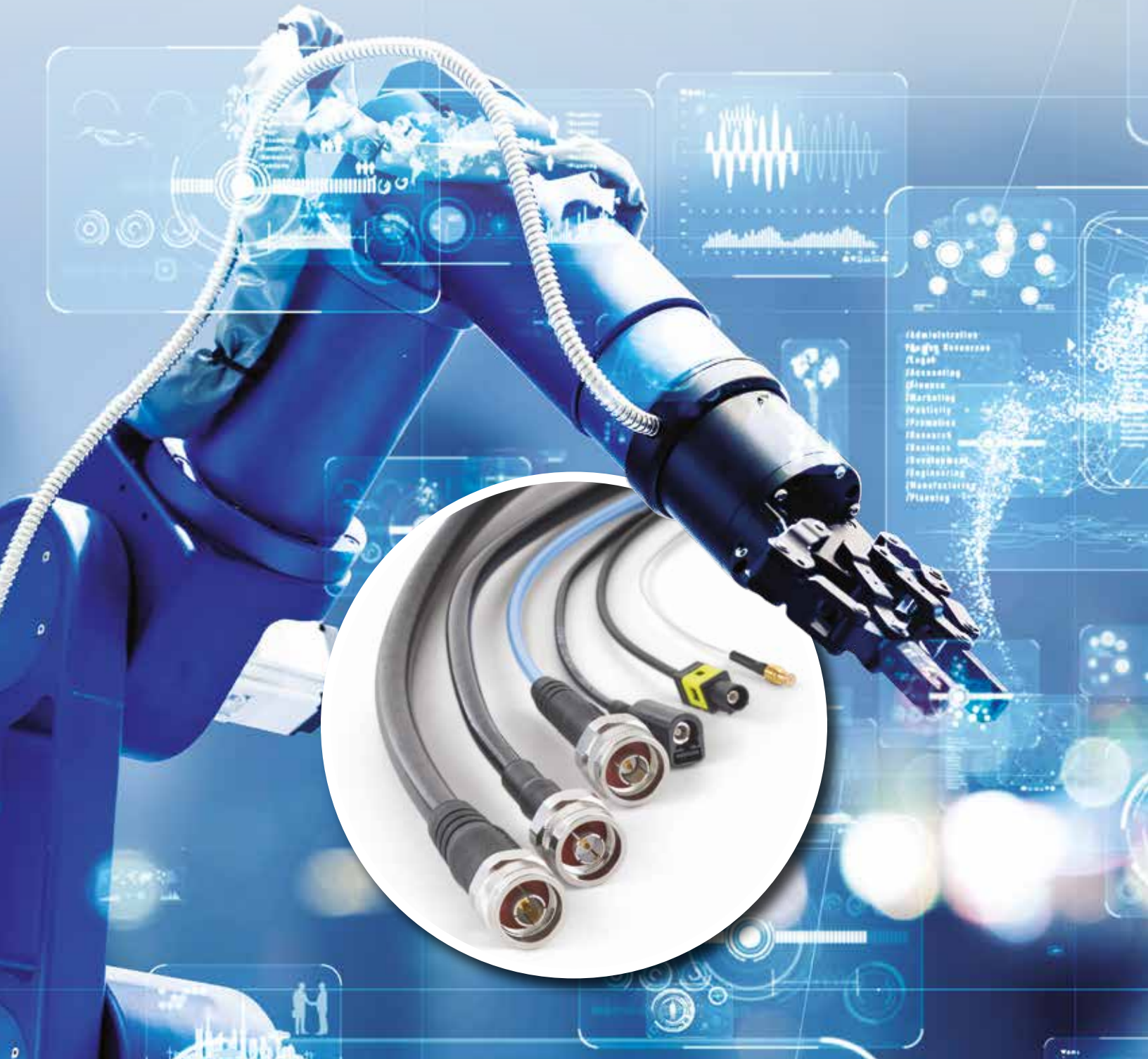


XtendedFlex[®]

Coaxial cables designed to withstand continuous flexure



- /Administration
- /Buyer Services
- /Legal
- /Accounting
- /Finance
- /Marketing
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- /Production
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The XtendedFlex® family of coaxial cables was designed to meet the rigorous demands of continuous flexure applications. Through the use of special conductor materials and plastics proven to maintain their integrity with flexure, we're able to offer coaxial cable constructions that have been optimized to perform with extreme flexure.

This initial offering of six cables will cover a wide range of applications from the very small cables used in RF ablation and mission critical wearables, to rolling drag chains common in warehouse robots and industrial automation, to

articulating robotic arms, and to large autonomous industrial equipment.

Whereas, most common coaxial cable constructions are not designed to hold up to continuous flexure, these designs have been thoroughly tested in either a rolling drag chain or tic-toc type of movement. In many cases, these constructions have continued to look rock solid after millions of flex cycles.

Every flex application is typically a little different in terms of the stress placed on the cable. We're able to support custom flex testing at our facility as well as cable assembly samples for customer evaluations.

Applications

- Industrial Automation
- Warehouse and Logistic Robots
- Articulating Robotic Arms
- Autonomous Industrial Vehicles
- Wearable Applications
- Turret Systems
- Satellite Tracking Dish Gimbals
- Quick Erect Antenna Masts

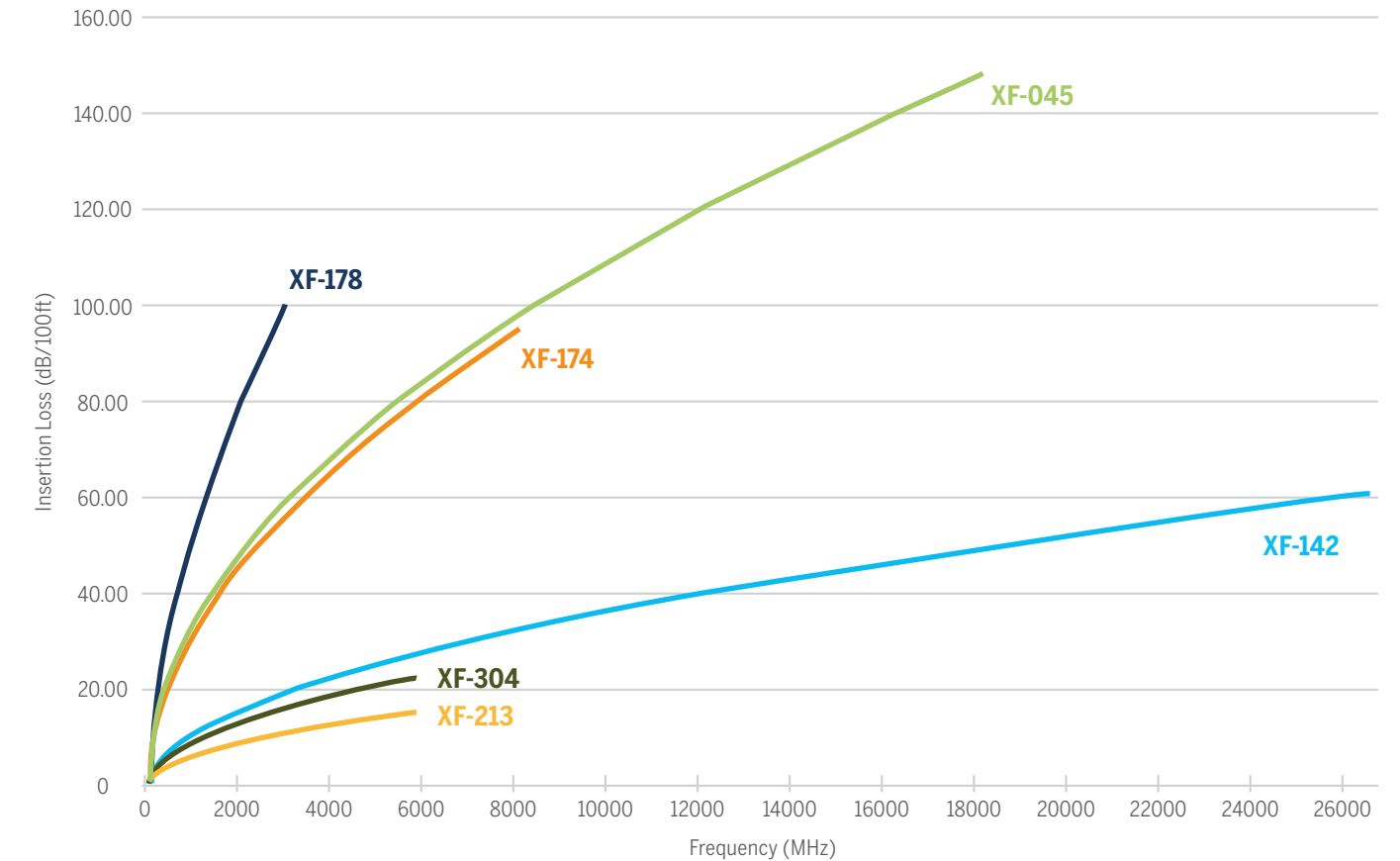


The XtendedFlex family of cables have been designed and tested to support high flex and continuous flex applications.

Cable Summary

	AA#	Smart Part #	Max. Frequency	Shielding Effectiveness
XtendedFlex® 045	AA-60305	XF045	18 GHz	-80 dB
XtendedFlex® 142	AA-11770	XF142	18 GHz	-100 dB
XtendedFlex® 174	AA-12187	XF174	8 GHz	-80 dB
XtendedFlex® 178	AA-12086	XF178	3 GHz	-60 dB
XtendedFlex® 213	AA-11406	XF213	8 GHz	-80 dB
XtendedFlex® 304	AA-11405	XF304	8 GHz	-80 dB

Insertion Loss vs. Frequency



XtendedFlex® 045

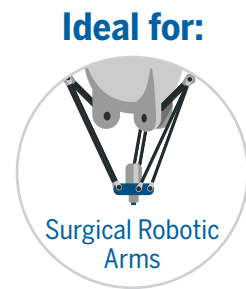


AA-60305

XtendedFlex® 045 is a micro-coaxial cable offering high flexibility and low shape memory. With its class-leading low attenuation, XF-045 maximizes power transfer efficiency in electrosurgical devices and signal integrity in industrial connectivity applications. The small diameter of XF-045 makes it an ideal coaxial component in high-density interconnects.

Features

- Ultra-flexible
- High Power Transfer Efficiency
- Lightweight
- Exceptional Flex Life



Specifications

Impedance 50 Ohms
Op Temp -67 to +302°F
-55 to +150°C

	Units	
Diameter	in (mm)	0.045 (1.14)
Weight	g/m	3.3
Minimum Bend Radius	in (mm)	0.20 (5.08)
Maximum Frequency	GHz	18
Velocity of Propagation	%	80
Capacitance	pF/ft (pF/m)	25.4 (83.3)
Time Delay	ns/ft (ns/m)	1.27 (4.17)
Shielding Effectiveness	dB	-60

Calculation

$$IL = (K1 \times \sqrt{f}) + K2 \times f \times \text{Cable Length}$$

Cable Insertion Loss
f = Frequency (MHz)
Use K values with matching length unit

K Values	dB/100ft	dB/100m
K1	1.08320	3.55398
K2	0.000001	0.000005

Cable Assembly Ordering Guide

XF045

Cable Code

- Code

Connector A

Code -

Connector B

XX.X

Length

XX

Units of measure: I = Inches, CM = Centimeters

Connector Options

Code	Part Number	Stock Code	Description
MCXM	3190-7039	3190-7039	MCX, male, straight

CENTER CONDUCTOR

Silver Plated Copper

DIELECTRIC

PTFE Tape

OUTER CONDUCTOR

Silver Plated
Copper Flat Braid

JACKET

PFA

Insertion Loss

Frequency (MHz)	Loss (dB/100ft)
600	26.62
800	30.76
1000	34.40
1600	43.57
1800	46.23
2000	48.74
2200	51.14
2400	53.43
2600	55.62
3400	63.67
3600	65.53
5800	83.36
8000	98.08

XtendedFlex® 142



AA-11770

XtendedFlex® 142 combines low loss with long flex life to make it an excellent solution for dynamic applications that demand high power transfer efficiency or signal integrity. With operating frequency well into K band, it is the ideal coaxial transmission line for microwave antenna, telescopic mast, and rotary joints, especially in harsh environments.

Features

- High Flexibility
- High Frequency
- Low Attenuation
- Exceptional Flex Life
- Highly Shielded

Ideal for:



Specifications

Impedance 50 Ohms	Op Temp -85 to +302°F -65 to +150°C
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	Units	
Diameter	in (mm)	0.172 (4.37)
Weight	g/m	47.6
Minimum Bend Radius	in (mm)	0.75 (19.1)
Maximum Frequency	GHz	26.5
Velocity of Propagation	%	76
Capacitance	pF/ft (pF/m)	26.6 (87.3)
Time Delay	ns/ft (ns/m)	1.34 (4.39)
Shielding Effectiveness	dB	-90

Calculation

$$IL = (K1 \times v(f) + K2 \times f) \times \text{Cable Length}$$

Cable Insertion Loss
f = Frequency (MHz)

Use K values with matching length unit

K Values	dB/100ft	dB/100m
K1	0.34840	1.1431
K2	0.00015	0.00049

Cable Assembly Ordering Guide

XF142

Cable Code

- Code

Connector A

Code -

Connector B

XX.X

Length

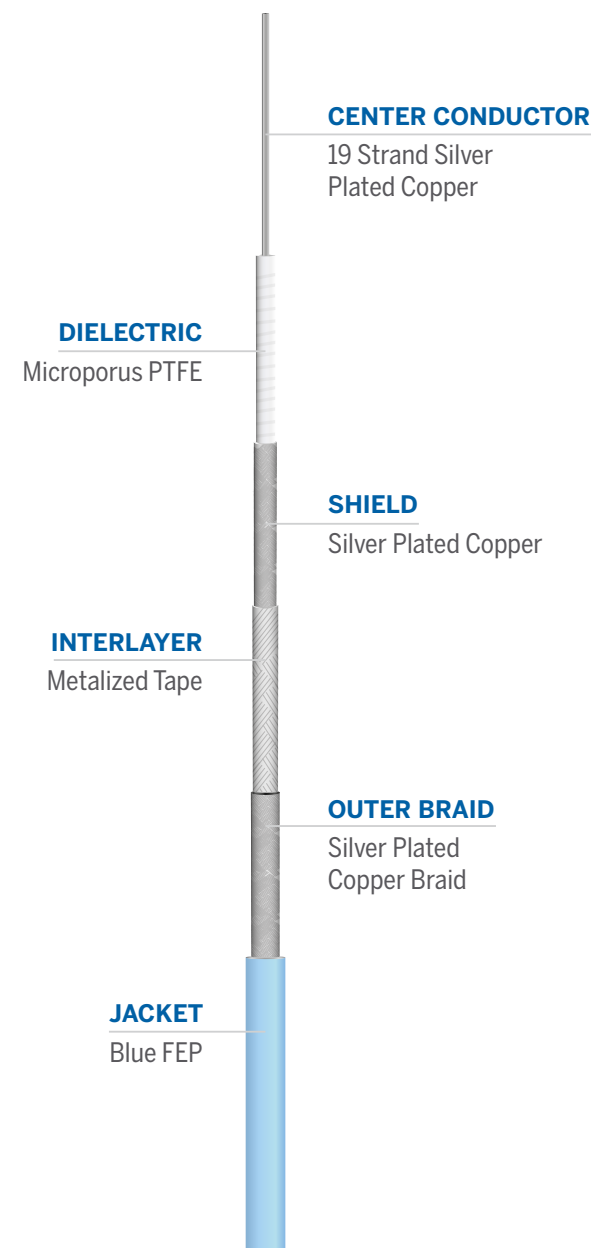
XX

Units of measure: I = Inches, CM = Centimeters

Connector Options

Interface	Gender	Orientation	Part Number	Stock Code	Connector Code
SMA	Male	Straight	TC-200-SM-SS-X	3190-6544	SM
		Right Angle	TC-200-SM-RA-D	3190-6428	SMR
N	Male	Straight	TC-200-NMH-X	3190-2882	NM
		Right Angle	TC-195-NMH-RA-D	3190-6542	NMR

The connectors listed are rated to 8GHz. Consult the factory for higher frequency connectors for this cable.



Insertion Loss

Frequency (MHz)	Loss (dB/100ft)
600	8.62
800	9.97
1000	11.17
1600	14.18
1800	15.05
2000	15.88
2200	16.67
2400	17.43
2600	18.15
3400	20.83
3600	21.44
5800	27.40
8000	32.36

XtendedFlex® 174



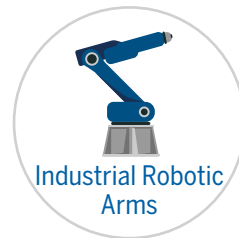
AA-12187

XtendedFlex® 174 is a versatile high-flexure cable for a wide array of applications. With a double-shield construction, XF-174 provides the high shielding effectiveness required in high-density applications - with an expected lifespan of over 1 million flexure cycles.

Features

- High Flexibility
- Ideal for All Dynamic Applications
- ≥ 1M Flex Cycles
- Exceptional Flex Life

Ideal for:



Specifications

Impedance 50 Ohms
Op Temp -85 to +221°F
-65 to +105°C

	Units	
Diameter	in (mm)	0.115 (2.921)
Weight	g/m	18.6
Minimum Bend Radius	in (mm)	0.50 (12.7)
Maximum Frequency	GHz	8.0
Velocity of Propagation	%	70
Capacitance	pF/ft (pF/m)	29.7 (97.4)
Time Delay	ns/ft (ns/m)	1.45 (4.76)
Shielding Effectiveness	dB	-80

Calculation

$$IL = (K1 \times \sqrt{f}) + K2 \times f \times \text{Cable Length}$$

Cable Insertion Loss
f = Frequency (MHz)
Use K values with matching length unit

K Values	dB/100ft	dB/100m
K1	0.9903	3.249
K2	0.0007943	0.002606

Cable Assembly Ordering Guide

XF174

Cable Code

- Code

Connector A

Code -

Connector B

XX.X

Length

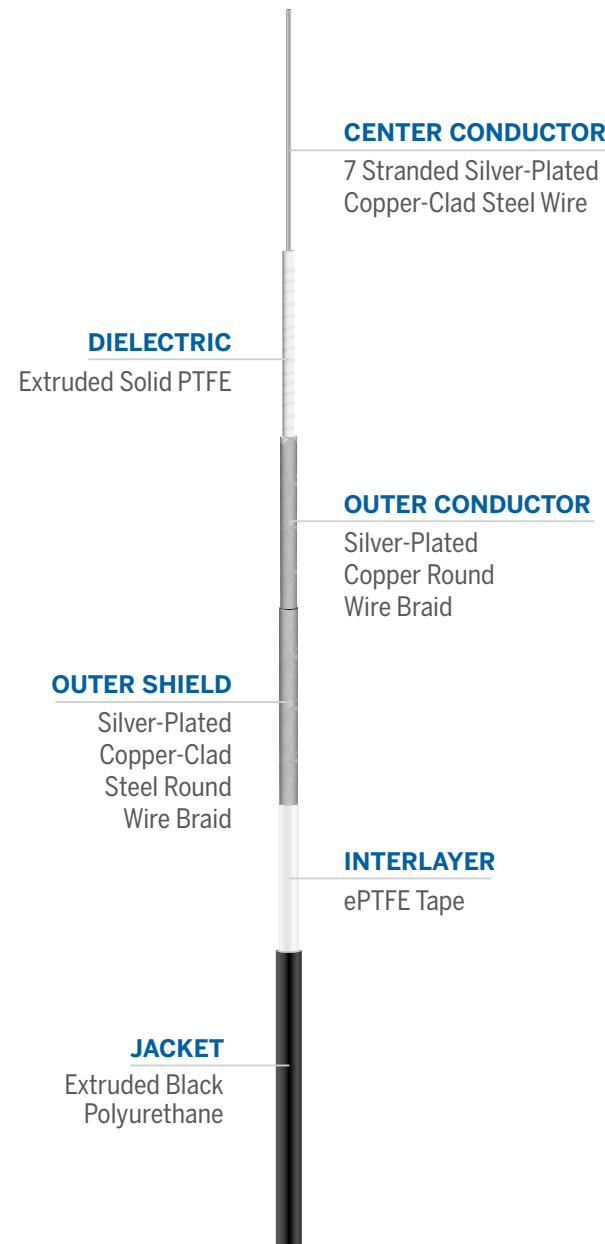
XX

Units of measure: I = Inches, CM = Centimeters

Connector Options

Interface	Gender	Orientation	Part Number	Stock Code	Connector Code
SMA	Male	Straight	SC-100-SM	3190-2245	SM

Consult the factory for FAKRA connector options.



Insertion Loss

Frequency (MHz)	Loss (dB/100ft)
600	24.73
800	28.64
1000	32.11
1600	40.88
1800	43.44
2000	45.87
2200	48.19
2400	50.41
2600	52.55
3400	60.43
3600	62.26
5800	80.00
8000	94.90

XtendedFlex® 178



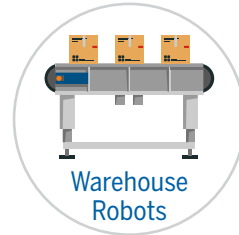
AA-12086

XtendedFlex® 178 is optimized for high-flexure applications and optimized for use with energy chain cable carriers. Combining consistent electrical performance with long flex life exceeding 7 million cycles, XF-178 minimizes downtime for equipment operating in extremely dynamic conditions.

Features

- Optimal Bend Movement
- Consistent Electrical Performance During Continuous Flexure
- Exceptional Flex Life

Ideal for:



Specifications

Impedance 50 Ohms
Op Temp -40 to +221°F
-40 to +105°C

	Units	
Diameter	in (mm)	0.120 (3.05)
Weight	g/m	14.0
Minimum Bend Radius	in (mm)	0.67 (16.9)
Maximum Frequency	GHz	3
Velocity of Propagation	%	70
Capacitance	pF/ft (pF/m)	31.7 (104.0)
Time Delay	ns/ft (ns/m)	1.45 (4.76)
Shielding Effectiveness	dB	-60

Calculation

$$IL = (K1 \times v(f) + K2 \times f) \times \text{Cable Length}$$

Cable Insertion Loss
f = Frequency (MHz)
Use K values with matching length unit

K Values	dB/100ft	dB/100m
K1	1.45699	4.78038
K2	0.00717	0.02352

Cable Assembly Ordering Guide

XF178

Cable Code

- Code

Connector A

Code -

Connector B

XX.X

Length

XX

Units of measure: I = Inches, CM = Centimeters

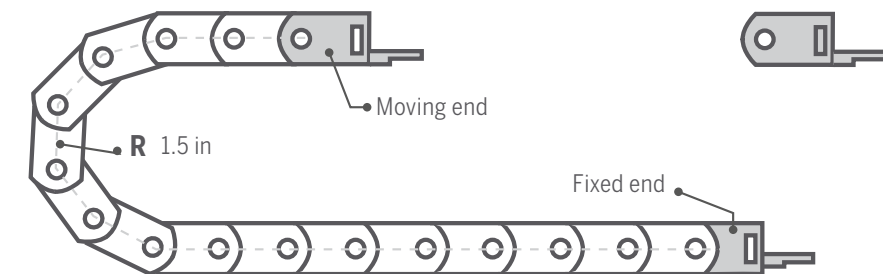
Connector Options

Interface	Gender	Orientation	Part Number	Stock Code	Connector Code
SMA	Male	Straight	TC-178-SM	3190-7068	SM
		Right Angle	TC-178-SM-RA	3190-7069	SMR

Consult the factory for FAKRA connector options.

Test Method

Plastic cable drag chain. XtendedFlex® can undergo millions of flexures using the detailed apparatus.



Insertion Loss

Frequency (MHz)	Loss (dB/100ft)
200	22.04
400	32.01
600	39.99
800	46.95
1000	53.24
1200	59.08
1400	64.55
1600	69.75
1800	74.72
2000	79.50
2200	84.11
2400	88.59
2600	92.93
2800	97.17
3000	101.31

CENTER CONDUCTOR

Stranded Silver-Plated
Copper Clad Steel

DIELECTRIC

Fluorinated Ethylene
Propylene (FEP)

BRAID

Tin-Plated Copper

JACKET

Black Thermoplastic
Elastomer (TPE)

XtendedFlex® 213



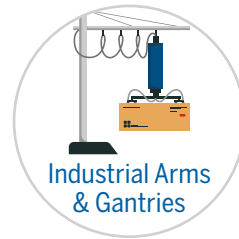
AA-11406

XtendedFlex® 213 offers high power and voltage handling while maintaining a high level of flexibility. It is ideal for dynamic industrial and transportation applications that demands long service life.

Features

- High Flexibility
- High Power Handling
- Ruggedized for Industrial Vehicles
- Exceptional Flex Life
- Highly Shielded

Ideal for:



Specifications

Impedance 50 Ohms
Op Temp -67 to +221°F
-55 to +105°C

	Units	
Diameter	in (mm)	0.405 (10.29)
Weight	g/m	200.9
Minimum Bend Radius	in (mm)	2.00 (50.8)
Maximum Frequency	GHz	8
Velocity of Propagation	%	76
Capacitance	pF/ft (pF/m)	26.9 (88.3)
Time Delay	ns/ft (ns/m)	1.34 (4.39)
Shielding Effectiveness	dB	-80

Calculation

$$IL = (K1 \times \sqrt{f}) + K2 \times f \times \text{Cable Length}$$

Cable Insertion Loss
f = Frequency (MHz)
Use K values with matching length unit

K Values	dB/100ft	dB/100m
K1	0.19366	0.63540
K2	0.00013	0.00043

Cable Assembly Ordering Guide

XF213

Cable Code

- Code

Connector A

Code -

Connector B

XX.X

Length

XX

Units of measure: I = Inches, CM = Centimeters

Connector Options

Interface	Gender	Orientation	Part Number	Stock Code	Connector Code
N	Male	Straight	TC-400-NMH-X	3190-2626	NM
		Right Angle	TC-400-NMH-RA-D	3190-2293	NMR
BNC	Male	Straight	TC-400-BM-X	3190-6232	BM
		Right Angle	TC-400-BM-RA-D	3190-6430	BMR



Insertion Loss

Frequency (MHz)	Loss (dB/100ft)
600	4.82
800	5.58
1000	6.25
1600	7.95
1800	8.45
2000	8.92
2200	9.37
2400	9.80
2600	10.21
3400	11.73
3600	12.09
5800	15.50

XtendedFlex® 304



AA-11405

XtendedFlex® 304 is a versatile coaxial cable offering increased power handling and low attenuation with high flexibility. Similar in construction to XF-213, the smaller XF-304 is an ideal solution for highly dynamic applications that may have more stringent weight and size requirements.

Features

- High Flexibility
- High Power Handling
- Low Attenuation
- Exceptional Flex Life
- Highly Shielded

Ideal for:



Specifications

Impedance 50 Ohms
Op Temp -67 to +221°F
-55 to +105°C

	Units	
Diameter	in (mm)	0.305 (7.75)
Weight	g/m	116.1
Minimum Bend Radius	in (mm)	1.50 (38.1)
Maximum Frequency	GHz	8
Velocity of Propagation	%	76
Capacitance	pF/ft (pF/m)	26.9 (88.3)
Time Delay	ns/ft (ns/m)	1.34 (4.39)
Shielding Effectiveness	dB	-80

Calculation

$$IL = (K1 \times \sqrt{f}) + K2 \times f \times \text{Cable Length}$$

Cable Insertion Loss
f = Frequency (MHz)
Use K values with matching length unit

K Values	dB/100ft	dB/100m
K1	0.29006	0.95169
K2	0.00012	0.00039

Cable Assembly Ordering Guide

XF304

Cable Code

- Code

Connector A

Code -

Connector B

XX.X

Length

XX

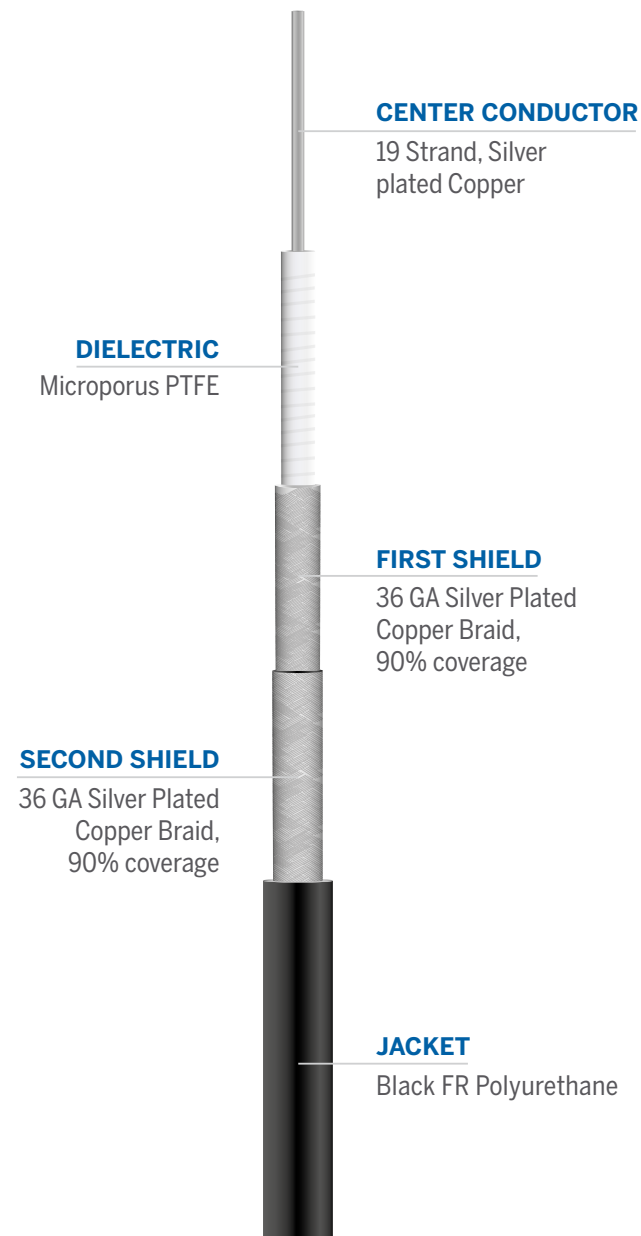
Units of measure: I = Inches, CM = Centimeters

Connector Options

Interface	Gender	Orientation	Part Number	Stock Code	Connector Code
N	Male	Straight	TC-300-NMH-X	3190-2861	NM
		Right Angle	TC-300-NMH-RA-D	3190-2761	NMR

Insertion Loss

Frequency (MHz)	Loss (dB/100ft)
600	7.18
800	8.30
1000	9.29
1600	11.79
1800	12.52
2000	13.21
2200	13.87
2400	14.50
2600	15.10
3400	17.32
3600	17.84
5800	22.79



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