



# **EAT•N** | Hydraulics

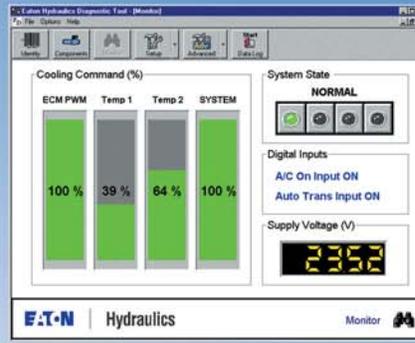
**Electronically Controlled  
Hydrostatic Transmissions**

Product Focus

For Mobile Applications



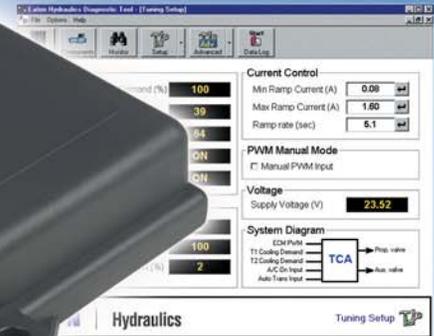
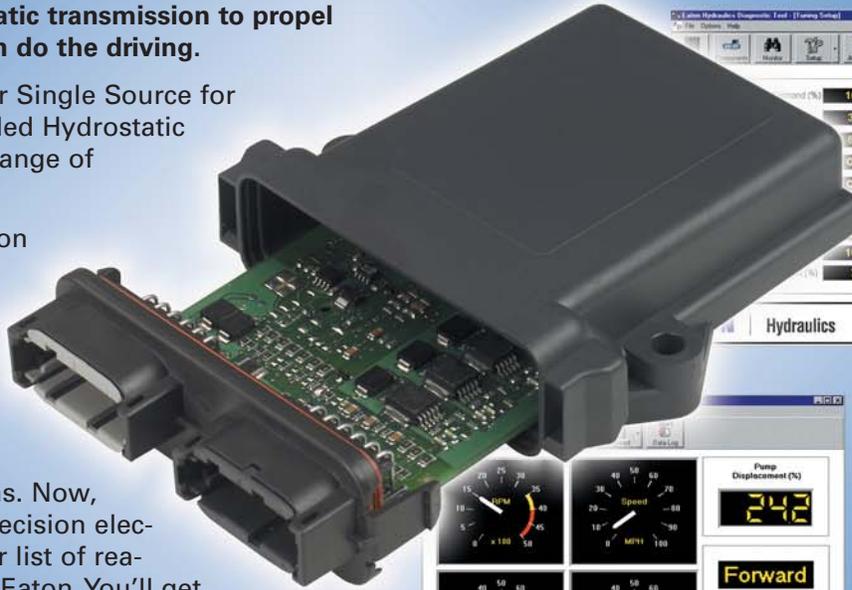
# Electro-hydraulic Hydrostatic Transmission Systems



**If you need a hydrostatic transmission to propel your vehicle, let Eaton do the driving.**

Eaton Hydraulics: Your Single Source for Electronically Controlled Hydrostatic Transmissions for a Range of Platforms.

You've purchased Eaton Hydraulics pumps, motors, steering units and valves in the past because you need rugged, dependable performance for your mobile hydraulics applications. Now, add the benefits of precision electronic controls to your list of reasons for buying from Eaton. You'll get smoother power transmission, more accurate speed control, and more reliable performance, when you include a fully integrated electro-hydraulic system from Eaton into your vehicle.



A fully integrated, electro-hydraulic system means a total solution for you. Working with a team of Platform Specialists and System Engineers, who fully understand your vehicle and what it needs to do, we'll help you configure the right mix of products for your application. Then we'll work with you

to fine-tune a system that's tailored for your needs.

The brain of the system is the Maestro Electronic Control Module. This unit can be configured, by means of software, to perform a wide range of functions.

The Graphical User Interface (GUI) walks the system engineer through the tuning process, using real-time graphical feedback to clearly indicate the system's response to each parameter change. You define the performance characteristics that give your vehicle its competitive advantage.

This brochure illustrates a few examples of how your vehicle performance and reliability can be improved with an Eaton electro-hydraulic control system..

Get the benefits of precision electronic controls from Eaton on your next vehicle redesign project.

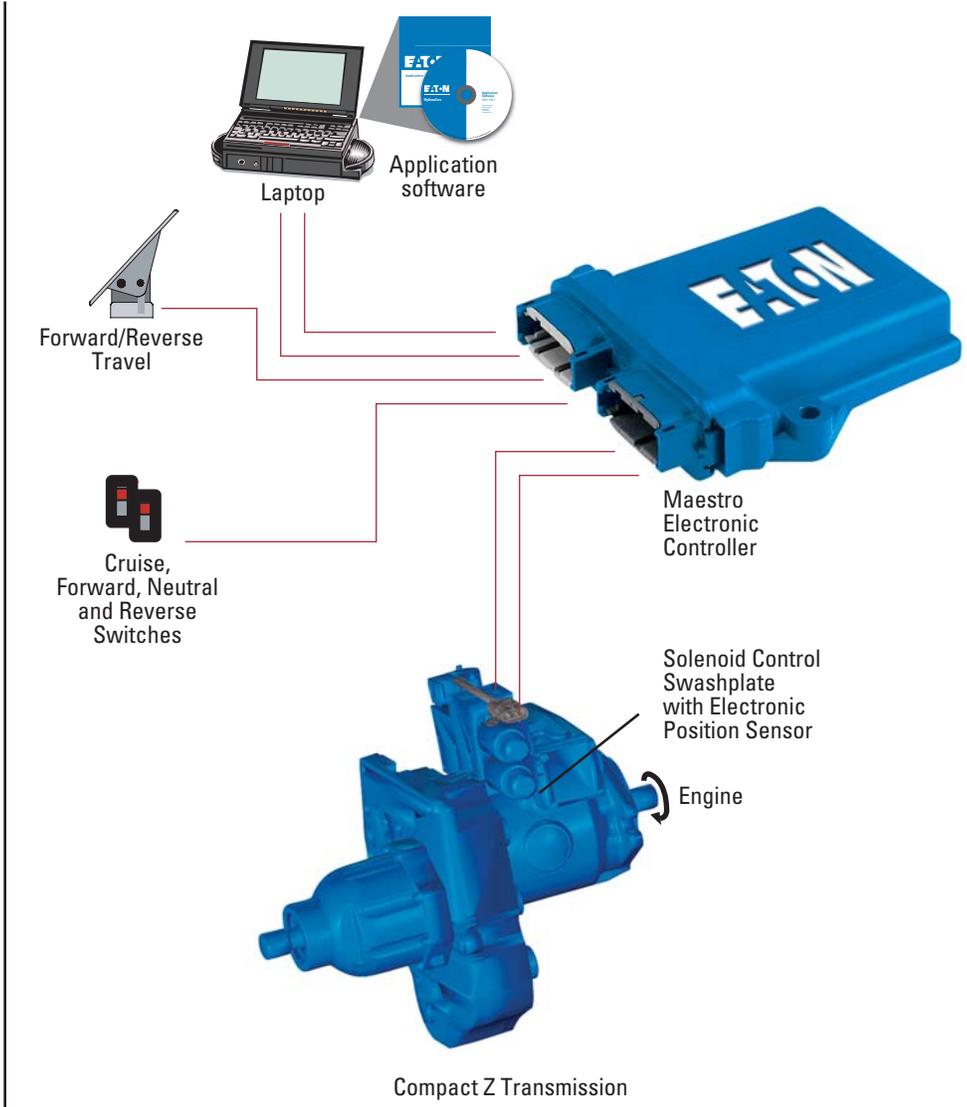
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# Displacement Control

Maestro, combined with the Eaton Compact Z Transmission provides a hydrostatic propulsion package that's ideally suited for compact utility tractors and other small- to medium-sized vehicles under 40 Horsepower.

A properly equipped Compact Z Transmission, fitted with electronic swashplate position feedback sensor and solenoid swashplate actuation, is a smooth-running electro-hydraulic propulsion system giving your

vehicle increased control, with dynamic hydrostatic braking.



## System Integration

- The mechanical coupling of the variable piston pump and motor provides a compact package with fewer leak paths.
- Fewer hose connections reduce assembly time.
- A small envelope allows design flexibility.
- Modular construction eases fit-up to your vehicle.
- Noise and vibrations are reduced with "Drive-by-wire" rather than mechanical linkages.

## Programmable Vehicle Control

- Joystick or foot pedal command transfer functions are easily tuned to your specifications to provide aggressive or mild vehicle acceleration.
- Dynamic hydrostatic braking can be adjusted to provide a more abrupt or a smoother response to operator input.

## Optional Control System Upgrades

- Electronic cruise control can be added to your electro-hydraulic Compact Z Transmission system for greater operator comfort and productivity.
- Programmable anti-stall prevents engine stalling by de-stroking the pump.

## Key Platforms

- Utility Tractors
- Turf Care Vehicles
- Municipal Utility Vehicles



# Electronic Transmission Automotive Control

(ETAC™)

The Maestro controller is integrated with the engine throttle management system as well as the closed circuit pump. It drives high performance proportional pump actuators and uses electronic swashplate feedback to provide precise, dynamic system control.

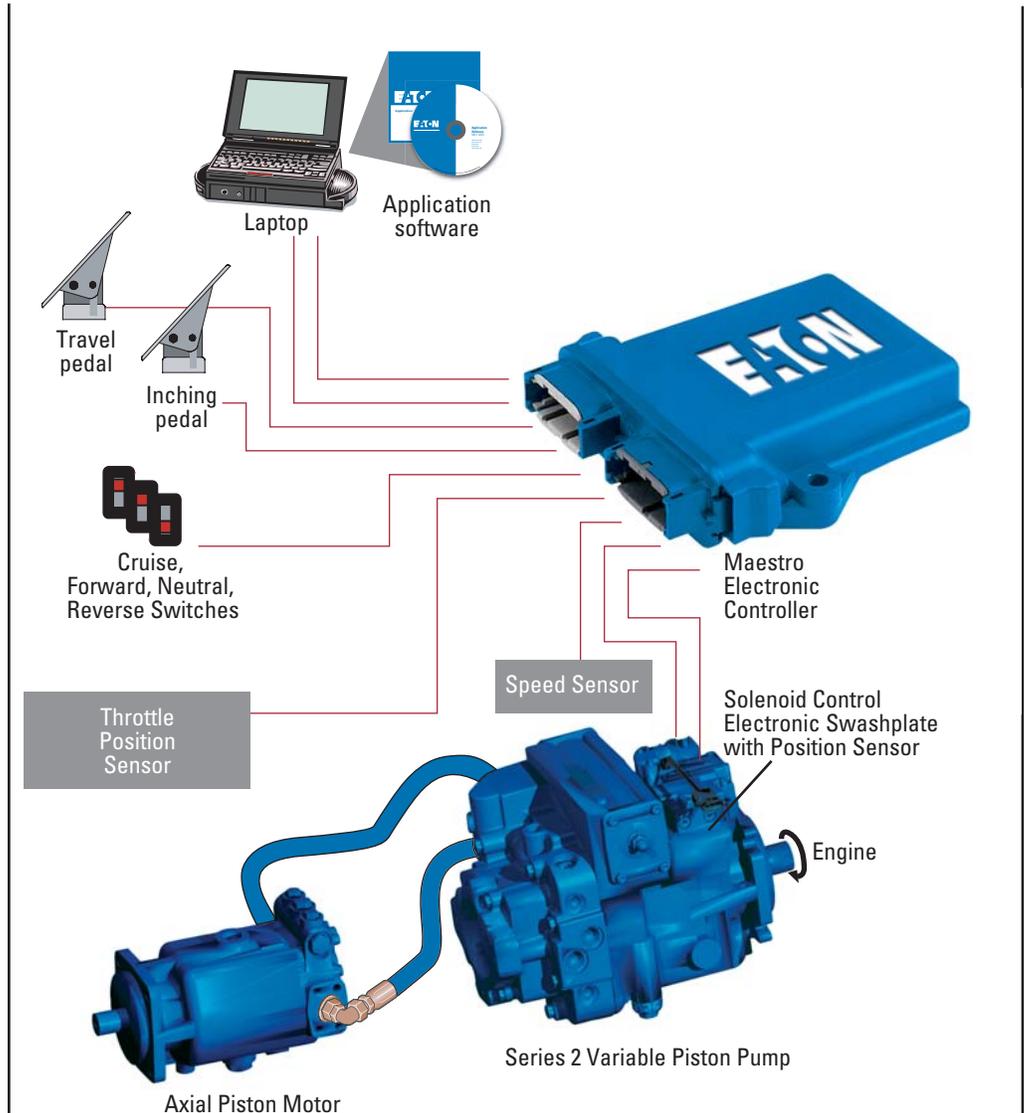
## ETAC™

- Tailored performance improves productivity over a wide range of operator skill levels.
- ETAC™ matches engine power to the work requirement, for quieter operation and reduced fuel consumption.
- Inching function maximizes productivity by allowing smoother, more manageable operation of work hydraulics.
- The anti-stall feature enables maximum use of available engine power.



### Key Platforms

- Wheel Loaders
- Fork Lift Trucks
- Telehandlers
- Street Sweepers



### Optional Control System Upgrades

#### Cruise Control

- Maintains consistent working speed so the operator can focus on work quality.
- Reduces operator fatigue.
- Adjusts and controls vehicle speed in discrete steps.

#### Motor Shift (2-speed)

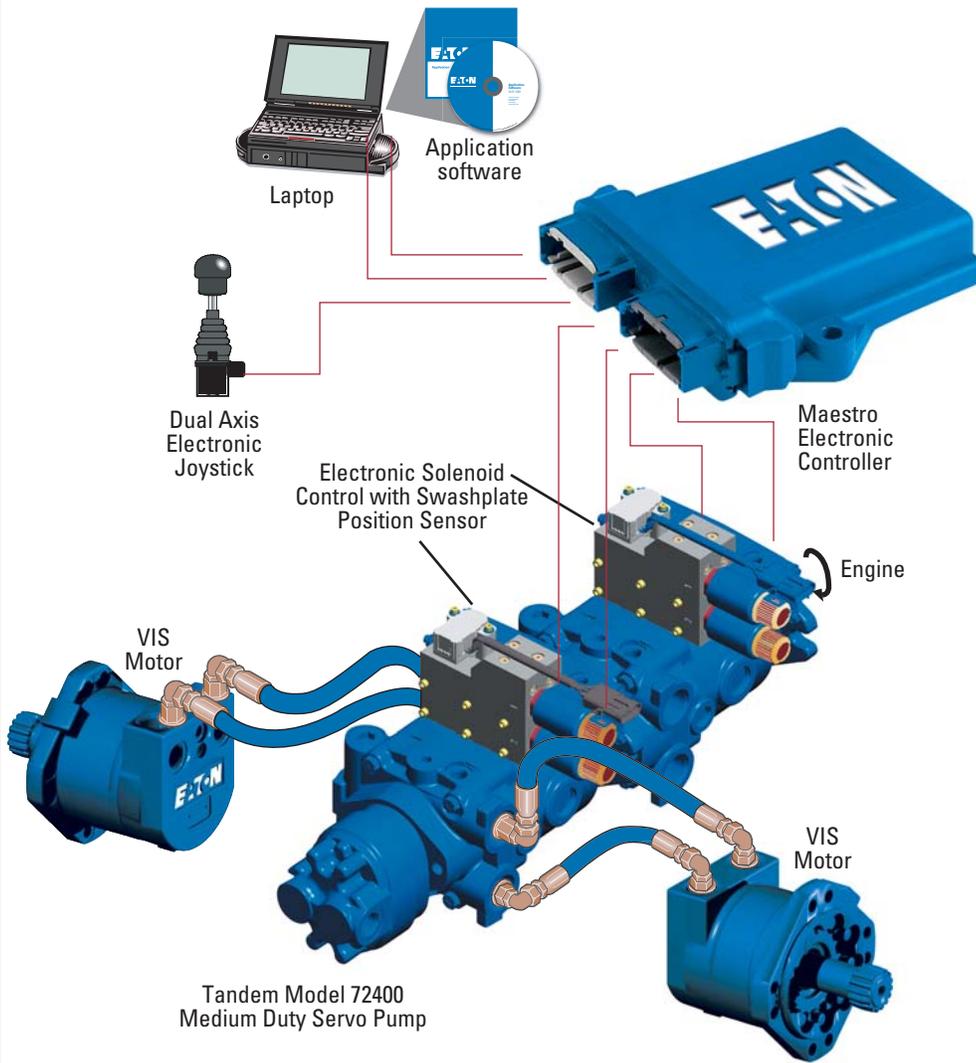
- Expands power and speed range with integrated motor control.
- Choose between automatic or operator selectable operation.

# Dual Path Control

Maestro is an ideal electronic controller for dual path hydrostatic propulsion systems on skid steer and tracked vehicles. Like the Compact Z Transmission and Heavy Duty Series 2 servo pumps, the Tandem Model 72400 Medium

Duty Servo Pump can be fitted with dual electronic swashplate position feedback sensor and solenoid swashplate actuation. This system matches the performance of independent propulsion systems. It also provides the indus-

try's leading straight-line tracking, slow speed stability and smooth turning performance.



## System Integration

- The easy installation of drive-by-wire systems allows for flexibility in vehicle design.
- Vibration, noise, and the need for cumbersome adjustment of mechanical linkages are eliminated.

## Electronic Control

- Precision control of independent propulsion systems eliminates uncommanded vehicle spin and allows accurate slow speed maneuverability.
- Near-zero hysteresis provides accurate vehicle response to joystick propulsion and steering command inputs.
- Programmability allows tuning of performance parameters for both the inexperienced rental market user and the expert user.
- CAN-bus interface provides communication between the vehicle master controller, and operator interface devices such as displays, engine controller and sensors.



## Key Platforms

- Skid Steer Loaders
- Windrowers
- Tracked Vehicles

# DrumMaster™ Electronic Control and Constant Speed Drive

Closed-loop electronic drum speed control, independent of engine speed, for your transit mixer is easy with DrumMaster™. Consistent concrete mix quality becomes routine. Constant speed control during transport

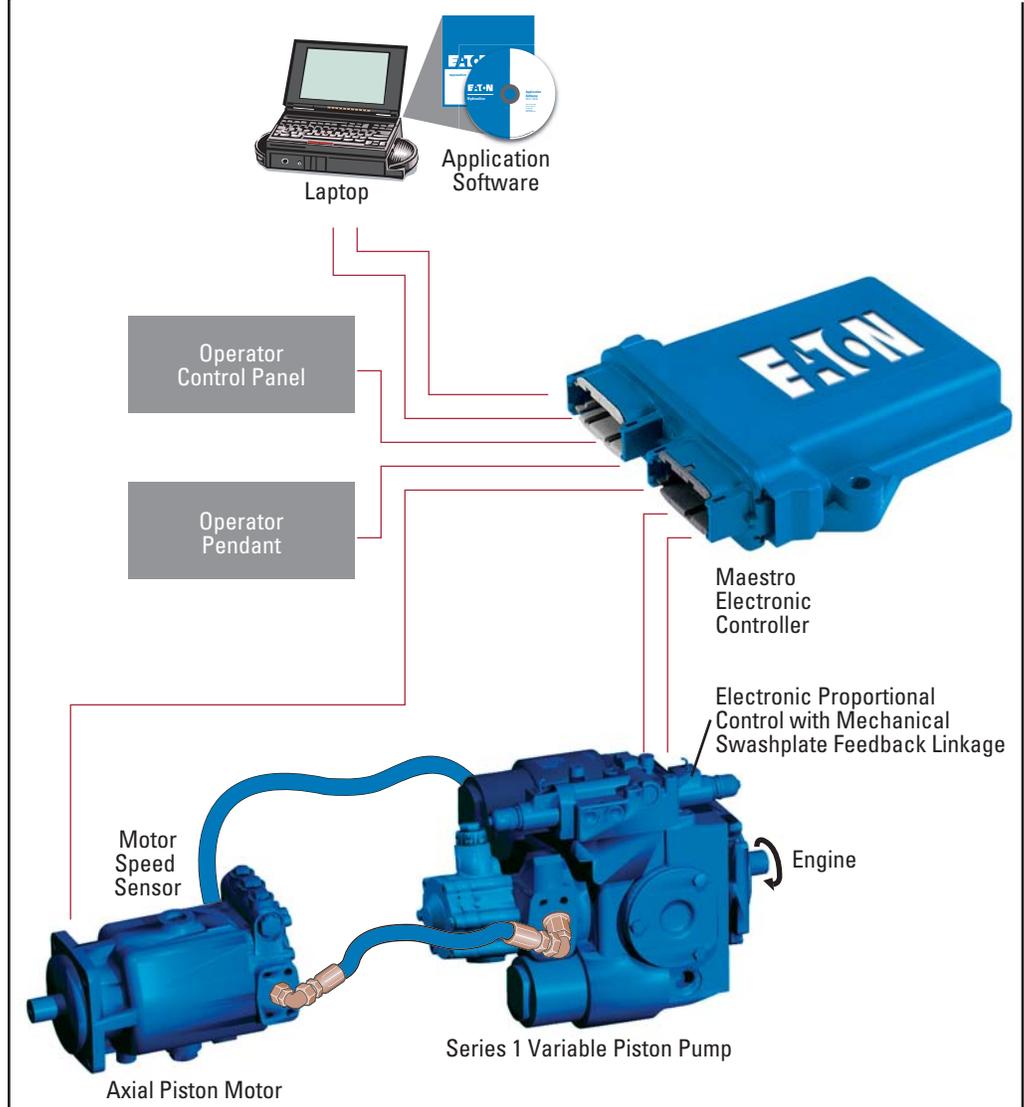
increases drum maintenance intervals as well as improving vehicle driving dynamics. Precise discharge speed control through push-button operation improves work quality and productivity. CAN-bus interface

allows integration of drum speed sensor to other on-board electronics, such as speed and rotation counter displays, or GPS systems, allowing maintenance on an as-needed basis.



## Other Speed Control Applications

- Concrete Transit Mixers
- Tub Grinders
- Trenchers



## Electronic Control

- Cables subjected to corrosive conditions, are eliminated.
- The discharge rate can be more easily modulated for more accurate placement of material.
- DrumMaster™ reduces wear and tear on the

drum drive gearbox and truck chassis components.

- Drum rotation direction indicator light output reduces operator discharge errors.
- Manual override capability is always available.

## Transport Drum Speed Control

- Constant, slow rate drum speed control reduces total drum revolutions, increasing drum life and providing better control of concrete consistency.
- The need for operator monitoring and adjustment of drum speed are eliminated.

- The demand placed on engine power by the hydraulic pump is not increased during acceleration, improving vehicle performance and fuel efficiency.

# Engineered Systems

Tailored for your needs

**Other Electro-hydraulic systems for steering, work circuit and fan drive applications.**

## Electro-hydraulic Steer By Wire (EH-SBW)

EH-SBW is a new technology steering system for vehicles where an electronic sensor replaces the rotary steering valve of a traditional hydraulic steering system. An electrical signal, rather than mechanical or fluid connections, transfers the steering command from the operator's steering wheel to the steered wheel electro-hydraulic actuator. The Eaton system includes a novel tactile feedback device at the steering wheel that simulates the feel of conventional hydrostatic steering.

### Additional Benefits:

- Hydraulic leaks and noise are reduced.
- Assembly is simplified, providing greater cab design flexibility.
- Productivity, safety, and ergonomics are all improved.
- The tailoring of steering characteristics by re-programming is simplified.

## Electro-hydraulic Work Circuits

An electronic remote control joystick replaces the hydraulic remote control, cables and levers of a traditional work circuit operator interface. An electrical signal, rather than mechanical or fluid connections, transfers the boom, bucket or implement command from the operator's joystick to an electro-hydraulic directional control valve. Other work circuit applications include control of auxiliary motors, power take-off clutches, and transmissions.

### Additional Benefits:

- The work circuit control is more accurate and stable.
- Hydraulic noise and leaks in the cab are reduced.
- Hydraulic connections are eliminated or simplified.
- Vehicle energy management is improved.

## Electro-hydraulic Fan Drive System

Electronically controlled hydraulic fan drive systems from Eaton provide fast, quiet, efficient cooling for engine coolant, hydraulic fluid, charge air and entire engine compartments. The electronic controller receives a cooling demand signal from either the engine control module or temperature sensors. Adjustable ramps provide smooth fan speed transitions, reducing noise and shock to power take-off couplings.

### Additional Benefits:

- Installation is flexible for optimum fan location.
- Emissions are reduced and fuel economy is improved.
- The power available to the drive wheels is increased.
- Choose from efficient variable or cost-effective fixed displacement systems.



Lift truck with steer by wire



Electro-hydraulic work circuit



Bus with Fan Drive System

## World Class Brands, Products and Systems

**EATON**

**VICKERS**<sup>®</sup>

**Char-Lynn**<sup>®</sup>

**Aeroquip**<sup>®</sup>

Eaton Corporation is a global diversified industrial manufacturer. Eaton is a leader in:

- Fluid power systems
- Electrical power quality, distribution and control
- Automotive engine air management and fuel economy
- Intelligent truck systems for fuel economy and safety

For more information, visit [www.eaton.com](http://www.eaton.com).

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