HC990E

Preliminary

TALLYSMAN®
A CALIAN® COMPANY

HC990E Embedded Full GNSS Helical Antenna + L-Band

Frequency Coverage: GPS/QZSS-L1/L2/L5, QZSS-L6, GLONASS-G1/G2/G3, Galileo-E1/E5a/E5b/E6, BeiDou-B1/B2/B2a/B3, NavIC-L5 + L-Band correction services

The HC990E embedded 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 HC990E utilizes Tallysman's latest wideband helical element design. The antenna element provides 70 MHz of signal bandwidth supporting the entire upper GNSS band and L-Band corrections (1536 - 1606 MHz) and 136 MHz of the lower band signal bandwidth (1164 - 1300 MHz). Strong full-band antenna element support is only one aspect of a precision GNSS antenna. The other key component 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 HC990E has a high peak gain of 3dBi, full bandwidth and the 0.5 dB axial ratio at zenith mitigating multipath, and enables the antenna to provide a precise phase center.

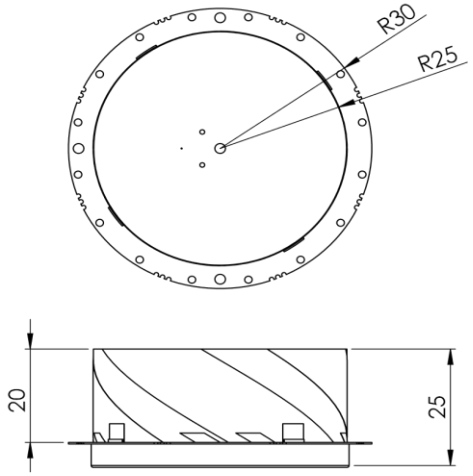
Weighing only 12 g, the light and compact HC990E features a precision-tuned helix element that provides excellent axial ratios and operates without the requirement of a ground plane, making it ideal for a wide variety of applications, including unmanned aerial vehicles (UAVs).

The HC990E features an industry-leading low current, low-noise amplifier (LNA) that includes an integrated low-loss pre-filter to prevent harmonic interference from high-amplitude signals, such as 700 MHz band LTE and other near-band cellular signals.

Care must be taken in installing the HC990E 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.

For mounting instructions, visit:
https://www.tallysman.com/downloads/Helical_Mounting_Instruction.pdf

Mechanical Drawing



Applications

- Autonomous unmanned aerial vehicles (UAVs)
- Precision GNSS positioning
- Precision land survey positioning
- Mission-critical GNSS timing
- Network timing and synchronization
- Sea and land container tracking
- Fleet management and asset tracking
- Marine and avionics systems
- Law enforcement and public safety

Features

- Very low noise preamp (2.2 dB typ.)
- Axial ratio (≤ 0.5 dB at zenith)
- High LNA gain (35 dB typ.)
- Low current (35 mA typ.)
- ESD circuit protection (15 kV)
- Invariant performance from 2.2 to 16 VDC
- REACH, and RoHS compliant

Benefits

- Extremely light (12 g)
- Excellent RH circular polarized signal reception
- Great multipath rejection
- Increased system accuracy
- Excellent signal-to-noise ratio
- Industrial temperature range

About Tallysman: With global headquarters and manufacturing in Ottawa, Canada, Tallysman is a leading manufacturer of high-precision antennas and components for Global Navigation Satellite System (GNSS) applications. Tallysman'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.tallysman.com**

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Revision: 1.0

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Antenna

Technology Full-spectrum, RHCP quadrifilar helix

		Gain	Axial Ratio
		dBic typ. at Zenith	dB at Zenith
GNSS			
GPS / QZSS	L1		≤ 0.5
	L2	2.1	≤ 0.5
	L5	1.6	≤ 0.5
GLONASS	G1	2.3	≤ 0.5
	G2	2.0	≤ 0.5
	G3	2.4	≤ 0.5
Galileo	E1	2.5	≤ 0.5
	E5a	1.6	≤ 0.5
	E5b	2.4	≤ 0.5
	E6	2.0	≤ 0.5
BeiDou	B1	2.5	≤ 0.5
	B2	2.4	≤ 0.5
	B2a	1.6	≤ 0.5
	B3	2.2	≤ 0.5
IRNSS / NavIC	L5	1.6	≤ 0.5
QZSS	L6	2.0	≤ 0.5
L-band correction services		2.7	≤ 0.5
Satellite Communications			
Iridium		-	-
Globalstar		-	-
Phase Centre			
Phase Centre Variation (PCV)		TBD	
Phase Centre Offset (PCO)		TBD	

Mechanicals

Mechanical Size	60.0 mm (dia.) x 26.0 mm (h.)
Weight	12 g
Available Connectors	Flying Lead (UFL)
Radome / Enclosure	-
Mount	Helical mounting ring P/N #

Environmental

Operating Temperature	-45 °C to +85 °C
Storage Temperature	-55 °C to +95 °C
Random Vibration	-
Shock and Drop	-
Salt Fog	-
IP Rating (housing)	n/a
Compliance	IPC-A-610, FCC, RED / CE Mark, RoHS, REACH

Warranty:

Parts and Labour	1-year standard warranty

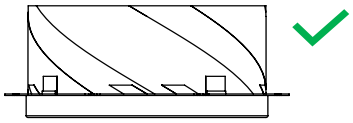
Low Noise Amplifier (LNA) - Measured at 3.0 VDC and 25°C

Frequency Bandwith		Out-of-Band Rejection
Lower Band	1160 - 1300 MHz	≥ 85 dB @ ≤ 0950 MHz ≥ 70 dB @ ≤ 1125 MHz ≥ 75 dB @ ≥ 1350 MHz
L-band corrections services	1539 - 1559 MHz	≥ 65 dB @ ≤ 1500 MHz ≥ 45 dB @ ≤ 1525 MHz ≥ 05 dB @ ≤ 1536 MHz ≥ 30 dB @ ≥ 1626 MHz ≥ 65 dB @ ≥ 1650 MHz
Upper Band	1559 - 1606 MHz	

Architecture	Pre-filter → LNA
Gain	35 dB typ.
Noise Figure	2.0 dB typ.
VSWR	< 1.5:1 typ. | 1.8:1 max.
Supply Voltage Range	2.2 to 16 VDC
Supply Current	36 mA typ.
ESD Circuit Protection	15 kV air discharge
P 1dB Output	TBD
Group Delay Variation	TBD

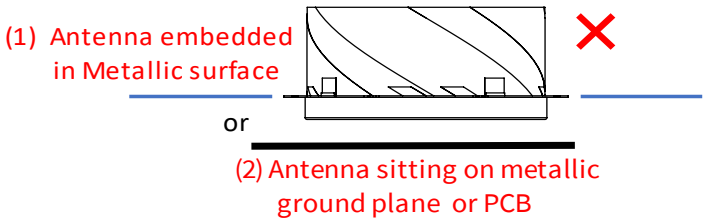
Installation Instructions

PROPER INSTALLATION



No metallic ground plane or PCB

IMPROPER INSTALLATION



Ordering Information

Part Number **33-HC990E**

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