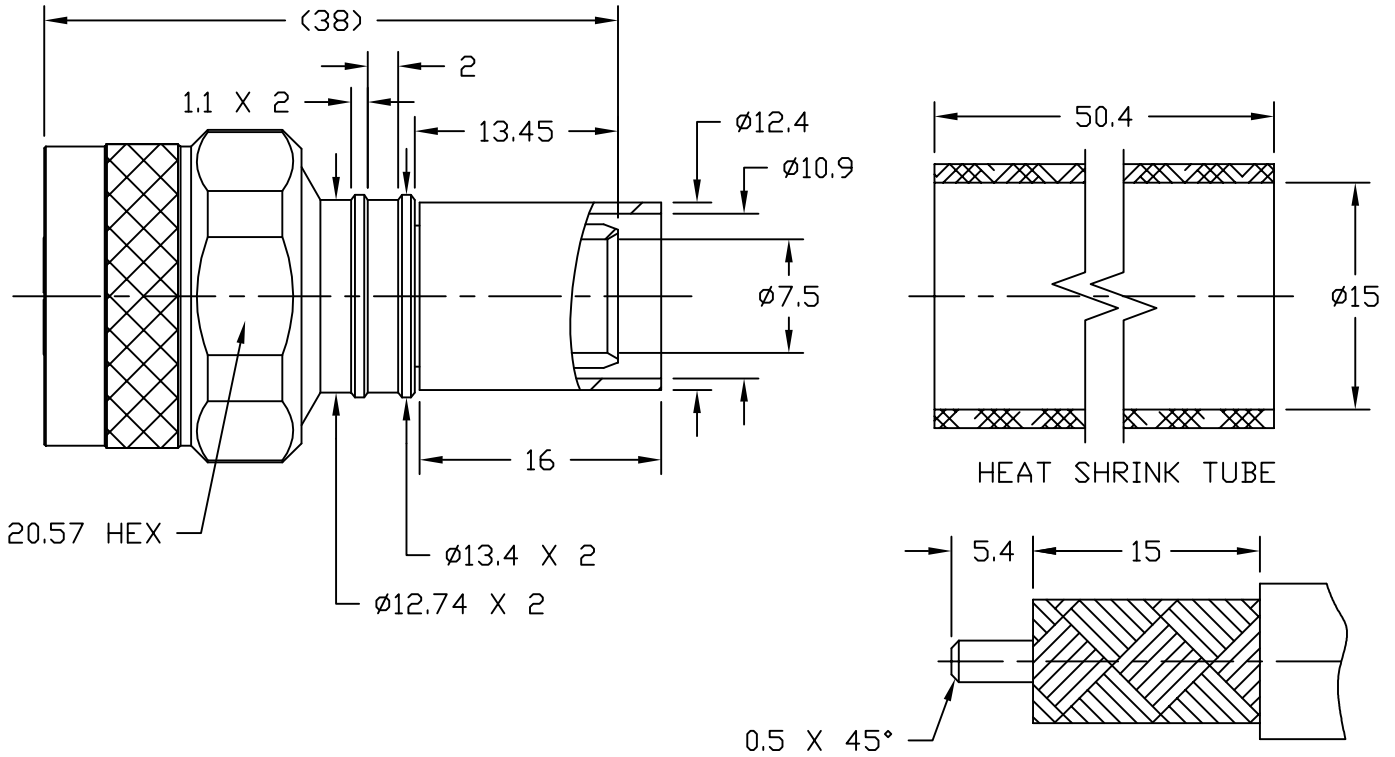


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| SYM | REVISION DESCRIPTION    | DFTM     | DATE    | APPD     | DATE    |
|-----|-------------------------|----------|---------|----------|---------|
| A   | RELEASED FOR PRODUCTION | D. J. H. | 3/15/11 | J. D. B. | 8/16/11 |

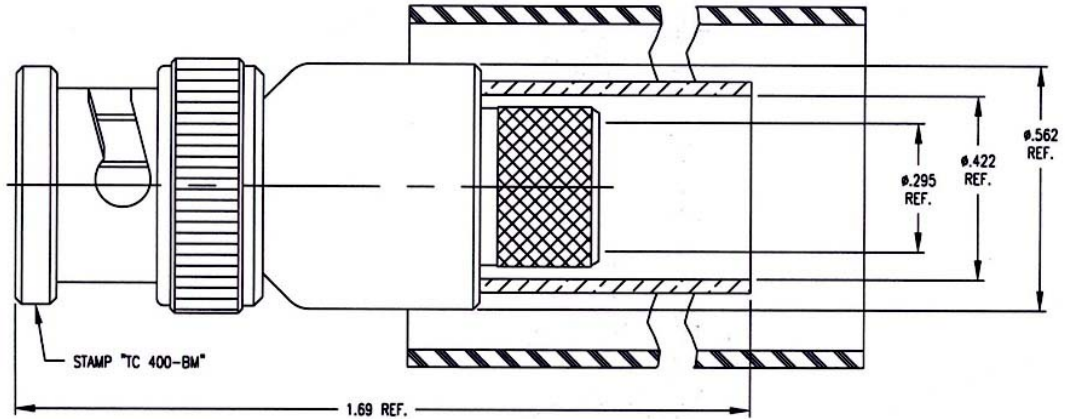


CABLE PREP.  
USE CST-400  
(3192-004)  
.429" HEX.

|                                     |  |  |   |
|-------------------------------------|--|--|---|
| Reference standard                  | IEC60169-16  | III. Material and plating:   |   |
| I. Electric Performance             |  | <u>Component</u>   | <u>Material</u>                                 |
| Impedance( $\Omega$ ):              | 50   | inner conductor  | Brass   |
| Frequency Range:                    | DC-6GHz  | outer conductor  | Brass   |
| VSWR:                               | $\leq 1.25$  | tube   | Copper  |
| Insert Loss: (dB)                   | $\leq 0.1$   | nut  | Brass   |
| Insulation resistance ( $M\Omega$ ) | $> 5000$   | gasket   | Silicone rubber                                 |
| Work voltage (V)                    | 1500   | insulator  | PTFE  |
| Conductor resistance ( $m\Omega$ )  | outer conductor $< 0.2$<br>inner conductor $< 0.8$ | IV. Environment  |   |
| II. Mechanical Performance          |  | Temp. range  | $-55^{\circ}\text{C} \sim +155^{\circ}\text{C}$ |
| Nut torque                          | 25N.m  | Weather standard   | IEC 60068 55 / 155/ 56                          |
| (Nut) Whorl pull                    | 1000N  | Thermal shock  | US MIL-STD 202, Meth.107, Cond.B                |
| Tensile force (cable-connect)       | 400N   | Vibration  | US MIL-STD 202, Meth.204, Cond.B                |
| Torsion (cable-connect)             | 2N.m   | Shock  | US MIL-STD 202, Meth.213, Cond.I                |
|                                     |  | Waterproofing standard   | IP67  |
|                                     |  | V. Assembly: inner conductor soldered and outer conductor crimped. |   |

|            |  |                      |   |              |
|------------|--|----------------------|---|--------------|
| MATL:      | UNLESS OTHERWISE SPECIFIED   | DFTM. D. J. H.       | TIMES MICROWAVE SYSTEMS   |              |
|            | ALL DIMENSIONS ARE IN mm<br>MACHINED SURFACES FINISH N/A RMS MAX.<br>REMOVE ALL BURRS N/A MAX. BREAK<br>MACHINE CORNERS N/A MAX. FILLET R.<br>TOLERANCES ON DECIMALS<br>. XX $\pm$ N/A . XXX $\pm$ N/A<br>ANGLES $\pm 1^{\circ}$ FRACTIONS $\pm$ N/A | DATE 3/15/11         | <b>TC-400-NMH-X</b><br>"N" MALE FOR LMR-400 CABLE<br>SOLDER/CRIMP/NO BRAID TRIM |              |
| USED ON: 0 |  | CHKD. J. D. B.       |   |              |
|            |  | DATE 8/16/11         |   |              |
| SCALE: N/A | DWG. SIZE A  | DO NOT SCALE DRAWING | APPD. J. D. B.  | DATE 8/16/11 |
|            |  | CODE IDENT 68999     | DATE 8/16/11  | 1 of 1       |
|            |  |                      |   | SD3190-2626  |
|            |  |                      |   | REV A        |

| LTR | DESCRIPTION | DATE   | BY |
|-----|-------------|--------|----|
| A   | Released    | 6/7/95 | JP |
|     |             |        |    |



**I. MATERIALS & FINISHES**

- center contact: Nickel Plated Brass
- outer contact: Nickel Plated Brass
- coupling nut: Nickel Plated Brass
- body: Nickel Plated Brass
- crimp sleeve: Nickel Plated Copper
- dielectric: Teflon® PTFE
- gasket: Silicone Rubber
- shrink sleeve: Adhesive Lined Polyolefin
- attachment: braid crimp (.429"hex)

**II. ELECTRICAL PROPERTIES**

- impedance: 50 ohms
- working voltage: 500 vrms (max)
- vswr: 1.25:1 (max) up to 3 GHz
- insertion loss:  $0.10 \times \sqrt{F}$ ghz

Unless otherwise specified, dimensions are in inches. Tolerances are applicable when specified.

These drawings and specifications contain proprietary information which is the property of Times Microwave Systems.

| Approvals |    |        |
|-----------|----|--------|
| Drawn     | JP | 6/7/95 |
|           |    |        |
|           |    |        |
|           |    |        |



**TIMES MICROWAVE SYSTEMS**

Wallingford, CT 06492  
 (203) 949-8400; (203) 949-8423.Fax  
 www.timesmicrowave.com

**TC-400-BM**

Type-BNC male (plug) – Solder Pin  
 for LMR-400 Cable

|           |                           |                                 |
|-----------|---------------------------|---------------------------------|
| Size<br>A | CAGE CODE<br><b>68999</b> | Drawing No.:<br><b>3190-318</b> |
| Scale: NA | Rev. (A)                  | Sheet: 1 of 1                   |

## 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**<br>Freq. (GHz) | Coupling<br>Nut | Inner<br>Contact<br>Attach | Outer<br>Contact<br>Attach | Finish*<br>Body<br>/Pin | Length<br>in<br>(mm) | Width<br>in<br>(mm) | Weight<br>lb<br>(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)   |

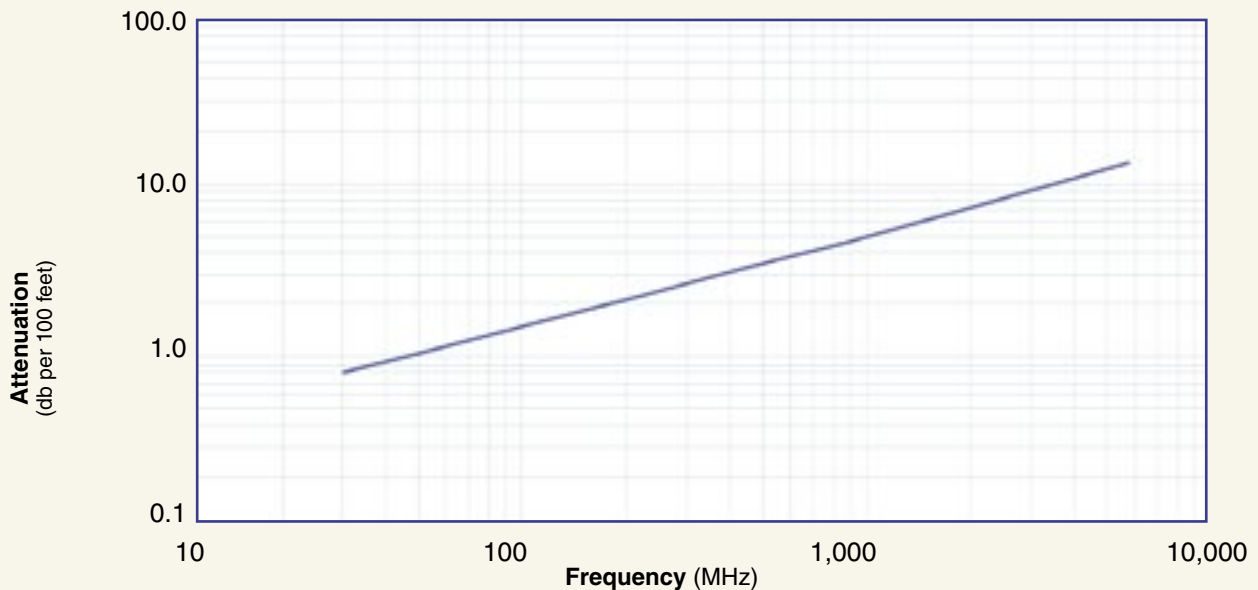
**Environmental Specifications**

| 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**

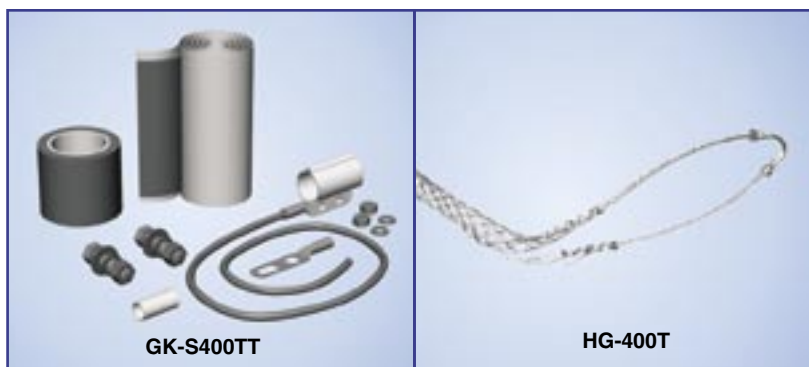
| Performance Property    | Units             | US    | (metric) |
|-------------------------|-------------------|-------|----------|
| Cutoff Frequency        | GHz               | 16.2  |          |
| Velocity of Propagation | %                 | 85    |          |
| Dielectric Constant     | NA                | 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   |          |
| <b>DC Resistance</b>    |                   |       |          |
| 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 |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|
| <b>Attenuation dB/100 ft</b> | 0.8  | 1.1  | 1.8  | 2.2  | 3.3  | 4.7  | 6.2  | 6.8  | 7.2  | 8.1  | 13.0 |
| <b>Attenuation dB/100 m</b>  | 2.7  | 3.5  | 6.1  | 7.4  | 10.7 | 15.4 | 20.2 | 22.3 | 23.6 | 26.6 | 42.6 |
| <b>Avg. Power kW</b>         | 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                   |