Broadcast Antenna Systems

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Broadcast Antenna Systems

KWBP Channel 32/31, Salem, Oregon
The side-mounted, dual adjacent, TRASAR antenna operates both NTSC & DTV signals simultaneously.

Full Size antenna section undergoing azimuth pattern test in one of two Andrew anechoic chambers dedicated to broadcast products.

The Andrew Broadcast System Planner (ABSP) helps you to configure digital and analog television broadcast systems. It provides printed antenna patterns with tabulated data, data for power analyses, produces electronic files of antenna patterns for propagation studies, and comes pre-loaded with more than 35 popular broadcast transmission lines. Download ABSP from www.andrew.com or ask for our Powertools CD-ROM.

Andrew has been providing broadcast antennas, systems and services for more than 60 years. Broadcasters worldwide have learned that Andrew technology is cost-effective and provides the highest level of performance, quality and reliability.

Full Range of Antennas for DTV and NTSC

High Power Television Broadcast Antennas

- *TRASAR® traveling wave antennas for both UHF and high band VHF applications*
  - *Choice of full radome or slot covered design*
  - *Choice of stacked antenna designs*
- *PANAR™ broadband panel antennas for UHF-TV application*
- *GUIDELINER® waveguide antennas for UHF-TV applications*
- *G-Series emergency and standby antennas for UHF-TV and high-band VHF-TV applications, designed for permanent installation*
- *STACKER™ optimized mounting structure for TRASAR antennas*

Low to Medium Power Television Broadcast Antennas

- *ALP Series II antennas for UHF applications*
- *AL8 Series antennas for UHF translator and low power DTV applications*

MMDS/ITFS Antennas

- *HMD Series trasmit antennas for global wireless cable applications*
- *DATAMASTER™ Series sector antennas for 2-way MMDS applications*

Widest Variety of Broadcast Transmission Lines in the Industry

Rigid Coaxial Transmission Lines

- *MACXLine® rigid line featuring unique bellows inner conductor*
- *WIDELine™ broadband rigid line for multiplexing broadcast applications*
- *DUALine™ rigid line for optimized transmission of multiple channels*

Waveguide Transmission Line

- *GUIDELine® high efficiency waveguide features advanced design for superior efficiency and stability*

Air and Foam-Dielectric Coaxial Cables

- *HELIAX® coaxial cables widely used for broadcast systems, including 5" high power coaxial cable*

Providing System Solutions in the Era of Digital Television

As the Recognized Leader in UHF Antenna Systems and a Pioneer in DTV Technology, Andrew is Uniquely Positioned.

No other supplier can offer the combination of UHF technical expertise, DTV experience, field-tested solutions, and price competitive, proven products and services that Andrew provides to the broadcast industry.

Andrew offers the highest quality antennas, filters, combiners, transmission line products, and RF components/accessories in the business – everything from the transmitter to the beacon with a five or ten-year system warranty.

When You Choose Andrew, You are Assured of Optimum Coverage for Your Market Area

Our broad product line and experienced broadcast personnel promote efficient system design. The number of antenna and transmission line combinations allows you to design a system that provides the best possible market coverage at minimum cost.

Experienced engineers and antenna technicians use state-of-the-art software tools and test equipment. Andrew pioneered and perfected the near-field measurement techniques now employed by all broadcast antenna manufacturers. Our flexibility in design, combined with the use of innovative software and anechoic chamber testing, offers broadcasters custom system solutions - providing optimum coverage for their markets.

Comprehensive Technical Assistance and Support

Our commitment doesn't end when the antenna is shipped. Andrew TRASAR® antennas include a ground check to ensure proper antenna performance after transportation to the transmitter site. Also, if the transmission line includes GLW circular waveguide, a system check is included with the equipment purchased. Additional field services are available on application.

Dedicated to supporting our customers, technical assistance is available to you by calling **1-800-DIAL-4RF**.

The Andrew professional support staff provides a complete line of troubleshooting information, installation and testing procedures, replacement parts, return material support and all other general technical support services.

We also provide:

- *Toll Free Emergency Technical Support 24/7*
- *Toll-Free Fax-on-Demand Document Support*
- *Catalog/Product information on our web site*

Broadcast Antenna Systems

Performance Features of Andrew Broadcast Antennas

Top and Side Mounts Available

Andrew broadcast antennas come in both top and side mounted versions for optimizing tower design and coverage considerations.

Choice of Azimuth and Elevation Patterns for Optimum Market Coverage

A wide variety of standard patterns are offered, as shown on the following pages. In addition, Andrew can customize both horizontal and vertical patterns to ensure optimum signal penetration.

Heavy Null Fill Standard with Andrew Antennas

Heavy null fill is a standard feature with Andrew antennas. This produces maximum signal levels where you need it – in your viewers' home.

Optimized Beamtilt

Substantially increase signal strength by optimizing your antenna beamtilt. Andrew antennas are designed for optimized beamtilt at the radio horizon, increasing the field strength to the majority of viewing areas by as much as 3-8 dB.

Radome Enclosed for Long, Trouble-Free Life

Andrew broadcast antennas feature full radomes or slot covers to ensure reliable performance under all environmental conditions.

Horizontal, Elliptical, or Circular Polarization for Ideal Viewer Reception

Andrew design concepts allow you to tailor your signal to your market conditions. In many urban and suburban areas, horizontal-only polarization reception can be affected by buildings, airplanes, receiving antenna position, or even the weather.

A vertically polarized component can greatly enhance the probability of improved reception. Andrew antennas are available in both horizontally and elliptically polarized versions. If appropriate, the V-Pol azimuth pattern can be shaped differently than the H-Pol pattern.

Elliptical polarization allows you to transmit a vertically polarized signal in addition to your licensed horizontal ERP. Any vertical to horizontal power ratio of one or less can be provided with the appropriate power split designed into the antenna.

Built-In Reliability/Maintainability

- *Factory tests using advanced computer aided techniques confirm specific gain and pattern characteristics.*
- *Direct slotted line measurement of antenna VSWR at the input flange ensures very low reflected power and top quality signal*
- *Four lightning rods project 3 ft above the top plate of the antenna to protect the beacon on all top-mounted antennas*
- *Heavy internal dc ground across the internal feed line protects against lightning damage*
- *Climbing ladders or pegs, included with all top mounted antennas, facilitate inspection and maintenance*
- *A fully illustrated operation and inspection manual is included with every antenna to ensure efficient inspection programs*

Specifications

VSWR, maximum (6 MHz Channel)	
Visual Carrier +0.5 MHz	1.05
Color Subcarrier	1.08
Remainder of Channel	1.10

Deicing. Full radome enclosure.

Antenna Selection. Antennas are selected on the following parameters:

- *Azimuth pattern*
- *Elevation gain*
- *Input power rating 240, 120 or 60 kW nominal*
- *Beam tilt 0.75, 1.0 or 1.25° typical, others available*
- *Horizontal or elliptical polarization*
- *Top or side mount*

Specify channel number and, for elliptically polarized antennas, specify ERP split. Other patterns, gains and beam tilts are available on request. Note that patterns shown are typical free space patterns and will vary depending on channel, structural design criteria and tower mounting configuration.

The Andrew Broadcast Sales Team is prepared to help meet your needs wherever you are located. Call for complete information on **Andrew Broadcast Antenna Products at 1-800-DIAL-4-RF.**

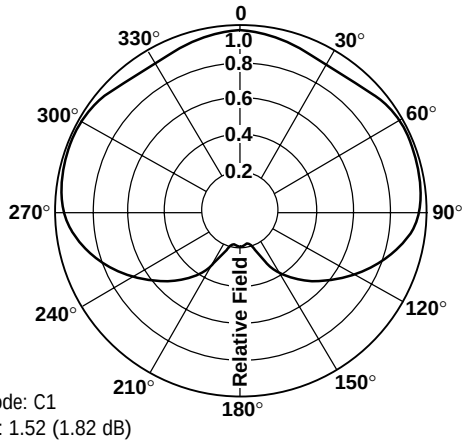
Elevation patterns are shown on page 281.

Typical mechanical characteristics are shown on page 280.

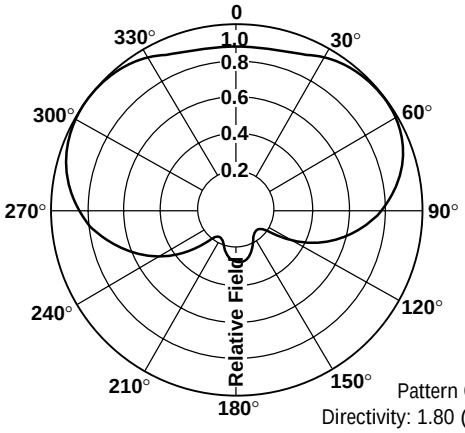
Elliptically polarized TRASAR antenna custom designed with trilobe pattern for WJYS channel 62, Hammond, Indiana.

TRASAR® Antennas
Typical Azimuth Patterns

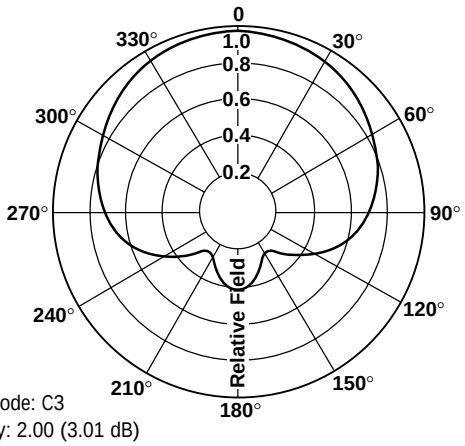
As shown below, a wide variety of Azimuth patterns can be selected or customized for TRASAR® antennas. **Note:** These are typical free space patterns and will vary depending on channel, structural design criteria and tower mounting configuration. For specific requests, call our **Broadcast Systems Department directly at 1-800-DIAL-4-RF.**



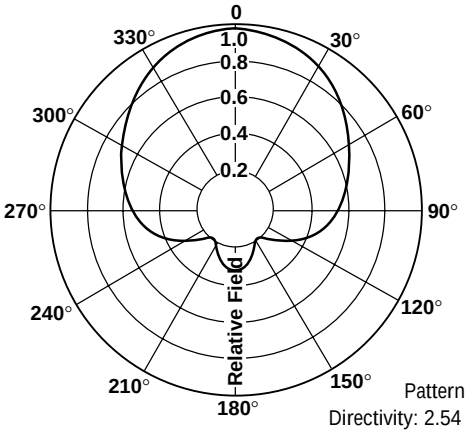
Pattern Code: C1
Directivity: 1.52 (1.82 dB)



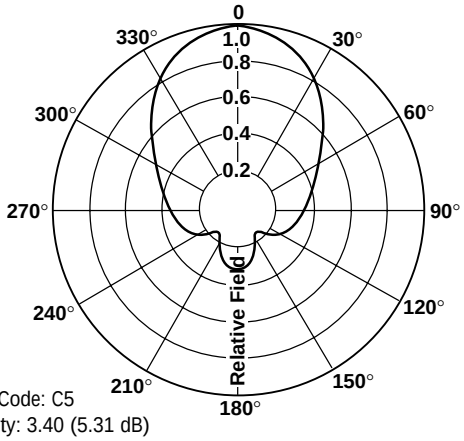
Pattern Code: C2
Directivity: 1.80 (2.55 dB)



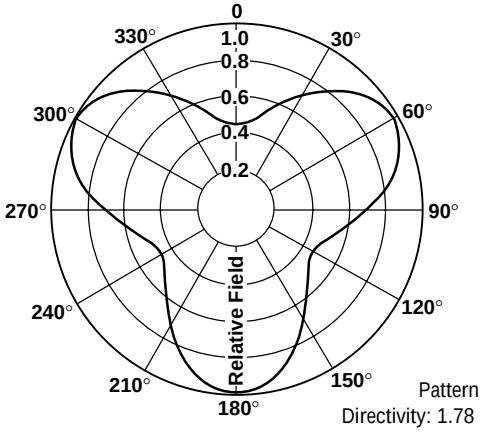
Pattern Code: C3
Directivity: 2.00 (3.01 dB)



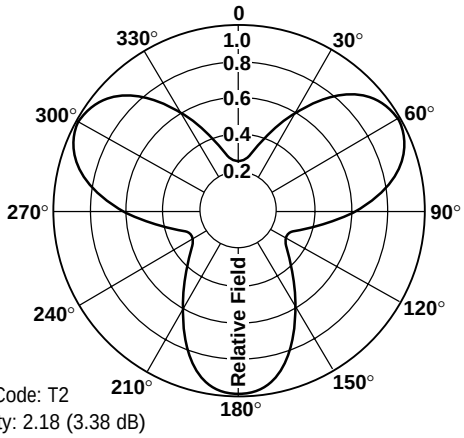
Pattern Code: C4
Directivity: 2.54 (4.05 dB)



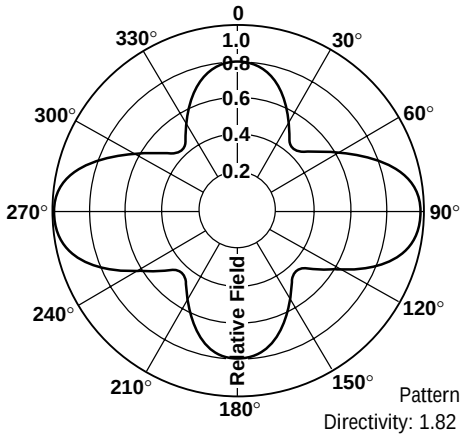
Pattern Code: C5
Directivity: 3.40 (5.31 dB)



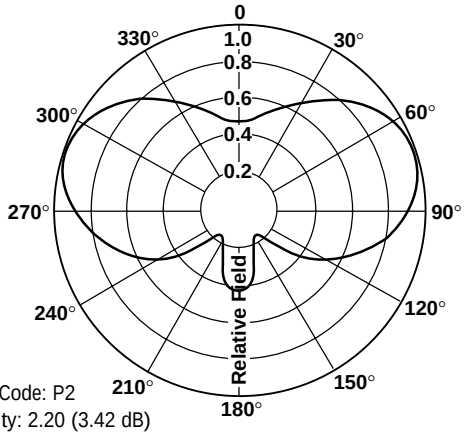
Pattern Code: T1
Directivity: 1.78 (2.50 dB)



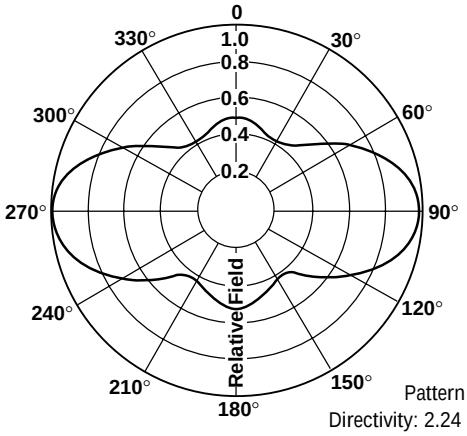
Pattern Code: T2
Directivity: 2.18 (3.38 dB)



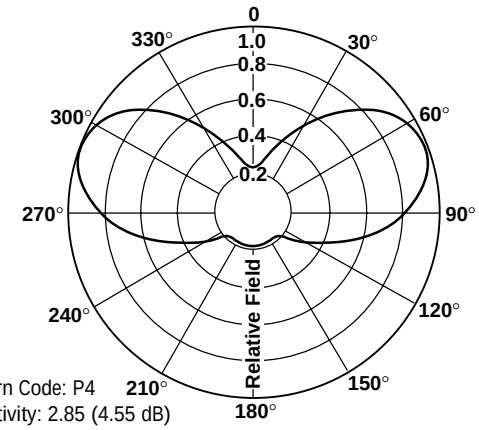
Pattern Code: P1
Directivity: 1.82 (2.83 dB)



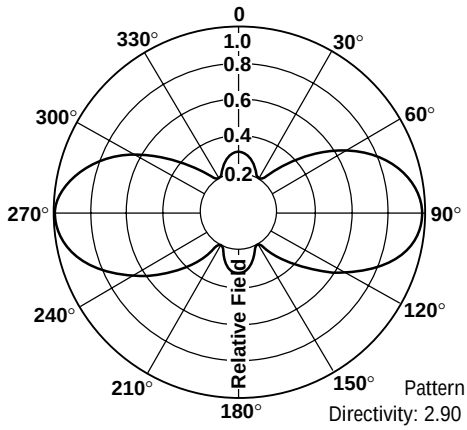
Pattern Code: P2
Directivity: 2.20 (3.42 dB)



Pattern Code: P3
Directivity: 2.24 (3.50 dB)



Pattern Code: P4
Directivity: 2.85 (4.55 dB)

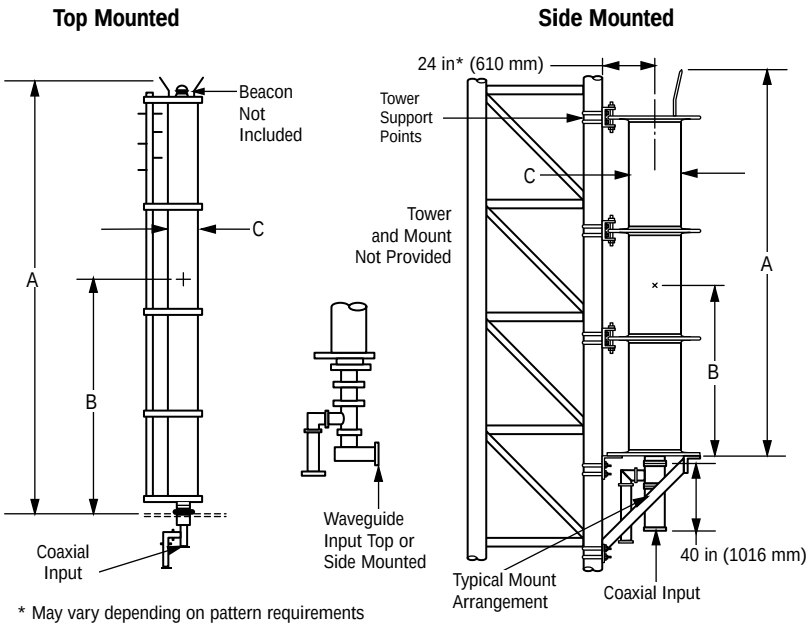


Pattern Code: P5
Directivity: 2.90 (4.62 dB)

TRASAR® Horizontally Polarized Antennas

Typical Mechanical Data

The mechanical data presented below apply to the UHF TRASAR® transmitting antennas described on page 277. Loads are typical for 50 lb/ft^2 (2.4 kPa) for flat surfaces and 33 lb/ft^2 (1.6 kPa) for cylindrical surfaces. For loading per other criteria, contact our **Broadcast Systems Department at 1-800-DIAL-4-RF.**



* May vary depending on pattern requirements

Typical Mechanical Data - TRASAR Horizontally Polarized Antennas

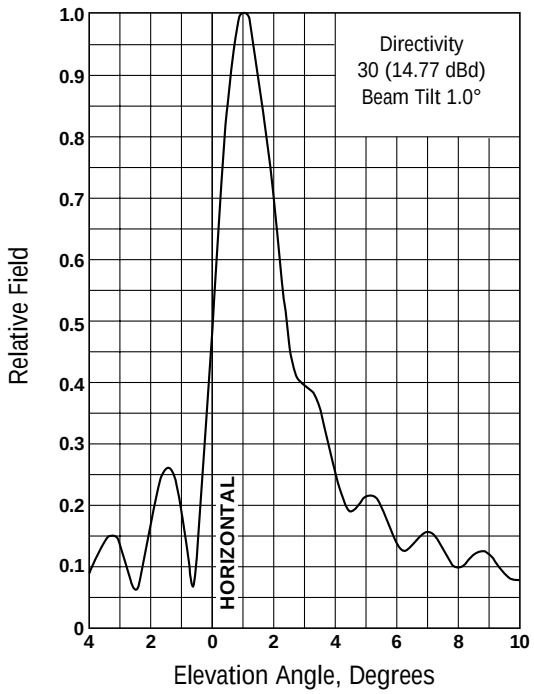
Channel Number	A Antenna Height* ft (m)	B Radiation Center Above Base ft (m)	C Radome Diameter in (mm)	Nominal Antenna Weight lb (kg)	Wind Load Shear** lb (N)	Overturning Moment lb-ft (N•m)
Top Mounted Antenna - Elevation Gain of 30						
14	73.0 (22.3)	35.0 (10.7)	16 (407)	12100 (5500)	4400 (19600)	154000 (209500)
22	66.7 (20.4)	31.9 (9.8)	16 (407)	11000 (5000)	4000 (17800)	127400 (173300)
30	61.5 (18.8)	29.3 (9.0)	16 (407)	10100 (4600)	3700 (16500)	108300 (147300)
38	57.1 (17.5)	27.1 (8.3)	16 (407)	9400 (4300)	3500 (15600)	94700 (128800)
46	53.3 (16.3)	25.2 (7.7)	14 (356)	6300 (2900)	2900 (12900)	73000 (99300)
54	50.1 (15.3)	23.6 (7.2)	14 (356)	5900 (2700)	2800 (12500)	66000 (89800)
62	47.3 (14.5)	22.2 (6.8)	14 (356)	5600 (2600)	2600 (11600)	57600 (78400)
69	45.1 (13.8)	21.1 (6.5)	14 (356)	5300 (2500)	2500 (11200)	52700 (71700)
Top Mounted Antenna - Elevation Gain of 25						
14	62.8 (19.2)	29.9 (9.2)	16 (407)	10300 (4700)	3800 (17000)	113620 (154600)
22	57.4 (17.5)	27.2 (8.3)	16 (407)	9400 (4300)	3500 (15600)	95200 (129500)
30	53.0 (16.2)	25.0 (7.7)	16 (407)	8600 (4000)	3200 (14300)	80000 (108800)
38	49.3 (15.1)	23.2 (7.1)	16 (407)	8000 (3700)	3000 (13400)	69450 (94500)
46	46.1 (14.1)	21.6 (6.6)	14 (356)	5400 (2500)	2600 (11600)	56030 (76300)
54	43.3 (13.2)	20.2 (6.2)	14 (356)	5100 (2400)	2400 (10700)	48360 (65800)
62	40.9 (12.5)	19.0 (5.8)	14 (356)	4800 (2200)	2300 (10300)	43585 (59300)
69	39.0 (11.9)	18.0 (5.5)	14 (356)	4500 (2100)	2200 (9800)	39600 (53900)
Side Mounted Antenna - Elevation Gain of 30						
14	71.7 (21.9)	34.4 (10.5)	18 (458)	2200 (1000)	4200 (18700)	–
22	65.5 (20.0)	31.3 (9.6)	18 (458)	2000 (1000)	3800 (17000)	–
30	60.3 (18.4)	28.7 (8.8)	18 (458)	1800 (900)	3600 (16100)	–
38	55.9 (17.1)	26.5 (8.1)	18 (458)	1700 (800)	3300 (14700)	–
46	52.2 (16.0)	24.6 (7.5)	18 (458)	1600 (800)	3100 (13800)	–
54	49.0 (15.0)	23.0 (7.1)	18 (458)	1500 (700)	2900 (12900)	–
62	46.2 (14.1)	21.6 (6.6)	18 (458)	1400 (700)	2800 (12500)	–
69	44.0 (13.50	20.5 (6.3)	18 (458)	1300 (600)	2700 (12100)	–
Side Mounted Antenna - Elevation Gain of 25						
14	61.5 (18.8)	29.3 (9.0)	18 (458)	1900 (900)	3600 (16100)	–
22	56.2 (17.2)	26.6 (8.2)	18 (458)	1700 (800)	3300 (14700)	–
30	51.8 (15.8)	24.4 (7.5)	18 (458)	1600 (800)	3100 (13800)	–
38	48.1 (14.7)	22.6 (6.9)	18 (458)	1400 (700)	2900 (12900)	–
46	44.9 (13.7)	21.0 (6.4)	18 (458)	1300 (600)	2700 (12100)	–
54	42.2 (12.9)	19.6 (6.0)	18 (458)	1300 (600)	2600 (11600)	–
62	39.8 (12.2)	18.4 (5.7)	18 (458)	1200 (600)	2400 (10700)	–
69	37.9 (11.6)	17.5 (5.4)	18 (458)	1100 (500)	2300 (10300)	–

* Typical height including 3-foot long (1 m) lightning rods.

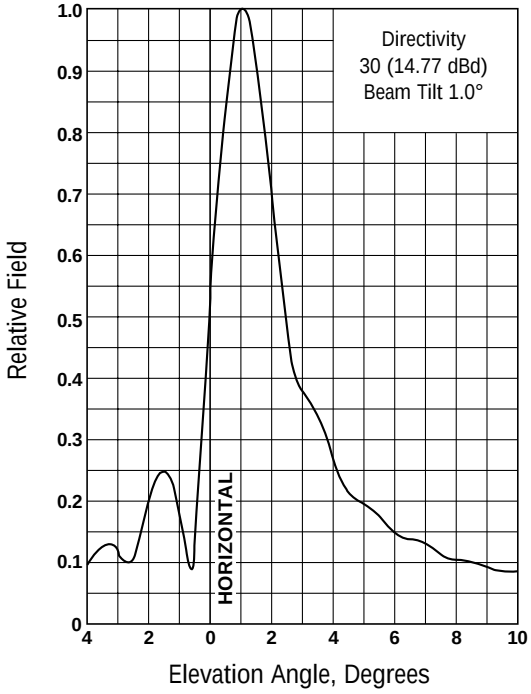
** 50 lb/ft^2 (2.4 kPa) for flat surfaces and 33 lb/ft^2 (1.6 kPa) for cylindrical surfaces.

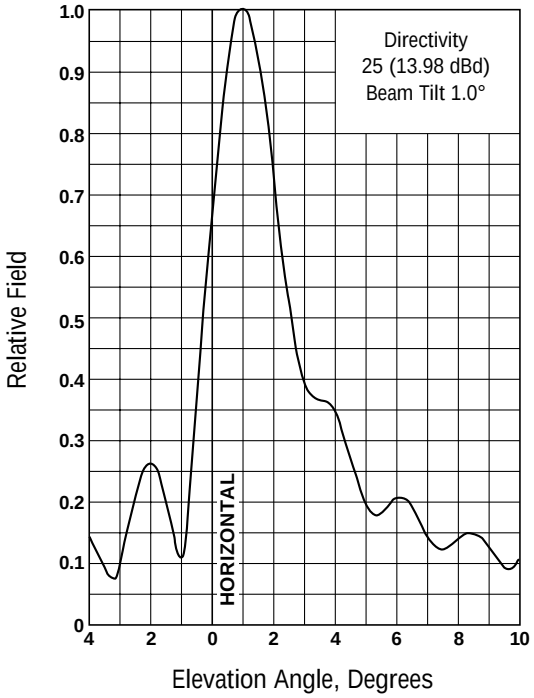
The patterns on this page apply to the TRASAR® and GUIDELINER® UHF-TV transmitting antennas described on pages 277 and 285. The patterns are typical; other Directivities, Beam tilts and Null Fills are available.

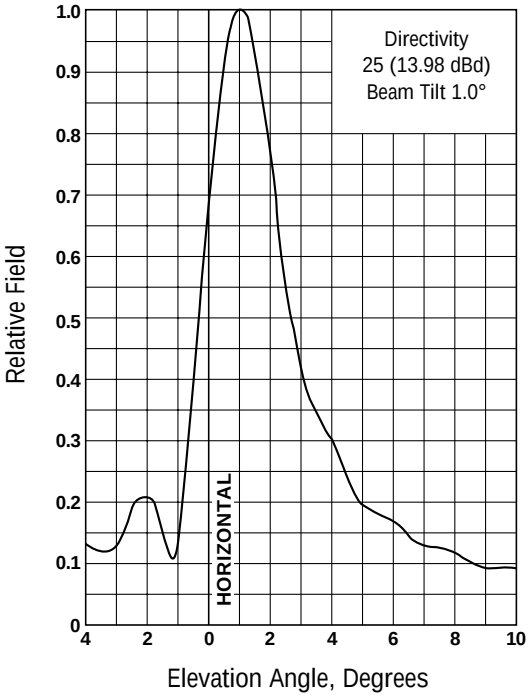
Standard Elevation Patterns



Smooth Elevation Patterns







Products Discontinued

Products Discontinued

Products Discontinued

GUIDELINER® UHF Waveguide Antennas

GUIDELINER UHF television transmitting antennas are offered for U.S. FCC Channels 14 through 69 and CCIR Bands IV and V.

Specifications

VSWR, maximum, 6 MHz Channel	
Visual Carrier +0.5 MHz	1.05
Color Subcarrier	1.08
Remainder of Channel	1.10

Power Rating. 240 kW, nominal.

Deicing. Full radome enclosure.

Antenna Selection. Antennas are selected on the basis of:

- *Azimuth pattern*
- *Elevation gain*
- *Beam tilt 0.75, 1.0 or 1.25° typical, others available*
- *Horizontal or elliptical polarization, See Table*
- *Top or side mount*

GUIDELINER antenna for WTIU channel 30 undergoing inspection.

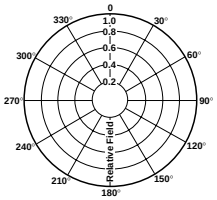
Type numbers are listed in the table for top mounted omnidirectional antennas. Specify channel number and, for elliptically polarized antennas, specify ERP split. Other patterns, gains and beam tilts are available.

Typical elevation patterns are shown on page 281.

Weights, dimensions and wind loading data are available upon request.

Call our Broadcast Systems Department at 1-800-DIAL-4-RF.

Top Mounted Omnidirectional Antennas

Azimuth Pattern Relative Field	Beam tilt Degrees	Pol.	25 Elevation Gain Antennas† Type No.	25 Elevation Gain Antennas† Peak Power Gain	15 Elevation Gain Antennas† Type No.	15 Elevation Gain Antennas† Peak Power Gain
Omnidirectional ±1 dB (Top Mount Only)						
	0.75	Horiz.	**AGW25H3-HTO1- (*)**	25.0 (13.98 dBd)	**AGW15H3-HTO1- (*)**	15.0 (11.76 dBd)
	0.75	Ellipt.	**AGW25H3-ETO1- (*)**	**	**AGW15H3-ETO1- (*)**	**
	1.00	Horiz.	**AGW25H4-HTO1- (*)**	25.0 (13.98 dBd)	**AGW15H4-HTO1- (*)**	15.0 (11.76 dBd)
	1.00	Ellipt.	**AGW25H4-ETO1- (*)**	**	**AGW15H4-ETO1- (*)**	**
	1.25	Horiz.	**AGW25H5-HTO1- (*)**	25.0 (13.98 dBd)	**AGW15H5-HTO1- (*)**	15.0(11.76 dBd)
	1.25	Ellipt.	**AGW25H5-ETO1- (*)**	**	**AGW15H5-ETO1- (*)**	**
Directivity 1.00 (0.00 dB)						

* Specify UHF-TV channel number.

** Horizontal and vertical gains depend on power split. Specify power split.

† Elevation patterns are shown on page 281.

TRASAR® VHF-TV Transmitting Antennas

Specifications

Channel Range:	7-13, one 6 MHz channel (174-216 MHz)
VSWR:	1.05 Visual +0.5 MHz 1.08 Color Sub-Carrier 1.10 Remainder of Channel
Deicing:	Fiberglass Radome Enclosed
Input Power:	100 kW, Peak Visual +20% Aural
Input Type:	Specify 50 or 75 ohm 6-1/8" EIA

Antenna Selection

Antennas are selected on the basis of:

- *Azimuth Pattern*
- *Elevation gain 6, 9, 12 or 16 are typical*
- *Beam tilt 0.75, 1.0 or 1.5° are typical*
- *Horizontal, elliptical or circular polarization*
- *Top or side mount*

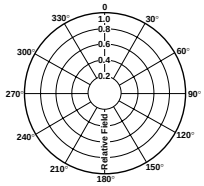
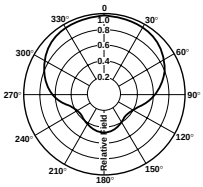
Standard Type Numbers are listed in the table. Specify channel number and, for elliptically/circularly polarized antennas, the desired power split. Other patterns, gains and beam tilts are available on request.

Azimuth Patterns

As shown in the table, omnidirectional and skull patterns are standard. Cardioid patterns are also available.

Note that these are typical free space patterns and may vary slightly depending on channel, structural design criteria and tower mounting configuration.

Top-Mounted Antennas

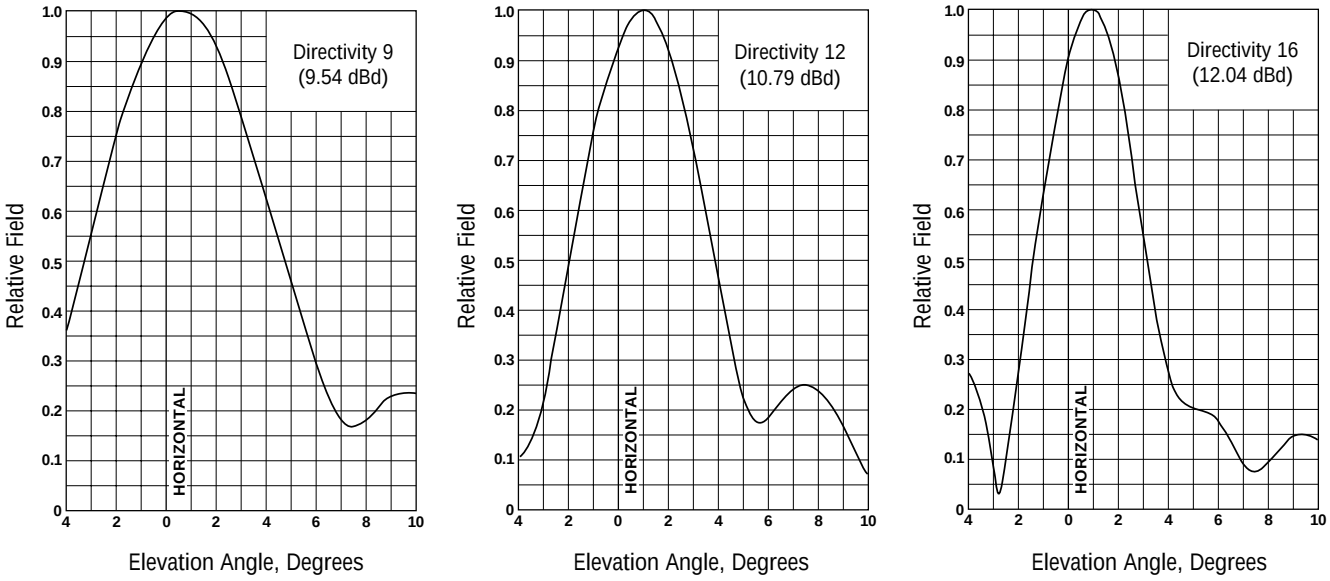
Azimuth Pattern Relative Field	Pol.	Peak Power Gain	Standard Type No.
Omnidirectional ±1 dB			
	Horiz.	6.00 (7.78 dBd)	**ATW6V3-HTO- (*)**
	Ellipt.	**	**ATW6V3-ETO- (*)**
	Horiz.	9.00 (9.54 dBd)	**ATW9V3-HTO- (*)**
	Ellipt.	**	**ATW9V3-ETO- (*)**
	Horiz.	12.00 (10.79 dBd)	**ATW12V3-HTO- (*)**
	Ellipt.	**	**ATW12V3-ETO- (*)**
	Horiz.	16.00 (12.04 dBd)	**ATW16V3-HTO- (*)**
	Ellipt.	**	**ATW16V3-ETO- (*)**
Directivity: 1.00 (0.00 dB)			
Skull			
	Horiz.	11.40 (10.57 dBd)	**ATW6V3-HTS-(*)**
	Ellipt.	**	**ATW6V3-ETS-(*)**
	Horiz.	17.10 (12.33 dBd)	**ATW9V3-HTS-(*)**
	Ellipt.	**	**ATW9V3-ETS-(*)**
	Horiz.	22.80 (13.58 dBd)	**ATW12V3-HTS-(*)**
	Ellipt.	**	**ATW12V3-ETS-(*)**
	Horiz.	30.40 (14.83 dBd)	**ATW16V3-HTS-(*)**
	Ellipt.	**	**ATW16V3-ETS-(*)**
Directivity: 1.90 (2.79 dB)			

* Specify VHF-TV channel number.

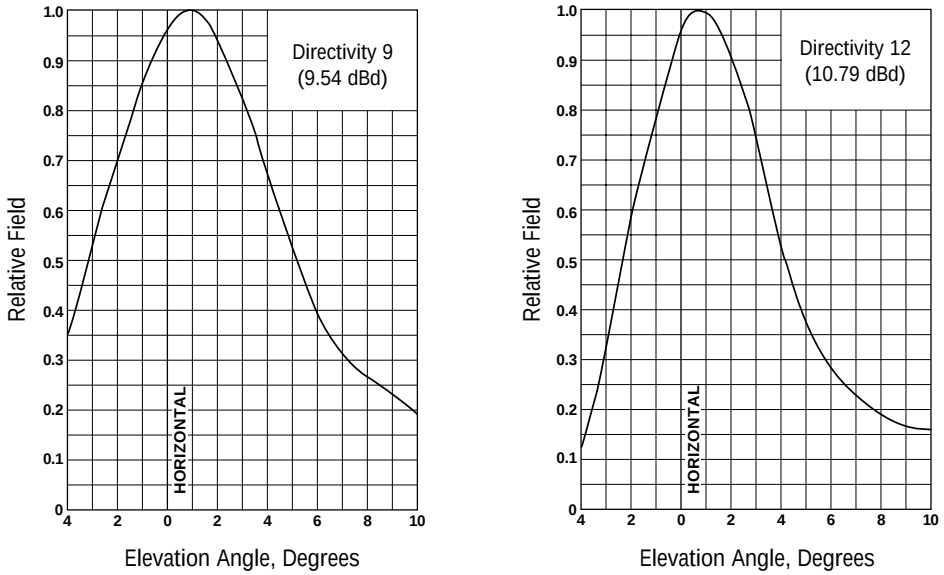
** Horizontal and vertical gains depend on power split. Specify power split.

Shown below are typical elevation patterns for 9, 12 and 16 gain V-series antennas with 0.75° beam tilt.

Standard Elevation Patterns



Smooth Elevation Patterns

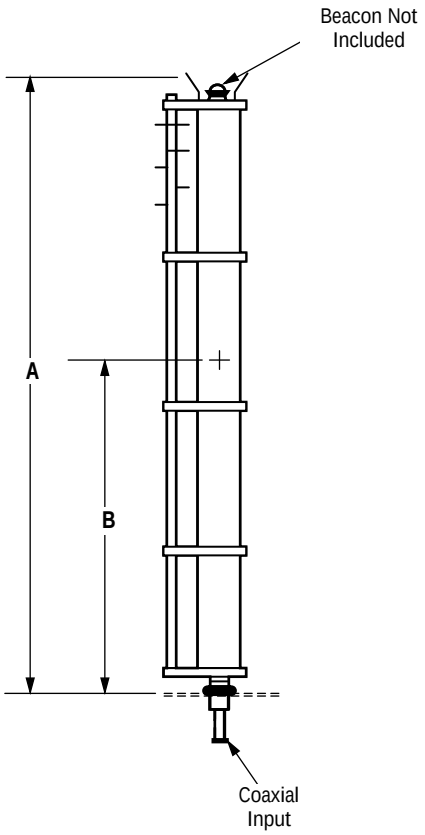


TRASAR® VHF-TV Antennas
Mechanical Data

TRASAR® V-Series antenna KNTV for channel 11 features pressurizable radome to withstand salt air coastal environment.

Mechanical data presented on this page are typical and may vary depending on specific channel, pattern required and structural design criteria. For further information, call our **Broadcast Systems Department at 1-800-DIAL-4-RF.**

Top Mounted



Typical Mechanical Data for Horizontally Polarized Antennas

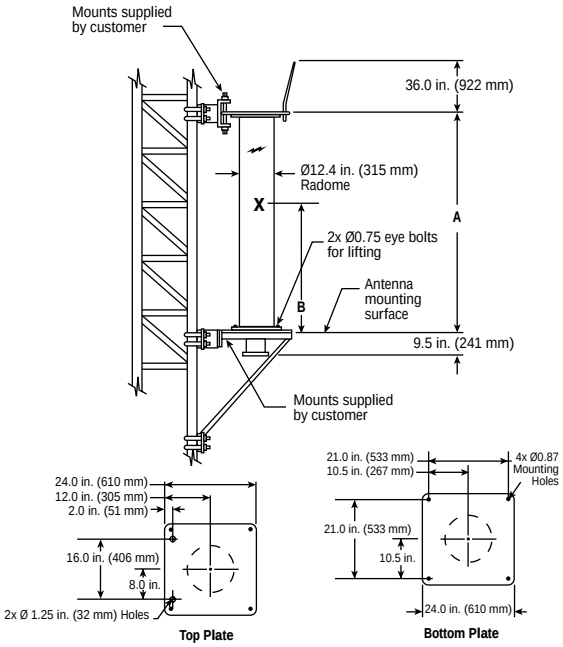
Antenna Series	Channel No.	A Antenna Height* ft (m)	B Radiation Center Above Base ft (m)	Nominal Weight lb (kg)	Wind Load** (Shear) lb (N)	Overturning Moment** lb-ft (N-m)
ATW6V3	7	41.11 (12.53)	19.05 (5.81)	5600 (2600)	2700 (12000)	56400 (76400)
	13	34.67 (10.57)	15.83 (4.82)	4800 (2200)	2300 (10000)	39600 (53700)
ATW9V3	7	57.45 (17.51)	27.22 (8.30)	7600 (3200)	3800 (16900)	112200 (152100)
	13	48.25 (14.71)	22.62 (6.89)	6500 (3000)	3200 (14100)	78400 (106300)
ATW12V3	7	73.79 (22.49)	35.35 (10.79)	9600 (4400)	4900 (21700)	187500 (254100)
	13	61.82 (18.84)	29.41 (8.96)	8100 (3700)	4100 (18200)	130400 (176800)
ATW16V3	7	95.57 (29.13)	46.28 (14.11)	19100 (8700)	6400 (28300)	316500 (429100)
	13	79.93 (24.36)	38.46 (11.72)	12200 (5500)	5300 (23600)	220100 (298400)

* Total height including 3 ft (1 m) lightning rods.

** Loads and weights are typical for wind pressure of 50 lb/ft^2 (2.4 kPa) for flat surfaces and 33 lb/ft^2 (1.6 kPa) for cylindrical surfaces. Other design criteria are available.

Andrew offers a line of lower gain (G-Series) TRASAR antennas for standby and emergency service. The antennas feature a full 60 kW power handling capability and provide excellent assurance against revenue losses in the event of catastrophic main antenna failure.

Antenna Dimensions



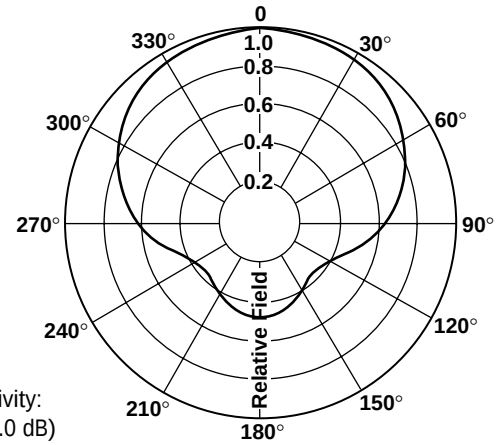
Electrical and Mechanical Characteristics

Type Number	ATW2G1(†)-HSS-(*)	ATW8G4(†)-HSS-(*)	ATW16G4(†)-HSS-(*)	ATW24G4(†)-HSS-(*)
Number of Bays	2	8	16	24
Peak Power Gain (dBd)	4 (6.02)	16 (12.04)	32 (15.05)	48 (16.8)
Standard Beam tilt, degrees	0	1.0	1.0	1.0
Input Power, kW (dBk), Peak Visual +20% Aural: 60 kW Nominal				
Antenna Height, Less Lightning Rods, ft (m) - Dimen. A				
Channel 14	5.1 (1.6)	17.6 (5.4)	33.7 (10.3)	50.0 (15.2)
Channel 69	5.1 (1.6)	11.5 (3.5)	21.0 (6.4)	30.0 (9.1)
Radiation Center Above Base, ft (m) - Dimen. B				
Channel 14	2.5 (0.8)	8.8 (2.7)	16.9 (5.1)	25.0 (7.6)
Channel 69	2.5 (0.8)	5.7 (1.7)	10.5 (3.2)	15.0 (4.5)
Antenna Weight, lb (kg)				
Channel 14	300 (140)	500 (230)	800 (370)	1200 (544)
Channel 69	300 (140)	400 (190)	600 (280)	900 (408)
Wind Load (Shear), lb (N)**				
Channel 14	200 (890)	700 (3200)	1300 (5800)	2000 (9000)
Channel 69	200 (890)	500 (2300)	800 (3600)	1200 (5400)

* Specify channel number. ** Loads are typical for 50 lb/ft^2 (2.4 kPa) for flat surfaces and 33 lb/ft^2 (1.6 kPa) for cylindrical surfaces.
† Specify 50 (50 ohm input) or 75 (75 ohm input).

TRASAR® Emergency and Standby Antennas

Azimuth Pattern - Skull



Directivity:
2.0 (3.0 dB)

High Reliability and Dependable Service

The antennas are fully radome enclosed for maximum environmental protection. Lightning rods are standard.

The skull-shaped azimuth pattern provides coverage appropriate for nearly all emergency situations. The broad elevation pattern ensures a good signal throughout the market area.

Built for Permanent Installation

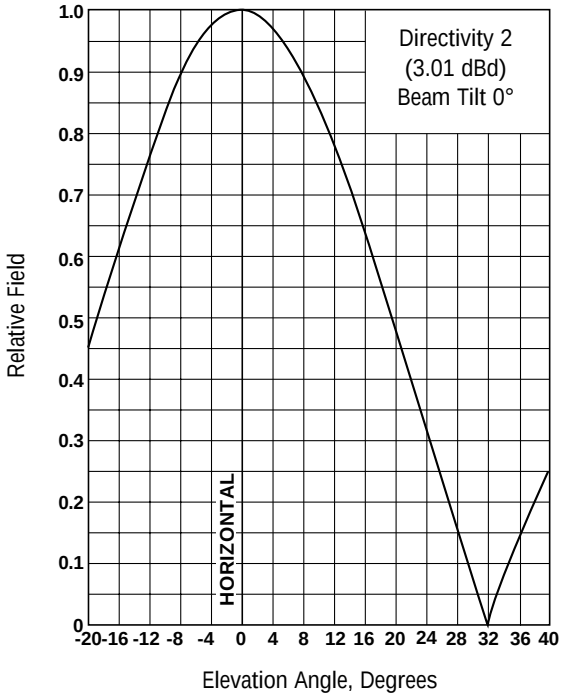
G-Series antennas can be permanently mounted to the tower for use during emergencies or during routine maintenance of the main antenna system. They are designed and manufactured to the same high standards as the high gain TRASAR antennas featured on page 277.

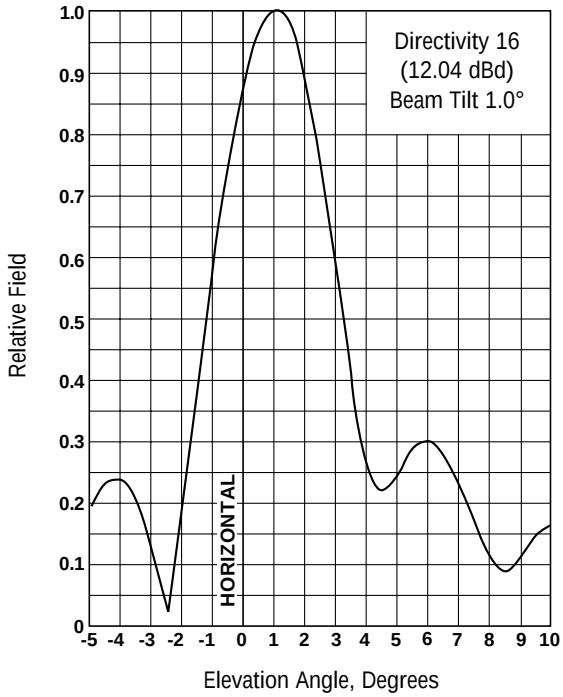
Input is 6-1/8" EIA, 50 or 75 ohm. Specify in Type Number per table on page 289.

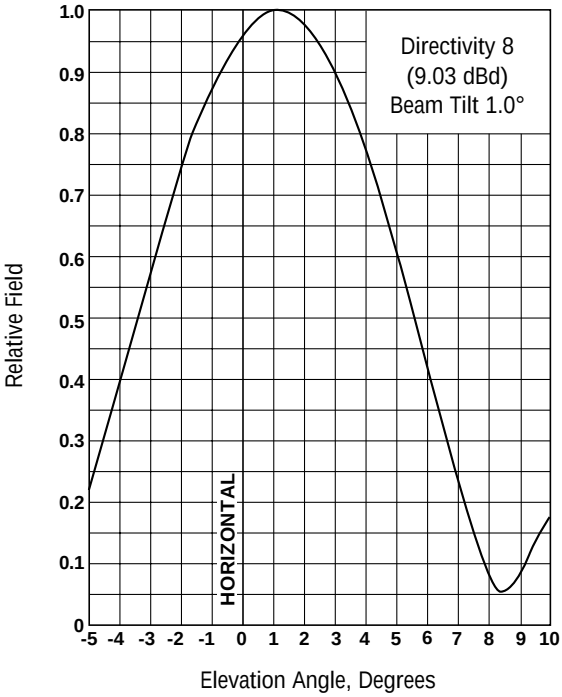
VSWR is maximum of 1.05 at the visual carrier and 1.10 across the channel.

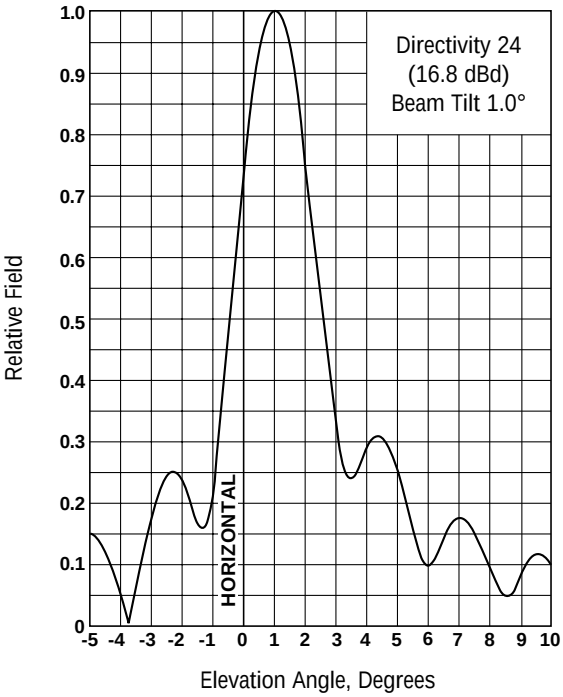
24 Hour emergency service available.

In the U.S.A., Type ATW2G antenna can normally be provided within 24 hours.


Directivity 2
(3.01 dBd)
Beam Tilt 0°
HORIZONTAL
Relative Field
Elevation Angle, Degrees
1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0
-20 -16 -12 -8 -4 0 4 8 12 16 20 24 28 32 36 40


Directivity 16
(12.04 dBd)
Beam Tilt 1.0°
HORIZONTAL
Relative Field
Elevation Angle, Degrees
1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0
-5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10


Directivity 8
(9.03 dBd)
Beam Tilt 1.0°
HORIZONTAL
Relative Field
Elevation Angle, Degrees
1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0
-5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10


Directivity 24
(16.8 dBd)
Beam Tilt 1.0°
HORIZONTAL
Relative Field
Elevation Angle, Degrees
1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0
-5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10

STACKER™ Optimized Antenna Structure
for Television Broadcast Applications

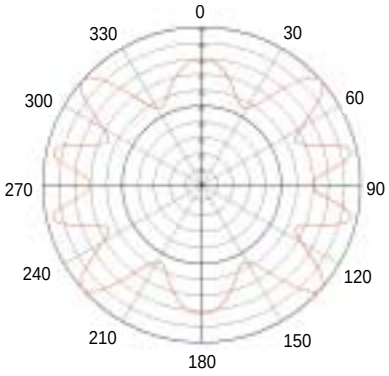
Now Andrew offers a unique solution (patent pending) to the problem of diminishing tower top real estate. The STACKER offers high antenna density without the tradeoffs of in-line stack designs or the expense of a Candelabra or T-Bar.

The "secret" to STACKER's success is the careful integration of the lower antenna(s) into the support structure. Using advanced computer modeling tools, Andrew engineers optimize the structure mechanically without compromising the electrical performance of each antenna.

Service access to each antenna is preserved, as there is no mechanical interconnection between antennas. In fact, the STACKER design is so flexible that any antenna may be replaced while the structure remains on the tower and other stations remain on the air.

- *Maximize antenna density at the tower top*
- *Independent operation, service & replacement of each antenna*
- *Superior azimuth pattern performance*
- *Lowest wind load per antenna*
- *Avoid the tradeoffs of other stack designs*
- *Performance of a Candelabra without the price*

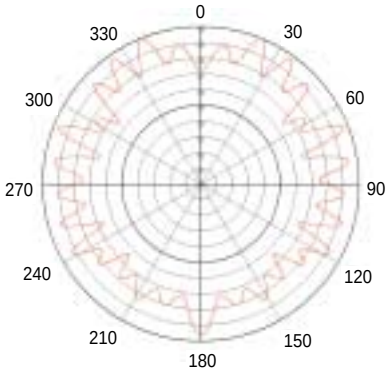
Typical Azimuth Patterns



Lower Antenna of In-line Stack (External 6" Rigid Coax for Top Antenna)

The pattern above shows one of the shortcomings of an in-line stack. If the transmission line for the upper antenna is routed up the outside of the lower antenna, it can impact the azimuth pattern.

If the transmission line for the upper antenna is routed through the lower antenna, power handling and pattern control are compromised. This also complicates the mechanical design (and increases the cost) of the lower antenna.



Lower Antenna(s) of STACKER

Every element of the STACKER mechanical design is chosen to minimize scattering and re-radiation. Transmission line for the upper antenna is routed behind the non-radiating leg – effectively disappearing from the view of the lower antenna(s).

ALP Series II Antennas

New Andrew ALP Series II antennas deliver the versatility, power, and reliability that are the keys to success in today's competitive broadcast marketplace.

For full-power stations transitioning to DTV, ALP Series II antennas offer field-proven solutions. Broadcasters with medium power requirements can benefit from this antenna's lightweight, low windloads, and easy installation which provide reductions in installation time and costs.

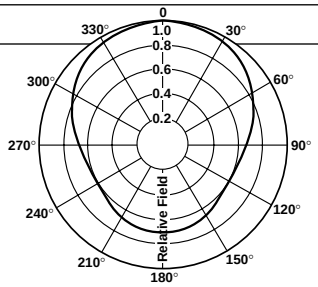
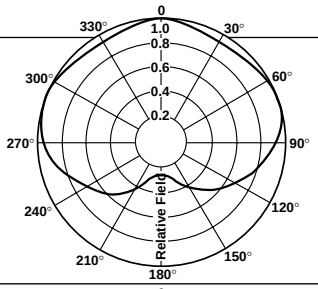
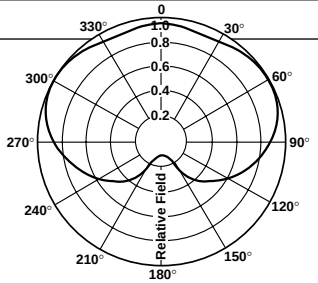
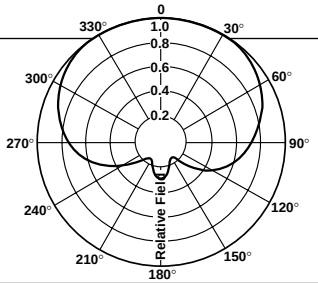
For Low Power Television (LPTV) stations the new, higher power handling capabilities of the ALP Series II UHF antennas make them the ideal choice for the higher ERPs now allowed for LPTV stations and translator facilities. The ALP Series II antennas offer the quality and performance needed to improve coverage and maintain competitiveness in today's broadcast marketplace.

- *Available for immediate implementation of DTV channels*
- *All CCIR bands IV/V channels available*
- *Lightweight/low wind load*
  - *Easy to install with less expense*
  - *Easier to lease tower space*
- *Radome enclosed for environmental protection*
  - *Long Life*
  - *Low maintenance*
  - *Reliable*
- *Power ratings up to 28 kW (peak) available*
- *Customized patterns*
  - *Optimize coverage for your market area*
- *Wide selection of "off the shelf" patterns*
  - *Simplified application process*
- *Patterns measured at factory*
  - *Reliable performance in the field*
  - *Superior coverage*
- *Special designs available*
  - *Circular polarization (low and medium power)*
  - *Broadband versions available*

ALP Series II Antennas

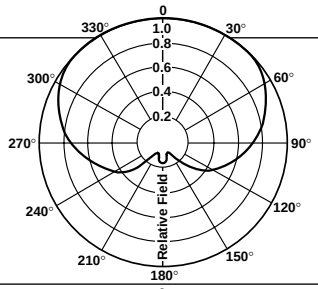
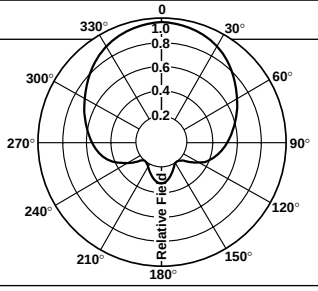
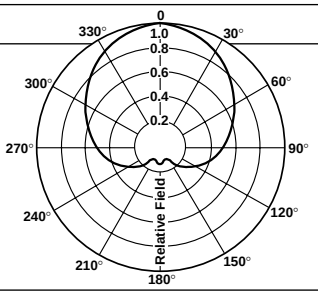
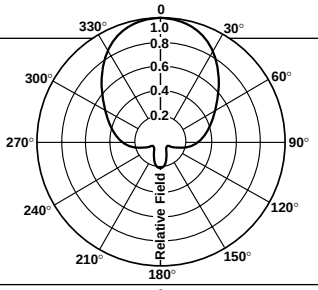
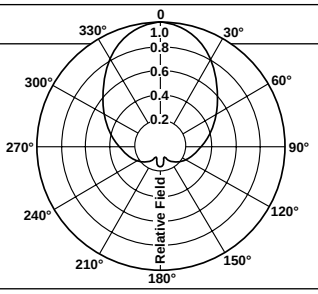
Azimuth Patterns

UHF Low and Medium Power Antenna Systems

Number of Bays	Antenna Type Number	Power Gain (dBd)		
Omnioid™ (Omnidirectional)				
4	ALP4†1-HSOC- (*)	7.79 (8.91)		Directivity 1.70 (2.30 dB) Pattern: OC
8	ALP8†1-HSOC- (*)	15.39 (11.87)		
12	ALP12†2-HSOC- (*)	21.49 (13.32)		
16	ALP16†2-HSOC- (*)	28.20 (14.50)		
24	ALP24†3-HSOC- (*)	42.86 (16.32)		
32	ALP32†3-HSOC- (*)	54.28 (17.35)		
Wide Cardioid				
4	ALP4†1-HSW- (*)	7.14 (8.54)		Directivity 1.56 (1.93 dB) Pattern: W
8	ALP8†1-HSW- (*)	14.12 (11.50		
12	ALP12†2-HSW- (*)	19.72 (12.95)		
16	ALP16†2-HSW- (*)	25.88 (14.13)		
24	ALP24†3-HSW- (*)	39.33 (15.95)		
32	ALP32†3-HSW- (*)	49.81 (16.97)		
Wide Cardioid - Reduced Rear (H-pol only)				
4	ALP4†1-HSWR- (*)	7.74 (8.89)		Directivity 1.69 (2.28 dB) Pattern: WR
8	ALP8†1-HSWR- (*)	15.29 (11.85)		
12	ALP12†2-HSWR- (*)	21.36 (13.30)		
16	ALP16†2-HSWR- (*)	28.04 (14.48)		
24	ALP24†3-HSWR- (*)	42.60 (16.30)		
32	ALP32†3-HSWR- (*)	53.96 (17.32)		
Extended Cardioid				
4	ALP4†1-HSE- (*)	8.52 (9.30)		Directivity 1.86 (2.70 dB) Pattern: E
8	ALP8†1-HSE- (*)	16.83 (12.26)		
12	ALP12†2-HSE- (*)	23.51 (13.71)		
16	ALP16†2-HSE- (*)	30.86 (14.89)		
24	ALP24†3-HSE- (*)	46.89 (16.71)		
32	ALP32†3-HSE- (*)	59.39 (17.74)		

† Insert "L" for low power or "M" for medium power.
* Insert channel number (14 to 69).
Note: C-Pol antenna azimuth patterns only available in E, M, N, OC, P, and W.

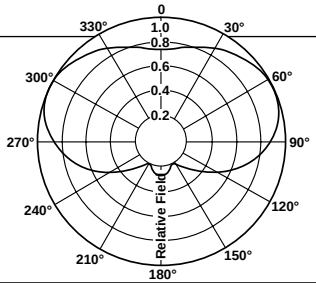
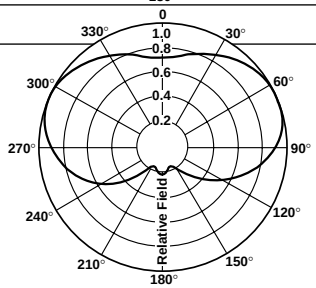
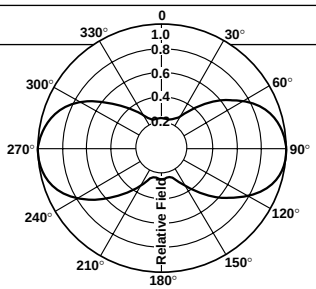
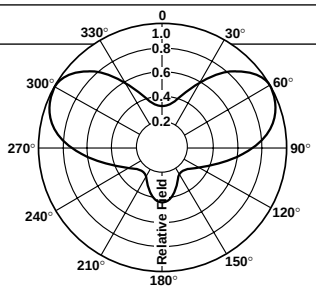
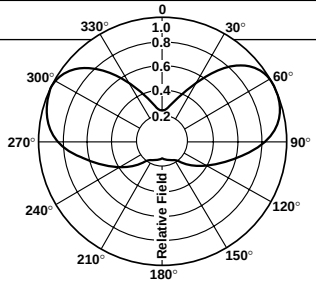
UHF Low and Medium Power Antenna Systems

Number of Bays	Antenna Type Number	Power Gain (dBd)		
Extended Cardioid - Reduced Rear (H-pol only)				
4	ALP4†1-HSER- (*)	8.84 (9.46)		Directivity 1.93 (2.86 dB)
8	ALP8†1-HSER- (*)	17.47 (12.42)		Pattern: ER
12	ALP12†2-HSER- (*)	24.40 (13.87)		
16	ALP16†2-HSER- (*)	32.02 (15.05)		
24	ALP24†3-HSER- (*)	48.66 (16.87)		
32	ALP32†3-HSER- (*)	61.62 (17.90)		
Medium Cardioid				
4	ALP4†1-HSM- (*)	11.63 (10.66)		Directivity 2.54 (4.05 dB)
8	ALP8†1-HSM- (*)	22.99 (13.61)		Pattern: M
12	ALP12†2-HSM- (*)	32.11 (15.07)		
16	ALP16†2-HSM- (*)	42.14 (16.25)		
24	ALP24†3-HSM- (*)	64.03 (18.06)		
32	ALP32†3-HSM- (*)	81.10 (19.09)		
Medium Cardioid - Reduced Rear (H-pol only)				
4	ALP4†1-HSMR- (*)	12.92 (11.11)		Directivity 2.82 (4.50 dB)
8	ALP8†1-HSMR- (*)	25.52 (14.07)		Pattern: MR
12	ALP12†2-HSMR- (*)	35.64 (15.52)		
16	ALP16†2-HSMR- (*)	46.78 (16.70)		
24	ALP24†3-HSMR- (*)	71.09 (18.52)		
32	ALP32†3-HSMR- (*)	90.04 (19.54)		
Narrow Cardioid				
4	ALP4†1-HSN- (*)	17.27 (12.37)		Directivity 3.77 (5.76 dB)
8	ALP8†1-HSN- (*)	34.12 (15.33)		Pattern: N
12	ALP12†2-HSN- (*)	47.65 (16.78)		
16	ALP16†2-HSN- (*)	62.54 (17.96)		
24	ALP24†3-HSN- (*)	95.04 (19.78)		
32	ALP32†3-HSN- (*)	120.38 (20.81)		
Narrow Cardioid - Reduced Rear (H-pol only)				
4	ALP4†1-HSNR- (*)	17.40 (12.41)		Directivity 3.80 (5.80 dB)
8	ALP8†1-HSNR- (*)	34.39 (15.36)		Pattern: NR
12	ALP12†2-HSNR- (*)	48.03 (16.82)		
16	ALP16†2-HSNR- (*)	63.04 (18.00)		
24	ALP24†3-HSNR- (*)	95.80 (19.81)		
32	ALP32†3-HSNR- (*)	121.33 (20.84)		

† Insert "L" for low power or "M" for medium power.
* Insert channel number (14 to 69)
Note: C-Pol antanna azimuth patterns only available in E, M, N, OC, P, and W.

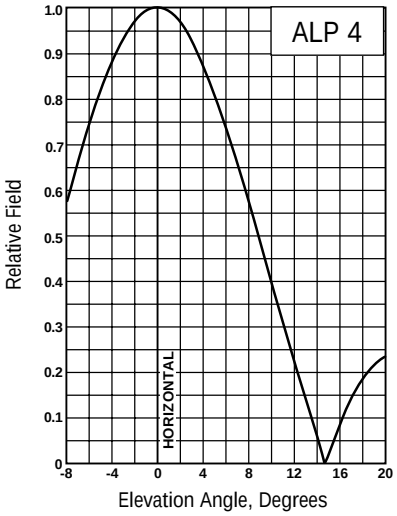
ALP Series II Antennas
Azimuth Patterns

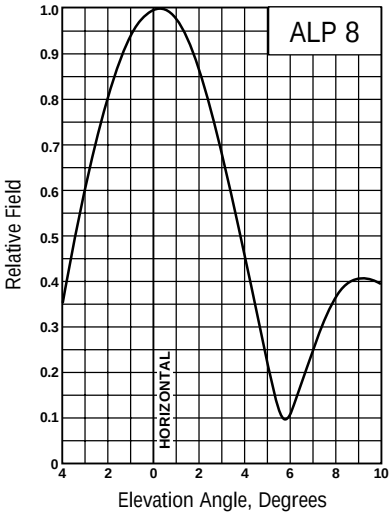
UHF Low and Medium Power Antenna Systems

Number of Bays	Antenna Type Number	Power Gain (dBd)		
Peanut				
4	ALP4†1-HSP- (*)	8.61 (9.35)		Directivity 1.88 (2.74 dB)
8	ALP8†1-HSP- (*)	17.01 (12.31)		Pattern: P
12	ALP12†2-HSP- (*)	23.76 (13.76)		
16	ALP16†2-HSP- (*)	31.19 (14.94)		
24	ALP24†3-HSP- (*)	47.39 (16.76)		
32	ALP32†3-HSP- (*)	60.03 (17.78)		
Peanut - Reduced Rear (H-pol only)				
4	ALP4†1-HSPR- (*)	8.79 (9.44)		Directivity 1.92 (2.83 dB)
8	ALP8†1-HSPR- (*)	17.38 (12.40)		Pattern: PR
12	ALP12†2-HSPR- (*)	24.27 (13.85)		
16	ALP16†2-HSPR- (*)	31.85 (15.03)		
24	ALP24†3-HSPR- (*)	48.40 (16.85)		
32	ALP32†3-HSPR- (*)	61.31 (17.88)		
H-Pattern Peanut (H-pol only)				
4	ALP4†1-HSH- (*)	11.27 (10.52)		Directivity 2.46 (3.91 dB)
8	ALP8†1-HSH- (*)	22.26 (13.48)		Pattern: H
12	ALP12†2-HSH- (*)	31.09 (14.93)		
16	ALP16†2-HSH- (*)	40.81 (16.11)		
24	ALP24†3-HSH- (*)	62.02 (17.93)		
32	ALP32†3-HSH- (*)	78.55 (18.95)		
Butterfly (H-pol only)				
4	ALP4†1-HSB- (*)	12.23 (10.87)		Directivity 2.67 (4.27 dB)
8	ALP8†1-HSB- (*)	24.16 (13.83)		Pattern: B
12	ALP12†2-HSB- (*)	33.75 (15.28)		
16	ALP16†2-HSB- (*)	44.30 (16.46)		
24	ALP24†3-HSB- (*)	67.31 (18.28)		
32	ALP32†3-HSB- (*)	85.25 (19.31)		
Butterfly - Reduced Rear (H-pol only)				
4	ALP4†1-HSBR- (*)	12.60 (11.00)		Directivity 2.75 (4.39 dB)
8	ALP8†1-HSBR- (*)	24.89 (13.96)		Pattern: BR
12	ALP12†2-HSBR- (*)	34.76 (15.41)		
16	ALP16†2-HSBR- (*)	45.62 (16.59)		
24	ALP24†3-HSBR- (*)	69.33 (18.41)		
32	ALP32†3-HSBR- (*)	87.81 (19.44)		

† Insert “L” for low power or “M” for medium power.
* Insert channel number (14 to 69).
Note: C-Pol antenna azimuth patterns only available in E, M, N, OC, P, and W.

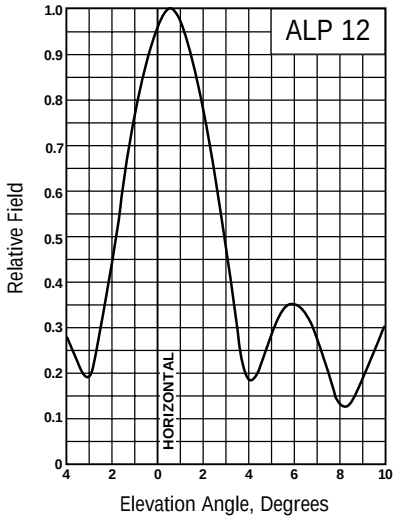
4 Bay
Directivity 4.58
(6.61 dBd)
Beam Tilt 0°

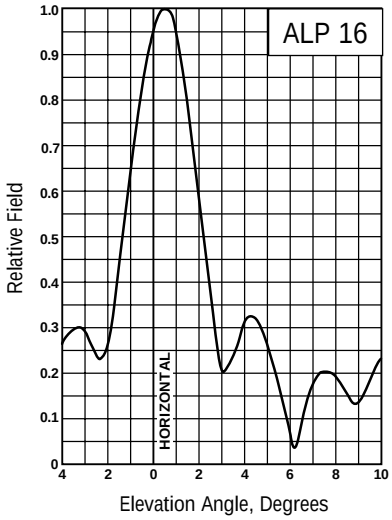




8 Bay
Directivity 9.05
(9.57 dBd)
Beam Tilt 0.25°

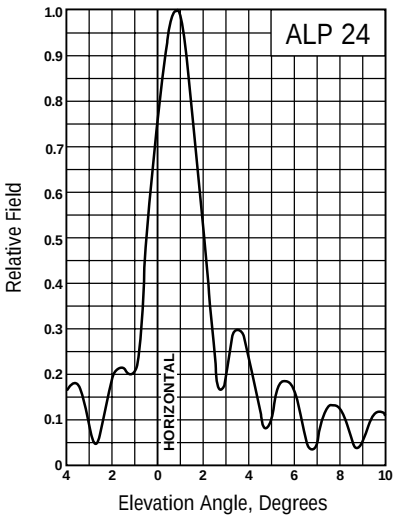
12 Bay
Directivity 12.64
(11.02 dBd)
Beam Tilt 0.5°

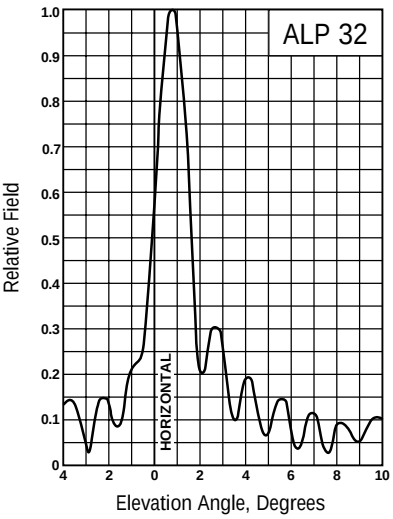




16 Bay
Directivity 16.59
(12.20 dBd)
Beam Tilt 0.5°

24 Bay
Directivity 25.21
(14.02 dBd)
Beam Tilt 0.75°



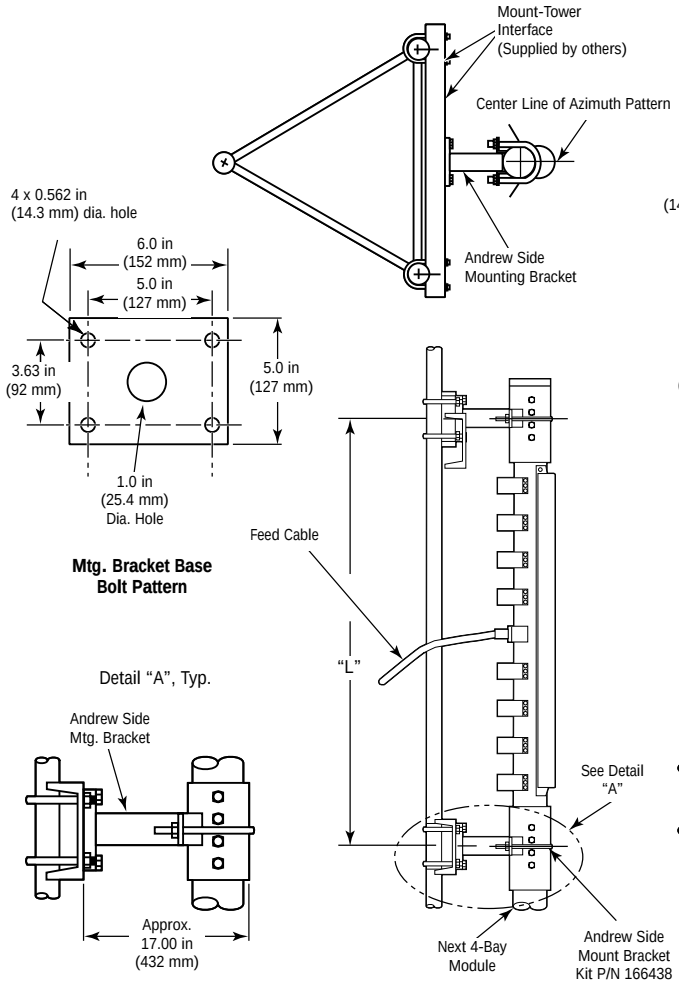


32 Bay
Directivity 31.93
(15.04 dBd)
Beam Tilt 0.75°

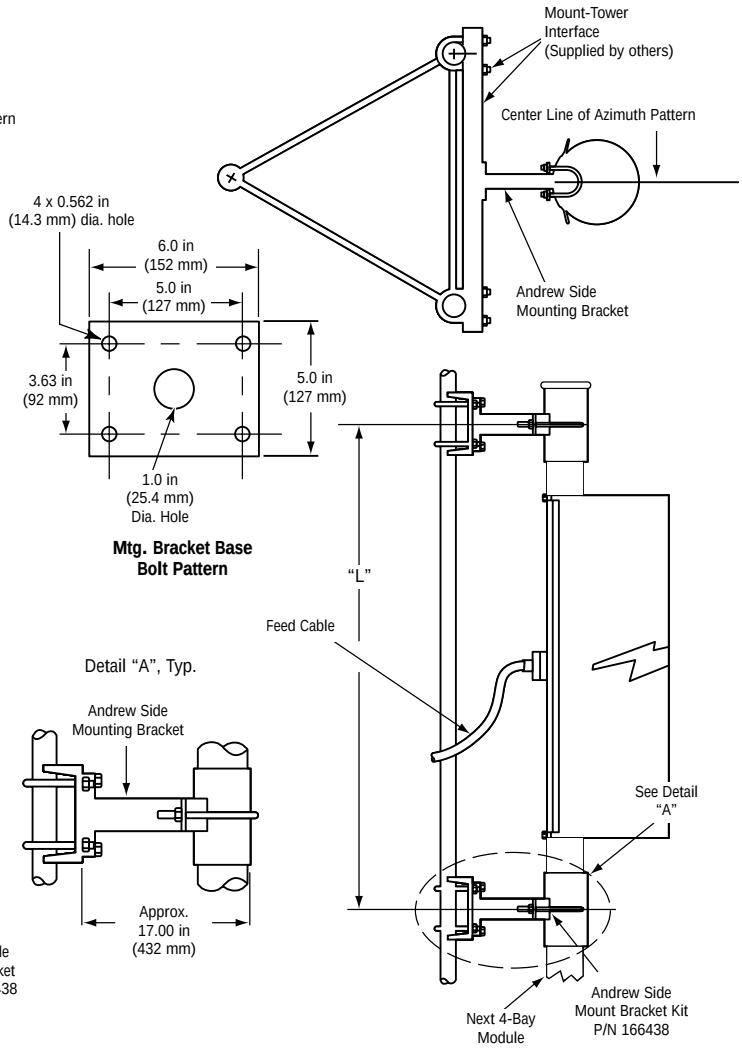
Note: Standard beamtilts are shown for each antenna model. Additional beamtilt up to 3.0° is available at an extra charge. See ordering information on page 299.

ALP Series II Antennas
Mechanical Drawings

H-Pol Side Mounting Details



C-Pol Side Mounting Details

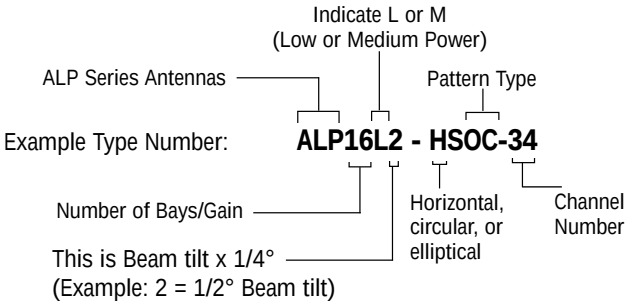


VSWR. All single channel antennas listed meet the following maximum VSWR specifications:

Visual Carrier + 0.5 MHz	1.05:1
Color Subcarrier	1.08:1
Remainder of channel	1.10:1

Mounting. Andrew does not supply the interface between mount and tower.

To Order:



The example antenna is a low power version of a 16 bay, horizontally polarized, omnidirectional antenna, with a beam tilt of 1/2°, for channel 34.

Bays	Mounting Brackets Required
4	2
8	3
12	4
16	5
24	7
32	9

Channel	"L" in (mm)
14-24	120.0 (3048)
25-30	114.0 (2896)
31-37	108.0 (2743)
38-45	102.0 (2591)
46-53	96.0 (2438)
54-61	90.0 (2286)
62-69	84.0 (2134)

Wide band antennas are specified similar to standard single channel antennas, except the applicable channels and bandwidth of the antenna are specified in the final three digits as follows:

The first two digits represent the number of the UHF channel at the bottom of the band requested.

The third digit represents the number of 6 MHz channels covered (5 for 30 MHz bandwidth or 3 for 18 MHz bandwidth).

For example: **ALP16L2-HSOC-425**

The example antenna is a low power version of a 16 bay omnidirectional antenna, with a beam tilt of 1/2°, which covers channels 42 through 46 (30 MHz).

For complete specifications on wide band versions, **call 1-800-DIAL-4RF.**

ALP Series II Antennas
Mechanical Data

H-pol Specifications

Channel Number	Diameter Inches (mm)	Height ft (m)	Weight lb (kg)	Wind Load† lb (N)	L-Series Peak Power Rating**	L-Series Input (50 ohm)	M-Series Peak Power Rating**	M-Series Input (50 ohm)
4 Bay								
14-24	3.5 (89)	10.8 (3.3)	60 (27)	200 (890)	3 kW	7/8" EIA	3 kW	7/8" EIA
25-30	3.5 (89)	10.3 (3.1)	60 (27)	200 (890)	3 kW	7/8" EIA	3 kW	7/8" EIA
31-37	3.5 (89)	9.8 (2.9)	60 (27)	190 (845)	3 kW	7/8" EIA	3 kW	7/8" EIA
38-45	3.5 (89)	9.3 (2.8)	55 (25)	190 (845)	3 kW	7/8" EIA	3 kW	7/8" EIA
46-53	3.5 (89)	8.8 (2.7)	55 (25)	180 (800)	3 kW	7/8" EIA	3 kW	7/8" EIA
54-61	3.5 (89)	8.3 (2.5)	55 (25)	180 (800)	3 kW	7/8" EIA	3 kW	7/8" EIA
62-69	3.5 (89)	7.8 (2.4)	50 (23)	170 (755)	3 kW	7/8" EIA	3 kW	7/8" EIA
8 Bay								
14-24	3.5 (89)	20.8 (6.3)	120 (55)	390 (1730)	2 kW	1-5/8" EIA	7 kW	1-5/8" EIA
25-30	3.5 (89)	19.8 (6.0)	120 (55)	390 (1730)	2 kW	1-5/8" EIA	7 kW	1-5/8" EIA
31-37	3.5 (89)	18.8 (5.7)	120 (55)	370 (1645)	2 kW	1-5/8" EIA	7 kW	1-5/8" EIA
38-45	3.5 (89)	17.8 (5.4)	110 (50)	370 (1645)	2 kW	1-5/8" EIA	7 kW	1-5/8" EIA
46-53	3.5 (89)	16.8 (5.1)	110 (50)	350 (1555)	2 kW	1-5/8" EIA	7 kW	1-5/8" EIA
54-61	3.5 (89)	15.8 (4.8)	110 (50)	350 (1555)	2 kW	1-5/8" EIA	7 kW	1-5/8" EIA
62-69	3.5 (89)	14.8 (4.5)	100 (45)	330 (1465)	2 kW	1-5/8" EIA	7 kW	1-5/8" EIA
12 Bay								
14-24	3.5 (89)	30.8 (9.4)	175 (80)	580 (2580)	3 kW	1-5/8" EIA	17 kW	3-1/8" EIA
25-30	3.5 (89)	29.3 (8.9)	175 (80)	570 (2535)	3 kW	1-5/8" EIA	17 kW	3-1/8" EIA
31-37	3.5 (89)	27.8 (8.5)	170 (75)	550 (2445)	3 kW	1-5/8" EIA	17 kW	3-1/8" EIA
38-45	3.5 (89)	26.3 (8.0)	170 (75)	540 (2400)	3 kW	1-5/8" EIA	17 kW	3-1/8" EIA
46-53	3.5 (89)	24.8 (7.6)	165 (75)	520 (2310)	3 kW	1-5/8" EIA	17 kW	3-1/8" EIA
54-61	3.5 (89)	23.3 (7.1)	164 (75)	510 (2265)	3 kW	1-5/8" EIA	17 kW	3-1/8" EIA
62-69	3.5 (89)	21.8 (6.6)	160 (70)	490 (2180)	3 kW	1-5/8" EIA	17 kW	3-1/8" EIA
16 Bay								
14-24	3.5 (89)	40.8 (12.4)	240 (110)	780 (3470)	4 kW	1-5/8" EIA	22 kW	3-1/8" EIA
25-30	3.5 (89)	38.8 (11.8)	235 (105)	760 (3380)	4 kW	1-5/8" EIA	22 kW	3-1/8" EIA
31-37	3.5 (89)	36.8 (11.2)	230 (105)	740 (3290)	4 kW	1-5/8" EIA	22 kW	3-1/8" EIA
38-45	3.5 (89)	34.8 (10.6)	225 (100)	720 (3200)	4 kW	1-5/8" EIA	22 kW	3-1/8" EIA
46-53	3.5 (89)	32.8 (10.0)	220 (100)	700 (3110)	4 kW	1-5/8" EIA	22 kW	3-1/8" EIA
54-61	3.5 (89)	30.8 (9.4)	215 (100)	680 (3025)	4 kW	1-5/8" EIA	22 kW	3-1/8" EIA
62-69	3.5 (89)	28.8 (8.8)	210 (95)	660 (2935)	4 kW	1-5/8" EIA	22 kW	3-1/8" EIA
24 Bay								
14-24	3.5 (89)	60.8 (18.5)	350 (160)	1160 (5160)	6 kW	1-5/8" EIA	28 kW	3-1/8" EIA
25-30	3.5 (89)	57.8 (17.6)	340 (155)	1130 (5025)	6 kW	1-5/8" EIA	28 kW	3-1/8" EIA
31-37	3.5 (89)	54.8 (16.7)	330 (150)	1100 (4890)	6 kW	1-5/8" EIA	28 kW	3-1/8" EIA
38-45	3.5 (89)	51.8 (15.8)	320 (145)	1070 (4760)	6 kW	1-5/8" EIA	28 kW	3-1/8" EIA
46-53	3.5 (89)	48.8 (14.9)	310 (140)	1040 (4625)	6 kW	1-5/8" EIA	28 kW	3-1/8" EIA
54-61	3.5 (89)	45.8 (14.0)	300 (135)	1010 (4490)	6 kW	1-5/8" EIA	28 kW	3-1/8" EIA
62-69	3.5 (89)	42.8 (13.0)	290 (130)	980 (4360)	6 kW	1-5/8" EIA	28 kW	3-1/8" EIA
32 Bay								
14-24	3.5 (89)	80.8 (24.6)	440 (200)	1550 (6895)	8 kW	1-5/8" EIA	28 kW	3-1/8" EIA
25-30	3.5 (89)	76.8 (23.4)	430 (195)	1510 (6715)	8 kW	1-5/8" EIA	28 kW	3-1/8" EIA
31-37	3.5 (89)	72.8 (22.2)	420 (190)	1470 (6535)	8 kW	1-5/8" EIA	28 kW	3-1/8" EIA
38-45	3.5 (89)	68.8 (21.0)	410 (185)	1430 (6360)	8 kW	1-5/8" EIA	28 kW	3-1/8" EIA
46-53	3.5 (89)	64.8 (19.8)	400 (180)	1390 (6180)	8 kW	1-5/8" EIA	28 kW	3-1/8" EIA
54-61	3.5 (89)	60.8 (18.5)	390 (175)	1350 (6005)	8 kW	1-5/8" EIA	28 kW	3-1/8" EIA
62-69	3.5 (89)	56.8 (17.3)	380 (170)	1310 (5825)	8 kW	1-5/8" EIA	28 kW	3-1/8" EIA

Notes: † Loads are typical for 50 lb/ft^2 (2.4 kPa) for flat surfaces and 33 lb/ft^2 (1.6 kPa) for cylindrical surfaces.

* For wide Cardioid, Butterfly and all "Reduced Rear" azimuth patterns, multiply weight values by 1.05 and windload values by 1.25

** For average power rating, multiply (peak power x 0.7)

C-pol Specifications - C-pol Antenna azimuth patterns only available in E, M, N, OC, P, and W.

Channel Number	Diameter Inches (mm)	Height ft (m)	Weight lb (kg)	Wind Load† lb (N)	L-Series Peak Power Rating**	L-Series Input (50 ohm)	M-Series Peak Power Rating**	M-Series Input (50 ohm)
4 Bay								
14-24	3.5 (89)	10.8 (3.3)	75 (34)	850 (3780)	3 kW	7/8" EIA	3 kW	7/8" EIA
25-30	3.5 (89)	10.3 (3.1)	75 (34)	830 (3690)	3 kW	7/8" EIA	3 kW	7/8" EIA
31-37	3.5 (89)	9.8 (2.9)	75 (34)	810 (3600)	3 kW	7/8" EIA	3 kW	7/8" EIA
38-45	3.5 (89)	9.3 (2.8)	70 (32)	790 (3515)	3 kW	7/8" EIA	3 kW	7/8" EIA
46-53	3.5 (89)	8.8 (2.7)	70 (32)	770 (3425)	3 kW	7/8" EIA	3 kW	7/8" EIA
54-61	3.5 (89)	8.3 (2.5)	70 (32)	750 (3335)	3 kW	7/8" EIA	3 kW	7/8" EIA
62-69	3.5 (89)	7.8 (2.4)	65 (29)	730 (3245)	3 kW	7/8" EIA	3 kW	7/8" EIA
8 Bay								
14-24	3.5 (89)	20.8 (6.3)	140 (64)	1810 (8050)	2 kW	1-5/8" EIA	7 kW	1-5/8" EIA
25-30	3.5 (89)	19.8 (6.0)	140 (64)	1770 (7875)	2 kW	1-5/8" EIA	7 kW	1-5/8" EIA
31-37	3.5 (89)	18.8 (5.7)	140 (64)	1730 (7695)	2 kW	1-5/8" EIA	7 kW	1-5/8" EIA
38-45	3.5 (89)	17.8 (5.4)	130 (59)	1690 (7520)	2 kW	1-5/8" EIA	7 kW	1-5/8" EIA
46-53	3.5 (89)	16.8 (5.1)	130 (59)	1650 (7340)	2 kW	1-5/8" EIA	7 kW	1-5/8" EIA
54-61	3.5 (89)	15.8 (4.8)	130 (59)	1610 (7160)	2 kW	1-5/8" EIA	7 kW	1-5/8" EIA
62-69	3.5 (89)	14.8 (4.5)	120 (54)	1570 (6985)	2 kW	1-5/8" EIA	7 kW	1-5/8" EIA
12 Bay								
14-24	3.5 (89)	30.8 (9.4)	200 (91)	2670 (11875)	3 kW	1-5/8" EIA	12 kW	3-1/8" EIA
25-30	3.5 (89)	29.3 (8.9)	200 (91)	2610 (11610)	3 kW	1-5/8" EIA	12 kW	3-1/8" EIA
31-37	3.5 (89)	27.8 (8.5)	195 (88)	2550 (11345)	3 kW	1-5/8" EIA	12 kW	3-1/8" EIA
38-45	3.5 (89)	26.3 (8.0)	195 (88)	2490 (11075)	3 kW	1-5/8" EIA	12 kW	3-1/8" EIA
46-53	3.5 (89)	24.8 (7.6)	190 (86)	2430 (10810)	3 kW	1-5/8" EIA	12 kW	3-1/8" EIA
54-61	3.5 (89)	23.3 (7.1)	190 (86)	2370 (10540)	3 kW	1-5/8" EIA	12 kW	3-1/8" EIA
62-69	3.5 (89)	21.8 (6.6)	185 (84)	2310 (10275)	3 kW	1-5/8" EIA	12 kW	3-1/8" EIA
16 Bay								
14-24	3.5 (89)	40.8 (12.4)	270 (122)	3530 (15700)	4 kW	1-5/8" EIA	16 kW	3-1/8" EIA
25-30	3.5 (89)	38.8 (11.8)	265 (120)	3450 (15345)	4 kW	1-5/8" EIA	16 kW	3-1/8" EIA
31-37	3.5 (89)	36.8 (11.2)	260 (118)	3370 (14990)	4 kW	1-5/8" EIA	16 kW	3-1/8" EIA
38-45	3.5 (89)	34.8 (10.6)	255 (116)	3300 (14680)	4 kW	1-5/8" EIA	16 kW	3-1/8" EIA
46-53	3.5 (89)	32.8 (10.0)	250 (113)	3220 (14325)	4 kW	1-5/8" EIA	16 kW	3-1/8" EIA
54-61	3.5 (89)	30.8 (9.4)	245 (111)	3140 (13970)	4 kW	1-5/8" EIA	16 kW	3-1/8" EIA
62-69	3.5 (89)	28.8 (8.8)	240 (109)	3060 (13610)	4 kW	1-5/8" EIA	16 kW	3-1/8" EIA
24 Bay								
14-24	3.5 (89)	60.8 (18.5)	390 (177)	5270 (23440)	6 kW	1-5/8" EIA	24 kW	3-1/8" EIA
25-30	3.5 (89)	57.8 (17.6)	380 (172)	5150 (22910)	6 kW	1-5/8" EIA	24 kW	3-1/8" EIA
31-37	3.5 (89)	54.8 (16.7)	370 (168)	5030 (22375)	6 kW	1-5/8" EIA	24 kW	3-1/8" EIA
38-45	3.5 (89)	51.8 (15.8)	360 (163)	4910 (21840)	6 kW	1-5/8" EIA	24 kW	3-1/8" EIA
46-53	3.5 (89)	48.8 (14.9)	350 (159)	4790 (21310)	6 kW	1-5/8" EIA	24 kW	3-1/8" EIA
54-61	3.5 (89)	45.8 (14.0)	340 (154)	4670 (20775)	6 kW	1-5/8" EIA	24 kW	3-1/8" EIA
62-69	3.5 (89)	42.8 (13.0)	330 (150)	4550 (20240)	6 kW	1-5/8" EIA	24 kW	3-1/8" EIA
32 Bay								
14-24	3.5 (89)	80.8 (24.6)	490 (222)	6990 (31095)	8 kW	1-5/8" EIA	28 kW	3-1/8" EIA
25-30	3.5 (89)	76.8 (23.4)	480 (218)	6830 (30380)	8 kW	1-5/8" EIA	28 kW	3-1/8" EIA
31-37	3.5 (89)	72.8 (22.2)	470 (213)	6670 (29670)	8 kW	1-5/8" EIA	28 kW	3-1/8" EIA
38-45	3.5 (89)	68.8 (21.0)	460 (209)	6510 (28960)	8 kW	1-5/8" EIA	28 kW	3-1/8" EIA
46-53	3.5 (89)	64.8 (19.8)	450 (204)	6350 (28245)	8 kW	1-5/8" EIA	28 kW	3-1/8" EIA
54-61	3.5 (89)	60.8 (18.5)	440 (200)	6190 (27535)	8 kW	1-5/8" EIA	28 kW	3-1/8" EIA
62-69	3.5 (89)	56.8 (17.3)	430 (195)	6040 (26870)	8 kW	1-5/8" EIA	28 kW	3-1/8" EIA

Notes:† Loads are typical for 50 lb/ft^2 (2.4 kPa) for flat surfaces and 33 lb/ft^2 (1.6 kPa) for cylindrical surfaces.
** For average power rating, multiply (peak power x 0.7)

ALP Series II Antennas

System Planning Worksheet

Use this worksheet to plan your material list for an efficient, cost-effective ALP antenna and HELIAX® coaxial cable system. Duplicate this page or call **Broadcast Systems at 1-800-DIAL-4-RF** for additional copies of the worksheet.

Item No.	Description	Type No.	Qty.	Unit Price	Extended Price
	Antenna and Accessories				
1	Antenna				
	Other				
	Transmission Line System				
2	HELIAX Coaxial Cable				
3	HELIAX Connector, Top				
4	HELIAX Connector, Bottom				
5	Hanger Kit of 10				
	Hardware Kit of 10				
	Adaptor Kit of 10				
	Threaded Rod Support				
6	Grounding Kit				
7	Wall/Roof Feed-Thru				
8	Miter Elbow				
9	Hoisting Grip				
	Pressurization Equipment				
10	Dehydrator (if required)				
11					
	Total Antenna System Estimate				

Channel(s)_____

Location_____

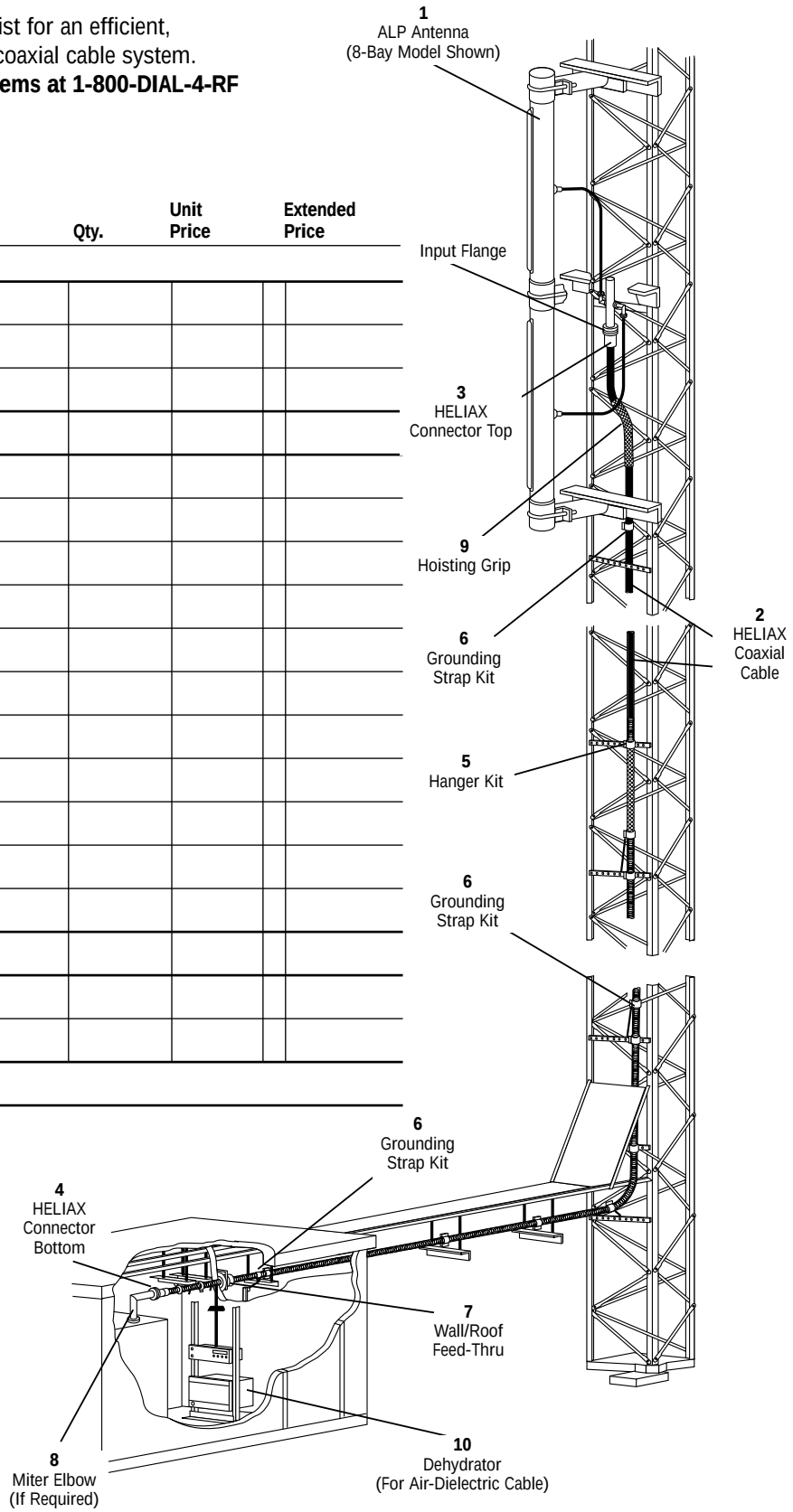
Owner_____

Prepared By_____

Date_____

Telephone_____

Notes_____



The Andrew AL8-Series Television Transmit Antenna will Give the Clear Picture

The Andrew Low-Power AL8 Series (CCIR Band IV/V) television transmitting antenna designed for UHF translator and low power applications offers a combination of quality, reliability, performance and economy.

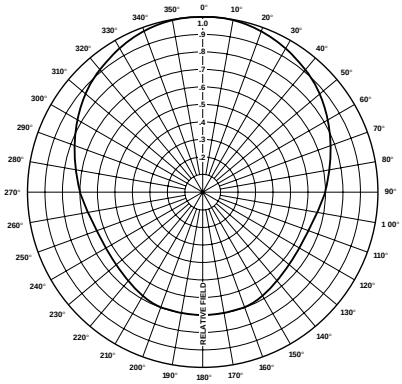
Our engineering staff uses a state-of-the-art manufacturing and testing facility for the development of antenna designs and the production of broadcast antennas. Every Andrew antenna has been individually designed and engineered to meet or exceed customer specifications.

Here are some of the outstanding features that make the AL8-Series antennas from Andrew the very best.

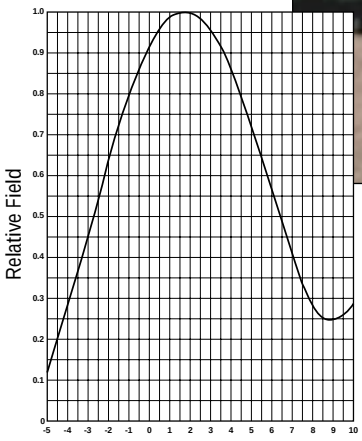
- *8-Bay (one module) antenna*
- *Single channel and wideband antennas available for U.S., Australia and European frequencies*
- *Omnioid pattern standard (directional patterns also available)*
- *3 kW peak power rating standard (10 kW version available on application)*
- *7/8" EIA flange standard*
- *1.75 degrees of electrical beam tilt standard*
- *Structural survival rating of 125 mph (201 km/h) plus 1/4 in (6.4 mm) radial ice*
- *Hardware furnished for pipe or flush mounting*
- *Slot cover radome for environmental protection*
- *Lightweight, cost effective shipping containers. Wood crate export packing available.*

Standard Patterns

Azimuth



Elevation



AL8 Series Antennas
Mechanical Specifications

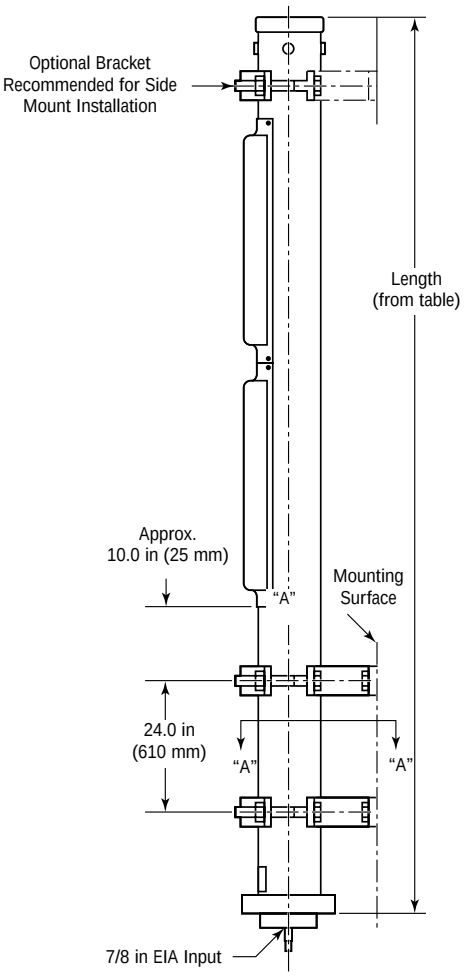
H-Pol, OC Pattern, 3 kW Peak Power Rating*

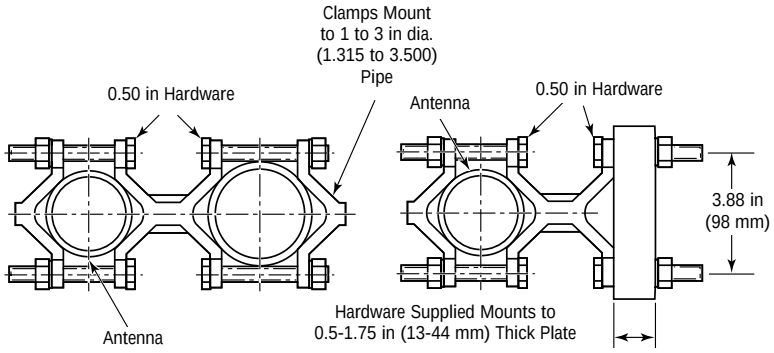
U.S, 6 MHz	European Channels, 8 MHz	Australian, 7 MHz	Diameter, in (mm)	Length, ft (m)	Weight, lb (kg)	Wind Load*, lb (N)
14-19	21E-24E	–	3.5 (89)	20.0 (6.1)	110 (49.9)	230 (1025)
20-25	25E-29E	28A-29A	3.5 (89)	18.6 (5.7)	105 (47.7)	215 (960)
26-31	30E-33E	30A-34A	3.5 (89)	17.6 (5.4)	100 (45.4)	205 (915)
32-38	34E-38E	35A-40A	3.5 (89)	16.6 (5.1)	95 (43.1)	195 (870)
39-49	39E-47E	41A-49A	2.875 (73)	15.6 (4.8)	90 (40.9)	160 (715)
50-60	48E-55E	50A-59A	2.875 (73)	14.6 (4.5)	85 (38.6)	150 (670)
61-69	56E-62E	60A-67A	2.875 (73)	13.6 (4.2)	80 (36.3)	140 (625)
70-83	63E-69E	68A-69A	2.875 (73)	12.6 (3.9)	75 (34.0)	130 (580)

* Wind Load specifications = 50/33 psf.

AL8-Series Electrical Specifications

- *Frequency range: 470 - 890 MHz (channels 14 - 83)*
- *Operating frequency: Specify by channel or bandwidth*
- *Peak gain: 14.06 (11.48 dBd)*
- *Input Impedance: 50 ohms*
- *Input type: 7/8" EIA (standard)*
- *Input power rating: 3 kW maximum*
  **(10 kW available on application)*
- *Polarization: Horizontal*
- *VSWR:6 MHz bandwidth: 1.10:1 max., e.g., AL8-21 (ch 21)*
  18 MHz bandwidth: 1.25:1 max., e.g., AL8-213 (ch 21-23)
  30 MHz bandwidth: 1.35:1 max., e.g., AL8-215 (ch 21-26)
- *Electrical beam tilt: 1.75 degrees*
- *Vertical 3 dB beamwidth: 6.8 degrees*
- *Null fill: Standard*





Section "A-A" Circular Mounting **Section "A-A" Flush Mounting**

Replacement Mounting Kit

AL8 Single Mount Type No. **167623**
AL8 Double Mount Type No. **168790**
SL8 Mount Adapter Plate (2 required) Type No. **167478**

HMD Series
Antenna Systems
For Global MMDS/ITFS Systems and Wireless Cable Applications

HMD Series Antennas for MMDS/ITFS and Wireless Cable Applications

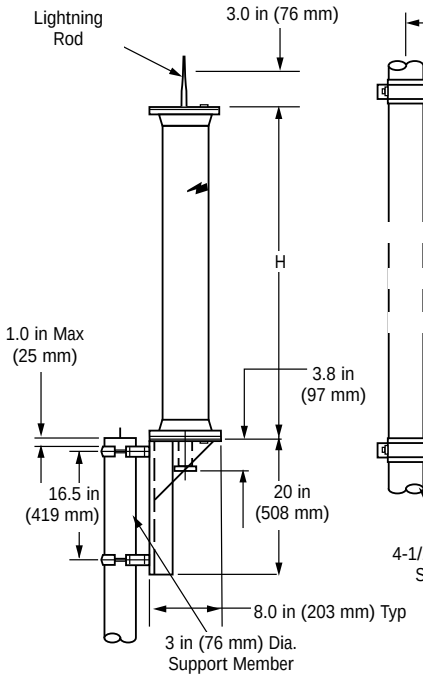
Features

- *Pressurizable, radome enclosed for long, trouble-free life*
- *Excellent VSWR performance*

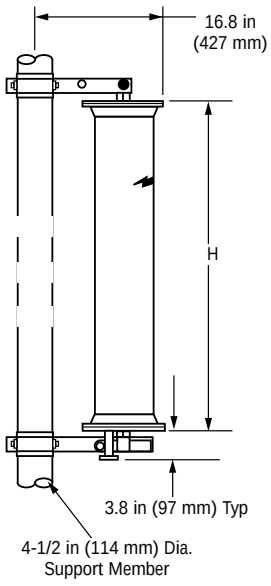
  1.35:1 max for W-Band
  1.5:1 max for other bands
- *Optimized beam tilt*

  0.5° Standard for 8, 12, and 16 bay
  0.75° Standard for 24 and 32 bay
  Others available on request
- *High power handling - 800 watts typical*
- *Wide selection of frequency bands and patterns*
- *Horizontal or vertical polarization*
- *Suitable for analog or digital transmission*
- *Null fill for excellent coverage*

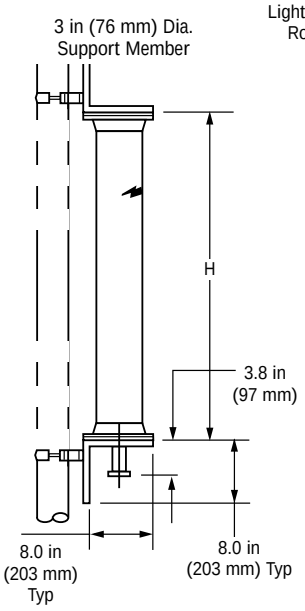
Standard Mounting Configurations



Mount Type A
Side Mounted at Top of Tower

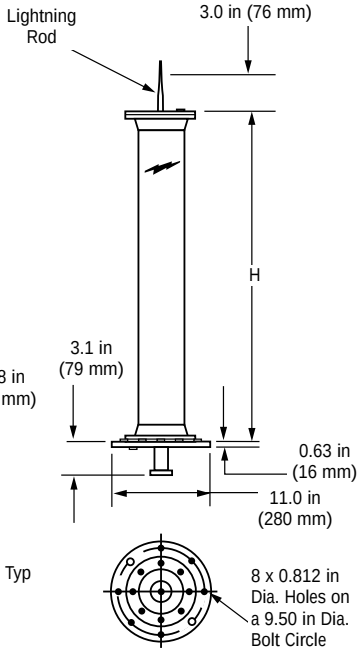


Mount Type B
Side Mounted at Side of Tower

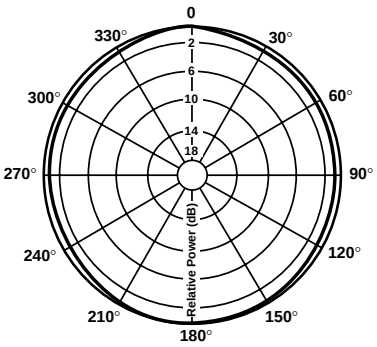


Mount Type C5
Side Mounted at Side of Tower

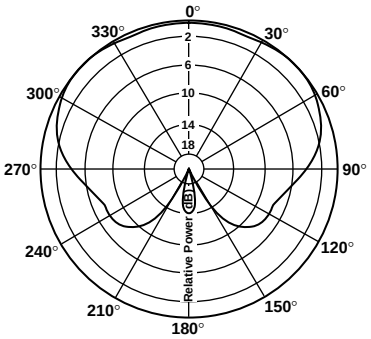
Mount Type C8
Has Bracket at Top and Bottom of Mount for Additional Support



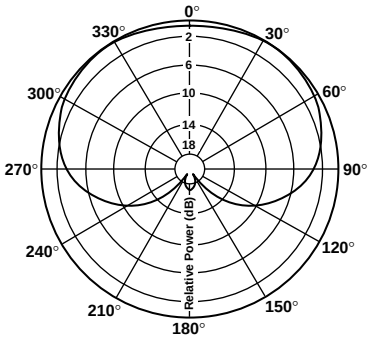
Mount Type D
Top Mounted at Top of Tower



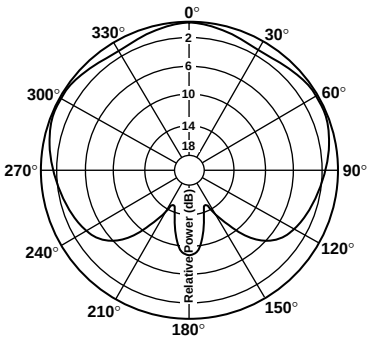
Omnidirectional



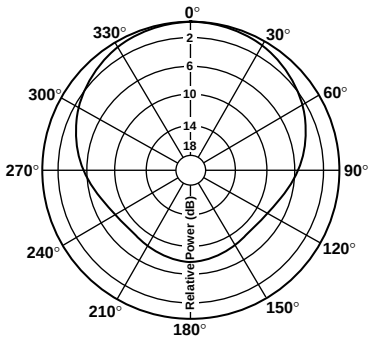
Horizontal Cardioid



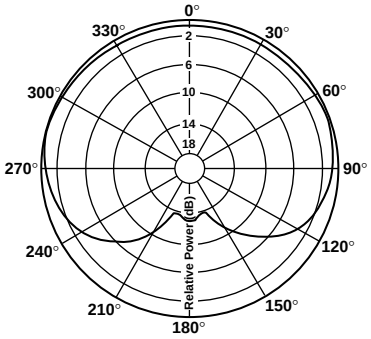
Vertical Cardioid



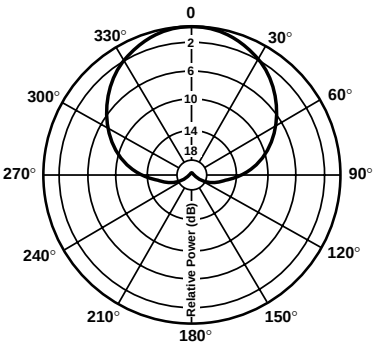
Wide Horizontal Cardioid



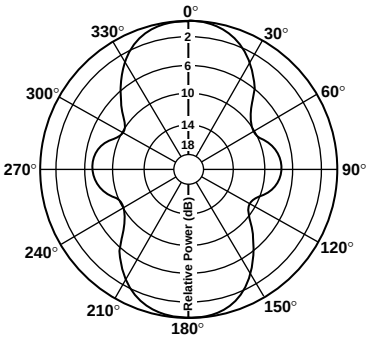
Narrow Horizontal Cardioid



Wide Vertical Cardioid



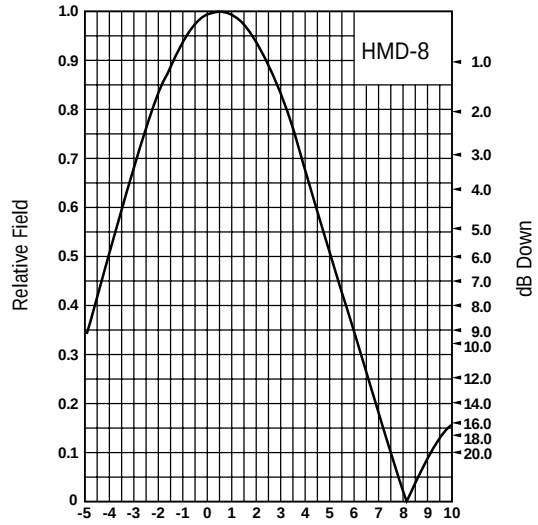
Narrow Vertical Cardioid

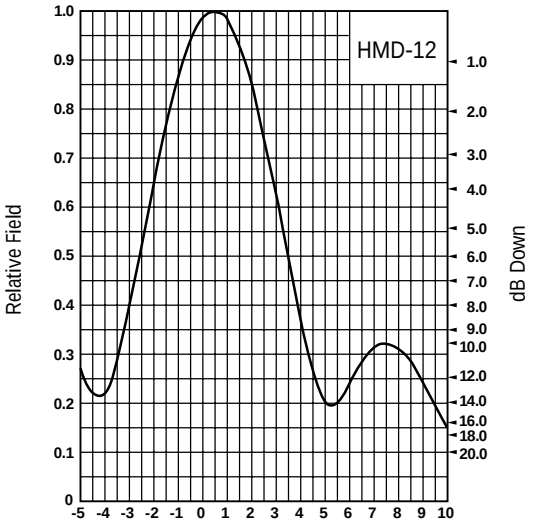


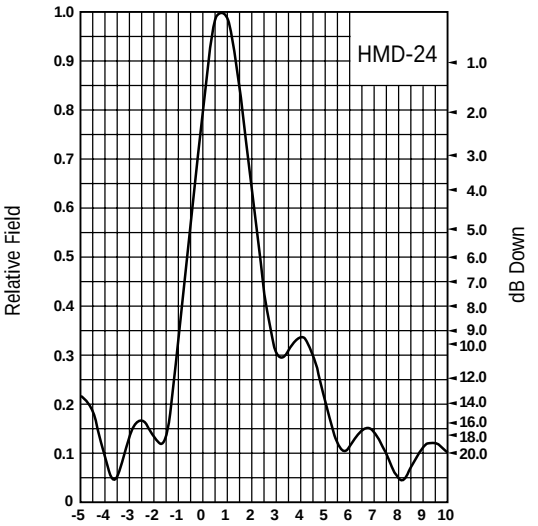
Horizontal Peanut

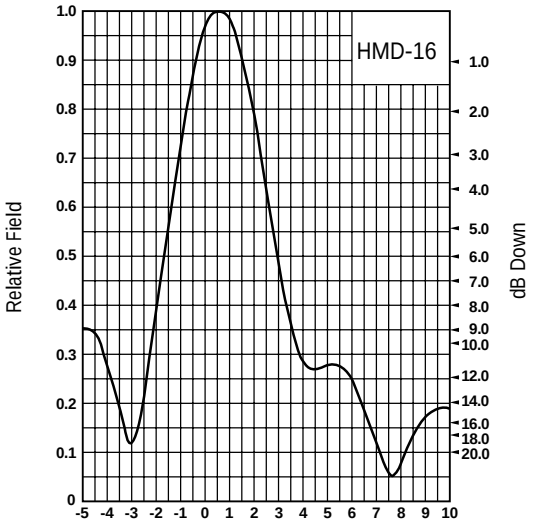
HMD Series Antennas

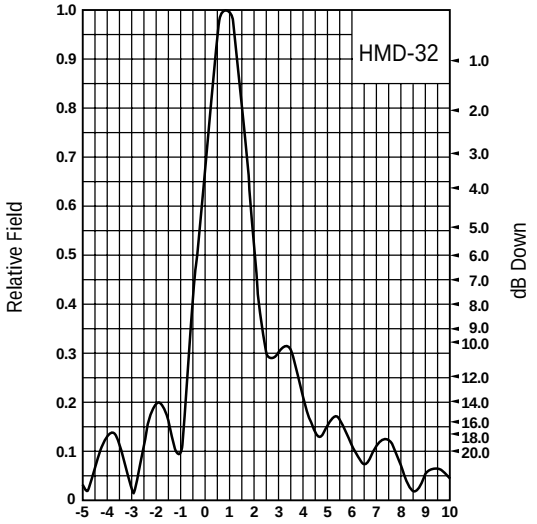
Elevation Patterns











Standard Single W-Band Antennas

2500 to 2700 MHz

Type Number: **HMDxxpa-Wzz**

xx = Number of bays (8, 12, 16, 24,or 32)

p = Polarization (H or V)

a = Azimuth pattern type (O, C, W, N, or P; see page 307)

zz = Beam tilt in tenths of a degree

Electrical Specifications

Frequency Band, MHz	2500 - 2700
Polarization	Vertical or Horizontal
Input Power (Watts)	
8-Bay	500**
12, 16, 24, or 32-Bay	800**
Input VSWR	1.35:1 Maximum
Beam Tilt	
8, 12, 16 Bay	0.5° Standard
24, 32 Bay	0.75° Standard
Input Type	7/8" EIA
Gain	(See Table)

** Peak of sync for analog systems (NTSC, PAL, etc.)

Gain Data (dBi) at W Band

Antenna Type	8-Bay	12-Bay	16-Bay	24-Bay	32-Bay
Omni (HO, VO)	11.5	13.0	14.0	16.0	–
Cardioid (HC, VC)	14.5	16.0	17.0	19.0	20.0
Wide Cardioid (HW)	13.8	15.3	16.3	18.3	–
Wide Cardioid (VW)	13.7	15.2	16.2	–	–
Narrow Cardioid (HN)	15.1	16.6	17.6	19.6	–
Narrow Cardioid (VN)	17.5	19.5	20.5	21.5	23.5
Peanut (HP)	15.7	17.2	18.2	20.2	–

Mechanical Data

Antenna Type	Mount Type	Shear lb (N)	Overturning Moment lb-ft (N-m)	Height (H) in (cm)	Radome Dia. in (cm)	Weight lb (kg)
HMD8HO-W	A	135 (600)	343 (466)	41 (104)	5 (13)	45 (20)
HMD12HO-W	A	155 (689)	504 (685)	58 (147)	5 (13)	55 (25)
HMD16HO-W	A	180 (801)	757 (1030)	81 (206)	5 (13)	60 (27)
HMD24HO-W	D*	140 (623)	676 (920)	116 (295)	5 (13)	45 (20)
HMD8HC-W	B	80 (356)	–	39 (99)	8 (20)	70 (32)
HMD12HC-W	B	115 (212)	–	61 (155)	8 (20)	80 (36)
HMD16HC-W	B	155 (689)	–	73 (185)	8 (20)	95 (43)
HMD24HC-W	B	205 (912)	–	108 (274)	8 (20)	110 (50)
HMD32HC-W	B	275 (1223)	–	145 (368)	8 (20)	130 (59)
HMD12HN-W	A	115 (212)	–	61 (155)	8 (20)	80 (36)
HMD16HN-W	A	155 (689)	–	73 (185)	8 (20)	95 (43)
HMD8VO-W	A	135 (600)	343 (466)	41 (104)	5 (13)	45 (20)
HMD12VO-W	A	155 (689)	343 (466)	58 (147)	5 (13)	55 (25)
HMD16VO-W	A	180 (801)	757 (1030)	81 (206)	5 (13)	60 (27)
HMD24VO-W	D*	140 (623)	676 (920)	116 (295)	5 (13)	45 (20)
HMD8VC-W	C5	92 (409)	–	41 (104)	5 (13)	40 (18)
HMD12VC-W	C5	112 (498)	–	58 (147)	5 (13)	45 (20)
HMD16VC-W	C5	138 (613)	–	81 (206)	5 (13)	55 (25)
HMD24VC-W	C5	179 (796)	–	116 (295)	5 (13)	65 (30)
HMD32VC-W	B	275 (1223)	–	145 (368)	5 (13)	110 (50)
HMD12VN-W	A	112 (498)	–	58 (147)	5 (13)	45 (20)
HMD16VN-W	A	138 (613)	–	81 (206)	5 (13)	55 (25)

* Mounting hardware not included with "D" mount.

Notes: 1) Wind loads are based on 50/33 psf loading. 2) For Mount Type A, overturning moments are taken about the center of the mounting bracket. 3) HC parameters cover the HW and HN patterns. 4) VC parameters cover VW and VN patterns. 5) 44.5 lb (198 N) included in shear for Type C mount. 6) Other mount types available on request.

Standard Single P, Q, and R-Band Antennas

Type Number: **HMDxxpa-bzz**

xx = Number of bays (8, 12, 16, 24, or 32)

p = Polarization (H or V)

a = Azimuth pattern type (O, C, W, or N; see page 307)

zz = Beam tilt in tenths of a degree

b = P, Q, or R

P = 1900 - 2100 MHz

Q = 2100 - 2300 MHz

R = 2300 - 2500 MHz

Electrical Specifications

Frequency Band, MHz	P, Q, R at left
Polarization	Vertical or Horizontal
Input Power (watts) 8-Bay 12, 16, 24, or 32-Bay	 500** 800**
Input VSWR	1.5:1 Maximum
Beam Tilt	0.5° Standard (8, 12, 16 Bay) 0.75° Standard (24, 32 Bay)
Input Type	7/8" EIA
Gain	See Gain Data for W-band antennas for reference. Contact Andrew for gain in a specific band.

** Peak of sync for analog systems (NTSC, PAL, etc.)

Mechanical Data

Antenna Type	Mount Type	Shear lb (N)	Overturning Moment lb-ft (N-m)	Height (H) in (cm)	Radome Dia in (cm)	Weight lb (kg)
1900 - 2100 MHz (P Band)*						
HMD8VO-P	A	175 (779)	488 (664)	47 (119)	8 (20)	55 (25)
HMD12VO-P	A	212 (943)	768 (1044)	67 (170)	8 (20)	65 (30)
HMD16VO-P	A	260 (1157)	1224 (1665)	93 (236)	8 (20)	75 (34)
* When specifying the Australian Band 2076-2111 MHz use P Band.						
2100 - 2300 MHz (Q Band)						
HMD8HO-Q	A	148 (659)	321 (436)	52 (132)	5 (13)	50 (23)
HMD12HO-Q	A	173 (770)	533 (725)	74 (188)	5 (13)	55 (25)
HMD16HO-Q	A	204 (908)	859 (1168)	101 (257)	5 (13)	60 (27)
HMD8HC-Q	B	115 (512)	–	61 (155)	8 (20)	50 (23)
HMD12HC-Q	B	155 (689)	–	73 (185)	8 (20)	55 (25)
HMD16HC-Q	B	260 (1157)	–	92 (234)	8 (20)	70 (32)
HMD8VO-Q	A	175 (779)	488 (664)	47 (119)	8 (20)	55 (25)
HMD12VO-Q	A	212 (943)	768 (1044)	67 (170)	8 (20)	60 (27)
HMD16VO-Q	A	260 (1157)	1224 (1665)	93 (236)	8 (20)	65 (30)
HMD8VC-Q	C5	112 (498)	–	52 (132)	5 (13)	45 (20)
HMD12VC-Q	C5	129 (573)	–	74 (188)	5 (13)	50 (23)
HMD16VC-Q	C5	162 (720)	–	101 (257	5 (13)	55 (25)
2300 - 2500 MHz (R Band)						
HMD8HO-R	A	138 (614)	367 (495)	44 (112)	5 (13)	50 (23)
HMD12HO-R	A	157 (699)	523 (711)	60 (152)	5 (13)	55 (25)
HMD16HO-R	A	187 (832)	826 (1123)	86 (218)	5 (13)	60 (27)
HMD8VO-R	A	138 (614)	367 (495)	44 (112)	5 (13)	55 (25)
HMD12VO-R	A	157 (699)	523 (711)	60 (152)	5 (13)	60 (27)
HMD16VO-R	A	187 (832)	826 (1123)	86 (218)	5 (13)	65 (30)
HMD8HW-R	B	80 (356)	–	39 (99)	8 (20)	70 (32)
HMD12HW-R	B	115 (212)	–	61 (155)	8 (20)	80 (36)
HMD16HW-R	B	155 (689)	–	73 (185)	8 (20)	95 (43)
HMD24HW-R	B	205 (912)	–	108 (274)	8 (20)	110 (50)
HMD8HN-R	B	80 (356)	–	39 (99)	8 (20)	70 (32)
HMD12HN-R	B	115 (212)	–	61 (155)	8 (20)	80 (36)
HMD16HN-R	B	155 (689)	–	73 (185)	8 (20)	95 (43)
HMD24HN-R	B	205 (912)	–	108 (274)	8 (20)	110 (50)

Notes: 1) Wind loads are based on 50/33 psf loading. 2) For Mount Type A, overturning moments are taken about the center of the mounting bracket. 3) HC parameters cover the HW and HN patterns. 4) VC parameters cover VW and VN patterns. 5) 44.5 lb (198 N) included in shear for Type C mount. 6) Other mount types available on request.

Standard Single Broadband Antennas

WNQ Band 2500-2700 (W)/2150-2163 (NQ)

Type Number: **HMDxxpa-WNQzz**

xx = Number of bays (8, 12, 16, or 24)

p = Polarization (H or V)

a = Azimuth pattern type (O, C, or N; see page 307)

zz = Beam tilt in tenths of a degree

Electrical Specifications

Frequency Band, MHz	2150 - 2163 and 2500 - 2700
Polarization	Vertical or Horizontal
Input Power (Watts)	
8-Bay	500**
12, 16,or 24-Bay	800**
Input VSWR	1.35:1 Maximum "W' Band 1.5:1 Maximum 'NQ' Band
Beam Tilt	
8, 12, 16 Bay	0.5° Standard
24, 32 Bay	0.75° Standard
Input Type	7/8" EIA
Gain	See Table

** Peak of sync for analog systems (NTSC, PAL, etc.)

Gain Data (dBi) at W Band/NQ Band

Antenna Type	8-Bay	12-Bay	16-Bay	24-Bay
Omni (HO, VO)	10.6/8.8	12.4/10.6	13.6/11.8	15.4/13.6
Cardioid (HC, VC)	13.4/11.6	15.2/13.4	16.4/14.6	18.2/16.4
Narrow Cardioid (HN)	–	–	–	–
Narrow Cardioid (VN)	–	–	–	–
Wide Cardiod (VN)	–	–	16.0/14.2	–

Mechanical Data

Antenna Type	Mount Type	Shear lb (N)	Overturning Moment lb-ft (N-m)	Height in (cm)	Radome in (cm)	Weight lb (kg)
HMD8HO-WNQ	A	135 (600)	386 (525)	41 (104)	5 (13)	45 (20)
HMD12HO-WNQ	A	155 (689)	553 (752)	58 (147)	5 (13)	55 (25)
HMD16HO-WNQ	A	180 (801)	814 (1108)	81 (206)	5 (13)	65 (30)
HMD24HO-WNQ	D*	140 (623)	676 (920)	116 (295)	5 (13)	50 (23)
HMD8HC-WNQ	C8	130 (579)	–	46 (116)	8 (20)	55 (25)
HMD12HC-WNQ	C8	167 (743)	–	66 (167)	8 (20)	60 (27)
HMD16HC-WNQ	C8	215 (957)	–	92 (233)	8 (20)	65 (30)
HMD24HC-WNQ	C8	258 (1148)	–	115 (292)	8 (20)	70 (32)
HMD8VO-WNQ	A	135 (600)	386 (525)	41 (104)	5 (13)	45 (20)
HMD12VO-WNQ	A	155 (689)	553 (752)	58 (147)	5 (13)	55 (25)
HMD16VO-WNQ	A	180 (801)	814 (1108)	81 (206)	5 (13)	60 (27)
HMD24VO-WNQ	D*	140 (623)	676 (920)	116 (295)	5 (13)	45 (20)
HMD8VC-WNQ	C5**	92 (409)	–	41 (104)	5 (13)	40 (18)
HMD12VC-WNQ	C5**	112 (498)	–	58 (147)	5 (13)	45 (20)
HMD16VC-WNQ	C5**	138 (613)	–	81 (206)	5 (13)	55 (25)
HMD24VC-WNQ	C5**	179 (796)	–	116 (295)	5 (13)	65 (30)
HMD12VN-WNQ	C5**	112 (498)	–	58 (147)	5 (13)	45 (20)
HMD16VN-WNQ	C5**	138 (613)	–	81 (206)	5 (13)	55 (25)
HMD24VN-WNQ	C5**	179 (796)	–	116 (295)	5 (13)	65 (30)

* Mounting hardware not included with "D" mount.

Notes: 1) Wind loads are based on 50/33 psf loading. 2) For Mount Type A, overturning moments are taken about the center of the mounting bracket. 3) HC parameters cover the HW and HN patterns. 4) VC parameters cover VW and VN patterns. 5) 44.5 lb (198 N) included in shear for Type C mount. 6) Other mount types available on request.

High Power Single W-Band Antennas

2500-2700 MHz

Type Number: **HMDxxpa-Wzz-H**

xx = Number of bays (8, 12, 16, or 24)

p = Polarization (H or V)

a = Azimuth pattern type (O or C; see page 307)

zz = Beam tilt in tenths of a degree

Electrical Specifications

Frequency Band, MHz	2500 - 2700
Polarization	Vertical or Horizontal
Input Power (Watts)	1000**
Input VSWR	1.35:1 Maximum
Beam Tilt	
8, 12, 16 Bay	0.5° Standard
24 Bay	0.75° Standard
Input Type	7/8" EIA
Gain	See Table

** Peak of sync for analog systems (NTSC, PAL, etc.)

Gain Data (dBi) at W Band/NQ Band

Antenna Type	8-Bay	12-Bay	16-Bay	24-Bay
Omni (HO, VO)	11.5	13.0	14.0	16.0
Cardioid (HC, VC)	14.5	16.0	17.0	19.0

Mechanical Data

Antenna Type	Mount Type	Shear lb (N)	Overturning Moment lb-ft (N-m)	Height in (cm)	Radome in (cm)	Weight lb (kg)
HMD8HO-W-H	A	135 (600)	386 (525)	41 (104)	5 (13)	45 (20)
HMD12HO-W-H	A	155 (689)	553 (752)	58 (147)	5 (13)	55 (25)
HMD16HO-W-H	A	180 (801)	814 (1108)	81 (206)	5 (13)	65 (30)
HMD24HO-W-H	D*	140 (623)	676 (920)	116 (295)	5 (13)	50 (23)
HMD8HC-W-H	B	80 (356)	–	39 (99)	8 (20)	70 (32)
HMD12HC-W-H	B	115 (212)	–	61 (155)	8 (20)	80 (36)
HMD16HC-W-H	B	155 (689)	–	73 (185)	8 (20)	95 (43)
HMD24HC-W-H	B	205 (912)	–	108 (274)	8 (20)	110 (50)
HMD8VO-W-H	A	135 (600)	386 (525)	41 (104)	5 (13)	45 (20)
HMD12VO-W-H	A	155 (689)	553 (752)	58 (147)	5 (13)	55 (25)
HMD16VO-W-H	A	180 (801)	814 (1108)	81 (206)	5 (13)	60 (27)
HMD24VO-W-H	D*	140 (623)	676 (920)	116 (295)	5 (13)	45 (20)
HMD8VC-W-H	C5	92 (409)	–	41 (104)	5 (13)	40 (18)
HMD12VC-W-H	C5	112 (498)	–	58 (147)	5 (13)	45 (20)
HMD16VC-W-H	C5	138 (613)	–	81 (206)	5 (13)	55 (25)
HMD24VC-W-H	C5	179 (796)	–	116 (295)	5 (13)	65 (30)

* Mounting hardware not included with "D" mount.

Notes: 1) Wind loads are based on 50/33 psf loading. 2) For Mount Type A, overturning moments are taken about the center of the mounting bracket. 3) HC parameters cover the HW and HN patterns. 4) VC parameters cover VW and VN patterns. 5) 44.5 lb (198 N) included in shear for Type C mount. 6) Other mount types available on request.

Super High Power Single W-Band Antennas

2500-2700 MHz

Type Number: **HMDxxpO-Wzz-V**

xx = Number of bays (8, 12, or 16)

p = Polarization (H or V)

zz = Beam tilt in tenths of a degree

Electrical Specifications

Frequency Band, MHz	2500 - 2700
Polarization	Vertical or Horizontal
Input Power (Watts)	
8-Bay	1200**
12 and 16-Bay	1600**
Input VSWR	1.35:1 Maximum
Beam Tilt	0.5° Standard
Input Type	1 5/8" EIA
Gain	See Table

** Peak of sync for analog systems (NTSC, PAL, etc.)

Gain Data (dBi) at W Band

Antenna Type	8-Bay	12-Bay	16-Bay
Omni (HO, VO)	11.5	13.0	14.0

Mechanical Data

Antenna Type	Mount Type	Shear lb (N)	Overturning Moment lb-ft (N-m)	Height in (cm)	Radome in (cm)	Weight lb (kg)
HMD8HO-W-V	A	148 (659)	386 (525)	52 (132)	5 (13)	50 (23)
HMD12HO-W-V	A	173 (770)	553 (752)	74 (188)	5 (13)	55 (25)
HMD16HO-W-V	A	180 (801)	757 (1030)	81 (206)	5 (13)	65 (30)
HMD8VO-W-V	A	148 (600)	321 (436)	52 (132)	5 (13)	50 (23)
HMD12VO-W-V	A	173 (689)	533 (725)	74 (188)	5 (13)	60 (27)
HMD16VO-W-V	A	180 (623)	757 (1030)	81 (206)	5 (13)	70 (30)

Notes: 1) Wind loads are based on 50/33 psf loading. 2) For Mount Type A, overturning moments are taken about the center of the mounting bracket. 3) HC parameters cover the HW and HN patterns. 4) VC parameters cover VW and VN patterns. 5) Other mount types available on request.

Dual Input Antennas

The HMD Dual Input series of antennas provide two omni-directional antennas enclosed in a single radome. These antennas provide:

- *Reduced tower space and wind load*
- *Lower installation cost*
- *Lower weight*

Type Number: **DHMDxxVO-bzz**

xx = Number of bays (8, 12, 16, or 24) in each antenna

b = Band desigantor

P = 1900-2100

Q = 2100-2300

R = 2300-2500

W = 2500-2700

zz = Beam tilt in tenths of a degree

Electrical Specifications

Frequency Band, MHz	See P, Q, R, W above
Polarization	Vertical
Input Power (Watts)	
8-bay	500**
12 and 16-bay	800**
Input VSWR, maximum	
W Band	1.35:1
P, Q, and R Bands	1.5:1 Maximum
Beam Tilt	0.5° Standard
Input Type	7/8" EIA
Gain	See Table

** Peak of sync for analog systems (NTSC, PAL, etc.)

Gain Data (dBi) at W Band

Antenna Type	8-Bay	12-Bay
Omni (VO)	11.5	13.0

Mechanical Data 8/12 Bay Dual Input

Antenna Type	Mount Type	Shear lb (N)	Overturning Moment lb-ft (N-m)	Height in (cm)	Radome in (cm)	Weight lb (kg)
DHMD8VO-W	A	180 (801)	757 (1022)	81 (206)	5 (13)	45 (20)
DHMD12VO-W	D*	135 (600)	653 (885)	116 (295)	5 (13)	45 (20)
DHMD8VO-R	A	260 (1157)	1224 (1665)	93 (236)	5 (13)	40 (18)
DHMD12VO-R	A	222 (986)	1257 (1698)	116 (295)	5 (13)	45 (20)
DHMD8VO-Q	A	260 (1157)	1224 (1665)	93 (236)	8 (20)	50 (23)
DHMD12VO-Q	A*	326 (1452)	2024 (2732)	129 (328)	8 (20)	65 (30)
DHMD8VO-P	A	260 (1157)	1224 (1665)	93 (236)	8 (20)	50 (23)
DHMD12VO-P	A*	326 (1452)	2024 (2732)	129 (328)	8 (20)	65 (30)

* Includes guy wires (customer to supply anchor points).

Notes: 1) Wind loads are based on 50/33 psf loading. 2) For Mount Type A, overturning moments are taken about the center of the mounting bracket. 3) HC parameters cover the HW and HN patterns. 4) VC parameters cover VW and VN patterns. 5) 44.5 lb (198 N) included in shear for Type C mount. 6) Other mount types available on request.

SHADOWMASTER™ Booster Antennas

2.5 to 2.7 GHz

This antenna is designed to enhance signal penetration for the wireless cable systems. It provides the improved quality and coverage wireless operators need to sustain and increase subscribership in their markets.

The SHADOWMASTER™ antenna is ideal for improving and increasing coverage in regions challenged by rugged terrain or other factors that result in shadowed or blocked areas. The sleek, lightweight design minimizes wind loading, and is exceptionally easy to install.

The SHADOWMASTER provides 16 or 18 dBi of signal gain as well as improved patterns with null fill for coverage at all angles. Both vertically and horizontally polarized models are available.

Type number: **HMDxxSM-p**

xx = 16 or 18 (gain in dBi)

p = H (horizontal) or V (vertical) polarization

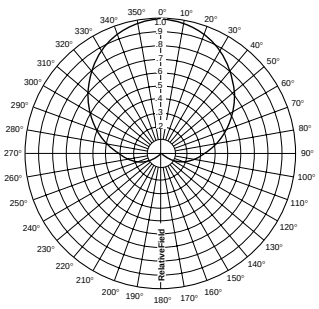
Electrical Specifications

Frequency, MHz	**2500 - 2700**
Gain, dBi	
Type HMD16SM	16
Type HMD18SM	18
VSWR	1.5:1 maximum
Polarization	Horizontal or Vertical
Half-power Beamwidth	
HMD16SM-H (V)	Azimuth: 100° (90°) typical Elevation: 5° typical
HMD18SM	Azimuth: 50° typical Elevation: 5° typical
Front-to-Back Ratio	20 dB typical
Input Power Rating, W	100
Input Connector	Type N female

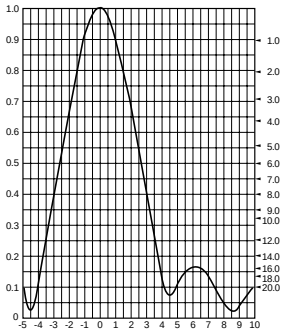
Mechanical Specifications

Wind Load at 112 mph (180 km/hr), lb (N)	100 (445)
Length, in (mm)	60 (1525)
Weight, lb (kg)	13 (5.9)

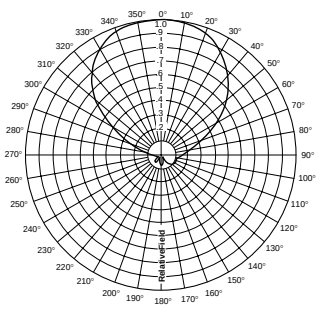
Azimuth Pattern-Vertical



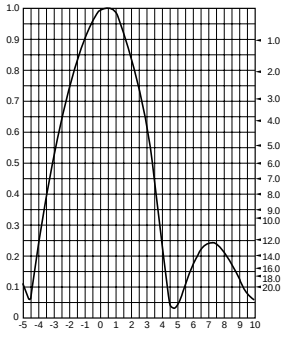
Elevation Pattern-Vertical



Azimuth Pattern-Horizontal

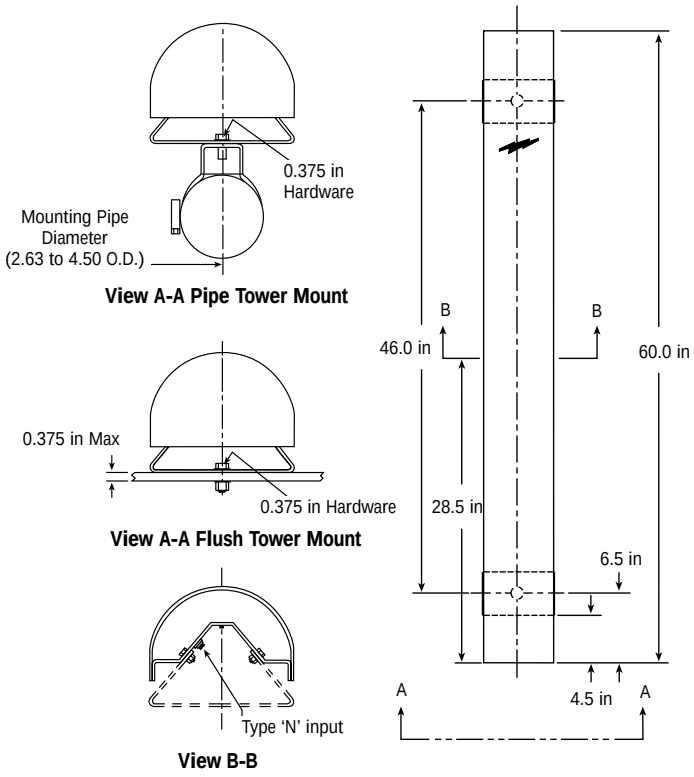


Elevation Pattern-Horizontal

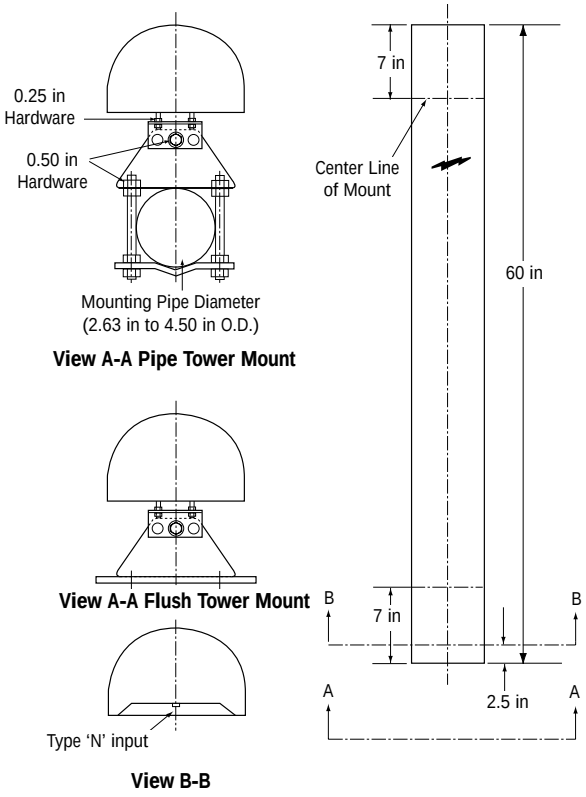


SHADOWMASTER™ Booster Antennas
for Wireless Cable

For V-POL installation



For H-POL installation



Coverage of the Same Area by Two Antennas

When programming requirements necessitate the use of two antennas in close proximity, they should be mounted to minimize interference between them.

Dual, side-mounted cardioids should be mounted one above the other.

Two antennas may be used:

- *For coverage of the same area, with additional programming, from a single location.*
- *To provide omnidirectional coverage when a single antenna cannot be used because of building or tower obstructions*

Recommended Antenna Spacings

Condition 1

Dual, top mounted omnidirectional antennas

Polarization of one or both of the antennas:

Vertical:	10 feet (3 m) apart
Horizontal:	5 feet (1.5 m) apart

Condition 2

Omnidirectional antenna mounted to side of tower.

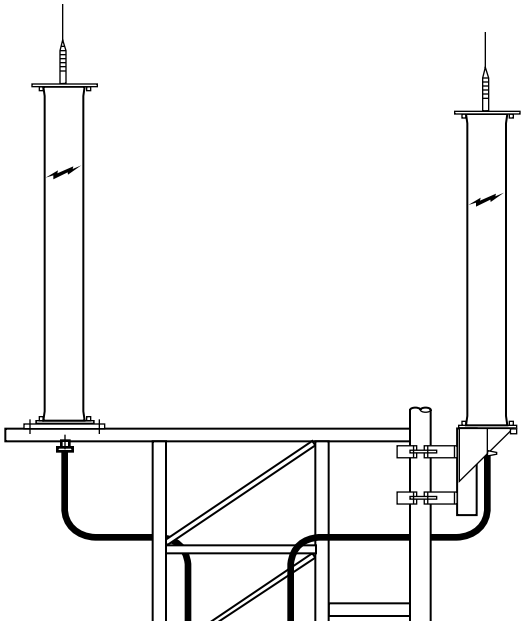
Polarization:

Vertical:	Not recommended for omnidirectional requirements
Horizontal:	Minimum of 3.5 feet (1 m) with base of antenna located at tower horizontal member.

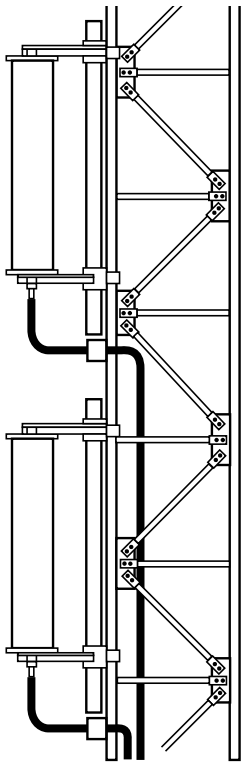
Note

These suggestions are general in nature. Basis for the spacing is to prevent nulls greater than 5 dB in azimuth pattern. For specific cases, model studies can be performed to determine optimum location for antenna mounting. Andrew accepts no responsibility for antenna performance other than those specifications stated in this catalog.

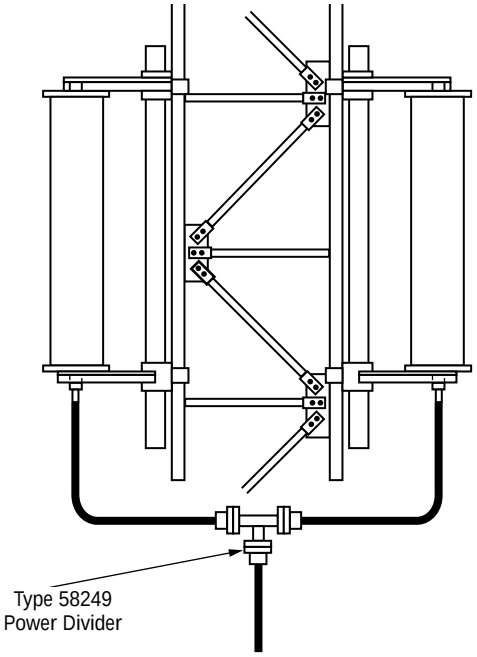
Dual Top Mounted Omni Antennas



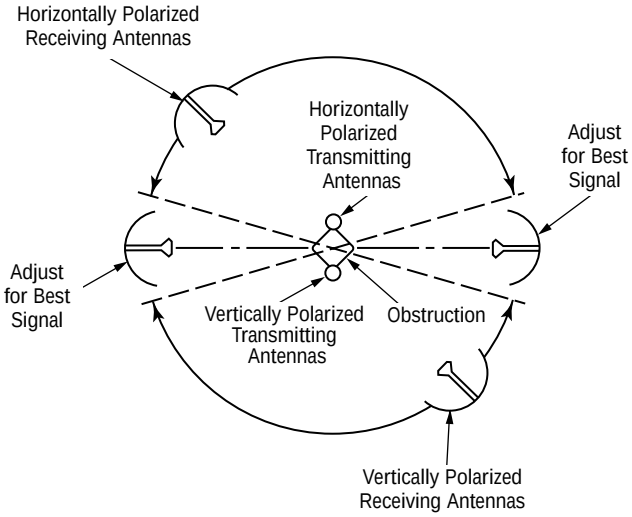
Dual Side Mounted Antennas



Dual Side Mounted Cardioid Antennas
for Omnidirectional Coverage



Side View



Top View

To Provide Omnidirectional Coverage

When an omnidirectional antenna cannot be used because of building or tower obstructions, two directional antennas can be used as shown.

Andrew pioneered the concept of using antennas with opposite polarizations to minimize deep nulls and interference at the pattern crossover points. The phase relationship between transmitting antennas is not important when opposite polarizations are used. Receive antennas positioned in the crossover areas can be adjusted on-site for maximum receive signal. A power divider is used to feed both transmitting antennas.

Power Dividers

Power dividers allow two antennas to be fed from one transmitter with equal or unequal power division as required. The units are air dielectric, have 7/8" EIA flanges, and are designed for operation over the 2.5 - 2.686 GHz band with 1.1 maximum input VSWR. Units for other bandwidths are also available (see detail letters below).

Type Number	Power Division-%	Insertion Loss, dB
58247 - (*)	10/90	10.0/0.5
58248 - (*)	25/75	6.0/1.2
58249 - (*)	50/50	3.0/3.0

* Insert detail letter:

-P	1.9 - 2.1 GHz
-Q	2.1 - 2.3 GHz
-R	2.3 - 2.5 GHz
-T	2.2 - 2.4 GHz
-W	2.5 - 2.7 GHz
-WNQ**	2.15 - 2.7 GHz

** Types 58247 and 58249 only.

DATAMASTER™ Sector Antennas
for 2-way MMDS Applications

Now Andrew offers an alternative to wireline access for providing data (including Internet) and voice services to multiple dwelling units and small businesses.

DATAMASTER sector antennas are specifically designed to meet the demands of the new 2-way MMDS marketplace created by recent FCC rulemaking.

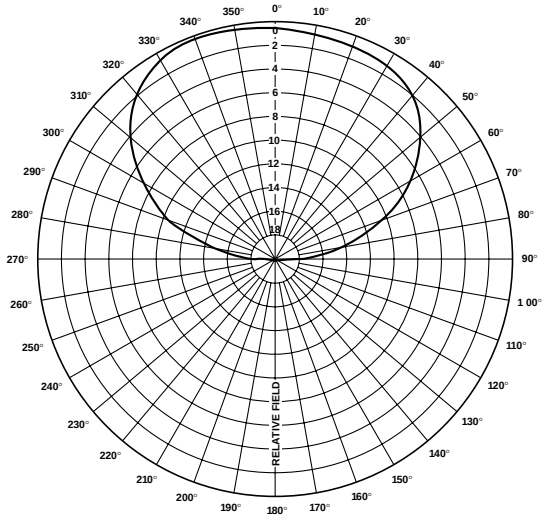
DATAMASTER antennas are optimized for sectorized data transmission and efficient use of the MMDS spectrum for data applications. Two versions are available: 90° sector transmit for the 2500 – 2700 MHz band; and 90° sector antennas for the 2150 – 2360 MHz band.

These new sector antennas are the latest addition to the Andrew market-leading family of internationally acclaimed HMD Series antennas for MDS and MMDS applications.

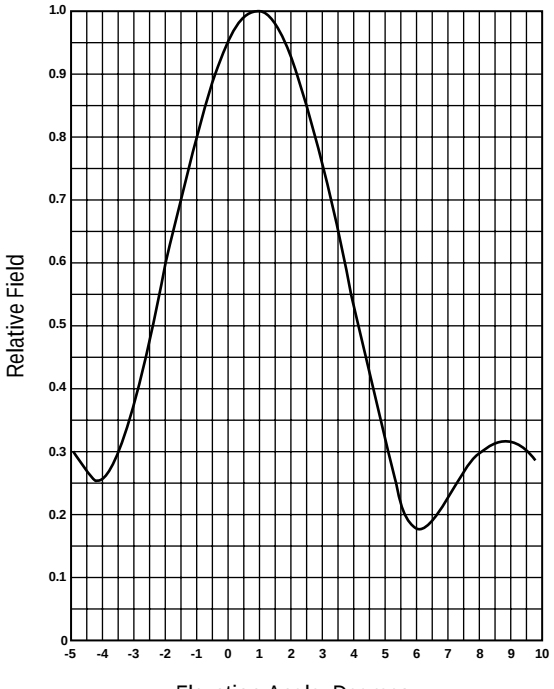
- *Efficient spectrum utilization – antenna pattern performance features excellent front to back ratios*
- *Available in horizontal polarization*
- *Comprehensive three year warranty*
- *For availability of other sector sizes and V-Pol models, contact Andrew at 1-800-DIAL-4RF.*

DATAMASTER™ Sector Antennas
for 2-way MMDS Applications

H-Pol Azimuth Pattern



H-Pol Elevation Pattern



Electrical Specifications

Gain, dBi	18
Frequency Band, Transmit, MHz	
Type **DMA18W090-H**	2500-2700
Type **DMP18NQ090-H**	2150-2360
Azimuth Beamwidth, degrees	90
Polarization	Horizontal
Impedance, ohms	50
Front-to-Back Ratio (180°), dB	>28
Input Power Rating, Average, W	200
Lightning Protection	dc ground
Return Loss, dB (VSWR)	>14 (1.5:1)
Cross Polarization Rejection, dB	25

Mechanical Specifications

Type No.	**DMA18W090-H**	**DMP18NQ090-H**
Mounting	Side Mount	Side Mount
Input Connector	7-16 DIN	7-16 DIN
Dimensions, in (mm)	62 x 15.25 x 22 (1575 x 388 x 559)	60 x 13.5 x 7 (1524 x 343 x 178)
Weight, lb (kg)	58 (26)	41 (19)
Radome Material	ABS	ABS
Radome Color	Gray	Gray
Environmental		
Survival Wind Speed, mph (km/hr)	125 (200)	
Temperature Range, °C (°F)	-40 to +70 (-40 to 158)	
Humidity	0 to 100% Condensing	

Largest Selection of Transmission Lines Available to the Broadcast Industry

Whatever your needs for broadcast transmission lines – thermally compensated, circular waveguide, or coaxial cable, Andrew can supply them.

MACXLine® rigid coaxial line is thermally compensated to provide twice the life of standard rigid lines. It is available in sizes from 3-1/8" to 8-3/16". MACXLine uses a bellows in the inner conductor to compensate for thermal expansion and contraction. Though standard bullet-type connections are used, they do not slide once put in service and never wear out.

New WIDELine™ broadcast rigid transmission line offers good VSWR performance across the entire width of the UHF band. New DUALine™ rigid coaxial line is ideal for combining both DTV and NTSC signals for a single station into one line. Both are thermally compensated the same as MACXLine.

In addition to these products, Andrew supplies standard rigid line in 8-3/16", 6-1/8" (50 ohm), 3-1/8", and 1-5/8" sizes. Some 7/8" rigid line components and accessories are also available.

GUIDELine® circular waveguide is an ideal choice for high power broadcast, with its cross-polarization cancellation rods, for lowest attenuation and highest power.

Reliable HELIAX® air-dielectric coaxial cable is available in sizes up to 5". New, high power Type HJ9HP-50, 5" cable has an average power rating higher than 6-1/8" cable. See pages 572 and 573.

All of our transmission lines are conservatively rated. One of them is the right choice to optimize the performance of your broadcast system!

For more information on any Andrew rigid transmission line products call our **Broadcast Systems Department at 1-800-DIAL-4-RF.**

WIDELine™ Rigid Transmission Line

NEW!

High Performance, Long Service Life Solution for Multiplexing Broadcast Applications

Now broadcast system engineers and designers can multiplex DTV and NTSC television signals and minimize VSWR spikes, while extending the life of their transmission line. WIDELine wideband transmission line is made up of different length sections to minimize the addition of reflections.* The result is excellent VSWR performance of a maximum of 1.1:1 over all UHF-TV channels in the U.S. FCC core spectrum.

For example, a 1,480-foot run of WIDELine transmission line (8-3/16", 75 ohm) was calculated to have a maximum VSWR of slightly more than 1.08. Actual field results may vary, but VSWR will not exceed 1.1:1 for any UHF-TV channel 14 through 51.

Andrew WIDELine transmission line also protects your investment by eliminating problems caused by sliding bullet-type connections found in conventional rigid transmission line. Conventional rigid line is capable of accepting future changes in frequency assignments, with acceptable VSWR performance, however, its service life is limited by the rubbing of its connection points, which can ultimately lead to bullet burnout or arc-over. WIDELine transmission line incorporates a unique, patented** bellows section into each inner conductor that compensates for differential expansion between the inner and outer conductors. Mechanical wear from sliding contacts is thus eliminated. The result is extremely long life. Since 1984, more than 75 broadcasters have selected transmission line using this technology, without a single failure due to bullet burnout.

WIDELine is available in 3-1/8" 50-ohm, 6-1/8" 75-ohm, 7-3/16" 75-ohm, and 8-3/16" 75-ohm sizes.

* Patent applied for

**United States Patent No. 4,543,548

DUALine™ Custom-Length, Dual-Band, Rigid Transmission Line

NEW!

If full wideband performance is not required, Andrew will calculate the optimum rigid line section length to minimize VSWR, by using a proprietary computer program. Sections would normally be 20 feet long, or somewhat shorter, and would all be the same length to simplify installation. This solution is ideal for applications where the DTV and NTSC signals are combined in a single line, as it typically results in outstanding VSWR performance (depending on which channels are combined).

Inners Only™ Inner Conductors

The Inexpensive Alternative to Transmission Line Replacement

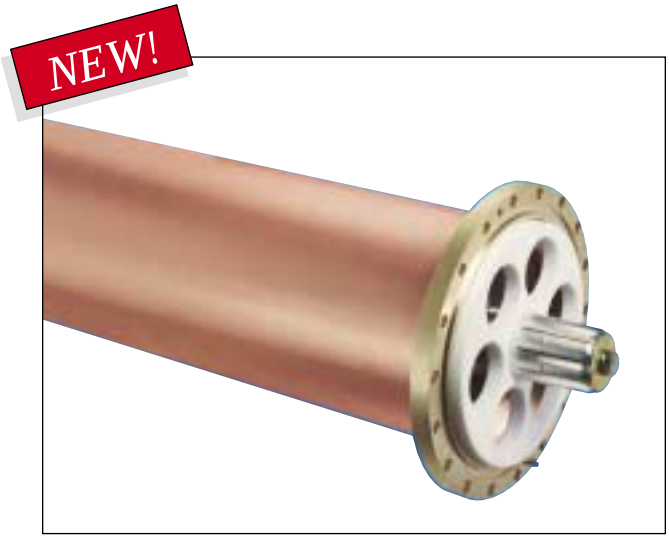
MACXLine® transmission lines are available as Inners Only replacements. Since MACXLine lengths are identical to those of standard rigid line, it is an excellent choice for any application.

Despite tight capital budgets, you can't afford to go off the air! Conventional rigid transmission line systems require maintenance after just ten years to avoid premature burnout of bullet-style connectors. By upgrading with Andrew Inners Only before your existing transmission line fails, you avoid the disaster of dead air.

MACXLine Inners Only replacements provide the ultimate in operational dependability at about half the cost of a new installation. You swap your worn-out, failure-prone bullets and inner conductors for the most dependable components in the industry while reusing your expensive outer conductors, which are normally good for many more years of service.

8-3/16" MACXLine® Rigid Transmission Line

For High Power UHF Broadcasting



Thermally Compensated for Dependable Transmission – Twice the Life of Standard Rigid Lines

Now UHF-TV system designers and engineers have a new choice for 8-3/16" 75 ohm rigid transmission line from Andrew. Thermally compensated for dependable transmission, MACXLine® rigid line features patented technology that can more than double the life of a transmission line system.

MACXLine incorporates a unique patented* bellows section into each inner conductor that compensates for differential expansion between the inner and outer conductors. Mechanical wear from sliding contacts is thus eliminated. This means no shaving dust to arc at the flange and insulator areas. The result is an extremely long life.

*U.S. Patent 4,543,548

Specifications

Type Number MACX875B	8-3/16" 75-ohm
Impedance, ohms	75 ± 0.5
Max. Channel	51
Velocity, Percent	99.8
Attenuation, see page 326	
Average power rating, see page 326	
Peak Power Rating, kW*	1800
Dimensions	
Outer Conductor,	
Outside dia., in (mm)	8.150 (207)
Inside dia., in (mm)	8.000 (203)
Inner Conductor	
Outside dia., in (mm)	2.293 (58)
Inside dia., in (mm)	2.229 (57)
Flange Dimensions	
Flange, Overall Diameter, in (mm)	11.000 (279)
Bolt Circle Diameter, in (mm)	10.312 (262)
Number of Bolts	18
Bolt Size	3/8"
Net Weight, lb/ft (kg/m)	7.46 (11.10)
MACX875B-1 Channels	
18, 19, 23, 24, 27, 28, 31, 32, 35, 36, 39, 40, 43, 44, 47, 48	
MACX875B-2 Channels	
15, 16, 17, 20, 45, 49, 50	
MACX875B-3 Channels	
14, 21, 22, 25, 26, 29, 30, 33, 34, 38, 41, 42, 46, 51	

*Based on production test voltage of 47 kV

Note: Channels listed are preferred channels; others may also be acceptable. Contact Andrew for more information. Specifications subject to change without notice.

MACX875B Premium Rigid Line Sections

	8-3/16" 75-ohm
20 ft	**MACX875B-1**
19.75 ft	**MACX875B-2**
19.5 ft	**MACX875B-3**

Straight sections with bellows, flanged both ends. Includes captivated inner connector, hardware kit, disk insulators and instructions. Standard tolerance is ± 0.050 in (1.3 mm)

MACX875B Field Cut Section Kits

	8-3/16" 75-ohm
Field Cut Straight Section, 5 to 20 ft	**MACX875B-39**
Includes bellows, captivated Inner connector, swivel field flange kit, hardware kit and installation instructions	
Field Cut Straight Section, up to 5 ft	**MACX875B-41**
No bellows. Includes captivated inner connector, field flange kit, hardware kit and installation instructions	

MACX875 Variable Length Sections

	8-3/16" 75-ohm
Variable Length, 5 to 20 ft	**MACX875B-42-VAR**
Variable Length, up to 5 ft	**MACX875B-40-VAR**

Specify length in inches.

8-3/16" 75-ohm MACXLine® Rigid Line
Typical System

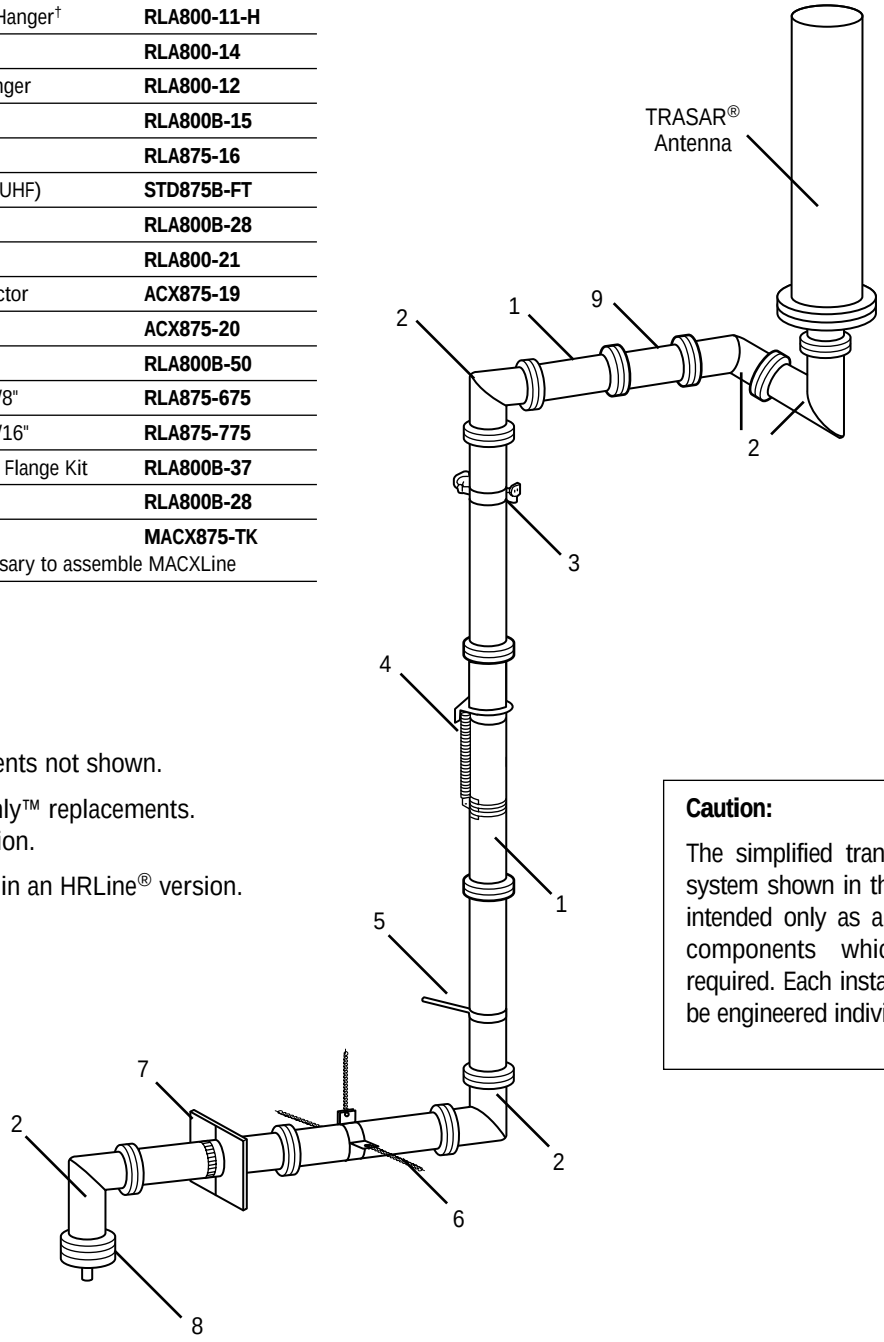
MACXLine Rigid Line System Components

Item No.	Description	8-3/16" 75-ohm
1	Straight Section	**MACX875B Series**
2	90° Miter Elbow	**ACX875B-10SE-(*)**
3	Rigid Hanger††	**RLA800B-13**
4	Hinged Vertical Spring Hanger†	**RLA800-11-H**
5	Lateral Brace	**RLA800-14**
6	3-Point Suspension Hanger	**RLA800-12**
7	Wall Feed Thru	**RLA800B-15**
8	Gas Barrier	**RLA875-16**
9	Fine Matching Section (UHF)	**STD875B-FT**
–	Fixed Field Flange Kit	**RLA800B-28**
–	Hardware Kit	**RLA800-21**
–	Captivated Inner Connector	**ACX875-19**
–	Inner Connector	**ACX875-20**
–	End Cap (to seal line)	**RLA800B-50**
–	Reducer, 8-3/16" to 6-1/8"	**RLA875-675**
–	Reducer, 8-3/16" to 7-3/16"	**RLA875-775**
–	Soft Solder Swivel Field Flange Kit	**RLA800B-37**
–	Fixed Flange Kit	**RLA800B-28**
–	Installation Tool Kit Contains all tools necessary to assemble MACXLine	**MACX875-TK**

* Specify television channel or frequency.

† Use at 10 ft (3 m) intervals.

†† One for every 1000 ft (300 m).



Contact Andrew for other components not shown.

MACX875 is available as Inners Only™ replacements. Contact Andrew for more information.

8-3/16" rigid coax is also available in an HRLine® version. Contact Andrew for details.

Caution:

The simplified transmission line system shown in this diagram is intended only as a guide to the components which may be required. Each installation should be engineered individually.

Attenuation and Average Power Ratings for 8-3/16"

75-ohm, MACXLine®, Type MACX875B

Television Channel No. (MHz)	Attenuation dB/100 ft (100 m)	Average Power kW
2 (55.25)	0.025 (0.082)	344
3 (61.25)	0.026 (0.086)	327
4 (67.25)	0.027 (0.090)	312
5 (77.25)	0.029 (0.097)	291
6 (83.25)	0.031 (0.100)	280
7 (175.25)	0.045 (0.147)	192
8 (181.25)	0.045 (0.149)	188
9 (187.25)	0.046 (0.152)	185
10 (193.25)	0.047 (0.154)	182
11 (199.25)	0.048 (0.156)	180
12 (205.25)	0.048 (0.159)	177
13 (211.25)	0.049 (0.161)	174
14 (471.25)	0.074 (0.243)	116
15 (477.25)	0.075 (0.245)	115
16 (483.25)	0.075 (0.246)	114
17 (489.25)	0.076 (0.248)	113
18 (495.25)	0.076 (0.250)	113
19 (501.25)	0.077 (0.251)	112
20 (507.25)	0.077 (0.253)	111
21 (513.25)	0.077 (0.254)	111
22 (519.25)	0.078 (0.256)	110
23 (525.25)	0.078 (0.257)	109
24 (531.25)	0.079 (0.259)	109
25 (537.25)	0.079 (0.260)	108
26 (543.25)	0.080 (0.262)	107
27 (549.25)	0.080 (0.263)	107
28 (555.25)	0.081 (0.265)	106
29 (561.25)	0.081 (0.266)	106
30 (567.25)	0.082 (0.268)	105
31 (573.25)	0.082 (0.269)	104
32 (579.25)	0.082 (0.271)	104
33 (585.25)	0.083 (0.272)	103
34 (591.25)	0.083 (0.273)	103
35 (597.25)	0.084 (0.275)	102
36 (603.25)	0.084 (0.276)	102
37 (609.25)	0.085 (0.278)	101
38 (615.25)	0.085 (0.279)	101
39 (621.25)	0.086 (0.281)	100
40 (627.25)	0.086 (0.282)	99.7
41 (633.25)	0.086 (0.283)	99.2
42 (639.25)	0.087 (0.285)	98.7
43 (645.25)	0.087 (0.286)	98.2
44 (651.25)	0.088 (0.287)	97.8
45 (657.25)	0.088 (0.289)	97.3
46 (663.25)	0.088 (0.290)	96.8
47 (669.25)	0.089 (0.292)	96.4
48 (675.25)	0.089 (0.293)	95.9
49 (681.25)	0.090 (0.294)	95.5
50 (687.25)	0.090 (0.296)	95.1
51 (693.25)	0.091 (0.297)	94.6

Standard conditions: For Attenuation – VSWR 1.0, Ambient Temperature 20°C (68°F), Atmospheric Pressure, Dry Air. For Average Power – VSWR 1.0, Ambient Temperature 40°C (140°F), Inner Conductor Temperature 102°C (216°F), Atmospheric Pressure, Dry Air. Attenuation and average power data guaranteed within ±5%.

All flanged items are EIA standard and include inner connector, "O" ring, silicone lubricant and hardware, except when noted. All inner connectors are silver-plated.

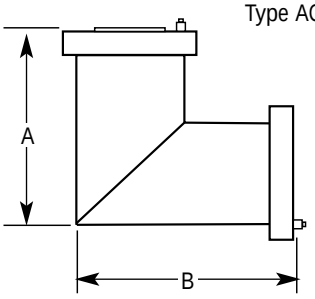
90° Miter Elbow

Swivel flanges, brass construction, reinforced outer.

Type	A in (mm)	B in (mm)	Weight lb (kg)
ACX875B-10SE-(*)	12.00 (305)	12.00 (305)	50 (22.68)

* Specify television channel or frequency

Type ACX875B-10ASE



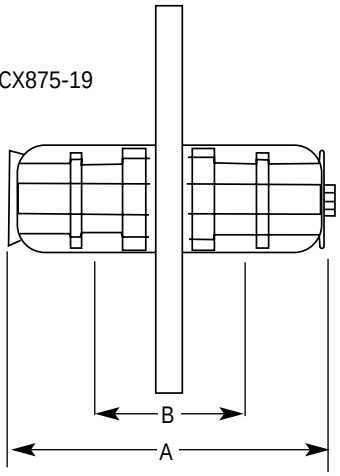
Inner Connector

Includes electrically compensated PTFE anchor disk.

Type	A in (mm)	B in (mm)	Weight lb (kg)
ACX875-20	6.5 (165)	3.12 (79)	5.25 (2.4)
ACX875-19†	6.5 (165)	3.12 (79)	5.25 (2.4)

† Captivated

Type ACX875-19



Gas Barrier (not pictured)

Fixed male inner connectors both ends. Both sides have a pressure port.

Type	A in (mm)	B in (mm)	Weight lb (kg)
RLA875-16	8.19 (208)	4.81 (122)	8 (3.6)

"O" Ring Gasket (not pictured) For EIA flange.

Type
10683-10

Soft Solder Swivel Field Flange (not pictured)

For use on interior runs. Includes soft solder, swivel flange and sleeve with fixed ring. Order inner connector and hardware kit separately.

Type	Weight, lb (kg)
RLA800B-37	4.4 (2.00)

Swivel Flange (not pictured)

Includes fixed ring, sliding ring, silver solder and flux. Order inner connector and hardware kit separately.

Type	Weight, lb (kg)
RLA800B-27	3.34 (1.52)

Fixed Flange (not pictured)

Includes silver solder and flux. Order inner connector and hardware kit separately.

Type	Weight, lb (kg)
RLA800B-28	3.75 (1.70)

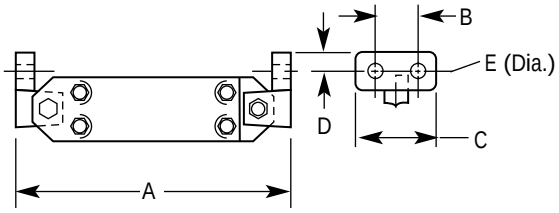
Hardware Kit (not pictured)

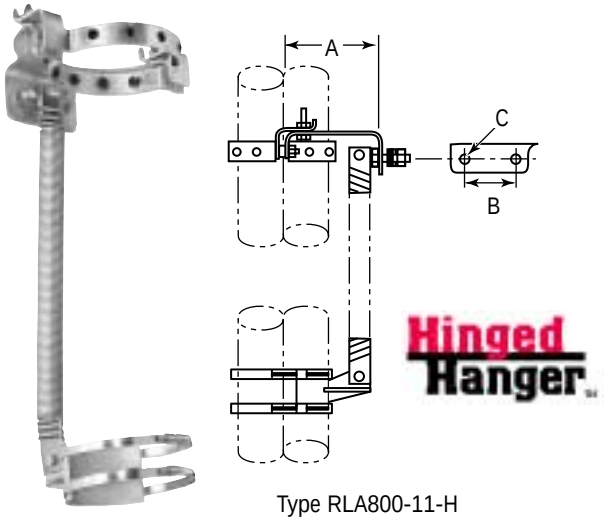
Includes "O" ring, silicone lubricant, nuts, bolts and lock-washers for one flange joint.

Type	Weight, lb (kg)
RLA800-21	1.13 (0.52)

8-3/16" Hangers

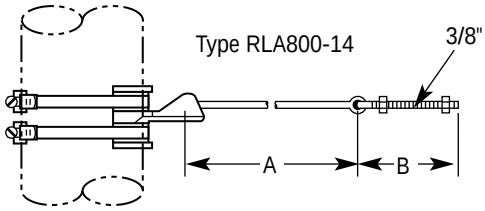
Type RLA800B-13

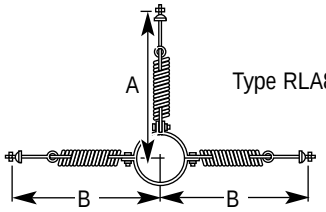




Type RLA800-11-H

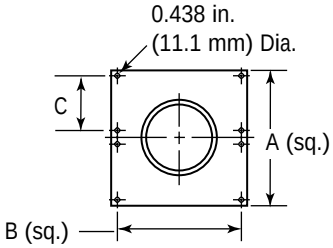
Type RLA800-14





Type RLA800-12

Type RLA800-15



8-3/16" Rigid Hanger

Hangers attach to top section. Use for up to 1000 ft (300 m) of line. Use two for up to 2000 ft (600 m) of line. Mounts to 11/16" (18 mm) diameter holes with included 5/8" diameter hardware.

Type	A in (mm)	B in (mm)	C in (mm)	D in (mm)	E (Dia.) in (mm)	Weight lb (kg)
RLA800B-13	16.7 (424)	2.25 (57)	4.30 (109)	1.0 (25.6)	0.688 (17.5)	27.4 (12.46)

Vertical Spring Hanger

Use at 10 ft (3 m) intervals. Supports the transmission line. Prevents lateral motion, and accommodates differential expansion and contraction. Mounting hardware for "C" holes are included. Hardware for 5/8" diameters. Hinged to open from left or right side - saves installation labor.

Type	A in (mm)	B in (mm)	C in (mm)	Weight lb (kg)
RLA800-11-H	8.0 (203)	3.0 (76)	0.656 (16.7)	13 (5.9)

Lateral Brace

Mounts through single 7/16" (11 mm) hole. Use one near bottom to restrict lateral motion of line while permitting vertical and horizontal movement.

Type	A in (mm)	B in (mm)	Weight lb (kg)
RLA800-14	40.0 (1016)	6.50 (165)	5.0 (2.28)

3-Point Suspension Hanger

Accommodates vertical movement in the horizontal run caused by differential expansion and contraction of the vertical run. Use at 10 ft (3 m) intervals.

Type	A in (mm)	B in (mm)	Weight lb (kg)
RLA800-12	26.7 (678)	22.3 (566)	9.5 (4.3)

Wall Feed Thru

Includes split mounting plate. Uses 3/8" mounting hardware (not included).

Type	A in (mm)	B in (mm)	C in (mm)	Weight lb (kg)
RLA800B-15	16.0 (406)	14.0 (356)	6.0 (152)	17.5 (7.95)

7-3/16" MACXLine® Rigid Transmission Line

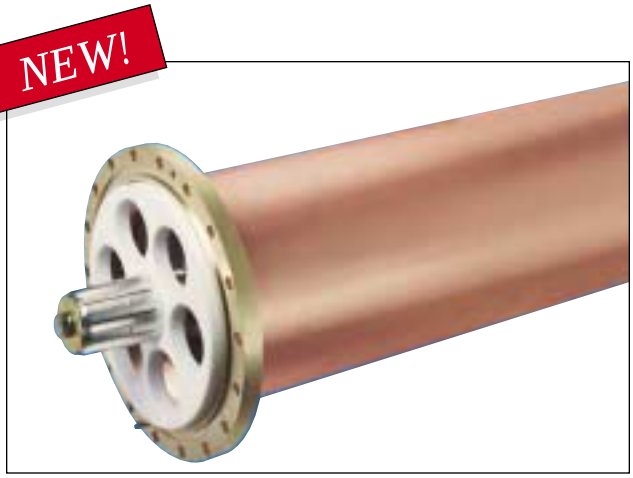
For High Power UHF Broadcasting

Thermally Compensated for Dependable Transmission – Twice the Life of Standard Rigid Lines

Now UHF-TV system designers and engineers have a new choice for 7-3/16" 75 ohm rigid transmission line from Andrew. Thermally compensated for dependable transmission, MACXLine® rigid line features patented technology that can more than double the life of a transmission line system.

MACXLine incorporates a unique patented* bellows section into each inner conductor that compensates for differential expansion between the inner and outer conductors. Mechanical wear from sliding contacts is thus eliminated. This means no shaving dust to arc at the flange and insulator areas. The result is an extremely long life.

*U.S. Patent 4,543,548.



MACX775 Premium Rigid Line Sections

	7-3/16" 75-ohm
20 ft	**MACX775-1**
19.75 ft	**MACX775-2**
19.5 ft	**MACX775-3**

Straight sections with bellows, flanged both ends. Includes captivated inner connector, hardware kit, disk insulators and instructions.

Standard tolerance is ± 0.050 in (1.3 mm).

MACX775 Field Cut Section Kits

	7-3/16" 75-ohm
Field Cut Straight Section, 5 to 20 ft	**MACX775-39**
Includes bellows, swivel field flange kit, hardware kit and installation instructions	
Field Cut Straight Section, up to 5 ft	**MACX775-41**
No bellows. Includes captivated inner connector, field flange kit, hardware kit and installation instructions	

MACX775 Variable Length Sections

	7-3/16" 75-ohm
Variable Length, 5 to 20 ft	**MACX775-42-VAR**
Variable Length, up to 5 ft	**MACX775-40-VAR**

Specify length in inches.

Specifications

Type Number MACX775	**7-3/16" 75-ohm**
Impedance, ohms	75 ± 0.5
Max. Channel	69
Velocity, percent	99.8
Attenuation†	
Average power rating†	
Peak Power Rating, kW*	1400
Dimensions	
Outer Conductor,	
Outside dia., in (mm)	7.150 (182)
Inside dia., in (mm)	7.000 (178)
Inner Conductor	
Outside dia., in (mm)	2.000 (51)
Inside dia., in (mm)	1.920 (49)
Flange Dimensions	
Flange, overall diameter, in (mm)	9.50 (241)
Bolt circle diameter, in (mm)	8.75 (222)
Number of bolts	14
Bolt size	3/8"
Net Weight, lb/ft (kg/m)	8.15 (12.15)
MACX775-1 Channels	
2, 3, 4, 5, 6, 7, 8, 11, 12, 14, 15, 18, 19, 22, 23, 27, 31, 35, 39, 43, 44, 47, 48, 51, 52, 55, 56, 60, 64, 68	
MACX775-2 Channels	
16, 20, 24, 28, 32, 36, 40, 41, 45, 49, 53, 57, 65, 66, 69	
MACX775-3 Channels	
9, 10, 13, 17, 21, 25, 26, 29, 30, 33, 34, 37, 38, 42, 46, 50, 54, 58, 59, 62, 63, 67	

*Based on production test voltage of 47 kV.

† Ask for Bulletin 10429

Note: Channels listed are preferred channels; others may also be acceptable. Contact Andrew for more information. Specifications subject to change without notice.

7-3/16" 75-ohm MACXLine® Rigid Line

Typical System

MACXLine Rigid Line System Components

Item No.	Description	7-3/16" 75-ohm
1	Straight Section	**MACX775 Series**
2	90° Miter Elbow	**ACX775-10ASE-(*)**
3	Rigid Hanger††	**RLA700-13**
4	Hinged Vertical Spring Hanger†	**RLA700-11-H**
5	Lateral Brace	**RLA700-14**
6	3-Point Suspension Hanger	**RLA700-12**
7	Wall Feed Thru	**RLA700-15**
8	Gas Barrier	**RLA775-16**
9	Fine Matching Section (UHF)	**STD775-FT**
–	Fixed Field Flange Kit	**RLA700-28**
–	Hardware Kit	**RLA700-21**
–	Captivated Inner Connector	**ACX775-19**
–	Inner Connector	**ACX775-20**
–	End Cap (to seal line)	**RLA700-50**
–	Reducer, 7-3/16" to 6-1/8"	**RLA775-675**
–	Reducer, 8-3/16" to 7-3/16"	**RLA875-775**
–	Soft Solder Swivel Field Flange Kit	**RLA700-37**
–	Fixed Flange Kit	**RLA700-28**
–	Installation Tool Kit Contains all tools necessary to assemble MACXLine	**MACX775-TK**

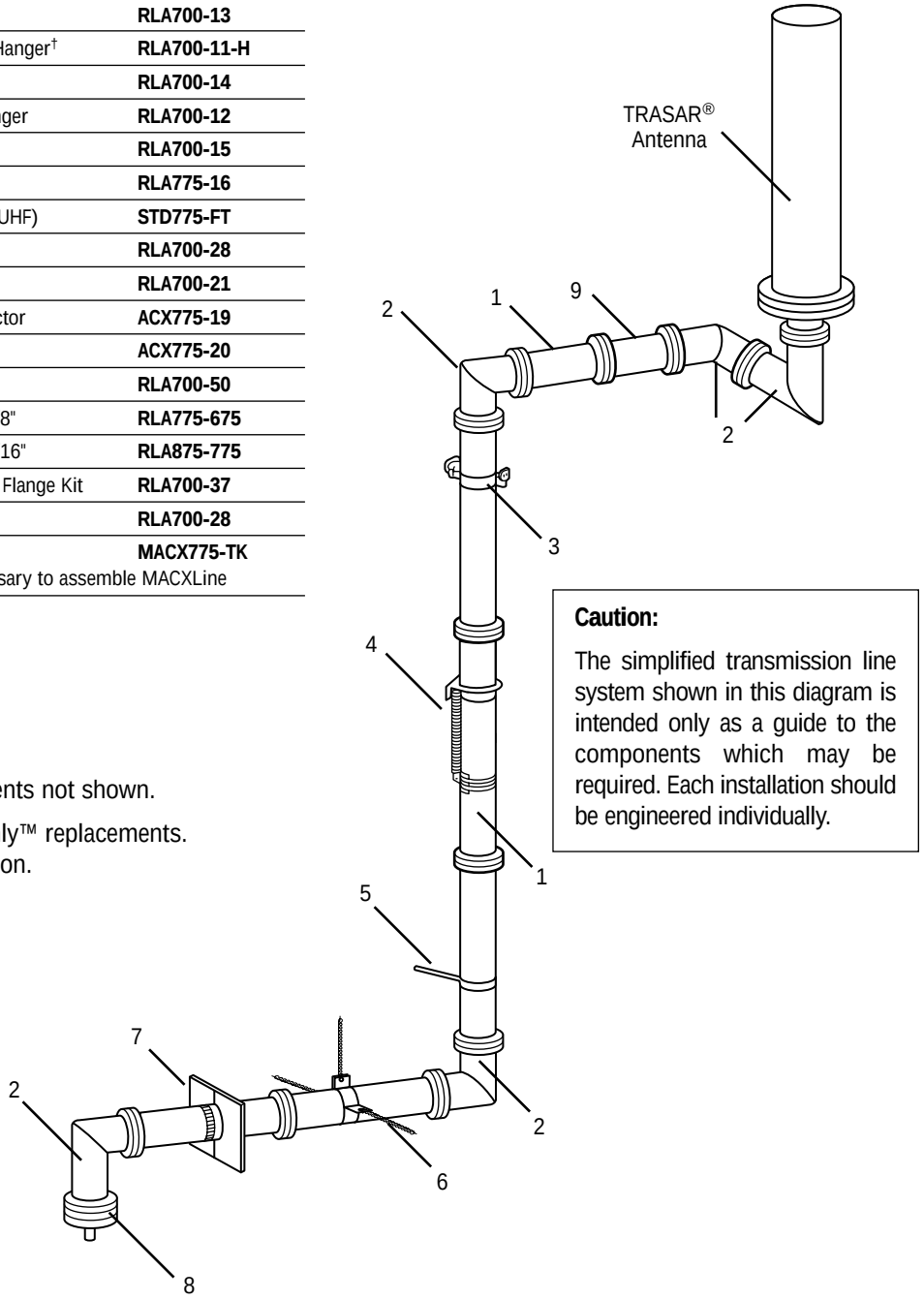
* Specify television channel or frequency.

† Use at 10 ft (3 m) intervals.

†† One for every 1000 ft (300 m).

Contact Andrew for other components not shown.

MACX775 is available as Inners Only™ replacements. Contact Andrew for more information.



Caution:

The simplified transmission line system shown in this diagram is intended only as a guide to the components which may be required. Each installation should be engineered individually.

All flanged items are EIA standard and include inner connector, "O" ring, silicone lubricant and hardware, except when noted. All inner connectors are silver-plated.

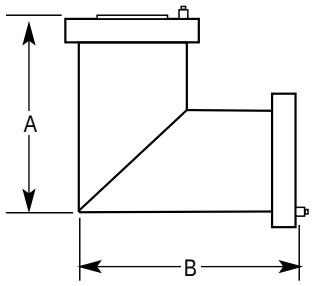
90° Miter Elbow

Swivel flanges, brass construction, reinforced outer.

Type	A in (mm)	B in (mm)	Weight lb (kg)
ACX775-10SE-(*)	12.0 (305)	16.125 (410)	50 (22.68)

* Specify television channel or frequency.

Type ACX775-10SE



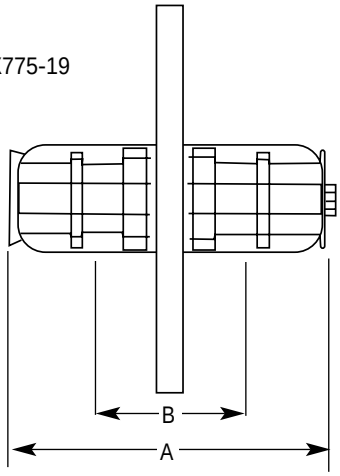
Inner Connector

Includes electrically compensated PTFE anchor disk.

Type	A in (mm)	B in (mm)	Weight lb (kg)
ACX775-20	6.5 (165)	3.12 (79)	5.25 (2.4)
ACX775-19†	6.5 (165)	3.12 (79)	5.25 (2.4)

† Captivated

Type ACX775-19



Gas Barrier (not pictured)

Fixed male inner connectors both ends. Both sides have a pressure port.

Type	A in (mm)	B in (mm)	Weight lb (kg)
RLA775-16	8.19 (208)	4.81 (122)	8 (3.6)

"O" Ring Gasket (not pictured) For EIA flange.

Type
RLA700-51

Soft Solder Swivel Field Flange (not pictured)

For use on interior runs. Includes soft solder, swivel flange and sleeve with fixed ring. Order inner connector and hardware kit separately.

Type	Weight, lb (kg)
RLA700-37	4.4 (2.00)

Swivel Flange (not pictured)

Includes fixed ring, sliding ring, silver solder and flux. Order inner connector and hardware kit separately.

Type	Weight, lb (kg)
RLA700-27	3.34 (1.52)

Fixed Flange (not pictured)

Includes silver solder and flux. Order inner connector and hardware kit separately.

Type	Weight, lb (kg)
RLA700-28	3.75 (1.70)

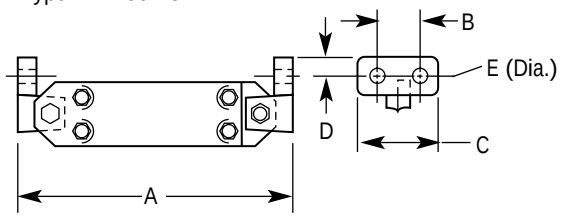
Hardware Kit (not pictured)

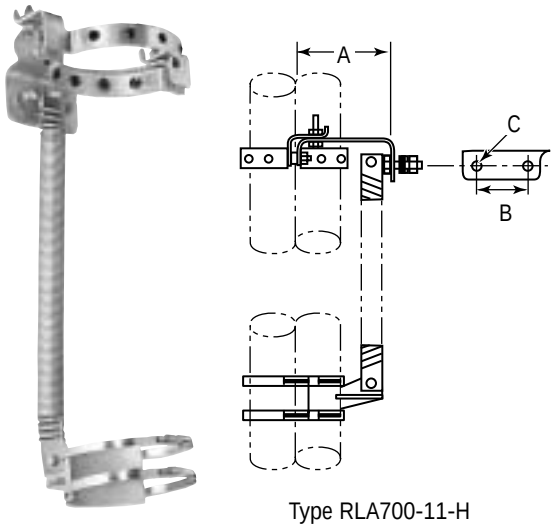
Includes "O" ring, silicone lubricant, nuts, bolts and lock-washers for one flange joint.

Type	Weight, lb (kg)
RLA700-21	1.13 (0.52)

7-3/16" Hangers

Type RLA700-13





Type RLA700-11-H

Hinged Hanger™

7-3/16" Rigid Hanger

Hangers attach to top section. Use for up to 1000 ft (300 m) of line. Use two for up to 2000 ft (600 m) of line. Mounts to 11/16" (18 mm) diameter holes with included 5/8" diameter hardware.

Type	A in (mm)	B in (mm)	C in (mm)	D in (mm)	E (Dia.) in (mm)	Weight lb (kg)
RLA700-13	16.7 (424)	2.25 (57)	4.30 (109)	1.0 (25.6)	0.688 (17.5)	27.4 (12.46)

Vertical Spring Hanger

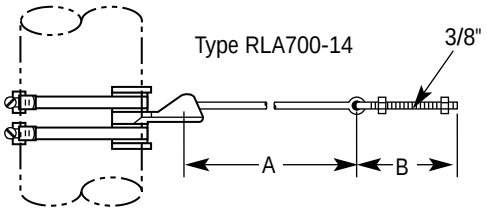
Use at 10 ft (3 m) intervals. Supports the transmission line. Prevents lateral motion, and accommodates differential expansion and contraction. Mounting hardware for “C” holes are included. Hardware for 5/8" diameters. Hinged to open from left or right side - saves installation labor.

Type	A in (mm)	B in (mm)	C in (mm)	Weight lb (kg)
RLA700-11-H	8.0 (203)	3.0 (76)	0.656 (16.7)	13 (5.9)

Lateral Brace

Mounts through single 7/16" (11 mm) hole. Use one near bottom to restrict lateral motion of line while permitting vertical and horizontal movement.

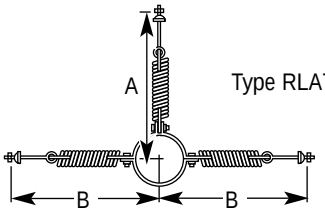
Type	A in (mm)	B in (mm)	Weight lb (kg)
RLA700-14	40.0 (1016)	6.50 (165)	5.0 (2.28)



3-Point Suspension Hanger

Accommodates vertical movement in the horizontal run caused by differential expansion and contraction of the vertical run. Use at 10 ft (3 m) intervals.

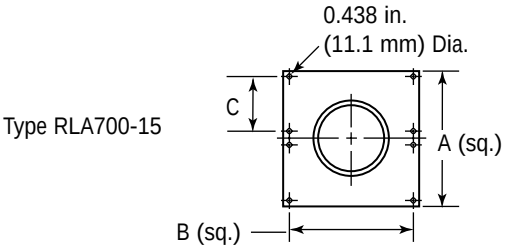
Type	A in (mm)	B in (mm)	Weight lb (kg)
RLA700-12	26.7 (678)	22.3 (566)	9.5 (4.3)



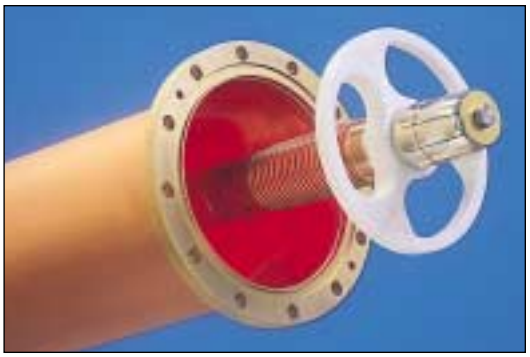
Wall Feed Thru

Includes split mounting plate. Uses 3/8" mounting hardware (not included).

Type	A in (mm)	B in (mm)	C in (mm)	Weight lb (kg)
RLA700-15	16.0 (406)	14.0 (356)	6.0 (152)	17.5 (7.95)



6-1/8" 75-ohm MACXLine® Rigid Line



High Reliability and Long Life

MACXLine rigid line is a high performance coaxial line designed for exceptional reliability and long life. It is ideal for high power VHF and UHF television transmit applications.

Bellows Inner Conductor. A unique patented* bellows section incorporated into each inner conductor compensates for differential expansion between the inner and outer conductors. Mechanical wear from sliding contacts is thus eliminated. This means no shaving dust to arc at the flange and insulator areas. The result is extremely long life, no routine maintenance, and no planned replacement cycles. Also, the need for a redundant run or space for a backup run is eliminated.

PTFE Disk Insulators. Extra-strength, custom PTFE dielectric disk insulators maintain precise mechanical alignment between inner and outer conductors at the high operating temperatures involved. This ensures minimum VSWR and maximum power transfer to your antenna, resulting in full utilization of transmitted power in high ambient temperature environments.

Inner Connectors are captivated and use tension springfingers for maximum contact force. This ensures efficient transmission of power and eliminates overheating which can lead to catastrophic failure. The result is longer life and increased cost effectiveness of the system.

Description

MACXLine rigid line is manufactured from high conductivity copper tubing for low attenuation. Electrical and mechanical characteristics are listed on pages 335 and 338.

All sections come complete with one captivated inner connector, a set of stainless steel flange hardware and a pressure sealing gasket. They are packed in easy to handle cardboard containers.

* Patented United States 4,543,548.

Selection Criteria

Attenuation of a transmission line varies with frequency, temperature and load VSWR. A table of attenuation versus frequency is given on page 338. Values shown are based on an ambient temperature of 20˚C (68˚F) and unity VSWR. The values obtained from this table can be corrected for other temperatures and load VSWRs using Figures 1 and 2 on page 631.

Power Handling. Average power ratings are dependent on frequency, pressurization and VSWR. A table of power ratings is shown on page 338. Peak power ratings do not vary with frequency, but can be significantly increased by pressurization as described on page 633.

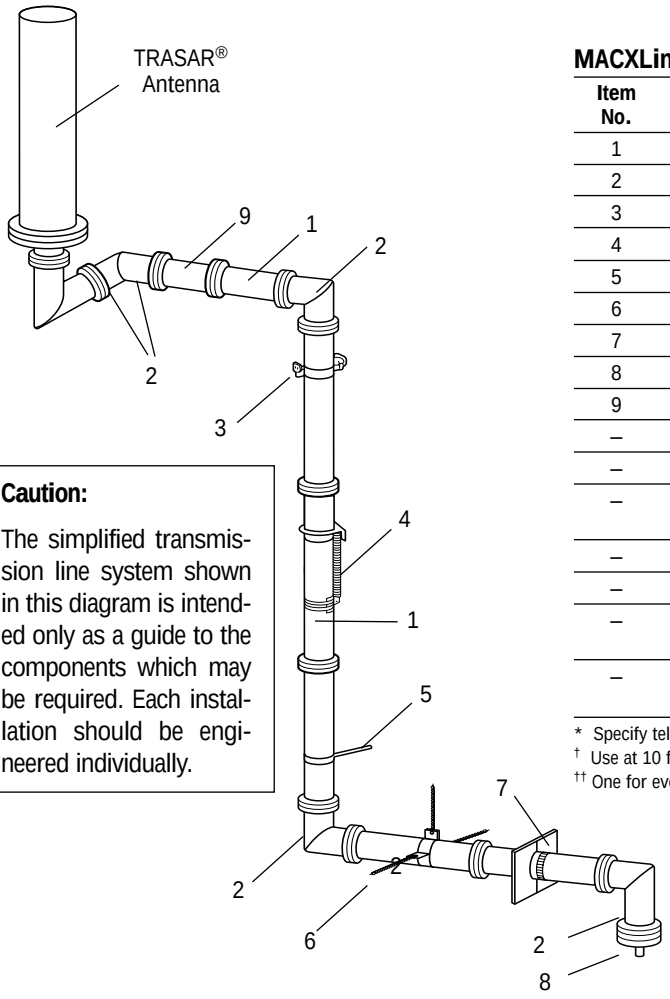
VSWR. MACXLine rigid line features excellent VSWR, typically 1.02 maximum per component. Contact Andrew for information on guaranteed VSWR ratings for your application.

6-1/8" Rigid Coax is also available in an HRLine® Version. Contact Andrew for details.

Recommended MACXLine Section Lengths

Television Channels
20 ft (6.096 m) Sections
2, 3, 5, 6, 7, 8, 11, 12, 14, 15, 18, 19, 23, 27, 31, 35, 39, 40, 43, 44, 47, 48, 52, 56, 60, 64, 68
19.75 ft (6.020 m) Sections
16, 20, 24, 28, 32, 33, 36, 41, 45, 49, 53, 57, 58, 61, 62, 65, 66, 69
19.5 ft (5.944 m) Sections
4, 9, 10, 13, 17, 21, 22, 25, 26, 29, 30, 34, 38, 42, 46, 50, 51, 54, 55, 59, 63, 67
FM Radio Frequencies
20 ft (6.096 m) Sections
88.1 - 95.9 MHz 100.3 - 107.9 MHz
19.5 ft (5.944 m) Sections
96.1 - 98.3 MHz
19.0 ft (5.791 m) Sections
98.5 - 100.1 MHz

6-1/8" 75-ohm MACXLine® Rigid Coax
Typical System



Caution:

The simplified transmission line system shown in this diagram is intended only as a guide to the components which may be required. Each installation should be engineered individually.

MACXLine Rigid Line System Components

Item No.	Description	6-1/8" 75-ohm
1	Straight Section	**MACX675B Series**
2	90° Miter Elbow	**ACX675B-10SE-(*)**
3	Rigid Hanger ††	**RLA600B-13**
4	Vertical Spring Hanger †	**RLA600-11-H**
5	Lateral Brace	**RLA600-14**
6	3-Point Suspension Hanger	**RLA600-12**
7	Wall Feed Thru	**RLA600-15**
8	Gas Barrier	**RLA675-16**
9	Fine Matching Section (UHF)	**STD675B-FT**
–	Fixed Field Flange Kit	**RLA600B-28**
–	Hardware Kit	**RLA600-21**
–	75, 50-ohm Impedance Transformer	**ACX675B-17-(*)**
–	Captivated Inner Connector	**ACX675-19**
–	6-1/8" Bellows Bullet Assembly	**MACX650A-20**
–	Installation Tool Kit Contains all tools necessary to assemble MACXLine®	**MACX675A-TK**
–	Stub Field Adapter, rosin core solder and Emery Cloth for MACXLine® field cuts	**MACX675A-TK-2**

* Specify television channel or frequency.
† Use at 10 ft (3 m) intervals.
†† One for every 1000 ft (3000 m).

Specifications

Type Number	6-1/8" 75-ohm MACX675B
Impedance, ohms	75 ± 0.5
Velocity, percent	99.8
Attenuation, see page	
Average power rating, see page	
Peak Power Rating, kW	1060
Dimensions	
Outer Conductor,	
Outside dia., in (mm)	6.125 (156)
Inside dia., in (mm)	5.981 (152)
Inner Conductor	
Outside dia., in (mm)	1.711 (43)
Inside dia., in (mm)	1.631 (41)
Flange Dimensions	
Flange, Overall Diameter, in (mm)	8.12 (206.2)
Bolt Circle Diameter, in (mm)	7.375 (187)
Number of Bolts	12
Bolt Size	3/8"
Net Weight, lb/ft (kg/m)	4.52 (6.73)

Contact Andrew for other components not shown. "Quick Patch" coaxial patch panels are available for 6-1/8", 75-ohm rigid line. See page 380
Specifications subject to change without notice.

MACXLine Premium Rigid Line Sections

	6-1/8" 75-ohm
20 ft	**MACX675B-1**
19.75 ft	**MACX675B-2**
19.5 ft	**MACX675B-3**
19.0 ft	**MACX675B-6**

Straight sections with bellows, flanged both ends. Includes captivated inner connector, hardware kit, disk insulators and instructions.
Standard tolerance is ± 0.050 in (1.3 mm)

MACXLine Field Cut Section Kits

	6-1/8" 75-ohm
Field Cut Straight Section, 5 to 20 ft	**MACX675B-39**
Includes bellows, fixed field flange kit, hardware kit and installation instructions	
Field Cut Straight Section, up to 5 ft	**MACX675B-41**
No bellows. Includes captivated inner conductor, fixed field flange kit, hardware kit and installation instructions.	

MACXLine Variable Length Sections

	6-1/8" 75-ohm
Variable Length, 5 to 20 ft	**MACX675B-42-VAR**
Variable Length, up to 5 ft	**MACX675B-40-VAR**

Specify length in inches.

6-1/8" 50-ohm Standard Rigid line

Standard Coaxial Transmission Line, available in 6-1/8", 50-ohm size, is used as a component in HRLine® systems and in shorter systems where thermal expansion and contraction are less significant. It has PTFE dielectric insulators and welded flanges.

All flanged sections come complete with one inner connector, a set of stainless steel flange hardware and a pressure sealing gasket.

Electrical Characteristics

Attenuation of a transmission line varies with frequency, temperature, and load VSWR. A table of attenuation versus frequency is given on page 337.

Power Handling. Peak power ratings do not vary with frequency, but can be significantly increased by pressurization. Average power ratings are dependent on frequency, pressurization and VSWR. Average power ratings are given on page 337.

"Quick Patch" coaxial patch panels are available for 6-1/8" 50-ohm line. See page 380.

Recommended STD650B Rigid Line Section Lengths

Television Channels
20 ft (6.096 m) Sections
2, 3, 5, 6, 7, 8, 11, 12, 14, 15, 18, 19, 23, 27, 31, 35, 39, 40, 43, 44, 47, 48, 52, 56, 60, 64, 68
19.75 ft (6.020 m) Sections
16, 20, 24, 28, 32, 33, 36, 41, 45, 49, 53, 57, 58, 61, 62, 65, 66, 69
19.5 ft (5.944 m) Sections
4, 9, 10, 13, 17, 21, 22, 25, 26, 29, 30, 34, 38, 42, 46, 50, 51, 54, 55, 59, 63, 67
FM Radio Frequencies
20 ft (6.096 m) Sections
88.1 - 95.9 MHz 100.3 - 107.9 MHz
19.5 ft (5.944 m) Sections
96.1 - 98.3 MHz
19.0 ft (5.791 m) Sections
98.5 - 100.1 MHz

Specifications

Type No. STD650B	**6-1/8" 50-ohm**
Impedance, ohms	50 ±0.5
Velocity, percent	99.8
Attenuation, see page 337	
Peak Power Rating, kW	1500
Dimensions	
Outer Conductor	
Outside dia., in (mm)	6.125 (156)
Inside dia., in (mm)	5.981 (152)
Inner conductor	
Outside dia., in (mm)	2.6 (66)
Inside dia., in (mm)	2.52 (64)
Net Weight, lb/ft (kg/m)	4.97 (7.40)

STD650B Rigid Line Sections

	6-1/8" 50-ohm
20 ft	**STD650B-1**
19.75 ft	**STD650B-2**
19.5	**STD650B-3**
19.0 ft	**STD650B-6**

STD650B Field Cut Section Kit

	6-1/8" 50-ohm
Field Cut Straight Section, 20 ft	**STD650B-39**

STD650B Variable Length Section

	6-1/8" 50-ohm
Variable Length, 2-20 ft, flanged both ends	**STD650B-40-VAR**

Specify length in inches. Standard tolerance is ± 0.050 in (1.3 mm)

STD650B Flange Dimensions

	6-1/8" 50-ohm
Flange, Overall Diameter, in (mm)	8.12 (206.2)
Bolt Circle Diameter, in (mm)	7.375 (187.3)
Number of Bolts	12
Bolt Size	3.8"

Specifications subject to change without notice.

6-1/8" Rigid Line
Attenuation and Average Power Ratings

50-ohm Standard Line Type or STD650

Television Channel No. (MHz)	Attenuation dB/100 ft (100 m)	Average Power kW
2 (55.25)	0.036 (0.120)	231
3 (61.25)	0.038 (0.126)	219
4 (67.25)	0.040 (0.132)	209
5 (77.25)	0.043 (0.142)	195
6 (83.25)	0.045 (0.147)	187
7 (175.25)	0.066 (0.215)	129
8 (181.25)	0.067 (0.219)	126
9 (187.25)	0.068 (0.222)	124
10 (193.25)	0.069 (0.226)	122
11 (199.25)	0.070 (0.229)	121
12 (205.25)	0.071 (0.233)	119
13 (211.25)	0.072 (0.236)	117
14 (471.25)	0.108 (0.356)	77.7
15 (477.25)	0.109 (0.358)	77.2
16 (483.25)	0.110 (0.360)	76.7
17 (489.25)	0.111 (0.363)	76.3
18 (495.25)	0.111 (0.365)	75.8
19 (501.25)	0.112 (0.367)	75.3
20 (507.25)	0.113 (0.369)	74.9
21 (513.25)	0.113 (0.372)	74.4
22 (519.25)	0.114 (0.374)	74.0
23 (525.25)	0.115 (0.376)	73.5
24 (531.25)	0.115 (0.378)	73.1
25 (537.25)	0.116 (0.380)	72.7
26 (543.25)	0.117 (0.383)	72.3
27 (549.25)	0.117 (0.385)	71.9
28 (555.25)	0.118 (0.387)	71.5
29 (561.25)	0.119 (0.389)	71.1
30 (567.25)	0.119 (0.391)	70.7
31 (573.25)	0.120 (0.393)	70.3
32 (579.25)	0.121 (0.395)	69.9
33 (585.25)	0.121 (0.398)	69.6
34 (591.25)	0.122 (0.400)	69.2
35 (597.25)	0.122 (0.402)	68.9

Television Channel No. (MHz)	Attenuation dB/100 ft (100 m)	Average Power kW
36 (603.25)	0.123 (0.404)	68.5
37 (609.25)	0.124 (0.406)	68.2
38 (615.25)	0.124 (0.408)	67.8
39 (621.25)	0.125 (0.410)	67.5
40 (627.25)	0.126 (0.412)	67.1
41 (633.25)	0.126 (0.414)	66.8
42 (639.25)	0.127 (0.416)	66.5
43 (645.25)	0.127 (0.418)	66.2
44 (651.25)	0.128 (0.420)	65.9
45 (657.25)	0.129 (0.422)	65.6
46 (663.25)	0.129 (0.424)	65.2
47 (669.25)	0.130 (0.426)	64.9
48 (675.25)	0.130 (0.428)	64.6
49 (681.25)	0.131 (0.430)	64.4
50 (687.25)	0.132 (0.432)	64.1
51 (693.25)	0.132 (0.434)	63.8
52 (699.25)	0.133 (0.436)	63.5
53 (705.25)	0.133 (0.437)	63.2
54 (711.25)	0.134 (0.439)	62.9
55 (717.25)	0.134 (0.441)	62.7
56 (723.25)	0.135 (0.443)	62.4
57 (729.25)	0.136 (0.445)	62.1
58 (735.25)	0.136 (0.447)	61.9
59 (741.25)	0.137 (0.449)	61.6
60 (747.25)	0.137 (0.451)	61.4
61 (753.25)	0.138 (0.453)	61.1
62 (759.25)	0.138 (0.454)	60.9
63 (765.25)	0.139 (0.456)	60.6
64 (771.25)	0.140 (0.458)	60.4
65 (777.25)	0.140 (0.460)	60.1
66 (783.25)	0.141 (0.462)	59.9
67 (789.25)	0.141 (0.464)	59.7
68 (795.25)	0.142 (0.465)	59.4
69 (801.25)	0.142 (0.467)	59.2

Standard conditions: For Attenuation – VSWR 1.0, Ambient Temperature 20°C (68°F), Atmospheric Pressure, Dry Air. For Average Power – VSWR 1.0, Ambient Temperature 40°C (140°F), Inner Conductor Temperature 102°C (216°F), Atmospheric Pressure, Dry Air.Attenuation and average power data guaranteed within ±5%.

6-1/8" Rigid Line

Attenuation and Average Power Ratings

75-ohm MACXLine®, Type MACX675B

Television Channel No. (MHz)	Attenuation dB/100 ft (100 m)	Average Power kW
2 (55.25)	0.033 (0.109)	201
3 (61.25)	0.035 (0.114)	191
4 (67.25)	0.036 (0.120)	182
5 (77.25)	0.039 (0.129)	170
6 (83.25)	0.040 (0.134)	164
7 (175.25)	0.060 (0.195)	112
8 (181.25)	0.061 (0.199)	110
9 (187.25)	0.062 (0.202)	109
10 (193.25)	0.063 (0.205)	107
11 (199.25)	0.064 (0.209)	105
12 (205.25)	0.065 (0.212)	104
13 (211.25)	0.066 (0.215)	102
14 (471.25)	0.099 (0.324)	67.8
15 (477.25)	0.099 (0.326)	67.4
16 (483.25)	0.100 (0.328)	66.9
17 (489.25)	0.101 (0.330)	66.5
18 (495.25)	0.101 (0.332)	66.1
19 (501.25)	0.102 (0.334)	65.7
20 (507.25)	0.102 (0.336)	65.3
21 (513.25)	0.103 (0.338)	64.9
22 (519.25)	0.104 (0.340)	64.5
23 (525.25)	0.104 (0.342)	64.1
24 (531.25)	0.105 (0.344)	63.8
25 (537.25)	0.106 (0.346)	63.4
26 (543.25)	0.106 (0.348)	63.0
27 (549.25)	0.107 (0.350)	62.7
28 (555.25)	0.107 (0.352)	62.3
29 (561.25)	0.108 (0.354)	62.0
30 (567.25)	0.109 (0.356)	61.7
31 (573.25)	0.109 (0.358)	61.3
32 (579.25)	0.110 (0.360)	61.0
33 (585.25)	0.110 (0.362)	60.7
34 (591.25)	0.111 (0.364)	60.4
35 (597.25)	0.111 (0.366)	60.0
36 (603.25)	0.112 (0.368)	59.7
37 (609.25)	0.113 (0.369)	59.4
38 (615.25)	0.113 (0.371)	59.1
39 (621.25)	0.114 (0.373)	58.8
40 (627.25)	0.114 (0.375)	58.5
41 (633.25)	0.115 (0.377)	58.3
42 (639.25)	0.115 (0.379)	58.0
43 (645.25)	0.116 (0.380)	57.7
44 (651.25)	0.117 (0.382)	57.4
45 (657.25)	0.117 (0.384)	57.2
46 (663.25)	0.118 (0.386)	56.9
47 (669.25)	0.118 (0.388)	56.6
48 (675.25)	0.119 (0.389)	56.4
49 (681.25)	0.119 (0.391)	56.1
50 (687.25)	0.120 (0.393)	55.9
51 (693.25)	0.120 (0.395)	55.6
52 (699.25)	0.121 (0.397)	55.4
53 (705.25)	0.121 (0.398)	55.1
54 (711.25)	0.122 (0.400)	54.9
55 (717.25)	0.122 (0.402)	54.5
56 (723.25)	0.123 (0.404)	54.4
57 (729.25)	0.124 (0.405)	54.2
58 (735.25)	0.124 (0.407)	53.9
59 (741.25)	0.125 (0.409)	53.7
60 (747.25)	0.125 (0.410)	53.5
61 (753.25)	0.126 (0.412)	53.3
62 (759.25)	0.126 (0.414)	53.1
63 (765.25)	0.127 (0.415)	52.8
64 (771.25)	0.127 (0.417)	52.6
65 (777.25)	0.128 (0.419)	52.4
66 (783.25)	0.128 (0.420)	52.2
67 (789.25)	0.129 (0.422)	52.0
68 (795.25)	0.129 (0.424)	51.8
69 (801.25)	0.130 (0.425)	51.6

Standard conditions: For Attenuation – VSWR 1.0, Ambient Temperature 20°C (68°F), Atmospheric Pressure, Dry Air. For Average Power – VSWR 1.0, Ambient Temperature 40°C (140°F), Inner Conductor Temperature 102°C (216°F), Atmospheric Pressure, Dry Air. Attenuation and average power data guaranteed within ±5%.

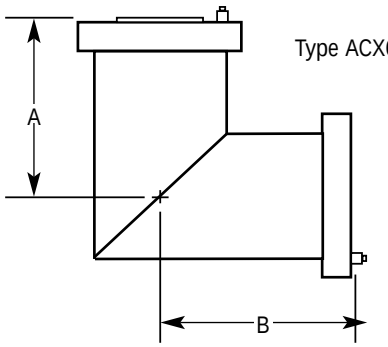
All flanged items are EIA standard and include inner connector, “O” ring, silicone grease and hardware, except when noted. All inner connectors are silver-plated.

90° Miter Elbow

Swivel flanges, brass construction, reinforced outer.

Type	Impedance ohms	A in (mm)	B in (mm)	Weight lb (kg)
ACX675B-10SE-(*)	75	7.00 (178)	14.00 (356)	29.0 (13.2)
ACX650B-10SE	50	5.50 (140)	5.50 (140)	25.0 (11.4)

* Specify television channel or frequency.



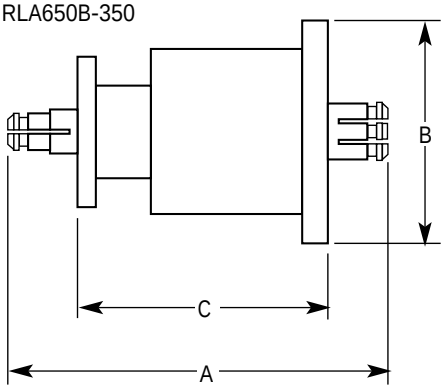
Type ACX675B-10SE

Reducer 50-ohm

Includes two inner connectors. Not a gas barrier.

Line Size	Type	A in (mm)	B in (mm)	C in (mm)	Weight lb (kg)
6-1/8" to 3-1/8"	**RLA650B-350**	11.69 (297)	8.13 (207)	7.13 (181)	20.0 (9.1)

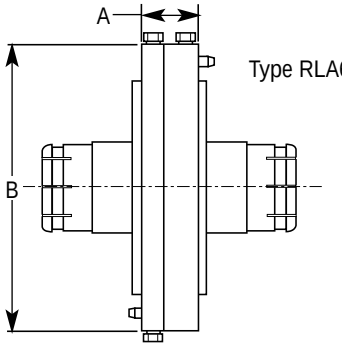
Type RLA650B-350



Gas Barrier

Fixed male inner connectors both ends. Pressure port both sides.

Type	Impedance ohms	A in (mm)	B in (mm)	Weight lb (kg)
RLA650-16	50	1.63 (41)	8.13 (206)	19.4 (8.8)
RLA675-16	75	2.00 (51)	8.13 (206)	19.4 (8.8)



Type RLA650-16

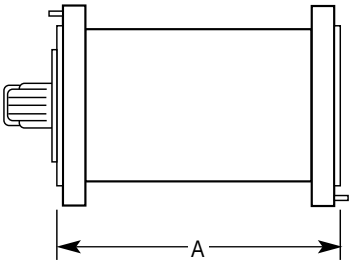
6-1/8" Impedance Transformer

Connects 6-1/8", 75-ohm line to 6-1/8", 50-ohm line. Includes inner connector for 50-ohm. Not a gas barrier.

Type	Channel No.	A in (mm)	Weight lb (kg)
ACX675B-17-2	2	56.28 (1430)	45 (20.0)
ACX675B-17-3	3	51.35 (1304)	42 (19.1)
ACX675B-17-4	4	47.28 (1201)	40 (18.2)
ACX675B-17-5	5	43.86 (1114)	38 (17.3)
ACX675B-17-6	6	40.95 (1040)	36 (16.4)
ACX675B-17-7	7	21.19 (538)	25 (11.4)
ACX675B-17-8	8	20.64 (524)	25 (11.4)
ACX675B-17-9	9	20.13 (511)	25 (11.4)
ACX675B-17-10	10	19.65 (499)	25 (11.4)
ACX675B-17-11	11	19.20 (488)	25 (11.4)
ACX675B-17-12	12	18.77 (477)	25 (11.4)
ACX675B-17-13	13	18.37 (467)	25 (11.4)
ACX675B-17-(*)	14 thru 26	13.22 (336)	22 (10.0)
ACX675B-17-(*)	27 thru 39	11.65 (296)	20 (9.1)
ACX675B-17-(*)	40 thru 53	10.46 (266)	19 (8.7)
ACX675B-17-(*)	54 thru 69	9.52 (242)	18 (8.2)

* Specify channel number

Type ACX675B-17



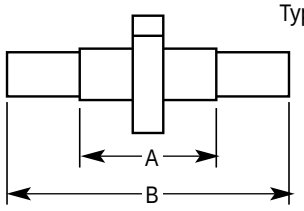
Fine Matcher

6-1/8" fine matching selection, seven tuners, 18 inches face to face (UHF only). Includes one inner connector and one flange hardware kit.

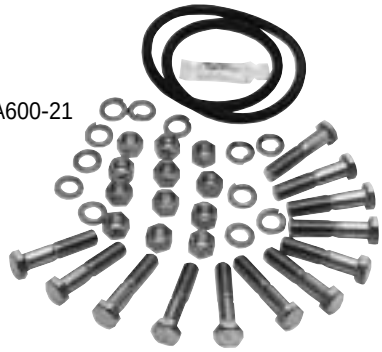
	Type
6-1/8" 50-ohm	**STD650B-FT**
6-1/8" 75-ohm	**ACX675B-FT**

Accessories for 6-1/8" Rigid Line

Type ACX675-20



Type RLA600-21



Type 10683-10

Type RLS600B-37

Type RLA600B-27

Type RLA600B-28

Male-to-Male Adapter

Joins two components having captivated inner connectors. 6 in (150 mm) length. No inner connectors. Includes hardware. (Not illustrated).

Type	Weight, lb (kg)
31472	18 (8.16)

Inner Connector

Includes electrically compensated PTFE anchor disk.

Type	Impedance ohms	A in (mm)	B in (mm)	Weight lb (kg)
ACX650-20	50	2.44 (62)	5.50 (140)	2.10 (0.96)
ACX675-20	75	2.40 (61)	5.40 (137)	2.10 (0.96)
ACX675-19†	75	2.40 (61)	5.40 (137)	2.10 (0.96)

† Captivated.

Hardware Kit

Includes “O” ring, silicone lubricant, nuts, bolts and lockwashers for one flange joint.

Type	Weight, lb (kg)
RLA600-21	1.13 (0.52)

“O” Ring Gasket

For EIA flange.

Line Size	Type
6-1/8"	**10683-10**

Soft Solder Swivel Field Flange

For use on interior runs. Includes soft solder, swivel flange and sleeve with fixed ring. Order inner connector and hardware kit separately.

Type	Weight, lb (kg)
RLA600B-37	4.4 (2.00)

Swivel Flange

Includes fixed ring, sliding ring, silver solder and flux. Order inner connector and hardware kit separately.

Type	Weight, lb (kg)
RLA600B-27	3.34 (1.52)

Fixed Flange

Includes silver solder and flux. Order inner connector and hardware kit seperately.

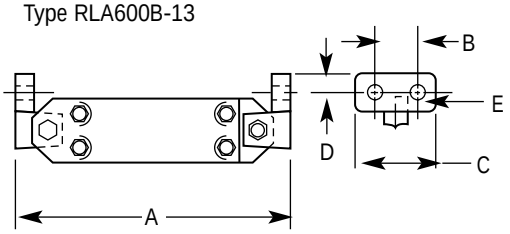
Type	Weight, lb (kg)
RLA600B-28	3.75 (1.70)

6-1/8" Rigid Hanger

Hangers attach to top section. Use one for up to 1000 ft (300 m) of line. Use two for up to 2000 ft (600 m) of line. Mounts to 11/16 in (18 mm) diameter holes with included 5/8" diameter hardware.

Type	A in (mm)	B in (mm)	C in (mm)	D in (mm)	E in (mm)	Weight lb (kg)
RLA600B-13	14.50 (368)	2.25 (57)	4.25 (108)	1.0 (25.6)	0.688 (17.5)	21.6 (9.82)

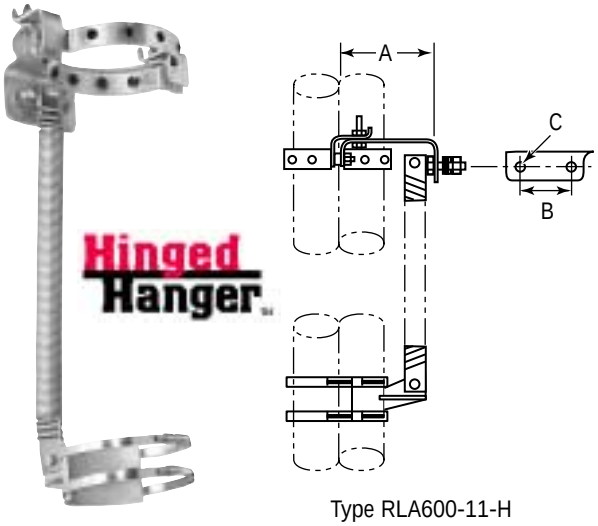
Type RLA600B-13



Vertical Spring Hanger

Use at 10 ft (3 m) intervals. Supports the transmission line. Prevents lateral motion, and accommodates differential expansion and contraction. Mounting hardware for "D" holes are included. Hardware for 5/8" diameters. Hinged to open from left or right side - saves installation labor.

Type	A in (mm)	B in (mm)	C in (mm)	Weight lb (kg)
RLA600-11-H	6.25 (159)	2.38 (60)	0.656 (16.7)	12.5 (5.7)



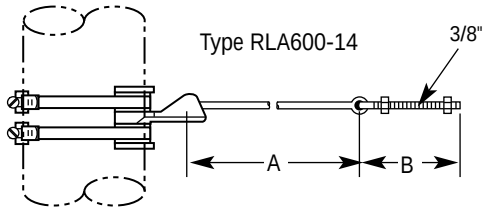
Type RLA600-11-H

Lateral Brace

Mounts through single 7/16 in (11 mm) hole. Use one near bottom to restrict lateral motion of line while permitting vertical and horizontal movement.

Type	A in (mm)	B in (mm)	Weight lb (kg)
RLA600-14	40.0 (1016)	6.50 (165)	4.13 (1.88)

Type RLA600-14

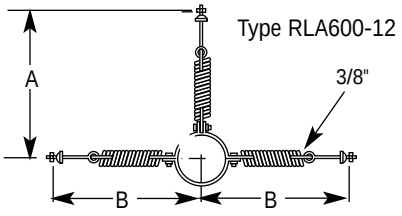


3-Point Suspension Hanger

Accommodates vertical movement in the horizontal run caused by differential expansion and contraction of the vertical run. Use at 10 ft (3 m) intervals.

Type	A in (mm)	B in (mm)	Weight lb (kg)
RLA600-12	26.0 (660)	20.9 (531)	9.38 (4.26)

Type RLA600-12

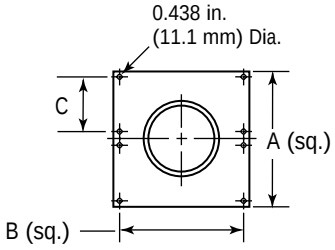


Wall Feed Thru

Includes split mounting plate. Uses 3/8" mounting hardware (not included).

Type	A in (mm)	B in (mm)	C in (mm)	Weight lb (kg)
RLA600-15	14.0 (356)	12.8 (325)	5.8 (147.3)	17.5 (7.95)

Type RLA600-15



6-1/8" Inners Only™

Inner Conductor Replacement Systems

Retrofit Your Existing Rigid Line with Inners Only at Half the Cost!

Despite tight capital budgets, you can't afford to go off the air! Transmission line systems require maintenance after just ten years to avoid premature burnout of bullet-style connectors. By upgrading with Inners Only before your transmission line fails, you avoid the disaster of dead air.

Andrew Inners Only connector replacement systems are available for other manufacturers' rigid lines. Contact Andrew for details.

MACXLine® Inners Only Replacement Systems (75 ohms)

MACXLine Inner Only inner conductors are preferred for two reasons: MACXLine lengths are identical to those of standard 6-1/8", 75-ohm rigid line, assuring that MACXLine can be used for every application. MACXLine inner conductors install quickly since they are similar to your old ones, except for the bellows; this allows retro-fitting to be done in stages during the interval a station is off the air every night.

All Inners Only replacement sections include captivated inner connector, hardware kit for EIA flange, and installation instructions.

Inner Conductors for Straight Sections

Type Number	
Full Length Section	**MACX675A-25-(*)**
Field-Cut Section, 5 to 20 ft (Includes bellows)	**MACX675A-26**
Field-Cut Section, up to 5 ft (No bellows)	**MACX675A-24**
Installation tool kit	**MACX675A-TK**
Field cut tool kit	**MACX675A-TK-2**

* Insert length of outer conductor, flange face to flange face in inches.

3-1/8" 50-ohm MACXLine® Rigid Coaxial Line

Dependable 3-1/8", 50-ohm Transmission Line for Television and AM/FM Radio. . .

Only from Andrew!

- *High Reliability*
- *Long Life*
- *Bellows Prevents Sliding of Bullet*
- *Ideal Inners Only™ Replacement*

MACXLine rigid line is a designed for exceptional performance and long life. It is ideal for high power VHF and UHF television transmit applications.

3-1/8" MACXLine flanges and inner connectors are fully compatible with both EIA Standard RS-225 and IEC Recommendations.

Bellows Inner Conductor

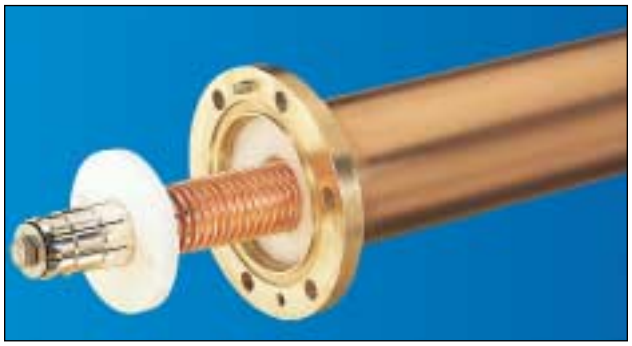
A unique patented bellows section incorporated into each inner conductor compensates for differential expansion between the inner and outer conductors. Mechanical wear from sliding contacts is thus eliminated. This means no shaving dust to arc at the flange and insulator areas. The result is extremely long life, no routine maintenance, and no planned replacement cycles.

VSWR. MACXLine rigid line features excellent VSWR, typically 1.02 maximum per component and 1.07 maximum per system. Optimized systems having 1.05 or better VSWR across the operating channel are usually available. Contact Andrew for information on guaranteed VSWR ratings for your application. Attenuation and average power ratings are on page 345.

3-1/8" rigid coax is also available in an HRLine® version. Contact Andrew for details.

Recommended Rigid Line Section Lengths

Television Channels
20 ft (6.096 m) Sections
2, 3, 5, 6, 7, 8, 11, 12, 14, 15, 18, 19, 23, 27, 31, 35, 39, 40, 43, 44, 47, 48, 52, 56, 60, 64, 68
19.75 ft (6.020 m) Sections
16, 20, 24, 28, 32, 33, 36, 41, 45, 49, 53, 57, 58, 61, 62, 65, 66, 69
19.5 ft (5.944 m) Sections
4, 9, 10, 13, 17, 21, 22, 25, 26, 29, 30, 34, 38, 42, 46, 50, 51, 54, 55, 59, 63, 67
FM Radio Frequencies
20 ft (6.096 m) Sections
88.1 - 95.9 MHz 100.3 - 107.9 MHz
19.5 ft (5.944 m) Sections
96.1 - 98.3 MHz
19.0 ft (5.791 m) Sections
98.5 - 100.1 MHz



Specifications

Type Number	MACX350
Impedance, ohms	50 ± 0.5
Max. Frequency, MHz	1600
Velocity, percent	99.7
Peak Power Rating, kW*	440
Net Weight, lb/ft (kg/m)	2.22 (3.30)

*Based on production test voltage of 19 kV.

Ordering Information

Straight Line Sections	Type Numbers
20 ft *	**MACX350A-1**
19.75 ft *	**MACX350A-2**
19.5 ft *	**MACX350A-3**
19.0 ft *	**MACX350A-6**
Variable Length, up to 5 ft***	**MACX350A-40-VAR**
Variable Length, 5 to 20 ft **	**MACX350A-42-VAR**
90° Miter Elbow	**ACX350-10SE**
Inner Conductor Assembly	**MACX350A-25-VAR**
Field Cut Straight Section, 5 to 20 ft **	**MACX350A-39**
Field Cut Straight Section, up to 5 ft ***	**MACX350A-41**
Accessories	
Captivated Inner Connector	**ACX350-19**
Fixed Field Flange Kit	**15840**
Hardware Kit	**69226-2**
Hinged Vertical Spring Hanger †	**RLA300-11-H**
3-Point Suspension Hanger	**RLA300-12**
Rigid Hanger ††	**13927**
Lateral Brace	**RLA300-14**
Wall Feed Thru	**RLA300-15**
Gas Barrier	**RLA350-16**

* Straight Sections with bellows, flanged both ends. Includes captivated inner connector, hardware kit, disk insulators and instructions.

** Includes bellows, captivated inner connector, fixed field flange kit, hardware kit and installation instructions.

***No bellows. Fixed field flange kit, hardware kit and installation instructions.

† Use at 10 ft (3 m) intervals.

†† One for every 300 ft (90 m).

3-1/8" 50-ohm Standard Rigid Line

Standard Rigid Coaxial Transmission Line is Available in 3-1/8", 50-ohm Size

All flanged sections come complete with one inner connector, a set of stainless steel flange hardware and a pressure sealing gasket.

Standard Rigid Line Components – 3-1/8" 50-ohm	
20 ft, flanged both ends	**STD350-1**
19.75 ft, flanged both ends	**STD350-2**
19.5 ft, flanged both ends	**STD350-3**
19.0 ft, flanged both ends	**STD350-6**
20 ft, unflanged	**STD350-31**
Field Cut, 20 ft, flanged one end*	**STD350-39**
Field Cut, 20 ft, unflanged	**STD350-29- (**)**
Variable Length, flanged both ends	**STD350-40- (**)**
Variable Length, flanged one end*	**STD350-45- VAR**
Specifications – STD350	
Impedance, ohms	50
Max. Frequency, MHz	1588
Velocity, percent	99.8
Attenuation, see table	
Average Power Rating, see table	
Peak Power Rating, kW	440
Dimensions	
Outer Conductor,	
outside dia. in (mm)	3.125 (79)
inside dia., in (mm)	3.027 (77)
Inner Conductor,	
outside dia., in (mm)	1.315 (33)
inside dia, in (mm)	1.231 (31)
Net Weight, lb/ft (kg/m)	3.0 (4.5)
Standard Flange Dimensions	
Flange, overall diameter, in (mm)	5.19 (131.8)
Bolt Circle Diameter, in (mm)	4.375 (111.1)
Number of bolts	6
Bolt size	3/8"

* Order one flange or coupling separately.

** Specify length in inches. Standard tolerance is ± 1/8 in (3 mm).

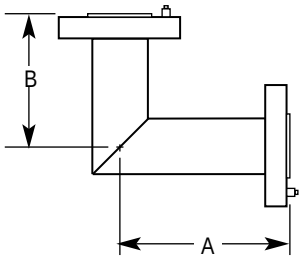
Attenuation and Average Power Ratings for 3-1/8" 50-ohm, Rigid Line, Type MACX350A or STD350

Television Channel No. (MHz)	Attenuation dB/100 ft (100 m)	Average Power kW
* (1.00)	0.010 (0.033)	440
2 (55.25)	0.071 (0.235)	66.7
3 (61.25)	0.075 (0.247)	63.3
4 (67.25)	0.079 (0.259)	60.4
5 (77.25)	0.084 (0.278)	56.4
6 (83.25)	0.088 (0.288)	54.3
7 (175.25)	0.128 (0.420)	37.3
8 (181.25)	0.130 (0.427)	36.7
9 (187.25)	0.132 (0.434)	36.1
10 (193.25)	0.134 (0.441)	35.5
11 (199.25)	0.137 (0.448)	35.0
12 (205.25)	0.139 (0.455)	34.5
13 (211.25)	0.141 (0.461)	34.0
14 (471.25)	0.211 (0.692)	22.7
15 (477.25)	0.212 (0.696)	22.5
16 (483.25)	0.214 (0.701)	22.4
17 (489.25)	0.215 (0.705)	22.2
18 (495.25)	0.218 (0.710)	22.1
19 (501.25)	0.218 (0.714)	22.0
20 (507.25)	0.219 (0.718)	21.8
21 (513.25)	0.220 (0.723)	21.7
22 (519.25)	0.222 (0.727)	21.6
23 (525.25)	0.223 (0.731)	21.4
24 (531.25)	0.224 (0.735)	21.3
25 (537.25)	0.225 (0.739)	21.2
26 (543.25)	0.227 (0.744)	21.1
27 (549.25)	0.228 (0.748)	21.0
28 (555.25)	0.229 (0.752)	20.9
29 (561.25)	0.230 (0.756)	20.7
30 (567.25)	0.232 (0.760)	20.6
31 (573.25)	0.233 (0.764)	20.5
32 (579.25)	0.234 (0.768)	20.4
33 (585.25)	0.235 (0.772)	20.3
34 (591.25)	0.237 (0.766)	20.2
35 (597.25)	0.238 (0.780)	20.1
36 (603.25)	0.239 (0.784)	20.0
37 (609.25)	0.240 (0.788)	19.9
38 (615.25)	0.241 (0.792)	19.8
39 (621.25)	0.243 (0.796)	19.7
40 (627.25)	0.244 (0.800)	19.6
41 (633.25)	0.245 (0.804)	19.5
42 (639.25)	0.246 (0.807)	19.4
43 (645.25)	0.247 (0.811)	19.3
44 (651.25)	0.248 (0.815)	19.2
45 (657.25)	0.250 (0.819)	19.1
46 (663.25)	0.251 (0.823)	19.1
47 (669.25)	0.252 (0.826)	19.0
48 (675.25)	0.253 (0.830)	18.9
49 (681.25)	0.254 (0.834)	18.8
50 (687.25)	0.255 (0.838)	18.7
51 (693.25)	0.256 (0.841)	18.6
52 (699.25)	0.258 (0.845)	18.6
53 (705.25)	0.259 (0.849)	18.5
54 (711.25)	0.260 (0.852)	18.4
55 (717.25)	0.261 (0.856)	18.3
56 (723.25)	0.262 (0.860)	18.2
57 (729.25)	0.263 (0.863)	18.2
58 (735.25)	0.264 (0.867)	18.1
59 (741.25)	0.265 (0.870)	18.0
60 (747.25)	0.267 (0.874)	17.9
61 (753.25)	0.267 (0.878)	17.9
62 (759.25)	0.269 (0.881)	17.8
63 (765.25)	0.270 (0.885)	17.7
64 (771.25)	0.271 (0.888)	17.7
65 (777.25)	0.272 (0.892)	17.6
66 (783.25)	0.273 (0.895)	17.5
67 (789.25)	0.274 (0.899)	17.4
68 (795.25)	0.275 (0.902)	17.4
69 (801.25)	0.276 (0.906)	17.3

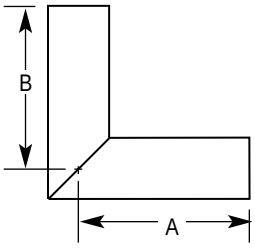
* Broadcast Radio Band

Standard conditions: For Attenuation – VSWR 1.0, Ambient Temperature 20°C (68°F), Atmospheric Pressure, Dry Air. For Average Power – VSWR 1.0, Ambient Temperature 40°C (140°F), Inner Conductor Temperature 102°C (216°F), Atmospheric Pressure, Dry Air. Attenuation and average power data guaranteed within ±5%.

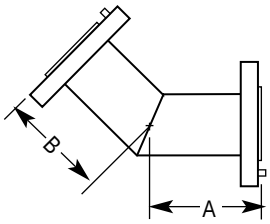
Accessories for 3-1/8" Rigid Line



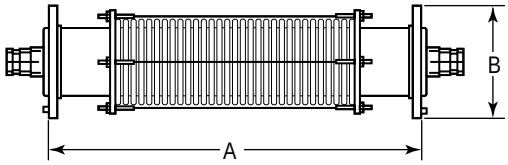
Type ACX350-10SE



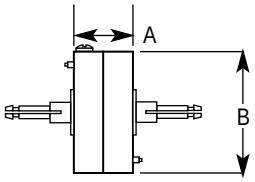
Type ACX350-10SE-3



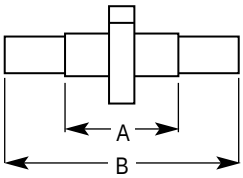
Type 1162



Type 19209C



Type RLA350-16



Type ACX350-20

All flanged items are EIA standard and include inner connector, “O” ring, silicone grease and hardware, except when noted. All inner connectors are silver-plated.

90° Miter Elbow

Swivel flanges, brass construction.

Type	Impedance ohms	A in (mm)	B in (mm)	Weight lb (kg)
ACX350-10SE	50	4.19 (106)	4.19 (106)	10.7 (4.86)

90° Miter Elbow

Unflanged. Does not include inner connector. Unpressurized.

Type	Impedance ohms	A in (mm)	B in (mm)	Weight lb (kg)
ACX350-10SE-3	50	4.00 (102)	4.00 (102)	2.63 (1.20)

45° Miter Elbow

Swivel Flanges, brass construction.

Type	Impedance ohms	A in (mm)	B in (mm)	Weight lb (kg)
1162	50	4.50 (114)	4.50 (114)	9.0 (4.09)

Flexible Section

Accommodates movement and angles up to 30° (± 15°). Maximum offset 0.5 in (13 mm). Captivated inner conductor. Includes two inner connectors.
A = 18 in (457 mm) B = 5.19 in (132 mm)

Swivel Flanges, unplated, has retaining cables to prevent expansion beyond 18 in (457 mm) under pressurization, while permitting compression and bending.
Weight 13 lb (6 kg). .....Type **19209C**

Gas Barrier

Fixed male inner connectors both ends. Both sides have a pressure port.

Type	Impedance ohms	A in (mm)	B in (mm)	Weight lb (kg)
RLA350-16	50	1.00 (25)	5.19 (132)	4.75 (2.2)

Inner Connector

Includes electrically compensated PTFE anchor disk.

Type	Impedance ohms	A in (mm)	B in (mm)	Weight lb (kg)
ACX350-20	50	1.69 (43)	4.13 (105)	0.63 (0.29)
ACX350-19*	50	1.69 (43)	4.13 (105)	0.63 (0.29)

* Captivated

“Quick Patch” Coaxial Patch Panels and Directional Couplers are available for 3-1/8" 50 ohm line. See pages 378 and 380.

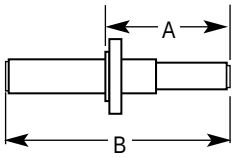
All flanged items are EIA standard and include inner connector “O” ring, silicone grease and hardware, except when noted. All inner connectors are silver-plated.

Adapter Inner Connector

50-51.5 ohm.

Type	A in (mm)	B in (mm)	Weight lb (kg)
4852	2.16 (55)	3.62 (92)	0.31 (0.141)

Type 4852



End Terminal

For strap connection. Gas tight with pressure port.

Type	Weight, lb (kg)
2062	6.3 (2.86)

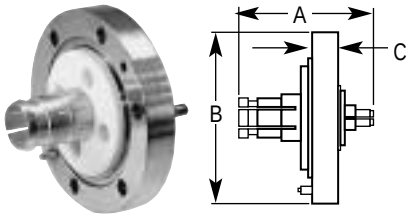
Type 2062

Reducer, 50-ohm

Includes two inner connectors. Not a gas barrier.

Line Size	Type	A in (mm)	B in (mm)	C in (mm)	Weight lb (kg)
3-1/8" to 1-5/8"	**1861**	4.15 (105)	5.19 (132)	0.88 (22)	5.6 (2.6)

Type 1861



Type N Female Adapter

Mates with UG-21. Gas tight with pressure port. Includes inner connector and hardware.

Type	Weight, lb (kg)
2262	5.6 (2.55)

Type 2262

Male-to-Male Adapter

Joins two components having captivated inner connectors. 6 in (150 mm) length. No inner connectors. Includes hardware.

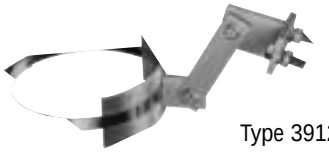
Type	Weight, lb (kg)
23187	6 (2.72)

Type 23187

Horizontal Hanger

Permits axial movement caused by expansion and contraction. Includes clamps and hardware. Use at 10 ft (3 m) intervals.

Type	Weight, lb (kg)
3912	0.8 (0.36)



Type 3912

Accessories for 3-1/8" Rigid Line

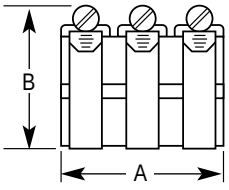
Type 69226-2

Type 10683-405

Type ACX350-37

Type 18200

Type 15840



Type 4862A

All flanged items are EIA standard and include inner connector, “O” ring, silicone grease and hardware, except when noted. All inner connectors are silver-plated.

Hardware Kit

Includes “O” ring, silicone lubricant, nuts, bolts and lockwashers for one flange joint.

Type	Weight, lb (kg)
69226-2	0.50 (0.23)

“O” Ring Gasket

For EIA flange.

Type
10683-405

Soft Solder Swivel Field Flange

For use on interior runs. Includes soft solder, swivel flange and sleeve with fixed ring. Order inner connector and hardware kit separately.

Type	Weight, lb (kg)
ACX350-37	2.9 (1.32)

Swivel Flange

Includes fixed ring, sliding ring, silver solder and flux. Order inner connector and hardware kit separately.

Type	Weight, lb (kg)
18200	2.00 (0.91)

Fixed Flange

Includes silver solder and flux. Order inner connector and hardware kit separately.

Type	Weight, lb (kg)
15840	2.00 (0.91)

Unpressurized Coupling

Connects unflanged lines and fittings. Includes supported inner connector and sleeve outer connector with clamps.

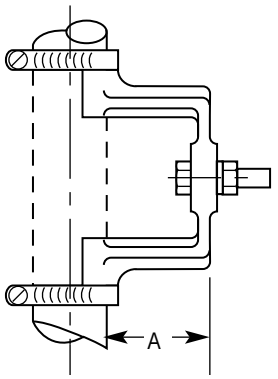
Type	A in (mm)	B in (mm)	Weight, lb (kg)
4862A	3.50 (89)	3.56 (90)	1.5 (0.68)

3-1/8" Rigid Hanger

Hangers attach to top section. Use one for up to 300 ft (90 m) of line and one for each additional 300 ft (90 m) of line. Mounts to 9/16 in (14 mm) diameter hole with included 1/2" diameter hardware.

Type	A in (mm)	Weight lb(kg)
13927	2.25 (57.2)	6.3 (2.86)

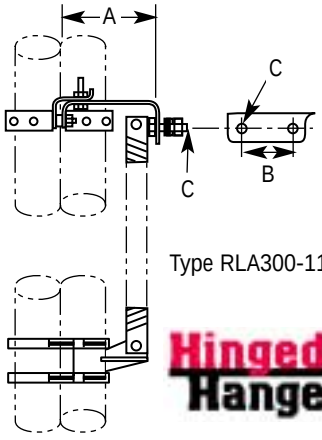
Type 13927



Vertical Spring Hanger

Use at 10 ft (3 m) intervals. Supports the transmission line. Prevents lateral motion, and accommodates differential expansion and contraction. Mounting hardware for "D" holes is included. Hardware is 1/2".

Type	A in (mm)	B in (mm)	C in (mm)	Weight lb (kg)
RLA300-11-H	4.13 (104.9)	2.25 (57.2)	0.53 (13.5)	6.0 (2.73)



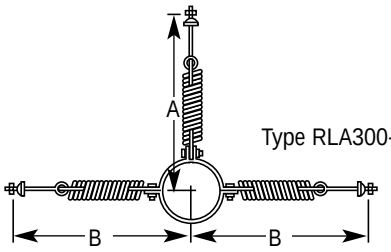
Type RLA300-11-H

Hinged Hanger™

3-Point Suspension Hanger

Accommodates vertical movement in the horizontal run caused by differential expansion and contraction of the vertical run. Use at 10 ft (3 m) intervals.

Type	A in (mm)	B in (mm)	Weight lb(kg)
RLA300-12	26.0 (660)	19.0 (483)	9.38 (4.26)



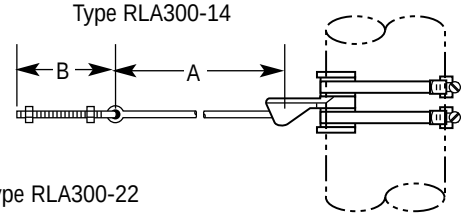
Type RLA300-12

Lateral Brace

Mounts through single 7/16 in (11mm) hole. Use one near bottom to restrict lateral motion of line while permitting vertical and horizontal movement.

Type	A in (mm)	B in (mm)	Weight lb(kg)
RLA300-14	40.0 (1016)	6.50 (165.1)	2.25 (102)

Type RLA300-14

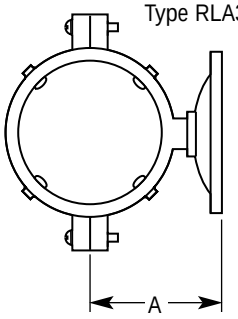


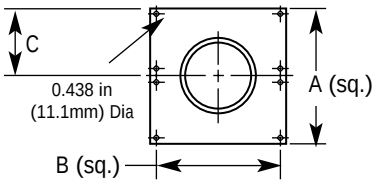
Wall Feed Thru

Includes split mounting plate. Uses 3/8" mounting hardware (not included).

Type	A in (mm)	B in (mm)	C in (mm)	Weight lb (kg)
RLA300-15	8.0 (203.2)	6.87 (174.5)	2.80 (71.1)	8.2 (3.73)

Type RLA300-22





Type RLA300-15

Slip Hanger

For indoor use. Flange mounted. Supports the transmission line, and accommodates lateral motion due to expansion and contraction.

Type	A in (mm)	Weight lb (kg)
RLA300-22	3-3/16 (81)	2.0 (0.9)

3-1/8" Inners Only™

Inner Conductor Replacement Systems

Retrofit Your Existing Rigid Line with Inners Only at Half the Cost!

Despite tight capital budgets, you can't afford to go off the air! Transmission line systems require maintenance after just ten years to avoid premature burnout of bullet-style connectors. By upgrading with Inners Only before your transmission line fails, you avoid the disaster of dead air.

Andrew Inners Only connector replacement systems are available for other manufacturers' rigid lines.

MACXLine® Inners Only Replacement Systems

MACXLine Inners Only inner conductors are preferred for two reasons: MACXLine lengths are identical to those of standard 3-1/8", 50-ohm, assuring that MACXLine can be used for every application. MACXLine inner conductors install quickly since they are similar to your old ones, except for the bellows; this allows retrofitting to be done in stages during the interval a station is off the air every night.

MACXLine Inners Only replacement sections include captivated inner connector, hardware kit for EIA flange, and installation insrtuctions.

Standard Inners Only Replacement Components

Standard rigid line Inners Only components for applications for which thermal compensation is not necessary. The inner conductor and captivated inner connector are included. Order EIA flange hardware kit separately.

MACXLine Inner Conductors for Straight Sections

	Type Number
Full Length Section	**MACX350A-25-(*)**
Field Cut Section, 5 to 20 ft (Includes bellows)	**MACX350A-26**
Field Cut Section, up to 5 ft (No bellows)	**MACX350A-24**
Installation tool kit	**MACX350A-TK**
Field cut tool kit	**MACX350A-TK-2**

Standard Inner Conductors for Straight Sections

	Type Number
Full Length Sections (Also used for field cut sections)	**STD350-25-(*)**

* Insert length of outer conductor, flange face to flange face in inches.

Standard Rigid Coaxial Transmission Line is Available in 1-5/8", 50-ohm Size

- *Uses PTFE dielectric peg insulators and silver soldered flanges*
- *Fully compatible with EIA standard RS-225 and IEC recommendations.*

All flanged sections come complete with one inner connector, a set of stainless steel flange hardware and a pressure sealing gasket.

Section	1-5/8" 50-ohm
Standard Rigid Line Components	**Type No.**
20 ft flanged both ends	**561**
20 ft flanged one end	**561-11**
20 ft unflanged	**561-21**
**flanged both ends	**2761-VAR-1**
**flanged one end	**2761-VAR-11**
**unflanged	**2761-VAR-21**

** Specify length, in inches.
Standard tolerance is ± 1/8 in (3 mm).

Characteristics	
Type No.	**561**
Impedance, ohms	50 ± 0.5
Max. Frequency, MHz	3000
Velocity, percent	99.8
Attenuation, see table	
Average Power Rating, see table	
Peak Power Rating, kW	150
Dimensions	
Outer Conductor,	
Outside dia. in (mm)	1.625 (41)
Inside dia., in (mm)	1.527 (38)
Inner Conductor,	
Outside dia., in (mm)	0.664 (17)
Inside dia, in (mm)	0.588 (15)
Net Weight, lb/ft (kg/m)	1.35 (2.0)
Standard Flange Dimensions	
Flange, overall diameter, in (mm)	3.50 (88.9)
Bolt Circle Diameter, in (mm)	2.810 (71.37)
Number of bolts	4
Bolt size	5/16"

1-5/8" 50-ohm Standard Rigid Line

Attenuation and Average Power Ratings for 1-5/8" 50-ohm Rigid Line, Type 561

Television Channel No. (MHz)	Attenuation db/100 ft (100 m)	Average Power kW
* (1.00)	0.017 (0.056)	148
2 (55.25)	0.1405 (0.4609)	19.8
3 (61.25)	0.1479 (0.4854)	18.8
4 (67.25)	0.1550 (0.5086)	18.0
5 (77.25)	0.1662 (0.5452)	16.8
6 (83.25)	0.1725 (0.5660)	16.2
7 (175.25)	0.251 (0.822)	11.1
8 (181.25)	0.255 (0.836)	10.9
9 (187.25)	0.259 (0.850)	10.8
10 (193.25)	0.263 (0.864)	10.6
11 (199.25)	0.267 (0.877)	10.4
12 (205.25)	0.271 (0.890)	10.3
13 (211.25)	0.275 (0.903)	10.1
14 (471.25)	0.412 (1.351)	6.77
15 (477.25)	0.415 (1.360)	6.72
16 (483.25)	0.417 (1.369)	6.68
17 (489.25)	0.420 (1.377)	6.64
18 (495.25)	0.422 (1.386)	6.60
19 (501.25)	0.425 (1.394)	6.56
20 (507.25)	0.427 (1.402)	6.52
21 (513.25)	0.430 (1.411)	6.48
22 (519.25)	0.433 (1.419)	6.44
23 (525.25)	0.435 (1.427)	6.41
24 (531.25)	0.438 (1.435)	6.37
25 (537.25)	0.440 (1.444)	6.33
26 (543.25)	0.442 (1.452)	6.30
27 (549.25)	0.445 (1.460)	6.26
28 (555.25)	0.447 (1.468)	6.23
29 (561.25)	0.450 (1.476)	6.20
30 (567.25)	0.452 (1.484)	6.16
31 (573.25)	0.455 (1.492)	6.13
32 (579.25)	0.457 (1.499)	6.10
33 (585.25)	0.459 (1.507)	6.07
34 (591.25)	0.462 (1.515)	6.04
35 (597.25)	0.464 (1.523)	6.00
36 (603.25)	0.466 (1.530)	5.97
37 (609.25)	0.469 (1.538)	5.94
38 (615.25)	0.471 (1.546)	5.92
39 (621.25)	0.473 (1.553)	5.89
40 (627.25)	0.476 (1.561)	5.86
41 (633.25)	0.478 (1.568)	5.83
42 (639.25)	0.480 (1.576)	5.80
43 (645.25)	0.482 (1.583)	5.78
44 (651.25)	0.485 (1.590)	5.75
45 (657.25)	0.487 (1.598)	5.72
46 (663.25)	0.489 (1.605)	5.70
47 (669.25)	0.491 (1.612)	5.67
48 (675.25)	0.494 (1.620)	5.64
49 (681.25)	0.496 (1.627)	5.62
50 (687.25)	0.498 (1.634)	5.60
51 (693.25)	0.500 (1.641)	5.57
52 (699.25)	0.502 (1.648)	5.55
53 (705.25)	0.505 (1.656)	5.52
54 (711.25)	0.507 (1.663)	5.50
55 (717.25)	0.509 (1.670)	5.48
56 (723.25)	0.511 (1.677)	5.45
57 (729.25)	0.513 (1.684)	5.43
58 (735.25)	0.515 (1.691)	5.41
59 (741.25)	0.517 (1.698)	5.39
60 (747.25)	0.520 (1.705)	5.36
61 (753.25)	0.522 (1.711)	5.34
62 (759.25)	0.524 (1.718)	5.32
63 (765.25)	0.526 (1.725)	5.30
64 (771.25)	0.528 (1.732)	5.28
65 (777.25)	0.530 (1.739)	5.26
66 (783.25)	0.532 (1.745)	5.24
67 (789.25)	0.534 (1.752)	5.22
68 (795.25)	0.536 (1.759)	5.20
69 (801.25)	0.538 (1.766)	5.18

* Broadcast Radio Band

Standard conditions:

For Attenuation	For Average Power
VSWR 1.0	VSWR 1.0
Ambient Temperature 20°C (68°F)	Ambient Temperature 40°C (140°F)
Atmospheric Pressure, Dry Air	Inner Conductor Temperature 102°C (216°F)
Atmospheric Pressure, Dry Air	Atmospheric Pressure, DryAir

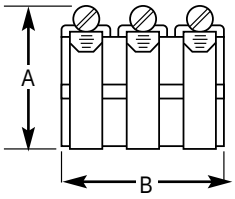
Attenuation and average power data guaranteed within ±5%.

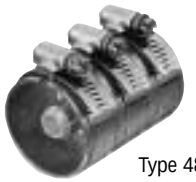
All flanged items are EIA standard and include inner connector, “O” ring, silicone grease and hardware, except when noted. All inner connectors are silver-plated.

Unpressurized Coupling

Connects unflanged lines and fittings. Includes supported inner connector and sleeve outer connector with clamps.

Line Size	Type	A in (mm)	B in (mm)	Weight lb(kg)
1-5/8"	**4861A**	2.19 (56)	2.50 (64)	0.5 (0.23)





Type 4861A

Soft Solder Swivel Field Flange

For use on interior runs. Includes soft solder swivel flange and sleeve with fixed ring. Order inner connector and hardware kit separately.

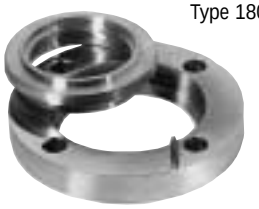
Line Size	Type	Weight, lb (kg)
7/8"	**1560A**	0.7 (0.32)
1-5/8"	**1561A**	1.3 (0.59)

Type 1561A

Swivel Flange

Includes fixed ring, sliding ring, silver solder and flux. Order inner connector and hardware kit separately.

Line Size	Type	Weight, lb (kg)
7/8"	**18096**	0.44 (0.20)
1-5/8"	**18041**	0.94 (0.43)



Type 18041

Fixed Flange

Includes sliver solder and flux. Order inner connector and hardware kit separately.

Line Size	Type	Weight, lb (kg)
7/8"	**18630**	0.38 (0.18)
1-5/8"	**18631**	0.94 (0.43)

Type 18631

Hardware Kit

Includes “O” ring, silicone lubricant, nuts bolts and lock-washers for one flange joint.

Line Size	Type	Weight, lb (kg)
7/8"	**66748-6**	0.03 (0.02)
1-5/8"	**69225-2**	0.25 (0.12)

Type 69225-2

“O” Ring Gasket

For EIA flange.

Line Size	Type
7/8"	**10683-197**
1-5/8"	**10683-406**

Type 10683-406

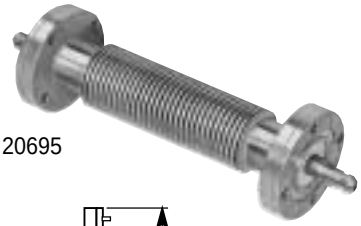
Accessories for 1-5/8" Rigid Line and 7/8" Components

Type 2260B

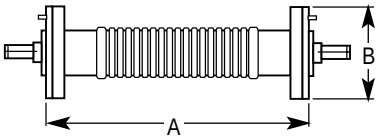
Type 2361A

Type 30452

Type 2061



Type 20695



All flanged items are EIA standard and include inner connector, “O” ring, silicone grease and hardware, except when noted. All inner connectors are silver-plated.

Type N Female Adapter

Mates with UG-21. Gas tight with pressure port. Includes inner connector and hardware.

Line Size	Type	Weight, lb (kg)
7/8"	**2260B**	1.2 (0.55)
1-5/8"	**2261A**	3.4 (1.55)

Type LC Female Adapter

Mates with UG-154. Gas tight with pressure port. Includes inner connector and hardware.

Line Size	Type	Weight, lb (kg)
7/8"	**2360A**	1.2 (0.55)
1-5/8"	**2361A**	3.4 (1.55)

Male-to-Male Adapter

Joins two components having captivated inner connectors. 6 in (150 mm) length. No inner connectors. Includes hardware.

Line Size	Type	Weight, lb (kg)
1-5/8"	**30452**	3.0 (1.36)

End Terminal

For strap connection. Gas tight with pressure port.

Line Size	Type	Weight, lb (kg)
1-5/8"	**2061**	2.3 (1.04)

Flexible Section

Accommodates vibration and angles up to 30°. Maximum offset 0.25 in (6mm) for 1-5/8" line. Includes two inner connectors.

Line Size	Type	Inpendance ohms	A in (mm)	B in (mm)	Weight lb (kg)
1-5/8”	**20695**	50	10.0 (254)	3.5 (89)	4.2 (1.91)

Standard Flange Dimensions

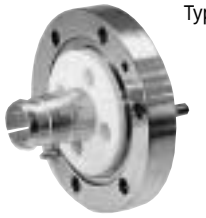
Line Size	1-5/8"	7/8"
Flange, Overall Diameter, in (mm)	3.50 (88.9)	2.25 (57.1)
Bolt Circle Diameter, in (mm)	2.810 (71.37)	1.750 (44.45)
Number of Bolts	4	3
Bolt Size	5/16"	1/4"

All flanged items are EIA standard and include inner connector, “O” ring, silicone grease and hardware, except when noted. All inner connectors are silver-plated.

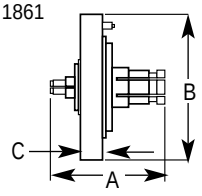
Reducer 50-ohm

Includes two inner connectors. Not a gas barrier.

Line Size	Type	A in (mm)	B in (mm)	C in (mm)	Weight lb (kg)
1-5/8" to 7/8"	**1860A**	5.46 (139)	3.50 (89)	3.34 (85)	2.3 (1.1)
3-1/8" to 1-5/8"	**1861**	4.15 (105)	5.19 (132)	0.88 (22)	5.6 (2.6)



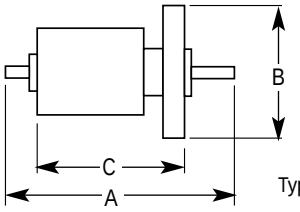
Type 1861



Gas Barrier

Heavy duty. Fixed male inner connectors both ends. Both sides have a pressure port.

Line Size	Type	Impedance ohms	A in (mm)	B in (mm)	Weight lb (kg)
7/8"	**1260A**	50	1.13 (29)	2.25 (57)	1.2 (0.55)
1-5/8"	**1261B**	50	1.66 (42)	3.50 (89)	3.6 (1.7)

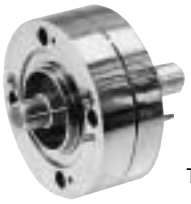


Type 1860A

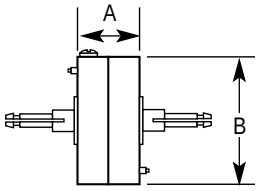
Inner Connector

Includes PTFE anchor disk.

Line Size	Type	Impedance ohms	A in (mm)	B in (mm)	Weight lb (kg)
7/8"	**25385**	75	0.93 (24)	1.94 (49)	0.05 (0.02)
7/8"	**34389A**	50	0.93 (24)	1.94 (49)	0.06 (0.03)
1-5/8"	**34660**	50	1.17 (30)	2.30 (58)	0.13 (0.06)



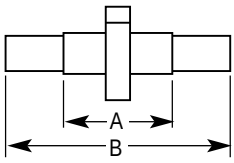
Type 1261B



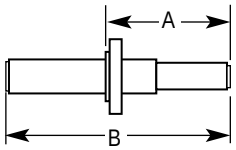
Adapter Inner Connector

50-51.5 ohm.

Line Size	Type	A in (mm)	B in (mm)	Weight lb(kg)
7/8"	**4850A**	1.31 (33)	2.31 (59)	0.03 (0.014)
1-5/8"	**4851**	1.18 (30)	2.34 (59)	0.16 (0.073)



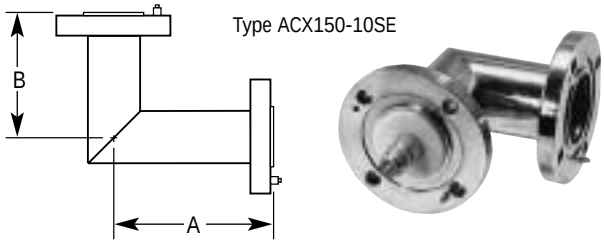
Type 34389A



Type 4851

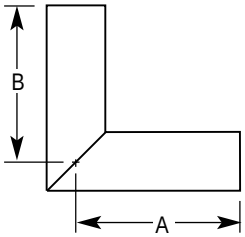
“Quick Patch” Coaxial Patch Panels are available for 1-5/8" 50-ohm line. See page 380.

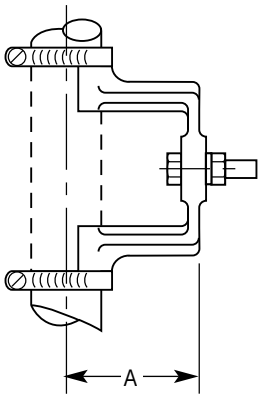
Accessories for 1-5/8" Rigid Line and 7/8" Components



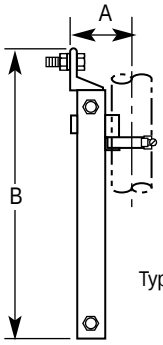
Type ACX150-10SE


Type ACX150-10SE-3



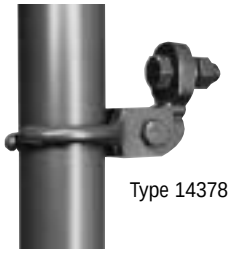


Type 13924



Type 14379


Type 13555A


Type 14378


Type 13550

All flanged items are EIA standard and include inner connector, “O” ring, silicone grease and hardware, except when noted. All inner connectors are silver-plated.

90° Miter Elbow

Swivel flanges, brass construction.

Line Size	Type	Impedance ohms	A in (mm)	B in (mm)	Weight lb (kg)
7/8"	**1060A**	50	3.08 (78)	2.44 (62)	1.4 (0.64)
1-5/8"	**ACX150-10SE**	50	2.89 (73)	2.89 (73)	3.5 (1.59)

90° Miter Elbow

Unflanged. Does not include inner connector.

Line Size	Type	A in (mm)	B in (mm)	Weight lb (kg)
1-5/8"	**ACX150-10SE-3**	2.65 (67)	2.65 (67)	0.69 (0.32)

1-5/8" Hangers

Rigid Hanger

Hangers attach top section. Use one for up to 300 ft (90 m) of line and one for each additional 300 ft (90 m) of line. Mounts to 9/16 in (14 mm) diameter hole with included 1/2" diameter bolt or to angle adapters.

Line Size	Type	A in (mm)	Weight lb (kg)
1-5/8"	**13924**	3.06 (77.7)	1.4 (0.64)

Spring Hanger

Accommodates line expansion and contraction. Use at 50 ft (15 m) intervals. Mounts to 9/16 in (14 mm) diameter hole with included 1/2" diameter bolt or to angle adapters.

Line Size	Type	A in (mm)	B in (mm)	Weight lb (kg)
1-5/8"	**14379**	3.06 (77.7)	14.0 (355.6)	3.2 (1.45)

Sliding Hanger

Use at 10 ft (3 m) intervals. Mounts to 9/16 in (14 mm) diameter hole with 1/2" diameter bolt, or to angle adapter.
1-5/8" line .....Type **14378**

Angle Adapter

For attaching hangers to tower angle members up to 7/8" (22 mm) thick .....Type **13555A**

Round Member Adapter

For attaching hangers to round tower members, up to 3 in (75 mm) diameter. Includes 1/2" x 1-1/4" hanger attachment bolt and nut .....Type **13550**

GUIDELine low attenuation waveguide is the premier transmission line for use in UHF television transmitting antenna systems. It offers highest possible efficiency, handles maximum power and has lower windload than rectangular waveguides. The unique design offers superior polarization stability and eliminates the need for on-site compensation tuning. Complete system layout drawings and detailed installation instructions are provided with every GUIDELine system.

Low Attenuation for High Efficiency

GUIDELine circular waveguide is the most efficient transmission line available for UHF broadcast frequencies. Attenuation is up to 50% lower than corresponding rectangular waveguides. This reduces electrical power consumption and, in some cases, may reduce the size and cost of the transmitter needed to provide maximum ERP. Attenuation tables are shown on page 358.

High Power Handling

GUIDELine waveguide will handle television transmitter power levels up to 360 kW. For higher power applications, contact Andrew.

Low Wind Load

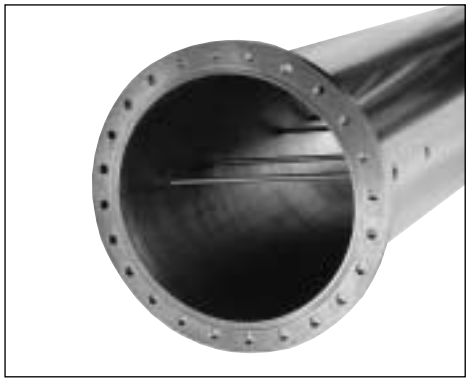
The cylindrical shape of GUIDELine waveguide reduces tower wind loading by one-third compared with rectangular waveguide and allow pressurization without risk or distortion and performance degradation. The shape and construction also resist distortion in high winds, icing and other severe environmental conditions. The result is stable and consistent performance proven under all weather conditions.

GUIDELine® System Components

Waveguide Sections are all aluminum construction, including flanges. The unique cross-polarization cancelers provide increased rigidity. The flanges are also a unique Andrew design. A flange gasket prevents entry of moisture at the flange junction. The flange facing up contains the gasket groove and the mating flange is flat for easy installation without concern for "pinching." Flange hardware and gaskets are included for every section. Select by channel number from table.

The horizontal run is comprised of heavy-wall rectangular waveguide allowing a constant pressurization of the system up to 2 lb/in^2, while permitting the flexibility of routing the waveguide using typical WR elbow configurations.

Advanced design of GUIDELine waveguide provides highest efficiency and eliminates cross polarization loads and field compensation even at power levels of 240 kW and above. Smooth, round cross section reduces tower loading.



GUIDELine Characteristics

Waveguide Size	Length in (mm)	Weight lb (kg)	Wind load Shear lb (N)
GLW1750	102.86 (2612.4)	95 (43)	480 (2135)
GLW1700	102.85 (2612.4)	87 (39)	440 (1957)
GLW1500	108.00 (2743.2)	75 (34)	397 (1766)
GLW1350	112.00 (2844.8)	69 (31)	371 (1650)

GUIDELine® Waveguide Electrical Performance

VSWR is 1.08 or better over the channel. Optimization to 1.05 or better at visual carrier is usually possible. And, GUIDELine waveguide does not exhibit band reject spikes associated with coaxial and rectangular waveguide transmission lines because of the extremely small mismatch of the circular flange junction.

System Planning Information

Andrew offers GUIDELine waveguide on a system basis. **FAX inquiry directly to our Broadcast Systems Department at 1-800-554-2204** and specify the following information:

- *Operating channel*
- *Waveguide size – GLW1750, GLW1700, GLW1500 or GLW1350*
- *Length of vertical run in feet or meters*
- *Length of horizontal run in feet or meters*
- *Input connection required – WR1800; WR1500; WR1150; 8-3/16", 75 ohm; 6-1/8" 75 ohm or 6-1/8" ,50 ohm*
- *Antenna input flange 8-3/16", 75 ohm; 6-1/8", 75 ohm or 6-1/8", 50 ohm or waveguide*

To Determine Efficiency

Select the attenuation in dB/100 feet from the table to the right. Multiply by the length of the waveguide run to find total attenuation. Use the formula below to determine efficiency.

$$\text{Efficiency in percent} = \frac{100}{10^{(\alpha/10)}}$$

where α is total waveguide attenuation

Example: For channel 30 and 1000 feet of GLW1750

$0.035 \times 10 = 0.35$ dB

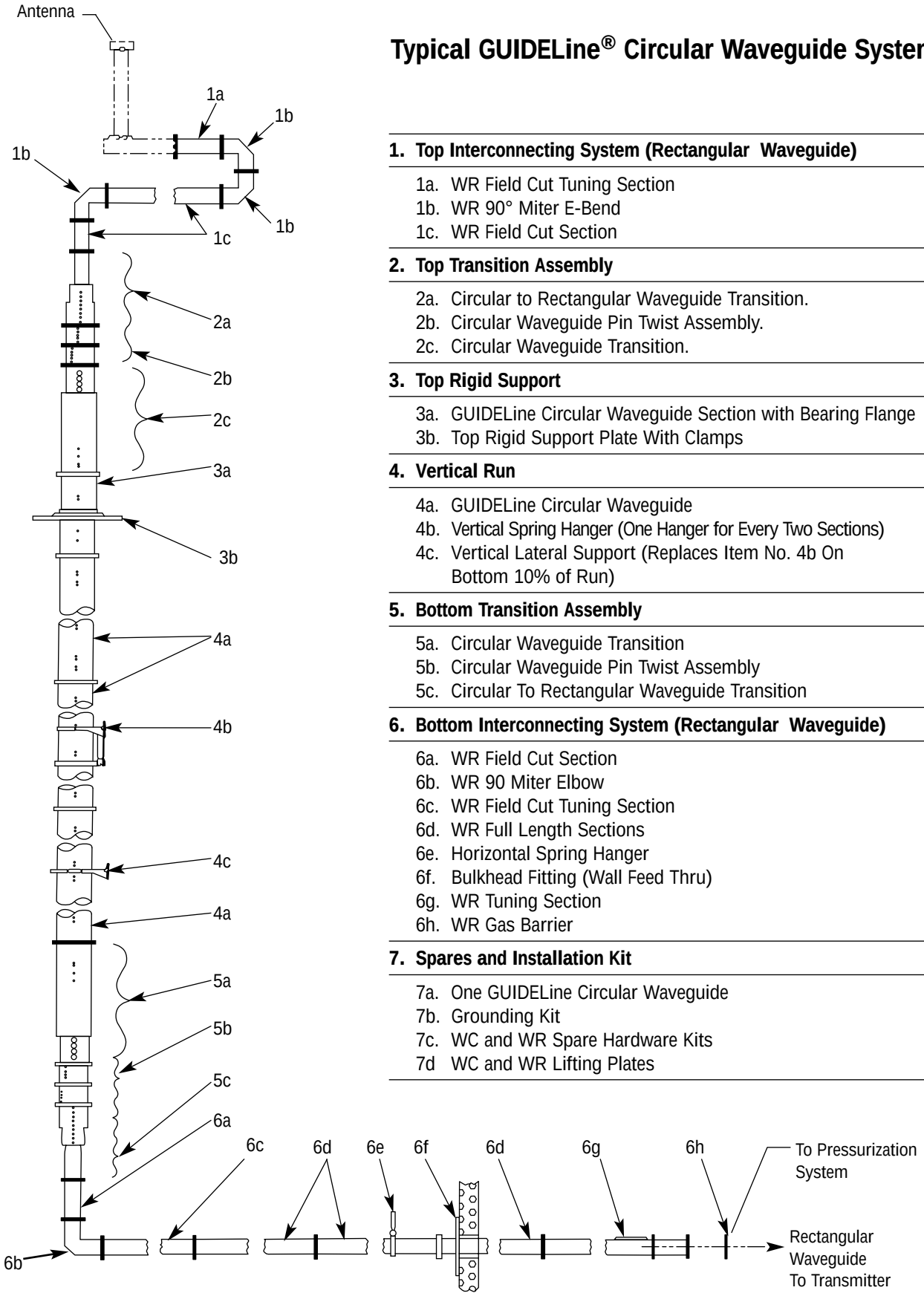
$$\text{Efficiency} = \frac{100}{10^{(0.35/10)}} = 92.3\%$$

GUIDELine® Attenuation Ratings

Channel Number	Visual Carrier MHz	Attenuation dB/100 ft
GLW1750		
14	471.25	0.0521
15	477.25	0.0502
16	483.25	0.0484
17	489.25	0.0469
18	495.25	0.0454
19	501.25	0.0441
GLW1700		
20	507.25	0.0430
21	513.25	0.0419
22	519.25	0.0409
23	525.25	0.0399
GLW1750		
24	531.25	0.0391
25	537.25	0.0383
26	543.25	0.0375
27	549.25	0.0368
28	555.25	0.0362
29	561.25	0.0356
30	567.25	0.0350
31	573.25	0.0344
32	579.25	0.0339
33	585.25	0.0334
34	591.25	0.0330
35	597.25	0.0325
36	603.25	0.0321
37	609.25	0.0317
38	615.25	0.0314
39	621.25	0.0310
40	627.25	0.0307
41	633.25	0.0303
GLW1500		
39	621.25	0.0490
40	627.25	0.0482
41	633.25	0.0474
42	639.25	0.0466
43	645.25	0.0459
44	651.25	0.0452
45	657.25	0.0445
46	663.25	0.0439
47	669.25	0.0433
48	675.22	0.0428
49	681.25	0.0423
50	687.25	0.0418
51	693.25	0.0413
52	699.25	0.0408
53	705.25	0.0404
54	711.25	0.0399
55	717.25	0.0395
GLW1350		
56	723.25	0.0530
57	729.25	0.0523
58	735.25	0.0516
59	741.25	0.0510
60	747.25	0.0504
61	753.25	0.0498
62	659.25	0.0493
63	765.25	0.0488
64	771.25	0.0483
65	777.25	0.0478
66	783.25	0.0473
67	789.25	0.0469
68	795.25	0.0464
69	801.25	0.0460

Standard Conditions
For Attenuation: VSWR 1.0 Ambient Temperature 24°C (75°F).
For Average Power: VSWR 1.0 Ambient Temperature 24°C (75°F).
Waveguide Temperature 64°C (147°F).

Typical GUIDELine® Circular Waveguide System



1. Top Interconnecting System (Rectangular Waveguide)

- 1a. WR Field Cut Tuning Section
- 1b. WR 90° Miter E-Bend
- 1c. WR Field Cut Section

2. Top Transition Assembly

- 2a. Circular to Rectangular Waveguide Transition.
- 2b. Circular Waveguide Pin Twist Assembly.
- 2c. Circular Waveguide Transition.

3. Top Rigid Support

- 3a. GUIDELine Circular Waveguide Section with Bearing Flange
- 3b. Top Rigid Support Plate With Clamps

4. Vertical Run

- 4a. GUIDELine Circular Waveguide
- 4b. Vertical Spring Hanger (One Hanger for Every Two Sections)
- 4c. Vertical Lateral Support (Replaces Item No. 4b On Bottom 10% of Run)

5. Bottom Transition Assembly

- 5a. Circular Waveguide Transition
- 5b. Circular Waveguide Pin Twist Assembly
- 5c. Circular To Rectangular Waveguide Transition

6. Bottom Interconnecting System (Rectangular Waveguide)

- 6a. WR Field Cut Section
- 6b. WR 90 Miter Elbow
- 6c. WR Field Cut Tuning Section
- 6d. WR Full Length Sections
- 6e. Horizontal Spring Hanger
- 6f. Bulkhead Fitting (Wall Feed Thru)
- 6g. WR Tuning Section
- 6h. WR Gas Barrier

7. Spares and Installation Kit

- 7a. One GUIDELine Circular Waveguide
- 7b. Grounding Kit
- 7c. WC and WR Spare Hardware Kits
- 7d WC and WR Lifting Plates

For Andrew Types GLW1350, GLW1500, GLW1700, GLW1750

Andrew Passive Power Products

Andrew Passive Power Products works in close collaboration with manufacturers and broadcasters to produce high quality RF systems in frequency ranges from 30 kHz to 3 GHz and at power levels from watts to megawatts.

Our product line covers all RF components (waveguide and coaxial) for combiners, filters, hybrids, diplexers, couplers, switches, loads, and more. We have the ability to call upon many years of design experience and fast-turn-around prototyping, which equates to dramatically reduced system development times and cost.

Andrew Passive Power Products often develops products for major OEMs to meet their stringent specifications. Whether the application is broadcast TV, DTV, radio, or DAB, Andrew Passive Power Products can provide the most cost-effective solution for your needs. High quality manufacturing and leading edge technology increase the product value to you, the customer.

Andrew Passive Power Products' strength is in our ability to bring state of the art design expertise and experienced product management to the development process. By working closely with our customers and involving everyone in the process, from designers to production personnel, test personnel, suppliers, end users, and consultants, Andrew Passive Power Products is able to produce quality products quickly and effectively.

The components and systems include but are not limited to:

Filters

- *Waveguide and Coax*
- *Low Pass (Harmonic)*
- *High Pass*
- *Band Pass (Intermodulation)*
- *Band Rejects*

Switches

- *Waveguide*
- *Coaxial*
- *Open Wire*

Hybrids

- *Waveguide*
- *Coaxial*
- *π / 2*
- *π (Magic Tee)*

Loads

- *Water Cooled*
- *Air Cooled*
- *Waveguide*
- *Coaxial*

Diplexers

- *Coaxial*
- *Dual Aural*
- *Waveguide*

Directional Couplers

- *Waveguide*
- *Coaxial*
- *Precision*
- *Adjustable*

Power Combiners

- *Waveguide*
- *Coaxial*
- Switchless Combiners

Channel Combiners

- *Constant Impedance*
- *Waveguide*
- *Coaxial*
- *Starpoint*

Andrew Passive Power Products provides a wide range of OEM products. We maintain customer specific designs and offer brand labeling on request.

Application Worksheet

Use this form to describe your custom application.
Return the form to the address shown.
Attach any additional specifications, sketches, masks, or other materials.

Page **of**

Attention: Applications Engineering
Andrew Passive Power Products
97 Shaker Road, PO Box 1176
Gray, ME U.S.A. 04039
Phone: (207) 657-2600
Fax: (207) 657-2632

Contact _____ **Company** _____

Address _____

_____

City _____ **State** _____

Country _____ **Phone** _____

Zip _____ **Fax** _____

Email _____ **Date** _____

Application (TV, Sat., Radio, etc.): _____

Country/System(s) (NTSC, Nicam, etc.) _____

Transmitter(s) (Type, Mfr.): _____

Filter Requirement(s): _____

Frequency Band/Channel(s): _____

Power Level(s): _____

Analog/Digital: _____

Combiner Type (If applicable): _____

System/Subsystem Description: _____

_____

System/Subsystem Specifications (Insertion Loss, VSWR, Isolation, Group Delay, etc.):

_____

_____

_____

_____

Other Requirements (I/O Connectors, Couplers, Test Load, Calorimetry, ac Power, etc.):

_____

_____

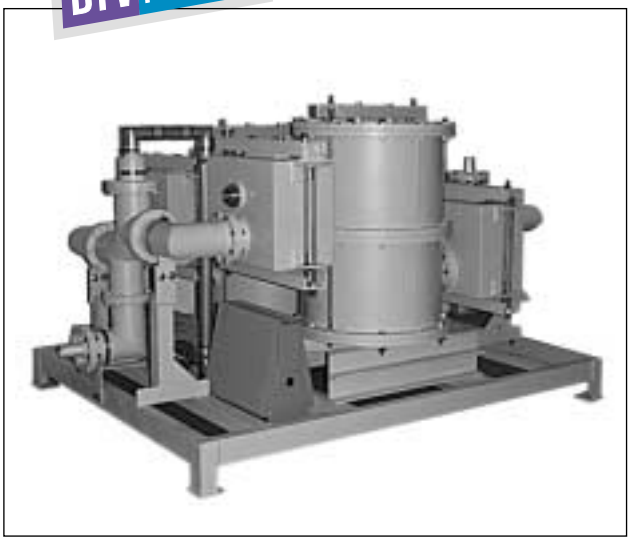
_____

Sketch/Block Diagram/Other:

D-MasK™ Series

DTV READY!

NEW!



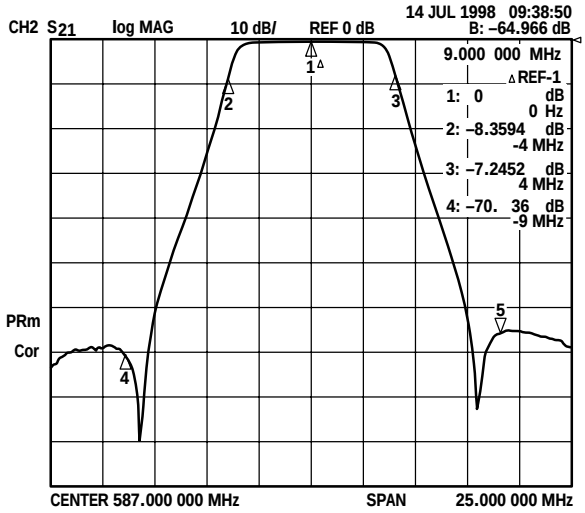
These patent pending filters are the most practical solution for single amplifier installations. Modular system design economically preserves your expansion options.

30 kW UHF Band-pass D-MasK™ Filters for DTV Broadcast

- *Multi-Mode*
- *Low Insertion Loss*
- *Superior Rejection*
- *Temperature Compensated*
- *Lightweight Aluminum Construction*
- *Compact Size*
- *Low VSWR*
- *Average Powers to 30 kW*

D-MasK Series DTV Bandpass Filters

Andrew has recently revolutionized the DTV filter market with a temperature compensated, mixed mode, band-pass filter to meet the latest FCC performance specifications. This filter uses patented technology to suppress unwanted spurious signals to desirable levels while compensating for drifts in temperature due to RF heating and ambient changes.



Specifications

Average Power Rating, kW	30
Frequency	UHF-TV
Passband VSWR	1.08 or better
Insertion Loss, dB, max.	0.3
Rejection, dB at Fc ± 9.0 MHz	-64
Group Delay Variation, ns, max.	150
Impedance, ohms	50
Connections	4-1/16" EIA
Dimensions, in (mm)	72 x 54 x 54 (1829 x 1372 x 1372)

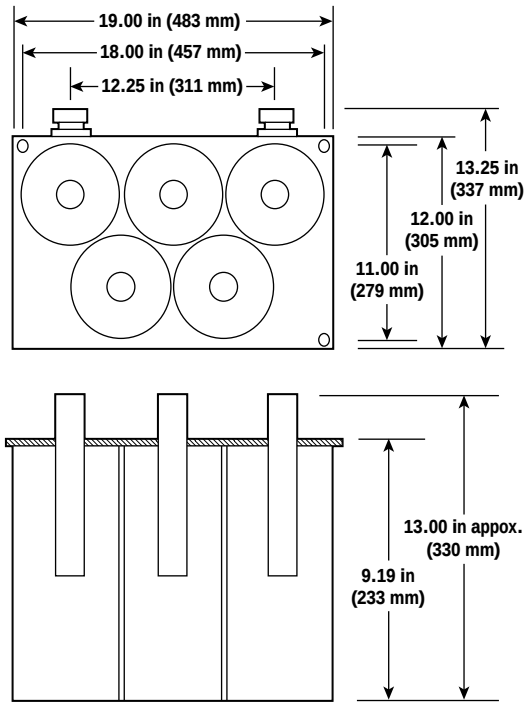
ANDREW®

UHF Band-Pass Filters for Digital Television

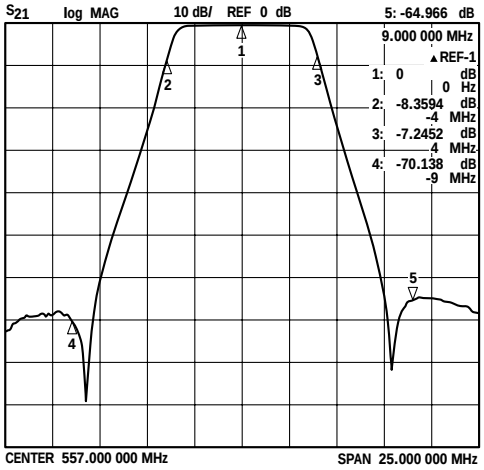
CF500 Series Tunable DTV/DVB Band-pass Filters

Andrew has developed a series of optimal performance, coaxial band-pass filters to meet the latest digital performance specifications in both Europe and the U.S. (European units shown). The U.S. version has six resonators; the European version has five. The filter suppresses unwanted spurious signals from the pass band edge through the third harmonic including the critical GPS band (1.5 GHz-1.7 GHz). You get all of this in addition to tunability and a range of power levels to 2.5 kW. Fixed tuned units are also available.

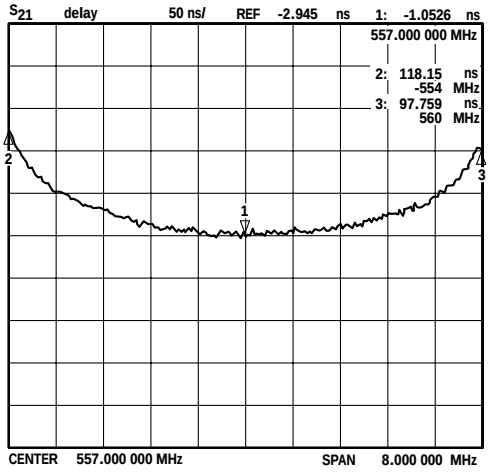
DTV READY!



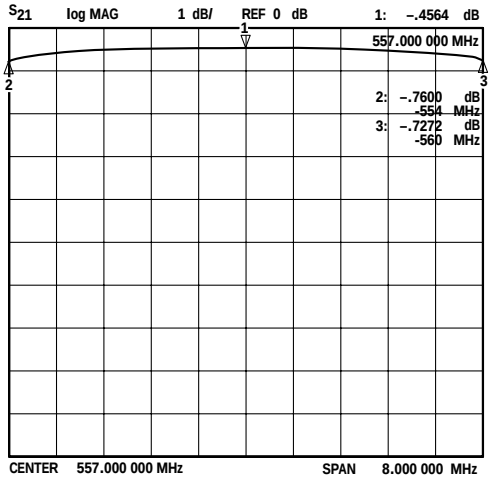
CF500 Series



Typical Rejection



Typical Group Delay



Typical Insertion Loss

Specifications

Average Power Rating, kW	2.5
Frequency	UHF-TV
Passband VSWR	1.12 or better
Insertion Loss, dB, max. at Fc	0.6
Rejection	to comply with DTV or DVB requirements
Group Delay Variation, ns, max.	150
Impedance, ohms	50
Connections	7-16 DIN, Type N, or 1-5/8" EIA
Dimensions, in (mm), 1 kW unit	13 x 9 x 18 (330 x 229 x 457)

NEW!

DTV READY!

Dual-Mode Band-Pass Filters for DVB Applications

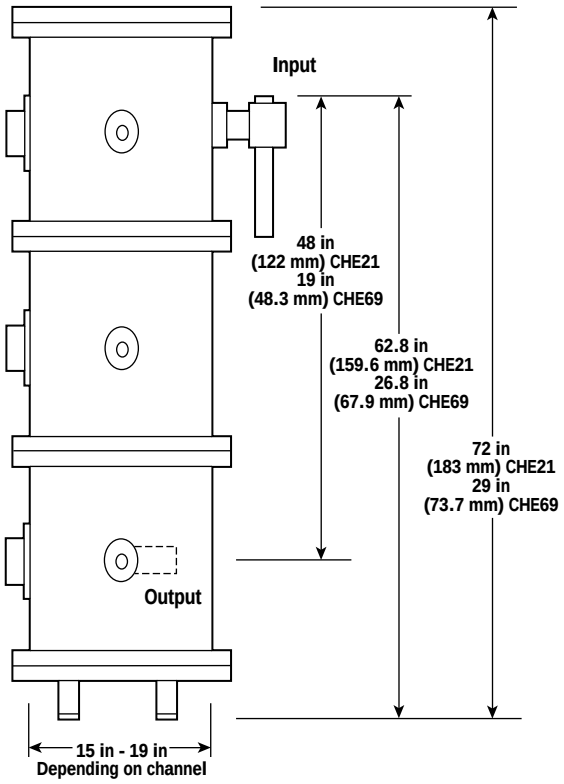
Features

- *Low VSWR*
- *Very Low Insertion Loss*
- *Excellent Rejection*
- *Rugged Aluminum Construction*
- *Average Powers to 10 kW*
- *2nd Harmonic Suppression*
- *Low Cost*

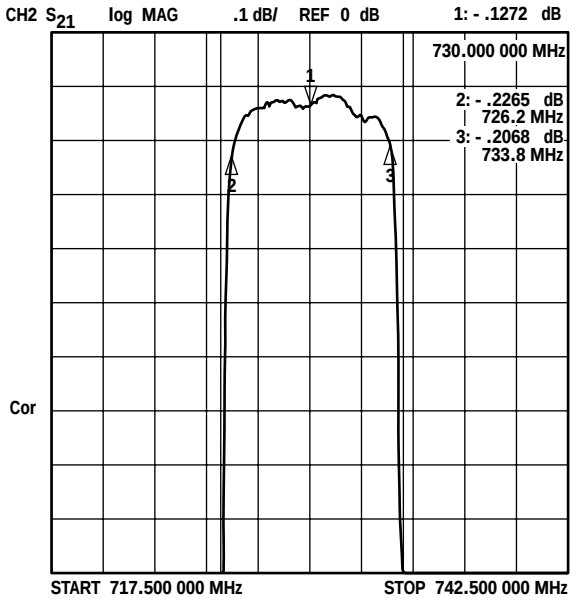
CF510 Series DVB Band-Pass Filters

Andrew has recently developed a new series of optimal performance DVB band-pass filters of dual mode construction to meet the latest digital performance specifications in Europe. The filter response suppresses unwanted spurious signals in the reject band.

Continued on next page



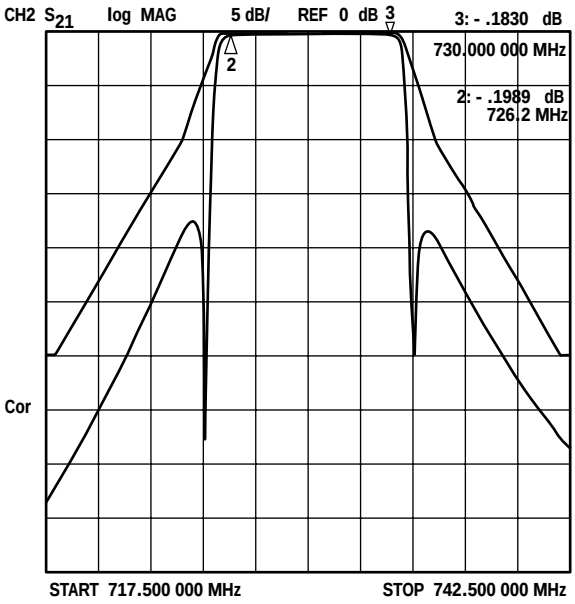
CF510 Series



Typical Insertion Loss

Specifications

Average Power, kW	10
Frequency	UHF
Passband Return Loss, dB	-24 or better
Insertion Loss, dB, max. at Fc	0.15
Rejection	
Fc ± 6 MHz	-10 dB or more
Fc ± 12 MHz	-30 dB or more
Group Delay, ns, max.	± 230
Impedance, ohms	50
Connections	DIN 13-30 or 1-5/8"
2nd Harmonic Rejection, dB	40 or more



Typical Rejection

NEW!

UHF Tunable EVA™ Band-Pass Filters for DTV Broadcast

DTV READY!

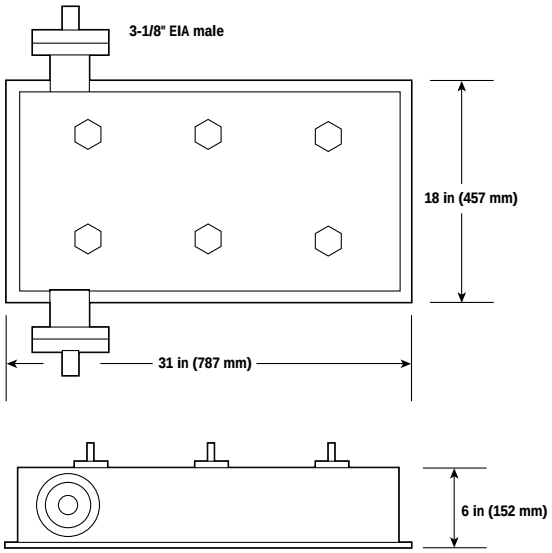
Features

- *Band IV/V Tunability*
- *Low Insertion Loss*
- *Superior Rejection*
- *Temperature Compensated*
- *Lightweight Aluminum Construction*
- *Compact Size*
- *Low VSWR*
- *Average Powers to 3 kW*

EVA Series Tunable DTV Band-Pass Filters

Andrew has recently developed an optimal performance temperature compensated coaxial band-pass filter to meet the latest FCC performance specifications. The filter suppresses unwanted spurious signals to acceptable levels, while compensating for drifts in temperature due to RF heating and ambient changes.

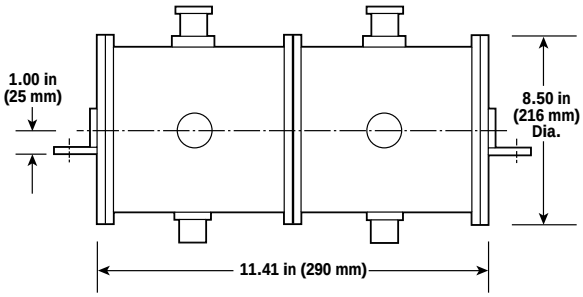
All of this, in addition to UHF full band tunability (2 bands), make this filter unique in the industry.

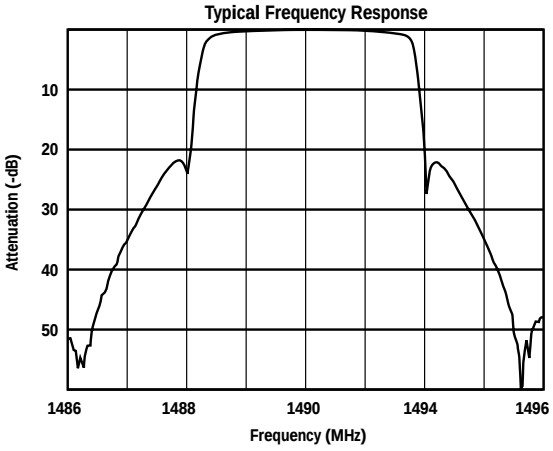


Specifications

Average Power Rating, kW	2.5
Frequency	UHF-TV
Passband VSWR	1.1 or better
Insertion Loss, dB, max. at Fc	0.3
Rejection, dB at Fc ± 9.0 MHz	-64
Group Delay, ns, max.	150
Impedance, ohms	50
Connections	1-5/8" EIA or 3-1/8" EIA
Dimensions, in (mm)	31 x 18 x 6 (787 x 457 x 152)

DAB 2000 Series





Dual-Mode Band-Pass Filters for L-Band DAB Applications

Features

- *Low VSWR*
- *Low Insertion Loss*
- *Excellent Rejection*
- *Precision Design*
- *Compact Size*
- *Pseudo-Elliptic Response*

DAB Band-Pass Filters for L-Band

Andrew offers a wide range of filters for L-band DAB requirements. Custom designs meet your electrical and mechanical performance specifications, for various L-band applications.

The cavities are fabricated from low-loss, temperature stable, metal tubing. The diameters depend on the Q requirements of the application.

Specifications

Average Power Handling, W	250
Frequency Band	L-band
Insertion Loss, dB	0.60 dB or less
Rejection, (see graph)	
at fc ± 2.00 MHz	-15 dB or more
at fc ± 3.00 MHz	-30 dB or more
Impedance, ohms	50

NEW!

Band-Pass Filters For Digital-Audio-Broadcasting

Features

- *Low VSWR*
- *Very Low Insertion Loss*
- *Superior Rejection*
- *Precision Design*
- *Temperature Compensated*
- *Pseudo-Elliptic Response*

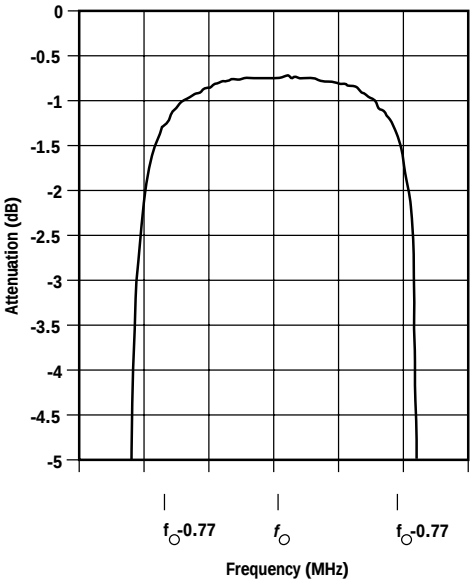
DAB 2000 Series Band-Pass Filters

Andrew has developed an optimal performance coaxial band pass filter for the Digital Audio Broadcasting industry. Advanced design parameters optimize insertion loss while minimizing size.

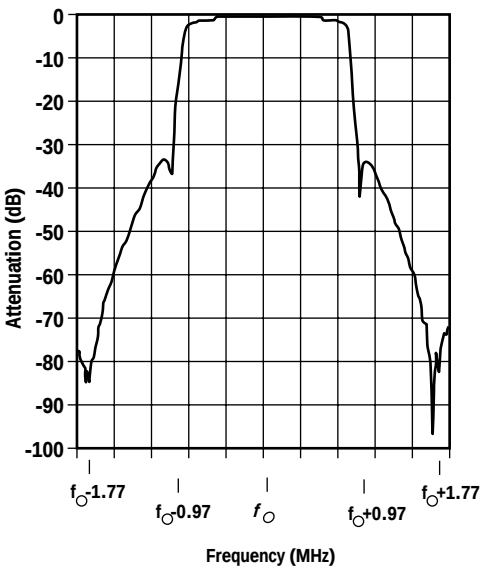
Specifications

Average Power, kW	2
Frequency	High Band VHF
Pass Band VSWR	1.10:1 or better
Insertion Loss	See graph
Rejection	See graph
Impedance, ohms	50
Connections	EIA
Dimensions, in (mm)	18 x 21 x 48 (460 x 530 x 1220)

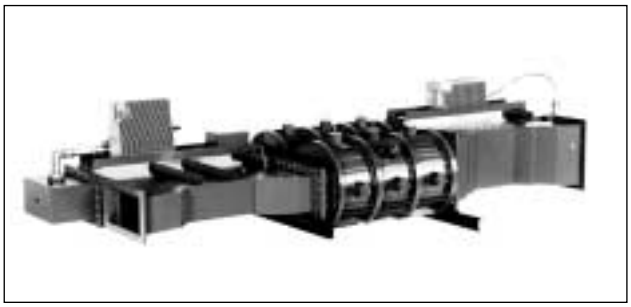
Typical Insertion Loss

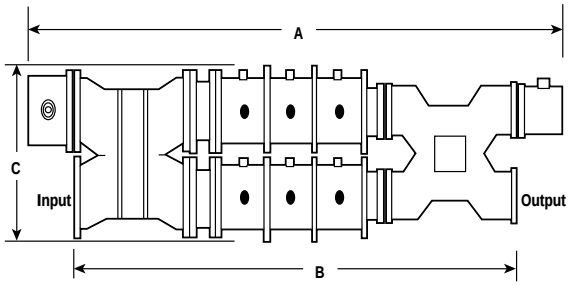


Typical Frequency Response



WF Series





High Power Band-Pass Filter Systems for UHF-TV

Features

- *Very Low Insertion Loss*
- *Excellent Rejection*
- *Low VSWR*
- *Proven Performance*
- *Unique Design*
- *Dual Mode Filters*
- *Rugged Aluminum Construction*

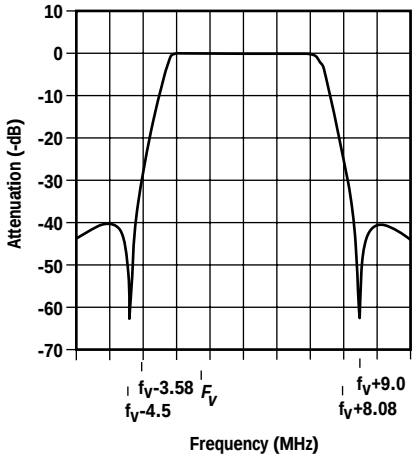
WF Series UHF Filter Systems

High power band-pass filter systems are designed to suppress spurious intermodulation products generated by the transmitters. High power band-pass filter systems are typically used with common amplification transmitter systems operating at combined powers up to 240 kW.

Ordering Information

Type No.	Frequency MHz	Channels	Waveguide Size	Dimension A, in (mm)	Dimension B, in (mm)	Dimension C, in (mm)
WF104	632-806	41-69	WR1150	126-139 (3200-3530)	105-118 (2667-2997)	35 (889)
WF504	470-632	14-40	WR1500	147-179 (3734-4547)	126-158 (3200-4013)	39 (990)

Typical Response



Specifications

Peak Sync Power Rating, kW	Up to 240
Frequency Range	UHF-TV Band
Input VSWR	
fv -0.75 to fv +4.75 MHz	1.05:1 or better
Over Channel Bandwidth	1.08:1 or better
Insertion Loss, dB, max.	
fv -0.75 to fv +4.75 MHz	0.15
Over Channel Bandwidth	0.20
Rejection	See graph
Input Isolation	
to Reject Load	-25 dB or more
to Ballast Load	-35 dB or more

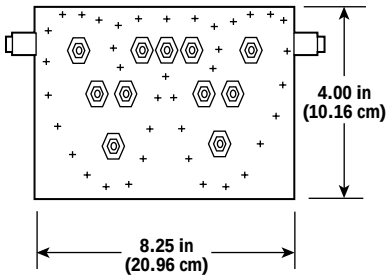
Band-Pass Filters for Digital Cellular Transmitter Systems

Features

- *Low VSWR*
- *Low Insertion Loss*
- *Excellent Rejection*
- *Precision Design*
- *Compact Size*

CELF 200 Series Band-pass Filters

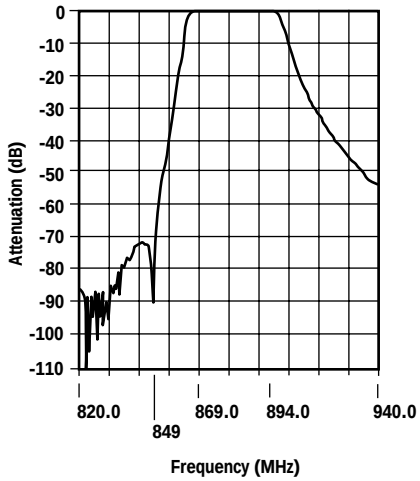
CELF 200 series low power band-pass filters are designed to conform to current electrical and mechanical performance specifications for transmitter base station systems within the digital cellular phone industry.



Specifications

Average Power, W	200
Peak Power, kW	1.5
Frequency Range, MHz	869-894
Return Loss, dB	22 or better
Insertion Loss, dB	< 0.50
Intermodulation Suppression, dB	>130
Attenuation, dB (See graph)	
824 MHz and Below	75 or more
Below 849 MHz	70 or more
849 MHz	80 or more
915 MHz	35 or more
940 MHz and above	56 or more
Number of channels	20 @10 watts each
Spacing, kHz	30
Modulation	s/4 DQPSK
Impedance, ohms	50
Connectors	Type N

Typical Frequency Response



Combiners

Andrew manufactures a wide range of combiners for the broadcast industry. Channel combiners of constant impedance or starpoint design, switchless combiners for transmitter amplification, switching combiners for main/alternate antenna feeds, power combiners and various diplexers for the TV and radio markets have been supplied to many locations throughout the world including the USA, Britain, Australia, South America, Mexico, Malaysia, China, Kuwait, the Netherlands, and other countries in Europe. Andrew has many decades of combined expertise and experience in filter design, combiner implementations and combiner system design. We have supplied many multi-channel digital/analog UHF and VHF channel combiners (including adjacent channel designs) for the demanding USA digital market as well as Europe.

Coaxial Low-Pass Harmonic Filters For UHF-TV Transmitters

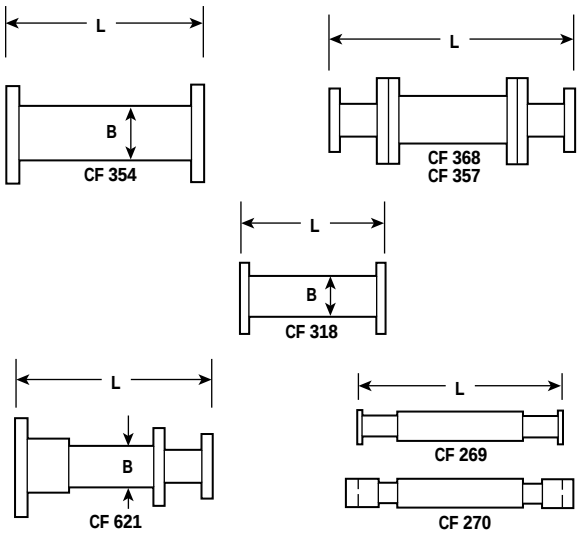
DTV READY!

Features

- *High Rejection 2nd and 3rd Harmonic*
- *Extremely Low Insertion Loss and VSWR*
- *Minimized Length*
- *Wide Range of Power Levels*
- *Built-in Couplers Available*
- *Alternative Connectors Available*
- *Rugged Construction*

CF Series UHF Harmonic Filters

CF series high rejection UHF low-pass harmonic filters are designed for transmitter power levels up to 60 kW. Chebishev design parameters define element values that provide 40 dB or greater rejection at the second harmonic and 30 dB or greater rejection at the third harmonic.



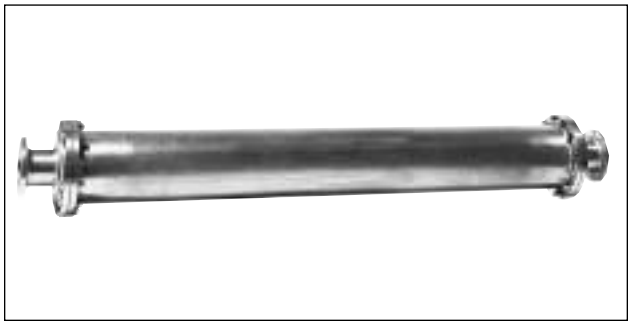
Specifications

Frequency	UHF Band
VSWR, max.	<1.05 (Individual channel)
Insertion Loss, dB, max.	<0.1
Rejection, dB	
2nd harmonic	>40 dB
3rd Harmonic	>30 dB

Ordering Information

Type No.*	Average Power, kW	Connections	Frequency MHz	Length, in (mm)	Diameter (B)
CF269-0XX	5	1-5/8" EIA	470-860	22 (559)	1-5/8"
CF270-0XX	5	1-5/8", non-flanged	470-860	22.5 (572)	1-5/8"
CF318-0XX	15	3-1/8" EIA	470-860	18 (458)	3-1/8"
CF357-0XX	30	3-1/8" EIA	470-626	24 (610)	4-1/16"
CF368-0XX	30	3-1/8" EIA	626-860	24 (610)	4-1/16"
CF621-0XX	30	3-1/8" (IP), 6-1/8" (OP)	698-860	20 (508)	4-1/16"
CF354-0XX	60	6-1/8" EIA	470-650	24 (610)	6-1/8"
CF354-0XX	60	6-1/8" EIA	650-698	24 (610)	6-1/8"

* XX indicates channel number.



VHF Coaxial Low-Pass Harmonic Filters

Features

- *High Rejection through 5th Harmonic*
- *Low Insertion Loss and VSWR*
- *Minimized Length*
- *Copper or Aluminum Construction*
- *Built-in Couplers Available*
- *Broadband Design*

Specifications

Frequency, MHz	174-230
VSWR	<1.08
Insertion Loss, dB	<0.1
Rejection, dB	
2nd Harmonic	>40
3rd through 5th Harmonic	>30
Connections	EIA or non-flanged

CF Series VHF Harmonic Filters

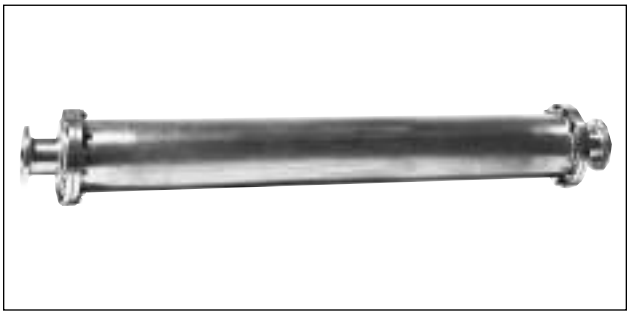
Andrew offers a series of high rejection, low-pass harmonic filters for transmitter power levels up to 60 kW for both high band and low band VHF applications. Chebishev design parameters define element values which, when synthesized, provide 40 dB or greater rejection at the 2nd harmonic and greater than 30 dB to the 5th harmonic. The oversized center section ensures optimal power handling capability. Each filter is individually tested and tuned for optimum electrical and mechanical performance. Measured test data is supplied with each filter.

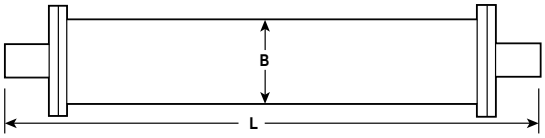
The low band filters are 116 in (2946 mm) in length; high band units are 48 in (1219 mm).

High Rejection FM Low-Pass Harmonic Filters

Features

- *High Rejection through 10th Harmonic*
- *Extremely Low Insertion Loss and VSWR*
- *Minimized Length*
- *Entire FM Band Coverage*
- *Rugged Built-in Couplers Available*
- *Wide Range of Power Ratings*





FM Harmonic Filter

CF Series Harmonic Filters

Andrew offers a series of remarkable high rejection, FM, low-pass, harmonic filters for transmitter power levels up to 40 kW. A unique design provides 50 dB or greater rejection from the second to the tenth harmonic and beyond. This yields filters with overall lengths 30% to 50% shorter than typical FM harmonic filters.

Specifications

Frequency, MHz	87.5 to 108 MHz
VSWR	<1.10
Insertion Loss, dB	<0.10
Rejection, 2nd through 10th harmonic, dB	>50

Ordering Information

Type No.	Average Power, kW	Connections	Length (L), in (mm) without Couplers*	Diameter (B)
CFH211-OFM	5	1-5/8" EIA	54 (1372)	3-1/8"
CFH221-OFM	5	1-5/8" non-flanged	54 (1372)	3-1/8"
CFH312-OFM	10	3-1/8" EIA	54 (1372)	4-1/16"
CFH322-OFM	10	3-1/8" non-flanged	54 (1372)	4-1/16"
CFH314-OFM	20	3-1/8" EIA	60 (1524)	6-1/8"
CFH324-OFM	20	3-1/8" non-flanged	60 (1524)	6-1/8"
CFH316-OFM	40	3-1/8" EIA	60 (1524)	9-3/16"
CFH326-OFM	40	3-1/8" non-flanged	60 (1524)	9-3/16"

* For single, dual, or quad directional couplers, add 6 in (152 mm) to length.

CL Series

DTV READY!

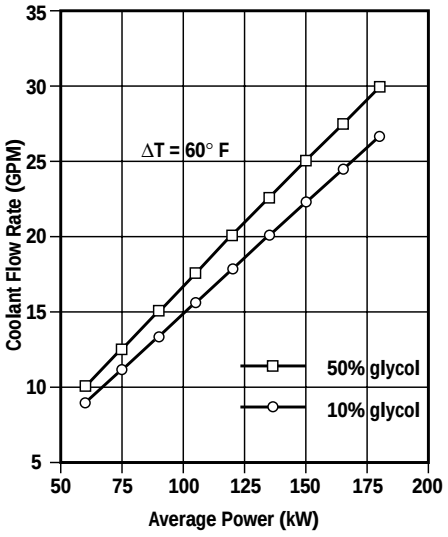
High Power UHF Coaxial Water Loads

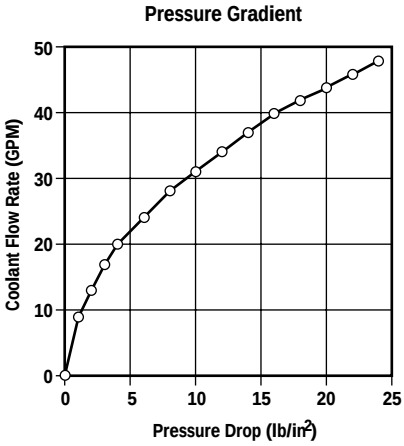
Features

- *Low Cost per kW*
- *Low In-channel VSWR*
- *Low Coolant Pressure Drop*
- *Failure Resistant Design*
- *Temperature Stable*
- *Wide Range of Power Levels*

CL Series Coaxial Loads

CL series UHF coaxial loads offer a proven design for handling high power at low cost. The load employs a solution of antifreeze and water as both coolant and resistive material. The power dissipated by the load heats the solution and is removed by the constant flow.



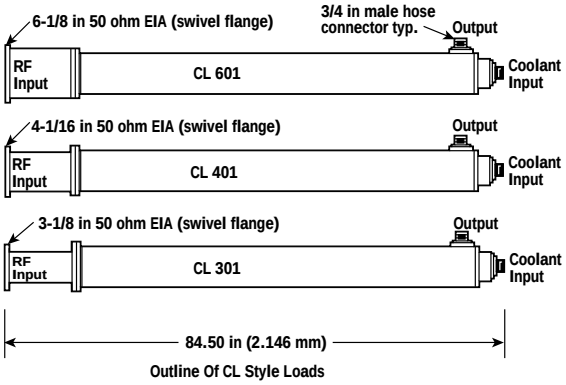


Ordering Information and Specifications

Type No.	CL 301	CL401	CL601
Average Power, kW	50	70	100
Peak Power, kW	500	1500	2000
Connector	3-1/8" EIA	4-1/16" EIA	6-1/8" EIA
VSWR			
Any TV Channel	1.05:1	1.05:1	1.05:1
470-860 MHz	1.2:1	1.2:1	1.2:1

Coolant

Connections	3/4" NGH or 3/4" NPT
Pressure, lb/in² (kPa)	80 (552)
Mixture	20% to 50% solution of antifreeze and water
Pressure Gradient	See Graph
Coolant flow Rate	See Graph

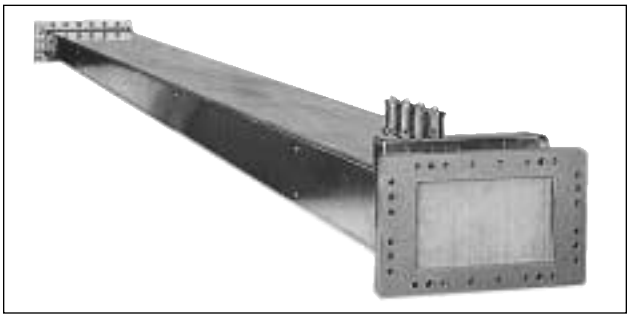


Outline Of CL Style Loads

Waveguide Loads for UHF-TV Systems

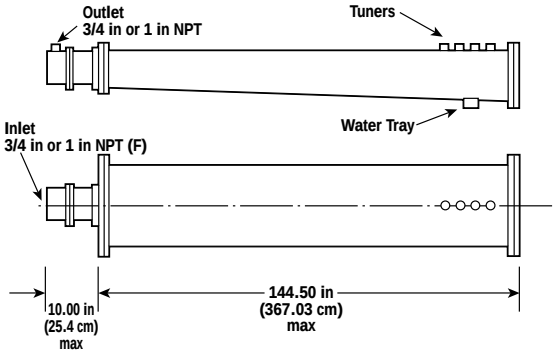
Features

- *High Power*
- *Very Low Cost per kW*
- *Low VSWR*
- *Rugged Construction*
- *Simple Design*
- *Fine Tuner Provided*
- *Efficient*



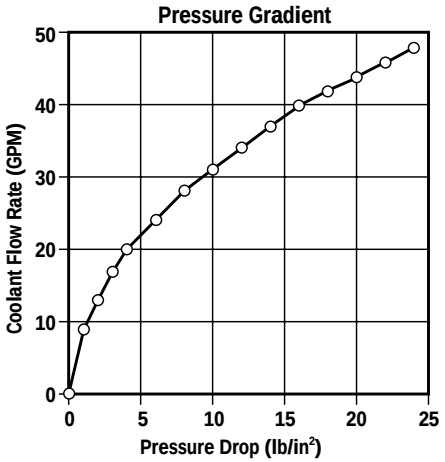
WL Series Waveguide Loads

These unique, tapered-waveguide water loads utilize two coaxial dielectric tubes to carry the water/glycol solution. The solution functions as both a heat dissipater and RF absorber.



Ordering Information

Type No.	Waveguide Size	Peak Synch Power, kW	UHF-TV Channels (U.S.A.)
WL-811	WR1800	240	14-19
WL-511	WR1500	240	14-19
WL-512	WR1500	240	20-29
WL-513	WR1500	240	30-39
WL-514	WR1500	240	40-49
WL-111	WR1150	240	41-69

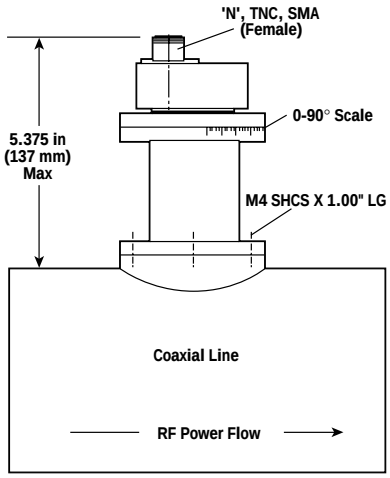


Specifications

Peak Sync Power VSWR (See table above)	
Channel BW	1.05:1
470-860 MHz	1.20:1
Input Connection	Rectangular waveguide
Coolant Connection	
Inlet	3/4" or 1" NPTF
Outlet	3/4" or 1" NPTM
Coolant Pressure, lb/in² (kPa)	80 (552)
Coolant Temperature, °C (°F)	27 (160)
Flow Rate	Contact Andrew
Pressure Gradient	See graph
Coolant Range, %	10 - 50

CD Series

DTV READY!



Forward Coupler Shown

VHF-UHF Coaxial Adjustable Directional Couplers

Features

- *32 dB+ Directivity*
- *Broad Frequency Range*
- *Reversible*
- *30-70 dB Coupling Range*
- *Low VSWR*
- *Field Replaceable Resistor*
- *Very Compact Design*
- *All Brass Probe Assembly*
- *Multiple Construction*
- *1-5/8", 3-1/8", 4-1/16", 6-1/8" Sizes*

CD Series Coaxial Adjustable Directional Couplers

CD series coaxial adjustable directional couplers are designed and manufactured to cover 50 MHz to 860 MHz with a broad coupling range and correspondingly high directivity, all within one of the smallest packages in the Broadcast industry. The highly directive coupling loop provides high accuracy in forward and/or reflected power measurements necessary for determining VSWR on the line, component or system losses, line power, or other operations.

Ordering Information

Type No.	Connections	Number of Couplers
CD308-N	3-1/8", N Female	1
CD309-N	3-1/8", N Female	2
CD310-N	3-1/8", N Female	3
CD408-N	4-1/16", N Female	1
CD409-N	4-1/16", N Female	2
CD410-N	4-1/16", N Female	3
CD608-N	6-1/8", N Female	1
CD609-N	6-1/8", N Female	2
CD610-N	6-1/8", N Female	3
CD314-N	3-1/8" Field Installable (w/saddle)	1
CD414-N	4-1/16" Field Installable (w/saddle)	1
CD614-N	6-1/8" Field Installable (w/saddle)	1

Specifications

Coupling Range, dB	-30 to -70
Frequency Range, MHz	50-860
VSWR	1.03 or better
Directivity, dB	32 or greater
Connectors	
Coupler	N, TNC, SMA
Line	EIA, IEC, Unflanged
Impedance, ohms	50

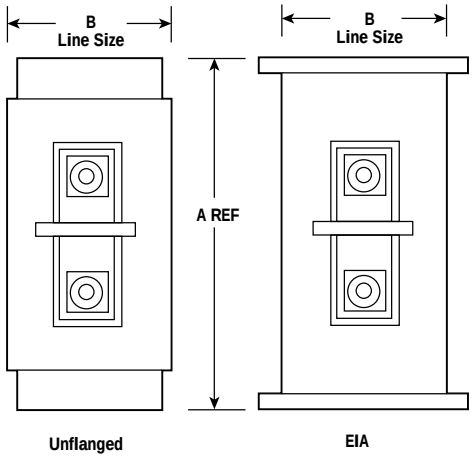
Coaxial Directional Couplers for UHF-VHF

Features

- *Low VSWR*
- *Broad Frequency Range*
- *High Directivity*
- *Broad Coupling Range*
- *Field Replaceable*
- *Compact Design*
- *Light Weight*
- *Any Coax Line Size*

CD Series Coaxial Directional Couplers

These loop couplers are designed, manufactured, and laboratory compensated for any coupling value between -30 dB and -60 dB for any channel in the VHF-FM-UHF bands. The highly directive coupling loops provide high accuracy in forward and/or reflected power measurements necessary for determining VSWR on the line or other operations.



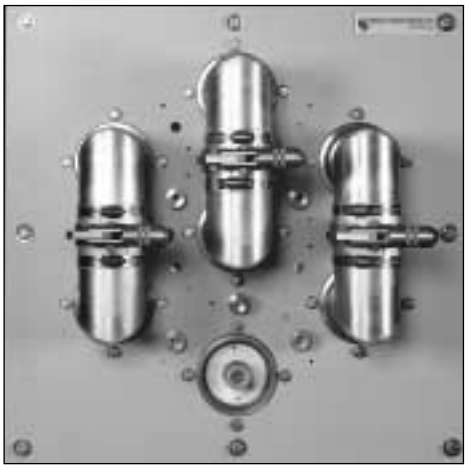
Specifications

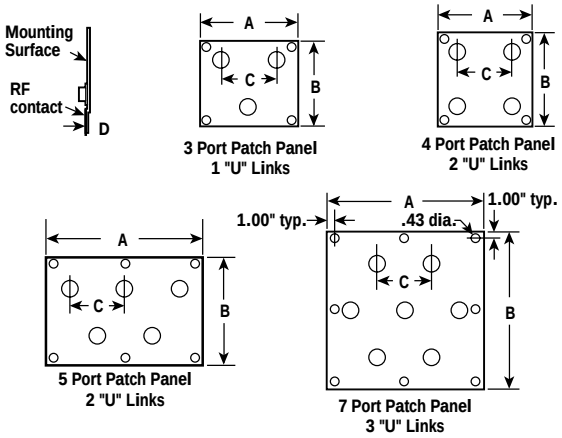
Coupling Range, dB	-30 to -60
Frequency Range, MHz	50-4000
VSWR	1.03 or better
Directivity, dB	30 or greater
Connectors	
Coupler	N, SMA, BNC
Line	EIA, IEC, unflanged
Impedance, ohms	50

Ordering Information

Type No.	Line Size	Flange Type	Number of Directional Couplers	Length, L in (mm)
CD103 (1-2 GHz)	7/8"	7/8" EIA	1	6 (152)
CD104 (2-4 GHz)	7/8"	7/8" EIA	1	6 (152)
CD201	1-5/8"	Unflanged	4	7 (178)
CD202	1-5/8"	Unflanged	2	7 (178)
CD203	1-5/8"	1-5/8" EIA	2	14.5 (368)
CD204	1-5/8"	Unflanged	1	7 (178)
CD205	1-5/8"	Unflanged	3	7 (178)
CD301	3-1/8"	Unflanged	2	6.75 (171)
CD302	3-1/8"	Unflanged	4	6.75 (171)
CD303	3-1/8"	3-1/8" EIA	2	8 (203)
CD304	3-1/8"	Unflanged	1	7.5 (191)
CD305	3-1/8"	3-1/8" EIA	3	8 (203)
CD401	4-1/16"	4-1/16" EIA	3	8 (203)
CD402	4-1/16"	4-1/16" EIA	1	8 (203)
CD403	4-1/8"	IEC50-105	2	8 (203)
CD404	4-1/16"	Unflanged	2	10 (254)
CD405	4-1/16"	4-1/16" EIA	2	8 (203)
CD603	6-1/8"	6-1/8" EIA	1	10 (254)
CD604	6-1/8"	Unflanged	1	10 (254)
CD605	6-1/8"	6-1/8" EIA	2	10 (254)
CD606	6-1/8"	6-1/8" EIA	3	10 (254)

CP Series





Quick Patch Coaxial Patch Panels

Features

- *Quick Connect*
- *Auto Locking*
- *Reduced Weight*
- *Various Port Arrangements*
- *Positive Pre-removal Interlocks*
- *Replaceable Contacts*

CP Series Patch Panels

Quick Patch coaxial patch panels are a new and unique design that allows for quick and positive change-over of any number of system inputs and outputs. This, combined with a positive pre-removal interlock system, provides ease of use with high reliability.

All patch links employ a positive locking handle with a lightweight aluminum outer and a high conductivity copper inner.

Specifications

Frequency	Contact Andrew
Power	90% of line rating
VSWR	1.04:1 max
Interlocks	DPDT

Ordering Information

Type Number	Number of Ports	Line Size	Impedance ohms	Dimensions, in (mm) A	B	C	D	Rear Connector
CP235	3	1-5/8"	50	15 (381)	15 (381)	6 (152)	0.81 (21)	Unflanged
CP245	4	1-5/8"	50	15 (381)	15 (381)	6 (152)	0.81 (21)	Unflanged
CP255	5	1-5/8"	50	20 (508)	15 (381)	6 (152)	0.81 (21)	Unflanged
CP275	7	1-5/8"	50	20 (508)	20 (508)	6 (152)	0.81 (21)	Unflanged
CP335	3	3-1/8"	50	15.5 (394)	15.5 (394)	7 (178)	0.88 (22)	Unflanged
CP345	4	3-1/8"	50	16 (406)	16 (406)	7 (178)	0.88 (22)	Unflanged
CP355	5	3-1/8"	50	23 (584)	16 (406)	7 (178)	0.88 (22)	Unflanged
CP375	7	3-1/8"	50	23 (584)	23 (584)	7 (178)	0.88 (22)	Unflanged
CP435	3	4-1/16"	50	22 (559)	22 (559)	11 (279)	0.88 (22)	Unflanged
CP445	4	4-1/16"	50	22 (559)	22 (559)	11 (279)	0.88 (22)	Unflanged
CP455	5	4-1/16"	50	32 (813)	22 (559)	11 (279)	0.88 (22)	Unflanged
CP475	7	4-1/16"	50	32 (813)	32 (813)	11 (279)	0.88 (22)	Unflanged
CP635	3	6-1/8"	50	26 (660)	26 (660)	13 (330)	1.12 (28)	6-1/8" EIA
CP645	4	6-1/8"	50	26 (660)	26 (660)	13 (330)	1.12 (28)	6-1/8" EIA
CP655	5	6-1/8"	50	38 (965)	26 (660)	13 (330)	1.12 (28)	6-1/8" EIA
CP675	7	6-1/8"	50	38 (965)	38 (965)	13 (330)	1.12 (28)	6-1/8" EIA
CP637	3	6-1/8"	75	26 (660)	26 (660)	13 (330)	1.12 (28)	6-1/8" EIA
CP647	4	6-1/8"	75	26 (660)	26 (660)	13 (330)	1.12 (28)	6-1/8" EIA
CP657	5	6-1/8"	75	38 (965)	26 (660)	13 (330)	1.12 (28)	6-1/8" EIA
CP677	7	6-1/8"	75	38 (965)	38 (965)	13 (330)	1.12 (28)	6-1/8" EIA

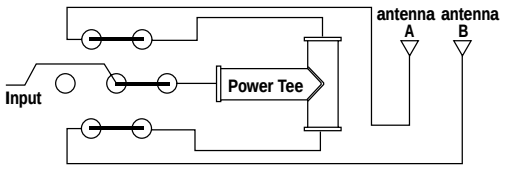
Patch Panel/Power Divider for Dual Antenna Systems

Features

- *Any Standard Line Size*
- *Auto Locking U-Links*
- *Positive Pre-removal Interlocks*
- *Quick Connect*
- *Low VSWR*
- *Multi-channel Bandwidth*
- *Bypass to Either Antenna*

PPD Series Output Patch Panel/Power Divider Systems

These patch panel/power divider systems integrate a unique combination of quality components to produce a unit that is normally used with dual antenna feed line systems. The input to the power combiner may be single channel or multi-channel (i.e., the output of a channel combiner). Contact Andrew for specific applications.

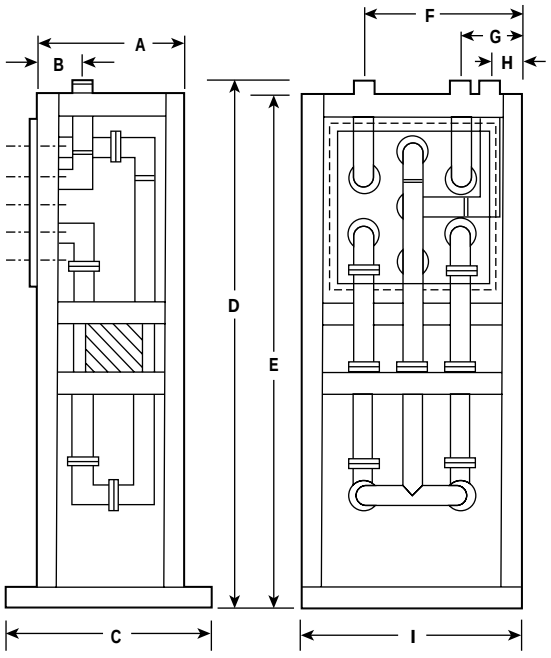


RF Diagram

Typical Dimensions

Line Size	Dimensions, in (mm) A	B	C	D	E
1-5/8"	16.00 (406)	3.63 (92)	24.00 (610)	61.50 (1562)	62.00 (1575)
3-1/8"	18.00 (457)	4.88 (124)	26.00 (660)	68.00 (1727)	70.38 (1788)
6-1/8"	28.00 (711)	10.15 (258)	28.00 (711)	72.00 (1829)	67.00 (1702)

Line Size	Dimensions, in (mm) F	G	H	I
1-5/8"	18.69 (475)	8.30 (211)	4.50 (114)	27.00 (686)
3-1/8"	21.07 (535)	8.93 (227)	4.63 (118)	30.00 (762)
6-1/8"	32.25 (819)	9.75 (248)	21.00 (533)	42.00 (1067)

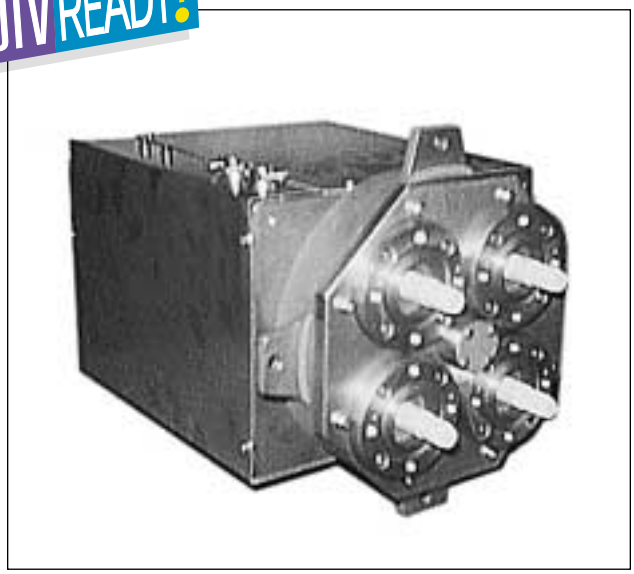


Typical Dimensions

Specifications

Power Handling	Determined by line size
Frequency Range	VHF-UHF
VSWR	1.10:1 max.
Insertion Loss, dB	0.10
Power Split	3.0 dB ± 0.1 dB
Impedance, ohms	50
Connections	Unflanged (typical)

CS Series



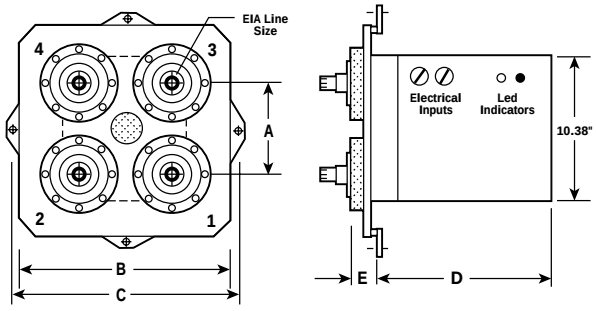
Coaxial Motorized Transfer Switches

Features

- *3 or 4 port Configuration*
- *Non-volatile Memory*
- *Low VSWR*
- *Manual Operation*
- *Mount in any Orientation*
- *Low Insertion Loss*
- *Very High Isolation*
- *Rugged Design*

CS Series Coaxial Switches

CS series coaxial switches are designed for operation within VHF television and FM radio broadcast transmitter systems. The switches utilize a unique, flat plane, silver plated, dual-contact design to provide high power capability and long life. The switch drive can be either 115 Vac or 230 Vac with control voltages of 12 Vdc or 24 Vdc.



Typical Dimensions

Specifications

Switch Size	1-5/8"	3-1/8"	4-1/16"	6-1/8"
Power Handling				
Peak, kW	165	300	500	1000
Average @ 25 MHz, kW	30	55	90	180
Average @ 250 MHz, kW	9	18	30	60
Frequency Range	dc to 250 MHz			
VSWR	1.03:1 (max)			
Insertion Loss	0.06 dB (max)			
Isolation, dB, max.	60 or more			
Impedance, ohms	50			
Switching Time, seconds	3 or less			
Connections	EIA (standard) or unflanged			

Ordering Information

			Typical Dimensions, in (mm)				
Type No.	Line Size	Ports	A	B	C	D	E
CS250-XYY*	1-5/8"	4	3.75 (95.3)	9.00 (228.6)	10.75 (273.1)	12.75 (323.9)	1.50 (38.1)
CS251-XYY*	1-5/8"	3	3.75 (95.3)	9.00 (228.6)	10.75 (273.1)	12.75 (323.9)	1.50 (38.1)
CS350-XYY*	3-1/8"	4	5.50 (139.7)	13.00 (330.2)	15.00 (381.0)	12.88 (327.2)	1.63 (41.4)
CS351-XYY*	3-1/8"	3	5.50 (139.7)	13.00 (330.2)	15.00 (381.0)	12.88 (327.2)	1.63 (41.4)
CS450-XYY*	4-1/16"	4	6.50 (165.1)	15.00 (381.0)	16.50 (419.1)	13.41 (340.6)	1.72 (43.7)
CS451-XYY*	4-1/16"	3	6.50 (165.1)	15.00 (381.0)	16.50 (419.1)	13.41 (340.6)	1.72 (43.7)
CS650-XYY*	6-1/8"	4	9.38 (283.3)	20.00 (508.0)	23.00 (584.2)	13.84 (351.5)	1.72 (43.7)
CS651-XYY*	6-1/8"	3	9.38 (283.3)	20.00 (508.0)	23.00 (584.2)	13.84 (351.5)	1.72 (43.7)

* X indicates first number in drive voltage; YY indicates two numbers in control voltage.
ie: CS350-212 designates a 3-1/8" switch with 230 Vac drive and 12 Vdc control voltage.

UHF Waveguide Motorized Transfer Switches

Features

- *H or E-plane Configuration*
- *Non-Volatile Memory*
- *Low VSWR*
- *Manual Operation*
- *Mount in any Orientation*
- *Low Insertion Loss*
- *Very High Isolation*
- *Rugged Design*

WS Series Waveguide Switches

WS series waveguide switches are designed for operation within UHF television broadcast transmitter systems. The switches utilize a unique, flat, rotating vane to ensure high power capability and long life.

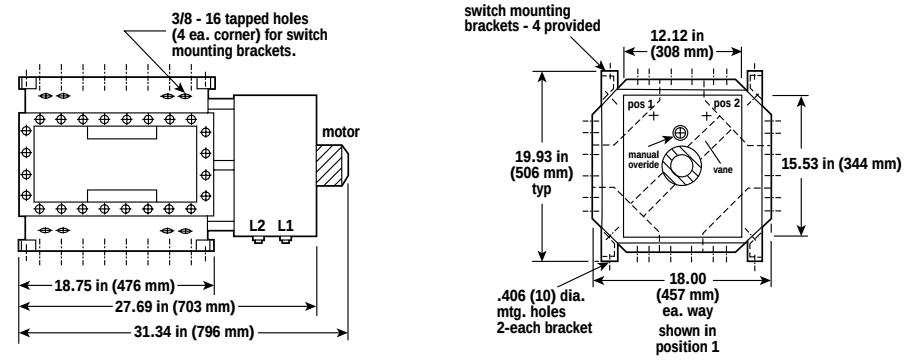
Specifications

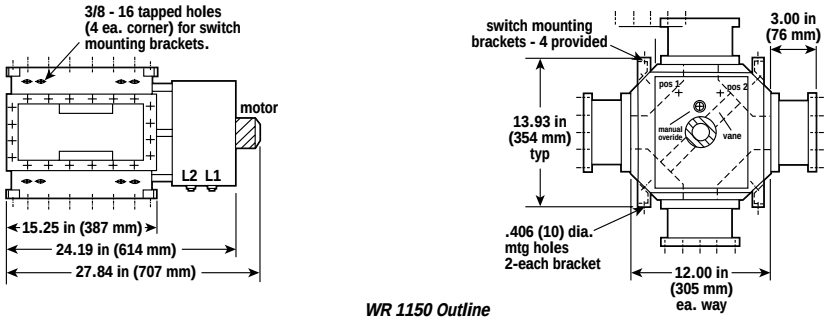
Peak Power Handling, kW	Up to 300
Frequency Range	UHF (specify channel)
VSWR	1.03:1 (single channel)
Insertion Loss, dB max	0.06
Isolation, dB	70 or more
Impedance, ohms	50
Switching Time, seconds	5 or less

Ordering Information

Type No.	Waveguide Type	Configuration
WS104	WR1150	E-Plane
WS503	WR1500	E-Plane
WS801	WR1800	E-Plane
WS106	WR1150	H-Plane
WS507	WR1500	H-Plane

WR 1500 Outline

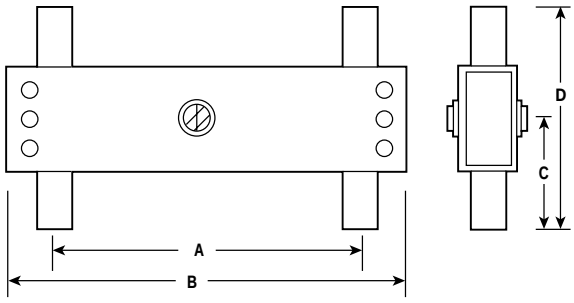




WR 1150 Outline

CH Series

DTV READY!



Low Power Coaxial Hybrids for VHF-TV and FM

Features

- *High Isolation*
- *Low VSWR*
- *Light Weight*
- *Broadband*
- *Compact Size*
- *Low Insertion Loss*

CH Series Coaxial Hybrids

Our coaxial hybrids are most often used as power dividers and power combiners in diplexers, switchless combiners, and channel combiners. The hybrid may also be used as a transmitter power combiner or power divider. Hybrids of different power splits may be cascaded to provide varying power combining and dividing configurations.

Ordering Information

		Dimensions, in (mm)			
Type No.	CH	A	B	C	D
CH203-002	2	56 (1422)	60 (1524)	6 (152)	12 (305)
CH203-003/6	3-6	42 (1067)	46 (1168)	6 (152)	12 (305)
CH203-007/13	7-13	14 (356)	18 (457)	6 (152)	12 (305)

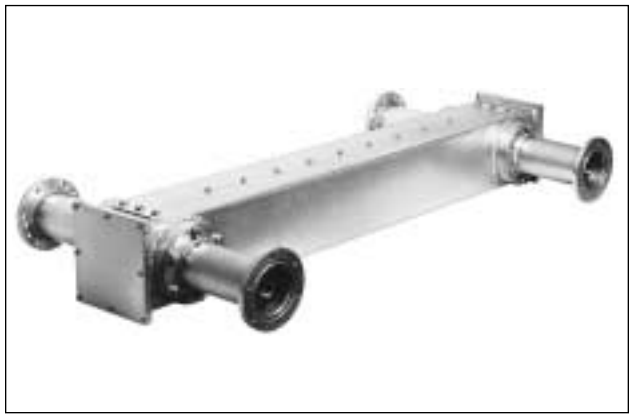
Specifications

Peak Power Range, kW	up to 10
Frequency, MHz	45-250
Power Split	to within ± 0.1 dB
Isolation, dB	35 or more
VSWR	1.03 or better (passband)
Insertion loss, dB	0.05 or less
Impedance, ohms	50
Phase shift	90° ± 1°
Connections	N, 7/8", 1-5/8" EIA or unflanged

FM Coaxial Hybrids

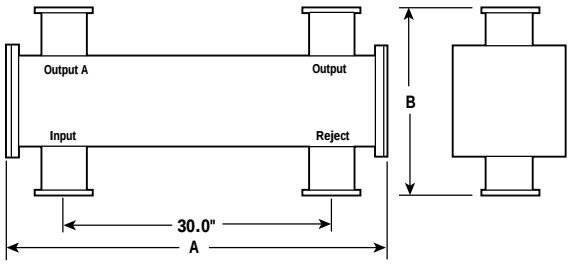
Features

- *Wholeband Quadrature Performance*
- *Used as Power Combiners or Dividers*
- *Compact Crossover Design*
- *Each Individually Tested*
- *Non-corroding Chromate Conversion Finish*
- *Exceptionally Low VSWR and Insertion Loss*
- *Low-loss Copper Inner Components*



CH Series FM Hybrid

Our high-power quadrature crossover coaxial hybrids are designed for optimum performance. The shielded tube design allows for a small cross section without sacrificing power handling. The design also ensures whole band operation with low VSWR and insertion loss.

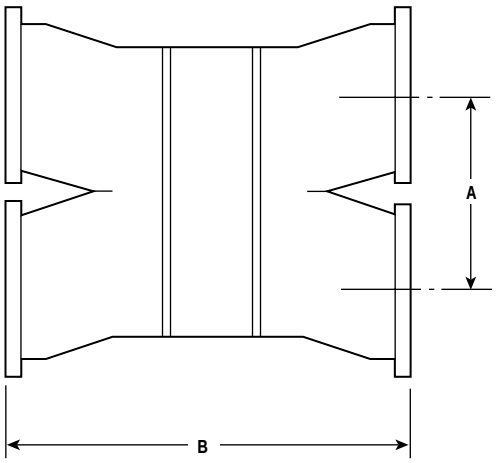


Specifications

Frequency, MHz	87.5 to 108
VSWR	<1.06:1
Insertion Loss, dB	<0.05
Power Split, dB	-3.0 ± 0.1
Isolation, dB	>32
Phase Split	90 ± 2 degrees

Ordering Information, FM 90° Hybrids

Type No. Power, kW	Combined Interface	Connector in (mm)	Dimension A in (mm)	Dimension B in (mm)	Case Dimensions
CH250-OFM	10	3-1/8" EIA, female	34.00 (863.6)	8.88 (225.6)	1.75 x 4.00 (44.5 x 101.6)
CH251-OFM	10	Unflanged	34.00 (863.6)	8.50 (215.9)	1.75 x 4.00 (44.5 x 101.6)
CH350-OFM	20	3-1/8" EIA, female	37.00 (939.8)	14.00 (355.6)	5.40 x 5.40 (137.2 x 137.2)
CH351-OFM	20	Unflanged	40.00 (1016)	13.50 (342.9)	5.40 x 5.40 (137.2 x 137.2)
CH450-OFM	40	3-1/8" EIA, female	40.00 (1016)	18.00 (457.2)	8.64 x 8.64 (219.5 x 219.5)
CH451-OFM	40	Unflanged	40.00 (1016)	17.50 (444.5)	8.64 x 8.64 (219.5 x 219.5)
CH650-OFM	80	3-1/8" EIA, female	40.00 (1016)	18.00 (457.2)	8.64 x 8.64 (219.5 x 219.5)



Waveguide Short-Slot Hybrids for UHF-TV

Features

- *High Power*
- *Low VSWR*
- *All Aluminum*
- *Broadband*
- *High Isolation*
- *Compact Size*
- *Low Insertion Loss*

WH Series Waveguide Hybrids

WH series broadband waveguide hybrids are most often used as power dividers and power combiners in high power waveguide UHF diplexers, switchless combiners, and channel combining systems. They may also be used as a transmitter power divider (four outputs) or combiner.

Ordering Information

Type No.	Waveguide Size	Frequency Band, MHz	Dimension A in (mm)	Dimension B in (mm)
WH801	WR1800	470-540	22 (559)	42 (1067)
WH503	WR1500	540-736	19 (483)	42 (1067)
WH510	WR1500	500-674	19 (483)	36 (914)
WH110	WR1500	644-806	15.5 (394)	36 (914)

Specifications

Power Handling, kW (WR1500)	up to 300
Frequency	UHF band
Power Split	to within ± 0.1 dB
Isolation, dB, min.	30
VSWR	1.02 or better (channel)
Insertion Loss, dB	0.1 or less
Impedance, ohms	50
Phase Shift	90° ± 1°
Sizes Available	WR1150, WR1500, WR1800

DTV READY!

Coaxial Fine Matcher

Coaxial Elbows

Coaxial Fixed Couplers

W/G Directional Coupler

Coaxial UHF Hybrid

W/G Fine Matcher

WR1150 E-Plane Miter
WE106

WR1500 H-Plane Miter
WE505

WR1800 H-Plane Miter

Andrew manufactures a wide variety of RF components for FM radio, VHF-TV, UHF-TV, and DTV systems. Our product line of coaxial elbows includes line sizes up to 8-3/16" and frequency ranges from AM to 2 GHz. Standard features include copper or aluminum construction and EIA flanged or unflanged with fully supported inner conductors.

E-Plane and H-Plane waveguide elbows are available in WR1150, WR1500 and WR1800 sizes. Waveguide and coaxial fixed couplers are located in almost all RF Andrew systems, where required. Our new coaxial adjustable couplers are widely accepted and rapidly becoming an industry standard due to their small package and high performance characteristics. The adjustable probe unit is interchangeable with any of the coaxial line sizes for frequency ranges from low-band VHF to UHF and will soon be easily adaptable to waveguide.

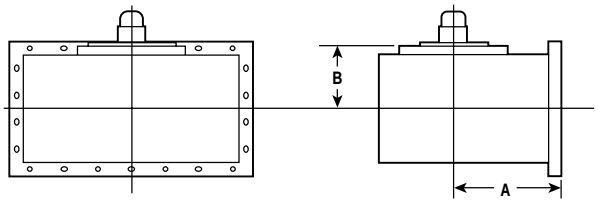
Fine matchers, a necessity for large RF systems, are available in coaxial line sizes from 1-5/8" to 8-3/16" and also in waveguide sizes WR1150, WR1500, and WR1800. Andrew also manufactures many different sizes and constructions of hybrids, including 3-way and 5-way power combiners. Contact Andrew for a quotation.

WX Series

High Power Waveguide to Coax Transitions

Features

- *Lightweight aluminum outer housing*
- *Rugged, welded construction*
- *Precision-machined flanges*
- *High-power, cross-bar design*
- *Non-corroding, chromate-conversion finish*
- *Low-loss copper inner components*
- *Exceptionally low VSWR and insertion loss*
- *Male EIA coaxial connectors supplied*



Waveguide to Coax Transition

WX-Series Transitions

Our high-powered rectangular waveguide-to-coax transitions are available in a wide range of waveguide and coax line sizes to match the required frequency range and power level. Superior materials, rugged construction, and plenty of reserve power-handling capability provide a lifetime of worry-free performance.

Specifications

Power Handling	Determined by the coaxial line size
VSWR	1.03:1 for any 2% band 1.10:1 for any 10% band
Flanges	
Coaxial port	EIA Male
Waveguide port	Rectangular waveguide to EIA RS-271

Ordering Information

Coaxial Line Size	Transition Type Number To WR1800	WR1500	WR1150	Dimension A in (mm)
1-5/8", 50-ohm	**WX820-0XX**	**WX520-0XX**	**WX120-0XX**	–
3-1/8", 50-ohm	**WX830-0XX**	**WX530-0XX**	**WX130-0XX**	–
4-1/16", 50-ohm	**WX840-0XX**	**WX540-0XX**	**WX142-0XX**	–
6-1/8", 50-ohm	**WX860-0XX**	**WX562-0XX**	**WX162-0XX**	–
6-1/8", 75-ohm	**WX865-0XX**	**WX565-0XX**	**WX167-0XX**	–
7-3/16", 75-ohm	**WX875-OXX**	**WX575-OXX**	**WX175-OXX**	–
8-3/16", 75-ohm	**WX885-0XX**	**WX585-0XX**	**WX185-0XX**	12.00 (305)
Dimension B in (mm)	5.50 (139.7)	4.75 (120.7)	3.88 (98.6)	–

* Specify 6 in or 12 in (152.4 mm or 304.8 mm) **-0XX** . XX designates a TV channel.