



VAN METER



smart

SOLUTIONS SUMMIT

**DRIVES THAT THRIVE:
VFD PLATFORM OVERVIEW**

WELCOME



GRIFFEN CLARK

Power Control Specialist
gclark@vanmeterinc.com



TRAVIS KASNER

Power Control Specialist
tkasner@vanmeterinc.com

ALLEN-BRADLEY® POWERFLEX DRIVES PORTFOLIO

BUILT ON A LEGACY OF MOTOR CONTROL EXCELLENCE

- A complete drives portfolio including Low Voltage, Medium Voltage and DC drives, scalable to meet your application needs
- Premier Integration offers optimized connectivity to Logix 5000™ controllers within the Studio 5000® design environment
- Energy-efficient designs and broad power ratings - plus industry-leading power density



COMPACT DRIVES PORTFOLIO



POWERFLEX 4M

- 0.25 to 15 Hp/ 0.25 to 10 kW
- Cost-effective solution
- Feed-through wiring design
- Ideal for Bulletin 160 drive migrations



POWERFLEX 523

- 0.25 to 30 HP/ 0.2 to 22 kW
- Modular design eases installation
- Compact footprint
- Clearances allow for zero-stacking
- 50°C operation with no de-rate, 70°C operation with optional fan kit and de-rate



POWERFLEX 525

- 0.5 to 30 HP/ 0.33 to 22 kW
- Premier Integration via built-in EtherNet/IP port
- Flexible motor control and installation options
- Built-in hardwired safety
- 50°C operation with no de-rate, 70°C operation with optional fan kit and de-rate



POWERFLEX 527

- 0.5 to 30 HP/ 0.33 to 22 kW
- Works exclusively with Logix controllers that support motion
- Premier Integration with Integrated Motion instructions
- Built-in dual ports for EtherNet/IP
- Built-in safety – hardwired or networked

ARCHITECTURE-CLASS AC DRIVES PORTFOLIO



POWERFLEX 753

- 1...400 Hp / 0.75...270 kW
- Speed & Torque Control
- 6-pulse Drive



POWERFLEX 755,755TS

- 1...1800 Hp / 0.75...1400 kW
- Speed, Torque & Position Control
- 6-pulse Drive



POWERFLEX 755TL

- 10...1800 Hp / 7.5...1400 kW
- Speed, Torque & Position Control
- Low Harmonic



POWERFLEX 755TR

- 10...6000 Hp / 7.5...4500 kW
- Speed, Torque & Position Control
- Regeneration & Low Harmonic



POWERFLEX 755TM

- 250...6000 Hp / 160...4500 kW (AC)
- 70...4800 kW (DC)
- Speed, Torque & Position Control
- Common Bus Drive System

POWERFLEX 755TS DRIVE



DEPENDABLE HIGH-PERFORMANCE INDUSTRIAL MOTOR CONTROL FOR ALL APPLICATIONS

- Power range: 1...400 Hp / 0.75...270 kW; 400/480V
- -20...60 °C operating temperature (-20...50 °C without derating)
- Supports up to five option cards for I/O, safety, communication
- Environmental: IP20, IP54, flange with option for XT enhanced corrosion protection
- Easy configuration, integration and visualization in Studio 5000® design environment
- Built-in dual-port Gigabit EtherNet/IP
- **DeviceLogix™** integrated logic-solving capability for applications that require a quick and localized response to input events
- T-Link high-speed fiber-optic drive-to-drive communications (option card)
- CIP Security
- Designed to exceed IEC 61800-9-2, IE2 EcoDesign directive efficiency ratings to improve application performance and lower energy use

POWERFLEX 755TS CORROSIVE GAS PROTECTION (OPTION)



01

Corrosion-Resistant Components

Selecting and designing components that provide better performance

02

Enhanced Conformal Coating

Not all conformal coatings are made equal

03

Critical Connection Point Protection

Helping prevent exposure to internal and external connections

04

Standard Product Offering

No custom engineering, additional equipment or floor space required

05

Tested and Validated to GX (ISA) and CX (IEC)

Test protocols combine proprietary accelerated corrosion tests with 30-day exposure in ASTM B845 method K accelerated corrosion test

Corrosive gas protection standard on PowerFlex 755TL, TR & TM drives, option on 755TS

POWERFLEX® 755TS DRIVE

NEXT GENERATION OF POWERFLEX DRIVES



Safe

Standard and advanced safety, hardwired and CIP Safety over EtherNet/IP



Smart

TotalFORCE® technology: Real-time operational intelligence, automatic commissioning & optimization



Scalable

Use the same platform all your applications



Secure

CIP Security as part of your defense-in-depth strategy

POWERFLEX 750-SERIES WITH TOTALFORCE® TECHNOLOGY

Patented drive analytics help increase performance and decrease commissioning time!

ADAPTIVE TUNING

**Helps increase
machine reliability
and performance**

- Monitors drive performance characteristics and adapts if necessary
- Automatically suppresses potentially harmful resonance and vibration conditions
- Can be used to indicate machine wear out over time

LOAD OBSERVER

**Helps reduce startup
time by reducing the
effort needed for tuning**

- Automatically monitors and compensates for load changes
- Compensates for normal machine wear
- Provides consistent dynamic behavior

BUS OBSERVER

**Helps increase reliability
by reducing the probability
of resonance**

- Accounts for dynamic DC bus conditions
- Reduce startup time needed for tuning
- Automatically monitors and compensates for line changes

APPLICATION ADVANTAGES

Wind/Rewind (Web Handling)

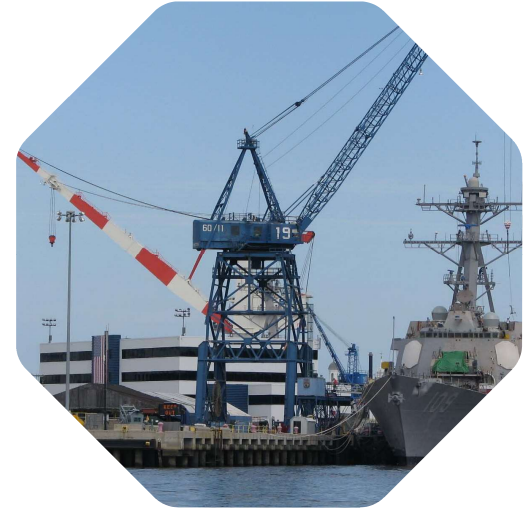
- Load Observer helps reduce startup time by reducing the effort needed for tuning

Crain Hoist

- TorqProve™ Control helps verify control of a load in lifting applications

Bridge Trolley

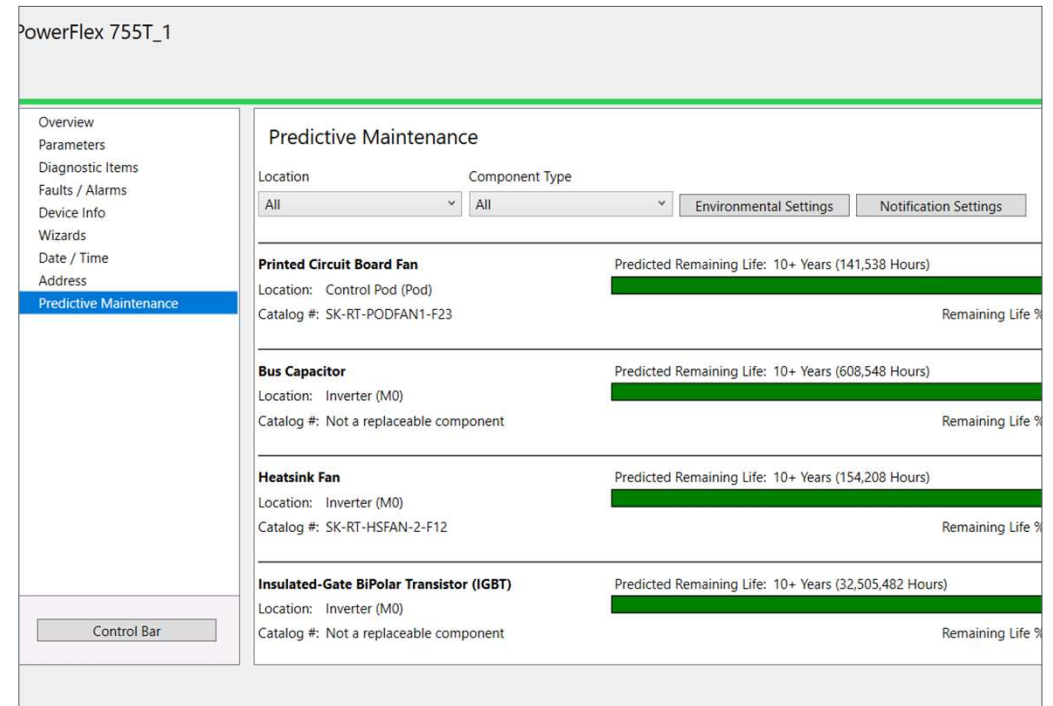
- Anti-sway capability helps improve safety and efficiency by reducing swinging of a moving load



OPERATIONAL INTELLIGENCE

PREDICTIVE ANALYTICS FOR MAINTENANCE - TOTALFORCE TECHNOLOGY

- Improve productivity with built in predictive maintenance capabilities to monitor drive and associated motors before an unplanned event occurs.
- Predict remaining life of:
 - Fan/Blower
 - Bus & LCL Capacitors
 - IGBTs
 - Relay Contacts
- Active drive feedback protection:
 - Blown Fuse & Surge Suppression
 - Thermal Manager



DESIGNED FOR SEAMLESS MIGRATION

- Drop-in replacement for PowerFlex 755 drives
- Uses identical mounting and electrical connections — “**rip & replace**”
- With the same: power range, footprint, options for safety & communications, and enclosure options
- **Parameter conversion tool** eases drive programming migration
- Competitive conversion **incentives***
- **Migration** pricing agreements*



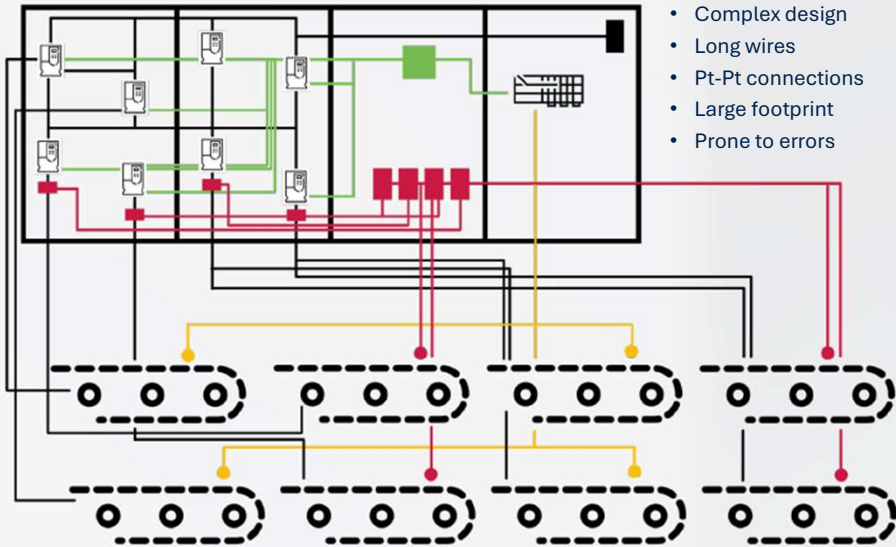
WHAT IS ON-MACHINE

A distributed architecture that is simpler, more modular approach to machine design to lower your total costs

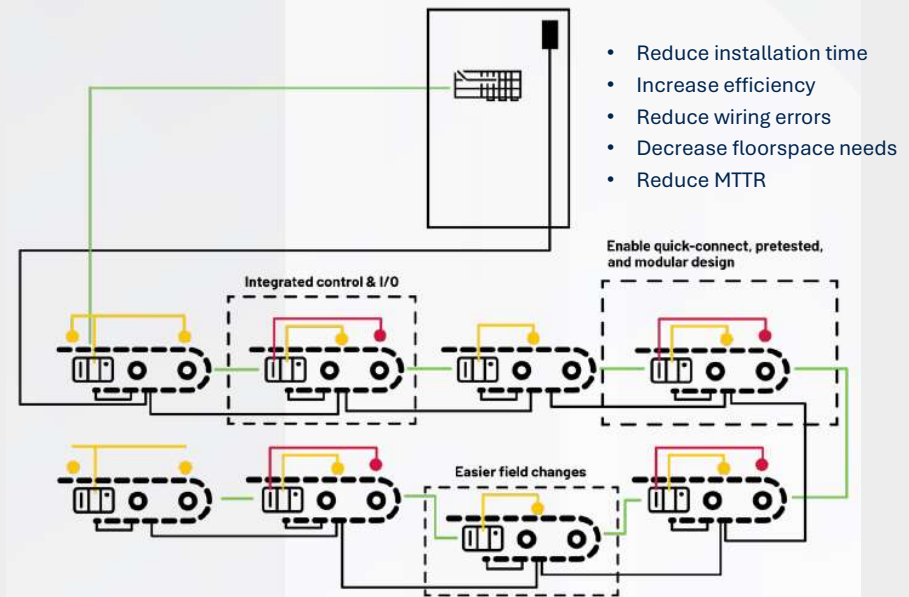
Centralized Design

Improved

Distributed Design



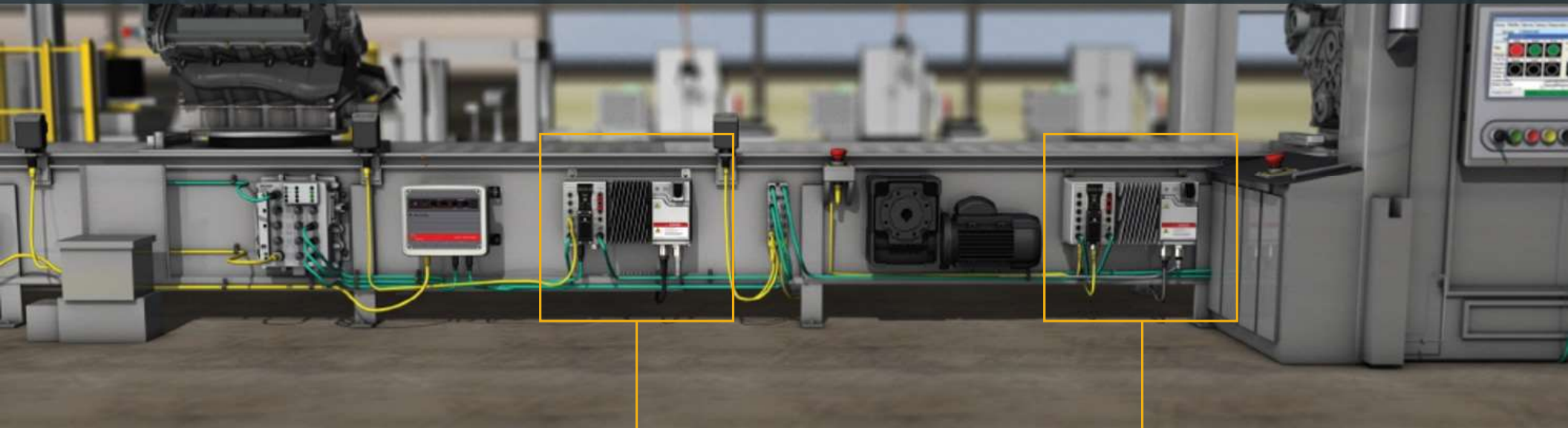
Higher installation costs and more time



Decreased installation costs and less time

Material handling conveyance and automation applications

ARMOR POWERFLEX



A FLEXIBLE NEAR-MOTOR SOLUTION THAT IS SAFE, SMART AND SECURE.

A ZERO-CABINET SOLUTION FOR ON MACHINE APPLICATIONS.

ARMOR™ POWERFLEX® KEY BENEFITS

NEXT GENERATION OF ON-MACHINE DRIVES



Safe

Standard Control + Hardwired Safety + Advanced Safety in a single device.



Smart

Premierely Integrated with Studio 5000.
Real-time operational intelligence.
Reduced design and installation cost



Secure

CIP Security as part of your defense in depth strategy



Flexible

Common design + common configuration enables a seamless user experience from 1-20 HPs

ARMOR POWERFLEX

HARDWARE FEATURE SUMMARY

- Extra Tough **IP66, Type 4/12 enclosure**, with hygienic friendly design
- Embedded Discrete and Safety **I/O**
- Standard 8 pin **Encoder** input
- Wide Ambient **Temperature**
- -25°C to ~ 55°C (derating required)
- Robust **shock**(>25G) & **vibration**(>3G) rating
- Compact, **one-box** design
- Local Motor **Disconnect** with status indication
- **100kA SCCR** rating @ 480VaC
- Quick Connect **Feed-through** power distribution
- **380-480V AC** Induction and Permanent and Magnet Motor control
- Light or standard duty dynamic **resistor**
- Flexible **Mounting** Orientation
- **Non-serviceable** design



ARMOR POWERFLEX

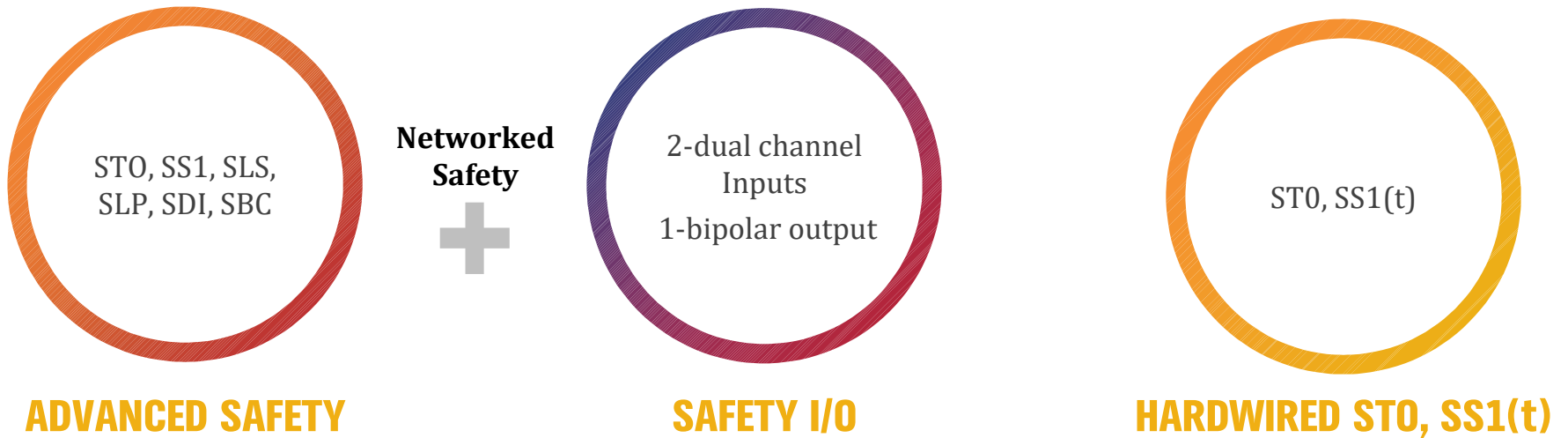
SOFTWARE FEATURE SUMMARY

- CIP Safety, Security, & EtherNet/IP
- **Embedded 1000mbps dual port switch** (10x improvement)
- Static or Dynamic IP address
- Contextualized **Add-On Profile** for Studio 5000
- Setup **Wizard**
- Automatic Device Configuration (**ADC**)
- Supports **firmware supervisor**
- **Real-time data** that supports analytics
- Events with **real-time clock**
- **One** firmware file
- **One** AOP file
- Troubleshooting **snap-shot**



ARMOR POWERFLEX BULLETIN 35S

Integrated & Hardwired Safety in **ONE** device



Minimum of **SIL CL 2, PLd** to a Maximum of **SIL CL 3, PLE, CAT4** safety performance
(risk assessment defines the need)

LOGIC SECTION FUNCTIONS

1. 4-user inputs & 2-user configurable
2. EtherNet/IP with dual port Gigabit switch
3. 4-Safety inputs & one safety output*
4. 1-Encoder input for incremental, AqB, or Sine/Cosine
5. 24Vdc auxiliary feedthrough ports**



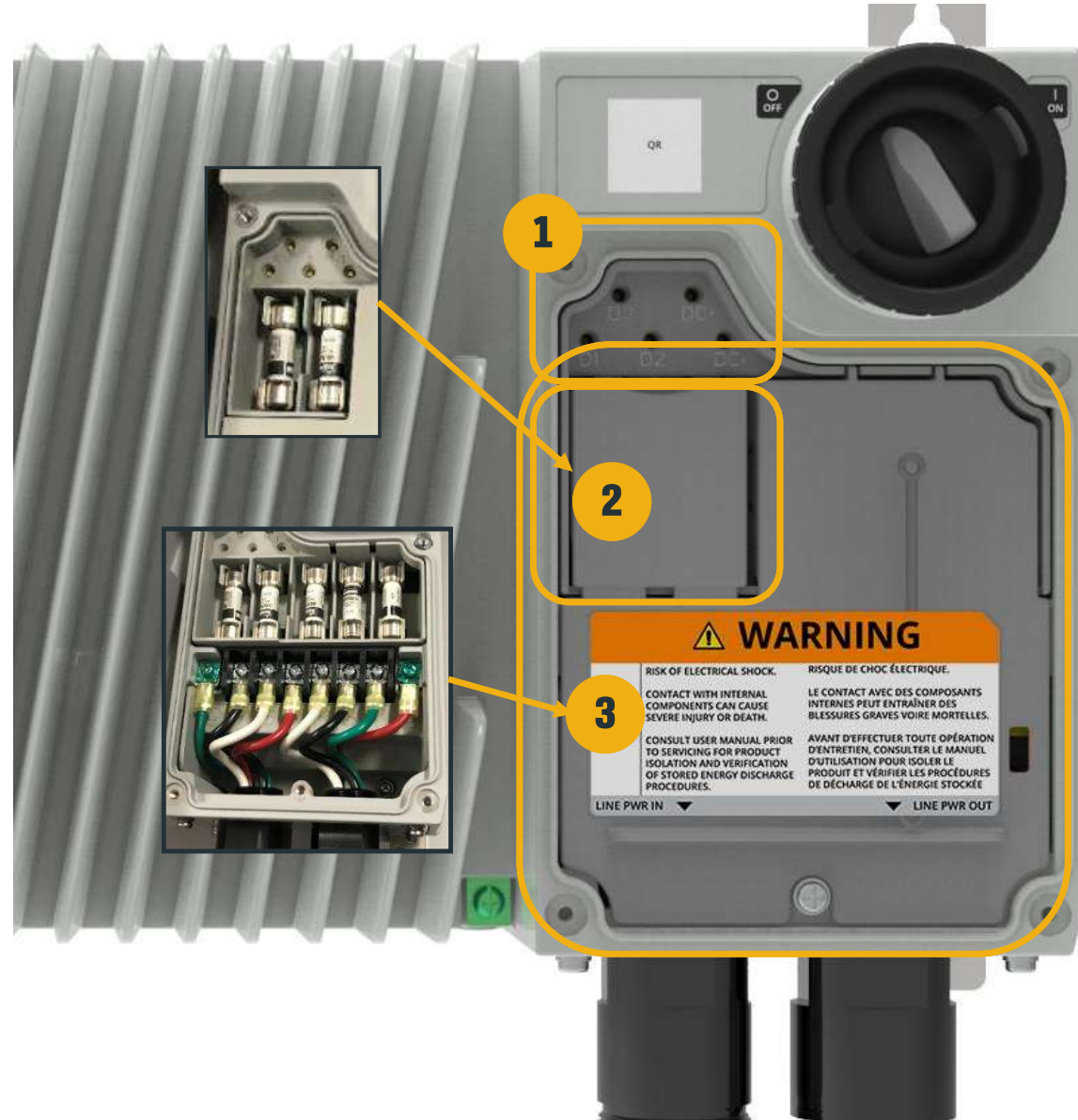
POWER SECTION FUNCTIONS

1. Lockable local disconnect
2. Product information
3. Three phase feedthrough
4. Secondary safety ground



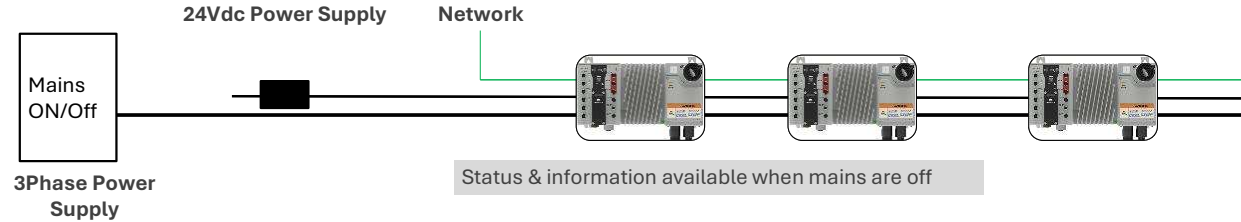
POWER SECTION FUNCTIONS

1. Test points
2. EM Brake fuses
3. Line side branch protection

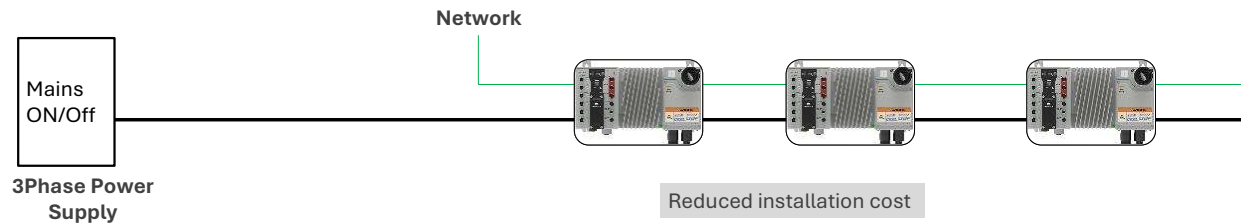


AUXILIARY 24VDC POWER SUPPLY OPTIONS

Mains Free Programming

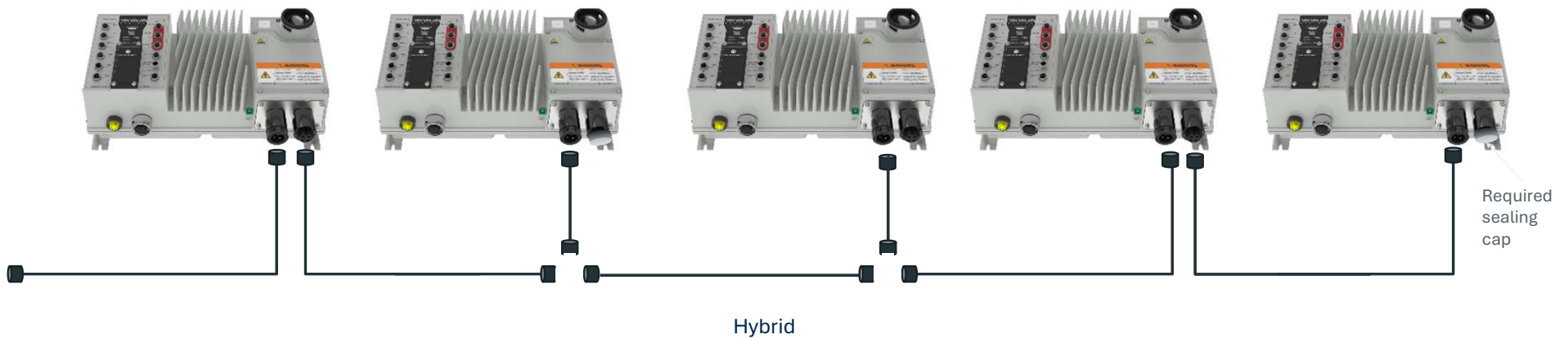


Internal Power Supply



POWER DISTRIBUTION TOPOLOGY SUPPORTED

FEED-THROUGH AND TRUNK AND DROP HYBRID



ARMOR POWERFLEX 330 ON-MACHINE VFD

DISTRIBUTED DRIVE MOTOR – COMING MID-2025



Available 0.5...3HP, 0.37...2.2KW@400-480VAC
Up to IP54, NEMA 12 enclosure

The premier On-Machine VFD solution



Energy
Efficiency



Increased
Sustainability



Integrated
safety



Built-in
intelligence



Integrated
security



Simplified
experience

EXAMPLE ARCHITECTURE

TARGET APPLICATIONS

- Automotive/tire
- Material Handling
- Transportation (airports)
- Packaging and Palletizing

AUX POWER (OPTIONAL)

NETWORK (ETHERNET/IP)

3-PHASE POWER

Power
Distribution
Panel

Simplified

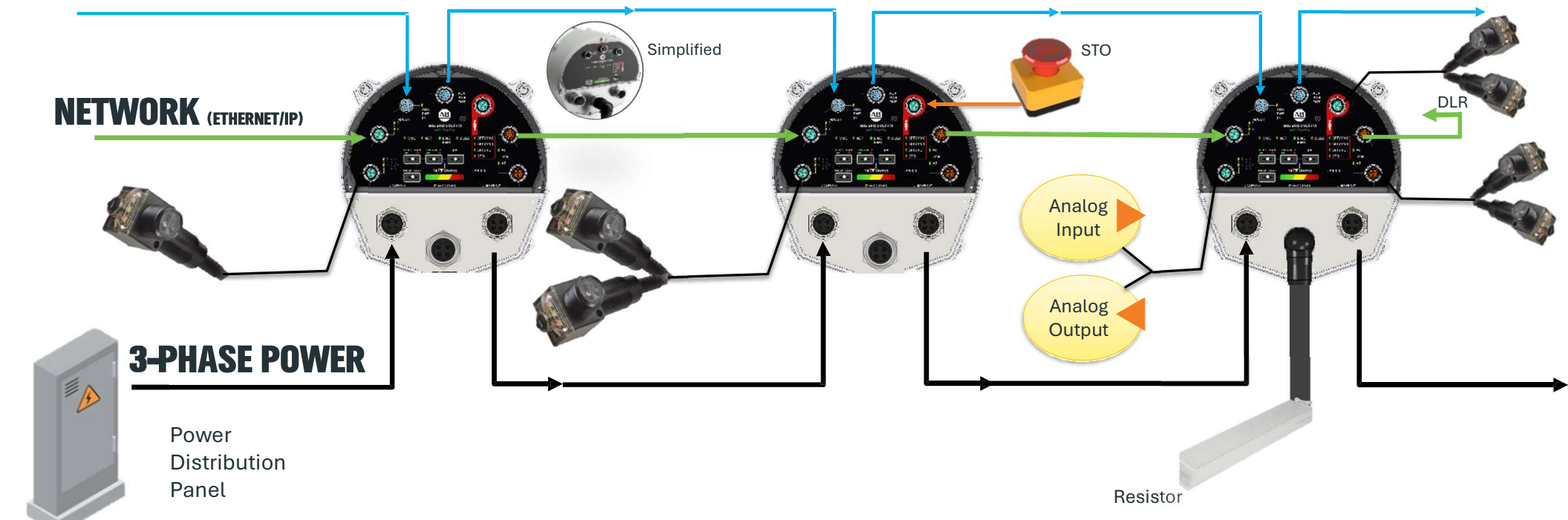
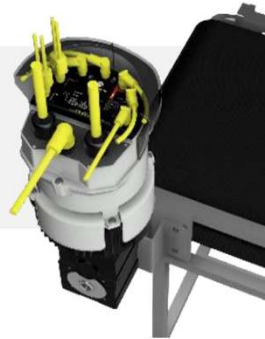
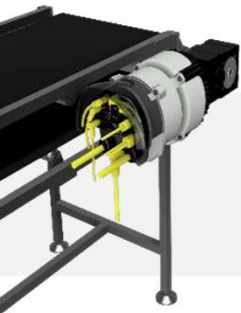
STO

DLR

Analog
Input

Analog
Output

Resistor

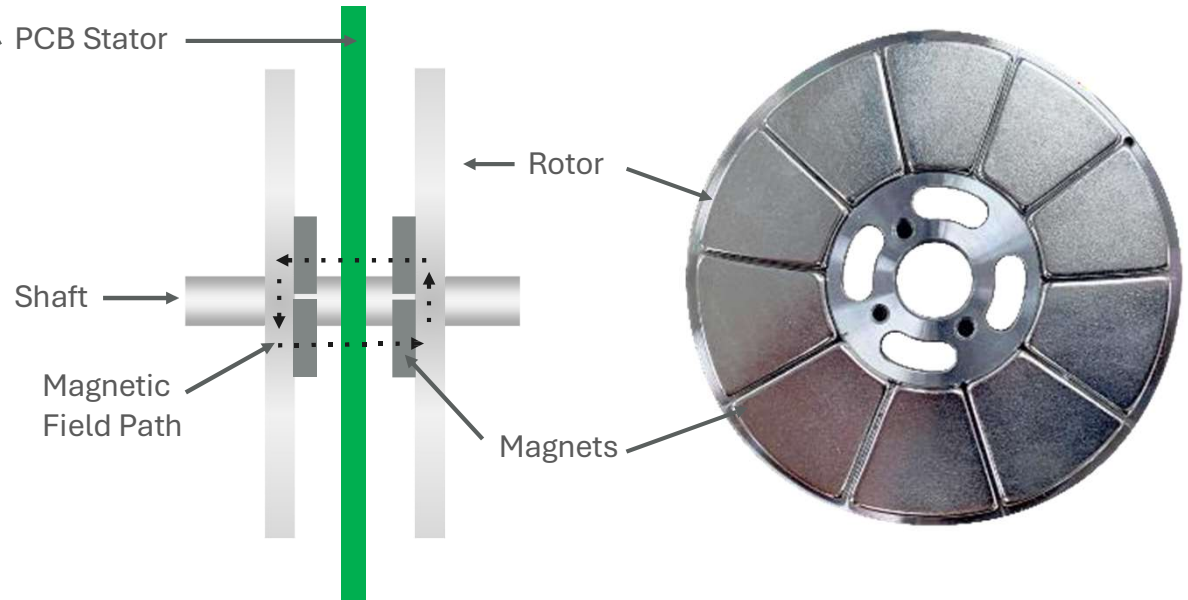
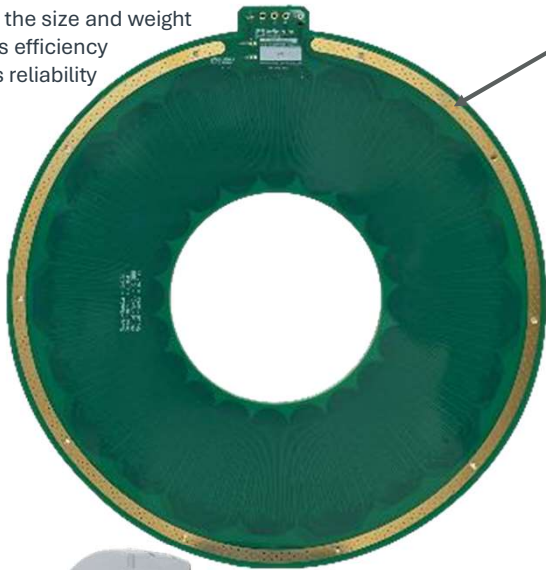


MOTOR TECHNOLOGY

PERMANENT MAGNET SYNCHRONOUS AXIAL-FLUX MOTOR TOPOLOGY

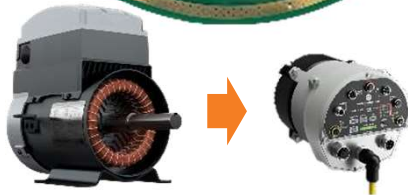
Copper coils etched directly onto the PCB stator

- Eliminates iron and copper wire windings
- Reduces the size and weight
- Increases efficiency
- Improves reliability



Sealed and cooler bearings lead to longer bearing life

VFD energizes PCB Stator and creates a magnetic field that generates torque to turn Rotors and Shaft



Reduced overall size when compared to an induction motor

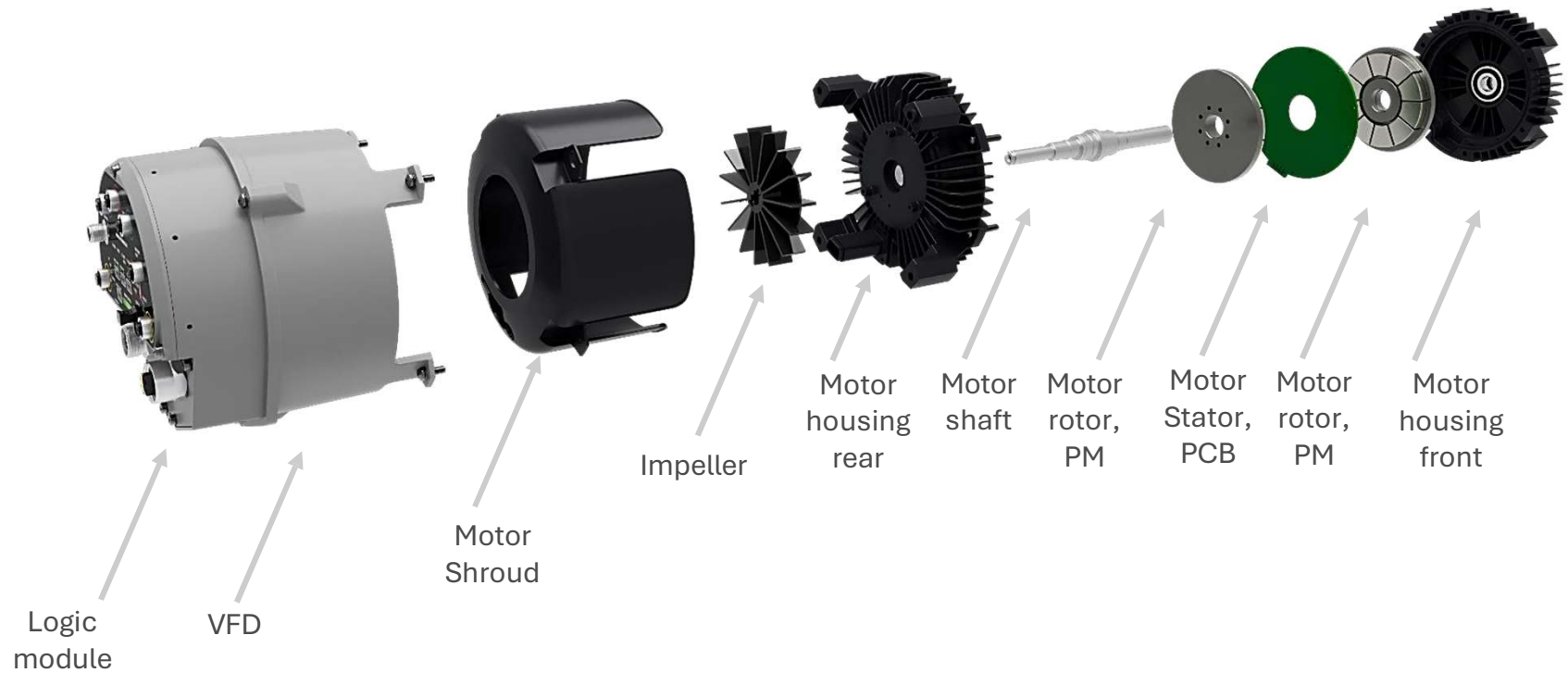
PATENTED PCB STATOR ADVANTAGES

- **No core losses**
- No eddy current losses in the rotor
- **High efficiency in all load conditions**
- No magnetic forces between rotor and stator
- No cogging torque
- **No magnetic noise**
- 2 to 3x higher stator current density
- 2 to 3x lighter than equivalent iron core motor
- **Uniform thermal expansion coefficient**
- **10x more reliable than a form wound coil stator**



REVOLUTIONARY MOTOR DESIGN

ARMOR™ POWERFLEX® 330 DRIVE MOTOR





QUESTIONS?
THANK YOU!