

For Immediate Release
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Solenoid with built-in control eliminates performance guesswork

The patented Equalizer from Trombetta Motion Technologies incorporates a solenoid, control module, and wire harness in one unit. There are no external switches or other assisting devices required. Fine-wire winding and fragile interconnect wiring are eliminated. The control module is under the end cap and connector shell, the end opposite the plunger. The Equalizer uses a single coil winding and achieves a 50% reduction in the continuous operating power, so there is less energy drain on the power source and less heat to dissipate.

Unlike other solenoids that lose pull force from the heat increases and wiring losses, the Equalizer automatically compensates for these factors. Equalizer's performance is virtually unaffected by the fluctuations in voltage and temperature that are inevitable with mobile and other equipment.

This pull-type solenoid eliminates the performance guesswork by eliminating the variations normally associated with voltage and temperature fluctuations. Trombetta's design uses PWM to precisely control coil power by changing the duty cycle (coil on time/ (on + off time)) in response to changing voltage and temperature conditions. The modulation affects pulse duration, which is changed in response to the information being interpreted by the control's microprocessor. The control's micro-code monitors voltage and temperature during each cycle to predetermine the on and off time ratio (duty cycle) for the next cycle.

Because the Equalizer uses a consistent amount of power under broadly varying conditions, it eliminates most of the headaches usually encountered in selecting a protective fuse that will adequately protect equipment without nuisance failures, for example, when the solenoid is cold.

The Equalizer operates at ambient temperatures between -40 to 105 C. Continuous operation in ambient temperatures as high as 105 C still produces the rated force of 12 lb, even with voltage at the solenoid as low as 10 V. With ambient temperatures lower than 105 C, the Equalizer will produce its rated force at voltages even less than 10 V. The typical Equalizer pull force is 12 lb minimum at 10-15 V, even when operating continuously at 105 C. The hold force is 25 lb at 6 VDC and above when operating through the full temperature range.

13901 Main Street
Menomonee Falls
Wisconsin 53051
p 262/251-5454
f 262/251-5757

www.trombetta.com

The Equalizer uses a three-pin Packard Electric Metri-Pack series 150 male receptacle connection that is integral to the solenoid. Two wires are for the typical battery positive and ground carrying the main power to the solenoid. The third wire is a command signal line. The solenoid is switched on by switching the control line to battery plus. The control line draws only a few milliamps of current, so the control wiring can be light-gauge wire and the switching device can be a low-current switch. The Equalizer maintains its performance even if the operator's point of control is a significant distance from the solenoid, as is often the case with mobile equipment such as aerial lifts. High-current wiring can be run the most direct and shortest route from battery to the solenoid. Only the low-current command signal needs to be wired to the operator's station.

Integrating the control module into the solenoid keeps the size of the solenoid down to a minimum, so the unit can fit in a relatively small envelope. The Equalizer is available in convenient side- or flange-mount configurations.

Trombetta will customize the Equalizer to suit special requirements. Options include pull-in time duration, force, minimum voltage, thermal shut down, and current modifications. Potential applications include remote throttle control, equipment with distributed actuation of control; differential locks; and distributed stop, release, lock, and unlock capabilities.

Equalizer 's full voltage range is from six to 15 VDC when operating continuously, but can increase to 16 VDC for 30 minutes or less. Its ratings also allow it to be subject to 24 V during jump starts of five minutes or less. Hold force is 25 lb at six VDC. Stroke length is 1.0 inch. The product's maximum duty cycle is 10 cycles in 1 minute.

Based in Menomonee Falls, Wisconsin, Trombetta has been a leading manufacturer of industrial work solenoids, DC contactors, electronic controls and engineering services for over seventy years.

For more information call (262) 251-5454 or visit www.Trombetta.com

Media Contact:
Stacy Wessell, Marketing Coordinator
P: 1.262.251.5454
F: 262.251.5757
E: swessell@trombetta.com

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