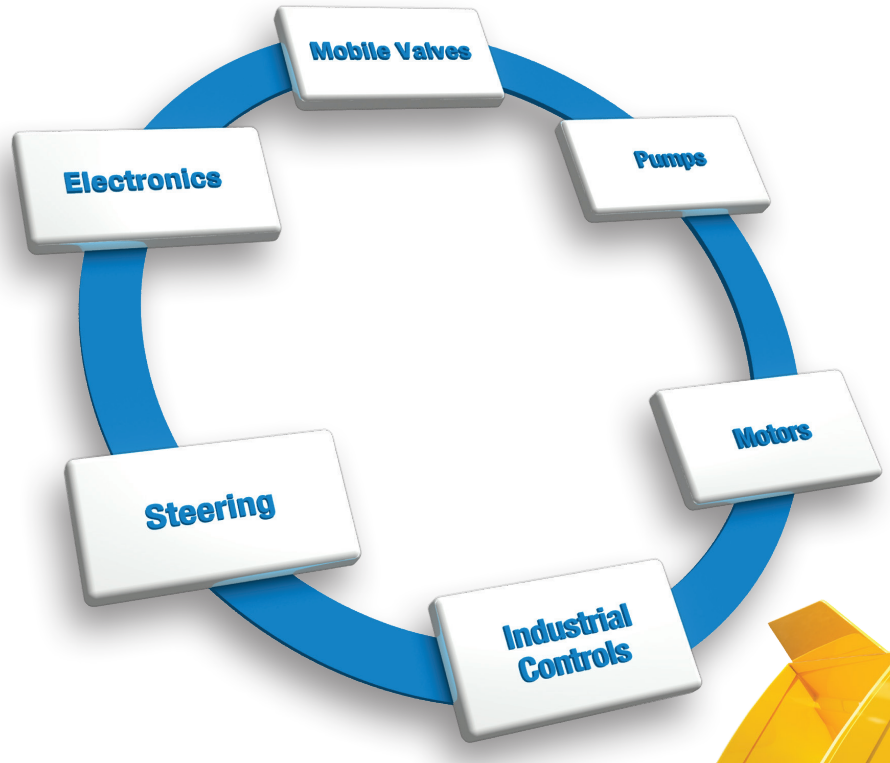
Industrial and Mobile Electro-hydraulic Power Management Solutions

Applied® Fluid Power Companies and Eaton



Electro-Hydraulic Solutions that Deliver Tangible ROI and Reduce the Total Cost of Product Ownership

EATON
Powering Business Worldwide

APPLIED
Industrial Technologies®

One Power Management Supplier + One Integrator = Cost Savings In Parts, Integration and Reduction In Overall Project Time

Machines designed for the toughest jobs in the world need a centralized power management solution that integrates quickly and efficiently to reduce build time and speed your product to market. Turn to the single source that can make it happen -- **Applied® Fluid Power Companies.**

Applied Fluid Power Companies have partnered with **Eaton and their P1 ("Power of One") Program** which provides all components, services and support for both electronic and hydraulics parts and solutions from one single source. **As certified Eaton P1 Integrators**, Applied Fluid Power Companies have the resources to design a solution that integrates your machine's electronics and hydraulics with a simple user interface to provide the power management your machinery needs.

It takes one software package, HFX controller and VFX display to run and monitor the performance of all the moving parts of your machines - pumps, valves, cylinders, motors, steering, etc. Combine that with our knowledgeable Applied P1 engineers, Eaton technical support and access to the largest inventory of electrical and hydraulic products in the world and we can engineer a custom design solution that meets your performance goals.

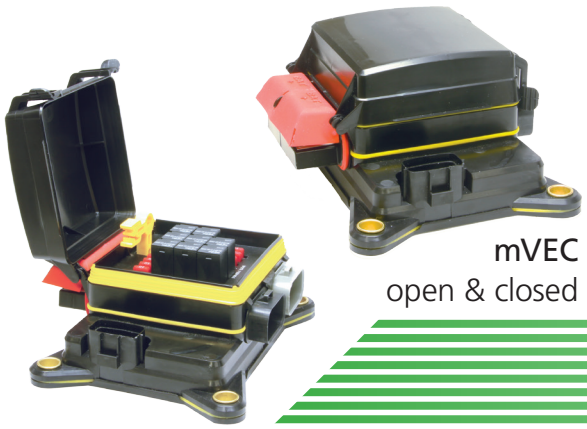
As Certified Eaton P1 Integrators, the Applied Fluid Power Companies Deliver:

- Access to the **industry's finest electro-hydraulic experts** across the country to design electro-hydraulic systems that optimize performance
- The broadest combined set of **electrical and hydraulic products** available anywhere
- **Rapid prototypes** to refine the solution with a series of iterations, dramatically reducing overall time and avoiding costly design rework
- **Lower total cost of ownership** in every project through the country's leading single source electro-hydraulic supplier

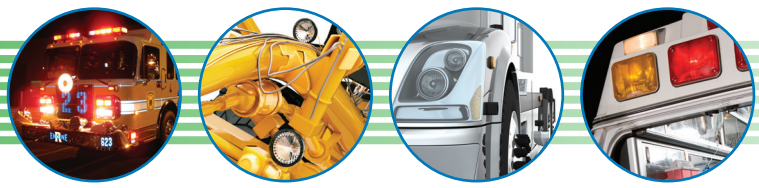
Arriving at a Power Management Solution: Our Process

Our approach involves a **team of design engineers** who understand the current demand in your industry and can design a solution that integrates your machine's electronics and hydraulics with a simple user interface to provide the power management you need.

We leverage **human-centered design principles (Looking, Understanding and Making)** to more quickly bring your key stakeholders and cross-functional project teams into alignment. This program is critical to establishing "design intent" and aligns expectations, identifies key business priorities, constraints, and performance requirements. **Rapid prototypes drive incremental improvements** that are reengineered into the overall solution. The result is an electro-hydraulic solution that is custom designed to **address your business and performance strategies**.



mVEC
open & closed



Your Total Integration So

Experts in the industry

Controls Logic Engineering Services

Access to the broadest electrical and hydraulic products

Partner with Eaton design engineering expertise

Designing custom solutions that meet performance goals

Use a systematic approach to identify customer's challenges and needs

Applied®

Applied P1 Certified Engineers:

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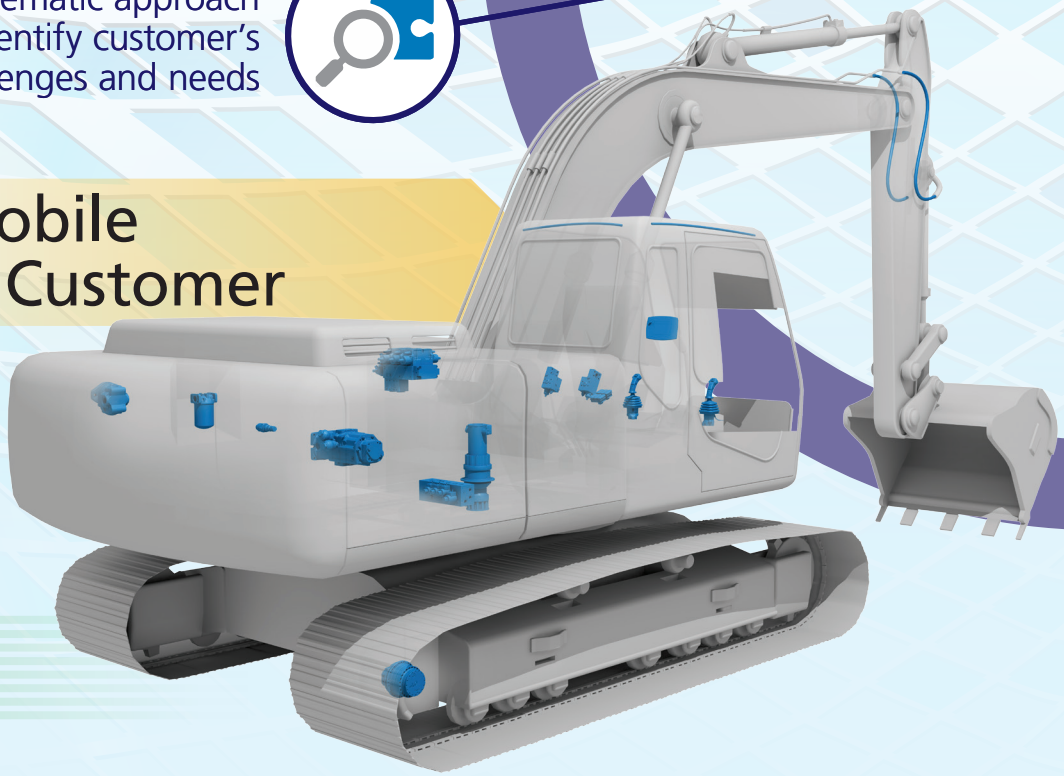

Mobile Customer

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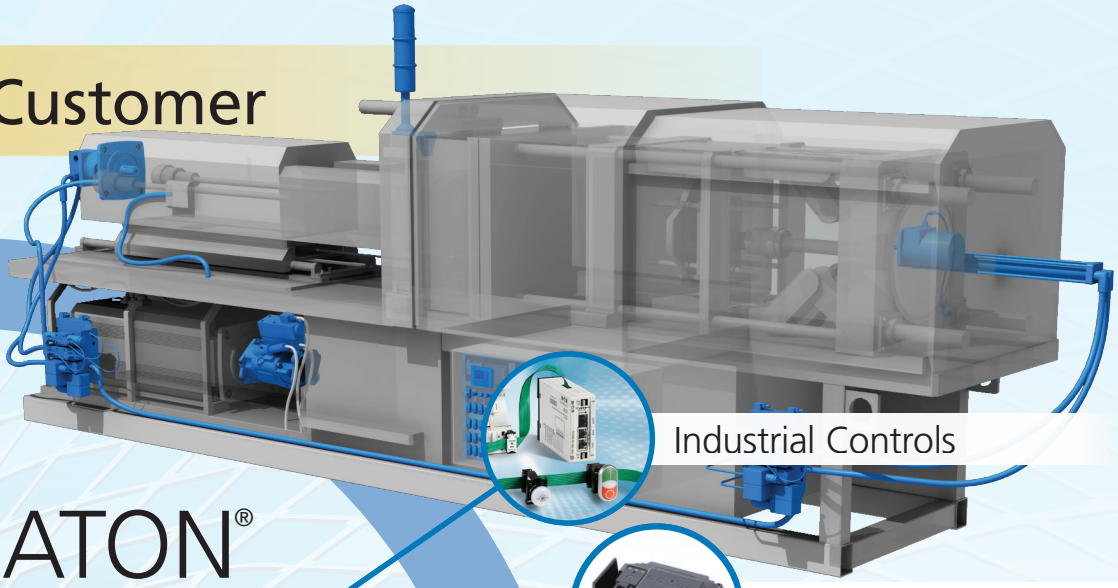
Industrial Customer



Industrial Controls

EATON®
Power of One

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HFX controllers

Codesys Open Architecture

Fluid Conveyance

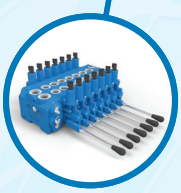
VFX Displays

Joysticks and keypads

Motors

Steering

Pumps



Mobile Valves

Experts in the Industry

Industry Acronyms

ECU – Electronic Control Unit

CAN – Controller Area Network

CANopen – CAN Communication protocol (similar to SAE J1939) for embedded systems used mostly in automation. Slowly becoming popular on off-road machines as well.

CAN bus – is a vehichle bus standard designed to allow microcontrollers and devices to communicate with each other within a vehicle without a host computer. CAN bus is a message-based protocol, designed specifically for automotive applications but now also used in other areas such as aerospace, maritime, industrial automation and medical equipment

PID Controller – A proportional-integral-derivative controller is a control loop feedback mechanism (controller)

SAE J1939 – Standard CAN communication for off road machines

PGN - Parameter Group Number (Used in SAE J1939 Standard)

SPN – Suspect Parameter Number (Used in SAE J1939 Standard)

DTC – Diagnostic Trouble Code (Used in SAE J1939 Standard)

FMI – Failure Mode Identifier (Used in SAE J1939 Standard)

DA – Destination Address (Used in SAE J1939 Standard)

SA – Source Address (Used in SAE J1939 Standard)

DM1 – Diagnostic Message 1, Active Diagnostic Trouble Codes (Used in SAE J1939 Standard)

DM2 – Diagnostic Message 2, Previously Active Diagnostic Trouble Codes (Used in SAE J1939 Standard)

DM3 – Diagnostic Message 3, Diagnostic Data Clear/Reset for Previously Active DTCs (Used in SAE J1939 Standard)

Telematics – The use of wireless devices to transmit data in real time back to a central system.

PLC – Programmable Logic Controller. The “brains” of a machine.

HMI – Human Machine Interface. Where the operator interacts with a machine, typically via flat-panel display.

HEX file – A file that can be directly loaded onto a PLC, without needing to be further compiled. This file cannot be edited once generated.

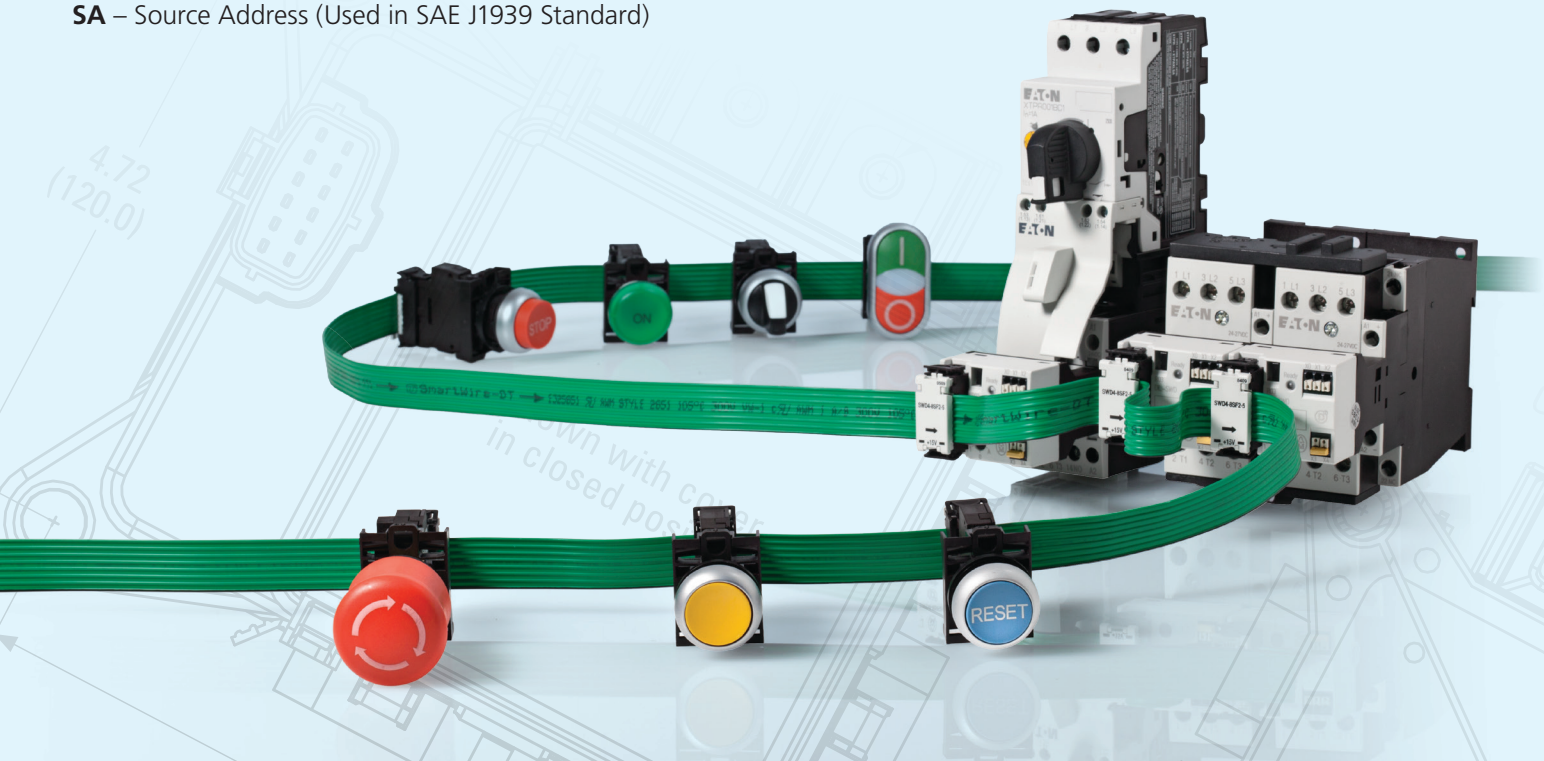
GUI – Graphical User Interface. The program(s) running on an HMI, allowing the operator to interact with the system.

ACK – Acknowledgement command, generally between an operator and a piece of software

EDS – Electronic Data Sheet. Used with CANopen devices to declare the variables the device can send and receive.

EMI – Electromagnetic Interference

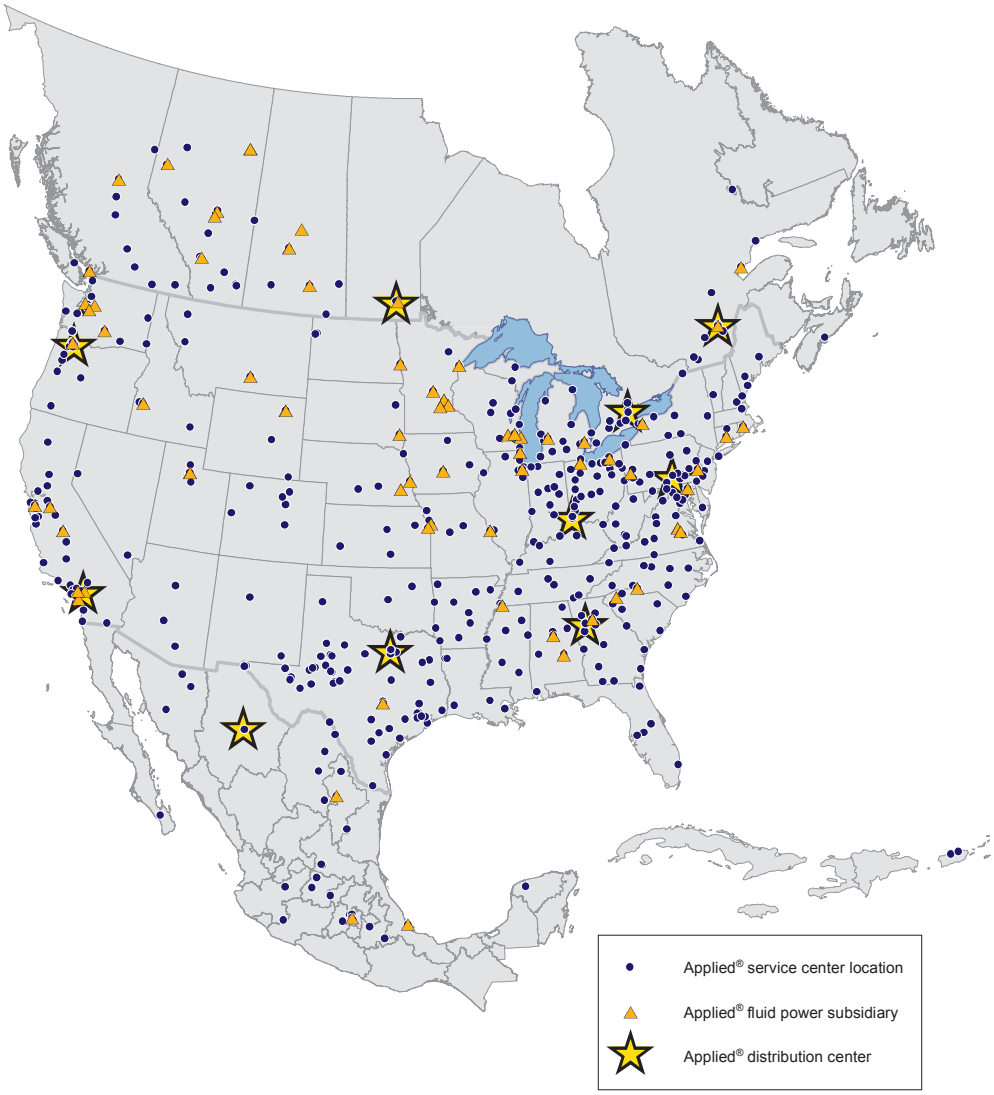
VFD – Variable Frequency Drive



About Applied Fluid Power Companies

Applied Industrial Technologies is the world's largest fluid power distributor. We are more than just a supplier of hydraulic and pneumatic components. Our network of 18 fluid power companies (70+ locations) is your resource for dedicated fluid power support, including: system integration, manifold design, machining and assembly, High Velocity Oxy-Fuel (HVOF) Cylinder Resurfacing, electronic controls, fabrication, fluid filtration, high speed hose assembly, engineering, repair services and much more. Additionally, Applied® has the largest team of Certified Fluid Power Specialists, Certified Electronic Control Specialists and Certified Fluid Power Mechanics and Technicians to assist with problem solving, system building, troubleshooting and other requirements. Between our service centers and our network of 18 fluid power companies, Applied provides immediate access to the critical fluid power components and services you need.

Eaton's largest system integrator nationwide



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APPLIED Industrial Technologies®

Corporate Headquarters
1 Applied Plaza
Cleveland, Ohio 44115
Toll Free Phone: 1-877-279-2799
Applied.com