

Maritime Capsat[®] Antenna

TT-3005M

Installation Manual

Thrane & Thrane

Maritime Capsat[®] Antenna

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Safety Summary

The following general safety precautions must be observed during all phases of operation, service and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture and intended use of the equipment. Thrane & Thrane A/S assume no liability for the customer's failure to comply with these requirements.

GROUND THE EQUIPMENT

To minimise shock hazard, the equipment chassis and cabinet must be connected to an electrical ground

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE

Do not operate the equipment in the presence of flammable gases or fumes. Operation of any electrical equipment in such an environment constitutes a definite safety hazard.

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must not remove equipment covers. Component replacement and internal adjustment must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

DO NOT SERVICE OR ADJUST ALONE

Do not attempt internal service or adjustments unless another person, capable of rendering first aid resuscitation, is present.

DO NOT SUBSTITUTE PARTS OR MODIFY EQUIPMENT

Because of the danger of introducing additional hazards, do not substitute parts or perform any unauthorized modification to the equipment.

SAFETY DISTANCE FOR THE ANTENNA UNIT

Minimum safety distance of 2 feet (61 cm) from the Antenna.

Radiated intensity at 0.56m is 10 W/m²

Radiated intensity at 0.36m is 25 W/m²

Radiated intensity at 0.18m is 100 W/m²

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1 Introduction

This manual provides instructions for installing a TT-3005M Maritime Antenna.



Figure 1.1 TT-3005 Maritime Capsat Antenna

1.1 Initial inspection

Inspect the shipping carton immediately upon receipt for evidence of mishandling during the transit. If the shipping carton is severely damaged or water stained, request that the carrier's agent be present when opening the carton. Save the carton packing material for future use.

If there is mechanical damage or defect, or if the TT-3005M Capsat Antenna does not work properly, notify your dealer.

After you unpack the TT-3005M Capsat Antenna, inspect it thoroughly for hidden damage and loose components or fittings.

1.2 Storage

The TT-3005M may be stored or shipped in temperatures within the limit -40°C to 80°C . It is advisable to protect the TT-3005M from extreme temperature variation, which can cause excessive condensation. It is recommended that the TT-3005M is unpacked immediately on delivery.

1.3 Repackaging for shipment

The shipping carton for the TT-3005M has been carefully designed to protect the antenna during shipment. This carton and its associated packing material should be used when repackaging for shipment. Attach a tag indicating the type of service required, return address, model number and full serial number. Mark the carton FRAGILE to ensure careful handling.

If the original shipping carton is not available, the following general instructions should be used for repackaging with commercially available material.

1. Wrap the TT-3005M in heavy paper or plastic. Attach a tag indicating the type of service required, return address, serial number and model number.
2. Use a strong shipping container, e.g. a double walled carton of 160 kg test material.
3. Insert a 7 cm to 10 cm layer of shock absorbing material between all surfaces of the equipment and the sides of the container.

4. Seal the shipping container securely.
5. Mark the shipping container **FRAGILE** to ensure careful handling.

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2 Description

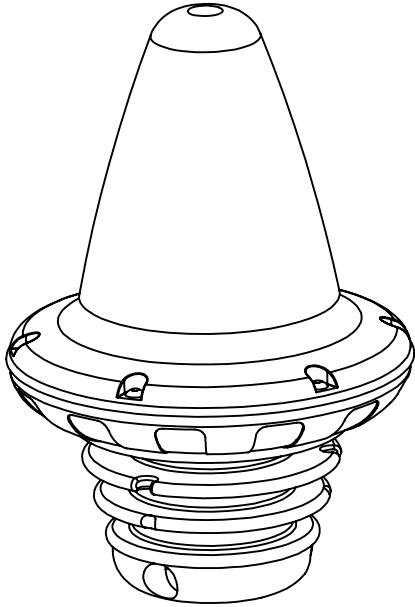


Figure 2.1 TT-3005M Maritime Antenna

The TT-3005M is an omni-directional antenna with built-in LNA/HPA electronics designed to operate on vessels. The antenna housing is sealed and contains no user serviceable parts.

The antenna is very compact and is designed to operate in a corrosive environment and in extreme weather conditions without any service. It has a modular construction that allows easy exchange of antenna elements.

Description

The antenna is designed to work with the Capsat transceivers TT-3020C, TT-3022D and TT-3022C.

The TT-3005M antenna is in compliance with the Inmarsat-C specifications, and can also receive GPS signals while not transmitting. This antenna can handle 32 Kbytes transmission length and up to 100 meter coax cable.

The TT-3005M antenna is designed to operate when the satellite is visible over the horizon and no signal path blockage is present.

The TT-3005M antenna is equipped with a TNC female connector and with 1" tube mounting. Please see section 3.3.

Description

TT-3005M Maritime Antenna	Inmarsat-C/GPS omnidirectional antenna, RHC polarised. G/T: -23 dB/K at 5° elevation EIRP: 14 dBW ± 2dB at 5° elevation. Temperature: -35°C to 55°C operating, -40°C to 80°C storage. Dimensions (H x D): 178 mm x 122 mm. Weight: 0.90 kg.
Maximum transmission length	Max. 32Kbyte.
Solar Radiation	Max. flux density 1200W/m2.
Relative Humidity	95% non-condensing at 40°C.
Precipitation	Up to 100 mm/hour, droplet size 0.5 to 4.5 mm
Ice	Up to 25 mm.
Wind	Up to 200 km/hour.
Vibration Operational	Random 5-20 Hz: 0.005 g ² /Hz 20-150 Hz: -3dB/oct. (0.5g RMS).
Vibration Survival	Random 5-20 Hz: 0.05 g ² /Hz 20-150 Hz: -3dB/oct. (1.7g RMS).
Shock	Half sine 20g/11ms
Antenna Mounting	1" tube mounting
Transceiver coax cable	0.7Ohm max DC resistance (shield + inner conductor) 17dB max RF insertion loss at 1.6GHz. 100 meter max cable length. TNC connectors.

Table 2.1 TT-3005M technical specifications.

Description

2.1 Safety Distance for Antenna Unit

The safety levels for the Thrane & Thrane INMARSAT-C Antenna Units are based on the ANSI standard C95.1-1982 "American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz"

This standard recommends the maximum power density at 1.6 GHz exposed to human beings not to exceed 5 mW/cm².

At the maximum radiated output power from the INMARSAT-C Antenna (16 dBW EIRP) this corresponds to a minimum safety distance of 30 cm.

In the standards from the European Telecommunication Standard Institute (ETSI) concerning 1.5/1.6 GHz Satellite Earth Stations the recommendation will be maximum 8W/m² (0.8 mW/cm²). This tighter recommendation corresponds to a minimum safety distance of 60 cm at 16 dBW.

To be sure that this distance is respected the Thrane & Thrane INMARSAT-C Antenna Units are provided with a label declaring a minimum safety distance on 2 feet (61 cm).

The relation between the power intensity is as follows:

Radiated intensity (W/m ²)	Distance (m)
10	0.56
25	0.36
100	0.18

Table 2.2 Radiated intensity

3 Installation

This chapter provides specific information enabling you to install the TT-3005M Capsat Antenna into your own system, with a minimal effort.

3.1 Transceiver Configuration

This new antenna is designed to use a very low amount of power. To ensure that the transceiver detects the antenna as connected the voltage output of the transceiver has to be reduced. Issuing the following command in the transceiver shell does this:

“Se -f 0”

If this command is not run the transceiver will probably set-up a warning box stating that the antenna is not connected.

3.2 Mounting

The TT-3005M maritime antenna is constructed for 1” tube mounting.

Installation

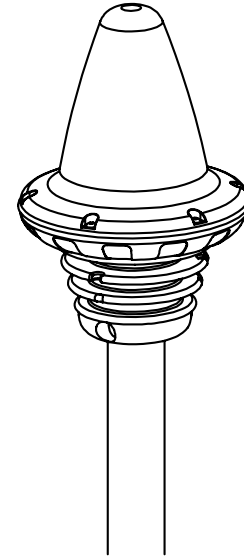


Figure 3.1 TT-3005M 1" Tube Mounting

It is important to notice that the pole mount device has to be disconnected from the antenna body when the antenna cable should be mounted. It is not possible to mount the cable without dismantling the pole mount.

3.3 Mounting considerations

When installing the Maritime Antenna you should find a location on the vessel that is as free from obstructions as possible. Also you should maintain a certain distance to other antennas, especially radar installations. Normally the best place for the antenna would be above radar scanning antennas. The following safe distances should be maintained:

Installation

Distance to HF antennas	> 5 m
Distance to VHF antennas	> 4 m
Distance to magnetic compass	> 3 m

The antenna is designed to provide satellite coverage even when the vessel has pitch and roll movements up to 15°. To maintain this coverage the antenna should be free from obstructions in the area down to 15° below the horizon. Since this may not be possible in the fore and aft directions of the vessel, the clear area can be reduced to 5° below the horizon in the fore and aft directions and 15° below the horizon in the port and starboard directions. Any compromise in this recommendation will degrade performance.

Installation

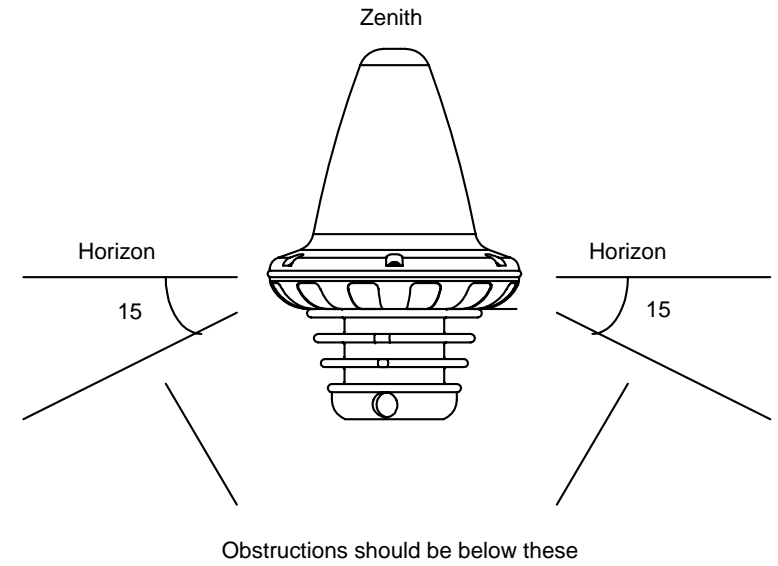


Figure 3.2 Inmarsat-C Antenna Mounting

If an obstruction such as a pole or a funnel is unavoidable, the following guidelines apply:

The distance to the obstruction should be so large, that the obstruction only covers 3 degrees. This means that the safe distance is:

$$\text{Safe distance} = 20 * \text{Diameter of obstruction}$$

Example:

Installation

Obstruction is a 4" pole. Diameter = 0.1 m. Safe distance is $20 * 0.1 \text{ m} = 2 \text{ m}$

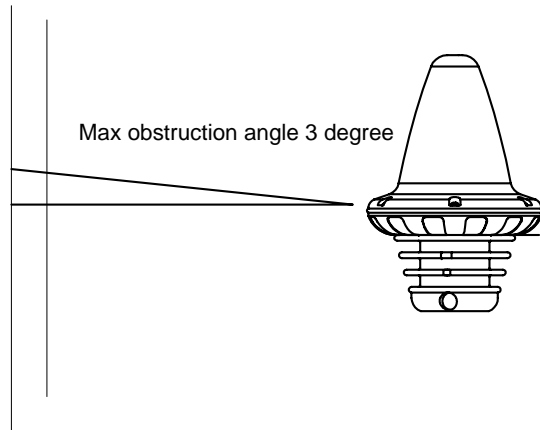


Figure 3.3 Inmarsat-C Antenna mounting near pole or funnel

Installation

3.4 Antenna cable

The TT-3005M Antenna specifications requires that the total maximal attenuation at 1.65 GHz must be less than 17 dB, and the maximal total (short-circuited in one end) DC resistance must not exceed 0.7 Ohms.

In case the antenna cable is to be produced on site, the cable type should match the below listed guidelines:

Range (m)	Cable type no.	Connector type no. (Suhners)
1 - 10	RG-223U, 5.5 mm	11TNC-50-3-14c and 11N-50-3-29c
11 - 40	RG-214U, 10.8 mm	11TNC-50-7-2c and 11N-50-7-44c
41 - 80	Suhner: SA7272, 10.0 mm Nokia: 02Y(st)C2YC 2,7/7,3AF	The SA7272 cable with N connectors (11N-50-7-35) and one adapters N female to TNC male (33TNC-N-50-51) TNC male / N male
81 - 100	SA12272, 15.0 mm	The SA12272 cable with N connectors (11N-50-12-35C) and one adapter N female to TNC male (33TNC-N-50-51)

Table 3.1 TT-3020C Capsat Transceiver Antenna Cable types (TNC - TNC) for TT-3005M.

All antenna cables types are double shielded.

The antenna cable may run together with radar or navigator cables. Separate cable ditch is not required.