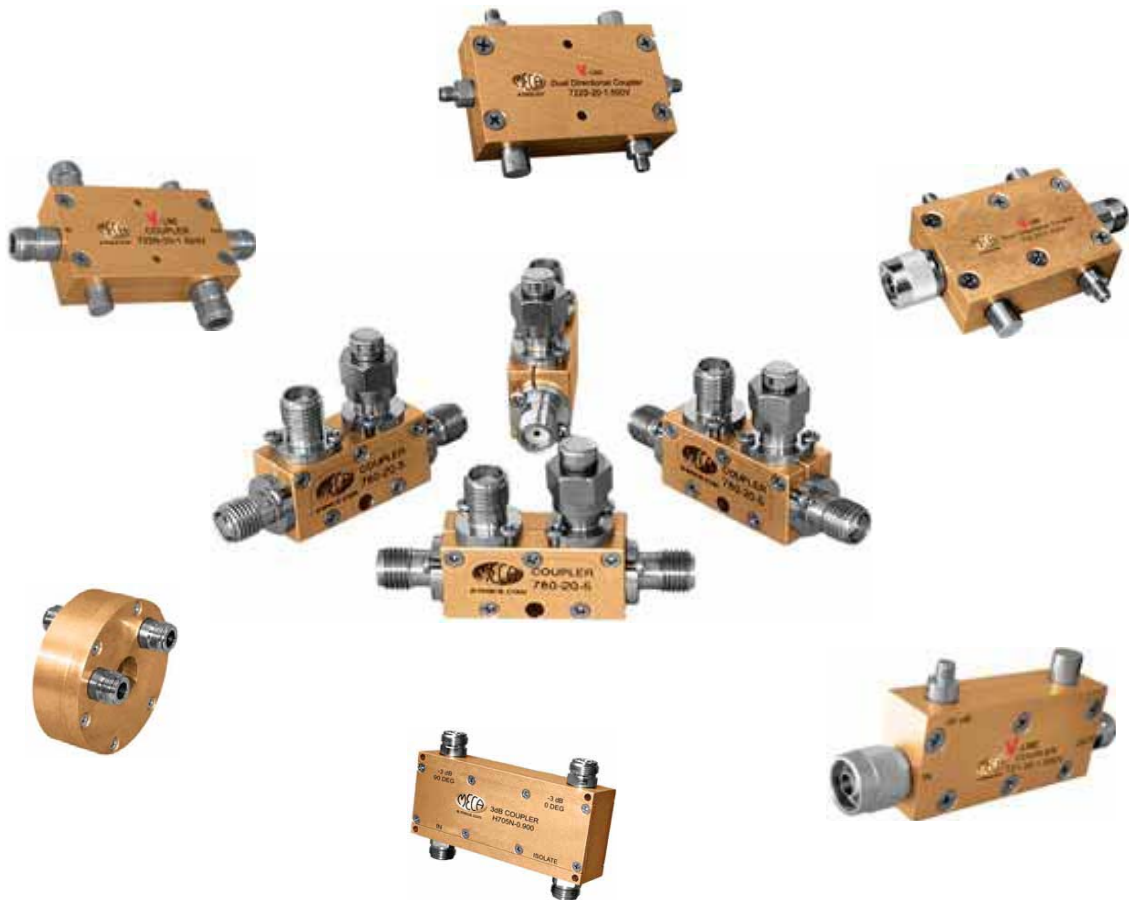




# Directional & Hybrid Couplers



**Your total source for  
everything wireless.**

DIRECTIONAL COUPLERS OVERVIEW				
Connector Configuration			Catalog Number	Page
Input	Output	Coupled Port		
<b>SINGLE DIRECTIONAL COUPLERS</b>				
N-Female	N-Female	N-Female	CN Series	C-17
SMA-Female	SMA-Female	SMA-Female	CS Series	C-17
N-Female	N-Female	N-Female	715 Series	C-18
SMA-Female	SMA-Female	SMA-Female	715S Series	C-19
N-Male	N-Female	SMA-Female	721 Series	C-20
SMA-Female	SMA-Female	SMA-Female	780 Series	C-21
<b>DUAL DIRECTIONAL COUPLERS</b>				
N-Female	N-Female	N-Female	722N Series	C-18
SMA-Female	SMA-Female	SMA-Female	722S Series	C-19
N-Male	N-Female	SMA-Female	722 Series	C-21
<b>HYBRID COUPLERS</b>				
N-Female			705N Series	C-22
SMA-Female			705S Series	C-22
N-Female & 7/16 DIN			H705N	C-22
N-Female & 7/16 DIN			700 Series	C-23

Directional couplers are used in a wide variety of applications and can satisfy almost any requirement for sampling incident and reflected microwave power conveniently and accurately with minimal disturbance to the transmission line. Some general applications for directional couplers include line monitoring, power measurements and load source isolators. When line monitoring, for the purpose of power level measuring and VSWR alarms, a directional coupler is used to sample power from the transmission line without altering line characteristics. In power measurements, insertion of a directional coupler in the transmission line allows measurement with simple low level detectors or field strength meters and power measuring equipment. By reversing the coupler in the transmission line, an indication of impedance match and/or reflected power can be derived by comparing the forward to reflected power levels. This may be more easily accomplished by using a dual directional coupler in the line. A signal can be taken from the source to the tap with high attenuation (directivity) between the tap and the load.

MECA offers a wide selection of directional couplers designed to exceed commercial specifications. Standard coupling values of **6, 10, 20, 30** and **40 dB** are available from stock. Custom configurations with special coupling values, external high power terminations and alternate connector styles or plating are also readily available in quantity. All models may be specified without an internal termination for bi-directional coupling. Passive intermodulation (PIM) compliant and weather resistant models are also available. With immediate access to our Application Engineers, you can choose the best product solutions for your specific needs.

Theoretical Mainline Insertion Loss Due to Coupling Factor (dB)							
Coupling Factor (dB)	3	6	10	20	30	40	50
Single Directional Coupler	3.01	1.2560	0.4560	0.0436	0.0043	0.0004	0.00004
Dual Directional Coupler	6.02	2.5120	0.9120	0.0872	0.0086	0.0008	0.00008

**How to order:**

Designates series →

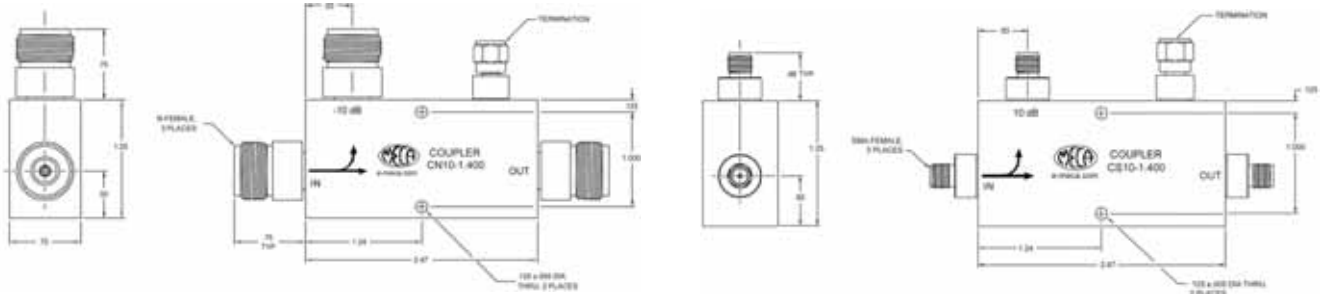
Typical Catalog Number: **715-dB-0.900** ← Designates center frequency

Designates nominal coupling value →

**CN Series**



**CS Series**



MECA introduces 50 watt couplers offering industry-leading performance, quality and reliability. Rugged construction and excellent performance across all wireless bands from 0.8 - 2.0 GHz make them ideal for base station and in-building wireless systems. Unique microstrip design provides lowest possible insertion loss while delivering high directivity and exceptional VSWR. Available from **STOCK** in **10, 15 & 20 dB** coupling in either **Type-N or SMA-Female** connector configurations.

Catalog Number	Frequency (GHz)	Nominal Coupling (dB)	Coupling Variation (Total) <sup>6</sup>	Insertion Loss (Max) <sub>1</sub>	VSWR (Max)	Directivity (Min)
C_10-1.400	0.800 - 2.000	10	+ 2.5 dB - 0.0 dB	0.3 dB	1.20:1	20 dB
C_15-1.400	0.800 - 2.000	15	± 1.25 dB	0.3 dB	1.20:1	20 dB
C_20-1.400	0.800 - 2.000	20	± 1.25 dB	0.2 dB	1.20:1	20 dB

To order or specify, please insert connector style in place of underscore (\_). EXAMPLE: **CN-10-1.400** for **N-Female**, 10 dB, 0.800 - 2.000 GHz.

Average Power (Watts) <sup>2</sup>			
Coupling Factor	10 dB	15 dB	20 dB
Forward	50	75	100
Reverse	5	5	5
Theoretical Insertion Loss Due to Coupling Factor (dB)			
Insertion Loss (dB)	0.456	.139	0.043

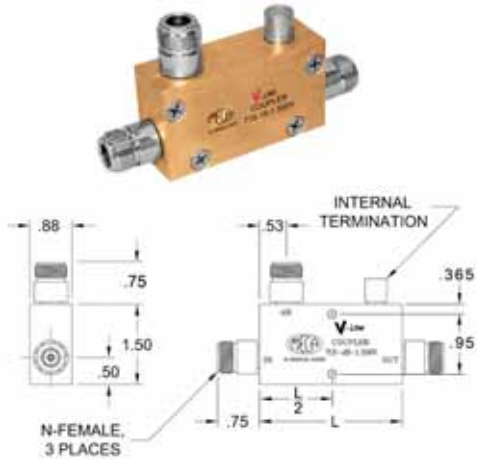
**Notes:**

- 1.) Excluding theoretical insertion loss due to coupling (see table).
- 2.) All units have a peak power rating of 3 kW.
- 3.) 50 ohm nominal impedance standard.
- 4.) Operating temperature is from -55° C to +85° C.
- 5.) Mounting holes 0.125" diameter thru in 2 places.
- 6.) Variation includes flatness/sensitivity

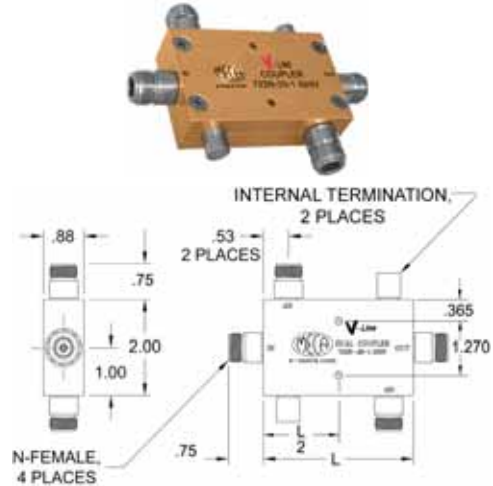
**Contact our Applications Engineer for customized options including:**

- **Special coupling values**
- **Alternate bands**
- **Silver-plated connectors**
- **Weather resistant**

715 Series - Single Directional



722N Series - Dual Directional



MECA's directional couplers are low loss with high power capability and are ideal for your system applications where precise monitoring, external leveling, signal mixing or swept transmission and reflection measurements are necessary. These units are furnished with brass N-Female connectors, gold-plated contact pins and a rugged aluminum housing. Weather resistant models (IP61) and silver-plated connectors available (option **S**) for your passive intermodulation (PIM) concerns.

Catalog Number		Frequency (GHz)	Coupling Variation (Total) <sup>6</sup>	Insertion Loss (Max) <sub>1</sub>	VSWR (Max)	Directivity (Min)	Length (L) (Inches)
Single	Dual						
715-dB-0.600	722N-dB-0.600	0.400 - 0.800	± 1.00 dB	0.1 dB	1.15:1	25 dB	6.08
715-dB-0.900	722N-dB-0.900	0.800 - 1.000	± 0.60 dB	0.1 dB	1.10:1	30 dB	4.46
		0.600 - 1.200	± 1.60 dB	0.1 dB	1.15:1	25 dB	4.46
715-dB-1.500V	722N-dB-1.500V	0.800 - 2.200	± 1.75 dB	0.1 dB	1.15:1	25 dB	3.15
715-dB-1.650W	722N-dB-1.650W	0.800 - 2.500	± 2.20 dB	0.1 dB	1.15:1	25 dB	2.96
715-dB-1.950	722N-dB-1.950	1.700 - 2.200	± 0.60 dB	0.1 dB	1.10:1	25 dB	2.70
		1.300 - 2.600	± 1.20 dB	0.1 dB	1.15:1	25 dB	2.70
715-dB-3.100	722N-dB-3.100	2.000 - 4.200	± 1.20 dB	0.1 dB	1.15:1	25 dB	2.14

V-Line

Nominal coupling values of **10, 20, 30** and **40 dB** are standard. 715 series is also available in **6 dB**. To order or specify, please insert coupling value in place of dB. EXAMPLE: **S715-10-0.900** for **silver-plated**, single directional coupler, **10 dB**, 0.800 - 1.000 GHz.

Average Power (Watts) <sub>2</sub>						
Coupling Factor		6 dB	10 dB	20 dB	30 dB	40 dB
715	Forward*	100	250	500	500	500
	Reverse*	10	25	250	500	500
722N	Forward/Reverse	N/A	25	250	500	500
Theoretical Insertion Loss Due to Coupling Factor (dB)						
715		1.2560	0.4560	0.0436	0.0043	0.0004
722N		2.5120	0.9120	0.0872	0.0086	0.0008

\* For higher average power, couplers can be configured with external load based on your application.

Notes:

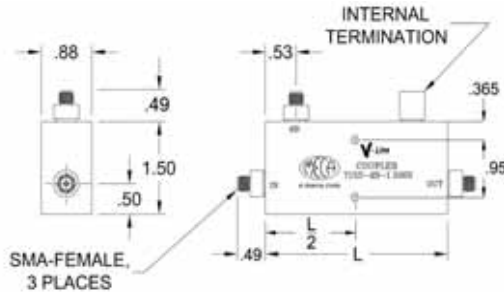
- 1.) Excluding theoretical insertion loss due to coupling (see table).
- 2.) All units have a peak power rating of 10 kW.
- 3.) 50 ohm nominal impedance standard.
- 4.) Operating temperature is from -55° C to +85° C.
- 5.) Mounting holes 0.156" diameter thru in 2 places.
- 6.) Variation includes flatness/sensitivity

V-Line directional couplers are designed to cover all wireless bands from **cellular** through **UMTS** (0.800 - 2.200 GHz) and offer industry-leading performance, quality, reliability, selection and convenience.

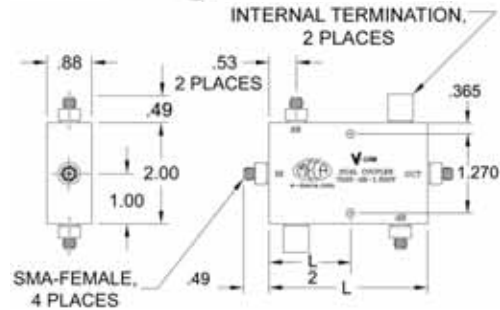
Contact our Applications Engineer for customized options including:

- Special coupling values
- External high power terminations
- Alternate connector styles
- Alternate bands
- Silver-plated connectors
- Weather resistant

715S Series - Single Directional



722S Series - Dual Directional



MECA's directional couplers are low loss and ideal for your system applications where precise monitoring, external leveling, signal mixing or swept transmission and reflection measurements are necessary. These units are furnished with stainless steel SMA-Female connectors on all ports, gold-plated contact pins and a rugged aluminum housing. Weather resistant models (IP61) available.

Catalog Number		Frequency (GHz)	Coupling Variation (Total) <sup>6</sup>	Insertion Loss (Max) <sub>1</sub>	VSWR (Max)	Directivity (Min)	Length (L) (Inches)
Single	Dual						
715S-dB-0.600	722S-dB-0.600	0.400 - 0.800	± 1.00 dB	0.1 dB	1.15:1	25 dB	6.08
715S-dB-0.900	722S-dB-0.900	0.800 - 1.000	± 0.60 dB	0.1 dB	1.10:1	27 dB	4.46
		0.600 - 1.200	± 1.60 dB	0.1 dB	1.15:1	25 dB	4.46
715S-dB-1.500V	722S-dB-1.500V	0.800 - 2.200	± 1.75 dB	0.1 dB	1.15:1	25 dB	3.15
715S-dB-1.650W	722S-dB-1.650W	0.800 - 2.500	± 2.20 dB	0.1 dB	1.15:1	25 dB	2.96
715S-dB-1.950	722S-dB-1.950	1.700 - 2.200	± 0.60 dB	0.1 dB	1.10:1	25 dB	2.70
		1.300 - 2.600	± 1.60 dB	0.1 dB	1.15:1	25 dB	2.70
715S-dB-3.100	722S-dB-3.100	2.000 - 4.200	± 1.20 dB	0.1 dB	1.15:1	25 dB	2.14

V-Line

Nominal coupling values of 10, 20, 30 and 40 dB are standard. 715S series is also available in 6 dB. To order or specify, please insert coupling value in place of dB. EXAMPLE: 715S-10-1.500V for single directional, 10 dB, 0.800 - 2.200 GHz, V-Line.

Average Power (Watts) <sup>2</sup>						
Coupling Factor		6 dB	10 dB	20 dB	30 dB	40 dB
715S	Forward*	100	100	100	100	100
	Reverse*	10	25	100	100	100
722S	Forward/Reverse	N/A	25	100	100	100
Theoretical Insertion Loss Due to Coupling Factor (dB)						
715S		1.2560	0.4560	0.0436	0.0043	0.0004
722S		2.5120	0.9120	0.0872	0.0086	0.0008

\* For higher average power, couplers can be configured with external load based on your application.

Notes:

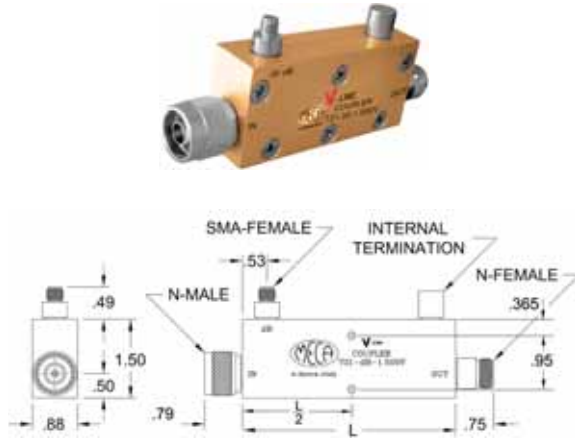
- 1.) Excluding theoretical insertion loss due to coupling (see table).
- 2.) All units have a peak power rating of 10 kW.
- 3.) 50 ohm nominal impedance standard.
- 4.) Operating temperature is from -55° C to +85° C.
- 5.) Mounting holes 0.156" diameter thru in 2 places.
- 6.) Variation includes flatness/sensitivity

V-Line directional couplers are designed to cover all wireless bands from cellular through UMTS (0.800 - 2.200 GHz) and offer industry-leading performance, quality, reliability, selection and convenience.

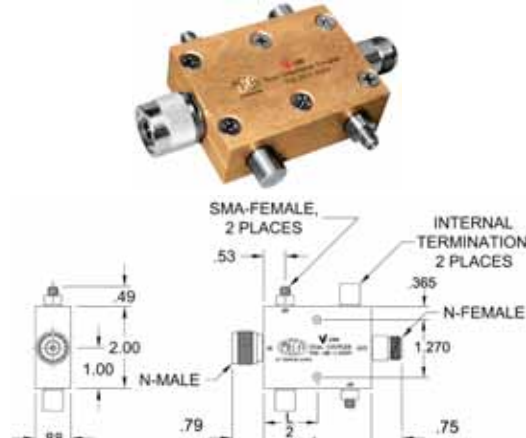
Contact our Applications Engineer for customized options including:

- Special coupling values
- Alternate bands
- External high power terminations
- Weather resistant

### 721 Series - Single Directional



### 722 Series - Dual Directional



These "in-line" designs eliminate the need for connector adaptors that add loss and uncertainty to your critical measurements. MECA's 721 & 722 series directional couplers are high power capable with extremely low insertion loss and are ideal for your system applications where precise monitoring, external leveling, signal mixing or swept transmission and reflection measurements are desired. These couplers are furnished with plated brass N-Male/Female mainline connectors, stainless steel SMA-Female coupled port connectors, gold-plated contact pins and a rugged aluminum housing. Weather resistant models (IP61) and silver-plated connectors available (option S) for your passive intermodulation (PIM) concerns.

Catalog Number		Frequency (GHz)	Coupling Variation (Total)	Insertion Loss (Max) <sub>1</sub>	VSWR (Max)	Directivity (Min)	Length (L) (Inches)
Single	Dual						
721-dB-0.600	722-dB-0.600	0.400 - 0.800	± 1.00 dB	0.1 dB	1.15:1	25 dB	6.08
721-dB-0.900	722-dB-0.900	0.800 - 1.000	± 0.60 dB	0.1 dB	1.10:1	27 dB	4.46
		0.600 - 1.200	± 1.60 dB	0.1 dB	1.15:1	25 dB	4.46
721-dB-1.500V	722-dB-1.500V	0.800 - 2.200	± 1.75 dB	0.1 dB	1.15:1	25 dB	3.15
721-dB-1.650W	722-dB-1.650W	0.800 - 2.500	± 2.20 dB	0.1 dB	1.15:1	25 dB	2.96
721-dB-1.950	722-dB-1.950	1.700 - 2.200	± 0.60 dB	0.1 dB	1.10:1	25 dB	2.70
		1.300 - 2.600	± 1.60 dB	0.1 dB	1.15:1	25 dB	2.70
721-dB-3.100	722-dB-3.100	2.000 - 4.200	± 1.20 dB	0.1 dB	1.15:1	25 dB	2.14

Nominal coupling values of **10, 20, 30** and **40 dB** are standard. 721 series is also available in **6 dB**. To order or specify, please insert coupling value in place of dB. EXAMPLE: **S 721-10-0.900** for **silver-plated**, single directional, **10 dB**, 0.800 - 1.000 GHz.

Average Power (Watts) <sup>2</sup>						
Coupling Value		6 dB	10 dB	20 dB	30 dB	40 dB
721	Forward*	100	250	500	500	500
	Reverse*	10	25	250	500	500
722	Forward/Reverse	N/A	25	250	500	500
Theoretical Insertion Loss Due to Coupling Factor (dB)						
721		1.2560	0.4560	0.0436	0.0043	0.0004
722		2.5120	0.9120	0.0872	0.0086	0.0008

\* For higher average power, couplers can be configured with external load based on your application.

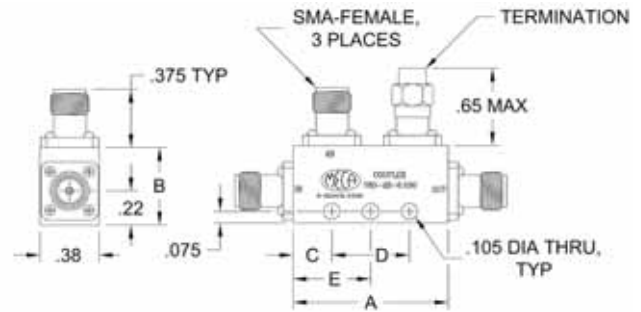
#### Notes:

- 1.) Excluding theoretical insertion loss due to coupling (see table).
- 2.) All units have a peak power rating of 10 kW.
- 3.) 50 ohm nominal impedance standard.
- 4.) Operating temperature is from -55° C to +85° C.
- 5.) Mounting holes 0.156" diameter thru in 2 places.
- 6.) Variation includes flatness/sensitivity

**V-Line** directional couplers are designed to cover all wireless bands from **cellular** through **UMTS** (0.800 - 2.200 GHz) and offer industry-leading performance, quality, reliability, selection and convenience.

#### Contact our Applications Engineer for customized options including:

- Special coupling values
- External high power terminations
- Alternate connector styles
- Alternate bands
- Silver-plated connectors
- Weather resistant

*Miniature Directional Couplers, 0.500 - 18.000 GHz*

MECA offers a miniature, 50 watt, SMA-Female directional coupler ideal for space-restricted applications where precise monitoring, external leveling, signal mixing or swept transmission and reflection measurements are necessary.

Drawing	A	B	C	D	E
1	3.10	0.50	0.80	1.50	-
2	1.78	0.50	0.42	0.94	-
3	1.16	0.50	0.41	0.34	-
4	1.00	0.50	-	-	0.50
5	1.00	0.60	-	-	0.50

Catalog Number	Frequency (GHz)	Coupling Variation	Insertion Loss (Max) <sub>1</sub>	VSWR (Max) Main Line	VSWR (Max) Sec. Line	Directivity (Min)	Outline Drawing
780-dB-0.750	0.500 - 1.000	±1.25 dB	0.15 dB	1.10:1	1.10:1	25 dB	1
780-dB-1.500	1.000 - 2.000	±1.25 dB	0.20 dB	1.10:1	1.10:1	25 dB	2
780-dB-3.000	2.000 - 4.000	±1.25 dB	0.20 dB	1.15:1	1.15:1	22 dB	3
780-dB-3.900	2.600 - 5.200	±1.25 dB	0.20 dB	1.25:1	1.25:1	20 dB	4
780-dB-6.000	4.000 - 8.000	±1.25 dB	0.25 dB	1.25:1	1.25:1	20 dB	4
780-dB-9.700	7.000 - 12.400	±1.00 dB	0.30 dB	1.30:1	1.30:1	17 dB	4
780-dB-11.750	7.500 - 16.000	±1.25 dB	0.50 dB	1.35:1	1.40:1	15 dB	5
780-dB-15.200	12.400 - 18.000	±1.00 dB	0.60 dB	1.30:1	1.40:1	15 dB	5

Nominal coupling values of **10**, **20** and **30 dB** are standard. To order or specify, please insert coupling value in place of dB. EXAMPLE: **780-10-0.750** for **10 dB**, 0.500 - 1.000 GHz.

Average Power (Watts) <sub>2</sub>			
Coupling Value	10 dB	20 dB	30 dB
Forward	50	50	50
Reverse	10	50	50
Theoretical Insertion Loss Due to Coupling Factor			
Insertion Loss (dB)	0.4560	0.0436	0.0043

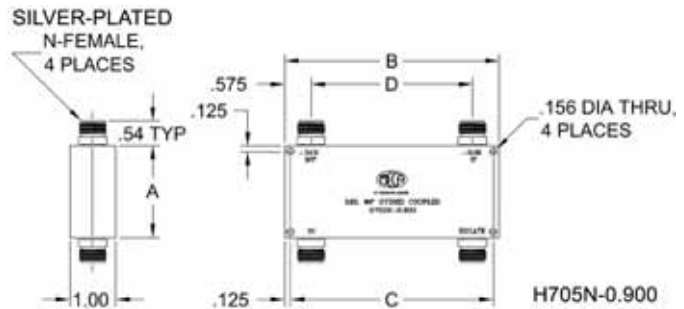
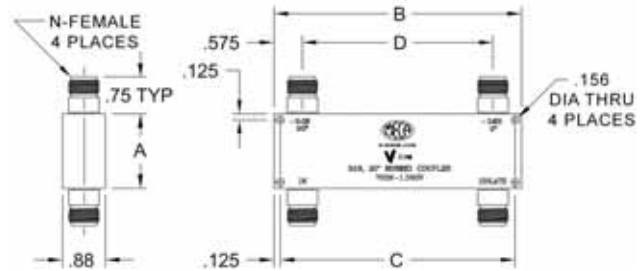
**Notes:**

- 1.) Excluding theoretical insertion loss due to coupling (see table).
- 2.) All units have a peak power rating of 3 kW.
- 3.) 50 ohm nominal impedance standard.
- 4.) Operating temperature is from -55° C to +85° C.
- 5.) Variation includes flatness/sensitivity

This unit is furnished with stainless steel SMA-Female connectors, gold-plated contact pins and an ultra-compact aluminum housing.



Drawing	A	B	C	D
1	1.50	5.00	4.75	3.85
2	2.00	7.78	7.53	6.63
3	2.00	4.65	4.40	3.50
4	2.00	2.90	2.65	1.75



A 3 dB, 90 degree hybrid coupler is a four-port device that is used either to equally split an input signal with a resultant 90 degree phase shift between output signals or to combine two signals while maintaining high isolation between them.

Whether you are designing a duplexer, combining amplifiers or just need a 90 degree phase shift with high isolation to avoid mixing signals, then MECA's 705 series will help you achieve your objectives. MECA's line of 3 dB, 90 degree hybrid couplers covers all wireless band applications from cellular through UMTS (0.800-2.200 GHz) with power levels to 500 watts. Additionally, your applications will benefit from low insertion loss and excellent VSWR.

These units are equipped with brass N-Female or stainless steel SMA-Female connectors, silver-plated N or gold-plated SMA contact pins and a rugged, precision, CNC machined aluminum housing coated with a yellow iridite finish for long lasting, reliable performance.

Catalog Number	Connector Style	Frequency (GHz)	Input Power (W) <sub>1</sub>	Coupling Variation (Total)	Isolation (Min)	VSWR (Max)	Phase Balance (degrees)	Outline Drawing
705N-1.500V	N-Female	0.800 - 2.200	120	3.0 ± 0.5 dB	18 dB	1.30:1	5	1
705S-1.500V	SMA-Female	0.800 - 2.200	120	3.0 ± 0.5 dB	18 dB	1.30:1	5	1
H705N-0.460	N-Female	0.400 - 0.520	500	3.0 ± 0.3 dB	30 dB	1.15:1	3	2
H705N-0.900	N-Female	0.800 - 1.000	500	3.0 ± 0.3 dB	25 dB	1.15:1	3	3
H705N-1.950	N-Female	1.700 - 2.200	500	3.0 ± 0.3 dB	22 dB	1.20:1	3	4

NEW!

NEW!

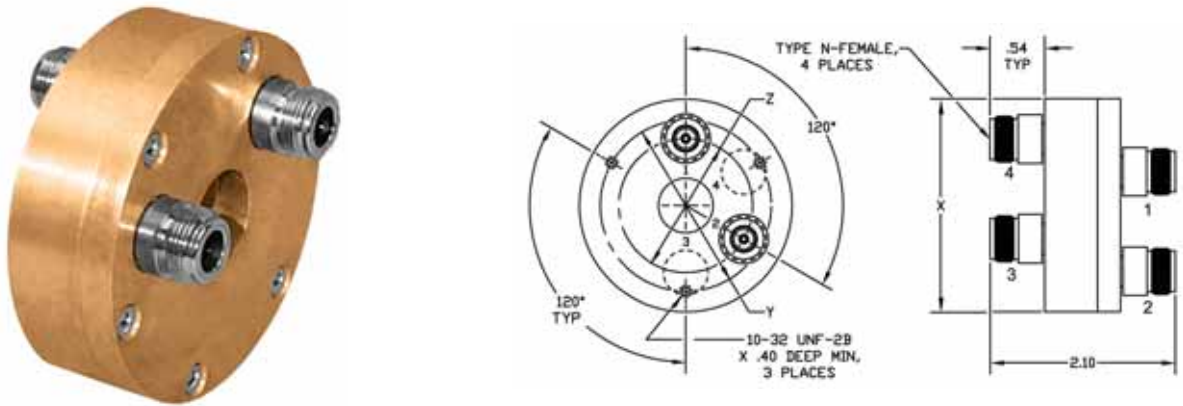
\* High power 250 watt conduction cooled termination/load available. (See page T-58 for details)

**Notes:**

- 1.) 705 Series has a peak power rating of 3 kW, H705N Series is rated at 10 kW.
- 2.) 50 ohm nominal impedance standard.
- 3.) Operating temperature range is -55° C to +85° C.

**Contact our Applications Engineer for customized options including:**

- Alternate bands
- 7/16 DIN
- Weatherproofing



A hybrid ring is a four-port device that is used either to equally split an input signal or to sum two combined signals. An additional benefit of the hybrid ring is to alternately provide equally-split but 180 degree phase-shifted output signals.

MECA offers a hybrid ring power divider/combiner series designed to cover wireless bands from 0.810-6.000 GHz with an average RF power handling capacity of 1,000 watts (5 kW peak). All models provide a power split of  $3.00 \pm 0.35$  dB over the specified frequency range.

These units are equipped with brass N-Female connectors, gold-plated contact pins and a rugged, precision, CNC machined aluminum housing coated with a yellow iridite finish for long lasting, reliable performance.

Catalog Number	Frequency GHz)	VSWR (Max)	Isolation (Min)	Z (Inches)	Y (Inches)	X (Inches)
700-0.900	0.810 - 0.960	1.20:1	22 dB	6.366	7.136	7.530
700-1.085	1.020 - 1.150	1.20:1	22 dB	5.192	5.962	6.350
700-1.300	1.200 - 1.400	1.20:1	22 dB	4.316	5.086	5.480
700-1.550	1.450 - 1.650	1.25:1	22 dB	3.624	4.394	4.780
700-1.850	1.700 - 2.000	1.25:1	22 dB	3.050	3.820	4.210
700-2.250	2.100 - 2.400	1.25:1	22 dB	2.530	3.300	3.690
700-2.450	2.300 - 2.600	1.25:1	22 dB	2.280	3.050	3.440
700-2.850	2.700 - 3.000	1.25:1	22 dB	2.010	2.780	3.170
700-3.950	3.700 - 4.200	1.25:1	22 dB	1.430	2.200	2.590
700-4.700	4.400 - 5.000	1.25:1	22 dB	1.180	1.950	2.340
700-5.700	5.400 - 6.000	1.25:1	22 dB	0.964	1.734	2.120

\* High power 500 watt conduction cooled termination/load available. (See page T-58 for details)

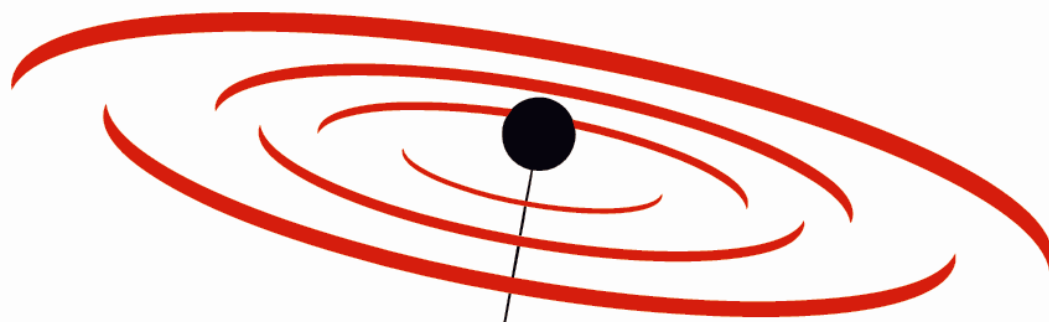
**Notes:**

- 1.) Insertion loss is 0.1 dB with coherent inputs.
- 2.) All units have a peak power rating of 5 kW.
- 3.) 50 ohm nominal impedance standard.
- 4.) Operating temperature range is -55° C to +85° C.

**Contact our Applications Engineer for customized options including:**

- **Alternate bands**
- **7/16 DIN**
- **Weatherproofing**

# Coaxial Components



Gap Wireless Inc.

**Eastern Canada  
Montreal**

603 Pierre Street  
Laval, PQ H7X 3V9  
514-469-0776  
514-469-0790

**Headquarters  
Central Canada  
Toronto**

14-2900 Argentia Road  
Mississauga, ON L5N 7X9  
905-487-8245  
905-487-8246

**Western Canada  
Edmonton**

2315 Rutherford Way SW  
Edmonton, AB T6W 1P4  
780-628-4886  
780-628-4911

**Your total source for everything wireless.**