Original instructions

FMC-1/2 Tina

Muting unit
Read and understand this document

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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.

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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

**To Focus**

Safety Light Curtain / Grid

**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

**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

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

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

LED indication

<table>
<thead>
<tr>
<th>LED</th>
<th>Indication</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>In A</td>
<td>ON</td>
<td>Muting sensor A active</td>
</tr>
<tr>
<td></td>
<td>OFF</td>
<td>Muting sensor A inactive</td>
</tr>
<tr>
<td>In B</td>
<td>ON</td>
<td>Muting sensor B active</td>
</tr>
<tr>
<td></td>
<td>OFF</td>
<td>Muting sensor B inactive</td>
</tr>
<tr>
<td>Muting</td>
<td>ON</td>
<td>Muting active</td>
</tr>
<tr>
<td></td>
<td>Flash</td>
<td>Muting indication lamp error</td>
</tr>
<tr>
<td></td>
<td>OFF</td>
<td>Muting inactive</td>
</tr>
<tr>
<td>Info</td>
<td>ON</td>
<td>Eden standard, see below</td>
</tr>
<tr>
<td></td>
<td>OFF</td>
<td>Eden standard, see below</td>
</tr>
</tbody>
</table>

Eden standard LED indication:

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

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).

<table>
<thead>
<tr>
<th>Input signal (pin-2)</th>
<th>Dynamic signal</th>
<th>No dynamic signal</th>
<th>+24 VDC</th>
<th>0 VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Info output signal (pin-5)</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Info output signal switch</th>
<th>H → L</th>
<th>L → H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delay</td>
<td>~ 140 ms</td>
<td>~ 2 ms</td>
</tr>
</tbody>
</table>

**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

<table>
<thead>
<tr>
<th>Operating voltage</th>
<th>24 VDC +20 %, -20 %</th>
</tr>
</thead>
</table>
| Total current consumption | 60 mA (70 mA with max information output)  
| Information output max: Max 10 mA |
| Time delay t (in/out) | t < 120 µs |
| 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

<table>
<thead>
<tr>
<th>Protection class</th>
<th>IP65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>Storage/Operation: -10…+55°C</td>
</tr>
<tr>
<td>Humidity range</td>
<td>35 to 85 % (with no icing or condensation)</td>
</tr>
<tr>
<td>Housing material</td>
<td>Based on polyamide, Macromelt OM646 (V0)</td>
</tr>
</tbody>
</table>
| 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  
| 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 |

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.
## EC Declaration of conformity

**ABB AB**

JOKAB SAFETY

Varlabergsvägen 11

SE-434 39 Kungsbacka

Sweden

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

**Product**

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

Jesper Kristensson
PRU Manager
Kungsbacka 2012-05-31

www.abb.com
www.jokabsafety.com

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