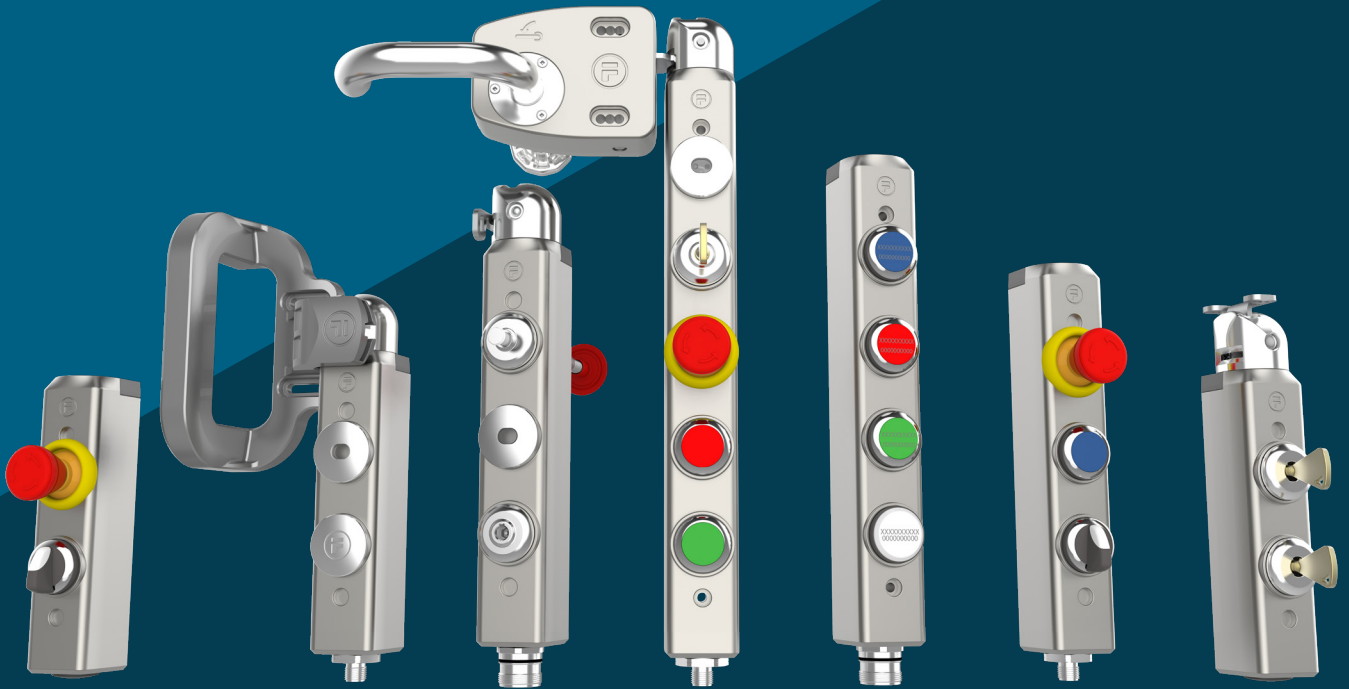




FORTRESS



Configurable Access & Control for Machine Guarding



THE QUEEN'S AWARDS
FOR ENTERPRISE:
INTERNATIONAL TRADE
2018



C



US

tGard



Introduction to tGard

tGard is a compact metal bodied system that enables the configuration of various safety products including electrical safety gate switches (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 unit.

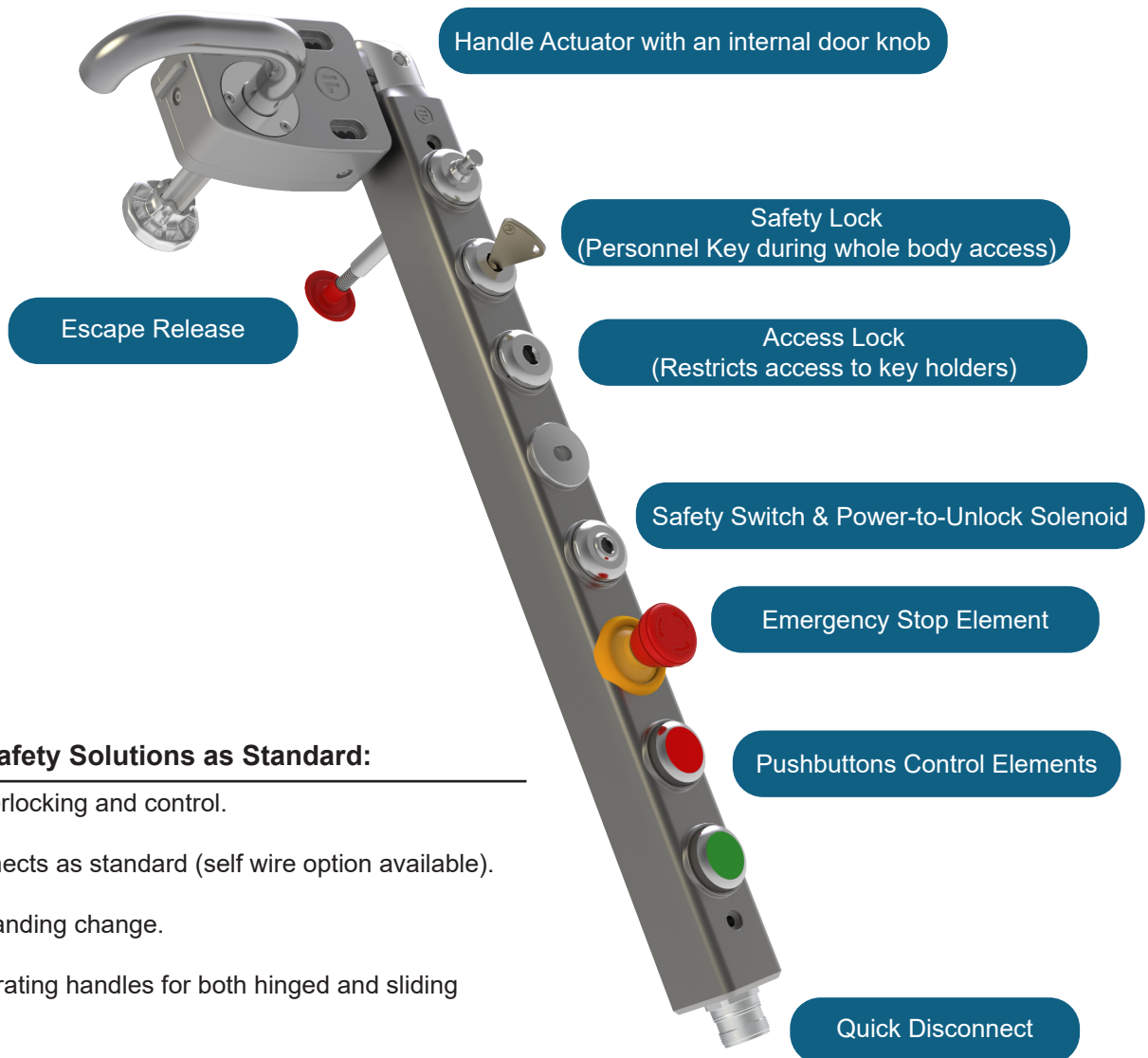
tGard offers “a customised safety solution, as standard”. Each order is defined by a range of tGard elements that include selector switches, safety switches (solenoid and non-solenoid), personnel keys, emergency release, pushbuttons, E-Stops, indicator lamps and a choice of operating handles for both 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.

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



Configuration Example



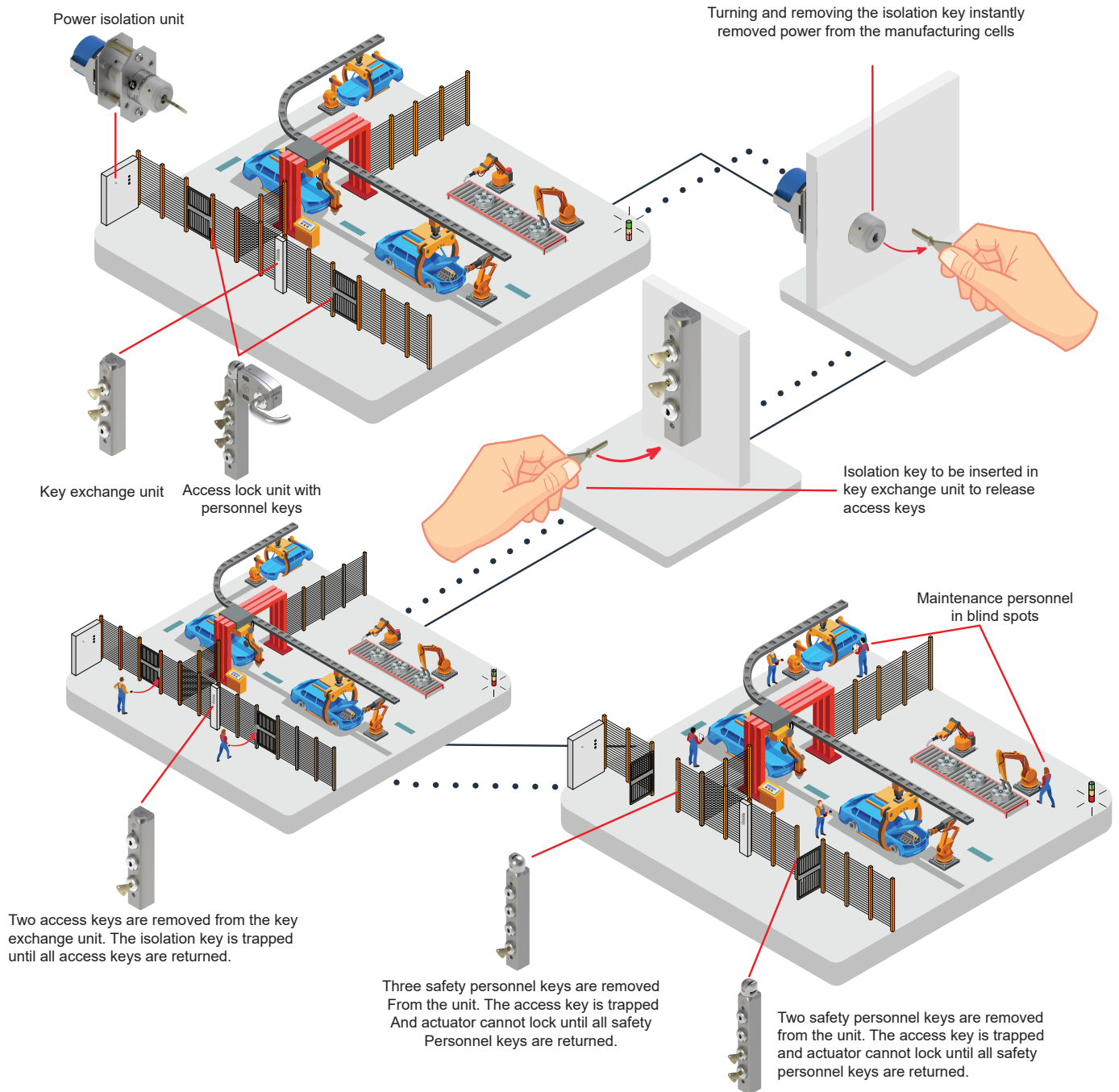
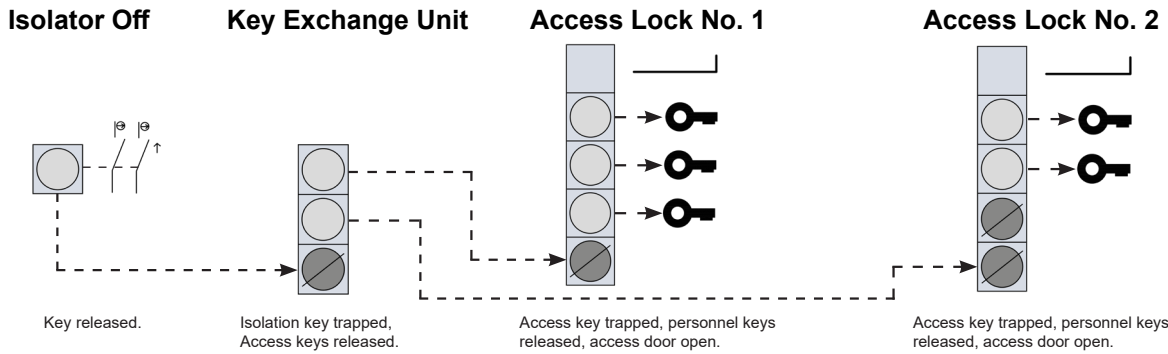
Customised Safety Solutions as Standard:

- Combines interlocking and control.
- Quick Disconnects as standard (self wire option available).
- Fast on site handing change.
- Choice of operating handles for both hinged and sliding guard doors.

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 a maintenance personnel could be performing work unknowingly 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. Therefore, the transfer line must be safeguarded to ensure access into the line can only be permitted while power to the line has been isolated and the safety circuits remain open until all personnel have exited the safeguarded space returning their keys to the interlock.



Robot Pallet Stacker

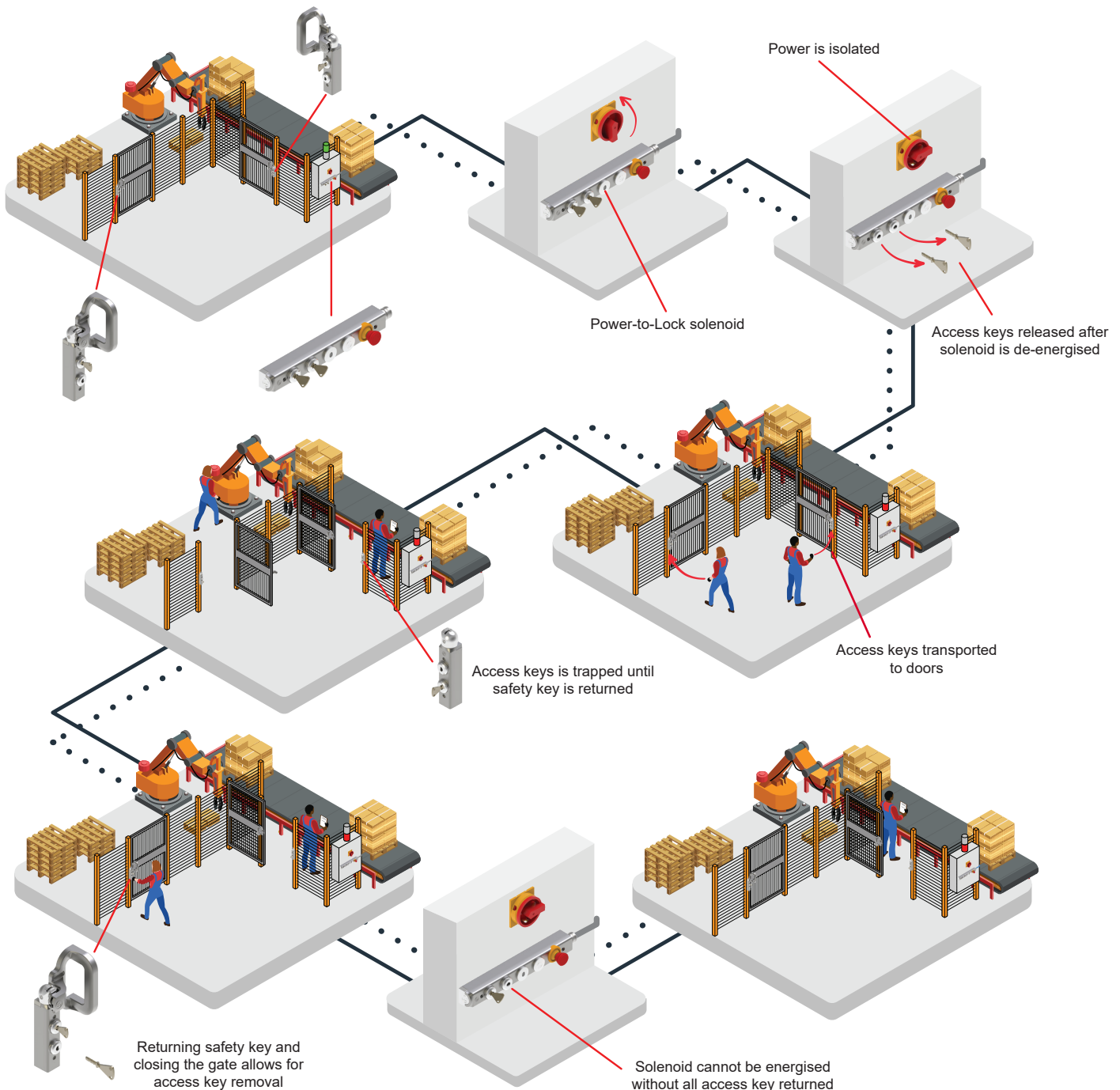
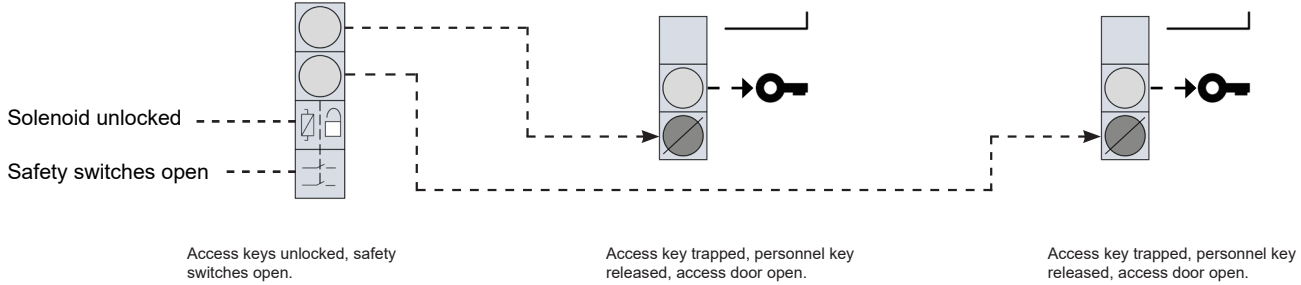
Application Requirement:

Robot arms require safeguarding measures during operation and when carrying loads. The robot pallet stacker below has two access points and a single central control panel. When mains power is isolated to the system, the Power-to-Lock solenoid is de-energised and Access keys for the access points are released. Mechanical only interlocks at the guard can be opened with an Access key whilst also providing a personnel key for the operator to take inside the cell to prevent restart.

Power-to-Lock Solenoid

Access Lock No. 1

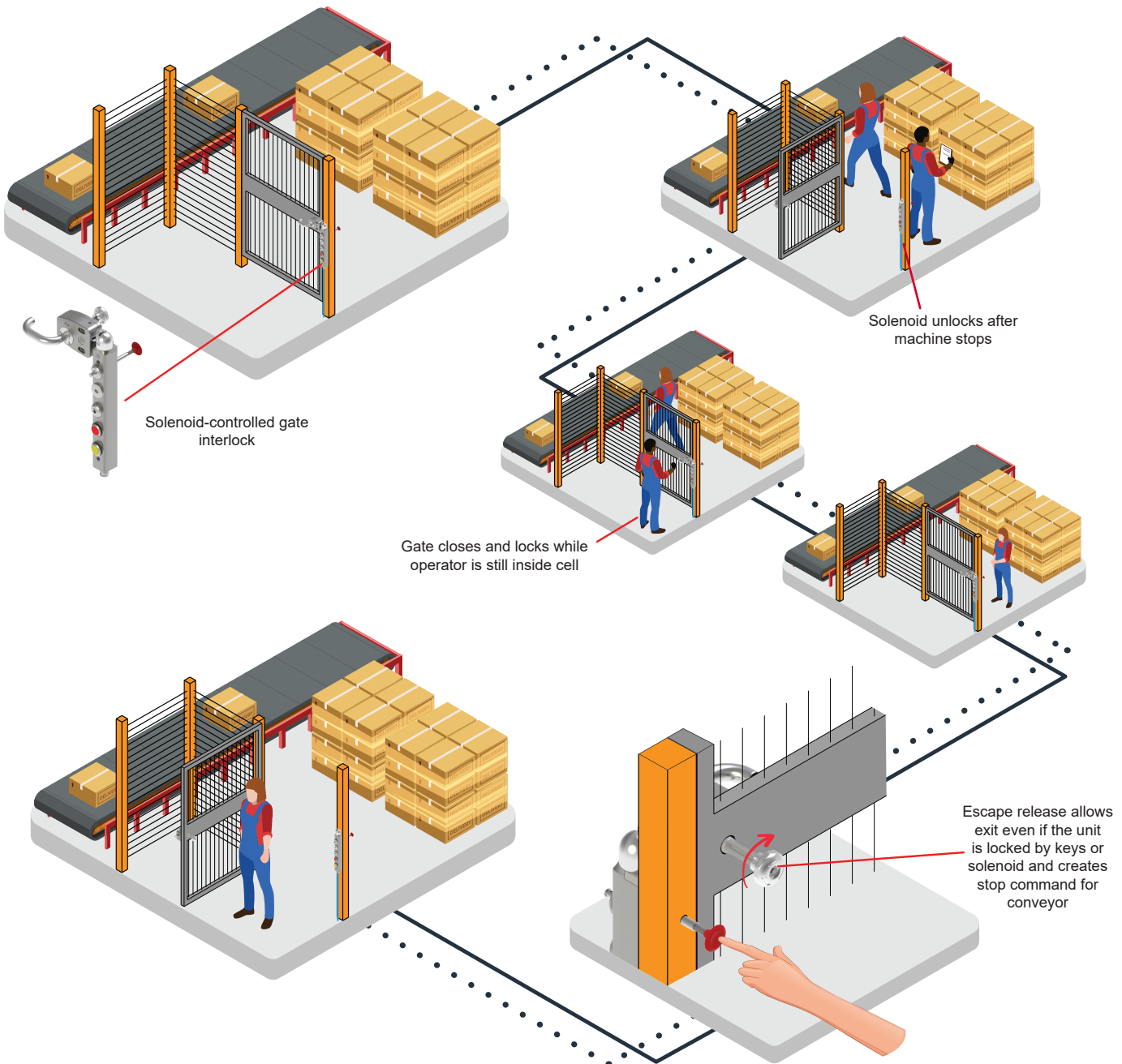
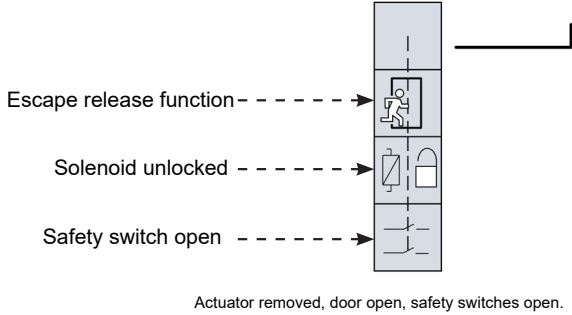
Access Lock No. 2



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 solenoid interlock keeps the guard locked until the conveyor stops, pushbutton functionality for additional control is included. The inclusion of an escape release mechanism allows any operator who finds them self behind a locked guard to override the keys and / or solenoid to exit.

Solenoid-Controlled Gate Interlock



Guard Switch

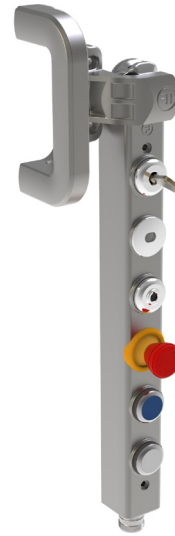
2NC, 1NO safety switch



THNSMQ1

Guard Lock with Integrated Machine Control

Personnel key available for operator to carry



THHSNSMDUEMP6P7Q9

Guard Lock

Power-to-Unlock solenoid with safety switch



THFSMDUQM

Guard Lock with Trapped Key Integration

Access restricted to key holders, personnel key available for operator to carry



Personnel Key

Access Key

THSSNABSMDUEDP6P7P2Q8

Guard Lock with Escape Release

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



THERXSMDUQM

Control Station

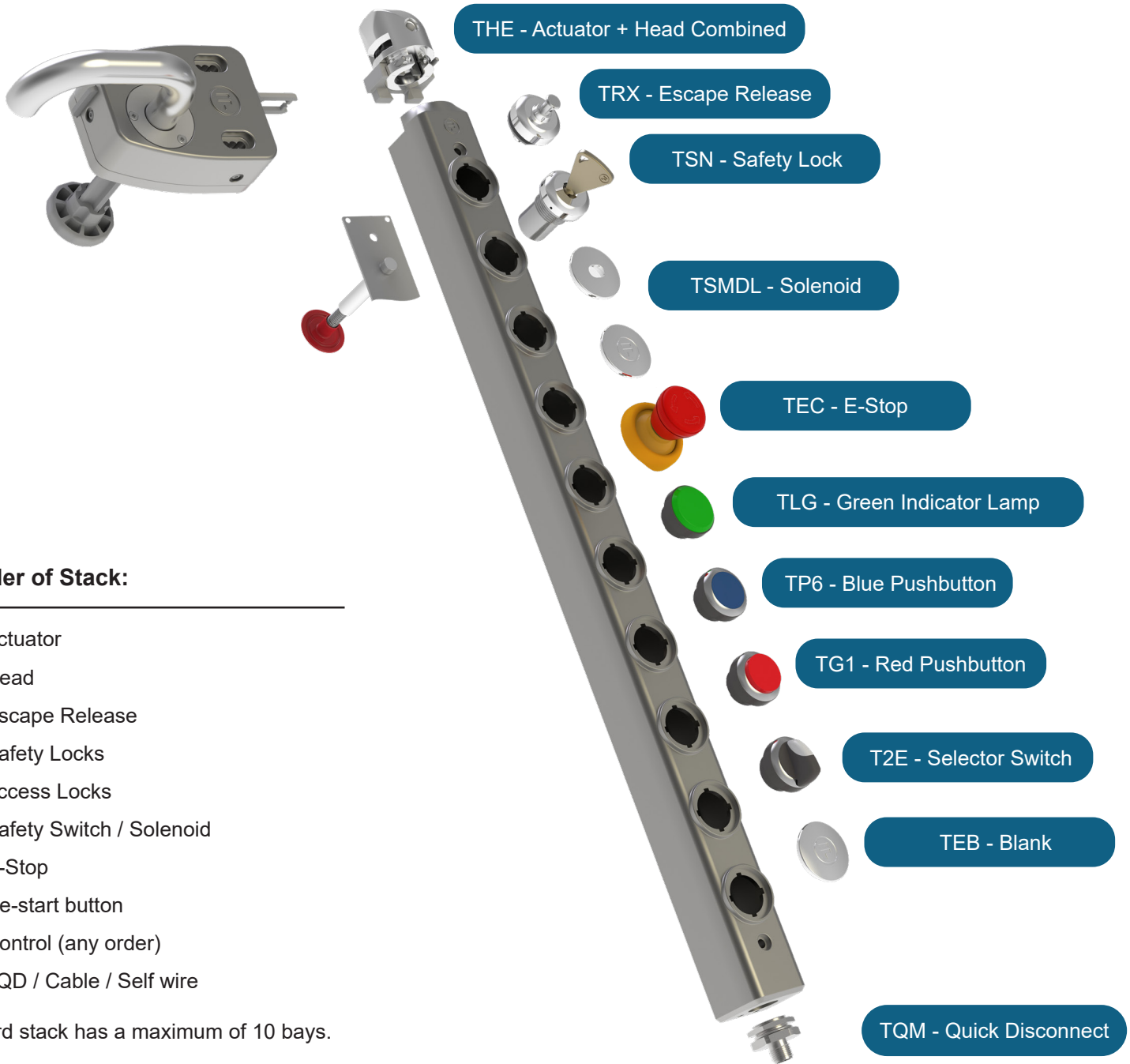
Control Station with emergency stop, indicator lamp and pushbuttons



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 SMDLECLGP6G12EEBQM

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.
2. Inputs / outputs are allocated from the bottom of the stack, ascending.
3. On any one element, the input is assigned first, then the output(s).
4. Outputs are +24v, taken from the +24v supply.
5. Selection of the connector depends upon the wiring requirements for inputs / outputs / safety circuit of the total stack.

Actuators

Fixed Actuator



Hinged Actuator



Sliding Actuator



Handle Actuator (No Internal knob)



Handle Actuator



Heads

Cap

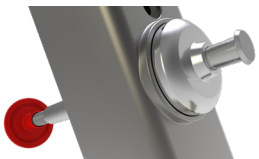


Head

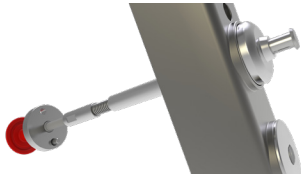


Core Elements

Escape Release



Safety Lock



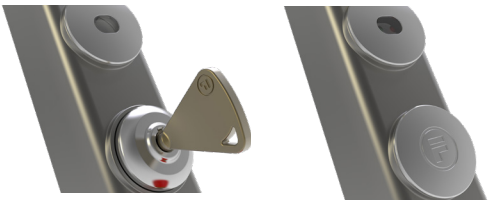
Access Lock



Safety Switch



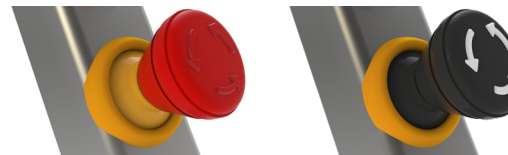
Safety Switch & Solenoid



Extension Blank Element



Emergency Stops

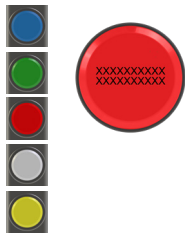


Safety Re-Start

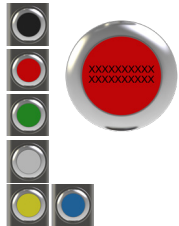


Core Elements

Indicator Lamps



Pushbuttons



Non-Illuminating Switches

2 Position Selector Switch



2 Position Selector Key Switch



Mushroom Pushbutton

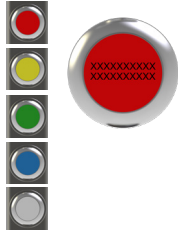


3 Position Selector Switch



Illuminating Switches

Pushbuttons



2 Position Selector Switch



3 Position Selector Switch



Base Elements

Safety & Control Quick Disconnect Connectors



Foot



Self Wire



AS- interface



Keys & Accessories

Keys



Lock-Out Clip

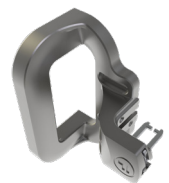


For more information on the lock-out clip see head & cap element operating instructions.



Step 1: Actuators

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



TAF
Fixed Actuator



TAH
Handle Actuator - Hinged Door



TAS
Handle Actuator - Sliding Door



THB
Blank Handle



TEN
Handle Actuator - (no internal knob)

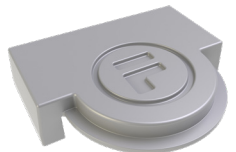


TEH
Handle Actuator

t
The internal knob on TEH handle doesn't override the solenoid or lock. A TRX/Z (emergency release element) must be used to deliver that functionality.

Step 2: Head Modules

t
You can combine a 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

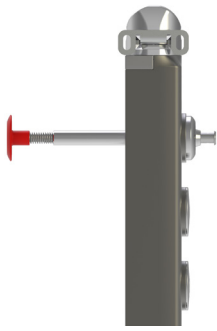


THM + TEN = THN
Head module including handle actuator (No internal knob)



THM + TEH = THE
Head module including handle actuator

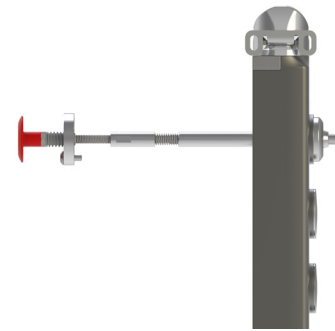
Step 3: Escape Release



TRX
Standard 60mm
Escape Release



TRZ
Variable length
Escape Release




Extended
version available
(TRZ) - < 300mm.

Step 4: Safety & Access Lock Element



TSN
Standard Safety
Lock (No Key)*

TGN
Master Safety
Lock (No Key)*

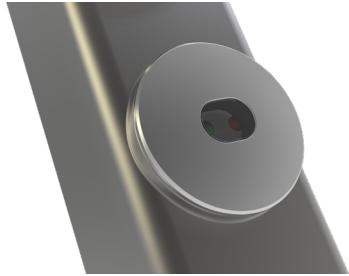


TAB
Standard Access
Lock (No Key)*

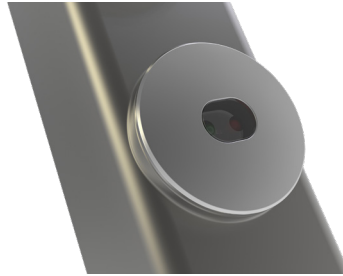
TQB
Master Access
Lock (No Key)*


*All keys need
to be ordered
separately.

Step 5: Safety Switches




TSM
Safety Switch



TSP
Safety switch
with extra retention force



TSS
Safety Switch -
No N/O monitor contact


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

Step 6: Solenoid Controlled Lock & Safety Switch Elements

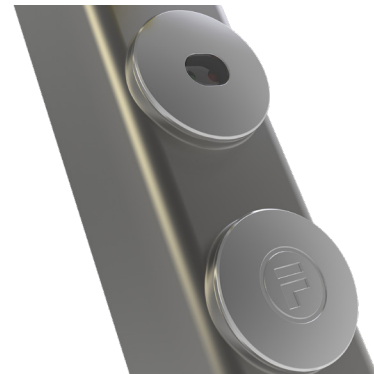

90% of customers select TSMDU.



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



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




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

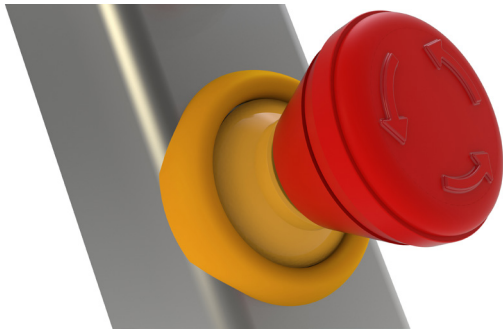
Step 7: Extension Blank Element



TEB
Extension Blank
Element


Can be used to
add extension bay
to a configuration.


Step 8: Emergency Stop Element



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



TES
TES is black version
of the TET


E-Stop
always mounted
at the top of any control
elements, but below
solenoid/head/safety
switches/locks. TEM & TEI
E-Stops can be positioned
at the bottom of the
stack.

Step 9: Safety Re-Start Switch

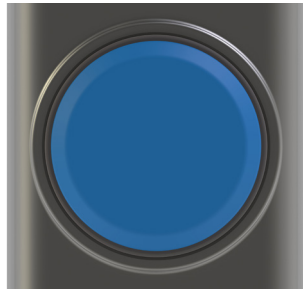


TSR
Safety Re-Start Switch - Blue



Location of safety re-start switch in stack is highest control element after E-Stop's.

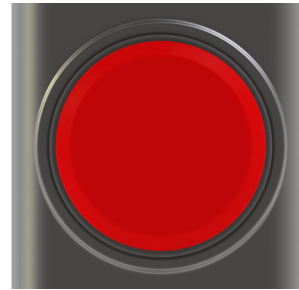
Step 10: Indicator Lamp Element



TLB
Indicator Lamp Element - Blue



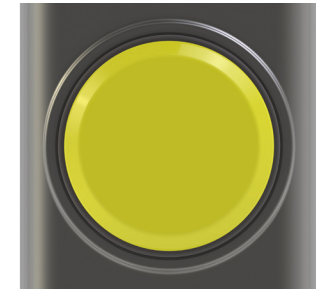
TLG
Indicator Lamp Element - Green



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



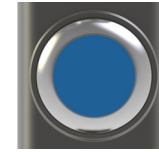
TPG
1 N/O Pushbutton -
Green



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

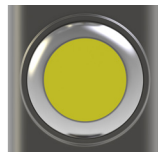


T3H
3 Position Selector Switches
- Momentary/Latching

Step 11b: Illuminating Switches



TP1
Pushbutton - Red



TP2
Pushbutton - Yellow



TP3
Pushbutton - Green



TP6
Pushbutton - Blue



TP7
Pushbutton - White

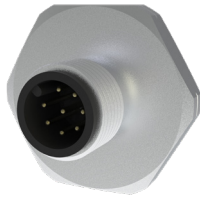


 Please see operating instructions for a full range of options.

Step 12a: Safety & Control Connectors



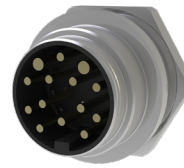
TQ1
5 Pin M12 QD



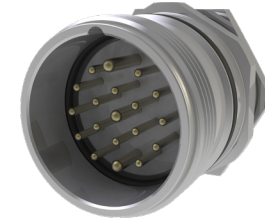
TQ2 / TQ3
8 Pin M12 QD



TQ4 / TQ5
12 Pin M23 QD



TQ7
14 Pin 7/8" UN2 QD



TQ8 / TQ9
19 Pin M23 QD



TQL / TQM
12 Pin M12 QD

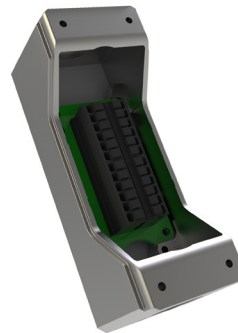
Step 12b: Foot, Self Wire Connectors, AS-interface



TBF
Foot Element



TW1
12 Terminals



TW3
24 Terminals



TW4
24 Terminals



TEBB4
Up to 2 AS-i nodes



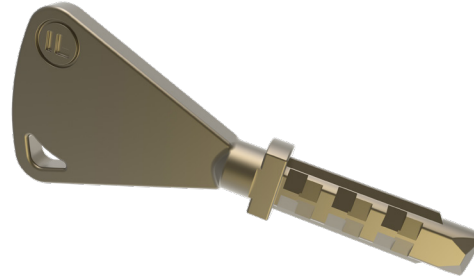
TEBB8
Up to 4 AS-i nodes



Step 13: Mating Cables for Quick Disconnect Connectors

Pin Assignments for Quick Disconnect & Mating Cable Pin Assignments																			Cable Length	Cable Part No.
Pin Assignments	Pins																		2M	Cable-2M-TQ1
	Part No.	Cable_M-TQ1		TEBB4 / 8	Wire Colour	Cable_M-TQ2 / TQ3		Wire Colour	Cable_M-TQ4 / TQ5		Wire Colour	Cable_M-TQ7	Wire Colour	Cable_M-TQ8	Cable_M-TQ9	Wire Colour	Cable_M-TQL	Cable_M-TQM	5M	Cable-5M-TQ1
	Number of Pins	5	5	8		12	14		19	12										
	Connector Size	M12	M12	M12	M23	M23	7/8" UN2	M23	M12											
	# of Safety Circuits	2	-	0	2	0	2	2	4	0	2									
	# of Control I/O	0	-	5	1	9	5	7	12	8	9	5								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20M
	Brown	SC 1	AS-i +	White	I/O 0	SC 1	Brown	+24V	+24V	Grey/Pink	I/O 3	Violet	SC 1	SC 1	White	I/O 0	SC1	5M	Cable-5M-TQ3	
	White	SC 2	Aux -	Brown	+24V	+24V	Brown/White	I/O 0	SC 1	White/Green	I/O 2	Red	SC 2	SC 2	Brown	+24V	+24V	10M	Cable-10M-TQ3	
	Blue	SC 1	AS-i -	Green	Earth	Earth	Blue	0V	0V	White/ Yellow	I/O 1	Grey	SC 1	SC 1	Green	Earth	Earth	20M	Cable-20M-TQ3	
	Black	SC 2	Aux +	Yellow	I/O 1	SC 2	White	I/O 1	SC 2	Brown	+24V	Red/Blue	SC 2	SC 2	Yellow	I/O 1	SC 2	2M	Cable-2M-TQ5	
	Grey	Earth	Earth	Grey	I/O 2	SC 1	Green	I/O 2	SC 1	Brown/Yellow	SC 2	Green	I/O 0	I/O 0	Grey	I/O 2	SC 1	5M	Cable-5M-TQ5	
				Pink	I/O 3	SC 2	Yellow	I/O 3	SC 2	Blue	0V	Blue	0V	0V	Pink	I/O 3	SC 2	10M	Cable-10M-TQ5	
				Blue	0V	0V	Grey	I/O 4	I/O 0	Yellow	I/O 6	Grey/Pink	I/O 1	I/O 1	Blue	0V	0V	20M	Cable-20M-TQ5	
				Red	I/O 4	I/O 0	Pink	I/O 5	I/O 1	Green	I/O 5	White/Green	I/O 2	I/O 2	Red	I/O 4	I/O 0	2M	Cable-2M-TQ7	
							Red	I/O 6	I/O 2	Pink	I/O 4	White/Yellow	I/O 3	I/O 3	Orange	I/O 5	I/O 1	5M	Cable-5M-TQ7	
							Black	I/O 7	I/O 3	White	SC 1	White/Grey	I/O 4	I/O 4	Tan	I/O 6	I/O 2	10M	Cable-10M-TQ7	
							Violet	I/O 8	I/O 4	Red/Blue	I/O 0	Black	I/O 5	I/O 5	Black	I/O 7	I/O 3	20M	Cable-20M-TQ7	
							Green/Yellow	Earth	Earth	Brown/Green	SC 2	Green/Yellow	Earth	Earth	Violet	I/O 8	I/O 4	2M	Cable-2M-TQ8/9	
										Grey	SC 1	Yellow/Brown	I/O 6	I/O 6				5M	Cable-5M-TQ8/9	
										Red	Earth	Brown/Green	I/O 7	I/O 7				10M	Cable-10M-TQ8/9	
												White	I/O 8	SC 3				20M	Cable-20M-TQ8/9	
												Yellow	I/O 9	SC 4				2M	Cable-2M-TQL/M	
												Pink	I/O 10	SC 3				5M	Cable-5M-TQL/M	
												Grey/Brown	I/O 11	SC 4				10M	Cable-10M-TQL/M	
												Brown	+24V	+24V				20M	Cable-20M-TQL/M	
Part No.	TQ1 / TEBB4 / 8			TQ2 / TQ3		TQ4 / TQ5		TQ7		TQ8 / 9		TQL / M								
Pin Heads																				

Step 14: Keys



TKS
Standard Key

TKM
Master Key

Step 15: Accessories



TLO
Lock-Out Clip

Allows tGard to be used as part of a Lock-Out / Tag-Out procedure. Holds for two padlocks / hasps.





FORTRESS

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“

We have the peace of mind that our workers are safe and protected by fortress equipment.

”



FORTRESS

“

Fortress is best at providing customised solutions at a rapid turnaround - reacting immensely to a challenge to put the customer's needs first.

”



FORTRESS

“

Fortress' best quality is providing each customer the most robust and safe solution - all while being completely customizable and retaining a high level of quality.

”



FORTRESS

“

We value suppliers that can help navigate the standards and provide guidance that is directly linked to our applications.

”



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