15 \text{ mm}$   |
| Operating mode: FAST              | Repeatability of the measured values |                       |
| 50...300                          | $\pm 5 \text{ mm}$                   | $\pm 8 \text{ mm}$    |
| 300...500                         | $\pm 5 \text{ mm}$                   | $\pm 8 \text{ mm}$    |
| 500...1000                        | $\pm 5 \text{ mm}$                   | $\pm 19 \text{ mm}$   |
| 1000...2000                       | $\pm 10 \text{ mm}$                  | -                     |
| Operating mode: FINE / STD / FAST | Repeatability of the measured values |                       |
| reflectivity                      |                                      |                       |
| 6 %                               | $\pm 3 \%$                           |                       |
| 50 %                              | $\pm 5 \%$                           |                       |
| 90 %                              | $\pm 8 \%$                           |                       |

The values apply at

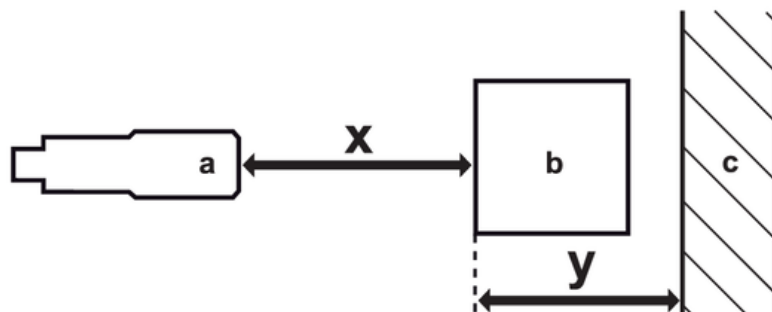
|                                  |                 |
|----------------------------------|-----------------|
| Extraneous light on the object   | < 10 klx        |
| constant ambient conditions      | 23 °C / 960 hPa |
| minimum power-on time in minutes | 15              |



## Laser distance sensor

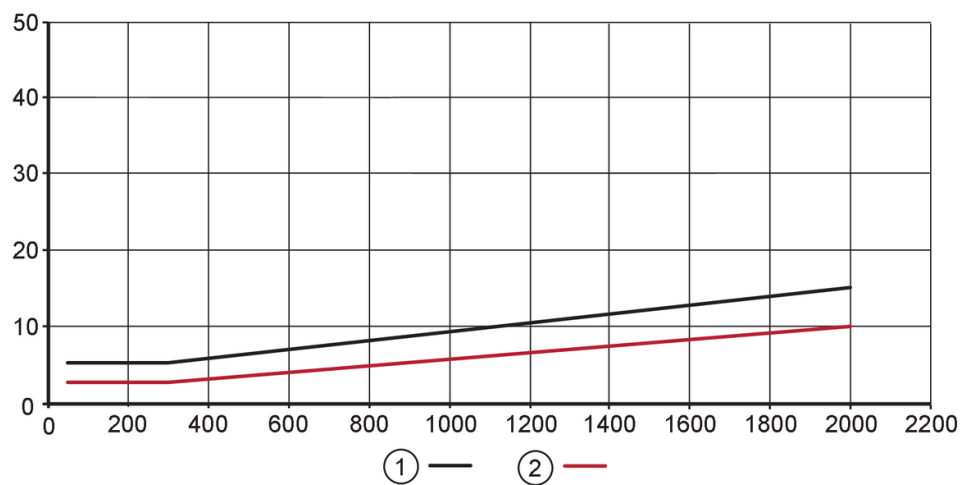
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### Diagrams and graphs



- a: sensor
- b: object
- c: background
- x: distance sensor/object [mm]
- y: min. distance object/background [mm]

Hysteresis graph for distance measurement / operating mode: FINE



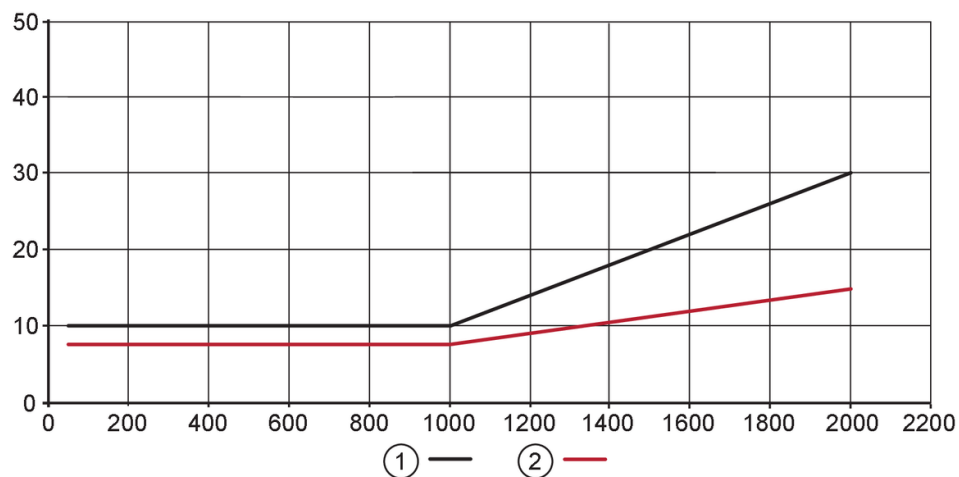
- 1: Background any (6...90 % remission)
- 2: Background white (90 % remission)



## Laser distance sensor

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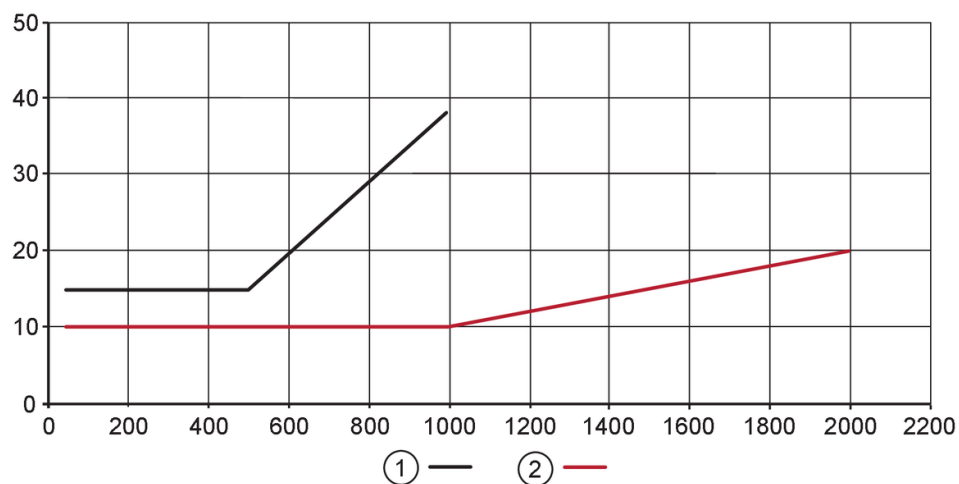
Hysteresis graph for distance measurement / operating mode: STD



1: Background any (6...90 % remission)

2: Background white (90 % remission)

Hysteresis graph for distance measurement / operating mode: FAST

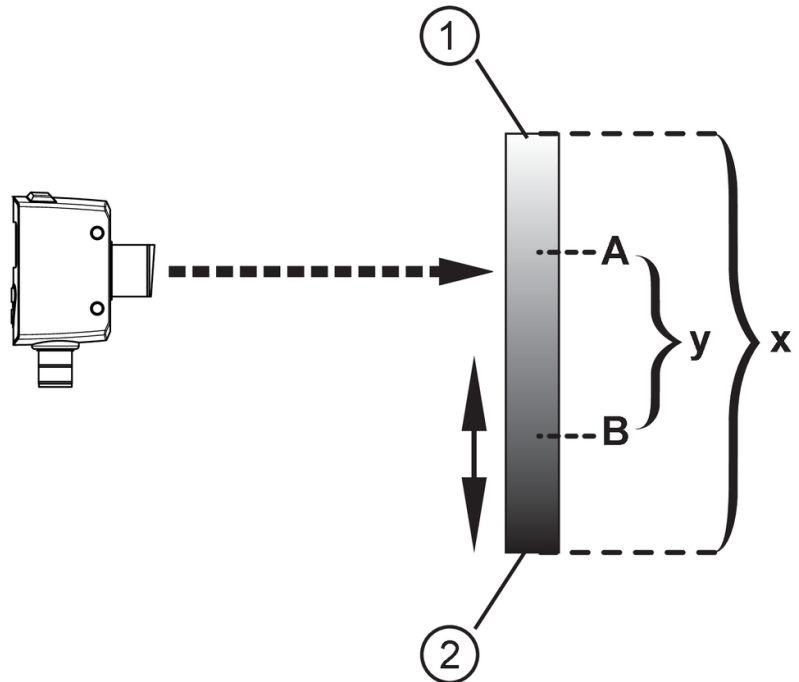


1: Background any (6...90 % remission)

2: Background white (90 % remission)

## Laser distance sensor

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- 1: bright
- 2: dark
- A: Set point
- B: Reset point
- x: object brightness ( Object reflectivity )
- y: min. reflectivity difference to be detected safely

Hysteresis curve for object reflectivity

