



Test&Measurement

AQ7420 series

High-Resolution Reflectometer



As global telecommunications and data requirements continue to grow, vast numbers of optical components and devices are produced every day. At the same time, R&D efforts aim for ever-higher levels of performance. Our mission is to enable innovation by delivering world-class measuring instruments. This instrument is designed to support you at every stage, from research to production.

Performance – Delivering industry-leading optical solutions to meet the fast-changing demands of today's technologies.

Reliability – Customers worldwide depend on Yokogawa for unmatched optical measurement quality.

Innovation – For over 40 years, our engineers have been closely listening to customers' needs and delivering solutions to the most difficult measurement challenges.

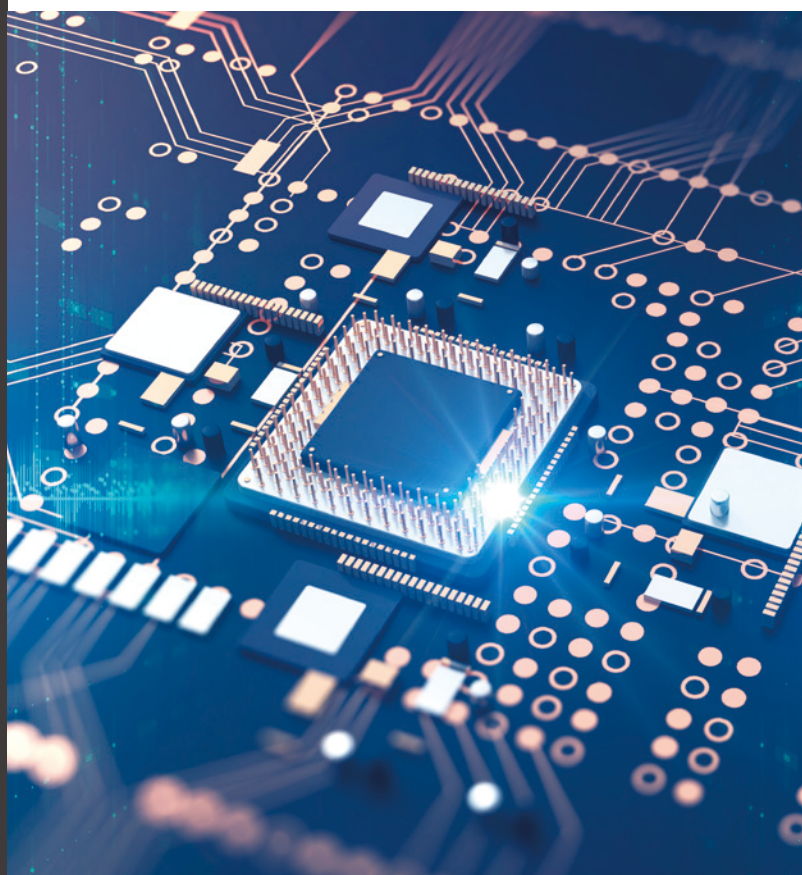
Spurious-Free High-Resolution

Achieve clean, spurious-free waveforms

- Sharper waveforms provide unmatched clarity
- Precisely separate closely spaced peaks with micrometer-level resolution

Simultaneous Dual-Wavelength RL and IL Measurement

- Achieve dual-wavelength return-loss measurement in just 10 seconds.
- Perform both reflection and insertion loss tests in a single unit



tion Reflectometer

Micro-Crack Detection

Detects reflections as small as -100 dB, revealing previously invisible defects

Expandable Measurement Systems

- Multi-Fiber Measurement for automated inspection of up to 24 fibers (+AQ740027)
- Long-Distance Measurement for extended measurement ranges up to 8 m (+AQ740051)

*Compatible with the AQ740051 for AQ7421 only



Advancing the future of communication technologies

AQ7420 series

High-Resolution Reflectometer

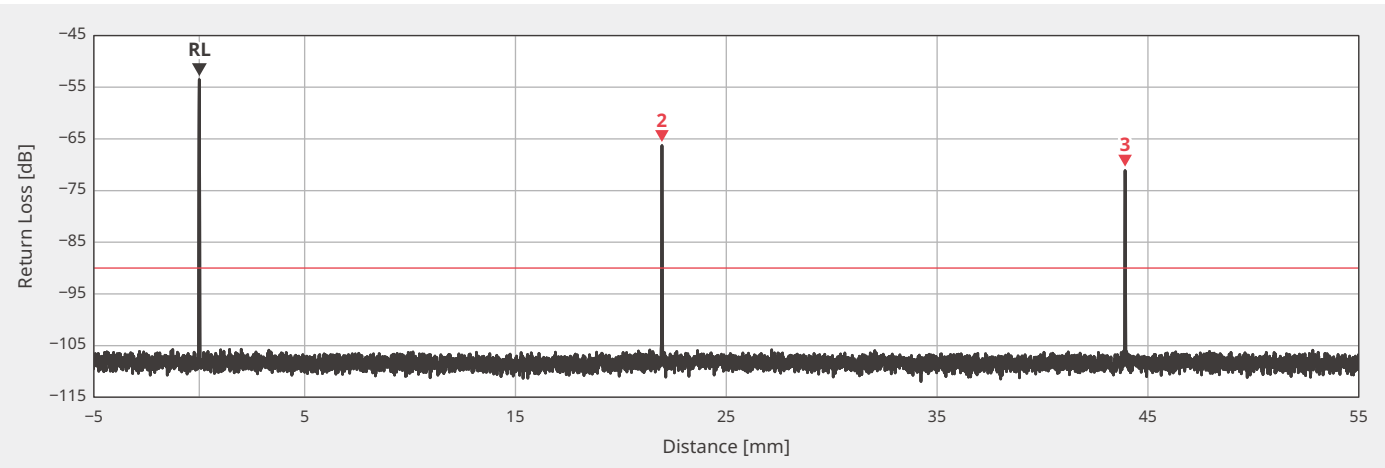
Enhancing Quality and Reliability with Precision Measurement

Spurious-Free Analysis

By significantly eliminating spurious noise, the reflectometer produces clean measurement results that accelerate R&D analysis and improve defect inspection in production, contributing directly to improved efficiency.

Ultra-High Sensitivity

The AQ7420 Series achieves sensitivity down to -100 dB , capturing even minute reflections with exceptional clarity. This delivers highly accurate waveform analysis and long-term product reliability, with sensitivity approximately $1000\times$ greater than its predecessor, the AQ7410.

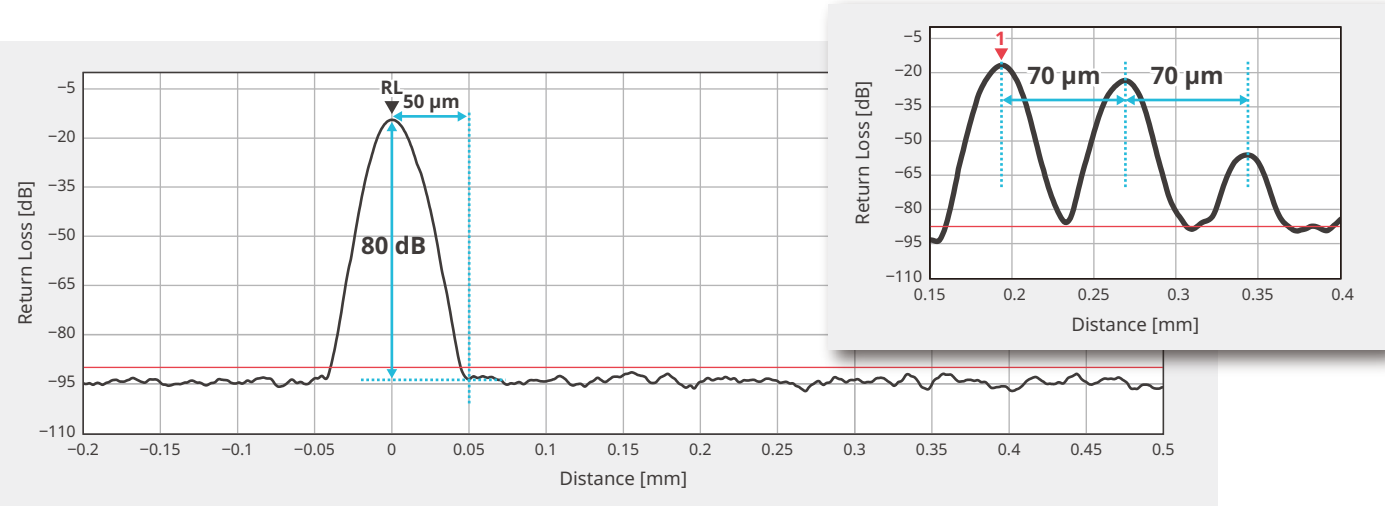


Sharp Waveforms, Clear Results

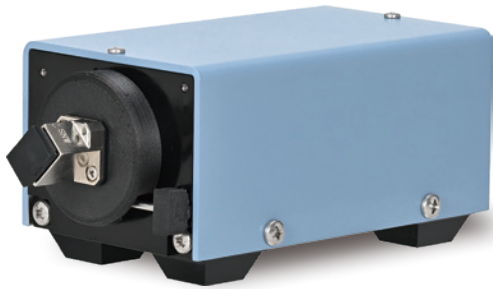
High resolution and wide dynamic range work together to deliver sharp waveforms, exposing the smallest reflections beside strong signals for unmatched confidence in analysis.

Simultaneous Wavelength Measurements

The AQ7420 can simultaneously measure reflection loss at two wavelengths in just ten seconds, and when combined with the AQ740023 Sensor Head, it evaluates both reflection and insertion loss in a single operation. This eliminates the need for reconnections, shortening tact time, and saving valuable lab space.



Convenience Through Series Connectivity

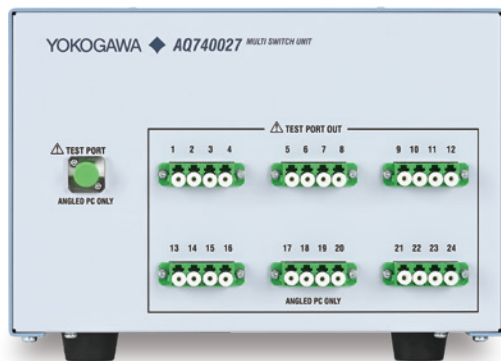


Measuring Insertion Loss

By connecting the sensor head (optional) to the AQ7420/AQ7421, insertion loss can be measured directly, shortening tact time and saving valuable space.

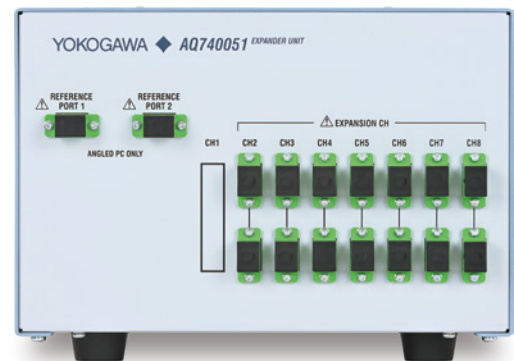
Compatible with Multiple Connectors

The sensor heads support optional accessories such as MPO, MT connectors, and Fiber holder, ensuring flexibility across different test setups (Compatible with the AQ740081 Connector Adapter).



Multi-Fiber Measurement

In conjunction with the AQ740027 Multi-Switch Unit, the AQ7420/AQ7421 enables automatic measurement of up to 24 fibers, enabling efficient inspection and analysis of multiple fibers and optical devices.



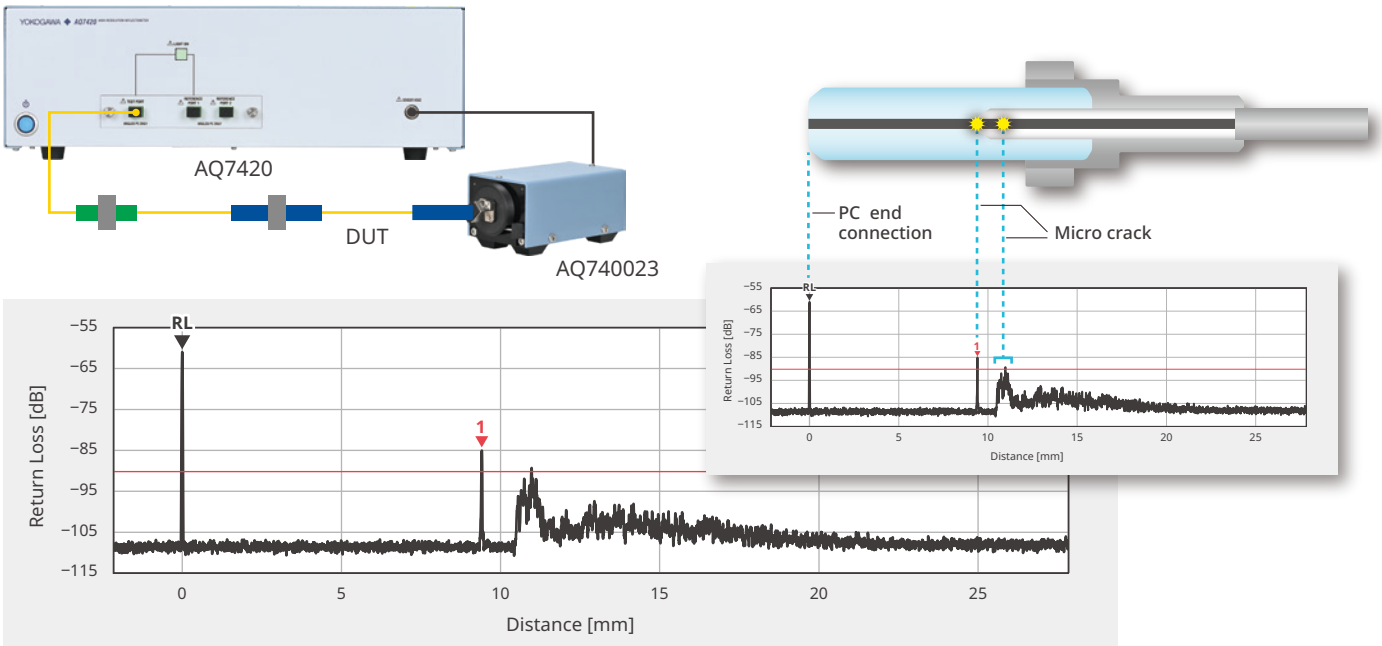
Extended Measurement Distance

The AQ7421's measurement distance can be extended up to 8 m with the AQ740051 Expander Unit (for the AQ7421 only), making it possible to locate failure points over an even wider inspection range.

Application Reflection and Insertion Loss Testing

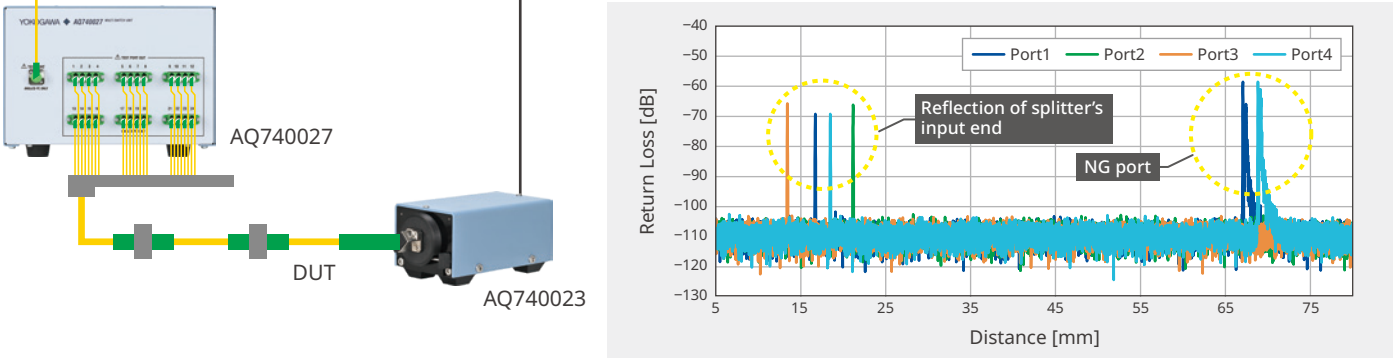
RL and IL Measurement in One Step

By combining the AQ7420/AQ7421 with the AQ740023 Sensor Head, users can automatically measure both return loss and insertion loss at two wavelengths simultaneously with a single system. With its spurious-free and high-sensitivity performance, the system clearly distinguishes reliable products (absence of reflection peaks) from defective ones (reflection peaks present). The control software also issues inspection reports to streamline quality management.

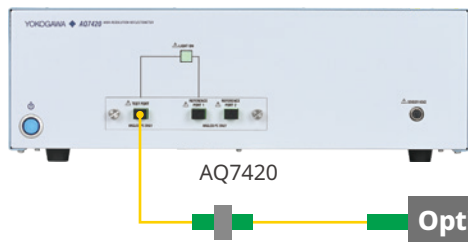


Dual-Wavelength RL and IL Measurement for Multi-Fiber Devices

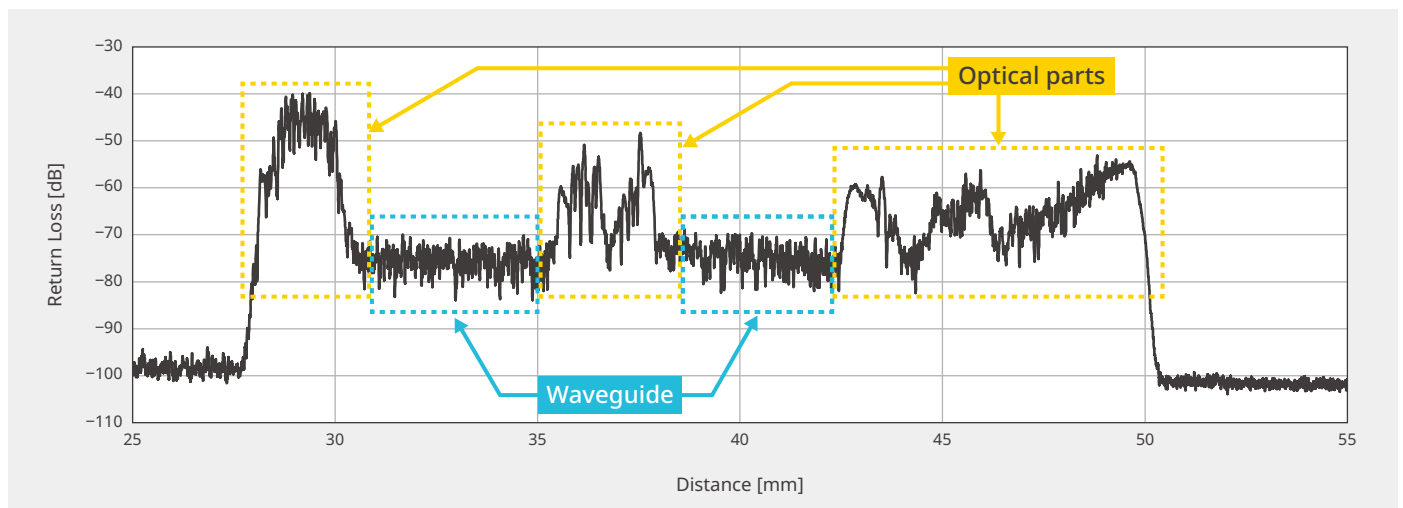
When paired with the AQ740027, the AQ7420/AQ7421 enables automatic inspection of multiple fibers and devices such as splitters. It can measure return loss and insertion loss simultaneously across multiple ports. This eliminates the need for manual reconnections or switching, allowing multiple ports to be tested with a single button press for maximum efficiency.



Component Position and Reflection Analysis in Optical Devices

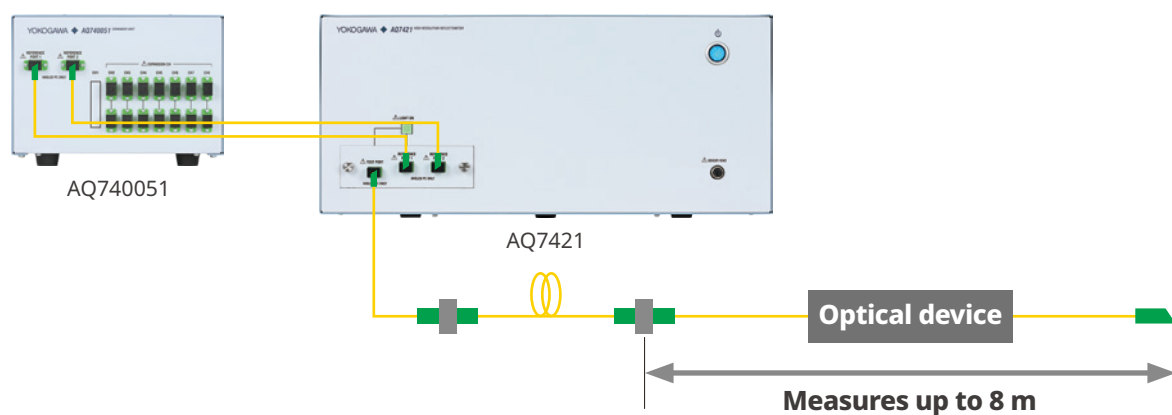


With high spatial resolution, spurious-free operation, and sharp waveforms, the AQ7420 precisely identifies component positions inside optical devices and measures the reflected light generated at their edges.



Failure Location Analysis across Long Test Distances

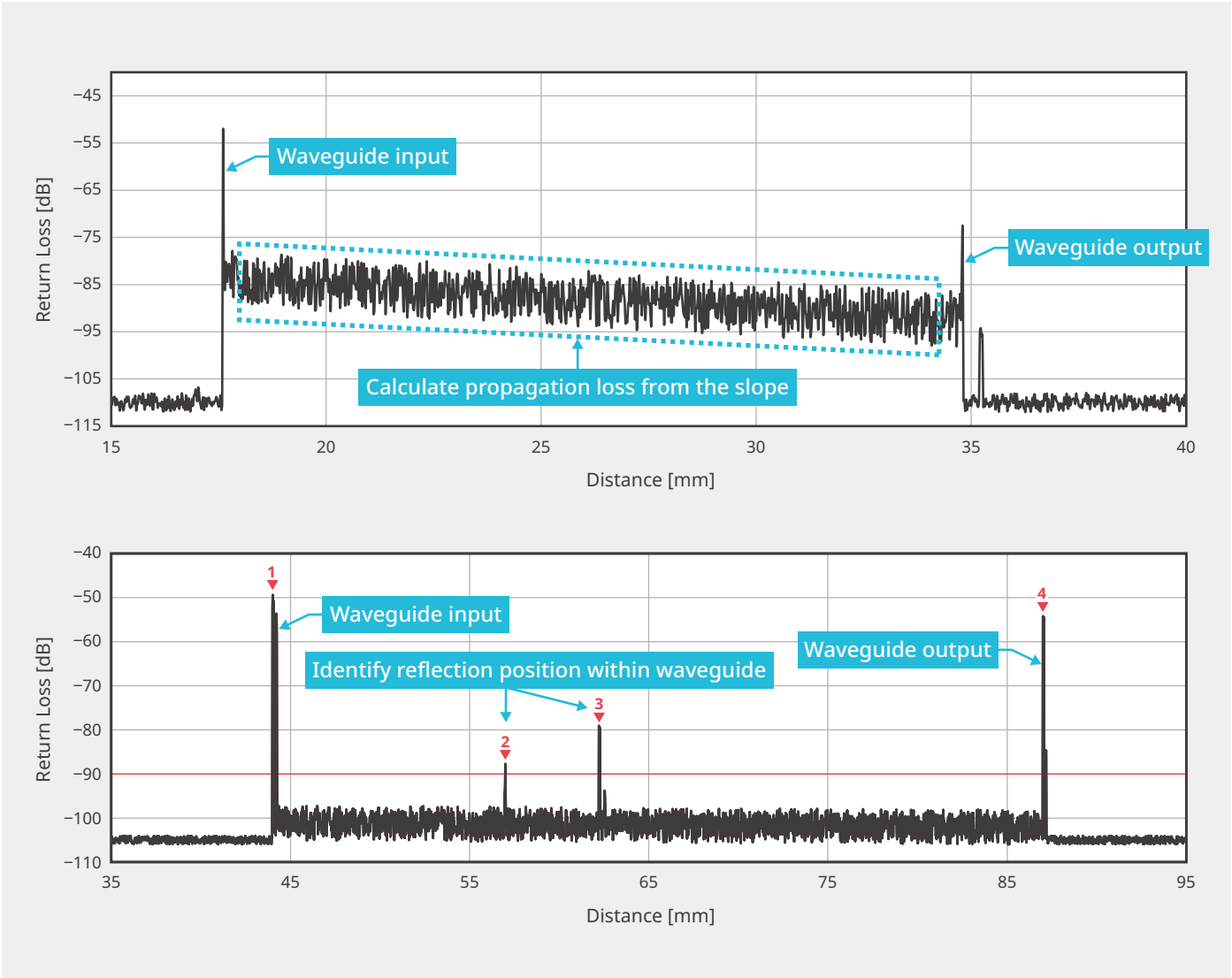
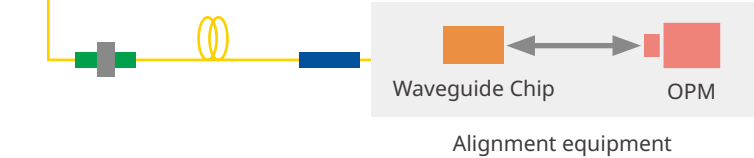
By combining the AQ7421 with the AQ740051 Expander Unit (for AQ7421 only), the measurement range can be extended up to 8 m. This capability enables accurate fault location and inspection for short fiber assemblies and integrated photonic devices that exceed 1 m in length but remain unsuitable for long-haul OTDR testing.



Waveguide Internal Reflection and Propagation Loss Analysis



The AQ7420 series accurately captures sharp peaks, clearly resolving small reflections and scattered light near strong coupling-point reflections. Propagation loss can be calculated directly from the slope of the return loss distribution, enabling precise waveguide analysis at a lower cost and in less time than with the conventional cutback method.



Interface

AQ7420



AQ7421



1 LIGHT SOURCE's ON/OFF BUTTON

Switch the light source button.

2 TEST PORT

This port is for connecting the relay cords.

3 REFERENCE PORT 1, 2

These ports are for connecting the distance adjustment cords.

4 SENSOR HEAD Connector

This port is for using IL measurement.

5 USB

This port is for connecting to the Control PCs.

6 Power Supply Terminal

This port is for connecting the attached Power Supply cords.

7 MULTI SWITCH UNIT Connecting Terminal

This port is for connecting to the AQ740027 MULTI SWITCH UNIT using dedicated cables.

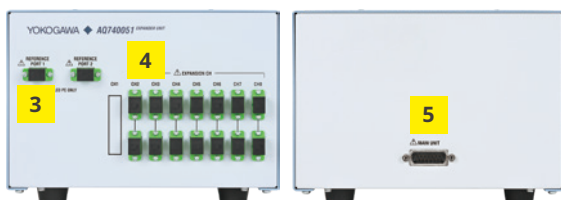
8 EXPANDER UNIT Connecting Terminal

This port is for connecting to the AQ740051 EXPANDER UNIT using dedicated cables (for AQ7421 only).

AQ740027



AQ740051



1 TEST PORT

The port is for connecting to the TEST PORTs of the AQ7420/ AQ7421 using the attached relay connectors.

2 TEST PORT OUT

This port is for connecting to the FO code of the AQ740094.

3 REFERENCE PORT 1, 2

Use the dedicated optical fiber connection cords of AQ740027/ AQ740051 to connect to REFERENCE PORT 1 and 2 on AQ7421.

4 EXPANSION CH

This port is for connecting to the AQ740097.

5 DEDICATED CABLE CONNECTING TERMINAL

This port is for connecting to the AQ7420/AQ7421 using dedicated cables.

*Compatible with the AQ740051 only to the AQ7421.

Main Specifications

AQ7420/AQ7421 High-Resolution Reflectometer

Items	Specifications	
Model	AQ7420	AQ7421
Measurement wavelength	-13NN: 1310 nm (Main), -1315: 1310 nm (Main)/1550 nm (Sub)	-13NN: 1310 nm (Main), -15NN: 1550 nm (Main), -1513: 1550 nm (Main)/1310 nm (Sub)
Measurement distance range ^{*1}	100 mm	1000 mm
Distance sampling resolution ^{*1}	1, 4, 8 μm	
Spatial resolution ^{*2, *3}	40 μm or less	
Distance measurement repeatability ^{*4, *6}	50 μm or less	
Back reflection measurement range	Normal range: -14.7 to -85 dB, High sensitivity range: -50 to -100 dB	Normal range: -14.7 to -80 dB, High sensitivity range: -50 to -100 dB
Back reflection measurement uncertainty ^{*2, *5, *6, *7}	Normal range: ±3 dB (-14.7 to -85 dB) High sensitivity range: ±3 dB (-50 to -90 dB), ±5 dB (-90 to -100 dB)	Normal range: ±3 dB (-14.7 to -80 dB) High sensitivity range: ±3 dB (-50 to -90 dB), ±5 dB (-90 to -100 dB)
Spurious noise ^{*8}	Normal range: -85 dB or less ^{*9} High sensitivity range: -100 dB or less ^{*10}	Normal range: -80 dB or less ^{*9} High sensitivity range: -100 dB or less ^{*10}
Measurement time ^{*11}	Approx. 6 seconds	Approx. 13 seconds
Applicable fiber	SMF (ITU-T G.652)	
Master cord	SMF (ITU-T G.652), FC/PC or SC/PC connector	SMF (ITU-T G.652), FC/PC or SC/PC, FC/Angled PC, SC/ Angled PC connector
Functions	By control software	
Performance guarantee environment ^{*12, *13}	18 to 28°C, ±2°C after reference, 20 to 70%RH, no condensation	
Operating environment	10 to 40°C, 20 to 50%RH (Below 35°C), 20 to 35%RH or less (Below 40°C), no condensation	
Storage environment	-10 to 50°C, 20 to 80%RH (Below 40°C), 20 to 40%RH (Below 50°C), no condensation	
Power requirements	100 to 240 VAC, 50/60 Hz, 120 VA or less (AC adapter)	
Dimensions and Mass ^{*14}	430 (W) × 132 (H) × 350 (D) mm (Excluding protector and handle), approx. 8 kg	430 (W) × 187 (H) × 492 (D) mm (Excluding protector and handle), approx. 22 kg
Laser safety standards	EN 60825-1:2014+A11:2021, IEC 60825-1:2014, GB/T 7247.1-2023 Class 1	
Recommended calibration period	1 year	
Standard accessories	Master cord, Relay cord, FC adapter, Distance Adjustment cord, USB cable, Control software (CD), AC Adapter	
Control software main functions	Optical return loss distribution waveform, The location of the reflection point, Optical reflection loss display, Judgement waveform scaling, Marker function, etc	
Recommended PC ^{*15}	CPU: CORE i5, 2 GHz or more, 64 bit, OS: Windows11, RAM: 8 GB or more, Storage space: 8 GB or more, Display resolution:1920 × 1080 dots or more USB2.0 or higher	

*Specifications are provided after warm-up and at the main wavelength.

- *1 For a refractive index of 1.467 (from the tip of the attached optical fiber)

*2 Measurement distance 0 mm

*3 Half value width of reflected light pulse waveform.

*4 In the case of an air-conditioned room at a temperature of 23°C to 24°C, excluding the effect of optical fiber expansion due to temperature, when stability mode is ON.

*5 The return loss value may fluctuate by up to about 3 dB by moving the fiber.

*6 2σ

*7 Averaging 1 time (-14.7 dB to -90 dB), 5 times averaging if smaller than -90 dB.

*8 Pseudo reflected waveform due to device-specific characteristics.
- *9 When measuring pseudo reflected light amount -20 dB (0 mm position), averaging 5 times.

*10 When measuring pseudo reflected light amount -50 dB (0 mm position), averaging 5 times.

*11 Measurement distance 100 mm (AQ7420) Measurement distance 1000 mm (AQ7421), distance measurement sample resolution 8 μm, high sensitivity range: -50 to -100 dB, averaging 1 time, varies depending on PC operating environment.

*12 No abrupt temperature change (±10°C/h).

*13 Specifications covered: Back reflection measurement uncertainty, distance measurement repeatability, spurious noise.

*14 Excluding accessories.

*15 A personal computer for control is not included. Please prepare a personal computer with recommended specifications or higher.

AQ740023 Sensor Head

Items	Specifications
Measurement wavelength	1310 nm/1550 nm ^{*1}
Insertion loss measurement range ^{*1}	0 to 10 dB
Insertion loss measurement uncertainty ^{*2, *3}	±0.02 dB
Applicable Optical fiber	SMF (ITU-T G.652)
Connector adapter	FC or SC *LC, MT, MPO connector, 2.5 dia. ferrule, 1.25 dia. ferrule, and Fiber holder sold separately
Performance guarantee environment ^{*4}	18 to 28°C, ±2°C after reference, 20 to 70%RH, no condensation
Operating environment	10 to 40°C, 20 to 50%RH (Below 35°C), 20 to 35%RH (Below +40°C), no condensation
Storage environment	-10 to 50°C, 20 to 80%RH (Below 40°C), 20 to 40%RH (Below 50°C), no condensation
Power	Supplied by AQ7420 or AQ7421 High-Resolution Reflectometer
Dimensions and Mass ^{*5}	60 (W) × 45 (H) × 100 (D) mm (excluding protrusions), Approx. 0.4 kg
Recommended calibration period	1 year
Standard accessories	Connector Adapter FC or SC, Adapter Cap, Cable (Special cable for AQ7420 series connection)

*This instrument is a dedicated sensor head that is driven and controlled by the AQ7420 or AQ7421 High-Resolution Reflectometer.

*All specifications are after 1 hour of warm-up and REF under the measurement condition.

*1 Same as measurement wavelength of AQ7420. *2 2σ *3 Within 5 minutes after reference temprature change ±1°C or less. *4 No abrupt temperature change (±10°C/h).

*5 Excluding accessories.

AQ740027 Multi Switch Unit

Items	Specifications
Connectable main units	AQ7420, AQ7421
Number of channels	Maximum 24 CH
Channel switching time	Approx. 2 seconds
Insertion loss*1	2.6 dB or less
CH Switching Repeatability*1, *2	±0.02 dB
Maximum input level	17 dBm or less
Measurement target	
Optical fiber	10/125 μm SM
Fiber count	Single fiber, multi-fiber (up to 24 fibers)
Measurement port	FC/Angled PC
Output ports	LC/Angled PC × 24 ports
Performance guarantee environment	18 to 28°C, ±2°C after reference, 20 to 70%RH, no condensation
Operating environment	10 to 40°C, 20 to 50%RH (Below 35°C), 20 to 35%RH (Below +40°C), no condensation
Storage environment	−10 to 50°C, 20 to 80%RH (Below 40°C), 20 to 40%RH (Below 50°C), no condensation
Power	Supplied by AQ7420 or AQ7421 High-Resolution Reflectometer
Dimensions and Mass*3	200 (W) × 132 (H) × 350 (D) mm (Excluding protector and handle), approx. 3.0 kg
Recommended calibration period	1 year
Standard accessories	Optical Fiber cable (Loopback for AQ740027): 1 piece, Connection Cable for AQ742x to AQ740027/AQ740051: 1 piece, Optical Fiber Cable for AQ7421 to AQ740051 (used with AQ740027): 2 pieces

*This instrument is a Multi Switch Unit that is driven and controlled by the AQ7420 or AQ7421 High-Resolution Reflectometer.

*All specifications are after 1 hour of warm-up the measurement condition.

*1 Reproducibility of IL measurements when used in combination with AQ7420/ AQ7421 and AQ740023.

*2 ±2 σ

*3 Excluding accessories.

AQ740051 Expander Unit

Items	Specifications
Connectable main unit	AQ7421
Number of channels*1	Maximum 8 CH
Channel switching time	Approx. 2 seconds
Insertion loss	4.8 dB or less
CH Switching Repeatability*2, *3	±0.04 dB
Expansion ports	SC/Angled PC × 14 ports
Reference ports	SC/Angled PC × 2 ports
Performance guarantee environment	18 to 28°C, ±2°C after reference, 20 to 70%RH, no condensation
Operating environment	10 to 40°C, 20 to 50%RH (Below 35°C), 20 to 35%RH (Below +40°C), no condensation
Storage environment	−10 to 50°C, 20 to 80%RH (Below 40°C), 20 to 40%RH (Below 50°C), no condensation
Power	Supplied by AQ7421 High-Resolution Reflectometer
Dimensions and Mass*4	200 (W) × 132 (H) × 350 (D) mm (Excluding protector and handle), approx. 3.0 kg
Recommended calibration period	1 year
Standard accessories	Optical Fiber Cable for AQ7421 to AQ740051: 2 pieces, Connection Cable for AQ742x to AQ740027/AQ740051: 1 piece

*This instrument is an Expander Unit that is driven and controlled by the AQ7421 High-Resolution Reflectometer.

*All specifications are after 1 hour of warm-up the measurement condition.

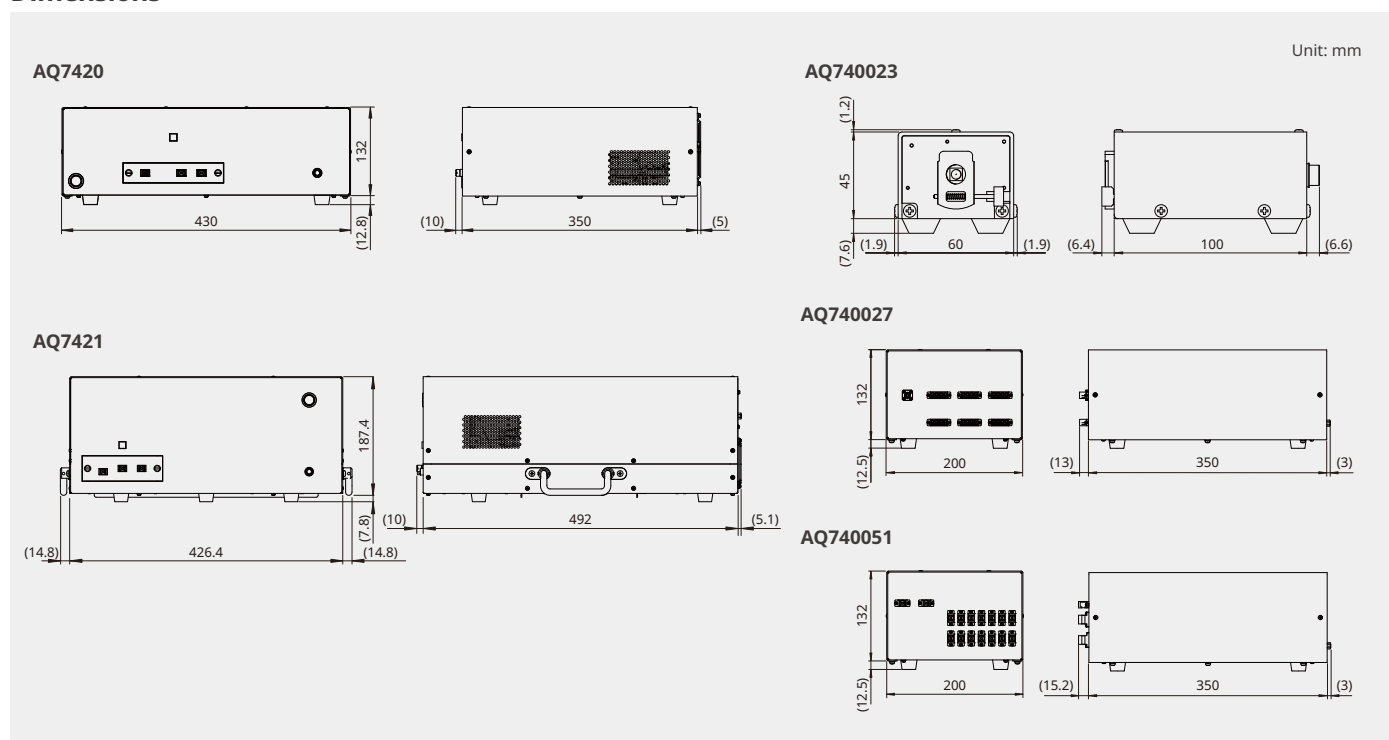
*1 CH1 is fixed for measurements in the range of 0 to 1000 m.

*2 ±2 σ

*3 Excluding variation dependent on the DUT.

*4 Excluding accessories.

Dimensions



Models and suffix codes

AQ7420

Model	Suffix Code	Description
AQ7420		AQ7420 High-Resolution Reflectometer
	-13NN	Wavelength 1310 nm
	-1315	Wavelength 1310 nm and 1550 nm
	-FCM	AQ740091 FC/PC Master cord
	-SCM	AQ740091 SC/PC Master cord
	-D	UL/CSA standard, 125 V
	-F	VDE/Korean standard, 250 V
	-H	Chinese standard, 250 V
	-N	Brazilian standard, 250 V
	-Q	BS/Singaporean standard, 250 V
	-T	Taiwanese standard, 125 V

AQ7421

Model	Suffix Code	Description
AQ7421		AQ7421 High-Resolution Reflectometer
	-13NN	Wavelength 1310 nm
	-15NN	Wavelength 1550 nm
	-1513	Wavelength 1550 nm and 1310 nm
	-FCM	AQ740091 FC/PC Master cord
	-SCM	AQ740091 SC/PC Master cord
	-D	UL/CSA standard, 125 V
	-F	VDE/Korean standard, 250 V
	-H	Chinese standard, 250 V
	-N	Brazilian standard, 250 V
	-Q	BS/Singaporean standard, 250 V
	-T	Taiwanese standard, 125 V

AQ740023

Model	Suffix Code	Description
AQ740023		AQ740023 Sensor Head
	-FCC	AQ740081 Connector Adapter (FC)
	-SCC	AQ740081 Connector Adapter (SC)
	-L1	AQ742x Connection cable length: 1 m
	-L2	AQ742x Connection cable length: 2 m

AQ740027

Model	Suffix Code	Description
AQ740027		AQ740027 Multi Switch Unit

AQ740051

Model	Suffix Code	Description
AQ740051		AQ740051 Expander Unit

AQ740081

Model	Suffix Code	Description
AQ740081		AQ740081 Connector Adapter
	-FCC	FC connector
	-SCC	SC connector
	-LCC	LC connector
	-LMC	Ferrule (1.25 diameter)
	-SFC	Ferrule (2.5 diameter)
	-MTC	MT connector
	-MPC	MPO connector
	-FHC	Fiber holder

AQ740091

Model	Suffix Code	Description
AQ740091		AQ740091 master Cord (for AQ7420/AQ7421)
	-FCA	FC/Angled PC connector
	-FCM	FC master connector
	-SCM	SC master connector
	-LCM	LC master connector
	-MUM	MU master connector
	-PCC	PC polish
	-APC	Angled PC polish

AQ740092

Model	Suffix Code	Description
AQ740092		AQ740092 master Cord (for AQ740027)
	-12	12-fibers
	-24	24-fibers
	-MPC	MPO connector
	-APC	Angled PC polish
	-MPM	MPO connector
	-APC	Angled PC polish
	-PPC	PC polish

AQ740094

Model	Suffix Code	Description
AQ740094		AQ740094 FO Cord (for AQ740027)
	-12	12-fibers
	-24	24-fibers
	-MPC	MPO connector
	-APC	Angled PC polish

AQ740095

Model	Suffix Code	Description
AQ740095		AQ740095 Distance Adjustment Cord (for AQ740027)
	-0000	0 mm
	-0500	500 mm
	-1000	1000 mm
	-1500	1500 mm
	-2000	2000 mm

The AQ740095 is used to adjust the starting position of the measurement. Please consult our sales representatives for code lengths that are not listed.

AQ740096

Model	Suffix Code	Description
AQ740096		AQ740096 Distance Adjustment Cord (for AQ7420/AQ7421)
	-0000	0 mm
	-0500	500 mm
	-1000	1000 mm
	-1500	1500 mm
	-2000	2000 mm

The AQ740096 is used to adjust the starting position of the measurement. Please consult our sales representatives for code lengths that are not listed.

AQ740097

Model	Suffix Code	Description
AQ740097		AQ740097 Distance Adjustment Cord (for AQ740051)
	-1000	1000 mm
	-2000	2000 mm
	-3000	3000 mm
	-4000	4000 mm
	-5000	5000 mm
	-6000	6000 mm
	-7000	7000 mm

The AQ740097 is used by connecting it to each channel (CH) of the Expander Unit.

NOTICE

- Before operating the product, read the user's manual thoroughly for proper and safe operation.

- Any company's names and product names mentioned in this document are trade names, trademarks or registered trademarks of their respective companies.

This is a Class A instrument based on Emission standards EN61326-1 and EN55011, and is designed for an industrial environment. Operation of this equipment in a residential area may cause radio interference, in which case users will be responsible for any interference which they cause.



YOKOGAWA TEST & MEASUREMENT CORPORATION
Global Sales Dept. /E-mail: tm@cs.jp.yokogawa.com

YOKOGAWA CORPORATION OF AMERICA
YOKOGAWA EUROPE B.V.
YOKOGAWA TEST & MEASUREMENT (SHANGHAI) CO., LTD.
YOKOGAWA ELECTRIC KOREA CO., LTD.
YOKOGAWA ENGINEERING ASIA PTE. LTD.
YOKOGAWA INDIA LTD.
YOKOGAWA ELECTRIC CIS LTD.
YOKOGAWA AMERICA DO SUL LTDA.
YOKOGAWA MIDDLE EAST & AFRICA B.S.C(c)

<https://tmi.yokogawa.com/us/>
<https://tmi.yokogawa.com/eu/>
<https://tmi.yokogawa.com/cn/>
<https://tmi.yokogawa.com/kr/>
<https://tmi.yokogawa.com/sg/>
<https://tmi.yokogawa.com/in/>
<https://tmi.yokogawa.com/ru/>
<https://tmi.yokogawa.com/br/>
<https://tmi.yokogawa.com/bh/>

<https://tmi.yokogawa.com/> YMI-E03

The contents are as of September 2025. Subject to change without notice.
Copyright © 2025, Yokogawa Test & Measurement Corporation
[Ed: 01/d] Printed in Japan, 509(YMI)