MAY 2022

ABB Jokab Safety

Application Guide

Document ID.: 1SXU172080G0201 Rev.: B

Important Notice

The connection diagrams in this document are only general recommendations from ABB. The conditions of a specific application could make alternative connections more suitable.

With regards to the stated functional safety levels, they apply under the assumption that the installation complies with all other relevant functional safety requirements in EN ISO 13849-1/-2, such as product selection, product placement, cable installation, environmental effects on the system etc.

ABB does not accept any liability and/or responsibility whatsoever for any errors or lack of information in this document. It is the responsibility of the machine builder to make a risk assessment and make sure the appropriate functional safety levels are achieved.

Click here for the latest release of the
"Application Guide"

Overview

Types of “Logic” devices

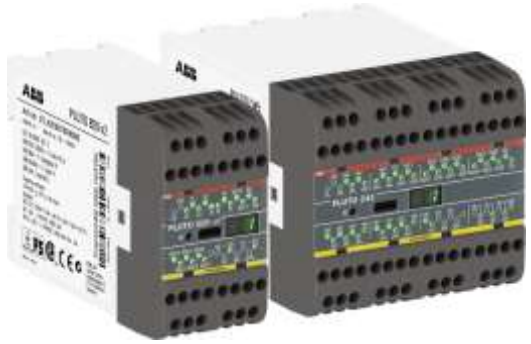
Sentry Safety Relays

For small machines and simple safety applications. Sentry has models that can be used for 1 or 2 channel devices, OSSD and two-hand control devices. They are models also for safe expansion and timing functions (on and off delay, timed bypass and reset).

Vital Controller

For small machines and simple safety applications. The Vital utilizes “DYNlink” that is a communication protocol unique to ABB. This protocol makes it easy to reach the highest level of safety using a minimum number of cables and controllers.

Pluto Programmable Safety Controller



For machines with a larger number of safety sensors and I/O’s are needed, or if more advanced functions are required, particularly in terms of communication with the control PLC. Take advantage of “DYNlink” devices for less I/O needed.

Click on images to go to application overview and selector

Sentry safety relays

Application overview

BSR
basic
safety relays

Expansion of safe outputs Emergency Stops

SSR
single function
safety relays

E-stops Door sensors Optical devices Two-hand devices

TSR
timer
safety relays

Delayed on/off Time bypass Timed reset
Emergency Stops

All common applications
+
Pressure sensitive devices

USR
universal
safety relays

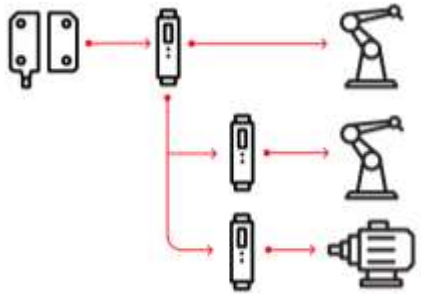
Sentry Safety Relays

Application Overview (Click images to select application)

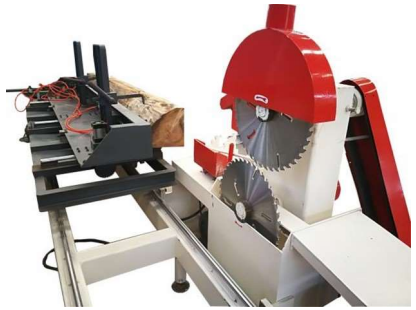
Emergency Stops

Rope Pull (Conveyors)

Expansion of Safe Outputs



Time Delay

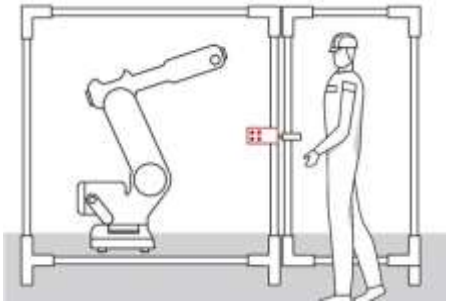


[Click here for the latest release of the Easy Reference]

Sentry Safety Relays

Application Overview (Click images to select application)

Door Sensing – Low Risk Applications



Door Sensing – High Risk Applications

Optical Devices

Two Hand Control

Click here for the latest release of the Easy Reference

Sentry Safety Relays

Application Overview (Click images to select application)

Pressure Sensitive Devices

Click here for the latest release of the Easy Reference

Component Wiring Selector to Sentry Safety Relays

(Click images to select component)

Smile 11EA

MKEY

Eden OSSD

Orion 1 Base

LineStrong

GKEY

Safeball

Safety Mat

Application Selector | Component Selector 1 | Component Selector 2 | Overview Page

Component Wiring Selector to Sentry Safety Relays

(Click images to select component)

BSR23

AFS Contactors

Emergency Stops

Application Notes

Overview

Small machine requiring emergency stops to safely shut down machine movements.

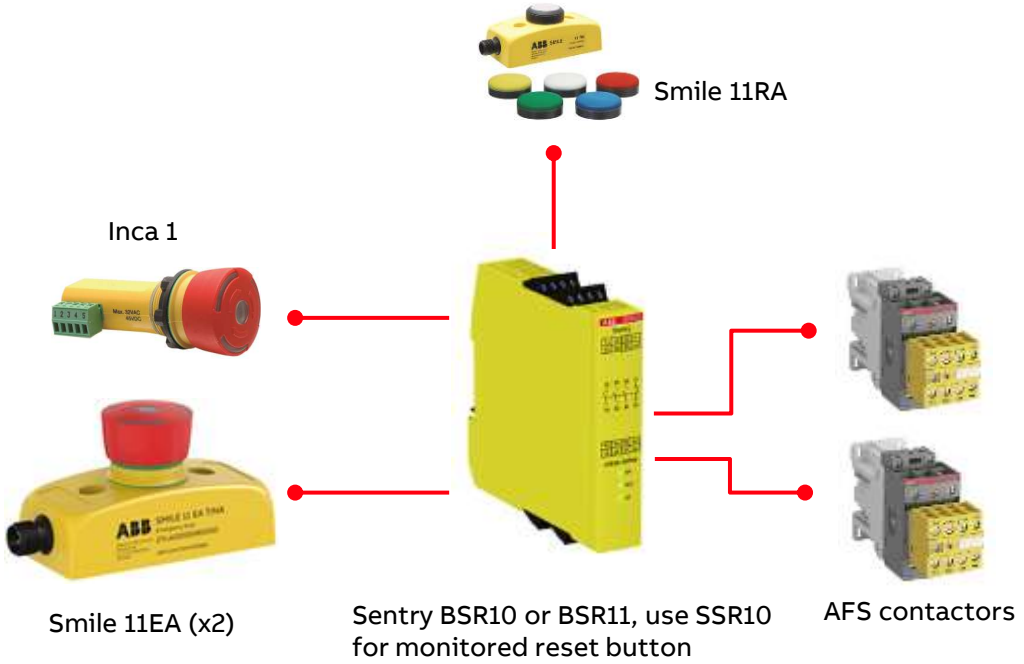
Additional Notes

2 emergency stops are remote, 1 located on main operator console.

Note: Picture is not of application on this page but only of a similar machine

Emergency Stops

ABB Jokab Safety Solution



Emergency Stops

(2)Smile 11EA – 2TLA020051R0000

(1)Inca 1 – 2TLA030054R0100

(1)Legend plate – 2TLA030054R0900

(1)M12-C101 – 2TLA020056R4000

Reset

(1)Smile 11RA – 2TLA030053R0000

(1)M12-C101 – 2TLA020056R1000

Safety Relay

(1)BSR10 – 2TLA010040R0000 or (1)BSR10P – 2TLA010040R0001 or BSR11 – 2TLA010041R0000 or (1)BSR11P – 2TLA010041R0001

NOTE: SSR10(M) and USR models can also be used for estops devices

Contactors

(2)AFS09Z-30-22-30 – for shutting down machine.

Rope Pull (Conveyors)

Application Notes

Overview

Aggregate conveyor that needs to be guarded on both sides along the full span.

Additional Notes

Conveyor will be just above waist level and spans 110 meters.

LEDs and estop needed on the rope pulls

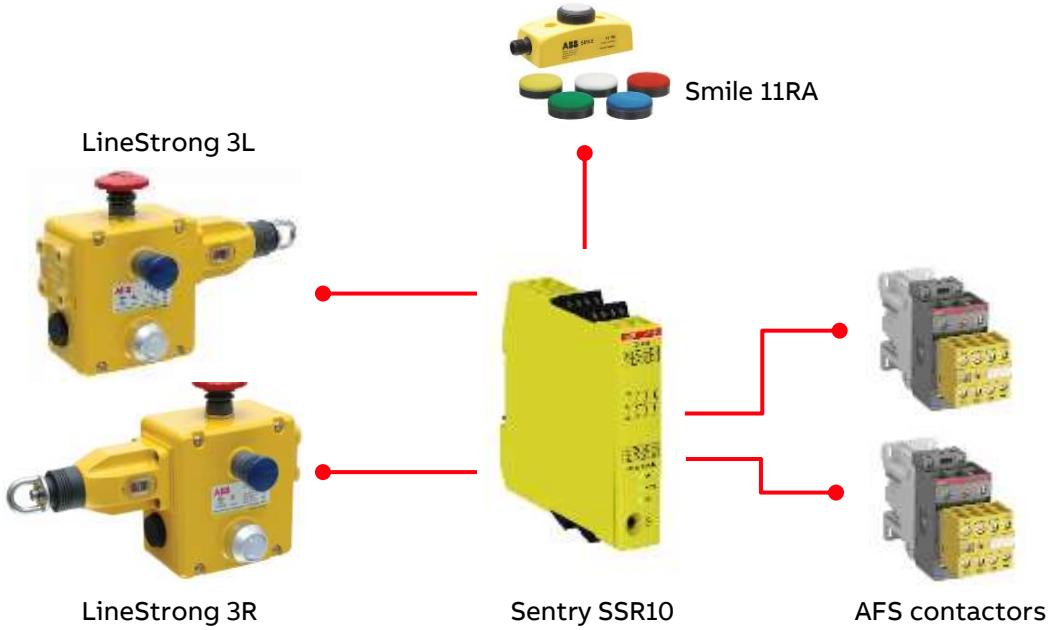
Location of rope pull will be out of the elements (ex rain)

Temperature fluctuation is minimal.

Note: Picture is not of application on this page but only of a similar machine

Rope Pull (Conveyors)

ABB Jokab Safety Solution



Rope Pull

(1)LineStrong 3L – 2TLA050206R1232

(1)LineStrong 3R – 2TLA050208R1232

(2)Estop – 2TLA050211R0005

(2)100m rope pull kit – 2TLA050210R0730

(2)Spring – 2TLA050211R0004

(2)1/2NPT Cable Gland - 2TLA050040R0001

Reset

(1)Smile 11RA – 2TLA030053R0000

(1)M12-C101 – 2TLA020056R1000

Safety Relay

(1)SSR10 – 2TLA010050R0000 or (1)SSR10P – 2TLA010050R0001

Contactors

(2)AFS09Z-30-22-30 – for shutting down machine.

Expansion of safe outputs

Application Notes

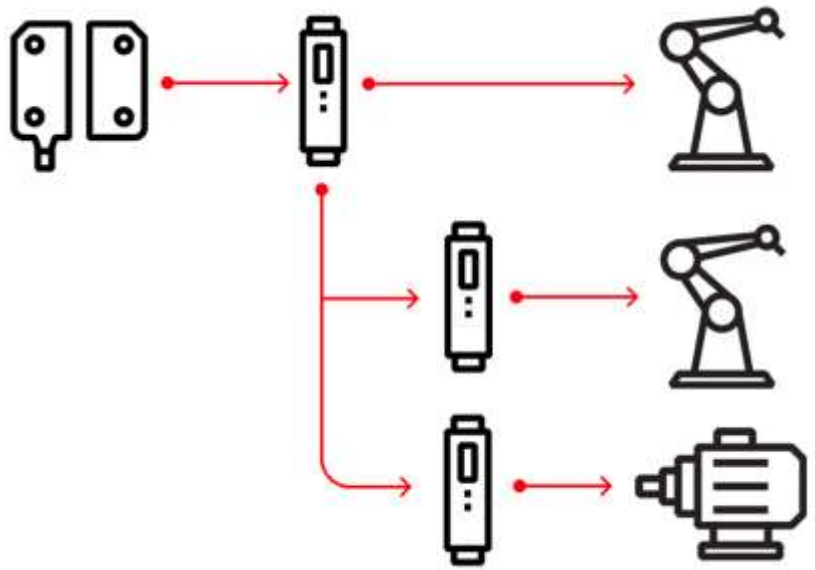
Overview

Additional outputs are needed for a low-risk gate circuit.

Additional Notes

Expansion will be in the same panel as the main safety relay so it can be wired single channel.

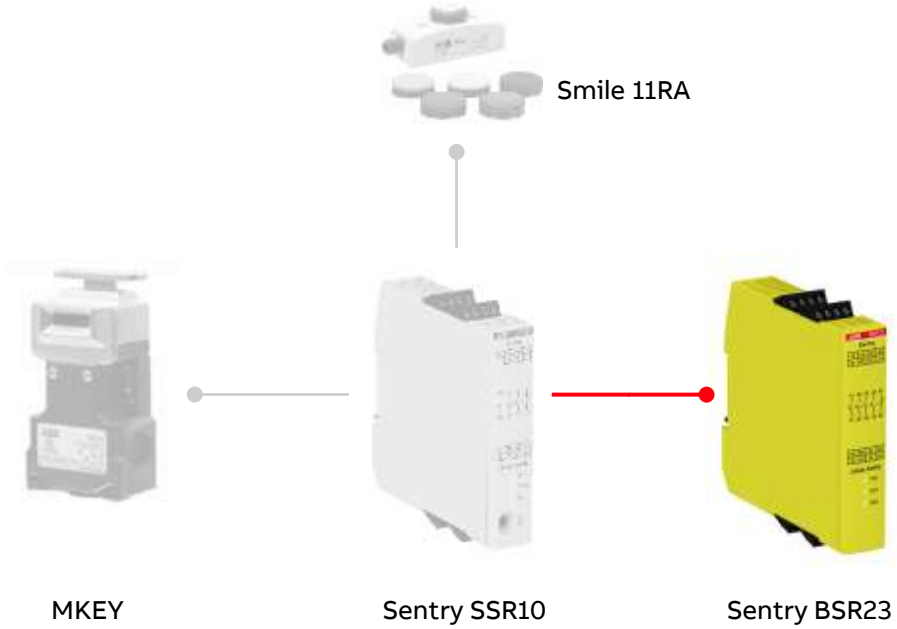
Monitoring of expansion safety relay need to be done by the main safety relay.



Note: Picture is not of application on this page but only of a similar machine

Expansion of safe outputs

ABB Jokab Safety Solution



Safety Expansion Relay

(1)BSR23 – 2TLA010041R0600 or (1)BSR23P – 2TLA010041R0601

NOTE: BSR10 and BSR11 models could also be used.

Time Delay

Application Notes

Overview

Machine with a saw needs to be safeguarded. The saw has a long rundown time (or commonly called inertia) so operators will need to be kept away from the saw blade until fully stopped.

Additional Notes

Entrance door needs to be guarded with a solenoid lock.

Power to unlock solenoid is needed due to inertia.

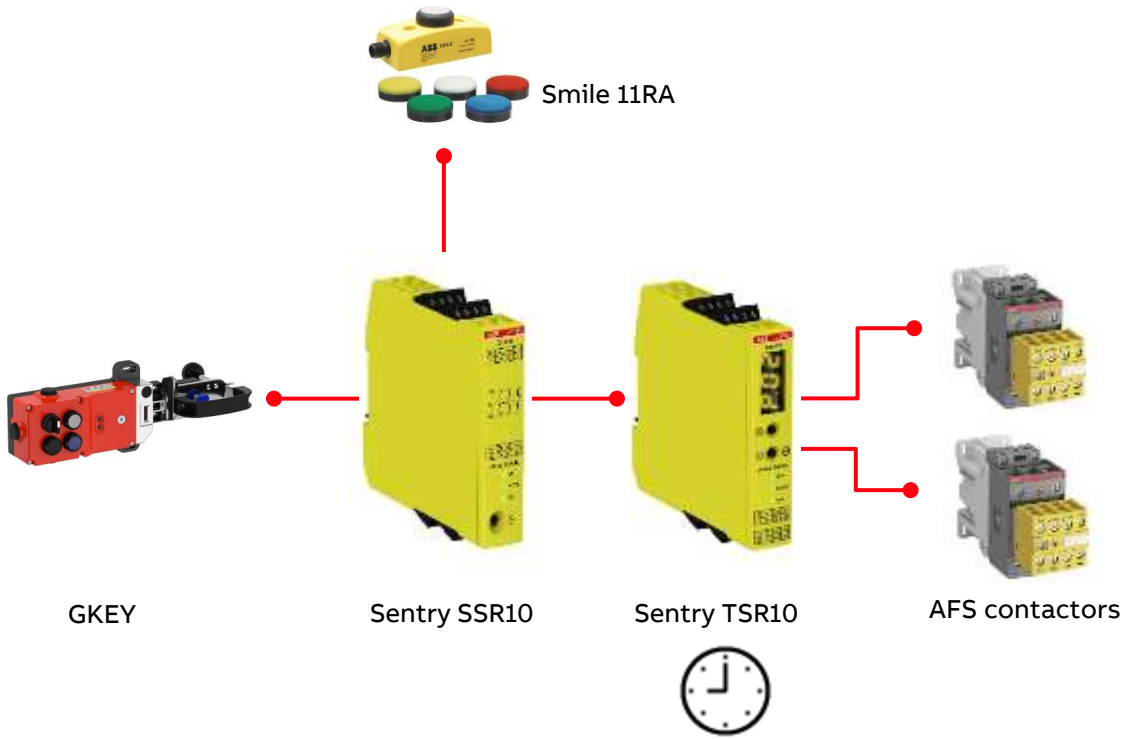
Rough environment so a metal switch is needed.

Minimal cable needed back to main panel.

Note: Picture is not of application on this page but only of a similar machine

Time Delay

ABB Jokab Safety Solution



Door Switch

(1)GKEY 4 RU – 2TLA050304R0002

(1)FHS GKEY 4 (sliding handle and mounting plate) = 2TLA050310R0032

(1)Rear Handle – 2TLA050040R0510

(1)Spring Catch – 2TLA050040R0511

(3)Cover – MA1-8130 (sold in multiples of 10 from ABB)

(1)C2SS1-10B-20

(1)1/2NPT Cable Gland – 2TLA050040R0001

Reset

(1)Smile 11RA – 2TLA030053R0000

(1)M12-C101 – 2TLA020056R1000

Safety Relay

(1)SSR10 – 2TLA010050R0000 or (1)SSR10P – 2TLA010050R0001

(1)TSR10 – 2TLA010060R0000 or (1)TSR10P – 2TLA010060R0001

Contactors

(2)AFS09Z-30-22-30 – for shutting down machine.

Door Sensing – Low Risk Applications

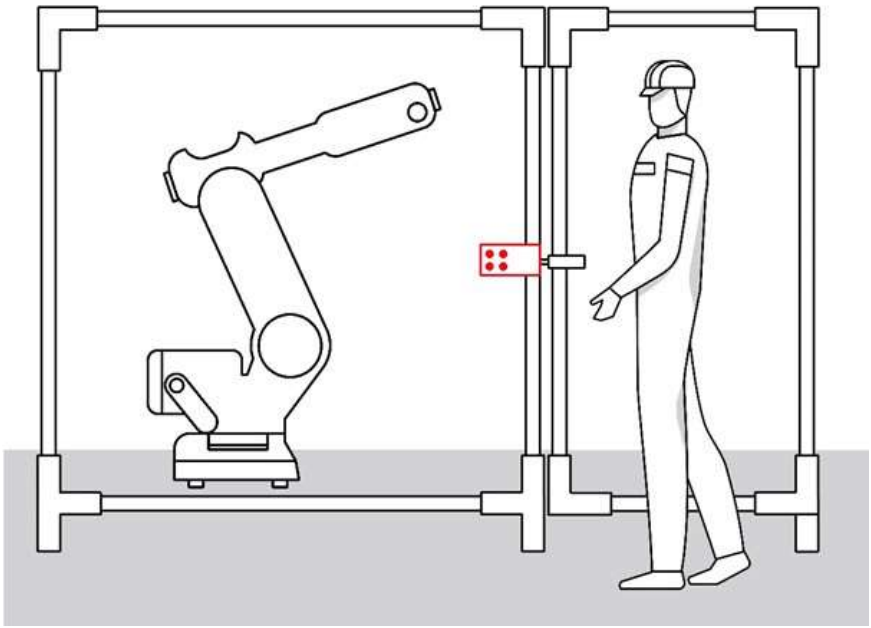
Application Notes

Overview

Small machine entry points needs be safeguarded to shut down all moving parts inside the machine.

Additional Notes

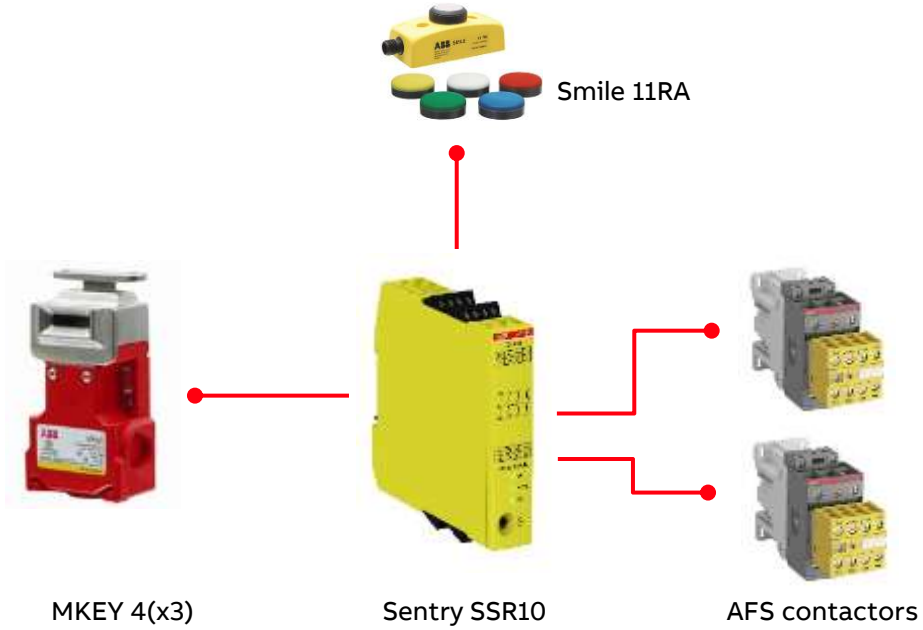
3 doors total.



Note: Picture is not of application on this page but only of a similar machine

Door Sensing – Low Risk Applications

ABB Jokab Safety Solution



Door Switch

(3)MKEY 4– 2TLA050001R1110

Reset

(1)Smile 11RA – 2TLA030053R0000

(1)M12-C101 – 2TLA020056R1000

Safety Relay

(1)SSR10 – 2TLA010050R0000 or (1)SSR10P – 2TLA010050R0001

NOTE: USR models can also be used for OSSD devices but SSR10 is typically the model used.

Contactors

(2)AFS09Z-30-22-30 – for shutting down machine.

Door Sensing – High Risk Applications

Application Notes

Overview

Small machine entry points needs be safeguarded to shut down all moving parts inside the machine.

Additional Notes

5 doors in total, 3 hatches and 2 conventional doors (man doors).

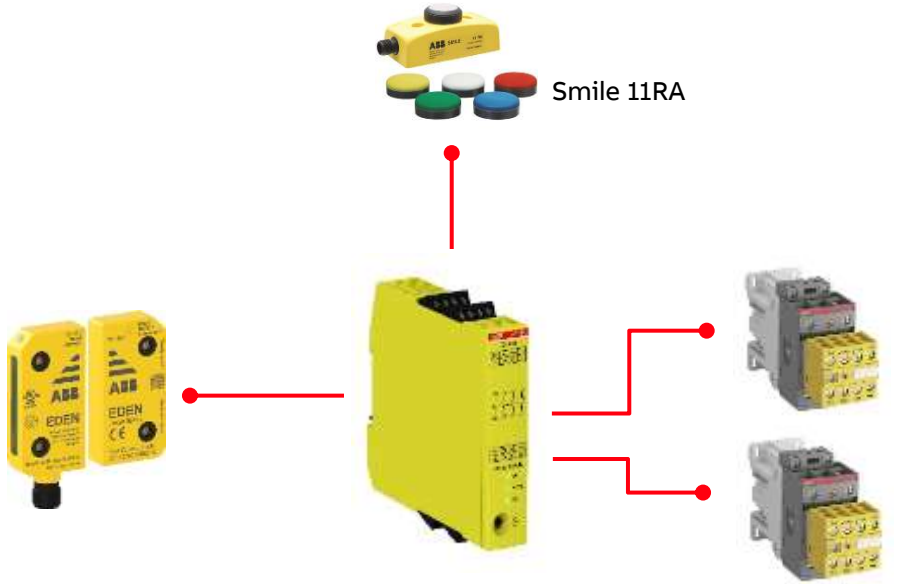
Manual Reset needed due to the man doors in the system.

Non-contact switch preferred.

Note: Picture is not of application on this page but only of a similar machine

Door Sensing – High Risk Applications

ABB Jokab Safety Solution



Door Sensing

(5)Adam OSSD Info – 2TLA020051R5700

(5)Eva General Code – 2TLA020046R0800

(5)M12-C103 – 2TLA020056R4000

Reset

(1)Smile 11RA – 2TLA030053R0000

(1)M12-C101 – 2TLA020056R1000

Safety Relay

(1)SSR10 – 2TLA010050R0000 or (1)SSR10P – 2TLA010050R0001

NOTE: USR models can also be used for OSSD devices but SSR10 is typically the model used.

Contactors

(2)AFS09Z-30-22-30 – for shutting down machine.

Optical Devices

Application Notes

Overview

Need to guard an opening in some safety fencing that an operator frequently enters in to load and unload parts.

Additional Notes

Only the operator's hands and arms will go through the light curtain. There is no possibility of the operator going past the light curtain.

Hand resolution is needed

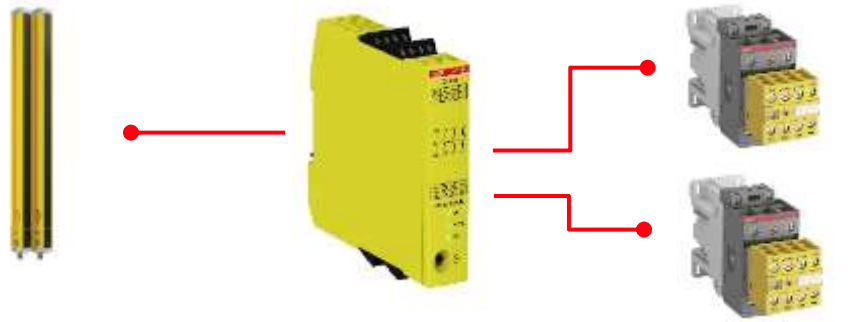
Overall height to be guarded is 900mm.

Only an on/off application for the light curtain.

Note: Picture is not of application on this page but only of a similar machine

Optical Devices

ABB Jokab Safety Solution



Orion 1 Base | Sentry SSR10 | AFS contactors

Optical Device

(1)Orion 1-4-30-090-B– 2TLA020302R0500

(1)M12-C101 – 2TLA020056R1000

(1)M12-C103 – 2TLA020056R4000

Safety Relay

(1)SSR10 – 2TLA010050R0000 or (1)SSR10P – 2TLA010050R0001

NOTE: USR models and BSR23 can also be used for optical devices but SSR10 is typically the model used.

Contactors

(2)AFS09Z-30-22-30 – for shutting down machine.

Two-hand Control

Application Notes

Overview

Small press needs two hand control to allow the operator to move the press up and down safely.

Additional Notes

Need for Ergonomic two hand control.

Note: Picture is not of application on this page but only of a similar machine

Two-hand Control

ABB Jokab Safety Solution

Safeball (x2) Sentry SSR20 AFS contactors

Two Hand Control

(2)JSTD1-A– 2TLA020007R3000

(2)JSMC5 – 2TLA020007R0900

Safety Relay

(1)SSR20 – 2TLA010051R0000 or (1)SSR20P – 2TLA010051R0001 or (1)SSR20M – 2TLA010051R0100 or (1)SSR20P – 2TLA010051R0101

NOTE: USR models can also be used for two hand control but SSR20 is typically the model used.

Contactors

(2)AFS09Z-30-22-30 – for shutting down machine.

Pressure sensitive devices

Application Notes

Overview

Need to guard in front of small machine. Operators need to be detected if in front of the machine as there is a turntable.

Additional Notes

A 36” x 48” area needs to be guarded.

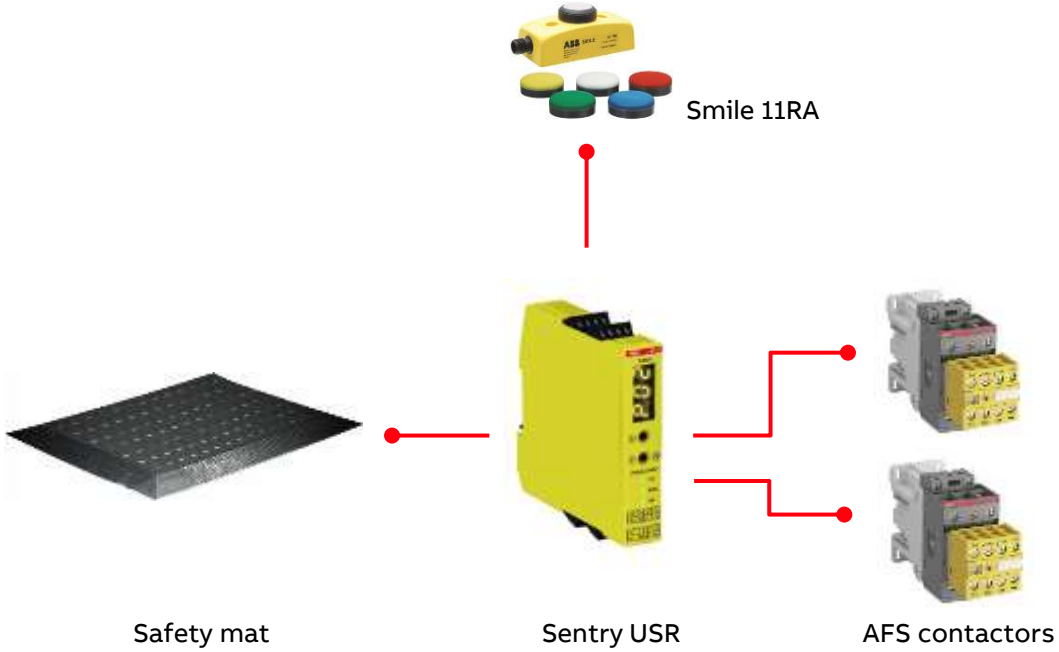
Manual reset needed.

Need to drop out turntable motor.

Note: Picture is not of application on this page but only of a similar machine

Pressure sensitive devices

ABB Jokab Safety Solution



Safety Mat

(1)Safety Mat with built in trim 36” x 48” – 2TLA858002R6800

Safety Relay

(1)USR10 – 2TLA010070R0000 or (1)USR10P – 2TLA010070R0001 or (1)USR22 – 2TLA010070R0400 or (1)USR22P – 2TLA010070R0401

Reset

(1)Smile 11RA – 2TLA030053R0000

(1)M12-C101 – 2TLA020056R1000

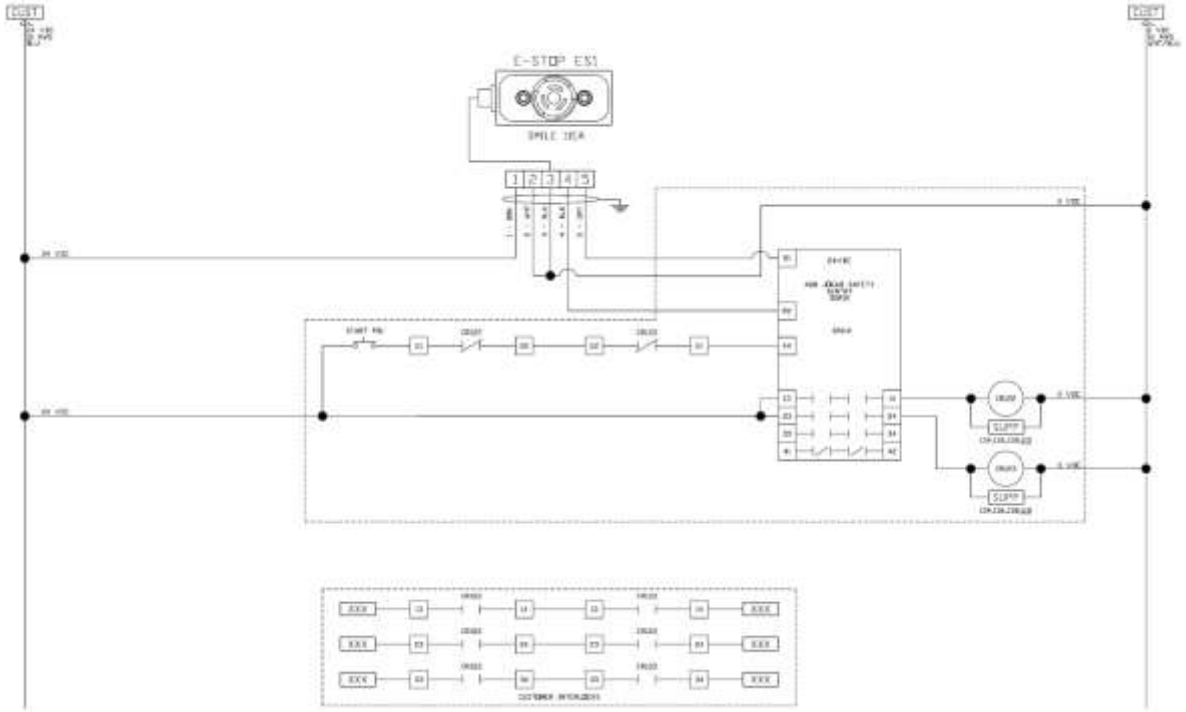
Contactors

(2)AFS09Z-30-22-30 – for shutting down exit and entry conveyors.

Wiring Examples for Sentry Safety Relays

Emergency Stops(Wiring)

Electrical Wiring to BSR10



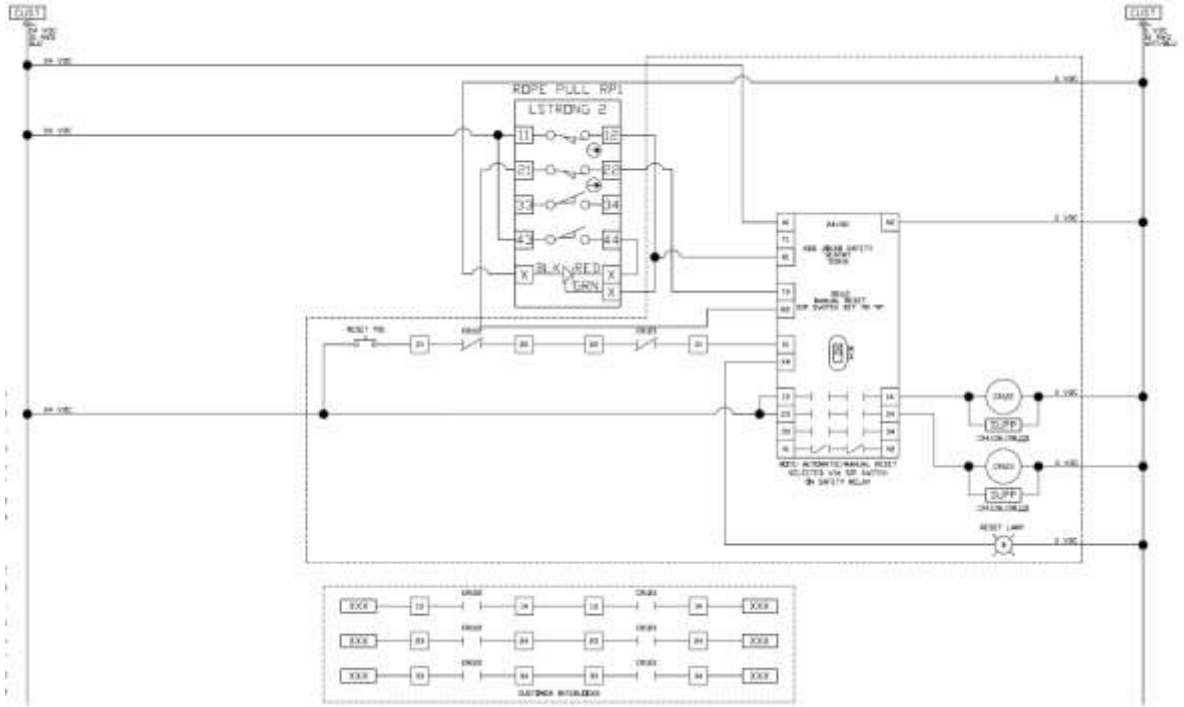
Device (ex. Smile 11EA)

Notes

With the BSR10/BSR11 if there is a short between input channels the power supply will short out. If a monitored reset is needed, then use a SSR10.

Rope Pulls(Wiring)

Electrical Wiring to SSR10



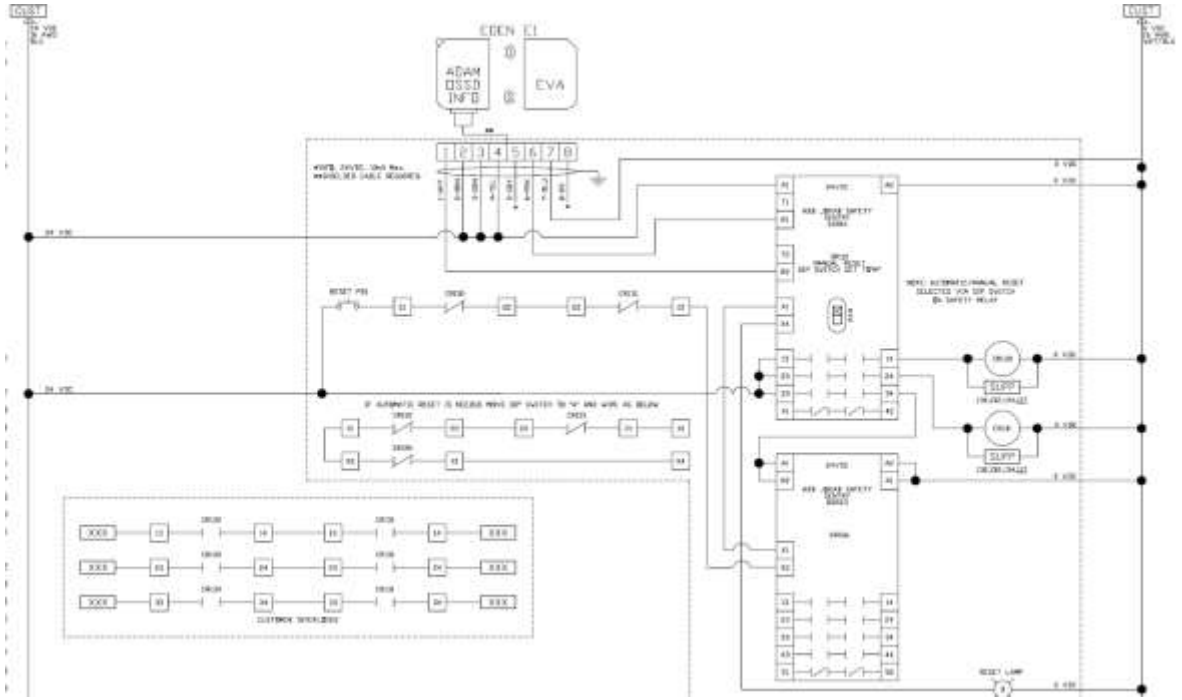
Device (ex. Linestrong 3R)

Notes

With the SSR10 if there is a short between input channels the safety relay will pick up this and safely turn off its outputs. A monitored reset is incorporated into the SSR10 to pick up a stuck reset button.

Expansion of safe outputs (Wiring)

Electrical Wiring from a SSR10



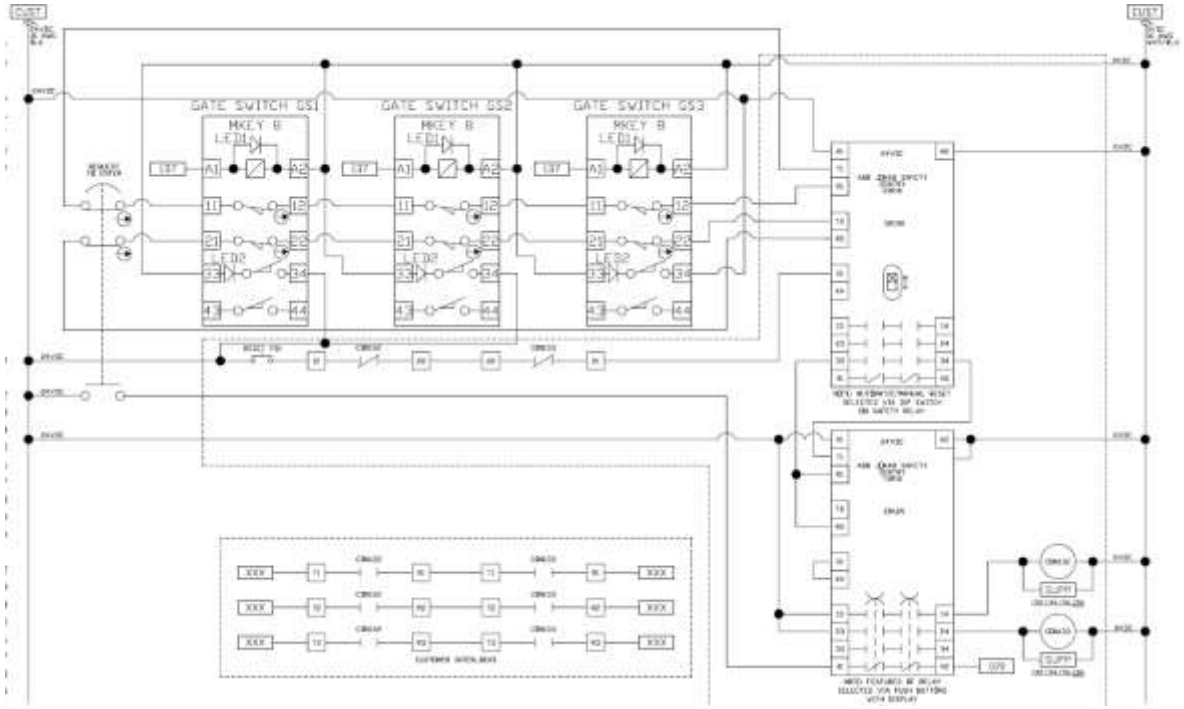
Device (ex. BSR10, BSR11, BSR23)

Notes

If BSR23 is in the same panel as the safety relay it can be driven single channel. The main safety relay must monitor the BSR23 for failure. Using a BSR10 or BSR11 this is not needed as these are self monitoring.

Time Delay(Wiring)

Electrical Wiring to a SSR10 and TSR10



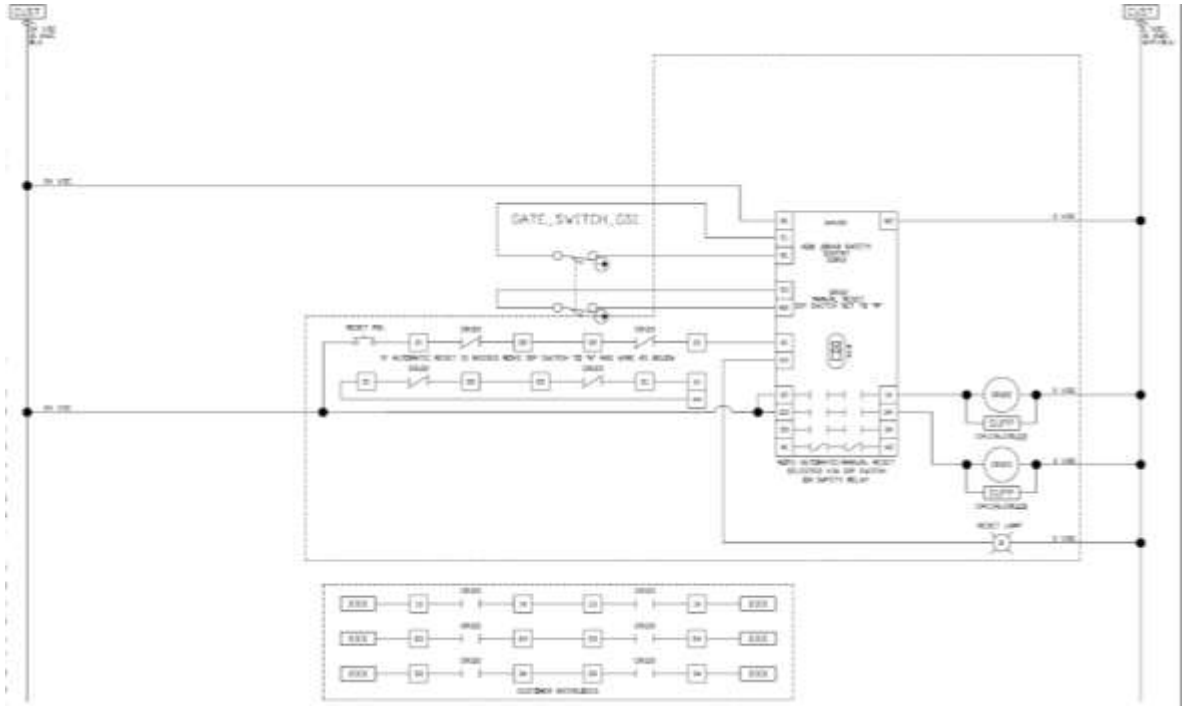
Device (ex. GKEY)

Notes

A time delay is need to keep the door locked to allow machinery to come to a complete stop ex. Saw blade. Typically, a main safety relay is used that drive a timed delay safety relay. A solenoid lock that power to unlock is used for these applications so even if power is lost the door is not unlocked right away. An override with a tool is needed to gain entry.

Door Sensing – Low Risk Applications (Wiring)

Electrical Wiring to SSR10



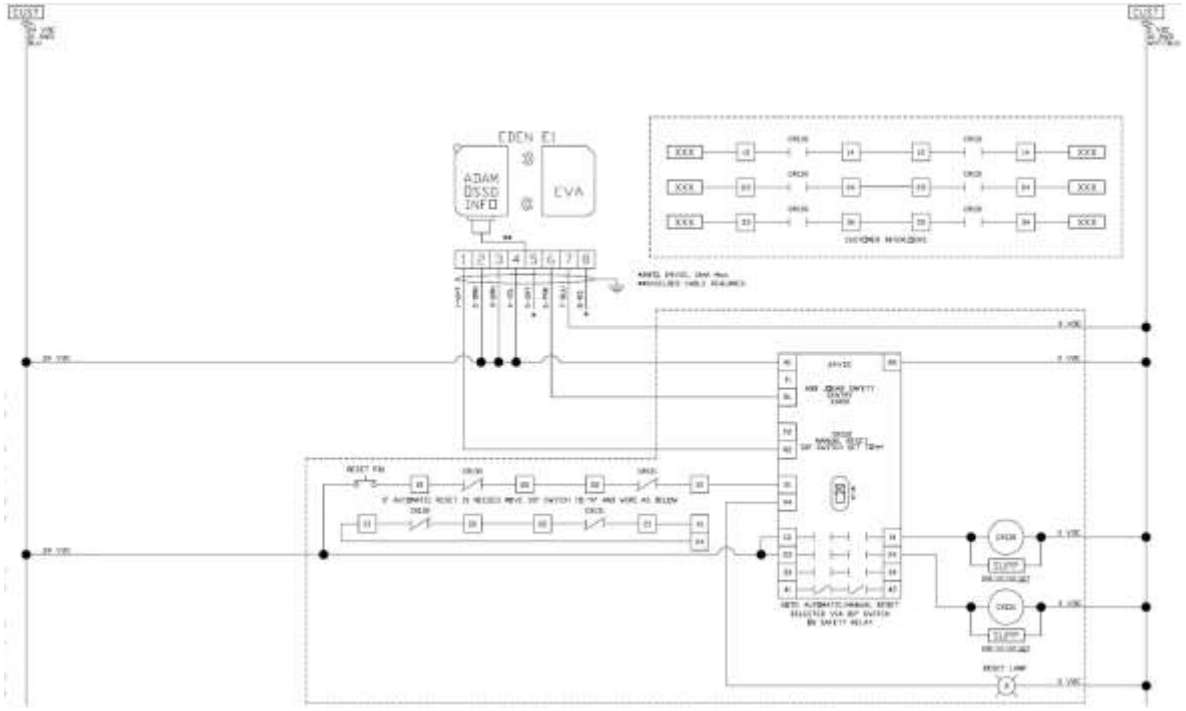
Device (ex. MKEY)

Notes

SSR10 can detect a cross short between input channels. Reset button is monitored so it will detect a stuck reset button.

Door Sensing – High Risk Applications (Wiring)

Electrical Wiring to SSR10



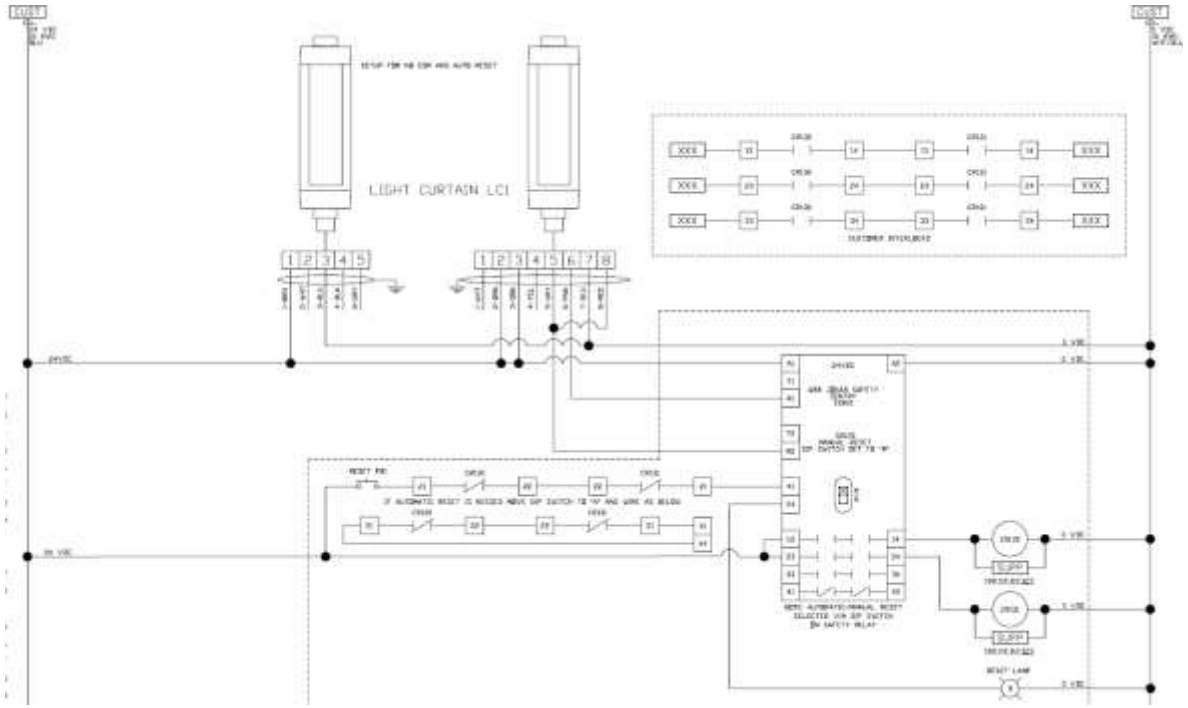
Device (ex. Eden OSSD)

Notes

Eden OSSD will fault out if there is a cross short between OSSD's or other voltage. Reset button is monitored so it will detect a stuck reset button.

Optical Devices (Wiring)

Electrical Wiring to SSR10



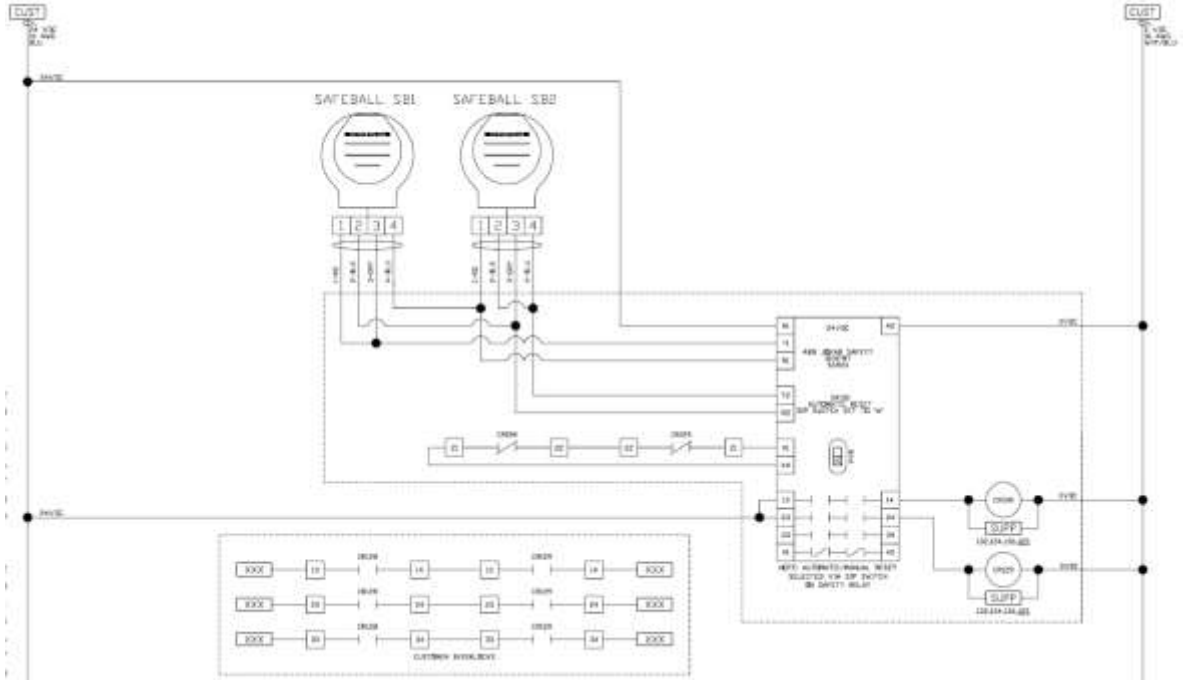
Device (ex. Orion 1 Base)

Notes

Light curtain will fault out if there is a cross short between OSSD's or other voltage. Reset button is monitored so it will detect a stuck reset button.

Two Hand Control (Wiring)

Electrical Wiring to SSR20



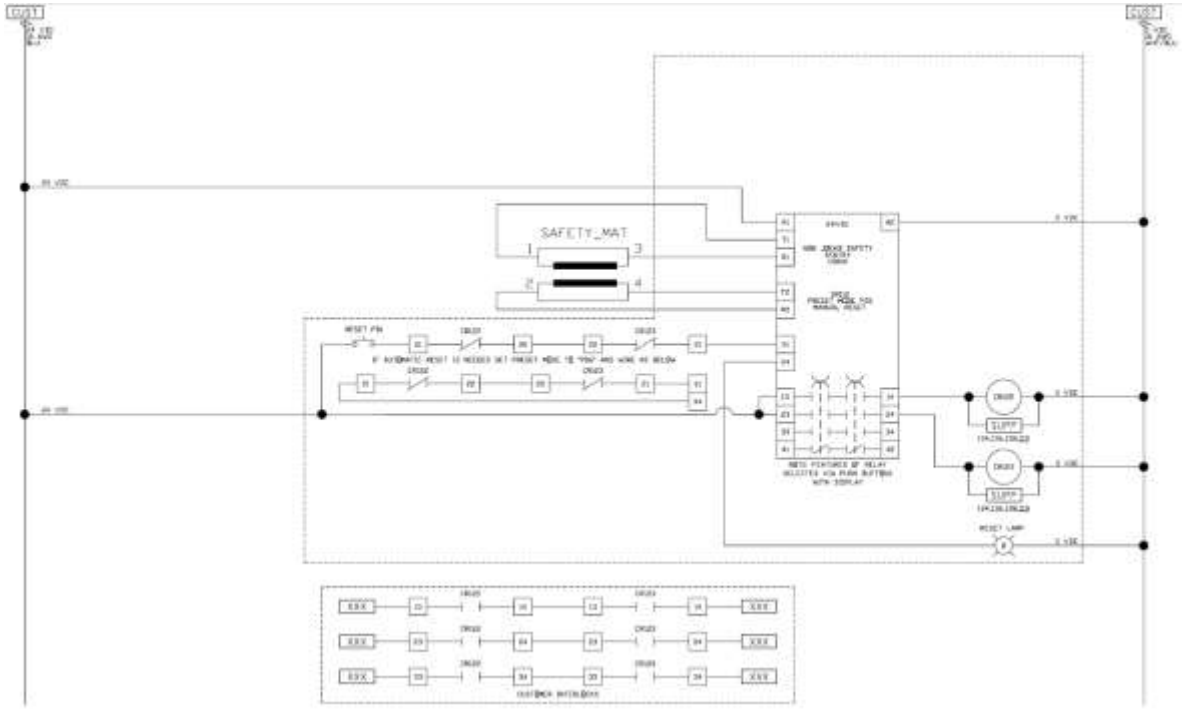
Device (ex. Safeball)

Notes

Two hand control required 2 push buttons or device with 1NO + 1NC contact on each. They are wired into an approved two hand control safety relay which both inputs have to be made within .5s in or to energize the outputs.

Pressure Sensitive Devices(Wiring)

Electrical Wiring to USR10



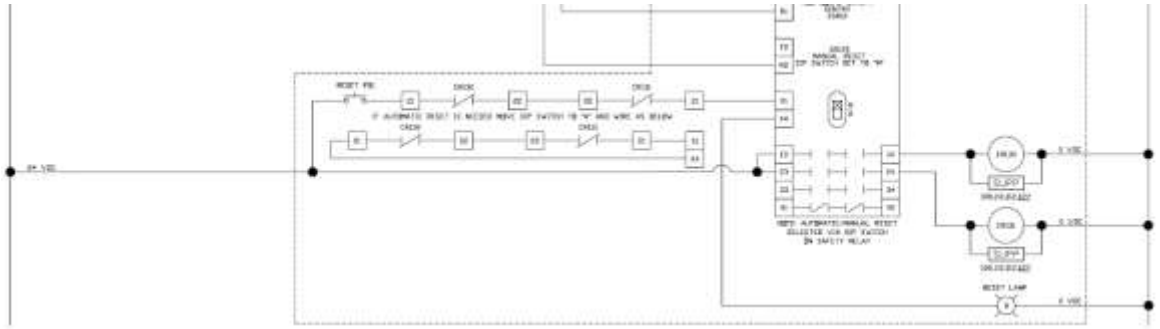
Device (ex. Safety Mat, Safety Edge or Bumper)

Notes

Pressure Sensitive Devices work a little differently than traditional dual channel devices(estop, gate switch). They do both send a signal to each input on a safety relay but with a pressure sensitive device when “pressed” your 2 channels short together. With a traditional dual channel device, they remove the signal to your inputs. USR22 can also be used with safety mats.

Output connection to Contactors/Control Relays (Wiring)

Electrical Wiring to Sentry Safety Relay



Device (ex. AFS Contactors)

Notes

If contactors/control relays are in the same panel as the safety relay they can be driven single channel. The safety relay monitors the contactors/control relays for failure by wiring a NC contact in series from each device to the reset circuit.

Vital 1 Controller

Application overview

Tina

Emergency Stops, Gate Switches, Optical Devices and Pressure Sensitive Devices (with use of Tina)

DYNlink
devices

Built in DYNlink Devices (ex. Eden DYN, Smile 11EA Tina, Inca 1 Tina)

Covers both

Vital
safety controller

Vital 1 Controller

Application Overview (Click images to select application)

Door Sensing – High Risk Applications

Door Sensing – High Risk Applications – Reduced Wiring

Multiple Safety Devices with the same Stop Condition

[Click here for the latest release of the Easy Reference]

Component Wiring Selector to Vital 1 Controller

(Click images to select component)

Eden DYN

Smile 11EA Tina

Inca 1 Tina

Orion 1 Base with Tina 10C

Tina 8A

Magne 4 DYN

Multiple Devices in Series

Contactors/Control Relays

Application Selector | Component Selector 1 | Overview Page

Door Sensing – High Risk Applications

Application Notes

Overview

A robot cell has 4 doors that need to be guarded. Need safety level to be the highest level of safety.

Additional Notes

All doors are conventional door(ex. man doors) so a manual reset is needed.

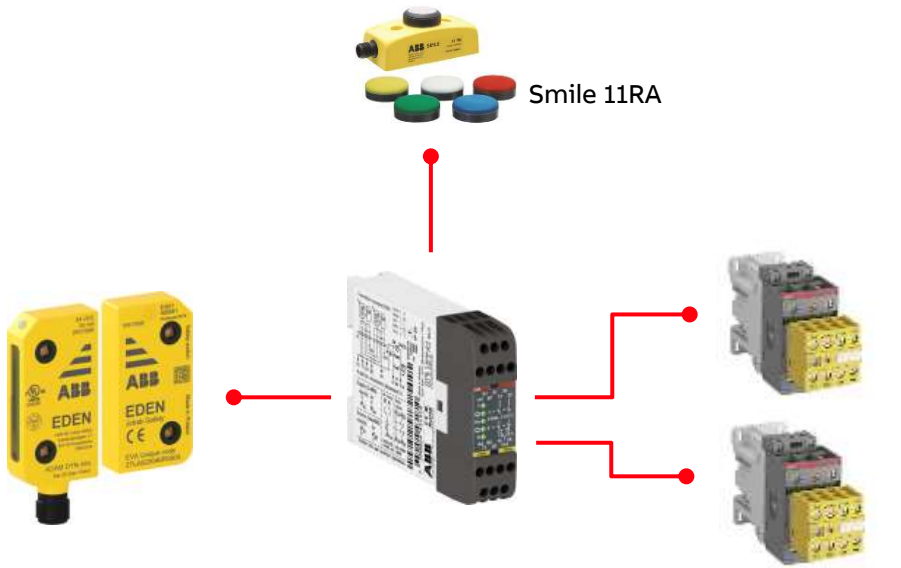
Individual status for each device is needed to be displayed on an HMI.

10m cables needed.

Note: Picture is not of application on this page but only of a similar machine

Door Sensing – High Risk Applications

ABB Jokab Safety Solution



Door Sensing

(4)Adam DYN Info – 2TLA020051R5100

(4)Eva General Code – 2TLA020046R0800

(4)M12-C101 – 2TLA020056R4000

Safety Controller

(1)Vital 1 – 2TLA020052R1000

Reset

(1)Smile 11RA – 2TLA030053R0000

(1)M12-C101 – 2TLA020056R1000

Contactors

(2)AFS09Z-30-22-30 – for shutting down exit and entry conveyors.

Door Sensing – High Risk Applications – Reduced Wiring

Application Notes

Overview

Machine has 7 doors that need to be guarded located on all 4 sides.

Additional Notes

Minimum cabling needed back to the main panel as wiring form main panel to machine is routed through conduit which goes up to the ceiling

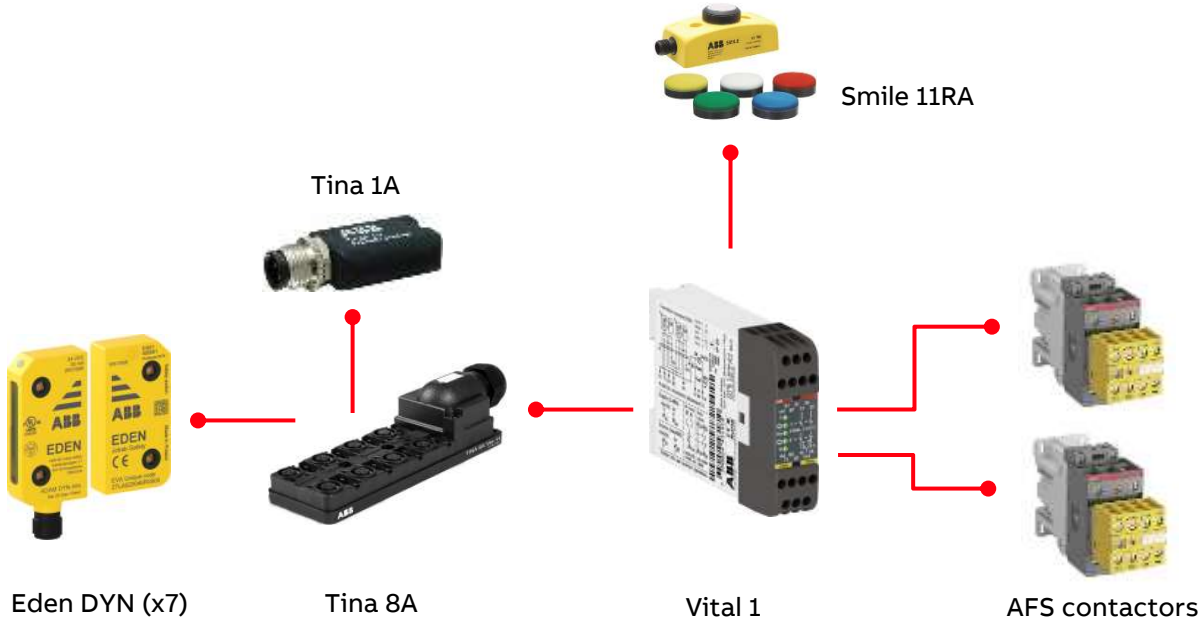
Individual status for each device is needed to be displayed on an HMI.

6m cables needed.

Note: Picture is not of application on this page but only of a similar machine

Door Sensing – High Risk Applications – Reduced Wiring

ABB Jokab Safety Solution



Door Sensing

(7)Adam DYN Info – 2TLA020051R5100

(7)Eva General Code – 2TLA020046R0800

(7)M12-C612 – 2TLA020056R2200

(1)Tina 1A – 2TLA020054R0000

(1)Tina 8A- 2TLA020054R0500

(1)C13 100m spool – 2TLA020057R2010

Safety Controller

(1)Vital 1 – 2TLA020052R1000

Reset

(1)Smile 11RA – 2TLA030053R0000

(1)M12-C101 – 2TLA020056R1000

Contactors

(2)AFS09Z-30-22-30 – for shutting down motor

Multiple Safety Devices with the same Stop Condition

Application Notes

Overview

Machine has a single door, 2 estop location and a opening in the guarding that operators reach in an out to grab parts.

Additional Notes

The single door is a man door.

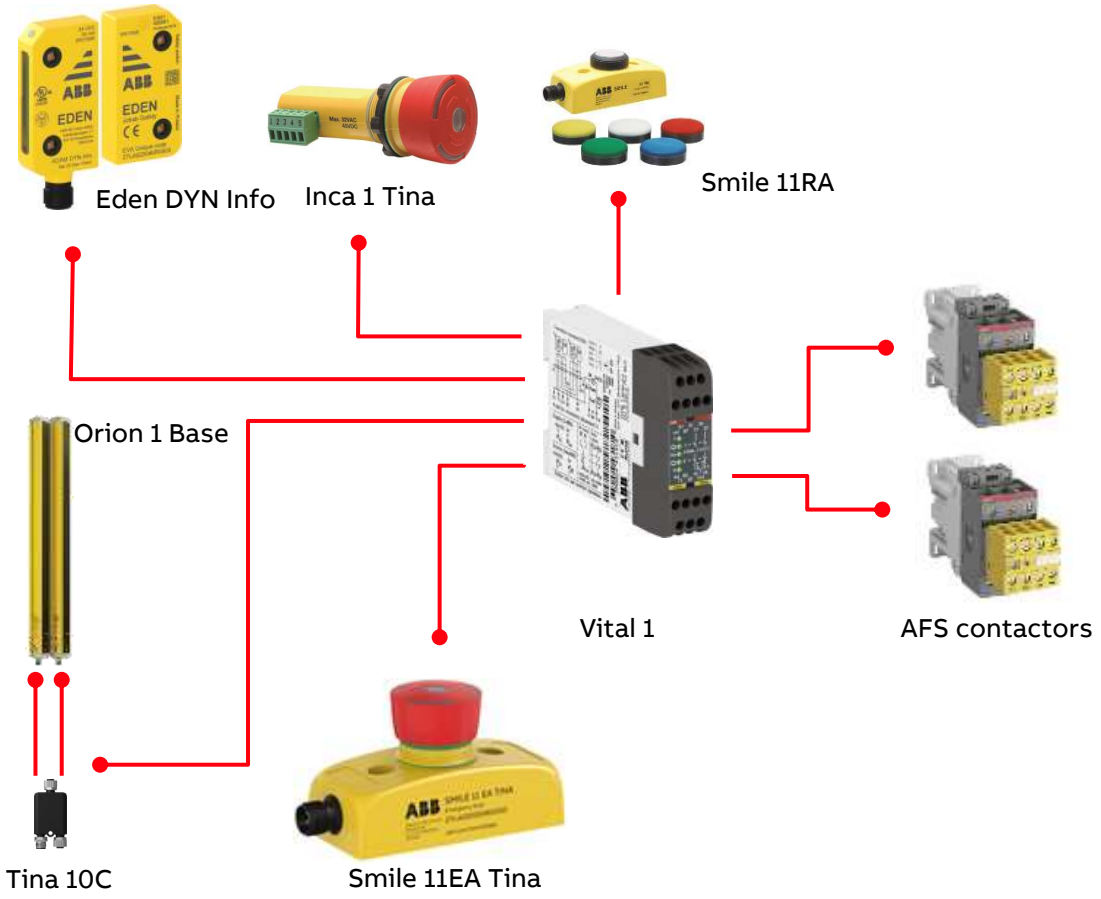
Estops are located in an operator station and 1 remotely.

For the opening in the fencing to guard a light curtain is needed. The opening is about 600mm high. Hazard is far enough away that hand resolution can be used.

Note: Picture is not of application on this page but only of a similar machine

Multiple Safety Devices with the same Stop Condition

ABB Jokab Safety Solution



Door Sensing

(1)Adam DYN Info – 2TLA020051R5100

(1)Eva General Code – 2TLA020046R0800

(1)M12-C101 – 2TLA020056R4000

Emergency Stops

(1)Smile 11EA – 2TLA020051R0000

(1)Inca 1 – 2TLA030054R0100

(1)Legend plate – 2TLA030054R0900

(1)M12-C101 – 2TLA020056R4000

Optical Device

(1)Orion 1-4-30-060-B– 2TLA020302R0300

(1)M12-C101 – 2TLA020056R1000

(1)M12-C103 – 2TLA020056R4000

Safety Controller

(1)Vital 1 – 2TLA020052R1000

Reset

(1)Smile 11RA – 2TLA030053R0000

(1)M12-C101 – 2TLA020056R1000

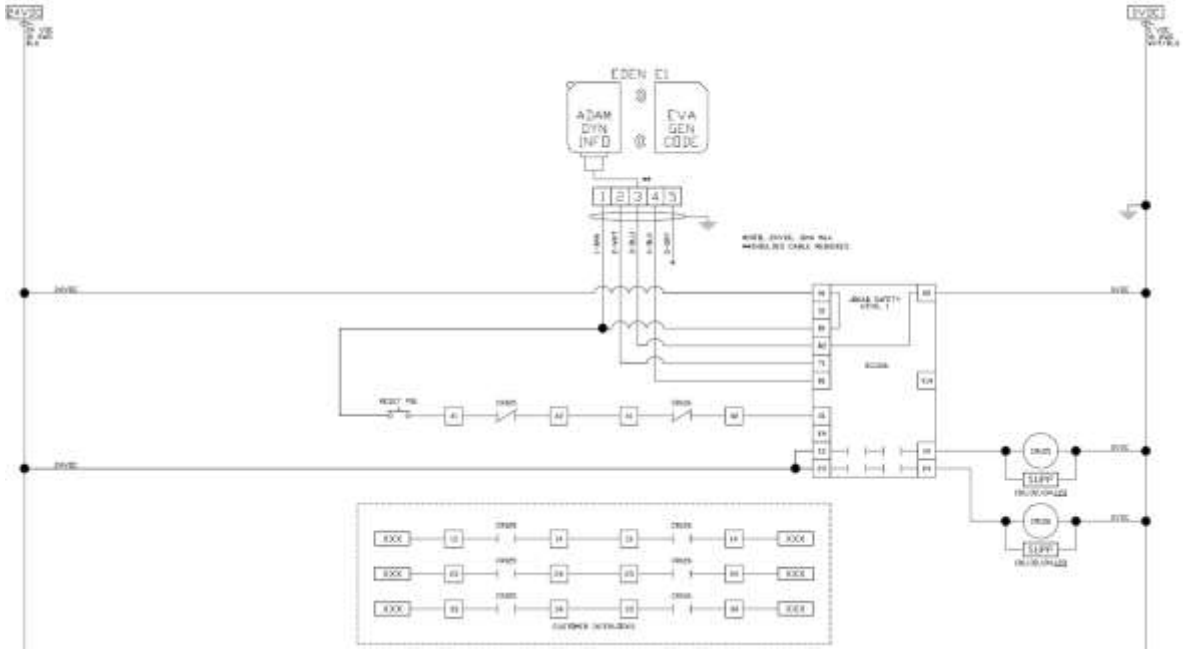
Contactors

(2)AFS09Z-30-22-30 – for shutting down motor

Wiring Examples for Vital 1 Controller

Eden DYN Info (Wiring)

Electrical Wiring to Vital 1



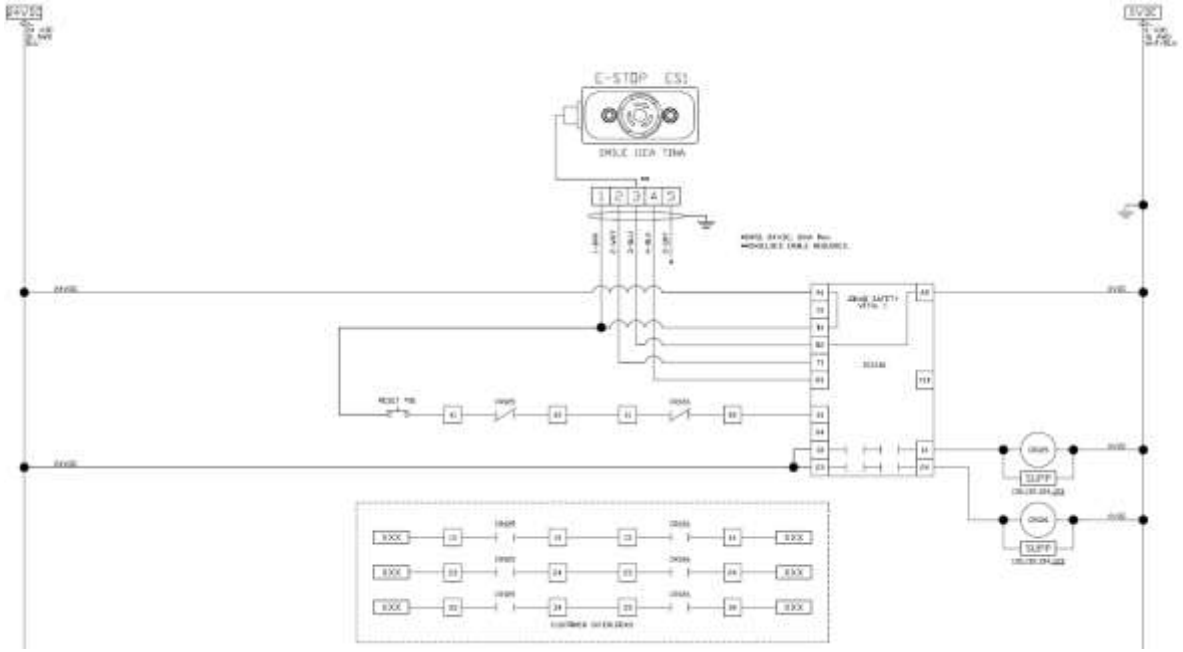
Device (ex. Eden DYN Info)

Notes

The Eden inverts the DYNLINK signal 180 degrees and sends it out. This allows for any short to be detected in the cable.

Smile 11EA Tina (Wiring)

Electrical Wiring to Vital 1



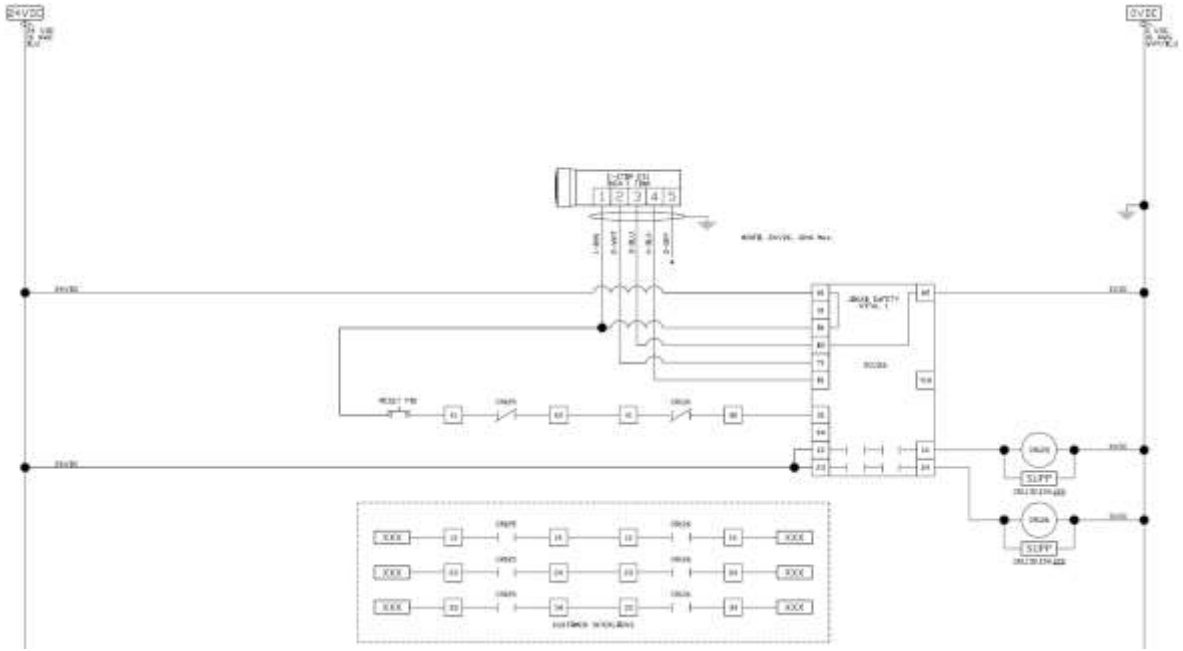
Device (ex. Smile 11EA Tina)

Notes

The Smile 11EA Tina inverts the DYNLINK signal 180 degrees and sends it out. This allows for any short to be detected in the cable.

Inca 1 Tina (Wiring)

Electrical Wiring to Vital 1



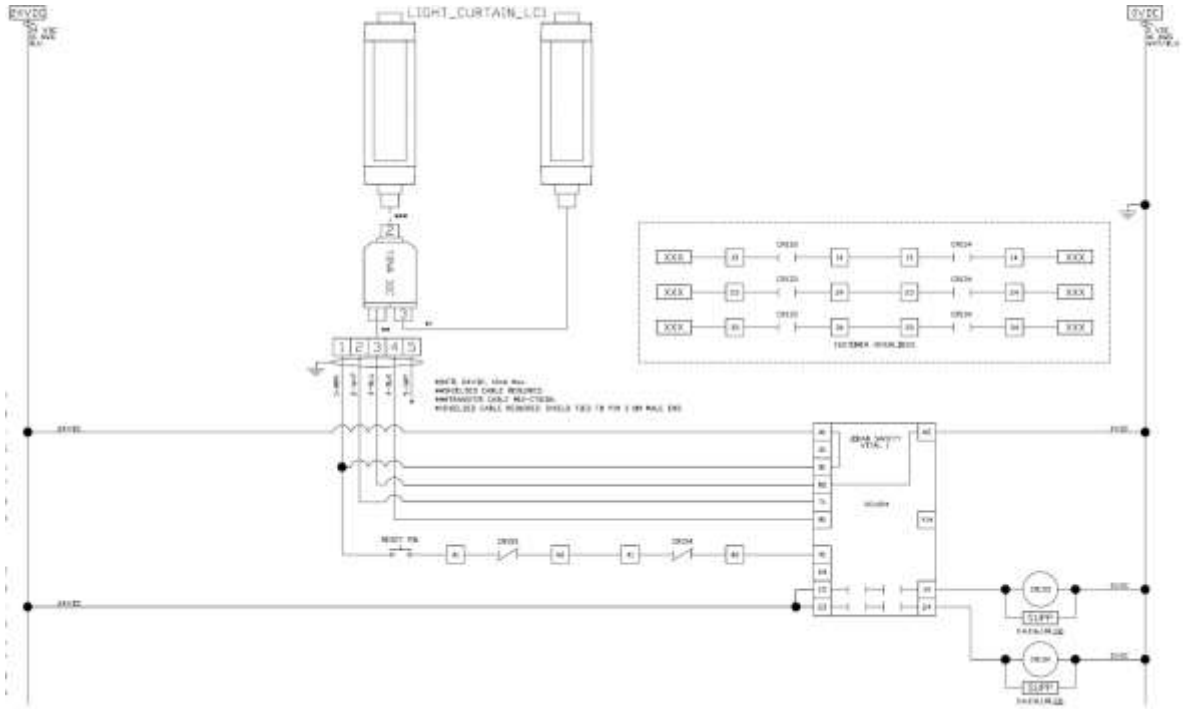
Device (ex. Inca 1 Tina)

Notes

The Inca 1 Tina inverts the DYNLINK signal 180 degrees and sends it out. This allows for any short to be detected in the cable.

Orion 1 Base with Tina 10C (Wiring)

Electrical Wiring to Vital 1



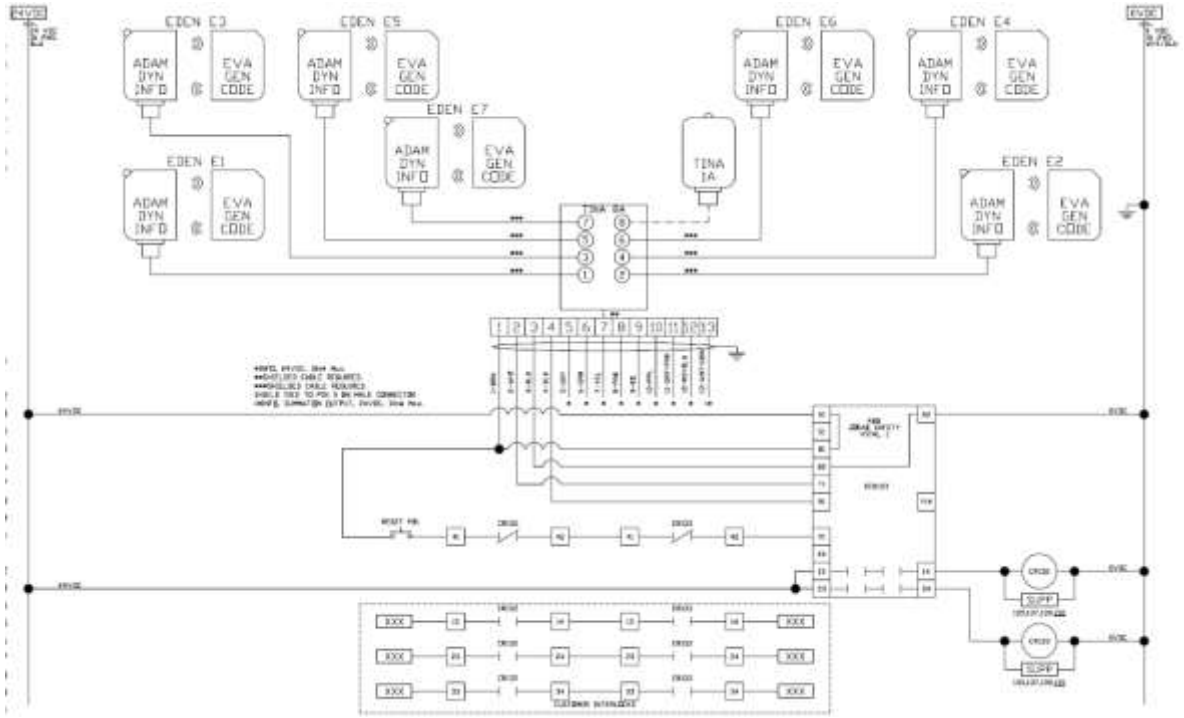
Device

Notes

The Tina 10C inverts the DYNLINK signal 180 degrees and sends it out. This allows for any short to be detected in the cable. Transfer cable M12-CT01BA is needed to put the light curtain into auto reset with no EDM.

Tina 8A (Wiring)

Electrical Wiring to Vital 1



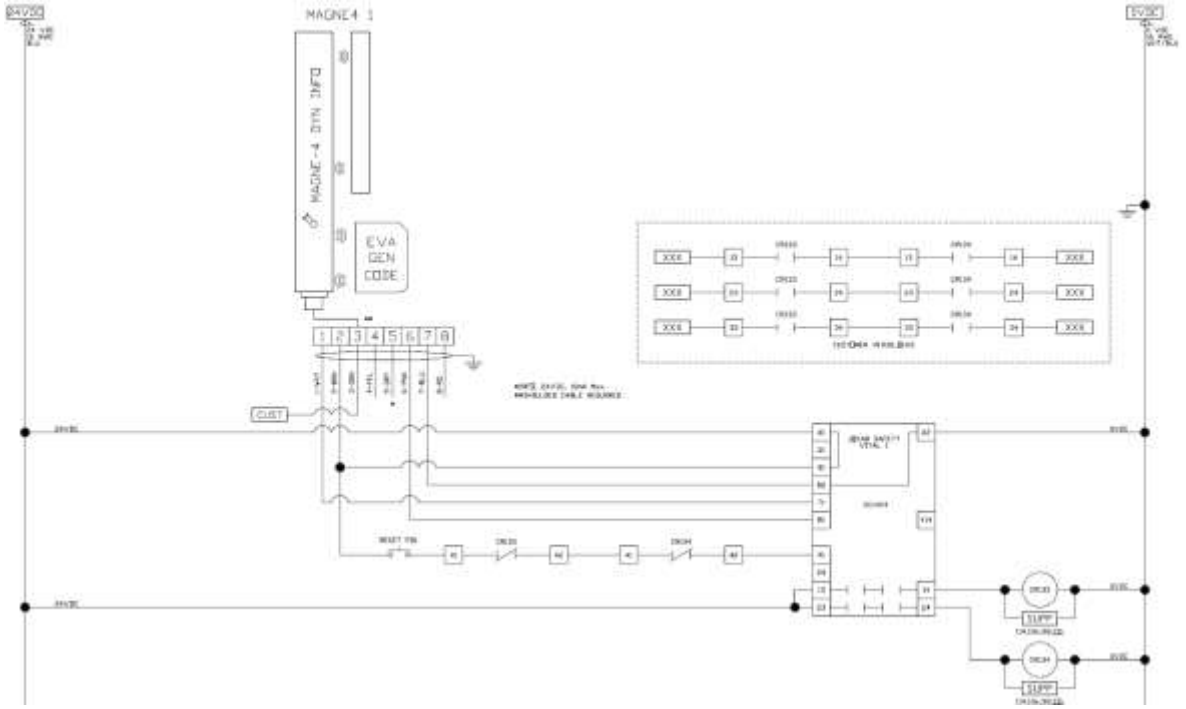
Device (ex. Eden DYN Info, Tina 8A)

Notes

The Eden inverts the DYNLINK signal 180 degrees and sends it out. This allows for any short to be detected in the cable. Tina 8A allows for a single cable back to the main panel with both safety and information in a single cable. There is a “Tina” built into the Tina 8A making the signal back an “odd” number of devices.

Magne DYN Info (Wiring)

Electrical Wiring to Vital 1



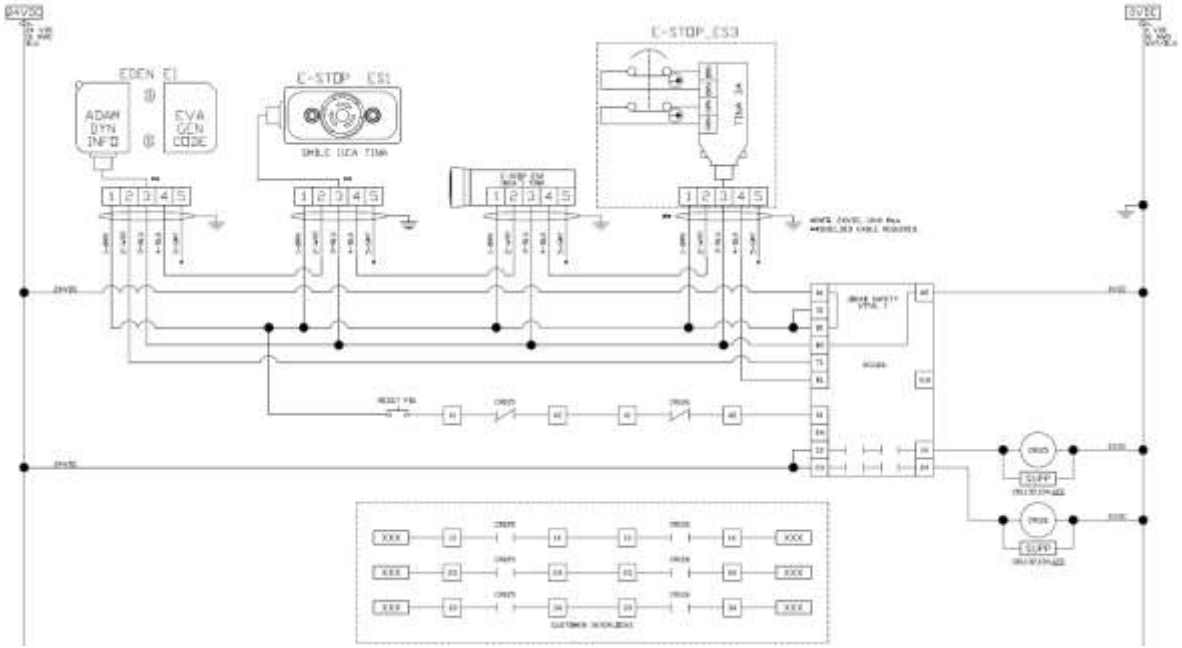
Device

Notes

The Magne inverts the DYNLINK signal 180 degrees and sends it out. This allows for any short to be detected in the cable.

Multiple Safety Devices with the same Stop Condition (Wiring)

Electrical Wiring to Vital 1



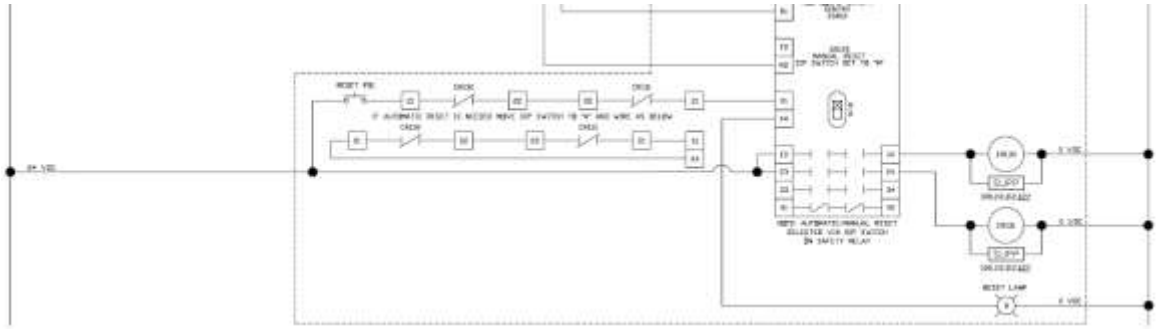
Device (ex. Eden DYN Info, Smile 11EA Tina, Tina 3A)

Notes

The Eden or Tina devices inverts the DYNLINK signal 180 degrees and sends it out. This allows for any short to be detected in the cable.

Output connection to Contactors/Control Relays (Wiring)

Electrical Wiring to Sentry Safety Relay



Device (ex. AFS Contactors)

Notes

If contactors/control relays are in the same panel as the safety relay they can be driven single channel. The safety relay monitors the contactors/control relays for failure by wiring a NC contact in series from each device to the reset circuit.

Pluto Programmable Safety Controller

Application overview

S20/S46
stand alone application

No “safety bus”

B20/B46/B22
system applications

With “safety bus”

D20/D45
advanced applications

With “safety bus”, safe analog input and high-speed counter inputs

Emergency stops, gate switches, sensors, optical devices, two-hand devices, pressure sensitive devices, timing (ex delay on/off/pulse, timed reset and bypass), DYNlink capable devices (Ex. Eden DYN, Tina 10C etc…)

Pluto Programmable Safety Controller

Application Overview (Click images to select application)

Robot Cell

Food and Beverage

Wrapping Machine

Material Handling

Click here for the latest release of the Easy Reference

Pluto Programmable Safety Controller

Application Overview (Click images to select application)

Press

Conveyors

Click here for the latest release of the Easy Reference

Component Programming and Wiring Selector

(Click images to select component)

EStrong Z/Linestrong 2Z

MKEY

Orion 1 Base

Tina 2A/B

Tina 3A

Tina 7A

Inca 1 Tina

Smile 11EA Tina

Component Programming and Wiring Selector

(Click images to select component)

Eden DYN

GKEY

JSHD4

HD5

Statusbus

Magne 4 DYN

Tina 6A

Smile 11RB

Application Selector | Component Selector 1 | Component Selector 2 | Component Selector 3 | Overview Page

Component Programming and Wiring Selector

(Click images to select component)

Smile 41 EWWWP

Safeball

BSR23

BSR11

AFS Contactors

Robot Cells

Application Notes

Overview

Need to guard a robot cell utilizing an ABB robot with IRC5 controller. There are 2 doors and 2 operator stations.

Additional Notes

Operators interacts with both stations.

Doors need to be processed locked.

Additional pendant needed for another person to enter in teach mode.

Communication (non-safe) needed between safety system and robot controller.

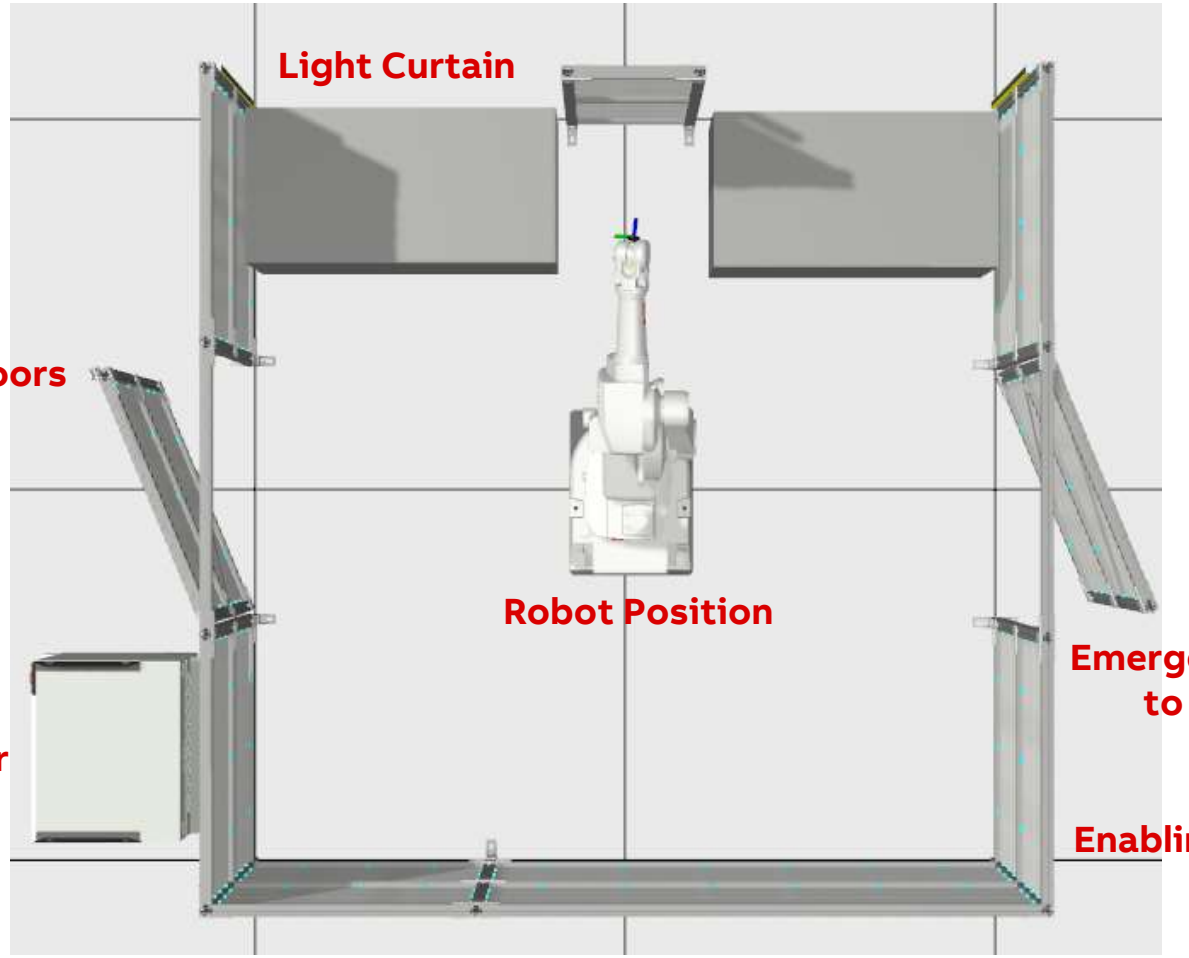
Emergency stops needed.

Note: Picture is not of application on this page but only of a similar machine

Robot Cells

ABB Jokab Safety Solution

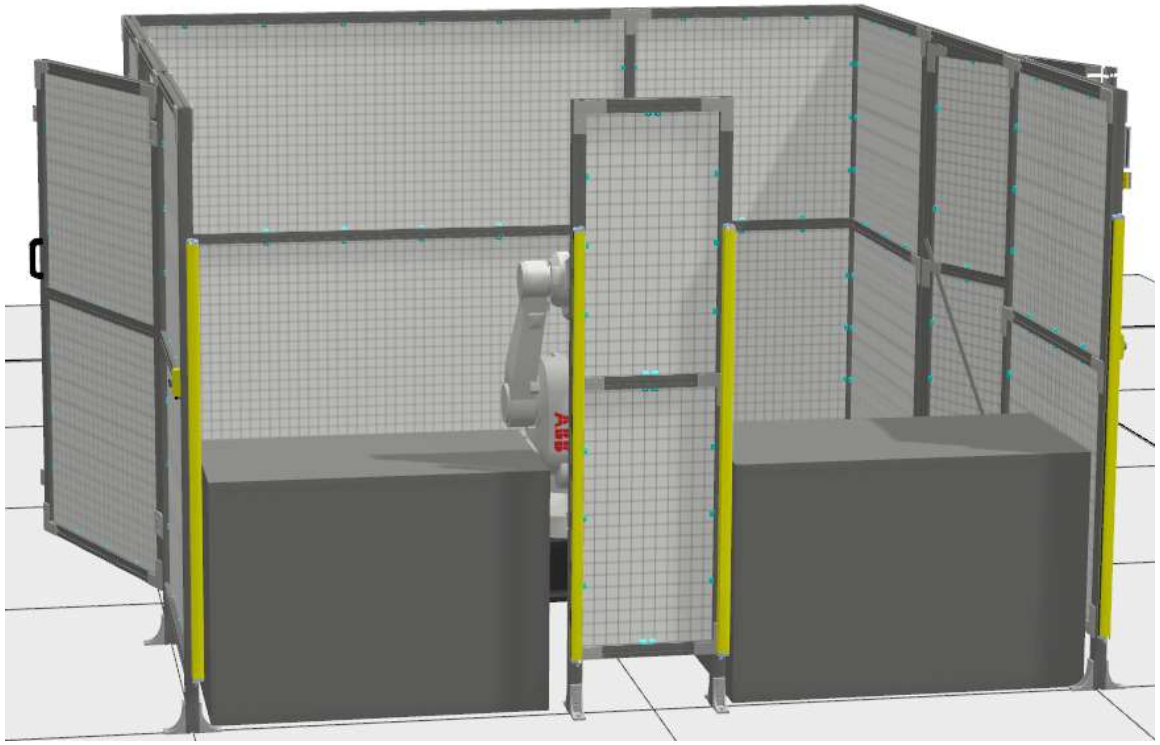
Top View of Cell



Robot Cells

ABB Jokab Safety Solution

Front View

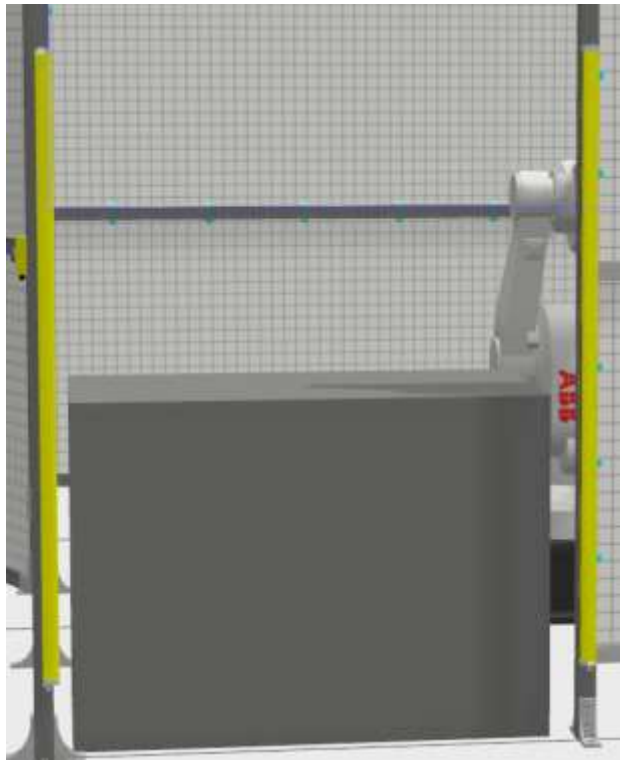


Side View

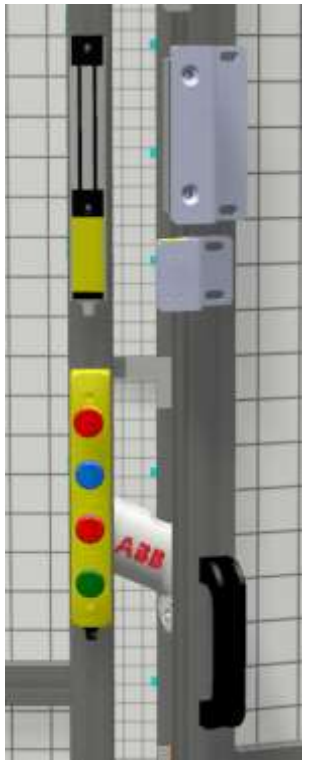
Robot Cells

ABB Jokab Safety Solution

Orion Light Curtain for entry/exit



Magne 4 and Smile 41 on door



Robot Cells

ABB Jokab Safety Solution

Doors (process lock)

(2)Magne 4 DYN Info – 2TLA042022R3400

(2)Anchor Plate 32B – 2TLA042023R0400

(2)Eva General Code – 2TLA020046R0800

(2)M12-C103 – 2TLA020056R4000 – 10m cable for Magne 4

(2)JSMD21B – 2TLA042023R0500 – bracket for anchor plate

(2)JSMD24 – 2TLA042023R0300 – bracket for Eva

Light Curtain (where operator interacts, operators can only reach through light curtains they can pass through them, 900mm height covers opening)

(2)Orion 1-4-30-090-B – 2TLA022302R0500

(2)M12-C101 – 2TLA020056R1000– 10m cable for transmitter

(2)M12-C103 – 2TLA020056R4000– 10m cable for receiver

Enabling Device (for additional person when robot is in teach mode)

(1)JSHD4-2 – 2TLA020006R2200

(1)AD Bottom – 2TLA020005R1300

(1)M12-C103 – 2TLA020056R4000

Emergency Stops, Request to Enter and Reset (Smile 41's by doors for emergency stop, request to enter and reset, Smile 11RB by light curtains for resetting)

(2)Smile 41 – 2TLA030057R0100

(2)M12-C103 – 2TLA020056R4000– 10m cable for Smile 41

(2)Smile 11RB – 2TLA030053R0100

(2)M12-C101 – 2TLA020056R1000 – 10m cable for Smile 11RB

Robot Position (to bypass each area operator interacts with)

(2)Adam DYN Info – 2TLA020051R5100

(1)Eva General Code – 2TLA020046R0800

(2)M12-C101 – 2TLA020056R1000 – 10m cable for Adam DYN Info

Safety Controller

(1)Pluto B20 v2 – 2TLA020070R4600

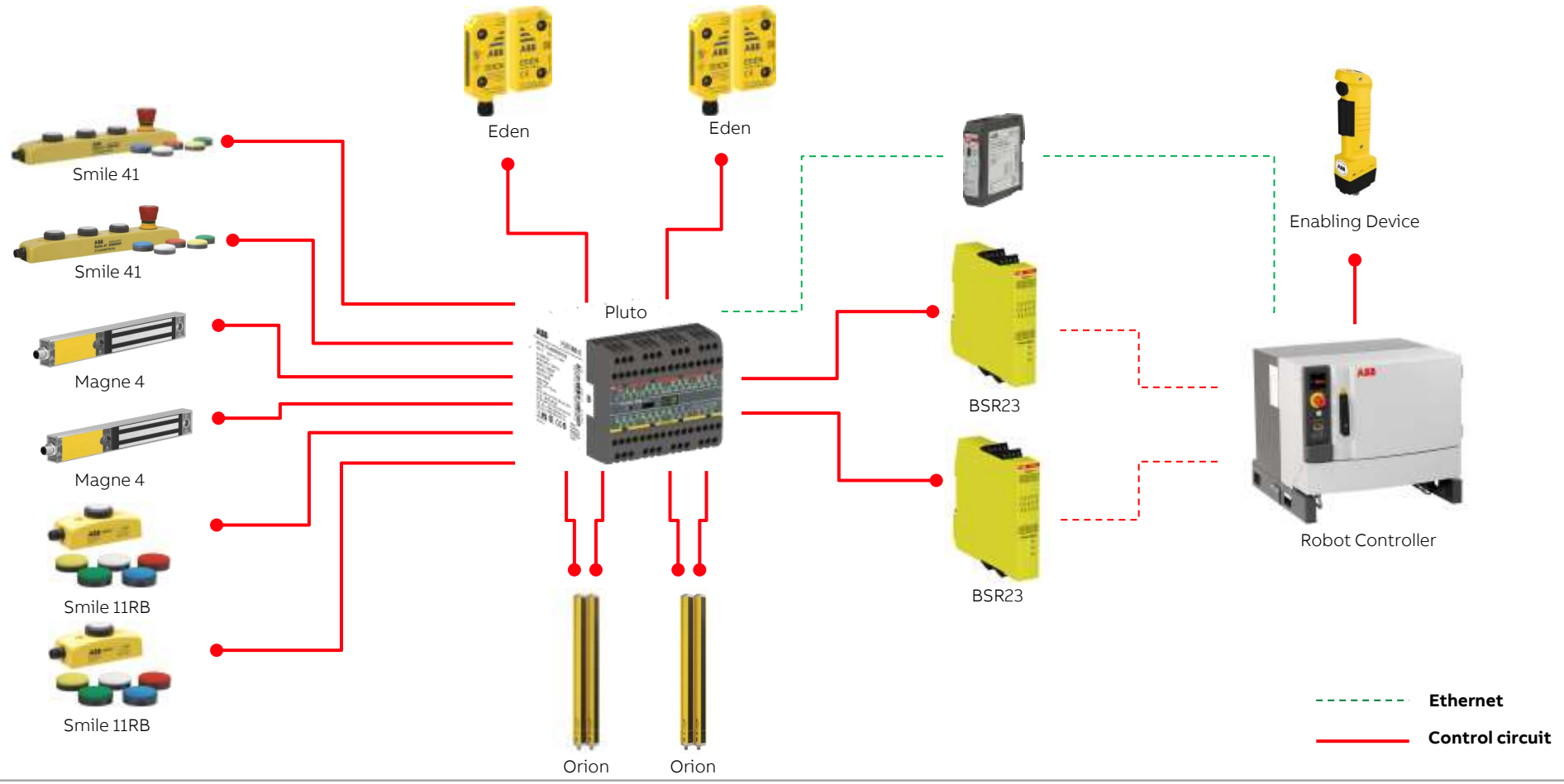
(1)Gate E1P – 2TLA020071R9000

(2)BSR23 – 2TLA010041R0600

(1)Programming Cable – 2TLA020070R5800

Robot Cell

ABB Jokab Safety Solution



Food and Beverage

Application Notes

Overview

Need to safe-guard a bottle filling machine.

Additional Notes

Devices used need to be wash down rated.

Need to be able to bypass light curtain to safely make adjustments

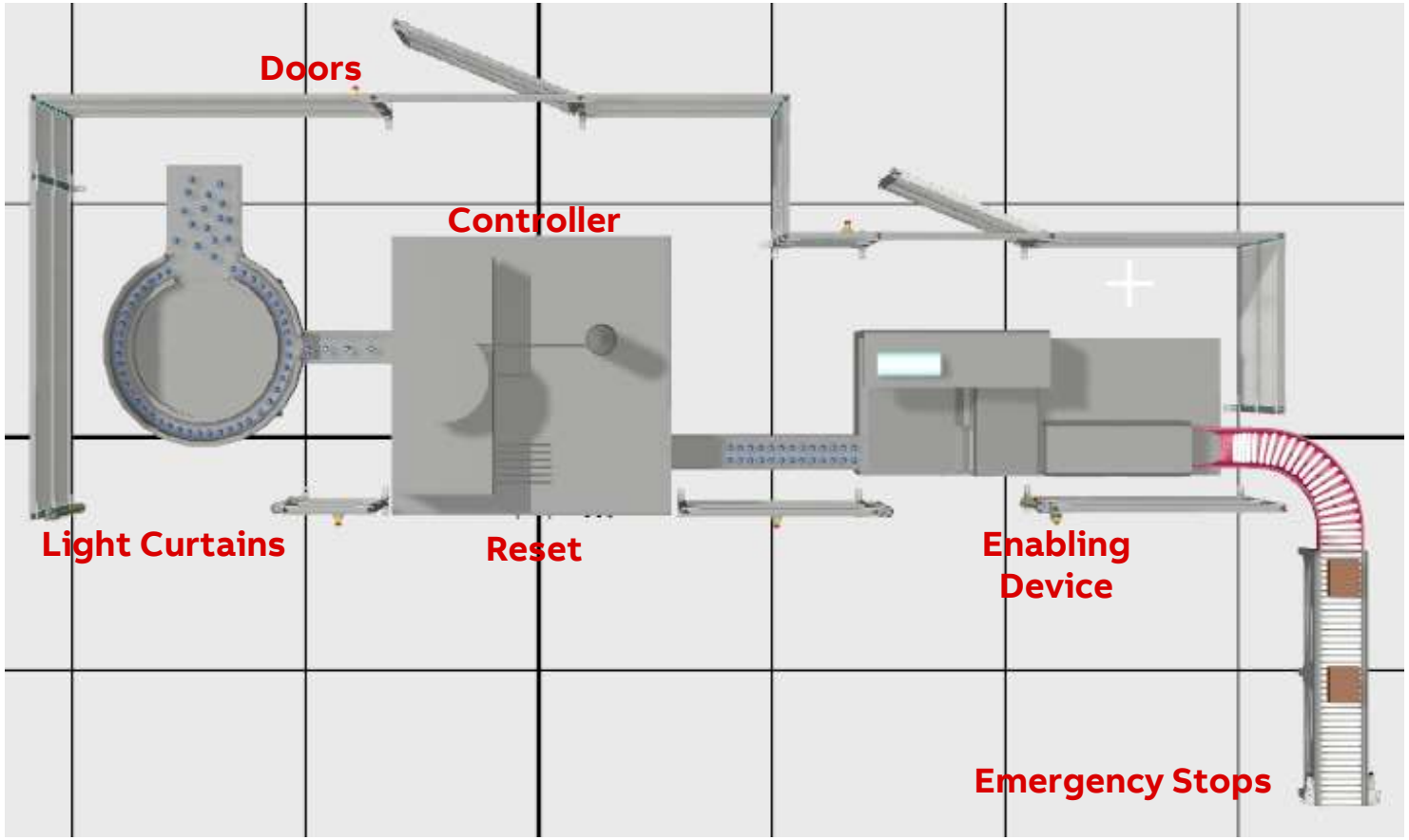
Conveyor needs be guarded.

Note: Picture is not of application on this page but only of a similar machine.

Food and Beverage

ABB Jokab Safety Solution

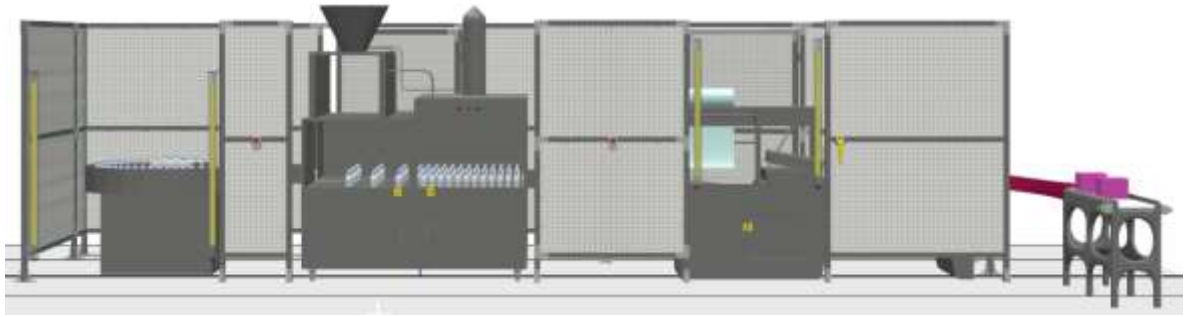
Top View of Cell



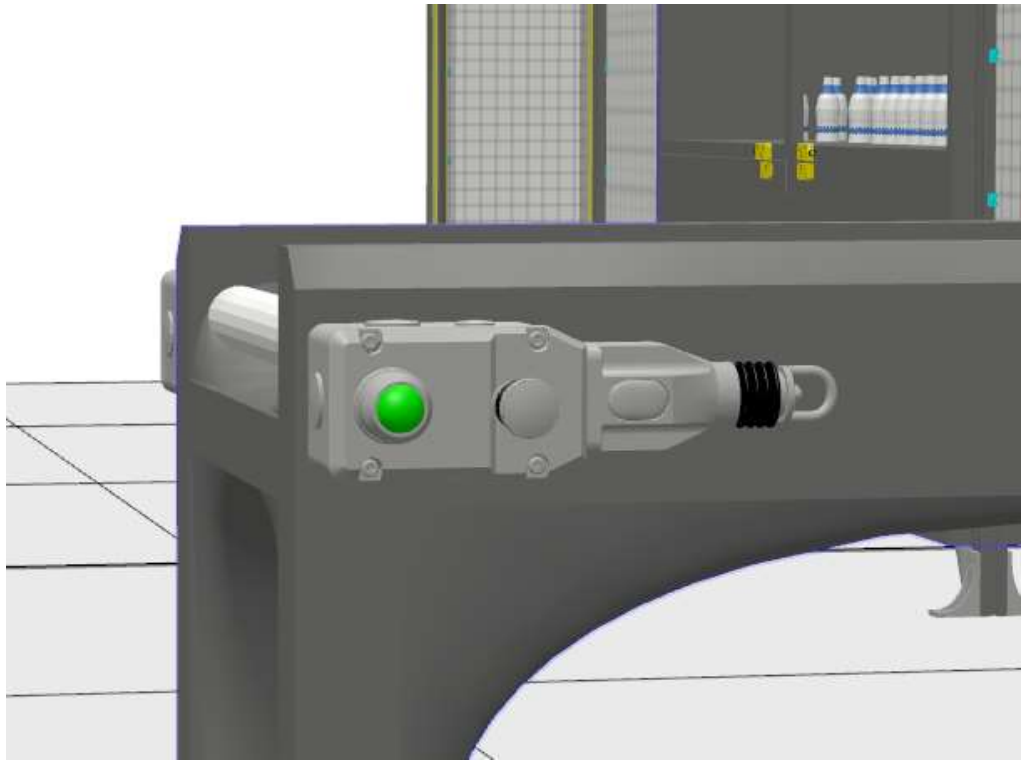
Food and Beverage

ABB Jokab Safety Solution

Side View



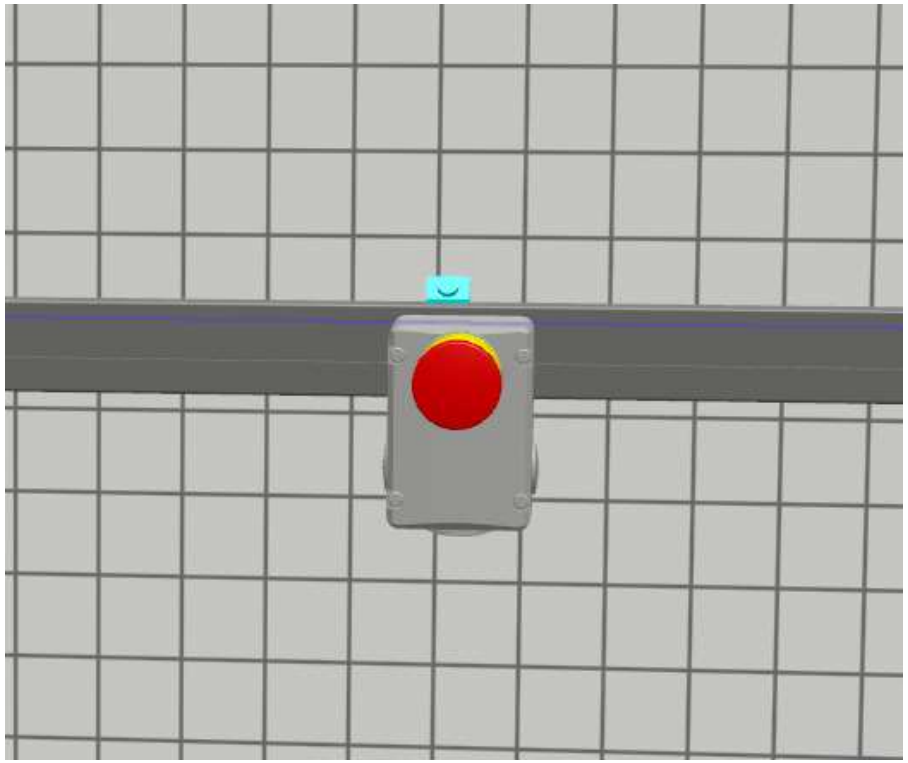
Linestrong 2Z Rope Pull



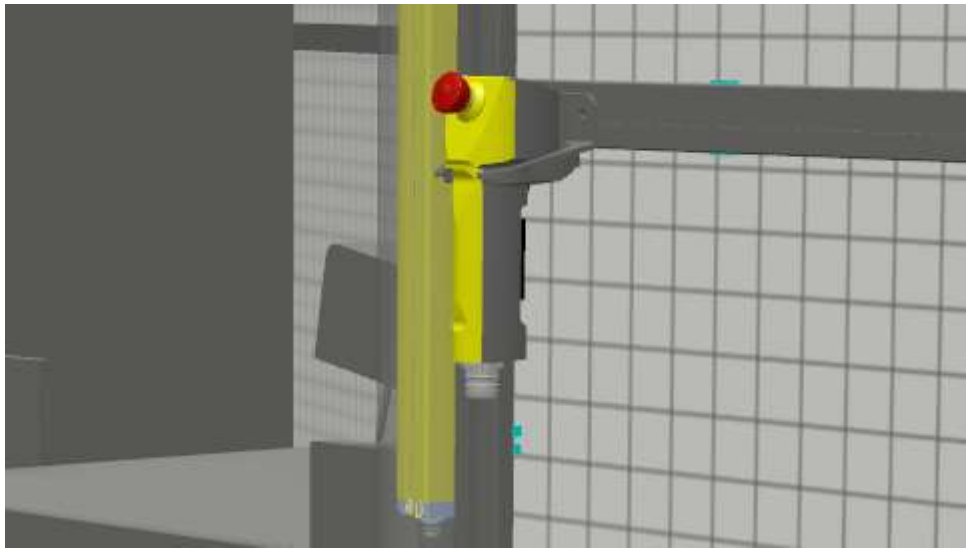
Food and Beverage

ABB Jokab Safety Solution

Estrong Z



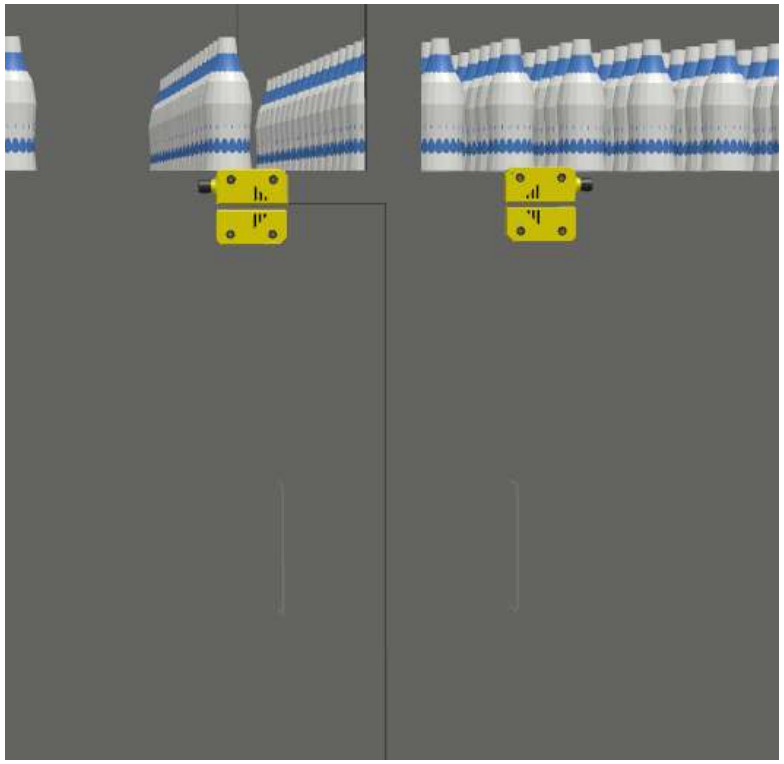
HD5 Enabling Device with Holster



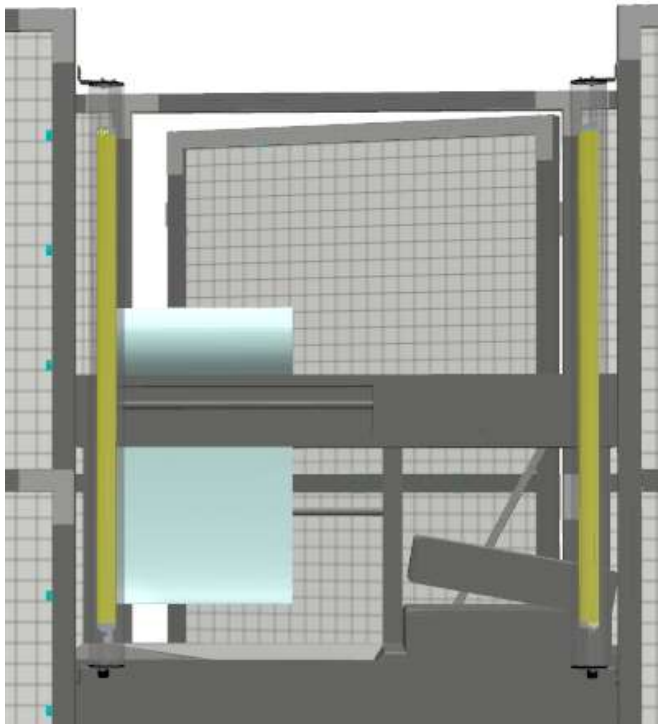
Food and Beverage

ABB Jokab Safety Solution

Eden on Door



Orion Light Curtain in WET tube



Food and Beverage

ABB Jokab Safety Solution

Doors

(5)Adam DYN Info – 2TLA020051R5100

(5)Eva General Code – 2TLA020046R0800

(5)M12-C101 – 2TLA020056R1000 – 10m cable for Adam DYN Info

Emergency Stops and Reset

(1)Compact Range Blue Illuminated push button with 1NO contact - CP1-10L-11

(1)Compact Range Green Illuminated push button with 1NO contact - CP1-10G-11

(1)Compact Range Red Illuminated push button with 1NO contact - CP1-10R-11

(2)Linestrong 2Z – 2TLA050202R1322

(3)Estrong Z – 2TLA050220R1030

(5)2TLA050040R0001 – ½ NPT cable gland

Enabling Device

(1)HD5-S-111 - 2TLA023001R0100

(1)HD5-M-001 Active Holster - 2TLA920509R0001

Light Curtains

(2)Orion 1-4-30-090-B – 2TLA022302R0500

(2)Orion WET-090 – 2TLA022313R0500

(2)Orion 1-4-30-120-B – 2TLA022302R0700

(2)Orion WET-120 – 2TLA022313R0700

(4)M12-C101 – 2TLA020056R1000– 10m cable for transmitter

(4)M12-C103 – 2TLA020056R1000– 10m cable for receiver

Safety Controller

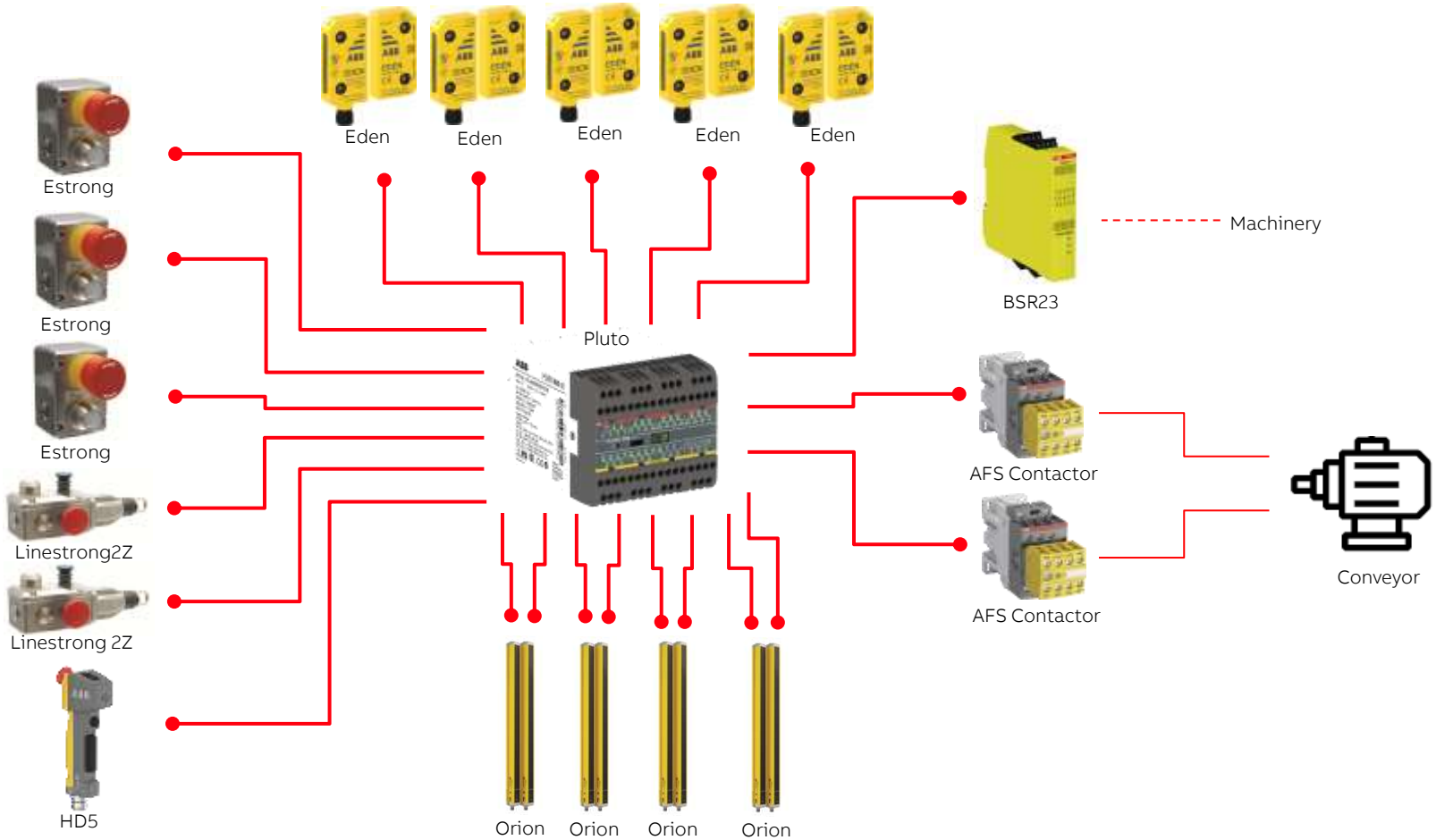
(1)Pluto S46 v2 – 2TLA020070R1800

(1)BSR23 – 2TLA010041R0600

(1)Programming Cable – 2TLA020070R5800

(2)AFS09Z-30-22-30 – for shutting down conveyor.

Food and Beverage



Wrapping Machine

Application Notes

Overview

Need to safe-guard a wrapping machine. There is an entry and exit conveyor that also needs to be guarded. Pallets with product comes into the cell, gets wrapped and exits the cell.

Additional Notes

2 door need to be interlocked. Safety lock is needed.

Emergency stops needed.

Wrapping machine uses an ABB drive with STO (Safe Torque Off)

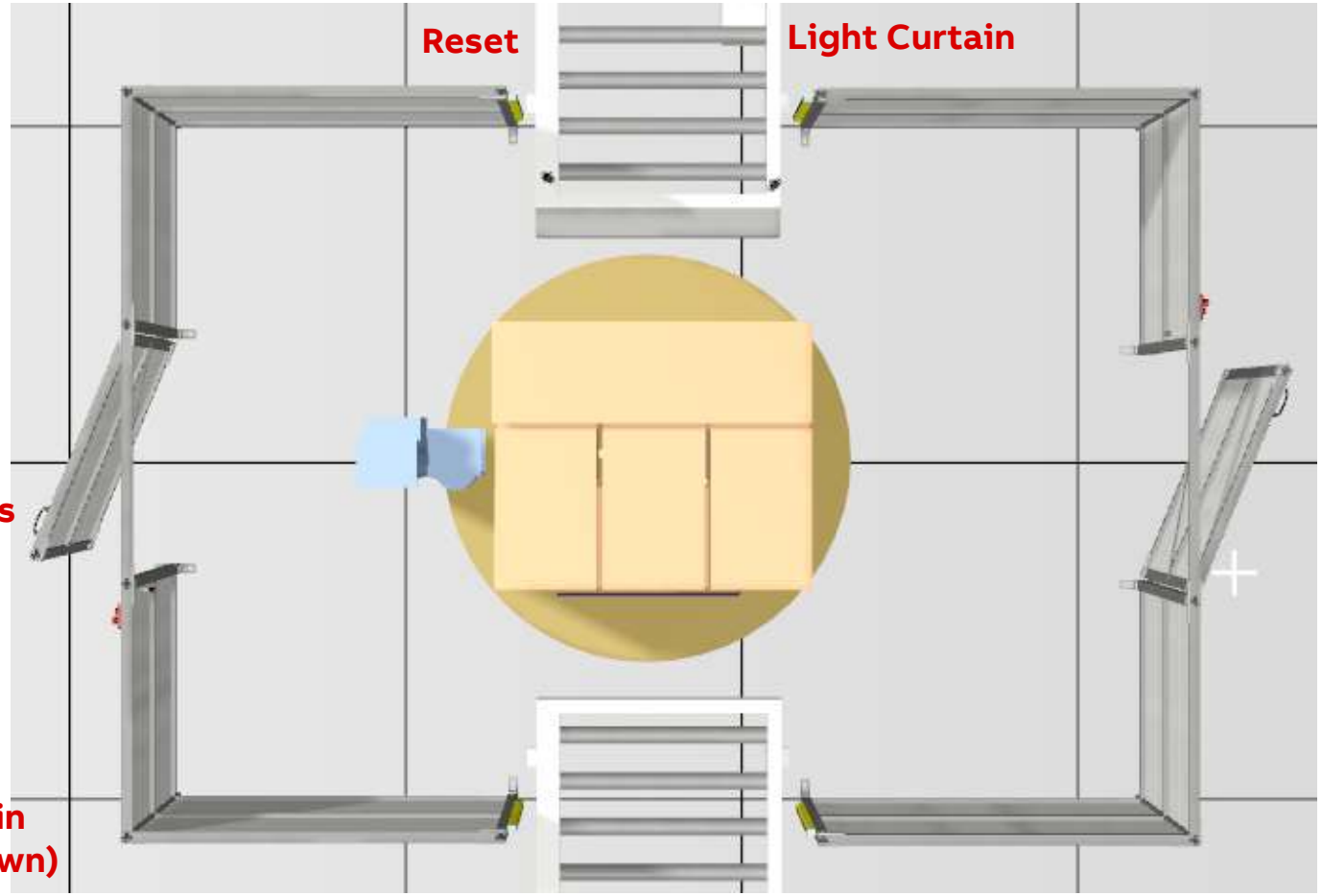
Entry and exit need to be fully guarded with light curtains which both need to be muted.

Note: Picture is not of application on this page but only of a similar machine.

Wrapping Machine

ABB Jokab Safety Solution

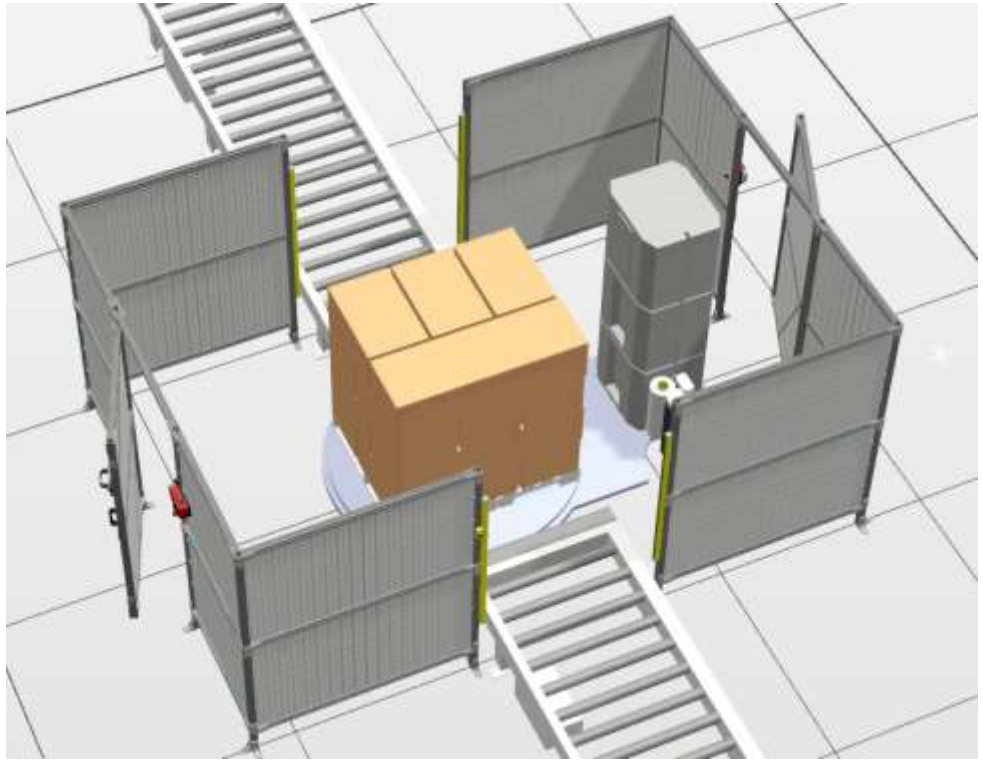
Top View of Cell



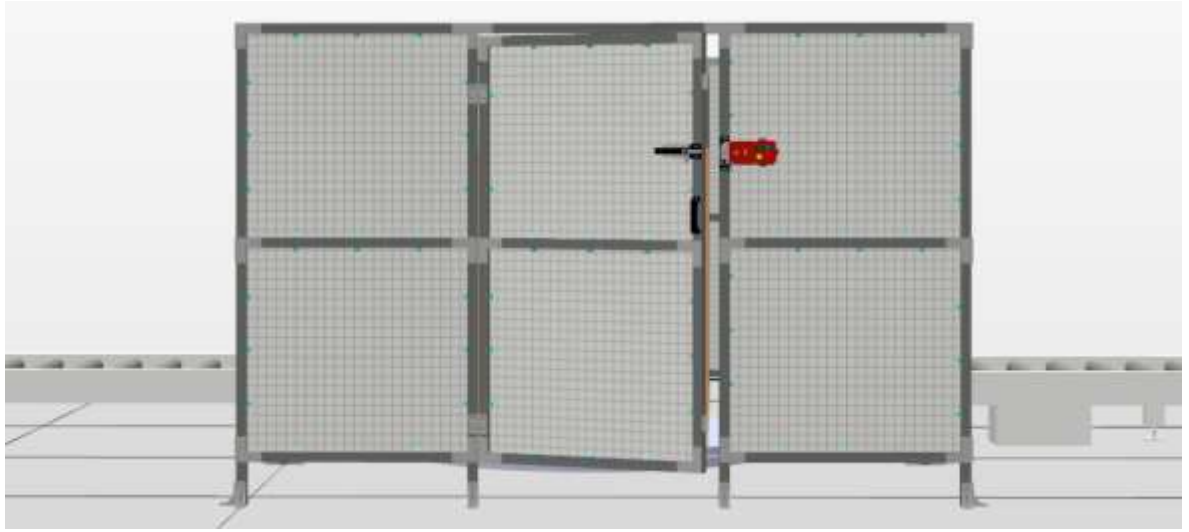
Wrapping Machine

ABB Jokab Safety Solution

Top View



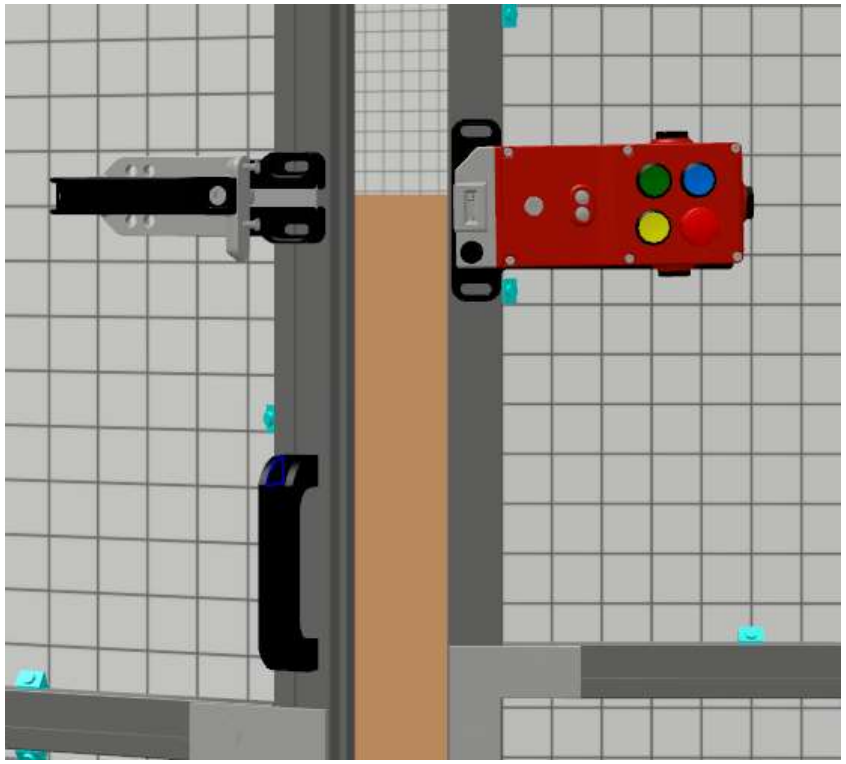
Side View



Wrapping Machine

ABB Jokab Safety Solution

GKEY on Door



Orion Light Curtain for Conveyors

Wrapping Machine

ABB Jokab Safety Solution

Doors

(2)2TLA050304R0002 - GKey4 RU

(2)2TLA050310R0032 - FHS GKey4

(2)2TLA050040R0510 - RHS GKey MKey

(2)2TLA050040R0511 - SCS GKey MKey

(2)2TLA050040R0002 – M20 cable gland

(2)MA1-8130 – blanking plug

(2)CP1-11L-10 – Compact Series Blue Illuminated button

(2)CE3T-10R-02 – Compact Series Emergency Stop Twist to release

(2)CP1-11Y-10 – Compact Series Yellow Illuminated button

(2)CP1-11G-10 – Compact Series Green Illuminated button

Reset (Smile 11RB by light curtains for resetting/override).

(2)Smile 11RB – 2TLA030053R0100

(2)M12-C101 – 2TLA020056R1000

Light Curtain (muting done through Pluto S20 v2, X pattern mute)

(2)Orion 1-4-30-120-B – 2TLA022302R0700

(2)M12-C101 – 2TLA020056R1000– 10m cable for transmitter

(2)M12-C103 – 2TLA020056R1000– 10m cable for basic receiver

(4)Mute R2 - 2TLA022044R0500

(4)Reflect 1 - 2TLA022044R2000

(2)KL70-306C – for mute lamp

(2)KT70-1002 – for mute lamp

(2)KA70-1034 – for mute lamp

Safety Controller

(1)Pluto S20 v2 – 2TLA020070R4700

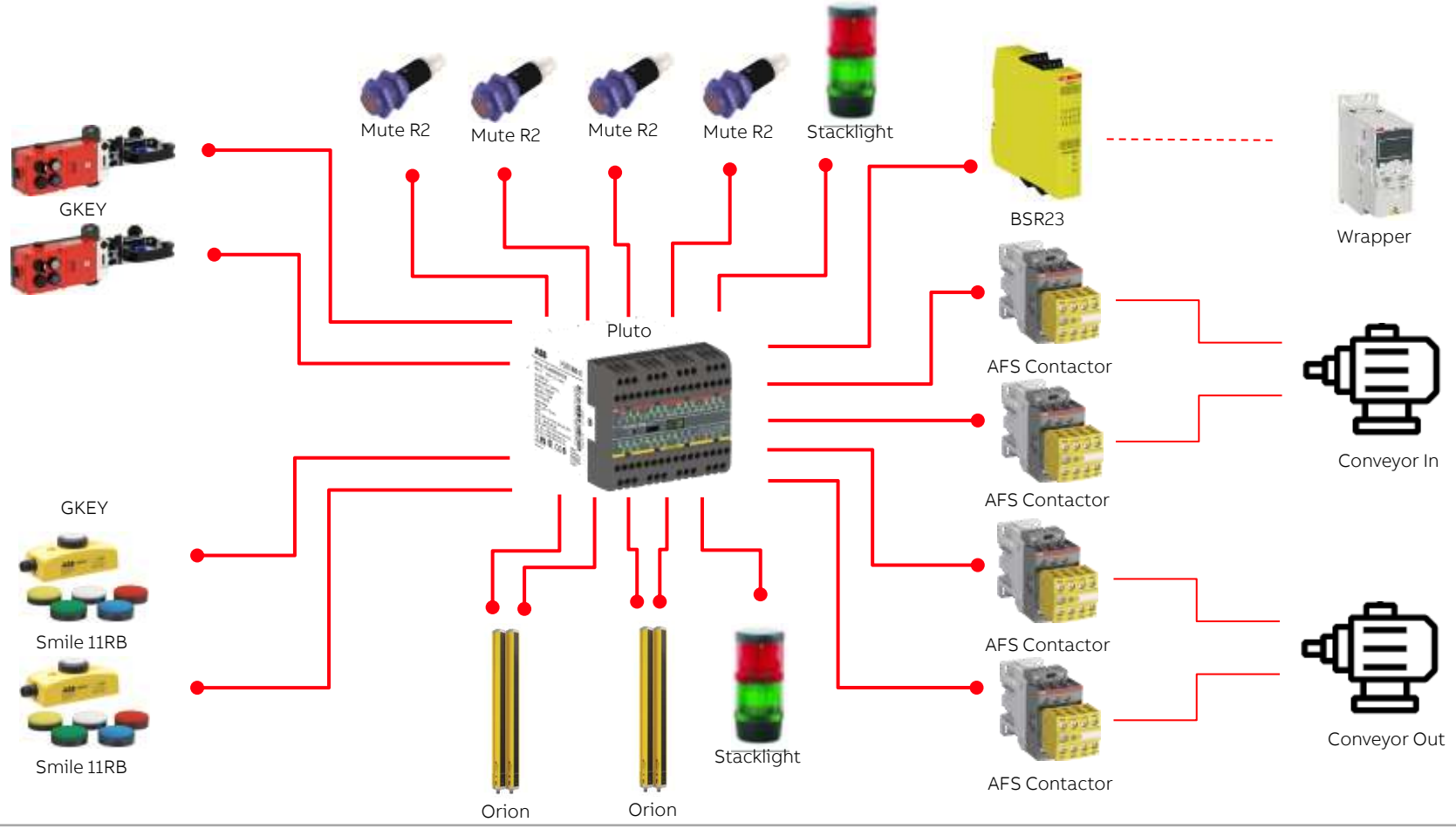
(1)BSR23 – 2TLA010041R0600

(1)Programming Cable – 2TLA020070R5800

(4)AFS09Z-30-22-30 – for shutting down exit and entry conveyors.

Wrapping Machine

ABB Jokab Safety Solution



Material Handling

Application Notes

Overview

Need to safe-guard a material handling machine. The arm picks up filled cardboard boxes off a conveyor and stacks them on a pallet for a forklift to take it to a wrapper.

Additional Notes

Light curtains needed to be muted entry and exit.

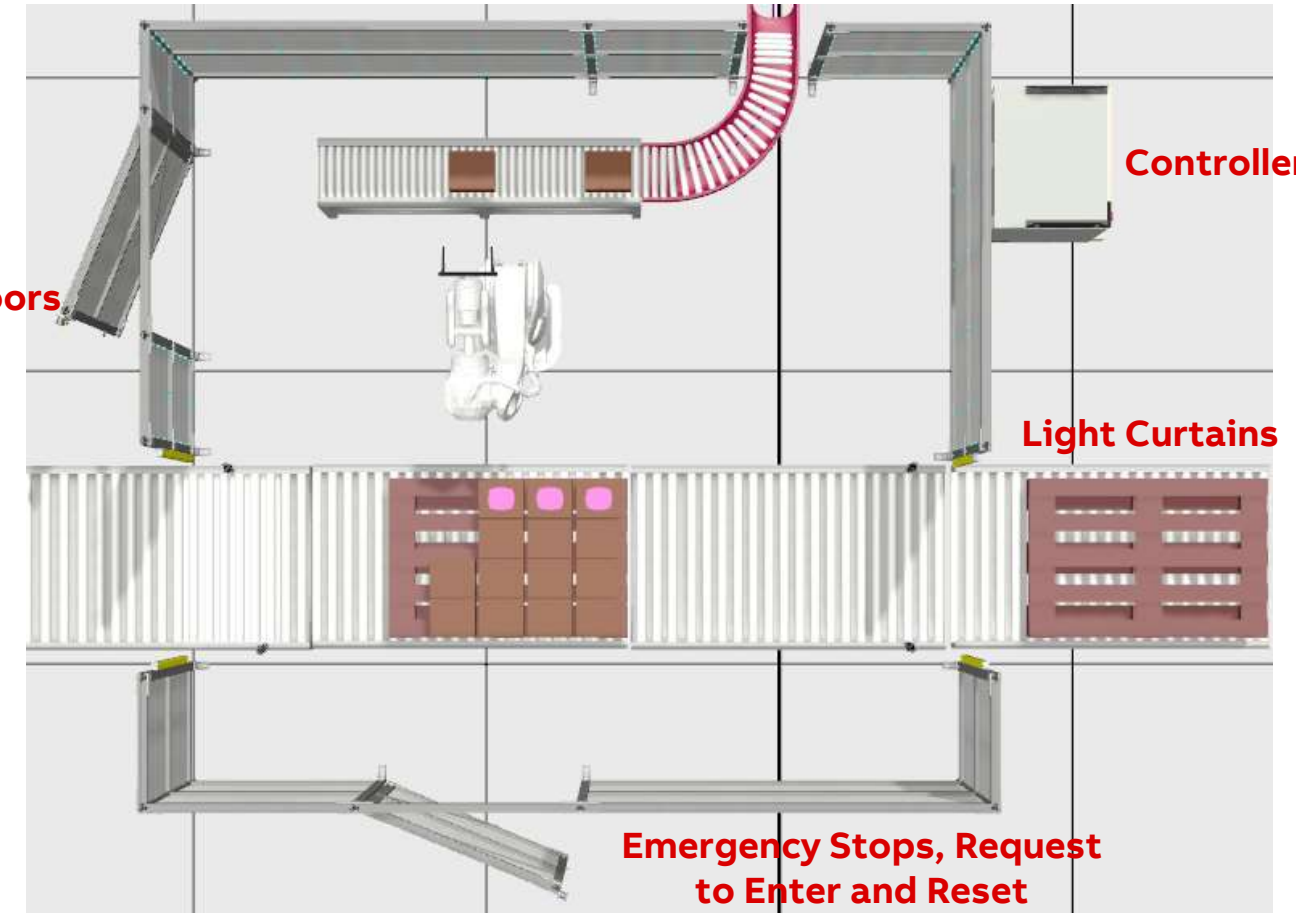
Need a process lock on 2 doors

Note: Picture is not of application on this page but only of a similar machine.

Material Handling

ABB Jokab Safety Solution

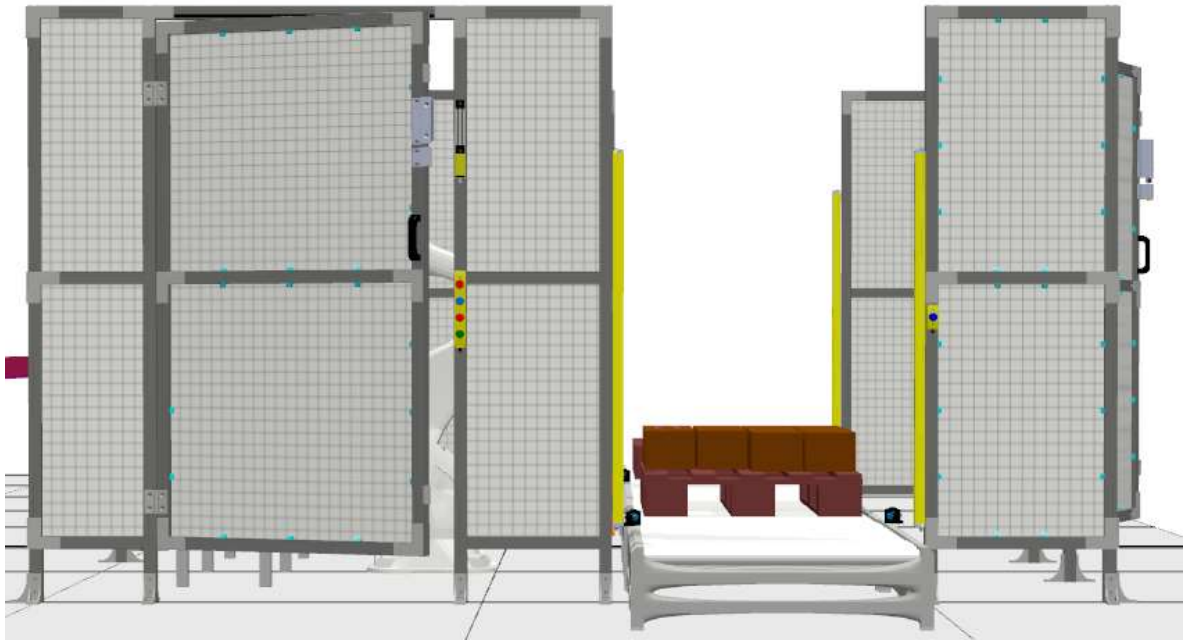
Top View of Cell



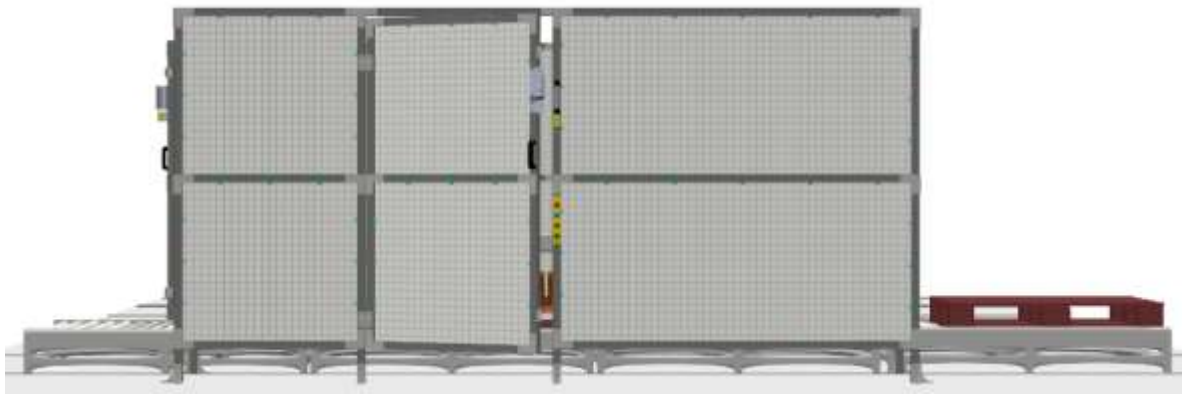
Material Handling

ABB Jokab Safety Solution

Front View



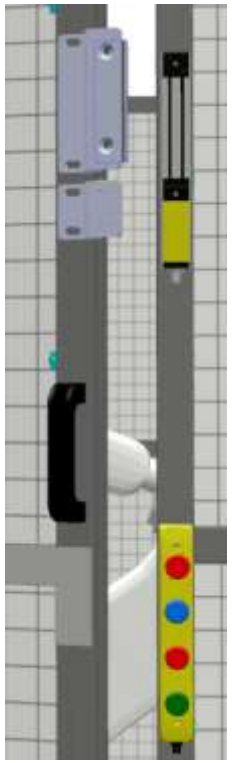
Side View



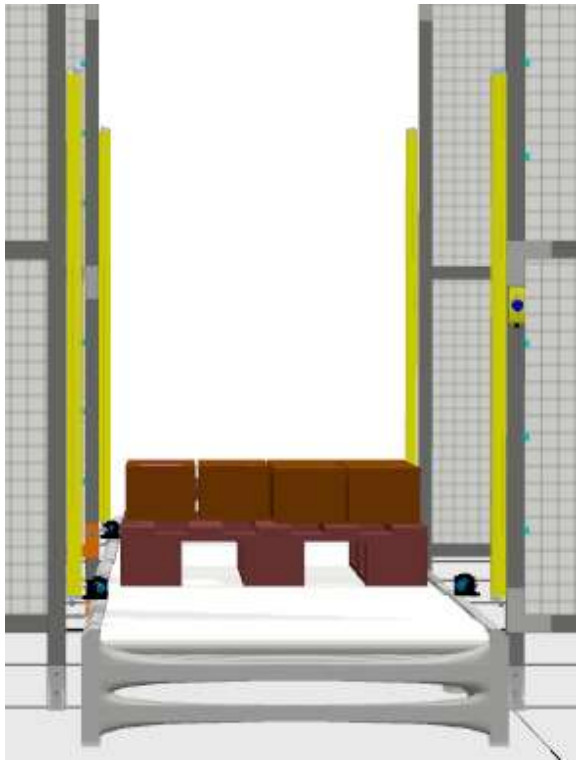
Material Handling

ABB Jokab Safety Solution

Magne 4 and Smile 41 on Door



Orion Light Curtain for Conveyors



Material Handling

ABB Jokab Safety Solution

Doors (process lock)

(2)Magne 4 DYN Info – 2TLA042022R3400

(2)Anchor Plate 32B – 2TLA042023R0400

(2)Eva General Code – 2TLA020046R0800

(2)M12-C103 – 2TLA020056R4000 – 10m cable for Magne 4

(2)JSMD21B – 2TLA042023R0500 – bracket for anchor plate

(2)JSMD24 – 2TLA042023R0300 – bracket for Eva

Emergency Stops, Request to Enter and Reset (Smile 11RB by light curtains for resetting/override).

(2)Smile 11RB – 2TLA030053R0100

(2)M12-C101 – 2TLA020056R1000 – 10m cable for Smile 11RB

(2)Smile 41 – 2TLA030057R0100

(2)M12-C103 – 2TLA020056R4000– 10m cable for Smile 41

Light Curtains (muting done through Pluto S20 v2, X pattern mute)

(2)Orion 1-4-30-120-B – 2TLA022302R0700

(2)M12-C101 – 2TLA020056R1000– 10m cable for transmitter

(2)M12-C103 – 2TLA020056R1000– 10m cable for basic receiver

(4)Mute R2 - 2TLA022044R0500

(4)Reflect 1 - 2TLA022044R2000

(2)KL70-306C – for mute lamp

(2)KT70-1002 – for mute lamp

(2)KA70-1034 – for mute lamp

Safety Controller

(1)Pluto S46 v2 – 2TLA020070R180000

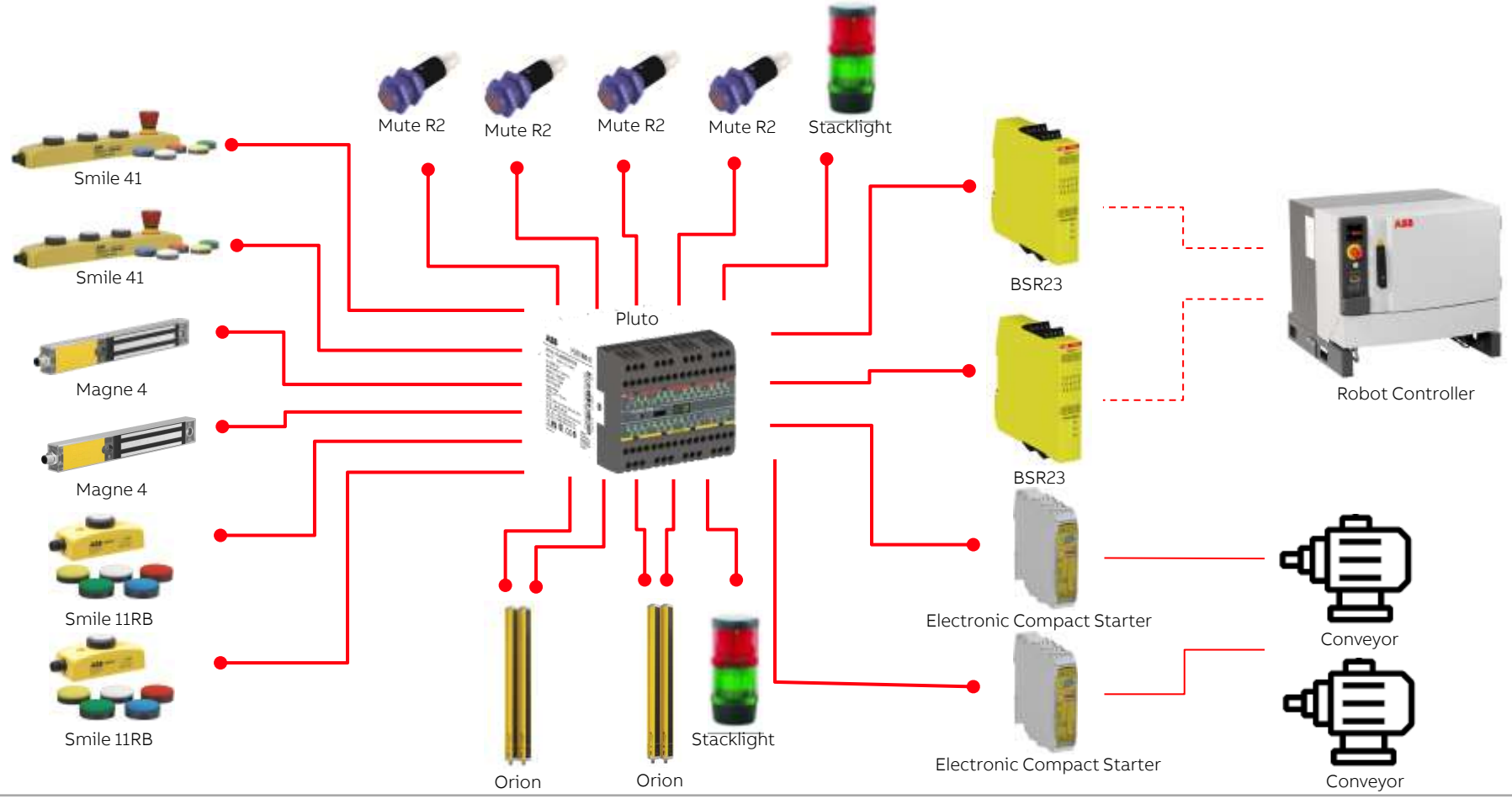
(2)BSR23 – 2TLA010041R0600

(1)Programming Cable – 2TLA020070R5800

(2)Electronic Compact Starter with Estop - 1SAT143000R1011

Material Handling

ABB Jokab Safety Solution



Presses

Application Notes

Overview

Need to safe-guard an existing press. There are a couple of doors that are added.

Additional Notes

Operators interacts with only 1 side of the press. The other side needs to be guarded (no hard guarding).

A chute sometimes is coming out of the side where the operator interacts.

Doors need to be interlocked.

Emergency stops needed.

Press stops immediately (not a full revolution press).

Note: Picture is not of application on this page but only of a similar machine.

Presses

ABB Jokab Safety Solution

Doors

(2)Adam DYN Info – 2TLA020051R5100

(2)Eva General Code – 2TLA020046R0800

(2)M12-C101 – 2TLA020056R1000 – 10m cable for Adam DYN Info

Light Curtain (operators can only reach through light curtains they can pass through them, extended model so chute can be blanked out)

(1)Orion 1-4-30-120-B – 2TLA022302R0700

(1)Orion 1-4-30-120-E – 2TLA022303R0700

(2)M12-C101 – 2TLA020056R1000– 10m cable for transmitter

(1)M12-C103 – 2TLA020056R4000– 10m cable for basic receiver

(1)M12-C105 – 2TLA020056R7300– 10m cable for receiver

(1)M12-C02PT2T – 2TLA022315R0100

(1)M12-C02PT6RB – 2TLA022315R0200

Emergency Stops, Request to Enter and Reset (Smile 11RB by doors for resetting).

(2)Smile 11RB – 2TLA030053R0100

(2)M12-C101 – 2TLA020056R1000 – 10m cable for Smile 11RB

(2)Smile 11EA Tina – 2TLA030050R0000

(2)M12-C101 – 2TLA020056R1000 – 10m cable for Smile 11EA Tina

(1)JSTD1-E – 2TLA020007R3400 – for cycle start

Safety Controller

(1)Pluto S20 v2 – 2TLA020070R4700

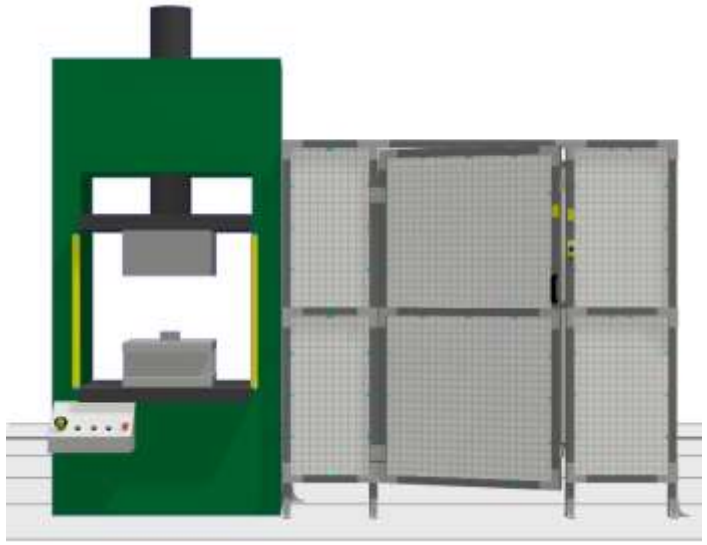
(2)BSR23 – 2TLA010041R0600

(1)Programming Cable – 2TLA020070R5800

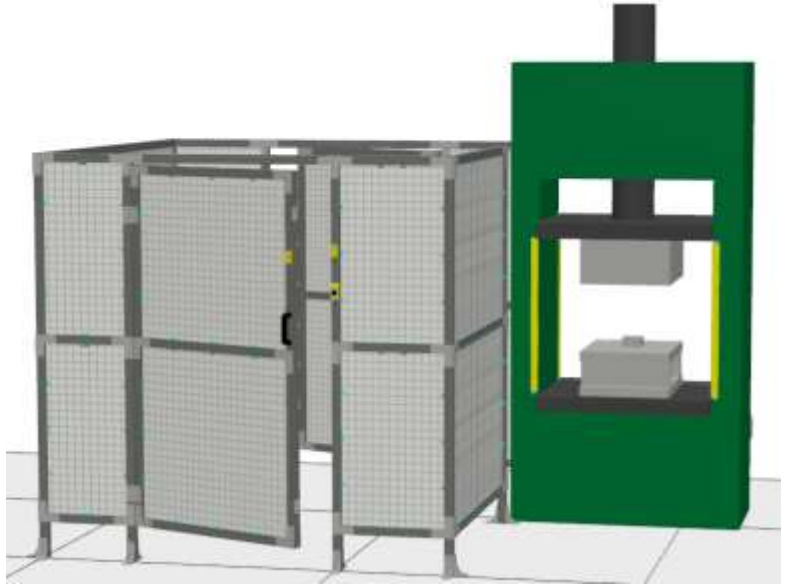
Presses

ABB Jokab Safety Solution

Front View



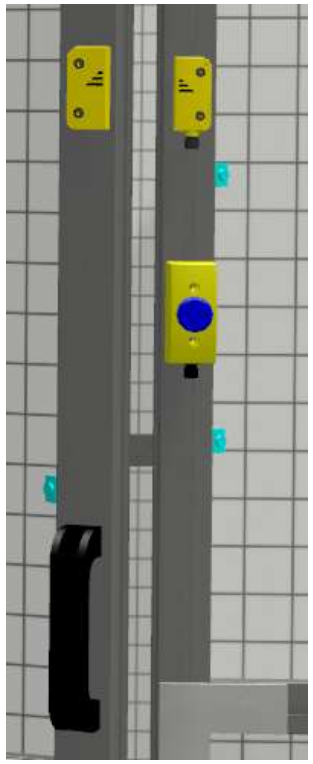
Side View



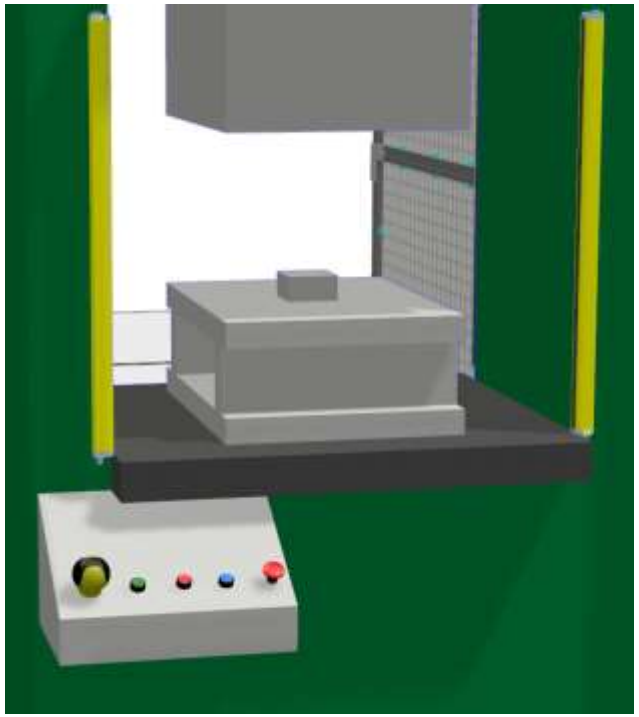
Presses

ABB Jokab Safety Solution

Adam/Eva and Smile Reset on Door

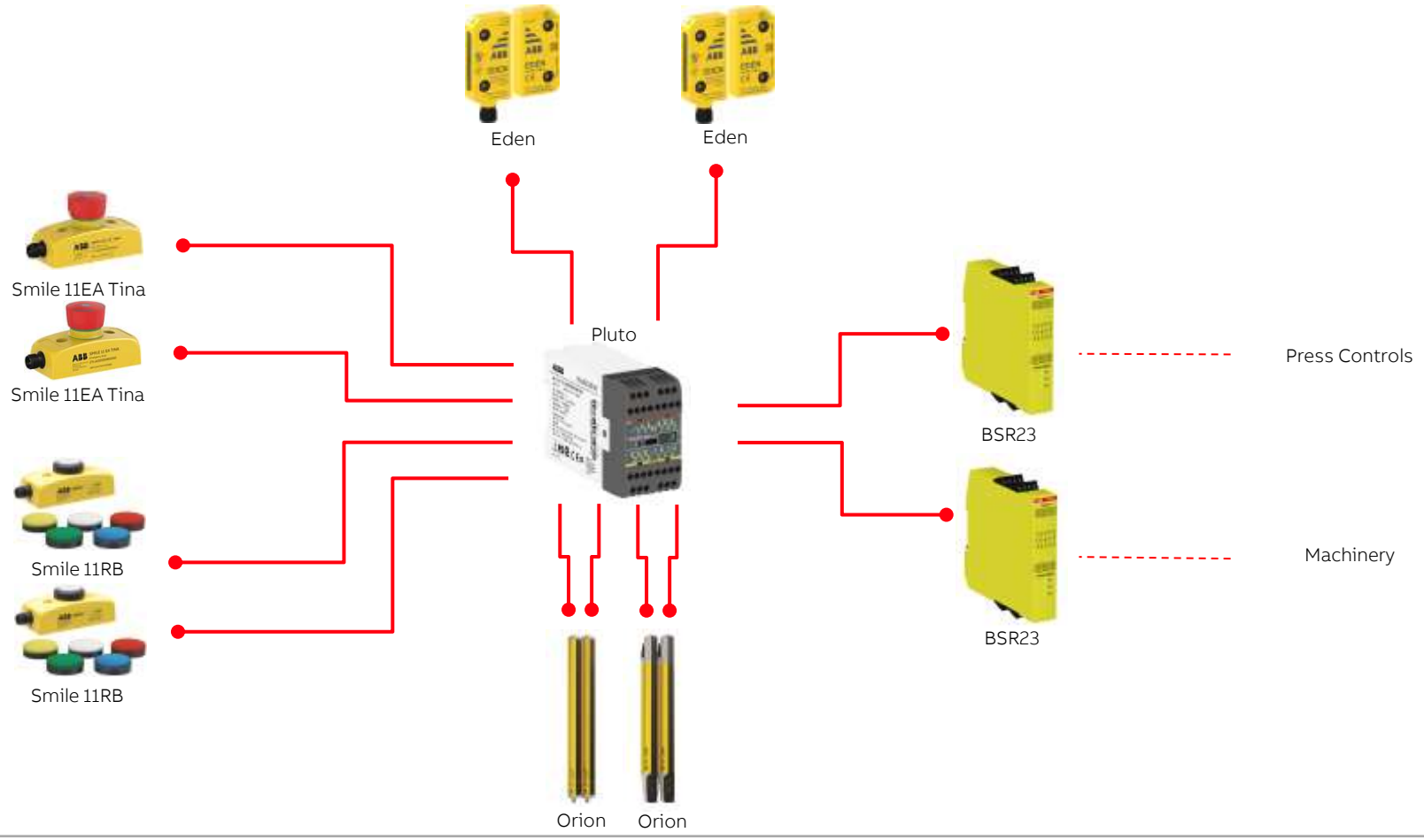


Orion Light Curtain and Safeball



Presses

ABB Jokab Safety Solution



Conveyors

Application Notes

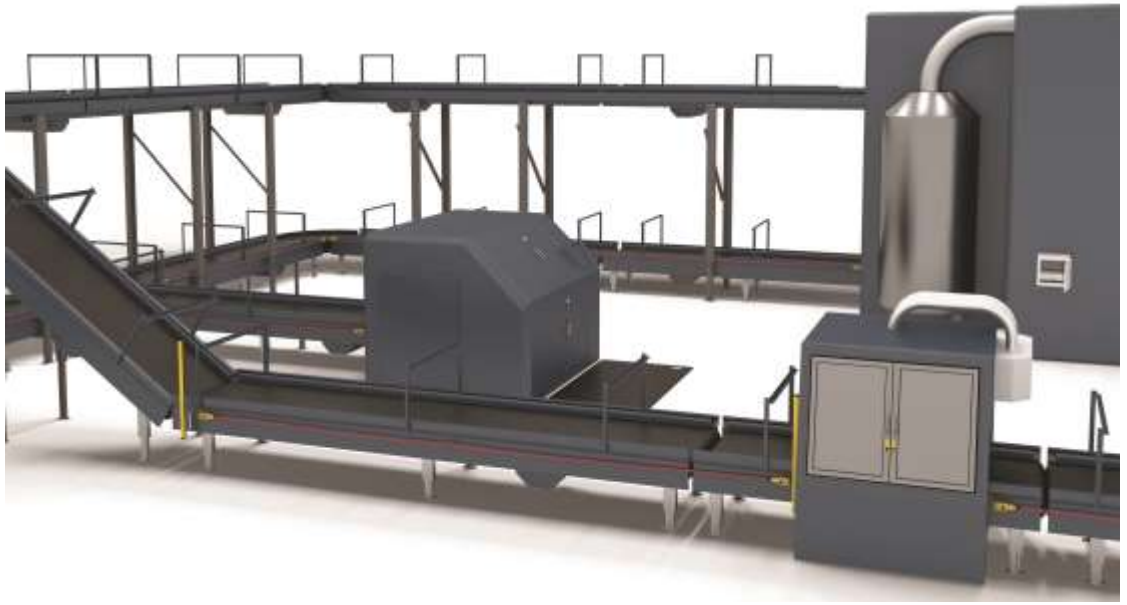
Overview

Larger conveyor system that needs to be guarded at multiple points. There are a couple of machine that the conveyors run through that have some hatches that needed to be guarded. There is also a vertical elevator that brings product up to a 2nd level.

Additional Notes

Each of the smaller machines has a door on each side

Vertical elevator has a man door as well as an infeed from the conveyor where a light curtain is needed. Hand resolution and 600mm opening.



Note: Picture is not of application on this page but only of a similar machine.

Conveyors

ABB Jokab Safety Solution

Doors

(4)Adam DYN Info – 2TLA020051R5100

(4)Eva General Code – 2TLA020046R0800

(4)M12-C101 – 2TLA020056R1000 – 10m cable for Adam DYN Info

Emergency Stops and Reset

(4)Linestrong 3D – 2TLA050204R1232

(2)LineStrong 3L – 2TLA050206R1232

(2)LineStrong 3R – 2TLA050208R1232

(8)Estop – 2TLA050211R0005

(6)100m rope pull kit – 2TLA050210R0730

(40)Flex Roller – 2TLA858006R1300

(8)1/2NPT Cable Gland - 2TLA050040R0001

(2)Smile 11RB – 2TLA030053R0100

(2)M12-C101 – 2TLA020056R1000 – 10m cable for Smile 11RB

Light Curtains

(2)Orion 1-4-30-060-B – 2TLA022302R0300

(2)M12-C101 – 2TLA020056R1000– 10m cable for transmitter

(2)M12-C103 – 2TLA020056R1000– 10m cable for receiver

Signalling

(2)KL70-401G – green element

(2)KL70-401R – red element

(2)KT70-1002 – terminal element

(2))KA70-1034 – bracket

Safety Controller

(1)Pluto B46 v2 – 2TLA020070R1700

(1)GATE E1P – 2TLA020071R9000

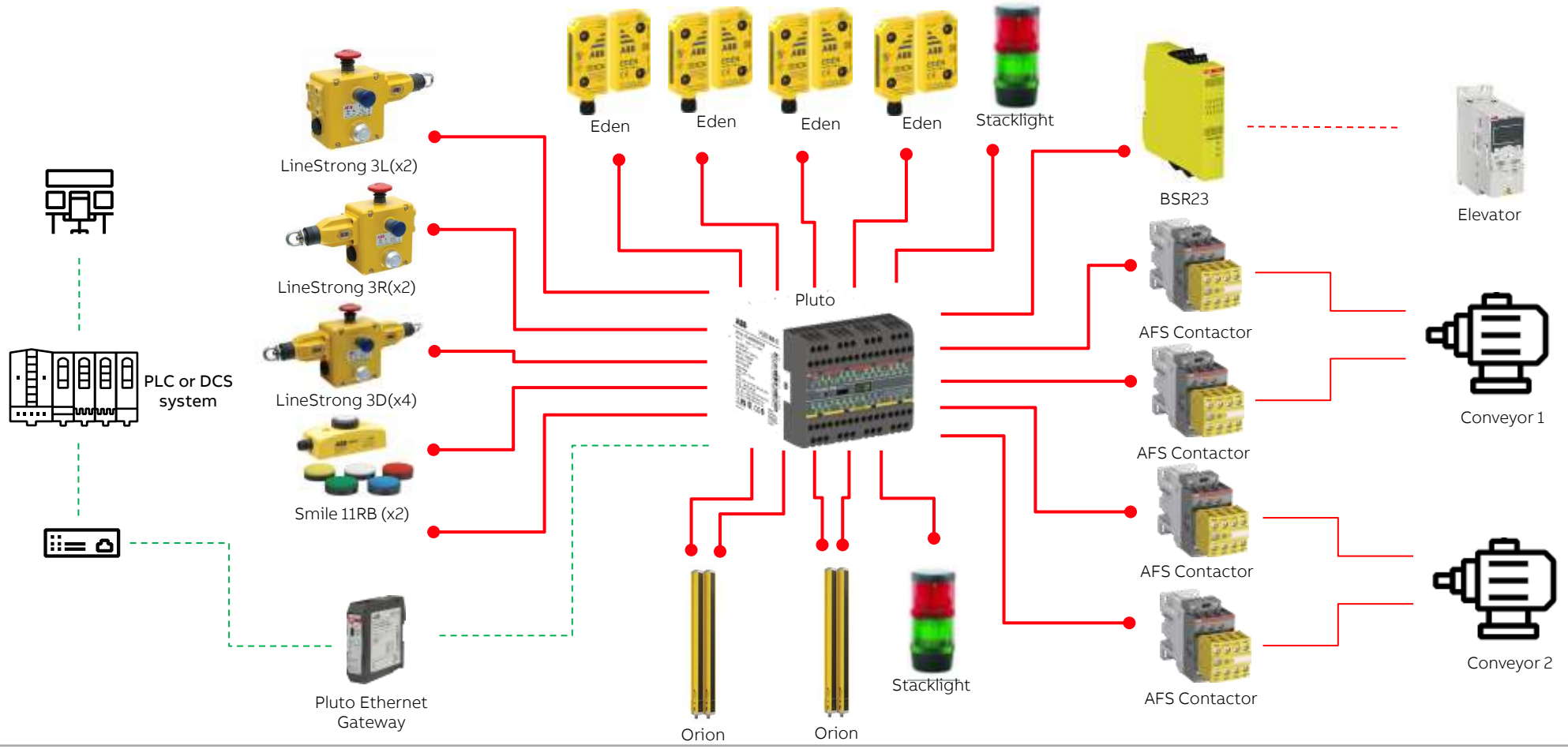
(1)BSR23 – 2TLA010041R0600

(1)Programming Cable – 2TLA020070R5800

(4)AFS16Z-30-22-30 – for shutting down conveyors.

Conveyors

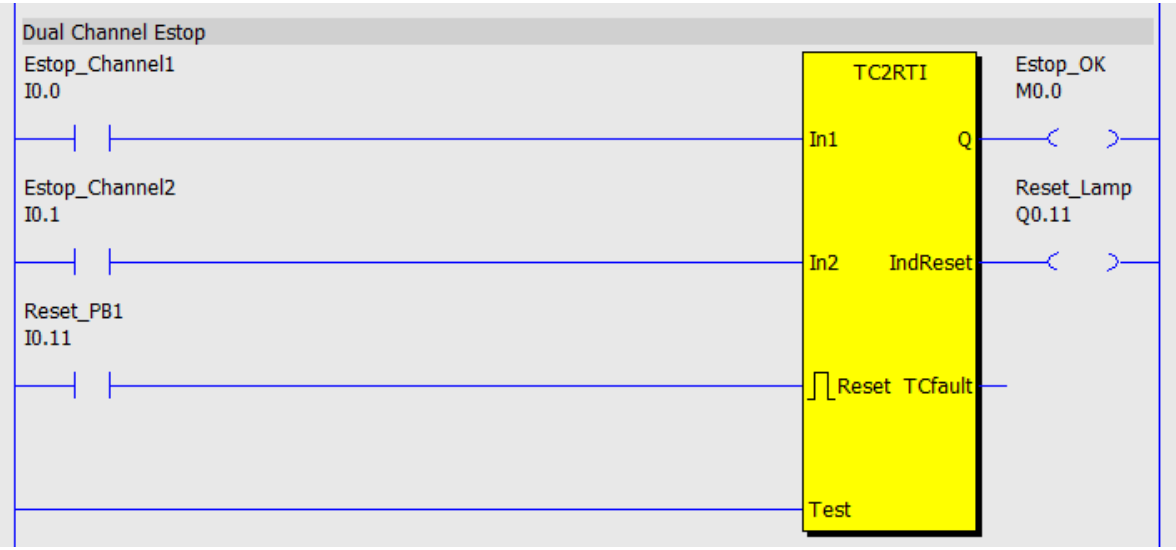
ABB Jokab Safety Solution



Wiring/Programming Examples for Pluto Safety Controller

Dual Channel Estop (Programming)

Pluto Manager Example Programming

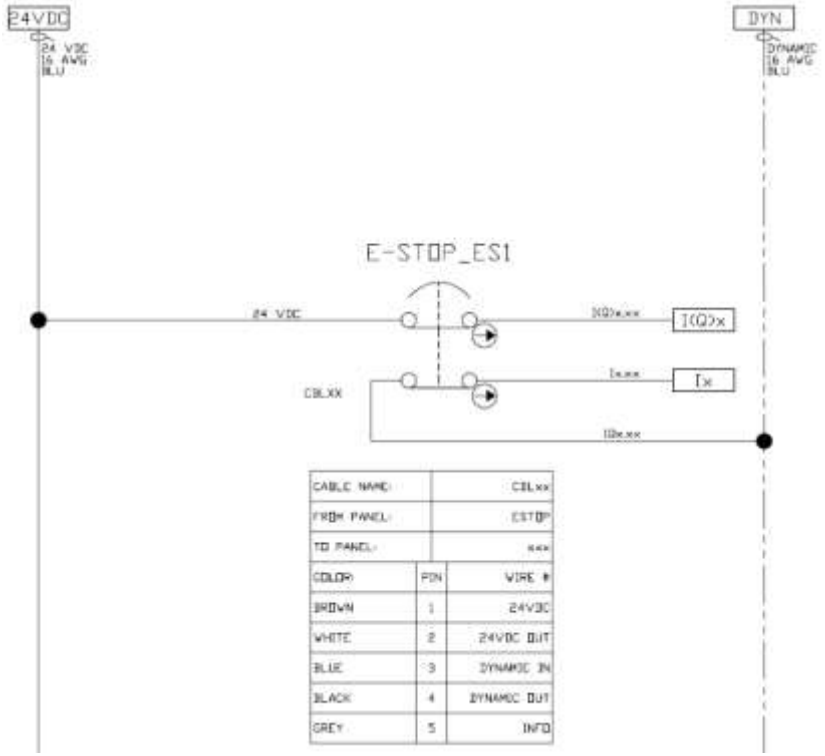


Device (ex. Estrong Z, Linestrong)

IO Option Configuration Example (Pluto Manager)

Dual Channel Estop (Wiring)

Electrical Wiring to Pluto Safety PLC



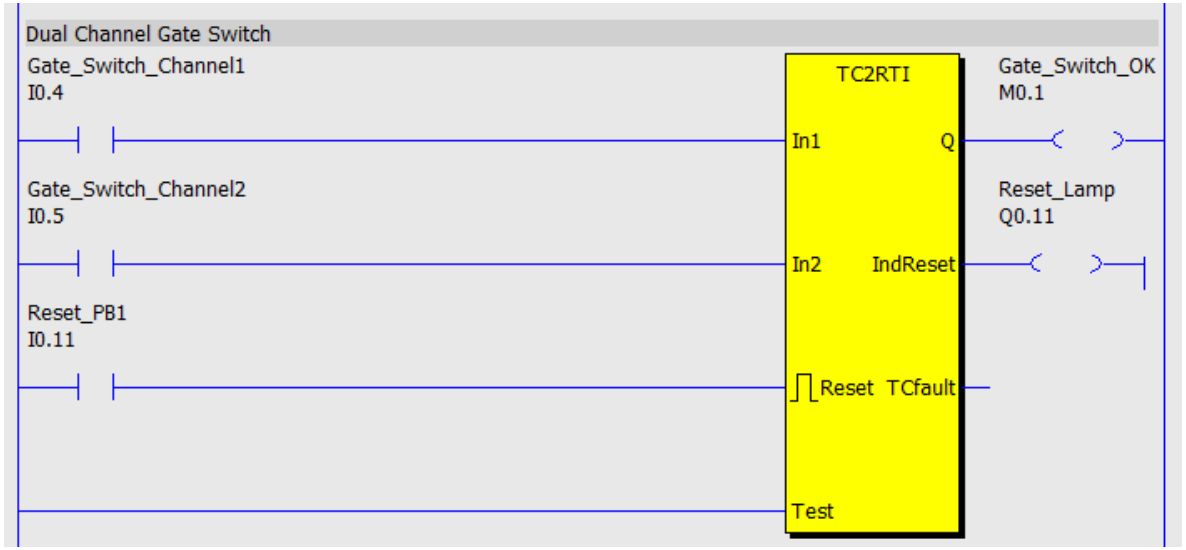
Device (ex. Estrong Z, Linestrong)

Notes

One channel Static (24VDC) and the other DYNLINK signal (ex. A Pulse, Non-Inverted) to detect a cross short between channels.

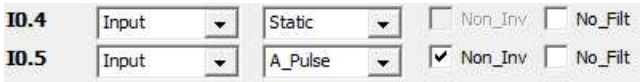
Dual Channel Gate Switch (Programming)

Pluto Manager Example Programming



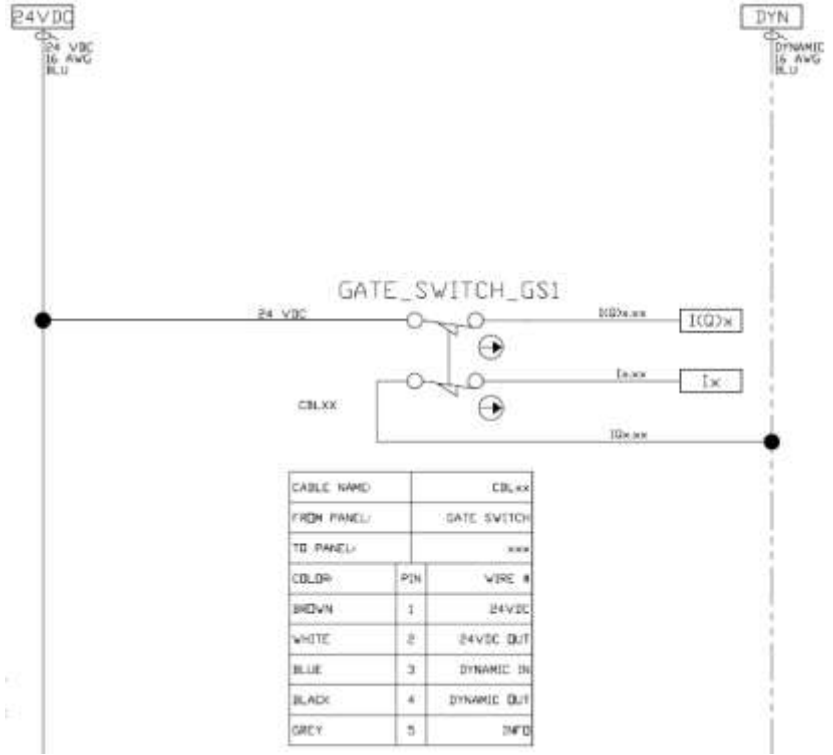
Device (ex. MKEY)

IO Option Configuration Example (Pluto Manager)



Dual Channel Gate Switch (Wiring)

Electrical Wiring to Pluto Safety PLC



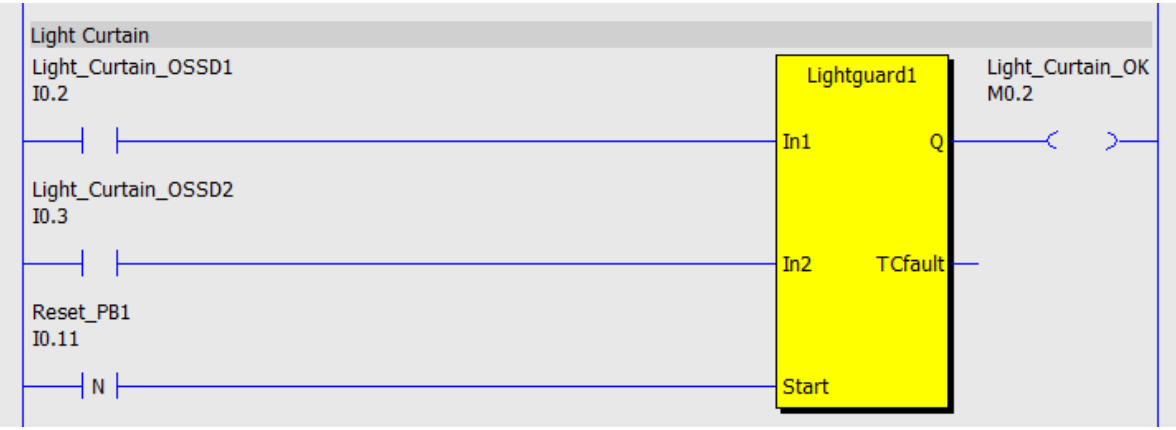
Device (ex. MKEY)

Notes

One channel Static (24VDC) and the other DYNLINK signal (ex. A Pulse, Non-Inverted) to detect a cross short.

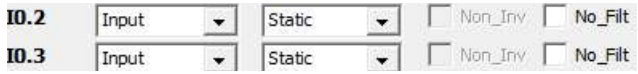
Orion 1 Base Light Curtain (Programming)

Pluto Manager Example Programming



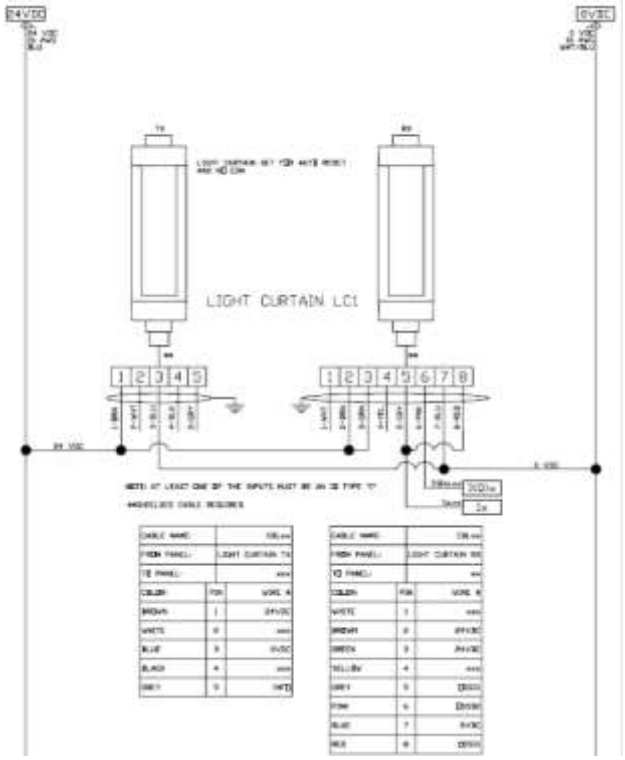
Device

IO Option Configuration Example (Pluto Manager)

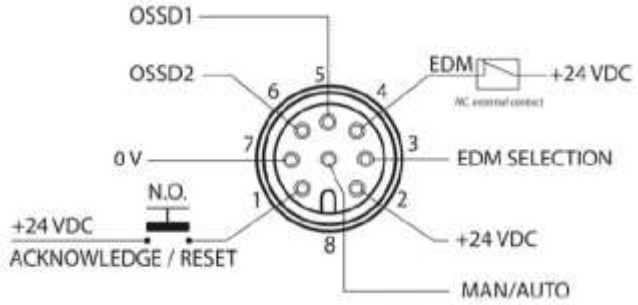


Orion 1 Base Light Curtain (Wiring)

Electrical Wiring to Pluto Safety PLC



Device Internal Wiring



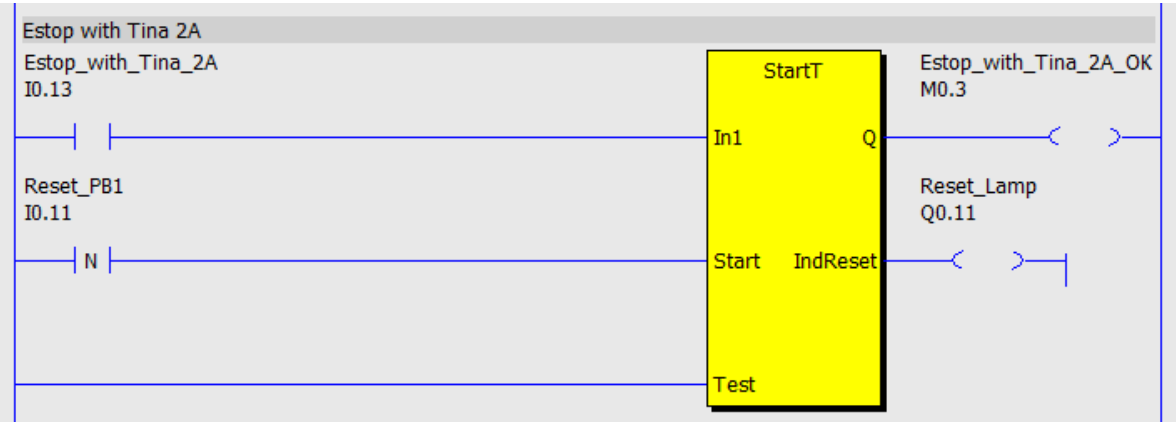
Notes

Light curtain will fault out if there is a cross short between OSSD's or other voltage.

OSSD's should be wired both to an "I" input or only one OSSD can be wired to an "IQ" input. Both OSSD's must never be connected both to an "IQ".

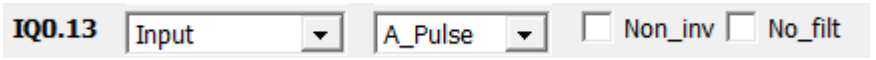
Estop with Tina 2A/B (Programming)

Pluto Manager Example Programming



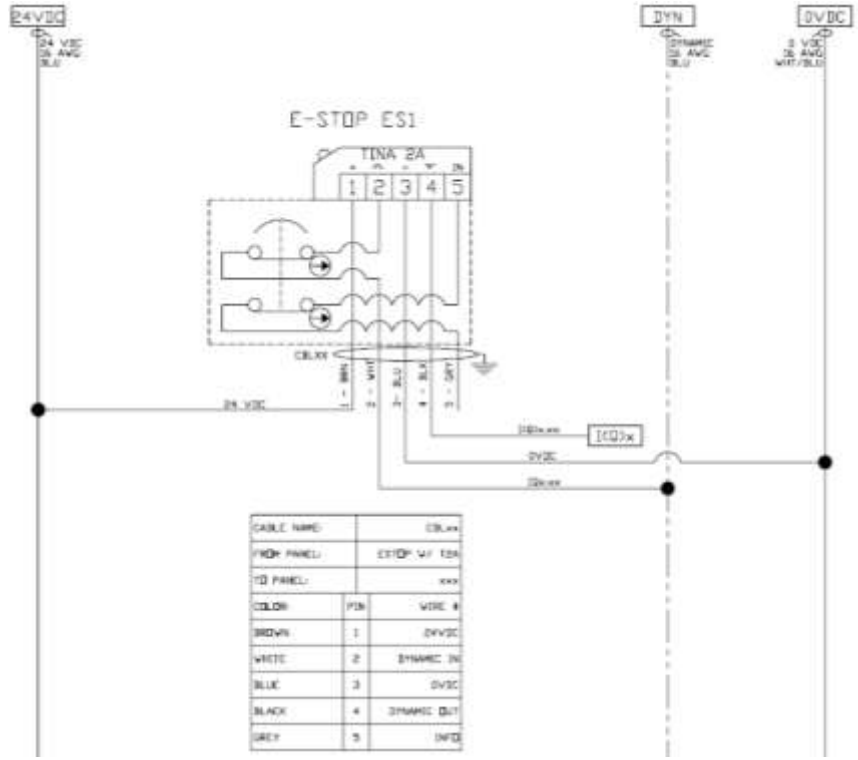
Device

IO Option Configuration Example (Pluto Manager)



Estop with Tina 2A/B (Wiring)

Electrical Wiring to Pluto Safety PLC



Device Internal Wiring

5-pole connection cables:

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

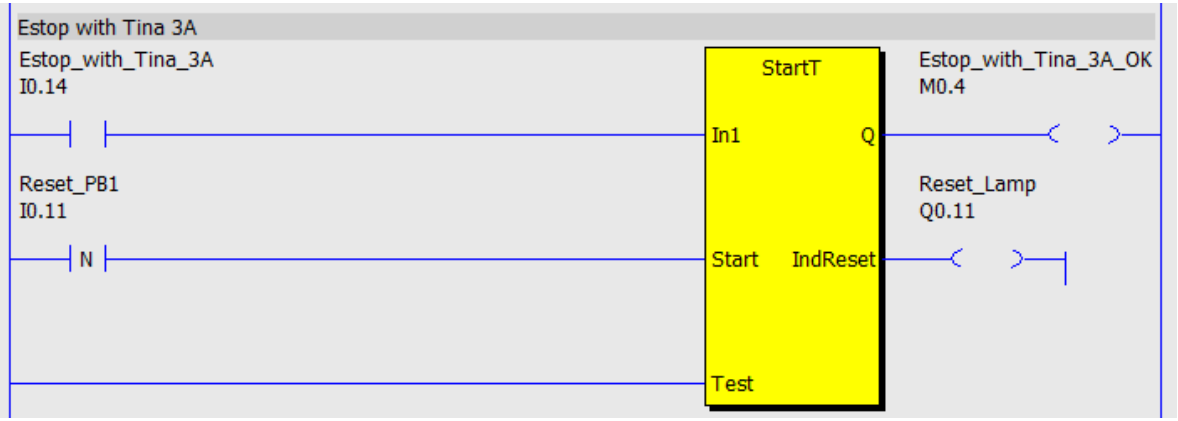
Notes

The Tina device inverts the DYNLINK signal (ex. A Pulse) 180 degrees and sends it out. This allows for any short to be detected in the cable.

Tina device connections to the safety device should be in the same enclosure .

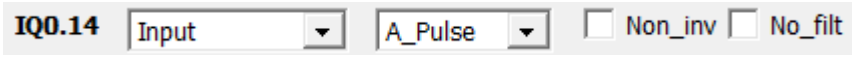
Estop with Tina 3A/APS (Programming)

Pluto Manager Example Programming



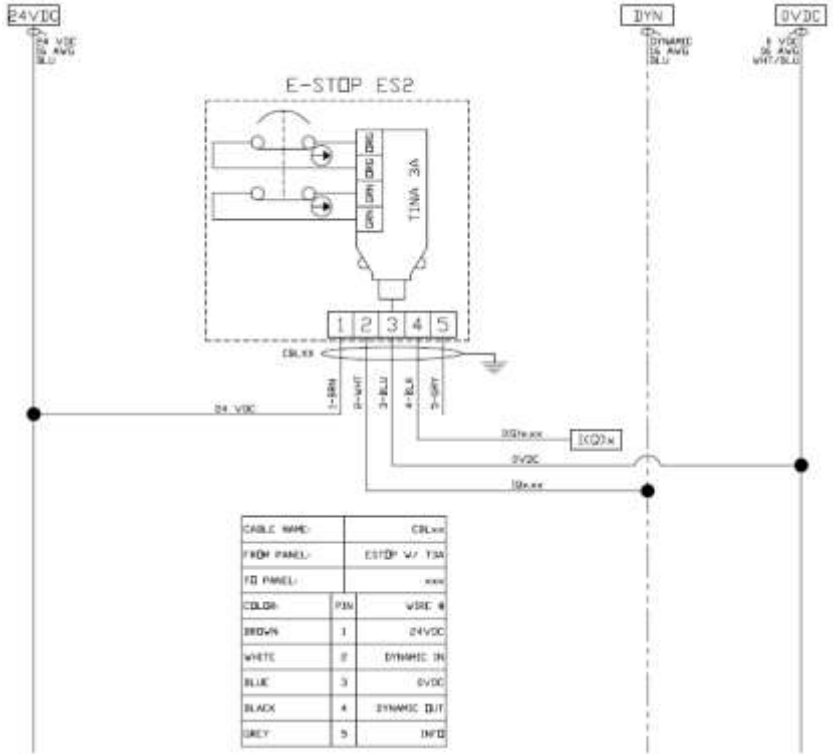
Device

IO Option Configuration Example (Pluto Manager)



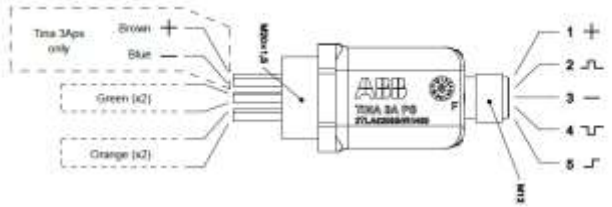
Estop with Tina 3A/APS (Wiring)

Electrical Wiring to Pluto Safety PLC



CABLE NAME:		CBLxx
FROM PANEL:		ESTOP W/ TINA
TO PANEL:		xxx
COLOR	PIN	WIRE #
BROWN	1	24VDC
WHITE	2	DYNAMIC IN
BLUE	3	0VDC
BLACK	4	DYNAMIC OUT
GREY	5	INFO

Device Internal Wiring



Connection cables:

Brown:	+24 VDC (Tina 3Aps only)
Blue:	0 VDC (Tina 3Aps only)
Green:	Safety loop A1-A2
Orange:	Safety loop B1-B2

5-pole M12 connector:

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

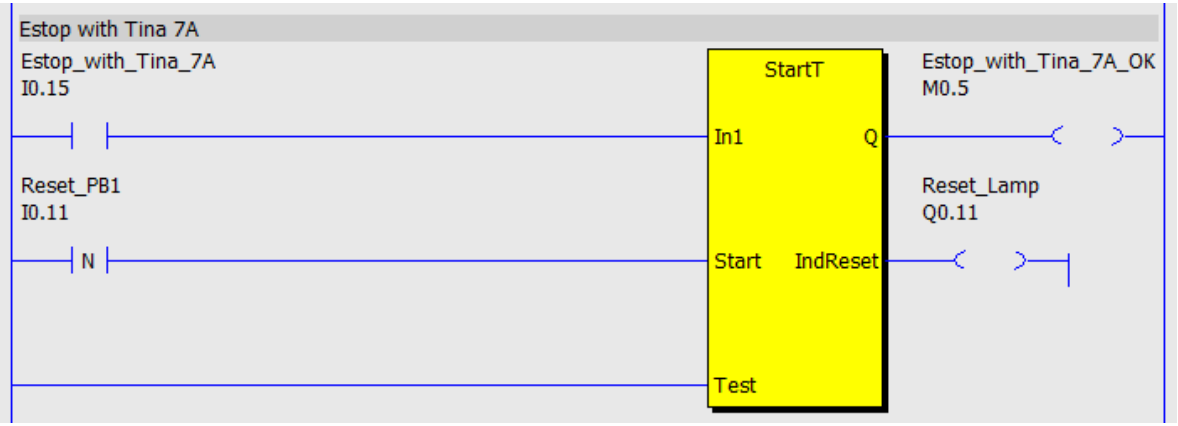
Notes

The Tina device inverts the DYNLINK signal (ex. A Pulse) 180 degrees and sends it out. This allows for any short to be detected in the cable.

Tina device connections to the safety device should be in the same enclosure.

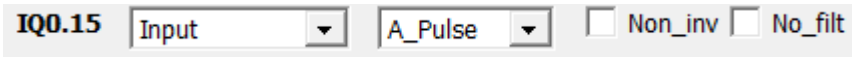
Estop with Tina 7A (Programming)

Pluto Manager Example Programming



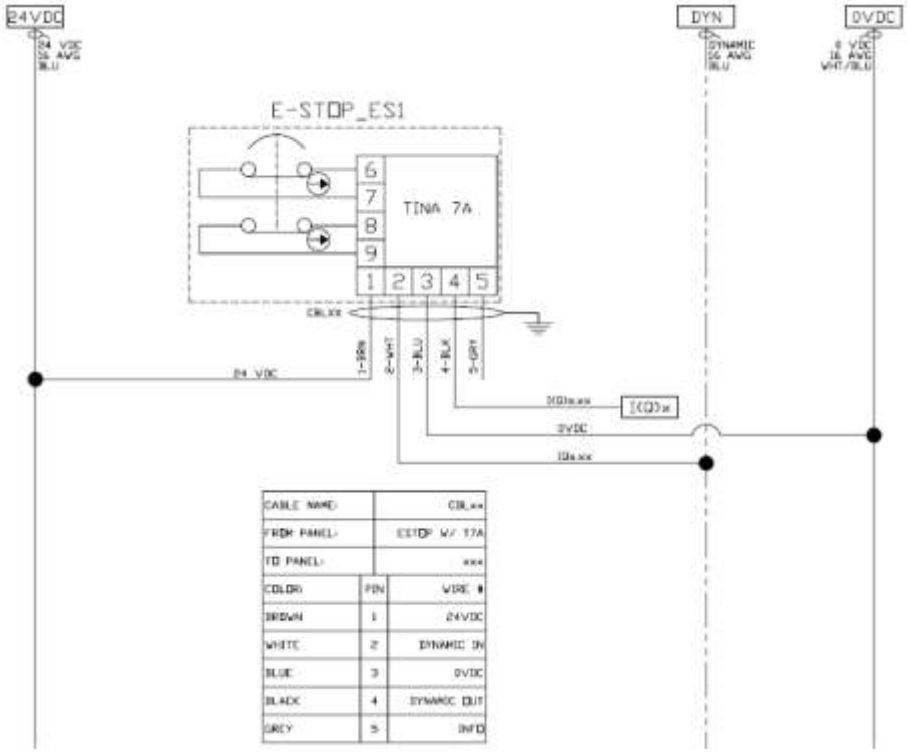
Device

IO Option Configuration Example (Pluto Manager)

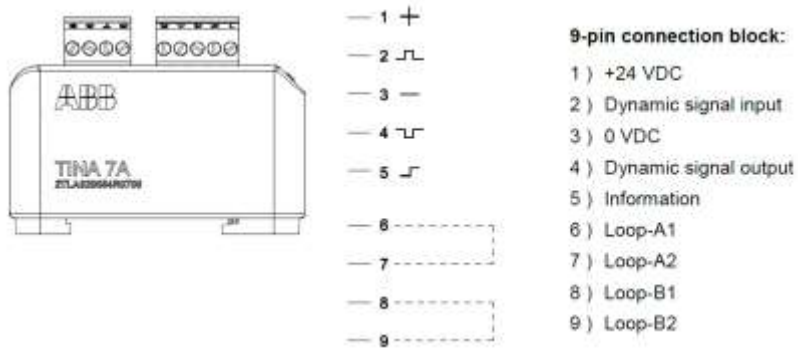


Estop with Tina 7A (Wiring)

Electrical Wiring to Pluto Safety PLC



Device Internal Wiring



9-pin connection block:

1) +24 VDC
2) Dynamic signal input
3) 0 VDC
4) Dynamic signal output
5) Information
6) Loop-A1
7) Loop-A2
8) Loop-B1
9) Loop-B2

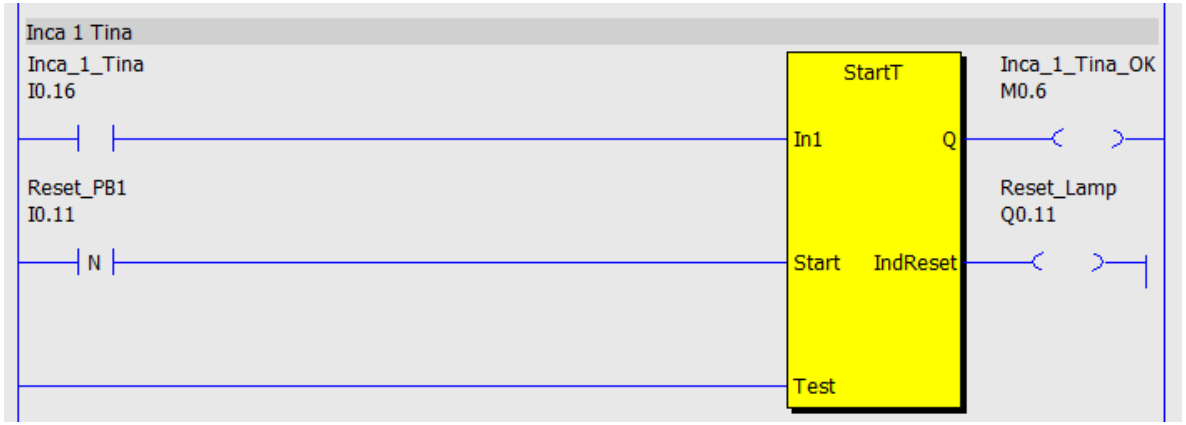
Notes

The Tina device inverts the DYNLINK signal (ex. A Pulse) 180 degrees and sends it out. This allows for any short to be detected in the cable.

Tina device connections to the safety device should be in the same enclosure.

Inca 1 Tina (Programming)

Pluto Manager Example Programming

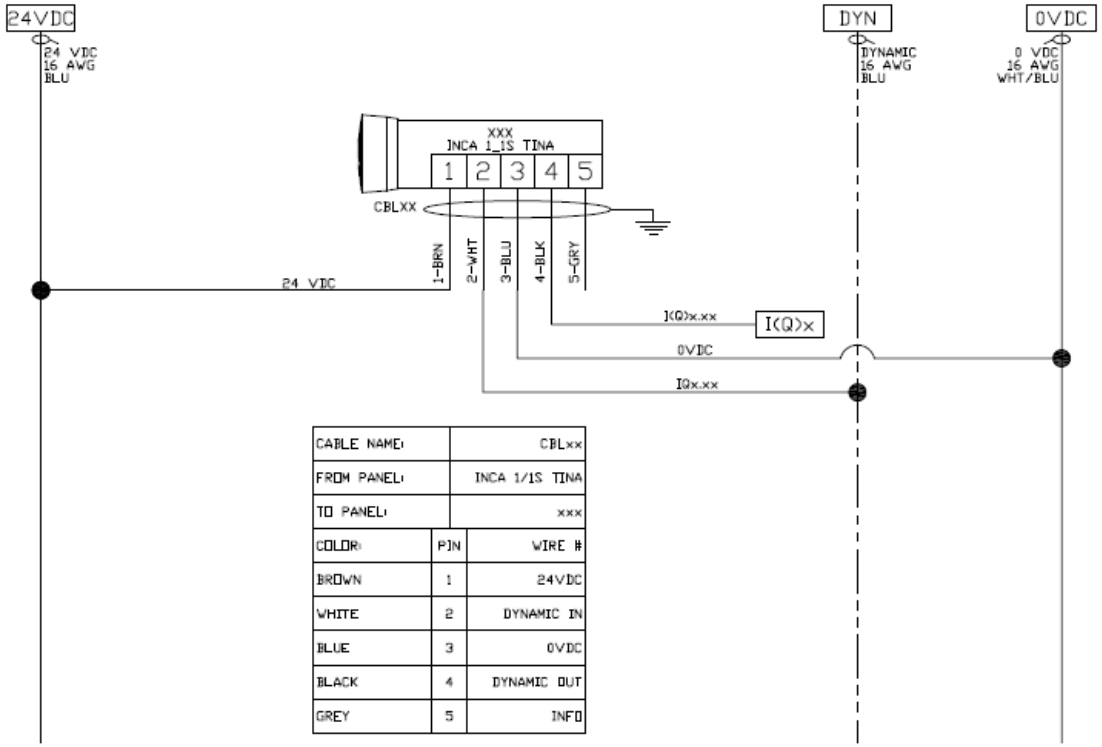


Device (ex. Inca 1 Tina)

IO Option Configuration Example (Pluto Manager)

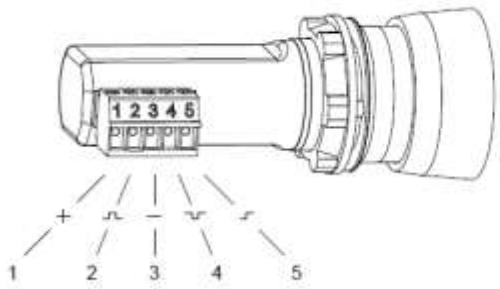
Inca 1 Tina (Wiring)

Electrical Wiring to Pluto Safety PLC



CABLE NAME:		CBLxx
FROM PANEL:		INCA 1/1S TINA
TO PANEL:		xxx
COLOR:	PIN	WIRE #
BROWN	1	24VDC
WHITE	2	DYNAMIC IN
BLUE	3	0VDC
BLACK	4	DYNAMIC OUT
GREY	5	INFO

Device Internal Wiring



INCA Tina
5-pin terminal block

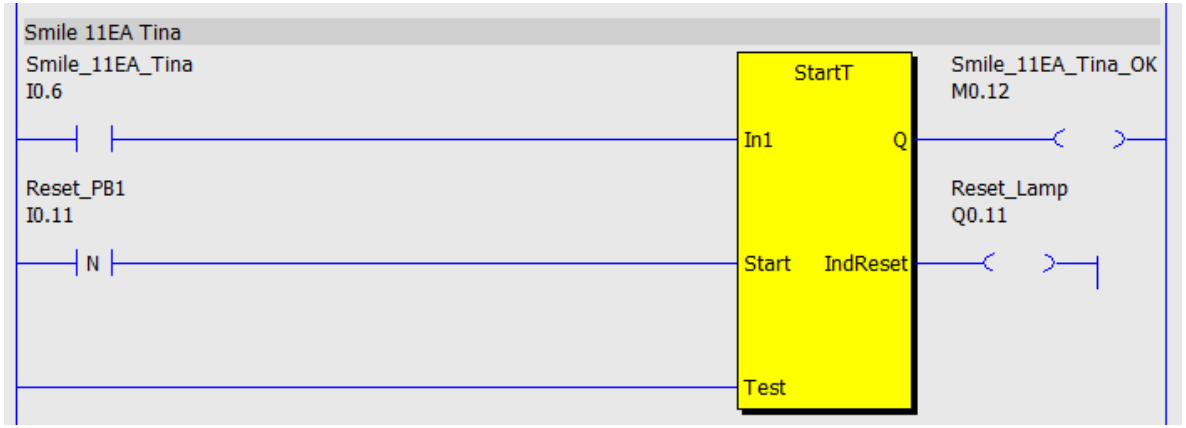
1) +24 VDC
2) Dynamic signal in
3) 0 V
4) Dynamic signal out
5) Information output*

Notes

The Tina device inverts the DYNLINK signal (ex. A Pulse) 180 degrees and sends it out. This allows for any short to be detected in the cable.

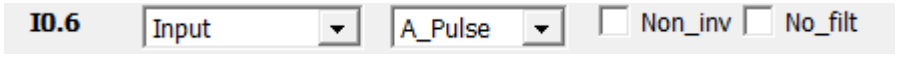
Smile 11EA Tina (Programming)

Pluto Manager Example Programming



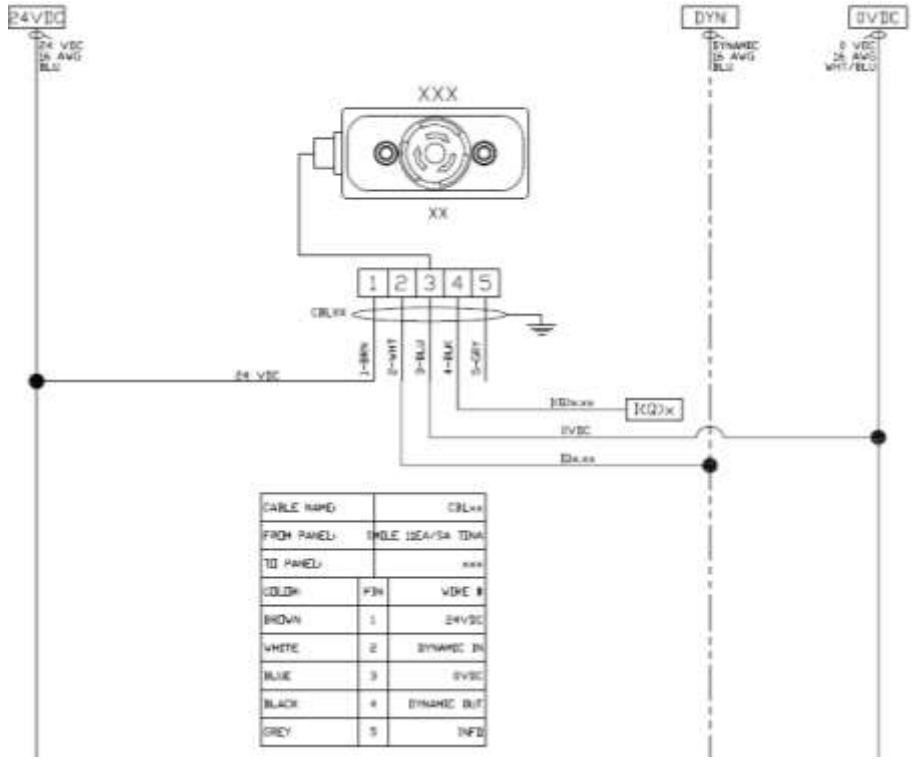
Device

IO Option Configuration Example (Pluto Manager)



Smile 11EA(SA) Tina (Wiring)

Electrical Wiring to Pluto Safety PLC

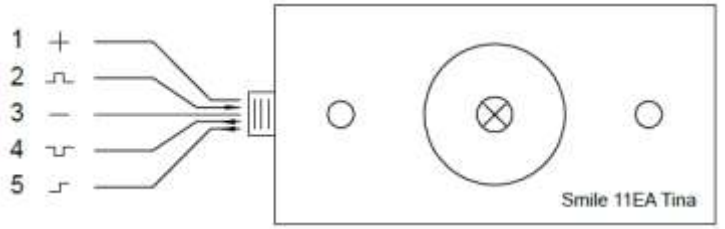


Device Internal Wiring

Smile 11EA Tina

M12 5-pole male

1) +24 VDC
2) Dynamic signal input
3) 0 VDC
4) Dynamic signal output
5) Information output*

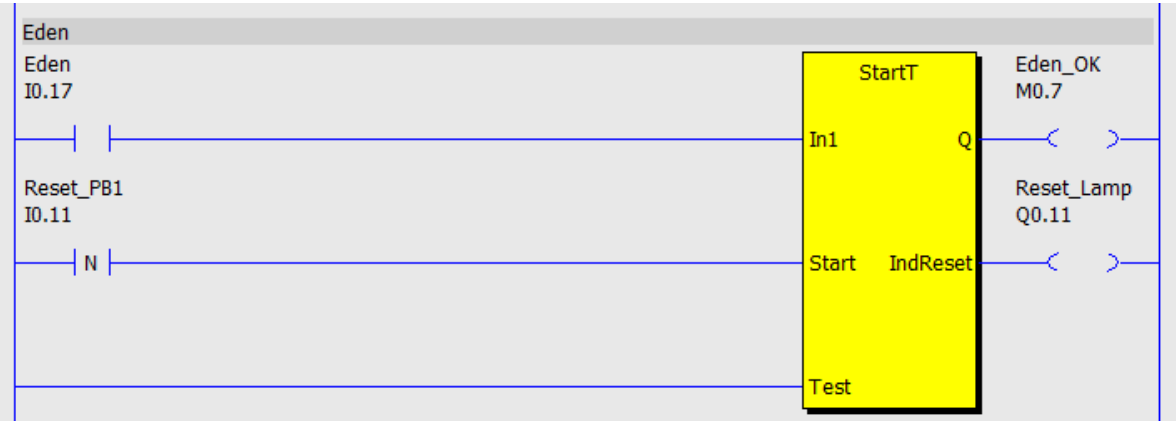


Notes

The Tina device inverts the DYNLINK signal (ex. A Pulse) 180 degrees and sends it out. This allows for any short to be detected in the cable.

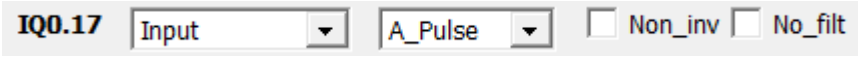
Eden DYN Info (Programming)

Pluto Manager Example Programming



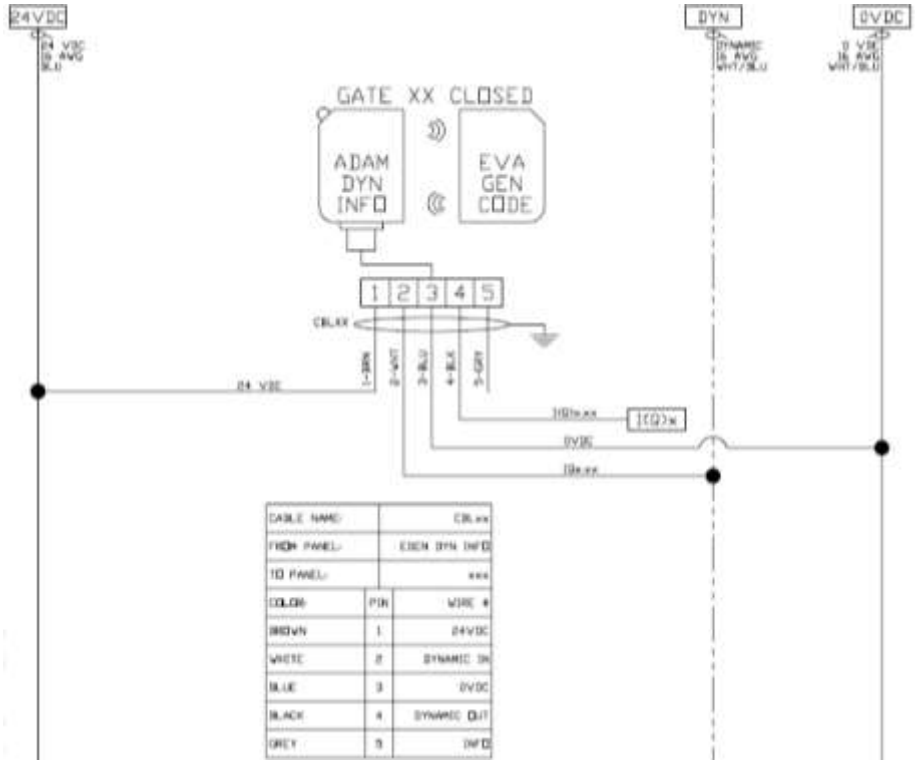
Device

IO Option Configuration Example (Pluto Manager)

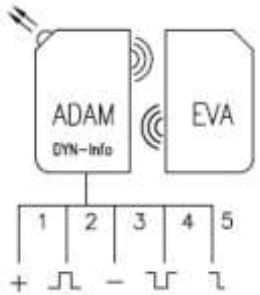


Eden DYN Info (Wiring)

Electrical Wiring to Pluto Safety PLC



Device Internal Wiring

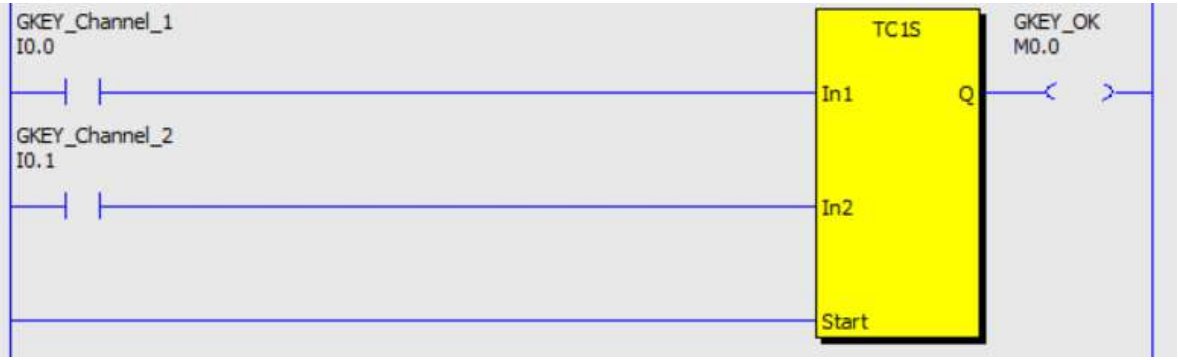


Notes

The Eden inverts the DYNLINK signal (ex. A Pulse) 180 degrees and sends it out. This allows for any short to be detected in the cable.

GKEY Info (Programming)

Pluto Manager Example Programming

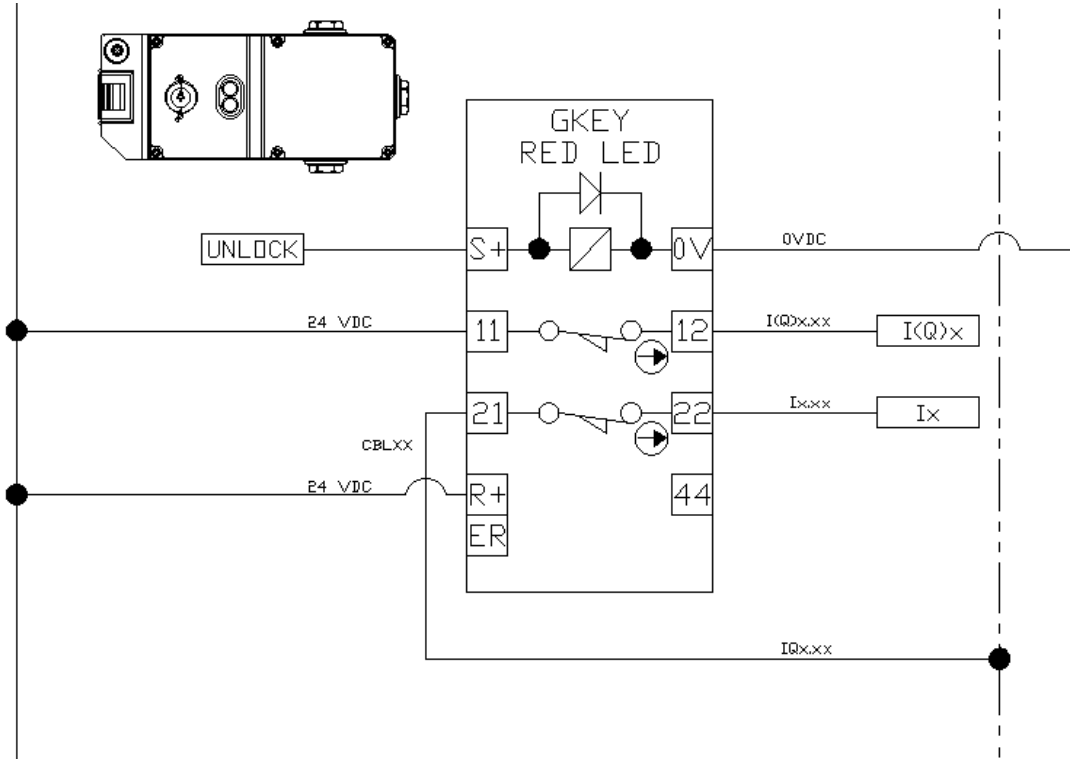


Device

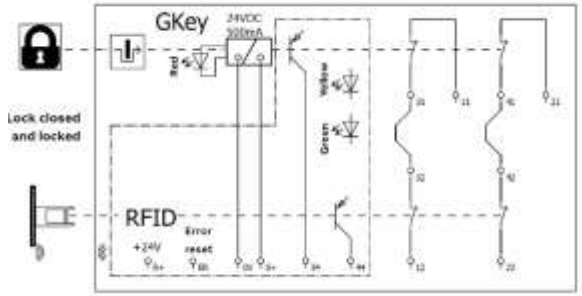
IO Option Configuration Example (Pluto Manager)

GKEY Info (Wiring)

Electrical Wiring to Pluto Safety PLC



Device Internal Wiring



Notes

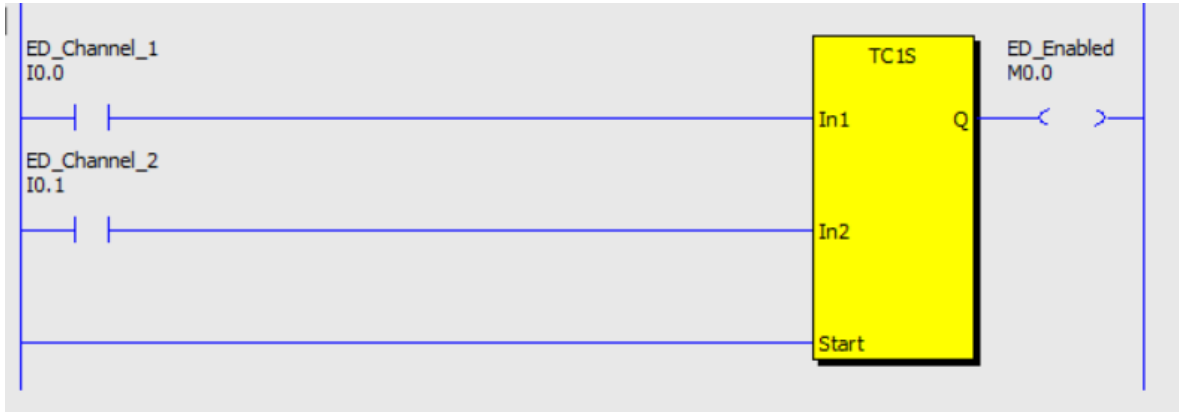
One channel Static (24VDC) and the other DYNLINK signal (ex. A Pulse, Non-Inverted) to detect a cross short between channels.

Internal Wiring Above is with no extra buttons installed.

Unlocking signal could come from Pluto or External source depending on application.

JSHD4-2 + AD Bottom Info (Programming)

Pluto Manager Example Programming

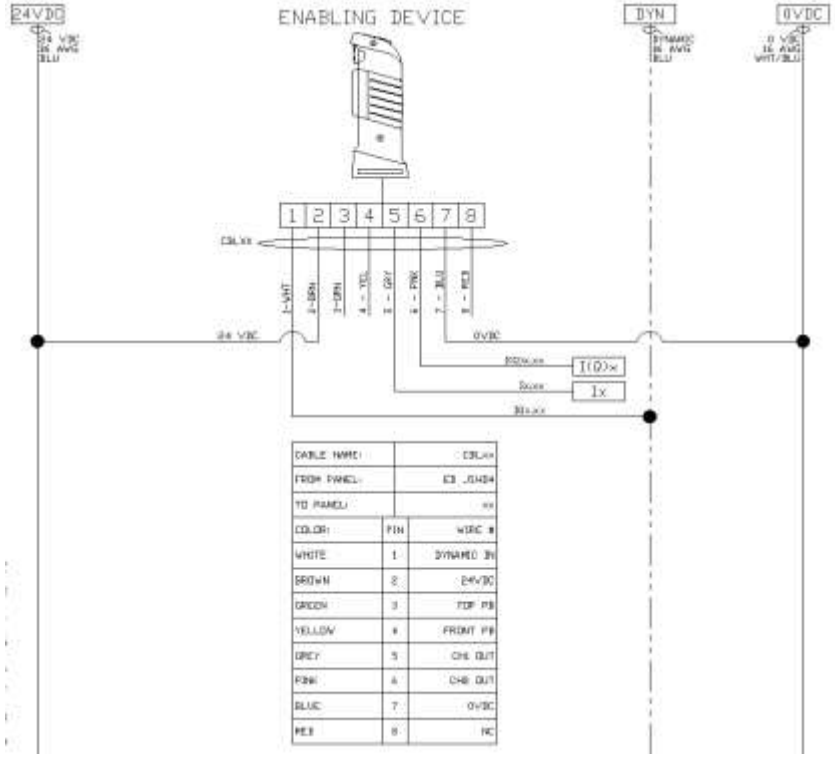


Device

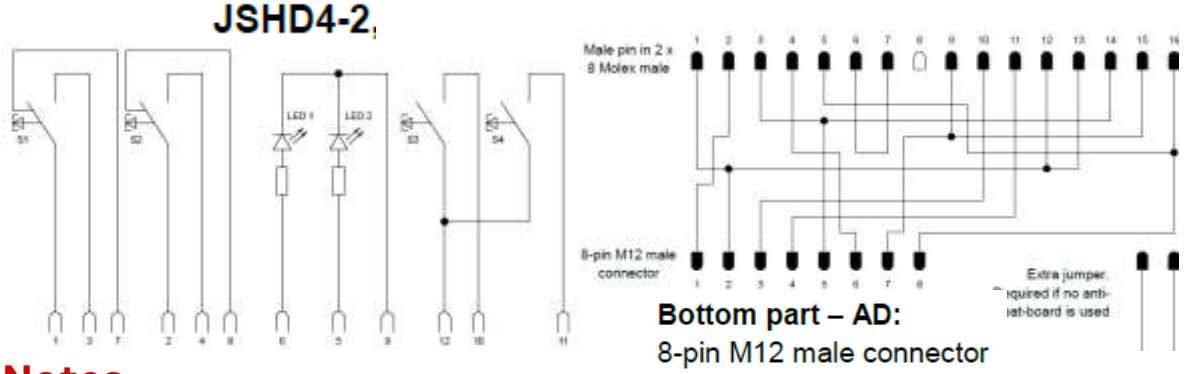
IO Option Configuration Example (Pluto Manager)

JSHD4-2 + AD Bottom Info (Wiring)

Electrical Wiring to Pluto Safety PLC



Device Internal Wiring

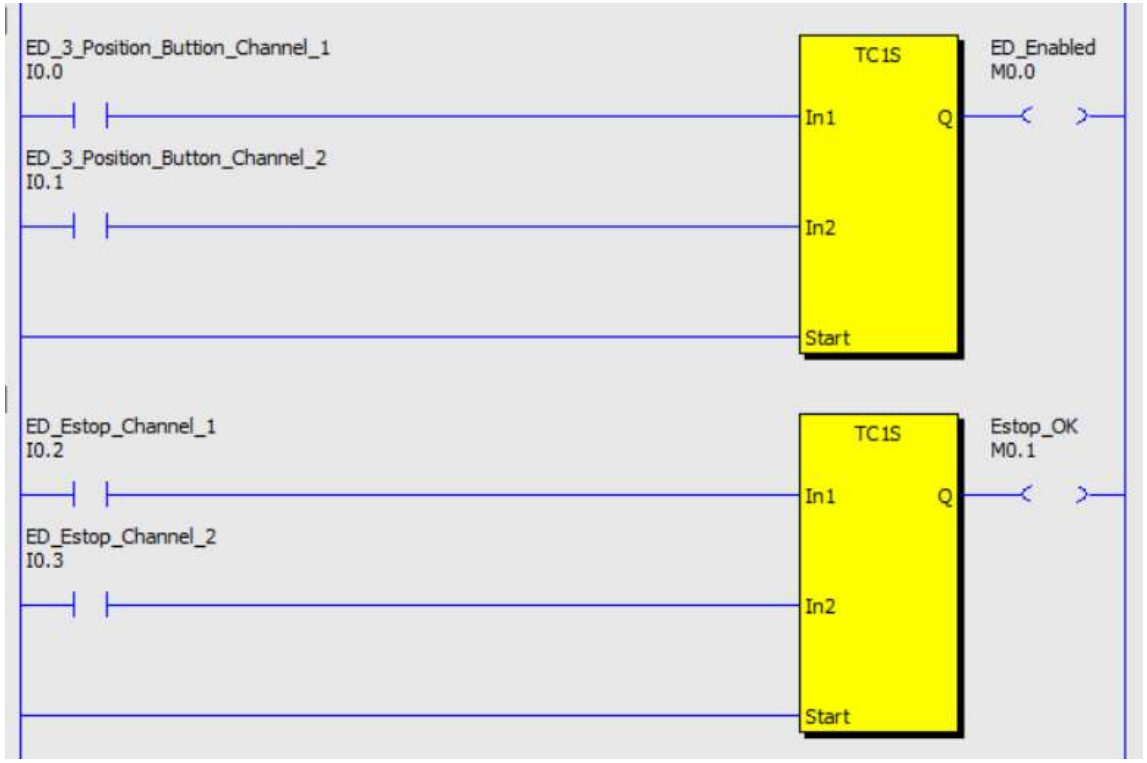


Notes

One channel Static (24VDC) and the other DYNLINK signal (ex. A Pulse, Non-Inverted) to detect a cross short between channels.

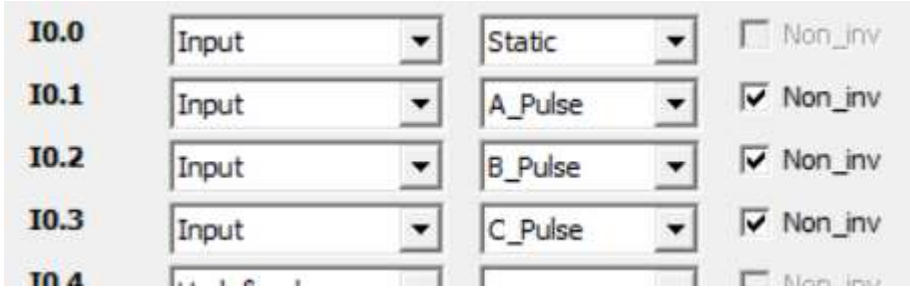
HD5 Info (Programming)

Pluto Manager Example Programming



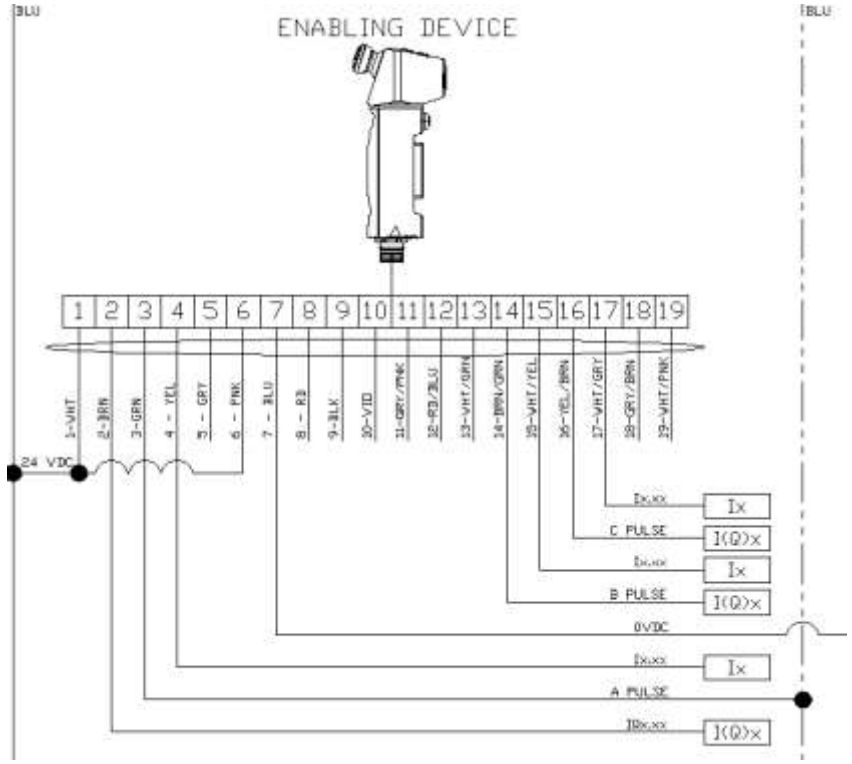
Device (HD5-S-111)

IO Option Configuration Example (Pluto Manager)

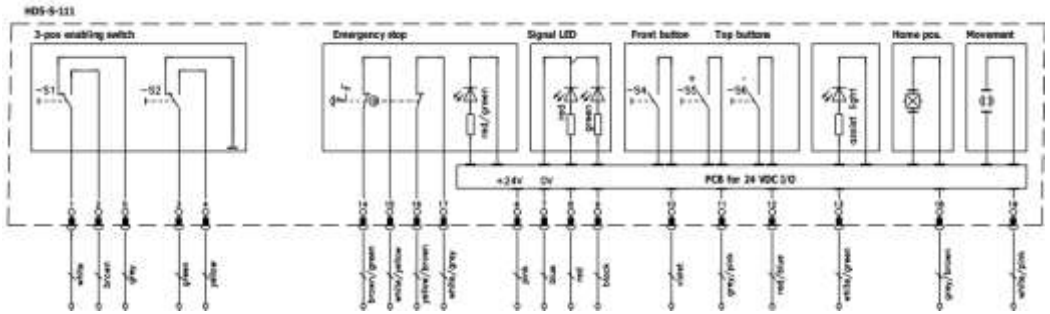


HD5 Info (Wiring)

Electrical Wiring to Pluto Safety PLC



Device Internal Wiring (HD5-S-111)



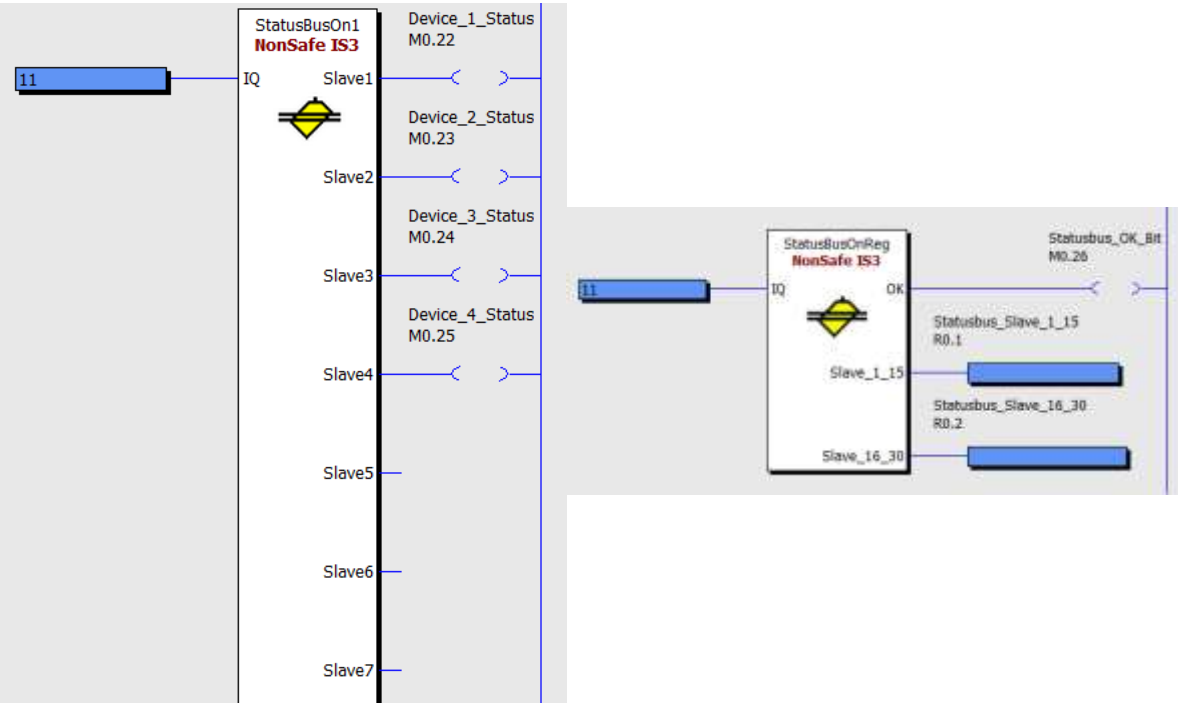
Notes

For 3 position button(Pins 1 to 4) one channel Static (24VDC) and the other DYNLINK signal (ex. A Pulse, Non-Inverted) to detect a cross short between channels.

For the estop(Pins 14 to 17) B pulse and C pulse are used. These come in as Non-Inverted into the Pluto.

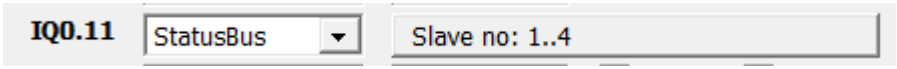
Status Bus Devices (Programming)

Pluto Manager Example Programming



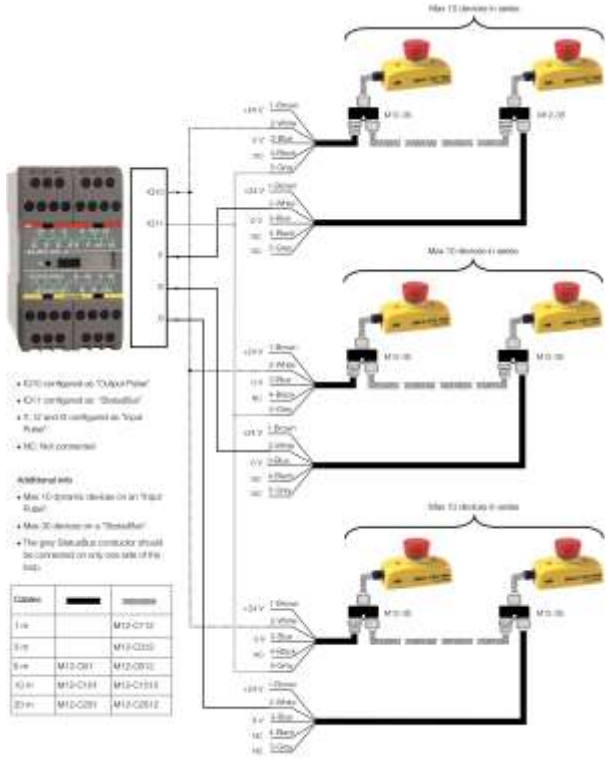
Device (ex. Eden Statusbus, Smile or Inca Statusbus)

IO Option Configuration Example (Pluto Manager)



Status Bus Devices (Wiring)

Electrical Wiring to Pluto Safety PLC



Device (ex. Eden Statusbus, Smile or Inca Statusbus)

Notes

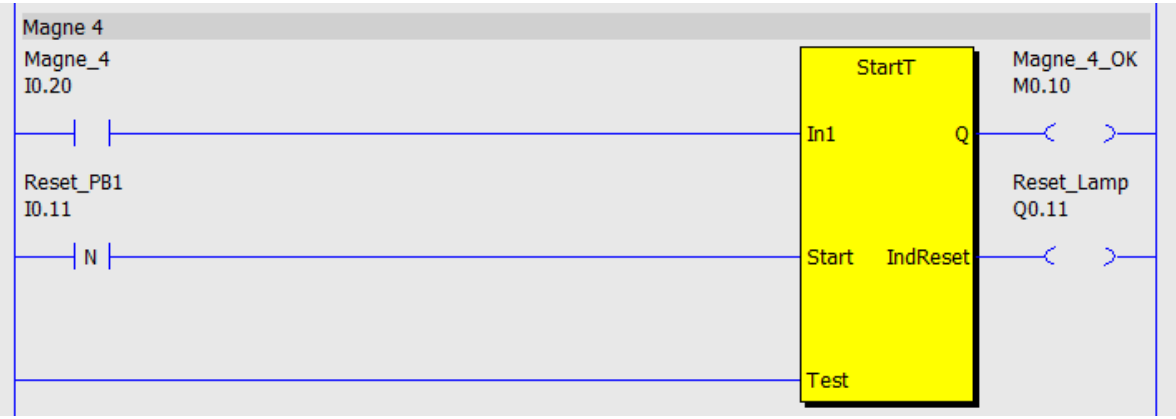
Up to 30 devices can be wired to one IQ for status. Internal bits from slave can be sent to standard PLC via Gateways (Either through a register or single bits)

Statusbus devices given a slave number via Pluto under the Tools Menu/Statusbus/Teach Addresses

M12-3S splitters can be used for daisy chaining or ran back to the panel individually (pins 1 to 4 normal DYNLINK wiring, pin 5 info is wired in parallel with other info lines.

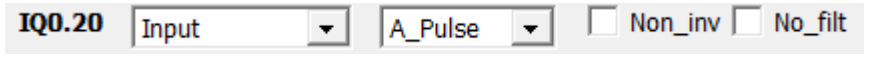
Magne 4 DYN Info(Programming)

Pluto Manager Example Programming



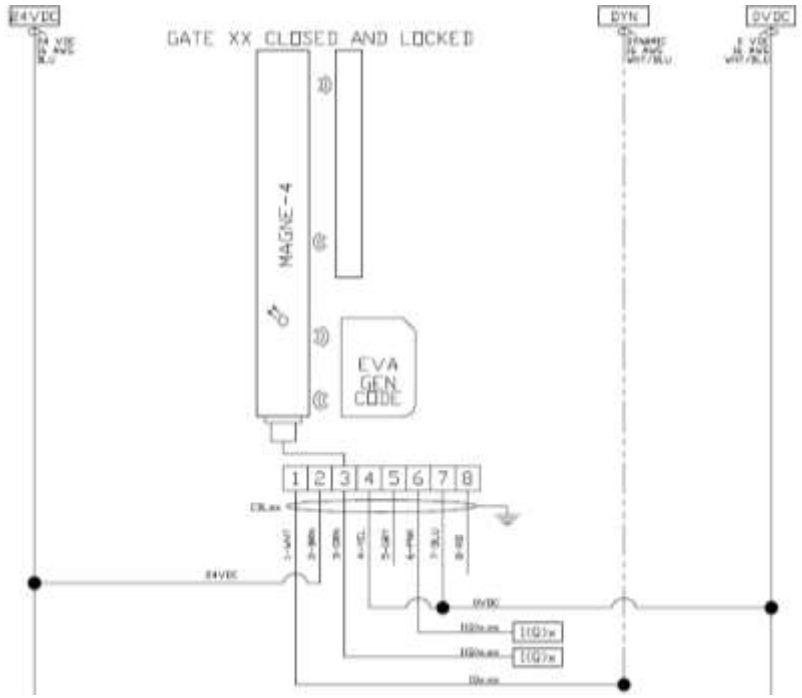
Device

IO Option Configuration Example (Pluto Manager)



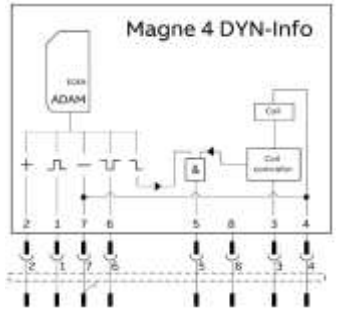
Magne 4 DYN Info(Wiring)

Electrical Wiring to Pluto Safety PLC



CABLE NAME:		CBLxx
FROM PANEL:		MAGNE 4
TO PANEL:		xx
COLOR	PIN	WIRE #
WHITE	1	DYNAMIC IN
BROWN	2	24VDC
GREEN	3	LOCKING 24VDC
YELLOW	4	LOCKING 0VDC
GREY	5	INFO CL/LCD
PINK	6	DYNAMIC OUT
BLUE	7	0VDC
RED	8	NC

Device Internal Wiring

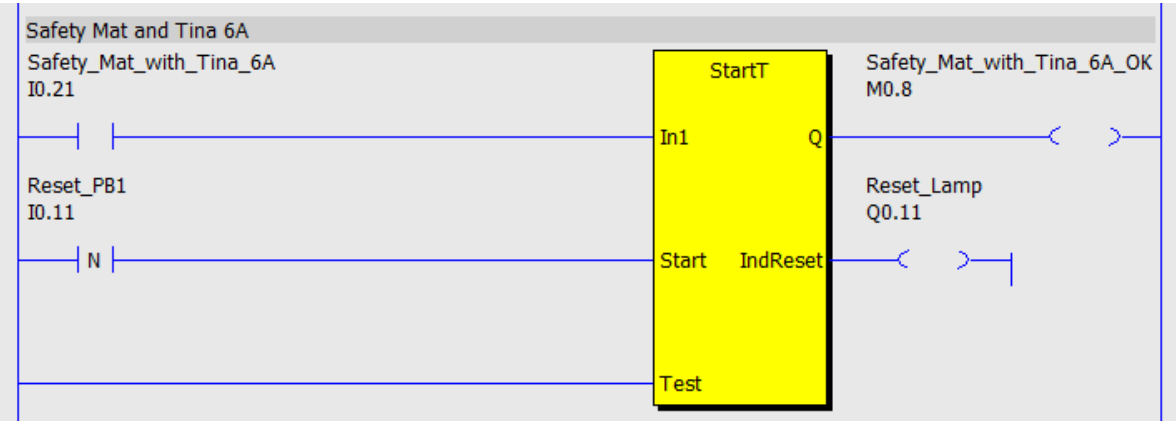


Notes

The Magne 4 inverts the DYNLINK signal (ex. A Pulse) 180 degrees and sends it out. This allows for any short to be detected in the cable

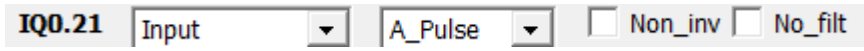
Safety Mat/Safety Edge with Tina 6A (Programming)

Pluto Manager Example Programming



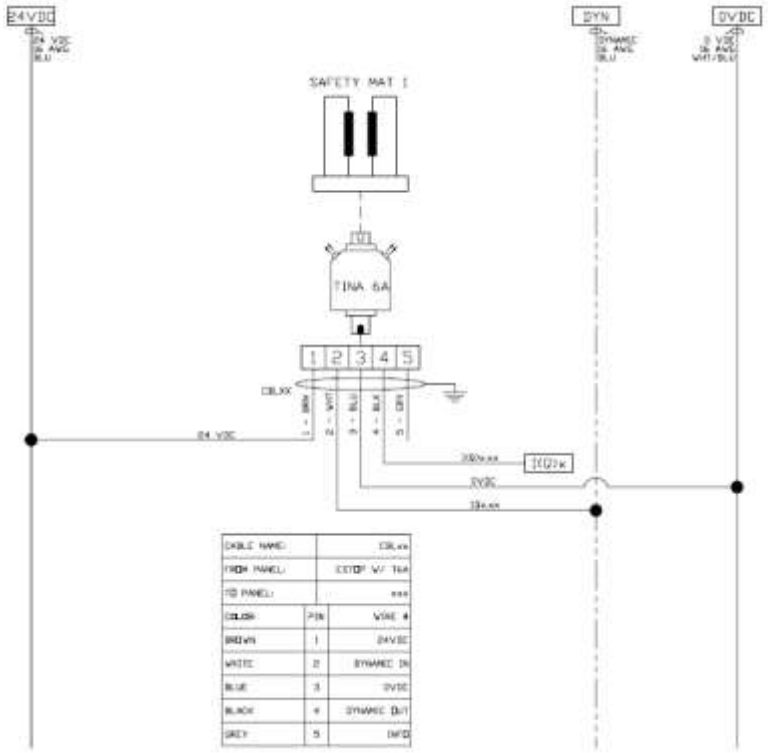
Device

IO Option Configuration Example (Pluto Manager)

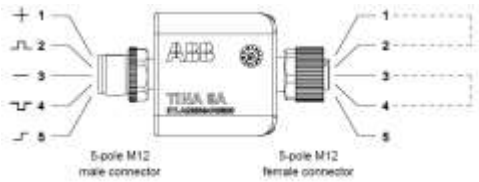


Safety Mat/Safety Edge with Tina 6A (Wiring)

Electrical Wiring to Pluto Safety PLC



Device Internal Wiring



M12 connector (male):

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

M12 connector (female):

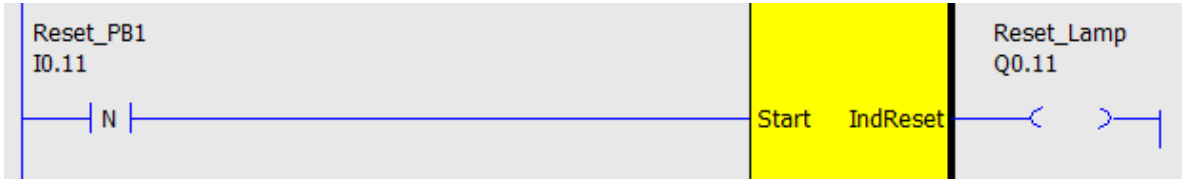
1)	Brown:	Loop-A1
2)	White:	Loop-A2
3)	Blue:	Loop-B1
4)	Black:	Loop-B2
5)	Grey:	Not used

Notes

The Tina device inverts the DYNLINK signal (ex. A Pulse) 180 degrees and sends it out. This allows for any short to be detected in the cable

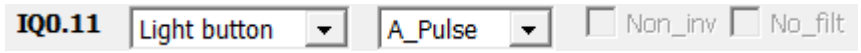
Illuminated Reset (Programming)

Pluto Manager Example Programming



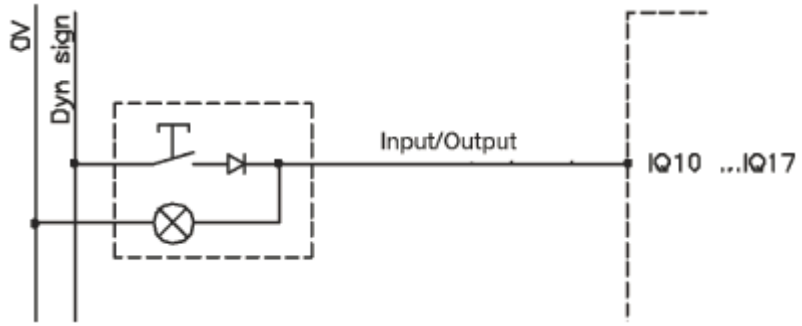
Device (ex. Smile 11RB)

IO Option Configuration Example (Pluto Manager)

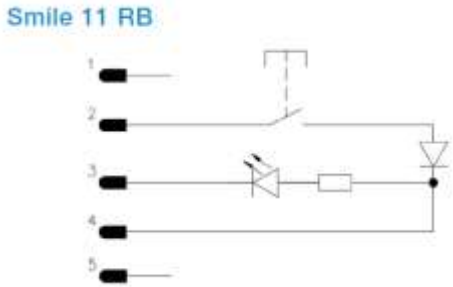


Illuminated Reset (Wiring)

Electrical Wiring to Pluto Safety PLC



Device Internal Wiring (Smile 11RB)



Notes

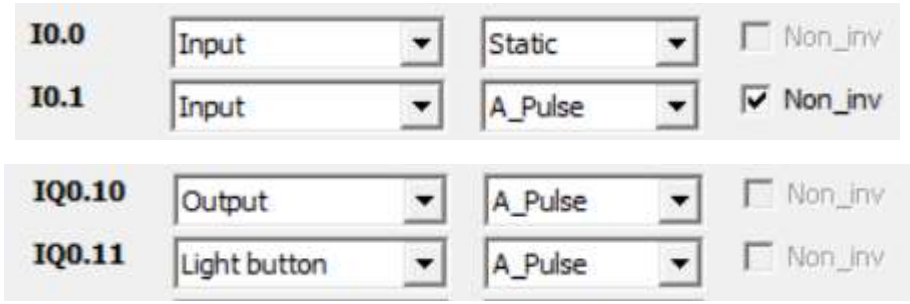
The illuminated reset uses the DYNLINK signal (ex A pulse). A diode is needed to allow the DYNLINK signal through when the button is pressed but will block the 24VDC as well as the pluto seeing a fault “IQ shorted to another IQ”.

Smile 41 EWWWP (Programming)

Pluto Manager Example Programming

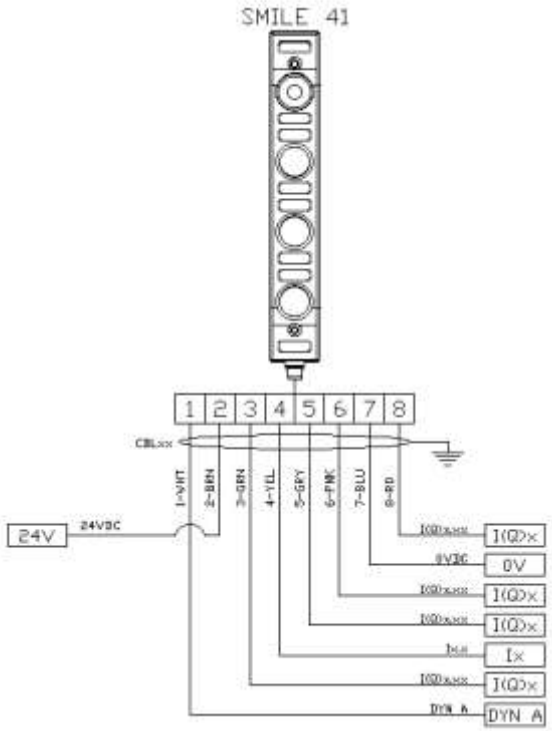
Device

IO Option Configuration Example (Pluto Manager)

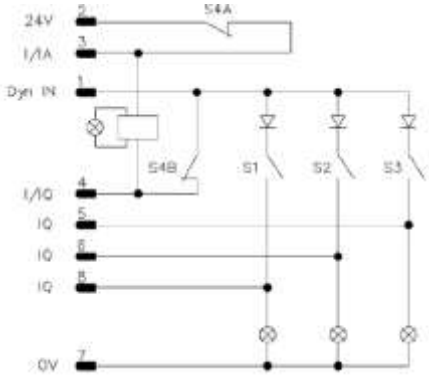


Smile 41 EWWWP (Wiring)

Electrical Wiring to Pluto Safety PLC



Device Internal Wiring

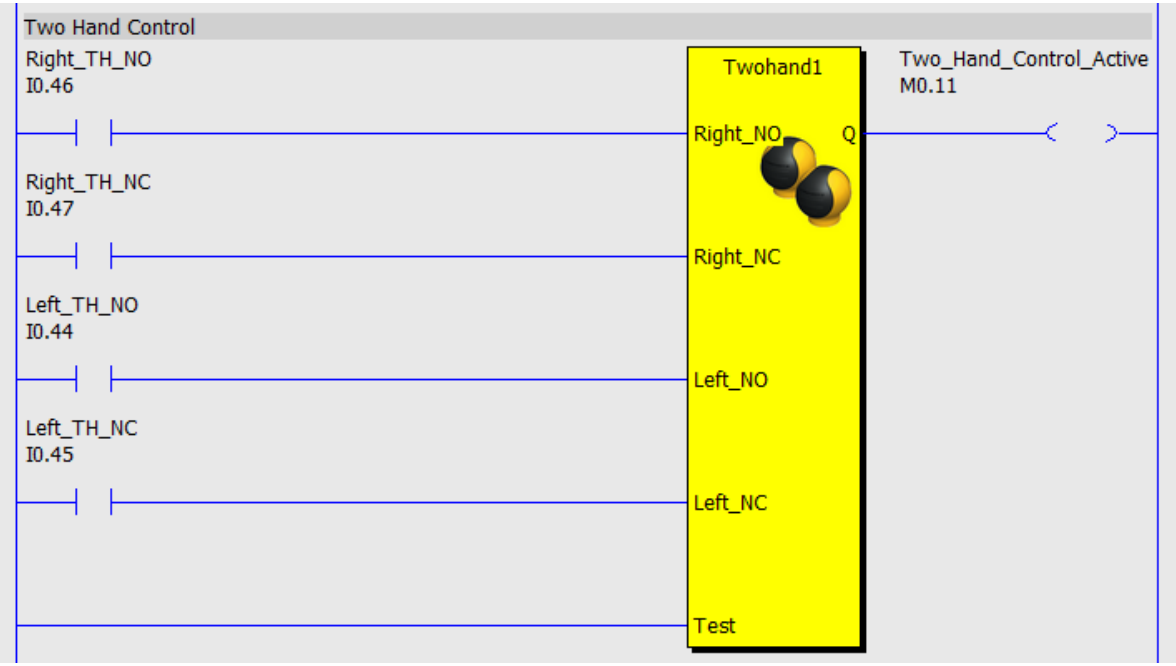


Notes

The illuminated reset uses the DYNLINK signal (ex A pulse). A diode is needed to allow the DYNLINK signal through when the button is pressed but will block the 24VDC as well as the pluto seeing a fault “IQ shorted to another IQ”.

Two Hand Control (Programming)

Pluto Manager Example Programming



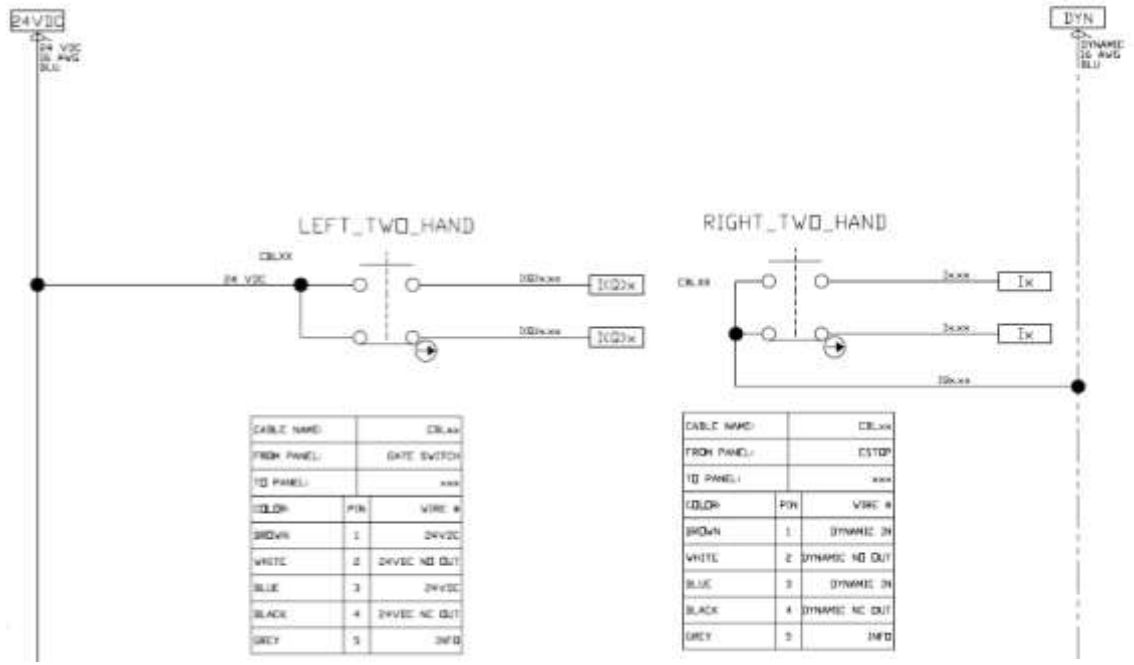
Device (Safeball)

IO Option Configuration Example (Pluto Manager)

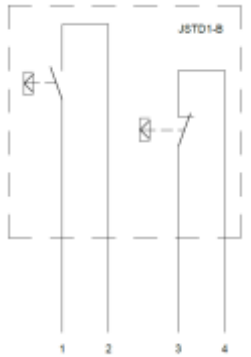
I0.44	Input	Static	☐ Non_inv	☐ No_filt
I0.45	Input	Static	☐ Non_inv	☐ No_filt
I0.46	Input	A_Pulse	☑ Non_inv	☐ No_filt
I0.47	Input	A_Pulse	☑ Non_inv	☐ No_filt

Two Hand Control (Wiring)

Electrical Wiring to Pluto Safety PLC



Device Internal Wiring(Safeball)



JSTD1-B:

1) Black (1)
2) White
3) Black (2)
4) Red

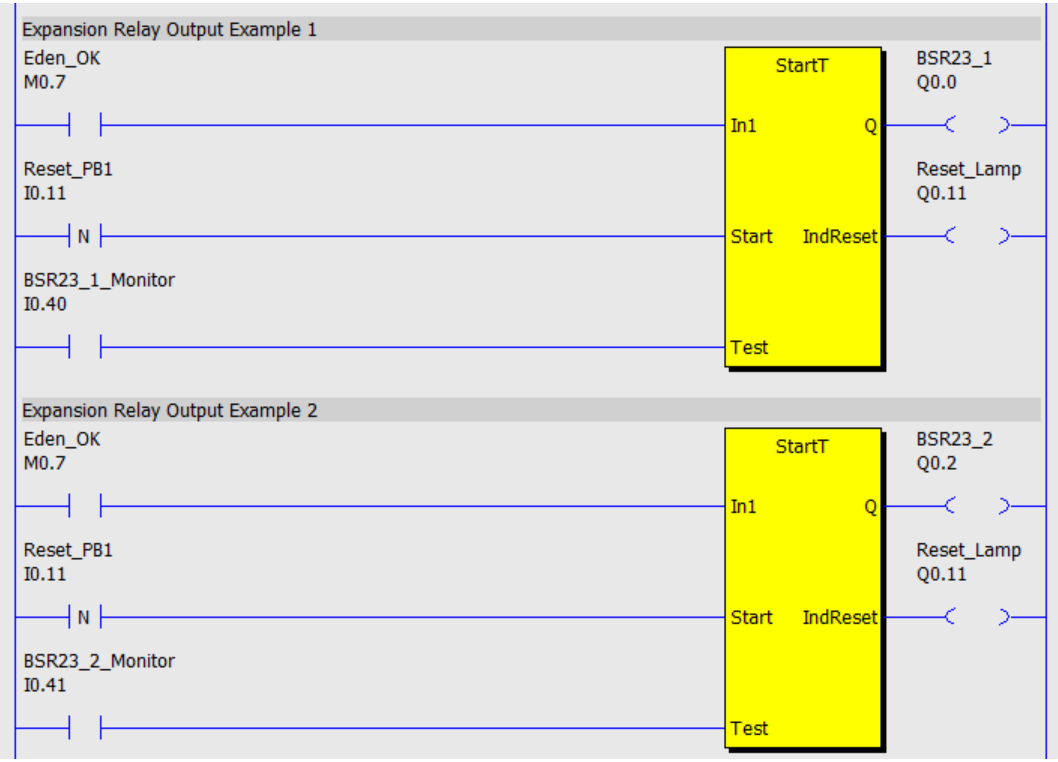
Notes

One button or Safeball connected to 24VDC (NO + NC) and other button or Safeball to DYNLINK signal (ex A pulse, Non-Inverted). This allows for both buttons to come back to the panel in 1 cable.

NOTE: Pushbuttons could also be used with NO/NC contacts.

Output Expansion to BSR23 (Programming)

Pluto Manager Example Programming



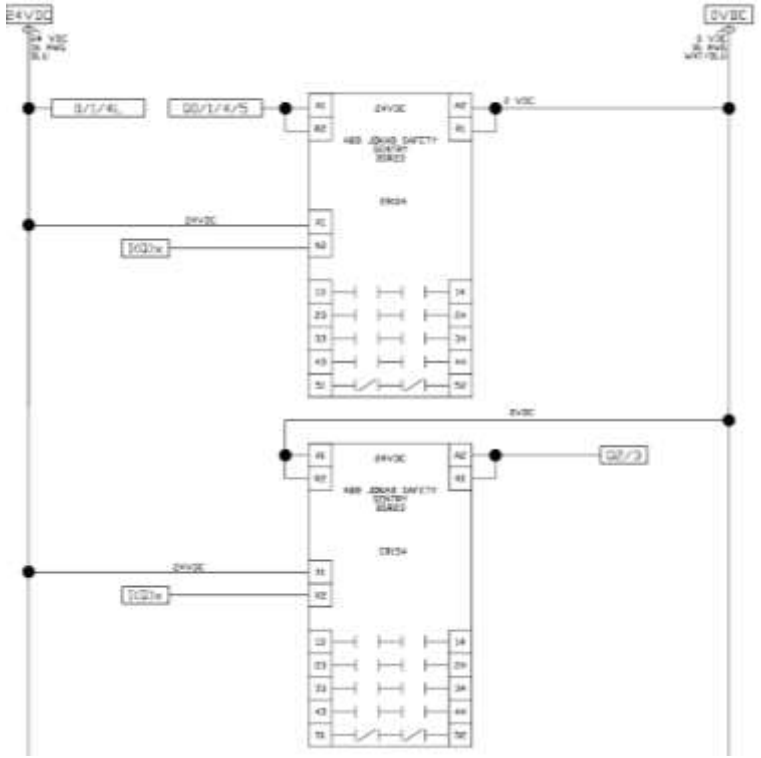
Device

IO Option Configuration (Pluto Manager) - Monitoring

Select “Safety Outputs” in Pluto Manager under variables and type in a Symbolic Name. These are already configured as safety outputs. Monitoring setup as below:

Output Expansion to BSR23 (Wiring)

Electrical Wiring to Pluto Safety PLC



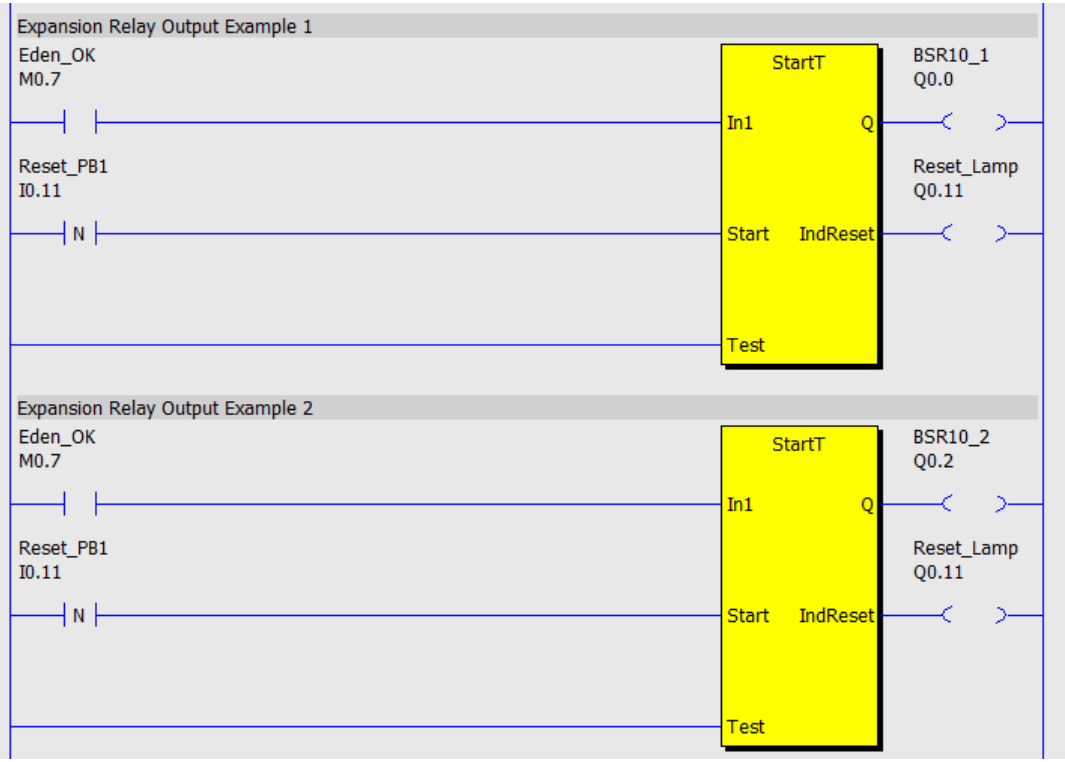
Device

Notes

If BSR23 is in the same panel as the Pluto they can be driven single channel

Output Expansion to BSR10/11 (Programming)

Pluto Manager Example Programming



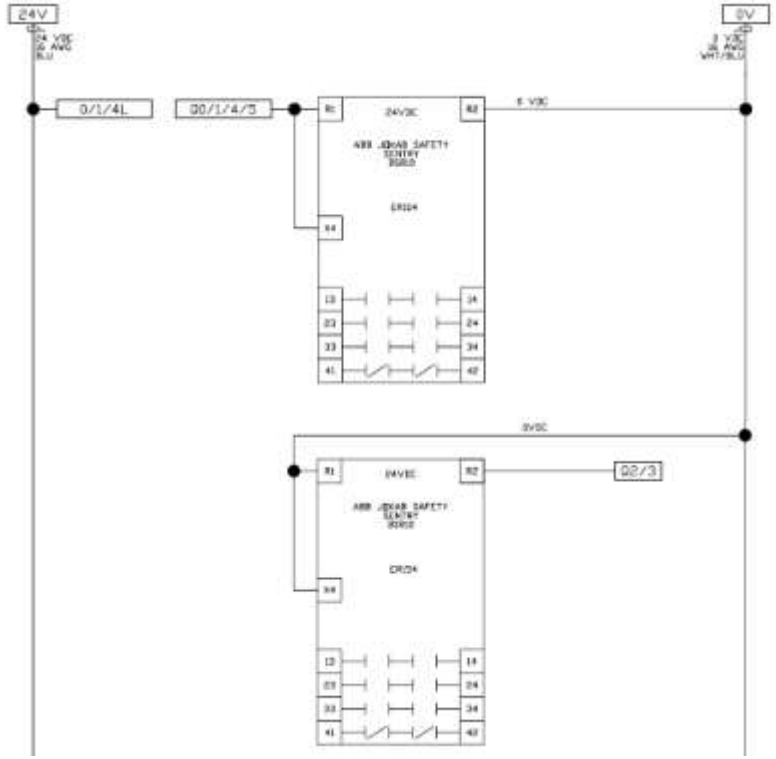
Device

IO Option Configuration (Pluto Manager) - None

Select “Safety Outputs” in Pluto Manager under variables and type in a Symbolic Name. These are already configured as safety outputs.

Output Expansion to BSR10/11 (Wiring)

Electrical Wiring to Pluto Safety PLC



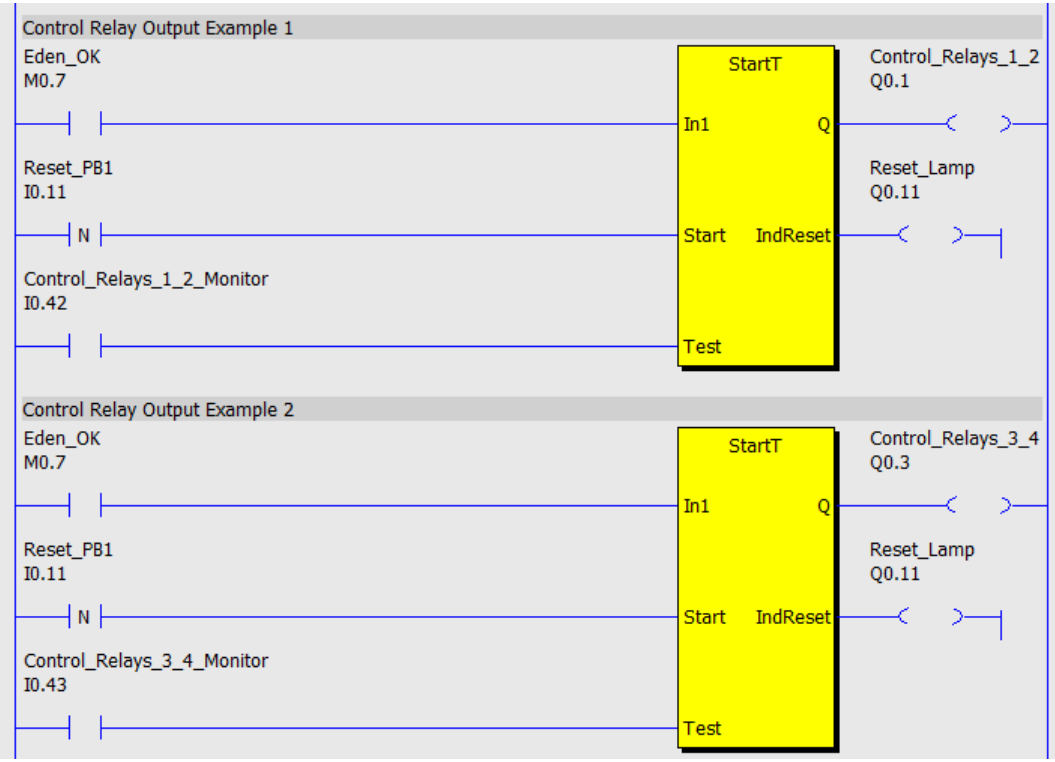
Device

Notes

If BSR10/11 is in the same panel as the Pluto they can be driven single channel

Output connection to Contactors/Control Relays (Programming)

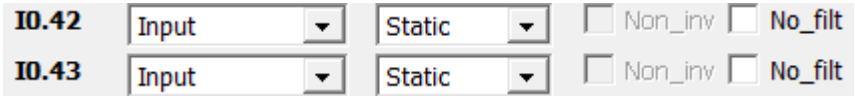
Pluto Manager Example Programming



Device (ex. AFS Contactors)

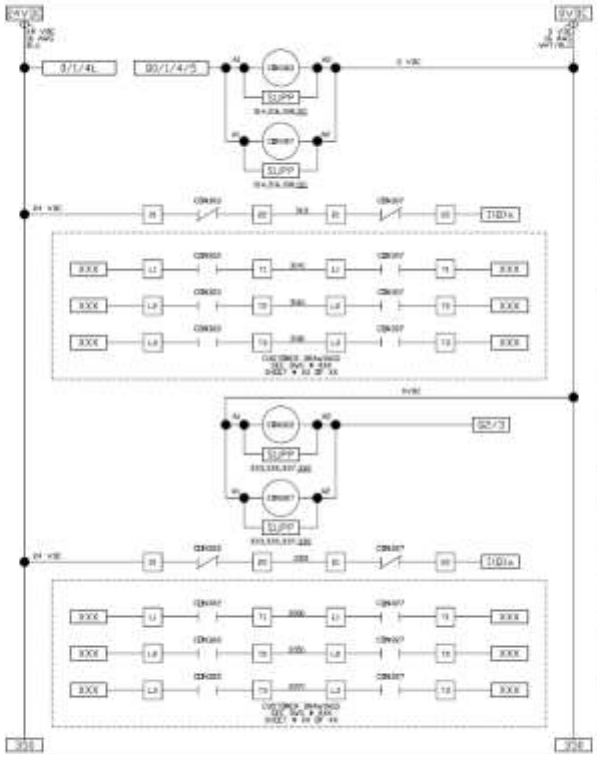
IO Option Configuration (Pluto Manager) - Monitoring

Select “Safety Outputs” in Pluto Manager under variables and type in a Symbolic Name. These are already configured as safety outputs. Monitoring setup as below:



Output connection to Contactors/Control Relays (Wiring)

Electrical Wiring to Pluto Safety PLC



Device (ex. AFS Contactors)

Notes

If contactors/control relays are in the same panel as the Pluto they can be driven single channel


ABB