

Safety Light Grids and Safety Light Curtains

Focus II



A light grid/light curtain with many possibilities

Focus II is a new version of our previous light beam/light curtain Focus. Features such as muting and override are standard in all Focus II light curtains and light beams. For light curtains, blanking and break functions are also standard. The optical sensors on Focus II also have variable frequency. The Focus II units are light grids/curtains with safety functions intended for applications where it is of great importance to protect persons from a dangerous machine, robot or other automated systems where it is possible to access to a dangerous area.

Focus II creates a protection field with infrared beams. If any beam is interrupted the safety mechanism is triggered and the dangerous machine is stopped. Focus II fulfills the requirements for non-contact safety equipment type 2 (Focus 2 series) and type 4 according to the international regulation standard EN 61496-1.

Units are available with safety heights between 150 and 2400 mm. All electronic control and monitoring functions are included in the light curtain profiles. External connec-

tion is made via a M12 connection at the end of the profile. Synchronization between transmitter and receiver is achieved optically. No electrical connection between the units is required. Control and monitoring of the beam transmission is carried out by two micro-processors which also give information on the status and alignment of the light curtain via several LEDs.

Muting and Override included in all Focus II

The "Muting" and "Override" functions are available on all Focus II light grids/curtains and is enabled directly when an indication lamp LMS is connected. Muting implies that one or more segments or the whole light curtain can be bypassed during in and out passage of material.

In the Focus II with Muting there is also an Override function which makes it possible to bypass the light grid/curtain i.e. activate the outputs if a machine start is necessary even if one or more light beams are interrupted. This is the case when the muting function is chosen and the A and B inputs

Approvals:



Application:

Optical protection in an opening or around a risk area

Features:

- Type 4 according to EN 61496
- Flexible assembly
- LED indication
- High protection class (IP65)
- Range 3-40 m
- Time reset
- Fixed / floating blanking
- Muting
- Single/Double Break funktion
- External Device Monitoring (EDM)
- Available with different resolutions
- Up to PL e according to EN 954-1/EN ISO 13849-1

are activated. If for example during the muting operation a loading pallet has stopped inside the safety field after a voltage loss, the override function is used to enable the pallet to be driven clear.

Floating blanking or fixed blanking

It is also possible to obtain the Focus II light grids/curtains with either "floating blanking or fixed blanking". Floating blanking makes it possible to 'disconnect' a defined number of beams from the safety field. The object is then free to move in the safety field without the safety function being triggered. During "fixed blanking" the object is not able to move in the safety field. The other beams are active with normal resolution.

Safety outputs OSSD1 and OSSD2

Focus II has two PNP outputs - OSSD1 and OSSD2. If the load to be switched is alternating current or requires a higher current than 500 mA then one should use a safety relay e.g. RT9, Pluto PLC or the FRM-1 unit (converts the outputs to relay contacts) from ABB Jokab Safety. The FMC-Tina and Tina 10A/10B converts the outputs to a dynamic signal for connection to Pluto or Vital. Pluto can also work directly with the OSSD-outputs.

Single/Double Break function

This function is used for presses when the operator prepares or picks out a detail. With the Single Break function

the light curtain allows operation after entry and withdrawal out of the curtain. Similarly, the Double Break function allows operation after entry and withdrawal twice.

External Device Monitoring (EDM)

In all light beams and light curtains an EDM function is available which allows Focus II to test if the external control element responds correctly. A test channel is connected through the respective contactor, in order to detect any faults and thereby prevent a reset.

Reset

On every Focus II there are inputs for reset and other functions:

Reset, Alignment and Override (bypassing is only possible when muting is used.) The reset option is chosen through dual switches in the Focus II receiver. At delivery, Focus II is set to automatic reset.

- **Automatic reset** – When the light field is free the outputs are closed directly. (Setting when delivered).
- **Manual reset** – Focus II gives a ready signal when the light field is free and the reset button has been actuated.
- **Time reset** – During manual reset. To reset the Focus II a pre-reset button must first be actuated and after wards within 8 seconds a reset button outside the risk area must be actuated.

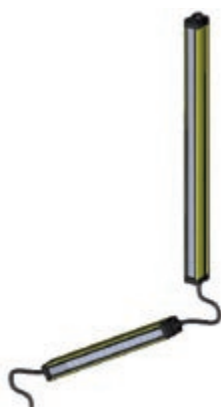
Focus II light curtain

Standard:

- Muting (bypassing) partly or completely
- Supervised output for muting lamp
- Override
- Manually supervised or automatic reset
- Time-reset
- Fixed or floating blanking
- Single/Double Break
- EDM

Option:

- CUT – a light curtain cascaded with another light curtain. The two light curtains can have different resolutions.



Focus II ljusbom

Standard:

- Muting (bypassing) of one, two, three or four beams
- Supervised output for muting lamp
- Override
- Manually supervised or automatic reset
- Time-reset.

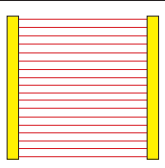
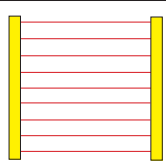
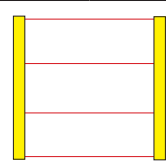
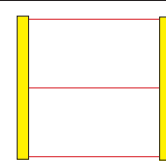
Option:

- Light grids for tough environments with parallel beams of light for improved reliability.



With the switches at the bottom of Focus II you can choose the function you desire.

Summary - Focus II light curtain/grid, Type 4 (FII-4)

				
Type 4	FII-4-14-zzzz	FII-4-30-zzzz	FII-4-K4-zzzz	FII-4-K3-800
Resolution	14	30	300 400	400
Height (mm=zzzz)	150 300 450 600 750 900 1050 1200 1350 1500 1650 1800 1950 2100 2250 2400	150 300 450 600 750 900 1050 1200 1350 1500 1650 1800 1950 2100 2250 2400	900 1200	800
Range (m) SR LR	0,2-3 3-6	0,2-7 7-14	0,5-20 20-40	0,5-20 20-40
Reaction time off (ms)	12-68	9-31	13	13
Reaction time on (ms)	138-104	141-119	142	142
Manual reset	•	•	•	•
Automatic reset	•	•	•	•
Pre reset	•	•	•	•
Muting inputs	•	•	•	•
Muting lamp supervision	•	•	•	•
Override	•	•	•	•
Muting T/L/X	• / • / •	• / • / •	• / • / •	• / • / •
Blanking 3 types	• / • / •	• / • / •	- / - / -	- / - / -
Single/Double break	• / •	• / •	- / -	- / -
EDM	•	•	•	•
Dyn. Adaption to Vital/Pluto	☒	☒	☒	☒

• Standard ☒ With Tina 10A/10B/10C or FMC-Tina

Note!

For ordering data and article number see the product list. For more information see the manual on our home page.

FII-4-K2-500	FII-4-K4-zzzz D	FII-4-K3-800 D	FII-4-K2-500 D	FII-4-K2C-zzzz	FII-4-K2C-800	FII-4-K1C-500		
500	300	400	400	500	300	400	800	500
500	900	1200	800	500	900	1200	800	500
0,5-20 20-40	0,5-20 20-40	0,5-20 20-40	0,5-20 20-40	0,5-7	0,5-8	0,5-12		
13	13	13	13	13	13	13		
142	142	142	142	142	142	142		
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Accessories

Muting-unit for Focus

Standard:

Muting (bypassing) of light curtain or light grid in one or two directions(L-form, T-form). The unit is connected directly to the light curtain/grid via a M12-connection.



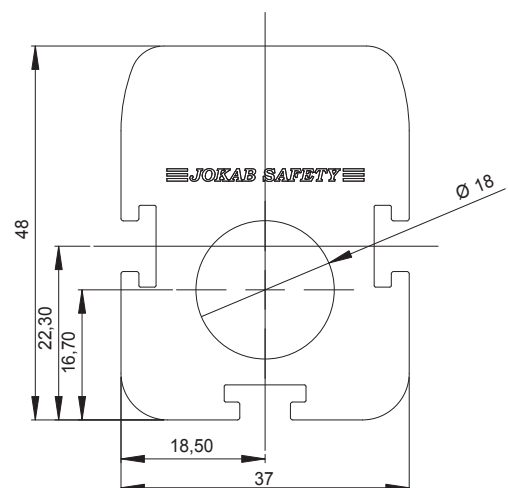
FMC-Focus Muting Connector med M12-kontakt

Standard:

FMC is a small, optimised connection block with M12 inputs. FMC is used for M12-connection of muting sensors, muting lamp, pre-reset (for time reset), reset button with indication, override and safety outputs.



Technical data – Focus II	
Manufacturer:	ABB AB/Jokab Safety, Sweden
Supply voltage:	24VDC ±20%
Power consumption:	
Transmitter	70 mA maximum
Receiver	100 mA maximum
Safety level	
EN/IEC 61496	Type 4
EN 954-1	Focus II type 4: Category 4
EN ISO 13849-1	Focus II type 4: PL e
EN/IEC 61508	SIL 3
PFH_d	2,5x10 ⁻⁹
Resolution:	14 mm and 30 mm
Wavelength on transmitter LED:	880 nm
Profile dimensions:	37 x 48 mm
Protection class:	IP65
Operating temperature:	-10 to +55° C
Storage temperature:	-25 to +70° C
Outputs:	2 supervised PNP outputs with cross circuit monitoring
Max. load:	500 mA (overload c.c. protection)
Response time:	9 – 68 ms (depending on model)
Connection transmitter:	M12 5-pin
Connection receiver:	M12 8-pin
Indikering:	Lysdioder på sändare och mottagare som indikerar injustering, smuts, matningsspänning och utgångar
Enclosure:	Aluminium painted yellow
Conformity:	2006/42/EG, EN/IEC 61496-1/2, EN 954-1, EN ISO 13849-1, EN/IEC 61508



Muting (bypassing)

- Focus II

Built-in muting for Focus is available in three ways:

- Pre-made muting units MFII-T and MFII-L, which have integral photo-cells. Units are manufactured with the same profile as Focus.
- Connection of muting sensors via a FMC.
- Separate connection of muting sensors (Mute R or Mute D) directly to the Focus receiver unit.

Muting-lamp

In the Focus receiver unit it is also possible to directly connect a muting-lamp. It is also possible to connect the muting-lamp via a FMC. During bypassing the muting-lamp is lit. Bypassing is only possible if the muting-lamp is functioning.

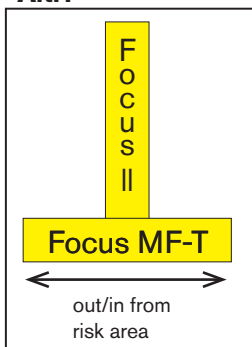
Conditions for muting

- a) Muting input A must be actuated at least 30ms before muting input B for muting to be possible.
- b) Muting is activated as long as the conditions are fulfilled. See also requirements for muting in IEC/TS 62046 chapters 4.7.3 and 5.5.

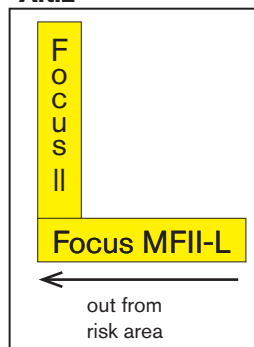
Muting with MFII-T and MFII-L units

MFII-T and MFII-L are muting units with integrated photo cells in the same profile type as the Focus light grid/curtain. No additional sensors are required because the muting units contain the required components. MFII-T/MFII-L is connected directly to Focus with M12-connectors.

Alt.1



Alt.2



M12 connection between Focus and MFII-T.

Alternative 3 (Alternative 4)

M12 to control cabinet

MFII-T (Diagram 1)

MFII-T contains four photo cells A1, B1, B2 and A2 arranged as shown. They are configured for installations where material is transported "in" or "out" or in both directions "in and out".

NOTE. All standard Focus light grids/curtains are delivered connected to function together with the MFII-T.

MFII-L (Diagram 2)

MFII-L contains two photo cells A1 and B1 which are actuated before exiting through the light grid/curtain. The light grid/curtain being bypassed just prior to the exit of the material.

NOTE. Unit MFII-L is primarily intended for material transport "out" of a working area. The standard Focus light grid/curtain delivered does not function together with the MFII-L version. They need to be ordered separately together with the MFII-L unit.

MFII-T Reflex (Alternative 3)

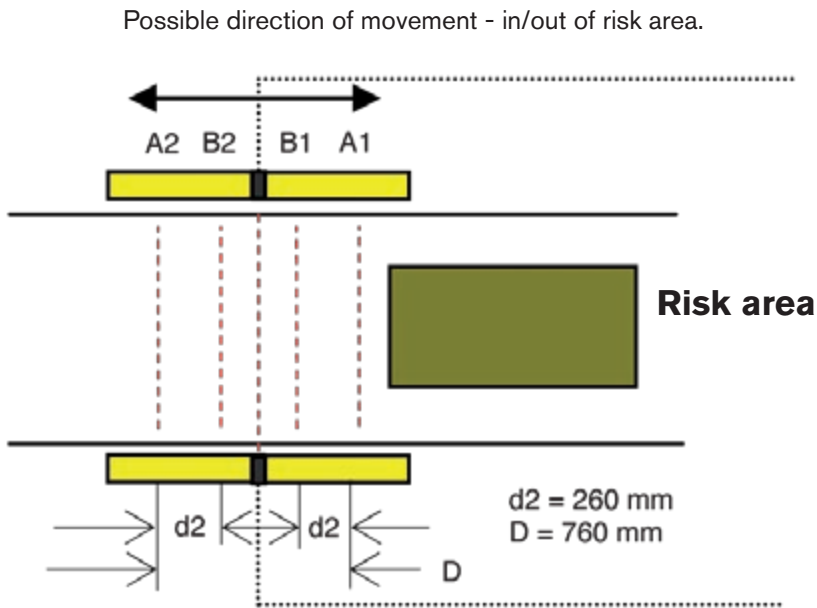
Contains four transmitters/receivers and a separate reflector unit. Range 6m. Used in the muting mode for transport of material into and/or out of hazardous areas. For other functions refer to Alternative 1. This unit, together with light beam F4-K1C-500 provides electrical connections on only one side!

MFII-L Reflex (Alternative 4)

Contains two transmitters/receivers and a separate reflector unit. Range 6m. Used in the muting mode for transport of material into and/or out of hazardous areas. For other functions refer to Alternative 2. This unit, together with light beam F4-K1C-500 provides electrical connections on only one side!

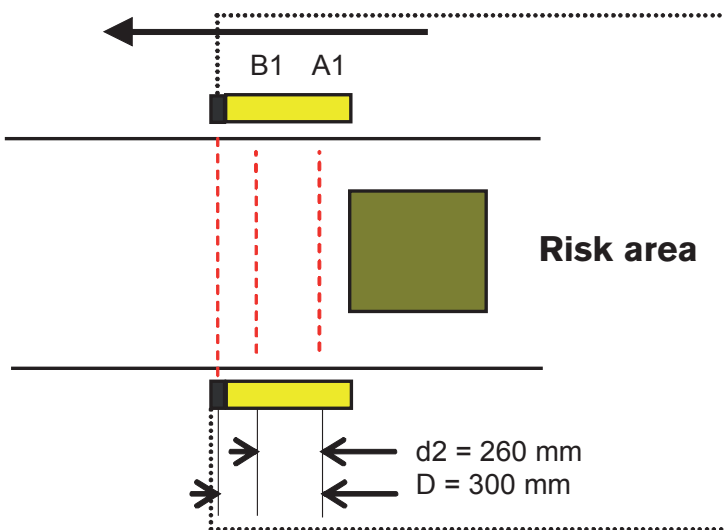
Examples on how the muting sensors MFII-T and MFII-L can be placed

A solution with Focus Muting unit MFII-T with integrated muting sensors.



A solution with Focus Muting unit MFII-L with integrated muting sensors

This solution shall only be used for movement out from a risk area.



NOTE. the muting sensors A and B must be placed so that the sensor A is always activated at least 30 ms before sensor B.

D: indicates the minimum length of the material that is to actuate the muting sensors that must be maintained during the passage through the light grid/curtain.
d2: indicates the measurement between the two/four pre-assembled muting sensors within the MFII-L and MFII-T.

Muting with FMC and FMI units

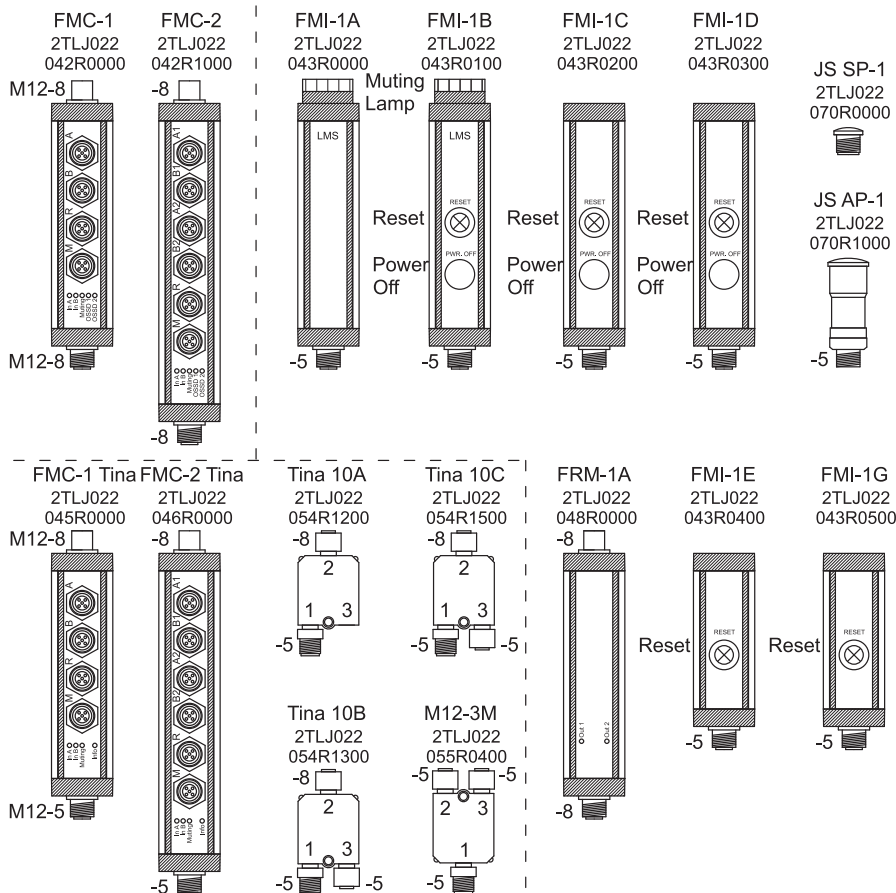


The FMC Focus Muting Connector, is a small, optimal unit which is used when the Focus light grid/curtain is required to be bypassed for in and out passage to and from a dangerous area. The FMC-unit is easily connected to Focus with a M12 connector.

The FMI Focus Muting Indicator, is a small unit with built-in muting lamp, reset button, "power off" (for alignment and override). The FMI unit is connected to the FMC unit with M12 connectors to facilitate the muting function connection.

Various FMC, FMI, FRM- versions and Tina units

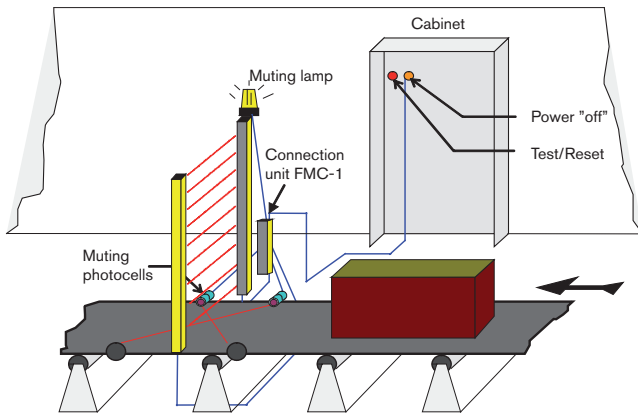
The Tina-versions have dynamic safety outputs for Vital/Pluto.



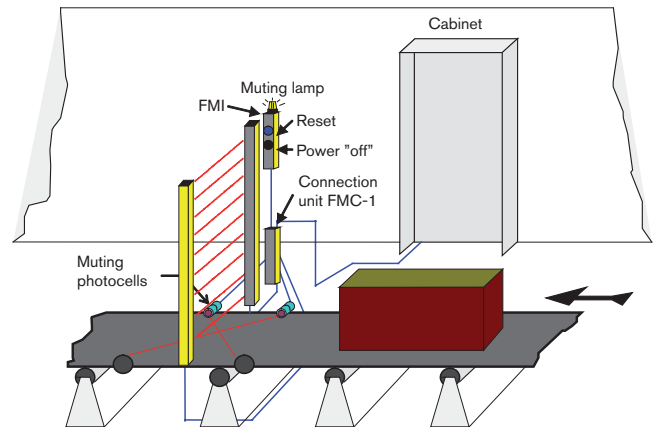
- FMC-1(2):** with connectors for muting sensors (A+B), reset, power off and muting lamp (R) and muting lamp (M).
- FMI-1A:** with muting lamp only.
- FMI-1B:** with reset, power off and muting lamp.
- FMI-1C:** with reset and power off.
- FMI-1D:** with reset, power off and internal resistor for the muting lamp.
- FMI-1E:** as pre reset connected to connector A (A2) on FMC-1(2) (Tina).
- FMI-1G:** with reset, and internal resistor for the muting lamp.
- FMC-1 (2)Tina:** same as FMC-1(2) but connected to Vital or Pluto.
- Tina 10A:** adaptor unit for connecting Focus to Vital or Pluto.
- Tina 10B:** simplified FMC-1(2) Tina including only the connector (R).
- Tina 10C:** simplified FMC-1(2) Tina including only power supply on con.no.3.
- M12-3M** bypass unit for easy connection outside the cabinet
- FRM-1A:** translates the two OSSD outputs to relay outputs (and power supply).
- JS SP-1:** protection plug for not used connectors.
- JS AP-1:** adaptor for FMC units to use instead of FMI-1B or -1D on the (R) connector including muting resistor.

Connection of Focus and muting components with FMC-1 and FMI-1

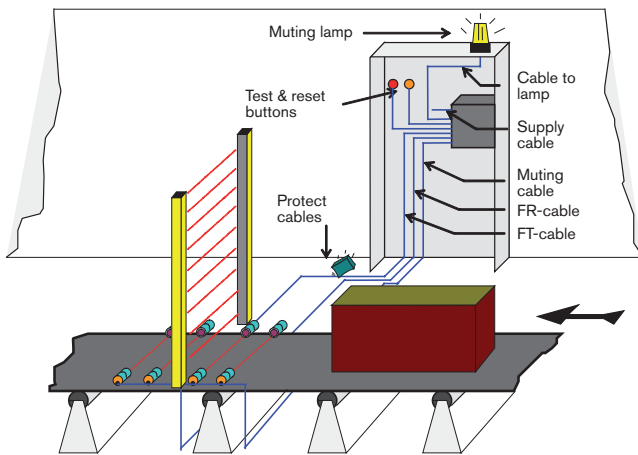
Ex 1. Connection of light curtain with connection block FMC-1, test/reset button and switch for supply voltage placed in (by) the control cabinet.



Ex 2. Connection of light curtain with connection block FMC-1. The Reset unit FMI must be placed out of reach from the risk area.



Connection of Focus and muting components directly to the control cabinet

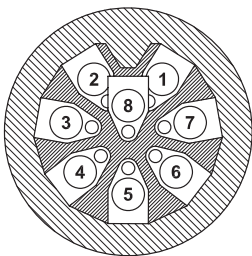


- The TEST /RESET button shall be placed so the operator can see the protected area during reset, testing, and bypassing. It should not be possible to reach the button from within the risk area.
- The LMS lamp for indication of muting and bypassing shall be placed so that it can be seen from all directions from where it is possible to access the dangerous area
- If photo cells are used as muting sensors then the sensor receivers should be assembled on the light curtain's transmitter side to minimise the interference risk.
- The system is protected against dangerous functions caused by damage on the transmitter cable and/or the receiver cable. However, we recommend that the cables be protected so that physical damage to them can be minimised.

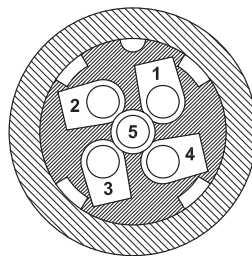
M12-connection device with screw connectors

Female - Connector-view from cable side

M12-C03

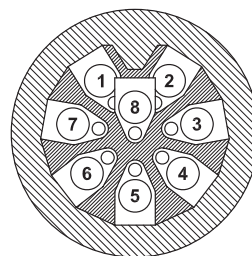


M12-C01



Male - Connector-view from cable side

M12-C04



M12-C02

