

**ONWA<sup>®</sup>**  
**KS-200A/B**

**KS-200A/B**

**OPERATOR`S MANUAL**

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**AIS Class B Transponder KS-200A**

**AIS Receiver KS-200B**



# SAFETY INSTRUCTIONS

## Safety Instructions for the Operator

### WARNING

**Do not open the equipment.**

Only qualified personnel should work inside the equipment.

**Do not disassemble or modify the equipment.**

Fire, electrical shock or serious injury can result.

**Immediately turn off the power at the switchboard if the equipment is emitting smoke or fire.**

Continued use of the equipment can cause fire or electrical shock. Contact a **ONWA** agent for service.

**Use the proper fuse.**

Use of a wrong fuse can damage the equipment or cause fire.

**Be sure the power supply is compatible with the equipment.**

Incorrect power supply may cause the equipment to overheat.

## Safety Instructions for the Installer

### WARNING

**Do not open the cover unless totally familiar with electrical circuits and service manual.**

Improper handling can result in electrical shock.

**Turn off the power at the switchboard before beginning the installation.**

Fire or electrical shock can result if the power is left on.

**Be sure that the power supply is compatible with the voltage rating of the equipment.**

Connection of an incorrect power supply can cause fire or equipment damage.

**Use the proper fuse.**

Use of a wrong fuse can damage the equipment or cause fire.

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## How AIS Works

### 1. What is AIS

AIS stands for Automatic Identification System. AIS increases navigational safety and collision avoidance by transmitting vessel identification, helping to reduce the difficulty of identifying ships when not in sight (e.g. at night, in radar blind arcs or shadows or at distance) by broadcasting navigational intentions to other vessels by providing ID, position, course, speed and other ship data with all other nearby ships and land based stations.

According to IALA regulations, AIS is defined as follows:

AIS is a broadcast Transponder system, operating in the VHF maritime mobile band. It is capable of sending ship information such as identification, position course, speed and more, to other ships and to shore. It can handle multiple reports at rapid update rates and uses Carrier Sense Time Division Multiple Access (CSTDMA) technology to meet these high broadcast rates and ensure reliable and robust ship to ship operation.

The IMO defines the performance standards as follows:

Ship to ship working, ship to shore working, including long range application, automatic and continuous operation, provision of information messaging via PC and utilization of maritime VHF channels.

### 2. What AIS classes do exist?

There are two classes of AIS units fitted to vessels, Class A and Class B. In addition AIS base stations may be employed by the Coastguard, port authorities and other authorized bodies. AIS units acting as Aids to Navigation (A to N) can also be fitted to fixed and floating navigation markers such as channel markers and buoys.

## 2.1 Class A

Class A units are a mandatory fit under the safety of life at sea (SOLAS) convention to vessels above 300 gross tons or which carry more than 11 passengers in International waters. Many other commercial vessels and some leisure craft also may be fitted Class A units.

The Class A operation consists of three different types of messages:

Dynamic information:

- position of the ship (derived from GPS)
- time, when the position was measured in UTC
- course over ground (COG)
- speed over ground (SOG)
- heading (HOG)
- ship status
- rotational speed/turn rate

Static information:

- MMSI number
- call sign and name of the vessel
- length and width of the vessel
- IMO-number of the vessel, if existent
- type of vehicle
- position of the GPS sensor onboard

Journey-related information:

- draught of the vessel
- type of cargo
- port of destination and estimated time of arrival (ETA)
- route plan, optional compulsory way, depending on the vessels movement.

The following table shows the mandatory repetition rate of class A transmissions linked to the ship's movement:

- anchored vessels 3 minutes
- vessels at 0 – 14 kn 10 seconds
- vessels at 0 – 14 kn, fast maneuver 3.3 seconds
- vessels at 14 – 23 kn 6 seconds
- vessels at 14 – 23 kn, fast maneuver 2 seconds
- vessels at > 23kn 2 seconds
- vessels at > 23 kn, fast maneuver 2 seconds

Static information as well as information belonging to the journey is dispersed every 6 minutes.

The reporting intervals correspond to both radio channels (161.975 MHz, 162.025 MHz) together.

## **2.2 Class B**

Class B: EN62287, 2005:

class B operation is described in the standard EN62287, published in 2005. This document is obligatory for class B.

Class B units are designed for fitting in vessels which do not fall into the mandatory Class A fit category.

### **The KS-200A is a Class B AIS unit**

Reporting intervals are:

Dynamic ship data:

- boats at < 2 kn: 3 minutes
- boats at > 2 kn: 30 seconds

Static ship data (similar to class A): 6 minutes

These intervals are the standard operation modes. Competent authorities, like base stations, can have influence on the reporting intervals (as they do with class A as well). Interval timing can be reduced down to 5 seconds in exceptional cases. There is no automatism to change the 30sec/3min dynamic intervals by the ship itself.

#### Physical:

- Dimension : 207mm (length) x 155.8mm (Width) x 50mm (Height)
- Weight : 0.8kg

#### Power:

- Input: 10 ~ 35VDC
- Power consumption 0,35A nominal , 2A peak

#### Electrical Interface:

- RS232 38.4kbaud bi-directional

#### Environmental:

- IEC 60945 (Cat C)
- Operating Temperature: -25°C to +55°C

### **KS-200A:**

#### GPS Receiver (AIS Internal)

- IEC 61108-1 compliant

#### Connectors

- VHF Antenna connector PL259 female
- GPS Antenna connector BNC female
- RS232 data connector Female 9 Way D-type

#### VHF Transceiver

- Transmitter x 1
- Receiver x 2 (one time shared between AIS/DSC)
- Frequency: 156.025 to 162.025 MHz in 25KHz steps
- Output power 33dBm  $\pm$ 1.5 dB
- Channel bandwidth: 25KHz
- Modulation modes 25KHz GMSK / AFSK
- Bit rate 9600 b/s GMSK & 1200 b/s FSK
- RX sensitivity <-107dBm at 20% packet error rate



## **KS200B:**

### Connectors

- VHF Antenna connector PL259 female
- RS232 data connector Female 9 Way D-type

### VHF Receiver

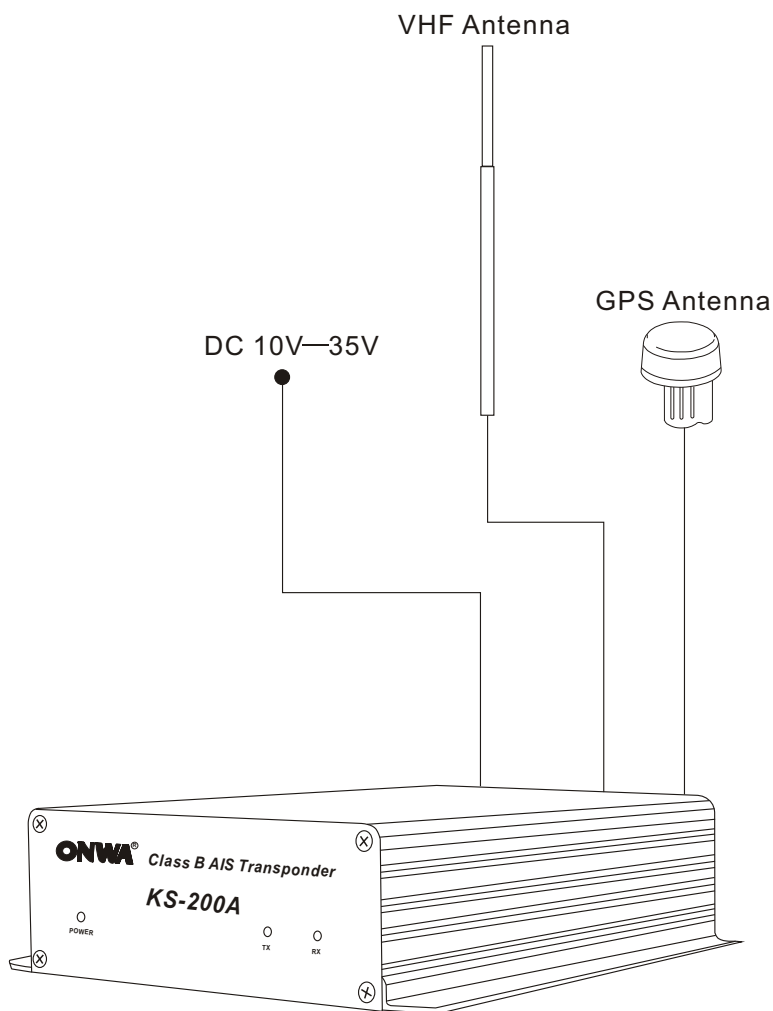
- Receiver x 2 (one time shared between AIS/DSC)
- Frequency: 156.025 to 162.025 MHz in 25KHz steps
- Channel bandwidth: 25KHz
- RX sensitivity <-107dBm at 20% packet error rate

### Compliant with the following standards:

- IEC62287-1 (IEC standard, Class B shipborne equipment)
- IEC60945 Edn 4.0 (IEC standard, environmental requirements)
- ITU-RM.1371-1 (Universal AIS Technical Characteristics)
- IEC61162-1 Edn. 2.0 (IEC standard, digital interfaces part 1)
- IEC61108-1 (IEC standard, GPS receiver equipment)

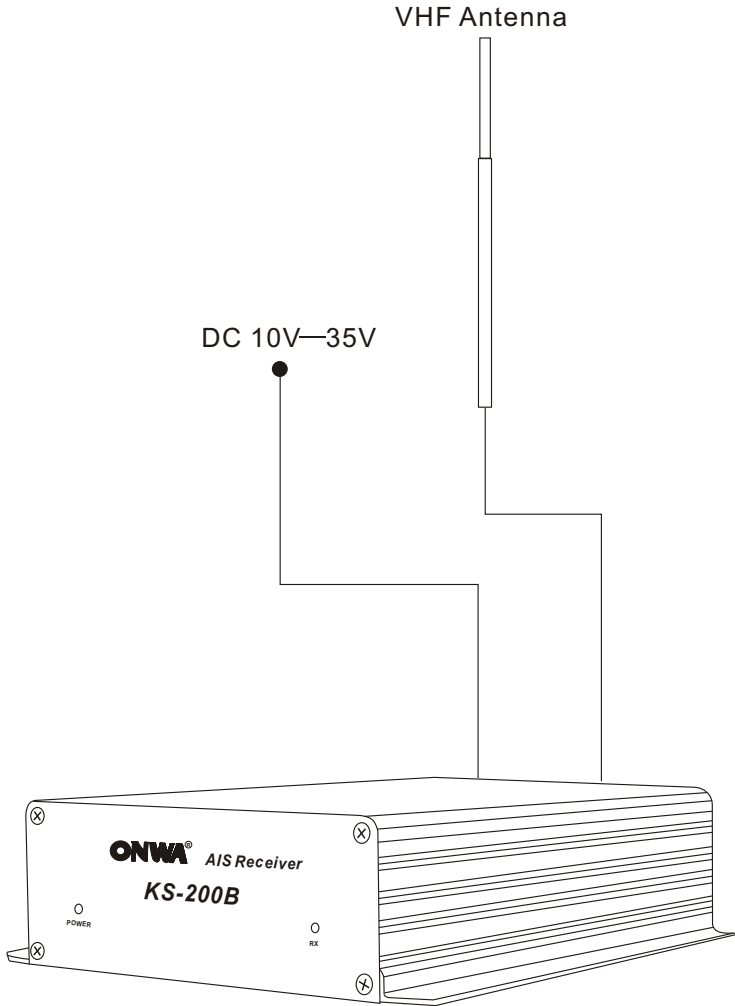
# KS-200A SYSTEM CONFIGURATION

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# KS-200B SYSTEM CONFIGURATION

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# KS-200A BASIC OPERATION

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## Turning Power ON/OFF

### Turning Power ON

Press [ON/OFF] to ON direction to turn on the power.

### Turning Power OFF

Press [ON/OFF] to OFF direction to turn off the power.

Notice : If the equipment remain long time no use, it is better to turn off the Main Power Source switch.



1. Transmitter Indicator blinking during transmit own ship AIS information
2. Receiver Indicator blinking during receive other vessels AIS information
3. Power Indicator lights up when equipment turns on.

# KS-200B BASIC OPERATION

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## Turning Power ON/OFF

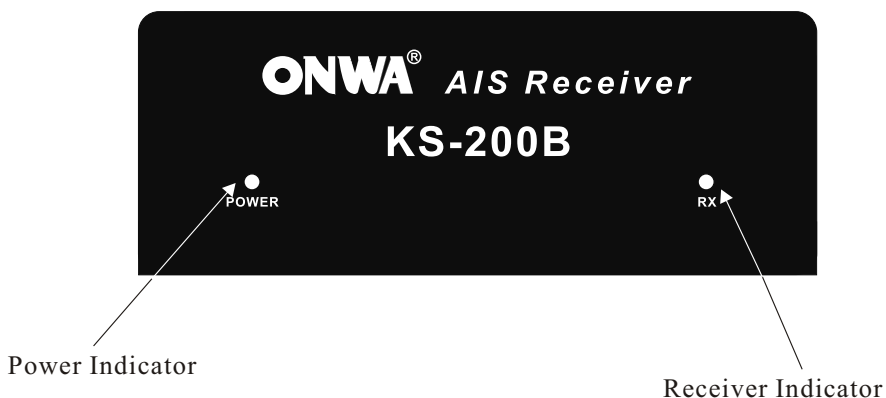
### Turning Power ON

Press [ON/OFF] to ON direction to turn on the power.

### Turning Power OFF

Press [ON/OFF] to OFF direction to turn off the power.

Notice : If the equipment remain long time no use, it is better to turn off the Main Power Source switch.



1. Receiver Indicator blinking during receive other vessels AIS information
2. Power Indicator lights up when equipment turns on.

# INSTALLATION

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## 1.Scope of Delivery

Description	Part Number	Quantity	Remark
Main unit	KS-200A/B	One	
Power Cable	KS2-PWR	One	
Data Cable	KS2-data1	One	
Data Cable	KS2-data2	One	
CD	KS2-CD	One	Only for KS-200A
Operator's Manual	KS2-manual	One	
GPS Antenna	KA-07	One	Only for KS-200A

## 2.Power Connection

Connect power cable to 12VDC (10~ 35VDC) supply, white wire to supply positive +ve and black wire to supply negative -ve.

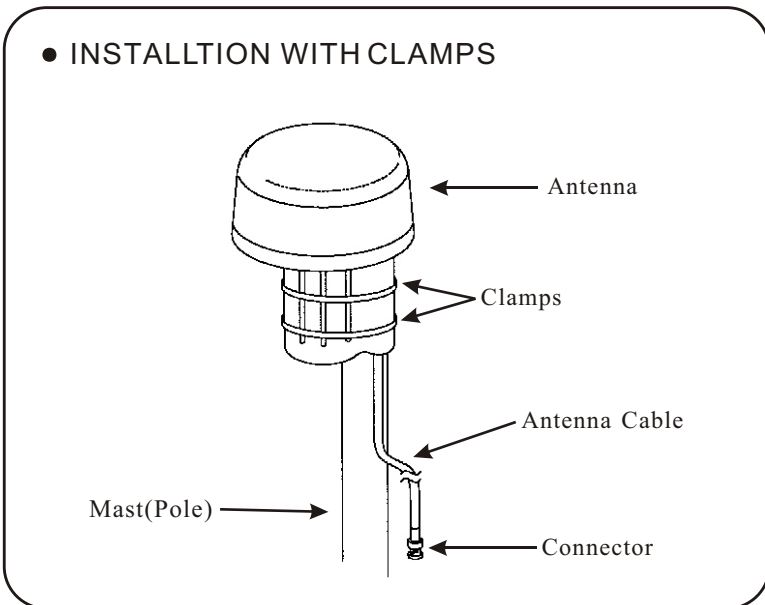
## 3. Antenna Connection

Connect the supplied GPS antenna to the BNC female connector on the Main unit.

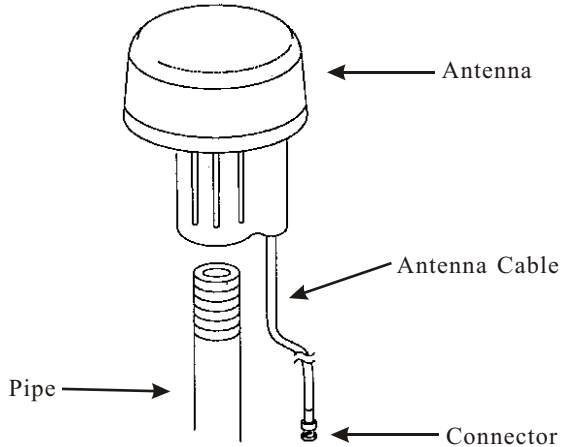
Connect VHF antenna (not supplied) to the PL-259 female connector on the Main unit (Please refer to the connection diagram of Page 16 )

## 4. Installation of GPS Antenna

- The GPS antenna is mounted in an elevated position and free of shadow effect from the ship's superstructure.
- The GPS antenna has a free view through 360 degrees with a vertical angle of 5 to 90 degrees above the horizon.
- As the received GPS signal is very sensitive to noise and interference generated by other onboard transmitters, ensure that the GNSS antenna is placed as far away as possible from radar, Inmarsat and Iridium transmitters and ensure the GPS antenna is free from direct view of the radar and the Inmarsat beam.
- It is also important that the MF/HF and other VHF transmitter antennas are kept as far away as possible from the GNSS antenna. It is good practice never to install a GNSS antenna within a radius of 2 meters from these antennas.



● INSTALLTION WITH A PLPE (CUSTOMER'S CARE)



## 5. Installation of VHF Antenna

For the VHF antenna there is a VHF female bulkhead connector used, that mounts to the back of the case.

The VHF antenna employed for AIS use:

- Must be a dedicated antenna, i.e. not shared with any other VHF transmitter/receiver.
- Must be suitable for marine shipboard applications (index of protection, ruggedness, means of mounting, etc.).
- Should be omni-directional and vertically polarized with unity gain (0dB) with a bandwidth sufficient to maintain VSWR < 1.5 over the frequency range 156 – 163 MHz. As a minimum the 3dB bandwidth must cover the two AIS channels and the DSC Channel.
- Should be mounted with at least a two meter vertical separation distance from any other VHF antenna used for speech or DCS communication.

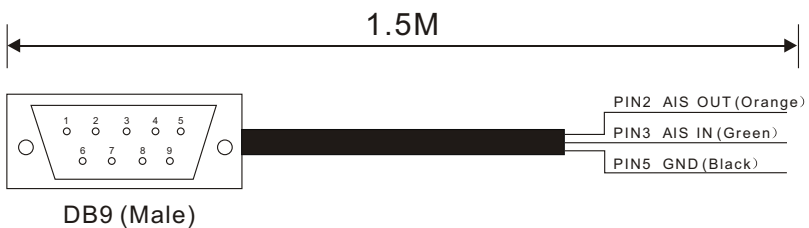


## 6. Connect to other navigational equipment

You can use the delivered cable (KS2-data1) to connect the AIS to other navigational equipments such as plotter, radar etc.

Please connect the DB9 connector of KS2-data1 cable to the DB9 socket of KS200A/B. Connect the other end of KS2-data1 cable to external navigational equipments according to the following diagram :

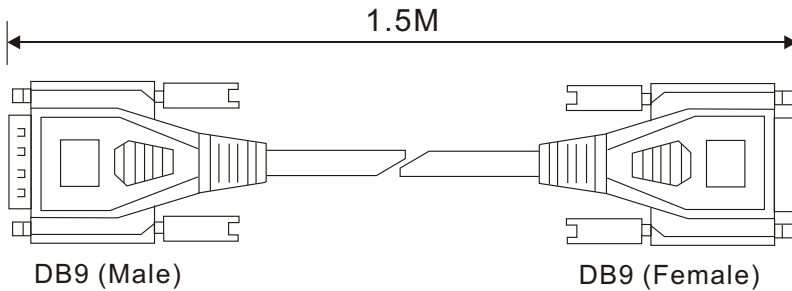
DB9 pin no.	Wire color	Signal
1	NC	
2	Orange	RS232-TX
3	Green	RS232-RX
4	NC	
5	Black	Signal Return
6	NC	
7	NC	
8	NC	
9	NC	



## 7. Connect to PC

You could use delivered cable (KS2-data2) to connect AIS data to PC as following diagram:

KS-200A/B	9-pin serial port of the computer
2-Orange-TX Data	2-Receive data
3-Green-RX Data	3-Send data
5-Black-GND	5-GND



## 8. DATA SERIAL PORT

The default baud rate of the data link is 38.4kBaund with 8 data bits, one stop bit and no parity. The data interface conforms to IEC 61162-1. The sent messages are VDM, VDO, RMC, and GSA are conform to NMEA 0183. Please refer to NMEA 0183 for full details of these AIS messages.

# **MAINTENANCE and TROUBLESHOOTING**

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## **1.Maintenance**

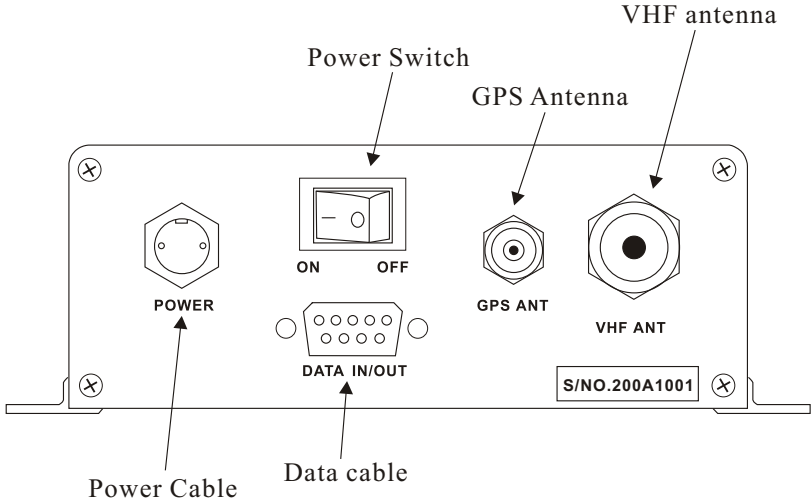
Unauthorized opening of the KS200A/B system will invalidate the warranty. Avoid using chemical solvents to clean the KS200A/B as some solvents can damage the case material. To clean, wipe down with a damp cloth. The KS200A/B contains no user serviceable parts. Contact your Service Agent for repair or for replacing.

## **2.Troubleshooting**

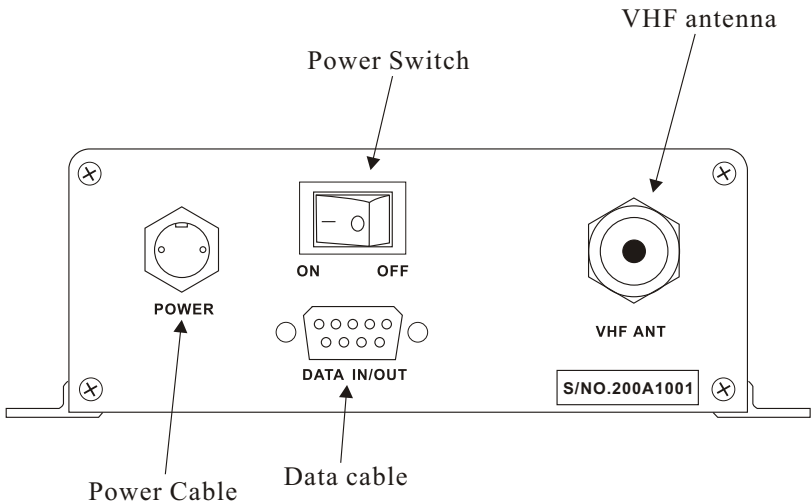
Problem	Cause	Solution
Cannot switch on	Power cable broken	Replace or reconnect power cable
	Power supply problem	Check power supply
	Fuse blown	Replace suitable rating fuse. Call service if fuse blown again after replacement
Unable to see AIS vessel around	KS200A/B not switch on	Switch on KS200A/B
	VHF antenna not connect properly	Reconnect VHF antenna
	No AIS vessel around	Check again in harbor
Other AIS vessel unable to see us (For KS200A)	KS200A not switch on	Switch on KS200A
	GPS antenna not connect properly	Reconnect GPS antenna
	VHF antenna not connect properly	Reconnect VHF antenna
	Incorrect power supply voltage	Check power supply and replace if necessary

# CONNECTION DIAGRAM

## KS200A Connection Diagram



## KS200B Connection Diagram



# DIMENSION

