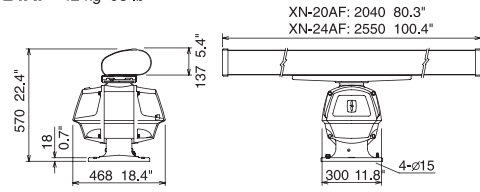


Antenna Unit for FCR-2817/2827/2827W

XN-20AF 39 kg 86 lb
XN-24AF 42 kg 93 lb



Antenna Unit for FCR-2837S/2837SW

SN-30AF 127 kg 280 lb
SN-36AF 133 kg 293.2 lb

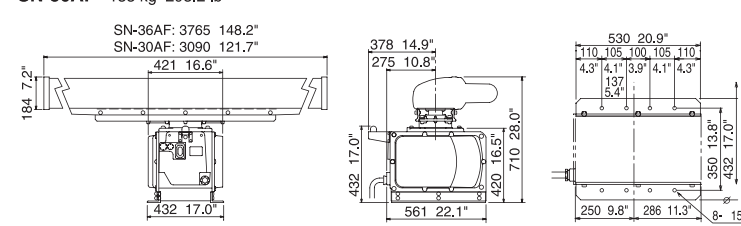
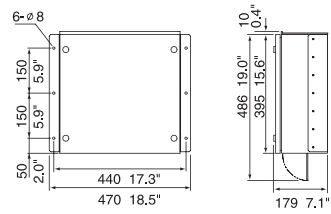


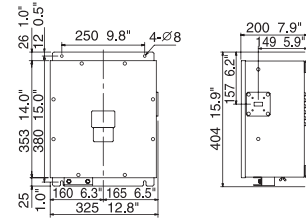
Chart Processor Unit

EC-1000C 15 kg 33.1 lb



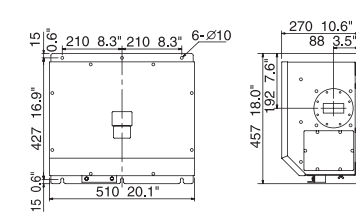
Transceiver Unit for FCR-2827W

RTR-081 8.0 kg 17.6 lb



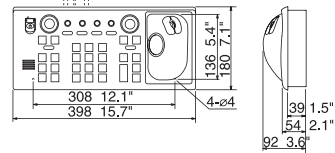
Transceiver Unit for FCR-2837SW

RTR-082 17.0 kg 37.5 lb



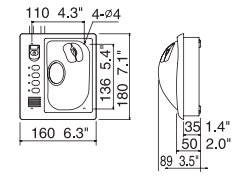
Control Unit Full-keyboard type

RCU-020 3.7 kg 8.2 lb



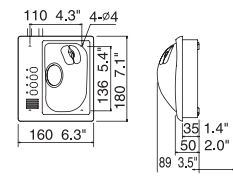
Control Unit Trackball type

RCU-015FEA 2.4 kg 5.3 lb



Control Unit Remote Control type

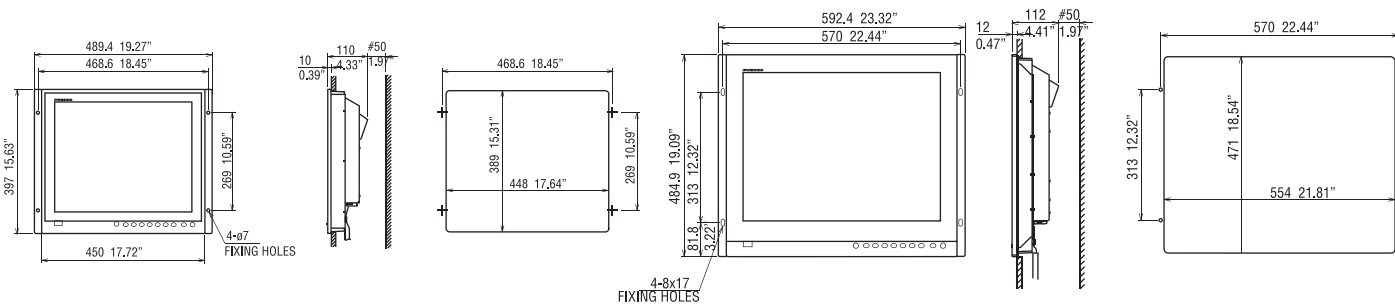
RCU-016 2.4 kg 5.3 lb



Display Unit

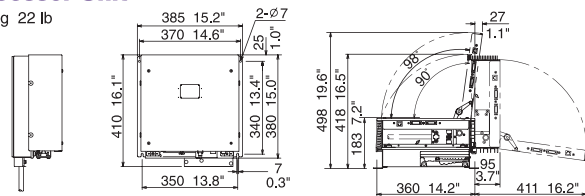
MU-190 (Flush mount)
8.8 kg 19.4 lb

MU-231 (Flush mount)
12.8 kg 28.22 lb



Radar Processor Unit

RPU-016 10 kg 22 lb



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SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

CHART RADAR

19" color LCD
FCR-21x7 Series
23" color LCD
FCR-28x7 Series



Full integration of FURUNO Radar and an ENC display system into a single unit for a new level of navigation safety and efficiency



Product Range

FCR-2117:	X-band, 12 kW, TR up
FCR-2127:	X-band, 25 kW, TR up
FCR-2817:	X-band, 12 kW, TR up
FCR-2827:	X-band, 25 kW, TR up
FCR-2137S:	S-band, 30 kW, TR up
FCR-2837S:	S-band, 30 kW, TR up
FCR-2827W:	X-band, 25 kW, TR down
FCR-2837SW:	S-band, 30 kW, TR down

Black Box available with 2117/2127/2137S

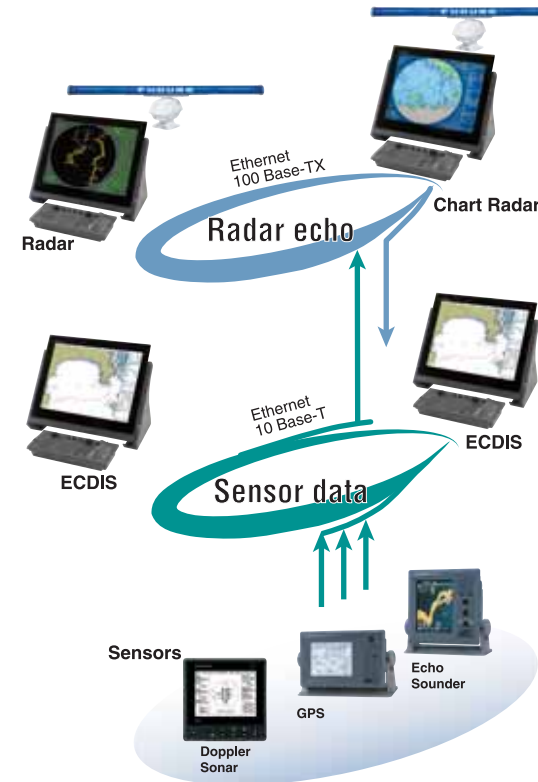


- ▶ Route planning and route monitoring facilities
- ▶ Wide variety of warning facilities contribute to safer and more efficient navigation
- ▶ Grounding warnings, safe depth contours
- ▶ Chart database loaded and updated using CD-ROMs
- ▶ Sharing of route with ECDIS
- ▶ Meets DNV NAUT-AW Requirements
- ▶ Utilizes advanced signal processing technique to achieve outstanding detection in rough seas
- ▶ Target data from ARPA (TT) radar and AIS transponder to aid in collision avoidance
- ▶ Up to 100 ARPA (TT) targets can be tracked and displayed
- ▶ Up to 1500 AIS targets can be displayed
- ▶ High-resolution LCD provides crisp radar images
- ▶ Compatible with IHO S-57 Edition 3.0/3.1
- ▶ Integration into total navigation network INS VOYAGER
- ▶ Black Box system configuration allows use of FURUNO or commercial monitors

CHART RADAR

This series of radar complies with the following IMO and IEC regulations:

• IMO A.694(17)	• IEC 60872-1 ed 1.0 ARPA
• IMO A.813(19)	• IEC 60872-2 ed 1.0 ATA
• IMO A.820(19)	• IEC 61993-2 ed 1.0 AIS
• IMO A.823(19)	• IEC 60945 ed 4.0 General requirements
• IMO MSC.64(67) Annex 4	• IEC 61162-1 ed 3.0 Digital interface
• IMO MSC 191(79)	• IEC 61162-2 ed 1 Digital interface
• IMO MSC 192(79)	• IEC 62388 ed 1.0 Shipborne radar
• ITU-R M.1177-3	• IEC 62288 ed 1.0 Presentation of navigation-related information
• ITU-R M.683-3	
• IEC 60936-1 ed 1.1 Shipborne radar	
• IEC 60936-2 ed 1.0 HSC radar	
• IEC 60936-3 ed 1.0 Chart radar	



Crucial navigation data obtained from each of the onboard sensors can be displayed onto the Radar, ECDIS as well as Chart Radar displays, utilizing Ethernet-based networking technology by which high-speed and stable data flow is possible. This networking capability allows operators to choose either a single station system or a total Integrated Navigation System (INS).

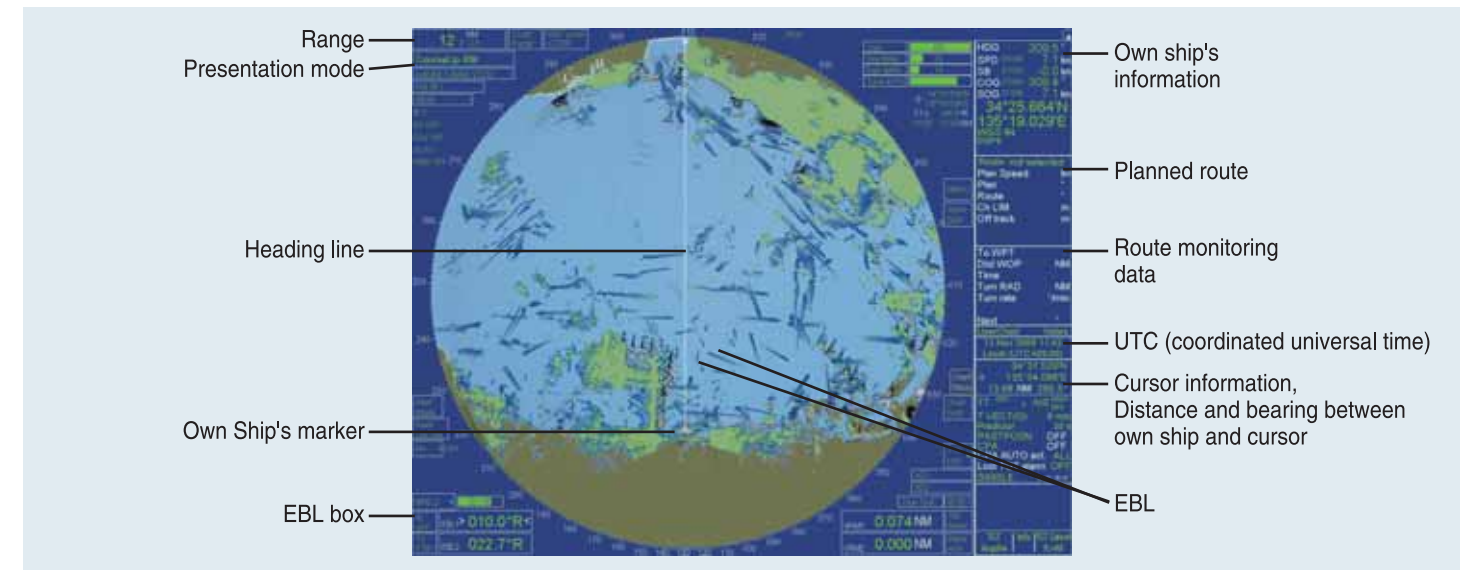


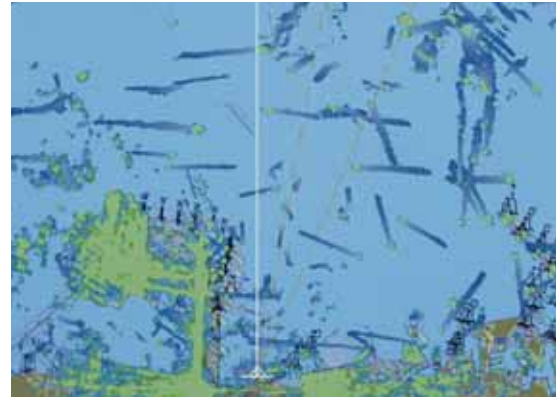
Chart Radar is Radar that can display electronic charts (vector charts) together with the radar echo. Chart Radar is required by DNV for notation of NAUT-AW and NAUT-OSV. The Chart Radar FCR-21x7/28x7 series features total integration of ARPA Radar and ENC Display System into a single unit. While retaining the full functions of FURUNO ARPA Radar FAR-21x7/28x7 series, the FCR-21x7/28x7 simultaneously displays radar images, with an ENC. The FCR-21x7/28x7 delivers a variety of display modes including Radar, ECDIS* and Chart Radar. *currently the FCR-21x7/28x7 can not substitute ECDIS.

The Chart Radar is a new core component of the FURUNO INS VOYAGER. When integrated into INS, route-monitoring can be performed both on ECDIS and Chart Radar screens. A chart is overlaid on the radar image, providing data observation stress-free.

Superb target detection in all climatic conditions is achieved by FURUNO's sophisticated signal processing techniques. With full-featured TT, other ships' movements are tracked and their CPA/TCPA are displayed. When the targets are coming close to own ship, audio and visual alarms are generated to notify the navigator. Also, two guard zones can be set to enhance monitoring of specific areas around the vessel. When any target, such as a ship and landmass enters into the guard zone, audio and visual alarms are activated to notify the navigator. These alarm functions are very useful tools for executing safe and efficient navigation.

The FCR-21x7/28x7 consists of an antenna unit, processor units, a display unit and a control unit. A high-resolution LCD (19" for FCR-21x7 series and 23" for FCR-28x7 series) presents clear radar images together with chart display.

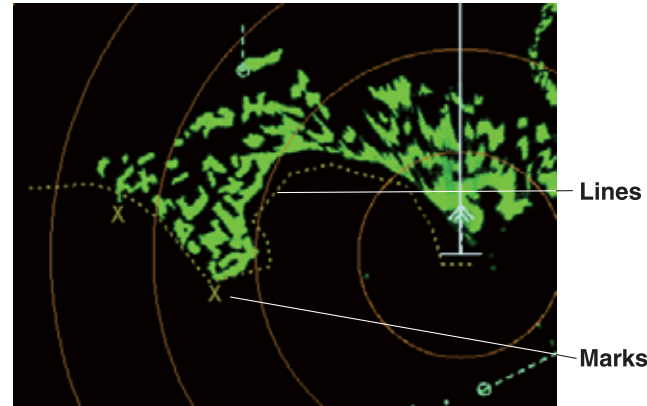
▶Target Trails



The target trails feature generates a monotone or gradual shading afterglow on radar targets on the display. The trails are useful for showing own ship movement and other ship tracks in any situation at sea. True* or Relative echo trail is available in Relative Motion. (only True echo trail is selectable in True Motion) Trails remain on the screen, when changing modes.

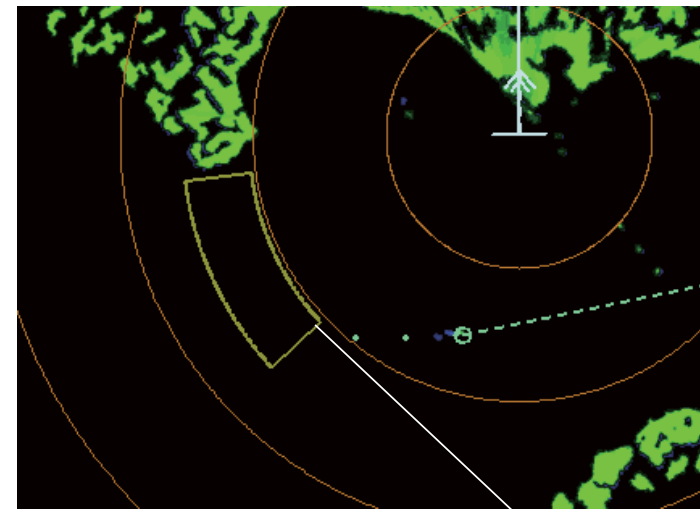
*Heading sensor required

▶User Chart



Operator can place points, lines, letter/number, symbols, areas and other indicators onto the radar display and the electronic chart. The radar display and electronic chart with those indicators can be used to highlight safety-related information such as position of buoys, light houses, wrecks and others. The areas set on these user charts can act as guard zones to notify of any adverse situation.

▶Guard Zones



Symbols for ARPA (TT)

Guard Zones

Automatic Acquisition Zone

Two automatic acquisition zones may be set in a sector form. They also act as suppression zones, avoiding unnecessary overloading to the processor and clutter by disabling automatic acquisition and tracking outside them. Targets in an automatic acquisition zone are shown with an inverse triangle. The operator can manually acquire important targets without restriction.

Guard Zones and Anchor Watch Zone

Guard Zones generate visual and audible alarms when targets enter the operator set zones. One of the Guard Zones may be used as an anchor watch to alert the operator when own ship or targets drift away from the set zone.

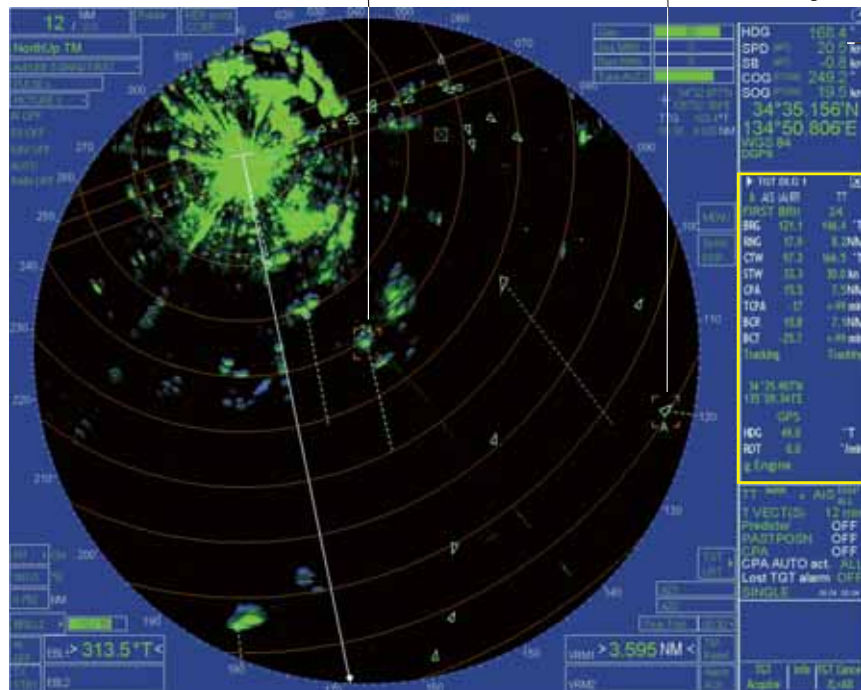
CPA Alarm

The target tracking symbol changes to a triangle when its predicted course (vector) violates the operator set CPA/TCPA. The operator can readily change the vector lengths to evaluate the target movement trend.

▶ARPA (TT)/AIS

Targets automatically acquired

AIS-equipped target selected for data reading



Own ship data cell

DATA Cell 1
Route Plan Information

DATA Cell
ARPA&AIS Information

DATA Cell 2
Course Information

DATA Cell 3
Cursor data

Data Display

When any mark on the electronic chart is selected, related information about the object such as a buoy, lighthouse, sunken vessel, etc., will be shown in the data cell. Additionally, other navigational information including both own ship's navigational, as well as other ship's information, from ARPA (TT) can also be presented.

HOG	308.5°
SPD	7.1 km
SB	-0.0 km
COG	308.4°
SOG	7.1 km
34°25'664"N	
135°19'029"E	
WGS 84	
OGPS	
Route: not selected	
Plan Speed	kn
Plan	
Route	
Ch LIM	m
Off track	m
To WPT	
Dist WOP	NM
Time	
Turn RAD	NM
Turn rate	°/min
Next	
UserChart Notes	
13 Nov 2009 11:50	
Local (UTC+09:00)	
34°28'5811"N	
135°23'501"E	
4.873 NM 48.1°	
TT AUTO = AIS ALL	
MAN	ALL
T VECT(G)	8 min
Predictor	30 s
PASTPOS(N)	10 min
CPA	OFF
CPA AUTO act.	ALL
Low TGT alarm	OFF
SINGLE	ON/OFF

▶ECDIS Mode



Status bar
• Presentation mode
• Operation Mode
• Chart Scale
• Data displayed

Own ship's information
• Heading
• Speed
• Course over ground (COG)
• Speed over ground (SOG)
• Own ship's position

AIS information
• Name • Course
• IMO MMSI number • CPA
• TCPA • Position
• Speed • range, etc.

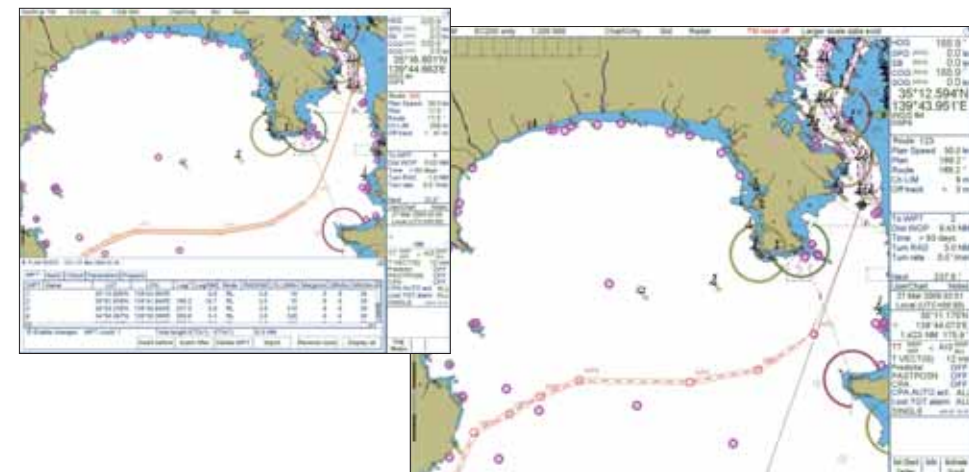
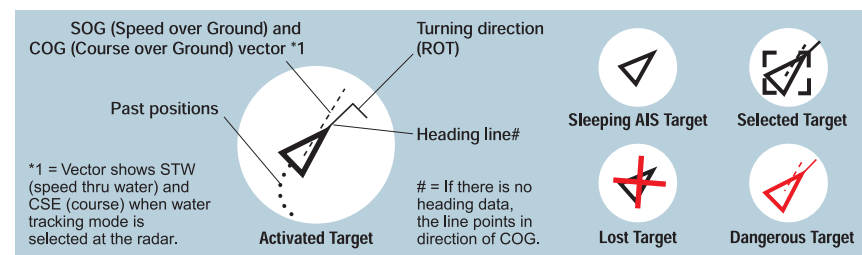
Heading
Own ship's marker
AIS symbol
Planned route
WTP (Waypoint)
Buoy

Target Association (Fusion)

An AIS-equipped ship may be displayed by both AIS and ARPA (TT) symbols. This is because the AIS position is measured by a GPS navigator in L/L while the ARPA (TT) target blip and data are measured by range and bearing from own ship. When the symbols are within an operator-set criteria, the ARPA (TT) symbol is merged with the AIS symbol. The criteria is determined by the differences in range, bearing, course, speed, etc.

Symbols for AIS

AIS COG/SOG vector changes its length with speed. ROT mark is viewable at the Heading line vector tip when a target ship is equipped with a FURUNO satellite compass SC-50/110 or gyrocompass which can talk in ROT serial sentence.



Route planning

The operators can plan and determine the precise route with ease, while studying the chart data on the screen. A route can be altered in minute detail, and the changed route can be saved for later use.

Antenna Radiators

1. Type Slotted waveguide array
2. Beamwidth and sidelobe attenuation

Radiator Type	X-Band		S-Band	
	XN-20AF	XN-24AF	SN-30AF	SN-36AF
Length	6.5 ft	8 ft	10 ft	12 ft
Beamwidth(H)	1.23°	0.95°	2.3°	1.8°
Beamwidth(W)	20°	20°	25°	25°
Sidelobe (within ± 10°)	-28 dB	-28 dB	-24 dB	-24 dB
Sidelobe (outside ± 10°)	-32 dB	-32 dB	-30 dB	-30 dB

S-band 10 ft radiator usable for an HSC

3. Rotation

X-Band	
Rotation	24 rpm
Gear Box	RSB-096/103
S-Band	
Rotation	21/26 rpm
Gear Box	RSB-098/099/104/105

RF Transceiver

1. Frequency
X-band: 9410 MHz ±30 MHz
S-band: 3050 MHz ±30 MHz
2. Output power

	FCR-2x17	FCR-2x27	FCR-2827W	FCR-2x37S	FCR-2837SW
Output Power	12 kW	25 kW	25 kW	30 kW	30 kW
Transceiver	RTR-078	RTR-079	RTR-081	RTR-080	RTR-082

3. Pulselength/PRR

Range scale (nm)	Pulselength (µs)	PRR (Hz)
0.125, 0.25	0.07	3000
0.5	0.07, 0.15	3000
0.75, 1.5	0.07, 0.15, 0.3	3000, 1500
3	0.15, 0.3, 0.5, 0.7	3000, 1500, 1000
6	0.3, 0.5, 0.7, 1.2	1500, 1000, 600
12, 24	0.5, 0.7, 1.2	1000, 600
48, 96	1.2	600

4. I.F.
Bandwidth 60 MHz, Linear
Short pulse: 40 MHz
Middle pulse: 10 MHz Long pulse: 3 MHz

Display Unit

23" color LCD (UXGA 1600 x 1200 pixels)
470 (H) x 353 (V) mm, Effective display diameter: 340 mm
Echo Color: Yellow, green or white in 32 levels
19" color LCD (SXGA 1280 x 1024 pixels)
400 (H) x 320 (V) mm, Effective display diameter: 308 mm
Echo Color: Yellow, green or white in 32 levels

General Characteristics

1. Display modes
Radar, ECDIS, Chart Radar
2. Range scales and ring intervals (nm)
Range*: .125, .25, .5, .75, 1.5, 3, 6, 12, 24, 48, 96
Ring: .025, .05, .1, .25, .25, .5, 1, 2, 4, 8, 16
* Range scales in the Chart Radar mode are selectable from .125 until 12 nm.
3. Minimum range
25 m in heading direction on 0.25 nm range scale
4. Range discrimination
25 m at 1.5 nm in heading direction on 1.5 nm range scale
5. Range ring accuracy
+1 %
6. Presentation modes**
Head-Up, Course-Up, North-Up, North-Up TM, Head-Up TB, Course-Up TM
** Only North-Up TM is available for the Chart Radar mode.
7. Heading information
Furuno GPS compass SC-50/110 is a recommendable heading sensor as a backup of a gyrocompass. Confirm with your Administrations.
8. Parallel index lines
1, 2, 3 or 6 lines (menu selectable)

Usable Charts

IHO/S-57 ed3 vector chart (IHO S-63 ENC data protection scheme), ARCS raster chart, C-MAP CM93 ed3, C-MAP CM-ENC

Automatic Plotting

1. Acquisition
100 targets (e.g. manually 50, automatically 50)
2. Tracking
Automatic tracking of all acquired targets in 0.1 to 32 nm
3. Guard zone (Target Acquisition Area)
Two guard zone, one of them 0.5 nm depth
4. Trial maneuver
Dynamic or static, with selected delay time.

AIS FUNCTIONS (Data input from AIS is required)

1. Symbols
Sleeping, Activated, Dangerous, Selected, Lost targets
2. Number of targets
1500 targets max.
3. Data indication
Basic and expanded data

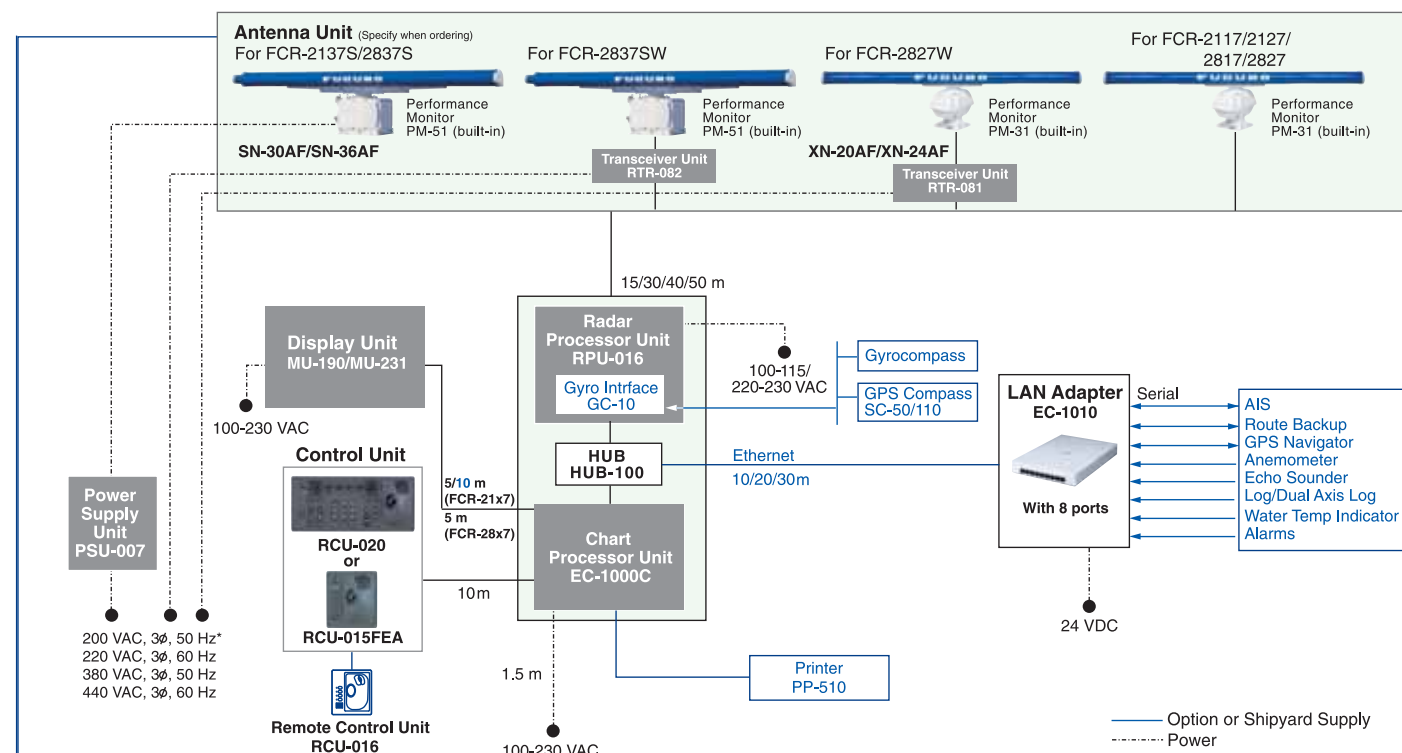
POWER SUPPLY (specify when ordering)

1. Radar Processor Unit
100-115/220-230 VAC, 1ø, 50/60 Hz
2. Chart Processor Unit
100-230 VAC, 1ø, 50/60 Hz
3. Display Unit
100-230 VAC, 1ø, 50/60 Hz
4. LAN Adaptor
24 VDC
5. Antenna Unit*
FCR-2137S/2837S/2837SW:
RSB-098/104 200 VAC, 3ø, 50 Hz; 220 VAC, 3ø, 60 Hz
RSB-099/105 380 VAC, 3ø, 50 Hz; 440 VAC, 3ø, 60 Hz
RSB-100 220 VAC, 3ø, 50 Hz (for HSC)
RSB-101 220 VAC, 3ø, 60 Hz (for HSC)
RSB-102 440 VAC, 3ø, 60 Hz (for HSC)
* Power supply for X-band radar is provided via a Radar Processor.

EQUIPMENT LIST

- | | | |
|---|-----------------------------|--------------------------|
| Standard | | |
| 1. Display Unit | MU-190 (FCR-21x7 series) | MU-231 (FCR-28x7 series) |
| 2. Radar Processor Unit | RPU-016 | |
| 3. Chart Processor Unit | EC-1000C | |
| 4. Control Unit with 10 m cable | RCU-020 | RCU-015FEA |
| Full-keyboard Control Unit | | (Specify when ordering) |
| Trackball Control Unit | | |
| 5. Antenna Unit with built-in performance monitor | 15/30/40/50 m | |
| 6. Antenna cable RW-9600 | (Specify when ordering) | |
| 7. HUB | HUB-100 | |
| 8. Transceiver Unit (FCR-2827W/FCR-2837SW only) | | |
| 9. Power Supply Unit PSU-007 (FCR-2137S/2837S only) | | |
| 10. Standard Spare Parts and Installation Materials | | |
| Option | | |
| 1. Remote Control Unit | RCU-016 | |
| 2. Gyro Interface | GC-10 | |
| 3. B-Adapter for equipment with analog interface | RU-1803/3305/5466/5693/6522 | |
| 4. Transformer | RJB-001 | |
| 5. Junction Box | FP03-09840 | |
| 6. Antenna Cable | FP03-09820 / 09830 | |
| 7. Hand Grip | HUB-100 | |
| 8. Bracket | EC-1010 | |
| 9. Switching Hub | 10/20/30 m | |
| 10. LAN Adapter | | |
| 11. LAN Cable | | |
| 12. Flash Mount Kit for Control Unit | | |
| 13. Connection Stand | | |

Single



Multi

