S300 PA

ADVANCED MAXI PHOTOELECTRIC MULTIVOLTAGE SENSORS

- Industrial plastic housing with IP67 mechanical protection
- Timing function from 0.6-16 s ON delay, OFF delay and ONE SHOT
- Terminal block for both Vdc and Vac/ Vdc free voltage
- Distance trimmer for mechanical background suppression models

APPLICATIONS

- Packaging end of line, palletizers
- Outdoor or indoor gates control
- Manufacturing plants

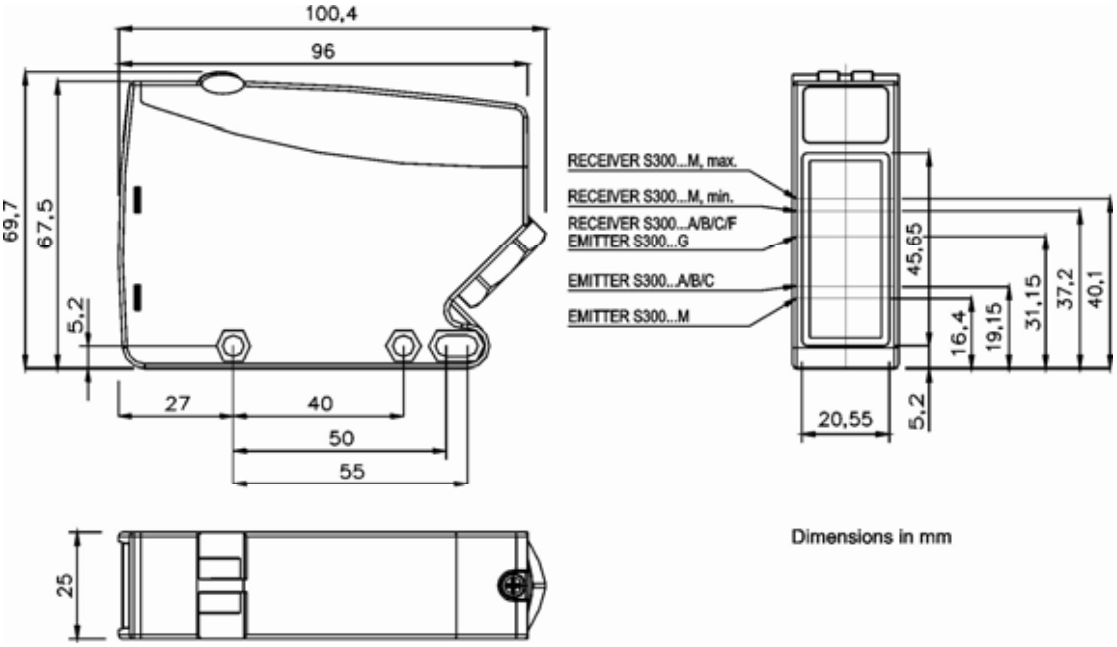
(*)DC models:
ATEX II 3DG

S300 PA		
Through beam		0...50 m
Retroreflective (on R2 reflector)		0,1...15 m
Polarized retroreflective		0,1...10 m
Diffuse proximity		0,05...2 m
Background suppression		0,2...2 m
Power supply	Vdc	12...30 V
	Vac	
	Vac/dc	24...240 Vac/24...60 Vdc
Output	PNP	
	NPN	
	NPN/PNP	•
	relay	•
	other	
Connection	cable	
	connector	•
	pig-tail	
Approximate dimensions (mm)		25x100x70
Housing material		PBT
Mechanical protection		IP67

TECHNICAL DATA

Power supply	12 ... 30 Vdc (mod. S300...2) 24...240 Vac/24...60 Vdc (mod. S300...1)
Ripple	10% max.
Consumption (output current excluded)	35 mA max. (mod. S300...2) 3 VA max. (mod. S300...1)
Light emission	red LED 660 nm (mod. S300...B) IR LED 940 nm (mod. S300...C) IR LED 880 nm (mod. S300...A/G/M)
Setting	sensitivity trimmer (mod. S300...A/B/C/F), DARK/LIGHT dip-switch (mod. S300...A/B/C/F/M) 7-turns distance adjustment trimmer (mod. S300...M) dip-switch mode ON delay/OFF delay/ON-OFF delay/single pulse (ONE-SHOT) (mod. S300...x06) timing trimmer (mod. S300...x06)
Indicators	yellow OUTPUT LED (excl. mod. S300...G) green STABILITY LED, POWER LED (mod. S300...G)
Output	PNP or NPN open collector (mod. S300...2); electromechanical SPDT 250 Vac/30 Vdc (mod. S300...1)
Output current	100 mA (mod. S300...2) 3 A max. (mod. S300...1)
Saturation voltage	2,4 V max.
Response time	1 ms (mod. S300..2-A/B/C/M) 2 ms (mod. S300...2-F/G) 25 ms (mod. S300...1)
Switching frequency	500 Hz (mod. S300..2-A/B/C/M) 250 Hz (mod. S300...2-F/G) 20 Hz max. (mod. S300...1)
Connection	terminal block
Dielectric strength	500 Vac, 1 min between electronics and housing
Insulating resistance	>20 MΩ, 500 Vdc between electronics and housing
Electrical protection	class 2 (mod. S300...2)
Mechanical protection	IP67 (IEC/EN60529)
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)
Housing material	PBT 30% glass fiber-reinforced
Lens material	frontal window and lens in PC
Operating temperature	-25 ... 55 °C
Storage temperature	-25 ... 70 °C
Weight	120 g (mod. S300...2), 130 g (mod. S300...1)

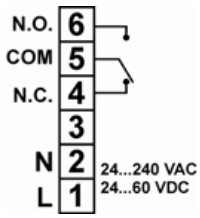
DIMENSIONS

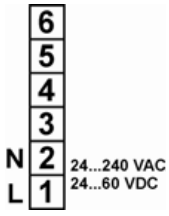


CONNECTIONS

VAC MODELS

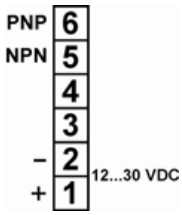
Through beam emitter

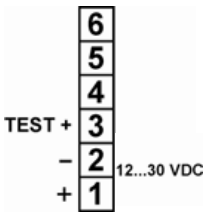




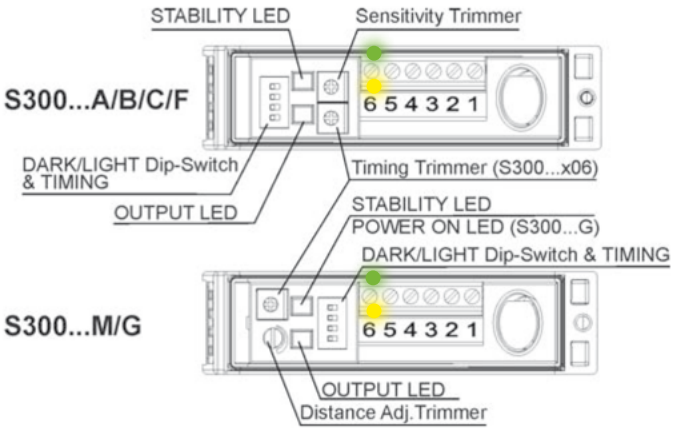
VDC MODELS

Through beam emitter





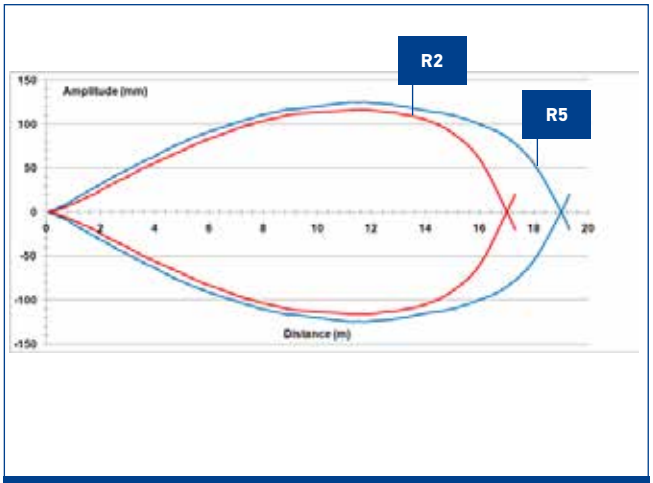
INDICATORS AND SETTINGS



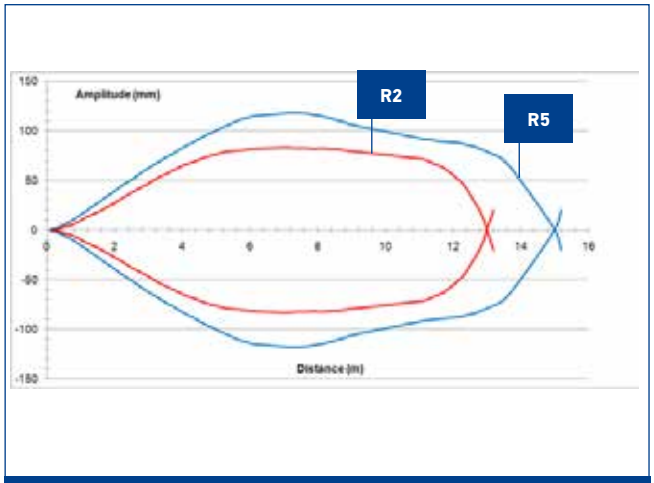
Settings

The **M** model presents a **multiturn adjustment screw** for the adjustment of the background suppression distance using a mechanical variation of the optic triangulation angle. The **other models have a mono-turn electronic trimmer** that adjusts the sensitivity and the sensor operating distance. The operating distance can be increased by rotating the screws clockwise.
Trimmers can be used to adjust the output activation and deactivation delay time whilst functioning mode selection is performed through DIP SWITCHES.

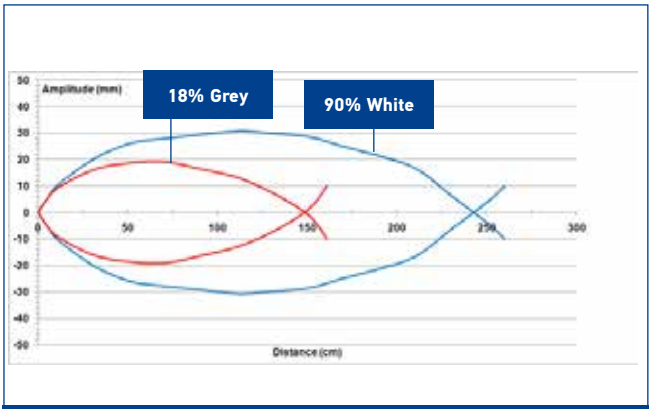
DETECTION DIAGRAMS



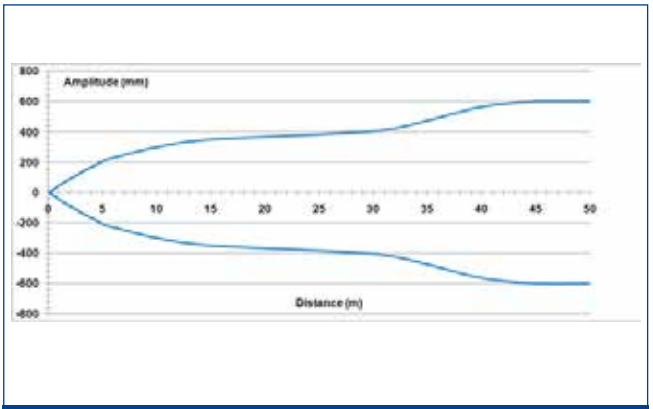
Retroreflective on R2 and R5 reflectors



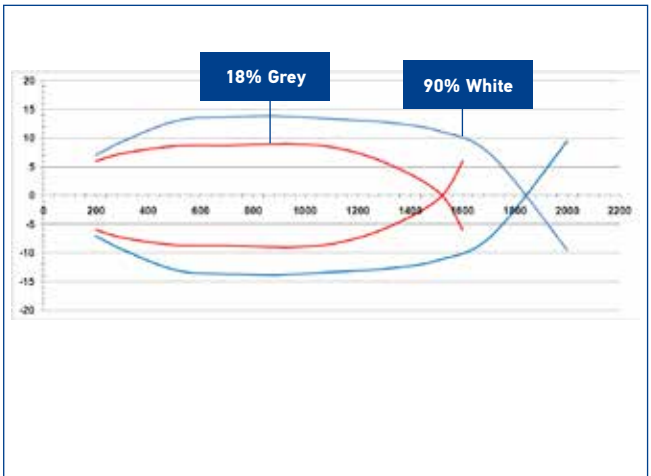
Polarized retroreflective on R2 and R5 reflectors



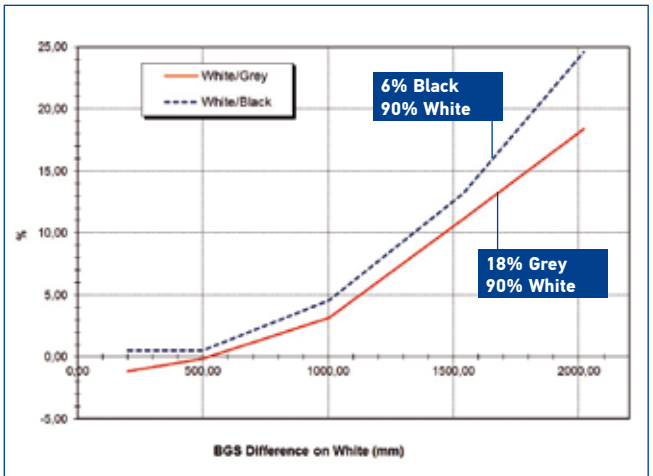
Diffused proximity



Through beam



Background suppression



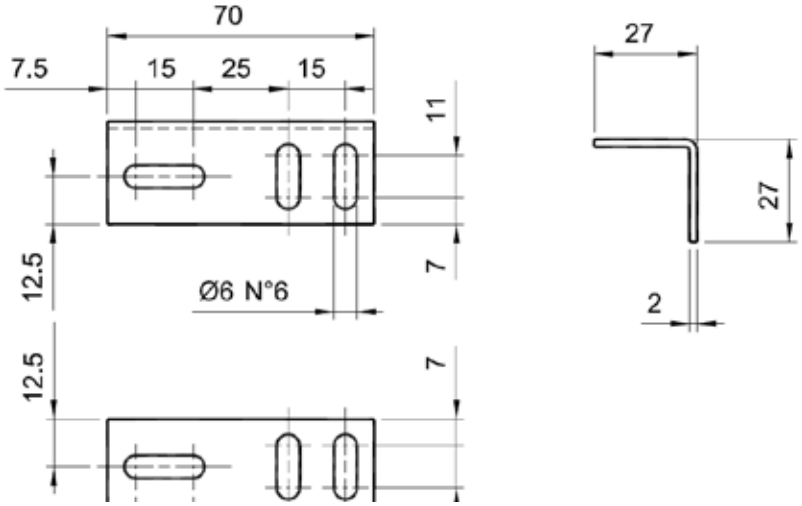
BGS - White/Grey and White/Black Difference

MODEL SELECTION AND ORDER INFORMATION

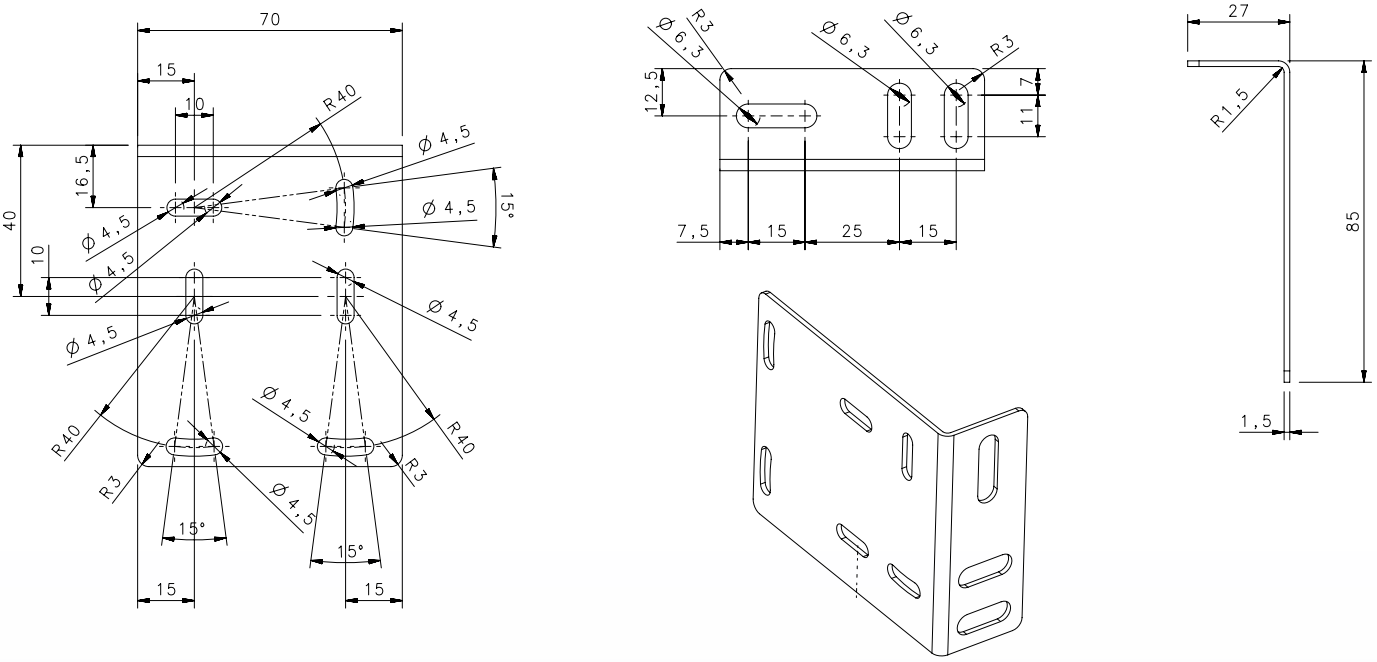
OPTIC FUNCTION	POWER SUPPLY	OUTPUT	SETTING	MODEL	ORDER No.
Retroreflective (IR LED 880 nm)	12...30 Vdc	NPN/ PNP	Sensitivity trimmer and D/L dip-switch	S300-PA-2-A01-OC	951451500
			Timing and sensitivity trimmers, D/L dip-switch	S300-PA-2-A06-OC	951451510
	24...240 Vac/24...60 Vdc	Relay	Sensitivity trimmer and D/L dip-switch	S300-PA-1-A01-RX	951451480
			Timing and sensitivity trimmers, D/L dip-switch	S300-PA-1-A06-RX	951451490
Polarized retroreflective (red LED 660 nm)	12...30 Vdc	NPN/ PNP	Sensitivity trimmer and D/L dip-switch	S300-PA-2-B01-OC	951451540
			Timing and sensitivity trimmers, D/L dip-switch	S300-PA-2-B06-OC	951451550
	24...240 Vac/24...60 Vdc	Relay	Sensitivity trimmer and D/L dip-switch	S300-PA-1-B01-RX	951451520
			Timing and sensitivity trimmers, D/L dip-switch	S300-PA-1-B06-RX	951451530
Diffused proximity (IR LED 940 nm)	12...30 Vdc	NPN/ PNP	Sensitivity trimmer D/L dip-switch	S300-PA-2-C01-OC	951451420
			Timing and sensitivity trimmers, D/L dip-switch	S300-PA-2-C06-OC	951451430
	24...240 Vac/24...60 Vdc	Relay	Sensitivity trimmer and D/L dip-switch	S300-PA-1-C01-RX	951451400
			Timing and sensitivity trimmers, D/L dip-switch	S300-PA-1-C06-RX	951451410
Through beam receiver	12...30 Vdc	NPN/ PNP	Sensitivity trimmer and D/L dip-switch	S300-PA-2-F01-OC	951451600
			Timing and sensitivity trimmers, D/L dip-switch	S300-PA-2-F06-OC	951451610
	24...240 Vac/24...60 Vdc	Relay	Sensitivity trimmer and D/L dip-switch	S300-PA-1-F01-RX	951451580
			Timing and sensitivity trimmers, D/L dip-switch	S300-PA-1-F06-RX	951451590
Through beam emitter (IR LED 880 nm)	12...30 Vdc	-	-	S300-PA-2-G00-EX	951451570
	24...240 Vac/24...60 Vdc			S300-PA-1-G00-EX	951451560
Background suppression (IR LED 880 nm)	12...30 Vdc	NPN/ PNP	7-turns distance adjustment trimmer and /L dip-switch	S300-PA-2-M01-OC	951451460
			Timing and 7-turns distance adj. trimmers, D/L dip-switch	S300-PA-2-M06-OC	951451470
	24...240 Vac/24...60 Vdc	Relay	7-turns distance adjustment trimmer and D/L dip-switch	S300-PA-1-M01-RX	951451440
			Timing and 7-turns distance adj. trimmers, D/L dip-switch	S300-PA-1-M06-RX	951451450

ACCESSORIES

ST-511



ST-S300-PA



MODEL	DESCRIPTION	ORDER No.
ST-511	mounting bracket	95ACC2810
ST-S300-PA	mounting bracket	95ACC7870

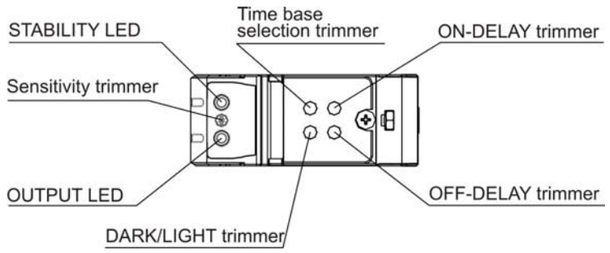
DATALOGIC

S300-PR…B
Polarised retroreflex

S300-PR…C
Diffuse proximity

INSTRUCTION MANUAL

CONTROLS



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

STABILITY LED (green)
The green LED ON indicates that the sensor has working with a enough safety margin.

SENSITIVITY TRIMMER
A mono-turn trimmer adjusts the sensitivity and the sensor operating distance.
The operating distance increases, rotating the screws in a clockwise direction.

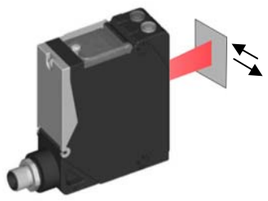
DARK/LIGHT TRIMMER
A mono-turn trimmer to select dark/light mode.

ON-DELAY AND OFF-DELAY TRIMMER *(only versions with timing functions)*
Mono-turn trimmers to setting output activation and disactivation delay time. Please refer to “TIMING FUNCTIONS” paragraph for for procedure indications.

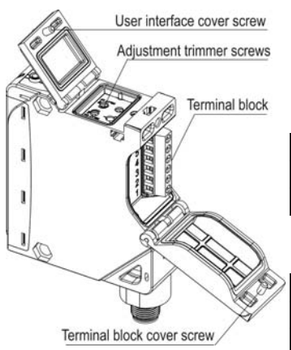
TIME BASE SELECTION AND ONE-SHOT TRIMMER (*only versions with timing functions*)
A mono-turn trimmer with three operation position: it allows to select two different delay time base (SHORT BASE and LONG BASE) or ONE SHOT. Please refer to “TIMING FUNCTIONS” paragraph for procedure indications.

***WARNING:** the maximum mechanical rotation range of the trimmer is 240°.* Do not force over of the maximum and minimum positions.

INSTALLATION



The sensor can be positioned by means of the two housing holes using two screws (M5x35 or longer, 1.2Nm maximum tightening torque).
The sensor bottom surface has been provided of two mechanical threaded insert M5x5,5. These metal insert are commercial components.
Various orientable fixing brackets to ease the sensor positioning are available (please refer to the accessories listed in the general catalogue).
The operating distance is measured from the front surface of the sensor optics.
For a correct use, the sensor must be installed orthogonal respect the direction of the object to detect like show in the figure.



Tighten all screws surely to maintain the water-proof characteristics for IP67 (IEC/EN60529).
Excessive tightening causes damage. Tighten the screws within the tightening torque range shown in the table.

TIGHTENING TORQUE (Nm)	
Terminal screws(6pc)	0.5 max
Covers screws	0.5…0.8

The cable gland assure mechanical retention compliant with EN50262.

CABLE DIAMETER	LOAD (N)
4,5..8mm	30
8..10mm	42

TECHNICAL DATA

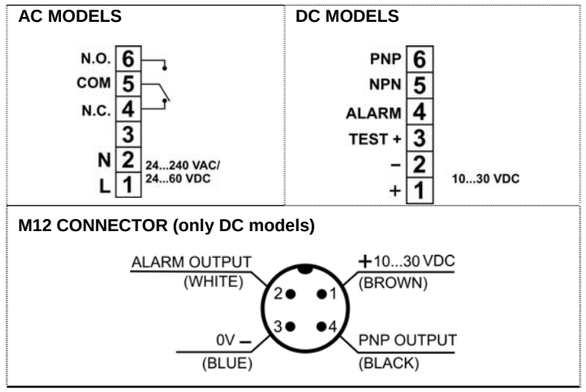
AC MODELS	S300-PR-1-B/C
Power supply:	24…240 VAC / 24…60 VDC
Ripple:	10 % max
Current consumption (output current excluded):	< 3 VA
Outputs:	Electromechanical SPDT: 250 VAC, 30 VDC
Output current:	Max 3 A (resistive load)
Response time:	20 ms
Switching frequency:	25 Hz
Weight:	150 g
AtEx 2014/34/EU:	II 3G EX nA II T6 ; II 3D EX tD A22 IP67 T85°C

DC MODELS	S300-PR-2/5-B/C
Power supply:	10…30 VDC Class 2 (UL508)
Ripple:	10 % max
Current consumption (output current excluded):	< 30 mA
Outputs:	PNP / NPN open collector R_pull-up/down = 47KΩ
Output current:	100 mA (resistive load)
Output saturation voltage:	2.4 V max
Diagnostic functions	PNP ALARM output / Test+ iput
Response time:	1 ms
Switching frequency:	500 Hz
Weight:	140 g
AtEx 2014/34/EU:	II 3G EX nA II T6 ; II 3D EX tD A22 IP67 T85°C

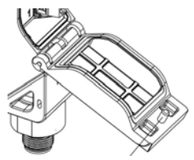
Common data

	S300 B	S300 C
Emission type:	RED LED (660nm)	INFRARED LED (880nm)
Operating distance (typical value):	20m (EG2), 22m (EG1) on R5 reflector	3,5m on 90% white target (EG2), 5M (EG1)
Indicators:	OUTPUT LED (YELLOW), STABILITY LED (GREEN)	
Adjustment:	Sensitivity trimmer / DARK/LIGHT trimmer *Versions with timing functions*: time base selection and one shot trimmer / ON DELAY trimmer / OFF DELAY trimmer	
Time base (*Versions with timing functions*):	SHORT BASE: 0…2 sec, LONG BASE: 0…10 sec	
Operating temperature:	-40…55 °C	
Storage temperature:	-40…70 °C	
Dielectric strength:	□: 1500 VAC, 1 min between electronics and housing	
Insulating resistance:	> 20 MΩ, □500 VDC between electronics and housing	
Ambient light rejection:	EN 60947-5-2	
Vibration:	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:	PBT 30% Glass fiber-reiforced	
Lenses:	frontal window and lens in PC	
Protection class:	IP67 (IEC / EN60529) / cable gland EN50262	
UL requirements:	60-70°C copper conductor 24-20 AWG; TYPE 1 ENCLOSURE	
Connections:	see the “CONNECTIONS” paragraph	

CONNECTIONS



Terminal block versions (S300-PR-1/2)
Use a cable of 4,5 to 10 mm in diameter to ensure water- and dust-proof characteristics. The trasversal section of the cable must be between 16 and 26AWG. The length of conductor peel must be 6mm and the cable peel must be 100mm.



To favour the cable connection it is possible remove (and then replace) the terminal block cover when it is in the maximum opening position (like showned in the figure).
Turn off the power supply before wiring. Connect correctly to prevent damage. At the end of the connections, screw the cable gland decisively to lock the cable.
Close the terminal block cover with the screw.

M12 connector versions (S300-PR-5)
The connector wires are just connected like show in the previous figure. It is possible change the wiring and use other functionality (NPN output, TEST+ input).

SETTING

Sensitivity setting (S300..B)
Position the sensor and reflector on opposite sides. Turn the sensitivity trimmer to maximum. Find the points where the yellow LED (OUT) is switched ON and OFF in both vertical and horizontal positions, and fix the sensor in the centre between these points. Optimum operation is obtained when both LEDs switch ON. If necessary, reduce sensitivity using the trimmer, in order to detect very small targets. In order to improve alignment, repeat the procedure detailed above whilst progressively reducing the sensitivity.

Sensitivity setting (S300..C)
Position the sensor and turn the sensitivity trimmer at minimum: the yellow LED is OFF (litgh mode). Place the target opposite the sensor. Turn the sensitivity trimmer clockwise until the yellow LED turns ON (Target detected state, pos.A). Remove the target, the yellow LED turns OFF. Turn the trimmer clockwise until the yellow LED turns ON (Background detected state, pos.B). The trimmer reaches maximum if the background is not detected. Turn the trimmer in intermediate position C, between the two positions A and B. The green LED must be ON.

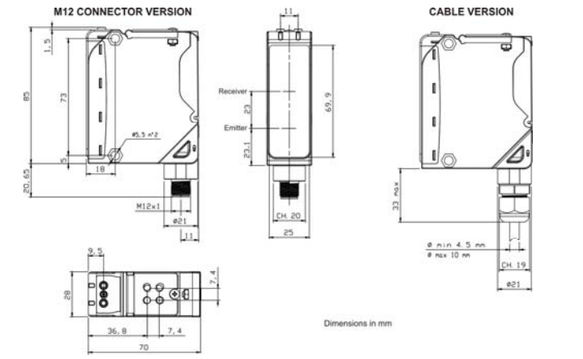
DIAGNOSTIC FUNCTIONS

S300 has the following diagnostic functions to verify the correct operation on application.

TEST+ input (only S300-PR-2/5)
The TEST+ input can be used to inhibit the emitter and verify that the system is correctly operating. The TEST function is activated if the TEST+ input is connected to a voltage between 10…30V, whereas if the TEST+ input is connected to GND or it is not connected the function is disactivated.
Activating the TEST while an object (C)/reflector (B) is in front of the sensor (output ON in light mode), the output switches from ON to OFF, testing the total operation. Activating the TEST whithout an object (C) in front of the sensor (output OFF in light mode), the outpt switches from OFF to ON, testing only the output operation.

ALARM output (only S300-PR-2/5)
The alarm output switches ON whenever the received signals remains without a safety margin (greater than 30% compared to the output switching level).
In C model the ALARM output is activated when the sensor detects an object in instability conditions (stability LED OFF, OUT LED ON) for 10 times consecutively. If the commutations number is lower, the count down is reset and restart only in instability condition. The ALARM output remain ON until there is a commutation in stability condition.
In B model the ALARM output is activated when the received signal remains without a safety margin for more than 3 seconds.

DIMENSIONS



TIMING FUNCTIONS

Vers.with timing functions

Vers.without timing functions

The TIME BASE SELECTION trimmer allows to select the time base or the ONE SHOT function.

Short Base 0..2sec
0..10sec
0..2s One shot 0..2sec

Long base 0..10sec
0..10sec
0..2s One shot 0..2sec

One shot 0..2sec
0..10sec
0..2s One shot 0..2sec

Selecting the short base the time setting of ON delay and OFF delay trimmer is in the range 0..2sec, selecting long base is in the range 0..10sec.
To allow a better setting of little delay, the variation of ON and OFF delay are not linear with mechanical regulation of the trimmer: until half rotation the regulation is thiner, whereas from half to full scale the regulation is faster.
The follow figure indicates the values of initial, middle and full scale delay of ON and OFF delay trimmer in the two different selectable time base:

ON / OFF DELAY (short base)
0.5sec
0sec 2sec

ON / OFF DELAY (long base)
2sec
0sec 10sec

The TIME BASE SELECTION trimmer has a third position to select ONE SHOT mode. The ONE SHOT duration is selectable by ON DELAY trimmer with short time base (0…2 sec). In this mode the OFF delay trimmer is disabled.

TIMING DIAGRAM (S300-x-xxxT)

OPERATION MODE	*OUTPUT*
Normal (timing disable)	
ONE SHOT *(only with short time base 0…2 sec.)*	Ton, Ton, Ton
ON/OFF delay	Ton, Toff, Ton
ON delay	Ton, Ton
OFF delay	Toff, Toff

The sensors are NOT safety devices, and so MUST NOT be used in the safety control of the machines where installed.

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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.

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