



Antenna Matching Transformers
Filter Systems
Multicouplers
Hybrids



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future never
**“The future never
sounded
so good”**
so good

Antenna Matching Transformers

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TA Series

Technical Specification

- Broad band 1.5 to 32 MHz
- Power - 50 Watt to 1 kW
- Lightweight fibreglass body
- Tactical or transportable application

The TA Series of transformers are rugged and lightweight, ideal for inclusion in tactical and transportable HF antenna systems. Combinations of power rating and impedance transformation ratio provide the antenna designer with a wide selection of units to complement most antenna configurations.

The transformers are housed in extremely strong fibre glass bodies, hermetically sealed with low loss resin and suitable for any commercial or military environment. The input coaxial connector is protected within the specially formed body and the transformer itself is grounded as an added protection against static and lightning induced EMF's.

TYPE DESIGNATIONS FOR TA AND TAS SERIES

Balance Impedance				
TA5 50 watt 50 ohm unbalanced	50 ohm	TA5-55	370 ohm	TA5-537
	75 ohm	TA5-57	450 ohm	TA5-545
	200 ohm	TA5-520	600 ohm	TA5-560
	300 ohm	TA5-530	800 ohm	TA5-580

Balance Impedance				
TA15 150 watt 50 ohm unbalanced	50 ohm	TA15-55	370 ohm	TA15-537
	75 ohm	TA15-57	450 ohm	TA15-545
	200 ohm	TA15-520	600 ohm	TA15-560
	300 ohm	TA15-530	800 ohm	TA15-580

Balance Impedance				
TA40 400 watt 50 ohm unbalanced	50 ohm	TA40-55	370 ohm	TA40-537
	75 ohm	TA40-57	450 ohm	TA40-545
	200 ohm	TA40-520	600 ohm	TA40-560
	300 ohm	TA40-530	800 ohm	TA40-580

Balance Impedance				
TAS40 400 watt 50 ohm unbalanced	50 ohm	TAS40-55	370 ohm	TAS40-537
	75 ohm	TAS40-57	450 ohm	TAS40-545
	200 ohm	TAS40-520	600 ohm	TAS40-560
	300 ohm	TAS40-530	800 ohm	TAS40-580

Tactical HF Antenna Matching Transformer

Balance Impedance				
TA100 1kW 50 ohm unbalanced	50 ohm	TA100-55	370 ohm	TA100-537
	75 ohm	TA100-57	450 ohm	TA100-545
	200 ohm	TA100-520	600 ohm	TA100-560
	300 ohm	TA100-530	800 ohm	TA100-580

Balance Impedance				
TAS100 1kW 50 ohm unbalanced	50 ohm	TAS100-55	370 ohm	TAS100-537
	75 ohm	TAS100-57	450 ohm	TAS100-545
	200 ohm	TAS100-520	600 ohm	TAS100-560
	300 ohm	TAS100-530	800 ohm	TAS100-580

Frequency	1.5 - 32MHz
Input Impedance	50 ohm unbalanced
Output Impedance	See tables
Maximum Peak	4 x average power
VSWR	Less than 1.3: 1
Max. Load VSWR	3: 1
Average Power	50 watt, 150 watt 400 watt, 1kW
Balance Ratio	Greater than 26dB
Temperature Range	-40°C to +70°C
Connectors	BNC, N, UHF
Insertion Loss	Less then 0.25dB
Configuration	Fibreglass body. Stainless steel arms (chemically blackened). Low loss resin fill. Drab olive green or light sand epoxy paint finish.



400 Watt HF Wide Band Antenna Matching Transformer

Technical Specification

- Wide band 1.5 to 32 MHz
- Ideal for fixed station receiving arrays
- Internal static drain ground

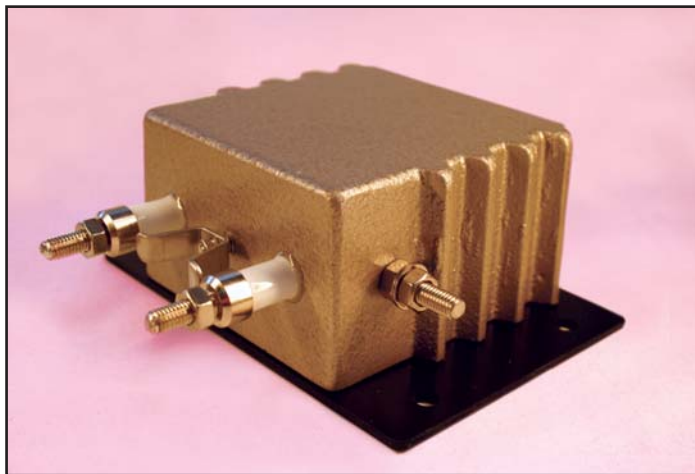
Fixed station HF receiving arrays are often subjected to high voltages not normally associated with RX systems. These voltages can be present due to static build up or by lightning induced EMF's from nearby strikes.

The HF4 Series of matching transformers, although designed for 400 watt average power are ideal for inclusion in receiving arrays. They reduce the possibility of high voltage damage and provide a DC path to ground which gives added protection to the receiving system.

For EMP proof operation no capacitors are incorporated.

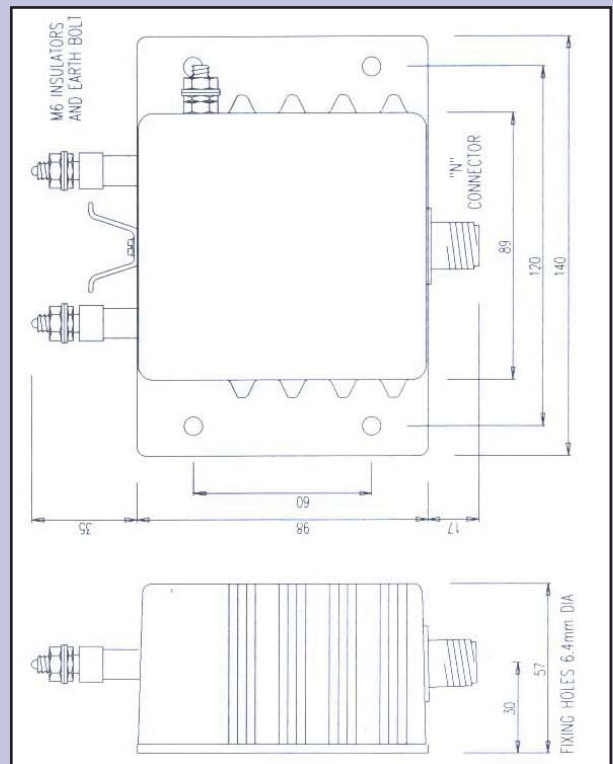
A wide selection of unbalanced and balanced impedance ratios are available to complement most antenna configurations and enquiries for non-standard arrangements are welcome.

The transformers are housed in cast aluminium cases, hermetically sealed for any military or commercial environment.



HF4 Series

Frequency	1.5 - 32MHz
Impedance	See table
Power	400 watt average, 1600 watt peak
Insertion Loss	Less then 0.3dB
VSWR	Less than 1.2:1 (2 - 30MHz) Less than 1.3:1 (1.5 - 32MHz)
Balance Ratio	Greater than 26dB
Load VSWR	2.5: 1 max
Coaxial Connectors	'N' type (Others on request)
Balance Terminals	Alumina ceramic M6 thread
Temperature Range	-40°C to +55°C
Weight	1.2kg gross
Shipping Dimensions	220 x 150 x 120mm approx
Configuration	Cast aluminium case (LM25). Hermetically sealed, solid encapsulation, epoxy paint finish
High Voltage Protection	Arcing horns and internal static drain. N.b. No internal capacitors fitted.

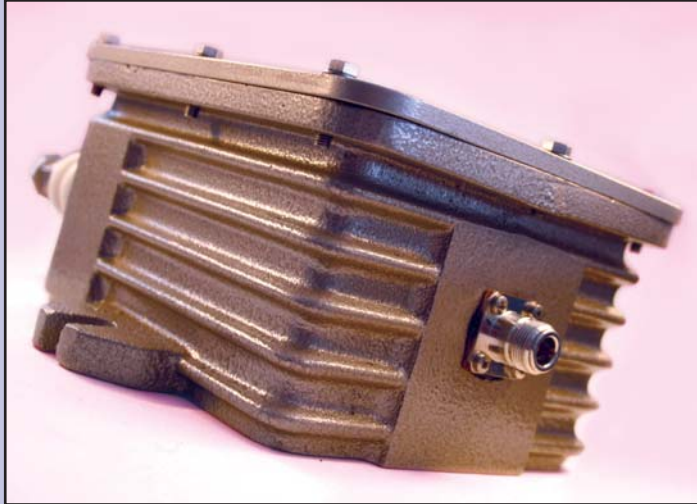


Unbalanced Impedance (ohm)	Balance Impedance (ohm)						
	50	75	200	300	370	450	600
50	HF4-55	HF4-57	HF4-520	HF4-530	HF4-537	HF4-545	HF4-560
75	HF4-75	HF4-77	HF4-720	HF4-730	HF4-737	HF4-745	HF4-760

HF10 Series

Technical Specification

- Wide band 1.5 to 32 MHz
- 1kW average 4 kW PEP
- All weather solid encapsulated
- Fixed station or transportable antenna arrays



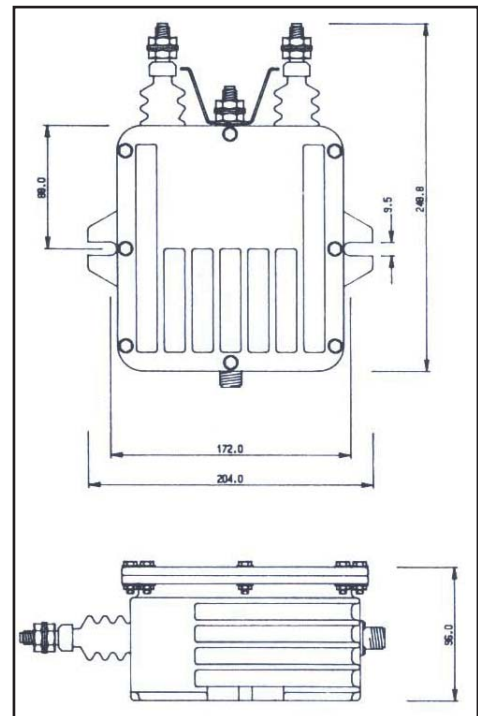
The HF10 Series of antenna matching transformers are solid encapsulated, heavy duty units suitable for the most arduous environmental conditions.

The transformers are housed in a cast aluminium case, vacuum impregnated with epoxy resin and finished in epoxy paint for added protection. High purity alumina ceramic insulators with arcing horns are fitted as standard. An integral static drain to earth provides additional protection against lightning induced EMF's.

For added EMF proof operation, no capacitors are used in the transformer circuit. A wide selection of unbalanced and balanced impedance ratios are available to complement most antenna configurations and enquiries for non-standard arrangements are welcome. No compromise has been made to provide a unit to the highest standard of reliability.

1kW HF Wide Band Antenna Matching Transformer

Frequency	1.5 - 32MHz
Impedance	See table
Power	1kW average, 4kW peak
Insertion Loss	Less than 0.3dB
VSWR	Less than 1.2:1 (2 - 30MHz) Less than 1.3:1 (1.5 - 32MHz)
Balance Ratio	Greater than 26dB
Load VSWR	2.5:1 max
Coaxial Connectors	'N' (Others on request)
Balance Terminals	Alumina ceramic M10 thread
Temperature Range	-40°C to +55°C
Weight	5kg gross
Shipping Dimensions	425 x 300 x 150mm approx
High Voltage Protection	Arcing horns and internal static drain. N.b. No internal capacitors fitted.
Configuration	Cast aluminium case (LM25). Hermetically sealed solid encapsulation, Stove enamel epoxy paint finish.



Unbalanced Impedance (ohm)	Balance Impedance (ohm)							
	50	75	100	200	300	370	450	600
50	HF10-55	HF10-57	HF10-510	HF10-520	HF10-530	HF10-537	HF10-545	HF10-560
75	HF10-75	HF10-77	HF10-710	HF10-720	HF10-730	HF10-737	HF10-745	HF10-760

3kW HF Wide Band Antenna Matching Transformer

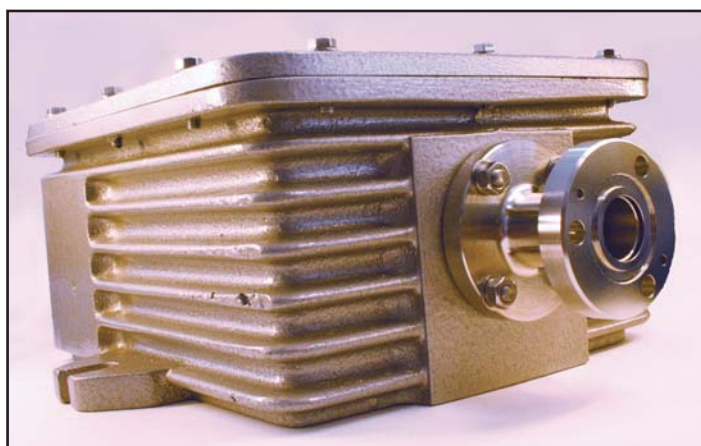
Technical Specification

- Wide band 1.5 to 32 MHz
- 3kW average 12kW PEP
- All weather solid encapsulated
- Heavy duty cast aluminium

The HF30 Series of antenna matching transformers are solid encapsulated, heavy duty units suitable for the most arduous environmental conditions and designed for installation in any orientation.

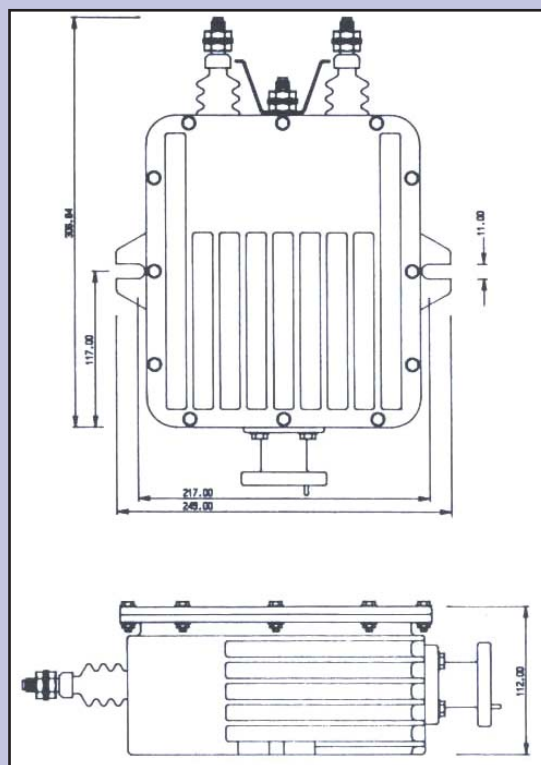
The transformers are housed in a cast aluminium case, vacuum impregnated with epoxy resin and finished in epoxy paint for added protection. High purity alumina ceramic insulators with arcing horns are fitted as standard. An internal static drain to earth provides additional protection against lightning induced EMF's.

For added EMF proof operation, no capacitors are used in the transformer circuit. A wide selection of unbalanced and balanced impedance ratios are available to complement most antenna configurations and enquiries for non-standard arrangements are welcome. The HF30 is a unit of the highest quality and reliability.



HF30 Series

Frequency	1.5 - 32MHz
Impedance	See table
Power	3kW average, 12kW peak
Insertion Loss	Less than 0.3dB
VSWR	Less than 1.2:1 (2 - 30MHz) Less than 1.3:1 (1.5 - 32MHz)
Balance Ratio	Greater than 26dB
Load VSWR	2.5:1 max
Coaxial Connectors	7/8" EIA (Others on request)
Balance Terminals	Alumina ceramic M10 thread
Temperature Range	-40°C to +55°C
Weight	14kg gross
Shipping Dimensions	320 x 300 x 140mm approx
High Voltage Protection	Arcing horns and internal static drain. N.b. No capacitors fitted to transformer circuit.
Configuration	Cast aluminium case (LM25). Hermetically sealed solid encapsulation, epoxy paint finish



Balance Impedance (ohm)							
Unbalanced Impedance (ohm)	50	75	100	200	300	450	600
50	HF30-55	HF30-57	HF30-510	HF30-520	HF30-530	HF30-545	HF30-560
75	HF30-75	HF30-77	HF30-710	HF30-720	HF30-730	HF30-745	HF30-760

HF50 Series

Technical Specification

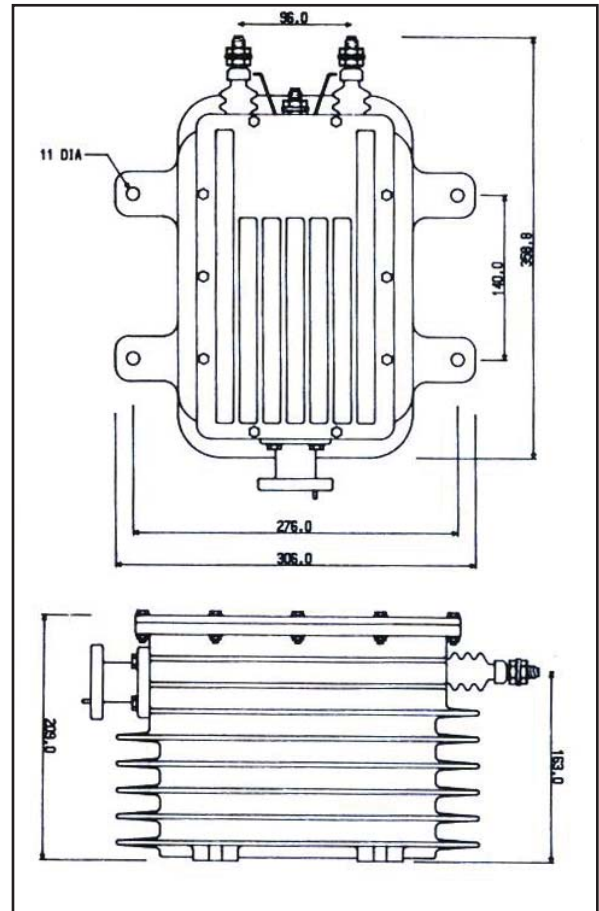
- Wide band 1.5 to 32 MHz
- 5kW average 20 kW PEP
- All weather solid encapsulated
- Heavy duty cast aluminium
- Very high efficiency

The HF50 Series of antenna matching transformers are solid encapsulated, and suitable for installation in any orientation.

The transformers are housed in a cast aluminium case, vacuum impregnated with epoxy resin and fully hermetically sealed for any military or commercial environment. High purity alumina ceramic insulators with arcing horns are fitted as standard and an internal static drain to earth provides additional protection against lightning induced EMF's.

A wide selection of unbalanced and balanced impedance ratios are available to complement most antenna configurations and enquiries for non-standard arrangements are welcome. The HF50 is a unit of the highest quality and reliability.

5kW HF Wide Band Antenna Matching Transformer



Frequency	1.5 - 32MHz
Impedance	See table
Power	5kW average, 20kW peak
Insertion Loss	Less than 0.3dB
VSWR	Less than 1.2:1 (2 - 30MHz) Less than 1.3:1 (1.5 - 32MHz)
Balance Ratio	Greater than 26dB
Load VSWR	2.5:1 max
Coaxial Connectors	7/8" EIA (Others on request)
Balance Terminals	Alumina ceramic M10 thread
Temperature Range	-40°C to +55°C
Weight	38kg gross
Shipping Dimensions	490 x 410 x 390mm approx
High Voltage Protection	Arcing horns and internal static drain.
Configuration	Cast aluminium case. Hermetically sealed solid encapsulation, Stove enamel epoxy paint finish.

Balance Impedance (ohm)								
Unbalanced Impedance (ohm)	50	75	100	200	300	370	450	600
50	HF50-55	HF50-57	HF50-510	HF50-520	HF50-530	HF50-537	HF50-545	HF50-560
75	HF50-75	HF50-77	HF50-710	HF50-720	HF50-730	HF50-737	HF50-745	HF50-760

10kW HF Wide Band Antenna Matching Transformer

Technical Specification

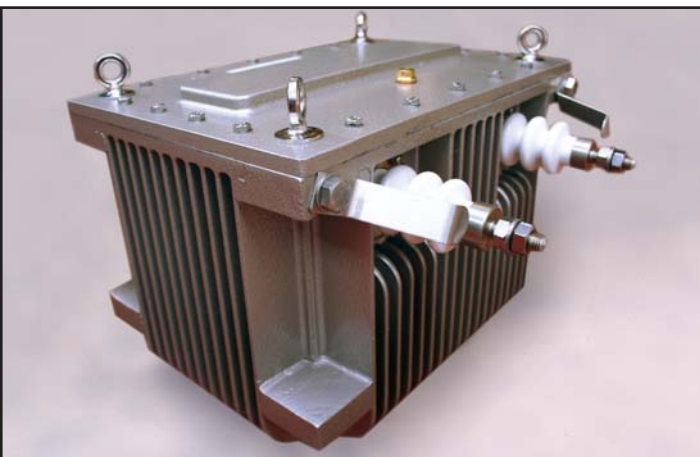
- Wide band 1.5 to 32 MHz
- 10kW average + 100% AM modulation
- All weather unprotected operation
- Suitable for communications or broadcast applications
- Very high efficiency

The HF100 Series are 10kW average power silicone cooled transformers suitable for communication or broadcast systems.

The units are housed in a finned cast aluminium tank which provides excellent natural convection cooling. Each casting is subjected to a double vacuum resin impregnation process which ensures complete sealing for the internal low loss silicone cooling oil.

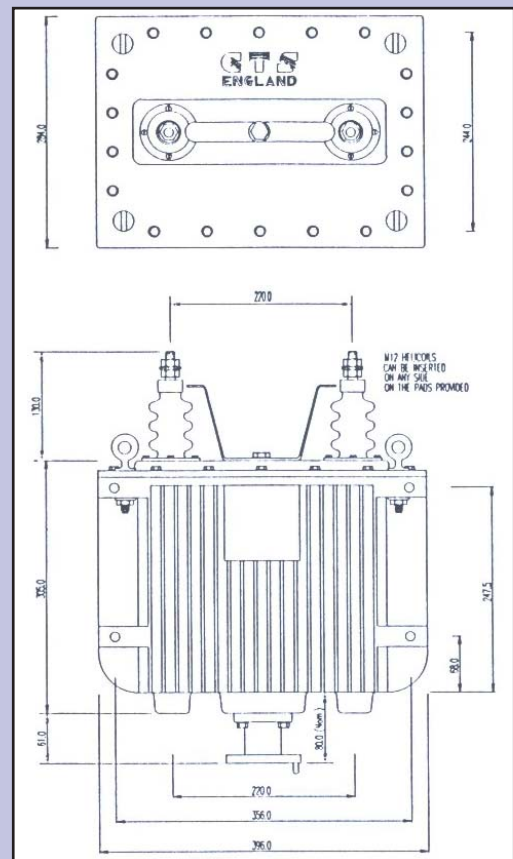
High purity alumina ceramic insulators with arcing horns are fitted as standard and an internal static drain to earth provides additional protection against lightning induced high voltages.

A wide selection of unbalanced and balanced impedance ratios are available to complement most antenna configurations and enquiries for non-standard arrangements are welcome. The HF100 is a unit of the highest quality and reliability.



HF100 Series

Frequency	1.5 - 32MHz
Impedance	See table
Power	10kW average + 100% AM modulation
Insertion Loss	Less than 0.2dB
VSWR	Less than 1.2:1 (2 - 30MHz) Less than 1.3:1 (1.5 - 32MHz)
Cooling	Natural convection, silicone transformer oil, pressure relief valve fitted.
Load VSWR	2.5:1 max
Balance Terminals	Alumina ceramic M12 thread
Temperature Range	-40°C to +55°C
Weight	60kg gross
Coaxial Connectors	7/8", 1 5/8", 3 1/8" EIA
High Voltage Protection	Arcing horns and internal static drain.
Balance Ratio	Greater than 26dB
Configuration	Cast aluminium case. Hermetically sealed, stove enamel finish.



Balance Impedance (ohm)								
Unbalanced Impedance (ohm)	50	75	100	200	300	370	450	600
50	HF100-55	HF100-57	HF100-510	HF100-520	HF100-530	HF100-537	HF100-545	HF100-560
75	HF100-75	HF100-77	HF100-710	HF100-720	HF100-730	HF100-737	HF100-745	HF100-760

The HF100 Series supercedes all Minns "X" types of 10kW Transformers

HF200 Series

Technical Specification

- Wide band 1.5 to 32 MHz
- 20kW average + 100% AM modulation
- All weather unprotected operation
- Suitable for communications or broadcast applications
- Very high efficiency

The HF200 Series are 20kW average power, silicone cooled transformers suitable for communication or broadcast systems.

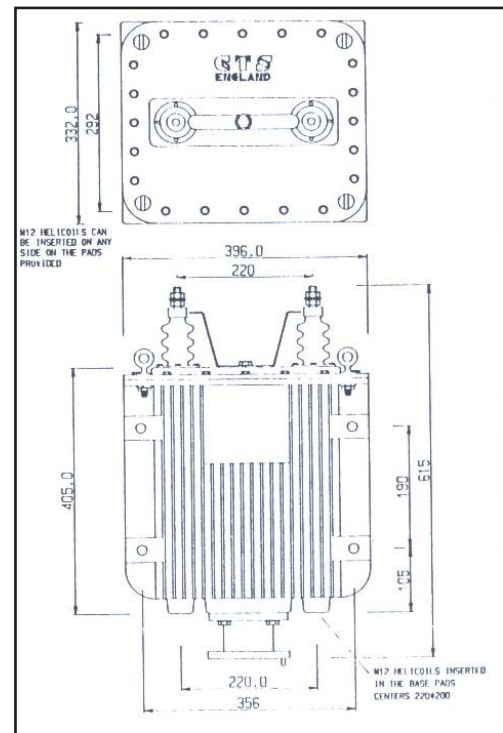
The units are housed in a finned cast aluminium tank which provides excellent natural convection cooling. Each casting is subjected to a double vacuum resin impregnation process which ensures complete sealing for the internal low loss silicone cooling oil.

High purity alumina ceramic insulators with arcing horns are fitted as standard and an internal static drain to earth provides additional protection against lightning induced high voltages.

A wide selection of unbalanced and balanced impedance ratios are available to complement most antenna configurations and enquiries for non-standard arrangements are welcome. The HF200 is a unit of the highest quality and reliability.

20kW HF Wide Band Antenna Matching Transformer

Frequency	1.5 - 32MHz
Impedance	See table
Power	20kW average + 100% AM modulation
Insertion Loss	Less than 0.2dB
VSWR	Less than 1.2:1 (2 - 30MHz) Less than 1.3:1 (1.5 - 32MHz)
Cooling	Natural convection, silicone transformer oil, pressure relief valve fitted.
Load VSWR	2.5:1 max
Balance Terminals	Alumina ceramic M12 thread
Temperature Range	-40°C to +55°C
Weight	110kg gross
Coaxial Connectors	1 5/8", 3 1/8" EIA
High Voltage Protection	Arcing horns and internal static drain.
Balance Ratio	Greater than 26dB
Configuration	Cast aluminium case. Hermetically sealed, epoxy paint finish.



Balance Impedance (ohm)								
Unbalanced Impedance (ohm)	50	75	100	200	300	370	450	600
50	HF200-55	HF200-57	HF200-510	HF200-520	HF200-530	HF200-537	HF200-545	HF200-560
75	HF200-75	HF200-77	HF200-710	HF200-720	HF200-730	HF200-737	HF200-745	HF200-760

The HF200 Series supercedes all Minns "Y" types of 20kW Transformers

30kW HF Wide Band Antenna Matching Transformer

Technical Specification

- Wide band 1.5 to 32 MHz
- 30kW average + 100% AM modulation
- All weather unprotected operation
- Suitable for communications or broadcast applications
- Very high efficiency

The HF300 Series are 30kW average power silicone cooled transformers suitable for communication or broadcast systems.

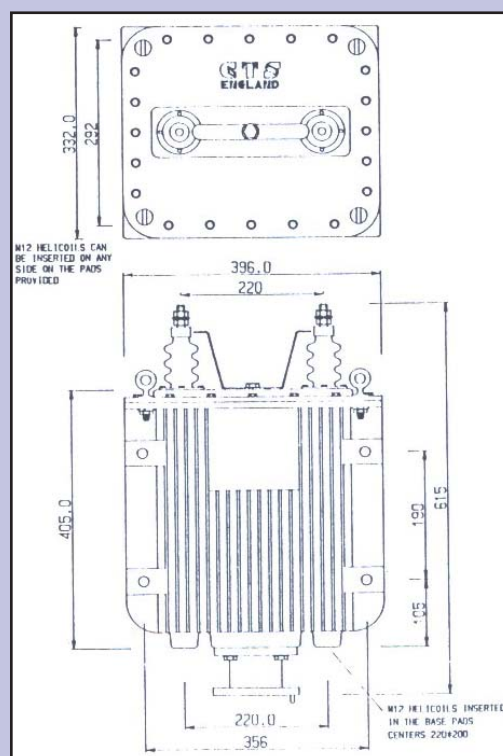
The units are housed in a finned cast aluminium tank which provides excellent natural convection cooling. Each casting is subjected to a double vacuum resin impregnation process which ensures complete sealing for the internal low loss silicone cooling oil.

High purity alumina ceramic insulators with arcing horns are fitted as standard and an internal static drain to earth provides additional protection against lightning induced high voltages.

A wide selection of unbalanced and balanced impedance ratios are available to complement most antenna configurations and enquiries for non-standard arrangements are welcome. The HF300 is a unit of the highest quality and reliability.

HF300 Series

Frequency	1.5 - 32MHz
Impedance	See table
Power	30kW average + 100% AM modulation
Insertion Loss	Less than 0.2dB
VSWR	Less than 1.2:1 (2 - 30MHz) Less than 1.3:1 (1.5 - 32MHz)
Cooling	Natural convection, silicone transformer oil, pressure relief valve fitted.
Load VSWR	2.5:1 max
Balance Terminals	Alumina ceramic M12 thread
Temperature Range	-40°C to +55°C
Weight	120kg gross
Coaxial Connectors	3 1/8" EIA
High Voltage Protection	Arcing horns and internal static drain.
Configuration	Cast aluminium case. Hermetically sealed, stove enamel finish.
Balance Ratio	Greater than 26dB



Balance Impedance (ohm)								
Unbalanced Impedance (ohm)	50	75	100	200	300	370	450	600
50	HF300-55	HF300-57	HF300-510	HF300-520	HF300-530	HF300-537	HF300-545	HF300-560
75	HF300-75	HF300-77	HF300-710	HF300-720	HF300-730	HF300-737	HF300-745	HF300-760

The HF300 Series supercedes all Minns "Y" types of 30kW Transformers

HF 500/HF1000

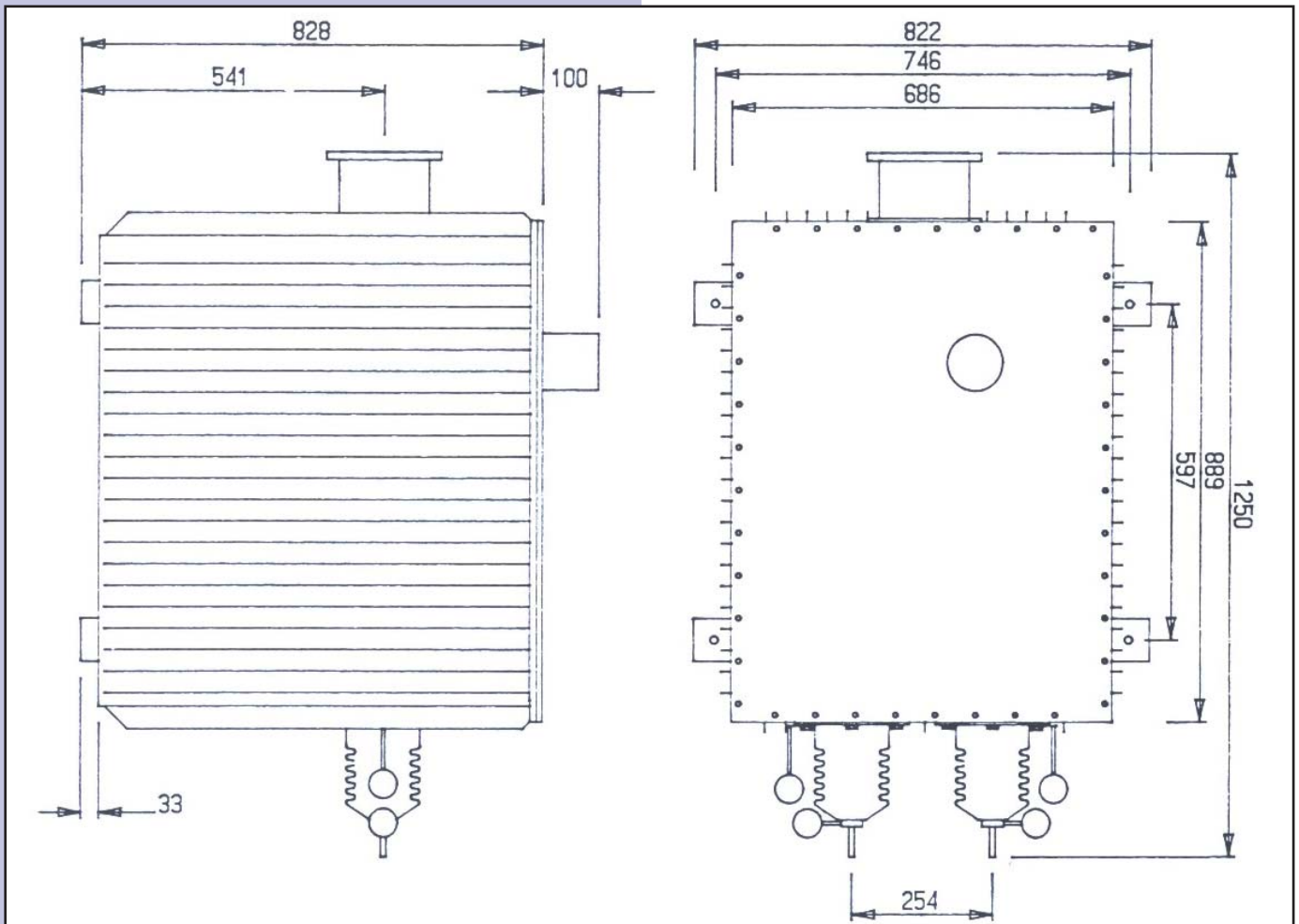
Technical Specification

- 50kW average, Type HF500
- 100kW average, Type HF1000

The 50kW and 100kW series of broadcast antenna matching transformers are suitable for inclusion in systems where 200 ohm or 300 ohm open wire feeds need to be matched to a 50 ohm coaxial feeder. The units are housed in aluminium tanks, silicone oil cooled to minimise losses and a major feature is broad band operation without the use of ferrite material in the transformer design.

High Power HF Broadcast Antenna Matching Transformers

Frequency	3 - 22MHz
Input Impedance	50 ohms unbalance
Output Impedance	200 ohm or 300 ohm balanced
VSWR	Less than 1.2: 1
Load VSWR	2.5: 1 max
Inserion Loss	Less than 0.1dB
Balance	>20dB
Weight	450kg
Balanced Insulators	Solid PTFE 6" diameter
Coaxial Connections	3 1/8" and 6 1/8" EIA
Temperature Range	-40°C to +55°C (sunshade recommended)
Power	HF500 - 50kW average + 100% broadcast mod HF1000 - 100kW average + 100% broadcast mod
Configuration	Aluminium tank, silicone oil cooled, pressure relief valve fitted.

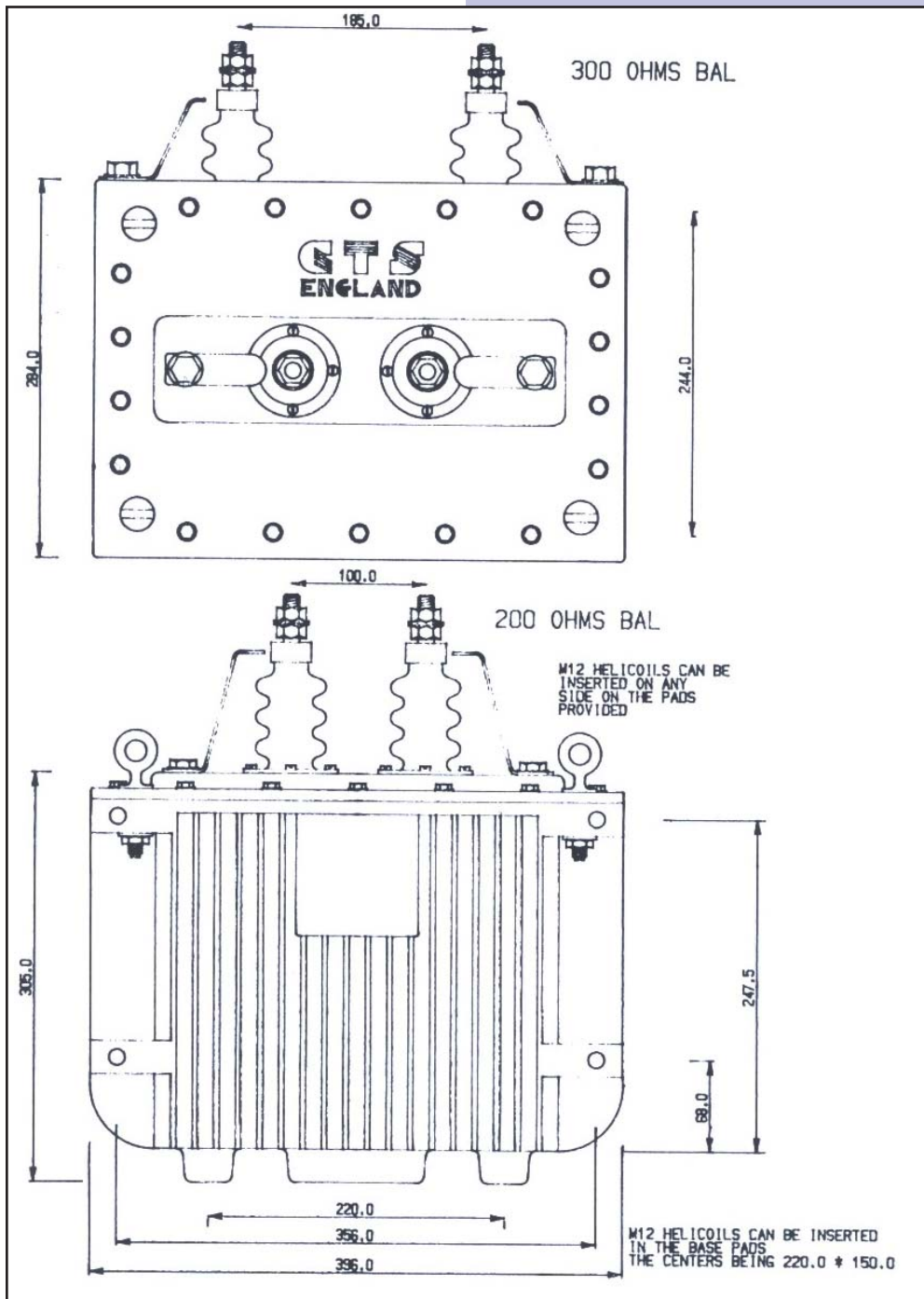


High Power Balance/Balance Matching Transformers

Technical Specification

HF100 300/600

Frequency	1.5 - 32MHz	Temperature Range	-40°C to +55°C
Input Impedance	300 ohms balanced	High Voltage Protection	Arcing horns
Output Impedance	200 ohm or 600 ohm balanced	Shipping Dimensions	700 x 600 x 500mm
VSWR	Less than 1.2:1 (2 - 30MHz) Less than 1.3: 1 (1.5 - 32MHz)	Configuration	Cast aluminium case, hermetically sealed, enamel finish.
Load VSWR	2.5: 1 max	Cooling	Natural convection, silicone transformer oil, pressure relief valve fitted.
Inserion Loss	Less than 0.2dB		
Balance Ratio	>26dB		
Weight	60kg gross	Power	10kW average + 100% AM modulation
Balance Terminals	Alumina ceramic M12 thread		

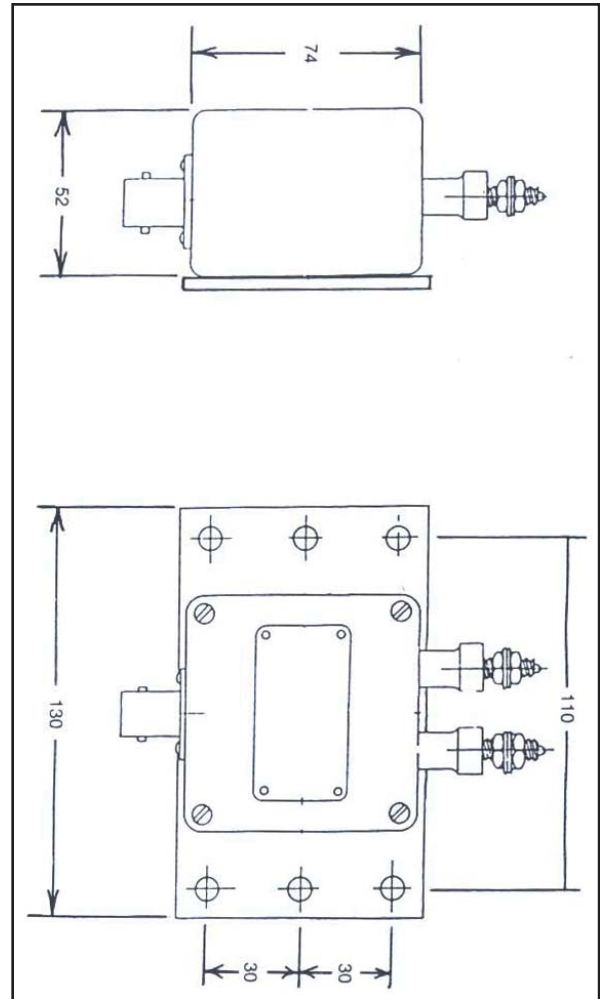


Technical Specification

- Wide band operation models for
 - 20Hz - 20KHz
 - 100Hz - 200KHz
 - 50KHz - 10Mhz
 - 1.5 MHz to 32 MHz
- 1 Watt Average
2 Watts PEP
- Fully encapsulated

The Minns Baluns VDC Series are designed for precision measurement purposes where 50/600 Ohm transformation is required with low VSWR and high balance ratio.

All the measuring transformers are fully encapsulated within a cast aluminium case to provide a high stability product capable of withstanding the most severe environment.



Unbalanced Impedance	50 ohms
Balanced Impedance	600 ohms
Frequency Range	See table
Balanced Connection	M6 Insulators
Unbalanced Connection	See table
Insertion Loss	Less then 0.2dB
Balance Ratio	See table
VSWR	See table
Power Rating	+10dBm
Temperature Range	-20°C to +55°C

Balance Impedance (ohm)						
Standard Frequency Ranges	Balanced Terminals	Balance Ratio	VSWR	'BNC'	'N'	'UHF'
20Hz - 20kHz	Ceramic M6	>12dB	1.1 : 1	VDC08A	VDC08B	VDC08C
100Hz - 200kHz	Ceramic M6	>50dB	1.1 : 1	VDC05A	VDC05F	VDC05G
50kHz - 10MHz	Ceramic M6	>40dB	1.1 : 1	VDC06A	VDC06F	VDC06G
1.5MHz - 32MHz	Ceramic M6	>26db	1.1 : 1	VDC02B	VDC02A	VDC02C

3 Port Low Signal Hybrid Splitter

Technical Specification

A series of very broad band hybrid transformers for signal splitting, combining or for laboratory measurements where high isolation is required.

Other connectors available on request. All specifications under matched load condition. PCB mounted units available.

5 Port Low Signal Hybrid Splitter

Technical Specification

A series of very broad band hybrid transformers for signal splitting, combining or for laboratory measurements where high isolation is required.

Other connectors available on request. All specifications under matched load condition. PCB mounted units available.

MHFH2-RX Series

	MHFH2 - RX - A	MHFH2 - RX - B
Frequency	50 kHz - 50 MHz	10 kHz - 32 MHz
Power	2 x 2 watts	2 x 2 watts
Isolation	>35 dB	>35 dB
Insertion Loss	< 0.5dB	< 0.5dB
VSWR	<1.2: 1	<1.2: 1
Balancing Loads	Internal	Internal
Temperature	-40°C to +55°C	-40°C to +55°C
Connectors	'N' BNC	'N' BNC
Configuration	Cast aluminium box, 50 x 50 x 30mm solid encapsulation.	

MHFH 4-RX Series

	MHFH4 - RX - A	MHFH4 - RX - B
Frequency	50 kHz - 50 MHz	10 kHz - 32 MHz
Power	4 x 1 watts	4 x 1 watts
Isolation	>30 dB	>30 dB
Insertion Loss	< 0.5dB	< 0.5dB
VSWR	<1.2: 1	<1.2: 1
Balancing Loads	Internal	Internal
Temperature	-40°C to +55°C	-40°C to +55°C
Connectors	'N' BNC	'N' BNC
Configuration	Cast aluminium box, 120 x 60 x 30mm solid encapsulation.	

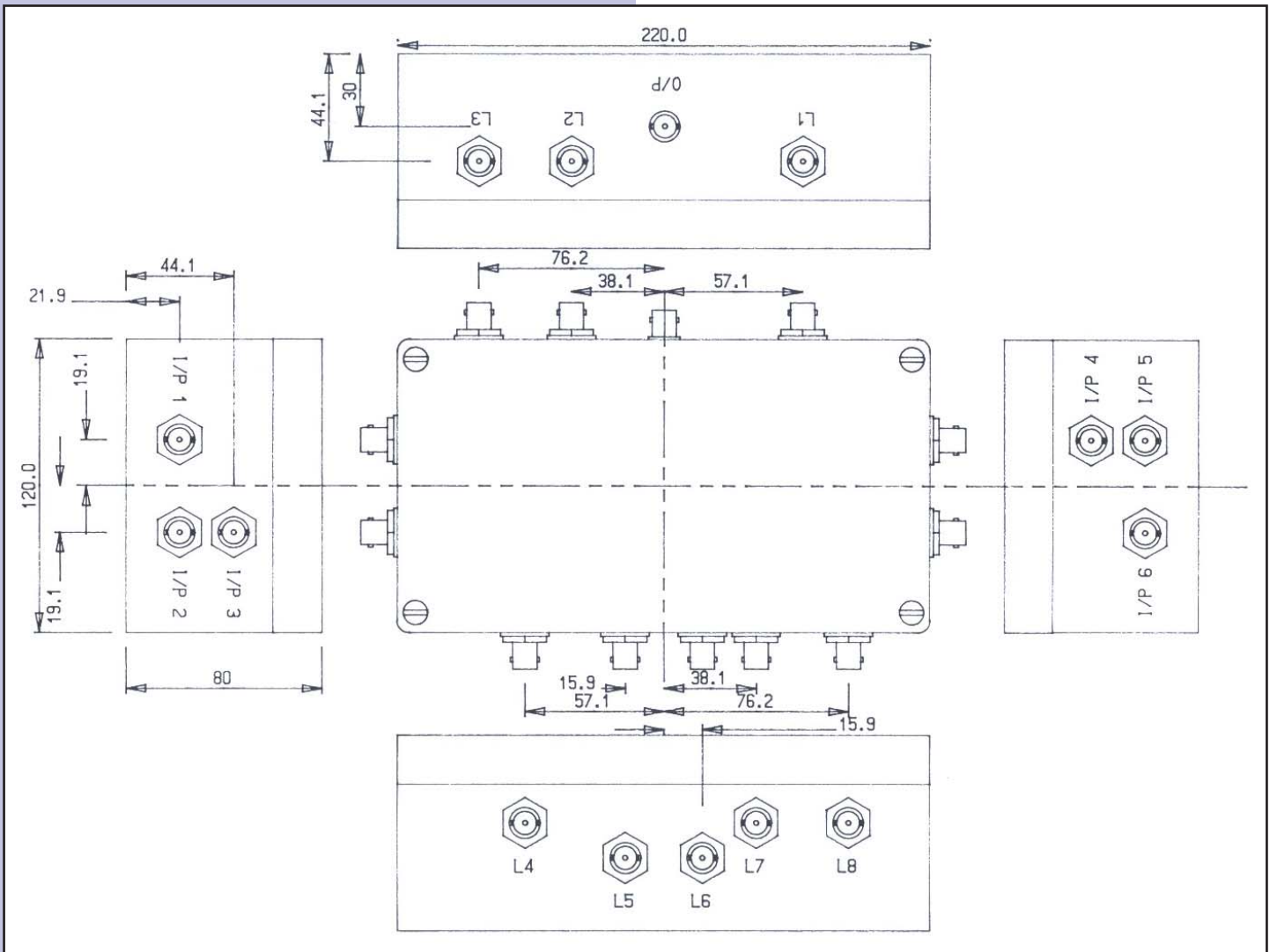
HFH6-50/B

Broad Band VHF Hybrid Combiner

Technical Specification

A broad band VHF hybrid for the frequency range 20- 90 MHz combining six unrelated signals.

Frequency	20 - 90MHz	Input Power	6 x 50 watts
Impedance	50 ohms	Output Power	50 watts
Insertion Loss	<0.75dB + 7.8dB splitting loss	Connectors	BNC
Isolation	>30dB (matched loads)	Configuration	Aluminium casting, epoxy paint finish. Solid encapsulation.
VSWR	<1.2 : 1 (matched loads)	Weight	1kg (exclusive of mounting plate and loads)
Load VSWR	2.5 : 1 max		
Load Ports	8 x 50 ohm (32 watts each)		



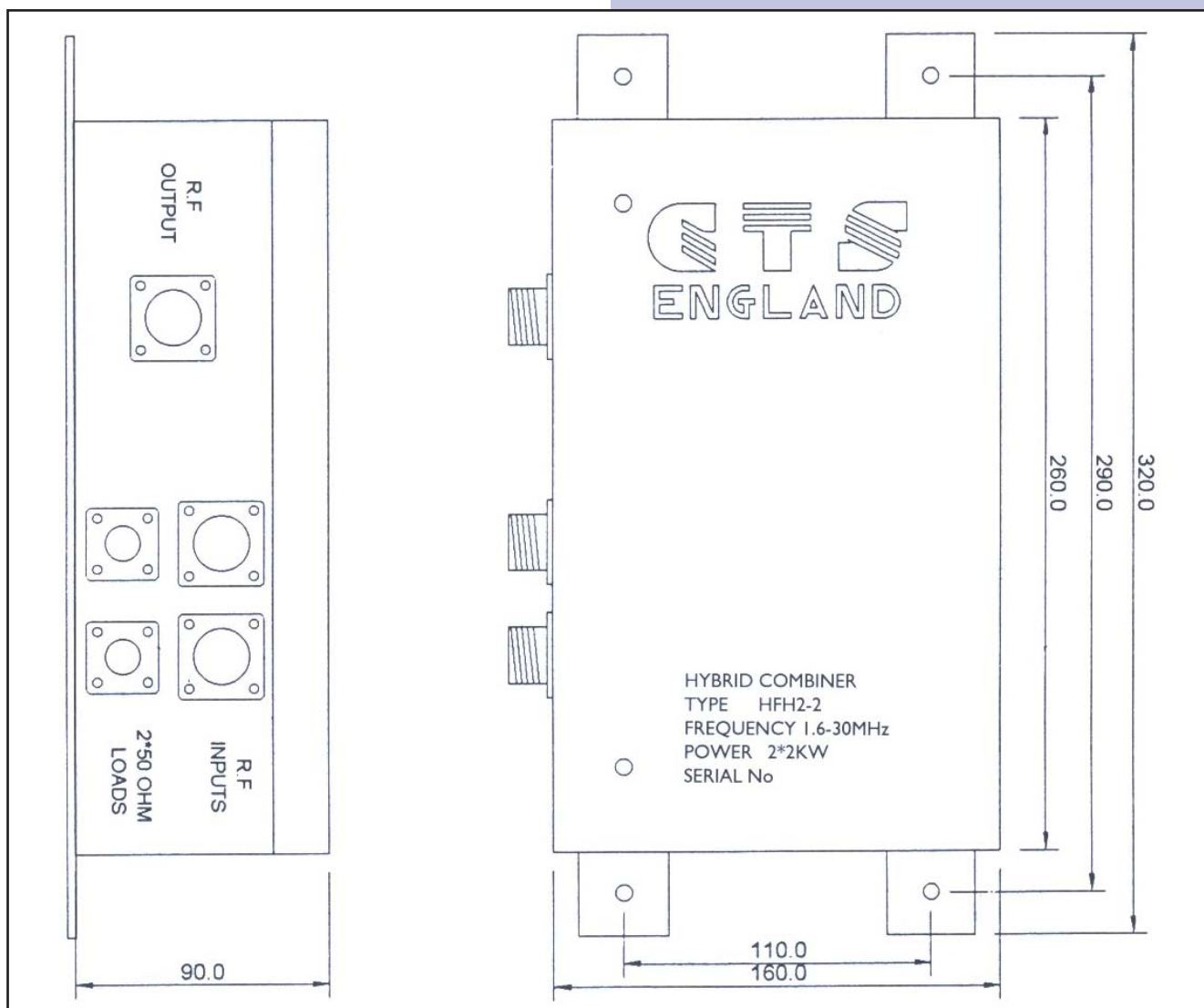
Technical Specification

Broad band hybrid combiners offer a means of combining or splitting transmitter powers and providing isolation between the separate signal paths.

Typical applications include:

- Combination of two co-phased transmitters to provide full output power, e.g broadcast systems.
- Combination of unequal frequencies with excellent isolation.
- Power splitting with isolation between outputs.

Frequency	1.5 - 32MHz
Impedance	50 ohms
Input Power	2 x 1kW average (2kW peak)
Output Power	2kW average (4kW peak)
Isolation	>30dB (matched loads)
VSWR	<1.2: 1 max
Insertion Loss	<0.25dB (matched loads)
Load VSWR	2.5: 1 max
Environment	Outdoor unprotected
Weight	12kg
Connectors	'N'
Load Ports	2 x 50 ohms 'N' connectors
Temperature Range	-40°C to +70°C
Construction	Cast aluminium case epoxy paint finish, encapsulated



HFH2-2

2 x 2kW HF Hybrid Combiner

Technical Specification

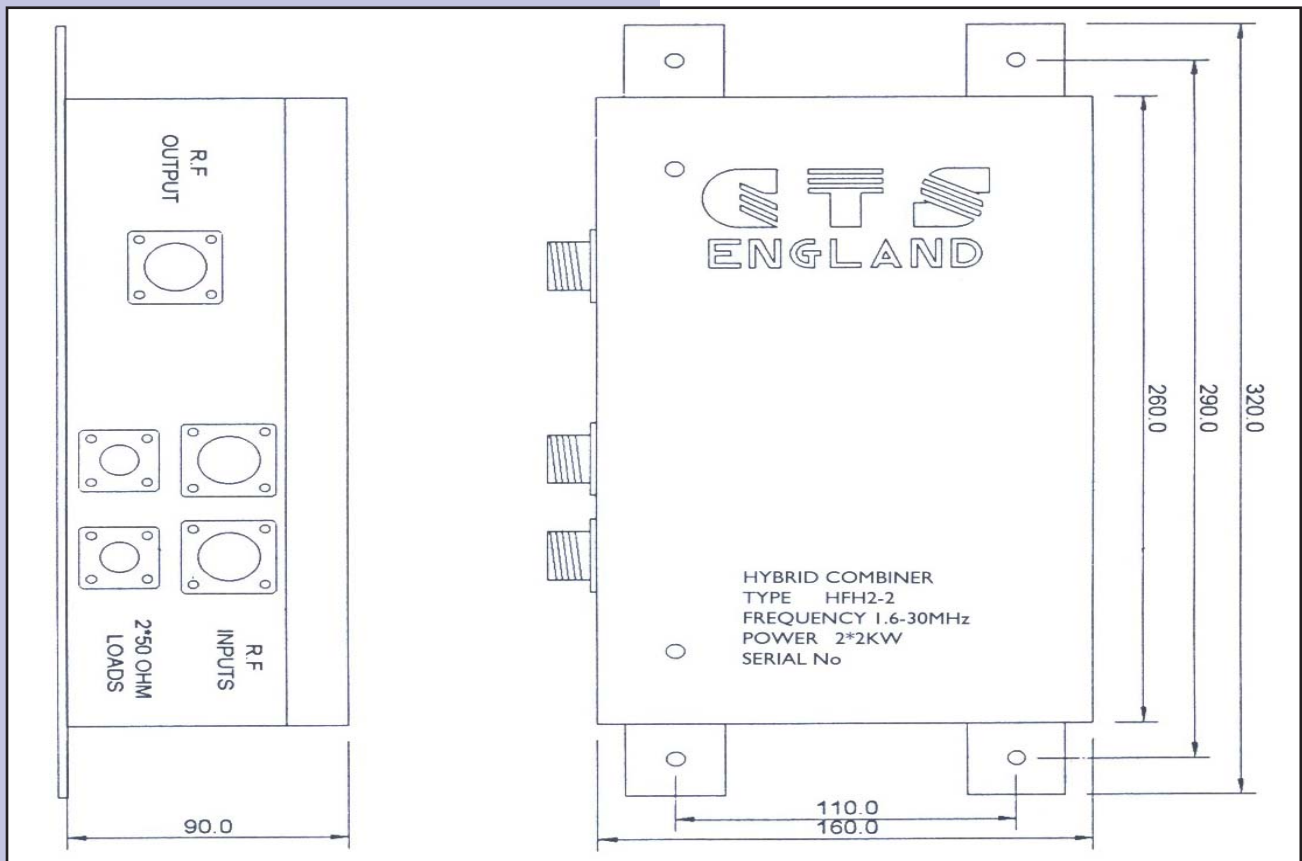
Broad band hybrid combiners offer a means of combining or splitting transmitter powers and providing isolation between the separate signal paths.

Typical applications include:

- Combination of two co-phased transmitters to provide full output power, e.g broadcast systems.
- Combination of unequal frequencies with excellent isolation.
- Power splitting with isolation between outputs.



Frequency	1.5 - 32MHz
Impedance	50 ohms
Input Power	2 x 2kW average (4kW peak)
Output Power	4kW average (8kW peak)
Isolation	>30dB (matched loads)
VSWR	<1.2: 1 max
Insertion Loss	<0.25dB (matched loads)
Load VSWR	2.5: 1 max
Environment	Outdoor unprotected
Weight	12kg
Connectors	'N', 'HN'
Load Ports	2 x 50 ohms 'N' connectors
Temperature Range	-40°C to +70°C
Construction	Cast aluminium case epoxy paint finish, encapsulated

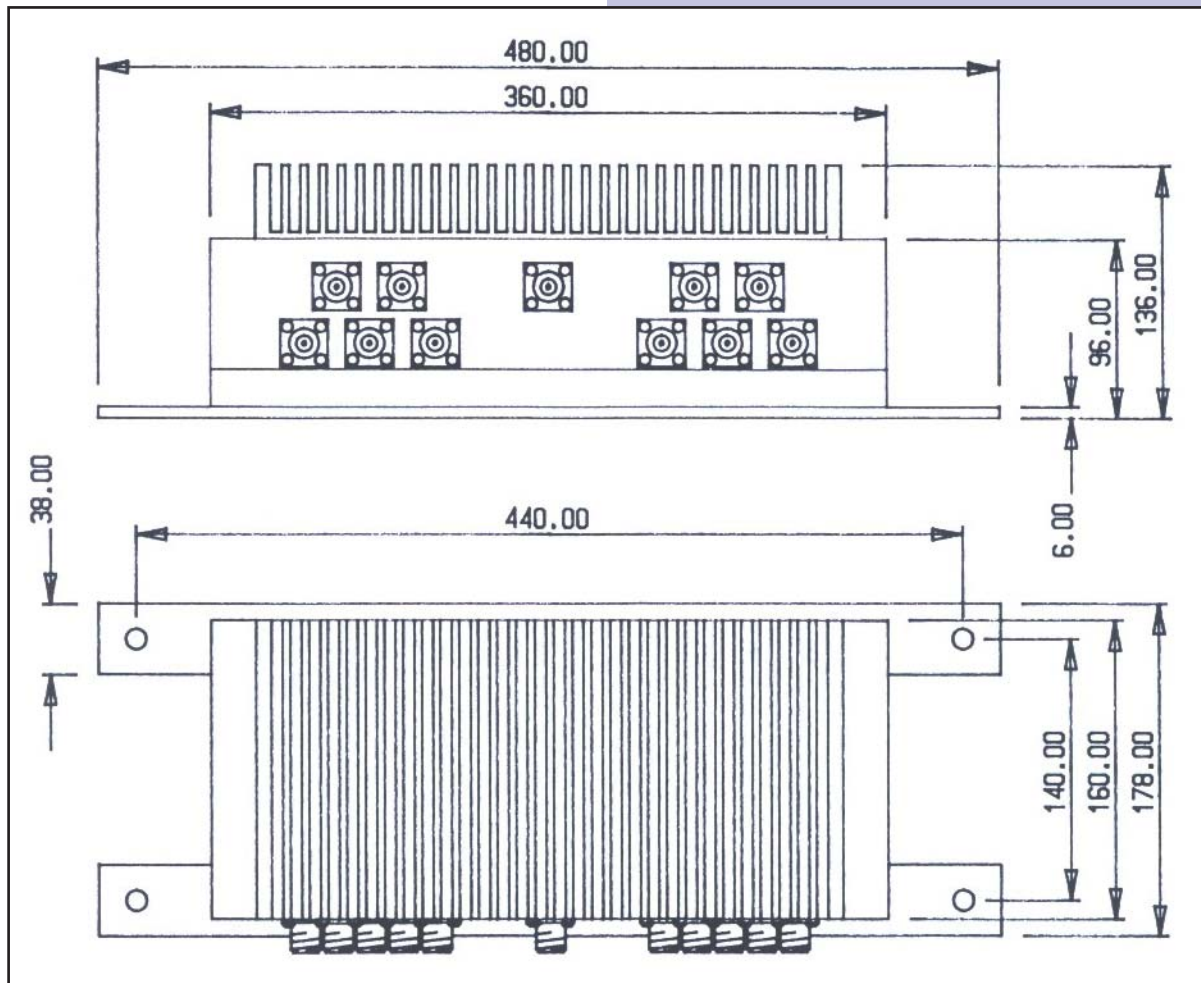


Technical Specification

The HFH4-1 is a 4 x 1kW broad band hybrid designed to combine four unequal frequencies within the range of 2 - 40 MHz. The unit is built to full military standards and suitable for frequency hopping and similar systems. It is emphasised that the HFH4-1 is not capable of combining co-phased transmitters and a 6dB splitting loss is applicable to each signal path.

- 'N' connectors only available
- Load port must be terminated in 500 watt 50 ohm unbalanced loads
- Units available for outdoor unprotected operation

Frequency	2 - 40MHz
Input Power	4 x 1kW average
Impedance	50 ohms
Balancing Loads	6 x 500 watt 50 ohms
Splitter Loss	6dB
Insertion Loss	0.5dB (matched loads)
Isolation	30dB (matched loads)
Load VSWR	3: 1 max
VSWR	<1.2: 1
Phase	0 +/- 5
Input Sockets	'N' Sockets
Ouput Sockets	'N' Sockets
Load Sockets	'N' Sockets
Temperature	-40°C to +55°C
Cooling	Solid encapsulation natural convection.



HFH2-10

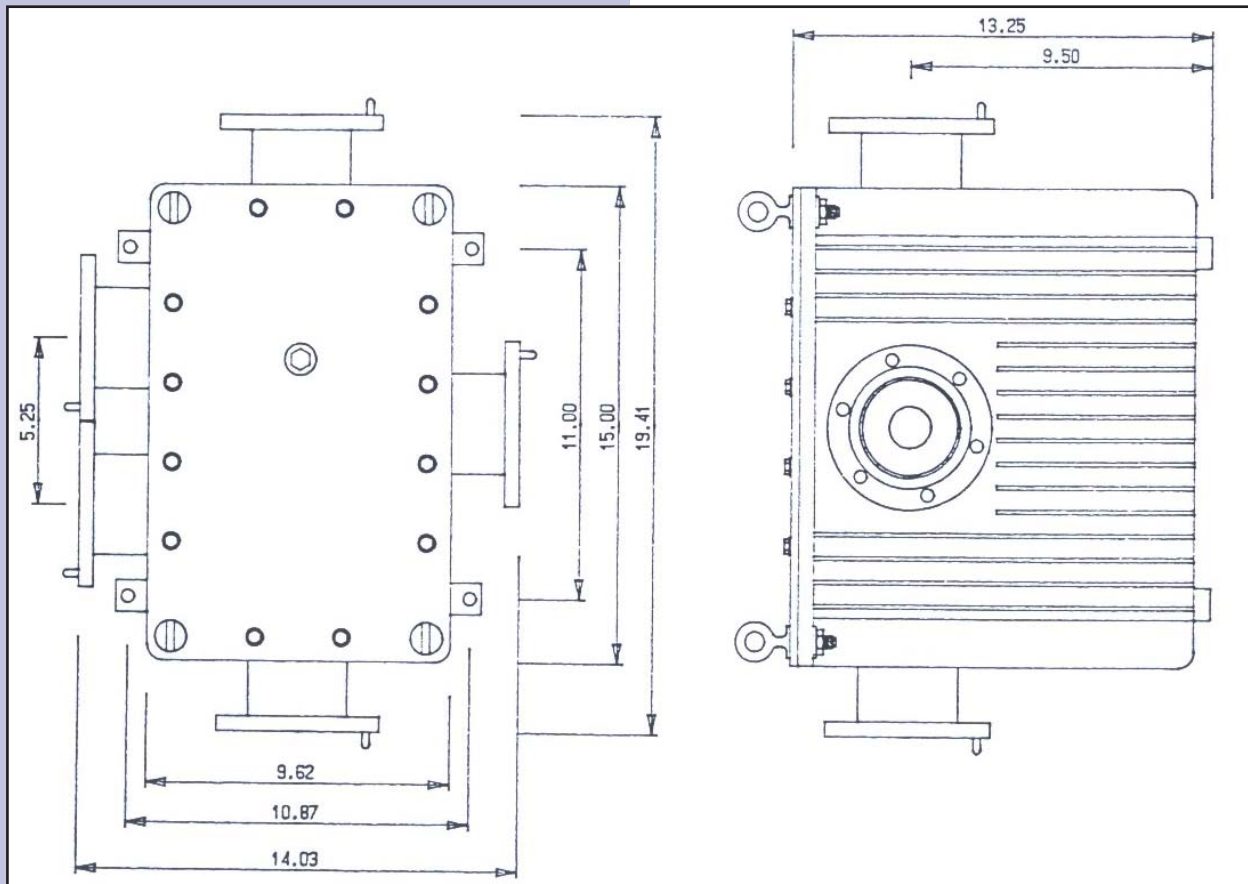
2 x 10kW HF Hybrid Combiner

Technical Specification

The HFH2-10 series of broad band hybrids enable two co-phased 10kW transmitters to be combined into a single 20kW output. These units are particularly useful in low power HF broadcast systems where uninterrupted service is required when failure in one transmitter occurs.

Due to the excellent isolation characteristic of the HFH2-10, combination of two unequal frequencies for common antenna working is possible if the 3dB power loss can be tolerated.

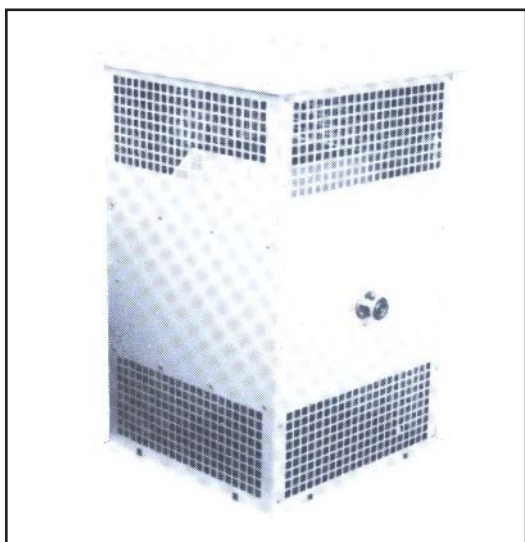
Frequency	2 - 30MHz
Impedance	50 ohms
Insertion Loss	<0.25dB (matched loads)
Isolation	>30dB (matched loads)
VSWR	<1.2: 1 (matched loads)
Load VSWR	2.5: 1 max
Load Ports	2 x 50 ohm, 7/8" EIA
Pressure Relief Valve	Set to 0.5-1 PSI
Connectors	7/8" or 1 5/8" EIA
Temperature	-40°C to +55°C
Weight	55kg
Power	2 input channels each 10kW (40kW peak) 20kW average output for co-phased inputs.
Configuration	Aluminium casting, silicone oil cooled, pressure relief valve, epoxy paint finish. Fully sealed for outdoor operation.



50 Ohm 10 kW Resistive Load

Technical Specification

RL100-5



The RL100-5 is a 50 ohm unbalanced resistive load designed specifically for the HF frequency range 1.5 - 32MHz. The load is convection cooled, requires no AC power and is suitable for outdoor unprotected operation. Typical applications include use as a transmitter load, hybrid balancing load and antenna common mode load.

Frequency	1.5 - 32MHz	Load VSWR	3:1 max
VSWR	<1.15 : 1	Weight	60kg
Input Impedance	50 ohms	Configuration	Aluminum housing with Alocrom 1200 and enamel paint finish
Connector	7/8" or 1 5/8" EIA		
Temperature	-40°C to +65°C	Power	10kW average continuous 20kW peak
Humidity	100% at 30C		

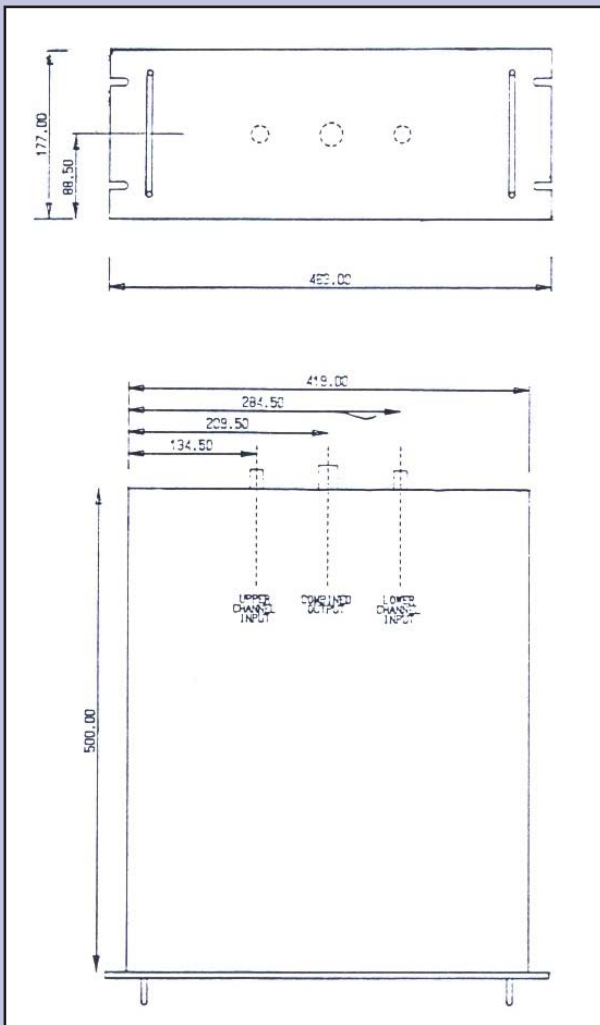
HFM2-1

Technical Specification

Transmitter multicouplers utilising low loss filter networks enable multiple transmitters to work into a common antenna. Computer aided design techniques provide optimum performance from conventional LC circuits which allows transmitters to work at 15% frequency separation.

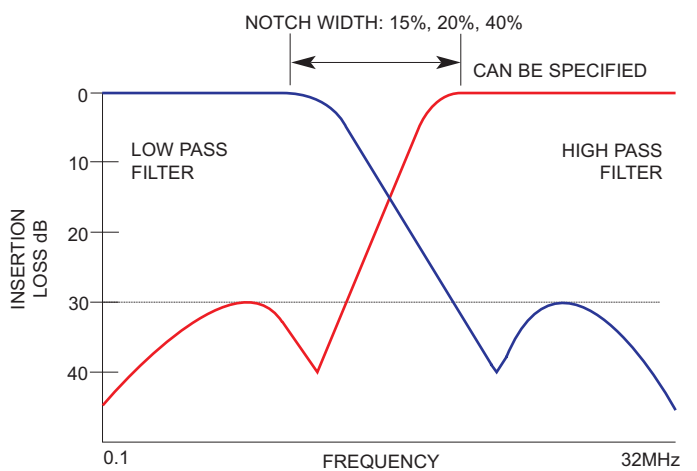
System losses are low, typically less than 0.2dB and rejection of the adjacent transmitter above 30dB. The HFM2-1 series are suitable for 19" rack mounting and do not require additional forced air cooling.

Models can be supplied with various notch widths and we will be pleased to advise on the most economical solution to your problems.



2 x 1kW HF Transmitter Multicouplers

Frequency	0.1 - 32MHz
Impedance	50 ohms
VSWR	<1.2: 1 (matched loads)
Insertion Loss	<0.25dB (matched load)
Isolation	>30dB (matched load)
Load VSWR	3:1 max
Weight	15kg
Notch Width	15%, 20%, 40% of cross over frequency
Cross Cover Frequency	Notch centre to be specified between 3-18MHz (lower notch centres available)
Environment	Indoor -20°C to +55°C (natural convection)
Connectors	'N', 'HN', 7/8" EIA, 7/16" Spinner
Power	2 input channels each 1kW average (2kW peak) 1 output channel 2kW average (4kW peak)



2 x 2kW HF Transmitter Multicouplers

Technical Specification

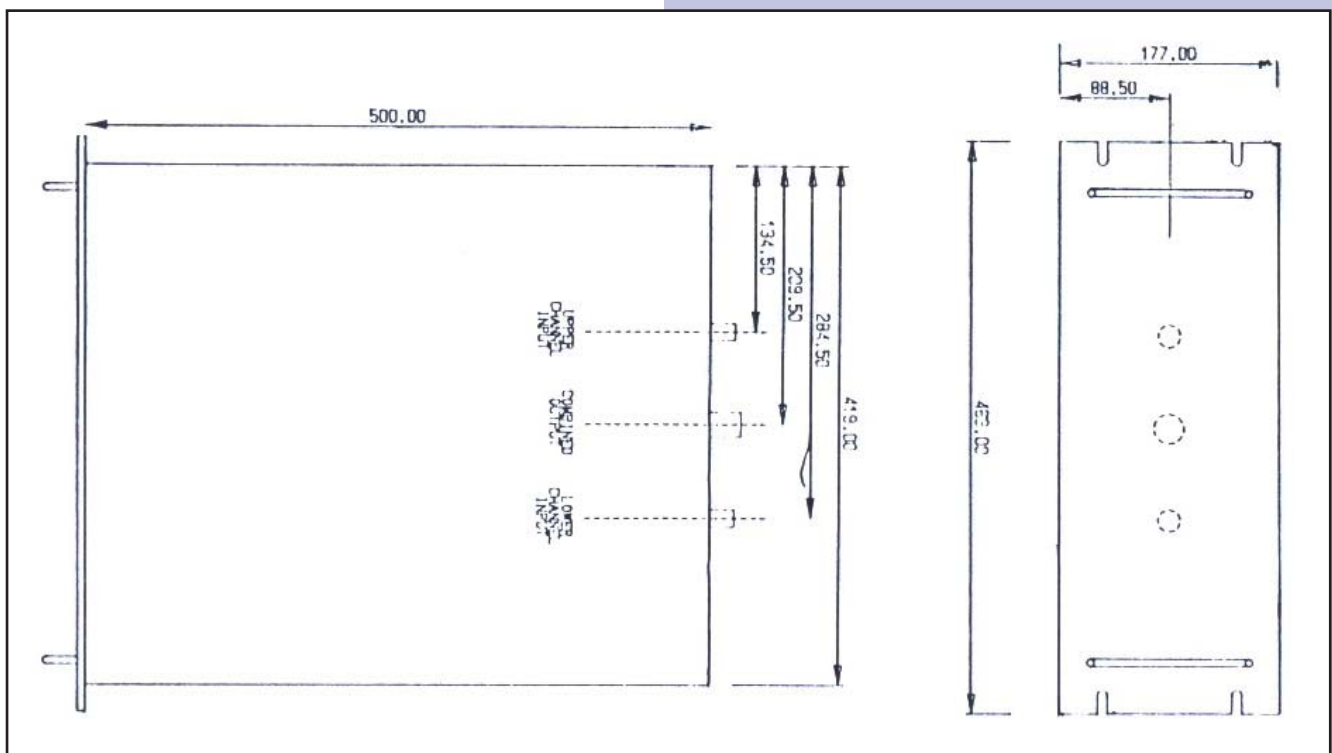
Transmitter multicouplers utilising low loss filter networks enable multiple transmitters to work into a common antenna. Computer aided design techniques provide optimum performance from conventional LC circuits which allows transmitters to work at 15% frequency separation.

System losses are low, typically less than 0.2dB and rejection of the adjacent transmitter above 30dB. The HFM2-2 series are suitable for 19" rack mounting and do not require additional forced air cooling.

Models can be supplied with various notch widths and we will be pleased to advise on the most economical solution to your problems.

HFM2-2

Frequency	0.1 - 32MHz
Impedance	50 ohms
VSWR	<1.2: 1 (matched loads)
Insertion Loss	<0.25dB (matched load)
Isolation	>30dB (matched load)
Load VSWR	3: 1 max
Weight	17kg
Notch Width	15%, 20%, 40% of cross over frequency
Cross Cover Frequency	Notch centre to be specified between 3-18MHz (lower notch centres available)
Environment	Indoor -20°C to +55°C (natural convection)
Connectors	'HN', 7/8" EIA, 7/16" Spinner
Power	2 input channels each 2kW average (4kW peak) 1 output channel 4kW average (8kW peak)

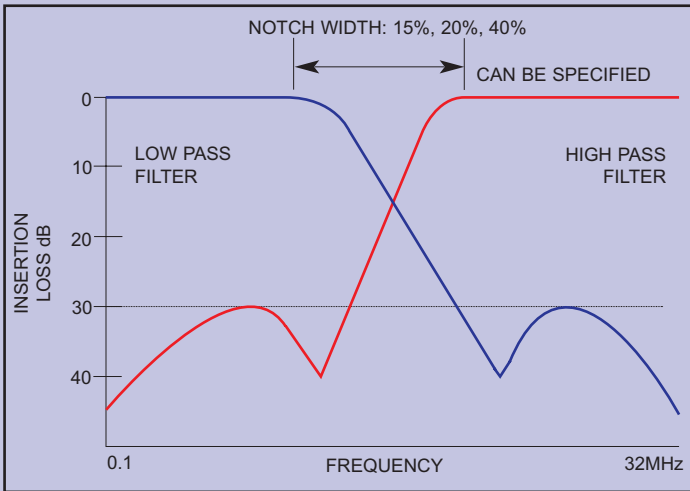


HFM2-5

Technical Specification

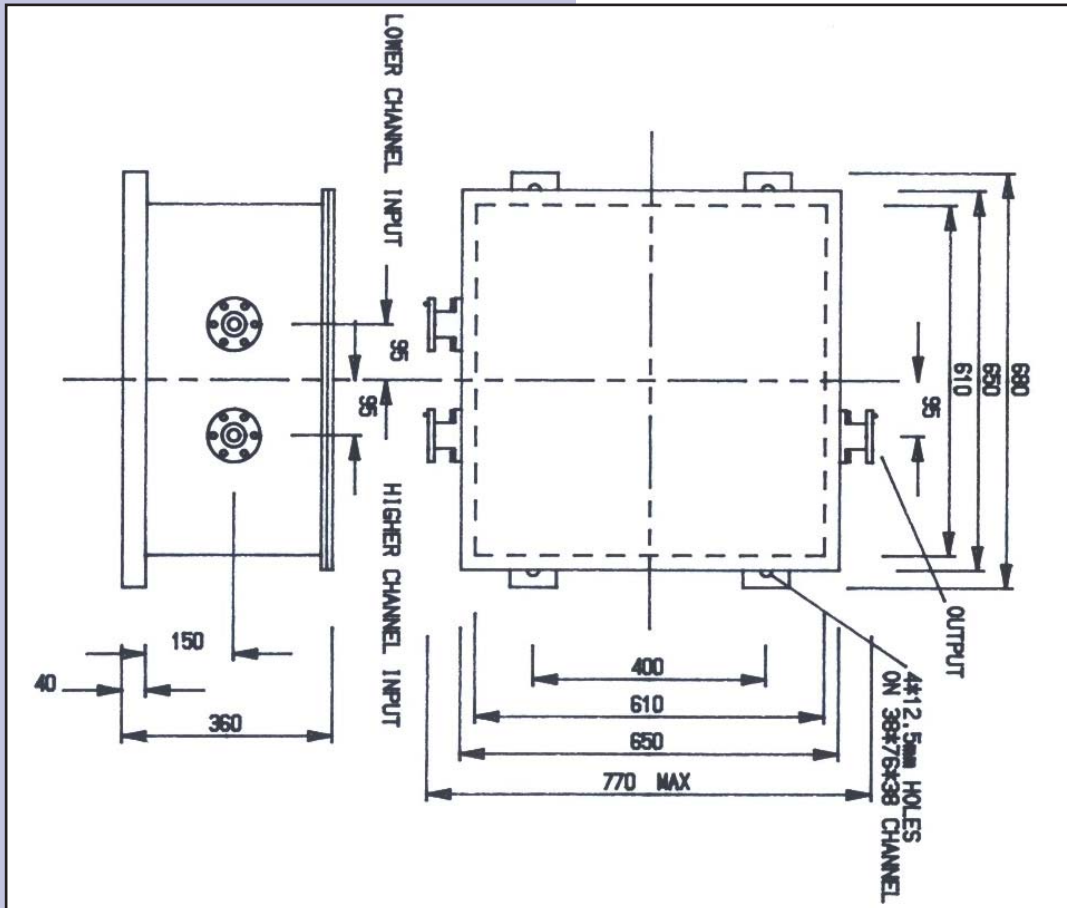
Transmitter multicouplers utilising low loss filter networks enable multiple transmitters to work into a common antenna. Computer aided design techniques provide optimum performance from conventional LC circuits which allows transmitters to work at 15% frequency separation.

System losses are low, typically less than 0.2dB and rejection of the adjacent transmitter above 30dB.



2 x 5kW HF Transmitter Multicoupler

Frequency	0.1 - 32MHz
Impedance	50 ohms
VSWR	<1.2: 1
Insertion Loss	<0.3dB
Isolation	>30dB
Load VSWR	3: 1 max
Weight	150kg approx
Notch Width	15%, 20%, 40%
Cross Cover Frequency	Notch centre to be specified between 3-MHz (lower notch centres available)
Environment	Outdoor -20°C to +55°C (natural convection)
Connectors	7/8", 1 5/8" EIA, LC
Power	2 input channels each 5kW average (20kW peak) 1 output channel 10kW average (40kW peak)



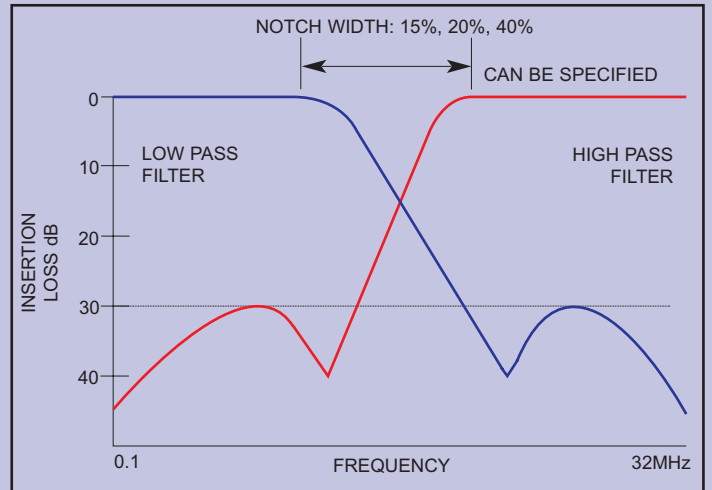
2 x 10kW HF Transmitter Multicoupler

Technical Specification

Transmitter multicouplers utilising low loss filter networks enable multiple transmitters to work into a common antenna. Computer aided design techniques provide optimum performance from conventional LC circuits which allows transmitters to work at 15% frequency separation.

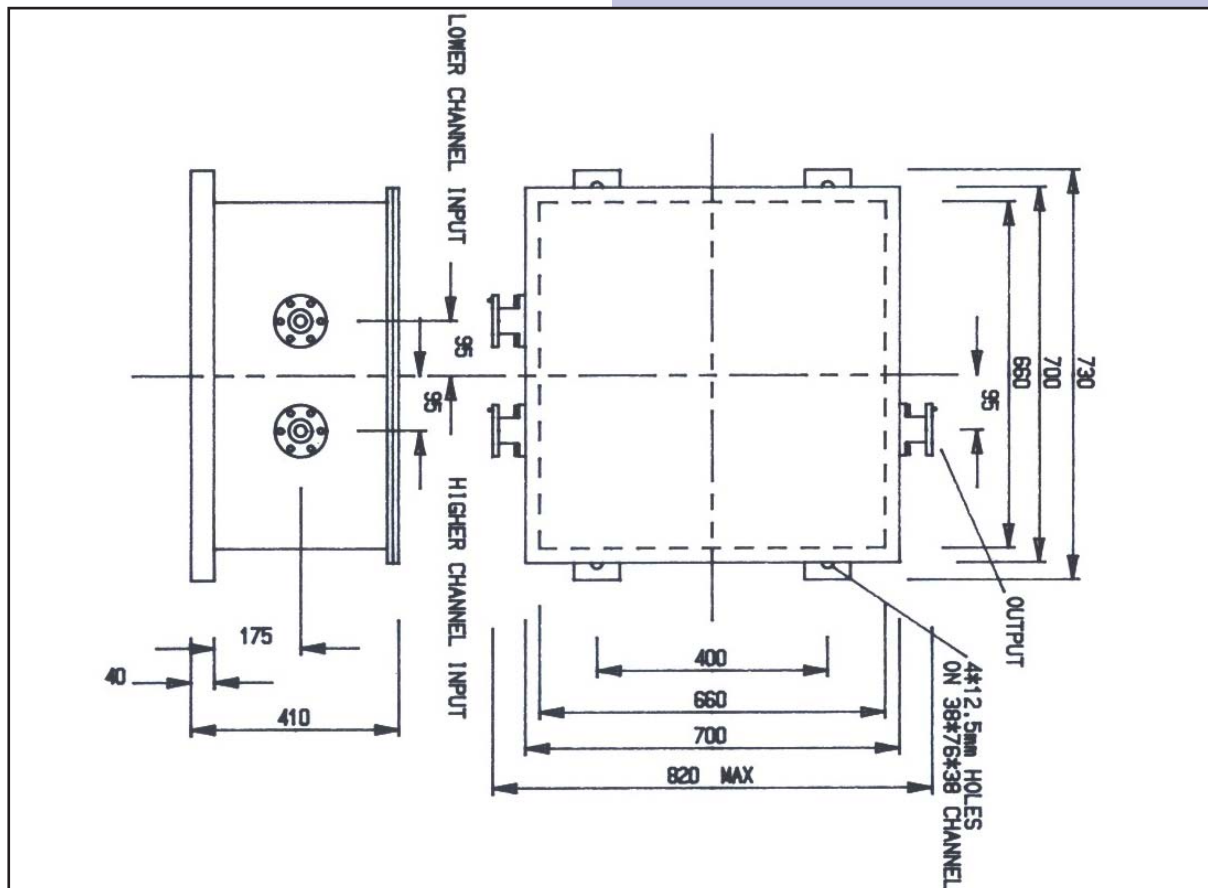
System losses are low, typically less than 0.2dB and rejection of the adjacent transmitter above 30dB.

HFM2-10



Frequency	0.1 - 32MHz
Impedance	50 ohms
VSWR	<1.2: 1
Insertion Loss	<0.3dB
Isolation	>30dB
Load VSWR	3: 1 max
Weight	250kg approx
Notch Width	15%, 20%, 40%

Cross Cover Frequency	Notch centre to be specified between 3-18MHz (lower notch centres available)
Environment	Outdoor -40°C to +55°C Silicone oil cooled natural convection
Connectors	3 1/8" EIA, 1 5/8"
Power	2 input channels each 10kW average (40kW peak) 1 output channel 20kW average (80kW peak)

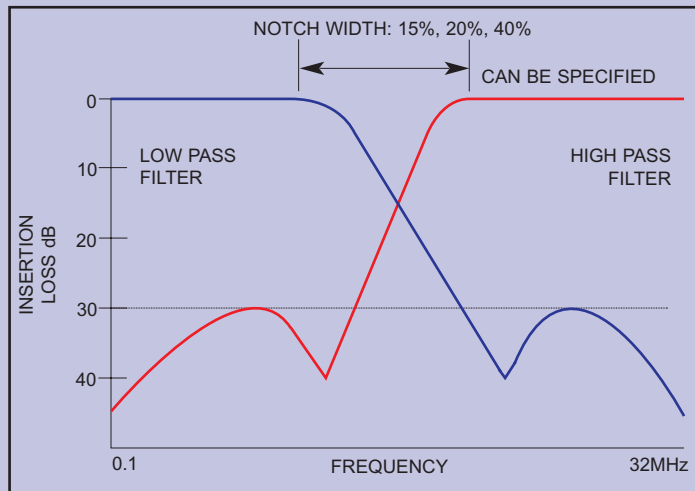


HFM2-20

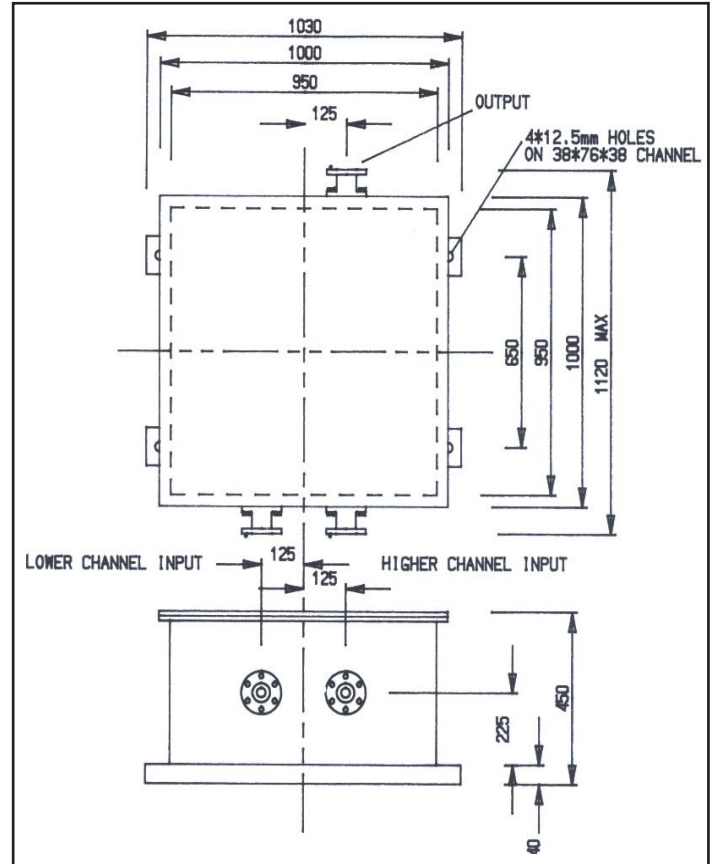
Technical Specification

Transmitter multicouplers utilising low loss filter enable multiple transmitters to work into a common antenna. Computer aided design techniques provide optimum performance from conventional LC circuits which allows transmitters to work at 15% frequency separation.

System losses are low, typically less than 0.2dB and rejection of the adjacent transmitter above 30dB.



2 x 20kW HF Transmitter Multicoupler



Frequency	0.1 - 32MHz	Cross Cover Frequency	Notch centre to be specified between 3-18MHz (lower notch centres available)
Impedance	50 ohms	Environment	Outdoor -40°C to +55°C Silicone oil cooled natural convection
VSWR	<1.2: 1	Connectors	3 1/8" EIA
Insertion Loss	<0.3dB	Power	2 input channels each 20kW average (80kW peak) 1 output channel 40kW average (160kW peak)
Isolation	>30dB		
Load VSWR	3:1 max		
Weight	325kg approx		
Notch Width	15%, 20%, 40%		

1kW HF Directional Coupler

HFC1-30

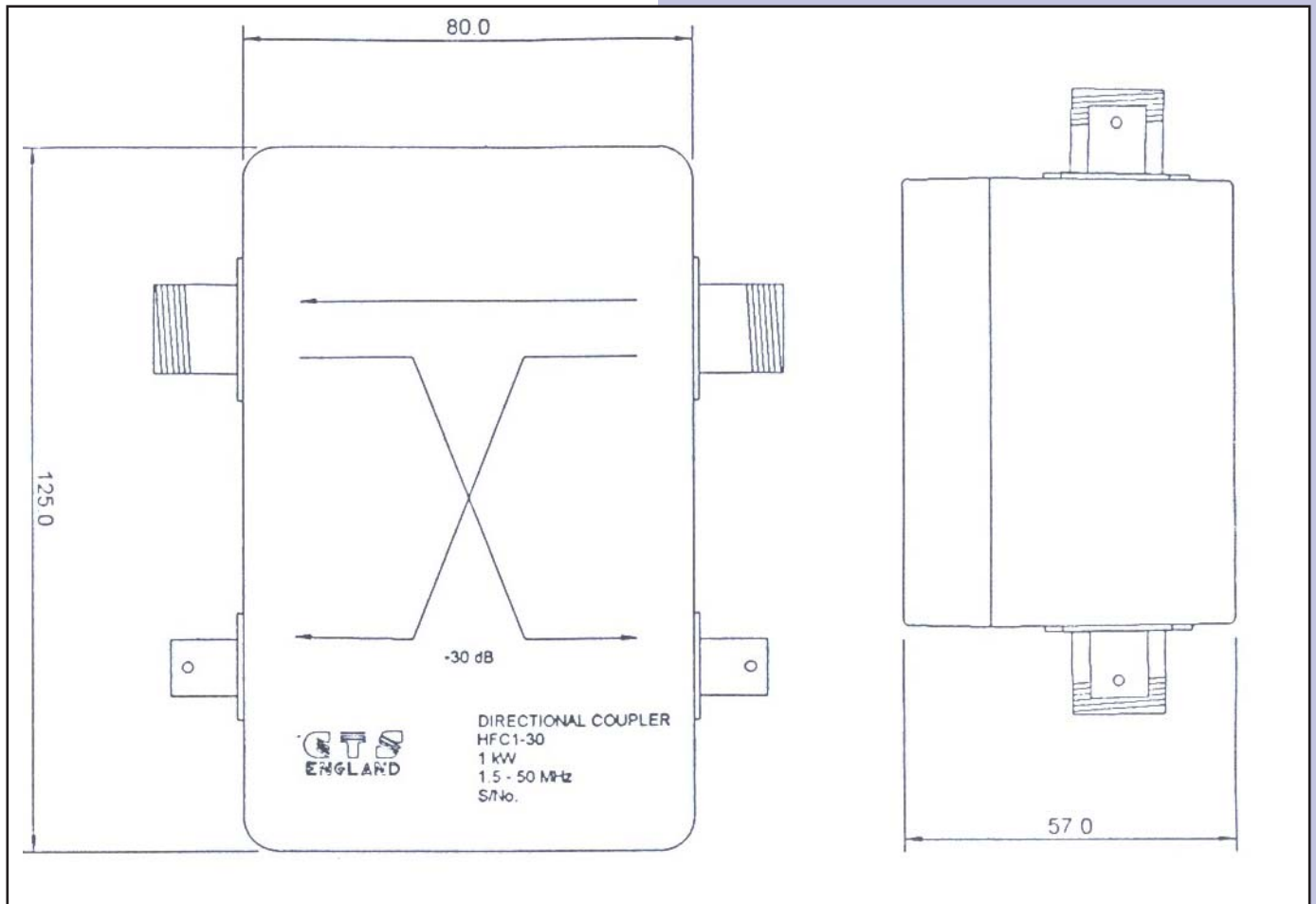
Technical Specification

The HFC1-30 is a wide band directional coupler for the HF frequency band.

The coupler uses ferrite transformer techniques resulting in an extremely small compact device for permanent installation or for field measurement purposes.

Output samples of forward and reverse power flow are provided. Being effectively a “dual” coupler the reverse signal is largely independent of the load on the forward port (and vice versa). Built in load resistors dissipate any un-terminated coupled power. (n.b at 1kW the forward output signal is 1W).

Frequency	2 - 50MHz full spec - see note*
Power Rating	1kW continuous. 2.5kW peak
Max VSWR	2.5: 1
Insertion Loss	<0.1dB
Return Loss (matched load)	26.5dB
Coupling Ratio	-30dB +/- 0.5dB
Forward/Reverse Discrimination	>30dB
Connectors	Main line 'N' Female. Coupled line 'BNC' Female



*The coupler is effective over a very much wider frequency range with a small degradation in performance. Calibration charts can be supplied for those out of band frequencies, where for example, measurement of harmonics is desired.

HFC10 - 26

10kW HF Directional Coupler

Technical Specification

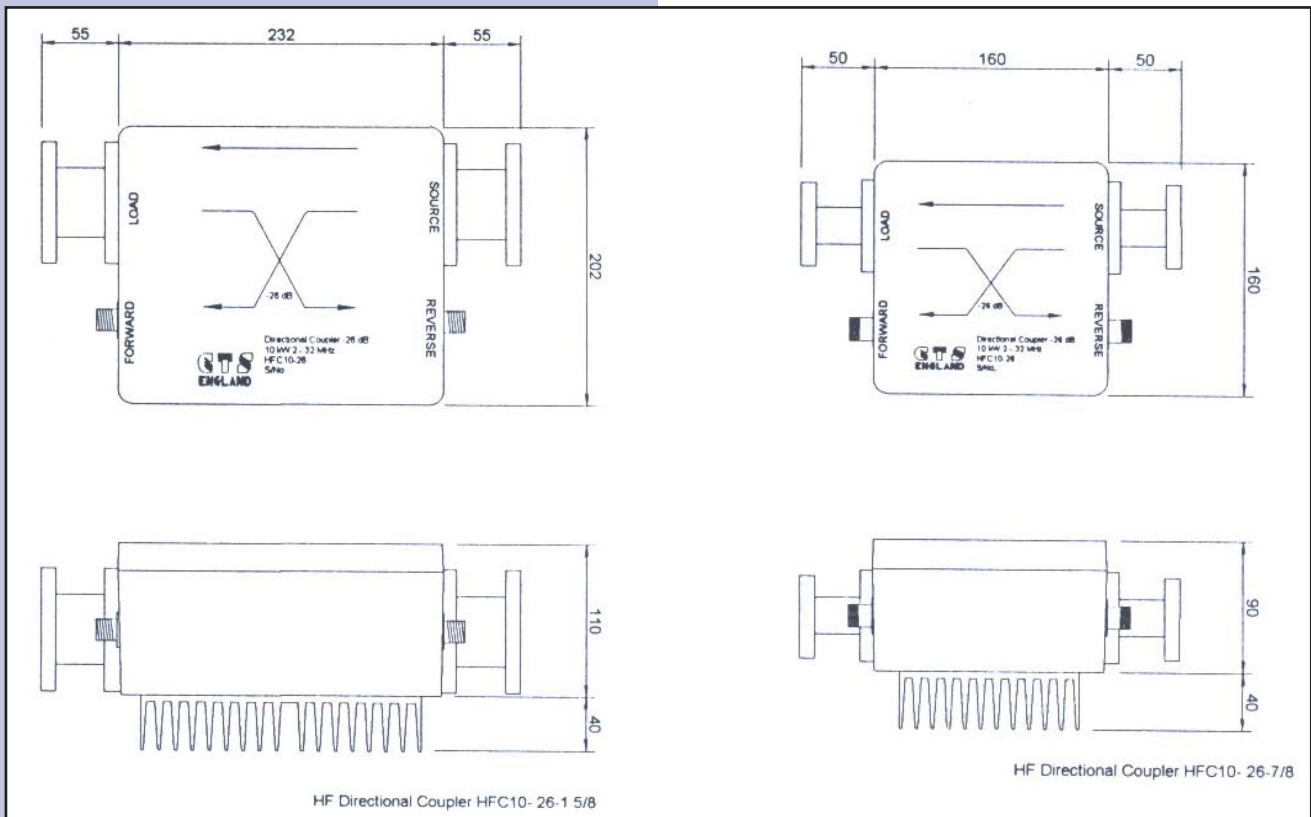
The HFC10-26 is a wide band directional coupler for the HF frequency band.

The coupler uses ferrite transformer techniques resulting in an extremely small compact device for permanent installation or for field measurement purposes.

Output samples of forward and reverse power flow are provided. Being effectively a "dual" coupler the reverse signal is largely independent of the load on the forward port (and vice versa). Built in load resistors dissipate any un-terminated coupled power. (n.b at 10kW the forward output signal is 25W).



Frequency	2 - 32MHz full spec - see note*	Return Loss (matched load)	26.5dB
Power Rating	10kW continuous and peak	Coupling Ratio	-26dB +/- 0.5dB
Max VSWR	2.5: 1	Forward/Reverse Discrimination	>30dB
Insertion Loss	<0.1dB	Connectors	Main line 7/8". Coupled line 'N' Female



*The coupler is effective over a very much wider frequency range with a small degradation in performance. Calibration charts can be supplied for those out of band frequencies, where for example, measurement of harmonics is desired.

Technical Specification

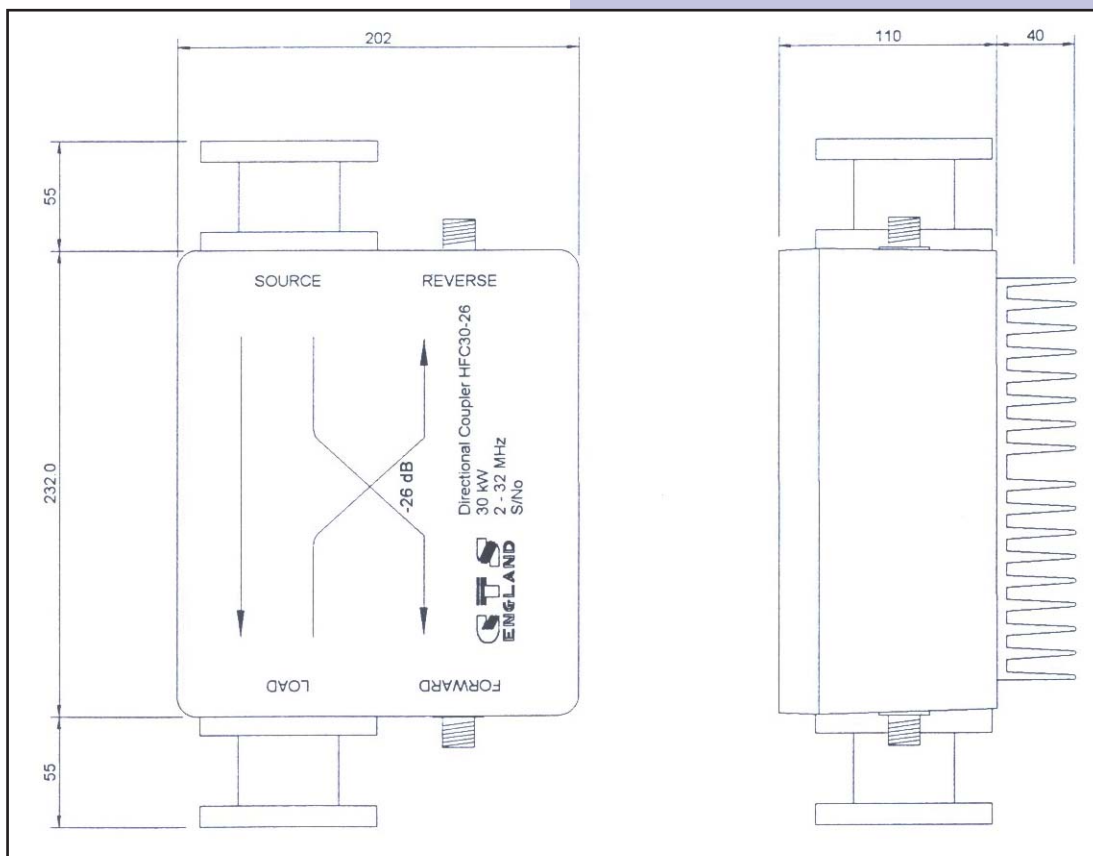


The HFC30-26 is a wide band directional coupler for the HF frequency band.

The coupler uses ferrite transformer techniques resulting in an extremely small compact device for permanent installation or for field measurement purposes.

Output samples of forward and reverse power flow are provided. Being effectively a “dual” coupler the reverse signal is largely independent of the load on the forward port (and vice versa). Built in load resistors dissipate any un-terminated coupled power. (n.b at 30kW the forward output signal is 75W).

Frequency	2 - 32MHz full spec - see note*	Return Loss (matched load)	26.5dB
Power Rating	30kW continuous and peak	Coupling Ratio	-26dB +/- 0.5dB
Max VSWR	2.5: 1	Forward/Reverse Discrimination	>30dB
Insertion Loss	<0.1dB	Connectors	Main line 1 5/8". Coupled line 'N' Female



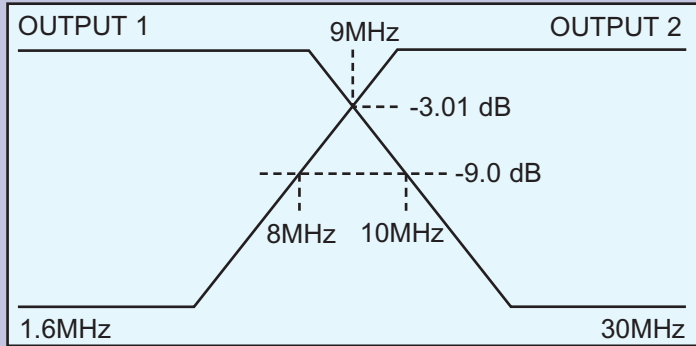
*The coupler is effective over a very much wider frequency range with a small degradation in performance. Calibration charts can be supplied for those out of band frequencies, where for example, measurement of harmonics is desired.

HFM2-2A

HF Diplexer

Technical Specification

The diplexer is a passive, 3-port network which splits RF signals between separate inputs of a broad band antenna.



Roll Off

Output 1 at 10MHz - 9db

Output 2 at 8MHz - 9db

Input Power	1.5kW average (4kW peak)
Input Frequency	1.6 - 30MHz
Output 1	1.6 - 9MHz
Output 2	9 - 30MHz
Insertion Loss	<0.2dB
Input VSWR	<1.2: 1
Load VSWR	Up to 6: 1
Configuration	19" rack, 3 units high
Temperature	-10°C to +55°C (operational) -40°C to +70°C (storage)

n.b Other bands available

