Junkosha

Creating Unsurpassed Value

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JUNFLON® MWX

JUNFLON® Microwave Coaxial Cable Assemblies

Junkosha Inc.



Junkosha

Creating Unsurpassed Value

JUNFLON® MWX SERIES

JUNFLON® Microwave Coaxial Cable Assemblies

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JUNFLON® MWX SERIES

JUNFLON® Microwave Coaxial Cable Assemblies

JUNFLON Microwave Coaxial Cable Assemblies

Statement of **Junkosha**

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.



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

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.

MWX0
Cable assemblies with highphase 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

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

Option

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

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℃ (＊4)Continuous operating temperature range for MWX461 : -65~+125℃

JUNFLON Microwave Coaxial Cable Assemblies

Cable structure

List of Cable Specifications

MWX0 Cable assemblies with high phase stability for measuring instruments

Vector network analyzers;

RF and high-speed digital testers

The MWX0 series offer excellent phase stability against temperature fluctuations from -30 to +85℃ and bending. They are ideal for connecting Vector Network Analyzers for precision measurements.

Frequency	Cable type	Typical insertion loss (dB/m) 18.5 GHz	Typical insertion loss (dB/m) Maximum frequency	Cable outer diameter (mm)	Mass (g/m)	Minimum bending radius (mm)	Continuous operating temperature (℃)	Assembly length (mm)(*1) Min	Assembly length (mm)(*1) Max	Described in
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.

MWX1 Cable assemblies with wide temperature range & high durability for measuring

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

Inspections requiring high durability

The MWX1 series offer excellent durability of connector and cable bending in wide temperature range from -65 to +125℃ for microwave measurements.

Frequency	Cable type	Typical insertion loss (dB/m) 18.5 GHz	Typical insertion loss (dB/m) Maximum frequency	Cable outer diameter (mm)	Mass (g/m)	Minimum bending radius (mm)	Continuous operating temperature (℃)	Assembly length (mm)(*1) Min	Assembly length (mm)(*1) Max	Described in
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

MWX2 Flexible and phase stability cable aseblies for mesuring instruments

Microwave/ millimeter-wave measurements

Micro-device measurements requiring high flexibility

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) 18.5 GHz	Typical insertion loss (dB/m) Maximum frequency	Cable outer diameter (mm)	Mass (g/m)	Minimum bending radius (mm)	Continuous operating temperature (℃)	Assembly length (mm)(*1) Min	Assembly length (mm)(*1) Max	Described in
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



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

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℃ (-30 to 85℃ for MWX315))

Frequency	Cable type	Old mode number	Typical insertion loss (dB/m) 18.5 GHz	Typical insertion loss (dB/m) Maximum frequency	Cable outer diameter (mm)	Mass (g/m)	Minimum bending radius (mm)	Continuous operating temperature (℃)	Assembly length (mm)(*1) Min	Assembly length (mm)(*1) Max	Described in
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) 18.0GHz	Typical insertion loss (dB/m) Maximum frequency	Cable outer diameter (mm)	Remark	Minimum bending radius (mm)	Continuous operating temperature (℃)	Assembly length (mm)(*1) Min	Assembly length (mm)(*1) Max	Described in
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	P68
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 ℃) 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) 18.5 GHz	Typical insertion loss (dB/m) Maximum frequency	Cable outer diameter (mm)	Mass (g/m)	Minimum bending radius (mm)	Continuous operating temperature (℃)	Assembly length (mm)(*1) Min	Assembly length (mm)(*1) Max	Described in
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

US Appl. No.:15/511,949

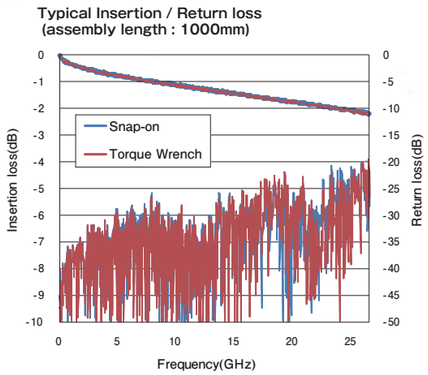
MWX0 SERIES

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.

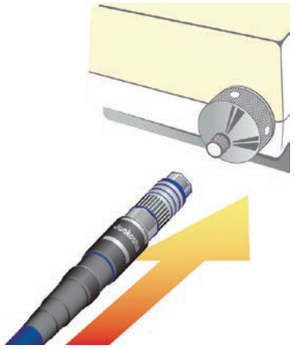


Easy & highly reliable connection

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

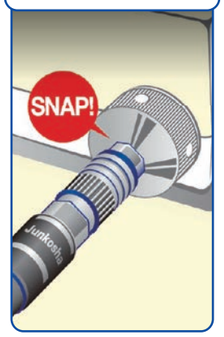


Various connection methods for various purposes

3 ways of connection methods are available for specific applications.

1 Snap-on Coupling

Coupling without screwing. Insert the cable connecto-rand 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 thework-load 1/3 comparedto the conventional ones.

3 Torque Wrench Coupling

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



Torque canceller with strain relief

US PAT. No.: 9,318,839

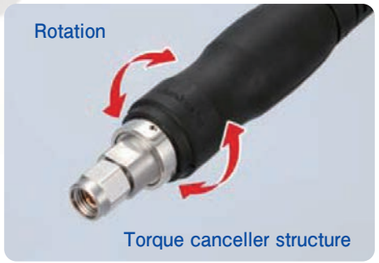
MWX1 SERIES

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

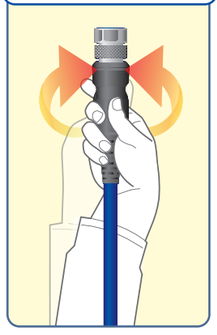
- Inspection lines in which the connector is attached/ detached frequently;
- Measurement environments in which the cable is complicatedly routed; and
- Exchanging devices.

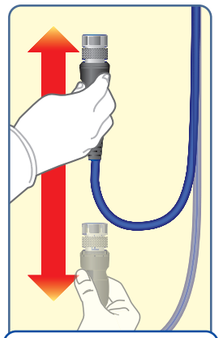
Point

	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.



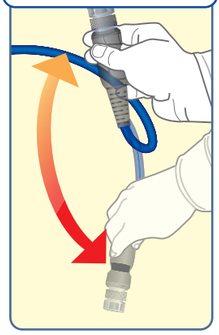


2 Comfortable routing of the cable

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.

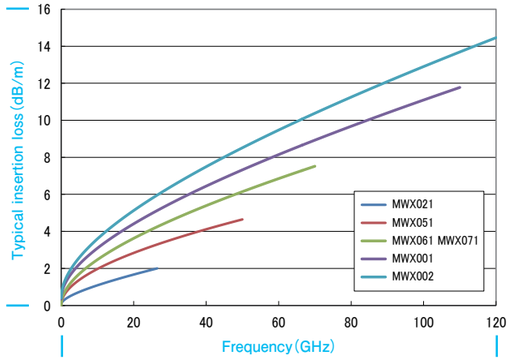
MWX0 SERIES

Cable assemblies with high phase stability for measuring instruments

How to select

The MWX0 series cable assemblies offer excellent phase stability against temperature fluctuationsand bending.
They are ideal for connecting to vector network analyzers for precision measurements .
(Continuous operating temperature range : from -30 to +85 ℃)
Cables are offered in wide range of the frequencies of 26.5, 50, 67 ,70, 110 and 120 GHz with various connectors.

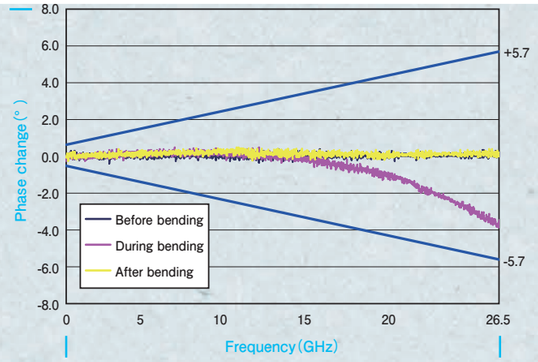
MWX0 Series typical insertion loss

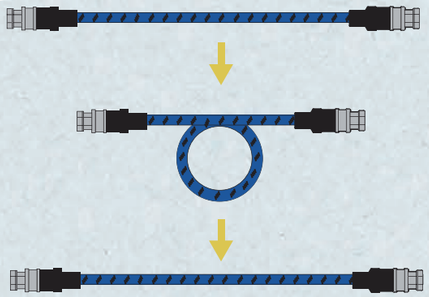


Simple criteria for cable selection

●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.

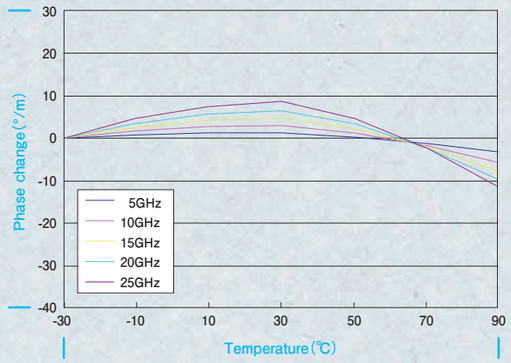
MWX021 Static bending data





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

MWX021 Phase change vs. temperature



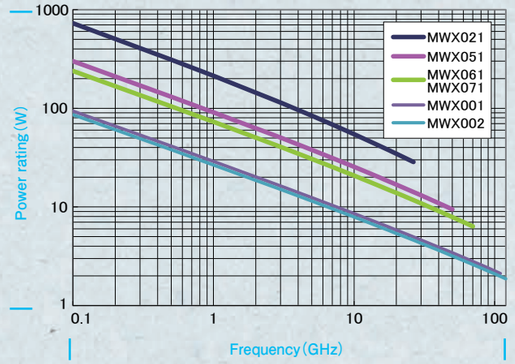
The cable was measured in chamber every 20 ℃ from -30 to 90 ℃, 1 hour after the temperature changed.

Power rating

The diagram to the right shows the relationship between frequency and power rating.
The values are calculated at 25 ℃ 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



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	
		N(m)	SMA(m)	SMA(f)	3.5mm(m)	3.5mm(f)	2.92mm(m)	2.92mm(f)	2.4mm(m)	2.4mm(f)	1.85mm(m)	1.85mm(f)	1.85mm(m)	1.85mm(f)	1.0mm(m)	1.0mm(f)	1.0mm(m)	1.0mm(f)
MWX021	26.5 GHz	●	●	●	●	●												
MWX051	50.0 GHz						●	●	●	●								
MWX061	67.0 GHz										●	●						
MWX071	70.0 GHz												●	●				
MWX001	110.0 GHz														●	●		
MWX002	120.0 GHz														●	●	●	●

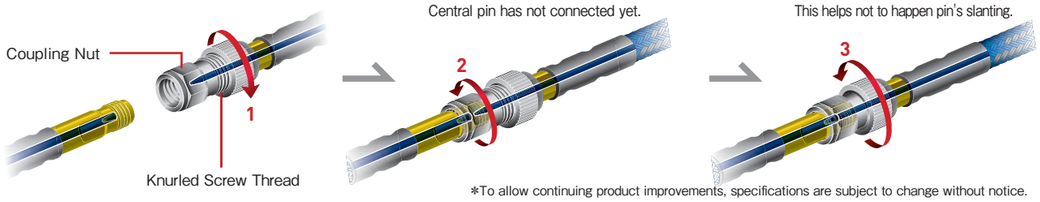
*MWX002 is a under developing product. Please contact us.

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

1 Rotate the knurled parts and check the knurled screw thread. Central pin is located back side, seeing from the coupling nut side.

2 Same as the normal 1.0mm(m) connectors, it the coupling nut with female connector. They will be fixed under the condition that both connector' s central axis is matched. Central pin has not connected yet.

3 Rotate the knurled parts, then let the cable side central pin forward, and insert to female connector's socket. With the help of fixed coupling nut, central axis is matched. This helps not to happen pin's slanting.



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

MWX0 SERIES

MWX 021

Static bending · Temperature change · Frequency 26.5 GHz · Temperature range -30~+85℃ · Minimum bending radius 30 mm · RoHS compliant · Measurement · Armored · Multi-lock · Delivery time 5 days · Listed in the catalogue; manufactured to order · Custom support



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 ℃
Armored side pressure	196N/cm
Assembly length	700~1,500 mm

Order form example

Please provide the following information when placing an order.

＊ See P.25"Connector combination codes"

Example MWX021

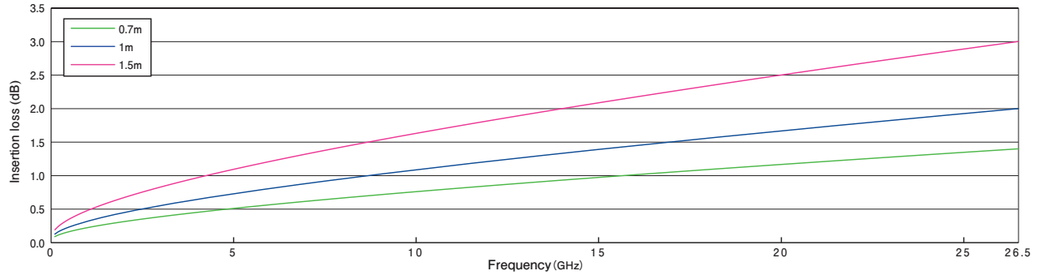
Assembly length : 1000 mm
Connector Ⅰ : 3.5 mm (f) straight
Connector Ⅱ : 3.5 mm (m) straight

Catalog No.:
MWX021-01000DFSDMS/B
a b c d

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

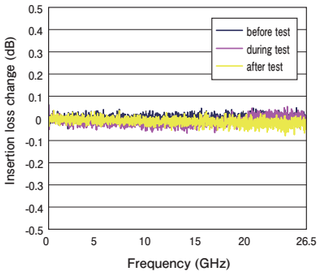
Technical Data

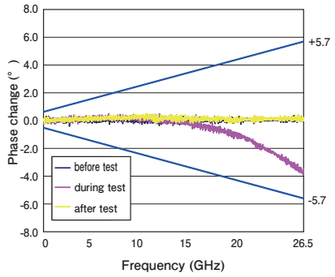
Cable typical insertion loss



● Typical insertion loss (0.67× (0.038×f(GHz) +0.371×√f(GHz)) +0.07) ×L(m) ● Maximum insertion loss (0.67× (0.038×f(GHz) +0.371×√f(GHz)) +0.07) ×1.12×L(m)

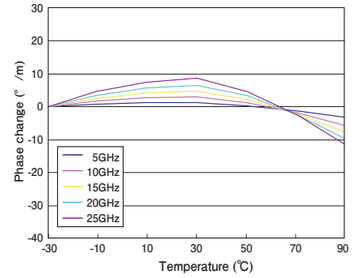
Static bending data (insertion loss, phase) Bending radius: 30 mm





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

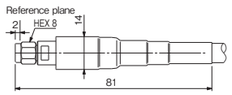
MWX021 Phase change vs. temperature



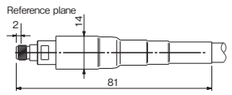
The cable was measured in chamber every 20 ℃ from -30 to 90 ℃, 1 hour after the temperature changed. Figure shows the excellent phase stability over the temperature changes.

Connector

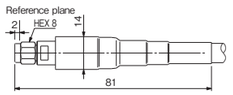
SMA(m) straight (Code:AMS)
Maximum operating frequency:18.5 GHz／Mass:18g



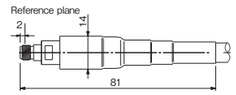
SMA(f) straight (Code:AFS)
Maximum operating frequency:18.5 GHz／Mass:17g



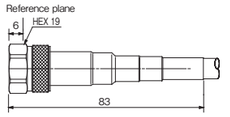
3.5mm(m) straight (Code:DMS)
Maximum operating frequency:26.5 GHz／Mass:18g



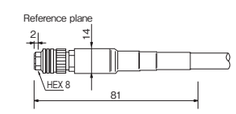
3.5mm(f) straight (Code:DFS)
Maximum operating frequency:26.5 GHz／Mass:17g



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 measureis available at the HEX part with standard tightening, ment, such as calibration.

MWX0 SERIES

MWX 051

Static bending · Temperature change · Frequency 50.0 GHz · Temperature range -30~+85℃ · Minimum bending radius 30 mm · RoHS compliant · Measurement · Armored · Delivery time 5 days · Listed in the catalogue; manufactured to order · Custom support



Property

Electrical properties

Maximum operating frequency	50.0 GHz
Characteristic impedance	50±1 Ω
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 ℃
Armored side pressure	196 N/cm
Assembly length	700~1,500 mm

Order form example

Please provide the following information when placing an order.

＊See P.25"Connector combination codes"

Example MWX051

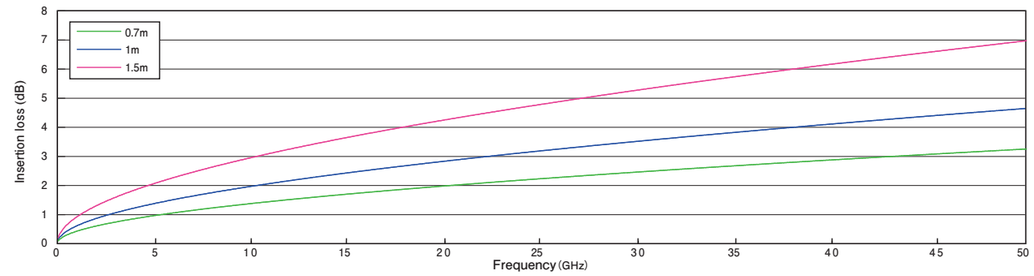
Assembly length : 1000mm
Connector Ⅰ:2.4 mm(f)straight
Connector Ⅱ:2.4 mm(m)straight

Catalog No.:
MWX051-01000LFSLMS/B
a b c d

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

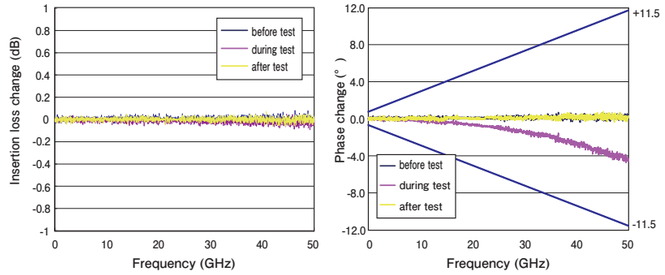
Technical Data

Cable typical insertion loss



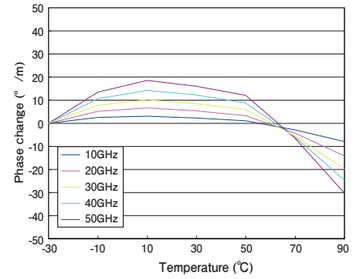
● Typical insertion loss (0.0095×f(GHz)+0.587×√f(GHz)+0.02)×L(m) ● Maximum insertion loss (0.0095×f(GHz)+0.587×√f(GHz)+0.02)×1.12×L(m)

Static bending data (insertion loss, phase) Bending radius: 30 mm



＊Guaranteed value within ±11.5° at 50 GHz (In shipping value).
＊The cable was wrapped 360° around φ60mm mandrel.

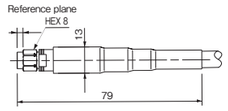
MWX051 Phase change vs. temperature



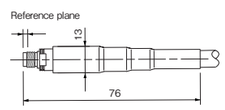
The cable was measured in chamber every 20 ℃ from -30 to 90 ℃, 1 hour after the temperature changed. Figure shows the excellent phase stability over the temperature changes.

Connector

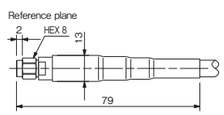
2.4 mm(m) straight (Code:LMS)
Maximum operating frequency:50.0 GHz／Mass:11g



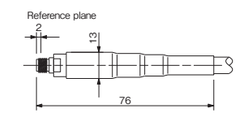
2.4 mm(f) straight (Code:LFS)
Maximum operating frequency:50.0 GHz／Mass:14g



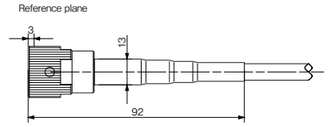
2.92 mm(m) straight (Code:KMS)
Maximum operating frequency:40.0 GHz／Mass:12g



2.92 mm(f) straight (Code:KFS)
Maximum operating frequency:40.0 GHz／Mass:14g

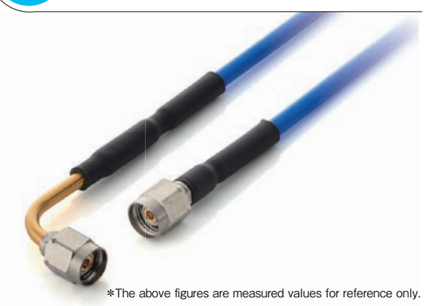


NMD 2.4mm(f) straight (Custom-made)
Maximum operating frequency:50.0 GHz／Mass:60g



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

Static bending | Temperature change | Frequency 67.0 GHz | Temperature range -30~+85℃ | Minimum bending radius 30 mm | RoHS compliant | Measurement | Armored | Delivery time 5 days | Listed in the catalogue; manufactured to order | Custom support



Property

Electrical properties

Maximum operating frequency	67.0 GHz
Characteristic impedance	50±1 Ω
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 ℃
Armored side pressure	196 N/cm
Assembly length	700~1,500 mm

Order form example

Please provide the following information when placing an order.

＊See P.25"Connector combination codes"

Example MWX061

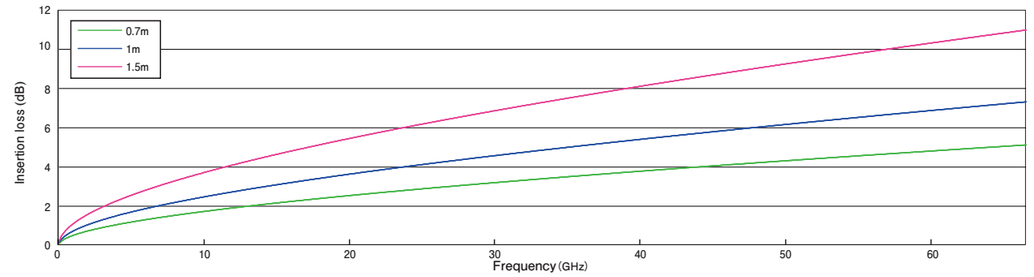
Assembly length:700 mm
Connector Ⅰ:1.85 mm(f)straight
Connector Ⅱ:1.85 mm(m)straight

Catalog No.:
MWX061-00700VFSVMS/B
a b c d

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

Technical Data

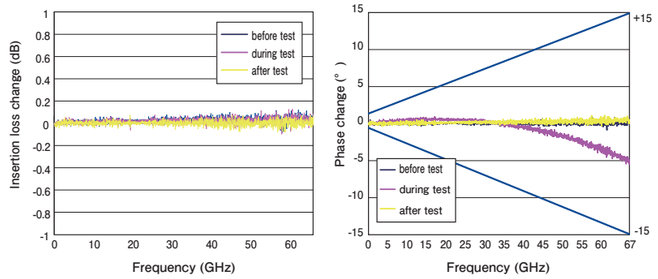
Cable typical insertion loss



● Typical insertion loss (0.0232×f(GHz)+0.702×√f(GHz)+0.02)×L(m) ● Maximum insertion loss (0.0232×f(GHz)+0.702×√f(GHz)+0.02)×1.12×L(m)

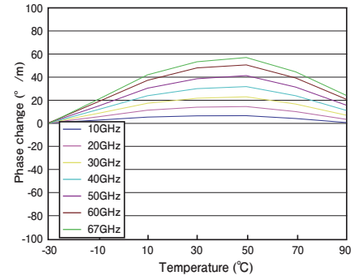
Static bending data (insertion loss, phase)

Bending radius: 30 mm



＊Guaranteed value within ±15° at 67 GHz (In shipping value).
＊The cable was wrapped 360° around φ60mm mandrel.

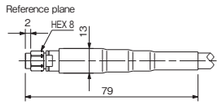
MWX061 Phase change vs. temperature



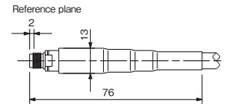
The cable was measured in chamber every 20 ℃ from -30 to 90 ℃, 1 hour after the temperature changed. Figure shows the excellent phase stability over the temperature changes.

Connector

1.85 mm(m) straight (Code:VMS)
Maximum operating frequency:67.0 GHz／Mass:11g

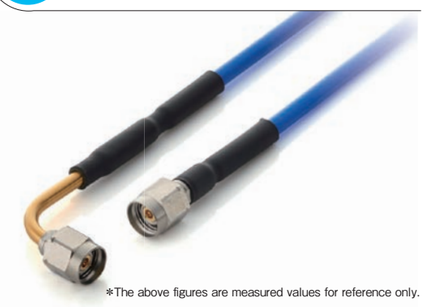


1.85 mm(f) straight (Code:VFS)
Maximum operating frequency:67.0 GHz／Mass:14g



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

Static bending | Temperature change | Frequency 70.0 GHz | Temperature range -30~+85℃ | Minimum bending radius 30 mm | RoHS compliant | Measurement | Armored | Delivery time 5 days | Listed in the catalogue; manufactured to order | Custom support



Property

Electrical properties

Maximum operating frequency	70.0 GHz
Characteristic impedance	50±1 Ω
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 ℃
Armored side pressure	196 N/cm
Assembly length	700~1,500 mm

Order form example

Please provide the following information when placing an order.

＊See P.25"Connector combination codes"

Example MWX071

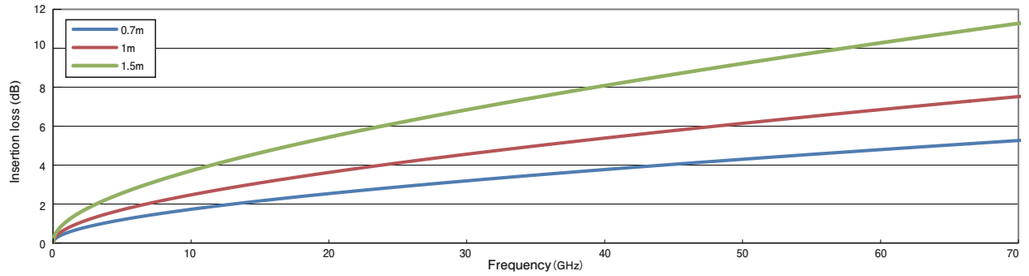
Assembly length:700 mm
Connector Ⅰ:1.85 mm(f)straight
Connector Ⅱ:1.85 mm(m)straight

Catalog No.:
MWX071-00700VFSVMS/B
a b c d

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

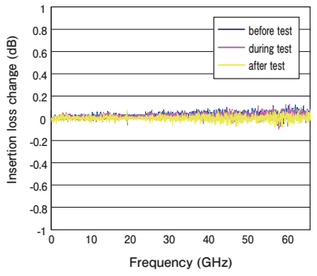
Technical Data

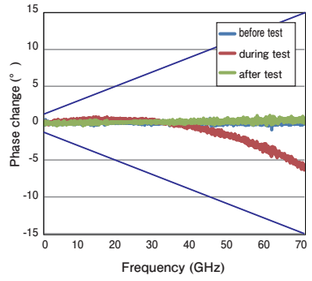
Cable typical insertion loss



● Typical insertion loss (0.0232×f(GHz)+0.702√f(GHz)+0.02)×L(m) ● Maximum insertion loss (0.0232×f(GHz)+0.702√f(GHz)+0.02))×1.12×L(m)

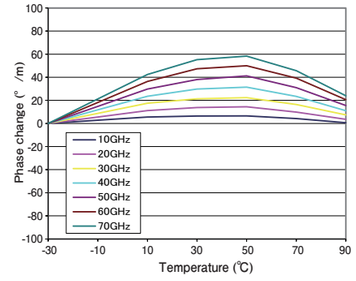
Static bending data (insertion loss, phase) Bending radius: 30 mm





＊Guaranteed value within ±15° at 70 GHz (In shipping value).
＊The cable was wrapped 360° around φ60mm mandrel.

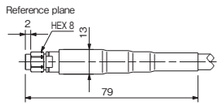
MWX071 Phase change vs. temperature



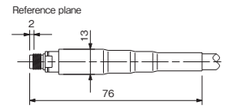
The cable was measured in chamber every 20 ℃ from -30 to 90 ℃, 1 hour after the temperature changed. Figure shows the excellent phase stability over the temperature changes.

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

Static bending | Temperature change | Frequency 110.0 GHz | Temperature range -30~+85℃ | Minimum bending radius 15 mm | RoHS compliant | Measurement | Armored | Delivery time 5 days | Listed in the catalogue; manufactured to order | Custom support



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 ℃
Armored side pressure	157 N/cm
Assembly length	100~200 mm

Order form example

Please provide the following information when placing an order.

＊See P.25"Connector combination codes"

Example MWX001

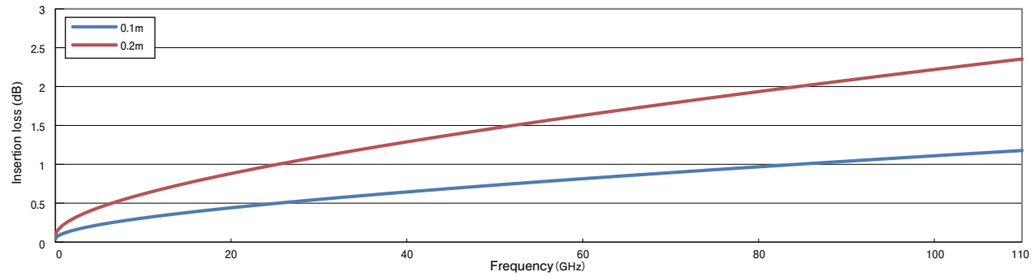
Assembly length：100 mm
Connector Ⅰ：1.0 mm(f)straight
Connector Ⅱ：1.0 mm(m)straight

Catalog No.:
MWX001-00100WFSWMT/B
a b c d

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

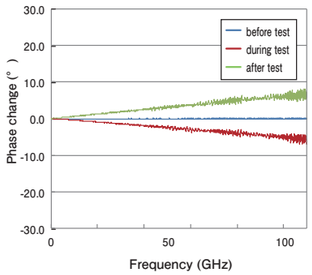
Technical Data

Cable typical insertion loss



● Typical insertion loss 0.86X (0.035×f(GHz)+0.9×√f(GHz)+0.4)×L(m) ● Maximum insertion loss 0.86X (0.035×f(GHz)+0.9×√f(GHz)+0.4)×1.12×L(m)

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

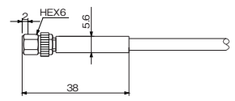


＊The cable was wrapped 90° around φ30mm mandrel.

Connector

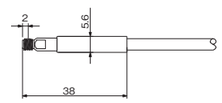
1.0mm(m) Safty Lock (Code:WMT)
Maximum operating frequency：110.0GHz／Mass:4g

Reference plane



1.0mm(f)straight (Code：WFS)
Maximum operating frequency:110.0GHz／Mass:2g

Reference plane

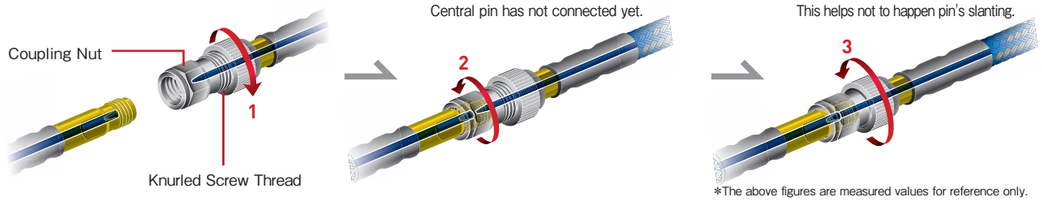


How to use "safety lock mechanism" of 1.0mm(m) connector

1 Rotate the knurled parts and check the knurled screw thread. Central pin is located back side, seeing from the coupling nut side.

2 Same as the normal 1.0mm(m) connectors, it the coupling nut with female connector. They will be fixed under the condition that both connector' s central axis is matched. Central pin has not connected yet.

3 Rotate the knurled parts, then let the cable side central pin forward, and insert to female connector's socket. With the help of fixed coupling nut, central axis is matched. This helps not to happen pin's slanting.



＊The above figures are measured values for reference only.

MWX0 SERIES

MWX 002

Under developing for special customers

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



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 ℃
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)

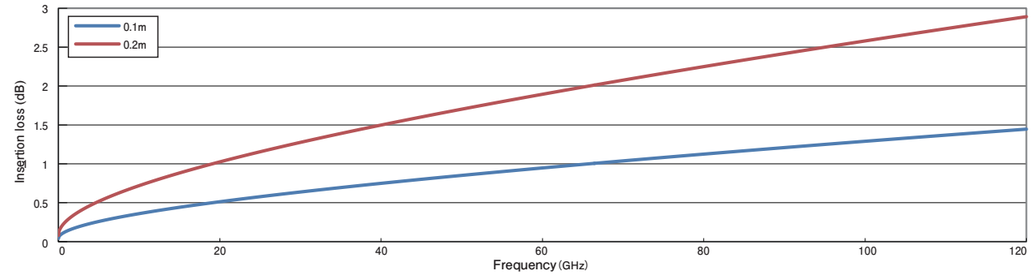
Assembly length: 150 mm
Connector Ⅰ: 1.0 mm(f) straight
Connector Ⅱ: 1.0 mm(m) straight

Catalog No.:
MWX002-00150WFS1WMS1/B
a b c d

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

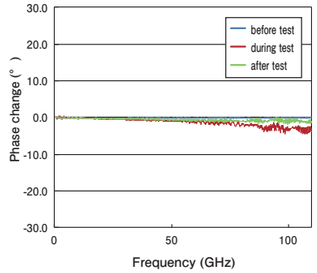
Technical Data

Cable typical insertion loss



● Typical insertion loss (0.035×f(GHz)+0.9×√f(GHz)+0.4)×L(m) ● Maximum insertion loss (0.035×f(GHz)+0.9×√f(GHz)+0.4)×1.12×L(m)

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

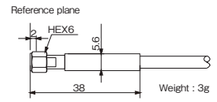


＊The cable was wrapped 90° around φ30mm mandrel.

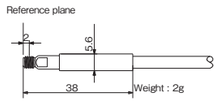
Connector

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

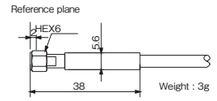


1.0 mm(f) straight (Code:WFS)
Maximum operating frequency:120.0GHz／Mass:2g

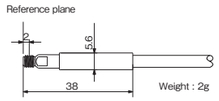


Up to 110 GHz: Standard 1.0mm Connector (Already released)

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



Catalog number

MWX021-01000 DFS DMS /B

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

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.

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.

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	AMSNMS	AMSDMS	AMSDMP	AMSDFS	-	-	-	-	-	-
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	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.

Connector combination codes for MWX001

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

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

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

Connector Ⅰ / Connector Ⅱ			1.0mm	1.0mm
			m	f
			WMT1	WFS1
1.0mm	m	WMT1	WMT1WMT1	WFS1WMT1
1.0mm	f	WFS1	-	WFS1WFS1

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

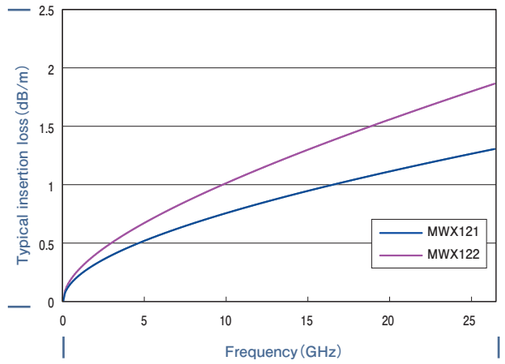
MWX1 SERIES

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℃) in the microwave measurement.
And MWX122 of the high-durability type (that can be used under the temperature range from -35℃ to +85℃) 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.

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.

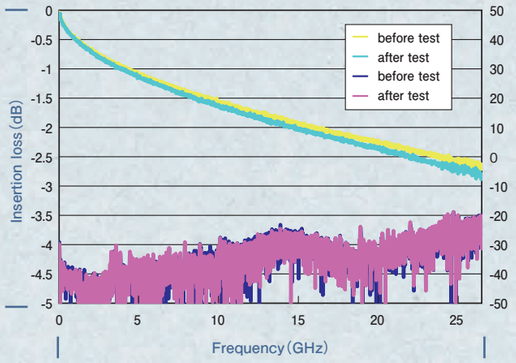
Connector compatibility

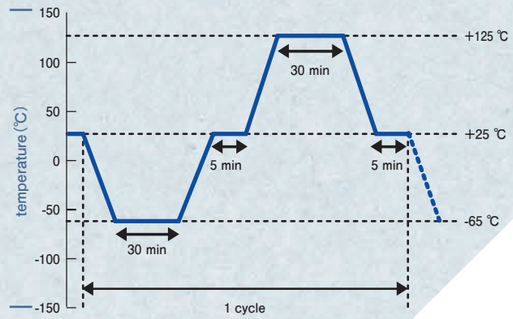
Cable type	Cable maximum operating frequency (GHz)	Compatible connector			
		18.0 GHz	18.5 GHz	26.5 GHz	
		N(m)	SMA(m)	3.5mm(m)	3.5mm(f)
MWX121	26.5 GHz	●	●	●	●
MWX122		●	●	●	●

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

Heat cycle test for MWX121

MWX121-02000DMSDMS





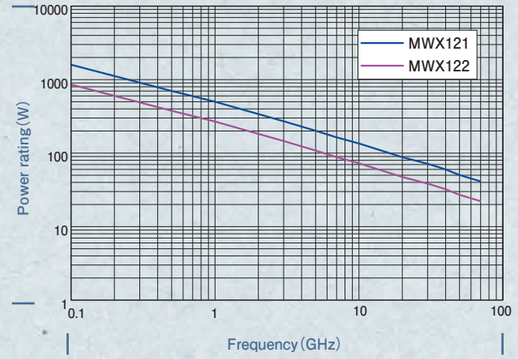
The cycle indicated above chart was repeated 30 times.
We measured the insertion and return loss of the specimen that was taken out from the tester after the 30 cycles.

Power rating

The diagram to the right shows the relationship between frequency and power rating.
The values are calculated at 25 ℃ 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 MWX1 series at sea level



Cable Structure : MWX121



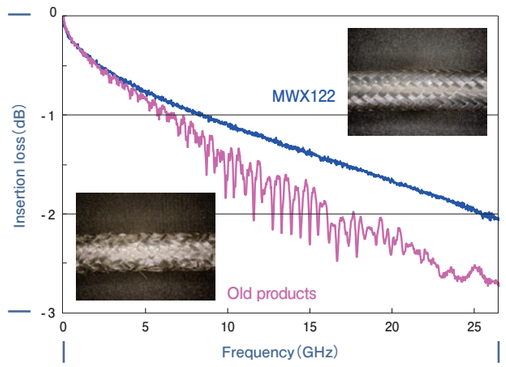
Center conductor	Dielectric	1st outer conductor	2nd outer conductor	Sheath	Sheath
Silver plated copper	Low density PTFE	Silver plated copper tape	Silver plated copper braid	Fluoropolymer	Aramid fiber

Cable Structure : MWX122

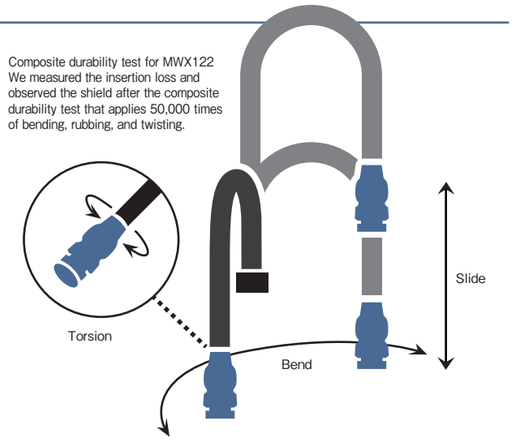


Center conductor	Dielectric	1st outer conductor	2nd outer conductor	Sheath	Sheath
Silver plated copper	Low density PTFE	Silver plated copper tape	Special braid	Fluoropolymer	PVC

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.



MWX1 SERIES

MWX 121

Static bending | Temperature change | Frequency 26.5 GHz | Temperature range -65~+125℃ | Minimum bending radius 30 mm | RoHS compliant | Measurement | Delivery time 5 days | Listed in the catalogue; manufactured to order | Custom support



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 ℃
Assembly length	200~5,000 mm

Order form example

Please provide the following information when placing an order.

＊ See P.33"Connector combination codes"

Example MWX121

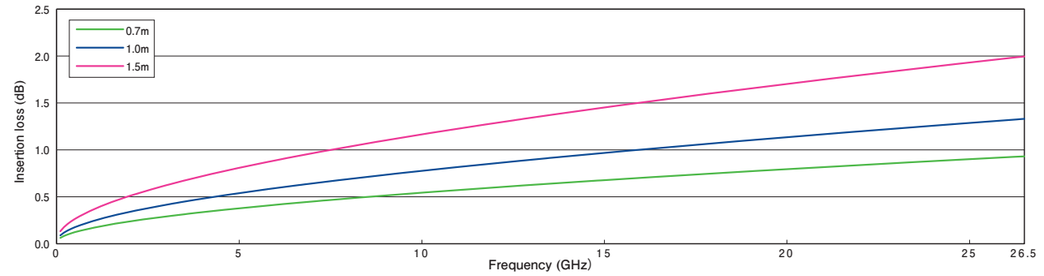
Assembly length：1000mm
Connector Ⅰ：3.5 mm(f) straight
Connector Ⅱ：3.5 mm(m) straight

Catalog No.
MWX121-01000DFSDMS
a b c

a:Cable
b:Assembly length
c:Connector

Technical Data

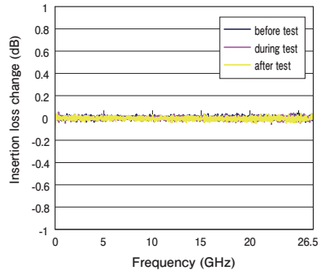
Cable typical insertion loss

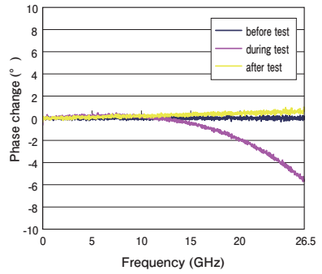


● Typical insertion loss (0.0077×f(GHz)+0.215×√f(GHz)+0.02)×L(m) ● Maximum insertion loss (0.0077×f(GHz)+0.215×√f(GHz)+0.02)×1.12×L(m)

Static bending data (insertion loss, phase)

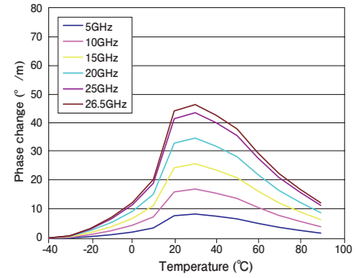
Bending radius: 30 mm





＊The cable was wrapped 360° around φ60mm mandrel.

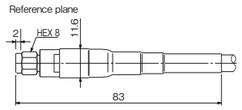
MWX121 Phase change vs. temperature



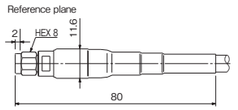
＊The cable was measured in chamber every 20 ℃ from -40 to 90 ℃, 1 hour after the temperature changed.

Connector

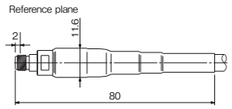
SMA(m) straight (Code:AMS)
Maximum operating frequency:18.5 GHz／Mass:14g



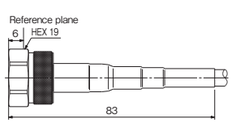
3.5mm(m) straight (Code:DMS)
Maximum operating frequency:26.5 GHz／Mass:13g



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

Static bending | Flexibility | Frequency 26.5 GHz | Temperature range -30~+85℃ | Minimum bending radius 30 mm | RoHS compliant | Measurement | Torque canceller | Delivery time 5 days | Listed in the catalogue; manufactured to order | Custom support



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 ℃
Assembly length	300~3,000 mm

Order form example

Please provide the following information when placing an order.

＊See P.33"Connector combination codes"

Example MWX122

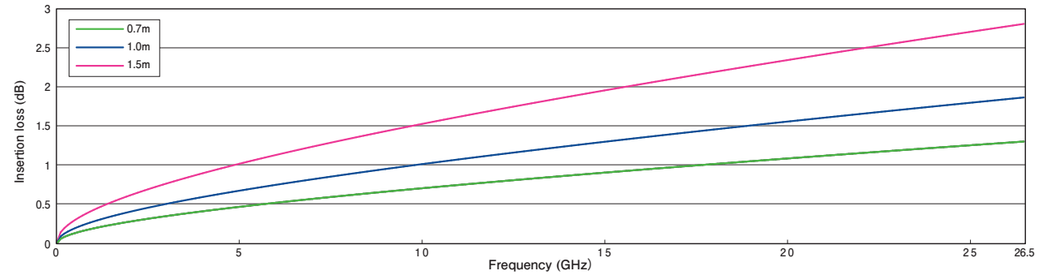
Assembly length：1000 mm
Connector Ⅰ：3.5 mm(f) straight torque canceller
Connector Ⅱ：3.5 mm(m) straight torque canceller

Catalog No.
MWX122-01000DFCDMC
a b c

a:Cable
b:Assembly length
c:Connector

Technical Data

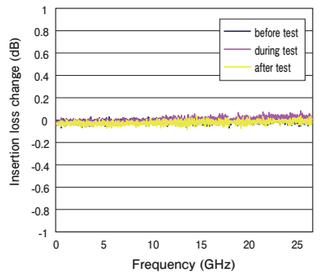
Cable typical insertion loss

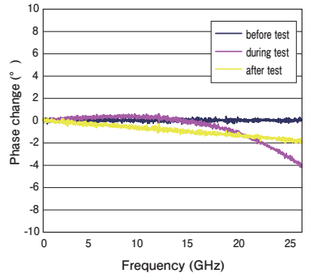


● ypical insertion loss (0.022f (GHz) +0.25√f (GHz) +0.025) ×L (m) ● Maximum insertion loss (0.022f (GHz) +0.25√f (GHz) +0.025) ×1.12×L (m)

Static bending data (insertion loss, phase)

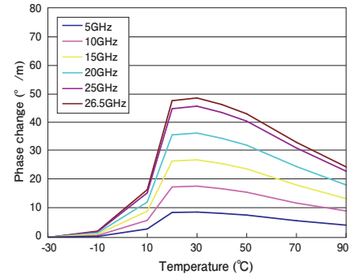
Bending radius: 30 mm





＊The cable was wrapped 360° around φ60mm mandrel.

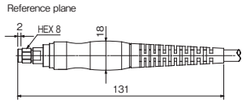
MWX122 Phase change vs. temperature



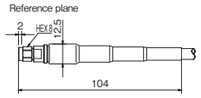
＊The cable was measured in chamber every 20 ℃ from -30 to 90 ℃, 1 hour after the temperature changed.

Connector

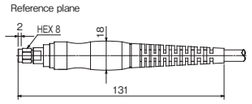
SMA(m) Torque canceller(Code:AMC)
Maximum operating frequency:18.5 GHz／Mass:41g



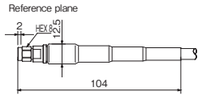
SMA(m) straight (Code:AMS)
Maximum operating frequency:18.5 GHz／Mass:15g



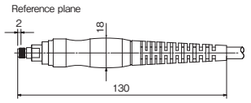
3.5mm(m) Torque canceller(Code:DMC)
Maximum operating frequency:26.5 GHz／Mass:41g



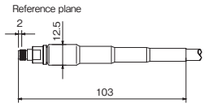
3.5mm(m) straight (Code:DMS)
Maximum operating frequency:26.5 GHz／Mass:15g



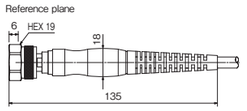
3.5mm(f) Torque canceller(Code:DFC)
Maximum operating frequency:26.5 GHz／Mass:40g



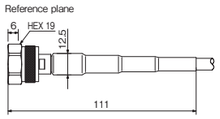
3.5mm(f) straight (Code:DFS)
Maximum operating frequency:26.5 GHz／Mass:14g



N(m) Torque canceller(Code:NMC)
Maximum operating frequency:18.0 GHz／Mass:67g



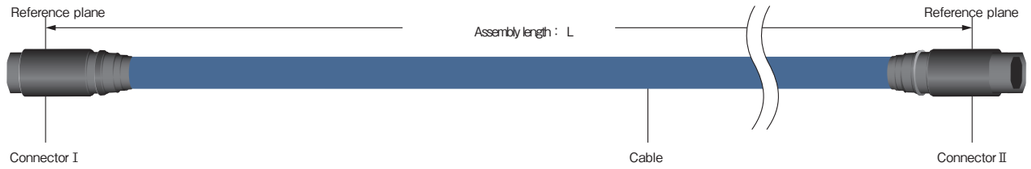
N(m) straight (Code:NMS)
Maximum operating frequency:18.0 GHz／Mass:41g



＊The above figures are measured values for reference only.

MWX1 SERIES

Placing orders



Catalog number

MWX121-02000 DMS DMS

ex.1
Cable : MWX121
Assembly length : 2000 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.

Catalog number

MWX122-01000 DFC DMC

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

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

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

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

Please provide a catalog number when placing an order.

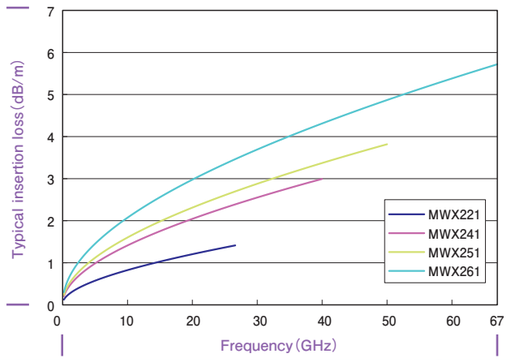
MWX2 SERIES

Flexible cable assemblies for measuring instruments

How to select

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

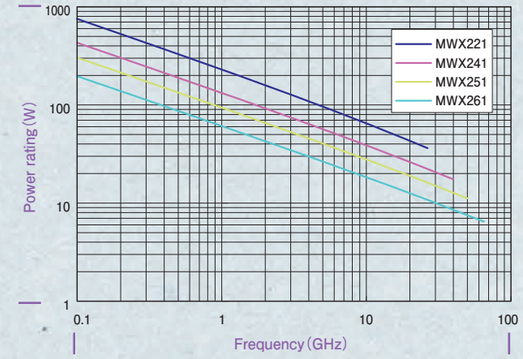
- Insertion loss:The larger the cable outer diameter, the lower the insertion loss.
- Frequency range:The smaller the cable, the higher the higher mode frequency.
- Power rating:The larger the cable outer diameter, the higher the power rating.
- Flexibility:The smaller the cable, the better the flexibility.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



Center conductor	Dielectric	1st outer conductor	2nd outer conductor	Sheath
Silver plated copper	Low density PTFE	Silver plated copper tape	Silver plated copper braid	PVC

Cable Structure Armored type



Center conductor	Dielectric	1st outer conductor	2nd outer conductor	Sheath	Armored	Braid	Sheath
Silver plated copper	Low density PTFE	Silver plated copper tape	Silver plated copper braid	Fluoropolymer	SUS Spiral tube	SUS wire	PVC

Cable Structure Lightweight Armored type (for fixed wiring)



Center conductor	Dielectric	1st outer conductor	2nd outer conductor	Sheath	Armored	Sheath
Silver plated copper	Low density PTFE	Silver plated copper tape	Silver plated copper braid	Fluoropolymer	SUS Spiral tube	PVC

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
		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)		●				●		●	●								
MWX241 (armored type)	40.0 GHz	●				●					●	●					
MWX241 (non-armored type, custom-made))		●				●					●	●	●				
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℃ test load : 454g diameter of bar : ϕ16mm

A test cable measuring 1,000 mm in length was formed into a circle with an internal diameter of 300mm. Both ends were overlapped andsecured 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.

MWX2 SERIES

MWX 221

Static bending · Flexibility · Frequency 26.5 GHz · Temperature range -30~+85℃ · Minimum bending radius 20~30 mm · RoHS compliant · Measurement · Armored · Lightweight Armored (for fixed wiring) · Delivery time 5 days · Listed in the catalogue; manufactured to order · Custom support



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 ℃	−30~+85 ℃	−30~+85 ℃
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.
MWX221-01000AMSDMS
a b c

Example 2
MWX221 Armored type
Assembly length:1500mm
Connector Ⅰ:N(m)straight
Connector Ⅱ:N(m)straight
Catalog No.
MWX221-01500NMSNMS/B
a b c d

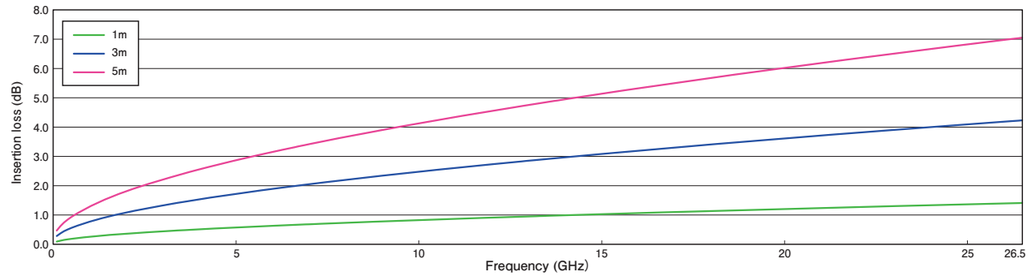
Example 3
MWX221 Lightweight Armored type
Assembly length:1000mm
Connector Ⅰ:SMA(m)straight
Connector Ⅱ:SMA(m)straight
Catalog No.
MWX221-01000AMSAMS/A
a b c d

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

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

Technical Data

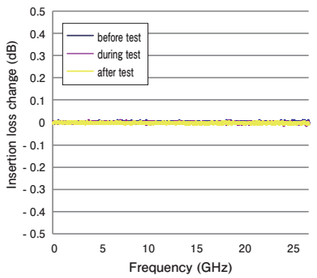
Cable typical insertion loss

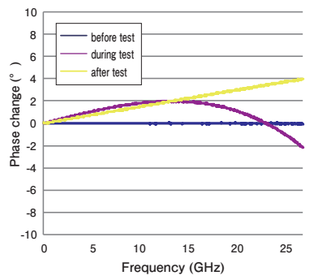


● Typical insertion loss (0.0077×f(GHz)+0.2304×√f(GHz)+0.02)×L(m) ● Maximum insertion loss (0.0077×f(GHz)+0.2304×√f(GHz)+0.02)×1.12×L(m)

Static bending data (insertion loss, phase)

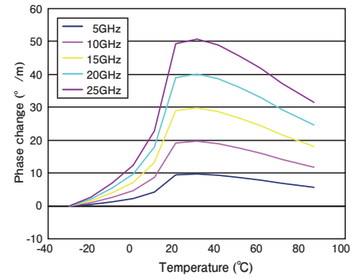
Bending radius: 30 mm





＊The cable was wrapped 360° around φ60mm mandrel.

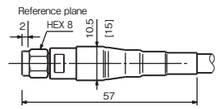
MWX221 Phase change vs. temperature



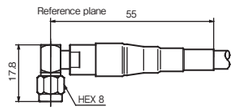
＊The cable was measured in chamber every 20 ℃ from -40 to 90 ℃, 1 hour after the temperature changed.

Connector

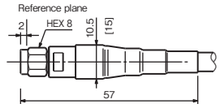
SMA(m) straight (Code:AMS)
Maximum operating frequency:18.5GHz／Mass:10g



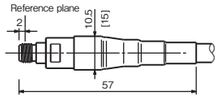
SMA(m) right Angle (Code:AMH)
Maximum operating frequency:18.0GHz／Mass:10g



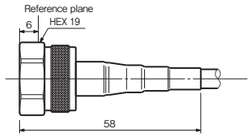
3.5mm(m) straight (Code:DMS)
Maximum operating frequency:26.5GHz／Mass:11g



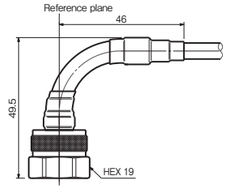
3.5mm(f) straight (Code:DFS)
Maximum operating frequency:26.5 GHz／Mass:10g



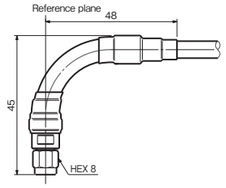
N(m) straight (Code:NMS)
Maximum operating frequency:18.0GHz／Mass:38g



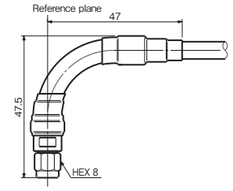
N(m) swept (Code:NMW)
Maximum operating frequency:18.0GHz／Mass:46g



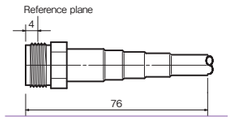
SMA(m) swept (Code:AMW)
Maximum operating frequency:18.5GHz／Mass:17g



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.

MWX2 SERIES

MWX 241

Static bending · Flexibility · Frequency 40.0 GHz · Temperature range -30~+85℃ · Minimum bending radius 20 mm · RoHS compliant · Measurement · Armored · Lightweight Armored (for fixed wiring) · Delivery time 5 days · Listed in the catalogue; manufactured to order · Custom support



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 ℃	−30~+85 ℃	−30~+85 ℃
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
*The individual specification is required.

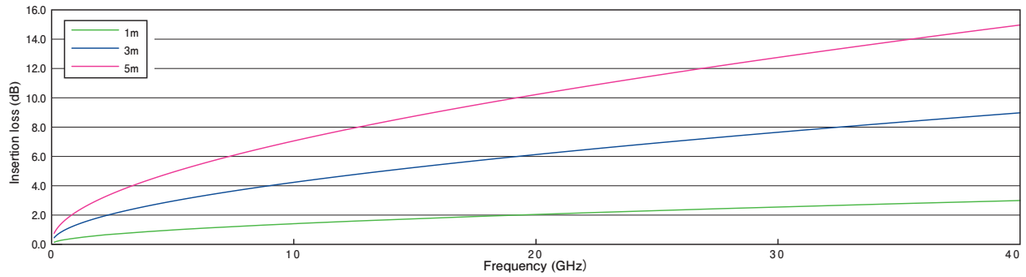
Example 3
MWX241 Lightweight Armored type
Assembly length: 1000mm
Connector Ⅰ: 2.92mm(m) straight
Connector Ⅱ: 2.92mm(m) straight
Catalog No.
MWX241-01000KMSKMS/A
a b c d

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

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

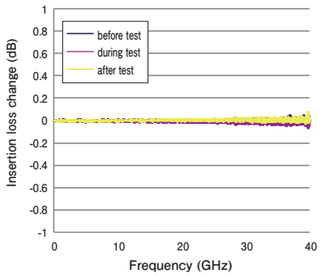
Technical Data

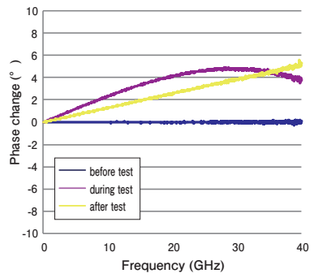
Cable typical insertion loss



● Typical insertion loss (0.0095×f(GHz)+0.41×√f(GHz)+0.02)×L(m) ● Maximum insertion loss (0.0095×f(GHz)+0.41×√f(GHz)+0.02)×1.12×L(m)

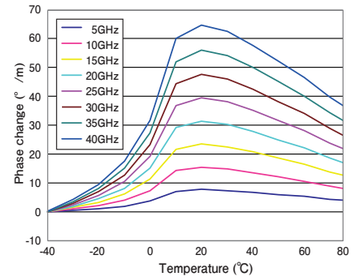
Static bending data (insertion loss, phase) Bending radius: 20 mm





*The cable was wrapped 360° around φ40mm mandrel.

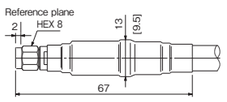
MWX241 Phase change vs. temperature



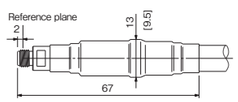
*The cable was measured in chamber every 20 ℃ from -40 to 90 ℃, 1 hour after the temperature changed.

Connector

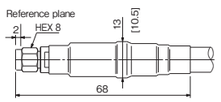
2.92mm (m) straight (Code:KMS)
Maximum operating frequency:40.0 GHz / Mass:10g



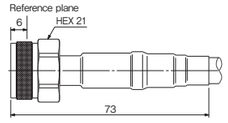
2.92mm (f) straight (Code:KFS)
Maximum operating frequency:40.0 GHz / Mass:10g



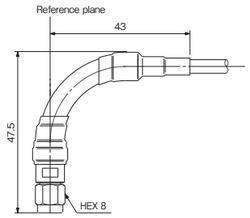
SMA (m) straight (Code:AMS)
Maximum operating frequency:18.5 GHz / Mass:12g



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.

MWX2 SERIES

MWX 251

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



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.)	1.197/1.43
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 ℃	−30~+85 ℃
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.

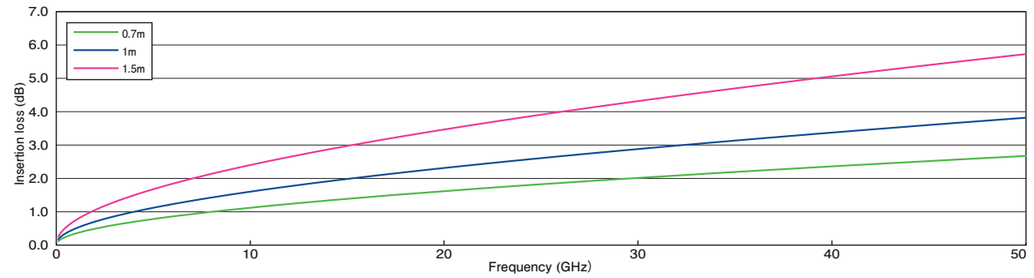
a:Cable
b:Assembly length
c:Connector
d:Armored

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

Option

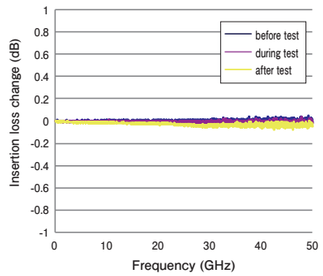
Technical Data

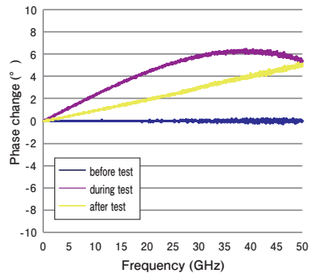
Cable typical insertion loss



● Typical insertion loss (0.0095×f(GHz)+0.47×√f(GHz)+0.02)×L(m) ● Maximum insertion loss (0.0095×f(GHz)+0.47×√f(GHz)+0.02)×1.12×L(m)

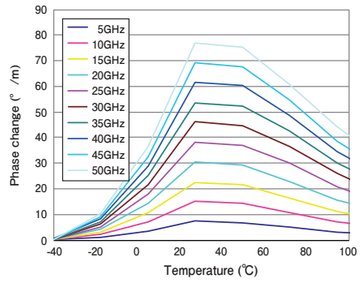
Static bending data (insertion loss, phase) Bending radius: 20 mm





*The cable was wrapped 360° around φ40mm mandrel.

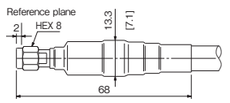
MWX251 Phase change vs. temperature



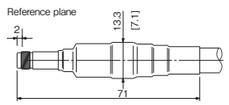
*The cable was measured in chamber every 20 ℃ from -40 to 90 ℃, 1 hour after the temperature changed.

Connector

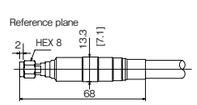
2.4mm(m) straight (Code:LMS)
Maximum operating frequency:50.0 GHz／Mass:13g



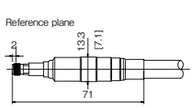
2.4mm(f) straight (Code:LFS)
Maximum operating frequency:50.0 GHz／Mass:13g



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.

*The above figures are measured values for reference only.

MWX2 SERIES

MWX 261

Static bending · Flexibility · Frequency 67.0 GHz · Temperature range -30~+85℃ · Minimum bending radius 6~20 mm · RoHS compliant · Measurement · Armored · Delivery time 5 days · Listed in the catalogue; manufactured to order · Custom support



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.)	1.197/1.43
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 ℃	−30~+85 ℃
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: 1000 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.

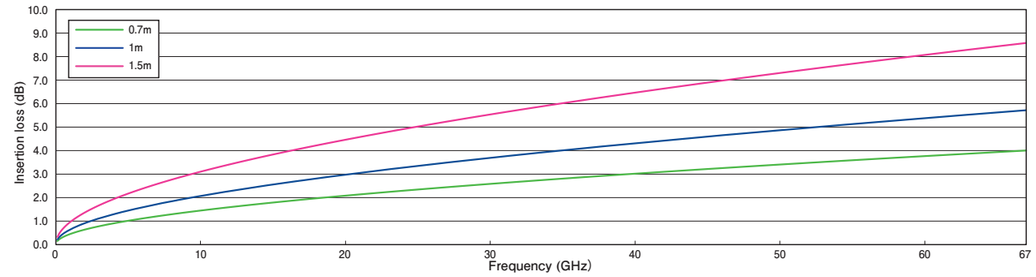
a:Cable
b:Assembly length
c:Connector
d:Armored

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

Option

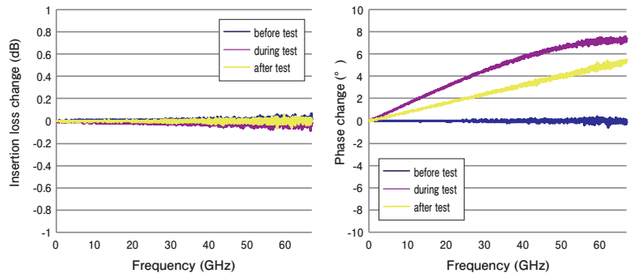
Technical Data

Cable typical insertion loss



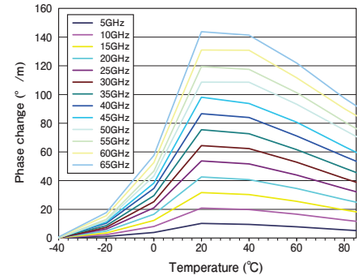
● Typical insertion loss (0.0095×f(GHz)+0.6148×√f(GHz)+0.02)×L(m) ● Maximum insertion loss (0.0095×f(GHz)+0.6148×√f(GHz)+0.02)×1.12×L(m)

Static bending data (insertion loss, phase) Bending radius: 20 mm



＊The cable was wrapped 360° around φ40mm mandrel.

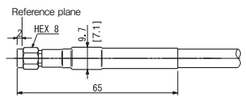
MWX261 Phase change vs. temperature



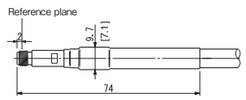
＊The cable was measured in chamber every 20 ℃ from -40 to 90 ℃, 1 hour after the temperature changed.

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

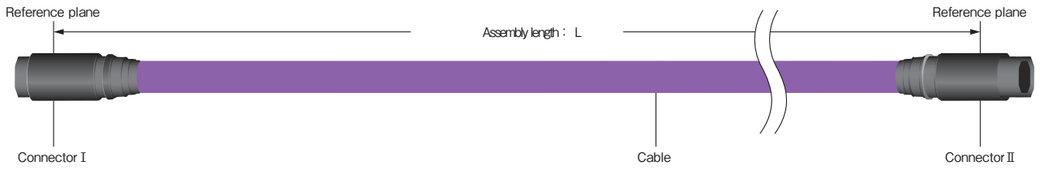


・[ ] : Non - armored type size.

＊The above figures are measured values for reference only.

MWX2 SERIES

Placing orders



Catalog number
MWX221-01000 DMS DMS

ex.1
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.

Catalog number
MWX241-02000 KMS KMS /B

ex.2
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.

Catalog number
MWX221-01000 AMS AMS /A

ex.3
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.

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.

Connector combination codes

Connector Ⅰ / Connector Ⅱ			SMA m AMS	SMA right angle m AMH	SMA swept m AMW	N m NMS	N f NFS	N swept m NMW	3.5mm m DMS	3.5mm f DFS	3.5mm swept m DMW	2.92mm m KMS	2.92mm f KFS	2.4mm m LMS	2.4mm f LFS	1.85mm m VMS	1.85mm f VFS
SMA	m	AMS	AMSAMS	AMHAMS	AMSAMW	AMSNMS	AMSNFS	AMSNMW	AMSDMS	AMSDFS	AMSDMW	AMSKMS	AMSKFS	—	—	—	—
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	DFSDMS	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.

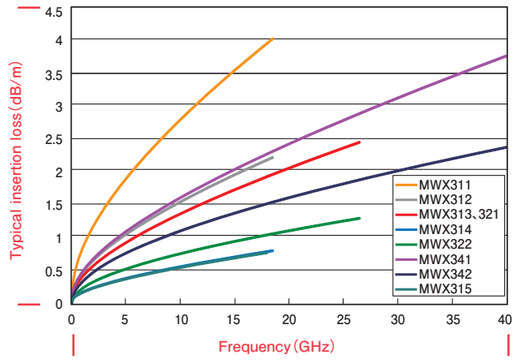
MWX3 SERIES

Cable assemblies for equipment wiring

How to select

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))

MWX3 Series typical insertion loss

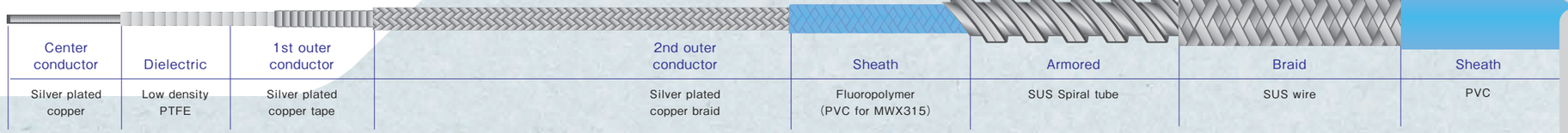


*MWX313:～18.5 GHz、MWX321:～26.5 GHz
*MWX312:～18.5 GHz、MWX341:～40.0 GHz

Simple criteria for cable selection

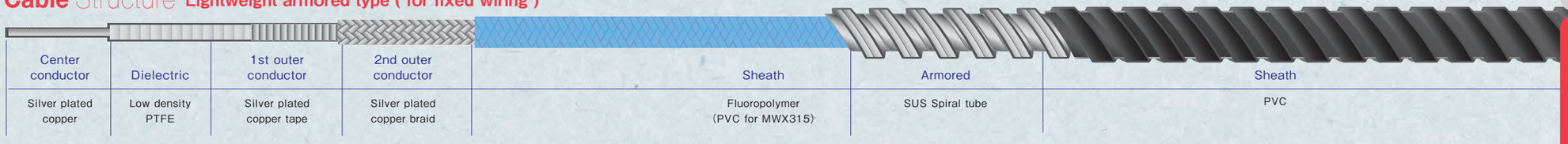
- Insertion loss:The larger the cable outer diameter, the lower the insertion loss.
- Frequency range:The smaller the cable, the higher the higher mode frequency.
- Power rating:The larger the cable outer diameter, the higher the power rating.
- Flexibility:The smaller the cable, the better the flexibility.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

Cable Structure Armored type



Center conductor	Dielectric	1st outer conductor	2nd outer conductor	Sheath	Armored	Braid	Sheath
Silver plated copper	Low density PTFE	Silver plated copper tape	Silver plated copper braid	Fluoropolymer (PVC for MWX315)	SUS Spiral tube	SUS wire	PVC

Cable Structure Lightweight armored type (for fixed wiring)



Center conductor	Dielectric	1st outer conductor	2nd outer conductor	Sheath	Armored	Sheath
Silver plated copper	Low density PTFE	Silver plated copper tape	Silver plated copper braid	Fluoropolymer (PVC for MWX315)	SUS Spiral tube	PVC

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													
		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												●	●	●	●

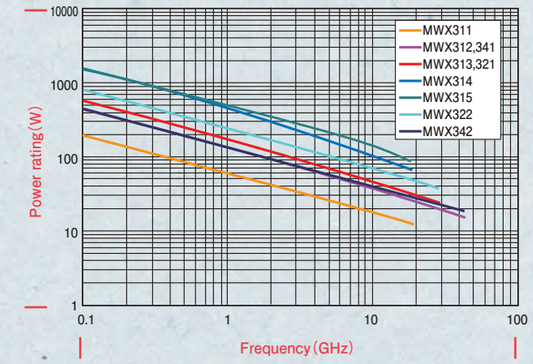
(*1)Available SMA(m) right angle type up to 18.0GHz.
(*2)Phase Matching Connector is also available upon the requirement.
(*3)(*4)Those SMA(m) connectors are uniquely developed by Junkosha, which specified to be used for 26.5 GHz and 40 GHz.
*See the individual specification of each cables.

Power rating

The diagram to the right shows the relationship between frequency and power rating.
The values are calculated at 25 ℃ 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

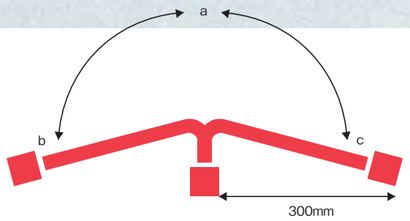


Center conductor	Dielectric	1st outer conductor	2nd outer conductor	Sheath
Silver plated copper	Low density PTFE	Silver plated copper tape	Silver plated copper braid	Fluoropolymer (PVC for MWX315)

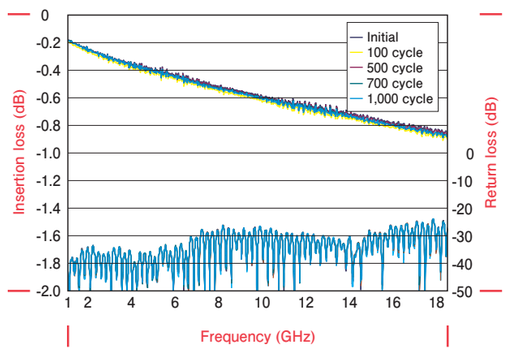
Bending test data of MWX312

Test method

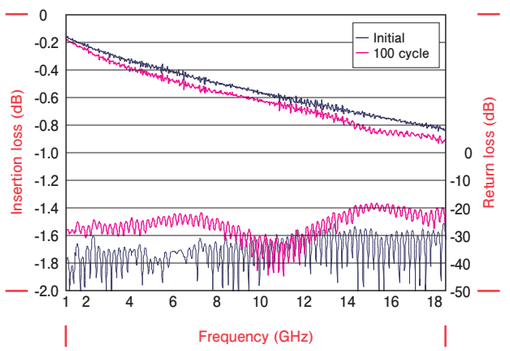
The connector on one end of test cable (MXW312-00500AMSAMS, measuring 500 mm in length and with SMA (m) connectors on both ends) was fixed in place.
The connector on the other end was moved in the sequence a → b → c, after which initial insertion loss and return loss values were compared to those after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



MWX312-00500AMSAMS



Previous product

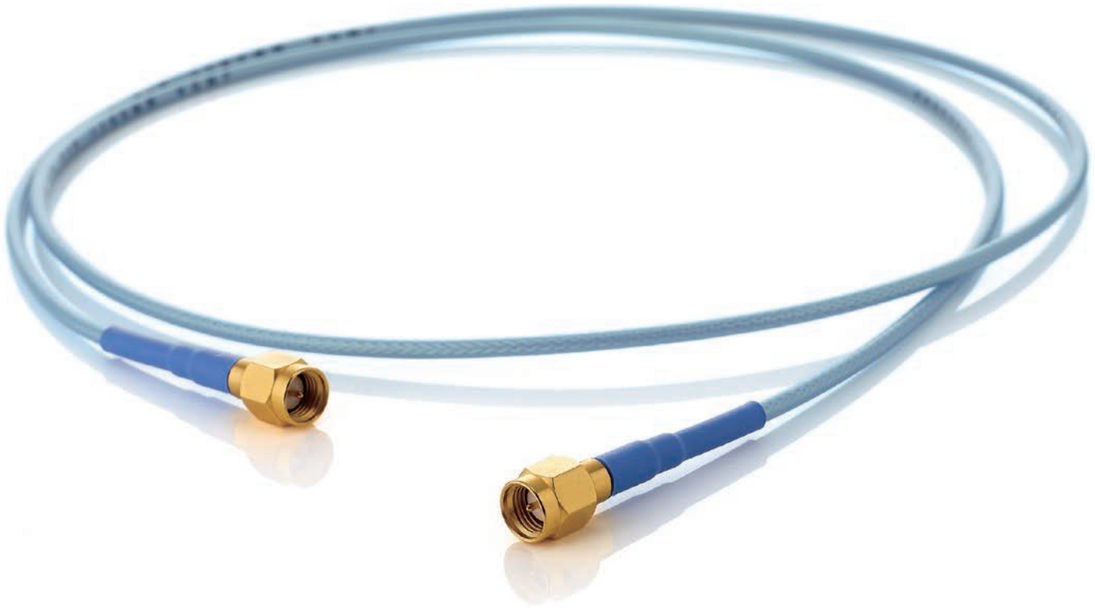


*The above figures are measured values for reference only.

MWX3 SERIES

MWX 311

Temperature change | Frequency 18.5 GHz | Temperature range -65~+125℃ | Minimum bending radius 10 mm | RoHS compliant | Equipment wiring | Listed in the catalogue; manufactured to order | Custom support



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 ℃
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

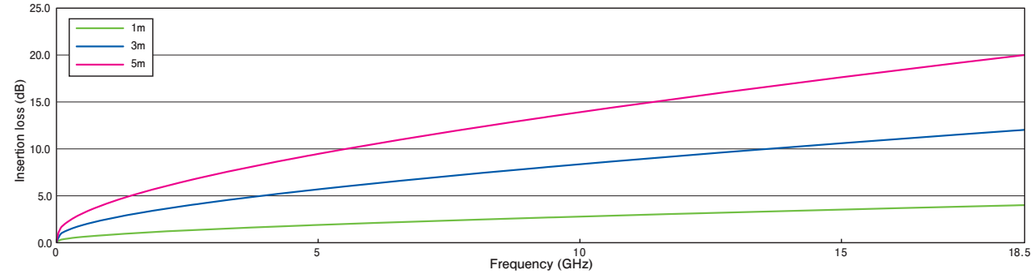
Catalog No.
MWX311- 01500AFSAMR
a b c

a:Cable
b:Assembly length
c:Connector

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

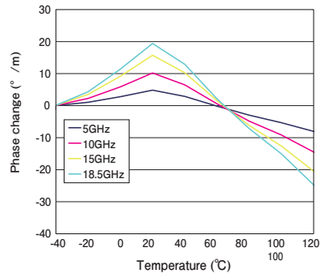
Technical Data

Cable typical insertion loss



● Typical insertion loss 1.55×(0.0297×f(GHz)+0.371×√f(GHz)+0.07)×L(m) ● Maximum insertion loss 1.55×(0.0297×f(GHz)+0.371×√f(GHz)+0.07)×1.12×L(m)

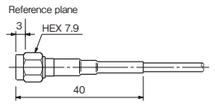
MWX311 Phase change vs. temperature



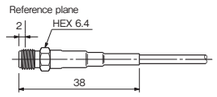
＊The cable was measured in chamber every 20 ℃ from -40 ℃, 1 hour after the temperature changed.

Connector

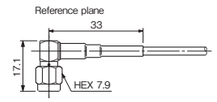
SMA(m) straight (Code:AMS)
Maximum operating frequency:18.5 GHz／Mass:3g



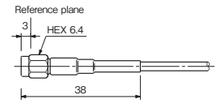
SMA(f) straight (Code:AFS)
Maximum operating frequency:18.5 GHz／Mass:3g



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



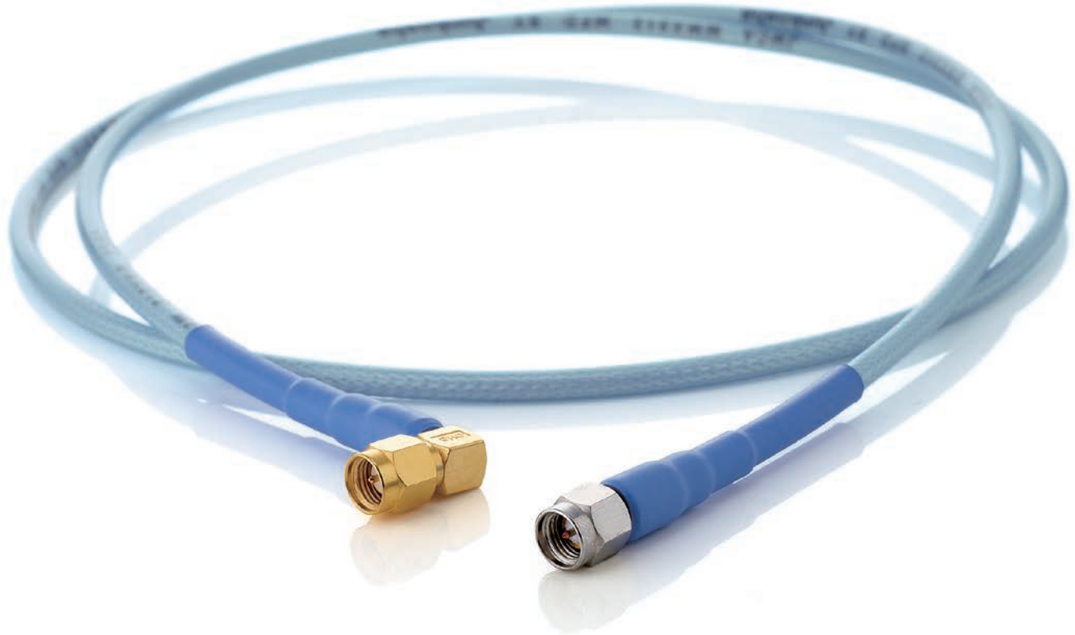
・Please see P.82 about" customer-specified swept and right angle connectors".

＊The above figures are measured values for reference only.

MWX3 SERIES

MWX 312

Temperature change | Frequency 18.5 GHz | Temperature range -65~+125℃ | Minimum bending radius 20 mm | RoHS compliant | Equipment wiring | Listed in the catalogue; manufactured to order | Custom support



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 ℃
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.
MWX312-01000AFSNMS
a b c

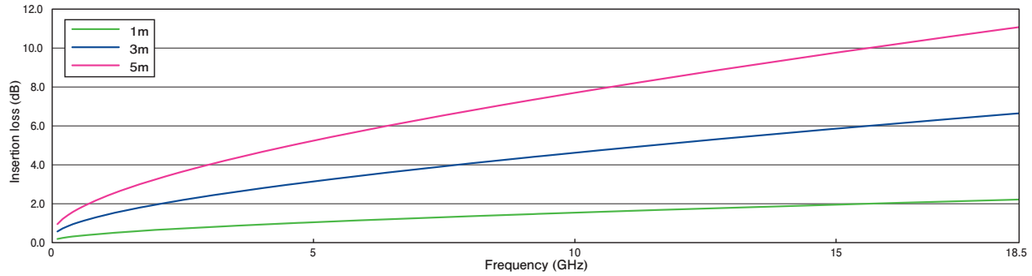
a:Cable
b:Assembly length
c:Connector

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

Option

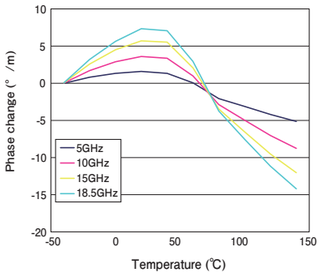
Technical Data

Cable typical insertion loss



● Typical insertion loss (0.0297×f(GHz)+0.371×√f(GHz)+0.07)×L(m) ● Maximum insertion loss (0.0297×f(GHz)+0.371×√f(GHz)+0.07)×1.12×L(m)

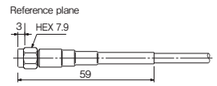
MWX312 Phase change vs. temperature



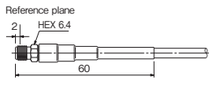
＊The cable was measured in chamber every 20 ℃ from -40 ℃, 1 hour after the temperature changed.

Connector

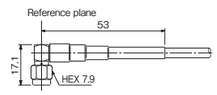
SMA(m) straight (Code:AMS)
Maximum operating frequency:18.5 GHz／Mass:3g



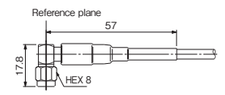
SMA(f) straight (Code:AFS)
Maximum operating frequency:18.5 GHz／Mass:3g



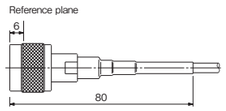
SMA(m) right angle (Code:AMR)
Maximum operating frequency:10.0 GHz／Mass:5g



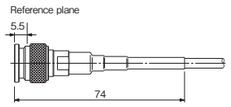
SMA(m) right angle (Code:AMH)
Maximum operating frequency:18.0 GHz／Mass:12g



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



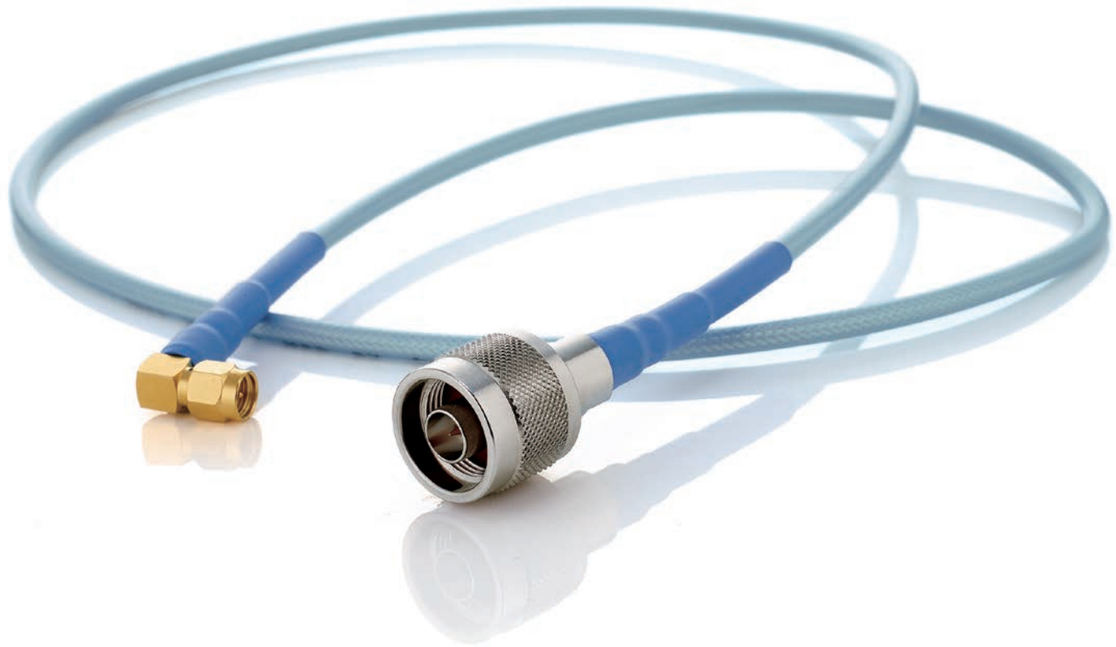
・Please see P.82 about" customer-specified swept and right angle connectors".

＊The above figures are measured values for reference only.

MWX3 SERIES

MWX 313

Temperature change
Frequency 18.5 GHz
Temperature range -65~+125℃
Minimum bending radius 30 mm
RoHS compliant
Equipment wiring
Listed in the catalogue; manufactured to order
Custom support



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 ℃
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

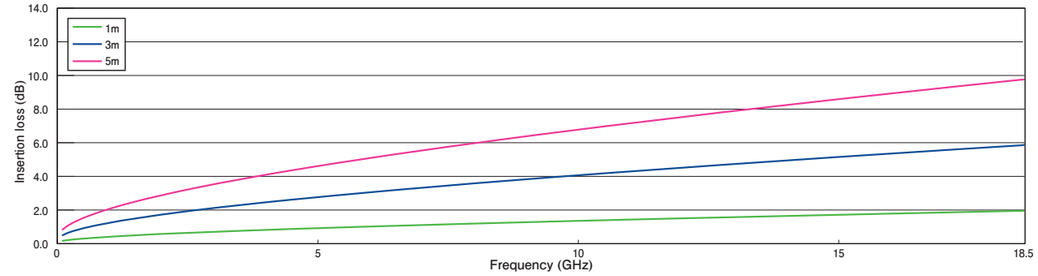
a:Cable
b:Assembly length
c:Connector

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

Option

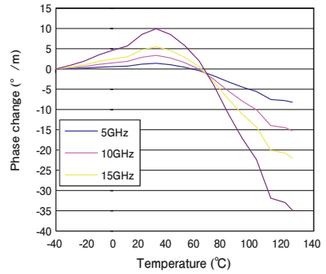
Technical Data

Cable typical insertion loss



● Typical insertion loss $0.88\times(0.0297\times f(GHz)+0.371\times\sqrt{f(GHz)}+0.07)\times L(m)$ ● Maximum insertion loss $0.88\times(0.0297\times f(GHz)+0.371\times\sqrt{f(GHz)}+0.07)\times 1.12\times L(m)$

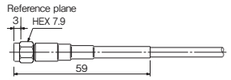
MWX313 Phase change vs. temperature



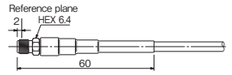
＊The cable was measured in chamber every 20 ℃ from -40 ℃, 1 hour after the temperature changed.

Connector

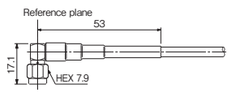
SMA(m) straight (Code:AMS)
Maximum operating frequency:18.5 GHz／Mass:3g



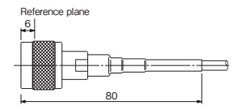
SMA(f) straight (Code:AFS)
Maximum operating frequency:18.5 GHz／Mass:3g



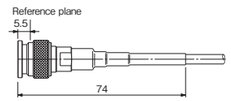
SMA(m) right angle (Code:AMR)
Maximum operating frequency:10.0 GHz／Mass:5g



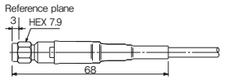
N(m) straight (Code:NMS)
Maximum operating frequency:18.5 GHz／Mass:39g



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".

＊The above figures are measured values for reference only.

MWX3 SERIES

MWX 314

Temperature change
Frequency 18.5 GHz
Temperature range -65~+125℃
Minimum bending radius 40 mm
RoHS compliant
Equipment wiring
Listed in the catalogue; manufactured to order
Custom support



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 ℃
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

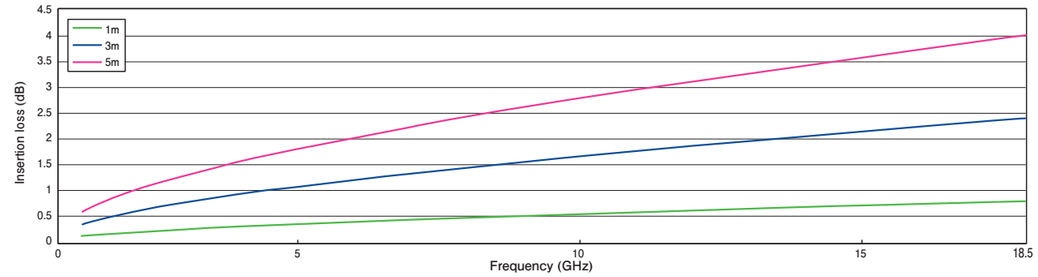
Example 2 MWX314
Assembly length：1500mm
Connector Ⅰ：N(m)straight
Connector Ⅱ：N(m)straight
Catalog No.
MWX314-01500NMSNMS
a b c

a:Cable
b:Assembly length
c:Connector

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

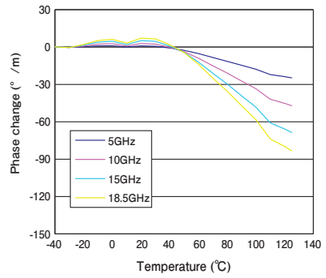
Technical Data

Cable typical insertion loss



● Typical insertion loss $0.36\times(0.0297\times f(GHz)+0.371\times\sqrt{f(GHz)}+0.07)\times L(m)$ ● Maximum insertion loss $0.36\times(0.0297\times f(GHz)+0.371\times\sqrt{f(GHz)}+0.07)\times 1.12\times L(m)$

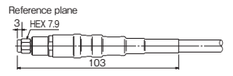
MWX314 Phase change vs. temperature



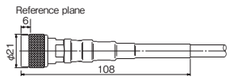
＊The cable was measured in chamber every 20 ℃ from -40 ℃, 1 hour after the temperature changed.

Connector

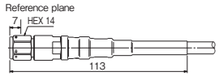
SMA(m) straight (Code:AMS)
Maximum operating frequency:18.5 GHz／Mass:39g



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



＊The above figures are measured values for reference only.

MWX3 SERIES

MWX 315

Temperature change
Frequency 18.0 GHz
Temperature range -30~+85℃
Minimum bending radius 30~40 mm
RoHS compliant
Equipment wiring
Lightweight Armored (for fixed wiring)
Listed in the catalogue; manufactured to order
Custom support



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 ℃	−30~+85 ℃
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

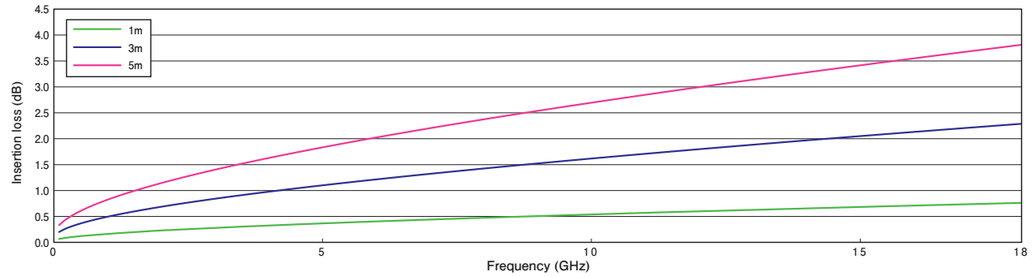
Catalog No.
MWX315-01000AMSAMS/A
a b c d

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

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

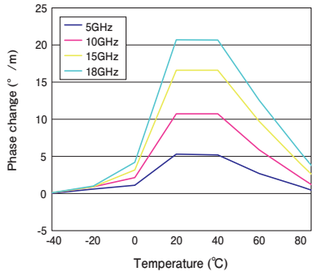
Technical Data

Cable typical insertion loss



● Typical insertion loss $0.35\times(0.0297\times f+0.371\times\sqrt{f}+0.07)\times L(m)$ ● Maximum insertion loss $0.35\times(0.0297\times f+0.371\times\sqrt{f}+0.07)\times L(m)\times 1.12$

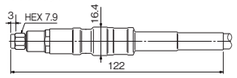
MWX315 Phase change vs. temperature



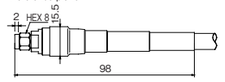
＊The cable was measured in chamber every 20 ℃ from -40 ℃, 1 hour after the temperature changed.

Connector

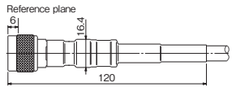
SMA(m) straight (Code:AMS)
Maximum operating frequency:18.0 GHz / Mass:46g



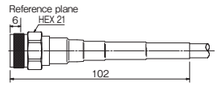
Lightweight type SMA(m) straight (Code:AMS1)
Maximum operating frequency:18.0 GHz / Mass:20g



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



＊The above figures are measured values for reference only.

MWX3 SERIES

MWX 321

Temperature change
Frequency 26.5 GHz
Temperature range -65~+125℃
Minimum bending radius 30 mm
RoHS compliant
Equipment wiring
Listed in the catalogue; manufactured to order
Custom support



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 ℃
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

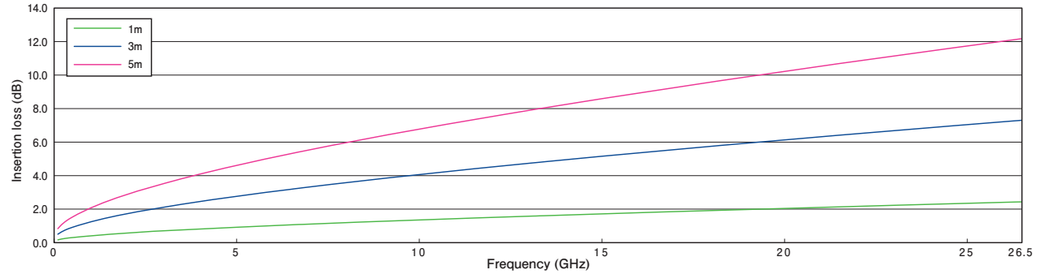
a:Cable
b:Assembly length
c:Connector

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

Option

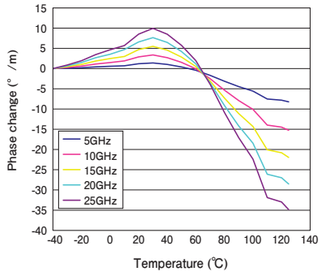
Technical Data

Cable typical insertion loss



● Typical insertion loss $0.88\times(0.0297\times f(GHz)+0.371\times\sqrt{f(GHz)}+0.07)\times L(m)$ ● Maximum insertion loss $0.88\times(0.0297\times f(GHz)+0.371\times\sqrt{f(GHz)}+0.07)\times 1.12\times L(m)$

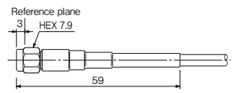
MWX321 Phase change vs. temperature



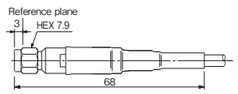
＊The cable was measured in chamber every 20 ℃ from -40 ℃, 1 hour after the temperature changed.

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



＊The above figures are measured values for reference only.

MWX3 SERIES

MWX322

Temperature change
Frequency 26.5 GHz
Temperature range -65~+125℃
Minimum bending radius 20~25mm
RoHS compliant
Equipment wiring
Armored
Lightweight Armored (for fixed wiring)
Listed in the catalogue/ manufactured to order
Custom support



Property

Electrical properties

Maximum operating frequency	26.5 GHz
Characteristic impedance	50±1 Ω
Capacitance (typ.)	88 pF/m
Propagation delay (typ.)	4.38 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)	1.3 dB/m

Mechanical properties

Mechanical properties	Standard type	Armored type	Lightweight Armored type (for fixed wiring)
Cable outer diameter	5.2 mm	12.5 mm	11.0 mm
Minimum bending radius (inner side)	25 mm	25 mm	25 mm
Maximum tensil strength)	98 N(10 kgf)	98 N(10 kgf)	98 N(10kgf)
Cable mass (typ.)	60 g/m	208 g/m	155 g/m
Continuous operating temperature range	−65~+125 ℃	−30~+85 ℃	−30~+85 ℃
Armored side pressure	—	196 N/cm	196 N/cm
Assembly length	200~20,000 mm	700~5,000 mm	500~20,000 mm

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.
MWX322-01000AMSNMS
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

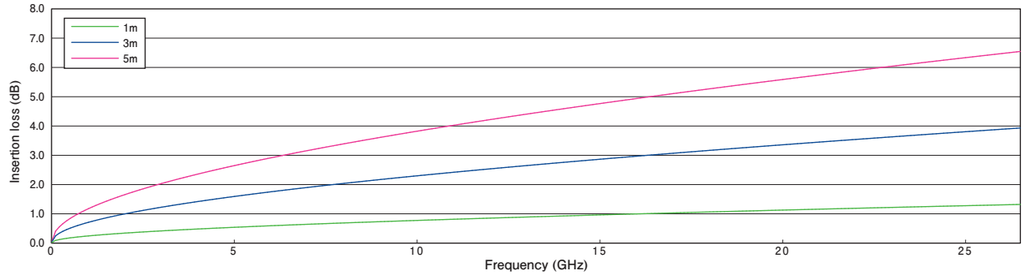
Example 3
MWX322 Lightweight Armored type
Assembly length: 1000mm
Connector Ⅰ: SMA(m) straight
Connector Ⅱ: SMA(m) straight
Catalog No.
MWX321-01000AMSAMS/A
a b c d

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

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

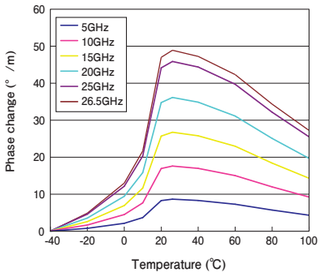
Technical Data

Cable typical insertion loss



● Typical insertion loss (0.214×√f(GHz)+0.007×f(GHz)+0.01)×L(m) ● Maximum insertion loss (0.214×√f(GHz)+0.007×f(GHz)+0.01)×1.12×L(m)

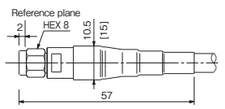
MWX322 Phase change vs. temperature



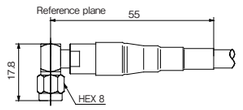
＊The cable was measured in chamber every 20 ℃ from -40 ℃, 1 hour after the temperature changed.

Connector

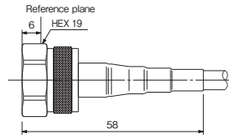
SMA(m) straight (Code:AMS)
Maximum operating frequency:18.5 GHz／Mass:10g



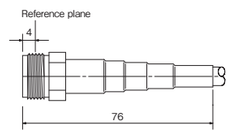
SMA(m) right angle (Code:AMH) (＊1) (＊2)
Maximum operating frequency:18.0 GHz／Mass:10g



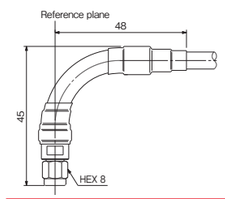
N(m) straight (Code:NMS)
Maximum operating frequency:18.0 GHz／Mass:38g



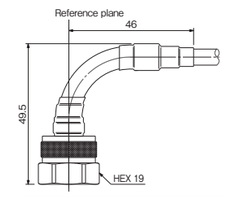
N(f) straight (Code:NFS)
Maximum operating frequency:18.0 GHz／Mass:26g



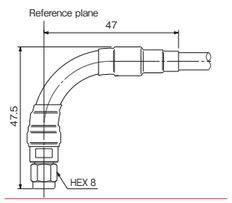
SMA(m)(m) swept (Code:AMW) (＊1) (＊2)
Maximum operating frequency:18.5 GHz／Mass:17g



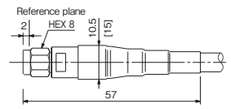
N(m)(m) swept (Code:NMW) (＊1) (＊2)
Maximum operating frequency:18.0 GHz／Mass:46g



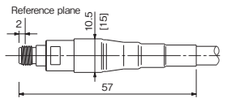
3.5mm(m)(m) swept (Code:DMW)
Maximum operating frequency:26.5 GHz／Mass:18g



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.

MWX3 SERIES

MWX 341

Temperature change
Frequency 40.0 GHz
Temperature range -65~+125℃
Minimum bending radius 20 mm
RoHS compliant
Equipment wiring
Listed in the catalogue; manufactured to order
Custom support



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.)	1.197/1.44
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 ℃
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 b c

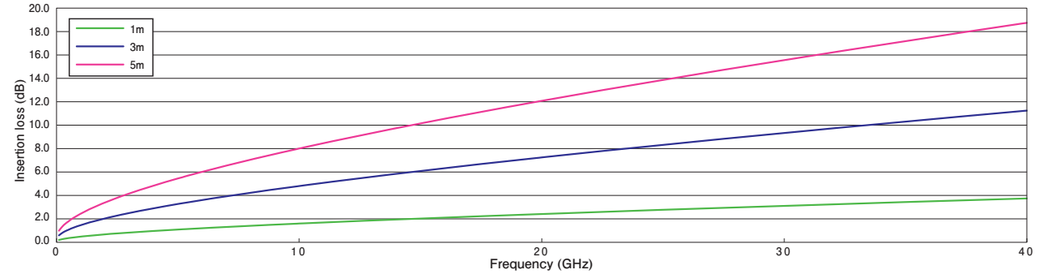
a:Cable
b:Assembly length
c:Connector

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

Option

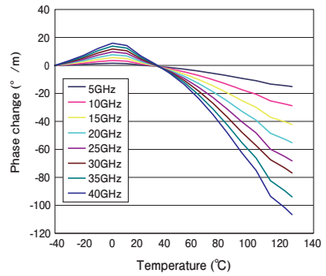
Technical Data

Cable typical insertion loss



● Typical insertion loss1.04×(0.0297×f(GHz)+0.371×√f(GHz)+0.07)×L(m) ● Maximum insertion loss1.04×(0.0297×f(GHz)+0.371×√f(GHz)+0.07)×1.12×L(m)

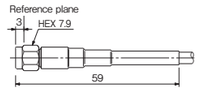
MWX341 Phase change vs. temperature



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

Connector

SMA(m) straight (Code:AMS)
Maximum operating frequency:40.0 GHz／Mass:3g

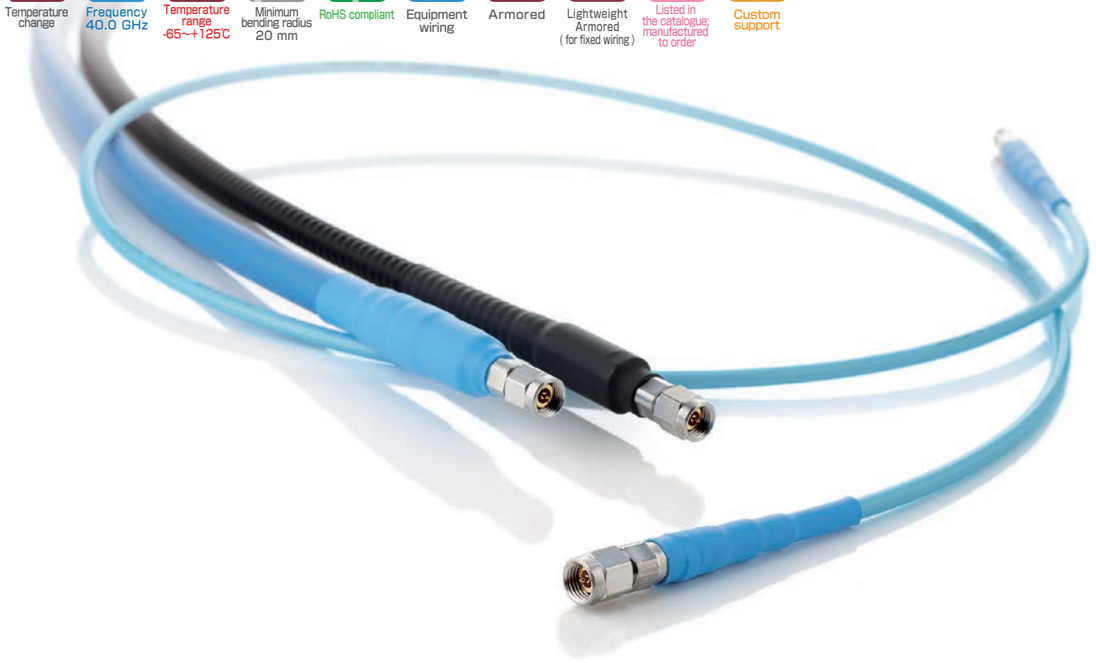


＊The above figures are measured values for reference only.

MWX3 SERIES

MWX342

Temperature change
Frequency 40.0 GHz
Temperature range -65~+125℃
Minimum bending radius 20 mm
RoHS compliant
Equipment wiring
Armored
Lightweight Armored (for fixed wiring)
Listed in the catalogue; manufactured to order
Custom support



Property

Electrical properties

Maximum operating frequency	40.0 GHz
Characteristic impedance	50±1 Ω
Capacitance (typ.)	87 pF/m
Propagation delay (typ.)	4.35 ns/m
Wavelength reduction rate (typ.)	76 %
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)	2.4 dB/m

Mechanical properties	Standard type	Armored type	Lightweight Armored type (for fixed wiring)
Cable outer diameter	3.9 mm	9.5 mm	8.0 mm
Minimum bending radius (inner side)	20 mm	20 mm	20 mm
Maximum tensil strength)	98 N(10 kgf)	98 N(10 kgf)	98 N(10kgf)
Cable mass (typ.)	35 g/m	137 g/m	98 g/m
Continuous operating temperature range	−65~+125 ℃	−30~+85 ℃	−30~+85℃
Armored side pressure	−	196 N/cm	196 N/cm
Assembly length	200~10,000 mm	700~10,000 mm	500~10,000 mm

Order form example

Please provide the following information when placing an order.

＊See P.67 "Connector combination codes"

Example 1
MWX342
Assembly length : 1000 mm
Connector Ⅰ : 2.92mm(f) straight
Connector Ⅱ : 2.92mm(m) straight
Catalog No.
MWX342-01000KFSKMS
a b c

Example 2
MWX342 Armored type
Assembly length : 1000mm
Connector Ⅰ : 2.4mm(f) straight
Connector Ⅱ : 2.4mm(m) straight
Catalog No.
MWX342-01000LFSLMS/B
a b c d

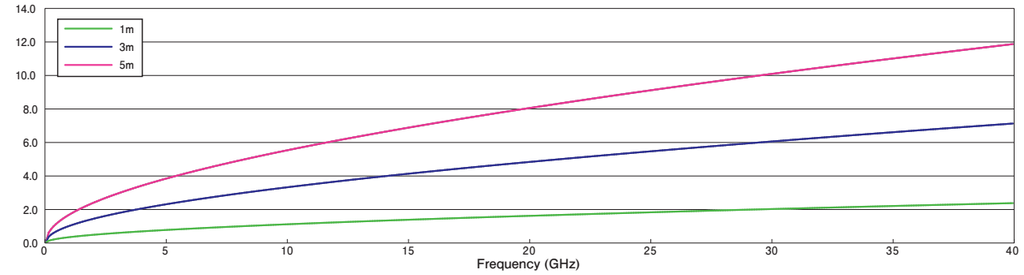
Example 3
MWX342 Lightweight Armored type
Assembly length : 1000mm
Connector Ⅰ : 2.92mm(m) straight
Connector Ⅱ : 2.92mm(m) straight
Catalog No.
MWX342-01000KMSKMS/A
a b c d

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

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

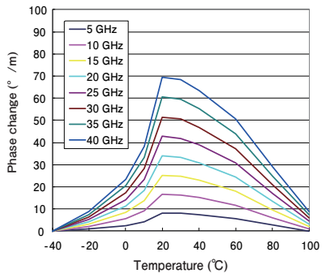
Technical Data

Cable typical insertion loss



● Typical insertion loss (0.315×√f(GHz)+0.009×f(GHz)+0.02)×L(m) ● Maximum insertion loss (0.315×√f(GHz)+0.009×f(GHz)+0.02)×1.12×L(m)

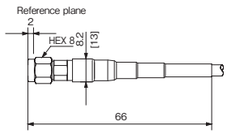
MWX342 Phase change vs. temperature



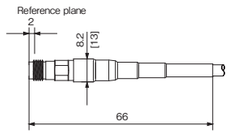
＊The cable was measured in chamber every 20 ℃ from -40 ℃, 1 hour after the temperature changed.

Connector

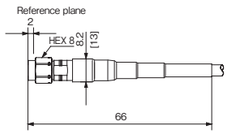
2.92mm (m) straight (Code:KMS)
Maximum operating frequency:40.0 GHz／Mass:6g



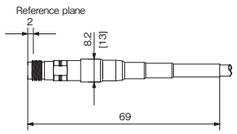
2.92mm (f) straight (Code:KFS)
Maximum operating frequency:40.0 GHz／Mass:5g



2.4mm (m) straight (Code:LMS)
Maximum operating frequency:40.0 GHz／Mass:6g



2.4mm (f) straight (Code:LFS)
Maximum operating frequency:40.0 GHz／Mass:6g

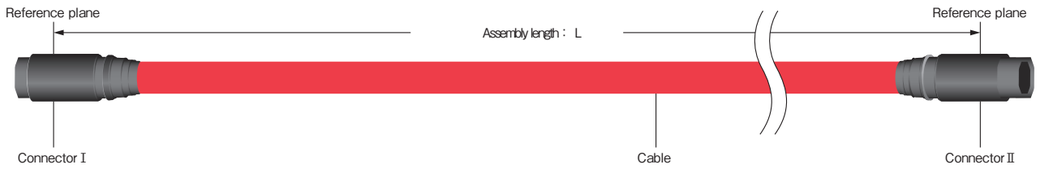


・[ ] : Armored type size.

＊The above figures are measured values for reference only.

MWX3 SERIES

Placing orders



Catalog number
MWX312-01500 AFS AMS

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

Catalog number
MWX322-01000 DFS DMS /B

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

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

Catalog number
MWX342-01000 KMS KMS /A

ex.3
Cable : MWX342
Assembly length : 1000mm
Connector Ⅰ : 2.92mm(m) Straight
Connector Ⅱ : 2.92mm(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 Lightweight type	SMA	SMA right angle	SMA right angle (18.0GHz type)	SSMA	N	N Light weight type	TNC	3.5mm	3.5mm	2.92mm	2.92mm	2.4mm	2.4mm
			m	m	f	m	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	AMHAMS	AMSSMS	AMSNMS	AMSNMS1	AMSCMS	AMSDMS	AMSDFS	—	—	—	—
SMA Lightweight type	m	AMS1	—	AMS1AMS1	—	—	—	—	AMSNMS1	AMS1NMS1	—	—	—	—	—	—	—
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 Light weight 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

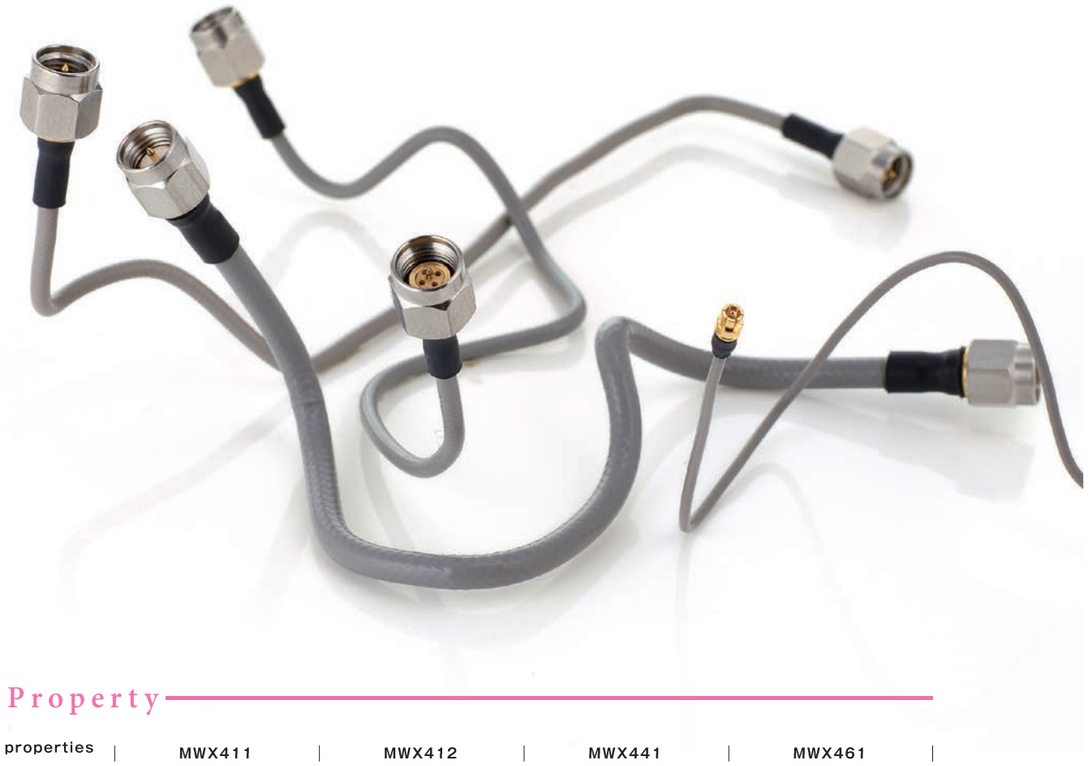
m : male (plug)
f : female (jack)

Please provide a catalog number when placing an order.

MWX4 SERIES

MWX4





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 ℃	−30~+85 ℃	−30~+85 ℃	−65~+125 ℃
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

Order form example

Please provide the following information when placing an order.

*Please order in minimum order quantity.

Example MWX441

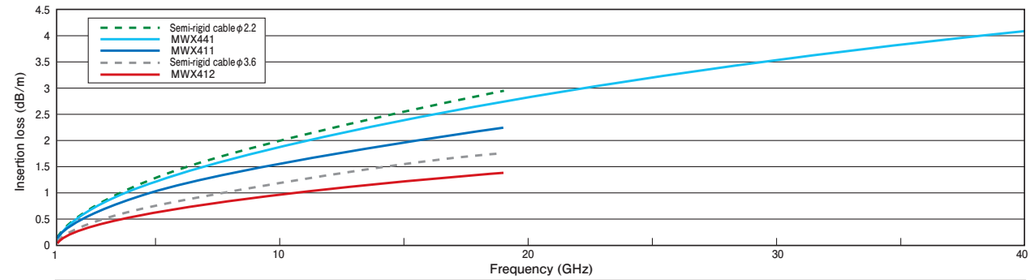
Assembly length:200 mm
Connector Ⅰ:2.92 mm(m)straight
Connector Ⅱ:2.92 mm(m)straight

Catalog No.
MWX441-KP-KP L=200 mm
a c b

a:Cable
b:Assembly length
c:Connector

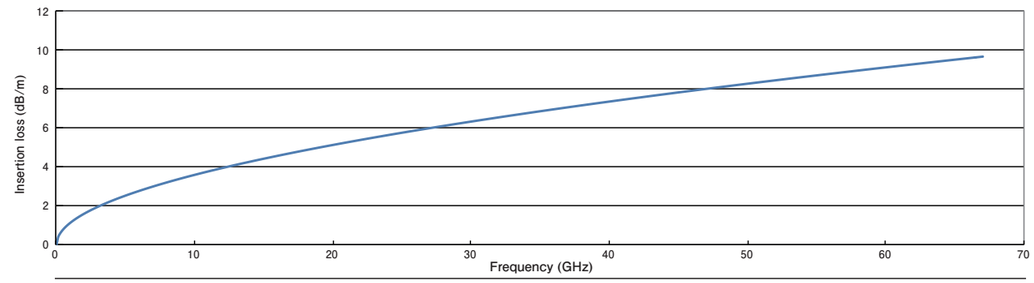
Technical Data

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



MWX411	● Typical insertion loss (0.002×f(GHz)+0.336×√f(GHz))×L(m) ● Maximum insertion loss (0.004×f(GHz)+0.517×√f(GHz))×L(m)x1.12
MWX412	● Typical insertion loss (0.004×f(Ghz)+0.517×√f(GHz))×L(m) ● Maximum insertion loss (0.004×f(GHz)+0.517×√f(GHz))×L(m)x1.12
MWX441	● Typical insertion loss (0.008×f(GHz)+0.604×√f(GHz))×L(m) ● Maximum insertion loss (0.008×f(GHz)+0.604×√f(GHz))×L(m)x1.12

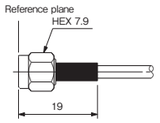
Typical insertion loss (MWX461 L=1000mm)



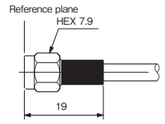
MWX461	● Typical insertion loss (0.01×f(GHz)+1.1×√f(GHz))×L(m) ● Maximum insertion loss (0.01×f(GHz)+1.1×√f(GHz))×L(m)×1.12

Connector

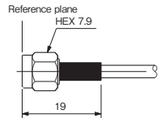
SMA(m) straight (Code:MWX411-AP)
Maximum operating frequency:18.0 GHz／Mass:3g



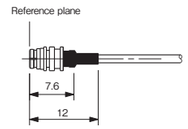
SMA(m) straight (Code:MWX412-AP)
Maximum operating frequency:18.0 GHz／Mass:3g



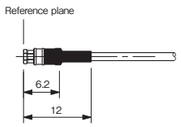
2.92mm(m) straight (Code:MWX441-KP)
Maximum operating frequency:40.0 GHz／Mass:5g



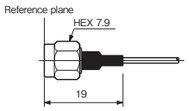
SMP(f) straight (Code:MWX461-SJ)
Maximum operating frequency:12.0 GHz／Mass:1g



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.

MWX5 SERIES

MWX5





Property

Electrical properties	MWX511	MWX512
Maximum operating frequency	18.0 GHz	18.0 GHz
Characteristic impedance (typ.)	50 Ω	50 Ω
Capacitance (typ.)	97 pF/m	95 pF/m
Propagation delay (typ.)	4.7 ns/m	4.7 ns/m
Wavelength reduction rate (typ.)	71 %	71 %
Higher mode frequency (typ.)	63.0 GHz	34.0 GHz
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)

Mechanical properties	MWX511	MWX512
Cable outer diameter	3.0 mm	4.4 mm
Minimum bending radius (inner side)	10 mm	15 mm
Cable mass (typ.)	19 g/m	41 g/m
Continuous operating temperature range	−30~+85 ℃	−30~+85 ℃
Assembly length	100~5,000 mm	100~5,000 mm
Remark	Semi-flexible cable φ2.1 equivalent	Semi-flexible cable φ3.45 equivalent

Order form example

Please provide the following information when placing an order.

*Please order in minimum order quantity.

Example MWX511

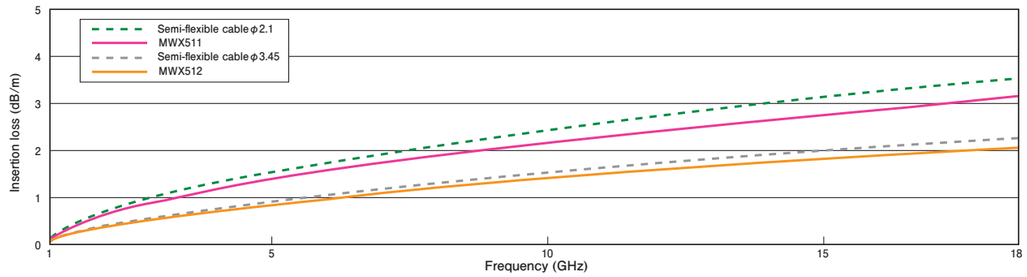
Assembly length:200 mm
Connector Ⅰ:SMA(m)straight
Connector Ⅱ:SMA(m)straight

Catalog No.
MWX511-AP-AP L=200 mm
a c b

a:Cable
b:Assembly length
c:Connector

Technical Data

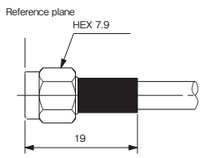
Comparison of typical insertion loss (MWX5 series vs. semi-flexible cable L=1000mm)



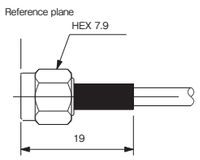
MWX511	● Typical insertion loss (0.015×f(GHz)+0.693×√f(GHz))×L(m) ● Maximum insertion loss (0.015×f(GHz)+0.693×√f(GHz))×L(m)×1.12
MWX512	● Typical insertion loss (0.018×f(GHz)+0.42×√f(GHz))×L(m) ● Maximum insertion loss (0.018×f(GHz)+0.42×√f(GHz))×L(m)×1.12

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



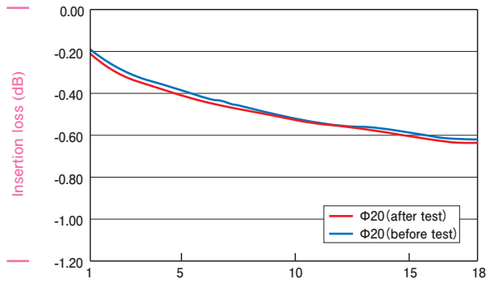
*The above figures are measured values for reference only.

MWX4,5 SERIES

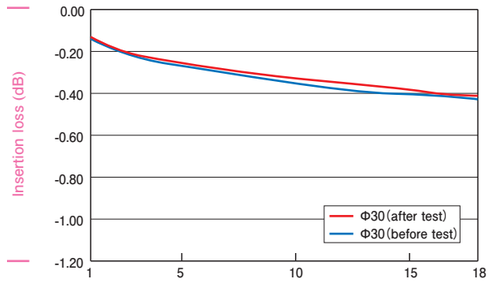
Formable (MWX4,5 Series) Technical Data 1

Static bending data (insertion loss)

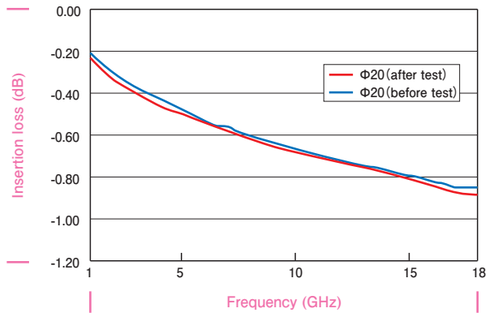
MWX411



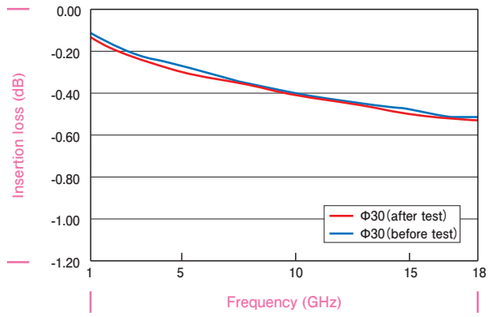
MWX412



MWX511



MWX512



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

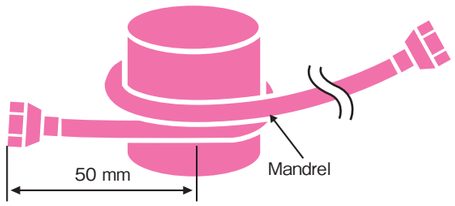


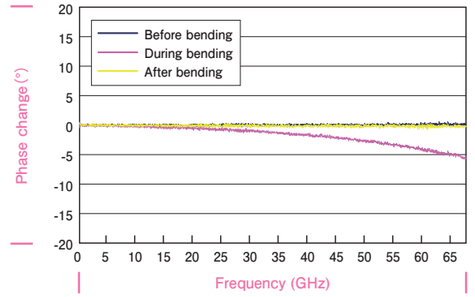
Fig.1 Schematic description of the static bending test

＊The above figures are measured values for reference only.

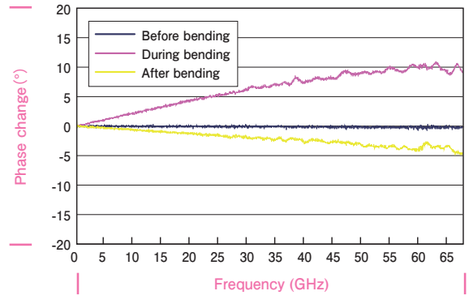
Formable (MWX4,5 Series) Technical Data 2

Static bending data (Phase)

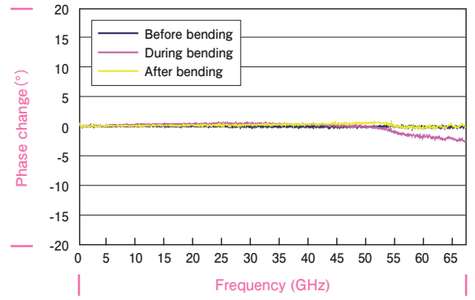
MWX461 Static bending data 1



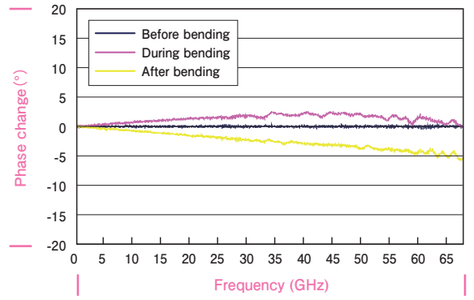
Semi-flexible coaxial cable corresponding to UT47



MWX461 MWX461 Static bending data 2



Semi-flexible coaxial cable corresponding to UT47



Test method

・The test is conducted as follows:

(1) The straight cable is connected to the vector network analyzer to record the initial phase waveform. (Waveform before the test)

(2) The phase waveform is recorded while the cable is wrapped on a mandrel of ϕ8mm (R = 4mm). (Waveform during the test)

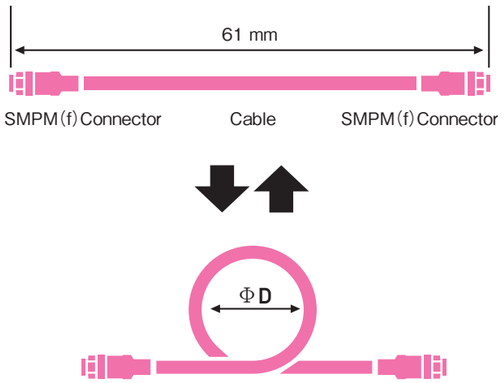
(3) The phase waveform is recorded after straightening the cable. (Waveform after the test)

Test cables

・2 type cables are tested as the right figures.

① MWX461 formable coaxial cable assembly

② Semi-flexible coaxial cable corresponding to UT47



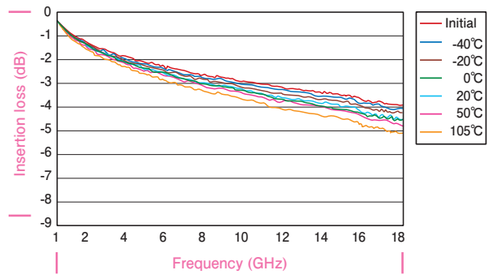
The cable was wrapped 360°around ϕ8mm mandrel. (During bending)

MWX4,5 SERIES

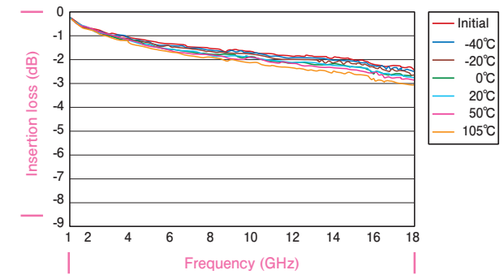
Formable (MWX4 Series) Technical Data 3

Temperature characteristics (insertion loss) Test cable: 2 m

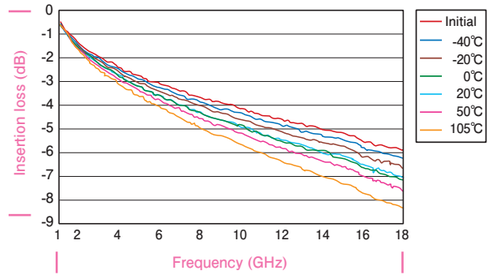
MWX411



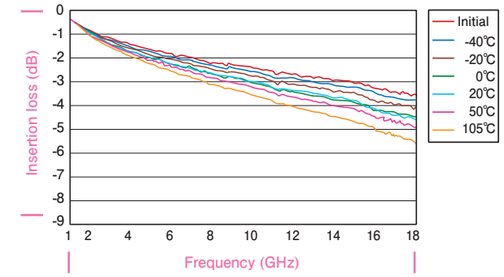
MWX412



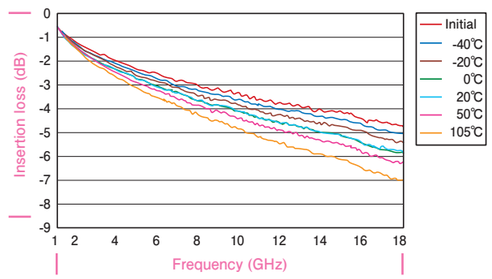
Semi-flexible cable ϕ2.1



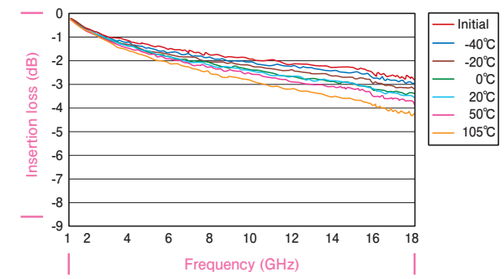
Semi-flexible cable ϕ3.45



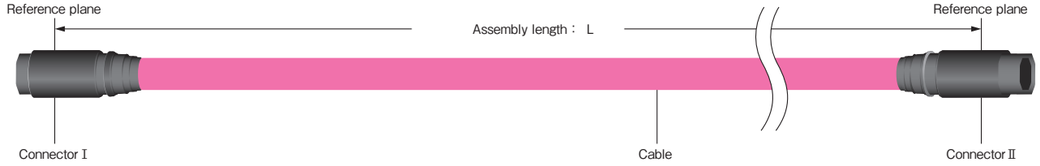
Semi-rigid cable ϕ2.2



Semi-rigid cable ϕ3.6



Placing orders



Catalog number

ex. MWX511 - AP - AP L=1000mm

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

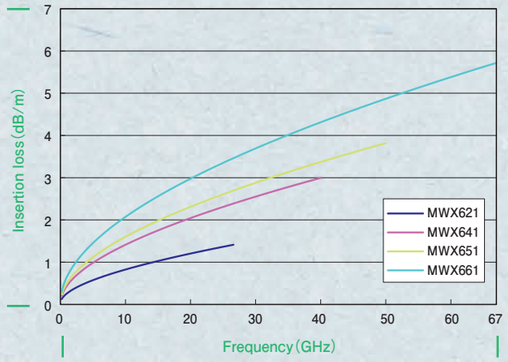
MWX4 and MWX5 series will be shipped within 12 business days after received order.
*Leadtime may be effected by larger order volume.

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 ℃)
Low insertion loss, suitable for measurement of the high-precision differential transmission signal.
4 type cables are a vailable　depends on maximum frequency (26.5GHz, 40GHz, 50GHz a nd 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×f (GHz) +0.2304×√f (GHz) +0.02) ×L (m) ● Maximum insertion loss (0.0077×f (GHz) +0.2304×√f (GHz) +0.02) ×1.12×L (m)

MWX641 ● Typical insertion loss (0.0095×f (GHz) +0.41×√f (GHz) +0.02) ×L (m) ● Maximum insertion loss (0.0095×f (GHz) +0.41×√f (GHz) +0.02) ×1.12×L (m)

MWX651 ● Typical insertion loss (0.0095×f (GHz) +0.47×√f (GHz) +0.02) ×L (m) ● Maximum insertion loss (0.0095×f (GHz) +0.47×√f (GHz) +0.02) ×1.12×L (m)

MWX661 ● Typical insertion loss (0.0095×f (GHz) +0.6148×√f (GHz) +0.02) ×L (m) ● Maximum insertion loss (0.0095×f (GHz) +0.6148×√f (GHz) +0.02) ×1.12×L (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

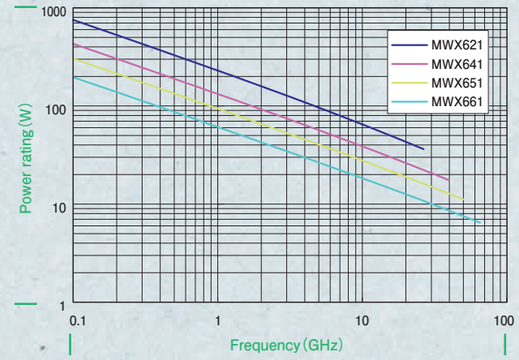
Cable type	Cable Maximum Frequency (GHz)	Applicable connector								
		18.5 GHz	26.5 GHz		40.0 GHz		50.0 GHz		67.0 GHz	
		SMA(m)	3.5mm (m)	3.5mm(f)	2.92mm(m)	2.92mm(f)	2.4mm(m)	2.4mm(f)	1.85mm(m)	1.85mm(f)
MWX621	26.5 GHz	●	●	●						
MWX641	40.0 GHz				●	●				
MWX651	50.0 GHz				●	●	●	●		
MWX661	67.0 GHz								●	●

Power rating

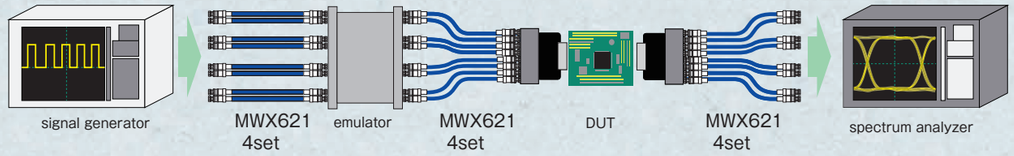
The diagram to the right shows the relationship between frequency and power rating.
The values are calculated at 25 ℃ and at sea level.
The power rating will need to be corrected for different ambient temperatures and altitude.
Power ratings may decrease, depending on the connector selected.

*The above figures are measured values for reference only.

Power rating of MWX6 series at sea level



Connection example of MWX6 Series



Major applications

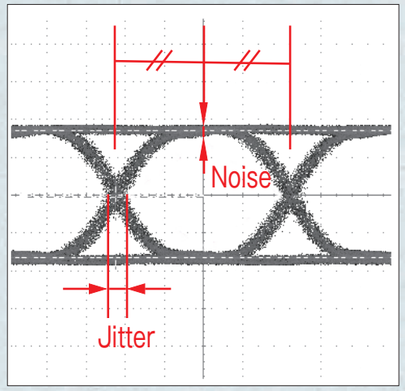
- Measurement and evaluation of the USB, HDMI etc.
- BERT measurement, Jitter measurement.

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

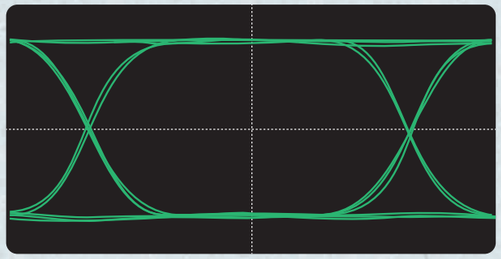
To measure pulse wave transmission characteristics, an experimental tool called "eye pattern" is observed.
Upon balanced transmission, skew (variability of propagation delay time) between the signal cables will become one of the cause of deterioration of the jitter.
Taking above into consideration, MWX6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

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

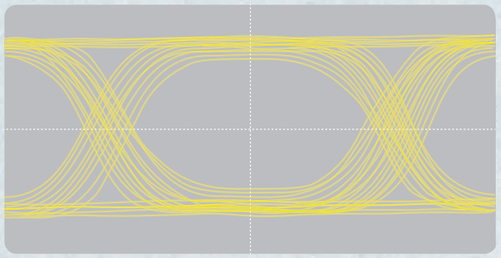
$$\text{Degree of vertial eye opening (\%)} = 100 \times \left(\frac{\text{amplitude of input signals} - 2 \times \text{noise}}{\text{amplitude of input signals}} \right)$$



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℃ | 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℃	-30~+85℃	-30~+85℃	-30~+85℃
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

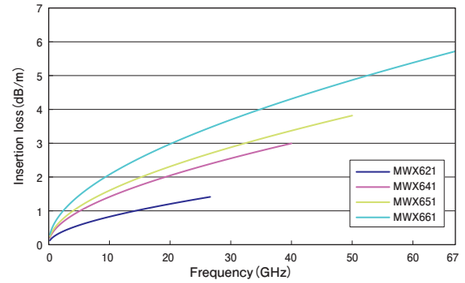
Assembly length:1000mm
Connector Ⅰ:3.5mm(f)straight
Connector Ⅱ:3.5mm(m)straight

Catalog No.
MWX621-01000DFSDMS/PAIR
a b c d

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

Technical Data

MWX6 Series Typical insertion loss



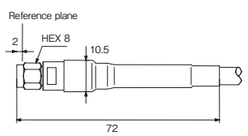
	MWX621	MWX641	MWX651	MWX661
18.5GHz	1.2dB/m	1.8dB/m	2.1dB/m	2.9dB/m
Maximum frequency	1.4dB/m	3.0dB/m	3.8dB/m	5.6dB/m

MWX621	● Typical insertion loss (0.0077×f(GHz)+0.2304×√f(GHz)+0.02)×L(m)	● Maximum insertion loss (0.0077×f(GHz)+0.2304×√f(GHz)+0.02)×1.12×L(m)
MWX641	● Typical insertion loss (0.0095×f(GHz)+0.41×√f(GHz)+0.02)×L(m)	● Maximum insertion loss (0.0095×f(GHz)+0.41×√f(GHz)+0.02)×1.12×L(m)
MWX651	● Typical insertion loss (0.0095×f(GHz)+0.47×√f(GHz)+0.02)×L(m)	● Maximum insertion loss (0.0095×f(GHz)+0.47×√f(GHz)+0.02)×1.12×L(m)
MWX661	● Typical insertion loss (0.0095×f(GHz)+0.6148×√f(GHz)+0.02)×L(m)	● Maximum insertion loss (0.0095×f(GHz)+0.6148×√f(GHz)+0.02)×1.12×L(m)

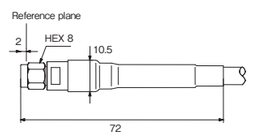
Connector

MWX621

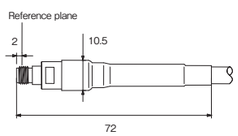
SMA(m) straight (Code:AMS)
Maximum operating frequency:18.5 GHz／Mass:11g



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

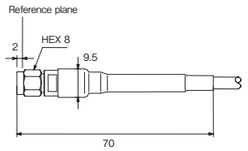


3.5mm(f) straight (Code:DFS)
Maximum operating frequency 26.5 GHz／Mass:10g

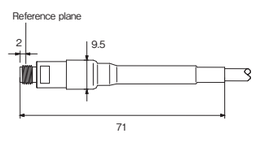


MWX641

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

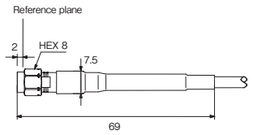


2.92mm(f) straight (Code:KFS)
Maximum operating frequency:40.0 GHz／Mass:8g

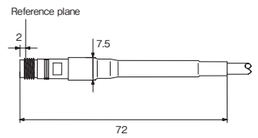


MWX651

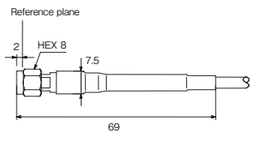
2.4mm(m) straight (Code:LMS)
Maximum operating frequency:50.0 GHz／Mass:5g



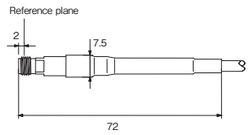
2.4mm(f) straight (Code:LFS)
Maximum operating frequency:50.0 GHz／Mass:5g



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

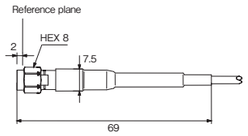


2.92mm(m) straight (Code:KFS)
Maximum operating frequency:40.0 GHz／Mass:5g

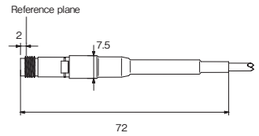


MWX661

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	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	-	-
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

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)

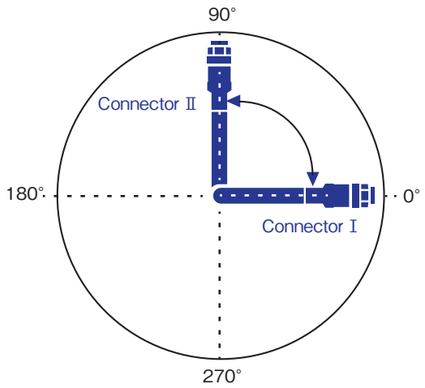
Connector type	Connector insertion loss	Frequency (GHz)						
		1.0 GHz	10.0 GHz	18.5 GHz	26.5 GHz	40.0 GHz	50.0 GHz	67.0 GHz
SSMA(m)straight	0.03√f	0.03	0.09	0.13	–	–	–	–
SMA(m)straight	0.03√f	0.03	0.09	0.13	0.15	0.19	–	–
SMA(f)straight	0.03√f	0.03	0.09	0.13	–	–	–	–
SMA(m)right angle	0.07√f	0.07	0.22	0.3	–	–	–	–
SMA(m)swept	0.04√f	0.04	0.13	0.17	–	–	–	–
TNC(m)straight	0.07√f	0.07	0.22	0.3	–	–	–	–
N(m)straight	0.05√f	0.05	0.16	0.22	–	–	–	–
N(f)straight	0.05√f	0.05	0.16	0.22	–	–	–	–
N(m)swept	0.06√f	0.06	0.19	0.26	–	–	–	–
SMP(f)straight	0.12√f	0.12	0.38	0.52	–	–	–	–
SMPM(f)straight	0.12√f	0.12	0.38	0.52	0.62	0.76	0.85	0.98
3.5mm(m)straight	0.03√f	0.03	0.09	0.13	0.15	–	–	–
3.5mm(f)straight	0.03√f	0.03	0.09	0.13	0.15	–	–	–
3.5mm(m)swept	0.04√f	0.04	0.13	0.17	0.21	–	–	–
2.92mm(m)straight	0.03√f	0.03	0.09	0.13	0.15	0.19	–	–
2.92mm(f)straight	0.03√f	0.03	0.09	0.13	0.15	0.19	–	–
2.92mm(m)swept	0.04√f	0.04	0.13	0.17	0.21	0.25	–	–
2.4mm(m)straight	0.042√f	0.04	0.13	0.18	0.22	0.27	0.3	–
2.4mm(f)straight	0.042√f	0.04	0.13	0.18	0.22	0.27	0.3	–
1.85mm(m)straight	0.065√f	0.065	0.206	0.28	0.33	0.41	0.46	0.53
1.85mm (f)straight	0.065√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≦1000	±10
1000<L≦2000	±20
2000<L≦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 rati $I_2/I_1 \cdot V_2/V_1$	dB Di・Dv
×0.01	−20dB	×0.01	−40dB
×0.1	−10dB	×0.1	−20dB
×1	0dB	×1	0dB
×2	3.0dB	×2	6.0dB
×3	4.8dB	×3	9.5dB
×4	6.0dB	×4	12.0dB
×5	7.0dB	×5	14.0dB
×6	7.8dB	×6	15.6dB
×7	8.5dB	×7	16.9dB
×8	9.0dB	×8	18.1dB
×9	9.5dB	×9	19.1dB
×10	10dB	×10	20dB
×100	20dB	×100	40dB
×1000	30dB	×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 10log10P[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		B	0.3
0.4	75	UHF		0.4
0.5	60			0.5
0.6	50		C	0.6
0.75	40			0.75
1	30	L	D	1
1.5	20			1.5
2	15	S	E	2
3	10		F	3
4	7.5	C	G	4
5	6			5
6	5		H	6
8	3.75	X	I	8
10	3	Ku	J	10
15	2	K		15
20	1.5	Ka	K	20
30	1			30
40	0.75	MILLIMETER	L	40
50	0.6			50
60	0.5		M	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
$\rho = (VSWR-1)/(VSWR+1) = 10^{-\frac{RL}{20}}$

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 $c = 2.998\times10^8$ [m/s]

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

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

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

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

where εr is the specific dielectric constant of the cable insulator.
Air : $\varepsilon r = 1$, Dense PTFE : $\varepsilon r \fallingdotseq 2.1$

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:

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

2. 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℃	260℃	400℃
PFA	260℃	260℃	400℃
FEP	200℃	230℃	300℃
ETFE	150℃	150℃	250℃
PVC	105℃	110℃	130℃
Polyurethane	80℃	110℃	130℃
Polyester	105℃	120℃	130℃