Class A AIS Transponder

SI-30A
Manual Instruction

Instruction

* The following settings can be modified only the dealer.

1. How to set MMSI IMO & Name, Call sign

1-1 SETTING

MENU key→ 2.INIT SETUP → ENT → 2.SET STATIC DATA → ENT → Password → ENT

1-2 Choose setting with arrow keys and then input the data. (After input, press ENT key)

1-2-1 . MMSI : ENT → Input 9 numbers → ENT

1-2-2 . IMO No : Move to IMO No. with arrow keys → ENT → Input IMO ID → ENT

1-2-3 . Ship Name : Move to Ship Name with arrow keys → ENT → Input Name of vessel → ENT

1-2-4 . C. SIGN : Move to C. SIGN with arrow keys → ENT → Input call sign → ENT

1-3 SAVE

1-3-1. After setting press F2(SAVE) → F1(YES : SAVE) / F2(NO : Not save)

1-3-2. F1 is to go back to the previous display without save.

* MMSI can be modified only in the case of "000000000" and After modifying it is impossible to change.   (All static information will be saved in AIS transponder.)

2. How to set a location of GPS ANT

2-1 SETTING

MENU key → 2.INIT SETUP → ENT → 5. SET GNSS ANTENNA POSITION → ENT → Password → ENT

2-2 Internal means the internal GPS function, External on the right hand side means a location of GPS antenna.

2-3 How to input

Move to input section with arrow keys → ENT → Input numbers → ENT

2-4 SAVE

2-4-1. After setting press F2(SAVE) → F1(YES : SAVE) / F2(NO : Not save)

2-4-2. F1 is to go back to the previous display without save.

3. How to set Port transmission ratio

3-1 SETTING

MENU key → 3.SYSTEM SETUP → ENT → 1.SET I/O PORT → ENT → Password → ENT

3-2 Definition of Each Port

3-2-1. LONG : Long Range Port(38400/4800)

3-2-2. External Display(38400/4800)

3-2-3. SEN1 : Sensor Port1(38400/4800)

3-2-4. SEN2 : Sensor Port2(38400/4800)

3-2-5. SEN3 : Sensor Port3(38400/4800)

3-2-6. RS232 : RS232 IN / OUT(38400/4800)

3-3 Adjustment for transmission rate of each port

Move to input section with arrow keys → ENT → Arrow key → ENT

3-4 SAVE

3-4-1. After setting press F2 (SAVE) → F1 (YES : SAVE) / F2(NO : Not save)

3-4-2. F1 is to go back to the previous display without save.

4. How to change password

4-1 SETTING

MENU key → 3.SYSTEM SETUP → ENT → 4. SET PASSWORD → ENT → Password → ENT

4-2 How to input (Password shall be 6 numbers)

Move to OLD PASSWORD → ENT → Input Number → ENT → Move to NEW PASSWORD →
ENT → Input New password → ENT → Move to CONFIRM NEW PASSWORD → ENT → Input
new password → ENT

4-3 SAVE

4-3-1. After setting press F2(SAVE) → F1(YES : SAVE) / F2(NO : Not save)

4-3-2. F1 is to go back to the previous display without save.

CAUSION

1. Ship's position received through the AIS might be different from the actual ship's position. It is desirable to always check visually with Radar prior to using AIS equipment for navigation data.
For External GPS data, NMEA Version 2.0 or above should be used based on RS-422/RS-232 of IEC-61162 (RS-422).

2. For External GPS data, if it is not connected with the format recommended by IMO, it may disturb the vessel traffic control, finally to create any dangerous accidents such as ship's collision .

3. Be sure to read carefully safety guidelines and indications before operation for this product and related documents.

MARK	DESCRIPTION
🚫	All PCB used in this unit are manufactured according to protection environment for discharging static electricity, because all semiconductor elements used in this PCB could be damaged sensitively due to electrostatic.
⚠	To prevent the unit from damaging due to electrostatic, operator should seek suitable preventive measure before operating. Handling circuit related working should be carried out by technicians who specialize for the electronic device sensitive. Dismantling SI-30A is restricted to the person who is authorized by Manufacturer.

SAMYUNG ENC

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1. Automatic Identification System

1-1 AIS OUTLINE

AIS is a very developed equipment which provides information of the vessel in real time.

This equipment is prevent for collision and this is duty by IMO. AIS make you enable to recognize position of another vessel and it's moving during radar isn't working properly, to recognize name, position and speed of another vessel so that it prevents for collision.

AIS is using VHF frequency, 161.975MHz(87B channel) and 162.025MHz(88B channel) which are assigned by World wireless association in 1997.

1-2 AIS Technical Outline

◆ AIS is basis on TDMA and simplex, semi-duplex or duplex communication and occupied bandwidth is within 25㎑.

1-3 Data for AIS

◆ **Static Information** : IMO number, Call sign and Name of vessel, length and beam, ship's type, the position and antenna on a ship. Data is renewed every 6 minutes or when it needs to be amended.

◆ **Dynamic Information** : Accurate command and ship's position in perfect condition, Time(UTC), course over ground(COG), speed of ground(SOG), Heading, Navigation status, ratio of turn.

◆ **Voyage Information** : Draught, Dangerous cargo, Destination and ETA, Route plan, number of crew. Data is renewed every 6 minutes or when it needs to be amended.

◆ **Safety Message** : You shall follow needs of message and this includes voyage information and weather alarm.

1-4 Interval of renewal AIS data for each class

Status of vessel(A Class)	Interval
Under 3knot during anchorage or mooring	3 min
Over 3knot during anchorage or mooring	10 sec
Sailing under at 14knot	10 sec
Changing course during sailing under 14knot	3⅓ sec
Sailing at between 14knot and 23knot	6 sec
Changing course during sailing at between 14knot and 23knot	2 sec
Sailing over at 23knot	2 sec
Changing course during sailing over at 23knot	2 sec

Status of vessel(B Class)	Interval
Sailing under 2knot	3 min
Sailing over 2knot	30 sec

DATA	A Class	B Class
Static Information of Radio Station		
- MMSI	⌄	⌄
- Ship's Name	⌄	⌄
- Ship's type	⌄	⌄
- Call sign	⌄	⌄
- IMO number	⌄	
- Position of Antenna	⌄	⌄
- Length and beam	⌄	⌄
Voyage Information		
- Draught	⌄	
- Number of crew	⌄	
- Dangerous Cargo	⌄	
- Destination and ETA	⌄	

Dynamic Information		
- Universal Time Coordinated(UTC)	✓	✓
- Ship's position	✓	✓
- Course over Ground (COG)	✓	✓
- Speed of Ground (SOG)	✓	✓
- Heading	✓	✓
- Ratio of turn	✓	
- Navigation Status	✓	
- Ship's condition	✓	
Message		
- Alarm	✓	
- Safety	✓	✓

When you input the static information for radio station, please download the software from 'product information' of web page (**http://www.samyungenc.com**) and then you can install into your Computer.

It is also available for MKD.

SAMYUNG ENC

2. PRODUCT SPECIFICATION

2-1 Designed to meet the following standards

◆ IEC61993-2 .... IEC standard, Class A shipborne equipment
◆ IEC60945 Edn 4.0 .... IEC standard, environmental requirements
◆ ITU-RM.1371-4 .... Universal AIS Technical Characteristics
◆ IEC61162-1/2 Edn. 2.0 .... IEC standards, digital interfaces
◆ IEC61108-1 .... IEC standard, GPS receiver equipment

2-2 PRODUCT SPECIFICATION

◆ Power Consumption .... 50W peak / 10W average
◆ Power supply .... 12V DC -10% +30%(DC10.8V~15.6V)
◆ Power supply (SP-580AD) .... 24V DC -10% +30% / 110V AC / 220V AC
                                              OUT 13.8V
◆ Default Frequencies .... AIS1 (CH 87B)   : 161.975 MHz(F1D)
                                              AIS2 (CH 88B)   : 162.025 MHz(F1D)
                                              DSC (CH70)   : 156.525 MHz(G2B)
◆ Frequency range .... 156.025 ~ 162.025 MHz
◆ Transponder size/weight .... 221 x 165 x 95 mm, 1.5 kg
◆ MKD size/weight .... 255 x 162 x 75 mm, 0.9 kg
◆ GPS size/weight .... 90 x Ø65mm (+140mm mounting bar) 0.2kg
◆ Compass safe Distance .... Display : 0.7 m for 1° / 1.2 m for 0.3° deviation
                                              Transponder : 1.3 m for 1° / 2.1 m for 0.3° deviation
◆ Indicators(LED) .... POWER, TX, RX, Status, Error

2-3 AIS Transmitter

◆ Power output .... 12.5W or 1.0W(41dBm ±1.5 dB or 30dBm ±1.5 dB)
◆ Antenna impedance .... 50 ohms(SO-239)
◆ Channel spacing 25kHz
◆ Frequency error .... < ±0.5 kHz
◆ Spurious emissions .... <-36dBm at 9KHz ~ 1GHz
                                              <-30dBm at 1GHz ~ 4GHz

SAMYUNG ENC

2-4 AIS Receivers

◆ Sensitivity .... (PER) < 20% at –107 dBm
◆ Channel spacing .... 25 kHz
◆ Modulation.. GMSK
◆ Data rate.. 9600 bits/s
◆ Frequency stability................................ <±1 ppm
◆ Co-Channel 10dB
◆ Adjacent Channel................................... 70dB
◆ IMD 65dB
◆ Blocking 84dB

2-5 DSC Receivers

◆ Sensitivity .... BER <10-4 at 107 dBm
◆ Channel spacing .... 25 kHz
◆ Modulation.. FSK (1300 Hz/2100 Hz)
◆ Frequency stability................................ <±1 ppm
◆ Co-Channel 10dB
◆ Adjacent Channel................................... 70dB
◆ IMD 65dB
◆ Blocking 84dB

2-6 Serial inputs/outputs

◆ SENS1/2/3/4 .... IEC61162-1/2 (input only)
◆ LONG/AUX/PILOT/RTCM .... IEC61162-1/2 (input & output)
◆ Display... RS422 non-isolated

2-7 GPS Antenna and Receiver

◆ Antenna.. PATCH ANTENNA / TNC (RG-58U)
◆ Receiver Type .... 16channel, L1 frequency, C/A code
◆ Accuracy .... Position   2.5 m CEP / DGPS ,SBAS   2.0 m CEP
◆ Start-up Times .... Hot start <3.5sec / Warm start 33sec / Cold start
   34sec / Aided start   5 sec / Reacquisition   < 1 s
◆ Sensitivity .... Acquisition   -140 dBm / Tracking   -150 dBm

2-8   Environment

◆   Operation temperature .... -15°C to +55°C
◆   Storage temperature........................... -25°C to +75°C
◆   Relative humidity.................................. 95% at 40°C (without dew condensation)
◆   Vibration .... IEC 60945

2-9   Composition

2-9-1   SI-30A Basic Specification

No.	Item	Standard	Quantity	Remark
1-1	Transponder	SI-30A	1EA	E02-3000-00
1-2	Equip. for install	SI-30A-A-K	1SET	
2-1	MKD	SI-30AM	1EA	E02-4000-01
3-1	VHF Antenna	SAN-150	1EA	542-1400-0D
3-2	Bracket	Bracket 35 Ass'y	1SET	575-0006-01
3-3	Cable Ass'y	PL259-30M(RG8)-PL259	1SET	574-0155-24
4-1	GPS Antenna	SAN60-30M(RG58)-TNC	1SET	574-9999-02
5-1	Power	SP-700	1EA	V01-0000-00
5-2	Equip. for install	SP-700-A	1SET	
6-1	Instruction	SI-30A-ME	1EA	M03-0101-00

2-9-2   SI-30A Optional Specification

No.	Description	Standard	Quantity	Remark
1	GYRO CONVERTER	SAD-30DC	1EA	

3. How to use SI-30AM(MKD)

- DC 12V

⚠ **(Warning) A version of programme could be adjusted without notice.**

3-1　Operation

3-1-1　Button description

It shows alphanumeric and symbol input buttons. To input alphabet and various buttons, press the assigned button until the wanted button is displayed.

1	**1** <(/@	Display information of the vessel what you choose.
2	**2** ABC	Display of geographical name & Depth.
3	**3** DEF	Display range of ring.
4	**4** GHI	Display map.
5	**5** KJL	To move map moving or to choose another vessel.
6	**6** MNO	To check vessel's position or to make cursor in the centre of display.
7	**7** PQRS	To move cursor.
8	**8** TUV	To enlarge map.
9	**9** WXYZ	To reduce map.
10	**.*** =+/-	To be dark.(10level)
11	**,#** !?&	To be bright.(10level)
12	**0** _	To change letter style and colour of display on the list menu.
13	◄●► ▲▼	**Arrow key:** Buttons for moving to up/down/right/left side and for movement of cursor and for deletion of previously input data.
14	⏻	**Power key:** To use for power off and on. If press a short time, power is on and if press a longer time, power is off.
15	MENU	**Menu key:** It is displayed related to Menu, goes back to menu mode if press it in any mode.
16	↵	Enter Key: It makes it possible to store the information after alteration or correction of them.
17	F1 F2 F3 F4	They are 4 function keys indicating LCD of MKD, which makes it possible to implement the function of the pressed button.

3-1-2 LED

There are 3 different LEDs depends on each function. TX LED in upper, RX LED in middle and POWER LED at bottom.

Each function is as follows.

LED	Function	Remark
TX	This function is to indicate when MKD display transmits data to transponder.	RED LED
RX	This function is to indicate when MKD display receives data from transponder.	ORANGE LED
PWR	This function is to indicate when MKD display is being powered on.	YELLOW LED

3-1-3 Buzzer

Buzzer function in MKD display gives "BEEP" signal from buzzer whenever each button in MKD display is pressed, which enables user to operate the unit efficiently. It is also designed to detect the alarm when it is activated as it gives alarm function to buzzer.

3-2 Basic Operation

3-2-1 Power ON/OFF

The unit will be operational within 2 minutes of switching on and transmit own ship's static data. These data are retransmitted every 6 minutes or when data has been changed and on request. The static data provided by AIS includes IMO number. MMSI number, Call sign, Length and width, Type of ship and Position of GPS antenna. Safety related information should be reported on request.

SI-30A should be power on while navigation or at anchor. However, ship's master may decide power off when he judged that ship's safety and security might be threatened due to constant operation of AIS. SI-30A should be restarted when the cause of danger will be safely eliminated.

After transponder and MKD powered on, SI-30A starts receiving data from other ships and displays object data on LCD of MKD.

3-3 List Display

3-3-1 List Display description

Home screen is displayed as below and each section means as following.
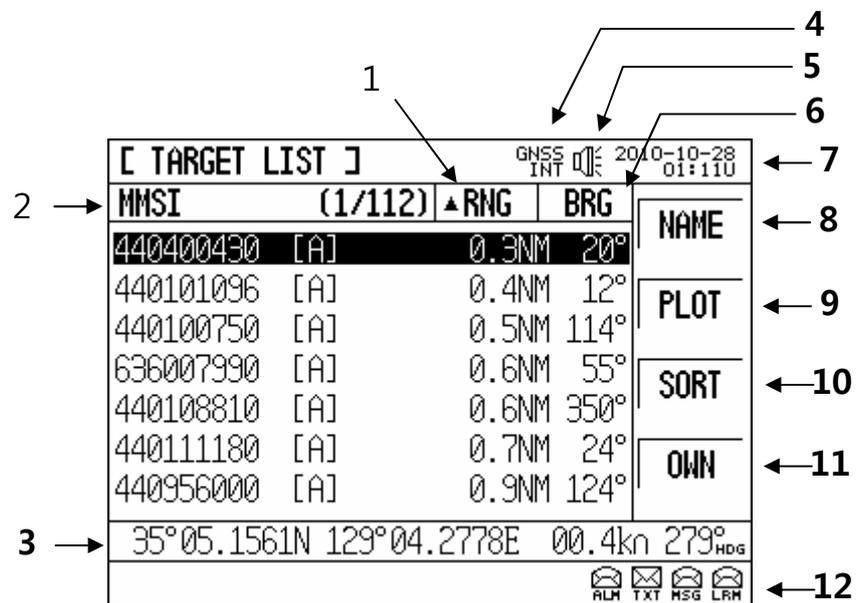
< **Target data display** >

1. Distance from vessel to target

2. MMSI (Maritime Mobile Service Identity)

3. Vessel's position, speed and information of azimuth

4. GNSS condition of receiving

5. ALARM sound

6. Azimuth angle (from current position to destination)

7. UTC (Universal Time Co-ordinate)

8. MMSI, select name of vessel

9. Plotter (graphic) function

10. Array in distance or azimuth angle

11. See information of own ship

12. Sent message, received message

3-3-2 How to set ship's name and MMSI

You can see all list of vessels which shares information with AIS and see the detailed information additionally.

When you press MMSI(F1), it displays MMSI number or ship's name. After choosing a vessel with arrow keys and Enter key, you can see the information what you selected.

[TARGET LIST]		GNSS INT	2010-10-28 01:11U			[TARGET LIST]		GNSS INT	2010-09-16 10:00L	
MMSI	(1/112)	▲RNG	BRG	NAME		NAME	(4/91)	RNG	▲BRG	MMSI
440400430 [A]		0.3NM	20°			KOREA NO.6		1.1nm	2°	
440101096 [A]		0.4NM	12°	PLOT		SITC QINGDAO		1.1nm	3°	PLOT
440100750 [A]		0.5NM	114°			440559000		0.8nm	3°	
636007990 [A]		0.6NM	55°	SORT		SKY EVOLUTION		1.1nm	7°	SORT
440108810 [A]		0.6NM	350°			KANGNAM STAR		0.4nm	9°	
440111180 [A]		0.7NM	24°	OWN		DONGJIN		0.6nm	13°	OWN
440956000 [A]		0.9NM	124°			NO1.HANLA		0.4nm	15°	
35°05.1561N 129°04.2778E 00.4kn 279°HDG						35°05.1512N 129°04.2874E 00.5kt 012°HDG				
			ALM TXT MSG LRM						ALM TXT MSG LRM	

MMSI NUMBER	SHIP NAME

* The Meaning of signs next to MMSI number show as below

[A] : A class

[B] : B class

[BS] : Base Station

[N] : A to N

[T] : AIS SART

3-3-3 Array Objects

You can array objects in azimuth angle with SORT(F3) key.

[TARGET LIST]		GNSS INT	2010-10-28 01:11U			[TARGET LIST]		GNSS INT	2010-10-28 01:11U	
MMSI	(1/112)	▲RNG	BRG	NAME		MMSI	(1/114)	RNG	▲BRG	NAME
440400430 [A]		0.3NM	20°			440547000 [A]		1.9NM	0°	
440101096 [A]		0.4NM	12°	PLOT		477415200 [A]		1.1NM	2°	PLOT
440100750 [A]		0.5NM	114°			440132470 [A]		1.1NM	6°	
636007990 [A]		0.6NM	55°	SORT		440101096 [A]		0.4NM	12°	SORT
440108810 [A]		0.6NM	350°			636013205 [A]		1.1NM	14°	
440111180 [A]		0.7NM	24°	OWN		440400430 [A]		0.3NM	20°	OWN
440956000 [A]		0.9NM	124°			440111180 [A]		0.7NM	22°	
35°05.1561N 129°04.2778E 00.4kn 279°HDG						35°05.1555N 129°04.2780E 00.5kn 303°HDG				
			ALM TXT MSG LRM						ALM TXT MSG LRM	

Array in Distance	Array in azimuth angle

There's a triangle in the left of letter.

3-3-4 Message icon

There are 4 icons in the right and below corner which is for message sending and receiving.

Icon	Description	Remark
✉	There is a message received.	
✉	There is no message received or means it's been read already.	
✉ **ALM**	Alarm from transponder	
✉ **TXT**	Each status from transponder	
✉ **MSG**	Displays safety or other message received	
✉ **LRM**	Displays message concerned with long range	
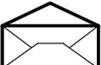
3-4 Plotter (Graphic) screen

3-4-1 Explanation of plotter screen

If PLOT(F2) key is pressed, the unit displays plotter screen.

< Plotter screen configuration >

1. The information of selected vessel
2. The selected vessel
3. The other vessels received information
4. Distance of outer circle
5. Indication of Head-up /North-up
6. Direction key mode (ZOOM/MOVE/CURS)
7. View of data screen
8. View of other vessels
9. View of own vessel
10. Selection of Head-up/North-up

3-4-2 Chat direction / Distance settings

Available for displaying North-up and Heading-up using N-UP/H-UP(F4)key.

North-Up   Heading-Up

No. 8 key, No. 9 key and up/down key on keyboard accept to adjust nautical mile.

The unit can display from 0.25nm to 64nm. The distance information is on the bottom of left side of the screen

And the unit accepts to search the information of other vessels using direction key (right/left) After 10 minutes from plotter screen mode, the part of subject (The indication of [TARGET PLOT]) and function part (The indication of LIST, INFO, OWN, N-UP) is disappeared. If any key of F1, F2, F3 and F4 is pressed, the disappeared parts are displayed. And they will be disappeared again after 10 minutes.

3-4-3 Display of vessel information

Every time No.1 key is pressed, users can display or deleted the selected vessel's information.

Display of vessel information   No information

3-4-4 Indication of letter's information

If No.2 key is pressed, user can display or delete information of letter's information (name of place, depth & etc).
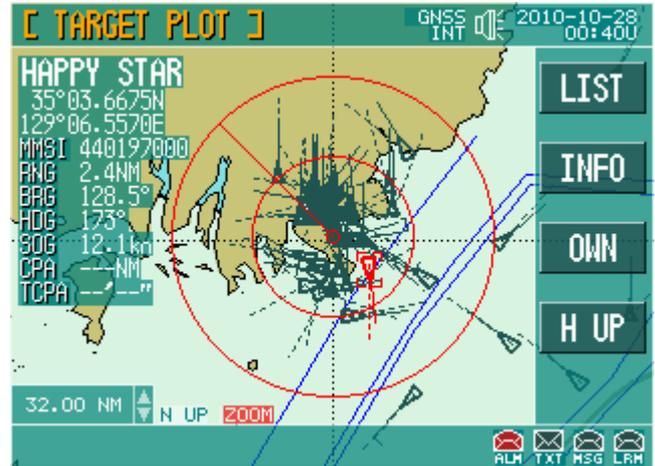
Display of information   No information

3-4-5 Display of Range Ring

If No.3 key is pressed, user can display or delete Range Ring.

Display of information   No information

3-4-6 Display of chart

If No. 4 key is pressed, user can display or delete the chart on the screen.

| Display of chart | No chart on the screen |

3-4-7 Transfer of cart

If No.5 key is pressed, the "ZOOM" on the bottom is changed to "MOVE" in red. User can move the chart using direction keys.

| The chart is on the center of screen | The moved chart |

To display own vessel to the center of screen in condition of moved chart, it is required to press No.6 key. Next picture is showing the screen of chart moved to center of screen. If transfer mode is cancelled, the chart is drawn again with own vessel as the center.

3-4-8 Use of cursor

If No.7 key is pressed, cursor will appear. Users can move chart and select other vessels using cursor.

Chart is on the center of screen   Chart is moved

User can move cursor using direction key. If the cursor is get out of screen, the place cursor was located is moved to the center of screen. If cursor is moved to other vessel, information of the selected is shown on the top of the screen.

If cursor is appeared on the screen, information of longitude, latitude, range and bearing is shown on the bottom of the screen.

If No.7 key is pressed again, cursor function is cancelled. And chart is displayed with own vessel as the center

3-4-9   Changing screen / Data view

Press LIST(F1) key for changing to the screen of objects list mode of initial screen.

Information on the plotter screen is the standard information for the objects. For more detailed information, press INFO(F2) to display information as below pictures.

Using direction key, user can 3 separated pictures.

PAGE 1

PAGE 2

PAGE 3

3-5 OWN SHIP DATA DISPLAY

Press OWN(F4) to see information related own ship and navigation.

PAGE 1

PAGE 2

PAGE 3

Ship name, MMSI number, IMO number, call sign, ship type, ETA, destination & etc are shown on page 1.

Longitude, latitude, CDG(Course Over Ground), SOG(Speed Over Ground), heading information, ROT(Rate of Turn), Navigation status & ETC are shown on page 2.

Information for internal & external GNSS position are shown on page .

3-6 COMPOSITION & USAGE OF MENU

3-6-1 Composition of menu

[MESSAGE & LOG]

1. NEW MESSAGE
2. FAVORITE MESSAGE
3. LONG RANGE MESSAGE LIST
4. RxD MESSAGE LIST
5. TxD MESSAGE LIST
6. ALARM LIST
7. STATUS LIST

[MENU]

1. **MESSAGE & LOG**
2. **INIT SETUP**
3. **SYSTEM SETUP**
4. **MAINTENANCE**

[INIT SETUP]

1. SET VOYAGE DATA
2. SET STATIC DATA
3. SET REGIONAL AREAS
4. SET LONG RANGE
5. SET GNSS ANTENNA POSITION

[SYSTEM SETUP]

1. SET I/O PORT
2. SET DISPLAY
3. SET BUZZER
4. SET PASSWORD
5. SET ETC.

[MAINTENANCE]

1. PROGRAM VERSION
2. KEY TEST
3. LCD TEST
4. COM MONITORING
5. SECURITY LOG
6. TRANSPONDER TEST
7. PROGRAM DOWNLOAD
8. PROGRAM UPLOAD

3-7 MESSAGE SETUP

Massage TX, massage RX, alarm & alarm status from system are displayed.

3-7-1 NEW MESSAGE

Press"MENU" → "1.MESSAGE & LOG" → "1. NEW MESSAGE"to display the below picture. Send the written massage to other party.
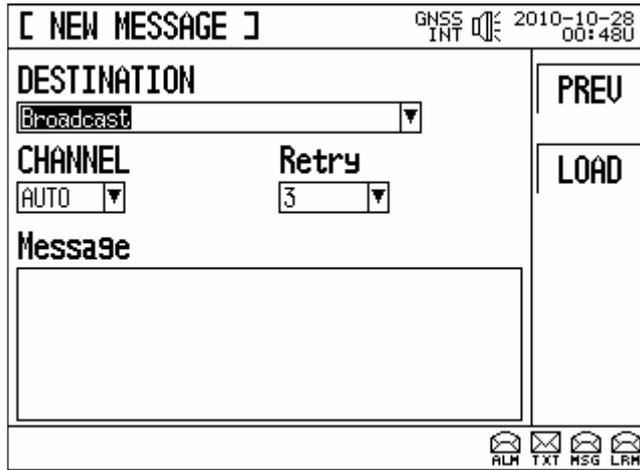
NEW MESSAGE screen

◆   DESTINATION : Select broadcast, MMSI number & ship name.
◆   CHANNEL : Select type of channels.
◆   Retry : Select the number of retransmissions.
◆   Message : Wright a massage.
◆   "LOAD(F2)" button : It allows to select favorite massages and used massages on [FAVORIT MESSAGE] SCREEN.
◆   "SAVE(F3)"button   : It allows to save the written massage in [FAVORITE MESSAGES].
◆   "SEND(F4)" button : It allows to send the message.

3-7-2 FAVORITE MESSAGES

Press"MENU" → "1.MESSAGE & LOG" → "2. FAVORITE MESSAGE" to display the below screen. This function is used to make new message and send the selected data using saved messages.
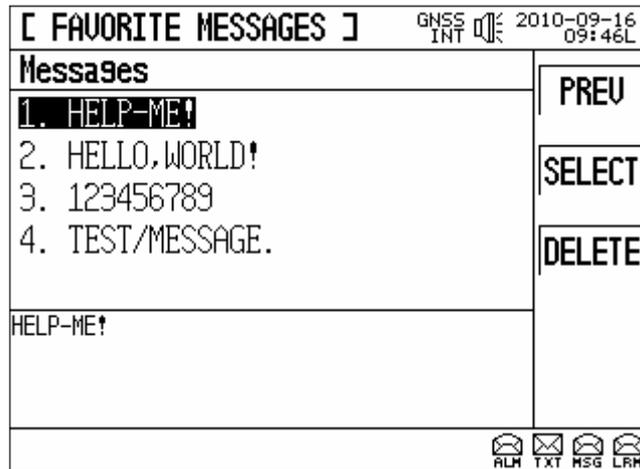
FAVORITE MESSAGES screen

Press SELECT(F2) to change to [New Message] screen. Press DELETE(F3) to display the screen for selecting to delete massage or not. If YES(F1) is pressed, the message is deleted. If NO(F2) is pressed, the screen is changed to [FAVORITE MESSAGES] mode.

3-7-3 LONG RANGE MESSAGE

Press"MENU" → "1.MESSAGE & LOG" → "3.LONG RANGE MESSAGE LIST" to display below screen. This function allows to see information for the reception date/time & requester regarding the received long range message.
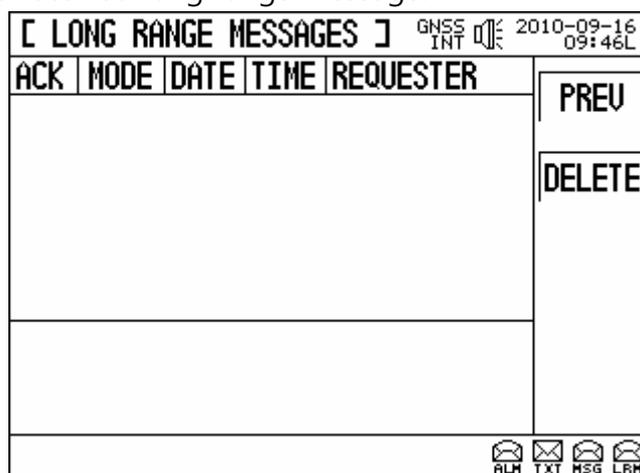
LONG RANGE MESSAGE screen

If DELETE(F2) button is pressed, the received data is deleted. ACK(F3) is a function to reply for inquiries of other parties.

3-7-4 RxD MESSAGE

Press "MENU" → "1.MESSAGE & LOG" → "4.RxD MESSAGE LIST" to display the below screen. RxD Message show reception date, type (broadcast, individual cases), time, sender and received message.

RxD MESSAGE LIST screen

EX) In the above pictures, Message type is broadcast, MMSI no. of sender is 123456789, time is September 15, 09:00, message contents is "@@TEST".

"FRWD(F2)"   : To send messages to other parties.
"REPLY(F3)"   : To reply messages to the senders.
"DELETE(F4)" : To delete the contents of messages.

3-7-5 TxD MESSAGE

Press"MENU" → "1.MESSAGE & LOG" → "5. TxD MESSAGE LIST" to display the below screen. User can check the transmitted date and time & etc.

TxD MESSAGE LIST screen

EX) In the above picture, transmitted massage type is individual case, 123456789 is MMSI

number of the ship received message.

"PREV(F1)"   : To return to initial screen.

"FRWD(F2)"   : To send messages to other parties.

"DELETE(F4)" : To delete data.

3-7-6   ALARM MESSAGE

Press"MENU" → "1.MESSAGE & LOG" → "6. ALARM LIST" to display the below screen.

User can check the time happened alarm, the status of acknowledge of alarm happened and description of alarm.
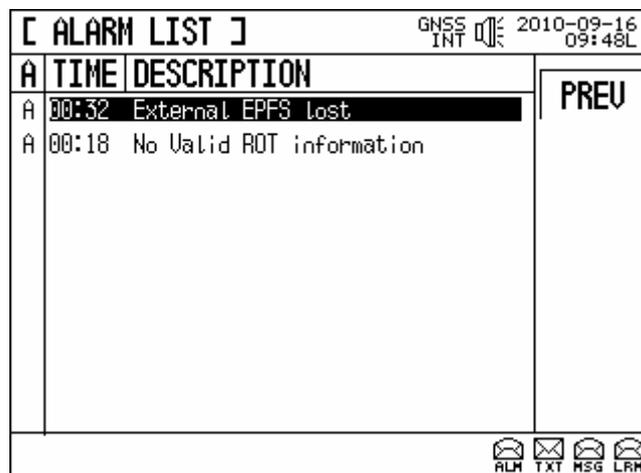
ALARM LIST screen

◆   A : Acknowledge

◆   TIME : The time alarm rang

◆   DESCRIPTION : The description of alarm

The below is the explanation about above alarm list screen.

Information for External position & related data is lost at 00:32.

3-7-7 STATUS MESSAGE

Press"MENU" → "1.MESSAGE & LOG" → "7. STATUS LIST" to display the below screen.

User can see the information regarding the status of the unit in real time.

STATUS LIST screen

The below is the explanation about above status message screen

◆ 09-16 00:19 : AIS: Heading valid : Information for heading is correct.

◆ 09-16 00:44 : AIS: Internal SOG/COG in use : Internal SOG/COG is used.

◆ 09-16 00:44 : AIS: Internal GNSS in use : Internal GNSS is used.

◆ 09-16 00:48 : no valid ROT information : There is no ROT(Rate Of Turn) information.

◆ 09-16 00:48 : AIS: UTC clock ok : UTC clock is valid.

3-8 INITIAL SETUP

The initial setup display is divided into 5 (five) sub-items as follows;

It includes SET VOYAGE DATA, SET STATIC DATA, SET REGIONAL AREAS, SET LONG RANGE, SET GNSS ANTENNA POSITION etc.

Order to do the initial setup, must input password.

3-8-1 VOYAGE DATA

From **"MENU"** button, go to **"2. INIT SETUP"** and go to **"1. SET VOYAGE DATA"**, then a following screen will appear.

Navigation related data, that is to say, destination (Max. 20 characters' input available), ETD, ETA, number of crewmen, draught, vessel type, navigation status etc. can be input.

```
[ SHIP VOYAGE DATA ]        GNSS        2010-09-16
                            INT          09:48L

DESTINATION  YOUNG-DO_____         PREV

ETA          11-12 11:45 (MM-DD HH:MM)
                                         SAVE
TYPE         Cargo/IMO hazard cat.A(71) ▼

STATUS       not defined(15)            ▼

DRAUGHT      10.0 m

PERSONS      0025

APP. FLAG    00
                                    ALM TXT MSG LRM
```
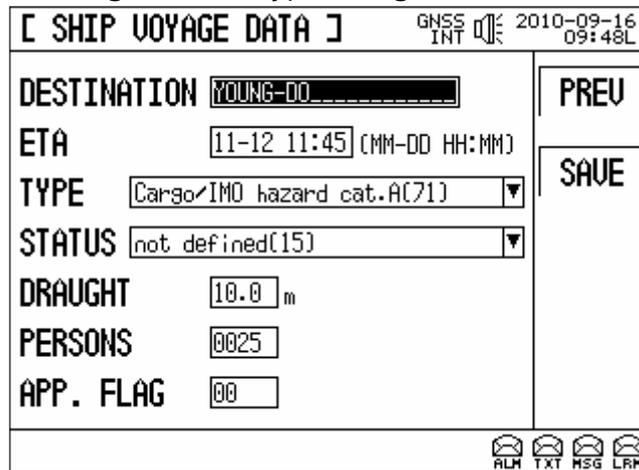
VOYAGE DATA SCREEN

For any changes or corrections, use [▼] or [▲] button(up and down arrow) or # key button to move the wanted item.

3-8-2 STATIC DATA

From **"MENU"** button, go to **"2. INIT SETUP"** and go to **"2. SET STATIC DATA"**, then a following screen will appear.

This screen is for inputting the static data on vessels that are in use. Ship name means the name of the ship (Max. 20 characters' input available) and Call Sign means the call number (Max. 7 characters' input available) respectively. The password should not be released because no one is allowed to freely change the data.
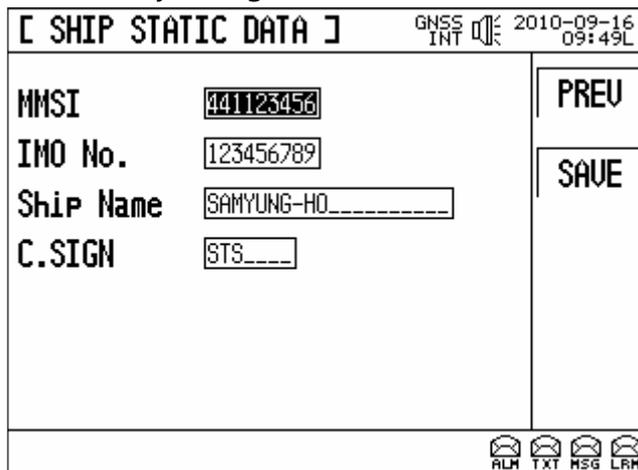
STATIC DATA SCREEN

For any changes or corrections, use ▼ or ▲ button(up and down arrow) or # key button to move the wanted item.

3-8-3 REGIONAL AREAS

From **"MENU"** button, go to **"2. INIT SETUP"** and go to **"2. SET STATIC DATA"**, then a following screen will appear.
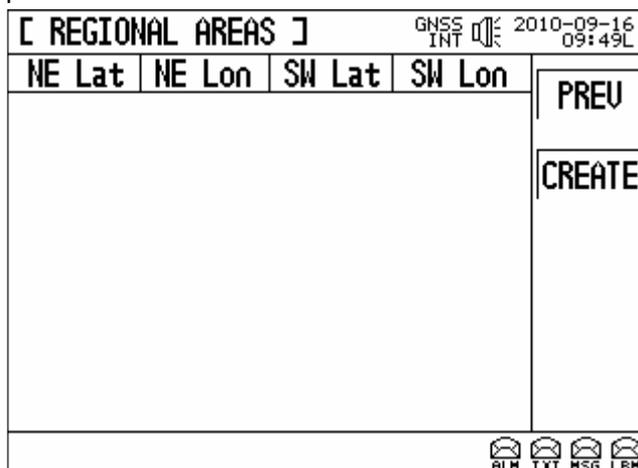
REGIONAL AREAS SCREEN

In the display, when press F2 **"CREATE"** button, it is ready to input the details of new

regional operation.

```
[REGIONAL AREAS CREATE]  GNSS ◁◱ 2010-09-16
                         INT         09:49L

In Use            Time of in use          PREV
Update            Info Source

Ch A 2087   BW Normal ▼  MODE RxTx ▼
Ch B 2088   BW Normal ▼  MODE RxTx ▼      APPLY

Power      High ▼
Zone Size 5      ▼ nm

NE Lat __°__._N    SW Lat __°__._N
NE Lon ___°__._E   SW Lon ___°__._E

                              ⊠ ⊠ ⊠ ⊠
                              ALM TXT MSG LRM
```

REGIONAL AREAS CREATE SCREEN

For any changes or corrections, use ▼ or ▲ button(up and down arrow) or # key button to move the wanted item.

3-8-4 LONG RANGE MODE

From **"MENU"** button, go to **"2. INIT SETUP"** and go to **"4. SET LONG RANGE"**, then a following screen will appear.

This is designed to set up whether an automatic response or a passive response should be made form long-range communication terminal such as INMARSAT-C vessel station regarding the request for data on own vessel.

```
[ LONG RANGE ]          GNSS ◁◱ 2010-09-16
                        INT         10:00L

Reply Value       MODE
  ☑ Ship ID       AUTO    ▼             PREV
  ☑ UTC
  ☑ Position
  ☑ COG                                 SAVE
  ☑ SOG
  ☑ Destination and ETA
  ☑ Draught
  ☑ Ship Cargo TYPE
  ☑ Ship's length, breadth, type
  ☑ Persons on Board

                              ⊠ ⊠ ⊠ ⊠
                              ALM TXT MSG LRM
```

LONG RANGE SCREEN

For any changes or corrections, use ▼ or ▲ button(up and down arrow) or # key button to move the wanted item.

3-8-5 GNSS ANTENNA POSITION

From **"MENU"** button, go to **"2. INIT SETUP"** and go to **"4. SET GNSS ANTENNA POSITION"**, then a following screen will appear.

The function is to set a position of internal GPS antenna and external GPS antenna.
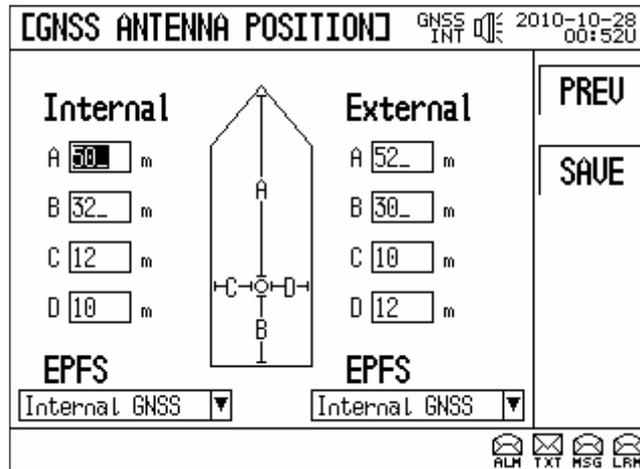
GNSS ANTENNA POSITION SCREEN

The internal means a position of internal GNSS antenna and the external on right side means a position of external GNSS antenna.

For any changes or corrections, use ▼ or ▲ button(up and down arrow) or # key button to move the wanted item.

3-9 SYSTEM SETUP

As of SI-30A's a function to set a definition of baud rate (SET I/O PORT) with MKD, transponder or external equipment, and a definition of luminosity and brightness adjustment (SET DISPLAY) alarm of MKD display, and a noise out of keypad (SET BUZZER) and to set alteration of password (SET PASSWORD), and to set initialization of system (INITIALIZE SYSTEM).

3-9-1 SET I/O PORT TRANSMIT RATE

From **"MENU"** button, go to **"3. SYSTEM SETUP"** and go to **"1. SET I/O PORT"**, then a following screen will appear.
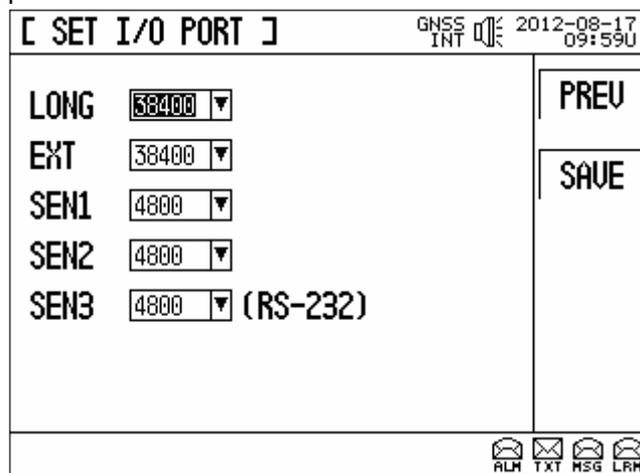
SET I/O PORT SCREEN

It displays following screen that enables to change the port relative items and port baud rate Port definition by item is as follows.

◆ LONG   : Long Range Port(**38400**/4800)

◆ EXT   : External Display(**38400**/4800)

◆ SEN1   : Sensor Port1(**4800**/34800)

◆ SEN2   : Sensor Port2(**4800**/34800)

◆ SEN3   : Sensor Port3(**4800**/34800)   = RS232 IN / OUT

◆ 그림 참고

RS-422 INTERFACE (T3)																										
LONG					EXT					ALARM			SEN1			SEN2			SEN3			RS-232				
TXB −	TXA +	GND	RXB −	TXA +	TXB −	TXA +	GND	RXB −	RXA +	A	B	C	RXB −	RXA +	GND	RXB −	RXA +	GND	RXB −	RXA +	GND	IN +	−	OUT −	+	SLD
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
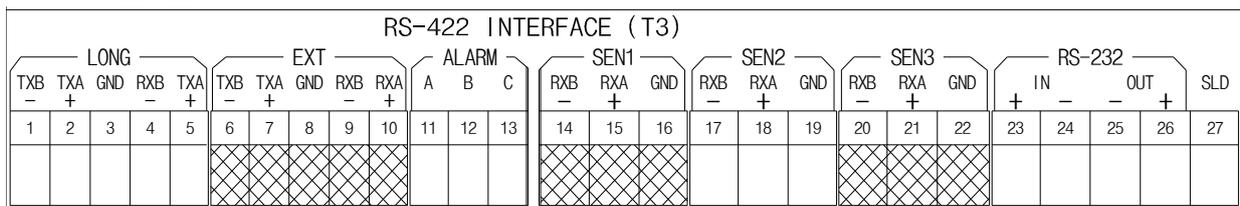
3-9-2 BRIGHTNESS ADJUSTMENT

From **"MENU"** button, go to **"3. SYSTEM SETUP"** and go to **"2. SET DISPLAY"**, then a following screen will appear.

It is available to adjust and modify LCD brightness, LED brightness of Keypad as a composition of moving to left / light on a screen.
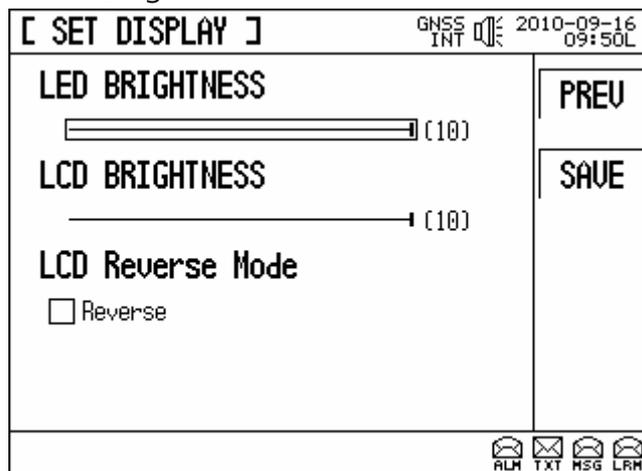
SET DISPLAY SCREEN

Adjust for LED of Keypad is available by using ◀ or ▶ button on LD BRIGHTNESS, and it will adjust up to 10 (ten) levels of brightness of LED.

This is a function of DAY/NIGHT Reverse on the LCD screen and this is necessary mostly in night navigation as function that allows users to reserve the display.

3-9-3 SET BUZZER

From **"MENU"** button, go to **"3. SYSTEM SETUP"** and go to **"2. SET BUZZER"**, then a following screen will appear.
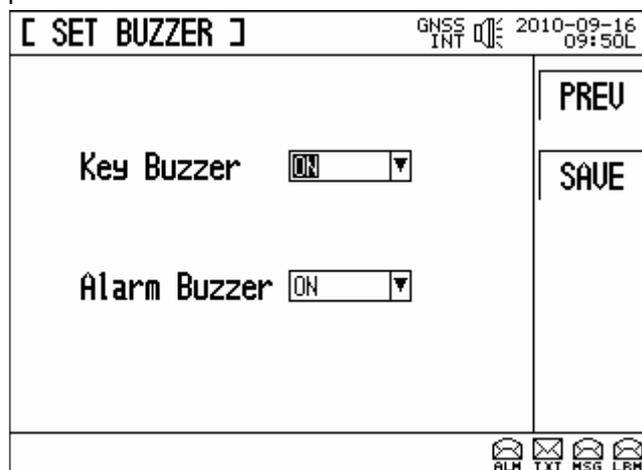
SET BUZZER SCREEN

◆ Key Buzzer: a function that allows users to turn on/off the beeping sound, which

occurs when various buttons of MKD pad are pushed.

◆ Alarm Buzzer: a function enabling users to set up the occurrence of various alarm signals delivered from transponder under systems operation. The buzzer/on creates sound while the buzzer/off eliminates sound.

3-9-4   SET PASSWORD

From **"MENU"** button, go to **"3. SYSTEM SETUP"** and go to **"4. SET PASSWORD"**, then a following screen will appear.

For password change, maximum of 6 characters or digits can be input.
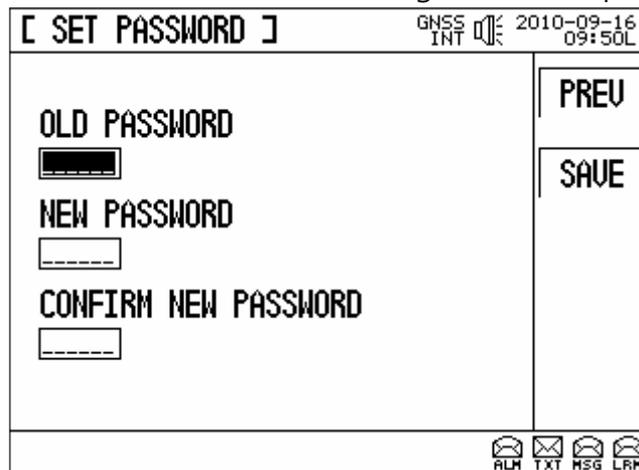
SET PASSWORD SCREEN

* The password should not be released because no one is allowed to freely change the data.

3-9-5   SET ETC.

From **"MENU"** button, go to **"3. SYSTEM SETUP"** and go to **"5. SET ECT"**, then a following screen will appear.
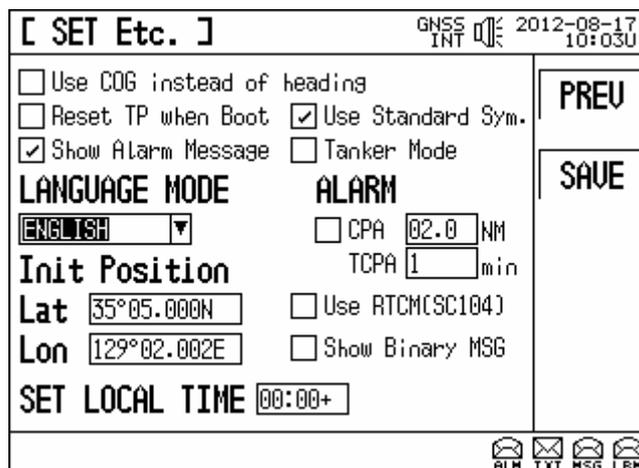
SET ETC SCREEN

◆ **Use of COG instead of heading**: to display COG value instead of HDG value indicated on a TARGET LIST or set a position of map's initial value to be indicated

before receiving a position of a ship's value on a plotter screen.

◆ **Reset TP when Boot**: When MKD starts, transponder will be restart.

◆ **Use Standard Sym**.: use of standard shape of symbol for the target.

◆ **Show Alarm Message**: it can be setup as warning with alarm message.

◆ **LANGUAGE MODE**: Choose one of following language (in ENGLISH, KOREAN, and/or CHINESE)

◆ **CPA/TCPA ALARM**: it can be select as warning with alarm between current distance of the ship position (CPA) or Time to Closest Point of Approach (TCPA).

◆ **Init Position**: input ship's own current initial position.

◆ **SET LOCAL TIME**: can input any time difference based on Universal Time Coordinated (UTC).

◆ **Use RTCM(SC104)** :DGNSS

◆ **Show Binary MSG**

3-10   MAINTENANCE

System maintenance is a function to test and keep main functions of system and the users can test the functions by using the function of maintenance anytime. Main function is PROGRAM VERSION, KEY TEST, LCD TEST, COM MONITORING between transponder and MKD, SECURITY LOG and so on.

3-10-1   PROGRAM VERSION

From **"MENU"** button, go to **"4. MAINTENANCE"** and go to **"1. PROGRAM VERSION"**, then a following screen will appear.

Screen will displayed with each transponder and MKD S/W version.

3-10-2   KEY TEST

From **"MENU"** button, go to **"4. MAINTENANCE"** and go to **"2. KEY TEST"**, then a following screen will appear.
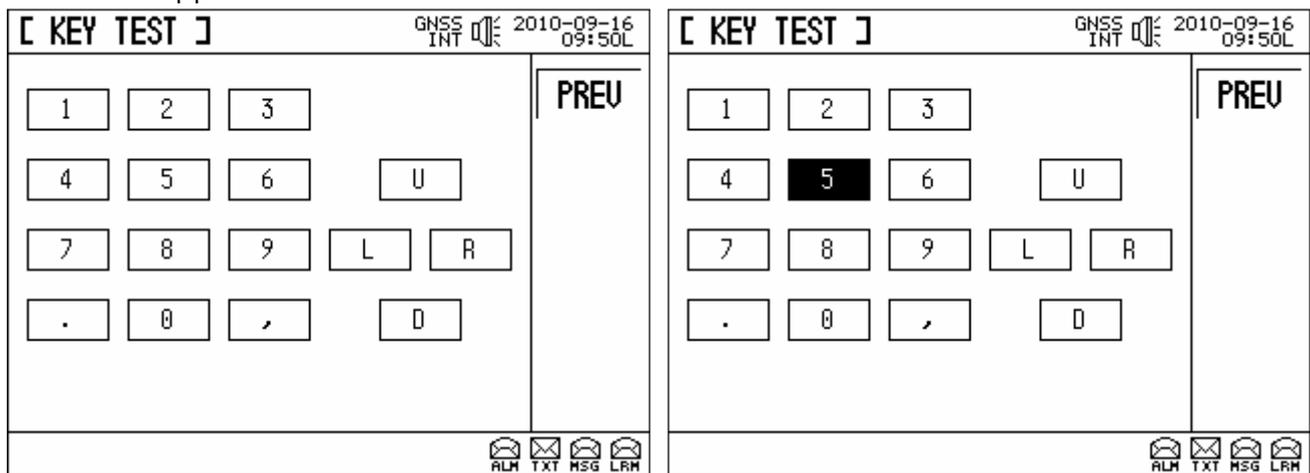
KEY TEST SCREEN	ACTUAL KEY TESTING SCREEN

For test method, when press a key on the Keypad, the appropriate item will turns to black. In example, when press No. 5 pad on the Keypad, a following screen appears.

3-10-3 LCD TEST

From **"MENU"** button, go to **"4. MAINTENANCE"** and go to **"3. LCD TEST"**, then a following screen will appear.

For test method, when press "ENT" button, it turns to five different type of colors.
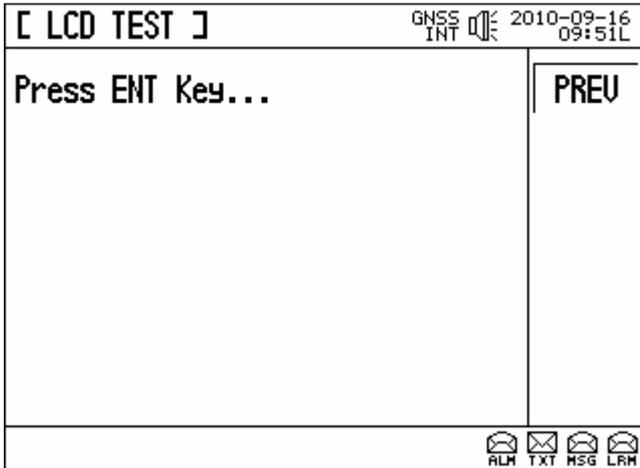
BEFORE LCD TEST SCREEN   AFTER TEST SCREEN CHANGES COLOR

3-10-4 COM MONITORING

From **"MENU"** button, go to **"4. MAINTENANCE"** and go to **"4. COM MONITORING"**, then a following screen will appear.

COM MONITORING test is to check the exchange of information between Transponder and MKD.
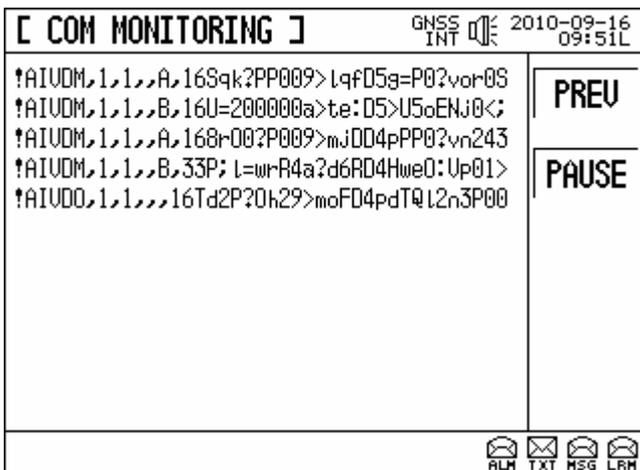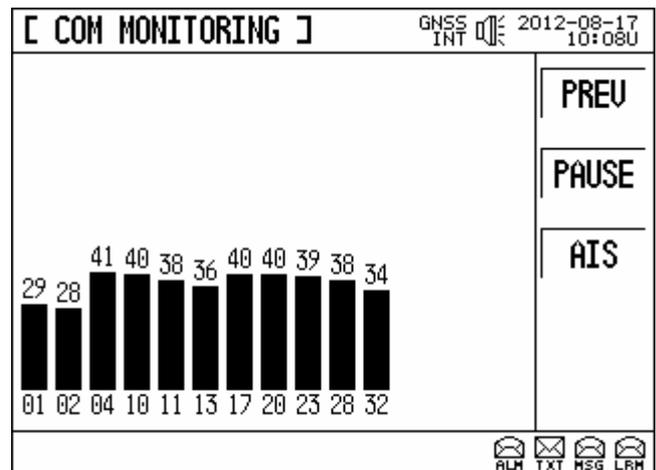
MONITORING SCREEN   GPS SCREEN

3-10-5 SECURITY LOG

From **"MENU"** button, go to **"4. MAINTENANCE"** and go to **"4. SECRUITY LOG"**, then a following screen will appear.

It is a function to record the occurrence took place like System ON/OFF record, VSWR error and System Alarm.

SECURITY SCREEN

3-10-6 TRANSPONDER TEST

From **"MENU"** button, go to **"4. MAINTENANCE"** and go to **"6. TRANSPONDER TEST"**, then a following screen will appear.

TRANSPONDER TEST executes TRANSCEIVER TEST of transponder, RECEIVER TEST, SET PARAMETER and IITIALIZE SYSTEM; however, it has to be conducted by technician or the expert.

TRANSPONDER TEST SCREEN

![SAMYUNG ENC logo]

3-10-7 PROGRAM DOWNLOAD

From **"MENU"** button, go to **"4. MAINTENANCE"** and go to **"7. PROGRAM DOWNLOAD"**, then a following screen will appear.

PROGRAM DOWNLOAD is for executing upgrade for software. This function is to delete a previous program as a downloading into MKD connecting to external PC and reinstall a new program.

```
Program
Download...

1. Down  : □
2. Erase : □
3. Fuse  : □



[MENU] : Cancel
```
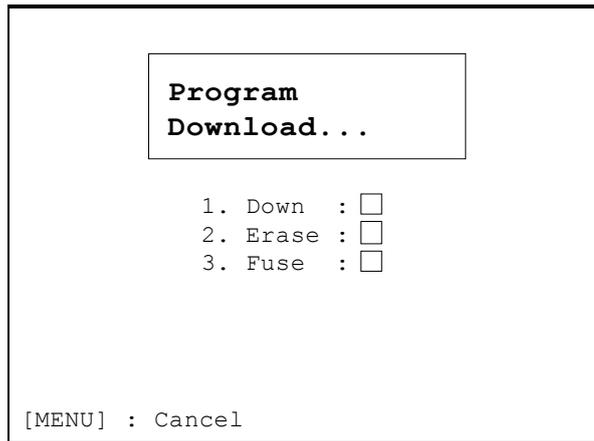
PROGRAM DOWLOAD, ERASE, OR FUSE SCREEN

Down: Downloading a new program into MKD

Erase : Deleting a previous program

Fuse : Indicating a downloaded program to MKD

3-10-8 PROGRAM UPLOAD

From **"MENU"** button, go to **"4. MAINTENANCE"** and go to **"8. PROGRAM UPLOAD"**, then a following screen will appear.

PROGRAM UPLOAD is for executing upgrade of other MKD software or of transponder software. This function is for system maintenance only so that it doesn't be included into a service manual.

```
[ PROGRAM UPLOAD ]        GNSS ◖ 2010-09-16
                          INT        09:51L
1. TRANSPONDER UPLOAD         PREV
2. MKD UPLOAD(CCFL)
3. MKD UPLOAD(LED)            UPLOAD
4. MAP UPLOAD



                              ⊠ ⊠ ⊠ ⊠
                              ALM TXT MSG LRM
```
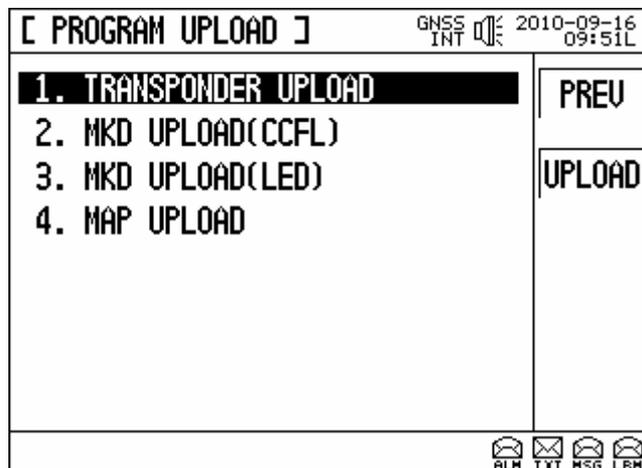
3-11 The explanation signs of AIS

This equipment of AIS shows 4 different signs and each sign has functions as below.

◆ ▽ : The sign for the pausing ship

◆ ◣ : The sign for the moving ship

◆ ◪ : The sign when you choose a ship.

◆ ⋇ : The sign for the ship which is in danger

The meaning of signs show as below

◆ COG/SOG : It means Course of ground, Speed of Ground.

◆ Heading : It means the azimuth of vessel's head.

◆ Direction of turn : It means that the ship's direction.

In the event of signing (4) case, it distinguishes dangerous ship after considering CPA/TCPA. CPA/TCPA means as follow

◆ CPA(Closest Point to Approach)

◆ TCPA(Time for Closest Point Approach)
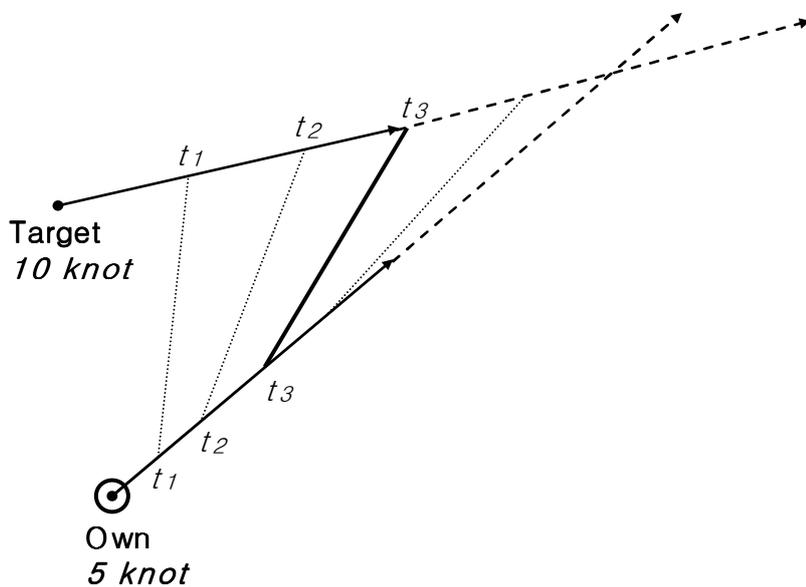
You get the distance each time between 2 points while the ship(Own) and the other ship(Target) cruise with 5Knot, 10 Knot as the picture above. When the time should be t1, t2, t3, …, tn, if you get the distance, you can learn that t3 is the closest point. At that moment, the point should be CPA and the time when it arrives at T3, should be TCPA.

4. The Installation method and explanation equipment

4-1   The explanation method

4-1-1   Front side
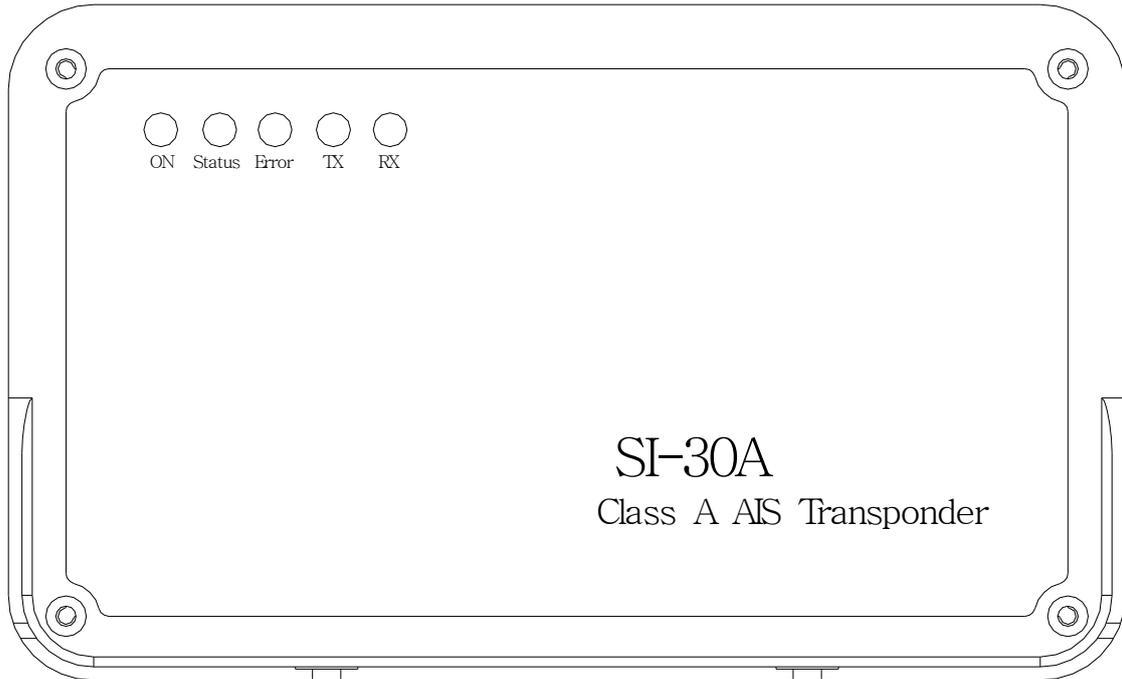
LED	Function	Remark
ON	The LED light is on when the power is connected.	Red LED
STATUS	Status LED light is on when the Transponder receives UTC Sync information via Internal GPS receiver, UTC Sync information is complied.	Green LED
ERROR	The error message is on when Transponder has defects or faults in products, when it is on the equipment's problem and inside errors.	Red LED
TX	When you send AIS data if you receive normally.	Red LED
RX	When you send AIS data if you transfer normally.	Green LED

4-1-2 Back Side
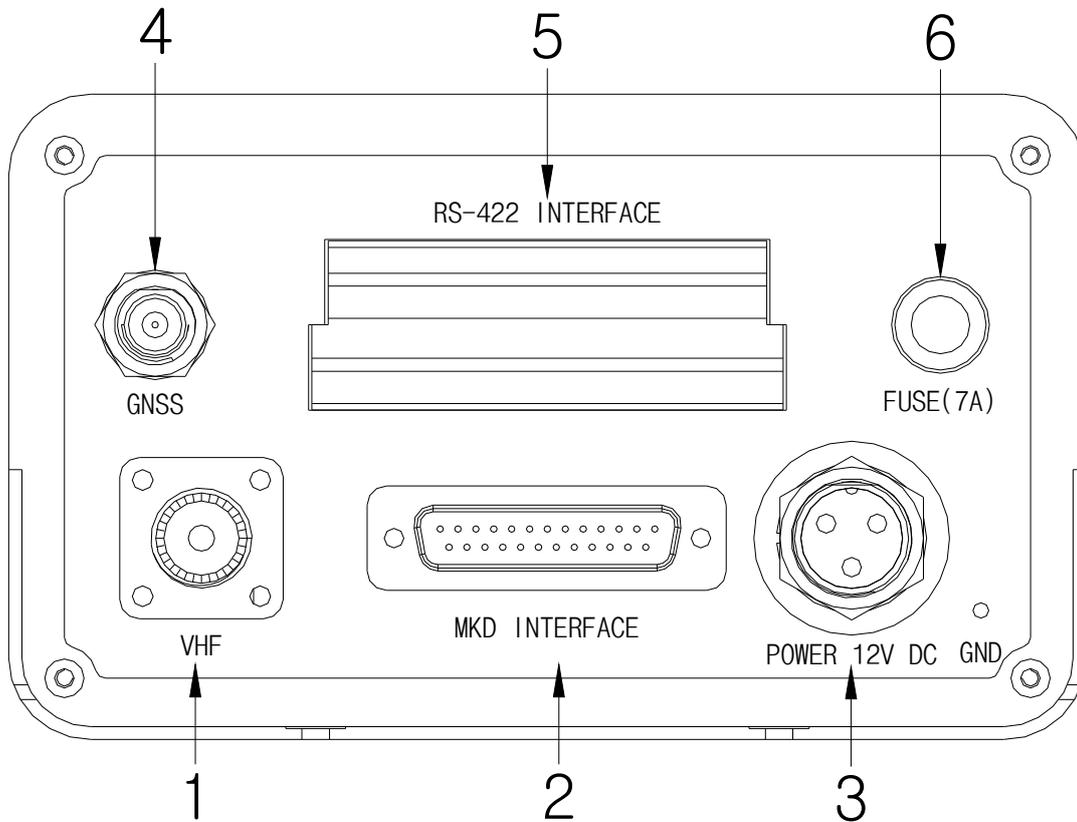
1. VHF – ANT
Receiving the signal of VHF .

2. MKD INTERFACE And Power (RS-422)
The port for the communication with MKD, it communicates with the form of NMEA0183 DATA.

3. POWER
Input from the power supply, or Battery. (Main unit: DC +12V. / SP-700 : DC13.8V)

4. GPS – ANT
Receiving the GPS signal.

5. RS-422 INTERFACE
The port for outer signal and the communication with other equipments, it is used as NMEA0183 DATA.

6. FUSE(7A)
It is used 7A fuse of power.

4-2 The method of installation

SI-30A is designed for installing to the existing bridge easily, it shows the occupation of general system on outer wiring diagram in Annex.

We suggest that all components such as VHF antenna, Plotter, MKD should be installed According to the instruction as manufacturer provides.

4-3 Main Unit installation

The method of installation SI-30A is as below.
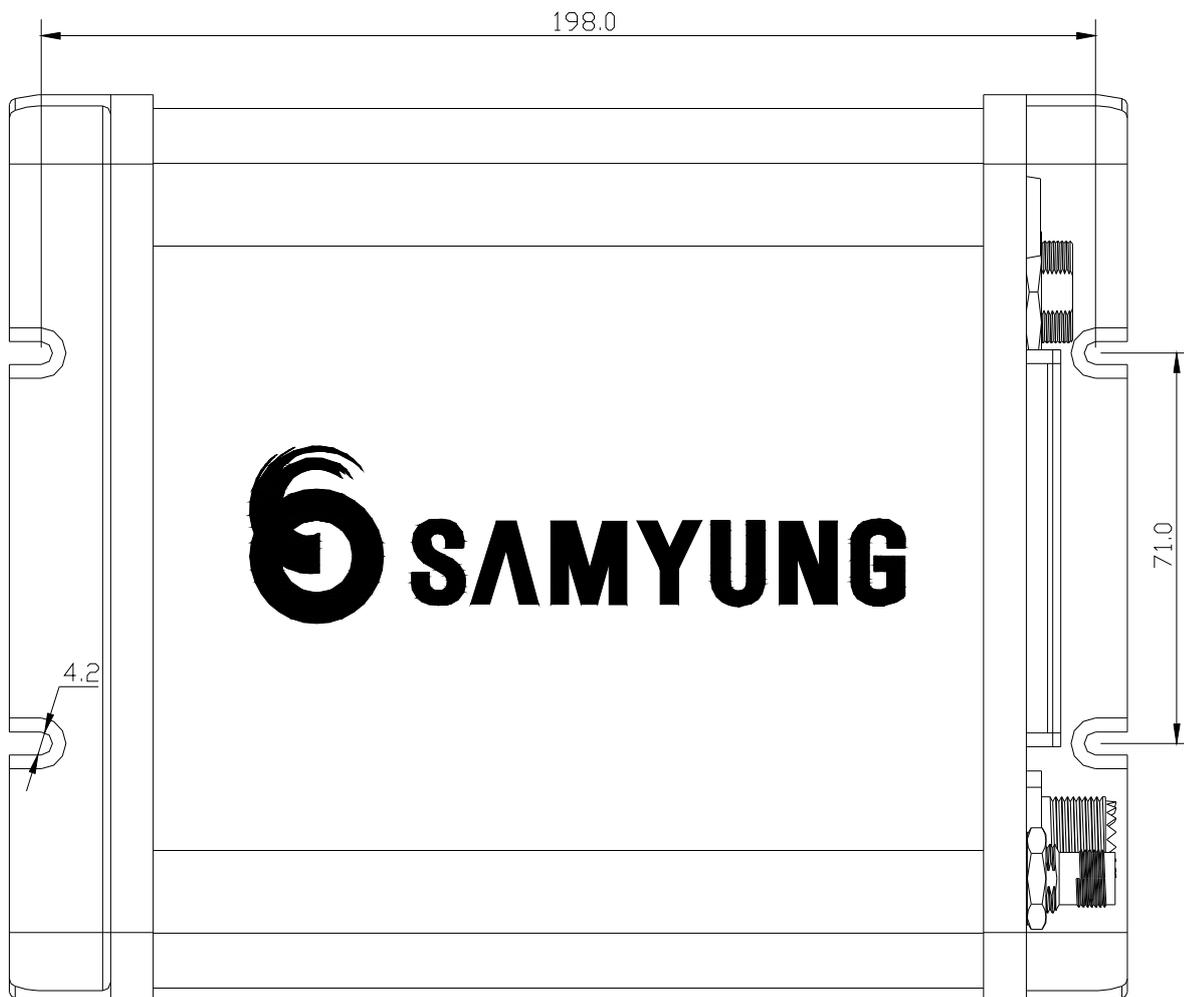
The installation of SI-30A should be considered to approach other outer equipments easily.

3P connector which is placed on back of main unit, is for power supply. It can be connected, if No.1 is (+), No3. is(-).

The cable of IEC/NMEA DATA should be connected to data port on back of main unit(refer to outer wiring diagram of SI-30A in Annex).

4-3-1 How to setup Antenna

VHF Antenna is for keeping TX/RX in good performance, please kindly refer below instructions when you install VHF Antenna.

Generally, VHF Antenna should be installed in high position as far away from other equipment. And it should be away at least 2M from the conductivity materials. Further, it should not be installed in near by vertical material and secured a 360 view.

It also need to be installed 2M away form high-voltage material and beam of their TX signal such as TX Radar, Radio and so on. Do not install 2 antennas on the same height. If you need to install 2 antennas on the same height, it should be at least 2M away from each other.

SAMYUNG ENC
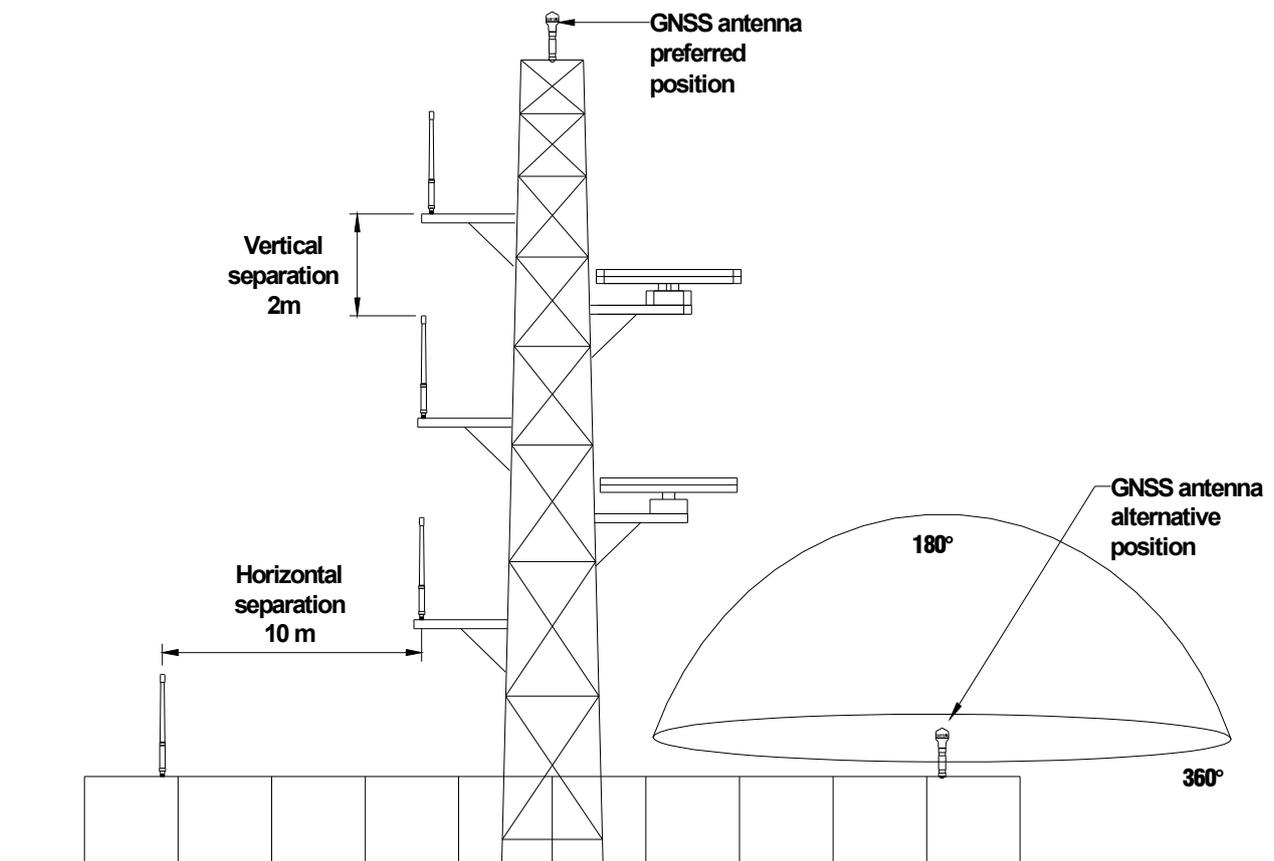
4-3-2　When you install VHF Antenna, please check bellows.

◆　The position of bracket.

◆　The bracket should be substantial spot.

◆　Put the antenna on Antenna's mount.

◆　Use RG-8U (coaxial cables) cables and keep shortened cables if possible.

◆　Leave some length of cables to the terminal.

◆　Put the connector at either ends of coaxial cables.

5. Maintenance and Troubleshooting

5-1 Maintenance and Troubleshooting of System

It is quite necessary to do periodical maintenance and troubleshooting for keeping performance of unit in good order. It means periodical unit test, and software upgraded if necessary but which following items should be included.

ITEM	CONTENT
Connector/Terminal	Check if the connection of connector and terminal is properly connected from rear part of transponder unit and MKD unit.
Cable	Check conditions of all cables. Replace it immediately with new one if something wrong has been founded.
Ground port and Ground cable	Check condition of ground terminal. Replace it or clean cables if it is decayed or rusted. Check the connection of ground cable.
Keep it clean	The dust on unit should be cleaned by using a clear for prevent LCD from damage. In case of having dot of salt or dust on the unit, it must be cleaned by cleaning tissues or cotton, but not by any chemical acid that may spoil the paint on surface of unit.

5-2 Troubleshooting

The following table shows general defective symptom and solution for the defects.

Even though users cannot restore the equipment with general methods, don't even try to look into the inside of the equipment. Whatever the issue is, the equipments must be checked by technical specialists.

A/S PIC ☎ : 051-601-5570~5574

SYMPTOMS	ACTIONS TO BE TAKEN
NO TURN ON	Check if power connector is fixed well. Check power supply / fuse.
No receiving Satellite information	Check if GPS antenna, cables, connectors have defects on connection.

6. Appendix

6-1 NMEA sentences used

The ports on the SI-30A transponder accept and output different combinations of NMEA sentences as follows:

Port	Input sentences	Output sentences
Main, Display and Aux ("Presentation ports")	ACA, ABM, BBM, ACK, AIR, AIQ, LRI, LRF, VSD, SSD	ABK, ACA, ACS, ALR, LRI, LRF, LR1, LR2, LR3, SSD, TXT, VDO,VDM, VSD
Long Range	LRI, LRF	LRI, LRF, LR1, LR2, LR3
S1, S2, S3 ("Sensor ports")	DTM, GBS, GGA, GLL, GNS, HDT, RMC, ROT, VBW, VTG, THS, OSD	None

6-2 Alarm Messages

The transponder may generate various alarm and information messages that appear as pop-ups on the display. Messages categorised as "alarms" also cause the transponder to generate an audible or visual alarm (depending on the installation) and must be acknowledged on the display unit in order to clear the alarm.

■ Tx malfunction

This indicates that there is a problem with the transponder. The occasional occurrence of this alarm may be caused by transient conditions and does not necessarily indicate a permanent problem. However, if this alarm occurs on a regular basis you should take action to have your installation checked by an authorised service agent.

■ Antenna VSWR exceeds limits

This indicates that there is a problem with the antenna. The transponder is likely to be still operational, although its performance may be impaired. The occasional occurrence of this alarm may be caused by transient conditions and does not necessarily indicate a permanent problem. However, if this alarm continues to occur you should take action to have your installation checked by an authorised service agent.

- **Rx Channel 1 malfunction**
- **Rx Channel 2 malfunction**
- **Rx Channel 70 malfunction**

These messages indicate that there is a possible problem with the receiver for AIS channel A, AIS channel B or the DSC channel 70 respectively. Again, the occasional occurrence of this message should not be cause for alarm, but the regular occurrence of these messages is likely to indicate a permanent problem which should be investigated by an authorised service agent.

- **Transceiver connection lost**

This message indicates that the SI-30A display unit can no longer communicate with the SI-30A transponder. This may indicate a problem with the connections, or may indicate that the transponder is no longer operating correctly. This fault should be investigated immediately. It is important to note that there is a safety timer in the transponder which causes it to shut down automatically if the transmitter should remain on for too long. In this event, the transponder will shut down and this alarm will be raised by the display unit. The situation can be resolved by disconnecting the power from the transponder for a short time and then re-connecting it again.

- **External EPFS lost**

This message indicates that the transponder is no longer receiving data from the vessel's on-board GPS system. This message should be investigated immediately.

- **No position sensor in use**

This message indicates that the SI-30A transponder is unable to obtain a location fix from either the internal GPS module or from the ship's own GNSS system. This message may occur during the first few minutes of operation while the transponder waits to obtain its location, and may safely be ignored during this time. If the message occurs at any other time, it indicates a possible problem with the GNSS antennae or wiring and should be investigated immediately

- **No valid SOG information**
- **No valid COG information**
- **Heading lost/invalid**
- **No valid ROT information**

These messages indicate that information from various sensors are not available. In a full installation it is expected that all this information will be available permanently and the display of one or more of these messages is an indication that there may be problems either with the other sensors or with the connections between the sensors and the SI-30A transponder unit. Such messages should be investigated immediately.

- **UTC clock lost**

This message indicates that internal GPS module within the SI-30A transponder is unable to obtain a valid time signal. If this message appears on a regular basis it may indicate a problem with the GNSS antenna connection, but it is possible for this message to occur temporarily in certain locations or in extreme weather conditions where the GNSS module is unable to receive transmissions from a sufficient number of satellites.

- **External DGNSS in use**
- **External GNSS in use**
- **Internal DGNSS in use (beacon)**
- **Internal DGNSS in use (msg 17)**
- **Internal GNSS in** use

These messages indicate which source of GNSS information is currently in use by the transponder. The external GNSS information from the ship's main onboard systems may or may not be augmented by differential correction information - in which case the messages show "DGNSS" rather than "GNSS". When the external GNSS signals are not available, the SI-30A transponder uses GNSS information from its own internal GNSS module and the message changes to "Internal GNSS". This information may be augmented by the receipt of differential correction data from a beacon receiver or by VHF transmissions from a base station - in which case the status message shows "DGNSS" and "beacon" or "msg 17" respectively to indicate the source of the differential data being used.

■ **External SOG/COG in use**

■ **Internal SOG/COG in use**

These messages indicate whether Speed over Ground and Course over Ground are being supplied by the external sensors or are being calculated from the internal GNSS module.

■ **Heading valid**

This message is received when a valid heading is first received from the ship's sensors.

■ **Rate of Turn indicator in use**

■ **Other ROT source in use**

The first of these messages indicates that the SI-30A transponder is using Rate of Turn information from an on-board device which directly calculates the rate of turn - such as a gyro compass. The second message indicates that the rate of turn is being calculated from changes in the ship's heading.

■ **Chan management params changed**

This message is issued each time that any of the channel management parameters are altered. These may be altered by the receipt of specific VHF or DSC messages from base stations and can also be modified directly by using the "Channel Regions" page on the SI-30A's display unit.

6-2-1　Decoded Sentences

The sentence types listed in the table below are decoded by the Transponder.

Formatter	Source	Primary function	Optional function	Comment
ABK	AIS			VDL Ack
ABM	AIS			Addressed binary message
BBM				Broadcast binary message
AIR	AIS			Interrogation
ACA	AIS			Channel assignment
ROT	Sensor	Rate of turn		
HDT	Sensor	Heading		Heading
VBW	Sensor	SOG		
GNS	GNSS	Pos+time of pos		
GLL	GNSS	Pos+time of pos		
RMC	GNSS	COG	Pos + time of pos, SOG	
GBS	GNSS	RAIM indication		RAIM
VTG	GNSS		COG, SOG	
GGA	GPS		Pos + time of pos	
VSD	Display			Voyage data
SSD	Display			Static data
LRF	LR			Long range interrogation
LRI	LR			Long range interrogation
TXT				
ALR				
ACK	Display			Alarm ack

6-2-2　Position Sensor Priority List

Priority (Highest first)	Sources
External Differential GNSS	GNS, GLL, RMC, GGA
Internal Differential GNSS (msg17)	GNS, GLL, RMC, GGA
Internal Differential GNSS (RTCM)	GNS, GLL, RMC, GGA
External GNSS	GNS, GLL, RMC, GGA
Internal GNSS	GNS, GLL, RMC, GGA
Manual input	
None available	

Notes : RAIM indication requires a valid GBS message from the sensor currently in use.

6-3 Message structures

Message structures are shown in the format used in IEC 61162-1

6-3-1 ABK - AIS addressed and binary broadcast acknowledgement

The ABK sentence is output by the transponder on the presentation ports in response to the receipt of an ABM, AIR or BBM sentence. Its purpose is to inform the requesting device about the success or failure of its request.

$--ABK ,xxxxxxxxx ,x ,x.x ,x ,x *hh<CR><LF>

①   ② ③ ④ ⑤

①. MMSI of the addressed AIS unit   ② AIS channel of reception

③ M.1371 Message ID   ④ Message sequence number

⑤ Type of acknowledgement

6-3-2 ABM – AIS addressed binary and safety related message

This sentence is used to transmit M.1371 messages 6 (binary addressed) or 12 (addressed safety related) via the AIS system by encapsulating the M.1371 message within one or more AIS sentences.

$--ABM ,x ,x ,x ,xxxxxxxxx ,x ,xx ,s—s ,x *hh<CR><LF>

①②③   ④   ⑤ ⑥ ⑦ ⑧

① total number of sentences   ② sentence number

③ sequential message identifier   ④ MMSI of the destination AIS unit

⑤ AIS channel   ⑥ M.1371 Message ID (6 or 12)

⑦ encapsulated data   ⑧ number of fill-bits

When the transponder receives an ABM sentence from an external device, it will return an ABK sentence to indicate the success or failure of the transmission attempt.

6-3-3 ACA – AIS channel assignment message

$--ACA ,x ,llll.ll,a ,yyyyy.yy,a ,llll.ll,a ,yyyyy.yy,a ,x ,xxxx ,x ,xxxx ,x ,x ,x ,a ,x ,hhmmss.ss *hh<CR><LF>

① ②   ③   ④   ⑤   ⑥ ⑦ ⑧ ⑨ ⑩⑪⑫⑬⑭   ⑮

① sequence number   ② region northeast corner latitude, N/S

③ region northeast corner longitude, E/W   ④ region southwest corner latitude, N/S

⑤ region southwest corner longitude, E/W   ⑥ transition zone size

⑦ channel A   ⑧ channel A bandwidth

⑨ channel B   ⑩ channel B bandwidth

⑪ Tx/Rx mode control   ⑫ power level control

⑬ information source   ⑭ in-use Flag

⑮ time of "in use" change

The ACA sentence is used both to send channel management information to the transponder and to obtain channel management information from it.

6-3-4   ACK – Acknowledge alarm

This sentence is used to acknowledge an alarm condition.

$--ACK,xxx *hh<CR><LF>
        ①

① alarm ID

6-3-5   ACS - AIS channel management information source

This sentence is used in conjunction with the ACA sentence. It identifies the originator of the information contained in the ACA sentence and the date and time when the transponder received that information.

$--ACS ,x ,xxxxxxxxx ,hhmmss.ss ,xx ,xx ,xxxx *hh<CR><LF>
     ①   ②   ③   ④ ⑤ ⑥

① sequence number   ② MMSI of originator

③ UTC of receipt of information   ④ day, month, year

6-3-6   AIR – AIS interrogation request

The interrogation request sentence allows an external to request certain M.1371 messages from other remote devices via the AIS system.

$--AIR ,xxxxxxxxx ,x.x ,x ,x.x ,x ,xxxxxxxxx ,x.x ,x *hh<CR><LF>
        ①   ② ③ ④ ⑤   ⑥   ⑦ ⑧

① MMSI of interrogated station   ② M.1371 message requested from station-1

③ message sub-section

④ number of second message requested from station-1

⑤ message sub-section   ⑥ MMSI of interrogated station-2

⑦ number of messages requested from station-2

⑧ message sub-section

When the transponder receives an AIR sentence it sends M.1371 interrogation messages (type 15) to the addressed station(s) and returns an ABK sentence to the requesting device indicating that the transmission is complete.

6-3-7   ALR – Alarm condition and status

This sentence is sent by the transponder to all presentation ports order to report an alarm condition on a device. It identifies the source of the alarm, whether it has been acknowledged or not and the time at which the condition changed.

$--ALR ,hhmmss.ss ,xxx,A ,A ,c--c *hh<CR><LF>

        ①   ② ③④   ⑤

① time of condition change   ② alarm source

③ alarm condition   ④ acknowledge state

⑤ descriptive text

This sentence is sent by the transponder whenever a new alarm is raised or its condition changes state. It is also sent periodically even when there are no active alarms In order to provide a positive indication of the current status of each alarm.

6-3-8   BBM - AIS broadcast binary message

The BBM sentence allows an external device to instruct the transponder to broadcast a block of binary data in an M.1371 binary broadcast message (type 8) or a safety related broadcast message (type 14).

!--BBM ,x ,x ,x ,x ,x.x,s—s ,x *hh<CR><LF>

       ①②③④ ⑤   ⑥   ⑦

① total number of sentences needed to transfer message

② sentence number   ③ sequential message identifier

④ AIS channel for broadcast of the radio message

⑤ M.1371 message ID   ⑥ encapsulated data

⑦ number of fill-bits

When the transponder receives one or more BBM sentences from an external device, is deencapsulates the encoded data and re-assembles an M.1371 message of type 8 or 14 and then 34 Issue 1 AIS Installation Manual transmits it over the VDL (if possible). It then sends an ABK sentence back to the requesting device to indicate whether the transmission of the message s ucceeded or failed.

6-3-9   DTM – Datum reference

Local geodetic datum and datum offsets from a reference datum.

$--DTM,ccc ,a ,x.x,a ,x.x,a ,x.x,ccc *hh<CR><LF>

        ① ②   ③   ④   ⑤   ⑥

① Local datum   ② Local datum subdivision code

③ Lat offset, min, N/S   ④ Lon offset, min, E/W

⑤ Altitude offset, m   ⑥ Reference datum

Note that the only datum supported by AIS is WGS84. The DTM sentence must be sent to the transponder at a frequency of more than once every 30 seconds otherwise any positional information sentences (eg GLL, GNS. RMC and GGA) will be ignored.

6-3-10 GBS – GNS satellite fault detection

This message is used to support receiver autonomous integrity monitoring (RAIM).

  $--GBS ,hhmmss.ss ,x.x ,x.x ,x.x ,xx ,x.x ,x.x ,x.x ,*hh<CR><LF>

                ①   ② ③ ④ ⑤ ⑥ ⑦ ⑧

① UTC time of GGA or GNS fix associated with this sentence

② Expected error in attitude   ③ Expected error in longitude

④ Expected error in altitude   ⑤ ID number of most likely failed satellite

⑥ Probability of missed detection for most likely failed satellite

⑦ Estimate of bias on most likely failed satellite

⑧ Standard deviation of bias estimate

6-3-11 GGA – Global positioning system (GPS) fix data

Time, position and fix-related data for a GPS receiver.

  $--GGA ,hhmmss.ss ,llll.ll,a ,yyyyy.yy,a ,x ,xx ,x.x ,x.x ,M ,x.x ,M ,x.x ,xxxx *hh<CR><LF>

              ①   ②   ③   ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫

① UTC of position   ② Latitude N/S

③ Longitude E/W   ④ GPS quality indicator

⑤ Number of satellites in use   ⑥ Horizontal dilution of precision

⑦ Antenna altitude above/below mean sea level (geoid)

⑧ Units of antenna altitude, m   ⑨ Geoidal separation

⑩ Units of geoidal separation, m   ⑪ Age of differential GPS data

⑫ Differential reference station ID

6-3-12 GLL – geographic position

This sentence is a primary source of position information for the transponder when connected to a functional GNSS system. In the absence of GNS sentences, longitude and latitude information may also be obtained from GNS, GGA or RMC sentences.

  $--GLL ,llll.ll,a ,yyyyy.yy,a ,hhmmss.ss ,A ,a *hh<CR><LF>

              ①   ②   ③   ④⑤

① latitude, N/S   ② longitude, E/W

③ UTC of position   ④ status ('A' -> use mode flag; 'V' -> use position as default)

⑤ mode indicator ('A', 'D', 'E', 'M' -> used; 'N' -> invalid)

Note that DTM sentences must be received by the transponder at least once every 30 seconds in order for the GLL sentence to be accepted.

6-3-13   GNS – GNSS fix data

The transponder may receive this sentence from other sensors and uses the information in its own calculations of the ship's current position.

$--GNS ,hhmmss.ss ,llll.ll,a ,yyyyy.yy,a ,c—c ,xx ,x.x ,x.x ,x.x ,x.x ,x.x *hh<CR><LF>
              ①   ②   ③   ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

① UTC of position   ② latitude, N/S

③ longitude, E/W

④ mode indicator ('A', D', 'E', 'M' - used; 'N' - default value)

⑤ number of satellites in use (ignored) ⑥ HDOP (ignored)

⑦ antenna altitude (ignored)   ⑧ geoidal separation (ignored)

⑨ age of diff data (ignored)   ⑩ Diff reference station ID (ignored)

6-3-14   HDT – heading true

This sentence provides the actual vessel heading and may be sent by any system or device that calculates true headings.

$--HDT,x.x,T *hh<CR><LF>
        ①

① heading, degrees true

6-3-15   LR1 - AIS long-range reply 1

The LR1 sentence identifies the destination for the reply and contains the information items requested by the function identification character in the LRF sentence that requested the information.

$--LR1 ,x ,xxxxxxxxx ,xxxxxxxxx ,c—c,c—c ,xxxxxxxxx *hh<CR><LF>
         ①   ②   ③   ④ ⑤   ⑥

① sequence number   ② MMSI of responder

③ MMSI of requestor (reply destination) ④ ship's name

⑤ call sign   ⑥ IMO number

6-3-16   LR2 - AIS long-range reply 2

The LR2 sentence contains further information items that can be requested in an LRF sentence.

$--LR2 ,x ,xxxxxxxxx ,xxxxxxxx ,hhmmss.ss ,llll.ll,a ,yyyyy.yy,a ,x.x,T ,x.x,N *hh<CR><LF>
      ①   ②   ③   ④   ⑤   ⑥   ⑦   ⑧

① sequence number   ② MMSI of responder

③ date   ④ UTC time of position

⑤ latitude, N/S   ⑥ longitude, E/W

⑦ True   ⑧ speed over ground, Knots course over ground, deg

6-3-17 LR3 - AIS long-range reply 3

The LR3 sentence contains further information items that can be requested in an LRF sentence.

$--LR3 ,x ,xxxxxxxxx,c—c ,xxxxxx ,hhmmss.ss ,x.x ,x.x ,x.x ,x.x ,x.x ,x.x *hh<CR><LF>

           ①   ②   ③   ④   ⑤   ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

① sequence number   ② MMSI of responder   ③ voyage destination

④ ETA date   ⑤ ETA time   ⑥ draught

⑦ ship/cargo   ⑧ ship length   ⑨ ship breadth

⑩ ship type   ⑪ persons

6-3-18 LRF - AIS long-range function

This sentence is used in both long-range interrogation requests and long-range interrogation replies. The LRF-sentence is the second sentence of the long-range interrogation request pair LRI and LRF. The LRF sentence is also the first sentence of the long-range interrogation reply. The minimum reply consists of an LRF sentence followed by a LR1 sentence. The LR2 sentence and/or the LR3 sentences follow the LR1 sentence if information provided in these sentences was requested by the interrogation.

$--LRF ,x ,xxxxxxxxx,c—c,c—c,c—c *hh<CR><LF>

        ①   ②   ③   ④   ⑤

① sequence number   ② MMSI of requestor   ③ name of requestor

④ function request   ⑤ function reply status

6-3-19 LRI - AIS long-range interrogation

Long-range interrogation is a mechanism that allows one AIS unit to request certain data from another AIS unit through the use of a number of interrogation and reply sentences. When the transponder receives an LRI and LRF sentence pair on its Long Range port, it forwards them on to all the presentation ports. If the transponder has been configured to provide and automatic response to the interrogation then it does so; otherwise it waits for the sentences to be returned to it (on any presentation port) before responding.

$--LRI,x ,a ,xxxxxxxxx,xxxxxxxxx ,llll.ll,a ,yyyyy.yy,a ,llll.ll,a ,yyyyy.yy,a *hh<CR><LF>

       ①②   ③   ④   ⑤   ⑥   ⑦   ⑧

① sequence number   ② control flag

③ MMSI of requestor   ④ MMSI of destination

⑤ latitude, N/S (NE co-ordinate) ⑥ longitude, E/W (NE co-ordinate)

⑦ latitude, N/S (SW coordinate) ⑧ longitude, E/W (SW coordinate)

6-3-20 OSD – Own ship data

Heading, course, speed, set and drift summary. Useful for, but not limited to radar/ARPA applications. OSD gives the movement vector of the ship based on the sensors and parameters in use.

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

    ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

① Heading, degrees true ② Heading status: A = data valid, V = data invalid

③ Vessel course, degrees true ④ Course reference, B/M/W/R/P (see Note)

⑤ Vessel speed   ⑥ Speed reference,B/M/W/R/P (see Note)

⑦ Vessel set, degrees true ⑧ Vessel drift (speed)

⑨ Speed units, K = km/h; N = knots; S = statute miles/h

NOTE Reference systems on which the calculation of vessel course and speed is based. The values of course and speed are derived directly from the referenced system and do not additionally include the effects of data in the set and drift fields.

B = bottom tracking log

M = manually entered

W = water referenced

R = radar tracking (of fixed target)

P = positioning system ground reference.

6-3-21 RMC – recommended minimum specific GNSS data

This sentence is used to transmit the time, data, position, course and speed data from a GNSS navigation receiver. The sentence is transmitted at least once every two seconds from GNSS device(s) and is always accompanied by an RMB sentence when a destination waypoint is active.

$--RMC,hhmmss.ss ,A,llll.ll,a ,yyyyy.yy,a ,x.x ,x.x ,xxxxxx ,x.x,a ,a *hh<CR><LF>

    ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

① UTC of position fix

② status ('A' -> use mode field; 'V' -> use fields as default values)

③ latitude, N/S   ④ londitude, E/W

⑤ speed over ground ⑥ course over ground

⑦ date ⑧ magnetic variation

⑨ mode indicator ('A', 'D', 'E', 'M' -> used; 'N' -> invalid)

Note that RMC has priority over VTG.

6-3-22 ROT – rate of turn

This sentence provides the rate and direction of turn.

$--ROT ,x.x ,A*hh<CR><LF>
      ① ②

① rate of turn ② status ('A' -> rate of turn is valid)

6-3-23 SSD – Ship Static Data

This sentence is used to enter static parameters into a shipboard AIS. The parameters in this sentence support a number of the ITU-R M.1371 messages.

$--SSD,c--c,c--c,xxx,xxx,xx,xx,c,aa*hh<CR><LF>
        ① ② ③ ④ ⑤⑥⑦⑧

① Ship's Call Sign, 1 to 7 characters ② Ship's Name, 1 to 20 characters

③ Pos. ref., "A," distance from bow, 0 to 511 metres

④ Pos. ref., "B," distance from stern, 0 to 511 metres

⑤ Pos. ref., "C," distance from port beam, 0 to 63 metres

⑥ Pos. ref., "D," distance from starboard beam, 0 to 63 metres

⑦ DTE indicator flag ⑧ Source identifier

6-3-24 THS – True heading and status

Actual vessel heading in degrees true produced by any device or system producing true heading. This sentence includes a "mode indicator" field providing critical safety related information about the heading data, and replaces the deprecated HDT sentence.

$--THS,x.x,a*hh<CR><LF>
      ① ②

① Heading, degrees true ②Mode indicator (see Note)

NOTE Mode indicator. This field should not be null.

A = Autonomous

E = Estimated (dead reckoning)

M = Manual input

S = Simulator mode

V = Data not valid (including standby)

6-3-25 TXT – text transmission

This sentence is used for transmitting text messages such as alarm messages from a sensor or the transponder to any presentation display device such as the SI-30A Display unit.

$--TXT ,xx ,xx ,xx ,c--c *hh<CR><LF>
      ① ② ③ ④

① total number of messages   ② message number

③ text identifier   ④ text message

6-3-26 VBW – Dual ground/water speed

S—VBW,x.x,x.x,A,x.x,x.x,A,x.x,A,x.x,A *hh<CR><LF>
       ① ②③④ ⑤ ⑥⑦ ⑧ ⑨ ⑩

① Longitudinal water speed   ② Traverse water speed

③ Status: water speed   ④ Longitudinal ground speed

⑤ Traverse ground speed   ⑥ Status: ground speed

⑦ Stern traverse water speed   ⑧ Status: stern water speed

⑨ Stern traverse ground speed   ⑩ Status: stern ground speed

Longitudinal ground speed – used   Transverse ground speed – used

Status of ground speed – used   Other fields ignored

6-3-27 VDM – VHF data link message

This sentence is output by the transponder each time it receives an incoming message over the VHF data link. The VDM sentence encapsulates a part of an M.1371 message, and several VDM sentences may need to be decoded and re-assembled in order to re-construct the original M.1371 message.

!--VDM ,x ,x ,x ,a ,s—s ,x *hh<CR><LF>
      ①②③④ ⑤ ⑥

① total number of sentences needed to transfer message

② sentence number   ③ sequential message identifier

④ AIS Channel   ⑤ encapsulated ITU-R M.1371 radio message

⑥ number of fill-bits

6-3-28 VDO - AIS VHF Data-link own-vessel report

This sentence is output to all the presentation ports at regular intervals and contains the contents of the transponders own-vessel report. Each time the transponder transmits an own-vessel report, it encapsulates the M.1371 message in one or more VDO sentences and outputs them on its presentation ports.

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

    ①②③④ ⑤ ⑥

① total number of sentences needed to transfer message

② sentence number   ③ sequential message identifier

④ AIS Channel ('A' or 'B')

⑤ encapsulated ITU-R M.1371 radio message   ⑥ number of fill-bits

The transponder outputs one VDO sentence every second in addition to echoing all transmitted VDO sentences as they are transmitted in order to provide frequent updates to all connected presentation devices. VDO sentences which have also been transmitted contain the appropriate AIS channel indicator whereas VDO sentences that have not been transmitted contain a NULL field for the channel indicator.

6-3-29　VSD – AIS voyage static data

This sentence may be output by the transponder in response to a query.

$--VSD ,x.x ,x.x ,x.x ,c—c ,hhmmss.ss ,xx ,xx ,x.x ,x.x *hh<CR><LF>

        ① ② ③ ④   ⑤   ⑥ ⑦ ⑧ ⑨

① type of ship and cargo category   ② maximum present static draught

③ persons on-board   ④ destination

⑤ estimated UTC of arrival at destination   ⑥ estimated day of arrival at destination

⑦ estimated month of arrival at destination ⑧ navigational status

⑨ regional application flags

6-3-30　VTG – course over ground and ground speed

This sentence contains the actual course and speed relative to the ground.

$--VTG ,x.x,T ,x.x,M ,x.x,N ,x.x,K ,a *hh<CR><LF>

        ①   ②   ③   ④ ⑤

① course over ground, degrees true   ② course over ground, degrees magnetic (ignored)

③ speed over ground, knots   ④ speed over ground, km/h (ignored)

⑤ mode indicator

Note that RMC has priority over VTG.

6-4 Abbreviations

4S	: Ship-to-Ship & Ship-to-Shore	AIS	: Automatic Identification System
ALM	: Alarm	ANT	: Antenna
ARPA	: Automatic Radar Plotting Aid	ATA	: Automatic Tracking Aid
AtoN	: Aid to Navigation	AUX	: Auxiliary
AUTO	: Automatic	BI IT	: Built-In Integrity Test
BAT	: Battery	BRILL	: Display Brilliance
BRG	: Bearing	CG	: Coast Guard
CH	: Channel	CHG	: Change
CLR	: Clear	CNCL	: Cancel
CNS	: Communication, Navigation & Surveillance	COG	: Course Over Ground
CONTR	: Contrast	CPA	: Closest Point of Approach
CPU	: Central Processing Unit	CSE	: Course
DEL	: Delete	DEST	: Destination
DG	: Dangerous Goods	DGLONASS	: Differential GLONASS
DGNSS	: Differential GNSS	DGPS	: Differential GPS
DISP	: Display	DIST	: Distance
DSC	: Digital Selective Calling	DTE	: Data Terminal Equipment
ECDIS	: Electronic Chart Display and Information System	ECS	: Electronic Chart System
EGNOS	: European Geo-stationary Navigational Overlay System	ENC	: Electronic Navigation Chart
		EPA	: Electronic Plotting Aid
ENT	: Enter	EPIRB	: Electronic Position Indicating Radio Beacon
EPFS	: Electronic Position Fixing System	ETA	: Estimated Time of Arrival
ERR	: Error	FCC	: Federal Communications Commission
EXT	: External	GLO or	: Global Orbiting Navigation Satellite System
FREQ	: Frequency	GLONASS	
GMDSS	: Global Maritime Distress and Safety System	GND	: Ground
GNSS	: Global Navigation Satellite System	GPS	: Global Positioning System
GYRO	: Gyro Compass	HDG	: Heading
HS	: Hazardous Substances	HSC	:High Speed Craft
I/O	: Input / Output	IBS	: Integrated Bridge System
ID	: Identification	IEC	: International Electrotechnical Commission
IMO	: International Maritime Organisation	IN	: Input
INFO	: Information	INS	: Integrated Navigation System
ITU-R	: International Telecommunications Union – Radiocommunications Bureaux	KN	: Knots
		LAT	: Latitude
L/L	: Latitude / Longitude	LON	: Longitude
LOST	: TGT Lost Target	M	: Metres
MAG	: Magnetic	MAN	: Manual
MED	: Marine Equipment Directive	MF/HF	: Medium Frequency/High Frequency
MID	: Maritime Identification Digit	MIN	: Minimum
MKD	: Minimum Keyboard and Display	MMSI	: Maritime Mobile Service Identity
MOB	: Man Overboard	MP	: Marine Pollutant

NAV	: Navigation		NM	: Nautical Mile
NUC	: Not Under Command		OOW	: Officer Of the Watch
OS	: Own Ship		OUT	: Output
PI	: Presentation Interface		POSN	: Position
PPU	: Portable Pilot Unit		PWR	: Power
RAIM	: Receiver Autonomous Integrity Monitoring		RNG	: Range
RORO	: Roll On, Roll Off		ROT	: Rate Of Turn
RR	: Range Rings		RTCM	: Radio Technical Commission for Maritime services
RTE	: Route		Rx	: Receive / Receiver
SAR	: Search And Rescue		SEL	: Select
SOG	: Speed Over Ground		SPD	: Speed
SPEC	: Specification		STBD	: Starboard
STBY	: Standby		STW	: Speed Through Water
TCPA	: Time to Closest Point of Approach		TDMA	: Time Division Multiple Access
TGT	: Target		TPR	: Transponder
TRK	: Track		TSS	: Traffic Separation Scheme
TTG	: Time To Go		Tx	: Transmit / Transmitter
Tx/Rx	: Transceiver		UAIS	: Universal Automatic Identification System
UHF	: Ultra High Frequency		UTC	: Universal Time Co-ordinate
MKD	: Visual Display Unit		VHF	: Very High Frequency
VOY	: Voyage		VSWR	: Virtual Standing Wave Ratio
VTS	: Vessel Traffic Systems		WAAS	: Wide Area Augmentation System
WCV	: Waypoint Closure Velocity		WGS	: World Geodetic System
WIG	: Wing In Ground		WPT	: Waypoint

6-5 PACKING LIST
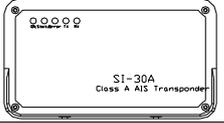
NO.	Item	External Feature	Standard		Q'ty	CHK	Remark
			SI-30A				
			SI-30A				
1	Transponder		CODE NO.	E02-3000-00	1		
2	MKD		SI-30AM		1		
			CODE NO.	E02-4000-01			
3	Cable Ass'y		DSUB25-7M-DSUB25		1	A-03	OPT. 10M
			CODE NO.	574-0166-01			
4	Cable Ass'y		SCN3-3M-02 Cable Ass'y		1	A-05	DC
			CODE NO.	574-0390-01			
5	Screw		Stain Truss Piece 4X16		10		Packing
			CODE NO.	904-0446-01			
6	Cable Ass'y		01-3M-D01 Cable Ass'y		2	A-04	5.5SQ OTYPE
			CODE NO.	574-0102-01			
7	Cable Tie		DACT300-2.5		10		
			CODE NO.	597-0050-1D			
8	FUSE		7A/250V[20mmX5mm]		2		
			CODE NO.	527-2007-1Q			
9	Manual		SI-30A-ME		1		
			CODE NO.	M03-0101-00			
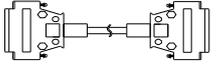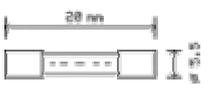
NO.	Item	External Feature	Standard		Q'ty	CHK	Remark
			SAN-60 GPS Antenna				
1	Antenna Ass'y		SAN60-30M(RG58)-TNC		1	A-02	STAIN BAND X2
			CODE NO	574-9999-02			

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SAN-150 VHF Antenna						
NO.	Item	External Feature	Standard		Q'ty	CHK	Remark
1	VHF Antenna		SAN-150		1		
			CODE NO	542-1400-0D			
2	Cable Ass'y		PL259-30M(RG8)-PL259		1	A-01	
			CODE NO	574-0155-24			
3	Bracket Ass'y		Bracket 35 Ass'y		1		
			CODE NO	575-0006-01			
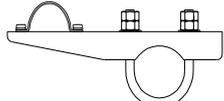
SP-700 POWER SUPPLY UNIT						
NO.	Item	External Feature	Standard		Q'ty	CHK	Remark
1	Power supply unit		SP-700		1		
			CODE NO.	V01-0000-00			
2	Cable Ass'y		SCN2-3M-02 Cable Ass'y		1	B-01	AC
			CODE NO.	574-0107-01			
3	Cable Ass'y		03-3M-C3 Cable Ass'y		1	B-02	DC
			CODE NO.	574-0307-01			
4	Fuse		5A/250V[20mmX5mm]		2		AC
			CODE NO.	527-2005-1Q			
5	Fuse		10A/250V[20mmX5mm]		2		DC
			CODE NO.	527-2010-1Q			
6	Cable Ass'y		01-3M-D01 Cable Ass'y		1	B-03	5.5SQ OTYPE
			CODE NO.	574-0102-01			
7	Screw		Stain Truss Piece 4X16		4		
			CODE NO.	904-0446-01			
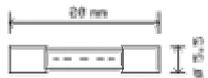
SI-30A OPTION GYRO CONVERTER						
NO.	Item	External Feature	Standard		Q'ty	CHK	Remark
1	GYRO CONVERTER		SAD-30DC		1		Option
			CODE NO.	SIS-5-26			

6-6   Drawings
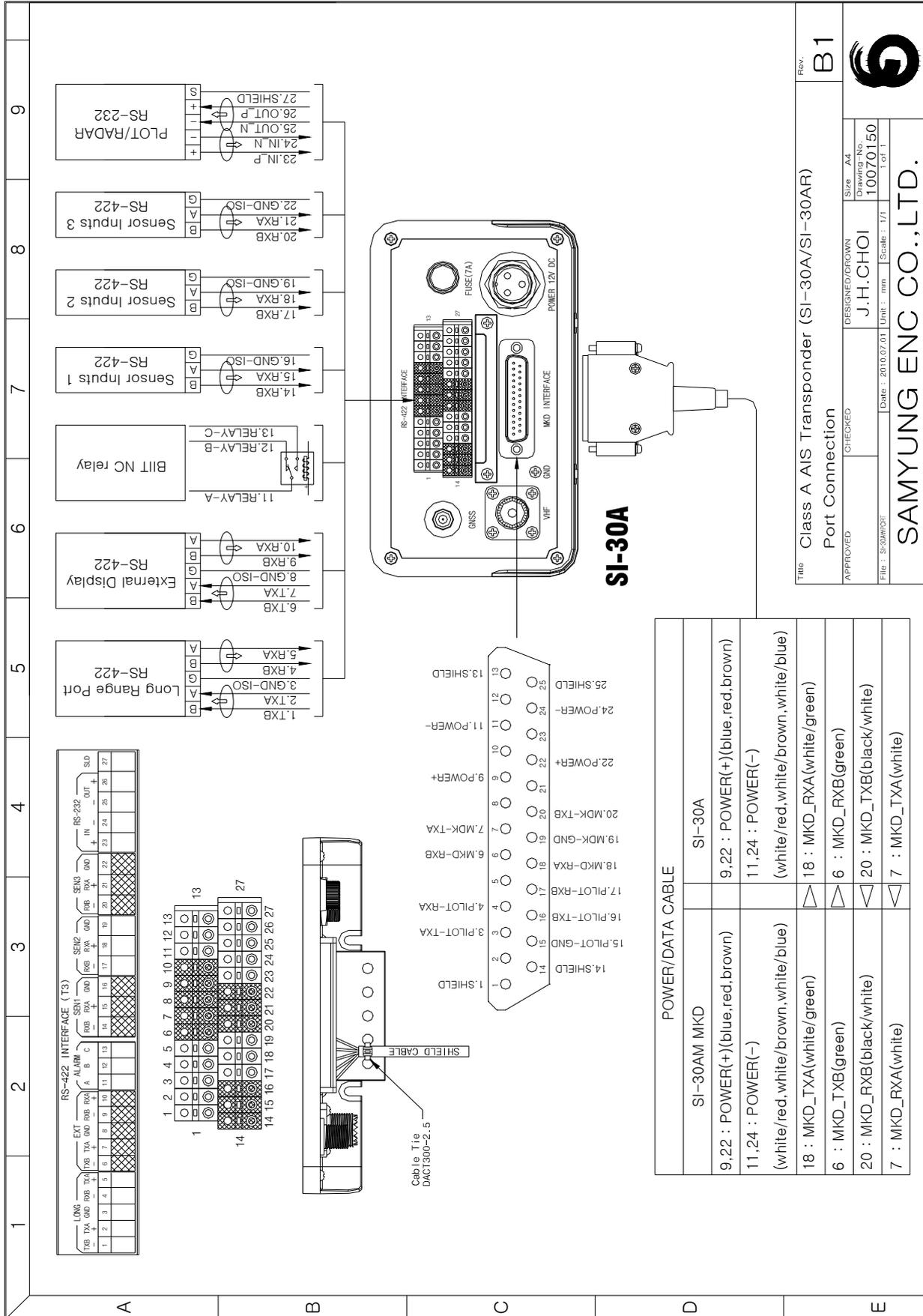
6-6-1 External Connection

6-6-2 Port Connection

Class A AIS Transponder (SI-30A/SI-30AR) Port Connection — SAMYUNG ENC CO.,LTD.

POWER/DATA CABLE	
SI-30AM MKD	SI-30A
9,22 : POWER(+)(blue,red,brown)	9,22 : POWER(+)(blue,red,brown)
11,24 : POWER(−) (white/red,white/brown,white/blue)	11,24 : POWER(−) (white/red,white/brown,white/blue)
18 : MKD_TXA(white/green)	18 : MKD_RXA(white/green)
6 : MKD_TXB(green)	6 : MKD_RXB(green)
20 : MKD_RXB(black/white)	20 : MKD_TXB(black/white)
7 : MKD_RXA(white)	7 : MKD_TXA(white)

6-6-3 SI-30A OUTLINE DRAWING

6-6-4 SI-30AM OUTLINE DRAWING

SAMYUNG ENC

Title: Class A AIS MKD (SI-30AM) OUTLINE DRAWING

DESIGNED/DROWN: J.H.CHOI
CHECKED
APPROVED
Date : 2010.07.02
File : SI-30AM SI-30AM 외형도.dwg

Size: A4
Drawing-No. E01-5000-00
Unit : mm   Scale : 1/1   1 of 1

Rev: A-0

SAMYUNG ENC CO.,LTD.

6-6-5 SAN-150 ANTENNA OUTLINE DRAWING

6-6-6 SAN-60 ANTENNA OUTLINE DRAWING

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