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TW5365 Installation Manual

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1 Introduction

The TW5365 is a multi-constellation GNSS Receiver/Antenna fused with inertial sensor data. It is an easy-to-use tracking solution that enables high performance positioning in places where GNSS signals are poor or not available.

The TW5365 incorporates a latest generation GNSS receiver that supports simultaneous GPS/GLONASS/Galileo reception and the Tallysman Accutenna™ patch antenna. This dual feed antenna greatly improves rejection of multi-path signal interference, making it the most precise antenna for tracking in dense urban environments.

The TW5365 Untethered Dead Reckoning (UDR) technology provides continuous navigation without requiring speed information from the vehicle. This innovative technology brings the benefits of dead reckoning to installations previously restricted to using GNSS alone, significantly reducing the cost of installation for Dead Reckoning applications.

The strength of UDR is particularly apparent under poor signal conditions, where it brings continuous positioning in urban environments, even to devices with antennas installed within the vehicle. Useful positioning performance is also available during complete signal loss, for example in parking garages or short tunnels. UDR positioning starts as soon as the ignition signal is applied and before the first GNSS fix is available.

The TW5365 may be installed in any position in a vehicle without electrical connection to the vehicle speed sensor. The on-board accelerometer and gyroscope sensors result in a self-contained UDR which is self calibrating and provides reliable and consistent navigation.



Figure 1 TW5365 Hardware

2 Regulatory Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that the device does not cause harmful interference. This device may only be used if operated or installed in a transportation vehicle including motor vehicles and aircraft, all other modes of use are prohibited. When used in a transportation vehicle it is exempt under FCC Part 15 Subpart B and ICES-003 from radiated and conducted emission test requirements.

3 Equipment Installation and Operation



3.1 Information regarding installation

Tallymatics provides wiring instructions to electrically connect the TW5365 device to the vehicle battery in a manner consistent with industry best practices.

Improper installation of aftermarket electronics within a vehicle can negatively impact the safety and security of the Driver (and Passengers) and could result in serious injury or death in the event of a collision. Selection of appropriate installation hardware and mounting location within the vehicle remain the exclusive responsibility of the Fleet Operator.

Standard industry recommendations for installation and use of aftermarket electronics within a vehicle include:

1. Do not install device in a location that could interfere with or negatively impact:
 - a. Driver's field of view
 - b. Operation of steering wheel
 - c. Operation of foot pedals, transmission levers
 - d. Deployment of Airbags
2. Please ensure that you are fully aware of the rules and regulations governing the use of aftermarket electronics within a vehicle in your operational jurisdiction or service area.
3. Ensure that you are up to date on any supplemental vehicle manufacturer installation notes for aftermarket equipment.

	Placement of components shall not impede driver visibility nor render the vehicle unsafe to operate.
	Ensure equipment placements and cable/wire routes do not impede vehicle air bag deployment.

3.2 Installation Considerations

The TW5365 is mounted using the integrated fixed mount feature. For optimal performance, the device should be securely mounted to the surface of a large ground plane when possible. Please note that the TW5365 GNSS receivers contain multi-axis inertial sensors which perform an auto calibration post installation. The antenna may be installed in any reasonable orientation which allows optimal GNSS performance and should maintain this fixed orientation during operation to allow the inertial sensors to maintain their calibration and superior augmentation performance. A device loosely fitted to the vehicle structure will degrade the receiver UDR performance.

The TW5365 has a 5-meter cable terminated with an RJ45 connector. Adaptor cables are available to interface to a PC and a variety of mobile radio devices. Please contact Tallymatics for details.

3.3 Operational Considerations

For optimal operating performance the TW5365 has been designed with the expectation that persisted power will be applied to the PWR input signal and the IGN/ENA input signal will be used to control the ON/OFF operational state. The continuous presence of the main voltage supply is used maintain the GNSS Almanac/Ephemeris data offering a hot start capability and the persisted UDR calibration allowing immediate navigation correction assistance.

The TW5365 has been designed with a wide input voltage operating range to offer maximum system integration flexibility. Should a direct connection to the vehicle power system be considered, additional fuse protection may be required at the power system connection points.

3.4 RJ45 Cable Connector

The smart antenna cable is terminated with an 8 position RJ45 signal connector which provides the following signals:

PIN	Description	Notes	Color
1	IGN/ENA	ON(>5V) / OFF(<4V)	White/Green
2	TIMEPULSE	RS-232	Green
3	TXB	RS-422	White/Orange
4	RXA	RS-422	Blue
5	RXB	RS-422	White/Blue
6	TXA	RS-422	Orange
7	GND	GND	White/Brown
8	PWR	(5-36 VDC)	Brown

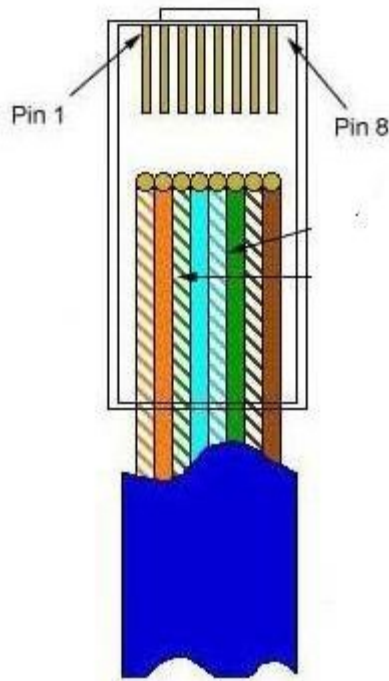


Figure 2 RJ45 - I/O Connector (looking onto the connector contacts)

3.5 Device Communication

The TW5365 smart antenna has been factory configured for out of the box operation. When the device is powered and enabled, NMEA messaging will be active immediately on the RS-232 TX signal pin.

A device with factory default will be configured as: **9600,8,N,1**
(A custom configuration may have another BAUD rates applied.)

3.6 NMEA Messages

The TW5365 has the following NMEA messages active by default:

GNRMC
GNVTG
GNGGA
GNGSA
GPGSV
GLGSV
GAGSV
GNLL

(A custom configuration may have other messages active.)

3.7 TW5365 Configured Settings

The TW5365 has been configured with the following specific settings set:

- NMEA Version -> 4.1 (Required to support Galileo Constellation)
- GNSS Configuration
 - GPS
 - GALILEO
 - GLONASS
- Navigation Dynamic Model -> Automotive

3.8 Inertial Calibration Status

Before UDR corrections can be applied to provide course correction the inertial sensors must be calibrated. This calibration process is automatic following each cold start device activation. This requires a combination of vehicle start/stops in combination with right/left turn events. The process is typically completed within 3-4 minutes of operating the vehicle in typical driving conditions providing the minimum quantity of each event type has been acquired.

Note: The current state of the TW5365 sensor calibration may be polled using the ESF/STATUS message via the u-center development tool or directly from an embedded vehicle computing system. Please refer to section **32.11.4.1 External Sensor Fusion (ESF) status information** contained in the u-blox8-M8_ReceiverDescrProtSpec for more details.

3.9 Flash Configuration

The TW5365 contains flash storage memory for persisting customized configuration settings. Please contact Tallymatics for assistance regarding custom configuration requirements.

Please note that attempting to store invalid configuration settings could render the TW5365 unresponsive and non-operational.

4 TW5365 Mechanical

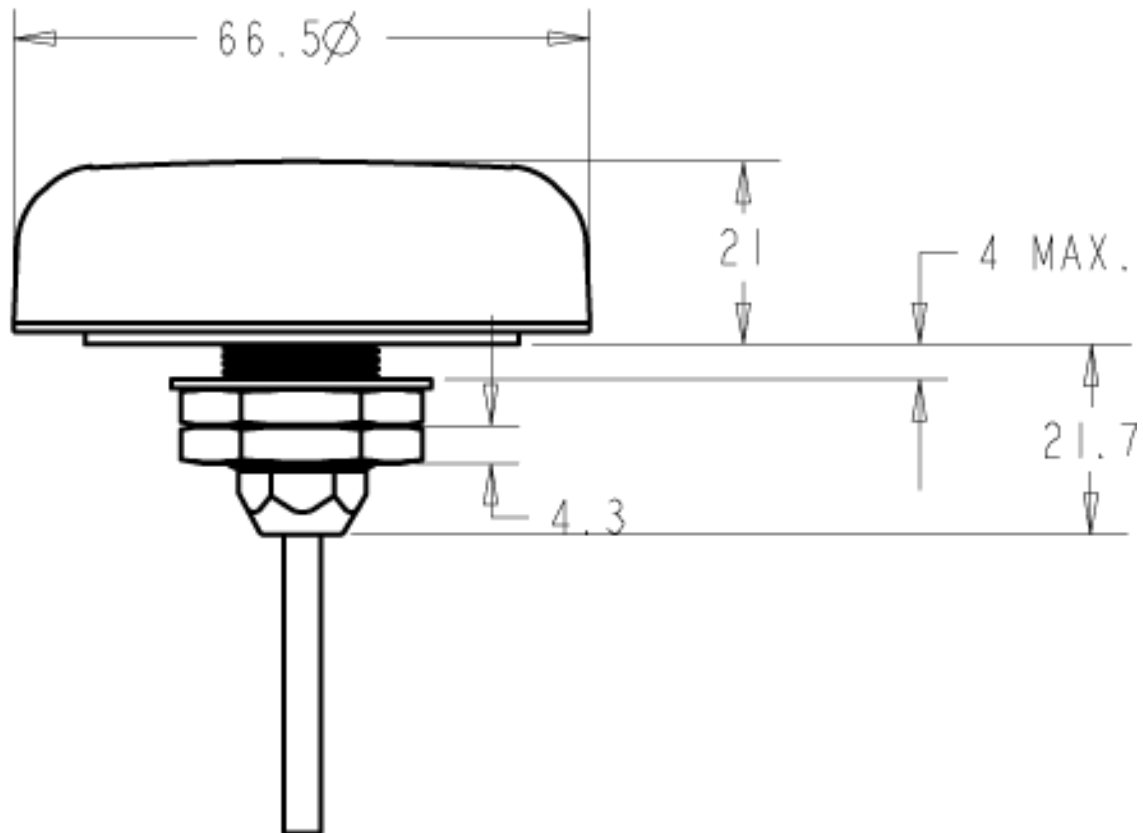


Figure 3 Mechanical dimensions of the TW5365