INDUSTRIAL SAFETY SOLUTIONS

DEEBAR
Est. 1976

DEEBAR
ELECTRICAL & MECHANICAL ENGINEERING

"ENSURING YOUR SAFETY"

IN PARTNERSHIP WITH

Fortress Interlocks

Telux

SMITH FLOW CONTROL LTD

Castell

THE IMPORTANCE OF SAFETY

A serious workplace injury or death changes lives forever, for families, friends, communities, and co-workers. Human loss and suffering is immeasurable. Occupational injuries and illnesses can provoke major crises for the families in which they occur. In addition to the major financial burden, they can impose substantial time demands on other family members. Today, when many families are operating with very little free time, resources can be stretched to breaking point.

Every person that leaves for work in the morning should expect to return home at night in good health. Can you imagine the knock on the door to tell you your loved one will never be returning home? Or the phone call to say he's in the hospital and may never walk again? Ensuring that husbands return to their wives, wives to their husbands, parents to their children, and friends to their friends - that is one of the most important reasons to create a safe and healthy work environment. But it isn't the only reason.

REDUCING INJURIES REDUCES COSTS TO YOUR BUSINESS:

If a worker is injured on the job, it costs the company in lost work hours, increased insurance rates, workers compensation premiums and possible litigation. Productivity is lost when other workers have to stop work to deal with the injury. Even after the injured employee has been sent home or taken to the hospital, other employees may be distracted or need to take time off from work to deal with the aftermath of the incident. A single injury can have far-reaching and debilitating effects on your business.

SAFE WORKERS ARE LOYAL WORKERS:

Any business knows that employee debilitation and absenteeism can be major obstacles. When you create a healthy and safe workplace, you reduce those issues in several ways. By budgeting for safety improvements and making safety part of your operational plan, you engender trust. By involving employees in safety decisions, through reporting, committees, walk-throughs and meetings, you show that their opinion matters to you. By following through on their input and improving safety, you prove quite tangibly that you care about their well-being. Workers typically respond by working harder, showing more pride in their jobs and remaining loyal.

SAFETY IMPROVES QUALITY:

Time and again, companies that put safety first turn out higher quality products. In some cases, that's because a safe workplace tends to be a more efficient one, free of debris and tangles of cords. In other cases, it's a matter of focus. By working in a clean, efficient environment, workers are able to reduce distractions and truly focus on the quality of what they do. The result is better products that create customer loyalty, bigger margins and increased sales.

In these ways and others, workplace safety is about much more than legislation. It's about creating the kind of productive, efficient, happy and inspiring workplace we all want to be part of. It's about creating a highly profitable company. That's why it's important.

OUR CORE VALUES

MISSION STATEMENT

Deebar designs and manufactures highly reliable Signalling, Communication, Monitoring Devices, Safety Equipment and Bulk Material Handling Systems for use in harsh environments within the Mining, Power Generation, Automotive and Process Industries and will continually improve its technologies and service by applying creativity to all aspects of its business.

VISION

Deebar intends to continually develop the latest technology for its core client base in which it operates and strives for perfection. In doing so, it will assist in uplifting and improving the quality of life of all its employees & customers.

RELIABILITY & QUALITY

Product reliability is vital and that is what Deebar remains focused on. Centered design, manufacture and service. Along with a comprehensive range of products, Deebar guarantees the highest quality in its products and services.

At Deebar, we are committed to listen to our customers, understand their need and endeavour to deliver results that exceed their expectations. When it comes to products and service we pride ourselves on service and reliability.

Quality means more than providing a product or service, it's a way of doing business and ultimately, a way of ensuring that we satisfy our customers needs.

SAFETY & RESPONSIBILITY

At Deebar, we strive to provide a safe working environment for all our employees and to produce safety enhancing products for all our customers. Safety is a priority to Deebar, this is evident in the wide range of safety related products in our portfolio.

We also consider the broader interests of society and contribute towards the organisation “Sports For All” to create community economic empowerment in urban, semi-urban and rural communities.

The programme focuses on job creation, service delivery to communities and skills development to create a sustainable future for our youth.

MACHINE SAFEGUARDING

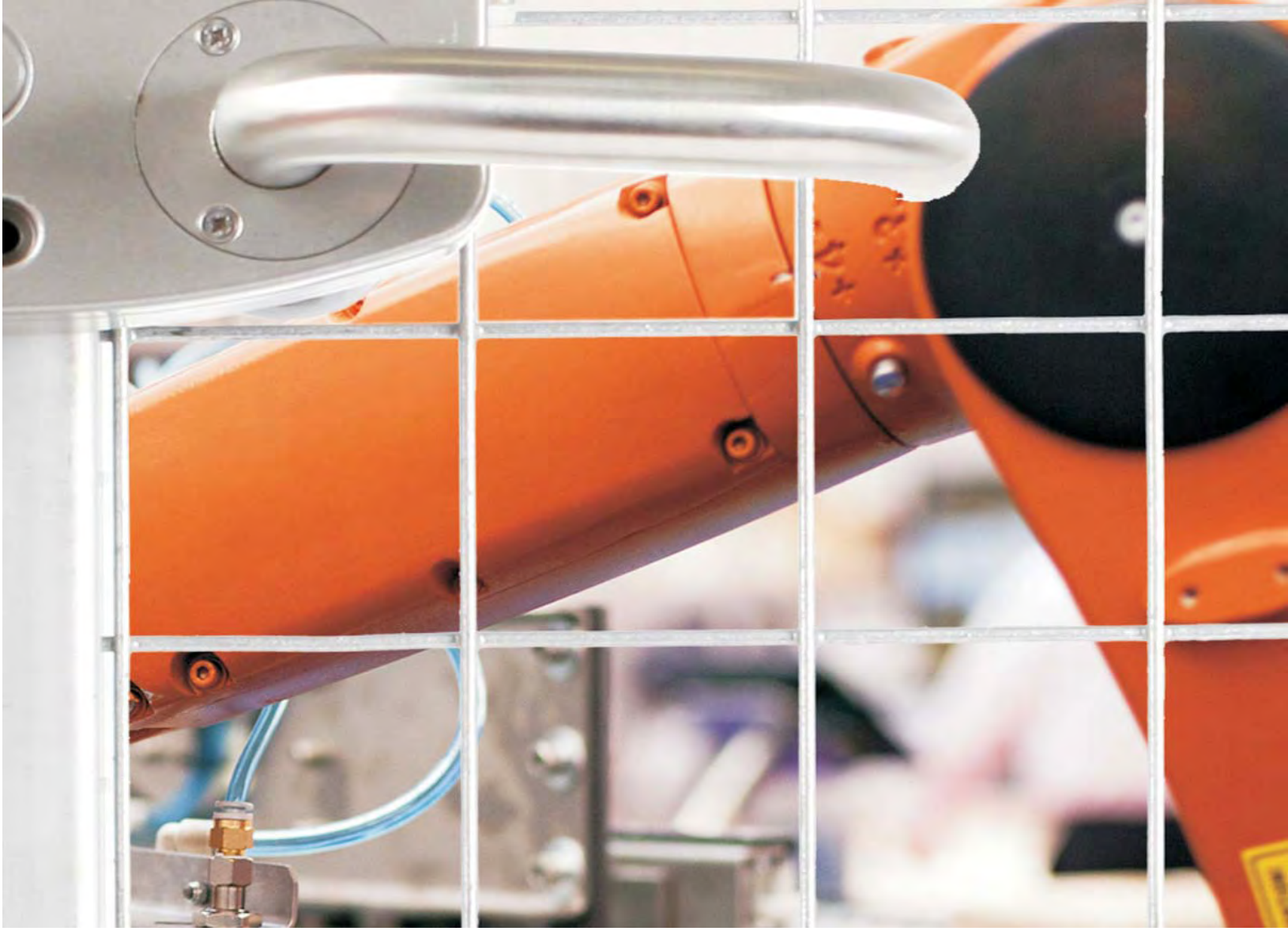
Machine guarding is a safety feature on or around manufacturing and other engineering equipment, consisting of a shield or device covering hazardous areas of a machine to prevent contact with body parts or to control hazards like chips or sparks from exiting the machine.

Machine guarding provides a means to protect humans from injury while working nearby or while operating equipment. It is often the first line of defense to protect operators from injury while working on or around industrial machinery during normal operations.

Workers who feel comfortable that their machinery is safe will be more productive and contribute more to the future of the business. With fewer injuries your business is able to meet quotas and continue to be profitable.

The type of guarding that is used in your plant can vary depending on the type of work performed. Some machines require specialized guards while others can use more standardized solutions.

Your business can become safer and more efficient through the proper use of machine guarding solutions.



PROTECTING PEOPLE, INDUSTRY AND PRODUCTIVITY

FOR ANYONE WHO NEEDS TO PROTECT PEOPLE AND MACHINERY. DEEBAR TOGETHER WITH IT'S VARIOUS RANGES OF INTERLOCKS OFFER RELIABLE, COST EFFECTIVE & CUSTOMISED SOLUTIONS.

IMPORTANCE OF SAFEGUARDING

Despite tighter statutory requirements for the guarding of dangerous machinery and an increased awareness for the need to design for operator safety, avoidable industrial accidents continue to occur. In virtually all cases some form of guarding was in use at the time.

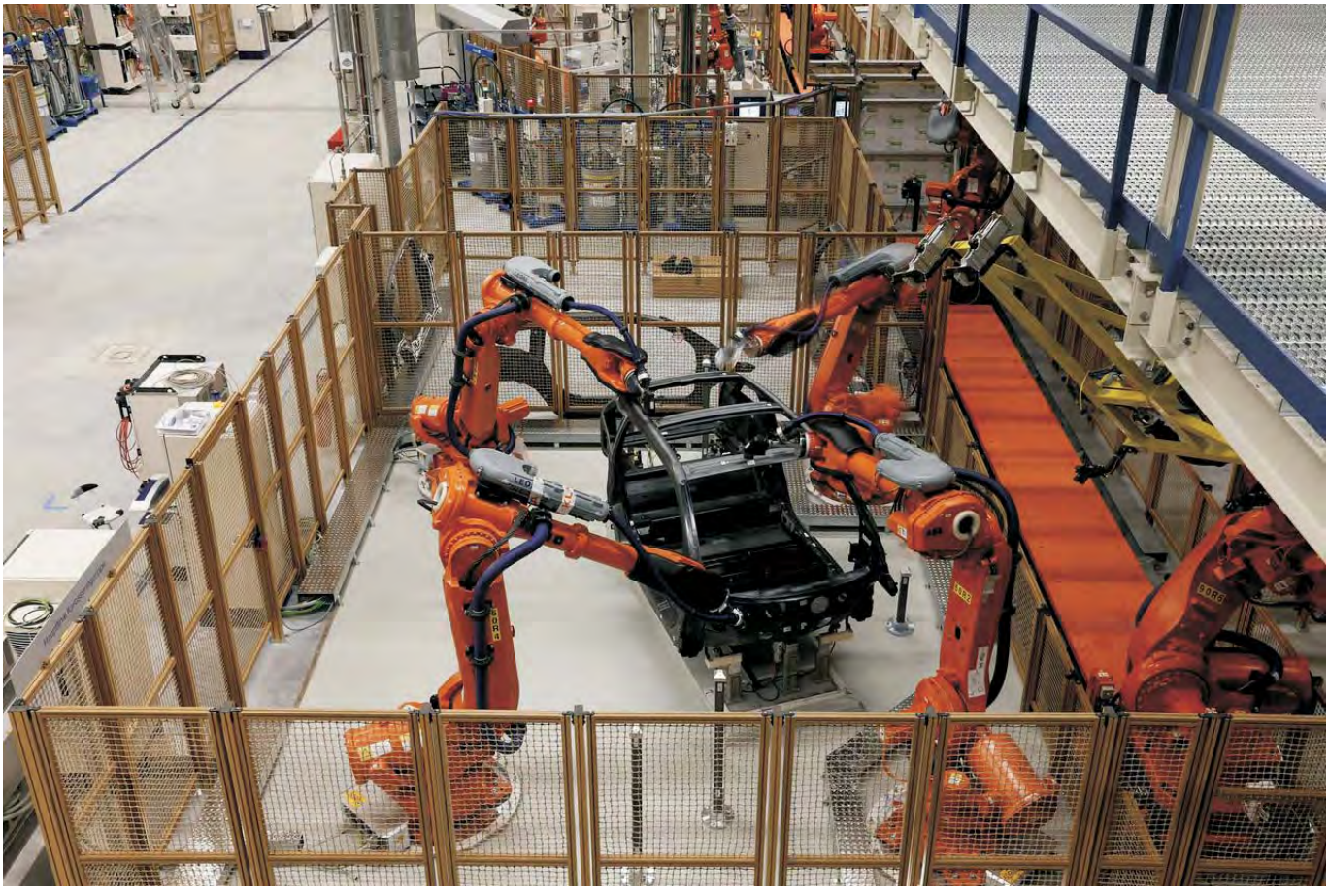
This section explains how and where interlocking can be used to augment existing safety systems, and effectively protect personnel. Later sections describe in detail the use of interlocking systems in industry.

The fundamental principles on which all machine guarding is based, is the construction of a secure barrier to stop a worker being able to come into contact with a dangerous part of a machine.

However, guarding is only effective while machine operation does not require human intervention. To ensure that when workers need to access a machine they do so under safe controlled conditions, further safety measures must be provided.

Even in highly automated environments there is a frequent need for personnel to gain access to machinery. With an assembly robot, for example, in addition to the need for local programming, there are other day-to-day requirements for regular access to the area around the robot.

Maintenance, servicing, cleaning, part loading, fine tuning and in-production adjustments are just some of the circumstances under which workers must enter perimeter guarding.



As soon as a worker needs to access a machine, a new and unpredictable element enters the safety system.

It should be safe to assume that a maintenance engineer will turn a machine off before unlocking the guard and that a simple "work in progress" indicator will ensure that no one inadvertently restores power to the machine while work is being carried out. It should be possible to rely on common sense and safe working practices.

The history of industrial accidents caused by human error indicates that this is not the case.

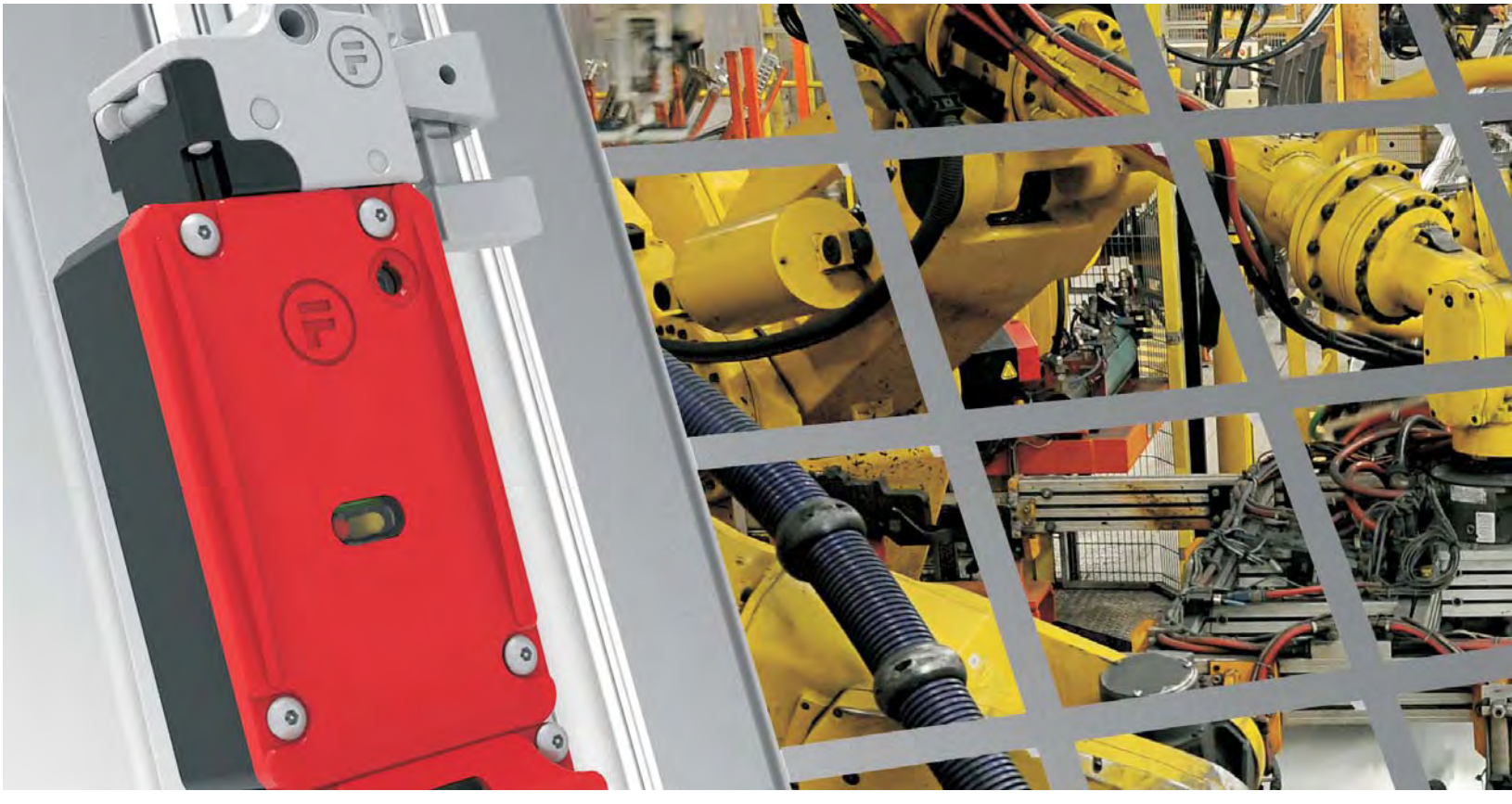
Ignorance, forgetfulness or haste can instantly negate the most thorough safe working practice regulations.

To be effective, a machine guarding system must accommodate the need for frequent access and positively control the conditions under which access is allowed.

It is important that users, as well as manufacturers, identify potential hazards and specify the relevant safety control measures at the earliest possible stage.

Using hazard analysis and risk assessment techniques this should take into account the design and operation of the machine in the context of its working environment, together with the nature of the production process itself.

Fortress Interlocks



Fortress Interlocks helps customers protect their personnel and capital assets. The company has over 40 years of experience in the safety market, designing and manufacturing safety interlock systems.

These systems create safe workplaces where employees in industrial environments are safeguarded from injury and equipment is protected from damage.

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

The company's products are suitable for applications across a wide industrial base including power generation and distribution, steel, automotive, recycling, building materials, food and beverage, robotics and palletisers.

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

The Fortress Interlock's range is made up of five different types. This extensive range allows Fortress to provide unique solutions for all safeguarding applications.

PROTECTING PEOPLE, INDUSTRY AND PRODUCTIVITY

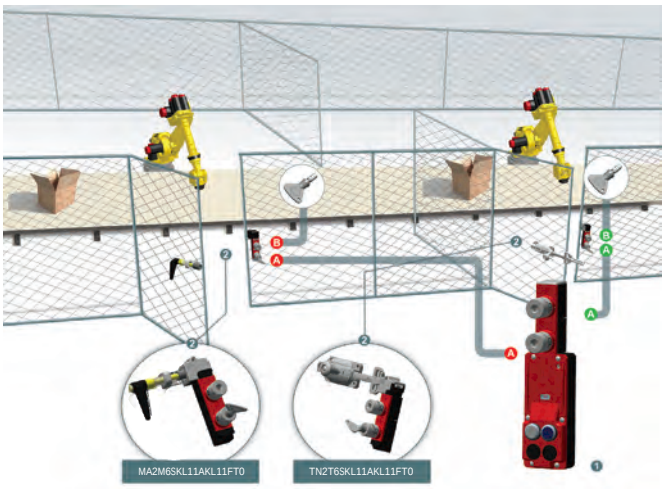
TRAPPED KEY INTERLOCKS

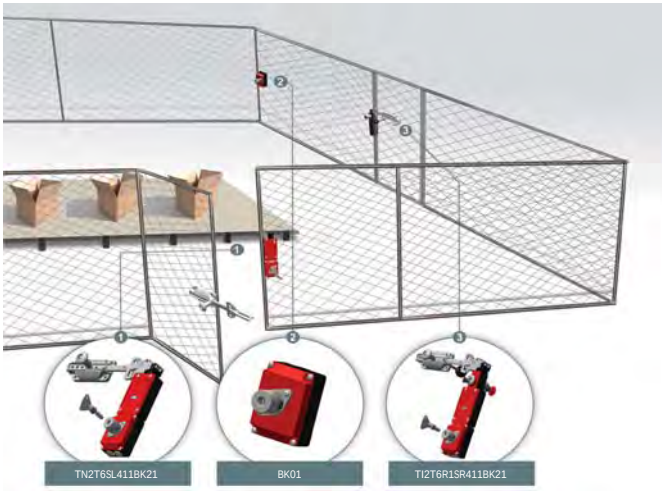
The manufacturing environment today relies on heavily automated processes and machinery.

Ensuring personnel safety whilst delivering productivity is vital to every manufacturing facility and therefore safeguarding operators from hazards as well as guaranteeing that processes have optimum efficiency is a constant challenge for operating companies.

The Fortress range of safety interlocks is specifically designed for such applications and spans each and every manufacturing sector from automotive assembly to food and drink production.

Our interlocks are specified by many global manufacturers and their equipment providers and our team of safety experts are widely consulted on applications at plant sites on a daily basis.





Fortress Interlocks

tGard

tGard offers total integration of control and safety. This is Fortress' brand new product that is customisable as standard.

Its unique design allows the configuration of safety gate switches, trapped key interlocks and machine control stations or any configuration of all three.

tGard elements are housed in a metal body to create a simple and robust safety system.

mGard

mGard is the premier range of modular robust trapped key interlocks for heavy duty applications. trapped key interlocking is a tried and tested method of mechanically safeguarding dangerous machines and hazardous processes.

It is called "Trapped Key" as it works by releasing and trapping keys in a predetermined sequence. After the control or power has been isolated, a key is released that can be used to grant access to individual or multiple doors.

The principles of trapped key technology apply to all industries where it is essential that all energy sources are isolated before gaining access to machinery.

amGard pro

amGardpro is the ultimate range of modular safety gate switch interlocks, for heavy duty applications. Its unique modular construction allows easy configuration and provides total electro-mechanical solutions for practically any safeguarding application up tp SIL3 (EN/IEC 62061), Category 4 and Ple (EN/ISO 13849-1).

With its unrivalled design concept, **amGardpro** offers a range of fully integrated safety interlocks, including solenoid and non solenoid safety switches complete with a host of additional options including key control modules, emergency release, redundant sensors, lock out/tag out and push buttons, estops and indication lights for enhanced functionality. The robust construction of this range makes it ideal for use in a wide range of industrial applications when safety, strength and reliability are of paramount importance.

PRODUCT RANGE OVERVIEW

amGard*S40* is a range of safety interlock switches, manufactured in 316 stainless steel, the range is modular in design, allowing a wide range of safety interlock switches to be configured to suit many industrial applications, including:

Solenoid Locking Safety Switches or Non Solenoid Tongue Switches, all with or without machine control.

The range is supplied in enclosures sealed to IP69K making it suitable to be pressure washed at high temperatures and has a retention force of 10,000N so it is ideal for ensuring guard doors are held closed until machines and/or processes are in a safe condition. The modules are a slim body design of 40mm so that it can be easily fitted to 50mm guarding sections or areas where space is limited.

amGard*nct* is a range of safety switches that utilise non contact technology.

Non-contact safety switches are ideal for use in applications where precise guidance of guards is difficult. Due to the design they are extremely long-lasting devices that require minimal maintenance. In addition they are resistant to shock and vibrations and offer a high level of prevention against tampering.

Stainless Steel IP69K housing, ideal for food, beverage and pharmaceutical environments or anywhere hygiene or robustness are paramount.

MODULAR SAFETY SWITCHES WITH PROFIsafe INTERFACE

WHAT IS MGARD

Robust trapped key technology for heavy duty applications.

mGard is the premier range of modular robust trapped key interlocks for heavy duty applications. Trapped key interlocking is a tried and tested method of mechanically safeguarding dangerous machines and hazardous processes.

It is called “Trapped Key” as it works by releasing and trapping keys in a predetermined sequence. After the control or power has been isolated, a key is released that can be used to grant access to individual or multiple doors.

The principles of trapped key technology apply to all industries where it is essential that all energy sources are isolated before gaining access to machinery. Almost all safety issues can simply be solved by selecting the required products in order of the steps shown on this page.

Power/Control Isolation

Identify the energy sources to be isolated and/or any hazard that cannot immediately be isolated such as; heat, pressure, radiation or machine rundown time

Power Isolation
- Mechanical Bolt Interlock
- Bolt Interlock with Limit Switch
- Bolt Interlock with Switch
- ATEX Solenoid Controlled Key Switch

All Fortress Interlocks rotary switches have European, Canadian, Chinese and North American approvals.

Control Isolation
- Key Switches
- Solenoid Controlled Key Switch
- ATEX Key Switch
- Electronic Time Delay Unit
- Voltage Sensing Unit
- Knob and Key Operated Switch Control Unit

Key Exchange

Key Exchange with Switch

Identify the type and number of access points.

- Key Exchange Units
- Key Exchange Units with Switch

Because of the modular arrangement of **mGard** both key exchange and door lock units can easily be extended with an *extension module (XMA)*, for instance when doors are added to the safeguarded area or machine.

The Fortress Trapped Key System allows the safeguarding of potentially hazardous areas without the need for wiring.

Door Locks & Actuators

Identify the type of access point; part body or full body access doors with or without the use of personal safety keys (to prevent accidental lock in).

- Single Door Interlocks
- Multiple Door Interlocks

- Fixed Actuator
- Handle Operated Actuator
- Spring Loaded Handle Operated Actuator
- Self Aligning Actuator
- Compressible Actuator

WHAT IS AMGARD

Robust trapped key technology for heavy duty applications.

amGard*pro* is the ultimate range of modular safety gate switch interlocks, for heavy duty applications. Its unique modular construction allows easy configuration and provides total electro- mechanical solutions for practically any safe guarding application up to SIL3 (EN/IEC62061), Category 4 and Ple (EN/ISO13849-1).

With its unrivaled design concept, amGardpro offers a range of fully integrated safety interlocks, including solenoid and non-solenoid safety switches complete with a host of additional options including key control modules, emergency release, redundant sensors, lockout/tagout and push buttons, E-stops and indication lights for enhanced functionality.

The robust construction of this range makes it ideal for use in a wide range of industrial applications when safety, strength and reliability are of paramount importance.

The amGardpro system replaces all adaptions normally fitted within guarding system, such that additional hardware like door catches, actuators, closing mechanisms, internal mechanisms, key functions including authorised access and deadlocks may be no longer needed. All of these separate functions can be incorporated into amGardpro configurations, resulting in the most flexible safety interlock solution available for today's industrial environment.

Actuators

Actuators
Handle Actuators
Hinged Handle Actuators
Tongue Actuator
Slimline Tongue Actuator
All in One Head and Handle Actuator
Slidebars

Head Modules

Head Modules
Handle Actuator Head Module
Tongue Actuator Head Module
All in One Head and Handle Unit
Padlock Adaptor

Adaptors

Adaptors
Safety Key Adaptors
Access Key Adaptors
Extracted Key Adaptors
Internal Release Adaptors

Electrical Switching / Locking

Electrical Switching / Locking
Safety Switch Bodies
Solenoid Controlled Lok Bodies
Extended body Solenoid Controlled Lok Bodies
Slimline Solenoid Controlled Lok Bodies
Explosion Proof Switch Bodies
Foot (to terminate mechanical lock)
PROFINET and PROFIsafe versions available
Ethernet/IP CIP Safety versions available
AS-interface versions available
European, Canadian and North American approvals

Option Pods

Option Pods
Key Switch Option Pod
Indicator Lamp Option Pod
Pushbutton Option Pod
Slimline Pushbutton Option Pod
PROFINET and PROFIsafe versions available
Ethernet/IP CIP Safety versions available
AS-interface versions available
European, Canadian and North American approvals

WHAT IS TGARD

An Innovative Platform for Machine Safety

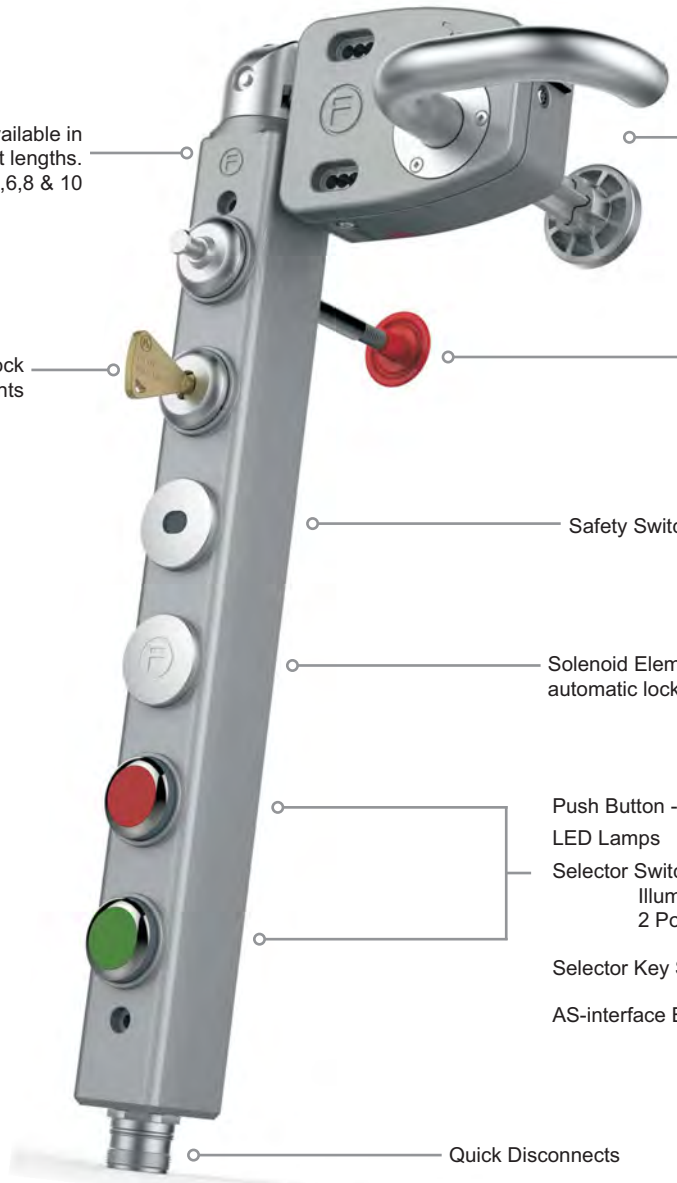
tGard is the new innovative approach to controlling access to hazardous machinery and equipment. It is a compact metal bodied system that enables the configuration of various safety products including electrical safety gate switches (with or without guard locking), mechanical trapped key interlocks, and electrical operator controls, either as separate devices or integrated into one device.

tGard offers “a customised safety solution, as standard” and is defined by a range of tGard elements, including selector switches, safety switches (solenoid and non solenoid), personnel keys, emergency release, push buttons, estops, indicator lamps and a choice of operating handles for both hinged and sliding guard doors. These elements are simply selected and then assembled into a robust housing, suitable for mounting onto machine guarding, providing the user with an exact configuration specific to the application.

tGard is quick and easy to install and can be mounted directly onto a flat surface, doors or extruded aluminium profiles without the need for mounting plates and brackets. It is IP65 as standard and has been designed to be fully compliant with the new machinery safety standards.

Customised Safety Solutions as Standard

- Simply Robust
- Customisable
- Future proof for future element expansion
- Easy to Install
- Quick Disconnects as standard
- Standards compliant
- Safety Gate Switches
- Trapped Key Interlocks
- Operator Control



WHAT IS AMGARD S40

Stainless Steel Modular Gate Switches For Hygienic Areas

amGard*S40* is the latest range of safety interlock switches from Fortress Interlocks. Manufactured in 316 stainless steel, the range is modular in design, allowing a wide range of safety interlock switches to be configured to suit many industrial applications.
The choice of configurations include:

Solenoid Locking Safety Switches
Solenoid Locking Safety Switches with internal release
Solenoid Locking Safety Switches with "safety keys" (for personal protection)
Solenoid Locking Safety Switches with machines control
Non Solenoid Tongue Switches
Non Solenoid Tongue Switches with machine control
Mechanical Trapped Key Interlocks
Machine Control Stations

The range is supplied in enclosures sealed to IP69K making it suitable to be pressure washed at high temperatures and has a retention force of 10,000N (greatest on the market) so it is ideal for ensuring guard doors are held closed until machines and/or processes are in safe condition. Each module has a slim body design of 40mm so that it can be easily fitted to 50mm guarding sections or areas where space is limited.

The rugged design and strength capability makes the S40 range an ideal choice for applications in the Food & Beverage, Pharmaceutical, Chemical and Construction Materials industries.

The graphic below shows the modules currently available in the range.

amGard*S40* Range

	S40 Slidebar	*S40* Hinged Handle	*S40* Tongue Actuator		*S40* Cap	*S40* Slimline Head
Actuators				Head Modules		
	S40 IR Adaptor	*S40* E Adaptor	*S40* Lock Adaptor			
Adaptors						
	S40 Stop	*S40* Lok	*S40* Foot			
Electrical Switching / Locking						
	S40 Option Pod					
Option Pod						

WHAT IS AMGARD *nct*

Coded Non Contact Switch Technology

Non-contact safety switches are interlocking devices that are designed to protect people, industry and productivity.

Non-contact safety switches are ideal for use in applications where precise guidance of guards is difficult. Due to the design they are extremely long-lasting devices that require minimal maintenance. In addition they are resistant to shock and vibrations and offer a high level of prevention against tampering.

Fortress have developed the amGardncs, a coded non-contact, safety, proximity switch in a robust package, featuring:

Stainless Steel IP69K housing, ideal for food, beverage and pharmaceutical environments or anywhere hygiene or robustness are paramount.

PLe Cat 4 / SIL3 safety rating.

Can be used as a coded interlock in accordance with EN14119.

Based on solid state Hall Effect sensors that do not suffer from vibration and contact bounce.

Copes with a very high level of misalignment.

Integrated electronics that monitor for faults and ensure the safety relay does not enter a fault state, irrelevant of the approach direction.

MODULAR SAFETY SWITCHES WITH PROFIsafe INTERFACE

PROFINET is the leading Industrial ethernet standard in the market and is supported by many product vendors, resulting in almost 10 million installed devices globally.

PROFIsafe is an integrated safety technology used in manufacturing and process automation, providing cost effective and flexible functional safety.

Fortress has effectively harnessed this technology and embedded it into the amGardpro range of safety interlocks.

The proNet module allows the features of amGardpro to become distributed IO (input output) on a PROFINET network; safety information is exchanged using the PROFIsafe extensions. The unit can connect the following modules to a PROFIsafe network;

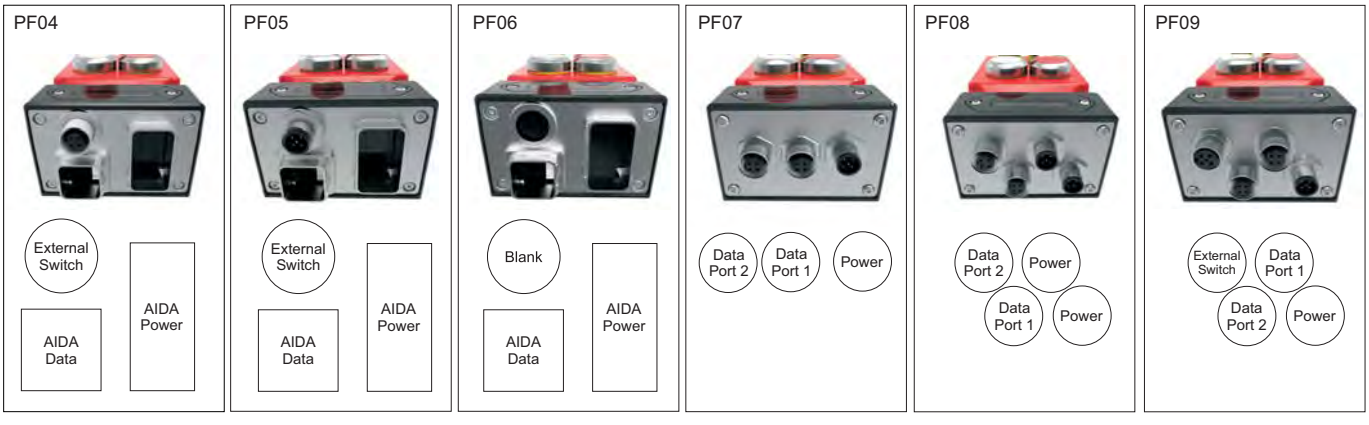
A proLok safety switch with a vast array of options using modular adaptors, heads and actuators in the amGardpro range. The safety switches are communicated safely, with standard PNIO (PROFINET input output) for solenoid drive, monitor and head monitor.

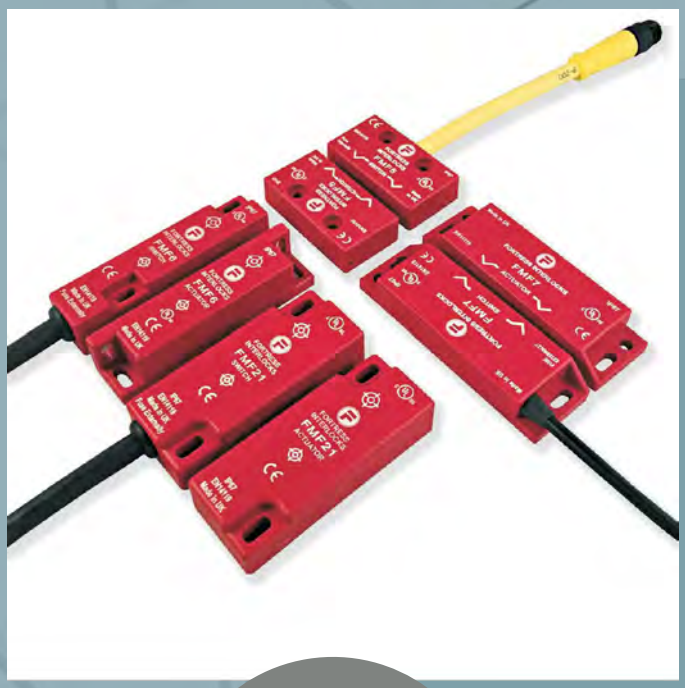
An e-stop and safety switch communicated safely across PROFIsafe.

Up to four lamps and pushbuttons from the proOption Pod range.

An integrated network switch facilitates 'daisy-chain' bus topologies with no additional hardware.

F-address set via web interface or DIP switches.





- **Non-Contact Operation**
- **IP67 Fully Sealed, Washdown**
- **ABS 2A Switching Capability**
- **Large Range of Sizes**

The FMF range are magnetically operated safety switches.

Easy to install and maintain, the FMF are fully encapsulated non-contact switches ideal for long term use in harsh / wet environments.

LISTED 2HAO IND.CONT.EQ

MAGNETIC SAFETY SWITCHES

- **Non-Contact Operation**
- **Solid State Coded Magnetic**
- **IP67 Fully Sealed, Washdown**
- **ABS or Stainless Steel**
- **Dual Colour LED Indication**

Fortress FE range are magnetically coded, solid state non-contact safety switches for use in machine guarding applications.

The solid state design is even more tolerant to shock and vibration making for a more reliable machine

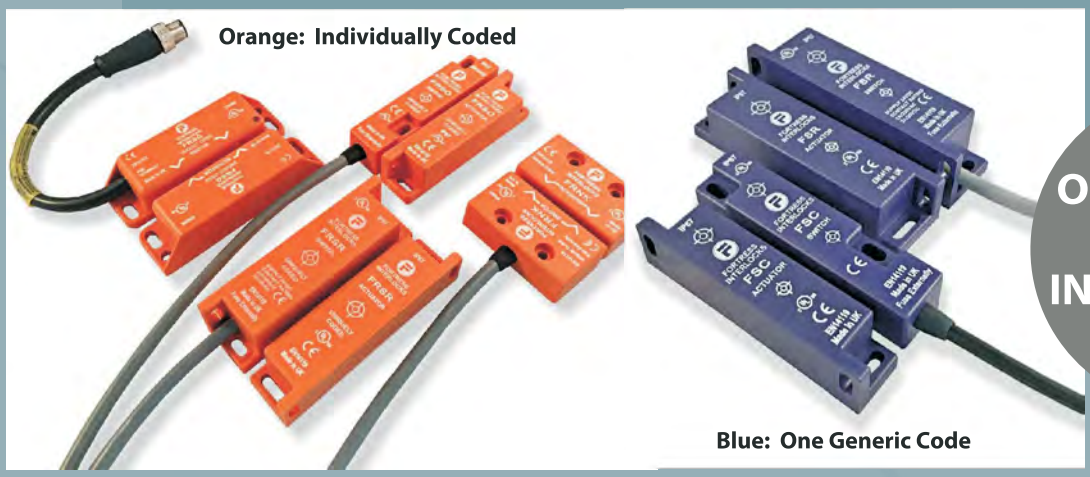
LISTED 2HAO IND.CONT.EQ

CODED MAGNETIC SAFETY SWITCHES

- **Non-Contact Operation**
- **Volt Free Contacts (Not OSSD)**
- **LED Guard Indication**
- **IP67 / IP69K Fully Sealed**
- **RFID Technology**

Based on RFID technology, the FR and FS type switches are designed to provide a higher level of security when machine guarding. Unlike the competition, the FR and FS safety switches feature volt free contacts making them compatible with most safety relays on the market.

These switches also feature LED guard indication, an ingress protection rating of IP69K and multiple housings to suit most applications.



ONE GENERIC CODE OR INDIVIDUALLY CODED

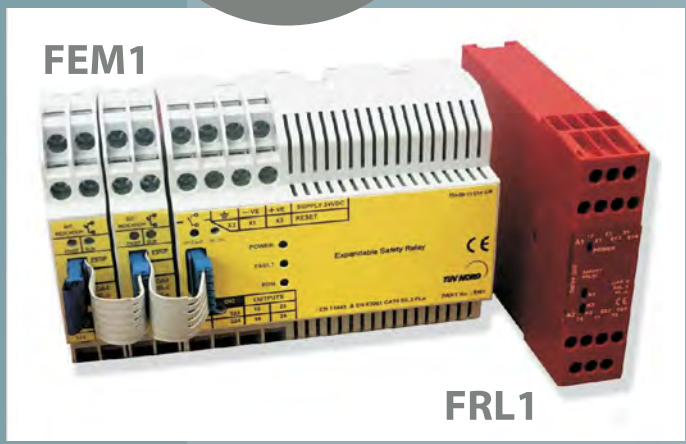
FEM1

- **Category 4 SIL3 PLe Expandable Safety Relay**
- **Monitors up to 30 2N/C Safety Devices**
- **Guard Fault Indication**
- **Eliminate Fault Masking**
- **Volt Free Indication Contacts**

SAFETY RELAYS

FRL1

- **Industry Standard Safety Relay**
- **24V AC/DC Supply**
- **Dual Channel Output**
- **Automatic / Manual-Monitored Reset**
- **2 N/C Safety Output / 1 N/C Aux Output**

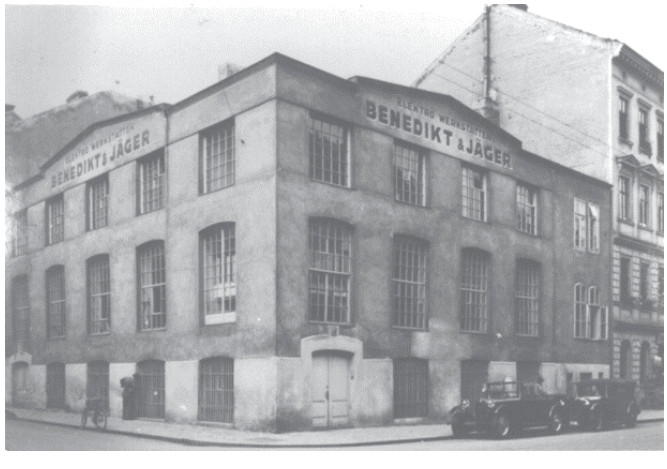


The FEM1 is designed to operate and monitor any device with 2 normally closed outputs. Using the FEX1 extender module, you can monitor up to 30 individual inputs. This product is ideal for anyone looking to eliminate fault masking and achieve a CAT4 SIL3 PL-e safety rating.

BENEDICT Telux

BENEDICT produces Low Voltage Switchgear that distinguish themselves from their competitors through their special features. Decades of experience in Research and Development are the basis for the excellent reliability of the Contactors, Thermal Overload Relays, Motor Starters, Motor Circuit Breakers, Load Disconnectors, Cam Switches, Push Buttons and Pilot Lights.

From a single product to a complete application solution, the Benedict range fully addresses the demands of factory automation and control environments. Benedict's extensive product range offers everything to meet the needs of today's OEMs, panel builders and end users.



With humble beginnings in the early 1920's, Benedict & Jäger has been a trusted brand globally for nearly 100 years. Low voltage control gear is what we do. We invite you to give us a call to discuss your requirements.

THE BETTER CONTACT, RELIABLE AND SAFE

LOW VOLTAGE SWITCHGEAR

From a single product to a complete application solution, the Benedict range fully addresses the demands of factory automation and control environments. Benedict extensive product range offers everything to meet the needs of today's OEMs, panel builders and end users.

TELUX ROTARY CAM SWITCHES

Telux switches, offer endless possibilities for custom rotary cam switches. From simple on-off switches, to complex custom multi-step switches, we can help build the perfect switch for your application.

An effectively limitless number of configurations including the typical.

Change Over Switches, Star Delta Switches, Isolator Switches, Motor Control Switches, Multi Step Switches and On/Off Switches.

Advantages:

- Drive shaft made of solid aluminium.
- Customized versions promptly available.
- Assembled locally avoiding delays.

PUSH BUTTONS & PILOT LIGHTS

Benedict offers a broad selection of pushbuttons, selector switches and signal lamps in both 22mm and 30mm. Variations include illuminated actuators, emergency stop buttons and monoblock LED's, but the options are endless.

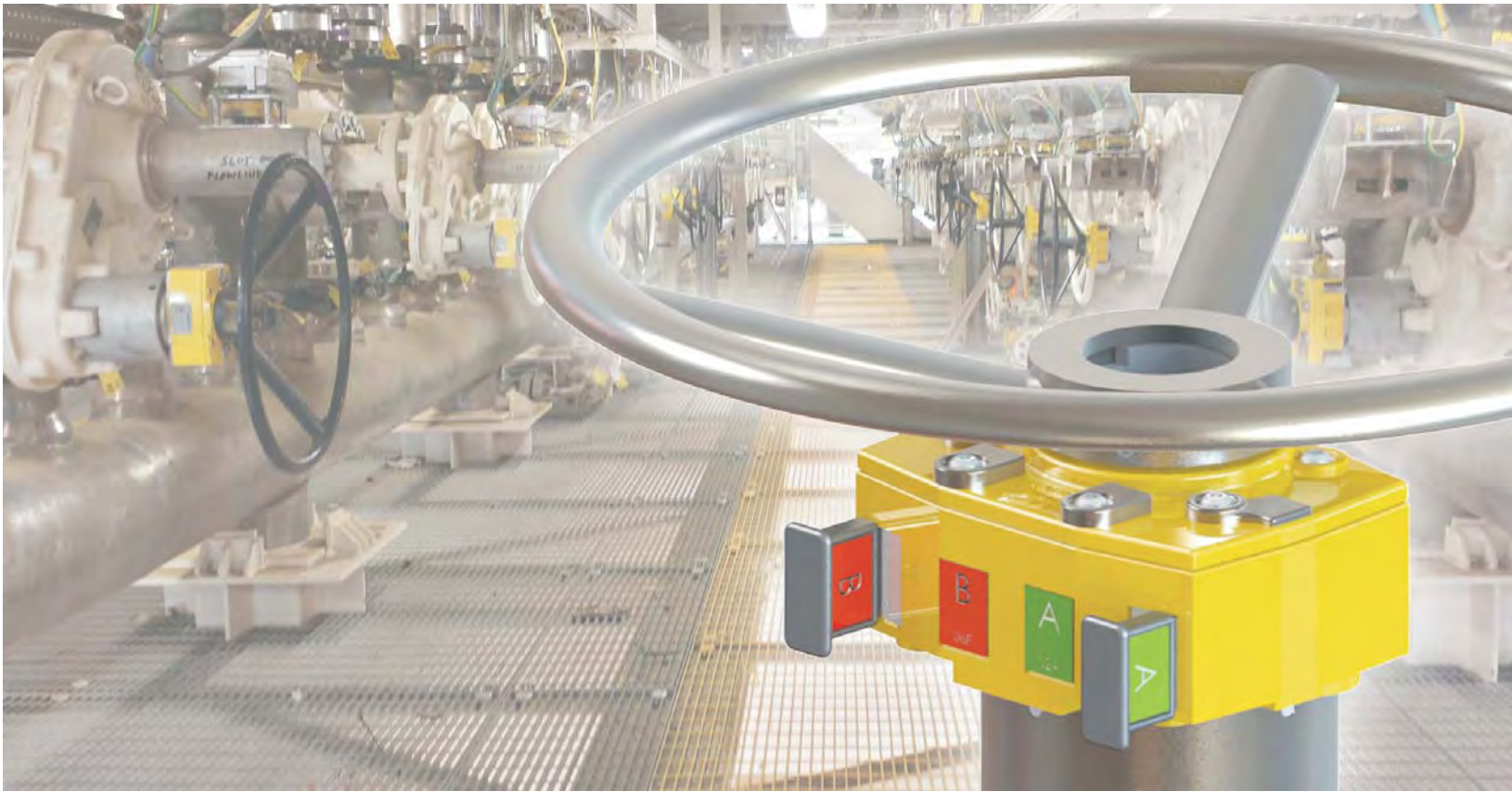
CONTACTORS

Benedict contactors are engineered to operate under the toughest conditions including heat, cold, dust, sand, high humidity and shock. Our compact, IEC style contactors offer maximum performance with a minimal footprint. With UL ratings from 5A to 1215A (covering up to 900 hp) and over 50 coil voltage options.

AC MAIN & DISCONNECT SWITCHES

Where highest safety and current carrying capacity are required, Main Switches and Disconnect Switches by Benedict come into use. Compact designs and box terminals for large cable cross-sections guarantee versatile applications.

SMITH
FLOW CONTROL LTD



In 1985 SFC introduced the coded-card, linear-key concept in a range of modular key-operated interlocks to regulate operator execution of work procedures on any form of host process equipment.

Typical applications include every form of valve (including motorised and instrument valves), switches, vessel closures, access guards, pressure and temperature sensing systems and rail/road/sea tanker loading systems.

SFC's solutions in hazardous processes reduce the scope for operator error and ensure safe continuous plant operation.

As a general principle, it may be said that operations which are safe when performed correctly can have catastrophic consequences when performed incorrectly.

The Oil & Gas and Chemical processing industries generally have a disciplined approach to design and operating practice - usually governed by well recognised international standards and enforced by regulatory authorities and certification bodies. Whilst good practice begins with good design, both are ultimately hostage to the 'Human Factor'.

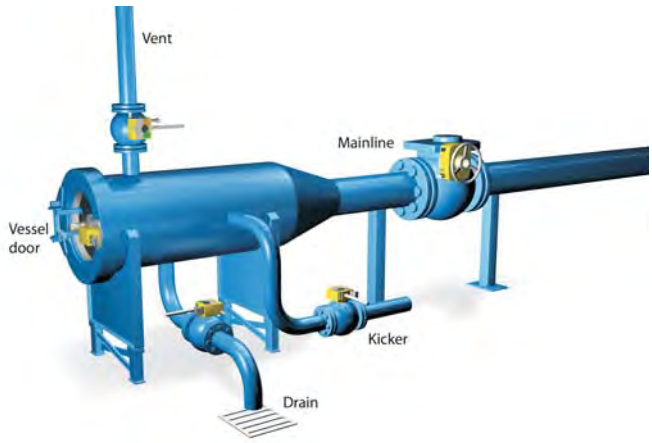
Modern process plants are highly automated and regulated by distributed software management systems which are simply monitored by 'Production' personnel - often remote from the physical location of the plant itself.

Maintenance procedures, however, invariably involve human intervention and interrupt automated processes creating 'abnormal' conditions for the duration of the work.

VALVE INTERLOCKS

Loading or unloading of pig traps, changeover of pressure relief valves, turbine servicing (requiring suspension of CO2 Fire Deluge), coupling or uncoupling of hoses for loading or discharge of tanker cargoes all involve human intervention and are hostage to the possibility of operator error.

Distributed control systems (DCS) cannot effectively regulate such procedures - the SFC 'Coded Card Key Interlock System' can!



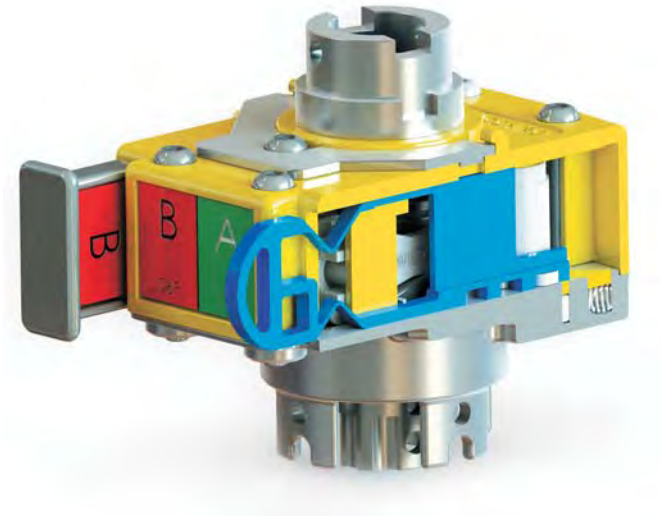
Controlling the sequence of events in which process activities are conducted has been achieved historically using Permit to Work (PtW) systems accompanied by documented instructions.

However, this system is hostage to 'human factor' distractions. Failure to interpret instructions correctly or ignorance of the system can all lead the operator to make errors which can manifest themselves in industrial accidents of varying magnitudes.

Trapped key interlocks are simple mechanical devices which can be customised to implement a safe sequence of operation in any process activity.

In the following pages we show how our mechanical key interlock system ensures that work tasks executed by human intervention can be completely regulated by SFC's coded-card key interlocks to prevent operator error or violations to protect plant, the neighbouring community and the environment.

In addition to our range of high-integrity coded-card key interlock safety products, SFC also offer a comprehensive range of valve security products for high and low-criticality applications.



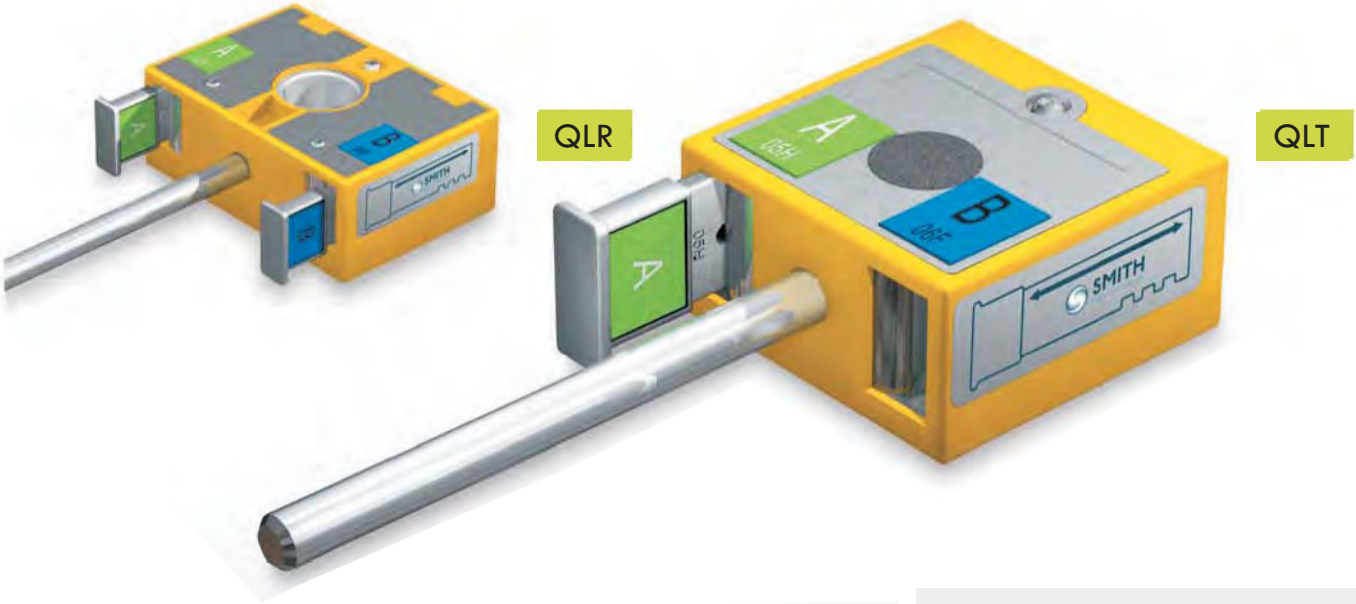
'...for more than 29 years SFC has never failed to provide a viable technical solution to a client's safety operating problem...'

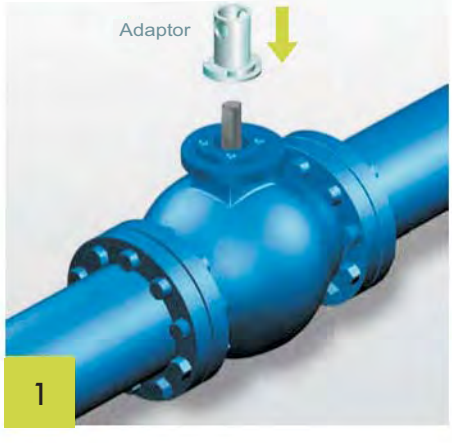
QL VALVE INTERLOCKS For lever operated valves

QL VALVE INTERLOCK (QLT & QLR)

QL valve (inter)locks suit all types of lever- operated quarter-turn valves - including Ball, Butterfly and Plug valves.

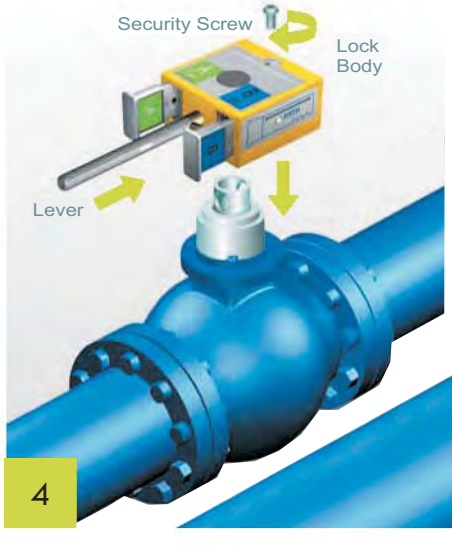
Installing the (inter)lock on the host valve is a simple procedure as described below and requires no modification or hot work to the host equipment as the anchor and adaptors are custom- machined to suit the valve.

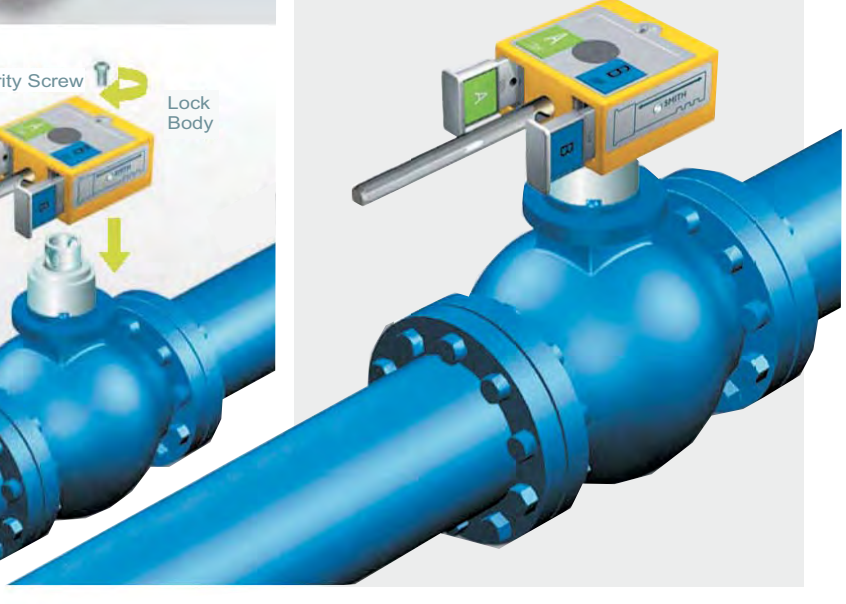


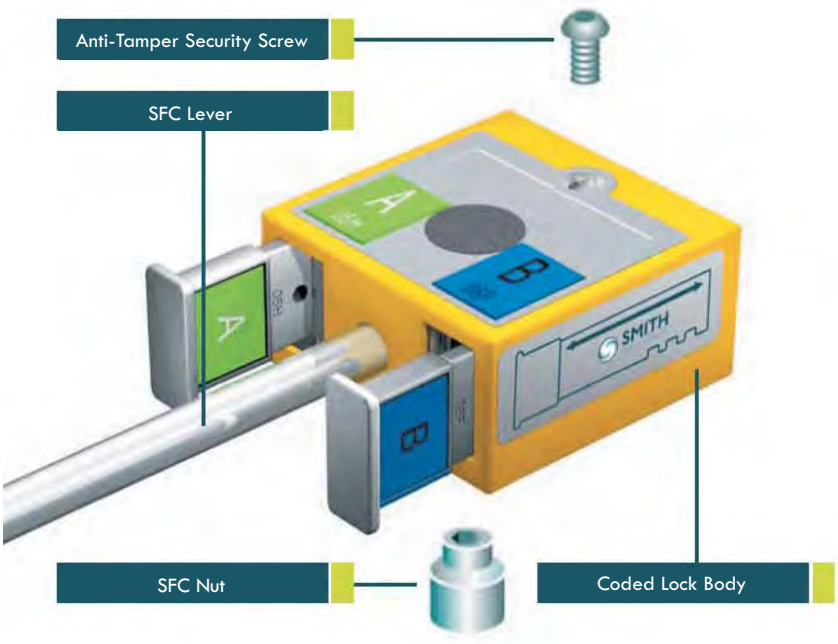


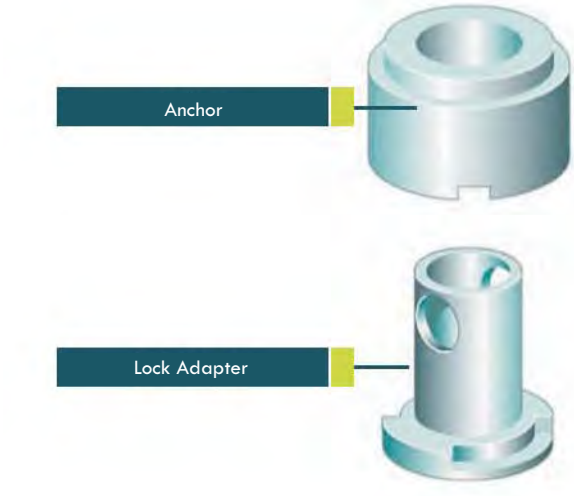
After removing the existing lever the QL is assembled as follows:

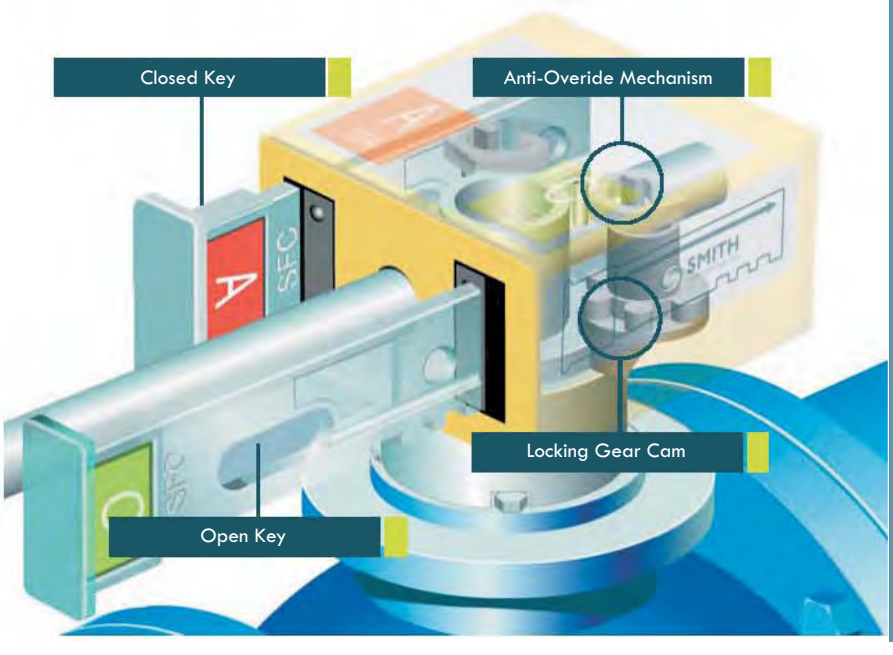
1. Install lock adaptor.
2. Install anchor.
3. Fit SFC nut.
4. Assemble QL lock, secure lever and tighten screw.





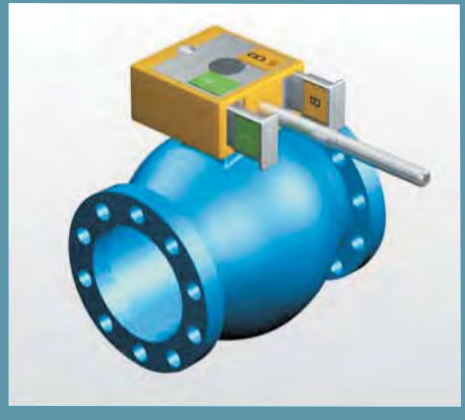






PRODUCT FEATURES

- 316 Stainless steel.
- Linear coded-card key design.
- Robust construction.
- Proven reliability in all climates.
- Single or double key versions.



- No modification to host value.
- Suitable for any valve type/model.
- Can be installed on 'live' plant.

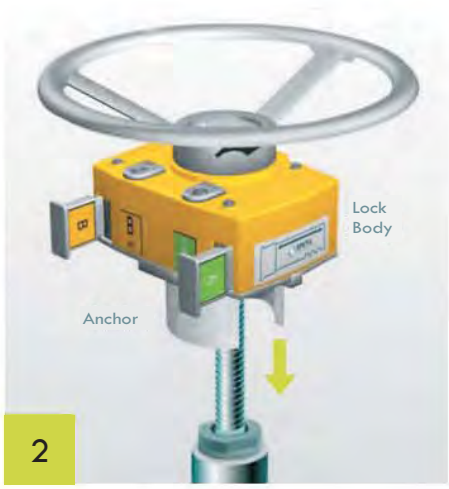
GLM & GLS VALVE INTERLOCKS

GL valve (inter)locks suit all types of handwheel operated valves- including Gate, Globe and Gear-operated valves.

Installing the (inter)lock on the host valve is a simple procedure as described below. Requiring no modification or hot-work to the host equipment, the anchor and adaptors are custom machined items. Universal Adaptors (UAS) may be supplied when precise valve topworks data is not available.

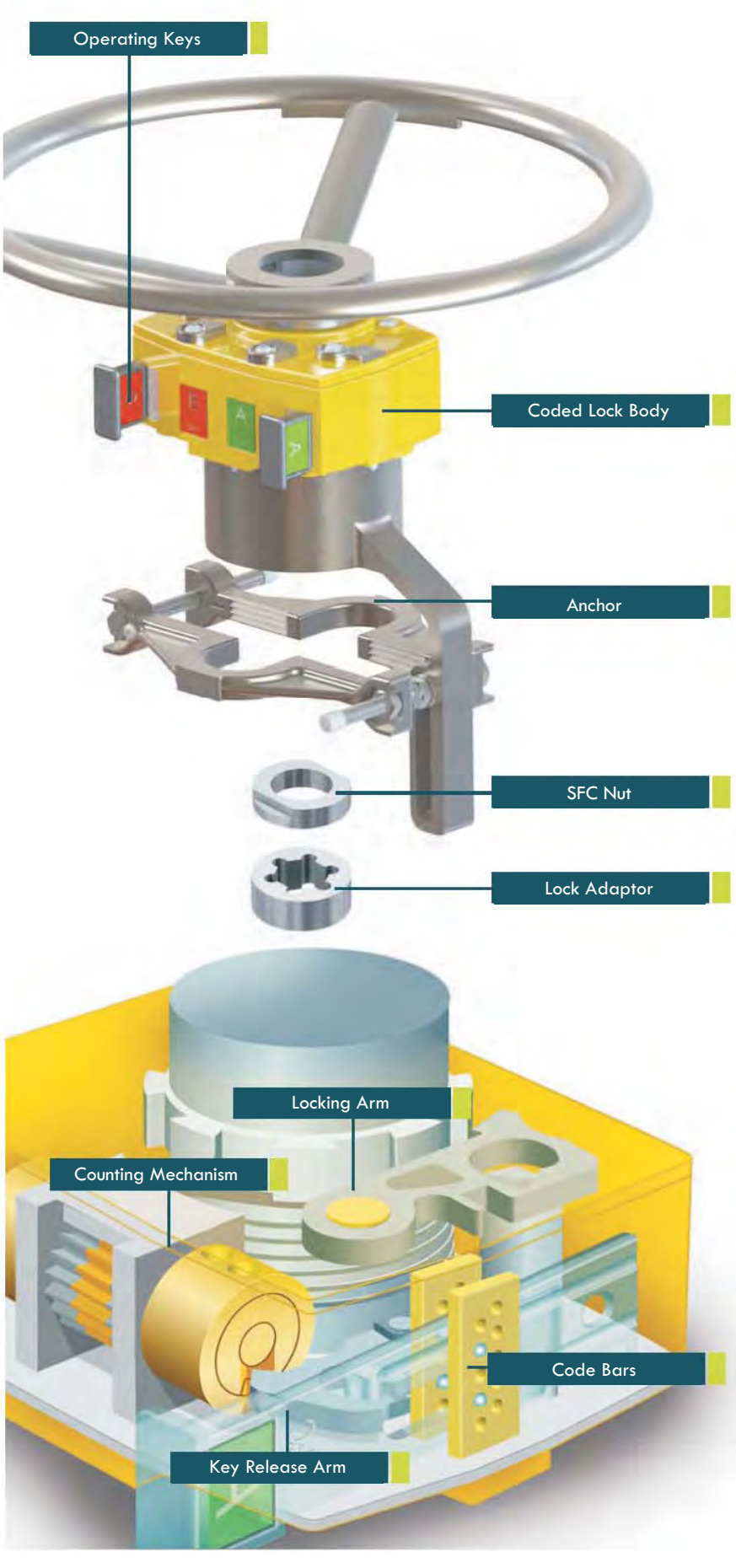
GLS

GLM



After removing the existing lever the QL is assembled as follows:

1. Mount lock adaptor and fix SFC nut
2. Locate body to adaptor.
3. Tighten fixing screws (x3).
4. Tighten setting screws to set “Open” and “Closed” key release positions.



PRODUCT FEATURES

- 316 Stainless steel.
- Linear coded-card key design.
- Robust construction.
- Proven reliability in all climates.
- Single or double key versions.
- Suitable for all handwheel operated applications.

- No modification to host value.
- Suitable for any valve type/model.
- Can be installed on 'live' plant.

KEY STORAGE & MANAGEMENT

SFC 'VISUAL ALERT' AND 'PERMIT-TO-WORK' KEY MANAGEMENT SYSTEMS

Well designed interlock installation also include an effective and efficient key management system that will provide a continuous and reliable indication of the status of all interlocked process systems.

SFC 'Visual Alert' Key Cabinets provide an effective and infallible management control system against unauthorised or inadvertent operation of interlocked valves or associated process equipment by keeping the coded keys which initiate the operation of critical valves under secure supervisory control.

The SFC 'Visual Alert' Key Management System dedicates and maintains the operation of critical valve and process operations totally within the control of the Designated Authority and the Performing Authority, enabling Permit to Work (PtW) procedures to be carried out safely and efficiently. The system concept is totally flexible and is designed in each case to integrate with each client's operating system and working practices.

DESIGN FEATURES AND BENEFITS

- Carbon or Stainless Steel construction available.
- 'Glazed' door provides key status without the need to open/un-lock.
- Ingress protection from IP55 to IP66.
- Lockable doors.
- Wall brackets provided.
- Total integrity by using dedicated key locations.
- Complete key status awareness.
- Can incorporate microswitch actuation to signal key movements.

KEY CABINETS

SFC Process Management Systems provide effective protection to clients' invstments in plant and equipment as well as improving employee safety and reducing the risk of damage to the environment.

SFC PERMIT TO WORK (PTW) SYSTEMS

Having adopted a good key interlock control system, the next most important step is to apply a good key management system.

For storage, ease of access and issue, SFC key cabinets provide all that is required.

A key cabinet should be located in a secure place. Typically a Control Room whereby initiating keys are issued by the Shift Supervisor. Offshore Installation Manager (OIM) or other person in authority.

Cabinets vary in size and can accommodate from 1 - 252 system initiating (or spare) keys. Keys can be located via means of hooks or holsters (the holster locator provides increased capacity).

Each interlocked system has a dedicated engraved tag location within the key cabinet. During periods of normal operations, all interlock system 'permit' (initiating) keys are visually displayed within the cabinet in dedicated locations.

Each key cabinet tag is engraved with the relevant piping package data - this same data is also replicated on each system key.

When the key is removed, a 'Visual Alert' tag is revealed providing details of the key which has been issued, its designated location, and the words 'WORK IN PROGRESS'.

Control Room staff have clear and easy indication of work status at any time. Key cabinets can also accommodate mimic diagrams. These are extracts of the P&ID diagram engraved onto a Traffelite plaque and show clear details of all valves which are indicated.

SFC Key Cabinets can incorporate a Pin Code system which prevents the replacing of a system key incorrectly. A micro-switch option is available for signalling key removal/ entry.

Castell interlocking systems are designed to be robust, durable and are proven in all types of operating environments that meet the demands of the harsh locations our customers operate in. Above all, they are designed to protect personnel and assets where the risk of injury and damage are high.

Castell's approach to working with customers is deeply rooted in understanding the safety issues found in modern industrial environments. Recognizing how safety impacts operations is an important step to designing systems that deliver fast safe access ensuring that efficiency is maintained and output rates are secured.

Trapped key interlocking ensures that a process is followed and cannot be circumvented or short cut.

The transfer of a key ensures that wherever personnel find themselves, in either starting or shutting down operations, they can be assured that they are safe. There are three simple steps in designing a trapped key system, what is being isolated, how many access points are there and what type of access is required.

A key is used to start the process and remains trapped whilst the machine is running. The only way to remove the key is to isolate the hazard. This key is then used to gain access to the dangerous area and remains trapped in position while the gate or door is opened. The key can only be removed when the gate or door has been shut. In this way the key is either trapped when the machine is running and access cannot be gained, or the key is trapped while access is gained and the machine cannot be started.

THE FUTURE OF SAFETY IS HERE

TRAPPED KEY INTERLOCKS

DESIGNING INTERLOCK SYSTEMS

To design an interlock system there are a number of key questions that need to be addressed. These are:

- What is the operational flow to start and stop?
- What is being isolated?
- Is there more than one system needing isolation?
- Is there a time delay required for safe access?
- How many access points are there?
- What is the type of access? Full body or part body?
- Severity of the possible injuries?
- What is the possibility of avoiding the hazard?
- What is the nature of the hazards?
- What are the energy sources present?
- What is the operating environment?

MACHINE GUARDING

Today's production environment is very demanding. Pressures on supply chain efficiency and output are major considerations when developing manufacturing systems.

Castell's approach to delivering solutions for machine guarding applications is to ensure that fast safe access can be gained. This means that efficiency is maintained whilst safety is not compromised.

Through this approach and the design of innovative products Castell systems can be found in a vast range of applications across the globe.

Working closely with industry Castell has ensured that products are available with the correct specifications, such as materials and finishes, to ensure a reliable operation for every environment.

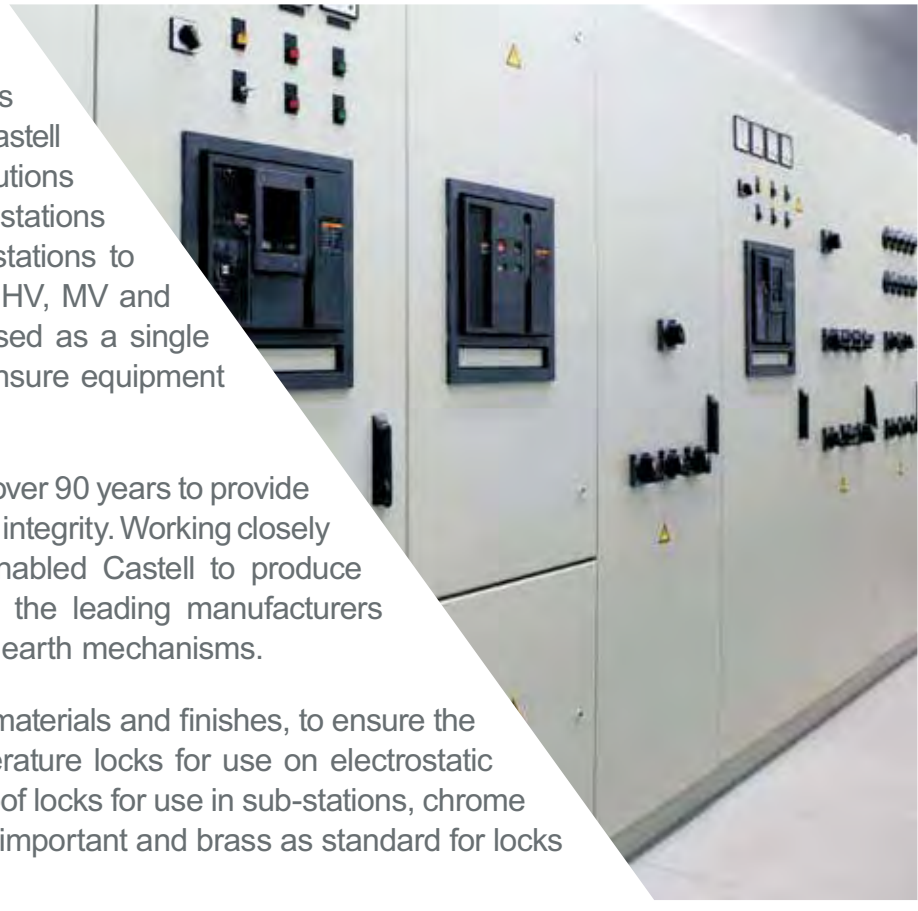
The three points of trapped key interlocking

1 Isolation

2 Key Exchange

Access Control

Switchgear



The original Castell interlock concept dates from 1922 and was developed for the electrical switchgear industry. Today this remains a very important part of the Castell product portfolio. Castell delivers solutions across the electrical network from power stations to transmission equipment and from sub stations to incomer rooms. The ability to work across HV, MV and LV means that a Castell system can be used as a single solution to provide personnel safety and ensure equipment is used in the correct mode.

Our range of products has been developed over 90 years to provide the industry with interlocks of high quality and integrity. Working closely with key switchgear manufacturers has enabled Castell to produce interlocks designed speciically for use on the leading manufacturers own breakers, isolators, disconnectors and earth mechanisms.

Castell products are available in a range of materials and finishes, to ensure the correct specification interlocks. High temperature locks for use on electrostatic precipitators, stainless steel and weatherproof locks for use in sub-stations, chrome plated locks for areas where aesthetics are important and brass as standard for locks in dry, clean, non-corrosive environments.

Castell products are used in the following areas:

- Wind Turbine Isolation & Earthing
- Rail Electrification Systems
- Electrostatic Precipitators
- UPS Systems
- LV Distribution & Busbar Systems
- HV Transmission & Distribution Sub Stations
- Transformer Isolation & Earthing Systems

Castell has developed products to suit the following companies' equipment:

ABB I Alstom I Terasaki I Schneider Electric I Siemens I Hawker Siddeley I George Ellison

Product Overview

Power Isolation

KSD

Control Switching

Salus20

KS

KSE

Solenoid Controlled Switching

KSS

KSSE

KSUPS+

Time Delay Interlocking

DAE

TDI

TDR

Key Exchange Boxes

X

B

Y

Z

W

Part Body Access

Salus

AI

D

KE

Olympus

Motion Sensing

BEMF

MSI

Valve Interlocking

MBV

Mechanical Isolation

K

KL

KF

KLF

KC

KLC

KP

KLP

FS / Q

Full Body Access

AIEAIE

BD

EDIX

KLE

AIS/Hercules

AIES

Salvo ™ Efficient & Safe Loading

Salvo prevents the accidental drive-away of a vehicle during loading or unloading of goods at a loading bay.

The Salvo links the articulated trailer to the loading bay door during the loading or unloading of goods.

The Salvo comprises of two sections:

- The lock that controls the movement of the articulated trailer – Salvo Susie
- The lock that controls the opening of the loading bay door – SCP+

Additionally, a data gathering and analysis software can be added to the system - Salvo DockMonitor.

The Salvo Susie is fitted to the emergency air line coupling when the trailer has been reversed into position at the bay. After successful fitment, a Salvo coded key is released from the Salvo Susie, locking the unit firmly onto the coupling. The coded Salvo key can only be released once the Salvo Susie has been fitted to the brake coupling. The coded Salvo key is then taken to the corresponding loading bay door and used to open the door.

The secret of the Salvo system is that only one Salvo key exists per bay, thus ensuring that the door can only be opened ONCE the trailer has been secured in place. To ensure the integrity of the system, each bay will have a different code.

Salvo Susie 2 3 4

The Salvo Susie is a key operated mechanical lock designed to fit on to all trailer emergency brake line connectors. Its purpose is to prevent re-connection of the air brake hose, thereby immobilising the trailer. When fitted, the Salvo Susie can only be removed with the permit Salvo key.

Salvo Control Panel 5

The Salvo Control Panel (SCP+) is the main interface between the Salvo couplings and associated bay door controls. The SCP+ comprises of a wall mounted panel with easy to use Castell interlock key switch to allow operation of the bay. There is also panel indication to indication status and operation. Installation is via plug in terminals on the inside door of the panel. 6 When bay door is open, the Salvo key is trapped in the SCP+.

Salvo Wireless DockMonitor 7

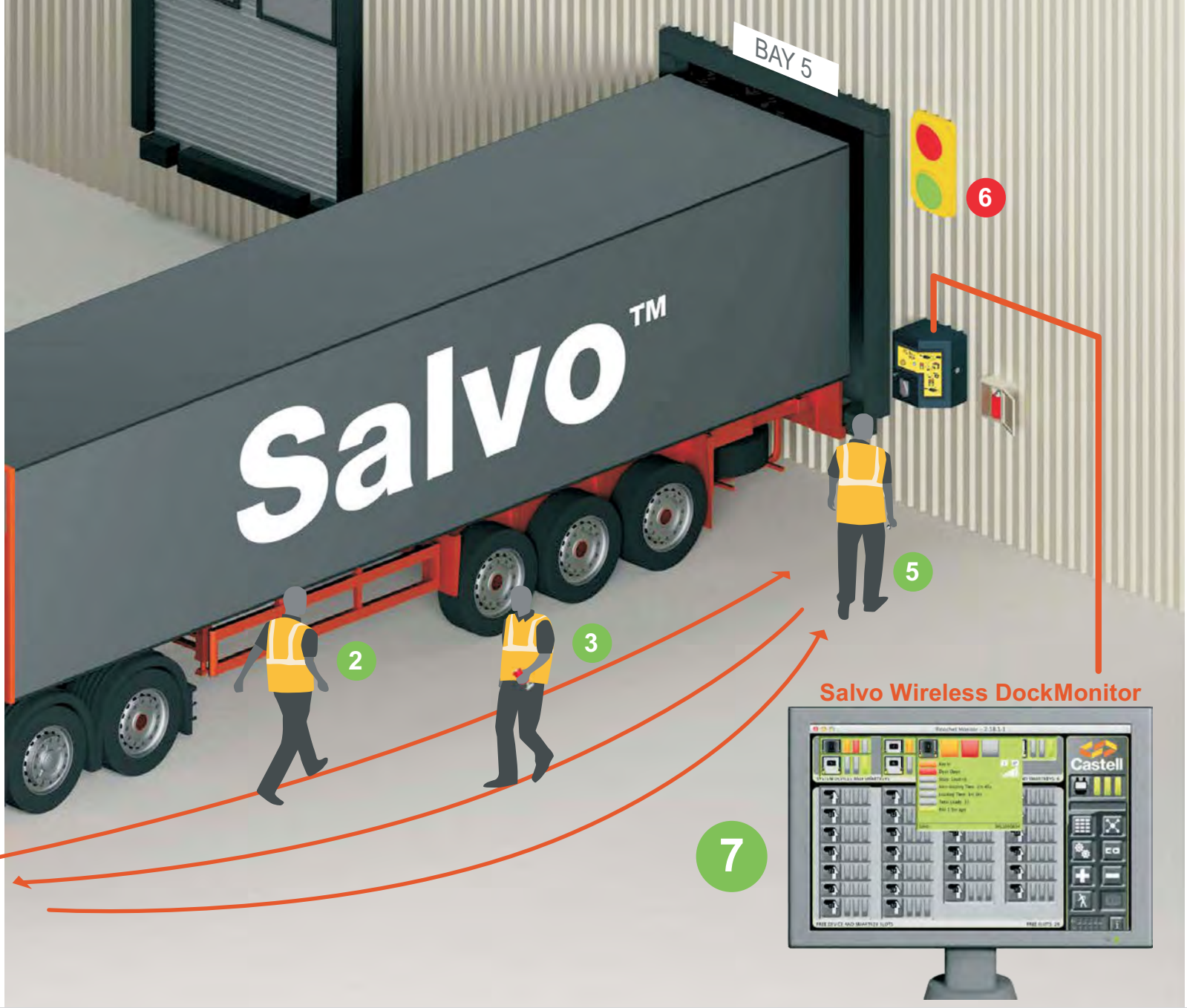
Wireless technology now removes the expensive and cumbersome fit of hard wiring.

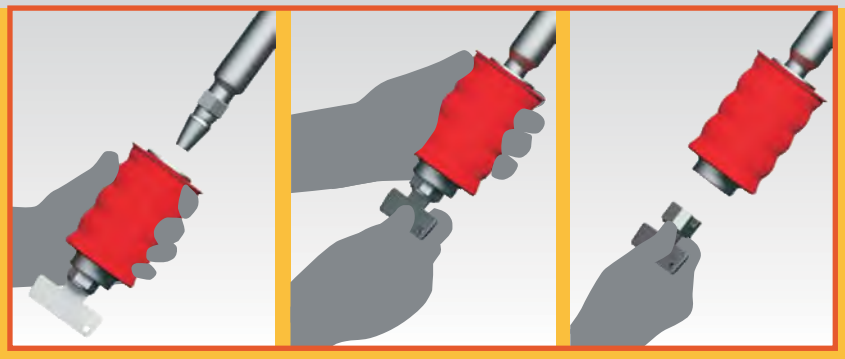
Using the latest wireless technology, Salvo Wireless DockMonitor can measure, display and record data that will enable you to access and monitor live bay usage information. This enables you to spot and implement efficiencies in your business avoiding the unnecessary costs associated with expansion or additional resources.

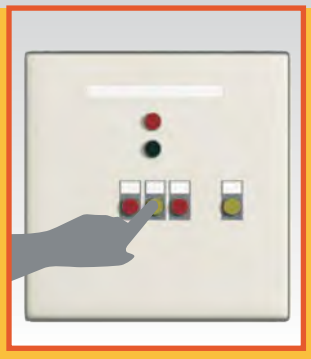
The Salvo Susie is collected from the storage area. (Usually located next to the bay area.)

The Salvo Susie is then taken to the brake line coupling end of the trailer.

Castell Salvo™







The Salvo Susie is placed over the emergency airline coupling releasing the trapped Salvo key and locking the Salvo Susie on.

The trailer brakes are locked on. The Salvo key is then taken back to the Salvo Control Panels (SCP+) at the loading bay.

When the Salvo key is inserted and turned in the Salvo Control Panel (SCP+) the loading bay becomes energised (with no key inserted the bay door will not open).

The loader can now operate the loading bay door and dock leveller. When the bay door is open the Salvo key is trapped in the Salvo Control Panel (SCP+).

FHURST ENGINEERING

Fhurst Engineering is a light steel fabrication company specialising in producing quality products. Our fully equipped workshop manufactures products such as: Standard Electrical Enclosures, Power Pack Cabinets, Floor Standing Panels and any special product required to meet customer's exact requirements. Fhurst also specialises in Stainless Steel fabrication. These include, 3CR12, 430, 304 and 316 Stainless Steel Products can be powder coated to any specific colour and the stainless steel can be supplied in a matt / brush finish.

Fhurst Engineering commenced business in 1990 from humble beginnings with a few fly presses and drilling machines. Fhurst started making electrical enclosures and from those humble beginnings expanded their armory to include a wide range of products that consist of electrical enclosures, kiosks, electrical panels, tanks and many other specialised products that are specific to their customers.

We also provide punching services to the customers requiring this type of metal fabricating service. We operate a variety of punches to assist our customers to produce the custom fabricated metal parts their company requires. We use some of the most technologically advanced and efficient punches available.

Our computerised 16 Station CNC punching machine produces 400 hits per minute and can cut, notch & punch various sized holes, slots, louvers etc. to suit customer requirements.

SPECIALISTS IN SHEET METAL FABRICATION

ENCLOSURES

We design and fabricate custom sheet metal products, including enclosures for electrical and general industry.

Our facilities are equipped produce small batches or high volume sheet metal work. The CNC Programmable Bending Brake has the ability to bend components without re-tooling and thereby saving in production cost and with its automatic adjusting stops, ensures that every product is identical.

ENCLOSURES

Enclosures manufactured in a wide range of sizes and various accessories to cater to your specific needs are fabricated from mild steel, 3CR12, 430, 304 and 316 stainless steel and have an Ingress protection ratings of IP54, IP55 and IP65.

Enclosures can be wall or pole mounted and are fitted with concealed hinges and 6mm square drive lock as standard, however lever or 3 point locking mechanisms are also available.

Enclosures are also available in with door with glass window

The finish can be to suit customer's exact requirements, however, standard enclosures powder coated in B26 Orange, textured finishes.

TECHNICAL INFORMATION

Pressure Equivalent Table

P.S.I	bar	kPa
1	0.06	6.89
5	0.34	34.48
10	0.68	68.96
20	1.37	137.93
30	2.06	206.89
50	3.44	344.82
75	5.17	517.24
100	6.89	689.65
125	8.62	862
150	10.34	1034
175	12.06	1206
200	13.79	1379
250	17.24	1724
300	20.68	2068

1kPa	= 0.01 bar
1MPa	= 10.00 bar
1kg/cm²	= 1.00 atm
1P.S.I	= 6.895 kPa
1kPa	= 0.145 P.S.I
1kg/cm²	= 14.223 P.S.I

Cable Ratings

3 & 4 Core Copper PVC/SWA/PVC 600/100V Cables - SABS 1507/1990

Cable Size	PROPERTIES						
	Current Ratings			Volt Drop	Gland Size		
(mm²)	Ground A	Ducts A	Air A	(mV/A/m)	3 Core	4 Core	5 Core
1.5	23	18	18	25.080	0	0	0
2.5	30	24	24	15.363	0	0/1	2
4	38	31	32	9.561	1	1	2
6	48	39	40	6.391	1	2	3
10	64	52	54	3.793	2	2	
16	82	67	72	2.390	2	2/3	
25	126	101	113	1.515	3	3	
35	147	120	136	1.097	3	3/4	
50	176	144	167	0.817	4	4	
70	215	175	207	0.576	4	4/5	
95	257	210	253	0.427	4/5	5	
120	292	239	293	0.348	5	5/6	
150	328	369	336	0.294	5	6	
185	369	303	384	0.250	6	6	
240	422	348	447	0.211	6	7	
300	472	397	509	0.189	6/7	7	

Utilization Categories IEC 947-4-1

Category	A.C. Contractors / Relays
AC-1	Non-inductive or slightly inductive loads, resistance furnaces
AC-2	Slip-ring motors: Starting, plugging
AC-3	Squirrel-cage motors: Starting, switching off motors during running
AC-4	Squirrel-cage motors: Starting, plugging, inching
AC-11	Electromagnets for contractors, valves, solenoid actuators

Category	A.C. Switches / Isolators
AC-20	Connecting and disconnecting under no-load conditions
AC-21	Switching of resistive loads including moderate overloads
AC-22	Switching of mixed resistive and inductive loads including moderate overloads
AC-23	Switching of motor loads or other highly inductive loads

IP Rating for Enclosures

1st Digit	Protection from Solid Objects
0	No Protection
1	Protected against Solid objects larger than ø 50mm
2	Protected against Solid objects larger than ø 12mm
3	Protected against Solid objects larger than ø 2.5mm
4	Protected against Solid objects larger than ø 1mm
5	Protected against Dust
6	Dust Tight (Total Protection)

EXAMPLE

Protection against dust — IP 5 4 — Protection against effects of splashing water

2nd Digit	Protection from Moisture
0	No Protection
1	Protected against Dripping Water
2	Protected against Dripping Water when tilted up to 15º
3	Protected against Spraying Water
4	Protected against Splashing Water
5	Protected against Water Jets
6	Protected against Heavy Seas / Powerful Water Jet
7	Protected against Temporary Immersion
8	Protected against Continuous Submersion

WHERE CAN YOU FIND US?

Branches

- Johannesburg
- Rustenburg
- Northwest
- Welkom

Distributors

- Kuruman
- Port Elizabeth (Rubicon)
- Richard's Bay (Magnet)
- Steelpoort/Kathu (Electro Diesel)
- Zambia (Botech)

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