STRUCTURED COMMUNICATIONS

Manufacturer Specs & Data Sheet Submittals

Project Name:	Ferrucci Junior High School
Project Location:	3213 WILDWOOD PARK DR Puyallup, WA
Specification Sections:	800MHZ Emergency Reponder Radio System
Submittal Date:	December 17, 2021

Data Sheets

Part	Description	Manufacturer	Part No.	Comments
Manufacturer Cert.	Structured - William Blais	Comba	Manufacturer Certification	**Certified 10/02/2017**
Manufacturer Cert.	Structured - Bill Blais	Comba	Manufacturer Certification	**Certified 05/06/2020**
Manufacturer Cert.	Structured - Eric Meyer	Comba	Manufacturer Certification	**Certified 05/06/2020**
GROL	Structured - Eric Meyer	FCC	PG145706	**Granted 02/08/1989**
A	Bi-Directional Amplifier	Comba	RX08V2-A3748-UL	
B	Battery Backup	Comba	CPBBUV2-48100-UL	24hr Battery Backup
C	1/2" Plenum Cable	RFS	ICA12-50JPL	
D	1/2" UV Rated Cable	RFS	LCF12-50JFNL	
E	1/2" NM Connectors	RFS	NM-LCF12-D01	
F	1/2" NF Connectors	RFS	NF-LCF12-D01	
G	Plenum RG142	Ventev	TWS-RG142	Cable for Jumpers
H	RG142 NM Connector	Ventev	552318	Connector for Jumpers
I	RG142 NF Connector	Ortronics	OR-808000010	Connector for Jumpers
J	Donor Antenna	CSI	CSI-AY/746-896/11	
K	Internal Omni Antenna	Laird	CFSA69383P	
L	Internal Omni Antenna	Clearlink	CS03-011-429	
M	Grounding Kit	Commscope	241088-1	
N	Waterproofing Kit	Ventev	WK-U	
O	Lightening Arrestor	Polyphaser	IS-50NX-C2	
P	Tappers/Couplers	Microlab	DN-xFN	
Q	Splitters	Microlab	D2-J12	

Submitted By:
Bill Blais
Structured Communications
206.665.0333
Wblais@gostructured.com

COMBA - WILLIAM BLAIS

Comba

keeps you connected

THIS IS TO CERTIFY THAT

William Blais

HAS SUCCESSFULLY COMPLETED THE REQUIRED TRAINING,
AND IS CERTIFIED TO INSTALL AND COMMISSION
COMBA CRITICALPOINT™ PUBLIC SAFETY EQUIPMENT

Augustin Chang, President

10/02/2017

Date

COMBA - ERIC MEYER

Comba

keeps you connected

THIS IS TO CERTIFY THAT

Eric Meyer

HAS SUCCESSFULLY COMPLETED THE REQUIRED TRAINING,
AND IS CERTIFIED TO INSTALL AND COMMISSION
COMBA CRITICALPOINT ™ BDA PUBLIC SAFETY EQUIPMENT

Augustin Chang, President

5/6/2020

Date

COMBA - ERIC MEYER

Comba

keeps you connected

THIS IS TO CERTIFY THAT

Eric Meyer

HAS SUCCESSFULLY COMPLETED THE REQUIRED TRAINING,
AND IS CERTIFIED TO INSTALL AND COMMISSION
COMBA CRITICALPOINT™ FIBER DAS
PUBLIC SAFETY EQUIPMENT

Augustin Chang, President

5/6/2020

Date

GROL - ERIC MEYER

Cut Along This Line

UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION

General Radiotelephone Operator License

MEYER, ERIC B

FCC Registration Number (FRN):

Special Conditions / Endorsements
NONE

Grant Date	Effective Date	Print Date	Expiration Date
02-08-1989	02-08-1989		

File Number	Serial Number
	PG145706

THIS LICENSE IS NOT TRANSFERABLE

(Licensee's Signature)

FCC 605-FRC - May 2007

Cut Along This Line

Licensee: This is your radio authorization in sizes suitable for your wallet and for framing. Carefully cut the documents along the lines as indicated and sign immediately upon receipt. They are not valid until signed.

The Commission suggests that the wallet size version be laminated (or another similar document protection process) after signing. The Commission has found under certain circumstances, laser print is subject to displacement.

Cut Along This Line

Cut Along This Line

Serial Number	Grant Date	Expiration Date	File Number	Print Date	Effective Date
PG145706	02-08-1989				02-08-1989

FCC Registration Number (FRN)

MEYER, ERIC B

General Radiotelephone Operator License

FCC 605-FRC - May 2007

Fold Here

THIS LICENSE IS NOT TRANSFERABLE

Special Conditions / Endorsements:

NONE

(Licensee's Signature)

FEDERAL COMMUNICATIONS COMMISSION

Cut Along This Line

Cut Along This Line

GROL - ERIC MEYER

Conditions:
Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

Conditions:
Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

CriticalPoint™ Public Safety Bi-Directional Amplifier

RXxxV2 PS 700/800MHz BDA (DC Version)
UL 2524 Standard Certified

A. Bi-Directional Amplifier

Features

- Digital Multi-Channel, Field Programmable BDA using FPGA Technology
- Supports public safety 700/800MHz in single band or dual band version
- Supports P25 P1/P2 digital and conventional analog communications simultaneously
- Single band versions include license key to switch between bands
- Single band can be upgraded to dual band via license key
- Class A devices can be configured to Class B via GUI
  (Class B devices CANNOT be configured as Class A)
- Each band supports up to 32 narrow band filters (Class A)
- Each band supports up to 3 wide band filters (Class B)
- Channelized Auto Level Control (ALC) / Channelized uplink squelch (Class A)
- **NetProtect** Uplink PA shutdown during no traffic periods to minimize noise being introduced to the network (Class A)
- Built-in mandatory isolation test to prevent BDA oscillation
- Auto shutdown with alarm upon oscillation detection
- Web based GUI for intelligent configuration, SNMP supported
- NFPA compliant dry contact alarms, UL50E Type 4
- **Complies with NFPA 1221 2016 / 2019 edition, IFC 2018 Section 510**
- **FCC: Class A (PX8RXA37)**
- **FCC: Class B (PX8RXB37)**
- **UL 2524 Standard Certified – SGS Certificate No.: SGSNA/20/GZ/00125**

Specifications

Electrical			700MHz	800MHz
Total Output Power, Downlink		dBm	37	37
Total Output Power, Uplink		dBm	30	
Maximum System Gain		dB	100	100
Gain Adjustment Range (1dB step)		dB	0-30	0-30
Pass Band Ripple, p-p		dB	≤ 5	≤ 5
Uplink Noise Figure		dB	≤ 5	≤ 5
Intermodulation		dBm	≤ -13	≤ -13
Spurious	9kHz to 1GHz	dBm	FCC Compliance	FCC Compliance
	1GHz to 12.75GHz	dBm		
Maximum RF Input Power without Damage		dBm	10	10
Maximum RF Input Power without Overdrive		dBm	-20	-20
ALC Range		dB	60	60
Input VSWR			≤ 1.5	≤ 1.5
Impedance		Ω	50	50

A. Bi-Directional Amplifier

Class A				
Frequency Range, Uplink		MHz	799-805	806-824
Frequency Range, Downlink		MHz	769-775	851-869
Filter Bandwidth		KHz	12.5/25/75	12.5/25/75
Number of Filters			32	32
System Group Delay	Bandwidth: 12.5KHz	μsec	≤ 35	≤ 35
	Bandwidth: 25KHz		≤ 27	≤ 27
	Bandwidth: 75KHz		≤ 15	≤ 15
Out-of-Band Suppression	Bandwidth: 12.5KHz	dBc	≥ 80 @ filter center + 75KHz	≥ 80 @ filter center + 75KHz
	Bandwidth: 25KHz		≥ 80 @ filter center + 75KHz	≥ 80 @ filter center + 75KHz
	Bandwidth: 75KHz		≥ 80 @ filter center + 200KHz	≥ 80 @ filter center + 200KHz

Class B			
Frequency Range, Uplink	MHz	788-805	806-824
Frequency Range, Downlink	MHz	758-775	851-869
Filter Bandwidth	MHz	0.2-10	0.2-10
Number of Filters		3	3
System Group Delay	μsec	≤ 6.5	≤ 6.5
Out-of-Band Suppression	dBc	≥ 45 @ filter edge + 0.6MHz ≥ 60 @ filter edge + 1MHz	≥ 45 @ filter edge + 0.6MHz ≥ 60 @ filter edge + 1MHz

Mechanical			
Dimensions, H x W x D		in(mm)	22.4 x 15.4 x 9.0 (570 x 390 x 228)
Weight (without bracket)		lb(kg)	66.2 (30)
Power Supply		VDC	-40 ~ -58
Power Consumption	Single band	W	135
	Dual band	W	175
Enclosure Cooling			Convection
RF Connectors			N-Female
Test Port			SMA, -27dB
Maximum Input for Dry Contact Port			24VDC, 1A / 110VAC, 0.5A
Operating Temperature		°F (°C)	-27 to +140 (-33 to +60)
Operating Humidity			≤ 95%
Environmental Class			UL50E Type 4
MTBF		hr	≥ 100,000 @ 77 °F

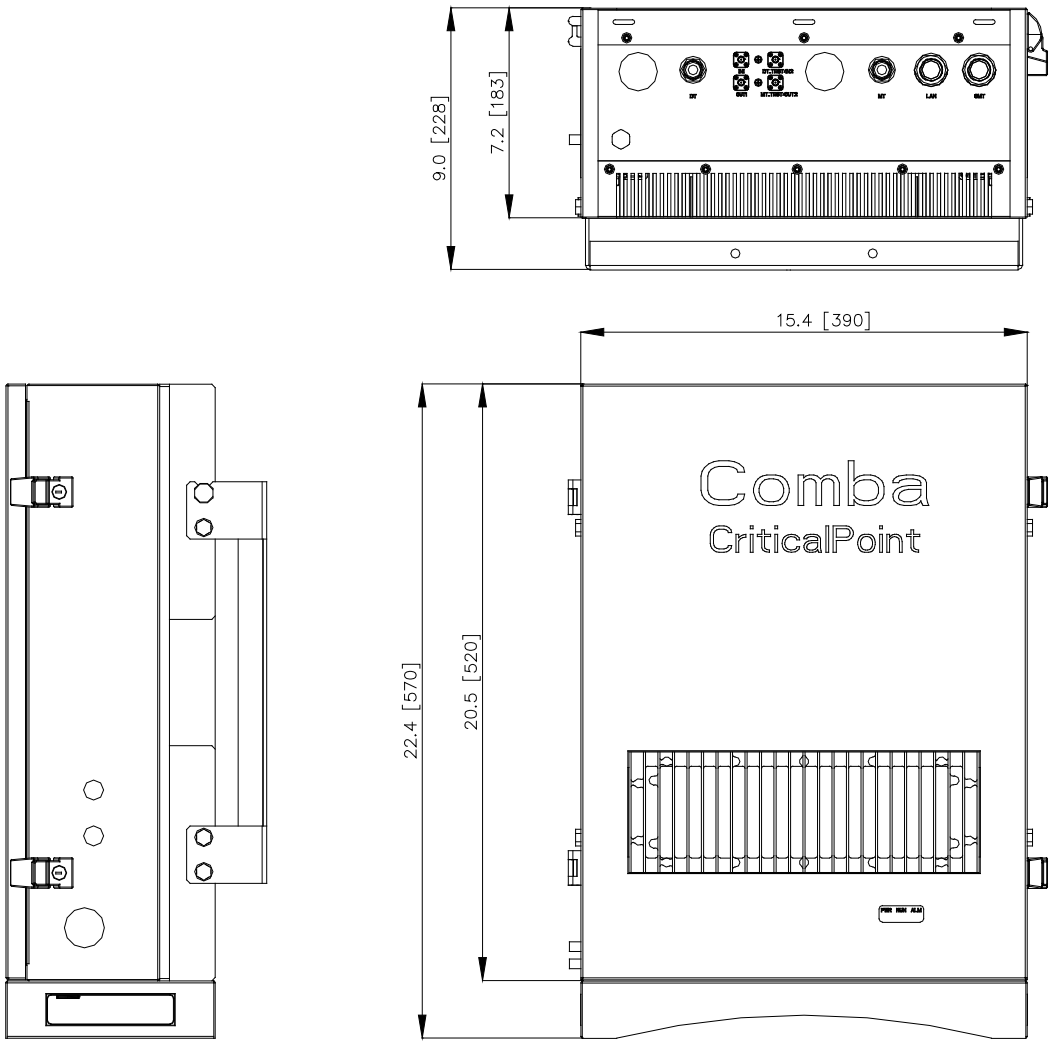
Note: Typical specifications at room temperature.

Part Numbers

Configuration	37dBm DC Class A	37dBm DC Class B
Single band 700MHz	RX07V2-A3748-UL	RX07V2-B3748-UL
Single band 800MHz	RX08V2-A3748-UL	RX08V2-B3748-UL
Dual band 700/800MHz	RX78V2-A3748-UL	RX78V2-B3748-UL

License	
Class A, Single Band to Dual Band upgrade license	RX78V2-L37-AASD
Class B, Single Band to Dual Band upgrade license	RX78V2-L37-BBSD
Single Band, Class B to Class A upgrade license	RX78V2-L37-BASS
Dual Band, Class B to Class A upgrade license	RX78V2-L37-BADD
Class B to Class A, Single Band to Dual Band upgrade license	RX78V2-L37-BASD

Mechanical Drawing



CriticalPoint™ Public Safety Battery Backup Unit

CPBBUV2 Series
UL 2524 Standard Certified

B. 24hr Battery Backup

Features

- Provides an uninterruptible DC -48V power supply to Public Safety equipment
- Provides minimum 24 hours backup power up to 200W equipment load
- Supports 4 external alarm inputs from other equipment
- Provides 7 dry contact outputs to FACP or external annunciator panel
- Provides integrated visual and audio alarm annunciation
- Supports external remote annunciator panels
- Provides connections for EPO (Emergency Power Off) switch
- Provides additional 12V, 0.5A and 24V, 0.5A output
- Provides battery capacity indication
- Provides AC convenience outlet inside BBU
- Supports local and remote monitoring and control through RJ45 port
- Supports SNMP v2/v3 for remote monitoring
- **UL 2524 Standard Certified – SGS Certificate No.: Pending**

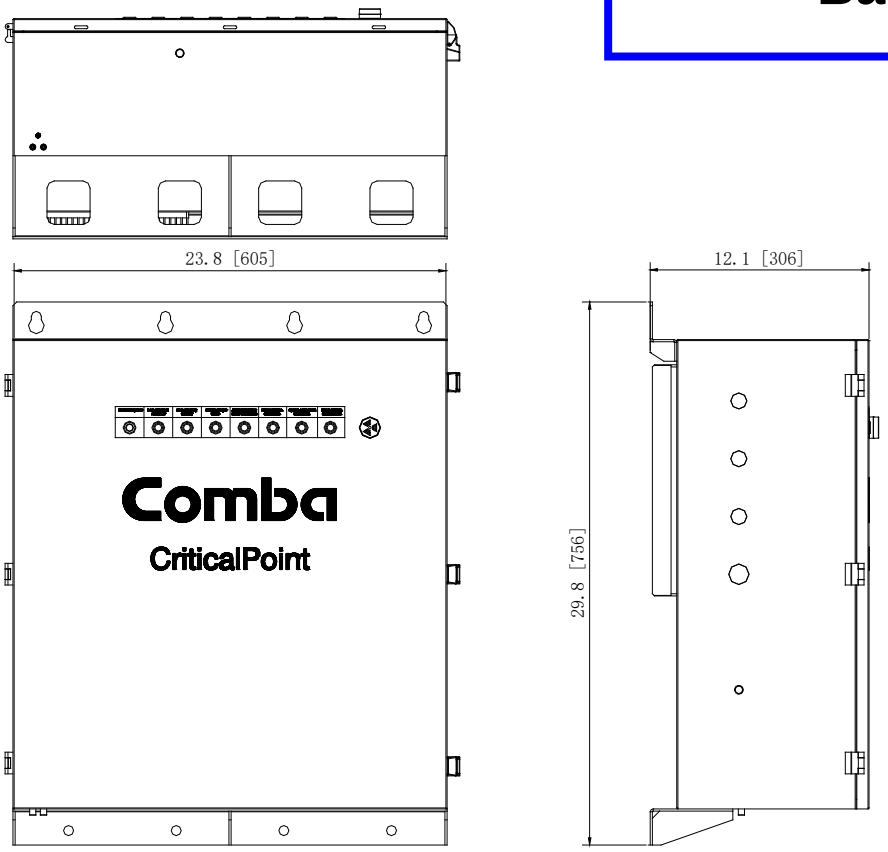
Specifications

Mechanical		
Dimensions, H x W x D	in(mm)	29.8 x 23.8 x 12.1 (756 x 605 x 306)
Weight (without bracket)	lb(kg)	44.1(20) (not including batteries)
Knockouts		0.875'' knockouts (1/2'' conduit) x 6 / 1.109'' knockouts (3/4'' conduit) x 2
Operating Temperature	°F (°C)	-27 to 131 (-33 to 55)
Operating Humidity		≤ 95%
Enclosure Environmental Class		UL50E Type 4
Electrical		
System Input		100-240VAC, 50-60Hz
Main Output	VDC	-48V
Additional Outputs		12.5V +/- 0.5V, 0.5A Max, 24V +/-0.5V, 0.5A Max.
Heat Dissipation	BTU/hr	143.3
Alarms		
Dry Contact Outputs		7
External Alarms Inputs		4
Maximum Input for Dry Contact Port		24VDC, 3A
Batteries		
Battery Type		$LiFePO_4$
Amp/Hour, Voltage		100AH, 48V
Battery Weight	lb(kg)	123.5(56)
Quantity		1
Battery Backup Capacity		min. 24 Hour for 200W load or min. 12 Hour for 400W load

DS-Control: 0-0-5 / 0720

Outline Drawing

B. 24hr Battery Backup



Part Numbers

Part Number	Description
CPBBUV2-48100-UL	100-240VAC Input / -48VDC Output, 100AH LFP battery, UL 2524 Standard Certified

Product Data Sheet **ICA12-50JPL**

C. 1/2" PLENUM CABLE

1/2" ClearFill®Line Plenum-Rated Air-Dielectric Coaxial Cable

Product Description

ClearFill®Line 1/2" low loss air dielectric cable, Plenum-rated, CMP

Application: Plenum In-Building

IN BUILDING PLENUM CABLING

1/2" Plenum-Rated In-Building Cable

Features/Benefits

- **Supports Multiple RF Signals**
- **Complete Shielding**
  The solid outer conductor of the ClearFill®Line coaxial cable creates a continuous RFI/EMI shield that minimizes system interference.
- **Outstanding Intermodulation Performance**
  RFS coaxial cable?s solid inner and outer conductors virtually eliminate intermods. Intermodulation performance is also confirmed with state-of-the-art equipment at the RFS factory.
- **Wide Range of Applications**
  Typical areas of application are: feedlines for plenum-space installations within occupied buildings or structures.

Technical Features

Structure

Inner conductor:	Copper-Clad Aluminum Wire	[mm (in)]	4.8 (0.19)
Dielectric:	Extruded Polyethylene	[mm (in)]	11.8 (0.464)
Outer conductor:	Corrugated Copper	[mm (in)]	13.8 (0.54)
Jacket:	Plenum Rated / color blue	[mm (in)]	15.93 (0.627)

Mechanical Properties

Weight, approximately	[kg/m (lb/ft)]	0.37 (0.25)
Minimum bending radius, single bending	[mm (in)]	125 (5)
Minimum bending radius, repeated bending	[mm (in)]	254 (10)
Bending moment	[Nm (lb-ft)]	4.1 (3)
Max. tensile force	[N (lb)]	1112 (250)
Recommended / maximum clamp spacing	[m (ft)]	0.5 / 0.9 (1.8 / 3)

Electrical Properties

Characteristic impedance	[Ω]	50 +/- 1
Relative propagation velocity	[%]	91
Capacitance	[pF/m (pF/ft)]	76 (23.2)
Inductance	[µH/m (µH/ft)]	0.19 (0.058)
Max. operating frequency	[GHz]	6
Jacket spark test RMS	[V]	8000
Peak power rating	[kW]	21.4
RF Peak voltage rating	[V]	1.5
DC-resistance inner conductor	[Ω/km (Ω/1000ft)]	1.48 (0.45)
DC-resistance outer conductor	[Ω/km (Ω/1000ft)]	1.9 (0.58)

Recommended Temperature Range

Storage temperature	[°C (°F)]	-40 to 85 (-40 to 185)
Installation temperature	[°C (°F)]	-20 to 60 (-4 to 140)
Operation temperature	[°C (°F)]	-40 to 85 (-40 to 185)

Other Characteristics

Fire Performance:	Flame Retardant, Plenum Rated	
Regulatory Compliance:	NEC Article 800 Communication Circuits ETL Listed to UL444 Canadian CSA C.22.2/FT6	
VSWR Performance:	24.3 (1.13) @ 806-960 MHz 24.3 (1.13) @ 1700-2155 MHz	18 (1.228) in other specified bands
Other Options:		

PRODUCT DATASHEET

LCF12-50JFNL

D. 1/2" UV CABLE

1/2" CELLFLEX® Lite Low-Loss Foam-Dielectric Coaxial Cable

CELLFLEX® Lite 1/2" low loss flexible cable

1/2" CELLFLEX® Lite Low-Loss Foam Dielectric Coaxial Cable

FEATURES / BENEFITS

- **It represents a light-weight transmission line solution**
  The light weight of CELLFLEX® Lite coaxial cable results in reduced work-force and lifting gear.
- **It is easy to transport, handle and install**
  CELLFLEX® Lite coaxial cables enable savings in shipping cost.
- **It exhibits a cost-efficient alternative to copper transmission line**
  CELLFLEX® Lite coaxial cable helps to reduce CAPEX spending.
- **It offers a user-friendly compatibility with RFS's existing range of accessories**
  CELLFLEX® Lite coaxial cable requires less inventory additions, thus reduced OPEX.
- **It enables trouble-free installation and operation**
  CELLFLEX® Lite coaxial cable avoids downtime and reduces OPEX.
- **The attenuation is comparable to the industry standard in traditional cable**
  CELLFLEX® Lite coaxial cable maintains uncompromised coverage.
- **Specially developed connectors exhibit low and stable intermodulation performance**
  CELLFLEX® Lite coaxial cable exceeds present PIM standards ensuring no dropped calls.
- **It is available with UV-resistant polyethylene or flame-retardant jackets**
  CELLFLEX® Lite coaxial cable can be used outside and in indoor applications where restrictions apply.
- **It exceeds industry standard for return loss performance**
  CELLFLEX® Lite coaxial cable means zero risk in network planning.

Technical Features

APPLICATIONS		
Applications		OEM jumpers, Main feed transitions to equipment, GPS lines, Riser-rated In-Building
STRUCTURE		
Cable Type		Foam-Dielectric, Corrugated
Size		1/2"
Jacket Option		Black
Inner Conductor	mm (in)	4.8 (0.19) Copper-Clad Aluminum Wire
Dielectric	mm (in)	11.3 (0.44) Foam Polyethylene
Outer Conductor	mm (in)	13.8 (0.54) Corrugated Aluminum
Jacket	mm (in)	15.9 (0.62) Polyethylene, PE, Metalhydroxite Filling
ELECTRICAL SPECIFICATIONS		
Impedance	Ω	50 +/- 1
Maximum Frequency	GHz	8.8
Velocity	%	88
Capacitance	pF/m (pF/ft)	76 (23.2)
Inductance	µH/m (µH/ft)	0.19 (0.058)
Peak Power Rating	kW	38
RF Peak Voltage	Volts	1950
Jacket Spark	Volt RMS	8000
Inner Conductor dc Resistance	Ω/1000 m (Ω/1000 ft)	1.57 (0.48)
Outer Conductor dc Resistance	Ω/1000 m (Ω/1000 ft)	2.4 (0.73)
Return Loss (VSWR) Performance		Standard
Maximum Return Loss	dB (VSWR)	Contact RFS for your VSWR performance specification for your required frequency band.
Phase Stabilized		Phase stabilized and phase matched cables and assemblies are available upon request.
Temperature & Power		Standard
MECHANICAL SPECIFICATIONS		
Cable Weight	kg/m (lb/ft)	0.2 (0.13)
Minimum Bending Radius, Single Bend	mm (in)	70 (3)
Minimum Bending Radius, Repeated Bends	mm (in)	125 (5)
Bending Moment	Nm (lb*ft)	6.5 (4.8)
Tensile Strength	N (lb)	800 (180)
Recommended / Maximum Clamp Spacing	m (ft)	0.6 / 1 (2 / 3.25)

D. 1/2" UV CABLE

1/2" CELLFLEX® Lite Low-Loss Foam-Dielectric Coaxial Cable

ATTENUATION AND POWER RATING

Frequency MHz	Attenuation dB/100m	Attenuation dB/100ft	Power kW
0.5	0.16	0.05	38.00
1	0.23	0.071	38.00
1.5	0.29	0.087	31.20
2	0.33	0.10	27.10
10	0.74	0.225	12.00
20	1.05	0.319	8.48
30	1.29	0.392	6.90
50	1.66	0.507	5.36
88	2.22	0.676	4.01
100	2.37	0.722	3.76
108	2.46	0.751	3.62
150	2.91	0.888	3.06
174	3.14	0.958	2.83
200	3.38	1.03	2.63
300	4.16	1.27	2.14
400	4.83	1.47	1.84
450	5.13	1.57	1.73
500	5.42	1.65	1.64
512	5.49	1.67	1.62
600	5.97	1.82	1.49
700	6.47	1.97	1.38
750	6.71	2.04	1.33
800	6.94	2.12	1.28
824	7.05	2.15	1.26
894	7.36	2.24	1.21
900	7.39	2.25	1.20
925	7.49	2.28	1.19
960	7.64	2.33	1.16
1000	7.81	2.38	1.14
1250	8.79	2.68	1.01
1400	9.34	2.85	0.953
1500	9.69	2.95	0.918
1700	10.40	3.16	0.856
1800	10.70	3.26	0.832
2000	11.30	3.45	0.788
2100	11.60	3.54	0.767
2200	11.90	3.63	0.748
2400	12.50	3.81	0.712
2500	12.80	3.89	0.695
2600	13.10	3.98	0.679
2700	13.30	4.06	0.669
3000	14.10	4.30	0.631
3500	15.40	4.69	0.578
4000	16.60	5.05	0.536
5000	18.80	5.72	0.473
6000	20.80	6.34	0.428
7000	22.70	6.92	0.392
8000	24.50	7.47	0.363
9000	26.20	8.00	0.34
10000	27.90	8.50	0.319
11700	30.60	9.33	0.291

Attenuation at 20°C (68°F) cable temperature; tolerance +/- 5% max.; Mean power rating at 40°C (104°F) ambient temperature

TESTING AND ENVIRONMENTAL

Fire Performance	Flame Retardant, LS0H
Flame Retardant Jacket Specifications	Meets/Exceeds: IEC 60754-1, -2; IEC 60332-1, -3.C; UL 1581; UL 1666; NEC type CATVR
Installation Temperature	-25 to 60 (-13 to 140) °C(°F)
Storage Temperature	-70 to 85 (-94 to 185) °C(°F)
Operation Temperature	-50 to 85 (-58 to 185) °C(°F)

External Document Links

Notes

Phase stabilized versions available upon request.

Product Data Sheet NM-LCF12-D01

E. 1/2" NM CONNECTOR

N Male Connector for 1/2" Coaxial Cable, OMNI FIT™ Premium, Straight, Polymer claw and compression sealing

Product Description

OMNI FIT™ high performance connectors are designed for use with both CELLFLEX® (copper) and CELLFLEX® Lite (aluminium) cables. They are designed specifically to provide the highest quality connector-cable interface while simplifying and speeding up connector attachment. All RFS connectors are fully tested for mechanical and electrical compliance to industry specifications.
The 7-16 connector is the most rugged RF connection meeting all requirements even under the most severe environmental conditions. Sealing against outer conductor and jacket by means of the polymer claw and 360? compression fit. Multifunctional, self-lubricating HighTech polymer assembly locks on cable corrugation, avoids electrochemical potential differences and compression-fits to the jacket.

OMNI FIT™ Premium Connectors

Features/Benefits

- Ultra high PIM performance i.e. reduced interference leading to high customer satisfaction
- Two-piece design i.e. visual inspection of interlocking leads to improved installation security
- OMNI FIT™ concept i.e. streamlined order management and reduced stock level
- Watertight sealing in mated and unmated condition, i.e. reduced efforts during installation and improved security during operation
- Unique NiTin plating i.e. extreme resistance against corrosion even under hardest climatic and environmental circumstances
- Multi-thread (Tristart) design i.e. simplified and accelerated tightening process
- RoHS (EU) and CRoHS (China) compliant i.e. can be used on a global basis

Technical Specifications

Transmission Line Type	Coaxial Cable
Cable Size	1/2"
Cable Type	Foam Dielectric
Model Series	LCF12-50 Series, ICA12-50 Series
Connector Interface	N
Nominal Impedance, ohms	50
Connector Type	OMNI FIT™ PREMIUM Straight
Sealing Method	Polymer claw + 360° Compression
Gender	Male
Plating Outer/Inner	NiTin/Silver
Length, mm (in)	64.05 (2.52)
Outer Diameter, mm (in)	29 (1.14)
Weight, kg (lb)	0.11 (0.24)
Inner Contact Attachment	Basket
Outer Contact Attachment	360° clamping
3rd Order IM Product @ 2x20 Watts, dBc	-156 ; typical -162
Maximum Frequency, GHz	3.7
VSWR (Return Loss, dB)	0 < f = 1.0 GHz: 1.020 (40.0) 1.0 < f = 2.7 GHz: 1.030 (36.6) 2.7 < f = 3.7 GHz: 1.060 (30.7)
Wrench size front, mm (in)	18
Wrench size rear, mm (in)	26
Trimming Tool	TRIM-SET-L12-D01 TRIM-LCF12-D01-A
Waterproof Level	IP68

Notes

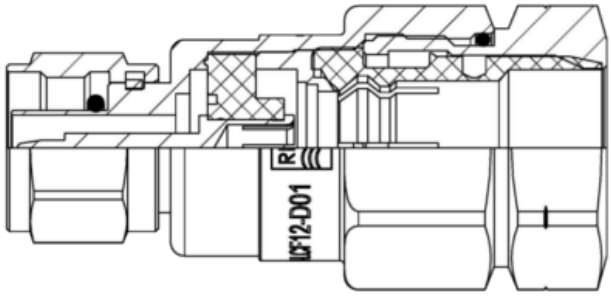
Other Documentation

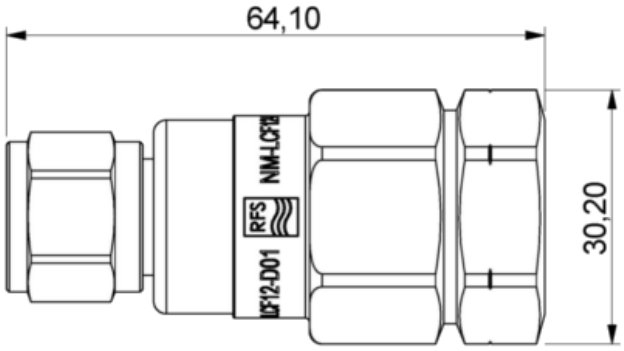
Product Data Sheet NM-LCF12-D01

E. 1/2" NM CONNECTOR

N Male Connector for 1/2" Coaxial Cable, OMNI FIT™ Premium, Straight, Polymer claw and compression sealing

Installation Instruction: 2800130-B.pdf





Product Data Sheet **NF-LCF12-D01**

F. 1/2" NF CONNECTOR

N Female Connector for 1/2" Coaxial Cable, OMNI FIT™ Premium, Straight, Polymer claw and compression sealing

Product Description

OMNI FIT™ high performance connectors are designed for use with both CELLFLEX® (copper) and CELLFLEX® Lite (aluminium) cables. They are designed specifically to provide the highest quality connector-cable interface while simplifying and speeding up connector attachment. All RFS connectors are fully tested for mechanical and electrical compliance to industry specifications.
The 7-16 connector is the most rugged RF connection meeting all requirements even under the most severe environmental conditions. Sealing against outer conductor and jacket by means of the polymer claw and 360° compression fit. Multifunctional, self-lubricating HighTech polymer assembly locks on cable corrugation, avoids electrochemical potential differences and compression-fits to the jacket.

OMNI FIT™ Premium Connectors

Features/Benefits

- Ultra high PIM performance i.e. reduced interference leading to high customer satisfaction
- Two-piece design i.e. visual inspection of interlocking leads to improved installation security
- OMNI FIT™ concept i.e. streamlined order management and reduced stock level
- Watertight sealing in mated and unmated condition, i.e. reduced efforts during installation and improved security during operation
- Unique NiTin plating i.e. extreme resistance against corrosion even under hardest climatic and environmental circumstances
- Multi-thread (Tristart) design i.e. simplified and accelerated tightening process
- RoHS (EU) and CRoHS (China) compliant i.e. can be used on a global basis

Technical Specifications

Transmission Line Type	Coaxial Cable
Cable Size	1/2"
Cable Type	Foam Dielectric
Model Series	LCF12-50 Series, ICA12-50 Series
Connector Interface	N
Nominal Impedance, ohms	50
Connector Type	OMNI FIT™ PREMIUM Straight
Sealing Method	Polymer claw + 360° Compression
Gender	Female
Plating Outer/Inner	NiTin/Silver
Length, mm (in)	57.1 (2.25)
Outer Diameter, mm (in)	26 (1.02)
Weight, kg (lb)	0.1 (0.22)
Inner Contact Attachment	Basket
Outer Contact Attachment	360° clamping
3rd Order IM Product @ 2x20 Watts, dBc	-156 ; typical -162
Maximum Frequency, GHz	3.7
VSWR (Return Loss, dB)	0 < f = 1.0 GHz: 1.020 (40.0) 1.0 < f = 2.7 GHz: 1.030 (36.6) 2.7 < f = 3.7 GHz: 1.060 (30.7)
Wrench size front, mm (in)	27 (1-1/16)
Wrench size rear, mm (in)	27 (1-1/16)
Trimming Tool	TRIM-SET-L12-D01 TRIM-LCF12-D01-A
Waterproof Level	IP68

Notes

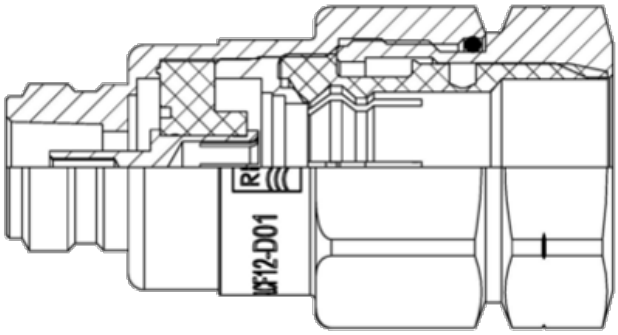
Other Documentation

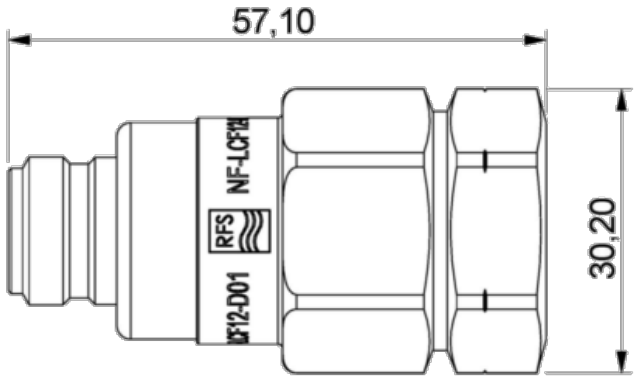
Installation Instruction: 2800130-B.pdf

Product Data Sheet **NF-LCF12-D01**

F. 1/2" NF CONNECTOR

N Female Connector for 1/2" Coaxial Cable, OMNI FIT™ Premium, Straight, Polymer claw and compression sealing



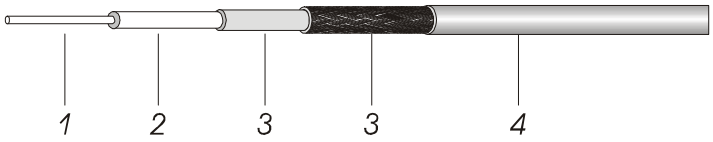


G. UL LISTED RG142 JUMPER CABLE

TWS-RG142 Bulk Coaxial Cable

The TWS-RG142 Cable is an outstanding braided coaxial cable for wireless professionals. A highly desirable cable for enterprise applications such as DAS systems, this cable offers maximum flexibility where curves, bends and twists exist. The cable is constructed of a fluorinated ethylene propylene (FEP) jacket providing durability and protection from high temperatures and is CMP-rated for plenum spaces. It is designed for any application requiring high-quality, flexible cabling such as in-building network deployments. Ventev's cable is compatible with a wide variety of Ventev connectors and can be used for an off-the-shelf cable assembly or customized cable assembly. *For questions or to purchase product, contact your Regional Sales Executive at 210-375-8482, 800-851-4965 or sales@ventev.com.*

TESSCO No: 582340
Ventev Part Number: TWS-RG142



Construction Specifications		
	Material	**Diameter (mm)**
1. Inner Conductor	Silver-plated copper clad steel	0.93 +- 0.02
2. Dielectric	PTFE	3.00 +- 0.05
3. Outer Conductor	Double Silver Plated Copper Braid	Nom 4.0
4. Jacket	Brown FEP	4.95 +- 0.15

Electrical Characteristics	
Capacitance (pF/m)	105
Impedance (Ω)	50
Velocity (%)	70
Dielectric strength (VRMS@60Hz)	2500
Max. Operating Voltage (Vrms)	1900
Max. Operating Frequency (GHz)	8

Typical Attenuation @20 and Sea Level	
Frequency (GHz)	**Typical Attenuation dB/100M**
0.1	14.4
0.4	29.4
1	48.3
3	89.8
5	115.5
6	127.5

Mechanical and Environmental Characteristics	
Bending Radius once (mm)	25
Repeated Bend Radius (mm)	40
Operating Temperature (C)	-55° to +200°
Fire Rating	Flame Retardant, Plenum Rated

General Information	
Warranty	7 Years

H. RG142 NM CONNECTOR

REV.	DESCRIPTIO
1	initial

1.Connector is in accordance with IEC60169-16
Male interface screw thread：5/8-24UNEF-2A

2.Electrical Characteristics:

Impedance(Ω)	50Ω
Frequency Range	0~3 GHz
Insulation Resistance	≥5000MΩ
Withstanding Voltage AC(V/min)	1500V
VSWR	≤1.15 0~3G
Contact Resistance(N)	
Inner conductor	≤1.5 mΩ
Outer conductor	≤0.4 mΩ

3.Material and plating:↔

Outer contact	Brass (HPb59-1)	Nickel plated
Center contact	Brass (HPb59-1)	Gold plated
Insulator	PTFE	
Nut	Brass (HPb59-1)	Nickel plated
Seal ring	Silicone Rubber	
Copper pipe	Brass (H62)	Nickel plated

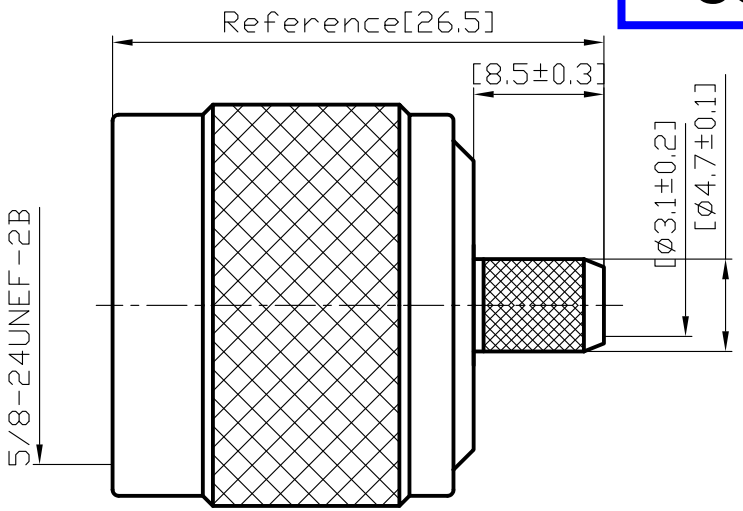
4.Mechanical

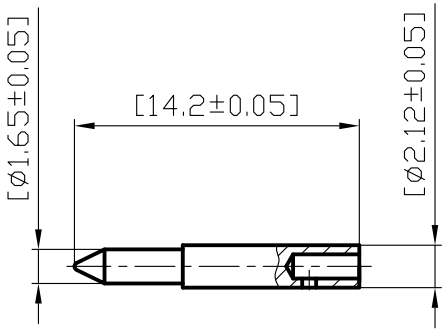
Center Conductor Withdrawal Force（N）	≥0.56N
Durability	≥500 Times

5.Working environment

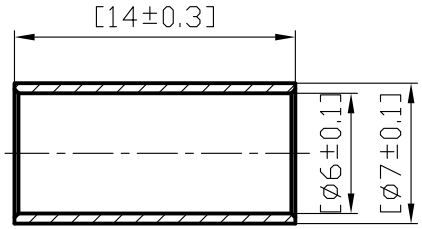
Working Temperature	-40~+85°C
Relative Moisture	90％~95％（Temperature: 40±2℃）

6.Connector conform to RoHs

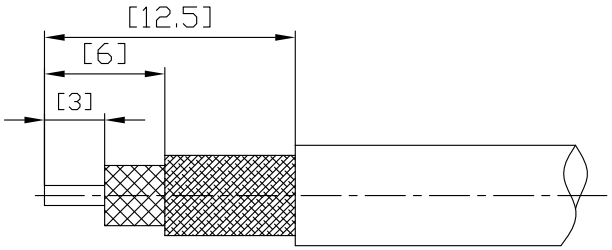




Pin



Copper pipe



Stripping Dimensions

UNLESS OTHERWISE SPECIFIED:
TOLERANCES:
± .XX = ±.01
±.XXX = ±.005
±.XXXX = ±.0001
±X.X° = ±°1.0
CAD FEATURES ARE BASIC:
.005 A B C
DIMENSIONS ARE IN MM
INTERPRET GEOMETRIC TOLERANCING PER ANSI Y14.5 - 2009
3RD ANGLE PROJECTION

DRAWN
RESP ENG
APPR.
APPR.
MATERIAL: SEE NOTES
FINISH: SEE NOTES

ventev®
A Division of Tessco Technologies Incorporated

TITLE: N MALE FOR RG142

SIZE	CAGE CODE	DWG. NO.	REV
B	8J168	552318	1

DO NOT SCALE DRAWING | SCALE: 1:5 | SHEET 1 OF 1

I. RG142 NF CONNECTOR

REV.	DESCRIPTIO
1	initial

1.Connector is in accordance with IEC60169-16
Male interface screw thread：5/8-24UNEF-2A

2.Electrical Characteristics:

Impedance(Ω)		50Ω
Frequency Range		0~3 GHz
Insulation Resistance		≥5000MΩ
Withstanding Voltage AC(V/min)		1500V
	VSWR	≤1.15 0~3G
Contact Resistance(N)		
	Inner conductor	≤1.5 mΩ
	Outer conductor	≤0.4 mΩ

3.Material and plating:↔

Outer contact	Brass(HPb59-1)	Nickel plated
Center contact	Bronze(QSn6.5-0.1)	Gold plated
Insulator	PTFE	
Copper pipe	Brass (H62)	Nickel plated

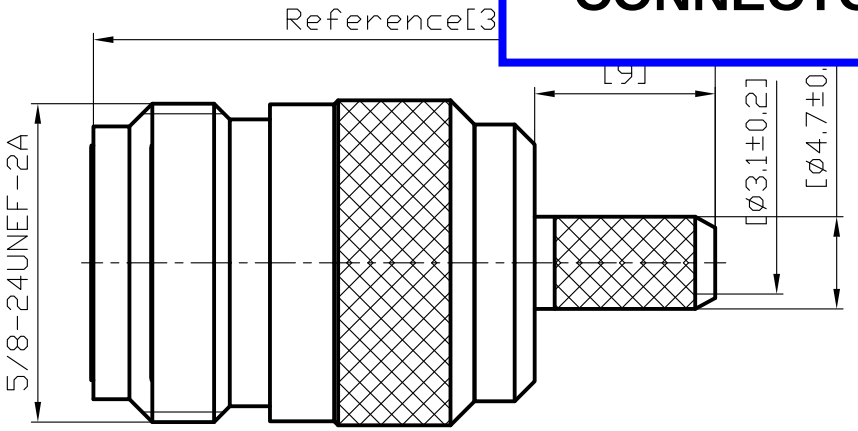
4.Mechanical

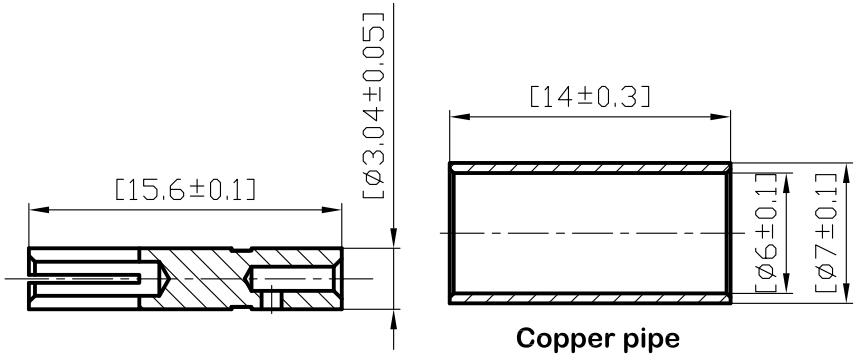
Center Conductor Withdrawal Force (N)		≥0.56N
	Durability	≥500 Times

5.Working environment

Working Temperature	-40~+85°C
Relative Moisture	90%~95%（Temperature: 40±2℃）

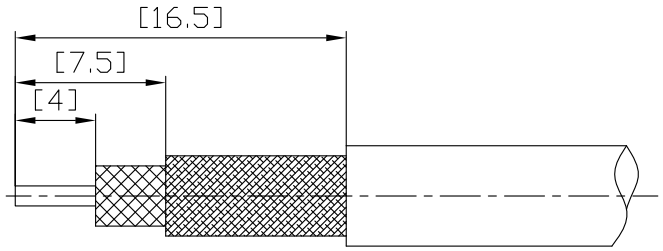
6.Connector conform to RoHs





Pin

Copper pipe



Stripping Dimensions

UNLESS OTHERWISE SPECIFIED:
TOLERANCES:
± .XX = ±.01
±.XXX = ±.005
±.XXXX = ±.0001
±X.X° = ±°1.0
CAD FEATURES ARE BASIC:
.005 | A | B | C
DIMENSIONS ARE IN MM
INTERPRET GEOMETRIC TOLERANCING PER ANSI Y14.5 - 2009
3RD ANGLE PROJECTION

DRAWN
RESP ENG
APPR.
APPR.
MATERIAL: SEE NOTES
FINISH: SEE NOTES

ventev®
A Division of Tessco Technologies Incorporated

TITLE: N FEMALE FOR RG142

SIZE	CAGE CODE	DWG. NO.	REV
B	8J168	557681	1

DO NOT SCALE DRAWING | SCALE: 1:5 | SHEET 1 OF 1

746-896 MHz Yagi Antenna (11 dBi)

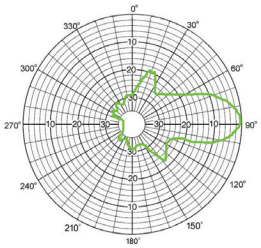
Specifications

Gain	11 dBi
VSWR	<1.7:1
Horizontal Beamwidth	48°
Vertical Beamwidth	42°
Polarization	Vertical
Maximum Input Power	100 Watts
Electrical Downtilt	0°
Front-back Ratio	>16 dB
Connector	N-Female
Lightning Protection	Direct Ground
Rated Wind Speed	134 mph (216 kph)
Max. Dimensions of Antenna	2.2 x 8 x 33.1 in. / (55.8 x 203.20 x 840 mm)
Weight of Antenna	1.76 lb / (0.8 Kg)
Mounting Hardware	U-Bolt

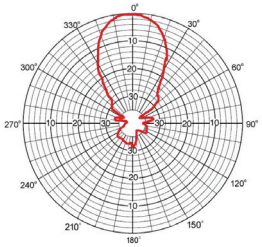
Included Mounting Hardware fits 1 7/8" OD Pipe

Specifications subject to change without notice.

Radiation Patterns



Vertical



Horizontal

Model Number

- CSI-AY/746-896/11

Frequency Range

- 746-896 MHz

Features & Benefits

- 11 dBi Gain
- 8 Elements
- Hermetically Sealed Driven Element
- Rugged Lightweight Design
- Stainless Steel Hardware
- Broad Bandwidth

csi cellular specialties, inc.

1.877.844.4CSI (4274)
www.cellularspecialties.com

ECO 2211 021-0047-001 REV B

Laird

Smart Technology. Delivered.

CFSA [illegible]3P1

698-960 MHz/13[illegible] MHz

Low PIM Ceiling Mount Antenna

K. INTERNAL OMNI ANTENNA

(Tile Mount) Patent Pending CFSA69383P

(Hard Ceiling Mount)
Patent Pending CFSA69383P1

MULTI-BAND LOW PIM CEILING MOUNTED OMNIDIRECTIONAL ANTENNA

The CFSA69383P/CFSA69383P1 is a Low PIM indoor wideband omnidirectional low profile ceiling mount antenna. It is designed to provide pattern coverage that is optimized for indoor coverage requirements at 698-960 MHz, and 1690-3800 MHz for the GSM, DCS, UMTS, AWS-3 and LTE/WiMAX frequency bands. The CFSA69383P/CFSA69383P1 is applicable for environments where aesthetics and wide angle coverage are necessary for successful wireless deployment. The surprisingly small size and extreme low profile enables maximum mounting flexibility while maintaining desired in-building aesthetics.

FEATURES

- Ultra Low profile aesthetically neutral housing
- Mounts directly and easily to ceiling tile
- Performance optimized using Laird proprietary optimization tools
- Supports AWS-3 Frequency Band

APPLICATIONS

- Small cells
- Meeting rooms
- Offices
- Hotels
- Museums
- iDAS
- Libraries
- Retail malls
- Bus terminals and train stations
- Other in-building areas

PARAMETER	SPECIFICATIONS										
Model	CFSA69383P/CFSA69383P1										
Frequency Bands, MHz	698-806	824-894	880-960	1350-1550	1690-1880	1850-1990	1910-2180	2300-2500	2500-2700	3300-3800	3800-4000
Peak Gain, dBi (Typ)	3.2	2.6	3.4	4.2	4.0	4.4	4.2	4.3	5.4	2.4	3.0
Peak Gain, dBi (Max)	3.5	3.1	4.1	5.6	4.3	4.7	4.7	5.1	5.8	3.0	3.2
VSWR, Typ	<1.2:1	<1.2:1	<1.2:1	<1.6:1	<1.3:1	<1.3:1	<1.3:1	<1.2:1	<1.2:1	<1.6:1	<1.7:1
VSWR, Max	<1.5:1	<1.5:1	<1.5:1	<2.0:1	<1.5:1	<1.5:1	<1.5:1	<1.5:1	<1.5:1	<1.8:1	<2.0:1
PIM, 3rd Order, 2x20 W (Typ)	<-159 dBc (LTE Low Band)				<-157 dBc (LTE High Band)			<-160 dBc			
PIM, 3rd Order, 2x20 W (Max)	<-150 dBc				<-150 dBc			<-150 dBc			
Nominal Impedance	50Ω										
Polarization	Linear Horizontal										
Azimuth 3 dB Beamwidth	360°										
Max Power (Ambient 25°C)	50 Watts										
Antenna Dimension (H x Dia)	7.6 x 180 mm (0.3" x 7.1")										
Weight	0.23 kg (0.5 lbs)										
Antenna Color	White										
Radome	PC, UL94-V0										
Operating Temperature	-30°C to +70°C (-22°F to +158°F)										
Storage Temperature	-40°C to +85°C (-40°F to +185°F)										
Material Substance Compliance	RoHS										

CONFIGURATION

PART NUMBER	CABLE LENGTH	CONNECTOR	MOUNTING	PACKAGING
CFSA69383P-30NF	30 cm (12")	Type N- female	Ceiling Tile	Unit
CFSA69383P-30D43F	30 cm (12")	4.3-10 female	Ceiling Tile	Unit
CFSA69383P-B30NF	30 cm (12")	Type N- female	Ceiling Tile	Bulk
CFSA69383P-B30D43F	30 cm (12")	4.3-10 female	Ceiling Tile	Bulk
CFSA69383P1-30NF	30 cm (12")	Type N- female	Hard Ceiling	Unit
CFSA69383P1-30D43F	30 cm (12")	4.3-10 female	Hard Ceiling	Unit
CFSA69383P1-B30NF	30 cm (12")	Type N- female	Hard Ceiling	Bulk
CFSA69383P1-B30D43F	30 cm (12")	4.3-10 female	Hard Ceiling	Bulk

Americas: +1.847 839.6925
IAS-AmericasSales@lairdtech.com

Europe: +44.1628.858941
IAS-EUSales@lairdtech.com

Asia:
IAS-AsiaSales@lairdtech.com

Middle East and Africa: +44.1628.858941
IAS-MEASales@lairdtech.com

www.lairdtech.com

Laird

Smart Technology. Delivered.

CFSA 3P1

698-960 MHz/13 MHz

PIM

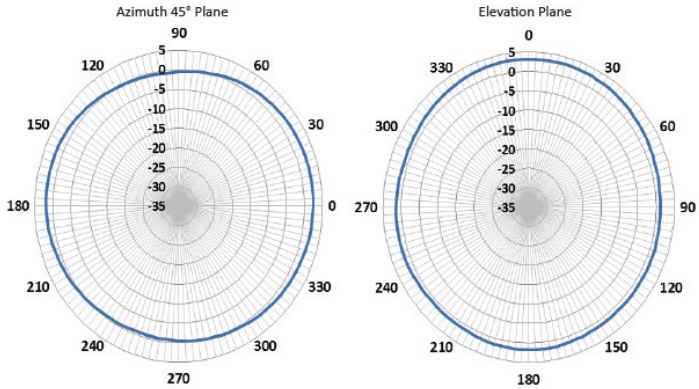
Ceiling Mount Antenna

K. INTERNAL OMNI ANTENNA

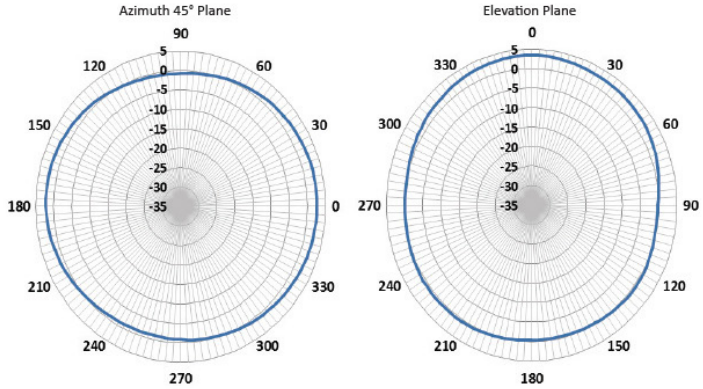
RADIATION PATTERNS

CFSA69383P

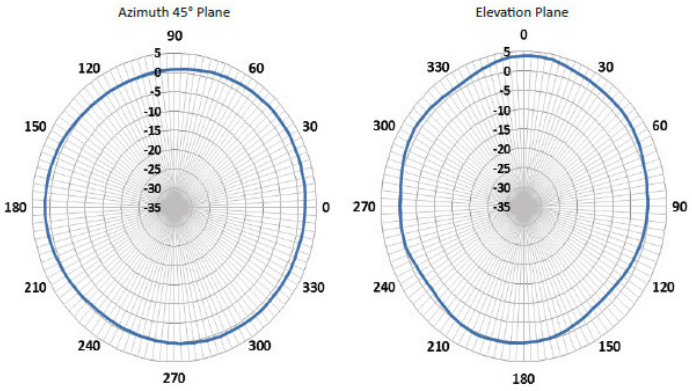
698 MHz



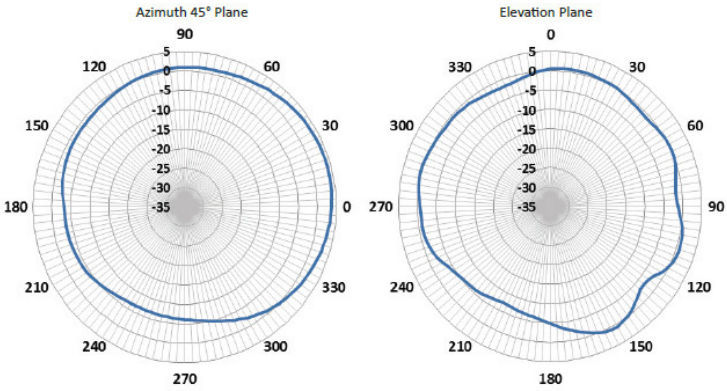
806 MHz



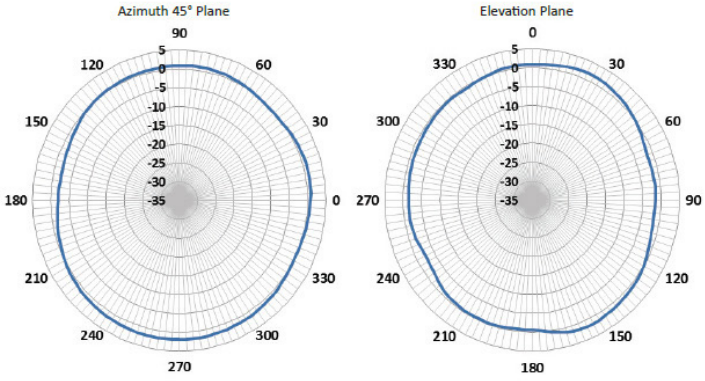
906 MHz



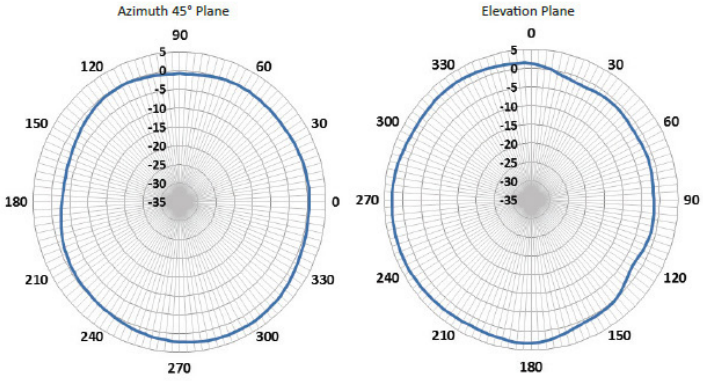
1350 MHz



1550 MHz



1690 MHz



Smart Technology. Delivered.

CFSA 3P1

698-960 MHz/13 MHz

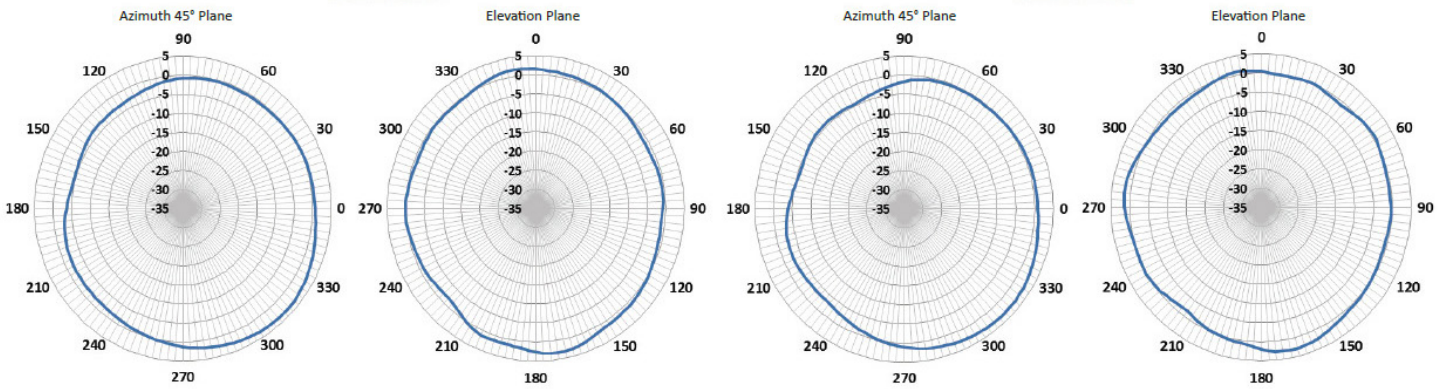
PIM

Ceiling Mount Antenna

K. INTERNAL OMNI ANTENNA

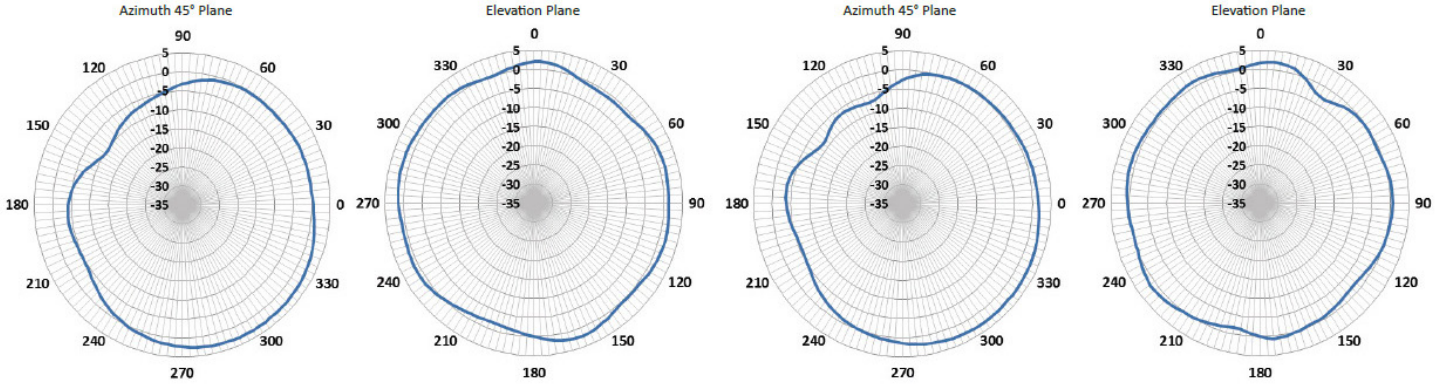
RADIATION PATTERNS

CFSA69383P

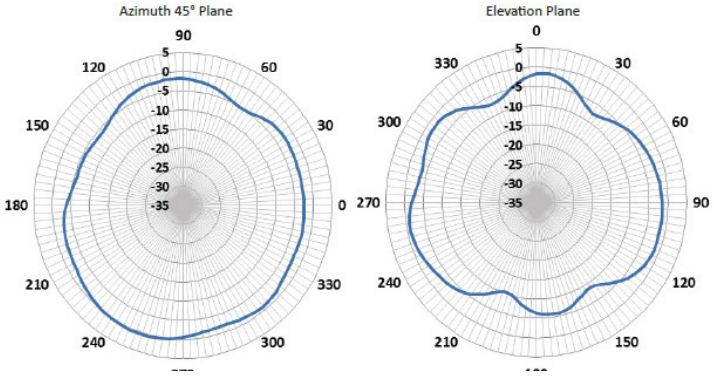


2170 MHz

2310 MHz



3500 MHz



L. INTERNAL OMNI ANTENNA

Build ... s®

Product Info

ClearLink™ Multiband Omnidirectional Antenna

High Performance - PIM Certified

Electrical Specifications

Horizontal Beamwidth	Omnidirectional
Gain	
698-738 MHz	2 dBi
738-818 MHz	1 to 2 dBi
818-960 MHz	1 to 2 dBi
1700-2690 MHz	2 to 4 dBi
Polarization	Vertical
Impedance	50 Ohm
VSWR/Return Loss	
698-738 MHz	2.0/9.5 dB
738-818 MHz	1.8/10.9 dB
818-960 MHz	1.5/14.0 dB
1700-2690 MHz	1.4/15.5 dB
PIM, 3rd order, 2 x 20W	-153 dBc
Max Input Power	50 Watts (2W typical)

Mechanical Specifications

Case Material	ABS with UV Protection
Operating Temperature	-40° to +70° C
Dimensions	8 Dia. x 4.5 H in.
Weight	1.6 lbs
Connectors	N-Female
Pigtail	Low PIM plenum rated cable
Standard Mounting Style	Ceiling

Universal bracket included for additional mounting options

Specifications subject to change without notice.

Model Number

- ClearLink-O/698-2.7K/N (CS03-011-429)

Frequency Range

- 698-960 MHz
- 1710-2690 MHz

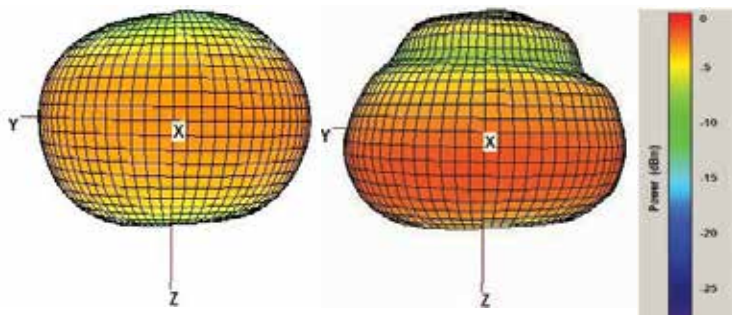
Features & Benefits

- Multiband Design
- Flexible Mounting Options
- Symmetric Construction
- Suitable for Wall Mounting

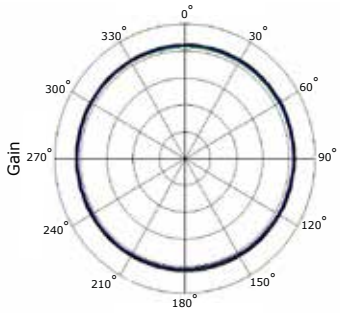
Target Applications

- CDMA, GSM, DCS, 3G/UMTS, LTE
- In-building Coverage

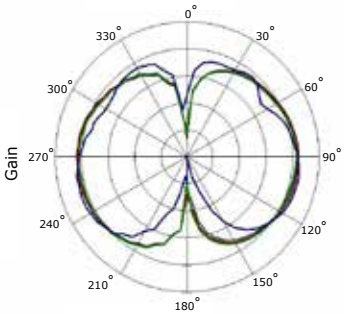
Sample Antenna Patterns*



698 MHz 1904 MHz



Azimuth Pattern



Elevation Pattern

698 MHz 740 MHz 818 MHz 1904 MHz

csi cellular specialties, inc.

* Additional patterns with enlarged images are available upon request.

1.877.844.4CSI (4274)
www.cellularspecialties.com

ECO 2906 021-0107-001 REV B
18 APR 2013

Product Specifications

M. GROUNDING KIT

POWERED BY ANDREW

241088-1

Standard Grounding Kit for 1/2 in corrugated coaxial cable and elliptical waveguide 180 and 220

Dimensions

Nominal Size	1/2 in
Waveguide Size	WR42 | WG20 | R220 | WR51 | WG19 | R180
Bonding Conductor Length	609.6 mm | 24 in
Cable Jacketing Removal Length, maximum	59.1 mm | 2.3 in
Cable Jacketing Removal Length, minimum	55.9 mm | 2.2 in
Compatible Diameter, maximum	16.510 mm | 0.650 in
Compatible Diameter, minimum	15.494 mm | 0.610 in

Electrical Specifications

Current Handling	Tested to withstand 100,000 amps peak current surge
Current Handling Test Method	MIL-STD-1757
Grounding, Bonding and Shielding Test Method	MIL-STD-188-124A
Lightning Protection Test Method	IEC 1024-1

General Specifications

Cable Type	Corrugated | Elliptical waveguide
Grounding Kit Type	Standard Grounding Kits
Ordering Note	CommScope® non-standard product
Color	Black
Bonding Conductor Material	Copper
Bonding Conductor Wire Size	6 gauge
Bonding Conductor Jacketing Material	PVC
Grounding Strap Material	Copper
Includes	Grounding kit | Hardware | Lug | One roll of 2 in PVC tape | One roll of 24 in butyl rubber tape
Lug Attachment	Factory attached
Lug Type	Two-hole lug
Package Quantity	1
Rivet Material	Copper
Weatherproofing Method	Butyl and electric tape

Mechanical Specifications

Blowing Rain Test Method	MIL-STD-810, Method 506
Corrosion Test Method	MIL-STD-1344, Method 1001
Freezing Rain/Icing Test Method	MIL-STD-810, Method 521
Humidity Test Method	MIL-STD-1344, Method 1002
Immersion Test Method	IEC 60529:2001, IP68

Product Specifications

M. GROUNDING KIT

241088-1

POWERED BY ANDREW

Operating Temperature	-40 °C to +85 °C (-40 °F to +185 °F)
Storage Temperature	-40 °C to +80 °C (-40 °F to +176 °F)
Thread Size	3/8 in
UV Resistance Test Method	MIL-STD-810, Method 505
Vibration Test Method	MIL-STD-202, Method 214

Packed Dimensions

Height	266.7 mm | 10.5 in
Length	57.2 mm | 2.3 in
Shipping Weight	0.72 kg | 1.58 lb
Width	266.7 mm | 10.5 in

Regulatory Compliance/Certifications

Agency	Classification
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Included Products

9905-71 — Black 2 in PVC Tape, 20 ft

42615-10 — Butyl Rubber Tape, 24 in

* Footnotes

Grounding, Bonding and Shielding Test Method	Military Standard for Grounding, Bonding, and Shielding: Bond Resistance Requirement of a Maximum dc resistance of 0.001 ohm
Lightning Protection Test Method	Protection Against Lightning Electromagnetic Impulse, Table 1—Protection Level III–IV, 1995-02

Product Specifications

M. GROUNDING KIT

POWERED BY ANDREW

9905-71

Black 2 in PVC Tape, 20 ft

Dimensions

Nominal Size	1-1/4 in | 1-5/8 in | 1/2 in | 1/4 in | 2-1/4 in | 3/8 in | 5/8 in | 7/8 in
Length	6.10 m | 20.00 ft
Width	50.80 mm | 2.00 in

General Specifications

Application	Provides additional moisture seal for cable connections
Applications per Kit	Four 1/2 in–1/2 in | Four 1/2 in–7/8 in to device | One 1/2 in–2-1/4 in | Two 1/2 in–7/8 in
Color	Black
Material Type	PVC tape
Ordering Note	CommScope® non-standard product
Package Quantity	1

Mechanical Specifications

UV Resistance Test Method	PVC tape test method UL 510, ASTM D1000
Weather Resistance Test Method	04AS00-03.6.0 | MIL-STD-1344A, Method 1002

Packed Dimensions

Height	6.4 cm | 2.5 in
Length	5.1 cm | 2.0 in
Shipping Weight	0.08 kg | 0.19 lb
Width	6.4 cm | 2.5 in

Regulatory Compliance/Certifications

Agency	Classification
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Product Specifications

M. GROUNDING KIT

POWERED BY ANDREW

42615-10

Butyl Rubber Tape, 24 in

Dimensions

Nominal Size	1-1/4 in | 1-5/8 in | 1/2 in | 1/4 in | 2-1/4 in | 3/8 in | 5/8 in | 7/8 in
Length	609.60 mm | 24.00 in
Width	63.50 mm | 2.50 in

General Specifications

Application	Provides additional moisture seal for cable connections
Applications per Kit	One 1/2 in–2-1/4 in | One 1/2 in–7/8 in | One 1/2 in–7/8 in to device | Two 1/2 in–1/2 in
Color	Black
Material Type	Butyl rubber tape
Ordering Note	CommScope® non-standard product
Package Quantity	1

Mechanical Specifications

UV Resistance Test Method	Butyl test method in QUV weatherometer cycle of 8 hours UV at 150 °F then 4 hours of condensation at 104 °F
UV Resistance, minimum with no degradation	=1000 hours
Weather Resistance Test Method	04AS00-03.6.0 | MIL-STD-1344A, Method 1002

Packed Dimensions

Height	6.4 cm | 2.5 in
Length	2.5 cm | 1.0 in
Shipping Weight	0.17 kg | 0.37 lb
Width	69.9 mm | 2.8 in

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant
China RoHS SJ/T 11364-2006	Below Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

ventev
wireless infrastructure

N.
WEATHERPROOFING

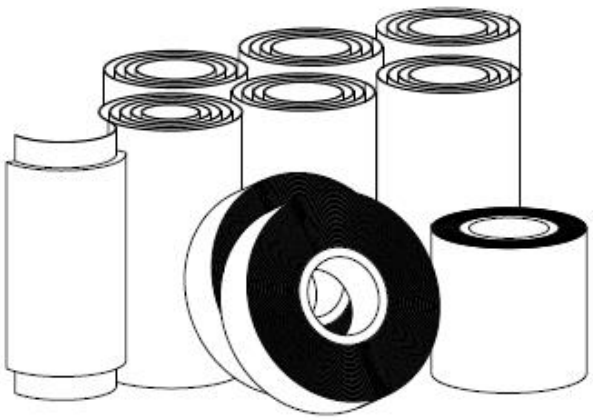
Wireless Solutions Universal Weatherproofing Kit

For Cable Mounting

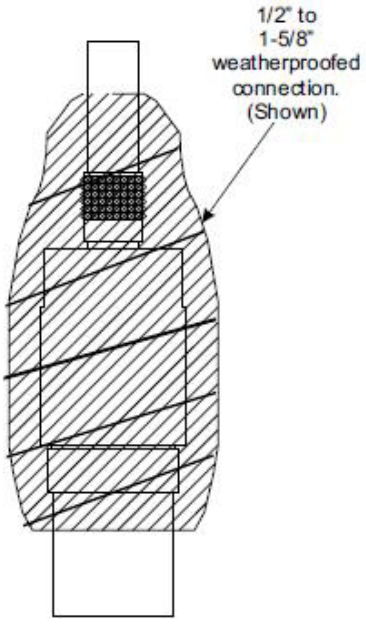
Ensure Reliability of Your Site

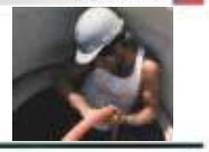
Wireless Solutions' Universal Weatherproofing Kit is a versatile kit used to protect coax connector junctions from moisture ingress and to prevent vibration from loosening the connection. The Universal Weatherproofing Kit accommodates connections consisting of any size coax from 1/2" to 5", simplifying ordering, inventory management, and installation setup. The Universal Weatherproofing Kit features a combination of butyl mastic and electrical tape, which is applied using a multi-layer wrapping procedure to create a long-term environmental seal for main feed, jumper, and antenna connections. The kit consists of six 2-1/2" (20.1m) x 24" (609.6mm) rolls of butyl mastic tape, two 66' (20.1m) rolls of 3/4" (19.1mm) wide electrical tape, and one 20' (6.1m) roll of 2" (50.8mm) wide electrical tape.

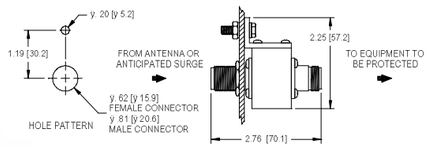
Part Number	SKU	DESCRIPTION
WK-U	18264	Universal Weatherproof Kit



WK-U
Universal Weatherproofing Kit







PolyPhaser's broadband protectors for general radio use
Bulkhead or surface mountable
dc-Blocked gas tube design, no dc continuity between center pins
Use indoors, if to be installed outdoors weatherize using WK-1

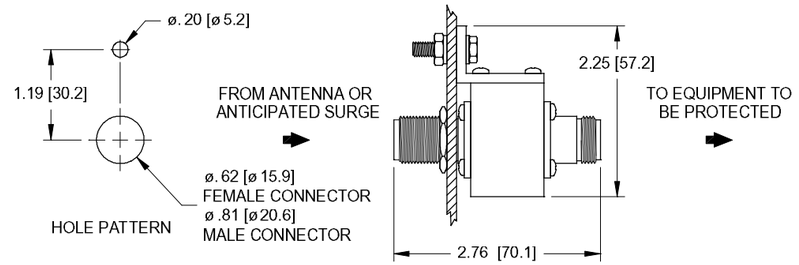
Insertion Loss: 0.1dB
Turn-on: 600Vdc L models, 1200Vdc H models
Turn-on time: 2.5ns L models, 7ns H models

Mounting	Part Number	Connector	Frequency Range	RF Power	VSWR	Let-through Voltage	Throughput Energy
Bulkhead	IS-B50LU-C0	UHF	1.5 to 400MHz	HF: 2kW, VHF: 375W, UHF: 125W	1.2 to 1	900	10mJ
	IS-B50HU-C0	UHF	1.5 to 400MHz	HF: 3kW, VHF: 500W, UHF: 250W	1.2 to 1	1200	20mJ
	IS-B50LU-C1	UHF	50 to 700MHz	VHF: 375W, UHF: 125W	1.2 to 1	750	600µJ
	IS-B50HU-C1	UHF	50 to 700MHz	VHF: 500W, UHF: 250W	1.2 to 1	800	1mJ
	IS-B50LN-C0	N	1.5 to 400MHz	HF: 2kW, VHF: 375W, UHF: 125W	1.2 to 1 (1.5 to 2MHz), 1.1 to 1 (2 to 400MHz)	900	10mJ
	IS-B50HN-C0	N	1.5 to 400MHz	HF: 3kW, VHF: 500W, UHF: 250W	1.2 to 1 (1.5 to 2MHz), 1.1 to 1 (2 to 400MHz)	1200	20mJ
	IS-B50LN-C1	N	50 to 700MHz	VHF: 375W, UHF: 125W	1.2 to 1 (50 to 60MHz), 1.1 to 1 (60 to 700MHz)	750	600µJ
	IS-B50HN-C1	N	50 to 700MHz	VHF: 500W, UHF: 250W	1.2 to 1 (50 to 60MHz), 1.1 to 1 (60 to 700MHz)	800	1mJ
	IS-B50LN-C2	N	125 to 1000MHz	VHF: 375W, UHF(low): 125W, 800 to 1000MHz: 50W	1.1 to 1	700	220µJ
	IS-B50HN-C2	N	125 to 1000MHz	VHF: 500W, UHF(low): 250W, 800 to 1000MHz: 125W	1.1 to 1	800	800µJ
Flange	IS-50UX-C0	UHF	1.5 to 400MHz	HF: 2kW, VHF: 375W, UHF: 125W	1.2 to 1	1100	10mJ
	IS-50UX-C1	UHF	50 to 700MHz	VHF: 375W, UHF: 125W	1.2 to 1	650	600µJ
	IS-50NX-C0	N	1.5 to 400MHz	HF: 2kW, VHF: 375W, UHF: 125W	1.2 to 1 (1.5 to 2MHz), 1.1 to 1 (2 to 400MHz)	1100	10mJ
	IS-50NX-C1	N	50 to 700MHz	VHF: 375W, UHF: 125W	1.2 to 1 (50 to 60MHz), 1.1 to 1 (60 to 700MHz)	650	600µJ
	IS-50NX-C2	N	125 to 1000MHz	VHF: 375W, UHF(low): 125W, 800 to 1000MHz: 50W	1.1 to 1	750	220µJ
	IS-75F-C1	F	4 to 900MHz	HF: 100W, VHF: 100W, UHF: 25W	1.2 to 1	720	1mJ

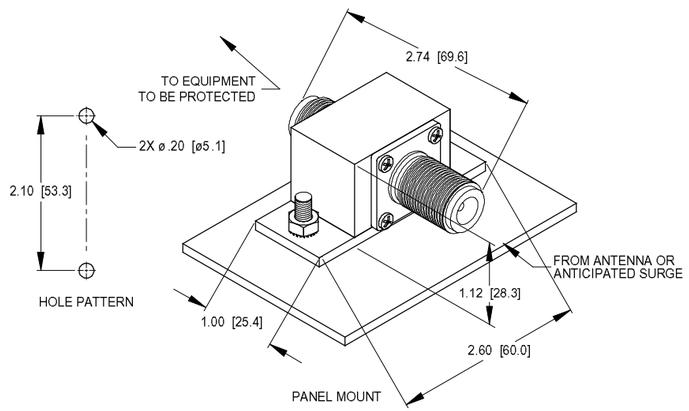
add: -MA for Male Surge (Antenna) Connector
-ME for Male Protected (Equipment) Connector

O. LIGHTENING ARRESTOR

Drawing Number: A001



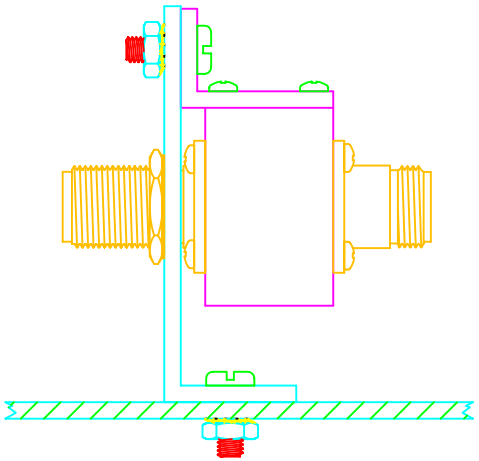
Drawing Number: A002



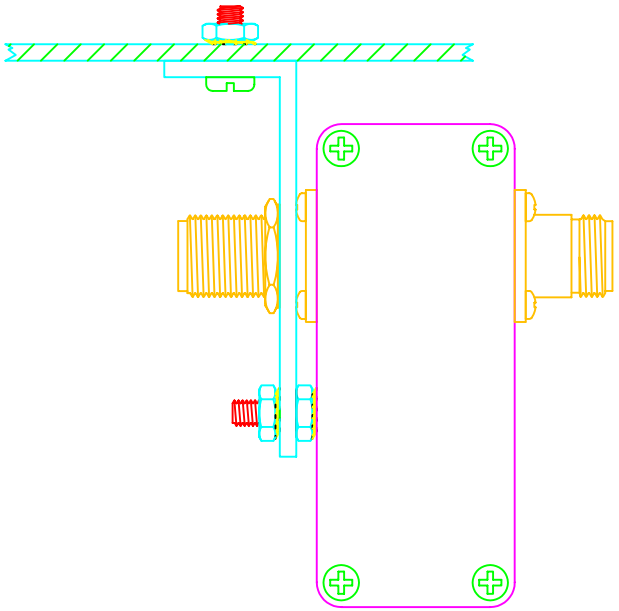
O. LIGHTENING ARRESTOR

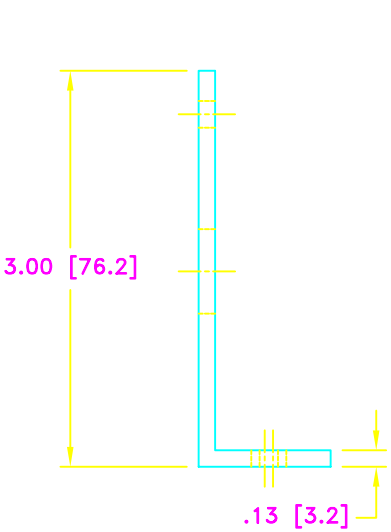
REVISIONS

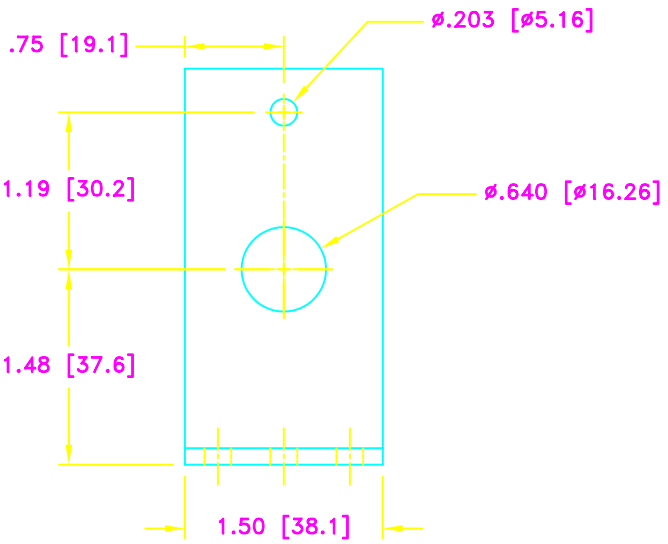
Q.A.	
RM	
RM	
LJ	
–	

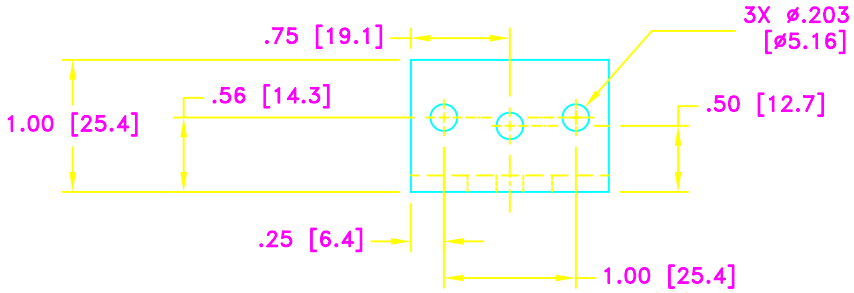


TYPICAL SUPPRESSOR MOUNTING CONFIGURATIONS









CUSTOMER APPROVAL: _____ DATE: _____

ALL DIMENSIONS SHOWN ABOVE ARE FOR REFERENCE ONLY.

DRAFTER: R. DUNNING	DATE: 08/21/92	PolyPhaser	
MECH ENGINEER: – – – –	DATE: – – –	P.O. BOX 9000 MINDEN, NV 89423 TEL: 775-782-2511 FAX: 775-782-4476	
ELEC ENGINEER: J. JONES	DATE: 08/21/92	DWG NO/PART NO/DESCRIPTION: BF ADAPTER CUSTOMER PRINT	
MARKETING: – – – –	DATE: – – –		
QUALITY DEPT: N. JOHN	DATE: 08/21/92	CAGE CODE: 61114	FILE NAME: -C1
		SCALE: 1/1.5	SHEET: 1 OF 1

Microlab

Tappers, DN-x4FN series

M

P. DIRECTIONAL COUPLER

Now with coverage to 5,850 MHz

- Split ratios from 1000:1 to 2:1
- Tetra, PMR, Cellular, UMTS, WiFi & WiMAX
- Guaranteed Low PIM
- 500 W Avg Power Rating
- Minimal RF Insertion Loss
- RoHS compliant
- High Reliability, IP67

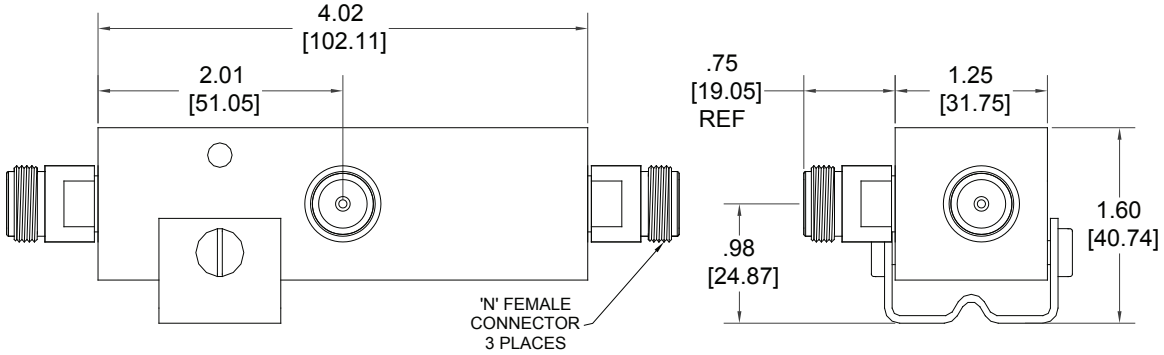
DN-44FN 3:1 Tapper

Microlab DN-x4FN series of Tappers unevenly split high power cellular signals in fixed ratios from 1000:1 to 2:1 with minimal reflections or loss over the key wireless bands in the range 350 - 5,850 MHz, (there is no coupling 1550 to 1650 MHz). The innovative asymmetric design ensures an excellent input VSWR and coupling flatness across the specified bands, even down to a 2:1 split.

The lightweight design allows easy attachment to a wall using the supplied bracket. Designed with only a few solder joints and an air dielectric, loss is minimized and reliability enhanced. See DN-x4FD and DN-x4FC series for similar Tappers with 7-16 and 4.1-9.5 DIN connectors. (03/15)

Frequency Bands:	Bands specified below
Dissipative Loss:	<0.1 dB (main line)
Power Rating:	500W avg., 3 kW peak
Impedance:	50Ω nominal
Intermod. (PIM):	-155 dBc typical <-153 dBc, (2 x 20W)
Environment:	IP67, -35°C to +75°C
Connectors:	N(f) trimetal
Housing Finish:	Passivated Aluminum
Weight, nom:	14 oz (380 g)
Mounting:	Bracket supplied

Model Number	Ratio, nom. (dB Inequality between Outputs)	Output Split Main/Branch dB	Branch Flatness ref. to Input Level, incl Loss, dB						Input VSWR max.	
			350 - 380 MHz	380 - 520 MHz	698- 960 MHz	1710 - 2700 MHz	3500 - 4500 MHz	4900 - 5850 MHz	700- 2500 MHz	350- 5850 MHz
DN-34FN	2:1/3.0dB	-1.8/-4.8	+0/-1.3	+0.3/-1.0	± 0.3	± 0.3	+0/-1.5	± 0.4	1.3:1	1.4:1
DN-44FN	3:1/4.8dB	-1.3/-6.1	+0/-1.3	+0.3/- 0.8	± 0.3	± 0.3	+0/-1.5	± 0.4	1.2:1	1.3:1
DN-54FN	4:1/6.0dB	-1.0/-7.0	+0/-1.3	+0.3/-0.8	± 0.3	± 0.3	+0/-1.5	± 0.4	1.2:1	1.3:1
DN-64FN	6:1/8.0dB	-0.7/-8.6	+0/-1.3	+0.3/-0.5	± 0.3	± 0.3	+0/-1.5	± 0.4	1.2:1	1.3:1
DN-74FN	10:1/10dB	-0.4/-10.4	+0/-1.3	+0.3/-0.5	± 0.3	± 0.3	+0/-1.5	± 0.5	1.2:1	1.3:1
DN-84FN	20:1/13dB	-0.2/-13.2	± 1.0	± 0.5	± 0.4	± 0.4	± 0.5	± 0.5	1.2:1	1.3:1
DN-94FN	30:1/15dB	-0.1/-15.1	± 1.0	± 0.8	± 0.5	± 0.5	+0/-1.5	± 0.8	1.2:1	1.3:1
DN-04FN	100:1/20dB	-0.1/-20.1	± 1.0	± 1.0	± 0.8	± 0.5	+2/-0	+4/-0	1.2:1	1.2:1
DN-14FN	1000:1/30dB	-0.1/-30.1	± 1.0	± 1.5	± 0.8	± 0.5	+2/-1	+4/-0	1.2:1	1.2:1



Microlab, A Wireless Telecom Group Company, 25 Eastmans Road, Parsippany, NJ 07054
Tel: (973) 386-9696 • sales@microlab.fxr.com • www.microlab.fxr.com • Fax: (973) 386-9191

2, 3, 4, 5 & 6 way Low Loss Splitters

Model Nos D2-J12 [illegible]

Super wideb[illegible]

Q. POWER SPLITTER

Products for Verizon with PIM <-153 dBc

- Multiple-Band Frequency
- 500 Watt Average Power
- Minimal RF Insertion Loss
- High Reliability, IP67
- Low Specified PIM
- RoHS compliant

Four Way Splitter D4-C09

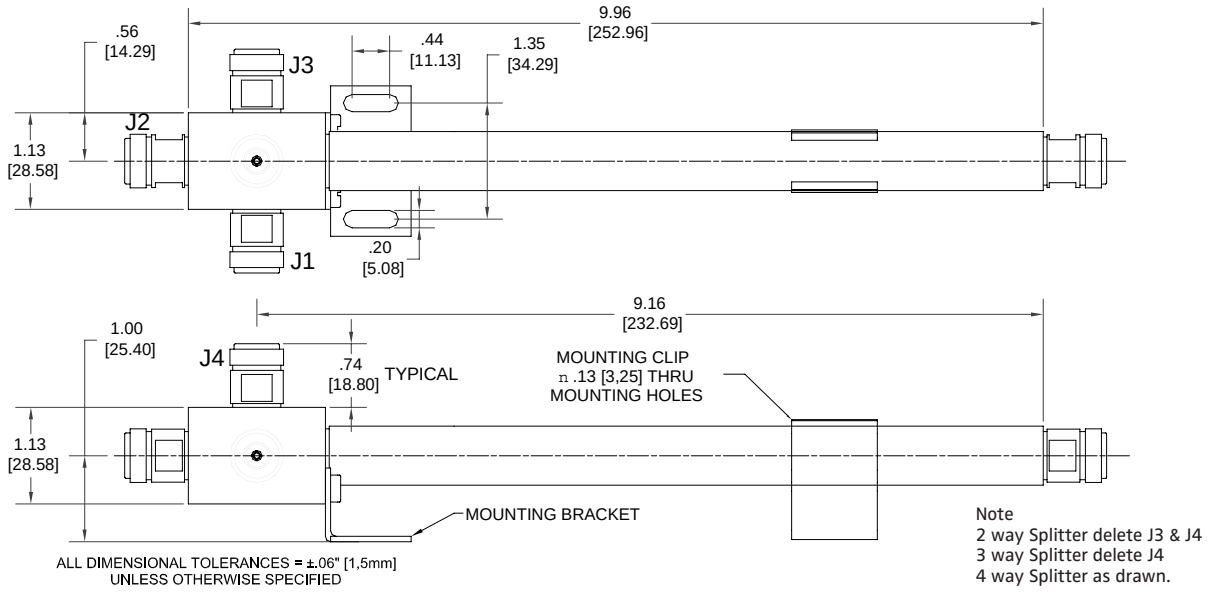
This Microlab series of 2, 3, 4, 5 and 6 way Power Splitters has been designed for Verizon with PIM <-153 dBc. Each splitter evenly splits high power cellular signals with minimal reflections or loss. All joints are moisture sealed to meet the IP67 rating. The design allows attachment to wall using the supplied bracket and clip.

The wide frequency range allows use with multiband antennas and leaky cable systems. With few solder joints and an air dielectric, the loss has been minimized and reliability enhanced. (04/10)

Impedance:	50Ω nominal
Power Rating:	500W avg, 3kW pk.
PIM, Passive IM:	<-153 dBc (2 tones at +43 dBm)
Environment:	IP67, -35°C to +75°C RoHS compliant
Finish: Connectors:	N (f), Triplate
Housing:	Passivated aluminum
Mounting:	Bracket & clip supplied

Model Number	No. of Ways	Frequency Band, MHz	Split Loss	Insertion Loss	Amplitude Balance, typ.	Input VSWR	Power Rating Avg	Power Rating Peak	Weight, nom. lbs.	Weight, nom. (kg)
D2-J12	2	698 - 2700	3 dB	<0.05 dB	0.15dB	<1.15:1	500W	3 kW	0.60	(0.28)
D3-C31	3	698 - 2700	4.8 dB	<0.05 dB	0.25dB	<1.15:1	500W	3 kW	0.65	(0.30)
D4-C09	4	698 - 2700	6 dB	<0.05 dB	0.25dB	<1.25:1	500W	3 kW	0.70	(0.32)
D5-A11	5	698 - 2700	7 dB	<0.05 dB	0.25dB	<1.30:1	500W	3 kW	0.75	(0.34)
D6-A30	6	698 - 2700	7.8 dB	<0.05 dB	0.25dB	<1.30:1	500W	3 kW	0.80	(0.36)

2, 3 & 4 way Outlines

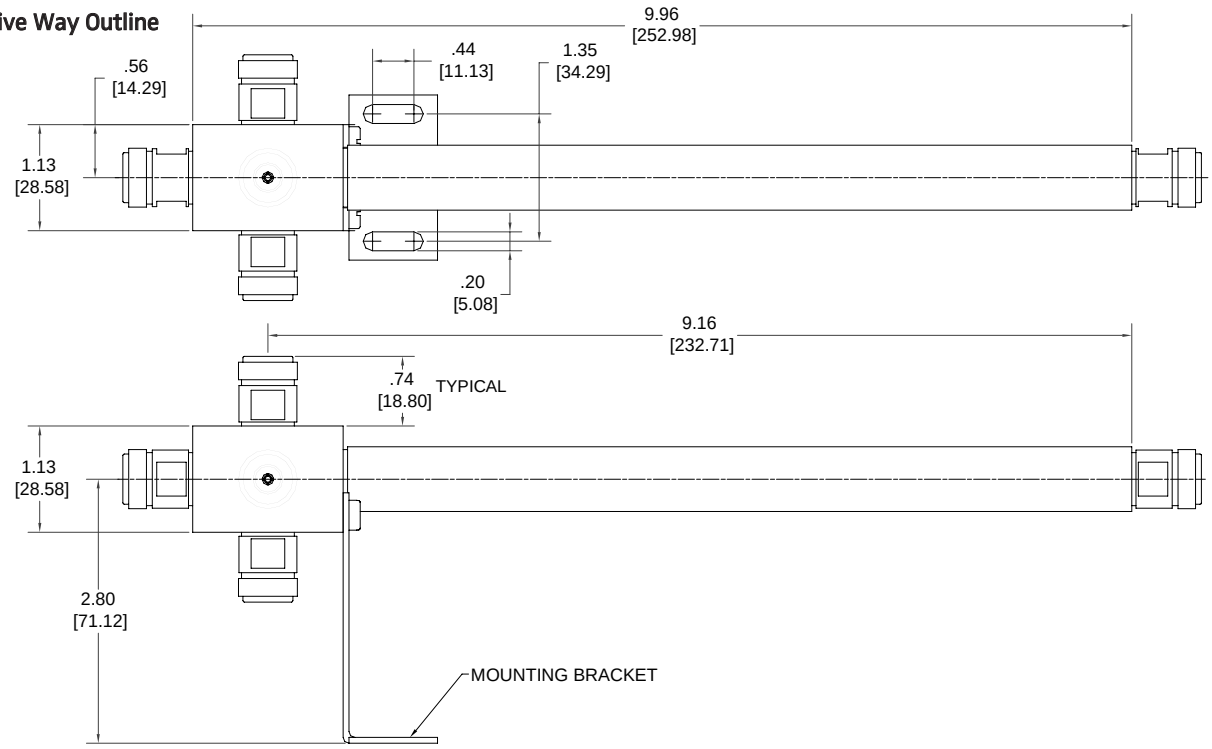


Note
2 way Splitter delete J3 & J4
3 way Splitter delete J4
4 way Splitter as drawn.

Microlab, A Wireless Telecom Group Company, 25 Eastmans Road, Parsippany, NJ 07054
Tel: (973) 386-9696 • sales@microlab.fxr.com • www.microlab.fxr.com • Fax: (973) 386-9191

Q. POWER SPLITTER

Five Way Outline



Six Way Outline