



# Making a better machine

Intelligent circuit protection allows OEMs to set new standards for accuracy, productivity

## Executive summary

**Machine builders need to deliver solutions that are robust and reliable over long periods to go beyond customer expectations; offering their customers speed, efficiency, and intelligence like never before. At the same time, advancing the productivity and profitability of their own business is equally essential.**

**For manufacturers that develop hydrostatic vessels for vital equipment testing applications, maintaining the health of their hydraulic power units is critical to supporting the needs of their business and customers. Because customer equipment is tested to discover the point of failure, each analysis is destructive by nature. This means every test needs to be performed without error and recorded exactly, as reperforming tests can add thousands of dollars in additional expenses.**

**For this reason, it is extremely valuable for the original equipment manufacturer (OEM) to apply metering and monitoring devices that provide the greatest degree of clarity and control possible.**

## Redefining accuracy, reliability in hydrostatic testing

Recently, Eaton worked with a test equipment company that manufactures custom fixtures for hydrostatic test environments to develop a hydraulic power unit with unprecedented levels of control, visibility, and maintainability.

Hydrostatic testing is a vital controlled process that gives equipment manufacturers across many different industries the opportunity to confirm maximum threshold measurements for safe operation in compliance with local, federal, and industry standards. Performing quality assurance of pressure vessels for transport and storage of gases is very important because such containers can explode if they fail under pressure.

These tests are performed in pressurized vessels, which are filled with a liquid that may be dyed to support visual leak detection and pressurized according to the specified testing criteria. These pressurized environments rely on hydraulic power units to operate the critical testing functions.

The hydraulic power units typically consist of four main components: an engine or motor, a pump, a valve, and a reservoir. Together, these components provide the flow (movement) that the system needs to operate. These power units are also equipped with integral metering and monitoring systems that provide critical data on power consumption and flow rates.

## Solution

To provide accurate collection of data regarding system power consumption and flow rate in Gallons Per Minute, the OEM used Eaton's Power Defense™ circuit breakers with motor protection technology.

The breakers utilize Eaton's Power Xpert™ Release electronic trip units with built-in communications and metering, which allow equipment manufacturers to use fewer components and a simplified design when designing connected systems.

The trip unit technology supports the ability to accurately measure energy consumption and flow rate with no additional meters or equipment. As a result, the device can deliver real-time data on hydraulic power unit performance and health.



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The intelligent trip unit also timestamps captured events, and stores critical data and waveforms associated with each event for fault analysis and forensic timeline reconstruction. Using the data from each hydraulic power unit, users can analyze baseline statistics to indicate proper HPU performance or signal need for maintenance.

Each electronic trip unit is equipped with the latest microprocessor technology including advanced algorithms that notify users when the circuit protection devices in their hydraulic power unit needs to be maintained or replaced. Additional programmable relay alarms provide users situational awareness to preempt impending system failures, keeping testing equipment online, safe, and productive.

For further analysis, Eaton's Power Xpert Protection Manager (PXPM) provides a clean, intuitive user interface enabling unmatched set-up, control, testing, and troubleshooting. Settings and tests are communicated to trip units via USB or through connected networks, with no special test equipment required.

This innovative platform greatly simplifies troubleshooting using historical event summaries and real-time data provided by the Power Xpert Release trip units to save labor and money. Eaton's PXPM also allows users to perform secondary injection and test reporting with no additional hardware to further reduce costs.

Code compliance is made simple using Eaton's PXPM to support breaker and current sensor testing through a simple USB interface. This unique offering ensures complete testing of the functionality of a breaker and electronic trip unit with dramatically reduced labor compared to traditional testing methods.

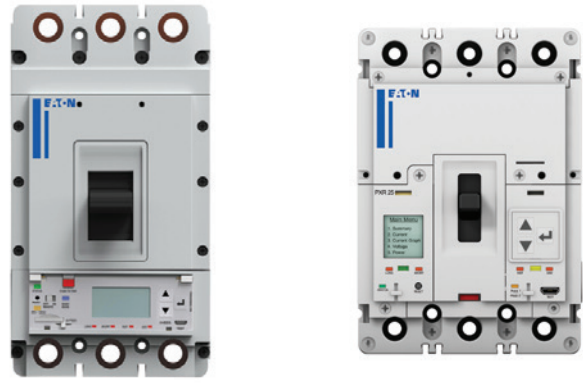
### The dramatic results of intelligent circuit protection

The integration of Eaton's Power Defense™ motor protection circuit breakers with Power Xpert Release trip units is providing the test equipment company with a foundation for success. By combining embedded communications with metering functionality, fewer components are needed for each hydraulic power unit, which translates into lower cost and a smaller footprint.

### Helping machine builders exceed customer expectations

Regardless of your application or industry, Eaton delivers the innovative solutions needed to help bridge the productivity gap.

Before you think about what you are building next, think about how you will defend it. You need a device with connected, communicating built-in electronics and the ability to generate the data to help you optimize performance. With Eaton's latest circuit protection innovations, you can build with confidence to not only increase reliability and uptime — but also get to market faster, at lower cost and with fewer components.



Power Defense molded case circuit breakers.

Eaton's intelligent circuit protection system is also providing the OEM with the following benefits:

#### Value-added equipment health

The granular level of monitored performance data provided through Eaton's intelligent circuit protection enables the user of the testing equipment to shift from reactive troubleshooting when they have an expensive test failure, to proactive prevention. Tests can be run with greater confidence of accuracy while expensive retesting expenses are eliminated.

#### Reduced costs

Typical motor protection requires many different parts. For embedded communications, several additional components are traditionally required. Through its integrated and simplified design, Eaton's intelligent circuit protection technology is driving cost savings. For example, the OEM producing hydraulic power units is saving approximately \$4,000 on each unit.

#### Improved pump protection

The OEM utilizes a specialized pump within its hydraulic power units. System protection was previously limited due to unprogrammable trip curves. The Power Xpert Release trip units solve this issue by providing the company with more control than previously achievable – allowing designers to customize protection for each pump and intended testing application.

#### Enhanced uptime and safety

Resetting legacy breakers after trip events can be extremely challenging. The new Eaton solution includes a contactor in addition to the breaker. This allows the OEM to remotely open the contactor, allowing the load to clear without tripping the breaker. This functionality significantly improves equipment uptime while offering improvements in operator safety.

#### Opportunities for increased profitability

Eaton's intelligent circuit protection solution has created the potential for enhanced profitability. Because the OEM can now remotely monitor machine operation and performance, they can shift to selling hours of hydraulic power unit operation or test equipment operation versus selling the equipment outright. Alternatively, the testing company has the ability to connect the hydraulic power units to the cloud and offer their customers proactive maintenance services performed by their technicians.



Power Xpert Protection Manager software.

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