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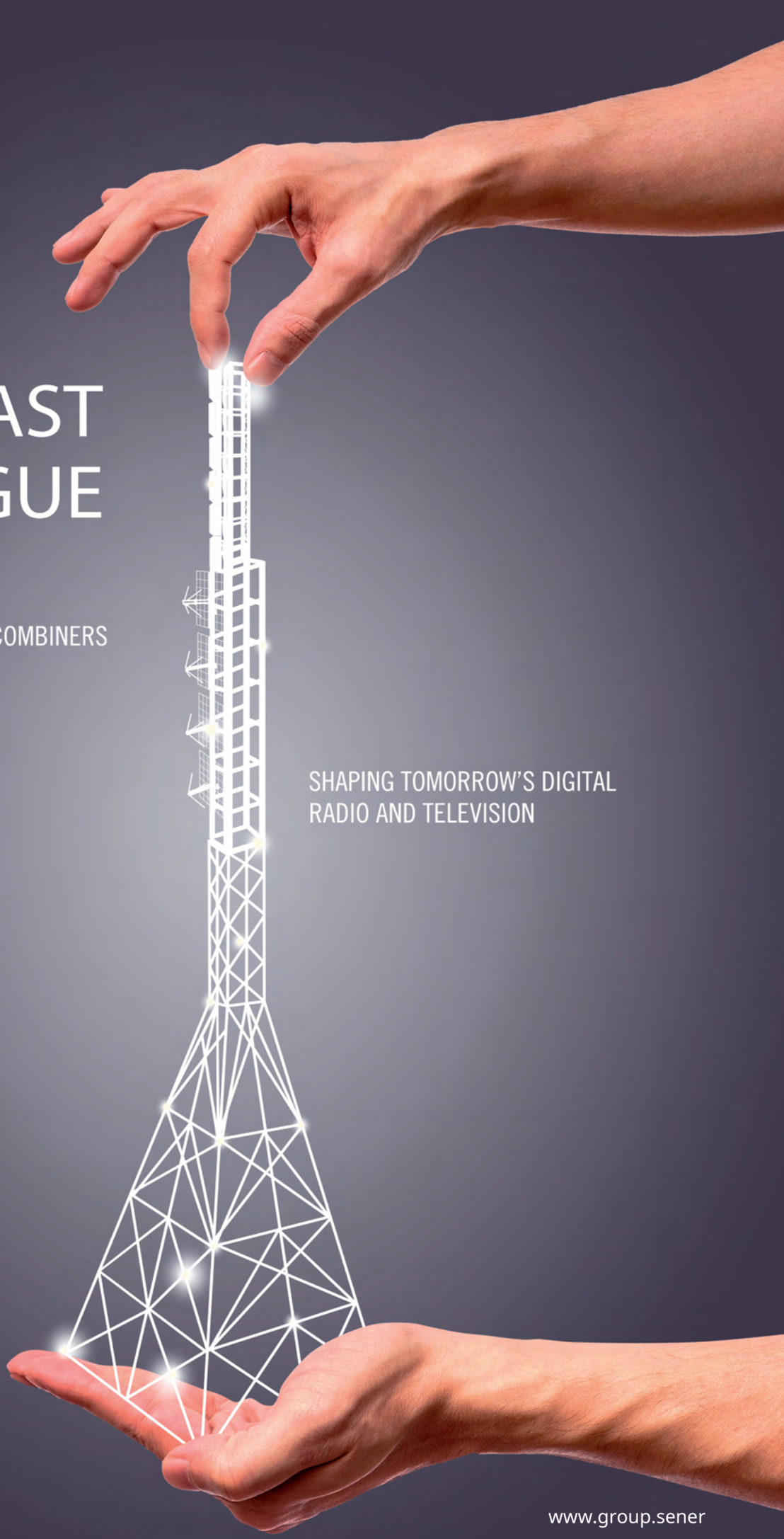
BROADCAST CATALOGUE ED. 23

ANTENNA SYSTEMS, CHANNEL COMBINERS & COAXIAL ACCESSORIES



SHAPING TOMORROW'S DIGITAL RADIO AND TELEVISION

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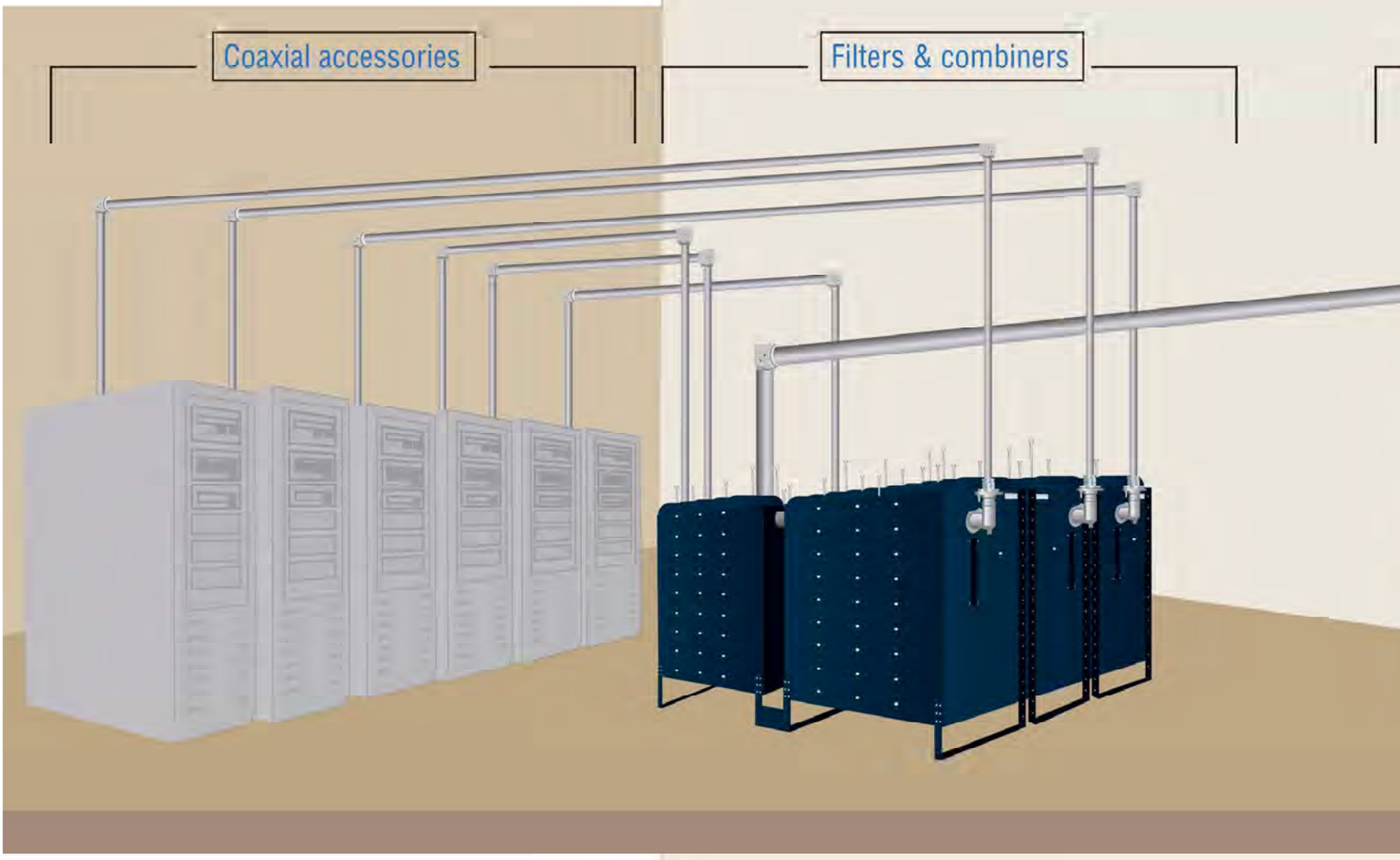
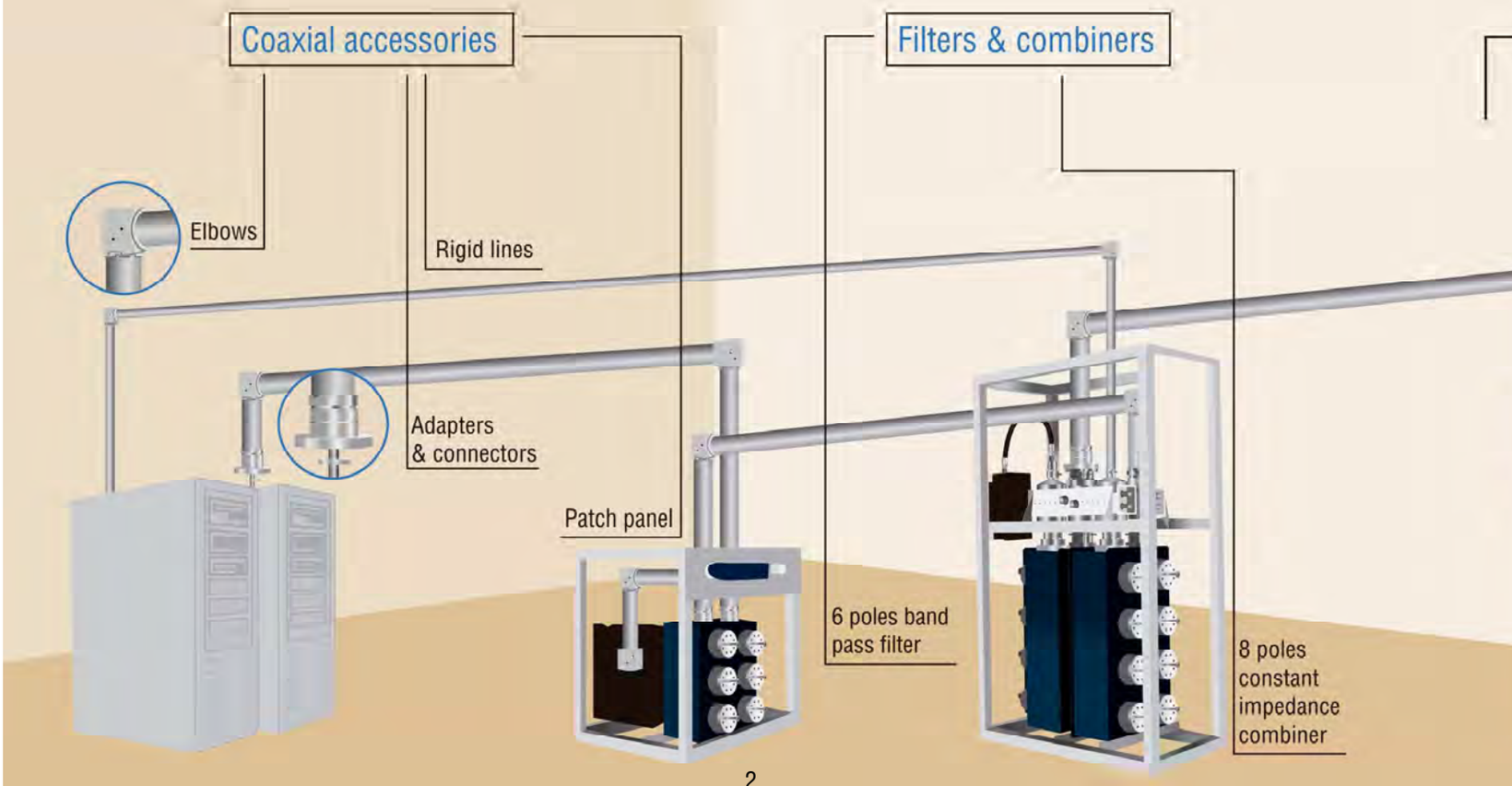
Radio (FM & DAB)



Television VHF (BI, BIII) - UHF



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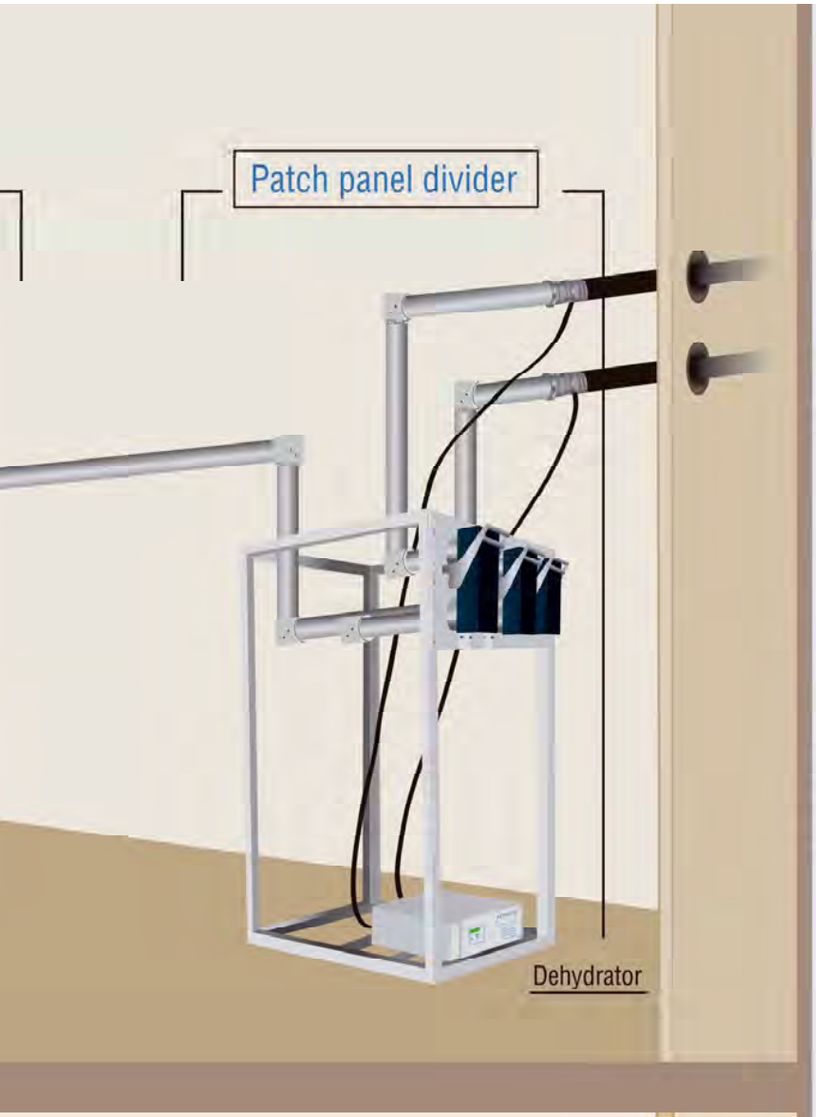
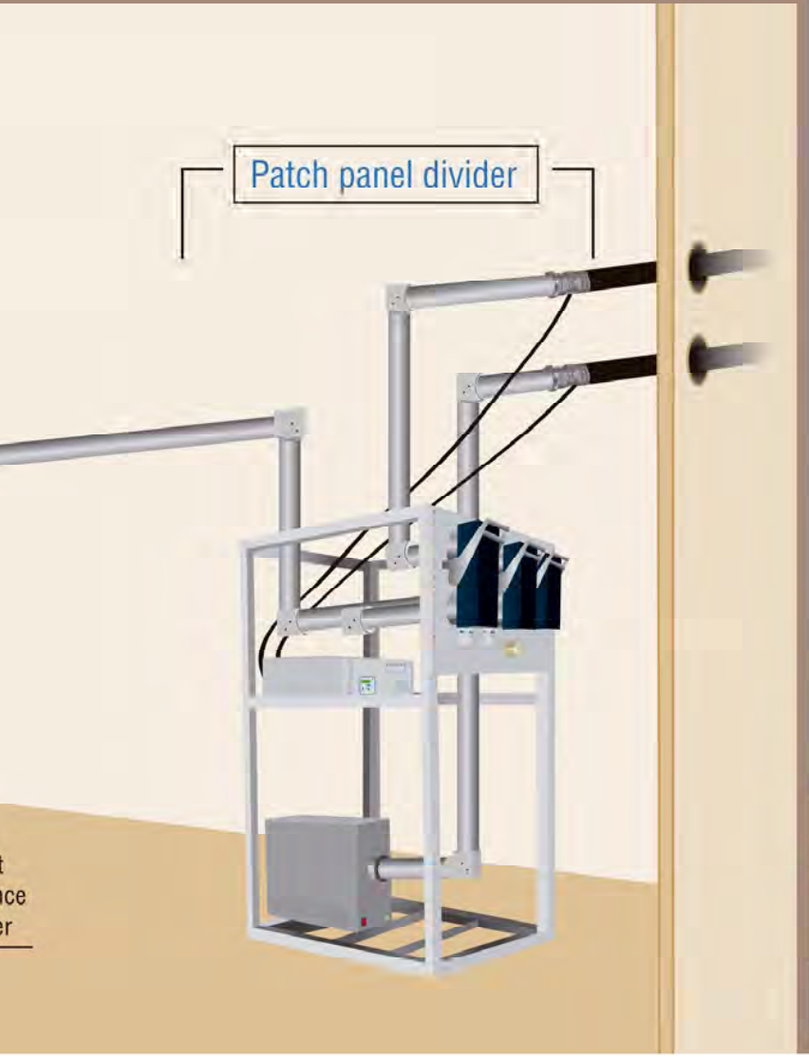
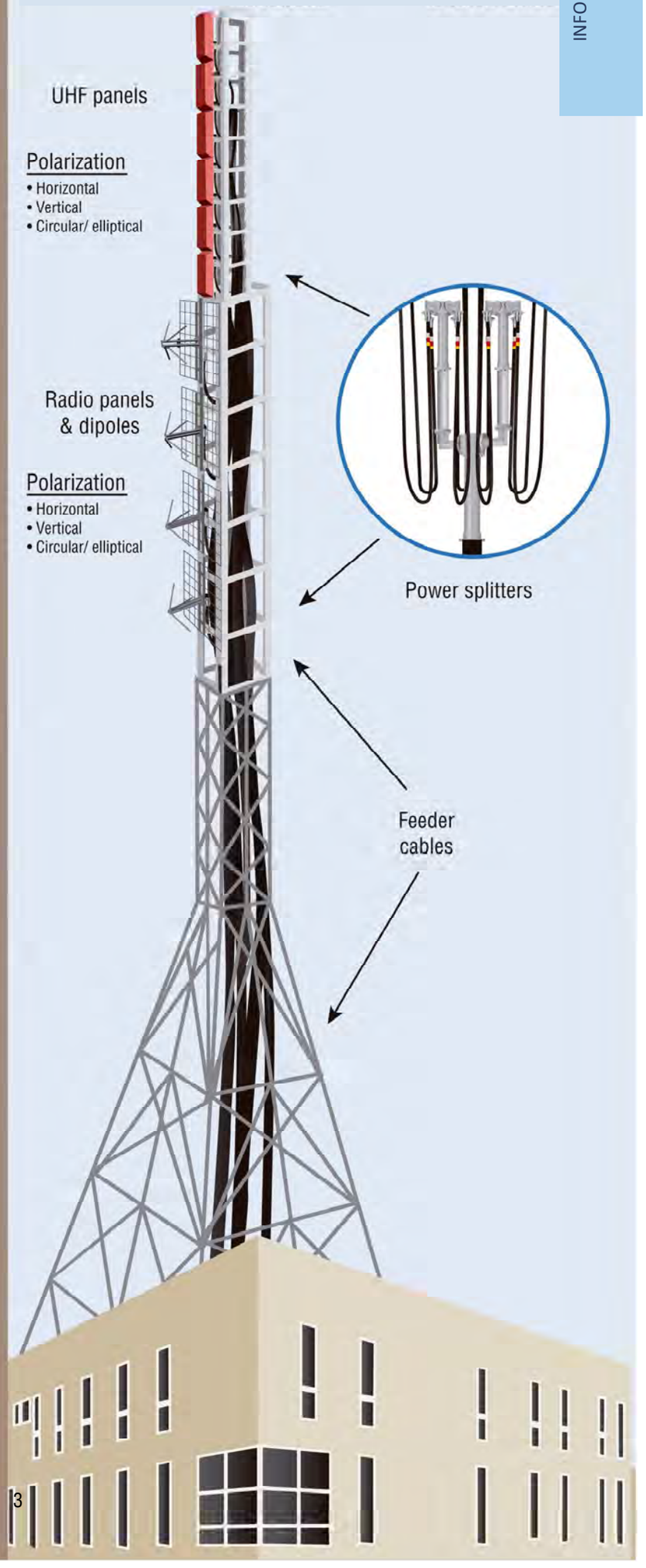

Patch panel divider
Dehydrator


Patch panel divider


UHF panels
Polarization
• Horizontal
• Vertical
• Circular/ elliptical
Radio panels & dipoles
Polarization
• Horizontal
• Vertical
• Circular/ elliptical
Power splitters
Feeder cables

BROADCAST SOLUTIONS

ANTENNA SYSTEMS
- TV antennas (UHF and VHF)
- Radio antennas (FM) and DAB
- Analog and digital with all kinds of unitary antennas: dipole, panels , turnstiles…

FILTERS
- Analog TV filters
- Digital TV filters
- FM radio filters
- Digital (DAB, IBOC) radio filters

COMBINERS
- Analog TV combiners
- Digital TV combiners
- FM and IBOC radio combiners

COAXIAL ACCESSORIES
- Coaxial accessories, including rigid lines, elbows, adapters, inner connectors…
- Patch panels (several ports, outdoors and indoors aplications)
- Motorized switch coax
- 3 dB Hybrid couplers
- Measurement couplers

RESOURCES AND CAPABILITIES: ENGINEERING

Technological design tools

PREVIOUS INFORMATION FROM THE CUSTOMER:

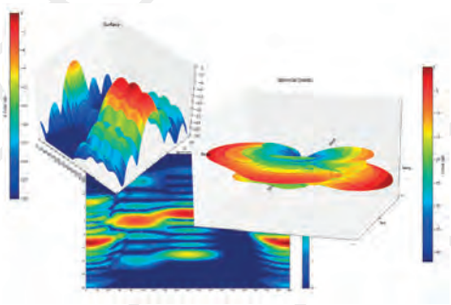
- GPS coordenates
- RMS / peak power
- Tower characteristics (height and size)
- Desired coverage

TECHNICAL ENGINEERING SOFTWARE:

- CST
- FEKO
- ICS Telecom
- Aswin

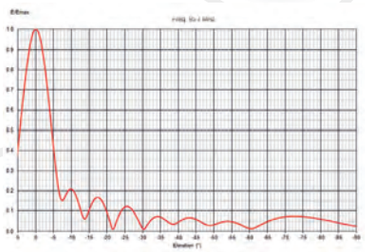
HUMAN RESOURCES

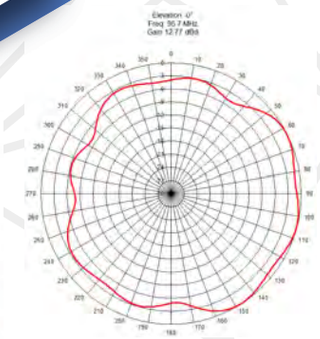
- Experience
- Expertise



DESIGN SIMULATIONS:

- Radiation Patterns
- Coverage simulations





Customized antenna systems design

STATE-OF-THE-ART PASSIVE RF TECHNOLOGY

BEST VALUE FOR THE BROADCASTER

RESOURCES AND CAPABILITIES: TEST FACILITIES

Internal Qualification Facilities

All our products are qualified, using our complete set of in-house test facilities.

Electrical Test

- Different antenna test ranges based in compact range and outdoor far field range for real antenna testing.
- High RMS power and Peak Voltage test using power and voltage generators and a real RF transmitter.
- Low level signal test using vectorial network and signal analyzers.

Mechanical and environmetal Tests

- For temperature, condensation humidity and corrosion tests:
  - Climatic chamber (temperature and humidity)
  - Salt Spray chamber
  - Rain test
- Shaker for vibration tests.
- Vacuum chamber for special environment conditions.

TURNKEY PROJECTS

SCOPE OF SUPPLY

- Supply of the antenna system, tailored to all customer requirements
- Design and supply of all the necessary mounting hardware to attach the antenna system to the tower.
- Supply of any indoor passive item needed from the transmitter outputs to the antenna system input.

IN-PLANT ENGINEERING WORK

- Factory acceptance tests.
- Training courses.
- Project documentation.

ON-SITE ENGINEERING WORK

- Site surveys.
- Installation supervision.
- Project commissioning.
- Training courses and road shows.

LOGISTICS

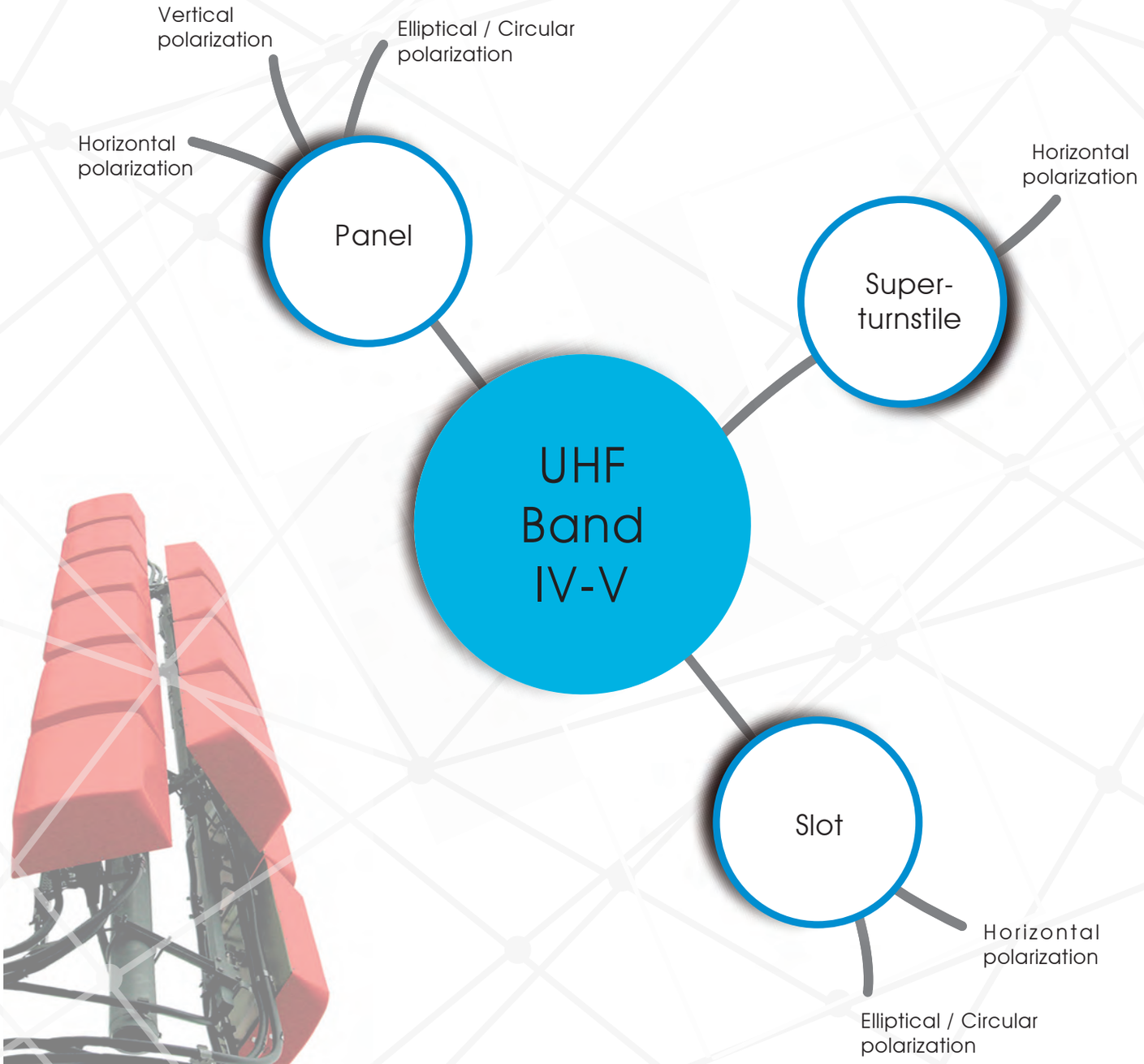
- Transportation and insurance of the goods up to their destination airport or seaport.

TV UHF ANTENNA SYSTEMS

Sener can provide UHF antenna system solution based on panel arrays, slots and superturnstile antennas.

Panel arrays are the most versatile solutions to customize radiation patterns to any particular coverage requirement. Ideal for multichannel needs, with full UHF bandwidth. Different polarizations are available, including elliptical polarization for an improved performance in indoor and mobile reception environments.

Superturnstile and slot antennas feature a simple installation with a fully pre-assembled antenna.



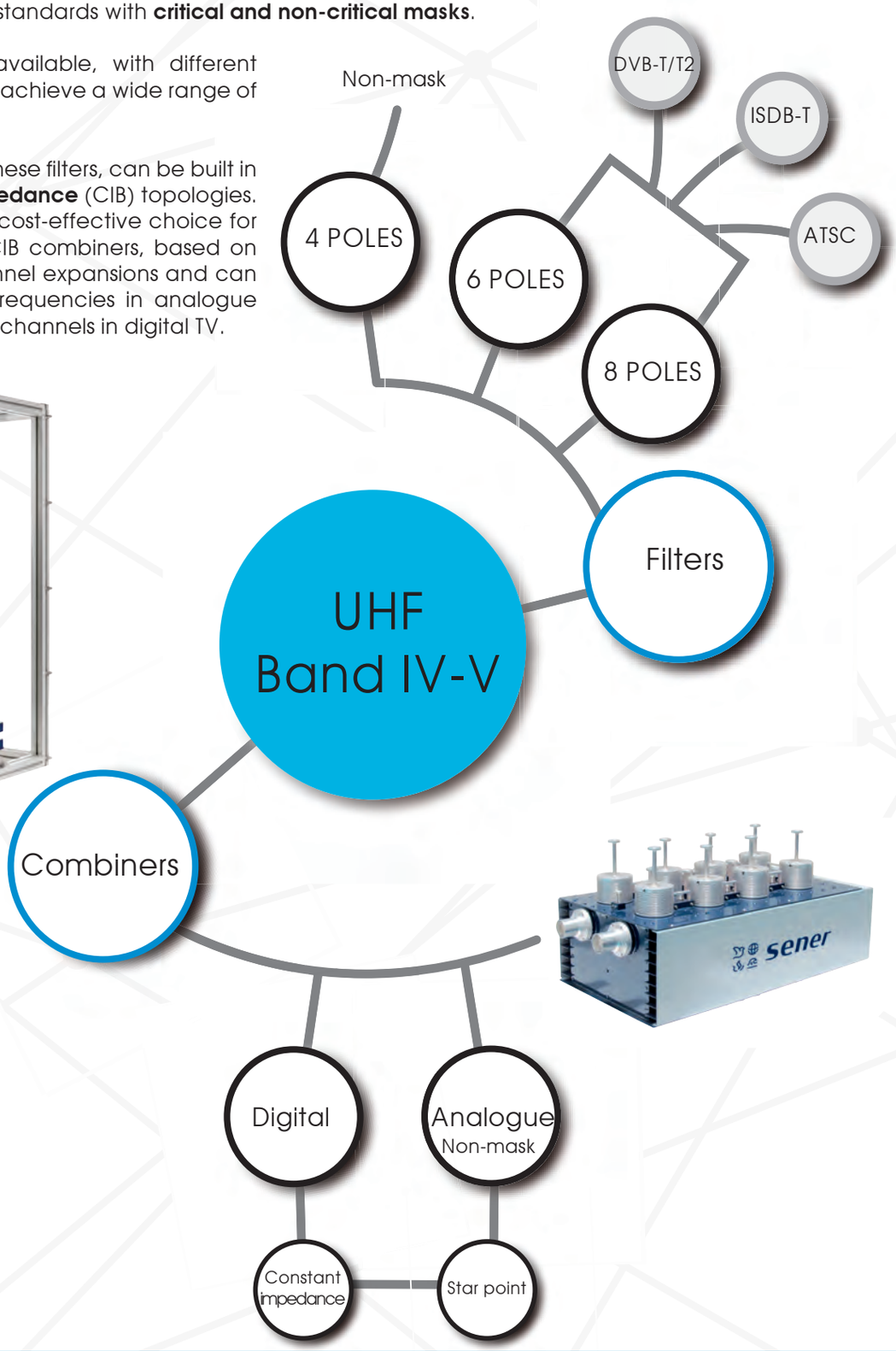
TV UHF FILTERS & COMBINERS

Sener has a successful history of supplying filters and multi-channel combiners to broadcasters worldwide.

Filters with **4, 6 and 8 cavities** and cross-coupling are available for analogue and digital broadcasting. They can be tuned to any frequency in the UHF band, complying to the different standards with **critical and non-critical masks**.

Several cavity sizes are available, with different cooling systems, in order to achieve a wide range of power admittance.

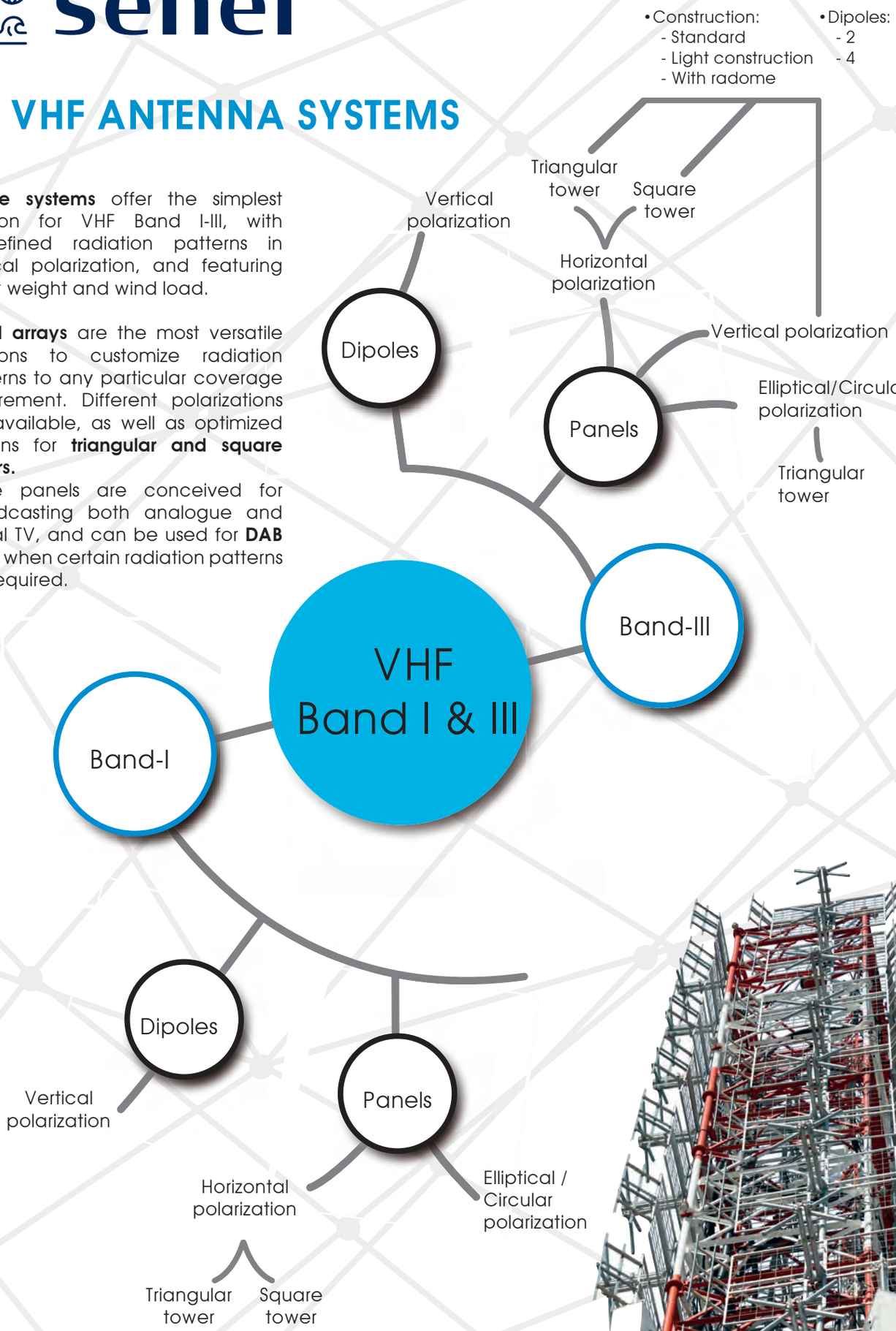
The combiners, based on these filters, can be built in **starpoint and constant impedance** (CIB) topologies. Starpoint combiners are a cost-effective choice for analogue systems; while CIB combiners, based on modules, allow future channel expansions and can combine closer channel frequencies in analogue broadcasting, or adjacent channels in digital TV.



TV VHF ANTENNA SYSTEMS

Dipole systems offer the simplest solution for VHF Band I-III, with predefined radiation patterns in vertical polarization, and featuring lower weight and wind load.

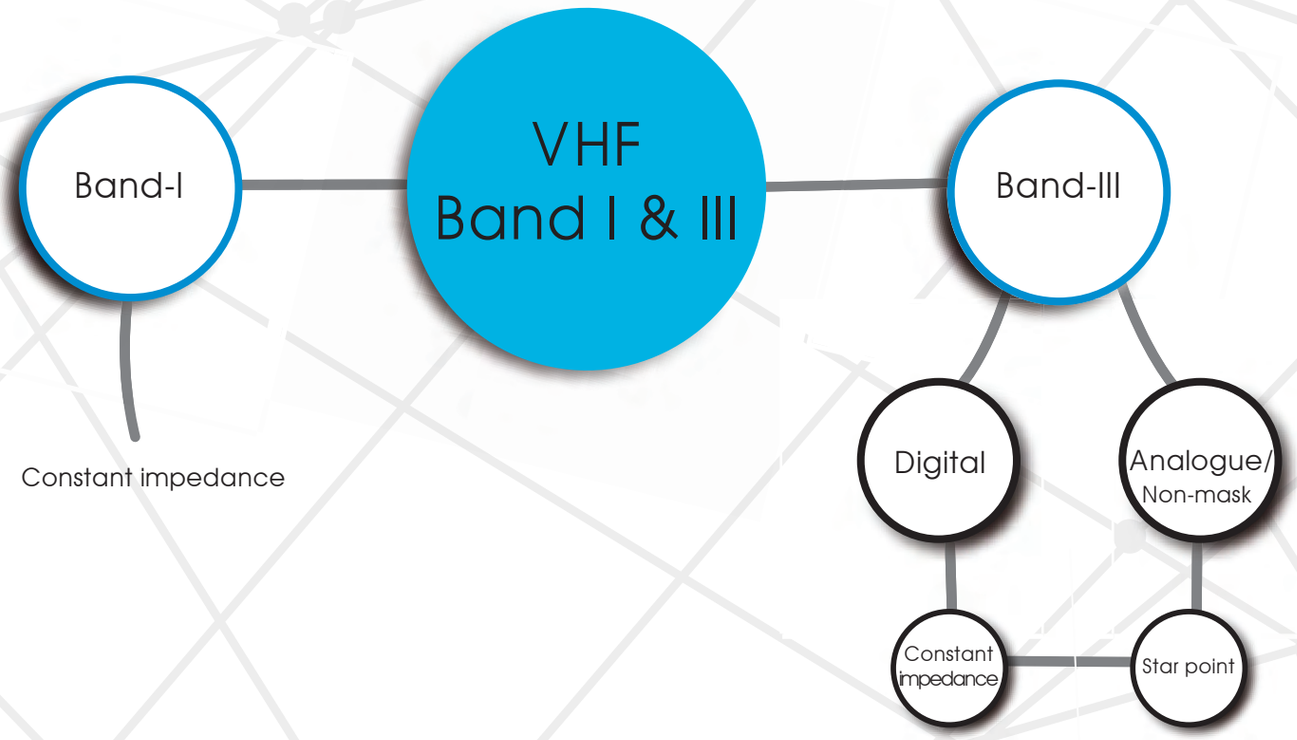
Panel arrays are the most versatile solutions to customize radiation patterns to any particular coverage requirement. Different polarizations are available, as well as optimized designs for **triangular and square towers.**
These panels are conceived for broadcasting both analogue and digital TV, and can be used for **DAB radio** when certain radiation patterns are required.

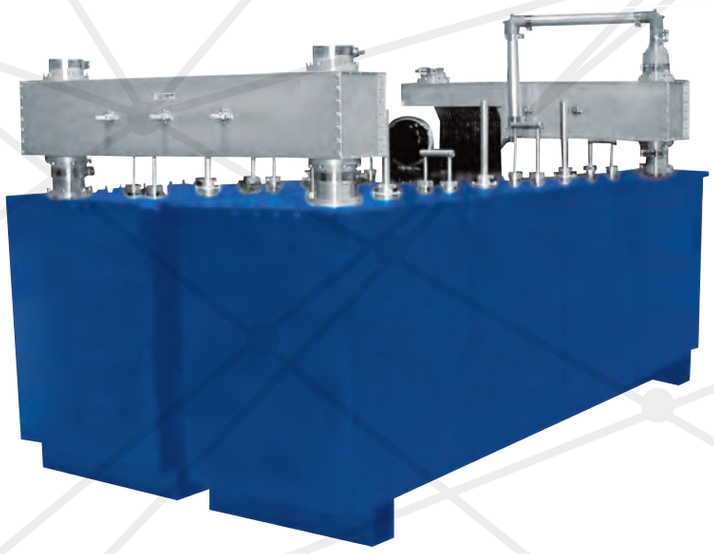


TV VHF COMBINERS

Sener has a successful history of supplying filters and multi-channel combiners to broadcasters worldwide.

The VHF combiners for analogue transmission, available for Band I and Band III, can be built in starpoint and constant impedance (CIB topologies. **Starpoint** combiners are a cost-effective choice; while **CIB** combiners, based on modules, allow future channel expansions and smaller channels guards.

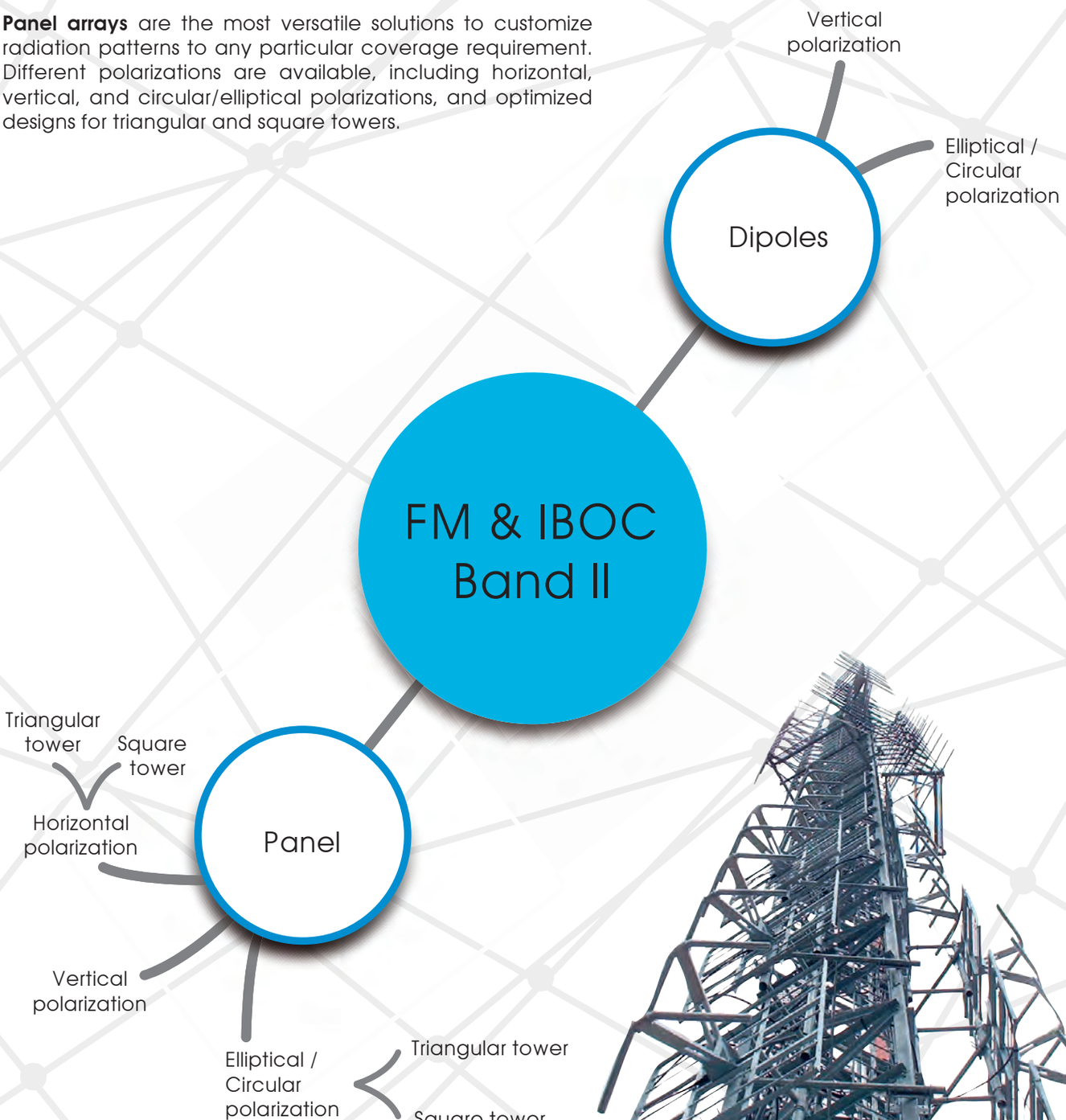




RADIO FM ANTENNA SYSTEMS

Dipole systems offer the simplest solution for FM (and IBOC) broadcasting, with predefined radiation patterns in vertical and circular/elliptical polarization, and featuring lower weight and wind load.

Panel arrays are the most versatile solutions to customize radiation patterns to any particular coverage requirement. Different polarizations are available, including horizontal, vertical, and circular/elliptical polarizations, and optimized designs for triangular and square towers.



RADIO FM FILTERS & COMBINERS

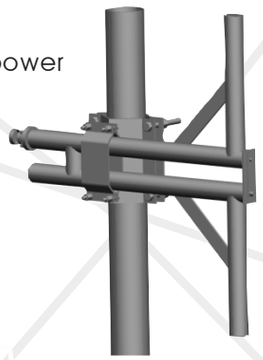
Sener has a successful history of supplying FM filters and multi-channel combiners to broadcasters worldwide. The FM filters, with **2, 3 and 4 cavities**, are tunable to any frequency in the FM band. Several cavity sizes are available in order to achieve a wide range of power admittance.

The FM (and IBOC) combiners, based on these filters, can be built in **starpoint** and **constant impedance (CIB) topologies**. Starpoint combiners are a cost-effective choice, especially when frequency spacing is not very demanding; CIB combiners, based on modules, allow future channel expansions and more critical channel spacing.

RADIO DAB ANTENNA SYSTEMS & FILTERS

DAB dipoles have been specifically designed for DAB frequency band (216-240 MHz); for more flexible radiation pattern customization, VHF panels may be used (see VHF section).

In order to guarantee the spectral channel response, 6 cavity filters for different power admittance area available.



Sener (TCOM Division) Presence Worldwide

Engineering solutions around the World

TCOM división belongs to Sener, a Spanish technology group of consolidated companies focused on providing completed solutions to our clients in a wide range of the professional telecommunications and radio frequency applications for broadcast, air traffic control, space, critical communications, scientific and defence.

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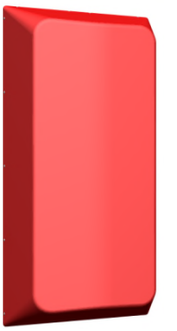
TV UHF ANTENNA SYSTEMS

AT15-250

Band IV/V horizontal polarization panel ● Especially suitable for square masts

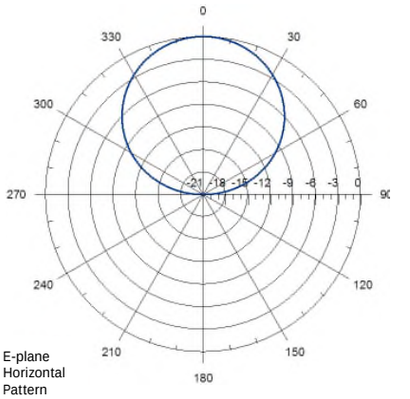
Electrical Specifications

Frequency range	470-862 MHz			
Peak gain	11.35 dB (ref. ▫/2 dipole)			
3 dB beam width	E-plane: 61º		H-plane: 26º	
Polarization	Horizontal			
Impedance	50 Ohm			
VSWR	≤1.1:1 typical (≤1.13:1 max)			
Maximum power handling peak sync	1.4 kW	3.5 kW	4.2 kW	6.5 kW
Maximum power handling RMS	1 kW	2.5 kW	3 kW	4.5 kW
Connector type	DIN 7/16	EIA 7/8"	DIN 13/30	EIA 1 5/8"
Pressurization	Non pressurized	Gas barrier on input connector		

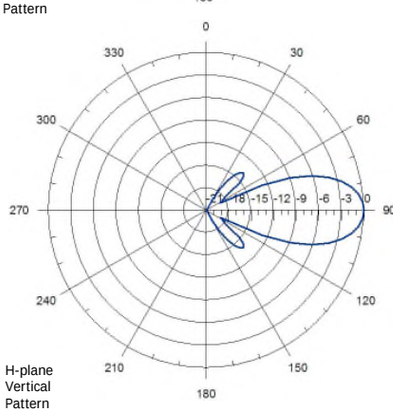


Mechanical & Environmental

Materials	Reflector & radiating elements	Aluminium (Stainless steel available on request)
	Radome	Fiberglass
	Radome colour	Red or white on request
Dimensions (W x D x H)		483 x 264 x 983 mm
Maximum wind speed		220 km/h
Wind load (front)		743 N (@160 km/h)
Wind load (lateral)		258 N (@160 km/h)
Weight		10 kg (model with DIN 7/16 connector)
Typical mounting		Square typical (other combinations depending on the radiation pattern required)
Vertical spacing		1000 mm
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%



E-plane Horizontal Pattern



H-plane Vertical Pattern

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	8.4	20	1.1 kN	1000
	3	6.6	30	1.6 kN	
	4	5.3	40	1.5 kN	
2	2	11.4	40	2.2 kN	2000
	3	9.6	60	3.2 kN	
	4	8.3	80	3.1 kN	
4	2	14.4	80	4.4 kN	4000
	3	12.6	120	6.4 kN	
	4	11.4	160	6.2 kN	
6	2	16.1	120	6.6 kN	6000
	3	14.4	180	9.6 kN	
	4	13.1	240	9.3 kN	
8	2	17.4	160	8.8 kN	8000
	3	15.6	240	12.8 kN	
	4	14.4	320	12.4 kN	

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

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AT15-251

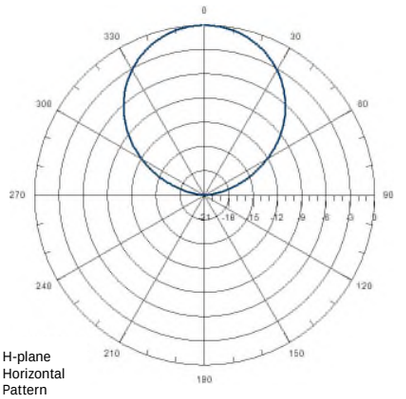
Band IV/V vertical polarization panel ● Especially suitable for square masts

Electrical Specifications

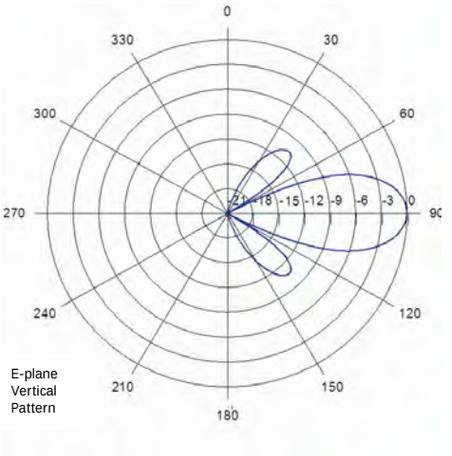
Frequency range	470-862 MHz			
Peak gain	11.05 dB (ref. ▫/2 dipole)			
3 dB beam width	E-plane: 27º		H-plane: 62º	
Polarization	Vertical			
Impedance	50 Ohm			
VSWR	▫▫1.15:1			
Maximum power handling peak sync	1.4 kW	3.5 kW	4.2 kW	6.5 kW
Maximum power handling RMS	1 kW	2.5 kW	3 kW	4.5 kW
Connector type	DIN 7/16	EIA 7/8"	DIN 13/30	EIA 1 5/8"
Pressurization	Non pressurized	Gas barrier on input connector		

Mechanical & Environmental Specifications

Materials	Reflector & radiating elements Radome Radome colour	Aluminium (Stainless steel available on request) Fiberglass Red or white on request
Dimensions (W x D x H)		483 x 264 x 983 mm
Maximum wind speed		220 km/h
Wind load (front)		743 N (@160 km/h)
Wind load (lateral)		258 N (@160 km/h)
Weight		9 kg (model with DIN 7/16 connector)
Typical mounting		Square typical (other combinations depending on the radiation pattern required)
Vertical spacing		1000 mm
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%



H-plane Horizontal Pattern



E-plane Vertical Pattern

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (Kg)	Wind load (@160 Km/h)	System height (mm)
1	2	8.1	18	1.1 kN	1000
	3	6.3	27	1.6 kN	
	4	5.0	36	1.5 kN	
2	2	11.1	36	2.2 kN	2000
	3	9.3	54	3.2 kN	
	4	8.0	72	3.1 kN	
4	2	14.1	96	4.4 kN	4000
	3	12.3	108	6.4 kN	
	4	11.1	144	6.2 kN	
6	2	15.8	108	6.6 KN	6000
	3	14.1	162	9.6 kN	
	4	12.8	216	9.3 kN	
8	2	17.1	144	8.8 kN	8000
	3	15.3	216	12.8 kN	
	4	14.1	288	12.4 kN	

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware

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AT15-252

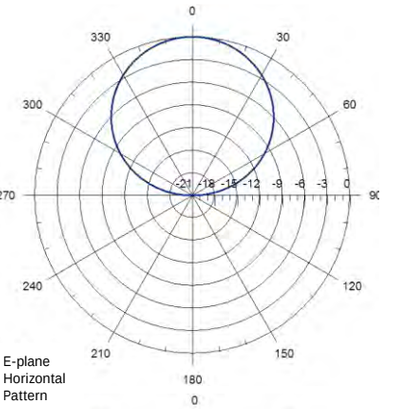
Band IV/V slant polarization panel ● Especially suitable for square masts

Electrical Specifications

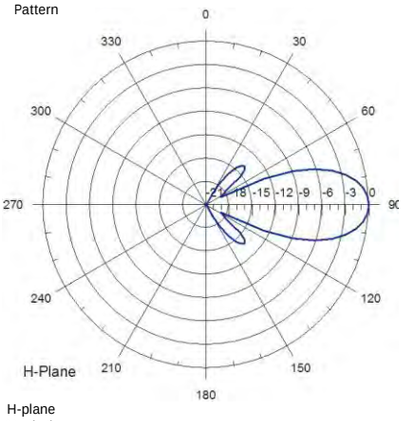
Frequency range	470-862 MHz			
Peak gain	11.50 dB (ref. ▫/2 dipole)			
3 dB beam width	E-plane: 61°		H-plane: 26°	
Polarization	Slant (typical 80%H / 20%V)			
Impedance	50 Ohm			
VSWR	≤1.1:1 typical (≤1.13:1 max)			
Maximum power handling peak sync	1.4 kW	3.5 kW	4.2 kW	6.5 kW
Maximum power handling RMS	1 kW	2.5 kW	3 kW	4.5 kW
Connector type	DIN 7/16	EIA 7/8"	DIN 13/30	EIA 1 5/8"
Pressurization	Non pressurized	Gas barrier on input connector		

Mechanical & Environmental Specifications

Materials	Reflector & radiating elements	Aluminium (Stainless steel available on request)
	Radome	Fiberglass
	Radome colour	Red or white on request
Dimensions (W x D x H)		483 x 264 x 983 mm
Maximum wind speed		220 km/h
Wind load (front)		743 N (@160 km/h)
Wind load (lateral)		215 N (@160 km/h)
Weight		10 kg (model with DIN 7/16 connector)
Typical mounting		Square arrangement tower
Vertical spacing		1100 mm
Grounding		DC grounded
Temperature range		-40˚C to +80˚C
Humidity		100%



E-plane Horizontal Pattern



H-plane Vertical Pattern

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	8.5	20	1.0 kN	1094
	3	6.8	30	1.2 kN	
	4	5.5	40	1.4 kN	
2	2	11.5	40	1.9 kN	2194
	3	9.8	60	2.3 kN	
	4	8.5	80	2.8 kN	
4	2	14.5	80	3.8 kN	4394
	3	12.8	120	4.7 kN	
	4	11.5	160	5.7 kN	
6	2	16.3	120	5.8 kN	6594
	3	14.5	180	7.0 kN	
	4	13.3	240	8.5 kN	
8	2	17.6	160	7.7 kN	8794
	3	15.8	240	9.4 kN	
	4	14.5	320	11.4 kN	

Specified gain must be understood for the ratio 80%H / 20%V

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

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AT15-245

Band IV/V circular/elliptical polarization panel ● Especially suitable for square masts

Electrical Specifications

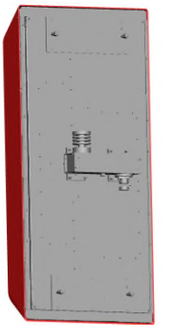
Frequency range	470-722 MHz	
Gain (Total field)	11.1 dB (ref. ¤/2 dipole)	
Gain (linear component for circular polariz.)	8.1 dBd (H. Pol.)	8.1 dBd (V. Pol.)
3 dB beam width	Horizontal: 61º	Vertical: 27º
Polarization	Circular or Elliptical (supplied by an integrated hybrid coupler)	
Polarization ratio options	Any from 50%H - 50%V to 80%H -20%V	
Impedance	50 Ohm	
VSWR	≤1.13:1	
Maximum power handling RMS	1 kW	2.5 kW
Connector type	DIN 7/16	EIA 7/8"
Pressurization	Non pressurized	Gas barrier on input connector

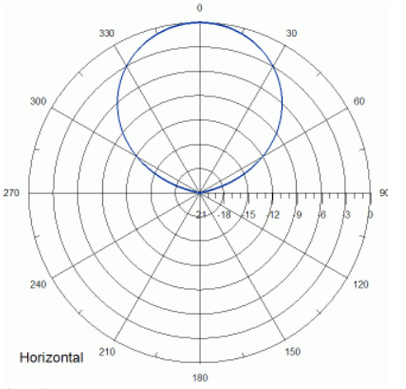
Mechanical & Environmental Specifications

Materials	Reflector & radiating elements Radome Radome colour	Aluminium (Stainless steel available on request) Fiberglass Red or white on request
Dimensions (W x D x H)		483 x 264 x 983 mm
Maximum wind speed		220 km/h
Wind load (front)		743 N (@160 km/h)
Wind load (lateral)		258 N (@160 km/h)
Weight		13 kg including hybrid
Typical mounting		Square typical (other combinations depending on the radiation pattern required)
Vertical spacing		1000 mm
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%

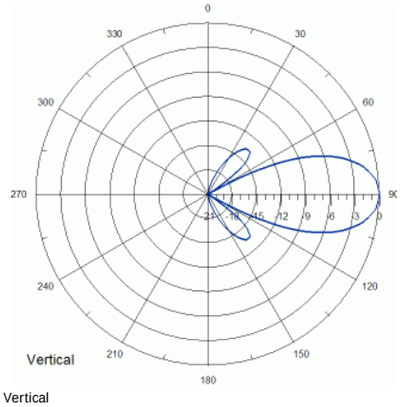
Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	8.1	26	1.1 kN	1000
	3	6.4	39	1.6 kN	
	4	5.2	52	1.5 kN	
2	2	11.1	52	2.2 kN	2000
	3	9.4	78	3.2 kN	
	4	8.2	104	3.1 kN	
4	2	14.4	104	4.4 kN	4000
	3	12.4	156	6.4 kN	
	4	11.2	208	6.2 kN	
6	2	15.9	156	6.6 kN	6000
	3	14.1	234	9.6 kN	
	4	13.0	312	9.3 kN	
8	2	17.2	208	8.8 kN	8000
	3	15.4	312	12.8 kN	
	4	14.2	416	12.4 kN	





Horizontal Pattern



Vertical Pattern

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

The above specified gain must be understood for circular polarization

The panel can be supplied without the input hybrid thus displaying two connectors (DIN 7/16 or EIA 7/8"), one feeding an HPOL array and one feeding a VPOL array.

E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

AT15-801/802/804

Band IV/V low power superturnstile antennas

UHF Superturnstile Antennas for TV applications offer a broadband omnidirectional radiation pattern with excellent circularity, combined with a minimum wind load impact on the supporting mast.

These antenna systems are ideal for top-mounting, and they are supplied ready for installation, fully assembled and enclosed in a GRP cylinder.

Electrical Specifications

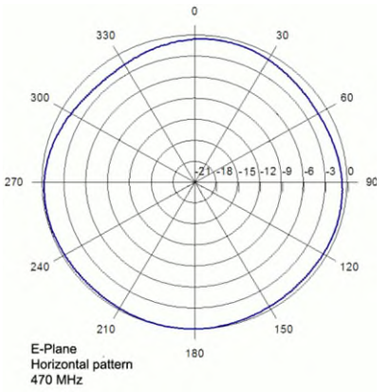
	AT15-801	AT15-802	AT15-804
Frequency range	470-800 MHz		
VSWR	≤ 1.15:1		
Impedance	50 Ohm		
Polarization	Horizontal		
Peak gain (ref. λ/2 dipole)	1 Bay 5 dBd	2 Bays 8 dBd	4 Bays 11 dBd
3 dB vertical beam width (mid-band)	25º	11º	5.5º
Maximum power handling RMS	2 kW	2 kW / 5 kW	5 kW / 10 kW
Connector type (1)	EIA 7/8" male	EIA 7/8" male / EIA 1 5/8" male	EIA 1 5/8" male / EIA 3 1/8" male
Pressurization	Not pressurized		

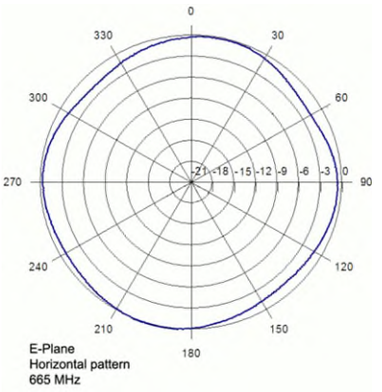
Mechanical & Environmental Specifications

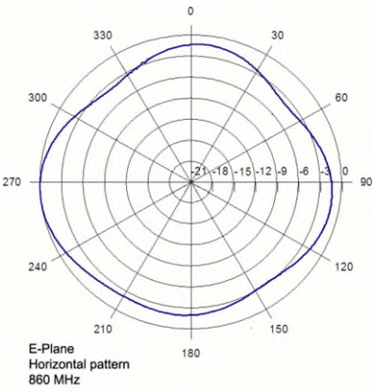
Materials	Batwings Connectors Isolators Radome	Aluminium Aluminium and brass PTFE Fiberglass		
Radome dimensions (Ø X H)		323 x 1200 mm	323 x 2300 mm	323 x 4600 mm
Weight		27 kg	53 kg	116 kg
Wind Load @ 160 Km/h		323 N	726 N	1228 N
Maximum wind speed		220 km/h		
Grounding		DC grounded		
Temperature range		-40°C to +60°C		
Humidity		100%		

NOTES:

(1) Other connector types under request. Others gain values and power handling can be supplied. Please, ask Sener.







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Web: https://www.group.sener/radiodifusion/

AT15-9XX

Band IV/V slot antennas ● Suitable for top-mount or side-mount

Slot antennas for UHF TV applications are a neat way to provide broadcasting solutions minimizing the visual and mechanical impact over its supporting structure. These antennas are constructed fully enclosed in a cylindrical fiberglass radome, featuring very reduced weight and windload figures, while keeping optimum radioelectrical performances under most severe environmental conditions.

They are ready for installation in top-mount and side-mount configurations, offering a very wide scope of radiating characteristics depending on the polarization (horizontal, circular, elliptical), on the shape of the horizontal radiation pattern, and on the vertical aperture.

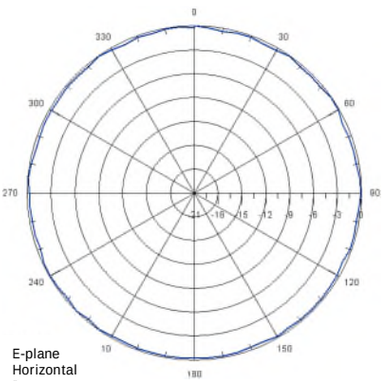
AT15-9XX series cover all the possible needs from low power/ low gain solutions up to 16 KW RMS and high gain.

Electrical Specifications

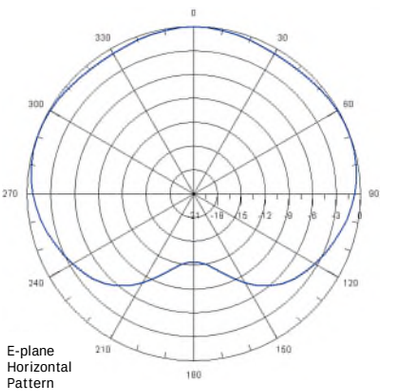
Frequency range	470-806 MHz
Multichannel versions available	Yes
VSWR	≤1.1:1 across a single channel
Polarization	Horizontal / Circular / Elliptical
Beam tilt & Null Fill	Customized under request
Impedance	50 Ohm
Number of bays	From 4 to 24 bays
Maximum power handling peak sync	From 500 W to 25 kW
Maximum power handling RMS	From 350 W to 16 kW
Connector type	EIA 1 5/8" or EIA 3 1/8"

Mechanical & Environmental Specifications

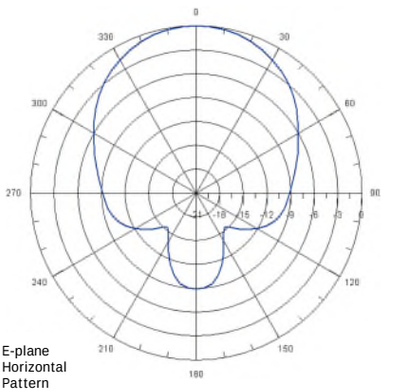
Radome	Fiberglass (included)
Height (for 4 bays and 24 bays)	From 2400 mm to 13060 mm
Grounding	DC grounded
Temperature range	-40°C to +80°C
Humidity	100%



E-plane
Horizontal
Pattern
650 MHz



E-plane
Horizontal
Pattern
650 MHz



E-plane
Horizontal
Pattern
650 MHz

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Web: https://www.group.sener/radiodifusion/

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TV UHF

TV UHF FILTERS & COMBINERS

Cooling applied to band pass filters allows increasing the power handling in a quite efficient way. Cooling system can be defined according to its particular working practice. There are four different cooling procedures which are defined for the UHF mask band pass filters:

Natural (-): natural cooling is the basic version of the filter with no specific added feature to increase the power admittance.

Heat sinks (-HS): it refers to the use of heat sinks, increasing the dissipating effects on the surface.

Forced air (-FA): it uses air as a heat transfer medium by using powered fans.

Liquid cooling (-LC): it allows transfer of the heat away from critical parts as quick and effectively as possible by using refrigerated liquid.

Natural, Heat sinks (-HS) and Forced Air (-FA) cooling is not requiring any external accessory. All system parts are integrated on the filter. On the other hand, liquid cooling (-LC) needs to be integrated with a transfer system, either a transmitter liquid cooling system or an external one, supplied by RYMSA RF according to CS00-001 and CS00-002 models.

In case of forced air cooling option (-FA), it is needed to plug the system to a VDC or VAC source. It includes a tailored control system to adapt the fan speed according to the required temperature. Fans are tested according to the strictest quality rules, 70,000 hours of useful life and high efficiency, including a complete alarm monitoring system in case of failure.

Some example of cooling effects on UHF filters:

UHF Mask Band Pass filter model **FLDV-196HS** using heat sinks (-HS) increase the power handling from 5 kWrms to 8 kWrms in DVB-T/T2 transmission standard.

UHF Mask Band Pass filter model **FLDV-156FA** using forced air cooling option (-FA) to increase the power handling from 2.8 kWrms to 3.8 kWrms in DVB-T/T2 transmission standard.

UHF Mask Band Pass filter model **FLDV-198LC** using liquid (-LC) increase the power handling from 5 kWrms to 11 kWrms in DVB-T/T2 transmission standard.

Cooling systems **(CS00-001 and CS00-002)** can be used in (-LC) system to enhance the power admission of band pass filters.

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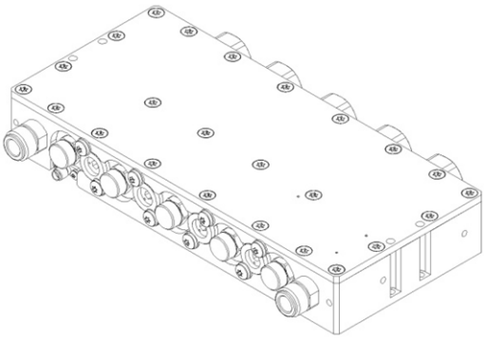
FLDV-005C

UHF DTV 5 poles bandpass filter ● ≤ 80 W

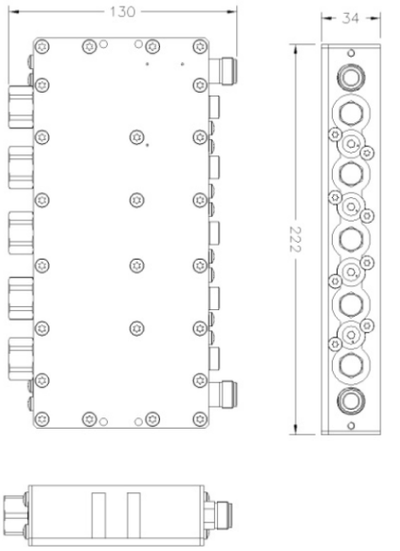
Electrical Specifications

Filter type	Bandpass coaxial	
Order	5 poles	
Cavity size	20 mm	
Frequency range	470-862 MHz	
Impedance	50 Ohm	
Channel bandwidth	6, 7, 8 MHz	
Maximum RMS output power handling up to 1500M ASL Natural Cooling	BW 6, 7 MHz 60 W	BW 8 MHz 80 W
Connectors	N female	
Thermal stability	≤ 15 kHz / ºC	
Output directional coupler	SMA female connector	



Mechanical & Environmental Specifications

Dimensions (W x D x H)	222 x 34 x 130 mm
Weight	1.5 kg
Temperature range	-5°C to +55°C
Working position	Any



Responses (1)

Channel bandwidth 8 MHz (typical DVB-T/T2)		
	470 MHz	800 MHz
Insertion loss f_0	< 1.27 dB	< 1.27 dB
Insertion loss $f_0 \pm 3.8$ MHz	< 1.85 dB	< 1.85 dB
Insertion loss $f_0 \pm 3.9$ MHz	< 1.90 dB	< 1.90 dB
Attenuations:		
$f_0 \pm 6$ MHz	>10 dB	
$f_0 \pm 12$ MHz	> 36 dB	
VSWR	>24 dB / < 1.13:1	
Group delay	< 60 ns	
Channel bandwidth 6 MHz (typical ISDB-T)		
	470 MHz	800 MHz
Insertion loss f_0	< 1.57 dB	< 1.57 dB
Insertion loss $f_0 \pm 2.79$ MHz	< 2.25 dB	< 2.25 dB
Attenuations:		
$f_0 \pm 4.5$ MHz	> 10 dB	
$f_0 \pm 9$ MHz	> 40 dB	
VSWR	>24 dB / < 1.12	
Group delay	< 60 ns	
Channel bandwidth 7.6 MHz (typical ATSC)		
	470 MHz	800 MHz
Insertion loss f_0	< 1.59 dB	< 1.59 dB
Insertion loss $f_0 \pm 2.7$ MHz	< 2.15 dB	< 2.15 dB
Attenuations:		
$f_0 \pm 6$ MHz	> 24 dB	
$f_0 \pm 9$ MHz	> 36 dB	
VSWR	>24 dB / < 1.13:1	
Group delay	< 60 ns	

NOTES:

(1): Other frequency responses can be supplied. Please, ask Sener.

Optional accessories

19 " Rack mounted	√

The filter can be field retuned to any frequency within specified band

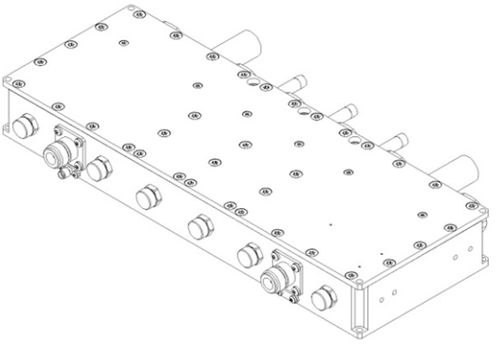
E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

FLDV-006C series

UHF DTV 6 poles bandpass filter ● ≤ 150 W

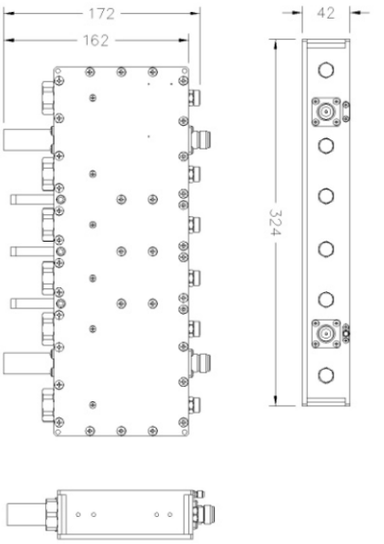
Electrical Specifications

Filter type	Bandpass coaxial	
Order	6 poles	
Cavity size	30 mm	
Frequency range	470-862 MHz	
Impedance	50 Ohm	
Channel bandwidth	6, 7, 8 MHz	
Maximum RMS output power handling up to 1500M ASL Natural Cooling	BW 6, 7 MHz 110 W	BW 8 MHz 150 W
Connectors	N Female / DIN 7/16 Female	
Thermal stability	≤ 2 kHz / ºC	
Output directional coupler	SMA female connector	



Mechanical & Environmental Specifications

Dimensions (W x D x H)	324 x 42 x 172 mm
Weight	2.5 kg
Temperature range	-5°C to +55°C
Working position	Any



Responses (1)

Channel bandwidth 8 MHz (typical DVB-T/T2)		
	470 MHz	800 MHz
Insertion loss f_0	< 1.03 dB	< 1.03 dB
Insertion loss $f_0 \pm 3.8$ MHz	< 2.55 dB	< 2.55 dB
Insertion loss $f_0 \pm 3.9$ MHz	< 2.80 dB	< 2.80 dB
Attenuations:		
$f_0 \pm 4.2$ MHz	> 4 dB	
$f_0 \pm 6$ MHz	> 18 dB	
$f_0 \pm 12$ MHz	> 40 dB	
VSWR	> 24 dB / < 1.13	
Group delay	< 300 ns	

Channel bandwidth 6 MHz (typical ISDB-T)		
	470 MHz	800 MHz
Insertion loss f_0	< 1.34 dB	< 1.34 dB
Insertion loss $f_0 \pm 2.79$ MHz	< 3.30 dB	< 3.30 dB
Attenuations:		
$f_0 \pm 3.15$ MHz	> 5 dB	
$f_0 \pm 4.5$ MHz	> 18 dB	
$f_0 \pm 9$ MHz	> 38 dB	
VSWR	> 25 dB / < 1.12	
Group delay	< 300 ns	

Channel bandwidth 6 MHz (typical ATSC)		
	470 MHz	800 MHz
Insertion loss f_0	< 1.23 dB	< 1.23 dB
Insertion loss $f_0 \pm 2.7$ MHz	< 2.30 dB	< 2.30 dB
Attenuations:		
$f_0 \pm 3.5$ MHz	> 10 dB	
$f_0 \pm 6$ MHz	> 24 dB	
$f_0 \pm 9$ MHz	> 36 dB	
VSWR	> 25 dB / < 1.12	
Group delay	< 150 ns	

NOTES:

(1): Other frequency responses can be supplied. Please, ask Sener.

Optional accessories

19 " Rack mounted	√

The filter can be field retuned to any frequency within specified band

E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

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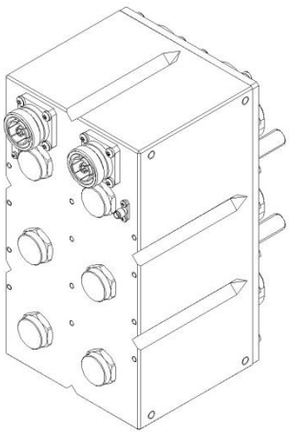
FLDV-016C series

UHF DTV 6 poles bandpass filter ● ≤ 400 W

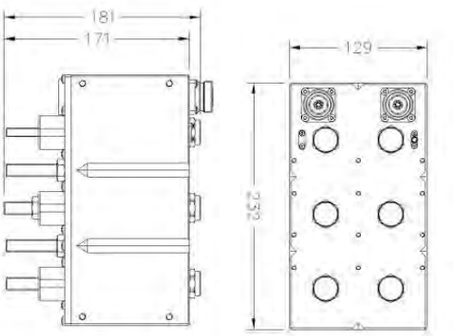
Electrical Specifications

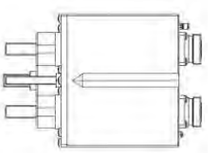
Filter type	Bandpass coaxial	
Order	6 poles	
Cavity size	60 mm	
Frequency range	470-862 MHz	
Impedance	50 Ohm	
Channel bandwidth	6, 7, 8 MHz	
Maximum RMS output power handling up to 1500M ASL Natural Cooling (FLDV-016C) Heat sinks (FLDV-016HSC)	BW 6, 7 MHz 275 W 300 W	BW 8 MHz 350 W 400 W
Connectors	DIN 7/16 Female / EIA 7/8"	
2nd Harmonic attenuation	> 50 dB	
Thermal stability	≤ 2 kHz / ºC	



Mechanical & Environmental Specifications

Dimensions (W x D x H)	232 x 129 x 181 mm
Weight	5.5 kg
Temperature range	-5°C to +55°C
Working position	Any





Responses (1)

Channel bandwidth 8 MHz (typical DVB-T/T2)		
	470 MHz	800 MHz
Insertion loss $f_0 \pm$	< 0.56 dB	< 0.59 dB
Insertion loss $f_0 \pm$ 3.8 MHz	< 1.55 dB	< 1.65 dB
Insertion loss $f_0 \pm$ 3.9 MHz	< 2.00 dB	< 2.05 dB
Attenuations:		
$f_0 \pm$ 4.2 MHz	> 4 dB	
$f_0 \pm$ 6 MHz	> 20 dB	
$f_0 \pm$ 12 MHz	> 41 dB	
VSWR	> 23 dB / < 1.15	
Group delay	< 400 ns	

Channel bandwidth 6 MHz (typical ISDB-T)		
	470 MHz	800 MHz
Insertion loss f_0	< 0.79 dB	< 0.83 dB
Insertion loss $f_0 \pm$ 2.79 MHz	< 2.20 dB	< 2.30 dB
Attenuations:		
$f_0 \pm$ 3.15 MHz	> 7 dB	
$f_0 \pm$ 4.5 MHz	> 22 dB	
$f_0 \pm$ 9 MHz	> 47 dB	
VSWR	> 25 dB / < 1.12	
Group delay	< 450 ns	

Channel bandwidth 6 MHz (typical ATSC)		
	470 MHz	800 MHz
Insertion loss f_0	< 0.79 dB	< 0.83 dB
Insertion loss $f_0 \pm$ 2.7 MHz	< 1.40 dB	< 1.50 dB
Attenuations:		
$f_0 \pm$ 3.5 MHz	> 10 dB	
$f_0 \pm$ 6 MHz	> 29 dB	
$f_0 \pm$ 9 MHz	> 63dB	
VSWR	> 26 dB / < 1.11	
Group delay	< 250 ns	

NOTES:

(1): Other frequency responses can be supplied. Please, ask Sener.

Optional accessories

	7/16	7/8"
Directional couplers at inputs and outputs (see page 137)	AC15-716	AC15-078
19 " Rack mounted	✓	

The filter can be field retuned to any frequency within specified band

E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

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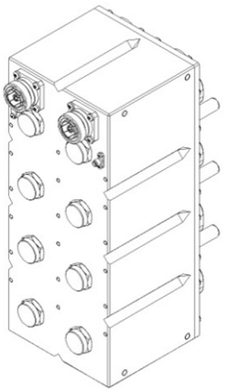
FLDV-018C series

UHF DTV 8 poles bandpass filter ● ≤ 350 W

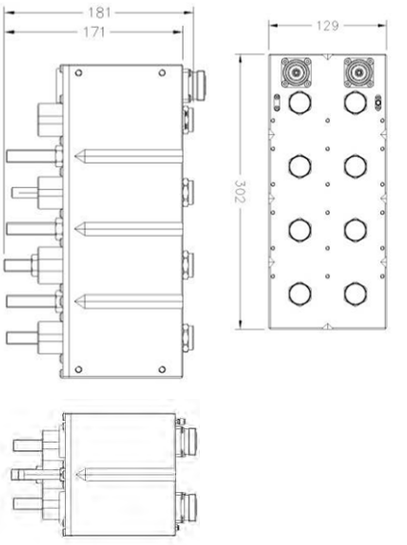
Electrical Specifications

Filter type	Bandpass coaxial	
Order	8 poles	
Cavity size	60 mm	
Frequency range	470-862 MHz	
Impedance	50 Ohm	
Channel bandwidth	6, 7, 8 MHz	
Maximum RMS output power handling up to 1500M ASL Natural Cooling (FLDV-018C) Heat sinks (FLDV-018HSC)	BW 6, 7 MHz 220 W RMS 250 W RMS	BW 8 MHz 275 W RMS 350 W RMS
Connectors	DIN 7/16 Female / EIA 7/8"	
Thermal stability	≤ 2 kHz / ºC	



Mechanical & Environmental Specifications

Dimensions (W x D x H)	302 x 129 x 181 mm
Weight	7 kg
Temperature range	-5°C to +55°C
Working position	Any



Responses (1)

Channel bandwidth 8 MHz (typical DVB-T/T2)		
	470 MHz	800 MHz
Insertion loss f_0	< 0.85 dB	< 0.88 dB
Insertion loss $f_0 \pm 3.8$ MHz	< 2.80 dB	< 2.95 dB
Insertion loss $f_0 \pm 3.9$ MHz	< 3.55 dB	< 3.75 dB
Attenuations:		
$f_0 \pm 4.2$ MHz	> 14 dB	
$f_0 \pm 6$ MHz	> 30 dB	
$f_0 \pm 12$ MHz	> 51 dB	
VSWR	> 22 dB / < 1.17	
Group delay	< 800 ns	
Channel bandwidth 6 MHz (typical ISDB-T)		
	470 MHz	800 MHz
Insertion loss f_0	< 1.19 dB	< 1.25 dB
Insertion loss $f_0 \pm 2.93$ MHz	< 3.95 dB	< 4.15 dB
Attenuations:		
$f_0 \pm 3.5$ MHz	> 15 dB	
$f_0 \pm 4$ MHz	> 31 dB	
$f_0 \pm 9$ MHz	> 61 dB	
VSWR	> 25 dB / < 1.12	
Group delay	< 700 ns	
Channel bandwidth 6 MHz (typical ATSC 3.0)		
	470 MHz	800 MHz
Insertion loss f_0	< 1.19 dB	< 1.25 dB
Insertion loss $f_0 \pm 2.7$ MHz	< 3.95 dB	< 4.15 dB
Attenuations:		
$f_0 \pm 3.5$ MHz	> 15 dB	
$f_0 \pm 6$ MHz	> 45 dB	
$f_0 \pm 9$ MHz	> 63dB	
VSWR	> 24 dB / < 1.13	
Group delay	< 600 ns	

NOTES:

(1): Other frequency responses can be supplied. Please, ask Sener.

Optional accessories

	7/16	7/8"
Directional couplers at inputs and outputs (see page 137)	AC15-716	AC15-078
19 " Rack mounted	√	

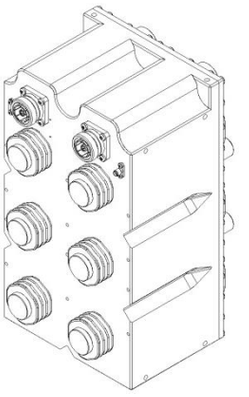
The filter can be field retuned to any frequency within specified band

E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

UHF DTV 6 poles bandpass filter ● ≤ 750 W

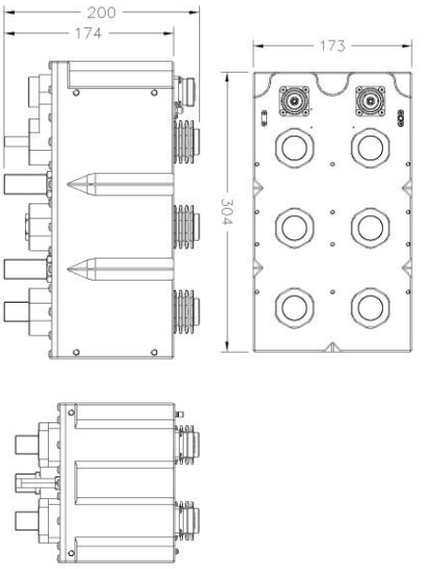
Electrical Specifications

Filter type	Bandpass coaxial	
Order	6 poles	
Cavity size	80 mm	
Frequency range	470-862 MHz	
Impedance	50 Ohm	
Channel bandwidth	6, 7, 8 MHz	
Maximum RMS output power handling up to 1500M ASL	BW 6, 7 MHz	BW 8 MHz
Natural Cooling (FLDV-026C)	475 W RMS	600 W RMS
Heat sinks (FLDV-026HSC)	550 W RMS	750 W RMS
Connectors	DIN 7/16 Female / EIA 7/8"	
Thermal stability	≤ 2 kHz / ºC	



Mechanical & Environmental Specifications

Dimensions (W x D x H)	304 x 173 x 200 mm
Weight	8.5 kg
Temperature range	-5°C to +55°C
Working position	Any



Responses (1)

Channel bandwidth 8 MHz (typical DVB-T/T2)

	470 MHz	800 MHz
Insertion loss f_0	< 0.37 dB	< 0.43 dB
Insertion loss $f_0 \pm 3.8$ MHz	< 1.00 dB	< 1.15 dB
Insertion loss $f_0 \pm 3.9$ MHz	< 1.30 dB	< 1.45 dB
Attenuations:		
$f_0 \pm 4.2$ MHz	> 4 dB	
$f_0 \pm 6$ MHz	> 20 dB	
$f_0 \pm 12$ MHz	> 41 dB	
VSWR	> 23 dB / < 1.15	
Group delay	< 400 ns	

Channel bandwidth 6 MHz (typical ISDB-T)

	470 MHz	800 MHz
Insertion loss f_0	< 0.52 dB	< 0.61 dB
Insertion loss $f_0 \pm 2.79$ MHz	< 1.40 dB	< 1.65 dB
Attenuations:		
$f_0 \pm 3.15$ MHz	> 7 dB	
$f_0 \pm 4.5$ MHz	> 22 dB	
$f_0 \pm 9$ MHz	> 47 dB	
VSWR	> 25 dB / < 1.12	
Group delay	< 450 ns	

Channel bandwidth 6 MHz (typical ATSC)

	470 MHz	800 MHz
Insertion loss f_0	< 0.52 dB	< 0.61 dB
Insertion loss $f_0 \pm 2.7$ MHz	< 0.90 dB	< 1.05 dB
Attenuations:		
$f_0 \pm 3.5$ MHz	> 10 dB	
$f_0 \pm 6$ MHz	> 29 dB	
$f_0 \pm 9$ MHz	> 63 dB	
VSWR	> 26 dB / < 1.11	
Group delay	< 250 ns	

Optional accessories

	7/16	7/8"
Directional couplers at inputs and outputs (see page 137)	AC15-716	AC15-078
19 " Rack mounted	√	

NOTES:

(1): Other frequency responses can be supplied. Please, ask Sener.

The filter can be field retuned to any frequency within specified band

E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

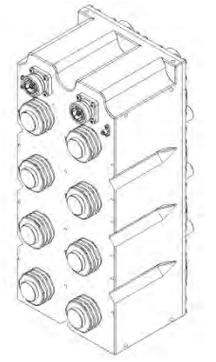
sener

FLDV-028C series

UHF DTV 8 poles bandpass filter ● ≤ 600 W

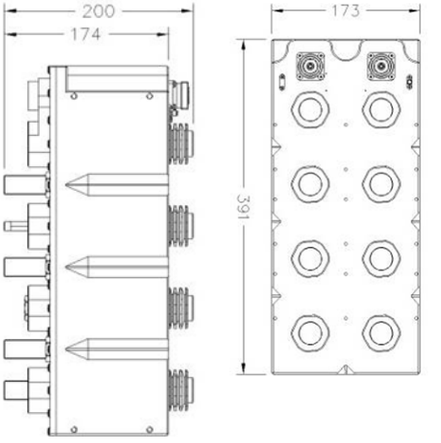
Electrical Specifications

Filter type	Bandpass coaxial	
Order	8 poles	
Cavity size	80 mm	
Frequency range	470-862 MHz	
Impedance	50 Ohm	
Channel bandwidth	6, 7, 8 MHz	
Maximum RMS output power handling up to 1500M ASL Natural Cooling (FLDV-028C) Heat sinks (FLDV-028HSC)	BW 6, 7 MHz 400 W RMS 475 W RMS	BW 8 MHz 500 W RMS 600 W RMS
Connectors	DIN 7/16 Female / EIA 7/8"	
Thermal stability	≤ 2 kHz / ºC	



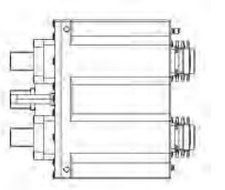
Mechanical & Environmental Specifications

Dimensions (W x D x H)	391 x 173 x 200 mm
Weight	11 kg
Temperature range	-5°C to +55°C
Working position	Any



Responses (1)

Channel bandwidth 8 MHz (typical DVB-T/T2)		
	470 MHz	800 MHz
Insertion loss $f_0 \pm$	< 0.56 dB	< 0.64 dB
Insertion loss $f_0 \pm 3.8$ MHz	< 2.00 dB	< 2.30 dB
Insertion loss $f_0 \pm 3.9$ MHz	< 3.20 dB	< 3.70 dB
Attenuations:		
$f_0 \pm 4.2$ MHz	> 14 dB	
$f_0 \pm 6$ MHz	> 30 dB	
$f_0 \pm 12$ MHz	> 51 dB	
VSWR	> 22 dB / < 1.17	
Group delay	< 800 ns	
Channel bandwidth 6 MHz (typical ISDB-T)		
	470 MHz	800 MHz
Insertion loss f_0	< 0.78 dB	< 0.92 dB
Insertion loss $f_0 \pm 2.79$ MHz	< 2.55 dB	< 3.00 dB
Attenuations:		
$f_0 \pm 3.15$ MHz	> 15 dB	
$f_0 \pm 4.5$ MHz	> 31 dB	
$f_0 \pm 9$ MHz	> 61 dB	
VSWR	> 25 dB / < 1.12	
Group delay	< 700 ns	
Channel bandwidth 6 MHz (typical ATSC 3.0)		
	470 MHz	800 MHz
Insertion loss f_0	< 0.73 dB	< 0.86 dB
Insertion loss $f_0 \pm 2.7$ MHz	< 2.20 dB	< 2.58 dB
Attenuations:		
$f_0 \pm 3.5$ MHz	> 15 dB	
$f_0 \pm 6$ MHz	> 45 dB	
$f_0 \pm 9$ MHz	> 63 dB	
VSWR	> 24 dB / < 1.13	
Group delay	< 600 ns	



NOTES:

(1): Other frequency responses can be supplied. Please, ask Sener.

Optional accessories

	7/16	7/8"
Directional couplers at inputs and outputs (see page 137)	AC15-716	AC15-078
Rack mounted	√	

The filter can be field retuned to any frequency within specified band

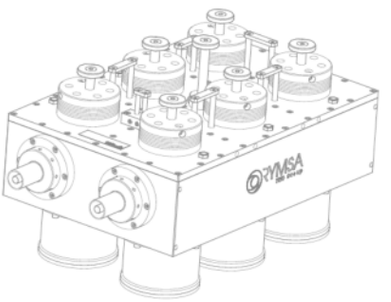
E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

FLDV-116

UHF DTV 6 poles bandpass filter ● ≤ 1.4 kW

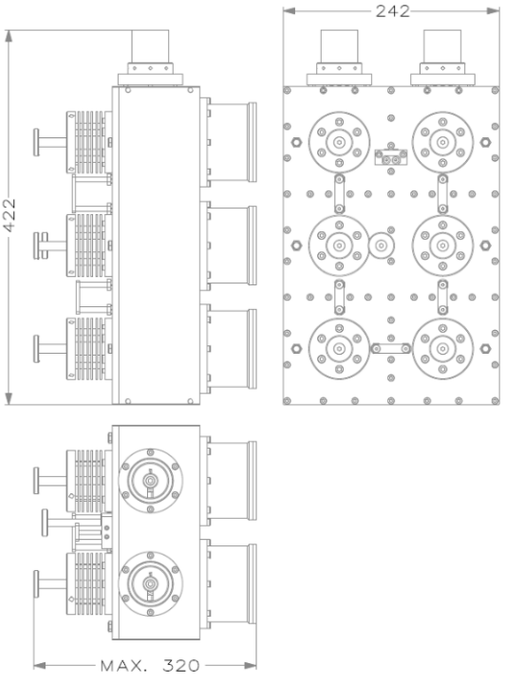
Electrical Specifications

Filter type	Bandpass coaxial	
Order	6 with double cross coupling	
Cavity size	110 mm	
Frequency range	470-862 MHz	
Impedance	50 Ohm	
Channel bandwidth	6, 7, 8 MHz	
Maximum RMS input power handling up to 1000M ASL	BW 6, 7 MHz 1.2 kW	BW 8 MHz 1.4 kW
Connectors	DIN 7/16 (F) / EIA 7/8" flanged (F) / 1 5/8" unfl.	
2nd Harmonic attenuation	> 50 dB	
Thermal stability	≤ 2 kHz / ºC	



Mechanical & Environmental Specifications

Dimensions (W x D x H)	242 x 422 x 320 mm
Weight	15 kg
Temperature range	-10°C to +50°C
Working position	Any



Responses (1)

Channel bandwidth 8 MHz (typical DVB-T/T2)	
Insertion loss f_0	≤ 0.4 dB (470 MHz <0.35 dB)
Insertion loss $f_0 \pm 3.8$ MHz	≤ 0.7 dB ($f_0 \pm 3.9$ MHz <0.9 dB)
Attenuations:	
$f_0 \pm 4.2$ MHz	> 5 dB
$f_0 \pm 6$ MHz	> 20 dB
$f_0 \pm 9$ MHz	> 30 dB
$f_0 \pm 12$ MHz	> 45 dB
VSWR $f_0 \pm 3.8$ MHz	1.15:1 ($f_0 \pm 3.9$ MHz 1.22:1)
Group delay $f_0 \pm 3.8$ MHz	< 350 ns ($f_0 \pm 3.9$ MHz <450ns)
Channel bandwidth 6 MHz (typical ISDB-T)	
Insertion loss f_0	≤ 0.5 dB (470 MHz <0.45 dB)
Insertion loss $f_0 \pm 2.79$ MHz	≤ 1 dB
Attenuations:	
$f_0 \pm 3.15$ MHz	> 5 dB
$f_0 \pm 4.5$ MHz	> 25 dB
$f_0 \pm 12$ MHz	> 50 dB
VSWR $f_0 \pm 2.79$MHz	1.15:1
Group delay $f_0 \pm 2.79$ MHz	< 450 ns
Channel bandwidth 6 MHz (typical ATSC)	
Insertion loss f_0	≤ 0.4 dB (470 MHz < 0.35 dB)
Insertion loss $f_0 \pm 2.69$ MHz	≤ 0.6 dB
Attenuations:	
$f_0 \pm 4$ MHz	> 10 dB
$f_0 \pm 4.5$ MHz	> 20 dB
$f_0 \pm 9$ MHz	> 40 dB
$f_0 \pm 12$ MHz	> 60 dB
VSWR $f_0 \pm 2.69$ MHz	1.1:1
Group delay $f_0 \pm 2.69$ MHz	< 200 ns

NOTES:

(1): Other frequency responses can be supplied. Please, ask Sener.

Optional accessories

	7/16	7/8"	1 5/8"
Directional couplers at inputs and outputs (see page 137)	AC15-716	AC15-078	AC15-158
Unflanged to flanged adapters (see page 136)	-	-	TR22-123
Rack mounted	√		

The filter can be field retuned to any channel within specified band

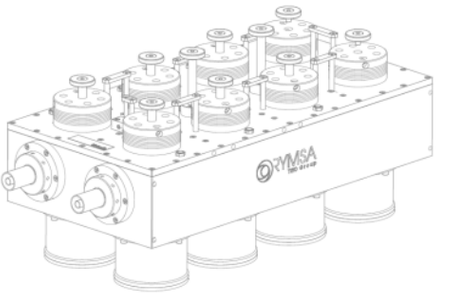
E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

FLDV-118

UHF DTV 8 poles bandpass filter ● ≤ 1.4 kW

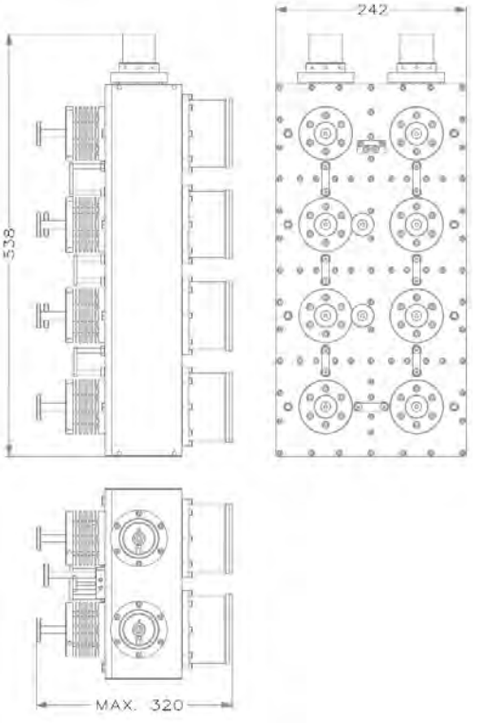
Electrical Specifications

Filter type	Bandpass coaxial	
Order	8 with double cross coupling	
Cavity size	110 mm	
Frequency range	470-862 MHz	
Impedance	50 Ohm	
Channel bandwidth	6, 7, 8 MHz	
Maximum input power handling up to 1000M ASL	BW 6, 7 MHz 1.2 kW rms	BW 8 MHz 1.4 kW rms
Connectors	DIN 7/16 (F) / EIA 7/8" flanged (F) / 1 5/8" unfl.	
2nd Harmonic attenuation	> 50 dB	
Thermal stability	≤ 2 kHz / ºC	



Mechanical & Environmental Specifications

Dimensions (W x D x H)	242 x 538 x 320 mm
Weight	21 kg
Temperature range	-10°C to +50°C
Working position	Any



Responses (1)

Channel bandwidth 8 MHz (typical DVB-T/T2)	
Insertion loss f_0	≤ 0.6 dB (470 MHz < 0.5 dB)
Insertion loss $f_0 \pm 3.8$ MHz	≤ 1.9 dB ($f_0 \pm 3.9$ MHz < 2dB)
Attenuations:	
$f_0 \pm 4.2$ MHz	> 15 dB
$f_0 \pm 6$ MHz	> 30 dB
$f_0 \pm 12$ MHz	> 55 dB
VSWR $f_0 \pm 3.8$ MHz	1.15:1 ($f_0 \pm 3.9$MHz < 1.22:1)
Group delay $f_0 \pm 3.8$ MHz	< 600 ns
Channel bandwidth 6 MHz (typical ISDB-T)	
Insertion loss f_0	≤ 0.75 dB (470 MHz < 0.6dB)
Insertion loss $f_0 \pm 2.79$ MHz	≤ 2.1 dB
Attenuations:	
$f_0 \pm 3.15$ MHz	> 15 dB
$f_0 \pm 4.5$ MHz	> 30 dB
$f_0 \pm 9$ MHz	> 55 dB
$f_0 \pm 12$ MHz	> 60 dB
VSWR $f_0 \pm 2.79$ MHz	1.15:1
Group delay $f_0 \pm 2.79$ MHz	< 600 ns
Channel bandwidth 6 MHz (typical ATSC)	
Insertion loss f_0	≤ 0.7 dB (470 MHz < 0.55 dB)
Insertion loss $f_0 \pm 2.69$ MHz	≤ 0.8 dB
Attenuations:	
$f_0 \pm 4$ MHz	> 15 dB
$f_0 \pm 4.5$ MHz	> 25 dB
$f_0 \pm 9$ MHz	> 55 dB
$f_0 \pm 12$ MHz	> 60 dB
VSWR $f_0 \pm 2.69$ MHz	1.1:1
Group delay $f_0 \pm 2.69$ MHz	< 200 ns

NOTES:

(1): Other frequency responses can be supplied. Please, ask Sener.

Optional accessories

	7/16	7/8"	1 5/8"
Directional couplers at inputs and outputs (see page 137)	AC15-716	AC15-078	AC15-158
Unflanged to flanged adapters (see page 136)	-	-	TR22-123
Rack mounted	√		

The filter can be field retuned to any frequency within specified band

E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

sener

FLDV-156 series

UHF DTV 6 poles bandpass filter ● ≤ 5 kW

Electrical Specifications

Filter type	Bandpass coaxial	
Order	6 with double cross coupling	
Cavity size	150 mm	
Frequency range	470-862 MHz	
Impedance	50 Ohm	
Channel bandwidth	6, 7, 8 MHz	
Maximum RMS output power handling up to 3000M ASL	BW 6, 7 MHz	BW 8 MHz
Heat sinks (FLDV-156HS)	2.5 kW	2.8 kW
Forced Air Cooling (FLDV-156FA)	3.5 kW	3.8 kW
Liquid Cooling (FLDV-156LC)	4 kW	5 kW
Connectors	1 5/8" unfl. / 3 1/8" unfl.	
2nd Harmonic attenuation	> 50 dB	
Thermal stability	≤ 2 kHz / ºC	
Liquid Cooling option (-LC)	Liquid (glycol and water coolant)	
Flow (-LC)	2 l/min	
Liquid Cooling circuit input (-LC)	3/8" NPT male	

Mechanical & Environmental Specifications

Dimensions (W x D x H) (FLDV-156HS/LC)	382 x 564 x 380 mm
Weight (FLDV-156HS/LC)	27 kg
Temperature range	-10°C to +50°C
Working position	Any

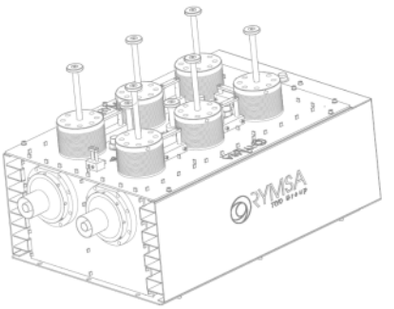
Responses (1)

Channel bandwidth 8 MHz (typical DVB-T/T2)	
Insertion loss f_0	≤ 0.35 dB (470 MHz < 0.3dB)
Insertion loss $f_0 \pm 3.8$ MHz	≤ 0.7 dB (f0 ± 3.9 MHz < 0.9 dB)
Attenuations:	
$f_0 \pm 4.2$ MHz	> 5 dB
$f_0 \pm 6$ MHz	> 20 dB
$f_0 \pm 12$ MHz	> 45 dB
VSWR $f_0 \pm 3.8$ MHz	1.15:1 ($f_0 \pm 3.9$ MHz < 1.22:1)
Group delay $f_0 \pm 3.8$ MHz	< 350 ns
Channel bandwidth 6 MHz (typical ISDB-T)	
Insertion loss f_0	≤ 0.45 dB (470MHz < 0.4 dB)
Insertion loss $f_0 \pm 2.79$ MHz	≤ 1.0 dB
Attenuations:	
$f_0 \pm 3.15$ MHz	> 5 dB
$f_0 \pm 4.5$ MHz	> 20 dB
$f_0 \pm 9$ MHz	> 40 dB
$f_0 \pm 12$ MHz	> 45 dB
VSWR $f_0 \pm 2.79$ MHz	1.15:1
Group delay $f_0 \pm 2.79$ MHz	< 400 ns
Channel bandwidth 6 MHz (typical ATSC)	
Insertion loss f_0	≤ 0.35 dB (470 MHz < 0.3 dB)
Insertion loss $f_0 \pm 2.69$ MHz	≤ 0.6 dB
Attenuations:	
$f_0 \pm 4$ MHz	> 15 dB
$f_0 \pm 4.5$ MHz	> 20 dB
$f_0 \pm 9$ MHz	> 40 dB
$f_0 \pm 12$ MHz	> 45 dB
VSWR $f_0 \pm 2.69$ MHz	1.1:1
Group delay $f_0 \pm 2.69$ MHz	< 200 ns

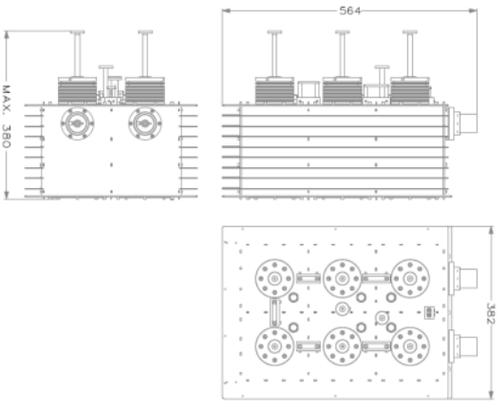
Optional accessories

	1 5/8"	3 1/8"
Directional couplers at inputs and outputs (see page 151)	AC15-158	AC15-318
Unflanged to flanged adapters (see page 150)	TR22-123	TR24-125
Rack mounted	√	

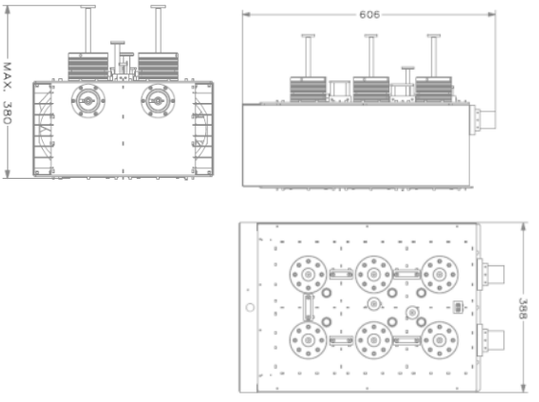
The filter can be field retuned to any channel within specified band



FLDV-156FA model



FLDV-156HS model



FLDV-156FA model

COOLING OPTIONS:

-AF: forced air cooling (fan MTBF 70.000 hours)
-LC: liquid cooling

NOTES:

(1): Other frequency responses can be supplied. Please, ask Sener.

E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

sener

FLDV-158 series

UHF DTV 8 poles bandpass filter ● ≤ 5 kW

Electrical Specifications

Filter type	Bandpass coaxial	
Order	8 with double cross coupling	
Cavity size	150 mm	
Frequency range	470-862 MHz	
Impedance	50 Ohm	
Channel bandwidth	6, 7, 8 MHz	
Maximum RMS output power handling up to 3000M ASL	BW 6, 7 MHz	BW 8 MHz
Heat Sinks (FLDV-158HS)	2.5 kW	2.8 kW
Forced Air Cooling (FLDV-158FA)	3.5 kW	3.8 kW
Liquid Cooling (FLDV-158LC)	4 kW	5 kW
Connectors	1 5/8" unfl. / 3 1/8" unfl.	
2nd Harmonic attenuation	> 50 dB	
Thermal stability	≤ 2 kHz / °C	
Liquid Cooling option (-LC)	Liquid (glycol and water coolant)	
Flow	2 l/min	
Liquid Cooling circuit input	3/8" NPT male	

Mechanical & Environmental Specifications

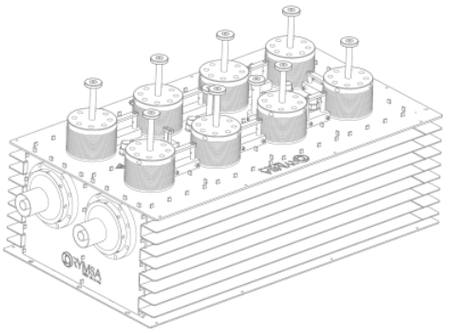
Dimensions (W x D x H) (-HS)	388 x 758 x 380 mm
Weight	39 kg
Temperature range	-10°C to +50°C
Working position	Any

Responses (1)

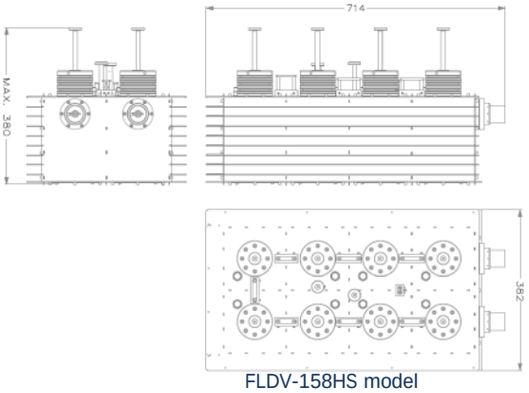
Channel bandwidth 8 MHz (typical DVB-T/T2)	
Insertion loss f_0	≤ 0.6 dB (470 MHz < 0.5 dB)
Insertion loss $f_0 \pm 3.8$ MHz	≤ 1.5 dB (f0 ± 3.9 MHz < 1.8 dB)
Attenuations:	
$f_0 \pm 4.2$ MHz	> 15 dB
$f_0 \pm 6$ MHz	> 30 dB
$f_0 \pm 12$ MHz	> 55 dB
VSWR $f_0 \pm 3.8$ MHz	1.15:1 ($f_0 \pm 3.9$ MHz < 1.22:1)
Group delay $f_0 \pm 3.8$ MHz	< 600 ns
Channel bandwidth 6 MHz (typical ISDB-T)	
Insertion loss f_0	≤ 0.65 dB (470MHz < 0.55 dB)
Insertion loss $f_0 \pm 2.79$ MHz	≤ 1.6 dB
Attenuations:	
$f_0 \pm 3.15$ MHz	> 15 dB
$f_0 \pm 4.5$ MHz	> 30 dB
$f_0 \pm 9$ MHz	> 50 dB
$f_0 \pm 12$ MHz	> 55 dB
VSWR $f_0 \pm 2.79$ MHz	1.15:1
Group delay $f_0 \pm 2.79$ MHz	< 600 ns
Channel bandwidth 6 MHz (typical ATSC)	
Insertion loss f_0	≤ 0.6 dB (470 MHz < 0.55 dB)
Insertion loss $f_0 \pm 2.69$ MHz	≤ 1.0 dB
Attenuations:	
$f_0 \pm 4$ MHz	> 15 dB
$f_0 \pm 4.5$ MHz	> 25 dB
$f_0 \pm 9$ MHz	> 50 dB
$f_0 \pm 12$ MHz	> 60 dB
VSWR $f_0 \pm 2.69$ MHz	1.1:1
Group delay $f_0 \pm 2.69$ MHz	< 250 ns

Optional accessories

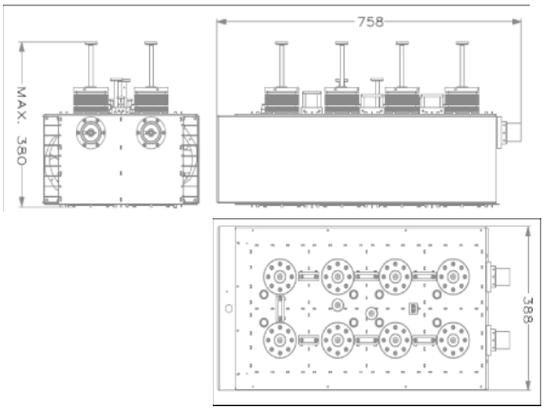
	1 5/8"	3 1/8"
Directional couplers at inputs and outputs (see page 137)	AC15-158	AC15-318
Unflanged to flanged adapters (see page 136)	TR22-123	TR24-125
Rack mounted	√	



FLDV-158HS model



FLDV-158HS model



FLDV-158FA model

COOLING OPTIONS:

-FA: forced air cooling (fan MTBF 70.000 hours)
-LC: liquid cooling

NOTES:

(1): Other frequency responses can be supplied. Please, ask Sener.

The filter can be field retuned to any frequency within specified band

E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

sener

FLDV-196 series

UHF DTV 6 poles bandpass filter ● ≤ 13 kW

Electrical Specifications

Filter type	Bandpass coaxial	
Order	6 with double cross coupling	
Cavity size	200 mm	
Frequency range	470-862 MHz	
Impedance	50 Ohm	
Channel bandwidth	6, 7, 8 MHz	
Maximum RMS output power handling up to 3000M ASL	BW 6, 7 MHz	BW 8 MHz
Natural Cooling (FLDV-196)	4 kW	5 kW
Heat Sinks (FLDV-1962HS)	6.5 kW	8 kW
Liquid Cooling (FLDV-196LC)	10 kW	13 kW
Connectors	3 1/8" unfl. / EIA 4 ½" unfl.	
2nd Harmonic attenuation	> 50 dB	
Thermal stability	≤ 2 kHz / ºC	
Liquid Cooling option	Liquid (glycol and water coolant)	
Flow	2 l/min	
Liquid Cooling circuit input	3/8" NPT male	

Mechanical & Environmental Specifications

Dimensions (W x D x H)	437 x 709 x 380 mm
Weight	42 kg
Temperature range	-10°C to +50°C
Working position	Any

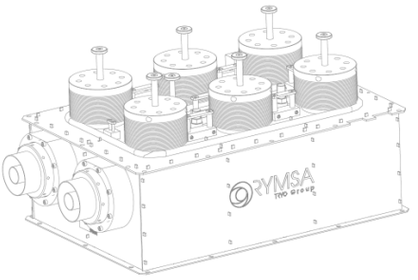
Responses (1)

Channel bandwidth 8 MHz (typical DVB-T/T2)	
Insertion loss f_0	≤ 0.3 dB (470 MHz < 0.25 dB)
Insertion loss $f_0 \pm 3.8$ MHz	≤ 0.6 dB (f0 ± 3.9 MHz < 0.8 dB)
Attenuations:	
$f_0 \pm 4.2$ MHz	> 5 dB
$f_0 \pm 6$ MHz	> 20 dB
$f_0 \pm 12$ MHz	> 45 dB
VSWR $f_0 \pm 3.8$ MHz	1.15:1 ($f_0 \pm 3.9$ MHz < 1.20:1)
Group delay $f_0 \pm 3.8$ MHz	< 350 ns
Channel bandwidth 6 MHz (typical ISDB-T)	
Insertion loss f_0	≤ 0.4 dB (470MHz < 0.35 dB)
Insertion loss $f_0 \pm 2.79$ MHz	≤ 0.8 dB
Attenuations:	
$f_0 \pm 3.15$ MHz	> 5 dB
$f_0 \pm 4.5$ MHz	> 20 dB
$f_0 \pm 9$ MHz	> 35 dB
$f_0 \pm 12$ MHz	> 45 dB
VSWR $f_0 \pm 2.79$ MHz	1.15:1
Group delay $f_0 \pm 2.79$ MHz	< 400 ns
Channel bandwidth 6 MHz (typical ATSC)	
Insertion loss f_0	≤ 0.3 dB (470 MHz < 0.25 dB)
Insertion loss $f_0 \pm 2.69$ MHz	≤ 0.4 dB
Attenuations:	
$f_0 \pm 4$ MHz	> 20 dB
$f_0 \pm 4.5$ MHz	> 30 dB
$f_0 \pm 9$ MHz	> 45 dB
$f_0 \pm 12$ MHz	> 60 dB
VSWR $f_0 \pm 2.69$ MHz	1.1:1
Group delay $f_0 \pm 2.69$ MHz	< 200 ns

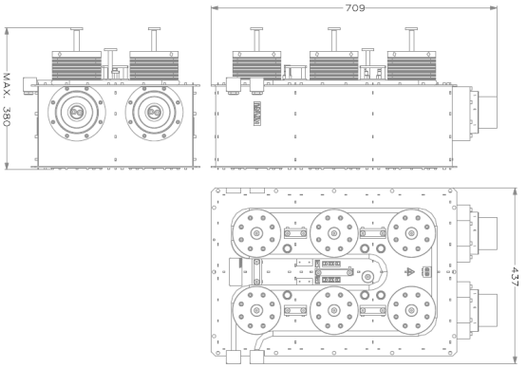
Optional accessories

	3 1/8"	4 1/2"
Directional couplers at inputs and outputs (see page 151)	AC15-318	AC15-412
Unflanged to flanged adapters (see page 150)	TR24-125	TR30-131
Rack mounted	√	

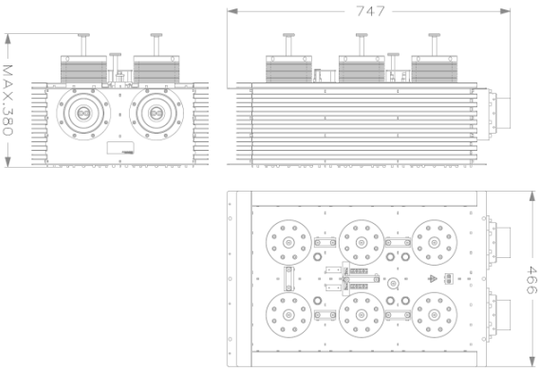
The filter can be field retuned to any frequency within specified band



FLDV-196 model



FLDV-196LC model



FLDV-1962HS model

COOLING OPTIONS:

-HS: heat sink cooling
-FA: forced air cooling (fan MTBF 70.000 hours)
-LC: liquid cooling

NOTES:

(1): Other frequency responses can be supplied. Please, ask Sener.

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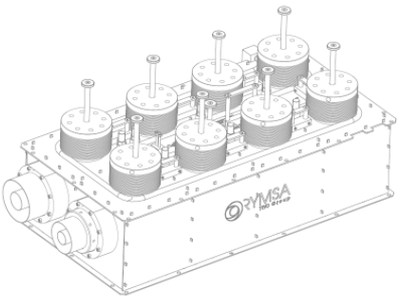
FLDV-198 series

UHF DTV 8 poles bandpass filter ● ≤ 11 kW

Electrical Specifications

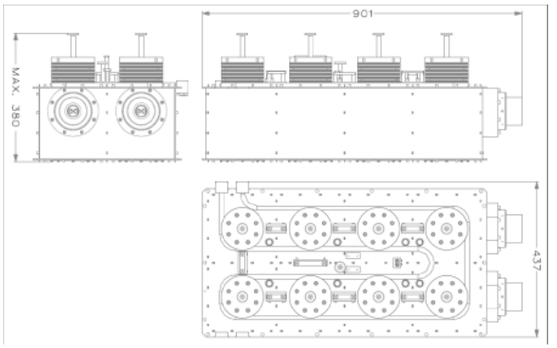
Filter type	Bandpass coaxial	
Order	8 with double cross coupling	
Cavity size	200 mm	
Frequency range	470-862 MHz	
Impedance	50 Ohm	
Channel bandwidth	6, 7, 8 MHz	
Maximum RMS output power handling up to 3000M ASL	BW 6, 7 MHz	BW 8 MHz
Natural Cooling (FLDV-198)	4 kW	5 kW
Heat Sinks (FLDV-1982HS)	6 kW	8 kW
Liquid Cooling (FLDV-198LC)	10 kW	11 kW
Connectors	3 1/8" unfl. / 4 ½" unfl.	
2nd Harmonic attenuation	> 50 dB	
Thermal stability	≤ 2 kHz / ºC	
Liquid Cooling option (-LC)	Liquid (glycol and water coolant)	
Flow	2 l/min	
Liquid Cooling circuit input	3/8" NPT male	



FLDV-198 model

Mechanical & Environmental Specifications

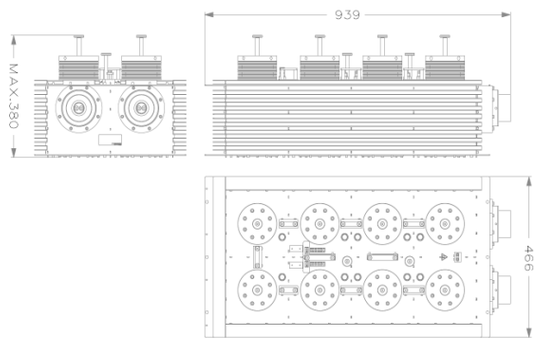
Dimensions (W x D x H)	437 x 901 x 380 mm
Weight	53 kg
Temperature range	-10°C to +50°C
Working position	Any



FLDV-198LC model

Responses (1)

Channel bandwidth 8 MHz (typical DVB-T/T2)	
Insertion loss f_0	≤ 0.45 dB (470 MHz < 0.35 dB)
Insertion loss $f_0 \pm 3.8$ MHz	≤ 1.1 dB (f0 ± 3.9 MHz < 1.5 dB)
Attenuations:	
$f_0 \pm 4.2$ MHz	> 15 dB
$f_0 \pm 6$ MHz	> 40 dB
$f_0 \pm 12$ MHz	> 55 dB
VSWR $f_0 \pm 3.8$ MHz	1.15:1 ($f_0 \pm 3.9$ MHz < 1.20:1)
Group delay $f_0 \pm 3.8$ MHz	< 450 ns
Channel bandwidth 6 MHz (typical ISDB-T)	
Insertion loss f_0	≤ 0.5 dB (470MHz < 0.4 dB)
Insertion loss $f_0 \pm 2.79$ MHz	≤ 1.2 dB
Attenuations:	
$f_0 \pm 3.15$ MHz	> 15 dB
$f_0 \pm 4.5$ MHz	> 40 dB
$f_0 \pm 9$ MHz	> 45 dB
$f_0 \pm 12$ MHz	> 60 dB
VSWR $f_0 \pm 2.79$ MHz	1.15:1
Group delay $f_0 \pm 2.79$ MHz	< 500 ns
Channel bandwidth 6 MHz (typical ATSC)	
Insertion loss f_0	≤ 0.45 dB (470 MHz < 0.35 dB)
Insertion loss $f_0 \pm 2.69$ MHz	≤ 0.9 dB
Attenuations:	
$f_0 \pm 4$ MHz	> 20 dB
$f_0 \pm 4.5$ MHz	> 30 dB
$f_0 \pm 9$ MHz	> 46 dB
$f_0 \pm 12$ MHz	> 60 dB
VSWR $f_0 \pm 2.69$ MHz	1.1:1
Group delay $f_0 \pm 2.69$ MHz	< 200 ns



FLDV-1982HS model

COOLING OPTIONS:

-HS: heat sink cooling
-FA: forced air cooling (fan MTBF 70.000 hours)
-LC: liquid cooling

NOTES:

(1): Other frequency responses can be supplied. Please, ask Sener.

Optional accessories

	3 1/8"	4 1/2"
Directional couplers at inputs and outputs (see page 150)	AC15-318	AC15-412
Unflanged to flanged adapters (see page 151)	TR24-125	TR30-131
Rack mounted	✓	

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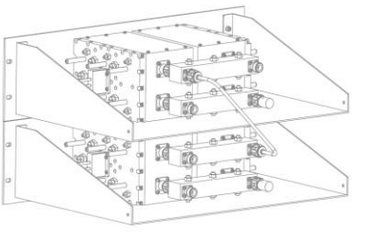
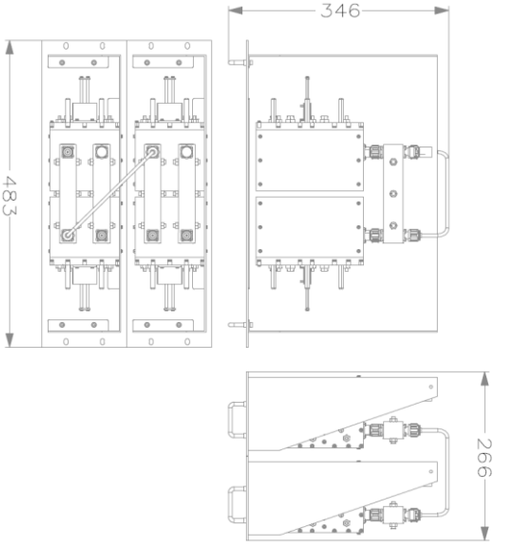
DPDV-006

UHF DTV 6 poles CIB combiner ● ≤ 100 W NB

Electrical Specifications

Filter type	FLDV-006 (50 mm)
Order of the bandpass filter	6 with internal feedback
Frequency range	470-862 MHz
Type	Constant impedance
Impedance	50 Ohm
Minimum channel spacing	≥ 0
Max. power handling (NB/WB/Output)	100 / 200 / 200 W RMS
Connectors (NB/WB/Output)	N (F)
Channel bandwidth	6, 7, 8 MHz
VSWR	≤ 1.10:1
Insertion Loss (NB/WB)	≤ 1 dB / ≤ 0.1 dB
Isolation	≥ 30 dB
Group delay variation	≤ 150 ns
Thermal stability	≤ 2 kHz / °C





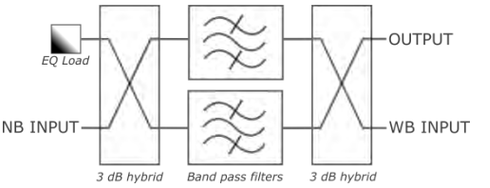
Mechanical & Environmental

Dimensions (W x D x H)	483 X 346 X 266 (2u) mm
Temperature range	-10°C to +50°C
Working position	Any

Optional accessories

Directional couplers and/or fine matcher at input and output
Aluminium tray to install in a 19" rack

The combiner can be field retuned to any frequency within specified band



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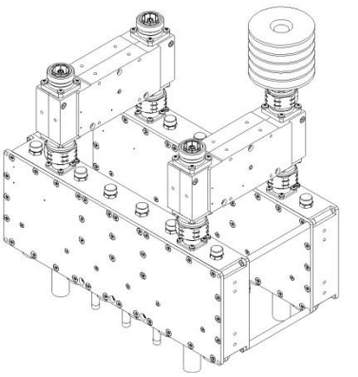
Web: https://www.group.sener/radiodifusion/

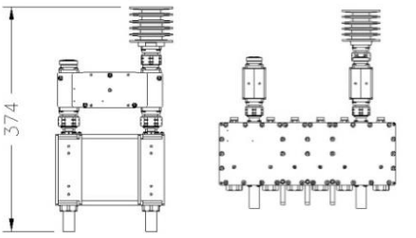
DPDV-006C

UHF DTV 6 poles CIB combiner ● ≤ 300 W NB

Electrical Specifications

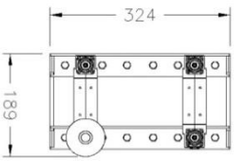
Filter type	FLDV-006 (30 mm)	
Order of the bandpass filter	6 with cross coupling	
Frequency range	470-862 MHz	
Type	Constant impedance	
Impedance	50 Ohm	
Minimum channel spacing	≥ 0	
Max. power handling (NB/WB/Output)	ISDB-T / ATSC	DVB-T/T2
DPDV-006C	0.23/2.27/2.5 kW RMS	0.30/2.2/2.5 kW RMS
Connectors (NB/WB/Output)	DIN 7/16 / EIA 7/8" / EIA 7/8"	
Channel bandwidth	6, 7, 8 MHz	
VSWR	≤ 1.10:1	
Insertion Loss (NB/WB)	≤ 1.34 dB / ≤ 0.1 dB	
Isolation	≥ 30 dB	
Group delay variation	≤ 300 ns	
Thermal stability	≤ 2 kHz / ºC	
Thermoswitch at EQ load	Yes	





Mechanical & Environmental Specifications

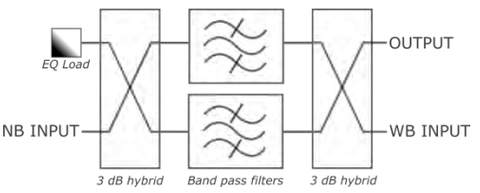
Dimensions (W x D x H) (rack incl.)	189 x 324 x 374 mm
Weight	7.5 kg
Temperature range	-10˚C to +50˚C
Working position	Any



Optional Accessories

	7/16	7/8"
Directional couplers at inputs and outputs (see page 137)	AC15-716	AC15-078
19" Rack mounted	✓	

The combiner can be field retuned to any frequency within specified band



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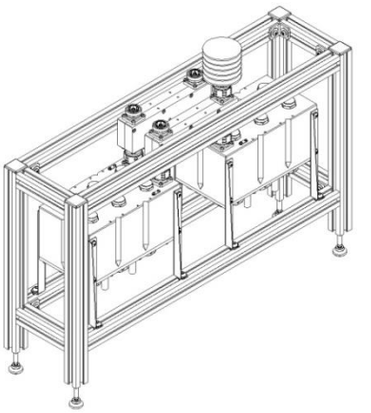
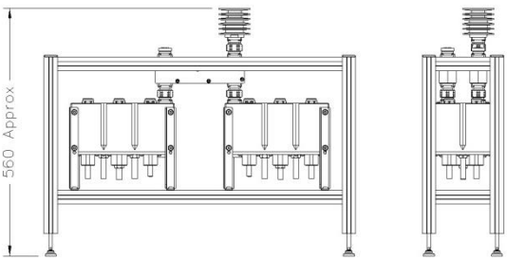
DPDV-016C series

UHF DTV 6 poles CIB combiner ● ≤ 800 W NB

Electrical Specifications

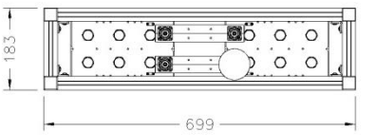
Filter type	FLDV-016C (60 mm)	
Order of the bandpass filter	6 with cross coupling	
Frequency range	470-862 MHz	
Type	Constant impedance	
Impedance	50 Ohm	
Minimum channel spacing	≥ 0	
Max. power handling (NB/WB/Output)	ISDB-T / ATSC	DVB-T/T2
natural	0.55/1.95/2.5 kW RMS	0.70/1.8/2.5 kW RMS
Heat sinks	0.60/1.90/2.5 kW RMS	0.80/1.7/2.5 kW RMS
Connectors (NB/WB/Output)	DIN 7/16 / EIA 7/8" /EIA 7/8"	
Channel bandwidth	6, 7, 8 MHz	
VSWR	≤ 1.10:1	
Insertion Loss (NB/WB)	≤ 0.83 dB / ≤ 0.1 dB	
Isolation	≥ 30 dB	
Group delay variation	≤ 450 ns	
Thermal stability	≤ 2 kHz / °C	
Thermoswitch at EQ load	Yes	





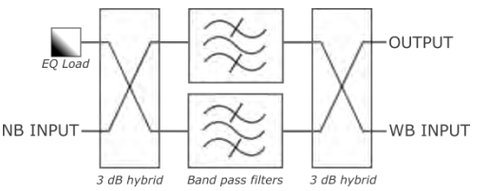
Mechanical & Environmental Specifications

Dimensions (W x D x H) (rack incl.)	699 x 183 x 560 mm
Weight	19 kg
Temperature range	-10°C to +50°C
Working position	Any



Optional Accessories

	7/16	7/8"
Directional couplers at inputs and outputs (see page 137)	AC15-716	AC15-078
19" Rack mounted	✓	



The combiner can be field retuned to any frequency within specified band

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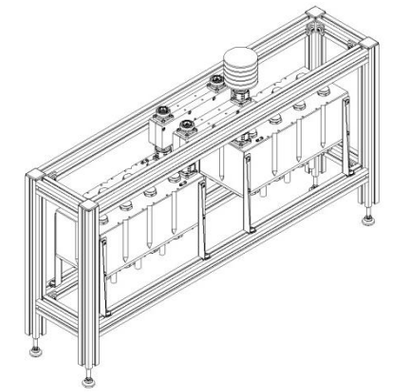
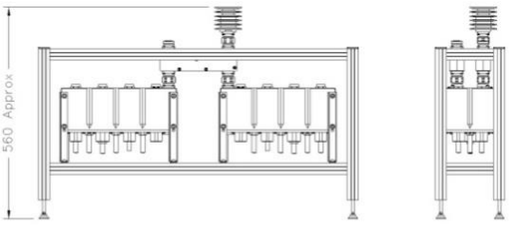
DPDV-018C series

UHF DTV 8 poles CIB combiner ● ≤ 700 W NB

Electrical Specifications

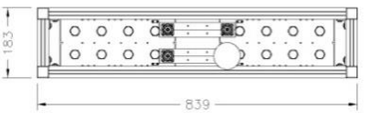
Filter type	FLDV-018C (60 mm)	
Order of the bandpass filter	8 with cross coupling	
Frequency range	470-862 MHz	
Type	Constant impedance	
Impedance	50 Ohm	
Minimum channel spacing	≥ 0	
Max. power handling (NB/WB/Output)	ISDB-T / ATSC	DVB-T/T2
natural	0.42 / 2.08 / 2.5 kW RMS	0.55 / 1.95 / 2.5 kW RMS
Heat sinks	0.50 / 2.00 / 2.5 kW RMS	0.70 / 1.8 / 2.5 kW RMS
Connectors (NB/WB/Output)	DIN 7/16 / EIA 7/8" /EIA 7/8"	
Channel bandwidth	6, 7, 8 MHz	
VSWR	≤ 1.10:1	
Insertion Loss (NB/WB)	≤ 1.25 dB / ≤ 0.1 dB	
Isolation	≥ 30 dB	
Group delay variation	≤ 800 ns	
Thermal stability	≤ 2 kHz / ºC	
Thermoswitch at EQ load	Yes	





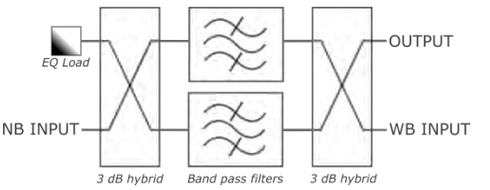
Mechanical & Environmental Specifications

Dimensions (W x D x H) (rack incl.)	839 x 183 x 560 mm
Weight	23 kg
Temperature range	-10°C to +50°C
Working position	Any



Optional Accessories

	7/16	7/8"
Directional couplers at inputs and outputs (see page 137)	AC15-716	AC15-078
19" Rack mounted	✓	



The combiner can be field retuned to any frequency within specified band

E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

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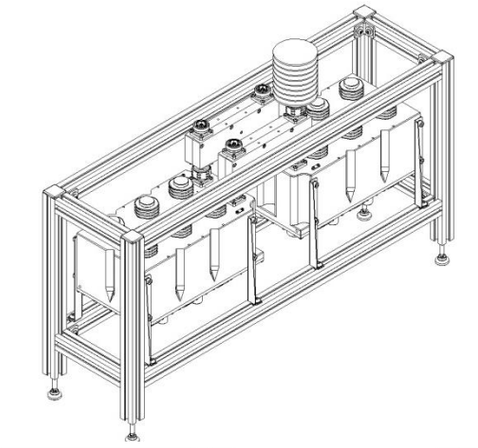
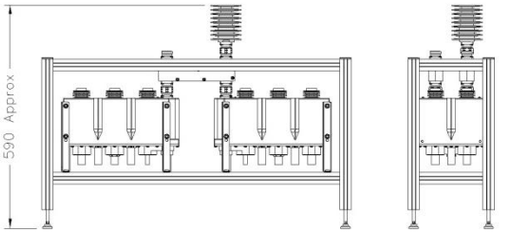
DPDV-026C series

UHF DTV 6 poles CIB combiner ● ≤ 1.5 kW NB

Electrical Specifications

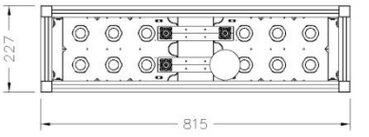
Filter type	FLDV-026C (80 mm)	
Order of the bandpass filter	6 with cross coupling	
Frequency range	470-862 MHz	
Type	Constant impedance	
Impedance	50 Ohm	
Minimum channel spacing	≥ 0	
Max. power handling (NB/WB/Output)	ISDB-T / ATSC	DVB-T/T2
natural	0.95/ 1.55 / 2.5 kW RMS	1.2 / 1.3 / 2.5 kW RMS
Heat sinks	1.1 / 1.40 / 2.5 kW RMS	1.5 / 1.0 / 2.5 kW RMS
Connectors (NB/WB/Output)	DIN 7/16 / EIA 7/8" /EIA 7/8"	
Channel bandwidth	6, 7, 8 MHz	
VSWR	≤ 1.10:1	
Insertion Loss (NB/WB)	≤ 0.61 dB / ≤ 0.1 dB	
Isolation	≥ 30 dB	
Group delay variation	≤ 450 ns	
Thermal stability	≤ 2 kHz / ºC	
Thermoswitch at EQ load	Yes	





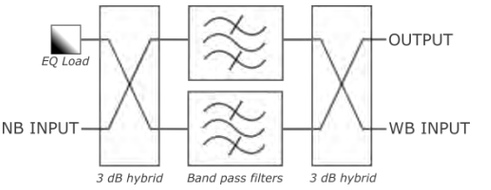
Mechanical & Environmental Specifications

Dimensions (W x D x H) (rack incl.)	815 x 227 x 590 mm
Weight	26 kg
Temperature range	-10˚C to +50˚C
Working position	Any



Optional Accessories

	7/16	7/8"
Directional couplers at inputs and outputs (see page 137)	AC15-716	AC15-078
19" Rack mounted	✓	



The combiner can be field retuned to any frequency within specified band

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Web: https://www.group.sener/radiodifusion/

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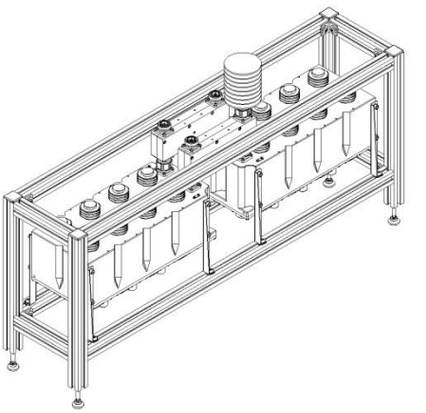
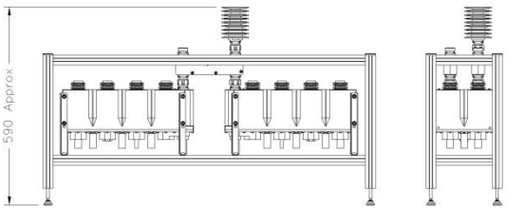
DPDV-028C series

UHF DTV 8 poles CIB combiner ● ≤ 1.2 kW NB

Electrical Specifications

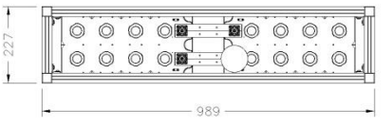
Filter type	FLDV-028C (80 mm)	
Order of the bandpass filter	8 with cross coupling	
Frequency range	470-862 MHz	
Type	Constant impedance	
Impedance	50 Ohm	
Minimum channel spacing	≥ 0	
Max. power handling (NB/WB/Output)	ISDB-T / ATSC	DVB-T/T2
natural	0.8/ 1.7 / 2.5 kW RMS	1.0 / 1.5 / 2.5 kW RMS
Heat sinks	0.95 / 1.55 / 2.5 kW RMS	1.2 / 1.3 / 2.5 kW RMS
Connectors (NB/WB/Output)	DIN 7/16 / EIA 7/8" /EIA 7/8"	
Channel bandwidth	6, 7, 8 MHz	
VSWR	≤ 1.10:1	
Insertion Loss (NB/WB)	≤ 0.92 dB / ≤ 0.1dB	
Isolation	≥ 30 dB	
Group delay variation	≤ 800 ns	
Thermal stability	≤ 2 kHz / ºC	
Thermoswitch at EQ load	Yes	





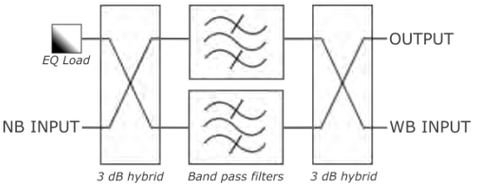
Mechanical & Environmental Specifications

Dimensions (W x D x H) (rack incl.)	989 x 227 x 590 mm
Weight	31 kg
Temperature range	-10°C to +50°C
Working position	Any



Optional Accessories

	7/16	7/8"
Directional couplers at inputs and outputs (see page 137)	AC15-716	AC15-078
19" Rack mounted	∫	



The combiner can be field retuned to any frequency within specified band

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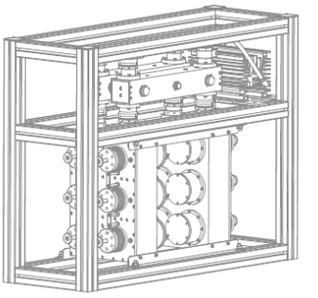
Web: https://www.group.sener/radiodifusion/

DPDV-116, DPDV-146, DPDV-146HP, DPDV-1462EHP

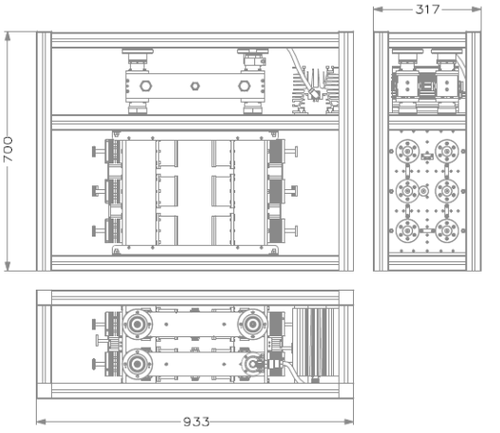
UHF DTV 6 poles CIB combiner ● ≤ 2.5 kW NB

Electrical Specifications

Filter type	FLDV-116 (110 mm)
Order of the bandpass filter	6 with double cross coupling
Frequency range	470-862 MHz
Type	Constant impedance
Impedance	50 Ohm
Minimum channel spacing	≥ 0
Max. power handling (NB/WB/Output) DPDV-116 DPDV-146 DPDV-146HP DPDV-1462EHP	 1.2/1.2/1.2 kW RMS 1.2/2.3/3.5 kW RMS 1.2/5/5 kW RMS 2.5/5/5 kW RMS
Connectors (NB/WB/Output) DPDV-116 DPDV-146, DPDV-146HP DPDV-1462EHP	 DIN 7/16(F) / DIN 7/16(F) / DIN 7/16(F) DIN 7/16(F) / 1 5/8”unfl. / 1 5/8”unfl. EIA 7/8”(M) / 1 5/8”unfl. / 1 5/8”unfl.
Channel bandwidth	6, 7, 8 MHz
VSWR	≤ 1.10:1
Insertion Loss (NB/WB)	≤ 0.5 dB / 0.1 dB
Isolation	≥ 35 dB
Group delay variation	≤ 200 ns
Thermal stability	≤ 2 kHz / ºC



DPDV-1462EHP model

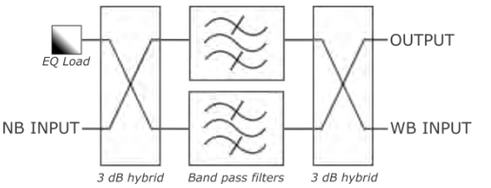


Mechanical & Environmental Specifications

Dimensions (W x D x H) (rack incl.)	933 x 317 x 700 mm
Weight	50 kg
Temperature range	-10˚C to +50˚C
Working position	Any

Optional Accessories

	7/16	7/8”	1 5/8”
Directional couplers at inputs and outputs (see page 137	AC15-716	AC15-078	AC15-158
Unflanged to flanged adapters (see page 136)			TR22-123
Rack mounted	√		



The combiner can be field retuned to any frequency within specified band

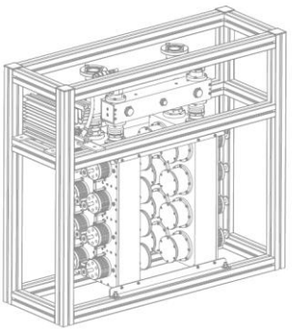
E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

DPDV-118, DPDV-148, DPDV-148HP, DPDV-1482EHP

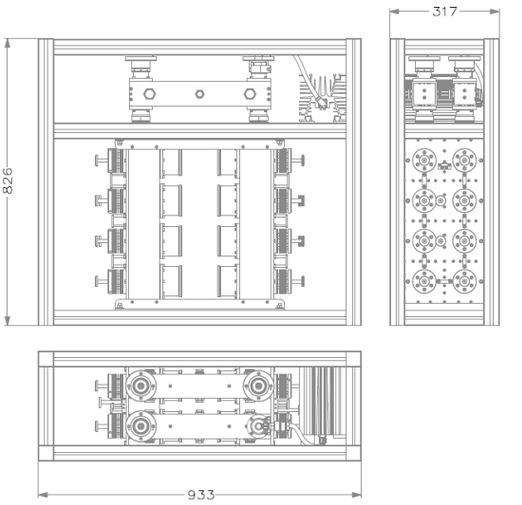
UHF DTV 8 poles CIB combiner ● ≤ 2.5 kW NB

Electrical Specifications

Filter type	FLDV-118 (110 mm)
Order of the bandpass filter	8 with double cross coupling
Frequency range	470-862 MHz
Type	Constant impedance
Impedance	50 Ohm
Minimum channel spacing	≥ 0
Max. power handling (NB/WB/Output) DPDV-118 DPDV-148 DPDV-148HP DPDV-1482EHP	 1.2/1.2/1.2 kW RMS 1.2/2.3/3.5 kW RMS 1.2/5/5 kW RMS 2.5/5/5 kW RMS
Connectors (NB/WB/Output)	
DPDV-118	DIN 7/16(F) / DIN 7/16(F) / DIN 7/16(F)
DPDV-148, DPDV-148HP	DIN 7/16(F) / 1 5/8”unfl. / 1 5/8”unfl.
DPDV-1482EHP	EIA 7/8” (M) / 1 5/8”unfl. /1 5/8”unfl.
Channel bandwidth	6, 7, 8 MHz
VSWR	≤ 1.10:1
Insertions Loss (NB/WB)	≤ 0.7 dB / 0.1 dB
Isolation	≥ 35 dB
Group delay variation	≤ 450 ns
Thermal stability	≤ 2 kHz / ºC



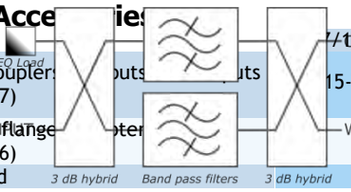
DPDV-1482EHP model



Mechanical & Environmental Specifications

Dimensions (W x D x H) (rack incl.)	933 x 317 x 826 mm
Weight	62 kg
Temperature range	-10˚C to +50˚C
Working position	Any

Optional Acce ies



	7/16 OUTPUT	7/8”	1 5/8”
Directional couplers (see page 137)	15-716	AC15-078	AC15-158
Unflanged to flange ter (see page 136)	WB INPUT		TR22-123
Rack mounted		∫	

The combiner can be field retuned to any frequency within specified band

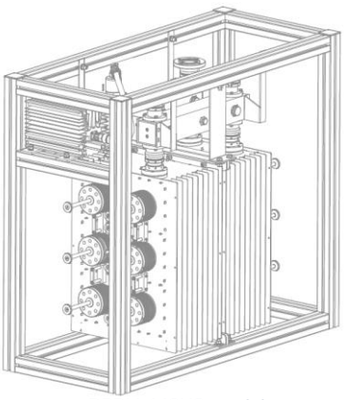
E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

DPDV-446HS, DPDV-456HS, DPDV-456HPHS, DPDV-466HS

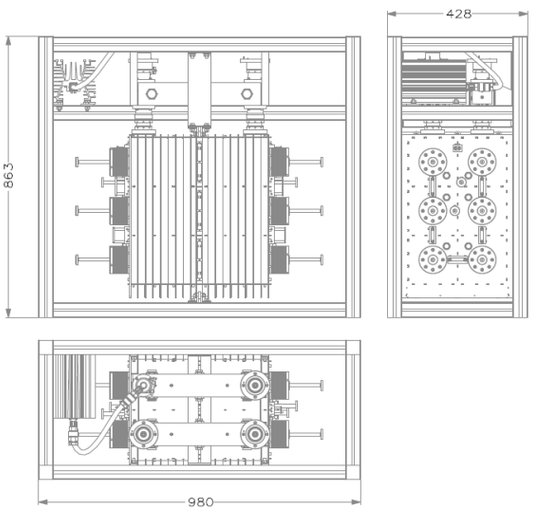
UHF DTV 6 poles CIB combiner ● ≤ 5 kW NB

Electrical Specifications

Filter type		FLDV-156HS (150 mm)
Order of the bandpass filter		6 with internal feedback
Frequency range		470-862 MHz
Type		Constant impedance
Impedance		50 Ohm
Recommended min. channel spacing		≥ 0
Max. power handling (NB/WB/Output)		
	DPDV-446HS	5/5/5 kW RMS
	DPDV-456HS	5/5/10 kW RMS
	DPDV-456HPHS	5/15/15 kW RMS
	DPDV-466HS	5/25/25 kW RMS
Connectors (NB/WB/Output)		
	DPDV-446HS	1 5/8" / 1 5/8" / 1 5/8" unfl. 1 5/8" / 3 1/8" / 3 1/8" unfl.
	DPDV-456HS, DPDV-456HPHS	1 5/8" / 4 1/2" / 4 1/2" unfl.
	DPDV-466HS	
Channel bandwidth		6, 7, 8 MHz
VSWR		≤ 1.10:1
Insertion Loss (NB/WB)		≤ 0.45 dB / ≤ 0.1 dB
Isolation		≥ 35 dB
Group delay variation		≤ 350 ns
Thermal stability		≤ 2 kHz / °C
Thermoswitch at EQ load		Yes
Cooling		Heatsink



DPDV-446HS model

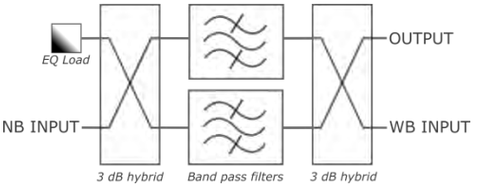


Mechanical & Environmental Specifications

Dimensions (W x D x H) (rack incl.)	428 x 980 x 863 mm
Weight	88 kg
Temperature range	-10°C to +50°C
Working position	Any

Optional Accessories

	1 5/8"	3 1/8"	4 1/2"
Directional couplers at inputs and Outputs (see page 137)	AC15-158	AC15-318	AC15-412
Unflanged to flanged adapters (see page 136)	TR22-123	TR24-125	TR30-131
Rack mounted	✓		



The combiner can be field retuned to any frequency within specified band

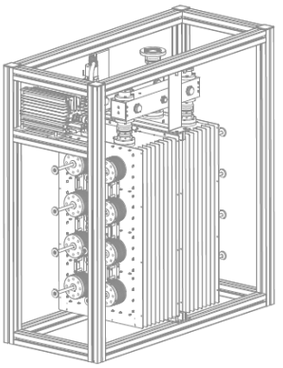
E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

DPDV-448HS, DPDV-458HS, DPDV-458HPHS, DPDV-468HS

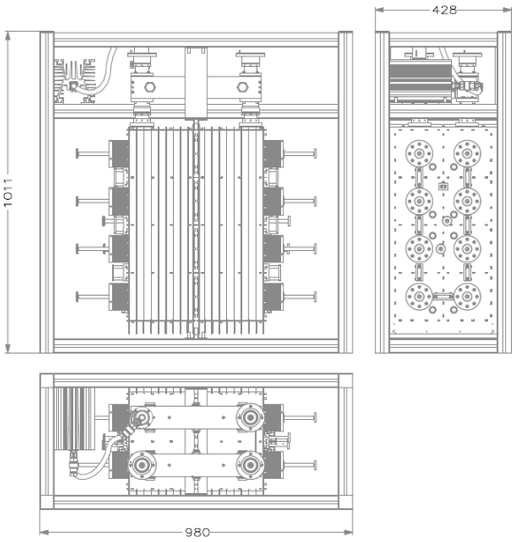
UHF DTV 8 poles CIB combiner ● ≤ 5 kW NB

Electrical Specifications

Filter type		FLDV-158HS (150 mm)
Order of the bandpass filter		8 poles with cross coupling
Frequency range		470-862 MHz
Type		Constant impedance
Impedance		50 Ohm
Minimum frequency spacing		≥ 0
Max. power handling (NB/WB/Output)		
	DPDV-448HS	5/5/5 kW RMS
	DPDV-458HS	5/5/10 kW RMS
	DPDV-458HPHS	5/15/15 kW RMS
	DPDV-468HS	5/25/25 kW RMS
Input connectors (NB/WB/Output)		
	DPDV-448HS	1 5/8" / 1 5/8" / 1 5/8" unfl. 1 5/8" / 3 1/8" / 3 1/8" unfl.
	DPDV-458HS, DPDV-458HPHS	
	DPDV-468HS	1 5/8" / 4 1/2" / 4 1/2" unfl.
Channel bandwidth		6, 7, 8 MHz
VSWR		≤ 1.10:1
Insertion Loss (NB/WB)		≤ 0.7 dB / ≤ 0.1 dB
Isolation		≥ 35 dB
Group delay variation		≤ 600 ns
Thermal stability		≤ 2 kHz / ºC
Thermoswitch at EQ load		Yes
Cooling		Heatsink



DPDV-448HS model

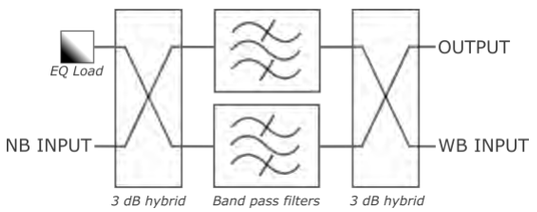


Mechanical & Environmental Specifications

Dimensions (W x D x H) (rack incl.)	428 x 980 x 1011 mm
Weight	100 kg
Temperature range	-10°C to +50°C
Working position	Any

Optional Accessories

	1 5/8"	3 1/8"	4 1/2"
Directional couplers at inputs and Outputs (see page 136)	AC15-158	AC15-318	AC15-412
Unflanged to flanged adapters (see page 137)	TR22-123	TR24-125	TR30-131
Rack mounted	✓		



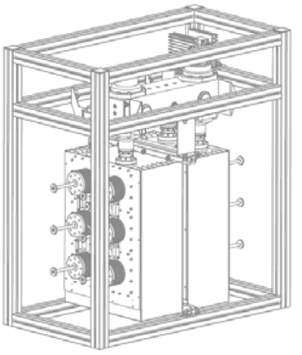
E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

DPDV-456FA, DPDV-466FA

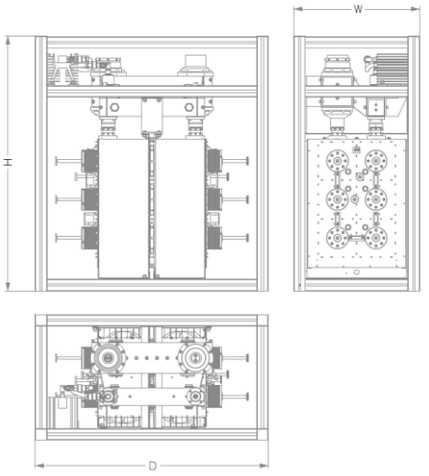
UHF DTV 6 poles CIB combiner ● ≤ 7.6 kW NB

Electrical Specifications

Filter type		FLDV-156FA (150 mm)	
Order of the bandpass filter		6 with internal feedback	
Frequency range		470-862 MHz	
Type		Constant impedance	
Impedance		50 Ohm	
Recommended min. channel spacing		≥ 0	
Max. power handling (NB/WB/Output)		ISDB-T/ATSC	DVB-T/T2
	DPDV-456FA	7/15/15 kW RMS	7.6/15/15 kW RMS
	DPDV-466FA	7/25/25 kW RMS	7.6/25/25 kW RMS
Connectors (NB/WB/Output)			
	DPDV-456FA	3 1/8" / 3 1/8" / 3 1/8" unfl.	
	DPDV-466FA	3 1/8" / 4 1/2" / 4 1/2" unfl.	
Channel bandwidth		6, 7, 8 MHz	
VSWR		≤ 1.10:1	
Insertion Loss (NB/WB)		≤ 0.45 dB / 0.1 dB	
Isolation		≥ 35 dB	
Group delay variation		≤ 350 ns	
Thermal stability		≤ 2 kHz / ºC	
Thermoswitch at EQ load		Yes	
Cooling (1)		Forced air	



DPDV-456FA model



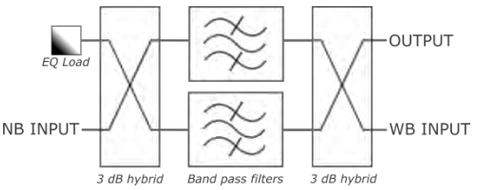
Mechanical & Environmental Specifications

Dimensions (W x D x H) (rack incl.)	488 x 980 x 892 mm
Weight	92 kg
Temperature range	-10°C to +50°C
Working position	Any

Optional Accessories

	3 1/8"	4 1/2"
Directional couplers at inputs and Outputs (see page 137)	AC15-318	AC15-412
Unflanged to flanged adapters (see page 136)	TR24-125	TR30-131
Rack mounted	√	

The combiner can be field retuned to any frequency within specified band



NOTES:

(1): Fan MTBF 70.000 hours

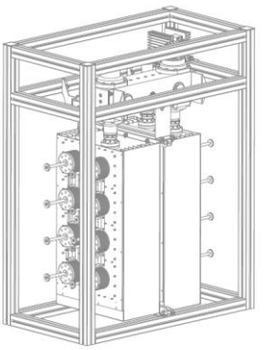
E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

DPDV-458FA, DPDV-468FA

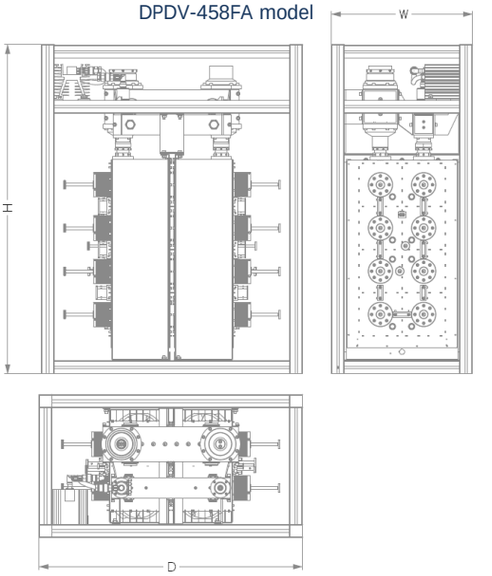
UHF DTV 8 poles CIB combiner ● ≤ 7.6 kW NB

Electrical Specifications

Filter type		FLDV-158FA (150 mm)	
Order of the bandpass filter		8 poles with double cross coupling	
Frequency range		470-862 MHz	
Type		Constant impedance	
Impedance		50 Ohm	
Minimum frequency spacing		≥ 0	
Max. power handling (NB/WB/Output)		ISDB-T/ATSC	DVB-T/T2
	DPDV-458FA	7 /15/15 kW RMS	7.6/15/15 kW RMS
	DPDV-468FA	7 /25/25 kW RMS	7.6/25/25 kW RMS
Input connectors (NB/WB/Output)			
	DPDV-458FA	3 1/8" / 3 1/8" / 3 1/8" unfl.	
	DPDV-468FA	3 1/8" / 4 1/2" / 4 1/2" unfl.	
Channel bandwidth		6, 7, 8 MHz	
VSWR		≤ 1.10:1	
Insertion Loss (NB/WB)		≤ 0.7 dB / ≤ 0.1 dB	
Isolation		≥ 35 dB	
Group delay variation		≤ 600 ns	
Thermal stability		≤ 2 kHz / ºC	
Thermoswitch at EQ load		Yes	
Cooling (1)		Forced air	



DPDV-458FA model

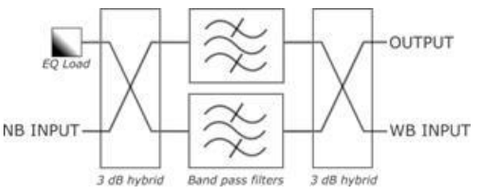


Mechanical & Environmental Specifications

Dimensions (W x D x H) (rack incl.)	488 x 980 x 1043 mm
Weight	104 kg
Temperature range	-10°C to +50°C
Working position	Any

Optional Accessories

	3 1/8"	4 1/2"
Directional couplers at inputs and outputs (see page 151)	AC15-318	AC15-412
Unflanged to flanged adapters (see page 150)	TR24-125	TR30-131
Rack mounted	√	



The combiner can be field retuned to any frequency within specified band

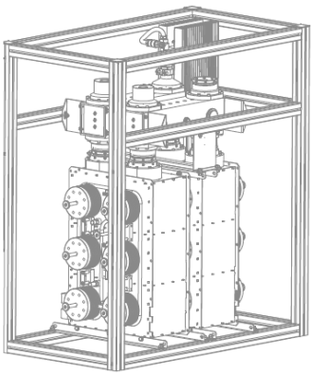
E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

DPDV-456LC, DPDV-466LC

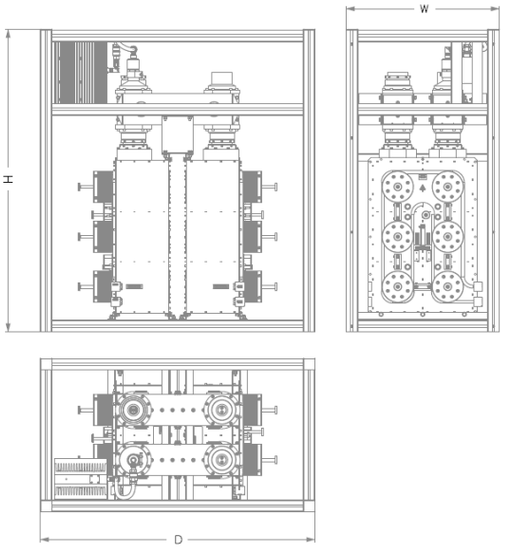
UHF DTV 6 poles CIB combiner ● ≤ 10 kW NB

Electrical Specifications

Filter type		FLDV-156LC (150 mm)	
Order of the bandpass filter		6 with cross coupling	
Frequency range		470-862 MHz	
Type		Constant impedance	
Impedance		50 Ohm	
Recommended min. channel spacing		≥ 0	
Max. power handling (NB/WB/Output)		ISDB-T/ATSC	DVB-T/T2
	DPDV-456LC	8/15/15 kW RMS	10/15/15 kW RMS
	DPDV-466LC	8/25/25 kW RMS	10/25/25 kW RMS
Connectors (NB/WB/Output)			
	DPDV-456LC	3 1/8" / 3 1/8" / 3 1/8" unfl.	
	DPDV-466LC	3 1/8" / 4 1/2" / 4 1/2" unfl.	
Channel bandwidth		6, 7, 8 MHz	
VSWR		≤ 1.10:1	
Insertion Loss (NB/WB)		≤ 0.4 dB / ≤ 0.1 dB	
Isolation		≥ 35 dB	
Group delay variation		≤ 350 ns	
Thermal stability		≤ 2 kHz / ºC	
Thermoswitch at EQ load		Yes	
Cooling (1)		Liquid cooling	



DPDV-456LC model

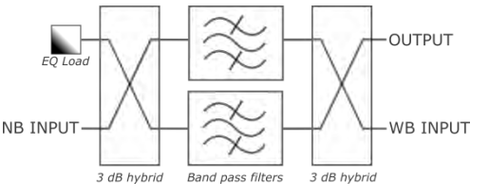


Mechanical & Environmental Specifications

Dimensions (W x D x H) (rack incl.)	428 x 980 x 863 mm
Weight	88 kg
Temperature range	-10°C to +50°C
Working position	Any

Optional Accessories

	3 1/8"	4 1/2"
Directional couplers at inputs and outputs (see page 137)	AC15-318	AC15-412
Unflanged to flanged adapters (see page 136)	TR24-125	TR30-131
Rack mounted	√	



NOTES:

External cooling system required.
Transmitter cooling system be used if available.
Sener dedicated cooling system can be supplied.

The combiner can be field retuned to any frequency within specified band

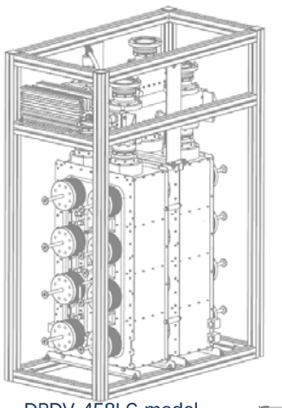
E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

DPDV-458LC, DPDV-468LC

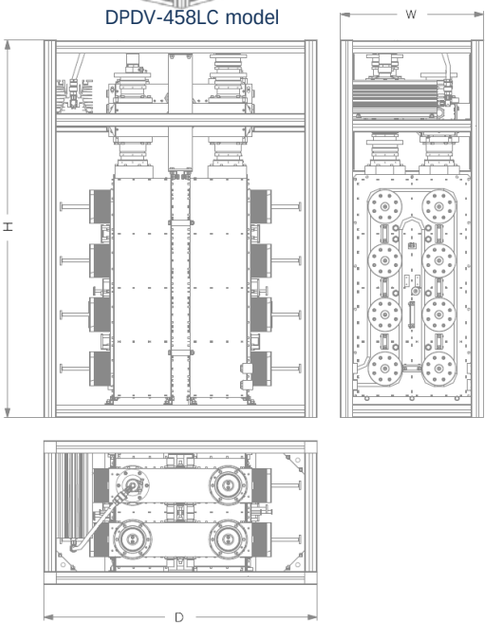
UHF DTV 8 poles CIB combiner ● ≤ 10 kW NB

Electrical Specifications

Filter type		FLDV-158LC (150 mm)	
Order of the bandpass filter		8 with cross coupling	
Frequency range		470-862 MHz	
Type		Constant impedance	
Impedance		50 Ohm	
Recommended min. channel spacing		≥ 0	
Max. power handling (NB/WB/Output)		ISDB-T/ATSC	DVB-T/T2
	DPDV-458LC	8/15/15 kW RMS	10/15/15 kW RMS
	DPDV-468LC	8/25/25 kW RMS	10/25/25 kW RMS
Connectors (NB/WB/Output)			
	DPDV-458LC	3 1/8" / 3 1/8" / 3 1/8" unfl.	
	DPDV-468LC	3 1/8" / 4 1/2" / 4 1/2" unfl.	
Channel bandwidth		6, 7, 8 MHz	
VSWR		≤ 1.10:1	
Insertion Loss (NB/WB)		≤ 0.4 dB / ≤ 0.1 dB	
Isolation		≥ 35 dB	
Group delay variation		≤ 350 ns	
Thermal stability		≤ 2 kHz / ºC	
Thermoswitch at EQ load		Yes	
Cooling		Liquid	



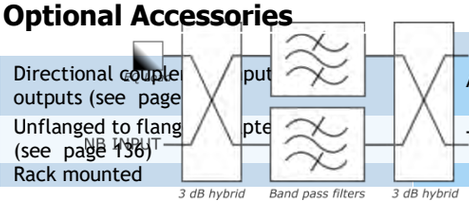
DPDV-458LC model



Mechanical & Environmental Specifications

Dimensions (W x D x H) (rack incl.)	488 x 980 x 1043 mm
Weight	104 kg
Temperature range	-10˚C to +50˚C
Working position	Any

Optional Accessories



	3 1/8"	4 1/2"
Directional couple put outputs (see page	AC15-318	AC15-412
Unflanged to flang pte (see page 136)	TR24-125	TR30-131
Rack mounted	∫	

The combiner can be field retuned to any frequency within specified band

NOTES:

External cooling system required.

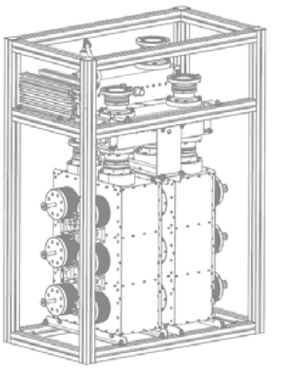
E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

DPDV-656, DPDV-666, DPDV-676

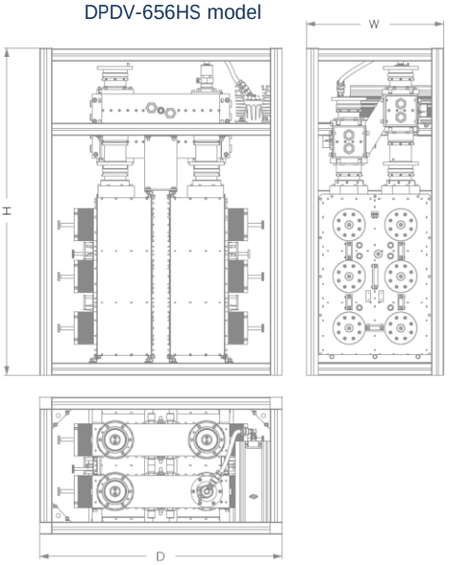
UHF DTV 6 poles CIB combiner ● ≤ 10 kW NB

Electrical Specifications

Filter type		FLDV-196 (200 mm)	
Order of the bandpass filter		6 with cross coupling	
Frequency range		470-862 MHz	
Type		Constant impedance	
Impedance		50 Ohm	
Minimum channel spacing		≥ 0	
Max. power handling (NB/WB/Output)		ISDB-T/ATSC	DVB-T/T2
	DPDV-656HS	8/15/15 kW RMS	10/15/15 kW RMS
	DPDV-666HS	8/25/25 kW RMS	10/25/25 kW RMS
	DPDV-676HS	8/50/50 kW RMS	10/50/50 kW RMS
Connectors (NB/WB/Output)			
	DPDV-656HS	3 1/8" / 3 1/8" / 3 1/8" unfl.	
	DPDV-666HS	3 1/8" / 4 1/2" / 4 1/2" unfl.	
	DPDV-676HS	3 1/8" unfl. / EIA 6 1/8" / EIA 6 1/8"	
Channel bandwidth		6, 7, 8 MHz	
VSWR		≤ 1.10:1	
Insertion Loss (NB/WB)		≤ 0.35 dB / ≤ 0.1 dB	
Isolation		≥ 35 dB	
Group delay variation		≤ 350 ns	
Thermal stability		≤ 2 kHz / ºC	
Thermoswitch at EQ load		Yes	



DPDV-656HS model

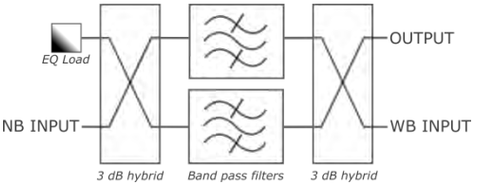


Mechanical & Environmental Specifications

Dimensions (W x D x H) (rack incl.)	
DPDV-656HS, DPDV-666HS	510 x 900 x 1215 mm
DPDV-676HS	580 x 1330 x 1490 mm
Weight	195 kg (DPDV-676), 128 kg (rest)
Temperature range	-10˚C to +50˚C
Working position	Any

Optional Accessories

	3 1/8"	4 1/2"	6 1/8"
Directional couplers at inputs and outputs (see page 137)	AC15-318	AC15-412	AC15-618
Unflanged to flanged adapters (see page 136)	TR24-125	TR30-131	TR30-126
Rack mounted	✓		



The combiner can be field retuned to any frequency within specified band

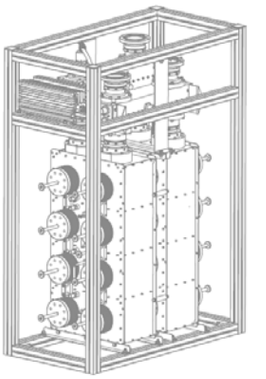
E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

DPDV-658, DPDV-668, DPDV-678

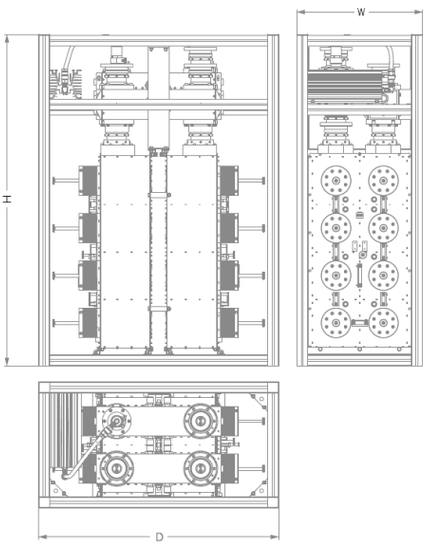
UHF DTV 8 poles CIB combiner ● ≤ 10 kW NB

Electrical Specifications

Filter type		FLDV-198 (200 mm)	
Order of the bandpass filter		8 with cross coupling	
Frequency range		470-862 MHz	
Type		Constant impedance	
Impedance		50 Ohm	
Minimum channel spacing		≥ 0	
Max. power handling (NB/WB/Output)		ISDB-T/ATSC	DVB-T/T2
	DPDV-658HS	8 / 15 / 15 kW RMS	10 / 15 / 15 kW RMS
	DPDV-668HS	8 / 25 / 25 kW RMS	10 / 25 / 25 kW RMS
	DPDV-678HS	8 / 50 / 50 kW RMS	10 / 50 / 50 kW RMS
Connectors (NB/WB/Output)			
	DPDV-658HS	3 1/8" / 3 1/8" / 3 1/8" unfl.	
	DPDV-668HS	3 1/8" / 4 1/2" / 4 1/2" unfl.	
	DPDV-678HS	3 1/8" unfl. / EIA 6 1/8" / EIA 6 1/8"	
Channel bandwidth		6, 7, 8 MHz	
VSWR		≤ 1.10:1	
Insertion Loss (NB/WB)		≤ 0.5 dB / ≤ 0.1 dB	
Isolation		≥ 35 dB	
Group delay variation		≤ 700 ns	
Thermal stability		≤ 2 kHz / °C	
Thermoswitch at EQ load		Yes	



DPDV-658HS model

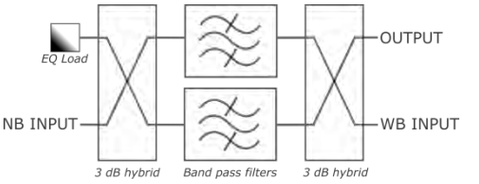


Mechanical & Environmental Specifications

Dimensions (W x D x H) (rack incl.)	
DPDV-658HS, DPDV-668HS	510 x 972 x 1343 mm
DPDV-678HS	580 x 980 x 1490 mm
Weight	169 kg, 236 kg (DPDV-678)
Temperature range	-10°C to +50°C
Working position	Any

Optional Accessories

	3 1/8"	4 1/2"	6 1/8"
Directional couplers at inputs and outputs (see page 137)	AC15-318	AC15-412	AC15-618
Unflanged to flanged adapters (see page 136)	TR24-125	TR30-131	TR30-126
Rack mounted	✓		



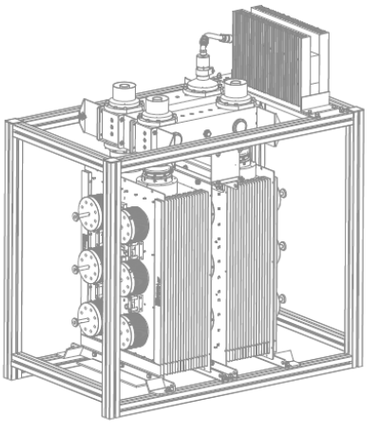
The combiner can be field retuned to any frequency within specified band

E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

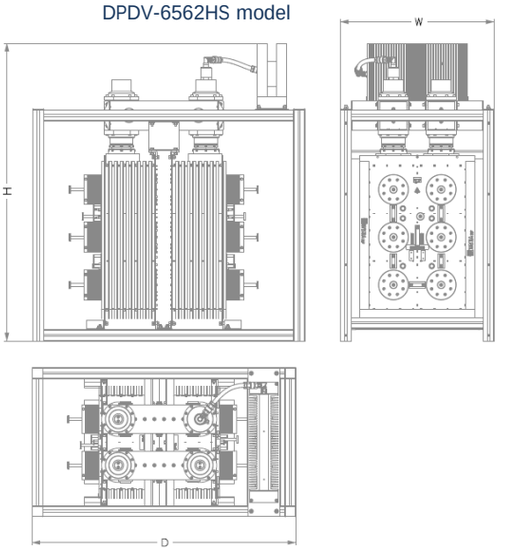
UHF DTV 6 poles CIB combiner ● 15 kW NB

Electrical Specifications

Filter type		FLDV-196HS (200 mm)
Order of the bandpass filter		6 with cross coupling
Frequency range		470-862 MHz
Type		Constant impedance
Impedance		50 Ohm
Minimum channel spacing		≥ 0
Max. power handling (NB/WB/Output)		
	DPDV-6562HS	15/15/15 kW RMS
	DPDV-6662HS	15/25/25 kW RMS
	DPDV-6762HS	15/50/50 kW RMS
Connectors (NB/WB/Output)		
	DPDV-6562HS	3 1/8" / 3 1/8" / 3 1/8" unfl.
	DPDV-6662HS	3 1/8" / 4 1/2" / 4 1/2" unfl.
	DPDV-6762HS	3 1/8" / EIA 6 1/8" / EIA 6 1/8"
Channel bandwidth		6, 7, 8 MHz
VSWR		≤ 1.10:1
Insertion Loss (NB/WB)		≤ 0.35 dB / ≤ 0.1 dB
Isolation		≥ 35 dB
Group delay variation		≤ 350 ns
Thermal stability		≤ 2 kHz / ºC
Thermoswitch at EQ load		Yes
Cooling		Heatsink



DPDV-6562HS model

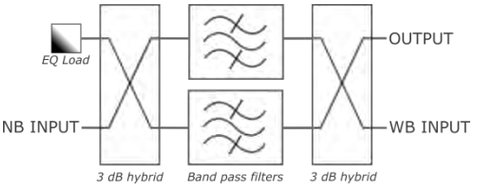


Mechanical & Environmental Specifications

Dimensions (W x D x H) (rack incl.)	
DPDV-6562HS, DPDV-6662HS	510 x 900 x 1215 mm
DPDV-6762HS	580 x 1330 x 1490 mm
Weight	195 kg (DPDV-676HS), 128 kg (rest)
Temperature range	-10°C to +50°C
Working position	Any

Optional Accessories

	3 1/8"	4 1/2"	6 1/8"
Directional couplers at inputs and outputs (see page 137)	AC15-318	AC15-412	AC15-618
Unflanged to flanged adapters (see page 136)	TR24-125	TR30-131	TR30-126
Rack mounted		√	



The combiner can be field retuned to any frequency within specified band

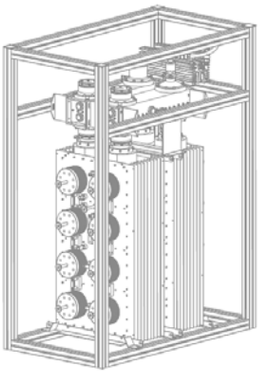
E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

DPDV-6582HS, DPDV-6682HS, DPDV-6782HS

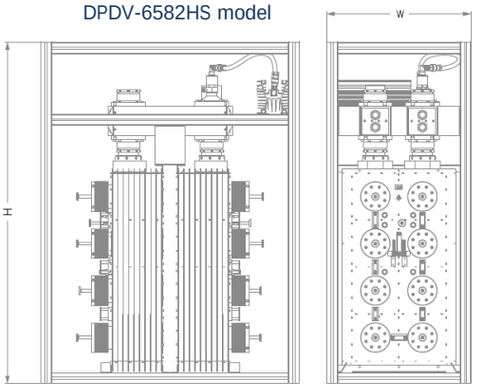
UHF DTV 8 poles CIB combiner ● ≤ 15 kW NB

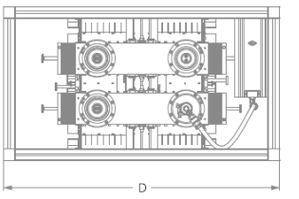
Electrical Specifications

Filter type		FLDV-198HS (200 mm)	
Order of the bandpass filter		8 with cross coupling	
Frequency range		470-862 MHz	
Type		Constant impedance	
Impedance		50 Ohm	
Minimum channel spacing		≥ 0	
Max. power handling (NB/WB/Output)		ISDB-T/ATSC	DVB-T/T2
	DPDV-6582HS	12 / 15 / 15 kW RMS	15 / 15 / 15 kW RMS
	DPDV-6682HS	12 / 25 / 25 kW RMS	15 / 25 / 25 kW RMS
	DPDV-6782HS	12 / 50 / 50 kW RMS	15 / 50 / 50 kW RMS
Connectors (NB/WB/Output)			
	DPDV-6582HS	3 1/8" / 3 1/8" / 3 1/8" unfl.	
	DPDV-6682HS	3 1/8" / 4 1/2" / 4 1/2" unfl.	
	DPDV-6782HS	3 1/8" unfl. / EIA 6 1/8" / EIA 6 1/8"	
Channel bandwidth		6, 7, 8 MHz	
VSWR		≤ 1.10:1	
Insertion Loss (NB/WB)		≤ 0.5 dB / ≤ 0.1 dB	
Isolation		≥ 35 dB	
Group delay variation		≤ 700 ns	
Thermal stability		≤ 2 kHz / °C	
Thermoswitch at EQ load		Yes	
Cooling		Heatsink	



DPDV-6582HS model



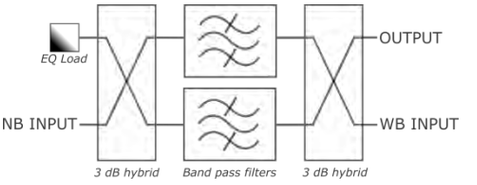


Mechanical & Environmental Specifications

Dimensions (W x D x H) (rack incl.)	
DPDV-6582HS, DPDV-6682HS	510 x 972 x 1343 mm
DPDV-6782HS	580 x 980 x 1490 mm
Weight	169 kg, 236 kg (DPDV-678HS)
Temperature range	-10°C to +50°C
Working position	Any

Optional Accessories

	3 1/8"	4 1/2"	6 1/8"
Directional couplers at inputs and outputs (see page 137)	AC15-318	AC15-412	AC15-618
Unflanged to flanged adapters (see page 136)	TR24-125	TR30-131	TR30-126
Rack mounted	✓		



The combiner can be field retuned to any frequency within specified band

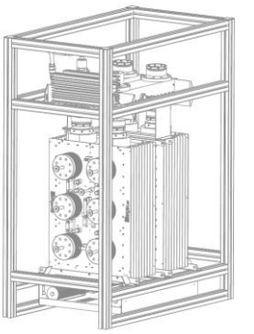
E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

DPDV-656FA, DPDV-666FA, DPDV-676FA

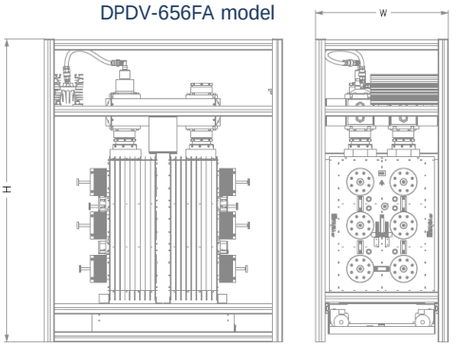
UHF DTV 6 poles CIB combiner ● ≤ 25 kW NB

Electrical Specifications

Filter type		FLDV-196FA (200 mm)	
Order of the bandpass filter		6 with cross coupling	
Frequency range		470-862 MHz	
Type		Constant impedance	
Impedance		50 Ohm	
Minimum channel spacing		≥ 0	
Max. power handling (NB/WB/Output)		ISDB-T/ATSC	DVB-T/T2
	DPDV-656FA	15/15/15 kW RMS	15/15/15 kW RMS
	DPDV-666FA	20/25/25 kW RMS	25/25/25 kW RMS
	DPDV-676FA	20/50/50 kW RMS	25/50/50 kW RMS
Connectors (NB/WB/Output)			
	DPDV-656FA	3 1/8" / 3 1/8" / 3 1/8" unfl.	
	DPDV-666FA	4 1/2" / 4 1/2" / 4 1/2" unfl.	
	DPDV-676FA	4 1/2" unfl. / EIA 6 1/8" / EIA 6 1/8"	
Channel bandwidth		6, 7, 8 MHz	
VSWR		≤ 1.10:1	
Insertion Loss (NB/WB)		≤ 0.35 dB / ≤ 0.1 dB	
Isolation		≥ 35 dB	
Group delay variation		≤ 350 ns	
Thermal stability		≤ 2 kHz / ºC	
Thermoswitch at EQ load		Yes	
Cooling		Forced air	

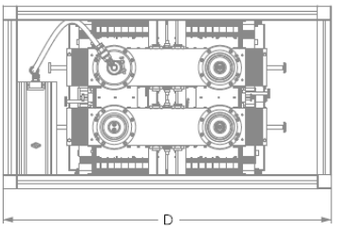


DPDV-656FA model



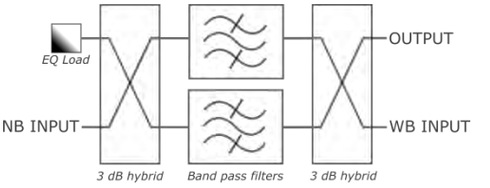
Mechanical & Environmental Specifications

Dimensions (W x D x H) (rack incl.)	
DPDV-656FA, DPDV-666FA	510 x 900 x 1215 mm
DPDV-676FA	580 x 1330 x 1490 mm
Weight	195 kg (DPDV-676FA), 128 kg (rest)
Temperature range	-10°C to +50°C
Working position	Any



Optional Accessories

	3 1/8"	4 1/2"	6 1/8"
Directional couplers at inputs and outputs (see page 137)	AC15-318	AC15-412	AC15-618
Unflanged to flanged adapters (see page 136)	TR24-125	TR30-131	TR30-126
Rack mounted	✓		



The combiner can be field retuned to any frequency within specified band

NOTES:

(1): Fan MTBF 70.000 hours

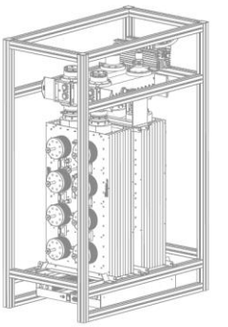
E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

DPDV-658FA, DPDV-668FA, DPDV-678FA

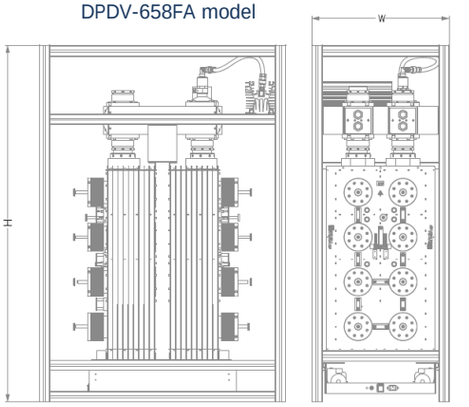
UHF DTV 8 poles CIB combiner ● ≤ 20 kW NB

Electrical Specifications

Filter type		FLDV-198FA (200 mm)	
Order of the bandpass filter		8 with cross coupling	
Frequency range		470-862 MHz	
Type		Constant impedance	
Impedance		50 Ohm	
Minimum channel spacing		≥ 0	
Max. power handling (NB/WB/Output)		ISDB-T/ATSC	DVB-T/T2
	DPDV-658FA	15 / 15 / 15 kW RMS	15 / 15 / 15 kW RMS
	DPDV-668FA	16 / 25 / 25 kW RMS	20 / 25 / 25 kW RMS
	DPDV-678FA	16 / 25 / 25 kW RMS	20 / 50 / 50 kW RMS
Connectors (NB/WB/Output)			
	DPDV-658FA	3 1/8" / 3 1/8" / 3 1/8" unfl.	
	DPDV-668FA	4 1/2" / 4 1/2" / 4 1/2" unfl.	
	DPDV-678FA	4 1/2" unfl. / EIA 6 1/8" / EIA 6 1/8"	
Channel bandwidth		6, 7, 8 MHz	
VSWR		≤ 1.10:1	
Insertion Loss (NB/WB)		≤ 0.5 dB / ≤ 0.1 dB	
Isolation		≥ 35 dB	
Group delay variation		≤ 700 ns	
Thermal stability		≤ 2 kHz / ºC	
Thermoswitch at EQ load		Yes	
Cooling		Forced air	

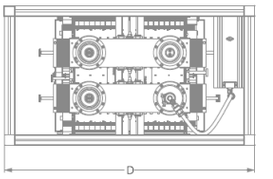


DPDV-658FA model



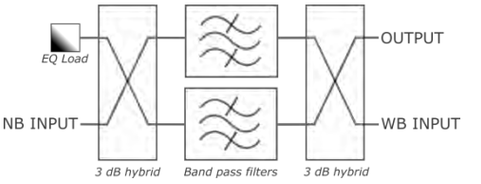
Mechanical & Environmental Specifications

Dimensions (W x D x H) (rack incl.)	
DPDV-658FA, DPDV-668FA	510 x 972 x 1343 mm
DPDV-678FA	580 x 980 x 1490 mm
Weight	169 kg, 236 kg (DPDV-678FA)
Temperature range	-10°C to +50°C
Working position	Any



Optional Accessories

	3 1/8"	4 1/2"	6 1/8"
Directional couplers at inputs and outputs (see page 137)	AC15-318	AC15-412	AC15-618
Unflanged to flanged adapters (see page 136)	TR24-125	TR30-131	TR30-126
Rack mounted	√		



The combiner can be field retuned to any frequency within specified band

NOTES:

(1): Fan MTBF 70.000 hours

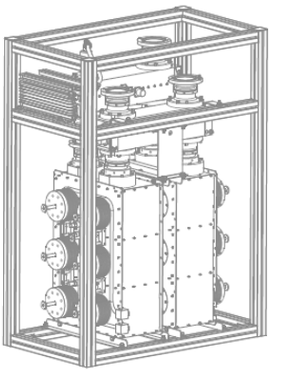
E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

DPDV-656LC, DPDV-666LC, DPDV-676LC

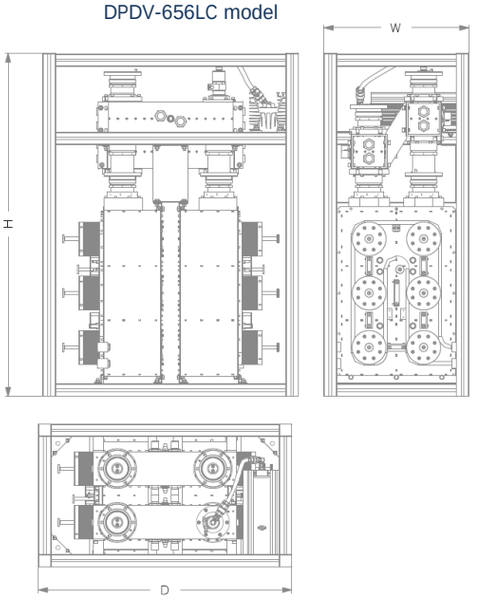
UHF DTV 6 poles CIB combiner ● ≤ 25 kW NB

Electrical Specifications

Filter type		FLDV-196LC (200 mm)	
Order of the bandpass filter		6 with cross coupling	
Frequency range		470-862 MHz	
Type		Constant impedance	
Impedance		50 Ohm	
Minimum channel spacing		≥ 0	
Max. power handling (NB/WB/Output)		ISDB-T/ATSC	DVB-T/T2
	DPDV-656LC	15/15/15 kW RMS	15/15/15 kW RMS
	DPDV-666LC	20/25/25 kW RMS	25/25/25 kW RMS
	DPDV-676LC	20/50/50 kW RMS	25/50/50 kW RMS
Connectors (NB/WB/Output)			
	DPDV-656LC	3 1/8" / 3 1/8" / 3 1/8" unfl.	
	DPDV-666LC	4 1/2" / 4 1/2" / 4 1/2" unfl.	
	DPDV-676LC	4 1/2"unfl. / EIA 6 1/8" / EIA 6 1/8"	
Channel bandwidth		6, 7, 8 MHz	
VSWR		≤ 1.10:1	
Insertion Loss (NB/WB)		≤ 0.35 dB / ≤ 0.1 dB	
Isolation		≥ 35 dB	
Group delay variation		≤ 350 ns	
Thermal stability		≤ 2 kHz / ºC	
Thermoswitch at EQ load		Yes	
Cooling		Liquid	
Flow		2 l/min	



DPDV-656LC model

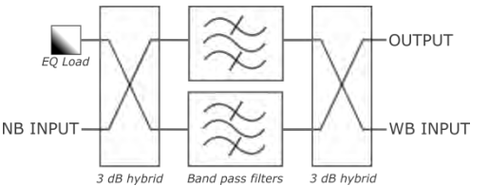


Mechanical & Environmental Specifications

Dimensions (W x D x H) (rack incl.)	
DPDV-656LC, DPDV-666LC	510 x 900 x 1215 mm
DPDV-676LC	580 x 1330 x 1490 mm
Weight	195 kg (DPDV-676LC), 128 kg (rest)
Temperature range	-10˚C to +50˚C
Working position	Any

Optional Accessories

	3 1/8"	4 1/2"	6 1/8"
Directional couplers at inputs and outputs (see page 137)	AC15-318	AC15-412	AC15-618
Unflanged to flanged adapters (see page 136)	TR24-125	TR30-131	TR30-126
Rack mounted	✓		



The combiner can be field retuned to any frequency within specified band

NOTES:

External cooling system required.

Transmitter cooling system be used if available.

Sener dedicated cooling system can be supplied.

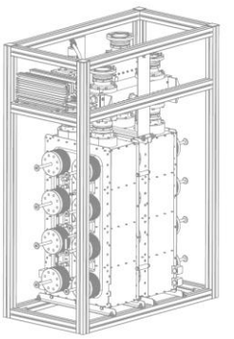
E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

DPDV-658LC, DPDV-668LC, DPDV-678LC

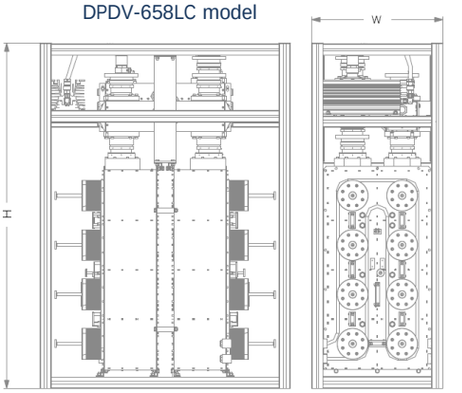
UHF DTV 8 poles CIB combiner ● ≤ 22 kW NB

Electrical Specifications

Filter type		FLDV-198LC (200 mm)	
Order of the bandpass filter		8 with cross coupling	
Frequency range		470-862 MHz	
Type		Constant impedance	
Impedance		50 Ohm	
Minimum channel spacing		≥ 0	
Max. power handling (NB/WB/Output)		ISDB-T/ATSC	DVB-T/T2
	DPDV-658LC	15 / 15 / 15 kW RMS	15 / 15 / 15 kW RMS
	DPDV-668LC	20 / 25 / 25 kW RMS	22 / 25 / 25 kW RMS
	DPDV-678LC	20 / 50 / 50 kW RMS	22 / 50 / 50 kW RMS
Connectors (NB/WB/Output)			
	DPDV-658LC	4 1/2" / 3 1/8" / 3 1/8" unfl.	
	DPDV-668LC DPDV-678LC	4 1/2" / 4 1/2" / 4 1/2" unfl. 3 1/8" unfl. / EIA 6 1/8" / EIA 6 1/8"	
Channel bandwidth		6, 7, 8 MHz	
VSWR		≤ 1.10:1	
Insertion Loss (NB/WB)		≤ 0.5 dB / ≤ 0.1 dB	
Isolation		≥ 35 dB	
Group delay variation		≤ 700 ns	
Thermal stability		≤ 2 kHz / °C	
Thermoswitch at EQ load		Yes	
Cooling		Liquid	
Flow		2 l/min	

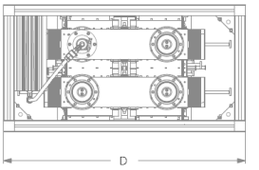


DPDV-658LC model



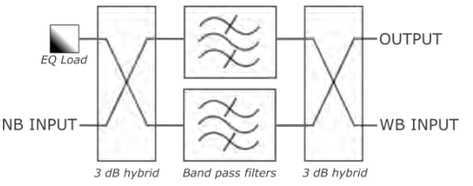
Mechanical & Environmental Specifications

Dimensions (W x D x H) (rack incl.)	
DPDV-658LC, 668LC	510 x 972 x 1343 mm
DPDV-678LC	580 x 980 x 1490 mm
Weight	169 kg, 236 kg (DPDV-678LC)
Temperature range	-10°C to +50°C
Working position	Any



Optional Accessories

	3 1/8"	4 1/2"	6 1/8"
Directional couplers at inputs and outputs (see page 137)	AC15-318	AC15-412	AC15-618
Unflanged to flanged adapters (see page 136)	TR24-125	TR30-131	TR30-126
Rack mounted	√		



The combiner can be field retuned to any frequency within specified band

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Web: https://www.group.sener/radiodifusion/

CS00-001, CS00-002

Liquid cooling system ● Especially suitable for DTV high power filters and combiners

Sener manufactures liquid cooling systems especially designed to enhance the power admission of DTV high power coaxial filters and channel combiners.

Our liquid-cooled high power DTV bandpass filters, FLDV series, are provided with a tubed cold plate integrated in the filter frame, and with the necessary thermostats. The cooling system supplies a coolant's constant flow that removes the heat from the filter body, allowing the operation at the highest RMS power handling with no impact on the radioelectrical response.

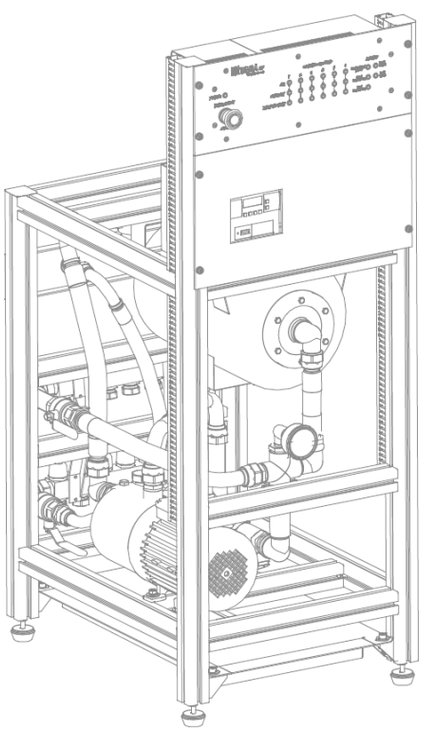
Two different models of cooling system are commercialized by Sener, CS00-001 and CS00-002.

CS00-001 consists of an external dry cooler and of a central unit, which integrates the coolant's tank, the electrical pump and a control /signalling circuit. It allows to supply liquid cooling to a maximum of twelve filters (six constant impedance cells).

CS00-002 is a simplified version, integrating the coolant's tank, the electrical pump and the dry cooler all of them within a unitized rack. This system allows to cool a maximum of four filters (two constant impedance cells).

General Specifications

	CS00-001	CS00-002
Maximum number of cooling outlets:	12 filters / 6 CIB cells	4 filters / 2 CIB cells
Coolant type	Mix of water and glycol (50% / 50%)	
Coolant's working pressure	< 5 bar	
Coolant's flow	4 l/min (2 l /min per filter)	
Hydraulic connections between central unit and filter cold plates	1/2" hose	
Power supply	230V / 50Hz, 115V / 60Hz, 230V / 60Hz	
Dissipation capacity	7.5 kW at 20ºC T_{AMB}	3.8 kW at 20ºC T_{AMB}
Temperature range	Central unit (-15ºC to +40ºC External dry cooler (-25ºC to +40ºC)	-15ºC to +40ºC



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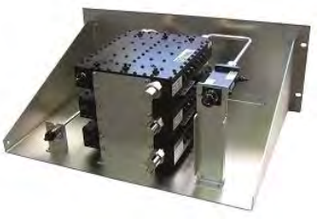
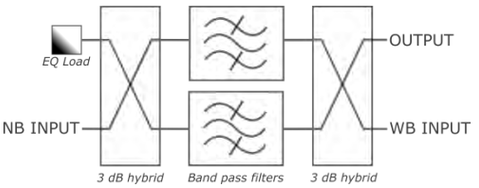
DP15-02A

UHF ATV 3-4 poles CIB combiner ● ≤ 70 W NB

Electrical Specifications

Order of the band-pass filter		3	4
Frequency range		470-862 MHz	
Type		Constant impedance	
Impedance		50 Ohm	
Recommended min. frequency spacing		2 guard channel	1 guard channel
Max. power handling (NB/WB/Output)		70/300/300 W peak sync 50/200/200 W RMS	
Input connectors		N (F)	
Output connector		N (F)	
Channel bandwidth		6, 7, 8 MHz	
VSWR	Narrowband input	≤ 1.06	
	Wideband input	≤ 1.10:1	
Insertion loss	Narrowband input (1)	≤ 0.8 dB	≤ 0.9 dB
	Wideband input	≤ 0.05 dB	
Isolation	Narrowband input	≥ 30 dB	
	Wideband input	≥ 30 dB	





Mechanical & Environmental Specifications

Dimensions (W x D x H)	252 x 43 x 152 mm
Temperature range	-10°C to +50°C
Working position	Any

NOTES:

(1): Typical specifications for 8 MHz channels. Ask Sener for other cases.

Optional accessories

Directional couplers at inputs and output
Structure to install in a 19" rack

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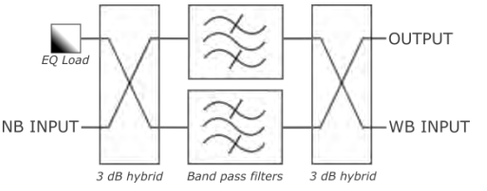
Web: https://www.group.sener/radiodifusion/

DP15-12A, DP15-340, DP15-350

UHF ATV 4 poles CIB combiner ● ≤ 2 kW NB

Electrical Specifications

Order of the bandpass filters	4	
Frequency range	470-862 MHz	
Type	Constant impedance	
Impedance	50 Ohm	
Minimum frequency spacing	2 guard channels	
Max. power handling (NB/WB/Output) DP15-12A DP15-340 DP15-350	 400/800/1200 W peak sync,280/560/840W RMS 2/7/7 kW peak sync,1.4/4.9/4.9 kW RMS 2/12/12 kW peak sync,1.4/9/9 kW RMS	
Input connectors (NB/WB) (1) DP15-12A DP15-340 DP15-350	 DIN 7/16 (F) 1 5/8" unfl. / 1 5/8" unfl. 1 5/8" unfl. / 3 1/8 unfl.	
Output connector (1) DP15-12A DP15-340 DP15-350	 DIN 7/16 (F) 1 5/8" unfl. 3 1/8" unfl.	
Channel bandwidth	6, 7, 8 MHz	
	DP15-12A	DP15-340/350
VSWR Narrowband input Wideband input	 ≤ 1.07:1 ≤ 1.20:1 (typical ≤ 1.1:1)	 ≤ 1.07:1 ≤ 1.10:1
Insertion loss	DP15-12A	DP15-340/350
Narrowband input (2)	≤ 1.2 dB (typical ≤ 0.7 dB)	≤ 0.6 dB
Wideband input	≤ 0.2 dB	≤ 0.2 dB
Isolation	DP15-12A	DP15-340/350
NB input to WB input WB input to NB input	≥ 26 dB ≥ 35 dB	≥ 30 dB ≥ 40 dB



Mechanical & Environmental Specifications

	DP15-12A	DP15-340/350
Dimensions (W x D x H)	220 x 352 x 315 mm	329 x 790 x 680 mm / 379 x 717 x 662 mm
Temperature range	-10°C to +50°C	
Working position	Any	

NOTES:

(1): Other connectors on request

(2): Typical specifications for 8 MHz channels. Ask Sener for other cases.

(3): The use of an extra filter connected to the wideband input enhances isolation between inputs, thus reducing the possible generation of inter-mod products.

Optional accessories

Directional couplers at inputs and output
Unflanged to flanged adapters at inputs and output
Band pass filter on wideband input (3)
Thermoswitch in EQ load

The combiner can be field retuned to any frequency within specified band

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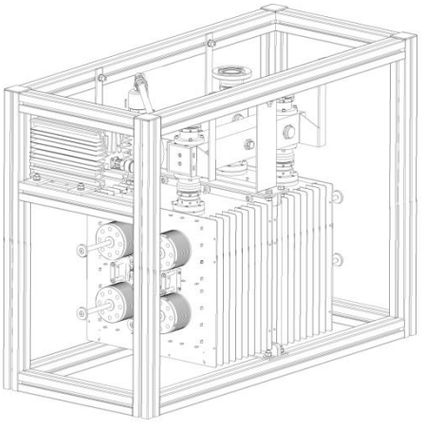
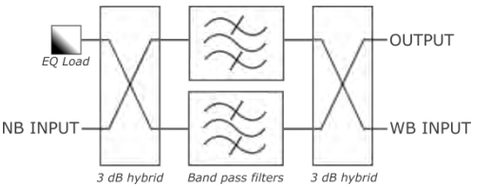
DP15-154

UHF ATV 4 poles CIB combiner ● ≤ 5 kW NB

Electrical Specifications

Order of the bandpass filter		4
Frequency range		470-862 MHz
Type		Constant impedance
Impedance		50 Ohm
Minimum frequency spacing (1)		2 guard channels
Max. power handling (NB/WB/Output) (2)		
	DP15-440	5/10/10 kW peak sync, 3.5/7/7 kW RMS
Input connectors (NB/WB)		
	DP15-440	1 5/8" Unfl. / 3 1/8" Unfl.
Output connector		
	DP15-440	3 1/8" Unfl.
Channel bandwidth		6, 7, 8 MHz
VSWR	Narrowband input	≤ 1.08:1
	Wideband input	≤ 1.10:1
Insertion loss	Narrowband input (3)	≤ 0.3 dB
	Wideband input	≤ 0.1 dB
Isolation		≥ 40 dB
Thermoswitch at EQ load		Yes





Mechanical & Environmental Specifications

Dimensions (W x D x H)	625 x 780 x 1600 mm
Temperature range	-10°C to +50°C
Working position	Any

Optional accessories

Directional couplers at inputs and output
Unflanged to flanged adapters at inputs and output
Band pass filter on wideband input (4)

The combiner can be field retuned to any frequency within specified band

NOTES:

(1): One channel frequency spacing can be achieved by sacrificing the transmission response figures.

(2): See section Environmental Conditions for an accurate application of power handling data.

(3): Typical specifications for 8 MHz channels. Ask Sener for other cases.

(4): The use of an extra filter connected to the wideband input enhances the isolation between inputs, thus reducing the possible generation of inter-mod products.

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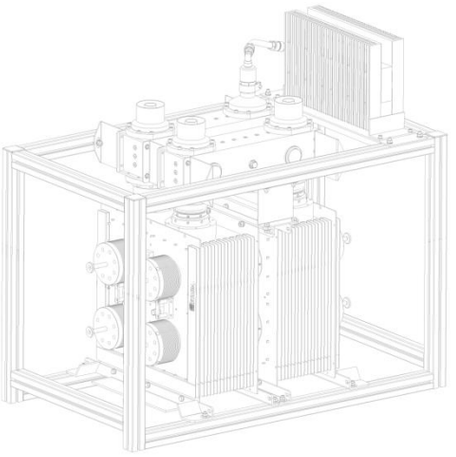
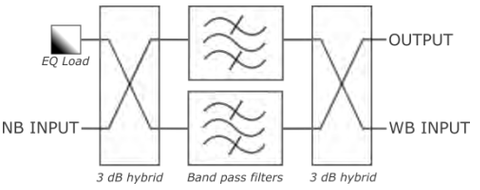
DP15-194

UHF ATV 4 poles CIB combiner ● ≤ 20 kW NB

Electrical Specifications

Order of the bandpass filter DP15-194		4
Frequency range		470-862 MHz
Type		Constant impedance
Impedance		50 Ohm
Minimum frequency spacing DP15-194 (1)		2 guard channels
Maximum power handling (NB/WB/Output)		20/40/40 kW peak sync 14/28/28 kW RMS
Input connectors (NB/WB) DP15-194		3 1/8" unfl. / 4 ½" unfl.
Output connector DP15-194		4 ½" unfl.
Channel bandwidth		6, 7, 8 MHz
VSWR	Narrowband input	≤ 1.08:1
	Wideband input	≤ 1.10:1
Insertion loss	Narrowband input (2)	≤ 0.30 dB
	Wideband input	≤ 0.15 dB
Isolation		DP15-560 (≥ 40 dB) /
Thermoswitch at EQ load		DP15-560 (Yes) /





Mechanical & Environmental Specifications

Dimensions (W x D x H) DP15-560	641 x 990 x 780 mm
Temperature range	-10°C to +50°C

Optional accessories

Directional couplers at inputs and output
Unflanged to flanged adapters at inputs
Band pass filter on wideband input (3)

The combiner can be field retuned to any frequency within specified band

NOTES:

(1): One channel frequency spacing can be achieved by sacrificing the transmission response figures.

(2): Typical specifications for 8 MHz channels. Ask Sener for other cases.

(3): The use of an extra filter connected to the wideband input enhances the isolation between inputs, thus reducing the possible generation of inter-mod products.

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DP15-121, DP15-341

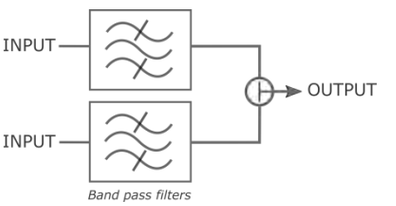
UHF ATV 3/4 poles Star-point combiner ● ≤ 1 kW NB

Electrical Specifications

Order of the bandpass filter DP15-121 DP15-341	 3 3	 4 4
Frequency range	470-862 MHz	
Type	Star-point	
Impedance	50 Ohm	
Minimum frequency spacing (1) DP15-121 DP15-341	 6 guard channels 4 guard channels	 3 guard channels 3 guard channels
Maximum power handling DP15-121 DP15-341	 2 x 200 W peak sync / 2 x 140 W RMS 2 x 1 kW peak sync / 2 x 700 kW RMS	
Input connectors DP15-121 (2) DP15-341 (3)	 DIN 7/16 F 1 5/8" unfl.	
Output connector DP15-121 DP15-341 (3)	 DIN 7/16 F 1 5/8" unfl.	
Channel bandwidth DP15-121 DP15-341	 8 MHz 6, 7, 8 MHz	
VSWR	≤ 1.07:1	
Insertion loss DP15-121 DP15-341 (4)	 ≤ 0.7 dB ≤ 0.5 dB	 ≤ 1.0 dB ≤ 0.6 dB
Isolation DP15-121 DP15-341 (4)	 ≥ 35 dB ≥ 30 dB	 ≥ 30 dB ≥ 30 dB

Mechanical & Environmental Specifications

Dimensions (W x D x H) DP15-121 DP15-341	 250 x 200 x 242 mm 468 x 720 x 523 mm	 250 x 200 x 242 mm 468 x 720 x 633 mm
Temperature range	-10°C to +50°C	
Working position	Any	



Band pass filters

NOTES:

(1): Less than 3 channels frequency spacing can be achieved by sacrifying the transmission response figures.

(2): N F connector available.

(3): Other connectors on request.

(4): Typical specifications for 8 MHz channels. Ask Sener for other cases.

Optional accessories

Directional couplers at inputs and output
Unflanged to flanged adapters at inputs and output (DP15-341)

The combiner can be field retuned to any frequency within specified band

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sener

TV VHF ANTENNA SYSTEMS

AT11-111

Band I versatile vertical polarization antenna system ● Top-mounted installation

This type of antenna system allows selection of the horizontal radiation pattern in the field that best fulfils a given application using either all or only part of the elements provided in a kit. Upon the number of elements used and the configuration installed, either directional, peanut or quasi-omnidirectional horizontal radiation patterns can be obtained.

The antenna system allows the implementation of a complete secondary low power network in a very short time. The system is top mounted by means of a supporting pipe included in the kit.

Two active and two parasitic dipoles, together with the splitter and dipole-feeding cables complete the kit.

Electrical Specifications

Frequency range	54 - 88 MHz (One model per FCC channel)		
Peak gain	Directional 7.5 dB (ref. ¤/2 dipole)	Peanut 3.5 dB (ref. ¤/2 dipole)	Quasi-omnidirectional 5.7 dB (ref. ¤/2 dipole)
Polarization	Vertical		
Impedance	50 Ohm		
VSWR	Visual: ≤ 1.22:1	Aural: ≤ 1.50	
Maximum power handling peak sync	500 W		
Maximum power handling RMS	350 W		
Connector type	DIN 7/16		
Pressurization	Non pressurized		

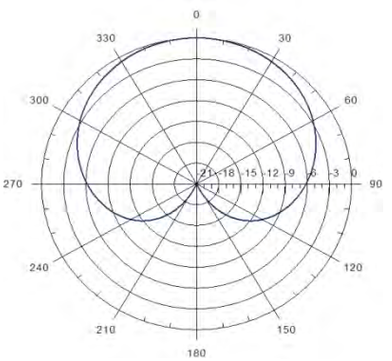
Peanut configuration

Mechanical & Environmental Specifications

Materials	Hot dip galvanized steel		
Configuration	Directional	Peanut	Quasi-omnidirectional
Aperture of radiating elements	5940 mm	2340 mm	5940 mm
Wind load @160 Km/h (including pipe)	1814 N	1322 N	1322 N
Weight	170 kg	136 kg	141 kg
Maximum wind speed	120 km/h		
Mounting	Top mounted on pipe		
Grounding	DC grounded		
Temperature range	-40°C to +80°C		
Humidity	100%		

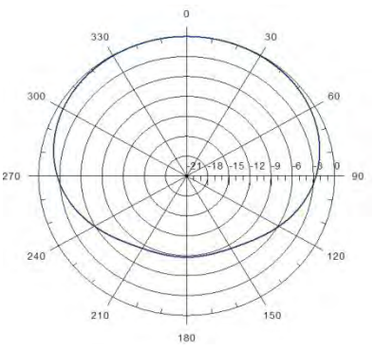
NOTE: Mechanical data supplied for the larger system, which corresponds to channel 2 FCC

DIRECTIONAL



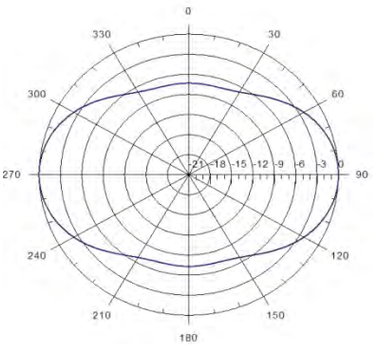
H-plane
Horizontal Pattern

QUASI-ONMI



H-plane
Horizontal Pattern

PEANUT



H-plane
Horizontal Pattern

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AT11-220

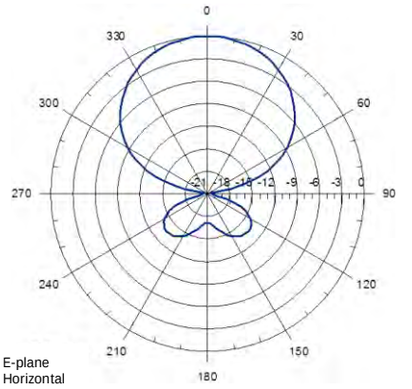
Band I 2 dipoles horizontal polarization panel ● Especially suitable for square masts

Electrical Specifications

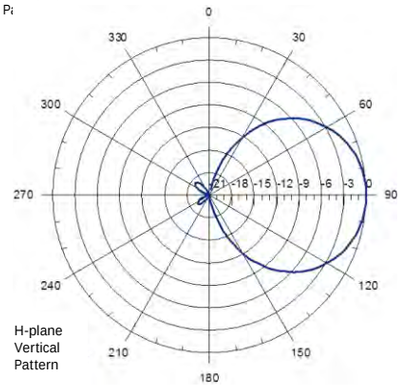
Frequency range	54 - 88 MHz		
Channels	2 - 4 FCC	3 - 5 FCC	4 - 6 FCC
	Individual FCC channels available on request		
Peak gain	7.5 dB (ref. □/2 dipole)		
3 dB beam width	E-plane: 72°	H-plane: 62°	
Polarization	Horizontal		
Impedance	50 Ohm		
VSWR	≤1.2:1		
Maximum power handling peak sync (per connector)	2 x 3 kW	2 x 6 kW	
Connector type (2 per antenna)	2 x DIN 7/16	2 x EIA 7/8"	
Pressurization	Non pressurized	Gas barrier on input connector	

Mechanical & Environmental Specifications

Channels		2 - 4 FCC	3 - 5 FCC	4 - 6 FCC
Materials	Reflector & dipoles	Hot dip galvanized steel		
	Feed points radome	Fiberglass		
Dimensions (W x D x H)		2730 x 1213 x 3630 mm	2730 x 1087 x 3380 mm	2220 x 1000 x 3000 mm
Maximum wind speed		200 km/h		
Wind load @ 160 Km/h (front)		1800 N	1747 N	1600 N
Wind load @ 160 Km/h (lateral)		925 N	905 N	790 N
Weight		102	97	85
Typical mounting		Square arrangement tower		
Vertical spacing between dipoles		2550 mm	2310 mm	2005 mm
Grounding		DC grounded		
Temperature range		-40°C to +80°C		
Humidity		100%		



E-plane
Horizontal
Pa



H-plane
Vertical
Pattern

Antenna System Characteristics (Channel 2-4 Model)

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	5.5	204	2.7 kN	3630
	3	3.7	306	3.7 kN	
	4	2.5	408	4.6 kN	
2	2	8.5	408	5.5 kN	8730
	3	6.7	612	7.3 kN	
	4	5.5	816	9.1 kN	
4	2	11.5	816	10.9 kN	18930
	3	9.8	1224	14.6 kN	
	4	8.5	1632	18.2 kN	
6	2	13.3	1224	16.4 kN	29130
	3	11.5	1836	21.9 kN	
	4	10.3	2448	27.3 kN	
8	2	14.5	1632	21.8 kN	39330
	3	12.8	2448	29.2 kN	
	4	11.5	3264	36.4 kN	

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware

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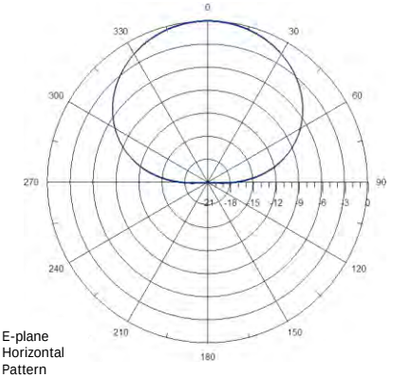
Web: https://www.group.sener/radiodifusion/

AT11-223

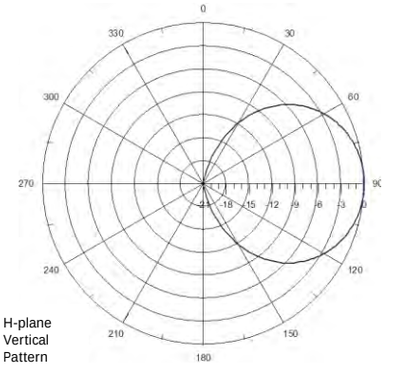
Band I 2 dipoles horizontal polarization panel ● Especially suitable for triangular masts

Electrical Specifications

Frequency range	54 – 88 MHz		
Channels	2 – 4 FCC	3 – 5 FCC	4 – 6 FCC
	Individual FCC channels available on request		
Peak gain	7.0 dB (ref. λ/2 dipole)		
3 dB beam width	E-plane: 80º	H-plane: 62º	
Polarization	Horizontal		
Impedance	50 Ohm		
VSWR	≤1.2:1		
Maximum power handling peak sync (per connector)	2 x 3 kW	2 x 6 kW	
Connector type (2 per antenna)	2 x DIN 7/16	2 x EIA 7/8"	
Pressurization	Non pressurized	Gas barrier on input connector	



E-plane Horizontal Pattern



H-plane Vertical Pattern

Mechanical & Environmental Specifications

Channels		2 – 4 FCC	3 – 5 FCC	4 – 6 FCC
Materials	Reflector & dipoles	Hot dip galvanized steel		
	Feed points radome	Fiberglass		
Dimensions (W x D x H)		2730 x 1425 x 3630 mm	2730 x 1313 x 3380 mm	2220 x 1208 x 3000 mm
Maximum wind speed		200 km/h		
Wind load @ 160 Km/h (front)		1793 N	1740 N	1593 N
Wind load @ 160 Km/h (lateral)		922 N	902 N	792 N
Weight		98	94	84
Typical mounting		Triangular arrangement tower		
Vertical spacing between dipoles		2550 mm	2310 mm	2005 mm
Grounding		DC grounded		
Temperature range		-40°C to +80°C		
Humidity		100%		

Antenna System Characteristics (Channel 2-4 Model)

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 Km/h)	System height (mm)
1	2	4.0	196	3.5 kN	3630
	3	2.2	294	5.2 kN	
2	2	7.0	392	7.0 kN	8730
	3	5.2	588	10.4 kN	
4	2	10.0	784	13.9 kN	18930
	3	8.3	1176	20.7 kN	
6	2	11.8	1176	20.9 kN	29130
	3	10.0	1764	31.1 kN	
8	2	13.0	1568	27.9 kN	39330
	3	11.3	2352	41.4 kN	

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

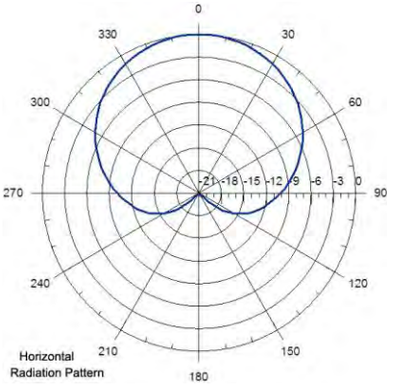
E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

AT11-303

Band I 2 crossed dipoles circular/elliptical polarization panel ● Especially suitable for triangular masts

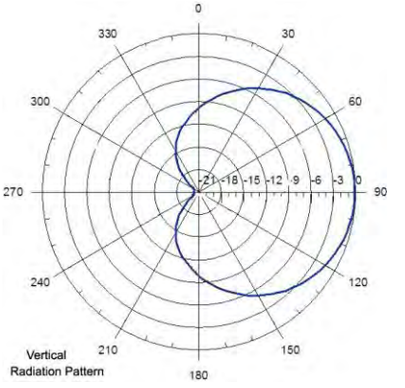
Electrical Specifications

Frequency range	54-88 MHz		
Peak gain	4.5 dB (ref. □/2 dipole) (circular polarization)		
3 dB beam width	E-plane: 92°	H-plane: 92°	
Polarization	Circular/ elliptical		
Impedance	50 Ohm		
VSWR	≤1.1:1 (with circular polarization)		
Maximum power handling peak sync. (per connector)	6 kW (3 kW)	10 kW (6 kW)	22 kW (11 kW)
Connector type (2 per antenna)	2 x DIN 7/16	2 x EIA 7/8"	2 x DIN 13/30
Pressurization	Non pressurized	Gas barrier on input connector Fully pressurized as an option	



Mechanical & Environmental Specifications (Channel 4)

Materials	Hot dip galvanized steel
Dimensions (W x D x H)	2590 x 1351 x 2590 mm
Maximum wind speed	200 km/h
Wind load (front)	1600 N (@160 km/h)
Wind load (lateral)	610 N (@160 km/h)
Weight	110 kg
Typical mounting	Triangular arrangement tower
Clamp type	To Ø 80 – 115 mm pipe
Vertical spacing	4200 mm typical
Grounding	DC grounded
Temperature range	-40°C to +80°C
Humidity	100%



Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	1.8	220	2.9 kN	2590
	3	0.1	330	4.3 kN	
2	2	4.8	440	5.9 kN	6790
	3	3.1	660	8.5 kN	
4	2	7.8	880	11.7 kN	15190
	3	6.1	1320	17.1 kN	
6	2	9.6	1320	17.6 kN	23590
	3	7.8	1980	25.5 kN	
8	2	10.8	1760	23.4 kN	31990
	3	9.1	2640	34.1 kN	

NOTES:

- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

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AT13-111

Band III versatile vertical polarization antenna system ● Top-mounted installation

This type of antenna system allows selection of the horizontal radiation pattern in the field that best fulfils a given application using either all or only part of the elements provided in a kit. Upon the number of elements used and the configuration installed, either directional, peanut or quasi-omnidirectional horizontal radiation patterns can be obtained.

The antenna system allows the implementation of a complete secondary low power network in a very short time. The system is top mounted by means of a supporting pipe included in the kit.

Two active and two parasitic dipoles, together with the splitter and dipole-feeding cables complete the kit.

Electrical Specifications

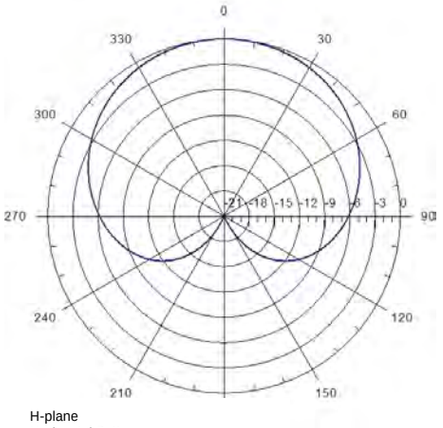
Frequency range	174-216 MHz		
Peak gain	Directional 7.5 dB (ref. □/2 dipole)	Peanut 3.5 dB (ref. □/2 dipole)	Quasi-omnidirectional 5.7 dB (ref. □/2 dipole)
Polarization	Vertical		
Impedance	50 Ohm		
VSWR	≤1.3:1		
Maximum power handling peak sync	500 W		
Maximum power handling RMS	350 W		
Connector type	DIN 7/16		
Pressurization	Non pressurized		

Directional configuration

Mechanical & Environmental Specifications

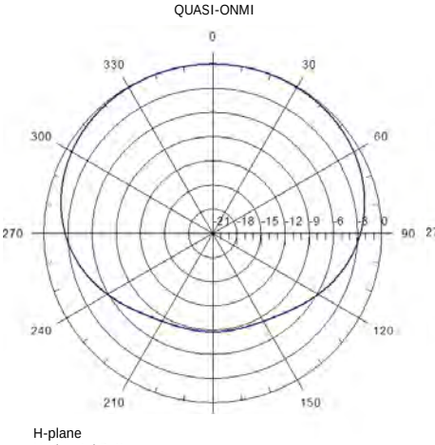
Materials	Hot dip galvanized steel		
Configuration	Directional	Peanut	Quasi-omnidirectional
Aperture of radiating elements	2230 mm	750 mm	2230 mm
Wind load @160 Km/h (including pipe)	1760 N	770 N	770 N
Weight	127 kg	118 kg	118 kg
Maximum wind speed	120 km/h		
Mounting	Top mounted on pipe		
Grounding	DC grounded		
Temperature range	-40°C to +80°C		
Humidity	100%		

DIRECTIONAL



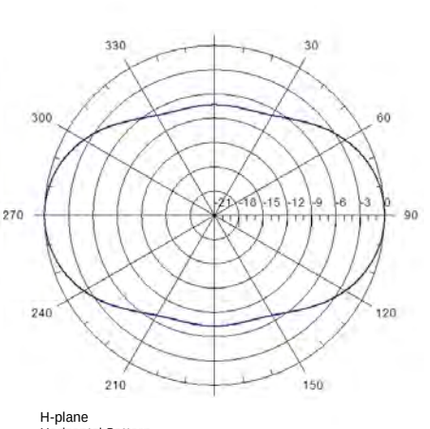
H-plane
Horizontal Pattern

QUASI-ONMI



H-plane
Horizontal Pattern

PEANUT



H-plane
Horizontal Pattern

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AT13-220

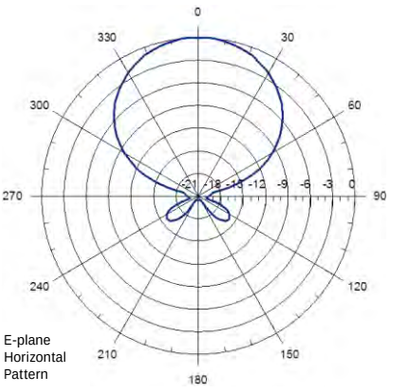
Band III 2 dipoles horizontal polarization panel ● Especially suitable for square masts

Electrical Specifications

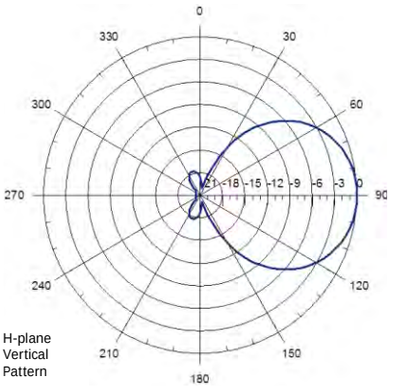
Frequency range	174-230 MHz		
Peak gain	7.5 dB (ref. □/2 dipole)		
3 dB beam width	E-plane: 69º	H-plane: 59º	
Polarization	Horizontal		
Impedance	50 Ohm		
VSWR	≤1.15:1		
Maximum power handling peak sync	2 kW	3.5 kW	6 kW
Maximum power handling RMS	1.4 kW	2.5 kW	4.2 kW
Connector type	DIN 7/16	EIA 7/8"	DIN 13/30
Pressurization	Non pressurized	Gas barrier on input connector	

Mechanical & Environmental Specifications

Materials	Reflector & dipoles Feed points radome	Hot dip galvanized steel Fiberglass
Dimensions (W x D x H)		1250 x 500 x 1300 mm
Maximum wind speed		200 km/h
Wind load (front)		793 N (@160 km/h)
Wind load (lateral)		392 N (@160 km/h)
Weight		38 Kg
Typical mounting		Square arrangement tower
Clamp type		To Ø 80 - 115 mm pipe
Vertical spacing		1600 mm
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%



E-plane
Horizontal
Pattern



H-plane
Vertical
Pattern

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	5.5	76	1.2 kN	1300
	3	3.7	114	1.6 kN	
	4	2.5	152	2.0 kN	
2	2	8.5	152	2.4 kN	2900
	3	6.7	228	3.2 kN	
	4	5.5	304	3.9 kN	
4	2	11.5	304	4.7 kN	6100
	3	9.7	456	6.3 kN	
	4	8.5	608	7.9 kN	
6	2	13.3	456	7.1 kN	9300
	3	11.5	684	9.5 kN	
	4	10.3	912	11.8 kN	
8	2	14.5	608	9.5 kN	12500
	3	12.7	912	12.6 kN	
	4	11.5	1216	15.8 kN	

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware

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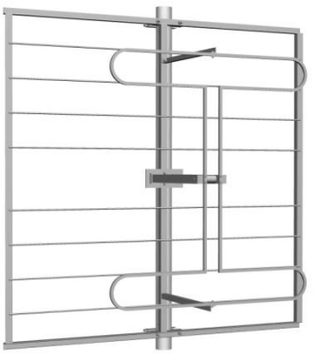
AT13-222

Band III 2 dipoles horizontal polarization panel ● Especially suitable for square masts
Light construction

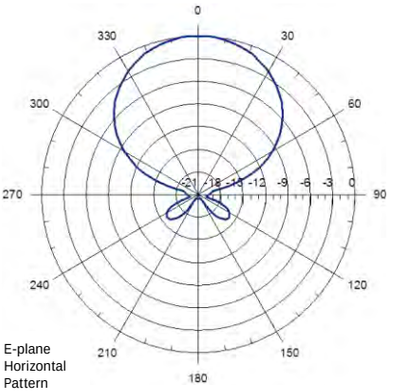
Electrical Specifications

Frequency range	174-230 MHz	
Peak gain	7.5 dB (ref. □/2 dipole)	
3 dB beam width	E-plane: 66°	H-plane: 61°
Polarization	Horizontal	
Impedance	50 Ohm	
VSWR	≤ 1.15:1	
Maximum power handling peak sync	2 kW	
Maximum power handling RMS	1.4 kW	
Connector type	DIN 7/16	
Pressurization	Non pressurized	

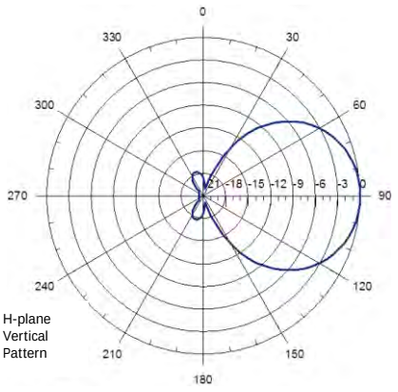


Mechanical & Environmental Specifications

Materials	Reflector & dipoles	Hot dip galvanized steel (aluminium construction as option)
	Isolators	PTFE
Dimensions (W x D x H)		1200 x 440 x 1200 mm
Maximum wind speed		200 km/h
Wind load (front)		455 N (@160 km/h)
Wind load (lateral)		240 N (@160 km/h)
Weight		15 kg
Typical mounting		Square arrangement tower
Clamp type		To Ø 50 - 70 mm pipe
Vertical spacing		1600 mm
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%



E-plane
Horizontal
Pattern



H-plane
Vertical
Pattern

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	5.5	30	0.7 kN	1200
	3	3.7	45	0.9 kN	
	4	2.5	60	1.2 kN	
2	2	8.5	60	1.4 kN	2800
	3	6.7	90	1.9 kN	
	4	5.5	120	2.3 kN	
4	2	11.5	120	2.8 kN	6000
	3	9.7	180	3.7 kN	
	4	8.5	240	4.7 kN	
6	2	13.3	180	4.2 kN	9200
	3	11.5	270	5.6 kN	
	4	10.3	360	7.0 kN	
8	2	14.5	240	5.6 kN	12400
	3	12.7	360	7.5 kN	
	4	11.5	480	9.3 kN	

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

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AT13-222R

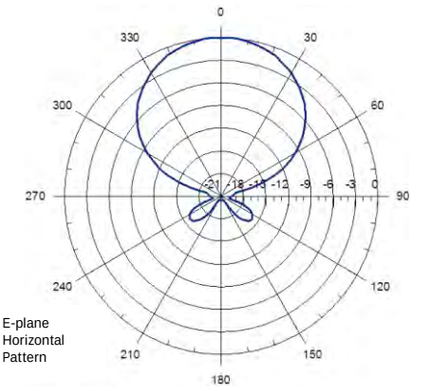
Band III 2 dipoles horizontal polarization panel ● Especially suitable for square masts
For extreme weather conditions (radome protected)

Electrical Specifications

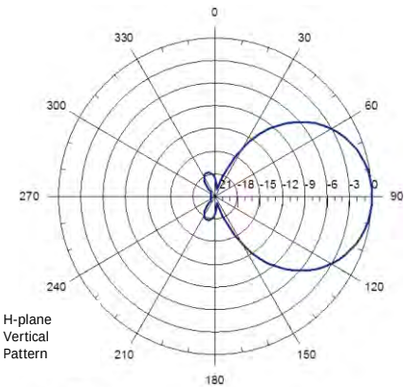
Frequency range	174-230 MHz	
Peak gain	7.5 dB (ref. □/2 dipole)	
3 dB beam width	E-plane: 66º	H-plane: 61º
Polarization	Horizontal	
Impedance	50 Ohm	
VSWR	≤1.15:1	
Maximum power handling peak sync	2 kW	
Maximum power handling RMS	1.4 kW	
Connector type	DIN 7/16	
Pressurization	Non pressurized	

Mechanical & Environmental Specifications

Materials	Radome Reflector & dipoles Isolators	Fiberglass Aluminium PTFE
Dimensions (W x D x H)		1210 x 520 x 1210 mm
Maximum wind speed		200 km/h
Wind load (front)		1680 N (@160 km/h)
Wind load (lateral)		860 N (@160 km/h)
Weight		32 kg
Typical mounting		Square arrangement tower
Clamp type		To Ø 80 - 115 mm pipe
Vertical spacing		1600 mm
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%



E-plane
Horizontal
Pattern



H-plane
Vertical
Pattern

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	5.5	64	2.5 kN	1210
	3	3.7	96	3.4 kN	
	4	2.5	128	3.9 kN	
2	2	8.5	128	5.0 kN	2810
	3	6.7	192	6.8 kN	
	4	5.5	256	7.8 kN	
4	2	11.5	256	10.0 kN	6010
	3	9.7	384	13.6 kN	
	4	8.5	512	15.6 kN	
6	2	13.3	384	15.0 kN	9210
	3	11.5	576	20.4 kN	
	4	10.3	768	23.4 kN	
8	2	14.5	512	20.0 kN	12410
	3	12.7	768	27.2 kN	
	4	11.5	1024	31.2 kN	

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware

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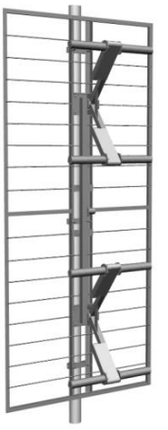
AT13-240

cBand III 4 dipoles horizontal polarization panel ● Especially suitable for square masts

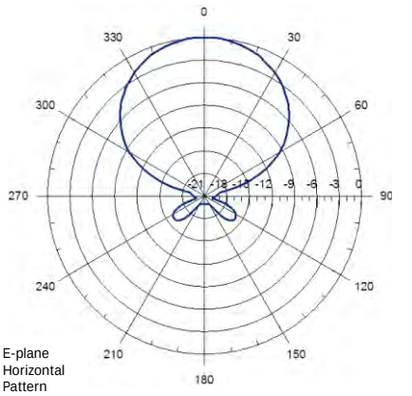
Electrical Specifications

Frequency range	174-230 MHz		
Peak gain	10.5 dB (ref. ¤/2 dipole)		
3 dB beam width	E-plane: 69º	H-plane: 25º	
Polarization	Horizontal		
Impedance	50 Ohm		
VSWR	≤1.1:1		
Maximum power handling peak sync	2 kW	3.5 kW	6 kW
Maximum power handling RMS	1.4 kW	2.5 kW	4.2 kW
Connector type	DIN 7/16	EIA 7/8"	DIN 13/30
Pressurization	Non pressurized	Gas barrier on input connector	

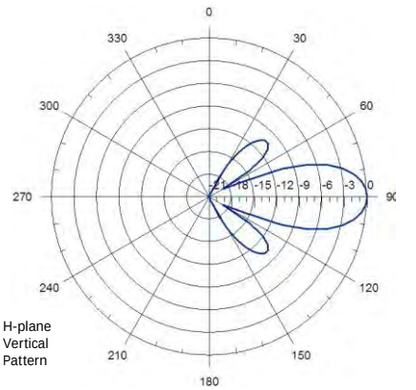


Mechanical & Environmental Specifications

Materials	Reflector & dipoles Feed points radome	Hot dip galvanized steel Fiberglass
Dimensions (W x D x H)		1250 x 500 x 2900 mm
Maximum wind speed		200 km/h
Wind load (front)		1590 N (@160 km/h)
Wind load (lateral)		950 N (@160 km/h)
Weight		68 Kg
Typical mounting		Square arrangement tower
Clamp type		To Ø 80 - 115 mm pipe
Vertical spacing		3200 mm
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%



E-plane Horizontal Pattern



H-plane Vertical Pattern

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	8.5	136	2.5 kN	2900
	3	6.7	204	3.5 kN	
	4	5.5	272	4.3 kN	
2	2	11.5	272	5.1 kN	6100
	3	9.7	408	7.0 kN	
	4	8.5	544	8.5 kN	
4	2	14.5	544	10.1 kN	12500
	3	12.7	816	13.9 kN	
	4	11.5	1088	17.1 kN	
6	2	16.3	816	15.2 kN	18900
	3	14.5	1224	20.9 kN	
	4	13.3	1632	25.6 kN	
8	2	17.5	1088	20.2 kN	25300
	3	15.7	1632	27.8 kN	
	4	14.5	2176	34.2 kN	

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

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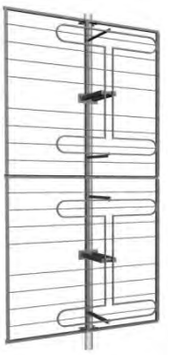
AT13-242

Band III 4 dipoles horizontal polarization panel ● Especially suitable for square masts
Light construction

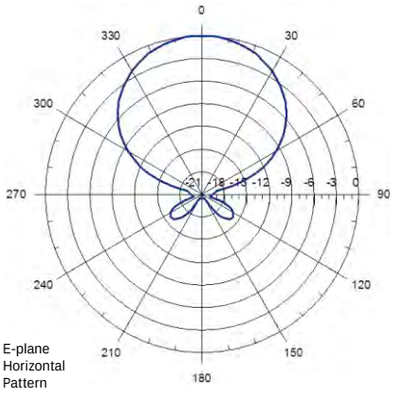
Electrical Specifications

Frequency range	174-230 MHz	
Peak gain	10.5 dB (ref. □/2 dipole)	
3 dB beam width	E-plane: 66º	H-plane: 30º
Polarization	Horizontal	
Impedance	50 Ohm	
VSWR	≤1.15:1	
Maximum power handling peak sync	2 kW	
Maximum power handling RMS	1.4 kW	
Connector type	DIN 7/16	
Pressurization	Non pressurized	

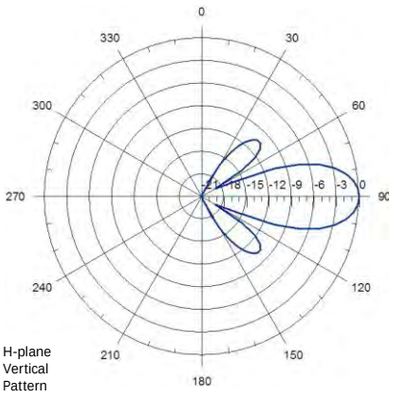


Mechanical & Environmental Specifications

Materials	Reflector & dipoles	Hot dip galvanized steel (aluminium construction as option)
	Isolators	PTFE
Dimensions (W x D x H)	1200 x 440 x 2700 mm	
Maximum wind speed	200 km/h	
Wind load (front)	915 N (@160 km/h)	
Wind load (lateral)	505 N (@160 km/h)	
Weight	33 Kg	
Typical mounting	Square arrangement tower	
Clamp type	To Ø 50 - 70 mm pipe	
Vertical spacing	3200 mm	
Grounding	DC grounded	
Temperature range	-40°C to +80°C	
Humidity	100%	



E-plane
Horizontal
Pattern



H-plane
Vertical
Pattern

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 Km/h)	System height (mm)
1	2	8.5	66	1.4 kN	2700
	3	6.7	99	1.9 kN	
	4	5.5	132	2.4 kN	
2	2	11.5	132	2.8 kN	5900
	3	9.7	198	3.9 kN	
	4	8.5	264	4.8 kN	
4	2	14.5	264	5.7 kN	12300
	3	12.7	396	7.7 kN	
	4	11.5	528	9.5 kN	
6	2	16.3	396	8.5 kN	18700
	3	14.5	594	11.6 kN	
	4	13.3	792	14.3 kN	
8	2	17.5	528	11.4 kN	25100
	3	15.7	792	15.4 kN	
	4	14.5	1056	19.1 kN	

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

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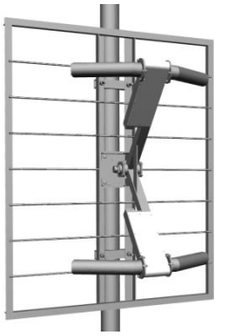
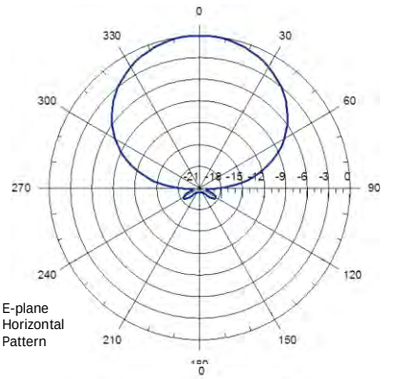
AT13-223

Band III 2 dipoles horizontal polarization panel ● Especially suitable for triangular masts

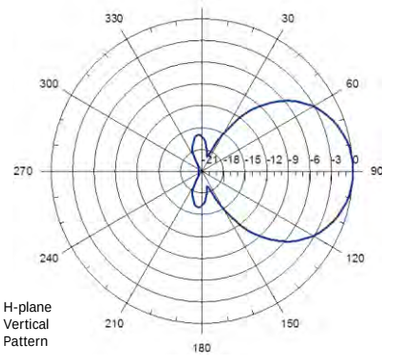
Electrical Specifications

Frequency range	174-230 MHz		
Peak gain	7 dB (ref. □/2 dipole)		
3 dB beam width	E-plane: 78°	H-plane: 58°	
Polarization	Horizontal		
Impedance	50 Ohm		
VSWR	≤1.15:1		
Maximum power handling peak sync	2 kW	3.5 kW	6 kW
Maximum power handling RMS	1.4 kW	2.5 kW	4.2 kW
Connector type	DIN 7/16	EIA 7/8"	DIN 13/30
Pressurization	Non pressurized	Gas barrier on input connector	





E-plane Horizontal Pattern



H-plane Vertical Pattern

Mechanical & Environmental Specifications

Materials	Reflector & dipoles Feed points radome	Hot dip galvanized steel Fiberglass
Dimensions (W x D x H)		1000 x 530 x 1300 mm
Maximum wind speed		200 km/h
Wind load (front)		664 N (@160 km/h)
Wind load (lateral)		488 N (@160 km/h)
Weight		36 kg
Typical mounting		Triangular arrangement tower
Clamp type		To Ø 80 – 115 mm pipe
Vertical spacing		1600 mm
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	4.0	72	1.5 kN	1300
	3	2.2	108	2.2 kN	
2	2	7.0	144	3.0 kN	2900
	3	5.2	216	4.3 kN	
4	2	10.0	288	6.0 kN	6100
	3	8.3	432	8.7 kN	
6	2	11.8	432	9.1 kN	9300
	3	10.0	648	13.0 kN	
8	2	13.0	576	12.1 kN	12500
	3	11.3	864	17.4 kN	

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

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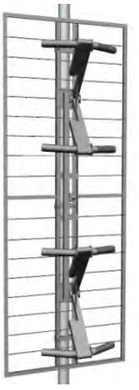
AT13-243

Band III 4 dipoles horizontal polarization panel ● Especially suitable for triangular masts

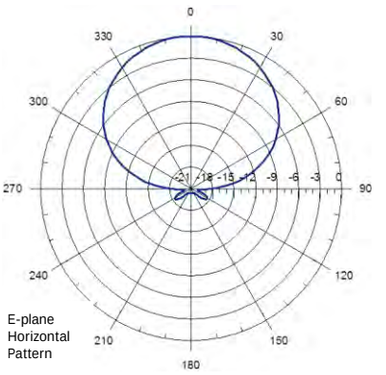
Electrical Specifications

Frequency range	174-230 MHz		
Peak gain	10 dB (ref. □/2 dipole)		
3 dB beam width	E-plane: 78°	H-plane: 26°	
Polarization	Horizontal		
Impedance	50 Ohm		
VSWR	≤1.1:1		
Maximum power handling peak sync	2 kW	3.5 kW	6 kW
Maximum power handling RMS	1.4 kW	2.5 kW	4.2 kW
Connector type	DIN 7/16	EIA 7/8"	DIN 13/30
Pressurization	Non pressurized	Gas barrier on input connector	

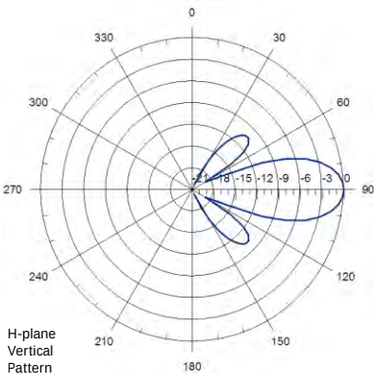


Mechanical & Environmental Specifications

Materials	Reflector & dipoles Feed points radome	Hot dip galvanized steel Fiberglass
Dimensions (W x D x H)		1000 x 530 x 2900 mm
Maximum wind speed		200 km/h
Wind load (front)		1465 N (@160 km/h)
Wind load (lateral)		976 N (@160 km/h)
Weight		65 kg
Typical mounting		Triangular arrangement tower
Clamp type		To Ø 80 – 115 mm pipe
Vertical spacing		3200 mm
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%



E-plane Horizontal Pattern



H-plane Vertical Pattern

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	7.0	130	3.2 kN	2900
	3	5.2	195	4.6 kN	
2	2	10.0	260	6.3 kN	6100
	3	8.2	390	9.2 kN	
4	2	13.0	520	12.6 kN	12500
	3	11.3	780	18.5 kN	
6	2	14.8	780	18.9 kN	18900
	3	13.0	1170	27.7 kN	
8	2	16.0	1040	25.2 kN	25300
	3	14.3	1560	37.0 kN	

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware

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AT13-221

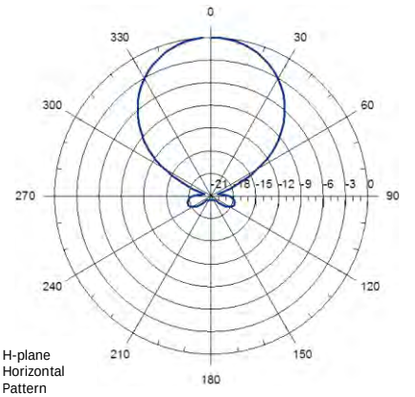
Band III 2 dipoles vertical polarization panel ● Especially suitable for square masts

Electrical Specifications

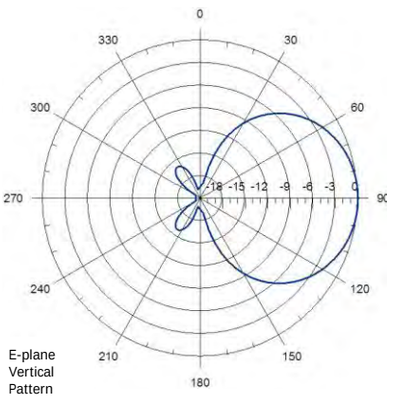
Frequency range	174-230 MHz		
Peak gain	7.5 dB (ref. ▫/2 dipole)		
3 dB beam width	E-plane: 69º	H-plane: 59º	
Polarization	Vertical		
Impedance	50 Ohm		
VSWR	≤ 1.15:1		
Maximum power handling peak sync	2 kW	3.5 kW	6 kW
Maximum power handling RMS	1.4 kW	2.5 kW	4.2 kW
Connector type	DIN 7/16	EIA 7/8"	DIN 13/30
Pressurization	Non pressurized	Gas barrier on input connector	

Mechanical & Environmental Specifications

Materials	Reflector & dipoles Feed points radome	Hot dip galvanized steel Fiberglass
Dimensions (W x D x H)		1300 x 500 x 1250 mm
Maximum wind speed		200 km/h
Wind load (front)		793 N (@160 km/h)
Wind load (lateral)		392 N (@160 km/h)
Weight		38 kg
Typical mounting		Square arrangement tower
Clamp type		To Ø 80 - 115 mm pipe
Vertical spacing		1600 mm
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%



H-plane
Horizontal
Pattern



E-plane
Vertical
Pattern

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	4.5	76	1.2 kN	1250
	3	2.7	114	1.6 kN	
	4	1.5	152	2.0 kN	
2	2	7.5	152	2.4 kN	2850
	3	5.7	228	3.2 kN	
	4	4.5	304	3.9 kN	
4	2	10.5	304	4.7 kN	6050
	3	8.7	456	6.3 kN	
	4	7.5	608	7.9 kN	
6	2	12.3	456	7.1 kN	9250
	3	10.5	684	9.5 kN	
	4	9.3	912	11.8 kN	
8	2	13.5	608	9.5 kN	12450
	3	11.7	912	12.6 kN	
	4	10.5	1216	15.8 kN	

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

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AT13-227

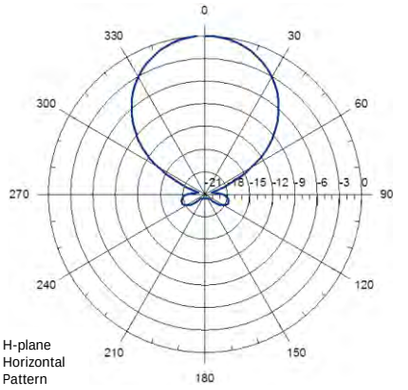
Band III 2 dipoles vertical polarization panel ● Especially suitable for square masts
Light construction

Electrical Specifications

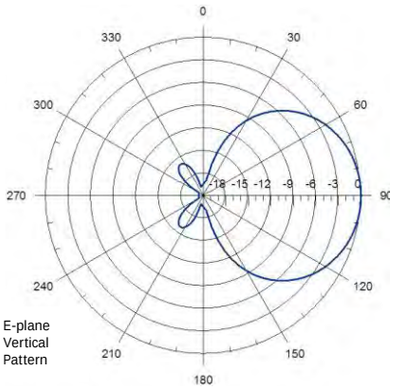
Frequency range	174-230 MHz	
Peak gain	7.5 dB (ref. □/2 dipole)	
3 dB beam width	E-plane: 66º	H-plane: 61º
Polarization	Vertical	
Impedance	50 Ohm	
VSWR	≤1.15:1	
Maximum power handling peak sync	2 kW	
Maximum power handling RMS	1.4 kW	
Connector type	DIN 7/16	
Pressurization	Non pressurized	

Mechanical & Environmental Specifications

Materials	Reflector & dipoles Feed points radome	Hot dip galvanized steel (Aluminium construction as option) PTFE
Dimensions (W x D x H)		1200 x 440 x 1200 mm
Maximum wind speed		200 km/h
Wind load (front)		455 N (@160 km/h)
Wind load (lateral)		240 N (@160 km/h)
Weight		15 kg
Typical mounting		Square arrangement tower
Clamp type		To Ø 50 – 70 mm pipe
Vertical spacing		1600 mm
Grounding		DC grounded
Temperature range		-40˚C to +80˚C
Humidity		100%



H-plane
Horizontal
Pattern



E-plane
Vertical
Pattern

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	4.5	30	0.7 kN	1200
	3	2.7	45	0.9 kN	
	4	1.5	60	1.2 kN	
2	2	7.5	60	1.4 kN	2800
	3	5.7	90	1.9 kN	
	4	4.5	120	2.3 kN	
4	2	10.5	120	2.8 kN	6000
	3	8.7	180	3.7 kN	
	4	7.5	240	4.7 kN	
6	2	12.3	180	4.2 kN	9200
	3	10.5	270	5.6 kN	
	4	9.3	360	7.0 kN	
8	2	13.5	240	5.6 kN	12400
	3	11.7	360	7.5 kN	
	4	10.5	480	9.3 kN	

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

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AT13-227R

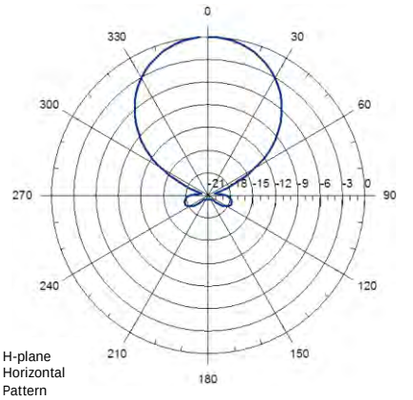
Band III 2 dipoles vertical polarization panel ● Especially suitable for square masts
For extreme weather conditions (radome protected)

Electrical Specifications

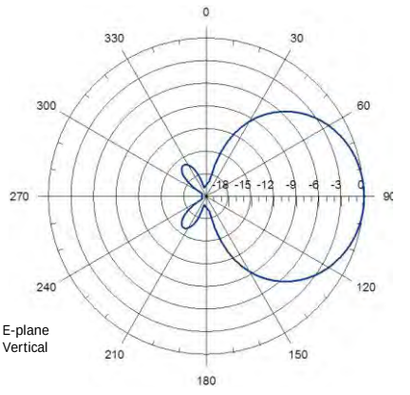
Frequency range	174-230 MHz	
Peak gain	7.5 dB (ref. ▫/2 dipole)	
3 dB beam width	E-plane: 66°	H-plane: 61°
Polarization	Vertical	
Impedance	50 Ohm	
VSWR	▫▫1.15:1	
Maximum power handling peak sync	2 kW	
Maximum power handling RMS	1.4 kW	
Connector type	DIN 7/16	
Pressurization	Non pressurized	

Mechanical & Environmental Specifications

Materials	Radome Reflector & dipoles Isolators	Fiberglass Aluminium PTFE
Dimensions (W x D x H)		1210 x 520 x 1210 mm
Maximum wind speed		200 km/h
Wind load (front)		1680 N (@160 km/h)
Wind load (lateral)		860 N (@160 km/h)
Weight		32 Kg
Typical mounting		Square arrangement tower
Clamp type		To Ø 80 - 115 mm pipe
Vertical spacing		1600 mm
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%



H-plane
Horizontal
Pattern



E-plane
Vertical

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	4.5	64	2.5 kN	1210
	3	2.7	96	3.4 kN	
	4	1.5	128	3.9 kN	
2	2	7.5	128	5.0 kN	2810
	3	5.7	192	6.8 kN	
	4	4.5	256	7.8 kN	
4	2	10.5	256	10.0 kN	6010
	3	8.7	384	13.6 kN	
	4	7.5	512	15.6 kN	
6	2	12.3	384	15.0 kN	9210
	3	10.5	576	20.4 kN	
	4	9.3	768	23.4 kN	
8	2	13.5	512	20.0 kN	12410
	3	11.7	768	27.2 kN	
	4	10.5	1024	31.2 kN	

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware

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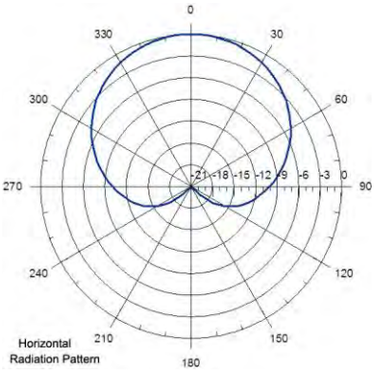
AT13-303

Band III 2 crossed dipoles circular/elliptical polarization panel ● Especially suitable for triangular masts

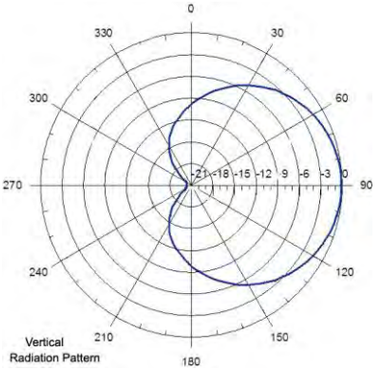
Electrical Specifications

Frequency range	174 - 216 MHz		
Peak gain	4.2 dB (ref. ¤/2 dipole) (circular polarization)		
3 dB beam width	E-plane: 85°	H-plane: 85°	
Polarization	Circular/Elliptical		
Impedance	50 Ohm		
VSWR	≤1.1:1 (with circular polarization)		
Maximum power handling peak sync.	2 kW	3.5 kW	6 kW
Maximum power handling RMS	1.4 kW	2.5 kW	4.2 kW
Connector type (2 per antenna)	2 x DIN 7/16	2 x EIA 7/8"	2 x DIN 13/30
Pressurization	Non pressurized	Gas barrier on input connector	



Mechanical & Environmental Specifications

Materials	Hot dip galvanized steel
Dimensions (W x D x H)	960 x 602 x 960 mm
Maximum wind speed	200 km/h
Wind load (front)	610 N (@160 km/h)
Wind load (lateral)	473 N (@160 km/h)
Weight	35 kg
Typical mounting	Triangular arrangement tower
Clamp type	To Ø 80 - 115 mm pipe
Vertical spacing	1300 mm
Grounding	DC grounded
Temperature range	-40°C to +80°C
Humidity	100%



Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	1.8	70	1.3 kN	960
	3	0.1	105	2.0 kN	
2	2	4.8	140	2.6 kN	2260
	3	3.1	210	4.1 kN	
4	2	7.8	280	5.3 kN	4860
	3	6.1	420	8.2 kN	
6	2	9.6	420	7.9 kN	7460
	3	7.8	630	12.2 kN	
8	2	10.8	560	10.6 kN	10060
	3	9.1	840	16.3 kN	

The above specified gain must be understood for circular polarization

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

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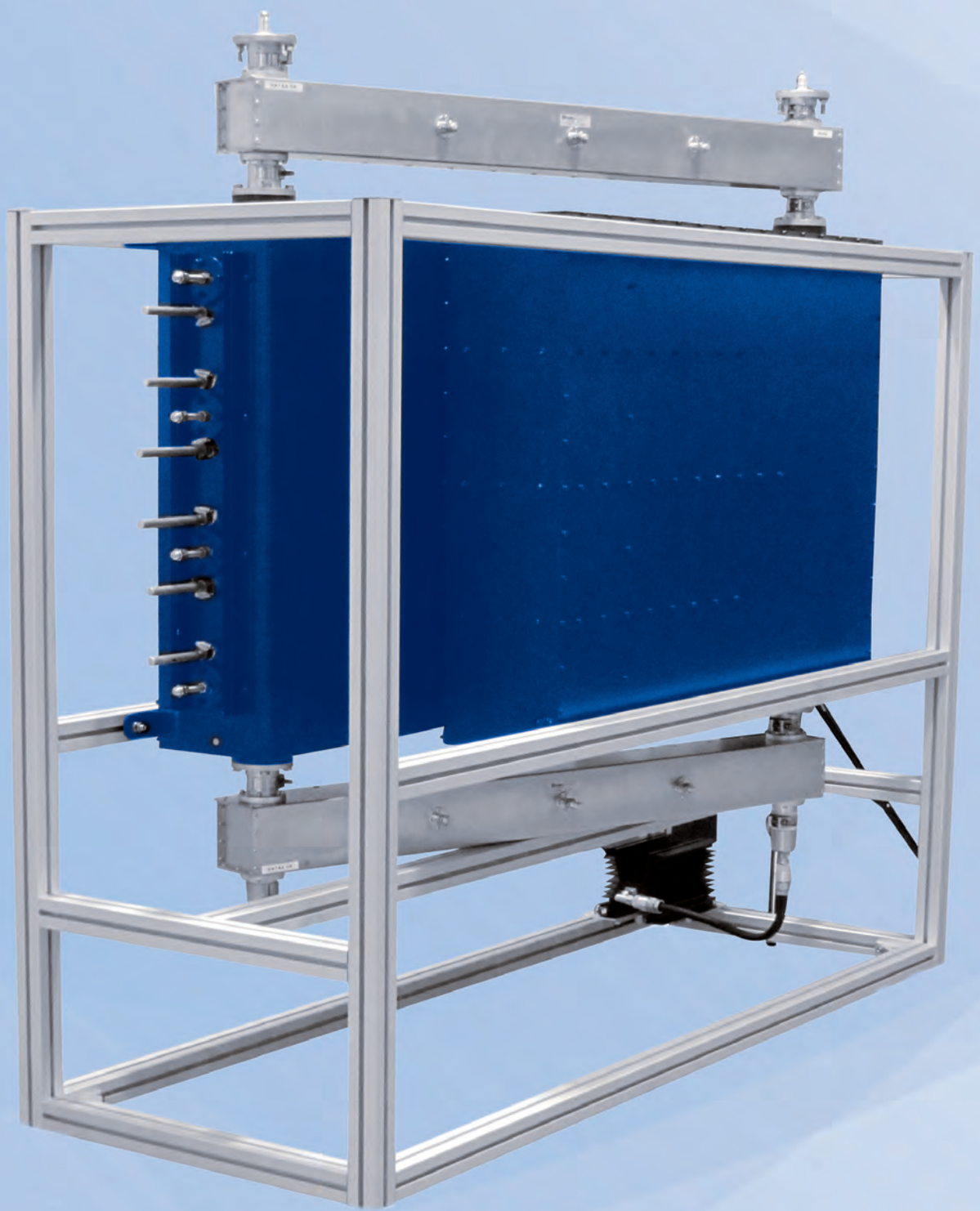
TV VHF COMBINERS

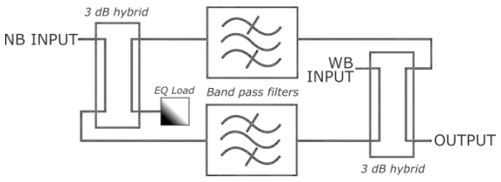


DP11-220

VHF ● Band I ● 4 poles CIB combiner ● ≤ 500 W

Electrical Specifications

Order of the bandpass filters		3 + 1 notch
Frequency range		54-88 MHz
Type		Constant impedance
Impedance		50 Ohm
Minimum frequency spacing		1 guard channel
Maximum power handling		2 x 500 W peak sync
Input connectors (NB/WB)		EIA 7/8”
Output connector		EIA 7/8”
Channel bandwidth		6 MHz
VSWR	Narrowband input	≤ 1.08:1
	Wideband input	≤ 1.10:1
Insertion loss	Narrowband input	≤ 0.2 dB
	Wideband input	≤ 0.1 dB
Isolation	NB input to WB input	≥ 35 dB
	WB input to NB input	≥ 40 dB



Mechanical & Environmental Specifications

Dimensions (W x D x H)	900 x 1259 x 648 mm
Temperature range	-10°C to +50°C
Working position	Any

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DP11-230, DP11-240

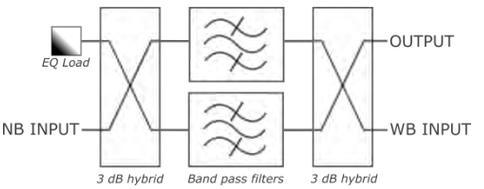
VHF ● Band I ● 4 / 5 poles CIB combiner ● ≤ 20 kW

Electrical Specifications

Order of the bandpass filters		4	5
Frequency range		54-88 MHz	
Type		Constant impedance	
Impedance		50 Ohm	
Minimum frequency spacing		1 channel	channel 4-5
Max. power handling (NB/WB/Output)	DP11-230 DP11-240	10/10/15 kW peak sync 20/20/40 kW peak sync	
Input connectors (NB/WB)	DP11-230 DP11-240	1 5/8" unfl. 3 1/8" unfl.	
Output connector	DP11-230 DP11-240	1 5/8" unfl. 3 1/8" unfl.	
Channel bandwidth		6 MHz	
VSWR	Narrowband input	≤ 1.08:1	
	Wideband input	≤ 1.10:1	
Insertion loss	Narrowband input	≤ 0.2 dB	
	Wideband input	≤ 0.1 dB	
Isolation	NB input to WB input	≥ 35 dB	
	WB input to NB input	≥ 40 dB	
Thermoswitch at EQ load		Yes	

Mechanical & Environmental Specifications

Dimensions (W x D x H)	DP11-230 DP11-240	1350x1490x1300mm 1350x1690x1300mm	1350x1690x1300mm 1350x1890x1300mm
Temperature range		-10°C to +50°C	
Working position		Any	



Optional Accessories

Unflanged to flanged adapter at inputs and output
Directional couplers at inputs and output

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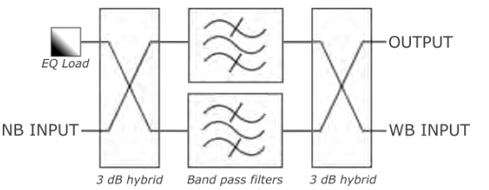
DP11-440, DP11-470

VHF ● Band I ● 3 / 4 poles CIB combiner ● ≤ 40 kW H

Electrical Specifications

Order of the bandpass filters		3	4
Frequency range		54-88 MHz	
Type		Constant impedance	
Impedance		50 Ohm	
Minimum frequency spacing		1 channel	channel 4-5
Max. power handling (NB/WB/Output)	DP11-440 DP11-470	40/60/60 kW peak sync 40/120/120 kW peak sync	
Input connectors (NB/WB)	DP11-440 DP11-470	3 1/8" unfl. 3 1/8" unfl.	
Output connector	DP11-440 DP11-470	3 1/8" unfl. 6 1/8" unfl.	
Channel bandwidth		6 MHz	
VSWR	Narrowband input	≤ 1.08:1	
	Wideband input	≤ 1.10:1	
Insertion loss	Narrowband input	≤ 0.2 dB	
	Wideband input	≤ 0.1 dB	
Isolation	NB input to WB input	≥ 35 dB	
	WB input to NB input	≥ 40 dB	
Thermoswitch at EQ load		Yes	



Mechanical & Environmental Specifications

Dimensions (W x D x H)	3150x1420x1900mm	3800x1420x1900mm
Temperature Range	-10°C to +50°C	
Working position	Any	

Optional Accessories

Unflanged to flanged adapter at inputs and output

Directional couplers at inputs and output

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DP13-230, DP13-240

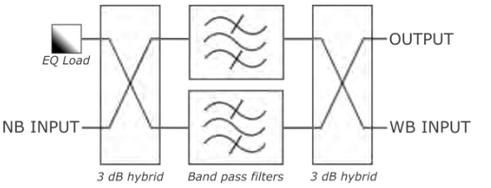
VHF ● Band III ● 4 poles CIB combiner ● ≤ 10 kW

Electrical Specifications

Order of the bandpass filters		4
Frequency range		174 - 230 MHz
Type		Constant impedance
Impedance		50 Ohm
Recommended minimum freq. spacing		1 guard channel
Max. power handling (NB/WB/Output)		
	DP13-230	10/10/10 kW peak sync, 7/7/7 RMS
	DP13-240	10/30/40 kW peak sync, 7/21/28 RMS
Input connectors (NB/WB)		
	DP13-230	1 5/8" unfl. / 1 5/8" unfl.
	DP13-240	1 5/8" unfl. / 3 1/8" unfl.
Output connector		
	DP13-230	1 5/8" unfl.
	DP13-240	3 1/8" unfl.
Channel bandwidth		6 MHz / 7 MHz / 8 MHz
VSWR	Narrowband input	≤ 1.08:1
	Wideband input	≤ 1.10:1
Insertion loss	Narrowband input	≤ 0.25 dB
	Wideband input	≤ 0.2 dB
Isolation	NB input to WB input	≥ 35 dB
	WB input to NB input	≥ 40 dB
Thermoswitch at EQ load		Yes

Mechanical & Environmental Specifications

Dimensions (W x D x H)		
	DP13-230	430 x 665 x 1570 mm
	DP13-240	430 x 665 x 1730 mm
Temperature range		-10°C to +50°C
Working position		Any



Optional Accessories

Directional couplers at inputs and output

Unflanged to flanged adapters at inputs and output

The combiner can be field retuned to any frequency within specified band

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DP13-440, DP13-470

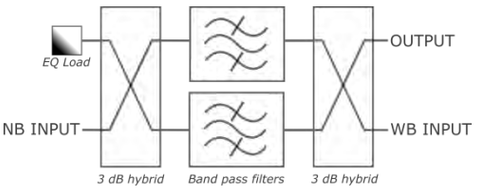
VHF ● Band III ● 4 poles CIB combiner ● ≤ 40 kW

Electrical Specifications

Order of the bandpass filters		4
Frequency range		174 - 230 MHz
Type		Constant impedance
Impedance		50 Ohm
Recommended minimum freq. spacing		1 guard channel
Max. power handling (NB/WB/Output) DP13-440 DP13-470		 20/40/40 kW peak sync, 14/28/28 RMS 40/80/120 kW peak sync, 28/56/84 RMS
Input connectors (NB/WB) DP13-440 DP13-470		 3 1/8" unfl. / 3 1/8" unfl. 3 1/8" unfl. / EIA 6 1/8"
Output connector DP13-440 DP13-470		 3 1/8" unfl. EIA 6 1/8"
Channel bandwidth		6 MHz / 7 MHz / 8 MHz
VSWR	Narrowband input	≤ 1.08:1
	Wideband input	≤ 1.10:1
Insertion loss	Narrowband input	≤ 0.2 dB
	Wideband input	≤ 0.1 dB
Isolation	NB input to WB input	≥ 35 dB
	WB input to NB input	≥ 40 dB
Thermoswitch at EQ load		Yes

Mechanical & Environmental Specifications

Dimensions (W x D x H) DP13-440 DP13-470	 955 x 1620 x 1110 mm 955 x 1620 x 1350 mm
Temperature range	-10°C to +50°C
Working position	Any



Optional Accessories

Directional couplers at inputs and output

Unflanged to flanged adapters at inputs and output

The combiner can be field retuned to any frequency within specified band

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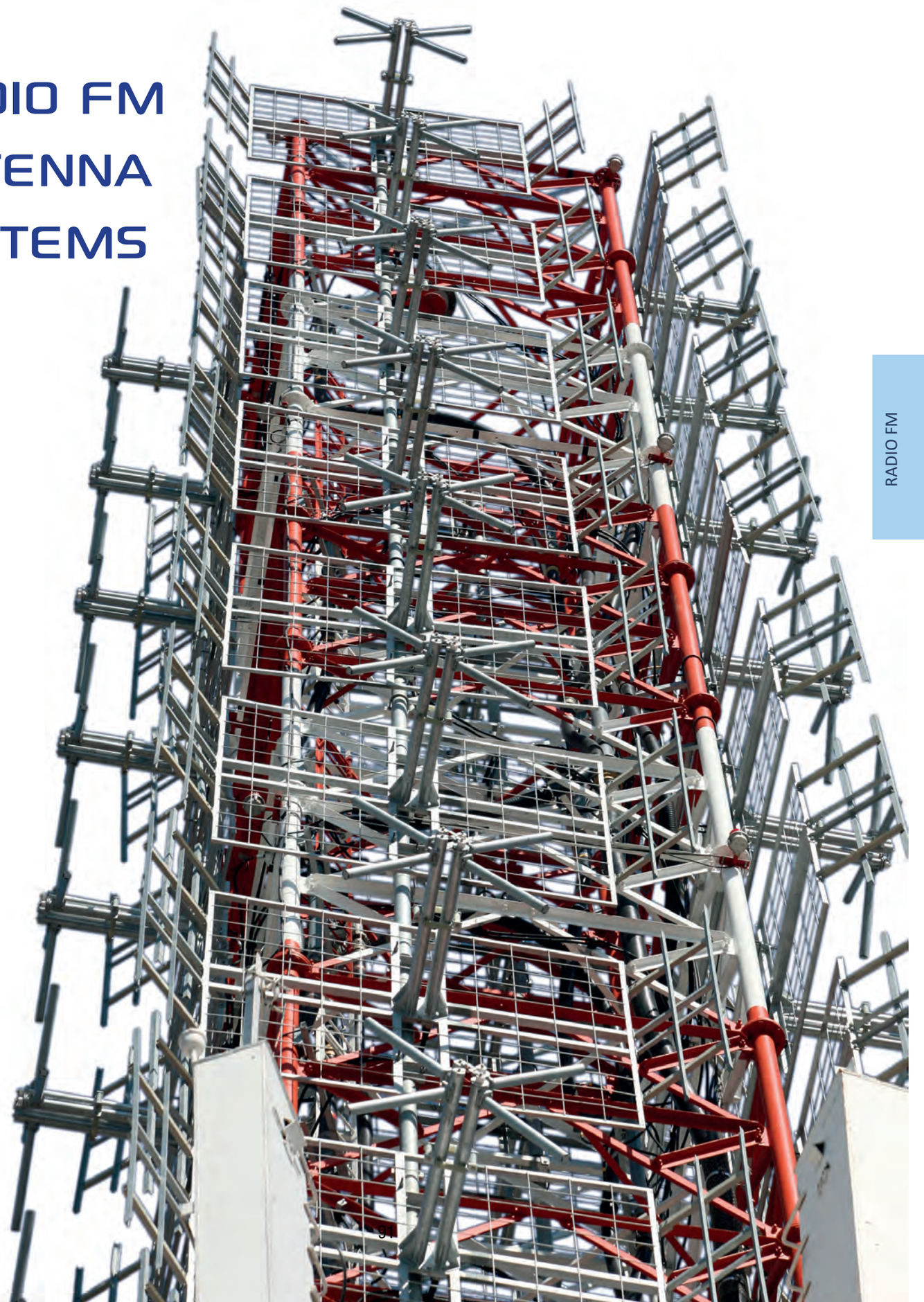
sener

RADIO FM ANTENNA SYSTEMS

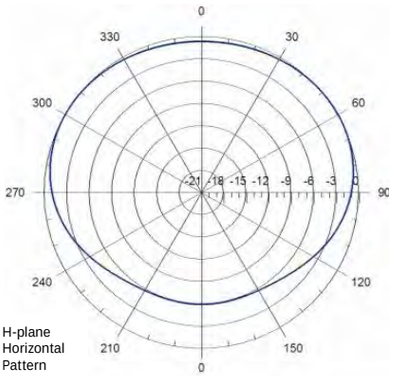


AT12-522

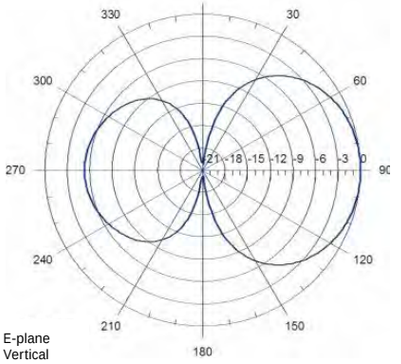
Band II dipole vertical polarization antenna ● Side-mounted installation

Electrical Specifications

Frequency range	87.5-108 MHz	
Peak gain	0 dB (ref. □/2 dipole, free space) 1.75 dB (ref. □/2 dipole, with pole)	
3 dB beam width	E-plane: 75°	H-plane: 220°
Polarization	Vertical	
Impedance	50 Ohm	
VSWR	≤ 1.3:1	
Maximum power handling	2 kW	
Connector type	DIN 7/16	
Pressurization	Non pressurized	



H-plane Horizontal Pattern



E-plane Vertical Pattern

Mechanical & Environmental Specifications

Materials	Dipole Isolators	Stainless steel PTFE
Dimensions (W x D x H)		85 x 1000 x 1340 mm
Maximum wind speed		200 km/h
Wind load		165 N (@160 km/h)
Weight		10 kg
Clamp type		To Ø 60 - 80 mm pipe
Vertical spacing		0.8 □□- 0.9 □ typical
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	1	1.8	10	0.17 kN	1340
2	1	4.8	20	0.34 kN	3949
4	1	7.8	40	0.68 kN	9166
6	1	9.5	60	1.02 kN	14383
8	1	10.8	80	1.36 kN	19601
10	1	11.8	100	1.70 kN	24821
12	1	12.6	120	2.04 kN	30039

NOTES:

- Radiation patterns and gain values at the table are including the effect of supporting pole
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED
- Wind load & weight figures without considering cables, splitters & hardware.

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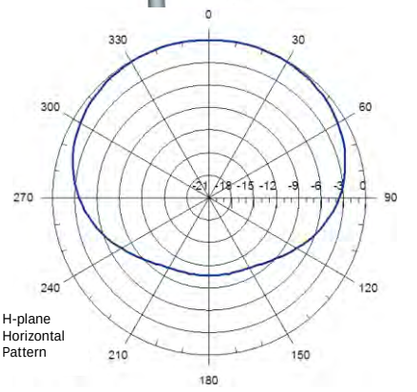
AT12-512

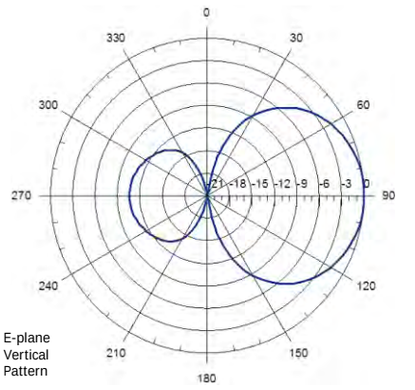
Band II dipole vertical polarization antenna system ● Side-mounted installation
For extreme weather conditions

Electrical Specifications

Frequency range	87.5-108 MHz		
Peak gain	1.13 dB (ref. □/2 dipole, free space) 3.08 dB (ref. □/2 dipole, with pole)		
3 dB beam width	E-plane: 75º	H-plane: 169º	
Polarization	Vertical		
Impedance	50 Ohm		
VSWR	≤ 1.2:1		
Maximum power handling	2.5 kW	5 kW	7 kW
Connector type	DIN 7/16	EIA 7/8"	DIN 13/30
Pressurization	Non pressurized	Gas barrier on input connector	



H-plane
Horizontal
Pattern



E-plane
Vertical
Pattern

Mechanical & Environmental Specifications

Materials	Dipole Feed points radome	Hot dip galvanized steel Fiberglass
Dimensions (W x D x H)		200 x 1105 x 1440 mm
Maximum wind speed		200 km/h
Wind load		350 N (@160 km/h)
Weight		30 kg
Clamp type		To Ø 80 - 115 mm pipe
Vertical spacing		0.8 □□□□0.9□ typical
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	1	3.1	30	0.4 kN	1440
2	1	6.1	60	0.7 kN	4049
4	1	9.1	120	1.4 kN	9266
6	1	10.9	180	2.1 kN	14483
8	1	12.1	240	2.8 kN	19701
10	1	13.1	300	3.5 kN	24917
12	1	13.9	360	4.2 kN	30135

NOTES:

- Radiation patterns and gain values at the table are including the effect of supporting pole
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED
- Wind load & weight figures without considering cables, splitters & hardware.

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AT12-220

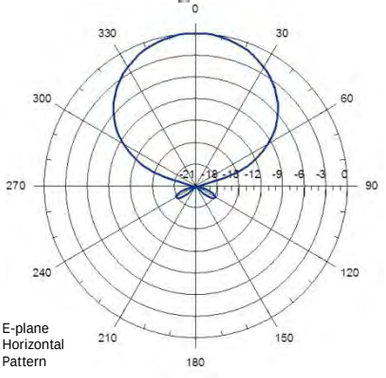
Band II 2 dipoles horizontal polarization panel ● Especially suitable for square masts

Electrical Specifications

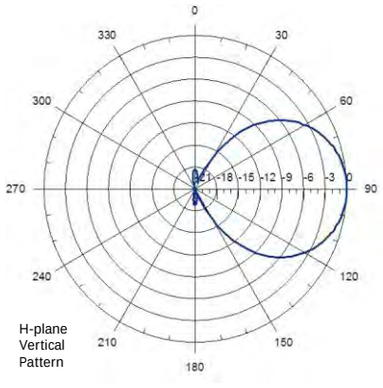
Frequency range	87.5-108 MHz		
Peak gain	7.5 dB (ref. ▫/2 dipole)		
3 dB beam width	E-plane: 70°	H-plane: 55°	
Polarization	Horizontal		
Impedance	50 Ohm		
VSWR	≤1.2:1		
Maximum power handling	2.5 kW	5 kW	7 kW
Connector type	DIN 7/16	EIA 7/8"	DIN 13/30
Pressurization	Non pressurized	Gas barrier on input connector	

Mechanical & Environmental Specifications

Materials	Reflector & dipoles Feed points radome	Hot dip galvanized steel Fiberglass
Dimensions (W x D x H)		1700 x 781 x 2214 mm
Maximum wind speed		200 km/h
Wind load (front)		1626 N (@160 km/h)
Wind load (lateral)		740 N (@160 km/h)
Weight		58 kg
Typical mounting		Square arrangement tower
Clamp type		To Ø 80 - 115 mm pipe
Vertical spacing		3200 mm
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%



E-plane
Horizontal
Pattern



H-plane
Vertical
Pattern

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	6.0	116	2.4 kN	2214
	3	4.2	174	3.1 kN	
	4	3.0	232	3.9 kN	
2	2	9.0	232	4.7 kN	5414
	3	7.2	348	6.2 kN	
	4	6.0	464	7.8 kN	
4	2	12.0	464	9.5 kN	11814
	3	10.3	696	12.4 kN	
	4	9.0	928	15.7 kN	
6	2	13.8	696	14.2 kN	18214
	3	12.0	1044	18.6 kN	
	4	10.8	1392	23.5 kN	
8	2	15.0	928	18.9 kN	24614
	3	13.3	1392	24.8 kN	
	4	12.0	1856	31.4 kN	

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

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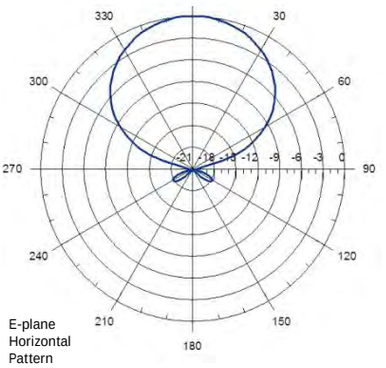
AT12-222

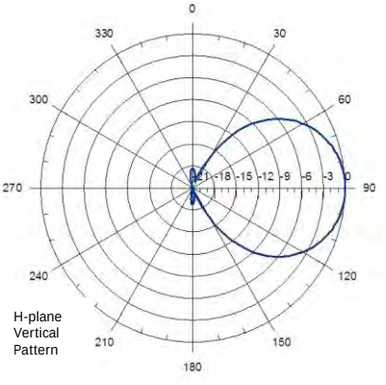
Band II 2 dipoles horizontal polarization panel ● Especially suitable for square masts
Light construction

Electrical Specifications

Frequency range	87.5-108 MHz	
Peak gain	7.5 dB (ref. □/2 dipole)	
3 dB beam width	E-plane: 70º	H-plane: 55º
Polarization	Horizontal	
Impedance	50 Ohm	
VSWR	≤1.2:1	
Maximum power handling	2.5 kW	
Connector type	DIN 7/16	
Pressurization	Non pressurized	



E-plane
Horizontal
Pattern



H-plane
Vertical
Pattern

Mechanical & Environmental Specifications

Materials	Reflector & dipoles Feed points radome	Hot dip galvanized steel ABS / MMA UVA high protection
Dimensions (W x D x H)		1700 x 781 x 2214 mm
Maximum wind speed		200 km/h
Wind load (front)		1300 N (@160 km/h)
Wind load (lateral)		592 N (@160 km/h)
Weight		36 Kg
Typical mounting		Square arrangement tower
Clamp type		To Ø 80 - 115 mm pipe
Vertical spacing		3200 mm
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	6.0	72	1.9 kN	2214
	3	4.2	108	2.5 kN	
	4	3.0	144	3.1 kN	
2	2	9.0	144	3.8 kN	5414
	3	7.2	216	5.0 kN	
	4	6.0	288	6.2 kN	
4	2	12.0	288	7.6 kN	11814
	3	10.3	432	9.9 kN	
	4	9.0	576	12.6 kN	
6	2	13.8	432	11.4 kN	18214
	3	12.0	648	14.9 kN	
	4	10.8	864	18.8 kN	
8	2	15.0	576	15.1 kN	24614
	3	13.3	864	19.8 kN	
	4	12.0	1152	25.1 kN	

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

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AT12-223

Band II 2 dipoles horizontal polarization panel ● Especially suitable for triangular masts

Electrical Specifications

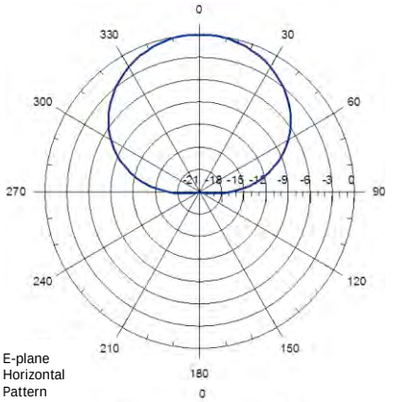
Frequency range	87.5-108 MHz		
Peak gain	7.0 dB (ref. □/2 dipole)		
3 dB beam width	E-plane: 78°	H-plane: 60°	
Polarization	Horizontal		
Impedance	50 Ohm		
VSWR	□1.22:1		
Maximum power handling	2.5 kW	5 kW	7 kW
Connector type	DIN 7/16	EIA 7/8"	DIN 13/30
Pressurization	Non pressurized		Gas barrier on input connector

Mechanical & Environmental Specifications

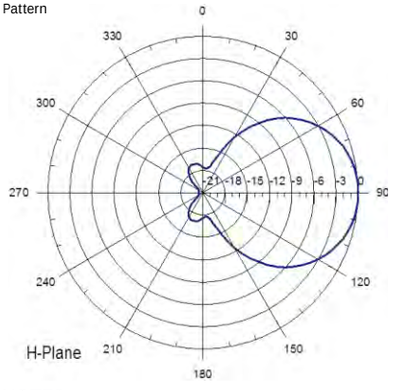
Materials	Structure Feed points radome	Hot dip galvanized steel Fiberglass
Dimensions (W x D x H)		1700 x 800 x 2214 mm
Maximum wind speed		200 km/h
Wind load (front)		1515 N (@160 km/h)
Wind load (lateral)		796 N (@160 km/h)
Weight		65 kg
Typical mounting		Triangular arrangement tower
Clamp type		To Ø 80 - 115 mm pipe
Vertical spacing		3200 mm
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	4.0	130	2.9 kN	2214
	3	2.2	195	4.4 kN	
2	2	7.0	260	5.8 kN	5414
	3	5.2	390	8.8 kN	
4	2	10.0	520	11.6 kN	11814
	3	8.3	780	17.6 kN	
6	2	11.8	780	17.4 kN	18214
	3	10.0	1170	26.5 kN	
8	2	13.0	1040	23.1 kN	24614
	3	11.3	1560	35.3 kN	



E-plane Horizontal Pattern



NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

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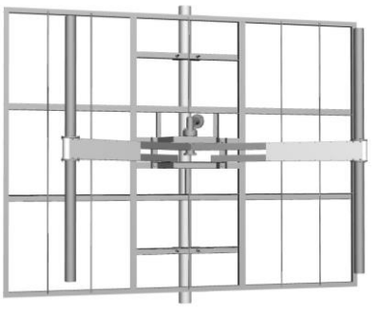
AT12-221

Band II 2 dipoles vertical polarization panel ● Especially suitable for square masts

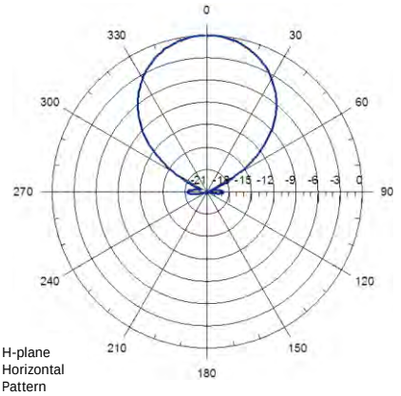
Electrical Specifications

Frequency range	87.5-108 MHz		
Peak gain	7.5 dB (ref. □/2 dipole)		
3 dB beam width	E-plane: 70°	H-plane: 55°	
Polarization	Vertical		
Impedance	50 Ohm		
VSWR	≤1.2:1		
Maximum power handling	2.5 kW	5 kW	7 kW
Connector type	DIN 7/16	EIA 7/8"	DIN 13/30
Pressurization	Non pressurized	Gas barrier on input connector	

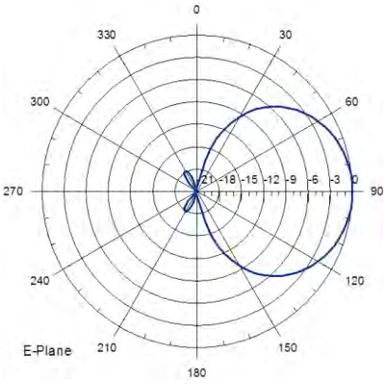


Mechanical & Environmental Specifications

Materials	Reflector & dipoles Feed points radome	Hot dip galvanized steel Fiberglass
Dimensions (W x D x H)		2214 x 781 x 1700 mm
Maximum wind speed		200 km/h
Wind load (front)		1626 N (@160 km/h)
Wind load (lateral)		740 N (@160 km/h)
Weight		58 kg
Typical mounting		Square arrangement tower
Clamp type		To Ø 80 - 115 mm pipe
Vertical spacing		3200 mm
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%



H-plane
Horizontal
Pattern



E-Plane

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	4.5	116	2.4 kN	1700
	3	2.7	174	3.1 kN	
	4	1.5	232	3.9 kN	
2	2	7.5	232	4.7 kN	4900
	3	5.7	348	6.2 kN	
	4	4.5	464	7.8 kN	
4	2	10.5	464	9.5 kN	11300
	3	8.7	696	12.4 kN	
	4	7.5	928	15.7 kN	
6	2	12.3	696	14.2 kN	17700
	3	10.5	1044	18.6 kN	
	4	9.3	1392	23.5 kN	
8	2	13.5	928	18.9 kN	24100
	3	11.7	1392	24.8 kN	
	4	10.5	1856	31.4 kN	

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

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AT12-227

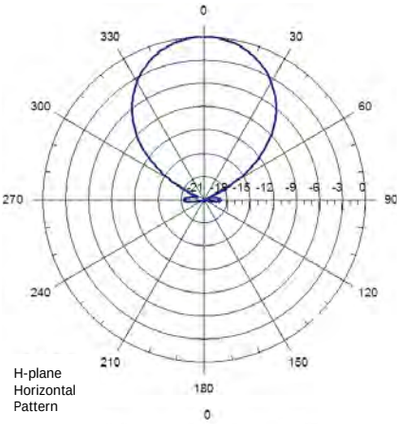
Band II 2 dipoles vertical polarization panel ● Especially suitable for square masts
Light construction

Electrical Specifications

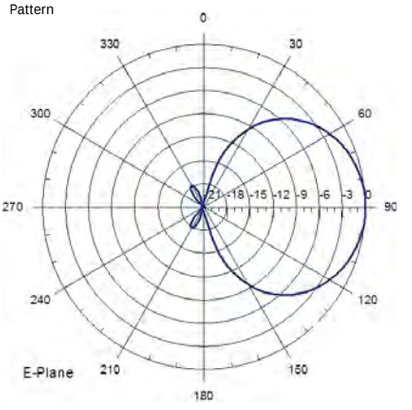
Frequency range	87.5-108 MHz	
Peak gain	7.5 dB (ref. □/2 dipole)	
3 dB beam width	E-plane: 70º	H-plane: 55º
Polarization	Vertical	
Impedance	50 Ohm	
VSWR	□□1.2:1	
Maximum power handling	2.5 kW	
Connector type	DIN 7/16	
Pressurization	Non pressurized	

Mechanical & Environmental Specifications

Materials	Reflector & dipoles Feed points radome	Hot dip galvanized steel ABS / MMA UVA high protection
Dimensions (W x D x H)		2214 x 781 x 1700 mm
Maximum wind speed		200 km/h
Wind load (front)		1300 N (@160 km/h)
Wind load (lateral)		540 N (@160 km/h)
Weight		36 kg
Typical mounting		Square arrangement tower
Clamp type		To Ø 80 - 115 mm pipe
Vertical spacing		3200 mm
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%



H-plane
Horizontal
Pattern



E-Plane

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	4.5	72	1.9 kN	1700
	3	2.7	108	2.5 kN	
	4	1.5	144	3.1 kN	
2	2	7.5	144	3.8 kN	4900
	3	5.7	216	5.0 kN	
	4	4.5	288	6.2 kN	
4	2	10.5	288	7.6 kN	11300
	3	8.7	432	9.9 kN	
	4	7.5	576	12.6 kN	
6	2	12.3	432	11.4 kN	17700
	3	10.5	648	14.9 kN	
	4	9.3	864	18.8 kN	
8	2	13.5	576	15.1 kN	24100
	3	11.7	864	19.8 kN	
	4	10.5	1152	25.1 kN	

NOTES:

- Radiation patterns and gain values at the table are including the effect of supporting pole
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

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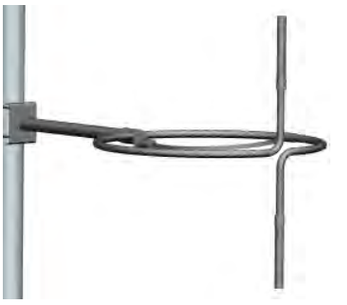
AT12-200

Band II FM circular polarization dipoles antenna ● Side-mounted installation

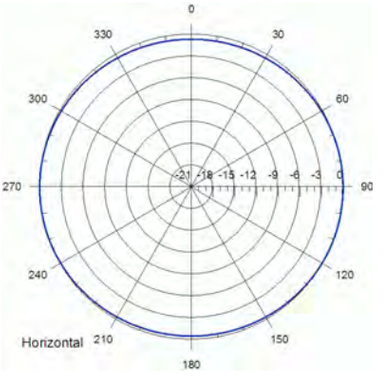
Electrical Specifications

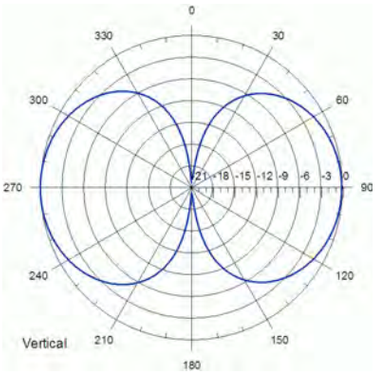
Frequency range	87.5-108 MHz	
Peak gain	0.2 dB (ref. □/2 dipole, Ø 50 mm pole)	
3 dB beam width	Horizontal: 360º	Vertical: 86º
Polarization	Circular	
Impedance	50 Ohm	
VSWR	□□1.1:1	
Bandwidth	500 KHz	
Maximum power handling	500 W	
Connector type	N	
Pressurization	Non pressurized	



Mechanical & Environmental Specifications

Materials	Stainless steel
Dimensions (W x D x H)	500 x 500 x 750 mm
Maximum wind speed	200 km/h
Wind load	200 N (@160 km/h)
Weight	5 kg
Clamp type	To Ø 25 - 75 mm pipe
Vertical spacing	0.8□□- 0.9□ typical
Grounding	DC grounded
Temperature range	-40˚C to +80˚C
Humidity	100%





Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	1	0.2	5	0.2 kN	750
2	1	3.2	10	0.4 kN	3450
4	1	6.2	20	0.8 kN	8850
6	1	8.0	30	1.2 kN	14250
8	1	9.2	40	1.6 kN	19650

NOTES:

- Radiation patterns and gain values at the table are including the effect of supporting pole
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED
- Wind load & weight figures without considering cables, splitters & hardware.

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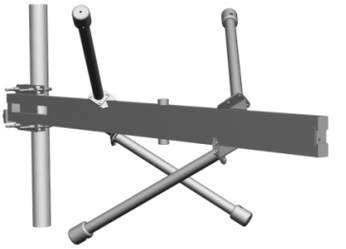
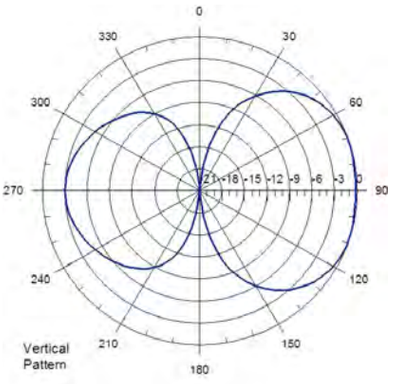
Band II “V” dipoles antenna circular polarization ● Side-mounted installation
For extreme weather conditions

Electrical Specifications

Frequency range	87.5-108 MHz (3 different models. Specify a 7 MHz range)		
Peak gain	-0.1 dB (ref. λ/2 dipole, free space) 1.1 dB (ref. λ/2 dipole, with pole)		
3 dB beam width	Horizontal: 268º	Vertical: 97º	
Polarization	Circular		
Impedance	50 Ohm		
VSWR	≤1.15:1 on a 7 MHz range		
Maximum power handling	2.5 kW	5 kW	7 kW
Connector type	DIN 7/16	EIA 7/8”	DIN 13/30
Pressurization	Non pressurized	Gas barrier on input connector	





Mechanical & Environmental Specifications

Materials	Structure Feed point radome	Hot dip galvanized steel Fiberglass
Dimensions (W x D x H)		900 x 2084 x 900 mm
Maximum wind speed		200 km/h
Wind load		495 N (@160 km/h)
Weight		25 kg
Clamp type		To Ø 80 – 115 mm pipe
Vertical spacing		0.8 λ 0.9 λ typical
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	1	1.1	25	0.5 kN	900
2	1	4.1	50	1.0 kN	3509
4	1	7.1	100	2.0 kN	8726
6	1	8.9	150	3.0 kN	13943
8	1	10.1	200	4.0 kN	19161
10	1	11.1	250	5.0 kN	24381
12	1	11.9	300	6.0 kN	29600

NOTES:

- Radiation patterns and gain values at the table are including the effect of supporting pole
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED
- Wind load & weight figures without considering cables, splitters & hardware.

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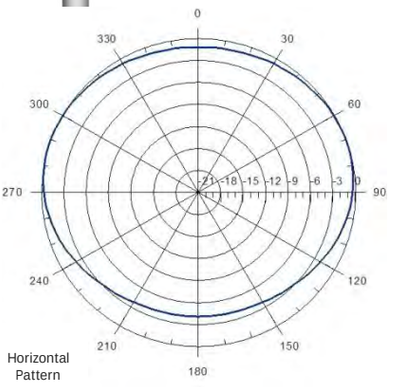
AT12-202

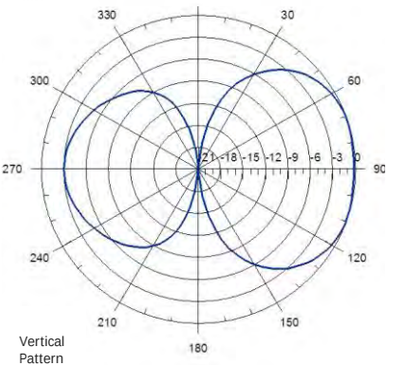
Band II “V” dipoles circular polarization antenna system ● Side-mounted installation

Electrical Specifications

Frequency range	87.5-108 MHz		
Peak gain	-0.1 dB (ref. □/2 dipole, free space) 1.1 dB (ref. □/2 dipole, with pole)		
3 dB beam width	Horizontal: 268º	Vertical: 97º	
Polarization	Circular		
Impedance	50 Ohm		
VSWR	≤1.4:1		
Maximum power handling	2.5 kW	5 kW	7 kW
Connector type	DIN 7/16	EIA 7/8”	DIN 13/30
Pressurization	Non pressurized	Gas barrier on input connector	
	Fully pressurized as an option		



Horizontal Pattern



Vertical Pattern

Mechanical & Environmental Specifications

Materials	Structure Feed point radome	Hot dip galvanized steel PVC
Dimensions (W x D x H)		1191 x 1528 x 1191 mm
Maximum wind speed		200 km/h
Wind load		305 N (@160 km/h)
Weight		20 kg
Clamp type		To Ø 80 – 115 mm pipe
Vertical spacing		0.75□□- 0.9□ typical
Grounding		DC grounded
Temperature range		-40˚C to +80˚C
Humidity		100%

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	1	1.1	20	0.3 kN	1191
2	1	4.1	40	0.6 kN	3800
4	1	7.1	80	1.2 kN	9017
6	1	8.9	120	1.8 kN	14234
8	1	10.1	160	2.4 kN	19452
10	1	11.1	200	3.0 kN	24669
12	1	11.9	240	3.6 kN	29886

Optional accessories

Tuned to 10 MHz bandwidth with VSWR 1.2:1
Stainless steel construction

NOTES:

- Radiation patterns and gain values at the table are including the effect of supporting pole
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED
- Wind load & weight figures without considering cables, splitters & hardware

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AT12-302

Band II 2 crossed dipoles circular/elliptical polarization antenna system ● Side-mounted installation

Electrical Specifications

Frequency range	87.5-108 MHz		
Peak gain	0.7 dB (ref. □/2 dipole, with pole)		
3 dB beam width	Horizontal: 220º	Vertical: 140º	
Polarization	Circular / Elliptical		
Impedance	50 Ohm		
VSWR	□1.22:1		
Maximum power handling (per connector)	5 kW (2.5 kW)	10kW (5 kW)	14 kW (7 kW)
Connector type (2 per antenna)	2 x DIN 7/16	2 x EIA 7/8"	2 x DIN 13/30
Pressurization	Non pressurized	Gas barrier on input connector	
	Fully pressurized as an option		

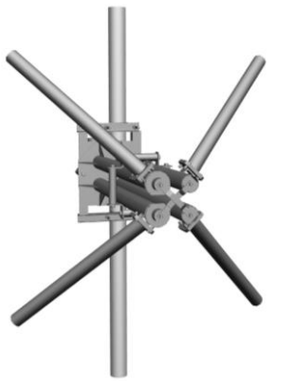
Mechanical & Environmental Specifications

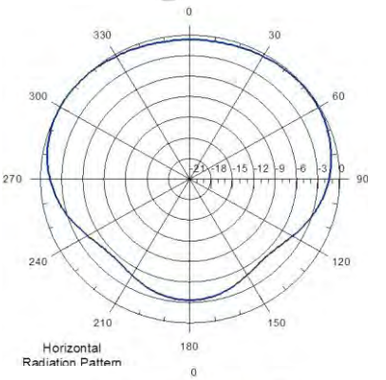
Materials	Hot dip galvanized steel
Dimensions (W x D x H)	924 x 959 x 924 mm
Maximum wind speed	200 km/h
Wind load	315 N (@160 km/h)
Weight	30 kg
Clamp type	To Ø 80 – 115 mm pipe
Vertical spacing	0.8□□- 0.9□typical
Grounding	DC grounded
Temperature range	-40˚C to +80˚C
Humidity	100%

Antenna System Characteristics

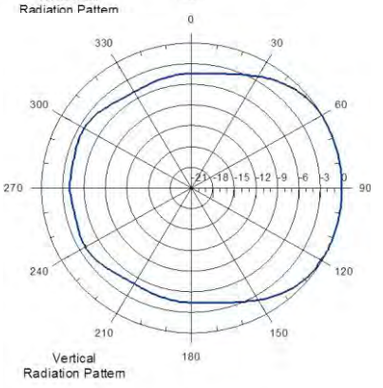
Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	1	0.7	30	0.3 kN	924
2	1	3.7	60	0.6 kN	3533
4	1	6.7	120	1.2 kN	8750
6	1	8.5	180	1.8 kN	13967
8	1	9.7	240	2.4 kN	19185
10	1	10.7	300	3.0 kN	24405
12	1	11.5	360	3.6 kN	29623

The above specified gain must be understood for circular polarization





Horizontal Radiation Pattern



Vertical Radiation Pattern

NOTES:

- Radiation patterns and gain values at the table are including the effect of supporting pole
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED
- Wind load & weight figures without considering cables, splitters & hardware.

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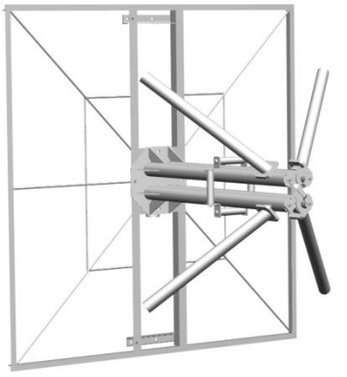
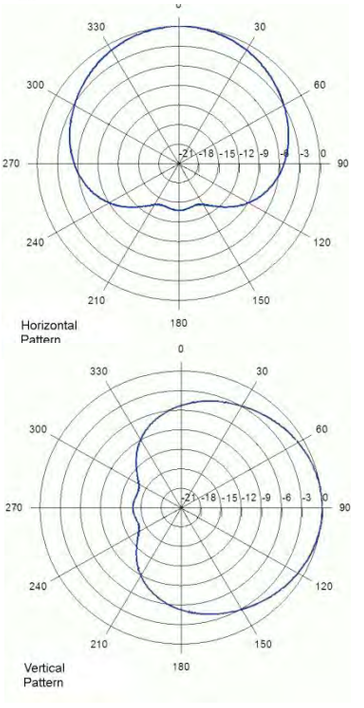
AT12-302REF

Band II 2 crossed dipoles circular/elliptical polarization antenna system ● Side-mounted installation

Electrical Specifications

Frequency range	87.5-108 MHz		
Peak gain	4.0 dB (ref. □/2 dipole)		
3 dB beam width	Horizontal: 128º	Vertical: 128º	
Polarization	Circular / Elliptical		
Impedance	50 Ohm		
VSWR	≤1.12:1		
Maximum power handling (per connector)	5 kW (2.5 kW)	10kW (5 kW)	14 kW (7 kW)
Connector type (2 per antenna)	2 x DIN 7/16	2 x EIA 7/8"	2 x DIN 13/30
Pressurization	Non pressurized	Gas barrier on input connector Fully pressurized as an option	





Mechanical & Environmental Specifications

Materials	Hot dip galvanized steel
Dimensions (W x D x H)	1500 x 1105 x 1500 mm
Maximum wind speed	200 km/h
Wind load (front)	350 N (@160 km/h)
Wind load (lateral)	315 N (@160 km/h)
Weight	35 kg
Clamp type	To Ø 80 - 115 mm pipe
Vertical spacing	2400mm typical
Grounding	DC grounded
Temperature range	-40°C to +80°C
Humidity	100%

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	1	4.0	35	0.35 kN	1500
2	1	7.0	70	0.7 kN	3300
4	1	10.0	140	1.4 kN	8700
6	1	11.7	210	2.11 kN	13500
8	1	13.0	280	2.8 kN	18300
10	1	14.0	350	3.5 kN	23100
12	1	14.7	360	4.2 kN	27900

The above specified gain must be understood for circular polarization

NOTES:

- Radiation patterns and gain values at the table are including the effect of supporting pole
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED
- Wind load & weight figures without considering cables, splitters & hardware.

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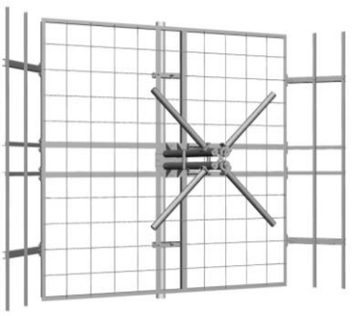
AT12-304

Band II 2 crossed dipoles circular/elliptical polarization panel ● Especially suitable for square masts

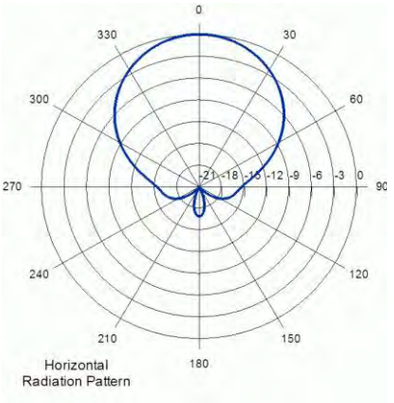
Electrical Specifications

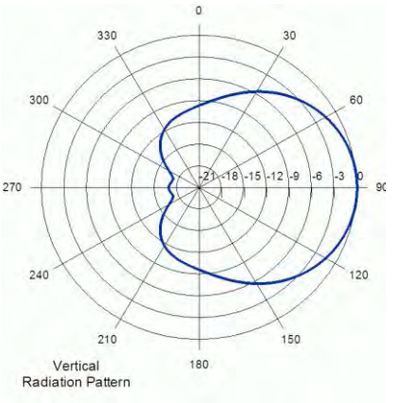
Frequency range	87.5-108 MHz		
Peak gain	6.5 dB (ref. ¤/2 dipole)		
3 dB beam width	Horizontal: 68º	Vertical: 84º	
Polarization	Circular / Elliptical		
Impedance	50 Ohm		
VSWR	≤ 1.1:1 (with circular polarization)		
Maximum power handling (per connector)	5 kW (2.5 kW)	10 kW (5 kW)	14 kW (7 kW)
Connector type (2 per antenna)	2 x DIN 7/16	2 x EIA 7/8"	2 x DIN 13/30
Pressurization	Non pressurized	Gas barrier on input connector	
	Fully pressurized as an option		



Mechanical & Environmental Specifications

Materials	Hot dip galvanized steel
Dimensions (W x D x H)	2900 x 1013 x 2200 mm
Maximum wind speed	200 km/h
Wind load (front)	1970 N (@160 km/h)
Wind load (lateral)	1410 N (@160 km/h)
Weight	90 kg
Typical mounting	Square arrangement tower
Clamp type	To Ø 80 - 115 mm pipe
Vertical spacing	2850 mm typical
Grounding	DC grounded
Temperature range	-40°C to +80°C
Humidity	100%





Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	3.5	180	3.4 kN	2200
	3	1.7	270	4.8 kN	
	4	0.5	360	5.8 kN	
2	2	6.5	360	6.8 kN	5050
	3	4.7	540	9.6 kN	
	4	3.5	720	11.6 kN	
4	2	9.5	720	13.5 kN	10750
	3	7.7	1080	19.2 kN	
	4	6.5	1440	23.1 kN	
6	2	11.3	1080	20.3 kN	16450
	3	9.5	1620	28.7 kN	
	4	8.3	2160	34.7 kN	
8	2	12.5	1440	27.0 kN	22150
	3	10.7	2160	38.3 kN	
	4	9.5	2880	46.2 kN	

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

The above specified gain must be understood for circular polarization

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AT12-225

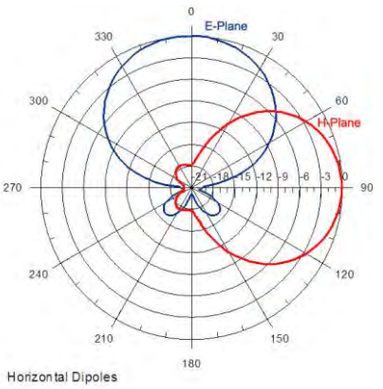
Band II 4 dipoles circular/elliptical polarization panel ● Especially suitable for square masts

Electrical Specifications

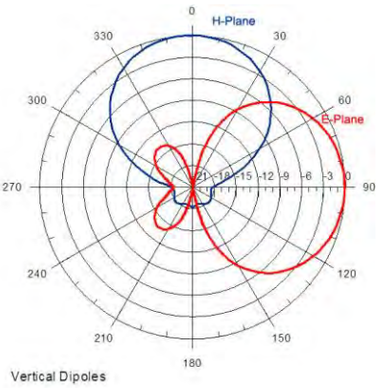
Frequency range	87.5-108 MHz	
Peak gain	7.5 dB (ref. □/2 dipole)	
3 dB beam width	Horizontal: 67°	Vertical: 65°
Polarization	Circular / Elliptical (allowing 2 independent signals horizontally & vertically polarized)	
Impedance	50 Ohm	
VSWR	□1.1:1 (with circular polarization)	
Maximum power handling (per connector)	10 kW (2.5 kW)	20 kW (5 kW)
Connector type (4 per antenna)	4 x DIN 7/16	4 x EIA 7/8"
Pressurization	Non pressurized	Gas barrier on input connector

Mechanical & Environmental Specifications

Materials	Reflector & dipoles Feed points radome	Hot dip galvanized steel Fiberglass
Dimensions (W x D x H)		2200 x 870 x 2200 mm
Maximum wind speed		200 km/h
Wind load (front)		1550 N (@160 km/h)
Wind load (lateral)		1210 N (@160 km/h)
Weight		75 kg
Typical mounting		Square arrangement tower
Clamp type		To Ø 80 - 115 mm pipe
Vertical spacing		2850 mm
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%



Horizontal Dipoles



Vertical Dipoles

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	4.8	150	2.8 kN	2200
	3	3.0	225	4.0 kN	
	4	1.8	300	4.7 kN	
2	2	7.8	300	5.5 kN	5050
	3	6.0	450	7.9 kN	
	4	4.8	600	9.5 kN	
4	2	10.8	600	11.0 kN	10750
	3	9.1	900	15.9 kN	
	4	7.8	1200	19.0 kN	
6	2	12.6	900	16.6 kN	16450
	3	10.8	1350	23.8 kN	
	4	9.6	1800	28.5 kN	
8	2	13.8	1200	22.1 kN	22150
	3	12.1	1800	31.8 kN	
	4	10.8	2400	38.0 kN	

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

The above specified gain must be understood for circular polarization

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AT12-303

Band II 2 crossed dipoles circular/elliptical polarization panel ● Especially suitable for triangular masts

Electrical Specifications

Frequency range	87.5-108 MHz		
Peak gain	4.5 dB (ref. ▫/2 dipole)		
3 dB beam width	Horizontal: 92°	Vertical: 92°	
Polarization	Circular / Elliptical		
Impedance	50 Ohm		
VSWR	≤ 1.1:1 (with circular polarization)		
Maximum power handling (per connector)	5 kW (2.5 kW)	10 kW (5 kW)	14 kW (7 kW)
Connector type (2 per antenna)	2 x DIN 7/16	2 x EIA 7/8"	2 x DIN 13/30
Pressurization	Non pressurized	Gas barrier on input connector	
	Fully pressurized as an option		

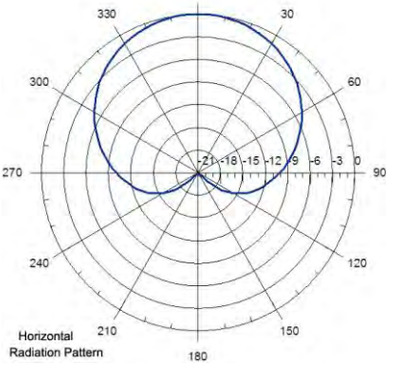
Mechanical & Environmental Specifications

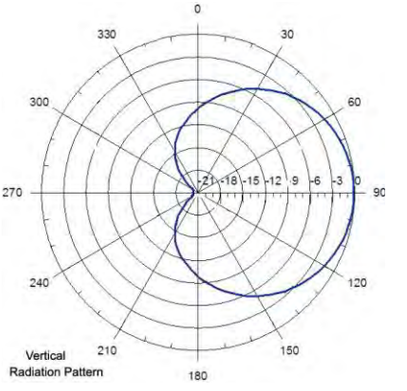
Materials	Hot dip galvanized steel
Dimensions (W x D x H)	2000 x 1013 x 2000 mm
Maximum wind speed	200 km/h
Wind load (front)	1150 N (@160 km/h)
Wind load (lateral)	803 N (@160 km/h)
Weight	55 kg
Typical mounting	Triangular arrangement tower
Clamp type	To Ø 80 - 115 mm pipe
Vertical spacing	2800 mm typical
Grounding	DC grounded
Temperature range	-40°C to +80°C
Humidity	100%

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	2.6	110	2.5 kN	2000
	3	0.4	165	3.7 kN	
2	2	5.6	220	5.1 kN	4800
	3	3.4	330	7.4 kN	
4	2	8.6	440	10.1 kN	10400
	3	6.4	660	14.8 kN	
6	2	10.4	660	15.2 kN	16000
	3	8.2	990	22.1 kN	
8	2	11.6	880	20.3 kN	21600
	3	9.4	1320	29.5 kN	

The above specified gain must be understood for circular polarization





NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

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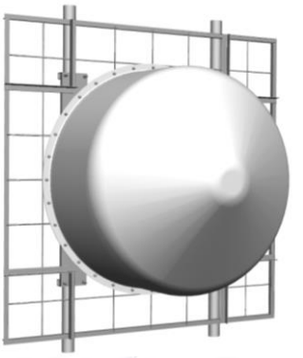
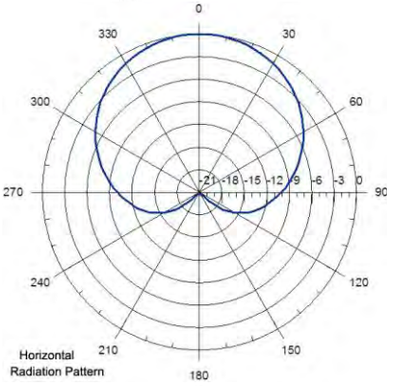
AT12-303R

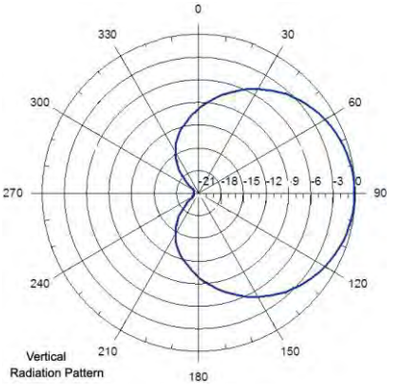
Band II 2 crossed dipoles circular/elliptical polarization panel ● Especially suitable for triangular masts
For extreme weather conditions (radome protected)

Electrical Specifications

Frequency range	87.5-108 MHz		
Peak gain	4.5 dB (ref. ▫/2 dipole)		
3 dB beam width	Horizontal: 92°	Vertical: 92°	
Polarization	Circular / Elliptical		
Impedance	50 Ohm		
VSWR	≤ 1.1:1 (with circular polarization)		
Maximum power handling (per connector)	5 kW (2.5 kW)	10 kW (5 kW)	14 kW (7 kW)
Connector type (2 per antenna)	2 x DIN 7/16	2 x EIA 7/8"	2 x DIN 13/30
Pressurization	Non pressurized	Gas barrier on input connector	
	Pressurized up to balun as an option		







Mechanical & Environmental Specifications

Materials	Reflector & dipoles	Hot dip galvanized steel
	Radome	Fiberglass
Dimensions (W x D x H)		2000 x 1028 x 2000 mm
Maximum wind speed		200 km/h
Wind load (front)		2418 N (@160 km/h)
Wind load (lateral)		1738 N (@160 km/h)
Weight		124 kg
Typical mounting		Triangular arrangement tower
Clamp type		To Ø 80 - 115 mm pipe
Vertical spacing		2800 mm typical
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	2.6	248	5.1 kN	2000
	3	0.4	372	7.8 kN	
2	2	5.6	496	10.3 kN	4800
	3	3.4	744	15.7 kN	
4	2	8.6	992	20.5 kN	10400
	3	6.4	1488	31.4 kN	
6	2	10.4	1488	30.8 kN	16000
	3	8.2	2232	47.1 kN	
8	2	11.6	1984	41.1 kN	21600
	3	9.4	2976	62.8 kN	

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

The above specified gain must be understood for circular polarization

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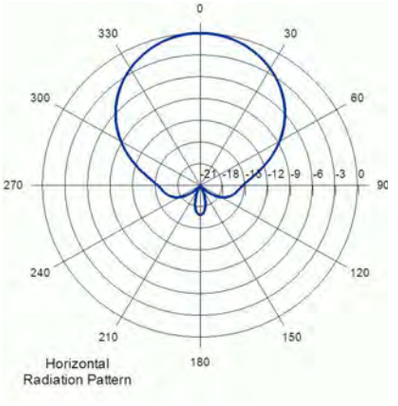
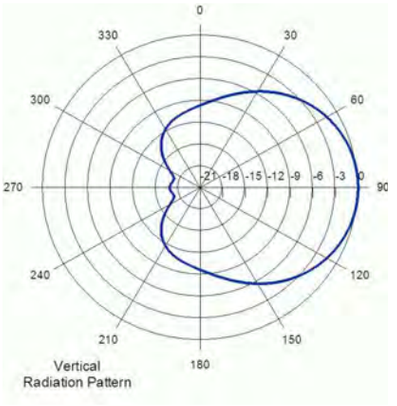
AT12-305

Band II 2 crossed dipoles circular/elliptical polarization panel • Especially suitable for square masts

Electrical Specifications

Frequency range	87.5-108 MHz		
Peak gain	6 dB (ref. λ/2 dipole)		
3 dB beam width	Horizontal: 85º	Vertical: 84º	
Polarization	Circular / Elliptical		
Impedance	50 Ohm		
VSWR	≤ 1.1:1 (with circular polarization)		
Maximum power handling (per connector)	5 kW (2.5 kW)	10 kW (5 kW)	14 kW (7 kW)
Connector type (2 per antenna)	2 x DIN 7/16	2 x EIA 7/8"	2 x DIN 13/30
Pressurization	Non pressurized	Gas barrier on input connector	
	Fully pressurized as an option		





Mechanical & Environmental Specifications

Materials	Hot dip galvanized steel
Dimensions (W x D x H)	2200 x 1013 x 2200 mm
Maximum wind speed	200 km/h
Wind load (front)	1150 N (@160 km/h)
Wind load (lateral)	803 N (@160 km/h)
Weight	65 kg
Typical mounting	Square arrangement tower
Clamp type	To Ø 80 – 115 mm pipe
Vertical spacing	2850 mm typical
Grounding	DC grounded
Temperature range	-40°C to +80°C
Humidity	100%

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	3	130	2.5 kN	2200
	3	1.2	195	3.7 kN	
	4	0	260	4.7 kN	
2	2	6	260	5.1 kN	5050
	3	4.2	390	7.4 kN	
	4	3	520	9.4 kN	
4	2	9	520	10.1 kN	10750
	3	7.2	780	14.8 kN	
	4	6	1040	18.7 kN	
6	2	10.8	780	15.2 kN	16450
	3	9	1170	22.1 kN	
	4	7.8	1560	28.1 kN	
8	2	12	1040	20.3 kN	22150
	3	10.2	1560	29.5 kN	
	4	9	2080	37.4 kN	

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

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AT12-321

Band II 2 crossed dipoles circular/elliptical polarization cavity ● Especially suitable for square masts

Electrical Specifications

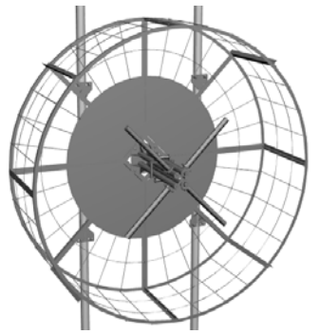
Frequency Range	87.5-108 MHz		
Peak gain	7.2 dB (ref. λ/2 dipole)		
3 dB beam width	Horizontal: 68º	Vertical: 68º	
Polarization	Circular / Elliptical		
Impedance	50 Ohm		
VSWR	≤ 1.1:1 (with circular polarization)		
Maximum power handling (per connector)	5 kW (2.5 kW)	10 kW (5 kW)	14 kW (7 kW)
Connector type (2 per antenna)	2 x DIN 7/16	2 x EIA 7/8"	2 x DIN 13/30
Pressurization	Non pressurized	Gas barrier on input connector	
	Fully pressurized as an option		

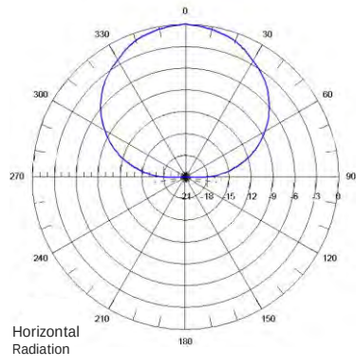
Mechanical & Environmental Specifications

Materials	Hot dip galvanized steel
Dimensions (W x D x H)	2700 x 986 x 2700 mm
Maximum wind speed	200 km/h
Wind load (front)	2320 N (@160 km/h)
Wind load (lateral)	1273 N (@160 km/h)
Weight	101 kg
Typical mounting	Square arrangement tower
Clamp type	To Ø 80 – 115 mm pipe
Vertical spacing	2800 mm
Grounding	DC grounded
Temperature range	-40°C to +80°C
Humidity	100%

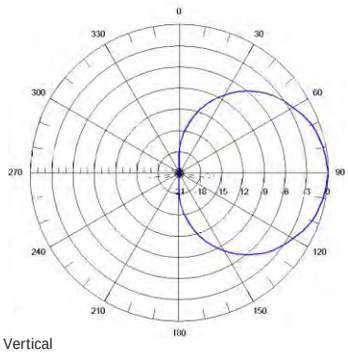
Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	2	5.4	202	3.6 kN	2700
	3	3.7	303	4.9 kN	
	4	2.6	404	6.0 kN	
2	2	8.4	404	7.2 kN	5500
	3	6.7	606	9.7 kN	
	4	5.6	808	12.1 kN	
4	2	11.4	808	14.4 kN	11100
	3	9.7	1212	19.5 kN	
	4	8.6	1616	24.1 kN	
6	2	12.8	1212	21.6 kN	16700
	3	11.5	1818	29.2 kN	
	4	10.4	2424	36.2 kN	
8	2	14.4	1616	28.7 kN	22300
	3	12.7	2424	38.9 kN	
	4	11.6	3232	48.2 kN	





Horizontal Radiation Pattern



Vertical Radiation Pattern

NOTES:

- Table supplies data up to 8 bays only for simplification purposes; systems with more bays are available.
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED.
- Wind load & weight figures without considering cables, splitters & hardware.

The above specified gain must be understood for circular polarization

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RADIO FM FILTERS & COMBINERS

FL12-103

FM 3 poles band pass filters ● ≤ 150 W

Electrical Specifications

Model	FL12-103
Order of the bandpass filters	3
Filter type	Bandpass coaxial
Frequency range	87.5-108 MHz
Impedance	50 Ohm
Max. power handling	150 W
Recommended selectivity	1.2 - 0.8 MHz
Insertion loss (at mid band)	≤0.7 (fc)
Input/output connectors	DIN 7/16 female
VSWR	≤ 1.08 at carrier
Group delay at fc ± 150 kHz	≤ 100 ns

Mechanical & Environmental Specifications

Dimensions (W x D x H)	120 x 483 x 630 (max) mm
Weight	12 kg
Temperature range	-10°C to +50°C

	7/16
Directional couplers at inputs and outputs (see page 137)	AC12-716

The filter can be field retuned to any frequency within specified band

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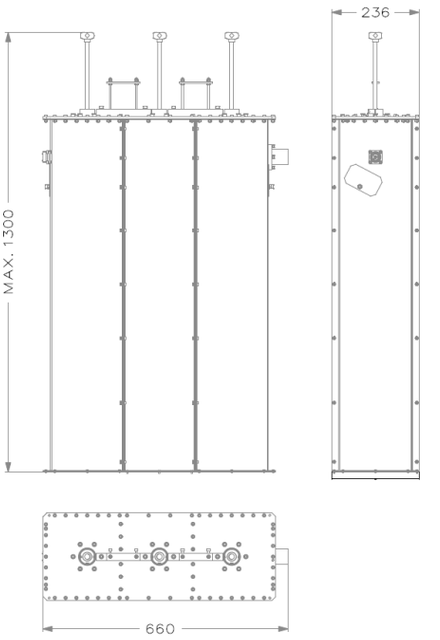
FL12-16 series

FM 2/3/4 poles band pass filters ● ≤ 2 kW

Electrical Specifications

Model	FL12-162	FL12-163	FL12-164
Order of the bandpass filters	2	3	4
Filter type	Bandpass coaxial		
Frequency range	87.5-108 MHz		
Impedance	50 Ohm		
Max. power handling	2 kW		
Recommended selectivity	2 - 1.6 MHz	1.6 - 0.8 MHz	1.2 - 0.6 MHz
Insertion loss (at mid band)	≤0.2 - 0.25 dB (fc)	≤0.3 - 0.5 dB (fc)	≤0.4- 0.7 dB (fc)
Input/output connectors	DIN 7/16 (F) or EIA 7/8"		
VSWR	≤ 1.05 at carrier		
Group delay at fc ± 150 kHz	≤ 80 ns	≤ 110 ns	≤ 130 ns



FL12-163

Mechanical & Environmental Specifications

Dimensions (W x D x H)	440 x 236 x 1300 (max) mm	660 x 236 x 1300 (max) mm	880 x 236 x 1300 (max) mm
Weight	16 kg	24 kg	31 kg
Temperature range	-10°C to +50°C		

Optional Accessories

	7/16	7/8"
Directional couplers at inputs and outputs (see page 137)	AC12-716	AC12-078
Rack mounted		√

The filter can be field retuned to any frequency within specified band
For 3 / 4 poles cross-coupling system for inspiring selectivity available

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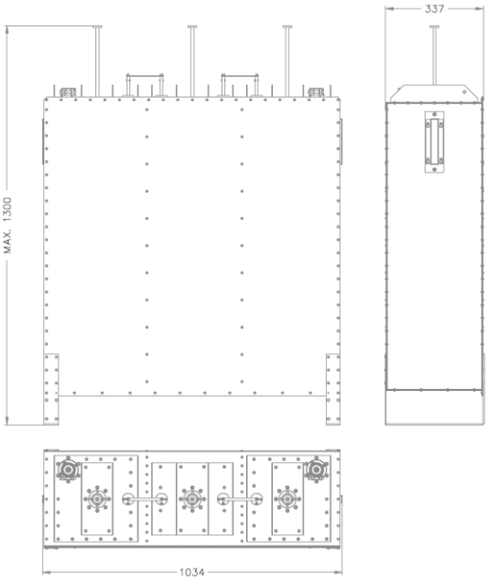
FL12-32 series

FM 2/3/4 poles band pass filters ● ≤ 5 kW

Electrical Specifications

Model	FL12-322HS	FL12-323HS	FL12-324HS
Order of the bandpass filters	2	3	4
Filter type	Bandpass coaxial		
Frequency range	87.5-108 MHz		
Impedance	50 Ohm		
Max. power handling	5 kW		
Recommended selectivity	1.6 - 1.4 MHz	1.2 - 0.8 MHz	1.0 - 0.6 MHz
Insertion loss (at mid band)	≤0.22 -0.25dB (fc)	≤0.35 - 0.45 dB (fc)	≤0.55- 0.7 dB (fc)
Input/output connectors	1 5/8" unfl female		
VSWR	≤ 1.05 at carrier		
Group delay at fc ± 150 kHz	≤ 80 ns	≤ 100 ns	≤ 120 ns



FL12-323HS

Mechanical & Environmental Specifications

Dimensions (W x D x H)	689 x 236 x 1300 (max) mm	1034 x 337 x 1300 (max) mm	1378 x 236 x 1300 (max) mm
Weight	27 kg	38 kg	50 kg
Temperature range	-10°C to +50°C		

	1 5/8"
Directional couplers at inputs and outputs (see page 137)	AC12-158
Unflanged to flanged adapters (see page 136)	TR22-123

The filter can be field retuned to any frequency within specified band
For 3 / 4 poles cross-coupling system for inspiring selectivity available

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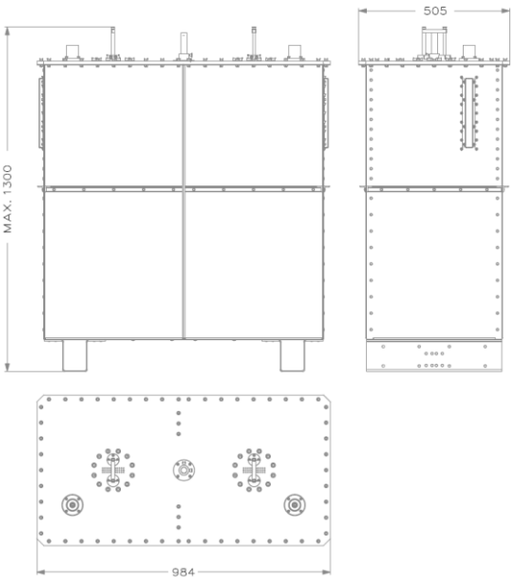
Web: https://www.group.sener/radiodifusion/

FL12-42 series

FM 2/3/4 poles band pass filters ● ≤ 15 kW

Electrical Specifications

Model	FL12-422 FL12-422HS	FL12-423 FL12-423HS	FL12-424 FL12-424HS
Order of the bandpass filters	2	3	4
Filter type	Bandpass coaxial		
Frequency range	87.5-108 MHz		
Impedance	50 Ohm		
Max. power handling (1) FL12-422/ FL12-423/ FL12-424 FL12-422HS/ FL12-423HS/ FL12-424HS	 12.5 kW 15 kW		
Recommended selectivity	1.6 - 1.2 MHz	1.2 - 0.8 MHz	0.8 - 0.6 MHz
Insertion loss (at mid band)	≤0.15 -0.20dB (fc)	≤0.20 -0.25dB (fc)	≤0.35- 0.45dB (fc)
Input/output connectors	1 5/8" and 3 1/8" unfl female		
VSWR	≤ 1.05 at carrier		
Group delay at fc ± 150 kHz	≤ 50 ns	≤ 80 ns	≤ 100 ns



FL12-422

Mechanical & Environmental Specifications

Dimensions (W x D x H)	984 x 505 x 1300 (max) mm	1476 x 505 x 1300 (max) mm	1968 x 505 x 1300 (max) mm
Weight	60 kg	83 kg	109 kg
Temperature range	-10°C to +50°C		

	1 5/8"	3 1/8"
Directional couplers at inputs and outputs (see page 137)	AC12-158	AC12-318
Unflanged to flanged adapters (see page 136)	TR22-123	TR24-125

NOTES:

(1): Heat sinks are available as an option to increase the power handling up to 15 kW

The filter can be field retuned to any frequency within specified band
For 3 / 4 poles cross-coupling system for inspiring selectivity available

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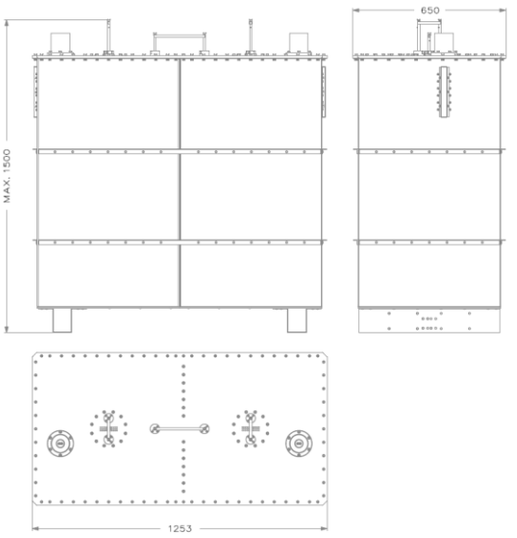
FM 2/3/4 poles band pass filters ● ≤ 20 kW

Electrical Specifications

Model	FL12-652	FL12-653	FL12-654
Order of the bandpass filters	2	3	4
Filter type	Bandpass coaxial		
Frequency range	87.5-108 MHz		
Impedance	50 Ohm		
Max. power handling	20 kW		
Recommended selectivity	1.6 - 1.2 MHz	1.2 - 0.8 MHz	0.8 - 0.6 MHz
Insertion loss (at mid band)	≤0.10 -0.15dB (fc)	≤0.12 -0.17dB (fc)	≤0.25- 0.35dB (fc)
Input/output connectors	1 5/8" and 3 1/8" unfl female		
VSWR	≤ 1.05 at carrier		
Group delay at fc ± 150 kHz	≤ 50 ns	≤ 80 ns	≤ 100 ns



FL12-652

Mechanical & Environmental Specifications

Dimensions (W x D x H)	1253 x 650 x 1300 (max) mm	1903 x 650 x 1300 (max) mm	2553 x 650 x 1300 (max) mm
Weight	101 kg	142 kg	185 kg
Temperature range	-10°C to +50°C		

	1 5/8"	3 1/8"
Directional couplers at inputs and outputs (see page 137)	AC12-158	AC12-318
Unflanged to flanged adapters (see page 136)	TR22-123	TR24-125

The filter can be field retuned to any frequency within specified band
For 3 / 4 poles cross-coupling system for inspiring selectivity available

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Web: https://www.group.sener/radiodifusion/

DP12-202, DP12-204, DP12-230

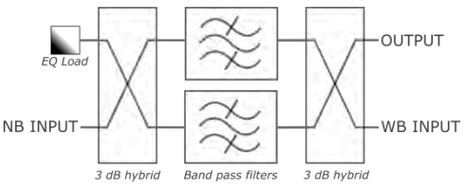
FM 2/3/4 poles CIB combiner ● ≤ 4 kW NB

Electrical Specifications

Order of the bandpass filters		2	3	4
Frequency range		87.5-108 MHz		
Type		Constant impedance		
Impedance		50 Ohm		
Recommended min freq. spacing (1)		1.6 MHz	1.1 MHz	0.9 MHz
Max. power handling (NB/WB/Output) DP12-202 - DP12-204 - DP12-230		2/2/2 kW - 2/12/12 kW - 4/12/12 kW		
Input connectors (NB/WB) DP12-202 DP12-204 DP12-230		DIN 7/16 (F) / DIN 7/16 (F) DIN 7/16 (F) / 1 5/8" Unfl. 1 5/8" Unfl. / 1 5/8" Unfl.		
Output connector DP12-202 DP12-204 DP12-230		DIN 7/16 (F) 1 5/8" Unfl.		
VSWR	Narrowband input	≤ 1.05:1 at carrier fc		
	Wideband input	≤ 1.10:1		
Insertion loss	Narrowband input	≤0.35dB (fc)	≤0.55dB (fc)	≤0.75dB (fc)
	Wideband input	≤ 0.1 dB		
Isolation	NB input to WB input	≥ 40 dB		
	WB input to NB input	≥ 50 dB		
Group delay at fc ± 150 kHz		≤ 80 ns	≤ 110 ns	≤ 130 ns
Thermoswitch at EQ load		Yes		

Mechanical & Environmental Specifications

Dimensions DP12-202 (W x D x H)	498 x 668 x 1500 mm	498 x 865 x 1500 mm	498 x 1060 x 1500 mm
Dimensions DP12-204 (W x D x H)	498 x 820 x 1500 mm	498 x 1016 x 1500 mm	498 x 1212 x 1500 mm
Dimensions DP12-230 (W x D x H)	498 x 1010 x 1500 mm	498 x 1205 x 1500 mm	498 x 1400 x 1500 mm
Temperature range	-10°C to +50°C		
Working position	Any		



Optional Accessories

Bandpass filter on wideband input (2)

	7/16	1 5/8"
Directional couplers at inputs and outputs (see page 137)	AC12-716	AC12-158
Unflanged to flanged adapters (see page 136)	TR22-123	X
Rack mounted	√	

The combiner can be field retuned to any frequency within specified band

NOTES:

(1): Each model can achieve a narrower channel spacing than the one specified, by sacrificing the transmission response figures, with 4º order and inter-cavity feedback.

(2): The use of an extra filter connected to the wideband input enhances the isolation between inputs, thus reducing the possible generation of inter-mod products.

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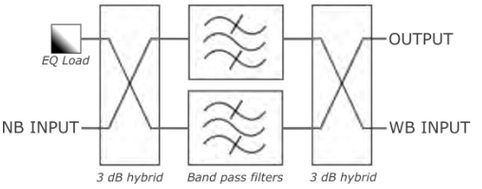
DP12-A30, DP12-A40

FM 2/3/4 poles CIB combiner ● ≤ 10 kW NB

Electrical Specifications

Order of the bandpass filters		2	3	4
Frequency range		87.5-108 MHz		
Type		Constant impedance		
Impedance		50 Ohm		
Recommended minimum freq. spacing (1)		1.4 MHz	1.1 MHz	0.8 MHz
Max. power handling (NB/WB/Output) DP12-A30 DP12-A40		10/12/12 kW 10/30/30 kW		
Input connectors (NB/WB) DP12-A30 DP12-A40		1 5/8" Unfl. / 1 5/8" Unfl. 1 5/8" Unfl. / 3 1/8" Unfl.		
Output connector DP12-A30 DP12-A40		1 5/8" Unfl. 3 1/8" Unfl.		
VSWR	Narrowband input	≤ 1.05:1 at carrier fc		
	Wideband input	≤ 1.10:1		
Insertion loss	Narrowband input	≤ 0.30dB(fc)	≤0.45dB (fc)	≤0.60dB (fc)
	Wideband input	≤ 0.1 dB		
Isolation	NB input to WB input	≥ 40 dB		
	WB input to NB input	≥ 50 dB		
Group delay at fc ± 150 kHz		≤ 80 ns	≤ 100 ns	≤ 120 ns
Thermoswitch at EQ load		Yes		



Mechanical & Environmental Specifications

Dimensions DP12-A30 (W x D x H)	735 x 695 x 1780 mm	920 x 1034 x 1425 mm	920 x 1360 x 1425 mm
Dimensions DP12-A40 (W x D x H)	755 x 800 x 1930 mm	920 x 1034 x 1550 mm	920 x 1360 x 1550 mm
Temperature range	-10°C to +50°C		

Optional Accessories

	1 5/8"	3 1/8"
Directional couplers at inputs and outputs (see page 137)	AC12-158	AC12-318
Unflanged to flanged adapters (see page 136)	TR22-123	TR24-125

The combiner can be field retuned to any frequency within specified band

NOTES:

(1): Each model can achieve a narrower channel spacing than the one specified, by sacrificing the transmission response figures. 0.6 MHz spacing available with 4th order and inter-cavity feedback.

(2): The use of an extra filter connected to the wideband input enhances the isolation between inputs, thus reducing the possible generation of inter-mod products.

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DP12-430, DP12-460

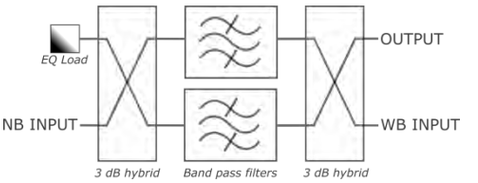
FM 2/3/4 poles CIB combiner ● ≤ 12 kW NB

Electrical Specifications

Order of the bandpass filters		2	3	4
Frequency range		87.5-108 MHz		
Type		Constant impedance		
Impedance		50 Ohm		
Recommended minimum freq. spacing (1)		1.2 MHz	0.9 MHz	0.7 MHz
Max. power handling (NB/WB/Output) DP12-430 DP12-460		12/40/40 kW 12/70/70 kW		
Input connectors (NB/WB) DP12-430 DP12-460		1 5/8" unfl. / 3 1/8" unfl. 1 5/8" unfl. / 4 ½" unfl.		
Output connector DP12-430 DP12-460		3 1/8" unfl. 4 ½" unfl.		
VSWR	Narrowband input	≤ 1.05:1 at carrier fc		
	Wideband input	≤ 1.10:1		
Insertion loss	Narrowband input	≤ 0.20dB (f_c)	≤ 0.26dB (f_c)	≤ 0.32dB (f_c)
	Wideband input	≤ 0.1 dB		
Isolation	NB input to WB input	≥ 40 dB		
	WB input to NB input	≥ 50 dB		
Group delay at fc ± 150 kHz		≤ 50 ns	≤ 80 ns	≤ 100 ns
Thermoswitch at EQ load		Yes		

Mechanical & Environmental Specifications

Dimensions DP12-430 (W x D x H)	1052 x 985 x 1520 mm	1052 x 1445 x 1520 mm	1052 x 1905 x 1520 mm
Dimensions DP12-460 (W x D x H)	1052 x 985 x 1520 mm	1052 x 1445 x 1520 mm	1052 x 1905 x 1520 mm
Temperature range	-10°C to +50°C		
Working position	Any		



Optional Accessories

	1 5/8"	3 1/8"	4 1/2"
Directional couplers at inputs and outputs (see page 151)	AC12-158	AC12-318	AC12-412
Unflanged to flanged adapters (see page 150)	TR22-123	TR24-125	TR30-131
Rack mounted	✓		

The combiner can be field retuned to any frequency within specified band

NOTES:

(1): Each model can achieve a narrower channel spacing than the one specified, by sacrificing the transmission response figures. 0.5 MHz spacing available with 4th order and inter-cavity feedback.

(2): The use of an extra filter connected to the wideband input enhances the isolation between inputs, thus reducing the possible generation of inter-mod products.

E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

DP12-440, DP12-450

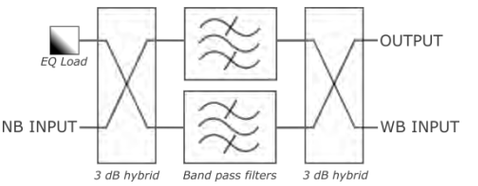
FM 2/3/4 poles CIB combiner • 25 kW NB

Electrical Specifications

Order of the bandpass filters		2	3	4
Frequency range		87.5-108 MHz		
Type		Constant impedance		
Impedance		50 Ohm		
Recommended minimum freq. spacing (1)		1.2 MHz	0.9 MHz	0.7 MHz
Max. power handling (NB/WB/Output) DP12-440 DP12-450		25/40/40 kW 25/70/70 kW		
Input connectors (NB/WB) DP12-440 DP12-450		3 1/8" unfl. / 3 1/8" unfl. 3 1/8" unfl. / 4 1/2" unfl.		
Output connector DP12-440 DP12-450		3 1/8" unfl. 4 ½" unfl.		
VSWR	Narrowband input	≤ 1.05:1 at carrier fc		
	Wideband input	≤ 1.10:1		
Insertion loss	Narrowband input	≤0.20dB(fc)	≤0.26dB(fc)	≤0.32dB(fc)
	Wideband input	≤ 0.1 dB		
Isolation	NB input to WB input	≥ 40 dB		
	WB input to NB input	≥ 50 dB		
Group delay at fc ± 150 kHz		≤ 50 ns	≤ 80 ns	≤ 100 ns
Thermoswitch at EQ load		Yes		

Mechanical & Environmental Specifications

Dimensions DP12-440 (W x D x H)	1055 x 980 x 1653 mm	1055 x 1440 x 1653 mm	1055 x 1900 x 1653 mm
Dimensions DP12-450 (W x D x H)	1055 x 990 x 1698 mm	1055 x 1450 x 1698 mm	1055 x 1910 x 1698 mm
Temperature range	-10°C to +50°C		
Working position	Any		



Optional Accessories

	3 1/8"	4 1/2"
Directional couplers at inputs and outputs (see page 137)	AC12-318	AC12-412
Unflanged to flanged adapters (see page 136)	TR24-125	TR30-131
Rack mounted	√	

The combiner can be field retuned to any frequency within specified band

NOTES:

(1): Each model can achieve a narrower channel spacing than the one specified, by sacrificing the transmission response figures. 0.5 MHz spacing available with 4th order and inter-cavity feedback.

(2): The use of an extra filter connected to the wideband input enhances the isolation between inputs, thus reducing the possible generation of inter-mod products.

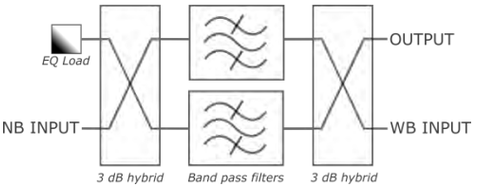
E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

DP12-470, DP12-480

FM 2/3/4 poles CIB combiner ● ≤ 30 kW NB

Electrical Specifications

Order of the bandpass filters		2	3	4
Frequency range		87.5-108 MHz		
Type		Constant impedance		
Impedance		50 Ohm		
Recommended minimum freq. spacing (1)		1.2 MHz	0.9 MHz	0.7 MHz
Max. power handling (NB/WB/Output) DP12-480 DP12-470		40/70/70 kW 40/140/140 kW		
Input connectors (NB/WB) DP12-480 DP12-470		3 1/8" unfl. / 4 1/2" unfl. 3 1/8" unfl. / EIA 6 1/8"		
Output connector DP12-480 DP12-470		4 1/2" unfl. EIA 6 1/8"		
VSWR	Narrowband input	≤ 1.05:1 at carrier fc		
	Wideband input	≤ 1.10:1		
Insertion loss	Narrowband input	≤0.20dB(fc)	≤0.26dB(fc)	≤0.32dB(fc)
	Wideband input	≤ 0.1 dB		
Isolation	NB input to WB input	≥ 40 dB		
	WB input to NB input	≥ 50 dB		
Group delay at fc ± 150 kHz		≤ 50 ns	≤ 80 ns	≤ 100 ns
Thermoswitch at EQ load		Yes		



Mechanical & Environmental Specifications

Dimensions DP12-480 (W x D x H)	1055 x 980 x 1698 mm	1055 x 1450 x 1698 mm	1055 x 1910 x 1698 mm
Dimensions DP12-470 (W x D x H)	1070 x 1085 x 1890 mm	1070 x 1545 x 1890 mm	1070 x 2005x 1890 mm
Temperature range	-10°C to +50°C		
Working position	Any		

Optional Accessories

Bandpass filter on wideband input (2)

	3 1/8"	6 1/8"	4 1/2"
Directional couplers at inputs and outputs (see page 137)	AC12-318	AC12-618	AC12-412
Unflanged to flanged adapters (see page 136)	TR24-125	TR23-127	TR30-131
Rack mounted	✓		

NOTES:

(1): Each model can achieve a narrower channel spacing than the one specified, by sacrificing the transmission response figures. 0.5 MHz spacing available with 4th order and inter-cavity feedback.

(2): The use of an extra filter connected to the wideband input enhances the isolation between inputs, thus reducing the possible generation of inter-mod products.

The combiner can be field retuned to any frequency within specified band

E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

DP12-680

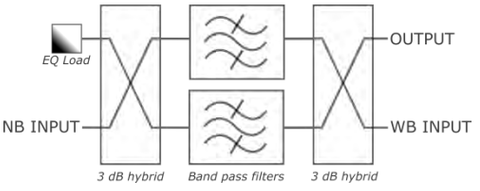
FM 2/3/4 poles CIB combiner ● 40 kW NB

Electrical Specifications

Order of the bandpass filters		2	3	4
Frequency range		87.5-108 MHz		
Type		Constant impedance		
Impedance		50 Ohm		
Recommended minimum freq. spacing (1)		1.2 MHz	0.9 MHz	0.7 MHz
Max. power handling (NB/WB/Output)		30/300/300 kW		
Input connectors (NB/WB)		3 1/8" unfl. / EIA 9 3/16"		
Output connector		EIA 9 3/16"		
VSWR	Narrowband input	≤ 1.05:1 at carrier fc		
	Wideband input	≤ 1.10:1		
Insertion loss	Narrowband input	≤0.18dB(fc)	≤0.25dB(fc)	≤0.34dB(fc)
	Wideband input	≤ 0.1 dB		
Isolation	NB input to WB input	≥ 40 dB		
	WB input to NB input	≥ 50 dB		
Group delay at fc ± 150 kHz		≤ 50 ns	≤ 80 ns	≤ 100 ns
Thermoswitch at EQ load		Yes		

Mechanical & Environmental Specifications

	2	3	4
Order of the bandpass filters			
Dimensions (W x D x H)	1430 x 1525 x 2150 mm	1430 x 2050 x 2150 mm	1430 x 2640 x 2150 mm
Temperature range	-10°C to +50°C		
Working position	Any		



Optional Accessories

	3 1/8"	9 3/16"
Directional couplers at inputs and outputs (see page 137)	AC12-318	AC12-040
Unflanged to flanged adapters (see page 136)	TR24-125	TR40-XXX
Rack mounted	√	

The combiner can be field retuned to any frequency within specified band

NOTES:

(1): Each model can achieve a narrower channel spacing than the one specified, by sacrificing the transmission response figures. 0.5 MHz spacing available with 4th order and inter-cavity feedback.

(2): The use of an extra filter connected to the wideband input enhances the isolation between inputs, thus reducing the possible generation of inter-mod products.

E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

FM 2/3/4 poles Star-point combiner ● ≤ 10 kW NB

Technical Specifications

Order of the bandpass filters	2, 3 and 4
Frequency range	87.5-108 MHz
Type	Star-point
Impedance	50 Ohm
VSWR	≤ 1.10:1 at carrier fc
Insertion loss	See table below
Isolation between inputs	≥ 32 dB
Connectors	Unflanged except on DIN 7/16 (see table below)
Temperature range	-10ºC to +50ºC
Working position	Any

Models

Max. power per input	Input connectors	Output connector	No. of inputs	Model	Filter order	Freq. spacing(2)	Insertion loss at fc	Dimensions Width x Depth x Height
150 W	DIN 7/16	DIN 7/16	2	DS12-103	3	≥ 2.5 dB	≤ 0.7 dB	270 x 310 x 576 mm
			3	TS12-103	3	≥ 2.5 dB	≤ 0.7 dB	377 x 310 x 576 mm
			4	XS12-103	3	≥ 2.5 dB	≤ 0.8 dB	484 x 310 x 576 mm
2 kW	DIN 7/16 F or EIA 7/8"	1 5/8" unfl.	2	DS12-203-2O	2	≥ 2.6 MHz	≤0.35 dB	495 x 460 x 1250 mm
				DS12-203-3O	3	≥ 1.5 MHz	≤0.55 dB	495 x 660 x 1250 mm
				DS12-203-4O	4	≥ 1.2 MHz	≤0.75 dB	495 x 860 x 1250 mm
			3	TS12-204-2O	2	≥ 2.6 MHz	≤0.35 dB	726 x 460 x 1250 mm
				TS12-204-3O	3	≥ 1.5 MHz	≤0.55 dB	726 x 660 x 1250 mm
				TS12-204-4O	4	≥ 1.2 MHz	≤0.75 dB	726 x 860 x 1250 mm
			4	XS12-204-2O	2	≥ 2.6 MHz	≤0.35 dB	1090 x 495 x 1250 mm
				XS12-204-3O	3	≥ 1.5 MHz	≤0.55 dB	1490 x 495 x 1250 mm
				XS12-204-4O	4	≥ 1.2 MHz	≤0.75 dB	1890 x 495 x 1250 mm
5 kW	1 5/8" unfl.	1 5/8" unfl.	2	DS12-A30-2O	2	≥ 2.2 MHz	≤0.30 dB	815 x 700 x 1400 mm
				DS12-A30-3O	3	≥ 1.4 MHz	≤0.45 dB	815 x 1050 x 1400 mm
				DS12-A30-4O	4	≥ 1.0 MHz	≤0.60 dB	780 x 1650 x 1400 mm
		3 1/8" unfl.	3	TS12-A40-2O	2	≥ 2.2 MHz	≤0.30 dB	1170 x 700 x 1400 mm
				TS12-A40-3O	3	≥ 1.4 MHz	≤0.45 dB	1170 x 1050 x 1400 mm
				TS12-A40-4O	4	≥ 1.0 MHz	≤0.60 dB	1150 x 1650 x 1400 mm
		3 1/8" unfl.	4	XS12-A40-2O	2	≥ 2.2 MHz	≤0.30 dB	815 x 1400 x 1400 mm
				XS12-A40-3O	3	≥ 1.4 MHz	≤0.45 dB	815 x 2100 x 1400 mm
				XS12-A40-4O	4	≥ 1.0 MHz	≤0.60 dB	730 x 3300 x 1400 mm
		3 1/8" unfl.	6	HS12-A40-2O	2	≥ 2.2 MHz	≤0.30 dB	815 x 2120 x 1400 mm
				HS12-A40-3O	3	≥ 1.4 MHz	≤0.45 dB	815 x 3160 x 1400 mm
				HS12-A40-4O	4	≥ 1.0 MHz	≤0.60 dB	1090 x 3300 x 1400 mm
10 kW	1 5/8" unfl.	3 1/8" unfl.	2	DS12-430-2O	2	≥ 2.0 MHz	≤0.20 dB	970 x 985 x 1350 mm
				DS12-430-3O	3	≥ 1.2 MHz	≤0.30 dB	970 x 1450 x 1350 mm
				DS12-430-4O	4	≥ 0.9 MHz	≤0.40 dB	970 x 1910 x 1350 mm
			3	TS12-430-2O	2	≥ 2.0 MHz	≤0.20 dB	1490 x 985 x 1350 mm
				TS12-430-3O	3	≥ 1.2 MHz	≤0.30 dB	1490 x 1450 x 1350 mm
				TS12-430-4O	4	≥ 0.9 MHz	≤0.40 dB	1490 x 1910 x 1350 mm
			4	XS12-430-2O	2	≥ 2.0 MHz	≤0.20 dB	970 x 1975 x 1350 mm
				XS12-430-3O	3	≥ 1.2 MHz	≤0.30 dB	970 x 2895 x 1350 mm
				XS12-430-4O	4	≥ 0.9 MHz	≤0.40 dB	970 x 3820 x 1350 mm

Optional Accessories

	7/16	1 5/8"	3 1/8"
Directional couplers at inputs and outputs (see page 137)	AC12-716	AC12-158	AC12-318
Unflanged to flanged adapters (see page 136)	-	TR22-123	TR24-125
Rack mounted		✓	

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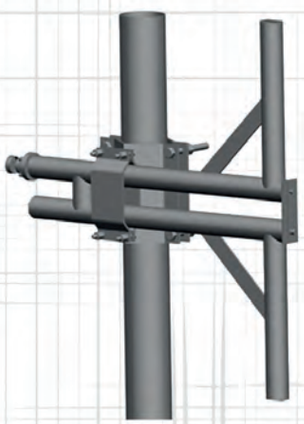
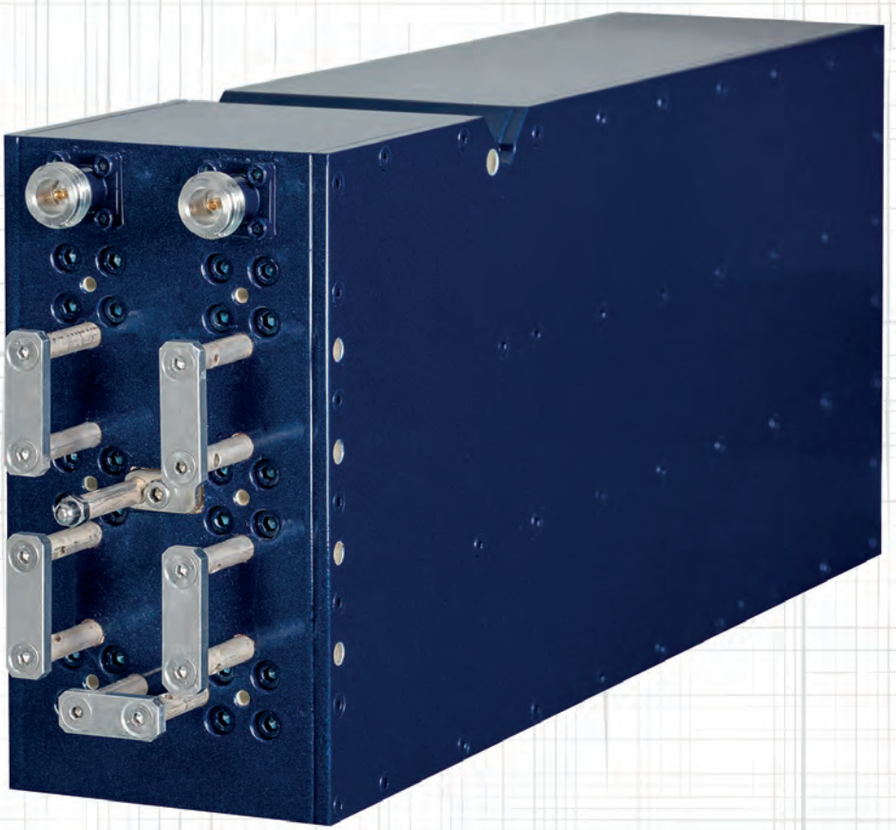
ANTENNA SYSTEMS AND FILTERS FOR DAB





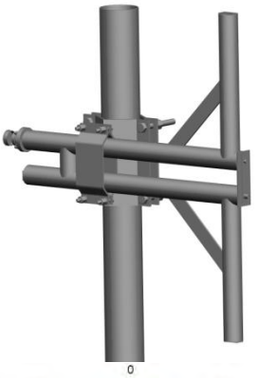
DAB+
Digital Audio Broadcasting

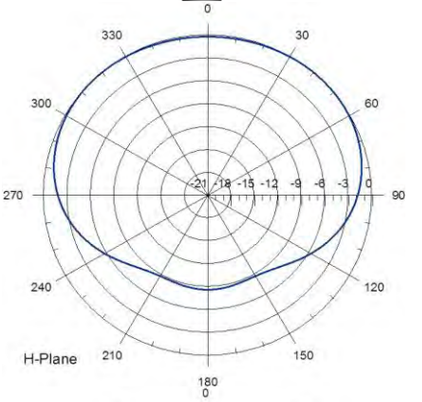
AT14-512

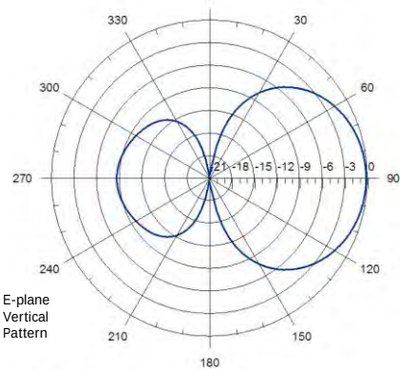
DAB dipole vertical polarization antenna ● Side-Mounted installation

Electrical Specifications

Frequency range	216-240 MHz	
Peak gain	0 dB (ref. □/2 dipole) 2.2 dB (ref. □/2 dipole, with pole)	
3 dB beam width	E-plane: 79º	H-plane: 200º
Polarization	Vertical	
Impedance	50 Ohm	
VSWR	≤ 1.15:1	
Maximum power handling RMS	1.5 kW	
Connector type	DIN 7/16	
Pressurization	Non pressurized	







Mechanical & Environmental Specifications

Materials	Dipole Isolators	Hot dip galvanized steel PTFE
Dimensions (W x D x H)		50 x 690 x 650 mm
Maximum wind speed		200 km/h
Wind load (front)		38 N (@160 km/h)
Wind load (lateral)		106 N (@160 km/h)
Weight		9 kg
Clamp type		To Ø 80 - 100 mm pipe
Vertical spacing		0.8 □□□□0.9 □□typical
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	1	2.2	9	0.11 kN	650
2	1	5.2	18	0.21 kN	1768
4	1	8.2	36	0.42 kN	4005
6	1	10.0	54	0.64 kN	6242
8	1	11.2	72	0.85 kN	8479
10	1	12.2	90	1.06 kN	10712
12	1	13.0	108	1.27 kN	12948

NOTES:

- Radiation patterns and gain values at the table are including the effect of supporting pole
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED
- Wind load & weight figures without considering cables, splitters & hardware.

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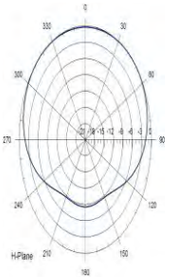
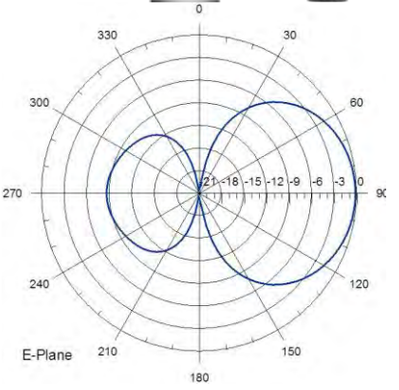
AT14-522

DAB dipole vertical polarization antenna ● Side-mounted installation
For extreme weather conditions

Electrical Specifications

Frequency range	216-240 MHz	
Peak gain	0 dB (ref. □/2 dipole) 2.2 dB (ref. □/2 dipole, with pole)	
3 dB beam width	E-plane: 79º	H-plane: 200º
Polarization	Vertical	
Impedance	50 Ohm	
VSWR	≤ 1.2:1	
Maximum power handling RMS	1.5 kW	
Connector type	DIN 7/16	
Pressurization	Non pressurized	





Mechanical & Environmental Specifications

Materials	Dipole Feed points radome	Hot dip galvanized steel Fiberglass
Dimensions (W x D x H)		50 x 460 x 560 mm
Maximum wind speed		200 km/h
Wind load (front)		38 N (@160 km/h)
Wind load (lateral)		128 N (@160 km/h)
Weight		12 kg
Clamp type		To Ø 80 - 100 mm pipe
Vertical spacing		0.8 □□□□0.9 □□typical
Grounding		DC grounded
Temperature range		-40°C to +80°C
Humidity		100%

Antenna System Characteristics

Number of Bays	Number ant. per bay	Peak gain (dBd)	Weight (kg)	Wind load (@160 km/h)	System height (mm)
1	1	2.2	12	0.13 kN	560
2	1	5.2	24	0.26 kN	1678
4	1	8.2	48	0.51 kN	3915
6	1	10.0	73	0.77 kN	6152
8	1	11.2	96	1.02 kN	8389
10	1	12.2	120	1.27 kN	10622
12	1	13.0	144	1.53 kN	12858

NOTES:

- Radiation patterns and gain values at the table are including the effect of supporting pole
- Null fill, beam tilt, harness & feeder losses NOT INCLUDED
- Wind load & weight figures without considering cables, splitters & hardware.

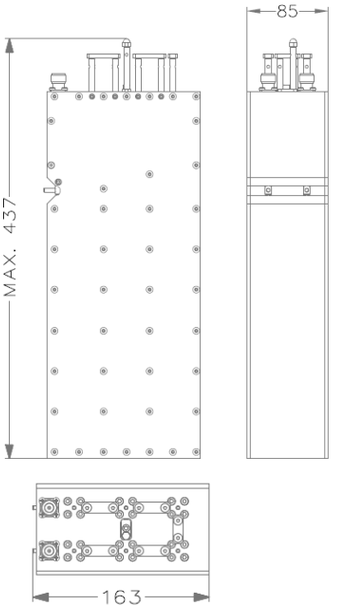
E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

FLDA-016

VHF DAB 6 poles bandpass filter ● 50W

Electrical Specifications

Filter type	Bandpass coaxial
Order	6 with cross coupling
Cavity size	40 mm
Frequency range	170-240 MHz
Impedance	50 Ohm
Channel bandwidth	1.54 MHz
Maximum input power handling	50W RMS
Connectors	DIN 7/16 (F)
2nd Harmonic attenuation	> 50dB
Thermal stability	≤ 0,5 kHz / °C



Mechanical & Environmental Specifications

Dimensions (W x D x H)	85 x 163 x 437 mm
Weight	4.5 kg
Temperature range	-10°C to +50°C
Working position	Any

Responses (1)

Tuning Information	Non Critical Mask	Critical Mask
Insertion loss f_0	≤ 2,2 dB (170 MHz <2,1dB)	≤ 2,3dB (170 MHz <2,2 dB)
Insertion loss f0+/- 0,77MHz	< 4dB	< 4,2dB
Attenuations:		
$f_0 \pm 0.97$ MHz	> 10 dB	> 16 dB
$f_0 \pm 1.75$ MHz	> 25 dB	> 20 dB
$f_0 \pm 2.20$ MHz	> 30 dB	> 35 dB
$f_0 \pm 3.0$ MHz	> 40 dB	> 45 dB
VSWR $f_0 \pm 0,77$ MHz	1.12:1	1.12:1
	< 650 ns	< 700ns

Optional accessories

	7/16
Directional couplers at inputs and outputs (see page 137)	AC13-716

Rack mounted

The filter can be field retuned to any channel within specified band

NOTES:

(1): Other frequency responses can be supplied. Please, ask Sener.

E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

FLDA-116

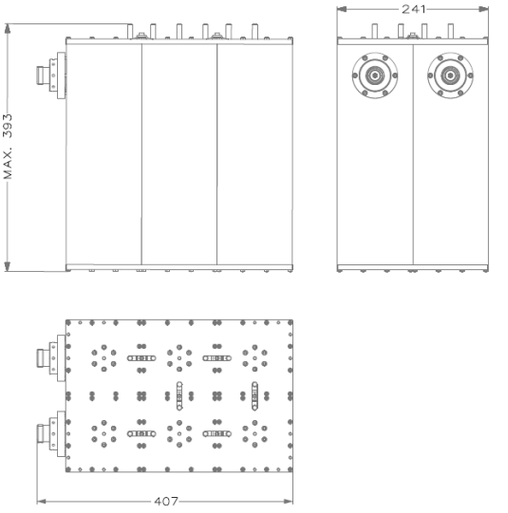
VHF DAB 6 poles bandpass filter • 600W

Electrical Specifications

Filter type	Bandpass coaxial
Order	6 with cross coupling
Cavity size	100 mm
Frequency range	170-240 MHz
Impedance	50 Ohm
Channel bandwidth	1.54 MHz
Maximum input power handling	600 W RMS
Connectors	DIN 7/16 (F)
2nd Harmonic attenuation	> 50dB
Thermal stability	≤ 0,5 kHz / °C

Mechanical & Environmental Specifications

Dimensions (W x D x H)	240 x 400 x 440 mm
Weight	24 kg
Temperature range	-10°C to +50°C
Working position	Any



Responses (1)

Tuning Information	Non Critical Mask	Critical Mask
Insertion loss f_0	≤ 0,85 dB (170 MHz <0,9dB)	≤ 0,9dB (170 MHz <0,95 dB)
Insertion loss f0+/- 0,77MHz	< 2,4dB	< 2,6dB
Attenuations:		
$f_0 \pm 0.97$ MHz	> 5 dB	> 16 dB
$f_0 \pm 1.75$ MHz	> 35 dB	> 45 dB
$f_0 \pm 2.20$ MHz	> 40 dB	> 45 dB
$f_0 \pm 3.0$ MHz	> 50 dB	> 45 dB
VSWR $f_0 \pm 0,77$ MHz	1.12:1	1.12:1
	< 550 ns	< 800ns

Optional accessories

	7/16
Directional couplers at inputs and outputs (see page 137)	AC13-716
Rack mounted	√

The filter can be field retuned to any channel within specified band

NOTES:

(1): Other frequency responses can be supplied. Please, ask Sener.

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Web: https://www.group.sener/radiodifusion/

sener

RF OUTDOORS COMPONENTS

Sener manufactures a wide range of power splitters for varied uses. As an essential component to build broadcast antenna systems, the power splitters are designed and manufactured to guarantee most stringent performances, minimizing VSWR and insertion loss. Broadband features across each broadcast working band (B-I, B-II, B-III, B-IV/V) lead to a high versatility for multichannel applications.

In general terms, the power dividers are constructed as the combination of junction boxes with multi-stage impedance transformers, which can be supplied in two different topologies: Series and Parallel transformer. The latter are maximizing peak power admission, so that they are especially suitable to deal with digital applications.

Sener provides symmetrical and asymmetrical power dividers. The latter are utilized to supply unequal power splitting to the unitary radiators composing the antenna system. This allows the implementation of customized horizontal radiation patterns and it is also useful when an exhaustive control of the vertical radiation pattern is desired. A very wide range of asymmetrical power ratios can be provided for all coaxial sizes and frequency ranges.

Electrical Specifications

Frequency range	VHF band I	54-88 MHz or sub-bands / DT11 Series
	VHF Band II	87.5-108 MHz / DT12 Series
	VHF Band III	174-230 MHz / DT13 Series
	UHF	470-860 MHz / DT15 Series
Impedance		50 Ohm
VSWR	VHF	< 1.05:1
	UHF	< 1.06:1
Insertion loss		< 0.05 dB
Number of outputs		2 up to 8
Power unbalance between output ports		± 0.2 dB
Manufacturing topology	VHF	Series transformer
	UHF	Series Parallel transformer High power
Input & Output connectors		From DIN 7/16 up to EIA 9 3/16”

Mechanical & Environmental

Pressurization (typical operating value)		0.5 bar
Materials	Outer conductor	Brass / copper
	Inner conductor	Silver plated aluminium or brass
	Isolators	PTFE
	Finishing	Long lasting outdoor grey paint
	Screws	Stainless steel
Environmental specification		Indoors or Outdoors
Temperature range		-40°C to +80°C

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Outdoors interconnection lines

The implementation of broadcast antennas by stacking arrays of elementary radiators requires the use of a power splitting network, to make the signals reach every unitary element with the appropriate phase and amplitude. This is achieved by using transmission lines to interconnect the radiating elements with the power splitter outputs. For complex dividers, composed of several splitters, these lines are also used for the connectivity between them.

Sener provides flexible and rigid interconnection lines. The connections from the splitters to the unitary antennas are usually implemented with flexible cables. Inter-splitter connections are made either with flexible or rigid line.

Flexible lines can be provided either using foam or air dielectric cable. Several sizes with a varied type of connectors are available, as for the rigid lines. Each manufactured flexible and rigid interconnection line is properly coded to enable its identification within the antenna system, and put under exhaustive quality tests, including the measurement of phase and return loss, hi-pot test and weatherproofing verification.

Technical Specifications

Frequency range		DC - 862 MHz
Impedance		50 Ohm
VSWR	Flexible	< 1.06:1 (B-I, B-II, B-III) < 1.10:1 (B-IV/V)
	Rigid	< 1.03:1
Pressurization (typical operating value)		0.5 bar
Temperature range		-40°C to +80°C
Materials	Conductors	Copper (flexible cable)
		Copper (rigid lines)
		Silver plated brass/aluminium (elbows)
	Isolators	PTFE
	Finishing	Polyethylene black cover (flexible) Long lasting grey paint (rigid and elbows)
Temperature range		-40°C to +80°C

Flexible cable models

Series	Cable size	Dielectric	Connectors
LKC012	1/2"	Foam	DIN 7/16 male
LKH058	5/8"	Air	DIN 7/16 male EIA 7/8" female
LKC078	7/8"	Foam	DIN 7/16 male EIA 7/8" female
LKH078	7/8"	Air	EIA 7/8" female DIN 13/30 male
LKH118	1 1/8"	Air	DIN 13/30 male EIA 1 5/8" female
LKH158	1 5/8"	Air	EIA 1 5/8" female
LKC158	1 5/8"	Foam	EIA 1 5/8" female
LAH300	3"	Air	EIA 3 1/8" female
LKH318	3 1/8"	Air	EIA 3 1/8" female

Rigid line models

Model	Size	Connectors
LR20-314	7/8"	EIA 7/8" female
LR22-314	1 5/8"	EIA 1 5/8" female
LR24-314	3 1/8"	EIA 3 1/8" female
LR30-314	4 1/2"	IEC 4 1/2" female

Outdoor elbows

Model	Size	Description
CD22-200	1 5/8"	90° EIA flanged female
CD24-200	3 1/8"	90° EIA flanged female
CD30-300	4 1/2"	90° EIA flanged female

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Gas barriers are usually employed at the input of one antenna system in order to isolate its weatherproofing from that of the main feeder line.

The gas barriers are flanged terminated and manufactured either with one or two air inlets.

The one-inlet gas barrier is delivered with a copper bypass pipe intended to conduct the pressurized air from the feeder line to the antenna system. The two-inlets gas barrier is utilized to achieve separated gas supply to both antenna and feeder cable.

Technical Specifications

Impedance		50 Ohm
Frequency range and bandwidth		DC – 860 MHz
VSWR		< 1.03:1
Maximum power handling		According to line size
Materials	Outer conductor	Bronze or brass
	Inner conductor	Silver plated brass
	Isolators	PTFE
	O-rings	Silicon
	Finishing	Long lasting grey paint
	Screws	Stainless steel
Temperature range		-40°C to +80°C

Models

Size	Code	Air inlets	Flanges
7/8"	BP20-020/6247	2	Female
1 5/8"	BP22-022/5038	1	Female
1 5/8"	BP22-022/5071	2	Female
3 1/8"	BP24-024/4702	1	Female
3 1/8"	BP24-024/5104	2	Female
4 1/2"	BP30-030/4779	1	Female
4 1/2"	BP30-030/6114	2	Female
6 1/8"	BP26-026/4622	1	Female
6 1/8"	BP27-026/4625	1	One male / one female

Other models not displayed in this list are available under request

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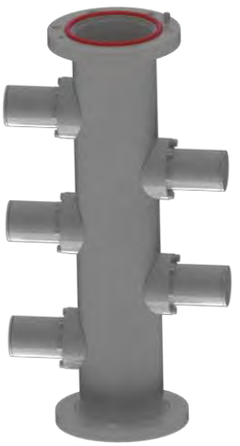
Sener manufactures coaxial fine matchers for outdoor applications in several line sizes (indoor version also available).

The outdoor units are normally employed in the interface between an antenna system and its feeder line to optimize the impedance matching between them.

Technical Specifications

Frequency range		See table below
Impedance		50 Ohm
Insertion loss		Negligible
Maximum power handling		According to line size
Materials	Outer conductor	Copper
	Inner conductor	Copper or silver plated aluminium
	Isolators	PTFE
	Finishing	Long lasting grey paint
Temperature range		-40°C to +80°C



Models

Description	Frequency range	Model
EIA 1 5/8" flanged male	Band II	SF12-400
EIA 1 5/8" flanged female	Band II	SF12-410
EIA 3 1/8" flanged female	Band II	SF12-610
EIA 3 1/8" flanged male	Band III	SF13-610
EIA 1 5/8" flanged male	Band IV-V	SF15-410
EIA 3 1/8" flanged male	Band IV-V	SF15-610
IEC 4 1/2" flanged male	Band IV-V	SF15-510
EIA 6 1/8" flanged male	Band IV-V	SF15-910

Other models not displayed in this table are available under request

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Outdoor adapters

Sener manufactures coaxial adapters to enable the connection between two transmission line elements of any nature and line size. The adapters, especially designed to be used outdoors, can be pressurized. Indoor adapters are also available.

Technical Specifications

Frequency range		DC-862 MHz
Impedance		50 Ohm
VSWR		<1.03:1
Insertion loss		Negligible
Maximum power handling		According to the smaller coaxial size
Materials	Outer conductor	Brass
	Inner conductor	Silver plated aluminium or brass
	Isolators	PTFE
	Finishing	Galvanic plating protection
Temperature range		-40ºC to +80ºC

Models

Family	Model	Port1	Port2
7/16	TR01-030	DIN 7/16 male	N female
1 5/8”	TR22-001	1 5/8” flanged female	DIN 7/16 male
	TR23-021	EIA 1 5/8” flanged male	EIA 7/8" flanged male
	TR22-021	EIA 1 5/8” flanged female	EIA 7/8" flanged male
	TR22-022	EIA 1 5/8” flanged female	EIA 1 5/8” flanged female
3 1/8"	TR25-022	EIA 3 1/8" flanged male	EIA 1 5/8” flanged female
	TR25-023	EIA 3 1/8" flanged male	EIA 1 5/8” flanged male
	TR24-023	EIA 3 1/8" flanged female	EIA 1 5/8” male
	TR24-024	EIA 3 1/8" flanged female	EIA 3 1/8" flanged female
4 1/2"	TR21-024	IEC 4 1/2" flanged male	EIA 3 1/8" flanged female
	TR31-025	IEC 4 1/2" flanged male	EIA 3 1/8" flanged male
6 1/8	TR27-025	EIA 6 1/8" flanged male	EIA 3 1/8” flanged male
	TR27-064	EIA 6 1/8" flanged male	IEC 4 1/2" flanged male
	TR26-026	EIA 6 1/8" flanged female	EIA 6 1/8" flanged female

Other coaxial sizes and DIN sizes not displayed in this table are available under request

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Outdoor patch panel divider • For dual feed line antenna systems

Outdoor patch panel dividers, usually consisting of one six-port patch panel, three u-links and one divider, are widely utilized with half antenna configured by one feeder cable only.

The mentioned elements are presented in a unitised frame, and properly interconnected to enable the three different operative configurations of the antenna system, with the adequate combination of the U-links: either the total system working or each of the two half sections separately.

Indoor models are also available.

Electrical Specifications

Impedance		50 Ohm
Frequency range and bandwidth		See models table
VSWR	TV VHF & FM	< 1.05:1
	TV UHF	< 1.10:1 (A1+A2) < 1.07:1 (A1, A2)
Insertion loss		< 0.1 dB
Amplitude split		- 3 +/- 0.2 dB
Phase split	Splitter models	0° +/- 2°
Input/outputs connectors		EIA 1 5/8", 3 1/8", 4 1/2" & 6 1/8"
Maximum power handling		According to line size
Pressurization		Yes

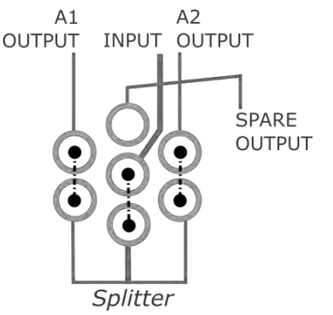
Mechanical & Environmental Specifications

Materials	Outer conductor	Copper and brass
	Inner conductor	Silver plated aluminium and copper
	Isolators	PTFE
	Finishing	Hot dip galvanizing and long lasting black paint
	Screws	Stainless steel
Temperature range		-40°C to + 80°C

Models

Frequency Range	Number of Ports	Coaxial Size EIA 1 5/8"	Coaxial Size EIA 3 1/8"	Coaxial Size IEC 4 1/2"	Coaxial Size EIA 6 1/8"
FM BII	6	CC12-031	CC12-061	CC12-041	CC12-081
TV VHF BIII	6	CC13-031	CC13-061	CC13-041	CC13-081
DAB VHF BIII	6	CC14-031	CC14-061	CC14-041	CC14-081
TV UHF BIV-V	6	CC15-031	CC15-061	CC15-041	-----

NOTE (1): Frequency range of TV VHF Band I models can be either the full working band or reduced sub-bands



PATCH PANEL / DIVIDER CONFIGURATION

Optional Accessories

Adapters at inputs and outputs	See outdoor adapters page 122 for more information

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sener

INDOOR COAXIAL ACCESSORIES

Sener supplies 50 Ohm unflanged 7/8” rigid line sections for indoor applications. The inner conductor is made in copper, and the outer conductor can be supplied either made in aluminium or in copper. Crossed isolators made of two PTFE rods are available to achieve the alignment between the two conductors, ensuring minimum VSWR contribution to the line performance by applying the relative spacing directions supplied below.

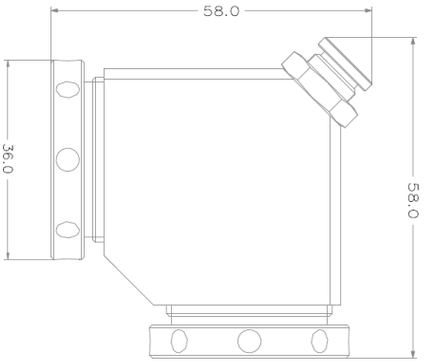
Sener also manufactures the related rigid coaxial accessories such as rigid line coupling elements, devoted to enable the connection between sections of unflanged rigid line, PTFE crossed isolators, coupling elements, unflanged elbows, inner connectors and unflanged to flanged adapters.

Both the rigid line and the corresponding accessories are manufactured optimizing the VSWR and insertion loss values.

Unflanged elbow

This element enables a direct connection to the rigid line without using additional coupling elements

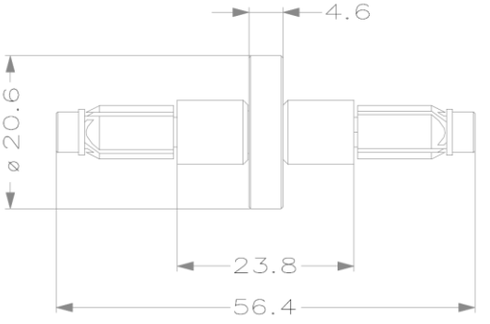
Model		**CD20-010**
Frequency range		DC-862 MHz
Impedance		50 Ohm
VSWR		<1.03:1
Insertion loss		Negligible
Max. Power and voltage		According to line size
Materials	Outer conductor	Aluminium
	Inner conductor	Copper-berilium
	Isolator	PTFE
	Finishing	Chromatized plating
Temperature range		-10°C to +50°C



Inner connector

This element enables the connection between two standard EIA flanged coaxial transmission line terminations

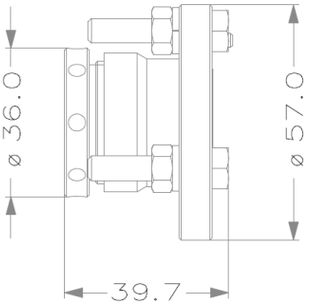
Model		**LR20-600**
Max. Power and voltage		According to line size
Materials	Conductor	Copper-berilium
	Isolator	PTFE
	Finishing	White brass
Temperature range		-10°C to +50°C



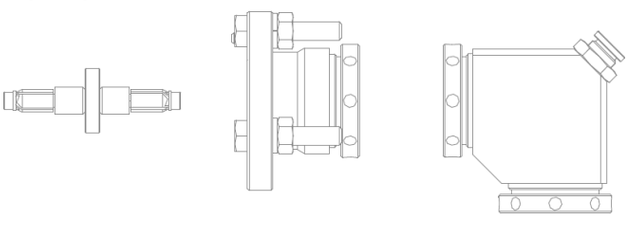
Unflanged to flanged adapter

This element provides a standard flanged EIA termination to an unflanged rigid line section

Model		**TR20-121**
Frequency range		DC-862 MHz
Impedance		50 Ohm
VSWR		<1.03:1
Insertion loss		Negligible
Max. Power and voltage		According to line size
Materials	Outer Conductor	Aluminium
	Finishing	Chromatized plating
Temperature range		-10°C to +50°C



Assembling diagram for 7/8”



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1 5/8” Transmission lines

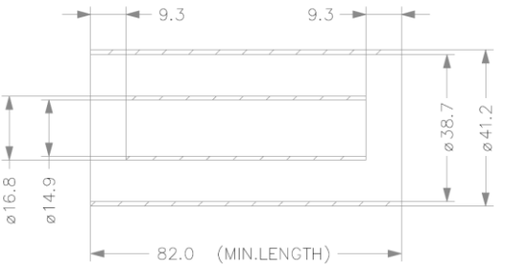
Sener supplies 50 Ohm unflanged 1 5/8” rigid line sections for indoor applications. The inner conductor is made in copper, and the outer conductor can be supplied either made in aluminium or in copper. Crossed isolators made of two PTFE rods are available to achieve the alignment between the two conductors, ensuring minimum VSWR contribution to the line performance by applying the relative spacing directions supplied below.

Sener also manufactures the related rigid coaxial accessories such as rigid line coupling elements, devoted to enable the connection between sections of unflanged rigid line, PTFE crossed isolators, coupling elements, unflanged elbows, inner connectors and unflanged to flanged adapters.

Both the rigid line and the corresponding accessories are manufactured optimizing the VSWR and insertion loss values.

Rigid line conductors

Frequency range		DC-3260 MHz				
Impedance		50 Ohm				
Maximum power handling (1)		70 MHz	100 MHz	200 MHz	500 MHz	800 MHz
		19.0 kW	16.0 kW	11.3 kW	7.2 kW	5.7 kW
RF Peak Voltage at sea level		5.2 KV				
Insertion loss (dB/100m) (2)		70 MHz	100 MHz	200 MHz	500 MHz	800 MHz
		0.51	0.61	0.90	1.37	1.74
Maximum Length section		5 m				
Materials	Outer conductor	Aluminium or copper				
	Inner conductor	Copper				
Temperature range		-10˚C to +50˚C				

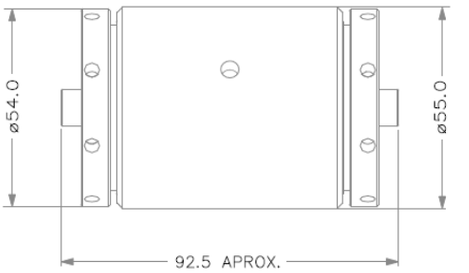


(1) This value is referred to ambient temperature of +40ºC and VSWR 1.0
(2) This value is referred to ambient temperature of +20ºC

Unflanged coupling elements

These elements enable the connection between two straight unflanged rigid line sections

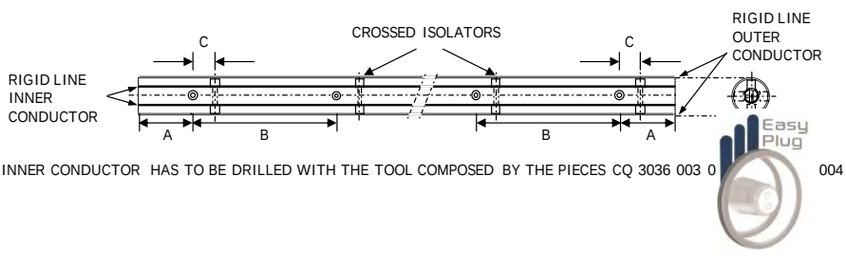
Model	Description
LR22-700	1 5/8” unflanged inner and outer coupling element



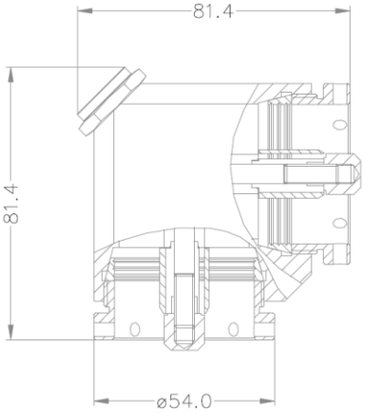
Crossed isolators

These elements enable the alignment between the two conductors ensuring min. VSWR

Model LR22-090	VHF (BI/II/III)	500 MHz	600 Mhz	700 MHz	800 MHz
A	350	350	350	350	350
B	1200	1200	1200	1200	1200
C	100	150	125	107	94



NOTE: INNER CONDUCTOR HAS TO BE DRILLED WITH THE TOOL COMPOSED BY THE PIECES CQ 3036 003 0 004 0



Unflanged elbow

This element enables a direct connection to the rigid line without using additional coupling

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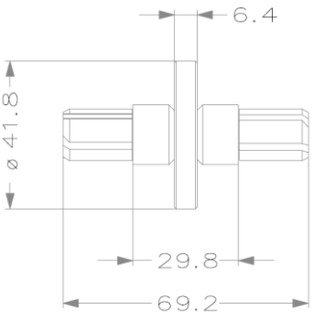
elements

Model		CD22-010
Frequency range		DC-862 MHz
Impedance		50 Ohm
VSWR		<1.03:1
Insertion loss		Negligible
Max. Power and voltage		According to line size
Materials	Outer conductor	Aluminium
	Inner conductor	Copper-berilium
	Isolator	PTFE
	Finishing	Chromatized plating
Temperature range		-10°C to +50°C

Inner connector

This element enables the connection between two standard EIA flanged coaxial transmission line terminations

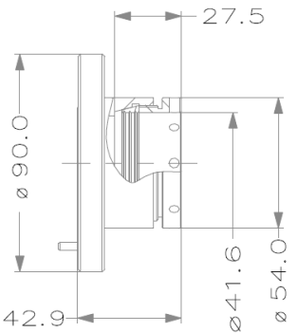
Model		LR22-600
Max. Power and voltage		According to line size
Materials	Conductor	Copper-berilium
	Isolator	PTFE
	Finishing	White brass
Temperature range		-10°C to +50°C



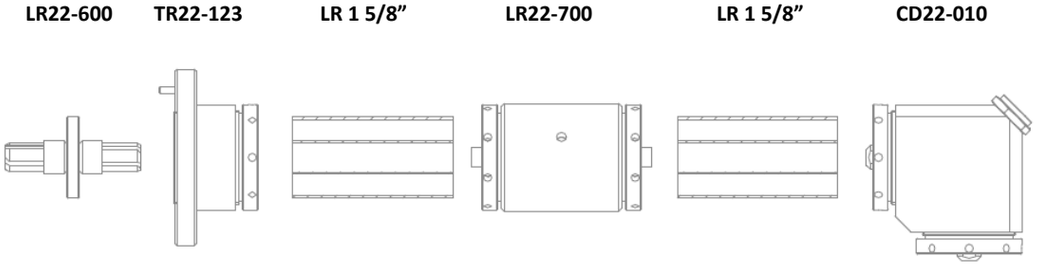
Unflanged to flanged adapter

This element provides a standard flanged EIA termination to an unflanged rigid line section

Model		TR22-123
Frequency range		DC-862 MHz
Impedance		50 Ohm
VSWR		<1.03:1
Insertion loss		Negligible
Max. Power and voltage		According to line size
Materials	Outer Conductor	Aluminium
	Finishing	Chromatized plating
Temperature range		-10°C to +50°C



Assembling diagram for 1 5/8” elements



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Web: https://www.group.sener/radiodifusion/

3 1/8” Transmission lines

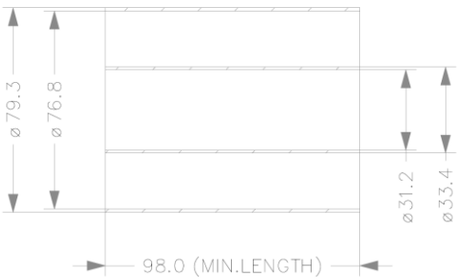
Sener supplies 50 Ohm unflanged 3 1/8” rigid line sections for indoor applications. The inner conductor is made in copper, and the outer conductor can be supplied either made in aluminium or in copper. Crossed isolators made of two PTFE rods are available to achieve the alignment between the two conductors, ensuring minimum VSWR contribution to the line performance by applying the relative spacing directions supplied below.

Sener also manufactures the related rigid coaxial accessories such as rigid line coupling elements, devoted to enable the connection between sections of unflanged rigid line, PTFE crossed isolators, coupling elements, unflanged elbows, inner connectors and unflanged to flanged adapters.

Both the rigid line and the corresponding accessories are manufactured optimizing the VSWR and insertion loss values.

Rigid line conductors

Frequency range		DC-1644 MHz				
Impedance		50 Ohm				
Maximum power handling [1]		70 MHz 63.9 kW	100 MHz 53.5 kW	200 MHz 37.7 kW	500 MHz 23.9 kW	800 MHz 18.9 kW
RF Peak Voltage at sea level		9.6 KV				
Insertion loss (dB/100m) [2]		70 MHz 0.26	100 MHz 0.31	200 MHz 0.44	500 MHz 0.69	800 MHz 0.88
Maximum Length section		5 m				
Materials	Outer conductor Inner conductor	Aluminium or copper Copper				
Temperature range		-10°C to +50°C				



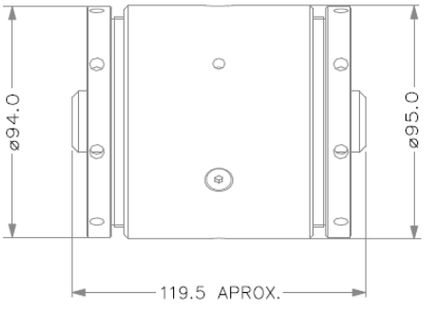
Line Size	Conductor	Material	Reference
3 1/8”	Inner	Copper	1123111800
3 1/8”	Outer	Copper	1123119900
3 1/8”	Outer	Aluminium	1253109000

(1) This value is referred to ambient temperature of +40ºC and VSWR 1.0
(2) This value is referred to ambient temperature of +20ºC

Unflanged coupling elements

These elements enable the connection between two straight unflanged rigid line sections

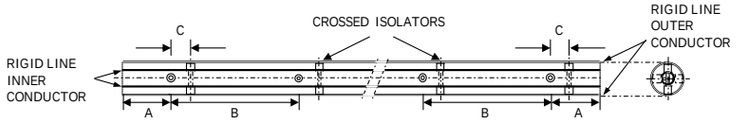
Model	Description
LR24-570 / 5018	3 1/8” unflanged inner and outer coupling element



Crossed Isolators

These elements enable the alignment between the two conductors ensuring min. VSWR

Model LR24-090	VHF (BI/II/III)	500 MHz	600 Mhz	700 MHz	800 MHz
A	350	350	350	350	350
B	1800	1800	1800	1800	1800
C	100	150	125	107	94



NOTE: INNER CONDUCTOR HAS TO BE DRILLED WITH THE TOOL COMPOSED BY THE PIECES CQ 3036 003 0 AND CQ 3036 004 0

Unflanged elbow

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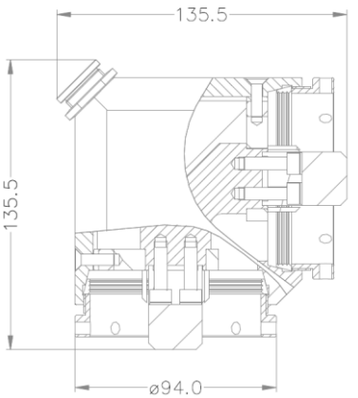
Web: https://www.group.sener/radiodifusion/

This element enables a direct connection to the rigid line conductor without using additional coupling elements

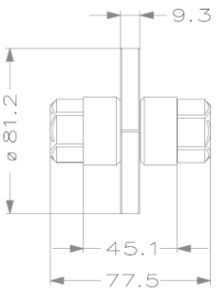
Model		CD24-010
Frequency range		DC-862 MHz
Impedance		50 Ohm
VSWR		<1.03:1
Insertion loss		Negligible
Max. Power and voltage		According to line size
Materials	Outer conductor	Aluminium
	Inner conductor	Brass
	Isolator	PTFE
	Finishing	Chromatized plating
Temperature range		-10˚C to +50˚C



Inner connector

This element enables the connection between two standard EIA flanged coaxial transmission line terminations.

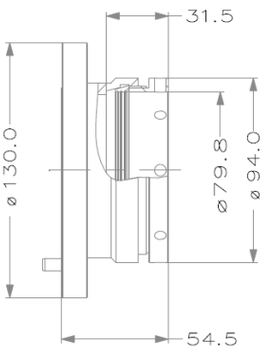
Model		LR24-600
Max. Power and voltage		According to line size
Materials	Conductor	Brass
	Isolator	PTFE
	Finishing	White brass
Temperature range		-10˚C to +50˚C



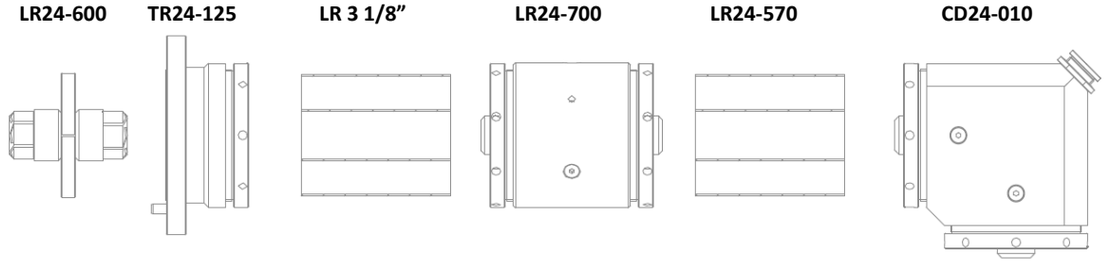
Unflanged to flange adaptor

This element enables provides a standard flanged EIA termination to an unflanged rigid line section

Model		TR24-125
Frequency range		DC-862 MHz
Impedance		50 Ohm
VSWR		<1.03:1
Insertion loss		Negligible
Max. Power and voltage		According to line size
Materials	Outer Conductor	Aluminium
	Finishing	Chromatized plating
Temperature range		-10˚C to +50˚C



Assembling diagram for 3 1/8” elements



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Web: https://www.group.sener/radiodifusion/

4 1/2” Transmission lines

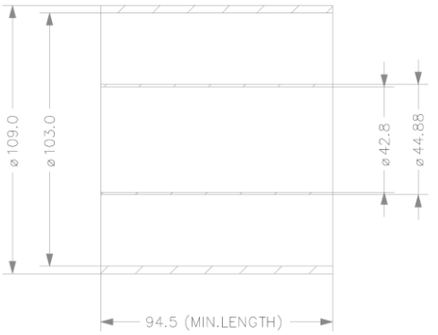
Sener supplies 50 Ohm unflanged 4 1/2” rigid line sections for indoor applications. The inner conductor is made in copper, and the outer conductor is made in aluminium. Crossed isolators made of two PTFE rods are available to achieve the alignment between the two conductors, ensuring minimum VSWR contribution to the line performance by applying the relative spacing directions supplied below.

Sener also manufactures the related rigid coaxial accessories such as rigid line coupling elements, devoted to enable the connection between sections of unflanged rigid line, PTFE cross isolators, coupling elements, unflanged elbows, inner and adapters.

Both the rigid line and the corresponding accessories are manufactured optimizing the VSWR and insertion loss values.

Rigid line conductors

Frequency range		DC-1226 MHz				
Impedance		50 Ohm				
Maximum power handling [1]		70 MHz 105 kW	100 MHz 87.8 kW	200 MHz 62.1 kW	500 MHz 39.3 kW	800 MHz 31.0 kW
RF Peak Voltage at sea level		12.5 KV				
Insertion loss (dB/100m) [2]		70 MHz 0.19	100 MHz 0.23	200 MHz 0.33	500 MHz 0.52	800 MHz 0.65
Maximum Length section		5 m				
Materials	Outer conductor	Aluminium				
	Inner conductor	Copper				
Temperature range		-10°C to +50°C				



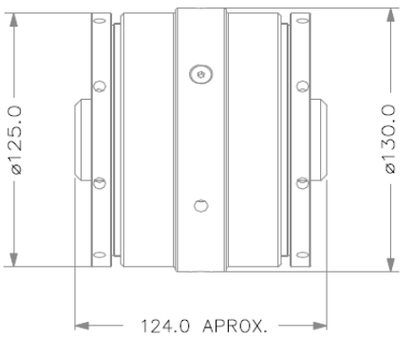
Line Size	Conductor	Material	Reference
4 1/2”	Inner	Copper	1123114120
4 1/2”	Outer	Aluminium	1253111300

[1] This value is referred to ambient temperature of +40ºC and VSWR 1.0
[2] This value is referred to ambient temperature of +20ºC

Unflanged Coupling Elements

These elements enable the connection between two straight unflanged rigid line sections

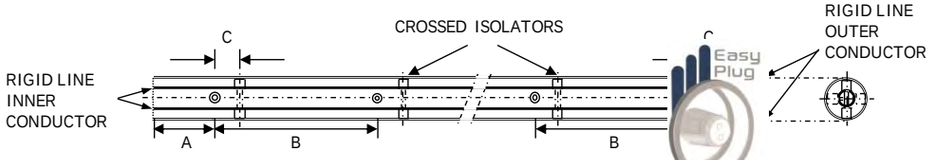
Model	Description
LR30-570	4 1/2” unflanged inner coupling element



Crossed Isolators

These elements enable the alignment between the two conductors ensuring minimum VSWR

Model LR30-090	VHF (BI/II/III)	500 MHz	600 Mhz	700 MHz	800 MHz
A	500	500	500	500	500
B	2000	2000	2000	2000	2000
C	100	150	125	107	94



NOTE: INNER CONDUCTOR HAS TO BE DRILLED WITH THE TOOL COMPOSED BY THE PIECE [illegible]03 0 AND CQ 3036 004 0

Unflanged elbow

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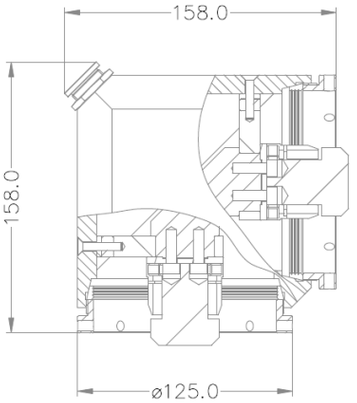
This element enables a direct connection to the rigid line conductor without using additional coupling elements

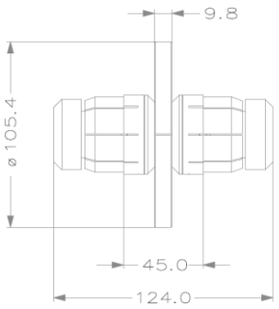
Model		CD30-010
Frequency range		DC-862 MHz
Impedance		50 Ohm
VSWR		<1.03:1
Insertion loss		Negligible
Max. Power and voltage		According to line size
Materials	Outer conductor	Aluminium
	Inner conductor	Brass
	Isolator	PTFE
	Finishing	Chromatized aluminium
Temperature range		-10˚C to +50˚C



Inner connector

This element enables the connection between two standard EIA flanged coaxial transmission line terminations

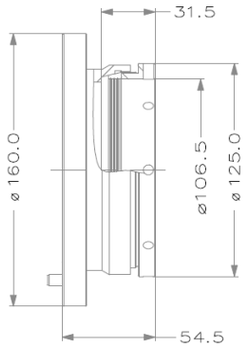
Model		LR30-600
Max. Power and voltage		According to line size
Materials	Conductor	Brass
	Isolator	PTFE
	Finishing	White brass
Temperature range		-10˚C to +50˚C



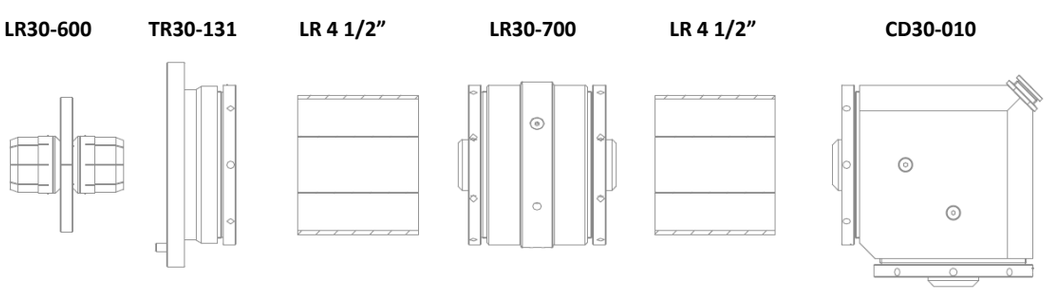
Unflanged to flange adaptor

This element provides a standard flanged EIA termination to an unflanged rigid line section

Model		TR30-131
Frequency range		DC-862 MHz
Impedance		50 Ohm
VSWR		<1.03:1
Insertion loss		Negligible
Max. Power and voltage		According to line size
Materials	Outer Conductor	Aluminium
	Finishing	Chromatized plating
Temperature range		-10˚C to +50˚C



Assembling diagram for 4 1/2” elements



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Web: https://www.group.sener/radiodifusion/

6 1/8” Transmission lines

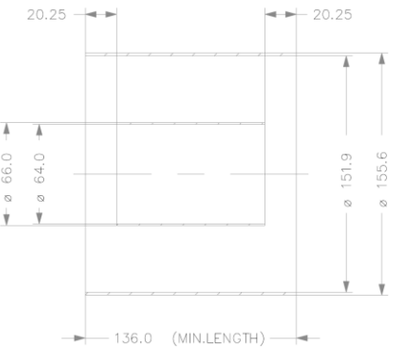
Sener supplies 50 Ohm unflanged 6 1/8” rigid line sections for indoor applications. The inner conductor is made in copper, and the outer conductor is made in aluminium. Crossed isolators made of two PTFE rods are available to achieve the alignment between the two conductors, ensuring minimum VSWR contribution to the line performance by applying the relative spacing directions supplied below. The outer conductor can be supplied either as such or with a standard EIA flanged factory welded.

Sener also manufactures the related rigid coaxial accessories such as rigid line coupling elements, devoted to enable the connection between sections of unflanged rigid line, PTFE cross isolators, coupling elements, unflanged elbows, inner and adapters.

Both the rigid line and the corresponding accessories are manufactured optimizing the VSWR and insertion loss values.

Rigid line conductors

Frequency range		DC-830 MHz				
Impedance		50 Ohm				
Maximum power handling [1]		70 MHz 211 kW	100 MHz 176 kW	200 MHz 125 kW	500 MHz 79 kW	800 MHz 62 kW
RF Peak Voltage at sea level		17.9 KV				
Insertion loss (dB/100m) [2]		70 MHz 0.13	100 MHz 0.16	200 MHz 0.22	500 MHz 0.35	800 MHz 0.44
Maximum Length section		5 m				
Materials	Outer conductor Inner conductor	Aluminium Copper				
Temperature range		-10°C to +50°C				



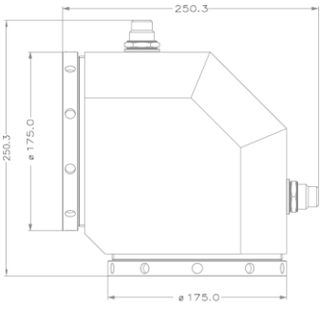
Line Size	Conductor	Material	Reference
6 1/8”	Inner	Copper	1123119450
6 1/8”	Outer	Aluminium	1253112100
6 1/8”	Outer with one welded flanged	Aluminium	LR26-313

[1] This value is referred to ambient temperature of +40ºC and VSWR 1.0
[2] This value is referred to ambient temperature of +20ºC

Unflanged Elbow

This element provides a standard flanged EIA termination to an unflanged rigid

Model		CD26-010
Frequency range		DC-830 MHz
Impedance		50 Ohm
VSWR		<1.03:1
Insertion loss		Negligible
Max. Power and voltage		According to line size
Materials	Outer conductor	Aluminium
	Inner conductor	Silver plated brass
	Isolator	PTFE
	Finishing	Chromatized plating
Temperature range		-10°C to +50°C



Crossed isolators

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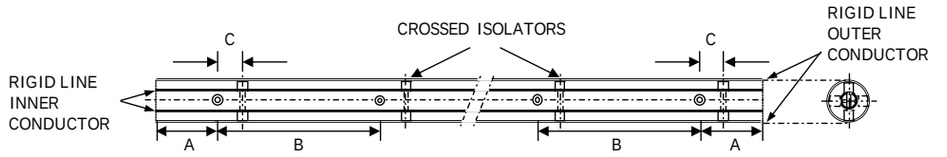
Web: https://www.group.sener/radiodifusion/

These elements enable the alignment between the two conductors ensuring minimum VSWR

Model LR22-090	VHF (BI/II/III)	500 MHz	600 Mhz	700 MHz	800 MHz
A	600	600	600	600	600
B	2250	2250	2250	2250	2200
C	100	150	125	107	94

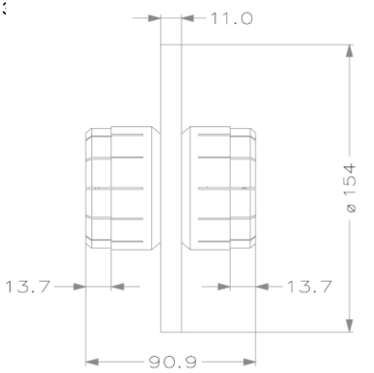


NOTE: INNER CONDUCTOR HAS TO BE DRILLED WITH THE TOOL COMPOSED BY THE PIECES CQ 3036 003 0 AND CQ 3

Inner connector

This element enables the connection between two standard EIA flanged coaxial transmission line terminations

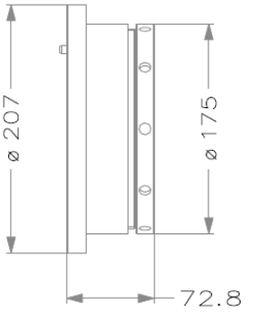
Model		LR26-600
Max. Power and voltage		According to line size
Materials	Conductor	Brass
	Isolator	PTFE
	Finishing	White brass
Temperature range		-10°C to +50°C



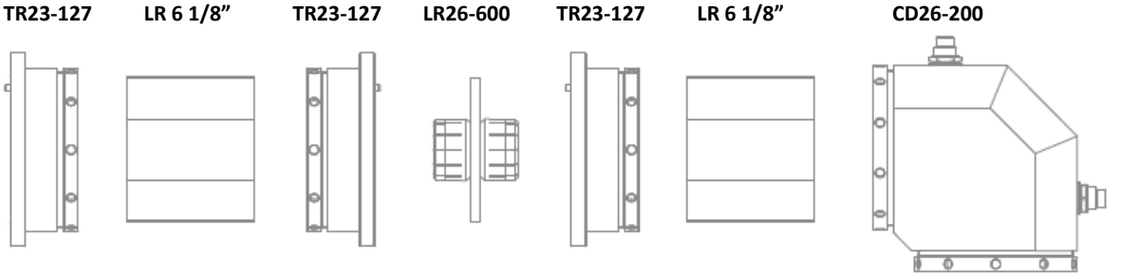
Unflanged to flange adapter

This element provides a standard flanged EIA termination to unflanged rigid line. Two of these elements, plus an inner connector are used to connect two unflanged rigid line sections.

Model		TR23-127
Frequency range		DC-830 MHz
Impedance		50 Ohm
VSWR		<1.03:1
Insertion loss		Negligible
Max. Power and voltage		According to line size
Materials	Outer Conductor	Aluminium
	Finishing	Chromatized plating
Temperature range		-10°C to +50°C



Assembling diagram for 6 1/8” elements



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9 3/16” Transmission lines

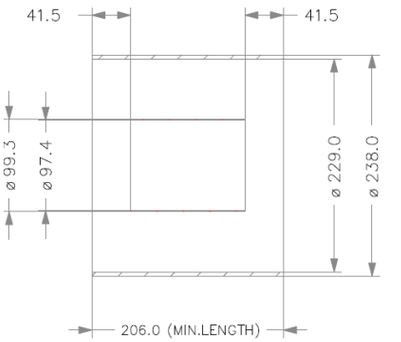
Sener supplies 50 Ohm flanged 9 3/16” rigid line sections for indoor applications. The inner conductor is made in copper, and the outer conductor is made in aluminium. The outer conductor can be supplied either as such or with a standard EIA flanged factory welded.

Sener also manufactures the related rigid coaxial accessories such as rigid line coupling elements, devoted to enable the connection between sections of unflanged rigid line, flanged elbows, inner and adapters.

Both the rigid line and the corresponding accessories are manufactured optimizing the VSWR and insertion loss values.

Rigid line conductors

Frequency range		DC-552 MHz			
Impedance		50 Ohm			
Maximum power handling (1)		70 MHz 455 KW	100 MHz 380 KW	200 MHz 270 KW	500 MHz 170 KW
RF Peak Voltage at sea level		26.7 KV			
Insertion loss (dB/100m) (2)		70 MHz 0.087	100 MHz 0.104	200 MHz 0.147	500 MHz 0.233
Maximum Length section		5 m			
Materials	Outer conductor Inner conductor	Aluminium Copper			
Temperature range		-10°C to +50°C			



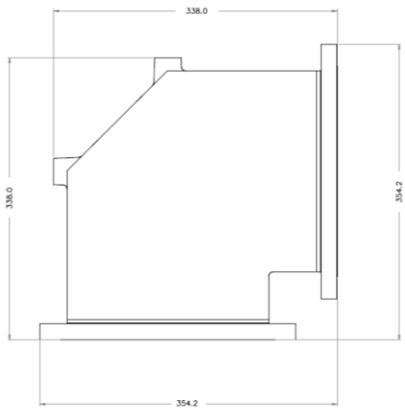
Line Size	Conductor	Material	Reference
9 3/16”	Outer with two welded flanged	Aluminium	LR40-313
9 3/16”	inner	Copper	LR40-313

(1) This value is referred to ambient temperature of +40ºC and VSWR 1.0
(2) This value is referred to ambient temperature of +20ºC

Flanged Elbow

This element enables a direct connection to a rigid line standard flanged 9 3/16” termination

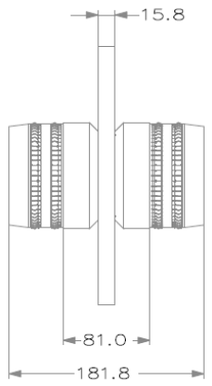
Model		CD40-400
Frequency range		DC-552 MHz
Impedance		50 Ohm
VSWR		<1.03:1
Insertion loss		Negligible
Max. Power and voltage		According to line size
Materials	Outer conductor	Aluminium
	Inner conductor	Silver plated brass
	Isolator	PTFE
	Finishing	Chromatized plating
Temperature range		-10°C to +50°C



Inner connector

This element enables the connection between two standards EIA flanged Coaxial transmission line terminations

Model		LR40-600
Max. Power and voltage		According to line size
Materials	Conductor	Brass
	Isolator	PTFE
	Finishing	White brass
Temperature range		-10°C to +50°C



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Indoor fine matchers

Sener manufactures coaxial fine matchers for indoor applications in several line sizes (outdoor version also available).

The indoor models are mainly used between the transmitter and the antenna system or channel combiner input, to provide final fine VSWR optimisation.

Technical Specifications

Frequency range		See table below
Impedance		50 Ohm
Insertion loss		Negligible
Maximum power handling		According to line size
Materials	Outer conductor	Aluminium
	Inner conductor	Copper or silver plated aluminium
	Isolators	PTFE
	Finishing	Chromatized plating
Temperature range		-10°C to +50°C

Models

Description	Frequency range	Model
DIN 7/16 female	Band IV-V	SD15-100
EIA 1 5/8" unflanged female	Band IV-V	SD15-400
EIA 1 5/8" flanged female	Band IV-V	SD15-410
EIA 3 1/8" unflanged female	Band IV-V	SD15-600
EIA 6 1/8" flanged female	Band IV-V	SD15-910

Other models not displayed in this table are available under request

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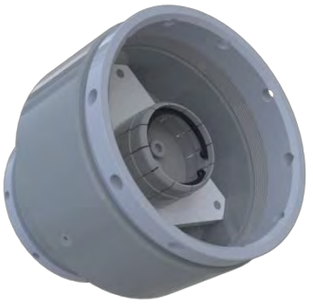
Indoor adapters

Sener manufactures coaxial adapters to enable the connection between two transmission line elements of any nature and line size. The adapters intended for indoor applications are unpressurized. Outdoor adapters are also available.

Technical Specifications

Frequency range		DC-862 MHz
Impedance		50 Ohm
VSWR		<1.03:1
Insertion loss		Negligible
Maximum power handling		According to the smaller coaxial size
Materials	Outer conductor	Aluminium
	Inner conductor	Silver plated aluminium or brass
	Isolators	PTFE
	Finishing	Galvanic plating protection
Temperature range		-10ºC to +50ºC



Models

Family	Model	Port1	Port2
7/16	TR00-001	DIN 7/16 female	N male
7/8"	TR21-031	EIA 7/8" flanged female	N male
	TR21-000	EIA 7/8" flanged male	DIN 7/16 female
1 5/8"	TR22-031	EIA 1 5/8" flanged female	N male
	TR22-301	EIA 1 5/8" unflanged female	N male
	TR23-331	EIA 1 5/8" unflanged male	N male
	TR22-000	EIA 1 5/8" flanged female	DIN 7/16 female
	TR22-300	EIA 1 5/8" unflanged female	DIN 7/16 female
	TR23-300	EIA 1 5/8" unflanged male	DIN 7/16 female
	TR22-001	EIA 1 5/8" unflanged female	DIN 7/16 male
	TR23-021	EIA 1 5/8" flanged male	EIA 7/8" flanged male
	TR22-021	EIA 1 5/8" flanged female	EIA 7/8" flanged female
	TR23-231	EIA 1 5/8" unflanged male	EIA 7/8" flanged male
3 1/8"	TR24-031	EIA 3 1/8" flanged female	N male
	TR25-331	EIA 3 1/8" unflanged male	N male
	TR24-522	EIA 3 1/8" unflanged female	EIA 1 5/8" unflanged female
	TR24-523	EIA 3 1/8" unflanged female	EIA 1 5/8" unflanged male
	TR25-322	EIA 3 1/8" unflanged male	EIA 1 5/8" flanged female
	TR25-522	EIA 3 1/8" unflanged male	EIA 1 5/8" unflanged female
	TR25-523	EIA 3 1/8" unflanged male	EIA 1 5/8" unflanged male
	TR25-123	EIA 3 1/8" flanged male	EIA 1 5/8" unflanged male
4 1/2"	TR30-031	IEC 4 1/2" flanged female	N male
	TR31-000	IEC 4 1/2" unflanged male	DIN 7/16 female
	TR30-000	IEC 4 1/2" flanged female	DIN 7/16 female
	TR30-522	IEC 4 1/2" unflanged female	EIA 1 5/8" unflanged female
	TR30-525	IEC 4 1/2" unflanged female	EIA 3 1/8" unflanged male
	TR31-324	IEC 4 1/2" unflanged male	EIA 3 1/8" flanged female
	TR30-024	IEC 4 1/2" flanged female	EIA 3 1/8" flanged female
	TR31-025	IEC 4 1/2" flanged female	EIA 3 1/8" flanged male
	TR30-030	IEC 4 1/2" flanged female	IEC 4 1/2" unflanged female
6 1/8"	TR27-031	EIA 6 1/8" unflanged female	N male
	TR26-000	EIA 6 1/8" unflanged female	DIN 7/16 female
	TR27-000	EIA 6 1/8" flanged male	DIN 7/16 female
	TR26-124	EIA 6 1/8" flanged female	EIA 3 1/8" unflanged male
	TR27-125	EIA 6 1/8" flanged male	EIA 3 1/8" unflanged male
	TR26-024	EIA 6 1/8" flanged male	EIA 3 1/8" flanged male
	TR27-025	EIA 6 1/8" unflanged female	EIA 3 1/8" flanged male
	TR27-531	EIA 6 1/8" unflanged male	IEC 4 1/2" unflanged male
	TR27-131	EIA 6 1/8" unflanged female	IEC 4 1/2" unflanged male
	TR26-331	EIA 6 1/8" flanged male	IEC 4 1/2" unflanged male
9 3/16"	TR71-026	EIA 9 3/16" flanged female	EIA 6 1/8" flanged female
	TR70-027	EIA 9 3/16" flanged male	EIA 6 1/8" flanged male

Other coaxial sizes and DIN sizes not displayed in this table are available under request

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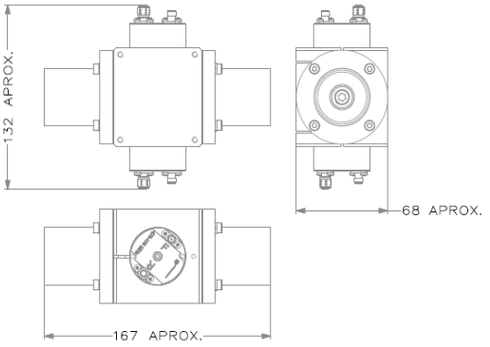
sener

AC15-158

Directional coupler • 1 5/8”

Electrical Specifications

Impedance	50 Ohm
Frequency range	170-240MHz and 470-806MHz
VSWR (transmission line)	< 1.05:1
Insertion loss	Negligible
Coupling range 170-240MHz Coupling range 470-806MHz	Adj. -45dB to -60dB (flat response +/-0,1) Adj. -40dB to -60dB (flat response +/-0,1)
Directivity	> 32 dB
N° of probes (bidirectional, movable termination)	2
Connectors of the transmission line	Default unflanged 1 5/8 Unflanged male 1 5/8 EIA 1 5/8”
Probes connectors	Default SMA female N female
aximum power handling 170-240MHz	7kW rms
Maximum power handling 470-806MHz	5kW rms



Mechanical & Environmental Specifications

Materials	Outer conductor	Aluminium and brass
	Inner conductor	Silver plated aluminium and copper
	Isolators	PTFE
	Finishing	Chromatized & silver plating
	Screws	Stainless steel
Dimension (mm)		300 x 200 x 100
Ambient temperature range		-10°C to + 50°C

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Web: https://www.group.sener/radiodifusion/

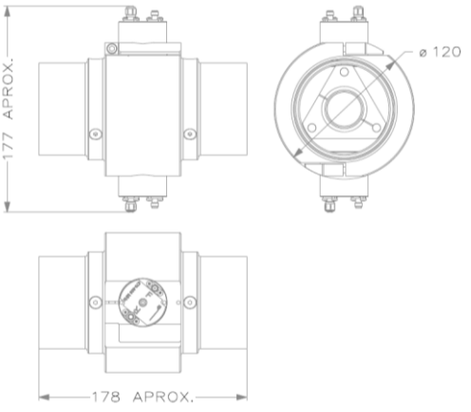
sener

AC15-318

Directional coupler • 3 1/8”

Electrical Specifications

Impedance	50 Ohm
Frequency range	170-240MHz and 470-806MHz
VSWR (transmission line)	< 1.05:1
Insertion loss	Negligible
Coupling range 170-240MHz Coupling range 470-806MHz	Adj. -45dB to -60dB (flat response +/-0,1) Adj. -49dB to -63dB (flat response +/-0,1)
Directivity	> 32 dB
N° of probes (bidirectional, movable termination)	From 1 to 6
Connectors of the transmission line	Default unflanged 3 1/8 EIA 3 1/8”
Probes connectors	Default SMA female N female
Maximum power handling 170-240MHz	25kW rms
Maximum power handling 470-806MHz	16kW rms



Mechanical & Environmental Specifications

Materials	Outer conductor	Aluminium and brass
	Inner conductor	Silver plated aluminium and copper
	Isolators	PTFE
	Finishing	Chromatized & silver plating
	Screws	Stainless steel
Dimension (mm)		200 x 300 x 100
Temperature range		-10°C to + 50°C

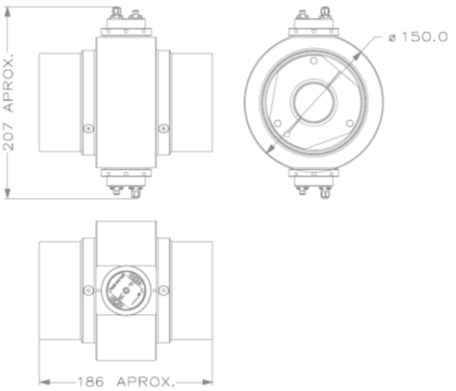
E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

AC15-412

Directional coupler • 4 1/2”

Electrical Specifications

Impedance	50 Ohm
Frequency range	170-240MHz and 470-806MHz
VSWR (transmission line)	< 1.05:1
Insertion loss	Negligible
Coupling range 170-240MHz Coupling range 470-806MHz	Adj. -45dB to -60dB (flat response +/-0,1) Adj. -50dB to -63dB (flat response +/-0,1)
Directivity	> 32 dB
N° of probes (bidirectional, movable termination)	From 1 to 6
Connectors of the transmission line	Default unflanged 4 1/2 EIA 4 1/2”
Probes connectors	Default SMA female N female
Maximum power handling 170-240MHz	40kW rms
Maximum power handling 470-806MHz	28kW rms



Mechanical & Environmental Specifications

Materials	Outer conductor	Aluminium and brass
	Inner conductor	Silver plated aluminium and copper
	Isolators	PTFE
	Finishing	Chromatized & silver plating
	Screws	Stainless steel
Dimension (mm)		200 x 200 x 200
Temperature range		-10°C to + 50°C

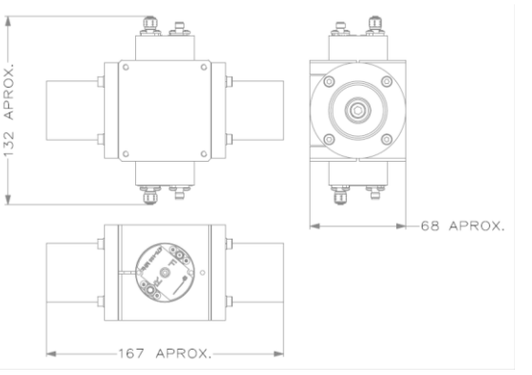
E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

AC15-618

Directional coupler • 6 1/8”

Electrical Specifications

Impedance	50 Ohm
Frequency range	170-240MHz and 470-806MHz
VSWR (transmission line)	< 1.05:1
Insertion loss	Negligible
Coupling range 170-240MHz Coupling range 470-806MHz	Adj. -45dB to -60dB (flat response +/-0,1) Adj. -40dB to -60dB (flat response +/-0,1)
Directivity N° of probes (bidirectional, movable termination)	> 32 dB From 1 to 6
Connectors of the transmission line	Default EIA 6 1/8”
Probes connectors	Default SMA female N female
Maximum power handling 170-240MHz Maximum power handling 470-806MHz	80kW rms 60kW rms



Mechanical & Environmental Specifications

Materials	Outer conductor	Aluminium and brass
	Inner conductor	Silver plated aluminium and copper
	Isolators	PTFE
	Finishing	Chromatized & silver plating
	Screws	Stainless steel
Dimension (mm)		200 x 200 x 200
Temperature range		-10°C to + 50°C

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3 dB hybrid couplers

3 dB Couplers are widely used either as power dividers or power combiners for several RF applications. Sener offers an extensive line of these products for the different frequency bands related to broadcast.

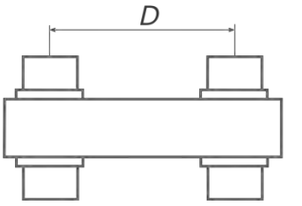
Crossover and adjacent configurations are available as per the table included.

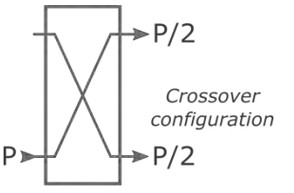
Technical Specifications

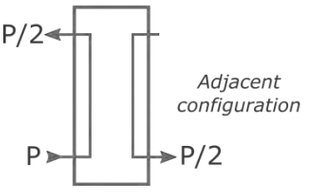
Impedance		50 Ohm	
VSWR		1.05:1 (VHF-FM)	1.06:1 (UHF)
Isolation		≥ 32 dB (VHF-FM)	≥ 30 dB (UHF)
Amplitude split / phase split		-3 ± 0.3 dB / -90º ± 2º	
Materials	Outer conductor	Aluminium	
	Inner conductor	Aluminium or silver plated brass	
	Isolators	PTFE	
	Screws	Stainless steel	
Temperature range		-10˚C to + 50˚C	

Models

Range	Bandwidth	Size & ports	RMS Power	Model	Type	D
TV VHF BI	54-88 MHz	1 5/8"	16 kW	AC11-222	Crossover	1060
		3 1/8"	55 kW	AC11-224	Crossover	1060
FM BII	87.5-108 MHz	7/16	2.5 kW	AC12-200	Crossover	780
		1 5/8"	13 kW	AC12-222	Crossover	780
				AC12-322	Adjacent	744
		3 1/8"	40 kW	AC12-224	Crossover	780
				AC12-324	Adjacent	744
		4 1/2"	70 kW	AC12-230	Crossover	780
				AC12-330	Adjacent	744
		6 1/8"	160 kW	AC12-226	Crossover	780
		9 3/16"	300 kW	AC12-340	Crossover	780
TV VHF BIII	174-230 MHz	7/8"	2 kW	AC13-320	Adjacent	370
		1 5/8"	9 kW	AC13-222	Crossover	400
				AC13-322	Adjacent	370
		3 1/8"	30 kW	AC13-224	Crossover	400
				AC13-324	Adjacent	370
		4 1/2"	50 kW	AC13-330	Adjacent	370
		6 1/8"	115 kW	AC13-326	Adjacent	370
TV UHF BIV-V	470-860 MHz	7/16	1.2 kW	AC15-200	Crossover	116
				AC15-200	Crossover	154
				AC15-200	Crossover	179
		7/8"	2 kW	AC15-220	Crossover	154
		1 5/8"	5 kW	AC15-222	Crossover	179
				AC15-322	Adjacent	112
		3 1/8"	15 kW	AC15-224	Crossover	179
		3 1/8"	18 kW	AC15-224	Crossover	340
		4 1/2"	25 kW	AC15-230	Crossover	179
				AC15-230	Crossover	340
TV UHF BIV-V	470-830 MHz	6 1/8"	36 kW	226333D	Crossover	616
		6 1/8"	50 kW	226333D	Crossover	616







Other models not displayed in this list are available under request

E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

Coaxial patch panels

Coaxial patch panels are utilized to enable quick and easy signal routing changes at RF systems with any number of inputs and outputs.

The patch panels are unpressurized and equipped with the necessary U-links. Interlock switches are supplied for all the models.

Technical Specifications

Impedance		50 Ohm
Frequency range		Series PP03, PP04 & PP06: DC-860 MHz Series PP08: DC-806MHz
VSWR		< 1.05:1
Insertion loss		< 0.1 dB
Inputs and outputs		Horizontally placed
Maximum power handling		According to the line size
Connectors type		EIA 1 5/8", 3 1/8", 4 1/2", 6 1/8" Flanged male
Materials	Outer conductor	Aluminium and nickel plated brass
	Inner conductor	Silver plated aluminium
	Isolators	PTFE
	Finishing	Nickel & chromatized plating and long lasting paint
	Screws	Stainless steel
Temperature range		-10ºC to + 50ºC

Models

Number of ports	Number of U-links	Coaxial Size DIN 7/16	Coaxial Size EIA 7/8"	Coaxial Size EIA 1 5/8"	Coaxial Size EIA 3 1/8"	Coaxial Size IEC 4 1/2"	Coaxial Size EIA 6 1/8"
3	1	PP01-330	PP09-330	PP03-330	PP06-330	PP04-130	PP08-230
4	2	PP01-340	PP09-340	PP03-340	PP06-340	PP04-140	PP08-240
5	2	PP01-350	PP09-350	PP03-350	PP06-350	PP04-150	PP08-250
7	3	PP01-370	PP09-370	PP03-370	PP06-370	PP04-170	PP08-270
9	4	PP01-390	PP09-390	PP03-390	PP06-390	PP04-190	PP08-290

Other models with different number of ports or line sizes are available under request

Optional Accessories

Unitised floor rack	ſ	
Directional couplers at inputs and outputs	1 5/8"	AC15-158
	3 1/8"	AC15-318
	4 1/2"	AC15-412
	6 1/8"	AC15-618
Unflanged to flanged adapters at inputs and outputs	1 5/8"	TR22-123
	3 1/8"	TR24-125
	4 1/2"	TR30-131
	6 1/8"	TR23-127
Inputs and outputs vertically placed	1 5/8"	CD22-010
	3 1/8"	CD24-010
	4 1/2"	CD30-010
	6 1/8"	CD26-010

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Indoor patch panel divider • For dual feed line antenna systems

These coaxial devices, usually consisting of one six-port patch panel, three u-links and one divider, are widely utilized with antenna systems fed by two feeder lines.

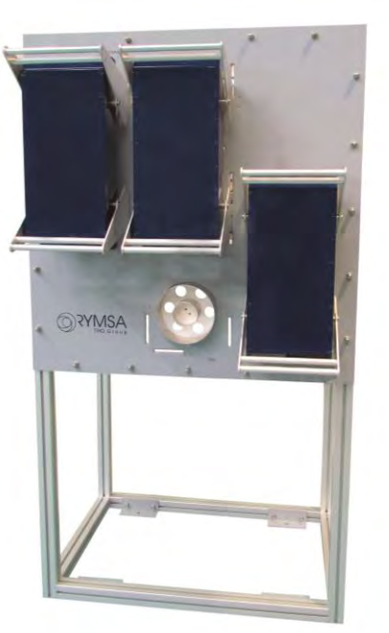
The mentioned elements are presented in a unitised frame, and properly interconnected to enable the three different operative configurations of the antenna system, with the adequate combination of the U-links: either the total system working or each of the two half sections separately.

An extra port is frequently supplied at the patch panel to add extra possibilities, as for example the use of a test load and the switch to a spare antenna system.

The divider can be either a power splitter or a 3 dB hybrid coupler with a balance load. Indoor and outdoor models are available.

Electrical Specifications

Impedance		50 Ohm
Frequency range and bandwidth		See models table
VSWR	TV VHF & FM	< 1.05:1
	TV UHF	< 1.10:1 (A1+A2) < 1.07:1 (A1, A2)
Insertion loss		< 0.1 dB
Amplitude split		- 3 +/- 0.2 dB
Phase split	Splitter models	0° +/- 2°
	Coupler models	90° +/- 2°
Input/outputs connectors		EIA 1 5/8", 3 1/8", 4 1/2" unflanged male EIA 6 1/8" unflanged female EIA 9 3/16" flanged male
Maximum power handling		According to line size
Pressurization		No



Mechanical & Environmental Specifications

Materials	Outer conductor	Aluminium and brass
	Inner conductor	Silver plated aluminium and copper
	Isolators	PTFE
	Finishing	Nickel and chromatized plating and long lasting black paint
	Screws	Stainless steel
Temperature range		-10°C to + 50°C

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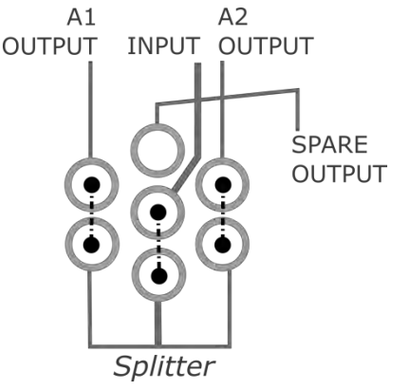
Web: https://www.group.sener/radiodifusion/

Models

Frequency Range	Number of Ports	Coaxial Size EIA 1 5/8"	Coaxial Size EIA 3 1/8"	Coaxial Size IEC 4 1/2"	Coaxial Size EIA 6 1/8"	Coaxial Size EIA 9 3/16"
TV VHF BI (1)	6	CC11-031	CC11-061	CC11-041	CC11-081	-----
TV VHF BI (1)	7	CC11-032	CC11-062	CC11-042	CC11-082	-----
FM BII	6	CC12-031	CC12-061	CC12-041	CC12-081	-----
FM BII	6	----	-----	-----	-----	CC12-0A6
FM BII	7	CC12-032	CC12-062	CC12-042	CC12-082	-----
TV VHF BIII	6	CC13-031	CC13-061	CC13-041	CC13-081	-----
TV VHF BIII	7	CC13-032	CC13-062	CC13-042	CC13-082	-----
DAB VHF BIII	6	CC14-031	CC14-061	CC14-041	CC14-081	-----
DAB VHF BIII	7	CC14-032	CC14-062	CC14-042	CC14-082	-----
TV UHF BIV-V	6	CC15-031	CC15-061	CC15-041	-----	-----
TV UHF BIV-V	7	CC15-032	CC15-062	CC15-042	-----	-----
470-806 MHz	6	-----	-----	-----	CC15-081	-----
470-806 MHz	7	-----	-----	-----	CC15-082	-----



PATCH PANEL / DIVIDER CONFIGURATION

NOTE (1): Frequency range of TV VHF Band I models can be either the full working band or reduced sub-bands

Optional Accessories

Directional couplers at inputs and outputs	1 5/8"	ACXX-158
	3 1/8"	ACXX-318
	4 1/2"	ACXX-412
	6 1/8"	ACXX-618
Inputs and outputs vertically placed	1 5/8"	CD22-010
	3 1/8"	CD24-010
	4 1/2"	CD30-010
	6 1/8"	CD26-010
	9 3/16"	CD40-400
Adapters at inputs and outputs	See indoor adapters page for more information	

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FL15-667

UHF Low pass filter ● 10kW

Electrical Specifications

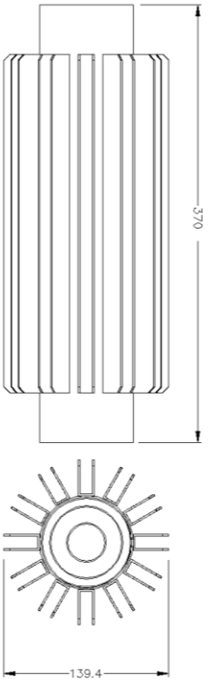
Filter type	coaxial
Order	7
Line size	3 1/8
Frequency range	400-806 MHz
Impedance	50 Ohm
Maximum input power handling	10kW rms
Connectors	Unflanged 3 1/8
Thermal stability	= 0,1 kHz / °C

Mechanical & Environmental Specifications

Dimensions (W x D x H)	140 x 140 x 370 mm
Weight	5.25 kg
Temperature range	-10°C to +50°C
Working position	Any

Response (1)

Insertion loss 400/806MHz	<0,08dB
Return loss 400/806MHz	>30dB
Attenuations: @ 940MHz From 1150MHz to 3GHz	 > 29dB > 70dB



Optional accessories

In/out EIA 3 1/8 flange	TR24-125

NOTES:

(1): Other frequency responses can be supplied. Please, ask Sener.

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Web: https://www.group.sener/radiodifusion/

Four port transfer switches are used to switch two signal sources between loads. They are fully automated, including independent interlock, logic and signaling circuits. They can also be operated manually.

Designed and built under strict quality control, our coaxial transfer switches offer a perfect electrical connection and a very high isolation, low insertion loss and VSWR.

A unique feature is the coplanar port configuration that permits neater, more compact layouts and requires fewer elbows. Complex switching matrices can easily be assembled.

Technical Specifications

Impedance		50 Ohm
Number of ports		4
Maximum power handling		According to line size
Insertion loss		< 0.1 dB
Mechanical life		10000 cycles
RF connectors		EIA flanged male
Output configuration		Crossed
Materials	Body	Aluminium
	Inner conductor	Silver plated aluminium and brass
	Isolators	PTFE
	Finishing	Chromatized plating
	Screws	Stainless steel
Temperature range		-10ºC to + 50ºC
Switching speed typical		2 sec

Models

Models	Connectors Size	Frequency Range	VSWR	Power Rating (RMS)			Isolation	Weight	Command Control (25PIN D-Sub Connector)	Voltage
				100 MHz	230 MHz	860 MHz				
61101	EIA 7/8”	DC-860 MHz	< 1.06:1	4.4 KW	3 KW	1.6 KW	> 35 dB	5.5 Kg	5/12/24 VDC 120/240 VAC	120/220 VAC
61103	EIA 1 5/8”	DC-860 MHz	< 1.06:1	16 KW	10.3 KW	5.5 KW	> 35 dB	7 Kg	5/12/24 VDC 120/240 VAC	120/220 VAC
61104	EIA 3 1/8”	DC-860 MHz	< 1.06:1	53 KW	36 KW	18 KW	> 40 dB	17 Kg	5/12/24 VDC 120/240 VAC	120/220 VAC
61102	4 1/16”	DC-860 MHz	< 1.06:1	82 KW	57 KW	29 KW	> 45 dB	27 Kg	5/12/24 VDC 120/240 VAC	120/220 VAC
61105	EIA 6 1/8”	DC-716 MHz	< 1.06:1	180 KW	123 KW	67 KW	> 50 dB	46 Kg	5/12/24 VDC 120/240 VAC	120/220 VAC

Other models displaying 3 ports are available under request

Optional Accessories

Control panel
Adapter from 4 1/16” to IEC 4 1/2”

E-mail: info@aeroespacial.sener
Web: https://www.group.sener/radiodifusion/

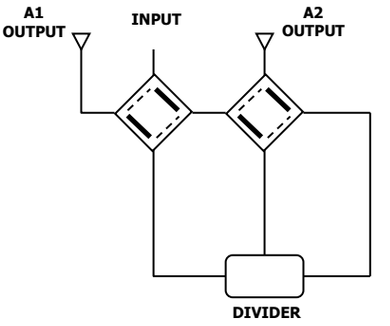
These devices basically consist of two motorized coaxial switches and one divider. They are widely utilized on antenna systems fed by two feeder lines.

The mentioned elements are presented in a unitised frame, interconnected to enable three operative configurations of the antenna system by selecting the coaxial switch positions: either the total system working or each of the two half sections separately.

The control unit enables the supervision of the coaxial switch / divider by using a front panel with buttons and LED displays. It shows the current antenna configuration and supplies the necessary interlock service. The system can also be controlled via remote interface.

Electrical Specifications

Impedance		50 Ohm
Frequency range and bandwidth		See models table
VSWR	TV VHF & FM	< 1.05:1
	TV UHF	< 1.10:1 (A1+A2) < 1.07:1 (A1, A2)
Insertion loss		< 0.1 dB
Amplitude split	TV VHF & FM	- 3 +/- 0.2 dB
	TV UHF	-3 +/- 0.25 dB
Phase split	TV VHF & FM	0° +/- 2°
	TV UHF	0° +/- 3°
Input/output connectors		EIA 1 5/8" & 3 1/8" unflanged male EIA 6 1/8"
Maximum power handling		According to line size
Motor voltage		220 VAC



COAXIAL SWITCH / DIVIDER CONFIGURATION

Mechanical & Environmental Specifications

Materials	Outer conductor	Aluminium and brass
	Inner conductor	Silver plated aluminium and copper
	Isolators	PTFE
	Finishing	Chromatized plating and long lasting paint
	Screws	Stainless steel
Temperature range		-10°C to + 50°C

Models

Frequency Range	Coaxial size EIA 1 5/8"	Coaxial size EIA 3 1/8"	Coaxial size EIA 4 1/2"	Coaxial size EIA 6 1/8"
FM BII	CC12-231	CC12-261	CC12-241	CC12-281
TV VHF BIII	CC13-231	CC13-261	CC13-241	CC13-281
DAB VHF BIII	CC14-231	CC14-261	CC14-241	CC14-281
TV UHF BIV-V	CC15-231	CC15-261	CC15-241	-----
470-750 MHz	-----	-----	-----	CC15-281

Optional Accessories

Directional couplers at inputs and outputs	1 5/8"	AC15-000
	3 1/8"	AC15-022
	4 1/2"	AC15-024
	6 1/8"	AC15-026
Adapters at inputs and outputs	See indoor adapters page for more information	

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B-I		
CHANNEL	START	STOP
2	54	60
3	60	66
4	66	72
5	76	82
6	82	88

BIII		
CHANNEL	START	STOP
7	174	180
8	180	186
9	186	192
10	192	198
11	198	204
12	204	210
13	210	216

6 MHz channel frequencies

BIV-V		
CHANNEL	START	STOP
14	470	476
15	476	482
16	482	488
17	488	494
18	494	500
19	500	506
20	506	512
21	512	518
22	518	524
23	524	530
24	530	536
25	536	542
26	542	548
27	548	554
28	554	560
29	560	566
30	566	572
31	572	578
32	578	584
33	584	590
34	590	596
35	596	602
36	602	608
37	608	614
38	614	620
39	620	626
40	626	632
41	632	638
42	638	644
43	644	650
44	650	656
45	656	662
46	662	668
47	668	674
48	674	680

CHANNEL	START	STOP
49	680	686
50	686	692
51	692	698
52	698	704
53	704	710
54	710	716
55	716	722
56	722	728
57	728	734
58	734	740
59	740	746
60	746	752
61	752	758
62	758	764
63	764	770
64	770	776
65	776	782
66	782	788
67	788	794
68	794	800
69	800	806
70	806	812
71	812	818
72	818	824
73	824	830
74	830	836
75	836	842
76	842	848
77	848	854
78	854	860
79	860	866
80	866	872
81	872	878
82	878	884
83	884	890

7 MHz channel frequencies

B-I		
CHANNEL	START	STOP
2	47	54
3	54	61
4	61	68

BIII		
CHANNEL	START	STOP
5	174	181
6	181	188
7	188	195
8	195	202
9	202	209
10	209	216
11	216	223
12	223	230

8 MHz UHF channel frequencies

BIV-V		
CHANNEL	START	STOP
21	470	478
22	478	486
23	486	494
24	494	502
25	502	510
26	510	518
27	518	526
28	526	534
29	534	542
30	542	550
31	550	558
32	558	566
33	566	574
34	574	582
35	582	590
36	590	598
37	598	606
38	606	614
39	614	622
40	622	630
41	630	638
42	638	646
43	646	654
44	654	662
45	662	670

CHANNEL	START	STOP
46	670	678
47	678	686
48	686	694
49	694	702
50	702	710
51	710	718
52	718	726
53	726	734
54	734	742
55	742	750
56	750	758
57	758	766
58	766	774
59	774	782
60	782	790
61	790	798
62	798	806
63	806	814
64	814	822
65	822	830
66	830	838
67	838	846
68	846	854
69	854	862

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Web: https://www.group.sener/radiodifusion/

Reflection parameters

VSWR	RETURN LOSS (db)	Power refl (%)	Power trans (%)
1	∞	0.0	100.0
1.01	46.1	0.0	100.0
1.02	40.1	0.0	100.0
1.03	36.6	0.0	100.0
1.04	34.2	0.0	100.0
1.05	32.3	0.1	99.9
1.06	30.7	0.1	99.9
1.07	29.4	0.1	99.9
1.08	28.3	0.1	99.9
1.09	27.3	0.2	99.8
1.10	26.4	0.2	99.8
1.11	25.7	0.3	99.7
1.12	24.9	0.3	99.7
1.13	24.3	0.4	99.6
1.14	23.7	0.4	99.6
1.15	23.1	0.5	99.5
1.16	22.6	0.5	99.5
1.17	22.1	0.6	99.4
1.18	21.7	0.7	99.3
1.19	21.2	0.8	99.2
1.20	20.8	0.8	99.2
1.25	19.1	1.2	98.8
1.30	17.7	1.7	98.3
1.40	15.6	2.8	97.2
1.50	14.0	4.0	96.0
1.60	12.7	5.3	94.7
1.70	11.7	6.7	93.3
1.80	10.9	8.2	91.8
1.90	10.2	9.6	90.4
2.00	9.5	11.1	88.9

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