

LISTEN.
THINK.
SOLVE.®

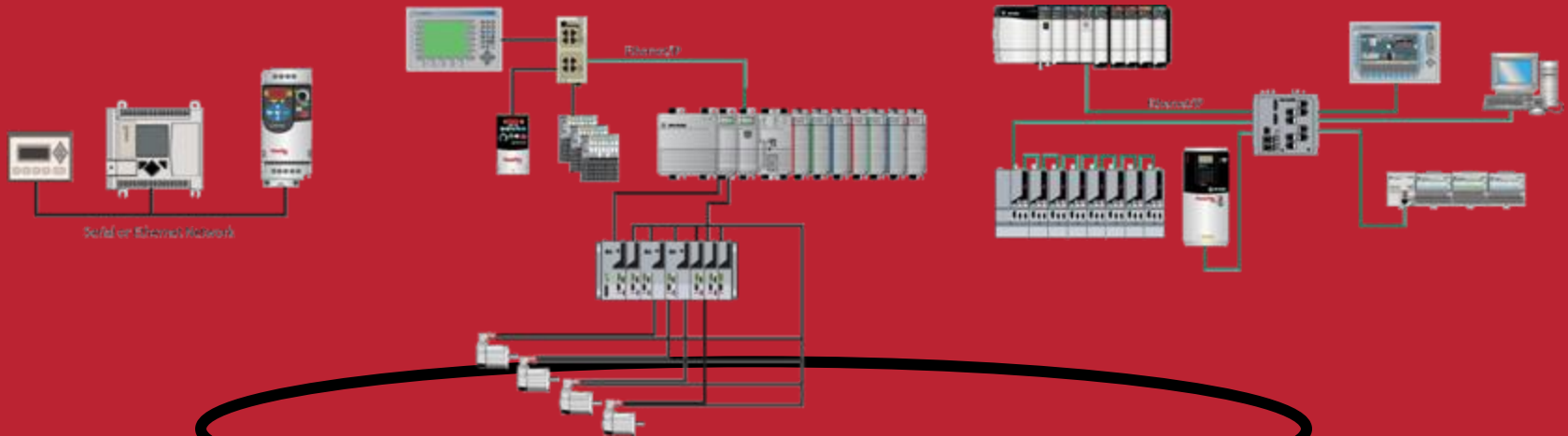
Inside the Panel: Maximizing the Rockwell Automation Architecture

Jack Smith – Schaedler Yesco

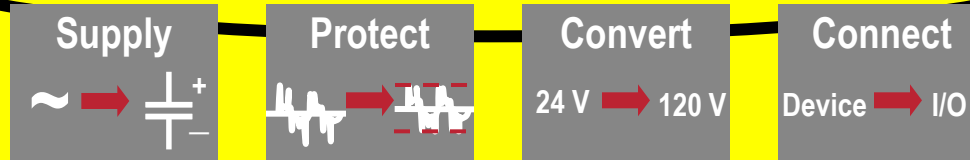
Joe Pickell – Rockwell Automation

(Confidential – For Internal Use Only)

Infrastructure for the Architecture



Discrete = Motion = Continuous = Batch = Drive



- Power Supplies
- UPS

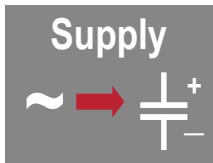
- MCB's
- Fuse Holders
- Surge Filters

- GP Relays
- Signal Conditioner

- Terminal Blocks
- Wiring Systems

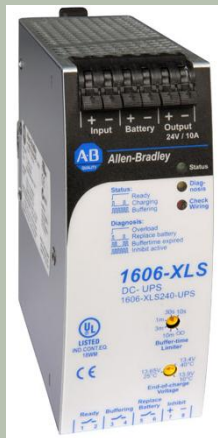
Power Supply Issues and Solutions

- The two most frequent failures of **Industrial Computers** are Corrupt Hard Drives and Blown Power Supplies.



- **Problem:** When the Panel Disconnect is turned off, the heads slam into the disk; corrupting it.
- **Problem:** Power surges and waveform anomalies can destroy the computer's power supply.

DC UPS



7Ah – 26Ah

AC UPS

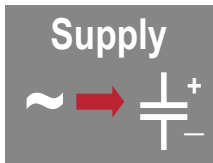


350VA – 500VA



750VA – 10KVA

Power Supply Issues and Solutions



- **Problem:** Most of my field devices are AC but I can only buy certain devices in DC versions.
- **Problem:** I have large portions of my control system on a single power supply. On start up the DC voltage sags creating anomalies.

Single Load Solution

1606-XLP15...

- 1606-XLP15A (5Vdc)
- 1606-XLP15B (12Vdc)
- 1606-XLP15E (24Vdc)

Small Size, only 22.5mm wide!

Wide Range AC Input (100-240AC)

Screw Terminals (To slim for spring clamps)



Small Load Solution

1606-XLE80E

- **3.3A (80Watt) Power Supply**
- **100-240Vac input**
(Wide range voltage input)
- **120% continuous power boost**
- **Low AC inrush**

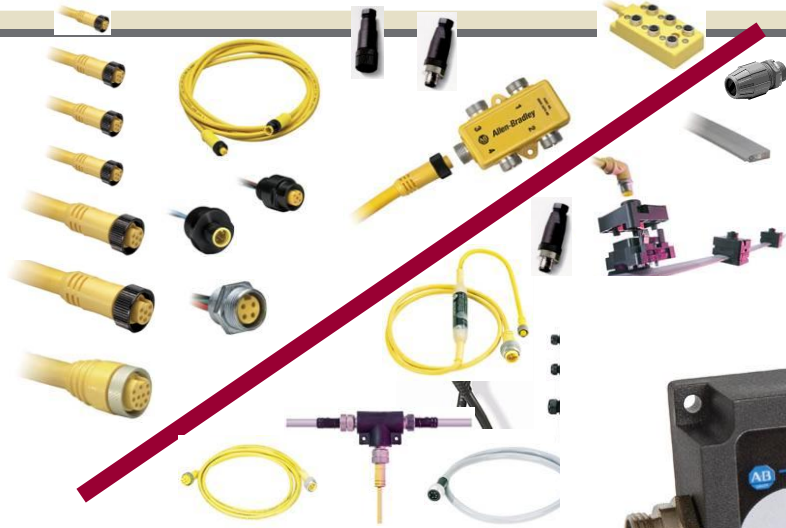


1606 XLS High Performance Solution

- **150%** rated Power Boost
- **Low** Inrush Current
- **DC ok** and **Overload** Indicators
- 80W (3.3A)
- 120W (5A)
- 240W (10A)
- 480W (20A, Single and Three Phase)
- DNET (4 & 8 amp)



Problem: A Completely Distributed Control System with no Distributed Power Solution



Connection Systems /



istributed IP67 I/O



1607-XT ArmorPower On-Machine Power Supply

Sensors, Actuators and Enunciators

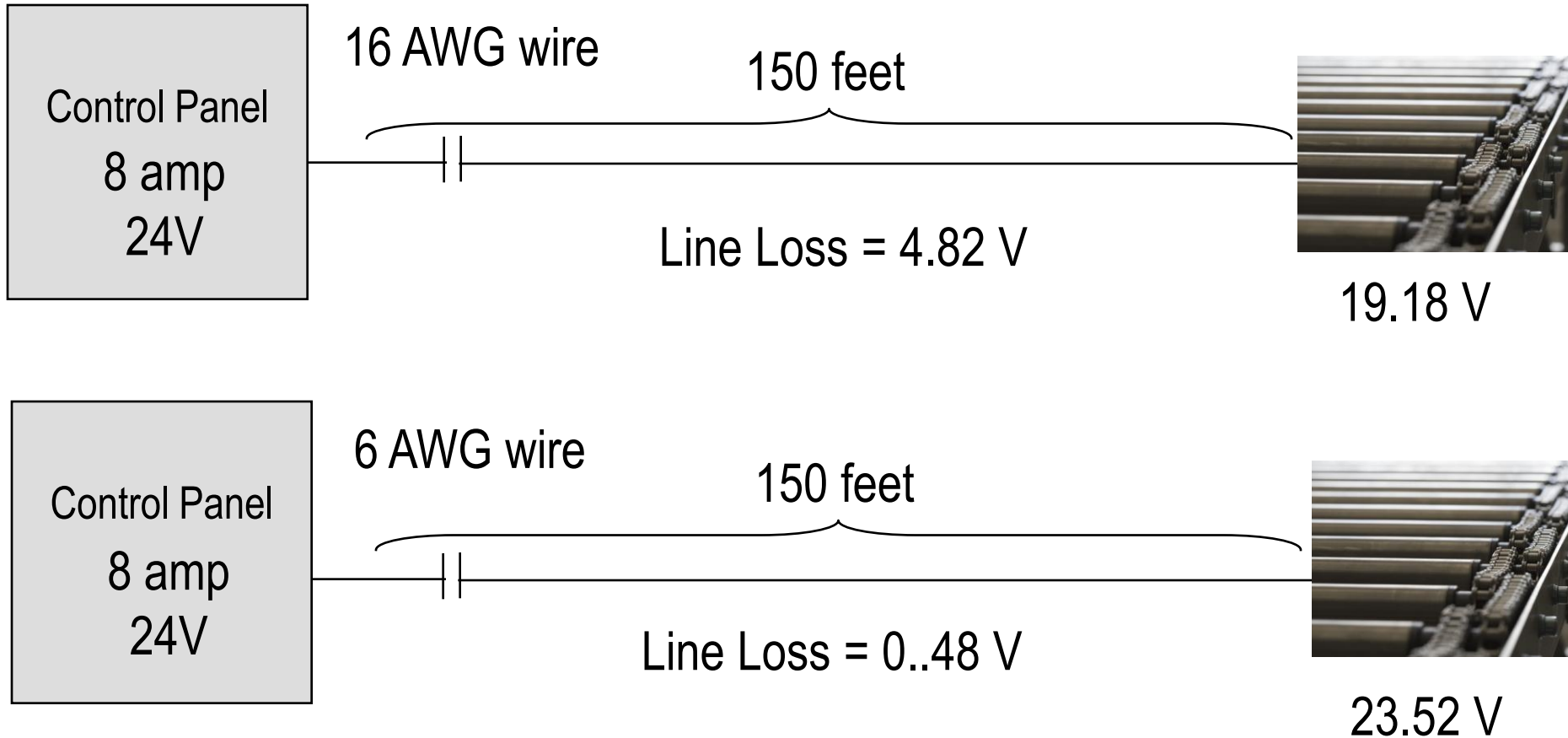
IP67 Distributed Motor Controller

NEW Bulletin 1607-XT



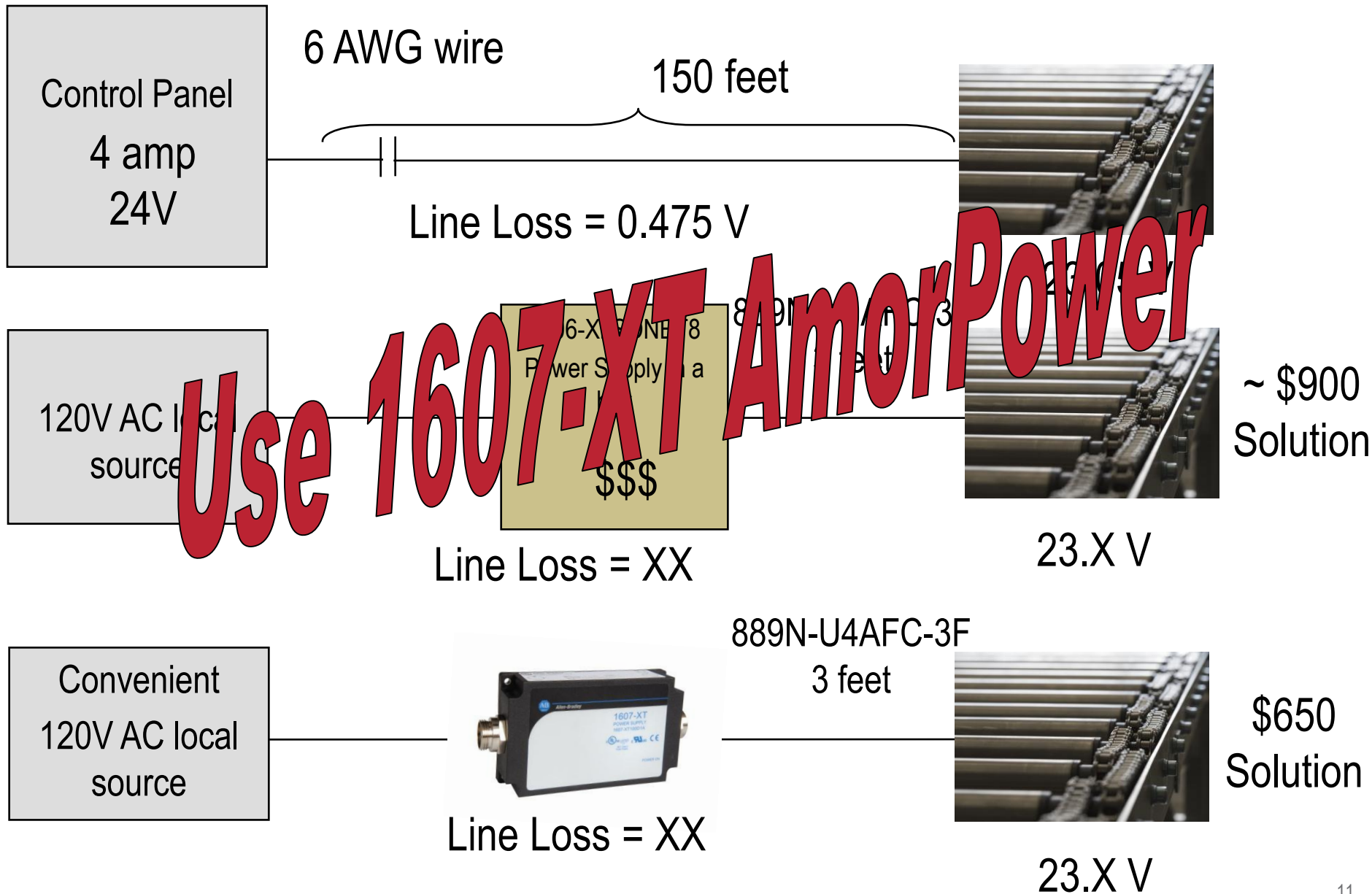
- On-Machine Power Supply
 - 1607-XT50D1A 50W
 - 1607-XT100D1A 100W
- IP 67 Rated
- UL 508 Listed
- NEC Class 2 rated
- 100-240VAC Input
- 24 VDC output
- Quick connect to Power Media
- Completely potted construction

Line Loss Solutions?

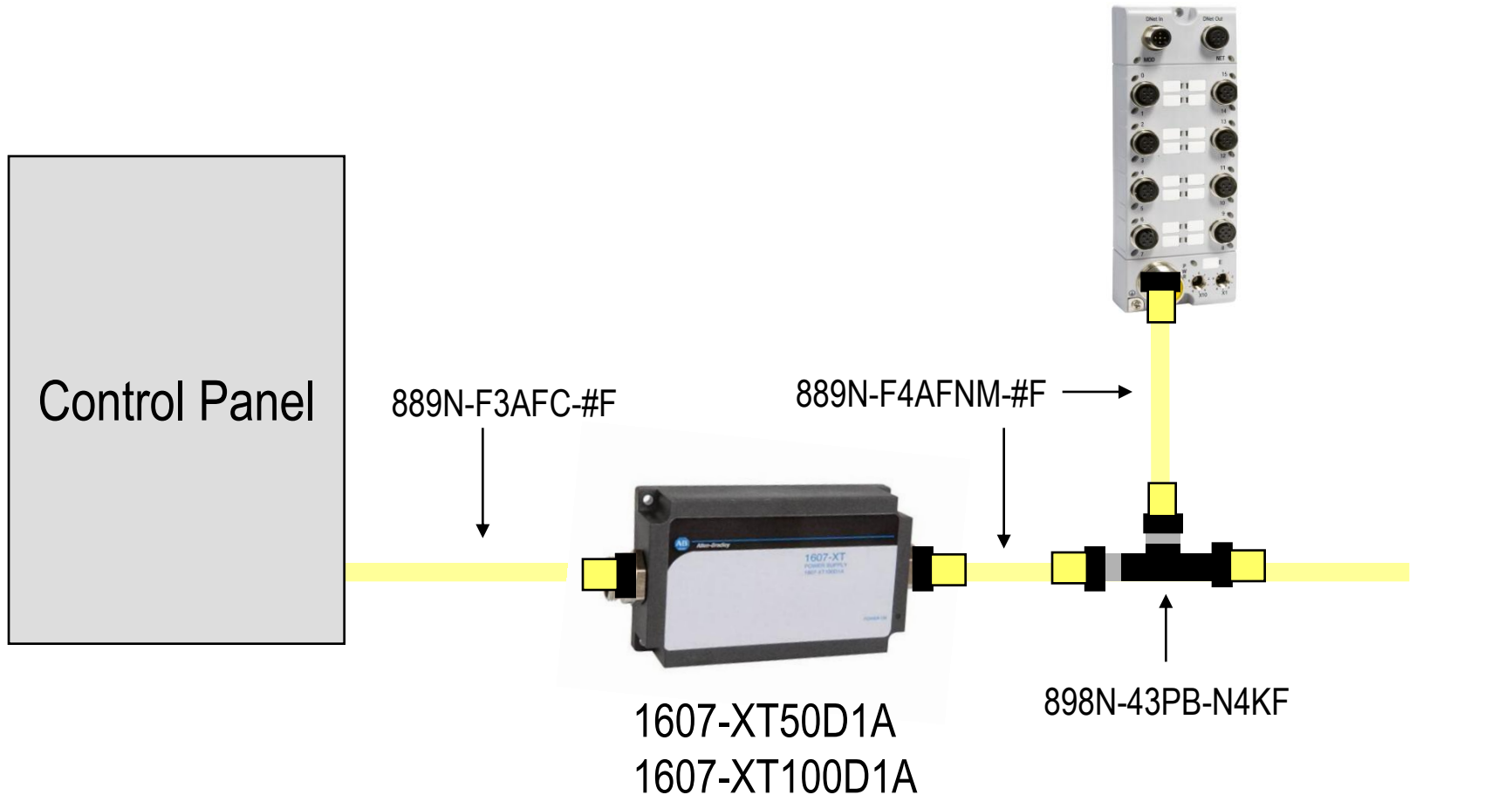


Minimize Line Loss

How do you bring power closer to the load?

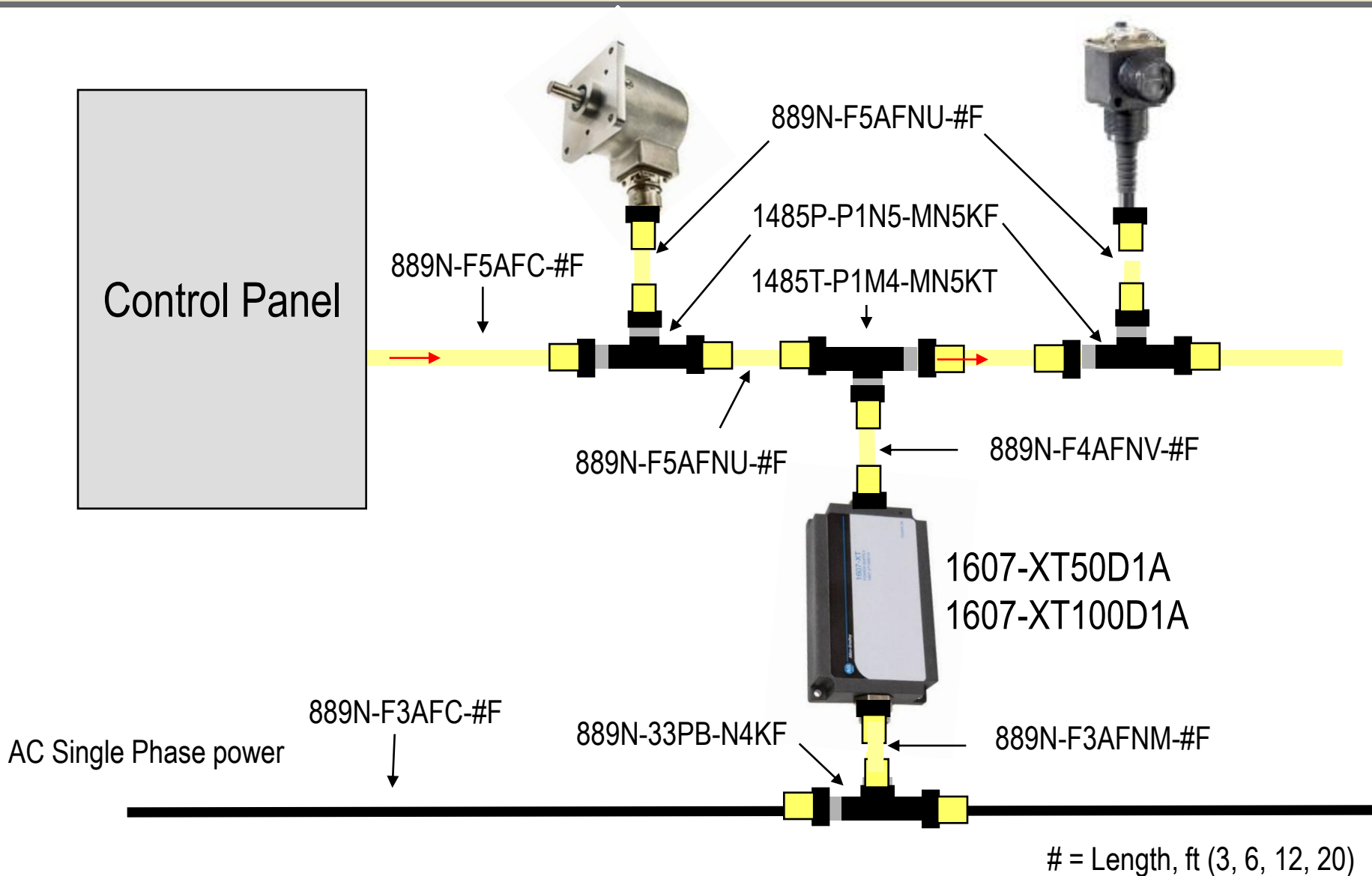


Single Phase Class 2 ArmorBlock

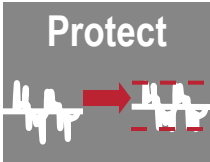


= Length, ft (3, 6, 12, 20)

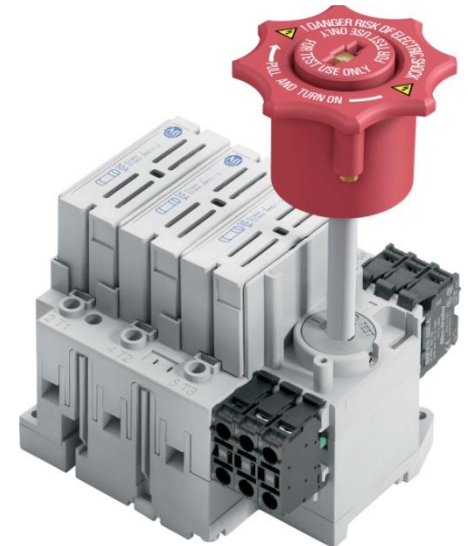
DeviceNet Power Boost



Power Protection Solutions



- Molded Case Breakers
 - Industry's smallest 125A frame
 - Up to 2500A frame
- Miniature Breakers
 - General application
 - UL Listed
- Fuse Holders
 - Panel service entrance
 - Motor fuse holders matched to contactors
 - General duty rail mounted fuse holders
 - I/O and field device fuse holders
- Line Filters
- Surge Protection



140U Multi Terminal Lug Kits

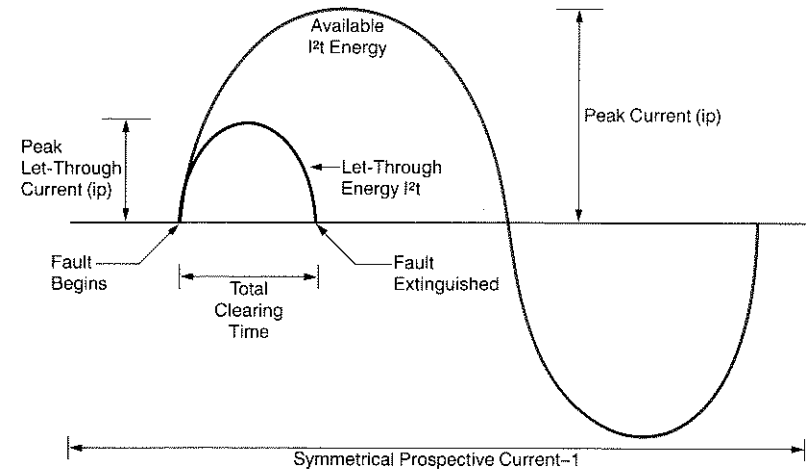
- **Problem:** Need to wire from breaker to several loads.
- Possibly eliminate a separate distribution block
- No effect on panel SCCR



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	

Current Limiting Breakers

- **Problem:** Need to provide a high panel SCCR but cannot use fuses
- **Solution:** 140U breakers are now available in high KA versions and current limiting performance.

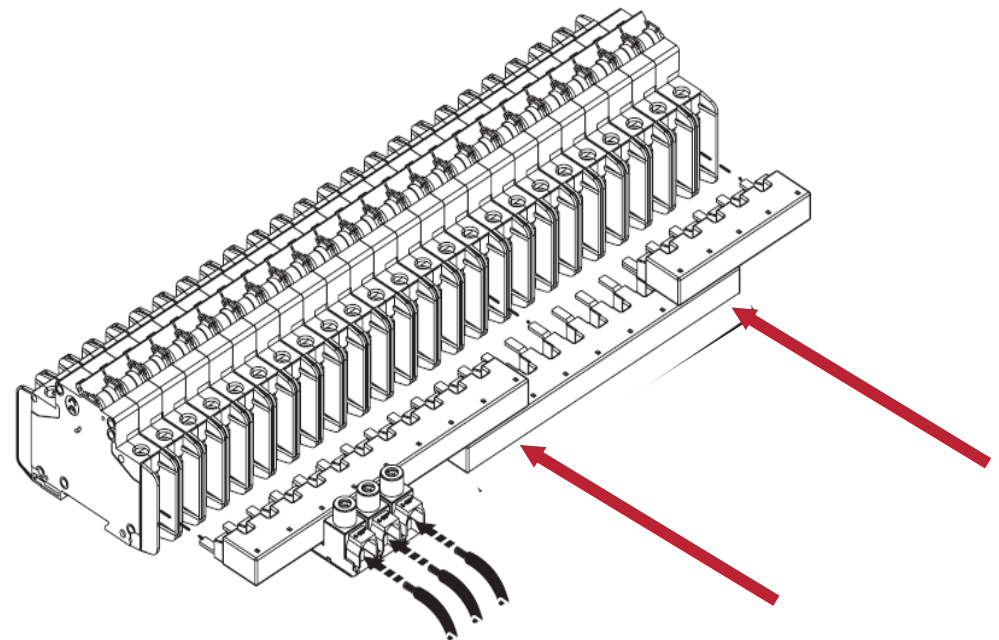


Up to 100KAIC Rated

Current Limiting in 65KA and 100KA versions H,J,L frames

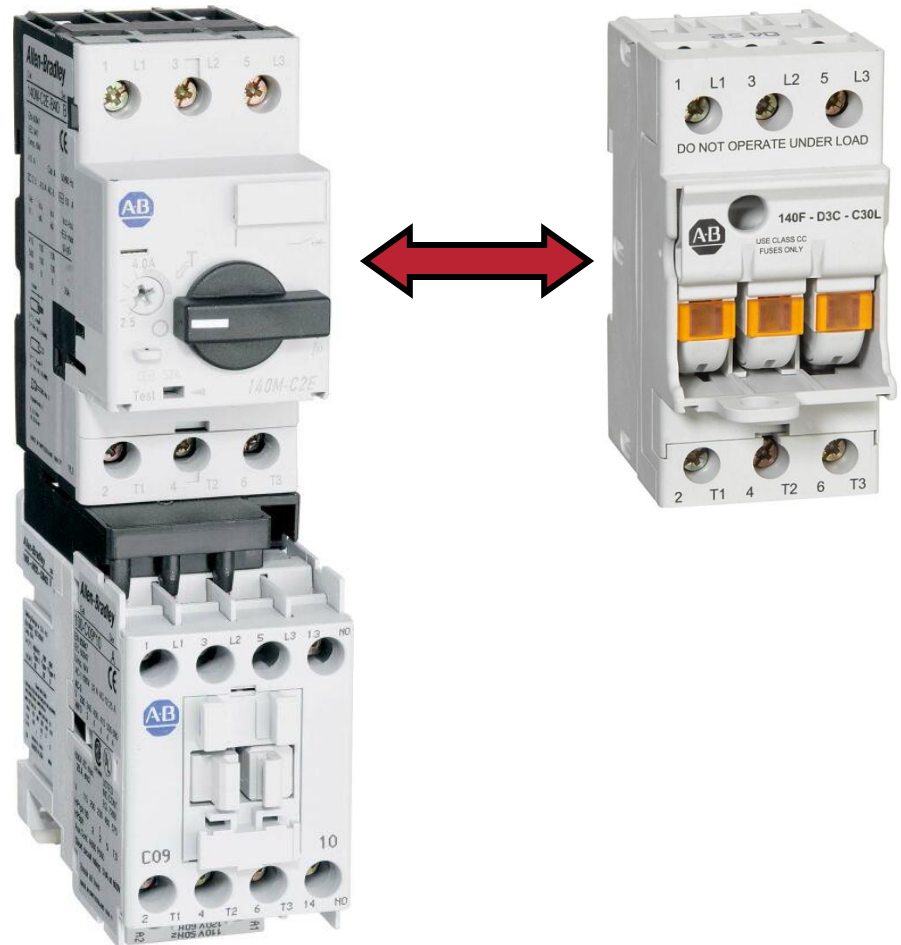
Mini Breaker and Fuse Holder Jumpers

- **Problem:** Excessive time spent wiring to distribute power on mini breakers.
- **Solution:** Bus Bar System
 - Available as: 1 Phase
2 Phase
3 Phase
 - Each as 6 pin
12 pin
18 pin
 - Up to two joints per UL



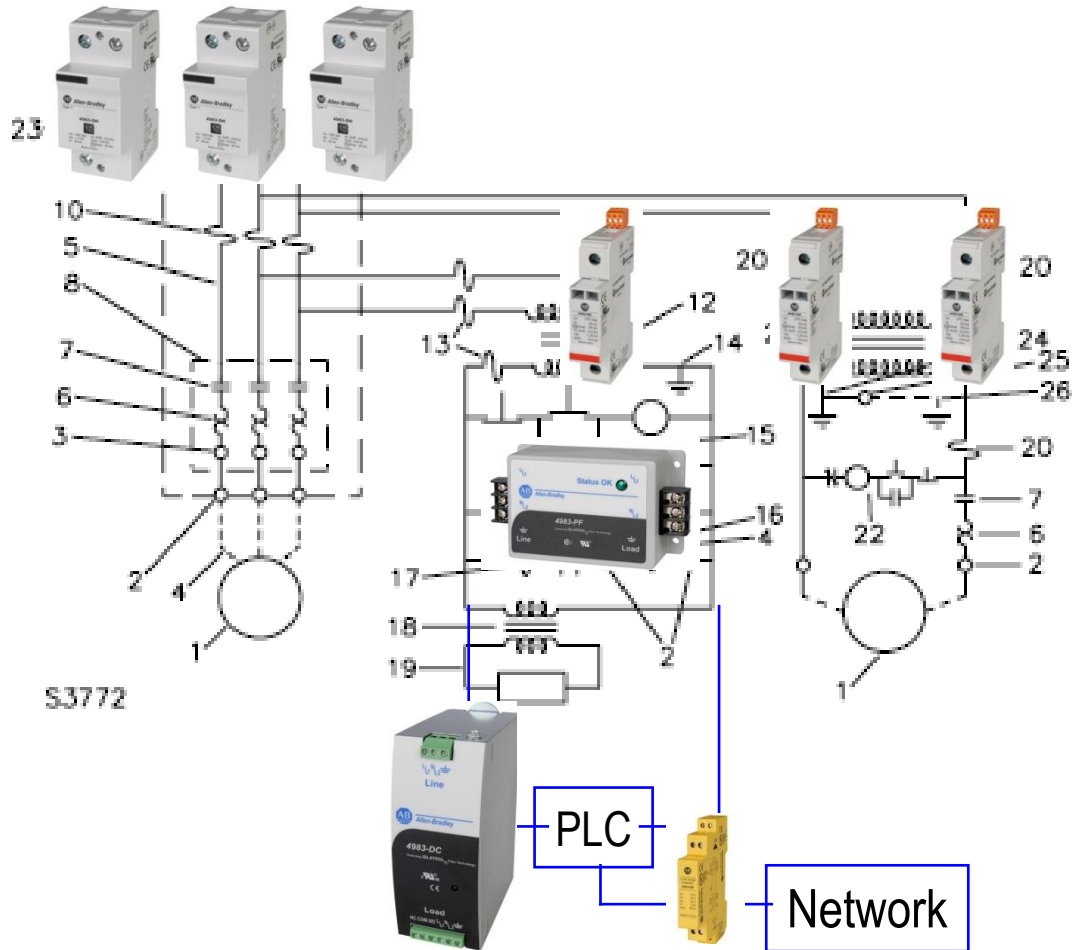
Fuse Holder Matched to Contactor

- Problem: When fuses are required for motor protection extra labor and panel space is used.
- Solution: 140F fuse holders in same form factor as 140M motor protectors.
 - Use the 140M wiring accessories



Surge Protection and Line Filters

- **Problem:** Every Spring/Summer we lose at least one processor due to line surges.
- **Solution:** Install a complete protection system from power entry through data lines.



GP Relay Applications

Convert

24 V → 120 V

- **Problem:** I have to obtain a signal from another manufacturers machine.
- **Problem:** My control system is all DC but one field device is 120VAC.
- **Problem:** I need to add a time delay on an output but do not want to alter my PLC program.
- **Solution:** 700-HLT relays

One or two pole

Multi function time delay version



700-HLT

- On Delay, One Shot, Flasher, Pulse
- 0.1 s – 6 hour
- 6mm wide



700-HL

- One or two pole
- 6 mm wide per pole
- Gold contacts available
- Solid state one pole available

Analog Signal Challenges

- Isolation
 - Ground loops and common mode noise
 - Isolate multiple signals on same power source
- Transmission
 - Noise on low voltage signals.
 - Expensive special cable required for long distance runs of t/c or RTD
 - Transmission of data via Hart protocol
- Conversion and Amplification
 - Match field device signal to controller I/O
 - Use existing I/O rather than add more special cards
- Signal splitting
 - Signals may need to go to several separate systems



Analog Signal Conditioners are PROBLEM SOLVERS!

Bulletin 931 - Analog Signal Conditioners

- Solutions for all common analog signal conditioning requirements
 - Isolation
 - Conversion (e.g. 0-10Vdc to 4-20mA, etc.)
 - Transmission/Amplification/Linearization (thermocouples, RTDs, etc.)
- Extensive offering
 - Simple (fixed function) to universal (programmable)
 - Variety of form factors – 6mm to 45mm
 - Global Approvals
 - CE
 - cULus or cURus/CSA
 - Hazardous Location Approvals
 - cULusEx (Class 1, Div 2 and Zone 2)
 - ATEX



Complete line of Analog Signal Conditioners

Bulletin 931 - Analog Signal Conditioners

931H



High Density -6mm

Basic, simple signals

Inputs

- Current, Voltage, Temperature

Outputs

- Current, Voltage
- HART pass through

Fixed or DIP switch configurable

931S



Standard - 12.5, 17.5 or 22.5mm

Increased level of isolation, accuracy

Inputs

- Current, Voltage, Temperature, Potentiometer, Frequency, Bridge

Outputs

- Current, Voltage
- Alarm/Relay output (Threshold Monitoring)
- Splitter

Fixed or DIP switch/Jumper configurable

931U



Universal - 12.5mm or 45mm

Highest level of isolation, accuracy

Inputs

- Current, Voltage, Temperature, Potentiometer, Frequency

Outputs

- Current, Voltage
- Alarm/Relay output (Threshold Monitoring)

Software configurable

DIN Rail Mounted Receptacle

Connect

Device → I/O

- A convenient power source for in-the-panel troubleshooting.
 - Available in standard Duplex or GFCI versions
 - Available in 15A or 20A versions
 - Option for visual indication of power
 - DIN rail mounted
 - External wire connections
 - Competitively priced starting at \$20 list



Solid State Contactors

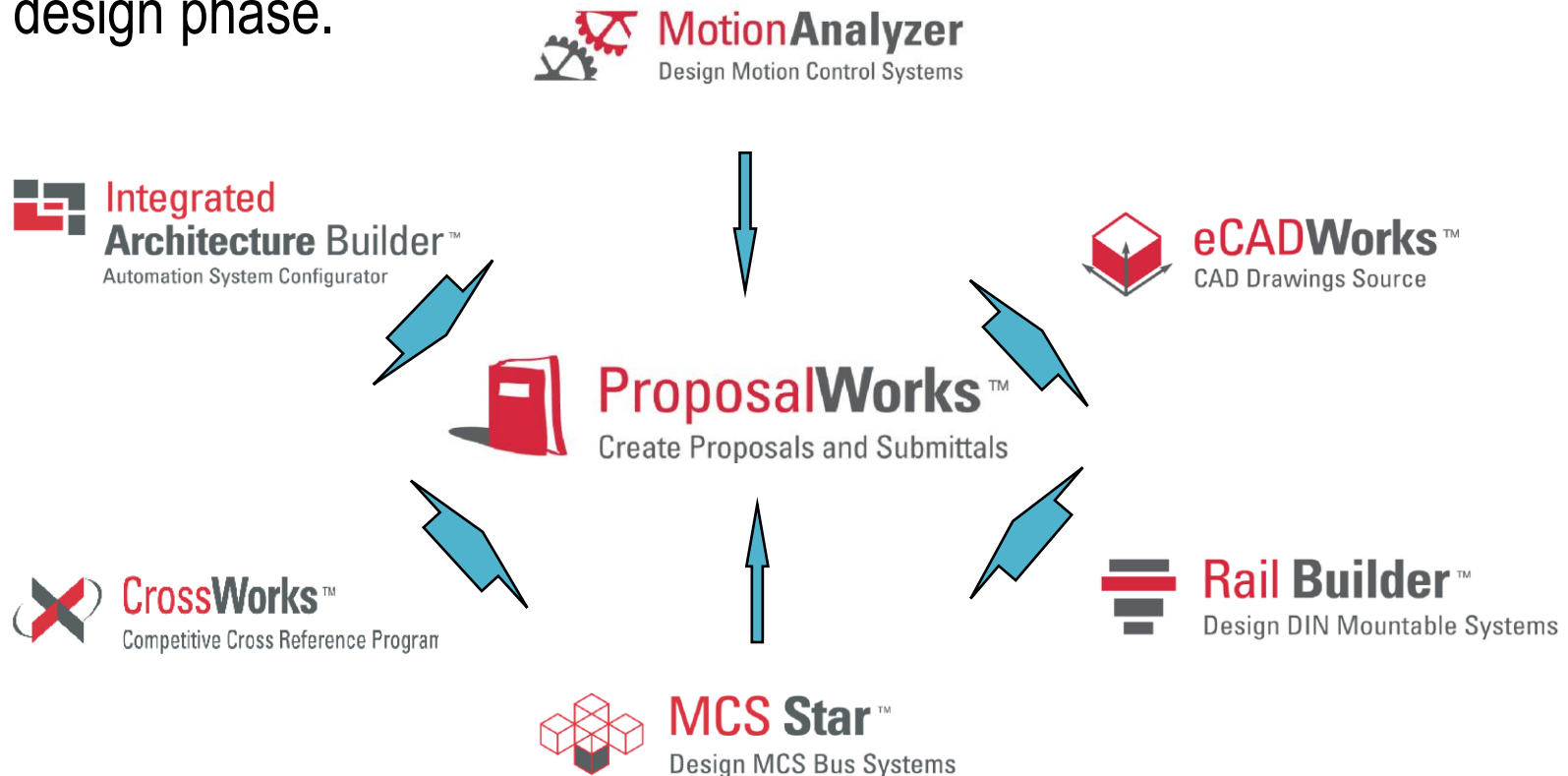
- **Problem:** High duty cycle loads are causing contactors to fail quickly.
- **Problem:** High vibration on equipment is causing contacts to bounce.
- **Solution:** Solid state contactors.



- Integral heatsink
- LED Status indication
- Panel or DIN rail mountable
- Zero Cross Switching
- Available in single phase, dual, or three phase versions
- 20A through 90A versions
- AC, DC, and Analog control options
- Integral MOV
- UL Listed as motor controller

Design Tools

- Problem: Engineering time is consumed specifying all the little parts and pieces needed to complete a system.
- Problem: Some parts always seem to be left unaccounted for during design phase.



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**Thank you for
participating!**

**Please complete the
session survey and tidy
up your workstation
before leaving!**

(Confidential – For Internal Use Only)