

S300 PR



HEAVY DUTY SENSOR FOR OUTDOOR APPLICATIONS AND HARSH ENVIRONMENTS

- Industrial plastic housing with IP67 mechanical protection
- Defogging system function
- Double independent timing functions with double time scale from 0-2s or 0-10s, One-Delay, Off Delay, ONE SHOT

APPLICATIONS

- Packaging end of line, palletizers
- Outdoor or indoor gates control
- Automotive plants
- Automated warehousing



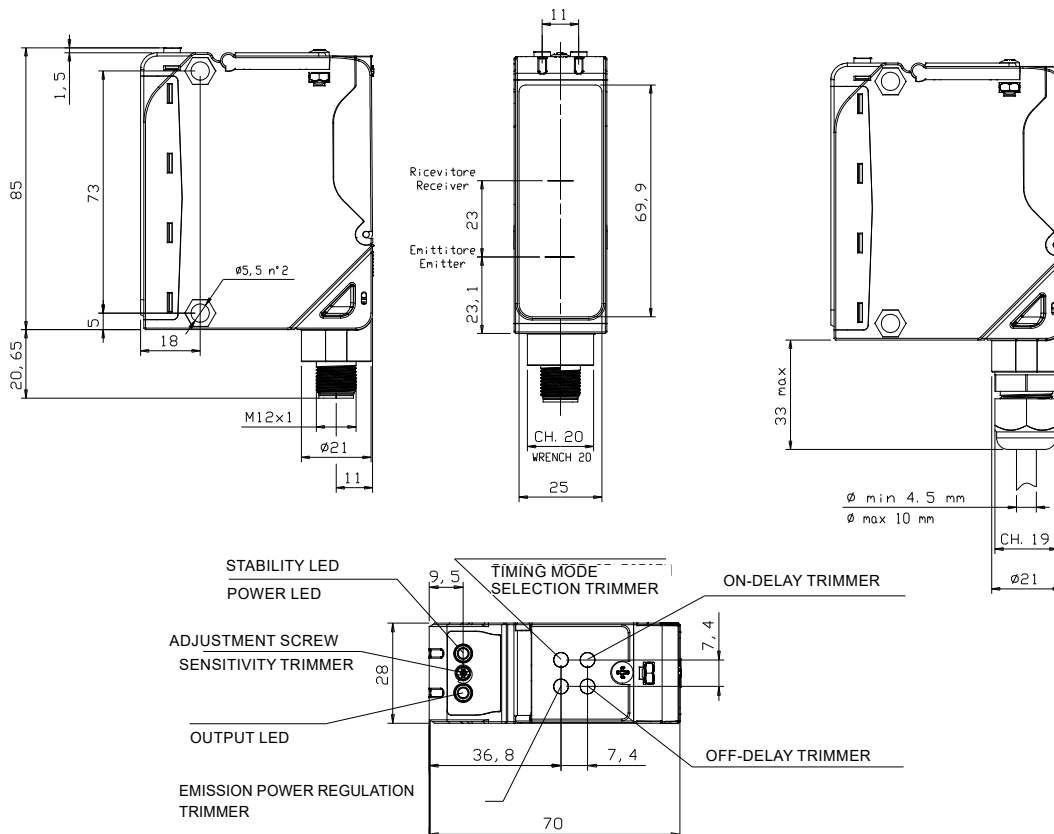
(*)DC models: ATEX II 3DG

S300 PA		
Through beam	0...60 m	
Polarized retroreflective	0,1...22 m	
Diffuse proximity	0,05...5 m	
Background suppression	0,4...2,5 m	
Power supply	Vdc	10...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	

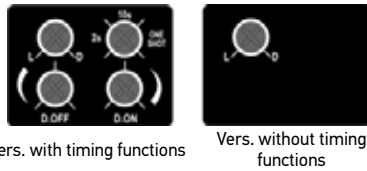
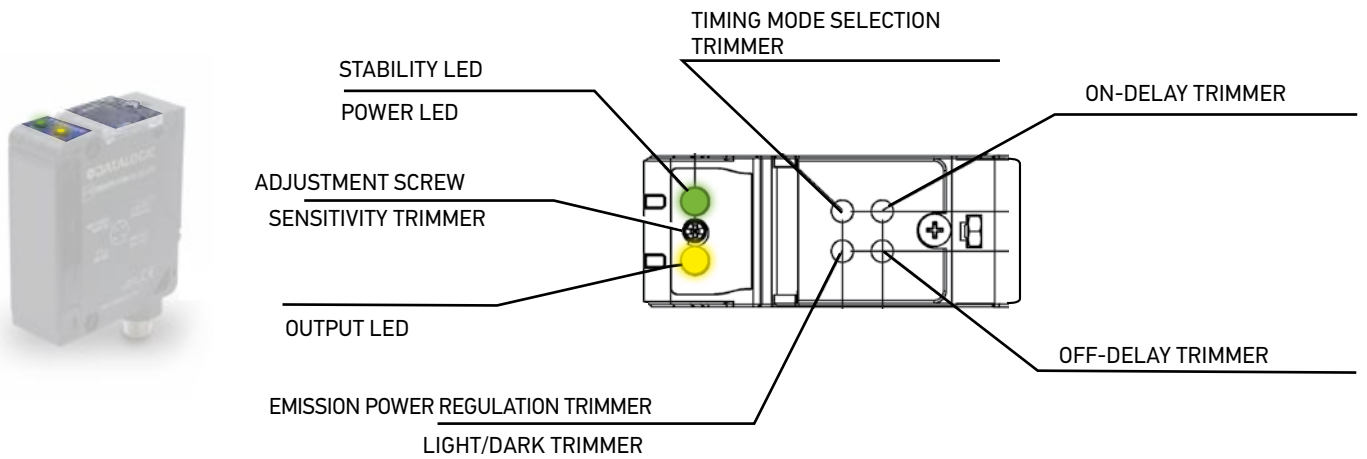
TECHNICAL DATA

Power supply	10 ... 30 Vdc (mod. S300...2/5) 24...240 Vac/24...60 Vdc (mod. S300...1)
Ripple	10% max.
Consumption (output current excluded)	30 mA max. (mod. S300...2/5-B/C) 35 mA max. (mod. S300...2/5-M) 25 mA max. (mod. S300...2/5-F) 20 mA max. (mod. S300...2/5-G) 3 VA max. (mod. S300...1) red LED 660 nm (mod. S300...B) IR LED 880 nm (mod. S300...C/G/M)
Light emission	sensitivity trimmer, DARK/LIGHT trimmer (mod. S300...F/C/B) 15 turns adjustment screw/DARK/LIGHT trimmer (mod. S300...M) emission power regulation trimmer (mod. S300...G)
Setting	versions with timing functions: time base selection and one shot trimmer/ON DELAY trimmer/OFF DELAY 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...2/5); Electromechanical SPDT 250 Vac/30 Vdc (mod. S300...1)
Output current	100 mA (mod. S300...2/5) 3 A max. (mod. S300...1)
Saturation voltage	2,4 V max.
Response time	1 ms (mod. S300...2/5-B/C/F/G) 2 ms (mod. S300...2/5-M) 20 ms (mod. S300...1)
Switching frequency	500 Hz (mod. S300...2/5-/B/C/F/G) 250 Hz (mod. S300...2/5-M) 25 Hz (mod. S300...1)
Connection	terminal block, M12 4-pole connector (only DC mod.)
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...2/5)
Mechanical protection	IP67 (IEC/EN60529)/cable gland EN50262
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	-40 ... 55 °C
Storage temperature	-40 ... 70 °C
Weight	140 g (mod. S300...2/5), 150 g (mod. S300...1)

DIMENSIONS



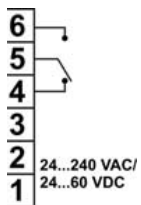
INDICATORS AND SETTINGS



CONNECTIONS

TERMINAL BLOCK

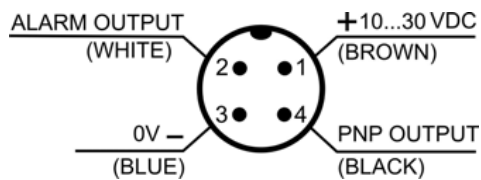
VAC/VDC MODELS



VDC MODELS



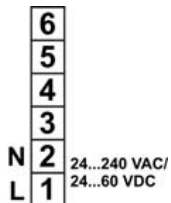
M12 CONNECTOR (only DC models)



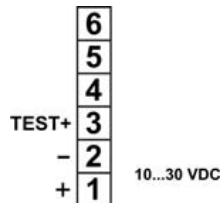
Through beam emitter

TERMINAL BLOCK

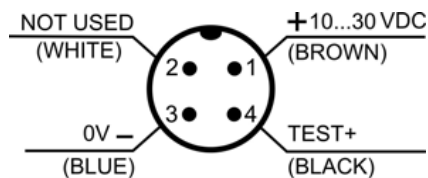
AC MODELS



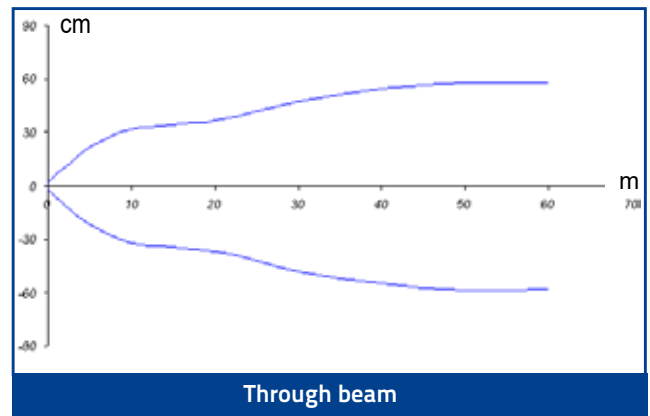
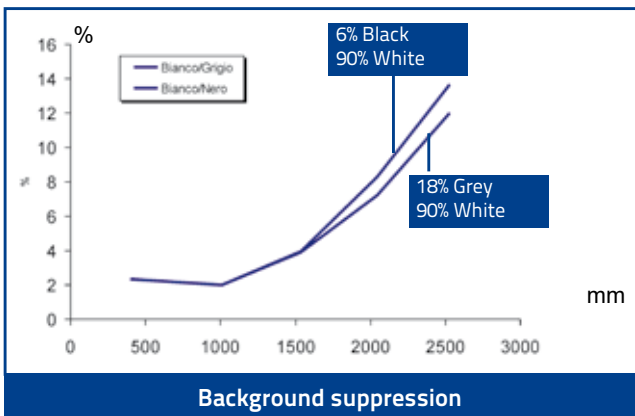
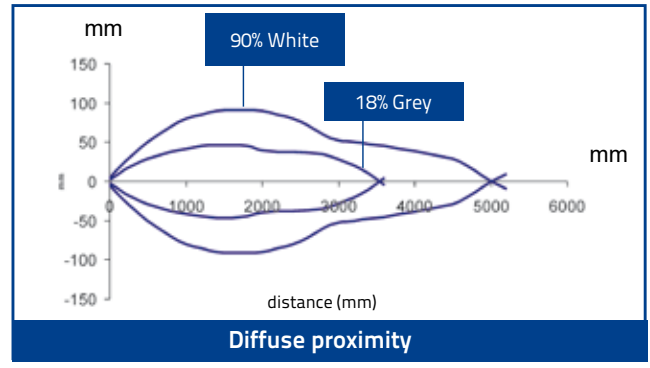
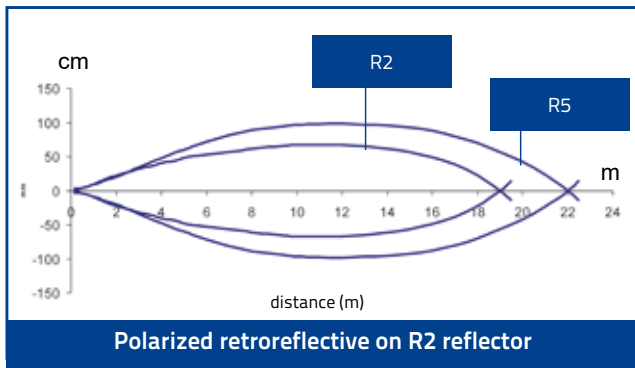
DC MODELS



M12 CONNECTOR (only DC models)



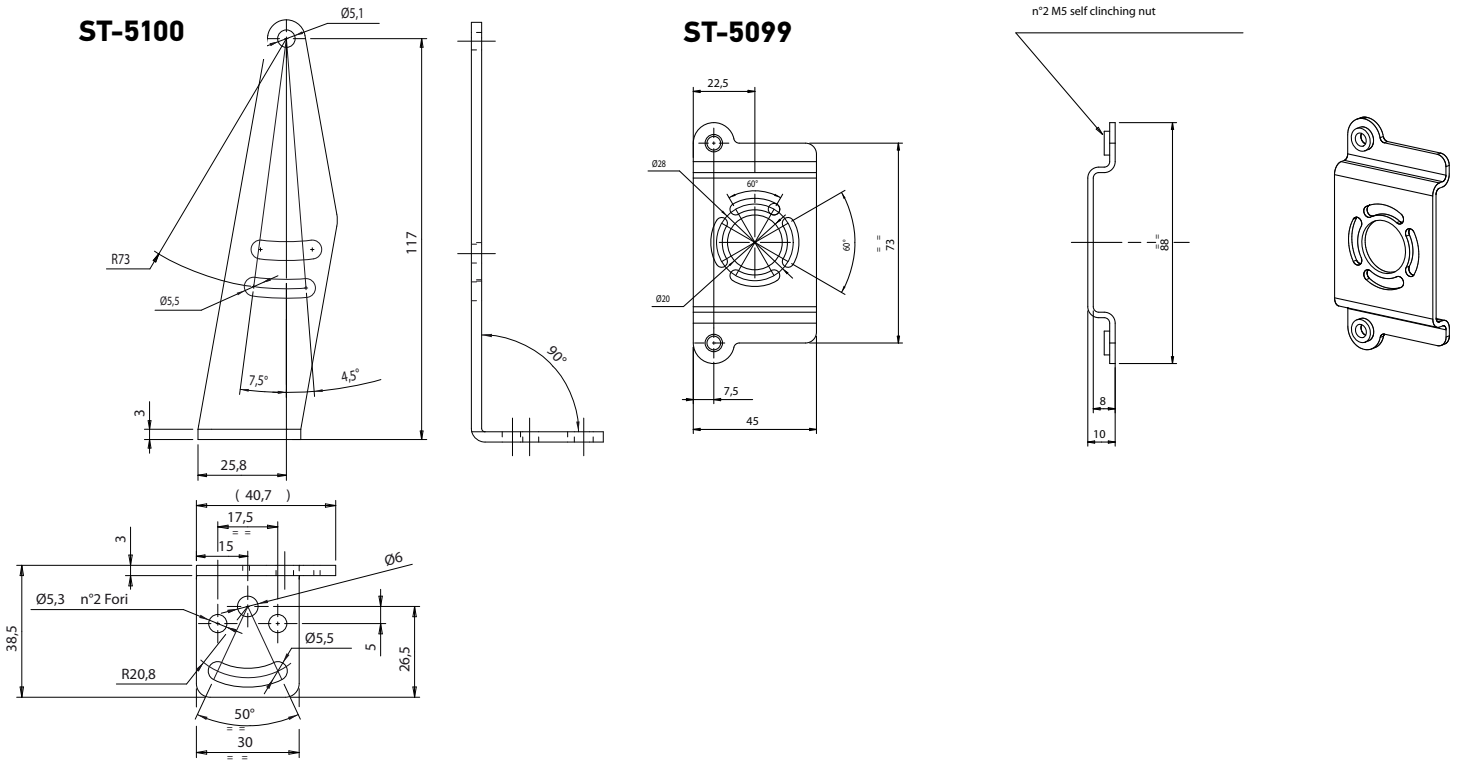
DETECTION DIAGRAMS



MODEL SELECTION AND ORDER INFORMATION

OPTIC FUNCTION	OUTPUT	CONNECTION	SETTING	MODEL	ORDER NO.	
Polarized retroreflective	NPN/PNP	Vdc - Terminal block	Sensitivity and D/L trimmers	S300-PR-2-B01-OC	951451000	
			Timing, sensitivity and D/L trimmers	S300-PR-2-B06-OC	951451010	
		Vdc - M12 Connector	Sensitivity and D/L trimmers	S300-PR-5-B01-OC	951451020	
			Timing, sensitivity and D/L trimmers	S300-PR-5-B06-OC	951451030	
	Relay	Vac - Terminal block	Sensitivity and D/L trimmers	S300-PR-1-B01-RX	951451040	
			Timing, sensitivity and D/L trimmers	S300-PR-1-B06-RX	951451050	
Diffused proximity	NPN/PNP	Vdc - Terminal block	Timing, sensitivity and D/L trimmers; defogging function	S300-PR-1-B06-RX-M	951451060	
			Sensitivity and D/L trimmers	S300-PR-2-C01-OC	951451070	
		Vdc - M12 Connector	Timing, sensitivity and D/L trimmers	S300-PR-2-C06-OC	951451080	
			Sensitivity and D/L trimmers	S300-PR-5-C01-OC	951451090	
		Relay	Vac - Terminal block	Timing, sensitivity and D/L trimmers	S300-PR-5-C06-OC	951451100
				Sensitivity and D/L trimmers	S300-PR-1-C01-RX	951451110
	Relay	Vac - Terminal block	Timing, sensitivity and D/L trimmers	S300-PR-1-C06-RX	951451120	
			Timing, sensitivity and D/L trimmers; defogging function	S300-PR-1-C06-RX-M	951451130	
			Sensitivity and D/L trimmers	S300-PR-2-F01-OC	951451210	
Through beam receiver	NPN/PNP	Vdc - Terminal block	Timing, sensitivity and D/L trimmers	S300-PR-2-F06-OC	951451220	
			Sensitivity and D/L trimmers	S300-PR-5-F01-OC	951451230	
		Vdc - M12 Connector	Timing, sensitivity and D/L trimmers	S300-PR-5-F06-OC	951451240	
			Sensitivity and D/L trimmers	S300-PR-1-F01-RX	951451250	
	Relay	Vac - Terminal block	Timing, sensitivity and D/L trimmers	S300-PR-1-F06-RX	951451260	
			Timing, sensitivity and D/L trimmers; defogging function	S300-PR-1-F06-RX-M	951451270	
Through beam emitter	-	Vdc - Terminal block	Emission power regulation trimmer	S300-PR-2-G00-EX	951451280	
		Vdc - M12 Connector		S300-PR-5-G00-EX	951451290	
		Vac - Terminal block	S300-PR-1-G00-EX	951451300		
			Defogging function	S300-PR-1-G00-EX-M	951451310	
Background suppression	NPN/PNP	Vdc - Terminal block	Sensitivity and D/L trimmers	S300-PR-2-M01-OC	951451140	
			Timing, sensitivity and D/L trimmers	S300-PR-2-M06-OC	951451150	
		Vdc - M12 Connector	Sensitivity and D/L trimmers	S300-PR-5-M01-OC	951451160	
			Timing, sensitivity and D/L trimmers	S300-PR-5-M06-OC	951451170	
	Relay	Vac - Terminal block	Sensitivity and D/L trimmers	S300-PR-1-M01-RX	951451180	
			Timing, sensitivity and D/L trimmers	S300-PR-1-M06-RX	951451190	
			Timing, sensitivity and D/L trimmers; defogging function	S300-PR-1-M06-RX-M	951451200	

ACCESSORIES



MODEL	DESCRIPTION	ORDER No.
ST-5099	mounting BRACKET	95ACC2830
ST-5100	mounting BRACKET	95ACC2840

CABLES

TYPE	DESCRIPTION	LENGTH	MODEL	ORDER No.
Axial M12 Connector	4-pole, grey, P.V.C.	3 m	CS-A1-02-G-03	95A251380
		5 m	CS-A1-02-G-05	95A251270
		7 m	CS-A1-02-G-07	95A251280
		10 m	CS-A1-02-G-10	95A251390
	4-pole, P.U.R.	2 m	CS-A1-02-R-02	95A251540
		5 m	CS-A1-02-R-05	95A251560
Radial M12 Connector	4-pole, grey, P.V.C.	3 m	CS-A2-02-G-03	95A251360
		5 m	CS-A2-02-G-05	95A251240
		7 m	CS-A2-02-G-07	95A251245
		10 m	CS-A2-02-G-10	95A251260
	4-pole, P.U.R.	2 m	CS-A2-02-R-02	95A251550
		5 m	CS-A2-02-R-05	95A251570
Axial M12 Connector	4-pole, shielded, black, P.V.C.	3 m	CV-A1-22-B-03	95ACC1480
		5 m	CV-A1-22-B-05	95ACC1490
		10 m	CV-A1-22-B-10	95ACC1500
		15 m	CV-A1-22-B-15	95ACC2070
		25 m	CV-A1-22-B-25	95ACC2090
Radial M12 Connector	4-pole, shielded, black, P.V.C.	3 m	CV-A2-22-B-03	95ACC1540
		5 m	CV-A2-22-B-05	95ACC1550
		10 m	CV-A2-22-B-10	95ACC1560
Axial M12 Connector	4-pole, U.L., black, P.V.C.	3 m	CS-A1-02-U-03	95ASE1120
		5 m	CS-A1-02-U-05	95ASE1130
		10 m	CS-A1-02-U-10	95ASE1140
		15 m	CS-A1-02-U-15	95ASE1150
		25 m	CS-A1-02-U-25	95ASE1160
Radial M12 Connector	4-pole, black	Connector- not cabled	CS-A1-02-B-NC	G5085002
Radial M12 Connector	4-pole, black	Connector- not cabled	CS-A2-02-B-NC	G5085003



S300-PR...B

Polarised retroreflex

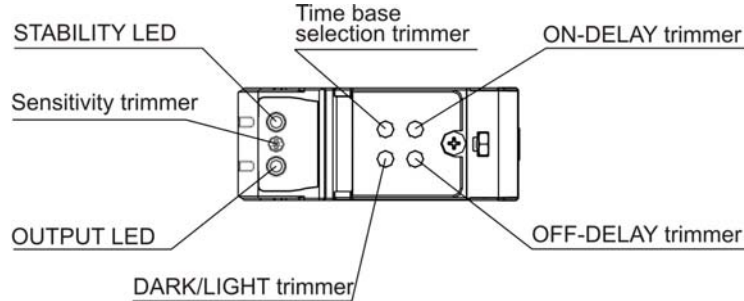


S300-PR...C

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 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.

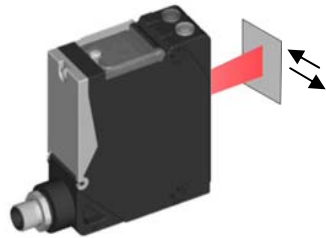
WARNING: the maximum mechanical rotation range of the trimmer is 240°. Do not force over of the maximum and minimum positions.

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.

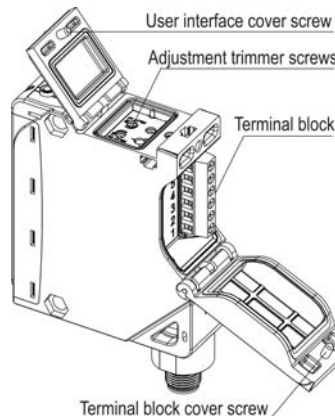


Tighten all screws surely to maintain the water-proof characteristics for IP67 (IEC/EN60529). Excessive tightening causes damage. Tighten the screws within the tightening torque range shown in the table.

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

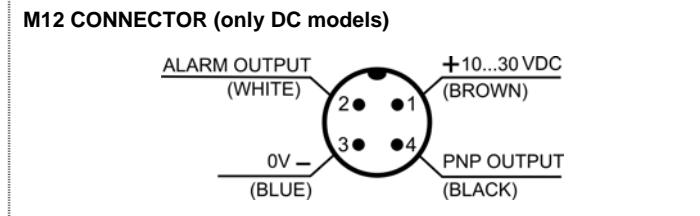
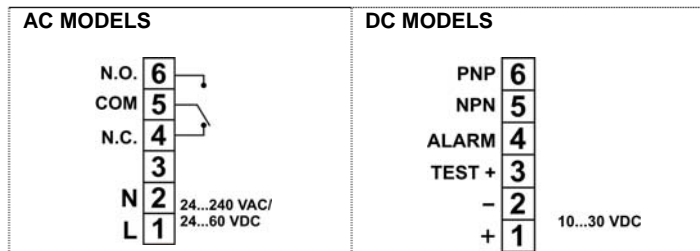


TECHNICAL DATA

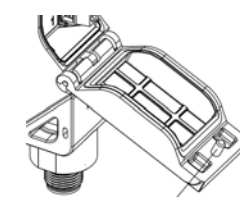
AC MODELS	S300-PR-1-B/C	DC MODELS	S300-PR-2/5-B/C
Power supply:	24...240 VAC / 24...60 VDC	Power supply:	10...30 VDC Class 2 (UL508)
Ripple:	10 % max	Ripple:	10 % max
Current consumption (output current excluded):	< 3 VA	Current consumption (output current excluded):	< 30 mA
Outputs:	Electromechanical SPDT: 250 VAC, 30 VDC	Outputs:	PNP / NPN open collector R_pull-up/down = 47KΩ
Output current:	Max 3 A (resistive load)	Output current:	100 mA (resistive load)
Response time:	20 ms	Output saturation voltage:	2.4 V max
Switching frequency:	25 Hz	Diagnostic functions:	PNP ALARM output / Test+ input
Weight:	150 g	Response time:	1 ms
AtEx 2014/34/EU:	II 3G EX nA II T6 ; II 3D EX tD A22 IP67 T85°C	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-reinforced	
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 showed 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.

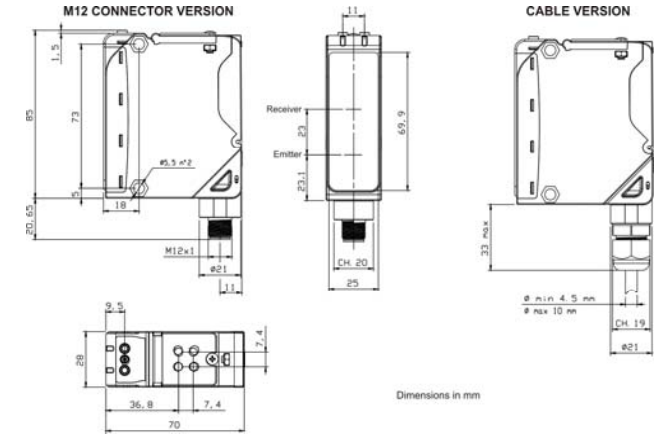
DIAGNOSTIC FUNCTIONS

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

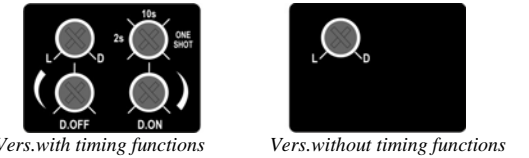
TEST+ input (only S300-PR-2/5)
The TEST+ input can be used to inhibit the emitter and verify that the system is correctly operating. The TEST function is activated if the TEST+ input is connected to a voltage between 10...30V, whereas if the TEST+ input is connected to GND or it is not connected the function is deactivated. 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 whitout 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.

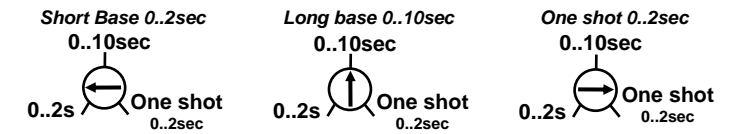
DIMENSIONS



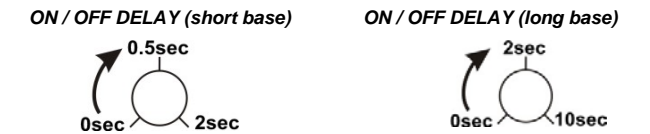
TIMING FUNCTIONS



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



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 thinner, 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:



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)	[Timing diagram showing normal output pulses]
ONE SHOT (only with short time base 0..2 sec.)	[Timing diagram showing one shot output pulse]
ON/OFF delay	[Timing diagram showing ON and OFF delay pulses]
ON delay	[Timing diagram showing ON delay pulse]
OFF delay	[Timing diagram showing OFF delay pulse]

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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