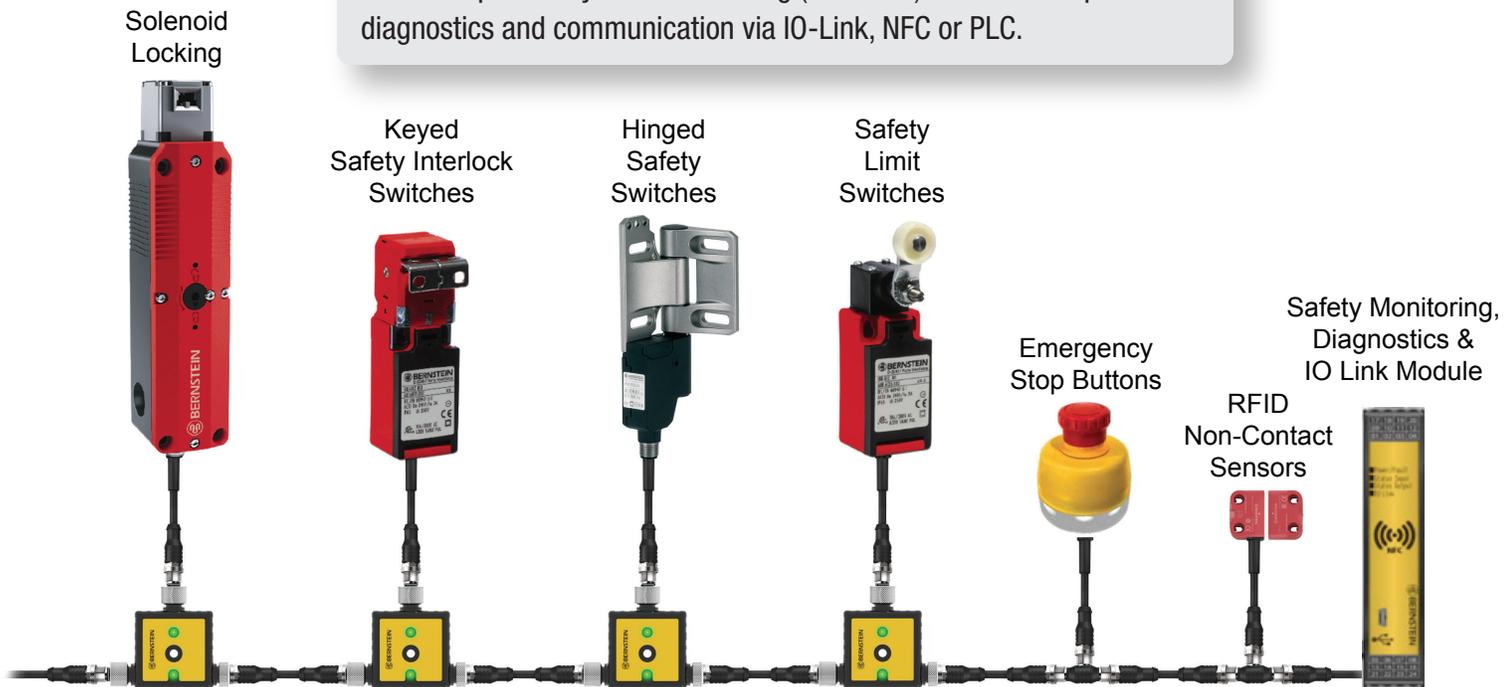


## Plug-in Series Safety with OSSD Outputs IO-Link Compatible; PLC & NFC Diagnostics

### The SMART Safety System

offers plug in convenience allowing up to 32 switches to be run in series. The system features redundant cascading OSSD outputs which eliminates the possibility of fault masking (TR24119) and offers superior diagnostics and communication via IO-Link, NFC or PLC.



### Other Output Options



OSSD Safety Relay



PLC USB, NFC Diagnostics, IO-Link



IO-Link with Profibus Bridge

### What is "Fault Masking"?

Fault masking is an error that can occur when several safety switches are wired in a series (or daisy chain) configuration. If a single contact or wire short occurs in one of the switches, it will be detected when the door or panel is opened and a typical safety relay will go into a "fault" mode; requiring the error to be corrected and power be reset to the safety relay before the machine can be restarted. However, if that door is closed and another door is opened and closed, the safety relay will interpret that an indication that the fault has been corrected and allow the machine to be restarted, even though the original fault condition still exists. This could eventually lead to a double fault, which would allow the door or panel to be opened when the machine is running and in a dangerous state.

## Preventing "Fault Masking"

The Bernstein SMART Safety System features redundant OSSD safety outputs (two pulsed 24 volt signals). The sensors are run in a cascading order. The first sensor checks its state and if closed sends a signal to the second sensor, which must detect that signal before it checks its own state and in turn sends a signal to the next sensor down line. Up to 32 sensors can be run in this manner. Any interruption in this sequence by either a door being opened or a fault will prevent the final OSSD signals from reaching last position where it is monitored by the safety relay, turning off the power to the machine or preventing it from starting.

## Diagnostics and Communication

DCD (Daisy Chain Diagnostics) offer much more detailed information providing over 20 different types of diagnostic information, via an internal bus system that can be accessed at the end of the series cable. This data can be accessed by the machine's control system via I/O Link and/or can be displayed on a Android Smartphone or tablet using NFC (Near Field Communication) technology. Both levels of diagnostic systems operate independently of the safety outputs. The I/O Link can be converted to be read by Profibus using a bridge.

## Safety Rating

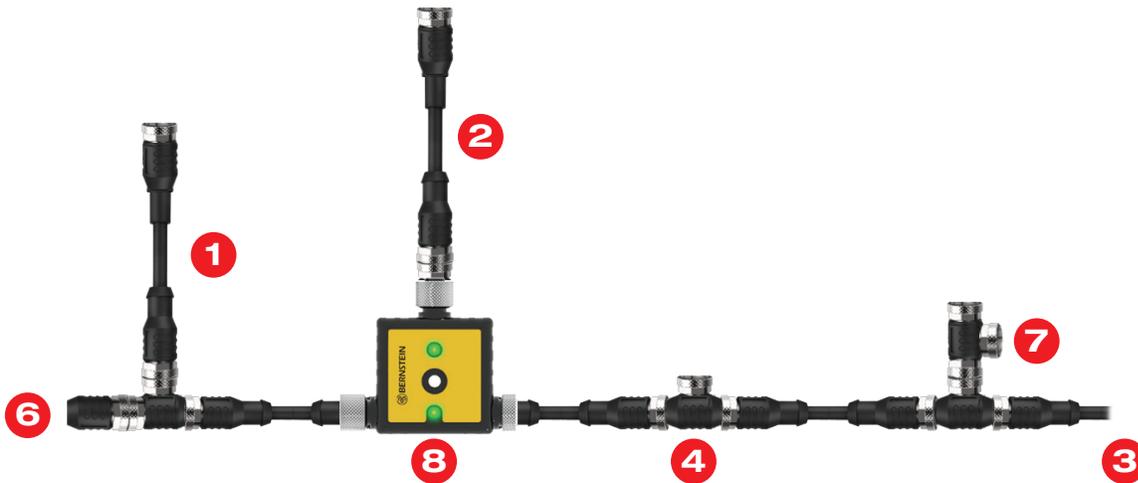
The SMART Safety System offers a safety rating of up to PLe, Cat.4 / SIL CL 3 even when multiple switches are used in series, via redundant OSSD outputs.

## Fault Tolerant Outputs

The SMART Safety System also features "Fault Tolerant Outputs", which prevent unnecessary machine shutdowns. If both OSSD safety outputs are lost, caused by an unsafe condition (such as a door being opened), the machine will immediately shut down. However, if only one output is lost (caused by a fault in the sensor or wiring), the sensor will indicate the condition with a flashing code and transmit the information via the DCD system (if used). After 20 minutes the machine will be shut down.

## M12 Cables and Connections

The sensors are designed to be used in series and feature an M12 connection system which provides plug in installation convenience; saving time, wiring errors and labor. Individual sensors are connected to the sensor chain "main line" using a "T" connector. The sensor chain "main line" uses a four conductor unshielded cable, which offers additional cost savings. The series line is ended using a terminator cap.



Position	Part Number	Description	Notes
1	607.5689.085	S1W-M12A8/8W/BW-1PU	Sensor Extension Cable Male to Female 8 Pin 1M (3.2')
1	607.5689.086	S1W-M12A8/8W/BW-2PU	Sensor Extension Cable Male to Female 8 Pin 2M (3.2')
2	607.5689.087	S1W-M12C4/AW-2PU	Series Line Extension Cable Male to Female 4 Pin 2M (3.2')
2	607.5689.088	S1W-M12C4/AW-5PU	Series Line Extension Cable Male to Female 4 Pin 5M (16.4')
2	607.5689.089	S1W-M12C4/AW-10PU	Series Line Extension Cable Male to Female 4 Pin 10M (16.4')
3	607.5689.090	SFW-M12C4/AW-0.5PU	Controller Connection Cable Female to Open 4 Pin .5M (1.6')
3	607.5689.091	SFW-M12C4/AW-2PU	Controller Connection Cable Female to Open 4 Pin 2M (3.2')
4	607.5989.082	ATS-M12/4-M12/8	T Adaptor at end of sensor
6	607.5689.084	AEP-M12/4	End of String Terminator
-	607.5689.127	AT-CLIP-M12	M12 Mounting Clip for T Adaptor
7	607.5989.083	ATD-M12/8-M12/4	T Adaptor for I/O Link Connection, PNP or Reset
8	607.5689.190	SEU-1/0-T456	Smart T Adapter

## SRF Non-Contact Switches

Basic PNP Diagnostics  
Low Coding



Switch (9.8" cable)  
Part Number - 607.5685.096  
Description - SRF-4/1/1-E-L

Actuator  
Part Number - 607.5687.078  
Description - SRF-0

Other coding options available

Basic PNP Diagnostics  
Unique Coding



Switch (9.8" cable)  
Part Number - 607.5685.094  
Description - SRF-4/1/1-E-U

Actuator  
Part Number - 607.5687.078  
Description - SRF-0

Daisy Chain Diagnostics (DCD)  
Low Coding



Switch (9.8" cable)  
Part Number - 607.5685.102  
Description - SRF-5/1/1-E-L

Actuator  
Part Number - 607.5687.078  
Description - SRF-0

## Safety Switches

### OSSD Connection Box

Converts Dry Contact Switches to OSSD  
Plugs in Between Switch and Main Line



Smart "T"  
Part Number - 607.5689.190  
Description - SEU-1/0-T45-C



Transition Box  
Part Number - 607.5689.137  
Description - SEU-1/0-M64-C

### Keyed Safety Switch with M12 connector



Part Number - 699.6469.066A  
Description - SKT-A2Z-M3-M12

### Keyed Safety Switch with M12 connector



Part Number - 699.6169.036A  
Description - SK-A2Z-M-M12

### Solenoid Locking Switch with M12 connector



Power for the locking solenoid must be supplied from an external

**Normally Locked (Power to Unlock)**  
Part Number - 699.8200.007A  
Description - SLC-F-024-20/20-R4-M12

**Normally Unlocked (Power to Lock)**  
Part Number - 699.8200.017A  
Description - SLC-M-024-20/20-R4-M12

### Hinged Safety Switch with field wire M12



**Left Hinged**  
Part Number - 699.9490.051A  
Description - SHS3-U15Z-KA5-L-M12

**Right Hinged**  
Part Number - 699.9490.050A  
Description - SHS3-U15Z-KA5-R-M12

### Safety Limit Switch with M12 connector



Actuators  
Sold Separately

**Safety Limit Switches**  
Part Number - 699.3000.274A  
Description - IN65-A2Z-M20-M12

## Emergency Stop Button

with LED Status Light  
Plugs directly into the sensor chain



SEU-2

SEU-3

SEU-4

### SEU-2

Part Number - 607.5689.138  
Description - SEU-2/0-P80-C

### SEU-3

Part Number - 607.5689.177  
Description - SEU-3/3/2-P81-C

### SEU-4

Part Number - 607.5689.174  
Description - SEU-3/3/2-P86-C

## OSSD Safety Relay

Simple safety, without diagnostics  
Basic safety relay for monitoring two OSSD inputs, manual or auto restart with 3 N/C Output Contacts



Part Number - 607.5111.020  
Description - SCR-ON4-W22-3.6-S

## Safety/Diagnostics Relay

Safety, diagnostics and I/O Link communication in one device



**I/O Link, NFC and USB 2.0**  
Part Number - 607.5113.141  
Description - SCR DI-1/01-T

### I/O Link with 8 Digital Outputs

Part Number - 607.5113.140  
Description - SCR DI-1/8/3-T

## Diagnostic Field Device

Plugs in the main line via T connector  
Converts Diagnostic to IO-Link which is accessed with 8 pole T connector  
Direct access with NFC device



Separate T Connector used to access IO-Link

Part Number - 607.5689.126  
Description - SRF DI-F-0/2-E0.25

## Diagnostics Module

With IO-Link, NCF and USB 2.0  
One or Six Diagnostics Circuit



**With One Diagnostic Circuit**  
Part Number - 607.5619.122  
Description- SRF DI-C-0/1-T

### With Six Diagnostics Circuits

Part Number-607.5619.125  
Description-SRF DI6-C-0/1-T

## Diagnostics Module

With IO-Link, NCF and USB 2.0  
One Diagnostics Circuit and 8 or 16 Digital Outputs



**With 8 Digital Outputs**  
Part Number - 607.5619.123  
Description- SRF DI-C-8/1-T

### With 16 Digital Outputs

Part Number - 607.5619.124  
Description-SRF DI-C-16/1-T

# Learn More @

[www.altechcorp.com/bernstein/PullSwitches](http://www.altechcorp.com/bernstein/PullSwitches)

Altech Corporation  
35 Royal Road  
Flemington, NJ 08822-6000  
P 908.806.9400 • F 908.806.9490  
www.altechcorp.com

Altech Corp.® 582-2000  
Printed February 2023

