XA-201 AIS (B) Shipborne Automatic Identification System CSTDMA

Quick Reference V1.0

Instructions for users

This is is notified if the information can be updated. You can visit the website www.xinuo.com of Xinuo Information Technology (Xiamen) Co., Ltd., or follow the wechat official account of "Xinuo Beidou" to learn about the latest updates and operation information of this product and other products.

Warning: Read the notes in this manual for the product safety statement and other important information. The device is not used for direct navigation. When using the device, please refer to other available sources of navigation, including information on other navigation AIDS and actual sea conditions, such as: official charts, visual observation, radar, tides, hydrology, weather, etc.

Statement: "Xinuo" and "Xinuo Tech" refer to "Information Technology (Xiamen) Co., Ltd.,"

Note: This is a sophisticated electronic equipment, the installation should avoid strong vibration and external impact, do not put anything on the equipment.

Statement: Other products and company names involved in this user manual are identified only and may be registered trademarks or copyrights of other companies.

The software name and version information are only displayed through the display and are not detailed in the user operation manual.

This user operation manual is for reference only, and the specific operation is subject to the physical object. This User Operating Manual is applicable to the following equipment: XA-201

Cautions

Before you open this product, be sure to read the following precautions to avoid product failure due to improper operation:

1. Do not place this product arbitrarily without fixing it, to avoid serious damage due to turbulence or other factors during the voyage.
2. Do not use any power adapter that is not equipped with this product, otherwise the equipment may not work due to different circuit design, or the performance may be affected or even damage the machine. The rated voltage of this product is 12V/24V. Pay attention to the voltage range.
3. Do not disassemble this product. A maintenance engineer not authorized by the company will lose the right of free warranty during the warranty period.
4. During the use or cleaning process, avoid putting any liquid or other objects from falling into the product, so as not to cause circuit damage or short circuit.
5. Do not place the product and its accessories in a easily humid environment or direct sunlight area to keep the machine in use in a dry environment.
6. The power supply shall be reliably grounded, to avoid static and lightning strikes; temporarily using the instrument, turn off.
7. If the product cannot be positioned properly, first check whether the antenna is installed; whether there is bad contact; whether it is blocked or has other interference around the antenna. Before starting the product, ensure that the antenna cable connector is open or short circuit, and then install the antenna in the correct way. In the boot state, do not pull out the antenna at will, so as to avoid causing equipment damage.
8. When the external temperature is too high, the product may shutdown. Please suspend the device and restart when the normal temperature is restored.
9. For hardware failure (such as power cable burned ,machine shell damaged or something falling into the machine interior), please turn off the power supply immediately and contact the dealer in time.
10. All data sources for this product may contain some inaccurate or incomplete data. These data are for your reference only and we cannot guarantee that any accident, injury or appropriate damage occurs. XINUO will not assume all legal responsibilities and other obligations.

Catalogue

1 Product instruction

XA-201 is an AIS (B) ship automatic identification system equipment, which supports carrier monitoring time-sharing multiple access (CSTDMA) technology. This product is small in size, easy for installation, very suitable for small vessels.

XA-201 supports NMEA 2000 and NMEA 0183 communication, and its output complies with the IEC 62287 and associated standards. XA-201 was certified by CCS / CE / BSH. With Wi-Fi and Bluetooth ports, you can connect to a mobile application or IPAD and view the AIS around the ship. The combination of the built-in buzzer and the LED indicator light indicates the actual working state of the equipment.

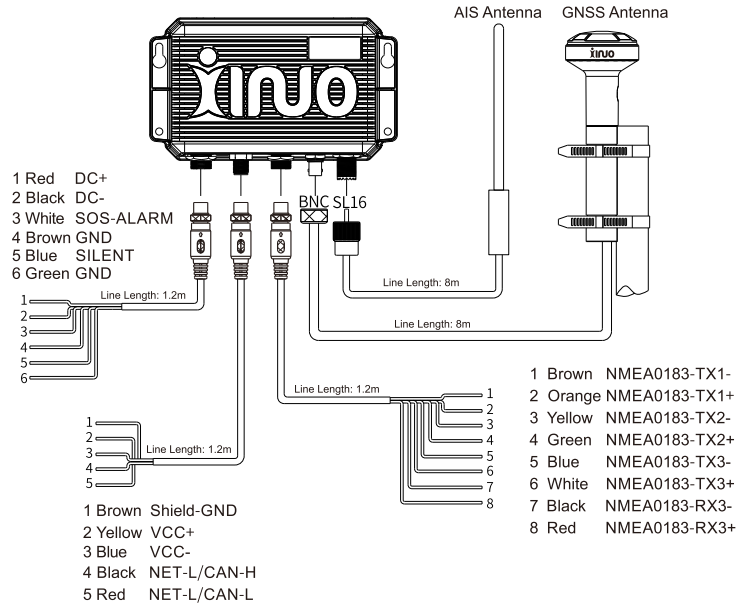
The optional switch box enables the "silent" mode, allowing the user to stop broadcasting static and dynamic information when privacy or security is required. An optional switch box enables an "Alarm" mode that allows the user to broadcast the SOS messages.

2 Standard package

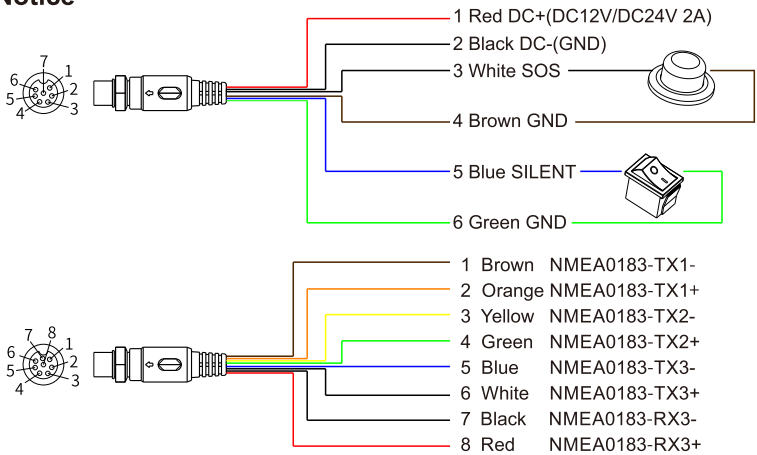
No.	Item	Qty
1	Main unit	1
2	Power cable (2m)	1
3	Data cable (1.2m)	1
4	GNSS antenna (8m)	1
5	NMEA2000 dust cap	1
6	Self-tapping screw (TA4.8*20)	4
7	User manual	1

3 Connection diagram

3-1 Port definition



Notice

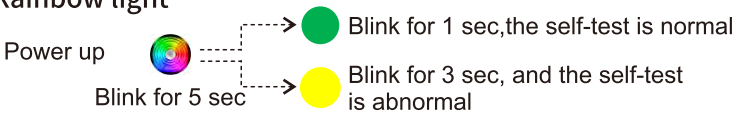


XA-201 has 3 NMEA 0183 output ports, each of which can be configured with 4800,9600,38400bps baud rates. The default port rate for the port is 38400 bps.

3-2 LED indicator light

This product contains only one LED light that can display 128 colors. In the actual use of the product, there are four rainbow colors, green, red and yellow colors. The functions they represent in the four color states are described below.

Rainbow light



Self-test after power-on, rainbow light cycle change color for 5 seconds, if then green flicker for 1 second, the self-test is successful, if yellow light, the equipment is abnormal.

Yellow light

- Often bright, No AIS data were received for 6 minutes or more
- Flashes for 10 sec, Wi-Fi or Bluetooth disconnected
- Flashes for 3 sec, If the self-check is abnormal, please check whether the VHF or GNSS antenna is normally connected

Red light

- Flashes for 1 min, Broadcast the SOS alarm
- Flashes for 1 sec, Launch an AIS message

Green light

- Flashes for 1 sec, Receiving an AIS message
- Flashes for 3 sec, The Wi-Fi / Bluetooth connect successfully
- Flashes for 3 sec, Self-inspection successfully

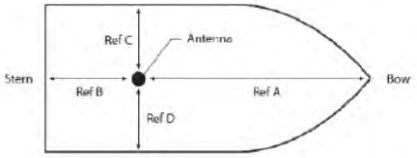
3-3 Buzzer

- Short-frequency ringing for 1 min (Bi-Bi-Bi··· ····), Broadcast the SOS alarm
- 3 sounds in the medium frequency (Bi----Bi----Bi) (3 sec), Wi-Fi/ Bluetooth connect successfully
- Long ringing for 1 sec, Self-inspection successfully
- Long ringing for 3 sec, Self-inspection abnormal

4 Installation Instruction

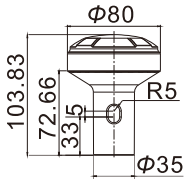
4-1 Installation of GNSS antenna

Selection of positioning antenna installation position: there should be no continuous obstacles in level 360 elevation 5-90. 3m away from the high-power antenna transmitting beam such as S-band radar and INMARSAT system. Measure the distance data of A, B, C and D to set the static parameters of the vessel.

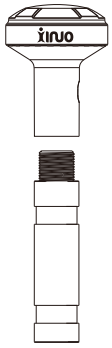


Installation diagram of GNSS antenna installation

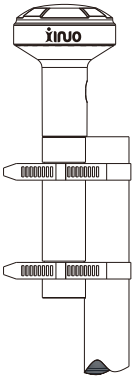
Installation and fixing of the positioning antenna: First, the antenna is fixed to the antenna fixing rod through the thread, select the appropriate laryngeal hoop (the recommended width is between 10-14MM), and the antenna rod is fixed on the fixed column of the ship, and the feeder is fixed on the fixed column with a tie belt.



Dimension figure of GNSS antenna

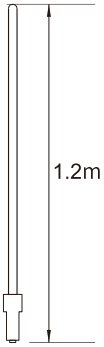


Antenna fixed on the antenna pole

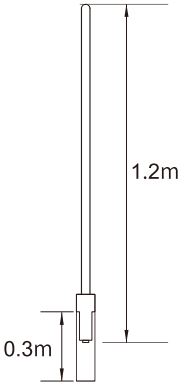


Fix to the fixation post with a hoop

4-2 VHF antenna installation



VHF Antenna figure



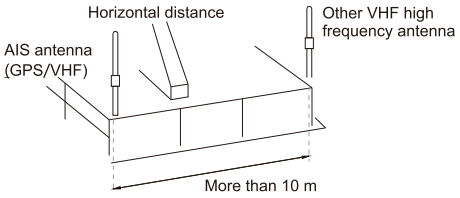
VHF Antenna base fixed

4-2-1 Horizontal Installation

(1) The VHF antenna of AIS shall be as free as possible in level 360.

(2) The VHF antenna of AIS should be above 2m from the conductor structure in the horizontal direction, The radar and high power source antenna (such as INMARSAT system) should be 3m away from the transmitting beam.

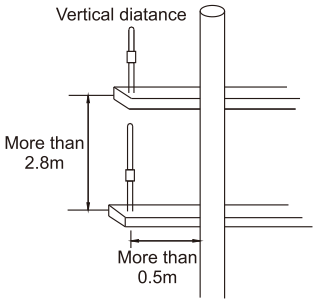
(3) If the VHF antenna of the AIS and the ship VHF antenna must be on the same horizontal plane, they shall be at least 10m apart in the horizontal direction.



Horizontal mounting position diagram

4-2-2 Vertical installation

The VHF antenna of AIS is at least 2.8m apart in the vertical direction.



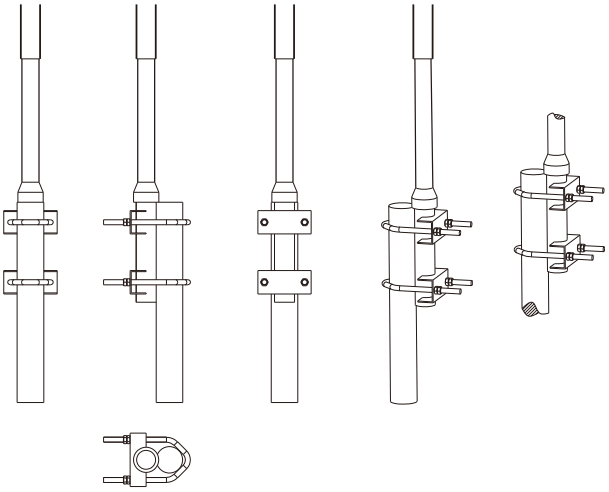
Vertical installation position diagram

VHF Antenna installation.

(1) First push the antenna to the fixed casing, then connect the feeder connector to the VHF antenna connector and tighten it.

(2) Tighten the fixing casing and VHF antenna with screws, then the antenna is fixed to the fixed rod of the ship with its own accessories, and the feeder is fixed on the fixed column of the ship with tie belt.

Note, the hexagon nut should be locked tightly.



VHF Antenna installation of fixed columns on board

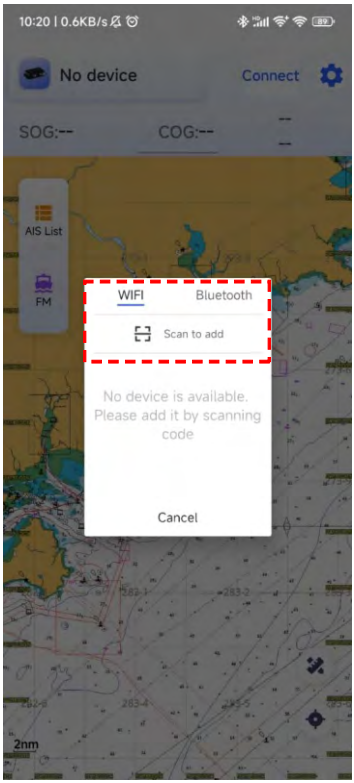
5 Operating instructions

5-1 APP functions

5-1-1 Device connection

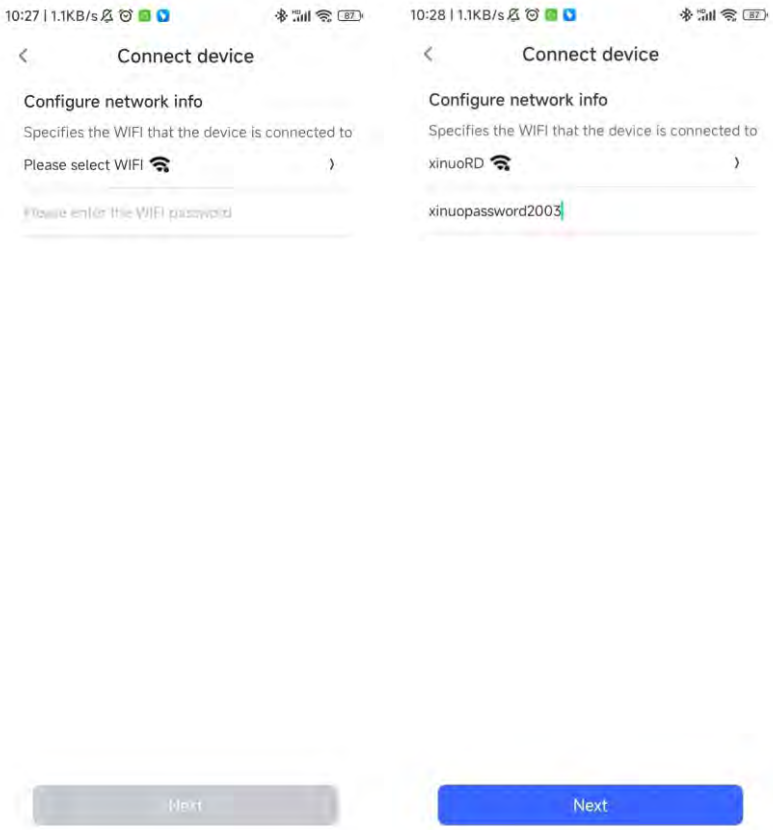
5-1-1-1 WIFI connection

First, clicks [connect] on home page - -> [WIF] - -> [Scan to add], and scan the QR code information on the XA201 device.



Secondly, Click [Copy password] turn to the mobile phone [WLAN] setting, manually connect to the XA201 hotspot:“XA201_XXXXXX”, Paste password.

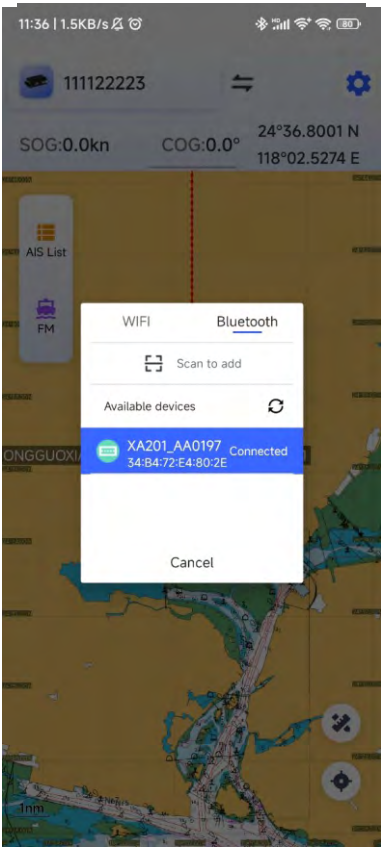
Thirdly, Select the WIFI to connect for the XA201, select the SSID account and enter the WIFI password.



Fourthly, Wait for the pop up "Device binding successfully", that is, the initial device binding is completed.

5-1-1-2 Bluetooth connection

Firstly, Clicks [connect] on home page - -> [Bluetooth] - -> [Scan to add], and scan the QR code information on the XA201 device.



Secondly, Wait for the pop up "Device binding successfully", that is, the initial device binding is completed.

5-1-1-3 Switch device

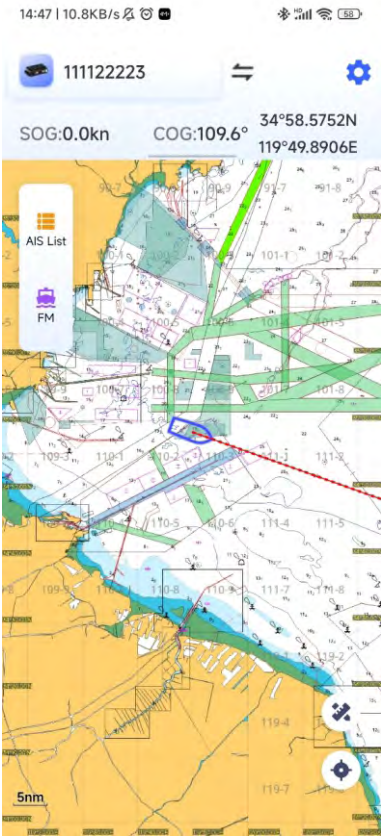
Firstly, Click --> 【WIFI connect】or【Bluetooth connect】.

Secondly, Select the device in the [available devices] list.

Thirdly, The device prompts "The connection is complete", which means that the device switch is completed.

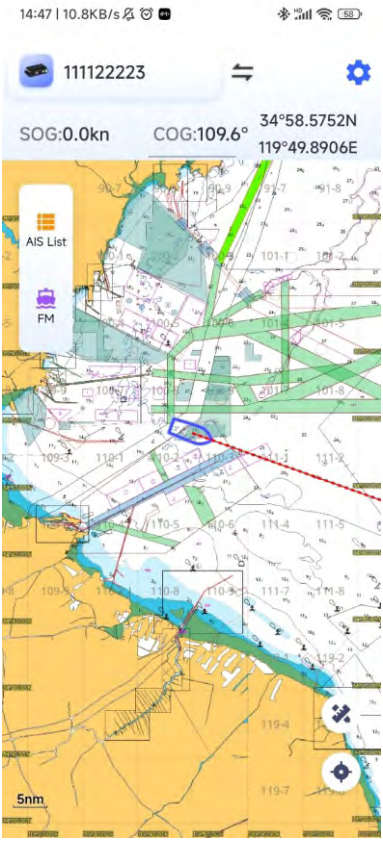
5-1-2 View ownship information

Display the position of the ship on the chart, and display the nine-digit code, longitude and latitude, heading, and speed at the top of the page.



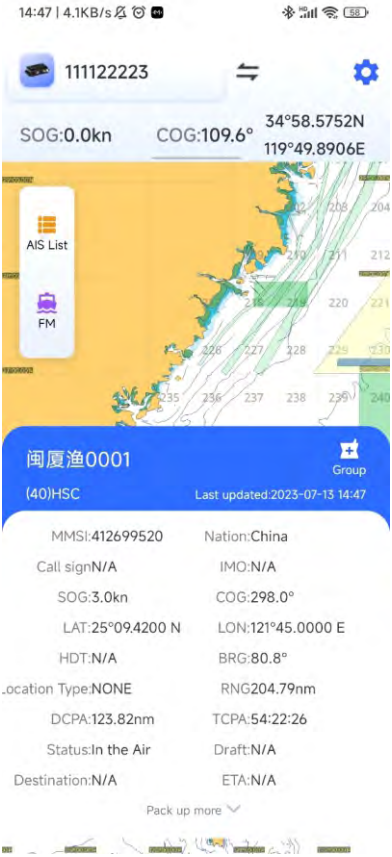
5-1-3 Center shortcut key

Click the one-click center icon on the chart to return to the ship immediately.



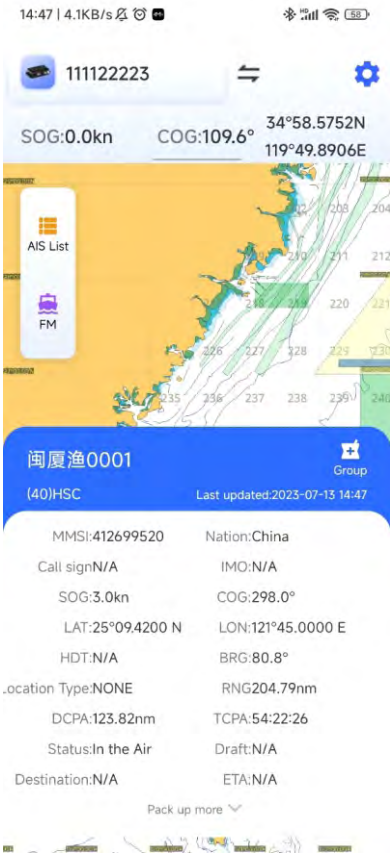
5-1-4 View the AIS target information

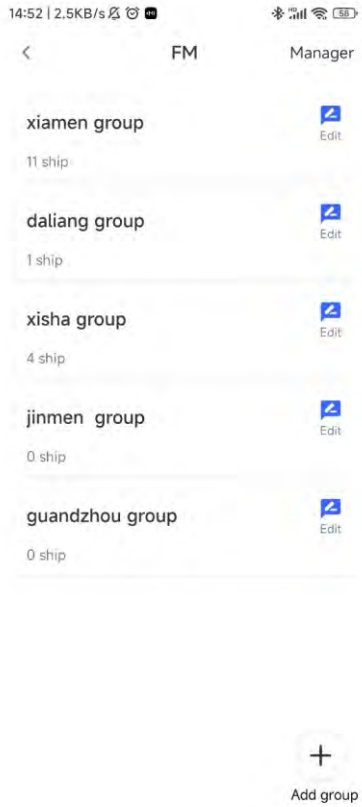
1. After connecting to the device, you can view the AIS target information received by the device on the mobile app, which can display the course, speed, longitude and other information of the AIS target.
2. Click the [AIS List] in the left function bar to view the AIS target information.



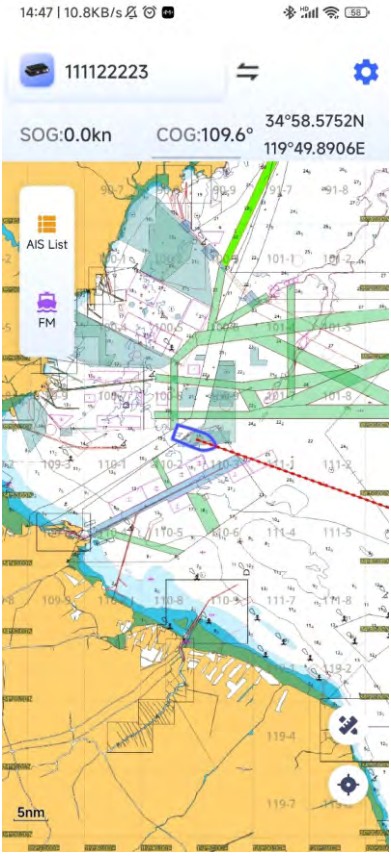
5-1-5 Group management

Method 1, On the chart page, select the AIS target to join the fleet, click the target, and then click [Group].





Method 2, On the chart page, click [AIS List], select the ship to join, and then click [Join the group].



5-1-6 Distance measurement

Click the [Measure] icon, click the starting point and end point of the test, to achieve the ranging function.

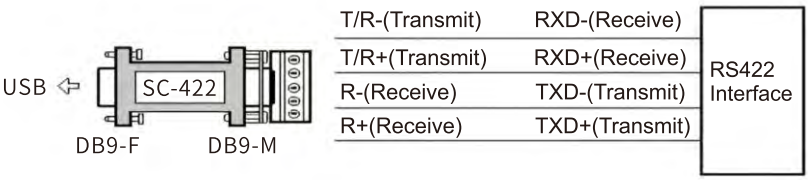
5-2 PC tool

5-2-1 Device connection

(1) Download the software package.

(2) Double-click to run software XINUO AIS MMSI.

(3) Connect the NMEA interface to XA-201, and then connect to the computer through USB adapter, as shown below.



5-2-2 Operating method

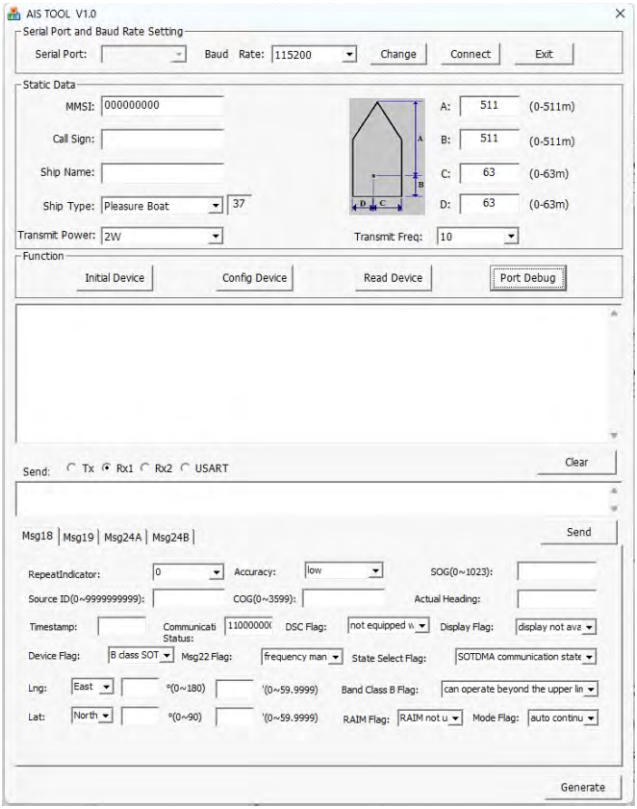
(1) Select the corresponding string slogan successively, set the port rate (the default is 38,400 bps), and click Connect. If the connection fails, please check that the wiring is correct.

(2) Set the static parameters of the device and the transmitting power of the device, and frequency. Click "Configure device" to write the set parameters.

(3) Click "Read Device" to obtain the static parameter information, transmission power and frequency of the currently connected XA 201.

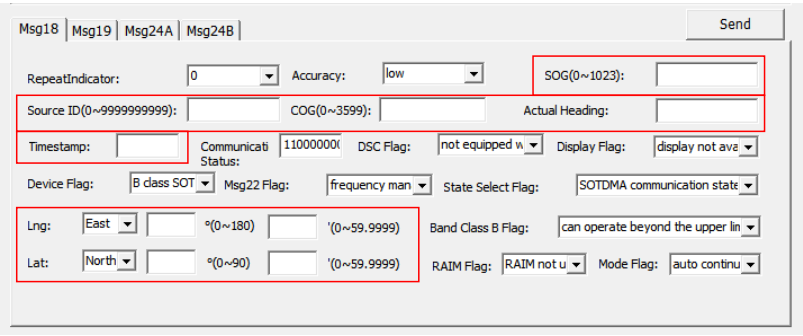
(4) You can initialize the device and set the parameters to the factory default values.

(5) Click "Serial port debugging" to open the serial port debugging window to view the message message sent by the device or send the message to the device. Click "Clear" to clear the current window content with one key. The message description is detailed in Appendix I.



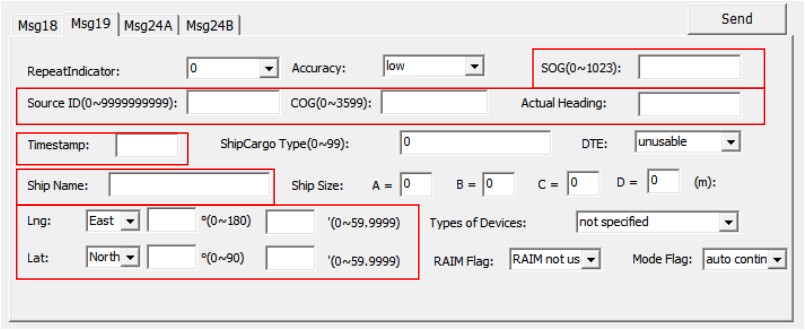
A. Message 18

SOG, navigational speed
COG, course
Source ID, MMSI
Timestamp, Message transmission timestamp
Lng, Lat, The longitude and latitude information of the ship
Other options can use default settings or modify settings.



B. Message 19

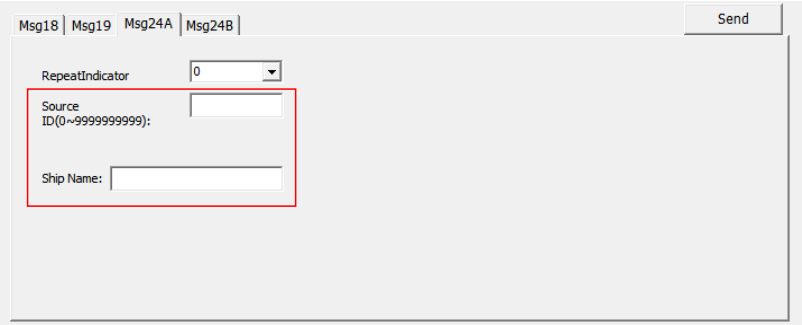
SOG, navigational speed
COG, course
Source ID, MMSI
Timestamp, Message transmission timestamp
Ship Name, Ship Name
Lng, Lat, The longitude and latitude information of the ship
Other options can use default settings or modify settings.



C. Message 24A

Source ID, MMSI

Ship Name, Ship Name

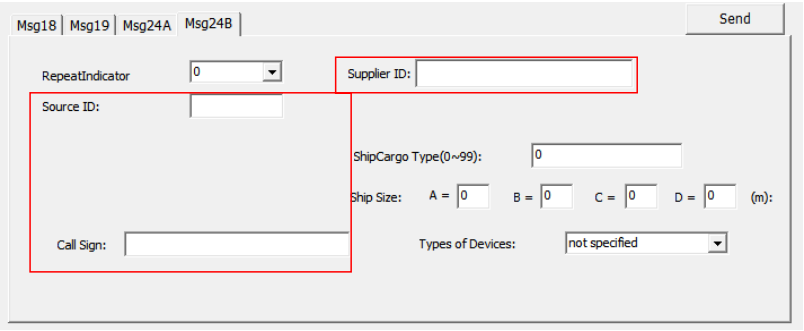


D. Message 24B

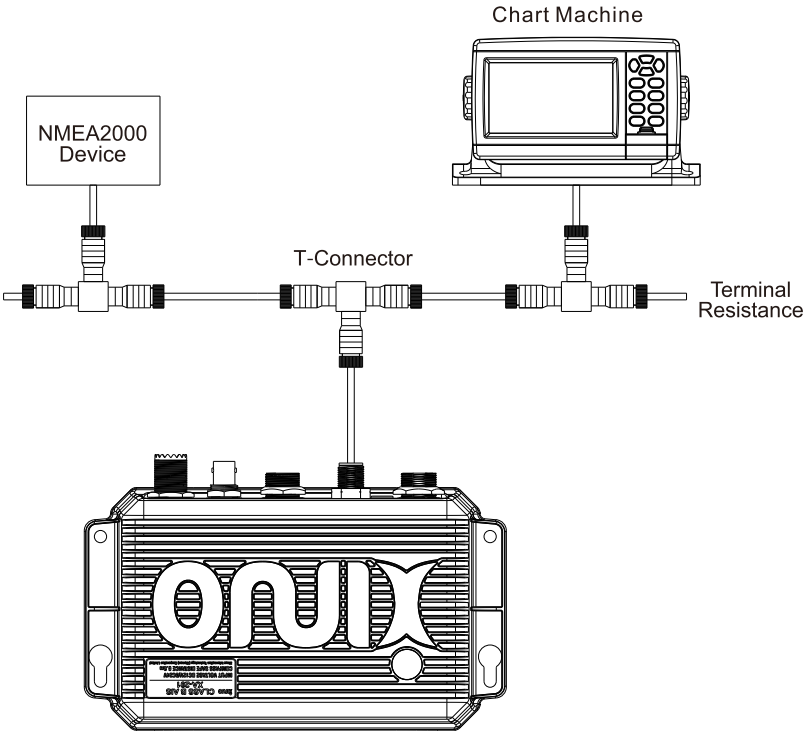
Source ID, MMSI

Supplier ID, Fill in supplier identification

Call Sign, IMO



5-3 NMEA2000 connection method



6 Hardware configuration

Environment	
Working temperature	-15°C～+55°C
IP rate	IP67
Power	
Power supply	DC12V/DC24V
Power consumption	<10W
Network connection mode	
Bluetooth	BT4.0
Wi-Fi	802.11 b/g/n
Data port	
GNSS antenna port	BNC
VHF antenna port	SI16 (Female)
NMEA0183 port	4 data ports, There are 3 input ports and 1 output port
NMEA2000 port	Support for GNSS and AIS data transmission
Power port	Support external power supply, external alarm button

Class B AIS transceiver	
Frequency range	156.025~162.025MHz
Channel bandwidth	25KHz
Modulation mode	GMSK/FM
Commissioning rate	9600bps
Number of AIS transmitter	1
Number of AIS receiver	2 (Contains A,B channels)
AIS channel A(default)	CH87B(161.975MHz)
AIS channel B(default)	CH88B(162.025MHz)
TX output power	2W/5W
Carrier sense	CSTDMA
RX sensitivity	< -107dBm @ Error rate<20%

GNSS		
GNSS receiver		72 channels
Receive frequency		GPS L1 1575.42MHz, BDS B1 1561.098MHz
Accuracy	GPS&BDS	2.5 m（CEP50%, Open sky）
	GPS	5 m（CEP50%, Open sky）
	BDS	5 m（CEP50%, Open sky）
Rate accuracy		0.1M/S (50%@10M/S)
First positioning time		Cold start<30s; Hot start<1s
Coordinated system		WGS-84 (or other)
Specification		
Size		189.8 x 122.2 x 46mm
Weight		0.5kg
Standard		
IEC 62287-1, IEC 61108-1, IEC 61162-1, IEC 60945, ITU-R M.1371-5, IMO.A.694(17)		

Appendix 1 message 18, 19, 24A, 24B description

1.Message 18: Standard Class B device location report

Standard Class B device location reports should be generated autonomously while messages 1,2 or 3 are used for Class B shipborne mobile devices.

The default values for the reporting interval shall be those given in Table 2 of Annex 1, unless otherwise specified for receive 16 or 23, and depending on the current SOG and navigation status flag settings.

Parameter	Bits No.	Remark
Message ID	6	Identifier of message 18, fixed to 18
Forwarding indicator	2	Used by the repeater to indicate how many times the message has been forwarded. 0-3, 0= default value, 3= No more forwarding
User ID	30	MMSI number
Backup	8	Not used. It should be set to zero. Save it for future use
SOG	10	Ground speed, step length of 1 / 10 knots (0-102.2 knots) 1023=Disabled, 1022=102.2 knots or faster
Positioning accuracy	1	1 = high (> 1 0 m) 0 = low (<10m) Default value=0
LONG	28	Longitude in units of 1/10000 min (±180°,East=Positive(表示为2的补码), West=Negative (表示为2的补码); 181°(6791ACOh)=Disabled=Default value)
LAT	27	LONG28Longitude in units of 1/10000 min (±180°,East=Positive(表示为2的补码), West=Negative (表示为2的补码); 181°(6791ACOh)=Disabled=Default value)
COG	12	Ground route, In units of1/10°=(0-3599), 3600(E10h)=Disabled=Default value, 3601-4095 should not be adopted

Parameter	Bits No.	Remark
Actual course	9	Degree(0-359) (511 indicates disabled=default value)
Time slot	6	UTC seconds, reported time generated by IPFS (0-59 or 60 when timestamp is unavailable, the default or 61 when the positioning system is in manual input mode or 62 when the electronic positioning system works in estimated (calculated) mode or 63 when the positioning system is not working), the "CS" AIS does not use 61,62,63
Backup	2	Unused. Should be set to zero. Stay for future use
Class B device logo	1	0=Class B SOTDMA device 1=Class B“CS”device
Class B display logo	1	0=Display is offline, Unable to display message 12and14 1=Equipped with integrated displays displaying messages 12 and 14
Class B DSC logo	1	0=DSC function disabled 1=Equipped with DSC functions (dedicated or time-sharing)
Class B bandwidth logo	1	0=Can work beyond the upper limit of 525 kHz 1=Can work beyond the entire Marine frequency band (Not applicable if "Class B Message 22 logo" is set to 0)
Class B message 22 logo	1	0=Frequency management without message 22, working only for AIS 1, AIS 2 1=Frequency management by message 22
Mode mark	1	0=Station works in autonomous and continuous mode = default value 1=The station works in the reference matching mode
Communication status Selector logo	1	0= SOTDMA communication status is as follows 1= ITDMAcommunication status is as follows (Class B "CS" is fixed to "1")

Parameter	Bits No.	Remark
Communication status	19	If the communication status selector flag is zero, SOTDMA communication status (see Section 3.3.7.2.1 of Attachment 2), Or if the communication status selector flag is 1, ITDMA communication status Since Class B "CS" does not adopt any communication status information, the field must be filled with the following values,1100000000000000110.
Number of bits	168	Occupy 1 time slot

2. Message 19, Extended Class B device positioning report

For the future device, This message is not required and should not be used. All content is covered by messages 18, 24A, and 24B.

For the old device, This message shall be adopted by the Class B shipborne mobile device. The message shall be sent every 6 minutes and the time slot is a two time slot divided by the message 18 in the ITDMA communication state. The message shall be sent immediately after the following parameter values change, ship size / position reference or type of electronic positioning device.

Parameter	Bits No.	Remark
Message ID	6	The Identifier of the message 19, Fix to 19
Forwarding indicator	2	Used by the repeater to indicate how many times the message has been forwarded. 0-3, 0= default value; 3= No more forwarding
User ID	30	MMSI number
Backup	8	Not used. It should be set to zero. Save it for future use
SOG Provided by message 18	10	Ground speed, step length of 1 / 10 knots (0-102.2 knots) 1023=Disabled,1022=102.2 knots or faster

Parameter	Bits No.	Remark
Positioning accuracy Provided by message 18	1	1 = High (> 1 0 m) 0 = Low (< 1 0 m) 0 =Default value
LONG Provided by message 18	28	Longitude in units of 1/10000 min (±180°,East=Positive(表示为2的补码), West=Negative (表示为2的补码); 181°(6791ACOh)=Disabled=Default value)
LAT Provided by message 18	27	Latitude in units of 1/10000 min(±90°, North=Positive(表示为2的补码), South=Negative(表示为2的补码); 91°(3412140h)=Disabled=Default value)
COG Provided by message 18	12	Ground route, In units of1/10°=(0-3599). 3600(E10h)=Disabled=Default value, 3601-4095 should not be adopted
Actual course Provided by message 18	9	Degree(0-359) (511 indicates disabled=default value)
Time slot Provided by message 18	6	UTC seconds, time when EPFS generated report (0-59 or 60 when timestamp is unavailable, should be the default, 61 when the positioning system is in manual input mode, 62 when the electronic positioning system is in estimated (calculated) mode, or 63 when the positioning system is not working)
Backup	4	unused. Should be set to zero. Stay for future use
Name Provided by message 24A	120	A 6-bit ASC code with the longest length of 20 characters, as specified in Table 47. @ = Not available = Default value

Parameter	Bits No.	Remark
Ship type or cargo type Provided by message 24B	8	0=Unavailable or no ship = Default value 1-99=In accordance with Section 3.3.2 100-199=Retained for regional use 200-255=Retained for future use
Ship dimensions/ reference position Provided by message 24B	30	Reference point for ship dimensions and reported locations in meters
Type of electronic positioning device Provided by message 24B	4	0=Not specified (default value), 1=GPS; 2=GLONASS, 3=GPS/GLONASS combo, 4=Loran-C, 5=Chayka, 6=INS, 7=Pending, 8=Galilio, 9-14=Unused, 15=Internal GNSS
RAIM LOGO Provided by message 18	1	RAIM (Receiver Autonomous Total Monitoring) flag for the electronic positioning device, 0 = RAIM unused = default, 1 = RAIM in use.
DTE Provided by message 18 (Display LOGO)	1	Data Terminal Ready (0= available; 1= Unavailable = Default)
Assign mode logo Provided by message 18	1	0= station working in autonomous and continuous mode = default value 1= station working in digital matching mode
Backup	4	Unused. Should be set to zero. Stay for future use
Number of bits	312	Occupy 2 time gap

3.Message 24：Static data report

Devices supporting part A of message 24 must change channel transmission every 6 minutes.

Part A of the message 24 can be used by any AIS base station to associate a name with the MMSI.

Parts A and B of message 24 shall be sent by Class B "CS" and Class B "SO" shipboard mobile devices every six minutes.The message consists of two parts. The message 24B shall be sent within message 24A within 1 min.

When the ship size / position reference parameter value of the type used for the electronic positioning device changes, Class B "CS" and Class B "SO" shall transmit the message 24B.

When requiring class B "CS" or Class B "SO" to transmit the message 24, the AIS station shall respond with parts A and B. When requesting Class A to transfer the message 24, the AIS desk shall respond in Part B, which may include only the vendor ID.

Part A of the message 24

Parameter	Bits No.	Remark
Message ID	6	Identifier of message 24, fixed to 24
Forwarding indicator	2	Used by the repeater to indicate how many times the message has been forwarded. 0= default value, 3= No more forwarding Used by the repeater to indicate how many times the message has been forwarded. 0= default value, 3= No more forwarding
User ID	30	MMSI number
Part number	2	Identifier of the message Part number, fixed to 0 for Part A
Name	120	The name of the MMSI registered vessel.6 bit ASCI code of up to 20 characters, @ = Unavailable = default. For the SAR aircraft, it shall install a"SARAIRCRAFTNNNNNNN", where NNNNNNN is the aircraft registration number
Number of bit	160	Occupies a time period

Part B of the message 24

Parameter	Bits No.	Remark
Message ID	6	Identifier of message 24, fixed to 24
Forwarding indicator	2	Used by the repeater to indicate how many times the message has been forwarded. 0= default value, 3= No more forwarding
Message ID	30	MMSI number
Part number	2	Identifier of the Part number of the message, It's fixed to 1 for part B
Type of vessel and cargo	8	0=Unavailable or no ships = Default 1-99=As specified in Section 3.3.2 100-199=Reserved for regional use 200-255=Reserved for future use Not applicable to the SAR aircraft
Vendor ID	42	Unique identification code for a device specified by the manufacturer (optional, "@@@@@" = Unavailable = Default)
Call sign	42	MMSI Call sign of a registered vessel. 7x6 bit ASCII character, “@@@@@@@”= Unavailable = Default value The vessel associated with the mother ship shall adopt the "A" and the last six of the associated MMSI. These ships include tugboats, lifeboats, traffic boats, lifeboats, and life rafts.
Ship size/ position reference	30	Size of a vessel in meters and the reference point of the reported location For the SAR aircraft, the use of this field may be determined by the responsible administration. If used, the maximum size shall be indicated. As the default, =D is A=B=C.

Parameter	Bits No.	Remark
The type of an electronic positioning device	4	0=Not specified (default value), 1=GPS, 2=GLONASS, 3=GPS/GLONASS combo, 4=Loran-C, 5=Chayka, 6=INS, 7=Pending, 8=Galileo, 9-14=Unused,15=Internal GNSS
Backup	2	MMSI number
Number of bit	168	Occupies a time period

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