

S40 SERIES INSTRUCTION MANUAL

CONTROLS

OUTPUT LED

The yellow LED indicates the output status.

READY LED

The green LED ON indicates that the received signal has a safety margin compared to the output switching value. See the "SETTING" paragraph for setup procedure indications.

POWER ON LED (S40-x-G)

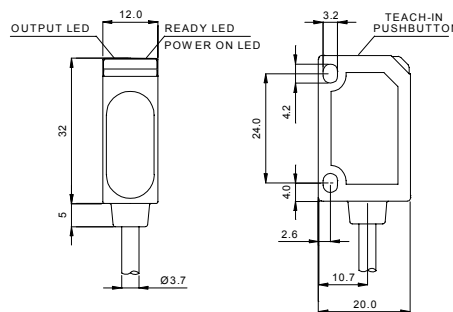
The green LED indicates that the sensor is operating.

TEACH-IN PUSHBUTTON

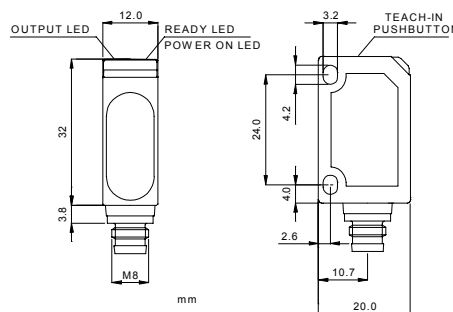
The pushbutton activates the setup procedure.

DIMENSIONS

CABLE VERSION

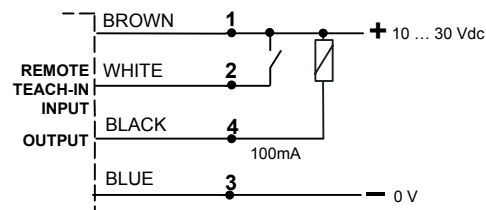


M8 CONNECTOR VERSION

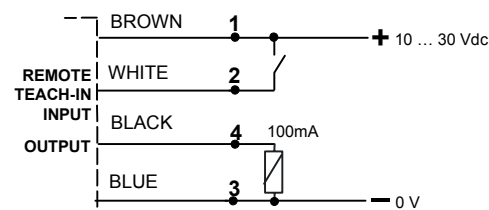


CONNECTIONS

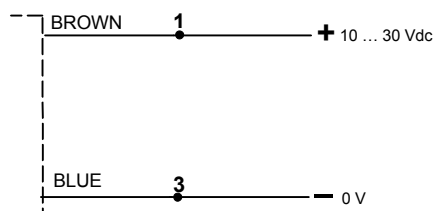
NPN OUTPUT



PNP OUTPUT



S40-x-G



M8 CONNECTOR



TECHNICAL DATA

	S40-x-A	S40-x-B	S40-x-T	S40-x-C	S40-x-F/G	S40-x-M
Power supply:	10 ... 30 Vdc; reverse polarity protected					
Ripple:	10% max					
Current consumption (output current excluded):	35 mA max.					
Output:	NPN or PNP, pull down/up resistance 22 kΩ (short-circuit protection)					
Output current:	100 mA max.					
Output saturation voltage:	2.4 V max.					
Response time:	0.5 ms max.					
Switching frequency:	1 kHz max.					
Data retention:	non-volatile EEPROM memory					
Indicators:	OUT LED (YELLOW) READY LED (GREEN) POWER ON LED (GREEN) mod. S40-x-G					
Setting:	TEACH-IN setting by pushbutton and REMOTE input					
Operating temperature:	-20 ... +60 °C					
Storage temperature:	-20 ... +80 °C					
Electrical shock protection:	Class 2					
Operating distance (minimum):	see TAB.1		0.1 ... 0.7 m	0.5 ... 30 cm	0.1 ... 6 m	20...100 mm
Emission type:	RED (660nm)					RED (640nm)
Ambient light rejection:	according to EN 60947-5-2					
Vibration:	10 ... 55 Hz, 1.5 mm amplitude in each X, Y, Z axis for 2 hours					
Shock resistance:	500 ms (approx. 50 G) 3 shock in each 3 axis					
LIGHT/DARK selection:	TEACH-IN procedure					
Housing:	ABS UL 94V-O					
Lenses:	PMMA plastic (TYPE 1 ENCLOSURE)					
Protection class:	IP67					
Connections:	2 m cable Ø 3.5 mm / M8 4-pole connector					
Weight:	40 g. max. cable versions / 10 g. connector versions					

The adhesive label supplied with the sensor briefly describes the setting procedure and may be applied on the sensor or close to it.

SETTING

A three-step setup procedure adjusts the sensor sensitivity or operating distance and sets the LIGHT/DARK mode.

The procedure given below describes a LIGHT mode setting for C and M models and a DARK mode setting for A, B, T, F and G models.

Connecting the REMOTE TEACH-IN input to the +Vdc supply is equivalent to pressing the pushbutton.

1) Alignment

Mod. A/B/T: position the sensor and reflector on opposite sides;

Mod. C/M: place the target opposite the sensor at the maximum distance required;

Mod. F/G: position the sensors on opposite sides;

press the TEACH-IN pushbutton and keep it pressed until the yellow and green LEDs flash synchronously. The flashing rate varies according to the operating conditions; high flashing rate indicates insufficient received signal level or excessive distance; improve alignment or reduce the distance to obtain a low flashing rate.

2) Output ON state acquisition

Mod. A/B/T: place the target between sensor and reflector;

Mod. C/M: place the target opposite the sensor at the maximum distance required;

Mod. F/G: place the target between the sensors;

press the TEACH-IN pushbutton and keep it pressed until the green LED flashes. Don't move the target during this phase.

3) output OFF state acquisition

Mod. A/B/T/F/G: place no target;

Mod. C: place no target;

Mod. M: remove or further the target;

press the TEACH-IN pushbutton and keep it pressed until the green LED lights permanently ON; this means a safe operation has been obtained.

If the yellow and green LEDs flash synchronously the setup procedure has failed due to insufficient contrast; repeat the procedure from the beginning.

To set the C and M models sensor in DARK mode and the A, B, T, F and G models in LIGHT mode invert the 2 and 3 steps.

TAB.1: S40-x-A/B max. operating distance table (meters)

	REFLECTOR					
	R1	R2	R3	R4	R5	R6
-A	1,8	3,0	2,4	3,6	3,1	4,2
-B	1,5	2,5	2,0	3,2	2,7	3,5



WARRANTY

DATASENSOR S.p.A. warrants its products to be free from defects. DATASENSOR S.p.A. will repair or replace, free of charge, any product found to be defective during the warranty period of 36 months from the manufacturing date.

This warranty does not cover damage or liability deriving from the improper application of DATASENSOR products.

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DATASENSOR

S40-PH-x-B03



INSTRUCTION MANUAL

CONTROLS

OUTPUT LED

In the normal operating mode indicates the output status (the yellow LED ON indicates the output activation). In the setting phase indicates the setting steps. Please refer to the "SETTING" paragraph for procedure indications during detection or setting phases.

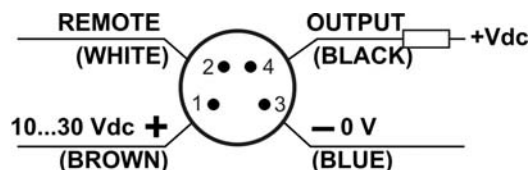
POWER ON LED

The green LED signal indicates the sensor functioning. The LED blinks with the yellow LED if the detection is lacking.

TEACH-IN PUSH-BUTTON

A long pressure on the push-button activates the self-setting procedure. The REMOTE input allows the external TEACH-IN control.

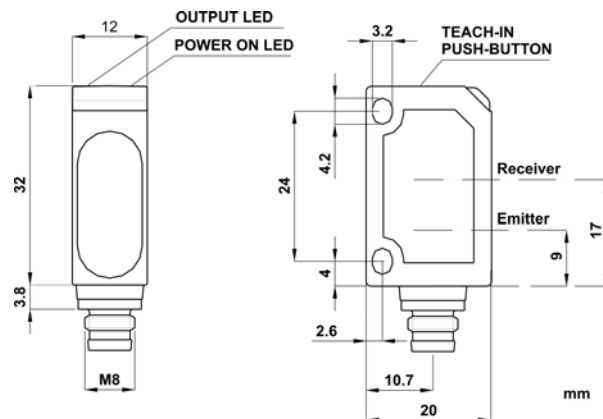
CONNECTIONS



REMOTE FUNCTION

The connection of the REMOTE wire to + Vdc is equivalent to pressing the TEACH-IN push-button. Leave the REMOTE wire unconnected and insulated if not used. If it is connected permanently to 0V, the TEACH-IN push-button functioning is blocked.

DIMENSIONS



TECHNICAL DATA

Power supply:	10 ... 30 Vdc (reverse polarity protection)
Ripple:	10% max
Consumption (output current excluded):	35 mA max.
Outputs:	NPN or PNP (short-circuit protection)
Output current:	100 mA max.
Output saturation voltage:	2.4 V max.
Response time:	125µs max.
Switching frequency:	4 kHz
Data retention:	EEPROM non volatile memory
Indicators:	OUTPUT LED (YELLOW) / POWER ON LED (GREEN)
Setting:	TEACH-IN via push-button and wire
Operating temperature:	-20 ... +60 °C
Storage temperature:	-20 ... +80 °C
Electric strength	500 Vac / 1 minimum between electric parts and enclosure
Insulation resistance	> 20 MΩ / 500 Vdc between electric parts and enclosure
Operating distance (min.values)*:	0.1...6 m on R2 reflector / 0.1...3 m on R7 reflector / 0.1...1.5 m on R8 reflector
Emission type:	RED LASER: Class 2 EN 60825-1 Class II CDRH 21 CFR PART 1040.10
Ambient light rejection:	According to EN 60947-5-2
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)
DARK/LIGHT selection:	automatic with fine detection setting mode
Housing material:	ABS UL 94V-O
Lens material:	Methacrylic PMMA
Mechanical protection:	IP67
Connections:	M8 4-pole connector
Weight:	10 g. max. connector vers.

*Minimum operating distance referred on the suggested reflector, select the reflector with higher surface area to improve the application tolerance.

Technical data for laser protection class 2 according to EN 60825-1-3/97:

Radiation divergence:	$\theta < 0.8^\circ$
Average optic power:	< 1mW
Wavelength:	$\lambda = 655 \text{ nm}$
Pulse width:	$t = 2.2 \mu\text{s}$
Pulse repetition frequency:	$f = 20 \text{ kHz}$

SETTING

EASYTOUCH™

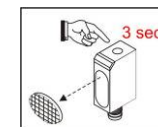
The sensor uses the patent-covered EASYTOUCH™ technology that allows a rapid self-setting of the product.

- EASYTOUCH™ (with reflector): sensor sets the best sensitivity mode for the detection of transparent objects.
- EASYTOUCH™ (without reflector, default setting): sensor sets the maximum sensitivity level without reflector. This condition is recommended for opaque object detection.

EASYTOUCH™ (with reflector):

Carefully align the sensor and the reflector. The light spot has to be inside the reflector area (see "Installation" section)

- Press the TEACH-IN push-button until the OUTPUT LED turns OFF and then release the push-button.



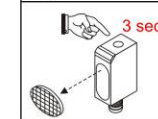
EASYTOUCH™ (without reflector)

Before aligning the sensor on reflector (see "Installation" section), set the sensor without reflector, pressing the TEACH-IN push-button, await the blinking of the OUTPUT LED and then release the push-button

FINE DETECTION

Recommended for critical detection conditions such as the detection of objects with shiny surfaces: Carefully align the sensor and the reflector. The light spot has to be inside the reflector area (see "Installation" section)

- Insert object to detect between sensor and reflector.
- Press the TEACH-IN push-button and await the blinking of the OUTPUT LED, without moving the object. Release the push-button.
- Remove the object.
- Press the TEACH-IN push-button and wait until the blinking OUTPUT LED switch OFF, without moving the object. Release the push-button.



The sensor selects the best operating conditions according to the acquired points and adjusts itself in the DARK mode condition. The acquisition sequence has to be inverted to select the opposite operating modes.

If the OUTPUT LED and the POWER ON LED blink contemporarily the detection has failed due to insufficient contrast or setting procedure error. The procedure has to be repeated from the beginning.

WARRANTY

DATASENSOR S.p.A. warrants its products to be free from defects. DATASENSOR S.p.A. will repair or replace, free of charge, any product found to be defective during the warranty period of 36 months from the manufacturing date. This warranty does not cover damage or liability deriving from the improper application of DATASENSOR products.

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DATASENSOR

S40-PH-x-C03



INSTRUCTION MANUAL

CONTROLS

OUTPUT LED

In the normal operating mode indicates the output status (the yellow LED ON indicates the output activation). In the setting phase indicates the setting steps. Please refer to the "SETTING" paragraph for procedure indications during detection or setting phases.

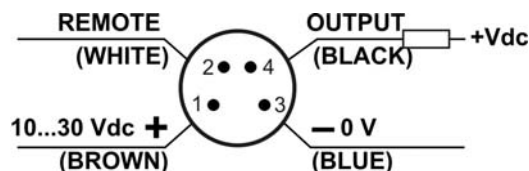
POWER ON LED

The green LED signal indicates the sensor functioning. The LED blinks with the yellow LED if the detection is lacking.

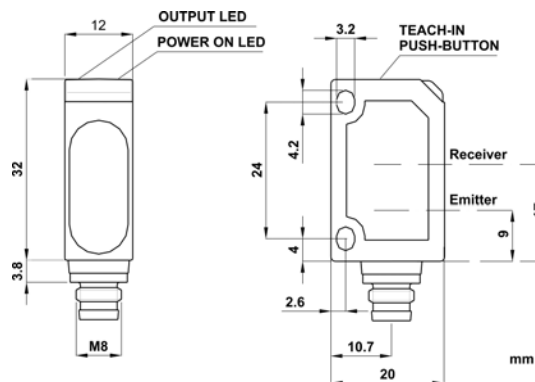
TEACH-IN PUSH-BUTTON

A long pressure on the push-button activates the self-setting procedure. The REMOTE input allows the external TEACH-IN control.

CONNECTIONS



DIMENSIONS



TECHNICAL DATA

Power supply:	10 ... 30 Vdc (reverse polarity protection)
Ripple:	10% max
Consumption (output current excluded):	35 mA max.
Outputs:	NPN or PNP (short-circuit protection)
Output current:	100 mA max.
Output saturation voltage:	2.4 V max.
Response time:	125µs max.
Switching frequency:	4 kHz
Data retention:	EEPROM non volatile memory
Indicators:	OUTPUT LED (YELLOW) / POWER ON LED (GREEN)
Setting:	TEACH-IN via push-button and wire
Operating temperature:	-20 ... +60 °C
Storage temperature:	-20 ... +80 °C
Electrical protection:	Class 2
Operating distance (min.values)*:	40...150 mm
Emission type:	RED LASER: Class 2 EN 60825-1 Class II CDRH 21 CFR PART 1040.10 average power ≤ 1mW; Pulse = 3 µs; λ = 630...680nm; Frequency =5kHz
Ambient light rejection:	According to EN 60947-5-2
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)
DARK/LIGHT selection:	automatic with fine detection setting mode
Housing material:	ABS UL 94V-O
Lens material:	Methacrylic PMMA
Mechanical protection:	IP67
Connections:	M8 4-pole connector
Weight:	10 g. max. connector vers.

*Minimum operating distance referred on the suggested reflector, select the reflector with higher surface area to improve the application tolerance.

Technical data for laser protection class 2 according to EN 60825-1-3/97:

Radiation divergence:	θ < 1.5°
Average optic power:	< 1mW
Wavelength:	λ = 650 nm
Pulse width:	t = 2.2 µs
Pulse repetition frequency:	f = 20 kHz

SETTING

EASYTOUCH™

The sensor uses the patent-covered EASY TOUCH™ technology that allows a rapid and safe self-setting of the product.

Two different setting possibilities are available:

- **EASYTOUCH™ (default programming):**
a long pressure of the SET push-button allows self-setting.
- **FINE DETECTION:**
recommended for difficult applications, as for example the detection of shiny objects.

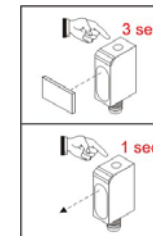
Place the target opposite the sensor at the maximum distance required;

EASYTOUCH™ (standard detection)

- Press the TEACH-IN push-button until the OUTPUT LED turns OFF and then release the push-button.

FINE DETECTION

- Press the TEACH-IN push-button and await the blinking of the OUTPUT LED, without moving the object. Release the push-button.
- Remove the object.
- Press the TEACH-IN push-button and wait until the blinking OUTPUT LED switch OFF, without moving the object. Release the push-button.



The sensor selects the best operating conditions according to the acquired points and adjusts itself in the LIGHT mode condition. The acquisition sequence has to be inverted to select the opposite operating modes.

If the OUTPUT LED and the POWER ON LED blink contemporarily the detection has failed due to insufficient contrast or setting procedure error. The procedure has to be repeated from the beginning.

REMOTE FUNCTION

The connection of the REMOTE wire to + Vdc is equivalent to pressing the TEACH-IN push-button.

Leave the REMOTE wire unconnected and insulated if not used. If it is connected permanently to 0V, the TEACH-IN push-button functioning is blocked.

WARRANTY

DATASENSOR S.p.A. warrants its products to be free from defects. DATASENSOR S.p.A. will repair or replace, free of charge, any product found to be defective during the warranty period of 36 months from the manufacturing date. This warranty does not cover damage or liability deriving from the improper application of DATASENSOR products.

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DATASENSOR

S40-PH-x-M03



INSTRUCTION MANUAL

CONTROLS

OUTPUT LED

In the normal operating mode indicates the output status (the yellow LED ON indicates the output activation). In the setting phase indicates the setting steps. Please refer to the "SETTING" paragraph for procedure indications during detection or setting phases.

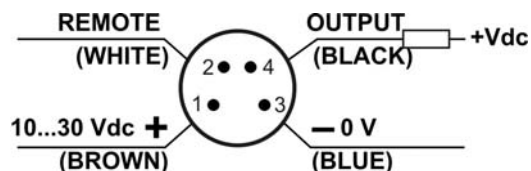
POWER ON LED

The green LED signal indicates the sensor functioning. The LED blinks with the yellow LED if the detection is lacking.

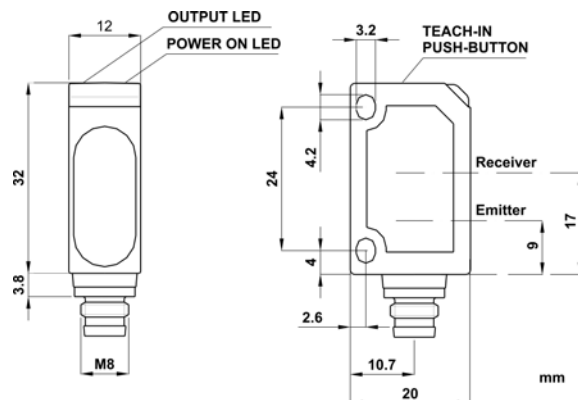
TEACH-IN PUSH-BUTTON

A long pressure on the push-button activates the self-setting procedure. The REMOTE input allows the external TEACH-IN control.

CONNECTIONS



DIMENSIONS



TECHNICAL DATA

Power supply:	10 ... 30 Vdc (reverse polarity protection)
Ripple:	10% max
Consumption (output current excluded):	35 mA max.
Outputs:	NPN or PNP (short-circuit protection)
Output current:	100 mA max.
Output saturation voltage:	2.4 V max.
Response time:	0.5 ms max.
Switching frequency:	1 kHz
Data retention:	EEPROM non volatile memory
Indicators:	OUTPUT LED (YELLOW) POWER ON LED (GREEN)
Setting:	TEACH-IN via push-button and wire
Operating temperature:	-20 ... +60 °C
Storage temperature:	-20 ... +80 °C
Electrical protection:	Class 2
Operating distance (min.values)*:	20...60 mm
Emission type:	RED LASER: Class 2 EN 60825-1 Class II CDRH 21 CFR PART 1040.10 average power ≤ 1mW; Pulse = 3 μs; λ = 630...680nm; Frequency =5kHz
Ambient light rejection:	According to EN 60947-5-2
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)
DARK/LIGHT selection:	automatic with fine detection setting mode
Housing material:	ABS UL 94V-O
Lens material:	Methacrylic PMMA
Mechanical protection:	IP67
Connections:	M8 4-pole connector
Weight:	10 g. max. connector vers.

*Minimum operating distance referred on the suggested reflector, select the reflector with higher surface area to improve the application tolerance.

Technical data for laser protection class 2 according to EN 60825-1-3/97:

Radiation divergence:	θ < 3.5°
Average optic power:	< 1mW
Wavelength:	λ = 655 nm
Pulse width:	t = 3 μs
Pulse repetition frequency:	f = 5 kHz

SETTING

EASYTOUCH™

The sensor uses the patent-covered EASY TOUCH™ technology that allows a rapid and safe self-setting of the product.

Two different setting possibilities are available:

- **EASYTOUCH™ (default programming):**
a long pressure of the SET push-button allows self-setting.
- **FINE DETECTION:**
recommended for difficult applications, as for example the detection of shiny objects.

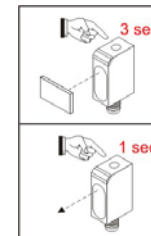
Place the target opposite the sensor at the maximum distance required;

EASYTOUCH™ (standard detection)

- Press the TEACH-IN push-button until the OUTPUT LED turns OFF and then release the push-button.

FINE DETECTION

- Press the TEACH-IN push-button and await the blinking of the OUTPUT LED, without moving the object. Release the push-button.
- Remove or further the object.
- Press the TEACH-IN push-button and wait until the blinking OUTPUT LED switch OFF, without moving the object. Release the push-button.



The sensor selects the best operating conditions according to the acquired points and adjusts itself in the LIGHT mode condition. The acquisition sequence has to be inverted to select the opposite operating modes.

If the OUTPUT LED and the POWER ON LED blink contemporarily the detection has failed due to insufficient contrast or setting procedure error. The procedure has to be repeated from the beginning.

REMOTE FUNCTION

The connection of the REMOTE wire to +Vdc is equivalent to pressing the TEACH-IN push-button. Leave the REMOTE wire unconnected and insulated if not used. If it is connected permanently to 0V, the TEACH-IN push-button functioning is blocked.

WARRANTY

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DATASENSOR

S40-PR SERIES

INSTRUCTION MANUAL

CONTROLS

LED DI USCITA

The yellow LED the output status. (LED ON indicates the the output activation).

READY/ERROR LED

The green LED ON during functioning indicates that the received signal has a safety margin respect to the output switching value. Please refer to the "SETTING" paragraph for procedure indications during automatic setting.

POWER ON LED (S40-PR-x-G00)

The green LED signal indicates the sensor functioning.

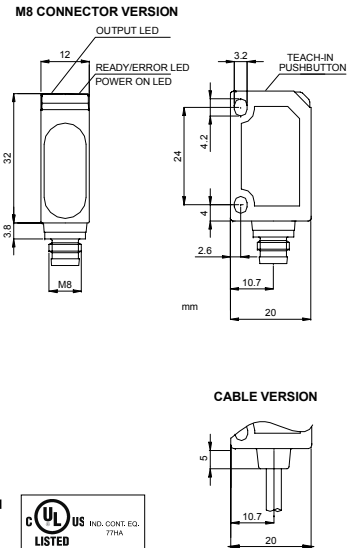
TEACH-IN PUSHBUTTON

A long pressure on the pushbutton activates the self-setting procedure. The REMOTE input allows the external TEACH-IN control.

REMOTE FUNCTION

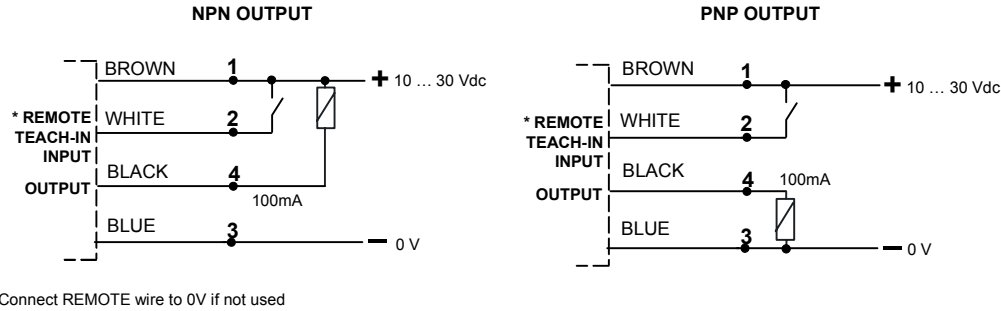
The REMOTE wire connected to +Vdc is equal to pressing the TEACH-IN pushbutton.

DIMENSIONS

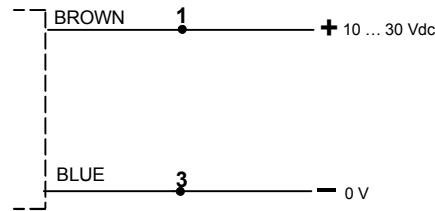


CONNECTIONS

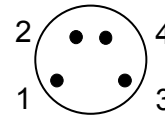
S40-PR-x-A03/B03/T03/C03/F03/M03



S40-PR-x-G00



M8 CONNECTOR



TECHNICAL DATA

FUNCTION	Retroreflex S40-PR-x-A03	Polarized retroreflex S40-PR-x-B03	Retroreflex for transparent S40-PR-x-T03	Diffuse proximity S40-PR-x-C03	Through beam S40-PR-x-FG3	Background suppression S40-PR-x-M03
Power supply:	10 ... 30 Vdc (reverse polarity protection)					
Ripple:	10% max					
Consumption (output current excluded):	35 mA max.					
Outputs:	NPN or PNP, 22 KΩ pull down/up resistance (short-circuit protection)					
Output current:	100 mA max.					
Output saturation voltage:	2.4 V max.					
Response time:	0.5 ms max.					
Switching frequency:	1 kHz					
Data retention:	EEPROM non volatile memory					
Indicators:	OUTPUT LED (YELLOW) READY/ERROR LED (GREEN) POWER ON LED (GREEN) S40-x-G mod.					
Setting:	TEACH-IN via pushbutton and wire					
Operating temperature:	-20 ... +60 °C					
Storage temperature:	-20 ... +80 °C					
Electrical protection:	Class 2					
Operating distance (minimum values):	refer to TAB.1	0.1 ... 0.7 m	0.5 ... 30 cm	0.1 ... 6 m	20...100 mm	
Emission type:	RED (660nm)				RED (640nm)	
Ambient light rejection:	According to EN 60947-5-2					
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)					
DARK/LIGHT selection:	automatic with fine detection					
Housing material:	ABS UL 94V-O					
Lens material:	Methacrylic PMMA					
Mechanical protection:	IP67					
Connections:	2 m Ø 3.5 mm cable / M8 4-pole connector					
Weight:	40 g. max. max. cable vers. / 10 g. max. connector vers.					

SETTING

EASY TOUCH™

The sensor uses the patent-covered EASY TOUCH™ technology that allows a rapid and safe self-setting of the product.

Two different setting possibilities are available:

- **EASY TOUCH™**; press for 2 sec. of the TEACH-IN pushbutton allows self-setting.
- **FINE DETECTION**; to be used only in particularly critical conditions. This setting procedure is used only when the EASY TOUCH™ is not sufficient.

EASY TOUCH™ (standard detection)

A03/B03/T03 mod.: place sensor and reflector on opposite sides;
C03 mod.: place object to detect inside the operating distance;

M03 mod.: place the background or the object to be suppressed inside the operating range;
FG3 mod.: place the sensors on opposite sides.

Press the TEACH-IN pushbutton until the READY/ERROR LED turns OFF, release the pushbutton; the sensor is now ready to detect all objects in the operating field. The DARK mode is automatically selected for the A03/B03/T03/F03 mod., the LIGHT mode for the C03/M03 mod.

FINE DETECTION

A03/B03/T03 mod.: insert object to detect between sensor and reflector;

C03/M03 mod.: place object to detect in front of the sensor at the desired distance;

FG3 mod.: place the sensors on opposite sides, insert object to detect between sensors.

Press the TEACH-IN pushbutton and wait for the blinking of the green LED, without moving the object. Release the pushbutton.

B03 mod.: remove the object to detect;

C03 mod.: move away or remove the object to detect;

M03 mod.: place the background to be suppressed;

FG3 mod.: remove object to detect

Press the TEACH-IN pushbutton until the READY/ERROR LED turns OFF, release the pushbutton.

The sensor selects the best operating conditions according to the acquired points and adjusts itself in the DARK mode condition for the A03/B03/T03/F03 mod., or in the LIGHT mode for the C03/M03 mod.

The given acquisition sequence has to be inverted to select the opposite operating modes. If the OUTPUT LED and the READY/ERROR LED blink contemporarily the detection has failed due to insufficient contrast and the procedure has to be repeated from the beginning.

TAB.1: Max. operating distances for S40-PR-x-A03/B03 (meters)

	REFLECTOR					
	R1	R2	R3	R4	R5	R6
-A03	1.8	3.0	2.4	3.6	3.1	4.2
-B03	1.5	2.6	2.0	3.2	2.7	3.5

WARRANTY

DATASENSOR S.p.A. warrants its products to be free from defects. DATASENSOR S.p.A. will repair or replace, free of charge, any product found to be defective during the warranty period of 36 months from the manufacturing date.

This warranty does not cover damage or liability deriving from the improper application of DATASENSOR products.

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