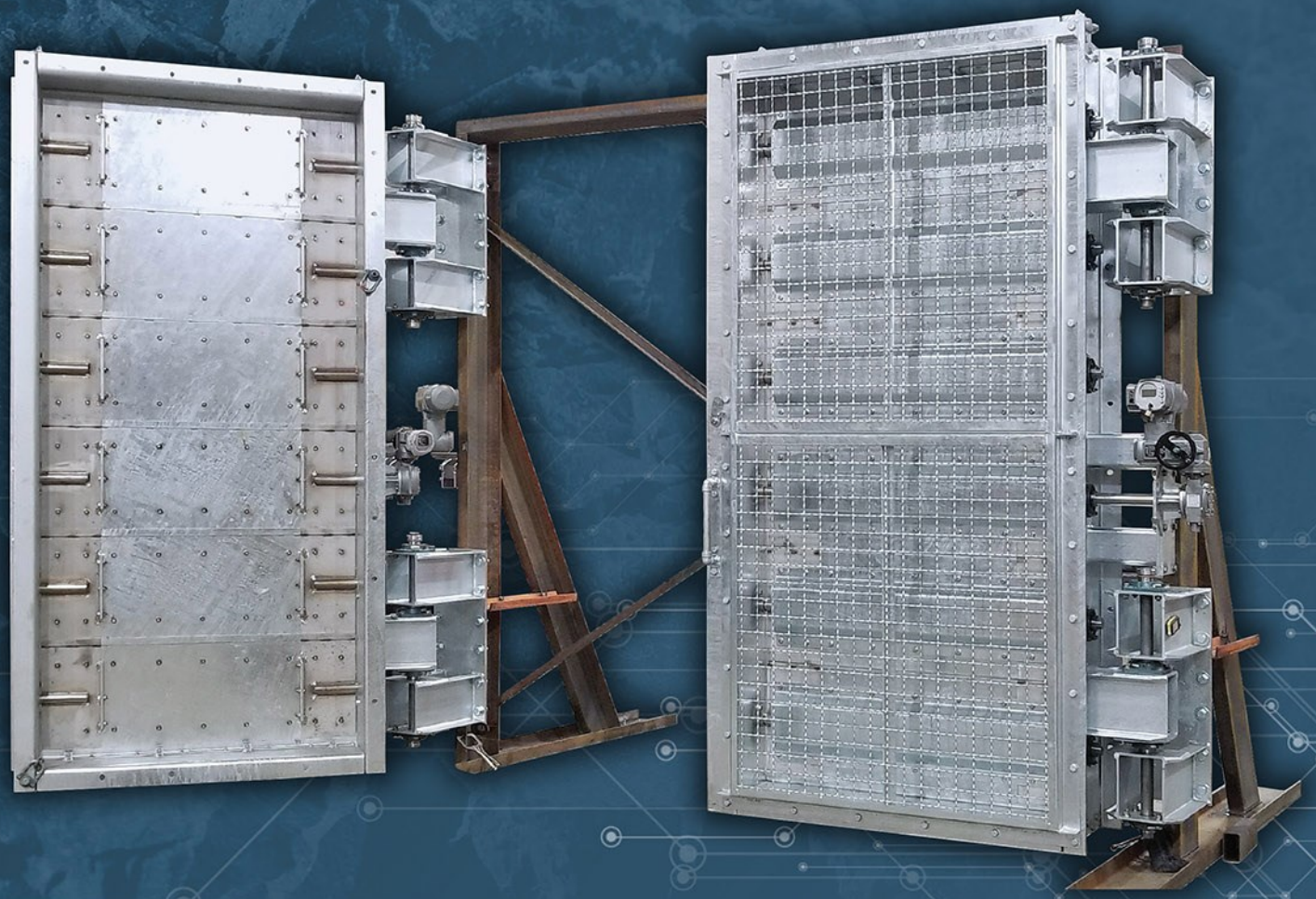
Maestro Digital Mine

Real time data means more time at the face.

Maestro

MaestroFlex™ Automated Regulators

Engineered for the harsh underground mine environment.



The **MaestroFlex™** automated regulators, replacing manual drop board regulators, are designed to exceed underground applications requiring adjustable airflow rates to match changing environmental and mobile equipment demand. The opposing blade design provides optimal flow control over large ranges allowing **its use** in Ventilation on Demand (VoD) applications.

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

MaestroFlex™ Automated Regulators

Underground Mine Airflow Regulators

Why do mining engineers choose to select MaestroFlex™ automated regulators?

- Adjusting ventilation, level by level, by controlling airflow quantity and quality assures worker health and safety as well as regulatory compliance.
- Scheduling regulators to fully open before the blast cycle improves blast clearance times and allow miners to return to the face quicker and safer.
- Reducing energy costs and GHG emissions by providing adequate ventilation to the operational areas of the mine versus ventilating all levels equally.
- Delaying major capital-intensive projects like additional air raises, booster fans and larger primary fans by reducing the amount of ventilation in areas that are non-operational.

MaestroFlex™ automated regulators are used for all forms of ventilation controls

- Manual based control systems
- Time-of-Day control systems
- Event-Based control system
- Real-Time (VoD) control systems

The Ventilation Challenge

Mine ventilation systems are designed around their planned life-of-mine (LOM) requirements considering all the worst-case-scenarios with respect to airflow demand which is mostly future based. As a result, many ventilation systems are over-sized early in the mine's life cycle and as such represents opportunities to reduce the mine's energy footprint as well as greenhouse gas (GHG) emissions and corporate decarbonization initiatives.

Conversely, mature underground mines are becoming increasingly ventilation constrained due to the increased depth of the ore body, heat due to auto compression, strata energy transfer as well as the increased total system resistance with longer passageways.

Underground ventilation systems require electricity to operate the fans and cooling systems. Many independent studies have shown that in mechanized metal mines, **50% of mine operating costs are electricity and of that 50-70% of the electrical cost is ventilation.**

Improved air quality means more time at the face

The MaestroFlex™ Advantage

Digital automated regulators control airflow, clearing gases in active production areas (at the face). Maintenance free regulators reduces blast clearance time and greenhouse gases; increases energy savings; reduces integration time and drives down CAPEX costs by 50% as compared to traditional analog systems.

Mines continue to report 25-50% energy reduction and production time by 1-2 hrs per day by deploying ventilation controls.

MaestroFlex™ automated regulators are designed to meet the harsh underground mining drill and blast cycles for decades of service. **ModuDrive™** digital IIoT actuators provides real-time diagnostics that allows troubleshooting from surface through **MaestroLink™ Server**.

The MaestroFlex™ regulator is used to automatically adjust the airflow on operating levels. Often installed either at the fresh air raise or return air raise and in some applications at both. The automated regulators replace drop board manual regulators that cannot be adjusted from surface, thus enabling operators from surface the ability to control ventilation as required either manually or using VoD software.

MaestroFlex™ automated regulators have been used in **critical 24-7 underground mining applications since 2007** and have been designed to withstand both continuous operation and blast concussion.

MaestroFlex™ automated regulators drive out significant CAPEX by eliminating expensive PLCs, transformers, engineering services and panel fabricators. MaestroFlex regulators provide a simple connection to any network switch and allows complete control, monitoring and real-time diagnostics over Modbus TCP/IP or EtherNet/IP™ communication protocols.

Automated regulators optimize worker safety and energy savings during the normal mining cycle as well as to provide increased operational time at the face by quickly clearing the blast gases.

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

Maestro Digital Mine applies its 20+ years 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.

IIoT integration that drives out complexity and CAPEX

Why choose MaestroFlex™ regulators?

Experience.

MaestroFlex™ designed regulators have been used in over 500+ applications globally in underground mines.

Avoid risk.

Regulators like control valves need to be properly sized otherwise the product might to either too small or large to provide suitable control. Although many fabrication shops might attempt to copy a design, they are not able to provide proper sizing that can put your project and people at risk.

Automation.

Automated regulators require complex control systems or PLCs to work as a system. MaestroFlex™ has embedded edge based control functions built into ModuDrive™ IIoT actuators providing real-time based control and diagnostic functions that other regulators can not imitate.

CAPEX reduction.

MaestroFlex™ regulator eliminate the requirement of expensive and complex PLC's, panels and transformers to reduce high voltage to lower voltage levels.

Delivery.

MaestroFlex™ regulators and designs reduce long delivery times by standardization of drawings, designs and on-the shelf ModuDrive™ IIoT actuators.

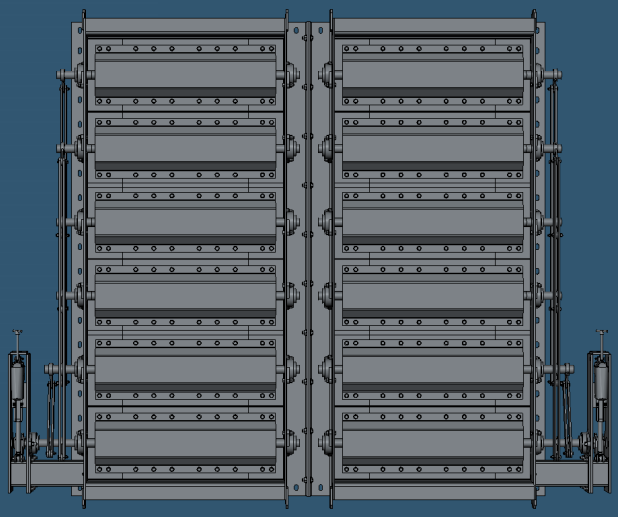
Support.

Bulkheads need to be designed and Maestro Digital Mine engineers can help with typical bulkhead designs cutting down the total project execution time and cost.

Automated Regulator Designs

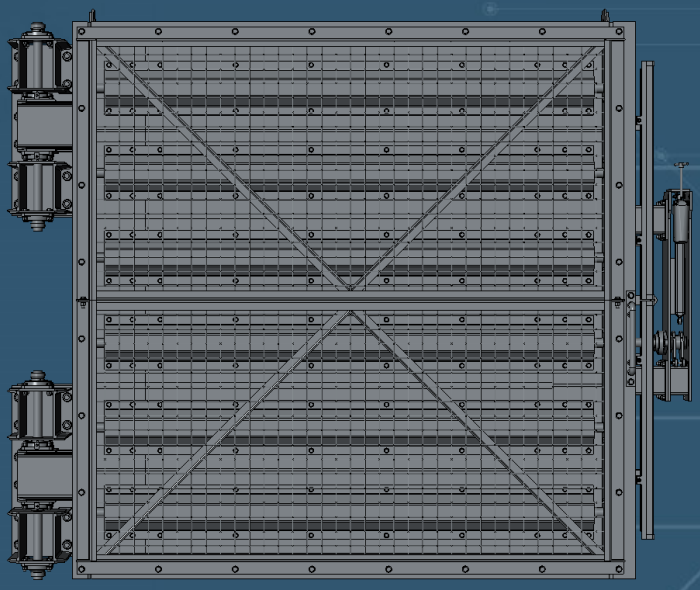
Fixed horizontal split panel design

The split design consists of single linkage and IIoT actuator allowing the regulator to be transported through the shaft for installation.



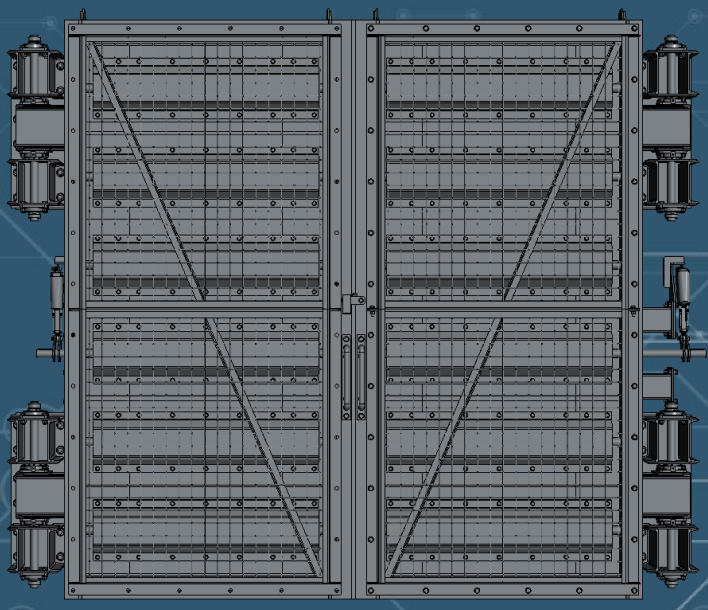
Fixed dual vertical split panel design

The dual panel design consists two panels, two separate linkages and two IIoT actuators for maximum redundancy.



Single swing out door design

Single hinged door design with single IIoT actuator for smaller swing door regulators.
The regulator can be swung out of service to allow mobile equipment occasional access to muck out the raise or access to booster fans.



Barn-yard door design

Dual hinged door design with dual IIoT actuators.
The regulator swings out on two sets of hinges to allow access by larger mobile equipment.

Technical Specifications

Materials of construction	Basic general service	Longest life service
Flanged frame	Painted (SSPC-SP10 surface preparation & Amerlock 2GF primer and top coat) low carbon steel (ASTM-A36)	Hot dipped galvanized low carbon steel (ASTM-A36)
Blades	Painted low carbon steel	Hot dipped galvanized low carbon steel
Blade operational	Opposing blade design for modulating service	Opposing blade design for modulating service
Seating	Metal to metal blade seating	Metal to metal blade seating
Shafts	Painted low carbon steel	304 stainless steel
Linkages	Painted low carbon steel	304 stainless steel
Bearings	Outboard permanently lubricated ball bearings	Outboard permanently lubricated ball bearings
Maximum operating differential pressure	10” W.C.	20” W.C.
Actuator	Single or dual IIoT actuators 100-220 VAC, 1 Phase, 3 AMP Built-in controller for each actuator Built-in feedback and diagnostic functions Modbus TCP/IP or EtherNet/IP	Single or dual IIoT actuators 100-220 VAC, 1 Phase, 3 AMP Built-in controller for each actuator Built-in feedback and diagnostic functions Modbus TCP/IP or EtherNet/IP
Pinch point protections options	OSHA linkage guard Protection screen on front flange	OSHA linkage guard Protection screen on front flange
Bulk head differential pressure transmitter	-40 to +40” W.C. range	-40 to +40” W.C. range
Airflow sensors	Single or dual ultrasonic airflow sensors	Single or dual ultrasonic airflow sensors
Blast gas sensors	21 different sensor types	21 different sensor types
Temperature and Humidity sensor	Dry bulb, wet bulb, worker heat stress and humidity	Dry bulb, wet bulb, worker heat stress and humidity
Bulkhead drainage	Slimes and water drainage duck bill valve	Slimes and water drainage duck bill valve

Click to learn more about the **MaestroFlex™ Automated Regulator**

Maestro Digital Mine

We leave no one stranded

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MDM1007-0321EN

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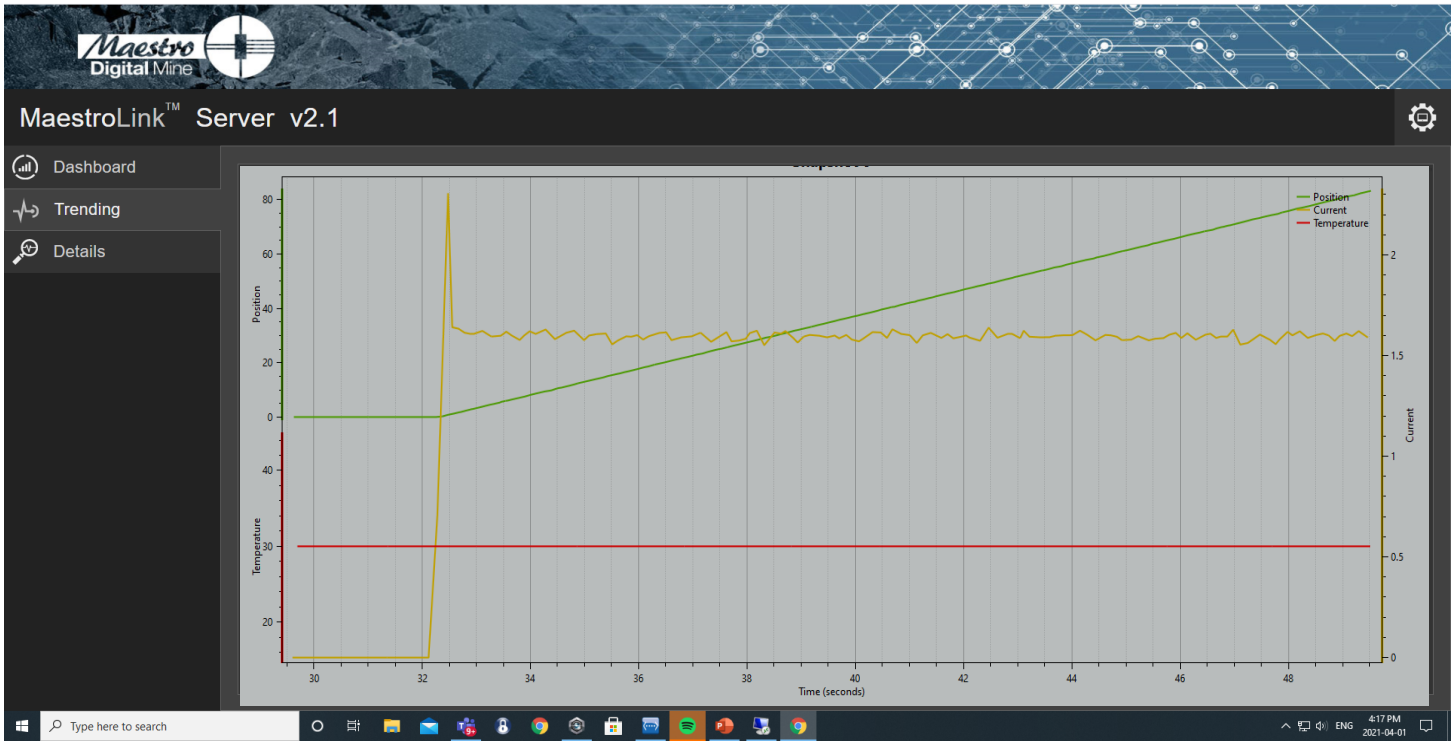
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MaestroLink™ Server v2.1
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