

**NOTICE OF PROPRIETARY RIGHTS** THIS DOCUMENT CONTAINS CONFIDENTIAL TECHNICAL DATA, INCLUDING TRADE SECRETS, PROPRIETARY TO TIMES MICROWAVE SYSTEMS. DISCLOSURE OF THIS DATA IS EXPRESSLY CONDITIONED UPON YOUR ASSENT THAT ITS USE IS LIMITED TO USE WITHIN YOUR COMPANY ONLY. ANY OTHER USE IS STRICTLY PROHIBITED WITHOUT THE PRIOR WRITTEN CONSENT OF TIMES MICROWAVE SYSTEMS.

SYM	REVISION DESCRIPTION	DFTM	DATE	APPD	DATE
A	RELEASED FOR PRODUCTION	K.A.M.	5/20/11	J.D.B.	6/9/11



Reference standard IEC60169-16

**I. Electric Performance**

Nominal Impedance( $\Omega$ ):	50
Frequency Range:	DC-6GHz
VSWR:	$\leq 1.35$
Insert Loss:	$\leq 0.10$ (0-3G)
Insulation resistance ( $M\Omega$ )	$> 5000$
Proof voltage (V)	2500
Conductor resistance ( $m\Omega$ )	outer conductor $< 0.4$ inner conductor $< 0.8$

**II. Mechanical Performance**

Whorl pull	500N
Nut torque	5N.m
Tensile force(cable-connect)	400N
Torsion(cable-connect)	2N.m

**III. Material and plating :**

Component	Material	Plating
inner conductor	Beryllium copper	Au $> 1.27\mu m$
outer conductor	Brass	Copper-tin-zinc $> 2\mu m$
insulator	PTFE	
nut	Brass	Copper-tin-zinc $> 2\mu m$

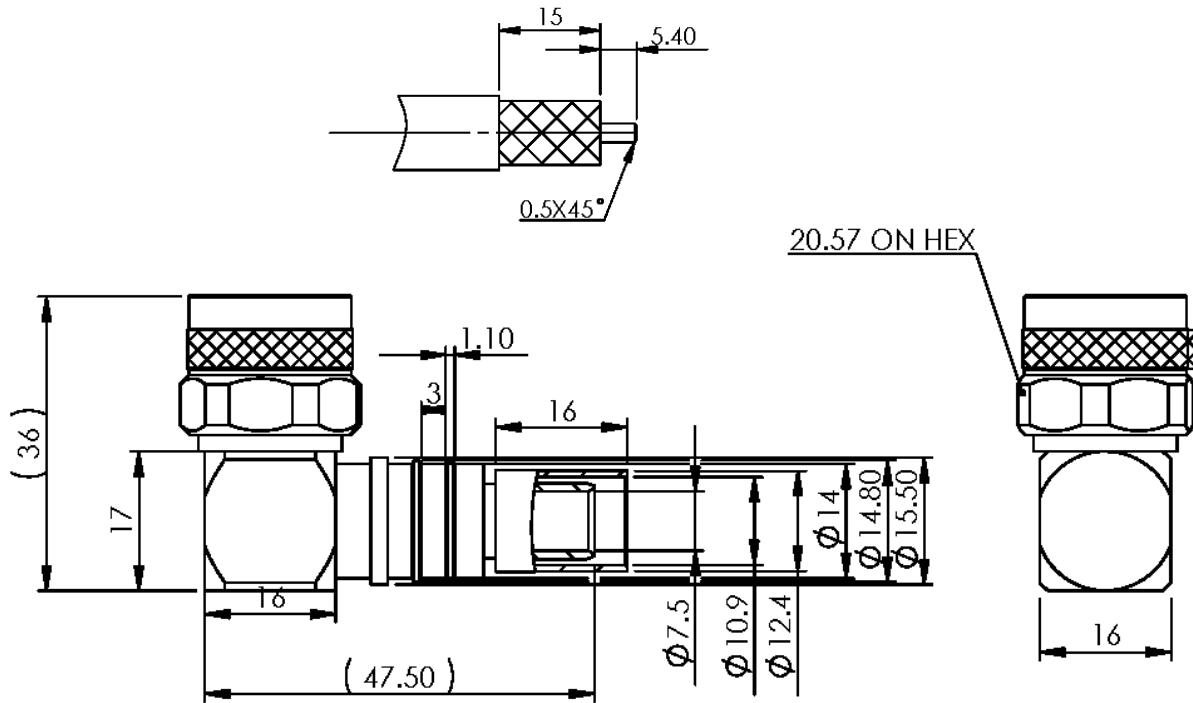
**IV. Environment**

Temp.range	-55 $^{\circ}C$ ~+155 $^{\circ}C$
Weather standard	IEC 60068 55 / 155/ 56
Thermal shock	US MIL-STD 202,Meth.107,Cond.B
Vibration	US MIL-STD 202,Meth.204,Cond.B
Shock	US MIL-STD 202,Meth.213,Cond.I
Waterproof standard	IP67
ROHS compliant	

MATERIAL:	UNLESS OTHERWISE SPECIFIED		DFTM: K. A. M.	TIMES MICROWAVE SYSTEMS			
	ALL DIMENSIONS ARE IN mm		DATE: 5/20/11				
USED ON:			CHKD: J. D. B.	CONNECTOR, NM FOR LMR-400 (EZ-400-NMC-2-D)			
			DATE: 6/9/11				
			APPD: J. D. B.				
SCALE: ~	DWG. SIZE: A	DO NOT SCALE DRAWING	CODE IDENT: 68999	DATE: 6/9/11	SHEET: 1 of 1	SD3190-2640	REV: A

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SYM	REVISION DESCRIPTION	DFTM	DATE	APPD	DATE
A	RELEASED FOR PRODUCTION	K.A.M.	5/19/11	J.D.B.	6/9/11



Reference standard IEC60169-16I, Electric Performance

Nominal Impedance( $\Omega$ ): 50  
 Frequency Range: DC-6GHz  
 VSWR:  $\leq 1.35$   
 Insert Loss:  $\leq 0.10$  (0-3G)  
 Insulation resistance ( $M\Omega$ ):  $>5000$   
 Proof voltage (V): 2500  
 Conductor resistance ( $m\Omega$ ):  
 outer conductor  $<0.4$   
 inner conductor  $<0.8$

II、 Mechanical Performance

Whorl pull: 500N  
 Nut torque: 5N.m  
 Tensile force(cable-connect): 300N  
 Torsion(cable-connect): 3N.m

III、 Material and plating :

Component	Material	Plating
inner conductor	Beryllium copper	Au $>1.27\mu m$
outer conductor	Brass	Copper-tin-zinc $>2\mu m$
insulator	PTFE	
nut	Brass	Copper-tin-zinc $>2\mu m$

IV、 Environment

Temp.range	-55°C~+155°C
Weather standard	IEC 60068 55 / 155/ 56
Thermal shock	US MIL-STD 202,Meth.107,Cond.B
Vibration	US MIL-STD 202,Meth.204,Cond.B
Shock	US MIL-STD 202,Meth.213,Cond.I
ROHS compliant	

V、 Assemble: inner conductor installed and outer conductor crimped

MATL:	UNLESS OTHERWISE SPECIFIED		DFTM: K. A. M.	TIMES MICROWAVE SYSTEMS			
	ALL DIMENSIONS ARE IN mm		DATE: 5/19/11				
USED ON:			CHKD: J. D. B.	CONNECTOR, 90° NM FOR LMR-400 (EZ-400-NMH-RA-X)			
			DATE: 6/9/11				
			APPD: J. D. B.				
SCALE: ~	DWG. SIZE: A	DO NOT SCALE DRAWING	CODE IDENT: 68999	DATE: 6/9/11	SHEET: 1 of 1	SD3190-2638	REV: A

## LMR-<sup>®</sup>400-UF UltraFlex Communications Coax

### Ideal for...

- Drop-in replacement for RG-8/9913 Air-Dielectric type Cable
- Jumper Assemblies in Wireless Communications Systems
- Short Antenna Feeder runs
- Any application that requires periodic/repeated flexing



• **LMR<sup>®</sup> - UltraFlex** has a stranded center conductor and rubber outer jacket designed for multiple bending/flexing cycles. It is used for both indoor and outdoor applications.

• **Flexibility** and bendability are hallmarks of the LMR-400-UF cable design. The flexible outer conductor enables the tightest bend radius available for any cable of similar size and performance.

• **Low Loss** is another hallmark feature of LMR-400-UF. Size for size LMR has the lowest loss of any flexible cable and comparable loss to semirigid hard-line cables.

• **RF Shielding** is 50 dB greater than typical single shielded coax (40 dB). The multi-ply bonded foil outer conductor is rated conservatively at > 90 dB (i.e. >180 dB between two adjacent cables).

• **Weatherability:** LMR-400-UF cables are designed for outdoor exposure and have a life expectancy in excess of 10 years.

• **Connectors:** A wide variety of connectors are available for LMR-400-UF cable, including all common interface types, reverse polarity, and solder-on center pins. Most LMR connectors employ crimp outer attachment using standard hex crimp sizes.

• **Cable Assemblies:** All LMR-400-UF cable types are available as pre-terminated cable assemblies. Refer to the section on FlexTech for further details.

Part Description				
Part Number	Application	Jacket	Color	Stock Code
LMR-400-UF	Indoor/Outdoor	TPE	Black	54040

Construction Specifications				
Description	Material	In.	(mm)	
Inner Conductor	Stranded BC	0.108	(2.74)	
Dielectric	Foam Polyethylene	0.285	(7.24)	
Outer Conductor	Aluminum Tape	0.291	(7.39)	
Overall Braid	Tinned Copper	0.320	(8.13)	
Jacket	Black Thermoplastic Elastomer	0.405	(10.29)	

# LMR<sup>®</sup>-400-UF UltraFlex Communications Coax



## Connectors

Interface	Description	Part Number	Stock Code	VSWR** Freq. (GHz)	Coupling Nut	Inner Contact Attach	Outer Contact Attach	Finish* Body /Pin	Length in (mm)	Width in (mm)	Weight lb (g)
7-16 DIN Female	Straight Jack	TC-400-716-FC	3190-376	<1.25:1 (2.5)	NA	Solder	Clamp	S/S	1.6 (41)	1.13 (28.7)	0.281 (127.5)
7-16 DIN Male	Straight Plug	TC-400-716-MC	3190-279	<1.25:1 (2.5)	Hex	Solder	Clamp	S/S	1.4 (36)	1.40 (35.6)	0.268 (121.6)
BNC Male	Straight Plug	TC-400-BM	3190-318	<1.25:1 (2.5)	Knurl	Solder	Crimp	N/S	1.7 (43)	0.56 (14.2)	0.063 (28.6)
Mini-UHF	Straight Plug	TC-400-MUHF	3190-520	<1.25:1 (2.5)	Knurl	Solder	Crimp	N/G	1.1 (28)	0.50 (12.7)	0.020 (9.1)
N Female	Straight Jack	TC-400-NFC	3190-299	<1.25:1 (2.5)	NA	Solder	Clamp	N/S	1.6 (41)	0.75 (19.1)	0.119 (54.0)
N Male	Straight Plug	SC-400-NM	3190-1454	<1.25:1 (2.5)	Knurl	Solder	Crimp	N/G	1.5 (38)	0.75 (19.1)	0.090 (40.8)
	Straight Plug	TC-400-NM	3190-188	<1.25:1 (2.5)	Knurl	Solder	Crimp	N/G	1.5 (38)	0.75 (19.1)	0.090 (40.8)
	Straight Plug	TC-400-NMC	3190-277	<1.25:1 (2.5)	Knurl	Solder	Clamp	N/G	1.5 (38)	0.75 (19.1)	0.121 (54.9)
	Straight Plug	TC-400-NMH-D	3190-552	<1.25:1 (10)	Hex/Knurl	Solder	Crimp	A/G	1.5 (38)	0.89 (22.6)	0.113 (51.3)
	Right Angle	TC-400-NMH-RA	3190-422*	<1.35:1 (6)	Hex	Solder	Crimp	S/G	1.8 (46)	1.25 (31.8)	0.130 (59.0)
	Right Angle	TC-400-NMH-RA-D	3190-2293*	<1.35:1 (6)	Hex/Knurl	Solder	Crimp	A/G	1.8 (46)	1.25 (31.8)	0.130 (59.0)
SMA Male	Straight Plug	TC-400-SM	3190-439	<1.25:1 (8)	Hex	Solder	Crimp	N/G	1.2 (29)	0.50 (12.7)	0.032 (14.5)
TNC Male	Straight Plug	TC-400-TM	3190-260	<1.25:1 (2.5)	Knurl	Solder	Crimp	N/S	1.7 (43)	0.59 (15.0)	0.074 (33.6)
	Right Angle	TC-400-TM-RA	3190-442*	<1.35:1 (2.5)	Knurl	Solder	Crimp	N/G	1.7 (43)	0.59 (15.0)	0.085 (38.6)

\* Finish metals: N=Nickel, S=Silver, G=Gold, SS=Stainless Steel, A=Alballoy \*\*VSWR spec based on 3 foot cable with a connector pair \*Available in bulk pack

**Mechanical Specifications**

Performance Property	Units	US	(metric)
Bend Radius: installation	in. (mm)	1.0	(25.4)
Bend Radius: repeated	in. (mm)	4.0	(101.6)
Bending Moment	ft-lb (N-m)	0.375	(0.51)
Weight	lb/ft (kg/m)	.088	(0.131)
Tensile Strength	lb (kg)	160	(72.6)
Flat Plate Crush	lb/in. (kg/mm)	20	(0.36)

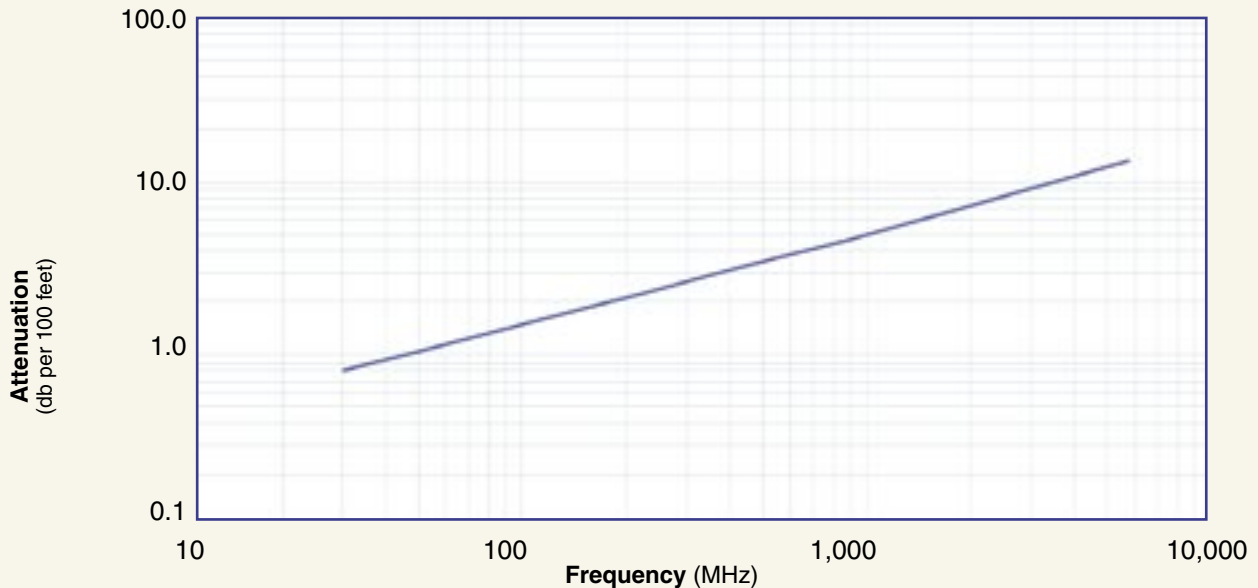
**Environmental Specifications**

Performance Property	°F	°C
Installation Temperature Range	-40/+185	-40/+85
Storage Temperature Range	-94/+185	-70/+85
Operating Temperature Range	-40/+185	-40/+85

**Electrical Specifications**

Performance Property	Units	US	(metric)
Cutoff Frequency	GHz	16.2	
Velocity of Propagation	%	85	
Dielectric Constant	NA	1.38	
Time Delay	nS/ft (nS/m)	1.20	(3.92)
Impedance	ohms	50	
Capacitance	pF/ft (pF/m)	23.9	(78.40)
Inductance	uH/ft (uH/m)	0.060	(0.21)
Shielding Effectiveness	dB	>90	
DC Resistance			
Inner Conductor	ohms/1000ft (/km)	1.07	(3.51)
Outer Conductor	ohms/1000ft (/km)	1.65	(5.4)
Voltage Withstand	Volts DC	2500	
Jacket Spark	Volts RMS	8000	
Peak Power	kW	16	

**Attenuation vs. Frequency (typical)**



Frequency (MHz)	30	50	150	220	450	900	1500	1800	2000	2500	5800
Attenuation dB/100 ft	0.8	1.1	1.8	2.2	3.3	4.7	6.2	6.8	7.2	8.1	13.0
Attenuation dB/100 m	2.7	3.5	6.1	7.4	10.7	15.4	20.2	22.3	23.6	26.6	42.6
Avg. Power kW	2.77	2.14	1.22	1.00	0.69	0.48	0.36	0.33	0.31	0.28	0.17

Calculate Attenuation =  $(0.146748) \cdot \sqrt{\text{FMHz}} + (0.000312) \cdot \text{FMHz}$  (interactive calculator available at [http://www.timesmicrowave.com/cable\\_calculators](http://www.timesmicrowave.com/cable_calculators))  
 Attenuation: VSWR=1.0; Ambient = +25°C (77°F) Power: VSWR=1.0; Ambient = +40°C; Inner Conductor = 100°C (212°F);  
 Sea Level; dry air; atmospheric pressure; no solar loading



## Hardware Accessories

Type	Part Number	Stock Code	Description
Ground Kit	GK-S400TT	GK-S400TT	Standard Grounding Kit (each)
Hoisting Grip	HG-400T	HG-400T	Laced Type (each)



## Install Tools

Type	Part Number	Stock Code	Description
Crimp Tool	HX-4	3190-200	Crimp Handle
Crimp Dies	Y1719	3190-202	.429" Hex Dies
Crimp Tool	CT-400/300	3190-666	Crimp tool for LMR 400 connectors
Crimp Rings	CR-400	3190-830	Crimp rings for TC/EZ-400 connectors (package of 10)
Cutting Tool	CCT-01	3190-1544	Cable end flush cut tool
Replacement Blade	RB-01	3190-1609	Replacement blade for cutting tool