

Junkosha

Creating Unsurpassed Value

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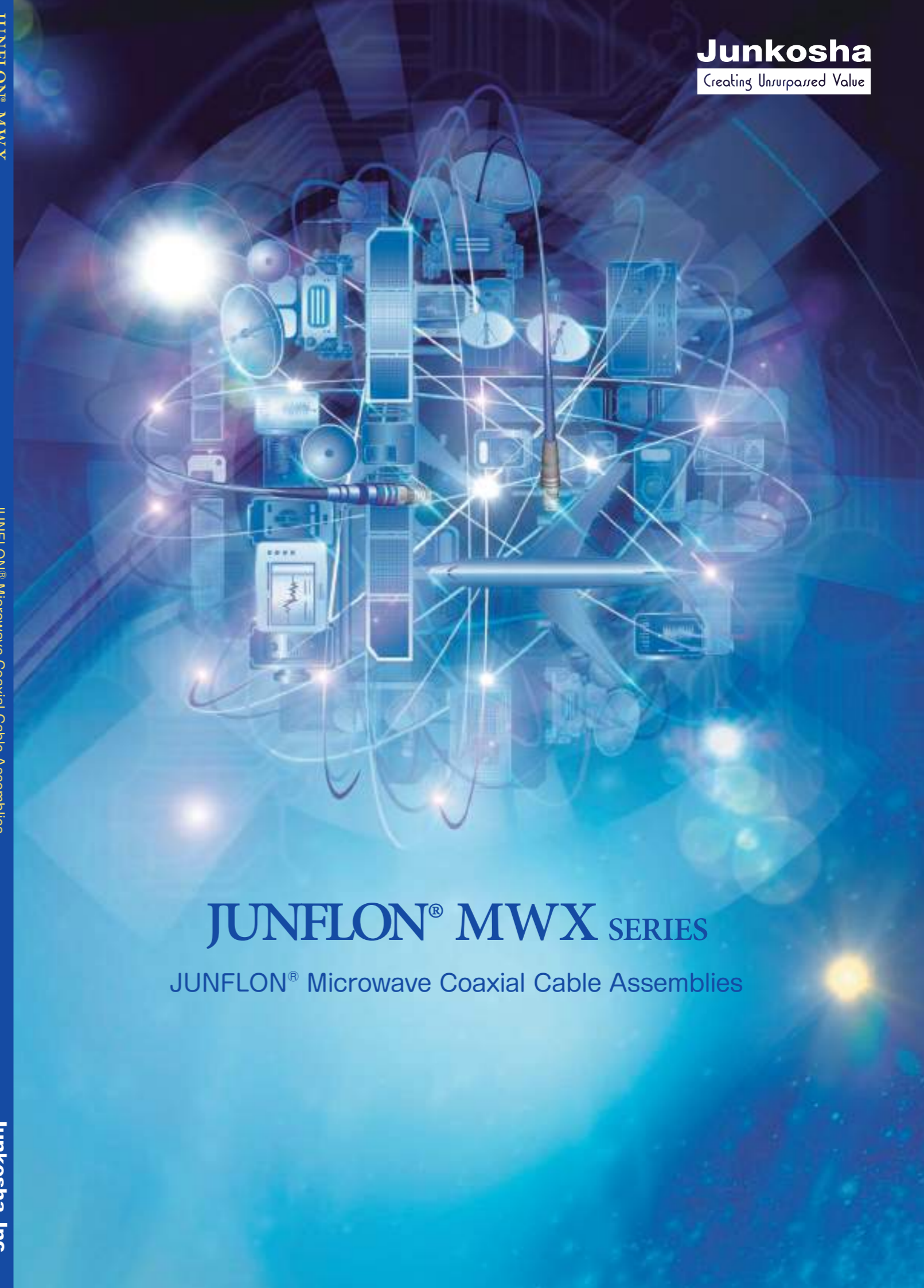
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JUNFLON® MWX SERIES

JUNFLON® Microwave Coaxial Cable Assemblies

JUNFLON[®] MWX
SERIES

JUNFLON[®] Microwave Coaxial Cable Assemblies

MWX 0 Series Cable assemblies with highphase stability for measuring instruments p.10

~26.5 GHz	MWX021	12
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~70.0 GHz	MWX071	18
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JUNFLON® MWX series are fully complied with RoHS directive including connectors.

Pursuing the Boundless Possibilities of Fluoropolymers

Junkosha Inc. was established in 1954 as a company manufacturing and selling polymer products. Polymers at the time were subject to intense interest in Japan as high-tech materials. Since then, Junkosha has consistently pursued technology-intensive research and development efforts. In 1961, Junkosha developed the world's first molten fluoropolymer (FEP) products and commercially introduced Junflon® FEP tubes and Junflon® FEP electric wires.

Boasting superb electrical characteristics, Junflon® FEP electric wires rapidly gained popularity in Japan, swept along by the burgeoning Silicon Era. In 1969, Junkosha incorporated the new fluoropolymer manufacturing technology of PTFE. In 1979, Junkosha began manufacturing microwave coaxial cable assemblies, expanding and strengthening our high-performance, high-reliability product business.

Junkosha continues to develop and release various unique products to meet the emerging needs and demands of the times. These products include oil leak detection sensors, tubes for medical use, and super-high-speed coaxial cables with world leading transmission speeds (equivalent to 95% the speed of light), as well as ultra-thin coaxial cable assemblies for laptop computers and mobile phones.

Today, Junkosha offers a wide range of fluoropolymer-based hyperpolymer products for numerous applications. Our products are used in the most advanced applications across a wide range of industries-electronics, precision equipment, healthcare and medicine, environmental energy, marine, and aerospace.

Innovative, Proprietary Forming Technologies and a Unique Network-based Organizational Structure

Innovative and proprietary polymer forming technologies are a major factor in the company's success. Using innovative technologies that combine mechanical engineering, electrical and electronics engineering, and polymer science, coupled with proprietary manufacturing facilities and systems designed to apply these technologies to production, we continue to introduce high-performance, high-quality products to the market while continually advancing the state of the art in forming technologies for extrusion, injection, fusion, lamination, and coating. Another factor underlying the company's success is our network-based organizational structure, which allows each employee to think creatively, act efficiently, and cooperate with other company staff to meet the needs and demands of our customers. Our company is organized into Efficient Business Units (EBUs) and Essential Core Projects (ECPs). Each EBU pursues efficient business activities within each specific product category, while ECPs target innovation.

The EBUs and ECPs make collaborative and effective use of corporate functions and collective resources achieving and enhancing various synergies.

Based on this organizational structure, Junkosha engages in the creative pursuit of business activities for a globally expanding business.



JUNFLON Microwave Coaxial Cable Assemblies
Feature List
Features of MWX

Junflon® Microwave Coaxial Cable Assemblies (MWX) are flexible signal transmission lines that take advantage of the remarkable properties of fluoropolymers.

They have been demonstrated in applications up to 110 GHz range. MWX feature low insertion loss and low VSWR ; less signal leakage and interference due to high shielding effectiveness ;

and higher density packaging applications. Junkosha offers highly reliable product line up for micro/millimeter wave applications to meet customers' needs.
 * Junflon® MWX series comply with RoHS restrictions.

Features of MWX

Application	type	Phase stability		Insertion loss		Others			
		Static bending Temperature change	Temperature change	Static bending Mechanical bending	Temperature	Temperature range Temperature range	Flexibility	Armored Durability	
Measurement	phase stability Measurement	★★★★	★★★★		★★★★	★★★★	-30~+85 °C	★★★	★★★★
	wide temperature & high durability Measurement	★★★	MWX121 ★		★★★★	★★★★	-65~+125 °C	★★★	★★★★ (*1)
			MWX122 ★		★★★★	★★★	-30~+85 °C	★★★★	★★★★ (*2)
flexibility Measurement	★★★	★		★★★	★★★	-30~+85 °C	★★★★	★★★★ ★★★	
Internal and external wiring	Internal and external wiring	★	★★★		★	★★★	-65~+125 °C (*3)	★	★
fixed wiring	Formable low insertion loss Fixed wiring Forming	—	—		★★★	—	-30~+85 °C (*4)	—	—
	Formable Fixed wiring Forming	—	—		★★★	—	-30~+85 °C	—	—
Measurement	Highly precise skew match type Skew match	★★★	★		★★★	★★★	-30~+85 °C	★★★	—

- MWX0**
Cable assemblies with high phase stability for measuring instruments
MWX0 Series
- MWX1**
Cable assemblies with wide temperature & high durability for measuring instruments
MWX1 Series
- MWX2**
Flexible cable assemblies for measuring instruments
MWX2 Series
- MWX3**
Cable assemblies for equipment wiring
MWX3 Series
- MWX4**
Formable MWX4 Series for fixed wiring
- MWX5**
Formable MWX5 Series for fixed wiring
- MWX6**
Highly precise skew match type
MWX6 Series

Option

- Multi-lock
- Torque canceller
- Custom support
- Listed in the catalogue, manufactured to order
- Delivery time

RoHS
RoHS compliant

JUNFLON® MWX series are fully complied with RoHS directive including connectors.

(*1) (*2)MWX121 and MWX122 are no-armored type. They have special cable structure for improving durability.

(*3) Continuous operating temperature range for MWX315 : -30~+85°C (*4) Continuous operating temperature range for MWX461 : -65~+125°C

MWX 0
MWX 1
MWX 2
MWX 3
MWX 4.5
MWX 6
TECHNICAL DATA

MWX 0
MWX 1
MWX 2
MWX 3
MWX 4.5
MWX 6
TECHNICAL DATA

JUNFLON Microwave Coaxial Cable Assemblies
Cable structure List of Cable Specifications

Vector network analyzers;
RF and high-speed digital testers

MWX0 Cable assemblies with high phase stability for measuring instruments
 The MWX0 series offer excellent phase stability against temperature fluctuations from -30 to +85°C and bending. They are ideal for connecting Vector Network Analyzers for precision measurements.

Frequency	Cable type	Typical insertion loss (dB/m)		Cable outer diameter (mm)	Mass (g/m)	Minimum bending radius (mm)	Continuous operating temperature (°C)	Assembly length (mm) ^{(*)1}		Described in
		18.5 GHz	Maximum frequency					Min	Max	
26.5 GHz	MWX021	1.6	2.0	8.5	122	30	-30~+85	700	1500	P12
50.0 GHz	MWX051	2.7	4.6	6.6	76	30		700	1500	P14
67.0 GHz	MWX061	3.5	7.3	6.6	73	30		700	1500	P16
70.0 GHz	MWX071	3.5	7.5	6.6	73	30		700	1500	P18
110.0 GHz	MWX001	4.2	11.8	4.0	50	15		100	200	P20
120.0 GHz	MWX002*	5.0	14.5	4.0	50	15		100	200	P22

*MWX002 is a under developing product. Please contact us.

Microwave measurements requiring a wide range of temperatures, such as device evaluations

MWX1 Cable assemblies with wide temperature range & high durability for measuring
 The MWX1 series offer excellent durability of connector and cable bending in wide temperature range from -65 to +125°C for microwave measurements.

Frequency	Cable type	Typical insertion loss (dB/m)		Cable outer diameter (mm)	Mass (g/m)	Minimum bending radius (mm)	Continuous operating temperature (°C)	Assembly length (mm) ^{(*)1}		Described in
		18.5 GHz	Maximum frequency					Min	Max	
26.5 GHz	MWX121	1.2	1.3	6.6	80	30	-65~+125	200	5000	P28
	MWX122	1.5	1.9	6.5	79	30	-65~+85	300	3000	P30

Microwave/millimeter-wave measurements

MWX2 Flexible and phase stability cable assemblies for measuring instruments
 The MWX2 series offer flexibility and low repulsion to reduce stress loads to measured objects with excellent phase stability against bending in intensive use of microwave measurement. Cables are offered in wide range of the frequencies of 26.5, 40, 50, and 67 GHz with various connectors.

Frequency	Cable type	Old mode number	Typical insertion loss (dB/m)		Cable outer diameter (mm)	Mass (g/m)	Minimum bending radius (mm)	Continuous operating temperature (°C)	Assembly length (mm) ^{(*)1}		Described in
			18.5 GHz	Maximum frequency					Min	Max	
26.5 GHz	MWX221	DLM262	1.2	1.4	6	64	20	-30~+85	200	5000	P36
	MWX221 (armored type) ^{(*)2}	DLM262			12.5	212	20		700	5000	P36
40.0 GHz	MWX241 (armored type) ^{(*)2}	DLM442	1.8	3.0	9.5	137	20		700	5000	P38
	MWX241 (non-armored type, custom-made)	DLM442			4.1	35	20		200	5000	P38
50.0 GHz	MWX251 (armored type) ^{(*)2}	-	2.1	3.8	9.5	129	20		700	1500	P40
	MWX251 (non-armored type, custom-made)	-			3.7	29	6		200	1500	P40
67.0 GHz	MWX261 (armored type) ^{(*)2}	DLM600	2.9	5.6	7.7	90	20		700	1500	P42
	MWX261 (non-armored type, custom-made)	DLM600			2.6	17	6		200	1500	P42

New Products Check



MWX002

•MWX002 for 120 GHz and MWX 071 for 70 GHz are added to the phase stable type MWX 0 series for measurement.

•Non-armored type is added to MWX 051 and MWX 061.



MWX051 · MWX061 Non-armored type

MWX3 Cable assemblies for equipment wiring
 The MWX3 series cable assemblies use a porous PTFE dielectric material to ensure excellent phase stability against temperature fluctuations. (Continuous operating temperature range: -65 to 125°C (-30 to 85°C for MWX315))

Electronic equipment for communication satellites and ground stations; electronic devices for aircraft equipment; air traffic control equipment

Electronic equipment for ships; equipment highly susceptible to signal leaks and interference

Frequency	Cable type	Old mode number	Typical insertion loss (dB/m)		Cable outer diameter (mm)	Mass (g/m)	Minimum bending radius (mm)	Continuous operating temperature (°C)	Assembly length (mm) ^{(*)1}		Described in
			18.5 GHz	Maximum frequency					Min	Max	
18.5 GHz	MWX311	DGM000	3.4	-	2.7	18.5	10	-65~+125	100	10000	P48
	MWX312	DGM010	2.2	-	4.1	42	20		100	20000	P50
	MWX313	DGM024	1.9	-	4.7	52	30		100	20000	P52
	MWX314	DGM060	0.8	-	7.7	125	40		200	20000	P54
18.0 GHz	MWX315	DGM062	-	0.76	8.6	155	30	-30~+85	500	5000	P56
26.5 GHz	MWX321	DGM224	1.8	2.4	4.7	52	30	-65~+125	100	20000	P58
	MWX322	-	1.1	1.3	5.2	60	25		200	20000	P60
40.0 GHz	MWX341	DGM410	2.1	3.3	4	40	20		100	10000	P62
	MWX342	-	1.5	2.4	3.9	35	20		200	10000	P64

Fixed wiring for communication devices at base stations

Fixed wiring in R&D-use circuit boards

MWX4,5 Formable MWX4,5 Series for fixed wiring
 The MWX4 and 5 series offer formability of the easy wiring, ideal for internal and external wiring of applications which require high frequencies up to 67 GHz, with lower insertion loss than semi-rigid cables. A broad range of other connectors are available to meet your specific needs.

Frequency	Cable type	Old mode number	Typical insertion loss (dB/m)		Cable outer diameter (mm)	Remark	Minimum bending radius (mm)	Continuous operating temperature (°C)	Assembly length (mm) ^{(*)1}		Described in
			18.0GHz	Maximum frequency					Min	Max	
18.0 GHz	MWX411	-	2.2	-	2.5	Semi-rigid cable φ2.2 equivalent	15	-30~+85	100	5000	P68
	MWX412	-	1.4	-	4	Semi-rigid cable φ3.6 equivalent	20		100	5000	P68
40.0 GHz	MWX441	-	2.9	4.3	2.4	Semi-rigid cable φ2.2 equivalent	15		100	5000	P68
67.0 GHz	MWX461	-	5.5	12	1.33	Semi-rigid cable φ1.2 equivalent	5		-65~+125	40	2000
18.0 GHz	MWX511	DFMF000	3.1	-	3	Semi-flexible cable φ2.1 equivalent	10	-30~+85	100	5000	P70
	MWX512	DFMF010	2.0	-	4.4	Semi-flexible cable φ3.45 equivalent	15		100	5000	P70



Measurement and evaluation of the USB, HDMI etc.

BERT measurement, Jitter measurement.

MWX6 Highly precise skew match type
 Highly precise skew match cable assembly with less than 1psec skew between the two cables for measurement of digital transmission. (Continuous operating temperature range : -30 to +85 °C) Low insertion loss, suitable for measurement of the high-precision differential transmission signal. 4 type cables are available depends on maximum frequency (26.5GHz, 40GHz, 50GHz and 67GHz).

Frequency	Cable type	Old mode number	Typical insertion loss (dB/m)		Cable outer diameter (mm)	Mass (g/m)	Minimum bending radius (mm)	Continuous operating temperature (°C)	Assembly length (mm) ^{(*)1}		Described in
			18.5 GHz	Maximum frequency					Min	Max	
26.5 GHz	MWX621	-	1.2	1.4	6.0	64	-	-30~+85	200	1500	P78
40.0 GHz	MWX641	-	1.8	3.0	4.1	35	-		200	1500	P78
50.0 GHz	MWX651	-	2.1	3.8	3.7	29	-		200	1500	P78
67.0 GHz	MWX661	-	2.9	5.6	2.6	17	-		200	1500	P78

*1) Please contact us if your assembly requirements are non-standard length.
 *2) Armored type: Armored with a protection sheath to reduce damage caused by mechanical movement.



MWX001 Safety lock

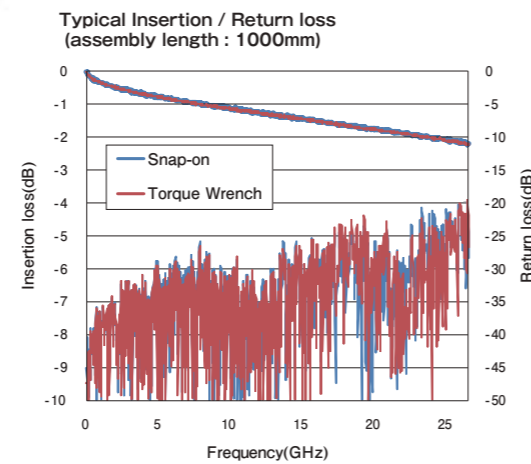
The insertion loss of MWX001 has been improved to 11.8 dB / m (conventional product 13.7 dB / m). And 1.0mm(m) connector has a safety lock mechanism.

3.5mm Connector Multi-lock type

MWX0 SERIES

US Appl. No.:15/511,949

For the phase stabilized measurement MWX021, the "Multi Lock type" is available. It is a new type 3.5-mm connector that not only can be easily attached and detached, but also has high phase stability.



Easy & highly reliable connection

The "Multi Lock type" connector enables you to conduct measurement with superior precision as the conventional connection method using a torque wrench even when it is connected by hand screw or snap-on coupling made only by sliding the coupling nut.

Point



Various connection methods for various purposes

3 ways of connection methods are available for specific applications.

1 Snap-on Coupling

Coupling without screwing. Insert the cable connector and slide the coupling nut forward. It helps to reduce workload for users who have repeating insertion and extraction, such as production and testing line.

2 Hand Screw Coupling

After snap-on coupling, screw the coupling nut, then the connection becomes stable. This connector made the work-load 1/3 compared to the conventional ones.

3 Torque Wrench Coupling

Torque wrench management is available at the HEX part with standard tightening, for more accurate measurement, such as calibration.

Torque canceller with strain relief

MWX1 SERIES

US PAT. No.: 9,318,839

This is the high performance microwave cable assembly which is best optimized for vector network analyzer.

Its extraordinary durability in use of measurement test eventually leads to total cost reduction.

New cable structure and strain relief with torque canceller were developed by simulation of actual measurement motion.

These bring excellent durability to MWX122.



Superior durability

The strain relief with torque canceller boasts superior durability because it is not fixed to the cable and tip of the connector, and can rotate freely.



Optimum for

- Inspection lines in which the connector is attached/detached frequently;
- Measurement environments in which the cable is complicatedly routed; and
- Exchanging devices.

Point

	Conventional product	MWX122
Bend test (cycle)	10,000	80,000
Slide test (cycle)	100,000	800,000
Torsion test (cycle)	20,000	80,000
Complex test (cycle)	10,000	30,000

1 Reduce twist of the cable for measurement

You can conduct measurement with high precision because bending and twisting of the cable are reduced and the phase change is minimized.

2 Comfortable routing of the cable

You are free from stress due to bending, rubbing, and twisting during cable routing work.

3 High durability

High durability reduces required service and maintenance effort and effectively cuts measurement costs.

The load on the cable while making connections is reduced due to the torque canceller mechanism. Furthermore, the life of the cable is extended to a maximum of 6 times compared to our conventional cable due to the special cable structure.

※The data are measured, not guaranteed values.

MWX0 SERIES

Cable assemblies with high phase stability for measuring instruments

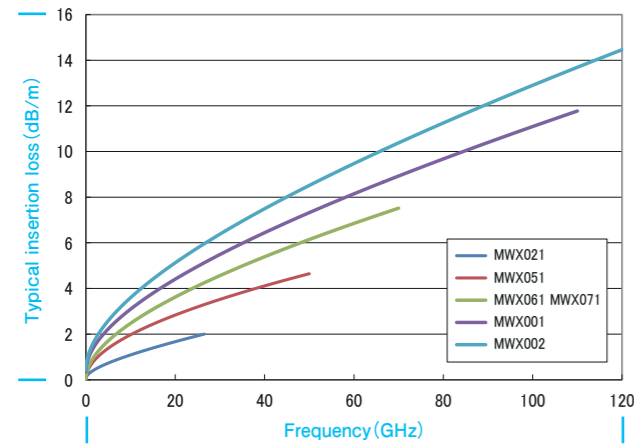
How to select

The MWX0 series cable assemblies offer excellent phase stability against temperature fluctuations and bending.

They are ideal for connecting to vector network analyzers for precision measurements. (Continuous operating temperature range : from -30 to +85 °C)

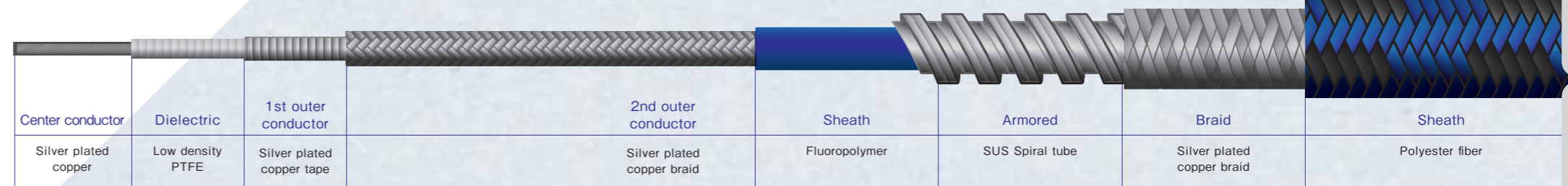
Cables are offered in wide range of the frequencies of 26.5, 50, 67, 70, 110 and 120 GHz with various connectors.

MWX0 Series typical insertion loss



Simple criteria for cable selection

- Insertion loss: The larger the cable outer diameter, the lower the insertion loss.
- Frequency range: The smaller the cable, the higher the higher mode frequency.
- Power rating: The larger the cable outer diameter, the higher the power rating.
- Flexibility: The smaller the cable, the better the flexibility.
- Mass: The smaller the cable, the lighter the cable.



Power rating

The diagram to the right shows the relationship between frequency and power rating.

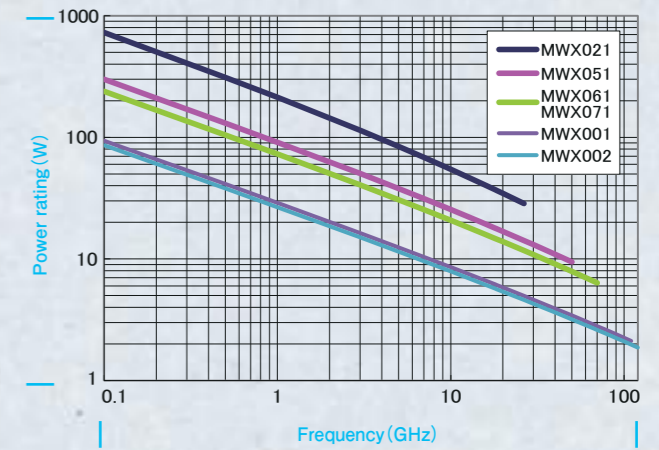
The values are calculated at 25 °C and at sea level.

The power rating will need to be corrected for different ambient temperatures and altitude.

Power ratings may decrease, depending on the connector selected.

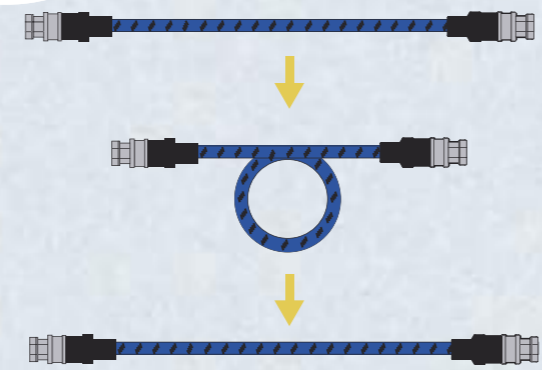
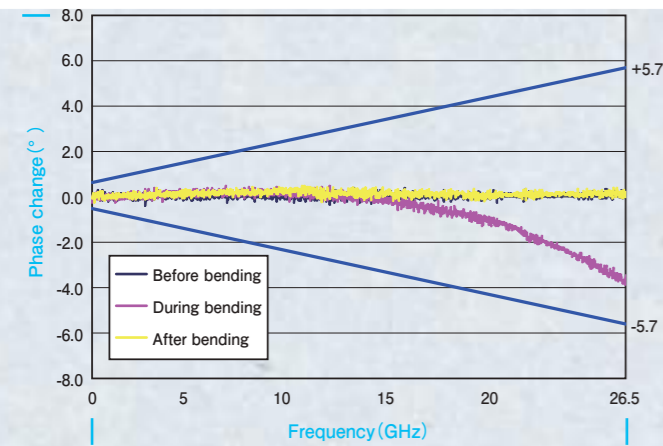
*The above figures are measured values for reference only.

Power rating of MWX0 series at sea level



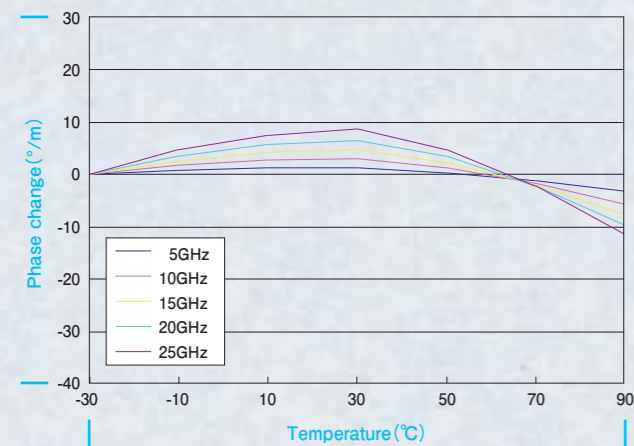
Cable Structure

MWX021 Static bending data



The cable was wrapped 360° around φ60mm mandrel. *Guaranteed value within ±5.7° at 26.5GHz (In shipping value)

MWX021 Phase change vs. temperature



The cable was measured in chamber every 20 °C from -30 to 90 °C, 1 hour after the temperature changed.

Simple criteria for connector selection

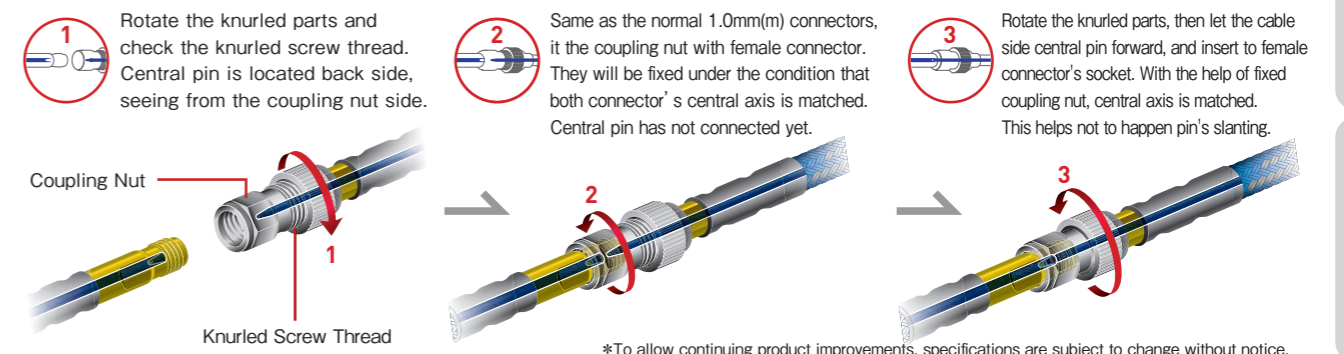
- Choose a suitable connector for your measuring instrument.
- The smaller the connector, the higher the maximum operating frequency.
- The larger the connector, the higher the power rating.

Connector compatibility

Cable type	Cable maximum operating frequency (GHz)	Compatible connector															
		18.0 GHz	18.5 GHz	26.5 GHz	40.0 GHz	50.0 GHz	67.0 GHz	70.0 GHz	110.0 GHz	120.0 GHz							
MWX021	26.5 GHz	●	●	●	●	●											
MWX051	50.0 GHz				●	●	●	●									
MWX061	67.0 GHz						●	●									
MWX071	70.0 GHz							●	●								
MWX001	110.0 GHz									●	●						
MWX002	120.0 GHz											●	●	●	●	●	

*MWX002 is a under developing product. Please contact us.

How to use "safety lock mechanism" of 1.0mm(m) connector



*To allow continuing product improvements, specifications are subject to change without notice.

MWX0 SERIES MWX 021



Property

Electrical properties

Maximum operating frequency	26.5 GHz
Characteristic impedance	50±1 Ω
Capacitance (typ.)	85 pF/m
Propagation delay (typ.)	4.21 ns/m
Wavelength reduction rate (typ.)	79 %
Higher mode frequency (typ.)	28 GHz
VSWR (per connector/both ends of assy.)	1.153/1.33
Maximum frequency insertion loss(26.5 GHz)	2.0 dB/m

Mechanical properties

Cable outer diameter	8.5 mm
Minimum bending radius (inner side)	30 mm
Cable mass (typ.)	122 g/m
Continuous operating temperature range	-30~+85 °C
Armored side pressure	196N/cm
Assembly length	700~1,500 mm

Example MWX021

Assembly length : 1000 mm
Connector I : 3.5 mm (f) straight
Connector II : 3.5 mm (m) straight

Catalog No.:
MWX021-01000DFSDMS/B

a b c d

a:Cable
b:Assembly length
c:Connector
d:Armored

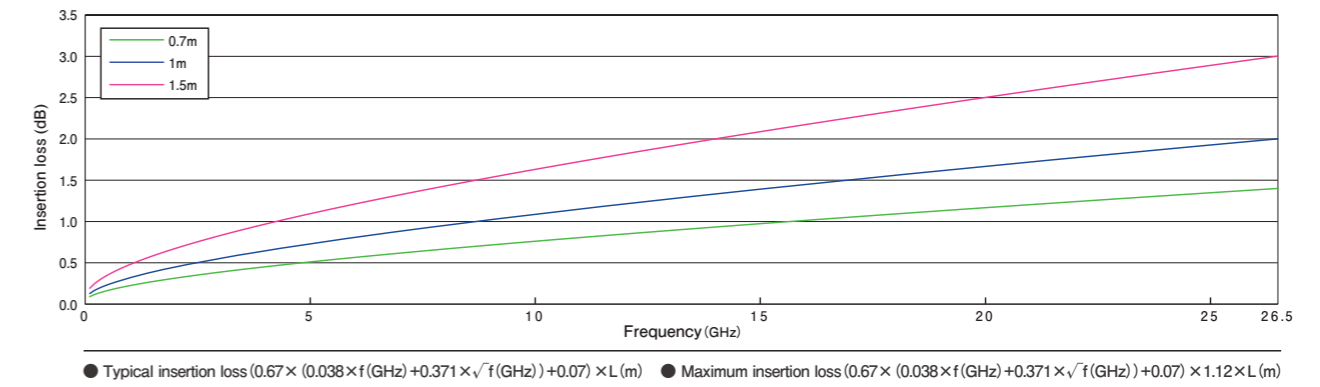
Order form example

Please provide the following information when placing an order.

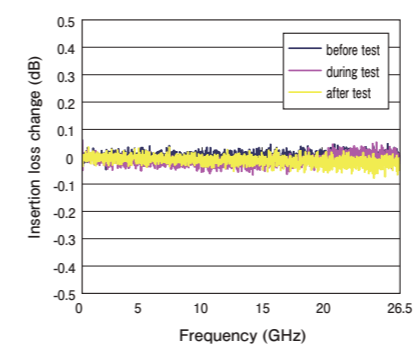
* See P.25 "Connector combination codes"

Technical Data

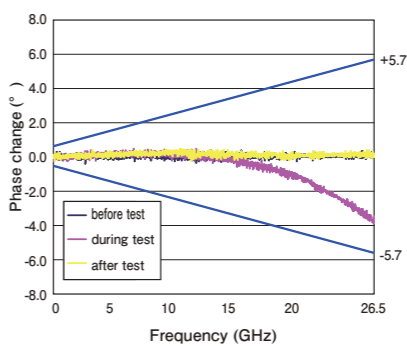
Cable typical insertion loss



Static bending data (insertion loss, phase)

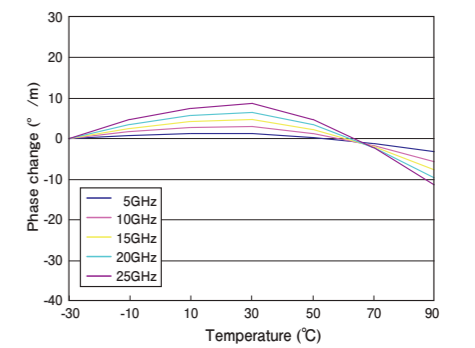


Bending radius: 30 mm



* Guaranteed value within ±5.7° at 26.5 GHz (In shipping value)
* The cable was wrapped 360° around φ60mm mandrel.

MWX021 Phase change vs. temperature

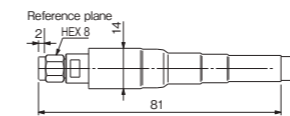


The cable was measured in chamber every 20 °C from -30 to 90 °C, 1 hour after the temperature changed. Figure shows the excellent phase stability over the temperature changes.

Connector

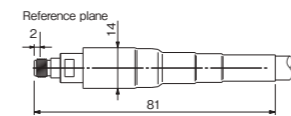
SMA (m) straight (Code:AMS)

Maximum operating frequency:18.5 GHz / Mass:18g



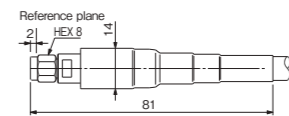
SMA (f) straight (Code:AFS)

Maximum operating frequency:18.5 GHz / Mass:17g



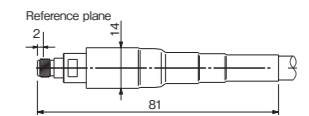
3.5mm (m) straight (Code:DMS)

Maximum operating frequency:26.5 GHz / Mass:18g



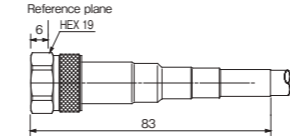
3.5mm (f) straight (Code:DFS)

Maximum operating frequency:26.5 GHz / Mass:17g



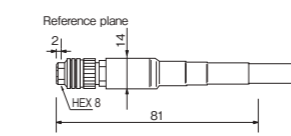
N (m) straight (Code:NMS)

Maximum operating frequency:18.0 GHz / Mass:43g



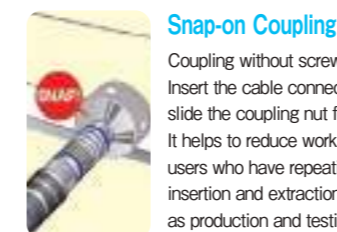
3.5mm (m) Multi-Lock Type (Code:DMP)

Maximum operating frequency:26.5 GHz / Mass:24g



*The above figures are measured values for reference only.

3.5mm Connector "Multi-Lock Type" 3 WAYS FOR COUPLING



Snap-on Coupling

Coupling without screwing. Insert the cable connector and slide the coupling nut forward. It helps to reduce workload for users who have repeating insertion and extraction, such as production and testing line.



Hand Screw Coupling

After snap-on coupling, becomes stable. screw the coupling nut, then the connection. This connector made the work-load 1/3 compared to the conventional ones.



Torque Wrench Coupling

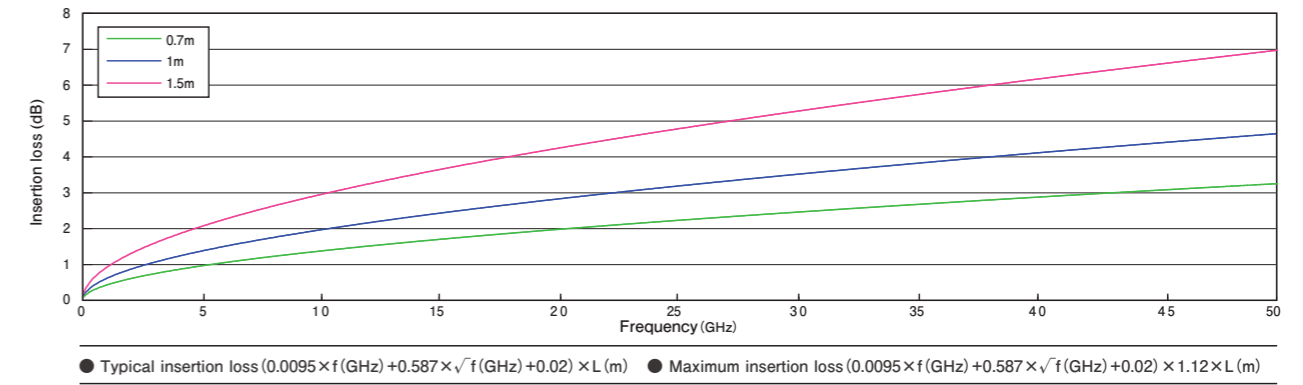
Torque wrench management for more accurate measurement, such as calibration.

MWX0 SERIES MWX 051

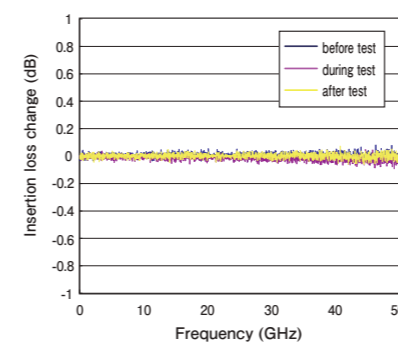


Technical Data

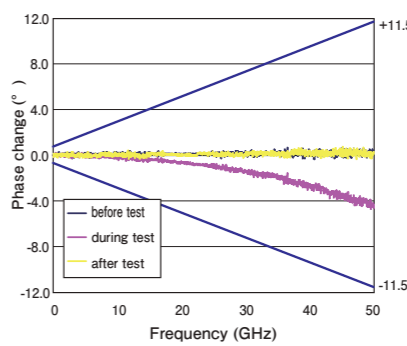
Cable typical insertion loss



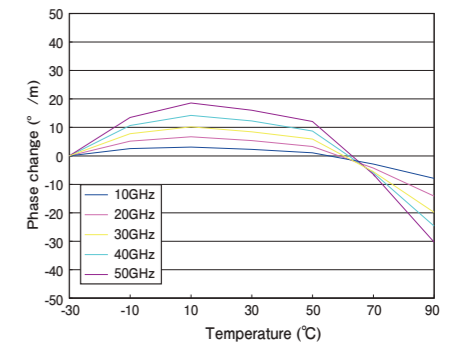
Static bending data (insertion loss, phase)



Bending radius: 30 mm



MWX051 Phase change vs. temperature



* Guaranteed value within $\pm 11.5^\circ$ at 50 GHz (In shipping value).
* The cable was wrapped 360° around $\phi 60\text{mm}$ mandrel.

The cable was measured in chamber every 20 °C from -30 to 90 °C, 1 hour after the temperature changed. Figure shows the excellent phase stability over the temperature changes.

Property

Electrical properties

Maximum operating frequency	50.0 GHz
Characteristic impedance	$50 \pm 1 \Omega$
Capacitance (typ.)	85 pF/m
Propagation delay (typ.)	4.19 ns/m
Wavelength reduction rate (typ.)	79 %
Higher mode frequency (typ.)	61 GHz
VSWR (per connector/ both ends of assy.)	1.21/1.46
Maximum frequency insertion loss(50.0 GHz)	4.6 dB/m

Mechanical properties

Cable outer diameter	6.6 mm
Minimum bending radius (inner side)	30 mm
Cable mass (typ.)	76 g/m
Continuous operating temperature range	-30~+85 °C
Armored side pressure	196 N/cm
Assembly length	700~1,500 mm

Example MWX051

Assembly length : 1000mm
Connector I : 2.4 mm (f) straight
Connector II : 2.4 mm (m) straight

Catalog No.:
MWX051-01000LFSLMS/B

a b c d

a: Cable
b: Assembly length
c: Connector
d: Armored

Order form example

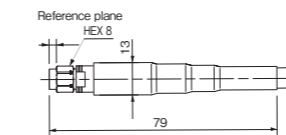
Please provide the following information when placing an order.

* See P.25 "Connector combination codes"

Connector

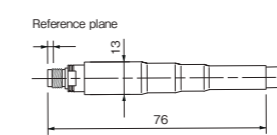
2.4 mm (m) straight (Code:LMS)

Maximum operating frequency:50.0 GHz / Mass:11g



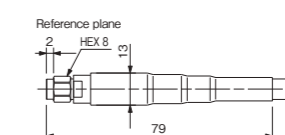
2.4 mm (f) straight (Code:LFS)

Maximum operating frequency:50.0 GHz / Mass:14g



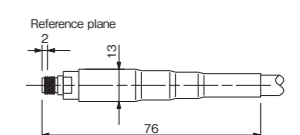
2.92 mm (m) straight (Code:KMS)

Maximum operating frequency:40.0 GHz / Mass:12g



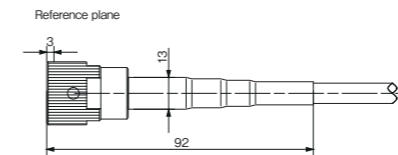
2.92 mm (f) straight (Code:KFS)

Maximum operating frequency:40.0 GHz / Mass:14g



NMD 2.4mm (f) straight (Custom-made)

Maximum operating frequency:50.0 GHz / Mass:50g



Option

Non-armored type (2.4 mm and 2.92 mm connector) can be used for MWX 051. Please contact us.



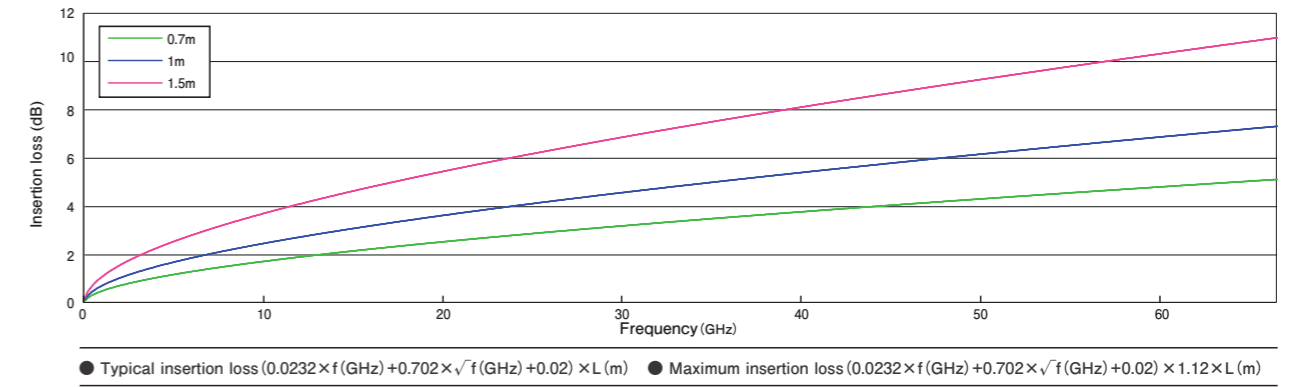
*The above figures are measured values for reference only.

MWX0 SERIES MWX 061

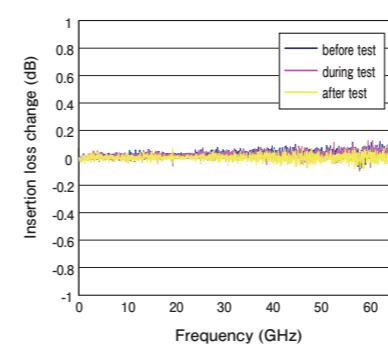


Technical Data

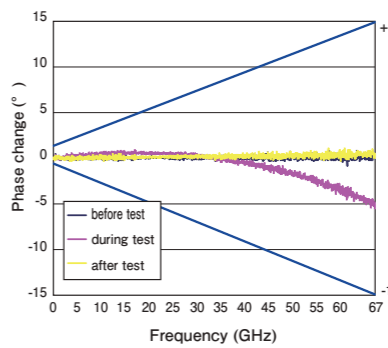
Cable typical insertion loss



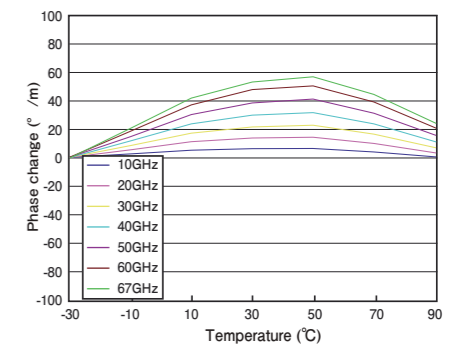
Static bending data (insertion loss, phase)



Bending radius: 30 mm



MWX061 Phase change vs. temperature



* Guaranteed value within $\pm 15^\circ$ at 67 GHz (In shipping value).
* The cable was wrapped 360° around $\phi 60\text{mm}$ mandrel.

The cable was measured in chamber every 20 °C from -30 to 90 °C, 1 hour after the temperature changed. Figure shows the excellent phase stability over the temperature changes.

Property

Electrical properties

Maximum operating frequency	67.0 GHz
Characteristic impedance	$50 \pm 1 \Omega$
Capacitance (typ.)	90 pF/m
Propagation delay (typ.)	4.35 ns/m
Wavelength reduction rate (typ.)	77 %
Higher mode frequency (typ.)	70 GHz
VSWR (per connector/both ends of assy.)	1.21/1.46
Maximum frequency insertion loss(67.0 GHz)	7.3 dB/m

Mechanical properties

Cable outer diameter	6.6 mm
Minimum bending radius (inner side)	30 mm
Cable mass (typ.)	73 g/m
Continuous operating temperature range	-30~+85 °C
Armored side pressure	196 N/cm
Assembly length	700~1,500 mm

Example MWX061

Assembly length: 700 mm
Connector I : 1.85 mm(f)straight
Connector II: 1.85 mm(m)straight

Catalog No.:
MWX061-00700VFSVMS/B

a b c d

a:Cable
b:Assembly length
c:Connector
d:Armored

Order form example

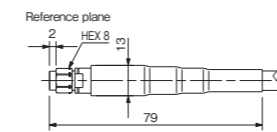
Please provide the following information when placing an order.

* See P.25 "Connector combination codes"

Connector

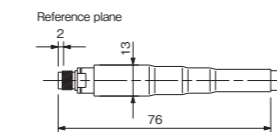
1.85 mm (m) straight (Code:VMS)

Maximum operating frequency:67.0 GHz / Mass:11g



1.85 mm (f) straight (Code:VFS)

Maximum operating frequency:67.0 GHz / Mass:14g



Option

Non-armored type (1.85mm connector) can be used for MWX 061. Please contact us.



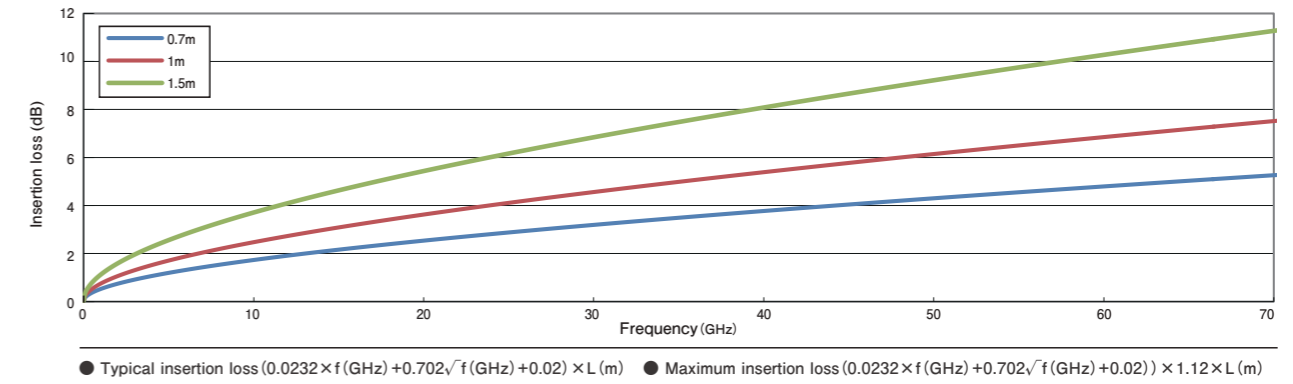
*The above figures are measured values for reference only.

MWX0 SERIES MWX 071

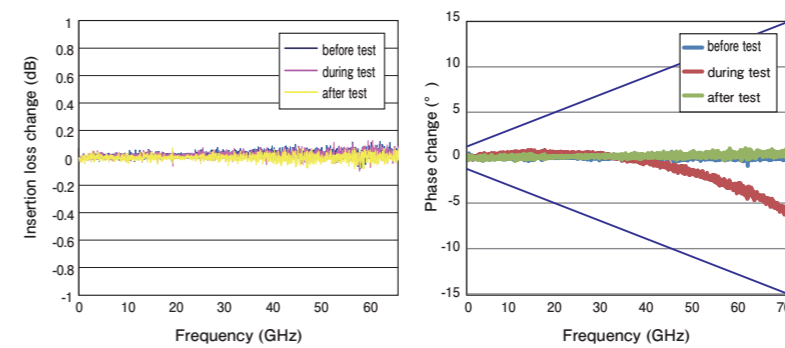


Technical Data

Cable typical insertion loss

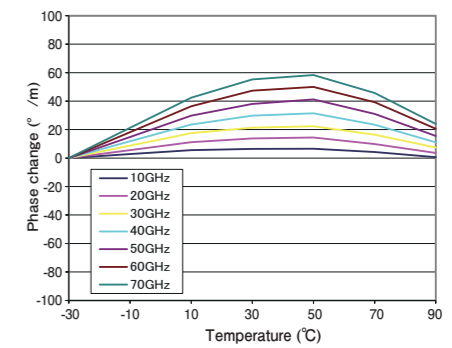


Static bending data (insertion loss, phase)



* Guaranteed value within $\pm 15^\circ$ at 70 GHz (In shipping value).
* The cable was wrapped 360° around $\phi 60\text{mm}$ mandrel.

MWX071 Phase change vs. temperature



The cable was measured in chamber every 20 °C from -30 to 90 °C, 1 hour after the temperature changed. Figure shows the excellent phase stability over the temperature changes.

Property

Electrical properties

Maximum operating frequency	70.0 GHz
Characteristic impedance	$50 \pm 1 \Omega$
Capacitance (typ.)	90 pF/m
Propagation delay (typ.)	4.35 ns/m
Wavelength reduction rate (typ.)	77 %
Higher mode frequency (typ.)	70 GHz
VSWR (per connector/both ends of assy.)	1.21/1.46
Maximum frequency insertion loss(70.0 GHz)	7.5 dB/m

Mechanical properties

Cable outer diameter	6.6 mm
Minimum bending radius (inner side)	30 mm
Cable mass (typ.)	73 g/m
Continuous operating temperature range	-30~+85 °C
Armored side pressure	196 N/cm
Assembly length	700~1,500 mm

Example MWX071

Assembly length: 700 mm
Connector I : 1.85 mm(f)straight
Connector II: 1.85 mm(m)straight

Catalog No.:
MWX071-00700VFSVMS/B

a b c d

a:Cable
b:Assembly length
c:Connector
d:Armored

Order form example

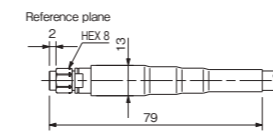
Please provide the following information when placing an order.

* See P.25 "Connector combination codes"

Connector

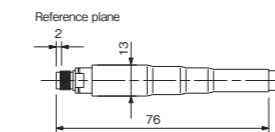
1.85 mm (m) straight (Code:VMS)

Maximum operating frequency:67.0 GHz / Mass:11g



1.85 mm (f) straight (Code:VFS)

Maximum operating frequency:67.0 GHz / Mass:14g



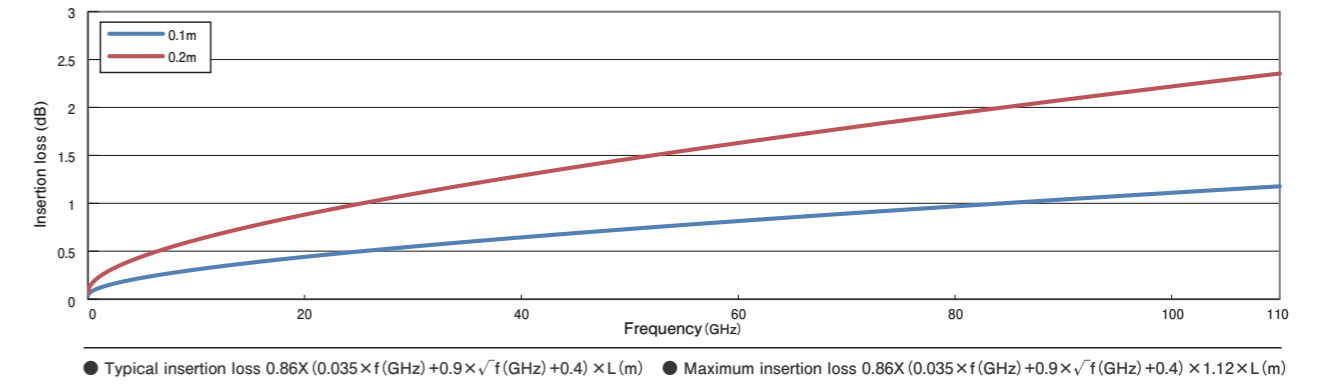
*The above figures are measured values for reference only.

MWX0 SERIES MWX 001

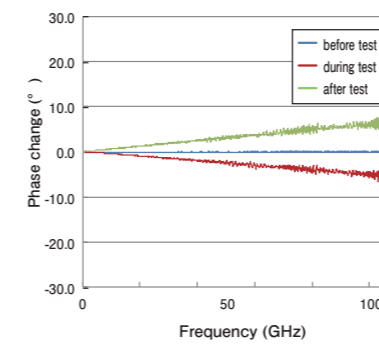


Technical Data

Cable typical insertion loss



Static bending data (insertion loss, phase) Bending radius: 15 mm



* The cable was wrapped 90° around φ30mm mandrel.

Property

Electrical properties

Maximum operating frequency	110.0 GHz
Characteristic impedance	standard 50 Ω
Capacitance (typ.)	88 pF/m
Propagation delay (typ.)	4.2 ns/m
Wavelength reduction rate (typ.)	79 %
Higher mode frequency (typ.)	110 GHz
VSWR (per connector/ both ends of assy.)	1.197/1.43
Maximum frequency insertion loss(110.0 GHz)	11.8dB/m

Mechanical properties

Cable outer diameter	4.0 mm
Minimum bending radius (inner side)	15 mm
Cable mass (typ.)	50 g/m
Continuous operating temperature range	-30~+85 °C
Armored side pressure	157 N/cm
Assembly length	100~200 mm

Example MWX001

Assembly length: 100 mm
Connector I: 1.0 mm(f)straight
Connector II: 1.0 mm(m)straight

Catalog No.:
MWX001-00100WFSWMT/B

a b c d

a:Cable
b:Assembly length
c:Connector
d:Armored

Order form example

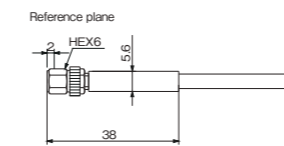
Please provide the following information when placing an order.

* See P.25 "Connector combination codes"

Connector

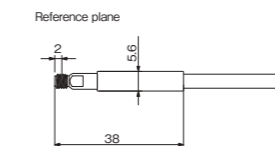
1.0mm(m) Safty Lock (Code:WMT)

Maximum operating frequency:110.0GHz / Mass:4g

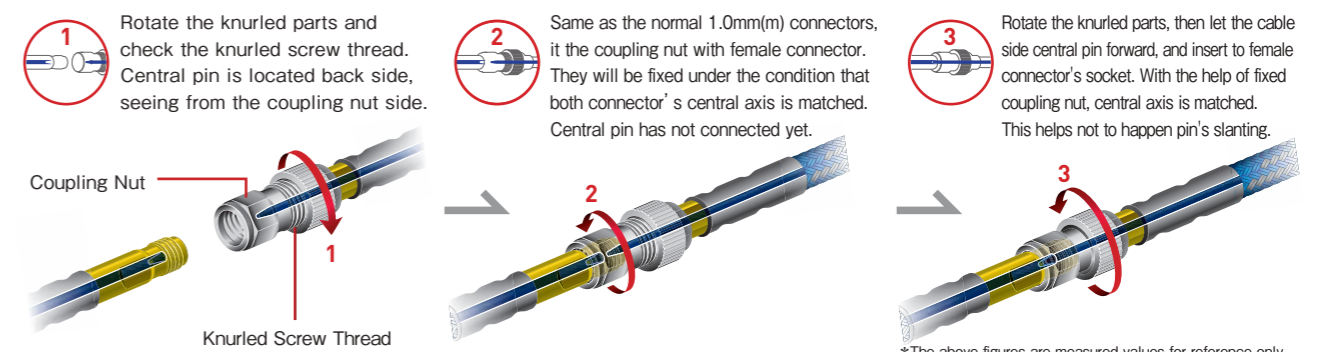


1.0mm(f)straight (Code:WFS)

Maximum operating frequency:110.0GHz / Mass:2g



How to use "safety lock mechanism" of 1.0mm(m) connector



*The above figures are measured values for reference only.

MWX 002

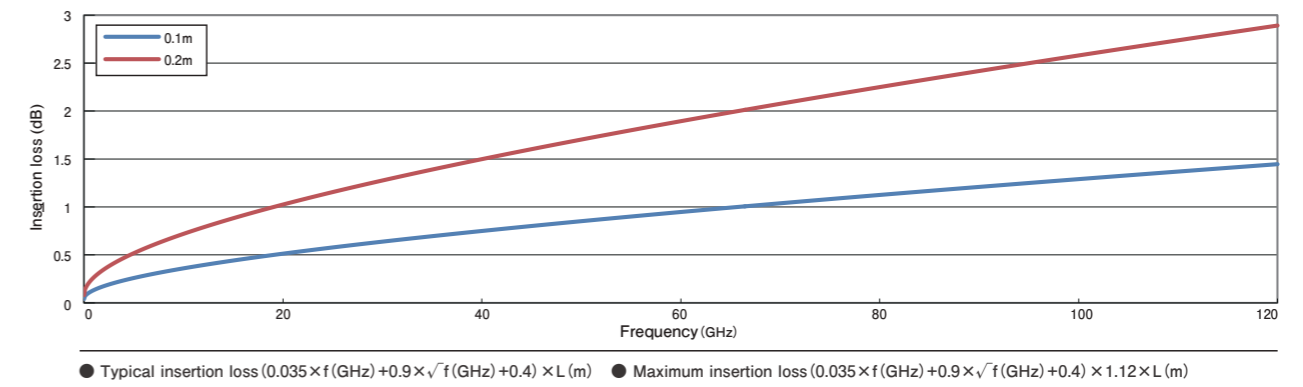
Under developing for special customers

- Static bending
- Temperature change
- Frequency 120.0 GHz
- Temperature range -30~+85°C
- Minimum bending radius 15 mm
- RoHS compliant
- Measurement
- Armored
- Custom support

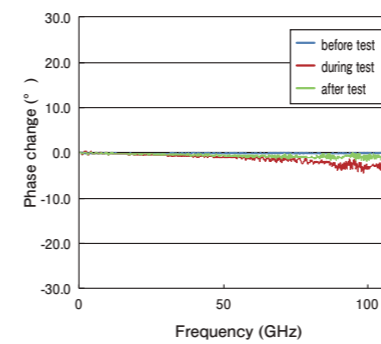


Technical Data

Cable typical insertion loss



Static bending data (insertion loss, phase) Bending radius: 15 mm



* The cable was wrapped 90° around φ30mm mandrel.

Property

Electrical properties

Maximum operating frequency	120.0 GHz
Characteristic impedance	50 Ω
Capacitance (typ.)	88 pF/m
Propagation delay (typ.)	4.2 ns/m
Wavelength reduction rate (typ.)	79 %
Higher mode frequency (typ.)	120 GHz
VSWR (per connector/ both ends of assy.)	1.197/1.43
Maximum frequency insertion loss (120.0 GHz)	14.5 dB/m

Mechanical properties

Cable outer diameter	4.0 mm
Minimum bending radius (inner side)	15 mm
Cable mass (typ.)	50 g/m
Continuous operating temperature range	-30~+85 °C
Armored side pressure	157 N/cm
Assembly length	100~200 mm

Order form example

- MWX002 for up to 120GHz is a under developing product. Please contact us.
- MWX002 for up to 110GHz is a already released product. Please order it as below.

Up to 110 GHz (Already Released)

Assembly length: 150 mm
 Connector I : 1.0 mm (f) straight
 Connector II : 1.0 mm (m) straight

Catalog No.:
MWX002-00150WFS1WMS1/B

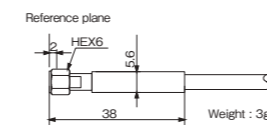


- a: Cable
- b: Assembly length
- c: Connector
- d: Armored

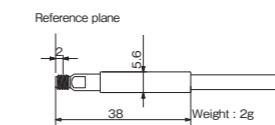
Connector

Up to 120 GHz: Enhanced 1.0mm Connector (Please contact us.)

1.0 mm (m) straight (Code:WMS)
 Maximum operating frequency:120.0GHz / Mass:3g

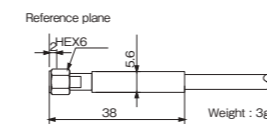


1.0 mm (f) straight (Code:WFS)
 Maximum operating frequency:120.0GHz / Mass:2g

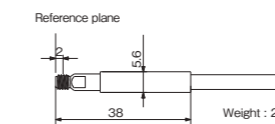


Up to 110 GHz: Standard 1.0mm Connector (Already released)

1.0mm (m) straight (Code : WMS1)
 Maximum operating frequency:120.0GHz / Mass:3g



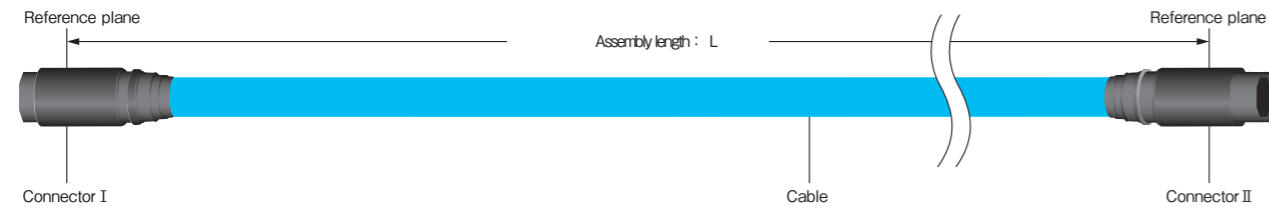
1.0mm (f) straight (Code : WFS1)
 Maximum operating frequency:120.0GHz / Mass:2g



*The above figures are measured values for reference only.

MWX0 SERIES

Placing orders



ex.1
 Cable : MWX021
 Assembly length : 1000 mm
 Connector I : 3.5 mm(f)straight
 Connector II : 3.5 mm(m)straight
 Armored : Armored-type

Catalog number
MWX021-01000 DFS DMS /B

The unit of assembly length is mm. Shown as a five-digit number. If the number consists of fewer than five digits, remember to add zero (s) to the left of the first digit to make it five digits. The assembly length is measured based on the reference planes, not on the connector ends, shown at the figure to the left.

Armored-type cables will have a " /B" appended to the connector combination code.
 No appended to the connector combination code when cables are not armored type.

Delivery time

MWX0 series will be shipped within 5 business days after received order.
 *Leadtime may be effected by larger order volume.

Connector combination codes for MWX021, MWX051, MWX061 and MWX071

Connector I		Connector II											
		SMA	SMA	N	3.5mm	3.5mm Multi-Lock	3.5mm	2.92mm	2.92mm	2.4mm	2.4mm	1.85mm	1.85mm
		m	f	m	m	m	f	m	f	m	f	m	f
		AMS	AFS	NMS	DMS	DMP	DFS	KMS	KFS	LMS	LFS	VMS	VFS
SMA	m	AMS	AMSAMS	AFSAMS	AMSAMS	AMSAMS	AMSAMS	-	-	-	-	-	-
SMA	f	AFS	-	AFSAFS	AFSNMS	AFSDMS	AFSDMP	AFSDFS	-	-	-	-	-
N	m	NMS	-	-	NMSNMS	DMSNMS	DMPNMS	DFSNMS	-	-	-	-	-
3.5mm	m	DMS	-	-	-	DMSDMS	DMPDMS	DFSDMS	-	-	-	-	-
3.5mm Multi-Lock	m	DMP	-	-	-	-	DMPDMP	DFSDMP	-	-	-	-	-
3.5mm	f	DFS	-	-	-	-	-	DFSDFS	-	-	-	-	-
2.92mm	m	KMS	-	-	-	-	-	-	KMSKMS	KFSKMS	KMSLMS	KMSLFS	-
2.92mm	f	KFS	-	-	-	-	-	-	-	KFSKFS	KFSLMS	KFSLFS	-
2.4mm	m	LMS	-	-	-	-	-	-	-	-	LMSLMS	LMSLFS	-
2.4mm	f	LFS	-	-	-	-	-	-	-	-	-	LFSLFS	-
1.85mm	m	VMS	-	-	-	-	-	-	-	-	-	-	VMSVMS
1.85mm	f	VFS	-	-	-	-	-	-	-	-	-	-	VFSVFS

m : male (plug)
 f : female (jack)

Please provide a catalog number when placing an order.

Connector combination codes for MWX001

Connector I		1.0mm Safty-Lock	
		m	f
Connector II		WMT	WFS
1.0mm Safty-Lock	m	WMT	WMTWMT
SMA	f	WFS	WFSWFS

m : male (plug)
 f : female (jack)

Connector combination codes for MWX002 Standard 1.0mm connector (up to 110GHz)

Connector I		1.0mm	
		m	f
Connector II		WMT1	WFS1
1.0mm	m	WMT1	WMT1WMT1
1.0mm	f	WFS1	WFS1WFS1

※Please contact us if you need enhanced 1.0mm connectors for 120GHz.

MWX1 SERIES

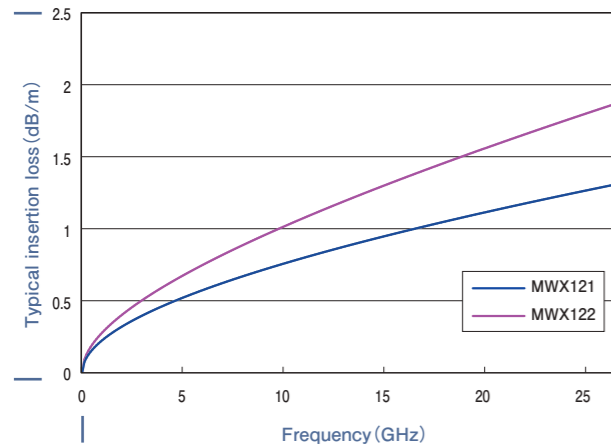
Cable assemblies with wide temperature & high durability for measuring instruments

How to select

We lineup MWX121 of the heat-resistant type that can be used under a wide range of temperatures (-65 - +125°C) in the microwave measurement.

And MWX122 of the high-durability type (that can be used under the temperature range from -35°C to +85°C) of which the mechanical life is drastically extended by applying a cabling structure that we developed in the robot cable.

MWX1 Series typical insertion loss



Simple criteria for cable selection

- Insertion loss: The larger the cable outer diameter, the lower the insertion loss.
- Frequency range: The smaller the cable, the higher the higher mode frequency.
- Power rating: The larger the cable outer diameter, the higher the power rating.
- Flexibility: The smaller the cable, the better the flexibility.
- Mass: The smaller the cable, the lighter the cable.



Cable Structure : MWX121

Simple criteria for connector selection

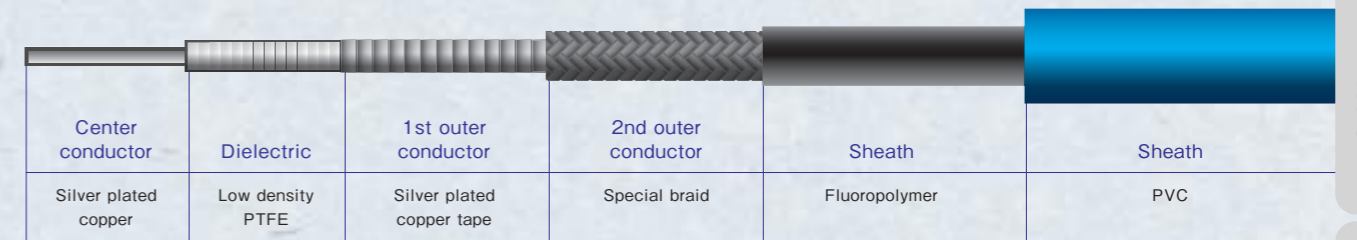
- Choose a suitable connector for your measuring instrument.
- The smaller the connector, the higher the maximum operating frequency.
- The larger the connector, the higher the power rating.

Connector compatibility

Cable type	Cable maximum operating frequency (GHz)	Compatible connector			
		18.0 GHz	18.5 GHz	26.5 GHz	
MWX121	26.5 GHz	N(m)	SMA(m)	3.5mm (m)	3.5mm (f)
MWX122		●	●	●	●

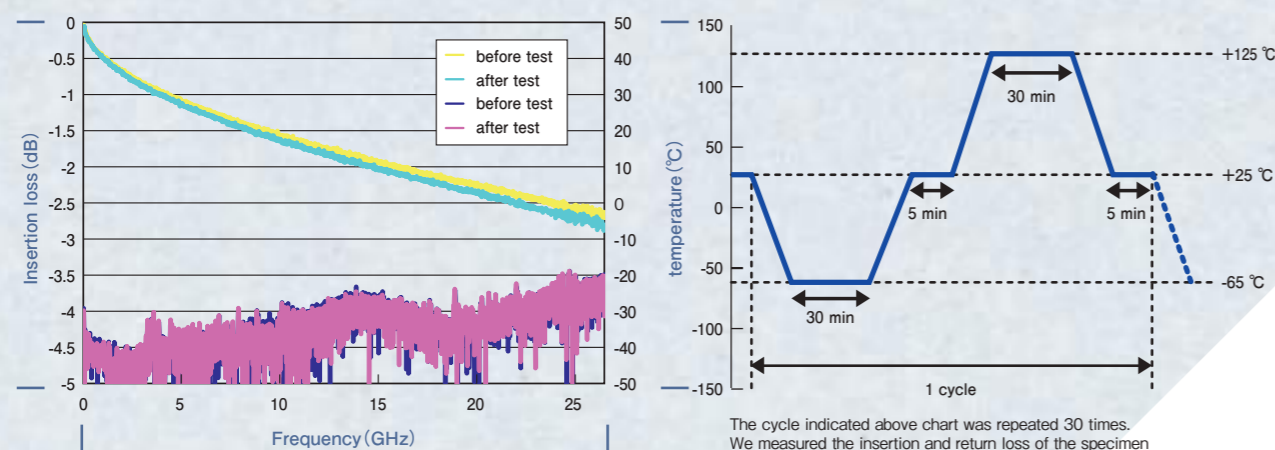
*For MWX122, you can select the "torque canceller type" that does not affect the twist of cable when connecting.

Cable Structure : MWX122

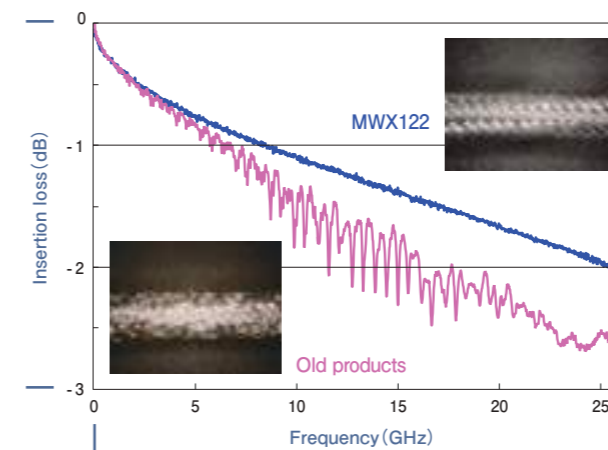


Heat cycle test for MWX121

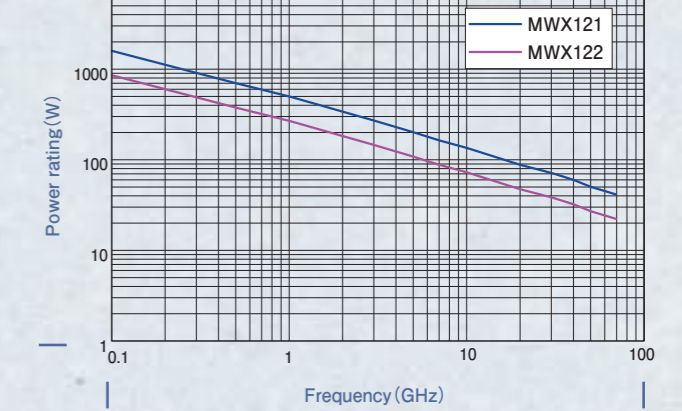
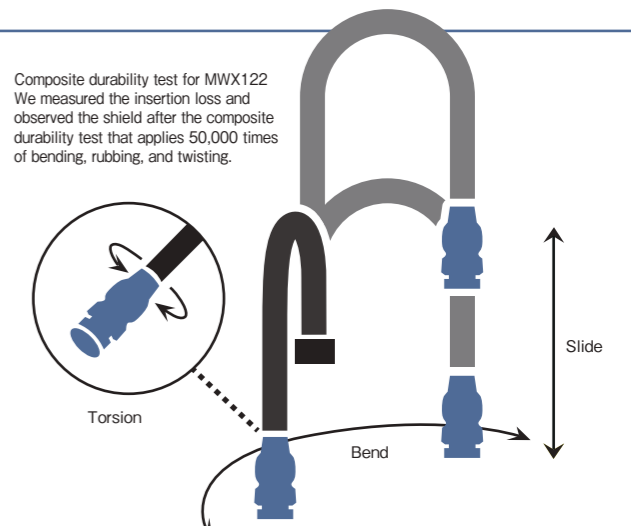
MWX121-02000DMSDMS



Composite durability test for MWX122



Composite durability test for MWX122
We measured the insertion loss and observed the shield after the composite durability test that applies 50,000 times of bending, rubbing, and twisting.



Power rating

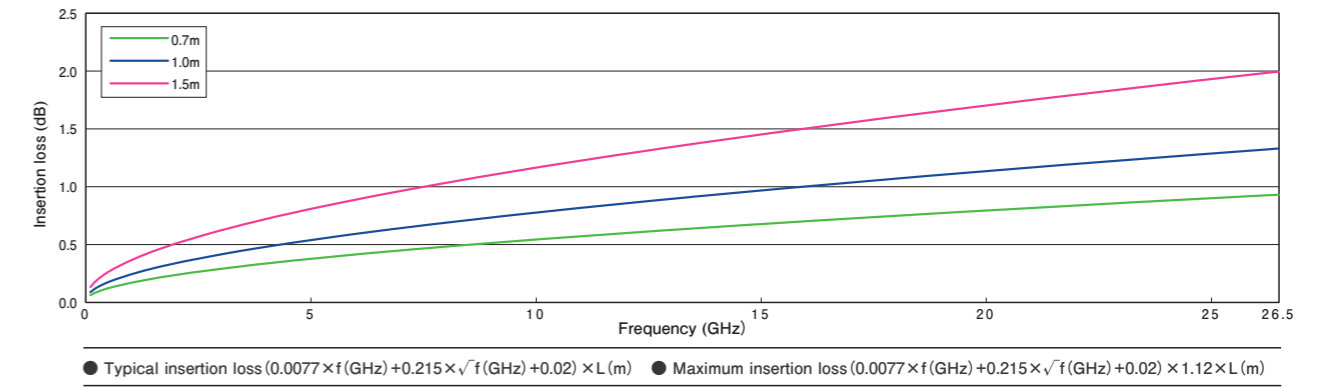
The diagram to the right shows the relationship between frequency and power rating. The values are calculated at 25 °C and at sea level. The power rating will need to be corrected for different ambient temperatures and altitude. Power ratings may decrease, depending on the connector selected. *The above figures are measured values for reference only.

MWX1 SERIES MWX 121

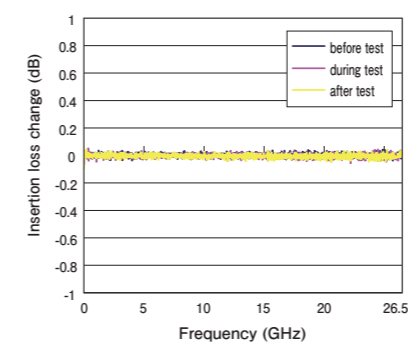


Technical Data

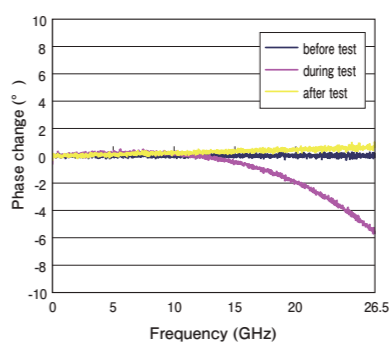
Cable typical insertion loss



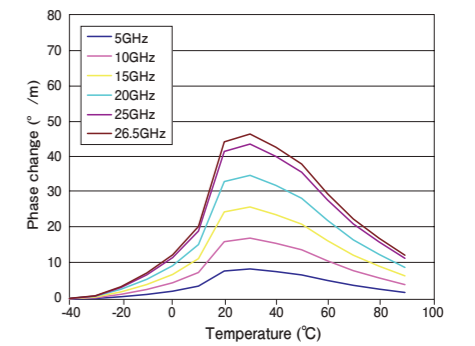
Static bending data (insertion loss, phase)



Bending radius: 30 mm



MWX121 Phase change vs. temperature



*The cable was wrapped 360° around φ60mm mandrel.

*The cable was measured in chamber every 20 °C from -40 to 90 °C, 1 hour after the temperature changed.

Property

Electrical properties

Maximum operating frequency	26.5 GHz
Characteristic impedance	50±1 Ω
Capacitance (typ.)	88 pF/m
Propagation delay (typ.)	4.28 ns/m
Wavelength reduction rate (typ.)	78 %
Higher mode frequency (typ.)	27.0 GHz
VSWR (per connector/ both ends of assy.)	1.153/1.33
Maximum frequency insertion loss (26.5 GHz)	1.3 dB/m

Mechanical properties

Cable outer diameter	6.6 mm
Minimum bending radius (inner side)	30 mm
Cable mass (typ.)	80 g/m
Continuous operating temperature range	-65~+125 °C
Assembly length	200~5,000 mm

Example MWX121

Assembly length: 1000mm
Connector I : 3.5 mm(f) straight
Connector II : 3.5 mm(m) straight

Catalog No.
MWX121-01000DFSDMS

a b c

a: Cable
b: Assembly length
c: Connector

Order form example

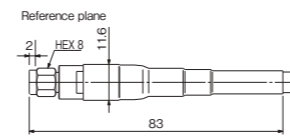
Please provide the following information when placing an order.

* See P.33 "Connector combination codes"

Connector

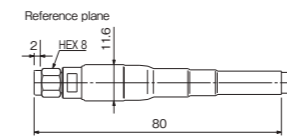
SMA (m) straight (Code:AMS)

Maximum operating frequency:18.5 GHz / Mass:14g



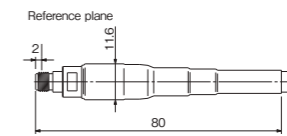
3.5mm (m) straight (Code:DMS)

Maximum operating frequency:26.5 GHz / Mass:13g



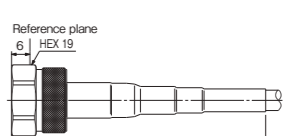
3.5mm (f) straight (Code:DFS)

Maximum operating frequency:26.5 GHz / Mass:12g



N (m) straight (Code:NMS)

Maximum operating frequency:18.0 GHz / Mass:36g



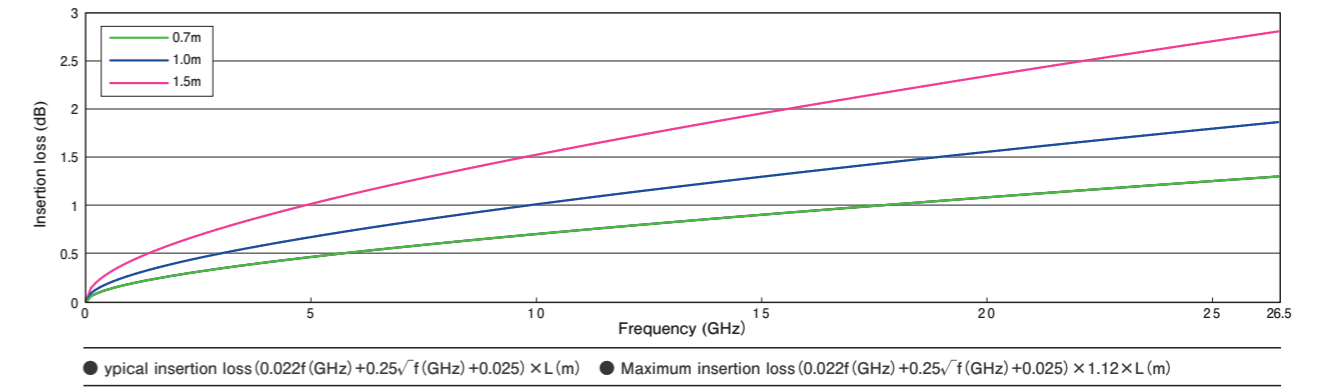
*The above figures are measured values for reference only.

MWX1 SERIES MWX 122

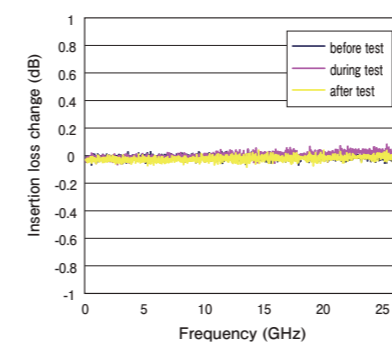


Technical Data

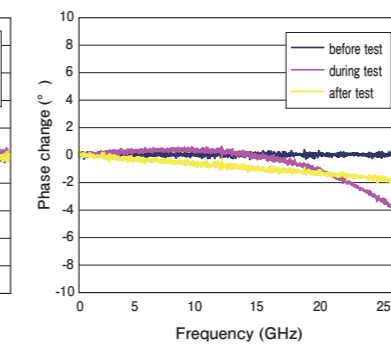
Cable typical insertion loss



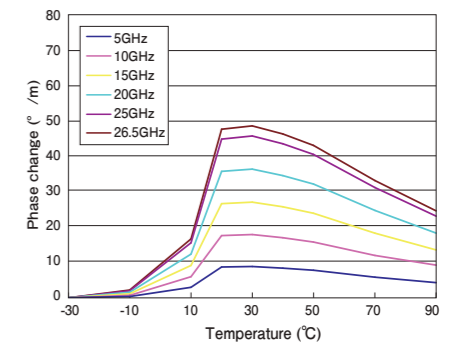
Static bending data (insertion loss, phase)



Bending radius: 30 mm



MWX122 Phase change vs. temperature



*The cable was wrapped 360° around φ60mm mandrel.

*The cable was measured in chamber every 20 °C from -30 to 90 °C, 1 hour after the temperature changed.

Property

Electrical properties

Maximum operating frequency	26.5 GHz
Characteristic impedance	50±1 Ω
Capacitance (typ.)	89 pF/m
Propagation delay (typ.)	4.39 ns/m
Wavelength reduction rate (typ.)	76 %
Higher mode frequency (typ.)	27.0 GHz
VSWR (per connector/both ends of assy.)	1.153/1.33
Maximum frequency insertion loss (26.5 GHz)	1.9 dB/m

Mechanical properties

Cable outer diameter	6.5 mm
Minimum bending radius (inner side)	30 mm
Cable mass (typ.)	79 g/m
Continuous operating temperature range	-30~+85 °C
Assembly length	300~3,000 mm

Example MWX122

Assembly length: 1000 mm
Connector I :3.5 mm(f) straight torque canceller
Connector II:3.5 mm(m) straight torque canceller

Catalog No.
MWX122-01000DFCDMC

a b c

a:Cable
b:Assembly length
c:Connector

Order form example

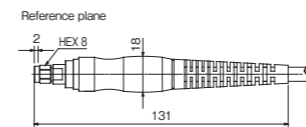
Please provide the following information when placing an order.

* See P.33 "Connector combination codes"

Connector

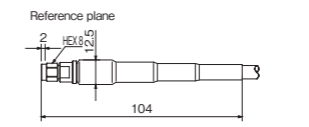
SMA (m) Torque canceller (Code:AMC)

Maximum operating frequency:18.5 GHz / Mass:41g



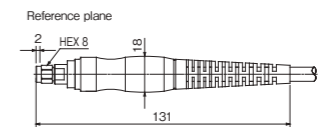
SMA (m) straight (Code:AMS)

Maximum operating frequency:18.5 GHz / Mass:15g



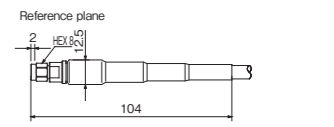
3.5mm (m) Torque canceller (Code:DMC)

Maximum operating frequency:26.5 GHz / Mass:41g



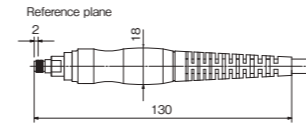
3.5mm (m) straight (Code:DMS)

Maximum operating frequency:26.5 GHz / Mass:15g



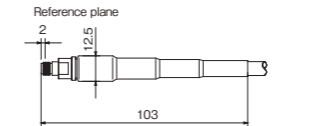
3.5mm (f) Torque canceller (Code:DFC)

Maximum operating frequency:26.5 GHz / Mass:40g



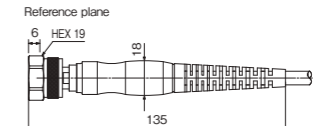
3.5mm (f) straight (Code:DFS)

Maximum operating frequency:26.5 GHz / Mass:14g



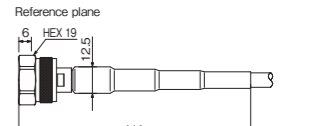
N (m) Torque canceller (Code:NMC)

Maximum operating frequency:18.0 GHz / Mass:67g



N (m) straight (Code:NMS)

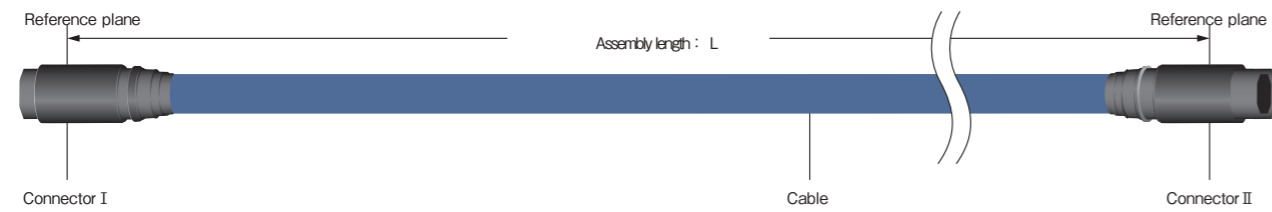
Maximum operating frequency:18.0 GHz / Mass:41g



*The above figures are measured values for reference only.

MWX1 SERIES

Placing orders



ex.1
 Cable : MWX121
 Assembly length : 2000 mm
 Connector I : 3.5 mm(m)straight
 Connector II : 3.5 mm(m)straight

Catalog number
MWX121-02000 DMS DMS

The unit of assembly length is mm. Shown as a five-digit number. If the number consists of fewer than five digits, remember to add zero (s) to the left of the first digit to make it five digits. The assembly length is measured based on the reference planes, not on the connector ends, shown at the figure to the left.

ex.2
 Cable : MW122
 Assembly length : 1000 mm
 Connector I : 3.5 mm(f)straight torque canceller
 Connector II : 3.5 mm(m)straight torque canceller

Catalog number
MWX122-01000 DFC DMC

Connector combination codes

Connector I		SMA		SMA Torque canceller		3.5mm		3.5mm Torque canceller		3.5mm		3.5mm Torque canceller		N		N Torque canceller	
		m	m	m	m	f	f	m	m	m	m	f	f	m	m		
Connector II		AMS		AMC		DMS		DMC		DFS		DFC		NMS		NMC	
SMA	m	AMS	AMSAMS	AMCAMS	AMSDMS	AMSDMC	AMSDFS	AMSDFC	AMSNMS	AMSMMC							
SMA Torque canceller	m	AMC	-	AMCAMC	AMCDMS	AMCDMC	AMCDFS	AMCDFC	AMCNMS	AMCNMC							
3.5mm	m	DMS	-	-	DMSDMS	DMCDMS	DFSDMS	DFCDMS	DMSNMS	DMSMMC							
3.5mm Torque canceller	m	DMC	-	-	-	DMCDMC	DFSDMC	DFCDMC	DMCNMS	DMCNMC							
3.5mm	f	DFS	-	-	-	-	DFSDFS	DFCDFS	DFSNMS	DFSMMC							
3.5mm Torque canceller	f	DFC	-	-	-	-	-	DFCDFC	DFCNMS	DFCNMC							
N	m	NMS	-	-	-	-	-	-	NMSNMS	NMSMMC							
N Torque canceller	m	NMC	-	-	-	-	-	-	-	NMCNMS							

m : male (plug)
 f : female (jack)

Please provide a catalog number when placing an order.

Delivery time

MWX0 series will be shipped within 5 business days after received order.
 *Leadtime may be effected by larger order volume.

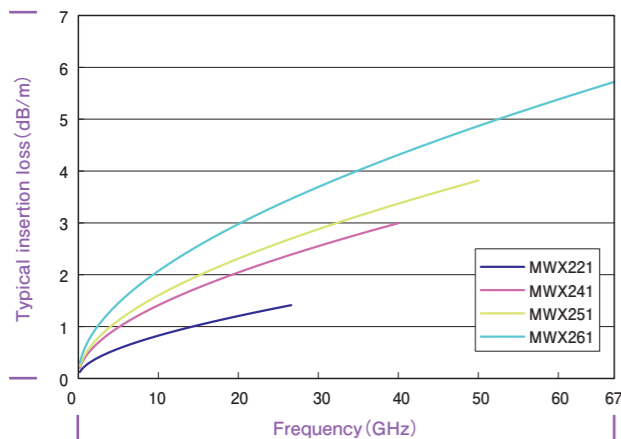
MWX2 SERIES

Flexible cable assemblies for measuring instruments

The MWX2 series offer flexibility and low repulsion to reduce stress loads to measured objects with excellent phase stability against bending in intensive use of microwave measurement.



MWX2 Series typical insertion loss



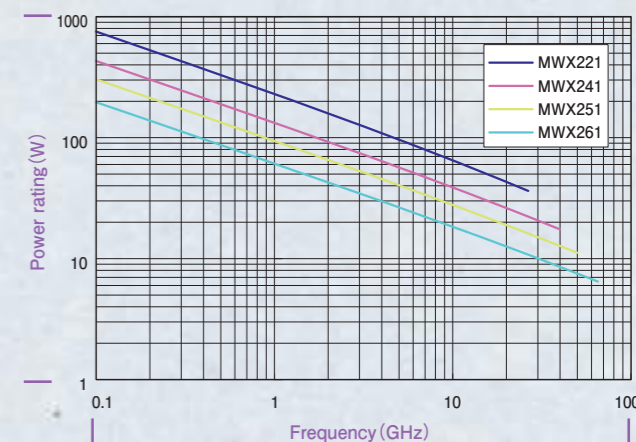
Simple criteria for cable selection

- Insertion loss: The larger the cable outer diameter, the lower the insertion loss.
- Frequency range: The smaller the cable, the higher the higher mode frequency.
- Power rating: The larger the cable outer diameter, the higher the power rating.
- Flexibility: The smaller the cable, the better the flexibility.
- Mass: The smaller the cable, the lighter the cable.

Power rating

The diagram to the right shows the relationship between frequency and power rating. The values are calculated at 25 °C and at sea level. The power rating will need to be corrected for different ambient temperatures and altitude. Power ratings may decrease, depending on the connector selected. *The above figures are measured values for reference only.

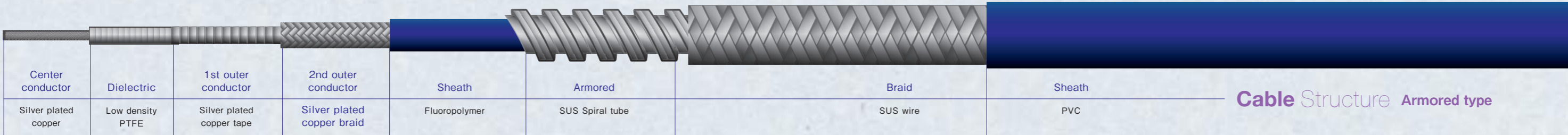
Power rating of MWX2 series at sea level



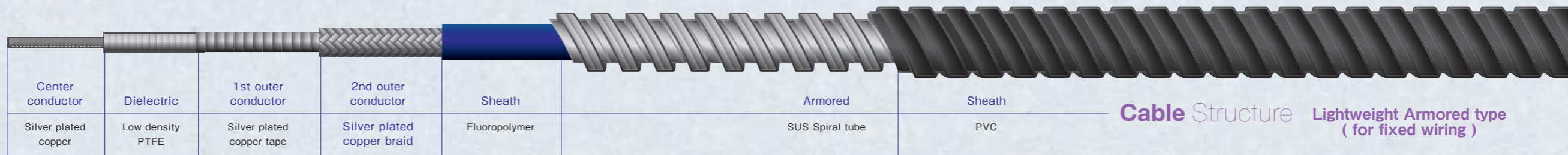
Cable Structure Non-armored type



Cable Structure Armored type



Cable Structure Lightweight Armored type (for fixed wiring)



Simple criteria for connector selection

- Choose a suitable connector for your measuring instrument.
- The larger the connector, the higher the power rating.
- The smaller the connector, the higher the maximum operating frequency.

Connector compatibility

Cable type	Cable maximum operating frequency (GHz)	Compatible connector															
		18.0 GHz		18.5 GHz		26.5 GHz		40.0 GHz		50.0 GHz		67.0 GHz					
		N(m)	N(f)	N(m) swept	SMA(m) right angle	SMA(m)	SMA(m) swept	3.5mm(m)	3.5mm(f)	3.5mm(m) swept	2.92mm(m)	2.92mm(f)	2.92mm(m) swept	2.4mm(m)	2.4mm(f)	1.85mm(m)	1.85mm(f)
MWX221	26.5 GHz	●	●	●	●	●	●	●	●	●							
MWX221 (armored type)	26.5 GHz	●				●	●	●									
MWX241 (armored type)	40.0 GHz	●				●			●	●							
MWX241 (non-armored type, custom-made)	40.0 GHz	●				●			●	●	●						
MWX251 (armored type)	50.0 GHz								●	●		●	●				
MWX261 (armored type)	67.0 GHz															●	●

*Armored type: Armored with a protection sheath to reduce damage caused by mechanical movement. MWX2 SERIES

Flexibility data

Test method Test cable : MWX221, MWX021, MWX121

Test condition temperature : 24°C test load : 454g diameter of bar : φ 16mm

A test cable measuring 1,000 mm in length was formed into a circle with an internal diameter of 300mm. Both ends were overlapped and secured with tape measuring 50 mm in width. The circularly formed test cable was then suspended, with the overlapping end section at the top and a weight positioned at the bottom. Circularity was measured after five seconds. (Circularity is expressed as the ratio a/b.)



Test result

Test cable	sample 1	sample 2	sample 3	average
MWX221	1,887	2,049	2,011	1,982
MWX021	1,532	1,404	1,482	1,473
MWX121	1,552	1,564	1,595	1,570

*The above figures are measured values for reference only.

General Assembly Information

MWX 0

MWX 1

MWX 2

MWX 3

MWX 4.5

MWX 6

TECHNICAL DATA

General Assembly Information

MWX 0

MWX 1

MWX 2

MWX 3

MWX 4.5

MWX 6

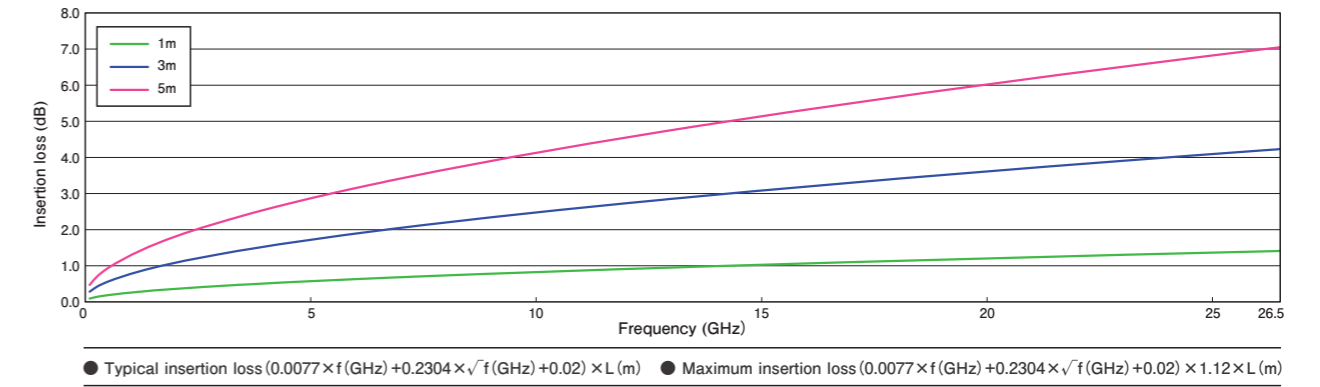
TECHNICAL DATA

MWX 2 SERIES MWX 221

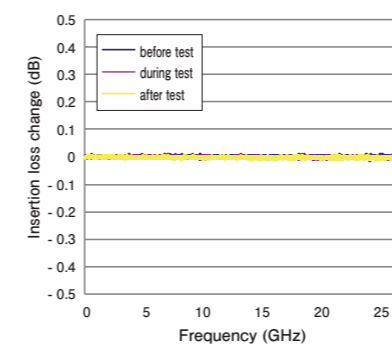


Technical Data

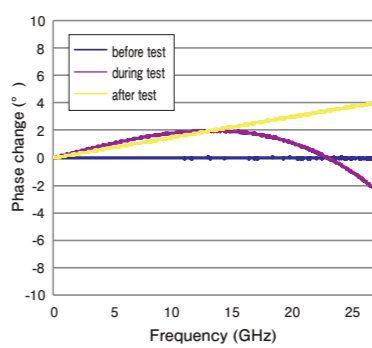
Cable typical insertion loss



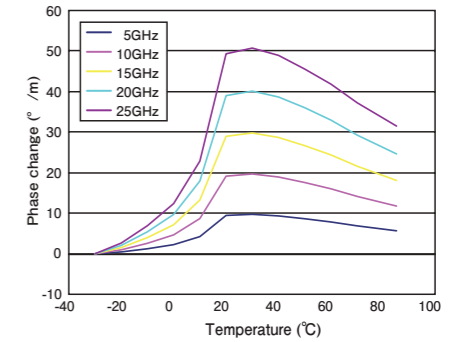
Static bending data (insertion loss, phase)



Bending radius: 30 mm



MWX221 Phase change vs. temperature



*The cable was wrapped 360° around φ60mm mandrel.

*The cable was measured in chamber every 20 °C from -40 to 90 °C, 1 hour after the temperature changed.

Property

Electrical properties

Maximum operating frequency	26.5 GHz
Characteristic impedance	50±1 Ω
Capacitance (typ.)	88 pF/m
Propagation delay (typ.)	4.4 ns/m
Wavelength reduction rate (typ.)	76 %
Higher mode frequency (typ.)	27.5 GHz
VSWR (per connector/both ends of assy.)	1.153/1.33
Maximum frequency insertion loss (26.5 GHz)	1.4 dB/m

Mechanical properties

	Standard type	Armored type	Lightweight Armored type (for fixed wiring)
Cable outer diameter	6.0 mm	12.5 mm	11 mm
Minimum bending radius (inner side)	20 mm	20 mm	30 mm
Cable mass (typ.)	64 g/m	212 g/m	160 g/m
Continuous operating temperature range	-30~+85 °C	-30~+85 °C	-30~+85 °C
Armored side pressure	-	196N/cm	196N/cm
Assembly length	200~5,000 mm	700~5,000 mm	500~5,000 mm

Order form example

Please provide the following information when placing an order.

* See P.45 "Connector combination codes"

Example 1 MWX221

Assembly length: 1000mm
Connector I : SMA(m)straight
Connector II : 3.5mm(m)straight

Catalog No.
MWX221-01000AMS DMS

Example 2 MWX221 Armored type

Assembly length: 1500mm
Connector I : N(m)straight
Connector II : N(m)straight

Catalog No.
MWX221-01500NMS NMS/B

Example 3 MWX221 Lightweight Armored type

Assembly length: 1000mm
Connector I : SMA(m)straight
Connector II : SMA(m)straight

Catalog No.
MWX221-01000AMSAMS/A

a: Cable c: Connector
b: Assembly length d: Armored

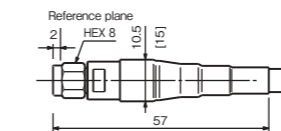
We have the capacity to deliver products with matched phases for customers who require this characteristic.

Option

Connector

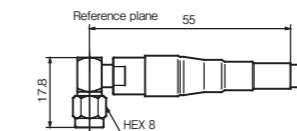
SMA (m) straight (Code:AMS)

Maximum operating frequency:18.5GHz / Mass:10g



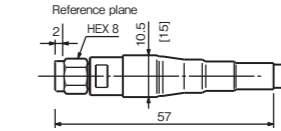
SMA (m) right Angle (Code:AMH)

Maximum operating frequency:18.0GHz / Mass:10g



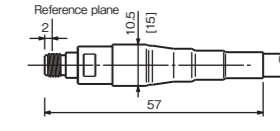
3.5mm (m) straight (Code:DMS)

Maximum operating frequency:26.5GHz / Mass:11g



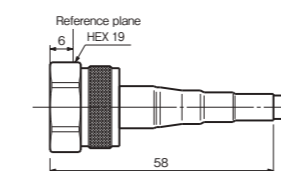
3.5mm (f) straight (Code:DFS)

Maximum operating frequency:26.5 GHz / Mass:10g



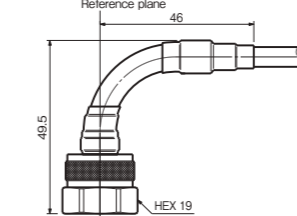
N (m) straight (Code:NMS)

Maximum operating frequency:18.0GHz / Mass:38g



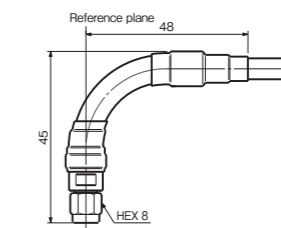
N (m) swept (Code:NMW)

Maximum operating frequency:18.0GHz / Mass:46g



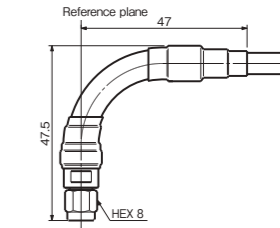
SMA (m) swept (Code:AMW)

Maximum operating frequency:18.5GHz / Mass:17g



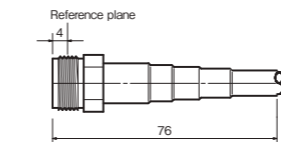
3.5mm (m) swept (Code:DMW)

Maximum operating frequency:26.5GHz / Mass:18g



N (f) straight (Code:NFS)

Maximum operating frequency:18.0GHz / Mass:26g



• Swept and right angle are not available to armored type.
• Please see P.82 about "customer-specified swept and right angle connectors".
• [] : Armored type size.

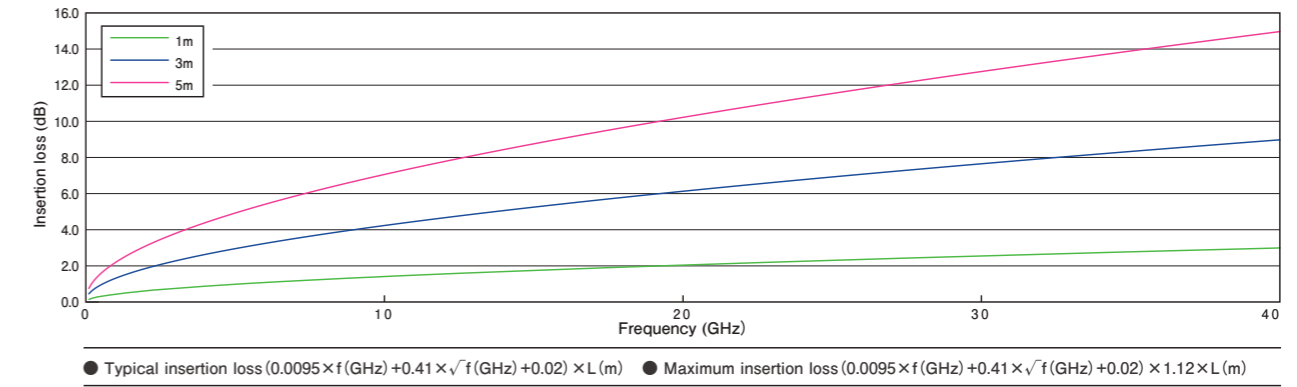
*The above figures are measured values for reference only.

MWX 2 SERIES MWX 241

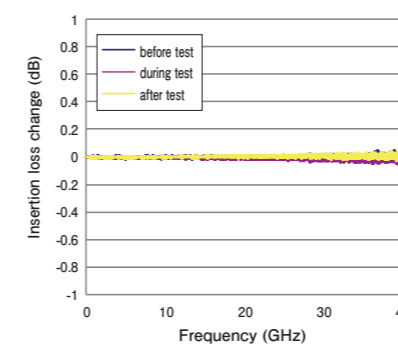


Technical Data

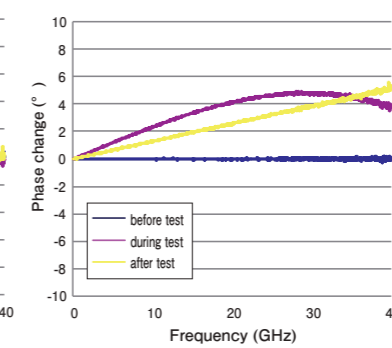
Cable typical insertion loss



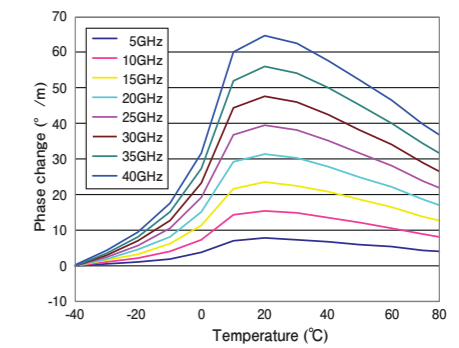
Static bending data (insertion loss, phase)



Bending radius: 20 mm



MWX241 Phase change vs. temperature



*The cable was wrapped 360° around φ40mm mandrel.

*The cable was measured in chamber every 20 °C from -40 to 90 °C, 1 hour after the temperature changed.

Property

Electrical properties

Maximum operating frequency	40.0 GHz
Characteristic impedance	50±1 Ω
Capacitance (typ.)	88 pF/m
Propagation delay (typ.)	4.35 ns/m
Wavelength reduction rate (typ.)	77 %
Higher mode frequency (typ.)	40.5 GHz
VSWR (per connector/both ends of assy.)	1.197/1.43
Maximum frequency insertion loss(40.0 GHz)	3.0 dB/m

Mechanical properties

	Standard type	Non-armored type custom-made	Lightweight Armored type (for fixed wiring)
Cable outer diameter	9.5 mm	4.1 mm	8 mm
Minimum bending radius (inner side)	20 mm	20 mm	20 mm
Cable mass (typ.)	137 g/m	35 g/m	98 g/m
Continuous operating temperature range	-30~+85 °C	-30~+85 °C	-30~+85 °C
Armored side pressure	196N/cm	-	196N/cm
Assembly length	700~5,000 mm	200~5,000 mm	500~5,000 mm

*Take care when handling the non-armored type product because its outer diameter of the cable is thin.

Order form example

Please provide the following information when placing an order.

* See P.45 "Connector combination codes"

Example 1

MWX241 Armored type (standard)
Assembly length: 1000mm
Connector I : 2.92mm(m) straight
Connector II : 2.92mm(m) straight

Catalog No.
MWX241-01000KMSKMS/B
a b c d

Example 2

MWX241 Non-armored type
Assembly length: 1000mm
Connector I : 2.92mm(m) straight
Connector II : 2.92mm(m) straight

*The individual specification is required.

Example 3

MWX241 Lightweight Armored type
Assembly length: 1000mm
Connector I : 2.92mm(m) straight
Connector II : 2.92mm(m) straight

Catalog No.
MWX241-01000KMSKMS/A
a b c d

a: Cable c: Connector
b: Assembly length d: Armored

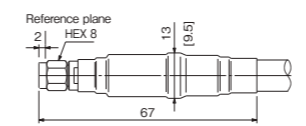
We have the capacity to deliver products with matched phases for customers who order this characteristic.

Option

Connector

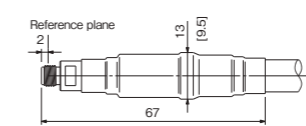
2.92mm (m) straight (Code:KMS)

Maximum operating frequency:40.0 GHz / Mass:10g



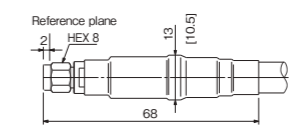
2.92mm (f) straight (Code:KFS)

Maximum operating frequency:40.0 GHz / Mass:10g



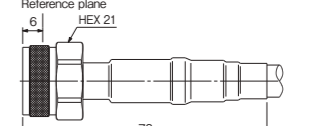
SMA (m) straight (Code:AMS)

Maximum operating frequency:18.5 GHz / Mass:12g



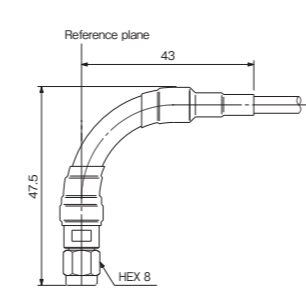
N (m) straight (Code:NMS)

Maximum operating frequency:18.0 GHz / Mass:42g



2.92mm (m) swept (custom-made)

Maximum operating frequency:40.0 GHz / Mass:17g



• Swept and right angle are not available to armored type.
• Please see P.82 about "customer-specified swept and right angle connectors".
• [] : Non - armored type size.

*The above figures are measured values for reference only.

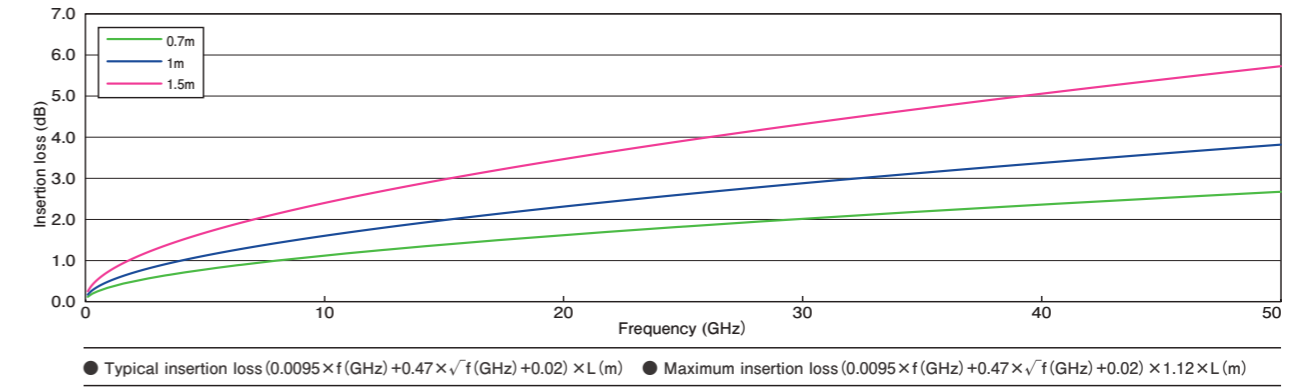
MWX 2 SERIES MWX 251

- Static bending
- Flexibility
- Frequency 50.0 GHz
- Temperature range -30~+85°C
- Minimum bending radius 6~20 mm
- RoHS compliant
- Measurement
- Armored
- Delivery time 5 days
- Listed in the catalogue: manufactured to order
- Custom support

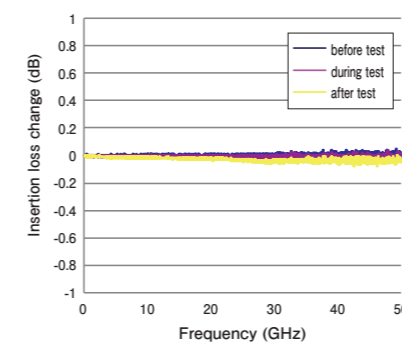


Technical Data

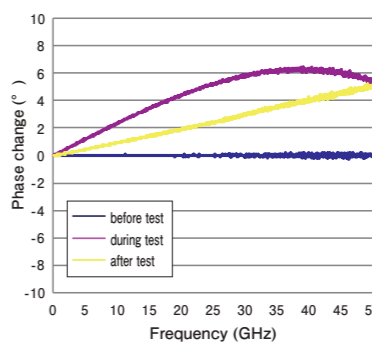
Cable typical insertion loss



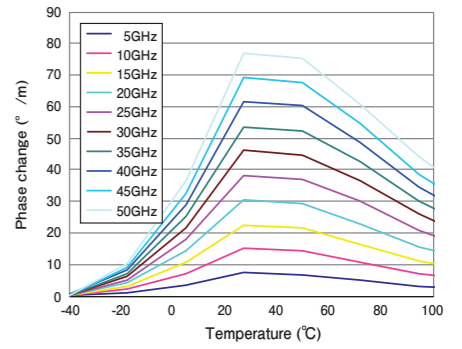
Static bending data (insertion loss, phase)



Bending radius: 20 mm



MWX251 Phase change vs. temperature



*The cable was wrapped 360° around φ40mm mandrel.

*The cable was measured in chamber every 20 °C from -40 to 90 °C, 1 hour after the temperature changed.

Property

Electrical properties

Maximum operating frequency	50.0 GHz
Characteristic impedance	50±1 Ω
Capacitance (typ.)	88 pF/m
Propagation delay (typ.)	4.36 ns/m
Wavelength reduction rate (typ.)	77 %
Higher mode frequency (typ.)	50.3 GHz
VSWR (per connector/ both ends of assy.)	1.197/1.143
Maximum frequency insertion loss (50.0 GHz)	3.8 dB/m

Mechanical properties

	Standard type	Non-armored type custom-made
Cable outer diameter	9.5 mm	3.7 mm
Minimum bending radius (inner side)	20 mm	6 mm
Cable mass (typ.)	129 g/m	29 g/m
Continuous operating temperature range	-30~+85 °C	-30~+85 °C
Armored side pressure	196N/cm	-
Assembly length	700~1,500 mm	200~1,500 mm

*Take care when handling the non-armored type product because its outer diameter of the cable is thin.

Order form example

Please provide the following information when placing an order.

* See P.45 "Connector combination codes"

Example 1
MWX251 Armored type (standard)
Assembly length: 1000mm
Connector I : 2.4mm(m) straight
Connector II : 2.4mm(m) straight
Catalog No.
MWX251-01000LMSLMS/B

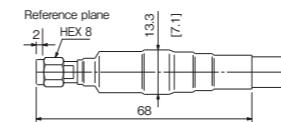
a b c d

Example 2
MWX251 Non-armored type
*The individual specification is required.

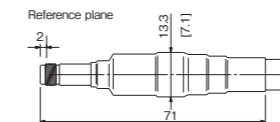
a: Cable
b: Assembly length
c: Connector
d: Armored

Connector

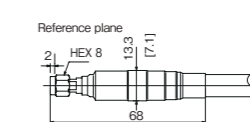
2.4mm (m) straight (Code:LMS)
Maximum operating frequency:50.0 GHz / Mass:13g



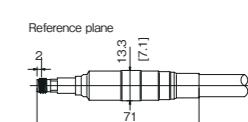
2.4mm (f) straight (Code:LFS)
Maximum operating frequency:50.0 GHz / Mass:13g



2.92mm (m) straight (Code:KMS)
Maximum operating frequency:40.0 GHz / Mass:13g



2.92mm (f) straight (Code:KFS)
Maximum operating frequency:40.0 GHz / Mass:13g



[] : Non - armored type size.

We have the capacity to deliver products with matched phases for customers who require this characteristic.

Option

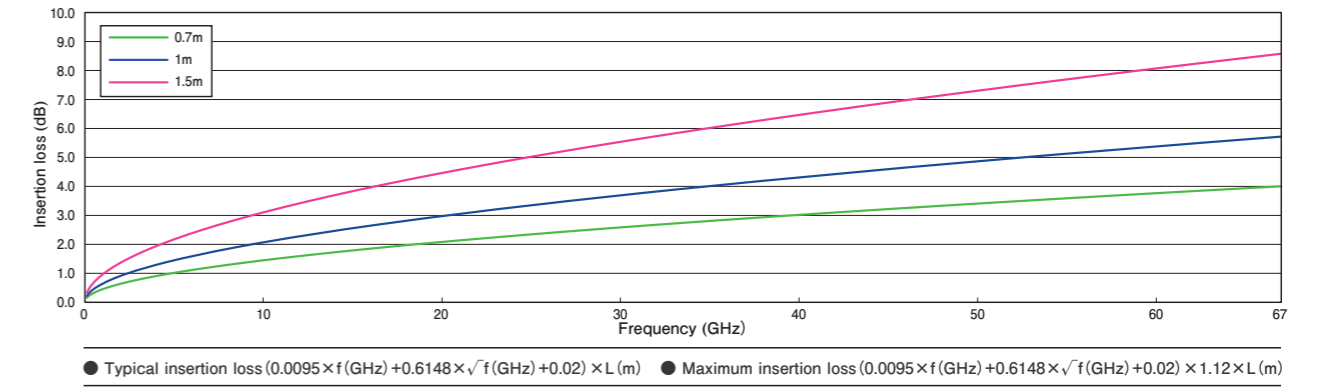
*The above figures are measured values for reference only.

MWX2 SERIES MWX 261

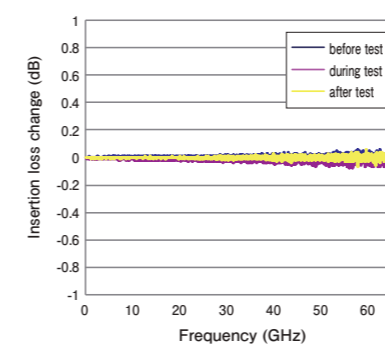


Technical Data

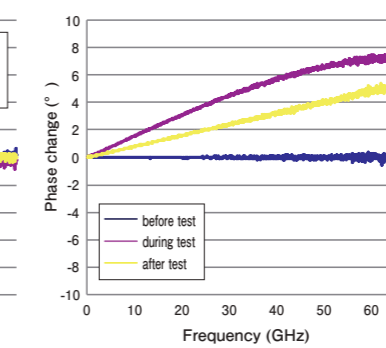
Cable typical insertion loss



Static bending data (insertion loss, phase)

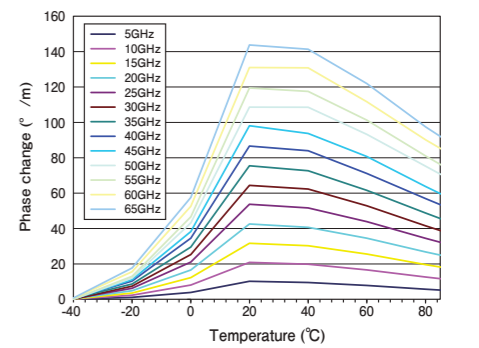


Bending radius: 20 mm



*The cable was wrapped 360° around φ40mm mandrel.

MWX261 Phase change vs. temperature



*The cable was measured in chamber every 20 °C from -40 to 90 °C, 1 hour after the temperature changed.

Property

Electrical properties

Maximum operating frequency	67.0 GHz
Characteristic impedance	50±1 Ω
Capacitance (typ.)	90 pF/m
Propagation delay (typ.)	4.38 ns/m
Wavelength reduction rate (typ.)	76 %
Higher mode frequency (typ.)	67.0 GHz
VSWR (per connector/ both ends of assy.)	1.197/1.143
Maximum frequency insertion loss (67.0 GHz)	5.6 dB/m

Mechanical properties

	Standard type	Non-armored type custom-made
Cable outer diameter	7.7 mm	2.6 mm
Minimum bending radius (inner side)	20 mm	6 mm
Cable mass (typ.)	90 g/m	17 g/m
Continuous operating temperature range	-30~+85 °C	-30~+85 °C
Armored side pressure	196N/cm	-
Assembly length	700~1,500 mm	200~1,500 mm

*Take care when handling the non-armored type product because its outer diameter of the cable is thin.

Order form example

Please provide the following information when placing an order.

* See P.45 "Connector combination codes"

Example 1

MWX261 Armored type (standard)
 Assembly length: 1 000 mm
 Connector I: 1.85 mm(m) straight
 Connector II: 1.85 mm(m) straight

Catalog No.
MWX261-01000VMSVMS/B

a b c d

Example 2

MWX261 Non-armored type

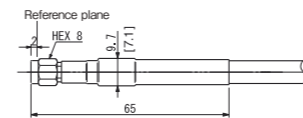
* The individual specification is required.

a: Cable
 b: Assembly length
 c: Connector
 d: Armored

Connector

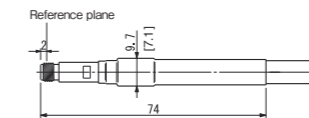
1.85mm (m) straight (Code:VMS)

Maximum operating frequency: 67.0 GHz / Mass: 8g



1.85mm (f) straight (Code:VFS)

Maximum operating frequency: 67.0 GHz / Mass: 8g



[] : Non - armored type size.

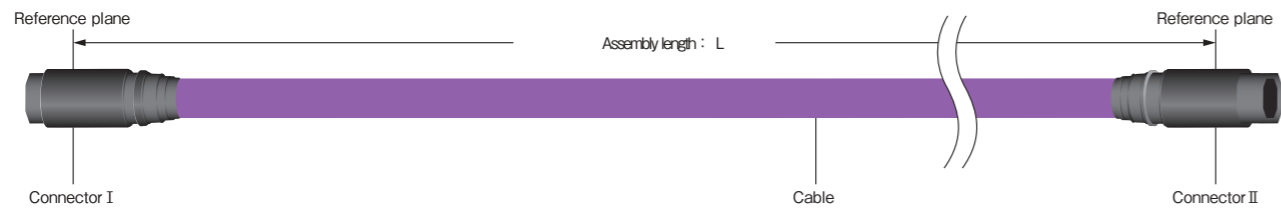
We have the capacity to deliver products with matched phases for customers who require this characteristic.

Option

*The above figures are measured values for reference only.

MWX2 SERIES

Placing orders



ex.1
Catalog number
MWX221-01000 DMS DMS
 Cable : MWX221
 Assembly length : 1000 mm
 Connector I : 3.5 mm(m)straight
 Connector II : 3.5 mm(m)straight

The unit of assembly length is mm. Shown as a five-digit number. If the number consists of fewer than five digits, remember to add zero (s) to the left of the first digit to make it five digits. The assembly length is measured based on the reference planes, not on the connector ends, shown at the figure to the left.

ex.2
Catalog number
MWX241-02000 KMS KMS /B
 Cable : MWX241
 Assembly length : 2000 mm
 Connector I : 2.92 mm(m)straight
 Connector II : 2.92 mm(m)straight
 Armored : Armored-type

Armored-type cables will have a " /B" appended to the connector combination code.

ex.3
Catalog number
MWX221-01000 AMS AMS /A
 Cable : MWX221
 Assembly length : 1000 mm
 Connector I : SMA(m)straight
 Connector II : SMA(m)straight
 Armored : Light weight armored-type

Lightweight armored-type cables will have a " /A" appended to the connector combination code.

Connector combination codes

Connector I		Connector II																
		SMA	SMA right angle	SMA swept	N	N	N swept	3.5mm	3.5mm	3.5mm swept	2.92mm	2.92mm	2.4mm	2.4mm	1.85mm	1.85mm		
		m	m	m	m	f	m	f	m	m	f	m	f	m	f	m	f	
		AMS	AMH	AMW	NMS	NFS	NMW	DMS	DFS	DMW	KMS	KFS	LMS	LFS	VMS	VFS		
SMA	m	AMS	AMSAMS	AMHAMS	AMSAMW	AMSAMS	AMSAMS	AMSAMS	AMSAMS	AMSAMS	AMSAMS	AMSAMS	AMSAMS	AMSAMS	AMSAMS	AMSAMS	AMSAMS	
SMA right angle	m	AMH	—	AMHAMH	AMHAMW	AMHNMS	AMHNFS	AMHNMW	AMHDMS	AMHDFS	AMHDMW	—	—	—	—	—	—	
SMA swept	m	AMW	—	—	AMWAMW	AMWNMS	AMWNFS	AMWNMW	AMWDMS	AMWDFS	AMWDMW	—	—	—	—	—	—	
N	m	NMS	—	—	—	NMSNMS	NFSNMS	NMSNMW	DMSNMS	DFSNMS	DMWNMS	KMSNMS	KFSNMS	—	—	—	—	
N	f	NFS	—	—	—	—	NFSNFS	NFSNMW	DMSNFS	DFSNFS	DMWNFS	—	—	—	—	—	—	
N swept	m	NMW	—	—	—	—	—	NMWNMW	DMSNMW	DFSNMW	DMWNMW	—	—	—	—	—	—	
3.5mm	m	DMS	—	—	—	—	—	—	DMSDMS	DFSMS	DMSDMW	—	—	—	—	—	—	
3.5mm	f	DFS	—	—	—	—	—	—	—	DFSDFS	DFSDMW	—	—	—	—	—	—	
3.5mm swept	m	DMW	—	—	—	—	—	—	—	—	DMWDMW	—	—	—	—	—	—	
2.92mm	m	KMS	—	—	—	—	—	—	—	—	—	KMSKMS	KFSKMS	—	—	—	—	
2.92mm	f	KFS	—	—	—	—	—	—	—	—	—	—	KFSKFS	—	—	—	—	
2.4mm	m	LMS	—	—	—	—	—	—	—	—	—	—	—	LMSLMS	LFSLMS	—	—	
2.4mm	f	LFS	—	—	—	—	—	—	—	—	—	—	—	—	LFSLFS	—	—	
1.85mm	m	VMS	—	—	—	—	—	—	—	—	—	—	—	—	—	VMSVMS	VFSVMS	
1.85mm	f	VFS	—	—	—	—	—	—	—	—	—	—	—	—	—	—	VFSVFS	

m : male (plug)
 f : female (jack)

Please provide a catalog number when placing an order.

Delivery time

We have following items in stock. We can ship these items immediately.
 MWX221-00500AMSAMS (L:500 mm, Connector:both ends SMA (m))
 MWX221-01000AMSAMS (L:1000 mm, Connector:both ends SMA (m))
 MWX221-00500DMSDMS (L:500 mm, Connector:both ends 3.5 mm (m))
 MWX221-01000DMSDMS (L:1000 mm, Connector:both ends 3.5 mm (m))
 MWX2 series will be shipped within 7 business days after received order.
 *Leadtime may be effected by larger order volume.

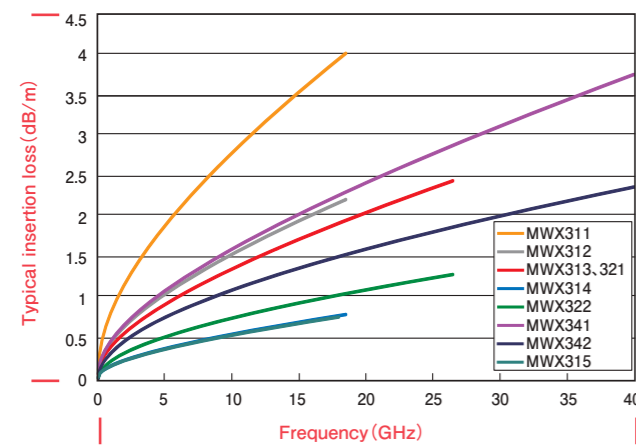
MWX3 SERIES

Cable assemblies for equipment wiring

The MWX3 series cable assemblies use a porous PTFE dielectric material to ensure excellent phase stability against temperature fluctuations. (Continuous operating temperature range: -65 °C to 125 °C (-30 °C to 85 °C for MWX315))

How to select

MWX3 Series typical insertion loss

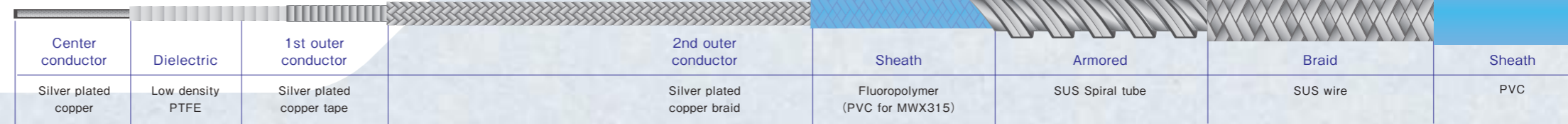


*MWX313:~18.5 GHz, MWX321:~26.5 GHz
*MWX312:~18.5 GHz, MWX341:~40.0 GHz

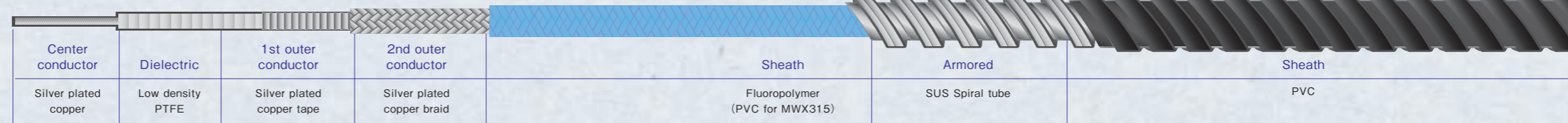
Simple criteria for cable selection

- Insertion loss: The larger the cable outer diameter, the lower the insertion loss.
- Frequency range: The smaller the cable, the higher the higher mode frequency.
- Power rating: The larger the cable outer diameter, the higher the power rating.
- Flexibility: The smaller the cable, the better the flexibility.
- Mass: The smaller the cable, the lighter the cable.

Cable Structure Armored type



Cable Structure Lightweight armored type (for fixed wiring)



Simple criteria for connector selection

- Choose a suitable connector for your measuring instrument.
- The smaller the connector, the higher the maximum operating frequency.
- The larger the connector, the higher the power rating.

Connector compatibility

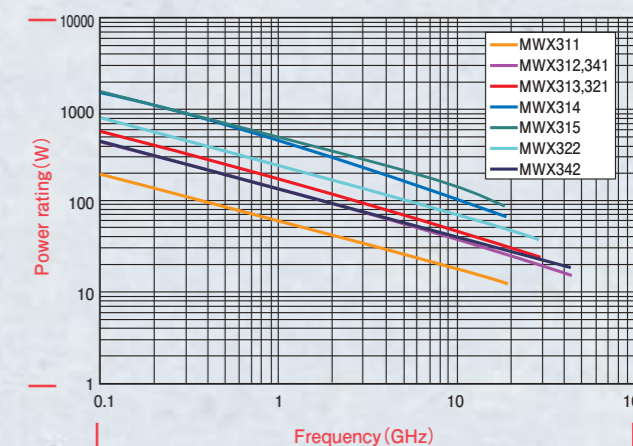
Cable type	Cable maximum operating frequency (GHz)	Compatible connector													
		10.0 GHz		15.0 GHz		18.5 GHz				26.5 GHz		40.0 GHz			
		SMA (m) right angle	TNC (m)	SMA (m)	SMA (f)	SSMA (m)	N (m)	N (m) Lightweight type	3.5mm (m)	3.5mm (f)	SMA (m)	2.92mm (m)	2.92mm (f)	2.4mm (m)	2.4mm (f)
MWX311	18.5 GHz	●		●	●	●									
MWX312		(*1)	●	(*2)	●		●								
MWX313			●		(*2)	●							(18.5 GHz)		
MWX314				(18.5 GHz)	●										
MWX315	18.0 GHz			(18.0 GHz)									(18.0 GHz)	(18.0 GHz)	
MWX321	26.5 GHz			(26.5 GHz/*3)											
MWX322													(18.0GHz)	●	
MWX341	40.0 GHz													(*4)	
MWX342														●	

(*1) Available SMA(m) right angle type up to 18.0GHz.
(*2) Phase Matching Connector is also available upon the requirement.
(*3) (*4) Those SMA(m) connectors are uniquely developed by Junkosha, which specified to be used for 26.5 GHz and 40 GHz.
*See the individual specification of each cables.

Power rating

The diagram to the right shows the relationship between frequency and power rating. The values are calculated at 25 °C and at sea level. The power rating will need to be corrected for different ambient temperatures and altitude. Power ratings may decrease, depending on the connector selected. *The above figures are measured values for reference only.

Power rating of MWX3 series at sea level



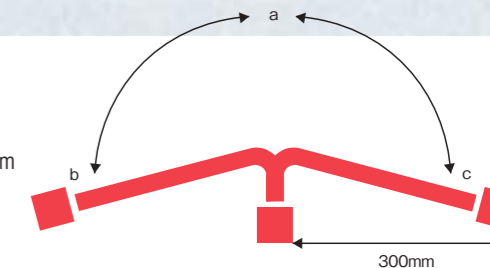
Cable Structure Non-armored type



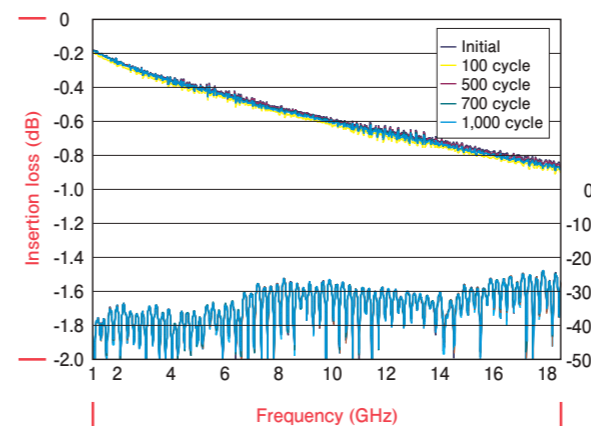
Bending test data of MWX312

Test method

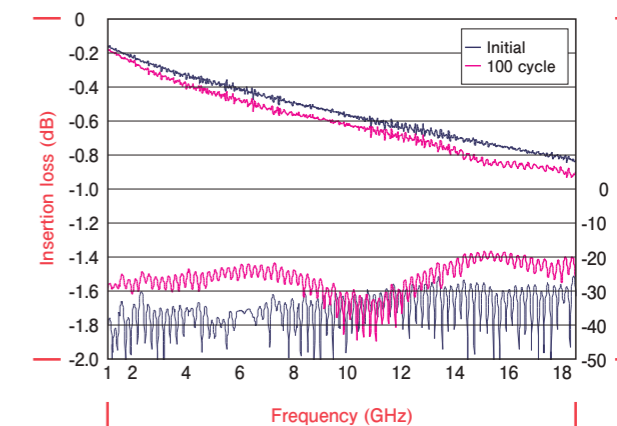
The connector on one end of test cable (MXW312-00500AMSAMS, measuring 500 mm in length and with SMA (m) connectors on both ends) was fixed in place. The connector on the other end was moved in the sequence a → b → c, after which initial insertion loss and return loss values were compared to those after the test.



MWX312-00500AMSAMS



Previous product



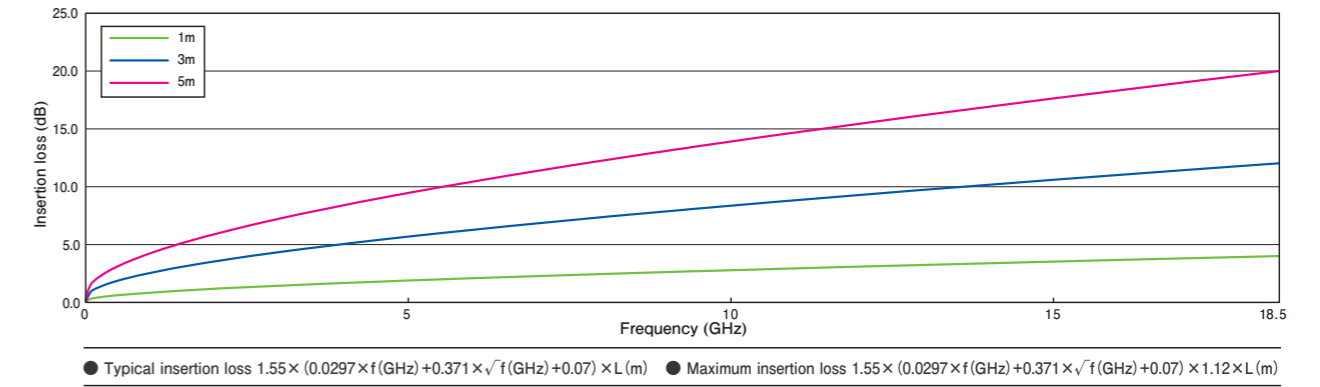
*The above figures are measured values for reference only.

MWX3 SERIES MWX311

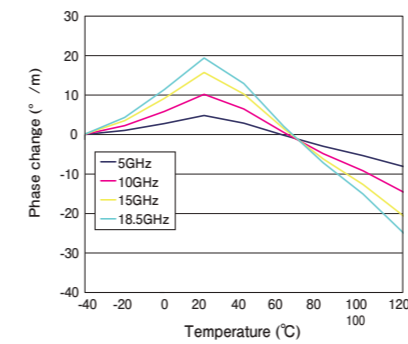


Technical Data

Cable typical insertion loss



MWX311 Phase change vs. temperature



*The cable was measured in chamber every 20 °C from -40 °C, 1 hour after the temperature changed.

Property

Electrical properties

Maximum operating frequency	18.5 GHz
Characteristic impedance	50±1 Ω
Capacitance (typ.)	86 pF/m
Propagation delay (typ.)	4.25 ns/m
Wavelength reduction rate (typ.)	79 %
Higher mode frequency (typ.)	75.0 GHz
VSWR (per connector/ both ends of assy.)	1.182/1.40
Maximum frequency insertion loss (18.5 GHz)	3.4 dB/m

Mechanical properties

Cable outer diameter	2.7 mm
Minimum bending radius (inner side)	10 mm
Maximum tensile strength	29.4 N(3kgf)
Cable mass (typ.)	18.5 g/m
Continuous operating temperature range	-65~+125 °C
Assembly length	100~10,000 mm

Order form example

Please provide the following information when placing an order.

* See P.67 "Connector combination codes"

Example 1 MWX311

Assembly length: 1000mm
Connector I : SMA (m) straight
Connector II : SMA (m) straight

Catalog No.
MWX311-01000AMSAMS

a b c

Example 2 MWX311

Assembly length : 1500 mm
Connector I : SMA (f) straight
Connector II : SMA (m) right angle

Catalog No.
MWX311-01500AFSAMR

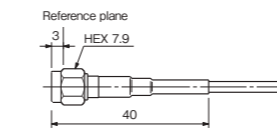
a b c

a:Cable
b:Assembly length
c:Connector

Connector

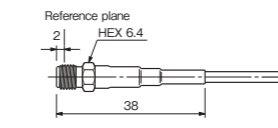
SMA (m) straight (Code:AMS)

Maximum operating frequency:18.5 GHz / Mass:3g



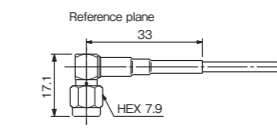
SMA (f) straight (Code:AFS)

Maximum operating frequency:18.5 GHz / Mass:3g



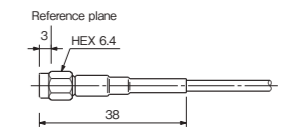
SMA (m) right angle (Code:AMR)

Maximum operating frequency:10.0 GHz / Mass:5g



SSMA (m) straight (Code:SMS)

Maximum operating frequency:18.5 GHz / Mass:3g



* Please see P.82 about "customer-specified swept and right angle connectors".

We have the capacity to deliver products with matched phases for customers who require this characteristic.

Option

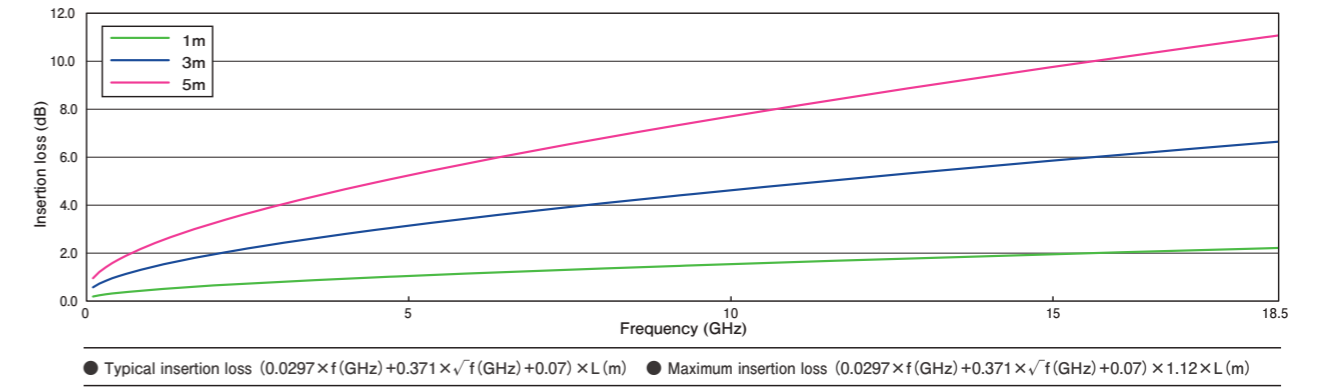
*The above figures are measured values for reference only.

MWX3 SERIES MWX 312

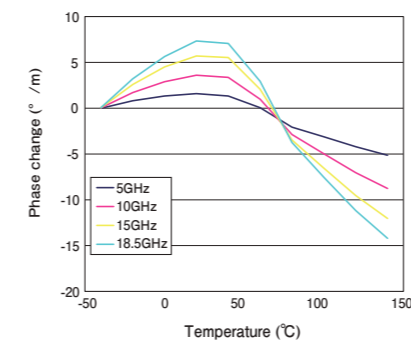


Technical Data

Cable typical insertion loss



MWX312 Phase change vs. temperature



Property

Electrical properties

Maximum operating frequency	18.5 GHz
Characteristic impedance	50±1 Ω
Capacitance (typ.)	82 pF/m
Propagation delay (typ.)	4.10 ns/m
Wavelength reduction rate (typ.)	81 %
Higher mode frequency (typ.)	44.0 GHz
VSWR (per connector/ both ends of assy.)	1.182/1.40
Maximum frequency insertion loss (18.5 GHz)	2.2 dB/m

Mechanical properties

Cable outer diameter	4.1 mm
Minimum bending radius (inner side)	20 mm
Maximum tensile strength	98 N (10 kgf)
Cable mass (typ.)	42 g/m
Continuous operating temperature range	-65~+125 °C
Assembly length	100~20,000 mm

Order form example

Please provide the following information when placing an order.

* See P.67 "Connector combination codes"

Example 1 MWX312

Assembly length: 1200 mm
Connector I : SMA (m) straight
Connector II : SMA (m) straight

Catalog No.
MWX312-01200AMSAMS

a b c

Example 2 MWX312

Assembly length: 1000mm
Connector I : SMA (f) straight
Connector II : N (m) straight

Catalog No.
MWX312-01000AFS NMS

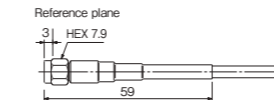
a b c

a: Cable
b: Assembly length
c: Connector

Connector

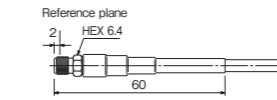
SMA (m) straight (Code:AMS)

Maximum operating frequency:18.5 GHz / Mass:3g



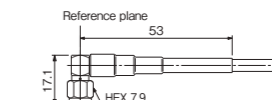
SMA (f) straight (Code:AFS)

Maximum operating frequency:18.5 GHz / Mass:3g



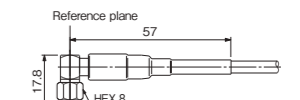
SMA (m) right angle (Code:AMR)

Maximum operating frequency:10.0 GHz / Mass:5g



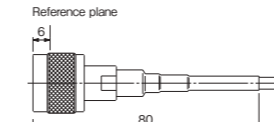
SMA (m) right angle (Code:AMH)

Maximum operating frequency:18.0 GHz / Mass:12g



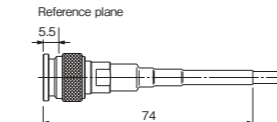
N (m) straight (Code:NMS)

Maximum operating frequency:18.5 GHz / Mass:39g



TNC (m) straight (Code:CMS)

Maximum operating frequency:15.0 GHz / Mass:21g



* Please see P.82 about "customer-specified swept and right angle connectors".

We have the capacity to deliver products with matched phases for customers who order this characteristic.

Option

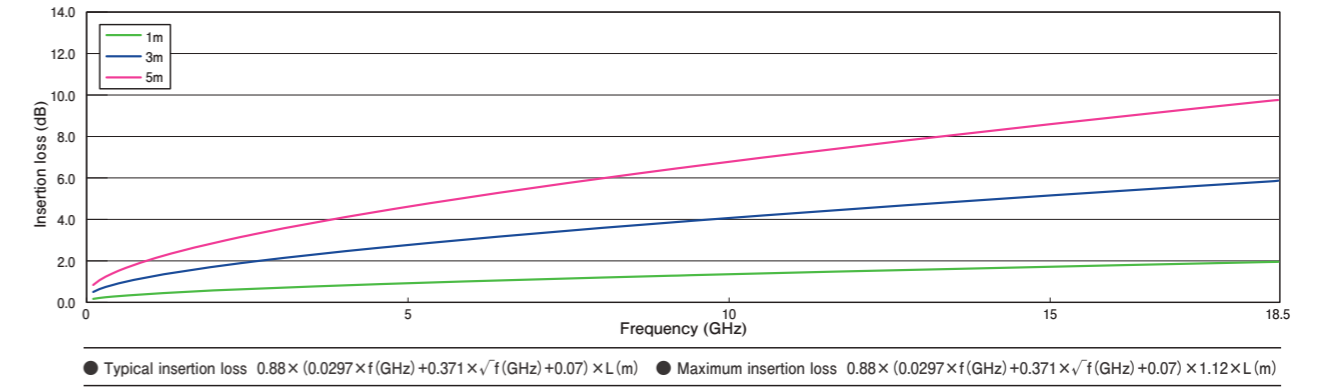
*The above figures are measured values for reference only.

MWX3 SERIES MWX 313

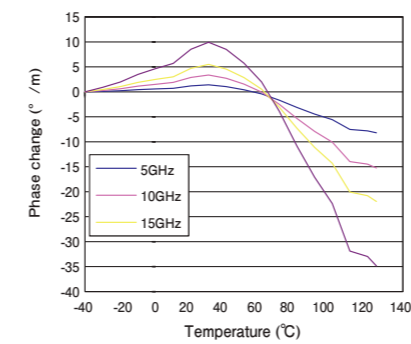


Technical Data

Cable typical insertion loss



MWX313 Phase change vs. temperature



*The cable was measured in chamber every 20 °C from -40 °C, 1 hour after the temperature changed.

Property

Electrical properties

Maximum operating frequency	18.5 GHz
Characteristic impedance	50±1 Ω
Capacitance (typ.)	80 pF/m
Propagation delay (typ.)	4.05 ns/m
Wavelength reduction rate (typ.)	82 %
Higher mode frequency (typ.)	37 GHz
VSWR (per connector/ both ends of assy.)	1.182/1.40
Maximum frequency insertion loss (18.5 GHz)	1.9 dB/m

Mechanical properties

Cable outer diameter	4.7 mm
Minimum bending radius (inner side)	30 mm
Maximum tensile strength	98 N (10 kgf)
Cable mass (typ.)	52 g/m
Continuous operating temperature range	-65~+125 °C
Assembly length	100~20,000 mm

Order form example

Please provide the following information when placing an order.

* See P.67 "Connector combination codes"

Example 1 MWX313

Assembly length: 1000 mm
Connector I : SMA(m) straight
Connector II : SMA(m) straight

Catalog No.
MWX313-01000AMSAMS

a b c

Example 2 MWX313

Assembly length: 1500 mm
Connector I : SMA(f) straight
Connector II : SMA(m) right angle

Catalog No.
MWX313-01500AFSAMR

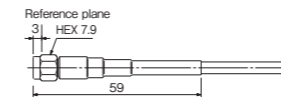
a b c

a: Cable
b: Assembly length
c: Connector

Connector

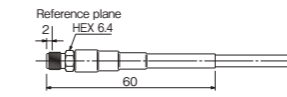
SMA(m) straight (Code:AMS)

Maximum operating frequency: 18.5 GHz / Mass: 3g



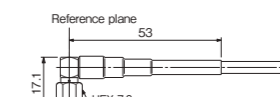
SMA(f) straight (Code:AFS)

Maximum operating frequency: 18.5 GHz / Mass: 3g



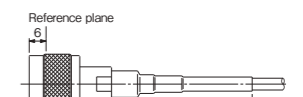
SMA(m) right angle (Code:AMR)

Maximum operating frequency: 10.0 GHz / Mass: 5g



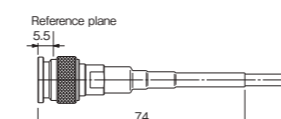
N(m) straight (Code:NMS)

Maximum operating frequency: 18.5 GHz / Mass: 39g



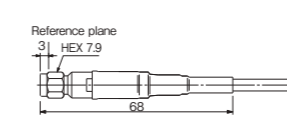
TNC(m) straight (Code:CMS)

Maximum operating frequency: 15.0 GHz / Mass: 21g



3.5mm(m) straight (Code:DMS)

Maximum operating frequency: 18.5 GHz / Mass: 13g



* Please see P.82 about "customer-specified swept and right angle connectors".

We have the capacity to deliver products with matched phases for customers who require this characteristic.

Option

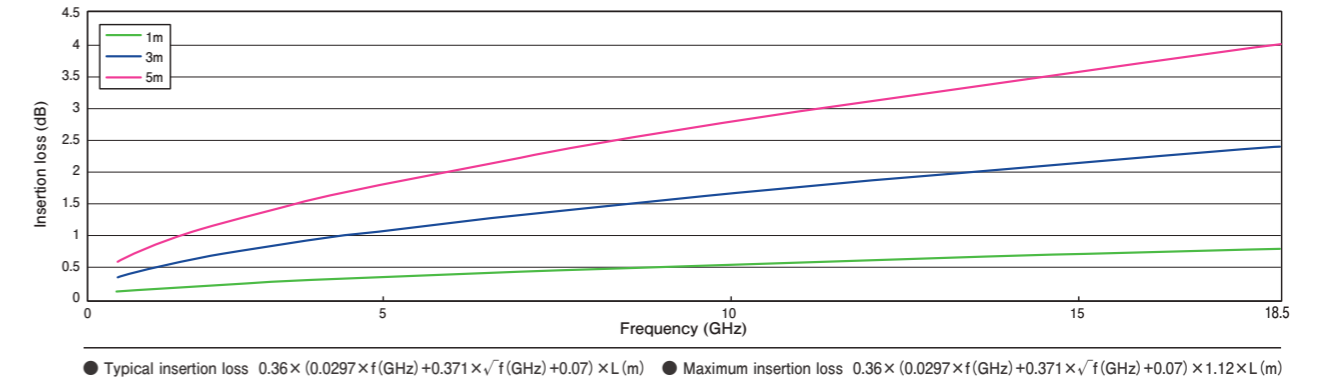
*The above figures are measured values for reference only.

MWX3 SERIES MWX 314

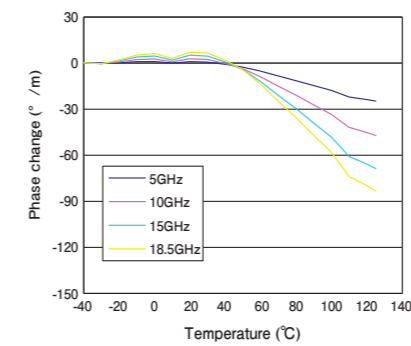


Technical Data

Cable typical insertion loss



MWX314 Phase change vs. temperature



*The cable was measured in chamber every 20 °C from -40 °C, 1 hour after the temperature changed.

Property

Electrical properties

Maximum operating frequency	18.5 GHz
Characteristic impedance	50±1 Ω
Capacitance (typ.)	78 pF/m
Propagation delay (typ.)	3.95 ns/m
Wavelength reduction rate (typ.)	84 %
Higher mode frequency (typ.)	19.0 GHz
VSWR (per connector/ both ends of assy.)	1.182/1.40
Maximum frequency insertion loss (18.5 GHz)	0.8 dB/m

Mechanical properties

Cable outer diameter	7.7 mm
Minimum bending radius (inner side)	40 mm
Maximum tensile strength	294 N(30 kgf)
Cable mass (typ.)	125 g/m
Continuous operating temperature range	-65~+125 °C
Assembly length	200~20,000 mm

Order form example

Please provide the following information when placing an order.

* See P.67 "Connector combination codes"

Example 1 MWX314

Assembly length: 1000 mm
Connector I : SMA (m) straight
Connector II : SMA (m) straight

Catalog No.
MWX314-01000AMSAMS

a b c

Example 2 MWX314

Assembly length: 1500mm
Connector I : N (m) straight
Connector II : N (m) straight

Catalog No.
MWX314-01500NMSNMS

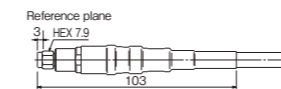
a b c

a: Cable
b: Assembly length
c: Connector

Connector

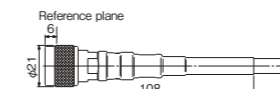
SMA (m) straight (Code:AMS)

Maximum operating frequency:18.5 GHz / Mass:39g



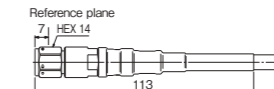
N (m) straight (Code:NMS)

Maximum operating frequency:18.5 GHz / Mass:53g



TNC (m) straight (Code:CMS)

Maximum operating frequency:18.5 GHz / Mass:42g



We have the capacity to deliver products with matched phases for customers who require this characteristic.

Option

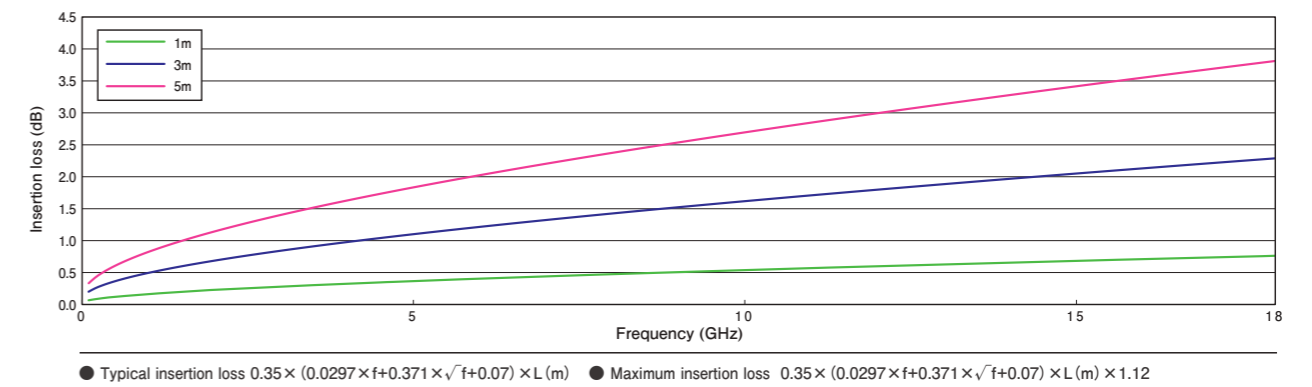
*The above figures are measured values for reference only.

MWX3 SERIES MWX315

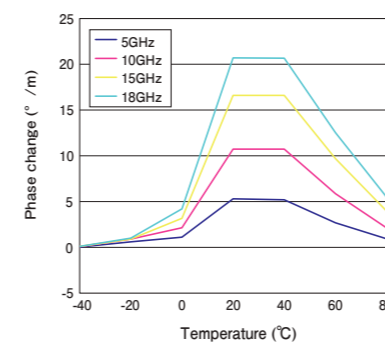


Technical Data

Cable typical insertion loss



MWX315 Phase change vs. temperature



*The cable was measured in chamber every 20 °C from -40 °C, 1 hour after the temperature changed.

Property

Electrical properties

Maximum operating frequency	18.0 GHz
Characteristic impedance	50±1 Ω
Capacitance (typ.)	88 pF/m
Propagation delay (typ.)	4.3 ns/m
Wavelength reduction rate (typ.)	77 %
Higher mode frequency (typ.)	18.5 GHz
VSWR (per connector/ both ends of assy.)	1.182/1.40
Maximum frequency insertion loss (18.0 GHz)	0.76 dB/m

Mechanical properties

	Standard type	Lightweight Armored type (for fixed wiring)
Cable outer diameter	8.6 mm	17mm
Minimum bending radius (inner side)	30 mm	40 mm
Cable mass (typ.)	155 g/m	313 g/m
Continuous operating temperature range	-30~+85 °C	-30~+85 °C
Armored side pressure	-	196 N/cm
Assembly length	500~5,000 mm	500~5,000 mm

Order form example

Please provide the following information when placing an order.

* See P.67 "Connector combination codes"

Example 1 MWX315

Assembly length: 1000mm
Connector I : SMA (m) straight
Connector II : SMA (m) straight

Catalog No.
MWX315-01000AMSAMS
a b c

Example 2 MWX315 Lightweight Armored type

Assembly length: 1000mm
Connector I : SMA (m) straight
Connector II : SMA (m) straight

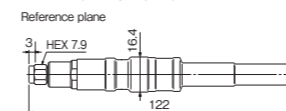
Catalog No.
MWX315-01000AMSAMS/A
a b c d

a: Cable
b: Assembly length
c: Connector
d: Armored

Connector

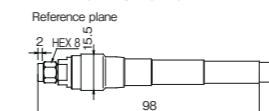
SMA (m) straight (Code:AMS)

Maximum operating frequency:18.0 GHz / Mass:46g



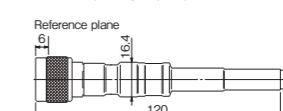
Lightweight type SMA (m) straight (Code:AMS1)

Maximum operating frequency:18.0 GHz / Mass:20g



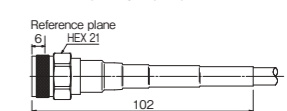
N (m) straight (Code:NMS)

Maximum operating frequency:18.0 GHz / Mass:61g



Lightweight type N (m) straight (Code:NMS1)

Maximum operating frequency:18.0 GHz / Mass:50g



We have the capacity to deliver products with matched phases for customers who require this characteristic.

Option

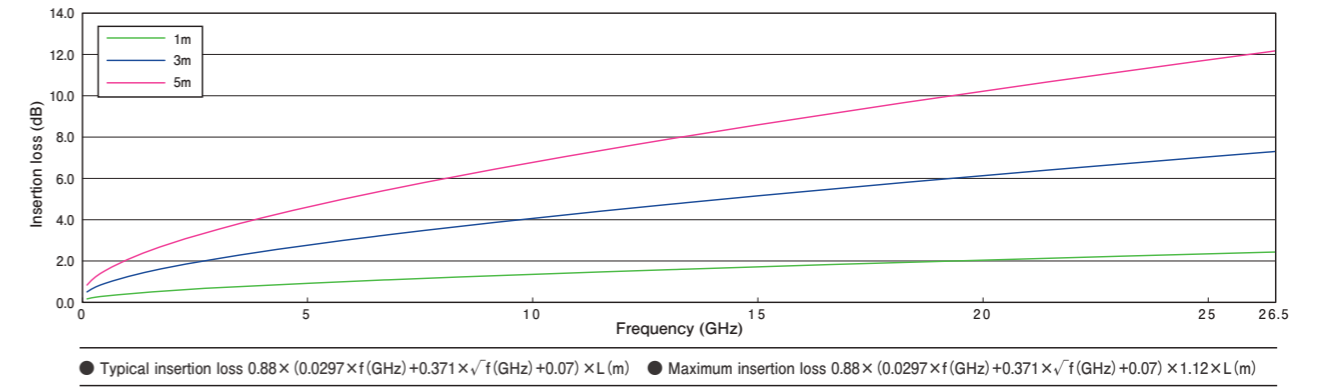
*The above figures are measured values for reference only.

MWX 321

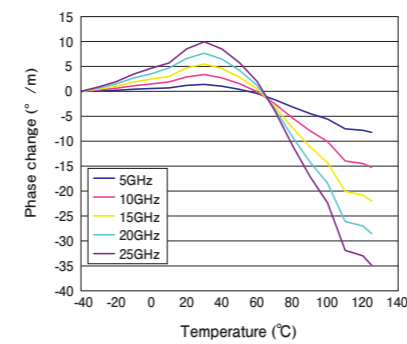


Technical Data

Cable typical insertion loss



MWX321 Phase change vs. temperature



*The cable was measured in chamber every 20 °C from -40 °C, 1 hour after the temperature changed.

Property

Electrical properties

Maximum operating frequency	26.5 GHz
Characteristic impedance	50±1 Ω
Capacitance (typ.)	80 pF/m
Propagation delay (typ.)	4.05 ns/m
Wavelength reduction rate (typ.)	82 %
Higher mode frequency (typ.)	37.0 GHz
VSWR (per connector/ both ends of assy.)	1.202/1.44
Maximum frequency insertion loss (26.5 GHz)	2.4 dB/m

Mechanical properties

Cable outer diameter	4.7 mm
Minimum bending radius (inner side)	30 mm
Maximum tensile strength	98 N (10 kgf)
Cable mass (typ.)	52 g/m
Continuous operating temperature range	-65~+125 °C
Assembly length	100~20,000 mm

Order form example

Please provide the following information when placing an order.

* See P.67 "Connector combination codes"

Example 1 MWX321

Assembly length: 1100 mm
Connector I : SMA(m) straight
Connector II : SMA(m) straight

Catalog No.
MWX321-01100AMSAMS

a b c

Example 2 MWX321

Assembly length: 1500mm
Connector I : SMA(m) straight
Connector II : 3.5mm(m) straight

Catalog No.
MWX321-01500AMSDMS

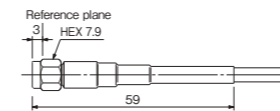
a b c

a:Cable
b:Assembly length
c:Connector

Connector

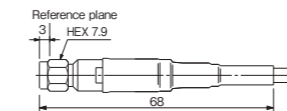
SMA (m) straight (Code:AMS)

Maximum operating frequency:26.5 GHz / Mass:3g



3.5mm (m) straight (Code:DMS)

Maximum operating frequency:26.5 GHz / Mass:13g



We have the capacity to deliver products with matched phases for customers who require this characteristic.

Option

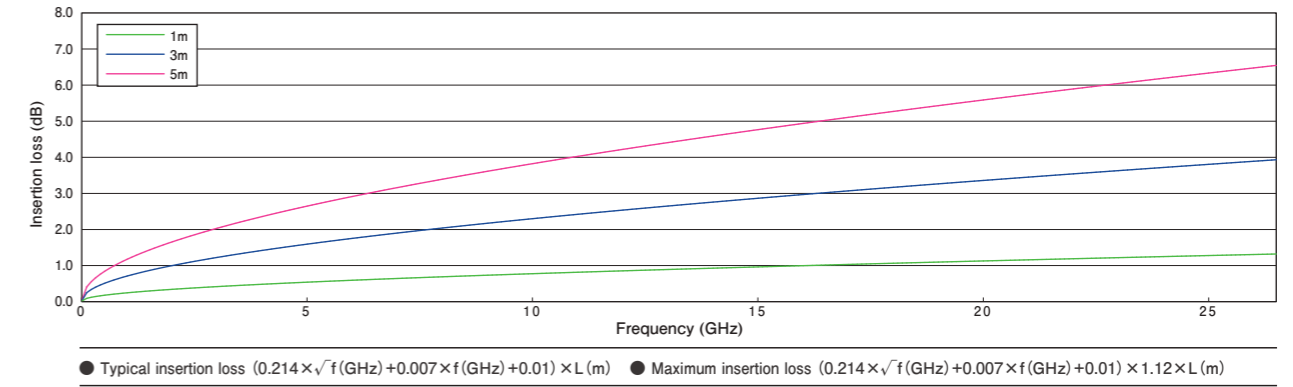
*The above figures are measured values for reference only.

MWX3 SERIES MWX 322

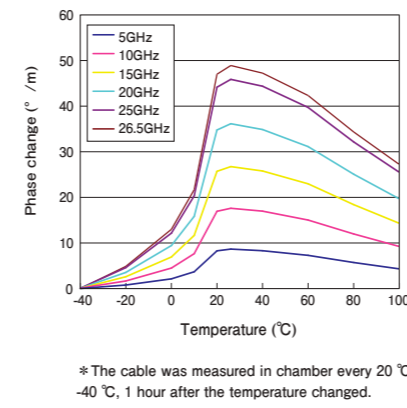


Technical Data

Cable typical insertion loss



MWX322 Phase change vs. temperature



Property

Electrical properties		Mechanical properties		
		Standard type	Armored type	Lightweight Armored type (for fixed wiring)
Maximum operating frequency	26.5 GHz	5.2 mm	12.5 mm	11.0 mm
Characteristic impedance	50±1 Ω	25 mm	25 mm	25 mm
Capacitance (typ.)	88 pF/m	98 N(10 kgf)	98 N(10 kgf)	98 N(10kgf)
Propagation delay (typ.)	4.38 ns/m	60 g/m	208 g/m	155 g/m
Wavelength reduction rate (typ.)	76 %	-65~+125 °C	-30~+85 °C	-30~+85 °C
Higher mode frequency (typ.)	27.5 GHz	—	196 N/cm	196 N/cm
VSWR (per connector/both ends of assy.)	1.153/1.33	200~20,000 mm	700~5,000 mm	500~20,000 mm
Maximum frequency insertion loss(26.5 GHz)	1.3 dB/m			

Order form example
Please provide the following information when placing an order.

* See P.67 "Connector combination codes"

**Example 1
MWX322**

Assembly length: 1000 mm
Connector I : SMA (m) straight
Connector II : N (m) straight

Catalog No.
MWX322-01000AMSNS
a b c

**Example 2
MWX322 Armored type**

Assembly length: 1000 mm
Connector I : 3.5mm (f) straight
Connector II : 3.5mm (m) straight

Catalog No.
MWX322-01000DFSDMS/B
a b c d

**Example 3
MWX322 Lightweight Armored type**

Assembly length: 1000mm
Connector I : SMA (m) straight
Connector II : SMA (m) straight

Catalog No.
MWX321-01000AMSAMS/A
a b c d

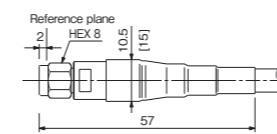
a: Cable c: Connector
b: Assembly length d: Armored

We have the capacity to deliver products with matched phases for customers who require this characteristic.

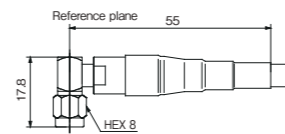
Option

Connector

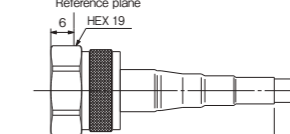
SMA (m) straight (Code:AMS)
Maximum operating frequency:18.5 GHz / Mass:10g



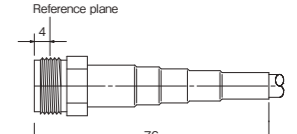
SMA (m) right angle (Code:AMH) (*1) (*2)
Maximum operating frequency:18.0 GHz / Mass:10g



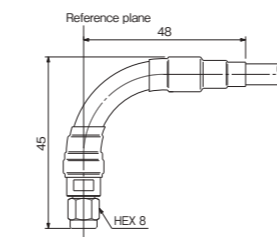
N (m) straight (Code:NMS)
Maximum operating frequency:18.0 GHz / Mass:38g



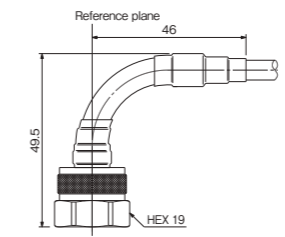
N (f) straight (Code:NFS)
Maximum operating frequency:18.0 GHz / Mass:26g



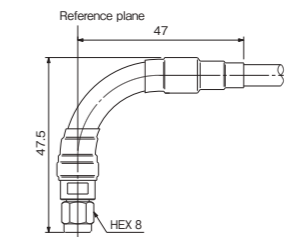
SMA (m) m swept (Code:AMW) (*1) (*2)
Maximum operating frequency:18.5 GHz / Mass:17g



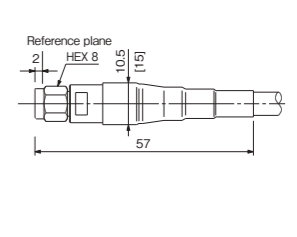
N (m) m swept (Code:NMW) (*1) (*2)
Maximum operating frequency:18.0 GHz / Mass:46g



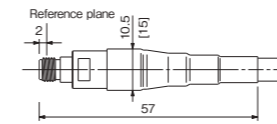
3.5mm (m) m swept (Code:DMW)
Maximum operating frequency:26.5 GHz / Mass:18g



3.5mm (m) straight (Code:DMS)
Maximum operating frequency:26.5 GHz / Mass:11g



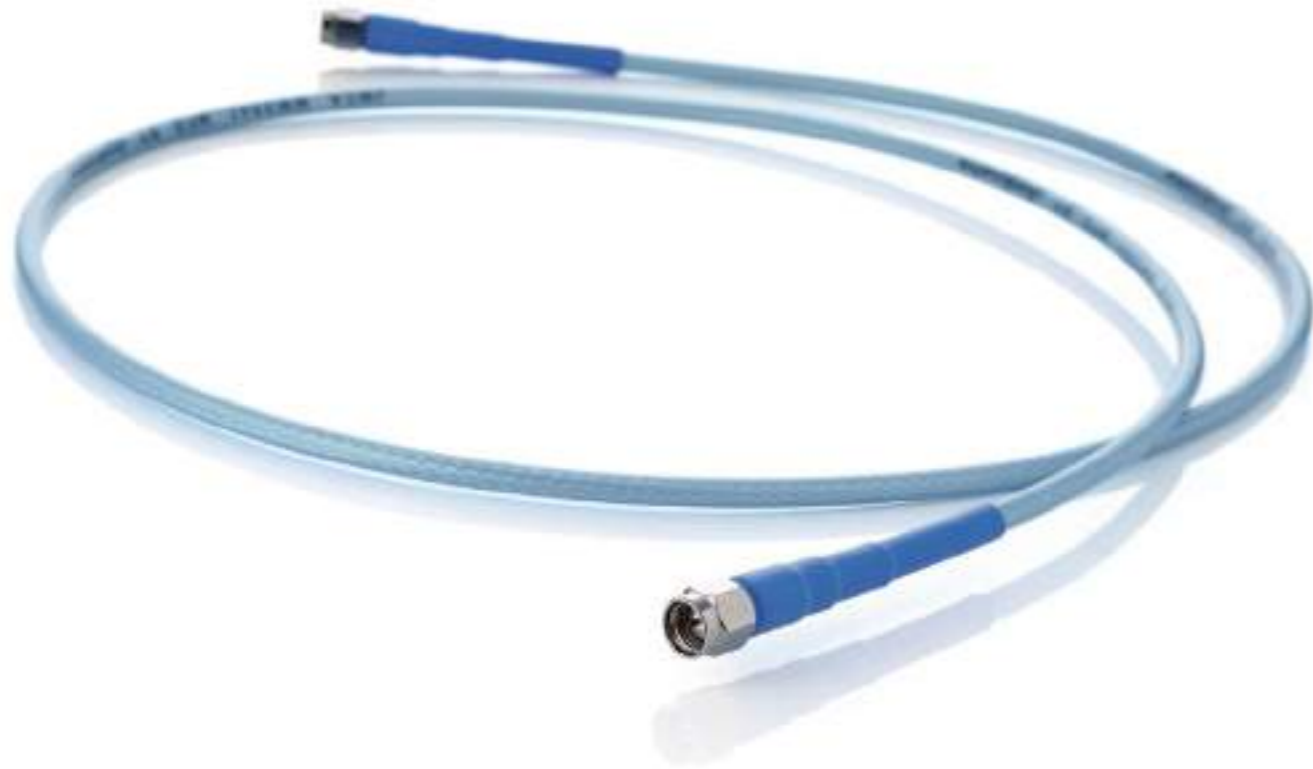
3.5mm (f) straight (Code:DFS)
Maximum operating frequency:26.5 GHz / Mass:10g



* Please see P.82 about "customer-specified swept and right angle connectors".
[] : Armored type size.

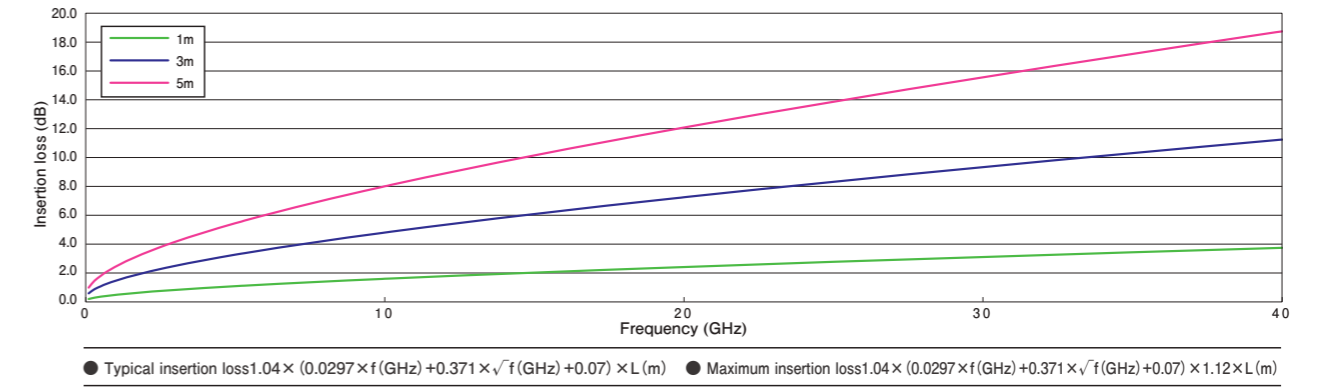
*The above figures are measured values for reference only.

MWX 341

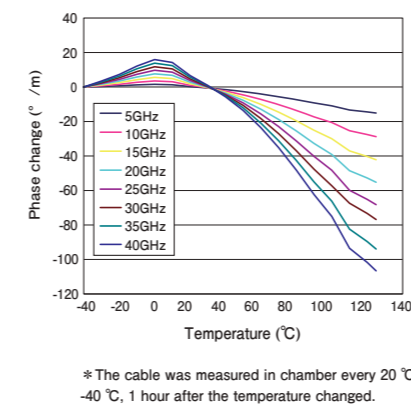


Technical Data

Cable typical insertion loss



MWX341 Phase change vs. temperature



Property

Electrical properties

Maximum operating frequency	40.0 GHz
Characteristic impedance	50±1 Ω
Capacitance (typ.)	80 pF/m
Propagation delay (typ.)	4.05 ns/m
Wavelength reduction rate (typ.)	82 %
Higher mode frequency (typ.)	46.0 GHz
VSWR (per connector/ both ends of assy.)	1.197/1.144
Maximum frequency insertion loss (40.0 GHz)	3.3 dB/m

Mechanical properties

Cable outer diameter	4.0 mm
Minimum bending radius (inner side)	20 mm
Maximum tensile strength	98 N (10 kgf)
Cable mass (typ.)	40 g/m
Continuous operating temperature range	-65~+125 °C
Assembly length	100~10,000 mm

Order form example

Please provide the following information when placing an order.

* See P.67 "Connector combination codes"

Example 1 MWX341

Assembly length: 1200 mm
Connector I : SMA (m) straight
Connector II : SMA (m) straight

Catalog No.
MWX341-01200AMSAMS

a: Cable
b: Assembly length
c: Connector

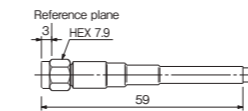
Option

We have the capacity to deliver products with matched phases for customers who require this characteristic.

Connector

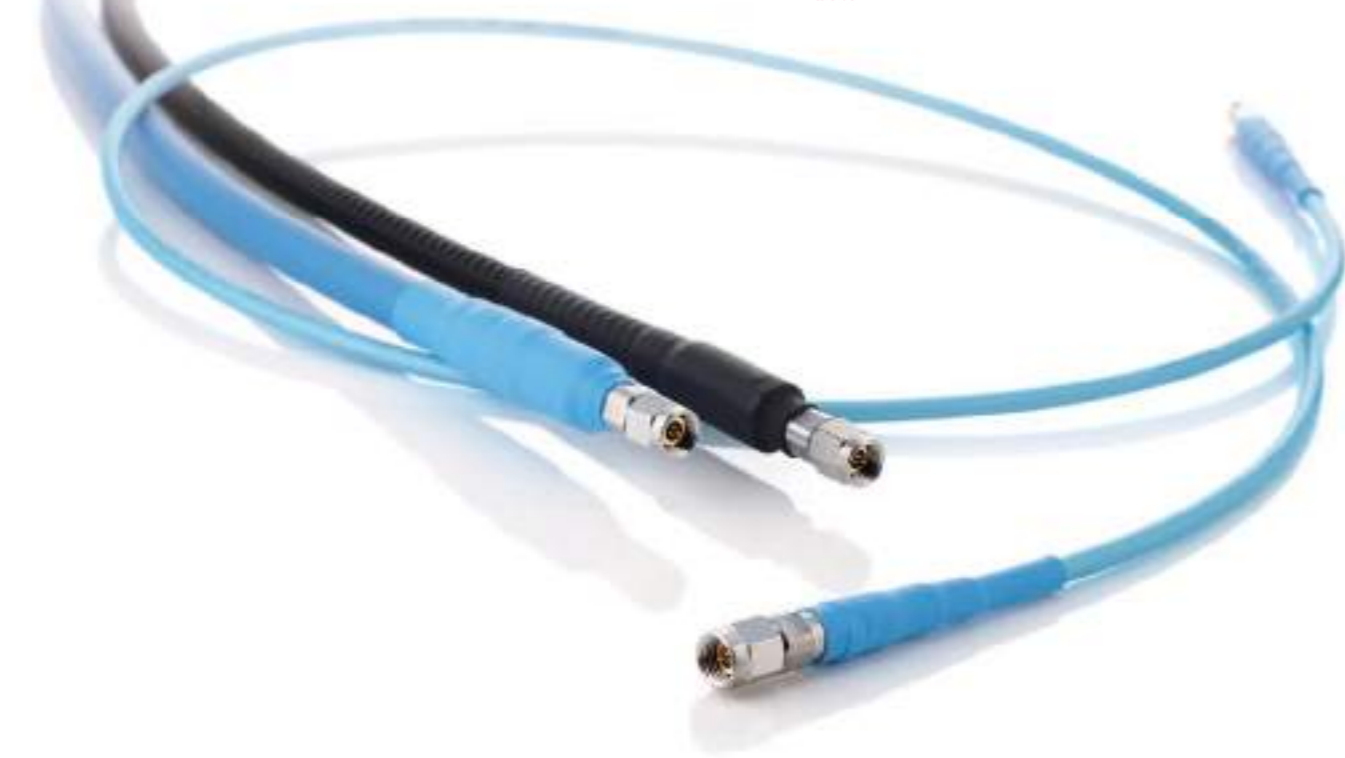
SMA (m) straight (Code:AMS)

Maximum operating frequency: 40.0 GHz / Mass: 3g



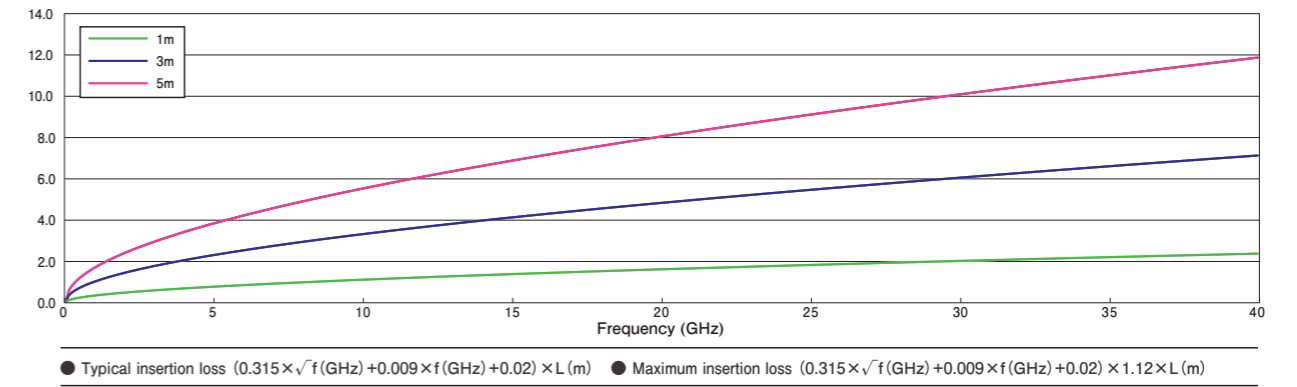
*The above figures are measured values for reference only.

MWX3 SERIES MWX342

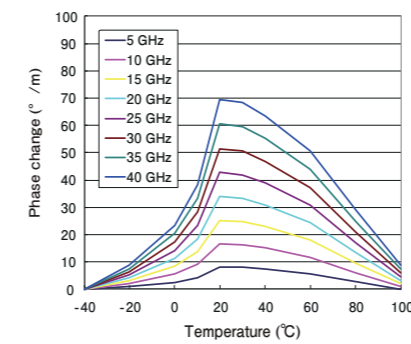


Technical Data

Cable typical insertion loss



MWX342 Phase change vs. temperature



*The cable was measured in chamber every 20 °C from -40 °C, 1 hour after the temperature changed.

Property

Electrical properties		Mechanical properties			
		Standard type	Armored type	Lightweight Armored type (for fixed wiring)	
Maximum operating frequency	40.0 GHz	Cable outer diameter	3.9 mm	9.5 mm	8.0 mm
Characteristic impedance	50±1 Ω	Minimum bending radius (inner side)	20 mm	20 mm	20 mm
Capacitance (typ.)	87 pF/m	Maximum tensile strength	98 N(10 kgf)	98 N(10 kgf)	98 N(10kgf)
Propagation delay (typ.)	4.35 ns/m	Cable mass (typ.)	35 g/m	137 g/m	98 g/m
Wavelength reduction rate (typ.)	76 %	Continuous operating temperature range	-65~+125 °C	-30~+85 °C	-30~+85°C
Higher mode frequency (typ.)	40.5 GHz	Armored side pressure	—	196 N/cm	196 N/cm
VSWR (per connector/both ends of assy.)	1.197/1.43	Assembly length	200~10,000 mm	700~10,000 mm	500~10,000 mm
Maximum frequency insertion loss(40.0 GHz)	2.4 dB/m				

Order form example
Please provide the following information when placing an order.

* See P.67 "Connector combination codes"

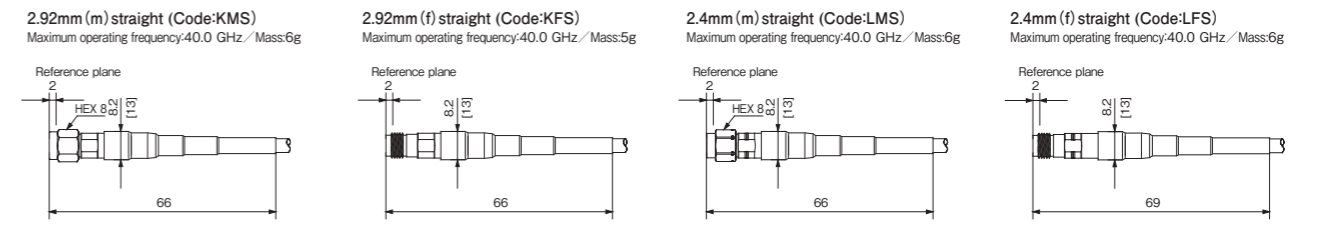
Example 1 MWX342	Example 2 MWX342 Armored type	Example 3 MWX342 Lightweight Armored type
Assembly length: 1000mm	Assembly length: 1000mm	Assembly length: 1000mm
Connector I: 2.92mm(f)straight	Connector I: 2.4mm(f)straight	Connector I: 2.92mm(m)straight
Connector II: 2.92mm(m)straight	Connector II: 2.4mm(m)straight	Connector II: 2.92mm(m)straight
Catalog No. MWX342-01000KFSKMS	Catalog No. MWX342-01000LFLSLS/B	Catalog No. MWX342-01000KMSKMS/A
a b c	a b c d	a b c d

a: Cable c: Connector
b: Assembly length d: Armored

We have the capacity to deliver products with matched phases for customers who require this characteristic.

Option

Connector

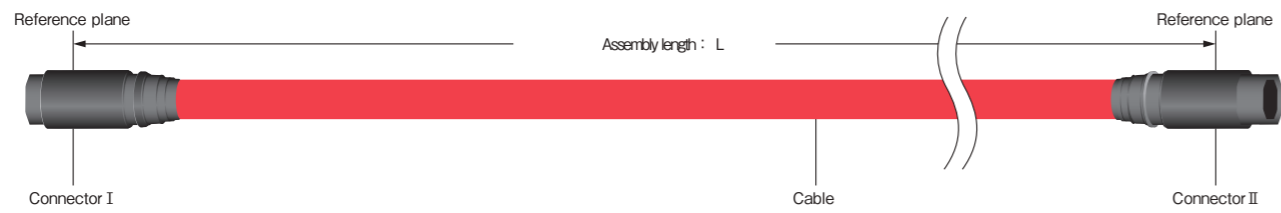


[] : Armored type size.

*The above figures are measured values for reference only.

MWX3 SERIES

Placing orders



ex.1
Cable : MWX312
Assembly length : 1500 mm
Connector I : SMA (f) Straight
Connector II : SMA (m) Straight

Catalog number
MWX312-01500 AFS AMS

The unit of assembly length is mm. Shown as a five-digit number. If the number consists of fewer than five digits, remember to add zero (s) to the left of the first digit to make it five digits. The assembly length is measured based on the reference planes, not on the connector ends, shown at the figure to the left.

ex.2
Cable : MWX322
Assembly length : 1000 mm
Connector I : 3.5mm (f) Straight
Connector II : 3.5mm (m) Straight
Armored : Armored type

Catalog number
MWX322-01000 DFS DMS /B

Armored-type cables will have a " /B" appended to the connector combination code.

ex.3
Cable : MWX342
Assembly length : 1000mm
Connector I : 2.92mm (m) Straight
Connector II : 2.92mm (m) Straight
Armored : Light weight armored type

Catalog number
MWX342-01000 KMS KMS /A

Lightweight armored-type cables will have a " /A" appended to the connector combination code.

Connector combination codes

Connector I		Connector II															
		SMA	SMA Lightweight type	SMA	SMA right angle	SMA right angle (18.0GHz type)	SSMA	N	N Lightweight type	TNC	3.5mm	3.5mm	2.92mm	2.92mm	2.4mm	2.4mm	
		m	m	f	m	m	m	m	m	m	f	m	f	m	f		
		AMS	AMS1	AFS	AMR	AMH	SMS	NMS	NMS1	CMS	DMS	DFS	KMS	KFS	LMS	LFS	
SMA	m	AMS	AMSAMS	AMSAMS1	AFSAMS	AMRAMS	AMHAMH	AMSSMS	AMSNMS	AMSNMS1	AMSCMS	AMSDMS	AMSDFS	—	—	—	—
SMA Lightweight type	m	AMS1	—	AMS1AMS1	—	—	—	—	AMSNMS1	AMSNMS1	—	—	—	—	—	—	—
SMA	f	AFS	—	—	AFSAFS	AFSAMR	AFSAMH	AFSSMS	AFSNMS	—	AFSCMS	AFSDMS	—	—	—	—	—
SMA right angle	m	AMR	—	—	—	AMRAMR	AMHAMR	AMRSMS	AMRNMS	—	AMRCMS	AMRDMS	—	—	—	—	—
SMA right angle (18.0GHz type)	m	AMH	—	—	—	—	AMHAMH	—	AMHNMS	—	AMHCMS	—	—	—	—	—	—
SSMA	m	SMS	—	—	—	—	—	SMSSMS	—	—	—	—	—	—	—	—	—
N	m	NMS	—	—	—	—	—	—	NMSNMS	NMSNMS1	CMSNMS	DMSNMS	DFSNMS	—	—	—	—
N Lightweight type	m	NMS1	—	—	—	—	—	—	—	NMS1NMS1	—	—	—	—	—	—	—
TNC	m	CMS	—	—	—	—	—	—	—	—	CMSCMS	CMSDMS	—	—	—	—	—
3.5mm	m	DMS	—	—	—	—	—	—	—	—	—	DMSDMS	DFSDMS	—	—	—	—
3.5mm	f	DFS	—	—	—	—	—	—	—	—	—	—	DFSDFS	—	—	—	—
2.92mm	m	KMS	—	—	—	—	—	—	—	—	—	—	—	KMSKMS	KFSKMS	KMSLMS	KMSLFS
2.92mm	f	KFS	—	—	—	—	—	—	—	—	—	—	—	—	KFSKFS	KFSLMS	KFSLFS
2.4mm	m	LMS	—	—	—	—	—	—	—	—	—	—	—	—	—	LMSLMS	LFSLMS
2.4mm	f	LFS	—	—	—	—	—	—	—	—	—	—	—	—	—	—	LFSLFS

m : male (plug)
 f : female (jack)

Please provide a catalog number when placing an order.

MWX4 SERIES

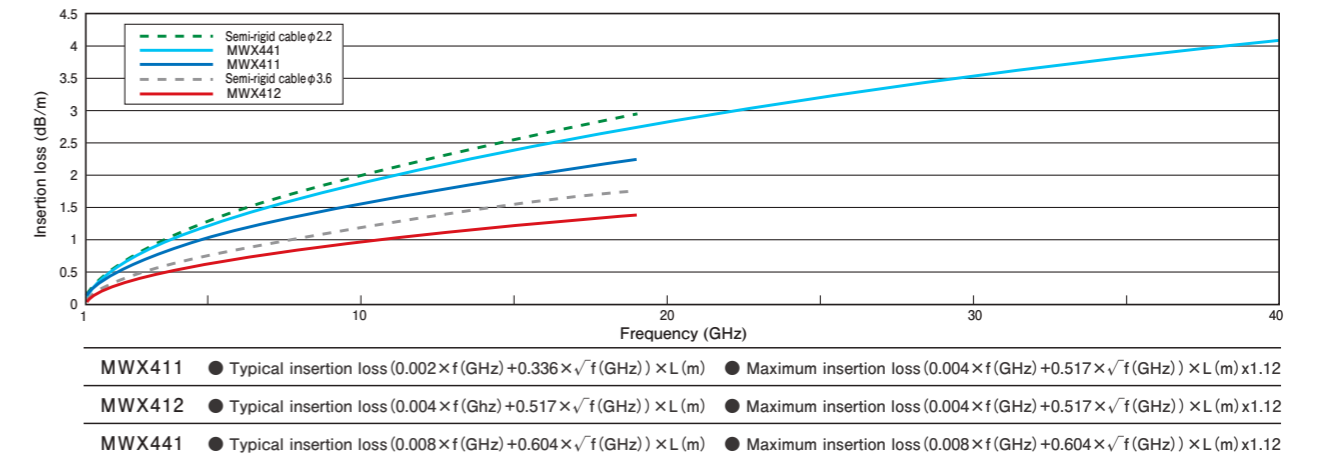
MWX 4

- Frequency
18.0 GHz
- Frequency
40.0 GHz
- Frequency
67.0 GHz
- Temperature
range
-30~+85°C
- Temperature
range
-65~+125°C
- RoHS compliant
- Fixed wiring
- Forming
- Listed in
the catalogue;
manufactured
to order
- Custom
support

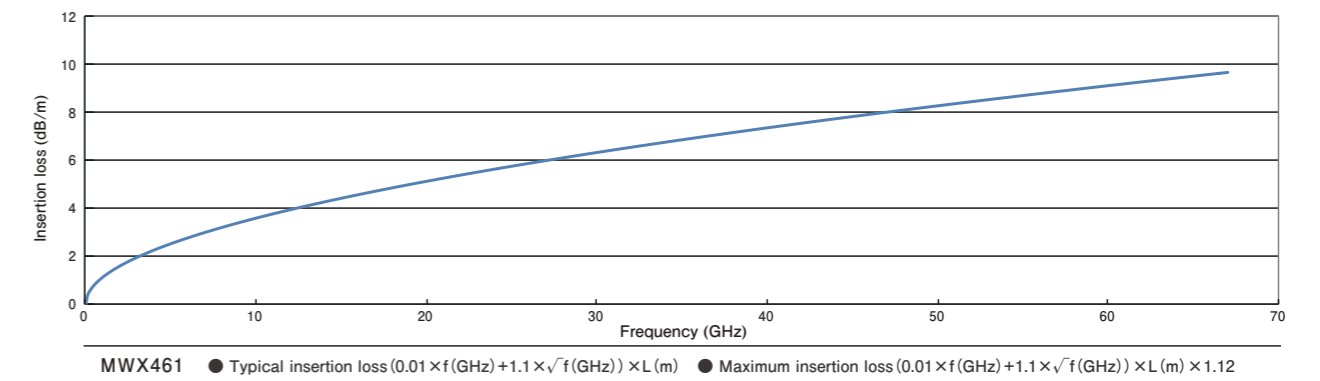


Technical Data

Comparison of typical insertion loss (MWX4 series vs. semi-rigid cable L=1000mm)



Typical insertion loss (MWX461 L=1000mm)



Property

Electrical properties	MWX411	MWX412	MWX441	MWX461
Maximum operating frequency	18.0 GHz	18.0 GHz	40.0 GHz	67.0 GHz
Characteristic impedance (typ.)	50 Ω	50 Ω	50 Ω	50 Ω
Capacitance (typ.)	85 pF/m	85 pF/m	90 pF/m	95 pF/m
Propagation delay (typ.)	4.3 ns/m	4.4 ns/m	4.3 ns/m	4.7 ns/m
Wavelength reduction rate (typ.)	78 %	76 %	78 %	70 %
Higher mode frequency (typ.)	64.0 GHz	36.0 GHz	76.0 GHz	108 GHz
VSWR (per connector/both ends of assy.)	1.182/1.40	1.182/1.40	1.224/1.50	1.732/3
Maximum frequency insertion loss	2.2 dB/m(18.0 GHz)	1.4 dB/m(18.0 GHz)	4.3 dB/m(40.0 GHz)	12 dB/m (67.0 GHz)

Mechanical properties	MWX411	MWX412	MWX441	MWX461
Cable outer diameter	2.5 mm	4.0 mm	2.4 mm	1.33 mm
Minimum bending radius (inner side)	15 mm	20 mm	15 mm	5 mm
Cable mass (typ.)	19 g/m	41 g/m	17 g/m	4.6 g/m
Continuous operating temperature range	-30~+85 °C	-30~+85 °C	-30~+85 °C	-65~+125 °C
Assembly length	100~5,000 mm	100~5,000 mm	100~5,000 mm	40~2,000 mm
Remark	Semi-rigid cable φ2.2 equivalent	Semi-rigid cable φ3.6 equivalent	Semi-rigid cable φ2.2 equivalent	Semi-rigid cable φ1.2 equivalent

Connector

SMA (m) straight (Code:MWX411-AP)
Maximum operating frequency:18.0 GHz / Mass:3g

SMA (m) straight (Code:MWX412-AP)
Maximum operating frequency:18.0 GHz / Mass:3g

2.92mm (m) straight (Code:MWX441-KP)
Maximum operating frequency:40.0 GHz / Mass:5g

SMP (f) straight (Code:MWX461-SJ)
Maximum operating frequency:12.0 GHz / Mass:1g

SMPM (f) straight (Code:MWX461-MJ)
Maximum operating frequency:67.0 GHz / Mass:1g

SMA (m) straight (Code:MWX461-AP)
Maximum operating frequency:18.0GHz / Mass:3g

Option For connectors not listed
Please contact us separately.

*The above figures are measured values for reference only.

Order form example
Please provide the following information when placing an order.

*Please order in minimum order quantity.

Example MWX441
Assembly length:200 mm
Connector I :2.92 mm(m)straight
Connector II :2.92 mm(m)straight

Catalog No.
MWX441-KP-KP L=200 mm

a: Cable
b: Assembly length
c: Connector

General Assembly Information
MWX 0
MWX 1
MWX 2
MWX 3
MWX 4.5
MWX 6
TECHNICAL DATA

General Assembly Information
MWX 0
MWX 1
MWX 2
MWX 3
MWX 4.5
MWX 6
TECHNICAL DATA

MWX5 SERIES

MWX 5



Property

Electrical properties	MWX511	MWX512	Mechanical properties	MWX511	MWX512
Maximum operating frequency	18.0 GHz	18.0 GHz	Cable outer diameter	3.0 mm	4.4 mm
Characteristic impedance (typ.)	50 Ω	50 Ω	Minimum bending radius (inner side)	10 mm	15 mm
Capacitance (typ.)	97 pF/m	95 pF/m	Cable mass (typ.)	19 g/m	41 g/m
Propagation delay (typ.)	4.7 ns/m	4.7 ns/m	Continuous operating temperature range	-30~+85 °C	-30~+85 °C
Wavelength reduction rate (typ.)	71 %	71 %	Assembly length	100~5,000 mm	100~5,000 mm
Higher mode frequency (typ.)	63.0 GHz	34.0 GHz	Remark	Semi-flexible cable φ2.1 equivalent	Semi-flexible cable φ3.45 equivalent
VSWR (per connector/both ends of assy.)	1.182/1.40	1.182/1.40			
Maximum frequency insertion loss	3.1 dB/m(18.0 GHz)	2.0 dB/m(18.0 GHz)			

Order form example

Please provide the following information when placing an order.

*Please order in minimum order quantity.

Example MWX511

Assembly length: 200 mm
 Connector I :SMA(m)straight
 Connector II:SMA(m)straight

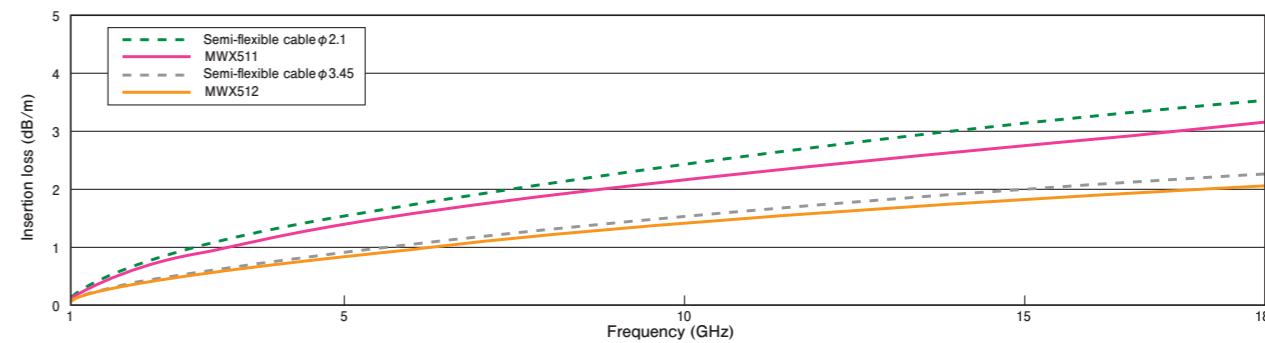
Catalog No.
MWX511-AP-AP L=200 mm

a c b

a:Cable
 b:Assembly length
 c:Connector

Technical Data

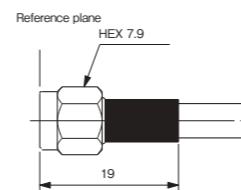
Comparison of typical insertion loss (MWX5 series vs. semi-flexible cable L=1000mm)



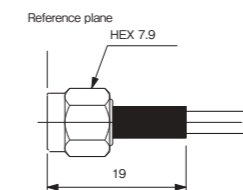
MWX511 ● Typical insertion loss $(0.015 \times f(\text{GHz}) + 0.693 \times \sqrt{f(\text{GHz})}) \times L(\text{m})$ ● Maximum insertion loss $(0.015 \times f(\text{GHz}) + 0.693 \times \sqrt{f(\text{GHz})}) \times L(\text{m}) \times 1.12$
 MWX512 ● Typical insertion loss $(0.018 \times f(\text{GHz}) + 0.42 \times \sqrt{f(\text{GHz})}) \times L(\text{m})$ ● Maximum insertion loss $(0.018 \times f(\text{GHz}) + 0.42 \times \sqrt{f(\text{GHz})}) \times L(\text{m}) \times 1.12$

Connector

SMA(m) straight (Code:MWX511-AP)
 Maximum operating frequency:18.0 GHz / Mass:3g



SMA(m) straight (Code:MWX512-AP)
 Maximum operating frequency:18.0 GHz / Mass:3g

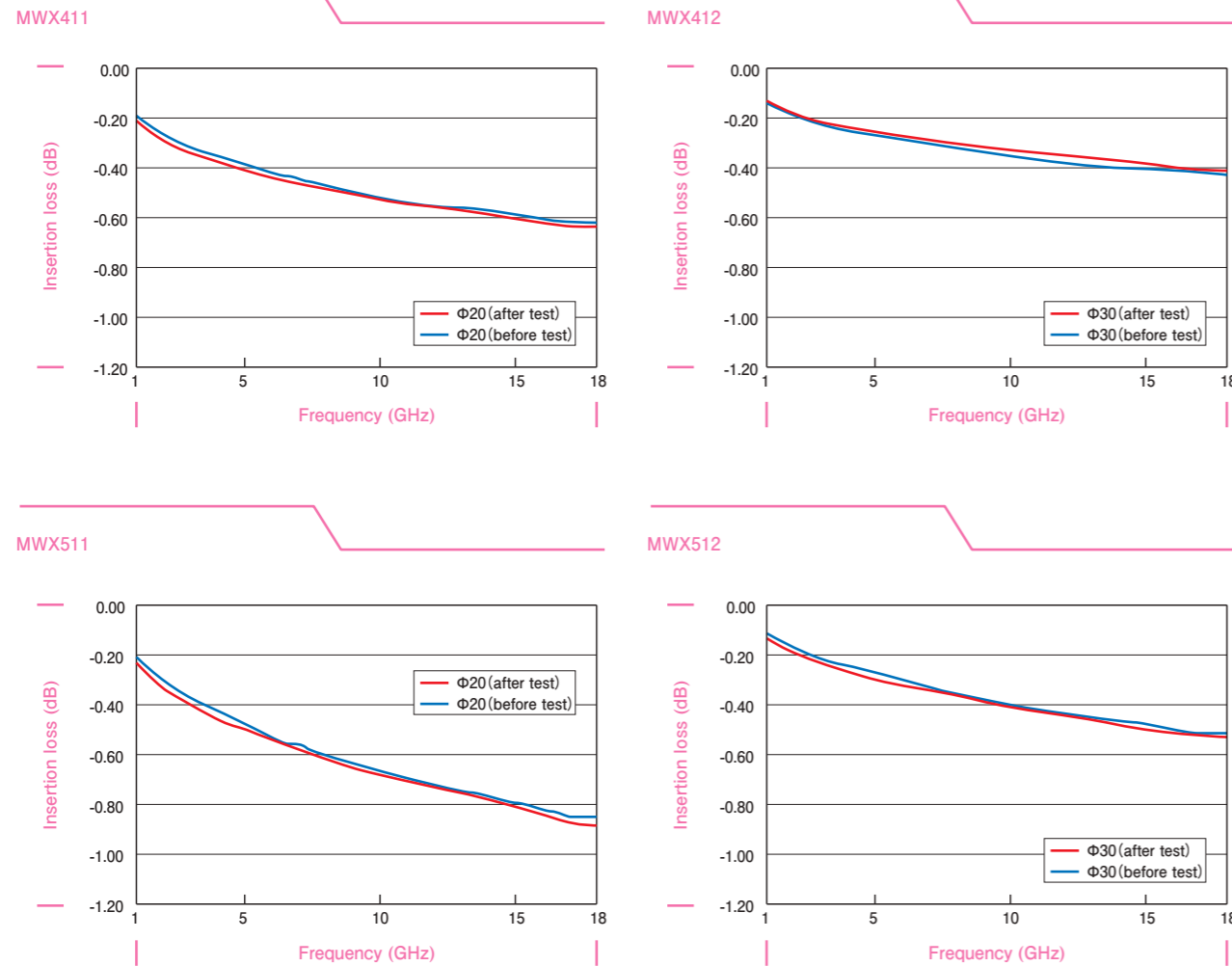


*The above figures are measured values for reference only.

MWX4,5 SERIES

Formable (MWX4,5 Series) Technical Data 1

Static bending data (insertion loss)



Measurement method

The initial value was measured with the test cable connected to the measuring instrument. The after-test value was measured with the cable wrapped 360° around a mandrel at a position approximately 50 mm from the measuring instrument.

Test conditions

Mandrel diameter

MWX411, MWX511 **20 mm** MWX412, MWX512 **30 mm**

Test cable length **300 mm**

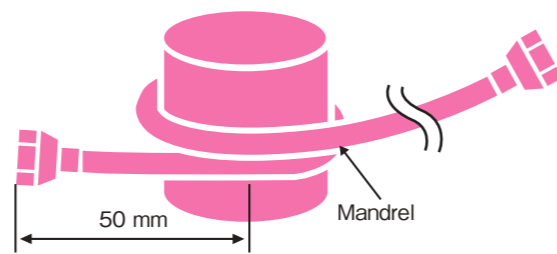


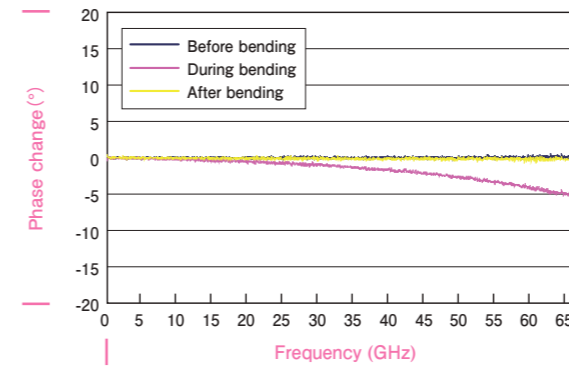
Fig.1 Schematic description of the static bending test

* The above figures are measured values for reference only.

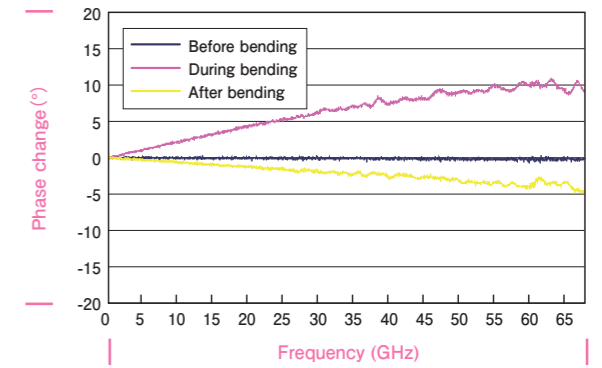
Formable (MWX4,5 Series) Technical Data 2

Static bending data (Phase)

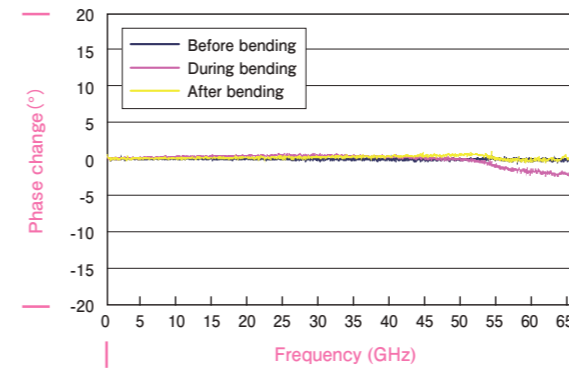
MWX461 Static bending data 1



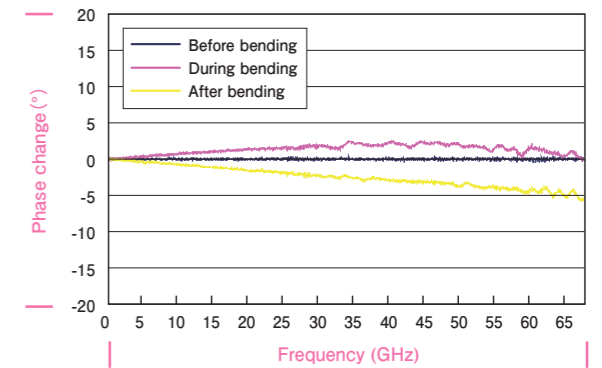
Semi-flexible coaxial cable corresponding to UT47



MWX461 MWX461 Static bending data 2

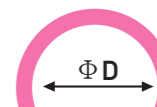
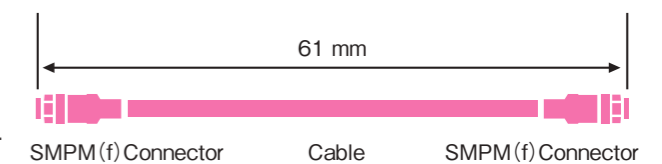


Semi-flexible coaxial cable corresponding to UT47



Test method

- The test is conducted as follows:
 - The straight cable is connected to the vector network analyzer to record the initial phase waveform. (Waveform before the test)
 - The phase waveform is recorded while the cable is wrapped on a mandrel of $\phi 8\text{mm}$ ($R = 4\text{mm}$). (Waveform during the test)
 - The phase waveform is recorded after straightening the cable. (Waveform after the test)



The cable was wrapped 360° around $\phi 8\text{mm}$ mandrel. (During bending)

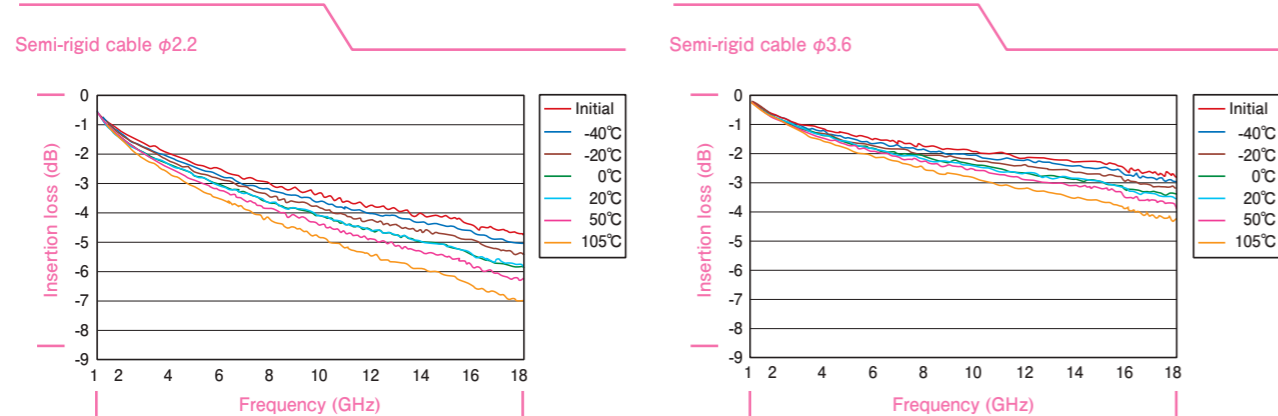
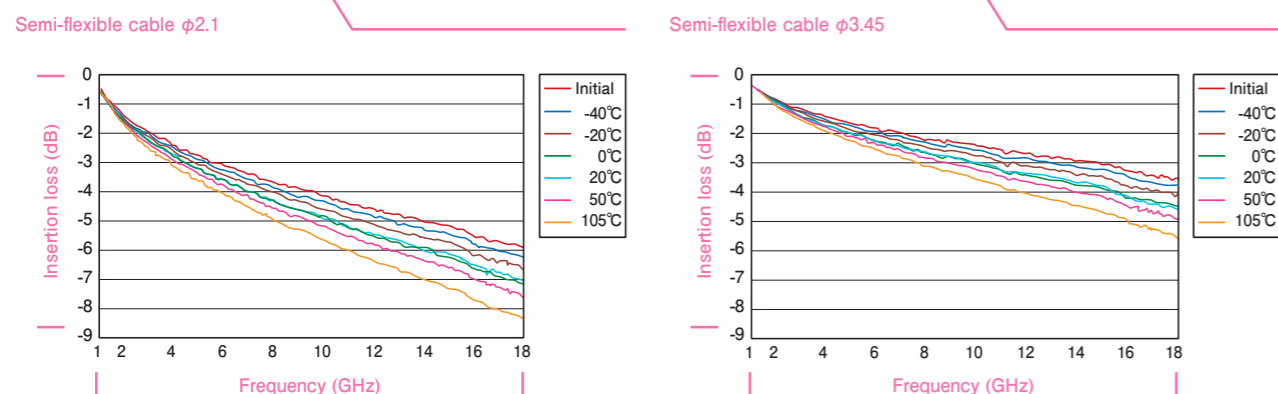
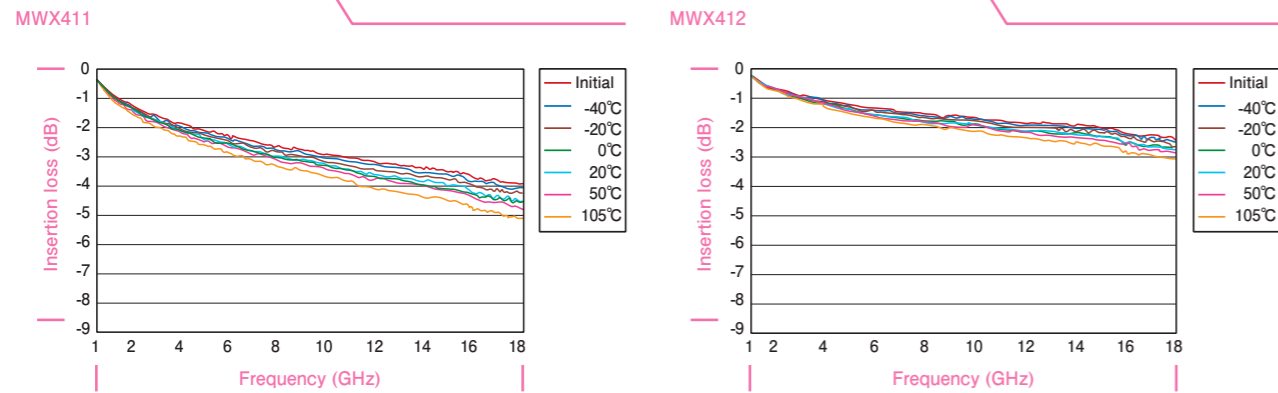
Test cables

- 2 type cables are tested as the right figures.
 - MWX461 formable coaxial cable assembly
 - Semi-flexible coaxial cable corresponding to UT47

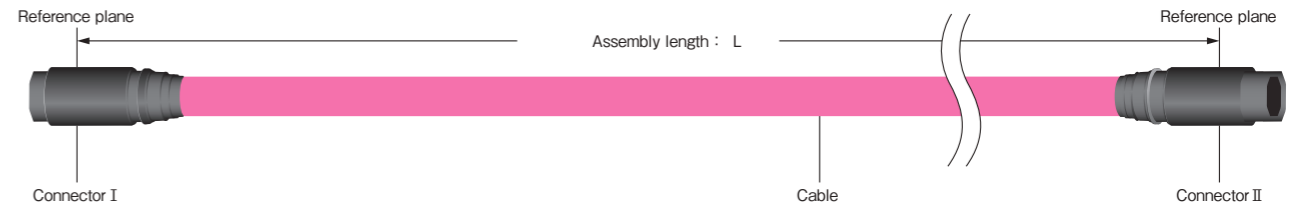
MWX4,5 SERIES

Formable (MWX4 Series) Technical Data 3

Temperature characteristics (insertion loss) Test cable: 2 m



Placing orders



Catalog number
MWX511 - AP - AP L=1000mm

ex.

Cable : MWX511 type

Connector I : SMA (m) straight

Connector II : SMA (m) straight

Assembly length : 1000mm

The minimum order quantity is 5 for MWX4 and 10 for MWX5 respectively (for MWX461, the minimum order quantity is 100).

*1) MWX411, 412, 511, and 512 come with the standard SMA (m) connector.

The product code for the connector is "AP." The standard connector for MWX411 is a 2.92 mm (m) straight type.

The product code for this connector is "KP." For MW461, the product code for the SMP (f) straight connector is

"SJ." The product code for the SMPM (f) straight connector is "MJ."

*2) Assembly length is measured from the end of one connector to the end of the other connector.

Delivery times

MWX4 and MWX5 series will be shipped within 12 business days after received order.

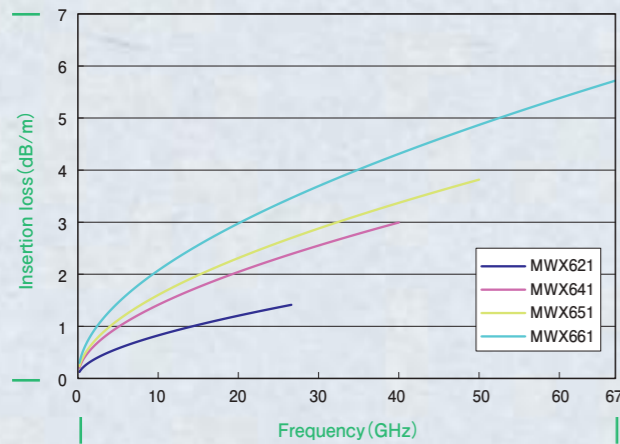
*Leadtime may be effected by larger order volume.

MWX6 SERIES Highly precise skew match type

How to select

Highly precise skew match cable assembly with less than 1psec skew between the two for measurement of digital transmission. (Continuous operating temperature range : -30 to +85 °C)
 Low insertion loss, suitable for measurement of the high-precision differential transmission signal.
 4 type cables are available depends on maximum frequency (26.5GHz, 40GHz, 50GHz and 67GHz).

MWX6 Series typical insertion loss



Simple criteria for cable selection

- Insertion loss: The larger the cable outer diameter, the lower the insertion loss.
- Frequency range: The smaller the cable, the higher the higher mode frequency.
- Power rating: The larger the cable outer diameter, the higher the power rating.
- Flexibility: The smaller the cable, the better the flexibility.
- Mass: The smaller the cable, the lighter the cable.

- MWX621** ● Typical insertion loss $(0.0077 \times f(\text{GHz}) + 0.2304 \times \sqrt{f(\text{GHz})} + 0.02) \times L(\text{m})$ ● Maximum insertion loss $(0.0077 \times f(\text{GHz}) + 0.2304 \times \sqrt{f(\text{GHz})} + 0.02) \times 1.12 \times L(\text{m})$
- MWX641** ● Typical insertion loss $(0.0095 \times f(\text{GHz}) + 0.41 \times \sqrt{f(\text{GHz})} + 0.02) \times L(\text{m})$ ● Maximum insertion loss $(0.0095 \times f(\text{GHz}) + 0.41 \times \sqrt{f(\text{GHz})} + 0.02) \times 1.12 \times L(\text{m})$
- MWX651** ● Typical insertion loss $(0.0095 \times f(\text{GHz}) + 0.47 \times \sqrt{f(\text{GHz})} + 0.02) \times L(\text{m})$ ● Maximum insertion loss $(0.0095 \times f(\text{GHz}) + 0.47 \times \sqrt{f(\text{GHz})} + 0.02) \times 1.12 \times L(\text{m})$
- MWX661** ● Typical insertion loss $(0.0095 \times f(\text{GHz}) + 0.6148 \times \sqrt{f(\text{GHz})} + 0.02) \times L(\text{m})$ ● Maximum insertion loss $(0.0095 \times f(\text{GHz}) + 0.6148 \times \sqrt{f(\text{GHz})} + 0.02) \times 1.12 \times L(\text{m})$

	MWX621	MWX641	MWX651	MWX661
18.5GHz	1.2dB/m	1.8dB/m	2.1dB/m	2.9dB/m
Maximum frequency	1.4dB/m	3.0dB/m	3.8dB/m	5.6dB/m

Simple criteria for connector selection

- Choose a suitable connector for your measuring instrument.
- The smaller the connector, the higher the maximum operating frequency.
- The larger the connector, the higher the power rating.

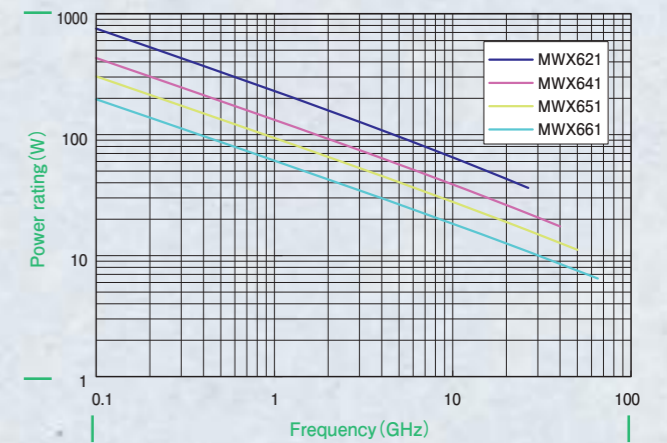
Connector compatibility

Cable type	Cable Maximum Frequency (GHz)	Applicable connector								
		18.5 GHz	26.5 GHz	40.0 GHz	50.0 GHz	67.0 GHz				
MWX621	26.5 GHz	●	●	●						
MWX641	40.0 GHz			●	●					
MWX651	50.0 GHz			●	●	●	●			
MWX661	67.0 GHz							●	●	

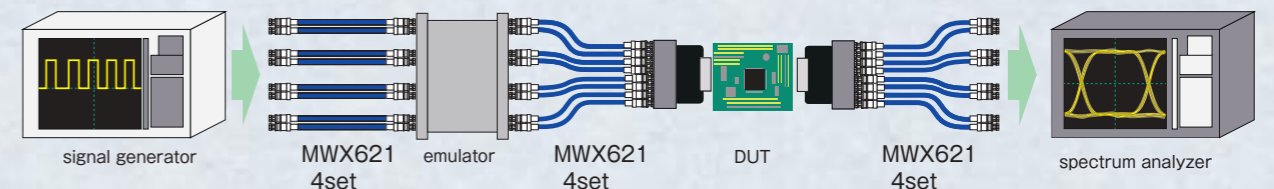
Power rating

The diagram to the right shows the relationship between frequency and power rating. The values are calculated at 25 °C and at sea level. The power rating will need to be corrected for different ambient temperatures and altitude. Power ratings may decrease, depending on the connector selected. *The above figures are measured values for reference only.

Power rating of MWX6 series at sea level



Connection example of MWX6 Series



Major applications

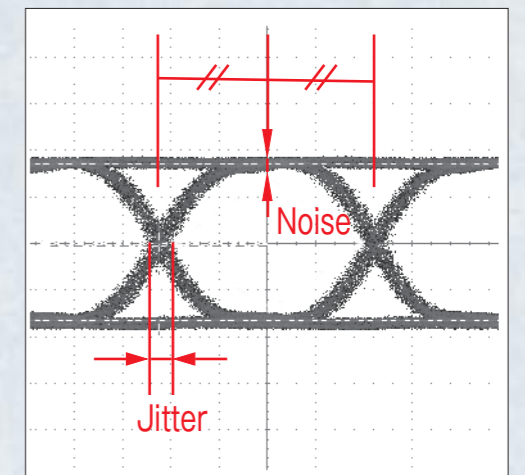
- Measurement and evaluation of the USB, HDMI etc.
- BERT measurement, Jitter measurement.

(Reference) Eye pattern and Junkosha's method of calculating degree of eye pattern

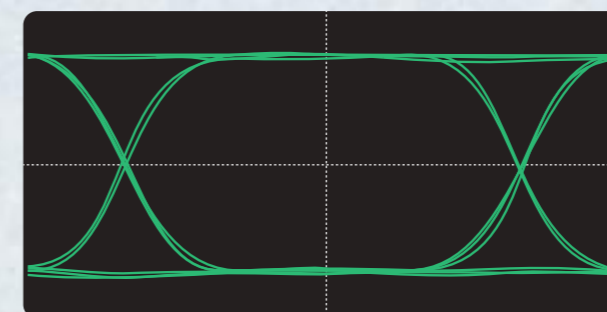
To measure pulse wave transmission characteristics, an experimental tool called "eye pattern" is observed. Upon balanced transmission, skew (variability of propagation delay time) between the signal cables will become one of the cause of deterioration of the jitter. Taking above into consideration, MWX6 series are designed and manufactured.

$$\text{Degree of horizontal eye opening (\%)} = 100 \times \left(\frac{\frac{1}{\text{bit rate}} - \text{jitter}}{\frac{1}{\text{bit rate}}} \right)$$

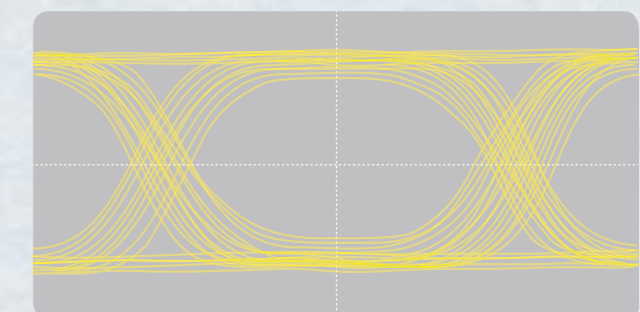
$$\text{Degree of vertical eye opening (\%)} = 100 \times \left(\frac{\text{amplitude of input signals} - 2 \times \text{noise}}{\text{amplitude of input signals}} \right)$$



MWX6SERIES







Conventional product



MWX6 SERIES

MWX 6

 Frequency 26.5 GHz	 Frequency 40.0 GHz	 Frequency 50.0 GHz	 Frequency 67.0 GHz	 Temperature range -30~+85°C	 RoHS compliant	 Skew match	 Delivery time 5 days	 Listed in the catalogue manufactured to order	 Custom support
---	---	---	---	---	--	--	---	--	--



Property

	MWX621	MWX641	MWX651	MWX661
Maximum operating frequency	26.5GHz	40.0GHz	50.0GHz	67.0GHz
Characteristics impedance (typ.)	50±1Ω	50±1Ω	50±1Ω	50±1Ω
Propagation delay (typ.)	4.4ns/m	4.35ns/m	4.36ns/m	4.38ns/m
VSWR(one end / both ends)	1.153/1.33	1.197/1.43	1.197/1.43	1.197/1.43
Typical insertion loss	1.4dB/m (26.5GHz)	3.0dB/m (40.0GHz)	3.8dB/m (50.0GHz)	5.6dB/m (67.0GHz)
Skew (between pair cables)	1ps	1ps	1ps	1ps
Phase deviation (between pair cables : @1GHz)	0.3°	0.3°	0.3°	0.3°
Cable outer diameter	6.0mm	4.1mm	3.7mm	2.6mm
Cable mass (typ.)	64g/m	35g/m	29g/m	17g/m
Continuous operating temperature range	-30~+85°C	-30~+85°C	-30~+85°C	-30~+85°C
Applicable connector	SMA(m) 3.5mm(m), 3.5mm(f)	2.92mm(m), 2.92mm(f)	2.4mm(m), 2.4mm(f) 2.92mm(m), 2.92mm(f)	1.85mm(m), 1.85mm(f)
Assembly length	200~1,500mm	200~1,500mm	200~1,500mm	200~1,500mm

Order form example

Please provide the following information when placing an order.

* We supply MWX6 series one pair of two cables.
* See P.81 "Connector combination codes"

Example MWX621

Assembly length: 1000mm
Connector I : 3.5mm (f) straight
Connector II : 3.5mm (m) straight

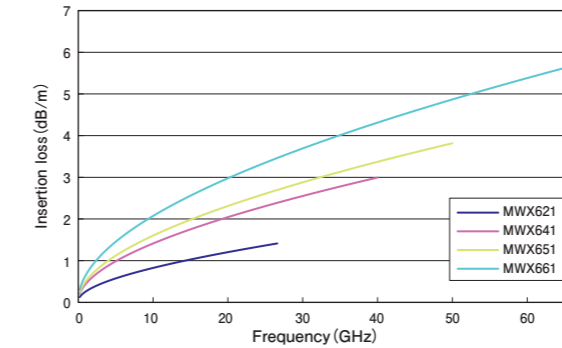
Catalog No.
MWX621-01000DFSDMS/PAIR



- a: Cable
- b: Assembly length
- c: Connector
- d: Armored

Technical Data

MWX6 Series Typical insertion loss



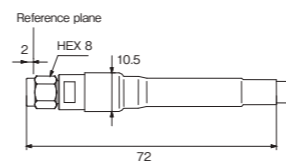
	MWX621	MWX641	MWX651	MWX661
18.5GHz	1.2dB/m	1.8dB/m	2.1dB/m	2.9dB/m
Maximum frequency	1.4dB/m	3.0dB/m	3.8dB/m	5.6dB/m

- MWX621** ● Typical insertion loss $(0.0077 \times f(\text{GHz}) + 0.2304 \times \sqrt{f(\text{GHz})} + 0.02) \times L(\text{m})$ ● Maximum insertion loss $(0.0077 \times f(\text{GHz}) + 0.2304 \times \sqrt{f(\text{GHz})} + 0.02) \times 1.12 \times L(\text{m})$
- MWX641** ● Typical insertion loss $(0.0095 \times f(\text{GHz}) + 0.41 \times \sqrt{f(\text{GHz})} + 0.02) \times L(\text{m})$ ● Maximum insertion loss $(0.0095 \times f(\text{GHz}) + 0.41 \times \sqrt{f(\text{GHz})} + 0.02) \times 1.12 \times L(\text{m})$
- MWX651** ● Typical insertion loss $(0.0095 \times f(\text{GHz}) + 0.47 \times \sqrt{f(\text{GHz})} + 0.02) \times L(\text{m})$ ● Maximum insertion loss $(0.0095 \times f(\text{GHz}) + 0.47 \times \sqrt{f(\text{GHz})} + 0.02) \times 1.12 \times L(\text{m})$
- MWX661** ● Typical insertion loss $(0.0095 \times f(\text{GHz}) + 0.6148 \times \sqrt{f(\text{GHz})} + 0.02) \times L(\text{m})$ ● Maximum insertion loss $(0.0095 \times f(\text{GHz}) + 0.6148 \times \sqrt{f(\text{GHz})} + 0.02) \times 1.12 \times L(\text{m})$

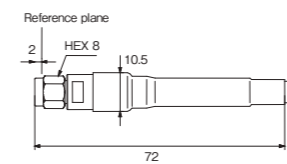
Connector

MWX621

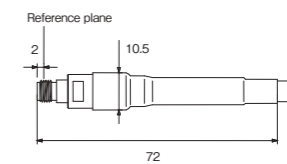
SMA (m) straight (Code:AMS)
Maximum operating frequency: 18.5 GHz / Mass: 11g



3.5mm (m) straight (Code:DMS)
Maximum operating frequency: 26.5 GHz / Mass: 11g

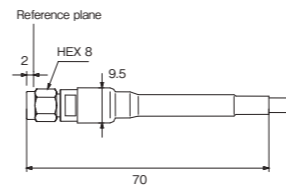


3.5mm (f) straight (Code:DFS)
Maximum operating frequency: 26.5 GHz / Mass: 10g

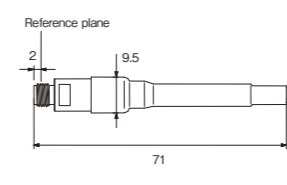


MWX641

2.92mm (m) straight (Code:KMS)
Maximum operating frequency: 40.0 GHz / Mass: 8g

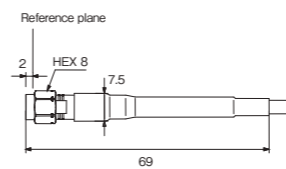


2.92mm (f) straight (Code:KFS)
Maximum operating frequency: 40.0 GHz / Mass: 8g

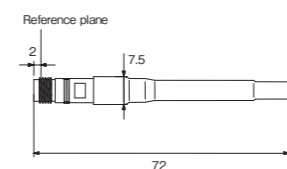


MWX651

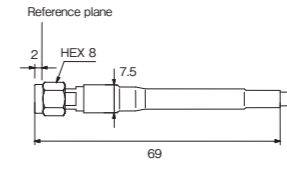
2.4mm (m) straight (Code:LMS)
Maximum operating frequency: 50.0 GHz / Mass: 5g



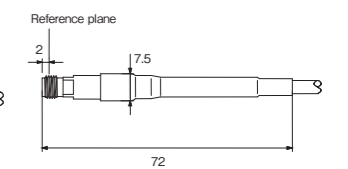
2.4mm (f) straight (Code:LFS)
Maximum operating frequency: 50.0 GHz / Mass: 5g



2.92mm (m) straight (Code:KMS)
Maximum operating frequency: 40.0 GHz / Mass: 5g

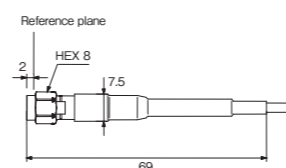


2.92mm (m) straight (Code:KFS)
Maximum operating frequency: 40.0 GHz / Mass: 5g

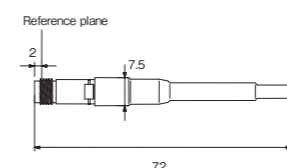


MWX661

1.85mm (m) straight (Code:VMS)
Maximum operating frequency: 67.0 GHz / Mass: 6g

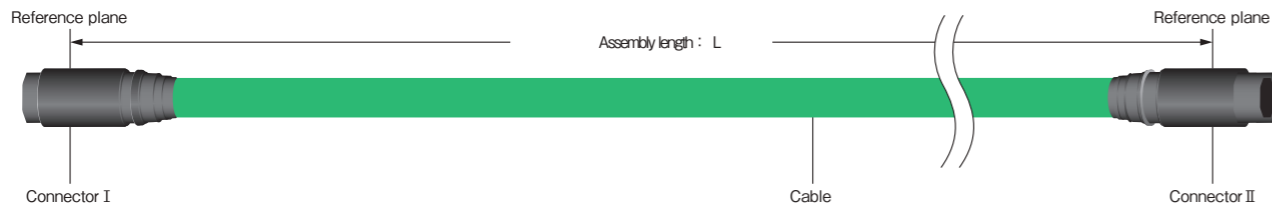


1.85mm (f) straight (Code:VFS)
Maximum operating frequency: 67.0 GHz / Mass: 6g



MWX6 SERIES

Placing orders



ex.1 Catalog number
MWX621-01000 DFS DMS /PAIR

- Cable : MWX621
- Assembly length : 1000 mm
- Connector I : 3.5 mm(f) straight
- Connector II : 3.5 mm(m) straight
- Pair product

Note 1) The unit of assembly length is mm. Shown as a five-digit number. If the number consists of fewer than five digits, remember to add zero (s) to the left of the first digit to make it five digits. The assembly length is measured based on the reference planes, not on the connector ends, shown at the figure to the left.
 Note 2) We supply MWX6 series one pair of two cables. Upon ordering, you are requested to inform us the catalogue number and set quantity.

Connector combination codes

Connector I		Connector II									
		SMA	3.5mm	3.5mm	2.92mm	2.92mm	2.4mm	2.4mm	1.85mm	1.85mm	
		m	m	f	m	f	m	f	m	f	
		AMS	DMS	DFS	KMS	KFS	LMS	LFS	VMS	VFS	
SMA	m	AMS	AMSAMS	AMSDMS	AMSDFS	-	-	-	-	-	
3.5mm	m	DMS	-	DMSDMS	DFSDFS	-	-	-	-	-	
3.5mm	f	DFS	-	-	DFSDFS	-	-	-	-	-	
2.92mm	m	KMS	-	-	-	KMSKMS	KFSKMS	KMSLMS	KMSLFS	-	
2.92mm	f	KFS	-	-	-	-	KFSKFS	KFSLMS	KFSLFS	-	
2.4mm	m	LMS	-	-	-	-	-	LMSLMS	LFSLMS	-	
2.4mm	f	LFS	-	-	-	-	-	-	LFSLFS	-	
1.85mm	m	VMS	-	-	-	-	-	-	-	VMSVMS	
1.85mm	f	VFS	-	-	-	-	-	-	-	VFSVFS	

m : male (plug)
 f : female (jack)

Please provide a catalog number when placing an order.

Delivery time

MWX6 Series will be shipped within 7 business days after receiving your order.

*L/T might be changed on your order Qty.

Option

In the event that you would like to change quantity of one set, please feel free to contact us.

Remarks

Skew of MWX6 series between the two cables is standardized less than 1 psec upon shipment. Please be careful upon handling them with great care.

MWX SERIES Common Properties

Connector insertion loss (dB/connector)

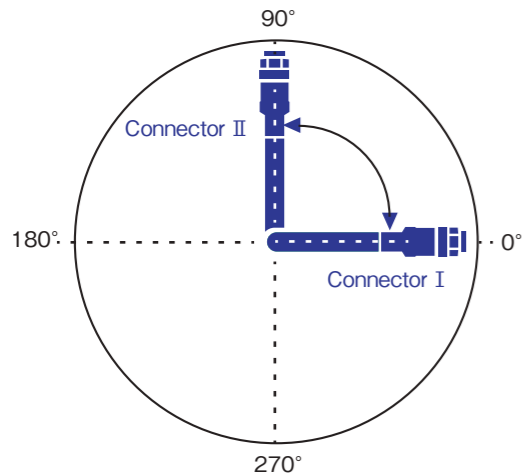
Connector type	Connector insertion loss	Frequency (GHz)						
		1.0 GHz	10.0 GHz	18.5 GHz	26.5 GHz	40.0 GHz	50.0 GHz	67.0 GHz
SSMA(m)straight	$0.03\sqrt{f}$	0.03	0.09	0.13	—	—	—	—
SMA(m)straight	$0.03\sqrt{f}$	0.03	0.09	0.13	0.15	0.19	—	—
SMA(f)straight	$0.03\sqrt{f}$	0.03	0.09	0.13	—	—	—	—
SMA(m)right angle	$0.07\sqrt{f}$	0.07	0.22	0.3	—	—	—	—
SMA(m)swept	$0.04\sqrt{f}$	0.04	0.13	0.17	—	—	—	—
TNC(m)straight	$0.07\sqrt{f}$	0.07	0.22	0.3	—	—	—	—
N(m)straight	$0.05\sqrt{f}$	0.05	0.16	0.22	—	—	—	—
N(f)straight	$0.05\sqrt{f}$	0.05	0.16	0.22	—	—	—	—
N(m)swept	$0.06\sqrt{f}$	0.06	0.19	0.26	—	—	—	—
SMP(f)straight	$0.12\sqrt{f}$	0.12	0.38	0.52	—	—	—	—
SMPM(f)straight	$0.12\sqrt{f}$	0.12	0.38	0.52	0.62	0.76	0.85	0.98
3.5mm(m)straight	$0.03\sqrt{f}$	0.03	0.09	0.13	0.15	—	—	—
3.5mm(f)straight	$0.03\sqrt{f}$	0.03	0.09	0.13	0.15	—	—	—
3.5mm(m)swept	$0.04\sqrt{f}$	0.04	0.13	0.17	0.21	—	—	—
2.92mm(m)straight	$0.03\sqrt{f}$	0.03	0.09	0.13	0.15	0.19	—	—
2.92mm(f)straight	$0.03\sqrt{f}$	0.03	0.09	0.13	0.15	0.19	—	—
2.92mm(m)swept	$0.04\sqrt{f}$	0.04	0.13	0.17	0.21	0.25	—	—
2.4mm(m)straight	$0.042\sqrt{f}$	0.04	0.13	0.18	0.22	0.27	0.3	—
2.4mm(f)straight	$0.042\sqrt{f}$	0.04	0.13	0.18	0.22	0.27	0.3	—
1.85mm(m)straight	$0.065\sqrt{f}$	0.065	0.206	0.28	0.33	0.41	0.46	0.53
1.85mm(f)straight	$0.065\sqrt{f}$	0.065	0.206	0.28	0.33	0.41	0.46	0.53

Tolerances for assembly length

Tolerance values of MWX0, 1, 2 and 3 series are shown below. Please contact us if your tolerance requirements for phase matching are more stringent.

Assembly length (mm)	Tolerance (mm)
$L \leq 1000$	± 10
$1000 < L \leq 2000$	± 20
$2000 < L \leq 5000$	± 50
$5000 < L$	± 100

About customer-specified swept and right-angle connectors



The angle of Connector II relative to Connector I when Connector I is assumed to be at 0° (as viewed from the direction of Connector I) is indicated by three digits following the catalog number. (The indication is omitted if the angle is 0°.)

Example: If Connector II is at an angle of 90° when viewed from the direction of Connector I: MWX312-01000AMRAMR-090

Technical Data

Return loss - VSWR conversion table

Return loss dB	Voltage Standing Wave Ratio VSWR	Reflection coefficient
60	1.002	0.001
50	1.006	0.003
40	1.020	0.010
35	1.036	0.018
30	1.065	0.032
29	1.074	0.035
28	1.083	0.040
27	1.094	0.045
26	1.106	0.050
25	1.119	0.056
24	1.135	0.063
23	1.152	0.071
22	1.173	0.079
21	1.196	0.089
20	1.222	0.100
19	1.253	0.112
18	1.288	0.126
17	1.329	0.141
16	1.377	0.158
15	1.433	0.178
14	1.499	0.200
13	1.577	0.224
12	1.671	0.251
11	1.785	0.282
10	1.925	0.316

VSWR - Return loss conversion table

Voltage Standing Wave Ratio VSWR	Return loss dB	Reflection coefficient	Propagation loss dB
1.01	46.1	0.005	0.0001
1.02	40.1	0.010	0.0004
1.03	36.6	0.015	0.0010
1.04	34.2	0.020	0.0017
1.05	32.3	0.024	0.0025
1.06	30.7	0.029	0.0037
1.07	29.4	0.034	0.0050
1.08	28.3	0.038	0.0063
1.09	27.3	0.043	0.0080
1.10	26.4	0.048	0.0100
1.15	23.1	0.070	0.0213
1.20	20.8	0.091	0.0361
1.25	19.1	0.111	0.0538
1.30	17.7	0.130	0.0740
1.35	16.5	0.149	0.0975
1.40	15.6	0.167	0.1228
1.45	14.7	0.184	0.1496
1.50	14.0	0.200	0.1773
1.60	12.7	0.231	0.2382
1.70	11.7	0.259	0.3016
1.80	10.9	0.286	0.3706
1.90	10.2	0.310	0.4388
2.00	9.5	0.333	0.5104
3.00	6.0	0.500	1.2494
4.00	4.4	0.600	1.9382

dB table

Power ratio P_2/P_1	dB Dp	Current ratio/ Voltage ratio $I_2/I_1 \cdot V_2/V_1$	dB Di · Dv
$\times 0.01$	-20dB	$\times 0.01$	-40dB
$\times 0.1$	-10dB	$\times 0.1$	-20dB
$\times 1$	0dB	$\times 1$	0dB
$\times 2$	3.0dB	$\times 2$	6.0dB
$\times 3$	4.8dB	$\times 3$	9.5dB
$\times 4$	6.0dB	$\times 4$	12.0dB
$\times 5$	7.0dB	$\times 5$	14.0dB
$\times 6$	7.8dB	$\times 6$	15.6dB
$\times 7$	8.5dB	$\times 7$	16.9dB
$\times 8$	9.0dB	$\times 8$	18.1dB
$\times 9$	9.5dB	$\times 9$	19.1dB
$\times 10$	10dB	$\times 10$	20dB
$\times 100$	20dB	$\times 100$	40dB
$\times 1000$	30dB	$\times 1000$	60dB

Power: $Dp = 10 \log_{10} \frac{P_2}{P_1}$ [dB]

Current: $Di = 20 \log_{10} \frac{I_2}{I_1}$ [dB]

Voltage: $Dv = 20 \log_{10} \frac{V_2}{V_1}$ [dB]

● Power level "dBm" represents the absolute value with respect to the standard 0[dBm] for 1[m/W]. P[mW] is given by $10 \log_{10} P$ [dBm].

Frequency band name and code

Frequency [GHz]	Wavelength [cm]	Conventional frequency band (radar)	Current frequency band (ECM)	Frequency [GHz]
0.1	300	VHF	A	0.1
0.15	200			0.15
0.2	150			0.2
0.3	100	UHF	B	0.3
0.4	75			0.4
0.5	60			0.5
0.6	50			0.6
0.75	40			0.75
1	30	L	D	1
1.5	20			1.5
2	15			2
3	10	S	E	3
4	7.5			4
5	6	C	G	5
6	5			6
8	3.75			8
10	3	X	I	10
15	2			15
20	1.5	Ku	J	20
30	1			30
40	0.75	K	K	40
50	0.6			50
60	0.5	MILLIMETER	L	60
75	0.4			75
100	0.3			100

1. $VSWR = \frac{1+\rho}{1-\rho} = \frac{1+10^{-\frac{RL}{20}}}{1-10^{-\frac{RL}{20}}}$

2. Return loss $RL(dB) = -20 \log \rho = -20 \log \frac{VSWR-1}{VSWR+1}$

3. Reflection coefficient $\rho = \frac{VSWR-1}{VSWR+1} \Rightarrow (VSWR+1) = 10^{-\frac{RL}{20}}$

4. Propagation loss $\alpha(dB) = -10 \log(1-\rho^2) = -10 \log \left(1 - \left(\frac{VSWR-1}{VSWR+1} \right)^2 \right)$

Relationship between frequency and wavelength

$f = \frac{c}{\lambda}$ where $c = 2.998 \times 10^8$ [m/s]

Relationship between phase change θ [°], frequency f [GHz], cable length L [mm] and propagation delay τ [nsec]

$L = 0.8328 \times \theta \div \sqrt{\epsilon_r} \div f$

$\theta = 1.201 \times L \times \sqrt{\epsilon_r} \times f$

$\theta = 360 \times f \times \tau$

where ϵ_r is the specific dielectric constant of the cable insulator. Air: $\epsilon_r = 1$, Dense PTFE: $\epsilon_r \approx 2.1$

Warning

Warning: Safe Handling Instructions for JUNFLON® MWX



Warning

JUNFLON® MWX products are safe when used for the applications and according to the conditions and methods specified in documents such as catalogs. However, note the following points:



Do not use JUNFLON® MWX products at temperatures above the continuous operating temperature (given in the table below) for each of the insulating materials .



JUNFLON® MWX products are not designed or manufactured for implantation or for use in medical devices that come into contact with human body fluids or tissue. If you intend to use the products for such applications, consult Junkosha in advance.

Continuous operating temperature and thermal decomposition temperature of insulating materials*

Type of insulating material	Continuous operating temperature	Temperature at which thermal decomposition starts	Temperature at which thermal decomposition accelerates
PTFE	260°C	260°C	400°C
PFA	260°C	260°C	400°C
FEP	200°C	230°C	300°C
ETFE	150°C	150°C	250°C
PVC	105°C	110°C	130°C
Polyurethane	80°C	110°C	130°C
Polyester	105°C	120°C	130°C