



FORTRESS

RM
Rolf Muri AG
Automations-Technik



Configurable Access & Control for Machine Guarding



THE QUEEN'S AWARDS
FOR ENTERPRISE:
INTERNATIONAL TRADE
2018



C



US

t **Gard**

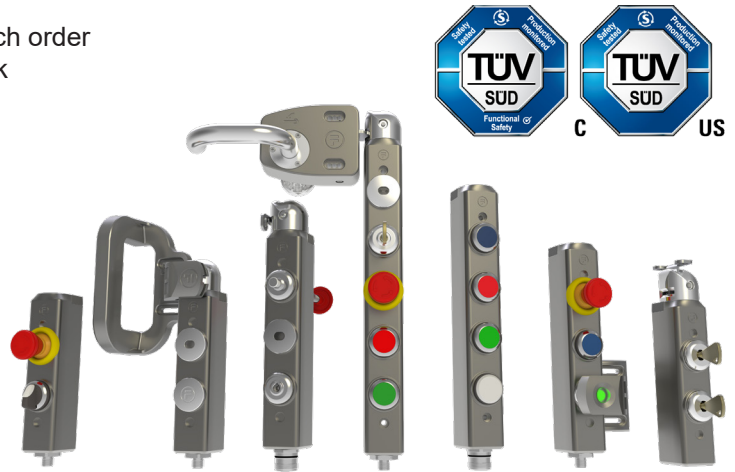
Introduction to tGard

tGard is a compact metal bodied system that enables the configuration of interlocks with or without guard locking, mechanical trapped key interlocks, and electrical operator controls either as separate devices or any combination of these three functions in one device.

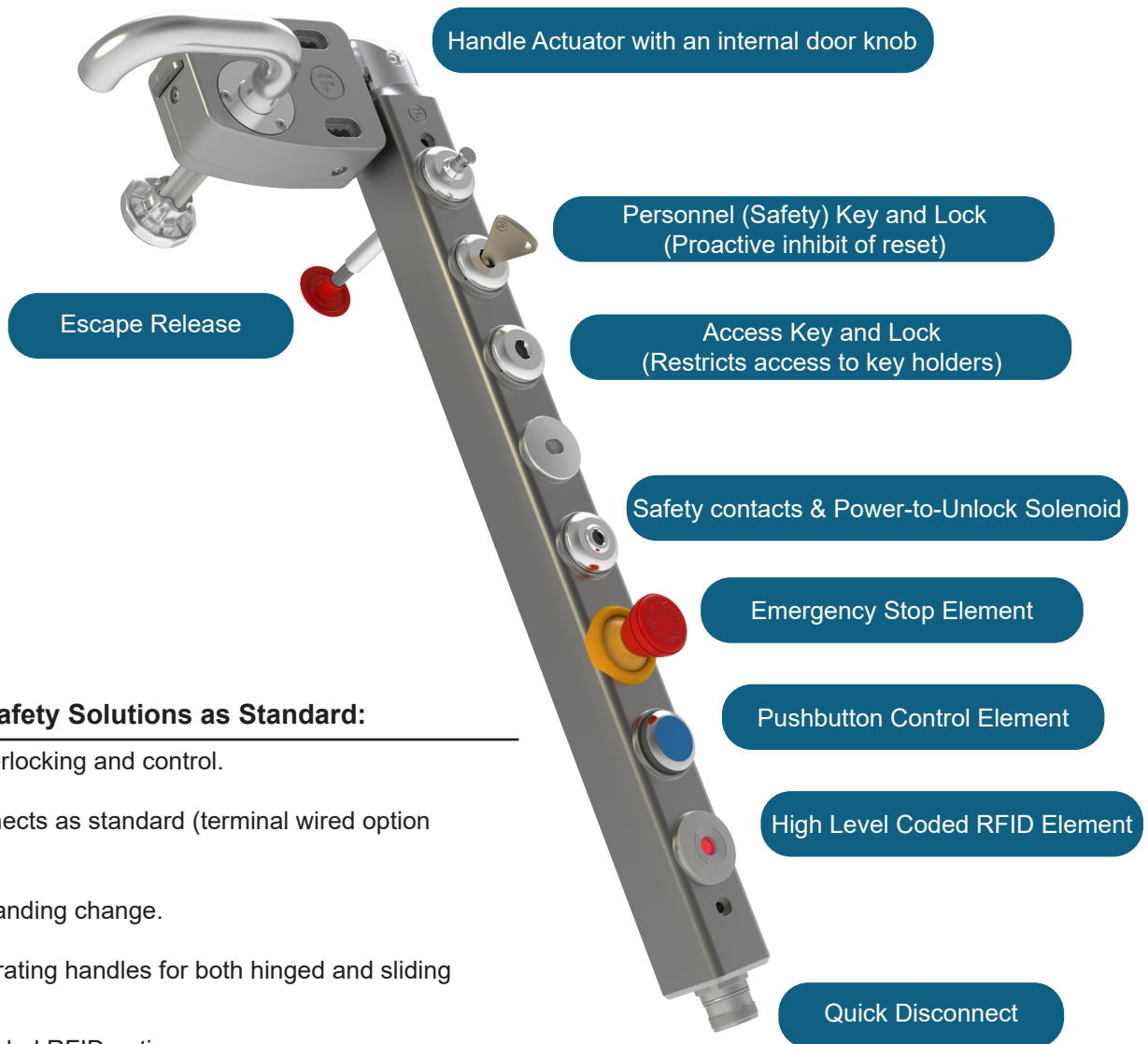
tGard offers “a customised safety solution, as standard”. Each order is defined by a range of tGard elements that include interlock safety switches, High Level Coded RFID, personnel keys, escape release, E-Stops, pushbuttons, selector switches, indicator lamps and a choice of operating handles for hinged and sliding guard doors.

tGard’s metal body includes through-holes for quick installation on aluminium profiles, flat surfaces, doors and even back of panels without the need for mounting plates.

tGard is IP65 as standard and has been designed to be fully compliant with machinery safety standards.



Configuration Example



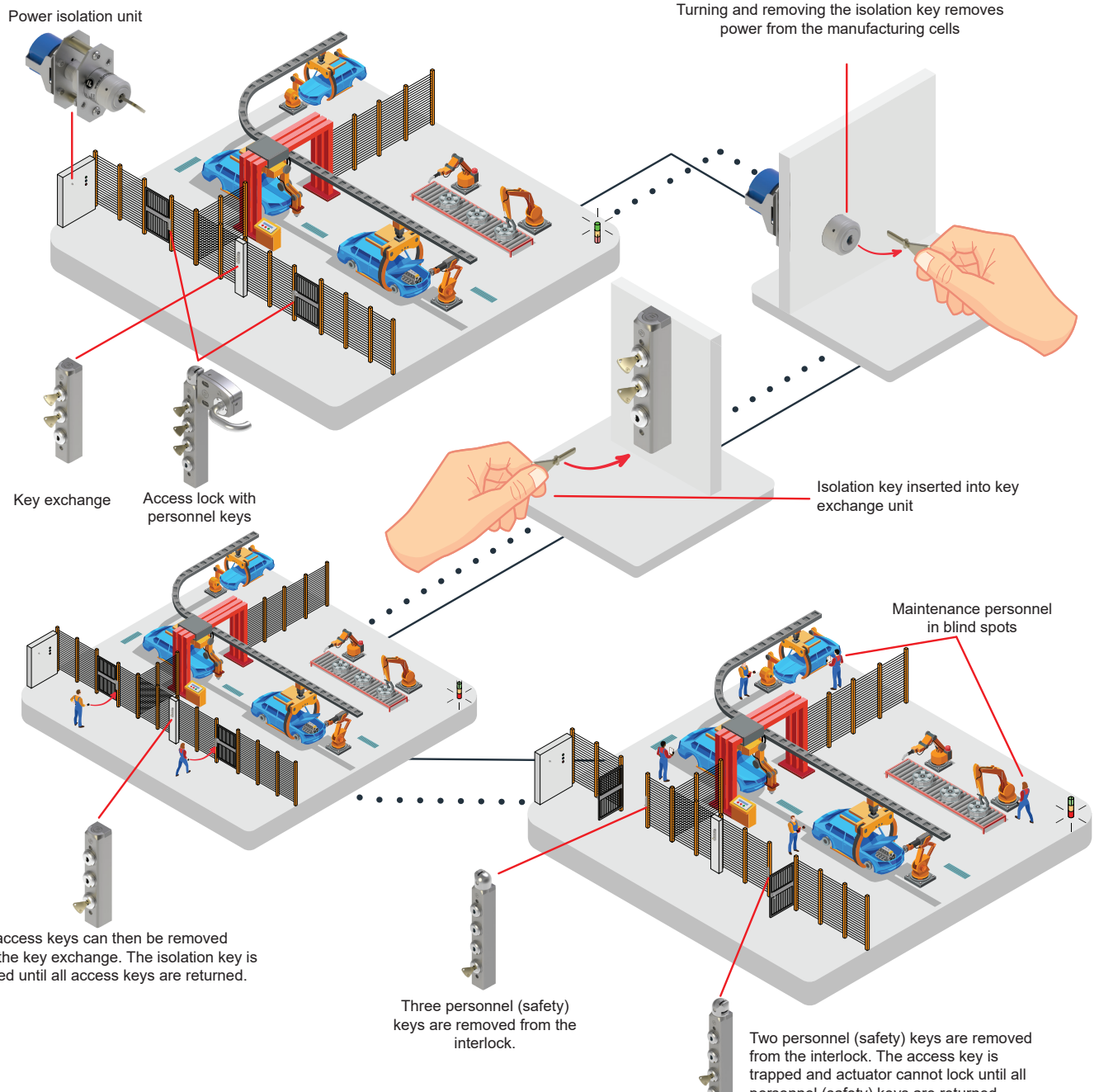
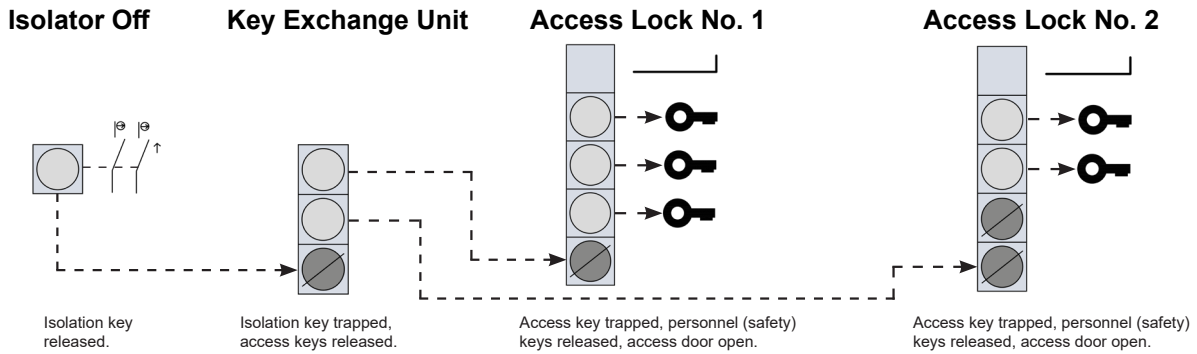
Customised Safety Solutions as Standard:

- Combines interlocking and control.
- Quick Disconnects as standard (terminal wired option available).
- Fast on-site handing change.
- Choice of operating handles for both hinged and sliding guard doors.
- High Level Coded RFID option.

Body Transfer Line

Application Requirement:

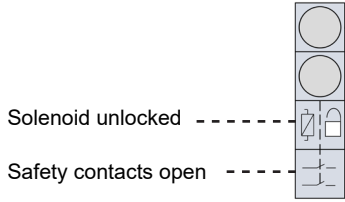
Due to the size of the safeguarded space surrounding body transfer lines in an automotive plant, there are blind spots where maintenance personnel could be performing work unknown to a line operator requesting the line to run. This could lead to the line running while maintenance personnel are still working within the cell. To avoid this, access to the transfer line can only be permitted when power has been isolated. Additionally, power cannot be restored until after all personnel have exited the safeguarded space and have returned their keys to the interlock.



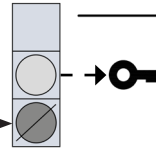
Application Requirement:

Robots require safeguarding measures during operation and when carrying loads. The robotic palletiser below has two access points and a single central control panel. When the interlock's Power-to-Unlock solenoid is energised and access keys for the access points are released. Mechanical interlocks on the moveable guards can be opened with an access key with each access lock providing a personnel (safety) key for the operator to take inside the cell to prevent restart.

Power-to-Unlock Solenoid



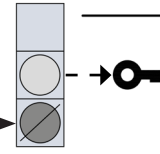
Access Lock No. 1



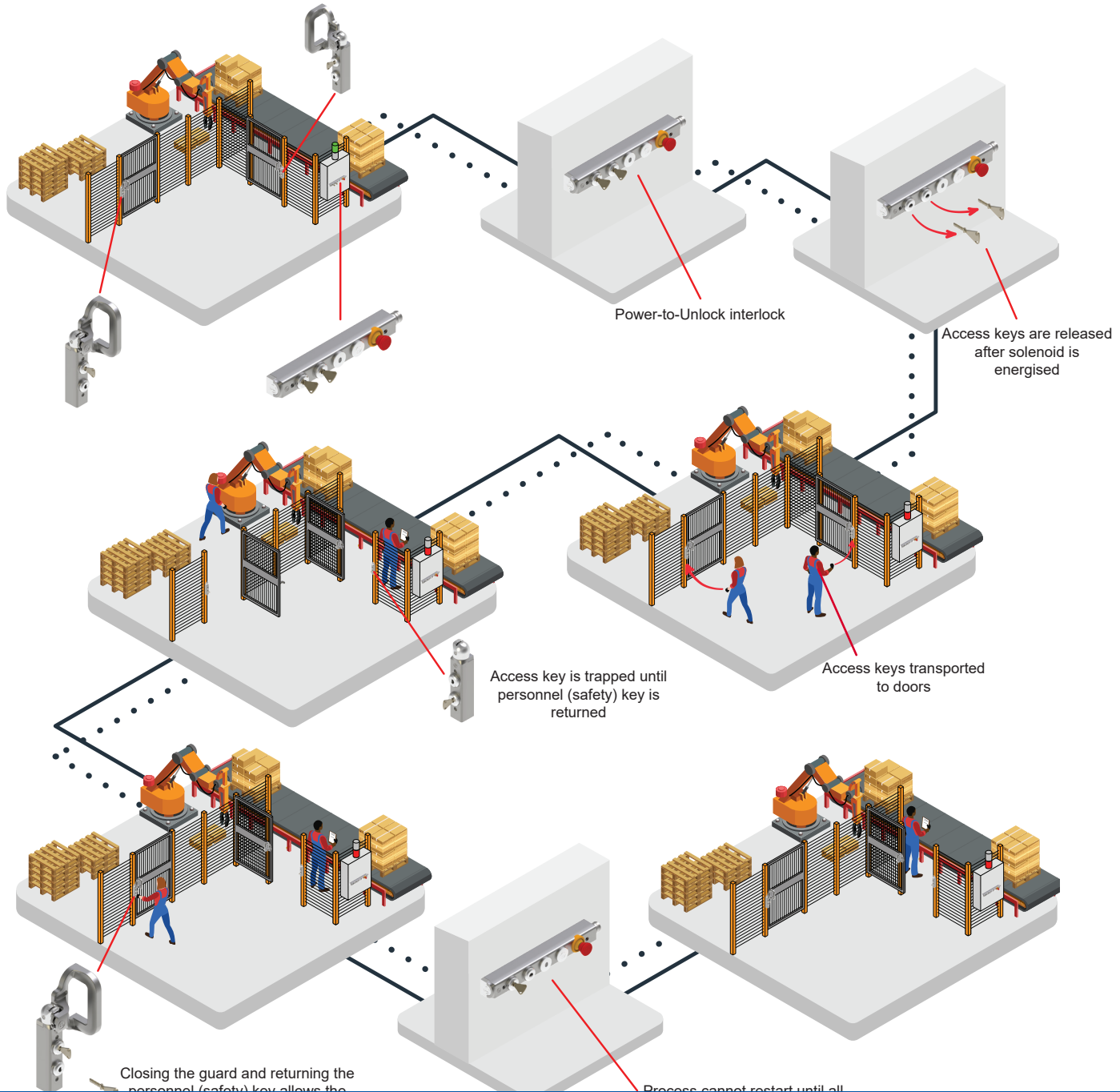
Access keys unlocked, safety contacts open.

Access key trapped, personnel (safety) key released, access door open.

Access Lock No. 2



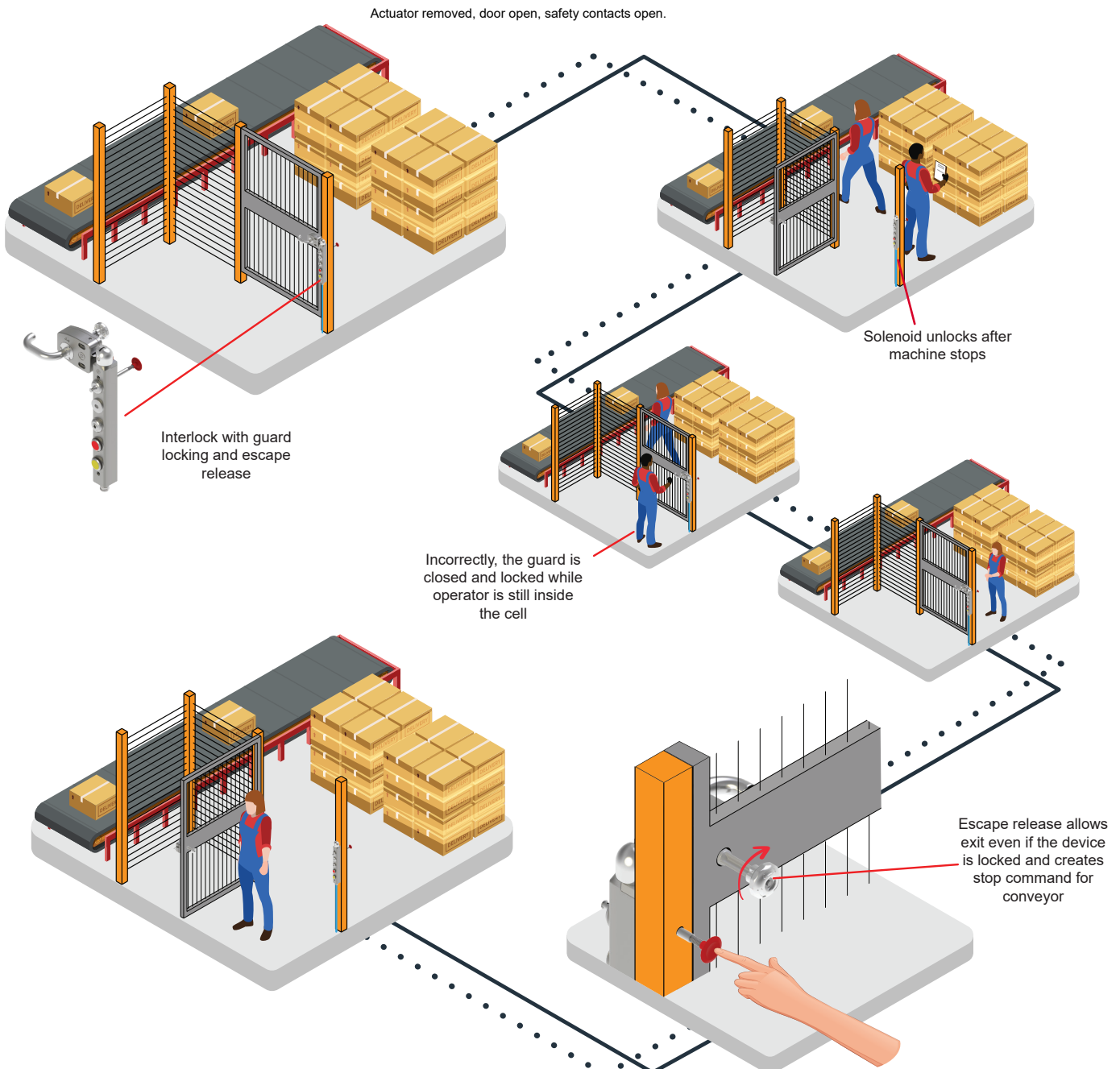
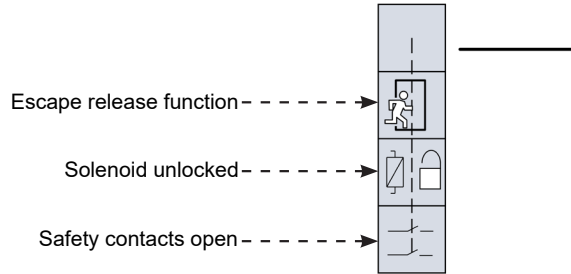
Access key trapped, personnel (safety) key released, access door open.



Application Requirement:

The conveyor system in an automated warehousing application below is safeguarded by interlocked guards. Access is required to remove incorrect packages or clear blockages on the conveyor. The interlock with guard locking keeps the guard locked until the conveyor is stopped. An escape release ensures any operator who becomes trapped within the safeguarded space can exit.

Interlock with Guard Locking



Common Configurations

Interlock (Safety Switch)

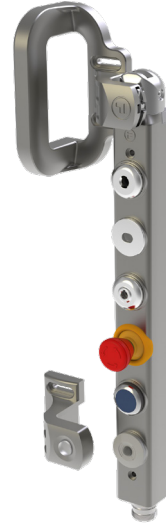
2NC, 1NO safety contacts.



THENSMQ1

Interlock with High Level Coded RFID and integrated operator controls

Personnel (safety) key available for operator to carry.



THHSNSMDUEMP6NRQ9

Interlock with Guard Locking

Power-to-Unlock solenoid with safety contacts.



THFSMDUQM

Interlock with Trapped Key and operator controls

controls

Access restricted to key holders, personnel (safety) key available for operator to carry.



THSSNABSMDUEDP6P7P2Q8

Interlock with Guard Locking and Escape

Release

Power-to-Unlock solenoid with safety contacts.
Escape release overrides locking mechanism and creates stop command.



THERXSMDUQM

Control Station

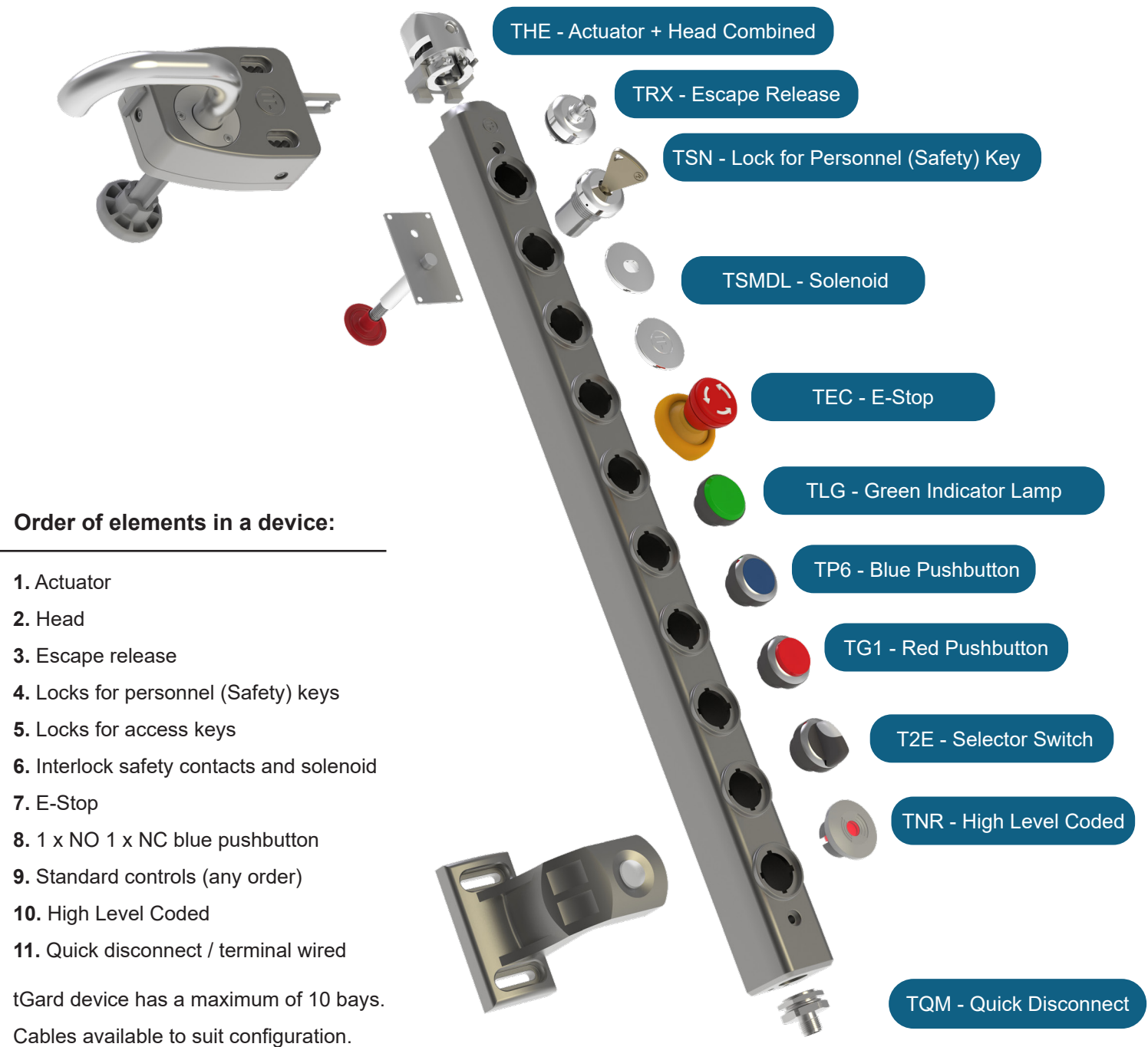
Control Station with emergency stop, indicator lamp and pushbuttons.



THCETLGP7P3P1Q8

How to Configure

Configuration tools are available on the Fortress website, www.fortress-safety.com



Configuration Example

At the end of the selection process, the part numbers drop their "T", except the first item. Example:

THE + TRX + TSN + TSMDL + TEC + TLG + TP6 + TG1 + T2E + TEB + TQM = THERXSN SMDLECLGP6G12ENRQM

When creating a tGard stack, the wiring of connections follow these rules:

1. Safety circuits are in fixed positions on each connector and comprise of volt free circuits for SSR options, or are +24V taken from the supply voltage for OSSD.
2. Inputs / outputs are allocated from the bottom of the stack, ascending.
3. On any one element, the inputs are assigned first, then the output(s).
4. Outputs are +24v, taken from the +24v supply, except for volt free options.

Actuators

Fixed Actuator



Hinged Actuator



Sliding Actuator



High Coded Actuator



Handle Actuator (No Internal knob)



Handle Actuator



Heads

Cap

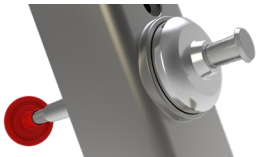


Head



Core Elements

Escape Release



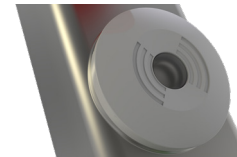
Lock for Personnel (Safety) Keys



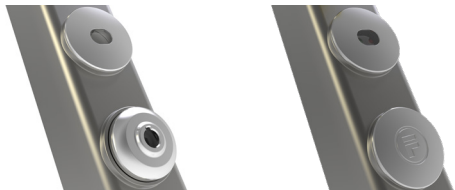
Lock for Access Keys



High Level Coded



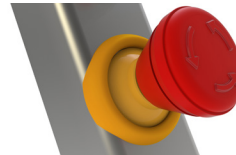
Interlock Safety Contacts & Solenoid Locking



Extension Blank Element



Emergency Stops

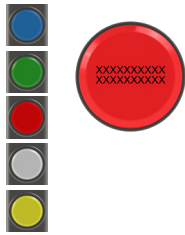


Blue Pushbutton with 1xNO & 1xNC Contacts

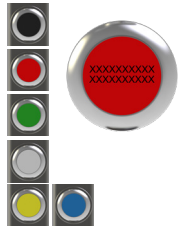


Core Elements

Indicator Lamps



Pushbuttons



2 Position Selector Switch



2 Position Selector Key Switch



Mushroom Pushbutton

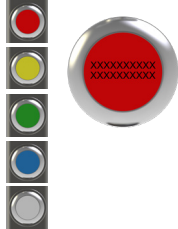


3 Position Selector Switch



Illuminating Switches

Pushbuttons



2 Position Selector Switch



3 Position Selector Switch



Base Elements

Safety & Control Quick Disconnect Connectors



Foot



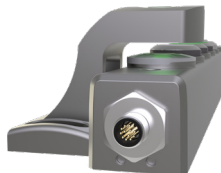
Self Wire



AS- interface

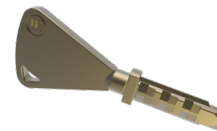


OSSD



Keys & Accessories

Keys



Packlockable Hasp



Teach Token



Cables



For more information on the padlockable hasp see head & cap element operating instructions.



Step 1: Actuators



TAF
Fixed Actuator



TAH
Handle Actuator -
Hinged Door



TAS
Handle Actuator -
Sliding Door



TNH
High Coded
Actuator



TEN
Handle Actuator -
(no internal knob)



TEH
Handle Actuator



All Actuators to be used in combination with a THM head module.



Actuator comes as standard with an High Level Coded RF element

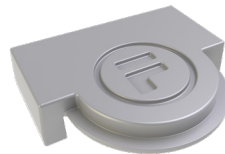


The internal knob on TEH handle does not release the solenoid or lock. A TRX/Z (escape release element) must be used to deliver that functionality.

Step 2: Head Modules



You can combine an actuator with a head to generate a single part number.



THC
Cap



THM
Head



THM + TAF = THF
Head module including fixed actuator



THM + TAH = THH
Head module including hinged actuator



THM + TAS = THS
Head module including sliding actuator

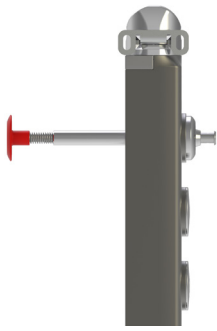


THM + TEN = THN
Head module including handle actuator (No internal knob)



THM + TEH = THE
Head module including handle actuator

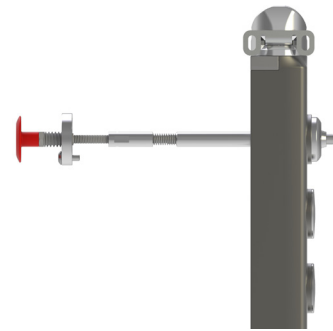
Step 3: Escape Release



TRX
Standard 60mm
Escape Release



TRZ
Variable length
Escape Release




Extended
version available
(TRZ) - < 300mm.

Step 4: Personnel (Safety) & Access Lock Element



TSN
Standard Personnel
(Safety) Lock
(No Key)*

TGN
Master Personnel
(Safety) Lock
(No Key)*

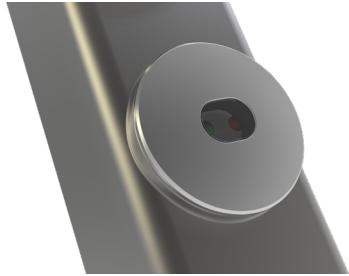


TAB
Standard Access
Lock (No Key)*

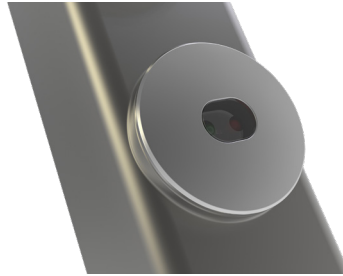
TQB
Master Access
Lock (No Key)*


*All keys need
to be ordered
separately.

Step 5: Safety Contacts for Interlock Safety Switches



TSM
Safety Contacts



TSP
Safety contacts
with extra retention force



TSS
Safety contacts -
No N/O monitor contact

t
Location of safety contacts in stack is first element after all mechanical elements (head, internal release and locks).

Step 6: Safety Contacts for Interlock Safety Switches with Solenoid Controlled Guard Locking

t
90% of customers select TSMDU.



TSMDU/L
Head & solenoid safety contacts in series
TSMDU (Power-to-Unlock)
TSMDL (Power-to-Lock)



TSMEU/L
Safety contacts on head element only
TSMEU (Power-to-Unlock)
TSMEL (Power-to-Lock)

TSEL
Safety contacts on head element only (no monitoring contact on head)
TSEL (Power-to-Lock)

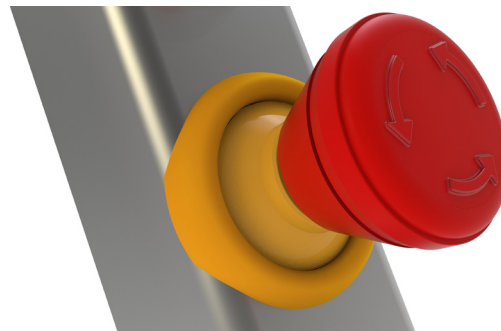
Step 7: Extension Blank Element



TEB
Extension Blank
Element


Can be used
to blank any
unused bays in a
configuration

Step 8: Emergency Stop Element



TEC, TET, TEM, TEP, TEI
Emergency stop element, version
available with a monitoring contact or
illumination


An E-Stop
is always located
below any lock or safety
contact elements. An
E-Stop is located above any
control elements, apart from
TEM & TEI E-Stops which
are at the bottom of the
device.

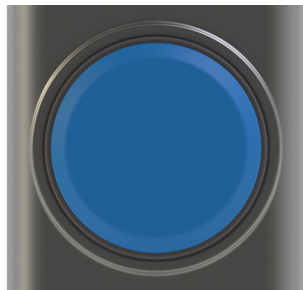
Step 9: Blue Pushbutton with 1xNO & 1xNC Contacts



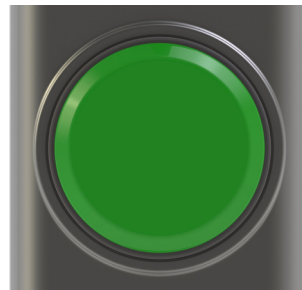
TSR
Blue Pushbutton with 1xNO & 1xNC Contacts

t
Location of Blue pushbutton with 1xNO & 1xNC Contacts in stack is highest control element after E-Stop's.

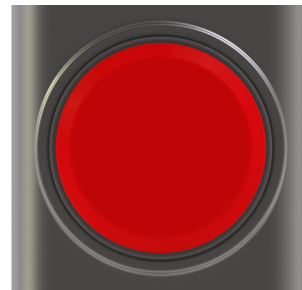
Step 10: Indicator Lamp Element



TLB
Indicator Lamp Element - Blue



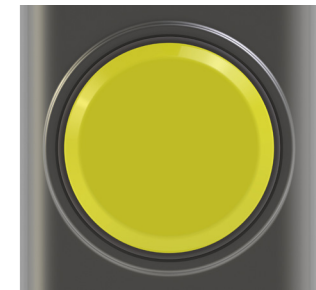
TLG
Indicator Lamp Element - Green



TLR
Indicator Lamp Element - Red



TLW
Indicator Lamp Element - White

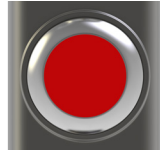


TLY
Indicator Lamp Element - Yellow

Step 11a: Non-Illuminating Switches



TPB
1 N/O Pushbutton -
Black



TPR
1 N/O Pushbutton -
Red



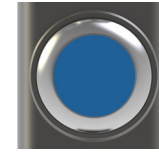
TPG
1 N/O Pushbutton -
Green



TPW
1 N/O Pushbutton -
White



TPY
1 N/O Pushbutton -
Yellow



TPZ
1 N/O Pushbutton -
Blue



T2A
2 Position Selector
Switch - Latching



T2V
2 Position Selector
Switch - 1 N/O & 1 N/C



TK5
2 Position Selector Key
Switch - Latching



TMB
1 N/O Mushroom
Pushbutton - Black

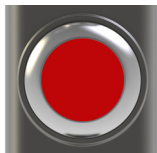


T3D
3 Position Selector
Switches - Momentary

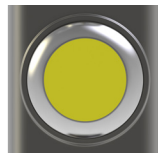


T3H
3 Position Selector Switches
- Momentary/Latching

Step 11b: Illuminating Switches



TP1
Pushbutton - Red



TP2
Pushbutton - Yellow



TP3
Pushbutton - Green



TP6
Pushbutton - Blue

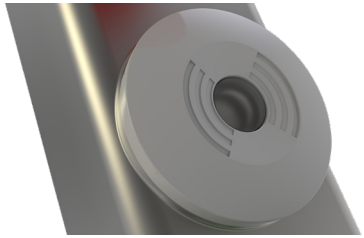


TP7
Pushbutton - White




Please see operating instructions for a full range of options.

Step 12: RF Element



Head (Actuator Locking)

I am daisy chaining my unit to operate in series

No

I want to save on cable costs (less cores in my cables)

No

I am hardwiring my unit

Yes

Yes

Yes

OSSD with Daisy Chain

OSSD without Daisy Chain

SSR

TNC

TNB

TNA

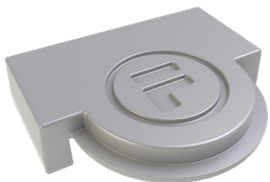


No Head (Non Contact)

TNT

TNS

TNR



Want to save more on your cabling, installation, safety validation and more... Why not check out our ethernet enabled amGardpro range?

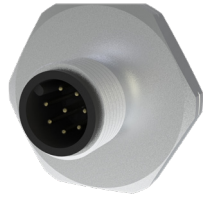
Step 12a: Safety & Control Connectors

SC = Safety Circuits
I/O = Inputs / Outputs



5 Pin M12 QD

TQ1	2 SC
------------	------



8 Pin M12 QD

TQ2	5 I/O
TQ3	2 SC, 1 I/O
TQG	OSSD, 2 SC, 3 I/O



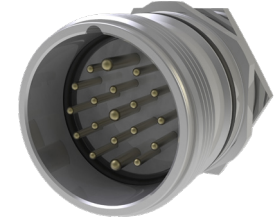
12 Pin M12 QD

TQL	9 I/O
TQM	2 SC, 5 I/O
TQO	OSSD, 2 SC, 7 I/O



12 Pin M23 QD

TQ4	9 SC
TQ5	2 SC, 5 I/O
TQH	OSSD, 2 SC, 7 I/O



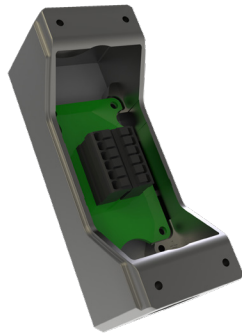
19 Pin M23 QD

TQ8	2 SC, 12 I/O
TQ9	4 SC, 8 I/O
TQJ	OSSD, 2 SC, 14 I/O
TQQ	OSSD, 4 SC, 10 I/O

Step 12b: Foot, Self Wire Connectors, AS-interface

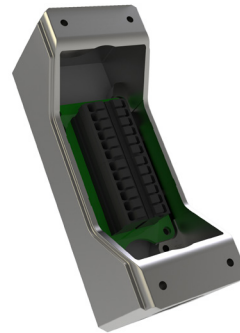


TBF
Foot Element



12 Terminals

TW1	2 SC, 6 I/O
TW7	OSSD, 2 SC, 8 I/O



24 Terminals

TW3	4 SC, 14 I/O
TW8	OSSD, 4 SC, 16 I/O

TW4
24 Terminals

TW4	6 SC, 10 I/O
TW9	OSSD, 6 SC, 12 I/O

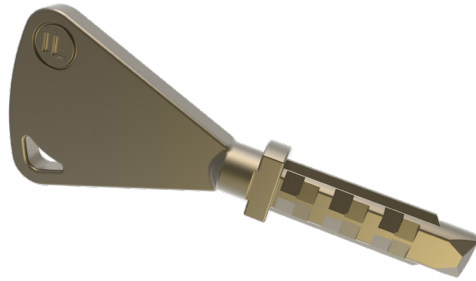


TEBB4
Up to 2 AS-i nodes



TEBB8
Up to 4 AS-i nodes

Step 14: Keys



TKS
Standard Key

TKM
Master Key

Step 15: Accessories



TLO
Padlockable Hasp

Allows interlock blocking of tGuard device. Padlocks / hasps lock the interlock open.



TNX
Teach Token for High Level Coded RF Element

CABLE - M - TQ



Cable Length (m)

- 2
- 5
- 10
- 20

Safety & Control Connector

1	2	L	4	8
	3	M	5	9
	G	O	H	J
				Q