SAILOR®

by Thrane & Thrane

TT-3000SSA Ship Security Alert System

Installation Manual

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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 assumes no liability for the customer's failure to comply with these requirements.

MICROWAVE RADIATION HAZARDS

During transmission this unit radiates microwaves from the antenna. This radiation may be hazardous if exposed directly to humans close to the antenna. Make sure that nobody is closer than the recommended minimum safety distance of 0.3 meter (1 ft.) during use of the transceiver.

KEEP AWAY FROM LIVE CIRCUITS

Operating personal must not remove equipment covers. Only qualified maintenance personal must make component replacement and internal adjustment. Under certain conditions, dangerous voltages may exist even with the cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

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1 INTRODUCTION

This manual describes the TT-3000SSA Ship Security Alert system and provides instructions for installing a TT-3000SSA system.

The TT-3000SSA consists of following parts:

- One Inmarsat mini-C Maritime Transceiver
- One interconnection box.
- One connection cable
- One pole mount kit
- One test button
- Two covert alert buttons[1]
- One installation manual

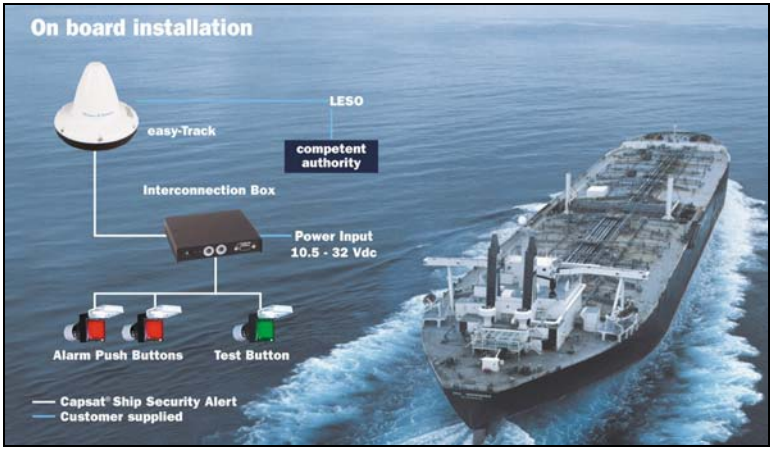


Figure 1 TT-3000SSA system

[1]Up to 6 Covert Alert Buttons can be installed.

1.1 IMPORTANT INFORMATION FOR TT-3000SSA SYSTEM

Use extreme caution when operating the system and do not initiate alerts unless under real attack or threat. Only test the system using the build-in test functionality.

Specifications of the SSAS routing requirement are found in IMO SOLAS Regulation XI-2/6 and in IMO Circulars MSC/Circ. 1072 and MSC/Circ.1073.

Thrane & Thrane has implemented a flexible covert alert messaging capability that provide the seafarers with the optimum Ship Security Alert Solution. The TT-3000SSA covert alert messaging capability, also referred to as SSA Message, offers flexible routing to MRCC and/or Ship Owner.

By using the TT-3000SSA system the ship owner accepts the responsibility for ensuring that the SSA Message address is pre-configured in the mobile in accordance to Flag Administration. Not doing so will render the SSA Message capability inactive. Configuration of the SSA Message addresses is mandatory.

The addressees of SSA Message are set-up during installation and the configuration is password protected. By using the TT-3000SSA system the ship owner accept responsibility for specifying and controlling the TT-3000SSA system access password. Not doing so will affect the security of the installation.

A ship owner selling a vessel is responsible for informing the Accounting Authority that the TT-3000SSA must be decommissioned. Not doing so means that he is still obligated to pay the fees. Furthermore, the ship owner is required to put the equipment into default configuration, i.e., clearing all SSAS Message recipients prior to changing owner ship. Leave the sysadm password as **123456789**. Not doing so means that the new owner will have to return the equipment to the manufacturer for initialisation.

Thrane & Thrane takes no legal liability of a SSA Message incorrectly being flagged as received by the terrestrial termination point. Testing at regular intervals of the TT-3000SSA installation is required to ensure a proper operating system.

1.2 INITIAL INSPECTION

WARNING

To avoid hazardous electrical shock, do not perform electrical tests if there is any sign of shipping damage to any portion of the outer cover. Read the safety summary at the front of this manual before installing or operating the TT-3000SSA

Inspect the shipping carton immediately upon receipt for evidence of mishandling during the transport. If the shipping carton is severely damaged or water stained, request the carrier's agent to be present when opening the carton. Save the carton packing material for future use.
Contents of the shipment should be as listed in the enclosed packing list. If the contents are incomplete, if there is mechanical damage or defect, or if the TT-3000SSA does not work properly, notify your dealer.
After you unpack the TT-3000SSA please:

- Inspect it thoroughly for hidden damaged, loose components or loose fittings.
- Inspect the cable harness for stress, loose or broken wires, or broken cable ties.
- Examine all the components for loose or missing hardware.

1.3 STORAGE

The TT-3000SSA may be stored or shipped in temperatures within the limits -40° C to +80° C. It is recommended that the TT-3000SSA is unpacked immediately on delivery.

1.4 REPACKING FOR SHIPMENT

The shipping carton for the TT-3000SSA has been carefully designed to protect the transceiver and its accessories 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.

- Wrap the TT-3000SSA in heavy paper or plastic. Attach a tag indicating the type of service required; return address, model number and full serial number.
- Use a strong shipping container, e.g., a double-walled carton made of 160 kg test material.
- Seal the shipping container **FRAGILE** to ensure careful handling.

1.5 ABBREVIATIONS

AA	Accounting Authority
AORE	Atlantic Ocean Region East
AORW	Atlantic Ocean Region West
CES	Costal Earth Station
COMSAR	Sub-Committee on Radio communications and Search and Rescue
DNID	Data Network Identification number
GPS	The Global Positioning System
IMO	The International Maritime Organisation
IOR	Indian Ocean Region

ISP	Inmarsat Service Provider
ISN	Inmarsat Serial Number of the TT-3026M
LES	Inmarsat-C Land Earth Station
LESO	Inmarsat-C Land Earth Station Operator
MES	Mobile Earth Station (the TT-3026M)
MRCC	Maritime Rescue Coordination Centre
MSC	The Maritime Safety Committee
NCS	Inmarsat-C Network Coordination Station
Opt.	Short for option
PDN	Positive Delivery Notification, a read confirmation
POR	Pacific Ocean Region
PSA	Point of Service Activation
PVT	Performance Verification Test
SAC	Special Access Code
SARF	Service Activation Registration Form
SSA Message	Covert alert based on messaging protocol
SSAS	Ship Security Alert System (Requirement of SOLAS regulation XI-2)

2 SYSTEM DESCRIPTION

The standard activation mode TT-3000SSA consists of

- TT-3026M Inmarsat mini-C Maritime Transceiver
- TT-3616D Interconnection Box.
- Opt. 943 Connection Cable, 20 meters
- Opt. 101 Pole Mount Kit
- Opt. 912 Green Test Button
- 2 x Opt. 911 Covert Alert Button (latched)
- TT-3000SSA Installation Manual

Certain national governments and authorities require the system to operate in "instant activation mode". In order to easily detect which operational mode is used for a given installation, the configuration for instant activation mode must be accompanied by the installation of a yellow test button, thus the configuration of an instant activation mode system is

- TT-3026M Inmarsat mini-C Maritime Transceiver
- TT-3616D Interconnection Box.
- Opt. 943 Connection Cable, 20 meters
- Opt. 101 Pole Mount Kit
- Opt. 915 Yellow Test Button
- 2 x Opt. 914 Covert Alert Button (unlatched)
- TT-3000SSA Installation Manual

A TT-3026M is a complete Inmarsat mini-C transceiver with built-in LNA/HPA and GPS electronics and an omni-directional antenna designed to operate on vessels. The housing is sealed and contains no user serviceable parts.

The TT-3026M is very compact and is designed to operate in a corrosive environment, and in extreme weather conditions without any service.

The TT-3026M easyTrack is equipped with an 18-pole female connector and is intended for pole mounting using the Opt. 101 or Opt. 103 Pole Mount Kit. See section 3.1.1.

The TT-3026M easyTrack has a built-in GPS module, capable of tracking up to 12 GPS satellites.

The TT-3026M easyTrack is designed to operate when the satellite is visible over the horizon and no signal path blockage is present.

The TT-3026M easyTrack antenna has an elevation angel of -15° ensuring perfect reception in sea area A3 (Inmarsat) even when the vessel has pitch and roll movements due to rough weather.

The TT-3026M easyTrack performs regular scanning of the Inmarsat satellite network and will automatically perform ocean region changeover if an ocean region is found with a stronger signal.

The TT-3026M easyTrack for Ship Security Alerting supports Ship Security Alert Messaging (SSA Message) for flexible routing. The SSA Message will use the messaging capability of Inmarsat-C to send a covert message with routine priority to a competent authority designated by the Administration or any other recipient such as the ship owner.

Figure 2 TT-3026M easyTrack Mini-C Transceiver

The TT-3616D Interconnection Box is designed to connect the Transceiver to the Covert Alert Buttons, the Test Button, a message Terminal (DTE) and the Power supply. The interconnection box is designed for below deck installation.

Figure 3 TT-3616D Interconnection Box

The Interconnection Box has a DB9 connector for serial communication with the TT-3026M.

For TT-3026M transceivers using software versions lower that 2.21, the DB9 connector is only used during configuration and is not a part of the TT-3000SSA system. For systems using software version 2.21 and newer, the system is approved for use with terminal equipment like a PC running Thrane & Thrane EasyMail® or equivalent.

The test and alert buttons forms the interface of the TT-3000SSA system. They are high quality switches equipped with flip open lids to prevent inadvertent operation. The buttons are designed for below deck installation.

The red buttons are the covert alert buttons.

If the system has been configured for instant activation mode an alert is initiated immediately after the alert button is pressed.

If the system has been configured for standard activation mode, the alert buttons have maintained action (stays open or closed after switch actuation until the next time the switch is actuated). When pressed, an alert will be sent after 30 – 33 seconds. If released within the 30 seconds, the alert will not be sent.

Before reinitiating a covert alert, leave the covert alert button released for at least 3 seconds before activating the button again.

If the alert button is not released SSA Messages will be retransmitted every 30 minutes.

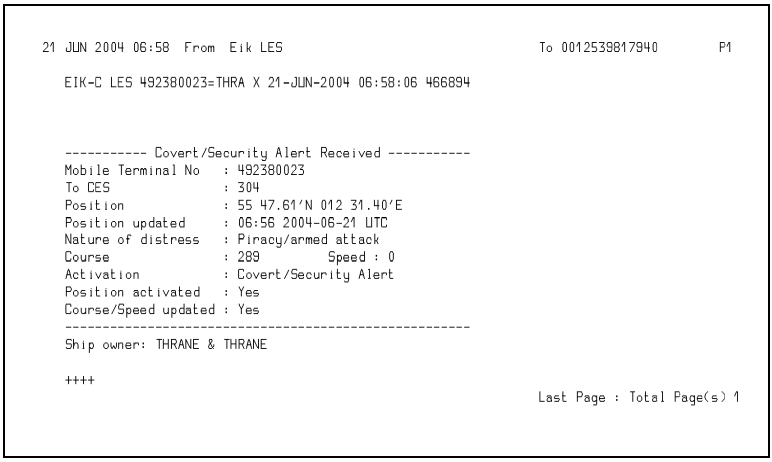


Figure 4 SSA Message layout

Following a Covert Alert Initiation, the system will start sending data reports for tracking purposes according to the actual easyTrack configuration; refer to section 2.2 and 3.5.

The green or yellow button is a test button with a lamp. The button has momentary action (closed only as long as the switch is pressed and held). When the system is operational, the test button will be permanently lit. When the test button is pressed the test button is no longer lit and the covert alert buttons can be tested (operated) without sending any alerts. If a covert alert buttons is pressed for 30 – 33 seconds[2] during test, a SSA Test Message is sent to all recipients configured to receive test messages. An example of a SSA Test Message is shown in Figure 5.

Refer to section 3.4 for a detailed description of how to configure SSA Messages.

[2] This timing applies for instant activation mode systems as well.

```
From: 492388069@inmc.eik.com
Sent: 10. juni 2004 14:46
To: John Doe (JD)
Subject: Message from Inmarsat-C Mobile


----------- TEST TEST TEST TEST TEST TEST  -----------
Mobile Terminal No   : 492388069
To CES               : 101
Position             : 55 47.60'N 012 31.40'E
Position updated     : 12:44 2004-06-10 UTC
Nature of distress   : Piracy/armed attack
Course               : 034         Speed : 0
Activation           : Covert/Security Alert
Position activated   : Yes
Course/Speed updated : Yes
-This message is for test purposes, please disregard--


Covert message setup (changed recently):
Destination type     : E-mail
Address              : john_doe_0@tt.dk
Parameter            :
Usage                : Msg+Test
Destination type     : PSTN
Address              : 4539558888
Parameter            : T30
Usage                : Msg+Test
Destination type     : PSTN
Address              : 4543435564
Parameter            : V22B
Usage                : Test


++++
```

Figure 5 SSA Test Message

Different flashing sequences are used to indicate that the system is functional. The test button lamp will turn off if the transceiver does not have a working satellite link. The link to the satellite is established automatically by the transceiver. Refer to section 5 for a detailed description of testing.

Figure 6 Buttons

2.1 SSA MESSAGES

The SSA Messages needs addressing of the recipients in accordance to Flag Administration.

The TT-3000SSA will select a random LES among a number of LES's in the Inmarsat-C system or use the pre-configured LES (refer to section *3.4.5 Optional LES selection*) as the first attempt. If the SSA Message could not be delivered, attempts are stepwise made to deliver the SSA Message to a number of other LES's in the current ocean region. If the SSA Message could not be delivered, attempts are stepwise made to deliver the alert to a number of LES's in all other visible ocean regions. Delivery is considered done when a Positive Delivery Notification (PDN) is received by the TT-3000SSA.

When a SSA Message is received at the LES it is routed directly to the recipient address found in the SSA Message, which can be any competent authority designated by the Administration – such as the MRCC – or the ship owner.

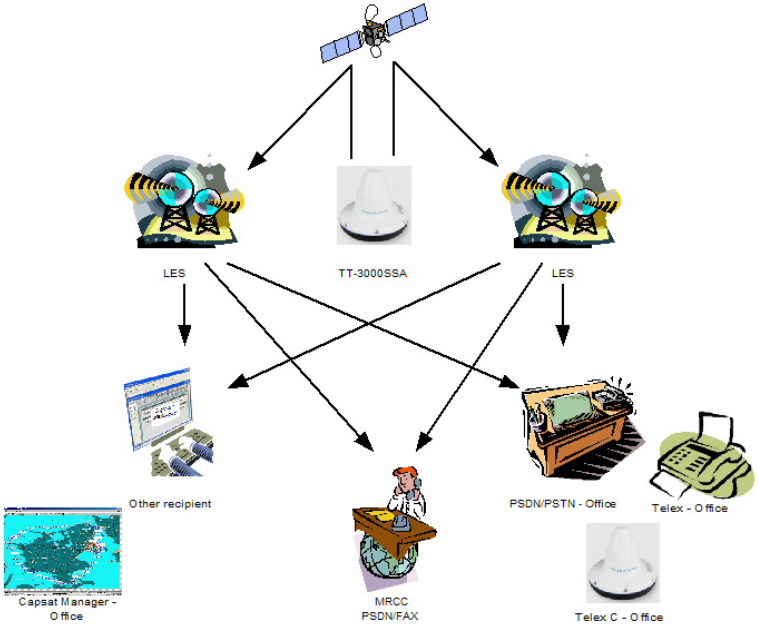


Figure 7 Example of SSA Message routing

Three individual and independent recipient addresses can be configured to receive the SSA Message.

2.2 COVERT ALERT INITIATED DATA REPORTING

The TT-3000E SSAS system is pre-configured[3] to send data reports at regular intervals following a Covert Alert initiation provided a Data Network Identification number (DNID) is downloaded. The report holds information about:

- Date/time
- Position
- Speed
- Course
- Button status

[3] Please check this setup during installation; Refer section 3.5.

The default interval between data reports is set to 15 minutes.

The data report is routed to a mailbox in the LES, from where it is normally forwarded to the DNID owners mailbox, from where it is read by Capsat® SSA Manager (TT-10220SSA) or equivalent.

To obtain a DNID please contact your local sales representative.

Please note, that to obtain global coverage, a DNID must be downloaded for each ocean region (AORW, AORE, POR, IOR).

3 INSTALLATION

3.1 INSTALLATION OF TRANSCEIVER

This chapter describes the physical mounting of the TT-3000SSA and the configuration of the TT-3026M.
Refer to sections 3.1.2 and 3.1.3 for guidelines on choosing the most effective and safe mounting location for the antenna.

3.1.1 MOUNTING OPTIONS

The TT-3026M easyTrack transceiver is designed for mounting on one of two pole mount adapters.

3.1.1.1 POLE MOUNT 1"

Opt. 101 is a standard 1" pole mount, illustrated in Figure 8.

- Pull the cable in the pole and adapter.
- Connect the cable to the transceiver.
- Mount the adapter on the transceiver using screws.
- Tighten the adapter to the pole.

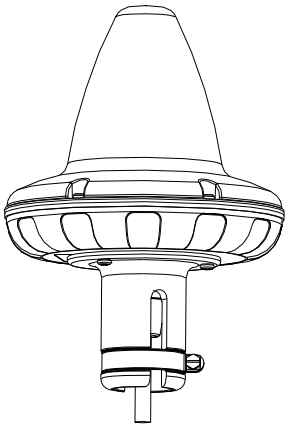


Figure 8 1" Pole mounting

Important note: When mounting the mini-C transceiver in very harsh environments i.e. directly exposed to exhaust fumes, it is recommended that the Adjustable Pole/Railing Mount described below is used!

3.1.1.2 ADJUSTABLE POLE/RAILING MOUNT

Opt. 103 is an adjustable pole/railing mount, illustrated in Figure 9.

- Attach the pole mount to the transceiver using the 3 screws.
- Mount the device to the pole in one of the 2 directions.
- Connect the cable.
- Adjustable between 20 - 35 millimetres

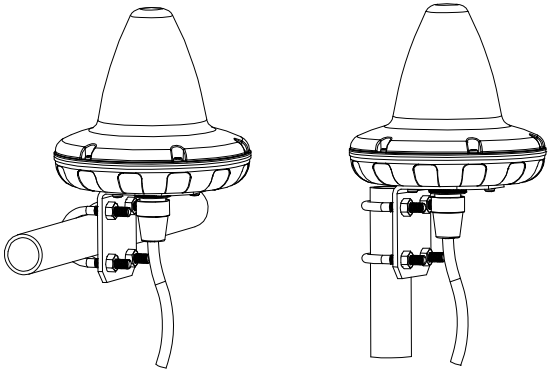


Figure 9 Vertical and Horizontal adjustable pole mount

3.1.2 ANTENNA MOUNTING CONDITIONS

When installing the TT-3026M easyTrack, find a location that is as free as possible from obstructions. Also 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:

Distance to HF antennas	> 5 meter
Distance to VHF antennas	> 4 meter
Distance to other Inmarsat transceiver	> 0.5 meter
Distance to magnetic compass	> 0.3 meter

Table 1 Antenna Safe Distance

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 (see Figure 10). 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 could degrade performance.

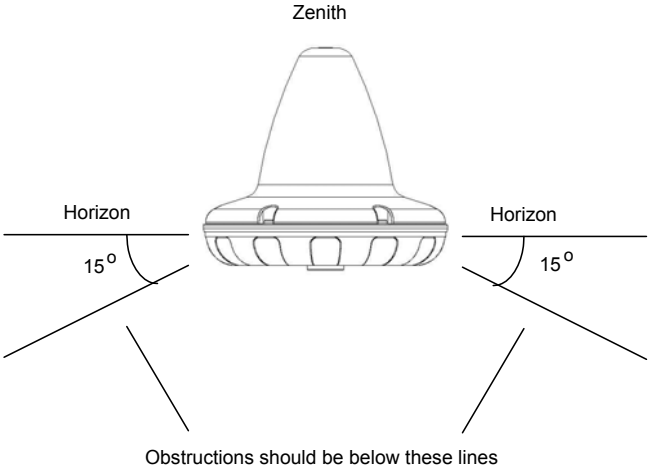


Figure 10 Viewing Angle to the Horizon

If an obstruction such as a pole or a funnel is unavoidable, the transceiver must be positioned in such a location that the

obstruction covers no more than a 2° arc along the horizon. To calculate the minimum distance, use the following formula:

Safe distance = 29 * Diameter of obstruction

Example:

Obstruction is a 4" pole (Diameter = 0.1 meter)
Safe distance is 29 * 0.1 meter = 2.9 meter

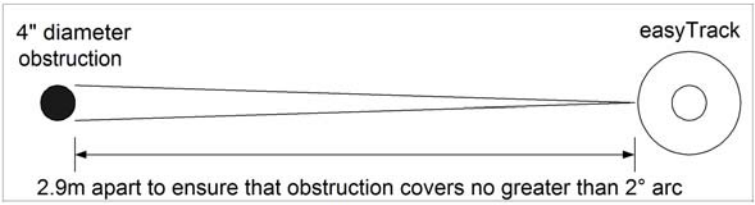


Figure 11 Mounting near pole or funnel (overhead view)

3.1.3 SAFETY DISTANCE FOR ANTENNA UNITS

When transmitting, the electromagnetic field radiated from the antenna can be harmful. To avoid danger, keep a safety distance of 0.3 meter (1 ft.) from the transceiver.
To be sure that this distance is respected, the TT-3026M easyTrack is provided with a label declaring a minimum safety distance of 0.3 meter (1 ft.) on the antenna.

The relation between the power intensity and distance is as follows:

Distance (m) from antenna	Radiated intensity (W/m^2)
0.20	10
0.13	25
0.07	100

Table 2 Radiated intensity

3.2 INSTALLATION OF THE BUTTONS

To fulfil the IMO requirement on covert activation, the alert button installation must be concealed using appropriate covert installation techniques. One of the alert buttons must be placed on the ships navigation bridge. To make testing easier it is recommended that the test button is installed in close proximity to one of the covert alert buttons but in a way

that the constant light emitted does not disturb navigation (night sight). The test button must be installed where it is easy to test the TT-3000SSA installation at regular intervals.

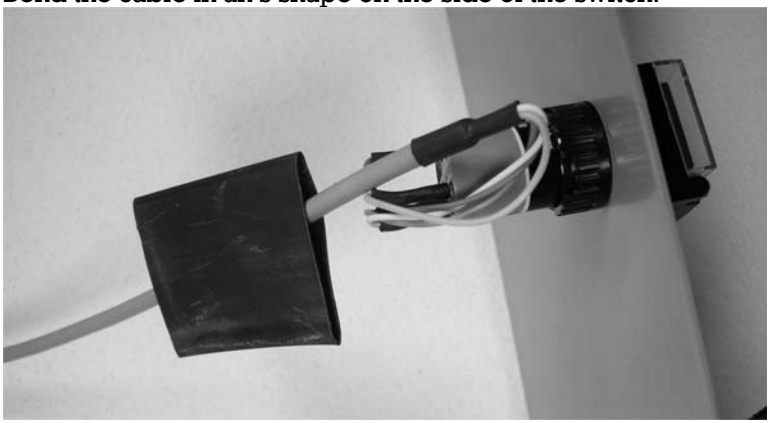
3.2.1 INSTALLATION

When the place for installation of the Covert Alert Button is determined, a hole with a diameter of 16 mm should be drilled.

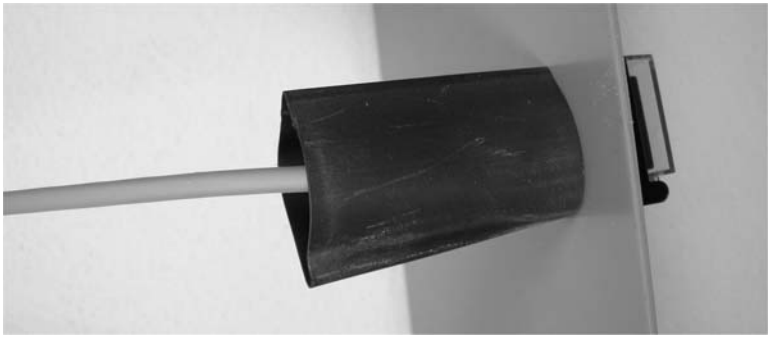
The mounting-nut and the large piece of flex 19x30mm should be placed on the backside of the hole. The wire must then be slipped through the hole, the mounting nut, the flex, and all the way to the Interconnection Box. Leftover length must be cut off. The 19x30mm flex is for cable strain relief on the backside of the button.

Tighten the mounting nut.

Bend the cable in an s shape on the side of the switch.



Pull the flex to the back of the board where the button is installed.



Shrink the flex.

The flex now takes the strain off the soldering.

Refer to Appendix D for further requirements regarding installation of cables.

3.3 INSTALLATION OF INTERCONNECTION BOX

Note: For installation of a TT-3616B Interconnection Box, please refer to *Appendix H – Using a TT-3616B.*

The TT-3616D Interconnection Box is designed to facilitate a simple and robust interconnection of the various system components.

Figure 12 Outside view of TT-3616D

Figure 13 Inside view of TT-3616D

3.3.1 MOUNTING OF TT-3616D

The TT-3616D is designed to be mounted on a flat surface anywhere inside a vessel and to be located up to 50 meters away from the TT-3026M mini-C Transceiver.

In order to ease the installation, please observe the minimum clearing area as given in Figure 14.

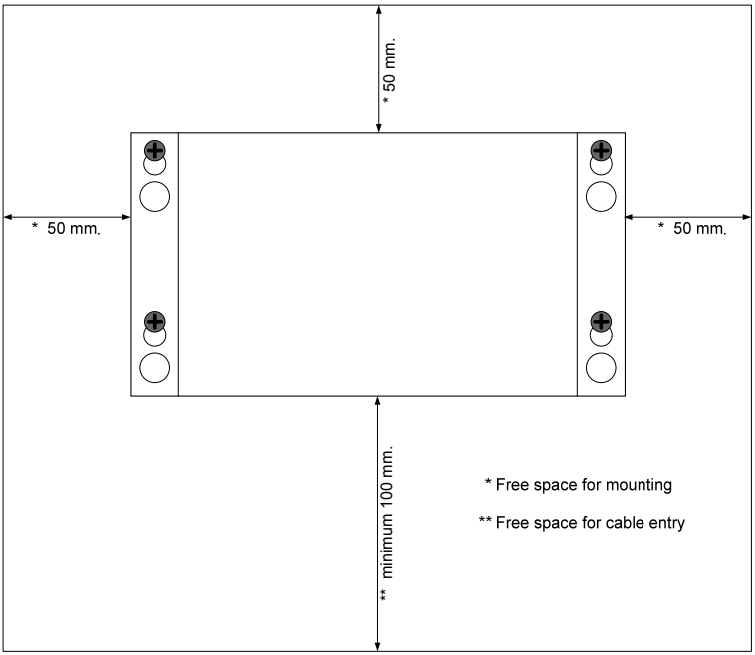


Figure 14 Recommended free space around TT-3616D.

The unit must be fastened by the used of 4 screws, one in each corner of the chassis as indicated by Figure 15. The accessories for TT-3616D include 2 different types of screws for the purpose, M5x12 and 5.5x25.

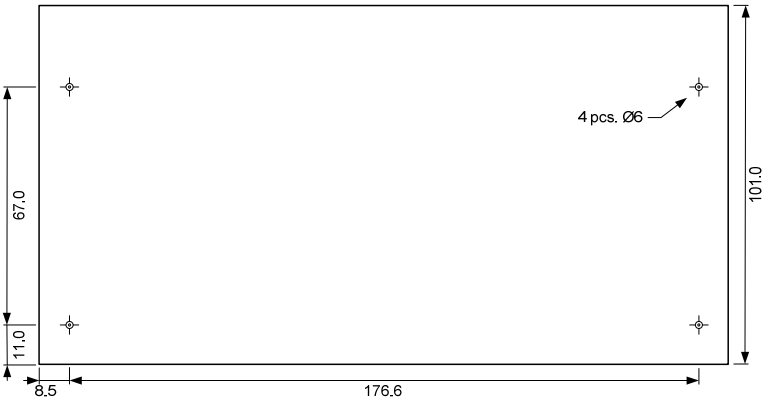


Figure 15 Drill template. All measures in mm.

The best grounding is made by fixing the chassis directly on to the ships structure (provided it's made of metal). If proper grounding can not be made this way, then connect the pre-mounted grounding wire to the ships structure. Find an appropriate location as close as possible to the TT-3616D and shorten the grounding wire accordingly. Terminate the grounding wire with the yellow ring terminal found in the accessory kit.

The correct (pre-mounted) position of the grounding wire can be seen on Figure 13. Please note the use of a washer underneath the yellow ring terminal.

The grounding wire delivered with the TT-3616D has a length of 1 meter and a wire cross section of 4mm^2. Avoid extending the length of the grounding wire, as the protective effect will be severely degraded in such a case.

3.3.2 HANDLING OF WIRE TERMINALS IN TT-3616D

To help inserting wires into the terminals, a special tool is delivered as part of the accessory kit. It is used as shown in Figure 16.

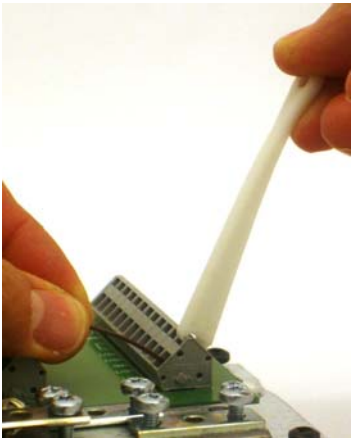


Figure 16 Wire tool

Please be careful not to apply to much pressure, as this might damage the top of the terminal housing.

In case the special tool is lost, a small screwdriver can be used as well.

3.3.3 CONNECTING POWER TO TT-3616D

The TT-3000SSA system is designed to operate on floating DC in the range 10.5 - 32 V when using 20-meter transceiver connection cable and 16 - 32 V when using 50-meter transceiver connection cable, which makes an AC/DC converter needed, in case the system works in an AC environment.

NOTE the requirement for floating DC of minimum 16 V when using a transceiver connection cable longer than 20 meters. This is important for the operation of the TT-3000SSA system.

To satisfy the IMO requirement on alternative source of power the TT-3000SSA shall be connected to a power supply that has emergency battery switch-over in case of drop-out on normal supply.

The power connector is designed to accept wire with a cross section area up to 2.5mm^2. The required wire cross section depends on the actual supply voltage, the supply cable length and the transceiver cable length. Typical cable resistance is given in Table 3.

Cross section [mm^2]	0.5	1	1.5	2	2.5
Resistance [Ω/km]	32.2	16.1	10.7	8.05	6.76

Table 3 Typical cable resistance

To calculate the maximum wire length in meters for a given cable type and transceiver cable length, the following formulas can be used:

$$L_{MAX,20M} = 156 \cdot \frac{(V_{MIN} - 10.5)}{R_{CABLE}} \quad \text{and} \quad L_{MAX,50M} = 156 \cdot \frac{(V_{MIN} - 16)}{R_{CABLE}}$$

, where V_{MIN} is the minimum guaranteed power supply voltage and R_{CABLE} is the cable resistance in Ω/km.

Example 1:

Using a 24VDC power supply with a 24V battery backup, V_{MIN} can be assumed to be above 22V. Using 50 meter of transceiver cable and a wire cross section of 1mm^2, the maximum power supply cable length is:

$L_{MAX,50M}$ = 58 m.

Example 2:

Using a 12V battery for backup, V_{MIN} can be assumed to be above 11V (if properly charged). Using 20 meter of transceiver cable and a wire cross section of 2.5mm2, the maximum power supply cable length is:

$L_{MAX,\ 20M}$=11 m.

When connecting the cable to TT-3616D, make sure the cable screen is properly terminated at the cable relief bracket as

shown in Figure 17. Connect the positive supply wire to the terminal denoted DC+ and the negative supply wire to the terminal denoted DC-.

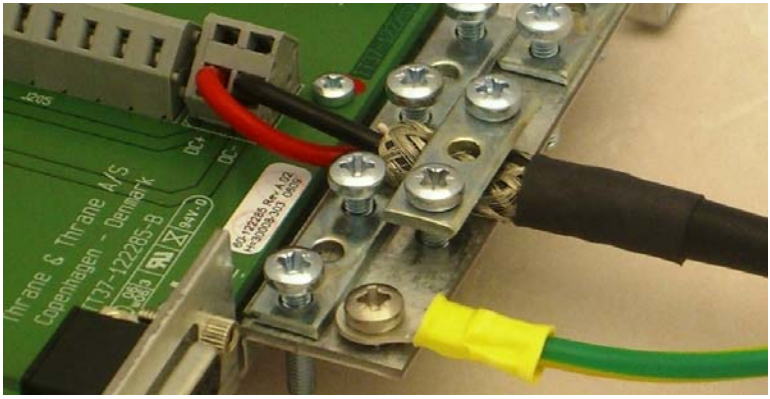


Figure 17 Power cable connections.

When power is switched on, the red LED denoted "DC in" should be turned on.

Please note that the jumper on W201 must remain on at all times.

3.3.4 CONNECTING TT-3026M TO TT-3616D

In order to prepare the transceiver cable for mounting, start by removing 20 cm. of isolation as shown in Figure 18.

Figure 18 Transceiver cable preparation.

Then wind the tinned wire around the isolation as shown in Figure 19 in order to prepare for a proper grounding of the cable screen.

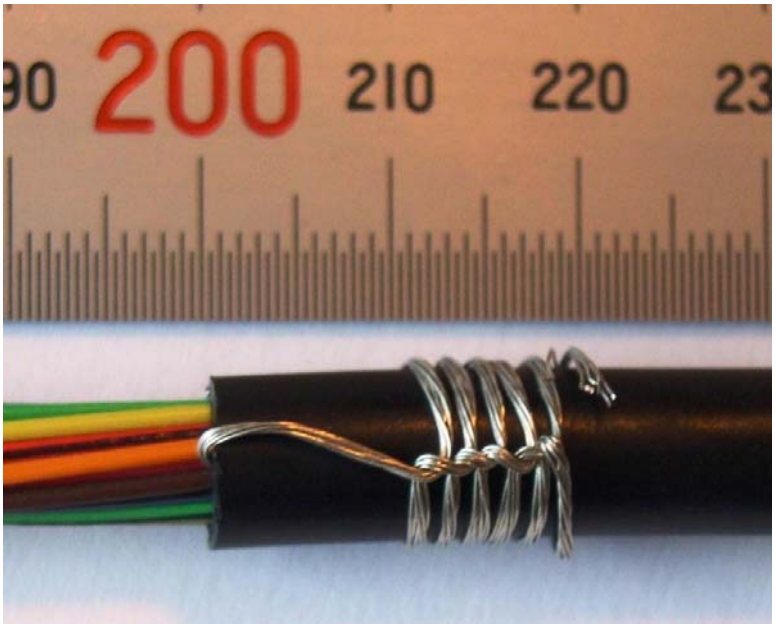


Figure 19 Preparation for grounding of the cable screen.

Then fasten the cable firmly in the cable relief bracket of the TT-3616D as shown in Figure 20.

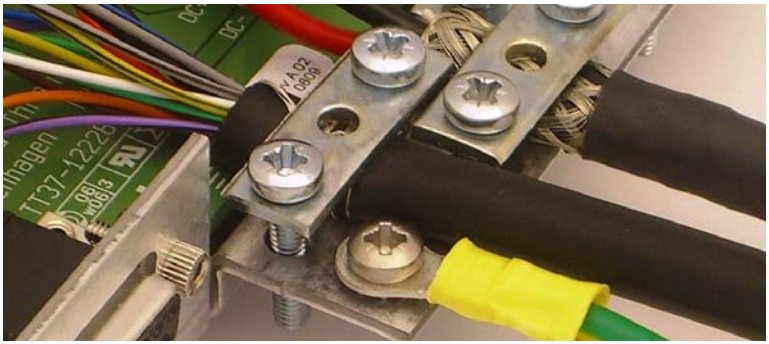


Figure 20 Fixation of the transceiver cable in TT-3616D.

Finally connect the individual wires to the 12 + 6 pole terminal blocks. They are labelled by wire colour. Connect the Transceiver cable as directed by these labels. Start by connecting the thick power wires and then continue towards the other end of the connector as shown in Figure 21.

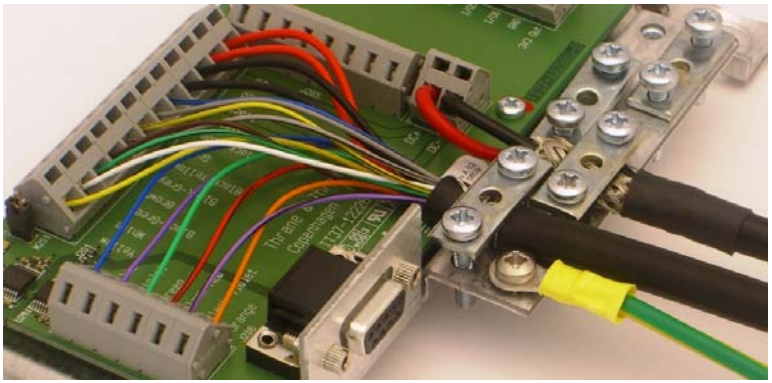


Figure 21 Mounting of transceiver cable wires.

3.3.5 CONNECTING BUTTONS

This section will describe how to connect a standard set of two covert alert buttons and one test button.

When connecting more than two covert alert buttons, please refer to *Appendix F – Additional alert buttons.*

To ease the installation process some of the transceiver I/O's have been connected to more than one terminal in the TT-3616D Interconnection Box.

When connecting 2 alert buttons, please use the colour code template shown in Figure 22 (can be copied/cut out and placed as shown in Figure 23). The wiring is detailed in *Appendix B – Standard Wiring*.

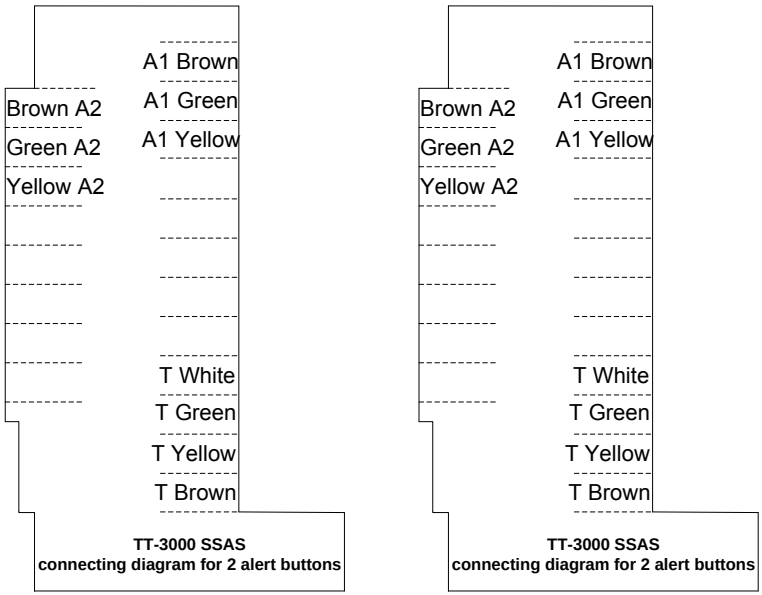


Figure 22 Colour code template for 2 alert buttons

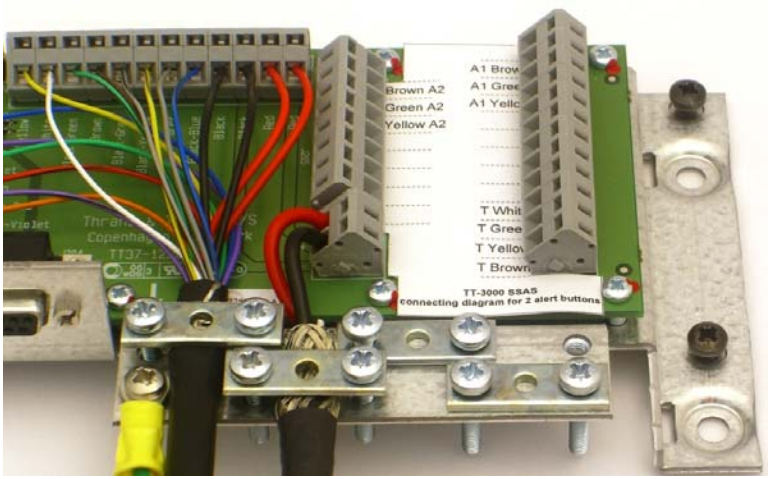


Figure 23 Use of button template - two alert buttons

Mount the cables according to the wire colours as shown in Figure 24. The paper template can easily be removed after use.

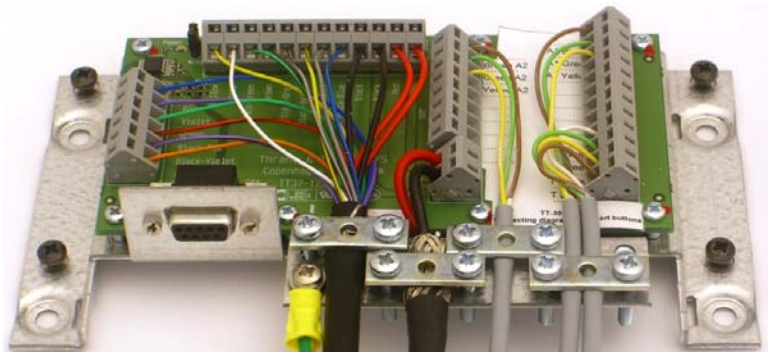


Figure 24 Fully equipped TT-3616D with two alert buttons

3.4 CONFIGURING THE TT-3026M FOR SSA

The TT-3000SSA must be configured prior to installation to ensure proper routing of the ship security alert to the competent authority.

3.4.1 PASSWORD PROTECTION OF TT-3000SSA SETTINGS

This is a required configuration.

By using the TT-3000SSA the ship owner accepts responsibility for specifying and controlling the TT-3000SSA access password and store it in a secure manner. Not doing so will affect the security of the installation.

Connect a Laptop or a PC to the DB9 Connector using a standard DB9 to DB9 Modem cable. Run a terminal program like Windows® HyperTerminal and connect to TT-3026M with 4800 baud, no parity, 8 data bits, 1 stop bit. Remember to use hardware handshake.

Access to the configuration is only granted at SYSADM user level. The terminal command to change SYSADM user level is "SU <user level>".

3.4.1.1 EXAMPLE

The default password is "*sysadm*" and the password is case sensitive. Note: The password might be "*123456789*", ref. section 1.1.

The below examples show change of password the first time SYSADM user level is entered.

```
: su sysadm<enter>

Enter password: sysadm<enter>
Enter new password: **************<enter>
Confirm new password: **************<enter>
Password for user sysadm changed.
```

The below examples show change of password when in SYSADM user level.

```
: passwd sysadm<enter>

Enter new password: ***************<enter>
Confirm new password: ***************<enter>
Password for user sysadm changed.
```

Replace *************** with a unique and individual password of at least 8 characters but 15 is preferred for this installation. The password must be specified, controlled and stored in a secure manner.

Change to NORMAL user level when all configurations have been completed. Press enter when asked for a password.

```
: su normal<enter>
Enter password:<enter>
```

3.4.2 SELECTION OF ACTIVATION MODE

Remark: Only applicable from software version 2.16.

When installing an instant activation mode system (Opt. 914/915), "instant activation mode" operation must be selected:

```
: cfg -c 3<enter>
```

The chosen operational mode can be checked:

```
: cfg -c<enter>

Covert alert mode: Message (instant activation)
```

When installing a standard activation mode system (Opt. 911/912), please check, that the operational mode is correct:

```
: cfg -c<enter>

Covert alert mode: Message
```

If not, then select activation mode:

```
: cfg -c 0<enter>
```

3.4.3 CONFIGURATION OF SSA RECIPIENTS

This is a required configuration.

SSA Message requires the recipient addressees to be pre-configured in the TT-3000SSA in accordance to Flag Administration.

Three individual and independent recipient addresses can be configured to receive the SSA Message. It is highly recommended that all three addresses are configured.

The terminal command to use is "SE –am" . The command takes 4 parameters as described below.

Format: SE –am <entry>,<type>[,<address>[,<param>]]

<entry>: Address list entry number: 0-2.

<type>: Destination type:
0: TELEX,
1: PSTN,
3: PSDN,
6: SAC (Special Access Code),
254: e-mail.
255: Delete address entry

<address>: Destination address. This can be telephone numbers, telex numbers, or e-mail addresses depending on the type.

<param>: Supplementary parameter for some address types. To address a PSTN FAX machine use **T30** or **t30** and for PSTN Modem use **V22B**.

Please refer to Appendix G for more information concerning the use of Destination Type 6: SAC.

For each of the three available addresses it is possible to control which addresses will receive Covert/Security alert and which addresses that will receive test messages. It is not permitted to disable the Covert/Security alert for the two first message destinations.

The terminal command to use is "SE –ame" . The command takes 2 parameters:

Format: SE –ame <entry>,<usage>

<entry>: Address list entry number: 0-2.

<usage>: Usage:
0: Reserved,
1: Message only,
2: Test only,
3: Both test and message.

3.4.3.1 EXAMPLES

Example of setting up the first addressee to Telex destination 5519298, Answerback code TATJH:

```
: se -am 0,0,5519298+/TATJH<enter>
```

Example of setting up the first addressee to another MES (destination type is telex; destination address is 580 followed by IMN):

```
: se -am 0,0,580422380021<enter>
```

Replace *422380021* with the correct IMN number when configuring a TT-3026M.

Example of setting up the second addressee to PSTN Fax destination +45 39558888:

```
: se -am 1,1,4539558888,T30<enter>
```

Example of setting up the third addressee to PSTN modem destination +45 39558788:

```
: se -am 2,1,4539558788,V22B<enter>
```

Example of setting up the first addressee to PSDN X.25 destination 1110492380047:

```
: se -am 0,3,1110492380047<enter>
```

Example of setting up the third addressee to e-mail destination support@thrane.com:

```
: se -am 2,254,support@thrane.com<enter>
```

Example of setting up the third addressee to e-mail destination aa@tt.dk and bb@tt.dk:

```
: se -am 2,254,aa@tt.dk;bb@tt.dk<enter>
```

Example of displaying the current setting:

```
: se -am<enter>

Update time: 2004-02-11  14:31:56
```

```
Entry  Type  Param  Address
    0     0        5519298+/TATJH
    1     1    T30  4539558888
    2     1   V22B  4539558788
```

Example of setting up the first addressee only to receive Covert Alert Messages:

```
: se -ame 0,1<enter>
```

Example of setting up the second addressee to receive Covert Alert Messages and Test Messages:

```
: se -ame 1,3<enter>
```

Example of setting up the third addressee only to receive Test Messages:

```
: se -ame 2,2<enter>
```

Example of displaying the current setting:

```
: se -ame<enter>

Extended address configuration.
Entry  Usage
    0   Msg
    1   Msg+Test
    2   Test
```

Note: If an illegal combination of parameters is used, the following error code will be seen:

```
: se -ame 0,2<enter>

ERROR 121: Bad parameter(s)
```

The recommended destinations are land based PSTN (Fax), PSDN (X.25) and Telex. Other destination type like SAC and e-mail is not recommended as no end-to-end connection is guaranteed and therefore should not be used for the first address. Thrane & Thrane takes no legal liability of a message incorrectly being flagged as received by a modem, fax, telex network or mail server.

The ship's flag administration has appointed a competent authority for the Ship Security Alert operation. The ship's flag administration is the administration of the country specified in *Section 7. To be completed for Maritime Mobile Earth Stations (MES)* item "In which country is the vessel registered". Obtain the competent authority Telex or Fax address from the flag administration.

It is highly recommended that at least two addresses are configured to the same recipient as a backup or fallback in case of Telex or Fax machine problems. The third can be used as a forward copy to, e.g., a fleet management system or another Inmarsat-C transceiver.

In case the Flag Administration has not yet implemented a procedure for routing alerts the addresses must be configured with ship owner controlled destination type. This is mandatory and not doing so will render the SSA Message capability inactive.
The recipient addressees can be changed remotely via satellite to avoid local access to the installation in case the recipient address needs to be changed. Contact you dealer for further information on this possibility. The password described in 3.4.1 is needed for the remote configuration change.

3.4.4 SETTING UP MOBILE NUMBER IN THE TRANSCEIVER

This is a required configuration

When the Service Activation, refer section 4, has been completed and the SSAS operator has received an Inmarsat-C Mobile Number (IMN number) the number must be configured in the TT-3026M.

The number configured will be used directly in the SSA Message. If the number is not configured the field "Mobile Terminal No" will be empty and the number must be read from the header line of the SSA Message. See Figure 25.

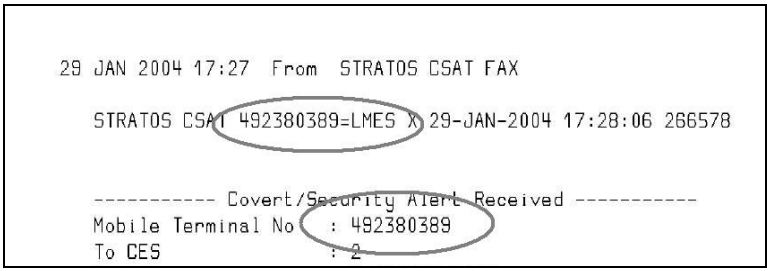


Figure 25 Position of Mobile Number in SSA Message

The configuration of IMN number in the TT-3026M easyTrack transceiver furthermore enables use of enhanced features in the Thrane & Thrane fleet monitoring software Capsat® SSA Manager.

The terminal command to use is "SE -u <IMN number>". The command takes 1 parameter, which is the mobile number.

3.4.4.1 EXAMPLE

Example of setting up mobile number:

```
: se -u 422380021<enter>
```

Replace *422380021* with the correct IMN number when configuring a TT-3026M.

3.4.5 OPTIONAL LES SELECTION

This is an optional configuration

The TT-3026M provides means for an SSAS operator to pre-set the covert alert Land Earth Station ID in each of the 4 ocean regions. This allows the SSAS operator to set up a preferred LES to handle the SSA Message. Setting up a preferred LES for alerting does not influence the retransmission protocol.

Automatic select LES does not take priority over the manual pre-set unless delivery could not be accomplished (or the pre-set LES ID becomes invalid).

Any LES can be selected but in case of selection of a demand-assigned LES, the TT-3000SSA will default to a permanently assigned LES, which is required for technical reasons

The terminal command to use is "se –m". The command takes 4 parameters. LES in AORW, LES in AORE, LES in POR and LES in IOR.

3.4.5.1 EXAMPLE

Use below example to configure the TT-3026M

Example of setting up Xantic:

```
: se -m 12,112,212,312<enter>
```

Replace 12,112,212,312 with the LES ID for the current installation.

3.4.6 OPTIONAL FREE TEXT IN ALERT

This is an optional configuration

It is possible to setup a supplementary text note on SSA messages. This may be used to provide information such as ship name, radio call sign, country of registration, etc.

```
----------- Covert/Security Alert Received -----------
Mobile Terminal No   : 492380023
To CES               : 304
Position             : 55 47.60'N 012 31.42'E
Position updated     : 05:27 2004-06-18 UTC
Nature of distress   : Piracy/armed attack
Course               : 024         Speed : 0
Activation           : Covert/Security Alert
Position activated   : Yes
Course/Speed updated : Yes
------------------------------------------------------
Ship owner: THRANE & THRANE

++++
```

The terminal command to use is "SE -at "text"". The command takes 1 parameter, which is the text in quotation marks.

The "SE –at" command accepts a text length of up to 64 characters. In case this is not sufficient, the command "SE –atf <filename>" can be used to enter a text of up to 199 characters.

A textfile can be made using the "tr" command:

Format: TRansfer <filename>

The command will input a file from the console and stop after a 5-second time-out. You should allow the Transceiver at least 20 ms to switch from text mode (command line) to binary mode (your data). It might be helpful to edit the text in a text editor before pasting it into the transceiver due to the 5 second timeout.

Other usefull commands:

- Use "DIR" to list the current files

- Use "DE <filename> to delete a file
- Use "TYPE <filename> to view the content of a file.

3.4.6.1 EXAMPLE

Example of setting up the supplementary free text of max 64 characters:

```
: se –at "Ship owner: THRANE & THRANE"<enter>
```

Example of creating a file to be used for input of up to 199 characters free text:

```
: tr free.txt<enter>
Ship name:  M/S Thrane
Ship owner: Thrane & Thrane
Flag state: Denmark
Code 1:     1234567890
Code 2:     Alpha1234
:
```

Example of setting up the supplementary free text of max 199 characters:

```
: se –atf free.txt<enter>
```

3.5 CONFIGURING THE TT-3026M FOR DATA REPORTING

Configuration for data reporting is optional and normally the factory default is sufficient.

3.5.1 FACTORY DEFAULT

Before any DNID's are downloaded, the TT-3026M must be configured to:

- DNID automatic grouping not disabled.
- Automatic initialisation of data reporting in case of an alert.
- Default interval between alert initiated data reports

The factory setting normally includes this setup. If not, the following sequence must be entered:

```
: su sysadm<enter>

Enter password: **********<enter>
: dn –fa 0<enter>

: dn -f 2,1,0,1,0,0,0,0,0,1,0<enter>

: pg -fa 1,104<enter>

Connection AlertCont AlertInt
 Default           1      104
:
```

Check of configuration:

```
: dn –fa<enter>

Auto group disabled  : 0
: dn -f<enter>

Default Data Network format:
Authority level      : 2
Time/pos type        : Maritime
Date format          : 0
IO pin data          : Yes
Add speed/course     : No
Single packet report : No
Append userstring    : No
Extra pos precision  : No
Tachograph data      : No
Autocreate intvpgr   : 1
Autocreate evpgr     : 0
```

```
: pg -fa<enter>

Connection AlertCont AlertInt
 Default           1      104
:
```

Remark: Alert interval 104 corresponds to 104 frames of 8.64 seconds = 898 seconds = 15 minutes. The amount of frames between data reports can be selected between 20 and 4999.

3.5.2 EXAMPLE CONFIGURATION AFTER DNID DOWNLOAD

After DNID download in AORW, IOR, AORE and POR the DNID status is as follows:

```
: dn -d<enter>

Entry  Provider Name                S  LES  DNID  Mem  Sub
0    : ALERT-TRACKING-TT-3000SSA  01  004  8048  101    0
1    : ALERT-TRACKING-TT-3000SSA  01  304  8048  101    0
2    : ALERT-TRACKING-TT-3000SSA  01  104  8048  101    0
3    : ALERT-TRACKING-TT-3000SSA  01  204  8048  101    0
```

The resulting data report program status is:

```
: pg -d<enter>

Connection  Program Ocean region
 0: remote  PU[sp][4] 004,8048,101 104,8048,101 204,8048,101 304,8048,101
 1: closed
 2: closed
 3: closed
```

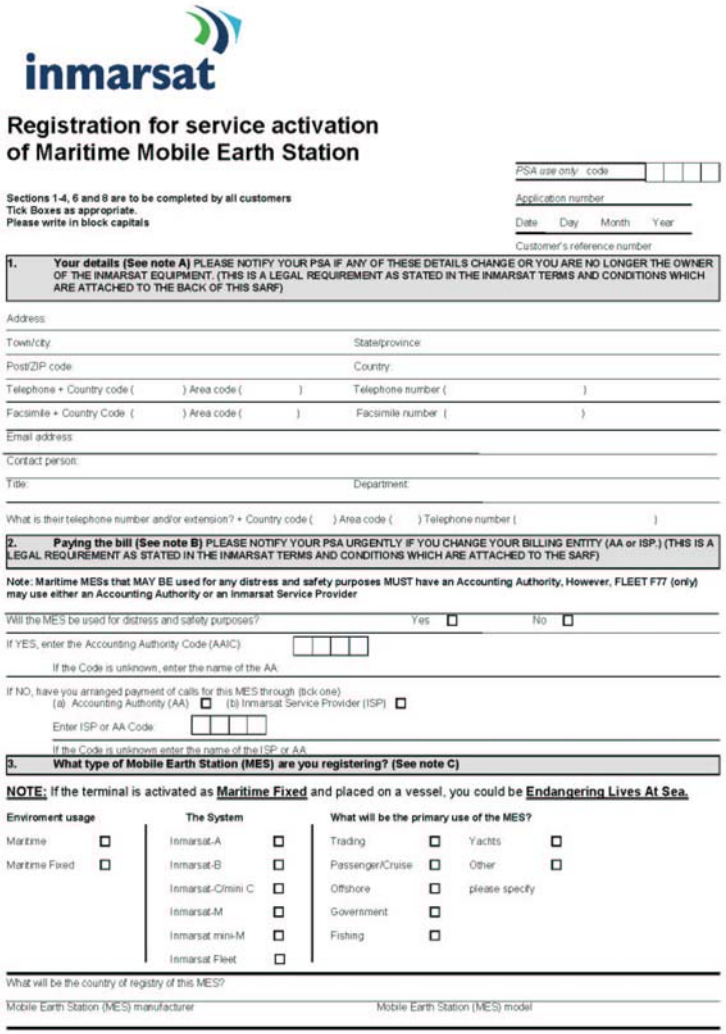
[4] Before the first activation of the data reporting this will read "none".

4 REGISTRATION

Before use of the TT-3000SSA system on the Inmarsat-C system the supplied easyTrack must be registered to the system, which involves a little paper work. This is done using the SARF (Service Activation Registration Form) supplied with the TT-3000SSA.

The SARF for registration of Maritime MES can also be found on www.inmarsat.org (CUSTOMER SUPPORT -> SERVICE ACTIVATION). The site also contains notes on how to complete the maritime form.

The TT-3000SSA includes a registration form for Maritime Mobile Earth Stations. The Service Activation Registration Form contains different abbreviations that will be explained here.



inmarsat

Registration for service activation of Maritime Mobile Earth Station

PSA use only: code

Application number

Date Day Month Year

Customer's reference number

Sections 1-4, 6 and 8 are to be completed by all customers
Tick Boxes as appropriate.
Please write in block capitals

1. Your details (See note A) PLEASE NOTIFY YOUR PSA IF ANY OF THESE DETAILS CHANGE OR YOU ARE NO LONGER THE OWNER OF THE INMARSAT EQUIPMENT. (THIS IS A LEGAL REQUIREMENT AS STATED IN THE INMARSAT TERMS AND CONDITIONS WHICH ARE ATTACHED TO THE BACK OF THIS SARF)

Address:

Town/city: State/province:

Post/ZIP code: Country:

Telephone + Country code ( ) Area code ( ) Telephone number ( )

Facsimile + Country Code ( ) Area code ( ) Facsimile number ( )

Email address:

Contact person:

Title: Department:

What is their telephone number and/or extension? + Country code ( ) Area code ( ) Telephone number ( )

2. Paying the bill (See note B) PLEASE NOTIFY YOUR PSA URGENTLY IF YOU CHANGE YOUR BILLING ENTITY (AA or ISP.) (THIS IS A LEGAL REQUIREMENT AS STATED IN THE INMARSAT TERMS AND CONDITIONS WHICH ARE ATTACHED TO THE SARF)

Note: Maritime MESs that MAY BE used for any distress and safety purposes MUST have an Accounting Authority, However, FLEET F77 (only) may use either an Accounting Authority or an Inmarsat Service Provider

Will the MES be used for distress and safety purposes? Yes ☐ No ☐

If YES, enter the Accounting Authority Code (AAIC):

If the Code is unknown, enter the name of the AA:

If NO, have you arranged payment of calls for this MES through (tick one)
(a) Accounting Authority (AA) ☐ (b) Inmarsat Service Provider (ISP) ☐

Enter ISP or AA Code:

If the Code is unknown enter the name of the ISP or AA:

3. What type of Mobile Earth Station (MES) are you registering? (See note C)

NOTE: If the terminal is activated as **Maritime Fixed** and placed on a vessel, you could be **Endangering Lives At Sea.**

Enviroment usage		The System		What will be the primary use of the MES?			
Maritime	☐	Inmarsat-A	☐	Trading	☐	Yachts	☐
Maritime Fixed	☐	Inmarsat-B	☐	Passenger/Cruise	☐	Other	☐
		Inmarsat-C/mini C	☐	Offshore	☐	please specify	
		Inmarsat-M	☐	Government	☐		
		Inmarsat mini-M	☐	Fishing	☐		
		Inmarsat Fleet	☐				

What will be the country of registry of this MES?

Mobile Earth Station (MES) manufacturer Mobile Earth Station (MES) model

Figure 26 Page 1 of the Service Activation Registration Form

The Service Activation Registration Form includes information needed to find out how to pay for the Inmarsat-C service. The

TT-3000SSA easyTrack MES must be registered directly at an Accounting Authority and payment will be done directly to this Accounting Authority.

In addition to the general information like name, address, etc. the ISN of the easyTrack MES must be specified. The ISN is located on the Delivery Note and in the bottom of the easyTrack MES.

For the TT-3000SSA registration the following guidelines should be followed:

- Select YES in section 2. "Will the MES be used for distress and safety communication"
- Select MARITIME in section 3. "Environmental usage"
- Select INMARSAT-C/MINI-C in section 3. "The System"
- Write TT-3000SSA in section 3. "MES model"
- Select OTHER in section 3. "What will be the primary use of the MES"
- Write "Ship Security Alert System" section 3. "please specify"
- Update section 6. on Distress and safety /Emergency Contact Details.

5 FUNCTION AND TESTING OF THE TT-3000SSA

This chapter describes the function of the TT-3000SSA and how to test the system.

5.1 OPERATING THE SYSTEM

How to operate the system differs on a few points between a standard activation mode (Opt. 911/912) and the instant activation mode (Opt. 914/915).

- Standard activation mode: Please read section 5.1.1
- Instant activation mode: Please read section 5.1.2

5.1.1 STANDARD ACTIVATION MODE OPERATION

When the system is operational, the green test button emits constant light. This includes a working satellite link, established automatically by the transceiver.

To send a covert ship security alert the lid of one of the covert alert buttons must be lifted and the button must be pressed. The button is latched and will stay pressed. After 30 – 33 seconds the transceiver will send a ship security alert. Keeping the button in its pressed state for at least 33 seconds guarantees initiation of ship security alert.
Pressing the covert alert button again (unlatching the button) before the 30 seconds has expired will cancel the alert. Keeping the button unlatched for at least 3 seconds guarantees cancellation. The green test button lamp will be flashing slowly indicating a cancelled alert. Press the green test button to clear the indication (stop the flashing).
Unlatching the alert button after the 33 seconds will not clear the initiated alert. In general when cancelling or reinitiating a covert alert, leave the covert alert button released for at least 3 seconds before activating the button again to ensure that the transceiver has detected the state of the button.

The two Covert Alert Buttons operate individually. If both alert buttons are pressed, two alerts will be sent.

If one or more of the Covert Alert Buttons are kept pressed (latched), a SSA Message will be send every 30 minute until all keys are unlatched.

The Ship Security Alert, when activated, does not cause any alarm or indication on the ship.

5.1.2 INSTANT ACTIVATION MODE OPERATION

When the system is operational, the yellow test button emits constant light. This indicates a working satellite link, established automatically by the transceiver.

To send a covert ship security alert the lid of one of the covert alert buttons must be lifted and the button must be pressed. This will immediately initiate transmission of a SSA Message. The system will continue sending updated SSA Messages with a 30 minute interval. The repeated transmissions can only be cancelled by sending a **SSA Test Message**. Refer to section 5.2.3 for information on how to send a SSA Test Message.

The two Covert Alert Buttons operate individually. If both alert buttons are pressed, two alerts will be sent.

The Ship Security Alert, when activated, does not cause any alarm or indication on the ship.

5.2 TESTING THE SYSTEM

5.2.1 TEST BUTTON LIGHT PATTERN

When not pressed, the light in the test button should be ON and not flashing.

In case the test button is flashing slowly (1.5s ON, 1.5s OFF), one of the covert alert buttons have been pressed and then released again before initiating an alert transmission. Press

and release the test button to clear the indication. This situation is not applicable for instant activation mode operation.

In case the test button light is permanently off, some sort of error exists. The reasons may be:

Reason:	**Solution:**
Error in basic TT-3000SSA system	Check that the system is installed correctly and powered on.
No satellite link	Check line of sight between TT-3026M and the satellite. Optionally connect a DTE to get more information.
No GPS fix	Check line of sight between TT-3026M and the GPS satellites. Optionally connect a DTE to get more information.
Missing configuration	Add at least one destination address; refer to section 3.4.3.
Missing button test	The transceiver is continuously scanning the alert buttons to detect errors. In case an error is detected, the test button light is turned off and it won't turn on again before the error is corrected and a successful button test has been completed. Perform the test as described in section 5.2.2.
Button error	Check wiring and buttons. Perform the button test sequence as described in section 5.2.2.
Test button light does not work	Check bulb (diode) and wiring by connecting the white wire to GND (yellow wire). The light should be on.

Table 4 Reasons for missing light in test button

5.2.2 INSTALLATION AND WIRING TEST INSTRUCTION

It is possible for covert alert buttons, wiring and lamps to be tested locally, without transmitting, by means of the TT-3000SSA being put into a special test mode. The operator is informed via the test lamp in the Test Button that the covert alert buttons are under test. The operator should cancel the test mode if a real covert alert needs to be sent.

The test button is not latched and must be kept pressed while performing the test instructions.

Step 1. Make sure all latched buttons are released. Cancel a slow flashing signal if present (ref. section 5.2.1). ..... Proceed to step 2

Step 2. Press the test button. Observe[5] a 0.3s flash every 10s. Release the test button. Observe a steady state (normally ON, but may be OFF; refer to section 5.2.1)
- If OK ..... Proceed to step 3
- Otherwise ..... Proceed to step 9

Step 3. Press the test button (which must be held during the entire test)
- If a 0.3s flash[5] is seen every 10s ..... Proceed to step 4
- If the light is now **flashing quickly** the *system is in test mode but one of the alert buttons seems to be pressed* ..... Go back and verify step 1
- Otherwise the *system is faulty* ..... Proceed to step 8

Step 4. Press alert button. The test button must be flashing quickly (0.3s ON, 0.3s OFF). Release the alert button. The test button must be back to one 0.3s flash every 10s.
- If OK ..... Proceed to step 5
- Otherwise the *system is faulty*. ..... Proceed to step 8

Step 5. If more alert buttons to test ..... Proceed to step 4
- Otherwise release the test button .. Proceed to step 6

[5] For software versions less than 2.21 no flash will be present, thus the test button will be permanently OFF.

Step 6. Inspect the light in the test button

- If the light in **ON** the *system is* operating ..... Proceed to step 7
- Otherwise the *system may not be functional*..... Proceed to step 8

Step 7. Test completed successfully

- The test procedure succeeded

Step 8. The test procedure failed. There can be several reasons for this.

- If the light was constantly **Off** these fault conditions are the most likely:
  - Test button lamp failure
  - Power failure
  - Wiring fault
  - Test button function fail
  - Transceiver unit or wiring failure

To avoid false alerts being initiated due to a failing test button, the testing of alert buttons must not be performed in case the test button is not working correctly.

- If the **flash indication** in step 4 was **missing**, these fault conditions are the most likely:
  - Alert button failure.
  - Wiring fault

- If the light does not turn **Off** in step 2, these fault conditions are the most likely:
  - Test button failure (contact element)
  - Wiring fault

- If the light does not turn **On** in step 6, or if the light turns **Off** again after a moment of operation, then refer to section 5.2.1 for further explanation.

Step 9. Try shorting I/O6 and GND in the interconnection box. This should result in test mode being entered.
• If so, the button and/or the wiring are erroneous. Fix the problem and start from step 1 again.
• If not, either the bulb in the test button does not work (refer to Table 4) or an error exists in the basic TT-3000SSA system (Check the installation).

It is recommended that the test is performed at regular intervals.

5.2.3 TRANSMISSION TEST

When the covert alert button is pressed during test mode the test light is flashing quickly indicating the button is working.

If the covert alert button is kept pressed for 30 seconds a SSA Test Message will be transmitted to all programmed destination addresses configured for reception of SSA Test Messages (refer to section 3.4.3). This timing applies to both standard activation mode and instant activation mode.

It will be clearly identified that it is a SSA Test Message. The SSA Test Message also includes a list of all recipients for SSA Messages.

An example is shown in Figure 27.

```
----------- TEST TEST TEST TEST TEST TEST  -----------
Mobile Terminal No   : 492380023
To CES               : 304
Position             : 55 47.63'N 012 31.34'E
Position updated     : 11:07 2004-06-18 UTC
Nature of distress   : Piracy/armed attack
Course               : 291         Speed : 1
Activation           : Covert/Security Alert
Position activated   : Yes
Course/Speed updated : Yes
-This message is for test purposes, please disregard--
Ship name:  M/S Thrane
Ship owner: Thrane & Thrane
Flag state: Denmark
Code 1:     1234567890
Code 2:     Alpha1234

Covert message setup (changed recently):
Destination type     : E-mail
Address              : aaaa@tt.dk
Parameter            :
Usage                : Msg
Destination type     : PSTN
Address              : 4539558888
Parameter            : t30
Usage                : Msg+Test
Destination type     : E-mail
Address              : cccc@tt.dk
Parameter            :
Usage                : Test


++++
```

Figure 27 SSA Test Message during test mode

It is also possible for the TT-3000SSA signal path to be tested including special alert test transmissions without interfering with the Ship Security Alert System.

This can be done by requesting a LESO in the Inmarsat-C system to perform a PVT (Performance Verification Test) on the mobile under test.

The LESO operator returns the result of the test, which is either that the mobile passed or failed the test. A written result might look like:

```
Test     Id  Group     Start time        End time          Overall result
pvt test ssm subsystem 20031028 15:07:45 20031028 15:17:07 finished pvt
```

Requirements for testing is defined by the competent authority.

6 TECHNICAL SPECIFICATION

Model	TT-3000SSA
General Specifications	Meets all INMARSAT specifications for the Inmarsat mini-C Network for Land mobile and Maritime terminals. R&TTE
Transmit Frequency	1626.5 to 1660.5 MHz. note 1
Receive Frequency	1525.0 to 1559.0 MHz. note 1
Channel Spacing	5 / 2.5 kHz.
Modulation	1200 symbols/sec BPSK.
Data Rate	600 bit/sec.
Terminal Interface	EIA/TIA-232-E DTE interface. CCITT Rec.V.24/28, 4800-115000 Baud IA-5 code
System Set-up	S-RAM Battery backup
I/O Interface @ max. 20 meter cable	Six dedicated In/Out pins. Open collector. Sinks 25 mA each.
I/O Interface @ max. 50 meter cable	Six dedicated In/Out pins. Open collector. Sinks 19 mA each.
DC Power Source @ max. 20 meter cable. Limited power sources <100VA	10.5 to 32 V floating DC Max limit 100VA Max current 4A Max power 32W Power: RX: 1,8W, TX: 23 W @ 12V supply
DC Power Source @ max. 50 meter cable. Limited power sources <100VA	16 to 32 V floating DC Max limit 100VA Max current 2A Max power 32W Power: RX: 1,8W, TX: 23W @ 16V supply
Fuse	Self recovering Poly fuse
Ambient Temperature	-35°C to 70°C operating -40°C to 80°C storage.
Dimensions	Ø=163 mm H: 143 mm
Weight	1.10 kg

Note 1: *Inmarsat-C frequencies: TX: 1626,5 – 1646,5 MHz*
RX: 1530 – 1545 MHz

Operating system	The TT-3026M easyTrack makes use of eCos™ operating system.
Inmarsat-C Protocol support	Polling and data reporting with automatic transmission of position reports down to a recommended minimum of 1 per 5 minutes. Program Unreserved Data reporting Inmarsat Ship Security Alert protocol Automatic ocean region shift for global coverage; 24hour scanning for strongest signal; scanning on signal loss
TT3026M easyTrack Transceiver	Inmarsat-C/GPS omnidirectional antenna, RHC polarised. G/T: -23,7 dB/K at 5° elevation EIRP: 7 dBW dB at 5° elevation.
Enclosure notation	Lloyds approved for IP 66; T&T tested for IP68
Ice	Up to 25 mm.
Velocity	Max velocity up to 140 km/hour (87mph).
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
Cable for alert and test buttons	Max. length 150m Flexible data cable Type CD 305 FRNC 4 x 0.25mm2. Temperature range, unmoved: -40°C to 85°C. No flame propagation acc. to IEC 60332-3-24+ EN 50266-2-4 + VDE 0482 part 266-2-4as well as flame retardant and self-extinguishing acc. to IEC 60332-1 + EN 50265-2-1 +VDE 0482 part 265-2-1.

Table 5 Technical Specifications

7 MAINTENANCE GUIDELINES

When properly installed the TT-3026M needs no maintenance. After approximately 10 years an internal battery has to be replaced[6], and the transceiver must be sent for service.

7.1 HANDLING PRECAUTIONS

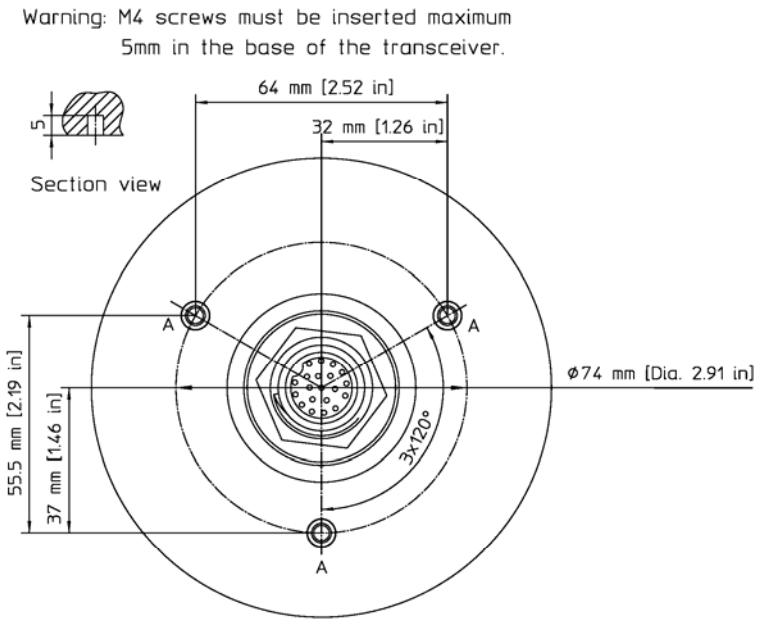
- Do not expose the transceivers parting line (the blue styling gasket) & connector to high-pressure water jets.
- Exposure of chemical containing alkalis may result in physical degradation of the transceiver.
- Do not expose the transceiver to acid curing silicone.
- Avoid contact with solvents.

Do not paint the transceiver. If it's absolutely necessary to paint the transceiver, ideally water-based paints or paint system based on mild solvents should be selected.

[6] The battery life time is limited by age, not power consumption, thus the battery life time is not extended by having the system powered on.

8 APPENDIX A – MOUNTING

8.1 MOUNTING GUIDE

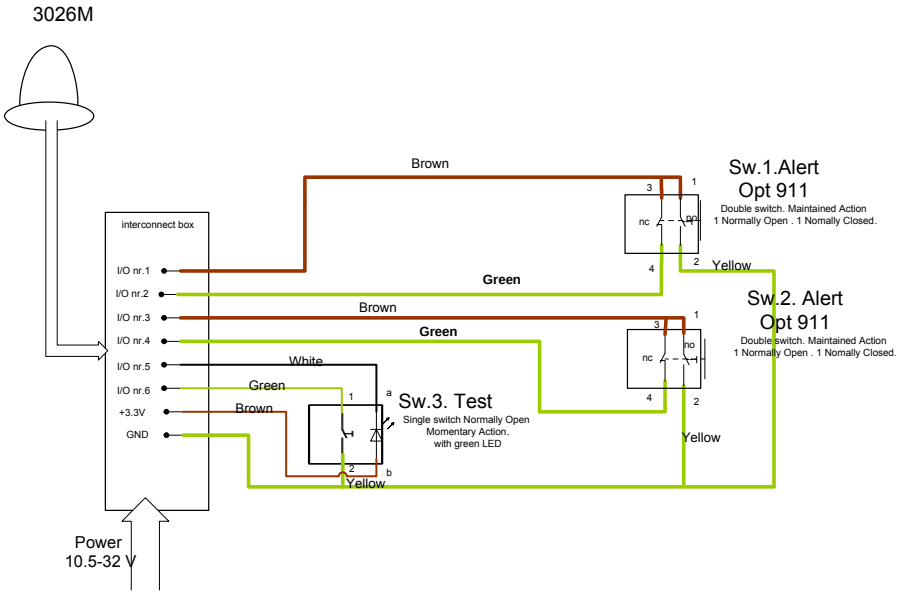


Maximum rotational force required to pull the insert out: 1,2 Nm.

For connector: Drilled hole 32mm (1.26") diameter
A: 3 x Drilled holes 5mm (0.2") diameter for M4 screws.

9 APPENDIX B – STANDARD WIRING

TT-3000SSA Ship Security Alert System. Schematic



10 APPENDIX C – ACCESSORIES

Capsat® Ship Security Alert System TT-3000SSA Accessories List

Product number:	**Product description:**
TT-3000SSA	Capsat® Ship Security Alert System incl. TT-3026M easyTrack w. opt. 101 pole mount, interconnection box, a 20-meter cable, two alert button and one test button all with 50-meter cable
	Options:
Opt. 101	1" Pole Mount Kit
Opt. 103	Railing/Angular Mount Kit
Opt. 911	Red alert button - latched. For standard activation mode.
Opt. 912	Green test button. For standard activation mode.
Opt. 914	Red alert button – non latched. For instant activation mode.
Opt. 915	Yellow test button For instant activation mode.
Opt. 940	Connection Cable, 5 meter with 90 degrees angular plug
Opt. 941	Connection Cable, 5 meter
Opt. 942	Connection Cable, 10 meter
Opt. 943	Connection Cable, 20 meter
Opt. 947	Connection Cable, 50 meter

TT10220SSA	SSA Capsat® Manager Fleet Tracking Software on CD-Rom incl. World Map. Runs under Windows 98, Windows NT 4.0 or higher, Windows 2000 and Windows XP.
	Accessories:
TT-3616B	Interconnection Box (earlier generation)
TT-3616D	Interconnection Box
TT-3682C	AC/DC Desktop Power Supply

11 APPENDIX D – CABLE INSTALLATION RULES

The cables delivered with the buttons for the Thrane & Thrane TT-3000SSA Ship Security Alert System are as a minimum tested for fire propagation/flame retardation according to IEC 60332-3 Category C.

The installation requirements applied must be in accordance with the relevant Classification Societies rules for the specific cable. For cable specification please refer to *Chapter 6 Technical Specification*. For installation rules please refer to the relevant IEC Publication and Classification Society rules.

Please be aware of the mechanical strength of the supplied cable. The cables are chosen for the purpose of covert installations and are not resistance towards harsh treatment during installation and long lasting mechanical influence.

Alternatives to the T&T cables can be used if the cables are identical or better than the T&T cables and the installation is done in accordance with Classification Societies rules. In order to gain approval of the installation by the relevant Classification Society, please note the following minimum technical Thrane & Thrane requirements:

- The cross-sectional area of conductors must be 0.25mm2 or greater.
- The length of the cable must not exceed 150 meters.
- An individual cable must be used for each button.
- The conductor resistance must be less than 85Ω/km

12 APPENDIX E – INSTALLATION HELP FORM

Completing this form prior to installation helps the installation process.

The ship owner accepts responsibility for specifying, controlling and storing password in a secure manner in accordance to ISPS code, accepts responsibility for ensuring that the SSA Message address is pre-configured in the mobile in accordance to Flag Administration and accepts responsibility for testing the system at regular intervals.

Mobile number: | | | | | | | | | |

Password: | | | | | | | | | | | | | | | |

Addressees	Destination type (TELEX, FAX, X25, e-mail)	Number or address
Addressee no. 1		
Addressee no. 2		
Addressee no. 3		

Supplementary free text	

TT-3000SSA first time configuration □ or Change of ownership □

(If the password is unknown in case of change of ownership, the TT-3000SSA must be sent back to manufacturer for initialisation)

13 APPENDIX F – ADDITIONAL ALERT BUTTONS.

In case 2 alert buttons are not sufficient, it is possible to add up to 4 extra buttons (resulting in a total of 3 buttons per set of I/Os), provided:

- The normally unused white wire is taken into use as shown in Table 6 (and Figure 28 & Figure 29).
- The wiring is changed according to Figure 28 or Figure 29.

Each button consists of 2 switches: a normally open switch, and a normally closed switch. When adding additional alert buttons, the normally open switches are connected in parallel, and the normally closed switches are connected in series.

Figure 28 shows how to add 2 buttons on one group of I/O's. The function of the buttons: Alert activation and testing, will be the same as with one button.

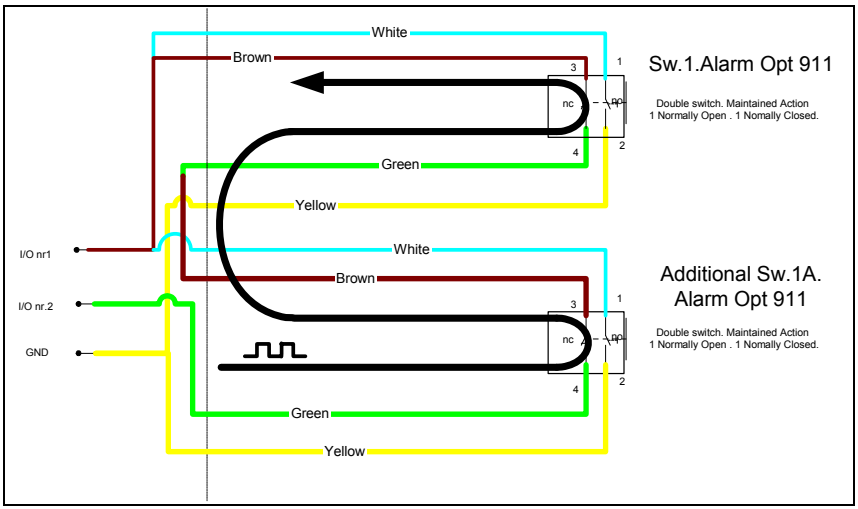


Figure 28 2 alert buttons in one set of I/O's

Figure 30 shows how to add 3 buttons on one group of I/O's. The function of the buttons: Alert activation and testing, will be the same as with one button.

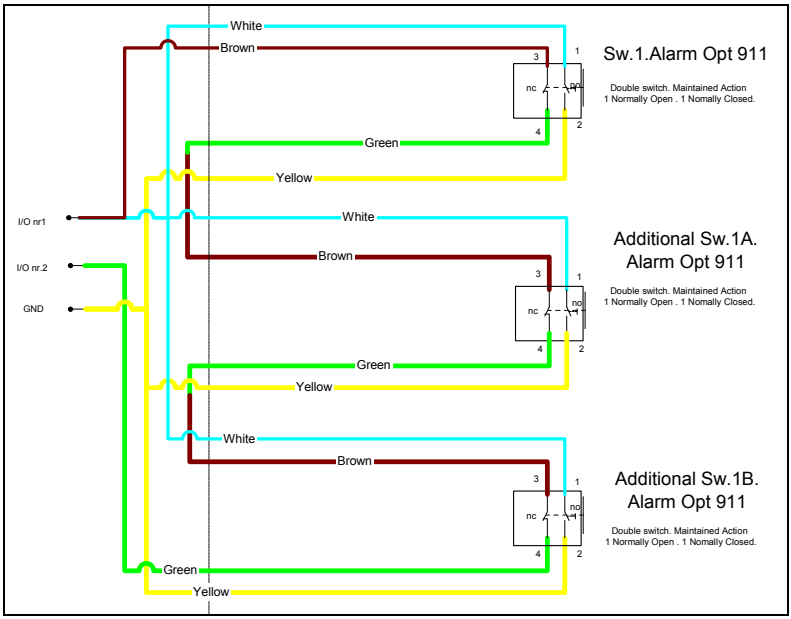


Figure 29 3 alert buttons in one set of I/O's

MODIFICATION OF A STANDARD ALERT BUTTON TO ADDITIONAL ALERT BUTTON :

The wire with the standard alert button has 4 leads, of which only 3 are used. When used as additional alert button all 4 leads must be connected as described in table 6.

Button Pin nr	Colour of wire
1	White
2	Yellow
3	Brown
4	Green

Table 6 Wiring of additional alert buttons

Note the heat shrink tube that takes the strain of the soldering.

Figure 30 4 wires on additional alert button

CONNECTING MORE ALERT BUTTONS IN THE INTERCONNECTION BOX:

Figure 28 and Figure 29 shows how the wires are connected to GND, I/O 1 and I/O 2 in the interconnection box. The same is done when using I/O 3, I/O 4 and GND.

To ease the installation process some of the transceiver I/O's have been connected to more than one terminal in the TT-3616D Interconnection Box. On both J202 and J205 two adjacent terminals are connected together to simplify connection of the green and brown wire.

When connecting 3 alert buttons, please use the colour code template shown in Figure 31 (can be copied, cut out and placed as shown in Figure 32).

When connecting 4 alert buttons, please use the colour code template shown in Figure 33 (can be copied, cut out and placed as shown in Figure 34).

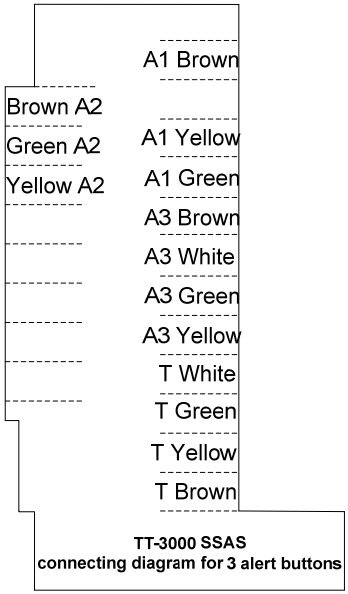


Figure 31 Colour code template for 3 alert buttons

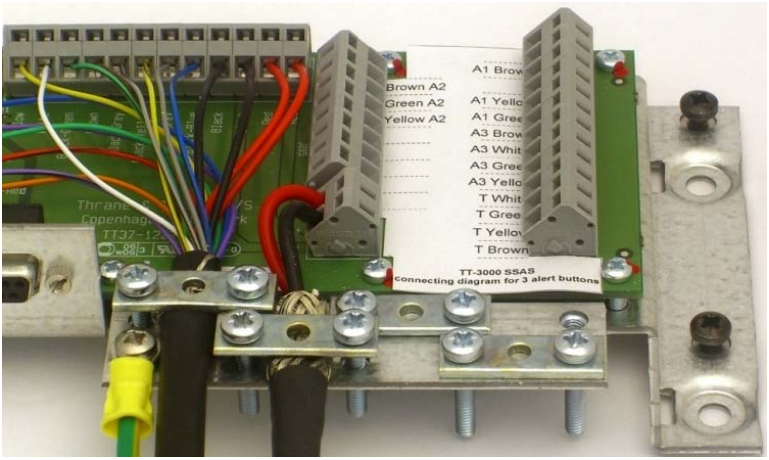


Figure 32 Use of button template - three alert buttons

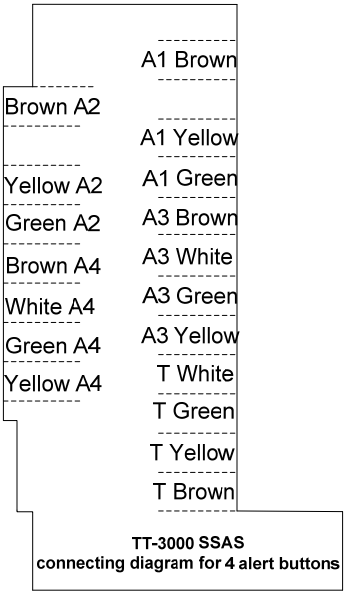


Figure 33 Colour code template for 4 alert buttons

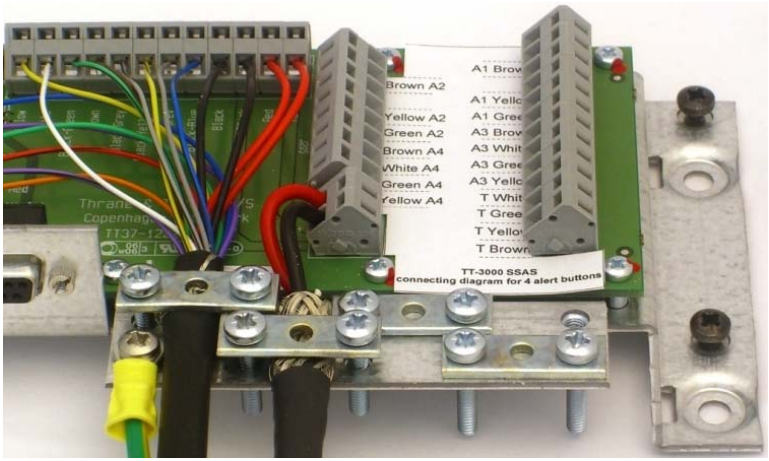


Figure 34 Use of button template - four alert buttons

14 APPENDIX G – USE OF SPECIAL ACCESS CODE.

This appendix gives some guidelines for the usage of SSA Message Destination Type 6 (SAC).

The configuration of SAC depends on which LES is used for the actual transmission. As described in section 2.2, it is not possible to guarantee which LES will be used for an SSA Message transmission, thus the use of SAC is not recommended for primary routing. It's **mandatory** to set up the preferred LES when using SAC. For set up of preferred LES, please refer to section 3.4.4.

14.1 SAC EXAMPLE FOR SMS:

Example of setting up the third addressee to SMS destination 4512345678 via TELENOR LES:

```
: se -am 2,6,4512345678,66<enter>
```

Example of setting up the third addressee to SMS destination 4512345678 via XANTIC LES:

```
: se -am 2,6,4512345678,696<enter>
```

Example of setting up the third addressee to SMS destination 4512345678 via France Telecom:

```
: se -am 2,6,SMS+4512345678,29<enter>
```

14.2 SAC EXAMPLE FOR E-MAIL:

Example of setting up the third addressee to SAC destination **e-mail** with additional addressing "TO:support@tt.dk" included. This is LES specific and this example is for e-mail with Beijing LES.

```
: se -am 2,6,TO:support@tt.dk,e-mail<enter>
```

Corresponding setting up of Beijing LES as preferred LES in POR and IOR:

```
: se -m 0,0,211,311<enter>
```

15 APPENDIX H – USING A TT-3616B

This chapter describes how the system is connected using a TT-3616B Interconnection Box (earlier generation interconnection box).

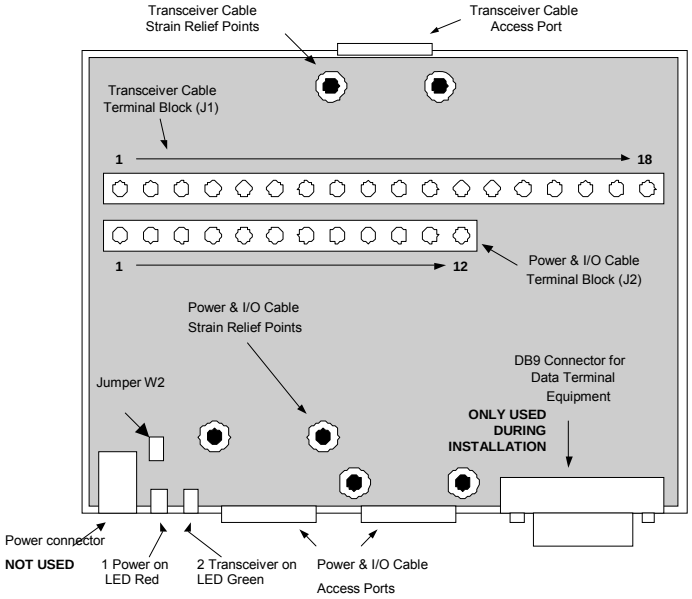


Figure 35 TT-3606B Interconnection Box.

15.1 THE TRANSCEIVER CONNECTION CABLE

The transceiver connection cable is used to connect the TT-3026M easyTrack to the Interconnection Box.

15.1.1 TERMINAL BLOCK J1

The **J1** terminal block in the Interconnection Box is labelled by wire color. Connect the Transceiver cable as directed by these labels. The terminal numbers, colours and functions are explained in Table 3.

Number on Terminal Block J1	Wire colour in transceiver cable	Function
1	Red	DC+
2	Red	DC+
3	Black	DC-
4	Black	DC-
5	Black/Violet	3V3 out
6	White	GND
7	Black/Blue	I/O 1
8	Grey	I/O 2
9	Black/Yellow	I/O 3
10	Black/Grey	I/O 4
11	Brown	I/O 5
12	Black/Green	I/O 6
13	Yellow	Remote On/Off
14	Orange	GND
15	Blue	CTS
16	Violet	RTS
17	Green	RD
18	Black/Red	TD
Stain relief Bracket	Cable shield	GND

Table 7 Transceiver-cable terminal block

15.1.2 GROUNDING

Make sure that the shield of the cable is connected to a proper ground. Use the screws of the cable strain relief bracket.

15.2 CONNECTING ALERT BUTTONS AND TEST BUTTON

The Covert Alert Buttons and the Test Button are connected to terminal block **J2** in the Interconnection Box. The **J2** terminal block is labelled by pin function, as illustrated in Table 8, the Function column.

Number on Terminal Block J2	Function	TT-3000SSA wiring
1	DC+	To ship's main power with backup
2	DC-	To ship's main power with backup
3	3V3 out	Test button: Brown
4	GND	Yellow wires from all 3 buttons
5	I/O 1	Brown wire from Alert button 1
6	I/O 2	Green wire from Alert button 1
7	I/O 3	Brown wire from Alert button 2
8	I/O 4	Green wire from Alert button 2
9	I/O 5	White wire from test button
10	I/O 6	Green wire from test button
11	Remote On/Off	**IMPORTANT ! MUST BE CONNECTED TO GND** pin 12
12	GND	Must be connected to pin 11

Table 8 Power & I/O cable terminal block

The wires of the buttons are connected to the terminals of J2 as described in Table 4. Refer to Appendix B for wiring schematic of the TT-3000SSA system.

15.3 Power Connection

The power connection input is floating, (i.e., there is no galvanic connection from any of the battery poles to the connector housing).

Connect external power to J2 terminal no. 1 and no. 2 in the Interconnection Box. Ref. table 4

15.4 Power Requirements

The TT-3000SSA is designed to operate on floating DC in the range 10.5 - 32 V when using 20-meter transceiver connection cable and 16 - 32 V when using 50-meter transceiver

connection cable, which makes an AC/DC converter needed, in case the system works in an AC environment.

NOTE the requirement for floating DC of minimum 16 V when using transceiver connection cable longer than 20 meters. This is important for the operation of the TT-3000SSA system.

To satisfy the IMO requirement on alternative source of power the TT-3000SSA shall be connected to a power supply that has emergency battery switch-over in case of drop-out on normal supply.

15.5 Other functions of the Interconnection Box

The DB9 Connector is connected to Data Terminal Equipment using a standard DB9 to DB9 Modem cable. A DTE is not approved in the TT-3000SSA Ship Security Installation using software versions older that 2.21 and for those systems the port must only be used during configuration of the system.

The green LED 2 indicates DC out, i.e. the transceiver is running.

Jumper W2 enables the red LED 1, which indicate DC in. Use a jumper pin on W2 to enable this visual indication. This is optional.

+++