

# LMR®-400 Flexible Low Loss 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 (e.g. WLL, GPS, LMR, WLAN, WISP, WiMax, SCADA, Mobile Antennas) requiring an easily routed, low loss RF cable
- **NEW!** Times Protect® LP-18-400 protector-series



| Part Description |                          |        |       |       | Stock |
|------------------|--------------------------|--------|-------|-------|-------|
| Part Number      | Application              | Jacket | Color | Code  |       |
| LMR-400          | Outdoor                  | PE     | Black | 54001 |       |
| LMR-400-DB       | Outdoor/Watertight       | PE     | Black | 54091 |       |
| LMR-400-FR       | Indoor/Outdoor Riser CMR | FRPE   | Black | 54030 |       |
| LMR-400-FR-PVC   | Indoor/Outdoor Riser CMR | FRPVC  | Black | 54073 |       |
| LMR-400-PVC      | General Purpose          | PVC    | Black | 54218 |       |
| LMR-400-PVC-W    | General Purpose          | PVC    | White | 54204 |       |

| Construction Specifications |               |       |         |
|-----------------------------|---------------|-------|---------|
| Description                 | Material      | In.   | (mm)    |
| Inner Conductor             | Solid BCCA1   | 0.108 | (2.74)  |
| Dielectric                  | Foam PE       | 0.285 | (7.24)  |
| Outer Conductor             | Aluminum Tape | 0.291 | (7.39)  |
| Overall Braid               | Tinned Copper | 0.320 | (8.13)  |
| Jacket                      | (see table)   | 0.405 | (10.29) |

| 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) |  |
| Velocity of Propagation   | %                 | 84    |          |  |
| 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  | (78.4)   |  |
| Inductance                | uH/ft (uH/m)      | 0.060 | (0.20)   |  |
| Shielding Effectiveness   | dB                | >90   |          |  |
| DC Resistance             |                   |       |          |  |
| Inner Conductor           | ohms/1000ft (/km) | 1.39  | (4.6)    |  |
| Outer Conductor           | ohms/1000ft (/km) | 1.65  | (5.4)    |  |
| Voltage Withstand         | Volts DC          | 2500  |          |  |
| Jacket Spark              | Volts RMS         | 8000  |          |  |
| Peak Power                | kW                | 18    |          |  |

| 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/100ft (kg/m) | 0.068 | (0.10)   |
| Tensile Strength          | lb (kg)         | 160   | (72.6)   |
| Flat Plate Crush          | lb/in. (kg/mm)  | 40    | (0.71)   |

**Attenuation vs. Frequency (typical)**



| Frequency (MHz)       | 50   | 150  | 220  | 450  | 900  | 1500 | 1800 | 2000 | 2500 | 5800 | 8000 |
|-----------------------|------|------|------|------|------|------|------|------|------|------|------|
| Attenuation dB/100 ft | 0.7  | 1.5  | 1.9  | 2.7  | 3.9  | 5.1  | 5.7  | 6.0  | 6.8  | 10.8 | 13.0 |
| Attenuation dB/100 m  | 2.3  | 5.0  | 6.1  | 8.9  | 12.8 | 16.8 | 18.6 | 19.6 | 22.2 | 35.5 | 42.7 |
| Avg. Power kW         | 3.33 | 2.57 | 1.47 | 1.20 | 0.83 | 0.58 | 0.44 | 0.40 | 0.37 | 0.33 | 0.21 |

**Calculate Attenuation \***

$(0.122290) \cdot \sqrt{\text{FMHz}} + (0.000260) \cdot \text{FMHz}$  (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

# LMR®-400

## Flexible Low Loss Communications

### Connectors

| Interface                  | Description      | Part Number       | Stock Code | VSWR**  | Coupling Freq. (GHz) | Nut       | Inner Contact Attach | Outer Contact Attach | Finish* Body /Pin | Length in (mm) | Width in (mm) | Weight lb (g)  |
|----------------------------|------------------|-------------------|------------|---------|----------------------|-----------|----------------------|----------------------|-------------------|----------------|---------------|----------------|
| 1. 4.1-8.5 mini DIN Female | Straight Jack    | EZ-400-4195F-X    | 3190-2968  | <1.25:1 | (6)                  | Hex       | Spring Finger Crimp  |                      | A/G               | 1.8 (45.0)     | 0.55 (14.0)   | 0.074 (33.6)   |
| 2. 4.1-8.5 mini DIN Female | Straight Plug    | EZ-400-4195M-X    | 3190-2969  | <1.25:1 | (6)                  | Hex       | Spring Finger Crimp  |                      | A/G               | 1.5 (38.1)     | 0.89 (22.6)   | 0.103 (46.8)   |
| 3. 7-16 DIN Female         | Straight Jack    | TC-400-716-FC     | 3190-376   | <1.25:1 | (2.5)                | N/A       | Solder               | Clamp                | S/S               | 1.6 (41)       | 1.12 (28.7)   | 0.281 (127.5)  |
| 4. 7-16 DIN                | Right Angle      | TC-400-716M-RA-D  | 3190-2598  | <1.35:1 | (6)                  | Hex       | Solder               | Crimp                | A/S               | 1.7 (43.20)    | 1.08 (27.3)   | 0.374 (169.5)  |
| 5. 7-16 DIN Male           | Straight Plug    | EZ-400-716M-X     | 3190-2524  | <1.25:1 | (6)                  | Hex       | Spring Finger Crimp  |                      | A/G               | 1.6 (39.5)     | 0.38 (9.7)    | 0.277 (126.0)  |
| 6. 7-16 DIN Male           | Straight Plug    | TC-400-716M-X     | 3190-2597  | <1.25:1 | (6)                  | Hex       | Solder               | Crimp                | A/S               | 1.6 (39.5)     | 0.42 (10.6)   | 0.320 (145.0)  |
| 7. 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)       | 1.02 (25.9)   | 0.268 (121.6)  |
| 8. 7-16 DIN Male           | Right Angle      | TC-400-716MC-RA   | 3190-1671  | <1.25:1 | (2.5)                | Hex       | Solder               | Clamp                | A/S               | 2.4 (61)       | 1.88 (47.8)   | 0.35 (159)     |
| 9. 7-16 DIN Male           | Right Angle      | EZ-400-716M-RA-X  | 3190-2545  | <1.35:1 | (6)                  | Hex       | Spring Finger Crimp  |                      | A/G               | 1.7 (43.2)     | 1.75 (44.3)   | 0.374 (170.17) |
| 10. BNC Male               | Straight Plug    | TC-400-BM-X       | 3190-6232  | <1.30:1 | (4)                  | Knurl     | Solder               | Crimp                | A/G               | 1.8 (45.8)     | 0.60 (15.5)   | 0.630 (28.6)   |
| 11. BNC Male               | Straight Plug    | EZ-400-BM-X       | 3190-2852  | <1.35:1 | (2)                  | Knurl     | Spring Finger Crimp  |                      | A/G               | 1.7 (42.7)     | 0.56 (14.2)   | 0.066 (29.9)   |
| 12. BNC Male               | Right Angle      | EZ-400-BM-RA-X    | 3190-2847  | <1.35:1 | (2)                  | Knurl     | Spring Finger Crimp  |                      | A/G               | 1.9 (48.0)     | 1.32 (33.5)   | 0.097 (44.0)   |
| 13. HN Male                | Straight Plug    | TC-400-HNM        | 3190-923   | <1.25   | (2)                  | Knurl     | Solder               | Clamp                | S/S               | 2.3 (59.2)     | 0.88 (22.4)   | 0.25 (113.4)   |
| 14. HN Male                | Right Angle      | TC-400-HNM-RA     | 3190-2541  | <1.25:1 | (2.5)                | Hex       | Solder               | Crimp                | A/G               | 1.6 (41.4)     | 1.56 (39.6)   | 0.198 (90.0)   |
| 15. UHF Male               | Straight Plug    | EZ-400-UM         | 3190-997   | <1.25:1 | (2.5)                | Knurl     | Spring Finger Crimp  |                      | N/G               | 1.8 (46)       | 0.80 (20.3)   | 0.076 (34.4)   |
| 16. 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)    |
| 17. N Female               | Straight Jack    | TC-400-NFC        | 3190-299   | <1.25:1 | (2.5)                | N/A       | Solder               | Clamp                | N/S               | 1.6 (41)       | 0.75 (19.1)   | 0.119 (54.0)   |
| 18. N Female               | Straight Jack    | EZ-400-NF-X       | 3190-2818  | <1.25:1 | (2.5)                | N/A       | Spring Finger Crimp  |                      | N/G               | 1.8 (45)       | 0.66 (16.8)   | 0.105 (47.6)   |
| 19. N Female               | Straight Jack    | TC-400-NF-X       | 3190-2815  | <1.25:1 | (2.5)                | N/A       | Solder               | Crimp                | N/G               | 1.8 (45)       | 0.66 (16.8)   | 0.105 (47.6)   |
| 20. N Female               | Bulkhead Jack    | EZ-400-NF-BH      | 3190-518   | <1.25:1 | (2.5)                | N/A       | Spring Finger Crimp  |                      | N/G               | 1.8 (46)       | 0.88 (22.4)   | 0.102 (46.3)   |
| 21. N Female               | Bulkhead Jack    | TC-400-NFC-BH (A) | 3190-872   | <1.25:1 | (2.5)                | N/A       | Solder               | Clamp                | A/G               | 1.8 (46)       | 0.88 (22.4)   | 0.145 (65.8)   |
| 22. 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)   |
| 23. N Male                 | Straight Plug    | TC-400-NMC        | 3190-6077  | <1.25:1 | (2.5)                | Knurl     | Solder               | Clamp                | N/G               | 1.5 (38)       | 0.70 (17.8)   | 0.121 (54.9)   |
| 24. N Male                 | Straight Plug    | EZ-400-NMC-2-D    | 3190-2640  | <1.25:1 | (2.5)                | Hex/Knurl | Spring FingerCramp   |                      | N/G               | 1.5 (38)       | 0.75 (19.1)   | 0.121 (54.9)   |
| 25. N Male                 | Straight Plug    | EZ-400-NMH-X      | 3190-2590  | <1.25:1 | (10)                 | Hex/Knurl | Spring FingerCramp   |                      | A/G               | 1.5 (38)       | 0.89 (22.6)   | 0.103 (46.8)   |
| 26. N Male                 | Straight Plug    | TC-400-NMH-X      | 3190-2635  | <1.25:1 | (10)                 | Hex/Knurl | Solder               | Crimp                | A/G               | 1.5 (38)       | 0.89 (22.6)   | 0.113 (51.3)   |
| 27. N Male                 | Right Angle      | EZ-400-NMH-RA-X   | 3190-2636  | <1.35:1 | (6)                  | Hex/Knurl | Spring Finger Crimp  |                      | A/G               | 1.87 (47)      | 1.42 (36.0)   | 0.177 (80.2)   |
| 28. N Male                 | Right Angle      | TC-400-NMH-RA-D   | 3190-2668  | <1.25:1 | (2.5)                | Hex       | Solder               | Crimp                | SS/G              | 1.5 (38.1)     | 0.89 (22.6)   | 0.130 (59.0)   |
| 29. N Male                 | 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)   |
| 30. N Male                 | Right Angle      | TC-400-NMH-RA-X   | 3190-870   | <1.35:1 | (2.5)                | Hex       | Solder               | Clamp                | A/G               | 1.8 (46)       | 1.25 (31.8)   | 0.150 (68.0)   |
| 31. N Male                 | Reverse Polarity | TC-400-NM-RP      | 3190-960   | <1.25:1 | (2.5)                | Knurl     | Solder               | Crimp                | N/G               | 1.5 (38)       | 0.75 (19.1)   | 0.090 (40.8)   |
| 32. QN Male                | Straight Plug    | EZ-400-QNM-X      | 3190-2979  | <1.25:1 | (6)                  | Hex       | Spring Finger Crimp  |                      | A/G               | 1.5 (38)       | 0.89 (22.6)   | 0.103 (46.8)   |
| 33. QN Male                | Straight Plug    | TC-400-QNM-X      | 3190-6212  | <1.25:1 | (6)                  | Hex       | Solder               | Crimp                | A/G               | 2.0 (50.2)     | 0.74 (18.9)   | 0.103 (46.8)   |
| 34. QN Male                | Right Angle      | EZ-400-QNM-RA-X   | 3190-2981  | <1.25:1 | (6)                  | Hex       | Spring Finger Crimp  |                      | A/G               | 1.9 (47.0)     | 1.42 (36.0)   | 0.177 (80.2)   |
| 35. QN Female              | Straight Jack    | EZ-400-QNF-X      | 3190-2980  | <1.25:1 | (6)                  | N/A       | Spring Finger Crimp  |                      | A/G               | 1.8 (45.0)     | 0.66 (16.8)   | 0.105 (47.8)   |
| 36. SMA Male               | Straight Plug    | TC-400-SM-X       | 3190-3046  | <1.25:1 | (8)                  | Hex       | Solder               | Crimp                | N/G               | 1.2 (29)       | 0.50 (12.7)   | 0.032 (14.5)   |
| 37. SMA Female             | Straight Jack    | TC-400-SF-X       | 3190-6174  | <1.35:1 | (6)                  | N/A       | Solder               | Crimp                | A/G               | 1.2 (29.7)     | 0.50 (12.7)   | 0.026 (12.0)   |
| 38. TNC Female             | Reverse Polarity | TC-400-TF-RP      | 3190-1063  | <1.25:1 | (2.5)                | N/A       | Solder               | Crimp                | N/G               | 1.8 (46)       | 0.55 (14.0)   | 0.074 (33.6)   |
| 39. TNC Female             | Reverse Polarity | EZ-400-TF-RP      | 3190-795   | <1.25:1 | (2.5)                | N/A       | Spring Finger Crimp  |                      | A/G               | 1.8 (46)       | 0.55 (14.0)   | 0.074 (33.6)   |
| 40. TNC Female             | Straight Jack    | EZ-400-TF-X       | 3190-3049  | <1.25:1 | (6)                  | N/A       | Spring Finger Crimp  |                      | A/G               | 1.8 (45)       | 0.55 (14.0)   | 0.074 (33.6)   |
| 41. TNC Female             | Straight Jack    | TC-400-TF-X       | 3190-3051  | <1.25:1 | (6)                  | N/A       | Solder               | Crimp                | A/G               | 1.8 (45.0)     | 0.55 (14.0)   | 0.074 (33.6)   |
| 42. TNC Male               | Straight Plug    | TC-400-TM-X       | 3190-2532  | <1.25:1 | (6)                  | Hex/Knurl | Solder               | Crimp                | A/G               | 1.9 (48)       | 0.67 (17.5)   | 0.075 (34.3)   |
| 43. TNC Male               | Straight Plug    | EZ-400-TM-X       | 3190-2533  | <1.25:1 | (6)                  | Hex/Knurl | Spring Finger Crimp  |                      | A/G               | 1.9 (48)       | 0.67 (17.5)   | 0.075 (34.3)   |
| 44. TNC Male               | Reverse Polarity | TC-400-TM-RP      | 3190-1062  | <1.25:1 | (2.5)                | Knurl     | Solder               | Crimp                | N/G               | 1.7 (43)       | 0.59 (15.0)   | 0.074 (33.6)   |
| 45. TNC Male               | Reverse Polarity | EZ-400-TM-RP      | 3190-794   | <1.25:1 | (2.5)                | Knurl     | Spring Finger Crimp  |                      | A/G               | 1.7 (43)       | 0.59 (15.0)   | 0.074 (33.6)   |
| 46. TNC Male               | Right Angle      | TC-400-TM-RA-D    | 3190-2671  | <1.35:1 | (6)                  | Hex/Knurl | Solder               | Crimp                | A/G               | 1.4 (35)       | 1.41 (35.8)   | 0.130 (59.0)   |
| 47. TNC Male               | Right Angle      | EZ-400-TM-RA-X    | 3190-2800  | <1.24:1 | (6)                  | Hex       | Spring Finger Crimp  |                      | A/G               | 2.0 (50.0)     | 0.62 (15.7)   | 0.130 (59.0)   |
| 48. TNC Male               | Right Angle RP   | TC-400-TM-RP-RA-D | 3190-6147  | <1.35:1 | (6)                  | Hex       | Solder               | Crimp                | A/G               | 1.4 (36.0)     | 1.20 (30.3)   | 0.130 (59.0)   |

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



|                                                                                                                                                   |                                                                                                                                                    |                                                                                                                                                            |                                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 28<br><br>TC-400-NMH-RA-SS<br>3190-1668                          | 29<br><br>TC-400-NMH-RA-D<br>3190-2293                            | 30<br><br>TC-400-NMC-RA (A)<br>3190-870                                  | 31<br><br>TC-400-NM-RP<br>3190-960                            |
| 32<br><br>EZ-400-QNM-X<br>3190-2979                              | 33<br><br>TC-400-QNM-X<br>3190-6212                               | 34<br><br>EZ-400-QNM-RA-X<br>3190-2981                                   | 35<br><br>EZ-400-QNF-X<br>3190-2980                           |
| 36<br><br>TC-400-SM-X<br>3190-3046                               | 37<br><br>TC-400-SF-X<br>3190-6174                                | 38-39<br><br>TC-400-TF-RP / 3190-1053<br>EZ-400-TF-RP / 3190-795         | 40-41<br><br>EZ-400-TF / 3190-3049<br>TC-400-TF-X / 3190-3051 |
| 42-43<br><br>TC-400-TM-X / 3190-2532<br>EZ-400-TM-X / 3190-2533 | 44-45<br><br>TC-400-TM-RP / 3190-1062<br>EZ-400-TM-RP / 3190-794 | 46-47<br><br>TC-400-TM-RA-D<br>3190-2871<br>EZ-400-TM-RA-X<br>3190-2800 | 48<br><br>TC-400-TM-RP-RA-D<br>3190-6147                     |

## Hardware

|                                                                                                              |                                                                                                  |                                                                                                                  |                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <br>HG-400T               | <br>GK-S400TT | <br>IPB-400-NM<br>3109-417-1 | <br>IPB-400-NF<br>3109-417-2 |
| <br>WSB-400<br>3109-394 |                                                                                                  |                                                                                                                  |                                                                                                                   |

| Type                             | Part Number | Stock Code | Description                                                                                    |
|----------------------------------|-------------|------------|------------------------------------------------------------------------------------------------|
| Hoisting Grip                    | HG-400T     | HG-400T    | Laced Type (each)                                                                              |
| Ground Kit                       | GK-S400TT   | GK-S400TT  | Standard Ground Kit (each)                                                                     |
| Weather Proof Boots              | 3109-417-1  | IPB-400 NM | LMR-400 Male IP boot suitable for type N, TNC, BNC, 4310, 4195                                 |
| Weather Proof Boots              | 3109-417-2  | IPB-400 NM | LMR-400 Female IP boots suitable for type N, TNC, BNC, 4310, 4195                              |
| Weather Seal Strain Relief Boots | 3109-394    | WSB-400    | Weather seal strain relief boots (10 pk) for use with most popular LMR-400-X series connectors |



## Install Tools

| Type                  | Part Number | Stock Code | Description                                                                              |
|-----------------------|-------------|------------|------------------------------------------------------------------------------------------|
| Crimp Tool            | CT-U        | 3192-181   | 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            | ST-400C-2   | 3190-1972  | Prep tool for EZ-400-NMC-2 two piece clamp style connector                               |
| Strip Tool            | CST-400     | 3192-004   | Combination prep tool for LMR-400 crimp and clamp style connectors                       |
| Mid-Span Strip Tool   | GST-400     | 3190-2174  | For ground strap attachment                                                              |
| Replacement Blades    | RB-456      | 3190-421   | Replacement blades for Strip Tool                                                        |
| Deburr Tool           | DBT-U       | 3192-001   | Removes center conductor rough edges                                                     |
| Cutting Tool          | CCT-02      | 3192-165   | Cable end flush cut tool                                                                 |
| Replacement Blade     | RB-02       | 3192-166   | Replacement blade for cutting tool                                                       |
| Tool Kit              | TK-400EZ    | 3190-1601  | Tool kit for LMR-400 Crimp Connectors (includes CCT-02, CST-400, CT-400/300, Tool Pouch) |
| Replacement Blade Kit | RB-CST      | 3192-086   | Replacement blade kit for all CST strip tools                                            |