



Description:

eGard provides a compact "total access and control system". Its modularity allows electrical gate switch, mechanical trapped key, simple machine control system or combinations of all three to be configured. The system features patented mechanical and electrical connections between every module.

Important:

eGard modules can be configured to produce many different functional products, which can be integrated into safety and / or machine control systems. As such eGard products and the systems they are part of need to be installed and commissioned by suitably competent and qualified personnel, whom have read and understood the whole of this document, prior to commencing the installation. **These installation instructions must be retained.**

A risk assessment must be carried out before installation. This product is not to be used as a mains isolator. When this unit is added to any electrical installation it must meet the requirements of the applicable local standards, (e.g. IEC or EN). All the voltages used within the eGard circuits must be derived from a safety extra low voltage power supply (SELV) Any modification or deviation from these instructions invalidates all warranties. Fortress Interlocks Ltd. accept no liability whatsoever for any situation arising from misuse or misapplication of this product.

Tools / Fixings / Cables Required:

- 1 X M5 Cap head screw per fixing refer to mounting diagrams for lengths. Every module must be fixed.
- 1 X Hex driver to suit M5 screws (3mm across flats).
- 1 X M5 Nut / tapped hole per fixing.
- 1 X Thread locking compound.
- 2 X M5 Nuts / tapped holes and screws per actuator, refer to mounting diagrams for screw lengths.
- 1 X M5 tap when fixing to a plate and not using nuts.
- 1 X Electrical (approx 3mm X 0.5mm) flat screwdriver (required when connecting or un-connecting modules).
- Ø 5.5mm Drill (when fixing to plate with nuts) or Ø 4.2mm Drill (when tapping plate).

Functional checking:

The following checks must be made during system commissioning:

1. Check all safety functions; Access to a guarded area is only granted when the machine's motive power is isolated. Any E-Stop brings the machine to an Emergency stop.
2. Check that every electrical I/O module activates or indicates the machine controls as desired. If you have any questions or queries of any nature please contact the Fortress Distributor who will be pleased to advise and assist.

Service and inspection:

Regular (minimum) weekly inspection of the following is necessary to ensuring trouble – free, lasting operation:

- Correct switching function
- Loose cable connections
- Secure mounting of components
- Material degradation
- Debris and accelerated wear
- Sealing
- Tampering
- Check the LED indicates no fault.

Maintenance & Repair:

If any problems are discovered during inspection, individual modules or complete configurations can be replaced. Any modifications must undergo full commissioning test. eGard contains no user serviceable parts, within the modules. The complete product must be replaced after 1 Million operations.

Table 1

Specification	
Application	Indoor use
Ambient Temperature	-5°C to + 40°C
Electrical Rating	24Vdc, +/-10%, 0.15A Max
Max. Relative Humidity	93(+/-3)% without any dew on the device
Ingress Protection	IP65 apart from head actuator entry & mechanical lock entries which are IP20
Vibration	10-55Hz Amplitude 0.35mm 10 octaves / per min Shock test: ½ sine wave acceleration 11k duration 60mS 10 cycles in each axis

Tested to the following standards:

EN1088	EN60947-1 cl 8.4 & table 23
EN954-1	DIN EN 60028-2-27
EN50178	DIN EN 60028-2-29
EN60204-1	DIN EN 60028-2-6
IEC60529	DIN EN 60028-2-51
IEC60068 series	DIN EN 60028-2-64
EN61000-6-2	DIN EN 61496-1
EN61000-6-4	UL508

Disposal:

eGard does not contain any certified hazardous materials so should be disposed of as general waste. Liability coverage is voided under the following conditions:

- If these instructions are not followed.
- Misapplication or use outside of recommended specifications in this sheet.
- Non-compliance with safety regulations.
- Installation not carried out by competent personnel.
- Non-implementation of functional checks.
- Tampering.

Fortress Interlocks Ltd. reserves the right to modify the design at any time and without notice.

Mounting eGard:

1.Choose optimal mounting position: eGard should be mounted in an environment within the specifications stated in **Table 1**. The mounting location should also be away from, or protected against influences such as mechanical collision (door stop required), machine vibration, debris, direct sunlight and sources of electrical interference.

2. If the configuration incorporates a locking head and door actuator go to step 3 otherwise skip to step 4.

3 Rotate the head into the desired orientation

3.1The "AF" actuator suits internal mounting on frame-less doors. It can be used in all mounting positions, but brackets may be required.

3.2 The "AH" actuator is designed to be utilised for hinged door applications, without the need for additional brackets.



3.3 The "AS" actuator is designed to be utilised for sliding door applications, without the need for additional brackets.



4.Prepare panel / door frame for mounting:

When plate mounting, the plate must be solid metal and a minimum thickness of 3mm



4.1For front of panel mounting

•For mounting to extruded aluminium frame:

position 1 off M5 nut (that are designed to suit the frame used). For each fixing that is available

•For plate mounting: drill Ø5.5 mm module & actuator fixing holes, if fixing with nuts or drill Ø4.2 mm fixing holes if tapping the plate (plate must be >6mm if tapping), as per drilling diagram



4.2For back of panel mounting

(Note panel cannot be sealed).

- Drill Ø5.5 mm clearance holes through the back of the centre of each legend plate
- Drill Ø5.5 mm module & actuator fixing holes, as per drilling diagram on page 2
- Drill holes for eGard protrusions through the panel as per drilling diagram. Mushroom button tops can be unscrewed; e-stops buttons can not, so holes must be drilled to allow the (diameter 40mm) button to pass through the panel. A hole must also be drilled to view the base module LED. Refer to drilling diagram, **Fig 2**.



5.Remove all legend plates and ensure all joining tubes are in place.



6.All modules and the actuator must be securely fixed in place using an M5 cap head screws with thread locking compound (applied to female thread)

7.All fixings must be torque tightened to between 1.5 & 2.5 Nm

8.Replace all legend plates

Electrical connection eGard:

Make sure that the electrical supply is isolated prior to connecting to it.

Description:

eGard incorporates safety circuits and standard I/O in a single product. The safety circuits and control circuits (standard I/O) are separate through all of the modules and are terminated in the head or cap. The control circuits form an internal eGard network. There are a selection of different connection "base" modules that enable the connection of just the safety circuits or both the safety and the control circuits

Installation:

When using a BB or BC, check that the voltage of the machine's power supply (control circuits) is 24V DC (SELV) (EN6950 & EN50178). The electrical system must incorporate circuit protection for all circuits, using a quick acting (F) device (rating 150mA) The power supply must contain filtering to protect against mains transient voltages and induced electro-magnetic radiation.

When using a BA base, the power supply must conform to the AS-interface specification.

Electrical guidelines:

Control modules with inputs / outputs (I/O), such as pushbuttons / lamps / selector switches can be configured in any order in the module formation The internal eGard network is self configuring. **Table 1** shows how many I/O connections can be made using the different types of connector. The modules are individually marked with their I/O requirements. (**See Fig. 1**)

Connections to electrical stacks are made via connection cables supplied by Fortress. Care must be taken to ensure threads remain undamaged and free from external forces either during installation or use.

Table 2. (I/O relative to eGard)

Part no	Type	Max No. I/O	2 Safety Circuits	Connector
BS	Safety only	0	Yes	4 Pin, M12
BB	Safety & control up tp 2 I/O	2	Yes	14 Pin
BC	Safety & control up to 8 I/O	8	Yes	14 Pin
BA	Safety & control ASi	4I & 4O	Yes	4 Pin, M12

Safety Circuit description and I/O allocation:

The safety circuits are made up of two, independent, normally closed (N/C) circuits. They are both closed when the machine is in operation. There are a number of modules that can open these safety circuits. All of these modules use positively guided, force disconnect contacts.

When the stack is terminated with a BC, BB or BS module, the safety circuits are connected directly to 4 pins on the connector. Refer to base module connection diagrams for pin assignments. When using the base modules listed, the safety circuits must be connected to a Safety Relay, in accordance with the installation instructions of the Safety Relay manufacturer, to provide the safety function. The voltage on the safety circuits should always be SELV. Both safety circuits include over-current protection, via internal 200mA self resetting fuses.

Non-safety functions in core modules, such as press button and lamp modules operate over an internal eGard data-bus. This data-bus is controlled by the BC, BB or BA module and the Inputs to the stack as well as the Outputs from the stack are self configuring:

A push button in the stack will have an Output (from the stack) associated with it whilst a Lamp in the stack will have an Input to the stack to drive it. When using a BC or BB base module, the I/O pins on the connector are set to either Inputs or Outputs, depending on the modules used on the stack. Each module that has I/O associated with it is marked on the side with graphic symbol(s) to indicate the I/O allocation. **Please refer to Fig. 1.** Working from the base module, towards the head, the first graphic symbol encountered indicates whether the pin, I/O 0 is an Input to the eGard stack or an Output from the stack. The next graphic symbol indicates whether the pin, I/O 1 is an Input or an Output. For BC modules, this scheme continues until a maximum of 8 I/O lines are allocated.

Installation Instructions

Where an I/O line has been configured as an Input to the stack, a voltage greater than 4.5V dc (and less than or equal to the supply voltage) on that pin is interpreted as high. A voltage on the pin that is less than 1V is Low. Voltages between these limits may be indeterminate. Any unused Input lines should be connected to 0V dc.

If the I/O line is an Output, and is set high by its associated module, the pin is connected internally via an output device to the supply voltage. When it is driven low (by its associated module), the pin is connected internally via an output device to 0V dc. Any unused Output lines should be left as open circuit. All I/O lines include over-current protection, via internal 200mA self resetting fuses. N.B Forcing an eGard output to an incorrect state (ie High O/P connected to 0V can cause permanent damage to BC & BB modules.)

Fig. 1

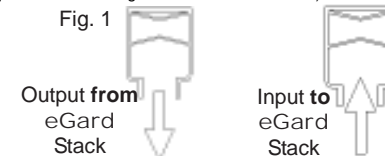


Table 3

Part No	Module	Input (1)	Output (0)	Order assigned from base to head	Module operates on safety circuits
HF	Head & Fixed Actuator	0	0	-	X
HM	Head Only	0	0	-	X
HC	Cap	0	0	-	X
M1-M2, MB, MR, MG	Mushrooms	0	1	-	X
2A-2F	2 Position Selector Switch	0	1	-	X
RB	Runner Bar Status	0	1	-	X
PG, PB, PR, PW	Flat Push Buttons	0	1	-	X
P1-P4	Illuminated Push Buttons	1	1	Input (LED) assigned first for P1-P4	X
3A-3F	3 Position Selector Switch	0	2	Clockwise output assigned first	X
EB	Extension Blank	0	0	-	X
SS	Safety Switch	0	0	-	✓
ES	E-Stop	0	0	-	✓
EM	Monitored E-Stop	0	1	-	✓
LR, LG, LC	Lamps	1	0	-	X
SR	Start / Restart	0	0	-	✓
BS	Safety Only Connector	0	0	-	✓
BB	Safety & Control 2 I/O	Max 2 I/O		-	✓
BC	Safety & Control 8 I/O	Safety & Control 8 I/O		-	✓

Base Modules

Safety base module, "BS" for connecting the dual safety circuits only. This module cannot be used to connect any module with I/O.

Control & Safety connector "BC" (8 I/O) or "BB" (2 I/O). These both use an 14 pin mini change connector, to terminate both safety and control circuits. There are two versions, both of which allow any combination of inputs and outputs up to the max of 8 or 2 I/O. The I/O is assigned starting at the base module (cable entry module) and moving up to the head of the configuration. For modules with multiple I/O the **Table 3** shows which is assigned to the first available I/O pin. **Table 4** shows which pins relate to which I/O connection. The LED flashes during normal operation and will go off continuously or illuminate continuously to indicate an eGard fault.

Table 4

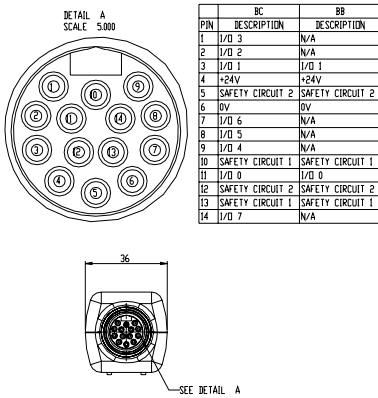


Table 5

Cabling Colours		
Connector Pins	4 Pin	14 Pin
1	Brown	Grey/Pink
2	White	White/Green
3	Blue	White/Yellow
4	Black	Brown
5		Brown/Yellow
6		Blue
7		Yellow
8		Green
9		Pink
10		White
11		Red/Blue
12		Brown/Green
13		Grey
14		Red

Emergency stop & start / restart:

ES – Emergency stop module. Twist release and dual safety contacts operating on the eGard safety circuits. Safety circuit 1&2 are broken when e-stop is pressed. EM – As above but including an additional normally open contact to monitor the e-stop (monitoring output from eGard goes high when e-stop pressed). This contact operates on eGard's control circuitry. SR – Start / restart module has a blue push button operating on the safety circuits to provide a momentary change of state to wire directly into safety relay or light curtain reset circuits. The SR module must be the only module in a stack that operates on the safety circuits. Safety circuit opens on button depression, whilst safety circuit 2 closes on button depression.

Selector switches: Contact made when selector switch turned so output from eGard goes high. 2 position or 3 position selector switches with either latching or non latching contacts (stays in switched position or spring returns). Available in black, red or green.

Push buttons: Contact made when push button pressed so output from eGard goes high. For illuminated push buttons the LED's light up when eGard is provided with a high input) PG, PB, PR, PW – various coloured flat push buttons with 1 normally open contact operating on eGard's control circuitry.

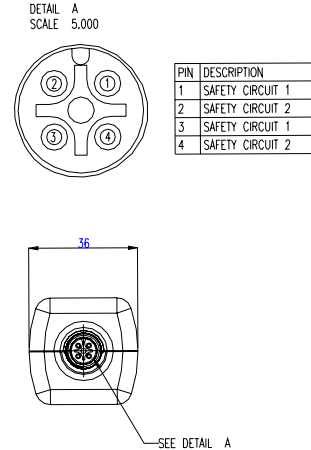
P1, P2, P3, P4 - various coloured illuminated flat push buttons all with 1 normally open contact and LED operating on eGard's control circuitry. MB, MR, MG -various coloured non latching (spring return) 40mm mushroom push buttons all with 1 normally open contact operating on eGard's control circuitry. M1, M2 - various coloured latching (stays in pressed position) 40mm mushroom push buttons all with 1 normally open contact operating on eGard's control circuitry.

Lamps: (LED's light up when eGard is provided with a high input) LR, LC, LG – various coloured LED modules, for status indication all operating on eGard's control circuitry.

Table 6

For connection of the following modules	
ES	Emergency stop (without monitoring)
SS	Safety switch

Table 7

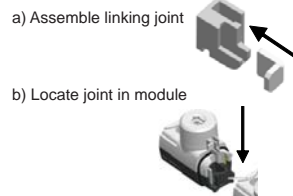


The following information is only relevant if configuring eGard from individual modules

Configuration instructions:

General: Each configuration must have a head module at least one core module and one base module.

Follow images below, to link modules.



c) Click modules together



d) Push linking joint into place



Joining assembly will only slide into place when the 2 runner bars are touching

e) Secure with joint tube

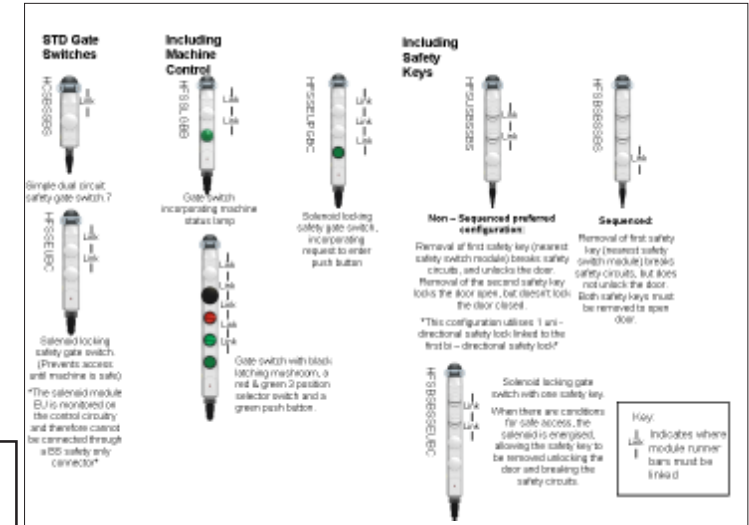


Drilling Diagram

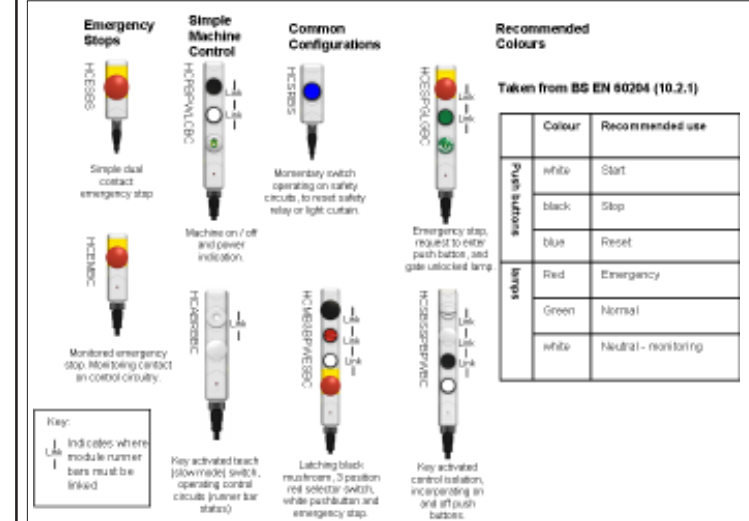


Fig. 2

Standard Gate Switch Configurations



Standard Machine Control Configurations



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