

Original instructions

Tina 5A

Bypassing 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 bypassing unit Tina 5A 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

Tina 5A is designed for bypassing of safety devices connected to the Vital or Pluto dynamic safety circuit as well as supervision of lamp indication.

Bypassing of safety devices such as a light grid or an interlocked gate is in some situations only allowed if status information (bypassing active/inactive) is indicated. Tina 5A can therefore supervise an indication lamp (1-5 W) connected across L1-L2, and the bypassing signal from Tina 5A is only sent if the indication lamp is working properly. If no indication lamp is to be used across L1-L2 (e.g. if the status indication is performed by other means) an 820 Ω / 2 W resistor must be connected across L1-L2. Whether indication is required depends on the specific situation and result of risk analysis.

When the Tina 5A receives a dynamic signal to S1 and the bypass indication lamp (1-5W) is ON, a bypassing output signal is provided on S2 and S3. A broken indication lamp, or a short circuit within it, leads to an interruption of the bypass output signal on S2 and S3, therefore stopping the bypassing.

The dynamic signal to S1 on Tina 5A must be the input signal from the first of the safety devices intended to bypass. The signal can be connected via output contacts from a safety relay, a safety timer or be initiated via a unit providing the dynamic signal as for example an Eden or a Spot.

The dynamic output signal from S2 or S3 is to be connected to the output signal from the last safety device which is to be bypassed.

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



8-pin connection block:

(2x4 terminals)

+A1: +24 VDC

Y14: Information output (bypass “ON”)

L1: Bypass indication lamp

L2: Bypass indication lamp

-A2: 0VDC

S1: Dynamic signal input

S2: Dynamic signal output, modified

S3: Dynamic signal output, modified twice

Caution! Tina 5A is supplied with a 820 Ω / 2 W resistor to be connected across terminals L1-L2 when bypass indication lamp is not required.

Caution! A suitable rated lamp (1-5 W) must be used when the supplied resistor is taken away and bypass indication is required.

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

S2 is used if:

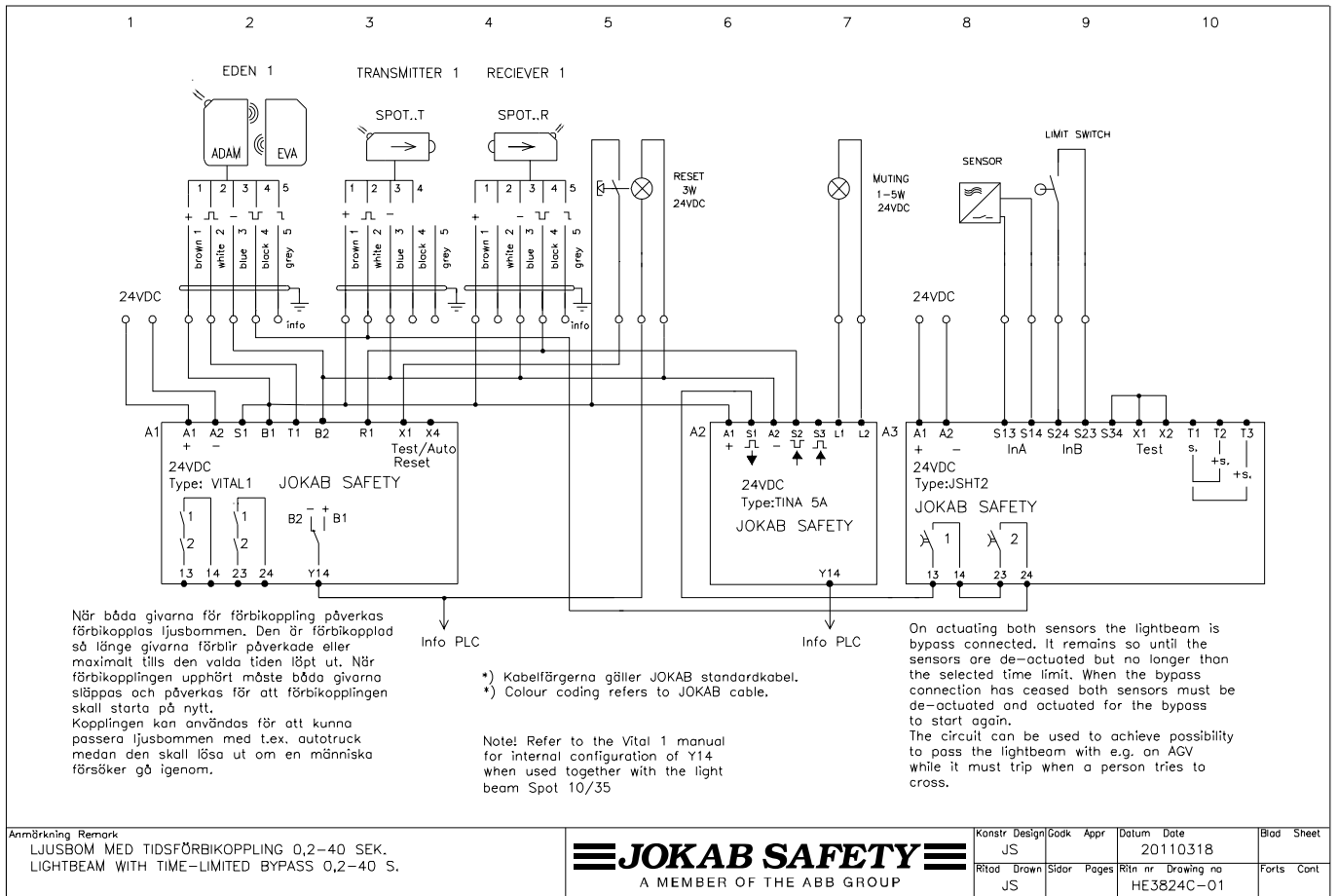
- an odd number of dynamic safety units is to be bypassed using an odd (including Tina 5A) number of dynamic safety devices. See connection example below (drawing no. HE3824C-01).
- an even number of dynamic safety units is to be bypassed using an even (including Tina 5A) number of dynamic safety devices. See connection example below (drawing no. HE3824F-01).

S3 is used if:

- an odd number of dynamic safety units is to be bypassed using an even (including Tina 5A) number of dynamic safety devices. See connection example below (drawing no. HE3824D-01).
- an even number of dynamic safety units is to be bypassed using an odd (including Tina 5A) number of dynamic safety devices. See connection example below (drawing no. HE3824E-01).

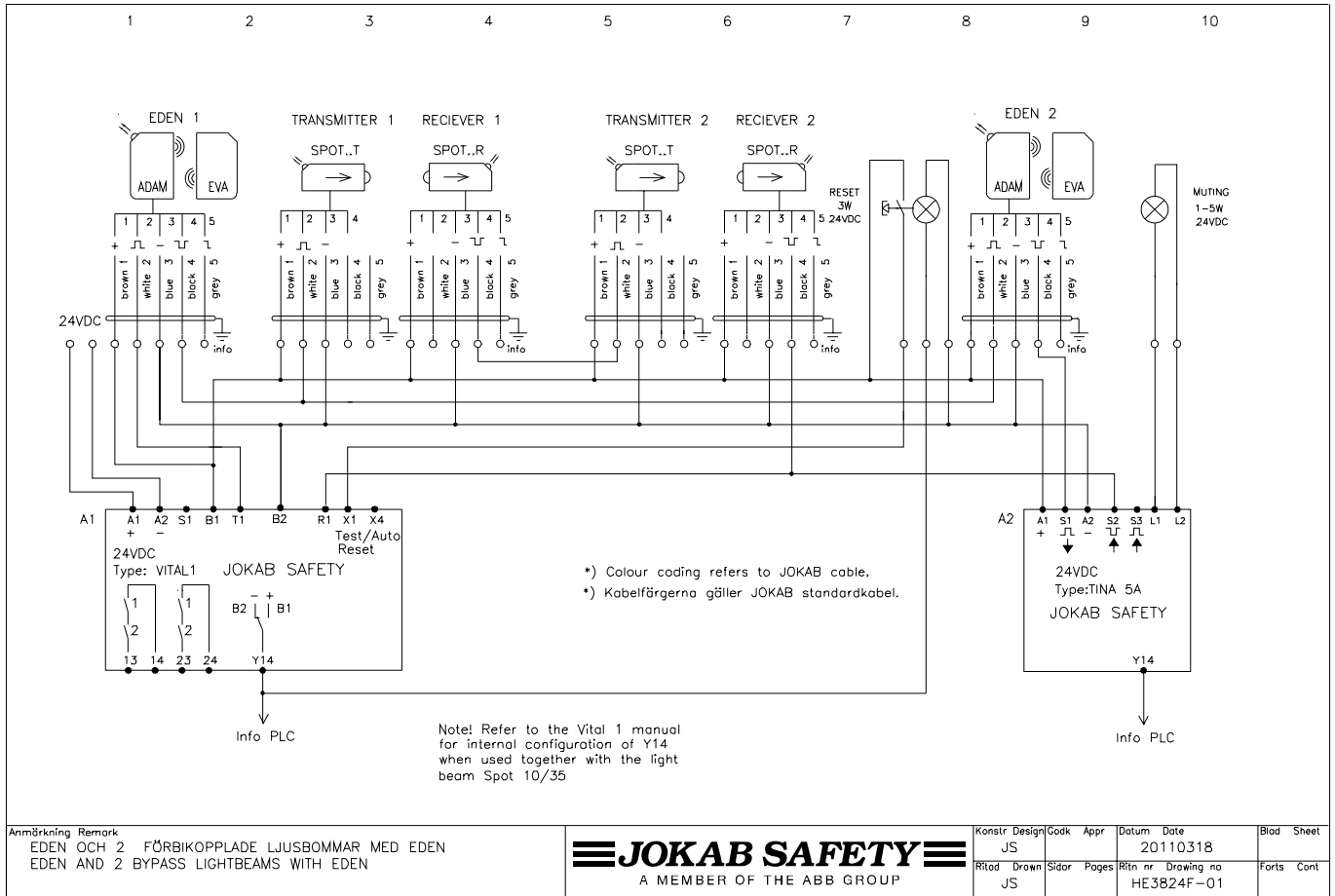
Connection examples

Drawing number HE3824C-01



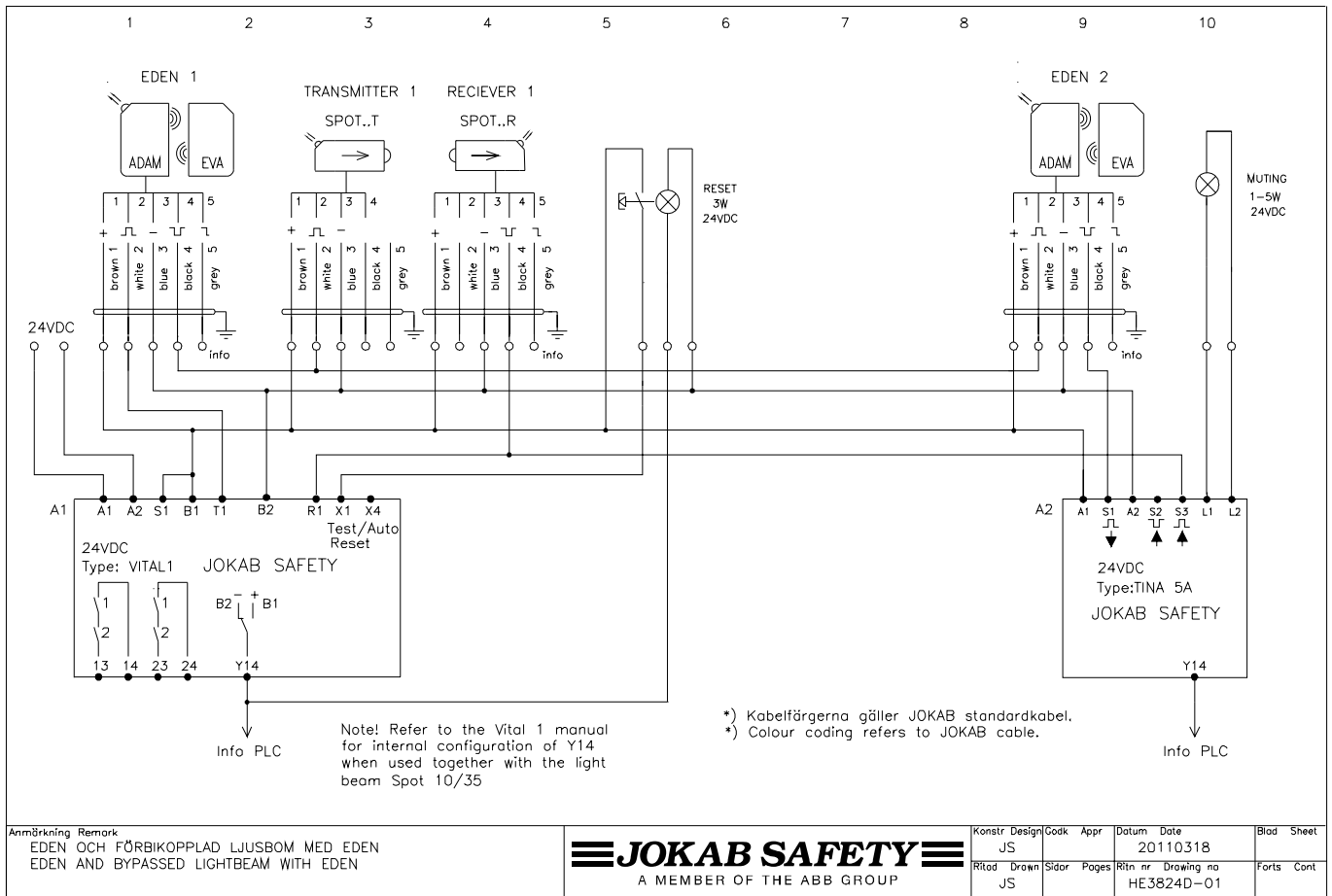
Caution! All cable colours according to ABB/Jokab Safety standard cables.

Drawing number HE3824F-01



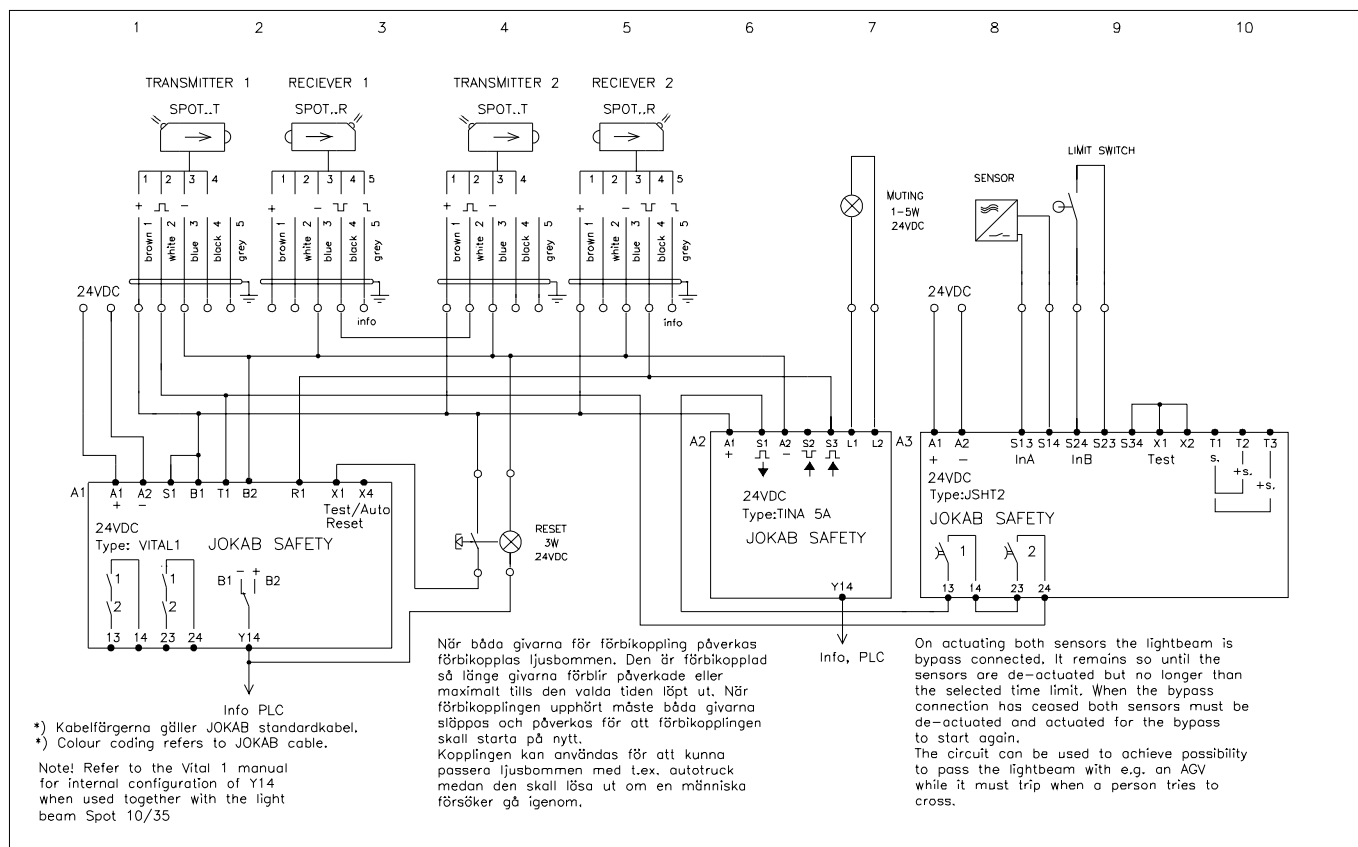
Caution! All cable colours according to ABB/Jokab Safety standard cables.

Drawing number HE3824D-01



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

Drawing number HE3824E-01



*) Kabelfärgerna gäller JOKAB standardkabel.
*) Colour coding refers to JOKAB cable.

Note! Refer to the Vital 1 manual for internal configuration of Y14 when used together with the light beam Spot 10/35

Anmärkning Remark LJUSBOMMAR MED TIDSFÖRBIKOPPLING 0,2-40 SEK. LIGHTBEAMS WITH TIME-LIMITED BYPASS 0,2-40 S.	<p>A MEMBER OF THE ABB GROUP</p>		Konstr. Design JS	Cock. Appr.	Datum Date 20110318	Blad Sheet
			Ritad Drawn JS	Sidor Pages	Ritn nr Drawing no HE3824E-01	Forts Cont

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

More reaction examples can be found at www.jokabsafety.com or in the Safety Handbook.

4 Installation and maintenance

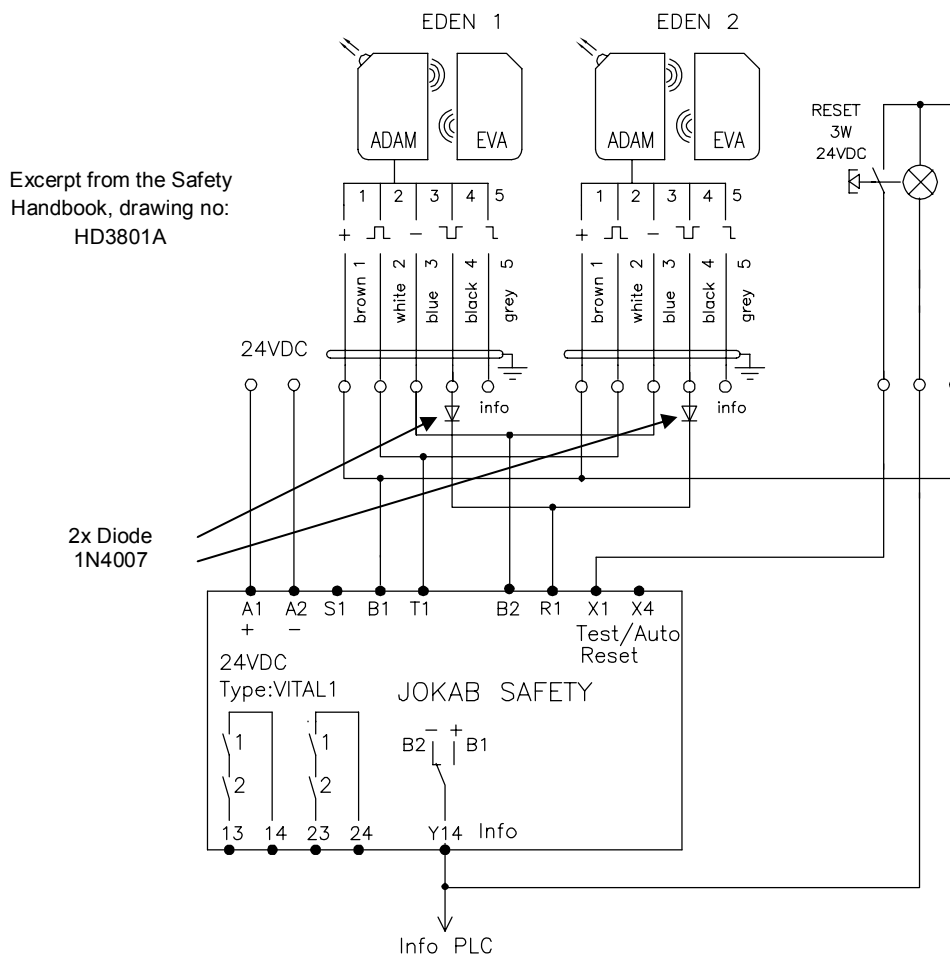
Installation precautions

Mount the unit on a 35 mm DIN rail. Attach all the cables to the connection block. Use max 1 Nm tightening torque.

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

Bypassing of Eden and Tina units

- If one or more Eden or Tina units are bypassed by a Tina 5A, a diode such as a 1N4007 must be inserted with forward current out from pin-4 of the last bypassed unit.
- If one or more Eden or Tina units bypass each other, a diode such as a 1N4007 must be inserted with forward current out from pin-4 of the last unit in both bypassing circuits (excerpt from connection example HD3801A in the Safety Handbook below).



Connection example – Eden directly bypassed by another Eden, diodes on both pin-4

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:

- Control that the muting of the desired unit is working properly (like the example above).
- Control that Vital/Pluto is working properly when the muting is active.

Troubleshooting

LED indication	Expected causes of faults	Checking and measures to take
Mute LED off (on Tina 5A)	No dynamic signal to S1	Check dynamic signal input
	Mute resistor removed	Mount a new 820 Ω / 2 W resistor at terminals L1-L2
Mute LED off (external)	Mute lamp broken	Replace the mute lamp
	Wrong mute lamp (1 W < Watt < 5 W)	Replace the mute lamp with a suitable one
No lights	Loss of power supply	Check 24 VDC / 0 VDC power supply
Weak lights	The unit is defect	The unit needs to be replaced. Contact ABB/Jokab Safety.

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

5 Operation

LED	Indication	Description
Signal:	ON	Dynamic signal input S1 – OK
	OFF	Dynamic signal input S1 – <u>not</u> OK
On:	ON	Supply voltage – OK
	OFF	Supply voltage – <u>not</u> OK
Mute:	ON	Dynamic signal output on S2 and S3, as well as +24 VDC to L1 and L2 – OK
	OFF	Dynamic signal output on S2 and S3, or +24 VDC to L1 and L2 – <u>not</u> OK

Information output signal attributes

The information output of the unit (terminal Y14) is set either high (+24 VDC) or low (0 VDC) depending on four different input signals (terminal S1):

- **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 the information output signal is always low (L).

Input signal (S1)	Dynamic signal	No dynamic signal	+24 VDC	0 VDC
Info output signal (Y14)	High	Low	Low	Low

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.

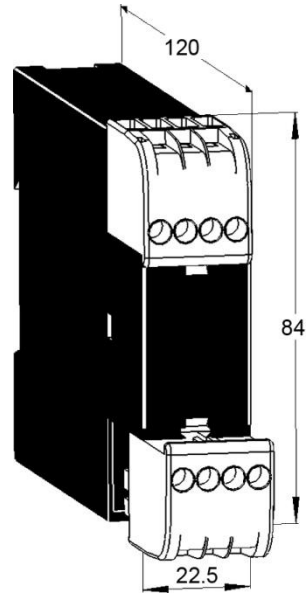
Info output signal switch	H → L	L → H
Delay	0 ms	0 ms

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

6 Technical data

Manufacturer	
Address	ABB AB / JOKAB SAFETY Varlabergsvägen 11 SE-434 39 Kungsbacka Sweden
Article number/Ordering data	Tina 5A: 2TLJ020054R0400
Power supply	
Operating voltage	24 VDC +10 %, -10 %
Current consumption, A1-A2	No bypass: 10 mA Bypass using a 5 W indication lamp: 240 mA
Bypass connection	Tina 5A can bypass max. 30 Eden/Tina-units or 6 Spot T/R
Time delay t (in/out)	t < 260 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	
Protection class	Enclosure: IP40 Connection block: IP20
Ambient temperature	-10...+55°C
Humidity range	35 to 85 % (with no icing or condensation)
Connectors	Connection blocks with a total of 8 screw terminals (2 x 4). Max tightening torque 1 Nm.
Mounting	35 mm DIN rail
Size	120 x 84 x 22.5 (L x W x H)
Weight	~ 135 g
Colour	Black and beige
Safety / Harmonized Standards	
Conformity	European Machinery Directive 2006/42/EC CE EN ISO 12100-1:2003, EN ISO 12100-2:2003, EN 60204-1:2007, EN 954-1:1996, EN ISO 13849-1:2008, EN 62061:2005, EN 61496-1:2004 + A1:2008
IEC/EN 61508-1...7	SIL3, PFH _d : 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

Dimensions



NB: All measurements in millimetres.

7 EC Declaration of conformity



EC Declaration of conformity

(according to 2006/42/EC, Annex2A)

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

Person authorised to compile
the technical file

Lars-Magnus Felth
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	44 207 10 372092-001	[000 – 000 ... 999-999]
Adapter unit Tina 1-8, Tina 10-12	44 207 10 372092-001	[000 – 000 ... 999-999]
Muting unit FMC-Tina	44 207 10 372092-001	[000 – 000 ... 999-999]
Non-contact safety sensor including locking function Magne 2A, 2B, 2AX, 2BX	44 207 10 372092-001	[000 – 000 ... 999-999]

Notified body

TÜV NORD CERT GmbH
Langemarckstrasse 20
45141 Essen
Germany

Notified body No. 0044

Used harmonized standards

EN ISO 12100-1,-2, EN 954-1, EN ISO 13849-1, EN 62061, EN 60204-1,
IEC 60664-1, EN 61000-6-2, EN 61000-6-4, EN 60947-5-1, EN 1088

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MD
Kungsbacka 2011-03-02

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