

Evolving fluid power

Eaton is committed to developing future technologies that advance the functionality of hydraulic systems and optimize current technology. One of the keys to advancing functionality is technology integration. Using the example of Darwin's theory of evolution, adaptability, not size or strength, is the key to advancement. Likewise, in the fluid-power industry, it is adaptability to the evolving marketplace that often creates the "fittest" ingredients for success. Adapting and blending existing technology is one way to successfully manipulate emerging technologies.

Perhaps one of the most promising advances in fluid-power technology that is happening right now is the blending of electronics, hydraulics, and software to create intelligent fluid-power systems. The target market for this technology is nearly all on- and off-highway hydraulic uses, including agriculture, construction, material-handling, and other industrial applications.

Intelligent fluid-power systems work by integrating the control of electronics with the power density of hydraulics to provide the best of both worlds. Hydraulic power is controlled using electric hardware, sensors, software, and controls. This electrohydraulic technology has taken quantum leaps in recent years as advances in microprocessor controls and hydraulic system improvements have merged.

While internal development of electrohydraulic controls at Eaton have been quite successful, one of the most significant ways that Eaton has moved into this technology is through its acquisition of UK-based **Ultronics**, which offered sensor and software technologies that allow the customization of electrohydraulic valve systems. Eaton believes the precision of controllability under changing load conditions offered by this technology is superior to any other solution currently on the market.

Another technological advancement that uses the notion of adaptation is

the hybrid hydraulic vehicle. Vehicles with hybrid technology can potentially offer significant improvement in fuel economy (between 25 to 50%), as well as lower emissions and reduce wear and tear on the brakes, engine, and transmission.

Eaton already has ventured into hybrid technology with its Hydraulic Launch Assist (HLA) system, a parallel hybrid regenerative braking system targeted at Class 2B through Class 8 commercial vehicles. The HLA technology recovers energy normally lost during vehicle braking and converts it into hydraulic power that can be used for vehicle acceleration. This design feature creates a more efficient powertrain that consumes less fuel and emits fewer harmful emissions while reducing wear on vehicles such as refuse trucks that operate mostly on a stop-and-go basis.

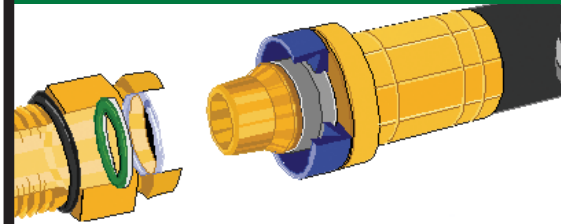
Of course, Eaton engineers never lose sight of the need to optimize current hydraulic systems and components to achieve zero external leaks, lower noise and vibration, and, overall, create more efficient systems while developing innovative manufacturing techniques. One example of optimization with which Eaton is leading the industry is its Snap-to-Connect (STC) technology, which not only offers innovative leak prevention, but also simplifies fluid connections.

Eaton's patented STC connections provide virtually zero leakage in hydraulic systems by using elastomeric seals. A ring-latch connection in place of a threaded connection significantly reduces installation time.

These are exciting times to be in the fluid-power industry. The challenges are many but, from my point of view, that only increases the opportunity and desire to use advanced technologies to achieve advanced solutions. Those that can adapt and develop technology will likely be the "fittest" innovators of the future. **OHE**



by Craig Arnold, Senior Vice President & Group Executive, Eaton Fluid Power Group



Schematic of STC connection.



STC and disconnecting tool.