



# Vital/Tina Safety Systems

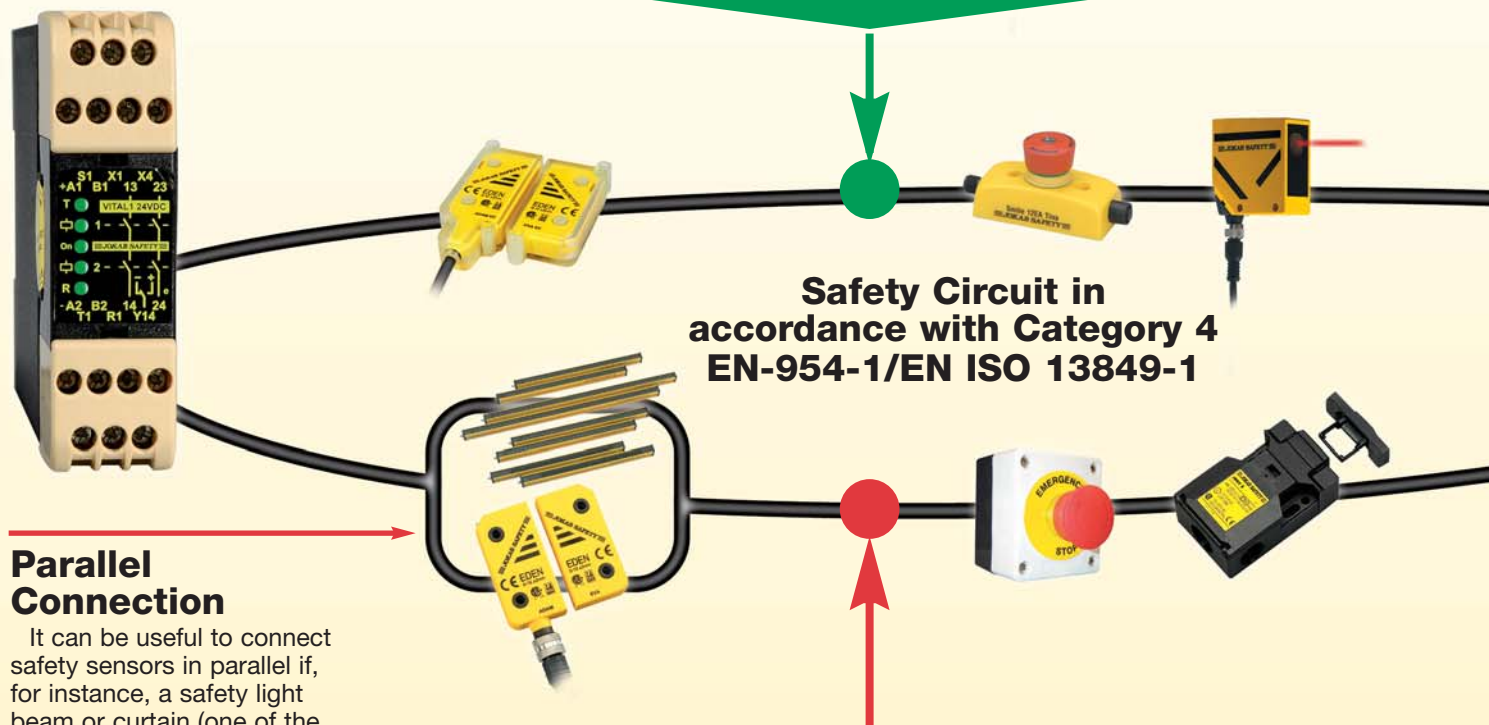
**Monitor all types of safety devices!  
Eliminate the need for safety relays!  
Simplify connections and cables!**

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# Vital Safety Dynamic Pulse Technology

Vital is a safety module, with redundant safety outputs, which can monitor up to 30 Eden door sensors and still comply with the highest safety level. Tina Duo makes it possible to monitor even more sensors. Vital offers the choice between manual and automatic reset of the safety circuit.

*The active safety sensors for the dynamic safety circuits offer a higher safety level than passive sensors, since a fault is already detected at its beginning or when the power is switched ON.*



## Parallel Connection

It can be useful to connect safety sensors in parallel if, for instance, a safety light beam or curtain (one of the sensors) is not supposed to generate a shutdown when a robot is in a safety position monitored by Eden (the other sensor).

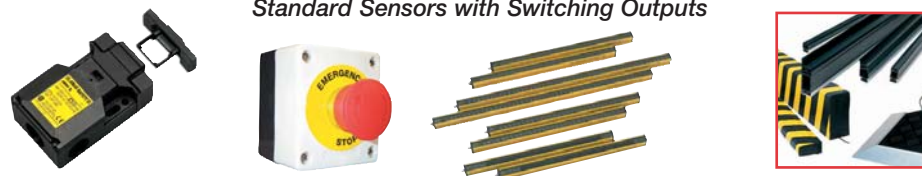
## Tina Adapters

The Tina adapters are used to adapt switching sensors to the dynamic safety circuits. This allows the use of switches with positive opening, emergency stops, light curtains and contact strips in the dynamic safety circuits.

*Tina Adapters*



*Standard Sensors with Switching Outputs*





## Dynamic Safety Circuits connected to Vital without Programming

### Tina Duo Remote Sensor Expansion Unit with Local Reset Capability for Vital and Pluto

Tina Duo allows for the addition of more dynamic circuits. It is possible to select a reset with LED indication or an automatic reset for each Tina Duo on the site.

### Systems can have an expanded number of sensors connected to one main Vital or Pluto Unit

This drawing shows a series of doors, which are monitored by active Eden door sensors with a supervised manual reset outside the danger zone.

### LED Indication for Easy Trouble Shooting

All active sensors and Tina adapters have LEDs, which indicate whether everything is OK (green), the safety circuit is interrupted (red), or if the circuit has been opened by another series-connected sensor (blinking).

### Tina 8A

Tina 8A is a connection block for 8 active sensors or sensors equipped with Tina adapters.

### Tina 8B

Jokab Safety also offers a Tina 8B Profibus version which transmits the information signals to the Profibus.

Tina 8B Profibus

Tina 1A

Tina 8A

Tina 1A required to complete safety connection circuit.

# The Vital Solution Concept vs. Safety Relay

The Vital Solution offers an enhanced level of safety that conventional safety relays do not. This difference is explained below.

Diagram 1 illustrates a safety relay circuit with one E-Stop input device. This dual input safety relay monitors both the “+” and the “-” inputs for any change in state. If either of these inputs open, the relay output contacts will open stopping the machine. Although this is dual channel and we are relying on redundancy, there are certain conditions that can occur resulting in an unsafe condition.

Diagram 2 introduces a short circuit in the “+” input. Because of the dual inputs the safety relay would still stop the machine when the E-Stop is depressed and further more would not reset because the safety relay only had the “-” input open. In a failure like this we must begin to troubleshoot, by simply cycling the power to the safety relay or replacement of the relay this short circuit in the “+” input will be masked and remain in the circuit allowing the machine to operate. By re-powering a safety relay, it will see the closed inputs as normal.

Diagram 3 introduces a second short across the “-” input. It is quite easy to understand that whatever caused the short circuit in the “+” input could cause a second short in the “-” input. This could be a result of crushed wires, damaged wires while being pulled through conduit, heat, or chemically damaged insulation on input wiring. In this case, when the E-Stop is depressed, nothing would happen! These short circuits have removed the E-Stop from the circuit. As a result, the machine would not stop resulting in a possible injury.

Diagram 4 illustrates a very common safety circuit with two door input switches. Because of the added cost for safety relays, it is quite common to see more than one safety switch in series to one safety relay. The introduction of the short circuit in red produces a new problem. Not only can you reset the relay by replacing or cycling power, you can simply fool it by cycling door #2; thus allowing the machine to run with this short circuit in place.

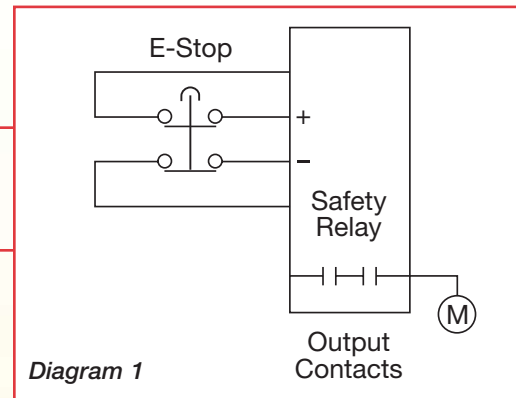


Diagram 1

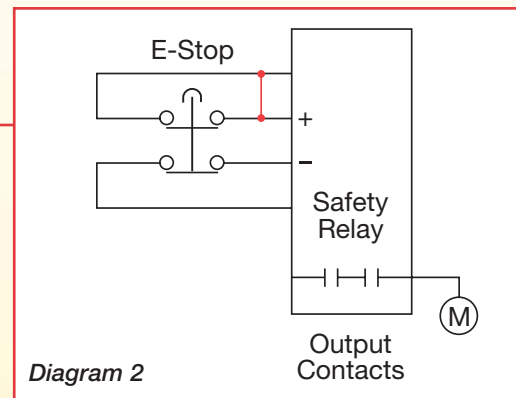


Diagram 2

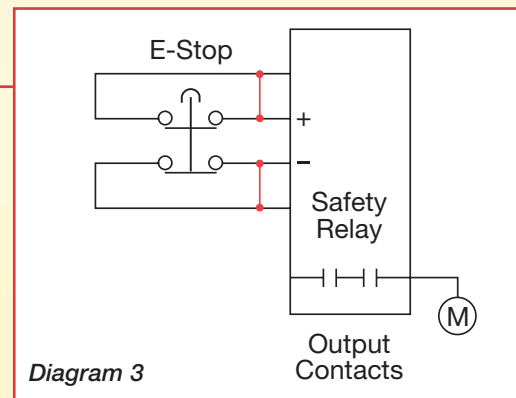


Diagram 3

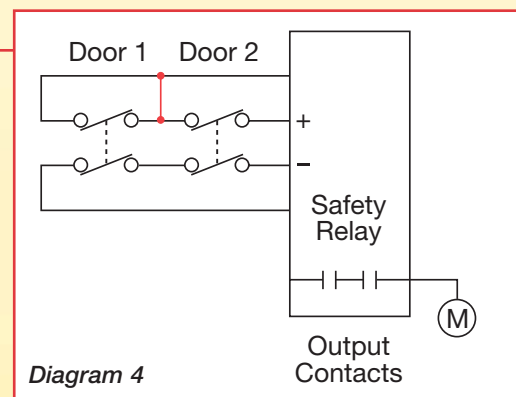


Diagram 4

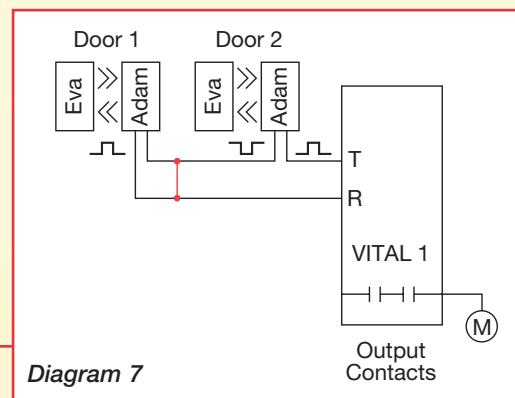
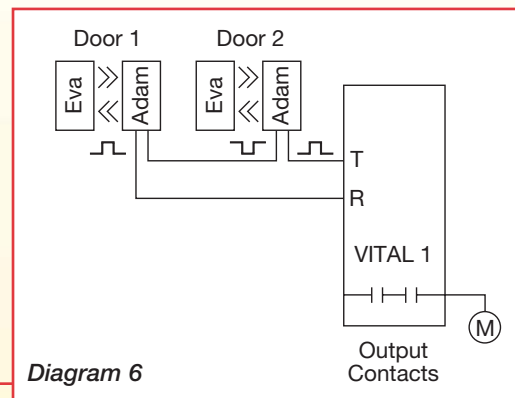
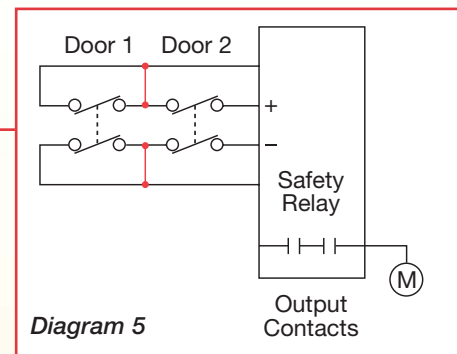
Diagram 5 illustrates the addition of a second short circuit. As explained earlier, this short is quite possible due to the fact that the interface between the switches could be damaged. Now both contacts of Door #1 have been bypassed. Someone entering at this door is no longer protected because the safety relay would not see this gate open, nor would it know that there are short circuits. Imagine if this was a robot cell, the robot was paused, and the operator thought it was stopped.

## Why the Vital Solution is changing the way people think about safety!

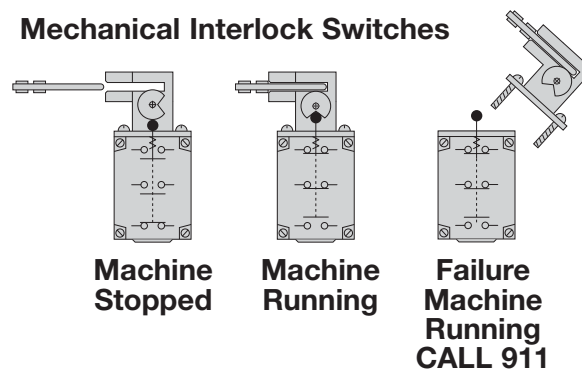
The difference between a standard safety relay and the Vital Solution is the dynamic signal that Vital produces. This signal is monitored throughout the system. Cycling the power or replacing the Vital controller will not result in the masking of a short circuit.

Diagram 6 illustrates the Vital Controller with two (2) doors. We have now introduced two Eden non-contact door safety sensors. These sensors are not magnetic; they are designed to work with the dynamic signal produced by the Vital. The Vital controller sends the signal to the Adam at door #2, it is altered by the presence of Eva and then sent on to the next-door where again this process takes place. Finally, the Vital received back the proper signal allowing the machine to operate. Opening either door results in the stopping of the machine.

Diagram 7 introduces a short illustrated in red. Unlike the safety relay examples above, this fault would be recognized immediately! Opening door #1 or door #2, cycling power, or replacing the Vital controller would not correct this problem, therefore increasing the safety circuit of the machine. In this case, the Vital controller does not see the correct signal and therefore would not operate until the short circuit has been corrected.



## Mechanical Interlock Switches



# Vital 1: The New Generation of Safety Systems

Vital is the heart of a new solution which makes it possible to install/connect many different types of safety devices in the same safety circuit and still achieve safety category 4 according to EN 954-1/EN ISO 13849-1. The Vital module is based upon a dynamic single-channel concept as opposed to conventional dual-channel safety relays. Up to 30 dynamic sensors can be connected directly in the safety circuit and be supervised by only one Vital module. The Vital therefore replaces several safety relays. Safety components with output contacts can be connected to the Vital via Tina adapters.

## Applications

- Safety solution for supervising different types of safety devices in the same circuit



Category 4 according to  
EN 954-1/EN ISO 13849-1

Most safety components on the market can be connected to the Vital module. Dynamic sensors enable safety category 4 to be achieved in a single-channel system. For example Jokab Safety's dynamic non-contact Eden sensor, Spot light beam and emergency stops (via Tina adapters) can be used. Even mechanical switches can be connected to Vital with the aid of Jokab Safety's Tina adapters. Up to 30 components can be connected to a Vital module.

Vital is a small, 22.5 mm in width, electronic safety module that dynamically supervises a number of safety components. Vital's detachable connector blocks simplifies connection, trouble-shooting and exchange of module. The Vital and other safety components can be connected together using standard cables and with cables having M12 connections.

## Features

- Safety category 4, dynamic safety circuit
- Width 22.5 mm
- Long cable lengths
- Manual supervised or automatic reset
- 2 NO safety outputs
- Quick release connector blocks
- LED indication of power on, dynamic signals and output status
- Information output for reset indication and status for PLCs

## Approvals





## Vital 1 Connection of Units and Cable Lengths

### Three Connection Alternatives

According to Category 4 (EN-954-1/EN ISO 13849-1) connection of sensors/adapter units in the Vital safety circuit must be made as per the following connection examples (see drawing HH3400A below).

#### Example 1

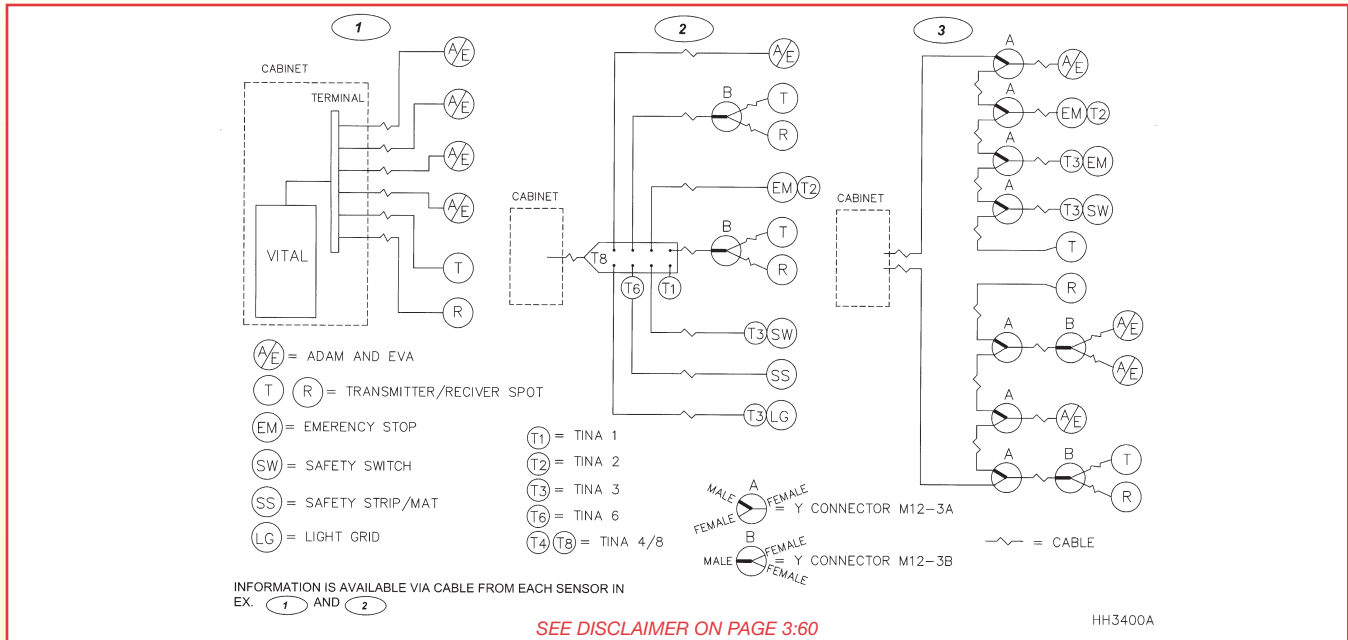
Use separate connection cables from each sensor or adapter unit to the Vital safety module. Interconnections to be made via suitable terminations in the control cabinet.

#### Example 2

Use Tina 4A/Tina 8A connector blocks to simplify connection of externally mounted sensors or adapter units. Only Tina 4A/Tina 8A connector blocks must be used. Use of any other connector blocks will not meet the safety circuit requirements.

#### Example 3

Use M12-3A and M12-3B 'Y' connectors to connect sensors in series/Parallel.



### Cable Lengths and Number of Sensor/Adapter Units for the Three Connection Examples

In order to determine the number of sensor/adapter units that can be connected to a Vital 1 unit it must be remembered that 1(one) Spot T/R is equivalent to five (5) Eden or Tina units. Units in parallel are equal to one unit. The following examples provide guidance as to possible configurations and cable lengths using suitable cables.

#### Example 1

Up to 1000 meters (0.75mm<sup>2</sup> or 0.34mm<sup>2</sup> conductors) in total can be connected to the sensors/units in this example. The connection is equivalent to 9 Eden or Tina units. A maximum of 30 Eden or Tina units can be connected to the Vital 1 unit on a maximum cable length of 500 meters (0.75mm<sup>2</sup> conductors) or 300 meters (0.34mm<sup>2</sup> conductors).

#### Example 2

Up to 600 meters (0.75mm<sup>2</sup> conductors) to Tina 8A and 10 meter cables type M12-C1012 (0.34mm<sup>2</sup>) to each sensor/unit connected to the Tina 8A. This connection example is equivalent to 17 Eden or Tina units.

A maximum of 3 Tina 8A units, equivalent to 27 Eden/Tina units (= 3 x 8 connected to Tina 8A + 3 Tina 8A) can be connected to one Vital 1 with a total cable length of 600 meters (0.75mm<sup>2</sup>). Up to 6 Tina 4A units can be connected to one Vital 1 (equivalent to 30 Eden/Tina units) with a total cable length of 600 meters (0.75mm<sup>2</sup>) to Tina 4A.

#### Example 3

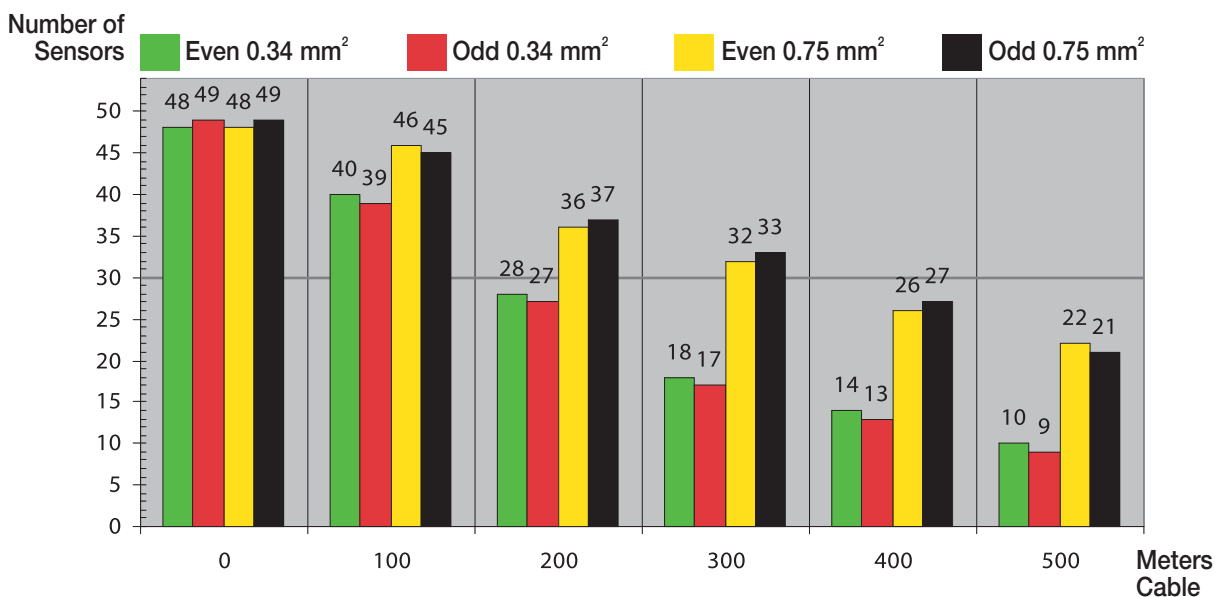
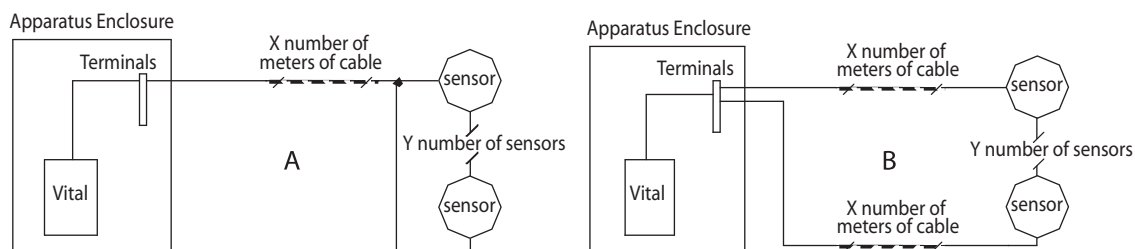
Either 2 x 500 Meter cables (0.75mm<sup>2</sup>) from the control cabinet and 10 meter cables (0.34mm<sup>2</sup>) to each sensor/unit or 2 x 10 meter cables (0.75mm<sup>2</sup>) from the control cabinet and 200 meter cables (0.75mm<sup>2</sup>) to each sensor/unit. The connection is equivalent to 16 Eden or Tina units.

A total of 30 Eden/Tina units can be connected using a maximum cable length of 1000 meters (0.75mm<sup>2</sup>) or 400 meters (0.34mm<sup>2</sup>). If power supply is only made from one direction (from one end of the network) the total cable length is reduced to approximately 300 meters (0.75mm<sup>2</sup>) and 100 meters (0.34mm<sup>2</sup>).

## Number of Edens that can be used with Vital

The table below shows the number of Edens that can be connected to Vital with the maximum voltage variation. The values have been established in a laboratory environment. The actual possible number of connected Edens may therefore differ from those given in the table. The values should be regarded as guidelines;

Jokab Safety recommends a maximum of 30 Edens per Vital. the table was prepared according to measurements with connection example A. If connection example B and 0.34 mm<sup>2</sup> cable is used (with feed voltage from two directions), the values for 0.75 mm<sup>2</sup> in the tables are used.

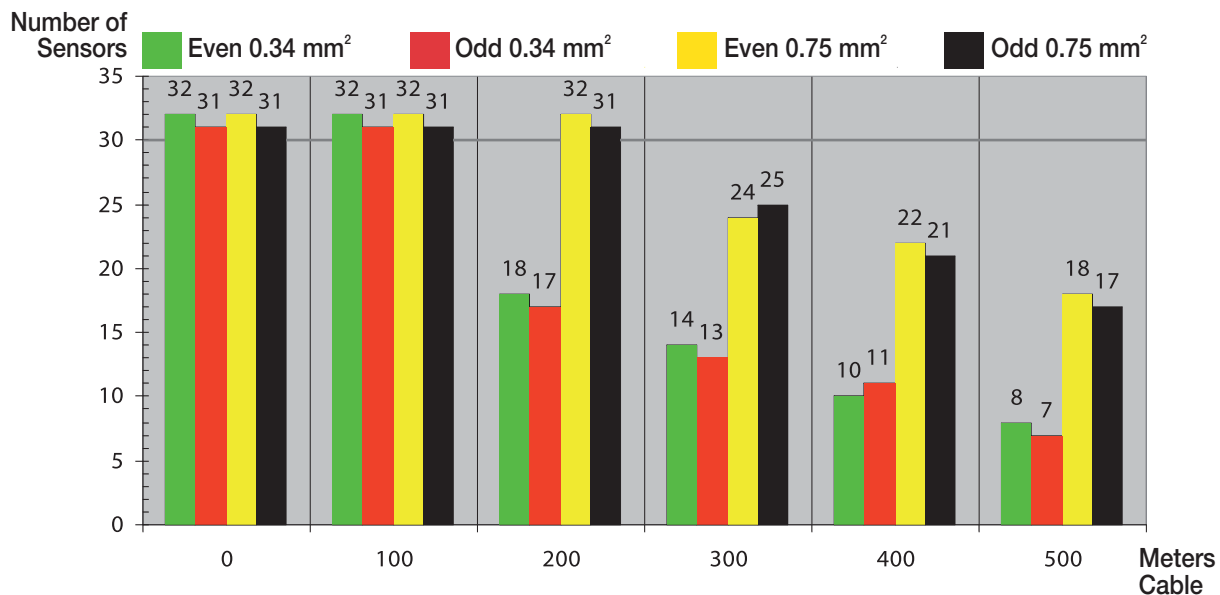
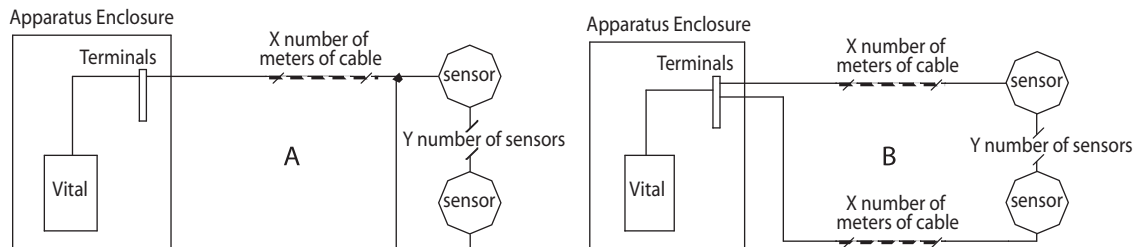




## Number of Tinas that can be used with Vital

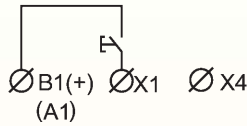
The following table shows the numbers of Tina-3A, Tina-6A, Tina-7A and SmileTina that can be connected to Vital with the maximum voltage variation. The values have been established in a laboratory environment. The actual possible number of connected Tinas may therefore differ from those given in the table.

The values should be regarded as guidelines; Jokab Safety recommends a maximum of 30 Tinas per Vital. The table was prepared according to measurements with connection example A. If connection example B and 0.34 mm<sup>2</sup> is used, the values for 0.75 mm<sup>2</sup> in the tables are used.



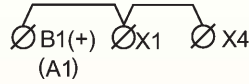
## Vital 1 Reset Connections

### Manual Supervised Reset



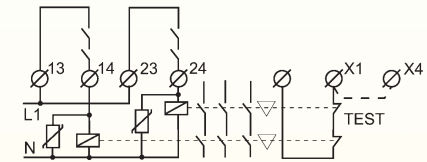
The manual supervised reset contact connected to input X1 must be closed and opened in order to activate the relay outputs.

### Automatic Reset



Automatic reset is selected when B1, X1 and X4 are connected. The relay outputs are then activated at the same time as the inputs.

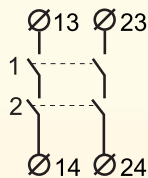
### Testing External Contactor Status



Contactors, relays and valves can be supervised by connecting 'test' contacts between B1 and X1. Both manual supervised and automatic reset can be used.

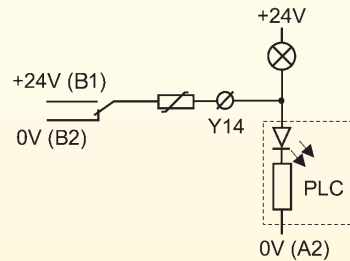
## Vital 1 Output Connections

### Relay Outputs



The Vital 1 has two (2 NO) safety outputs. In order to protect the output contacts it is recommended that loads (inductive) are suppressed by fitting correctly chosen VDRs, diodes etc. Diodes are the best arc suppressors, but will increase the switch off time of the load.

### Information Outputs



The Vital 1 has a single changeover contact information relay output. The relay output Y14 is connected internally to 0V and 24V in the following way:

- Y14 is internally closed to 0V B2 (A2) when the Vital 1 is not reset.
- Y14 is internally closed to +24V B1 when the Vital 1 is reset.

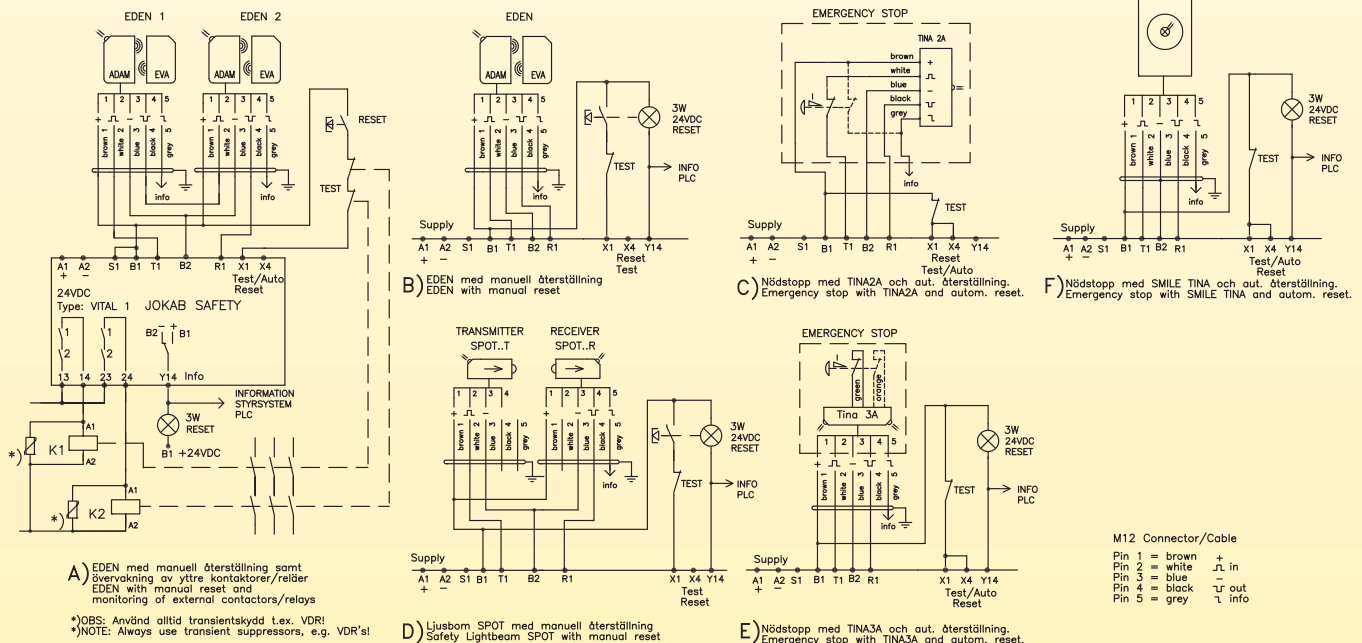
### Connection of S1

Even numbers of sensors (Eden, Spot, Tina) requires a connection between B1 and S1.

- S1 is not to be connected for odd numbers of sensors.
- See connection examples below figures A and B.

## Vital 1 Connection of Safety Devices

Following are simple examples. Consult pages 3:36 through 3:50 for more details or contact Jokab Safety North America.



\*OBS: Använd alltid transientkydd t.ex. VDR!  
 \*NOTE: Always use transient suppressors, e.g. VDR's!

## Vital 1 Technical Data

**Manufacturer**..... JOKAB SAFETY

**Ordering Data/Article Numbers**..... see page 3:51

**Safety Category**  
(according to EN 954-1)..... 4

**Color**..... black and beige

**Weight**.....220 g

### Power Supply

Vital, A1-A2.....24 VDC +/-15%

From Vital to Sensors/Units,  
B1-B2.....24 VDC

### Power Consumption

DC supply, nominal voltage (without load).....3 W

DC supply, nominal voltage (with max load).....48 W

### Fuse\*

An external fuse should be fitted in supply to A1..... 3AT

### Dynamic Safety Circuit

T1.....output signal

R1.....input signal

### Reset input X1

Supply for reset input.....+24 VDC

Reset current..... 30 mA Max.  
(inrush current 300 mA during contact closure)

Minimum contact  
closure time for reset..... 80 ms

### Connection of S1

*Even numbers of sensors (Eden + Spot T/R + Tina)  
require a connection between B1 and S1.*

*S1 is not connected for odd numbers of sensors.*

### Number of Sensors

Max. number of Eden/Tina to Vital 1..... 30 pcs

Total max. cable length to Eden/Tina..... 1000 m

Max. number of Spot T/R to Vital..... 6 pairs

Total max. cable length to Spot T/R..... 600 m

*The above limits vary depending on cable size and application.  
See Connection of Units and Cable Lengths to Vital 1 Connection  
Example on page 7, Number of Edens that can be used with  
Vital on page 8, and Number of Tinas that can be used with Vital  
on page 9.*

### Response Time

At Power On.....< 65 ms

When activating (input-output).....< 40 ms

When deactivating (input-output).....< 38 ms

At Power Loss.....< 45 ms

### Relay Outputs

NO.....2

Maximum switching  
capacity, resistive load.....6A/250 VAC/1500 VA/150W

Minimum load.....10mA/10 V

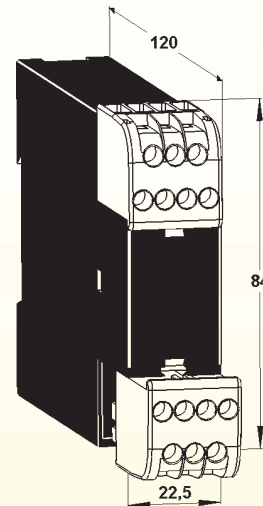
Contact material.....AgCdO

Mechanical life.....>10<sup>7</sup> operations

External fuse (EN 600947-5-1)..... 6.3A or 4A slow

**Note:**  
Connector  
blocks are  
detachable  
without cables  
having to be  
disconnected.

**Warning:** This  
equipment is  
not to be used  
in any other  
way than stated  
in technical  
description.



### Relay Information Output (changeover contact)

Y14 - (0V)..... Indicates Vital is not reset

+ (24V)..... Indicates Vital is reset

Max. permissible load on Y14.....200 mA  
(Internal automatic fuse)

### LED Indication

**On** ● ..... Fixed light: supply voltage OK,  
Flashing light: under-voltage  
or overload

**T** ● **R** ● ..... T: Signal out OK  
R: Signal in OK

☐ ● **1** ☐ ● **2** .....Indicates that the output  
relays have been activated

### Mounting

Rail..... 35 mm DIN rail

**Operating Temperature Range**..... -10° C to + 55° C

### Connection Blocks (detachable)

Maximum screw torque.....1 Nm

Maximum connection area

Solid conductors.....1x4mm<sup>2</sup>/2x1.5mm<sup>2</sup>/12AWG

Conductor with  
socket contact.....1x2.5mm<sup>2</sup>/2x1mm<sup>2</sup>

Air and creep distance.....4kV/2 DIN VDE 0110

### Protection Class

Enclosure..... IP 40 IEC 60529

Connection block.....IP 20 IEC 60529

### This equipment is intended for:\*

- Indoor use
- Altitude maximum 2000 m
- Maximum relative humidity 80% at max 31°C and decreasing linearly to 50% at 40°C
- Pollution degree 2
- Installation category (over-voltage category) II: Local level, appliances, portable equipment, etc. with smaller transient overvoltage than installation category (over-voltage category) III.

\*CSA/UL Requirement

# Eden Non-Contact Non-Magnetic Safety Sensor for the Highest Level of Safety

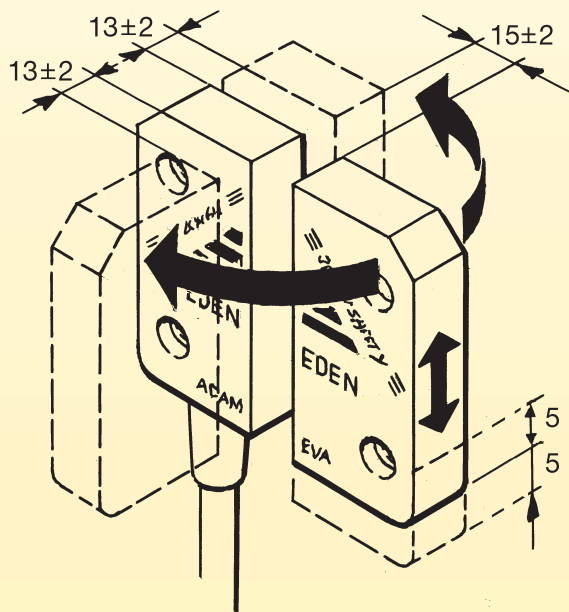
Eden — Adam and Eva — is a non-contact safety sensor for use on interlocked gates, hatches, etc. A coded signal is transmitted from the control device Vital or from the safety PLC Pluto via Adam to Eva, which modifies the signal and sends it back again. The maximum sensing distance between Adam and Eva is currently 15mm +/- 2 mm.

Up to 30 Edens can be connected in series to Vital and still achieve the same safety level in the safety circuit. It is also possible to connect safety light beams and E-stops in the same safety circuit.

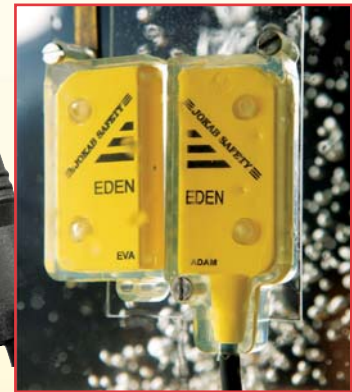
Adam is available with cable lengths up to 20 m and with M12 connectors. The LED on Adam provides indication of four different conditions, contact/non-contact between Adam and Eva, alignment, and safety status. The same information is also available via the Adam connection cable. For harsh environments, Jokab Safety offers Eden E — Adam E and Eva E. There is also a coded version Eden EC, Adam EC and Eva EC.

## Flexible Mounting

The ability to operate at distances of up to 15mm and at different detection directions allows a wide range of mounting possibilities.



*Eden E for harsh environments*



## Applications

- Doors and Hatches
- Position Control
- Sector Detection
- Slot Detection

## Features

- Safety category 4 according to EN 954-1/EN ISO 13849-1 together with Vital or Pluto
- Non-contact detection, large sensing distance 0 - 15 mm +/- 2 mm
- Up to 30 sensors connected in series at safety category 4
- Versatile mounting, 360° detection
- Protection class IP67 (Eden E - IP69K)
- Signal will penetrate through non-metallic materials (wood, plastic, etc.)
- Safety light beams, E-stops and Eden can be connected in the same safety circuit together with Vital or Pluto meeting safety category 4 (EN 954-1/EN ISO 13849-1)
- LED indication on sensor and status information via the connector cable
- Small hysteresis (< 1mm)
- Eden C and Eden EC - available coded versions

## Approvals





## Eden Application Examples

### Eden to Detect Position

Adam and Eva has contact only if they are within 15 mm from each other.

### Eden Used for Sector Detection

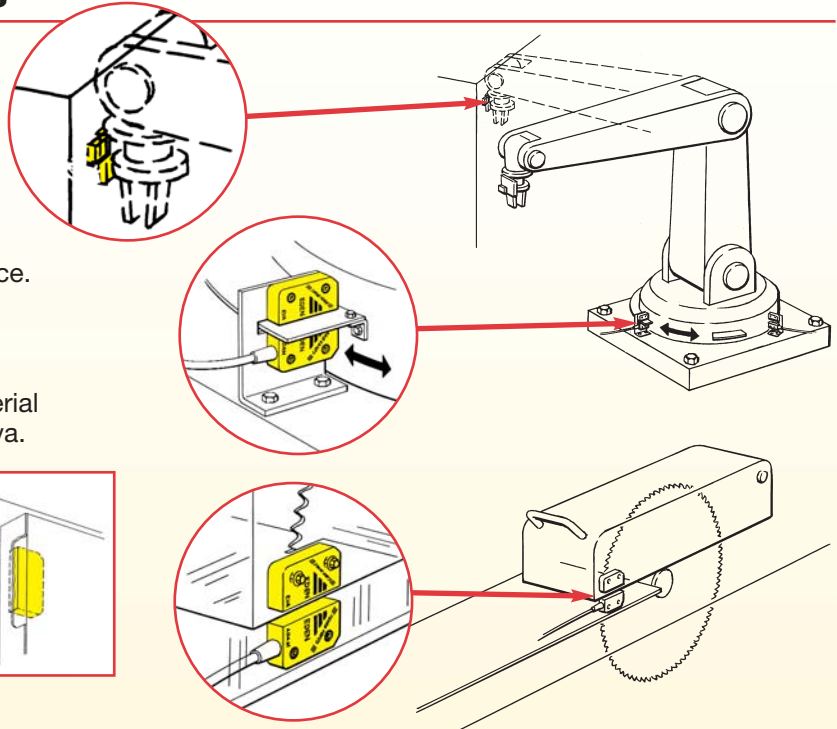
Metal stops the signal between Adam and Eva. Additional Eden sensor(s) can be mounted to detect metal plate(s) in place.

### Eden Used for Detection of Position of Saw Guard

Wood, plastic and other non-metallic material lets the signal pass between Adam and Eva.

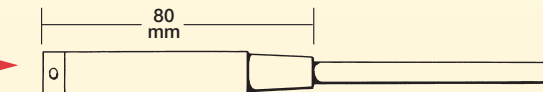
### Eden Hidden in Doors and Hatches

Non-metallic door material between Adam and Eva allows signal through.

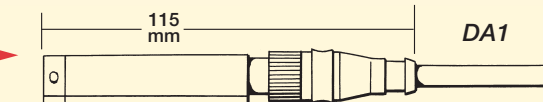


## Eden Mounting

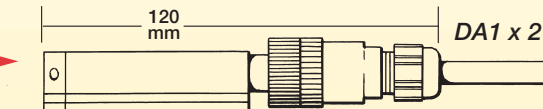
### Mounting Adam with integral cable.



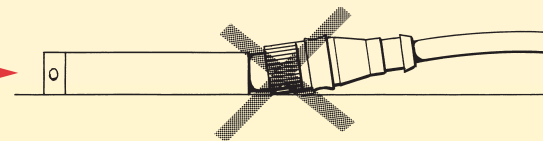
### Mounting with one protection plate (DA1) for Adam M12 using prewired molded M12 connector.



### Mounting with two protection plates (DA1) for Adam M12 using field wirable M12 connector.

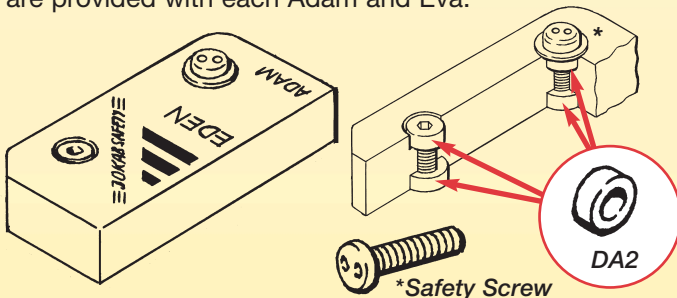


### Wrong mounting without protection plate may cause permanent damage to sensor.



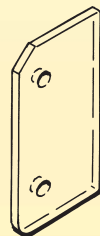
### DA2 Mounting Spacer

The DA2 mounting spacer must be used in order to physically protect Eden from damage. Four spacers are provided with each Adam and Eva.



### DA1 Protection Plate

Four protection plates (2.5 mm) are supplied with Adam M12. To protect Adam and Eva protection plate (DA1) can be used on both sides.



## Eden Technical Data

**Manufacturer**..... JOKAB SAFETY

**Ordering Data/Article Numbers**.....see page 3:51-3:52

**Safety Category together with Vital or Pluto**

(according to EN 954-1/EN ISO 13849-1)..... 4

**Color**.....yellow and black

### Weight

Adam M12.....30 g

Adam 3 m.....220 g (including cable)

Adam 10 m.....650 g (including cable)

Adam E10 m.....660 g (including cable)

Adam EC.....660 g (including cable)

Eva.....26 g

Eva E.....36 g

Eva EC.....36 g

**Power Supply**.....24VDC +15%/-25%

### Power Consumption

Adam without info output.....45 mA

Adam with info output.....max. 55 mA

**Max. Cable Length**.....see Vital Technical Data

### Ambient Temperature

Eden/Eden C.....-40°C to +70°C (operation)

-25°C to +70°C (storage)

Adam E/Adam EC.....-40°C to +70°C (operation)

-25°C to +70°C (storage)

(Test OK +90°C to 100°C)

### Protection Class

Eden.....IP67

Eden E/Eden EC.....IP69K

**Mounting**.....M4 screw, e.g. safety screw

20-053-42. Max torque 2 Nm

(screws should be locked with Loctite or similar)

### Detection Distance Max

Adam/Eva 15+/-2 mm.....Flash 2 mm before red position

Adam C/Eva C 12+/-2 mm.....Flash 2 mm before red position

Adam E/Eva E 12+/-2 mm.....Flash 2 mm before red position

Adam/Eva EC 10+/-2 mm.....Flash 2 mm before red position

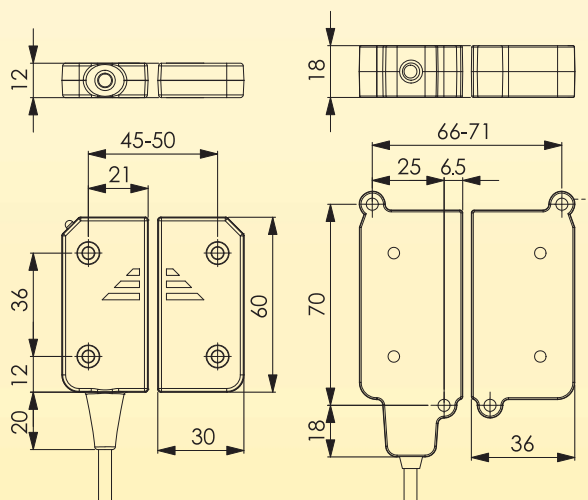
Hysteresis.....approx. 1 mm

*Metal may have influence on detection distance.*

*This can be prevented by protection plates, DA1.*

**Minimum Distance between Eden Pairs**.....50 mm

**Life**.....>10<sup>7</sup> cycles



### Minimum distance to metal when there is metal on one or more sides.

Adam/Eva, Adam EC/Eva EC (1).....0 mm

Adam/Eva, Adam EC/Eva EC (more).....2.5 mm

Adam E/Eva E (1).....0 mm

Adam E/Eva E (more).....0 mm

Adam C/Eva C (1).....5 mm

Adam C/Eva C (more).....5 mm

**Material**.....Macromelt (based on polyamid)

(Eden E and Eden EC is also covered by PUR, polyurethane)

### Chemical Resistance

Macromelt.....cutting oils, vegetable and animal oils,  
hydrogen peroxide, diluted acids and bases: good  
(alcohol and strong acids: not recommended)

PU (Eden E and Eden EC).....cutting oils, vegetable and  
animal oils, hydrogen peroxide, diluted  
acids and bases, alcohols: good  
(strong oxidating acids: not recommended)

### LED on Adam

Green.....Eva within range, safety  
circuit closed (door closed)

Flashing.....Eva within range, earlier  
safety circuit open (door closed)

Red.....Eva out of range, safety  
circuit open (door open)

Fast Flashing.....Eva within 2 mm from maximum  
sensing distance (door closed)

**Cable**.....3 or 10 m, Ø5.7 mm, black PVC  
5 x 0.34 mm<sup>2</sup> + screen, UL 2464

**Connector**.....M12: 5-pin male contact

### Connections

Brown (1).....+24 VDC

White (2).....dynamic signal in

Blue (3).....0 VDC

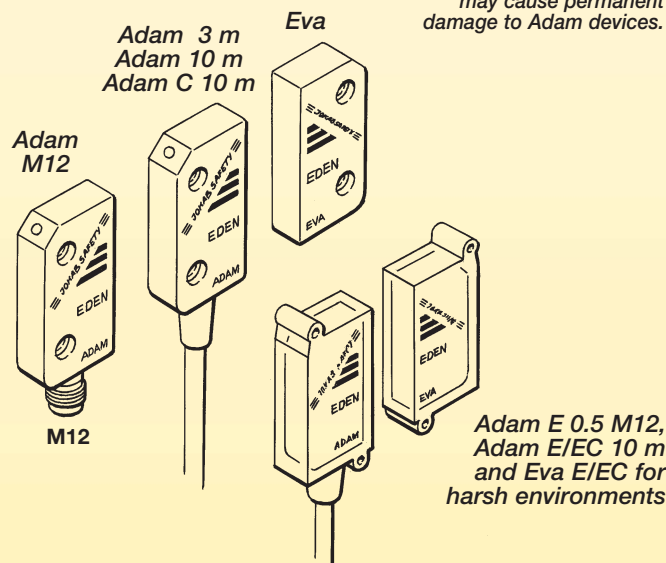
Black (4).....dynamic signal out

Grey (5).....info output (see below)

24 VDC when LED is green or flashing  
(tolerance -2 VDC) 10mA max

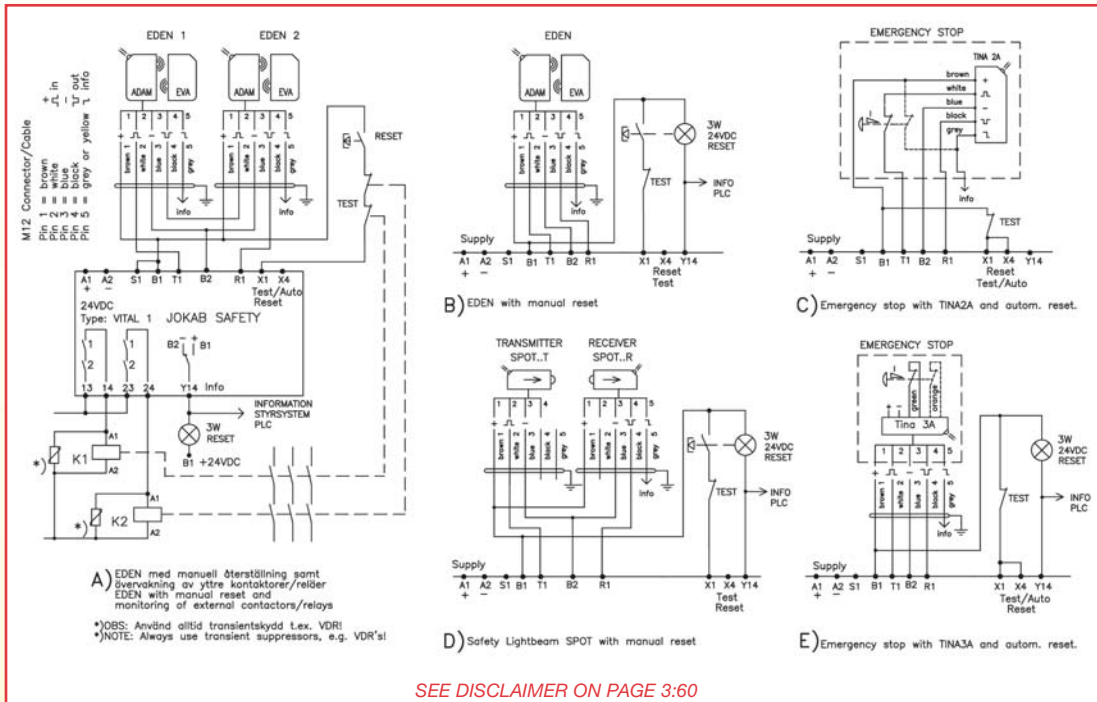
0 VDC when LED is red (tolerance +2 VDC)

**Warning:** Incorrect connection  
may cause permanent  
damage to Adam devices.



## Eden Connection Example

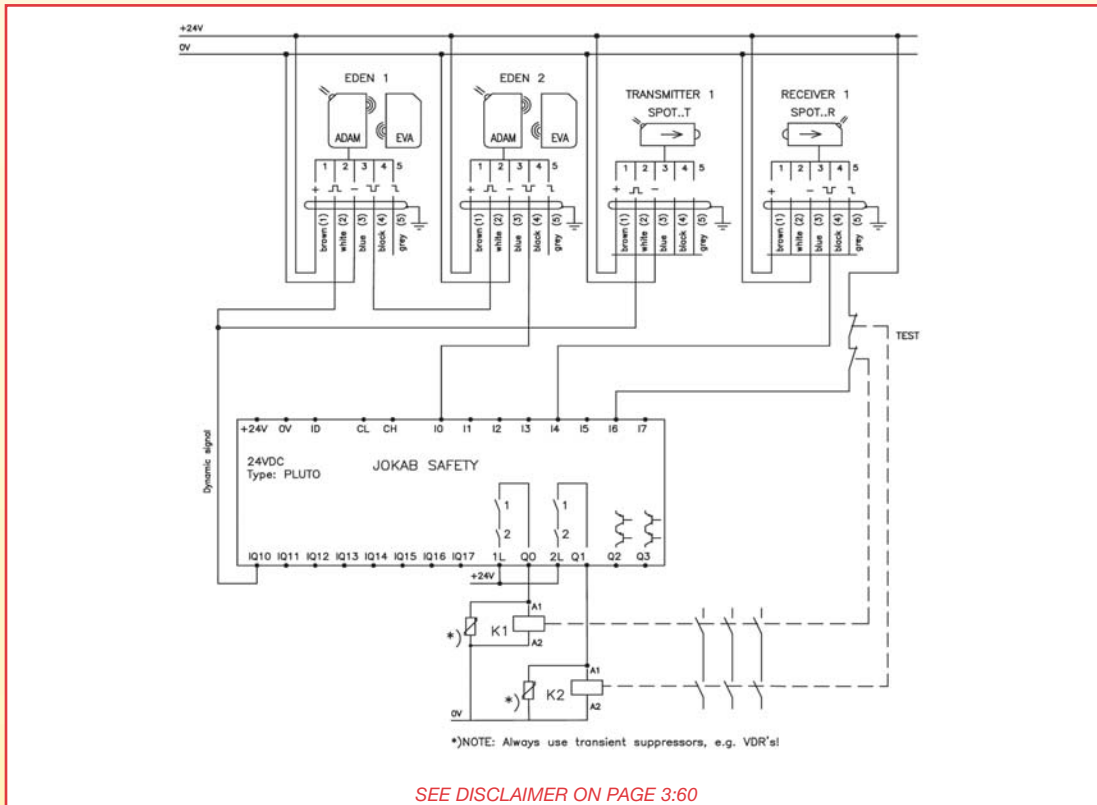
### Connection of Eden to Vital 1



SEE DISCLAIMER ON PAGE 3:60

## Eden Connection Example

### Connection of Eden to Pluto



SEE DISCLAIMER ON PAGE 3:60

# SafeSlide™ Safety Lockout System

SafeSlide, a unique Safety Lockout System, was designed and developed by Jokab Safety North America to be used in conjunction with Jokab Safety's Eden non-contact, non-magnetic electronic safety sensor.

The product is engineered to be installed on doors, gates and hatches of all types used on machine guarding, barrier and fencing systems to provide safe entry and exit.

When the SafeSlide is engaged while the door is open and secured with a single or multiple padlocks, the system prevents the door from inadvertently closing which would cause the Eden Adam and Eva to reestablish contact creating an unsafe situation.

When the SafeSlide is engaged while the door is closed, it slides down over the flange on the bracket attached to the door and secures the door until the SafeSlide is disengaged.

The handle on the front of the slide allows for opening of the door, gate or hatch from the outside of the guarded area and a metal tab allows opening from the inside.



*With the door closed and SafeSlide engaged, the Eden Adam and Eva are able to make contact and the door is secured.*



*With the door open and SafeSlide engaged, the Eden Adam and Eva are unable to make contact preventing an unsafe situation.*



*When SafeSlide is engaged it completely eliminates the possibility of the Eden Adam and Eva making contact. A simple padlock can secure the position for further safety.*

## Applications

- Hinged or Sliding Doors, Hatches and Gates for Machine Guarding, Barrier and Fencing Systems

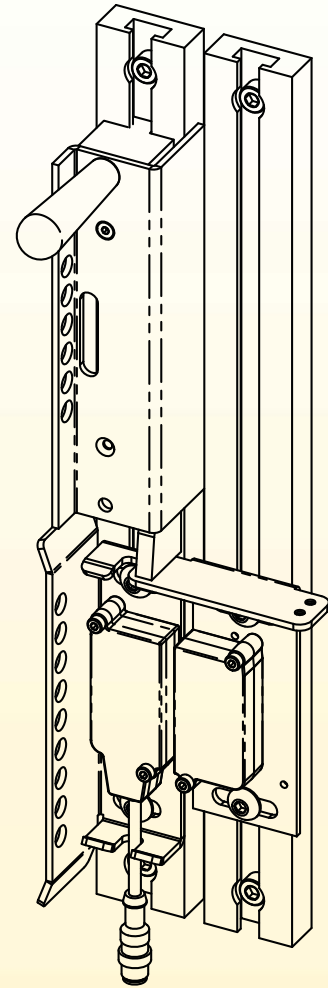
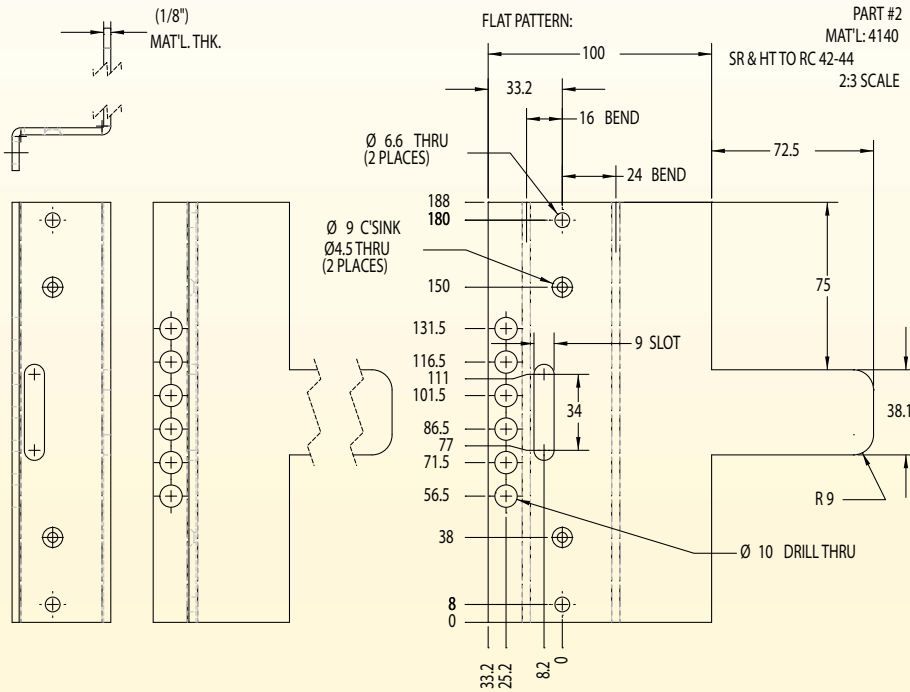
## Features

- Lock out holes for padlocks and scissor type lockout devices
- Mounting holes to accommodate installation of Eden — Adam and Eva Safety Sensor
- Adjustable slots for door, gate or hatch gap differences
- Upper slide with handle provides an automatic or manual lock cover upon opening of door gate or hatch
- Tabs located on device allow for wire and cable connections the the Eden switches
- Slots provided to allow viewing of LEDs located on the switches



## SafeSlide Technical Data

**Manufacturer**.....JOKAB SAFETY  
**Ordering Data/Article Numbers**.....see page 3:53  
**Color**.....yellow and black  
**Weight**.....1.9 kg  
**Mounting**.....Quick-Guard Fencing Profile  
*(can be mounted to other handles or locking devices)*  
**Material**.....steel with UHMW slide block



## SafeSlide Isolates Hazardous Motion and Offers Control Reliability during Non-Lockout/Tagout Applications

SafeSlide meets safety standards that apply to the control of energy during servicing and/or maintenance of machines and equipment.

Normal production operations are not covered by OSHA 1910 - Subpart O - Lockout/Tagout. Servicing and/or maintenance which takes place during normal production operations is covered by this standard only if one of these situations occurs:

- An employee is required to remove or bypass a guard or other safety device
- An employee is required to place any part of his or her body into an area on a machine or piece of equipment where work is actually performed upon the material being processed (point of operation) or where an associated danger zone exists during a machine operating cycle.

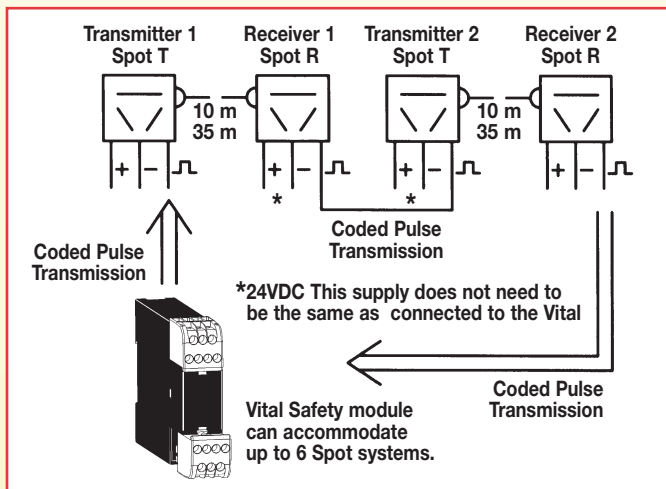
Minor tool changes and adjustments, and other minor servicing activities, which take place during normal production operations, are not covered by this standard if they are routine, repetitive and integral to the use of the equipment for production, provided that the work is performed using alternative measures which provide effective protection.

# Spot Safety Light Beam for the Highest Level of Safety

The light beam is available in two versions — Spot 10 for distances up to 10 m and Spot 35 for up to 35 m. The light beams can be mounted at different heights and be angled around a machine using our mirrors and brackets.

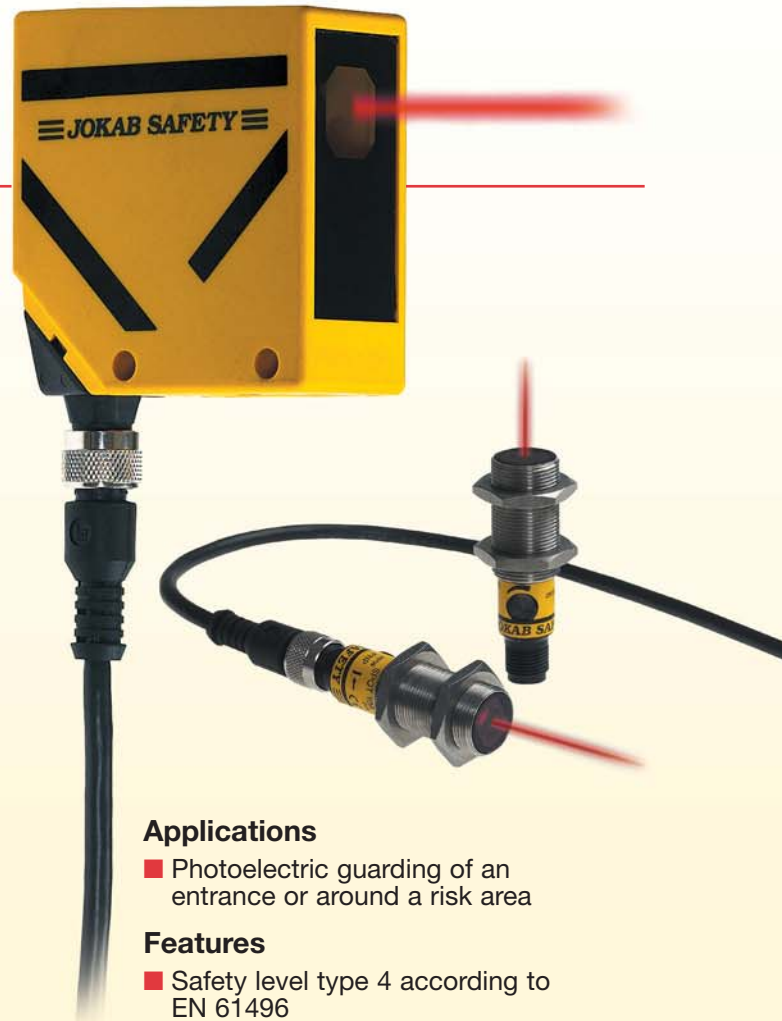
Spot and Vital in combination fulfills the requirements for Category 4 according to EN-954-1/EN ISO 13849-1 and type 4 according to EN 61496. Several light beams, Eden sensors and emergency stops can be connected in series achieving the high safety level for the safety circuit. A number of solutions for bypassing of light beams for material transport are available.

For indication there are LEDs on the transmitter and on the receiver which indicate 'contact' between transmitter and receiver and safety status. The 'contact' information is available via the light beam receiver connection cables.



## Function

The Spot light beam is supervised by the Vital safety module. A unique coded signal is sent out from the control unit (Vital) to the transmitter (Spot T). The signal which comes back from the receiver (Spot R) is then compared in the Vital. If the correct coded signal is received the Vital switches the necessary safety output contacts to permit dangerous machine movements. Coding guarantees that no output signals can be produced by light from other sources, interference or faults in components in the transmitter or receiver. The light beam is dynamically supervised which means that if the signal stops pulsating at the correct frequency it is immediately detected. By using this special code function in the sensors, the signal can travel via up to 6 transmitter/receiver pairs which are not electrically connected to the Vital unit.



## Applications

- Photoelectric guarding of an entrance or around a risk area

## Features

- Safety level type 4 according to EN 61496
- Versatile mounting
- LED indication
- Protection class IP67
- 10 m or 35 m range
- Bypassing possibility
- Can be connected with several other different safety devices in the same safety circuit at category 4 together with Vital according to EN-954-1/EN ISO 13849-1.

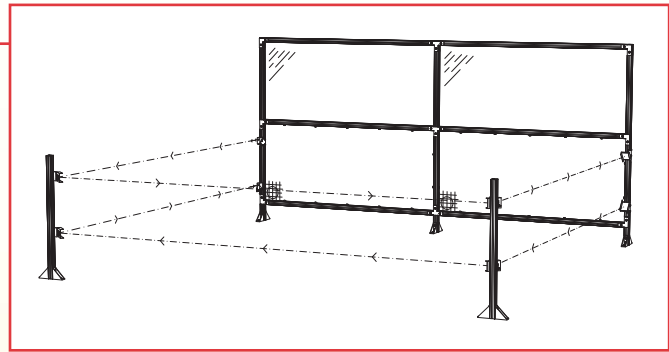
## Approvals



## Spot Mounting and Alignment

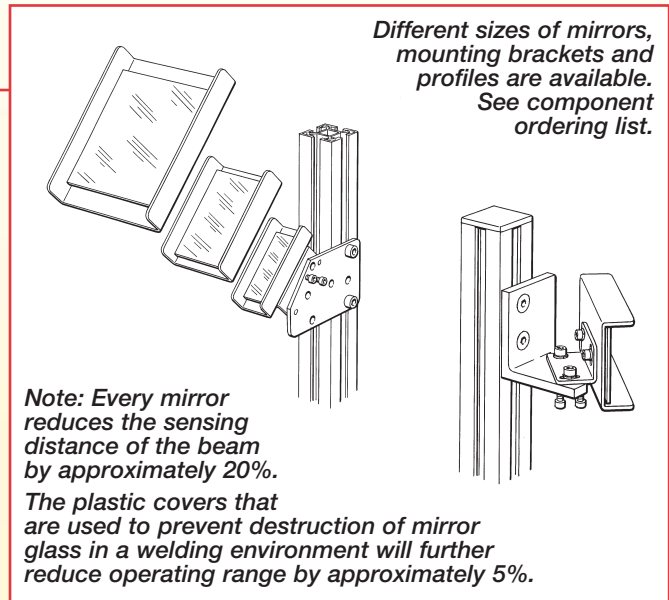
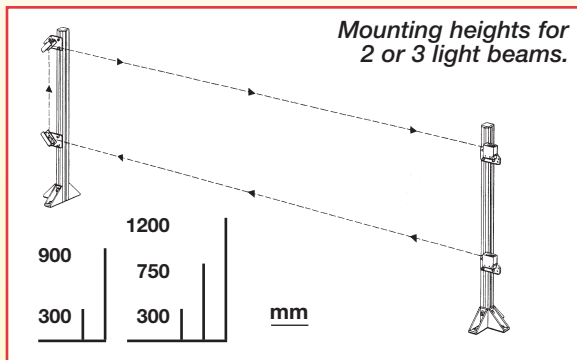
### Safety Distance

The basic principle is that dangerous machine movements should be stopped before a person reaches the dangerous area, which should be at least 1200 mm from the light beams. When determining the correct safety distance the stopping time of the machine and the risk level must be taken into account (see also EN 999). Contact us for further information.



### Accessories and Mounting

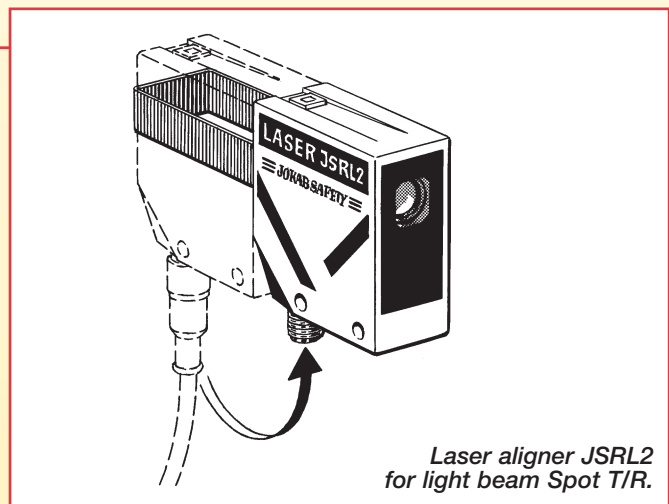
The Spot light beam can be mounted using a variety of brackets, posts and mirrors. See component list for further information.



### Alignment

When aligning the light beam, look towards the transmitter. In the lens will be seen a strong red light. When this light is seen from the receiver (via mirrors if fitted) the light beam is basically aligned. The LED on the receiver is on when the receiver is aligned with the transmitter. By moving the transmitter up/down and left/right the best alignment can be found.

When vertically mounting, (as shown in the diagram) the receiver should be mounted above the transmitter as this will simplify the alignment and minimize the risk of extraneous light disturbance. In exceptional light disturbance environments the received light can be adjusted by a screw on the rear of the Spot 35 receiver. On Spot 10 this adjustment can be made on the transmitter. To make the alignment even easier the Laser Aligner (JSRL2) can be used for Spot 35. The laser has



visible light (class IIa) and is easy to mount for aligning. Supply to the Laser Aligner is taken from the Spot 35 T/R connector.

## Spot Technical Data

**Manufacturer**.....JOKAB SAFETY

**Ordering Data/Article Numbers**.....see page 3:54

**Safety Level with Vital**  
(according to EN 61496).....Type 4

**Safety Category together with Vital**  
(according to EN 954-1).....4

**Color**.....Spot 10: steel grey  
Spot 35: yellow

**Weight**.....Spot 10: 2 x 21 g  
Spot 35: 2 x 100 g

**Power Supply**.....17 - 27 VDC,  
ripple +/- 10% of operation voltage

### Current Consumption

Transmitter.....< 25 mA

Receiver.....< 15 mA

Info. Output.....+10 mA max.

**Light Source**.....Red visible light,  
660 nm, <+/- 2°

### Function Indication

Transmitter LED on.....Power supply ok

Receiver LED status

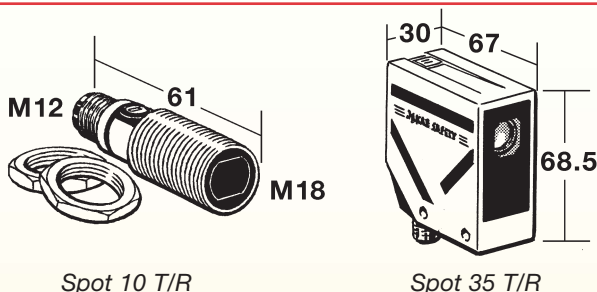
On.....Alignment ok, safety circuit closed

Flashing.....Alignment ok, earlier safety circuit open

Off.....Beam interrupted, safety circuit open

**Range**.....Spot 10: 0 - 10 m  
Spot 35: 0 - 35 m

**Operating Temperature Range**.....-25°C to +65°C



### Installation

Spot 10.....(2) M18 nuts (provided)

Spot 35.....Either via mounting holes in the casing  
or with angle bracket JSM63 (provided)

**Cable Connection**.....M12 fixed connector

### Casing Material

Spot 10.....Steel

Spot 35.....Polyamide housing with polyacryl lens protection

### Connections

Transmitter - Brown (1).....+24 VDC

White (2).....dynamic signal in

Blue (3).....0 VDC

Receiver - Brown (1).....+24 VDC

White (2).....dynamic signal in

Blue (3).....0 VDC

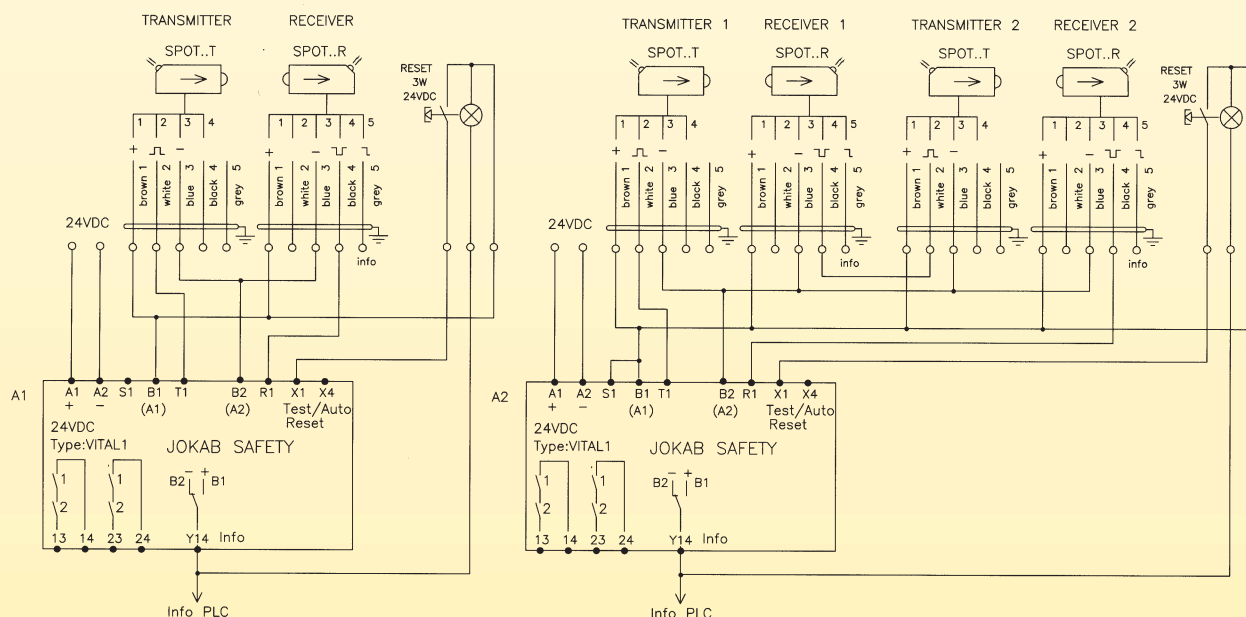
Black (4).....dynamic signal out

Grey (5).....Info. output (see below)

(24 VDC when LED is green or flashing/tolerance -2 VDC)  
(0 VDC when LED is off/tolerance +2 VDC)

**Protection Class**.....IP 67

## Connection of Spot T/R to Vital 1





## Spot Resetting - 3 Possibilities

### Supervised Manual Reset (Figure 1)

When the Spot light beam is broken Vital gives stop signals to dangerous machines inside the guarded area and the reset indication lamp is on. A new start of the machine requires a reset of the light beam. The reset button must be placed so that it cannot be reached from inside the guarded area and so that it has to be activated from outside the machine. When the reset button has been activated, i.e. the reset inputs have been both closed and opened, the outputs from the Vital are activated, the reset indication lamp is off and the machine can be started. High demands are placed on the reset function, a fault must not lead to the ready signal being given when someone has interrupted the light beam. (See connection example HD3800A on page 3:42.)

### Supervised Time Resetting (Figure 2)

To reset the light beam, push button 1 must first be pressed and then push button 2 (within the predetermined preset time). This prevents unintentional resetting when someone is within the hazardous area. This is especially important when the area which is being protected by the light beam is not clearly visible from outside.

When time resetting is performed the safety timer relay JSHT1 A/B is used together with the Vital. This allows pre-reset times (in steps from 5 to 40 seconds) to be set. (See connection example HE3811B on page 3:43.)

### Automatic Reset (Figure 3)

Automatic reset is utilized for example when a light beam is used to monitor an area. In this case when the light beam is interrupted this indicates that the robot is operating in the area allowing it to be stopped if a person enters into the same area. When the light beam is clear, the Vital is reset automatically.

## Bypassing

### Automatic Bypassing (Figure 4)

For the transport of materials, the light beams, grids or curtains can be bypassed just before they are interrupted. The bypassing is achieved by sensors which detect the auto carrier and give signals direct or via a safety relay to the Vital.

In the connection examples you can find a number of different solutions. (See connection examples HE3824C-E on pages 3:43 and 3:44.)

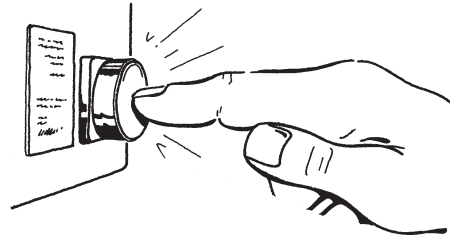


Figure 1 - Reset push button with lamp indication.

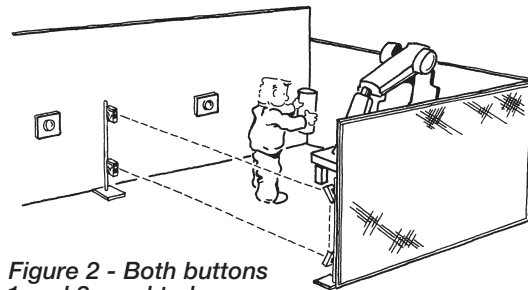


Figure 2 - Both buttons 1 and 2 need to be pressed (in sequence) within the pre-reset time to reset the Spot light beam

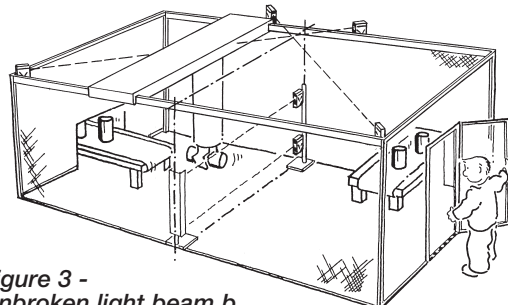


Figure 3 - Unbroken light beam b indicates that the industrial robot is outside area B. Area B can now be entered without stopping the robot.

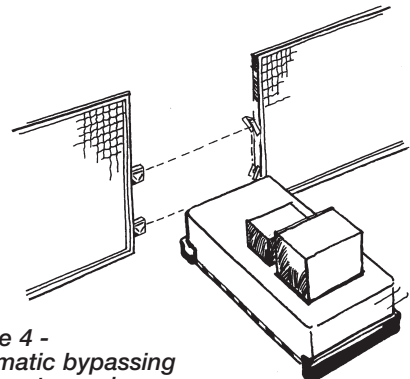


Figure 4 - Automatic bypassing when auto carrier passes.

# Why should I use Tina Adapter Units?

## ...to adapt safety components to a dynamic single-channel circuit according to safety category 4!

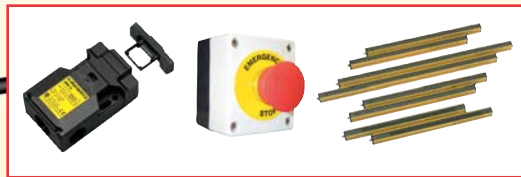
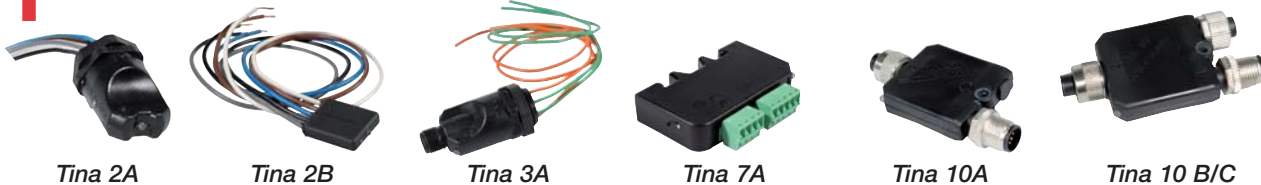
Tina units allow safety components with mechanical contacts, such as E-stops, switches and light curtains and grids with dual outputs to be connected into Vital or Pluto dynamic safety circuits. This enables safety category 4 to be achieved according to EN 954-1/EN

ISO 13849-1 for the connected safety components together with the Vital/Pluto control unit.

**Note:** Jokab Safety's Eden and Spot components can be directly connected to the Vital/Pluto dynamic circuit without using a Tina adapter unit.

1

Maximum 30 Tina-Units in series



## Vital/Pluto Safety Circuit in accordance with Category 4 using Tina Adapter Units



4

Tina 5A

Bypassing  
and Lamp  
Supervision



## ...for bypassing of safety components in a dynamic circuit!

The Tina 5A bypass unit is used for bypassing of safety components in a dynamic circuit and provides the possibility for supervision of bypass lamp indication. During bypassing of safety devices (e.g. a light grid or an interlocked gate switch/sensor) it must only be possible to allow the bypass function if a lamp indication is given. The lamp indication must therefore be supervised. With this system it is possible to bypass one or more safety components at the same time.

## ...as a connection block for connection to a dynamic circuit!

The Tina 4A/8A connection blocks are available with 4 or 8 M12 connections. They are used to enable several safety components — having M12 connection terminated cables — to be connected together. The blocks are connected with a suitable multi-core cable, that contains status information from each safety component, to the control cabinet. This enables simplified wiring. The connection block contains electronic circuits which modify the coded dynamic signal in the safety circuit.

**Note:** Several connection blocks can be connected to one Vital/Pluto, eliminating connection faults and can significantly reduce system cable costs.

## Designed to decode the Dynamic Signal in the Safety Circuit of Vital/Pluto

Tina is available in several versions depending on the type of safety component that is connected to the Vital or Pluto circuit. Also available is a bypassing unit, three connector blocks with 2, 4 or 8 M12 connectors, and a blind plug for un-used connections. As an accessory there is a Y-connector for series or parallel connection—and even for connection of light beams with separate transmitter and receiver.

### Features

- Safety circuit, category 4 according to EN 954-1/EN ISO 13849-1
- Individual status indication of every connected unit in the safety circuit
- Supervision of lamp indicating bypassing of safety device
- Quick release M12 connector

### Approvals



**1** Tina 2A/B, Tina 3A and Tina 7A are used to connect safety components with mechanical contacts, such as emergency stops, switches and light curtains or light beams with relay outputs.

*Note: In order to maintain safety category 4 and to reduce the risk of electrical interference, Tina 2A, 3A and 7A units must be installed within the same physical encapsulation as the safety component that is to be monitored, and this is to be connected to the Tina unit with as short a cable as possible.*

Tina 10A/B/C units are used for connection of Focus light beams/curtains to Vital or Pluto. Tina 10B has an extra M12 connector that enables reset, a reset lamp and switching of the Focus supply voltage. The Tina 10C has an additional M12 connector that permits a Focus transmitter to receive power.

**2** Tina 6A is used to connect door sensitive edges and safety mats, and provides an indication for each unit (Tina 7A may also be used). If a Tina 6A is connected close to the edge or mat, the risk of electrical interference is reduced.

**3** Tina 4A, Tina 8A, Tina 11A and Tina 12A are used as terminal blocks and simplify connection to a Vital safety circuit. Each safety component is connected to the terminal block via an M12 connection. A terminal block is connected to the apparatus enclosure by means of a cable that also contains status information from each safety component that is connected to Tina 4A/Tina 8A and summed information from Tina 11A/Tina 12A. There is also a Tina 8B Profibus, whereby the information signals go to a Profibus connector. Tina 1A must be used to terminate any open, unused ports.

**4** Tina 5A is used as a bypass for safety components in a Vital safety circuit and for monitoring lamp indications in the case of a bypass.

**2**

Tina 6A

Individual Indication for every connected Safety Mat, Strip or Bumper



**3**

Simple Connection Arrangements



Tina 4A



Tina 1A



Tina 8A



Tina 8B



Tina 11A



Tina 12A

# Tina 1A, 2A, 2B, 3A, 4A, 6A, 7A, 8A, 8B ProfiBus and 11A Technical Data

**Manufacturer**.....JOKAB SAFETY  
**Ordering Data/Article Numbers**.....see page 3:54-3:56  
*(including M12 contacts and cables)*

**Safety Category with Vital or Pluto**  
*(according to EN 954-1/EN ISO 13849-1)*..... 4

**Color**.....black

**Material**.....based on polyamid

**Max. connected units/cable length**..... see data for Vital

**LED Indication on Tina 1A, 2A, 2B, 3A, 6A, 7A and 11A**

Green..... Protection OK, safety circuit intact

Flashing..... Protection OK, safety circuit was interrupted earlier

Red..... Protection open, safety circuit interrupted  
*(continuous red lamp not used in Tina 1A, 2A or 11A)*  
*(diodes on Tina 11A flash when the connected unit opens)*

**Current Consumption**

Tina 1A, 2A, 2B and 11A..... 17 mA

Tina 3A, 6A and 7A.....47 mA

Tina 4A.....10 mA

Tina 8A.....15 mA

**Tina 3A, 6A and 7A**

Current through safety device contacts..... 12 mA

Short circuit current between contacts..... 10 mA

**Temperature Range**

Operation.....-10°C to +55°C

Storage.....-30°C to +70°C

**Connections for 1A, 2A, 2B, 3A, 4A, 6A, 7A, 8A and 11A**

Brown (1)..... 24 VDC, +15%, -25%  
 24VDC +15%, -15% *(Tina 4A, 8A, 11A)*

White (2).....dynamic input signal

Blue (3).....0 VDC

Black (4)..... dynamic output signal

Grey (5)..... indication output

24 VDC when LED is green or flashing

*(tolerance -2 VDC) 10mA max.*

0 VDC when LED is red *(tolerance +2 VDC)*

Connection block 5 - 8, 13 Tina 4A status for unit according to connection 5

Connection block 5 - 12 Tina 8A see above 5 - 8 Tina 4A

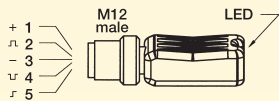
*Note: Shielded cable is recommended between cabinet and Tina 4A/8A. Shield to be connected to ground in cabinet only.*

**Protection Class**..... IP 67 (Tina 7A IP 20)

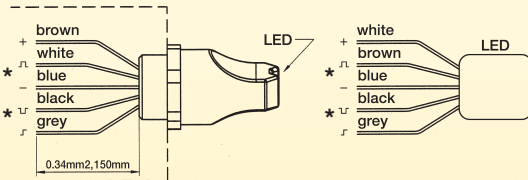
## Tina 1A, 2A, 3A, 4A, 6A, 7A, 8A and 11A Connections

*\*In order to achieve category 4 according to EN 954-1 the connection to the safety device must be made inside an enclosure — i.e. safety switch, E-stop...*

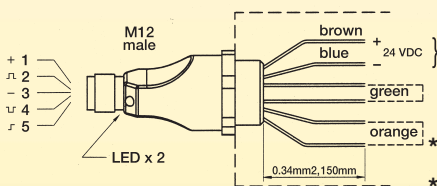
**Tina 1A** See connection example HA3302B on page 3:38.



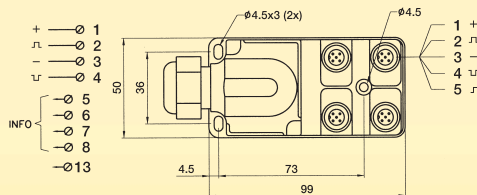
**Tina 2A/B** See connection example HA3303B on page 3:39.



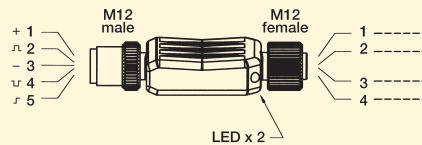
**Tina 3A** See connection example HA3304A on page 3:39.



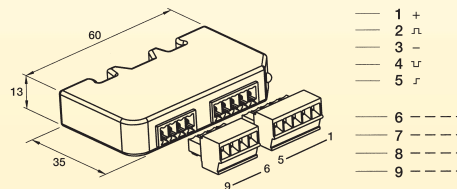
**Tina 4A** See connection example HH3300D on page 3:46.



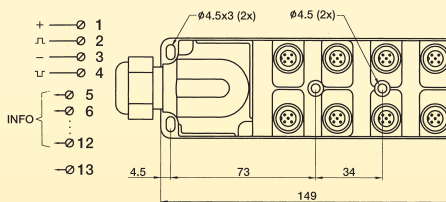
**Tina 6A** See connection example HH3300A on page 3:46.



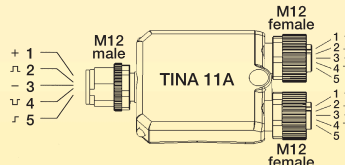
**Tina 7A** See connection example HA3307A on page 3:41.



**Tina 8A** See connection example HH3302D on page 3:48.



**Tina 11A** See connection examples HB0005A on page 3:49.





## Tina 5A Technical Data

<b>Manufacturer</b> .....	JOKAB SAFETY
<b>Ordering Data/Article Numbers</b> .....	see page 3:55
<b>Safety Category with Vital or Pluto</b> (according to EN 954-1/EN ISO 13849-1).....	4
<b>Color</b> .....	black and beige
<b>Weight</b> .....	135 g
<b>Bypass connection</b> .....	can bypass max 30 Eden/Tina units or 6 Spot T/R
<b>LED Indication</b>	
Signal.....	Dynamic input S1 OK
On.....	Supply voltage OK
Mute.....	Dynamic output on S2, S3 and 24 VDC to L1 - L2 OK
<b>Current Consumption A1-A2</b>	
No bypass .....	10 mA
During bypass using 5 W indication lamp.....	240 mA
<b>Mounting</b> .....	35 mm DIN rail
<b>Operating Temperature Range</b> .....	-10°C to +55°C
<b>Connections</b>	
A1-A2 Supply.....	24 VDC +/- 10%
S1 Input dynamic signal.....	10 mA
S2 Output dynamic signal modified.....	20 mA max
S3 Output dynamic signal modified twice.....	20 mA max
L1-L2 Bypass indication lamp.....	min 1W, max 5W (or resistor when lamp is not required - 820 ohm/2W)
<i>Note: Tina 5A is supplied with the resistor connected across terminals L1, L2. This resistor must be taken away and replaced with a suitable rated lamp when bypass indication is required.</i>	
Y14 Information output bypass on.....	10 mA max
<b>Protection Class</b>	
Enclosure.....	IP 40
Connection blocks.....	IP 20

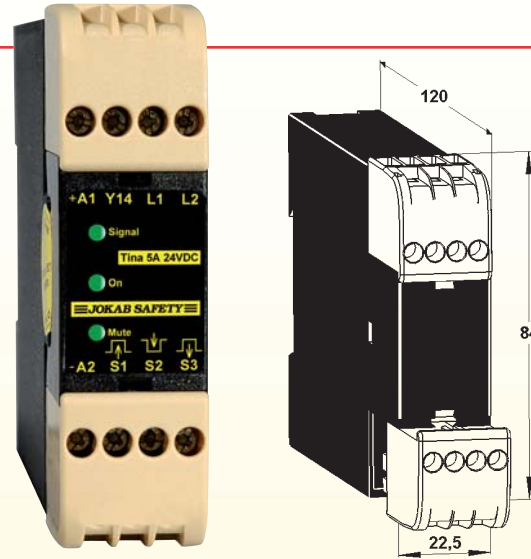
## Function

The Tina 5A is designed for bypassing of safety devices connected to the Vital/Pluto safety circuit and for supervision of lamp indication.

During bypassing of safety devices — e.g. a light grid or an interlocked gate — it must only be possible to allow the bypass function if a lamp indication is on. The lamp indication must therefore be supervised. Whether indication is required depends on the specific situation and result of risk analysis.

When the Tina 5A receives a coded dynamic signal to S1 and the bypass indication lamp is on (connected across L1-L2), a bypassing output signal is provided on S2 and S3. A broken or short circuit in the indication lamp 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 coded signal — as for example an Eden Sensor or a Spot Light Beam.



## 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 are bypassed by one or more Eden or Tina units direct to each other, a diode, such as a 1N4007 must be inserted by the last unit in both loops with forward current out from pin 4. (Refer to Connection Example HD3801A on page 3:42.) In the case of bypassing of a Tina 10A, B or C, or of more than one unit towards each other, it is recommended that a Tina 5A or M12-3M is used. (See Connection Examples HE3824C, D, E, F or G on pages 3:43, 3:44 and 3:45.)

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

S2 is used if:

- an odd number of dynamic safety units is to be bypassed using an odd number of dynamic safety units. (See Connection Example HE3824C on page 3:43.)
- an even number of dynamic safety units is to be bypassed using an even number of dynamic safety units. (See Connection Example HE3824F on page 3:45.)

S3 is used if:

- an odd number of dynamic safety units is to be bypassed using an even number of dynamic safety units. (See Connection Example HE3824D on page 3:44.)
- an even number of dynamic safety units is to be bypassed using an odd number of dynamic safety units. (See Connection Example HE3824E on page 3:44.)

The total number of dynamic safety units is calculated by adding the number of Eden, Spot and Tina units connected in the Vital circuit. (See Connection Examples HE3824C, D, E, F or G on pages 3:43, 3:44 and 3:45.)

## Tina 10A, 10B and 10C Technical Data

<b>Manufacturer</b> .....	JOKAB SAFETY
<b>Ordering Data/Article Numbers</b> .....	see page 3:55-3:56
<b>Safety Category with Vital or Pluto</b> (according to EN 954-1/EN ISO 13849-1).....	4
<b>Color</b> .....	black
<b>Material</b> .....	based on polyamid
<b>Operating Voltage</b> .....	24 VDC +/- 20%
<b>Number of units connected to Vital</b> .....	6 off
Max number of Tina 10A.....	4 off (when Focus is supplied via Vital and a reset lamp is used)
Max number of Tina 10B/C.....	6 off (when Focus is supplied with power separately or no reset lamp is used)
<b>Number of units connected to one Pluto input</b> .....	2 off
<b>LED Indication</b>	
Green.....	Focus OK, safety circuit closed
Flashing.....	Focus OK, safety circuit open
Red.....	Focus open, safety circuit open
<b>Current Consumption</b> .....	60 mA
<b>Ambient Temperature Range</b>	
Operation.....	-10°C to +55°C
Storage.....	-10°C to +55°C
<b>Connections</b>	
Tina 10A.....	1: to Vital or Pluto 2: to Focus receiver
Tina 10B.....	1: to Vital or Pluto 2: to Focus receiver 3: to Reset unit
Tina 10C.....	1: to Vital or Pluto 2: to Focus receiver 3: to Focus transmitter
<b>Protection Class</b> .....	IP 67



### Tina 10A/B/C Connections

#### Focus Receiver

- 1 White +24VDC
- 2 Brown +24VDC
- 3 Green
- 4 Yellow
- 5 Grey OSSD1
- 6 Pink OSSD2
- 7 Blue 0V
- 8 Red LMS

#### Vital/Pluto

- 1 Brown +24VDC
- 2 White
- 3 Blue 0V
- 4 Black
- 5 Grey

#### FMI-1B

- 1 Brown +24VDC
- 2 White
- 3 Blue
- 4 Black
- 5 Grey

#### Focus Transmitter

- 1 Brown +24VDC
- 2 White
- 3 Blue
- 4 Black
- 5 Grey

### Function

Tina 10A/B/C are three connection units, with M12 connections, that make it easy to connect a Focus light curtain or light beam with OSSD outputs to the dynamic safety circuits of Vital and Pluto. This also enables complete external interconnections, with M12 cabling, which reduces the cabling to and connections in the apparatus enclosure. Tina 10A/B/C has LEDs for function indication — with green, red or flashing green/red indications.

#### Tina 10A

This unit has two M12 connections that are connected to: 1) Vital/Pluto and — 2) a Focus light curtain/light beam receiver. (See Connection Examples HH3300F on page 3:47.)

#### Tina 10B

This unit has three M12 connections that are connected to: 1) Vital/Pluto — 2) a Focus light curtain/light beam receiver and — 3) an external reset button and muting lamp, such as unit FMI-1C.

#### Tina 10C

This unit has three M12 connections that are connected to: 1) Vital/Pluto — 2) a Focus light curtain/light beam receiver and — 3) a Focus light curtain/light beam transmitter. (See connection Examples HA3305A on page 3:40 and HH3302D on page 3:48.)

## Tina 12A Technical Data

<b>Manufacturer</b> .....	JOKAB SAFETY
<b>Ordering Data/Article Numbers</b> .....	see page 3:56
<b>Safety Category with Vital or Pluto</b> (according to EN 954-1/EN ISO 13849-1).....	4
<b>Color</b> .....	black
<b>Operating Voltage</b> .....	24 VDC +/- 20%
<b>LED Indication</b>	
Green.....	Safety circuit closed and sensor OK
Flashing.....	Safety circuit or sensor open
Red.....	not used
<b>Current Consumption</b> .....	60 mA
<b>Material</b> .....	based on polyamid
<b>Protection Class</b> .....	IP 67
<b>Number of units connected to Vital</b> .....	10 off
<b>Number of units connected to Pluto</b> .....	3 off
<b>Operating Temperature Range</b> .....	-10°C to +55°C



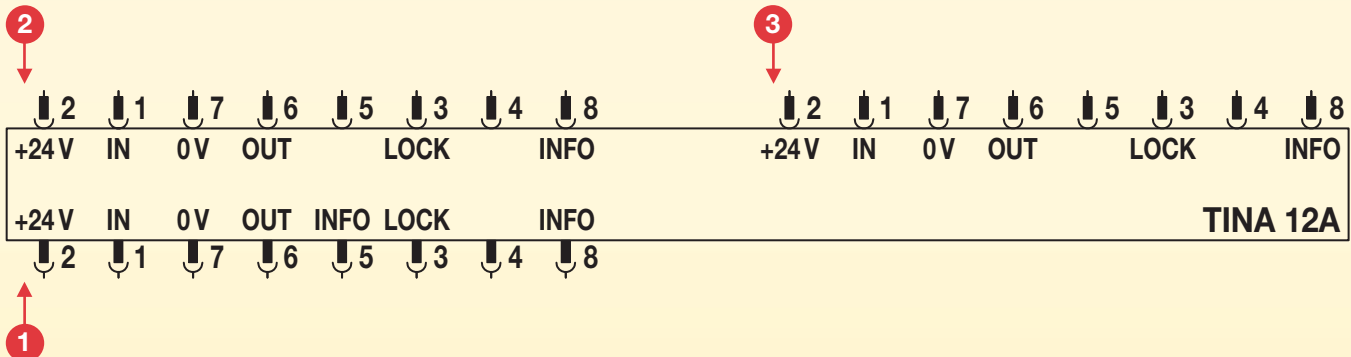
### Connections

White (1).....	dynamic input signal to Eden 1
Brown (2).....	power supply voltage +24VDC for Dalton and Eden
Green (3).....	locking signal to Dalton
Yellow (4).....	not used
Grey (5).....	information output Eden 1 and Eden 2 = OK
Pink (6).....	dynamic output signal from Eden 2
Blue (7).....	0V DC
Red (8).....	information output Dalton 1 and Dalton 2 = locked

Tina 12A is a junction block with an M12 connector. It enables quick and easy connection of two Dalton process locks or Magne 2A, with integrated Eden sensors via a cable to a Pluto safety PLC or a Vital safety circuit. the Tina 12A has LED indication and an information output to report the status of the safety sensors.

The Tina 12A has three 8-pole M12 connectors that are connected to:

- 1: Pluto/Vital, information for the sensor and a lock signal.
- 2: Dalton with Eden no. 1
- 3: Dalton with Eden no. 2



## Connection Examples of Sensors to Tina 4A and 8A



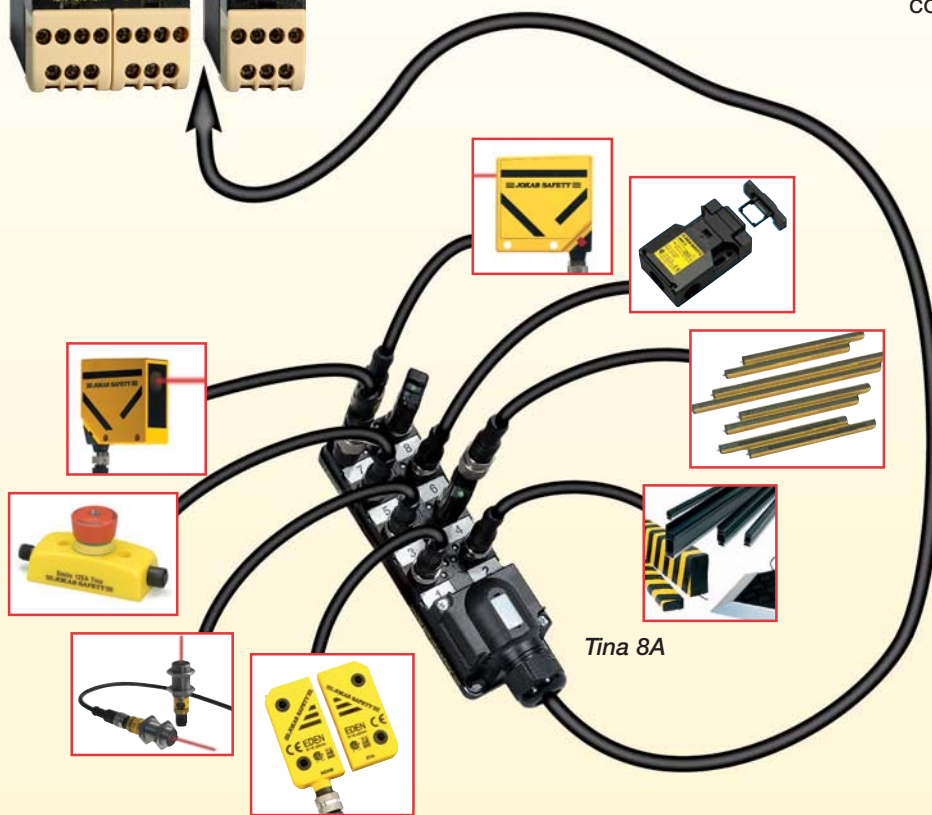
Tina 4A and Tina 8A are connection blocks equipped with electronic circuits which modify the coded dynamic signal in the Vital or Pluto safety circuit.

### The cable between Vital and Tina 4A/8A has conductors for:

- Power supply (24 VDC)
- Coded dynamic signal output/input
- Information signals from each sensor connected to the block

### Each M12 connector on Tina 4A/8A contains:

- Power supply (24 VDC)
- Short circuit supervised input and output which require connections of Eden, Tina or Spot T/R
- Output information from sensor



Tina 4A

*Note: Several Tina 4A and Tina 8A units can be connected to one Vital unit. (See Connection Example HA3302B)*

## Cabling

Many of Jokab Safety's products are connected using standard M12 connectors. This facilitates installation, saving a lot of time, and also dramatically reduces the risk of incorrect connection.

We have therefore developed cables — with 5 conductors (5 x 0.34mm + screening) or 8 conductors (8 x 0.34mm + screening) — which offer the advantages that we believe a good cable should have. These are available in any length and in various standard lengths, with molded straight or angled male or female connectors. Particularly suitable cables for the Tina 4A and Tina 8A units are C9 and C13. They have thicker conductors — 0.75 mm for the feed line and for the other conductors — 0.5mm + screening. Refer to the components list on page 57 for the variants that are available.



### Advantages

- Area 0.34mm<sup>2</sup>
- Always screened cable
- Screen is always connected to negative in male connectors
- Guide pin in the small connector is indicated by a recessed arrow that is easy to recognize
- Convenient cable in PVC
- Available in any length



## Connections Examples

### According to Figure 1 and Electrical Drawing HH3300D

**Connection 1:** One Eden is connected directly to the Tina 8A. The Eden status is shown by an LED on the Adam sensor. A status information signal is also connected to Tina 8A.

**Connection 2:** One Focus safety light grid is connected to the Tina 8A via a Tina 10A. The output from the Tina 10A is via a M12 connector. The connection between Tina 10A and Tina 8A is achieved using a cable with M12 connectors on each end.

The Tina 10A has two LEDs which show the status of the light grid. The same status information signal is connected to the Tina 8A. Tina 10A and the Focus transmitter are connected, via an M12-3B, to Tina 8A.

**Connection 3:** A Spot 10 light beam is connected directly to Tina 8A. A 'Y' connector M12-3B for M12 plugs is connected to the transmitter and the receiver. The status information shown on the Spot LED is also connected to Tina 8A.

**Connection 4:** A safety mat (same for safety strip and safety bumper) is connected via a Tina 6A to the Tina 8A. Two LEDs in Tina 6A shows the status of the mat. The same status information signal is connected to Tina 8A.

**Connection 5:** A Smile E-Stop is connected via a Tina 2A. On the Tina 2A there is a LED which shows the status of the Smile E-Stop. The same information signal is connected to the Tina 8A.

**Connection 6:** A safety interlock switch is connected via a Tina 3A mounted directly on the switch. The output from the Tina 3A is via a M12 connector. The connection between the Tina 3A and the Tina 8A is therefore simply made with a cable with M12 connectors on each end. On the Tina 3A there is a LED which shows the status of the switch. The same information signal is connected to the Tina 8A.

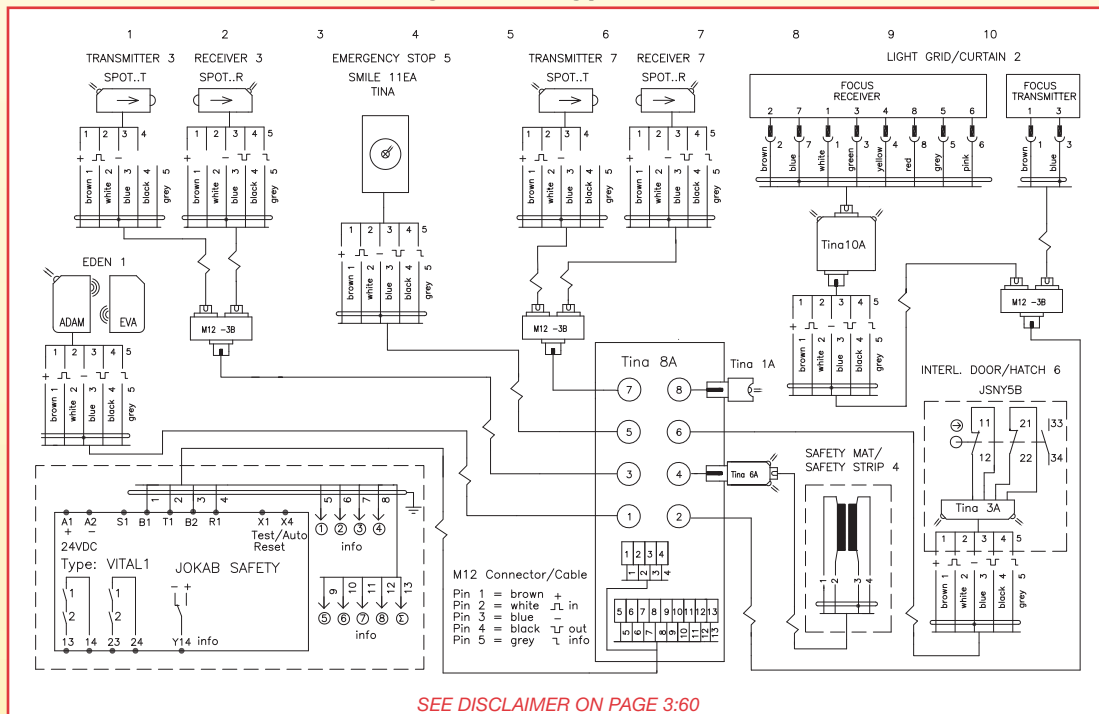
**Connection 7:** A Spot 35, transmitter and receiver are connected directly to the Tina 8A via a M12-3B 'Y' connector. The status information shown by the LED on the Spot is also connected to the Tina 8A.

**Connection 8:** Tina 1A is a plug which has to be connected to Tina 8A inputs when no sensor is required, in order to complete the safety connection circuit.

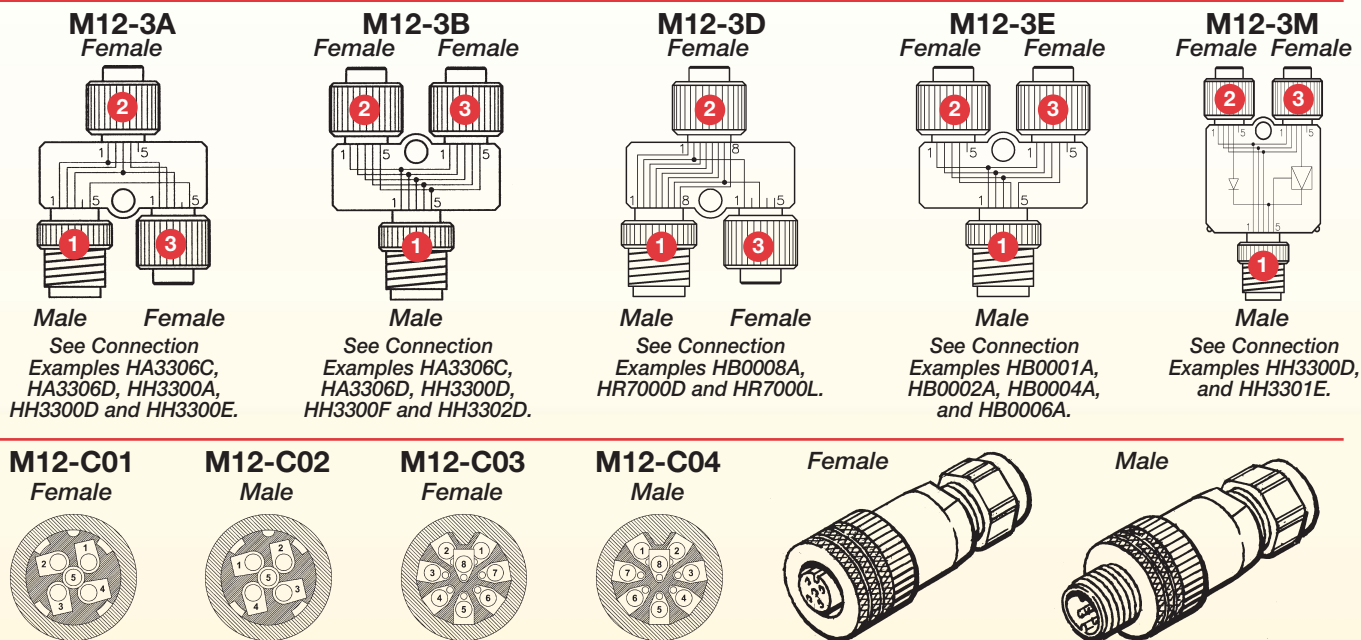
*Note: All input connectors on the Tina 8A must be connected to sensors or have Tina 1A plugs fitted.*

## HH3301D Connection Example

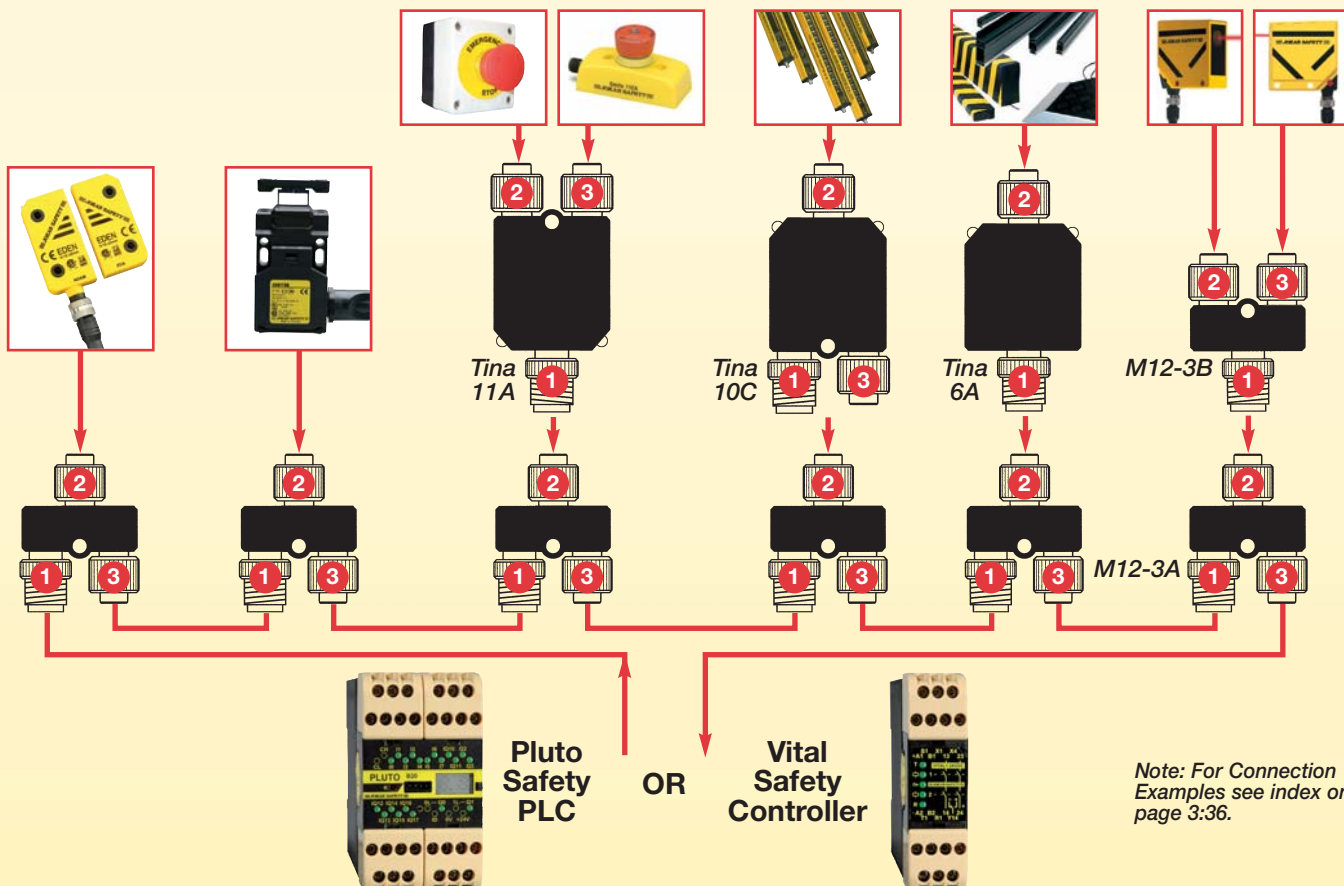
### Vital 1 and Tina 8A with Different Safety Device Types



## 'Y' Branch with M12 Connection and M12 Connection Device with Screw Connectors



## Example of Safety Component Connections based on 'Y' Branch



# One Vital Supervises the Entire Robot Cell

The cell has dynamic protection connected to a Vital, with the following functions...

## Two Load Stations

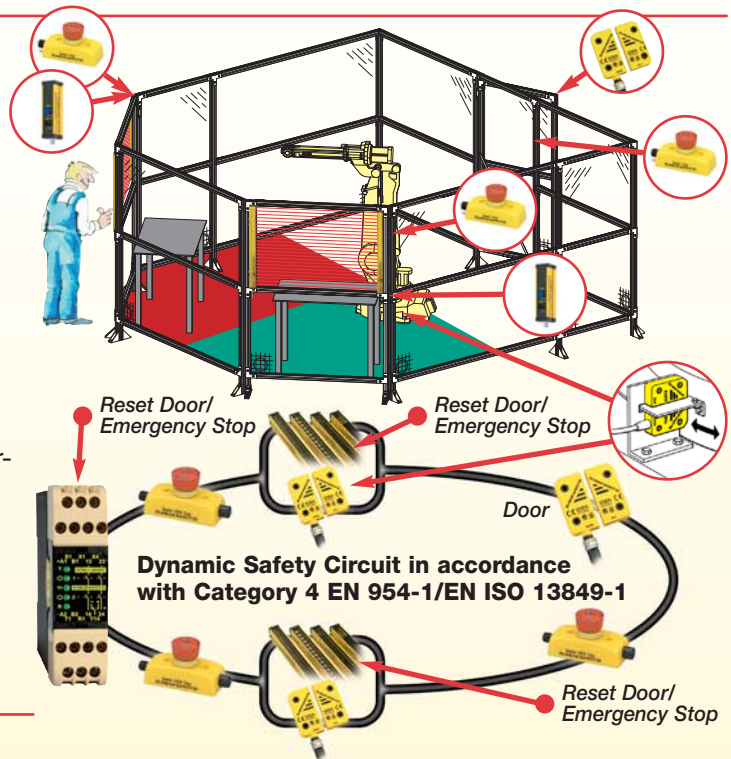
At each load station a light curtain checks for anyone putting their hand into a risk area, and an Eden Sensor checks whether a robot is inside the same risk area. This means that a stop is only ordered if a robot and a person are in the same area. When the station is clear, the person presses the reset button connected to the light curtain.

## Fence with Eden-Interlocked Door

If the door is opened, the robot stops. To reset the robot system, the door must be closed and a supervisory reset button operated.

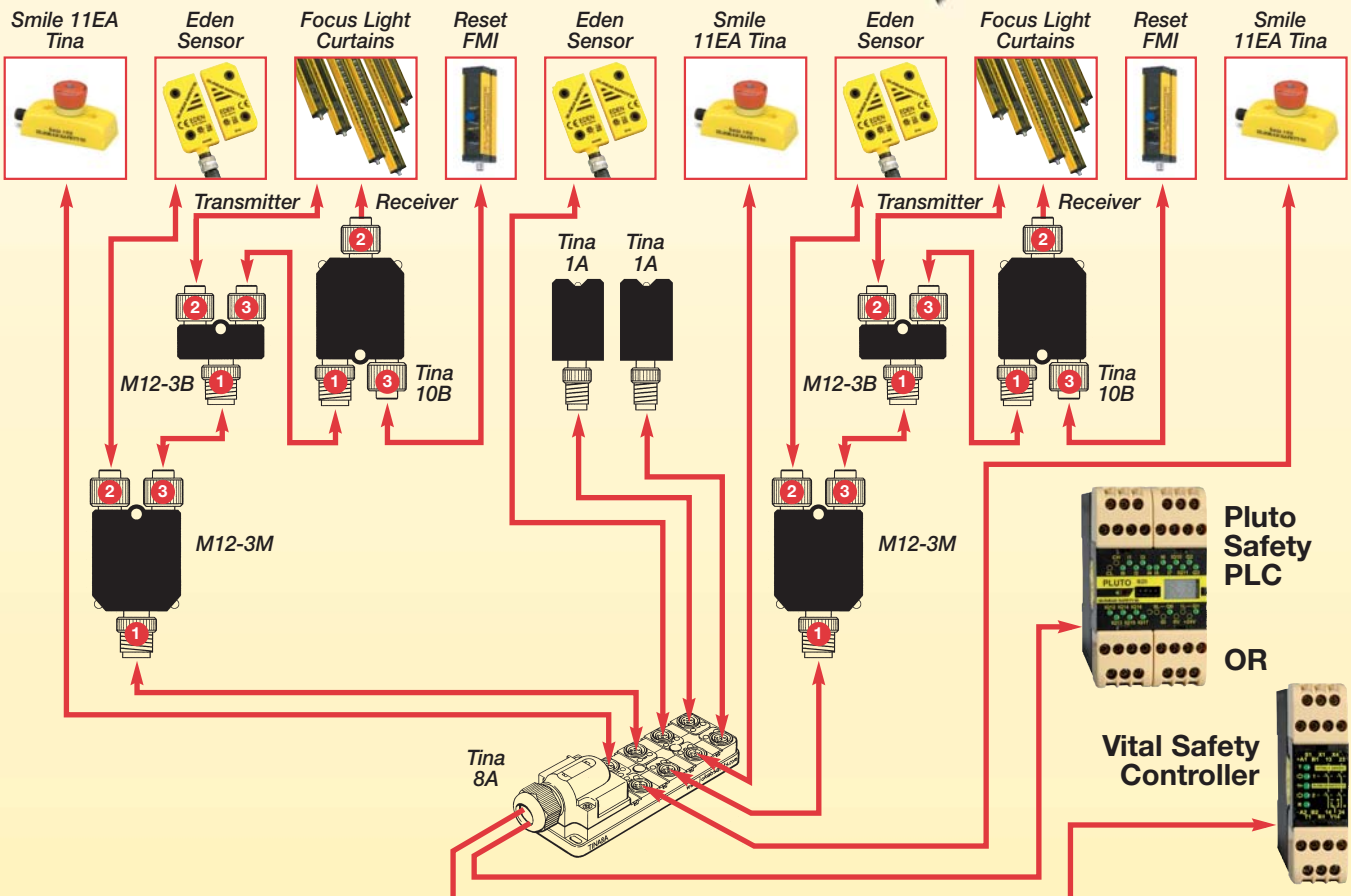
## Three Emergency Stops with Tina Units

If any of the emergency stop buttons is pressed, the robot performs an immediate emergency stop.



## Connection Example

Protection Solution shown above.



# Tina Duo 1/2 Remote Sensor Unit with Reset Capability for Vital/Pluto

The Tina Duo unit can expand the number of sensors in a Vital/Pluto system. It creates a further dynamic circuit in which up to 30 active sensors, standard sensors with Tina or 10 off Tina Duos can be connected. It also permits resetting of the new sensors.

The Tina Duo splits the signal into two circuits (A and B). Circuit B is the expanded circuit where external reset is possible — circuit A is reset by the Vital/Pluto. The Tina Duo is equivalent in terms of timing to 3 (three) Eden or Tina units in circuit A.

Two jumpers are located under the bottom cover. They define Manual/Auto-Reset and Even/Odd number of sensors between B1-B2.

The Tina Duo contains a “slimmed down” version of Vital that monitors circuit B. Therefore, it is possible to connect as many sensors to circuit B as for a “regular” Vital. It is, however, important to note that when a sensor is opened in circuit B, the fall-time of the main unit (Pluto/Vital) is increased by 30 ms. For each additional Tina Duo that is connected, it is possible to select local resetting with indication or automatic resetting.

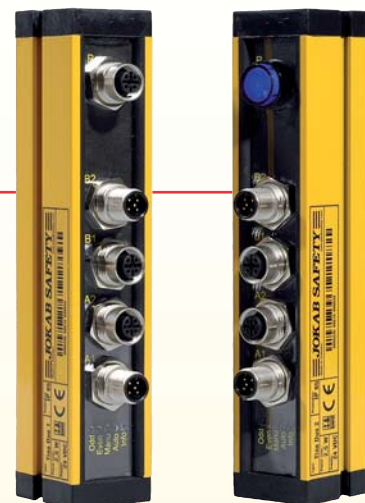
## Applications

- For increasing the number of sensors in a Vital or Pluto circuit with automatic or manual local reset

## Features

- Local reset:  
Tina Duo 1 - External with FMI-1E  
Tina Duo 2 - Integral push button
- Easy connection with M12 connectors
- LED indication for Even/Odd numbers of sensors.
- Manual/automatic reset
- Information output

## Approvals

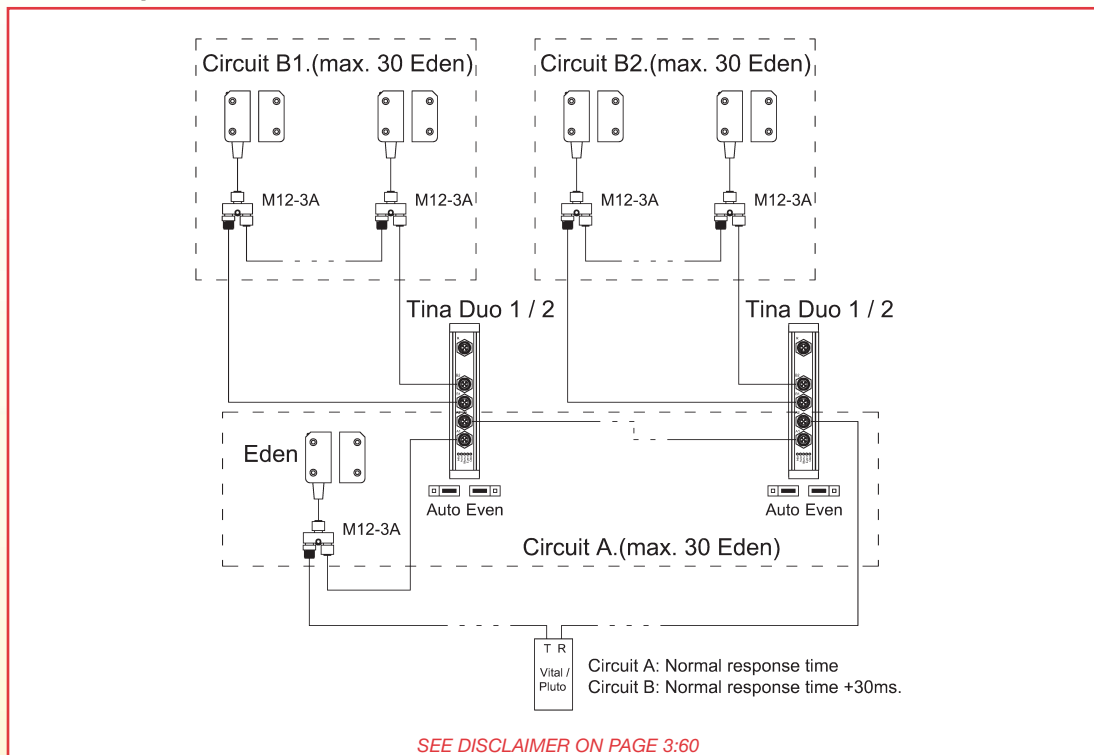






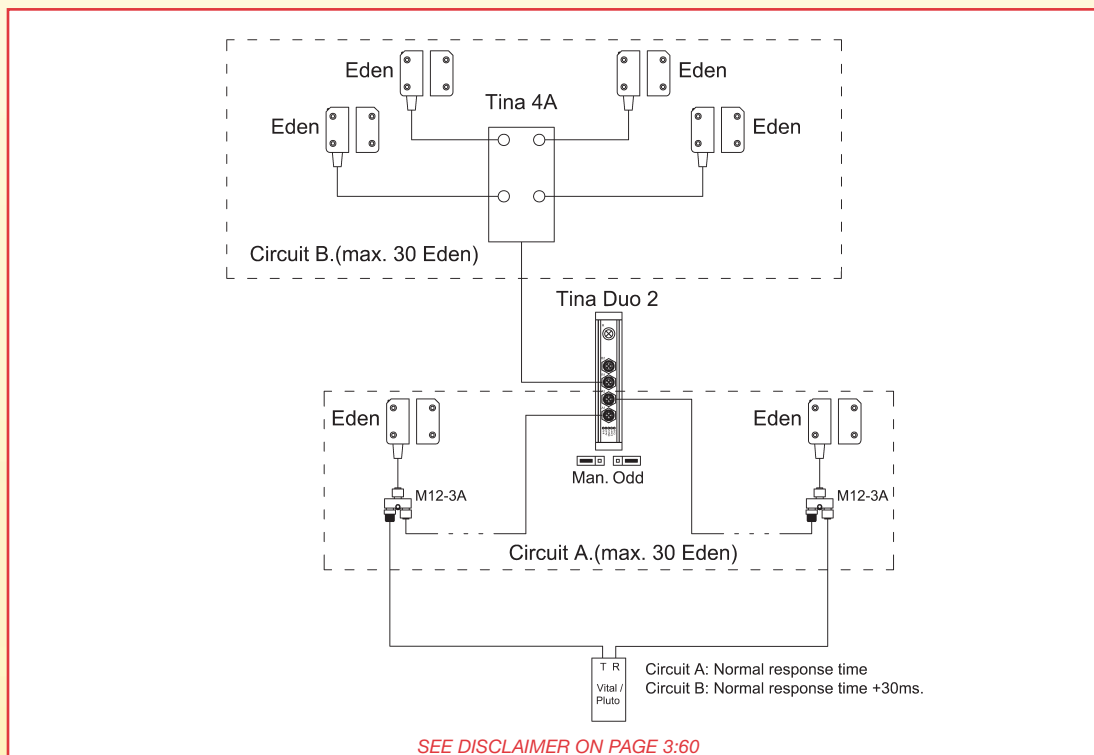
## General Drawing

### Tina Duo with 2 Separate Local Automatic Reset Circuits



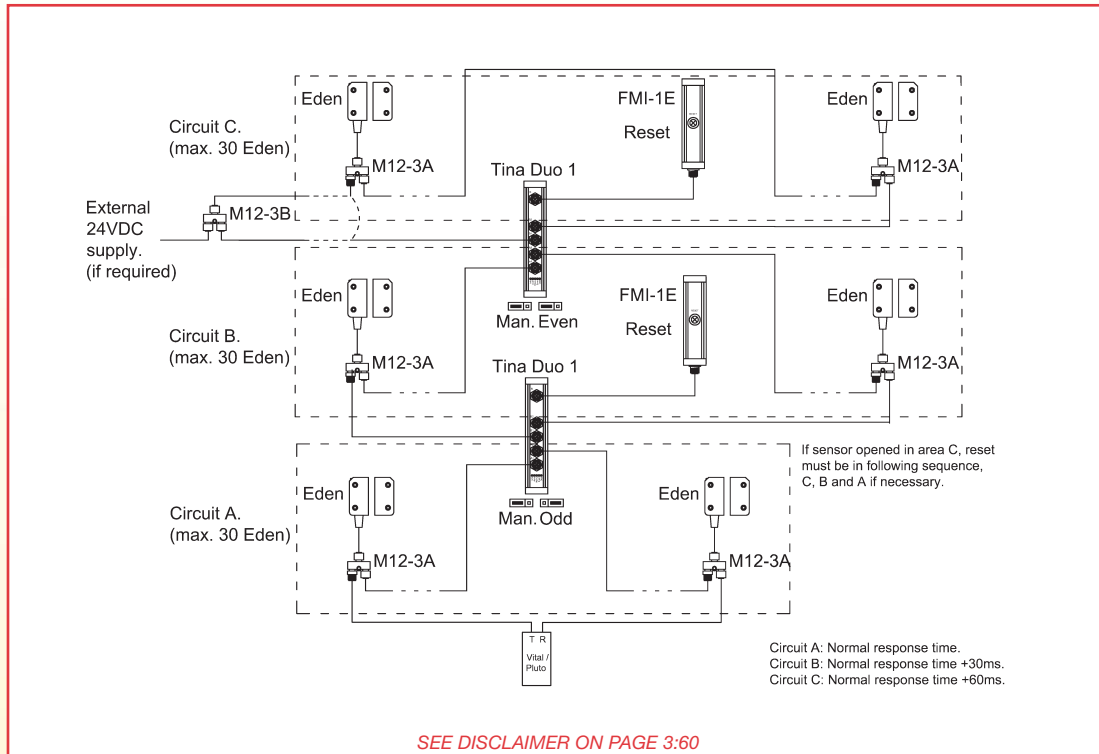
## General Drawing

### Tina Duo 2 and Tina 4A with Manual Local Reset



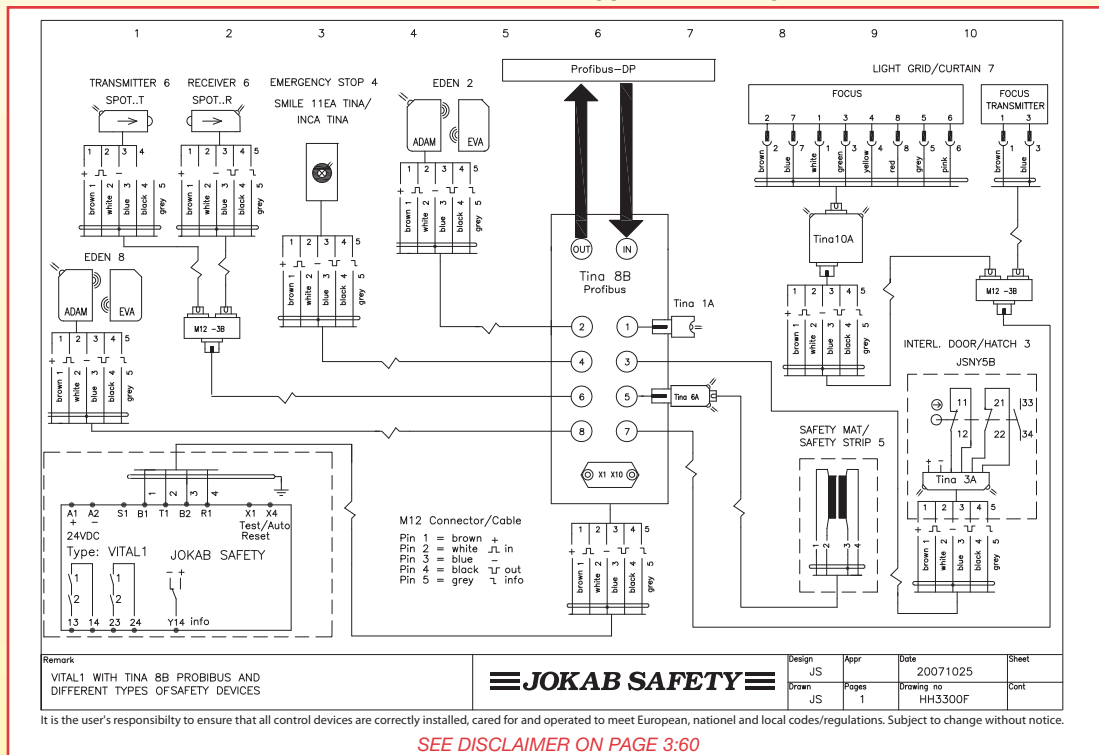
## General Drawing

### Tina Duo with 3 Circuits each with Separate Manual Reset (with or without External Power Supply)



## General Drawing

### HH3300F Vital 1 with Tina 8B Profibus and Different Types of Safety Devices



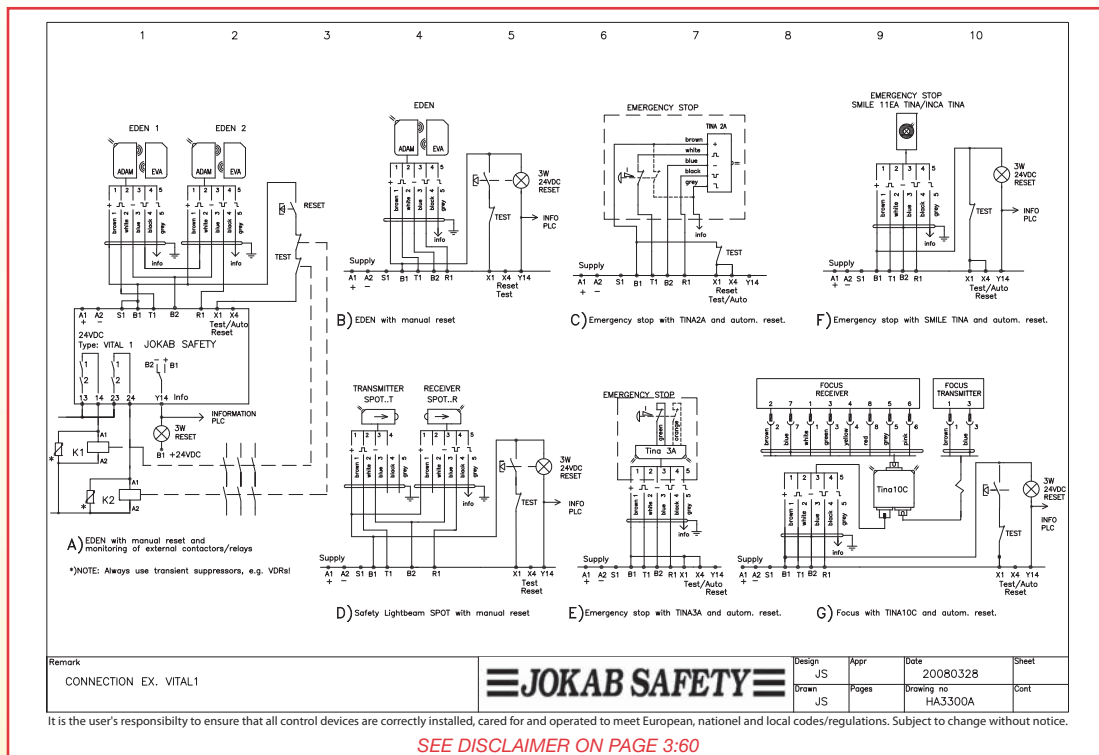
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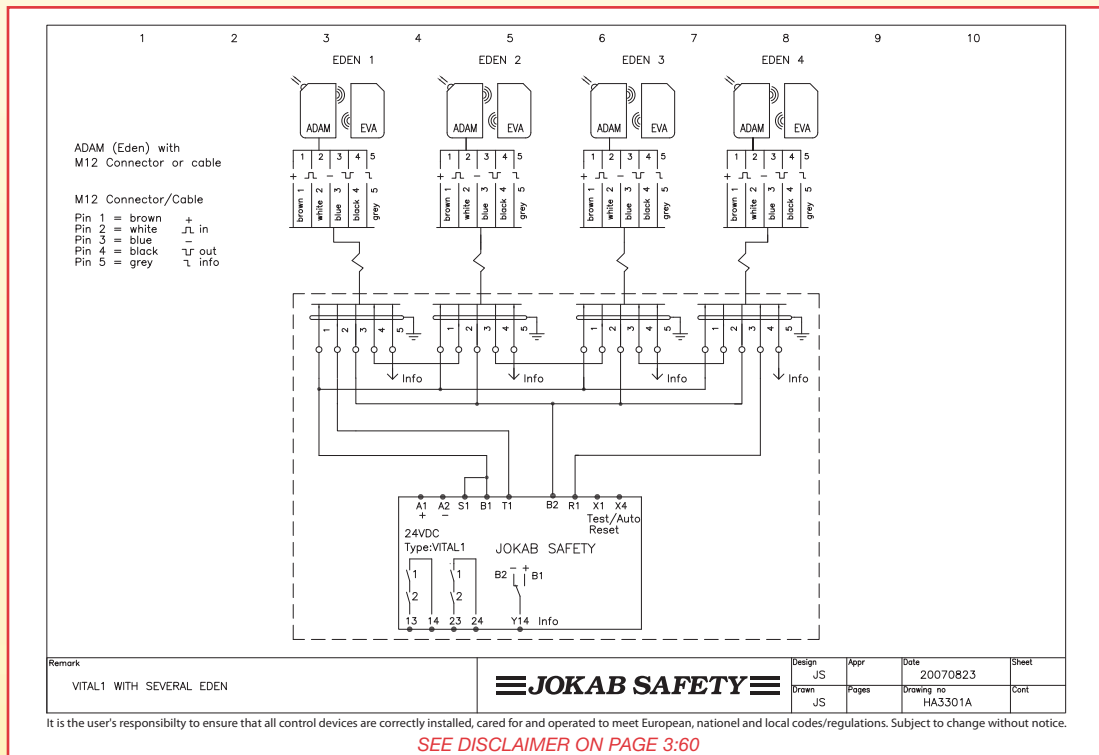
# HA3300A Connection Example

## Vital 1



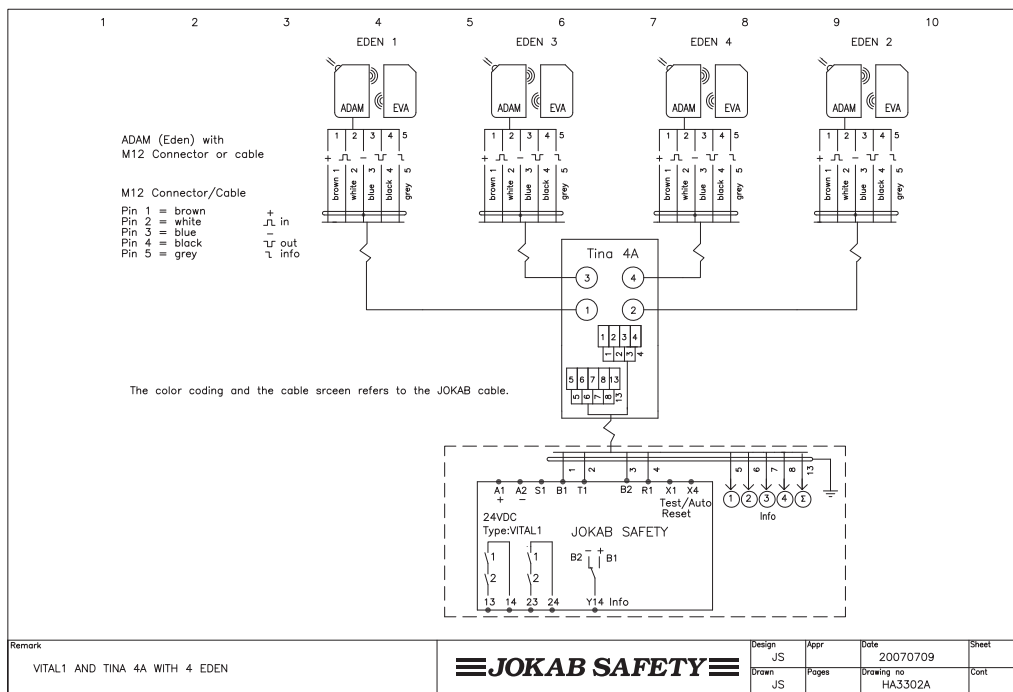
# HA3301A Connection Example

## Vital 1 with Several Eden



## HA3302A Connection Example

### Vital 1 and Tina 4 with 4 Eden

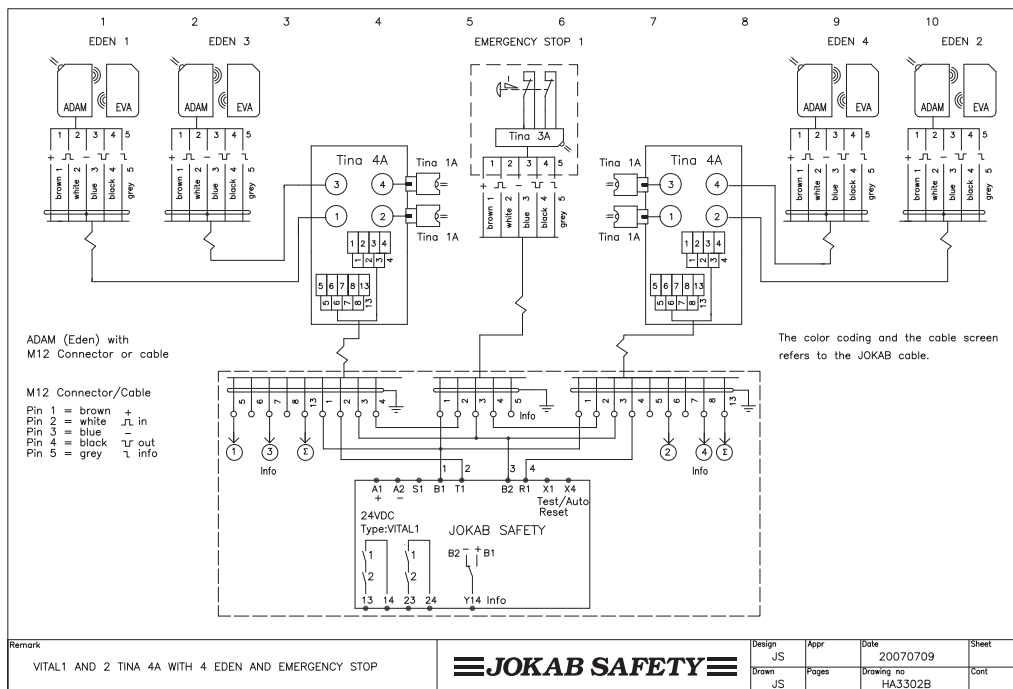


It is the user's responsibility to ensure that all control devices are correctly installed, cared for and operated to meet European, national and local codes/regulations. Subject to change without notice.

SEE DISCLAIMER ON PAGE 3:60

## HA3302B Connection Example

### Vital 1 and 2 Tina 4A with 4 Eden and Emergency Stop

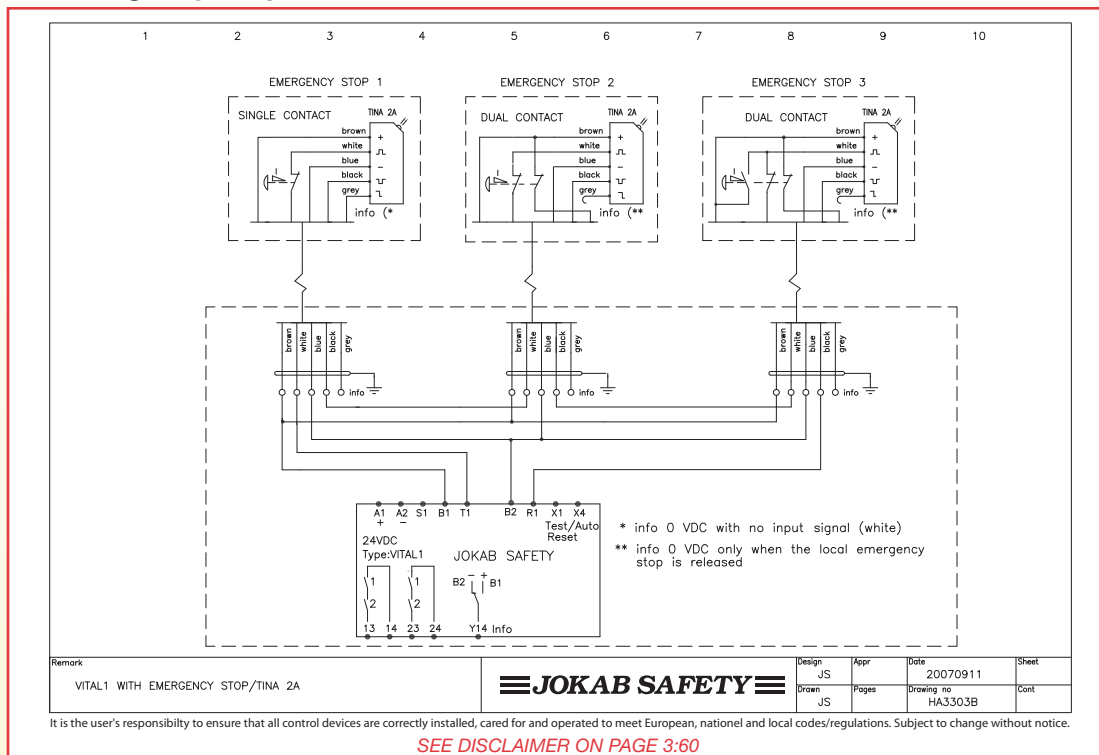


It is the user's responsibility to ensure that all control devices are correctly installed, cared for and operated to meet European, national and local codes/regulations. Subject to change without notice.

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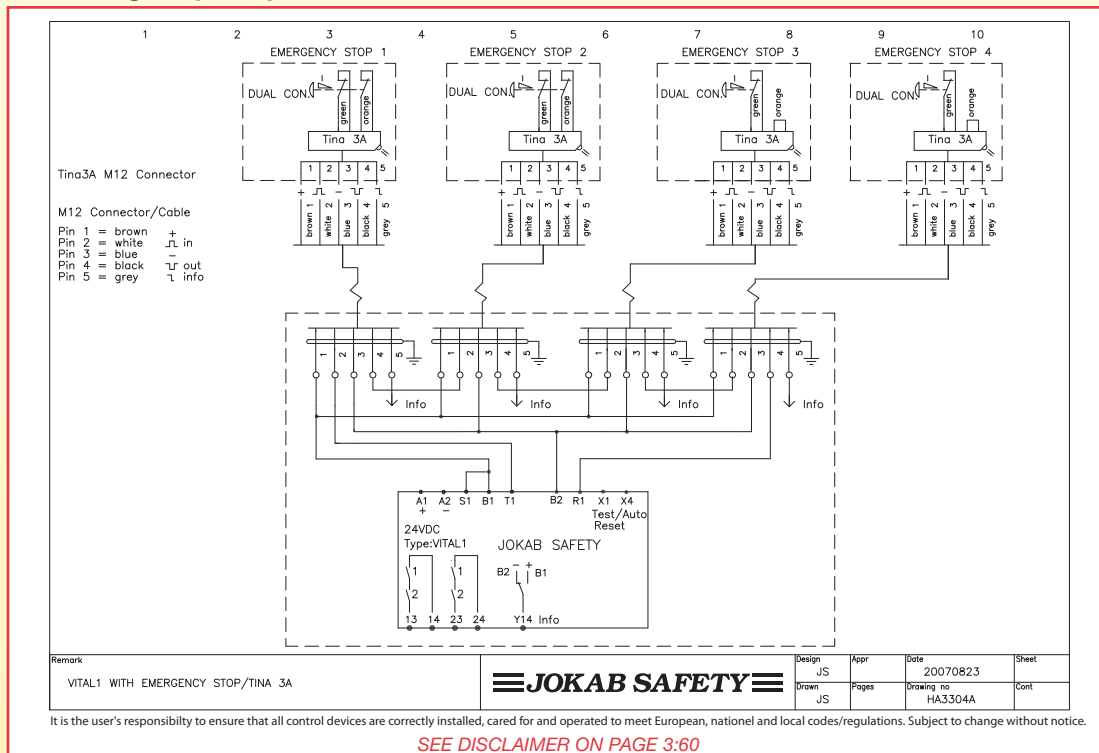
## HA3303B Connection Example

### Vital 1 with Emergency Stop/Tina 2A



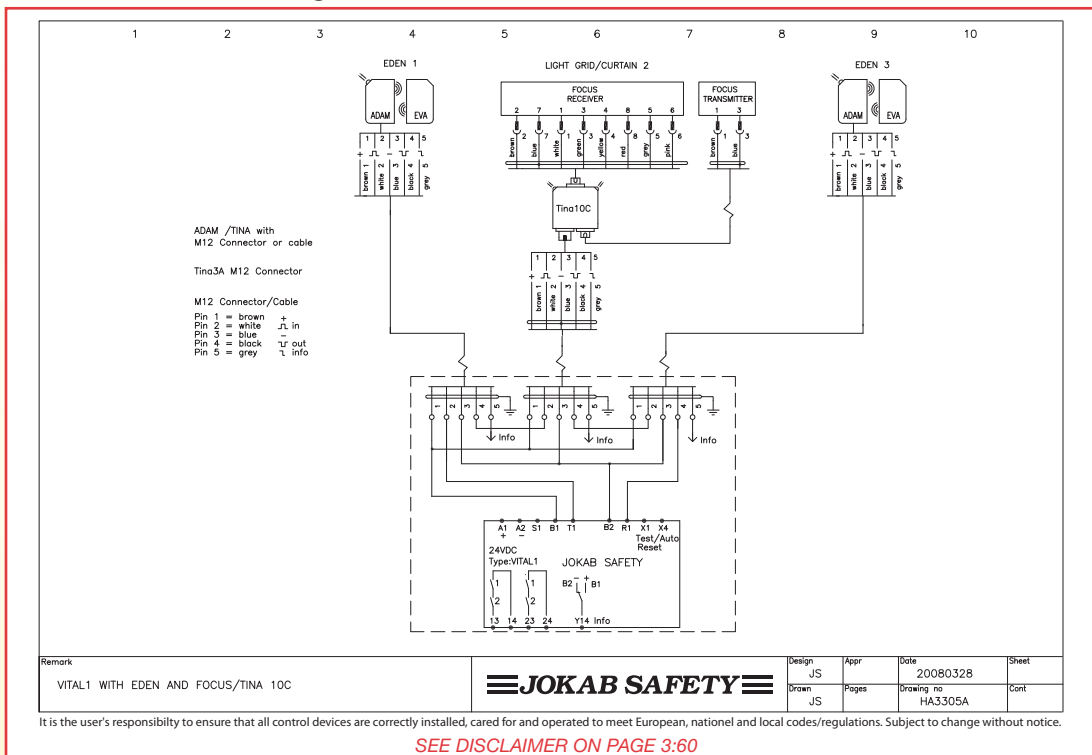
## HA3304A Connection Example

### Vital 1 with Emergency Stop/Tina 3A



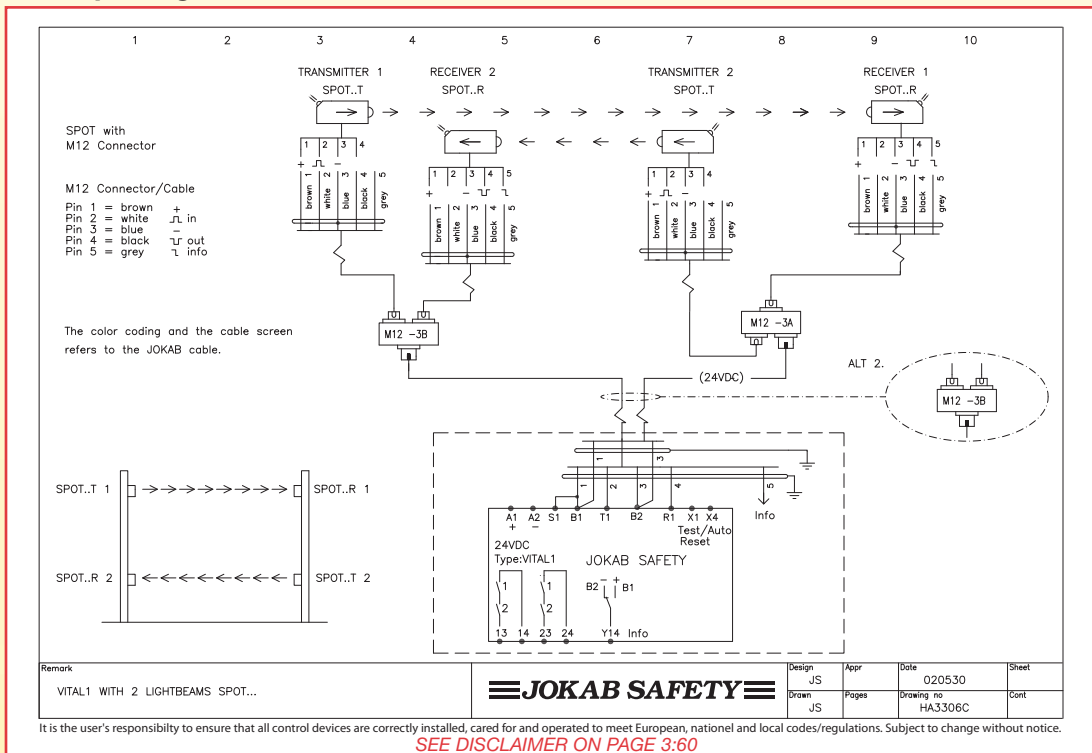
## HA3305A Connection Example

### Vital 1 with Eden and Focus Light Grid/Tina 10C



## HA3306C Connection Example

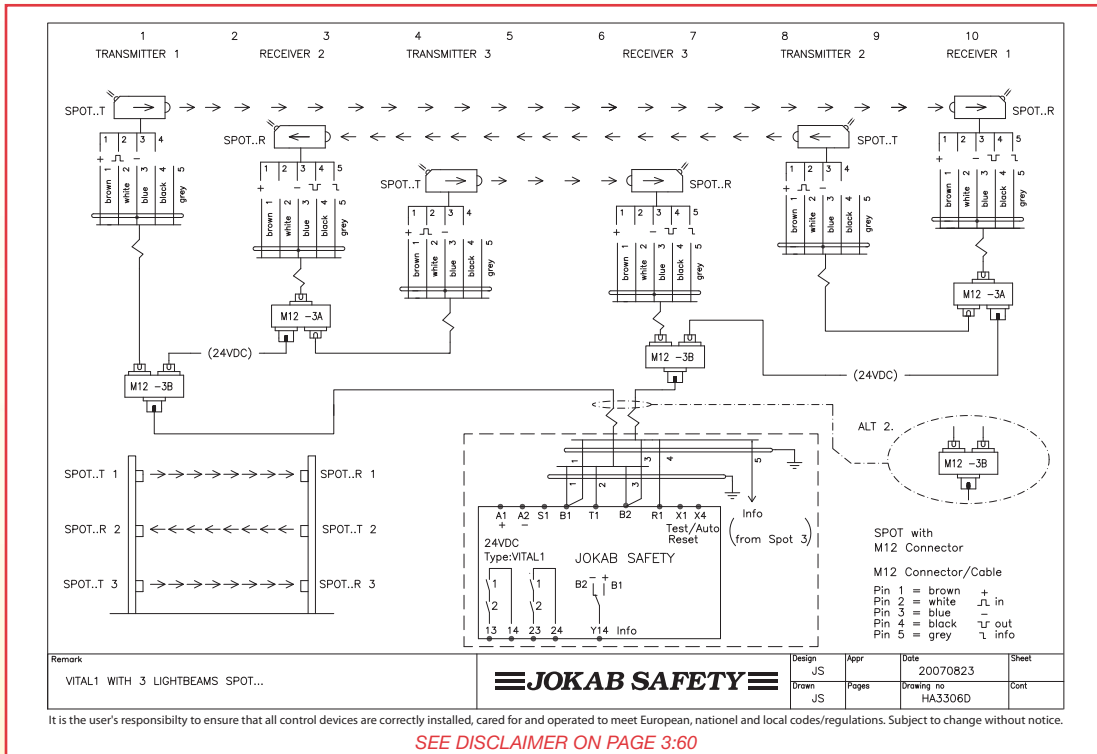
### Vital 1 with 2 Spot Light Beams





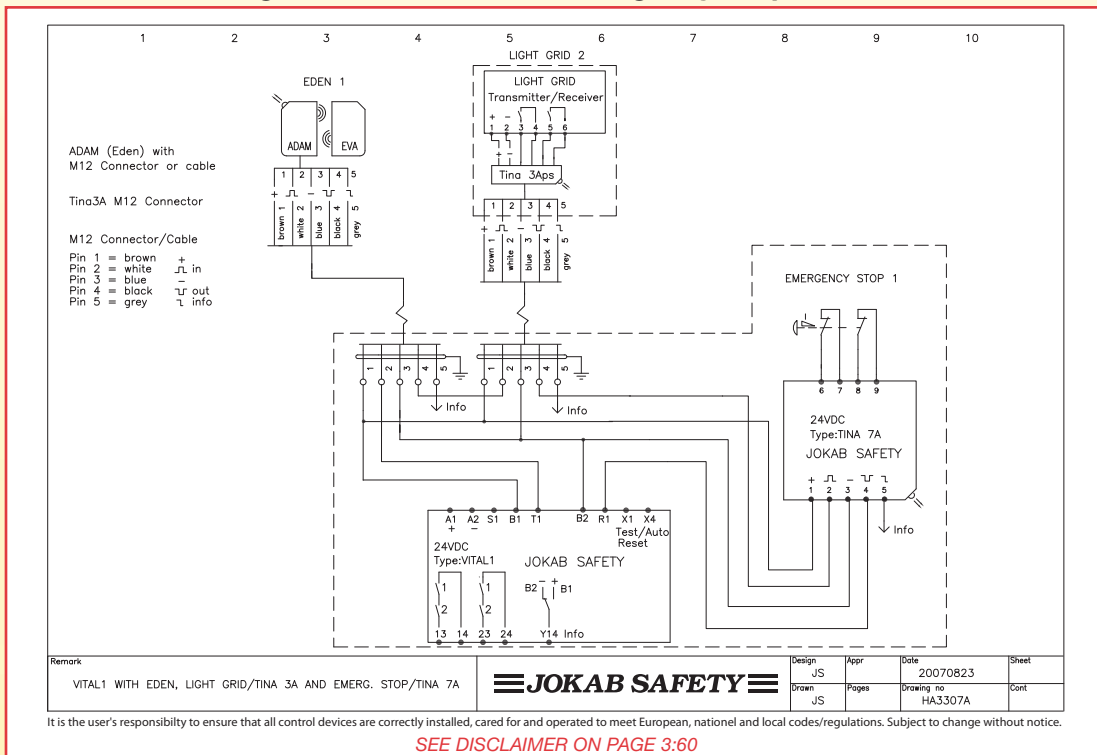
## HA3306D Connection Example

### Vital 1 with 3 Spot Light Beams



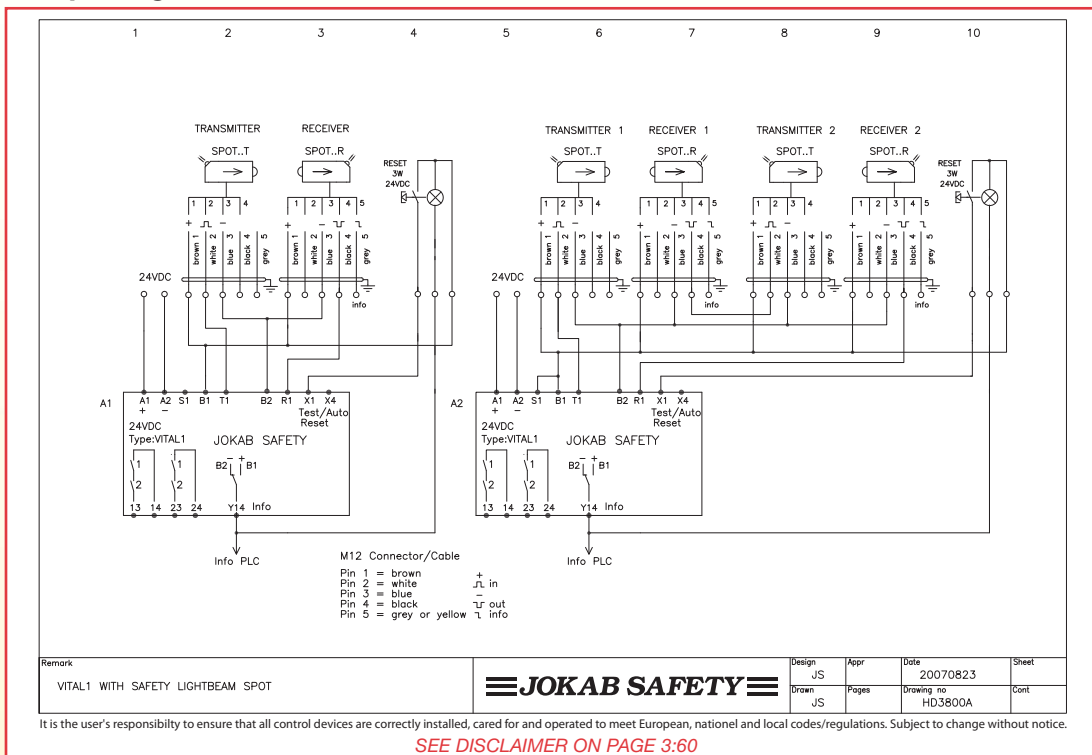
## HA3307A Connection Example

### Vital 1 with Eden, Focus Light Grid/Tina 3A and Emergency Stop/Tina 7A



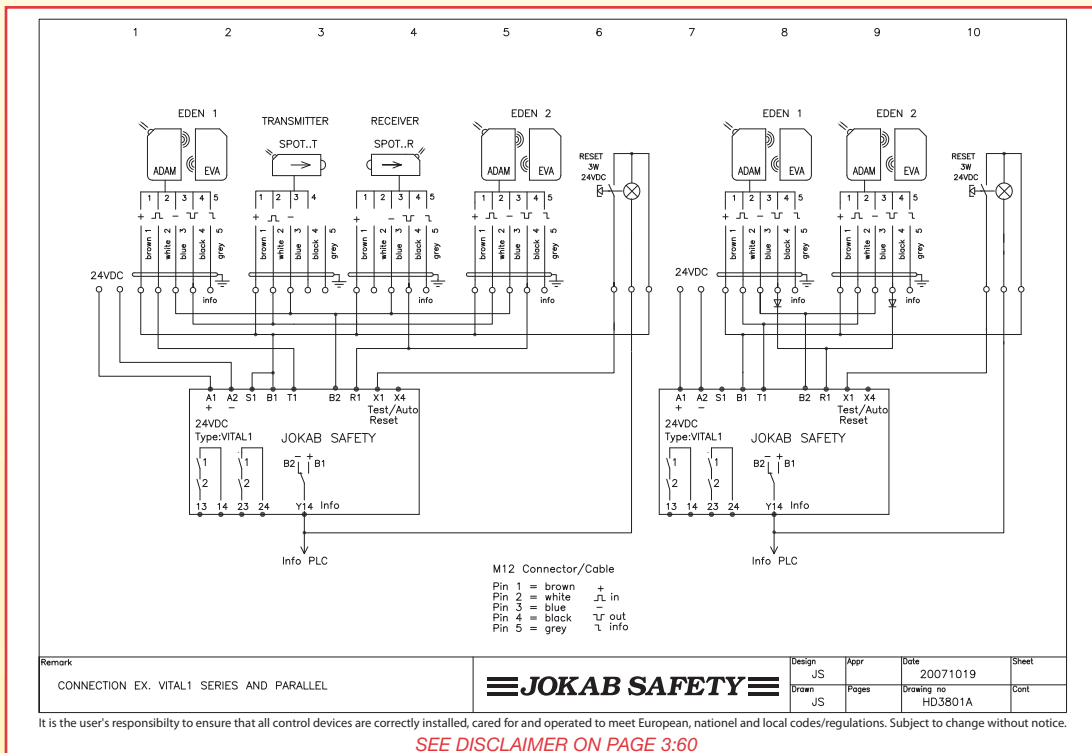
## HD3800A Connection Example

### Vital 1 with Spot Light Beam



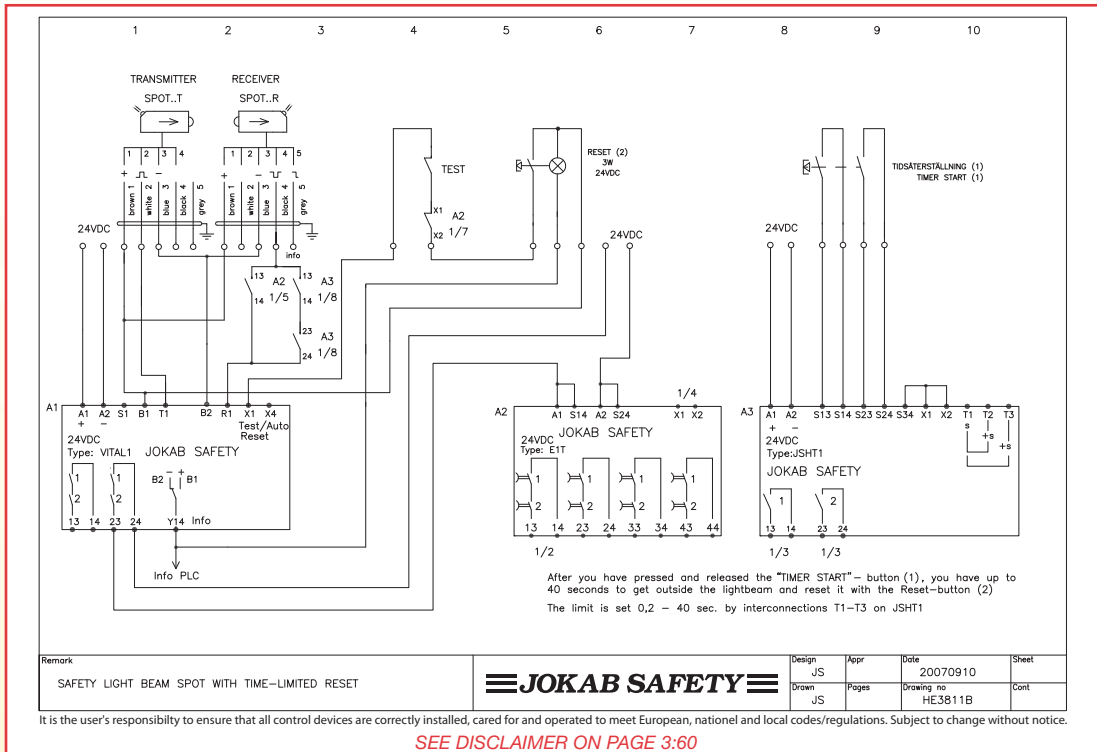
## HD3801A Connection Example

### Vital 1, Series and Parallel



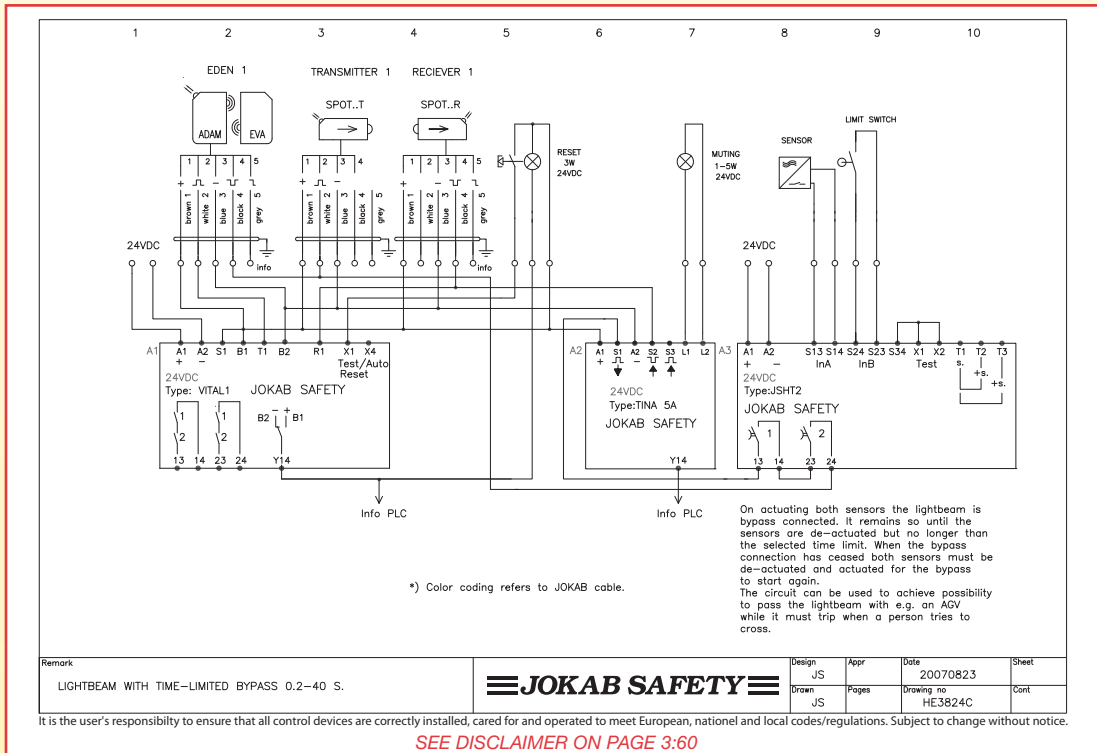
## HE3811B Connection Example

### Spot Light Beam with Time-Limited Reset



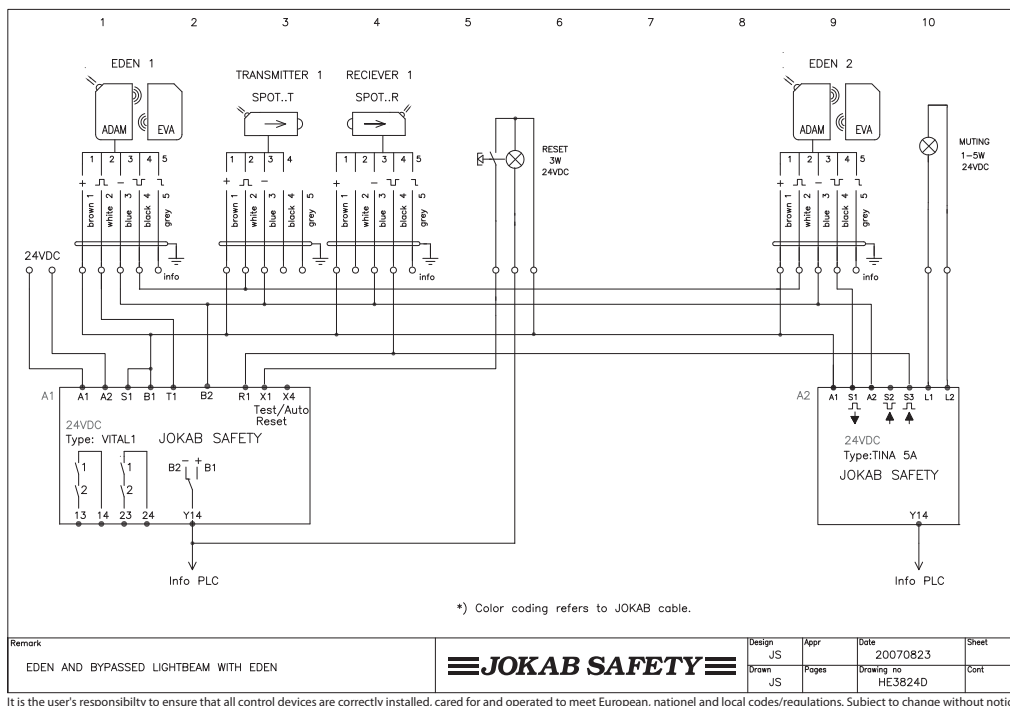
## HE3824C Connection Example

### Spot Light Beam with Time-Limited Bypass (0.2 - 40 seconds)



## HE3824D Connection Example

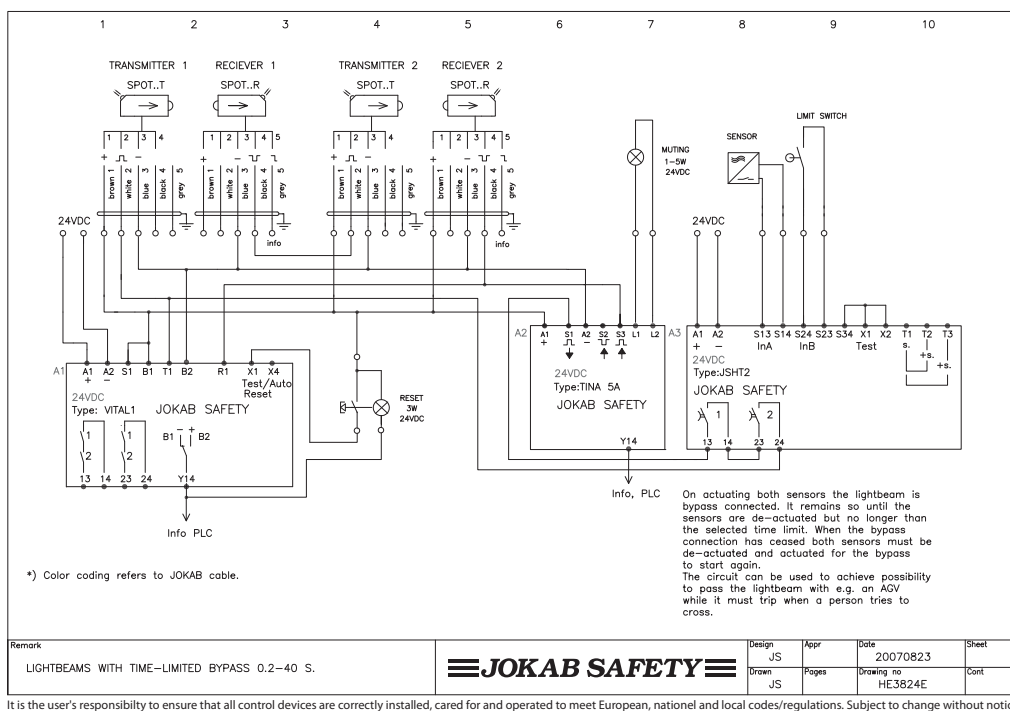
### Eden and Bypassed Spot Light Beam with Eden



SEE DISCLAIMER ON PAGE 3:60

## HE3824E Connection Example

### Spot Light Beams with Time-Limited Bypass (0.2 - 40 seconds)

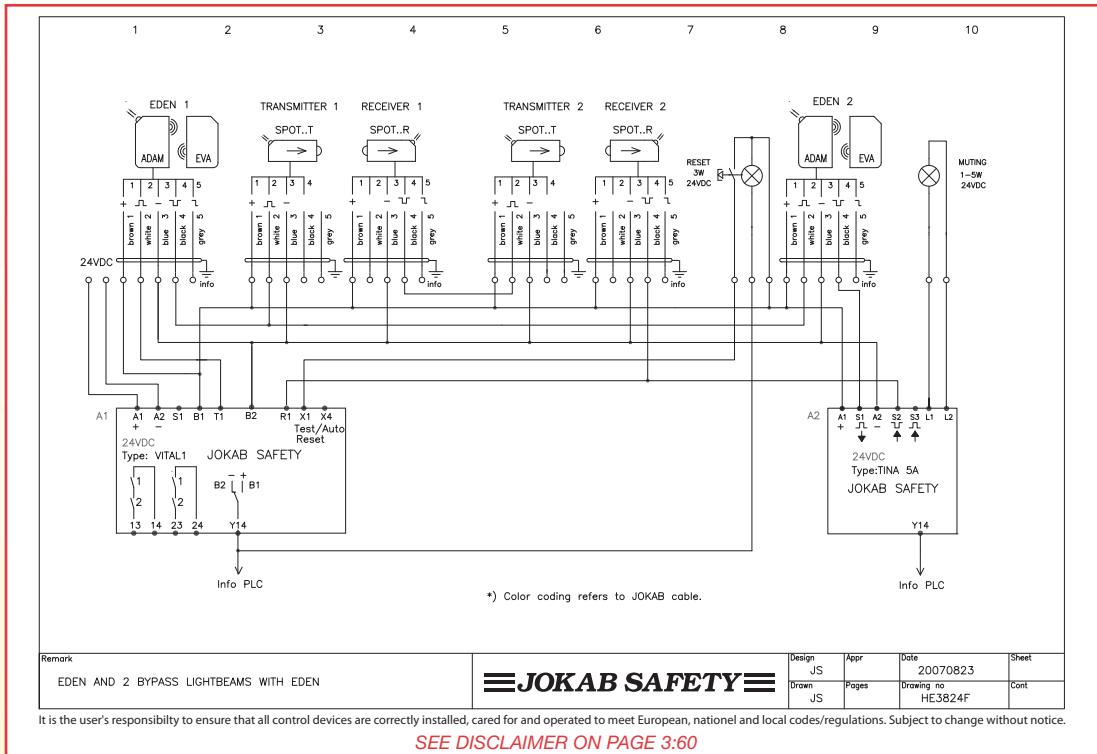


SEE DISCLAIMER ON PAGE 3:60



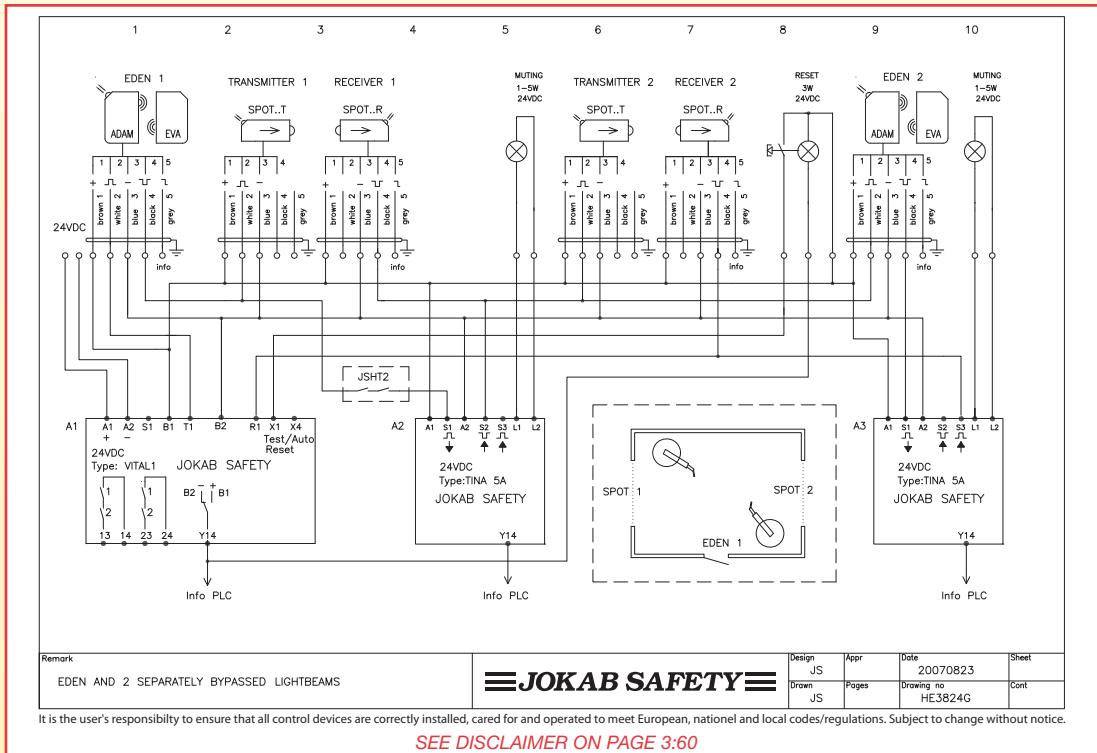
## HE3824F Connection Example

### Eden and 2 Bypass Spot Light Beams with Eden



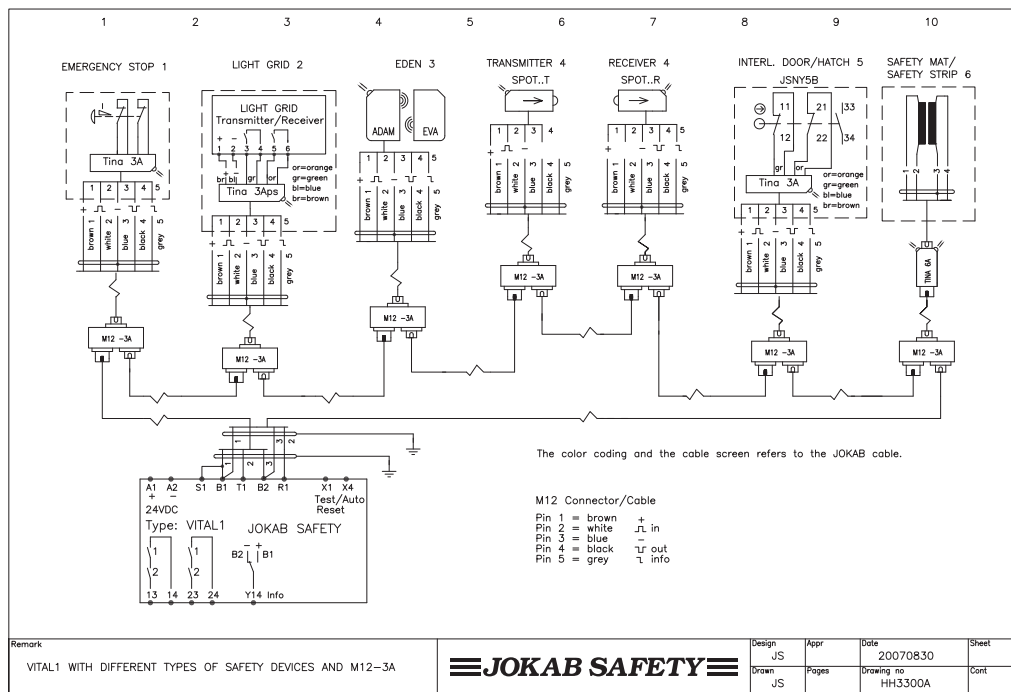
## HE3824G Connection Example

### Eden with 2 Separately Bypassed Spot Light Beams



## HH3300A Connection Example

### Vital 1 with Different Types of Safety Devices and M12-3A

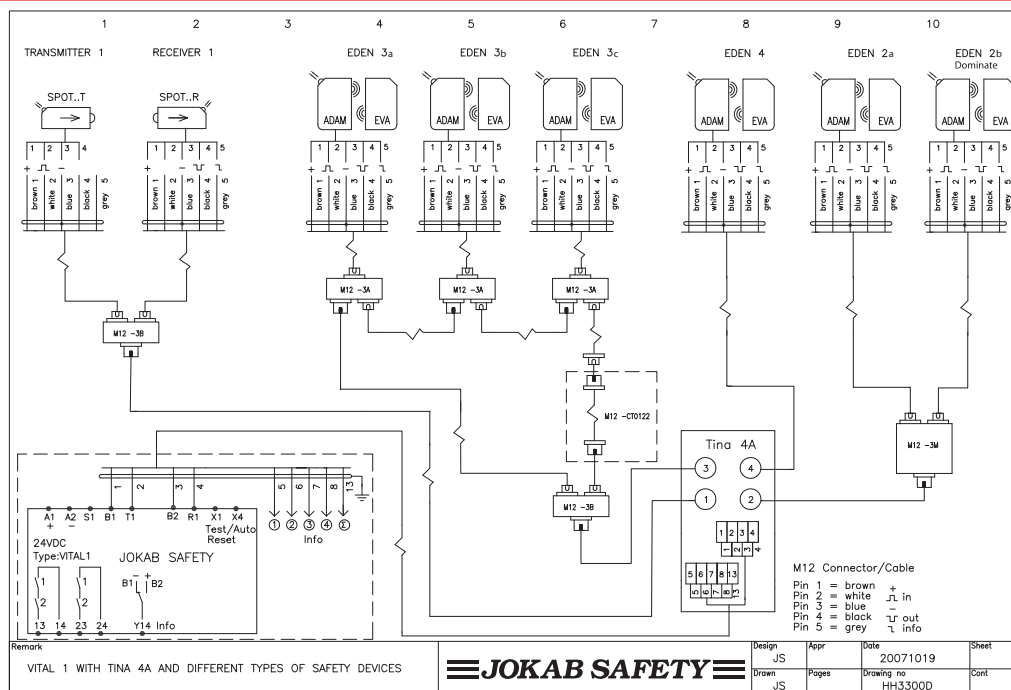


It is the user's responsibility to ensure that all control devices are correctly installed, cared for and operated to meet European, national and local codes/regulations. Subject to change without notice.

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## HH3300D Connection Example

### Vital 1 with Tina 4A and Different Types of Safety Devices

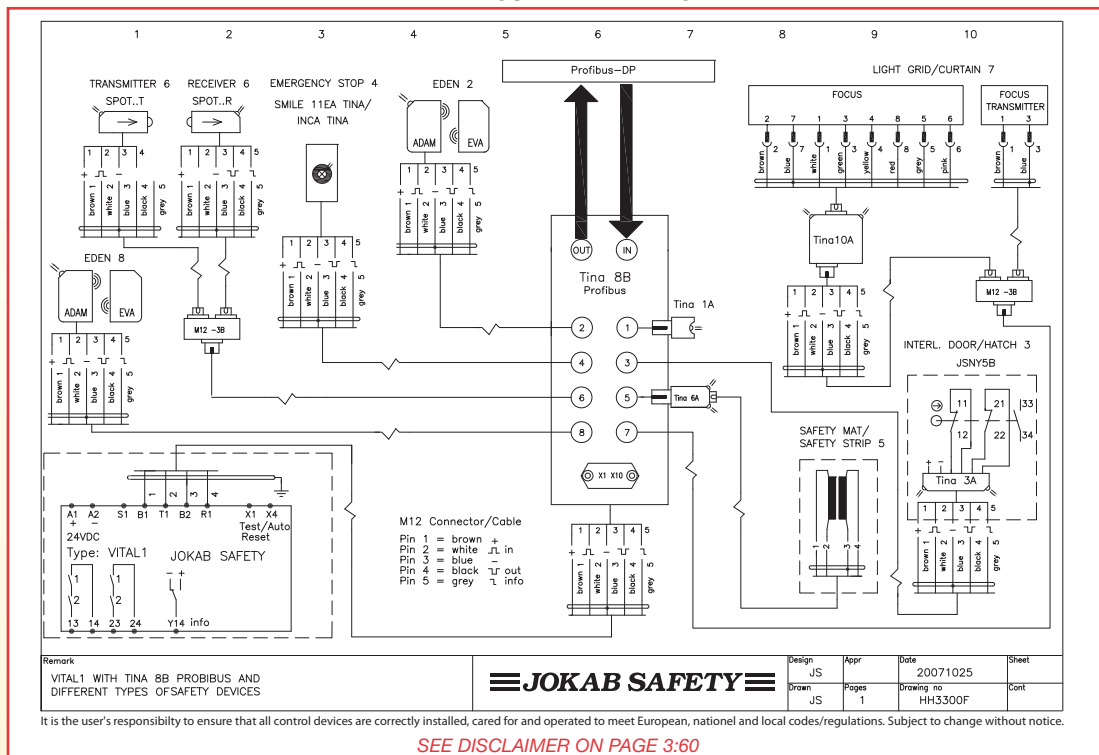


It is the user's responsibility to ensure that all control devices are correctly installed, cared for and operated to meet European, national and local codes/regulations. Subject to change without notice.

SEE DISCLAIMER ON PAGE 3:60

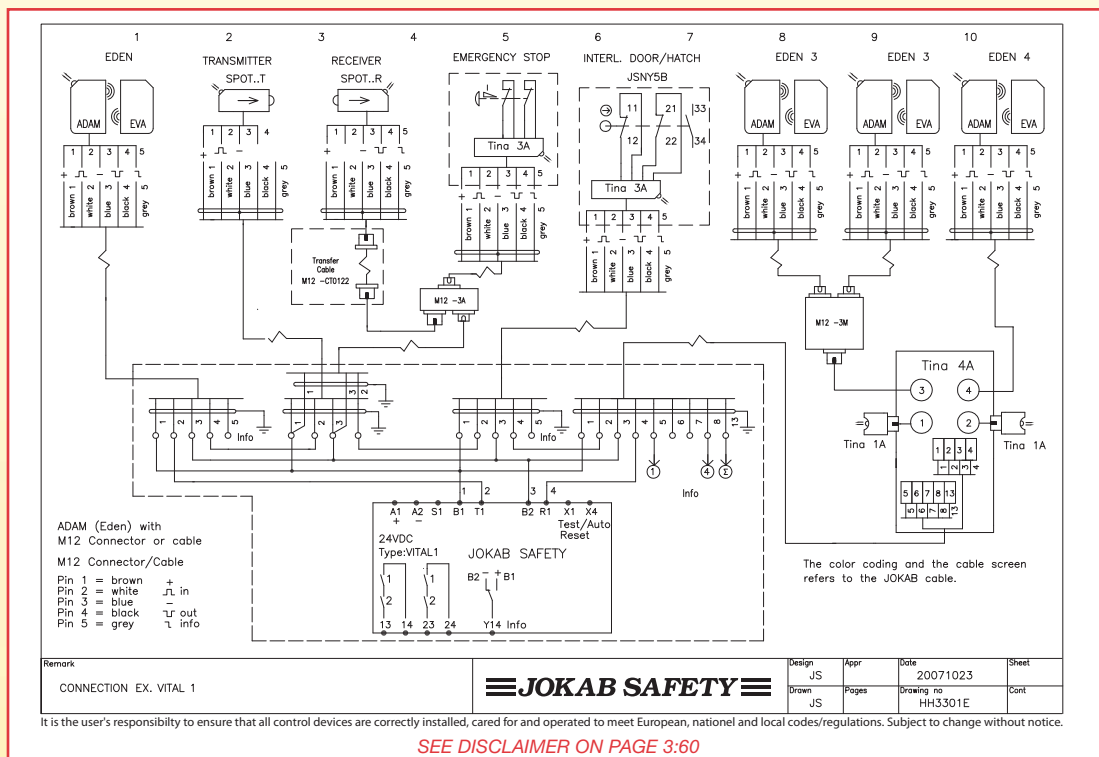
# HH3300F Connection Example

## Vital 1 with Tina 8B Profibus and Different Types of Safety Devices



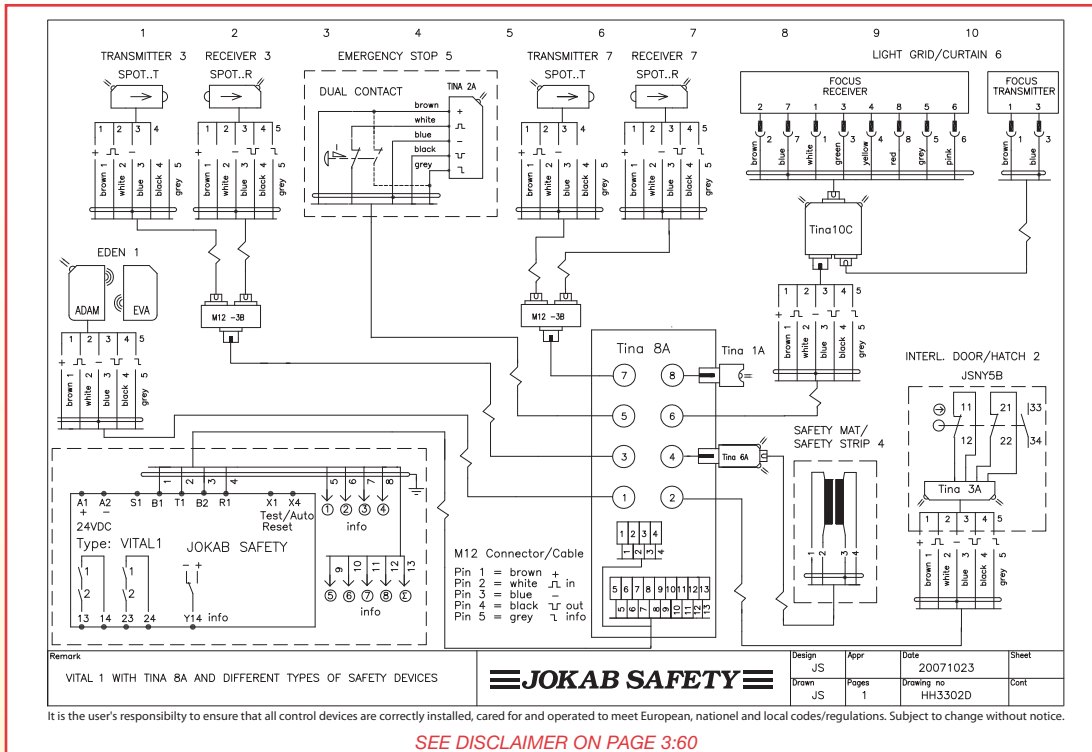
# HH3301E Connection Example

## Vital 1



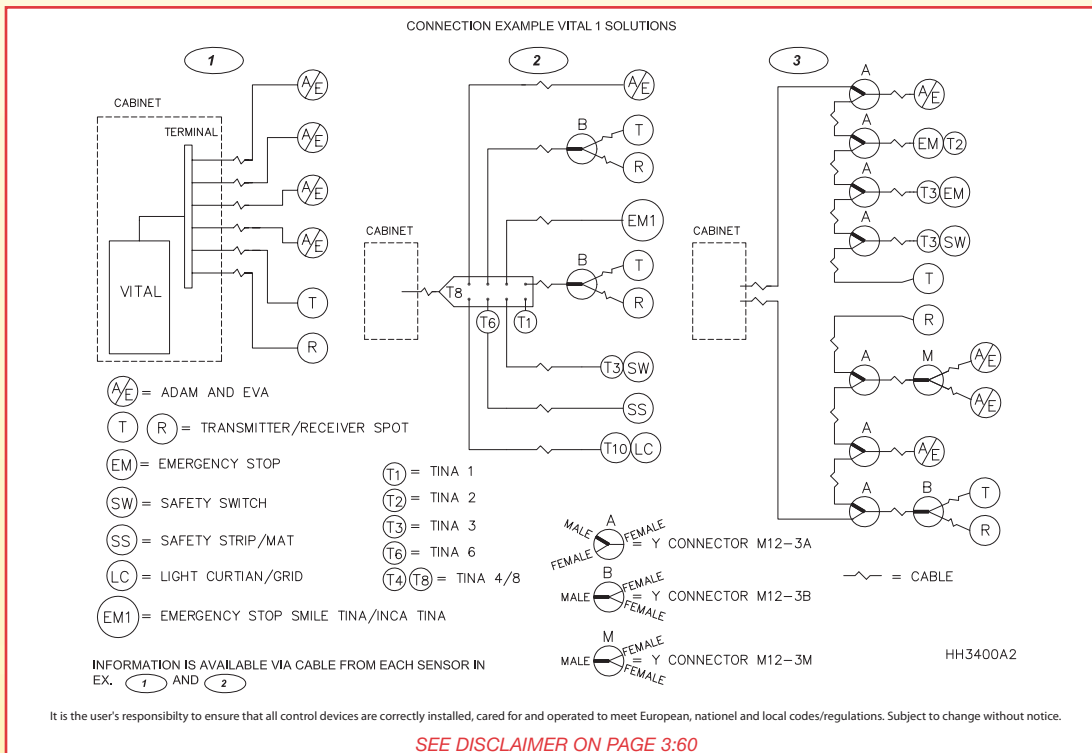
## HH3302D Connection Example

### Vital 1 with Tina 8A and Different Types of Safety Devices



## HH3400A2 Connection Example

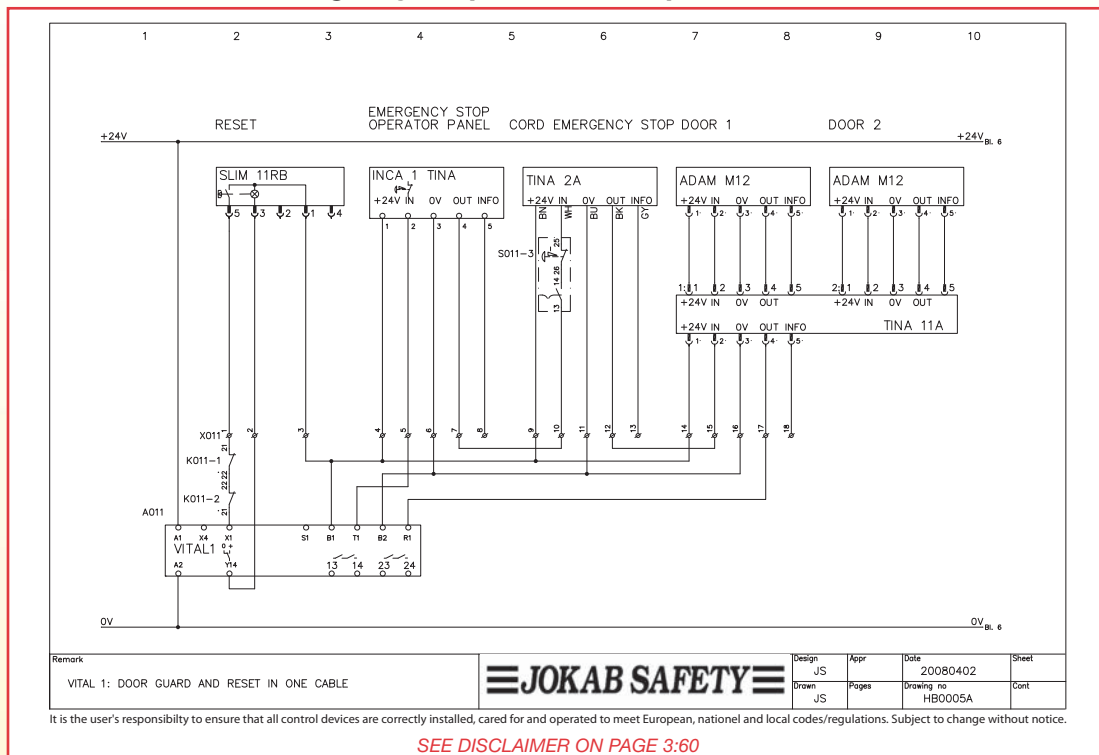
### Vital 1 Solutions





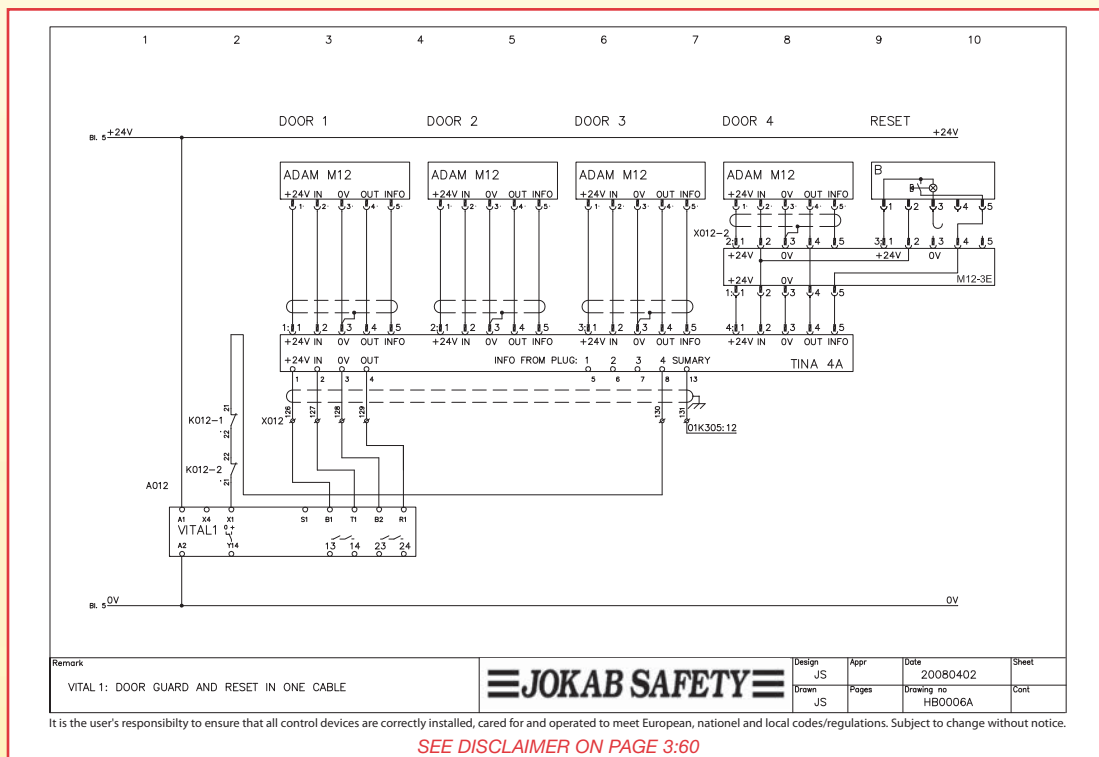
## HB0005A Connection Example

### Vital with Eden and Smile Emergency Stop Unit with Separate Reset



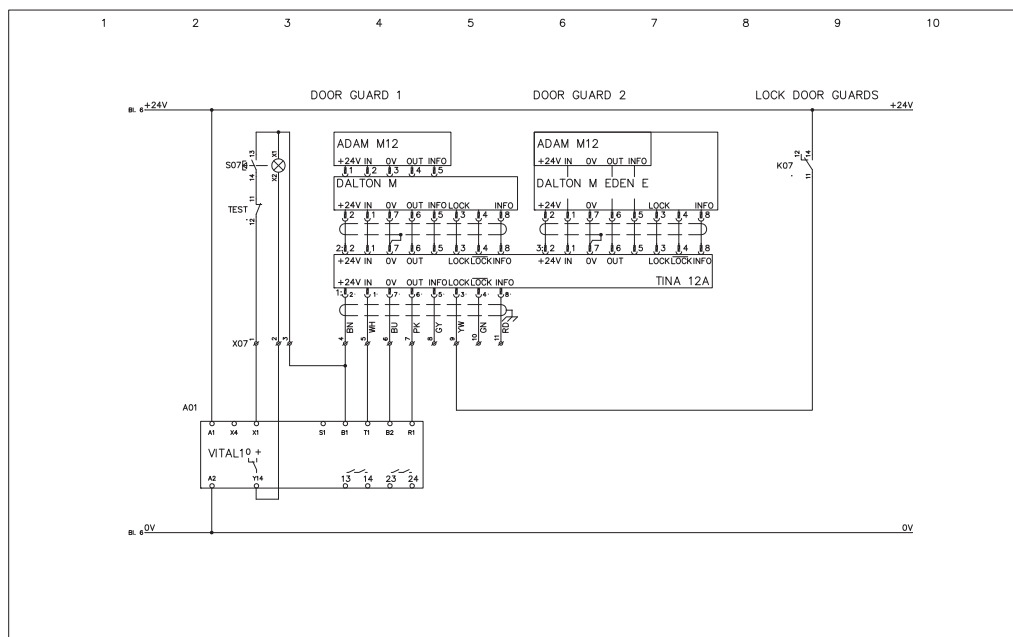
## HB0006A Connection Example

### Vital with 4 Eden Units + Reset via M12-3E and Tina 4A



# HB0007A Connection Example

## Vital with 2 Dalton Units via Tina 12A



Remark

VITAL AND DALTON WITH TINA 12A








**JOKAB SAFETY**

Design	JS	Appr		Date	20080402	Sheet
Drawn	JS	Pages		Drawing no.	HB0007A	Cont

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## Component List - Vital/Tina

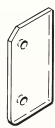

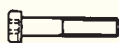








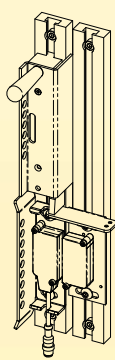
Designation	Article Number	Description
<b>Vital 1</b> 	20-052-00	Safety controller with 2 safety outputs, uses unique dynamic signal technology, automatic or manual supervised reset, test input for monitoring of external positive guided relays/contactors, 5 LED indicators, 1 dual purpose information output, quick release terminal blocks, 22.5mm wide, 24VDC supply. Meets safety category 4, dynamic self test.
<b>Eva</b> 	20-046-00	Electronic actuator for Adam switches, IP67 protection degree, polyamid housing. Includes 4 pieces of DA2 mounting washers.
<b>Eva E</b> 	20-046-06	Electronic actuator encapsulated for Adam switches, IP69K protection degree, polyamid housing.
<b>Adam M12</b> 	20-051-00	Non-contact electronic safety sensor with 5 pole M12 male quick disconnect, multi-function status indicator LED, integrated information output 24VDC - 10mA, IP67 protection degree, versatile mounting with 360 degree detection, sensing distance of 0-15mm +/- 2mm with Eva, polyamid housing. Requires Vital 1 controller or Pluto Safety PLC to function and operate to Safety Category 4. Maximum of 30 Eden sensors connected to one Vital controller possible while maintaining category 4 level of safety (10 per Pluto input). 4 pieces DA1 distance protection plate and 4 pieces DA2 mounting washers included.
<b>Adam 3m</b> 	20-051-02	Non-contact electronic safety sensor with 3 meter molded PVC cable, multi-function status indicator LED, integrated information output 24VDC - 10mA, IP67 protection degree, versatile mounting with 360 degree detection, sensing distance of 0-15mm +/- 2mm with Eva, polyamid housing. Requires Vital 1 controller or Pluto Safety PLC to function and operate to Safety Category 4. Maximum of 30 Eden sensors connected to one Vital controller possible while maintaining category 4 level of safety (10 per Pluto input). 4 pieces DA1 distance protection plate and 4 pieces DA2 mounting washers included. M12 male connection at end of cable.
<b>Adam 10m</b> 	20-051-04	Non-contact electronic safety sensor with 10 meter molded PVC cable, multi-function status indicator LED, integrated information output 24VDC - 10mA, IP67 protection degree, versatile mounting with 360 degree detection, sensing distance of 0-15mm +/- 2mm with Eva, polyamid housing. Requires Vital 1 controller or Pluto Safety PLC to function and operate to Safety Category 4. Maximum of 30 Eden sensors connected to one Vital controller possible while maintaining category 4 level of safety (10 per Pluto input). 4 pieces DA1 distance protection plate and 4 pieces DA2 mounting washers included. M12 male connection at end of cable.
<b>Adam 20m</b> 	20-051-05	Non-contact electronic safety sensor with 20 meter molded PVC cable, multi-function status indicator LED, integrated information output 24VDC - 10mA, IP67 protection degree, versatile mounting with 360 degree detection, sensing distance of 0-15mm +/- 2mm with Eva, polyamid housing. Requires Vital 1 controller or Pluto Safety PLC to function and operate to Safety Category 4. Maximum of 30 Eden sensors connected to one Vital controller possible while maintaining category 4 level of safety (10 per Pluto input). 4 pieces DA1 distance protection plate and 4 pieces DA2 mounting washers included. M12 male connection at end of cable.

## Component List - Vital/Tina

Designation	Article Number	Description
Adam E 10m	20-051-06	Non-contact electronic safety sensor encapsulated with 10 meter molded PVC cable, multi-function status indicator LED, integrated information output 24VDC - 10mA, IP69K protection degree, versatile mounting with 360 degree detection, sensing distance of 0-12mm +/- 2mm with EvaE, polyurethane housing for harsh environments. Requires Vital 1 controller or Pluto Safety PLC to function and operate to Safety Category 4. Maximum of 30 Eden sensors connected to one Vital controller possible while maintaining category 4 level of safety (10 per Pluto input). M12 male connection at end of cable.
Adam E 0.5m M12	20-051-07	Non-contact electronic safety sensor encapsulated with 0.5 meter molded PVC cable and 5 pole M12 male quick disconnect, multi-function status indicator LED, integrated information output 24VDC - 10mA, IP69K protection degree (IP67 at connector), versatile mounting with 360 degree detection, sensing distance of 0-12mm +/- 2mm with EvaE, polyurethane housing for harsh environments. Requires Vital 1 controller or Pluto Safety PLC to function and operate to Safety Category 4. Maximum of 30 Eden sensors connected to one Vital controller possible while maintaining category 4 level of safety (10 per Pluto input).
Adam E 20m	20-051-08	Non-contact electronic safety sensor encapsulated with 20 meter molded PVC cable, multi-function status indicator LED, integrated information output 24VDC - 10mA, IP69K protection degree, versatile mounting with 360 degree detection, sensing distance of 0-12mm +/- 2mm with EvaE, polyurethane housing for harsh environments. Requires Vital 1 controller or Pluto Safety PLC to function and operate to Safety Category 4. Maximum of 30 Eden sensors connected to one Vital controller possible while maintaining category 4 level of safety (10 per Pluto input).
Eden C 10m	20-051-14	Non-contact electronic safety sensor and actuator with 10 meter molded PVC cable, multi-function status indicator LED, integrated information output 24VDC - 10mA, IP67 protection degree, versatile mounting with 360 degree detection, sensing distance of 0-15mm +/- 2mm, polyamid housing. Requires Vital 1 controller or Pluto Safety PLC to function and operate to Safety Category 4. Maximum of 30 Eden sensors connected to one Vital controller possible while maintaining category 4 level of safety (10 per Pluto input). 4 pieces DA1 distance protection plate and 8 pieces DA2 mounting washers included. System comes as a matched, coded pair.
Eden EC 10m	20-051-16	Non-contact electronic safety sensor encapsulated and actuator with 10 meter molded PVC cable, multi-function status indicator LED, integrated information output 24VDC - 10mA, IP69K protection degree, versatile mounting with 360 degree detection, sensing distance of 0-12mm +/- 2mm, polyurethane housing for harsh environments. Requires Vital 1 controller or Pluto Safety PLC to function and operate to Safety Category 4. Maximum of 30 Eden sensors connected to one Vital controller possible while maintaining category 4 level of safety (10 per Pluto input). System comes as a matched, coded pair.



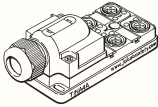
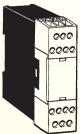

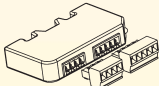
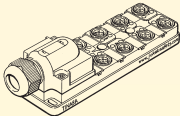
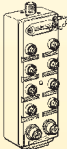
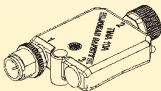
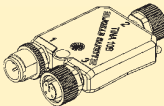
## Component List - Vital/Tina

Designation	Article Number	Description
DA 1	20-053-00	Distance protective plate for Adam M12. Polycarbonate with 2.5mm thickness. Suitable for Adam 3m/10m/20m if necessary.
DA 2	20-053-01	Mounting spacer 4.5 x 8 x 4 mm, polyamid for use with Adam and Eva units.
		
		
	20-053-10	M4 mounting screw (length 18 mm) for recessed mounting of Adam and Eva.
	20-053-20	M4 mounting screw (length 16 mm) for projecting mounting of Adam and Eva.
	20-053-30	M4 mounting screw (length 25 mm) for projecting mounting of Adam E and Eva E.
	20-053-32	M4 nylon mounting screw (length 25 mm) for recessed or projecting mounting of Adam and Eva (Adam E and Eva E).
	20-053-42	Safety screw (SM4 x 20) for mounting Adam and Eva.
	20-053-43	Safety screw (SM4 x 25) for mounting of Adam E and Eva E.
	20-053-50	Safety screwdriver bit SBITS
	20-053-62	4 Safety screws (SM4 x 20mm) + 1 screwdriver bit
	20-053-63	4 Safety screws (SM4 x 25mm) + 1 screwdriver bit
SafeSlide™	50-003-08	Eden lockout assembly for safe lockout at the door. Provisions or up to 6 locks that fastens the metal plate between the Eden pair. Adjustable for either right side or left side opening doors.
		

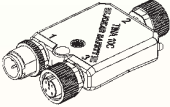
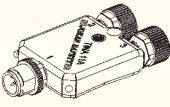
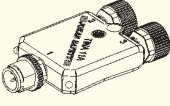


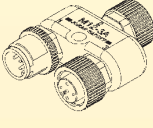
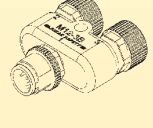
## Component List - Vital/Tina

Designation	Article Number	Description
Spot 10T/R	20-009-06	Safety light beam with 10m range, 24VDC supply, multi-function status indicator LEDs, integrated information output 24VDC - 10mA on receiver, IP67 protection class, M18 barrel style steel housing, 5 pole M12 male quick disconnect. Requires Vital 1 controller/Pluto to function. Provides safety category level 4 according to EN954-1 with Vital 1 controller/Pluto. Maximum of 6 light beam pairs connected to one controller possible while maintaining category 4 level of safety.
Spot 35T/R	20-009-05	Safety light beam with 35m range, 24VDC supply, multi-function status indicator LEDs, integrated information output 24VDC - 10mA on receiver, IP67 protection class, plastic housing, 5 pole M12 male quick disconnect. Requires Vital 1 controller/Pluto to function. Provides safety category level 4 according to EN954-1 with Vital 1 controller/Pluto. Maximum of 6 light beam pairs connected to one controller possible while maintaining category 4 level of safety. 2 pieces of JSM 63 brackets are included.
JSRL2	20-008-01	Laser alignment aid for SPOT 35 single beams. Secured by an adjustable elastic fabric band around the sensing unit. Housed in the SPOT housing with 4 pole M12 connector for power connection via existing SPOT cable.
Tina 1A	20-054-00	Tina M12 dynamic port plug for Tina 4A/8A connection blocks. Must be used to fill empty ports not used on connection blocks. Multi-function status indicator LED.
Tina 2A	20-054-01	Dynamic adapter for connecting potential free dry contact safety devices to the Vital 1 controller or Pluto Safety PLC. M20 thread connection for direct connection to the safety device or safety device enclosure, multi-function status indicator LED, integrated information output 24VDC - 10mA. Comes with plastic locking nut.
Tina 2B	20-054-11	Dynamic adapter for connecting potential free dry contact safety devices to the Vital 1 controller or Pluto Safety PLC. Multi-function status indicator LED, integrated information output 24VDC - 10mA. For mounting inside of an enclosure.
Tina 3A	20-054-02	Dynamic adapter with 5 pole M12 male quick disconnect for connecting potential free dry contact safety devices to the Vital 1 controller or Pluto Safety PLC. M20 thread connection for direct connection to the safety device or safety device enclosure, multi-function status indicator LEDs, integrated information output 24VDC - 10mA. Comes with plastic locking nut.
Tina 3Aps	20-054-14	Dynamic adapter with 5 pole M12 male quick disconnect for connecting potential free dry contact safety devices to the Vital 1 controller or Pluto Safety PLC. M20 thread connection for direct connection to the safety device or safety device enclosure, multi-function status indicator LEDs, integrated information output 24VDC - 10mA, 24VDC and 0VDC power leads for powering up devices. Comes with plastic locking nut.

## Component List - Vital/Tina

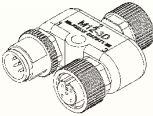
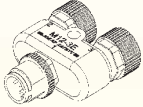
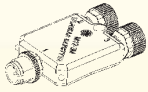
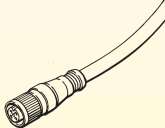

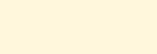




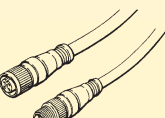

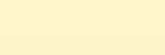


Designation	Article Number	Description
<b>Tina 4A</b> 	20-054-03	Dynamic 4 port connection block for connecting up to 4 safety devices with dynamic signal. Ports are 5 pole M12 female quick disconnects. Cable gland cover with internal terminal block for wiring 24VDC supply, dynamic signal input/output from Vital 1 controller or Pluto Safety PLC information outputs for each port, and summation output.
<b>Tina 5A</b> 	20-054-04	Dynamic bypass connection module for bypassing safety devices with dynamic signal connected to Vital 1 controller. Can bypass one or multiple devices at once. 24VDC supply, LED indicators, information output Y14 rated at 24VDC - 10mA, quick disconnect terminal blocks, 22.5mm wide and monitoring of bypassing light (24VDC - 1 to 5W maximum).
<b>Tina 6A</b> 	20-054-06	Dynamic adapter with in-line 5 pole M12 male & female quick disconnects for connecting safety mats or strips with M12 connector to the Vital 1 controller or Pluto Safety PLC. Multi-function status indicator LEDs, integrated information output 24VDC - 10mA.
<b>Tina 7A</b> 	20-054-07	Dynamic adapter, DIN rail mount with quick disconnect for connecting potential free dry contact safety devices to the Vital 1 controller or Pluto Safety PLC. Multi-function status indicator LEDs, integrated information output 24VDC - 10mA.
<b>Tina 8A</b> 	20-054-05	Dynamic connection block with 8 ports for connecting up to 8 safety devices with dynamic signals. Ports are 5 pole M12 female quick disconnects. Cable gland cover with internal terminal block for wiring 24VDC supply, dynamic signal input/output from Vital 1 controller and information outputs for each port.
<b>Tina 8B Profibus</b> 	20-054-10	Dynamic 8 port connection block for connecting up to eight safety devices with dynamic signal. Ports are 5 pole M12 female quick disconnects. One 5 pole M12 female quick disconnect for wiring 24VDC supply, dynamic signal input / output from Vital 1 controller and information outputs for each port. Two 5 pole M12 quick disconnects for Profibus In and Out connections. Two rotary switches for addressing.
<b>Tina 10A</b> 	20-054-12	Dynamic adapter with 5 pole M12 male quick disconnect for connecting transistor output safety devices to the Vital 1 controller or Pluto Safety PLC. 8 pole M12 female quick disconnect for direct connection to the safety device or safety device enclosure, multi-function status indicator LEDs, integrated information output 24VDC - 10mA.
<b>Tina 10B</b> 	20-054-13	Dynamic adapter with 5 pole M12 male quick disconnect for connecting transistor output safety devices to the Vital 1 controller or Pluto Safety PLC. 5 pole M12 female quick disconnect for connecting a local reset and power off push button. 8 pole M12 female quick disconnect for direct connection to the safety device or safety device enclosure, multi-function status indicator LEDs, integrated information output 24VDC - 10mA.

## Component List - Vital/Tina

Designation	Article Number	Description
<b>Tina 10C</b> 	20-054-16	Dynamic adapter with 5 pole M12 male quick disconnect for connecting transistor output safety devices to the Vital 1 controller or Pluto Safety PLC. 5 pole M12 female quick disconnect for connecting and powering the transmitter. 8 pole M12 female quick disconnect for direct connection to the safety device or safety device enclosure, multi-function status indicator LEDs, integrated information output 24VDC - 10mA.
<b>Tina 11A</b> 	20-054-17	Dynamic 2 port connection block for connecting up to 2 safety devices with dynamic signals. Ports are 5 pole M12 female quick disconnects. 5 pole M12 male quick disconnect for connecting the safety devices to the Vital 1 controller. Multi-function status indicator LEDs, integrated information output 24VDC - 10mA.
<b>Tina 12A</b> 	20-054-18	Dynamic 2 port connection block for connecting up to 2 safety devices with dynamic signals and locking inputs. Ports are 8 pole M12 female quick disconnects. 8 pole M12 male quick disconnect for connecting the safety devices to the Vital 1 controller. Multi-function status indicator LEDs, integrated information output 24VDC - 10mA.
<b>Tina Duo 1</b> 	20-051-30	Tina expansion unit for increasing the number of sensors in a Vital or Pluto circuit with manual or automatic reset. Tina Duo counts as 3 devices from the original Vital circuit. M12 5 pole connector for reset push button option, 4 M12 5 pole connectors for Vital branches. 24VDC, IP65 in yellow aluminum Focus profile.
<b>Tina Duo 2</b> 	20-052-35	Tina expansion unit for increasing the number of sensors in a Vital or Pluto circuit with manual or automatic reset. Tina Duo counts as 3 devices from the original Vital circuit. Integrated reset push button and 4 M12 5 pole connectors for Vital branches. 24VDC, IP65 in yellow aluminum Focus profile.
<b>M12-3A</b> 	20-055-00	M12 Y connector for series connection for Vital/Pluto safety devices such as Eden Sensors, Smile E-Stops, Inca E-Stops, Spot Single Beams, and Tina Dynamic Adapters. 5 pole M12 female quick disconnect connector for connection of the safety device. 5 pole M12 male quick disconnect for connecting 24VDC, 0VDC and the dynamic transmit signal to the field devices. 5 pole M12 female quick disconnect connector for either the continuation of the circuit or the return of the dynamic receive signal to the Vital 1/Pluto controller.
<b>M12-3B</b> 	20-055-01	M12 Y connector for the parallel connection of 2 Vital/Pluto safety devices such as Eden Sensors, Spot Signal Beams and Tina Dynamic Adapters. Two 5 pole M12 female quick disconnect connectors for connection of the safety devices. 5 pole M12 male quick disconnect for connection to the Vital 1/Pluto controller.



## Component List - Vital/Tina


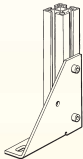


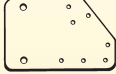
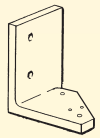
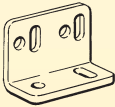
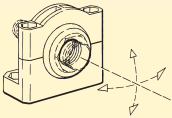


Designation	Article Number	Description
<b>M12-3D</b> 	20-055-03	M12 Y connector parallel Connection. 1 M12 8 pole female connector for connection of the Focus Receiver, 1 M12 5 Pole female connector for connection of the Focus Transmitter and 1 M12 8 pole male connector for panel connection.
<b>M12-3E</b> 	20-055-02	M12 Y connector for the connection of 2 different safety or non-safety circuits in one cable. 5 pole M12 female quick disconnect connector for connection of the first circuit. 5 pole M12 female quick disconnect connector for connection of the second circuit. 5 pole M12 male quick disconnect for connection to IQs on the Pluto controller.
<b>M12-3M</b> 	20-055-04	M12 Y connector for the connection of a Vital/Pluto safety devices such as Eden sensors, Spot Single Beams, and Tina Dynamic Adapters. 5 pole M12 female quick disconnect connector for the safety device. 5 pole M12 female quick disconnect connector for the bypass safety device. 5 pole M12 male quick disconnect for connection to the Vital 1/Pluto controller.
<b>M12-C61</b> 	20-056-00	Cable single ended 6 meter black PVC jacket with straight 5 pole M12 female molded connector, 22AWG conductors, overall braid shield.
<b>M12-C101</b> 	20-056-10	Cable single ended 10 meter black PVC jacket with straight 5 pole M12 female molded connector, 22AWG conductors, overall braid shield.
<b>M12-C201</b> 	20-056-14	Cable single ended 20 meter black PVC jacket with straight 5 pole M12 female molded connector, 22AWG conductors, overall braid shield.
<b>M12-C61V</b> 	20-056-01	Cable single ended 6 meter black PVC jacket with angled 5 pole M12 female molded connector, 22AWG conductors, overall braid shield.
<b>M12-C101V</b> 	20-056-11	Cable single ended 10 meter black PVC jacket with angled 5 pole M12 female molded connector, 22AWG conductors, overall braid shield.
<b>M12-C62</b> 	20-056-02	Cable single ended 6 meter black PVC jacket with straight 5 pole M12 male molded connector, 22AWG conductors, overall braid shield.*
<b>M12-C102</b> 	20-056-12	Cable single ended 10 meter black PVC jacket with straight 5 pole M12 male molded connector, 22AWG conductors, overall braid shield.*
<b>M12-C112</b> 	20-056-20	Extension cable 1 meter, black PVC jacket with straight 5 pole M12 male/female connectors, 22AWG conductors, overall braid shield.*
<b>M12-C312</b> 	20-056-21	Extension cable 3 meters, black PVC jacket with straight 5 pole M12 male/female connectors, 22AWG conductors, overall braid shield.*
<b>M12-C612</b> 	20-056-22	Extension cable 6 meters, black PVC jacket with straight 5 pole M12 male/female connectors, 22AWG conductors, overall braid shield.*
<b>M12-C1012</b> 	20-056-23	Extension cable 10 meters, black PVC jacket with straight 5 pole M12 male/female connectors, 22AWG conductors, overall braid shield.*
<b>M12-C2012</b> 	20-056-24	Extension cable 20 meters, black PVC jacket with straight 5 pole M12 male/female connectors, 22AWG conductors, overall braid shield.*

\*Screen connected to pin 3 (0VDC) on male connector.

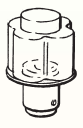


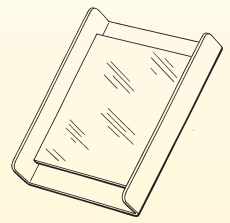
## Component List - Vital/Tina

Designation	Article Number	Description
M12-C63	20-056-30	Cable single ended 6 meters black PVC jacket with straight 8 pole M12 female molded connector, 22AWG conductors, overall braid shield.
M12-C103	20-056-40	Cable single ended 10 meters black PVC jacket with straight 8 pole M12 female molded connector, 22AWG conductors, overall braid shield.
M12-C203	20-056-41	Cable single ended 20 meters black PVC jacket with straight 8 pole M12 female molded connector, 22AWG conductors, overall braid shield.
M12-C134	20-056-50	Extension cable 1 meter, black PVC jacket with straight 8 pole M12 male/female connectors, 22AWG conductors, overall braid shield.*
M12-C334	20-056-51	Extension cable 3 meter, black PVC jacket with straight 8 pole M12 male/female connectors, 22AWG conductors, overall braid shield.*
<i>*Screen connected to pin 7 (0VDC) on male connector.</i>		
M12-CT0122	20-060-00	Transfer cable 10cm, black PVC jacket with 2 straight 5 pole M12 male connectors, 22AWG conductors, overall braid shield. Pin 2 transfers to pin 4 for connection to M12-3A Y connector.
M12-CT0214	20-060-01	Extension cable 20cm, black PVC jacket with straight 5 pole M12 female, 8 pole M12 male connectors, 22AWG conductors, overall braid shield.
M12-CT0232	20-060-02	Extension cable 20cm, black PVC jacket with straight 5 pole M12 male, 8 pole M12 female connectors, 22AWG conductors, overall braid shield.
M12-CT0134F	20-060-03	Extension cable 1m, black PVC jacket with straight 8 pole M12 male/female connectors, 22AWG conductors, overall braid shield. Transfer pins.
C5	20-057-00	Cable 5 conductors, 22AWG, black PVC jacket cable with overall braid shield. Per meter. OD - 5.5mm +/- .15mm.
C8	20-057-10	Cable 8 conductors, 22AWG, black PVC jacket cable with overall braid shield. Per meter. OD - 6.3mm +/- .15mm.
C9	20-057-15	Cable 7 conductors at 20AWG and 2 conductors at 18AWG, aluminum shield, drain. Per meter. OD - 8mm. For use with Tina 4A.
C13	20-057-20	Cable 11 conductors at 20AWG and 2 conductors at 18AWG, aluminum shield, drain. Per meter. OD - 9mm. For use with Tina 8A.
M12-C01	20-055-10	5 pole M12 female field retro-fittable connector with screw terminals for connecting wires. Cable diameter range 2.5 - 6.5 mm.
M12-C02	20-055-11	5 pole M12 male field retro-fittable connector with screw terminals for connecting wires. Cable diameter range 2.5 - 6.5 mm.
M12-C03	20-055-16	8 pole M12 female field retro-fittable connector with screw terminals for connecting wires. Cable diameter range 2.5 - 6.5 mm.
M12-C04	20-055-17	8 pole M12 male field retro-fittable connector with screw terminals for connecting wires. Cable diameter range 2.5 - 6.5 mm.

## Component List - Vital/Tina

Designation		Article Number	Description
J SMA 44-L		40-001-00	Post for mirrors and light beam. Aluminum profile 44 x 44 mm, from our guard fencing system Quick-Guard, height 1100 mm. Other heights are also available. Delivered with L1A yellow end cap.
J SM 36-K2		40-030-10	Floor fixture with screws for mounting to post. Normally two are used per post.
J SM 9		40-007-00	Bracket for mirror.
J SM 11		40-008-01	Wall bracket for JSM 63 and JSM 9.
J SM 60-L		40-003-00	Bracket for JSM 9 or JSM 63. Profile attachment (screws included).
J SM 62-L		40-004-00	Bracket for JSM 9. To enable mirrors to be horizontally angled around a machine. Screws for fixing to profile are included.
J SM 63		40-007-01	Angle bracket for Spot 35 T/R light beam. Two pcs of JSM 63 are included with Spot 35 T/R.
J SM 64		40-007-02	Adjustable mounting bracket with rotational knuckle for 18mm barrel style sensors.
LH1		40-007-10	Bypass indicator lamp with 24VDC, 5W BA15d style bulb.
ML1		40-007-15	Light bulb 24V, 5W BA15d style bulb.

## Component List - Vital/Tina

Designation	Article Number	Description
ML2	40-007-20	LED-lamp, long-life 24V AC/DC <45mA
		
JSM 6	40-006-00	Mirror for 0 - 10 m, size: 100 x 40 x 25 mm. (Plastic cover JSM 16 order no. 40-010-01) Screws for bracket included.
		
JSM 7A	40-006-05	Mirror for 0 - 20 m, adjustable mirror, size: 115 x 80 x 30 mm. (Plastic cover: JSM 17 order no. 40-010-02) Screws for bracket included.
		
JSM 8A	40-006-06	Mirror for 0 - 35 m, adjustable mirror, size: 160 x 135 x 30 mm. (Plastic cover: JSM 18 order no. 40-010-03) Screws for bracket included.
		

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