SMART Safety System

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.

Solenoid Locking

Keyed Safety Interlock Switches

Hinged Safety Switches

Safety Limit Switches

Emergency Stop Buttons

RFID Non-Contact Sensors

Safety Monitoring, Diagnostics & IO Link Module

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 an 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
indicated 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 installa-
tion 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.
SRF Non-Contact Switches

Switches (with 9.8” cable & M12 connector)

<table>
<thead>
<tr>
<th>Position</th>
<th>Part Number</th>
<th>Description</th>
<th>Coding</th>
<th>Diagnostics</th>
<th>Local Reset</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>607.5685.096</td>
<td>SRF-4/1/1-E-L</td>
<td>X</td>
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<td>607.5685.095</td>
<td>SRF-4/1/1-E-H</td>
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<td>A</td>
<td>607.5685.094</td>
<td>SRF-4/1/1-E-U</td>
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<td>A</td>
<td>607.5685.102</td>
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<td>607.5685.100</td>
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</table>

Actuator (for all coding levels - sold separately)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>607.5687.078</td>
<td>SRF-0</td>
</tr>
</tbody>
</table>

Safety Switches

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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>607.5689.137</td>
<td>SEU-1/0/M64-C</td>
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</table>

Keyed Safety Switch

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>601.8200.889</td>
<td>SLC-F-024-20/22-R4-M12</td>
</tr>
<tr>
<td>601.8200.885</td>
<td>SHS3-U15Z-KA5-R-M12</td>
</tr>
</tbody>
</table>

Solenoid Locking Switch

Power for the locking solenoid must be supplied from an external source

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>601.8200.889</td>
<td>SLC-F-024-20/11-R4-M12</td>
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Hinged Safety Switch

<table>
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<th>Description</th>
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<tr>
<td>601.9490.880</td>
<td>SHS3-U15Z-KA5-R-M12</td>
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</table>

Safety Limit Switches

Actuators Sold Separately

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>601.9490.880</td>
<td>IN65-A2Z-M20-M12</td>
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</tbody>
</table>

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Emergency Stop Button
with LED Status Light
Plugs directly into the sensor chain

Part Number - 607.5689.138
Description - SEU-2/O-P80-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

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 Circuits

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

With Six Diagnostics Circuits
Part Number-607.5689.125
Description-SRF DI6-C-0/1-T

With Eight 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