

Modularity for Future Scalability

One modular platform for diverse applications





Moxa Solution

The MDS-G4020 Series offers a fully modular platform that can be outfitted with fiber interfaces to connect pipeline subsystems to a remote control center over long distances, while providing wire-speed Gigabit bandwidth to aggregate and process video, voice, and data transmissions from the field equipment smoothly.

Featuring a fanless, rugged design that is ATEX Zone 2 and C1D2-certified, the MDS-G4020 Series can withstand the extreme environmental conditions common in oil and gas applications. To consistently monitor remote pipelines, the solution provides 50 ms Gigabit network recovery times to ensure network resilience and reliability. In addition, the compact form factor enables installation in DIN-rail cabinets while the high-capacity PoE budget can be leveraged to deploy and power nearby substation field equipment including IP surveillance cameras and valve controls.

In the control center, the MXview network management software provides real-time network status information and makes it easy for engineers to monitor the network and provide timely information for field-site engineers, simplifying maintenance and maximizing uptime.

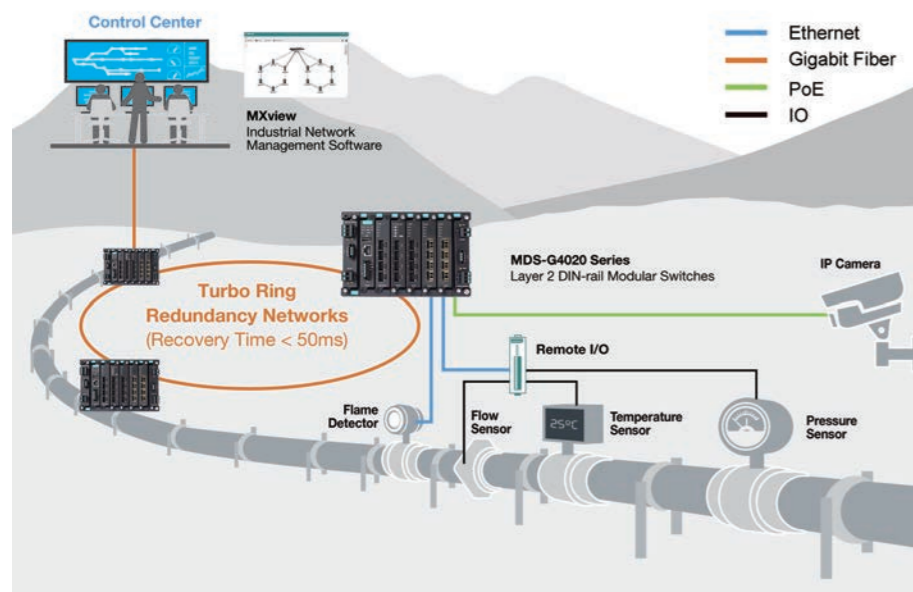
Field Monitoring for Oil and Gas Pipelines

Background

In order for oil and gas companies to develop a fully digitalized oilfield, it is key to build a reliable network backhaul for monitoring the various integrated pipeline subsystems including IP surveillance, ventilation, and fire control.

As the pipeline extends many kilometers away from the control center, companies are looking for a reliable and sustainable solution that can aggregate all data from the field sites and establish a high-bandwidth communications backhaul connection to the remote compressor stations and network operation center.

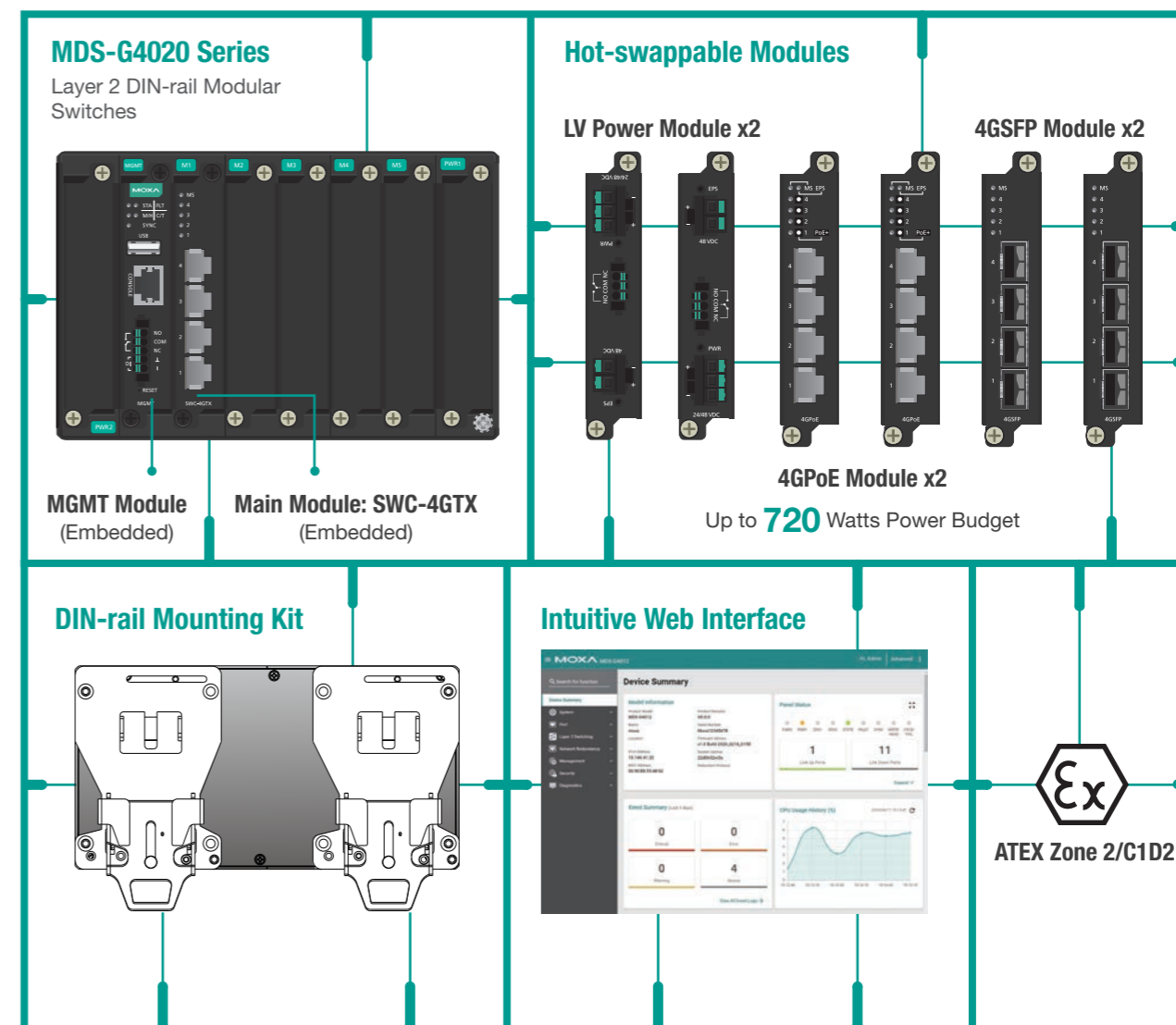
System Architecture

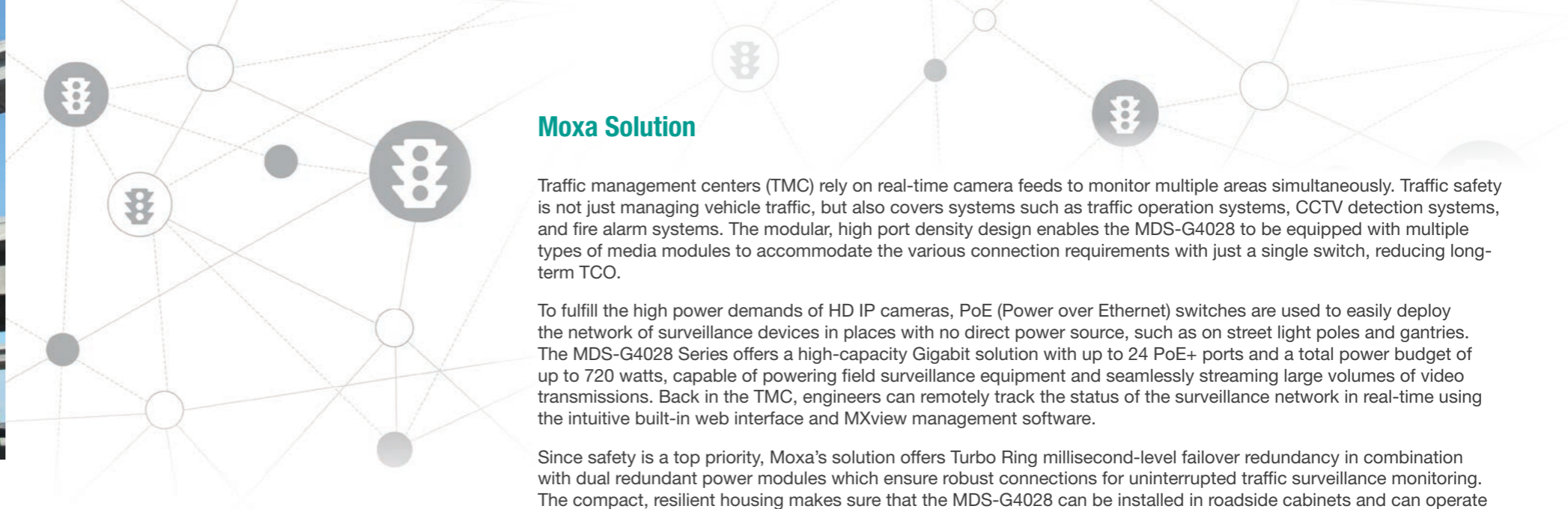


System Requirements

- A Gigabit, long-distance network backhaul to connect the subsystems in the field
- Reliable Ethernet switches with multiple interfaces to aggregate real-time video, voice, and data from the remote subsystems
- Resilient industrial-grade devices that can operate in harsh environmental conditions
- Compliance with ATEX Zone 2 and Class I Division 2 industrial certifications
- DIN-rail design to fit inside cabinets

True Network Versatility With Just One Modular Platform





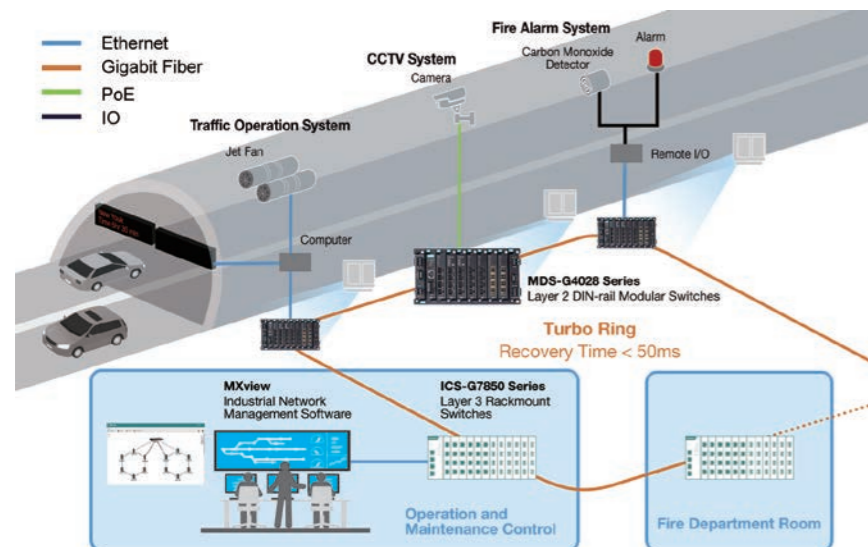
HD IP Surveillance for Tunnel Traffic Management

Background

Local authorities commonly deploy roadside surveillance systems to monitor traffic in tunnels from a remote traffic management center (TMC). The TMC not only manages vehicle traffic, but also controls multiple infrastructure systems. Nowadays, remote HD IP cameras are being deployed in large numbers to effectively monitor vehicle traffic and speed.

However, existing infrastructure is usually not equipped to provide the extra power output needed to sustain a large volume of surveillance devices. Being deployed in the field, the network equipment connecting these surveillance devices to the TMC are exposed to a wide variety of environmental conditions ranging from rain and snow to high temperatures and humidity. Therefore, having rugged networking devices with multiple interfaces and Power over Ethernet capabilities is key to facilitating the strenuous network and power demands. It is also vital that network operators have full visibility of the network status and are able to remotely manage the network via centralized software to avoid unnecessarily dispatching field engineers to perform high-risk maintenance tasks on highways and in tunnels.

System Architecture



System Requirements

- Combinations of SFP fiber and copper interfaces for network aggregation
- High-capacity PoE power source to power PoE field surveillance devices
- The ability to monitor and maintain the network easily
- Network devices that can operate reliably in outdoor environments
- DIN-rail design to fit inside cabinets

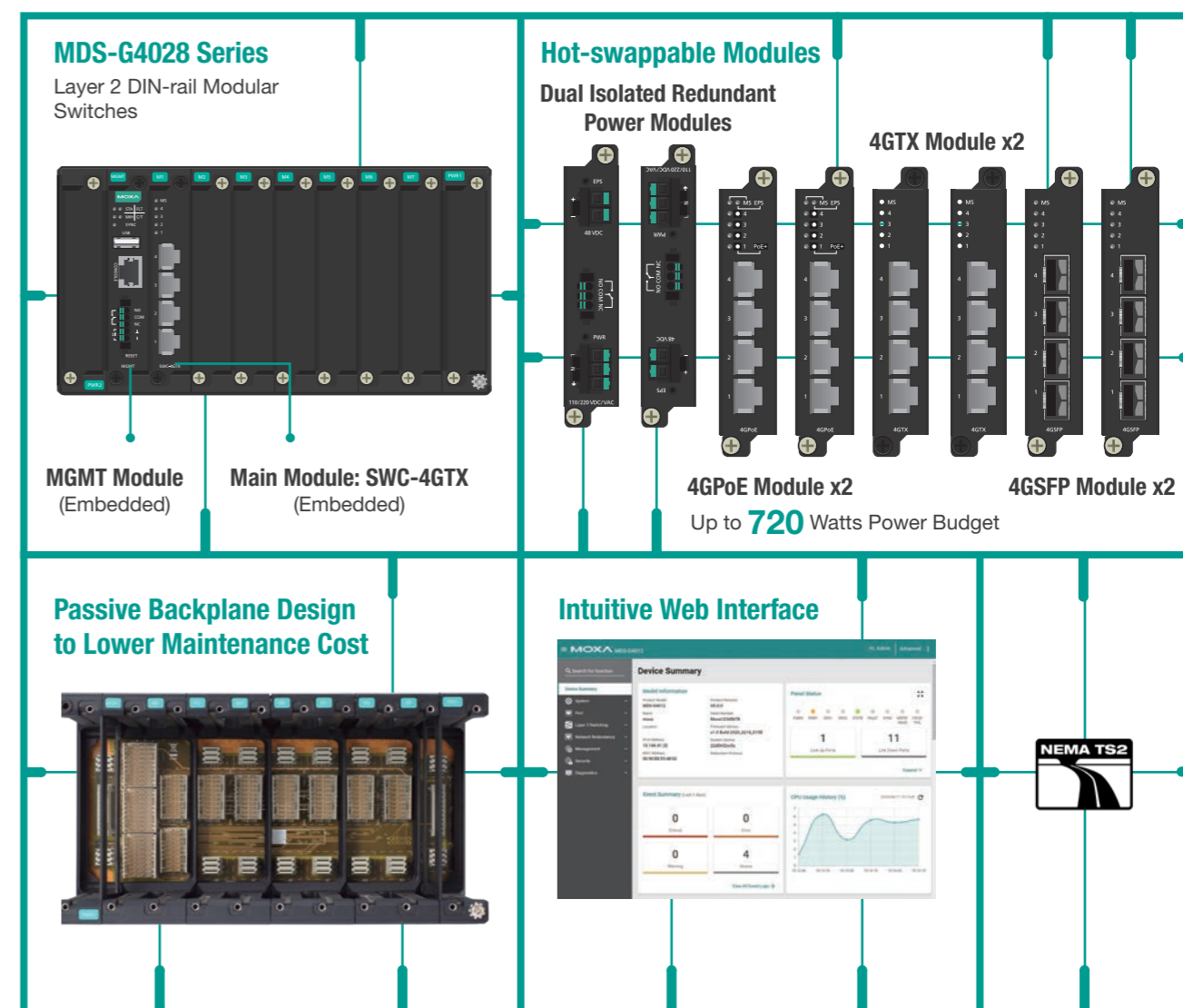
Moxa Solution

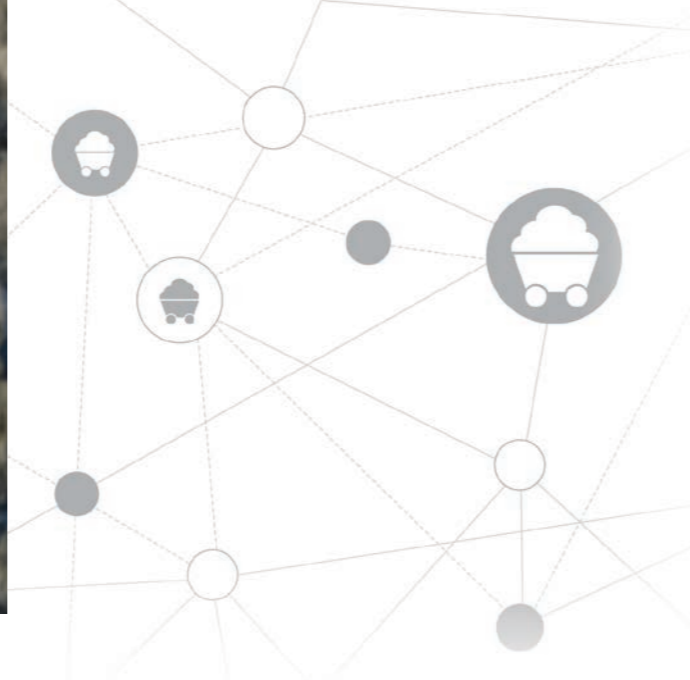
Traffic management centers (TMC) rely on real-time camera feeds to monitor multiple areas simultaneously. Traffic safety is not just managing vehicle traffic, but also covers systems such as traffic operation systems, CCTV detection systems, and fire alarm systems. The modular, high port density design enables the MDS-G4028 to be equipped with multiple types of media modules to accommodate the various connection requirements with just a single switch, reducing long-term TCO.

To fulfill the high power demands of HD IP cameras, PoE (Power over Ethernet) switches are used to easily deploy the network of surveillance devices in places with no direct power source, such as on street light poles and gantries. The MDS-G4028 Series offers a high-capacity Gigabit solution with up to 24 PoE+ ports and a total power budget of up to 720 watts, capable of powering field surveillance equipment and seamlessly streaming large volumes of video transmissions. Back in the TMC, engineers can remotely track the status of the surveillance network in real-time using the intuitive built-in web interface and MXview management software.

Since safety is a top priority, Moxa's solution offers Turbo Ring millisecond-level failover redundancy in combination with dual redundant power modules which ensure robust connections for uninterrupted traffic surveillance monitoring. The compact, resilient housing makes sure that the MDS-G4028 can be installed in roadside cabinets and can operate reliably in unpredictable weather conditions, including extreme temperatures, rain, and snow.

True Network Versatility With Just One Modular Platform





Moxa Solution

The security monitoring system includes both surface and underground communication systems. One of the challenges of this application is that devices located underground are difficult to maintain. To overcome this issue, the MDS-G4028-L3 Series features a modular design that can be outfitted with a combination of different interface modules for up to 24 ports, providing network operators with the flexibility to reserve unused ports for future expansion as connectivity demands soar. The Layer 3 Ethernet switches also support the Open Shortest Path First (OSPF) feature, which uses 'link state' instead of 'hop count' to determine the network route. Compared to the Routing Information Protocol (RIP), OSPF has faster network convergence and consumes less traffic on the network.

Because mining sites involve multiple machines and personnel working together, it is critical to ensure the safety of the whole ecosystem. Operators need to continuously monitor the network status and ensure operations are uninterrupted. To increase the reliability of the entire network, the MDS-G4028-L3 Series features hot-swappable modules that can be easily replaced without any tools, which minimizes downtime. Furthermore, the dual isolated power inputs provide back up power if one of the power inputs fail. In addition, the software supports VRRP, which will automatically reassign traffic to another switch in the event that a switch fails, to avoid causing significant problems on the network.

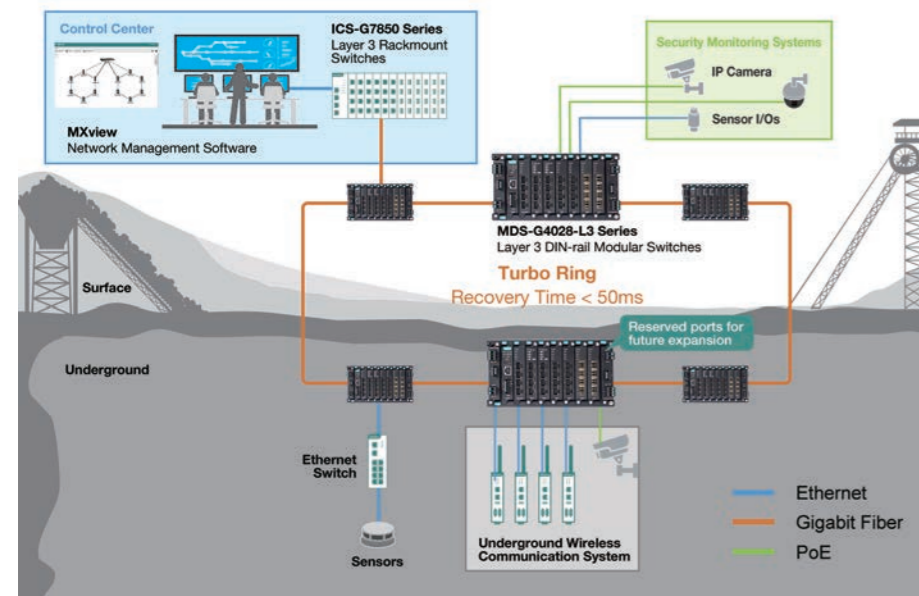
The rugged, compact housing includes a robust DIN-rail mounting kit that fits in confined cabinet spaces and is built to withstand heavy vibrations that are common at mining sites. The front-wired cabling coupled with panel display indicators further simplifies deployment and provides real-time status checking.

Centralized Underground Security Monitoring System

Background

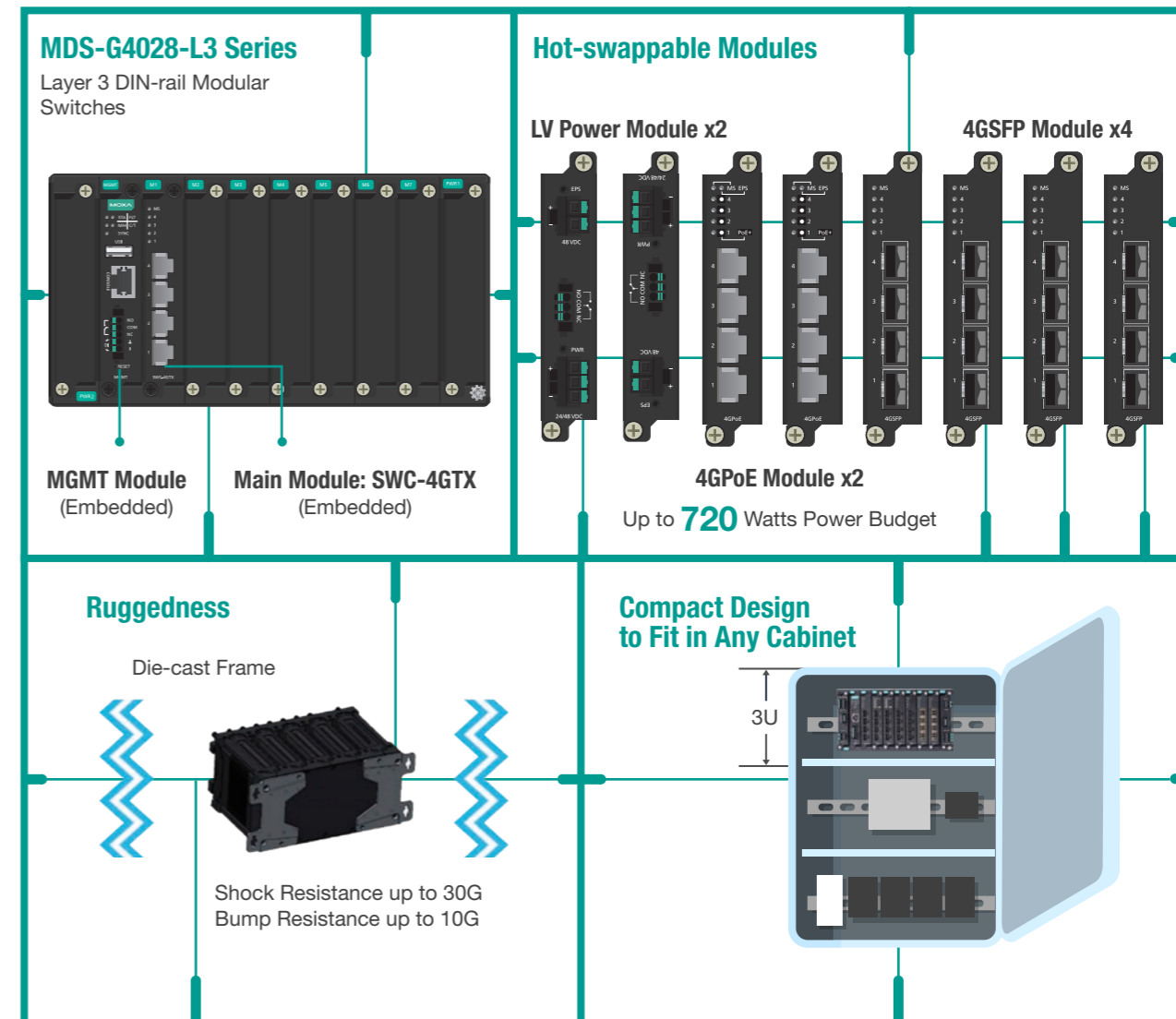
In the open-pit mining industry, automated underground control systems are deployed and integrated to achieve optimal operational efficiency. There are numerous automated underground control systems to keep mining operations working smoothly and security monitoring systems to check on the staff and the status of machinery. As field personnel and machinery are constantly moving around between different sites across rough terrain, operators rely on a robust wireless communication system to connect personnel and machinery and capture multiple concurrent live image feeds to monitor underground activities.

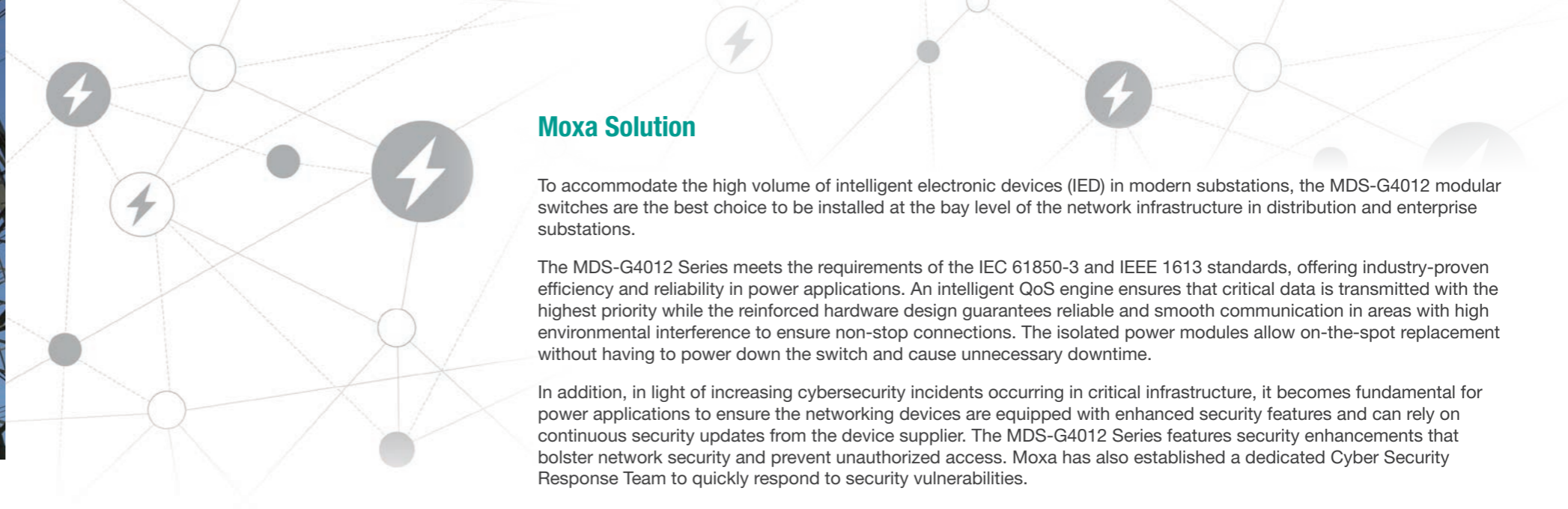
System Architecture



System Requirements

- Layer 3 networking devices for cross-site communications
- Power over Ethernet to connect and power surveillance and security devices
- Compact devices that fit in narrow and confined spaces
- Rugged design with high vibration resistance to withstand the environmental hazards of mining sites



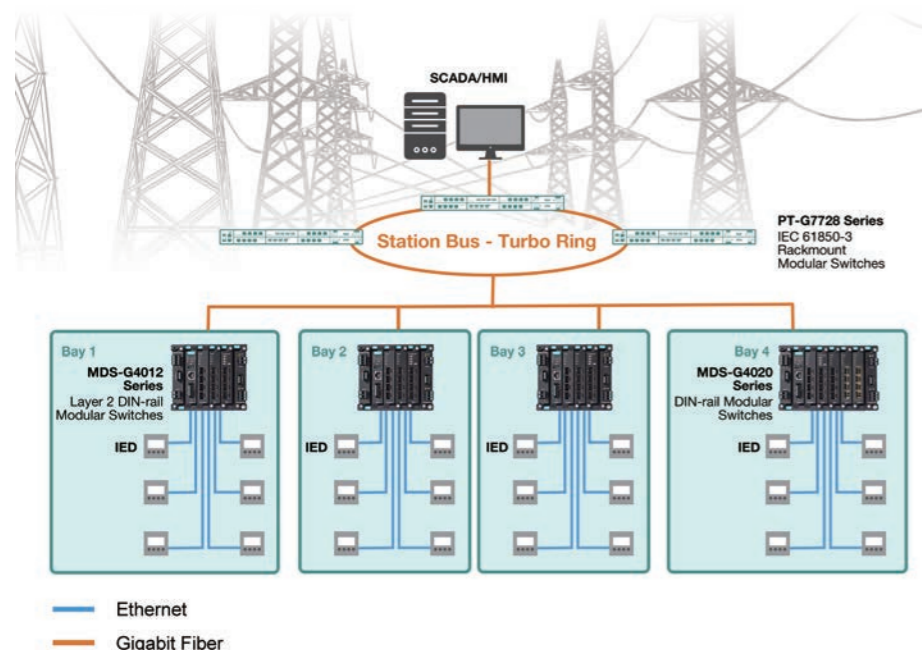


Aggregating Ethernet-based Power Substation Infrastructure

Background

Traditional substations use hard-wired links between devices that run relatively low-speed serial connections over copper wiring. Today, IEDs (intelligent electronic devices) in modern substations are designed around the IEC 61850 standard and can connect to a high-speed Ethernet bus, making it easier to implement a comprehensive management, maintenance, and control strategy via a centralized power SCADA system.

System Architecture



System Requirements

- Devices compliant with the IEC 61850-3 and IEEE 1613 standards
- Options for isolated high-voltage power modules
- Highly reliable devices to ensure zero downtime
- Enhanced security features

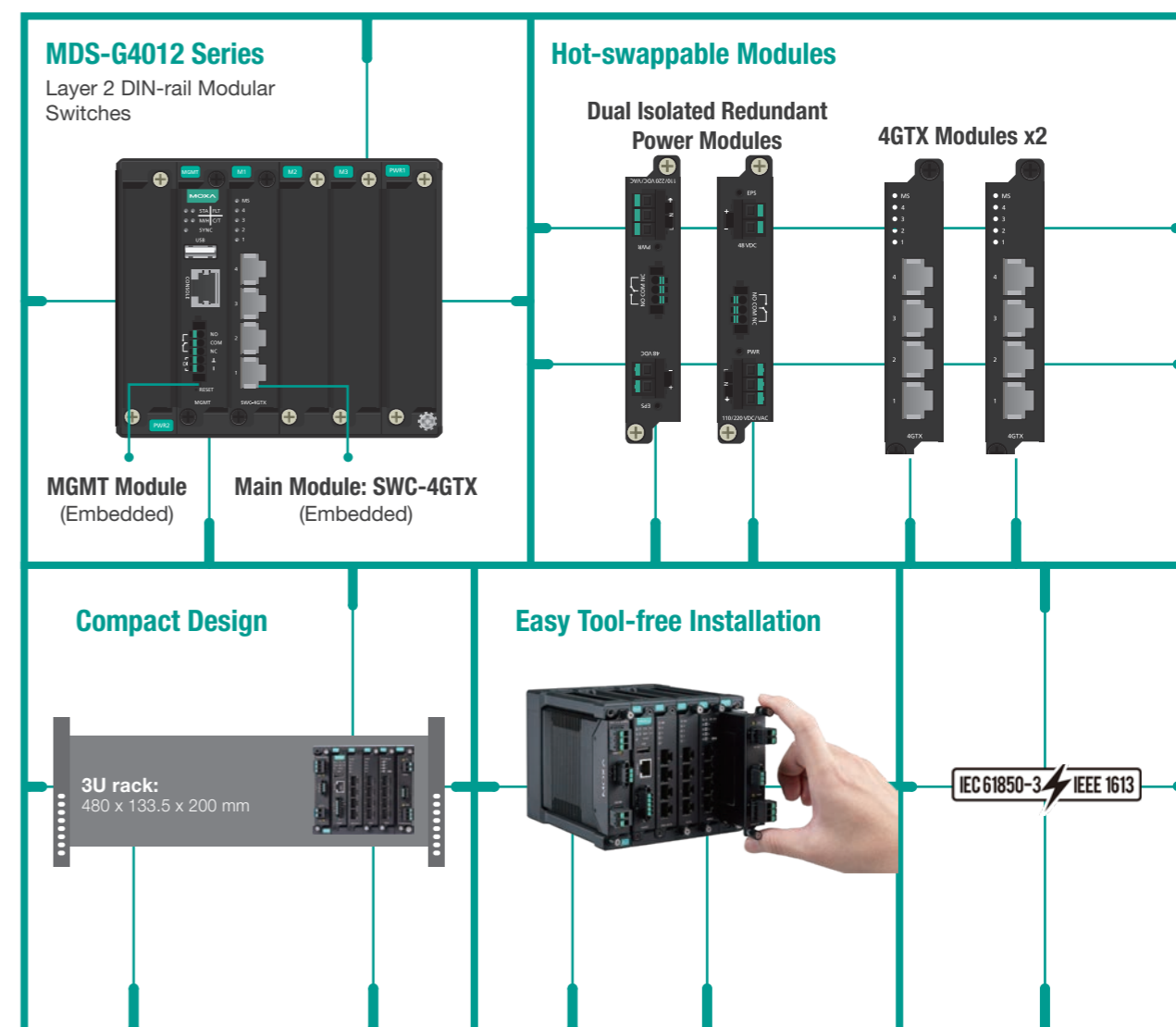
Moxa Solution

To accommodate the high volume of intelligent electronic devices (IED) in modern substations, the MDS-G4012 modular switches are the best choice to be installed at the bay level of the network infrastructure in distribution and enterprise substations.

The MDS-G4012 Series meets the requirements of the IEC 61850-3 and IEEE 1613 standards, offering industry-proven efficiency and reliability in power applications. An intelligent QoS engine ensures that critical data is transmitted with the highest priority while the reinforced hardware design guarantees reliable and smooth communication in areas with high environmental interference to ensure non-stop connections. The isolated power modules allow on-the-spot replacement without having to power down the switch and cause unnecessary downtime.

In addition, in light of increasing cybersecurity incidents occurring in critical infrastructure, it becomes fundamental for power applications to ensure the networking devices are equipped with enhanced security features and can rely on continuous security updates from the device supplier. The MDS-G4012 Series features security enhancements that bolster network security and prevent unauthorized access. Moxa has also established a dedicated Cyber Security Response Team to quickly respond to security vulnerabilities.

True Network Versatility With Just One Modular Platform



MDS-G4000 and MDS-G4000-L3 Series

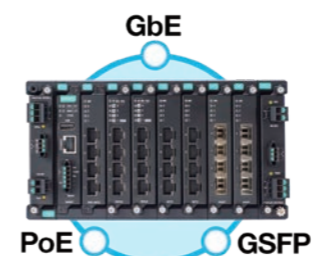
Layer 2 and Layer 3 full Gigabit modular managed Ethernet switches

3U rack:
480 x 133.5 x 200 mm

- A** MDS-G4028 and MDS-G4028-L3 Series: 218 x 115 x 163 mm
- B** MDS-G4020 and MDS-G4020-L3 Series: 176 x 115 x 163 mm
- C** MDS-G4012 and MDS-G4012-L3 Series: 134 x 115 x 163 mm

Module Types
Gigabit TX, Gigabit SFP, Gigabit PoE, TX, PoE, 24/48 VDC Power Module, 110/220 VAC/VDC Power Module

The MDS-G4000 and MDS-G4000-L3 Series industrial switches offer 12/20/28-port Gigabit mix-and-match modularity, ideal for flexible network expansion. With a highly durable housing smaller than a 3U half-rack, these switches are designed to fit in confined spaces and operate in the harsh environments common in substation, mining, and oil and gas applications. The MDS-G4000 and MDS-G4000-L3 Series switches offer a variety of hot-swappable media modules (RJ45, SFP, PoE) and power units (24/48 VDC, 110/220 VAC/VDC) to provide even greater flexibility and availability, especially for continuity-critical operations.



Flexibility

- Up to 28-port Gigabit scalability allowing for hundreds of media combinations
- Up to 24 GbE PoE+ / 24 GSFP media options
- Supports DIN rail, rack*, and wall-mounting options

*Only the MDS-G4028/MDS-G4028-L3 supports rack-mounting.



Security

- Device security based on the IEC 62443 standard
- 3-level user security
- MAC-based IP assignment



Continuity

- Hot-swappable power and port modules
- Passive backplane to minimize failure rates
- Power outage protection during firmware upgrades to avoid malfunction



Reliability

- A robust, industrial-grade design with superior bump and shock resistance
- Compliant with multiple industry standards



Redundancy

- Gigabit redundancy under 50 ms
- Dual isolated redundant power modules



Usability

- OT-friendly HTML5 dashboards for device summary, smart search, and configurations

	MDS-G4028 Series MDS-G4028-L3 Series	MDS-G4020 Series MDS-G4020-L3 Series	MDS-G4012 Series MDS-G4012-L3 Series
No. of Ports	28	20	12
Gigabit Ports	28	20	12
Fiber Ports	Up to 24	Up to 16	Up to 8
Fiber Type	LC	LC	LC
Certifications	CE/FCC, UL, EN 50121-4, NEMA TS2, IEC 61850-3, IEEE 1613, C1D2, ATEX Zone 2		



Your Trusted Partner in Automation

Moxa is a leading provider of edge connectivity, industrial computing, and network infrastructure solutions for enabling connectivity for the Industrial Internet of Things (IIoT). With over 30 years of industry experience, Moxa has connected more than 71 million devices worldwide and has a distribution and service network that reaches customers in more than 80 countries. Moxa delivers lasting business value by empowering industries with reliable networks and sincere service. Information about Moxa's solutions is available at www.moxa.com.

Moxa Americas

USA

Toll Free: 1-888-MOXA-USA
Tel: +1-714-528-6777
Fax: +1-714-528-6778
usa@moxa.com

Brazil

Tel: +55-11-95261-6545
brazil@moxa.com

Moxa Europe

Tel: +49-89-37003-99-0
Fax: +49-89-37003-99-99
europe@moxa.com

Moxa Asia-Pacific and Taiwan

Asia/Taiwan

Tel: +886-2-8919-1230
Fax: +886-2-8522-8623
asia@moxa.com
taiwan@moxa.com

India

Tel: +91-80-4172-9088
Fax: +91-80-4132-1045
india@moxa.com

Russia

Tel: +7-495-287-0929
Fax: +7-495-269-0929
russia@moxa.com

Korea

Tel: +82-2-6268-4048
Fax: +82-2-6268-4044
korea@moxa.com

Japan

Tel: +81-3-6721-5670
Fax: +81-3-6721-5671
japan@moxa.com

Moxa China

Shanghai

Tel: +86-21-5258-9955
Fax: +86-21-5258-5505
china@moxa.com

Beijing

Tel: +86-10-5976-6123/24/25/26
Fax: +86-10-5976-6122
china@moxa.com

Shenzhen

Tel: +86-755-8368-4084/94
Fax: +86-755-8368-4148
china@moxa.com