

Industrial Control Components Update



ESSENTIAL COMPONENTS,
EXCEPTIONAL VALUE.

Jack Smith – Industrial Control Specialist, SYD
Joe Pickell – Component Sales Engineer, RA

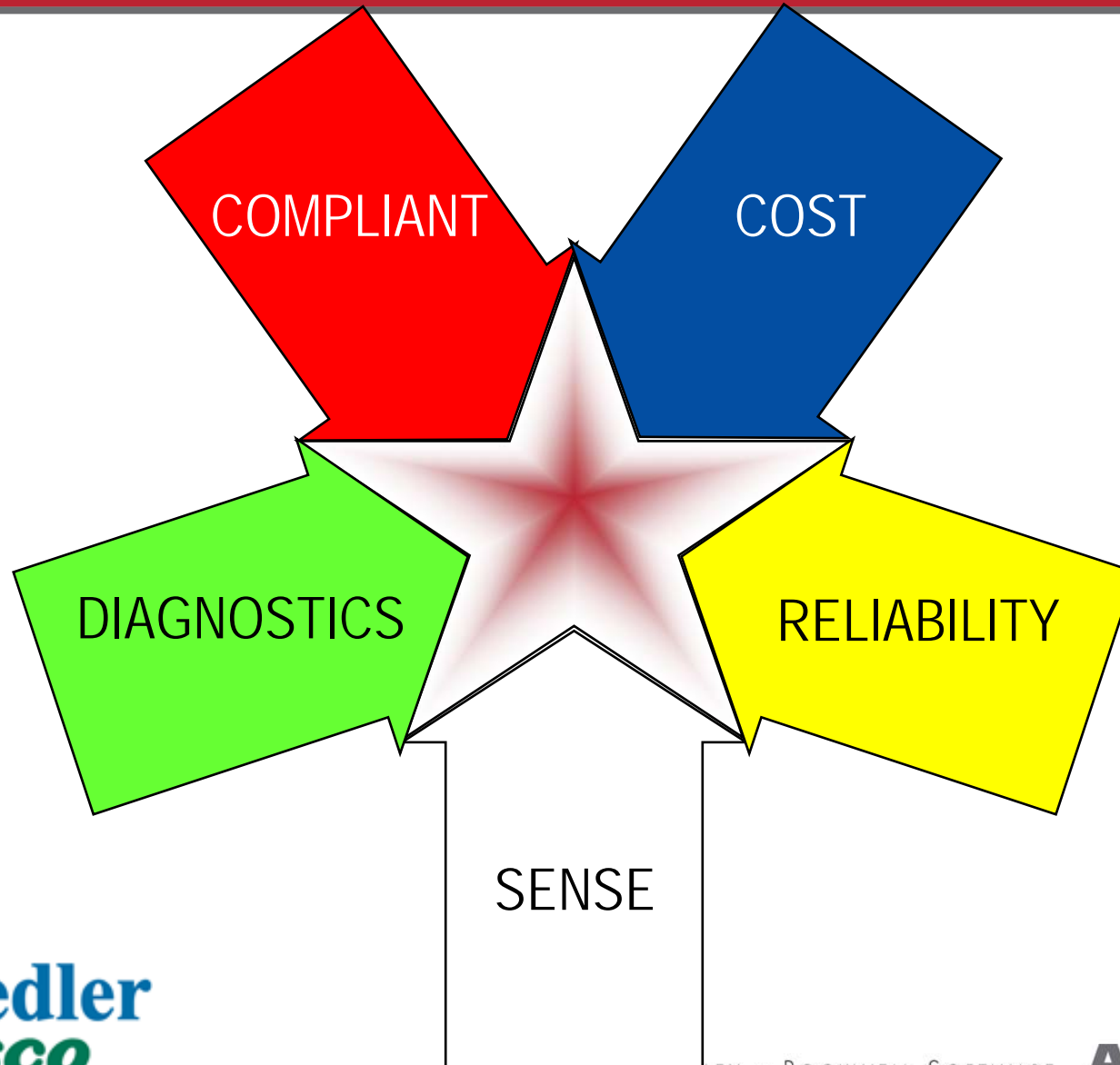
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New Components Build All Star Control Systems



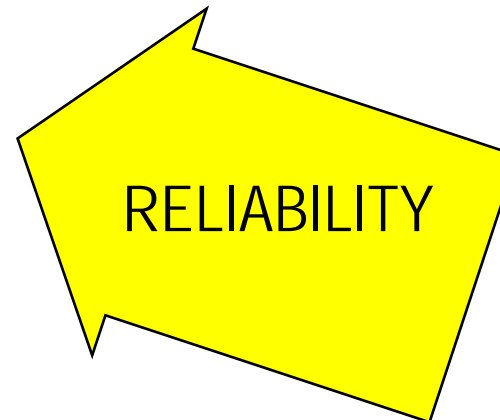
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Reliability Issues

- Transients
 - Surges
 - Noise
- Power Losses
 - Black Outs
 - Sags
- Motor Issues
 - Mechanical Problems
 - Electrical Failures



4983 Surge and Filter Products

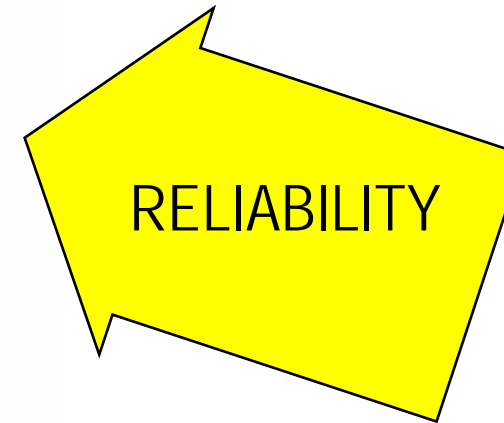
RELIABILITY



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Surge Product: 4983-DH (lightning protection)

- cURus for UL1449, IEC 61643-1
- **Heavy Duty Surge Protection**
- DIN rail design
- MOV+GDT technology
- Connection Mode L/G or N/G
- Fail safe condition
- **Standard remote signaling**
- Visual fault indication
- MCOV: 150 – 330 VAC
- **Up to 50kA @ 10/350 μ s**
- As low as 400 VAC SVR
- Located on Feeder Circuits



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Surge Product: 4983-DS

- cURus for UL1449, IEC 61643-1
- Modular DIN rail design
- **Standard remote signaling**
- Visual fault indication
- MCOV: 150 – 400v
- **In 20kA nominal discharge (8/20 μ s)**
- **Used in power and control circuits located after circuit protection**



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Dataline Surge: 4983-DD

- UL 497B, IEC 61643-21
- 2 Wire + ground protector
- Network Applications:
 - 4-20mA loop
 - RS232
 - RS485
 - High speed transmission (LAN)
- Protection Level as low as 25V
- Two methods of grounding: screw and DIN rail clip
- Located in front of Network system



RELIABILITY

Filter Products: 4983-PF

- UR for UL1283, CSA C22.2
- Features Islatrol® technology
- Critical loads drawing up to 30 A
- 120V and 240V single phase models
- Panel (flange) mount
- All mode protection
- LED power indication
- Located directly in front of equipment to be protected



RELIABILITY

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Surge/Filter Product: 4983-DC

RELIABILITY



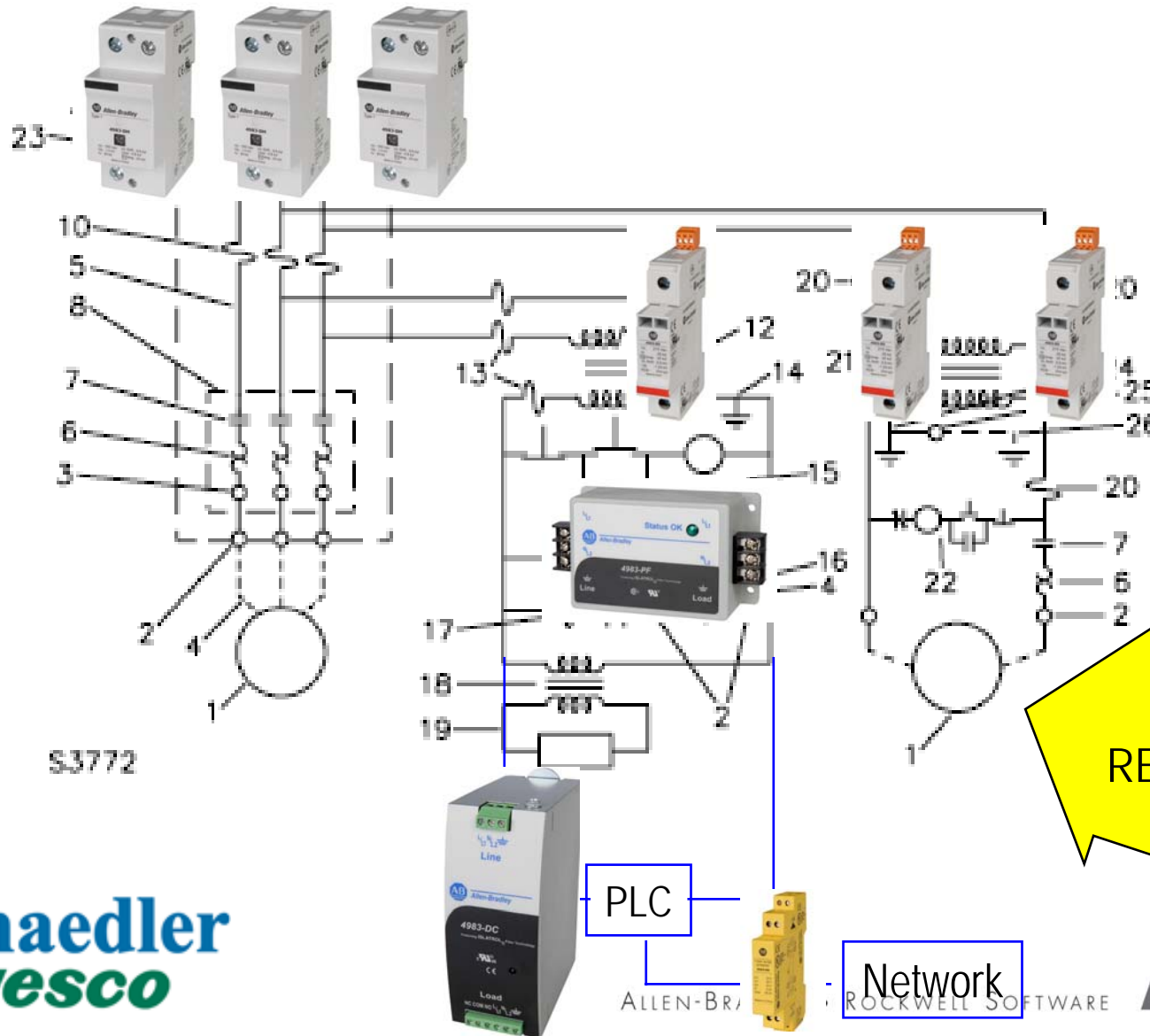
- cURus for UL1449, cURus for UL 1283
- Features Islatrol® technology
- Critical Loads 3, 5, 10 or 20 A
- 120V and 240V single phase models
- All mode protection
- LED status indication
- 330-1000 V SVR
- 25kA Surge current rating (L-N)
- Located directly in front of equipment to be protected

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Surge and Filter Protection System



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PLC

Network

RELIABILITY

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Power Supplies



RELIABILITY

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Full Line Available



Power Supply Quick Guide		1606-XL THE STANDARD			1606-XLP THE COMPACT		1606-XLS THE PERFORMANCE		1606-XLE THE ESSENTIAL		
	30...40 W	50 W	60 W	72...80 W	90...100 W	120 W	180 W	240 W	480 W	720 W	960 W
5...5.5V	XLP25A	—	—	—	—	—	—	—	—	—	—
10...12V	XLP30B	—	—	—	—	—	—	—	—	—	—
12...15V	—	XLP50B	—	—	XLP90B	—	XL180B	—	—	—	—
(+/-)12 and 15V	XLP26C	—	—	—	—	—	—	—	—	—	—
24...28V 1-Ph	XLP30E	XLP50E XLP50EZ	XL60D	XLP72E XLS80E XLE72E	XLP95E XLP100E	XLS120E XL120D XLE120E XLE120EC	—	XLS240E XLS240EC XL240E XL240EP XLE240E XLE240EP	XL480E XL480EP XL480EPT	—	—
24...28V 2, 3-Ph	—	—	—	—	XLP90E-2 XLP100E-2	XL120E-3	—	XL240E-3 XL240E-3C	XLS480E-3 XLS480E-3C XL480E-3 XL480E-3W	XL720E-3	XL960E-3 XL960E-3S
36...43V	—	—	—	—	—	—	—	—	XL480GP	—	—
48...56V 1-Ph	—	XLP50F	—	—	XLP100F	—	—	XL240FP XLE240F	XL480F	—	—
48...56V 3-Ph	—	—	XL60DR	—	—	—	—	—	XL480F-3H	—	—
24V Redundant	—	—	—	—	—	XL120DR	—	XL240DR XLPRED	XLSRED XLRED20-30	XLRED20-30	XLRED40
DeviceNet	—	—	—	—	XLSNET4 XLDNET4	—	—	XLSNET8 XLDNET8	—	—	—

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All Power Supplies are Not the Same

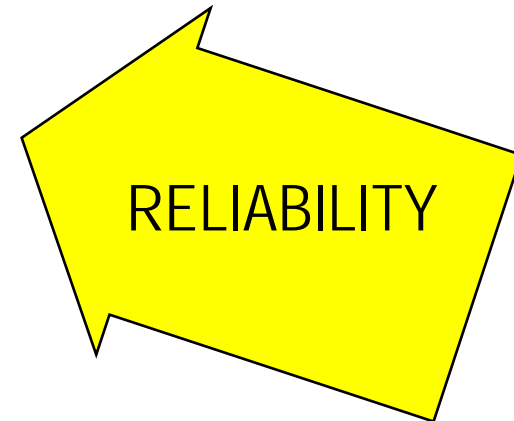
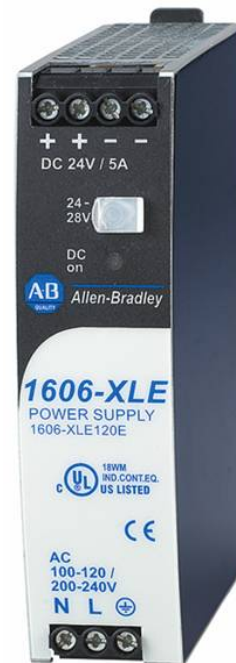
•XLS Performance

- Size (Less than half!)
- Performance
(150% / 5 seconds Over current capability)
- Life Expectancy
(2-6 Times)



XLE Essential

- Size (Less than half!)
- Life Expectancy
(2-6 Times)



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Buffer Module

1606-XLBUFFER

What are these used for?

- Brown outs
- Ride through during power surges
- Additional holdup time
- Additional inrush capacity
- 40sec/100mA, 4 sec/1 A, 250msec/20 A



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Industrial UPS Systems

AC



350 or 500 VA



3 – 10 KVA

DC



7 or 26Ah Battery

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Parallel Module

- Connect two standard power supplies in parallel
- Diodes prevent back feed
- Relays signal input unit health



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Protect Motors to Keep Systems Running



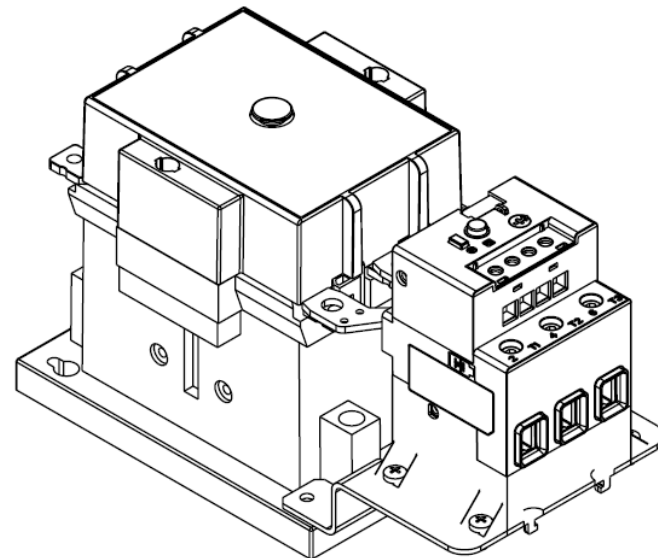
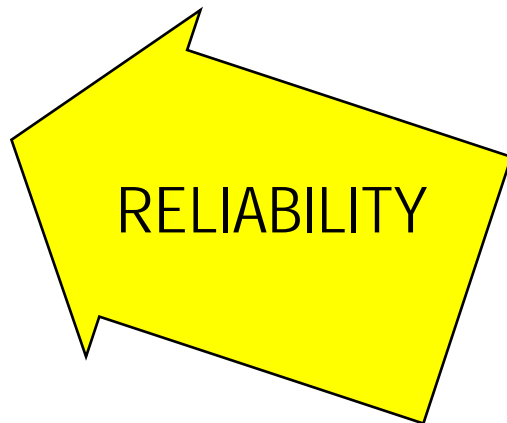
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E1 Plus Series C

- 193-ED Product Family Extension
 - 193-ED1FD (9-45A mounts to C30/37/43)
 - 193-ED1GE (18-90A mounts to C60/85)
- 193-EE Product Family Extension
 - 193-EEGF (55-110A mounts to D95/110)



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E1 Plus Side Mount Modules

- **Jam Module**
 - Selectable Jam Trip Level Settings
 - Selectable Trip Delay
 - Remote Reset Input
- **Ground Fault Module**
 - Selectable Trip Ranges
 - Trip Delay
 - Status Contact
 - Remote Reset Input
- **Ground Fault / Jam Module**
 - GF Functions
 - Fixed Jam Protection
- **Remote Reset Module**
- **PTC Module**
 - Status Contact



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E1 Plus Ground Fault Cores

<u>Catalog Number</u>	<u>Core Inner Diameter</u>	<u>Max Wire Size</u>	<u>3 Phase Current Rating</u>	<u>NEMA Contactor</u>	<u>IEC Contactor</u>	<u>Available</u>
193-CBCT1	20mm	(1) #8 A wg	45A	Size 00...1	C9...C37	Feb
193-CBCT2	40mm	(1) #2 A wg	90A	Size 00...3	C9...C85	Feb
193-CBCT3	65mm	(1) 250MCM	180A	Size 4	D180	Sep
193-CBCT4	85mm	(2) 350 MCM	420A	Size 5	D420	Sep
193-CBCT5	160mm	(4) 500 MCM	860A	Size 6	D860	-



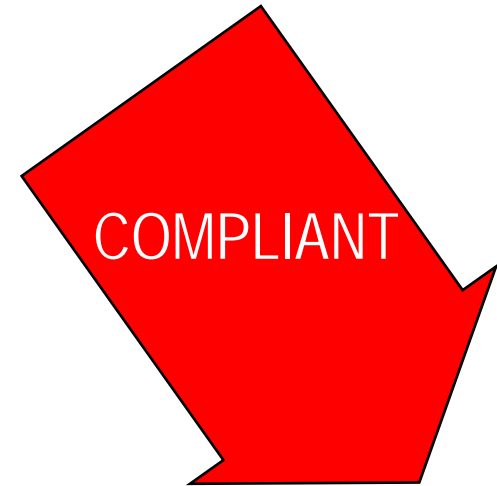
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Code Compliance Issues

- UL508A
 - Panel SCCR – NEC 409
 - Main Disconnect Operating Handles
- NFPA 79
 - Operating Handles
- Branch Circuit vs. Supplemental Protection
 - UL489 or UR1077
- UL508 Back of Hand Touch Safety

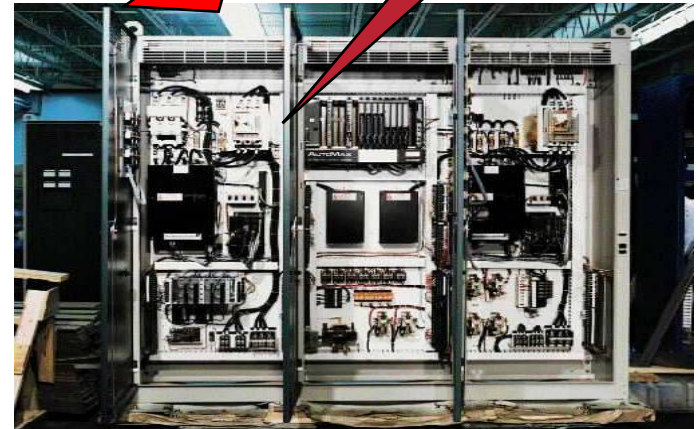


NEC 409 Code Change

- *New* Article 409 covers “Industrial Control Panels”
- “Industrial Control Panel” Definition
 - Industrial Control Panels, intended for general use, ordinary locations, 600V or less.
- Clause 409-110 (3) “Markings”
Industrial Control Panels *must* be evaluated & marked for their Short-Circuit Current Rating (SCCR)



Panel SCCR
50kA RMS Symmetrical
480V Maximum



(3) Short-circuit current rating of the industrial control panel based on one of the following:

- a. Short-circuit current rating of a listed and labeled assembly
- b. Short-circuit current rating established utilizing an approved method

→

FPN: UL 508A-2001, Supplement SB, is an example of an approved method.

ARTICLE 409
Industrial Control Panels

I. General

409.1 Scope. This article covers industrial control panels intended for general use and operating at 600 volts or less.


FPN: UL 508A is a safety standard for industrial control panels.

409.2 Definitions.

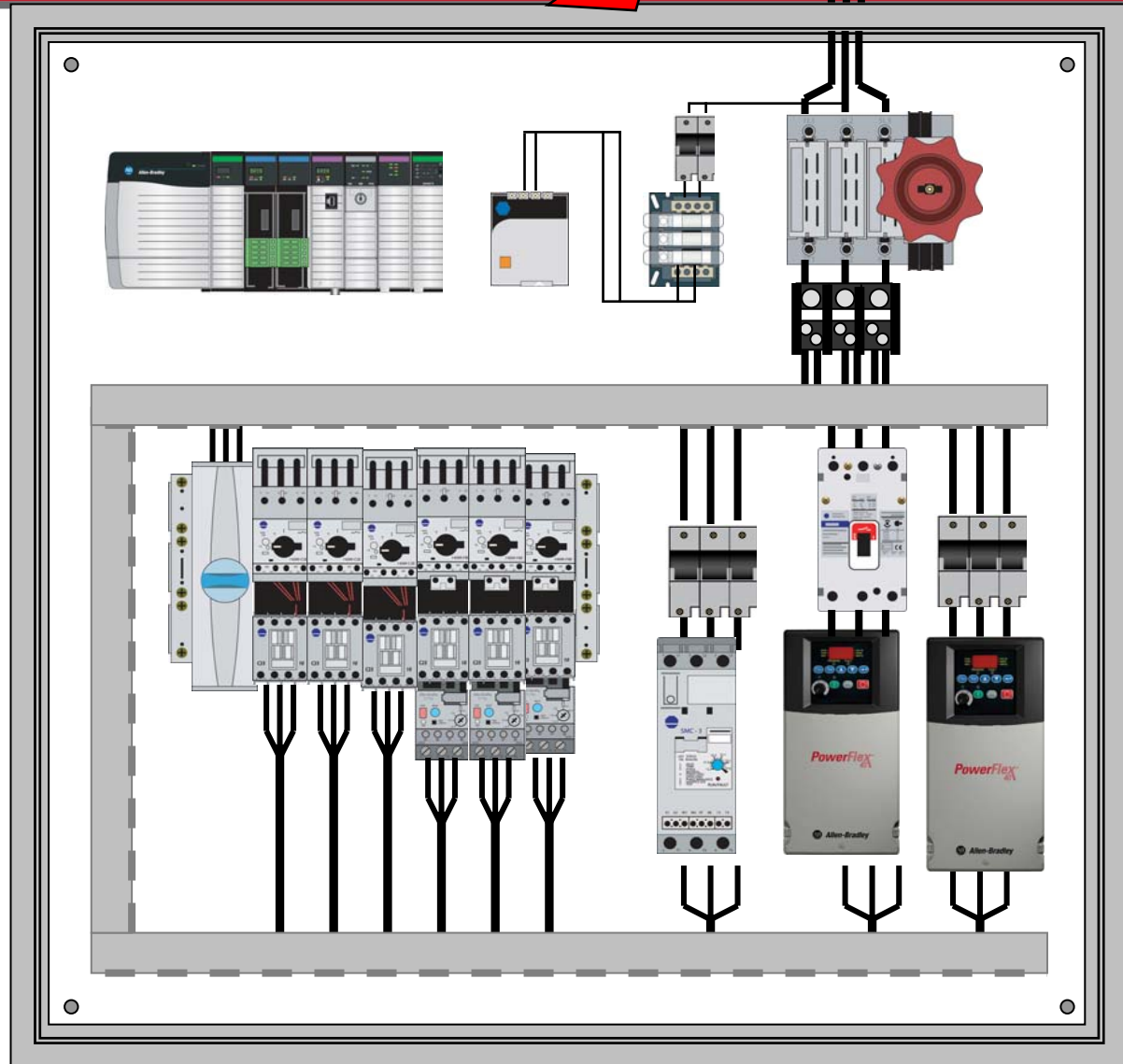
Industrial Control Panel. An assembly of a systematic and standard arrangement of two or more components such as motor controllers, overload relays, fused disconnect switches, and circuit breakers and related control devices such as pushbutton stations, selector switches, timers, switches, control relays, and the like with associated wiring, terminal blocks, pilot lights, and similar components. The industrial control panel does not include the controlled equipment.

SCCR What's Included?



65kA Available 

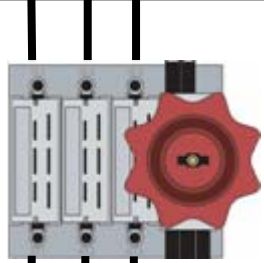
- SCCR of panel must exceed available fault current.
- All power circuit components must be accounted for.



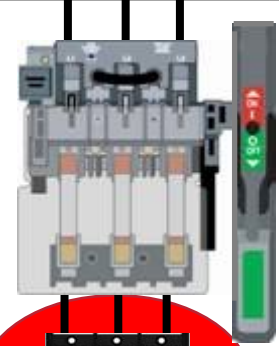
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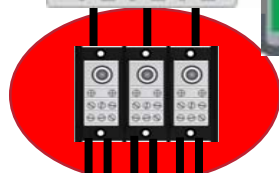
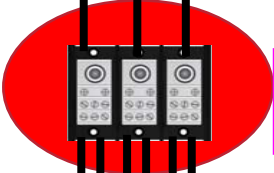
Disconnecting Means



Branch Circuits "Control"



Connection Systems



Branch Circuits "Power"

1492-J Terminal Blocks

1492-J Terminal Blocks

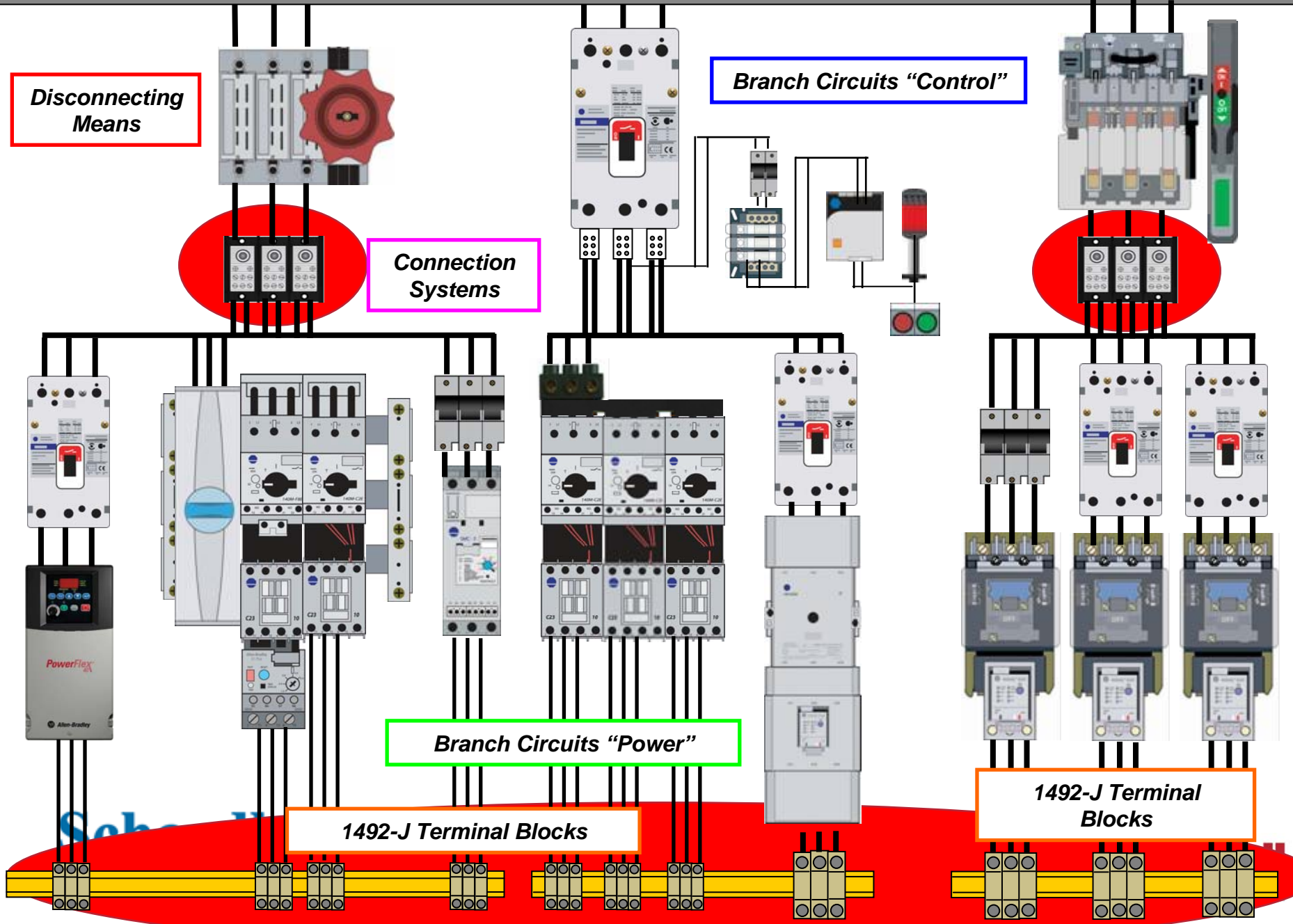


Table SB4.1 - Unmarked Components

COMPLIANT

508A SB - Table SB4.1

- "Assumed" SCCR's
- Line up with UL minimum test SC test requirements to attain listing
- These minimum ratings limit "high fault" panel ratings
- High Fault SCCR's on all components & combinations are top priority

Table SB4.1
Assumed maximum short circuit current rating for unmarked components

Table SB4.1 effective April 25, 2006

Component	Short circuit current rating, kA
Bus bars	10
Circuit breaker (including GFCI type)	5
Current meters	a
Current shunt	10
Fuseholder	10
Industrial control equipment:	
a. Auxiliary devices (overload relay)	5
b. Switches (other than mercury tube type)	5
c. Mercury tube switches	
Rated over 60 amperes or over 250 volts	5
Rated 250 volts or less, 60 amperes or less, and over 2 kVA	3.5
Rated 250 volts or less and 2 kVA or less	1
Motor controller, rated in horsepower (kW)	
a. 0 – 50 (0 – 37.3)	5 ^c
b. 51 – 200 (38 – 149)	10 ^c
c. 201 – 400 (150 – 298)	18 ^c
d. 401 – 600 (299 – 447)	30 ^c
e. 601 – 900 (448 – 671)	42 ^c
f. 901 – 1500 (672 – 1193)	85 ^c
Meter socket base	10
Miniature or miscellaneous fuse	10 ^b
Receptacle (GFCI type)	2
Receptacle (other than GFCI type)	10
Supplementary protector	0.2
Switch unit	5
Terminal block or power distribution block	10

^a A short circuit current rating is not required when connected via a current transformer or current shunt. A directly connected current meter shall have a marked short circuit current rating.
^b The use of a miniature fuse is limited to 125-volt circuits.
^c Standard fault current rating for motor controller rated within specified horsepower range.

Termination Devices with High SCCR's



Combination Tested and Approved



100KA@ 480VAC w fuses



100KA@480VAc w fuses

50-65KA@480VAC w 140M



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140U Multi Terminal Lug Kits

COMPLIANT

- Provides the ability to distribute panel power at the circuit breaker
 - Possibly eliminate a separate distribution block
- Saves panel space



Frame	Wires Per Terminal	Wire Size Range Per terminal	Catalog number (with Terminal cover)	Catalog number (without Terminal cover)
H-125A	3	14 -2 AWG (2..33mm ²)	140U-H-MTL3A	140U-H-MTL3N
	6	14 -6 AWG (2..13mm ²)	140U-H-MTL6A	140U-H-MTL6A
J-250A	3	14 -2 AWG (2..33mm ²)	140U-J-MTL3A	
	6	14 -6 AWG (2..13mm ²)	140U-J-MTL6A	
K-400A	3	12 -2/0 AWG (3..67mm ²)	140U-K-MTL3A	
	6	14 -2/0 AWG (2..67mm ²)	140U-K-MTL6A	

Primary Path to SCCR



Tools & Resources

- Contact Us
- Search
- A to Z Product Directory
- Configuration and Selection Tools
- Events Listing
- + Locate Us
- + Newsletters / Magazines
- [Product Certification](#)
- Product Cross Reference
- + Publications Library

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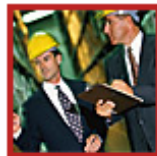
Resources

- » A-Z Product Directory
- » Product Catalogs
- » Product Configuration/ Selection
- » Search
- » Manuals & Literature
- » Technical Support
- » Knowledgebase
- » Training



News

- » New NEMA AC Multi-Pole Lighting Contactors Available
- » ModCenter Plus. NEMA Products. Same-day Delivery
- » New Family of Definite-purpose Style Enclosures
- » Pico GFX-70 Wins Control Engineering Award
- » [UL 508A Short-Circuit Current Ratings](#)



Rockwell Automation Solutions

- » Unlock the Power of the Web
- » A-B Journal: SLCs Sing in Packaging Machines
- » Case Study: PowerFlex 7000 Drives Canadian Oil Pipeline
- » Automation Fair, St. Louis, MO, Nov. 16-17, 2005

Industry Solutions

- Overview
- Automotive
- Beverage
- Entertainment
- Fibers & Textiles
- Food

Product Quick Link

- **Condition Sensing Switches**
- Pressure
- Temperature
- Float
- Rotating Cam
- Speed Sensing
- **Control Circuit and Load Protection**
- Fuse Holders
- Circuit Breakers



Requirements

Ability to Lock OFF with Door Open

Ability to Operate without Tools

Intentional Action to Turn On



Rotary Handles for NFPA 79 Compliance

COMPLIANT

- NFPA 79 Compliance with New **Internal Handle** for:
 - 194R Disconnects
 - 140U Breakers
 - Also Complies with [UL508A \(effective March 2007\)](#)
- Turn Handle CCW to Turn Switch Off (No Tools)
- Pull Handle and Turn CW to Turn Switch On (Deliberate Action & No Tools)
- Simply Replaces Existing Shaft on 194R
 - Field Installable
 - Easy Retrofit of Existing Installations
- Interfaces with Existing External Handle



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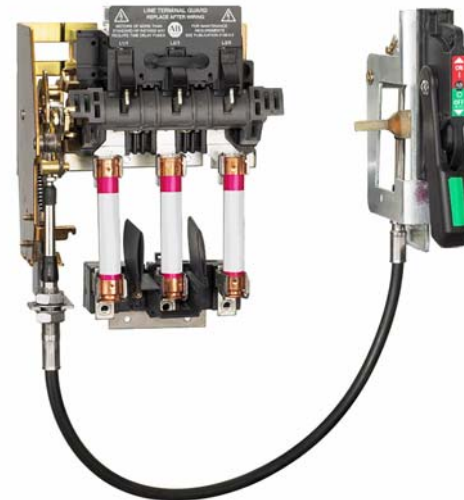
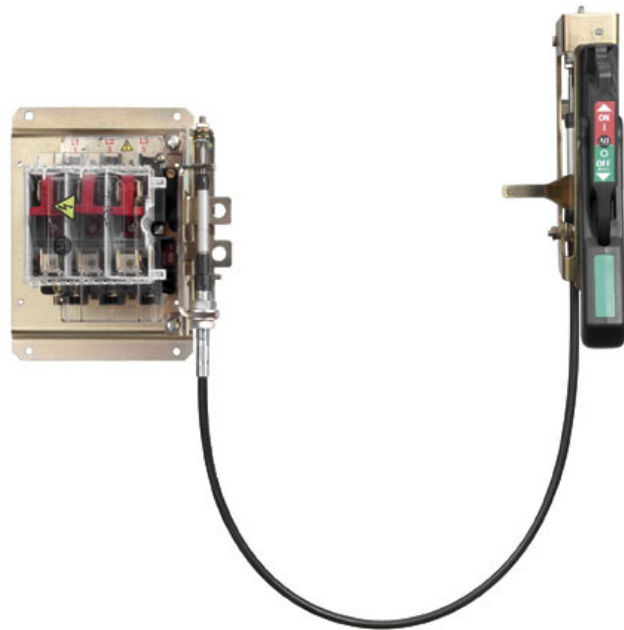
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Flange Handles for NFPA79 Compliance

COMPLIANT

- Cable Operators for:
 - 140U Breakers
 - 194R Disconnects
 - 1494 V Disconnects



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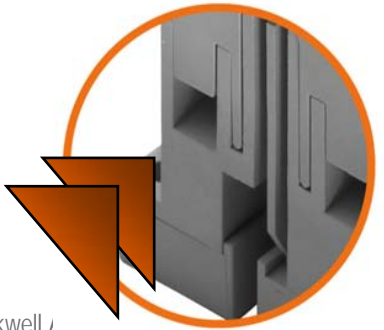
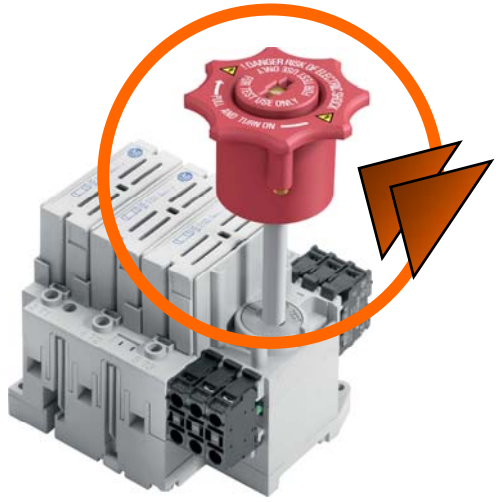
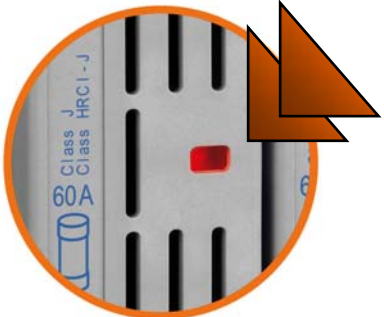
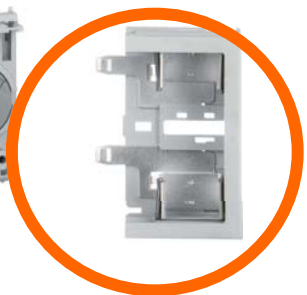
194R Next Gen 30A / 60A



Key Benefits

1. Safety:

- ✓ Removable fuse carriers
- ✓ Fuse carriers interlocked with switch when switch is 'ON'
- ✓ IP20 terminals
- ✓ Optional blown fuse indication
- ✓ Optional integrated NFPA 79 handle



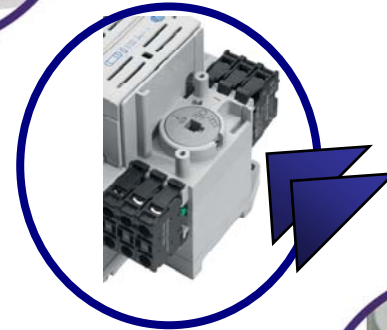
194R Next Gen 30A / 60A Benefits

COMPLIANT

Key Benefits

2. Modularity:

- ✓ Optional 4th pole accessory
- ✓ Optional snap-on 800F contacts for auxiliary and test-mode switching
- ✓ Optional top-mount padlock accessory
- ✓ Optional "test-mode" handle to test control circuitry

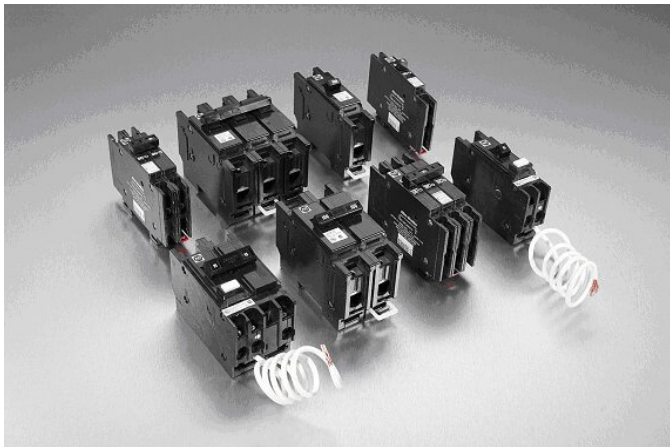
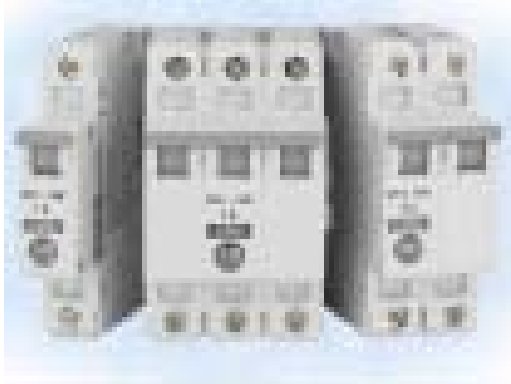


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Which Mini Breaker Do I Use?



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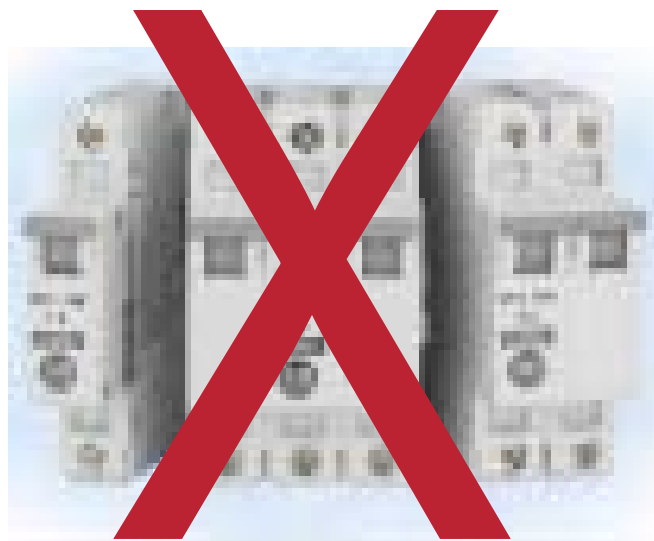
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1492-CB Migration

COMPLIANT

- 1492-CB (AC products) will no longer be available after December 31, 2007



UL 508 / UL1077

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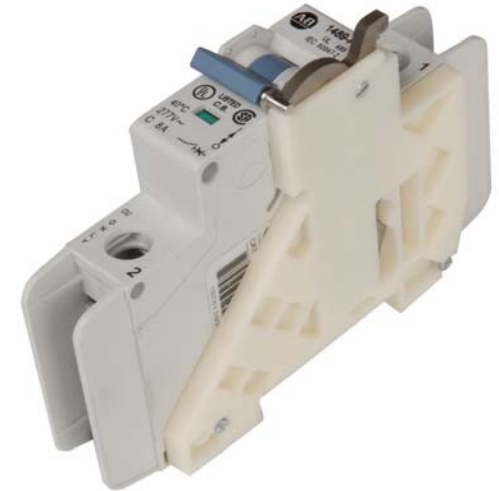


Product	Approvals	# Poles	Space per Pole	Current Range	Voltage
1492-SP	UR1077	1-3	17.5mm	0.5 – 63A	480Y/277 VAC
1489	UL 489	1-3	17.5mm	0.5 – 40A	480Y/277 VAC 48VDC
1492-GH	UR 1077	1	12.4mm	0.2 – 15A	250VAC
1492-GS	UR 1077	1-3	12.5mm	0.2 – 25.0	480Y/277 VAC
1492-MC	UL 489	1-3	11.3mm – 22.5mm	10-100A	120/240 VAC 480Y/277 VAC

New Lockout for 1489

COMPLIANT

- New Lockout – 1489-APLOA
 - Add on device
 - Once installed it is non-removable
 - Pull out tab to engage Lockout
 - Add Padlock
 - It is always available to Maintenance/Service to add padlock



Permanent Mounted Lock off Attachment

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UL508 Touch safety



COMPLIANT

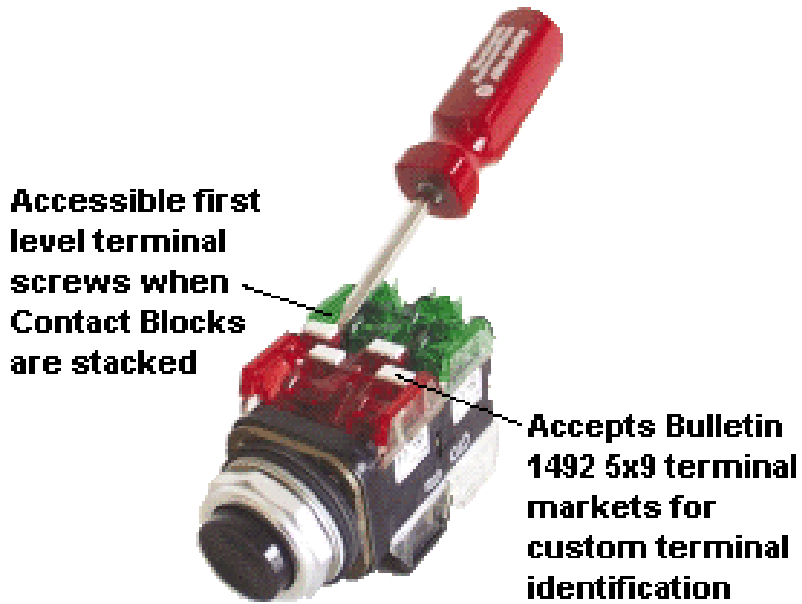
- Back of hand touch safety requirement.
- All door mounted components.
- Hinged doors.
- 30V and below exempt.

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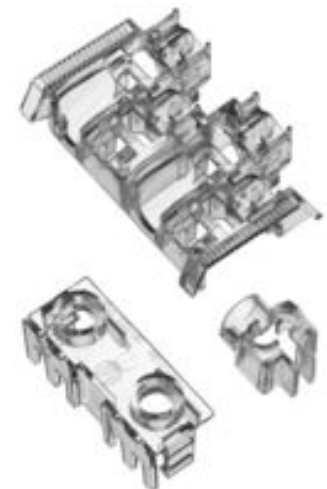
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UL508 Touch Safe NEMA Push Buttons



800TC-...

Finger Safe Contact Blocks



800T-N...

Snap On Finger Safe Covers



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More Safety Improvements

COMPLIANT

- Lexan covers for NEMA disconnects and starters.



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1494V Series Changes

Series A

Disconnect Switch Kit
(1975 – 2004)

Disconnect Switch



1494V-DS60 Series A
(Right and Left Hand)

Trailer Fuse Block



1494V-FS60 Series A
1494V-FSR266 Series A
1494V-FS60 Series A
1494V-FSR666 Series A

Fuse Clips



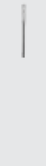
1401-N42 250V Class H
1401-N43 250V Class R
1401-N43 600V Class H & J
1401-N43 600V Class R

Handle



1494V-H1 (Painted)
1494V-W1 (Stainless)

Connecting Rod



1494V-RA1 (short)
1494V-RA2 (long)

Fuse Cover



1495-N59

Auxiliary Contacts



595-A (N.O.)
595-B (N.C.)

Series 1

Disconnect Switch Kit
(2004 – 2005)

Disconnect Switch



1494V-DS60 Series A
(Right and Left Hand)

Trailer Fuse Block



1494V-FS60 Series A

Fuse Clips



1401-N42 250V Class H
1401-N51 250V Class R
1401-N43 600V Class H & J
1401-N52 600V Class R

Handle



1494F-P1 (Plastic)
1494F-M1 (Painted)
1494F-S1 (Stainless)

Connecting Rod



1494V-RA3 (short)
1494V-RA4 (long)

Fuse Cover



1495-N59

Auxiliary Contacts



595-A (N.O.)
595-B (N.C.)

Series 2

Disconnect Switch Kit
(2005)

Disconnect Switch



1494V-DS60 Series B
(Right Hand)
1494V-DSX60 Series B
(Left Hand)

Trailer Fuse Block



1494V-FS60 Series B

Fuse Clips



1401-N42 250V Class H
1401-N51 250V Class R
1401-N43 600V Class H & J
1401-N52 600V Class R

Handle



1494F-P1 (Plastic)
1494F-M1 (Painted)
1494F-S1 (Stainless)

Connecting Rod



1494V-RA3 (short)
1494V-RA4 (long)

Fuse Cover



1495-N56

Auxiliary Contacts



1495-N8 (N.O.)
1495-N9 (N.C.)

Series 3

Disconnect Switch Kit
(2006 – Present)

Disconnect Switch



1494V-DS60 Series D
(Right Hand)
1494V-DSX60 Series D
(Left Hand)

Trailer Fuse Block



1494V-FS60 Series D

Fuse Clips



1401-N42 250V Class H
1401-N51 250V Class R
1401-N43 600V Class H & J
1401-N52 600V Class R

Handle



1494F-P1 (Plastic)
1494F-M1 (Painted)
1494F-S1 (Stainless)

Connecting Rod



1494V-RA3 (short)
1494V-RA4 (long)

Fuse Cover



1495-N64
1495-N65
1495-N66

Auxiliary Contacts



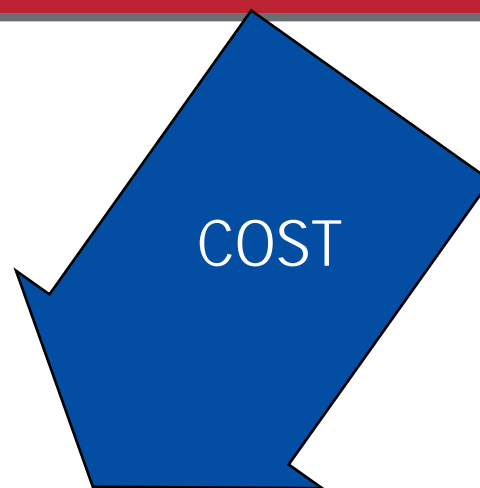
1495-N8 (N.O.)
1495-N9 (N.C.)
Right Hand Switch: No Adapter Kit
Left Hand Switch: Adapter Kit
1495-N24

Notes: The Disconnect Switch and Trailer Fuse Block must have the same series letter.

Notes: The Handle and Connecting Rod are compatible within each kit. They are not interchangeable.

Factors Impacting System Cost

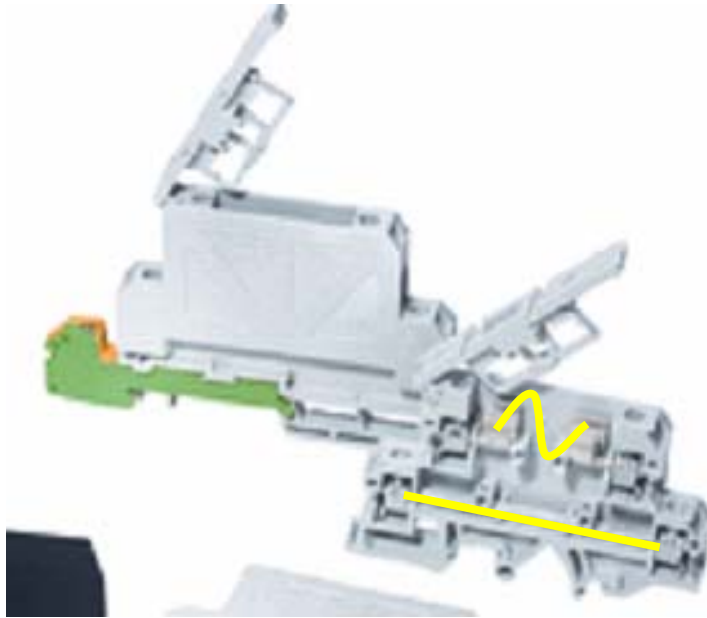
- Installation Labor
- Panel Size
- Functionality vs. Application
- Troubleshooting Time
- Manufacturing Time
- Material Cost



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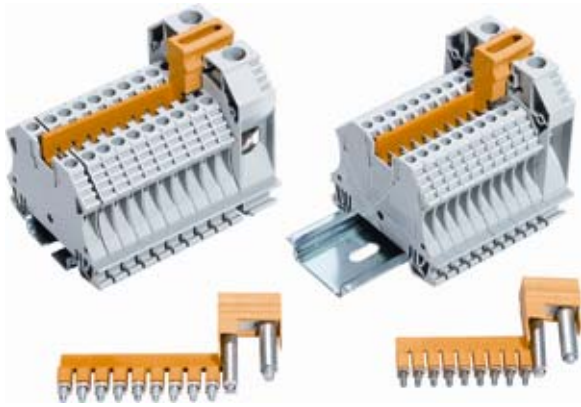
Two Tier Fused Blocks

- Keep Wiring Clean
- Simplify Circuit Troubleshooting
- Two Tier for Power Circuit
- Two Tier Plus Ground Foot for Twisted Shielded Pair

1492-J Power Distribution Center-Jumpers

COST

- Using terminal blocks for power distribution creates many benefits.
 - Increased usage of products already in inventory
 - It can create very clean and organized panels
 - Creates an opportunity for finger safety in some power circuits



- New products include:
 - Step down jumper from 1492-J50 to J3
 - Step down jumper from 1492-J50 to J4/J6
 - Step down jumper from 1492-J35 to J3
 - Step down jumper from 1492-J35 to J4/J6
 - All blocks and other jumpers are standard products.

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Expanded Range of Multi-Level Blocks

COST

- We have expanded our screw terminal block line to include a range of new two-level blocks for larger wire sizes (#22-#10 AWG / 4mm²) and a new triple-level block with ground connection for small motor installations and a range of panel density improvement installations.
- New products include:
 - Two-level feed-through blocks in 9 colors.
 - A new two-level block with linked circuits
 - A new three-level block with ground point



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1492 Wiring Systems Update

COST



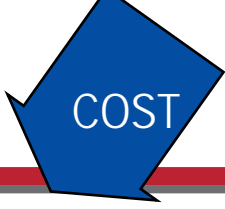
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Recently Released 1492 Wiring System Products: HS Counter Encoder Modules



NEW 1492 Wiring System Modules for PLC High Speed Counter/Encoder Modules

1492-AIFCE4

Counter I/O Interface Module:

- Interface for single or dual chnl ctr
- Interface for 4 counter outputs
- Compatible with 1746, 1756 & 1769 Ctrs

1492-AIFCE4-F

Fused Counter I/O Interface Module:

- Interface for single or dual chnl ctr w/fusing
- Interface for 4 counter outputs w/fusing
- Compatible with 1746, 1756 & 1769 Ctrs

Note: Configuration for 1771 counter NOT available



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Recently Released 1492 Wiring System Products: PowerFlex Drives

COST

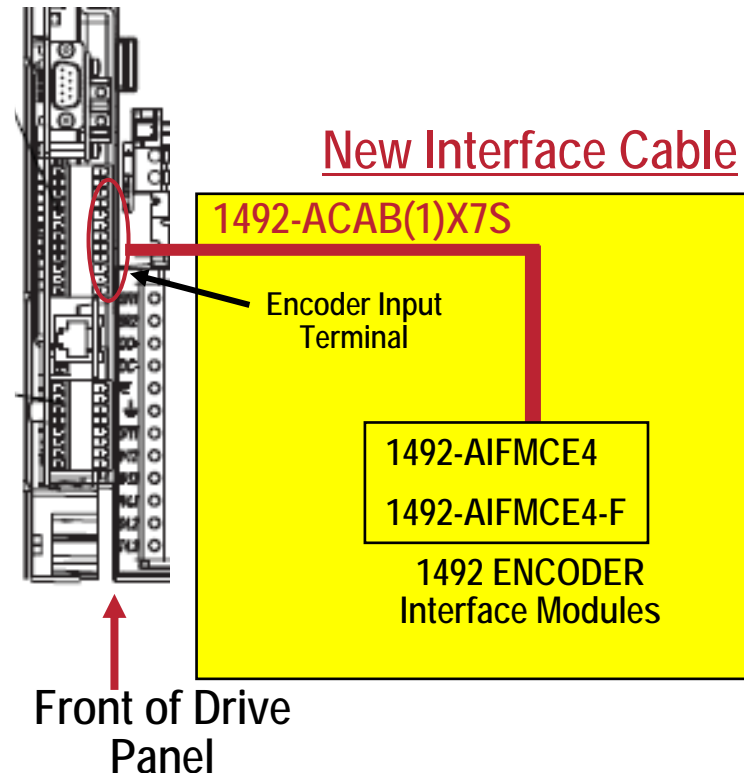
Wiring Systems Solution for PowerFlex 700S Drive Encoder Input

New 1492 Cables for Select 1492 Wiring Systems Modules

700S Drive I/O

Interface

Boards



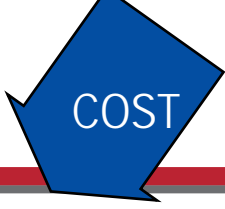
NOTE: Digital and Analog interface are also available

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Recently Released 1492 Wiring System Products: CompactLogix 1769 I/O



New Wiring System Solutions for CompactLogix/MicroLogix 1769-IQ32T, 1769-OB32T and 1769-OV32T Single-slot 32-pt I/O Modules



1492-CABLE(1)H
Interface Cable

1769-IQ32T
1769-OB32T
1769-OV32T

1492 Digital Input &
Output Interface Modules



1492-IFM40D24
1492-IFM40F
1492-RIFM40F
1492-IFM40F-2
1492-RIFM40F-2

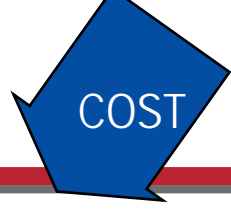
:
etc.

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Recently Released 1492 Wiring System Products: UL Listed Modules & Cables



Agency Certification Modification and Update

Previous Agency Certifications	
UL/CSA Certifications Modules:	UR/CSA: UL Recognized catalog number, File E113724 Guide No. NRAQ2; CSA Certified: File: LR1234 Class 321107
UL/CSA Certifications Cables:	Made of rated components but not certified or listed as a catalog number
CE Certification:	Compliant for all applicable directives
Factory Mutual (FM) Modules:	Class I Div 2. Groups A, B, C & D

Current Agency Certifications	
UL/CSA Certifications Modules & Cables:	cULus: UL Listed Catalog Number for Canada & U.S. in Hazardous Locations: Class I Div 2 (except relay modules) Groups A, B, C & D Temperature Code T3C @ 60 degrees C. UL File E10314, Guide No. NRAG
	Relay Modules: cULus: UL Listed Catalog Number for Canada & U.S. in Standard Locations; UL File: 11372, Guide No. NRAQ (1)
CE Certification:	Compliant for all applicable directives
Factory Mutual (FM) Modules:	Class I Div 2. Groups A, B, C & D Temperature Code T3C @ 60 degrees C
NOTES: (1) Haz. Loc. Rating exceeds Standard Loc so cables exceed rating for relay module use	

Major Improvements:

- 1) Both 1492 wiring system modules & cables are UL listed in the U.S & Canada for Class I Div 2, except for modules with contacts such as relay modules.
- 2) Relay modules or modules with contacts, are UL listed in the U.S. and Canada for Standard (non-hazardous) locations and cables are also listed.



Launched in North America: July 2, 2007



Mini IEC Power Components



100-K Miniature Contactors

COST

- Bulletin 100-K screw type and 100-KR push-in type
 - 3 power ratings
 - 3 HP (460V/60Hz), 2.2 kW (415V/50Hz)
 - 5 HP (460V/60Hz), 4.0 kW (415V/50Hz)
 - 7.5 HP (460V/60Hz), 5.5 kW (415V/50Hz)
 - 3 Pole and 4 Pole versions
 - 3 pole with N.C. or N.O. built in auxiliary contact
 - 4 pole 4N.O. / 3N.O.+1N.C / 2N.O.+2N.C. versions
 - Optional Integrated Suppressor
 - Limits over voltages due to current interruption to contactor coil
 - For 24VDC
 - Mechanically-Linked main contact and auxiliary contact. Mirror Contacts between main contact and front-mounted auxiliary contacts.

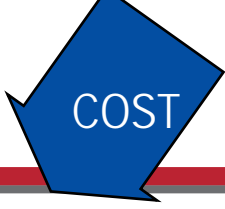


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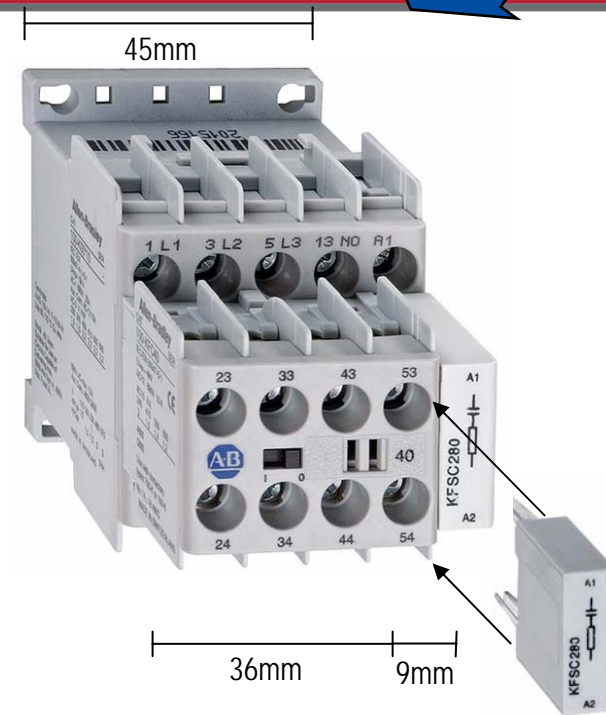
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100-K Miniature Contactor Accessories



- **Surge Suppressor Modules Bulletin 100-KFS**
 - For voltage peak protection when contactor coil is de-energized
 - R-C, MOV, and Diode types
 - Front mounting next to auxiliary contact block
- **Connecting Module Bulletin 140M-C-PEK12**
 - Mechanical and electrical connection between 104-K contactor and 140-M circuit breaker or 140-F fuse holder.
 - Reliable mechanical connection so that only one DIN Rail is required per starter



100-K Miniature Contactor Accessories

COST

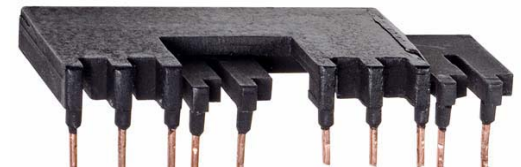
- **Mechanical Interlock Bulletin 100-KMCH**

- Mechanical interlock prevents reversing contactors from simultaneously engaging
- Top-Mounts to contactors, auxiliary contacts snap-on to top of mechanical interlock



- **Reversing Wiring Kit Bulletin 100-KPR**

- Fastest most reliable wiring of reversing combinations through built-in power connection as well as control wiring used for electrical interlocking of the two contactors
- Allows for direct mounting of 193-K overload relay

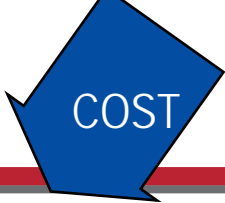


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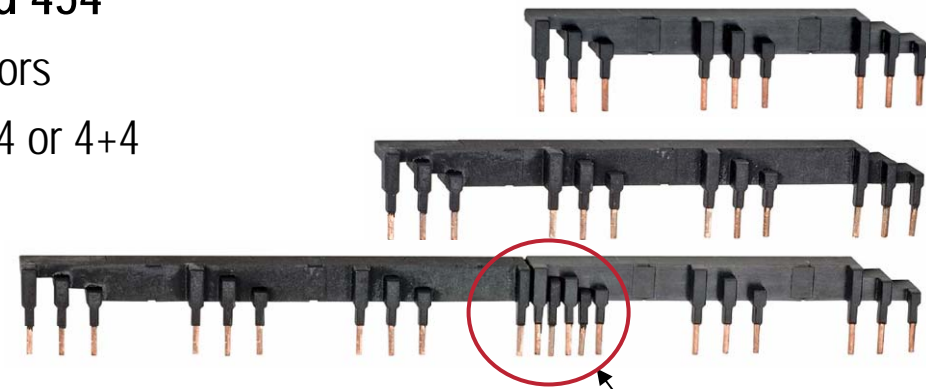
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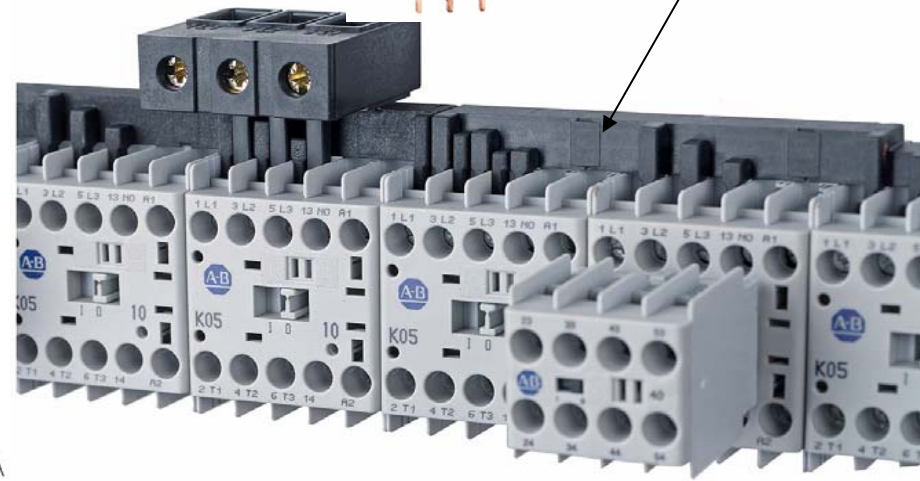
100-K Miniature Contactor Accessories



- Compact Bus Bar Bulletin 100-KW453 and 454
 - Parallel feeding connection for 3 or 4 contactors
 - Extension capabilities: combinations 3+3, 3+4 or 4+4
- Feeding Terminal Bulletin 100-KWT
 - Parallel Feeding terminal to be used with compact bus bars



Extension



Parallel Feeding connection with Terminal and Extension bar

A



700-K Miniature Control Relays

COST

- Bulletin 700-K screw type and 700-KR Push-in type
 - For switching of low energy signals through bifurcated contacts as standard
 - Variety of contact combinations
 - 4N.O. / 3N.O.+1N.C. / 2N.O.+2N.C. / 1N.O. 1N.O.early make+1N.C. 1N.C. late break
 - Optional build in surge suppressors
 - Limits voltage surges due to the interruption of coil current
 - For 24VDC with diode
 - For 24, 110, and 230VAC with MOV



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193-K Miniature Overload Relay

COST

- **Bi-metallic Overload Relay Bulletin 193-K**
 - For motor protection of overload and single-phase conditions
 - Trip class 10 A
 - Current range up to 12A
 - Designed for 100-K contactor mounting provides a stable, shock resistant mechanical connection
 - Shallow profile
 - Built in trip contact 95/96 and signal contact 97/98
 - Selectable Automatic or Manual Reset
 - Trip indicator
 - Test trip actuator
 - Stop button option for economic enclosure applications
 - Optional Remote Reset Solenoid 193-T1R



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Low Profile 24VDC Electronic Coil Contactors

- Contactors 100-C09...C37
- Control relays 700-C
- 4-pole contactors 100-C09...23
- Safety contactors 100S-C09...37
- Safety control relays 700S-C
- Capacitor contactors 100Q-C16...37
- Reversing combinations 104-C and 104S-C09...37
- 100-C40 and C43 targeted for 2008
- 9A to 37A available now



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100-C with 24VDC Electronic Coil

COST

- Coil Consumption (100-C09...37 / 700-C)
 - Pick-up 10W / 0.42A
 - Hold-in 1.5W / 0.063A
- PLC control without need for interposing relay
- Reducing heat dissipation and need for cooling equipment in control cabinets
- Integrated in small contactor body with same dimensions as AC controlled devices
 - low depth
 - light design
 - uniform panel appearance
 - Common accessories with AC coil devices (except electronic timers)



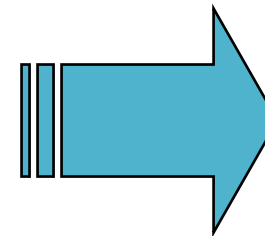
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Why Should You Change?

- New electronic coil versions are same size as AC coil contactors
- New versions mount directly to existing 140M's to form compact starter package.



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193-T1 Bimetallic Overload Relays

COST

- 193-T1 Overload Relays
 - For use with 100-C and 104-C contactors
 - Trip Class 10A
 - Trip time between 2 and 10 sec. at 7.2X current setting (vs. between 4 and 10 sec for Class 10)
 - Manual/Auto reset
 - N.O. Alarm Contact
 - Ambient Temperature Compensation
 - Trip Indication
 - Phase Loss Sensitivity
 - Optional Remote Reset

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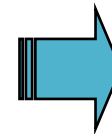
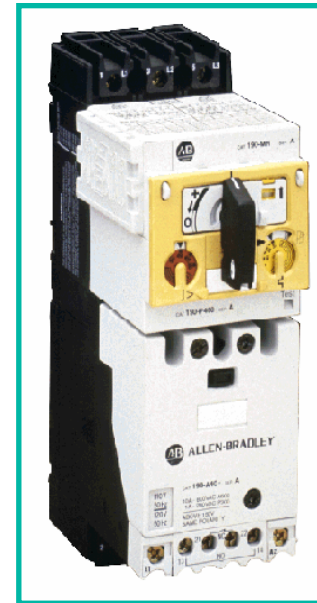
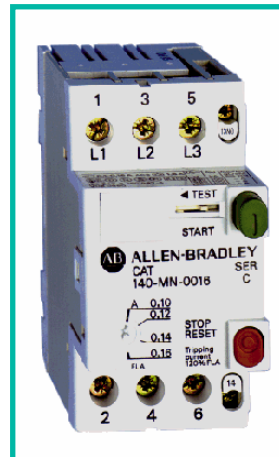


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Product Obsolescence

COST

- 190 CPS
 - Obsolete in December 2007
 - Replace with 190E, 190S or 103S
- 140-MN
 - Obsolete in June 2008
 - Replace with 140M
 - Higher SCCR
 - Type E ratings



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PanelView Component Focus

COST

- Global
 - Europe, Asia Pacific, South Africa, Latin America, North America
- Standalone systems
 - Point-to-point connection or small networks (100 tags nominal)
 - Optimized for MicroLogix based systems
- Focused on the essentials
 - Selective offering (7 catalog numbers)
 - Optimized for cost

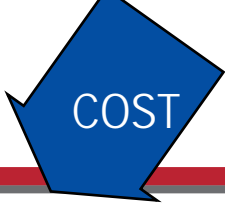


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PanelView Component Platforms



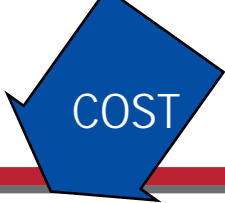
Catalog/Feature	2711C-F2M 2711C-K2M	2711C-T3M 2711C-K3M	2711C-T6M 2711C-T6C	2711C-T10C
Display	2" mono, graphic	3" mono, graphic	6" graphic Mono <i>or</i> STN color	10" TFT color
Ethernet	No	No	Yes	Yes
Serial - RS232, RS422/RS485	Yes			
USB Device USB Host	Yes			
SD Card	No	No	Yes	Yes
Real Time Clock	Volatile	Volatile	Battery Backed	Battery Backed
Environmentals	NEMA 4X / IP65, 0-50°C , 18-30 VDC (Not Class 1, Div 2)			



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On Machine Architecture



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ArmorConnect™ Power Media

COST

- Completes the “Plug and Play” connectivity for the ArmorStart product line
- Quick connect cables allows for faster installations and reduced wiring errors.
 - Ideal for production line expansions
- This will provide for a reduction in installed costs to OEMs and End Users
- UL Listed per UL 2237
 - Three Phase Power media suitable for use with motor branch circuits



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855H General Purpose Horn

COST

- Direct drop-in for Federal Signal and Edwards
- Two mounting styles: Flush or Box
- Electronic Horn has significant life advantage over traditional Electromechanical Horns
- Three selectable tones w/ volume control
- Max of 108dB @ 1 meter
- Ingress protection
 - Box mount UL 4/4X/13, IP 66, Flush mount UL 3R/13, IP 54



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855B 90 mm LED Beacons

COST

- Exceptional life, exceeding 100,000 hrs
 - No servicing of burned out bulbs required
- LED technology provides the best beacon option for high vibration environments
- Multiple beacon options:
 - Single color (steady or flashing)
 - **Three color**
 - LED Strobe (single or dual flash)
- LEDs have low power consumption and low in-rush
- Exceptional front and side illumination



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855X Hazardous Location Devices

COST

- Broad offering for customers applications:
 - Horns, Xenon strobe beacons, Public address loudspeakers, Combined horn-beacon units
- Suitable for most “Division” rated applications
 - Class I Div 2 Groups A, B, C, D
 - Class II Div 2 Groups F&G
 - Class III Div 1&2
- Modern electronic design protected by high impact ABS plastic



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Coming Soon: 855W Half Dome Indicator

COST

- Intended for wall, side of machine or side of panel mount applications
- LED Technology
 - Long life: no maintenance
 - Excellent in high vibration
 - Excellent Front and side illumination
- Ingress protection : UL 4/4X/13 (Intended)
- Supports 6 circuits: 3, 4 or 5 Visual + 1 Sounder
- Common color patterns will be stocked initially
 - Housing color: standard light gray or chrome

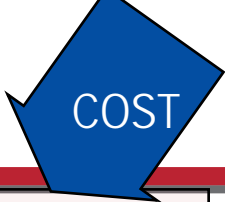


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RA's Visual Signaling Portfolio



Single-Status Indication



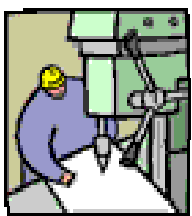
855P Panel Alarms



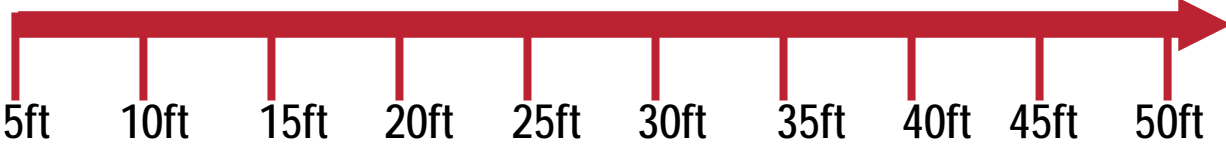
Mini-Square Strobe



Round Beacons



Small Areas



Large Areas

<p>855D</p>	<p>855E</p>	<p>855T</p>	<p>855F</p>	<p>855W</p>
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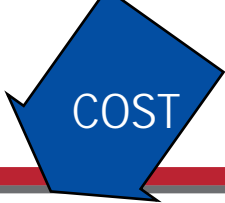
Multi-status Indication



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COMPLETE Audible Signaling Portfolio



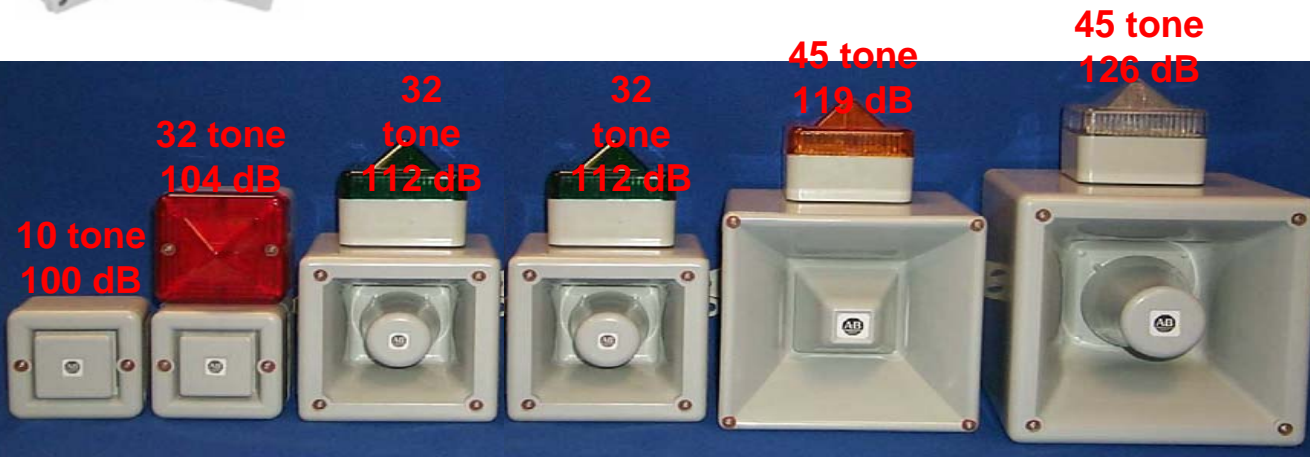
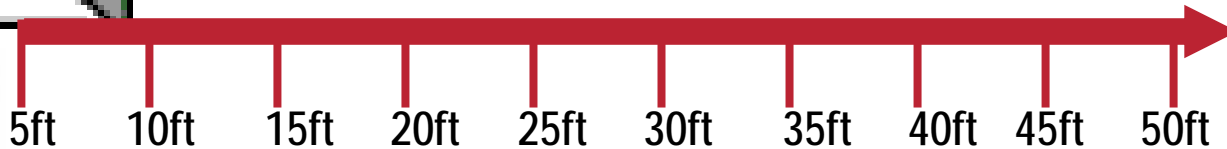
80-107dB Panel Alarms



Sound Modules



Large Areas



NEW 700-SH SSRs

COST

- 10A, 25A, 50A, 75A and 100A (resistive) Continuous Load (output) Current with Heat Sink
- Four different Load Voltage Range Options
- Five different Control Input Voltage Options
- DC load and Phase-angle control available
- LED Indicator for Input/Logic On/Off Status Monitoring
- Protective Cover for Added Safety (except DC load version)



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NEW 700-SH SSRs

COST

- Three static and Two Active Heat Sinks are available for Heat Dissipation
- Conductive Grease and Screws included with Heat Sinks



Heat Dissipation is **CRITICAL** for ALL SSR Applications

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E1 Plus DeviceNet™ Module Profibus Module

- **Protection**
 - Overload warning
 - Jam trip and warning
 - Underload warning
- **Inputs / Outputs**
 - 2 inputs (24 Vdc rated)
 - 1 output relay (B300 rated)
 - Status indication LEDs
- **Diagnostics**
 - % Therm Utilized
 - Avg Current %FLA
 - Device Status
 - Trip and Warn Status



DIAGNOSTICS

193-EDN

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DeviceNet™ Handheld Programmer BuL. 193-DNCT

DIAGNOSTICS

- Can be used with any DeviceNet device
- Features
 - Parameter monitoring / editing
 - Copycat
 - DeviceLogix™
 - Metering
 - Graphing
 - Auto-display capabilities



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RFID is Part of the Growing Family of Data Sensing Solutions from the Sensing Business

MultiSight Family

- Vision sensor for Error Proofing and Inspection



Laser Measurement

- Analog output laser sensors for Error Proofing, positioning, and measurement applications



Pressure, Temperature, Flow, Process Sensors

- Expanding Process condition sensing portfolio



RFID Technology

- Focus on industrial applications. Growth opportunities beyond "Wall Mart" applications

Part Verification Array

- Provides visual cues for workers choosing parts and verifies a correct part was chosen

Encoders

- Precision Motion and Speed Control



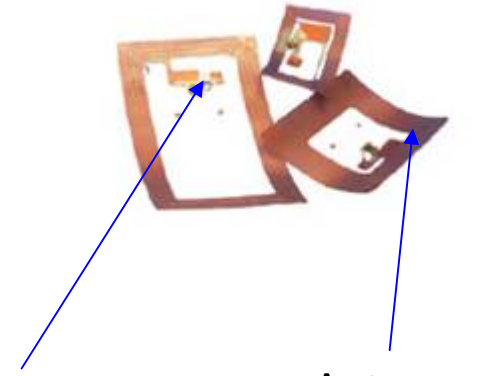
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A Full Range of Sensing Technologies

What is RFID?

- Radio Frequency Identification

- "Radar ID" developed in WW II as a way to identify "Friend or Foe" Aircraft
- An Automated Identification and Information Storage technology
- Non-contact technology using Inductive or RF energy
- Read / Write tags keep up to date information where it is needed - with the product.



Transponder Style Chip

Antenna

In Cooperation With

BALOGH



A New RFID with Embedded Antenna μ -Chip

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RFID Frequencies For Different Applications

	Radio frequency	Benefits	Limitations	Common commercial uses today
54RF 55RF	<p>Low Freq (125 to 134 KHz)</p> <p>Balogh (1.5 MHz)</p>	<ul style="list-style-type: none"> • Frequency highly immune to EMI • Works well near metal • LF in wide use today 	<ul style="list-style-type: none"> • Limited read range of < 1.5 m makes it impractical for some warehouse operations such as pick and pack 	<ul style="list-style-type: none"> • Animal identification • Beer keg tracking • Automobile key and lock; anti-theft systems
56RF	<p>High Freq (13.56 MHz)</p> <p>This frequency also used in new Smart Cards</p>	<ul style="list-style-type: none"> • Frequency accepted worldwide • Works well in moist environments • In wide use today 	<ul style="list-style-type: none"> • Does not work well near metal • Limited read-range potential of < 1.5 m • More sensitive to industrial generated EMI than 1.5 MHz 	<ul style="list-style-type: none"> • Library book tracking • Pallet container tracking • Access control (building) • Airline baggage tracking • Apparel item tracking
	<p>Ultra High Freq (866 to 928 MHz)</p> <p>EPC</p>	<ul style="list-style-type: none"> • Long read range potential of more than 15 m • Commercial use growing rapidly; tag prices dropping; read accuracy improving 	<ul style="list-style-type: none"> • Detuning when tags are in close physical proximity • Does not work well in moist or salt water environments • Reflects off metal surfaces 	<ul style="list-style-type: none"> • Pallet and container tracking • Truck and trailer tracking (shipping yard) • Consumer packaging
	<p>Microwave Freq (2.45 GHz)</p>	<ul style="list-style-type: none"> • Good read range potential of more than 1.5 m • Near "line of sight" focusing capabilities 	<ul style="list-style-type: none"> • Frequency not licensed for commercial use in parts of Europe • Complex systems development • Not in wide use today 	<ul style="list-style-type: none"> • Access control (vehicles)

No Single Technology can cover all Applications - Physics !

Technical Overview: 56RF

- **13.56 MHz Systems: 56RF Family**
 - For Light Industrial to Non-Industrial Applications
 - Transponder based communication (Listens for a Tag)
 - Tags are “Unintelligent” no on-board micro-controller
 - can not control exchanges
 - Copper Coiled antenna
 - No Tag to Transceiver orientation
 - Generally looked at for “cleaner” environments
 - Transceiver to interface distance limit is 150 feet



This frequency provides lower initial hardware costs, making it a very attractive in many applications. Initial costs should be balanced with potentially greater start-up costs due to the frequencies greater susceptibility to interference and environmental variables.

A 5xRF RFID system is comprised of the following parts

- **Interface**

- Is the “brain” and backplane or network interface for the RFID system

- **Transceiver**

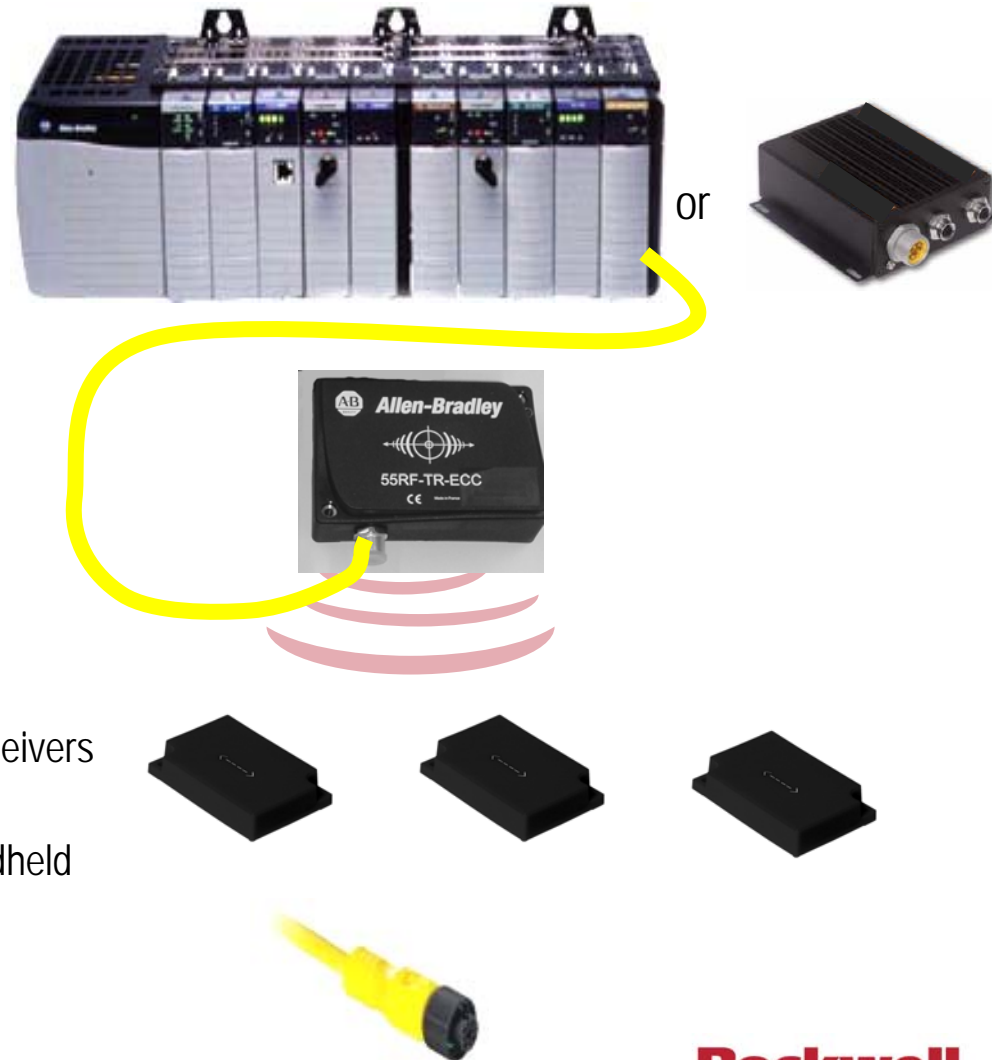
- Combination of antenna and electronics that reads and writes to tags

- **Tags**

- Remain with the fixture or container during production and are re-applied to another fixture or container after production is complete

- **Cables and Accessories**

- Cables are used for connectivity between transceivers and the interface unit
- Accessories include tag mounting spacers, handheld readers for trouble shooting, etc.



5xRF Family Connectivity to Integrated Architecture

- **Connectivity**

- All Three RFID families can be integrated into the Integrated Architecture via

- **ControlLogix 1756 Module (AFS Fall 2008)**

- 4 Channels for a total of 4 different reader heads (transceivers)
 - Uses RSLogix 5000 profiles for configuration

- **SLC 1746 Module**

- 2 Channels for a total of 2 different reader heads (transceivers)

- **EtherNet/IP**

- 2 Channels for a total of 2 different reader heads (transceivers)
 - Uses RSLogix 5000 profiles for configuration

- **ControlNet**

- 2 Channels for a total of 2 different reader heads (transceivers)
 - Uses RSLogix 5000 profiles for configuration

- **DeviceNet**

- 2 Channels for a total of 2 different reader heads (transceivers)
 - Uses EDS files and RSNetWorx for configuration

- **MicroLogix (DF1)**

- 1 Channels for a total of 1 reader head (transceiver)



5xRF RFID Hardware Design

- Noise Immunity on the 54RF and 55RF families (1.5mhz)
 - Welding, VFD's and motors noise emissions and EMI rich environments do not affect this product range

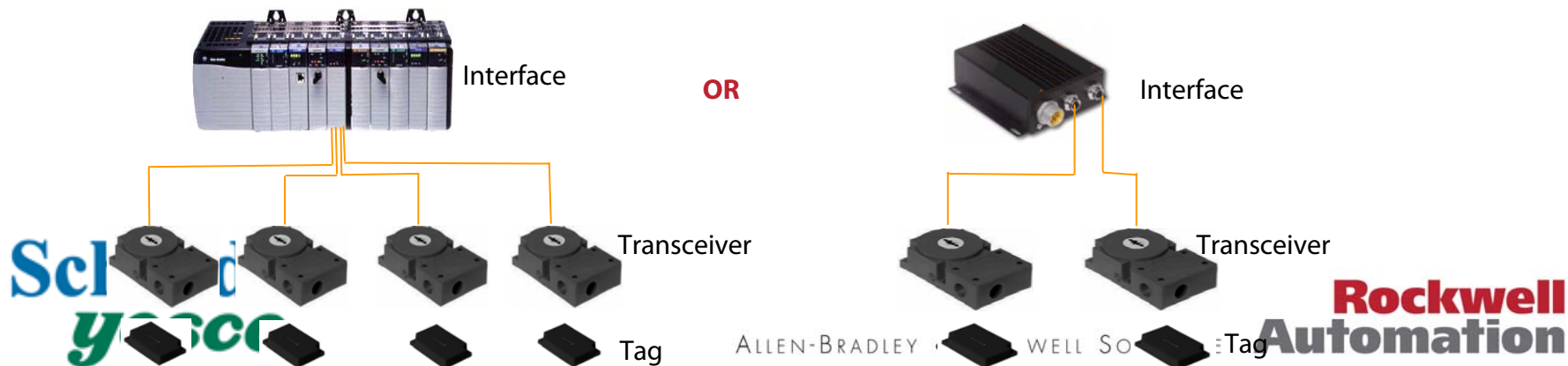
Rugged Metal Industrial Packaging

- IP65 Rated and Sealed Construction
- Risan® Tags (nylon product)– More forgiving than PVC (not brittle)
- Polyurethane potting materials are fracture resistant as opposed to epoxy based system when crack and fracture easily.






5xRF Firmware and Design

- Status Diagnostics
 - Tag execution bit
 - Tag Present Bit
 - Error codes identify the issue
- Network Interfaces have dedicated microcontrollers for each transceiver channel so that that can act and react simultaneously and independently of each other
 - data timing and flow control is EASY compared to competitive designs
 - NOT a “subnet and scanner” design with a “CIP” bridge...



Quick Comparison- 5xRF Industrial RFID Tags

Tag Family	Environment	Speed	Max. Memory	Technology	Cost
54RF-	Harsh Industrial		7 Bytes Read Only; 2 Kbytes	1.5 MHz Inductive	\$\$
55RF -	Harsh industrial		8Kbytes or 32 Kbytes	1.5 MHz Inductive	\$\$\$
56RF -	Light Industrial		2 Kbytes	13.56 MHz Transponder	\$



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Control Interfaces: EtherNet/IP

- IP 65 Rated Field Mountable Interface
- Controls up to 2 Transceivers Simultaneously and Independently
- Industrial 4-Pin M12 EtherNet connector
- HTML accessible configuration data
- Quick Install Connectors
- Flash Upgradeable Firmware
- Embedded Device Diagnostics
 - Interlocked Tag Presence Indication
 - Command Execution
 - Error Reporting and Coding
 - LED Status Indicators



Control Interfaces: DeviceNet

- IP 65 Rated Field Mountable Interface
- Small Footprint
- Controls up to 2 Transceivers Simultaneously and Independently
- Receives 24VDC Power over DeviceNet
- Quick Install Connectors
- Flash Upgradeable Firmware
- Embedded Device Diagnostics
 - Interlocked Tag Presence Indication
 - Command Execution
 - Error Reporting and Coding
 - LED Status indicators



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Control Interfaces: ControlNet

- IP 65 Rated Field Mountable Interface
- Controls up to 2 Transceivers Simultaneously and Independently
- Quick Install Connectors
- Supports Redundant Media
- Embedded Device Diagnostics
 - Interlocked Tag Presence Indication
 - Command Execution
 - Error Reporting and Coding
 - LED Status Indicators



Control Interfaces: 1756 Backplane

- Backplane Style Interface
- Plugs directly into a 1756 Rack or Remote Rack
- Controls up to 4 Transceivers Simultaneously and Independently
- Flash Upgradeable
- Embedded Device Diagnostics
 - Interlocked Tag Presence Indication
 - Command Execution
 - Error Reporting and Coding
 - LED Status Indicators
- Available Fall 2008



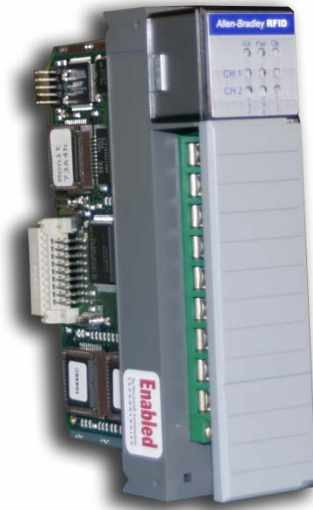
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Control Interfaces: 1746 Backplane

- Backplane Style Interface
- Plugs directly into a 1746 Rack (not remote rack mountable)
- Controls up to 2 Transceivers Simultaneously and Independently
- User Configurable Serial Port
- Flash Upgradeable
- Embedded Device Diagnostics
 - Interlocked Tag Presence Indication
 - Command Execution
 - Error Reporting and Coding
 - LED Status Indicators



Cables and Accessories

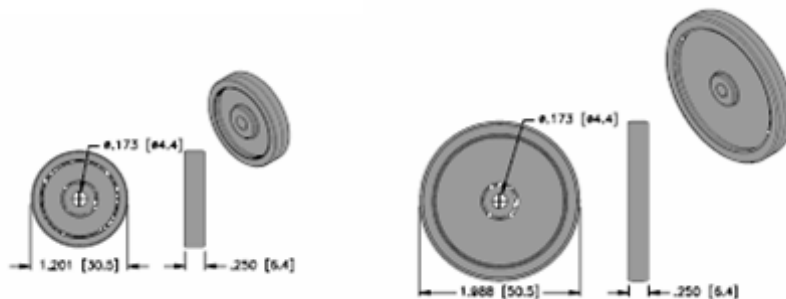
- 57RF Cables

- Shielding Designed Specifically for Transceiver to Interface Communications
- Single Ended Style for use with Chassis based and MicroLogix Interfaces
- Double Ended in Straight or Right Angle style for Transceiver to Network Interfaces
- PUR Jacketing for Improved Oil and Abrasion resistance



- 57RF Disc Spacers for 56RF Family Tags

- 30 mm or 50 mm size



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- 57RF Handheld RFID Maintenance and Field Programming Units



:kwel
lation

836E Pressure Switch

- Six Different Pressure Ranges (Vacuum to 6,000 PSI)
 - -15 to 15 PSI
 - 0 to 60 PSI
 - 0 to 150 PSI
 - 0 to 600 PSI
 - 0 to 1,500 PSI
 - 0 to 6,000 PSI
- Six Different Process Connection Bases – Females “Core”
 - Female and Male: ¼ NPT, SAE 7/16-20, G1/4 BSPP
 - Female versions to ship from stock, males made to order
- Accessory process connection bases available.
- Selectable units PSI, BAR, kPa, % of range.



837E Temperature Switch

- Four Process Connection Options
 - Male: ¼ NPT, ½ NPT, G1/4 BSPP, G1/2 BSPP
- Different probe insertion lengths available:
 - 50mm, 100mm, 200mm
 - 6 mm diameter
 - Accommodates variety of mounting options
- Selectable units °C, °F, or K
- Common Temperature range -50..150°C (-58°...302°F)



839E Flow Switch NEW!

- Calorimetric Flow Technology
- Flow rates of liquid media in the range of 0.03 to 3 m/s (0.1 to 9.8 ft/s)
- Dual independently programmable PNP outputs (NO or NC) or 4-20 mA analog output with single PNP output.
- Temperature (RTD), optional for second switch output -20 to 85 C (-4 to 185F)
- IP66 enclosure rating
- Easy to use software configuration tool (ReadWin)



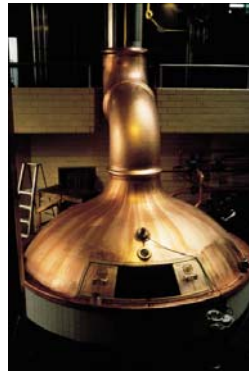
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Sanitary Process Connections

- Sanitary Connections for pressure, temperature and flow sensors
- Flush fittings for contact with consumables
- Food, Beverage, and pharmaceutical applications
- 3-A approved
- Standard tri-clamp configurations



Recent Photoelectric Launches

Products launched

Industries/Applications

<p>48MS MultiSight™</p>	<ul style="list-style-type: none"> • Error proofing • Automotive, Packaging, Assembly
<p>45PVA Retro/Diffuse</p> <ul style="list-style-type: none"> • 18mm metal cylindrical family 	<ul style="list-style-type: none"> • Error proofing • Bin picking applications • Automotive, Assembly
<p>44B Series</p> <ul style="list-style-type: none"> • Adj. background suppression • Adj. foreground suppression 	<ul style="list-style-type: none"> • Packaging (Food, Beverage, HHB) • Suppression of background in diffuse mode • Target color/texture independence
<p>Laser Distance Measurement</p> <ul style="list-style-type: none"> • Short Range (45BRD, 45BPD) • Long Range (45CPD) 	<ul style="list-style-type: none"> • Automotive, Packaging, Assembly • Edge detection, contrast detection, small part detection • Error proofing
<p>LaserSight™ RightSight 42EF</p> <ul style="list-style-type: none"> • Laser family in popular RightSight package 	<ul style="list-style-type: none"> • Packaging and Small Assembly • Small part detection, edge detection • Error proofing



MultiSight™



45PVA



44B



45BPD



45CPD



LaserSight™
42EF

ARE

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Products being covered in hands on lab sessions

ColorSight™ 45CLR Color Sensors

- 12-32 mm Range
- Wide +/- 6mm tolerance
 - detects target even with varying distance to target
- No Fiber Optic Cable
- 3 output channels (concurrent 3 color detection)
- 50 x 50 x 12 mm rectangular package
- 500 Hz switching frequency
- Local and Remote Teach
- Teachable color tolerance



- Color Scan Feature
- Gating Input
- RS 485 Model available
 - Match up to 5 colors
 - True RGB values communicated for remote processing of additional colors

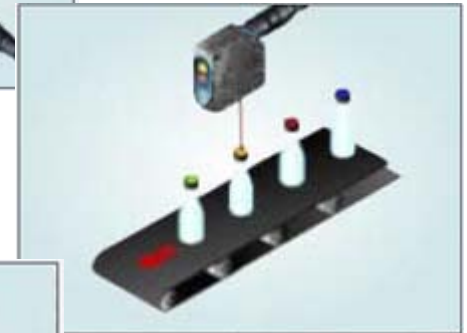
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Typical Color Sensor Applications

- Detection of different color labels
- Detection of different color covers
- Sorting of packing
- Additional Error Proofing Applications
 - Paint color matching in Automotive
 - Paint mark detection on tires and brake drums (used for balancing)
 - Paint mark on lumber (to differentiate board quality)
 - Packaging color matching applications



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Complete Automation on the Move

- **May 13-14, 2008**

- Valley Forge Convention Center
 - 1210 First Avenue
 - King of Prussia, PA 19406

- A **FREE** event featuring:

- 4 Focused Industry Symposiums
- 20 Hands-On Labs
- 27 Technical Sessions
- 9 Encompass Partner Sessions
- 25 Show Floor Pedestals and Kiosks
- 35+ Encompass Partners

- Visit the Rockwell Automation booth on the Expo show floor for more detailed information and registration!

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