

HC990EXF



Embedded Multi-Constellation Full-Band Antenna

Frequency Coverage: GPS L1, L2, L5 | QZSS L6 | GALILEO E1, E5a, E5b, E6 | BEIDOU B1, B2a, B2b, B3 | GLONASS G1, G2, G3 | NavIC L5 + L-Band

The patented HC990EXF eXtended-filter embedded low-profile helical antenna is designed for precision positioning, covering the GPS/QZSS-L1/L2/L5, QZSS-L6, GLONASS-G1/G2/G3, Galileo-E1/E5a/E5b/E6, BeiDou-B1/B2/B2a/B3, and NavIC-L5 frequency bands, including the satellite-based augmentation system (SBAS) available in the region of operation [WAAS (North America), EGNOS (Europe), MSAS (Japan), or GAGAN (India)], as well as L-band correction services.

The patent-pending HC990EXF utilizes Calian's latest wideband helical element design. The antenna element provides 67 MHz of signal bandwidth supporting the entire upper GNSS band and L-Band corrections (1539 - 1606 MHz) and 136 MHz of the lower band signal bandwidth (1164 - 1300 MHz). The other key component of the antenna is the axial ratio, which is a measure of how well the antenna captures the broadcast Right Hand Circular Polarized (RHCP) signal and mitigates the reflected LHCP signals. The Tallysman HC990EXF has a high peak gain of 2.5 dBi and 0.5 dB axial ratio at zenith, enabling excellent multipath mitigation and a very precise phase centre.

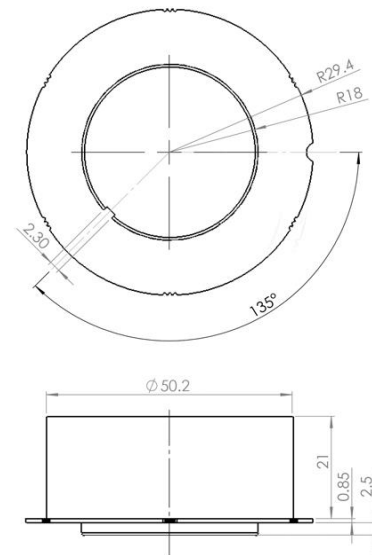
Weighing only 11 g, the light and compact HC990E features a precision-tuned helix element that provides excellent axial ratios and operates without the requirement of a ground plane, making it ideal for a wide variety of applications, including unmanned aerial vehicles (UAVs).

The HC990EXF antenna supports Calian's eXtended Filtering (XF) technology. Worldwide the radio frequency spectrum has become congested as many new LTE bands have been activated, and their signals or harmonic frequencies can affect GNSS antennas and receivers. In North America, the planned Ligado service, which will broadcast in the frequency range of 1526 to 1536 MHz, can affect GNSS signals. Similarly, new LTE signals in Europe [Band 32 (1452 - 1496 MHz)] and Japan [Bands 11 and 21 (1476 - 1511 MHz)] have also affected GNSS signals. Calian's XF technology mitigates all these signals.

The HC990EXF must be installed carefully, as ground planes below the antenna can affect its tuning. To facilitate a successful installation and optimum antenna performance, Tallysman also provides an Embedded Helical Antenna Installation Guide. Mounting instructions available on our product page.



Mechanical Drawing



Applications

- Autonomous unmanned aerial vehicles (UAVs)
- Precision GNSS positioning
- Precision land survey positioning
- Mission-critical GNSS timing
- Marine and avionics systems

Features

- Very low noise preamp (2.5 dB typ.)
- Axial ratio (≤ 0.5 dB at zenith)
- LNA gain (28 dB typ., 35 dB typ.)
- Low current (26 mA typ., 32 mA typ.)
- ESD circuit protection (15 kV)
- Invariant performance from 2.5 to 16 VDC
- REACH, and RoHS compliant

Benefits

- Extremely light (11 g)
- Excellent RH circular polarized signal reception
- Great multipath rejection
- Increased system accuracy
- Excellent signal-to-noise ratio
- Industrial temperature range

About Calian: With global headquarters and manufacturing in Ottawa, Canada, Calian is a leading manufacturer of high-precision antennas and components for Global Navigation Satellite System (GNSS) applications. Calian's mission is to support the needs of a new generation of positioning systems by delivering unprecedented antenna precision at competitive prices. Learn more at www.calian.com

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Antenna

Technology Full-spectrum, RHCP quadrifilar helix

		Gain dBic typ. at Zenith	Axial Ratio dB at Zenith
GNSS			
GPS / QZSS	L1	2.0	≤ 0.5
	L2	2.2	≤ 0.5
	L5	2.2	≤ 0.5
GLONASS	G1	1.8	≤ 0.5
	G2	2.1	≤ 0.5
	G3	2.2	≤ 0.5
Galileo	E1	2.0	≤ 0.5
	E5A	2.2	≤ 0.5
	E5B	2.3	≤ 0.5
	E6	2.0	≤ 0.5
BeiDou	B1	2.0	≤ 0.5
	B2b	2.3	≤ 0.5
	B2a	2.2	≤ 0.5
	B3	2.2	≤ 0.5
IRNSS / NavIC	L5	2.2	≤ 0.5
QZSS	L6	2.0	≤ 0.5
L-Band Services		2.0	≤ 0.5
Satellite Communications			
Iridium		-	-
Globalstar		-	-
Other			
Axial Ratio at 10°	-	Efficiency	-
PC Variation	± 3.0 mm (all freq.)	PCO (z-axis, mm)	-

Mechanicals

Mechanical Size	60.0 mm (dia.) x 25.0 mm (h.)
Weight	11 g
Radome	-
Mount	Helical mounting ring P/N #
Available Connectors	Please refer to ordering guide

Environmental

Operating Temperature	-40 °C to + 85 °C
Storage Temperature	-55 °C to +95 °C
Vibration	MIL-STD-810-G - Test Method 514.6
Shock	-
Salt Fog	-
IP Rating	-
Compliance	IPC-A-610, FCC, RED / CE Mark, RoHS, REACH

Warranty:

Parts and Labour	1-year standard warranty
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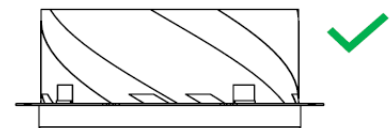
Low Noise Amplifier (LNA) - Measured at 3V and 25°C

Frequency Bandwidth		Out of Band Rejection
Lower Band	1164 - 1300 MHz	≥ 85 dB @ ≤ 0950 MHz ≥ 70 dB @ ≤ 1125 MHz ≥ 75 dB @ ≥ 1350 MHz
L-Band Corr.	1539 - 1559 MHz	≥ 65 dB @ ≤ 1500 MHz ≥ 45 dB @ ≤ 1525 MHz ≥ 05 dB @ ≤ 1536 MHz
Upper Band	1559 - 1606 MHz	≥ 30 dB @ ≥ 1626 MHz ≥ 65 dB @ ≥ 1650 MHz

Architecture	eXtended Filtering
Gain	28 dB typ., 35 dB typ.
Noise Figure	2.5 dB typ.
VSWR	< 1.5:1 typ., 2:1 max.
Supply Voltage Range	2.5 to 16 VDC nominal, up to 50mV p-p ripple
Supply Current	26 mA typ. (28 dB), 32 mA typ. (35 dB)
ESD Circuit Protection	15 kV air discharge
P 1dB Output	11 dBm typ.
Group Delay	20 ns (L1), 3 ns (L2), 31 ns (L5), 48 ns (L5)

Installation Guidelines

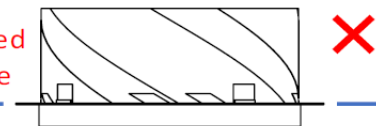
PROPER INSTALLATION



No metallic ground plane or PCB

IMPROPER INSTALLATION

(1) Antenna embedded in Metallic surface



OR

(2) Antenna sitting on metallic ground plane or PCB

Ordering Information

Part Number 33-HC990EXF-GG-xx-yyyy

where GG = gain (28 or 35 dB); xx = connector type;
yyyy = cable length in mm

Please refer to our **Ordering Guide** to review available radomes and connectors at:
<https://www.tallysman.com/resource/tallysman-ordering-guide/>