

Application Guide

Total Access & Control

Introduction

A market leader
Fortress Interlocks
design and
manufacture safety
interlock systems for a
wide variety of
industrial applications.

Fortress Interlocks is a market leader in the design and manufacture of safety interlock systems.

We offer an unrivalled portfolio of interlocks suitable for applications across a wide industrial base from power generation and distribution, steel, automotive, through to controlling and/or safeguarding a pick and place robot.

With in excess of 40 years experience in the safety market, **Fortress** are renown for their innovative design, robust engineering and reliability.

This guide has been devised to offer an introduction to the different types of interlocks available, advise on how to choose engravings and illustrate how our products can be used in specific application contexts. Demonstrating how products from our three ranges mGard, amGard and eGard can be utilised for a variety of safety solutions.

The applications shown are just an example of what can be used to facilitate your safety requirements and specific application schematics can be developed to address your own needs should you require it.

For specific application information or technical product information please visit our website **www.fortressinterlocks.com**.

www.fortressinterlocks.com
Total Access & Control

What are Gate Switches?

Non Solenoid

A non solenoid gate switch has the equivalent function to opening a microwave door (the microwave automatically stops whenever the door is opened). Therefore a guarded machine would automatically stop when the door is opened, ensuring that it is safe to enter the area.



Solenoid

A solenoid gate switch has the equivalent function to a horizontal loading washing machine door, it is electrically locked until the machine's water has emptied. A solenoid gate switch is used where a machine has a run down cycle or to stop the machine cycle from being interrupted (request to enter).



What is Trapped Key?

A method of isolating the source of danger (usually control power) before releasing keys to allow access.

What Trapped Key solutions Offer

- A simple mechanical system of interlocking
- No wiring to the access gates
- Keys are trapped and freed in a defined logic sequence, to only allow access when safe to enter.

Example 1

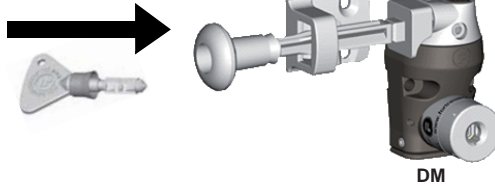
A method of isolating the source of danger (usually control power) before releasing keys to allow access.

Key Switch



Removal of key breaks the dual safety circuits. (similar to removing a key from the car ignition as the engine stops).

Door Lock

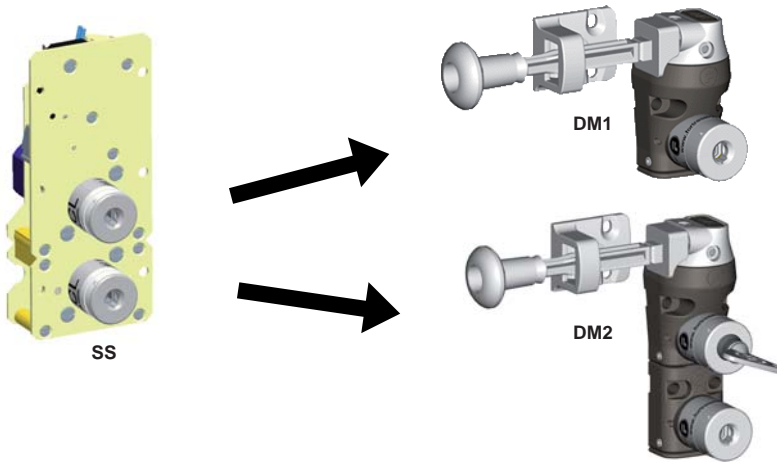


Different to a standard door lock as the key is trapped when the door is open. Therefore the machine cannot run with the door open.

Example 2

Machines with two doors (both can be open at the same time). The machine needs to be electrically locked until safe to enter (either because it has a run down cycle or a request for the robot to reach a programmed stop as required).

Solenoid controlled isolation configuration. Keys are electrically locked in place until the machine is stopped. Removal of first key breaks the safety circuits.



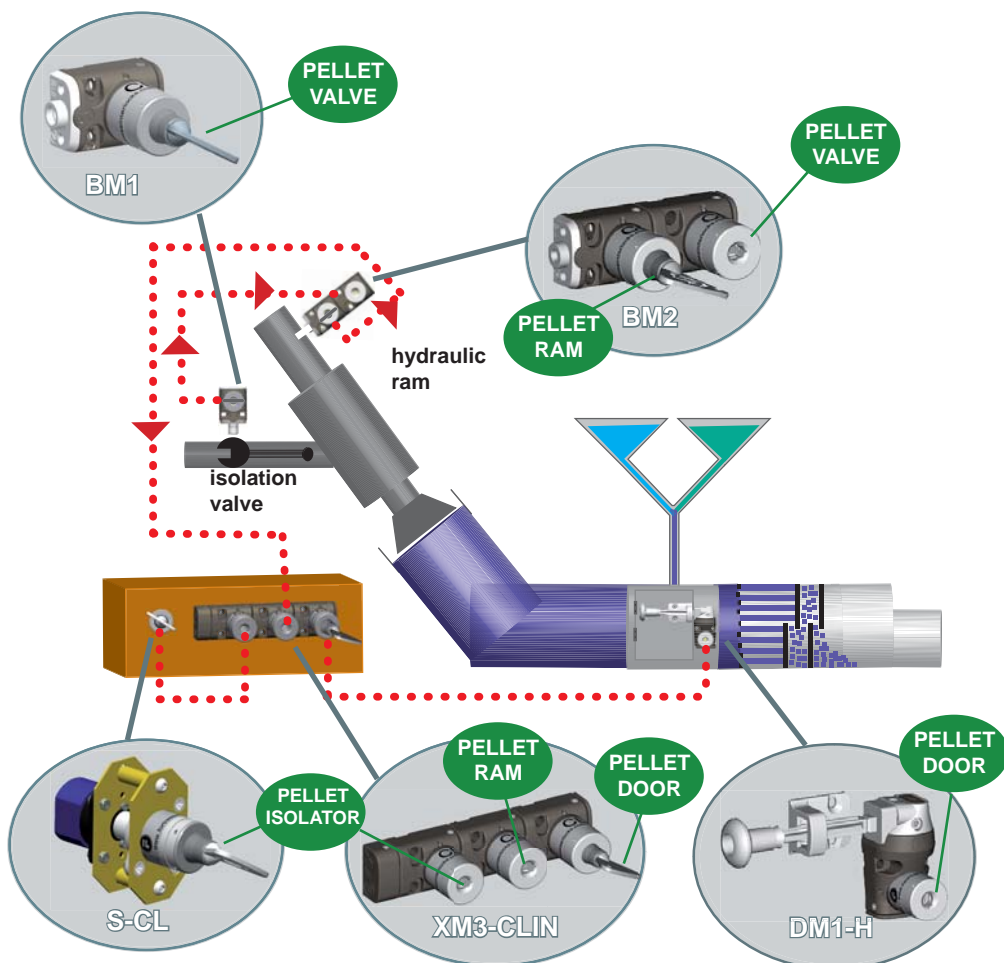
Insertion of the key into bottom lock releases a safety key which in turn unlocks the door and traps the bottom access key, ensuring personnel do not get accidentally locked in

Questions to consider when specifying a solution

1. Rundown/process interruption? (Solenoid)
2. Accidental lock-in? (Safety Key)
3. Frequency of access? (Trapped Key / Gate Switch)
4. Number of access points?
5. Controlled low power / speed (robot teach / setting / conveyor jog)
6. Wire to access points, if so will it be hard wired or networked?

What type of interlock?

Example of lock and key engravings



● = ENGRAVING

Every lock and key can have an engraving. Every lock operated by the same key must have the same combination and therefore engraving.

Example of engravings for this application;

BM1-CLIN = “PELLET VALVE” **BM2-CLIN** = primary “PELLET RAM”
 secondary = “PELLET VALVE”

S-CLIN = “PELLET ISOLATOR” **DM1-CLIN** = 2 in “PELLET RAM” &
 “PELLET ISOLATOR”
 1 out “PELLET DOOR”

Keys ordered separately = CLK-SUS 1 off each engraving

Engraving



eGard

eGard offers “Total Access & Control”. The innovative modular design allows the creation of safety gate switches, trapped key interlocks and machine control stations or any configuration of all three.



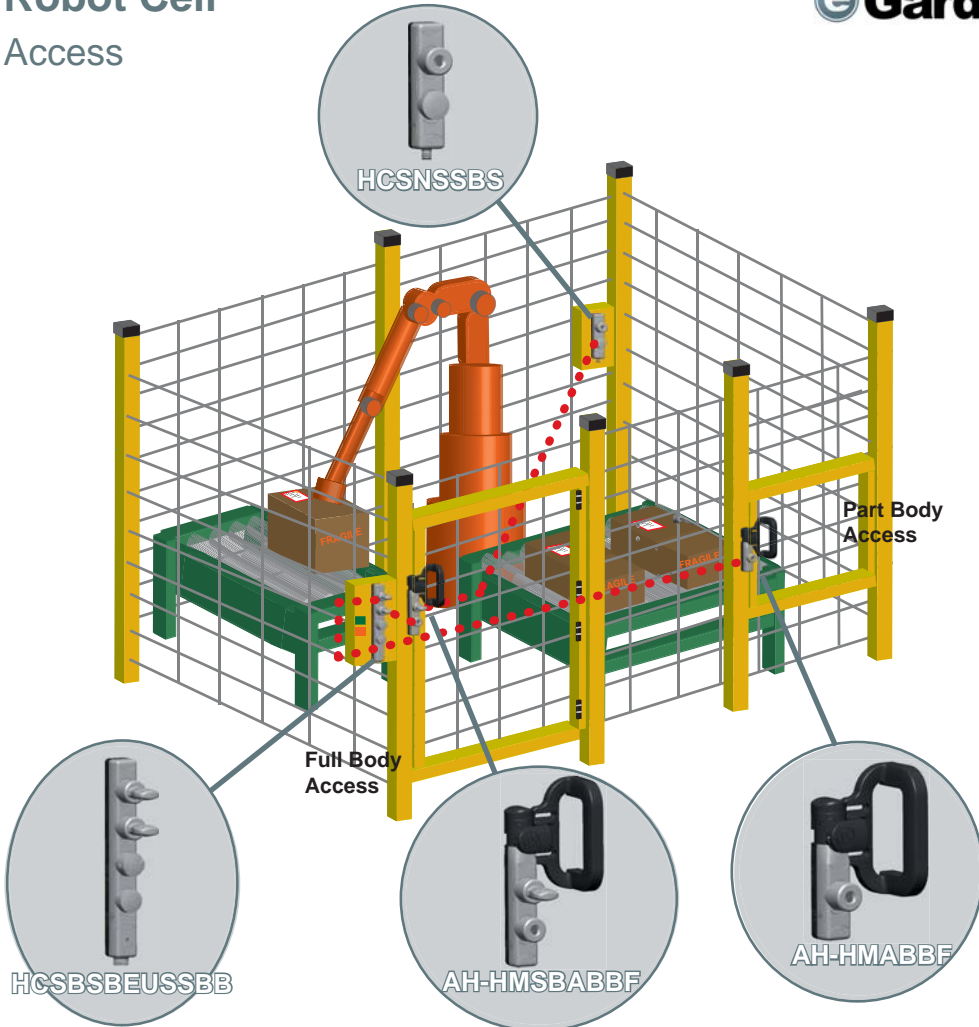
mGard

mGard is the premier range of robust modular trapped key products. Trapped key technology offers mechanical solutions to safeguarding dangerous machines and hazardous processes.



amGard

amGard is the ultimate range of safety gate switches. The robust modular arrangement offers an extensive variety of access solutions that can be tailored to suit any application.



Sequence

- Request stop at the control panel.
- Once safe this energises the solenoid allowing removal of the first key from HCSBSBEUSSBB which breaks the safety circuits.
- Insert the key into the AH-HMSBABBFF this releases the safety key, removal of which unlocks the door trapping the bottom access key. This ensures that personnel do not get accidentally locked in. The safety key can also be inserted into the HCSNSSBS to put the robot in teach mode.
- For part body access remove the second key from the HCSBSBEUSSBB insert into the AH-HMABBFF.

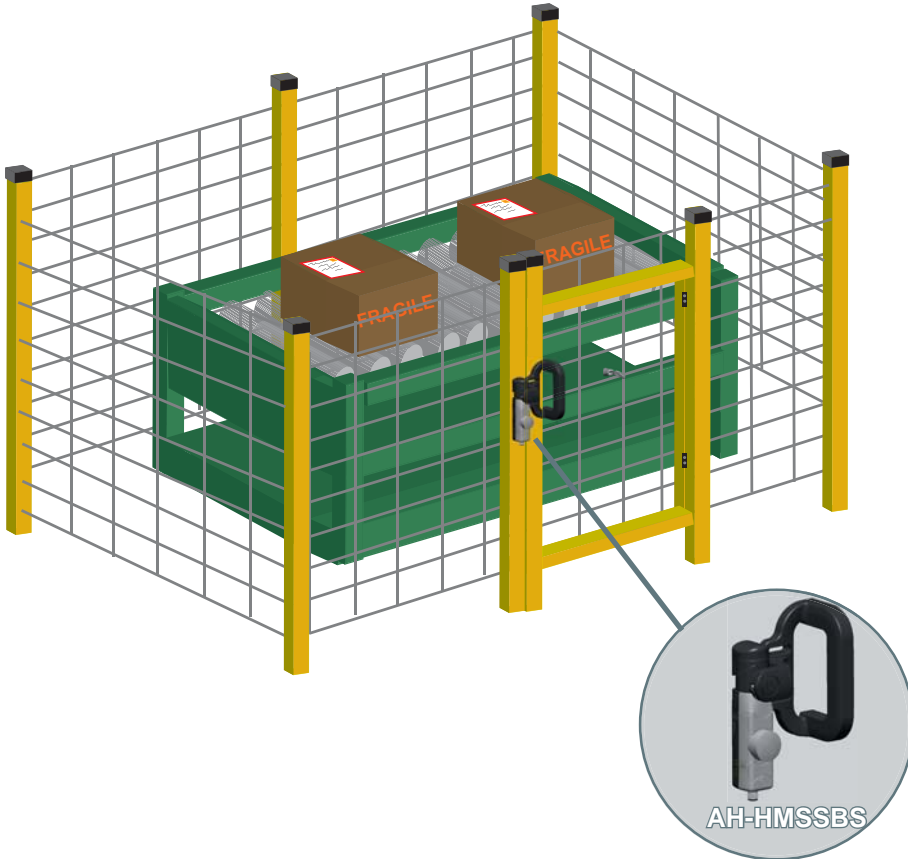
Shopping List

HCSBSBEUSSBB

AH-HMSBABBFF

AH-HMABBFF

HCSNSSBS

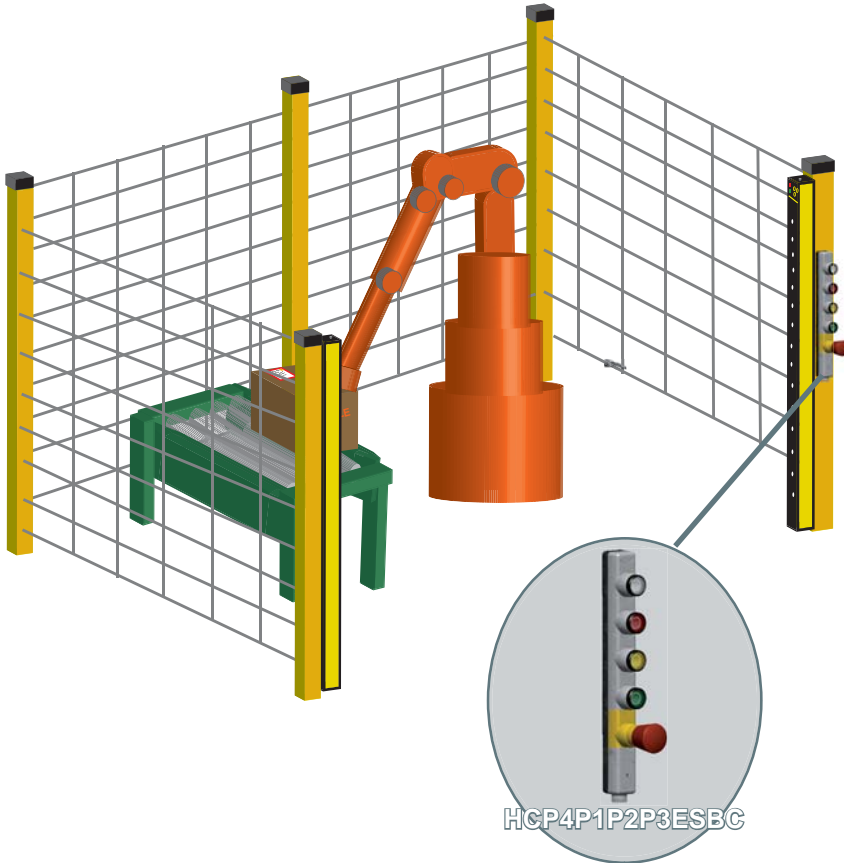


Sequence

- Open the door, this will pull the tongue actuator from the gate switch therefore breaking the safety circuits.
- The machine can be restarted once the tongue has been re-located in the head (door shut).
- To add a solenoid for a run down cycle add an EU module and change to a BB connector.

Shopping List

AH-HMSSBS



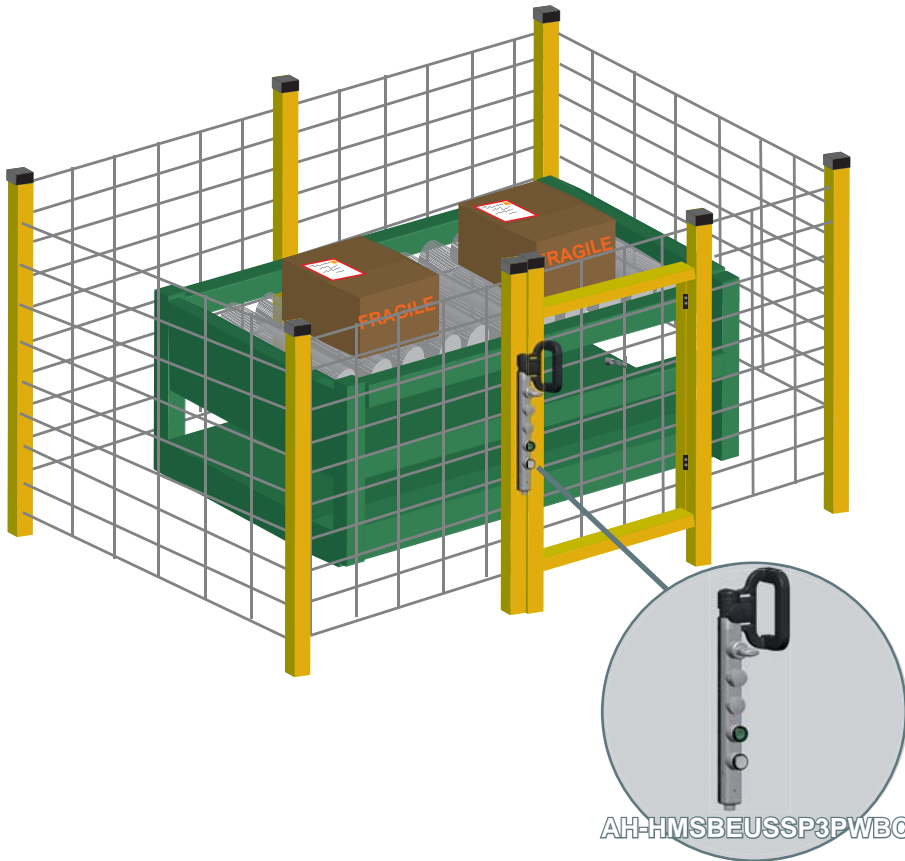
HCP4P1P2P3ESBC

Sequence

- Illuminated push buttons activate robot functions and indicate robot status.
- Laser marked legend plates indicate the function of each module.

Shopping List

HCP4P1P2P3ESBC



AH-HMSBEUSSP3PWBC

Sequence

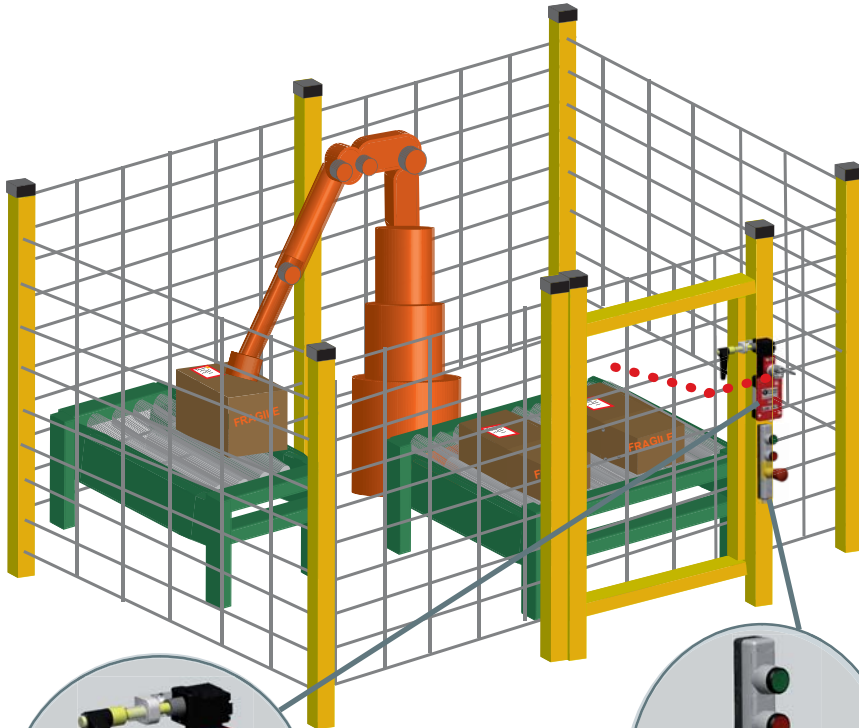
- Pressing the green illuminated button (P3) requests entry.
- Once the run down cycle is complete the P3 illuminates indicating that the solenoid is unlocked.
- The safety key can now be removed door opened and access gained.
- The safety key ensures the machine cannot be re-started accidentally with someone inside.
- The machine is restarted by shutting the door, replacing the safety key and pressing the white starter button.

Shopping List

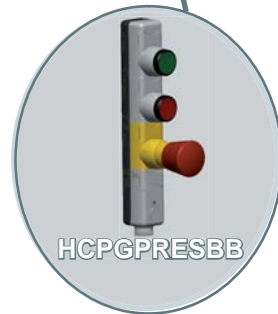
AH-HMSBEUSSP3PWBC

Conveyor

Heavy Duty Access / General Duty Control



AMS1LOK



HCPGPRESBB

Sequence

- To request entry press the red stop button on the eGard stack.
- The solenoid is energised and the yellow LED will illuminate on the AmS1Lok to indicate that it is safe to gain access.
- To open the door remove the safety key and turn the handle.
- The safety key ensures the machine cannot be re-started accidentally with someone inside.
- To restart the machine shut the door, replace the safety key and press the green pushbutton on the eGard stack.

Shopping List

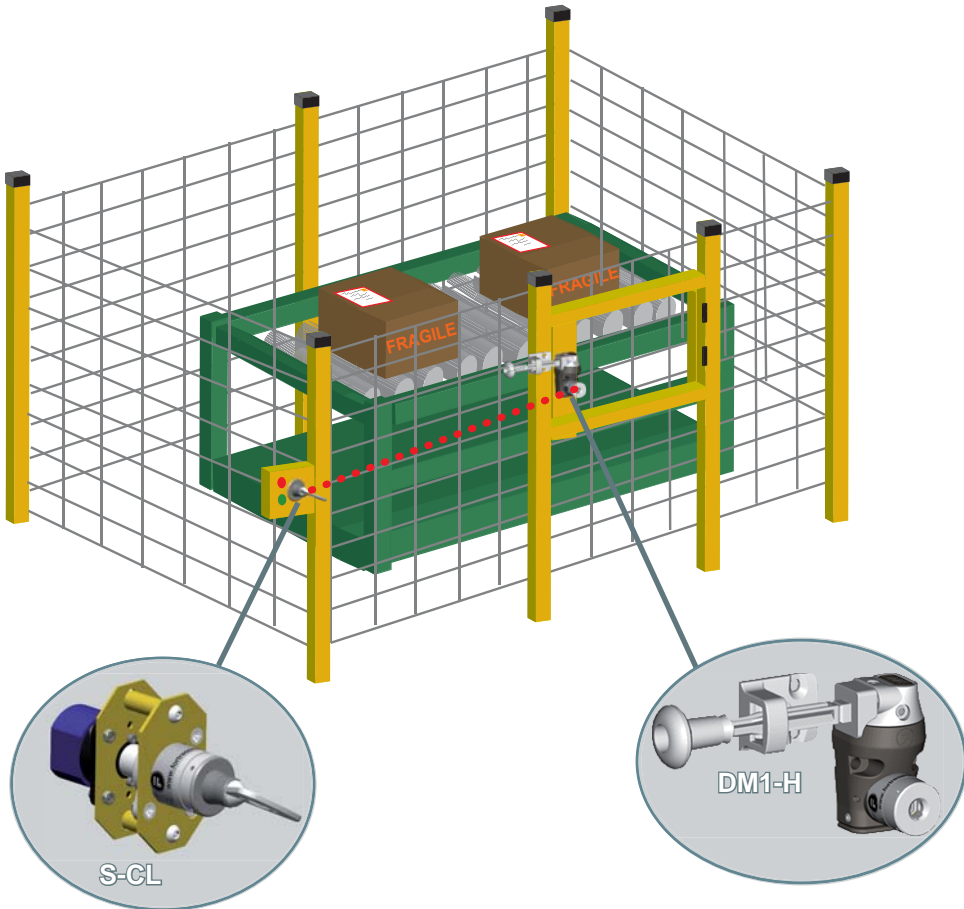
AMS1LOK024024CLIN

HCPGPRESBB

CLK-SUS x 1

Conveyor

Part Body Access



Sequence

- Turn and release the key from the S in the control panel (putting the machine in a safe state).
- Insert, turn and trap the key into the DM1 door lock
- Remove the handle actuator from the door lock and gain entry into the area
- To restart the line reverse the above process

Shopping List

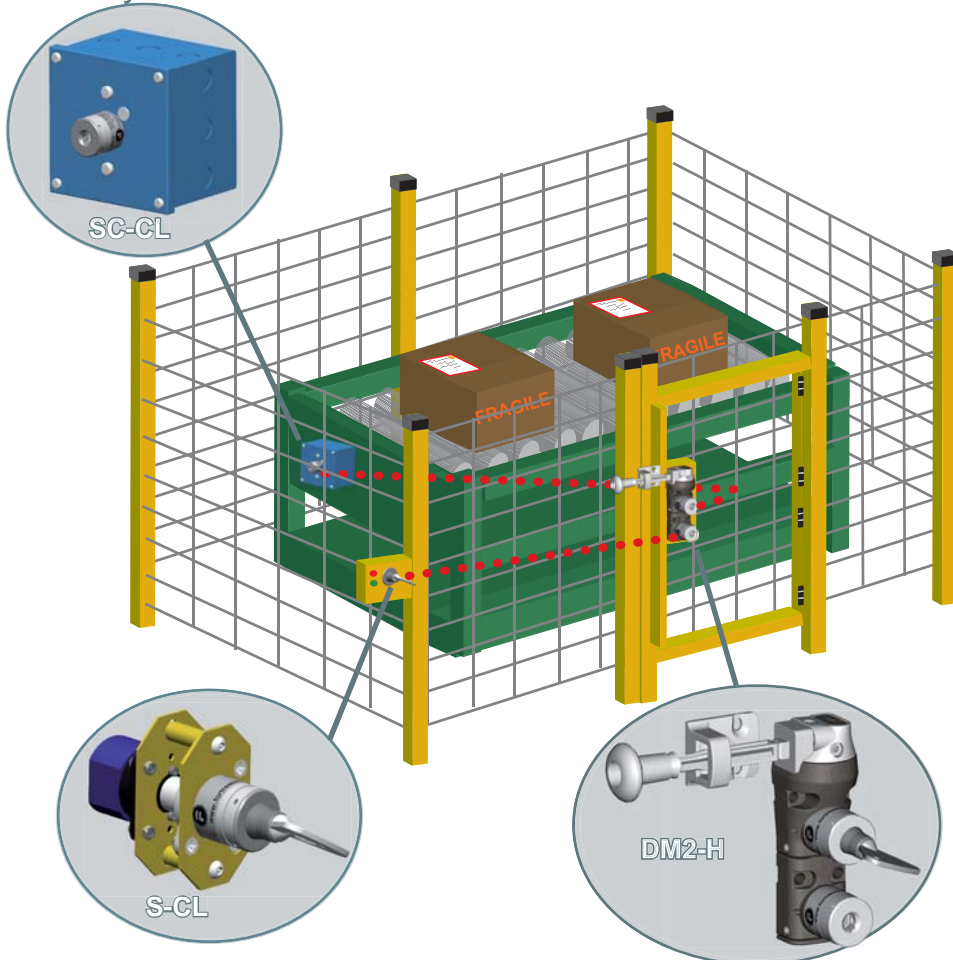
S-CLIN-A02022

DM1-CLIN-H

CLK-SUS x 1

Wrap/Unwrap Line

Full Body Access



Sequence

- Turn and release the key from the S in the control panel (putting the machine in a safe state).
- Insert, turn and trap the key into the DM2 door lock
- Remove the top safety key.
- Remove the handle actuator from the door lock and gain entry to the conveyor line.
- Take the top key into the guarded area and insert, turn and trap it into the surface mounted key switch (to put the machine into creep mode).
- To re-start the line reverse the above procedure.

Shopping List

S-CLIN-A02022

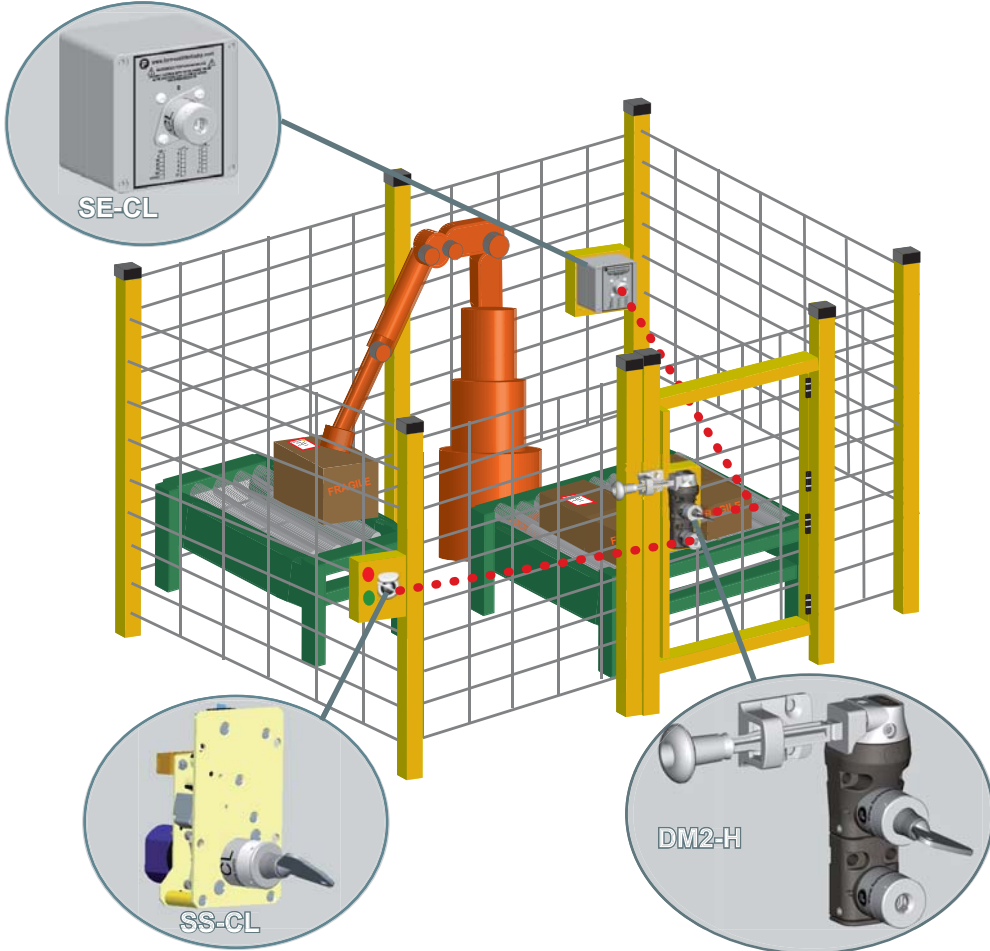
DM2-CLIN-H

SC-CLIN-A02022

CLK-SUS x 2

Robot Cell

Full Body Access



Sequence

- Request robot to come to end of cycle. When in a safe state, the solenoid (SS) is energised, this will then allow the key to be turned and removed, disabling control circuits.
- Insert, turn and trap the key into the DM2 door lock
- Remove the top safety key.
- Remove the handle actuator from the door lock and gain entry to the conveyor line.
- The released key can either be retained as a safety key or inserted, turned and trapped into the SE enabling the robot to be placed into a teach mode.
- To re-start the line reverse the above procedure.

Shopping List

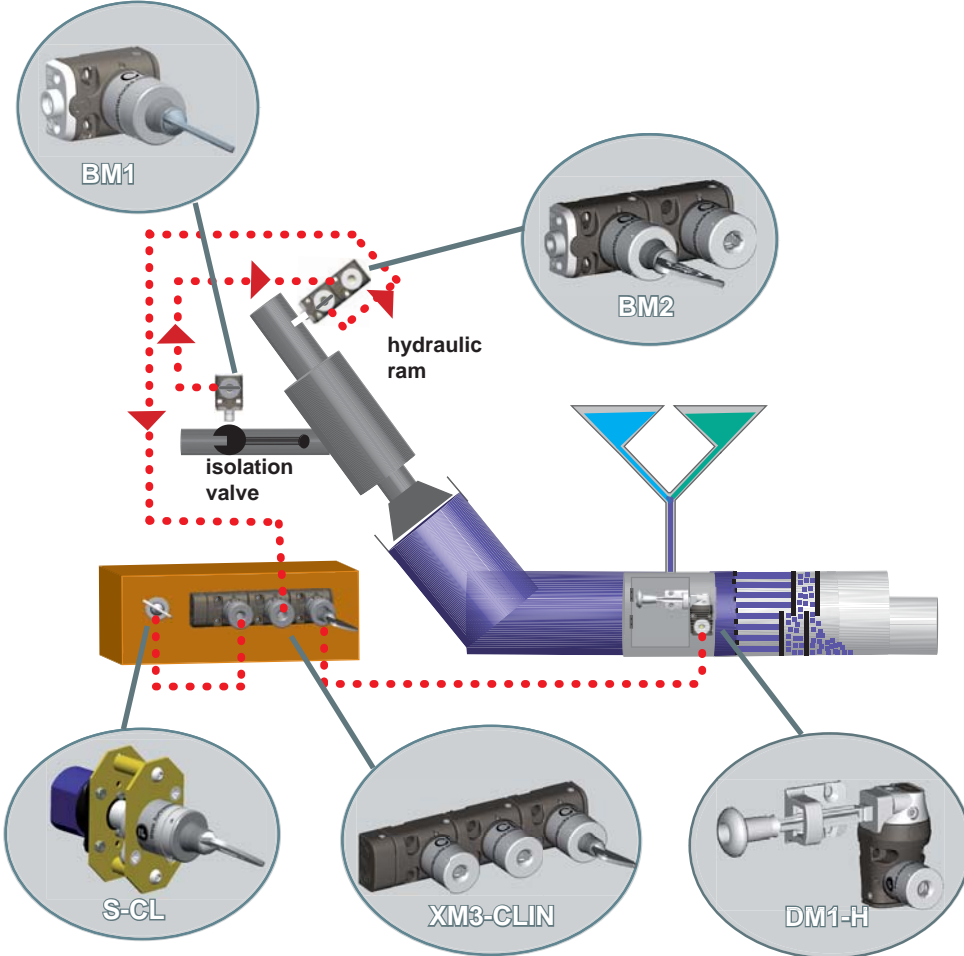
SS1-CLIN-A02022-D110-B

DM2-CLIN-H

SE-CLIN-A02022

CLK-SUS x 2

Part Body Access



Sequence

- Turn and release the key from the S unit in the control panel (putting the machine in a safe state).
- Insert turn and trap the key into the first lock in the XM3.
- Turn the isolation valve to the off position, turn and remove the key trapped in the BM1, the bolt is extended trapping the isolation valve in position.
- Take the BM1 key turn and trap into the BM2 unit. Turn and release the second key in the BM2, the bolt will extend trapping the hydraulic ram in the off position.
- Take the released key turn and trap into the second lock in the XM3. This releases the door access key which is then turned and trapped into the DM1. Remove the handle actuator from the door lock to gain entry.
- To re-start the line reverse the above sequence.

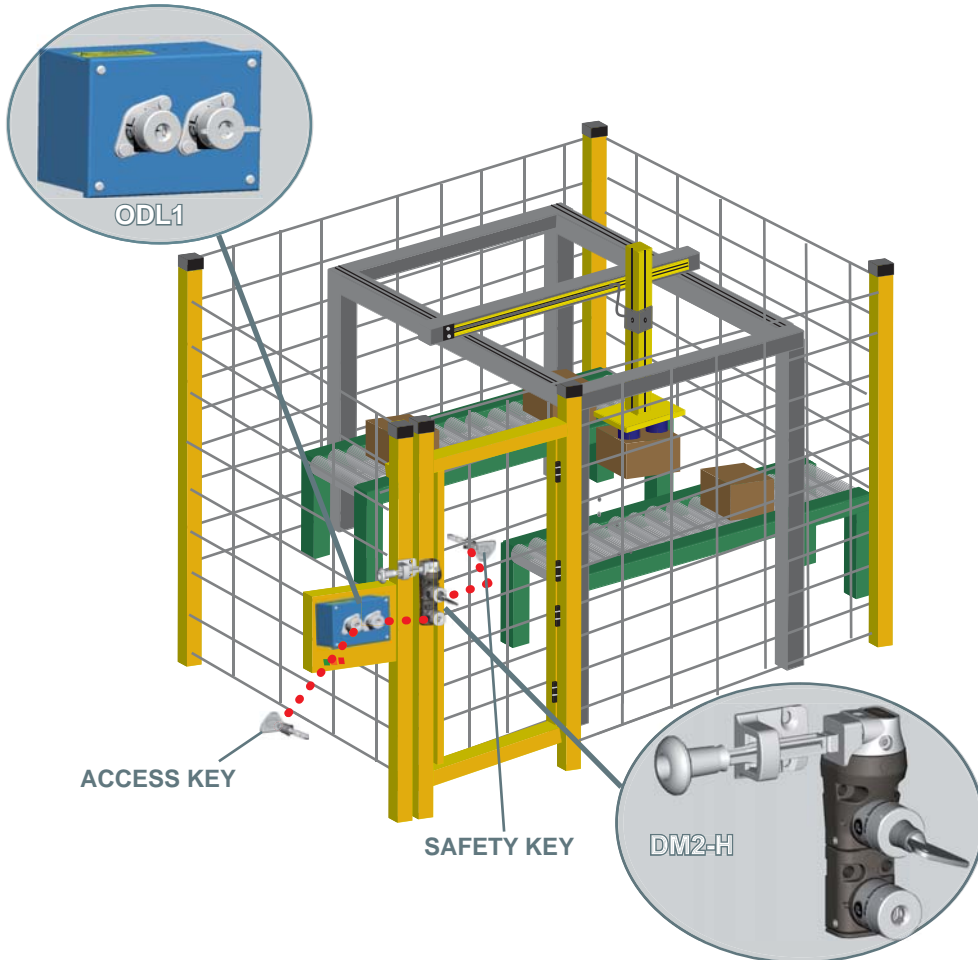
Shopping List

- BM1-CLIN
- BM2-CLIN
- S-CLIN-A02022
- XM3-CLIN
- DM1-CLIN-H
- CLK-SUS x 4

Crane Access



Single Door / Full Body Access



Sequence

- Insert turn and trap the access key into the first lock of the ODL unit this will change the state of the electrical contacts on the rear of the lock.
- The second key in the ODL unit can now be turned and removed.
- Insert turn and trap this key into the bottom lock of the DM2.
- This allows the top safety key in the DM2 to be turned and released. The handle actuator can now be removed and access into the guarded area gained. Retaining this key as a safety key ensures that the operator cannot be accidentally locked in the guarded area.
- To re-start the line reverse the above sequence.

Shopping List

ODL1-CLIN-
H1CMFA02022

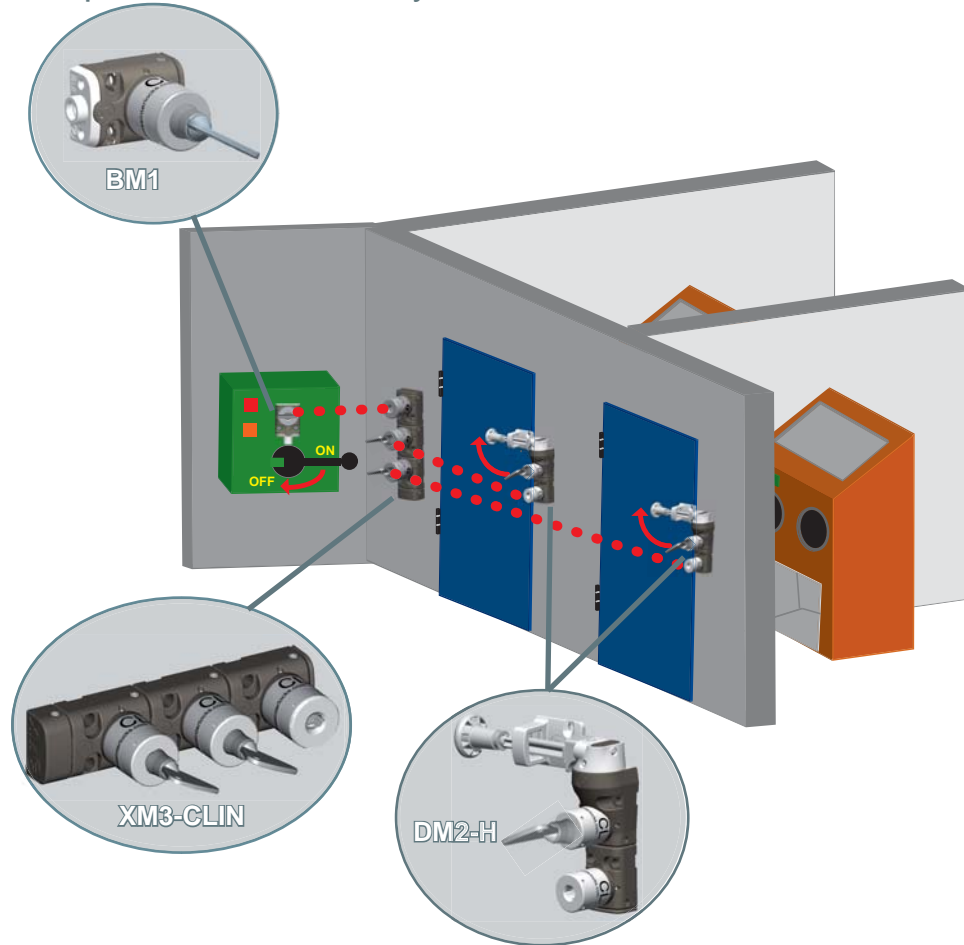
DM2-CLIN-H

CLK-SUS x 3

Shot / Sand Blaster



Multiple Doors / Full Body Access



Sequence

- Turn the power to the isolator to the OFF position.
- Turn and release the key from the BM door lock this will extend the bolt locking the isolator in the OFF position.
- Insert turn and trap the key into the top lock of the XM3
- This will then allow the bottom two locks to be turned and released. Insert these keys in the bottom lock of each DM2 unit.
- Remove the top safety keys from these units and take them into the guarded area, to avoid accidental lock in.
- To re-start the line reverse the above sequence.

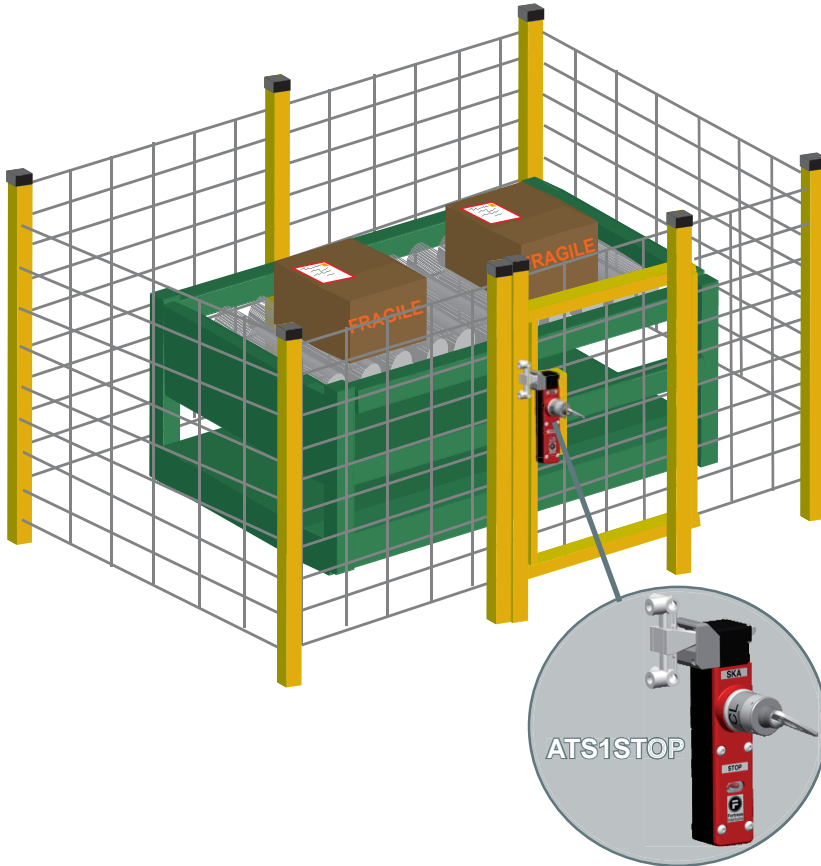
Shopping List

BM1-CLIN-A

XM3-CLIN

DM2-CLIN-H x 2

CLK-SUS x 5



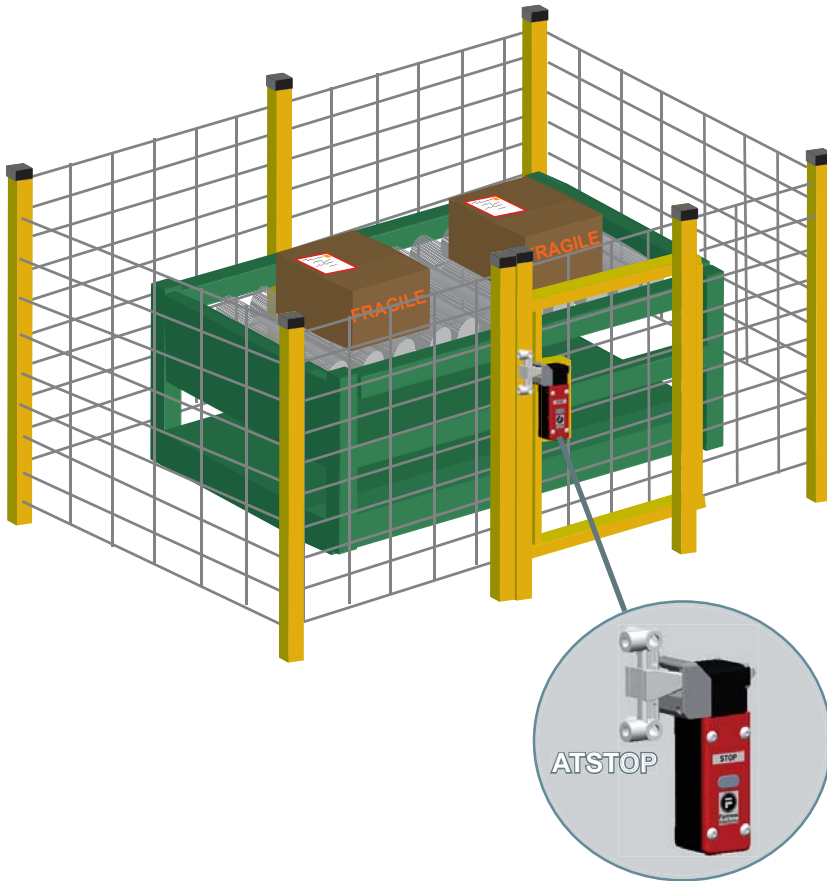
Sequence

- Turn and remove the key from the Safety Key Adaptor (S1)
- Open the door, this will pull the tongue from the unit
- Retaining the key as a Safety Key ensures that the operator cannot be accidentally locked in the guarded area.
- To be able restart the machine the tongue must be re-located in the head and the key re-inserted into the Safety Key Adaptor.

Shopping List

ATK1STOP024CLIN

CLK-SUS x 1



Sequence

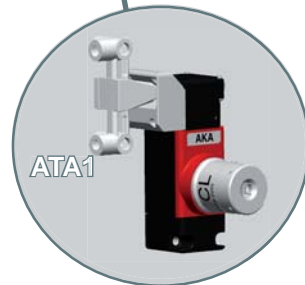
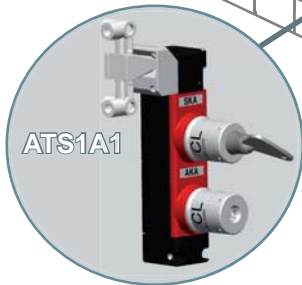
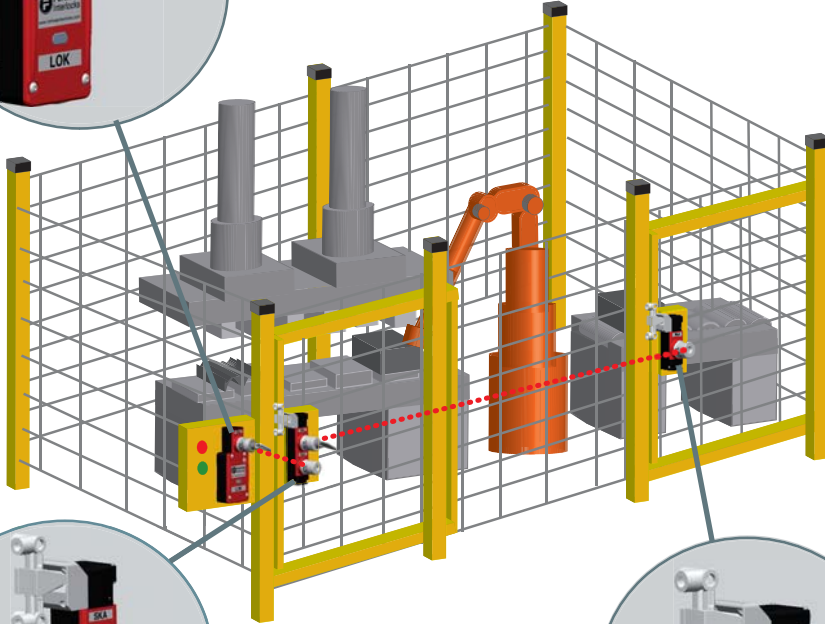
- Open the door, this will pull the tongue from the unit therefore breaking both sets of safety circuits.
- To be able to re-start the machine the tongue must be re-located in the head (door shut).

Shopping List

ATSTOP024

Transfer Line

Multiple Access Points



Sequence

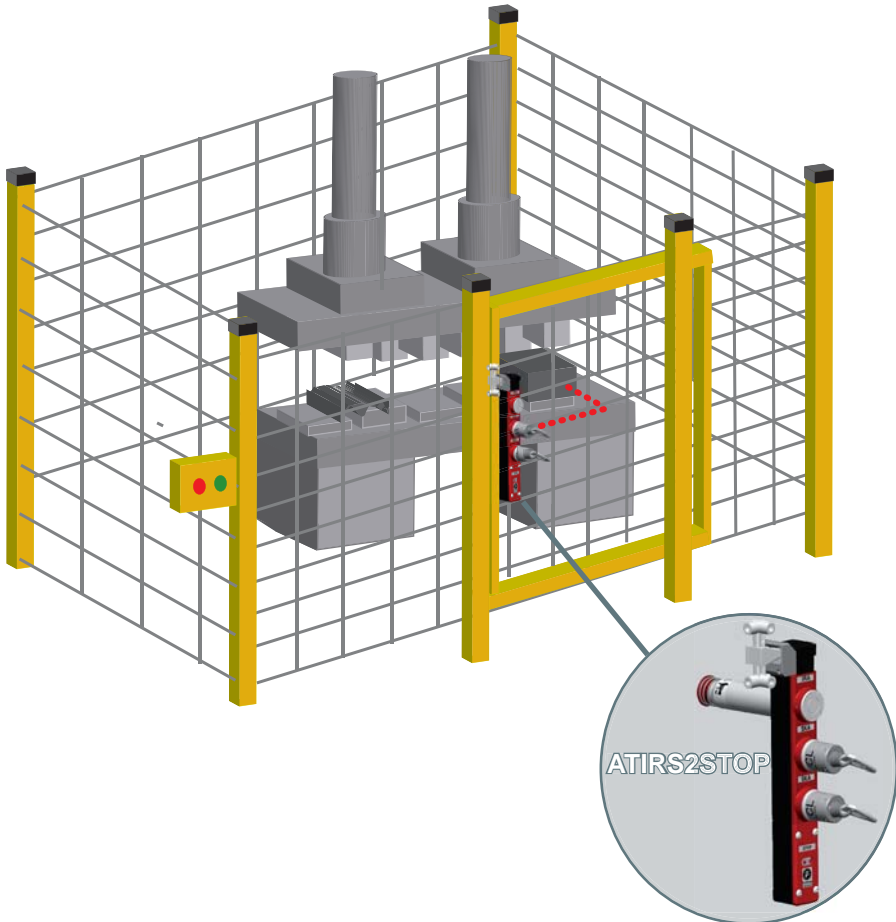
- When the machine is running the Access Points are locked closed.
- Request stop at the control panel
- When the machine is in the required state the solenoid will be energised in the CPS1LOK, breaking the safety circuits allowing the key to be turned and removed (breaking a second set of contacts).
- This key can then be inserted, turned and trapped into the lower portion of the ATS1A1 allowing the second access point to be opened.
- The released key can then be retained for safety or inserted, turned and trapped into the ATA1 allowing the second access point to be opened.
- To be able to restart the machine the above process must be reversed

Shopping List

- CPS1LOK024024CLIN
- ATS1A1FOOTCLIN
- ATA1FOOTCLIN
- CLK-SUS x 2

Compressor

Full Body Access Internal Release



Sequence

- Remove the first safety key out of the gate switch which isolates the control power allowing the door to be opened and access gained.
- The second key can be used by a second operator ensuring that neither operator can be locked in accidentally.
- The internal release can be operated if someone inside is trapped.

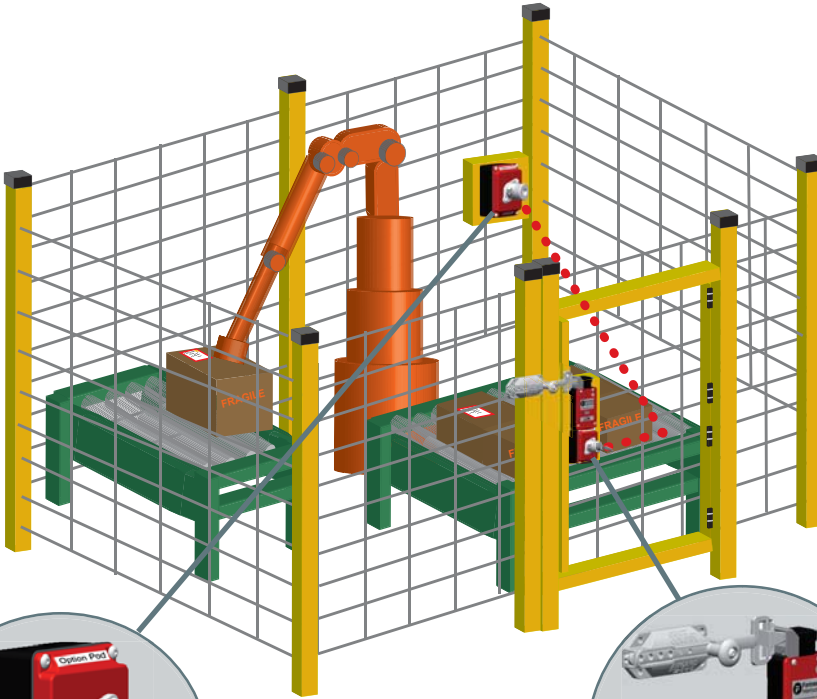
Shopping List

ATIRS2STOP024CLIN

CLK-SUS x 2

Robot Cell

Request Entry, Safety Key, Teach



PODKCLIN



SBNLOKKCLIN

Sequence

- Turn and release the key from the key switch unit at the door. This requests entry.
- When the robot reaches a programmed stop the yellow LED is illuminated.
- Open the door using the slide bar. The red LED illuminates indicating gate open.
- Retain the key as a safety key or use to activate the teach mode inside the guarded area.

Shopping List

SBNLOK024024KCLIN

PODKCLIN

CLK-SUS x 1