DATALOGIC DS1 SERIES Current Sensing Switch Instruction Manual

Contents

DATALOGIC DS1 SERIES Current Sensing Switch

Product Information

Specifications

- **Model:** DS1 SERIES
- **Receiver (RX) LED Indicators:**
  - **CONTROLS OUT LED:** Yellow LED that indicates the presence of an object in the controlled area.
  - **POWER ON LED:** Green LED that indicates optimal device functioning. Fast blinking indicates critical device alignment.
- **Emitter (TX) LED Indicators:**
  - POWER ON LED: Green LED that indicates correct device functioning.
- **Installation Modes:**
  - Device positioning: Align the RX and TX units, ensuring their distance is within the operating distance. Place the sensitive sides of the units facing each other in a parallel manner with connectors oriented on the same side. Critical alignment is indicated by the fast blinking of the RX green LED.
  - Mounting: Use rigid supports and specific fixing brackets or holes on the device lids to mount the RX and TX units. Avoid strong vibrations.
- **Precautions:**
  - Choose the device based on minimum object detection and maximum controlled area.
  - In agroindustrial applications, verify the compatibility of light grid housing material with chemical agents used in the production process with the DATALOGIC technical sales support department.
  - The AREAscanTM light grids are not safety devices and should not be used for the safety control of machines.
  - Avoid installation near intense or blinking light sources, especially near the receiver unit.
  - Strong electromagnetic disturbances can affect the correct functioning of the device.
- **Object Detection and Measurement:**

    - For correct detection and measurement, objects must completely pass through the controlled area. It is suggested to test detection before beginning the process.
- **Connections:**
    - **Receiver (RX):** M12 5-pole connector with Analog output, Switching output, and SYNC (TX) connections.
    - **Emitter (TX):** M12 4-pole connector with +24 Vdc, 0V, SYNC connections.
    - Shielded cables are not included in the standard connection.
    - Ground connection of the two units is not necessary.
    - Use the same power supply for both TX and RX units with a common voltage reference of 0V for correct functioning.
- **Functioning and Performances:**
    - The passage of an object inside the controlled area causes beam interruption, which results in the closing of the switching output and variation of the device's analog output signal.
    - The device can detect small objects with dimensions as small as 5 mm and provide linear measurements with a 3 mm error in best cases.
    - The switching output is always activated when at least one beam is obscured. This status variation is indicated by the yellow receiver LED turning on.

Product Usage Instructions

Installation

1. Align the RX and TX units, ensuring their distance is within the operating distance.
2. Place the sensitive sides of the units facing each other in a parallel manner with connectors oriented on the same side.
3. Verify the critical alignment by checking if the RX green LED is fast blinking.
4. Mount the RX and TX units on rigid supports using specific fixing brackets or the holes present on the device lids. Avoid strong vibrations.

Precautions

- Choose the appropriate device based on the minimum object to detect and the maximum controlled area required.
- In agroindustrial applications, verify the compatibility of the light grid housing material with any chemical agents used in the production process with the assistance of the DATALOGIC technical sales support department.
- Do not use the AREAscanTM light grids as safety devices for machine control.
- Avoid installing the device near intense or blinking light sources, especially near the receiver unit.
- Strong electromagnetic disturbances can affect the correct functioning of the device.

Object Detection and Measurement

For correct object detection and/or measurement:

1. Ensure that objects pass completely through the controlled area.
2. It is suggested to test the correct detection before beginning the process.

Connections
Follow these steps to make the necessary connections:

1. Connect the Receiver (RX) unit using an M12 5-pole connector, with connections for Analog output, Switching output, and SYNC (TX).
2. Connect the Emitter (TX) unit using an M12 4-pole connector, with connections for +24 Vdc, 0V, and SYNC.
3. Shielded cables are not included in the standard connection.
4. Ground connection of the two units is not necessary.
5. Use the same power supply for both TX and RX units with a common voltage reference of 0V for correct functioning.

FAQ

- **Q: Are the AREAscanTM light grids safety devices?**
  A: No, the AREAscanTM light grids are not safety devices and should not be used for the safety control of machines.
- **Q: What should I do if the green LED on the receiver (RX) is fast blinking?**
  A: The fast blinking of the green LED on the receiver indicates a critical device alignment. Please refer to the DIAGNOSTICS paragraph in the manual for further indications.
- **Q: Can the device detect small objects?**
  A: Yes, the device can detect small objects with dimensions as small as 5 mm.
- **Q: What is the error in linear measurements provided by the device?**
  A: In best cases, the device can provide linear measurements with a 3 mm error.
- **Q: What does it mean when the yellow LED on the receiver (RX) turns on?**
  A: The yellow LED turning on indicates that the switching output has closed due to beam interruption caused by the passage of an object inside the controlled area.

CONTROLS

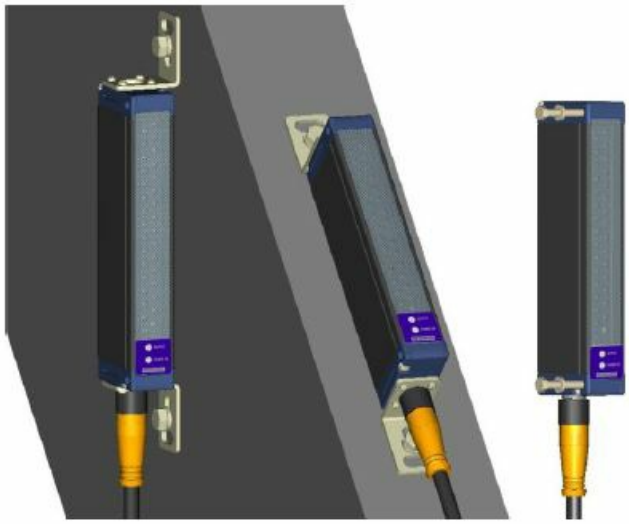
- **OUT LED on the receiver (RX)**
  The yellow LED ON indicates the presence of the object in a controlled area.
- **POWER ON LED on receiver (RX)**
  - The green LED ON indicates the optimal device functioning.
  - The fast blinking of the green LED indicates a critical device alignment.
  - Please refer to the “DIAGNOSTICS” paragraph for other indications.
- **POWER ON LED on emitter (TX)**
  - The green LED ON indicates the correct device functioning.
  - Please refer to the “DIAGNOSTICS” paragraph for other indications.

INSTALLATION MODES

General information on device positioning

- Align the two receivers (RX) and emitter (TX) units, verifying that their distance is inside the device operating distance, in a parallel manner, placing the sensitive sides one in front of the other, with the connectors oriented

on the same side. The critical alignment of the unit will be signalled by the fast blinking of the green receiver LED.



- Mount the receiver and emitter units on rigid supports which are not subject to strong vibrations, using specific fixing brackets and /or the holes present on the device lids.

Precautions to respect when choosing and installing the device

- Choose the device according to the minimum object to detect and the maximum controlled area requested (= operating distance x controlled height);
- In agroindustrial applications, the compatibility of light grid housing material and any chemical agents used in the production process has to be verified with the assistance of the DATALOGIC technical sales support department;
- The AREAscanTM light grids are NOT safety devices, and so MUST NOT be used in the safety control of the machines where installed.

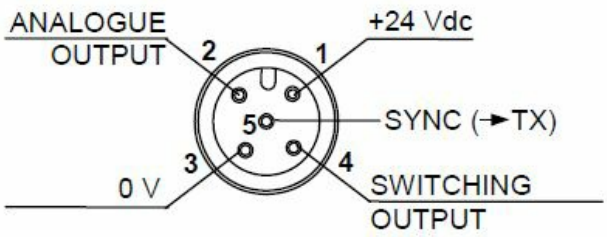
Moreover the following points have to be considered:

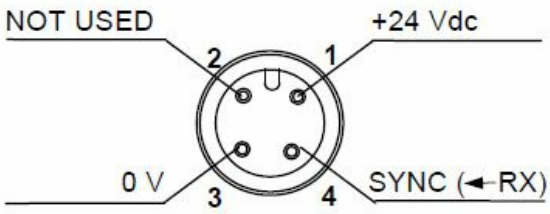
- avoid installation near very intense and/or blinking light sources, in particular near to the receiver unit;
- the presence of strong electromagnetic disturbances can condition the correct functioning of the device; this condition has to be carefully evaluated and checked with the DATALOGIC technical sales support department;
- the presence of smoke, fog and suspended dust in the working environment can reduce the operating distance of the device;
- strong and frequent temperature variations, with very low peak temperatures, can generate a thin condensation layer on the surfaces of the optics, compromising the correct functioning of the device;
- reflecting surfaces near the luminous beam of the AREAscanTM device (above, under or lateral) can cause passive reflections able to compromise object detection inside the controlled area.

If different devices have to be installed in adjacent areas, the emitter of one unit must not interfere with the receiver of the other unit.

General information relative to object detection and measurement
For correct object detection and/or measurement, the object has to pass completely through the controlled area; testing the correct detection before beginning the process is suggested.

CONNECTIONS

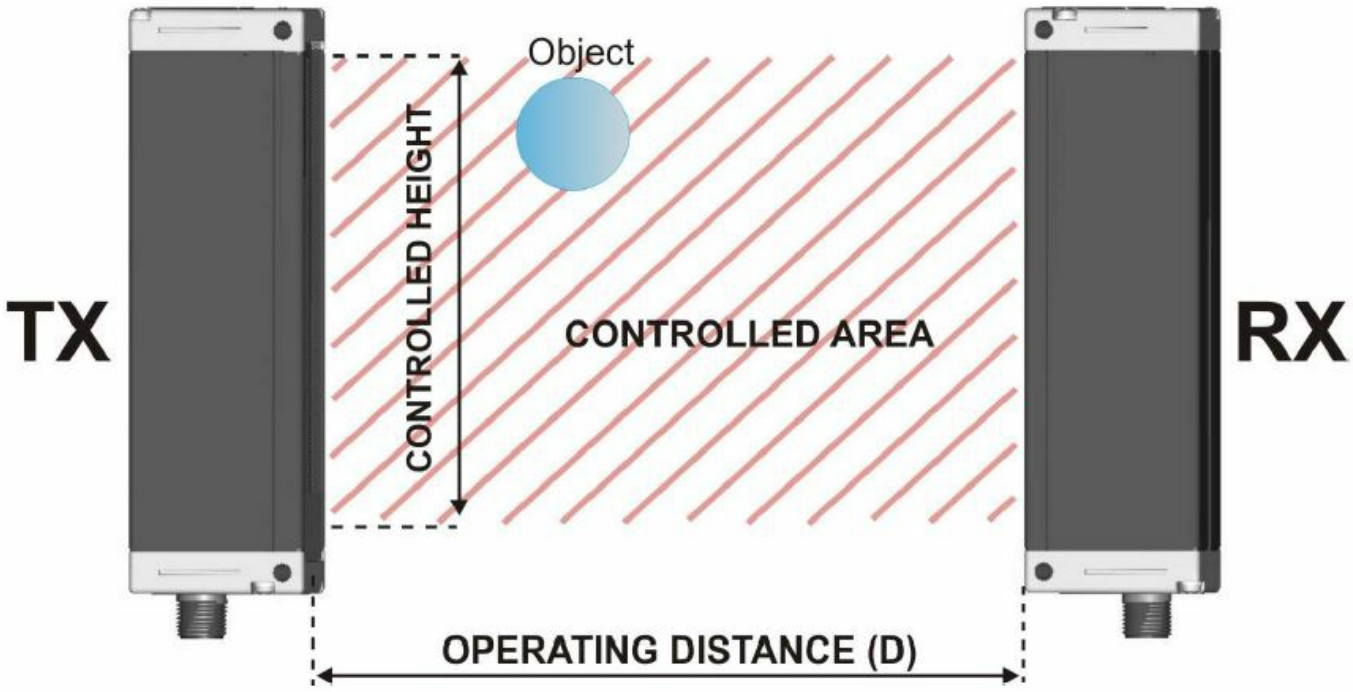




RECEIVER (RX): M12 5-pole connector	1 – brown:	+24 Vdc	***EMITTER (TX):*** M12 4-pole connector	1 – brown:	+24 Vdc
	2 – white:	Analogue output		2 – white:	Not used
	3 – blue:	0 V		3 – blue:	0 V
	4 –black:	Switching output		4 – black:	SYNC
	5 – grey:	SYNC			

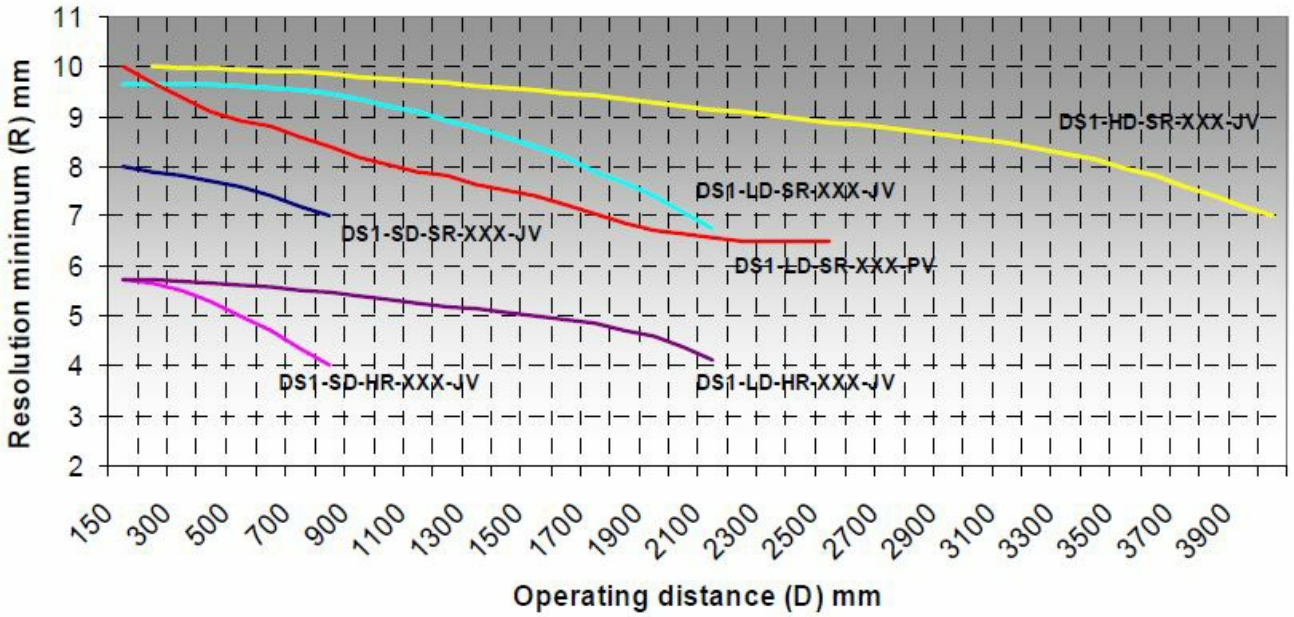
- Shielded cables are not foreseen in the standard connection
- Ground connection of the two units is not necessary
- Use the same power supply for both units: for a correct functioning both units TX and RX must have the same voltage reference 0V

FUNCTIONING AND PERFORMANCES



- The beam interruption due to the passage of an object inside the controlled area caused the closing of the switching output and the variation of the device's analogue output signal.
- Small objects can be detected (reaching dimensions of only 5 mm) and determine linear measurements with a ±3 mm error in best cases.
- In particular, the switching output is always activated when at least one beam is obscured. The status variation is signalled by the yellow receiver LED that turns on.
- The analogue output value (0-10 V) is proportional to the number of obscured beams (0V means that no beam is interrupted, and 10V all beams are interrupted)

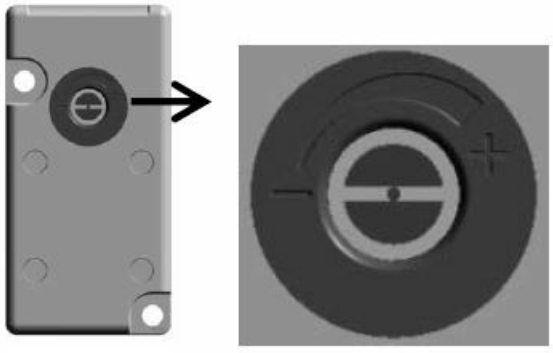
- The device does not require calibration; periodical checks of the resolution and/or measurement are however suggested.
- The blinking of the green receiver LED (stability function) signals the critical alignment of the units and/or the functioning outside or near the maximum operating distance. In optimal conditions, the LED remains on continuously.
- The two units are synchronised via cable (SYNC wire); precarious connections or induced disturbances on the synchronism line can cause device malfunction or temporary blocking.
- The diagrams, given below, show the typical minimum resolution trend of each model, SR (standard resolution) and HR (high resolution), according to the operating distance (D). For DS1-LD-SR-XXX-PV, the minimum resolution at a particular operating distance is to be intended with the trimmer calibrated near the commutation threshold for that distance.



EMISSION POWER REGULATION

EMISSION POWER REGULATION (only DS1-LD-SR-XXX-PV)

The emitter is equipped with a trimmer which lets the user change the emission power. The operating distance increases rotating the trimmer clockwise. The emission power reduction is useful to decrease passive reflections when the maximum operating distance is not required. Trimmer rotation is limited to 260°. Do not apply a torque greater than 35 Nmm.



Rotate the trimmer clockwise to the limit (maximum emission), then align RX and TX at the required operating distance (LED OUT off); decrease emission power by rotating the trimmer counterclockwise until the output switches (LED OUT off) or the limit is reached (minimum emission); in the first case, rotate the trimmer clockwise

until the output switches again and LED OUT remains off.

TECHNICAL DATA

Power supply:	24 Vdc ± 15%
Consumption of emitting unit (TX):	150 mA max.
Consumption on receiving unit (RX) :	50 mA max without load
Switching output:	1 PNP output
Switching output current:	100 mA; short-circuit protection
Output saturation voltage:	£ 1.5 V at T=25 °C
Analogue output:	0-10V proportional to obscured beams
Analogue output current:	10 mA max. (1KW minimum resistive load)
Minimum resolution:	refer to the “Specifications” table
Measurement precision:	± 3.5 mm (refer to “*Specifications*” table)
Response time:	1 ms (refer to “*Specifications*” table)
Indicators:	**RX:** OUT LED (yellow) / POWER ON LED (green) **TX:** POWER ON LED (green)
Operating temperature:	0…+ 50 °C
Storage temperature:	-25…+ 70 °C
Operating distance (typical values):	**DS1-SD-XX-XXX-JV**: 0.15…0.8 m **DS1-LD-XX-XXX-JV**: 0.15…2.1 m **DS 1-LD-SR-XXX-PV**: 0.20…2.5 m **DS1-HD-XX-XXX-JV**: 0.20…4.0 m
Emission type:	Infrared (880 nm)
Vibrations:	0.5 mm amplitude, 10 … 55 Hz frequency, for every axis (EN60068-2-6)
Shock resistance:	11 ms (30 G) 6 shock for every axis (EN60068-2- 27)
Housing material:	Black electro-painted aluminium
Lens material:	PMMA
Mechanical protection:	IP65 (EN 60529)
Connections:	M12 4-pole connector for TX M12 5-pole connector for RX

Weight:	300 g. (DS1-xx-010-xx) 400 g. (DS1-xx-015-xx) 600 g. (DS1-xx-030-xx)

DIAGNOSTICS

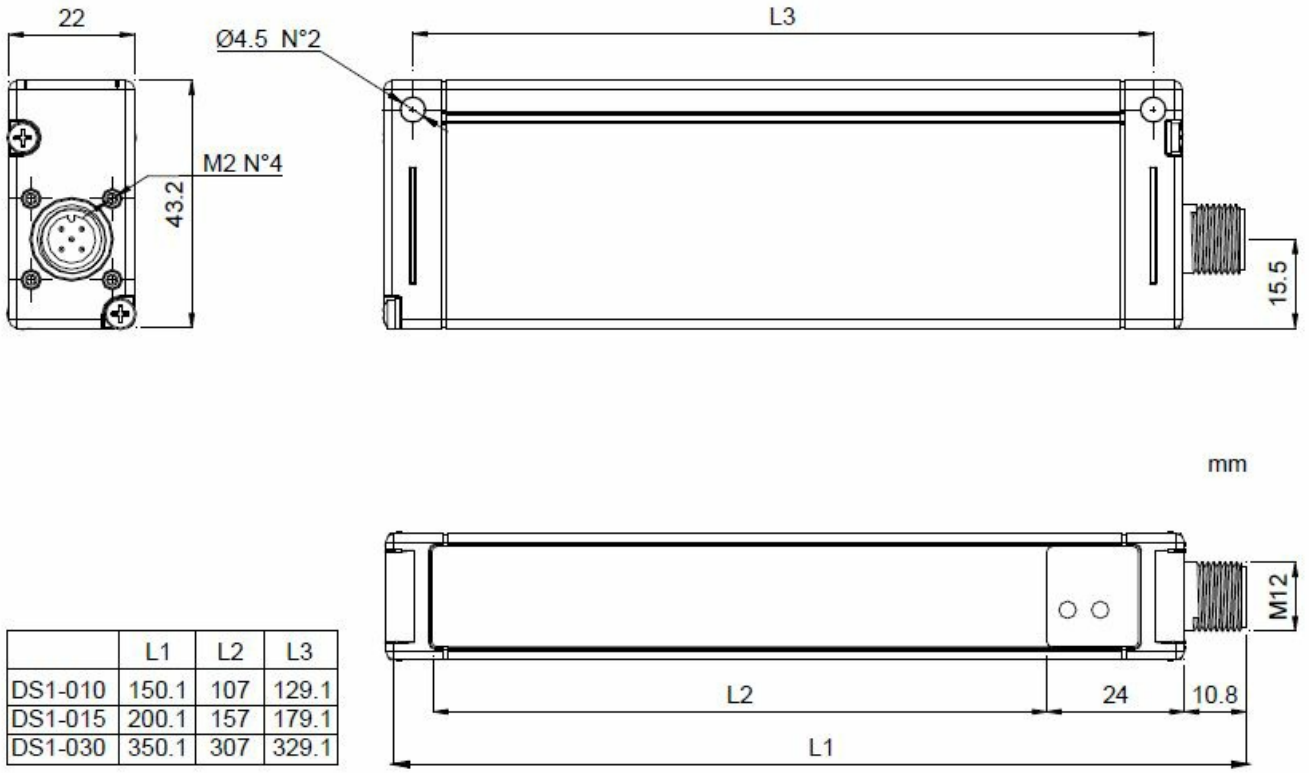
RECEIVING UNIT (RX):

Segnal	Status	Cause	Action
 *OUT LED*	**ON**	Switching output. Presence of the object in the controlled area.	
	OFF	Switching output. Controlled area free of objects.	
 *POWER ON LED*	**ON**	Optimal functioning	
	Fast blinking	Critical alignment of the unit or/and functioning closed to maximum operating distance.	
	Slow blinking	Wrong connections and/or malfunctioning.	- Verify the output connections and any short- circuits - Switch OFF and switch ON the device. - If condition persists, contact Datalogic.
	OFF	Device is not powered.	- Verify the connections. - If condition persists, contact Datalogic.

EMITTING UNIT (TX):

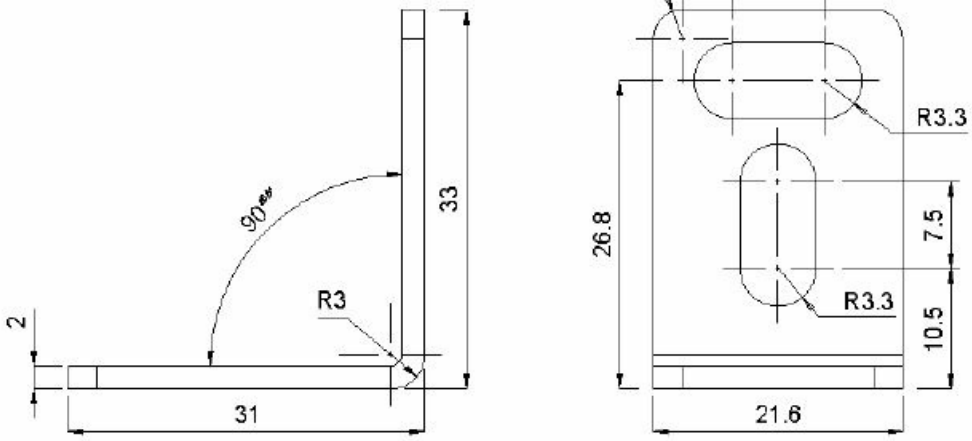
Segnal	Status	Cause	Action
 *POWER ON LED*	**ON**	Normal functioning of emission unit.	
	Blinking	Unit malfunctioning	- Switch OFF and switch ON the device. - If condition persists, contact Datalogic.
	OFF	Absence of powering and/or synchronism with receiver	- Verify the connections and right value of power supply. - If condition persists, contact Datalogic.

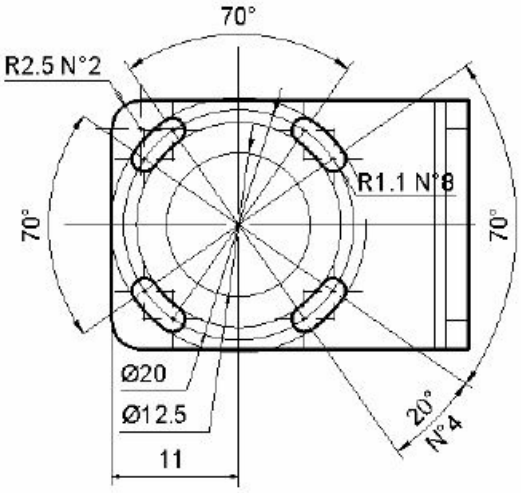
DIMENSIONS



	L1	L2	L3
DS1-010	150.1	107	129.1
DS1-015	200.1	157	179.1
DS1-030	350.1	307	329.1

FIXING BRACKET





The fixing bracket is supplied with the product.

SPECIFICATIONS

Model	Controlled height (mm)	N°. beams	Minimum resolution (mm)	Output analogue sensitivity (V)	Measurement precision (mm)	Response time (ms)	Operating distance (m)
DS1-LD-HR-010-JV	**100**	**32**	**5**	**0.31**	**± 3.5**	**2**	**0.15…2.1**
DS1-LD-HR-015-JV	**150**	**48**	**5**	**0.21**	**± 3.5**	**2.75**	**0.15…2.1**
DS1-LD-SR-010-JV	**100**	**16**	**7**	**0.63**	**± 7**	**1**	**0.15…2.1**
DS1-LD-SR-010-PV	**100**	**16**	**7**	**0.63**	**± 7**	**1**	**0.20…2.5**
DS1-LD-SR-015-JV	**150**	**24**	**7**	**0.42**	**± 7**	**1.5**	**0.15…2.1**
DS1-LD-SR-015-PV	**150**	**24**	**7**	**0.42**	**± 7**	**1.5**	**0.20…2.5**
DS1-LD-SR-030-JV	**300**	**48**	**7**	**0.21**	**± 7**	**2.75**	**0.15…2.1**
DS1-LD-SR-030-PV	**300**	**48**	**7**	**0.21**	**± 7**	**2.75**	**0.20…2.5**
DS1-SD-SR-010-JV	**100**	**16**	**7**	**0.63**	**± 7**	**1**	**0.15…0.8**
DS1-SD-SR-015-JV	**150**	**24**	**7**	**0.42**	**± 6**	**1.5**	**0.15…0.8**
DS1-SD-SR-030-JV	**300**	**48**	**7**	**0.21**	**± 7**	**2.75**	**0.15…0.8**
DS1-SD-HR-010-JV	**100**	**32**	**4**	**0.31**	**± 3**	**2**	**0.15…0.8**
DS1-SD-HR-015-JV	**150**	**48**	**4**	**0.21**	**± 3**	**2.75**	**0.15…0.8**
DS1-HD-SR-010-JV	**100**	**16**	**7**	**0.63**	**± 7**	**1**	**0.20…4**
DS1-HD-SR-015-JV	**150**	**24**	**7**	**0.42**	**± 7**	**1.5**	**0.20…4**
DS1-HD-SR-030-JV	**300**	**48**	**7**	**0.21**	**± 7**	**2.75**	**0.20…4**

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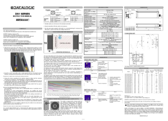
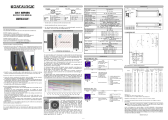
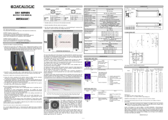
Helpful links at **www.datalogic.com**: Contact Us, Terms and Conditions, Support.

The warranty period for this product is 36 months. See General Terms and Conditions of Sales for further details.

Under current Italian and European laws, Datalogic is not obliged to take care of product disposal at the end of its life. Datalogic recommends disposing of the product in compliance with local laws or contacting authorised waste collection centres.

Documents / Resources

	DATALOGIC DS1 SERIES Current Sensing Switch [pdf] Instruction Manual DS1 SERIES Current Sensing Switch, DS1 SERIES, Current Sensing Switch, Sensing Switch, Switch
	DATALOGIC DS1 SERIES Current Sensing Switch [pdf] Instruction Manual DS1 SERIES Current Sensing Switch, DS1 SERIES, Current Sensing Switch, Sensing Switch, Switch
	DATALOGIC DS1 SERIES Current Sensing Switch [pdf] Instruction Manual DS1 SERIES Current Sensing Switch, DS1 SERIES, Current Sensing Switch, Sensing Switch, Switch

References

- Datalogic | Automatic Data Capture and Industrial Automation - Datalogic
- Manual-Hub.com - Free PDF manuals!
- User Manual