TronTracker

RA10 Receiver

Installation manual

JOTRON
Performance for Life

Document revision log				
A	20.01.26	Initial version	KH	PKS
Rev	**Issue Date (DD.MM.YY)**	**Reason for Issue**	**Author**	**Approval**

About this manual

This manual guides you through the installation of your RA10 Receiver. Manuals for the other TronTracker products can be downloaded from jotron.com. Please note that screenshots in this manual may differ slightly from the current user interface due to continuous updates and improvements to the software.

This manual applies to hardware rev. 2327 and software v1.0 or later. For software update details, refer to the mobile app release notes.

Safety instructions

ELECTRICAL SHOCK HAZARD:
Warning! Do not open the equipment!
Only qualified personnel should work inside the equipment.

TOXIC HAZARD:
Warning! Some RF semiconductor devices used in this equipment may contain Beryllium Oxide. If inhaled, dust from this oxide can be toxic. No danger will arise from normal handling, but no attempt should be made to tamper with these devices. On no account must these transistors be destroyed or discarded with industrial or domestic waste but should be returned to the manufacturer for subsequent disposal or to a suitable destination facility that can safely handle the electronic waste.

ELECTROSTATIC SENSITIVE DEVICE:
Important! This equipment contains CMOS integrated circuits. Observe handling precautions to avoid static discharges which may damage these devices.

Important! Jotron is not liable and cannot be held responsible for any injury or damages caused directly or indirectly by an error or omission of information, incorrect or misuse, breach of procedures or failure of any specific component or part of this product.

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1 System description

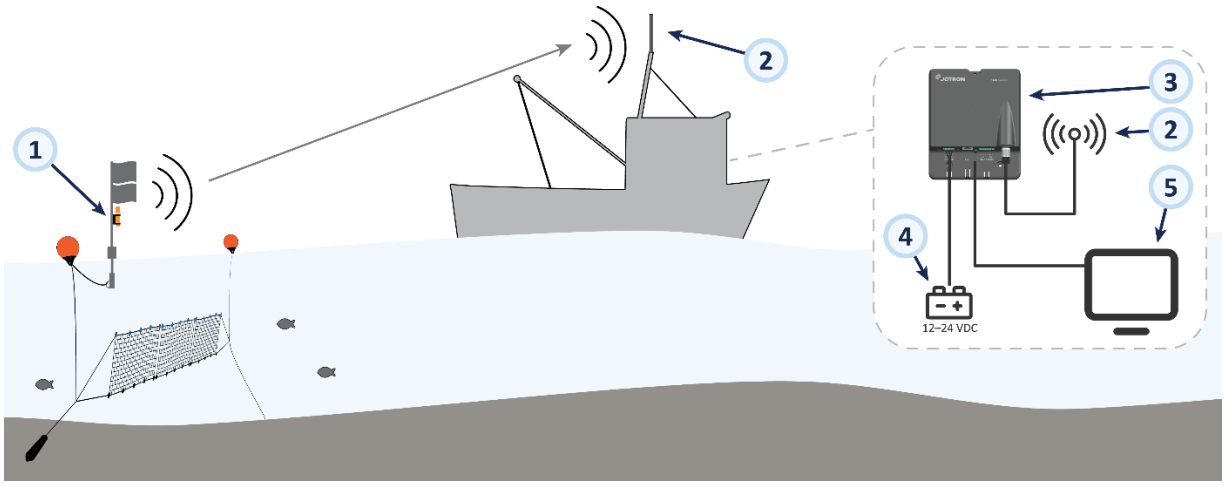
TronTracker is an innovative tracking system designed for tracking objects, such as fishing gear, enabling precise and efficient equipment retrieval. The system combines an integrated tracker and receiver to deliver accurate positioning, enhance safety, and optimize resource management.

The TronTracker system operates as an AMRD-B device on 160.900 MHz. It is a trusted and compliant alternative to the unauthorized use of maritime AIS tracking devices.

The TA10 Tracker is equipped with a rechargeable lithium battery, offering long operational life and reliable performance even in low temperatures. It can be easily detached for charging using the dual inductive charger BC10.

The RA10 Receiver integrates seamlessly with the vessel's chart system, displaying the precise location of objects for efficient tracking and retrieval.

Any vessel equipped with a Receiver can view gear marked by other trackers operating on the same frequency. This promotes collaboration, information sharing, and helps reduce gear loss and marine waste.



Item no.	Description
1	TA10 Tracker installed on a fishing buoy
2	VHF antenna
3	Receiver installed in a vessel
4	Power supply (12–24 VDC)
5	Chart system connected to the Receiver with an NMEA 0183 or LAN connector

2 Installation

2.1 Mounting the Receiver

It is recommended to mount the Receiver vertically with the connectors facing downward to reduce the risk of water ingress. Ensure it is installed in a location protected from water splashes.

Secure the Receiver using three screws, see Figure 1. Use screws that are suitable for the mounting surface. The hole diameter on the Receiver is 4.8 mm.

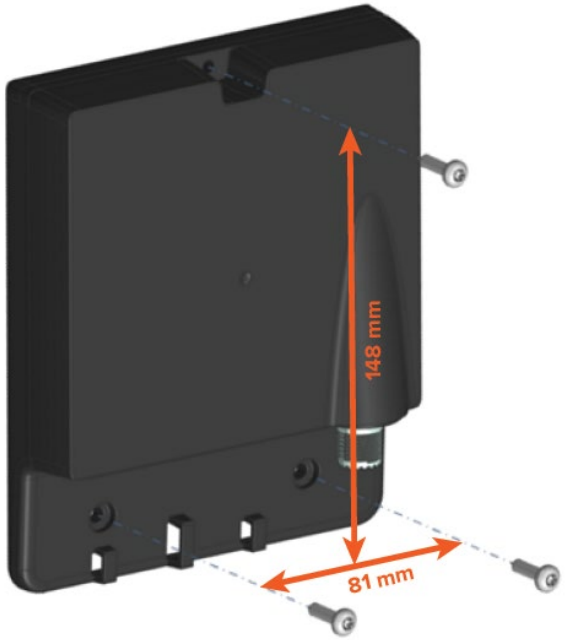


Figure 1 - RA10 installation

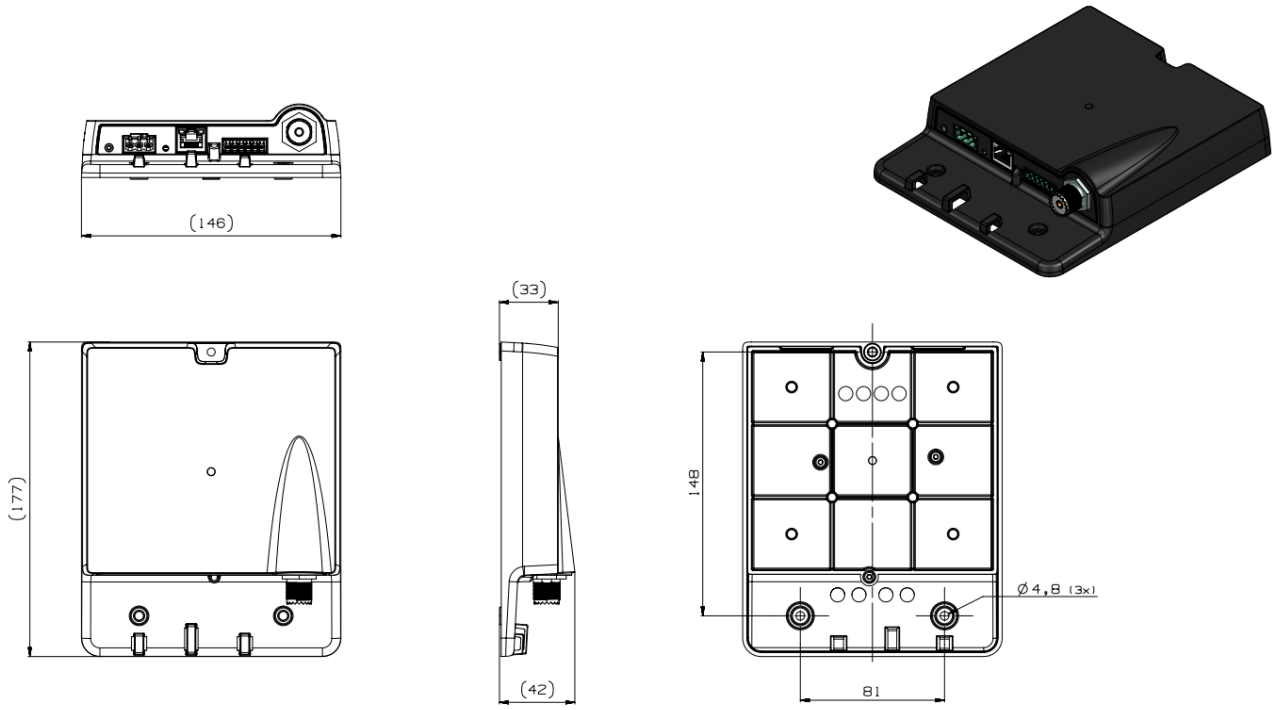


Figure 2 - RA10 dimensions (all dimensions in millimeters)

2.2 Connecting the components

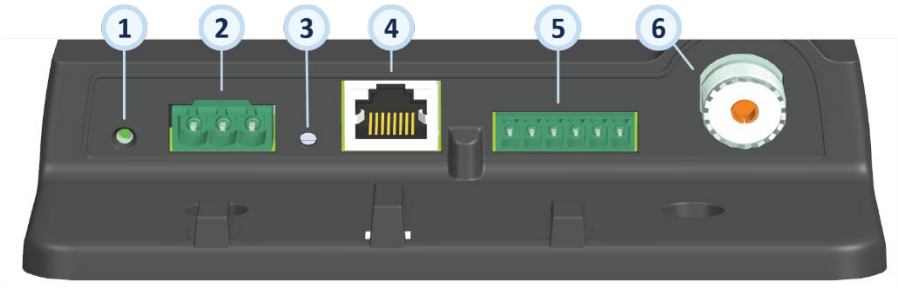
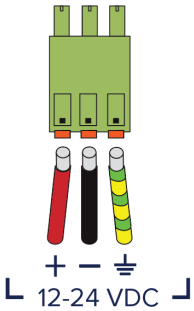


Figure 3 - RA10 connection ports

Item no.	Description
1	Power LED
2	Power connector
3	Reset
4	LAN connector
5	NMEA 0183 connector
6	Antenna (SO-239) connector

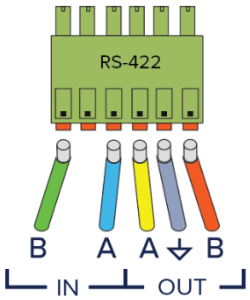


Power

The Receiver shall be powered by a 12–24 VDC supply. A power plug is supplied with the Receiver.

The Receiver must be connected to the vesselʼs ground to ensure optimal radio performance.

Once connected, the green indicator light on the left side of the power connector will light up.



Communication

To connect to an electronic chart system, use either the supplemented NMEA 0183 (RS-422) connector or a LAN connector. It is not required to have both NMEA 0183 and LAN connected at the same time.

The default baud rate for NMEA is 38400 bps, and can be changed by using the TronTracker app.

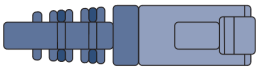
NMEA 0183 connector

The RS-422 plug on the Receiver is marked with A and B according to the NMEA standard. The labels IN and OUT in the illustration are shown from the perspective of the Receiver unit.

To connect it correctly to your chart plotter:

- Connect wire A (OUT) from the Receiver to the corresponding A (IN) on the chart system
- Connect wire B (OUT) from the Receiver to the corresponding B (IN) on the chart system
- Connect the shield (OUT) wire (⏚) to the cable shield only.

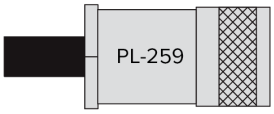
Note that IN connections (A and B) are only used for two-way interaction with the chart plotter, and in many cases not required.
Do not connect ground IN-shield wire (pin 2).



LAN connector

The Receiver is a single port device with a single 8-way RJ-45 100BASE-TX connector. It is recommended to use a CAT5 STP cable with a length up to 100 meters.

If the LAN connector is not in use, please use the supplemented dust cover.



Antenna

The antenna should be installed in the same manner as a VHF-radio installation. To ensure the best possible performance, please follow these guidelines:

- Place the antenna as high as possible, away from conductive materials and sources of electromagnetic noise such as LED navigation lights, radars, and other transmitting antennas.
- Double screened cable with maximum loss of 3 dB is recommended. Use a low-loss cable if the length is more than 10 meters (RG-213 or better).
- An antenna gain between 0 and +3 dB is recommended.

The SO-239 connector on the Receiver is intended for connection with a PL-259 plug.

Important! Make sure the antenna cable is tightly fastened to the Receiver. A firm connection is critical for the signal reception.

Note! Using a VHF splitter may involve risks, including reduced performance or permanent damage to the equipment. Any use of a splitter is at the user's own risk.

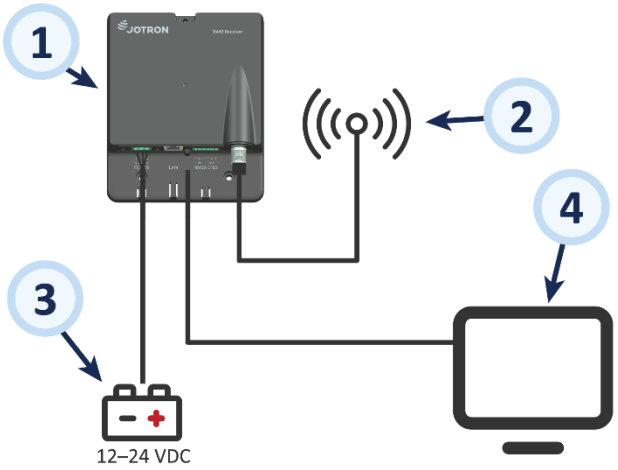


Figure 4 - Operational setup of the Receiver

Item no.	Description
1	Receiver
2	VHF antenna
3	Power supply (12–24 VDC)
4	Chart system connected to the Receiver with an NMEA 0183 or LAN connector

Secure the cables to the housing using cable ties.

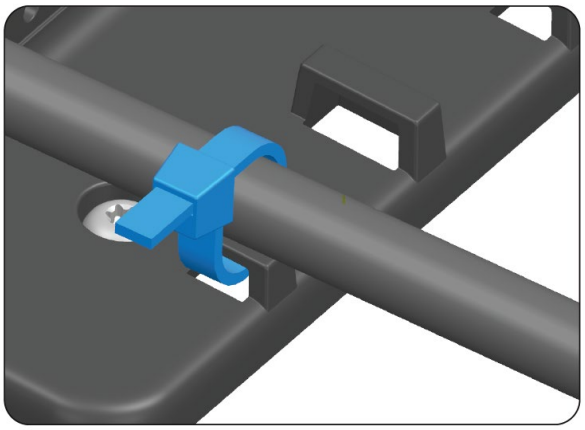


Figure 5 - Example of cable management using cable tie

3 Configuration

Use the TronTracker mobile app to configure the Receiver. First connect to a Receiver over Bluetooth and add it to a vessel in the app.

Dealers can alternatively use the ‘Dealer Setup’ screen in the app to configure a device without connecting it to a vessel.

3.1 App installation

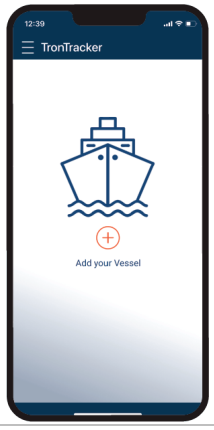
Download the Jotron TronTracker mobile app from App Store or Google Play.

App Store

Google Play

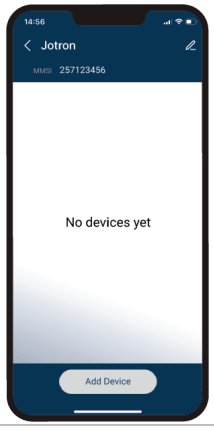
3.2 First time setup of the Receiver

To begin using the TronTracker app, start by registering your vessel. This step is essential for correctly linking and organizing your Receiver and Trackers.



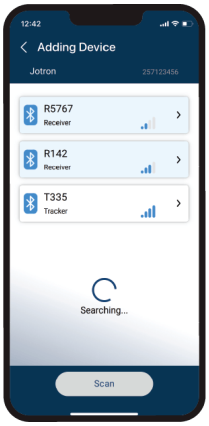
Tap **'Add your Vessel'** on the screen and enter your vessel's name and MMSI number.

If you manage more than one vessel, you can repeat this step for each.



After adding your vessel, tap '**Add Device**' to find your Receiver via Bluetooth. Bluetooth is always activated on the Receiver.

The devices will appear in the list under '*Adding Device*'.



When the desired device is selected, you'll be prompted to enter a PIN code. This code is unique to each device and can be found on a label on your product.

Click '**Add to Vessel**' to add the Receiver to your list of devices.

Use the app to configure your Receiver according to your installation.

3.3 Configure the Receiver

To configure the Receiver, use the TronTracker app.

3.3.1 Electronic chart system

Use the RA10 Configuration screen to:

- Enable **Send AMRD B messages** to transmit AMRD B messages from the Tracker to the electronic chart system.
- Enable **Send AIS AtoN messages** to send Tracker data as AIS AtoN messages to the electronic chart system.

If '**Send AIS AtoN messages**' is enabled, the Receiver converts AMRD B messages from the Tracker into AIS AtoN messages. On the chart plotter, they display as either the standard AtoN symbol or the chart plotter's custom AtoN mark. When '**Send AMRD B messages**' is enabled, chart plotters that support AMRD will display their own symbol. It is recommended to keep both enabled, which is also the default setting.

For information regarding connection and configuration of the chart plotter, please refer to the chart plotter documentation.

3.3.2 Serial interface

Use the RA10 Configuration screen to change the NMEA 0183 baud rate when the electronic chart system is connected via the serial interface. Ensure the baud rate for the Receiver matches the chart plotter's baud rate.

3.3.3 Antenna

Use the RA10 Configuration screen to enter the approx. height of the antenna. The height is measured in meters from sea level to the bottom of the antenna as it is mounted on the vessel.

3.3.4 Network

If the electronic chart system is connected to the ethernet connector, use the RA10 Configuration screen to perform the following actions:

- Set IP addresses
  - Default: 172.16.0.2 with a /16 subnet. See section 5.4.1 for details.
- Configure destination addresses
  - Default: TGTD multicast group at 239.192.0.2, port 60002
  - The destination can be changed to another IEC 61162-450 multicast group, or a custom address and port can be specified for systems requiring a unicast destination. All transmissions use UDP. See section 5.4.2 for supported multicast groups.
- Enable or disable network usage
- Enable the '**Non 61162-450 format'** if your chart plotter does not support the IEC 61162-450 standard

If Ethernet is used to connect the chart plotter, ensure that the Receiver's IP address and port match those of the chart plotter, and that both devices have IP addresses within the same subnet.

3.3.5 Configuration of SFI

To configure the IEC 61162-450 System Function ID (SFI), navigate to the RA10 Configuration screen, tap the **More Options** icon (⋮) and select **Advanced**.

If no value is entered, the default SFI is set to AI9999.

3.4 Maintainance

3.4.1 Upgrade the device

To upgrade the firmware for the Receiver, go to the TronTracker mobile app:

1. Select the device to upgrade
2. Tap the **More Options** icon (⋮)
3. Choose **Firmware upgrade** from the menu – a number will be shown next to the menu item if an upgrade is available.
4. A pop-up window gives an overview of the current and new versions, including a change log. Press **Confirm** to start the upgrade.

3.5 Factory reset

To perform a factory reset, press the pinhole **Reset** button on the Receiver for 5 seconds (see figure in section 2.2) or go to the TronTracker mobile app:

1. Select the device to reset
2. Tap the **More Options** icon (⋮)
3. Select **Remove device**
4. Select **Factory reset device**

Performing a factory reset will delete all Bluetooth pairings and restore default settings.

4 Troubleshooting

4.1 Receiver diagnostics

Diagnostic parameters for the Receiver are available in the TronTracker mobile app. Select the RA10 Receiver, then tap the **More Options** icon (⋮) and choose **Diagnostics** from the menu.

From this screen, parameters such as serial number, software and hardware versions, signal strength, background noise, etc. are available.

4.2 Problem scenarios and fixes

Scenario	What to try
Power LED not illuminated	• Verify that the power supply is connected according to the installation instructions. • Ensure that the supply voltage is within the specified range.

No data received by the chart plotter	• Confirm that the power supply is connected correctly and that the green power LED is illuminated.
	• If an NMEA 0183 cable is used:
	  ○ Verify that the NMEA/RS-422 data connections are wired according to the installation instructions.
	  ○ Check that the Baud rate configured in the TronTracker mobile app matches the Baud rate set in the chart plotter.
	• If a LAN cable is used:
	  ○ Some chart plotters may not support the IEC 61162-450 standard. Try turning the 'Non IEC 61162-450 format' option on to see if it solves the problem.
	  ○ Ensure IP address settings are compatible with the chart plotter's settings.

Data received by the chart plotter, but Tracker not visible	• Verify that the Tracker is powered on and transmitting. • Verify that the Receiver is receiving data from the Tracker, by checking the time since last message was received (Diagnostics, Last Message RSSI Age) in the TronTracker mobile app. • Ensure the VHF antenna is connected and installed according to the recommendations. • AIS layer disabled on chart plotter. Enable AIS display layers in the plotter settings. Check filtering options.
Incorrect position displayed for the Tracker	• Ensure the Tracker has an unobstructed view of the sky. Relocate the Tracker if necessary. • Be aware that position may be affected by GNSS spoofing and jamming.
Limited range between Tracker and Receiver	• Confirm that the Tracker's power setting (High/Low mode) is set to the preferred mode. • Ensure the installation follows the recommended guidelines to avoid noise issues. Pay extra attention to the antenna height and interference from surrounding equipment, as this will affect communication range directly.
TronTracker mobile app won't connect to the Receiver	• Ensure Bluetooth is enabled on the mobile device. • Make sure mobile device is within range of the Receiver. • Close and reopen the app on the mobile device. • Remove the Receiver from the list of Bluetooth devices on the mobile device, then add the Receiver to the TronTracker app. • Ensure the correct PIN code is entered.

5 Technical specifications

5.1 Product specifications

Physical	
Dimensions	146 x 177 x 33 mm (W x D x H)
Weight	330 g
Electrical	
Power	12-24 VDC (10.8 V to 31.2 V), max. 1 A
Compass safe distance	Minimum 0.5 meters
Connectivity	
NMEA 0183	RS-422, RJ-45 (single 8-pin)
Antenna	SO-239
Configuration	Bluetooth, mobile app for iOS/Android
Radio	
Category	AMRD group B
Frequency	160.900 MHz
Channel bandwidth	25 kHz
Channel	2006
Environmental	
Operating temperature	-20°C to +55°C
Storage temperature	-30°C to +70°C
Ingress protection	IP20

5.2 Network functions

The Receiver outputs IEC 61162-450 compatible sentences, containing positional data and information derived from received messages. These messages use the 'AI' talker ID and are encapsulated within the VDM sentence.

No other network functions are present on the device, except for DHCP support, which can be enabled in the app. When enabled, DHCP uses the standard DHCP port 68.

5.3 Supported sentences

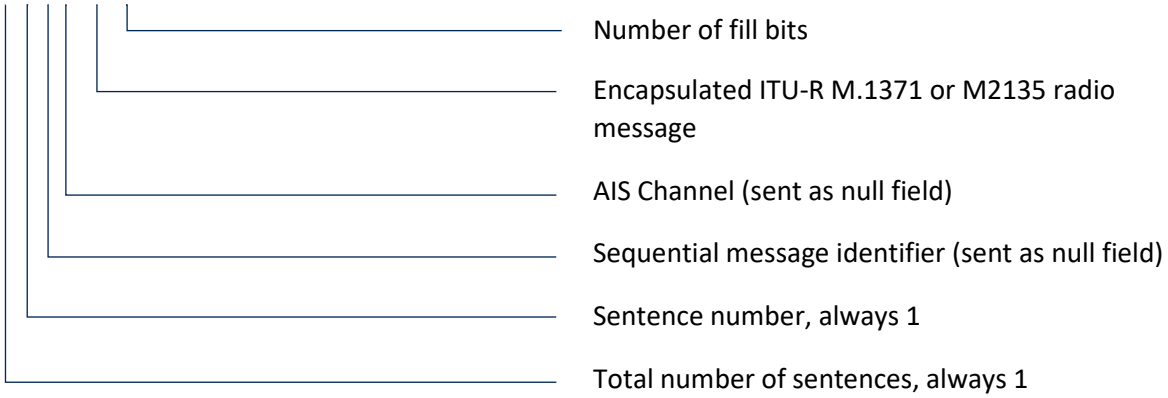
5.3.1 Standard NMEA sentences

All standard sentences are sent with the AI talker prefix.

!--VDM

The Receiver sends a VDM message for every received transmission from a beacon with the received message as payload. In addition, if 'Send AIS AtoN messages' is enabled, it will also send a crafted AIS Message 21 that translates the AMRD messages into an AIS AtoN message so display systems without AMRD support can show the beacon.

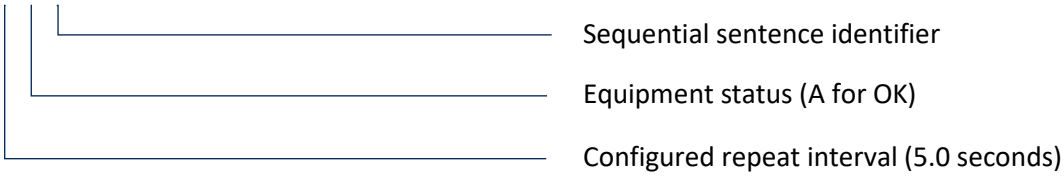
!--VDM,x,x,x,a,s-s,x*hh<CR><LF>



$--HBT

A heartbeat sentence is sent every 5 seconds from the receiver, on both -450 and RS422 interface.

$--HBT,x.x,A,x*hh<CR><LF>



$--SRP (IEC 61162-450 only)

The self-report sentence is sent after startup, after configuration change, after network connectivity changes, and in reply to received SRP messages with all null fields. This message is only sent on the ethernet interface.

\s:ccxxxx*hh\$--SRP,x,hhhhhhhhhhhh,c--c*hh<CR><LF>

$--VER

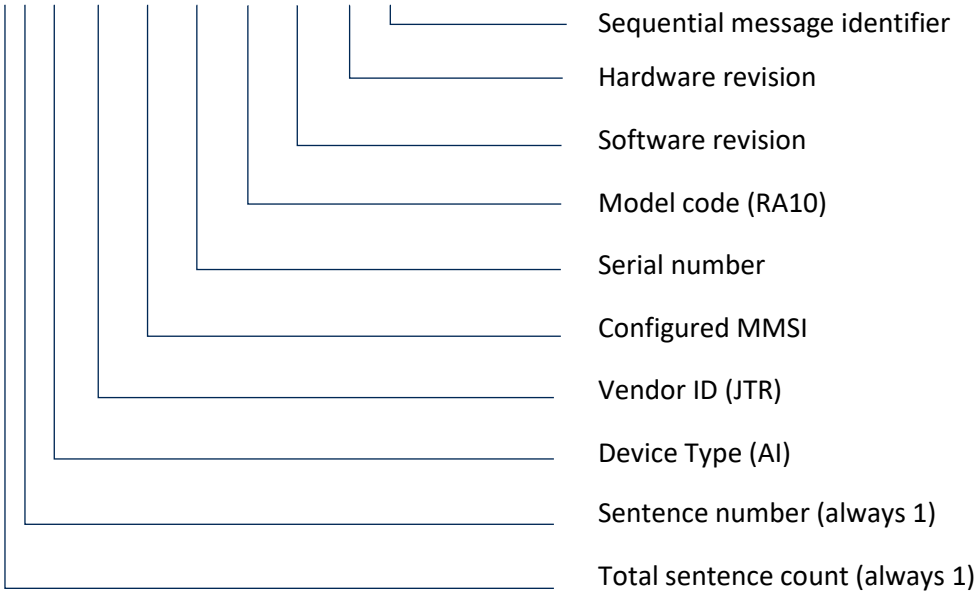
The Receiver will send a version message in response to a query with the AI destination identifier.

Query:

$--AIQ,VER*hh<CR><LF>

Response:

$--VER,x,x,aa,c--c,c--c,c--c,c--c,c--c,c--c,x*hh<CR><LF>



5.3.2 Proprietary NMEA sentences

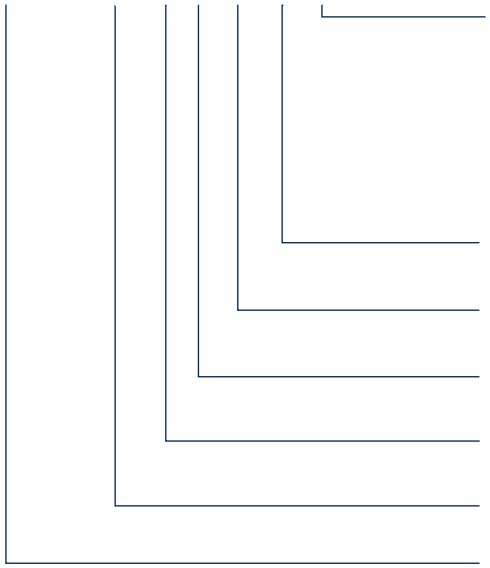
$PJTTRD (Output when non-position data for a tracker device is received)

$PJTRTTR (Output whenever a message is received on the radio)

$PJTTRD

The PJTRTTD sentence provides additional information for a transmitter device that cannot be sent in standard AMRD messages.

$PJTRTTD,xxxxxxxxxx,c--c,c--c,x,xx.x,xxx,a*hh<CR><LF>



Battery state (can be blank for unknown):

H = High (Green)

L = Low (Yellow)

C = Critical (Red)

Battery percentage (0 – 100)

Temperature in Celsius, one decimal

Owner flag (0 for others or 1 for own)

Beacon Sub-type (see examples below)

Beacon Name (16 characters)

Beacon MMSI (9 digits)

Examples of beacon sub-types are the following fishing gear types:

- Longline
- Gillnet
- Crab pots
- Danish seine

$PJTRTTR

The PJTRTTR sentence is sent when a frame has been received from the Tracker. It contains the source of the frame and the message ID and signal strength.

$PJTRTTR,xxxxxxxxxx,xxx,,c--c *hh<CR><LF>

RSSI levels, in textual form

Null field, for internal debug use

Message ID (16 characters)

Beacon MMSI (9 digits)

5.4 IP address configuration

5.4.1 Default configuration

IP Address: 172.16.0.2
Netmask: 255.255.0.0
Gateway: 172.16.0.1

The IP address settings can be changed in the TronTracker mobile app.

5.4.2 Supported multicast addresses

Multicast groups are supported within the range 239.192.0.1 to 239.192.0.16, inclusive. The default group is the TGTD (239.192.0.2) group. Use the TronTracker mobile app to change the group.

5.5 Maximum rates

The maximum data rates for the TronTracker IEC 61162-450 implementation are listed below.

- Maximum processed input: 0 (No input is intended to be handled).
- Maximum unhandled input: 150 packets per second.
- Maximum unhandled input at 50% load: 150 packets per second.

6 Spare parts, warranty and disposal

6.1 Accessories and spare parts

For an overview of the available accessories and spare parts for this product, refer to jotron.com.

6.2 Warranty

All Jotron products are warranted against factory defects in materials and/or workmanship during the warranty period.

Refer to the sales terms and conditions for specific warranty information regarding this product.

6.3 Recycling and disposal

This product should not be disposed as normal waste and must be handled in accordance with the applicable federal, state and local waste disposal regulations in the country where the equipment is used.

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