

RF LOADS & ATTENUATORS

Rugged and Reliable Solutions for Low to High Power Attenuation and Termination



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Attenuators

Bird manufactures a broad spectrum of RF power attenuators from 2 W to 4000W. Our resistive product portfolio includes air-cooled, water-cooled, oil-dielectric, convection cooled, and conduction cooled RF units.

1 WHAT IS AN ATTENUATOR?

Bird's Convection cooled RF Attenuators are components that will reduce the amplitude level of an incoming signal and are used to protect systems from receiving a signal with a power level that is too high to process. Attenuators are a valuable and reliable accessory for reducing power levels, for isolating components under test, for harmonic signal analysis, and as comparison standards. Convection RF Attenuators feature a self-cooling design, frequencies up to 18GHz and fully shielded.

2 ATTENUATOR SELECTION CRITERIA

- **Attenuation Value** - most important of all is attenuation factor. Attenuators are available from 0 dB to 40 dB and above depending on applications. Attenuation is how much power is removed from the signal before the output.
- **Power Rating (Watts)** - it is recommended to pick one with higher power handling capability than your required power
- **Convection Product Type**
 1. **A** = input and output connector on the same side of the heatsink
 2. **SA and WA** = connectors in-line, or straight through the heatsink
- **Connector Gender** - Male or Female combinations
- **Connector Type** - SMA, BNC, N, TNC or IEC 7/16





RF Loads

Bird manufactures a broad spectrum of devices from one watt to eighty kilowatts. Our resistive product portfolio includes air-cooled, water-cooled, oil-dielectric, convection cooled, and conduction cooled RF attenuators and RF loads.

1 WHAT IS A RF LOAD?

RF Loads come in various shapes and sizes and provide one purpose – convert RF electrical energy into a form of energy that can be dissipated efficiently, economically, and safely. The purpose of a load or termination (also known as a “dummy load”) is to absorb RF energy and turn it into heat. Many times, the load takes the place of an antenna during transmitter testing.

2 OTHER APPLICATIONS WHERE TERMINATIONS CAN BE FOUND

- Reject Loads
- Hybrid Combiners
- Isolators / Circulators
- Transmitter Tuning
- System Testing & Calibration

3 CONSIDERATION BASICS

Terminations should be properly matched to the characteristic impedance of a transmission line. The termination characteristics of primary concern are operating frequency range, average power handling capability, operating temperature range, VSWR, size and weight. Impedance is typically 50 Ohms unless otherwise stated.

▪ Electrical Considerations

1. **Frequency Range** - the exact operating frequency range of each dummy load should be specified
2. **Maximum VSWR** - measure of how well the load is “matched” to the transmission line
3. **Peak to Average Power Ratio** - how much “Instantaneous” power can be absorbed
4. **Power Rating** - the amount of energy (heat) a load can absorb. The average and peak powers are interrelated in that the peak power capacity is a function of the operating temperature which in turn is a function of the average power. These are then impacted by the ambient temperature of the cooling medium (air or water).

▪ Mechanical considerations - Connectors or Flanges, Dimensions, mounting provisions, Coolant

▪ Environmental Consideration - Ambient Temperature Range, Coolant Flow, Coolant Temp, Humidity, Shock, Vibration and Altitude

4 WHAT ARE THE TYPES OF LOADS?

Load types are defined by cooling methods: Convection, Conduction, Oil Cooled, Water Cooled and Forced air (Modulo loads). Bird offers power levels from 2 W to 80 kW.



- Convection cooling** describes a termination equipped with a heat sink with cooling fins. A heat sink with cooling fins increases the effective heat exchange toward the environment. The heat sink is characterized by its thermal resistance or by the increase of surface temperature per watt (in °C per W). The shorter this value is, the greater the power will be.



- Conduction cooling** describes the termination heat transfer by means of molecular agitation within the material without any motion of the material as a whole, this is considered a passive cooling device. Important considerations are ambient temperature and how much free airflow is available and the amount of heat needed to dissipate.



- Water-cooled loads** use pressurized water of proper temperature and flow rate to carry heat away from the resistive element. The water-cooling system can be sub-divided into two groups: water that is contained totally inside the resistor and water that flows on both the inside and outside of the resistor. Advantages include superior efficiency, small size and common for calorimetry due to containment of heat flux paths. Typical mixtures are 50/50 water/glycol mixture or potable water.



- Modulo load** is for those installations that do not have water access or good water quality but still desire high power capabilities, Bird manufactures a water-cooled load (Modulo load series) that is completely self-contained.



- Oil-dielectric loads** surround the resistive element with oil, which transfers heat to an exterior, finned shell for dissipation into the surrounding air.



- Air-cooled loads** use the properties of moving air to transfer the heat away from the resistive element. Typically, these loads are equipped with fans to move the air past the resistors. They are virtually maintenance free, handle extremely high peak powers and high operating temperatures. They do have a large footprint which also limits the frequency.

Typical Peak Power Ratings For Bird Loads

Understanding your application and criteria for the heat sink when using a conductive load for proper operation will assure your needs are met in thermal performance and will help eliminate any unwanted effects in the entire system.

OIL-COOLED LOADS

MODEL	AVERAGE POWER	PULSE WIDTH (MICROSECONDS)					FREQUENCY RANGE	VSWR
		1 μ	10 μ	100 μ	1000 μ	5000 μ		
8135	150 W	10 kW	8 kW	5.75 kW	3.5 kW	2 kW	DC to 1 GHz 1 to 2.5 GHz 2 to 4 GHz	1.1:1 1.2:1 1.3:1
8201	500 W	200 kW	150 kW	105 kW	57 kW	25 kW	DC to 1 GHz 1 to 2.5 GHz	1.1:1 1.25:1
8251	1 kW	200 kW	150 kW	105 kW	57 kW	25 kW	DC to 1 GHz 1 to 2 GHz 2 to 2.4 GHz	1.1:1 1.25:1 1.3:1
8890 Series	2.5 kW	150 kW	115 kW	80 kW	54 kW	22 kW	DC to 1 GHz 1 to 2 GHz 2 to 2.4 GHz	1.1:1 1.25:1 1.3:1
8920 Series	5 kW	150 kW	115 kW	80 kW	54 kW	22 kW	DC to 1 GHz	1.1:1
8930 Series	10 kW	150 kW	120 kW	85 kW	55 kW	30 kW	DC to 400 MHz 400 MHz to 1 GHz	1.15:1 1.2:1

Note: Duty factor should be such that the average power rating of the load is never exceeded.

WATER-COOLED LOADS

MODEL	AVERAGE POWER	PULSE WIDTH (MICROSECONDS)					FREQUENCY RANGE	VSWR
		1 μ	10 μ	100 μ	1000 μ	5000 μ		
8730 Series	10 kW	100 kW	77 kW	50 kW	32 kW	16 kW	DC to 1 GHz	1.1:1
8740 Series	20 kW	250 kW	190 kW	135 kW	75 kW	35 kW	1 kHz to 900 MHz	1.1:1
8750 Series	30 kW	250 kW	190 kW	135 kW	75 kW	40 kW	1 kHz to 900 MHz	1.1:1
8760 Series	40 kW	250 kW	197 kW	145 kW	90 kW	55 kW	1 kHz to 900 MHz	1.1:1
8770 Series	50 kW	250 kW	197 kW	145 kW	97 kW	65 kW	1 kHz to 900 MHz	1.1:1
8790 Series	80 kW	250 kW	210 kW	170 kW	130 kW	100 kW	1 kHz to 900 MHz	1.15:1

Note: Duty factor should be such that the average power rating of the load is never exceeded.





RF Power Loads

CONDUCTION-COOLED

Dry Conduction-Cooled RF Power Loads are world-renowned for their high-quality, robust construction and conservative power ratings. The use of non-magnetic materials and plating provide safety when used in applications with high magnetic fields such as MRI.

LOAD CONFIGURATION GUIDE

POWER RATING	PRODUCT TYPE	CONNECTOR GENDER	CONNECTORS*
See selection guide	T, WT = Convection-cooled CT = Conduction-cooled ST = Square convection-cooled	F = Female M = Male	A = SMA B = BNC N = N T = TNC E = IEC 7/16

*Call for custom connector options not shown in this catalog

Example: 25-CT-FB= Model 25-CT, 25 W, conduction-cooled load with female BNC connectors.

Note: Not all combinations are valid. If assistance is needed consult the factory to define the model that is right for you.

LOAD SELECTION GUIDE

MODEL	POWER RATING	CONNECTORS	FREQUENCY RANGE & VSWR	DIMENSIONS	WEIGHT
25-CT	25 W	SMA	DC to 1 GHz @ 1.15:1 max 1 to 3 GHz @ 1.25:1 max	0.9 in x 1.0 in x 0.5 in (23 x 26 x 13 mm)	0.4 oz (12 g)
50-CT	50 W	SMA	DC to 3 GHz @ 1.15:1 max 3 to 6 GHz @ 1.25:1 max	0.8 in x 0.9 in x 0.4 in (21 x 23 x 11 mm)	1.1 oz (32 g)
100-CT	100 W	SMA	DC to 2 GHz @ 1.15:1 max 2 to 3 GHz @ 1.25:1 max	1.4 in x 1.4 in x 0.6 in (36 x 36 x 16 mm)	1.0 oz (30 g)
150-CT	150 W	N	DC to 2 GHz @ 1.15:1 max 2 to 3 GHz @ 1.25:1 max	1.9 in x 1.2 in x 1.1 in (49 x 31 x 28 mm)	2.2 oz (63 g)
150-CT	150 W	SMA	DC to 2 GHz @ 1.15:1 max 2 to 3 GHz @ 1.25:1 max	2.1 in x 2.1 in x 0.6 in (54 x 54 x 16 mm)	2.2 oz (63 g)
151-CT	150 W	N	DC to 1 GHz @ 1.10:1 max 1 to 4 GHz @ 1.25:1 max	2.0 in x 2.0 in x 1.1 in (51 x 51 x 28 mm)	2.2 oz (63 g)
250-CT	250 W	BNC, N	DC to 1 GHz @ 1.10:1 max 1 to 2.4 GHz @ 1.25:1 max	2.5 in x 2.2 in x 1.1 in (64 x 56 x 28 mm)	5.2 oz (148 g)
250-CT	250 W	SMA	DC to 2 GHz @ 1.15:1 max 2 to 3 GHz @ 1.25:1 max	2.1 in x 2.1 in x 0.6 in (54 x 54 x 16 mm)	5.2 oz (148 g)
300-CT	300 W	N	DC to 1 GHz @ 1.10:1 max 1 to 3 GHz @ 1.25:1 max	4.8 in x 2.0 in x 1.2 in (122 x 51 x 31 mm)	12 oz (340 g)
500-CT	500 W	SMA, BNC, N, TNC	DC to 1 GHz @ 1.15:1 max 1 to 3 GHz @ 1.30:1 max	2.7 in x 2.0 in x 1.2 in (69 x 51 x 31 mm)	8.2 oz (233 g)

PRODUCT FEATURES

- Ultra-compact, lightweight design
- Economical design
- Fully shielded against production of extraneous radiation
- Load requires no AC power
- Requires a heatsink capable of maintaining a case temperature at or below 100°C

SYSTEM

Coolant Method	Dry, conduction-cooled
Impedance	50 Ohms
AC Power	None
Finish	Tri-alloy
Operating Position	Any

ENVIRONMENTAL

Water Inlet Temperature	-40 °C to 40 °C (-40 °F to 104 °F)
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RF Power Loads CONVECTION-COOLED

Bird manufactures a broad line of Convection-Cooled RF Loads. They are known for their high-quality, rugged construction and conservative power ratings. These loads are fully shielded against production of extraneous radiation and the self-cooling design needs no cooling plate.

PRODUCT FEATURES

- Self-cooling design, needs no cooling plate
- Frequencies up to 18 GHz
- Load requires no AC power
- Rugged construction
- Broadband operation

SYSTEM

Coolant Method	Dry, convection-cooled
Impedance	50 Ohms
AC Power	None except 1500 W models require 115/230V AC power
Operating Position	Any

ENVIRONMENTAL

Ambient Temperature	-40 °C to 40 °C (-40 °F to 104 °F)
Humidity	95% non-condensing

LOAD CONFIGURATION GUIDE

POWER RATING	PRODUCT TYPE	CONNECTOR GENDER	CONNECTORS*
See selection guide	T, WT = Convection-cooled CT = Conduction-cooled ST = Square convection-cooled	F = Female M = Male	A = SMA B = BNC N = N T = TNC E = IEC 7/16

*Call for custom connector options not shown in this catalog

Example: 2-18T-FA = Model 2-18T, 2 W, convection-cooled load with female SMA connectors.

Note: Not all combinations are valid. If assistance is needed consult the factory to define the model that is right for you.

LOAD SELECTION GUIDE

MODEL	POWER RATING	CONNECTORS	FREQUENCY RANGE & VSWR	DIMENSIONS	WEIGHT	FINISH
2-T	2 W	BNC, 7/16 DIN, N, TNC	DC to 1 GHz @ 1.10:1 max 1 to 4 GHz @ 1.25:1 max	2.9 in x 1.4 in dia (74 mm x 36 dia mm)	4.6 oz (131 g)	Tri-Alloy
2-NT	2 W	N	DC to 1 GHz @ 1.10:1 max 1 to 3 GHz @ 1.15:1 max	2.9 in x 1.4 in dia (74 mm x 36 dia mm)	4.6 oz (131 g)	Tri-Alloy
2-18T	2 W	SMA, N	DC to 12.4 GHz @ 1.20:1 max 12.4 to 18 GHz @ 1.25:1 max	1.0 in x 0.9 in dia (26 mm x 23 dia mm)	2.0 oz (57 g)	Stainless Steel
5-T	5 W	BNC, 7/16 DIN, N, TNC	DC to 1 GHz @ 1.10:1 max 1 to 4 GHz @ 1.25:1 max	2.9 in x 1.4 in dia (74 mm x 36 dia mm)	4.6 oz (131 g)	Tri-Alloy
5-NT	5 W	N	DC to 1 GHz @ 1.10:1 max 1 to 3 GHz @ 1.15:1 max	2.9 in x 1.4 in dia (74 mm x 36 dia mm)	4.6 oz (131 g)	Tri-Alloy
5-18T	5 W	SMA, N	DC to 4 GHz @ 1.15:1 max 4 to 12.4 GHz @ 1.25:1 max 12.4 to 18 GHz @ 1.35:1 max	1.4 in x 0.9 in dia (36 mm x 23 dia mm)	2.0 oz (57 g)	Stainless Steel

RF Power Loads CONVECTION-COOLED

LOAD SELECTION GUIDE

MODEL	POWER RATING	CONNECTORS	FREQUENCY RANGE & VSWR	DIMENSIONS	WEIGHT	FINISH
10-T	10 W	N	DC to 1 GHz @ 1.10:1 max 1 to 4 GHz @ 1.25:1 max	2.2 in x 2.3 in dia (56 mm x 59 dia mm)	5.9 oz (168 g)	Black Anodized Aluminum
25-T	25 W	SMA, BNC, 7/16 DIN, N, TNC, 4.1/9.5	DC to 1 GHz @ 1.10:1 max 1 to 4 GHz @ 1.25:1 max	5.3 in x 2.3 in dia (135 mm x 59 dia mm)	7 oz (199 g)	Black Anodized Aluminum
25-NT	25 W	N	DC to 1 GHz @ 1.10:1 max 1 to 3 GHz @ 1.25:1 max	4.9 in x 2.3 in dia (125 mm x 59 dia mm)	7 oz (199 g)	Black Anodized Aluminum
25-6T	25 W	N	DC to 6 GHz @ 1.20:1 max	3.5 in x 2.3 in x 2.3 in (89 mm x 59 mm x 59 mm)	14.0 oz (397 g)	Black Anodized Aluminum
25-18T	25 W	N	DC to 6 GHz @ 1.20:1 max 6 to 12.4 GHz @ 1.30:1 max 12.4 to 18 GHz @ 1.40:1 max	3.5 in x 2.3 in x 2.3 in (89 mm x 59 mm x 59 mm)	14.0 oz (397 g)	Black Anodized Aluminum
50-T	50 W	SMA, BNC, 7/16 DIN, N, TNC, 4.1/9.5	DC to 1 GHz @ 1.10:1 max 1 to 4 GHz @ 1.25:1 max	5.3 in x 2.3 in dia (135 mm x 59 dia mm)	1.3 lb (590 g)	Black Anodized Aluminum
50-NT	50 W	N	DC to 1 GHz @ 1.10:1 max 1 to 3 GHz @ 1.15:1 max	5.3 in x 2.3 in dia (135 mm x 59 dia mm)	1.2 lb (545 g)	Black Anodized Aluminum
50-6T	50 W	N	1 to 6 GHz @ 1.25:1 max	4.0 in x 3.0 in x 3.0 in (102 mm x 77 mm x 77 mm)	1.6 lb (726 g)	Black Anodized Aluminum
50-18T	50 W	N	DC to 6 GHz @ 1.25:1 max 6 to 12.4 GHz @ 1.35:1 max 12.4 to 18 GHz @ 1.45:1 max	4.0 in x 3.0 in x 3.0 in (102 mm x 77 mm x 77 mm)	1.6 lb (726 g)	Black Anodized Aluminum
75-T	75 W	BNC, 7/16 DIN, N	DC to 1 GHz @ 1.10:1 max 1 to 4 GHz @ 1.25:1 max	7.2 in x 2.3 in dia (183 mm x 59 dia mm)	1.5 lb (682 g)	Black Anodized Aluminum
100-T	100 W	BNC, 7/16 DIN, N, TNC	DC to 1 GHz @ 1.10:1 max 1 to 3 GHz @ 1.25:1 max	6.8 in x 6.4 in x 2.6 in (173 mm x 163 mm x 67 mm)	3.6 lb (1.6 kg)	Stainless Steel
100-ST	100 W	BNC, 7/16 DIN, N, TNC	DC to 1 GHz @ 1.10:1 max 1 to 4 GHz @ 1.25:1 max	7.4 in x 2.8 in x 2.8 in (188 mm x 72 mm x 72 mm)	2.7 lb (1.2 kg)	Black Anodized Aluminum
100-NST	100 W	N	DC to 1 GHz @ 1.10:1 max 1 to 3 GHz @ 1.15:1 max	7.3 in x 2.8 in x 2.8 in (186 mm x 72 mm x 72 mm)	2.7 lb (1.2 kg)	Black Anodized Aluminum
100-6T	100 W	N	DC to 2 GHz @ 1.20:1 max 2 to 4 GHz @ 1.30:1 max 4 to 6 GHz @ 1.40:1 max	5.5 in x 3.5 in x 3.8 in (140 mm x 89 mm x 97 mm)	2.2 lb (1.0 kg)	Black Anodized Aluminum
150-T	150 W	BNC, N	DC to 1 GHz @ 1.10:1 max 1 to 3.0 GHz @ 1.25:1 max	6.8 in x 11.5 in x 2.6 in (173 mm x 293 mm x 67 mm)	6.0 lb (2.8 kg)	Black Anodized Aluminum
150-ST	150 W	N	DC to 1 GHz @ 1.10:1 max 1 to 3.0 GHz @ 1.25:1 max	8.1 in x 4.0 in x 4.0 in (206 mm x 102 mm x 102 mm)	5.0 lb (2.3 kg)	Black Anodized Aluminum
150-WT	150 W	N	DC to 1 GHz @ 1.10:1 max 1 to 3.0 GHz @ 1.25:1 max	4.9 in x 5.4 in x 4.8 in (125 mm x 138 mm x 122 mm)	2.5 lb (1.2 kg)	Black Anodized Aluminum
300-T	300 W	N	DC to 1 GHz @ 1.10:1 max 1 to 2.4 GHz @ 1.25:1 max	7.4 in x 5.4 in x 10.9 in (188 mm x 138 x 277 mm)	11.5 lb (5.3 kg)	Black Anodized Aluminum
300-WT	300 W	7/16 DIN, N	DC to 1 GHz @ 1.10:1 max 1 to 2.4 GHz @ 1.25:1 max	8.2 in x 5.4 in x 4.8 in (209 mm x 138 x 122 mm)	4.7 lb (2.2 kg)	Black Anodized Aluminum
500-WT	500 W	7/16 DIN, N	DC to 1 GHz @ 1.10:1 max 1 to 2.4 GHz @ 1.25:1 max	11.0 in x 5.4 in x 4.8 in (280 mm x 138 mm x 122 mm)	7.8 lb (3.6 kg)	Black Anodized Aluminum
600-T	600 W	7/16 DIN, N	DC to 1 GHz @ 1.10:1 max 1 to 2.4 GHz @ 1.25:1 max	12.4 in x 9.6 in x 7.4 in (315 mm x 244 mm x 188 mm)	21.5 lb (9.8 kg)	Black Anodized Aluminum
1000-T	1 kW	N	DC to 1 GHz @ 1.10:1 max 1 to 2.4 GHz @ 1.25:1 max	12.3 in x 9.6 in x 12.8 in (313 mm x 244 mm x 326 mm)	26.5 lb (12.0 kg)	Black Anodized Aluminum
1000-WT	1 kW	7/16 DIN, N	DC to 1 GHz @ 1.10:1 max 1 to 2.4 GHz @ 1.25:1 max	18.5 in x 10.6 in x 4.8 in (470 mm x 270 mm x 122 mm)	26.5 lb (12.0 kg)	Black Anodized Aluminum
1500-WT**	1.5 kW	7/16 DIN, N	DC to 1 GHz @ 1.10:1 max 1 to 2.4 GHz @ 1.25:1 max	20 in x 10.6 in x 6.0 in (508 mm x 270 mm x 152 mm)	30.0 lb (13.6 kg)	Black Anodized Aluminum
1500-WA**	1.5 kW	N	DC to 1 GHz @ 1.10:1 max 1 to 2.4 GHz @ 1.25:1 max	20.4 in x 10.7 in x 5.9 in (519 mm x 272 mm x 150 mm)	30.0 lb (13.6 kg)	Black Anodized Aluminum

**1.5 kW Models require 115/230V AC Power



RF Loads

OIL-COOLED

Bird's Oil-Cooled RF Loads are self-contained high-power 50 Ohm coaxial transmission line terminations requiring no outside power source or additional equipment. These units provide accurate, dependable, and practically non-reflective termination for testing and adjusting transmitters under non-radiating conditions. The loads consist essentially of a cylindrical film type resistor immersed in a dielectric coolant. The resistor, individually selected for its accuracy, is enclosed in a special tapered housing which provides a linear reduction in surge impedance directly proportional to the distance along the resistor.

PRODUCT FEATURES

- Self-contained cooling system that includes cooling fans for higher power models
- Capable of up to 10 dB peak to average power ratios
- Wide range of available RF input connectors
- Compact design
- Broadband operation

SYSTEM

Coolant Method	8135, 8201, 8251: Refined mineral oil All Others: Silicone oil
Impedance	50 Ohms
Finish	Gray powder coat
AC Power	None except 1500 W models require 115/230V AC power
Operating Position	Vertical

ENVIRONMENTAL

Ambient Temperature	-40 °C to 45 °C (-40 °F to 113 °F)
Storage Temperature	-40 °C to 45 °C (-40 °F to 113 °F)
Humidity	95% non-condensing
Altitude	1520 m (5000 ft)

CERTIFICATIONS

Safety	EMC EN 61326-1:2006 (units w/blowers) and Safety EN 61010-1:2001 (all units)
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LOAD SELECTION GUIDE

MODEL	POWER RATING	CONNECTORS	COOLING METHOD	FREQ. RANGE & VSWR	DIMENSIONS	WEIGHT
8135	150 W	QC - N(F)	Convection	DC to 1 GHz @ 1.1:1 max 1 to 2.5 GHz @ 1.2:1 max 2.5 to 4 GHz @ 1.3:1 max	9.6 in x 6.5 in x 4 in (242 mm x 164 mm x 102 mm)	6.0 lb (2.7 kg)
8141	250 W	QC - N(F)	Convection	DC to 1 GHz @ 1.1:1 max 1 to 1.8 GHz @ 1.2:1 max 1.8 to 2.5 GHz @ 1.3:1 max	9.6 in x 8.5 in x 6 in (243 mm x 216 mm x 151 mm)	10 lb (4.5 kg)
8201	500 W	QC - N(F)	Convection	DC to 1 GHz @ 1.1:1 max 1 to 2.5 GHz @ 1.25:1 max	16.8 in x 8.5 in x 6 in (427 mm x 216 mm x 151 mm)	20 lb (9.1 kg)
8401	600 W	QC - N(F)	Convection	DC to 1 GHz @ 1.1:1 max 1 to 2.8 GHz @ 1.2:1 max 2.8 to 3 GHz @ 1.3:1 max	16.2 in x 8.5 in x 6 in (408 mm x 216 mm x 151 mm)	20 lb (9.1 kg)
8251	1 kW	QC - N(F)	Convection	DC to 1 GHz @ 1.1:1 max 1 to 2 GHz @ 1.25:1 max 2 to 2.4 GHz @ 1.3:1 max	17.9 in x 8.5 in x 6 in (455 mm x 216 mm x 151 mm)	25 lb (11.5 kg)
8860	1.5 kW	QC - N(F)	Convection	DC to 1 GHz @ 1.1:1 max 1 to 2 GHz @ 1.25:1 max	19.5 in x 7.5 in x 13.2 in (496 mm x 184 mm x 334 mm)	32 lb (14.5 kg)
8861	1.5 kW	1 5/8 in EIA Unflanged	Convection	DC to 1 GHz @ 1.1:1 max 1 to 2 GHz @ 1.25:1 max	19.5 in x 7.5 in x 13.2 in (496 mm x 184 mm x 334 mm)	32 lb (14.5 kg)
8862	1.5 kW	1 5/8 in EIA Flanged	Convection	DC to 1 GHz @ 1.1:1 max 1 to 2 GHz @ 1.25:1 max	19.5 in x 7.5 in x 13.2 in (496 mm x 184 mm x 334 mm)	32 lb (14.5 kg)

RF Loads **OIL-COOLED**

LOAD SELECTION GUIDE

MODEL	POWER RATING	CONNECTORS	COOLING METHOD	FREQ. RANGE & VSWR	DIMENSIONS	WEIGHT
8890-300	2.5 kW	QC - LC(F)	Convection	DC to 1 GHz @ 1.1 max 1 to 2 GHz @ 1.25:1 max 2 to 2.4 GHz @ 1.3 max	25.2 in x 7 in x 17.2 in (638 mm x 178 mm x 437 mm)	59 lb (27 kg)
8891-300	2.5 kW	3 1/8 in EIA Flanged	Convection	DC to 1 GHz @ 1.1:1 max 1 to 2 GHz @ 1.25:1 max 2 to 2.4 GHz @ 1.3 max	25.2 in x 7 in x 17.2 in (638 mm x 178 mm x 437 mm)	59 lb (27 kg)
8892-300	2.5 kW	1 5/8 in EIA Flanged	Convection	DC to 1 GHz @ 1.1:1 max 1 to 2 GHz @ 1.25:1 max 2 to 2.4 GHz @ 1.3 max	25.2 in x 7 in x 17.2 in (638 mm x 178 mm x 437 mm)	59 lb (27 kg)
8895-300	2.5 kW	1 5/8 in EIA Unflanged	Convection	DC to 1 GHz @ 1.1:1 max 1 to 2 GHz @ 1.25:1 max 2 to 2.4 GHz @ 1.3 max	25.2 in x 7 in x 17.2 in (638 mm x 178 mm x 437 mm)	59 lb (27 kg)
8890-315	5 kW	QC - LC(F)	115 VAC Fan	DC to 1 GHz @ 1.1:1 max 1 to 2 GHz @ 1.25:1 max 2 to 2.4 GHz @ 1.3 max	25.2 in x 7.4 in x 22.7 in (638 mm x 187 mm x 560 mm)	73 lb (33 kg)
8890-320	5 kW	QC - LC(F)	230 VAC Fan	DC to 1 GHz @ 1.1:1 max 1 to 2 GHz @ 1.25:1 max 2 to 2.4 GHz @ 1.3 max	25.2 in x 7.4 in x 22.7 in (638 mm x 187 mm x 560 mm)	73 lb (33 kg)
8891-315	5 kW	3 1/8 in EIA Flanged	115 VAC Fan	DC to 1 GHz @ 1.1:1 max 1 to 2 GHz @ 1.25:1 max 2 to 2.4 GHz @ 1.3 max	25.2 in x 7.4 in x 22.7 in (638 mm x 187 mm x 560 mm)	73 lb (33 kg)
8891-320	5 kW	3 1/8 in EIA Flanged	230 VAC Fan	DC to 1 GHz @ 1.1:1 max 1 to 2 GHz @ 1.25:1 max 2 to 2.4 GHz @ 1.3 max	25.2 in x 7.4 in x 22.7 in (638 mm x 187 mm x 560 mm)	73 lb (33 kg)
8892-315	5 kW	1 5/8 in EIA Flanged	115 VAC Fan	DC to 1 GHz @ 1.1:1 max 1 to 2 GHz @ 1.25:1 max 2 to 2.4 GHz @ 1.3 max	25.2 in x 7.4 in x 22.7 in (638 mm x 187 mm x 560 mm)	73 lb (33 kg)
8892-320	5 kW	1 5/8 in EIA Flanged	230 VAC Fan	DC to 1 GHz @ 1.1:1 max 1 to 2 GHz @ 1.25:1 max 2 to 2.4 GHz @ 1.3 max	25.2 in x 7.4 in x 22.7 in (638 mm x 187 mm x 560 mm)	73 lb (33 kg)
8895-315	5 kW	1 5/8 in EIA Unflanged	115 VAC Fan	DC to 1 GHz @ 1.1:1 max 1 to 2 GHz @ 1.25:1 max 2 to 2.4 GHz @ 1.3 max	25.2 in x 7.4 in x 22.7 in (638 mm x 187 mm x 560 mm)	73 lb (33 kg)
8895-320	5 kW	1 5/8 in EIA Unflanged	230 VAC Fan	DC to 1 GHz @ 1.1:1 max 1 to 2 GHz @ 1.25:1 max 2 to 2.4 GHz @ 1.3 max	25.2 in x 7.4 in x 22.7 in (638 mm x 187 mm x 560 mm)	73 lb (33 kg)
8921	5 kW	QC - LC(F)	Convection	DC to 1 GHz @ 1.1:1 max	32.8 in x 9.5 in x 26.9 in (832 mm x 241 mm x 681 mm)	126 lb (57 kg)
8922	5 kW	1 5/8 in EIA Flanged	Convection	DC to 1 GHz @ 1.1:1 max	32.8 in x 9.5 in x 26.9 in (832 mm x 241 mm x 681 mm)	126 lb (57 kg)
8926	5 kW	3 1/8 in EIA Flanged	Convection	DC to 1 GHz @ 1.1:1 max	32.8 in x 9.5 in x 26.9 in (832 mm x 241 mm x 681 mm)	126 lb (57 kg)
8931-115	10 kW	QC - LC(F)	115 VAC Fan	DC to 400 MHz @ 1.15:1 max 400 MHz to 1 GHz @ 1.2:1 max	32.8 in x 9.5 in x 33.4 in (832 mm x 241 mm x 847 mm)	142 lb (65 kg)
8931-230	10 kW	QC - LC(F)	230 VAC Fan	DC to 400 MHz @ 1.15:1 max 400 MHz to 1 GHz @ 1.2:1 max	32.8 in x 9.5 in x 33.4 in (832 mm x 241 mm x 847 mm)	142 lb (65 kg)
8932-115	10 kW	1 5/8 in EIA Flanged	115 VAC Fan	DC to 400 MHz @ 1.15:1 max 400 MHz to 1 GHz @ 1.2:1 max	32.8 in x 9.5 in x 33.4 in (832 mm x 241 mm x 847 mm)	142 lb (65 kg)
8932-230	10 kW	1 5/8 in EIA Flanged	230 VAC Fan	DC to 400 MHz @ 1.15:1 max 400 MHz to 1 GHz @ 1.2:1 max	32.8 in x 9.5 in x 33.4 in (832 mm x 241 mm x 847 mm)	142 lb (65 kg)
8936-115	10 kW	3 1/8 in EIA Flanged	115 VAC Fan	DC to 400 MHz @ 1.15:1 max 400 MHz to 1 GHz @ 1.2:1 max	32.8 in x 9.5 in x 33.4 in (832 mm x 241 mm x 847 mm)	142 lb (65 kg)
8936-230	10 kW	3 1/8 in EIA Flanged	230 VAC Fan	DC to 400 MHz @ 1.15:1 max 400 MHz to 1 GHz @ 1.2:1 max	32.8 in x 9.5 in x 33.4 in (832 mm x 241 mm x 847 mm)	142 lb (65 kg)



Market Specific RF Loads

OIL-COOLED

Bird's Oil-Cooled RF Loads for Digital Broadcast and Semiconductor Precision applications are self-contained high-power 50 Ohm coaxial transmission line terminations requiring no outside power source or additional equipment. These coaxial load resistors provide accurate, dependable, and practically non-reflective termination for testing and adjusting transmitters under non-radiating conditions.

DIGITAL BROADCAST LOAD SELECTION GUIDE

MODEL	POWER RATING	CONNECTORS	COOLING METHOD	FREQ. RANGE & VSWR	DIMENSIONS	WEIGHT
8251D	1 kW	1 5/8 in EIA Flanged	Convection	470 to 860 MHz @ 1.065:1 max	17.9 in x 8.5 in x 6 in	25 lb
8251D7-16	1 kW	QC-DIN(F)	Convection	470 to 860 MHz @ 1.065:1 max	(455 mm x 216 mm x 151 mm)	(11.5 kg)
8862D	1.5 kW	1 5/8 in EIA Flanged	Convection	470 to 860 MHz @ 1.065:1 max	19.5 in x 7.5 in x 13.2 in	32 lb
8891D300	2.5 kW	3 1/8 in EIA Flanged	Convection	470 to 860 MHz @ 1.065:1 max	(496 mm x 184 mm x 334 mm)	(14.5 kg)
8892D300	2.5 kW	1 5/8 in EIA Flanged	Convection	470 to 860 MHz @ 1.065:1 max	25.2 in x 7 in x 17.2 in	59 lb
8892D320	5 kW	1 5/8 in EIA Flanged	230 VAC Fan	470 to 860 MHz @ 1.065:1 max	(638 mm x 178 mm x 437 mm)	(27 kg)
8922D	5 kW	1 5/8 in EIA Flanged	Convection	470 to 860 MHz @ 1.065:1 max	25.2 in x 7 in x 17.2 in	73 lb
8926D	5 kW	3 1/8 in EIA Flanged	Convection	470 to 860 MHz @ 1.065:1 max	(638 mm x 178 mm x 437 mm)	(33 kg)
8927D	5 kW	3 1/8 in EIA Flanged	Convection	470 to 860 MHz @ 1.065:1 max	32.8 in x 9.5 in x 26.9 in	126 lb
8936D115	10 kW	3 1/8 in EIA Flanged	115 VAC Fan	470 to 860 MHz @ 1.15:1 max	(832 mm x 241 mm x 681 mm)	(57 kg)
8936D230	10 kW	3 1/8 in EIA Flanged	230 VAC Fan	470 to 860 MHz @ 1.15:1 max	32.8 in x 9.5 in x 33.4 in	142 lb
					(832 mm x 241 mm x 847 mm)	(65 kg)

SEMICONDUCTOR PRECISION LOAD SELECTION GUIDE

MODEL	POWER RATING	CONNECTORS	COOLING METHOD	FREQ. RANGE & VSWR	DIMENSIONS	WEIGHT
8862D	1 kW	QC-LC(F)	Convection	DC to 28 MHz @ 1.10:1 max	19.5 in x 7.5 in x 13.2 in	32 lb
8890-300SC13	2.5 kW	QC-LC(F)	Convection	DC to 28 MHz @ 1.10:1 max	(496 mm x 184 mm x 334 mm)	(14.5 kg)
8921SC13	1.5 kW	QC-LC(F)	Convection	DC to 28 MHz @ 1.10:1 max	25.2 in x 7 in x 17.2 in	59 lb
8931-115SC13	5 kW	QC-LC(F)	115 VAC Fan	DC to 28 MHz @ 1.10:1 max	(638 mm x 178 mm x 437 mm)	(27 kg)
8931-230SC13	1.5 kW	QC-LC(F)	230 VAC Fan	DC to 28 MHz @ 1.10:1 max	32.8 in x 9.5 in x 26.9 in	126 lb
8941-115SC13	5 kW	QC-DIN(F)	115 VAC Fan	DC to 28 MHz @ 1.10:1	(832 mm x 241 mm x 681 mm)	(57 kg)
8941-230SC13	1.5 kW	QC-DIN(F)	230 VAC Fan	DC to 28 MHz @ 1.10:1	32.8 in x 9.5 in x 33.4 in	142 lb
					(1092 mm x 241 mm x 847 mm)	(107 kg)

PRODUCT FEATURES

- Self-contained cooling system that includes cooling fans for higher power models
- Tuned for optimal performance over target frequency ranges
- Capable of up to 10 dB peak to average power ratios
- Wide range of available RF input connectors
- Compact design

SYSTEM

Coolant Method	Silicone oil
Impedance	50 Ohms
Finish	Digital Broadcast: Gray powder coat Semiconductor: Black powder coat
AC Power	None except 1.5 kW models require 115/230V AC power
Operating Position	Vertical

ENVIRONMENTAL

Ambient Temperature	Digital Broadcast: -40 °C to 45 °C (-40 °F to 113 °F) Semiconductor: 5 °C to 40 °C (41 °F to 104 °F)
Storage Temperature	-40 °C to 45 °C (-40 °F to 113 °F)
Humidity	95% non-condensing
Altitude	1520 m (5000 ft)



Econoloads

WATER-COOLED

Econoloads are designed as a compact, low VSWR and non-radiating termination for high-power transmitter/transmission line systems. It generates almost no ambient heat, making installation space minimal and convenient, in any position. The RF power is converted to heat in the hollow resistive film load resistor and directly absorbed by the water flowing through it.

LOAD SELECTION GUIDE

MODEL	POWER RATING	CONNECTORS	FREQUENCY RANGE & VSWR	FLOW RATE	DIMENSIONS	WEIGHT
8720	5 kW	1 5/8 in EIA Flanged	DC to 500 MHz @ 1.1:1 max 500 to 900 MHz @ 1.15:1 max 900 to 2000 MHz @ 1.25:1 max	1 GPM (4 LPM) @ 5 °C to 4 GPM (15 LPM) @ 80 °C	8.1 in x 3.5 in dia (204 mm x 89 mm dia)	2 lb 2 oz (964 g)
8726	5 kW	QC - LC(F)	DC to 500 MHz @ 1.1:1 max 500 to 2000 MHz @ 1.25:1 max	1 GPM (4 LPM) @ 5 °C to 4 GPM (15 LPM) @ 80 °C	10.5 in x 1.7 in dia (265 mm x 43 mm dia)	2 lb 8 oz (1.1 kg)
8730A	10 kW	1 5/8 in EIA Flanged	DC to 1 GHz @ 1.1:1 max	4 GPM (15 LPM) @ 5 °C to 6 GPM (23 LPM) @ 60 °C	16.0 in x 4.4 in dia (406 mm x 111 mm dia)	8 lb (3.6 kg)
8731	10 kW	3 1/8 in EIA Flanged	1 kHz to 1 GHz @ 1.1:1 max	4 GPM (15 LPM) @ 5 °C to 6 GPM (23 LPM) @ 60 °C	14.7 in x 5.2 in dia (372 mm x 132 mm dia)	6 lb 4 oz (2.9 kg)
8738A	10 kW	3 1/8 in EIA Unflanged	1 kHz to 1 GHz @ 1.1:1 max	4 GPM (15 LPM) @ 5 °C to 6 GPM (23 LPM) @ 60 °C	16.0 in x 4.4 in dia (406 mm x 111 mm dia)	6 lb (2.8 kg)
8745	20 kW	3 1/8 in EIA Flanged	1 kHz to 900 MHz @ 1.1:1 max	6 GPM (23 LPM) @ 5 °C to 8 GPM (30 LPM) @ 60 °C	19.5 in x 5.2 in dia (495 mm x 132 mm dia)	15 lb 13 oz (7.2 kg)
8746	20 kW	3 1/8 in EIA Unflanged	1 kHz to 900 MHz @ 1.1:1 max	6 GPM (23 LPM) @ 5 °C to 8 GPM (30 LPM) @ 60 °C	19.5 in x 5.2 in dia (495 mm x 132 mm dia)	15 lb 5 oz (7.0 kg)
8755	30 kW	3 1/8 in EIA Flanged	1 kHz to 900 MHz @ 1.1:1 max	7 GPM (26 LPM) @ 5 °C to 9 GPM (34 LPM) @ 60 °C	19.5 in x 5.2 in dia (495 mm x 132 mm dia)	15 lb 13 oz (7.2 kg)
8756	30 kW	3 1/8 in EIA Unflanged	1 kHz to 900 MHz @ 1.1:1 max	7 GPM (26 LPM) @ 5 °C to 9 GPM (34 LPM) @ 60 °C	19.5 in x 5.2 in dia (495 mm x 132 mm dia)	15 lb 5 oz (7.0 kg)
8765	40 kW	3 1/8 in EIA Flanged	1 kHz to 900 MHz @ 1.1:1 max	8 GPM (30 LPM) @ 5 °C to 10 GPM (38 LPM) @ 60 °C	19.5 in x 5.2 in dia (495 mm x 132 mm dia)	15 lb 13 oz (7.2 kg)
8775	50 kW	3 1/8 in EIA Flanged	1 kHz to 900 MHz @ 1.1:1 max	9 GPM (34 LPM) @ 5 °C to 11 GPM (42 LPM) @ 60 °C	19.5 in x 5.2 in dia (495 mm x 132 mm dia)	15 lb 13 oz (7.2 kg)
8776	50 kW	3 1/8 in EIA Unflanged	1 kHz to 900 MHz @ 1.1:1 max	9 GPM (34 LPM) @ 5 °C to 11 GPM (42 LPM) @ 60 °C	19.5 in x 5.2 in dia (495 mm x 132 mm dia)	15 lb 5 oz (7.0 kg)
8792	80 kW	6 1/8 in EIA Flanged	1 kHz to 800 MHz @ 1.15:1 max	9 GPM (34 LPM) @ 5 °C to 12 GPM (46 LPM) @ 60 °C	35.2 in x 8.2 in dia (891 mm x 206 mm dia)	25 lb (11.3 kg)

PRODUCT FEATURES

- Econoloads are the smallest load design for power dissipation
- Utilizes an external water supply where there is a source of potable water
- Compact size may be carried easily, mounted in any orientation
- Load requires no AC power
- Surface cool to the touch
- Standard EIA RF connections and NPT water connection

SYSTEM

Coolant Method	Water-cooled
Impedance	50 Ohms
AC Power	None
Operating Position	Any
Waterlines	5 kW, 8720: 1/4 in FPT 5 kW, 8726: 3/4 in hose 10 kW to 80 kW: 3/4 in hose

ENVIRONMENTAL

Water Inlet Temperature	5 kW: -8 °C to 40 °C (17.6 °F to 104 °F) 10 kW to 80 kW: -5 °C to 60 °C (23 °F to 140 °F)
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Digital Air Loads

DA SERIES AIR-COOLED

DA-Series, Digital Air RF Loads are forced air-cooled loads that provide a fully self-contained and convenient means of dissipating large amounts of analog or digital RF power. Digital Air loads require no plumbing, pumps or complicated installation and setup procedures. The four fan design provides excellent cooling efficiency as well as extremely high reliability.

LOAD SELECTION GUIDE

VHF LOAD	CONNECTOR	AC POWER	POWER RATING	FREQUENCY RANGE	DIMENSIONS	WEIGHT
DA10V1F15	1 5/8 in Flanged	115 VAC	10 kW	0 to 240 MHz to AM, FM, VHF	23.5 in x 23.5 in x 59 in (597 mm x 597 mm x 1499 mm)	130 lb (58.97 kg)
DA10V1U15	1 5/8 in Unflanged					
DA10V1F30	1 5/8 in Flanged	230 VAC	10 kW	0 to 240 MHz to AM, FM, VHF	23.5 in x 23.5 in x 59 in (597 mm x 597 mm x 1499 mm)	130 lb (58.97 kg)
DA10V1U30	1 5/8 in Unflanged					
DA10V3F15	3 1/8 in Flanged	115 VAC	10 kW	0 to 240 MHz to AM, FM, VHF	23.5 in x 23.5 in x 59 in (597 mm x 597 mm x 1499 mm)	130 lb (58.97 kg)
DA10V3U15	3 1/8 in Unflanged					
DA10V3F30	3 1/8 in Flanged	230 VAC	10 kW	0 to 240 MHz to AM, FM, VHF	23.5 in x 23.5 in x 59 in (597 mm x 597 mm x 1499 mm)	130 lb (58.97 kg)
DA10V3U30	3 1/8 in Unflanged					
DA25V3F15	3 1/8 in Flanged	115 VAC	25 kW	0 to 240 MHz to AM, FM, VHF	27 in x 27 in x 61 in (686 mm x 686 mm x 1549 mm)	160 lb (72.57 kg)
DA25V3U15	3 1/8 in Unflanged					
DA25V3F30	3 1/8 in Flanged	230 VAC	25 kW	0 to 240 MHz to AM, FM, VHF	27 in x 27 in x 61 in (686 mm x 686 mm x 1549 mm)	160 lb (72.57 kg)
DA25V3U30	3 1/8 in Unflanged					
DA25V4U15	4 1/2 in Unflanged	115 VAC	25 kW	0 to 240 MHz to AM, FM, VHF	27 in x 27 in x 61 in (686 mm x 686 mm x 1549 mm)	160 lb (72.57 kg)
DA25V4U30	4 1/2 in Unflanged	230 VAC				

PRODUCT FEATURES

- Self-contained and convenient means of dissipating large amounts analog, digital, and combined signals
- Excellent VSWR performance with <1.05:1 typical VSWR (1.1:1 max) across rated frequency range
- Handles >13 dB Peak to Average power ratio
- Ductable exhaust and cool-to-the-touch exterior surfaces
- Double shielded against the production of extraneous radiation

MEASUREMENT

Impedance	50 Ohms nominal
VSWR	
VHF (DC-240 MHz)	1.05:1 typical, 1.10:1 max
UHF (470 to 890 MHz)	
Peak to Average Power	>10 dB

SYSTEM

Cooling Method	Forced air-cooled
Interlock Contact Rating	10 A @ 120 VAC, 5 A @ 250 VAC
Finish	Blue Powder Coat
Power Requirements	115 V/230 V 50/60 Hz

ENVIRONMENTAL

Operating Temperature	-40 °C to 45 °C (-40 °F to 113 °F)
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CERTIFICATIONS

CE	EMC: EN 61326-1:2006 and Safety: EN 61010-1:2001
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Digital Air Loads **DA SERIES AIR-COOLED**

LOAD SELECTION GUIDE

UHF LOAD	CONNECTOR	AC POWER	POWER RATING	FREQUENCY RANGE	DIMENSIONS	WEIGHT
DA5F15	3 1/8 in Flanged	115 VAC	5 kW	470 to 890 MHz UHF	17 in x 17 in x 64 in (495 mm x 495 mm x 1740 mm)	100 lb (45.5 kg)
DA5U15	3 1/8 in Unflanged					
DA5F30	3 1/8 in Flanged	230 VAC	5 kW	470 to 890 MHz UHF	17 in x 17 in x 64 in (495 mm x 495 mm x 1740 mm)	100 lb (45.5 kg)
DA5U30	3 1/8 in Unflanged					
DA10F15	3 1/8 in Flanged	115 VAC	10 kW	470 to 890 MHz UHF	19.5 in x 19.5 in x 68.5 in (432 mm x 432 mm x 1608 mm)	130 lb (58.97 kg)
DA10U15	3 1/8 in Unflanged					
DA10F30	3 1/8 in Flanged	230 VAC	10 kW	470 to 890 MHz UHF	19.5 in x 19.5 in x 68.5 in (432 mm x 432 mm x 1608 mm)	130 lb (58.97 kg)
DA10U30	3 1/8 in Unflanged					
DA15F15	3 1/8 in Flanged	115 VAC	15 kW	470 to 890 MHz UHF	25 in x 25 in x 76.5 in (635 mm x 635 mm x 1943 mm)	192 lb (87.09 kg)
DA15U15	3 1/8 in Unflanged					
DA15F30	3 1/8 in Flanged	230 VAC	15 kW	470 to 890 MHz UHF	25 in x 25 in x 76.5 in (635 mm x 635 mm x 1943 mm)	192 lb (87.09 kg)
DA15U30	3 1/8 in Unflanged					
DA25F15	4 1/16 in Myat Flanged	115 VAC	25 kW	470 to 890 MHz UHF	27 in x 27 in x 76.5 in (686 mm x 686 mm x 1943 mm)	245 lb (111.13 kg)
DA25U15	4 1/16 in Myat Unflanged					
DA25F30	4 1/16 in Myat Flanged	230 VAC	25 kW	470 to 890 MHz UHF	27 in x 27 in x 76.5 in (686 mm x 686 mm x 1943 mm)	245 lb (111.13 kg)
DA25U30	4 1/16 in Myat Unflanged					
DA25 to 4U15	4 1/2 in IEC Unflanged	115 VAC	25 kW	470 to 890 MHz UHF	27 in x 27 in x 76.5 in (686 mm x 686 mm x 1943 mm)	245 lb (111.13 kg)
DA25 to 4U30	4 1/2 in IEC Unflanged	230 VAC				
DA40 to 5U15	4 7/8 in IEC Unflanged	115 VAC	40 kW	470 to 890 MHz UHF	27.5 in x 27.5 in x 84 in (701 mm x 701 mm x 2134 mm)	310 lb (140.6 kg)
DA40 to 5U30	4 7/8 in IEC Unflanged	230 VAC				
DA40F15	6 1/8 in IEC Flanged	115 VAC	40 kW	470 to 890 MHz UHF	27.5 in x 27.5 in x 84 in (701 mm x 701 mm x 2134 mm)	310 lb (140.6 kg)
DA40F30	6 1/8 in IEC Flanged	230 VAC				
DA40U30	6 1/8 in IEC Unflanged	230 VAC				

Note: Other models available, please consult factory.



Moduloads

FORCED AIR-COOLED

Bird's Moduloads are self-cooling, low reflection, non-radiating terminations for higher power 50 Ohm RF transmission lines efficient at dissipation of RF over a wide frequency range. The equipment consists of three basic systems: the RF load assembly, the control system, and the heat exchanger system. Useable with CW, AM, FM, SSB, and TV modulation, and certain pulse types.

LOAD SELECTION GUIDE

MODEL	INPUT POWER	POWER RATING & OPERATING TEMPERATURE	CONNECTOR	DIMENSIONS	WEIGHT
8631B115	9.5 A @ 115 V, 60 Hz	10 kW - 100% Water: 5 °C to 45 °C 35% Ethylene Glycol/65% Water: -20 °C to 35 °C	3 1/8 in EIA Flanged	24.6 in x 15.9 in x 17.5 in (623 mm x 402 mm x 443 mm)	113 lb (50.9 kg)
8631B230	4.75 A @ 230 V, 50 Hz		3 1/8 in EIA Flanged	24.6 in x 15.9 in x 17.5 in (623 mm x 402 mm x 443 mm)	113 lb (50.9 kg)
8635B115	9.5 A @ 115 V, 60 Hz		1 5/8 in EIA Flanged	24.6 in x 15.9 in x 17.5 in (623 mm x 402 mm x 443 mm)	113 lb (50.9 kg)
8635B230	4.75 A @ 230 V, 50 Hz		1 5/8 in EIA Flanged	24.6 in x 15.9 in x 17.5 in (623 mm x 402 mm x 443 mm)	113 lb (50.9 kg)
8645B115	11 A @ 115 V, 60 Hz	25 kW - 100% Water: 5 °C to 30 °C 35% Ethylene Glycol / 65% Water: -20 °C to 25 °C	3 1/8 in EIA Flanged	28.5 in x 19.6 in x 20.9 in (723 mm x 497 mm x 528 mm)	155 lb (70 kg)
8645B230	5.5 A @ 230 V, 50 Hz		3 1/8 in EIA Flanged	28.5 in x 19.6 in x 20.9 in (723 mm x 497 mm x 528 mm)	155 lb (70 kg)
8645B230-6	5.5 A @ 230 V, 60 Hz	20 kW - 100% Water: 5 °C to 45 °C 35% Ethylene Glycol / 65% Water: -20 °C to 35 °C	3 1/8 in EIA Flanged	28.5 in x 19.6 in x 20.9 in (723 mm x 497 mm x 528 mm)	155 lb (70 kg)
8655B115-6	15 A @ 115 V, 60 Hz		3 1/8 in EIA Flanged	53 in x 19.6 in x 20.9 in (1347 mm x 497 mm x 528 mm)	275 lb (125 kg)
8655B230-5	8 A @ 230 V, 50 Hz	40kW - 100% Water: 5 °C to 45 °C 35% Ethylene Glycol / 65% Water: -20 °C to 25 °C	3 1/8 in EIA Flanged	53 in x 19.6 in x 20.9 in (1347 mm x 497 mm x 528 mm)	275 lb (125 kg)
8655B230-6	8 A @ 230 V, 60 Hz		3 1/8 in EIA Flanged	53 in x 19.6 in x 20.9 in (1347 mm x 497 mm x 528 mm)	275 lb (125 kg)

LOAD PROTECTION SWITCH GUIDE

MODEL	INPUT POWER	POWER RATING	CONNECTOR	DESCRIPTION
8640A930-1	24VDC (from included universal input power adapter)	60kW at 2MHz 20kW at 60MHz 16kW at 120MHz	3-1/8 in EIA Flanged	Provides an added layer of safety for the water-cooled Moduloads by preventing RF power from reaching it before proper coolant flow has been established, protecting it from damage that can result in costly downtime.

PRODUCT FEATURES

- Forced-air heat exchanger cooled load for high-power applications up to 900 MHz
- High power RF dissipation with 10, 25 and 50 kW versions are available
- Compact, low-profile design saves space in crowded transmitter sites
- Interlock control circuit provides fail-safe protection of the transmitter
- Available in models to work with 115 or 230 V at 50 or 60 Hz
- Optional Load Protection Switch available as a safeguard against costly damage and downtime

SYSTEM

Coolant Method	Forced air
Load Coolant	Dependent on power rating, 100% water or 35% Ethylene glycol/65% water
Frequency Range/VSWR	10 kW: 1 kHz to 1000 MHz at 1.1:1 max 25 kW & 50 kW: 1 kHz to 900 MHz at 1.1:1 max
Operating Position	Horizontal
Finish	Grey powder coat

ENVIRONMENTAL

Operating Temperature	Dependent on power rating and load coolant. See chart.
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CERTIFICATIONS

CE	EMC: EN 61326-1:2006 and Safety: EN 61010-1:2001
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RF Power Attenuators

OIL CONVECTION-COOLED

The Bird oil convection-cooled attenuator 8320 Series may be used for the isolation of power sources up to their maximum power rating and for low level monitoring. They are valuable and reliable accessories for reducing power levels and VSWR, for isolating components under test, for harmonic signal analysis, and as comparison standards.

ATTENUATOR SELECTION GUIDE

MODEL	POWER RATING	CONNECTOR	FREQ. RANGE & VSWR	COOLING METHOD	DIMENSIONS	WEIGHT
8325	500 W	QC - N(F) Input QC - N(F) Output	DC to 500 MHz at 1.1:1 max	Convection	17.5 in x 6.0 in x 8.5 in (445 mm x 151 mm x 216 mm)	25 lb (11.0 kg)
8327-300	1 kW	QC - LC(F) Input QC - N(F) Output	DC to 500 MHz at 1.1:1 max	Convection	24.0 in x 7.2 in x 17.2 in (596 mm x 181 mm x 437 mm)	57 lb (26.0 kg)
8329-300	2 kW	QC - LC(F) Input QC - N(F) Output	DC to 500 MHz at 1.1:1 max	Convection	24.0 in x 7.2 in x 17.2 in (596 mm x 181 mm x 437 mm)	57 lb (26.0 kg)
8329-300 w/ BA-300-115	4 kW	QC - LC(F) Input QC - N(F) Output	DC to 500 MHz at 1.1:1 max	Forced Convection, 115 VAC Fan	23.5 in x 7.2 in x 22.1 in (596 mm x 181 mm x 560 mm)	70.5 lb (32 kg)
8329-300 w/ BA-300-230	4 kW	QC - LC(F) Input QC - N(F) Output	DC to 500 MHz at 1.1:1 max	Forced Convection, 230 VAC Fan	23.5 in x 7.2 in x 22.1 in (596 mm x 181 mm x 560 mm)	70.5 lb (32 kg)

BLOWER SELECTION GUIDE

MODEL	INPUT VOLTAGE	FUSE RATING	COMPATIBLE WITH MODELS
BA-300-115	115 VAC - 0.6A at 50-60 Hz	115 VAC - 1 A	889X-300 RF Termination 8329-300 RF Attenuators
BA-300-230	230 VAC - 0.3 A at 50/60 Hz	230 VAC - 500 mA	889X-300 RF Termination 8329-300 RF Attenuators
BA-310-115**	115 VAC - 0.6A at 50-60 Hz	115 VAC - 1 A	889X-300 RF Termination 8329-300 RF Attenuators
BA-310-230**	230 VAC - 0.3 A at 50/60 Hz	230 VAC - 500 mA	889X-300 RF Termination 8329-300 RF Attenuators

PRODUCT FEATURES

- Self-contained instruments that require no external source of power
- Equipped with Quick-Change (QC) connectors
- Self cooling design
- Fully shielded against production of extraneous radiation
- Rugged construction

SYSTEM

Coolant Method	Oil convection-cooled
Frequency Range/VSWR	DC to 500 MHz at 1.1:1 max
Impedance	50 Ohms
Standard Attenuation Value	30 dB
Operating Position	Horizontal

ENVIRONMENTAL

Operating Temperature	-40 °C to 45 °C (-40 °F to 113 °F)
Humidity	95% non-condensing



RF Power Attenuators

CONVECTION-COOLED

Bird's Convection-Cooled RF Power Attenuators are a valuable and reliable accessory for reducing power levels, for isolating components under test, for harmonic signal analysis and as comparison standards. They are world renowned for their high-quality, robust construction and conservative power ratings. These attenuators are fully shielded against production of extraneous radiation and the self-cooling design needs no cooling plate.

PRODUCT FEATURES

- Self cooling design, needs no cooling plate
- Frequencies up to 18 GHz
- Attenuator requires no AC power
- Rugged construction, fully shielded
- Full broadband operation and models to cover all LTE frequencies

SYSTEM

Coolant Method	Dry, convection-cooled
Impedance	50 Ohms
AC Power	None except 1.5 kW models require 115/230V AC power
PIM	-110 dBc min
Standard Attenuation Values	3, 6, 10, 20, 30 dB
Operating Position	Any

ENVIRONMENTAL

Ambient Temperature	-40 °C to 40 °C (-40 °F to 104 °F)
Humidity	95% non-condensing

ATTENUATOR CONFIGURATION GUIDE

POWER RATING	PRODUCT TYPE	CONNECTOR GENDER	CONNECTORS*	ATTENUATION VALUE
See selection guide	A, SA, WA = Attenuator	M/F = Male/Female F/F = Female/ Female	A = SMA B = BNC N = N T = TNC E = IEC 7/16	03 = 3 dB 06 = 6 dB 10 = 10 dB 20 = 20 dB 30 = 30 dB

*Call for custom connector options not shown in this catalog

Example: 2-A-MFB-10= Model 2-A, 2 W, A-Type Attenuator with Male/Female BNC connectors with an attenuation value of 10 dB.

Note: Not all combinations are valid. If assistance is needed consult the factory to define the model that is right for you.

ATTENUATOR SELECTION GUIDE

MODEL	POWER RATING	CONNECTORS	FREQUENCY RANGE & VSWR	DIMENSIONS	WEIGHT	FINISH
2-A	2 W	BNC, N	DC to 1 GHz @ 1.10:1 max 1 to 4 GHz @ 1.25:1 max	2.4 in x 0.8 in dia (61 mm x 21 mm dia)	3.1 oz (88 g)	Tri-Alloy
2-A	2 W	SMA	DC to 2.5 GHz @ 1.15:1 max 2.5 to 6 GHz @ 1.30:1 max	0.9 in x 0.4 in dia (23 mm x 11 mm dia)	1.2 oz (34 g)	Stainless Steel
2-6A	2 W	N	DC to 6 GHz @ 1.25:1 max	1.8 in x 0.9 in dia (46 mm x 23 mm dia)	2.5 oz (71 g)	Stainless Steel
2-18A	2 W	SMA, N	DC to 4 GHz @ 1.15:1 max 4 to 8 GHz @ 1.20:1 max 8 to 12.4 GHz @ 1.25:1 max 12.44 to 18 GHz @ 1.35:1 max	1.8 in x 0.9 in dia (46 mm x 23 mm dia)	2.5 oz (71 g)	Stainless Steel
3-A	3 W	BNC, TNC	DC to 1 GHz @ 1.10:1 max 1 to 4 GHz @ 1.25:1 max	1.5 in x 0.6 in dia (39 mm x 16 mm dia)	3.1 oz (88 g)	Tri-Alloy
5-A	5 W	BNC, N, TNC	DC to 1 GHz @ 1.10:1 max 1 to 4 GHz @ 1.25:1 max	2.6 in x 0.8 in dia (67 mm x 21 mm dia)	3.1 oz (88 g)	Tri-Alloy

RF Power Attenuators CONVECTION-COOLED

ATTENUATOR SELECTION GUIDE

MODEL	POWER RATING	CONNECTORS	FREQUENCY RANGE & VSWR	DIMENSIONS	WEIGHT	FINISH
5-6A	5 W	N	DC to 6 GHz @ 1.25:1 max	2.4 in x 0.9 in dia (61 mm x 23 mm dia)	3.0 oz (86 g)	Stainless Steel
5-18A	5 W	SMA, N	DC to 4 GHz @ 1.15:1 max 4 to 12.4 GHz @ 1.25:1 max 12.4 to 18 GHz @ 1.35:1 max	2.5 in x 0.9 in dia (64 mm x 23 mm dia)	3.5 oz (100 g)	Stainless Steel
10-A	10 W	SMA, BNC, N	DC to 1 GHz @ 1.10:1 max 1 to 4 GHz @ 1.25:1 max	2.8 in x 2.3 in dia (72 mm x 59 mm dia)	5.0 oz (142 g)	Black Anodized Aluminum
10-6A	10 W	N	DC to 4 GHz @ 1.20:1 max 4 to 6 GHz @ 1.30:1 max	2.5 in x 1.1 in dia (64 mm x 28 mm dia)	3.5 oz (100 g)	Stainless Steel
10-18A	10 W	N	DC to 4 GHz @ 1.20:1 max 4 to 12.4 GHz @ 1.30:1 max 12.4 to 18 GHz @ 1.45:1 max	2.5 in x 0.9 in dia (64 mm x 23 mm dia)	3.5 oz (100 g)	Stainless Steel
25-A	25 W	SMA, BNC, N	DC to 1 GHz @ 1.10:1 max 1 to 4 GHz @ 1.25:1 max	5.3 in x 2.3 in dia (135 mm x 59 mm dia)	9.0 oz (256 g)	Black Anodized Aluminum
25-6A	25 W	N	1 to 6 GHz @ 1.20:1 max	4.2 in x 2.3 in x 2.3 in (107 mm x 59 mm x 59 mm)	13.5 oz (383 g)	Stainless Steel
25-18A	25 W	N	DC to 4 GHz @ 1.20:1 max 4 to 12.4 GHz @ 1.30:1 max 12.4 to 18 GHz @ 1.40:1 max	4.2 in x 2.3 in x 2.3 in (107 mm x 59 mm x 59 mm)	13.5 oz (383 g)	Stainless Steel
50-A	50 W	SMA, BNC, N	DC to 1 GHz @ 1.10:1 max 1 to 3 GHz @ 1.25:1 max	6.4 in x 2.3 in dia (163 mm x 59 mm dia)	1.0 lb (454 g)	Black Anodized Aluminum
50-6A	50 W	N	DC to 6 GHz @ 1.20:1 max	4.7 in x 3.0 in x 3.0 in (120 mm x 77 mm x 77 mm)	1.7 lb (772 g)	Stainless Steel
50-18A	50 W	SMA, N	DC to 6 GHz @ 1.25:1 max 6 to 12.4 GHz @ 1.35:1 max 12.4 to 18 GHz @ 1.45:1 max	4.7 in x 3.0 in x 3.0 in (120 mm x 77 mm x 77 mm)	1.7 lb (772 g)	Stainless Steel
75-A	75 W	SMA, BNC, N	DC to 1 GHz @ 1.10:1 max 1 to 3 GHz @ 1.25:1 max	7.3 in x 2.3 in dia (186 mm x 59 mm dia)	1.6 lb (726 g)	Black Anodized Aluminum
100-A	100 W	SMA, N	DC to 1 GHz @ 1.10:1 max 1 to 3 GHz @ 1.25:1 max	7.3 in x 2.6 in x 6.4 in (186 mm x 67 mm x 163 mm)	3.6 lb (1.6 kg)	Black Anodized Aluminum
100-6A	100 W	N	DC to 2 GHz @ 1.20:1 max 2 to 4 GHz @ 1.35:1 max 4 to 6 GHz @ 1.40:1 max	6.4 in x 2.7 in x 3.8 in (163 mm x 69 mm x 97 mm)	2.4 lb (1.7 kg)	Stainless Steel
100-SA	100 W	N	DC to 1 GHz @ 1.10:1 max 1 to 2.4 GHz @ 1.25:1 max	8.4 in x 2.8 in x 2.8 in (214 mm x 72 mm x 72 mm)	3.0 lb (1.4 kg)	Black Anodized Aluminum
150-A	150 W	N	DC to 1 GHz @ 1.10:1 max 1 to 3 GHz @ 1.25:1 max	6.7 in x 2.6 in x 11.9 in (171 mm x 67 mm x 303 mm)	6.6 lb (3.0 kg)	Black Anodized Aluminum
150-SA	150 W	N	DC to 1 GHz @ 1.10:1 max 1 to 2.4 GHz @ 1.25:1 max	9.1 in x 4.0 in x 5.0 in (232 mm x 102 mm x 127 mm)	5.5 lb (2.5 kg)	Black Anodized Aluminum
150-WA	150 W	BNC, N	DC to 1 GHz @ 1.10:1 max 1 to 2.4 GHz @ 1.25:1 max	5.6 in x 5.4 in x 4.3 in (143 mm x 138 mm x 110 mm)	2.5 lb (1.2 kg)	Black Anodized Aluminum
300-A	300 W	N	DC to 1 GHz @ 1.10:1 max 1 to 2.4 GHz @ 1.25:1 max	7.3 in x 5.4 in x 10.9 in (186 mm x 138 mm x 277 mm)	12.0 lb (5.5 kg)	Black Anodized Aluminum
300-WA	300 W	N	DC to 1 GHz @ 1.10:1 max 1 to 2.4 GHz @ 1.25:1 max	9.0 in x 5.4 in x 4.8 in (229 mm x 138 mm x 122 mm)	4.6 lb (2.1 kg)	Black Anodized Aluminum
500-WA	500 W	N	DC to 1 GHz @ 1.10:1 max 1 to 2.5 GHz @ 1.25:1 max	12.4 in x 5.4 in x 4.8 in (315 mm x 138 mm x 122 mm)	7.9 lb (3.6 kg)	Black Anodized Aluminum
600-A	600 W	N	DC to 1 GHz @ 1.10:1 max 1 to 2.4 GHz @ 1.25:1 max	12.7 in x 9.4 in x 9.6 in (323 mm x 239 mm x 244 mm)	21.5 lb (9.8 kg)	Black Anodized Aluminum
1000-A*	1 kW	N	DC to 1 GHz @ 1.10:1 max 1 to 2.4 GHz @ 1.25:1 max	13.6 in x 12.8 in x 9.6 in (346 mm x 326 mm x 244 mm)	26.5 lb (12.0 kg)	Black Anodized Aluminum
1000-WA*	1 kW	N	DC to 1 GHz @ 1.10:1 max 1 to 2.4 GHz @ 1.25:1 max	19.6 in x 10.6 in x 4.8 in (498 mm x 270 mm x 122 mm)	26.5 lb (12.0 kg)	Black Anodized Aluminum
1500-WA*	1.5 kW	N	DC to 1 GHz @ 1.10:1 max 1 to 2.4 GHz @ 1.25:1 max	20.4 in x 10.7 in x 5.9 in (519 mm x 272 mm x 150 mm)	30.0 lb (13.6 kg)	Black Anodized Aluminum

*Attenuators 1 kW and above are not available in attenuation values less than 10 dB