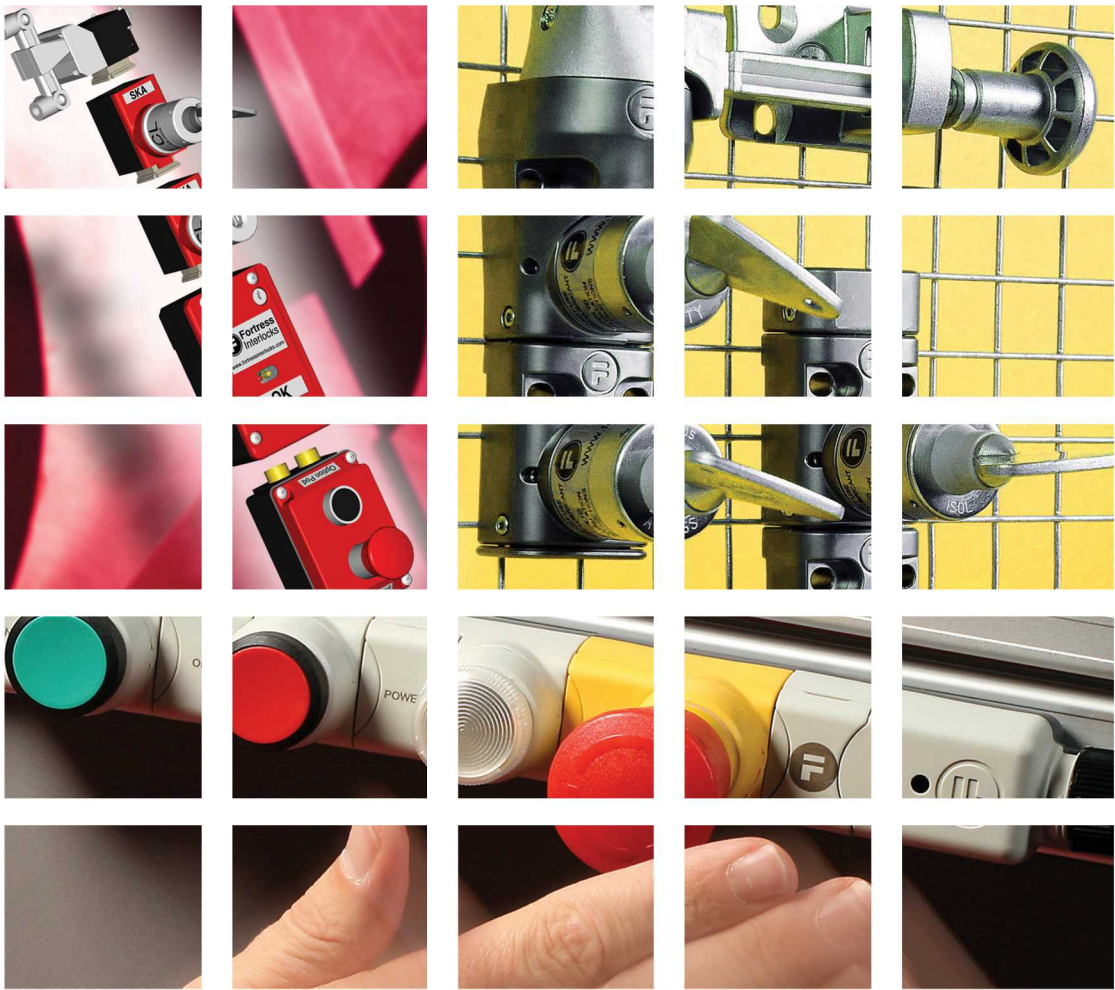


- m Gard** Trapped Key Technology
- am Gard** Safety Gate Switch Interlocks
- e Gard** Total Access & Control



# Product Catalogue

Total Access & Control

## “Who we are”

A market leader, Fortress Interlocks design and manufacture safety access & control systems. Fortress offer an unrivalled portfolio suitable for applications across a wide industrial base from power generation and distribution, steel, automotive, recycling, building materials, through safeguarding robots and palletisers.

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

## “What we do”

Fortress help customers protect their human and capital assets. We create safe workplaces where employees are safeguarded from injury and plant is protected from damage.

We are world leaders in access control systems, and our products guarantee that actions and events are undertaken in a pre-determined sequence ensuring a safe working environment.

## “Total Access & Control”

With the introduction of eGard, Fortress can provide “Total Access & Control”, from cost effective general duty access interlocks and simple automation control systems (eGard), to the most robust trapped key interlocks (mGard) or safety gate switches (amGard).

## “Why choose Fortress”

Fortress are a solution provider and our extensive product offering and interlocking experience allows us to provide unique solutions for all safeguarding applications. We regularly create bespoke solutions, often by customising our standard products.

# Fortress Interlocks

The designer, manufacturer  
and global supplier of Total  
Access & Control systems

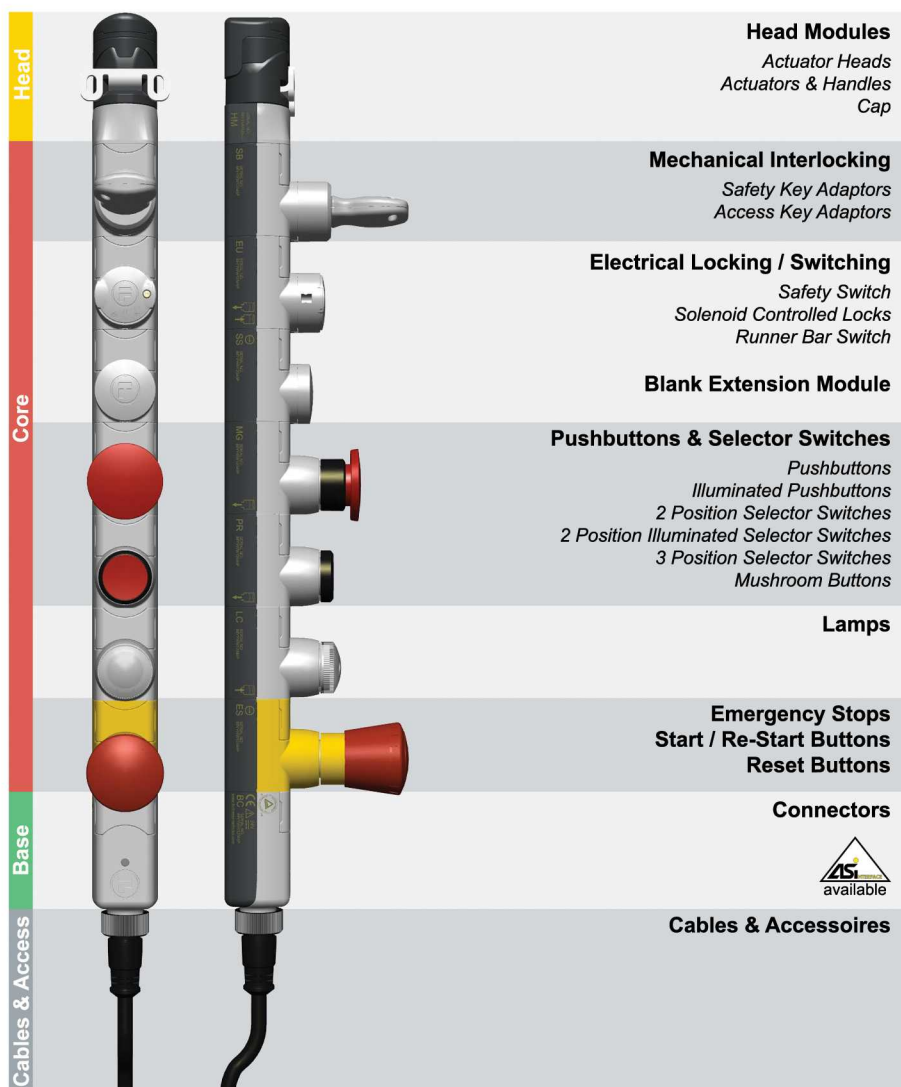


NB Our brochure is designed to give an overview of our brand portfolio. For detailed technical information including 2D autocad file downloads, 3D animated product views and specific application information, visit our web site [www.fortressinterlocks.com](http://www.fortressinterlocks.com)



**eGard** is the new totally modular approach to controlling access to hazardous machinery and equipment. A compact access and control system has been developed that enables a selection of configurations including mechanical trapped key interlocks, electrical safety gate switch interlocks and electrical operator controls, either as separate devices or intergrated into one device.

The system features patented mechanical and electrical connections between every module. It simply clips together and the internal network is self-configuring. With over 4,000 billion possible combinations of modules it can be easily customised for every access and control application. The eGard product range is defined into three sections: head modules, core modules and base modules.



## Module Configuration & Assembly:

A module stack consists of a head module (actuator head or cap), at least one core module (switches, buttons or LED's) and a base module for data-transfer to the PLC-control. Base modules are also available for AS-interface BUS systems. Maximum number of modules = 11 (including head and base).

## Mounting Principle:

This mechanical and electrical combinable eGard closure-system configured, for PLC-systems, consists of connectable modules with different functions and can be used on hinged and sliding doors or just as a control configuration. The stacks can be mounted directly onto a flat surface, doors or extruded profiles, without the need for mounting plates or brackets.

## Configuration and Wiring Setup:

The wiring is configuration specific. The eGard range incorporates safety circuits and standard I/O (input / output) in a single product. The safety and control circuits are separate through all of the modules and are terminated in the head module. The control circuits form an internal network.

## Base connector selection:

There are selections of different base modules, that enable the connection of just the safety circuits (4-pole) or both, the safety and control circuits (14-pole up to 8 I/O). Alternatively a 4-pole ASI-connector can be used for bus-systems (max. 4 I and 4 O). eGard configurations are suitable for use in category 4 applications, acc. to standard EN 954-1 and EN 13849.

## Connection:

Depending on amount of modules 4- or 14-pole, coupling with the 2 m, 5 m, 10 m or 20 m ready made cable.

## Material and Surface Versions:

Module housings made of plastic PBT and 304 stainless steel internals. Upper part light grey coloured, lower part dark grey coloured.

## Protection Class:

The protection class conforms to IP 65 when correctly mounted.

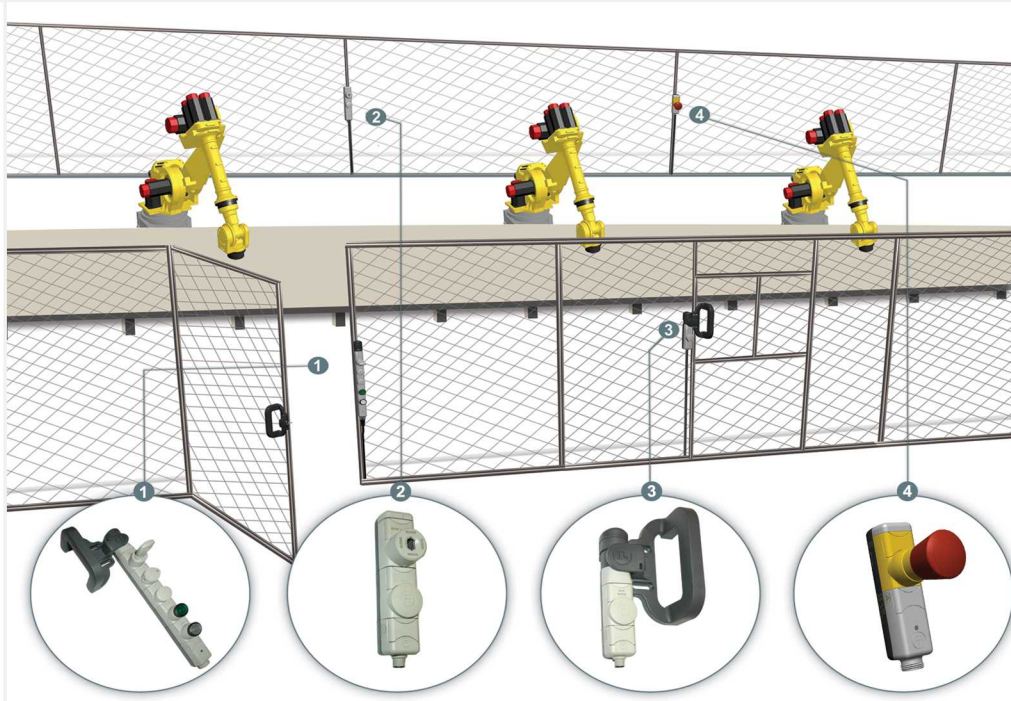
- Locking, switching and machine controls in one configuration with one PreFab connector
- From conventional to AS-i bus by just changing the connector
- Simply add modules to existing configurations
- All eGard mechanically tested to 1 million operations
- Type tested and approved by TÜV Rheinland Group, UL and CSA Listed



## eGard Application Examples

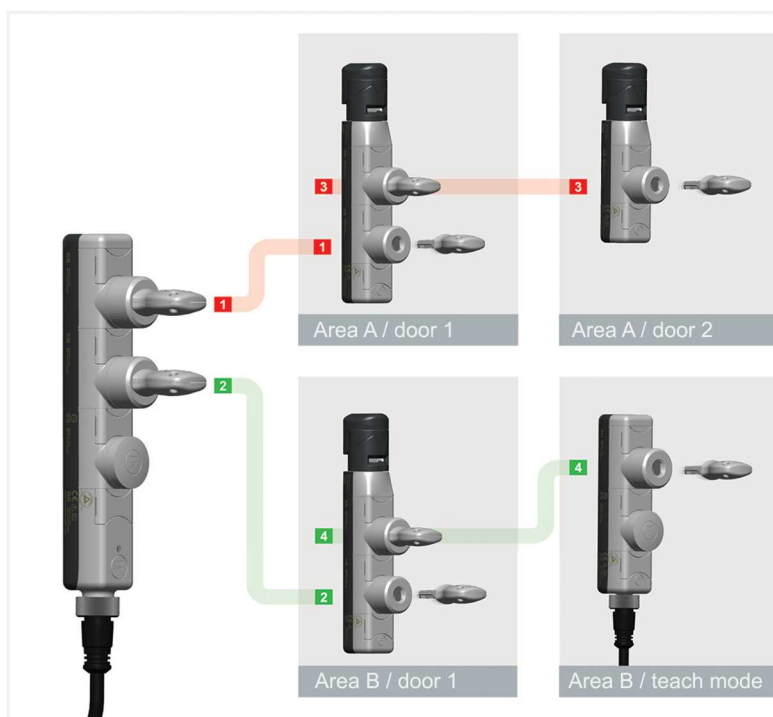
eGard offers the possibility to configure solutions to safeguard, regulate access and control of machinery and/or guarded areas, as is shown in the automated production line below.

- 1 HMSBEUSSP4LCBC-AH**  
Handle operated door lock with a safety key, a solenoid controlled safety switch, an access request button and an indication lamp (for full body access doors).
- 2 HCABSSBS**  
The safety key from configuration 1 can be inserted in the key switch module to activate a teach mode function.
- 3 HMSSBS-AH**  
Handle operated door lock with safety switch, that terminates the machine after opening the door (for part body access doors).
- 4 HCEMBB**  
A monitored emergency stop.



## Trapped Key Interlocking Principles

A simple mechanical system of interlocking, without need for wiring to the access gates, keys are trapped and freed in a defined logic sequence, for machine controls, as well as allowing access when the guarded area or machine is safe to enter.



By turning key 1 or 2 in the key controlled switch configuration, the dual safety circuits are broken and the machine stopped.

**Key 1** can be used to open door 1 of the safeguarded area A.

**Key 2** can be used to open door 1 of the safeguarded area B.

**Key 3** is a safety key that keeps key 1 trapped in the door lock preventing machine restart and can also be used to open a door inside area A.

**Key 4** is a safety key that prevents machine restart and can also be used to start machine teachmode inside area B. using a key controlled switch configuration.

### Trapped Key Interlock Interfacing

Interfacing trapped key interlocks with safety gate switch and/or control functions does offer unique and new methods to improve, optimise, and rationalise the implementation of all these safety related functions into one system.

## General Guidelines

- A configuration must be made up of one head module, at least one core module and one base module
- Configuration sequence is: head module, safety locks, access locks, solenoid, safety switches, control modules and base.
- Maximum number of modules = 11 (including head & base)

## Head Modules

- HF** incl. fixed actuator
- HM** head only



### Actuator Head

For gate switch and door lock configurations.

- Rotatable through 360 degrees
- Top and side entry
- Operating force 5 to 10N
- Retention force 1000N

- HC**



### Cap

Used to terminate all non door lock or gate switch configurations.

- Used in mechanical exchange box, machine control or key switch configurations.

## Actuators

- AF** fixed actuator
- AG** actuator used in handles



### Fixed Actuator

- Fixed actuator suitable for mounting for either sliding or hinged doors.

*Must be used in combination with a HM head module.*

- AH** Hinged door actuator
- AS** Sliding door actuator

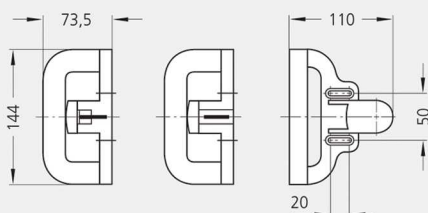


### Handle Actuators

- Handle actuators suitable for bracketless mounting for either sliding or hinged doors.

*Must be used in combination with a HM head module.*

Handles for hinged and sliding doors:



AH



AS



## Mechanical Interlocking

Mechanical lock modules - for use in trapped key configurations (e.g. key switches, exchange boxes and door locks). It can also be used in conjunction with safety gate switches to add further levels of access control (e.g. modular safety keys to prevent accidental lock in of personnel in full body access applications or additional key transfer).

### Access Key Module

- AB** standard lock
- QB** master lock



For access (request) functions.

- Robust radial disc tumbler lock
- >3000 combinations
- 10 mastered combinations (can be used with all 3000 individual combinations)
- No key included
- Max No of mechanical locks = 6

### Safety Key Module

- SB** standard lock
- GB** master lock



To prevent accidental lock in of personnel.

- Robust radial disc tumbler lock
- >3000 combinations
- 10 mastered combinations (can be used with all 3000 individual combinations)
- Key included
- Max No of mechanical locks = 6

### Keys

- KS** standard key
- KM** master key



Master key can only be used in combination with masterable lock modules.

## Electrical Locking / Switching

eGard offers four different electrical locking/switching modules. The safety switch module, is driven by either the operation of the head module (removal of actuator or handle) or a mechanical lock. The module is for instance used to switch "off" an installation when opening the door. The solenoid controlled lock is also able to lock a door or trap a key until the area is safe to enter. The runner bar switch only detects the operation of the head module or mechanical lock and translates this into a I/O signal.

### Safety Switch

**SS**



Can be driven by either the operation of the head module (removal of actuator) or a mechanical lock.

- Operates on dual safety circuits
- 2 force break positive make NC safety contacts (uses none of the I/O pins)



### Solenoid Controlled Lock

- EU** power to unlock
- EL** power to lock



To electrically lock a door or trap a mechanical key. This module restricts access until it is safe.

- Both have 1NO contact to monitor when the module is locked
- Uses 1 output and 1 input pin
- A high output indicates that the solenoid has successfully locked the runnerbar



RB



## Runner Bar Switch

Additional monitoring contact. Can be driven by either the runner bar operation of the head module (removal of actuator) or a mechanical lock.

- 1NO monitoring contact (each runner bar status module uses 1 output pin)



## Extension Blank Modules

EB



## Blank Extension Module

Additional blank module for extending a configuration.

*Generally used for spacing between core modules.*

## Pushbutton Modules

- PG** green   **PY** yellow  
**PR** red  
**PW** white  
**PB** black  
**PZ** blue



## Pushbuttons - Flat

- Uses 1 output pin
- All pushbuttons have 1NO contact

*Other colours are available on request.*



- P1** red   **P7** white  
**P2** yellow  
**P3** green  
**P4** clear  
**P6** blue



## Pushbuttons - Flat Illuminated

- Uses 1 output pin and 1 input pin
- All pushbuttons have 1NO contact

*Other colours are available on request.*



- M1** **MB** black  
**M2** **MR** red  
**M3** **MY** yellow  
**MG** green  
non-latching  
latching



## Pushbuttons - 40mm Mushroom

- Uses 1 output pin
- All mushroom buttons have 1NO contact
- non-latching - spring return to original position
- latching - stay in each switch position

*Other colours are available on request.  
Red mushroom buttons cannot be used in the USA.*



eGard simply clips together and provides a vast number of options. Modules such as stop and start switches and indicator lights can be included in the one unit, with or without gate switch modules. This eliminates much of the wiring and connection time involved with control panels. Ease of installation also provides a huge cost saving for specifiers.



## Selector Switches

- 2A 2D** black  
**2B 2E** red  
**2C 2F** green  
**2G 2H** white
- non-latching  
 latching



### 2 Position Selector Switches

- All 2 position selector switches have 1NO contact
- Each 2 position selector switch uses 1 output pin
- Non-latching - spring return to original position
- Latching - stay in each switch position



Other colours are available on request.

- 3A 3D** black  
**3B 3E** red  
**3C 3F** green  
**3G 3H** white
- non-latching  
 latching



### 3 Position Selector Switches

- All 3 position selector switches have 2NO contacts
- Each 3 position selector switch uses 2 output pins
- Non-latching - spring return to original position
- Latching - stay in each switch position



Other colours are available on request.

- 2J 2N** red  
**2K 2O** green  
**2L 2P** white
- non-latching  
 latching



### 2 Position Illuminated Selector Switches

- All 2 position illuminated selector switches have 1NO contacts
- Each 2 position illuminated selector switch uses 1 input pin and 1 output pin
- Non-latching - spring return to original position
- Latching - stay in each switch position



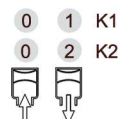
Other colours are available on request.

- K1** 2 position  
**K2** 3 position



### Ronis Key Switch

- 2 position switch uses 1 output pin and 1NO contact
- 3 position switch uses 2 output pins and 2NO contacts
- Including Ronis key
- Latching - stay in each switch position



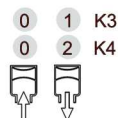
K1 : Siemens 3SB30 00-4AD01  
 K2 : Siemens 3SB30 00-4DD01

- K3** 2 position  
**K4** 3 position



### BKS ET Key Switch

- 2 position switch uses 1 output pin and 1NO contact
- 3 position switch uses 2 output pins and 2NO contacts
- Excluding BKS ET key
- Latching - stay in each switch position



K3 : Siemens 3SB30 00-5AE31 (E2 : Volkswagen)  
 K4 : Siemens 3SB30 00-5AE51 (E7 : Volkswagen)

## Lamps

- LB** blue   **LY** yellow  
**LC** clear  
**LG** green  
**LR** red  
**LW** white



### LED Lamps

- LED status indicator
- Each lamp uses 1 input pin

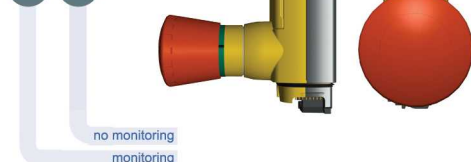


Other colours are available on request.



## Emergency Stops / Start Re-Start

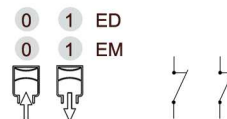
EM ES 40mm  
ED EC 30mm



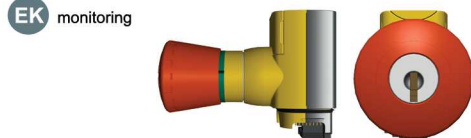
### Twist Release Emergency Stop

- 2 force break positive make NC Safety contacts (uses none of the I/O pins)
- Monitored version (EM) also has 1NO monitoring contact, uses 1 output pin
- 30mm or 40mm button

Standard twist release operates on dual safety contacts.



EJ no monitoring  
EK monitoring



### Emergency Stop with Key Operated Reset

- 2 force break positive make NC Safety contacts (uses none of the I/O pins)
- Monitored version (EK) also has 1NO monitoring contact, uses 1 output pin
- With Ronis key operated reset function
- 40mm button

Standard twist release operates on dual safety contacts.



SC



### Start Re-start Key Switch

- Start restart key switch, operating on safety circuits
- Uses 1 NO and 1 NC
- For safety relay re-set
- With Ronis key operated reset function
- Latching - stay in each switch position



SR blue  
ST black  
SX red  
SY white  
SZ yellow



### Start Re-start

- Start restart pushbutton, operating on safety circuits
- Uses 1 NO and 1 NC
- For safety relay re-set



## Connectors

BF



### Foot

For terminating mechanical configurations (no wiring).

BS



### Safety Only Connector

4 pin M12 for connecting dual safety circuits.

## Safety & Control Connectors

- BB** 2 I/O sourcing output
- BC** 8 I/O sourcing output
- BD** 2 I/O sinking output
- BE** 8 I/O sinking output



- All versions connect dual safety circuits and either up to 2 inputs/outputs or up to 8 inputs/outputs
- 14 pin for connecting to 24V DC

## AS-Interface Connectors

- BA** AS-i safety & control
- BH** AS-i safety only
- BG** AS-i control only



- BA** AS-i connectors 4 pin M12 for connecting dual safety circuits and up to 4 inputs and up to 4 outputs (uses two addresses)
- BH** AS-i connectors 4 pin M12 for connecting dual safety circuits only (uses one address)
- BG** AS-i connectors 4 pin M12 for connecting controls only up to 4 inputs and up to 4 outputs (uses one address)

## Cables & Accessories

### 4 Pin Cables

- 24** 2m
- 54** 5m
- 14** 10m
- 04** 20m



- Single ended straight connector
- 4 pin M12

### 14 Pin Cables

- 21** 2m
- 51** 5m
- 10** 10m
- 20** 20m



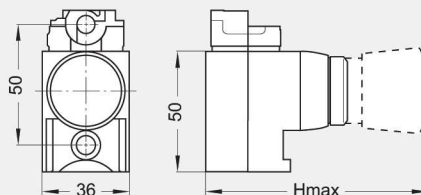
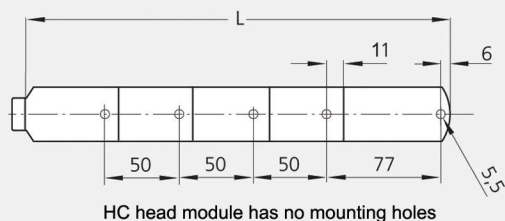
- Single ended straight connector
- 14 pin

## Marked Legend Plates

- VG** landscape grey
- VY** landscape yellow
- HG** portrait grey
- HY** portrait yellow
- DG** image grey
- DG** image yellow



- Grey (or yellow for emergency stop modules)
- For vertically mounted configuration (landscape legend plate) up to 3 lines of 17 digits long and 3mm high
- For horizontally mounted configuration (portrait legend plate) up to 2 lines of 11 digits long and 3mm high
- Both portrait and landscape legend plates are also available with an image (DWG format)



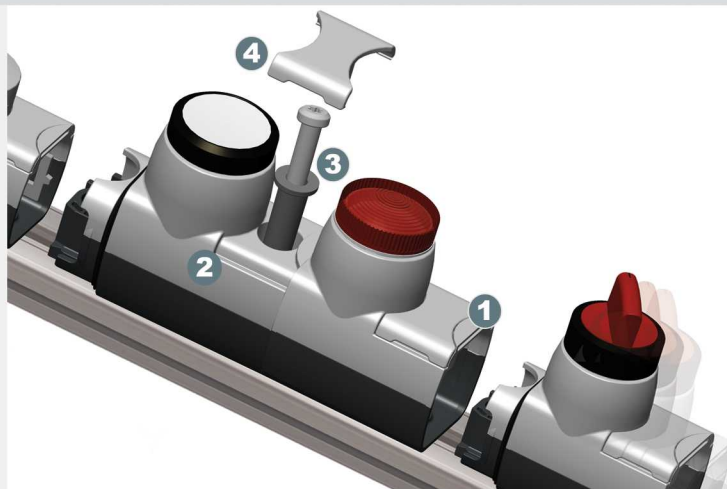
Designation	Hmax (mm)
Key Modules	100
Solenoid Locks	55
Safety Switch	48
Runner Bar	48
Emergency Stops	100
Ronis/BKS Key modules	96
Pushbuttons	59
Mushroom Buttons	76
Selector Switches	76
Lamps	63
Connectors/Heads	35

#### Assembly & Mounting of Modules \*

1. The upper module will be connected to the lower module by simply clicking together.
2. Inserting the joining tube through the middle bore secures and seals the module connection.
3. After connecting all modules according to step 2 the configuration can be mounted e.g. on a grooved profile by slot nuts and cylindrical head screws M 5, DIN 912.  
(or alternatively bolting on flat surface)
4. Finally the cover caps will be pushed on the connecting bores of the module housings.

\* To assure IP 65, all modules must be fixed.

\* Complete ordered configurations are supplied fully assembled.



#### Configuration Rules

1. A configuration must be made up of one head module, at least one core module and one base module.
2. Maximum No of modules = 11 (including head & base).
3. Configuration sequence is: head module, safety locks, access locks, solenoid, safety switches, control modules and base.
4. The start / restart (SR, ST, SW, SX, SY & SZ) module cannot be used in stacks with another module that works on the safety circuits.
5. All eGard configurations are suitable for use in Installation Category 4 (to EN954-1) applications apart from ones combining an e-stop and a gate switch having an ES and SS in same stack (this is Installation Category 3 EN954-1)

#### Electrical Guidelines

Control modules with inputs/outputs (I/O) can be configured in any order in the stack (the internal eGard network is self configuring). Table 1 shows how many I/O connections can be made using the different types of connector, and table 2 shows each core modules I/O requirements.

Ref N°	Description	Max I/O	Connects safety circuits
BS	Safety Only	Zero	Yes
BB	Safety and Control sourcing	Max 2 I/O	Yes
BC	Safety and Control sourcing	Max 8 I/O	Yes
BD	Safety and Control sinking	Max 2 I/O	Yes
BE	Safety and Control sinking	Max 8 I/O	Yes
BA	Safety and Control AS-i	Max 4I & 4O	Yes
BH	Safety Only As-i	Zero	Yes
BG	Control Only As-i	Max 4I & 4O	No

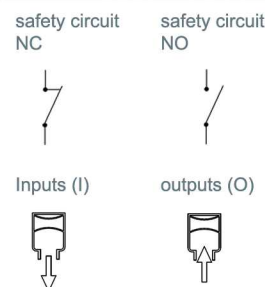
table 1: max I/O connections per base connector type



I/O relative to eGard		inputs (I)	outputs (O)	connects to safety circuits
Head Modules	HF, HM, HC	0	0	-
Mechanical Interlocking	AB, SB	0	0	-
Safety Switches	SS	0	0	yes
Solenoid Controlled Locks	EU, EL	1	1	-
Runner Bar Modules	RB	0	1	-
Blank Extension Modules	EB	0	0	-
Pushbuttons Flat	PB, PG, PR, PW, PZ, PY	0	1	-
Pushbuttons Flat Illuminated	P1 - P7	1	1	-
2 Position Selector Switches	2A - 2H	0	1	-
3 Position Selector Switches	3A - 3H	0	2	-
2 Position Illuminated Selector Switch	2J, 2K, 2L, 2N, 2O, 2P	1	1	-
2 Position Key Switch	K1, K3	0	1	-
3 Position Key Switch	K2, K4	0	2	-
Pushbutton 40mm Mushroom	M1, M2, MB, MR, MG	0	1	-
Lamps	LR, LG, LC, LB, LW, LY	1	0	-
Emergency Stop	ES, EC	0	0	yes
Monitored Emergency Stop	EM, ED	0	1	yes
Key Operated E-stop	EJ	0	0	yes
Monitored Key Operated E-stop	EK	0	1	yes
Start / Re-start Buttons	SR, ST, SW, SX, SY, SZ	0	0	yes
Key Operated Start / Re-start Buttons	SC	0	0	yes

table 2: Core module I/O requirements

## Designation



## Technical Information

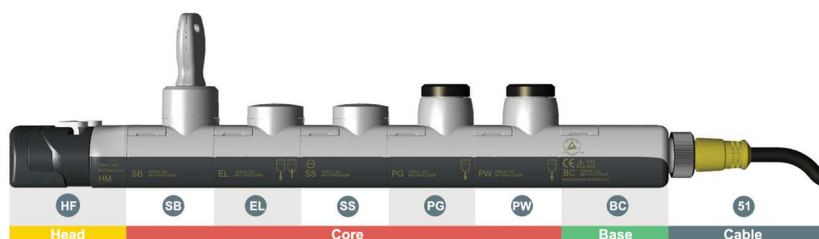
Base Modules	Max. current
4 pole	200 mA
14 pole	200 mA
4 pole AS-i	75 mA
Temperature Range	-5... + 40 C°
Operating Voltage	24V DC

Max. Relative Humidity	93(+/-3)% without any dew on the device
Ingress Protection	IP65

## Creating an Article Code

An eGard configuration article code can simply be created by adding up the single used module part numbers in sequence from head to base. The legend plates, cables, and door actuators must be ordered separately and are not part of the configuration article code. Below an example of how to create an eGard part number:

The complete part number of the example configuration is: HFSBELSSPGWPBC - 51

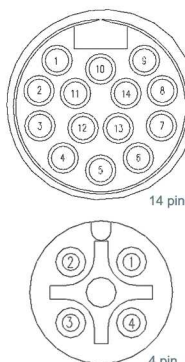


## Wiring Schemes

By using the eGard configurator ([www.fortressinterlocks.com](http://www.fortressinterlocks.com)) you are able to simply extract a wiring diagram of each configuration. You can also contact our Technical Sales department for any assistance. Shown below is a wiring diagram for both the 14 pin (safety & control) as the 4 pin (safety only and AS-i) connector.

I/O Assigned from base upwards	Wire Colours	Connector Pins
+24 V	Brown	4
0 V	Blue	6
Safety circuit 1	White	10
Safety circuit 1	Grey	13
Safety circuit 2	Brown/Yellow	5
Safety circuit 2	Brown/Green	12
I/O 0	Red/Blue	11
I/O 1	White/Yellow	3
I/O 2	White/Green	2
I/O 3	Grey/Pink	1
I/O 4	Pink	9
I/O 5	Green	8
I/O 6	Yellow	7
I/O 7	Red	14

table 3: BC 14 Pin Control &amp; Safety Connector wiring scheme



I/O Assigned from base upwards	Wire Colours	Connector Pins
Safety circuit 1	Brown	1
Safety circuit 2	White	2
Safety circuit 1	Blue	3
Safety circuit 2	Black	4

table 4: BS 4 Pin Control only Connectors wiring scheme

Pins	Description
1	AS-i +
2	-
3	AS-i -
4	-

table 5: 4 Pin AS-i connector wiring scheme

Core	<b>Head</b>  Ref N°	<b>Handles &amp; Actuators</b>  Ref N°
	<b>Mechanical Interlocking</b>  Ref N°	<b>Electrical Locking/Switching</b>  Ref N°
	<b>Pushbuttons</b>  Ref N°	<b>Lamps</b>  Ref N°
	<b>Selector Switches</b>  Ref N°	<b>Start / Re-Start</b>  Ref N°
Base	<b>Selector Switches</b>  part n°	<b>Emergency Stops</b>  Ref N°
	<b>Connectors</b>  Ref N°	
Cables & Access	<b>Cables</b>  Ref N°	<b>Marked Legend Plates</b>  Ref N°

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