



7/16 SERIES

R185

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7/16

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Introduction

50Ω

DC - 7.5 GHz

GENERAL

- Standard coaxial connectors
- Screw-on coupling
- High power rating
- Excellent RF performance

APPLICABLE STANDARDS

- IEC 169-4
- DIN 47223
- CECC 22 190

APPLICATIONS

- Mobile communication infrastructure networks: combiner, diplexer, filter...
- Jumper and feeder cables assemblies
- Radio links
- Indoor and outdoor applications

Radiall's 7/16 series has been developed using the latest technology advances in connector design. These connectors are easy to use, highly reliable, innovative and designed to meet the needs of the telecommunications market. The complete connector series features:

- An extensive range, with optimized component part design
- An upgraded cross-knurled coupling nut allowing better manual tightening

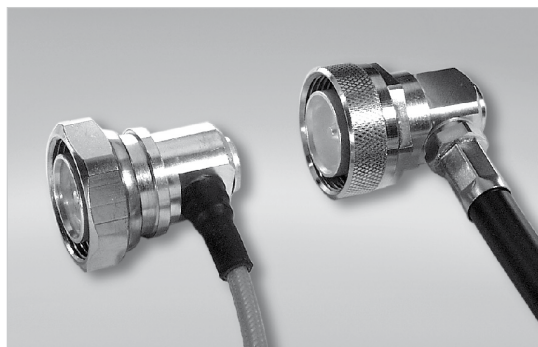
Composite 7/16

Radiall expanded its line of innovative 7/16 composite connectors with jacks and receptacles as a lightweight, low cost alternative to brass connectors. Manufactured with corrosion-proof, composite materials these new single-piece connectors are UV resistant, meeting IEC 68-2-5 and IEC-68-2-9 to withstand all environments, including harsh outdoor installations. Radiall now offers over 20 different variations. The selection of the composite materials is a result of an in-depth competitive analysis of creeping speeds of zinc and aluminum alloys. Not only do the composite materials offer considerable performance advantages guaranteeing up to 500 matings, but with more than a 50% reduction in weight, this receptacle reduces the overall weight of the final module as well as transportation costs.

Introduction

High performance range

- Frequency range: DC - 7.5 GHz
- 2 types of coupling nut:
 - Cross-knurled and 6 flats 27mm wide coupling nut (3 000 N.cm)
 - 6 flats coupling nut (32mm wide), allowing high coupling torque (3 500 N.cm) when used with a torque wrench
- Intermodulation performance: 2 levels
 - 125 dBm cable assemblies
 - 110 dBm connectors and cable assemblies



2 types of coupling nut

Radiall has developed its intermodulation measurement equipment following the IEC 46 D/292/NP standard proposal. It is aimed at third-order IMP measurements through the reflection method. The range of this test set-up is -132 dBm (-175 dBc) under 2 x 20 W.

- High performance non-magnetic material (brass) and plating (silver) with anti-tarnishing finish (strike of BBR)
- Non-slotted outer contact on standard products
- The 7/16 connector series benefits from a complete easy-to-use range of tooling



Custom models

To fulfill customer requirements, Radiall offers complete design of custom connectors according to the 7/16 series standard.

Characteristics

| Test / Characteristics | Standard reference | Values / Remarks |
|------------------------|--------------------|------------------|
|------------------------|--------------------|------------------|

ELECTRICAL CHARACTERISTICS

| | | |
|--|------|--|
| Impedance | | 50Ω |
| Frequency range | | DC - 7.5 GHz |
| Typical V.S.W.R. | | 1 GHz 2.5 GHz 5 GHz 7.5 GHz |
| • Straight models | | 1.10 max from DC to 3 GHz - 1.20 max from 3 to 7.5 GHz |
| RG213-RG214-RG393 | | 1.04 1.06 1.08 1.10 |
| .141" | | 1.04 1.07 1.08 1.20 |
| .250" | | 1.03 1.05 1.11 1.13 |
| 1/2" superflexible corrugated | | 1.02 1.04 1.05 1.05 |
| 3/8" superflexible corrugated | | 1.03 1.03 1.12 1.20 |
| 1/4" superflexible corrugated | | 1.01 1.02 1.09 1.17 |
| • Right angle models | | 1.15 max from DC to 3 GHz |
| RG213-RG214-RG393 | | 1.02 1.04 1.12 1.50 |
| 1/2" superflexible corrugated | | 1.04 1.04 1.14 1.60 |
| 3/8" superflexible corrugated | | 1.05 1.08 1.12 1.80 |
| 1/4" superflexible corrugated | | 1.02 1.06 1.13 1.60 |
| Intermodulation product (IMP ₂) | | |
| • Connectors | | -110 dBm typ. [- 153 dBc typ / 20 W] |
| • Home made cable assemblies | | -125 dBm typ. [- 168 dBc typ. / 20 W] |
| Insertion loss (dB) | | |
| Straight connectors and right-angle connectors | MIL | 0.05 V F (GHz) |
| RF Leakage | CECC | 130 dB at 1 GHz |
| Insulation resistance | CECC | 10 000 MΩ min |
| Contact resistance | | |
| • Center contact | CECC | < 0.4 mΩ |
| • Outer contact | | ≤ 1.5 mΩ |
| Working voltage in VRMS at sea level | CECC | 2 700 |
| Dielectric withstanding voltage in VRMS | | |
| • At sea level | CECC | 4 000 |
| (at 70, 000 feet) | | 350 |

MECHANICAL CHARACTERISTICS

| | | |
|-----------------------------------|------|--|
| Durability | CECC | 500 matings |
| Force to engage and disengage | CECC | 15 N |
| Recommended coupling nut torque | | |
| • Hex. coupling nut | | 3 500 Ncm (with torque wrench R 282 303 500) |
| • Hex. + cross knurl coupling nut | | 3 000 Ncm (with torque wrench R 282 303 520) |
| Proof torque | CECC | 3 500 Ncm |
| Coupling nut retention force | CECC | 1 000 N |
| Cable retention force | | |
| Cable 5/50 & 10/50 | | 250 N |
| Cable 1/4" | CECC | 200 N |
| Cable 3/8" | | 250 N |
| Cable 1/2" | | 350 N |
| Cable 7/8" | | 500 N |
| Center contact retention force | CECC | 200 N |

ENVIRONMENTAL CHARACTERISTICS

| | | |
|---|---------|--|
| Temperature range | | |
| • Flexible cables and corrugated cables | CECC | - 55 °C + 155 °C |
| • Semi-rigid cables | | - 55 °C + 105 °C |
| Thermo cycling test | CECC | - 55 °C / + 155 °C / 56 days |
| Rapid change of temperature | IEC | - 55 °C / + 155 °C / 5 cycles |
| High temperature test | CECC | 1000 hours / 155 °C |
| Corrosion salt spray | IEC | 48 hours / Na Cl 5% / 35 °C (Up to 720h with HEP2R)* |
| Vibration | CECC | 98 m/s ² - 10 Hz at 500 Hz |
| Moisture resistance | | |
| • Clamp type | IEC 529 | IP67 |
| • Crimp type | | IP65 (with heatshrink sleeve) |
| • Home made cable assemblies | | IP68 (overmolding) |
| Hermetic test | IEC | 5 Pa. cm ³ /s |
| Leakage | CECC | 1 cm ³ /h max |

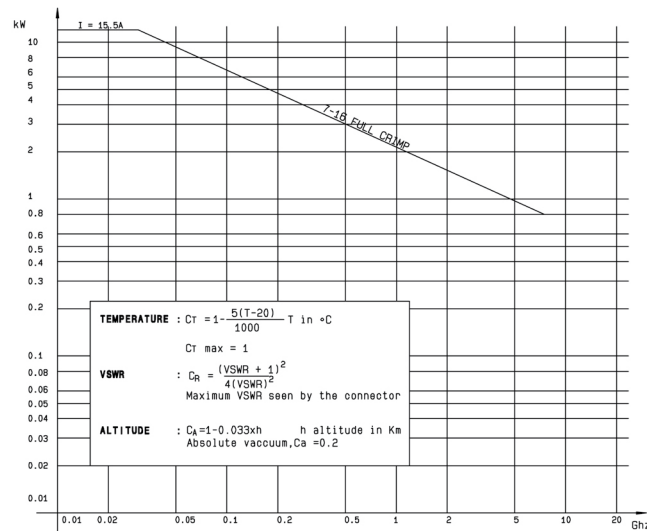
* Contact us

Characteristics

MATERIALS AND PLATINGS

| | Materials | Plating |
|--------------------------------------|---------------------------|--------------|
| Bodies | Brass | Silver + BBR |
| Nut | Brass | BBR |
| Center contact • Male • Female | Brass Beryllium copper | Silver |
| Insulator | PTFE | |
| Gasket | Silicon rubber | |

POWER RANGE



Characteristics Composite 7/16

ELECTRICAL CHARACTERISTICS

| | |
|--------------------------|--|
| Frequency range | DC - 7.5 GHz |
| VSWR | 1.06@DC-3 GHz - 1.10@DC - 3-7.5 GHz |
| High working voltage | > 2700 V |
| Very low intermodulation | IMP3 < -125 dBm under 2 carriers of +43dBm And typically < -130 dBm |
| Power handling | > 800 W@ 935 MHz |

MECHANICAL CHARACTERISTICS

| | |
|--|-------------------------|
| Longlife duration | up to 500 mating cycles |
| Coupling torque | 35 Nm or less |
| Coupling strength | 1000 N |
| Center contact retention / axial force | > 200 N |
| Center contact retention / torque | > 80 Ncm |

ENVIRONMENTAL CHARACTERISTICS

| | |
|---------------------|-------------------------|
| Temperature range | -40°C / +85°C |
| Humidity | Up to 100% @ 20°C |
| Flammability rating | UL94-V0 |
| UV resistance | IEC 68-2-5 / IEC 68-2-9 |
| Waterproof | IP67 |

Plugs and Jacks

STRAIGHT PLUGS, FOR FLEXIBLE AND SEMI-RIGID CABLE

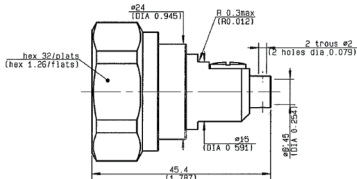


Fig. 1

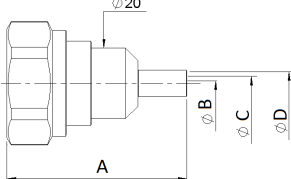




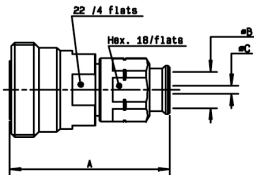



Fig. 2

| Cable group | Cable group dia. | Part number | Fig. | Dimensions (mm) | | | | Captive center contact | Finish | Note |
|-------------|------------------|--------------|--|-----------------|-------|------|-------|------------------------|--------------|-------------|
| | | | | A | B | C | D | | | |
| RG401 | .250" | R185 054 020 |  | 1 | | | | | Silver + BBR | Solder Type |
| AEP-240FR | LMR® 240 | R185 083 310 |  | 2 | 51.15 | 1.5 | 4.05 | Yes | BBR | Clamp type |
| AEP-400FR | LMR® 400 | R185 085 007 |  | | 49.55 | 2.82 | 7.46 | | | |
| AEP-600FR | LMR® 600 | R185 077 010 |  | | 58.05 | 4.7 | 11.96 | | | |

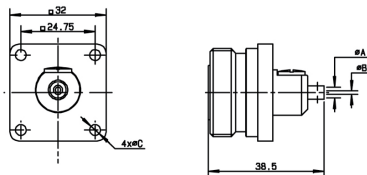
STRAIGHT JACKS




| Cable group dia. | Part number | | Dimensions (mm) | | | Captive center contact | Finish | Note |
|-------------------------------|--------------|---|-----------------|------|-----|------------------------|--------------|------------|
| | | | A | B | C | | | |
| 1/4" superflexible corrugated | R185 215 200 |  | 49.45 | 7.95 | 4.7 | Yes | Silver + BBR | Clamp type |
| 1/2" superflexible corrugated | R185 216 200 | | 50 | 14 | 8.8 | | | |
| 3/8" superflexible corrugated | R185 217 200 | | | 11 | 7.1 | | | |

Jacks

STRAIGHT SQUARE FLANGE JACK



| Cable group | Cable group dia. | Part number | | Captive center contact | Dimensions (mm) | | | Panel drilling | Finish | Note |
|-------------|------------------|--------------|---|------------------------|-----------------|-------|-----|----------------|--------------|-----------------------------------|
| | | | | | A | B | C | | | |
| RG402 | .141" | R185 252 000 |  | Yes | 3.65 | 0.996 | 3.6 | P01 | Silver + BBR | Solder type for semi-rigid cables |

STRAIGHT BULKHEAD JACKS FOR FLEXIBLE CABLES AND CORRUGATED CABLES

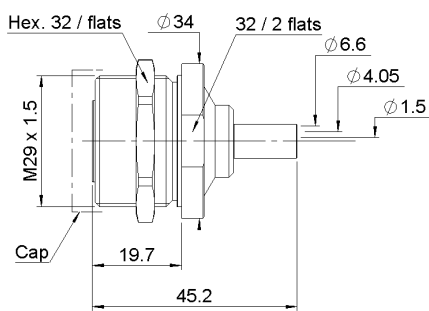


Fig. 1

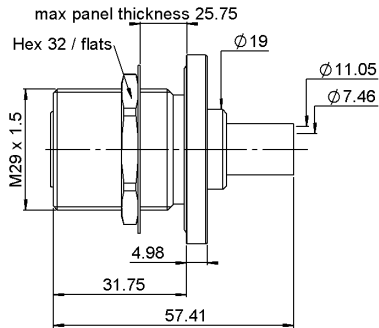


Fig. 2

| Cable group | Cable group dia. | Part number | | Fig. | Captive center contact | Panel drilling | Finish | Note |
|-------------|------------------|--------------|---|------|------------------------|----------------|--------|------------|
| AEP-240FR | LMR® 240 | R185 314 100 |  | 1 | Yes | P02 | BBR | Clamp type |
| AEP-400FR | LMR® 400 | R185 320 020 |  | 2 | | | | |

Receptacles

STRAIGHT FLANGE FEMALE RECEPTACLES

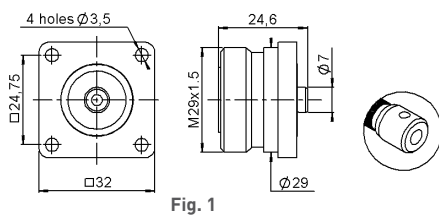


Fig. 1

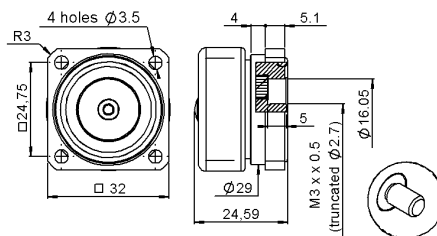


Fig. 2

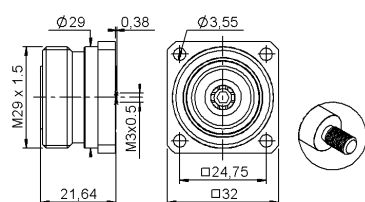


Fig. 3

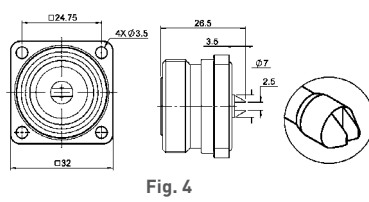


Fig. 4

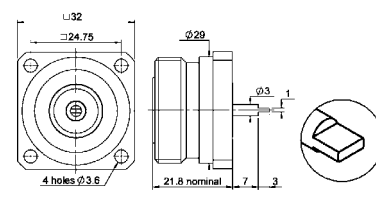

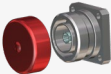



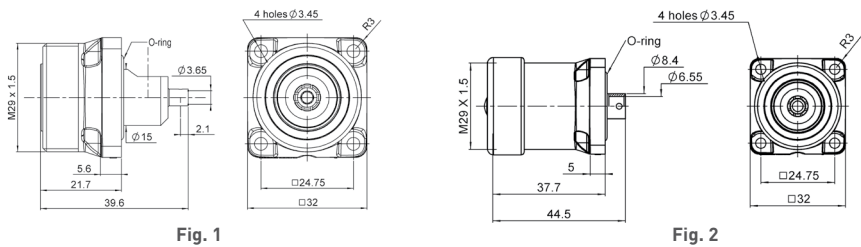


Fig. 5

| Part number | | Fig. | Captive center contact | Panel drilling | Finish | Slotted outer contact | Packaging | Note |
|--------------|---|------|------------------------|----------------|-----------------|-----------------------|-----------|-------------------------|
| R185 403 547 |  | 1 | Yes | P03 | BBR | No | 20 | With solder pot contact |
| R185 405 200 |  | 2 | | P05 | Silver + Copper | Yes | | Panel seal flange mount |
| R185 406 090 |  | 3 | | | BBR | No | 50 | M3 |
| R185 404 200 |  | 4 | | | Silver + Copper | | 20 | With slotted contact |
| R185 403 490 |  | 5 | | P04 | | | 20 | With tab contact |

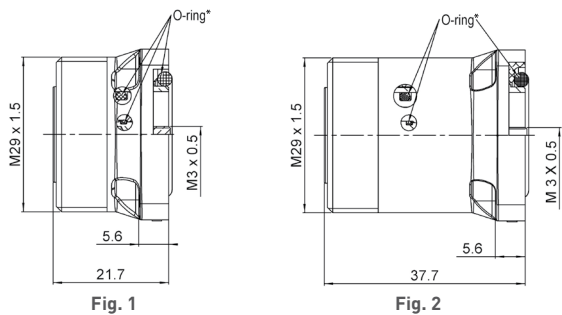
Receptacles



SQUARE FLANGE JACK RECEPTACLE SOLDER TYPE, PANEL SEAL



| Cable group | Cable group dia. | Part number | | Fig. | Panel drilling |
|-------------|------------------|--------------|---|------|----------------|
| RG402 | .141" | R187 403 010 |  | 1 | P06 |
| RG401 | .250" | R187 130 000 |  | 2 | |

SQUARE FLANGE JACK RECEPTACLE PANEL SEAL



| Part number | | Fig. | Captive center contact | Waterproof interface | Color | Panel drilling |
|--------------|---|------|------------------------|----------------------|-------|----------------|
| R187 403 000 |  | 1 | No | No | Black | P06 |
| R187 403 100 | | | | Yes | | |
| R187 406 000 | | | Yes | No | | |
| R187 406 100 | | | | Yes | | |
| R187 413 000 |  | 2 | No | No | | |
| R187 413 100 | | | | Yes | | |
| R187 416 000 | | | Yes | No | | |
| R187 416 100 | | | | Yes | | |

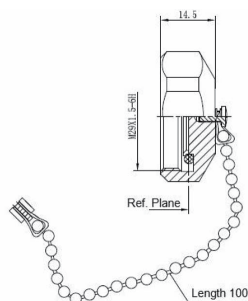
Available packaged in increments of 20 units

Processed according to customer needs

* O-ring inside, only on the waterproof models

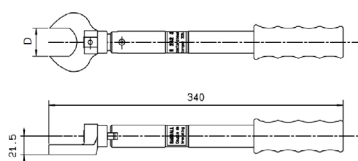
Accessories and Tools

PROTECTIVE CAP



| Part Number | Note |
|--------------|-----------------|
| R185 812 007 | Male with chain |

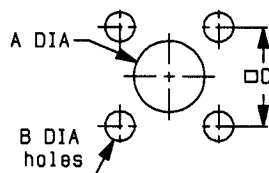
TORQUE WRENCH 32mm



| Part Number | Across flats D (mm) | Coupling torque (N.cm) |
|--------------|---------------------|------------------------|
| R282 303 500 | 32 (1.260) | 3500 |

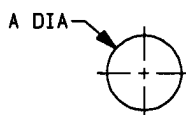
Panel Drilling

P01



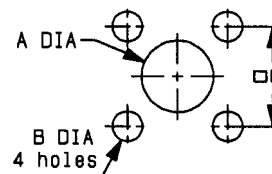
| | MM | | INCH | |
|---|------|------|-------|-------|
| | maxi | mini | maxi | mini |
| A | 29.2 | 29.1 | 1.15 | 1.146 |
| B | 3.7 | 3.6 | 0.146 | 0.142 |
| C | 24.8 | 24.7 | 0.976 | 0.972 |

P02



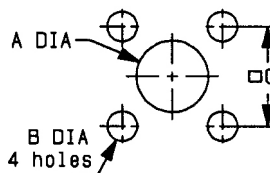
| | MM | | INCH | |
|---|------|------|------|-------|
| | maxi | mini | maxi | mini |
| A | 29.2 | 29.1 | 1.15 | 1.146 |

P03



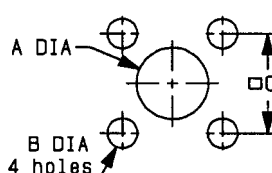
| | MM | | INCH | |
|--------------|------|------|-------|-------|
| | maxi | mini | maxi | mini |
| A (R. Mount) | 16.2 | 16 | 0.638 | 0.63 |
| A (F. Mount) | 29.3 | 29.1 | 1.154 | 1.146 |
| B | 3.7 | 3.6 | 0.146 | 0.142 |
| C | 24.8 | 24.7 | 0.976 | 0.972 |

P04



| | MM | | INCH | |
|---|------|------|-------|-------|
| | maxi | mini | maxi | mini |
| A | 12.3 | 12.1 | 0.484 | 0.476 |
| B | 3.8 | 3.7 | 0.15 | 0.146 |
| C | 24.8 | 24.7 | 0.976 | 0.972 |

P05



| | MM | | INCH | |
|---|------|------|-------|-------|
| | maxi | mini | maxi | mini |
| A | 16.2 | 16 | 0.638 | 0.63 |
| B | 3.7 | 3.6 | 0.146 | 0.142 |
| C | 24.8 | 24.7 | 0.976 | 0.972 |

Low Power Terminations

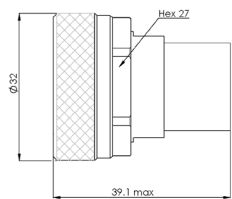


Fig. 1

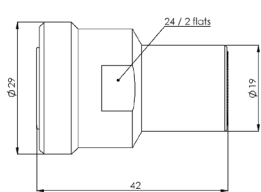




Fig. 2

| Frequency DC to (GHz) | VSWR max. | Return loss min. (dB) | Power rating (W) | | Impedance (Ω) | Gender | Part number | | Fig. |
|--------------------------|--------------|--------------------------|------------------|------|------------------|--------|--------------|---|------|
| | | | average | peak | | | | | |
| 4 | 1.15 | 23.1 | 2 | 500 | 50±5% | Male | R404 170 111 |  | 1 |
| | | | | | | Female | R494 175 111 |  | 2 |

Medium Power Terminations

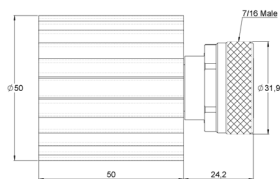


Fig. 1

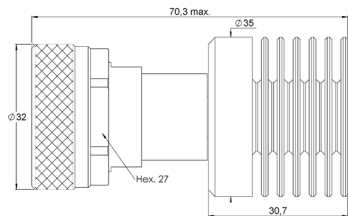


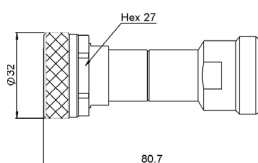



Fig. 2

| Frequency DC to (GHz) | VSWR max. | Return loss min. (dB) | Power rating (W) | | Impedance (Ω) | Gender | Part number | | Fig. |
|--------------------------|--------------|--------------------------|------------------|-------|------------------|--------|--------------|---|------|
| | | | average | peak | | | | | |
| 6 | 1.3 | 17.7 | 30 | 2,000 | 50±5% | Male | R404 756 000 |  | 1 |
| 4 | 1.2 | 20.8 | 12 | 5,000 | | | R494 564 000 |  | 2 |

Low Power Attenuators

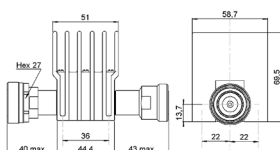



| Frequency DC to (GHz) | VSWR max. | Return loss min. (dB) | Power rating (W) | | Nom. Attenuation (dB) | Max dev. | Part number | |
|-----------------------------|--------------|--------------------------|------------------|------|-----------------------------|---------------------|--------------|---|
| | | | average | peak | | | | |
| 3 | 1.3 | 17.7 | 1 | 100 | xx | ±0,5 ⁽¹⁾ | R412 806 000 |  |

Available attenuation value: xx- 03, 06, 10 and 20 dB.

(1) ±1 for xx = 20

Medium Power Attenuators



| Frequency DC to (GHz) | VSWR max. | Return loss min. (dB) | Power rating (W) | | Nom. Attenuation (dB) | Max dev. | Part number | |
|--------------------------|--------------|--------------------------|------------------|-------|-----------------------------|---------------------|--------------|---|
| | | | average | peak | | | | |
| 4 | 1.35 | 16.5 | 25 | 5,000 | xx | ±0,6 ⁽¹⁾ | R420 303 110 |  |

Available attenuation value: xx- 03, 06, 10 and 20 dB.

(1) ±0,6 for xx = 20