F3S-TGR-CL

Multi-beam, finger- and hand protection safety sensor

The F3S-TGR-CL multi-beam, finger- and hand protection safety sensors are available in Type 2 (PL c) and Type 4 (PL e) with integrated safety control functions selectable via built-in dip-switches.

- Type 2 or type 4 acc. EN61496-1
- PL c or PL e acc. ISO13849
- · Family concept in wiring and mounting
- All models with dip-switch setup for external device monitoring, interlock function, range setting (short and long range) and optical or wired coding
- Advanced models with pre-reset function, T-, L-or X- muting function and muting lamp integrated

Multi-beam models

- Max. operating range 12 m in active/passive
- Max. operating range 50 m in active/active
- · Selectable muting mode (timeout or infinite muting) in advanced models

Finger- or hand protection models (14, 35 or 70 mm resolution)

- Max. operating range 6 m in 14 mm resolution
- Max. operating range 14 m in 35 or 70 mm resolution
- Selectable muting mode (timeout muting), blanking and single / double brake function in advanced models

Model number structure

Multi-beam safety sensors

F3S-TGR-CL___-K___--_-1 2 3 4 5 6

- 1. Type
 - 2: Type 2
 - 4: Type 4
- 2. Feature set
 - A: Advanced
 - B: Basic
- 3. Number of optical axes
 - 2: 2 optical axes
 - 3: 3 optical axes
 - 4: 4 optical axes
- 4. System
 - _: Active/active system
 - C: Active/passive system
- 5. Protective height [mm]
 - 500, 800, 900, 1,200
- 6. Additional functions
 - _: Standard
 - LD: Long distance (only active/active systems)

Finger and hand protection safety sensors

- 1. Type
 - 2: Type 2
 - 4: Type 4
- 2. Feature set
 - A: Advanced
 - B: Basic
- 3. Resolution
 - 014: Finger protection
 - 035: Hand protection
 - 070: Foot protection (only slave versions)
- 4. Protective height [mm]
 - 150, 300, 450, 600, 750, 900, 1,050, 1,200, 1,350, 1,500,
 - 1,650, 1,800, 1,950, 2,100, 2,250,
 - (2,400, only standalone versions)
- 5. Version
 - _: Standard
 - M: Master
 - S: Slave

Ordering information multi-beam safety sensors

F3S-TGR-CL2_-K_ (Type 2)

System	Sensing distance	Detection capability	Order code			
System	Sensing distance	Detection capability	Basic feature set*1	Advanced feature set*2		
	0.5 m 12 m	500	F3S-TGR-CL2B-K2C-500	F3S-TGR-CL2A-K2C-500		
A ativa /magaiya	0.5 m 8 m	400	F3S-TGR-CL2B-K3C-800	F3S-TGR-CL2A-K3C-800		
Active/passive	0.5 m 7 m	300	F3S-TGR-CL2B-K4C-900	F3S-TGR-CL2A-K4C-900		
	0.5 111 7 111	400	F3S-TGR-CL2B-K4C-1200	F3S-TGR-CL2A-K4C-1200		
		500	F3S-TGR-CL2B-K2-500	F3S-TGR-CL2A-K2-500		
Active/active	0.5 m 40 m	400	F3S-TGR-CL2B-K3-800	F3S-TGR-CL2A-K3-800		
Active/active	0.5 111 40 111	300	F3S-TGR-CL2B-K4-900	F3S-TGR-CL2A-K4-900		
		400	F3S-TGR-CL2B-K4-1200	F3S-TGR-CL2A-K4-1200		
		500	F3S-TGR-CL2B-K2-500-LD	F3S-TGR-CL2A-K2-500-LD		
Active/active, long distance	25 m 50 m	400	F3S-TGR-CL2B-K3-800-LD	F3S-TGR-CL2A-K3-800-LD		
	25 111 50 111	300	F3S-TGR-CL2B-K4-900-LD	F3S-TGR-CL2A-K4-900-LD		
		400	F3S-TGR-CL2B-K4-1200-LD	F3S-TGR-CL2A-K4-1200-LD		

F3S-TGR-CL4_-K_ (Type 4)

Custom	Canaina diatanas	Detection conchility	Orde	r code
System	Sensing distance	Detection capability	Basic feature set*1	Advanced feature set*2
	0.5 m 12 m	500	F3S-TGR-CL4B-K2C-500	F3S-TGR-CL4A-K2C-500
Active/passive	0.5 m 8 m	400	F3S-TGR-CL4B-K3C-800	F3S-TGR-CL4A-K3C-800
Active/passive	0.5 m 7 m	300	F3S-TGR-CL4B-K4C-900	F3S-TGR-CL4A-K4C-900
		400	F3S-TGR-CL4B-K4C-1200	F3S-TGR-CL4A-K4C-1200
	0.5 40	500	F3S-TGR-CL4B-K2-500	F3S-TGR-CL4A-K2-500
Active/active		400	F3S-TGR-CL4B-K3-800	F3S-TGR-CL4A-K3-800
Active/active	0.5 m 40 m	300	F3S-TGR-CL4B-K4-900	F3S-TGR-CL4A-K4-900
		400	F3S-TGR-CL4B-K4-1200	F3S-TGR-CL4A-K4-1200
		500	F3S-TGR-CL4B-K2-500-LD	F3S-TGR-CL4A-K2-500-LD
Active/active,	25 m 50 m	400	F3S-TGR-CL4B-K3-800-LD	F3S-TGR-CL4A-K3-800-LD
long distance	25 III 50 III	300	F3S-TGR-CL4B-K4-900-LD	F3S-TGR-CL4A-K4-900-LD
		400	F3S-TGR-CL4B-K4-1200-LD	F3S-TGR-CL4A-K4-1200-LD

^{*1} Basic feature set: Manual/automatic restart, coding
^{*2} Advanced feature set: Basic + Muting + integrated Muting lamp + Pre-reset

Ordering information safety sensors

F3S-TGR-CL2_(Type 2)

Feature set	Master/Slave	Sensing distance	Detection capability	Order code	Length
Basic*1	Standalone	0.2 m 6 m	14 mm	F3S-TGR-CL2B-014	
Dasic	Stariuatorie	0.2 m 14 m	35 mm	F3S-TGR-CL2B-035	150 mm 2400 mm*3
	Standalone	0.2 m 6 m	14 mm	F3S-TGR-CL2A-014	150 11111 2400 111111
		0.2 m 14 m	35 mm	F3S-TGR-CL2A-035	
	Mootor	0.2 m 6 m	14 mm	F3S-TGR-CL2A-014M	
Advanced*2	Master 0.2 m	0.2 m 14 m	35 mm	F3S-TGR-CL2A-035M	150 mm 2250 mm*3
		0.2 m 6 m 14 mm		F3S-TGR-CL2A-014S	150 11111 2250 111111
	Slave	0.2 m 14 m	35 mm	F3S-TGR-CL2A-035S	1
		0.2 m 14 m	70 mm	F3S-TGR-CL2A-070S	300 mm 2100 mm

F3S-TGR-CL4_ (Type 4)

Feature set	Master/Slave	Sensing distance	Detection capability	Order code	Length	
Basic*1	Standalone	0.2 m 6 m	14 mm	F3S-TGR-CL4B-014		
Dasic	Staridatorie	0.2 m 14 m	35 mm	F3S-TGR-CL4B-035	150 mm 2400 mm*3	
	Standalone	0.2 m 6 m	14 mm	F3S-TGR-CL4A-014	150 11111 2400 11111	
	Stariuaione	0.2 m 14 m	35 mm	F3S-TGR-CL4A-035	1	
	Master*4	0.2 m 6 m	14 mm	F3S-TGR-CL4A-014M		
Advanced*2	Master	0.2 m 14 m	35 mm	F3S-TGR-CL4A-035M	150 mm 2250 mm*3	
		0.2 m 6 m	14 mm	F3S-TGR-CL4A-014S	— 150 mm 2250 mm °	
	Slave*4	0.2 m 14 m	35 mm	F3S-TGR-CL4A-035S	1	
		0.2 111 14 111	70 mm	F3S-TGR-CL4A-070S	300 mm 2100 mm	

^{*1} Basic feature set:

Manual/automatic restart, coding

F3S-TGR-CL-_-_M/S Master-Slave Series

- A Master-Slave cascade system is made of one master segment and one slave segment.
- The length of the total protective field can vary from minimum 300 mm till maximum 2,400 mm.
- The interconnect cable length limitation between master and slave segment is in total max. 0,9 m.

Possible combinations of master and slave are in this table:

											S	lave r	nodel	s									
			14 mm or 35 mm resolution									70 mm resolution											
		150	300	450	009	750	006	1,050	1,200	1,350	1,500	1,650	1,800	1,950	2,150	2,250	300	009	006	1,200	1,500	1,800	2,100
	150	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	300	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	OK	OK
_	450	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK			OK	OK	OK	OK	OK	OK	
· models mm resolution)	600	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK				OK	OK	OK	OK	OK	OK	
풀	750	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK					OK	OK	OK	OK	OK		
els	900	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK						OK	OK	OK	OK	OK		
Master models or 35 mm resc	1,050	OK	OK	OK	OK	OK	OK	OK	OK	OK							OK	OK	OK	OK			
두 돌	1,200	OK	OK	OK	OK	OK	OK	OK	OK								OK	OK	OK	OK			
ster 35	1,350	OK	OK	OK	OK	OK	OK	OK									OK	OK	OK				
Mas	1,500	OK	OK	OK	OK	OK	OK										OK	OK	OK				,
= E	1,650	OK	OK	OK	OK	OK											OK	OK					
4	1,800	OK	OK	OK	OK												OK	OK					
Ξ	1,950	OK	OK	OK													OK						
	2,100	OK	OK														OK						
	2,250	OK																					

^{*2} Advanced feature set:

¹² Advanced feature set:
¹³ Available length (in mm):
¹⁴ Master/slave system:
Basic + Muting + integrated Muting lamp + Pre-reset
150, 300, 450, 600, 750, 900, 1,050, 1,200, 1,350, 1,500, 1,650, 1,800, 1,950, 2,100, 2,250, (2,400 mm, only standalone versions)
A master/slave system cannot exceed the total length of 2,400 mm

Ordering information Accessories

Receiver Cables (M12-8pin, shielded, flying leads)

Shape	Description	Order code	Remark
	_	Y92E-M12PURSH8S2M-L	Receiver cable, 2 m length
	end M12-8pin, outer shielding layer	Y92E-M12PURSH8S5M-L	Receiver cable, 5 m length
		Y92E-M12PURSH8S10M-L	Receiver cable, 10 m length
		Y92E-M12PURSH8S25M-L	Receiver cable, 25 m length

Transmitter Cables (M12-4pin, shielded, flying leads)

Shape	Description	Order code	Remark
	_	Y92E-M12PURSH4S2M-L	Transmitter cable, 2 m length
	Sensor connector with open cable end M12-4pin, outer shielding layer	Y92E-M12PURSH4S5M-L	Transmitter cable, 5 m length
		Y92E-M12PURSH4S10M-L	Transmitter cable, 10 m length
		Y92E-M12PURSH4S25M-L	Transmitter cable, 25 m length

Mounting brackets

Shape	Description	Order code	Remark	
	Mounting bracket	F39-TGR-ST-SB ^{'1}	Mounting bracket × 1, SLC mounting screws × 1 set	
1	Adjustable bracket	F39-TGR-ST-ADJ	Adjustable bracket × 1, Bracket mounting screws × 1 set	

^{*1} Brackets amount included in shipment is shown in table of Dimensions

Master-Slave Accessories

Shape	Description	Order code	Remark
	Male-male extension connector	Y92E-M12MSM12MSPURSH80.3M-L	Connection cable, 0.3 m length
	M12-8pin, outer shielding layer	Y92E-M12MSM12MSPURSH80.9M-L (included in slave system)	Connection cable, 0.9 m length
	Alignment kit – end cap	F39-TGR-CL-MSA (included in slave system)	To support alignment of a Master-Slave system

Laser alignment kit

Shape	Description	Order code	Remark
	Laser alignment kit	F39-TGR-CL-LLK	Scanning range: ≤ 60 m Batteries: 2 × 1.5 V Micro/AAA Laser Class 2 (IEC 60825)

Specifications

Multi-beam safety sensors

CL40				
n)				
for the emitter and receiver at a detection distance of at least 3 m according to IEC 61496-2				
st 20 ms				
2 PNP transistor outputs, load current 2 × 250 mA max				
-				

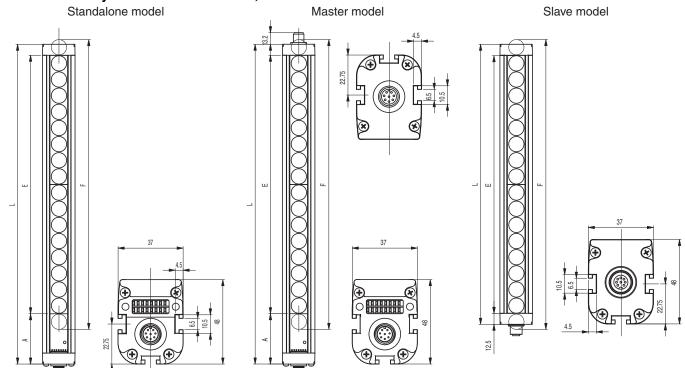
Item	F3S-TGR-	CL20	F3S-TGR-CL40		
Safety-related functions	All models with dip-switch setup for external device monitoring, interlock function, range setting (short and long range) and optical or wired sync Advanced models with selectable pre-reset function, T-, L-or X- muting function (timeout or infinite muting dip switch option) and muting lamp integrated				
Response time	ON to OFF: Maximum: 13	3 ms			
Ambient temperature	Operating: -10 to 55°C, Storage: -25°C to 70°C (no icing, no condensation)				
Ambient humidity	95% not condensing				
Degree of protection	IP 65 (IEC 60529)				
Materials	Housing: Front Window: Red end cap: Transparent end cap: Sealing Gasket: Mounting Bracket:	Front Window: Acrylic Lexan Red end cap: PA6 (Standalone models), Transparent end cap: PC (Advanced standalone models), Sealing Gasket: EPDM			
Suitable for safety control systems	PLc (ISO 13849-1)		PLe (ISO 13849-1)		
Category	Categorie 2		Categorie 4		
PFHd	2.5 × 10 ⁻⁹		1		
Proof test interval	every 20 years				

Finger- and hand safety protection sensors

Item	F3S-TGR-CL20	F3S-TGR-CL40					
Sensor type	Type 2	Type 4					
Protective height	150 mm - 2,400 mm						
Operating range: (short setting or long setting)	F3S-TGR-CL014: 0.2 m to F3S-TGR-CL035: 0.2 m to F3S-TGR-CL070: 0,2 m to	7 m or 7 m to 14 m (Dip switch option)					
Detection capability	F3S-TGR-CL035: Opaque	objects 14 mm in diameter objects 35 mm in diameter objects 70 mm in diameter					
Effective aperture angle (EAA)	Within ±5°	Within ±2.5°					
Effective aperture angle (EAA)	for the emitter and receiver at a detecti	on distance of at least 3 m according to IEC 61496-2					
Light source	Infrared LED (880 nm), power dissipat	on <3 mW, Class 1 per EN 60825-1					
Supply voltage	24 VDC ±20%, according EN 60204-1	able to cover a drop of voltage of at least 20 ms					
OSSD	2 PNP transistor outputs, load current	2 × 250 mA max					
Series connection	Number of connections: One master at Total number of beams ≤ 336 Maximum interconnect cable length: 96	, ,					
Test functions	Self test (after power ON and during op	peration)					
Safety-related functions	and long range) and optical or wired sy	eset function, T-, L-or X- muting function (timeout muting), blank-					
Response time	ON to OFF: 14 ms to 103 ms						
Ambient temperature	Operating: -10°C to +55°C, Storage: -	25°C to +70°C (no icing, no condensation)					
Ambient humidity	95% not condensing						
Degree of protection	IP 65 (IEC 60529)						
Materials	Housing: Painted aluminum, Yellow, RAL 1018 Front Window: Acrylic Lexan Red end cap: PA6 (Standalone models), Transparent end cap: PC (Advanced standalone models), Die cast aluminium (Master-, Slave models) Sealing Gasket: EPDM Mounting Bracket: Cold rolled Steel						
Suitable for safety control systems	PLc (ISO 13849-1)	PLe (ISO 13849-1)					
Category	Categorie 2	Categorie 4					
PFHd	2,5 × 10 ⁻⁹	·					
Proof test interval	every 20 years						

Dimensions

F3S-TGR-CL system data with 14 mm, 35 mm and 70 mm resolution



- L: Total length of the F3S-TGR-CL system
- F: Protective height where an object equal or greater the resolution is detected
- E: Detection zone
- A: Dead zone without detection capability

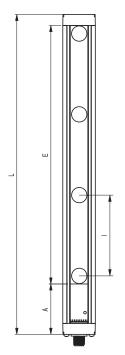
Standalone and Master models

Model cod	le	150	300	450	600	750	900	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400
Stand-	L [mm]	217	364	511	658	805	952	1,099	1,246	1,393	1,540	1,687	1,834	1,981	2,128	2,275	2,422
alone and Master	E [mm]	147	294	441	588	735	882	1,029	1,176	1,323	1,470	1,617	1,764	1,911	2,058	2,205	2,352
models	Weight [kg]	1.0	1.4	1.9	2.5	3.0	3.6	4.1	4.7	5.3	5.8	6.4	7.0	7.5	8.1	8.6	9.2
14 mm	F [mm]	161	308	455	602	749	896	1,043	1,190	1,337	1,484	1,631	1,778	1,925	2,072	2,219	2,366
35 mm	F [mm]	182	329	476	623	770	917	1,064	1,211	1,358	1,505	1,652	1,799	1,946	2,093	2,240	2,352
Mounting brackets (F39-TGR-ST-SB) included in shipment		4					6		8		10			12			

Slave models

Model co	de	150	300	450	600	750	900	1050	1200	1350	1500	1650	1800	1950	2100	2250
Slave models	L [mm]	172	319	466	613	760	907	1,054	1,201	1,348	1,495	1,642	1,798	1,936	2,083	2,230
	E [mm]	147	294	441	588	735	882	1,029	1,176	1,323	1,470	1,617	1,764	1,911	2,058	2,205
	Weight [kg]	0.8	1.2	1.7	2.3	2.8	3.4	3.9	4.5	5.1	5.6	6.2	6.8	7.3	7.9	8.4
14 mm	F [mm]	161	308	455	602	749	896	1,043	1,190	1,337	1,484	1,631	1,778	1,925	2,072	2,219
35 mm	F [mm]	182	329	476	623	770	917	1,064	1,211	1,358	1,505	1,652	1,799	1,946	2,093	2,240
70 mm	F [mm]	-	347	_	641	-	931	-	1,229	-	1,523	-	1,817	-	2,111	-
Mounting brackets (F39-TGR-ST-SB) included in shipment		4			•		6			8	•	10			12	•

F3S-TGR-CL-K system data

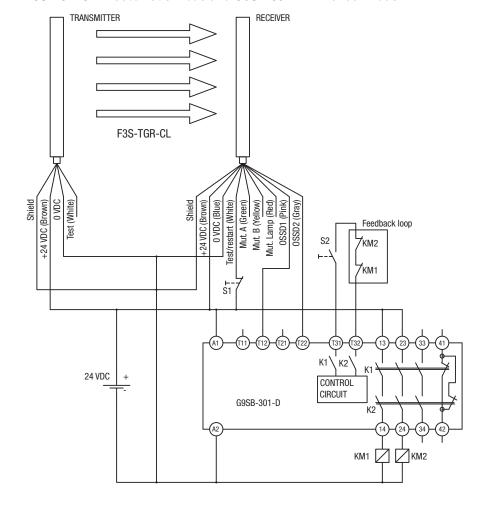


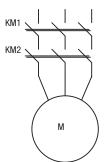
- L: Total length of the F3S-TGR-CL system
- I: Beam distance
- E: Detection zone
- A: Dead zone without detection capability

Model cod	le	500	800	900	1200
all models	L [mm]	682	982	1,082	1,382
	E [mm]	518	818	918	1,218
	Weight [kg]	2.3	3.2	4.1	4.9
	I [mm]	500	400	300	400
Mounting by (F39-TGR-included in	·ST-SB)	4		6	

Wiring example

F3S-TGR-CL in automatic mode and G9SB-301-D in manual mode





Note: This circuit achieves up to PLe according to EN ISO 13849-1 with F3S-TGR-CL4 and up to PLc according to EN ISO 13849-1 with F3S-TGR-CL2.

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Cat. No. F07E-EN-03

In the interest of product improvement, specifications are subject to change without notice.

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