

F39-TGR-MCL_

Muting Activator for
F3S-TGR-CL
Safety Sensors

**Installation and operation manual
Original instruction**

**Addition to the
Installation and operation manual
F05E and F06E**

Notice:

OMRON products are manufactured for use according to proper procedures by a qualified operator and only for the purposes described in this manual.

The following conventions are used to indicate and classify precautions in this manual. Always heed the information provided with them. Failure to heed precautions can result in injury to people or damage to property.



DANGER Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage.

OMRON Product References

All OMRON products are capitalized in this manual. The word “Unit” is also capitalized when it refers to an OMRON product, regardless of whether or not it appears in the proper name of the product.

Visual Aids

The following headings appear in the left column of the manual to help you locate different types of information.



Note Indicates and emphasizes essential information of particular interest for efficient and convenient operation of the product.

1,2,3... 1. Indicates lists of one sort or another, such as procedures, checklists, etc.

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Read and understand this document

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1 Safety precautions

In order to use the F3S-TGR-CL safety sensor together with a F39-TGR-MCL_ muting actuator, the precautions listed in this manual indicated by alert symbols and descriptions must be followed in addition to the precautions listed in the manual of the F3S-TGR-CL safety sensor. Failure to follow all precautions and alerts may result in an unsafe use or operation. For additional information, please refer to the:

- F05E-EN-0x Installation and operation manual for F3S-TGR-CL Finger- and hand protection sensors
- F06E-EN-0x Installation and operation manual for F3S-TGR-CL Body protection sensors
- F07E-EN-0x Precautions for F3S-TGR-CL safety sensor range

The following indications and symbols are used for the application:



WARNING This sign indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.

2 Alert statements in this manual

The alert statements shown in this manual are specific for the F39-TGR-MCL_ muting actuators. Refer to the installation and operation manual of the safety sensor for alert statements that are specific for the safety sensor.

2.1 For users



WARNING When changes are made to each function using the selector switches, the administrator must manage the detail of the changes and perform the changes. Accidental functional setting change may result in a serious injury.

2.2 For installations



WARNING After unpacking and before installing the F39-TGR-MCL_ system please check the mechanical condition of the system carefully. Do not install a mechanically damaged product. Return this to your OMRON service for inspection or repair. Failure to do so may result in serious injury.



WARNING Do not drop the products. Dropping the products may lead to internal or external damage. Please return a F39-TGR-MCL_ system that was dropped on the floor to your OMRON service for inspection or repair. Failure to do so may result in serious injury.



WARNING Make sure to test the operation of the F39-TGR-MCL_ system after installation to verify that the F39-TGR-MCL_ system operates as intended. Make sure to stop the machine until the test is complete. Unintended function settings may cause a person to go undetected, resulting in serious injury.



WARNING The muting and override functions disable the safety functions of the device. You must ensure safety using other method when these functions are operating.



WARNING Install muting sensors so that they can distinguish between the object that is being allowed to pass through the detection zone and a person. If the muting function is activated by the detection of a person, it may result in serious injury.



WARNING A sufficiently trained and qualified person must properly configure muting related timings for its specific application, and that person must have responsibility for settings, especially when the muting time limit is infinite.



WARNING Do not place fluorescent and/or incandescent lights within the effective aperture angle of the receiver, as it may influence the F39-TGR-MCL_ system under certain circumstances.



WARNING When using more than 1 set of F39-TGR-MCL_ system, install them so that mutual interference does not occur.



WARNING Make sure that the F39-TGR-MCL_ system is securely mounted and its cables and connectors are properly connected.



WARNING Make sure that foreign objects such as water, oil, or dust do not enter the inside of the F39-TGR-MCL_ system while the cover for the selector switches is open and tighten the screws of the cover firmly after changing the settings.

2.3 For wiring



WARNING Do not connect each line of F39-TGR-MCL_ system to a DC power supply of more than 24 VDC+20%. Also, do not connect to an AC power supply. Failure to do so may result in electric shock.



WARNING For the F39-TGR-MCL_ system to comply with IEC 61496-1 and UL 508, the DC power supply unit must satisfy all of the following conditions:

- Must be within the rated power voltage (24 V DC \pm 20%)
- Must have tolerance against the total rated current of devices if it is connected to multiple devices
- Must comply with EMC directives (industrial environment)
- Double or reinforced insulation must be applied between the primary and secondary circuits
- Automatic recovery of over-current protection characteristics
- Output holding time must be 200 ms or longer
- Must satisfy output characteristic requirements for class 2 circuit or limited voltage current circuit defined by UL508
- Must comply with laws and regulations, regarding EMC and electrical equipment safety, of the country or region where the F3S-TGR-CL system is used (Ex: In EU, the power supply must comply with the EMC Directive and the Low Voltage Directive).



WARNING Double or reinforced insulation from hazardous voltage must be applied to all input and output lines. Failure to do so may result in electric shock.



WARNING Extension of the cable must be within a specified length. If it isn't, safety function may not work properly, resulting in danger.

2.4 Other



WARNING Do not try to disassemble, repair, or modify this product. Doing so may cause the safety functions to stop working properly.



WARNING Do not use the F39-TGR-MCL_ system in environments where flammable or explosive gases are present. Doing so may result in an explosion.



WARNING Perform daily and 6-monthly inspections for the F39-TGR-MCL_ system. Otherwise, the system may fail to work properly, resulting in serious injury.



WARNING If the F39-TGR-MCL_ system is used in an environment where foreign materials such as spatter may adhere to the product, use a cover to protect the F39TGR-MCL_ system or inspect and clean the F39-TGR-MCL_ system periodically.



WARNING Do not use the F39-TGR-MCL_ system in an atmosphere containing oil mist or corrosive gas. Failure to do so may result in damage of the product.



WARNING When scrapping the F39-TGR-MCL_ system, please make sure to comply with the waste treatment regulations of the country where the product has been used.

2.5 Precautions for Safe Use

Make sure to observe the following precautions that are necessary for ensuring safe use of the product.

- Thoroughly read this manual and understand the installation procedures, operation check procedures, and maintenance procedures before using the product.
- Do not drop the product
- Dispose of the product in accordance with the relevant rules and regulations of the country or area where the product is used.

2.6 Precautions for Correct Use

Observe the precautions described below to prevent operation failure, malfunctions, or undesirable effects on product performance.

2.7 Installation environment

Do not install the F3S-TGR-CL system in the following types of environments:

- Areas exposed to intense interference light, such as direct sunlight
- Areas with high humidity where condensation is likely to occur
- Areas where corrosive gases are present
- Areas exposed to vibration or shock levels higher than in the specification provisions
- Areas where the product may come into contact with water
- Areas where the product may come into contact with oil that is an adhesive solvent

Do not use radio equipment such as cellular phones, walkie-talkies, or transceivers near the F39-TGR-MCL_ system.

2.8 Wiring and installation

- Make sure to perform wiring while the power supply is OFF. Otherwise, the F39-TGR-MCL_ system may fail to operate due to the diagnosis function.
- When replacing the cable connectors with other types of connectors, use connectors that provide a proper grade of protection.
- Do not operate the control system until 2 seconds or more (2.2 seconds or more in case of series connection) after turning ON the power of the entire F3S-TGR-CL system.
- Be sure to route the F3S-TGR-CL system cable separate from high potential power lines or through an exclusive conduit.
- When using a commercially available switching regulator power supply, make sure to ground the FG terminal (frame ground terminal).
- Install the transmitter and receiver so that their vertical direction should match.



WARNING When substituting/replacing the F39-TGR-MCL_ system with an equivalent F39-TGR-MCL_ system, remember to set the dip-switches of the new F39-TGR-MCL_ system the same as the old one. Failure to do so may cause serious injury or undesired loss of muting capability.

2.9 Cleaning

Do not use thinner, benzene, or acetone for cleaning, they affect the product's resin parts and paint on the case.

3 System overview

3.1 Intended use

The F39-TGR-MCL_ muting actuators are accessories for the F3S-TGR-CL series of safety sensors. Direct connection to the F3S-TGR-CL safety system is supported by using the optional connection box. The muting actuators are available in two versions:

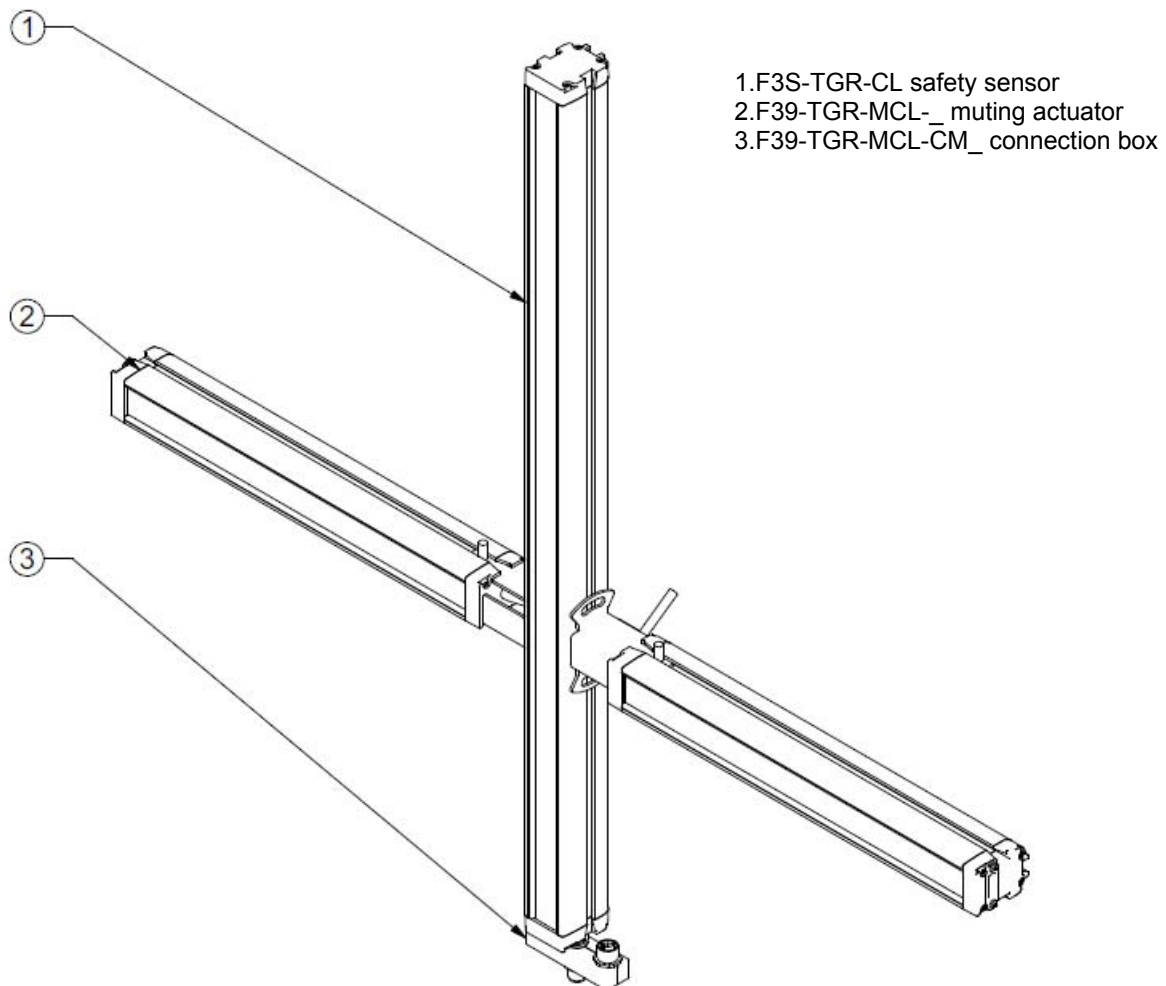
F39-TGR-MCL is a system of active transmitter and receiver and can be used with:	F39-TGR-MCL-R is a system of active transceiver and passive reflector side and can be used with:
F3S-TGR-CL_-K_-___ (body protection guards)	F3S-TGR-CL_-K-C-___ (body protection guards)
F3S-TGR-CL_-035-___ (hand protection guards)	
F3S-TGR-CL_-014-___ (finger protection guards)	

The muting actuators F39-TGR-MCL and F39-TGR-MCL-R and the connection boxes can be used in either T- or L-Muting applications.



Note Do not use the F39-TGR-MCL_ muting actuators together with other safety sensors than F3S-TGR-CL series. Failure to do so may cause damage of the safety sensor or the muting actuators.

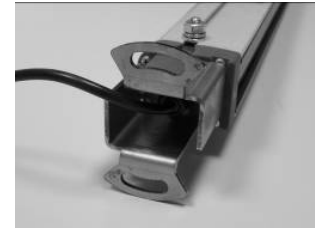
3.2 System components



4 Mechanical setup in 4 steps:

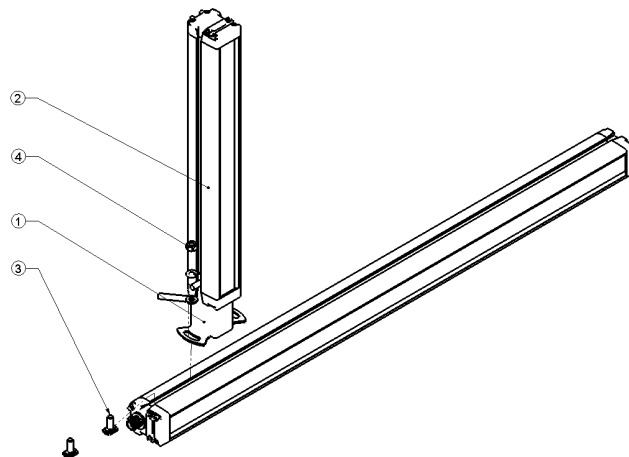
1) First mount the F3S-TGR-CL safety sensor.

2) The mounting brackets are pre-mounted on the muting actuators as shown in the picture

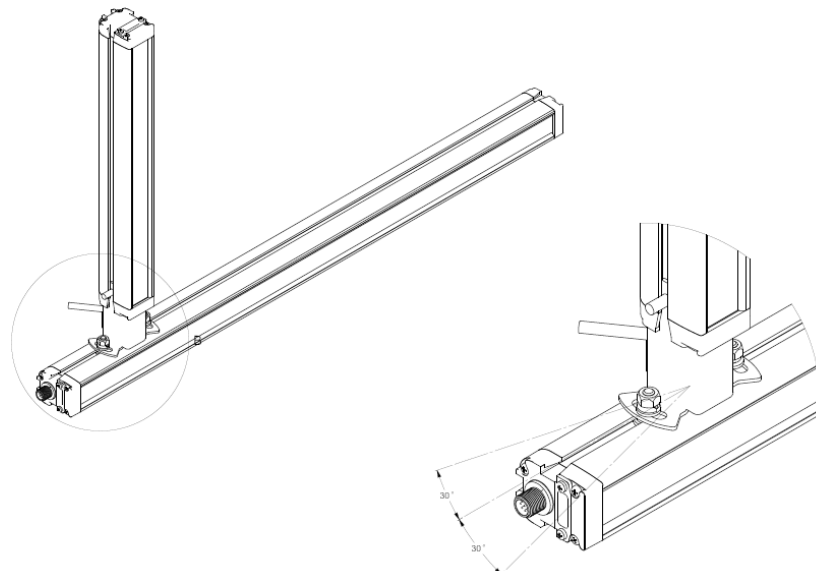


3) The muting actuators of the F39-TGR-MCL – system as well as the muting actuator and the reflector part of the F39-TGR-MCL-R – system are directly mounted to the side of the F3S-TGR-CL_ safety sensor, using the included bolts, washers and nuts:

- 1) Fixing bracket
- 2) F39-TGR-MCL-_ Muting Actuator
- 3) Bolts (2 per F39-TGR-MCL-_)
- 4) Washers and Nuts



4) The alignment is done vertically by using the T-nuts and by turning the muting actuators in the adjustment range provided by the mounting bracket (up to 30° in both directions).



Perform the electrical installation according to chapter 5 after finalizing the four steps.

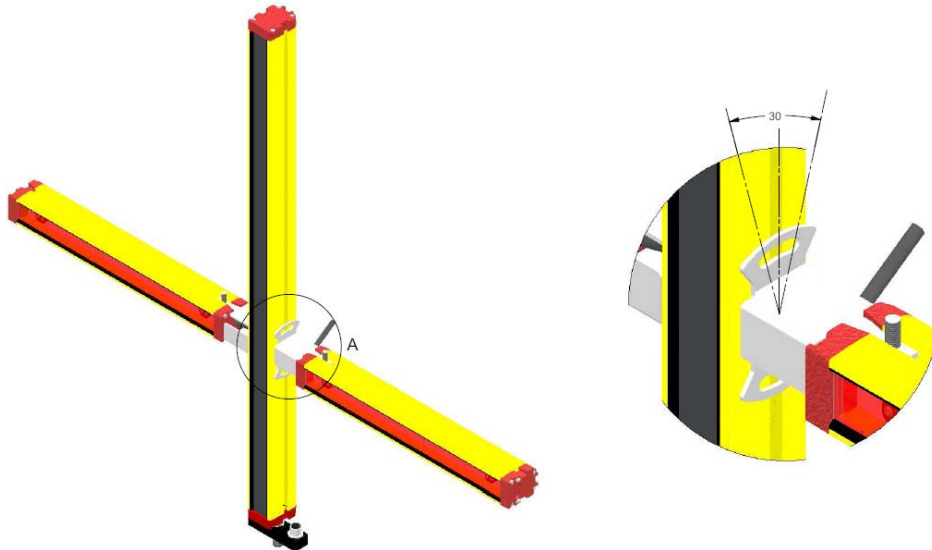
5 Electrical installation and system setup

5.1 General

Simple wiring of the entire system is provided by the pre-wired muting actuators and the connection boxes:

F39-TGR-MCL-CML: Connector box for the transmitter side of an active/active system
eg. F3S-TGR-CL_-K2-500 + F39-TGR-MCL

F39-TGR-MCL-CMD: Connector box for the Receiver side of an active/active system
eg. F3S-TGR-CL_-K2-500 + F39-TGR-MCL or
Transceiver side of an active/passive system
eg. F3S-TGR-CL_-K2C-500 + F39-TGR-MCL-R



5.2 Wiring and setup of the system

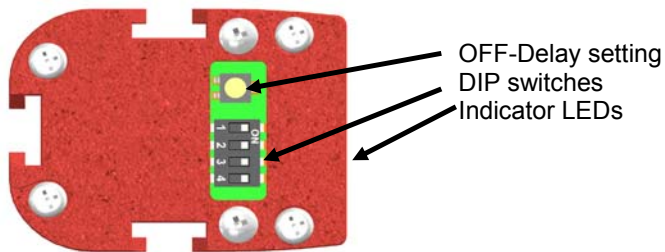
- 1) disconnect the power supply to the F3S-TGR-CL safety sensor system
- 2) Set the required muting mode in the F3S-TGR-CL safety sensor by using the DIP switches as described in the F05 or F06 manual. Please make sure to reinstall the cover after setting the DIP-switches.
- 3) Connect the
 - a. F39-TGR-MCL-CML connection box to the transmitter in an active/active system
 - b. F39-TGR-MCL-CMD connection box to the receiver in an active/active system
 - c. F39-TGR-MCL-CMD connection box to the transceiver in an active/passive system
 Remark: no wiring is needed on the passive side of an active/passive system
 Remark: both F39-TGR-MCL-CM_ connection boxes can be used in T- or L- muting applications
- 4) Connect each muting actuator to the connection box by using the M12 connectors
- 5) Set the DIP-switches on the F39-TGR-MCL muting actuators for the correct sequence of the muting signals as shown in chapter 5.3 in this manual.
- 6) Connect the power supply
- 7) Align the F3S-TGR-CL safety sensor as shown in the F05E-EN-0x or F06E-EN-0x - manual
- 8) Align the F39-TGR-MCL_ muting actuators as shown in chapter 5.6 in this manual.
- 9) Adjust the timing of the muting signals if needed.

5.3 Installation and selection of the activation sequence

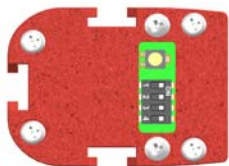
Since the muting actuators can be either used in T- and L-muting, the activation sequence can be modified according to the application using DIP-switches. Indicator LEDs on receiver of the F39-TGR-MCL – system and on the transceiver of the F39-TGR-MCL-R – system show the status of the Muting signals MUT A and MUT B and if OFF-delay is active. The LEDs are visible from the front side. They are located next to the endcap where the DIP-switches are located.




By default the Sensor 1 is linked to the MUT A signal output and Sensor 2 is linked to the MUT B signal output. DIP switches are located at the end of the muting actuator under a removable cover.



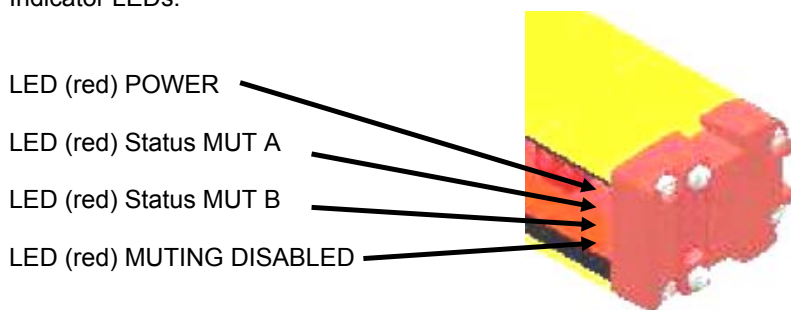
DIP switches setting:



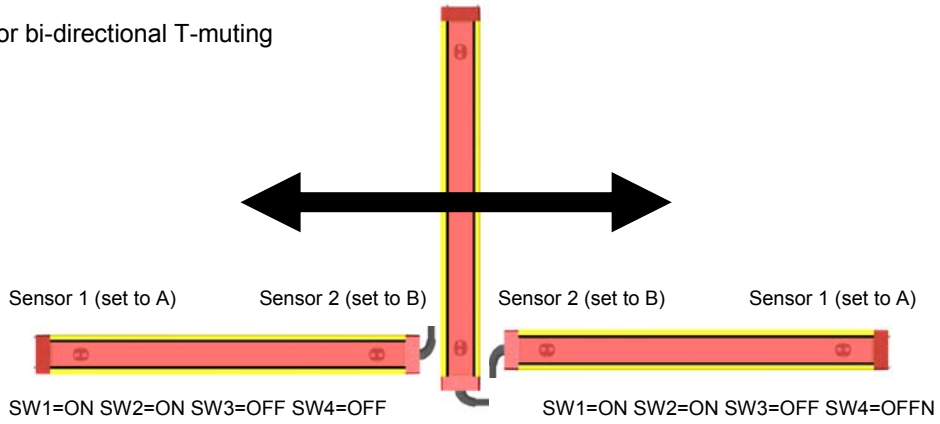
	Sensor 1 linked to	Sensor 2 linked to
SW1 ON SW2 ON SW3 OFF SW4 OFF	MUT A signal output	MUT B signal output
SW1 OFF SW2 OFF SW3 ON SW4 ON	MUT B signal output	MUT A signal output

 **Note** Incorrect setting of the DIP-switches may damage the muting actuator.

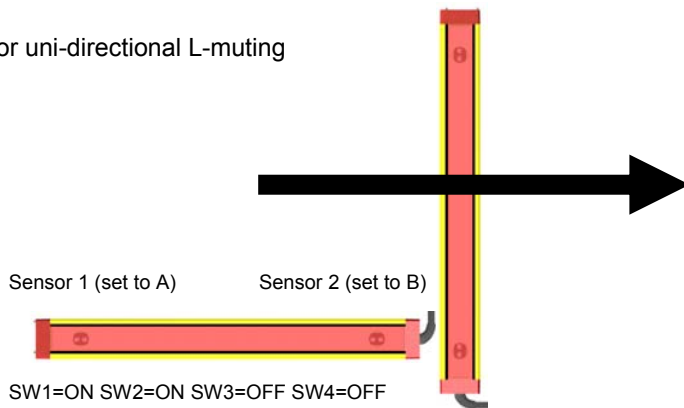
Indicator LEDs:



5.4 Example for bi-directional T-muting



5.5 Example for uni-directional L-muting

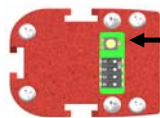


5.6 Adjusting the off-delay time for the muting sensors

The timing requirements mentioned in the F05 and F06 manuals have to be met when using the muting actuators. To change the timing of the muting sensors according to the application make use of the adjustment located next to the DIP switches in the end-cap. This adjustment provides an OFF-delay function to cover short signal drops caused by e.g. gaps between boxes on a pallet or reflective surfaces. The setting range is $0,2s \leq \text{OFF-delay} \leq 1s$.

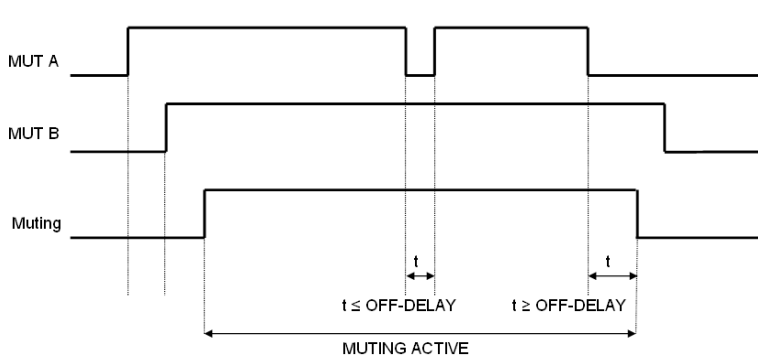


WARNING Make sure to consider the use of the OFF-delay in the risk assessment process and make sure to use proper safety distance. Failure to do so may result in serious injury.



Adjustment of muting sensor OFF-delay

5.7 Timing diagram:



Muting remains active if $t \leq \text{OFF-delay}$
 Muting stops if $t \geq \text{OFF-delay}$

6 Technical Data

6.1 Electrical and optical data

Power supply	24 Vdc \pm 20%.	
Consumption	5W max (F39-TGR-MCL-_ only)	
Off delay time Response time (ON to OFF)	F39-TGR-MCL-R	20ms to 1s
	F39-TGR-MCL	120ms to 1s
Reset time (OFF to ON)	F39-TGR-MCL-R	10ms
	F39-TGR-MCL	100ms
Ambient temperature	During operation; -10 to + 55 °C (With no dew condensation)	
Ambient humidity	15% to 95% (non condensing).	
Cable connector	Length	30cm pre-wired
	RX	M12 5 pins female + insulation
	TX	M12 5 pins female + insulation
Indicator LEDs	RX	Red POWER Red Status MUT A Red Status MUT B Red muting disable
	TX	Red POWER
Metal housing (Al) painted	Yellow (RAL 1018)	
Degree of protection	IP65	
Materials	Case; Aluminium Cap; Red PC Front Cover; Polycarbonate red	
Weight	1kg each unit	

Optical data F39-TGR-MCL	Through-beam system
Operating distance:	0 ... 7m; max. 0 ... 8,4m
Light source	Red emitting LEDs, Wavelength 630nm

Optical data F39-TGR-MCL-R	Polarized retro-reflective system
Operating distance:	0 ... 4m; max. 0 ... 4,8m
Light source	Red emitting LEDs, Wavelength 660nm

6.2 Muting system connection to the control cabinet

Active/passive system F39-TGR-MCL-R Transceiver (F39-TGR-MCL-CMD is used):

Front View	Pin.No	Signal Name	Wire Color
	1	Test and Reset Input	White
	2	+24Vdc	Brown
	3	No connect	Green
	4	Muting disable	Yellow
	5	OSSD1(OUT 1)	Gray
	6	OSSD2(OUT 2)	Pink
	7	0Vdc	Blue
	8	Muting Lamp	Red

Active/active system F39-TGR-MCL-L Transmitter (F39-TGR-MCL-CML is used):

Front View	Pin.No	Signal Name	Wire Color
	1	+24Vdc	Brown
	2	Test Input	White
	3	0Vdc	Blue
	4	No connect	Black

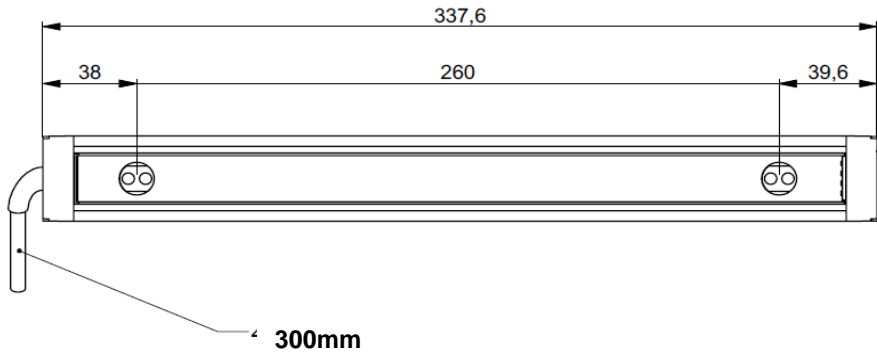
Active/active system F39-TGR-MCL-D Receiver (F39-TGR-MCL-CMD is used):

Front View	Pin.No	Signal Name	Wire Color
	1	Test and Reset Input	White
	2	+24Vdc	Brown
	3	No connect	Green
	4	Muting disable	Yellow
	5	OSSD1(OUT 1)	Gray
	6	OSSD2(OUT 2)	Pink
	7	0Vdc	Blue
	8	Muting Lamp	Red

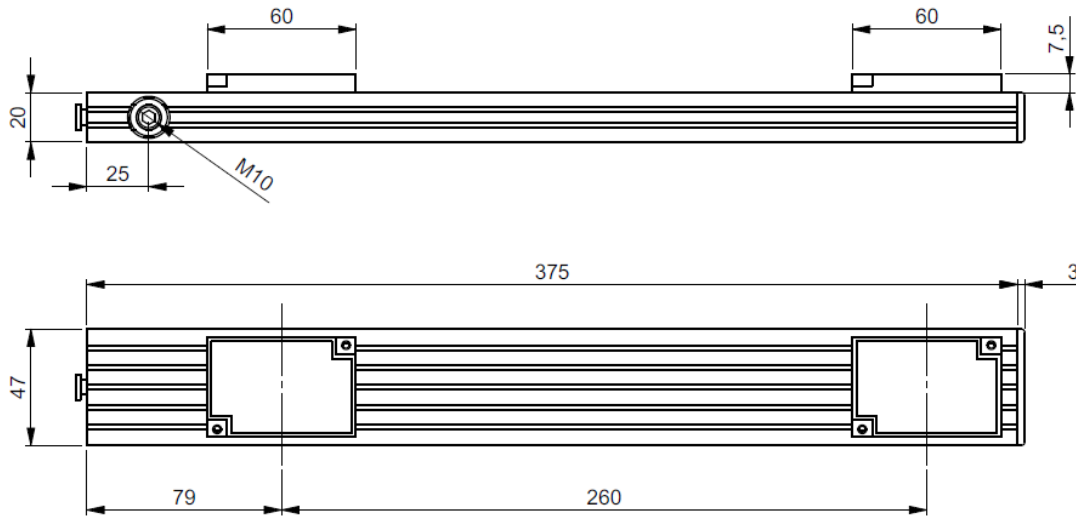
6.3 Dimensions

Active/passive system F39-TGR-MCL-R

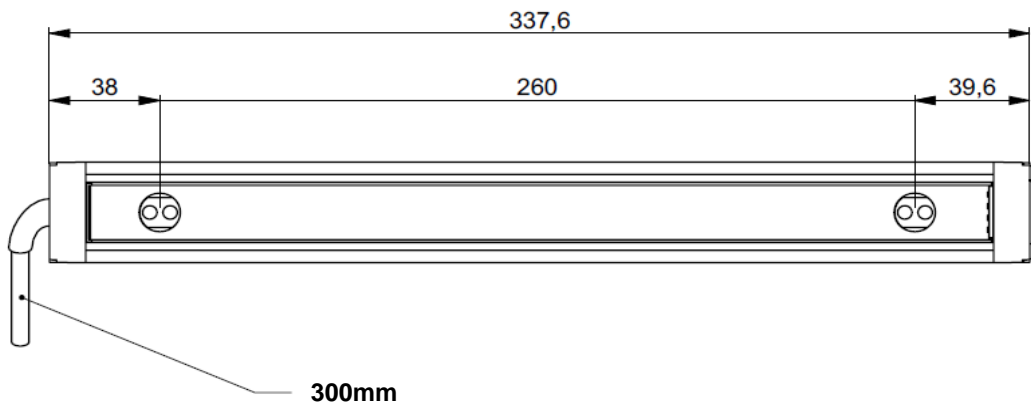
Active part F39-TGR-MCL-R-A:



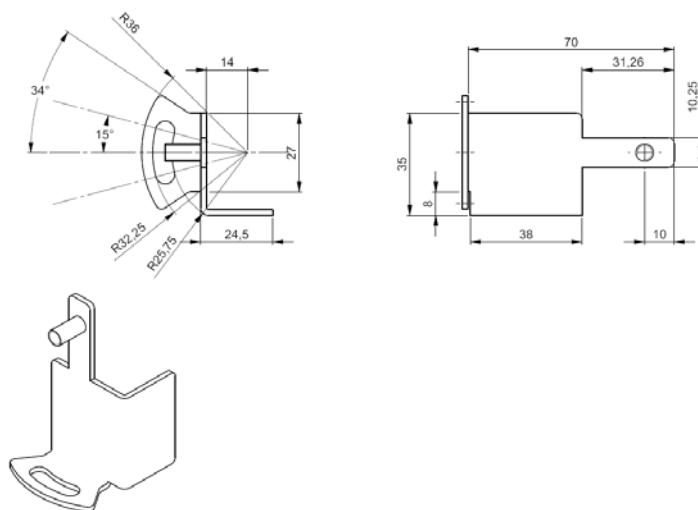
Passive part F39-TGR-MCL-R-P



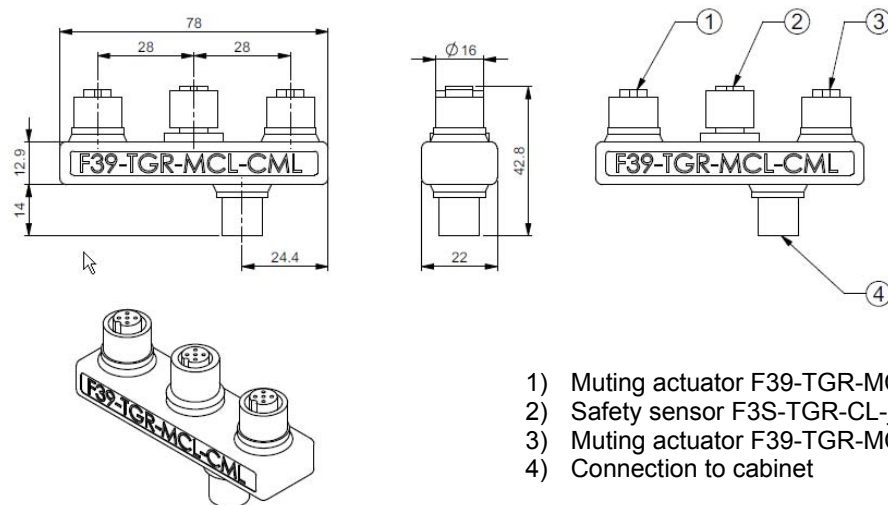
Active/active – system F39-TGR-MCL, Transmitter and receiver part



Mounting bracket F39-TGR-MCL-ST (included in shipment):

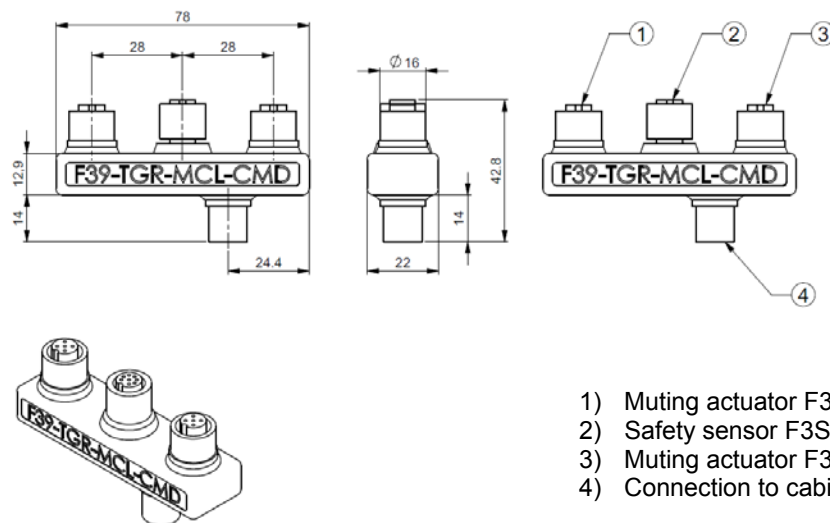


Connection box for Transmitter F39-TGR-MCL-CML:



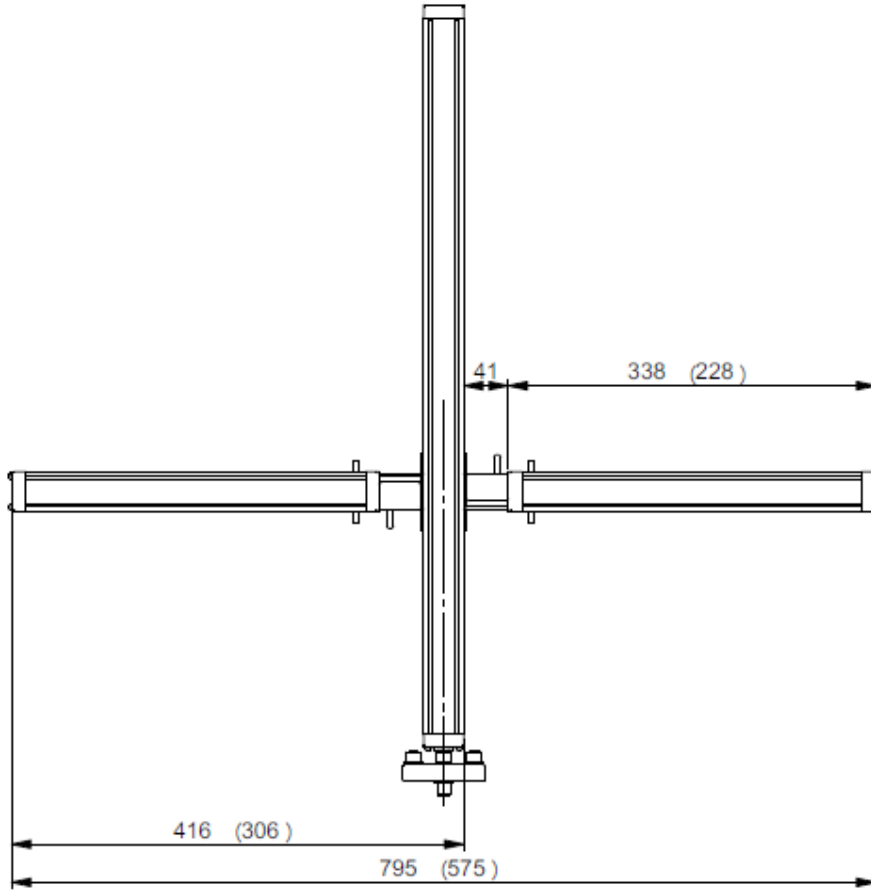
- 1) Muting actuator F39-TGR-MCL-
- 2) Safety sensor F3S-TGR-CL-
- 3) Muting actuator F39-TGR-MCL-
- 4) Connection to cabinet

Connection box for Receiver and Transceiver F39-TGR-MCL-CMD:



- 1) Muting actuator F39-TGR-MCL-
- 2) Safety sensor F3S-TGR-CL-
- 3) Muting actuator F39-TGR-MCL-
- 4) Connection to cabinet

6.4 T-Muting system, typical setup



7 Applications

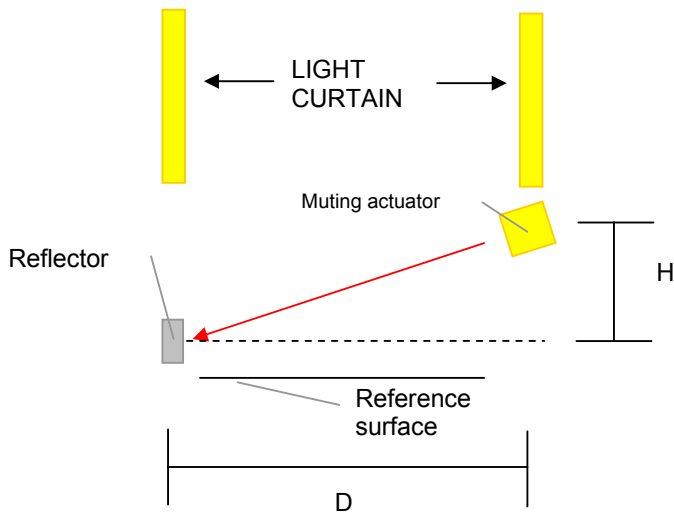
7.1 General

For details on the muting applications, please refer to the relevant part of the F05E-__-__ or F06E-__-__ safety sensor manual.

7.2 Adjustment when shiny surfaces or foil is used with F39-TGR-MCL-R

Particular goods passing through the F39-TGR-MCL-R sensors can create spurious reflections. Those unwanted reflections can generate a non-correct behaviour of the sensor resulting in a loss of muting function and result in the stop of the machine.

To avoid the direct reflections on the shiny surface, please align the F39-TGR-MCL-R muting actuators as shown in the picture below:



Suggested
is a function of the

D (mm)	H (mm)
750	75
1000	100
2000	200
3000	300

difference in height H is shown in the table and operating distance D of the safety sensor:



NOTE To avoid malfunction, the minimum distance between reflector and active part should be more than 750mm

8 Troubleshooting

This section helps to solve problems during mechanical and/or electrical setup of muting activator:

PROBLEM	Action		
The LEDs are not lit.	Check the cable connection and the wiring on the connection box.		
Mut A and Mut B red LEDs are always on	Check the alignment of unit.		
	Check the unit by decreasing the distance between the two parts of the muting actuator.		
A package is not recognized during crossing the light curtain	Check if in normal conditions without any package the red led of muting in the unit are off.		
	Check the muting lamp connection or the bulb.		
	Check the correct cabling of the whole systems, the connector strength the power supply voltage.		
	T configuration	Check if the muting actuator is properly placed. During the complete crossing of SLC the muting activator has to have at least mut A and mut B input triggered on, otherwise the muting drops.	
A package is recognized during crossing the light curtain	Check if the conveyor speed respects the minimum timing requirements shown in the F05E-__-__ and F06E-__-__ manuals.		
	Check if the muting mode is set correct by using the DIP switches of the safety sensor.		
	Check if some unpredictable reflection causes the drop of muting function.		
	L configuration	Check if the goods crossing the light curtain do not present holes that can drop the muting function.	
		Check if the conveyor speed respects the minimum timing requirements shown in the F05E-__-__ and F06E-__-__ manuals.	
		Set the off-delay timing accordingly to cover gaps or holes in the passing material.	

9 Accessories

Muting actuators for active/active safety sensors:

Set, consisting of Transmitter and Receiver unit
Transmitter
Receiver

F39-TGR-MCL
F39-TGR-MCL-L
F39-TGR-MCL-D

Muting actuators for active/passive safety sensors:

Set, consisting of Transceiver and reflector unit
Transceiver
Reflector unit

F39-TGR-MCL-R
F39-TGR-MCL-R-A
F39-TGR-MCL-R-P

Connection box:

Transmitter
Transceiver and Receiver

F39-TGR-MCL-CML
F39-TGR-MCL-CMD

Mounting brackets

F39-TGR-MCL-ST

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

Receiver Cable, 2m length
Receiver Cable, 5m length
Receiver Cable, 10m length
Receiver Cable, 20m length
Receiver Cable, 25m length

F39-TGR-CVL-B-2-R
F39-TGR-CVL-B-5-R
F39-TGR-CVL-B-10-R
F39-TGR-CVL-B-20-R
F39-TGR-CVL-B-25-R

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

Transmitter Cable, 2m length
Transmitter Cable, 5m length
Transmitter Cable, 10m length
Transmitter Cable, 20m length
Transmitter Cable, 25m length

F39-TGR-CVL-B-2-E
F39-TGR-CVL-B-5-E
F39-TGR-CVL-B-10-E
F39-TGR-CVL-B-20-E
F39-TGR-CVL-B-25-E

10 Declaration of conformity

Ref.nr.: FTGR-010701



EC DECLARATION OF CONFORMITY

We hereby declare that the following product is in conformity with requirements of the following EC Directives:

Product: MUTING ACTIVATOR for F3S-TGR-CL safety light curtain
Types: F39-TGR-MCL_

Title and No. of Directive: EMC Directive, 2004/108/EC

YEAR CE MARK AFFIXED: 2010

These products are designed and manufactured in accordance with the following standards:

Electrical safety: Electronic equipment used in power installation EN50178:1997

Electromagnetic immunity: Electro sensitive protective equipment EN61496-1:2004

Electromagnetic Emission: Industrial, scientific and medical equipment EN55011:2007

Description of Product:

The F39-TGR-MCL series are electro-sensitive detection equipment designed specifically to ease the connection of Muting inputs on F3S-TGR-CL light curtain. F39-TGR-MCL works with through beam techniques.

Product covered:

F39-TGR-MCL; F39-TGR-MCL-150;

Notified body:

Teseo S.P.A.
C.so Flemin 25 Druento (Italy)

Responsible person for documentation:

Enzo Romano, OMRON Europe B.V. Via Torino 13/15
Poirino (TO) Italy

Manufacturer

Omron Europe B.V..
Via Torino 13/15
10046 Poirino (To)
ITALIA

Date: 01/07/2010

E. Romano, Quality Assurance Manager



OMRON**EC DECLARATION OF CONFORMITY**

We hereby declare that the following product is in conformity with requirements of the following EC Directives:

Product: MUTING ACTIVATOR for F3S-TGR-CL safety light curtain
Types: F39-TGR-MCL-R_

Title and No. of Directive: EMC Directive, 2004/108/EC

YEAR CE MARK AFFIXED: 2010

These products are designed and manufactured in accordance with the following standards:

Electrical safety: Electronic equipment used in power installation EN50178:1997

Electromagnetic immunity: Electro sensitive protective equipment EN61496-1:2004

Electromagnetic Emission: Industrial, scientific and medical equipment EN55011:2007

Description of Product:

The F39-TGR-MCL series are electro-sensitive detection equipment designed specifically to ease the connection of Muting inputs on F3S-TGR-CL light curtain.
F39-TGR-MCL-R works with retro-reflection techniques.

Product covered:

F39-TGR-MCL-R; F39-TGR-MCL-R-150;

Notified body:

Teseo S.P.A.
C.so Fleming 25 Druento (Italy)

Responsible person for documentation:

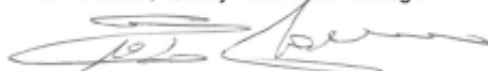
Enzo Romano, OMRON Europe B.V. Via Torino 13/15
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Manufacturer

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Via Torino 13/15
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Date: 01/07/2010

E. Romano, Quality Assurance Manager



OMRON

Authorised Distributor: