

MULTIBAND OUTDOOR



FEATURES

- Antenna mount, weatherproof to IP65
- Automatic 5/10 MHz internal/external reference selection
- RS-485/RS-422 and 10/100 Base-T Ethernet remote control
- Superior phase noise below IESS-308/IESS309 and MIL-STD-188-164B specification
- 30 dB gain control
- 32 memory locations
- High-frequency stability
- Summary alarm
- AC power supply (CE mark)

OPTIONS

- Higher frequency stability
- Lower phase noise
- Fiber-optic L-Band interface
- Fiber-optic RF-Band interface
- LO level monitor
- Lower gain
- DC power

This series of L3 Narda-MITEQ's outdoor block upconverters and downconverters is designed for antenna mounting.

A strong set of monitor and control functions supports powerful remote control. A contact closure summary alarm is provided for fault monitoring. A continuously updated log of time-stamped records of activity is also provided.

BLOCK UP AND DOWN CONVERTERS

BLOCK UP CONVERTERS

BAND	RF FREQUENCY (GHz)	IF FREQUENCY (MHz)	LO FREQUENCY (GHz)	MODEL NUMBER
1	12.75 to 13.25	0.95 to 1.45	11.8	UPB2-WS-13.625
2	13.75 to 14.5	0.95 to 1.7	12.8	
1	29.5 to 30.0	1.50 to 2.0	28.0	UPB2-WS-30.25
2	30.0 to 31.0	1.00 to 2.0	29.0	
1	27.5 to 28.7	0.95 to 2.15	26.55	UPB2-WS-28.7-1.2
2	28.7 to 29.9	0.95 to 2.15	27.75	
1	28.0 to 29.0	0.95 to 1.95	27.05	UPB2-WS-29-1
2	29.0 to 30.0	0.95 to 1.95	28.05	
1	28.0 to 28.8	0.95 to 1.7	27.05	UPB2-WS-28.75
2	28.7 to 29.5	0.95 to 1.75	27.75	

BLOCK DOWN CONVERTERS

BAND	RF FREQUENCY (GHz)	IF FREQUENCY (MHz)	LO FREQUENCY (GHz)	MODEL NUMBER
1	10.7 to 11.45	0.95 to 1.7	9.75	DNB3-WS-11.725
2	11.45 to 12.2	0.95 to 1.7	10.5	
3	12.2 to 12.75	0.95 to 1.5	11.25	
1	10.95 to 11.7	0.95 to 1.7	10.0	DNB3-WS-11.85
2	11.7 to 12.2	0.95 to 1.45	10.75	
3	12.2 to 12.75	0.95 to 1.5	11.25	
1	10.7 to 11.75	0.95 to 2.0	9.75	DNB2-WS-11.725
2	11.7 to 12.75	0.95 to 2.0	10.75	
1	17.7 to 18.7	0.95 to 1.95	16.75	DNB3-WS-18.95-1
2	18.3 to 19.3	0.95 to 1.95	17.35	
3	19.2 to 20.2	0.95 to 1.95	18.25	
1	18.3 to 18.8	0.95 to 1.45	17.35	DNB3-WS-19.75
2	19.7 to 20.2	0.95 to 1.45	18.75	
3	20.2 to 21.2	0.95 to 1.95	19.25	
1	19.7 to 20.2	1.5 to 2.0	18.2	DNB2-WS-20.45
2	20.2 to 21.2	1.0 to 2.0	19.2	
1	17.0 to 18.8	0.80 to 2.60	16.2	DNB3-WS-19.5-1.8
2	18.6 to 20.4	0.80 to 2.60	17.8	
3	20.2 to 22.0	0.80 to 2.60	19.6	
1	27.5 to 28.5	0.95 to 1.95	26.55	DNB3-WS-28.75-1
2	28.3 to 29.3	0.95 to 1.95	27.35	
3	29.0 to 30.0	0.95 to 1.95	28.05	
1	27.0 to 28.5	0.95 to 2.45	26.05	DNB3-WS-2.9-1.5
2	28.3 to 29.8	0.95 to 2.45	27.35	
3	29.5 to 31.0	0.95 to 2.45	28.55	



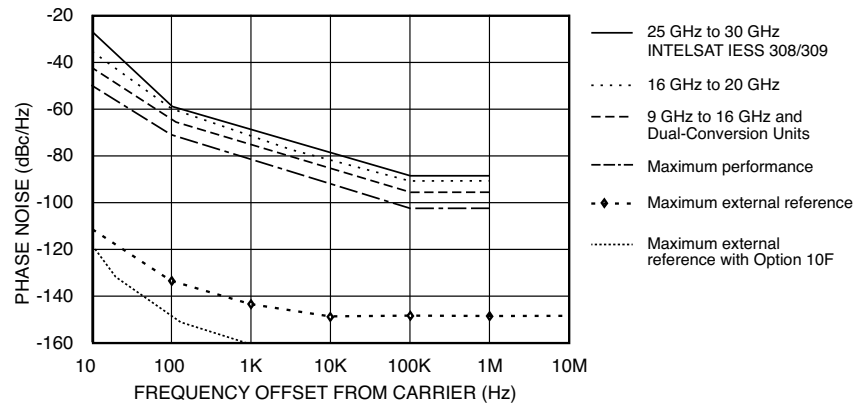
SPECIFICATIONS	UPCONVERTERS	DOWNCONVERTERS
Input characteristics		
Return loss (50 ohms)	18 dB minimum	18 dB minimum
LO leakage	N/A	-80 dBm maximum
Signal monitor	-20 dBc nominal	-20 dBc nominal
Output characteristics		
Return loss	18 dB minimum	18 dB minimum
Signal monitor	-20 dBc nominal	-20 dBc nominal
Power output (P1dB)	+13 dB minimum	+18 dB minimum
Transfer characteristics		
Gain	33 dB, ± 3 dB at 23 °C	38 dB, ± 3 dB at 23 °C
Gain adjustment	30 dB in 0.2 dB steps	30 dB in 0.2 dB steps
Gain stability	± 0.25 dB/day maximum at constant temperature, ± 2 dB -40 °C to +60 °C	
Amplitude response	± 0.25 dB/40 MHz maximum, ± 1 dB over RF frequency band	
Image rejection	80 dB minimum	80 dB minimum
Noise figure at minimum attenuation	15 dB maximum, 18 dB with 1 GHz to 1.5 GHz IF bandwidth	15 dB maximum
Intermodulation distortion (third-order)	With two inband signals at 0 dBm output, third-order intermodulation products are less than:	
	50 dBc minimum	60 dBc minimum
Spurious outputs (in-band)		
Signal-related	65 dBc minimum up to 0 dBm output (65 dBc minimum up to -10 dBm output, including 2 x 1 spurious on 1 GHz to 1.5 GHz IF bandwidth upconverters)	65 dBc minimum up to 0 dBm output -55 dBm second harmonic
Signal-independent	-75 dBm maximum	-75 dBm maximum
Phase noise	See graph on next page	See graph on next page
Frequency stability	$\pm 5 \times 10^{-8}$, -40 °C to +60 °C (higher stability options available), 5×10^{-9} /day typical (fixed temperature after 24 hours on time)	
Automatic reference configuration	5 MHz or 10 MHz at +4 ± 3 dBm on J4 (0 ± 5 dBm on L-Band connector, available as option). If external reference is above +1 dBm, the internal reference oscillator will lock to the external reference input. Reference oscillator acts as an analog phase lock with a 0.1 Hz nominal loop bandwidth. Typical loop suppression of the external reference is as follows: 28 dB at 1 Hz offset, 65 dB at 10 Hz offset, and 100 dB at 100 Hz offset (improved external reference tracking and no reference suppression with Option 10F).	
Upconverter mute	60 dB minimum on summary alarm or mute command (100 ms maximum)	
Remote interface	10/100 Base-T Ethernet interface providing Web-browser-based configuration, SNMP 1.0 configuration, alarm reporting via SNMP trap, telnet access, password protection and selectable RS-485/RS-422. Refer to L3 Narda-MITEQ Technical Note 25T060 for details.	
Indicator and Summary alarms (front panel)	Red LED (for active alarm), amber LED (for logged alarms). Summary alarm indicates: LO out-of-lock or DC voltage alarm or LNA current on block downconverters.	
Power ON indicator	Green LED (front panel)	
Summary alarm	Contact closure status for DC voltage and local oscillator, external mute input on J3 connector (programmable LNA current alarm for downconverters +12 VDC up to 500 mA maximum)	

Note: All specifications at maximum gain unless otherwise noted.

BLOCK UP AND DOWN CONVERTERS

PHASE NOISE SPECIFICATIONS

**PHASE NOISE CHARACTERISTICS
(1.0 Hz BANDWIDTH)**



GENERAL SPECIFICATIONS

PRIMARY POWER REQUIREMENTS

Voltage..... 100 VAC to 240 VAC (-10%, +6%)
 Frequency..... 47 Hz to 63 Hz
 Consumption 25 W, typical

PHYSICAL

Weight 20 lb. [9.07 kg], nominal

Connectors

Front panel connectors

RF-Band**

Below 22 GHz SMA female-compatible
 25 GHz to 27 GHz..... WR-34 grooved, 2 psi 10 cm³/min leakage rate (see Option 27 for alternatives)
 Above 27 GHz WR-28 grooved, 2 psi 10 cm³/min leakage rate (see Option 27 for alternatives)

L-Band N female

RF-Band monitor..... SMA female-compatible 2.92 mm

L-Band monitor SMA female with termination

External reference input..... SMA female with termination

Status/Control interface*..... MS3116F14-18S for summary alarm, RS-422/RS-485, and LNA power

Remote interface* RJ-45 female for Ethernet, RS-422/RS-485 available on status connector

Primary power input*..... FCI clipper series CL1M1102

Notes: * Unit supplied with mating connector.

** Option 14 RF input on rear (see outline drawing on page seven).

ENVIRONMENTAL

Enclosure rating..... IP-65

Operating

Ambient temperature..... -40 °C to +60 °C

Atmospheric pressure Up to 10,000 feet

Humidity Up to 100% condensing

Non-operating

Ambient temperature..... -50 °C to +70 °C

Atmospheric pressure Up to 40,000 feet

Shock and vibration Normal handling by commercial carriers



OPTIONS

Missing option numbers are not applicable for this product.

1. High-performance package

- Power output (1 dB compression) 18 dBm minimum (15 dBm minimum, Ka-Band upconverters)
- Gain slope 0.03 dB/MHz maximum
- Gain stability ± 0.25 dB/day maximum at constant temperature, ± 1 dB peak-to-peak maximum/-40 °C to +60 °C
- Group delay 1 ns peak-to-peak maximum
- Spurious outputs (inband)
 - Signal-independent -80 dBm maximum
 - LO leakage -70 dBm maximum (upconverters only)
- Intermodulation distortion (third-order) ... With two inband signals at 0 dBm output, third-order intermodulation products are less than 60 dBc minimum and 54 dBc minimum (Ka-Band upconverters)

High-performance phase noise (dBc/Hz) (maximum)

LO FREQUENCY	OFFSET (Hz)					
	10	100	1 K	10 K	100 K	1 M
Up to 6.7 GHz	-54	-78	-108	-116	-119	-136
6.7 LO to < 8 GHz	-53	-76	-107	-114	-117	-134
8 LO to < 12 GHz	-48	-73	-103	-112	-115	-132
12 LO to < 13.4 GHz	-48	-72	-102	-110	-113	-130
13.4 LO to < 16 GHz	-47	-70	-100	-108	-111	-128
16 LO to < 24 GHz	-42	-67	-98	-106	-109	-126
24 LO to < 29.5 GHz	-41	-64	-94	-102	-107	-124

Noise spectral density -87 dBm/4 kHz maximum (upconverters below 1 GHz to 1.5 GHz IF bandwidth), -82 dBm/4 kHz maximum downconverters, -84 dB/4 kHz maximum (upconverters above 1 GHz to 1.5 GHz IF bandwidth)

AM/PM conversion (at 0 dBm output) 0.1°/dB maximum

Upconverter mute 80 dB minimum on summary alarm, external mute input command or remote control

- 2. Lower gain 20 \pm 3 dB at 23 °C, 18 dB NF (20 dB for upconverters with 1 GHz to 1.5 GHz bandwidth and downconverters above 22 GHz), (Wide IF: 1 GHz to 1.5 GHz 2 x 1 signal related, 65 dBc at -10 dBm output) at maximum gain
- 3. Lower gain 10 \pm 3 dB at 23 °C, 20 dB NF (22 dB for upconverters with 1 GHz to 1.5 GHz bandwidth and downconverters above 22 GHz), (Wide IF: 1 GHz to 1.5 GHz 2 x 1 signal related, 65 dBc at -20 dBm output) at maximum gain
- 6. RF monitor above 18 GHz 20 dBc nominal from RF signal
- 8. LO level alarm
Summary alarm is generated for loss of power in any of the required local oscillators

10. Higher frequency stability reference

$\pm 5 \times 10^{-9}$, -40 °C to +60 °C,
1 $\times 10^{-9}$ /day typical (fixed temperature after 24 hours on time).

10F. $\pm 5 \times 10^{-9}$, -40 °C to +60 °C,
1 $\times 10^{-9}$ /day typical (fixed temperature after 24 hours on time).

Higher frequency stability reference with direct phase lock to external reference input. No phase-noise suppression on external reference input inside 100 kHz (inside 100 Hz with Option 1).

Note: Converter may require 7 to 10 days to reach stability after long storage periods.

BLOCK UP AND DOWN CONVERTERS

OPTIONS (CONTINUED)

Missing option numbers are not applicable for this product.

14. Low-noise option (downconverters only). See outline drawing on page seven.

FREQUENCY (GHz)	AVAILABLE NOISE TEMPERATURE At +25 °C (MAXIMUM)	INTERFACE INPUT (LOCATED ON REAR PANEL)
3.40 to 4.20	35	CPR-229GN
3.70 to 4.20	35	CPR-229GN
7.25 to 7.75	50	CPR-112G
10.70 to 11.70	80	WR-75 Grooved Flange
10.95 to 11.70	70	WR-75 Grooved Flange
11.45 to 12.25	70	WR-75 Grooved Flange
11.70 to 12.50	70	WR-75 Grooved Flange
12.20 to 12.75	70	WR-75 Grooved Flange
18.30 to 18.80	120	WR-42 Grooved Flange
19.70 to 20.20	120	WR-42 Grooved Flange
20.20 to 21.20	120	WR-42 Grooved Flange

Note: Gain increase of 25 dB to system gain. This option is not available with Options 2 and 3.

25. Front panel connector option

1. WR-42 per low-noise Ka-Band outline
2. WR-34 input per Ka-Band up outline
3. 2.92 mm female per standard outline

27. Rear panel RF waveguide connector option. RF output on rear panel as per outlines on pages six and seven.

1. WR-34 input per low-noise outline
2. WR-42 input per Ka-Band up outline
3. 2.92 mm female per standard outline

28. L-Band fiber-optic interface (available 0.95 GHz to 2.15 GHz)

- A. Downconverter output transmitter.

Fiber: 9/125 (single-mode fiber), Wavelength: 1540 nm to 1560 nm, Optical power in fiber: 4 mW typical,
Connector: FC/APC

- B. Upconverter input receiver

Fiber: 9/125 (single-mode fiber), Wavelength: 1300 nm to 1560 nm, Connector: FC/APC

29. RF-Band fiber-optic interface (available 0.95 GHz to 18 GHz)

- A. Upconverter output transmitter

Fiber: 9/125 (single-mode fiber), Wavelength: 1540 nm to 1560 nm, Optical power in fiber: 4 mW typical,
Connector: FC/APC

- B. Downconverter input receiver

Fiber: 9/125 (single-mode fiber), Wavelength: 1300 nm to 1560 nm, Connector: FC/APC

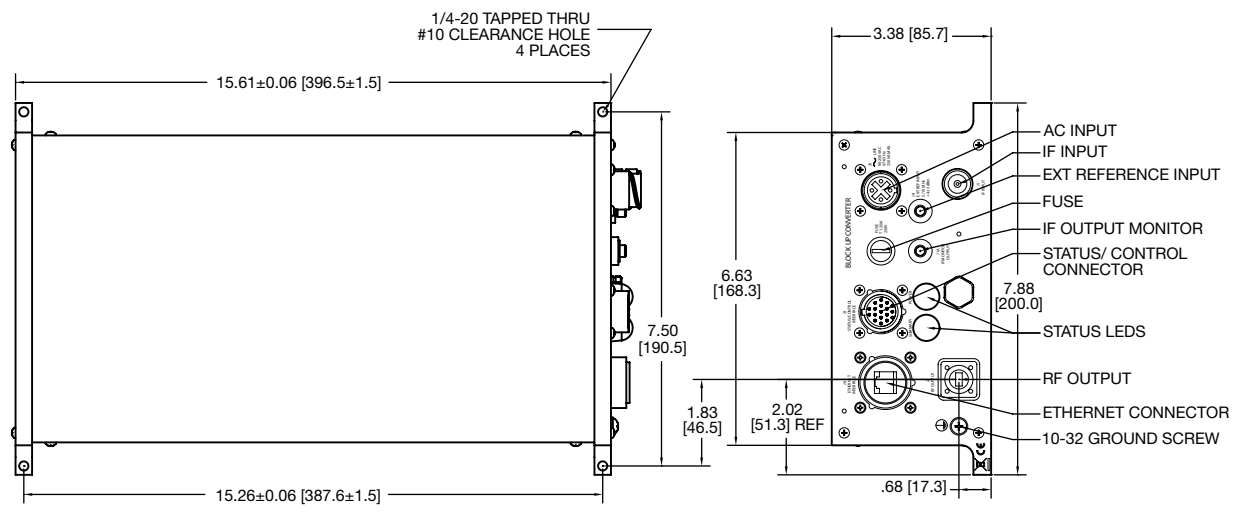
34. External reference input on IF connector

- VM. Vertical Mount (see outline on page seven)

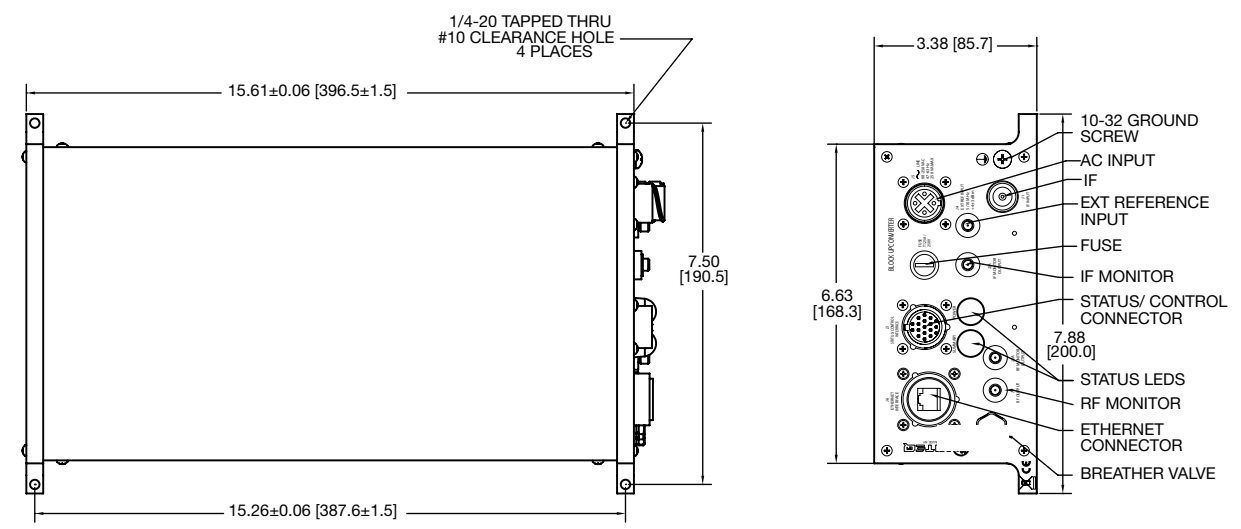


OUTLINE DRAWINGS

Ka-BAND UPCONVERTER PACKAGE



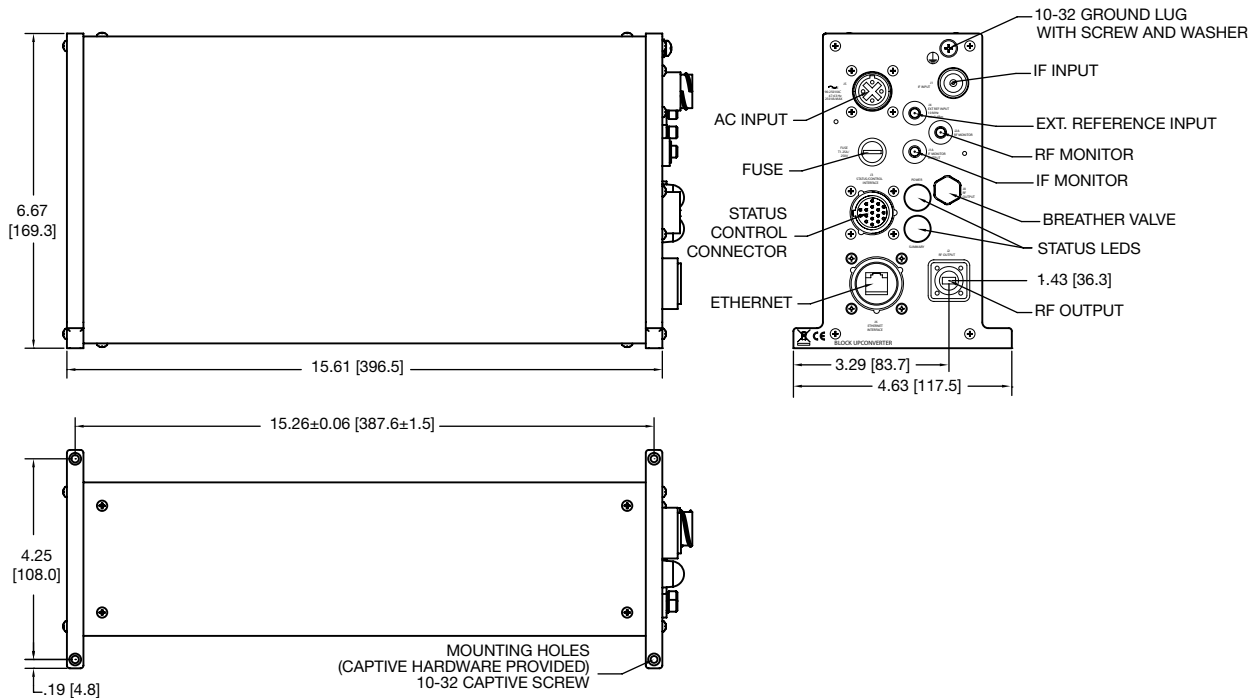
STANDARD PACKAGE FOR ALL BANDS EXCEPT Ka-BAND UPCONVERTER



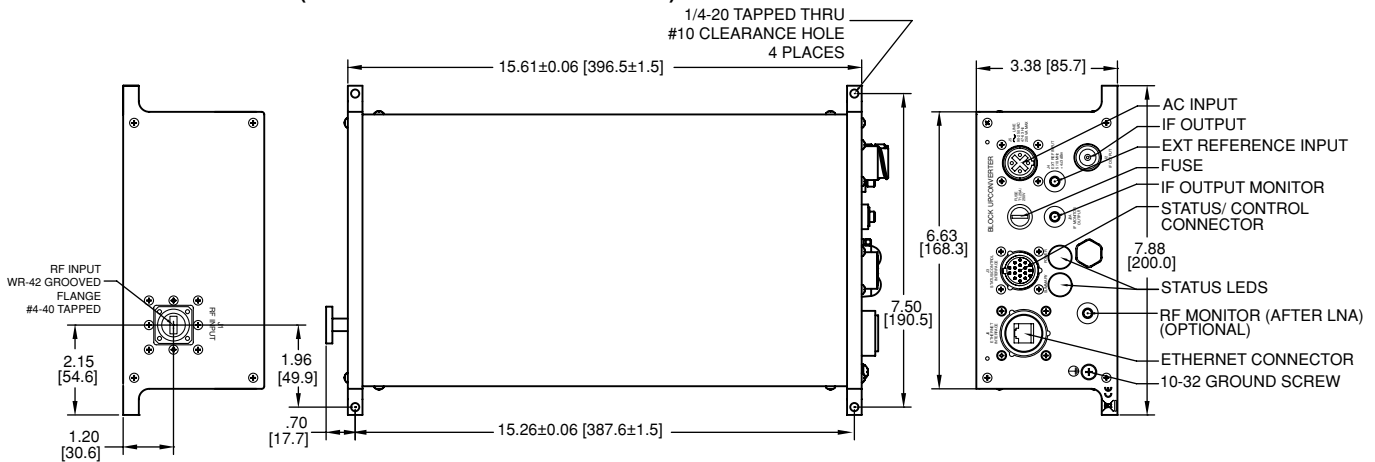
Note: Dimensions shown are in inches and those shown in brackets [] are in millimeters.

BLOCK UP AND DOWN CONVERTERS

OUTLINE DRAWINGS (CONTINUED) VERTICAL MOUNT Ka-BAND



LOW NOISE OPTION 14 (DOWN CONVERTER PACKAGE)



Note: Dimensions shown are in inches and those shown in brackets [] are in millimeters.

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