

# L-Band Block Up- and Downconverter

Indoor / Outdoor



Single / Dual / Triple Band

Single / Dual Channel

S-, C-, X-, Ku-, K- (DBS), Ka-band (Q/V-band available on request)



VSBU / VSBD Type



VSBUR / VSBDR Type



IP 67 Outdoor housing

WORK Microwave's block converters are designed to optimize the performance and bandwidth of satellite communications links, enabling operators to cost effectively deliver a superior signal quality. Ideal use cases include fixed satellite ground stations as well as in satellite newsgathering (SNG) vehicles, fly-aways and other mobile or portable applications.

The fifth-generation frequency converter series is built with the most advanced technologies available to ensure outstanding performance, high reliability and a longer lifetime.

## 5<sup>th</sup>-generation enhancements

**Reduced phase noise:** Based on a powerful new synthesizer the frequency converters achieve a phase noise significantly beyond the recommended industry specification (Intelsat's IESS-308/309).

**Optional slope compensation up to +8 dB / GHz over L-band:** With slope compensation users can effectively balance the losses and negative slope of augmented cable runs to ensure that all signals entering the RF processing chain are at similar levels across all frequencies.

**Improved flexibility and usability:** Through a new USB port, operators can now access the converter via the back panel to make copies of parameter settings, replicate selected configurations on another device or save configuration settings for future reference. In addition, a user-friendly, Web-based interface offers

an intuitive user experience. When coupled with the enhanced USB port, the customizable GUI also simplifies the installation of firmware updates.

**Higher reliability:** An AC power consumption of typically 35 VA / 20 W maximizes the reliability and lifetime of the units.

## High signal integrity

The very low phase noise of the oscillators guarantees an excellent signal quality. Low spurious emissions allow our customers to use the converters in the environments with demanding requirements, such as high power video uplinks. Sophisticated temperature compensation guarantees the stability over a wide temperature range.

## Housing options

The converters normally are delivered without fans and can be operated in environments, where at minimum one RU space for natural ventilation is available above each unit. This eliminates the fan as a potential point of failure. For rack installations without any space in between the units, a fan within the converter unit is recommended. This forces airflow from the right side to left side of the units. Outdoor versions with IP 67 degree of protection are also available.

The converters can be operated via the push buttons on the front panel using intuitive display menus or via

remote control (RS232, RS422/485, TCP/IP over Ethernet). Detailed monitoring of the system status and a summary alarm output (dual change over switch contacts) are provided. For the remote control either ASCII string-based commands as well as addressable, packet-based commands are provided.

Remote monitoring and control through SNMP and a Web browser interface is also available.

### Customized products

In addition to standard products WORK Microwave offers custom tailored products and specialized products as follows:

- Modified or smaller housings to fit into your AC power switch on the front panel
- Existing design for mobile and portable applications.
- Different IF or RF frequency bands
- Customized M&C interface and control syntax.
- Extended storage or operating temperature range.
- Military versions for hostile environment (shock, vibration, humidity).

### Key features

- Three indoor unit types are available:  
VSBU\* Type – with front panel commands  
VSBUR\* Type – remote control operation only  
*\*VSBD, VSBDR also*
- Low phase noise
- Adjustable attenuator (typ. range: 0 ... 20 dB or 0 ... 30 dB, 0.1 dB step size)
- Gain slope Equalizer available
- Output power +10 dBm (1 dB compression point)
- Low spurious emissions
- Internal OCXO with long term stability  $10^{-7}$  / year
- External reference input 5 or 10 MHz
- Local control through push buttons on front panel and display menu
- Stored alarms with time stamps

- Reference output 10 MHz
- Remote control through RS232, RS422/485 (2-wire or 4-wire) interfaces. Packet command syntax supports RS485 bus systems and allows addressed operation. TCP/IP over Ethernet, Web browser interface, SNMP with MIBs downloadable from the device
- Summary alarm output (DPDT)
- Low power consumption, typically less than 20 W
- CE compliant
- Up to 4 channels / frequency bands per unit are possible
- **3 years warranty**

### Orders information

WORK Microwave offers two series of 19" rack satellite converters, Standard and High Performance. The specifications are the same for both types except the operating temperature range. The High Performance type operates between -30 °C to 60 °C (-22 °F to 140 °F) and the Standard type between 0 °C to 50 °C (32 °F to 122 °F). Therefore if you only need units for inside use, the standard unit is perfectly suited for this application.

### Open questions, demo units

If you need more information about WORK Microwave's synthesized frequency block converters or if you would like to have demo unit, please contact us via e-mail: [sales@work-microwave.com](mailto:sales@work-microwave.com) or call us. We are glad to assist you.

# L-Band Block Upconverter

Indoor / Outdoor

S-, C-, X-, Ku-, K- (DBS), Ka- band

Q/V-band available on request (contact factory)

Upconverter Type:	VHBU- / VSBU- / VHBUR- / VSBUR-			
	C, C2, C3	X	Ku1, Ku2, Ku3	Ku4, Ku5, Ku6
RF-Output Frequency:	C-Band C: 5.85 ... 6.45 GHz C1: 5.85 ... 6.65 GHz C2: 5.78 ... 6.52 GHz C3: 6.45 ... 7.05 GHz	X-Band 7.90 ... 8.40 GHz	Ku-Band Ku1: 13.75 ... 14.50 GHz Ku2: 12.75 ... 13.75 GHz Ku3: 12.75 ... 13.50 GHz	Ku-Band Ku4: 12.90 ... 13.50 GHz Ku5: 10.70 ... 11.75 GHz Ku6: 11.70 ... 12.75 GHz
LO Frequency:	C: 4.90 GHz C1: 4.90 GHz C2: 4.83 GHz C3: 5.50 GHz	6.95 GHz	Ku1: 12.80 GHz Ku2: 11.80 GHz Ku3: 11.80 GHz	Ku4: 11.95 GHz Ku5: 9.75 GHz Ku6: 10.75 GHz
Phase Noise:	10 Hz 100 Hz 1 kHz 10 kHz 100 kHz 1 MHz	-68 / -58 -88 / -78 -98 / -88 -103 / -93 -106 / -96 -130 / -120	-65 / -55 <sup>1)</sup> -85 / -75 <sup>1)</sup> -95 / -85 <sup>1)</sup> -100 / -90 <sup>1)</sup> -103 / -93 <sup>1)</sup> -127 / -117 <sup>1)</sup>	-65 / -55 <sup>2)</sup> -85 / -75 <sup>2)</sup> -95 / -85 <sup>2)</sup> -100 / -93 <sup>2)</sup> -103 / -93 <sup>2)</sup> -140 / -130 <sup>2)</sup>
	typ. / max. values in dBc/Hz <sup>1)</sup> standard values <sup>2)</sup> values with low phase noise option LPN			
IF-Input Frequency:	C: 950 ... 1550 MHz C1: 950 ... 1750 MHz C2: 950 ... 1690 MHz C3: 950 ... 1550 MHz	950 ... 1450 MHz	Ku1: 950 ... 1700 MHz Ku2: 950 ... 1950 MHz Ku3: 950 ... 1700 MHz	Ku4: 950 ... 1550 MHz Ku5: 950 ... 2000 MHz Ku6: 950 ... 2000 MHz
Conversion Scheme:	Block up conversion, no frequency inversion			

Upconverter Type:	VHBU- / VSBU- / VHBUR- / VSBUR-			
	Ku7, Ku8, Ku9	K1, K2, K3	K4	Ka1, Ka2, Ka4
RF-Output Frequency:	Ku-Band Ku7: 14.50 ... 14.80 GHz Ku8: 13.75 ... 14.80 GHz Ku9: 14.00 ... 14.50 GHz	K-Band K1: 17.30 ... 17.80 GHz K2: 17.60 ... 18.40 GHz K3: 17.30 ... 18.10 GHz	K-Band 17.30 ... 18.40 GHz	Ka-Band Ka1: 29.00 ... 30.00 GHz Ka2: 27.50 ... 28.60 GHz Ka4: 28.50 ... 29.10 GHz
LO Frequency:	Ku7: 13.40 GHz Ku8: 12.80 GHz Ku9: 13.05 GHz	K1: 16.35 GHz K2: 16.35 GHz K3: 16.35 GHz	16.35 GHz	Ka1: 28.05 GHz Ka2: 26.55 GHz Ka4: 27.55 GHz
Phase Noise:	10 Hz 100 Hz 1 kHz 10 kHz 100 kHz 1 MHz	-65 / -55 <sup>1)</sup> -85 / -75 <sup>1)</sup> -95 / -85 <sup>1)</sup> -100 / -90 <sup>1)</sup> -103 / -93 <sup>1)</sup> -127 / -117 <sup>1)</sup>	-65 / -55 <sup>2)</sup> -85 / -75 <sup>2)</sup> -95 / -85 <sup>2)</sup> -100 / -93 <sup>2)</sup> -123 / -113 <sup>2)</sup> -140 / -130 <sup>2)</sup>	-60 / -50 -80 / -70 -90 / -80 -97 / -87 -117 / -107 -135 / -125
	typ. / max. values in dBc/Hz <sup>1)</sup> standard values <sup>2)</sup> values with low phase noise option LPN			
IF-Input Frequency:	Ku7: 1100 ... 1400 MHz Ku8: 950 ... 2000 MHz Ku9: 950 ... 1450 MHz	K1: 950 ... 1450 MHz K2: 1250 ... 1750 MHz K3: 950 ... 1750 MHz	950 ... 2050 MHz	Ka1: 950 ... 1950 MHz Ka2: 950 ... 2050 MHz Ka4: 950 ... 1550 MHz
Conversion Scheme:	Block up conversion, no frequency inversion			

Upconverter Type:	VHBU- / VSBU- / VHBUR- / VSBUR-			
	Ka6, Ka7	Ka8, Ka9	Ka10, Ka11	
RF-Output Frequency:	Ka-Band Ka6: 27.50 ... 28.70 GHz Ka7: 28.30 ... 29.50 GHz	Ka-Band Ka8: 30.00 ... 31.00 GHz Ka9: 27.00 ... 28.00 GHz	Ka-Band Ka10: 28.00 ... 29.00 GHz Ka11: 29.50 ... 30.00 GHz	
LO Frequency:	Ka6: 26.55 GHz Ka7: 27.35 GHz	Ka8: 29.05 GHz Ka9: 26.05 GHz	Ka10: 27.05 GHz Ka11: 28.55 GHz	
Phase Noise:	10 Hz 100 Hz 1 kHz 10 kHz 100 kHz 1 MHz	-57 / -47 -77 / -70 -90 / -83 -93 / -90 -103 / -95 -125 / -115	-57 / -47 -77 / -70 -90 / -83 -93 / -90 -103 / -95 -125 / -115	-57 / -47 -77 / -70 -90 / -83 -93 / -90 -103 / -95 -125 / -115
	typ. / max. values in dBc/Hz			
IF-Input Frequency:	Ka6: 950 ... 2150 MHz Ka7: 950 ... 2150 MHz	Ka8: 950 ... 1950 MHz Ka9: 950 ... 1950 MHz	Ka10: 950 ... 1950 MHz Ka11: 950 ... 1450 MHz	
Conversion Scheme:	Block up conversion, no frequency inversion			

Specifications continued next page



# L-Band Block Upconverter

Indoor / Outdoor

S-, C-, X-, Ku-, K- (DBS), Ka-band

Q/V-band available on request (contact factory)

Common Parameters		
<b>IF-Input Characteristics:</b>	Impedance: Return loss: Maximum aggregate input level: Connector:	50 Ω > 18 dB 0 dBm (damage Level) SMA female (standard) N female (standard with option OD)
<b>IF/RF-Monitor (Option):</b>	Signal level in ref. to in/output: Impedance: Connector:	-20 dB 50 Ω SMA female
<b>RF-Output Characteristics:</b>	Impedance: Return loss: 1 dB compression point: Output muting: Connectors:	50 Ω > 18 dB > 10 dBm <sup>1)</sup> > 75 dB (by command or sense input or by alarm condition) SMA female (standard) K female (2.92 mm) (-Ka standard) WR28 waveguide (-Ka with option WR28)
<b>LO Test Output (Option):</b>	Frequency: Signal level: Impedance: Connector:	LO Frequency standard (LO/2 Frequency on -Ka) -10 dBm ±3 dB 50 Ω SMA female
<b>Transfer Characteristics (standard):</b>	Max. conversion gain: Attenuation range:  Gain variation over temp.: Gain flatness over freq.: Gain flatness over 40 MHz: Image rejection: Noise figure:	35 dB ±1 dB 0 ... 20 dB, 0.1 dB steps 0 ... 19 dB, 1 dB steps (Option VSBxL)  ±0.5 dB max ±1.0 dB max. over band ±0.5 dB > 80 dB < 11 dB <sup>1)</sup> (on Ka < 15 dB <sup>1)</sup> )
<b>Transfer Characteristics with Gain Slope Equalizer: (Option EQ, only for VHBU, VSBU, VHBUR, VSBUR)</b>	Max. conversion gain: Attenuation range: Gain variation over Temp.: Gain flatness over Freq.: Gain flatness over 40 MHz: Gain equalization: Image rejection: Noise figure:	35 dB ±1 dB 0 ... 30 dB, 0.1 dB steps ±0.5 dB max ±1.0 dB max. over band ±0.5 dB +8.0 dB / GHz max., adjustable > 80 dB < 11 dB <sup>1)</sup> (on Ka < 15 dB <sup>1)</sup> )
<b>Group Delay:</b>	Ripple, Slope:	< 1 ns peak-peak / 80 MHz
<b>Spurious Outputs:</b>	Signal related: Output harmonics: Signal independent:	< -65 dBc (< -60 dBc for Ka-Band and BW > 800 MHz) <sup>1) 2)</sup> < -40 dBc <sup>1) 2)</sup> < -85 dBm (< -75 dBm on -Ka)
<b>Output Intercept Point 3<sup>rd</sup> Order:</b>	OIP3:	> 20 dBm <sup>1)</sup>
<b>Internal Frequency Stability:</b>	±1 x 10 <sup>-7</sup> , -30 °C ... 60 °C ±1 x 10 <sup>-8</sup> , -30 °C ... 60 °C (after 30 min warm up) ±1 x 10 <sup>-9</sup> per day (fixed temperature after 24 h warm up)	

<sup>1)</sup> at max. conversion gain

<sup>2)</sup> Pout = 0 dBm

Specifications are subject to change

These converter types are only a small selection of what is available. Please contact us for further frequency bands and features.

# L-Band Block Downconverter

Indoor / Outdoor

S-, C-, X-, Ku-, K- (DBS), Ka-band

Q/V-band available on request (contact factory)

These converter types are only a small selection of what is available. Please contact us for further frequency bands and features.

Downconverter Type:	VHBD- / VSBD- / VHBDR- / VSBDR-					
	C	C3	C-NI	X	Ku1, Ku2, Ku3, Ku4, Ku5, Ku6, Ku7	
RF-Input Frequency:	C-Band 3.40 ... 4.20 GHz	C-Band 5.85 ... 6.45 GHz	C-Band 3.40 ... 4.20 GHz	X-Band 7.25 ... 7.75 GHz	Ku-Band Ku1: 10.95 ... 11.70 GHz Ku2: 10.70 ... 11.70 GHz Ku3: 11.70 ... 12.75 GHz Ku4: 11.55 ... 12.75 GHz Ku5: 12.25 ... 12.75 GHz Ku6: 12.75 ... 13.75 GHz Ku7: 13.75 ... 14.50 GHz	
LO Frequency:	5.15 GHz	4.90 GHz	LO1: 10.0 GHz LO2: 7.55 GHz	6.30 GHz	Ku1: 10.00 GHz Ku2: 9.75 GHz Ku3: 10.75 GHz Ku4: 10.60 GHz Ku5: 11.30 GHz Ku6: 11.80 GHz Ku7: 12.80 GHz	
Phase Noise:	10 Hz 100 Hz 1 kHz 10 kHz 100 kHz 1 MHz	-70 / -60 -90 / -80 -100 / -90 -105 / -95 -110 / -100 -133 / -123	-70 / -60 -90 / -80 -100 / -90 -105 / -95 -110 / -100 -133 / -123	-65 / -55 -85 / -75 -95 / -85 -100 / -90 -103 / -93 -125 / -117	-68 / -58 -88 / -78 -98 / -88 -103 / -93 -106 / -96 -130 / -120	-65 / -55 <sup>1)</sup> -65 / -55 <sup>2)</sup> -85 / -75 <sup>1)</sup> -85 / -75 <sup>2)</sup> -95 / -85 <sup>1)</sup> -95 / -85 <sup>2)</sup> -100 / -90 <sup>1)</sup> 100 / -90 <sup>2)</sup> -103 / -93 <sup>1)</sup> -123 / -113 <sup>2)</sup> -127 / -117 <sup>1)</sup> -140 / -130 <sup>2)</sup>
	typ. / max. values in dBc/Hz <sup>1)</sup> standard values <sup>2)</sup> values with low phase noise option LPN					
IF-Output Frequency:	950 ... 1750 MHz	950 ... 1550 MHz	950 ... 1750 MHz	950 ... 1450 MHz	Ku1: 950 ... 1700 MHz Ku2: 950 ... 1950 MHz Ku3: 950 ... 2000 MHz Ku4: 950 ... 2150 MHz Ku5: 950 ... 1450 MHz Ku6: 950 ... 1950 MHz Ku7: 950 ... 1700 MHz	
Conversion Scheme:	frequency inversion	no frequency inversion				

Downconverter Type:	VHBD- / VSBD- / VHBDR- / VSBDR-				
	Ku2Ku3	Ka2, Ka3, Ka5, Ka7	Ka8, Ka9, Ka10, Ka11	Ka4	
RF-Input Frequency:	Ku-Band Ku2: 10.70 ... 11.70 GHz Ku3: 11.70 ... 12.75 GHz (switchable)	Ka-Band Ka2: 18.30 ... 19.30 GHz Ka3: 18.20 ... 19.30 GHz Ka5: 19.20 ... 20.30 GHz Ka7: 20.20 ... 21.30 GHz	Ka-Band Ka8: 18.60 ... 19.70 GHz Ka9: 21.20 ... 22.20 GHz Ka10: 18.25 ... 19.45 GHz Ka11: 17.20 ... 18.30 GHz	Ka-Band 28.50 ... 29.10 GHz	
LO Frequency:	Ku2: 9.75 GHz Ku3: 10.75 GHz	Ka2: 17.35 GHz Ka3: 17.25 GHz Ka5: 18.25 GHz Ka7: 19.25 GHz	Ka8: 17.65 GHz Ka9: 20.25 GHz Ka10: 17.30 GHz Ka11: 16.25 GHz	27.55 GHz	
Phase Noise:	10 Hz 100 Hz 1 kHz 10 kHz 100 kHz 1 MHz	-60 / -50 -80 / -72 -93 / -85 -97 / -93 -107 / -100 -127 / -120	-60 / -50 -80 / -72 -93 / -85 -97 / -93 -107 / -100 -127 / -120	-60 / -50 -80 / -72 -93 / -85 -97 / -93 -107 / -100 -127 / -120	-57 / -47 -77 / -70 -90 / -83 -93 / -90 -103 / -95 -125 / -115
	typ. / max. values in dBc/Hz <sup>1)</sup> standard values <sup>2)</sup> values with low phase noise option LPN				
IF-Output Frequency:	Ku2: 950 ... 1950 MHz Ku3: 950 ... 2000 MHz	Ka2: 950 ... 1950 MHz Ka3: 950 ... 2050 MHz Ka5: 950 ... 2050 MHz Ka7: 950 ... 2050 MHz	Ka8: 950 ... 2050 MHz Ka9: 950 ... 1950 MHz Ka10: 950 ... 2150 MHz Ka11: 950 ... 2050 MHz	950...1550 MHz	
Conversion Scheme:	no frequency inversion				

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# L-Band Block Downconverter

Indoor / Outdoor

S-, C-, X-, Ku-, K- (DBS), Ka-band

Q/V-band available on request (contact factory)

Common Parameters	
<b>RF-Input Characteristics:</b>	Impedance: 50 Ω Return loss: > 18 dB Maximum aggregate input level: 0 dBm (damage level) LO leakage: < -80 dBm RF-connector: SMA female (standard) K female (2.92 mm) (-Ka standard) WR28 waveguide (-Ka with option WR28)
<b>IF/RF-Monitor (Option):</b>	Signal level in reference to input: -20 dB Impedance: 50 Ω Connector: SMA female
<b>IF-Output Characteristics:</b>	Impedance: 50 Ω Return Loss: > 18 dB 1 dB Compression Point: > 17 dBm <sup>1)</sup> IF-Connectors: SMA female (standard) N female (standard with option OD)
<b>LO Test Output (Option):</b>	Frequency: LO Frequency standard (LO/2 Frequency on -Ka) Signal level: -10 dBm ±3 dB Impedance: 50 Ω Connector: SMA female
<b>Transfer Characteristics (standard):</b>	Max. conversion gain: 35 dB ±1 dB Attenuation range: 0 ... 20 dB, 0.1 dB steps 0 ... 19 dB, 1 dB steps (Option VSBDL) Gain Variation over Temp.: ±0.5 dB Gain Flatness over Freq.: ±1.0 dB max. over band Gain Flatness over 40 MHz: ±0.5 dB Image Rejection: > 80 dB Noise Figure: < 11 dB <sup>1)</sup> (-on Ka <15 dB <sup>1)</sup> )
<b>Transfer Characteristics with Gain Slope Equalizer: (Option EQ, only for VHBD, VSBD, VHBD, VSBD)</b>	Max conversion gain: 35 dB ±1 dB Attenuation range: 0 ... 30 dB, 0.1 dB steps Gain Variation over Temp.: ±0.5 dB Gain Flatness over Freq.: ±1.0 dB max. over band Gain Flatness over 40 MHz: ±0.5 dB Gain Equalization: +8.0 dB / GHz max. adjustable Image Rejection: > 80 dB Noise Figure: < 11 dB <sup>1)</sup> (-on Ka <15 dB <sup>1)</sup> )
<b>Group Delay:</b>	Ripple, Slope: < 1 ns peak-peak / 80 MHz
<b>Spurious Outputs:</b>	Signal related: < -65 dBc (-on C-Band <-60 dBc) <sup>1) 2)</sup> Output harmonics: < -40 dBc <sup>1) 2)</sup> Signal independent: < -75 dBm
<b>Output Intercept Point 3<sup>rd</sup> Order:</b>	OIP3: > 30 dBm <sup>1)</sup>
<b>Internal frequency Stability:</b>	±1 x 10 <sup>-7</sup> , -30 °C ... 60 °C ±1 x 10 <sup>-8</sup> , -30 °C ... 60 °C (after 30 min warm up) ±1 x 10 <sup>-9</sup> per day (fixed temperature after 24 h warm up)

<sup>1)</sup> at max. conversion gain

<sup>2)</sup> Pout = 0 dBm

Specifications are subject to change

These converter types are only a small selection of what is available. Please contact us for further frequency bands and features.

# L-Band Block Up- and Downconverter

Indoor / Outdoor

Single / Dual / Triple Band

Single / Dual Channel

Q/V-band available on request (contact factory)

## Indoor Housing:

<b>Reference Input:</b>	Frequency: 5 or 10 MHz sine wave Level: 5 dBm ±5 dB Modes: auto/extern/intern Connector: BNC female
<b>Reference Output:</b>	Frequency: 10 MHz Level: 0 dBm ±3 dB Connector: BNC female
<b>Monitoring and Control Interface:</b>	Protocol: SNMP Connection: UDP over Ethernet (10 or 100 Mbps, auto sensing), connector RJ-45
	Protocol: HTTP (web browser interface) Connection: TCP/IP over Ethernet (10 or 100 Mbps, auto sensing), connector RJ-45
	Protocol: Multipoint packet format commands Connection: RS232 or RS422/RS485 (configurable), connector DSUB09 female or TCP/IP over Ethernet (10 or 100 Mbps, auto sensing), connector RJ-45
<b>Alarm Interface:</b>	Alarm: two potential free contacts (DPDT), Connector DSUB09 female
<b>Temperature Range:</b>	Standard performance: 0 °C ... 50 °C operating, -30 °C ... 80 °C storage High performance: -30 °C ... 60 °C operating (10 minutes warm up at -30 °C)
<b>Relative Humidity:</b>	< 95 % non condensing
<b>User Interface (VSBU/VSD only):</b>	LCD-Display 2 x 40 characters, 4 cursor keys, 4 function keys VFD-Display 2 x 40 characters, 4 cursor keys, 4 function keys (with option VFD)
<b>Mains Power Input:</b>	100 ... 240 V AC nominal, 90 ... 264 V AC max., 50 ... 60 Hz
<b>Mains Power Consumption:</b>	Max.: 35 VA / 20 W
<b>Mains Power Input Connector:</b>	IEC C14
<b>Mains Fuse:</b>	2 x 2 A time-lag fuse
<b>Dimension and Weight:</b>	483 x 44 x 270 mm <sup>3</sup> (WxHxD), 1 RU (19"), approx. 6 kg

## Outdoor Housing:

<b>Reference Input (Option):</b>	Frequency: 5 or 10 MHz sine wave Level: 5 dBm ±5 dB Modes: auto/extern/intern Connector: SMA female
<b>Reference Output (Option):</b>	Frequency: 10 MHz Level: 0 dBm ±3 dB Connector: SMA female
<b>Combined Monitoring and Control Interface and Alarm Interface:</b>	Protocol: Multipoint packet format commands Connection: RS232 or RS422/RS485 (configurable), connector MIL-C-26482: MS 3120 E 14-19-S
	Alarm output: Two potential free contacts (DPDT) 24 V DC output: max. 0.3 A 6.5 V DC output: max. 0.2 A Connection type: MIL-C-26482: MS 3120 E 14-19-S Mute Input: TTL logic input with internal pull up
<b>Monitoring and Control Interface:</b>	Protocol: SNMP Connection: UDP over Ethernet (10 or 100 Mbps, auto sensing), connector RJ-45
	Protocol: HTTP (web browser interface) Connection: TCP/IP over Ethernet (10 or 100 Mbps, auto sensing), connector RJ-45
	Protocol: Multipoint packet format commands Connection: TCP/IP over Ethernet (10 or 100 Mbps, auto sensing), connector RJ-45
<b>Temperature Range:</b>	-30 °C ... 60 °C operating (10 minutes warm up at -30 °C)
<b>Relative Humidity:</b>	< 100 %
<b>Mains Power Input:</b>	100 ... 240 V AC nominal, 90 ... 264 V AC max., 50 ... 60 Hz
<b>Mains Power Consumption:</b>	Max.: 35 VA / 20 W
<b>Mains Power Input Connector:</b>	Amphenol C16-1 (3+PE) male
<b>Mains Fuse:</b>	2 x 2 A time-lag fuse
<b>Dimensions:</b>	322 x 108 x 391 mm <sup>3</sup> (WxHxD) (small housing) (standard) 402 x 111 x 391 mm <sup>3</sup> (WxHxD) (large housing) 412 x 74 x 515 mm <sup>3</sup> (WxHxD) (XL housing)
<b>Degree of Protection:</b>	IP 67 (acc. IEC 529)

Specifications are subject to change