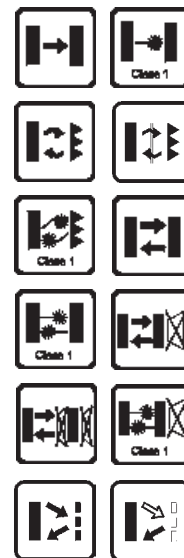


COMPACT METAL PHOTOELECTRIC SENSORS



- **Sturdy metal housing in a compact 41x49x15 mm format**
- **Complete range of universal, application and laser optic functions**
- **Trimmer or push-button setting with EASYtouch™ function**
- **NPN and PNP versions standard M12 rotatable connector**

S90 SERIES

The **S90** series, in a compact 41x49x15 mm metal housing, offers all the application and universal optic functions also with safety class 1 laser emission.

The series includes polarised retroreflex models with coaxial optics for the detection of reflective and transparent objects, background and foreground suppression versions, contrast sensor with white light emission for colour mark detection, ultraviolet sensor for luminescent object detection. Basic models are available with class 1 laser emission for high-resolution detection.

The **S90** models with universal proximity, retroreflex and through beam optic functions have trimmer sensitivity adjustment. More sophisticated models are microprocessor controlled and offer the patent-covered *EASYtouch™* setting procedure for rapid and precise automatic setting of the switching threshold, with remote control, keyboard lock and output delay activation functions.

NPN or PNP versions are available with standard M12 connector that can be rotated in 4 different positions.

S90 COMPACT METAL SENSORS

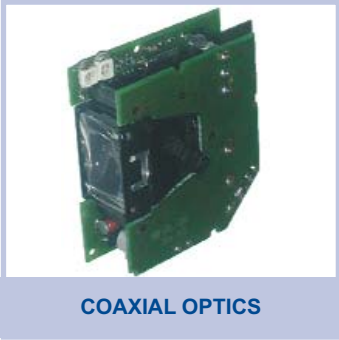
The polarised retroreflex model and the version for transparent object detection are available also with coaxial optics guaranteeing a more accurate axis detection as well as the elimination of the blank zone near to the sensor.

The coaxial optics is also present in the contrast sensor with white light LED emission and in the luminescence sensor with ultraviolet light LED emission, improving the precision and depth of field.

The biaxial optics which is present in the background suppression models, including laser versions, allows the triangulation for a precise detection.



BIAXIAL OPTICS



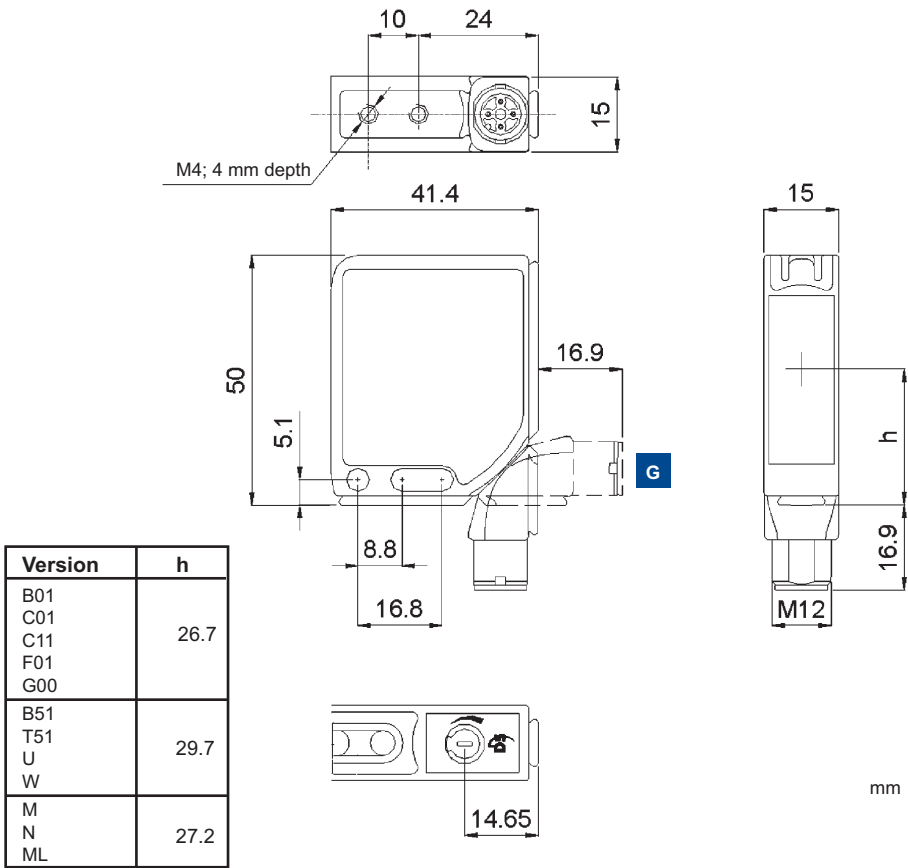
COAXIAL OPTICS

ACCESSORIES

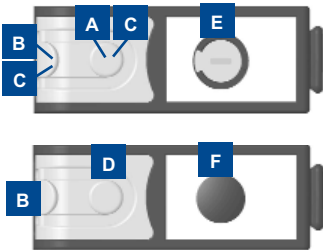
For dedicated accessories refer to the **ACCESSORIES** section of this catalogue.

Refer also to **Connectors (A.03)** and **Fixing Brackets (A.04)** of the **General Catalogue**.

DIMENSIONS



INDICATORS AND SETTINGS



* Teach-in push-button for setting.
EASytouch™ provides two setting modes: standard or fine.
Please refer to instructions manual for operating details.

- A** STABILITY LED
- B** Output status LED
- C** POWER ON LED
- D** READY/ERROR LED
- E** Trimmer
- F** SET push-button *
- G** M12 connector output, orientable in 4 positions

CONNECTIONS



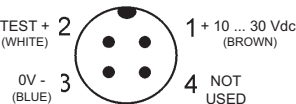
S90...B01 / B51 / C01 / C11 / F01 / T51
S90-ML ... B01 / C01 / F01



S90 ... M / N / U / W / S90-ML ... M



S90 ... G00



S90-PL ... G00

Versions and options: refer to **MODEL SELECTION TABLE**

TECHNICAL DATA

		S90-MA-5-F01	S90-ML-5-F01	S90-MA-5-G00	S90-ML-5-G00	S90-MA-5-B01	S90-ML-5-B01	S90-MA-5-B51	S90-ML-5-B51	S90-MA-5-T51	S90-ML-5-T51	S90-MA-5-C01	S90-ML-5-C01	S90-MA-5-C11	S90-ML-5-M08	S90-MA-5-N03	S90-ML-5-W08	S90-MA-5-U08
Operating distance:																		
through beam	0 ... 20 m	•	•															
laser through beam	0 ... 60 m	•	•															
polarised retroreflex	0.1 ... 6 m (on R2)			•														
coaxial polarised retroreflex	0 ... 3 m (on R2)							•										
retroreflex for transparents	0 ... 1.5 m (on R2)								•									
laser polarised retroreflex	0.1 ... 20 m (on R2)					•												
medium proximity	1 ... 100 cm								•									
long proximity	5 ... 200 cm											•						
laser proximity	0 ... 60 cm									•								
background suppression	2 ... 20 cm													•				
foreground suppression	7 ... 20 cm															•		
laser background suppression	5 ... 10 cm														•			
contrast sensor	19 mm ± 2 mm																•	
luminescence sensor	0 ... 40 mm																•	
Power supply:	10 ... 30 Vdc ¹	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Ripple:	2 Vpp	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Consumption:	30 mA max.																	
	35 mA max.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	50 mA max.														•	•	•	
Light emission ²:	red LED 660 nm					•		•	•	•								
	infrared LED 880 nm		•										•					
	red LED 670 nm														•		•	
	UV LED 370 nm																	•
	white LED 400 - 700 nm																	•
Setting:	red LASER 650 nm					•						•			•			
	sensitivity trimmer ³	•	•			•	•	•	•	•	•	•	•	•	•	•	•	•
	SET push-button														•	•	•	•
Setting Procedure:	EASYtouch™														•	•	•	•
Indicators:	yellow OUTPUT LED	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	green STABILITY LED	•				•		•				•						
	green POWER ON LED		•	•	•		•				•							
	green/red READY/ERROR LED														•	•	•	•
Output type:	30 Vdc max., NPN or PNP	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Output current:	≤ 100 mA	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Saturation voltage:	≤ 2 V	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Response time:	100 µs																•	
	250 µs							•				•						•
	333 µs			•														
	500 µs					•		•	•						•	•	•	
	1 ms	•										•	•					
Switching frequency:	500 Hz	•										•	•					
	1 kHz					•		•	•					•	•	•		
	1.5 kHz		•															
	2 kHz						•					•						•
	5 kHz																	•
Connection:	M12 4-pole connector ⁴	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Electrical protection:	class 2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Mechanical protection:	IP67	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Protection devices:	A, B ⁵	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Housing material:	Zama (Zn-Al alloy)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Lens material ⁶:	window in PMMA	•	•	•	•	•						•	•	•	•	•	•	
	window in glass (tilted anti-reflection)								•	•							•	•
Weight:	77 g max.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Operating temperature:	-10 ... +50 °C		•	•								•						
	-10 ... +55 °C														•	•	•	•
	-25 ... +55 °C	•	•		•	•	•	•	•	•	•	•	•	•				
	-25 ... +70 °C														•	•	•	•
Storage temperature:	-20 ... +70 °C																	
	-25 ... +70 °C	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Reference standard:	EN 60947-5-2	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	EN 60825-1, CDRH21 CFR 1040.10	•	•	•	•	•									•			

SELECTION TABLE

receiver			
S90-MA-5-F01-PP	956301050	PNP	
S90-MA-5-F01-NN	956301210	NPN	
S90-ML-5-F01-PP	956301110	PNP	laser
S90-ML-5-F01-NN	956301280	NPN	laser

emitter			
S90-MA-5-G00-XG	956301060	-	
S90-ML-5-G00-XG	956301120	-	laser

polarised retroreflex			
S90-MA-5-B01-PP	956301000	PNP	
S90-MA-5-B01-NN	956301160	NPN	
S90-ML-5-B01-PP	956301090	PNP	laser
S90-ML-5-B01-NN	956301260	NPN	laser

coaxial polarised retroreflex			
S90-MA-5-B51-PP	956301030	PNP	coaxial
S90-MA-5-B51-NN	956301170	NPN	coaxial

retroreflex for transparents			
S90-MA-5-T51-PP	956301040	PNP	coaxial
S90-MA-5-T51-NN	956301180	NPN	coaxial

diffuse proximity			
S90-MA-5-C01-PP	956301010	PNP	
S90-MA-5-C01-NN	956301190	NPN	
S90-ML-5-C01-PP	956301100	PNP	laser
S90-ML-5-C01-NN	956301270	NPN	laser
S90-MA-5-C11-PP	956301020	PNP	
S90-MA-5-C11-NN	956301200	NPN	

background suppression			
S90-MA-5-M08-PH	956301070	PNP	
S90-MA-5-M08-NH	956301220	NPN	
S90-ML-5-M08-PH	956301130	PNP	laser
S90-ML-5-M08-NH	956301290	NPN	laser

foreground suppression			
S90-MA-5-N03-PH	956301080	PNP	
S90-MA-5-N03-NH	956301230	NPN	

contrast sensor			
S90-MA-5-W08-PH	956301150	PNP	coaxial
S90-MA-5-W08-NH	956301250	NPN	coaxial

luminescence sensor			
S90-MA-5-U08-PH	956301140	PNP	coaxial
S90-MA-5-U08-NH	956301240	NPN	coaxial

TECHNICAL NOTES

¹ Limit values

² Average life of 100.000 h with T_A = +25 °C
Average life of 50.000 h in ML-B01, C01, F01, M vers.

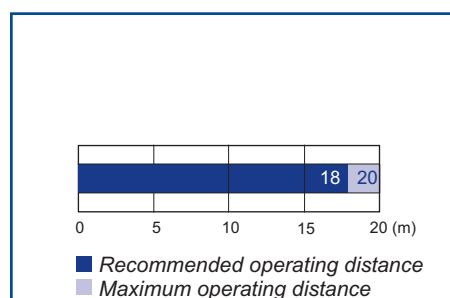
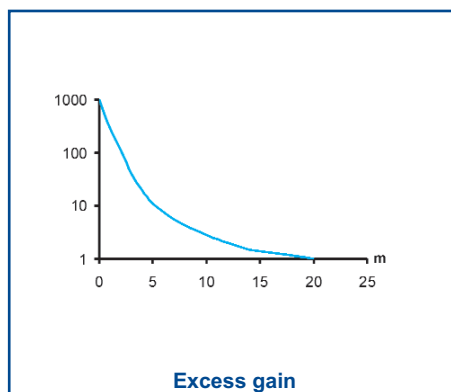
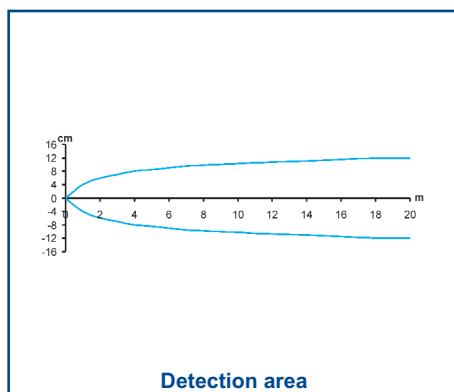
³ 270° single-turn trimmer

⁴ Connector with 4 position rotation

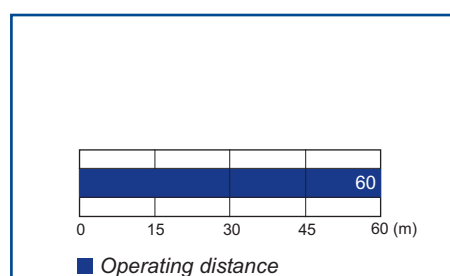
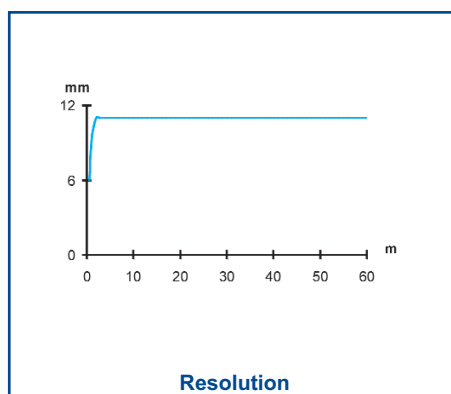
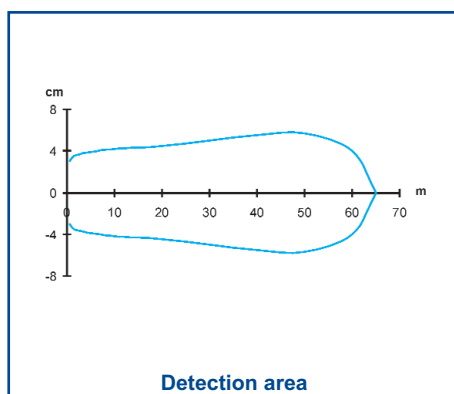
⁵ A - reverse polarity protection
B - overload and short-circuit protection

⁶ Internal lenses in polycarbonate
Internal lenses in glass in B51, T51, U, W vers.
Internal lenses in glass and PC in ML-B01, C01, F01, M vers.

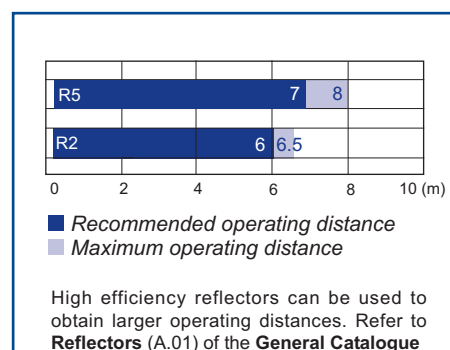
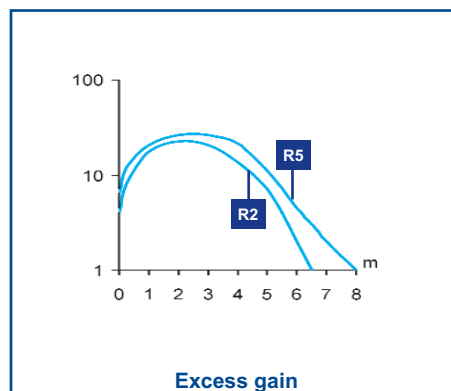
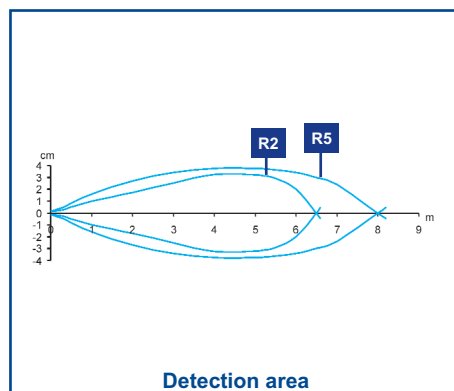
DETECTION DIAGRAMS



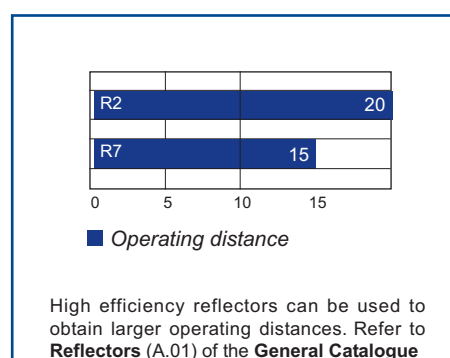
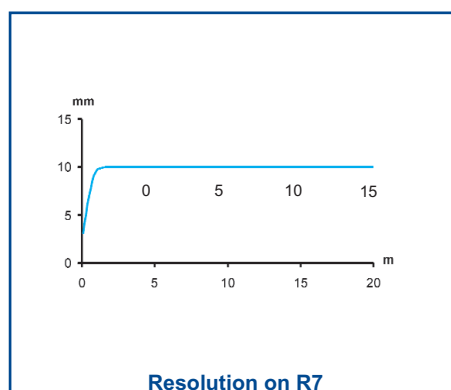
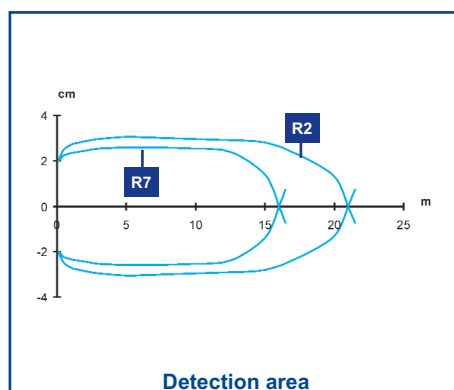
F01, G00 models



L-F01, G00 models

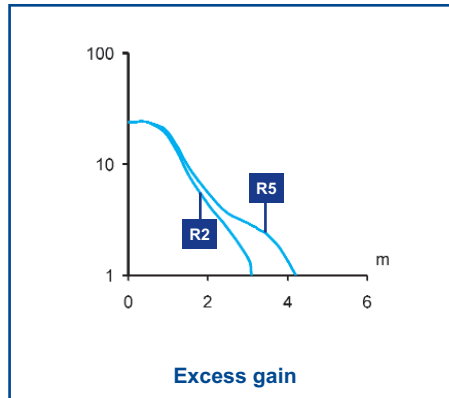
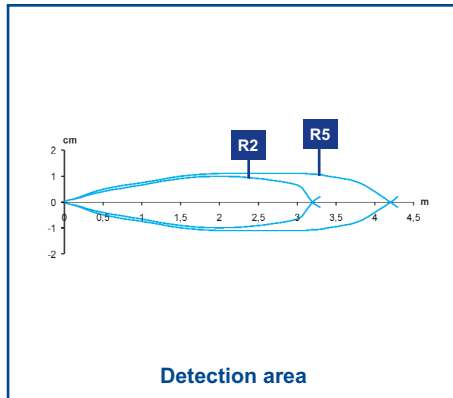


B01 models



L-B01 models

DETECTION DIAGRAMS

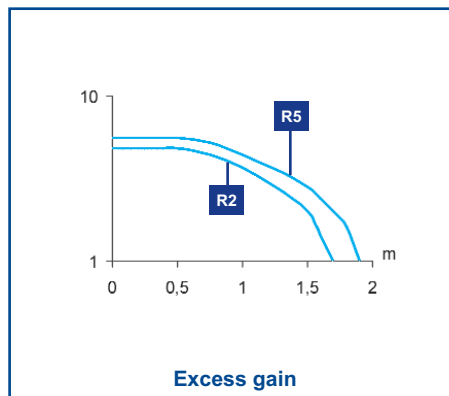
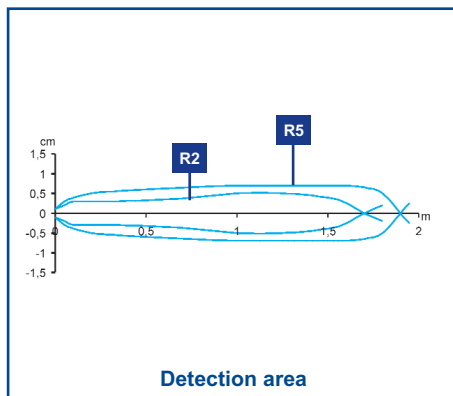


R5	4	4.2
R2	3	3.2

■ Recommended operating distance
 ■ Maximum operating distance

High efficiency reflectors can be used to obtain larger operating distances. Refer to **Reflectors (A.01)** of the **General Catalogue**

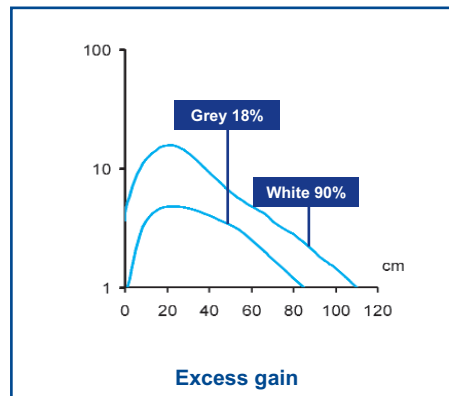
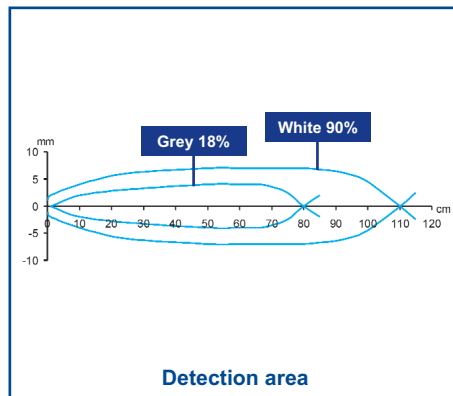
B51 models



R5	1.7	2
R2	1.5	1.7

■ Recommended operating distance
 ■ Maximum operating distance

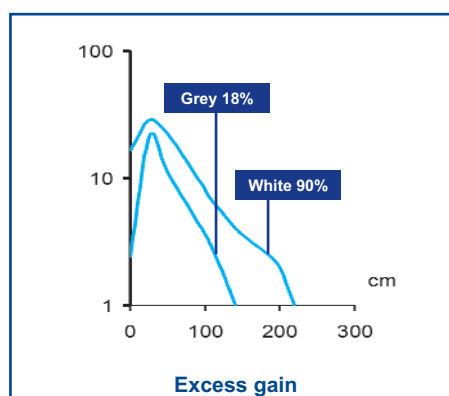
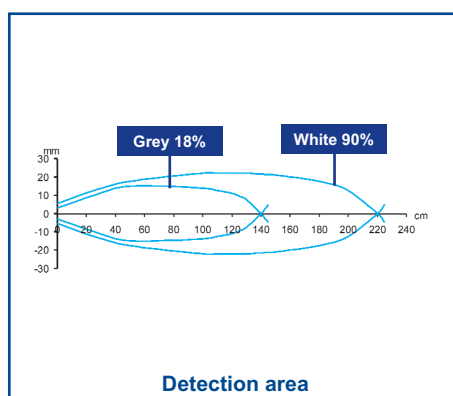
T51 models



White	100	110
Grey	70	80

■ Recommended operating distance
 ■ Maximum operating distance

C01 models

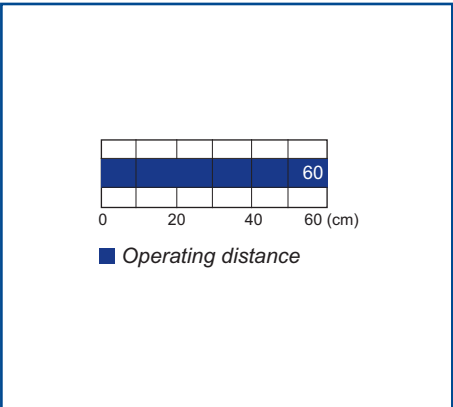
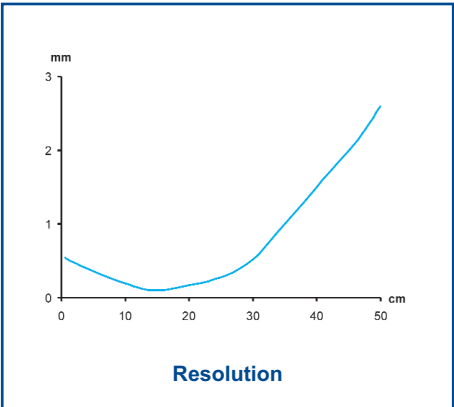
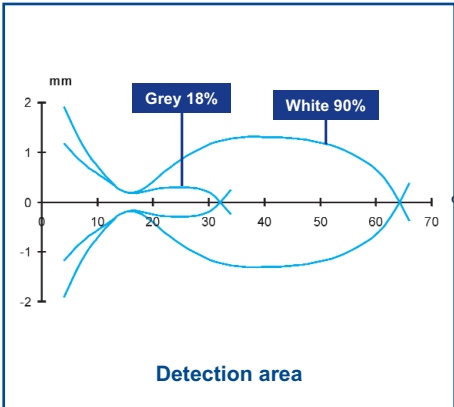


White	200	220
Grey	120	140

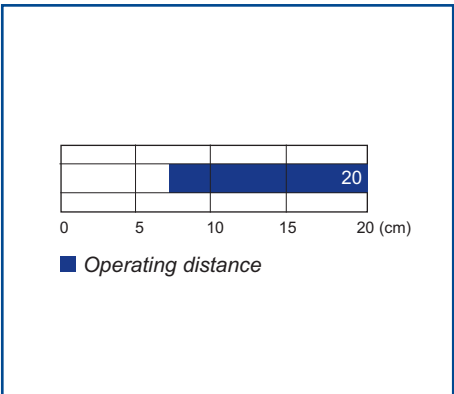
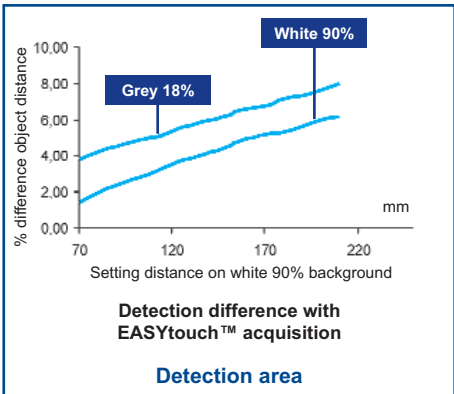
■ Recommended operating distance
 ■ Maximum operating distance

C11 models

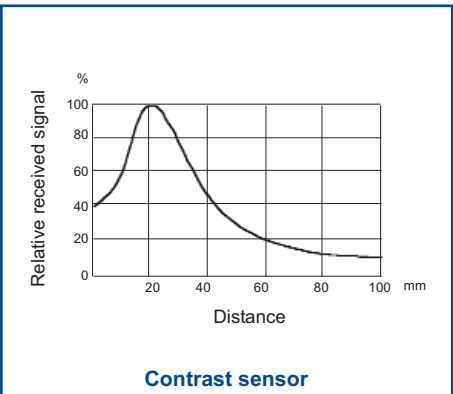
DETECTION DIAGRAMS



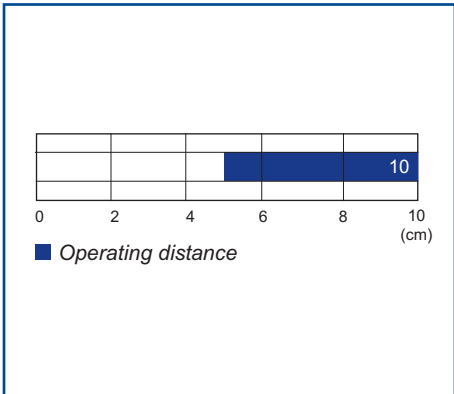
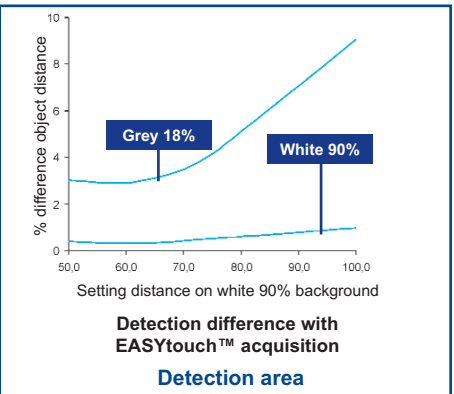
L-C01 models



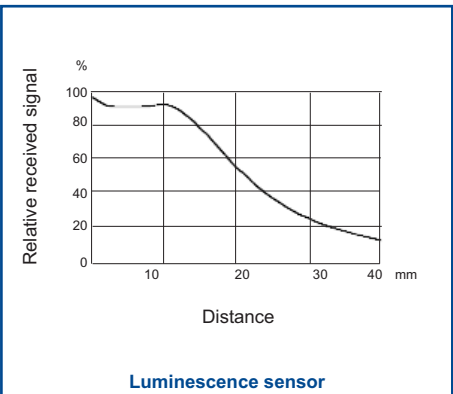
M08 models



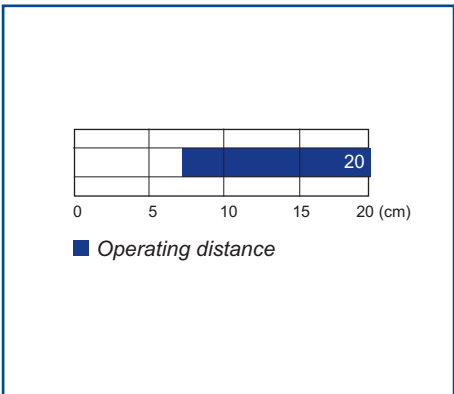
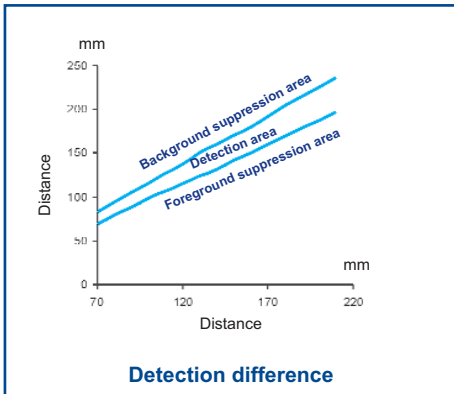
W models



L-M08 models



U models



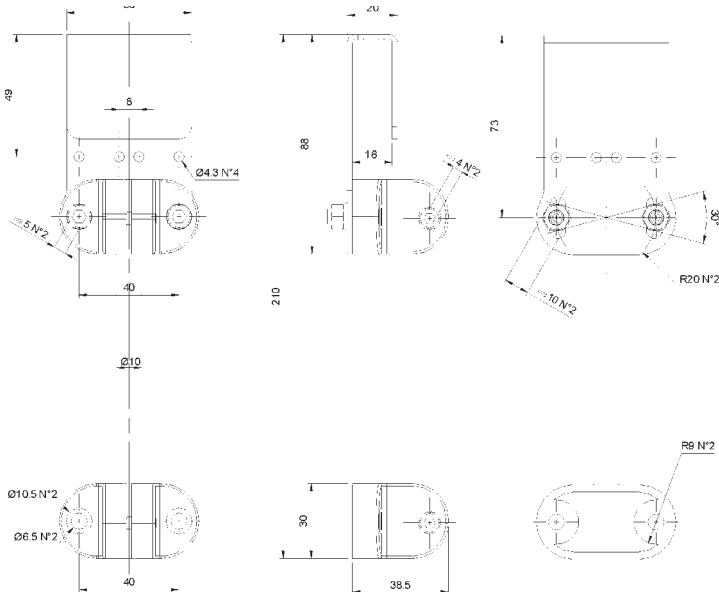
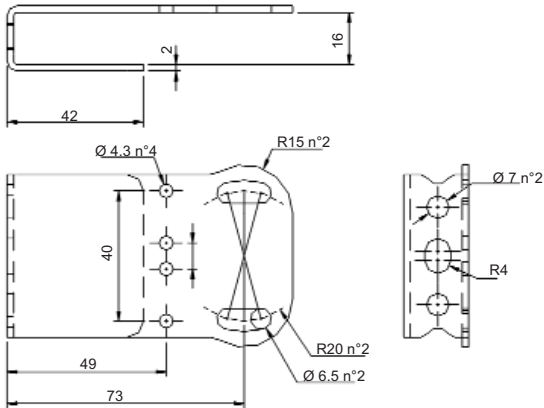
N03 models

ACCESSORY SELECTION AND ORDER INFORMATION

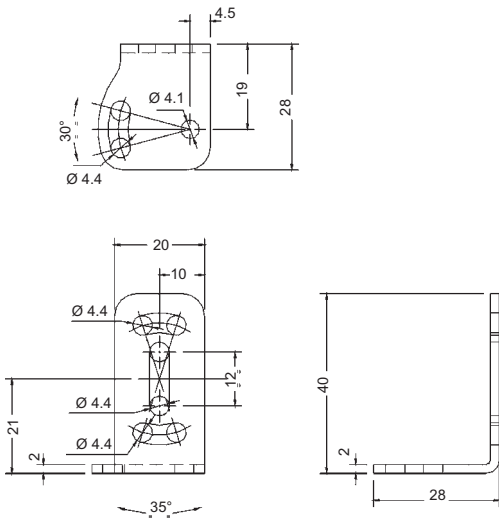
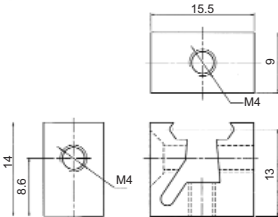
MODEL	DESCRIPTION	ORDER N°
ST-5018	protection bracket	95ACC5310
ST-5019	protection bracket	95ACC5320
ST-5020	fixing bracket	95ACC5330
ST-5021	fixing bracket	95ACC5340
ST-5041	short dove-tail fixing bracket	95ACC2300
ST-5042	long dove-tail fixing bracket	95ACC2310
JOINT-60	protection bracket with jointed support	95ACC5350

Refer also to Accessories for Sensors

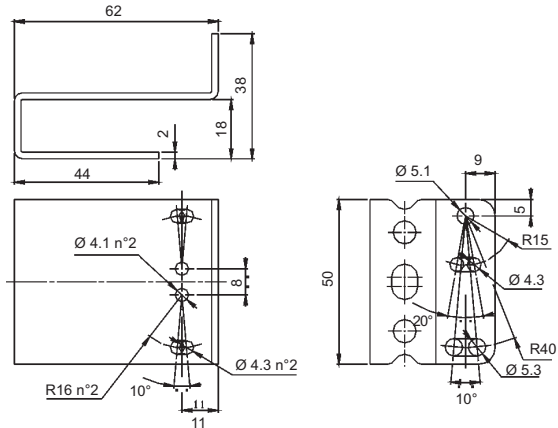
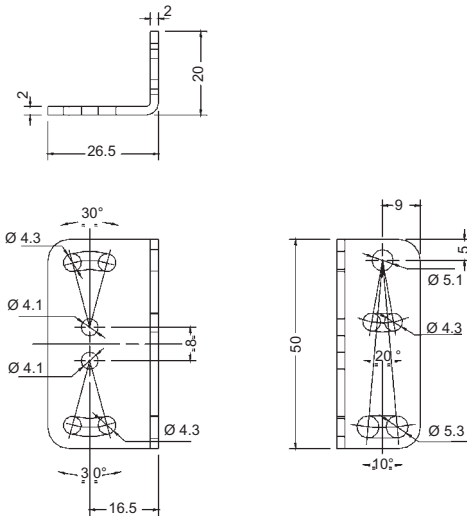
Refer also to Accessories for Sensors

JOINT-60**ST-5019**

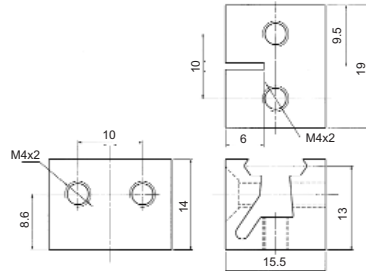
ST-5021

**ST-5041**

ST-5018

**ST-5020**

ST-5042



MODEL SELECTION AND ORDER INFORMATION

MODEL	DESCRIPTION	OUTPUT	CONNECTION	ORDER N°
S90-MA-5-F01-PP	receiver	PNP NO-NC	M12 connector	956301050
S90-MA-5-F01-NN	receiver	NPN NO-NC	M12 connector	956301210
S90-ML-5-F01-PP	laser receiver	PNP NO	M12 connector	956301110
S90-ML-5-F01-NN	laser receiver	NPN NO	M12 connector	956301280
S90-MA-5-G00-XG	emitter	-	M12 connector	956301060
S90-ML-5-G00-XG	laser emitter	-	M12 connector	956301120
S90-MA-5-B01-PP	polarised retroreflex	PNP NO-NC	M12 connector	956301000
S90-MA-5-B01-NN	polarised retroreflex	NPN NO-NC	M12 connector	956301160
S90-ML-5-B01-PP	laser polarised retroreflex	PNP NO-NC	M12 connector	956301090
S90-ML-5-B01-NN	laser polarised retroreflex	NPN NO-NC	M12 connector	956301260
S90-MA-5-B51-PP	coaxial polarised retroreflex	PNP NO-NC	M12 connector	956301030
S90-MA-5-B51-NN	coaxial polarised retroreflex	NPN NO-NC	M12 connector	956301170
S90-MA-5-T51-PP	coaxial retroreflex for transparents	PNP NO-NC	M12 connector	956301040
S90-MA-5-T51-NN	coaxial retroreflex for transparents	NPN NO-NC	M12 connector	956301180
S90-MA-5-C01-PP	diffuse proximity	PNP NO-NC	M12 connector	956301010
S90-MA-5-C01-NN	diffuse proximity	NPN NO-NC	M12 connector	956301190
S90-ML-5-C01-PP	laser diffuse proximity	PNP NO-NC	M12 connector	956301100
S90-ML-5-C01-NN	laser diffuse proximity	NPN NO-NC	M12 connector	956301270
S90-MA-5-C11-PP	diffuse proximity	PNP NO-NC	M12 connector	956301020
S90-MA-5-C11-NN	diffuse proximity	NPN NO-NC	M12 connector	956301200
S90-MA-5-M08-PH	background suppression	PNP NO	M12 connector	956301070
S90-MA-5-M08-NH	background suppression	NPN NO	M12 connector	956301220
S90-ML-5-M08-PH	laser background suppression	PNP NO	M12 connector	956301130
S90-ML-5-M08-NH	laser background suppression	NPN NO	M12 connector	956301290
S90-MA-5-N03-PH	foreground suppression	PNP NO	M12 connector	956301080
S90-MA-5-N03-NH	foreground suppression	NPN NO	M12 connector	956301230
S90-MA-5-W08-PH	coaxial contrast sensor	PNP NO	M12 connector	956301150
S90-MA-5-W08-NH	coaxial contrast sensor	NPN NO	M12 connector	956301250
S90-MA-5-U08-PH	coaxial luminescence sensor	PNP NO	M12 connector	956301140
S90-MA-5-U08-NH	coaxial luminescence sensor	NPN NO	M12 connector	956301240

UNIVERSAL COMPACT SENSORS

