e2v technologies

N6312 Series
Stellar 125 W TWT, 13.75 - 14.5 GHz Antenna Mount TWTA

- **Fully Weatherproof** Allows exposed mounting in mobile applications.
- **Ruggedised** Designed specifically for use in antenna mount applications.
- **Lightweight** Weighs less than 12 kg.
- **EMC** Complies with current worldwide specifications.
- **Power Factor Correction** Broad input voltage range allows connection to portable or mains supplies worldwide.
- **Reliable** Designed and built to provide a high level of reliability in all applications, from fixed ground base to flyaway systems.
- **Digital Operation** Designed for digital and analogue satellite communications, meeting the requirements of Intelsat and Eutelsat uplink specifications.
- **Redundant Control** Contains all the necessary control and drive requirements to implement a basic waveguide switch based redundant system.
- **Stand Alone Setting** A selectable facility that automatically sequences the unit to the transmit mode, upon application of the mains power. This reduces the complexity of control requirements for 'blackbox' applications.
- **RF Circuit** Includes RF input isolation RF output isolation, receiver rejection filter and harmonic filter as standard.

The amplifiers can be simply deployed anywhere in the world, are user friendly, and incorporate a comprehensive remote control facility as standard, including RS485.

TYPICAL DATA

Frequency	13.75 to 14.5	GHz
Output power at output flange (see note)	120	W
Gain at rated power	65	dB
Prime power	99 to 265	V nom
	47 to 63	Hz
	900	VA
Power factor	0.99	nom
Dimensions	436 mm (17.2 inches) long	
	213 mm (8.4 inches) wide	
	203 mm (8.0 inches) high	
Weight	11.5	kg

Note Measured output power at the output flange will vary depending on operating frequency, configuration of the measurement system and temperature, and will typically be between 115 and 125 W.

Variants

In addition to the N6312, variants are available which include a choice of options. These are shown on page 4, along with other accessories available from e2v technologies.

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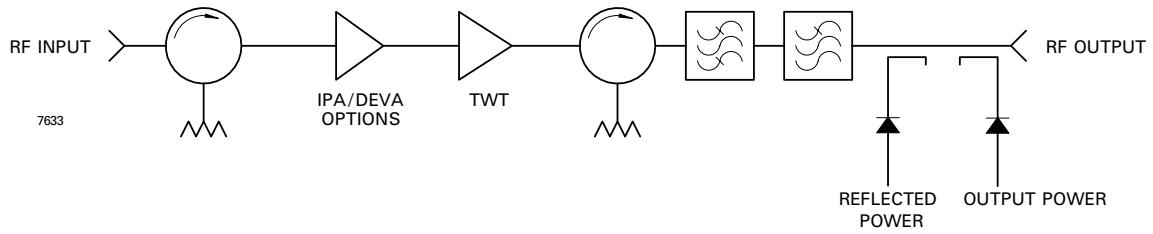
INTERNAL SCHEMATIC



TEST PERFORMANCE

Frequency	13.75 to 14.5	GHz
Output power (at output flange)	115	W min
Output power variation	±0.3	dB max
Gain:		
at rated power	61	dB min
at P_{SAT} − 10 dB	66	dB min
stability (constant level, temperature and load)	±0.25	dB max
stability over full operating temperature range	±1.5	dB max
variation (ssg)	±0.5	dB/80 MHz
slope (over any 50 MHz)	±0.05	dB/MHz max
RF input level	+10	dBm max
Input VSWR (non-operating)	1.5:1	max
Load VSWR:		
operate	1.5:1	max
no damage	2.0:1	max
Residual AM:		
<10 kHz	−40	dBc
10 to 500 kHz	−20 (1 + log f)	dBc
>500 kHz	−77	dBc
Noise and spurious:		
10.7 - 12.75 GHz	−150	dBW/4 kHz
13.75 - 14.5 GHz	−65	dBW/4 kHz
18 - 40 GHz	−100	dBW/4 kHz
Intermodulation: two equal carriers, total power −7 dB of rated power	−23	dBc max
Group delay (in any 50 MHz)	1.0	ns p-p max
Phase noise	Intelsat IESS-308	
Harmonic output	−60	dBc max
AM to PM conversion (at rated power)	6	°/dB

ELECTRICAL

Prime power	single phase, line-neutral or line-line	
Voltage	99 to 265	V
Frequency	47 to 63	Hz
Power requirement	1050	VA max
Power factor	0.95	min

MECHANICAL

Weight	12.0 kg (26 lb) max
Dimensions	see outline
Cooling	integral forced-air

CONNECTORS

RF input	type N female
RF output	WG17/WR75

Note Mating connectors for the mains supply and control interface are supplied.

ENVIRONMENTAL

For operation outside these parameters, refer to e2v technologies for guidance.

Operating temperature	−40 to +45 °C
Derating	2 °C/300 m above sea level (3.6 °F/1000 ft)
Storage temperature	−40 to +80 °C
Relative humidity (condensing)	100 %
Altitude:	
operating	4.5 km (15,000 ft) max
non-operating	12 km (40,000 ft) max
Vibration	MIL-STD-810E; common carrier and field transportation
Shock	IEC Publication 68-2-27 Part 2 Test Ea 25 g
Electromagnetic compatibility	EMC Directive 89/336/EEC
Safety	Low Voltage Directive 73/23/EEC BS EN 60950

CONTROLS

All controls are achieved through the control interface connector, the functions are listed below:

Control inputs;
- OFF
- STANDBY
- TRANSMIT
- RF INHIBIT NO/NC
- INTERLOCK

Indicator outputs;
- OFF
- WARMUP
- STANDBY
- TRANSMIT
- FAULT SUMMARY
- FOUR MULTIPLEXED FAULT LINES

Helix Current monitor

Output power monitor

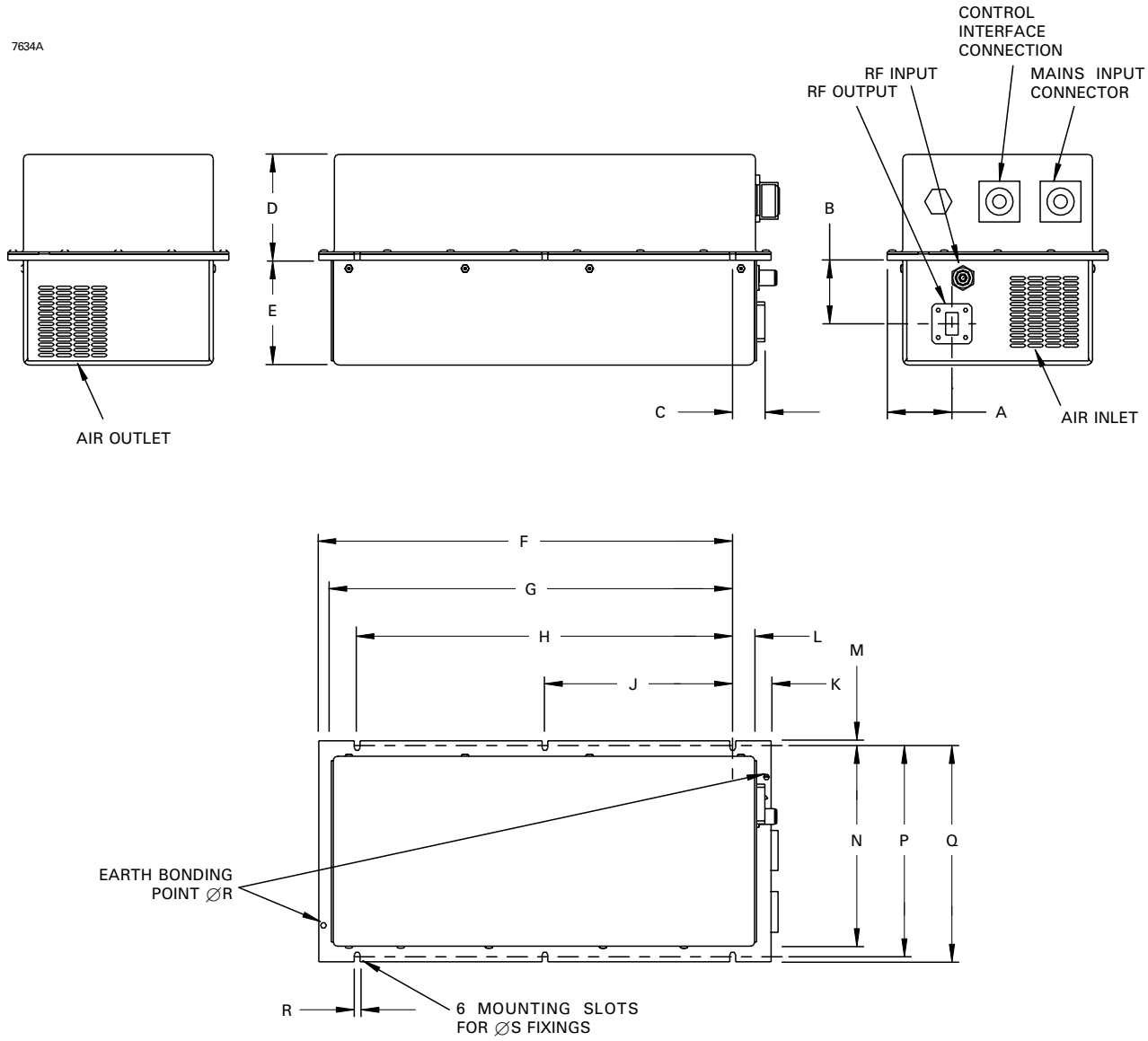
RS-485 Serial Communications Port (including address selection)

Auxiliary voltage output

Redundant system control and waveguide switch drive

'Stand alone' setting for automatic power-up.

OUTLINE
(All dimensions without limits are nominal)



Ref	Millimetres	Inches
A	61 ± 1	2.40 ± 0.04
B	59 ± 1	2.34 ± 0.04
C	31 ± 1	1.22 ± 0.04
D	102	4.02
E	101	3.98
F	399	15.71
G	387	15.24
H	362	14.25
J	181	7.13
K	37	1.46
L	23	0.91
M	7	0.28
N	192	7.56
P	200	7.87
Q	207	8.15
R	6	0.22
S	5	0.20

Inch dimensions have been derived from millimetres.

HEALTH AND SAFETY HAZARDS

e2v technologies electronic devices are safe to handle and operate provided that the relevant precautions are observed. e2v technologies does not accept responsibility for damage or injury resulting from the use of electronic devices it produces.

High Voltage

Dangerous voltages are present within the TWT amplifier when operating normally. However, the equipment is designed so that personnel cannot come into contact with high voltage circuits unless covers are removed.

RF Radiation

All RF connectors must be correctly fitted before operation.

Beryllia

The TWT in the amplifier contains beryllium oxide ceramic parts. These are not accessible unless the TWT casing is damaged. Consult e2v technologies regarding the disposal of damaged or life-expired tubes.

N63xx SERIES OPTIONS

In addition to the standard product, the following variants and options are available. Contact e2v technologies for further information. To order an option please add the suffix letter to the HPA part number, for example to order a 180W HPA with built-in upconverter and digital gain control with a sample port would be part number **N6318DUAP.**

DEVA OPTION (D)

A digital electronically variable attenuator (DEVA) that provides a typical gain adjustment of 30 dB with a control resolution of 0.125 dB, controlled via the RS485 serial communications control link.

Gain:		
at rated power	62	dB typ.
	58	dB min.
at P_{SAT} −10 dB	63	dB min.
Adjustment	30	dB typ.
	20	dB min.

SAMPLE PORT (P)

The RF Sample port is situated on the end panel (opposite end to mains input connections).

RF sample	50	dB nom.
Connector		N-type female

INTEGRAL UPCONVERTERS (UA) or (UB)

It is recommended that the DEVA option is used if an integral upconverter is required (DUA or DUB). If the DEVA option is not included with the upconverter, then the external 10 MHz reference signal to the amplifier should be disabled.

Two versions of L-band to Ku-band upconverter, a 500 MHz and a 750 MHz version, that are fitted within the antenna mount amplifier package.

Input frequency:		
14.00 to 14.50 GHz (UA version)	950 to 1450	MHz
13.75 to 14.50 GHz (UB version)	950 to 1700	MHz
Gain:		
at rated output	50	dB typ.
	47	dB min.
at P_{SAT} −10 dB	56	dB typ.
	53	dB min.
L-band input level	−10	dBm min.
	0	dBm max.
Input VSWR	2.0:1	max.
External reference input on incoming RF:		
frequency	10	MHz
level	−5	dBm min.
	0	dBm max.

UPCONVERTER BREAK-OUT LINK (S)

Allows access to the Ku-band TWT drive signal when an integral upconverter is fitted. Typically used for monitoring, set-up, redundant switching or bypass configuration. The link is situated on the end panel (opposite end to mains input connections).

Connectors	SMA-type female

LOW GAIN OPTION (C)

The internal solid-state pre-amplification stage of the standard amplifier is omitted.

Gain:		
at rated power	36	dB typ.
	33	dB min.
at P_{SAT} −10 dB	38	dB min.
RF input level	+30	dBm max.

Note Not available with the upconverter option.

STELLAR ACCESSORIES

This product is supplied with an Operation Manual, a mains connector mating half, a control connector mating half and an air cowl.

Additional accessories available from e2v technologies include:

- **N6143 ODU 1:1 Control Unit** housed in a standard 19-inch rack mountable, 1U high enclosure. The N6143 provides the user with full remote control of two amplifiers and a redundant switch. It can be used to control a single amplifier, allowing for future expansion, including redundancy.
- **DPP563119BA Circular Duct Adaptor** can be fitted to either the cooling air inlet or outlet and provides a method of connecting to a solid wall or flexible duct.
- **DAS563573AA Waveguide Window Kit** provides a method of sealing the internal waveguide system, preventing moisture ingress from the external waveguide system, and reducing the risk of subsequent amplifier damage. The window is designed to fit between the RF output flange and the external waveguide system flange. The window is approximately 6 mm long, increasing outline dimension C to 37 ± 1 mm. The kit comprises the waveguide window, longer fixing screws and an O-ring seal.
- **DPP563119AA Additional air cowls**
- **DAS563750AA Additional mains connector mating parts**
- **DAS563751AA Additional control connector mating parts**