

Remote Fiber Monitoring System in Modern Fiber Network

2026 - 27

Proactive Network Maintenance | Reduced Downtime | Faster Fault Resolution



Quality in Network Performance & Optimization. Delivered.

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Adtran is a global leader in fiber networking and telecommunications solutions, headquartered in Huntsville, Alabama, USA. Founded in 1985, the company delivers innovative technologies that help service providers, enterprises, utilities and governments build high-performance broadband and optical networks. With annual revenues exceeding USD 1 billion and a presence across more than 100 countries, Adtran is recognized for its open, scalable and vendor-neutral networking solutions that power the digital infrastructure of the future.

Adtran's portfolio includes fiber access platforms, optical transport systems, Wi-Fi solutions, timing and synchronization technologies, cloud-based network management and advanced fiber monitoring systems such as ALM (Active Line Monitoring). Designed for reliability, automation and security, Adtran solutions enable real-time network visibility, rapid fault detection and seamless connectivity without disrupting live traffic—helping organizations improve operational efficiency, reduce downtime and deliver superior network performance.

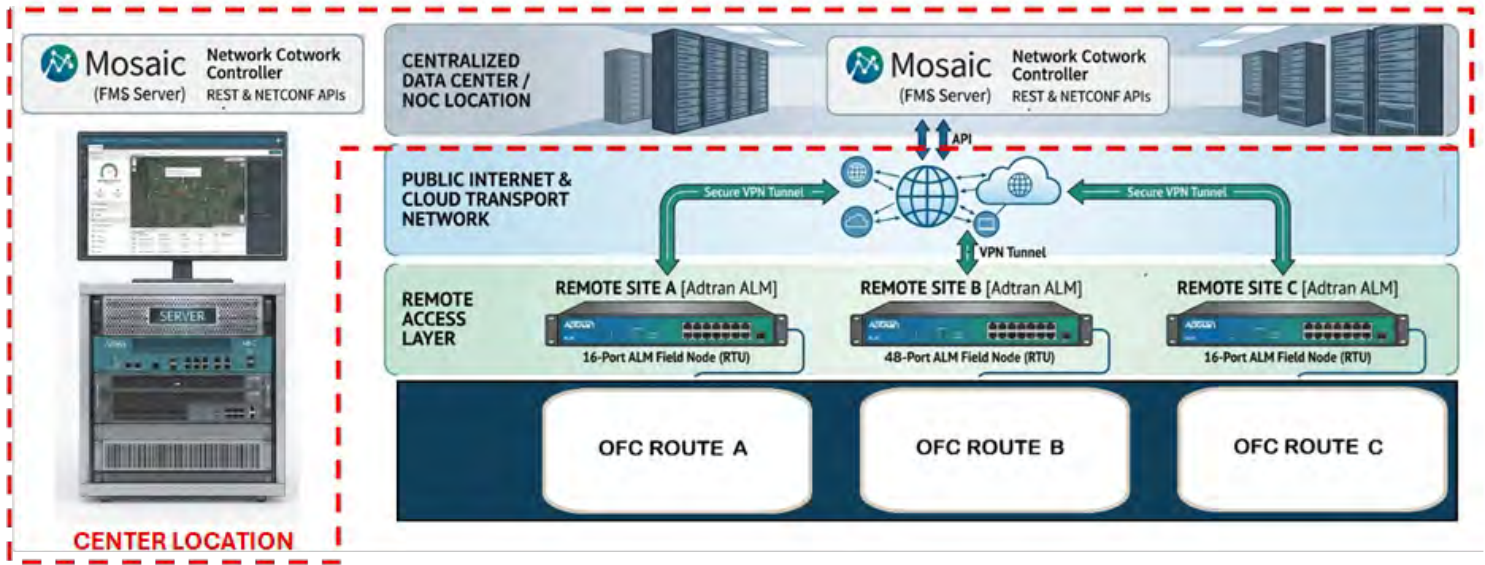
ACL Stanley is responsible for sales, value add engineering, tech support and after sales, for ensuring efficient deployment and utilisation of Adtran equipments in India.

Understanding RFMS: RFMS Monitoring Infrastructure Components

The RFMS monitoring infrastructure is built on two core components that work together to deliver comprehensive, real-time fiber network monitoring and management:

- 1. **Edge-Based Physical Layer Monitoring:** Continuous monitoring of the optical fiber infrastructure using edge-deployed **Adtran ALM Series Remote Test Units (RTUs)** for proactive fault detection and network health assessment.
- 2. **Centralized Intelligent Network Orchestration:** A centralized **Fiber Management System (FMS)** powered by the **Adtran Mosaic Network Controller (MNC)**, providing intelligent orchestration, real-time visualization, alarm management, and end-to-end network performance monitoring from a single control point.

ADTRAN RTU & FIBER MONITORING (FMS) DEPLOYMENT GRAPHIC



Remote Test Units (RTUs) (Hardware)	Centralized FMS (Fiber Management Software) (Software)
Built-in Optical Time-Domain Reflectometers (OTDR) send automated optical pulses down the fiber at customized intervals or when triggered by localized hardware events. Remote Test Units serve as the dedicated hardware eyes of the physical fiber plant. The RFMS provides: • Monitor dark fibers as well as In-Service/Live fibers • Detect fiber degradation and breaks • Generate real-time alarms • Localize fault distance through OTDR trace analysis • Integrate with GIS mapping platform	A centralized NOC using a FMS installed on Server located at centralized location, preferably at NOC. Centralized monitoring of all RTUs installed - • 24x7 monitoring OFC health status across all sections. • Alarm management and escalation • Fault analytics and reporting • Coordination with field rectification teams • SLA tracking and reporting The NOC team Can continuously monitor: • Fiber attenuation changes • Fiber breaks • Route-wise health dashboards • RTU status and communication health



With MFD Client License

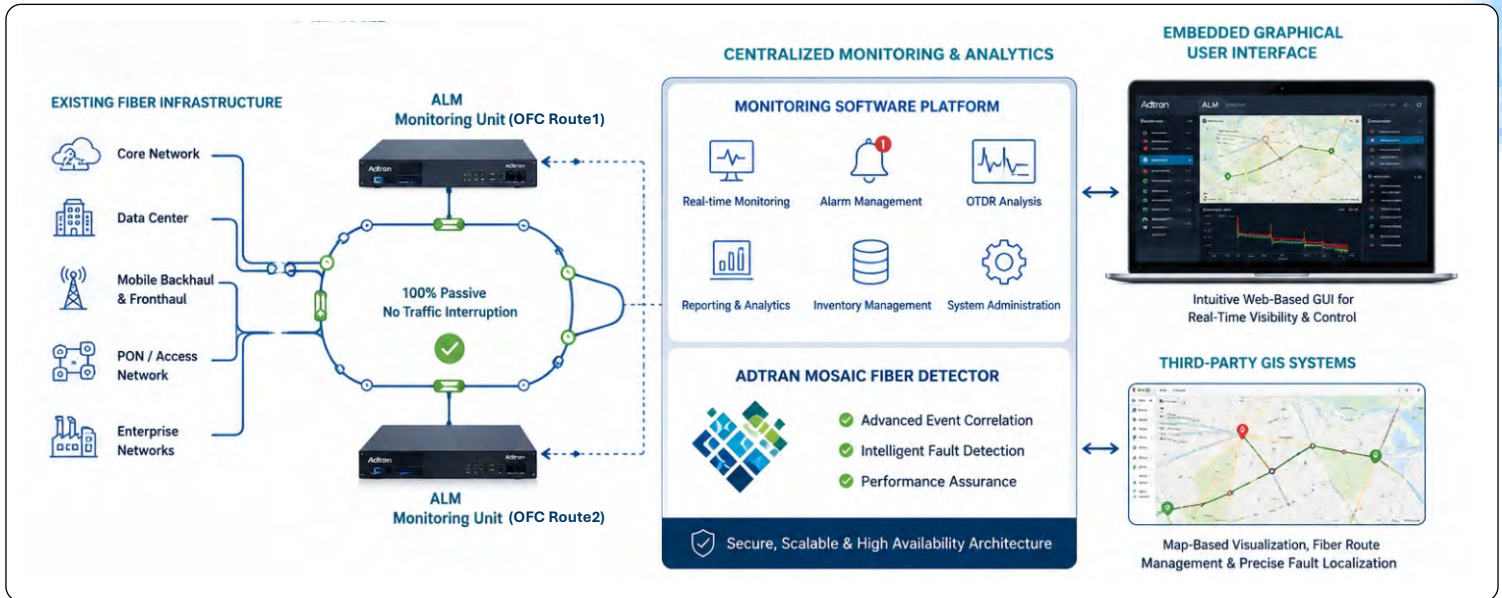
- Converts optional distance into Geographical coordinates
- Enabling fast Localization
- Supports Integrating GIS data

Acronyms:

RTU: Remote Terminal Unit (used for continuous fiber monitoring at OFC)	ALM: Advanced Fiber Line Monitor-RTU
FMS: Fiber Monitoring System	MNC: Mosaic Network Controller - Server License Fiber monitoring software.
	MFD: Mosaic Fiber Director - Client License

Fiber Network Challenges in India

As India accelerates fiber deployment across railway communication networks, utility networks, telecom, smart cities, and enterprise connectivity, network operators can manage increasingly complex fiber infrastructures that span large geographic areas, with in small reliability and security if the **“fiber networks are monitored with Integrated GIS”** for immediate rectification capability.



- **Frequent fiber cuts and physical damage**

HDD Installs construction activities, road expansion, metro work, and utility digging frequently damage fiber cables. Identifying the exact fault location with Adtran RFMS will take 2 to 5 minutes.

- **Visibility into fiber health**

Real-time monitoring eliminates troubleshooting time and reduces operational costs.

- **Fault localization**

Automated monitoring tools allow field teams identify the exact fault point for quick network restoration.

- **Security risks and unauthorized tapping**

Enterprise, government, and railway networks require secure communication infrastructure. Detecting potential fiber tapping attempts is critical for protecting sensitive data.

- **Harsh deployment environments & scalability**

Fiber networks deployed along railway tracks, outdoor cabinets, and remote areas require equipment capable of operating under extreme environmental conditions & also identifying moisture/water & open cabinet doors & open manholes.

Solution

Adtran's Active Line Monitoring (ALM) provides a proactive solution for continuous monitoring of fiber networks, delivering real-time insight into their health, performance, and security.

Operating as an in-service monitoring system, ALM supervises fiber infrastructure without disrupting live traffic. It detects abnormal attenuation, fiber breaks, or potential tapping attempts and immediately alerts operators.

When an issue occurs, ALM accurately pinpoints the geographic fault location, enabling faster troubleshooting and repair. Integration with Adtran Mosaic Fiber Director, embedded GUIs, or third-party GIS platforms provides operators with clear, real-time visibility of their fiber infrastructure.

Active Line Monitoring (ALM) Series

Intelligent Fiber Monitoring System

Adtran's Active Line Monitoring (ALM) provides a complete solution for continuous fiber monitoring, enabling operators to proactively manage the health and security of their fiber infrastructure.

ALM addresses the critical challenge of **fast and accurate fiber fault detection** by continuously monitoring the network while services remain active.



The system quickly identifies abnormal attenuation, fiber breaks, or potential tapping attempts and instantly alerts operators with the **exact geographic location of the fault**. Through integration with **Adtran Mosaic Fiber Director, an embedded GUI, or third-party GIS platforms**, operators gain clear visibility of network events, allowing them to respond quickly and reduce service downtime.

Designed to support both **access and core network environments**, ALM provides scalable monitoring capabilities. The solution is available in multiple variants—**16ALM, 64ALM, and 48ALM-T**—allowing operators to select the configuration that best fits their deployment requirements. With **port extenders**, a single monitoring system can supervise **up to 800 fibers**, enabling efficient management of large fiber infrastructures from a centralized location.

Advanced PON Monitoring with Deep PON Assurance

The ALM-T enables reliable PON monitoring in harsh environments (-40°C to +65°C). With **Deep PON Assurance (DPA)**, it provides visibility down to individual ONTs without passive reflectors, simplifying fault detection in complex networks. It supports multi-vendor networks and long-distance monitoring **up to 160 km** (single direction) and **320 km** (bi-directional), making it suitable for both metro and long-haul FTTH deployments.

Operating **non-intrusively at 1650 nm**, ALM ensures continuous monitoring **on live dark fibers without affecting network traffic**. Its real-time insights, precise fault localization, and low maintenance help operators improve reliability and quickly resolve issues.

Key Features

1. 24×7 Real-Time Fiber Monitoring

Monitors fiber health round-the-clock and instantly detects cuts, attenuation, degradation, and intrusions.

2. 1650 nm Non-Intrusive Monitoring

Operates completely outside transmission bands, ensuring zero interference with active telecom and signaling traffic (Safe for Live Railway Networks)

3. GIS-Based Fault Localization

With MFD integration, pinpoint faults are displayed with exact geographic coordinates for faster field response.

4. Monitor Both Dark & Live Fibers

Supports monitoring of unused dark fibers as well as live operational fiber links without service disruption.

5. Built for Harsh Outdoor Environments

48ALM-T variant supports extended temperature range (-40°C to +65°C) with redundant DC power architecture.

6. Faster Fault Isolation & Reduced MTTR

Accurate fault detection and localization significantly reduce downtime and maintenance response time.

7. Integrated Passive Sensor Monitoring

Supports cabinet intrusion, water ingress, and maintenance hole monitoring using passive environmental sensors.

8. Centralized Network Visibility

MNC/FMS platform aggregates alarms, reports, and monitoring data from all deployed ALMs.

Active Line Monitoring (ALM) Series



Intelligent Fiber Monitoring System

16ALM



- Monitors up to 16 ports
- AC and DC power options
- Half-RU compact design
- Passive air cooling without fans

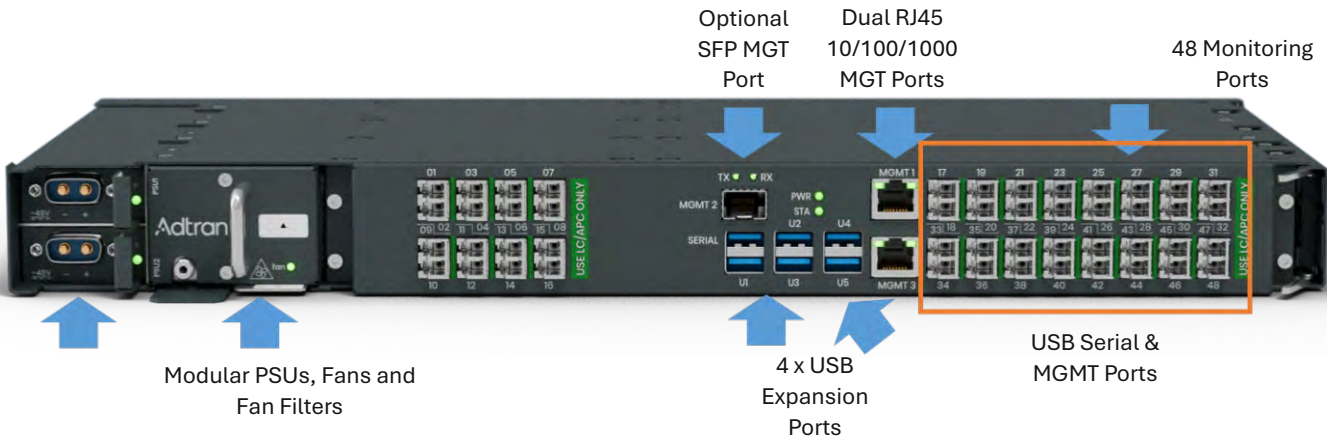
64ALM



- Monitors up to 64 ports
- AC and DC power options
- 1-RU compact design
- Passive air cooling without fans

48ALM-T

Ideal for harsh indian operating environments



- Built in cooling fan system for extended temperature range (-40 to 65°C)
- Monitors up to 48 ports
- 1+1 Hot Swappable DC Power Supply
- 1-RU compact design
- Modular power supplies(AC, DC), filters and fans
- Dual DCN ports (1xSFP, 1XRJ45)

Extention Units for High Density Solutions

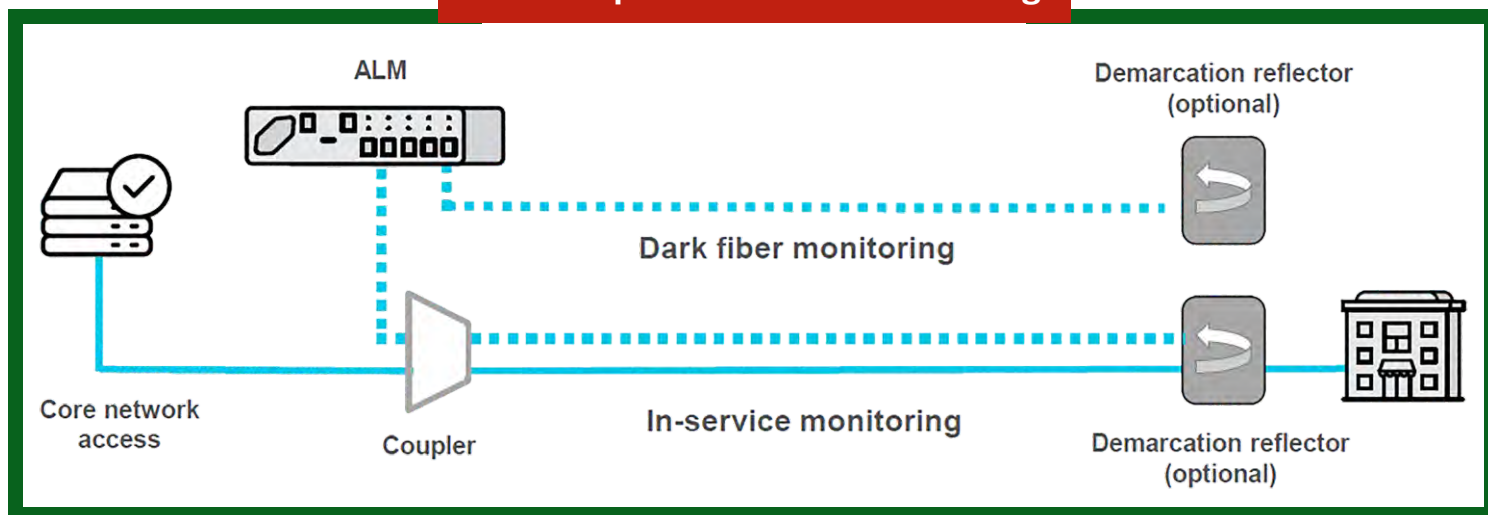
96-Port Extension Unit	384-Port Extension Unit
• 96-port extension • LC-APC based • 1-RU compact design • Powered by ALM unit	• 384-port extension • MPO based • Half-RU compact design • Powered by ALM unit

Active Line Monitoring (ALM) Series

Intelligent Fiber Monitoring System

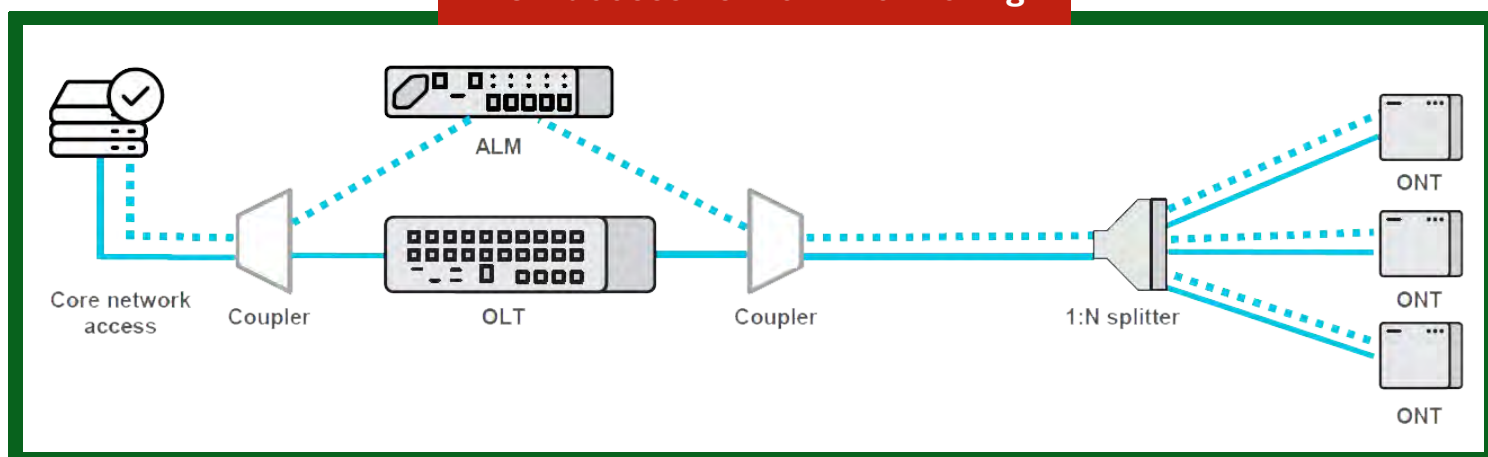
Applications in Your Network

Point-to-point network monitoring



- Proactive fiber monitoring with long-term performance measurement of passive plant elements
- Support for various point-to-point topologies, including ring architectures
- Dark and lit fiber monitoring capabilities, independent of traffic services
- Passive demarcation improves monitoring time and accuracy
- Remote access to passive environmental sensors for monitoring of unpowered sites

PON access network monitoring



- Advanced PON Network Monitoring: Delivers detailed visibility of access networks from the OLT through the splitter to individual ONT's, supporting all PON generations without requiring demarcation reflectors.
- Proactive fiber monitoring with long-term performance measurement of passive plant elements
- Monitor any PON network from the OLT to the ONT without the need to install passive demarcation reflectors
- Fiber monitoring solution compatible with any PON standard and data rate
- Support for fiber buildout certification services in passive plant construction phase
- Full visibility of the passive network elements and fiber

Active Line Monitoring (ALM) Series

Intelligent Fiber Monitoring System

Technical Specifications:

General Information

Parameter		Units	16ALM	64ALM	48 ALM-T	96-Port Extension	384-Port Extension
Dimensions	Height	RU	1				
	Width	HP	42	84	84	84	42
	Depth Without Brackets	mm	212	212	212	207	207
	Depth With Brackets	mm	221 (ETSI)	221 (ETSI)	235 (ETSI)	207 (ETSI)	207 (ETSI)
	Depth With Fan Filter	mm	N/A		273	N/A	
Power		w	10	13	20W Typical @40°C and during, warm-up: 50W @65°C; 25W		N/A (USB powered by ALM Unit)
Power Supply Options		VDC/VAC	DC (-72VDC to -36VDC); AC (90VAC to 264VAC)				N/A (USB powered by ALM Unit)
MTBF at 30°C Ambient Temperature		years	>20				
Operating Temperature		°C	-5 to 55		-40 to 65		-5 to 65
Storage		°C	-40 to 85				

OTDR Specifications

Parameter		Units	16ALM	64ALM	48ALM-T
Number of Ports		ports	16	64	48
Laser Safety			Class I		
RF Tone Frequencies		Hz	270, 330, 1k, 2k		
Dynamic Range(*) (**) OTDR Core		dB	41	41	42
Wavelength		nm	1650		
Pulse Width		ns	5 to 20,000		
Number of Data Points		points	up to 256,000		
Distance Range	Unidirectional	km	Up to 160		
	Bidirectional	km	Up to 320		
Sampling Resolution		m	0.1 to 1.6		
Event Dead Zone		m	0.8		
Attenuation Dead Zone		m	4		
Distance Accuracy		m	$\hat{A} \pm (0.8 + \text{sampling resolution} + 9.5 \times 10^{-6} \times \text{distance})$		
Optical Switch Lifetime		cycles	1×10^9		
Extension Unit Insertion Loss		dB	1.5 (Typical)		

(*) Specifications at 25°C. (**) Depending on pulse width and resolution

Active Line Monitoring (ALM) Series



Intelligent Fiber Monitoring System

Equipment Management

Management Method	Supported protocols
Embedded GUI	HTTPS
Northbound Interfaces	SNMP v1, v2c, v3, NETCONF, REST API
Command Line	SSH
Remote Authentication	RADIUS, TACACS+
Geographic Data	Embedded KML/KMZ support Adtran Mosaic Fiber Director Third-party GIS systems

Description	Compliance
ETSI EN 300019-1-3	Compliant
Protection Class IP20	Compliant
CE, FCC, NRTL, VCCI	Compliant

Ordering Information

Product Code	Product Name	Product Description
1043709880-03	48ALM/T/#1650D	ALM-T monitor Unit, 48 ports with LC/APC connector. Extended temperature range OTDR in 1RU form factor. 19 inch, 23 inch and ETSI mounting kits included. Fans, PSUs and fan filters not included
1043709881-03	48ALM/T/FAN	Fan module including shelf display and fan controller for ALM-T. One fan module per ALM-T required
1043709882-03	48ALM/T/PSU-AC	Power Supply Unit (230W) AC for ALM-T. Power cords must be ordered separately
1043709883-03	48ALM/T/PSU-DC	Power Supply Unit (230W) DC for ALM-T. Power cords must be ordered separately
1043709841-03	16ALM/#1650D/AC	ALM 16 ports with LC/APC connectors, AC powered
1043709842-03	16ALM/#1650D/-48VDC	ALM 16 ports with LC/APC connectors, -48V DC powered
1043709846-02	64ALM/#1650D/AC	ALM 64 ports with LC/APC connectors, AC powered
1043709847-02	64ALM/#1650D/-48VDC	ALM 64 ports with LC/APC connector, -48V DC powered
1043709849-01	ALM/EXT/96LA/2LA	ALM extension unit with 96 LC/APC connectors, no power supply required
1043709848-01	ALM/EXT/16MPO24/8LA	ALM extension unit with 384 ports via 16 MPO connectors, no power supply required

Mosaic Network Controller (MNC)

Real-time GIS-based solution for fiber network surveillance

Adtran's Mosaic Fiber Director is provided as a client license at RTU level - which integrates with the Mosaic Network Controller Software at server - to empower network operators with integration of GIS geographically.

With built-in alerts via email, SMS, or third-party systems, the platform ensures that the right teams are notified immediately—helping **accelerate response times and minimize operational delays**.

Additionally, its GIS-based mapping and documentation tools provide **accurate visualization and better management of fiber assets**, enabling more efficient maintenance and long-term planning. Overall, Mosaic Fiber Director helps organizations **enhance network reliability, optimize operations, and deliver a superior customer experience**.

Key Functions:

- Fiber route visualization
- Map-based display of network
- Fault localization on maps
- OTDR trace visualization
- Supports web, desktop and mobile access

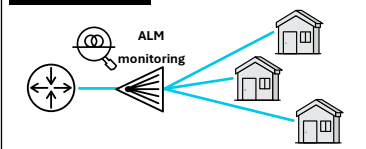
Advanced Capabilities:

- Converts optical distance into **geographical coordinates**
- Enables **precise real-world fault localization**
- Supports **third-party GIS integration**
- Provides enhanced operational workflow for NOC teams

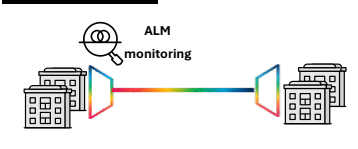
Applications

- Advanced fiber plant monitoring, assurance, and visualization
- Centralized visibility of entire fiber plant infrastructure
- Real-time, real-world situational awareness
- Proactive notification of fiber faults with precise geographical fault location
- PON and point-to-point topologies

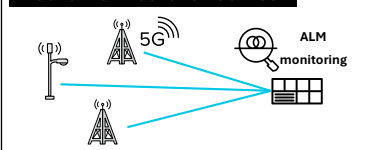
PON Networks



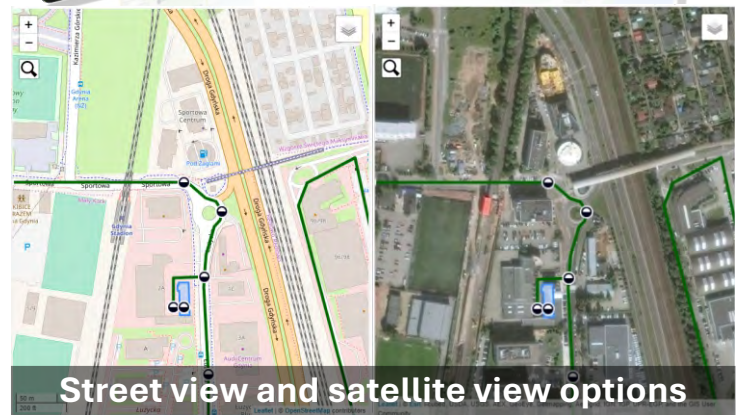
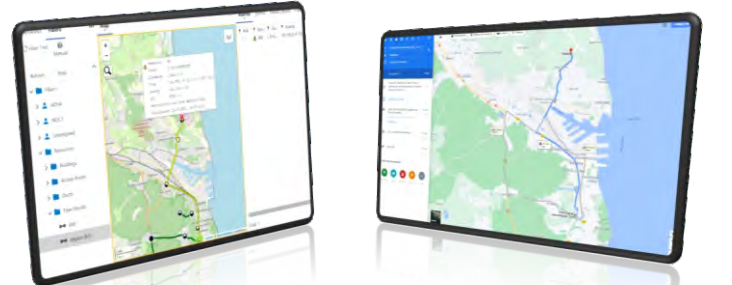
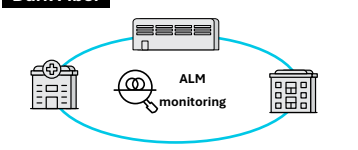
DWDM Systems



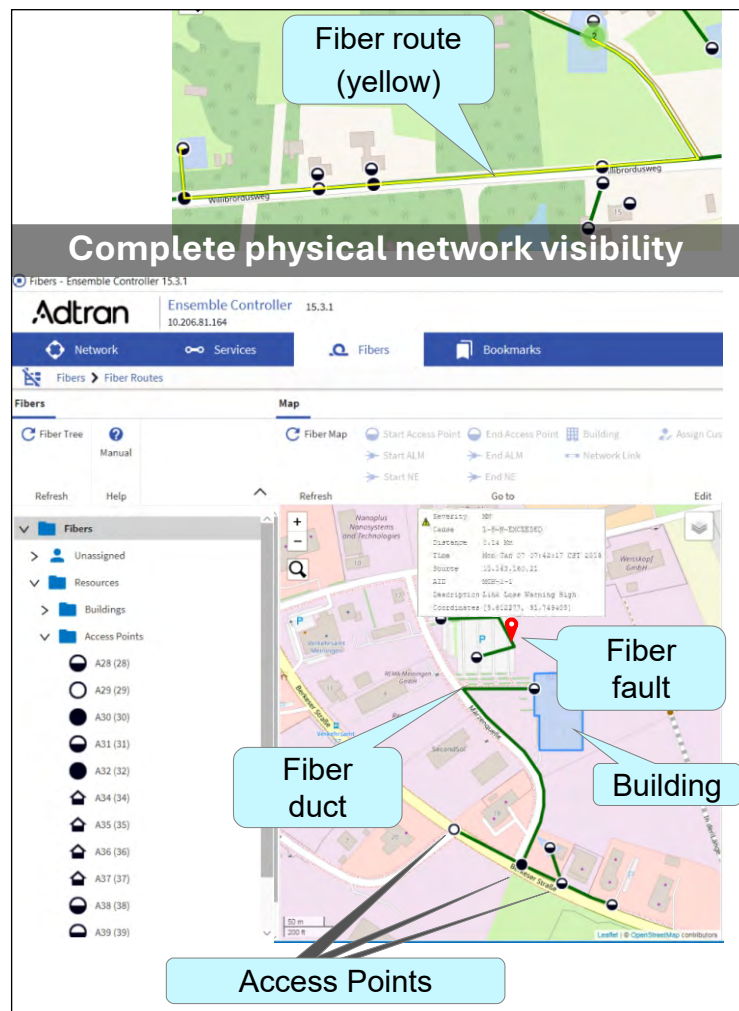
Mobile Fronthaul and Backhaul



Dark Fiber



Street view and satellite view options



Mosaic Network Controller (MNC)

Real-time GIS-based solution for fiber network surveillance

Technical Specifications:

Server requirements – GIS Server

Parameter	Specification	Units
RAM	16	GB
CPU	2.2	Ghz
Hard Disk Space	110	GB
System Architecture	64-bit	
Supported OS (*)	CentOS/RHEL	

Client requirements - Fiber editor

Parameter	Specification	Units
RAM	8	GB
CPU	2.5	Ghz
Hard Disk Space	10	GB
System Architecture	64-bit	
Supported OS	Windows 10	

Communication Protocols

Interface	Protocols
ALM communication	SNMP, REST, FTP
MNC Communication	HTTP, HTTPS, WFS API
Third-Party Systems	WFS API

Geographic File Support

File Format	Support
Shape (SHP)	Supported natively
KMZ/KML	Supported natively
Other WGS-84 compliant formats (**)	Supported after conversion

(**) Any standard file format can be easily converted to SHP files for import

Ordering Information

Software Licenses:

Product Code	Product Name	Product Description
1091008940	ENC/EFD	Mosaic Fiber Director license: Serves for geographical management of fibers in connection with ALM devices NOTE: A current MNC license is required to operate the software
1091008941	ENC/EFD/Editor	Mosaic Fiber Editor Application license for one client

ALM connection Licenses:

Product Code	Product Name	Product Description
1091009401	ENC/EFD/CL/M	Mosaic Fiber Director connection license for one ALM16 unit
1091009402	ENC/EFD/CL/L	Mosaic Fiber Director connection license for one ALM64 unit

Upgrade licenses are available.

ALM - Water sensor

Reusable Sensor for Humidity Detection in Outdoor Enclosures

ADTRAN's passive water sensing solution, integrated with the ALM fiber assurance platform, enables operators to **proactively monitor outdoor enclosures and detect water intrusion** before network performance is impacted. Designed for continuous, real-time infrastructure protection, the solution provides a simple, cost-effective, and highly reliable method for safeguarding critical fiber assets. With support for cascading multiple sensors across large deployments, network operators gain centralized visibility, faster response capabilities, reduced downtime, and enhanced long-term reliability for railway, utility, and telecom environments.

Modern fiber networks are the backbone of mission-critical communication systems, supporting **FTTH and mobile access networks to railway signaling and long-haul telecom infrastructure**. While fiber enables high-speed data transmission, outdoor network assets remain vulnerable to environmental threats such as **water ingress, humidity and flooding**. Even minor moisture exposure over time can degrade splices, connectors, and optical components, leading to increased insertion loss, unexpected failures, and costly service disruptions.

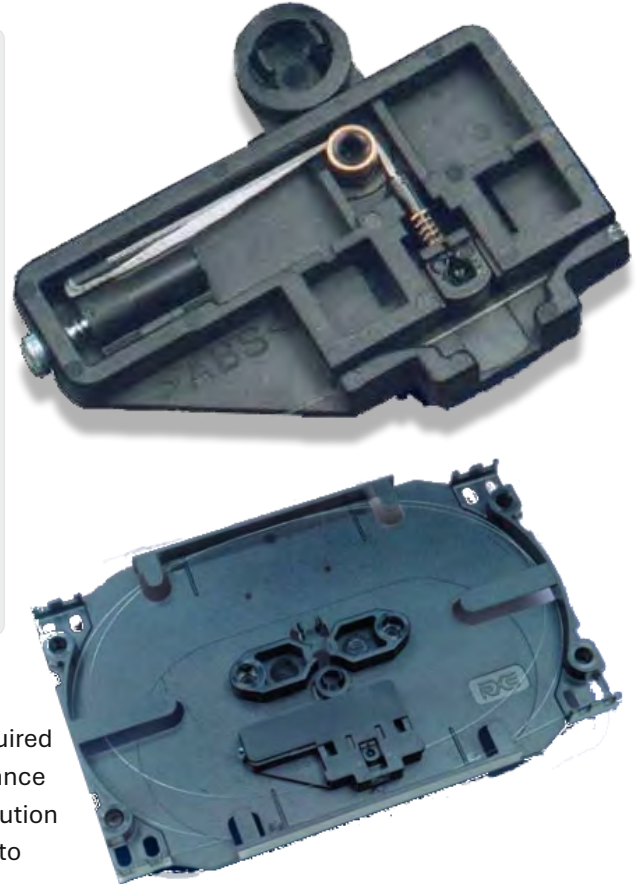
Key Features

- **Powerless Operation:** Passive monitoring. No power supply or battery required
- **Robust Solution:** Limited use of moving parts calls for little to no maintenance
- **Simplified Integration:** Seamlessly integrated with the ALM monitoring solution
- **Fast Detection Time:** Fiber degradation can be spotted before any impact to data transmission is observed
- **Multiple Use:** The sensor isn't damaged by water and so doesn't need to be replaced
- **Accurate Geographic Data:** Integrated with various geographic information systems (GIS) to easily localize flooding events

Applications

Cost-efficient solution to monitor network infrastructure and detect flooding events

- The ALM, located in the central office, continuously monitors the status of water sensors with a single OTDR trace
- If water penetrates a splice box, additional attenuation is introduced. Upon detection the ALM will generate an alarm, identifying which of the water sensors was triggered
- Events can be precisely and easily located via GIS
- Water sensors are passive. No power supply or battery is required at the site



ALM - Water sensor

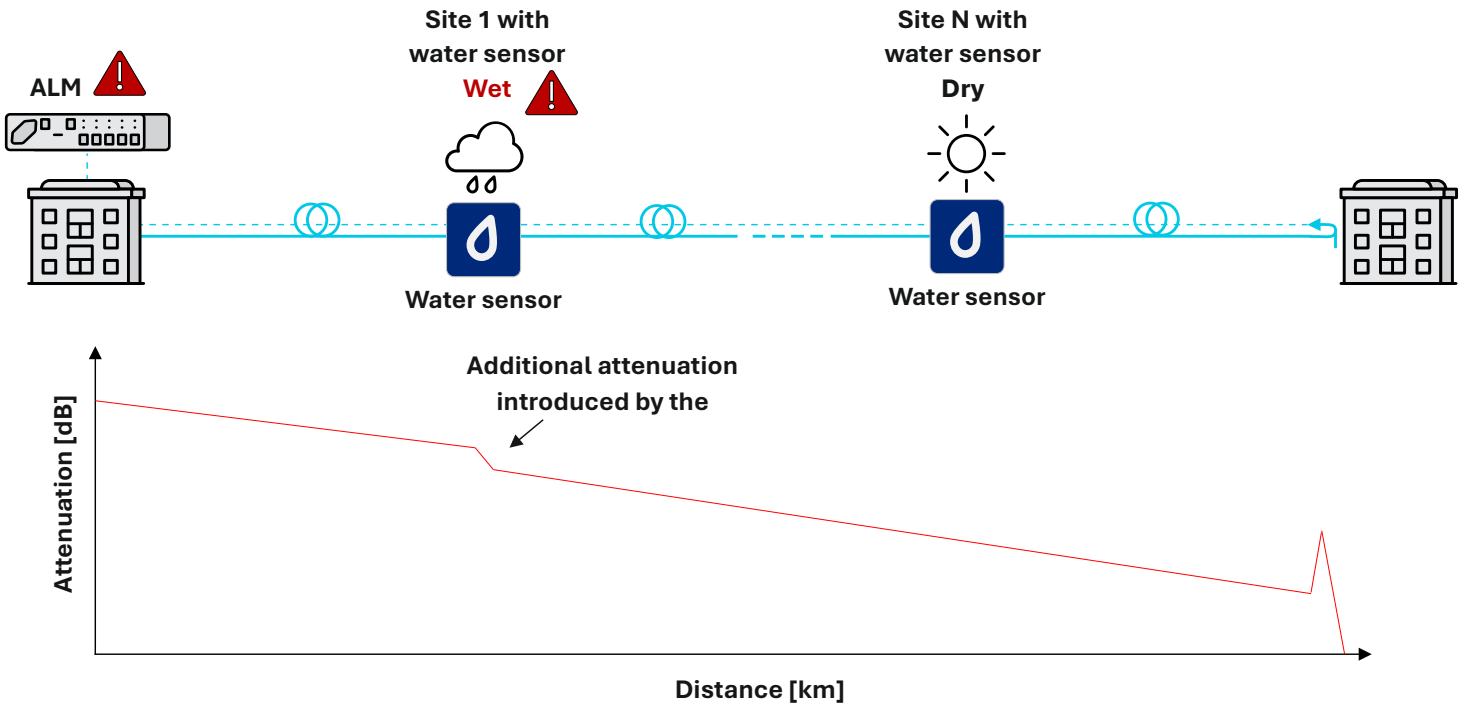


Reusable Sensor for Humidity Detection in Outdoor Enclosures

Technical Specifications:

Parameter	Specification
Recommended Fiber Type	ITU-T G.652
Min. Bending Radius of the Fiber	20mm
Attenuation Increase at 100% RH	Typically ~1dB*
Drying Time from Full Flooding	8 hours
Response Time	≤ 5 minutes
Splice Box Compatibility	Corning C46197-A7-A70/A66 and similar
Ordering Information	FAS/ALM/WTS 1043709867-01
Dimensions (HXWXD)	46.5mm x 36.0mm x 6.5mm

(*) Depends on the fiber type



ALM - Cabinet Door Sensor

Fiber-Based Passive Sensor for Door Monitoring

ADTRAN's passive cabinet door sensors enhance the ALM fiber assurance platform by providing **real-time monitoring of enclosure** access points across the network. Designed for railway and utility environments, these completely passive sensors help operations teams detect unauthorized access, vandalism, and security breaches instantly — without requiring local power at field locations.

Whenever the cabinet door is opened, the reflection disappears and the ALM can identify the location of the cabinet door that was opened. Any changes in the sensor status are reported by the ALM in seconds, allowing the end user to quickly pinpoint the change and alerting the operations team to the specific location being accessed.



Multiple sensors can be **“daisy chained”** together supporting fiber links **up to 100km** and further simplifying installation, monitoring and operations. The event information provided by the ALM can then be viewed on a network management system such as Adtran's Ensemble Controller with Fiber Director or a number of third-party NMS/GIS systems.

Key Features

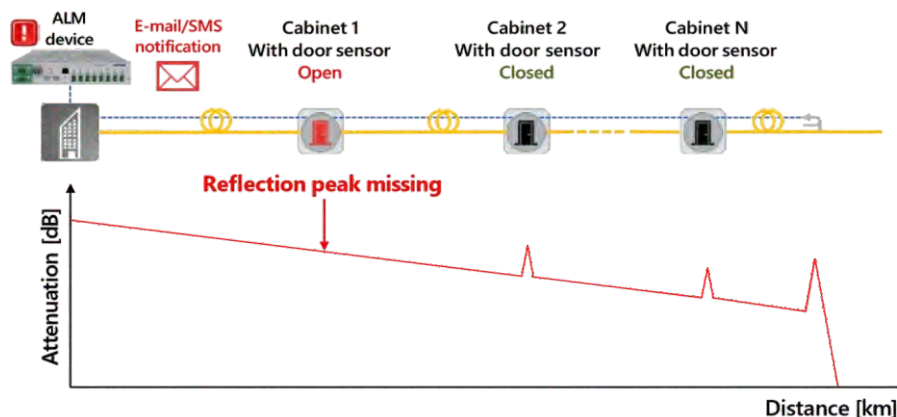
- **Simplified Installation:** Completely passive solution connects directly to fiber optic cable for monitoring of remote locations
- **Zero Maintenance:** No power or battery replacement requirements, eliminating outages and downtime
- **Ease of operation:** No wireless or protocol dependencies or setup needed
- **Improved security:** Passive design eliminates opportunity to “jam” monitoring operations
- **Wide network coverage:** Links up to 100 km are supported with multiple sensors, providing end-to-end network coverage
- **Management visibility:** 24/7 location monitoring via Adtran's Ensemble Controller with Fiber Director as well as third-party GIS platforms

Applications

- Improve network reliability and security with instant event notifications
- Continuous real-time monitoring of cabinet and facility doors from a central location
- Precise detection and location information reporting for events
- Monitor unstaffed remote locations to reduce operational expenses

How does it work?

- The illustration nearby shows multiple sensors deployed in a fiber optic network on a single fiber.
- The ALM monitoring device is located in the central office and continuously monitors the optical link. Each door or cabinet location is equipped with a passive sensor that generates a reflection peak.
- In the event that a door is opened the ALM will generate an alarm identifying which of the sensors experienced a change in status.



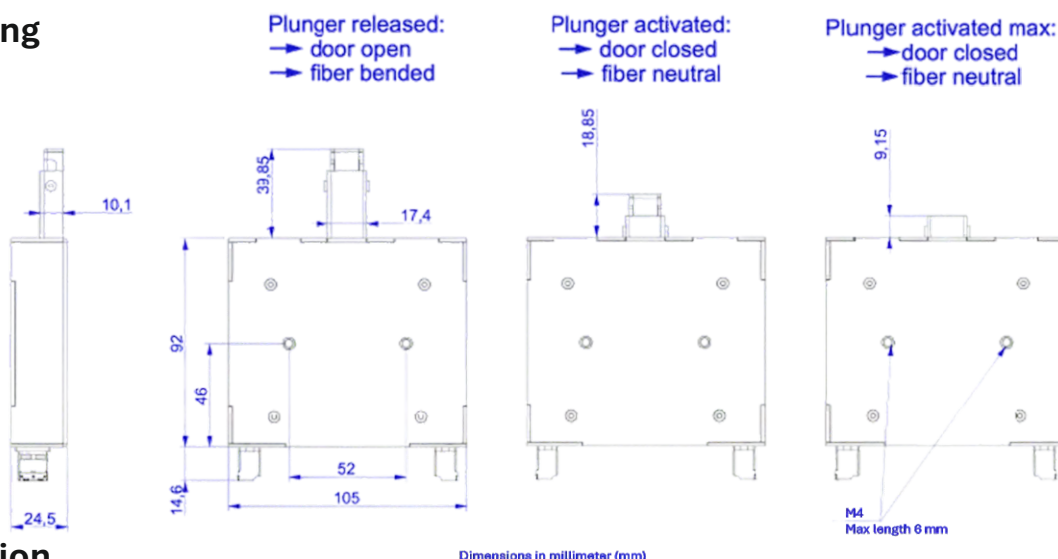
ALM - Cabinet Door Sensor

Fiber-Based Passive Sensor for Door Monitoring

Technical Specifications:

Parameter	Description	Specification	Units
Mechanical Specification			
Dimension (HXWXD)	H X W X D with plunger compressed and fiber connectors	23.75 x 125.45 x 92	mm
	H X W X D with plunger open and fiber connectors	23.75 x 146.45 x 92	mm
Dimensions for Mounting Options	Screw type	M4	
	Max screw length	6	mm
	Mounting holes placement	52	mm
Weight		180	grams
Plunger Force	Minimum - Maximum	3-8	Newtons
Cycle Count		20000	cycles
Optical Specification			
Reflection	Reflect band wavelength	1638~1700	nm
	Insertion loss including connectors (typical)	0.6	dB
	In closed state - In opened state	>-27 - <-35	dB
Long-Range Mode Performance	Maximum fiber length	100	km
	Maximum fiber loss (including all sensors on link)	32	dB
	Minimum spacing between sensors	200	meters
Short-Range Mode Performance	Maximum fiber length	20	km
	Maximum fiber loss (including all sensors on link)	28	dB
	Minimum spacing between sensors	5	meters
Temperature Specification			
Temperature Range		-35 to +75	°C
Environmental, Certification and RoHS Compliance			
IP Protection	IP20	Compliant	
RoHS Compliance	Directive 2011/65/EU and Delegated Directive (EU) 2015/863	Compliant	

Mechanical Drawing



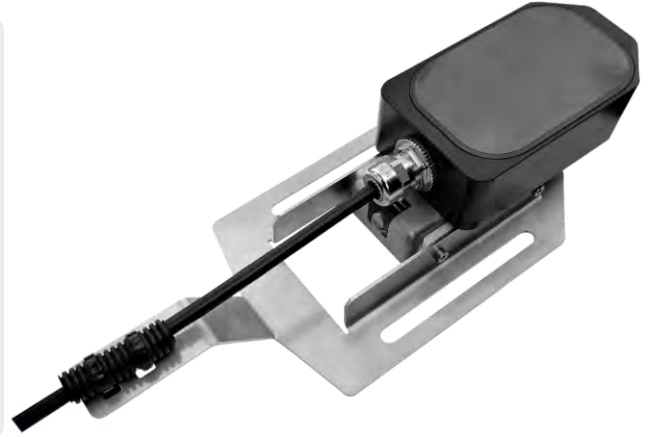
Ordering Information

Product Code	Product Name	Product Description
1043709876-01	ALM/DS	Sensor for door or cabinet, LC/APC connectors

ALM - Maintenance Hole sensor

Fiber-Based Passive Sensor for Maintenance Hole Monitoring

ADTRAN's passive Maintenance Hole Sensor (MHS), integrated with the ALM fiber monitoring platform, provides an intelligent and cost-effective solution for **securing critical underground fiber infrastructure**. Designed with a completely passive and maintenance-free architecture, the solution requires **no local power or internal electronics, ensuring high reliability with minimal operational costs**. Whenever a maintenance hole is opened, the ALM instantly detects the event, identifies the exact location, and generates real-time alerts for rapid operational response. With support for daisy-chaining multiple sensors across **distances up to 100 km on a single fiber link**, operators gain centralized visibility and scalable infrastructure protection for railway, utility, and telecom networks.



As fiber optic networks continue to support mission-critical communication systems, protecting physical access points has become more important than ever. Maintenance holes and underground access enclosures are highly vulnerable to vandalism, sabotage, unauthorized access, and other security threats that can lead to service disruption and costly downtime. By enabling continuous real-time monitoring of these critical locations, the MHS solution empowers operations teams to proactively detect security breaches, minimize network risks, and improve overall infrastructure resilience while integrating seamlessly with network management and GIS platforms.

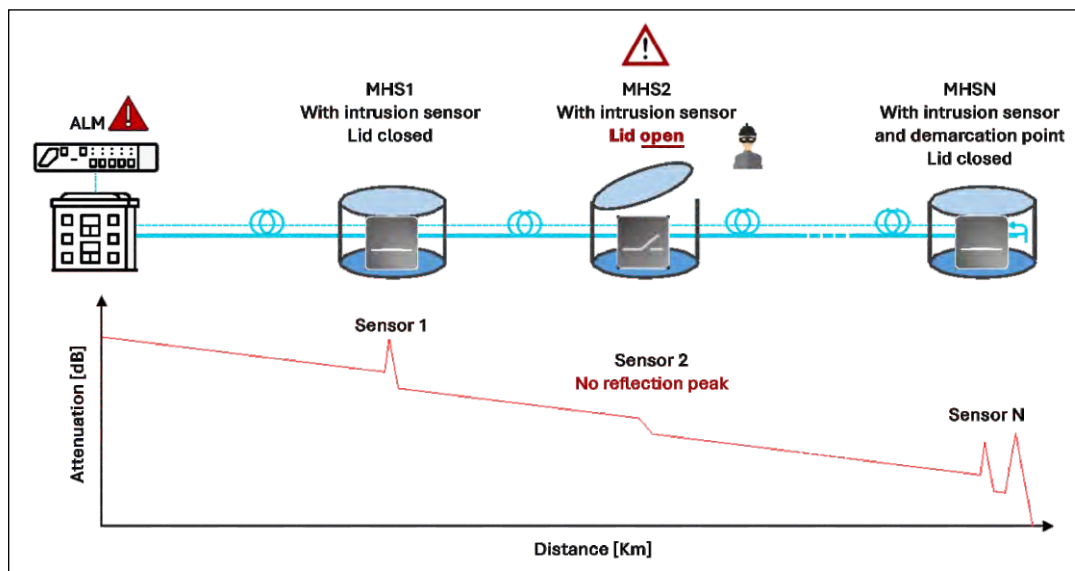
Key Features

- **Passive Device:** No power supply required, sensor is operated passively
- **Robust Design:** No moving parts on the outside, design is water and dust proof (IP68-compliant)
- **Simplified Integration:** No wireless or protocol dependencies or setup needed
- **Improved Security:** Passive design eliminates opportunity to “jam” monitoring operations
- **Wide network Coverage:** Cascaded sensors supported in links up to 100 km, providing end-to-end network coverage
- **Management Visibility:** 24x7 location monitoring including email and SMS notification support via Adtran's Ensemble Fiber Director

Applications

The illustration shows how multiple MHS can be cascaded on a fiber optical cable

- The ALM monitoring device is located at the central office and continuously monitors the optical link
- Each maintenance hole lid location is equipped with a MHS that generates a reflection peak
- In the event that a lid is opened or closed, the ALM will generate an alarm, identifying which of the sensors experienced a change of status



ALM - Maintenance Hole sensor



Fiber-Based Passive Sensor for Maintenance Hole Monitoring

Technical Specifications:

Parameter	Description	Specification	Units
Mechanical Specification			
Dimension (WXHxD)	MHS inclusive wall mount	310x118x58	mm
Dimension (WXHxD)	Step protector	200x200x90	mm
Cycle Count		20,000	cycles
Optical Specification			
Reflect Band Wavelength		1638~1700	nm
Reflection	In closed state	>-5	dB
	In opened state	<-10	dB
Long-Range Mode Performance	Maximum fiber length	100	km
	Maximum fiber loss (including all sensors on link)	32	dB
	Minimum spacing between sensors	200	m
Short-Range Mode Performance	Maximum fiber length	20	km
	Maximum fiber loss (including all sensors on link)	28	dB
	Minimum spacing between sensors	5	m
Temperature Specification			
Temperature Range		-20 to +75	°C
Environmental, Certification and RoHS Compliance			
IP Protection	IP68	Compliant	
RoHS Compliance	Directive 2011/65/EU and Delegated Directiv 2015/863	Compliant	

ALM - Maintenance Hole sensor



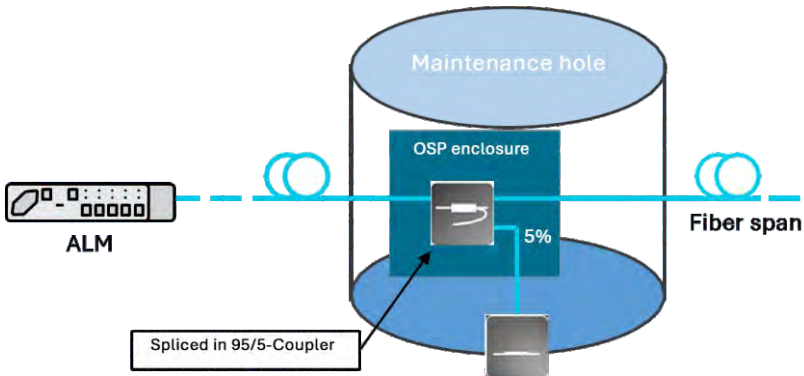
Fiber-Based Passive Sensor for Maintenance Hole Monitoring

Installation and ordering

Installation Notes

For practical reasons, the MHS does not contain an integrated coupler. Coupling out from the monitored fiber to the location of the maintenance hole lid or MHS requires an additional 95/5-coupler which is usually spliced in and installed in an OSP enclosure located close to a maintenance hole.

For ordering information of the 95/5 coupler, please refer to the "Ordering information" table below. The MHS is delivered with a 7 meter fiber-optical cable which in most cases is sufficient to connect it to the 5%-port of the 95/5-coupler installed within the OSP enclosure.



The MHS is provided in two variants, 25 mm and 35 mm, both of which include the wall mounting hardware bracket. The 25 mm and 35 mm options refer to the distance from the wall which the sensor is mounted to engage with the lid. Consult your vendor's specifications to determine which model applies.

The optional step protection is offered in two variants to match the sensor mounting 25 mm and 35 mm sensor options. The step protector is used to protect the sensor when the lid is removed to avoid accidental damage.

Ordering Information

Product Code	Product Name	Product Description
1043709878-01	FAS/ALM/MHS-WALL-IP68-35	Maintenance hole sensor, 7m fiber, wall mount bracket included, 35mm activation distance
1043709886-01	FAS/ALM/MHS-WALL-IP68-25	Maintenance hole sensor, 7m fiber, wall mount bracket included, 25mm activation distance
1043709887-01	FAS/ALM/MHS-STEP-35	Step protection bracket for use with FAS/ALM/ MHS/WALL-IP68-35 ONLY
1043709888-01	FAS/ALM/MHS-STEP-25	Step protection bracket for use with FAS/ALM/ MHS/WALL-IP68-25 ONLY
1043739868-01	J-Y/SM/95-5/NC/0200	95/5-Coupler, 2m fiber, no connectors

Typical System Configuration

The following table illustrates the recommended combinations of product SKUs commonly used to build complete, fully functional systems for different deployment scenarios.

S.No	Product Name	Item Code
1.	Mosaic Network Controller Fiber Monitoring Software with GIS capability	IC: 1091007502+1091008940+1091006170 UPC: 107174
2*	48ALM-T Fiber Monitoring System 48Fiber with MFD Client license	IC: 1043709880-01+1043709883-01+1036904053+1036006011+1043709881-01+1091707075-01+BC00001099 UPC: 107172
3*	16ALM Fiber Monitoring System 16Fiber with MFD Client License	IC: 1043709842-03+ 1013904019+ 1036904053+ 1036006011+BC00001098 UPC: 107173
4*	16ALM Fiber Monitoring System 16Fiber without MFD	IC: "1043709842-03+ 1013904019+ 1036904053+ 1036006011+1091007430" UPC: 107194
5**	8-Port WDM Coupler / Bypass Filter Module	IC: 8/1CSM+#1650/1LGX + SH1HU/LGX-19/PASSIVE UPC: 107286
6.	ALM Demarcation Reflector	IC: DR/PTP/SC/GREY UPC: 107287
7.	Passive Cabinet Door Sensor for RFMS	IC: 1043709876-01 UPC: 107288
8.	Hardware server for installation of fiber monitoring server software	IC: Server_FMS UPC: 107175
9.	Industrial work station	Ex02 UPC: 107176

(*)

RTU's are of different port capability that is 48 port, 16 port. Shall be chosen on the basis of route length and no of fiber links to be monitored.

(**)

Passive and unmanaged module with 8 integrated WDM couplers (Y-Cables) , designed for monitoring of 8 individual live/In service fiber cores. If Monitoring Dark Fiber Links use of WDM Couplers shall be eliminated.



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