NSR marine

User Manual

AIS AtoN Station

NAN-X000 Series

NAN-X000 UM.E 20200915-03

NOTICE TO USERS

- Thanks for your purchasing this product NAN-X000 AIS AtoN Station.

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- Please read this manual carefully to ensure proper use before installation and operation of the NAN-X000.

- NSR will assume no responsibility for the damage caused by improper use or modification of the product or claims of loss of profit by a third party.

- Software version in your product may be some different from that described as in this manual. Such difference will not affect the performance of the product. NSR reserves the right on continuous improvement of products both in software and hardware without any prior notice.

- Please keep the manual for your future reference.

NAN-X000 UM.E 20200915-03

MODIFY RECORD

No.	Modify by	Date	Paragraph	Version	Reason
1	Q/A	2011/08/10	all	01	First edition
2	Q/A	2016/09/19	5	02	Software upgrade
3	Q/A	2020/09/15	all	03	Full modification

TABLE OF CONTENTS

1. OUTLINE

AIS is the abbreviation for Automatic Identification System, which is of a radio communication system working with TDMA technology.

Generally there are three types of AIS transponders:

- Shipborne AIS (Class A and Class B)
- AIS base station
- AtoN AIS

AIS's communication modes include SOTDMA, RATDMA, ITDMA, FATDMA and CSTDMA, which are used for different terminals and different applications.

AIS, as applied to aids to navigation (AtoN), improves and enhances services provided to mariners.

The main communication mode of AIS AtoN Station is RATDMA and FATDMA. SOTDMA can work independently from the base station while FATDMA must rely on the base station to work. The slot on which the message is transmitted in FATDMA, needs to be reserved by the AIS base station to avoid slot collision.

According to the definition of IALA and IEC, there are three types of AIS AtoN Stations, Type I, II and III. NAN-X000 is Type I AIS AtoN Station.

Table 1 Types of AIS AtoN Stations

Item	Type I	Type II	Type III
Communication Mode	FATDMA	RATDMA FATDMA	RATDMA FATDMA
Built-in Receiver	0	1	2
Transmission Channel	1-2	1-2	2

There are four models for NAN-X000 as below:

Table 2 Models of NSR AIS AtoN Stations

Model No.	Design	Transmitting power	GPS antenna	VHF antenna	Power supply
NAN-1000	RADOME TYPE	12.5W	inside	inside	12-18V
NAN-2000	UFO TYPE	12.5W	inside	separate	12-18V
NAN-4000	POLE TYPE	4.0W	inside	outside	12-18V
NAN-5000	BOX TYPE	12.5W	separate	separate	12-18V

NAN-1000 NAN-2000 NAN-4000 NAN-5000

Figure 1 Four models of NSR AIS AtoN stations

2. PRODUCT DESCRIPTION

2.1 OVERVIEW

NAN-X000 AIS AtoN Station conforms to the international standards such as ITU-R M. 1371-5, IEC 62320-2, IEC60945.

2.2 PRODUCT FEATURES

NAN-X000 has all the basic functions of AIS AtoN station. The message transmitted includes AtoN name, type, ID, position status (on position or off position), light status (light on / off, battery voltage/current) , etc.

As Type I AIS AtoN station, NAN-X000 is transmit-only, without any receiver process, which operates only at slots preserved by AIS base stations. The TX mode of NAN-X000 adopts A or B mode recommended by IALA, i.e., two adjacent transmissions are alternately performed on two different channels, or two adjacent transmissions are performed on both channels.

NAN-X000 is specially designed to be used on buoys, which carries limited batteries to supply any additional electronic equipment. It can also be used on lighthouse, light vessel，oil platforms, harbor electronic fences and big rigs at sea.

NAN-X000 can also transmit messages for virtual AtoNs. Max 50 virtual AtoNs can be transmitted by one NAN-X000.

2.3 SPECIFICATIONS

Table 3 Technical Specifications

Item	Specifications
Frequency	AIS1(161.975MHz), AIS2(162.025MHz)
Power Supply	DC12V (12-18V)
Average Power Consumption	≤50mA Conditions: - GNSS continuous - MSG 6/ MSG21: 3 minutes interval
Operating Temperature	-15℃~+55℃
IP Grade	IP66
Position Information	BDS & GPS receiver
GNSS Antenna	Built-in for NAN-1000/2000/4000. Seperate for NAN-5000

Item	Specifications
VHF Antenna	Built-in for NAN-1000 External for NAN-4000 Separate for NAN-2000/NAN-5000
Communication Mode	FATDMA
TX Power	12.5W (NAN-1000/2000/5000) 4.0W (NAN-4000)
TX Mode	A or B (refer to Figure 2)
Message Type	MSG 6/21
TX Interval for MSG 6	3~60 minutes (to be configurated)
TX Interval for MSG 21	3~60 minutes (to be configurated)
Number of virtual AtoN to be transmitted	Max 50

Note: When Mode A is adopted for TX Mode, the last message is transmitted on Channel 1, and the next message is transmitted on Channel 2. Compared with the Mode B, this mode occupies fewer slots.
When Mode B is adopted for TX Mode, the same message transmitted on Channel 1 and Channel 2 in quick (nominally 4 seconds) succession. The first transmission of each message may be either on Channel 1 or Channel 2. The second transmission shall be on the other channel.

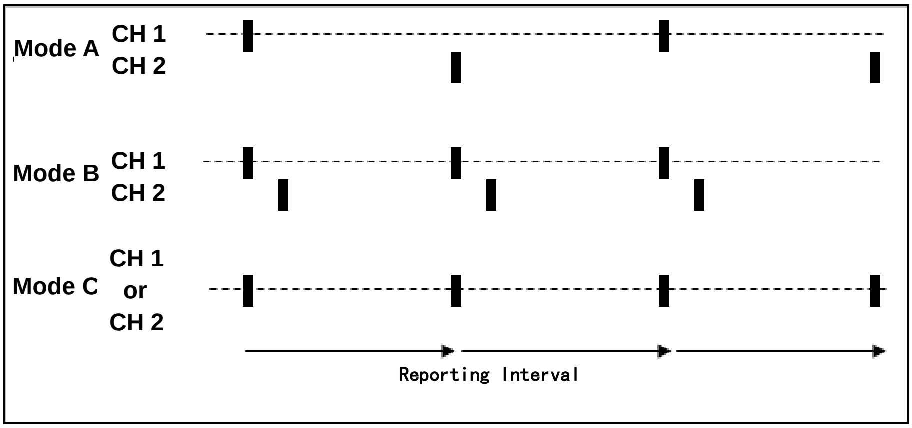


Figure 2 TX Mode

2.4 SAMPLING PARAMETERS

In MSG6, battery voltage and current are included. They need sampling before the data is transmitted with the message.

Table 4 Light Sampling Parameters

NO	ITEM	Display Accuracy	Sampling Accuracy	Measuring Range
1	Current	0.1A	10mA	0-5A
2	Voltage	0.1V	10mV	0-20V

2.5 PRODUCT COMPATIBILITY

NAN-X000 can work in the existing AIS system.

2.5.1 Compatible with Shipborne AIS

NAN-X000 is designed according to the ITU, IEC standards, and compatible with the shipborne AIS which conforms to the international standards.

The main function of AIS AtoN Station is transmitting **MSG21** position reports. These messages can be received by the shipborne AIS.

2.5.2 Compatible with AIS base station

MSG6 and **MSG21** which transmitted by NAN-X000 can be received by the AIS base station installed locally, and displayed well in chart system.

AIS base station can transmit special messages to reserve slots for AIS AtoN station's transmission.

In some cases, if needed, NAN-X000 can also transmit such messages to reserve slots for its own transmission of MSG21 and MSG6. Please contact NSR for any special requirements.

3. PRODUCT FUNCTION

3.1 MAIN MESSAGES

The main messages transmitted by NAN-X000 are **MSG6** and **MSG21**.

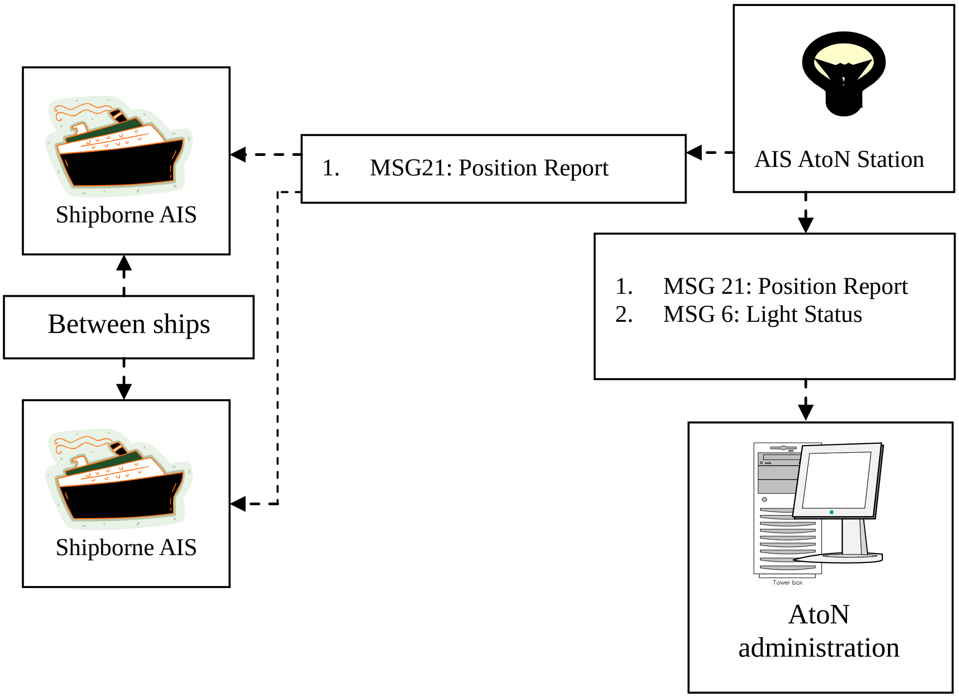


Figure 3 Message Flow

MESSAGE 6 （MSG6 ）

MSG6, addressed Binary Message, can be transmitted by an AIS AtoN Station for sending AtoN status reports to the AIS base station, and then be transferred to the AtoN administration responsible for the AtoN monitoring.

MSG6 includes:

- AtoN ID
- Base station ID
- Light Status (for example: ON or OFF)
- Battery current (for example: 0.4A)
- Battery voltage (for example: 13.2V）

MSG6 transmitted by NAN-X000 can be received and decoded by AIS base station whose MMSI matches with base station ID in MSG6.

MESSAGE 21（MSG21）

MSG21, broadcast Binary Message, can be transmitted by an AIS AtoN Station for sending AtoN position reports to both AIS base stations and shipborne AIS.

MSG21 includes:

- AtoN MMSI
- AtoN Name
- AtoN Type
- Position Accuracy
- Position Latitude
- Position Longitude
- Type of Position Fixing
- Time Stamp
- Position Status (on position or off position)

MSG21 transmitted by NAN-X000 can be received by all surrounding AIS base stations and shipborne AIS. It's possible that some old AIS cannot decode and display AtoN target on MKD correctly if they have not been upgraded to latest ITU standards.

When an AIS AtoN station is used to transmit virtual AtoN, only MSG21 is necessary.

3.2 MESSAGE RECEIVED AND DISPLAYED

3.2.1 Shipborne AIS

Shipborne AIS transponder can receive **MSG21**. While it's received, the position, name etc. will be displayed as an AIS target on MKD or as an AtoN icon on ECS/ECDIS when installed.

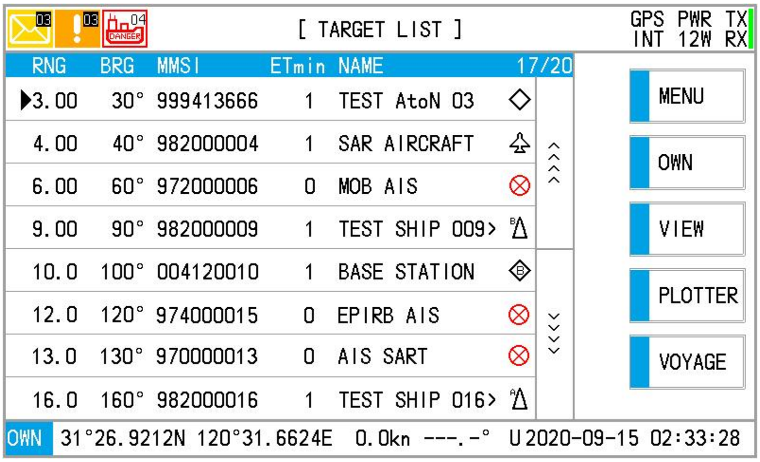


Figure 4 AtoN target displayed on shipborne MKD

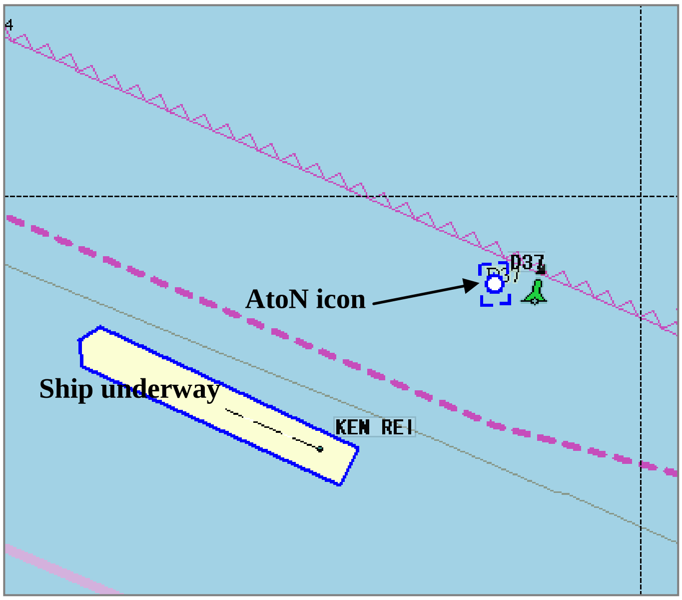


Figure 5
AtoN displayed on shipborne ECS/ECDIS

3.2.2 AtoN administration

AtoN administration can receive **MSG6** and **MSG21** via AIS base station. These messages can be displayed in electric chart software of AIS base station normally.
For example, the display of **MSG6** and **MSG21** received can be as follows:

A、 Light Status

Used for light monitoring by the authorities. Light status includes position status, light on/off, battery current/voltage etc. These data are transmitted by **MSG6** (addressed).

B、Position Report

Used for sending AtoN position reports (including AtoN name, MMSI, position etc.) to the light authorities and all shipborne AIS . These data are transmitted by **MSG21** (broadcast).

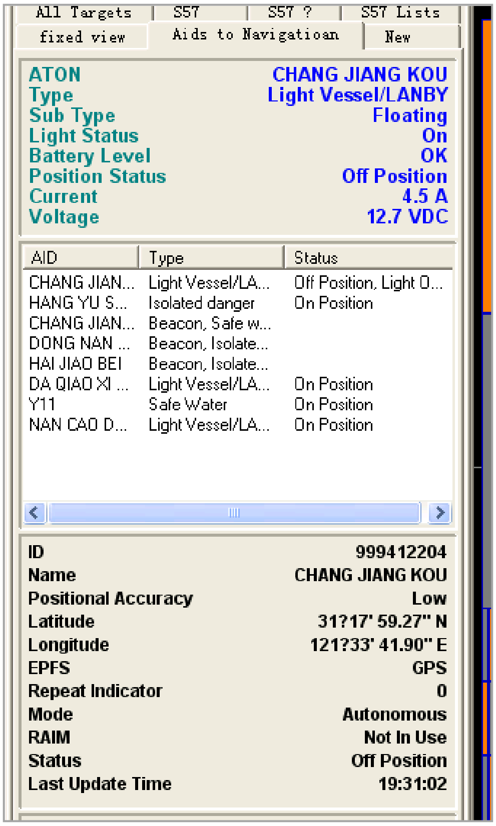


Figure 6 NAN-X000 Message displayed on monitoring system in AtoN administration

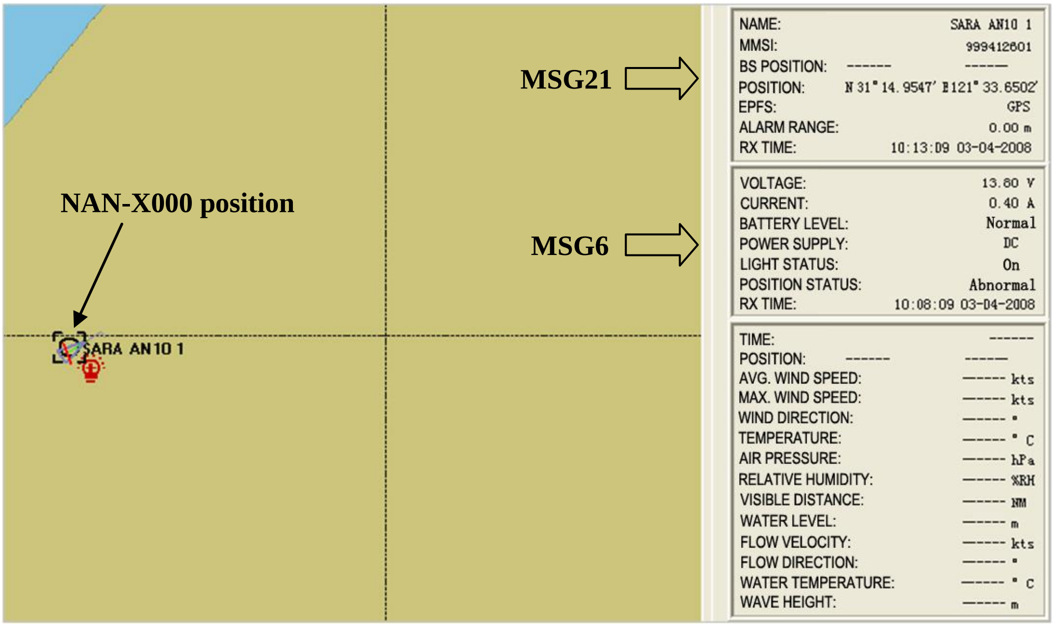


Figure 7 NAN-X000 Message displayed on chart system in AtoN administration

4. PRODUCT APPLICATIONS

Please consider the following situation while choose NAN-X000.

（1） **Purpose**

If the AIS AtoN Station is only for sending **MSG21** and **MSG6**, for broadcasting position report and monitoring light status, our NAN-X000 is the better choice due to its good cost performance, and needn't additional investment in new solar cells and batteries, etc.

（2） **Application**

NAN-X000 can only installed within the coverage of base stations. It can be used on buoys, lighthouses and other aids to navigation facilities. It can also used for other applications such as:

- Virtual AtoN path for bridges
- Harbor electronic fence for rig, bridge, wind farm, offshore……

Model No.	Design	Transmitting power	GPS antenna	VHF antenna	Power supply	Transmission range
NAN-1000	RADOME TYPE	12.5W	inside	inside	12-18V	5-10nm
NAN-2000	UFO TYPE	12.5W	inside	separate	12-18V	10-20nm
NAN-4000	POLE TYPE	4.0W	inside	outside	12-18V	5-10nm
NAN-5000	BOX TYPE	12.5W	separate	separate	12-18V	10-20nm

5. PRODUCT PROGRAMMING

Before installing the NAN-X000, it should be programmed by following steps:

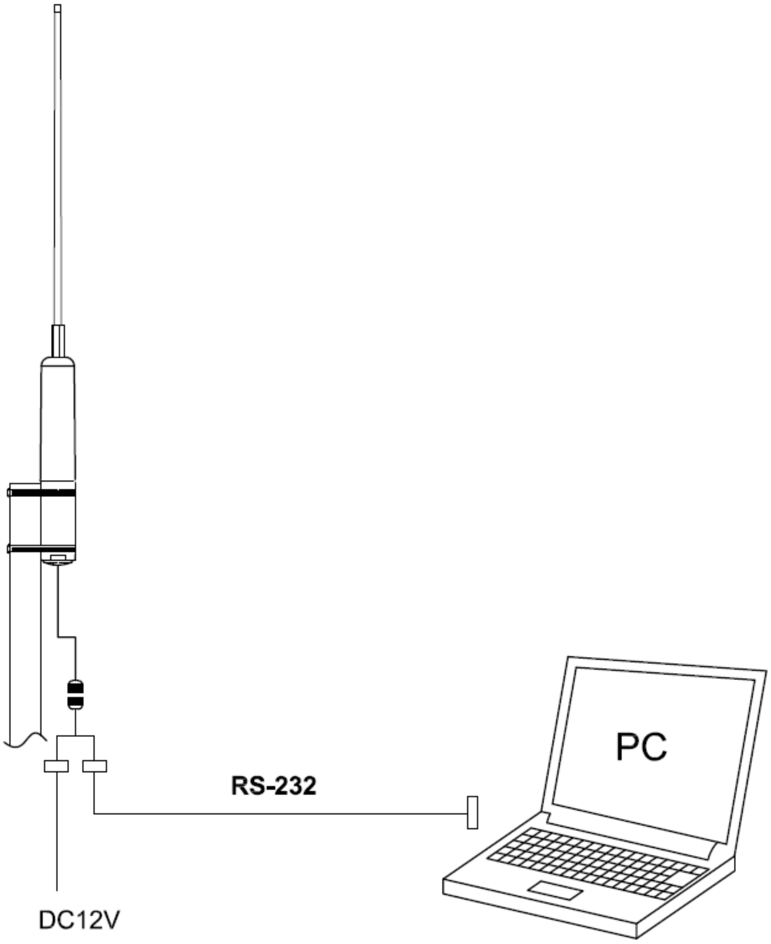


Figure 8 Connection for programming (For example: NAN-4000)

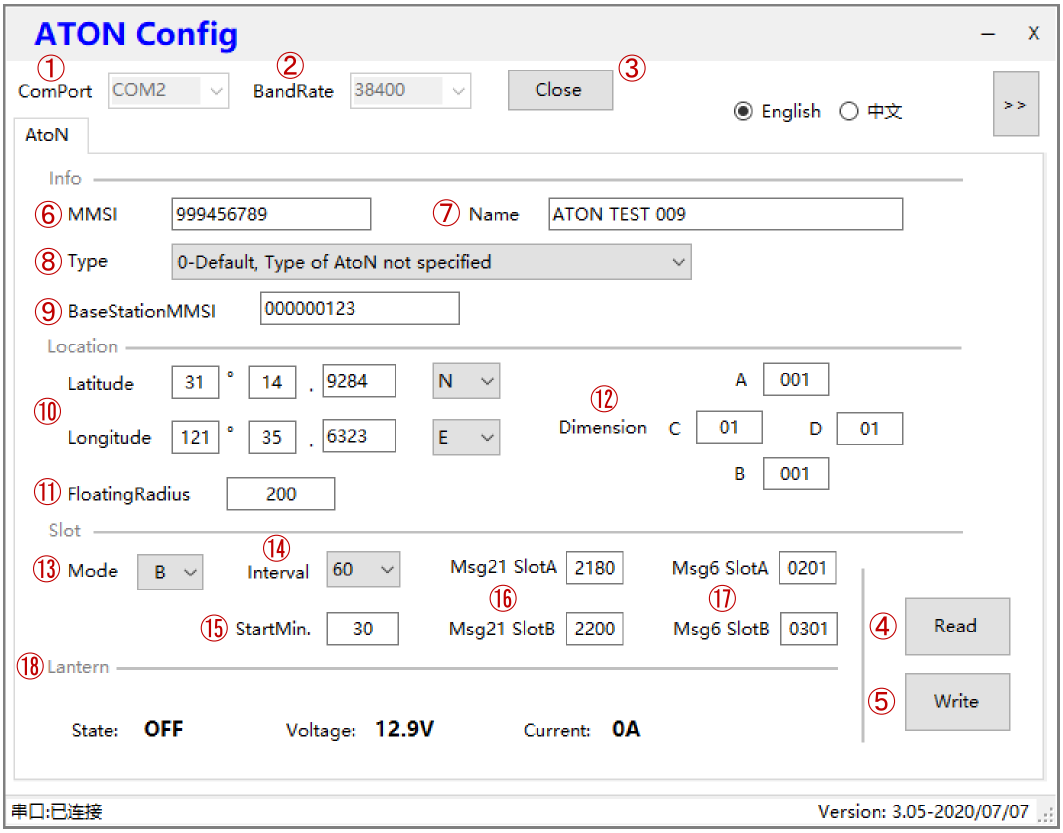


Figure 9 Basic Parameter Setting

① **Com Port**: Serial port selection.

② **Baud Rate**: Choose a different baud rate (38400bps).

③ **Open**: Click to open or close serial port.

④ **Read**: Click to read setting and status data from the device.

⑤ **Write**: Click to write setting data to the device.

⑥ **MMSI**: Appointed by AtoN administration.

⑦ **Name (** AtoN): Appointed by AtoN administration. Refer to the relevant rules.

⑧ **Type(** AtoN): Set in the pull-down menu. Refer to the APPENDIX B.

⑨ **Base Station MMSI**: This setting is used for transmitting MSG6 and other addresses message. Generally, it should be set with the nearest base station's MMSI.

⑩ **Latitude/Longitude**: Chart position of the device.

⑪ **Floating Radius**: Radius of the area in which the device can move. Unit: m.
When the actual position of the AtoN exceeds the floating radius of the chart position, the relevant field of the **MSG21** will become "FLOAT".

⑫ **Dimension**: A, B, C, D are the locations of the AIS antenna on the buoy. Refer to the APPENDIX C.

⑬ **Mode**: TX mode (A or B).

⑭ **Interval**: TX interval (3-60 minutes).

⑮ **Start Min.**: TX start time.

⑯ **Msg21 Slot A/B**: Tx Slot No, 0~2249 configured.

⑰ **Msg6 Slot A/B**: Tx Slot No, 0~2249 configured.

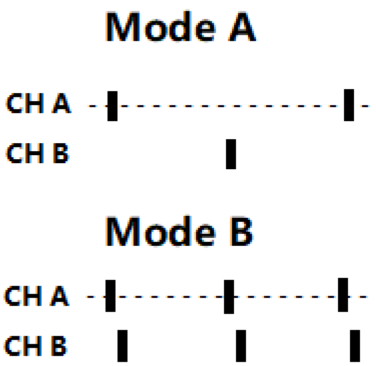
Description:

MSG21 occupies 2 slots.

MSG6 occupies 1 slot.

Mode A: AIS transmits on channel A and channel B alternately at the TX interval.

Mode B: AIS transmits on both channel A and channel B at the TX interval.



Grouping:

The slot numbers assigned to the device are reserved by the AIS base station through the MSG20, and other AIS stations shall not use these reserved slots. The messages are transmitted at a certain interval, so in the idle minutes, the reserved slots may not be fully used. For example, the TX interval is 3 minutes, the device transmits the message at the 0th minute, but the slot is free in the 1st minute and the 2nd minute. In order to improve the utilization of slots, the devices can be grouped when using the same slot configured.

For example:

MSG21 slot of channel A is 1300, **MSG21** slot of channel B is 1500.

In Mode A, if the TX interval is 3 minutes, six devices can be grouped.

No.0: Start time 0

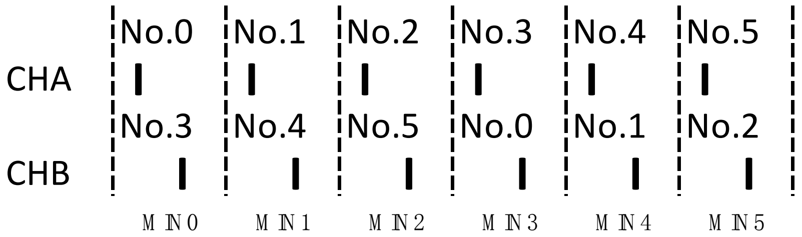
No.1: Start time 1

No.2: Start time 2

No. 3: Start time 3

No.4: Start time 4

No. 5: Start time 5

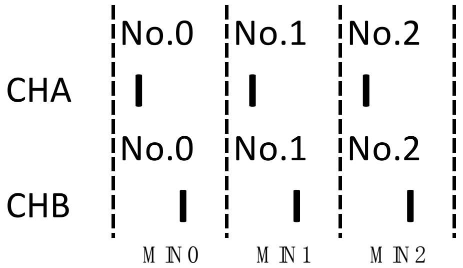


In Mode B, if the TX interval is 3 minutes, three devices can be grouped.

No.0: Start time 0

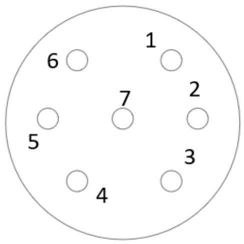
No.1: Start time 1

No.2: Start time 2



⑱ **Lantern**: Lantern status can be read, such as ON/OFF state, voltage and current.

6. INTERFACE DEFINITION



1	POWER SUPPLY (+)
2	POWER SUPPLY (-) (RS232-GND)
3	LANTERN (+)
4	LANTERN (-)
5	RS232-RXD
6	RS232-TXD

Pin 1/2/3/4 are connected for normal operation.
Pin 1/2/5/6 are connected for programming.

[APPENDIX A] TERMS DESCRIPTION

TERM	DESCRIPTION
AIS	Automatic Identification System
IMO	International Maritime Organization
IALA	International Association of Maritime Aids to Navigation & Lighthouse Authorities
ITU	International Telecommunications Union
ITU-R	International Telecommunications Union- Radio Bureaux
IEC	International Electrotechnical Commission
TDMA	Time Division Multiple Access
SOTDMA	Self Organized Time Division Multiple Access
FATDMA	Fixed Access Time Division Multiple Access
RATDMA	Random Access Time Division Multiple Access
ITDMA	Incremental Time Division Multiple Access
GPS	Global Positioning System
MMSI	Maritime Mobile Safety Identification
VTS	Vessel Traffic System

[APPENDIX B] DESCRIPTION OF MESSAGE 21

Extracted from ITU-R M.1371-5.

This message should be used by an Aids to navigation (AtoN) AIS station. This station may be mounted on an aid-to-navigation or this message may be transmitted by a fixed station when the functionality of an AtoN station is integrated into the fixed station. This message should be transmitted autonomously at a Rr of once every three (3) min or it may be assigned by an assigned mode command (Message 16) via the VHF data link, or by an external command. This message should not occupy more than two slots.

Parameter	Number of bits	Description
Message ID	6	Identifier for Message 21
Repeat indicator	2	Used by the repeater to indicate how many times a message has been repeated. See §4.6.1, Annex 2; 0-3; 0 = default; 3 = do not repeat any more
ID	30	MMSI number (see Article 19 of the RR and Recommendation ITU-R M.585)
Type of aids-to-navigation	5	0 = not available = default; refer to appropriate definition set up by IALA; see Table 74.
Name of Aids-to-Navigation	120	Maximum 20 characters 6-bit ASCII, as defined in Table 47 "@@@@@@@@@@@@@@@@@@@@" = not available = default. The name of the AtoN may be extended by the parameter "Name of Aid-to-Navigation Extension" below.
Position accuracy	1	1 = high (≤10 m) 0 = low (>10 m) 0 = default The PA flag should be determined in accordance with Table 50.
Longitude	28	Longitude in 1/10 000 min of position of an AtoN (±180°, East = positive, West = negative 181 = ($6791AC0_h$) = not available = default)
Latitude	27	Latitude in 1/10 000 min of an AtoN (±90°, North = positive, South = negative 91 = (3412140_h) = not available = default)
Dimension/ reference for position	30	Reference point for reported position; also indicates the dimension of an AtoN (m) (see Fig. 41*bis* and §4.1), if relevant(1) .

Parameter	Number of bits	Description
Type of electronic position fixing device	4	0 = Undefined (default) 1 = GPS 2 = GLONASS 3 = Combined GPS/GLONASS 4 = Loran-C 5 = Chayka 6 = Integrated Navigation System 7 = surveyed. For fixed AtoN and virtual AtoN, the charted position should be used. The accurate position enhances its function as a radar reference target. 8 = Galileo 9-14 = not used 15 = internal GNSS
Time stamp	6	UTC second when the report was generated by the EPFS (0-59 or 60) if time stamp is not available, which should also be the default value or 61 if positioning system is in manual input mode or 62 if electronic position fixing system operates in estimated (dead reckoning) mode or 63 if the positioning system is inoperative.
Off-position indicator	1	For floating AtoN, only: 0 = on position; 1 = off position. NOTE 1 – This flag should only be considered valid by receiving station, if the AtoN is a floating aid, and if time stamp is equal to or below 59. For floating AtoN, the guard zone parameters should be set on installation.
AtoN status	8	Reserved for the indication of the AtoN status 00000000 = default
RAIM-flag	1	RAIM (Receiver autonomous integrity monitoring) flag of electronic position fixing device; 0 = RAIM not in use = default; 1 = RAIM in use, see Table 50.
Virtual AtoN flag	1	0 = default = real AtoN at indicated position; 1 = virtual AtoN, does not physically exist(2).
Assigned mode flag	1	0 = Station operating in autonomous and continuous mode = default 1 = Station operating in assigned mode
Spare	1	Spare. Not used. Should be set to zero. Reserved for future use
Name of Aid-to-Navigation Extension	0, 6, 12, 18, 24, 30, 36, ... 84	This parameter of up to 14 additional 6-bit-ASCII characters for a 2-slot message may be combined with the parameter “Name of Aid-to-Navigation” at the end of that parameter, when more than 20 characters are needed for the name of the AtoN. This parameter should be omitted when no more than 20 characters for the name of the A-to-N are needed in total. Only the required number of characters should be transmitted, i.e. no @-character should be used.

Parameter	Number of bits	Description
Spare	0, 2, 4, or 6	Spare. Used only when parameter "Name of Aid-to-Navigation Extension" is used. Should be set to zero. The number of spare bits should be adjusted in order to observe byte boundaries.
Number of bits	272-360	Occupies two slots.

Notes:

(1) When using Fig. 41*bis* for AtoN the following should be observed:

– For fixed Aids-to-Navigation, virtual AtoN, and for off-shore structures, the orientation established by the dimension A should point to true north.

– For floating aids larger than 2 m * 2 m the dimensions of the AtoN should always be given approximated to a circle, i.e. the dimensions should always be as follows A = B = C = D ≠ 0. (This is due to the fact that the orientation of the floating Aid to Navigation is not transmitted. The reference point for reported position is in the centre of the circle.)

– A = B = C = D = 1 should indicate objects (fixed or floating) smaller than or equal to 2 m * 2 m. (The reference point for reported position is in the centre of the circle.)

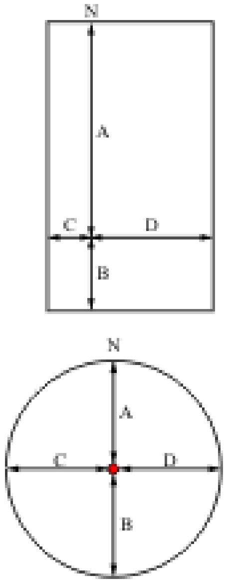
– Floating off shore structures that are not fixed, such as rigs, should be considered as Code 31 type from Table 74 AtoN. These structures should have their "Dimension/reference for position" parameter as determined above in Note (1).

For fixed off shore structures, Code 3 type from Table 74, should have their "Dimension/reference for position" parameter as determined above in Note (1). Hence, all off shore AtoN and structures have the dimension determined in the same manner and the actual dimensions are contained in Message 21.

(2) When transmitting virtual AtoN information, i.e. the virtual/pseudo AtoN Target Flag is set to one (1), the dimensions should be set to A=B=C=D=0 (default). This should also be the case, when transmitting "reference point" information (see Table 73).

FIGURE 41*bis*

Reference point for reported position of a maritime aid to navigation, or the dimension of an aid to navigation



	Number of bits	Bit Fields	Distance (m)
A	9	Bit 21-Bit 29	0-511 511 = 511 m or greater
B	9	Bit 12-Bit 20	0-511 511 = 511 m or greater
C	6	Bit 6-Bit 11	0-63; 63 = 63 m or greater
D	6	Bit 0-Bit 5	0-63; 63 = 63 m or greater

This message should be transmitted immediately after any parameter value was changed.

Note on AtoN within AIS:

The competent international body for aids-to-navigation, IALA, defines an AtoN as: “a device or system external to vessels designed and operated to enhance safe and efficient navigation of vessels and/or vessel traffic.” (IALA Navguide, Edition 2010).

The IALA Navguide stipulates: “A floating aid to navigation, which is out of position, adrift or during the night is unlighted, may itself become a danger to navigation. When a floating aid is out of position or malfunctioning, navigational warnings must be given.” Therefore, a station, which transmits Message 21, could also transmit safety related broadcast message (Message 14) upon detecting that the floating AtoN has gone out of position or is malfunctioning, at the competent administration’s discretion.

TABLE 74

The nature and type of aids to navigation can be indicated with 32 different codes

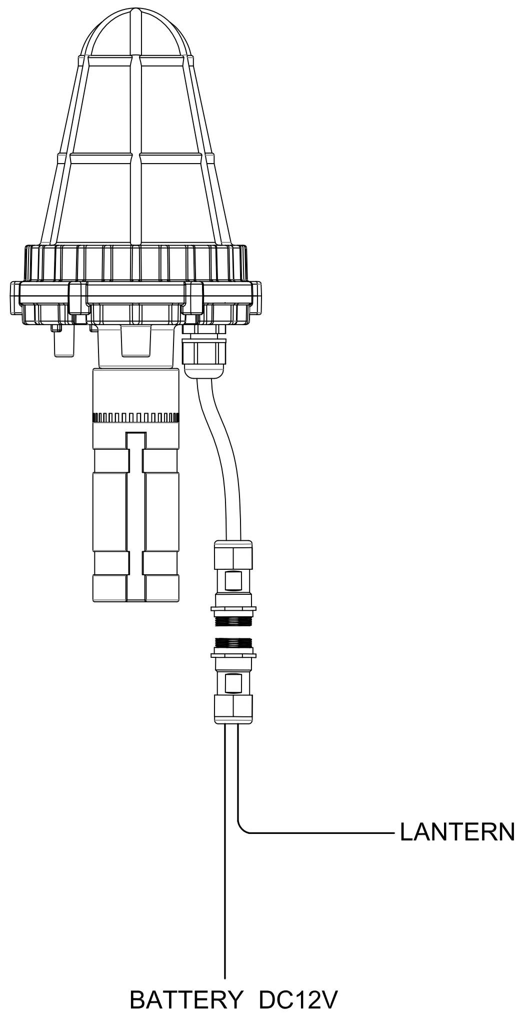
	Code	Definition
	0	Default, Type of AtoN not specified
	1	Reference point
	2	RACON
	3	Fixed structures off-shore, such as oil platforms, wind farms. (NOTE – This code should identify an obstruction that is fitted with an AtoN AIS station.)
	4	Emergency Wreck Marking Buoy
Fixed AtoN	5	Light, without sectors
	6	Light, with sectors
	7	Leading Light Front
	8	Leading Light Rear
	9	Beacon, Cardinal N
	10	Beacon, Cardinal E
	11	Beacon, Cardinal S
	12	Beacon, Cardinal W
	13	Beacon, Port hand
	14	Beacon, Starboard hand
	15	Beacon, Preferred Channel port hand
	16	Beacon, Preferred Channel starboard hand
	17	Beacon, Isolated danger
	18	Beacon, Safe water
	19	Beacon, Special mark
Floating AtoN	20	Cardinal Mark N
	21	Cardinal Mark E
	22	Cardinal Mark S
	23	Cardinal Mark W
	24	Port hand Mark
	25	Starboard hand Mark
	26	Preferred Channel Port hand
	27	Preferred Channel Starboard hand
	28	Isolated danger
	29	Safe Water
	30	Special Mark
	31	Light Vessel/LANBY/Rigs

NOTE 1 – The types of aids to navigation listed above are based on the IALA Maritime Buoyage System, where applicable.

NOTE 2 – There is potential for confusion when deciding whether an aid is lighted or unlighted. Competent authorities may wish to use the regional/local section of the message to indicate this.

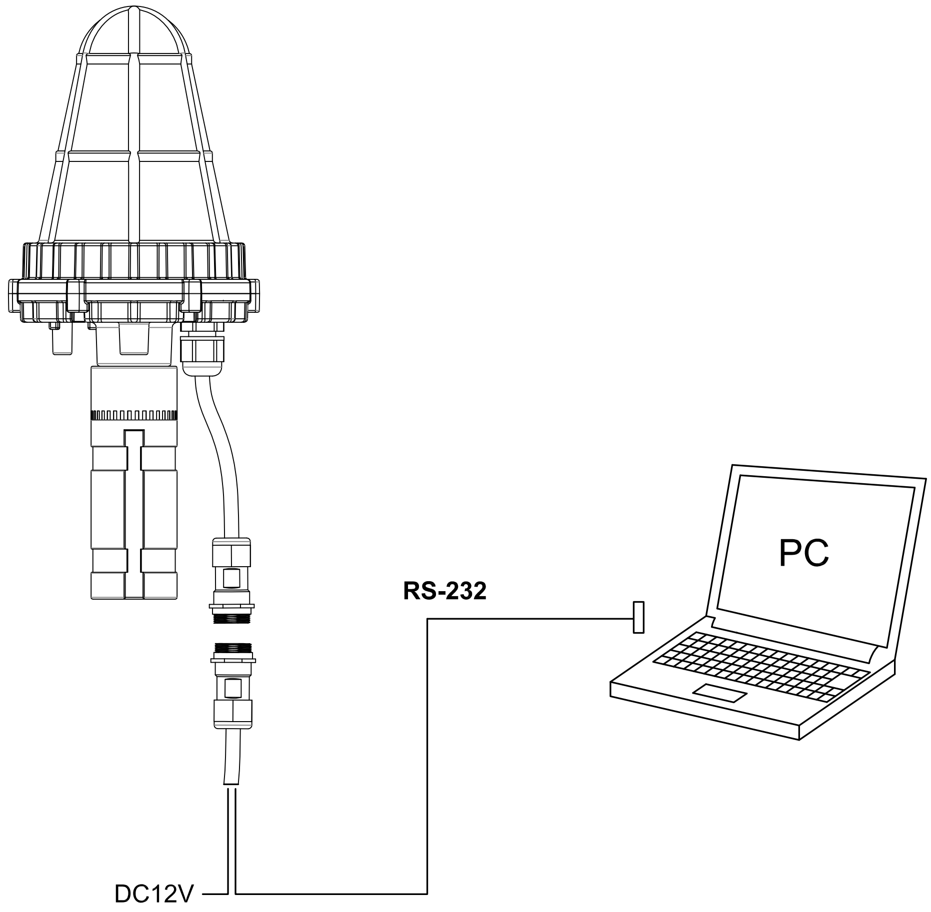
[APPENDIX C] DRAWINGS

NO.	DATE	REVISION & DESCRIPTION	REVIEWED	CHECKED
			SIGNATURE	
0				

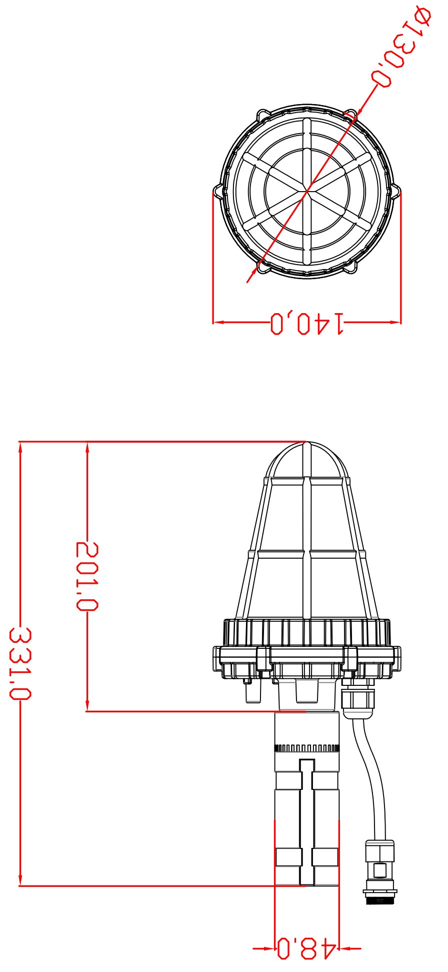


APPLICATION	NAN-1000 SYSTEM DIAGRAM		
DATE		ITEM	SIZE A4
APPROVAL		SCALE N/S UNIT mm PROJECTION	▽▽▽▽0.8S ▽▽▽6.3S ▽▽12S ▽100S
CHECKED		NSR marine	NEW SUNRISE CO., LTD.
DRAWING			
DWG NO.	NAN1000-ID-001		

NO.	DATE	REVISION & DESCRIPTION	REVIEWED / CHECKED SIGNATURE	
0				



APPLICATION	NAN1000 CONFIG DRAWING		
DATE		ITEM	SIZE A4
APPROVAL		SCALE N/S UNIT mm PROJECTION	▽▽▽▽0.8S ▽▽▽6.3S ▽▽12S ▽100S
CHECKED		NSR marine	NEW SUNRISE CO., LTD.
DRAWING			
DWG NO.	NAN1000-ID-002		



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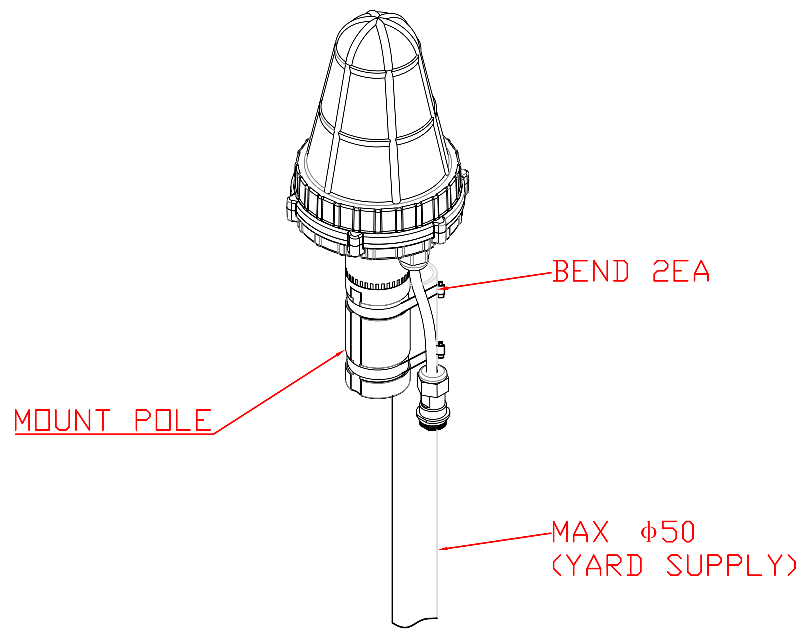
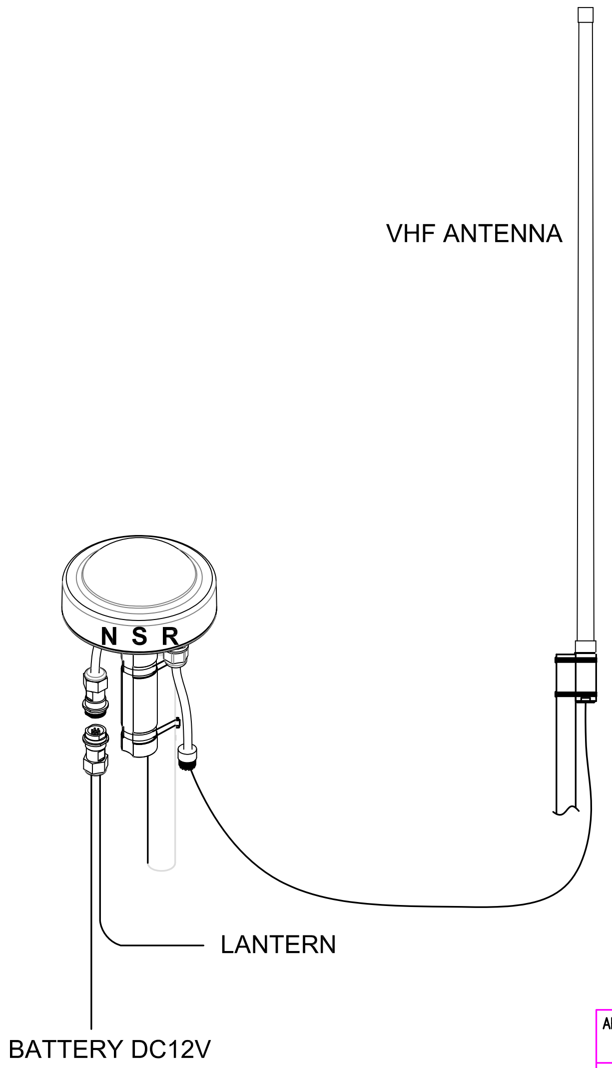


INSTALLATION

NO.	DATE	REVISION & DESCRIPTION	REVIEWED	CHECKED
			SIGNATURE	

APPLICATION	NAN-1000 INSTALLATION DRAWING		
DATE		ITEM: NAN-1000	SIZE: A4
APPROVAL		SCALE: N/S	UNIT: mm
CHECKED		NSR marine NEW SUNRISE CO., LTD.	
DRAWING			
DWG NO.	NAN1000-ID-003		



NO.	DATE	REVISION & DESCRIPTION	REVIEWED	CHECKED
			SIGNATURE	
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APPLICATION	NAN-2000 SYSTEM DIAGRAM		
DATE		ITEM	SIZE A4
APPROVAL		SCALE N/S UNIT mm PRO-JECTION	▽▽▽▽0.8S ▽▽▽6.3S ▽▽12S ▽100S
CHECKED		NSR marine	NEW SUNRISE CO., LTD.
DRAWING			
DWG NO.	NAN2000-ID-001		

NO.	DATE	REVISION & DESCRIPTION	REVIEWED	CHECKED
			SIGNATURE	
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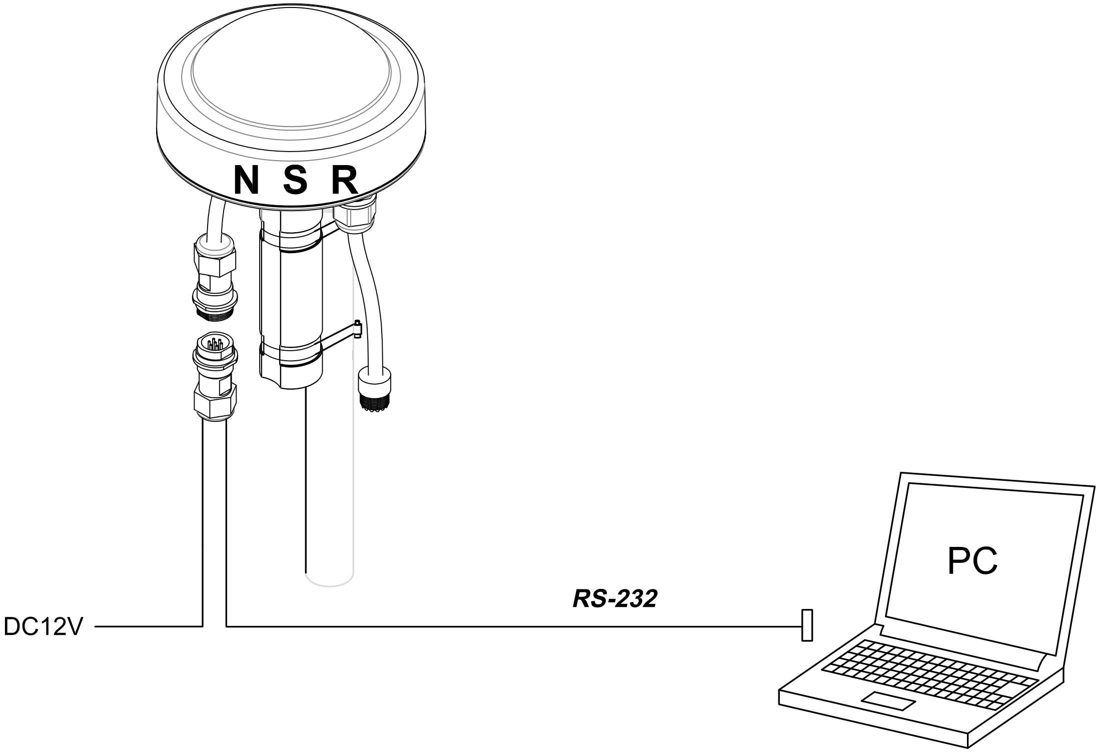
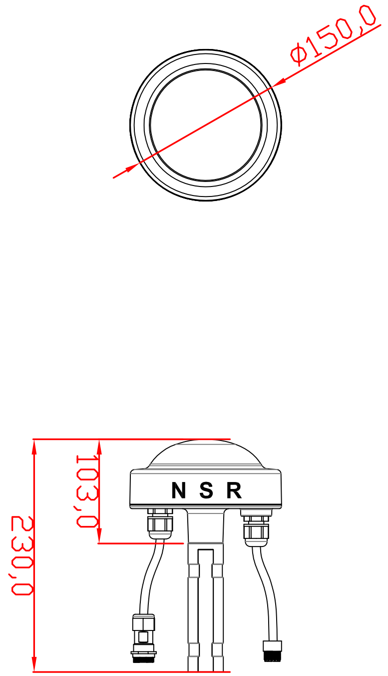


APPLICATION	NAN-2000 CONFIG DRAWING				
DATE		ITEM		SIZE	A4
APPROVAL		SCALE N/S	UNIT mm	PRO-JECTION	▽▽▽▽0.8S ▽▽▽6.3S ▽▽12S ▽100S
CHECKED		NSR marine	NEW SUNRISE CO., LTD.		
DRAWING					
DWG NO.	NAN2000-ID-002				

NO.	DATE	REVISION & DESCRIPTION	REVIEWED	CHECKED
			SIGNATURE	
△				



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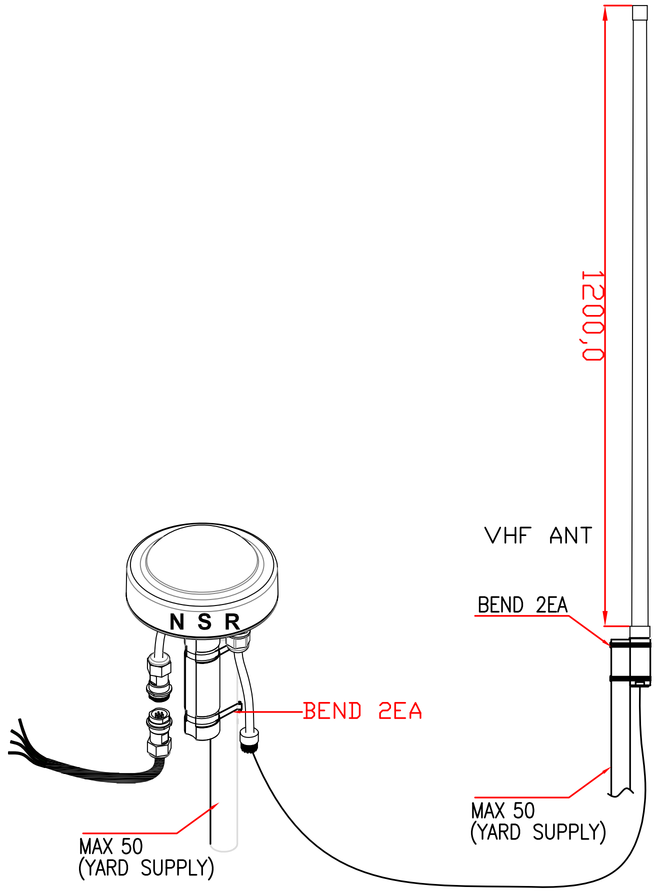
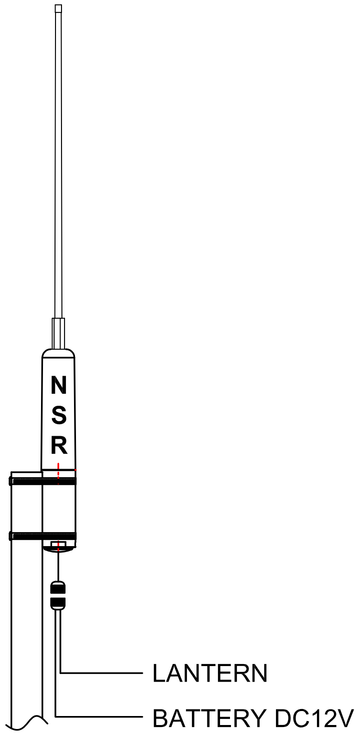


INSTALLATION

APPLICATION

NAN-2000 INSTALLATION DRAWING

DATE		ITEM	NSR
APPROVAL		SCALE N/S	UNIT mm	PRO-JECTION	SIZE A4
CHECKED		NSR marine	NEW SUNRISE CO., LTD.
DRAWING			
DWG NO.	NAN2000-ID-003		



NO.	DATE	REVISION & DESCRIPTION	REVIEWED SIGNATURE	CHECKED SIGNATURE
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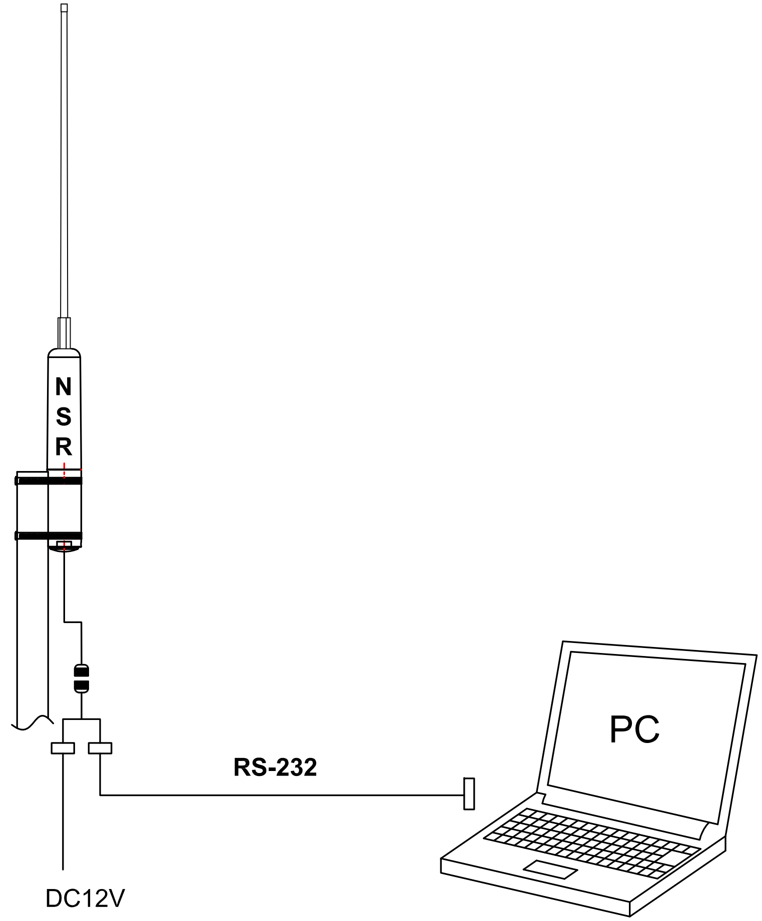
APPLICATION	NAN-4000 SYSTEM DIAGRAM		
DATE		ITEM	SIZE A4
APPROVAL		SCALE N/S	UNIT mm	PROJECTION ▽▽▽▽0.8S ▽▽▽6.3S ▽▽12S ▽100S
CHECKED		NSR marine	NEW SUNRISE CO., LTD.
DRAWING			
DWG NO.	NAN4000-ID-001		

NO.	DATE	REVISION & DESCRIPTION	REVIEWED	CHECKED
0			SIGNATURE	



APPLICATION	NAN-4000 CONFIG DRAWING				
DATE		ITEM		SIZE	A4
APPROVAL		SCALE N/S	UNIT mm	PRO-JECTION	▽▽▽▽0.8S ▽▽▽6.3S ▽▽12S ▽100S
CHECKED		NSR marine	NEW SUNRISE CO., LTD.		
DRAWING					
DWG NO.	NAN4000-TD-002				

NO.	DATE	REVISION & DESCRIPTION	REVIEWED	CHECKED
			SIGNATURE	
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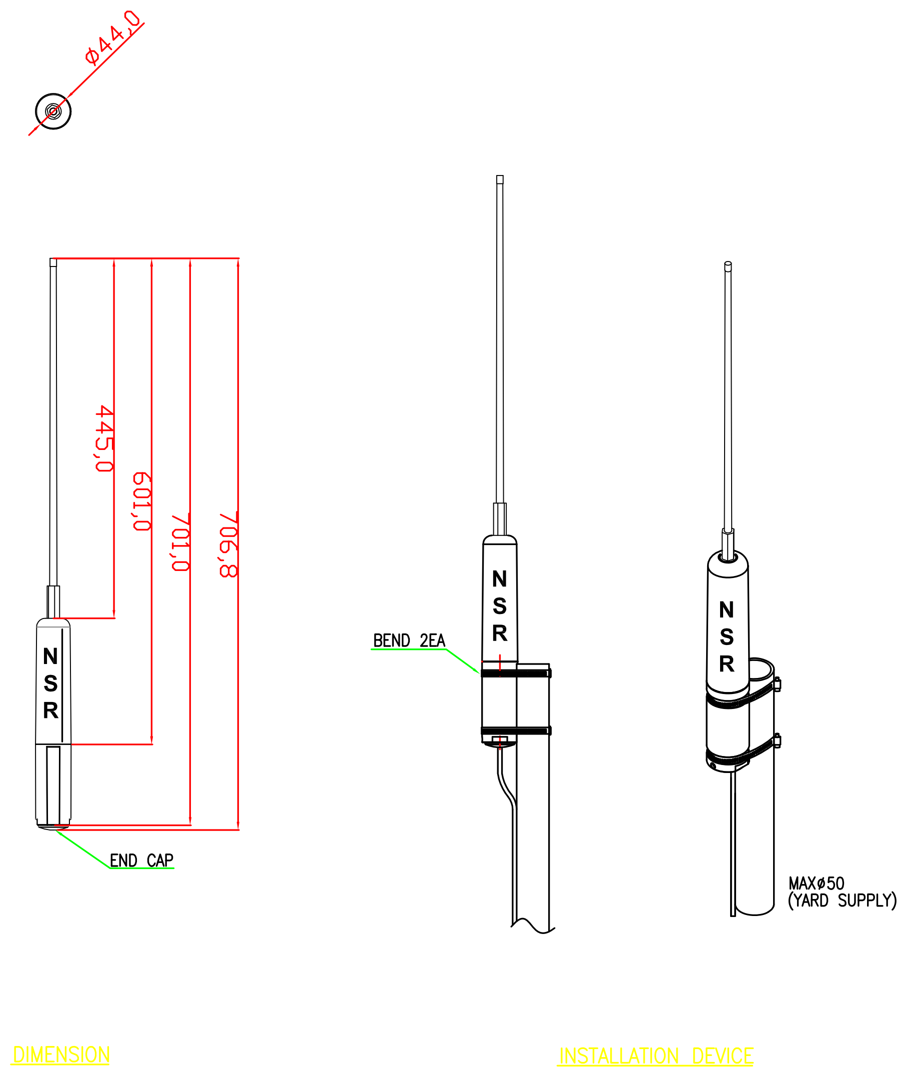
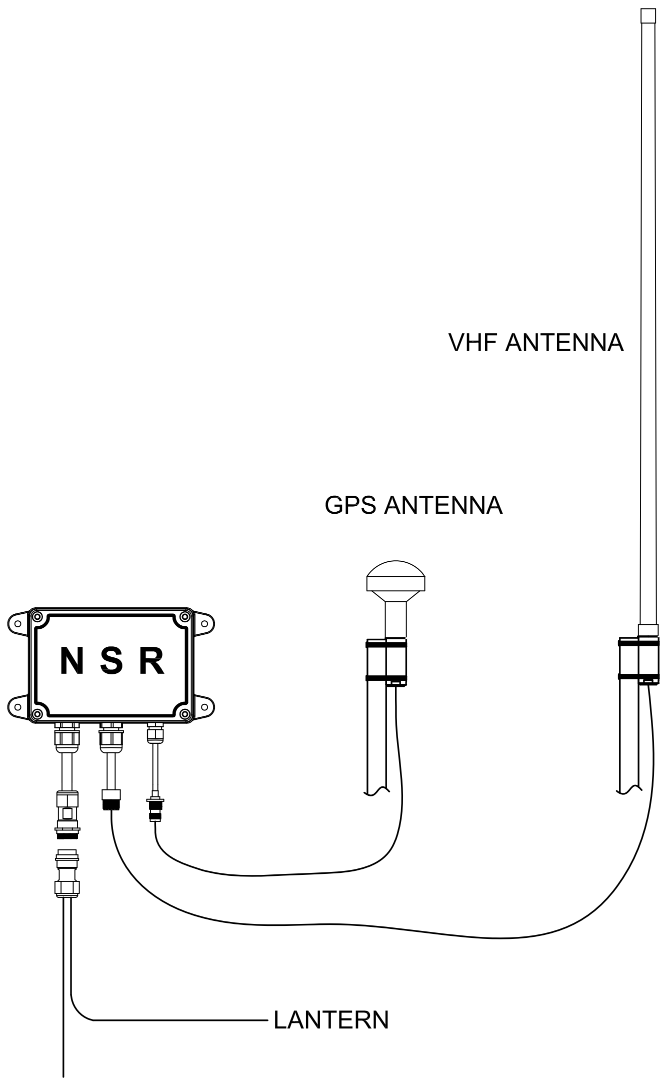


APPLICATION	NAN-4000 INSTALLATION DRAWING			
DATE		ITEM	NAN-5000C	SIZE A4
APPROVAL		SCALE N/S	UNIT mm	PRO-JECTION
CHECKED		NEW SUNRISE CO., LTD.		
DRAWING				
DWG NO.	NAN4000-ID-003			



NO.	DATE	REVISION & DESCRIPTION	REVIEWED (SIGNATURE)	CHECKED (SIGNATURE)
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APPLICATION	NAN-5000 SYSTEM DIAGRAM		
DATE		ITEM	SIZE A4
APPROVAL		SCALE N/S UNIT mm PROJECTION	▽▽▽▽0.8S ▽▽▽6.3S ▽▽12S ▽100S
CHECKED		NSR marine	NEW SUNRISE CO., LTD.
DRAWING			
DWG NO.	NAN5000-ID-001		

NO.	DATE	REVISION & DESCRIPTION	REVIEWED	CHECKED
			SIGNATURE	
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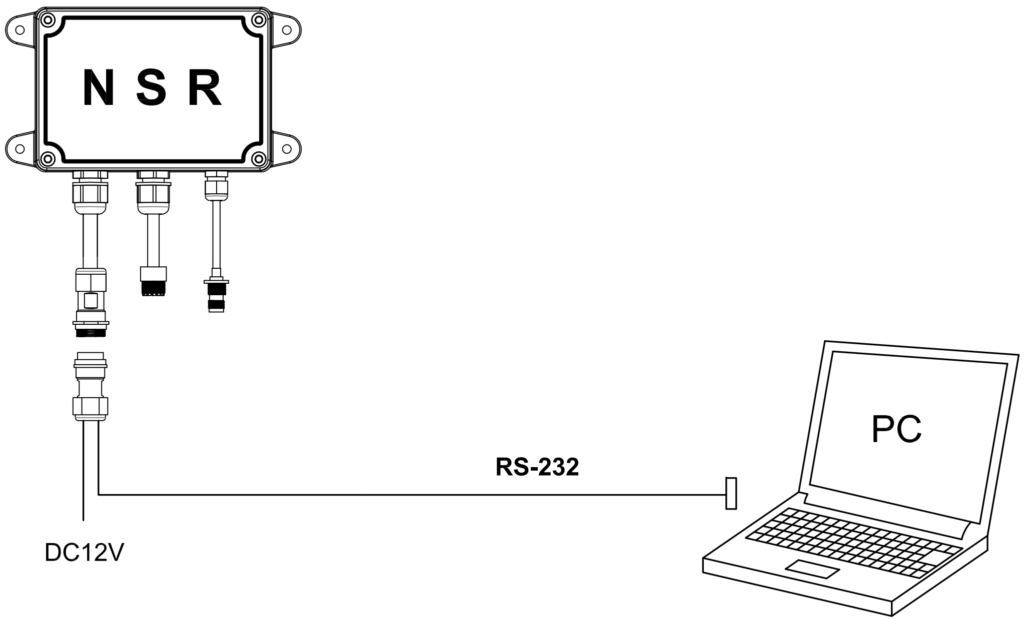
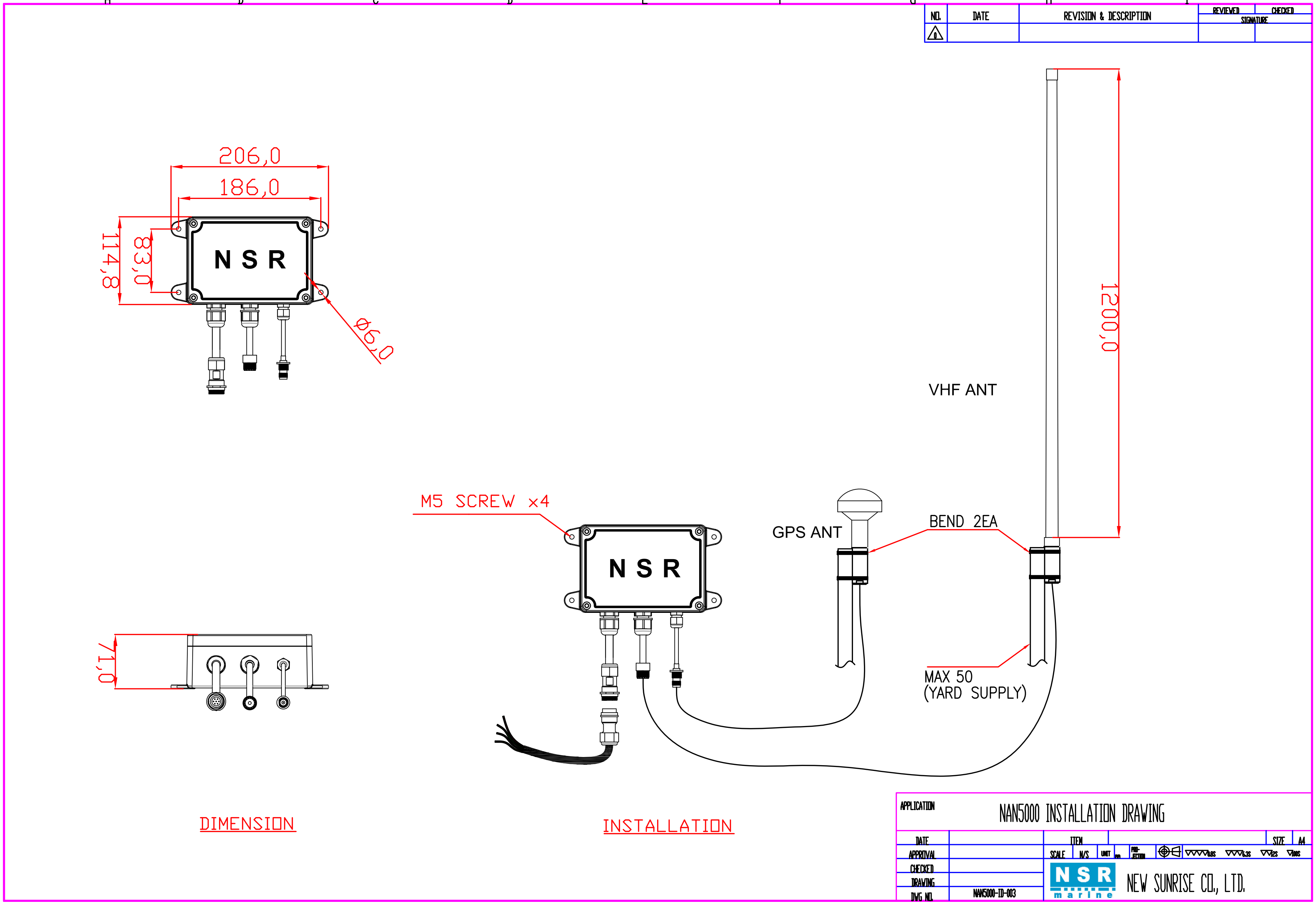


APPLICATION	NAN-5000 CONFIG DRAWING				
DATE		ITEM		SIZE	A4
APPROVAL		SCALE N/S	UNIT mm	PRO-JECTION	▽▽▽▽0.8S ▽▽▽6.3S ▽▽12S ▽100S
CHECKED		NSR marine	NEW SUNRISE CO., LTD.		
DRAWING					
DWG NO.	NAN5000-ID-002				


NO.
DATE
REVISION & DESCRIPTION
REVIEWED
SIGNATURE
CHECKED
206,0
186,0
114,8
83,0
NSR
Ø6,0
71,0
VHF ANT
1200,0
GPS ANT
BEND 2EA
M5 SCREW x4
NSR
MAX 50
(YARD SUPPLY)
DIMENSION
INSTALLATION
APPLICATION
NAN5000 INSTALLATION DRAWING
DATE
APPROVAL
CHECKED
DRAWING
DWG NO.
NAN5000-ID-003
ITEM
SCALE
N/S
UNIT
SIZE
A4
NSR marine
NEW SUNRISE CO., LTD.