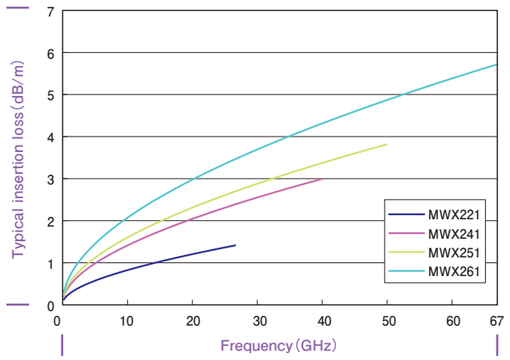
MWX2 SERIES

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

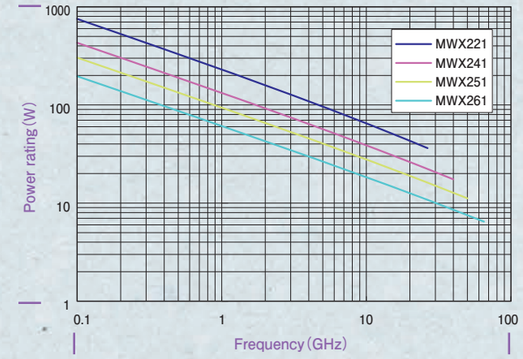
- Insertion loss:The larger the cable outer diameter, the lower the insertion loss.
- Frequency range:The smaller the cable, the higher the higher mode frequency.
- Power rating:The larger the cable outer diameter, the higher the power rating.
- Flexibility:The smaller the cable, the better the flexibility.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

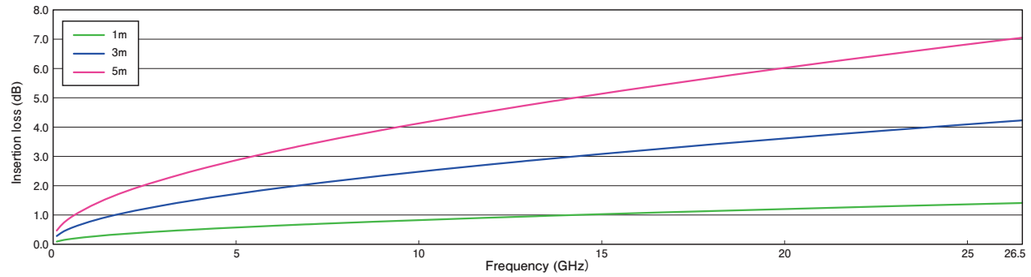
Example 3
MWX221 Lightweight Armored type
Assembly length:1000mm
Connector Ⅰ:SMA(m)straight
Connector Ⅱ:SMA(m)straight
Catalog No.
MWX221-01000AMSAMS/A
a b c d

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

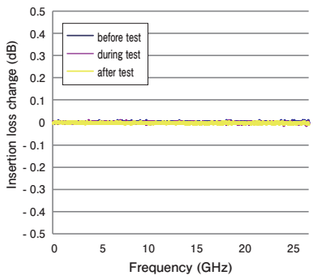
Cable typical insertion loss

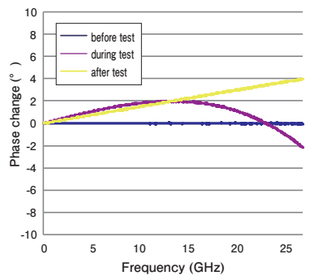


● Typical insertion loss (0.0077×f(GHz)+0.2304×√f(GHz)+0.02)×L(m) ● Maximum insertion loss (0.0077×f(GHz)+0.2304×√f(GHz)+0.02)×1.12×L(m)

Static bending data (insertion loss, phase)

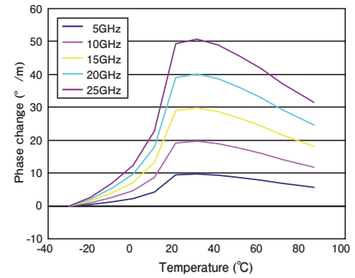
Bending radius: 30 mm





＊The cable was wrapped 360° around φ60mm mandrel.

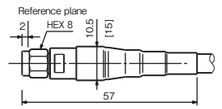
MWX221 Phase change vs. temperature



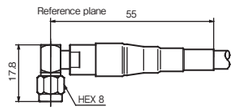
＊The cable was measured in chamber every 20 ℃ from -40 to 90 ℃, 1 hour after the temperature changed.

Connector

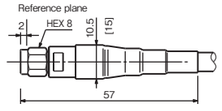
SMA(m) straight (Code:AMS)
Maximum operating frequency:18.5GHz／Mass:10g



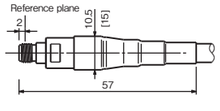
SMA(m) right Angle (Code:AMH)
Maximum operating frequency:18.0GHz／Mass:10g



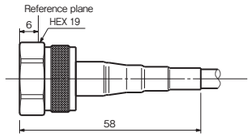
3.5mm(m) straight (Code:DMS)
Maximum operating frequency:26.5GHz／Mass:11g



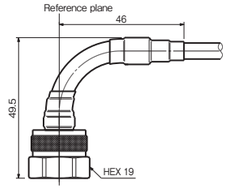
3.5mm(f) straight (Code:DFS)
Maximum operating frequency:26.5 GHz／Mass:10g



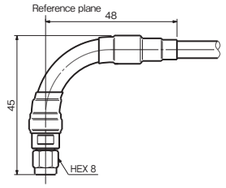
N(m) straight (Code:NMS)
Maximum operating frequency:18.0GHz／Mass:38g



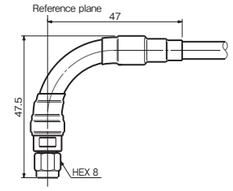
N(m) swept (Code:NMW)
Maximum operating frequency:18.0GHz／Mass:46g



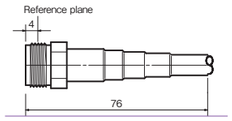
SMA(m) swept (Code:AMW)
Maximum operating frequency:18.5GHz／Mass:17g



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.

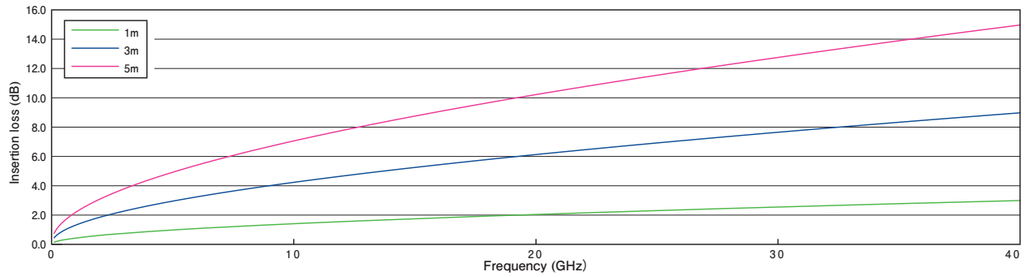
Example 3
MWX241 Lightweight Armored type
Assembly length: 1000mm
Connector Ⅰ: 2.92mm(m) straight
Connector Ⅱ: 2.92mm(m) straight
Catalog No.
MWX241-01000KMSKMS/A
a b c d

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

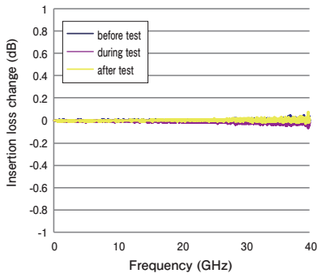
Technical Data

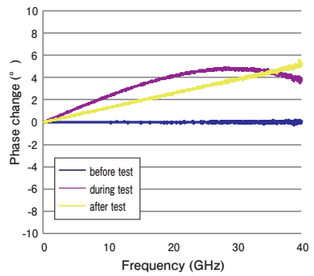
Cable typical insertion loss



● 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)

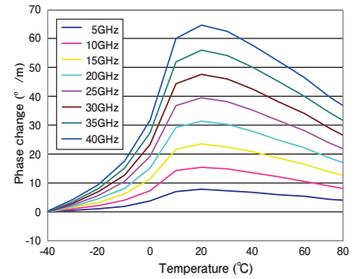
Static bending data (insertion loss, phase) Bending radius: 20 mm





*The cable was wrapped 360° around φ40mm mandrel.

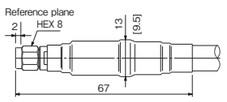
MWX241 Phase change vs. temperature



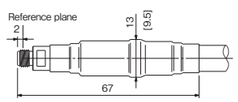
*The cable was measured in chamber every 20 ℃ from -40 to 90 ℃, 1 hour after the temperature changed.

Connector

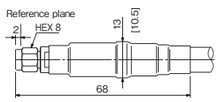
2.92mm (m) straight (Code:KMS)
Maximum operating frequency:40.0 GHz / Mass:10g



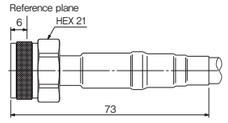
2.92mm (f) straight (Code:KFS)
Maximum operating frequency:40.0 GHz / Mass:10g



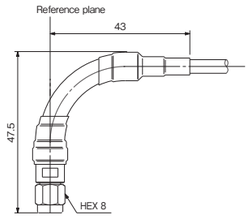
SMA (m) straight (Code:AMS)
Maximum operating frequency:18.5 GHz / Mass:12g



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

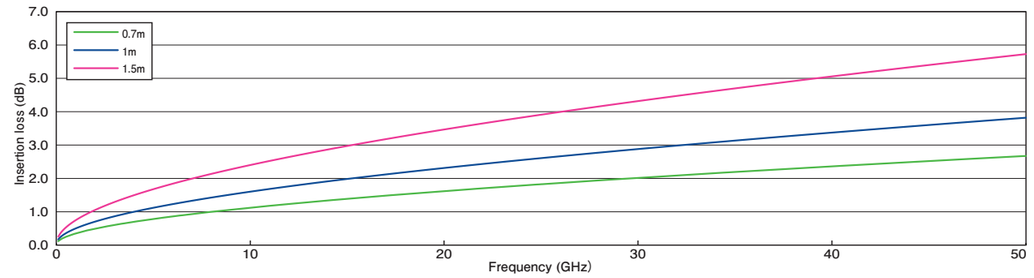
*The individual specification is required.

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

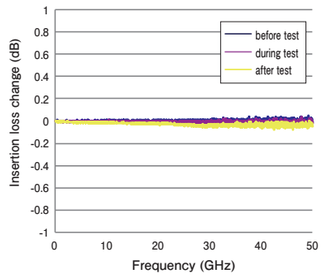
Technical Data

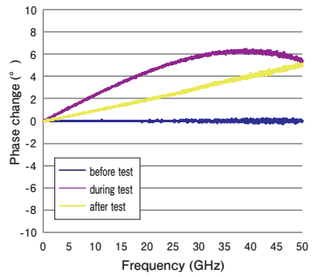
Cable typical insertion loss



● 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)

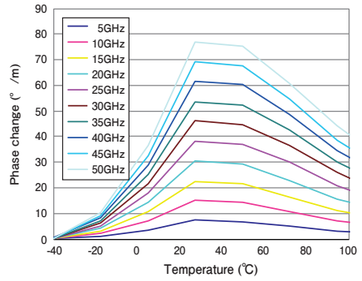
Static bending data (insertion loss, phase) Bending radius: 20 mm





*The cable was wrapped 360° around φ40mm mandrel.

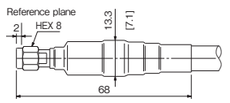
MWX251 Phase change vs. temperature



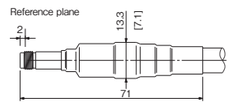
*The cable was measured in chamber every 20 ℃ from -40 to 90 ℃, 1 hour after the temperature changed.

Connector

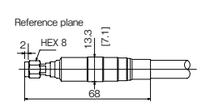
2.4mm(m) straight (Code:LMS)
Maximum operating frequency:50.0 GHz／Mass:13g



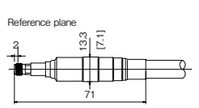
2.4mm(f) straight (Code:LFS)
Maximum operating frequency:50.0 GHz／Mass:13g



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.

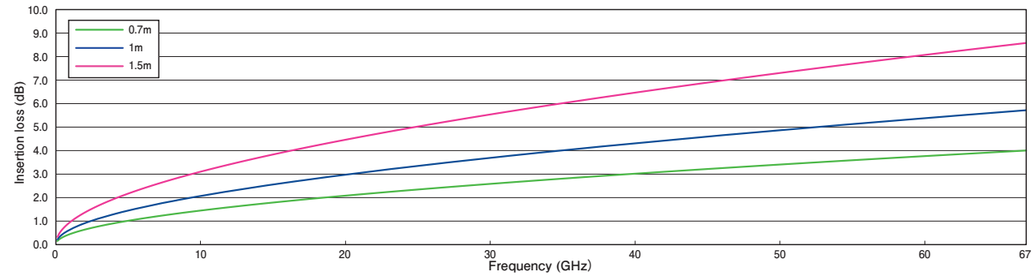
a:Cable
b:Assembly length
c:Connector
d:Armored

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

Option

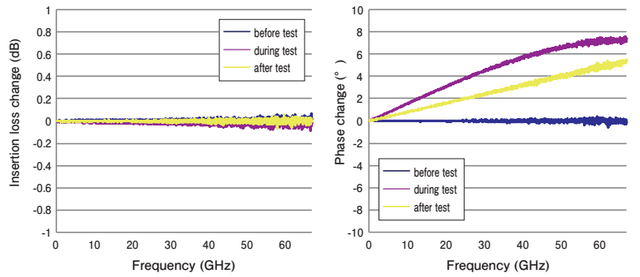
Technical Data

Cable typical insertion loss



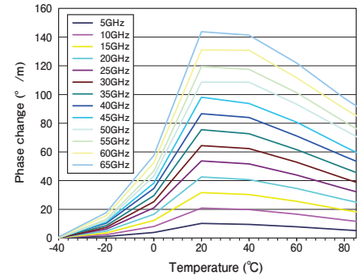
● Typical insertion loss (0.0095×f(GHz)+0.6148×√f(GHz)+0.02)×L(m) ● Maximum insertion loss (0.0095×f(GHz)+0.6148×√f(GHz)+0.02)×1.12×L(m)

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



＊The cable was wrapped 360° around φ40mm mandrel.

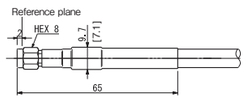
MWX261 Phase change vs. temperature



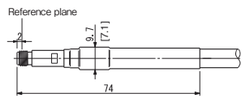
＊The cable was measured in chamber every 20 ℃ from -40 to 90 ℃, 1 hour after the temperature changed.

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

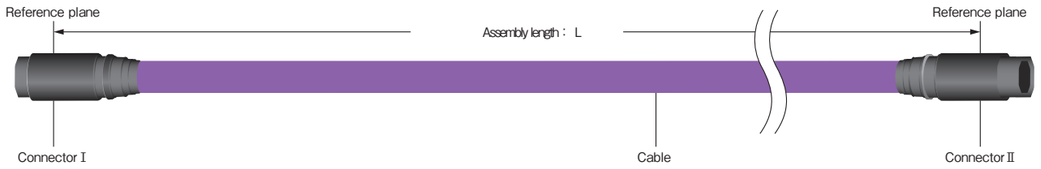


・[ ] : Non - armored type size.

＊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.