GUARDSHIELD™ 450L
Most advanced Safety Light Curtain in the Market
GUARDSHIELD 450L LIGHT CURTAINS

FEATURES

- Slim design
- Finger or hand Resolution
- Indicators provide Status and Diagnostics
- Optical Interface for Diagnostics
- Easy Top/Bottom mounting
- Unique stick architecture
- Advanced plug-in technology
- Cascading for series connection
- Increased operating range
- Muting 2 & 4 sensors
- Blanking Fixed/Floating
- Laser Alignment for fast installation

450L-B
450L-E
### GUARDSHIELD 450L PLUG-INS

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A Family- and Employee-Owned Company

Optical Communication Interface
(for diagnostic with CCW)

450L-B

Cascading
Blanking
Muting
Reset
Regional intensity
OSSD
Tx/Rx
Fault
Optical Communication Interface
(Laser alignment)

450L-E
- Patented Integrated Laser Alignment
  - For quick installation

Makes Alignment much more Effortless
Safety over EtherNet/IP

- **New generation of Safety Laser Scanner**
- **Rapid setup and troubleshooting:** AOP and Premier Integration in Studio 5000 allows for easy integration into a Logix system
- **Improved scanning technology:** Provides a substantial increase in the number of pulses per scan which results in an increased immunity to dust and optical interference
- **Expanded scan angle:** Protective safety field range: 4m or 5 m, with a maximum scanning angle of 275°
- **Rugged design:** Developed for harsh industrial environments, the SafeZone3 is more resilient and robust while increasing productivity through increased up-time
LIFELINE™4 SAFETY CABLE-PULL SWITCHES
Features:

- **Solid-state** operation – the first in the industry
- Enhanced safety and productivity with microprocessor-based
- Performs at the highest safety ratings, even in series connection
- TÜV Approved
  - PLe Cat 4 according to EN ISO 13849-1
  - SIL CL3 per IEC 62061 and IEC 61508
  - EN ISO 13850 and IEC 60947-5-5
- 100 m (328 ft) maximum cable span
- **Electronic rope monitoring system monitors the cable span and compensates for thermal expansion**
  - Built in margin indication helps reduce downtime
  - Wide operating temperature range -20°C to 75°C (-4°F to 167°F)
- **270-degree visible LED** indicators offer diagnostic for switch and tensioning setup
  - Rugged stainless steel (IP69K) or die cast aluminum (IP66) housings with optional e-stop
- Available with a 5- or 8-pin Micro M12 connector
- OSSD outputs
  - 2 OSSDs for safety
  - 1 Auxiliary
  - **1 Tension/margin (8- pin model only)**
## Problem

Plante availability – no shut downs

- Random trips due to cable expansion
- Frequent re-adjustment of cable tension
- Operator leaning on cable
- Therman Expansion

## Solution

### Increase productivity

- **Electronic monitoring** of the cable to reduce false trips from thermal changes or operator leaning on cable
- Solid-state safety outputs
- Tension indication
Built in margin indication to monitor rope tension:
If the status indicators are green and the tension indicator is flashing amber, the rope/cable requires maintenance/adjustment before the machine shuts down.

5x better than traditional cable-pull switches at maximum cable span
Design Goals:

1. Improve Safety and Increase Uptime
2. Reduce Wiring and Improve Diagnostics
3. Must remain low-cost
GUARDLINK™
Safety Device Diagnostics on EtherNet

SmartTap
- Provides device location and status to GSR DG

GSR DG
- Receives upstream device data via SmartTap and transfers that data via optical link to GSR ENETR
- Performs the functions of a standard local Safety Relay

GSR ENETR series B
- Puts the accumulated status information on the network

A Family- and Employee-Owned Company
• **SMART:** Provides access to diagnostic data when safety function is in a safe state

• **SIMPLE:** No configuration required and devices use standard 5 wire cables with M12 connectors

• **SAFE:** Daisy chain up to 32 devices with no loss of Safety rating (up to PLe)

Series connection of devices typically reduces the granularity of the diagnostics, leading to unnecessary machine downtime – not so with GuardLink

Diagnostics are critical for identifying the location and reason for the demand on the safety system as well as guiding operators through a quick recovery
GUARDLINK™ TECHNOLOGY OVERVIEW

Principal Function

GuardLink master
- Manages GuardLink comms.
- Executes the safety function
- Aggregates and passes on data

GuardLink slave
- Monitors safeguarding device
- Creates and repeats safety pattern

GuardLink Terminator
- Terminates open wires
- Determines last device on Link

CLU – Command, Lock and Unlock
- Connection to manage operation modes and initiate lock/unlock

Unique safety pattern to achieve PLe/CL SIL3

Safety or diagnostics on the same single wire

Distribution of 24V across GuardLink devices - Same 0V reference required for master and slaves
Indicators Provide Status and Diagnostics

Solid Mechanical Door Stop

Optional Escape Release

Auto-Extending Bolt Locking Mechanism

Handle Unlatches and Opens Guard Door

Operator Controls for Machine Access

Auxiliary/Manual Release

Manually Extended Bolt Locking Mechanism
442G Multi-Functional Access Box

Before & After
442G MULTI-FUNCTIONAL ACCESS BOX

CIP Safety over E/IP with Add-on Profile for Studio 5000 Logix Designer®

- E/IP Network (NET) and Module (MOD) Status Indicators
- Bus Module
- Handle Mounting Plate
- M12 Connector for Enabling Switch (select models)
- 2 Ethernet Ports
- 2 Power Connectors
SMART SAFETY DEVICES ON ETHERNET

The Connected Enterprise/Industry 4.0

Visualization
Design Environment
Information Software
Logix Programmable Automation Controller

Input
Logic
Output

Mobility

Emergency stop
Non contact switches
Guard locking switches
Key Interlock Switches
Cable pull switches

MAB CIP Safety
Light Curtains CIP Safety
Safety Scanner CIP Safety

Benefits of Smart Safety

A Family- and Employee-Owned Company
Lets take a second to get back to basics

- Terminal Block – Din rail mounted component which provides wire connection points

1492-J / -W

- Screw Clamp Technology
- Advantages:
  - Tactile feedback of cranking down screw
  - Wires enter/exit the block from the “side”
  - Multiple wires per terminal
  - Angled marking tag locations
  - Up to 3 jumper locations
- Disadvantages
  - Potential for screws to back out / Maintenance
  - Wires enter/exit the block from the “side”

1492-L

- Spring Clamp Technology
- Advantages:
  - Faster installation than screw clamp
  - Wires enter/exit the block from the “front/face”
  - No screws to back out (vibration proof)
  - Top of block marking tag locations
  - Up to 2 jumper locations
- Disadvantages
  - One wire per terminal
  - “Side” marking harder to view
Introducing 1492-P series - Push-in Terminal Blocks

- Test points on all TB's
- 2 Jumper Channels
- Plastic Actuators
- Marking Areas – Side and Top
- Push-In Connection Technology

A connection so easy, you can’t “SCREW” it up!!
How to increase wiring efficiency and safety in a Terminal Block design?

- **Push-in Technology**
  - Steel for construction / Copper for conductivity parts
  - Clamp holds wire onto current bar connection
  - Vibration proof connection

- **Operation of Push-in terminal**
  - All wire types approved
    - Solid – direct insertion
    - Ferrule – direct insertion
    - Stranded – press actuator to open clamp

- **Installation Time**
  - Reduce wiring time by at least 50%

- **Plastic Actuators**
  - Safe method of disconnecting wire
    - No touching live metal parts
  - Use to insert flexible/stranded wire

Let's prove it!
What are these “ferrule” things and why do I care?

- A cylindrical tube of tin-coated copper (with or without a insulated collar) that can be crimped onto the end of a wire.
- Allow a stranded wire to act as a solid wire
- UL / CSA and other certification approvals
- Multiple ferrule offerings available (length/size/color/"
- Multiple crimp shapes to fit the users requirements
- Advantages of utilizing Ferrules:
  - Improves connection strength and reliability
  - Increases the ease of installation – solid wire versus flying strands
  - Minimizes the likelihood of a “turn-back” strand / cross-connection
Overview of the 1492-P series of Terminal Blocks

- **Universal / Standard Offering**
  - “Every day” Terminal Blocks
  - Universal usage around any/all applications
  - Standard single/double/triple/quad level terminal blocks

- **Application Specific Offering**
  - Developed for specific “applications” to provide even more customer value
  - Control Power Distribution
  - Sensor/Signal Wiring

Phase “A” Launch – AFC at Automation Fair 2017 (November)
Application Specific Terminal Block Offering

- Control Power Distribution Terminal Blocks
Application Specific Terminal Block Offering

- Sensor / Signal Terminal Blocks
  - 3 different size/shape variations – depending upon wiring requirements
1606-XLB

- Best in class, cost optimized Power Supply
  - Competitively priced
  - Focused on low-end high-volume OEM's
  - 5A and 10A versions available
  - 120/240 VAC Single Phase

- Highly differentiated features for the “Basic Class” market
  - Up to 95.2% efficient (vs. 85% typical for this market)
  - Maximized MTBF/Reliability
  - Minimized footprint for its class

- AFC: Now, since October 29, 2016

- In stock at CDC
Bulletin 156-C1P, C2P, & C3P
Solid State Contactors

Product release
April 2017
Product Enhancements

- Our next generation of Solid State Contactors
  - One (1) switched pole 20 amps to 85 amps (prev 72 amps)
  - Two (2) switched poles 25 amps to 75 amps (prev 32 amps)
  - Three (3) switched poles 20 amps to 65 amps (prev 23 amps)
- Expanded current range @ 40C (not 25C as existing)
- Improved $I^2T$ with SCCR ratings up to 100kA with fuses
- Type 2 protection with 1492-SPM miniature circuit breakers (MCB’s)
- Rated operating voltage 600
- Control voltage 5-32 VDC, 20-275 VAC (24 – 190 VDC)
Product Enhancements — reduced width less rail space

- One phase devices
  - 20 & 25 amp - 17.8mm vs 22.5mm
  - 43 amp - 35mm vs 45mm, but 30mm taller
  - 65 amp - 70mm vs 90mm, but 30mm taller

- Two phase switched devices
  - 25 amp 54mm vs 45 mm **no fan!!**
  - 32 amp 54mm vs 90mm **no fan!!**

- Three phase switched devices
  - 25 amp 54mm vs 90mm
100-E Overview

- **New 100-E Contactors**
  - Expanded Accessories
  - Worldwide Accepted Approvals
    - Global approvals for all industries
  - Expanded ratings
    - Current ratings up to 2650A
    - 1000V ratings for all sizes
    - UL DC ratings

These new contactors enable our customers to efficiently design and build smaller panels, reducing energy consumption, offering global certifications.
100-E Overview

- New 100-E Contactors
  - Smaller Size and Footprint
    - Reduces panel space and shipping costs
  - Wide Range AC/DC Electronic Coils
    - Enables ease of design and selection
    - Eco-friendly design reduces power requirements 25-65%
    - Reduces the size of the power supply or control transformer
  - Safety Solutions
    - 116...750A
    - Mirror contactor performance
    - SUVA third-party certified
Expanded Ratings

- Ampere ratings up to 2650A
- 1000V Ratings
  - AC-1, AC-3, AC-4
- UL DC General-Purpose Ratings for alternate energy
- UL/CSA Definite Purpose Ratings for HVAC applications
- CSA/ASME Elevator Duty Ratings
- UL/CSA Ballast Lighting Ratings
Electronic Coils

- Wide Range AC/DC Electronic Coils
  - 4 coils cover 24…500V AC/DC
  - Enables ease of design and selection
  - Eco-friendly design reduces power requirements 25-65%
  - Less heat generation
  - Reduces the size of the power supply or control transformer
  - Lowers inventory requirements
  - Built-in surge suppression
  - Allows for a PLC input
  - Quiet operation
871FM Inductive Sensors
Miniature Metal Flat Pack Sensors with IO-Link
4-Wire DC Stainless Steel Housing
Key Features

- **IO-Link enabled, Auto PNP/NPN models**
  - Low profile mini metal flat pack sensors available in 8 mm and 14 mm heights
- **Rugged stainless steel design to prevent damage to sensor**
  - General purpose models
  - Weld Field Immune models with ToughCoat Finish™ weld slag coating
  - Ideal for harsh or extremely demanding environments
  - Resist abrasion and chemical wear
- **General Purpose modes rated IP69K**
  - High temperature and high pressure washdown
- **Equal/Factor-1 sensing** - Detect ferrous/nonferrous materials at the same distance
- **Low Margin & Proximity Alarm status**
  - Communicates when signal level is below the threshold
  - Status available in standard mode via LED or from controller tag in IO-Link mode
194U Non-fused Disconnect Switch

- 194U Non-fusible (front and base mount) disconnect switch compatible with 194R, 194E, 194L-HE6* and NFPA79 handles
  - 30…100 A – Available: Jan 2018
    - 30/40 A & 60/63 A (cULus/IEC/EAC)
    - 100/125 A (cULus/IEC/EAC/CCC)
  - 100…125 A – Available: May 2018
    - 100/125 A / 160 A (cULus/UR/IEC/EAC/CCC)

- Differentiation
  - Smaller footprint UL98 disconnect than 194R non-fused disconnect
  - 194U has full NFPA79 compliance
  - Robust lock-out/tag-out accessory vs. competitive
194U Non-fused Disconnect Switch

Certifications

194U covers Global Certifications in both Front & DIN mount versions:

- 30 A / 40 A (cULus/IEC/EAC)
- 60 A / 63 A (cULus/IEC/EAC)
- 100 A / 125 A (ULus/IEC/EAC/CCC)
- 100/125 A / 160 A (ULus/UR/IEC/EAC/CCC)
837T Solid-State Display Temperature

Product Overview

- Measuring Element: Pt1000
- Sensing Element: 316Ti SS
- Housing: SS 304
- Display Head: PC+ABS blend
- Temperature Ranges: -20…+80°C (-4…+176°F)
- Probe Lengths: 25…350 mm (1…13 inches)
- Process Connections:
  - ¼” NPT Male
  - ½” NPT Male
  - G ¼ A Male
  - G ½ A Male
- Electrical Outputs: 2PNP, 1 PNP + 4…20mA
- Brighter, easy to read and robust display
- Bigger push buttons for easy on-device configuration
- Flexible mounting configuration
- Electrical Connection: 4-pin M12 connector
- Ingress Protection: IP65/67 rated
837RTD Resistance Temperature Detector
Customer Value Proposition

- Ideal for high-temperature applications where measurement electronics cannot be installed
- Low cost, high precision temperature measurement
- Output is a resistance value that changes proportionally to temperature
- Platinum measuring element provides better long-term stability, high accuracy and linearity over wider temperature ranges.
- **Measuring Ranges:** -50…+250 °C ( -58...482°F)
- **Probe Lengths:** 28…65 mm (1.1…2.5 inches)
- **Process Connections:**
  - ¼” NPT (Male)
  - G ¼ BSPP ( Male)
- IP67 rated enclosure

Available in Probe lengths up to 250 mm
837T Solid-State Non-Display Temperature
Product Overview

- Compact Design
- High vibration resistance and fast response time
- Measuring Ranges: -50...+250 °C (-58...482°F)
- Probe Lengths: 25...400 mm (1...15 inches)
- Process Connections:
  - 1/4" NPT (Male)
  - G 1/2" Male
  - G 1/4 BSPP (Male)
- Electrical Outputs: Analog 4...20mA
- Electrical Connection: 4-pin Micro M12
- Stainless Steel IP67 rated enclosure

Low Cost and High Performance Temperature Sensing Solution
836P Solid State Pressure
Display Overview with IO-Link 1.1

- Pressure Ranges: -14.5…8,000 psi
- Available in Gauge, Absolute and Vacuum pressure measurement types
- Compact Housing: 316L SS
- Sensing Element: 316L SS
- Process Connections:
  - ¼"NPT (Male/Female)
  - G ¼ BSPP (Male/Female)
  - G ½ B
  - SAE 7/16-20 UNF Male
- Outputs: 2 x PNP, 1 PNP + 4…20 mA
- Easy-readable and robust display
- Intuitive + Fast setup
- IP67 rated enclosure
836P Solid State Pressure
Non Display Overview

- Pressure Ranges: -14.7 (-30 inHg)...10,000 psi
- Available in Gauge, Absolute and Vacuum pressure measurement types
- Enclosure Housing – 316L SS
- Wetted Parts: 316L Stainless Steel
- Process Connections:
  - \( \frac{1}{4} \)”NPT (Male/Female)
  - G \( \frac{1}{4} \) BSPP (Male/Female)
  - G \( \frac{1}{2} \) B
  - SAE 7/16-20 UNF Male
- Electrical Outputs: 4...20 mA
- IP67 rated enclosure
Features and Benefits

- Snap-together wiring technology
- Made complex wiring easy
- No cutting and stripping
- **Plug-n-Play** configuration
- EASIEST and FASTEST assembly
- Pre-sales support documentation
- Launch Portfolio
  - Non-reversing combination starters
  - Nema size 0 – 5 (up to 200 HP)

Accessories kits

Packaged Components Business

Next Generation of Enclosed Nema starters with Snap-Together Wiring

Plug-n-Play Solution
Product Anatomy

- Improved Lifting Means
- Configured Heights (Optional)
- Multiple Component Mounting Surfaces
- Snap-together plug and play pilot options
- Removable Gland Plate
SMC-50 Snap-together wiring

* Snap-together wiring offered only on controllers 90A...780A
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