

Original instructions

FMC-1/2 Tina

Muting unit



Read and understand this document

Please read and understand this document before using the products. Please consult your ABB JOKAB SAFETY representative if you have any questions or comments.

WARRANTY

ABB JOKAB SAFETY's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by ABB JOKAB SAFETY.

ABB JOKAB SAFETY MAKES NO WARRANTY OR REPRESENTATION, EXPRESSED OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS, ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OR THEIR INTENDED USE. ABB JOKAB SAFETY DISCLAIMS ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED.

LIMITATIONS OF LIABILITY

ABB JOKAB SAFETY SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall responsibility of ABB JOKAB SAFETY for any act exceed the individual price of the product on which liability asserted.

IN NO EVENT SHALL ABB JOKAB SAFETY BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS ABB JOKAB SAFETY'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

SUITABILITY FOR USE

ABB JOKAB SAFETY shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the product. At the customer's request, ABB JOKAB SAFETY will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.

Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, and installations subject to separate industry or government regulations.

Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE ABB JOKAB SAFETY PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

PERFORMANCE DATA

While every effort has been taken to ensure the accuracy of the information contained in this manual ABB JOKAB SAFETY cannot accept responsibility for errors or omissions and reserves the right to make changes and improvements without notice. Performance data given in this document is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of ABB JOKAB SAFETY'S test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the ABB JOKAB SAFETY Warranty and Limitations of Liability.

Table of Contents

1	Introduction	4
	Scope	4
	Audience	4
	Prerequisites	4
	Special notes	4
2	Overview	5
	General description.....	5
	Safety regulations	5
3	Connections	6
	Connection examples	7
4	Installation and maintenance	9
	Installation precautions	9
	Maintenance	9
	Testing of the safety functions	9
	Troubleshooting	9
5	Operation	10
	LED indication.....	10
	Information output signal attributes.....	10
6	Technical data	11
7	EC Declaration of conformity	12

1 Introduction

Scope

The purpose of these instructions is to describe the muting units FMC-1/2 Tina and to provide the necessary information required for installation and operation.

Audience

This document is intended for authorized installation personnel.


Prerequisites

It is assumed that the reader of this document has knowledge of the following:

- Basic knowledge of ABB Jokab Safety products.
- Knowledge of machine safety.

Special notes

Pay attention to the following special notes in the document:

 **Warning!** Danger of severe personal injury!
An instruction or procedure which, if not carried out correctly, may result in injury to the technician or other personnel.

Caution! Danger of damage to the equipment!
An instruction or procedure which, if not carried out correctly, may damage the equipment.

NB: Notes are used to provide important or explanatory information.

2 Overview

General description

FMC Tina is a unit to connect a light curtain or a light beam Focus with OSSD outputs to Vital or Pluto with muting devices. This also enables complete external interconnections with M12 cabling which reduces the cabling to and connections in the apparatus enclosure. There are inputs to connect FMI-1.

There are two LEDs (A/B) in the front of the unit to indicate the outputs from the muting device. There is a LED to indicate active Muting and a LED to indicate Information (have dynamic pulse and signal from light curtain/beam) LED, when the unit is activated.

Safety regulations

Warning!

Carefully read through this entire manual before using the device.

The devices shall be installed by a trained electrician following the Safety regulations, standards and the Machine directive.

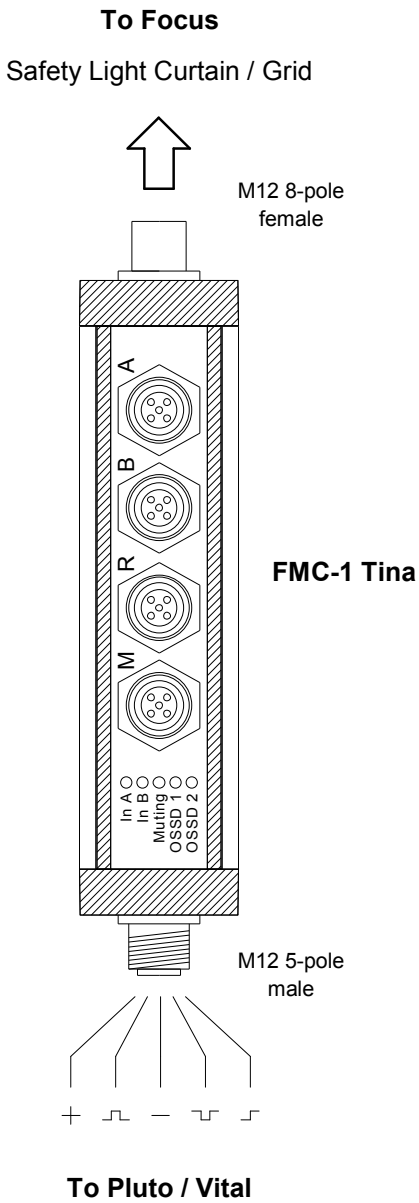
Failure to comply with instructions, operation that is not in accordance with the use prescribed in these instructions, improper installation or handling of the device can affect the safety of people and the plant.

For installation and prescribed use of the product, the special notes in the instructions must be carefully observed and the technical standards relevant to the application must be considered.

In case of failure to comply with the instructions or standards, especially when tampering with and/or modifying the product, any liability is excluded.

3 Connections

Electrical connections – FMC Tina



FMC-1 Tina has two channel inputs (A & B) for the signal from the muting device.

FMC-2 Tina has two parallel coupled channel inputs (A1, A2 & B1, B2) for the signal from the muting device.

FMC-1 Tina:

5-pole M12 female connectors (x4)

- A: Muting sensor A
- B: Muting sensor B
- R: Reset / Muting lamp / Power Off
- M: Muting lamp / Power supply

FMC-2 Tina:

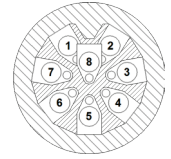
5-pole M12 female connectors (x6)

- A1: Muting sensor A1
- A2: Muting sensor A2
- B1: Muting sensor B1
- B2: Muting sensor B2
- R: Reset / Muting lamp / Power Off
- M: Muting lamp / Power supply

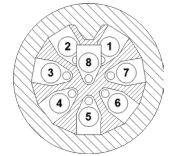
Vital / Pluto connector:

M12 5-pole male

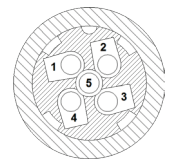
- 1) Brown: +24 VDC
- 2) White: Dynamic signal input
- 3) Blue: 0 VDC
- 4) Black: Dynamic signal output
- 5) Grey: Information



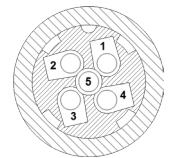
M12 8-pole male seen from cable side



M12 8-pole female seen from cable side



M12 5-pole male seen from cable side



M12 5-pole female seen from cable side

NB: Shielded cable is recommended between this unit and the rest of the safety circuits.

Caution! All cable colours according to ABB Jokab Safety standard cables.

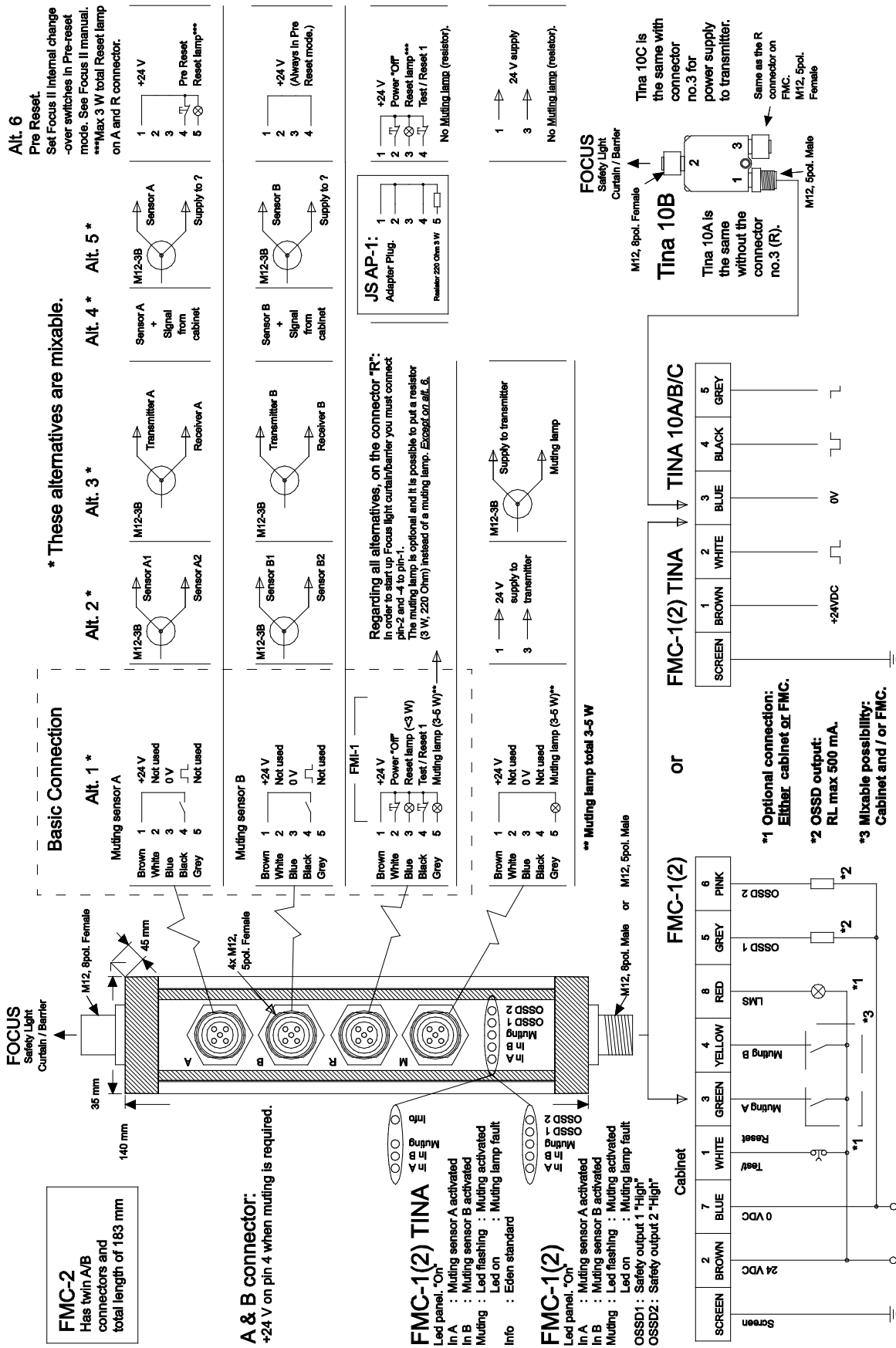
Warning! The information channel output shall **never** be used for the safety purpose(s).

Warning! The safety loops shall **not** be used for purposes other than intended. All loading or tampering with loops can lead to serious risk of life.

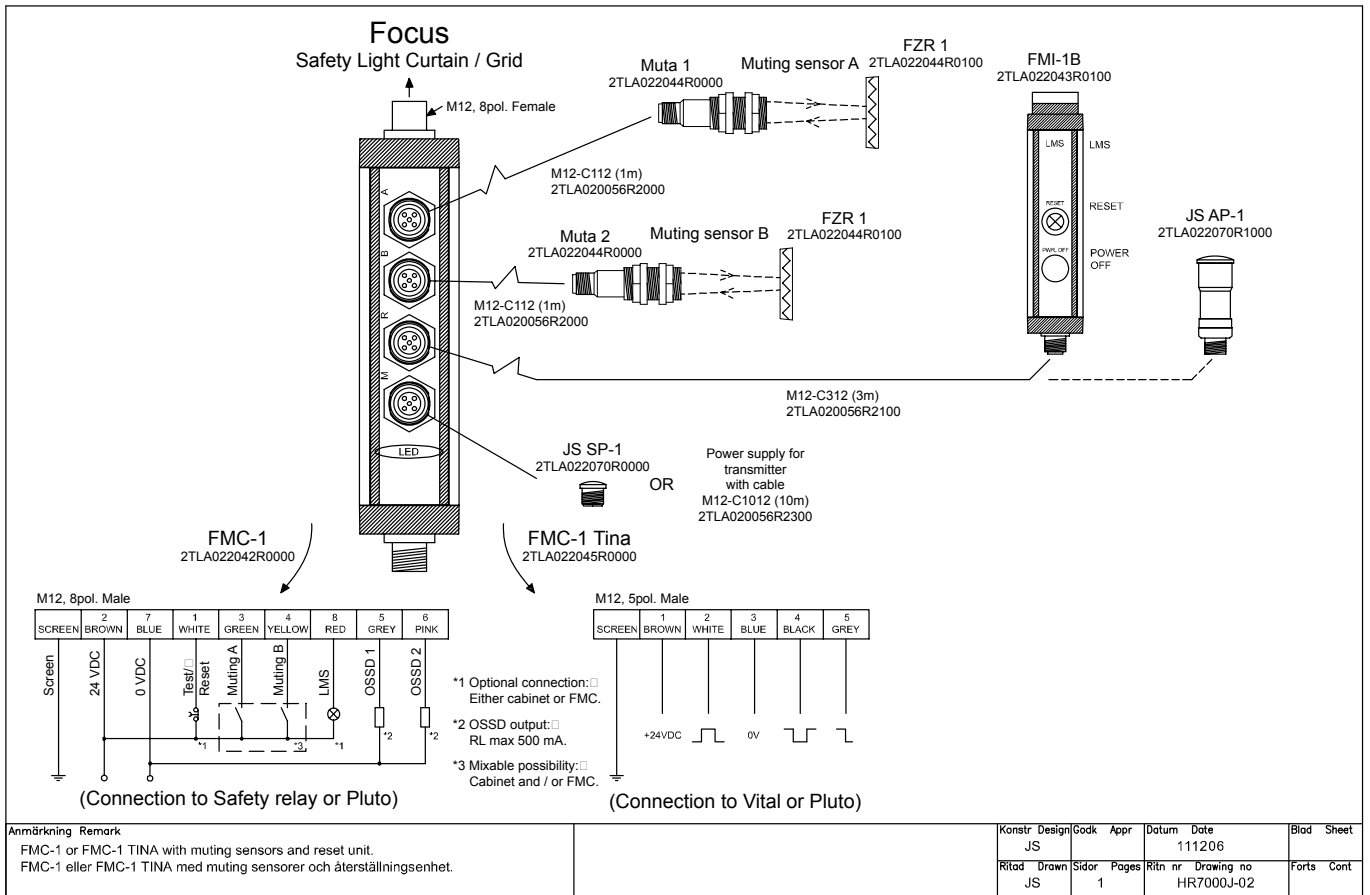
Connection examples

Caution! All cable colours according to ABB Jokab Safety standard cables.

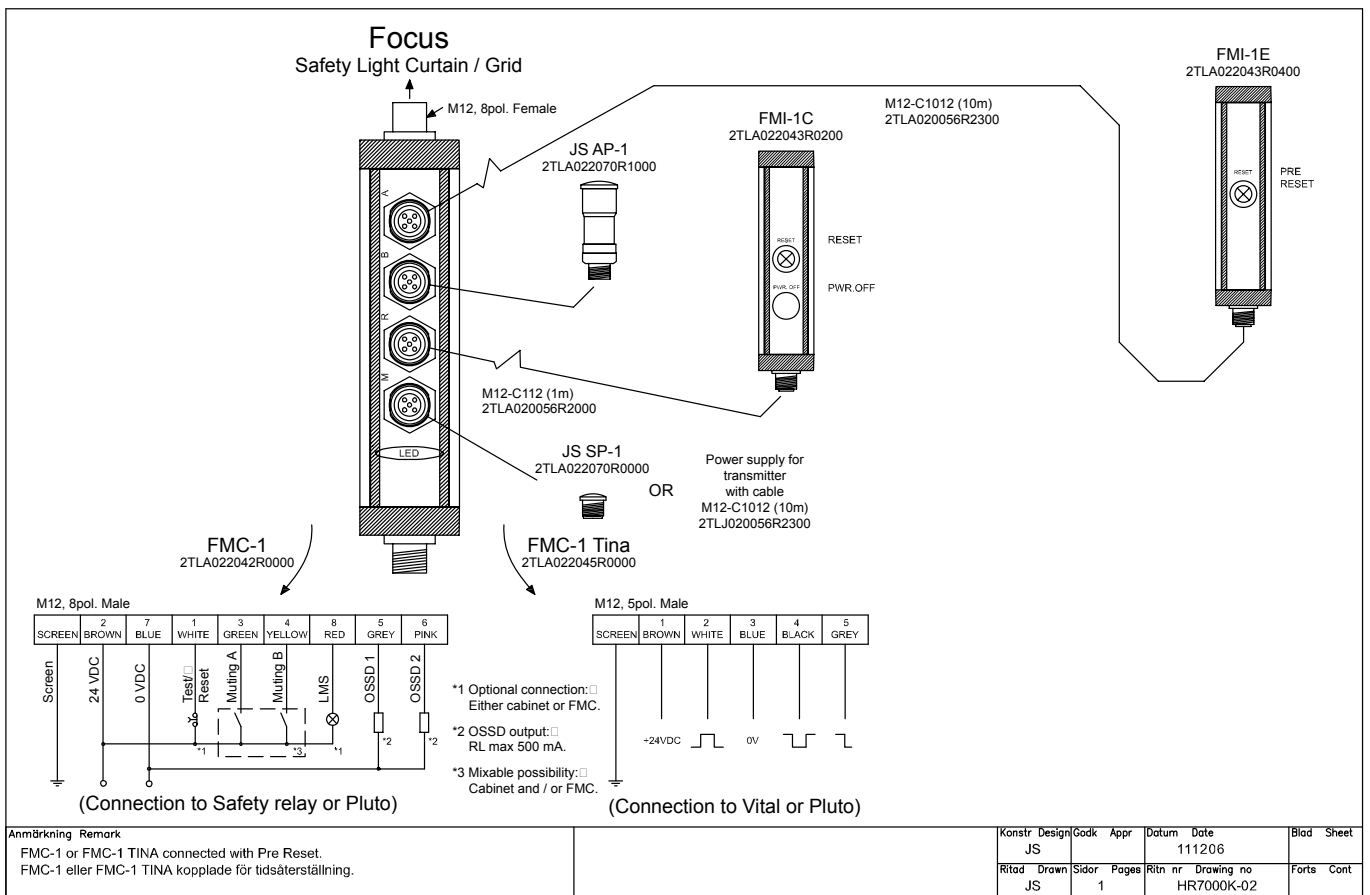
Connection example – FMC connection possibilities



Connection example – FMC-1 Tina with muting sensors and reset unit



Connection example – FMC-1 Tina connected with Pre Reset



4 Installation and maintenance

Installation precautions

First mount the unit to the surface with the installation screws, then attach all M12 connectors (max 0.25 Nm tightening torque).

Warning! All the safety functions must be tested before starting up the system.

Maintenance

Warning!

The safety functions and the mechanics shall be tested regularly, at least once every year to confirm that all the safety functions are working properly (EN 62061:2005).

In case of breakdown or damage to the product, contact the nearest ABB Jokab Safety Service Office or reseller. Do not try to repair the product yourself since it may accidentally cause permanent damage to the product, impairing the safety of the device which in turn could lead to serious injury to personnel.

Testing of the safety functions

Make sure the safety unit is working properly by following these steps:

- Interrupt the dynamic safety circuit before this unit. The LED should flash between green and red.
- Interrupt protection. The LED should light red.
- The LED should light green when protection is OK and the safety circuit is not previously broken.

Troubleshooting

LED indicator note	Expected causes of faults	Checking and measures to take
Lights red	Focus misaligned	Check if Focus has been accidentally moved, realign as necessary.
	Bad connection between loops	Carefully check the M12 contact
	24 VDC input to pin-2 (no dynamic signal)	Check if there is 24 VDC to input (pin-2). If Yes, check cable or unit before and fix it.
No lights	Loss of power supply	Check 24 VDC / 0 VDC power supply
Lights green (but no dynamic output detected)	Defected dynamic signal input to unit (asymmetric pulses)	Check the dynamic input or the unit before
Weak lights or red and green lights at the same time	The unit is defect	The unit needs to be replaced. Contact ABB Jokab Safety.

Warning! Replace a defected unit with a new one and never bypass the safety circuit.

5 Operation

LED indication

LED	Indication	Description
In A	ON	Muting sensor A active
	OFF	Muting sensor A inactive
In B	ON	Muting sensor B active
	OFF	Muting sensor B inactive
Muting	ON	Muting active
	Flash	Muting indication lamp error
	OFF	Muting inactive
Info	ON	Eden standard, see below
	OFF	Eden standard, see below

Eden standard LED indication:

LED	Indication	Description	Input signal on pin-2
Info LED	Green	Safety circuit closed (protection OK)	Dynamic signal in
	Green-Red (flash)	Safety circuit open (protection OK)	No dynamic signal in <u>or</u> 0 VDC in
	Red	Safety circuit interrupted (protection open)	+24 VDC in <u>or</u> safety circuit interrupted

Information output signal attributes

The information output of the unit (pin-5, Vital/Pluto connector) is set either high (+24 VDC) or low (0 VDC) depending on four different input signals (pin-2, Vital/Pluto connector):

- **Dynamic signal** - Dynamic signal input exist, i.e. the safety circuit is OK up until this unit
- **No dynamic signal** - Dynamic signal input does not exist, i.e. the safety circuit is interrupted before this unit.
- **+24 VDC** - A constant +24 VDC signal is applied = high (H)
- **0 VDC** - The pin is connected to 0 VDC = low (L)

The information output signal depends on the input signal according to the table below. Note that if the safety is interrupted on the device connected to this unit, the information output signal is always low (L).

Input signal (pin-2)	Dynamic signal	No dynamic signal	+24 VDC	0 VDC
Info output signal (pin-5)	High	High	Low	High

The delay for switching the information signal output from high to low (H → L) and low to high (L → H) is given in the table below.

Info output signal switch	H → L	L → H
Delay	~ 140 ms	~ 2 ms

Warning! The information output signal is not a failsafe signal and shall **never** be used for the safety purpose(s).

6 Technical data

Manufacturer

Address ABB JOKAB SAFETY
Varlabergsvägen 11
SE-434 39 Kungsbacka
Sweden

Article number/Ordering data FMC-1 Tina: 2TLA022045R0000
FMC-2 Tina: 2TLA022046R0000

Power supply

Operating voltage 24 VDC +20 %, -20 %

Total current consumption 60 mA (70 mA with max information output)
Information output: Max 10 mA

Time delay t (in/out) $t < 120 \mu\text{s}$

Voltage supply at normal operation (protection OK) and 24 VDC supply voltage Dynamic input: between 9 and 13 volt (RMS)
Dynamic output: between 9 and 13 volt (RMS)
Information output: ~ 23 VDC

General

Protection class IP65

Ambient temperature Storage/Operation: -10...+55°C

Humidity range 35 to 85 % (with no icing or condensation)

Housing material Based on polyamide, Macromelt OM646 (V0)


Connector M12 8-pole female (to Focus)
M12 5-pole male (to Pluto / Vital)
M12 5-pole female (4x, for muting devices etc)

Size FMC-1 Tina: 168 x 35 x 55 mm (L x W x H)
FMC-2 Tina: 211 x 35 x 55 mm (L x W x H)

Weight FMC-1 Tina: ~ 250 g
FMC-2 Tina: ~ 350 g

Colour Yellow and black

Safety / Harmonized Standards

Conformity European Machinery Directive 2006/42/EC 
EN ISO 12100-1:2010, EN 954-1:1996, EN ISO 13849-1:2008,
EN 62061:2005, EN 62061:2005, EN 61508:2010,
EN 60204-1:2006+A1:2009, EN 60664-1:2007, EN 61000-6-2:2005,
EN 61000-6-4:2007, EN 60947-5-1:2004, EN 1088+A2:2008

IEC/EN 61508-1...7 SIL3, PFHd: 4.50*10⁻⁹

EN 62061 SIL3

EN ISO 13849-1 Performance level: PL e, category 4

EN 954-1 Category 4

Certificates TÜV Nord

The Jokab Safety branded product with article number beginning with 2TLJ is fully compatible with the ABB branded product with article number beginning with 2TLA.

7 EC Declaration of conformity



EC Declaration of conformity

(according to 2006/42/EC, Annex 2A)

We **ABB AB**
JOKAB SAFETY
Varlabergsvägen 11
SE-434 39 Kungsbacka
Sweden

declare that the safety components of ABB AB make with type designations and safety functions as listed below, is in conformity with the Directives
2006/42/EC
2006/95/EC
2004/108/EC

Authorised to compile the technical file

ABB AB
JOKAB SAFETY
Varlabergsvägen 11
SE-434 39 Kungsbacka
Sweden

<u>Product</u>	<u>Certificate</u>	<u>Serialnumber</u>
Non-contact safety sensor Eden (Adam, Eva) E/C/EC	44 799 12 408341-003	[000 – 000 ... 999-999]
Adapter unit Tina 1-8, Tina 10-12	44 799 12 408341-003	[000 – 000 ... 999-999]
Muting unit FMC-Tina	44 799 12 408341-003	[000 – 000 ... 999-999]
Non-contact safety sensor Eden including locking function Magne 2A, 2B, 2AX, 2BX	44 799 12 408341-003	[000 – 000 ... 999-999]

Certification body

TÜV NORD CERT GmbH
Langemarckstrasse 20
45141 Essen
Germany

Used harmonized standards

EN ISO 12100-1:2010, EN ISO 13849-1:2008, EN 62061:2005,
EN 60204-1:2006+A1:2009, EN 60664-1:2007, EN 61000-6-2:2005,
EN 61000-6-4:2007, EN 60947-5-1:2004, EN 1088+A2:2008

Other used standards

EN 61508:2010

Jesper Kristensson
PRU Manager
Kungsbacka 2012-05-31

www.abb.com
www.jokabsafety.com

Original

ABB JOKAB SAFETY Varlabergsvägen 11, SE-434 39 Kungsbacka, Sweden

www.abb.com/jokabsafety