Chapter 10 Technical References

10.1 Serial input data sentence detail

Sentence name: IEC61162-1

Descriptions

(1) Data priority

Data such as waypoint display, own ship's position and the speed against water are available from two different sentences in IEC61162-1. These data are prioritized as follows:

Data name	Available sentences	Priority
Waypoint	RMB and BWC	RMB>BWC
Own ship's position	GGA and GGL	GGA>GLL
Own ship's speed against water	VBW and VHW	VBW>VHW

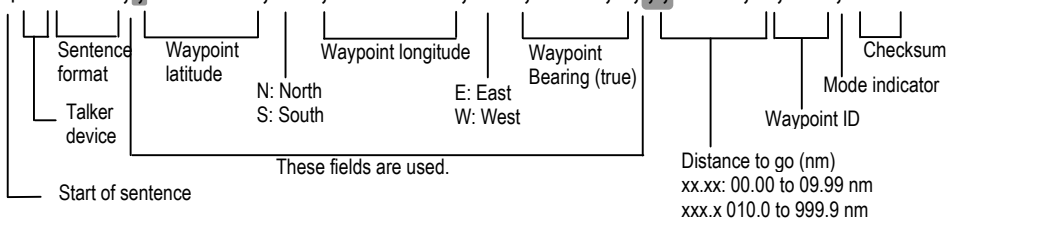
(2) Route display

In case the RMB/BWC and RTE/WPL sentences are all input, only routes are displayed while the waypoint without route is not displayed.

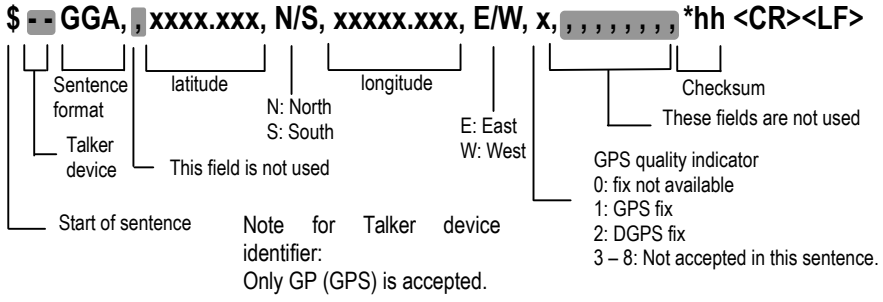
(3) Checksum

Checksum is the total of all the EX-ORed data between the $ and asterisk (*) signs.

BWC **Bearing & Distance to Waypoint**

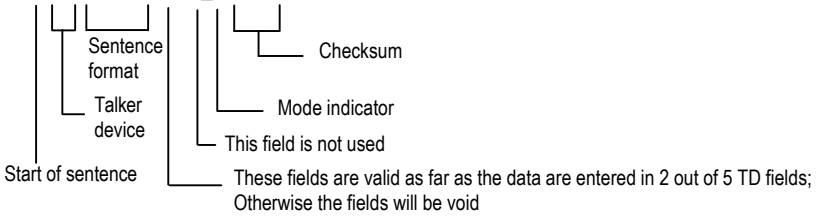


GGA **Global Positioning System Fix Data**



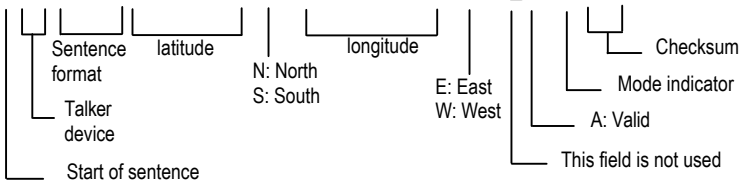
GLC — Geographic Position, Loran C

$ - - GLC, , , , , a *hh <CR><LF>



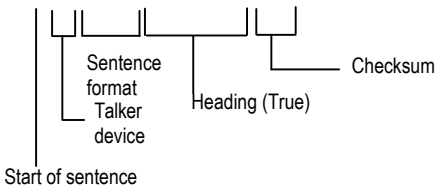
GLL — Geographic Position, Latitude/Longitude

$ - - GGL, xxxx.xxx, N/S, xxxxx.xxx, E/W, , A, a *hh <CR><LF>



HDT — Heading, True

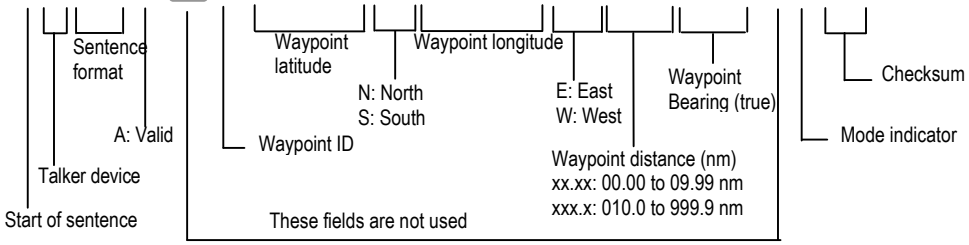
$ - - HDT, xxx.x, T *hh <CR><LF>



Note for Talker Device:
Only HE (North Seeking Gyro) and HN (Non-north Seeking Gyro) are accepted.

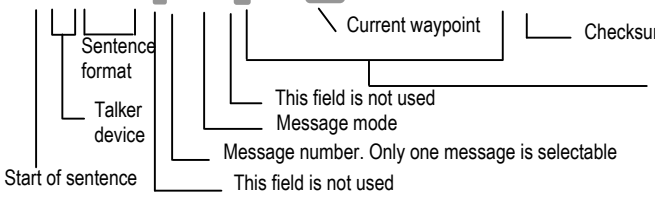
RMB — Recommended Minimum navigation Information

$ - - RMB, A, , , , c-c, xxxx.xxx, N/S, xxxxx.xxx, E/W, xxx.x, xxx.x, , , , a, *hh <CR><LF>



RTE — Routes

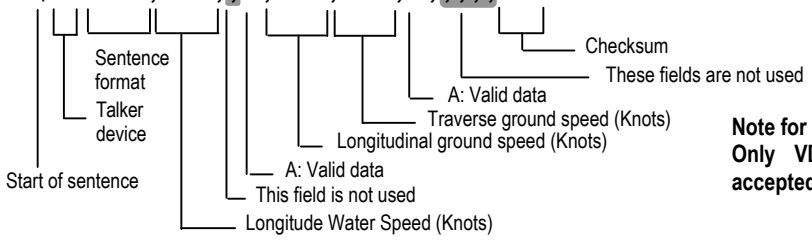
$ - - RTE, , x, W, , c-c, c-c, c-c, c-c, c-c *hh <CR><LF>



Waypoint ID:
- The first 4 digits are valid to designate Waypoint ID, which can be assigned up to 8 kinds as maximum.
- Only a working route is displayed.

VBW — Dual Ground/Water Speed

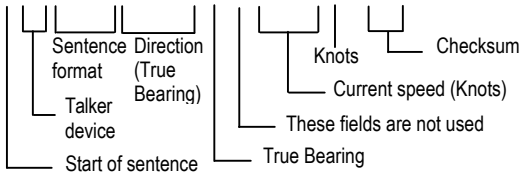
$ - - VBW, xx.x, , A, xx.x, xx.x, A, , , , *hh <CR><LF>



Note for Talker device identifier:
Only VD (Doppler Speed Log) is accepted.

VDR — Set and Drift

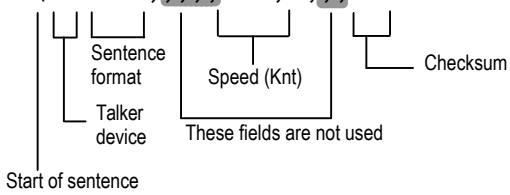
$ - - VDR, xxx.x, T, , xx.x, N, *hh <CR><LF>



- The radar only accepts VD as a talker.

VHW — Water Speed and Heading

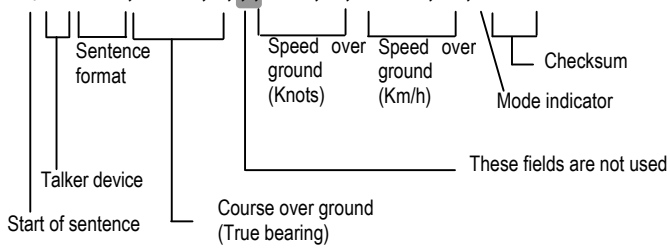
$ - - VHW, , , , xx.x, N, , , *hh <CR><LF>



Note 1:
In case the speed data in knots is not available, then the metric speed data field will be recovered and used for alternative metric data.
Note 2:
Talker Device: Only VD (Doppler Speed Log), VM (Magnetic Water Speed Log) and VW (Mechanical Water Speed Log) are accepted.

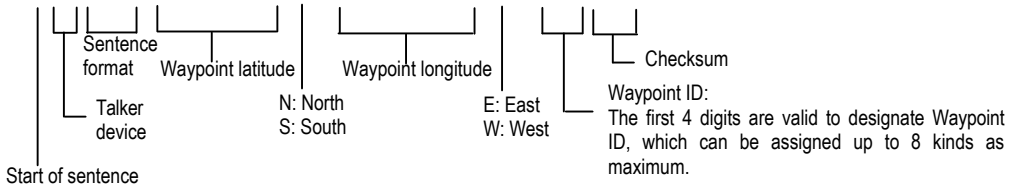
VTG — Course and Ground Speed

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



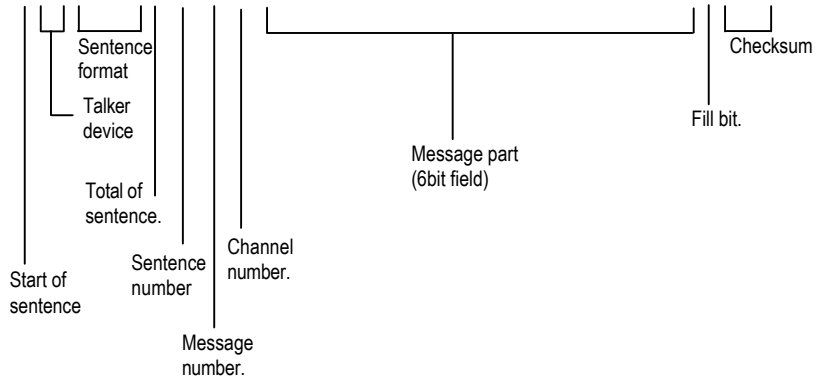
WPL — Waypoint Location

$ - - WPL, xxxx.xxx, N/S, xxxxx.xxx, E/W, c-c *hh <CR><LF>



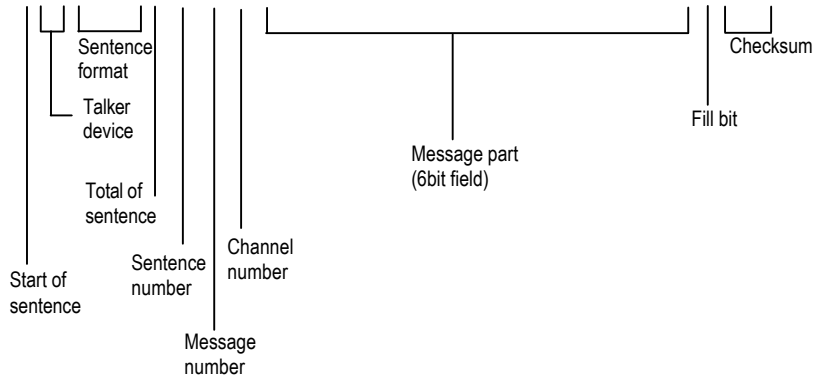
VDM	AIS Other Ship Data

! AI VDM, x, x, x, x, xxxxx••••••••••••••••••xxxx, N *hh <CR><LF>



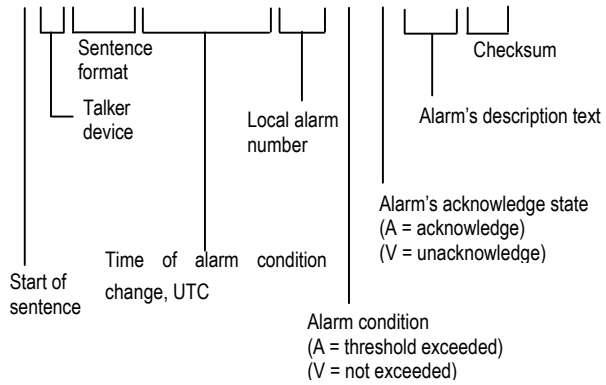
VDO	AIS Own Ship Data

! AI VDO, x, x, x, x, xxxxx••••••••••••••••••xxxx, N *hh <CR><LF>



ALR	Set Alarm State

$ - - ALR, xxxxxx.xx, xxx, A, A, c- -c*hh <CR><LF>



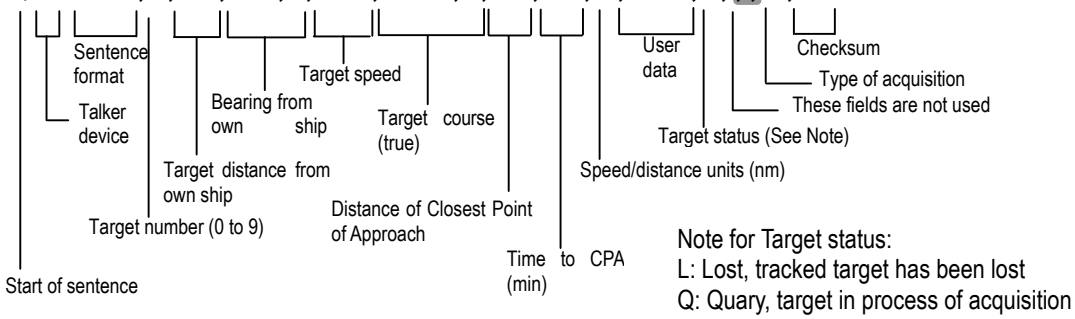
10.2 Tracking data output sentence detail

Sentence name: IEC61162-1

The ATA data can be output to an external unit via the data connector labeled “DATA 1,2 & 3” on the display rear panel.

TTM	Tracked Target Message

$ RA TTM, x, x.x, xxx, T, xx.x, xxx.x, T, x.x, x.x, N, xxxx, a, , , M, *hh <CR><LF>



Note for Target status:
L: Lost, tracked target has been lost
Q: Quary, target in process of acquisition
T: Tracking, target in process of tracking

10.3 Radar data output sentence detail

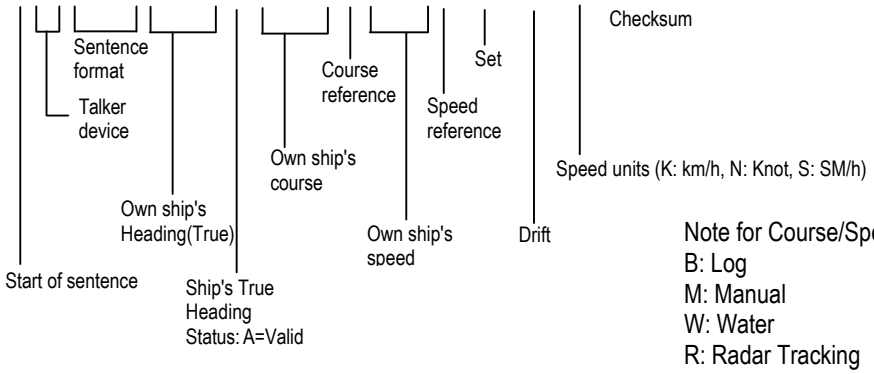
Sentence name: IEC61162-1

The Radar data can be output to an external unit via the data connector labeled “DATA 1,2 &3” on the display rear panel.

10.3.1 Own Ship Data

OSD	Own Ship Data

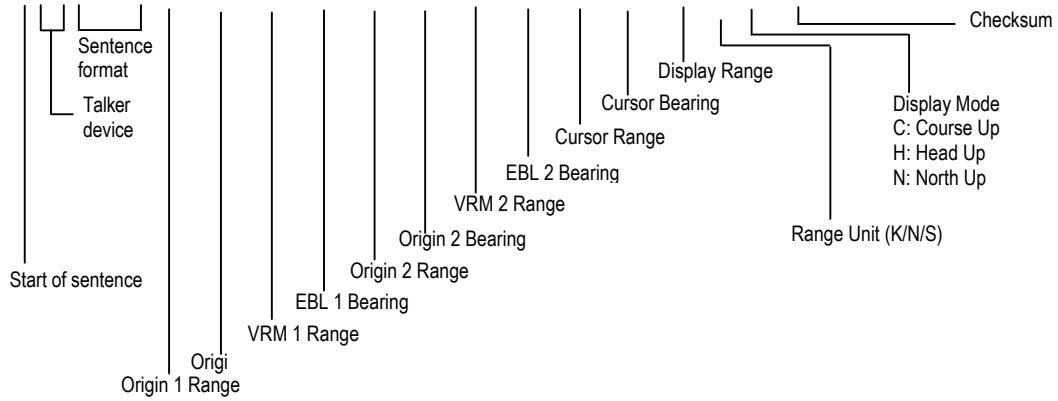
$ RA OSD, xxx.x, A, xxx.x, a, xx.x, a, x.x, x.x, N *hh <CR><LF>



Note for Course/Speed reference:
B: Log
M: Manual
W: Water
R: Radar Tracking
P: Positioning System

10.3.2 Radar System Data

RSD	Radar System Data
	$ RA RSD, x.x, x.x, x.x, x.x, x.x, x.x, x.x, x.x, x.x, x.x, x.x, a, a *hh <CR><LF>



10.4 Interface requirements

10.4.1 Input requirements

Feature	Characteristics	
Power	Voltage Consumption	24/32VDC, -10%, +30% 170 W
Gyro compass	Synchro Stepper Gear ratio Serial	Voltage value: 50VAC or 100VAC+/-10%, 50/60 Hz+/-10% Gear ratio: 1:360, 1:180, 1:90 Voltage value: 21.6 to 38.5 V (See NOTE) or 63 to 77 V (Standard) 1:360, 1:180, 1:90 To IEC61162-1 via opto-isolator
LOG	Mechanical input Electronic input Serial input	PRR: 100, 200, 400 pulse/nm Input type: opto-isolator (5V/5mA) Pulse width: 100 ms (min) Same as above To IEC61162-1 via opto-isolator
Serial interface	Signal standard	To IEC 61162-1 via opto-isolator
AIS interface	Signal standard	To IEC 61162-2 via floated RS422

NOTE: *Changing Link settings are required on the Main Logic PCB for J721 to J725. Refer to Para. 4.6.6 for detail.*

10.4.2 Data input/output serial line

Port name: DATA 1,2 & 3

The connector used:

Type LTWD-06PMMP-LC

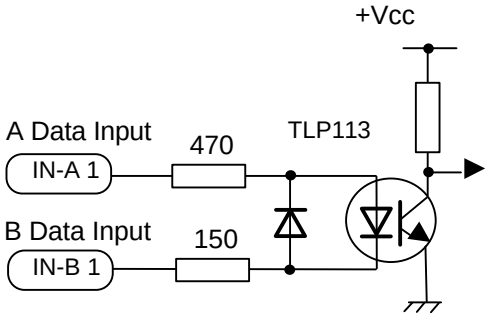
Serial Data input (listener side):

The IEC61162-1 standard signal can be received.

Input load: 470 + 150 ohms

Device: Opto-isolator

Type TLP113 (Toshiba)



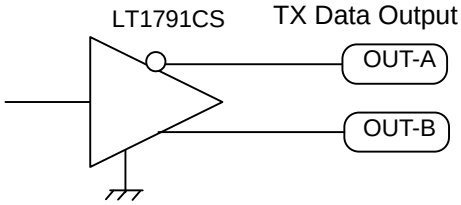
Serial data input circuit

Serial Data output (talker side):

The IEC61162-1 standard signal can be transmitted.

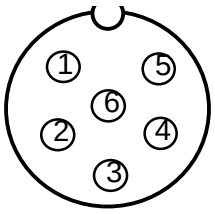
Device: RS422 Driver IC

Type LT1791CS (Linear Technology)



Serial data output circuit

Pin assignment on
Data Connector (Top view)



Data connector pin assignment

DATA 1,2 & 3	
Pin No.	Name
1	Shield
2	OUT-A
3	OUT-B
4	IN-A
5	IN-B
6	GND

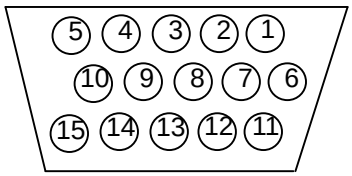
10.4.3 External monitor signal interface

Port name: VDR

The connector used: Small D-sub 15 pin

Pin assignment of the connector is as follows:

External CRT connector
(Top View)

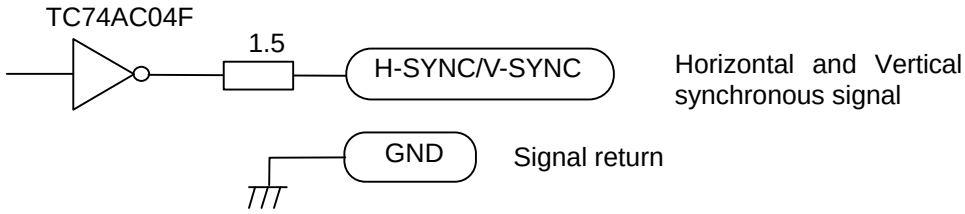


Pin No.	Signal name
1	RVD
2	GVD
3	BVD
6	R-GND
7	G-GND
8	B-GND
13	H-SYNC
14	V-SYNC
5,10	GND
4,9,11,12,15	NC

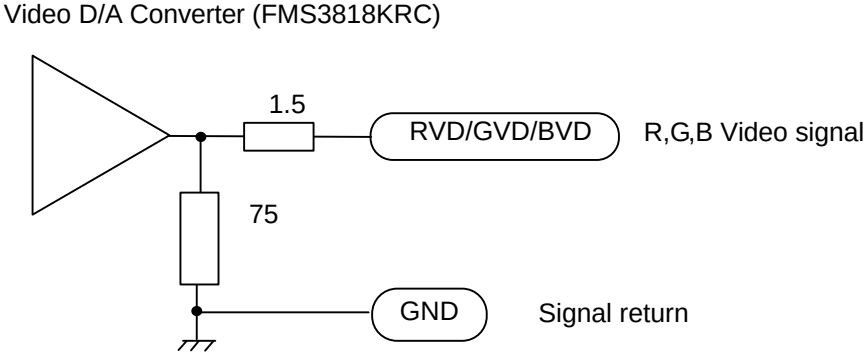
The signal specifications are as follows:

Name	Frequency	Polarity	Pulse width	Level	Impedance
Horizontal sync signal	64.0kHz	Negative	1.04 μs	TTL	200 Ω
Vertical synchronous signal	60.0Hz	Negative	46.9 us	TTL	200 Ω
R,G,B Video signal	-	Positive	-	0.7 Vp-p	75 Ω

Horizontal and Vertical synchronous signal output circuit



R,G,B Video signal output circuit



10.4.4 Data input/output serial line (AIS)

Port name: AIS

The connector used:

Type LTWD-08PMMP-LC

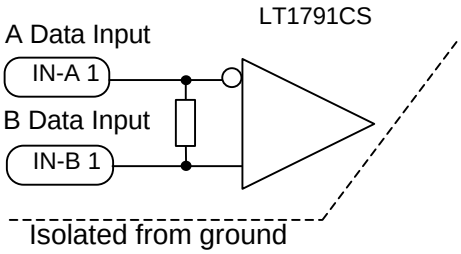
Serial Data input (listener side):

The IEC61162-1 standard signal can be received.

Input load: 94 ohms

Device: RS422 Driver/Receiver IC

Type LT1791CS (Linear Technology)



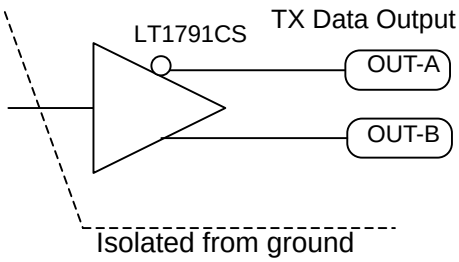
Serial data input circuit

Serial Data output (talker side):

The IEC61162-1 standard signal can be transmitted.

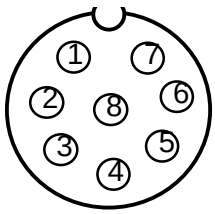
Device: RS422 Driver/Receiver IC

Type LT1791CS (Linear Technology)



Serial data output circuit

Pin assignment on
Data Connector (Top view)



Data connector pin assignment

DATA 1,2 & 3	
Pin No.	Name
1	Shield
2	IN-B
3	IN-A
4	OUT-B
5	OUT-A
6	GND
7	ALARM+
8	ALARM-

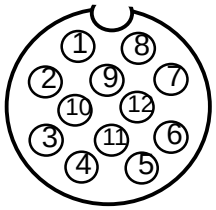
10.4.5 Radar Signal input/output

Port name: REMOTE

The connector used:

Type LTWU-12PMMP-LC

Pin assignment on Data Connector (Top view)



Data connector pin assignment

Pin No.	NAME
1	VIDEO OUT
2	TRIG OUT
3	GND
4	AZIP OUT
5	SHF OUT
6	GND
7	VIDEO IN
8	TRIG IN
9	GND
10	AZIP IN
11	SHF IN
12	+12Vdc

DIP Switch S1-6 on the Logic PCB (E47-700B) in the Processor Unit (RP100A)

The Processor Unit can be used as a radar remote display. When the status switch S1-#6 is set to ON, the display unit is operated with the radar signal supplied from external main display. When the status switch is set to the REMOTE position, never connect the scanner unit to the SCANNER connector.

10.4.6 Talker identifier accepted

The RA83/84/85/93/94/95 series of radar accepts the following talker identifiers applied from external equipment.

Talker device	Talker identifier	Display
Decca navigator	DE	DEC
Global positioning system GPS)	GP	GPS (See NOTE)
Differential GPS receiver (DGPS)	GP	DGPS (See NOTE)
GLONASS receiver	GL	GLO
Global navigation satellite system	GN	GNSS
Integrated navigation	IN	INS
Loran C	LC	LOR
Electronic positioning system	SN	EPFS
Gyro, north seeking	HE	GYRO
Gyro, non-north seeking	HN	GYRO
Compass, magnetic	HC	MAG
Doppler, other/general	VD	DOLOG
Speed LOG, water, magnetic	VM	LOG
Speed LOG, water, mechanical	VW	LOG
Other device		display talker identifier

NOTE

The on-screen device name, GPS or DGPS, is selected according to the GPS quality indicator in the GGA sentence. (Refer to Para 10.1 “Serial input data sentence detail”)