

Maestro ModuDrive™ IIoT Ethernet Actuators

Engineered for the harsh underground mine environment.



The **ModuDrive™** Industrial Internet of Things (IIoT) linear actuator provides the ultimate in reliability, precision and high thrust in a compact and robust enclosure. The edge based actuator provides full feedback and health conditions thereby providing maximum uptime and performance.

Real-time diagnostics that allow troubleshooting from surface assuring maximum uptime and safety.

ModuDrive™ IIoT Actuators

Robust • Compact • Powerful

Why do automation & mining engineers choose to select ModuDrive™ IIoT linear actuators?

- Eliminates expensive and maintenance intensive hydraulic and pneumatic actuators.
- Reduces CAPEX by eliminating hydraulic power-packs or systems to drain water from compressed air lines.
- Reduces OPEX by providing real-time advanced diagnostics through MaestroLink™ Server on any desk top PC.
- Simple connection to any electrical power source and network connection.
- Actuator soft start and stop functions to eliminate damage from inertia.

ModuDrive™ IIoT linear actuators are used for rotary or linear control and positioning

- Automated ventilation regulators and louvers
- Automated safety gates for ramp traffic control
- Automated ventilation dampers



The Actuator Challenge

Pneumatic and hydraulic actuators have been used to automate gates, regulators and dampers but still offer significant challenges in underground mines.

Pneumatic actuators require reliable and dry compressed air. All atmospheric air contains a certain amount of water vapor which is mixed with other gases making up the air. This water vapor is drawn into the compressor with the incoming air. The act of compression generates large amounts of heat which allows this water to remain in a vapor state. As the air/water mixture cools, either in a receiver, dryer, or in the system piping, the vapor condenses to liquid, and falls out of the air stream. Significant moisture buildup results in rust in pipes and early failure of water traps and cylinders resulting in higher OPEX and reduced system uptime.

Hydraulic actuators eliminate most of the operating maintenance but require significantly higher CAPEX often to the point of reducing automation in many underground applications.

IIoT integration that drives out complexity and CAPEX

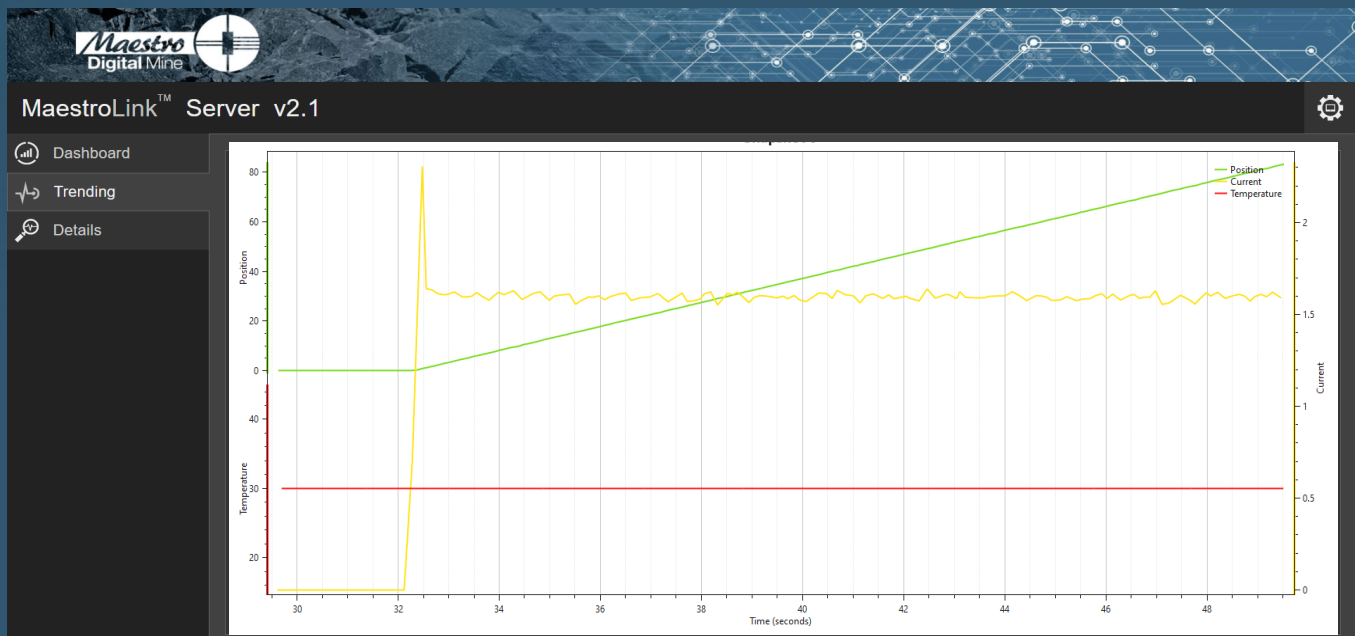
The ModuDrive™ Advantage

The **ModuDrive™** IIoT linear actuators are 100% electric operated, reliable and simple to apply. The system consists of a remote electronics controller and fully electric linear cylinder providing real-time diagnostics allowing troubleshooting from surface through **MaestroLink™ Server**.

Installation signatures can be captured comparing the operation of a new application overtime thereby providing early detection of potential failure points.

Smart IIoT actuators provide service counters for starts/stops/total run time, over/under voltage, power failures and min/max internal temperatures providing maximum up-time and worker safety.

Full feedback data on the stroke position, current draw and internal temperature provides early warning of bearing or blade damage on regulators, stuck or broken safety gates or duct blade damage on dampers to allow scheduled maintenance.

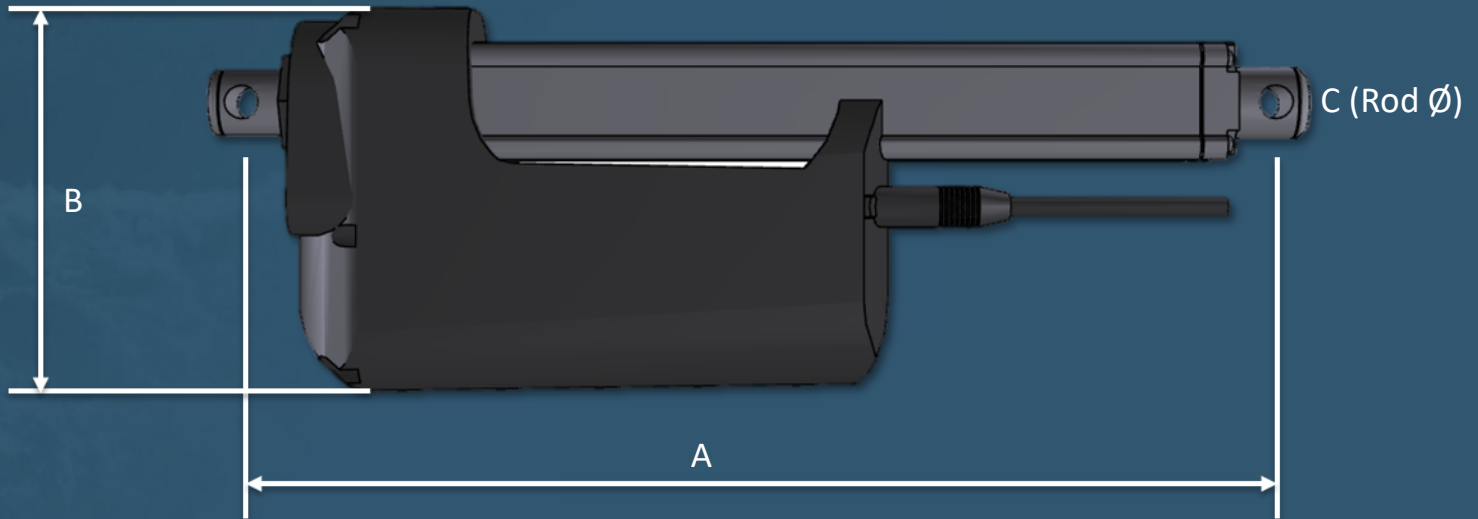


Pneumatic actuators require compressed air. Compressors are costly.

The Ontario Mining Association (OMA), representing all of the underground mining companies in Ontario, Canada conducted research and found that over 30% percent of the compressed air is ultimately wasted resulting in high operating costs and on-going operational maintenance.

Similar studies from South Africa estimated energy waste exceeding 30%. Also in Canada, New Gold's New Afton Mine studied their compressed air delivery system and found electrical operating costs alone in the \$400,000.00/annum range noting high maintenance and inefficient compressors.

Automated regulators optimize worker safety and energy savings



Maestro's Brand Promise - We leave no one stranded.

Maestro Digital Mine applies decades of mining experience and globally recognized expertise in developing and enabling mine ventilation IIoT devices for underground mines. We have supplied regulators to the top global mining companies (Rio Tinto, Vale, Glencore, Newmont, etc.). The commitment to excellence is one of our core values and is evident in our technologies with our first regulators still in operations after 20 years of use in operating underground mines.

Technical Specifications

Actuator Model #	HGC-MD-001	HGC-MD-002
Stroke length	200 mm (7.8 inches)	400 mm (15.7 inches)
Thrust	10,000 Newton force (2200 lbs force)	10,000 Newton force (2200 lbs force)
Temperature limitations	-30 to +65°C (-22 to +149°F)	-30 to +65°C (-22 to +149°F)
Housing	Ruggedized coated anodized aluminum	Ruggedized coated anodized aluminum
Enclosure rating	IP66 and wash down to IP69K	IP66 and wash down to IP69K
Piston rod	304 Stainless Steel	304 Stainless Steel
Connecting hardware and screws	304 Stainless Steel	304 Stainless Steel
ModuDrive Power supply	100-240 VAC, 50-60 Hz, 6.3 Amp (typical 2 amp current draw at 120 VAC)	100-240 VAC, 50-60 Hz, 6.3 Amp (typical 2 amp current draw at 120 VAC)
ModuDrive Remote Electronics	Modbus TCP/IP or EtherNet/IP communication protocols RJ45 connection IP 65/ NEMA 4X	Modbus TCP/IP or EtherNet/IP communication protocols RJ45 connection IP 65/ NEMA 4X
Dimensions	A = 400 mm (15.7 inches) B = 148 mm (5.8 inches) C = 27.8 mm (1 inch) D = 76 mm (3 inches)	A = 650 mm (25.6 inches) B = 148 mm (5.8 inches) C = 27.8 mm (1 inch) D = 76 mm (3 inches)
Weight	5.5 kg (12 lb)	10 kg (22 lbs)

Click to [learn more](#) about applying the **ModuDrive™** to Automated Regulators



We leave no one stranded

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Real time data means more time at the face