

LMR[®]-400-LLPL Flexible Low Loss Plenum Coax

Ideal for...

- Indoor Plenum Feeder runs
- UL/NEC/CSA rated CMP/FT6
- Any wireless application (e.g. LMDS, MMDS, WLL, GPS, LMR, WLAN, WISP, WiMax, SCADA, Cellular, PCS, Paging) requiring an easily routed, low loss RF cable for in-building systems



- **LMR[®]-LLPL** is an indoor highly fire retarded cable intended specifically for runs within return air handling plenums (e.g. dropped ceilings, raised floors). It has a UL/NEC & CSA rating of ‘CMP’ and ‘FT6’ respectively.
- **Flexibility** and bendability are hallmarks of the LMR-400-LLPL 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-LLPL. 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-LLPL cables are designed for indoor Plenum applications. Black jacketed LMR-LLPL versions can be supplied for applications that originate outdoors (e.g., rooftop) and subsequently enter the building.

- **Connectors:** A variety of connectors are available for LMR-400-LLPL cable, including the most common interface types. Most employ crimp outer attachment using standard hex crimp sizes.
- **Cable Assemblies:** All LMR-400-LLPL 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-LLPL | Indoor Plenum CMP/FT6 | FRPVC | Orange | 54070 |

| Construction Specifications | | | |
|-----------------------------|------------------|-------|---------|
| Description | Material | In. | (mm) |
| Inner Conductor | Solid BCCAl | 0.095 | (2.41) |
| Dielectric | Low density PTFE | 0.285 | (7.24) |
| Outer Conductor | Aluminum Tape | 0.291 | (7.39) |
| Overall Braid | Tinned Copper | 0.320 | (8.13) |
| Jacket | Orange FRPVC | 0.405 | (10.29) |

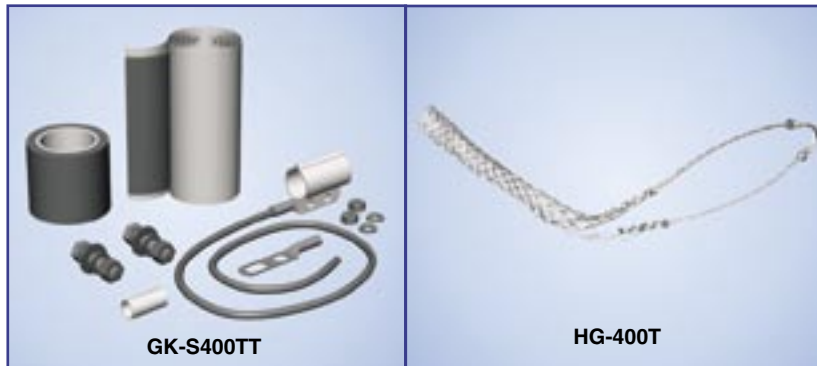
LMR[®]-400-LLPL Flexible Low Loss Plenum Coax



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) |
|-----------|---------------|-----------------|------------|-----------------------|--------------|----------------------|----------------------|----------------------|-------------------|------------------|------------------|
| N Female | Straight Jack | TC-400-NF-PL | 3190-964 | <1.25:1 (2.5) | NA | Solder | Crimp | N/G | 1.8 (45) | 0.66(16.8) | 0.105 (47.6) |
| N Male | Straight Plug | EZ-400-NMH-PL-D | 3190-602 | <1.25:1 (2.5) | Hex/Knurled | Spring Finger | Crimp | A/G | 1.5 (38) | 0.89(22.6) | 0.113 (51.3) |
| | Straight Plug | TC-400-NMH-PL | 3190-759 | <1.25:1 (2.5) | Hex | Solder | Crimp | S/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) |

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



Hardware Accessories

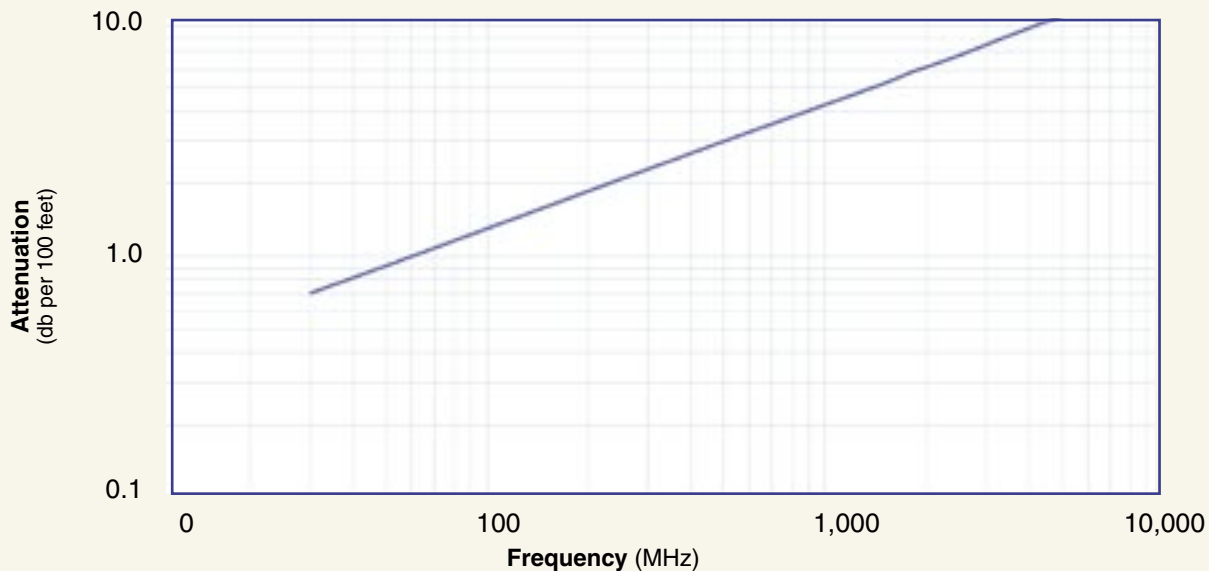
| Type | Part Number | Stock Code | Description |
|---------------|-------------|------------|-------------------------------|
| Ground Kit | GK-S400TT | GK-S400TT | Standard Grounding Kit (each) |
| Hoisting Grip | HG-400T | HG-400T | Laced Type (each) |

| Mechanical Specifications | | | |
|---------------------------|----------------|-------|----------|
| Performance Property | Units | US | (metric) |
| Bend Radius: installation | in. (mm) | 1.00 | (25.4) |
| Bend Radius: repeated | in. (mm) | 4.0 | (101.6) |
| Bending Moment | ft-lb (N-m) | 0.5 | (0.68) |
| Weight | lb/ft (kg/m) | 0.114 | (0.17) |
| Tensile Strength | lb (kg) | 120 | (54.5) |
| Flat Plate Crush | lb/in. (kg/mm) | 185 | (3.31) |

| Electrical Specifications | | | |
|---------------------------|-------------------|-------|----------|
| Performance Property | Units | US | (metric) |
| Cutoff Frequency | GHz | | 15 |
| Velocity of Propagation | % | | 76 |
| Dielectric Constant | NA | | 1.73 |
| Time Delay | nS/ft (nS/m) | 1.34 | (4.40) |
| Impedance | ohms | | 50 |
| Capacitance | pF/ft (pF/m) | 26.7 | (87.6) |
| Inductance | uH/ft (uH/m) | 0.067 | (0.22) |
| Shielding Effectiveness | dB | | >90 |
| DC Resistance | | | |
| Inner Conductor | ohms/1000ft (/km) | 1.8 | (5.9) |
| Outer Conductor | ohms/1000ft (/km) | 1.65 | (5.4) |
| Voltage Withstand | Volts DC | | 2500 |
| Jacket Spark | Volts RMS | | 8000 |
| Peak Power | kW | | 16 |

| Environmental Specifications | | | |
|--------------------------------|----------|--------|--|
| Performance Property | °F | °C | |
| Installation Temperature Range | +23/+167 | -5/+75 | |
| Storage Temperature Range | +23/+167 | -5/+75 | |
| Operating Temperature Range | +23/+167 | -5/+75 | |

Attenuation vs. Frequency (typical)



| Frequency (MHz) | 30 | 50 | 150 | 220 | 450 | 900 | 1500 | 1800 | 2000 | 2500 | 3400 | 5800 |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Attenuation dB/100 ft | 0.7 | 0.9 | 1.6 | 1.9 | 2.8 | 4.0 | 5.2 | 5.7 | 6.1 | 6.8 | 8.0 | 10.7 |
| Attenuation dB/100 m | 2.3 | 3.0 | 5.3 | 6.4 | 9.2 | 13.2 | 17.1 | 18.9 | 19.9 | 22.4 | 26.4 | 35.1 |
| Avg. Power kW | 3.33 | 2.57 | 1.48 | 1.22 | 0.84 | 0.59 | 0.45 | 0.41 | 0.39 | 0.34 | 0.29 | 0.22 |

Calculate Attenuation = $(0.129140) \cdot \sqrt{\text{FMHz}} + (0.000150) \cdot \text{FMHz}$ (interactive calculator available at http://www.timesmicrowave.com/cable_calculators)

Attenuation:

VSWR=1.0 ; Ambient = +25°C (77°F)

Power:

VSWR=1.0; Ambient = +40°C; Jacket = +75°C (167°F); Sea Level; dry air; atmospheric pressure; no solar loading



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) |
| Strip Tool | CST-400 | 3192-004 | Combination prep tool for LMR-400 crimp and clamp connectors |
| Mid-Span Strip Tool | GST-400 | 3190-2174 | For ground strap attachment |
| Deburr Tool | DBT-U | 3192-001 | Removes center conductor rough edges |
| Cutting Tool | CCT-01 | 3190-1544 | Cable end flush cut tool |
| Replacement Blade | RB-01 | 3190-1609 | Replacement blade for cutting tool |
| Tool Kit | TK-400EZ | 3190-1602 | Tool kit for LMR-400 Crimp Connectors (includes CCT-01, CST-400, CT-400/300, DBT-U, Tool Pouch) |