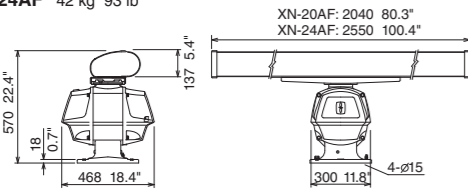


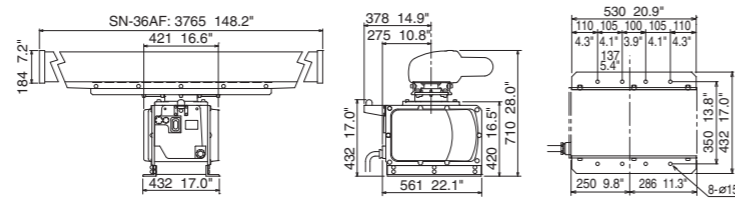
Antenna Unit for FCR-2119/2129/2819/2829/2829W

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



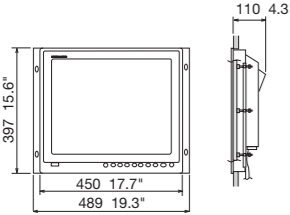
Antenna Unit for FCR-2139S/2839S/2839SW

SN-36AF 133 kg 293.2 lb

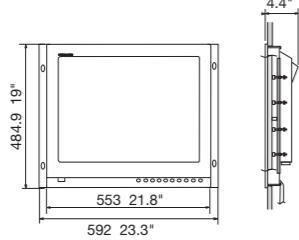


Monitor Unit

MU-190 8.8 kg 19.4 lb

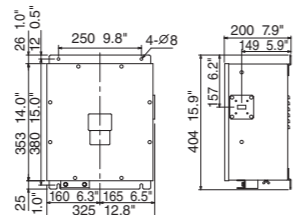


MU-231 12.8 kg 28.2 lb



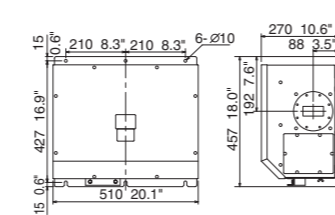
Transceiver Unit for FCR-2829W

RTR-081 8.0 kg 17.6 lb



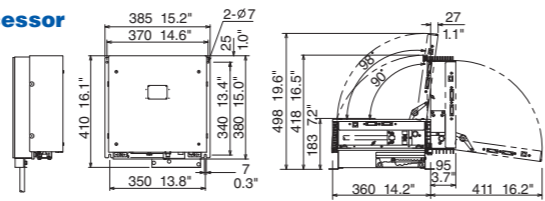
Transceiver Unit for FCR-2839SW

RTR-082 17.0 kg 37.5 lb



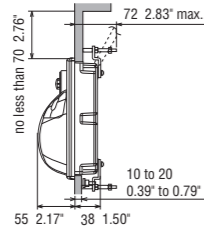
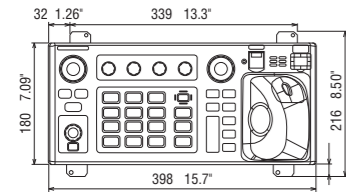
Radar Processor Unit

RPU-013 10 kg 22 lb



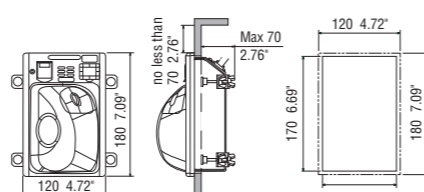
Control Unit

RCU-025 3.1 kg 6.84 lb



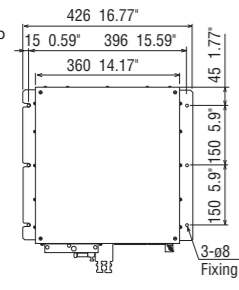
Trackball Control Unit

RCU-026 1.5 kg 3.31 lb



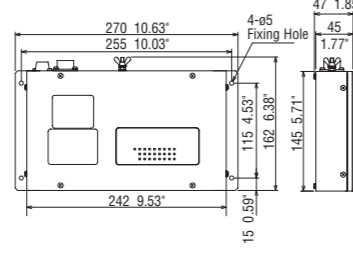
Processor Unit

EC-3000 14 kg 30.9 lb



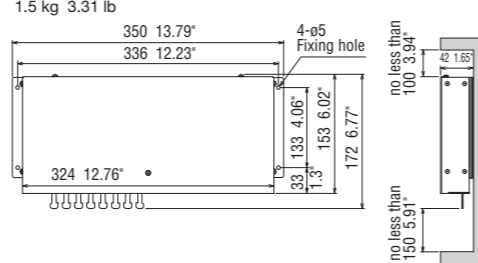
Switching Hub

HUB-100 1.5 kg 3.31 lb



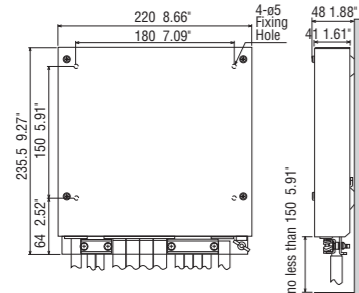
Intelligent Hub

HUB-3000 1.5 kg 3.31 lb

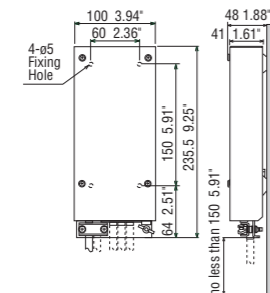


Sensor Adapter

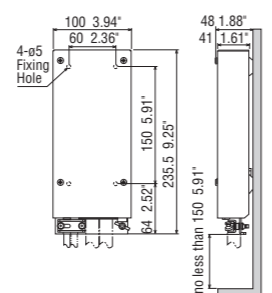
Serial : MC-3000S 1.5 kg 3.3 lb



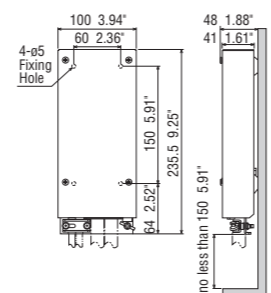
Analog : MC-3010A 0.8 kg 1.8 lb



Digital In : MC-3020D 0.8 kg 1.76 lb



Digital Out : MC-3030D 0.8 kg 1.76 lb



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FURUNO

CHART RADAR

Models: FCR-21x9 (with 19" LCD) / FCR-28x9 (with 23.1" LCD)



with an optional pedestal

FURUNO ELECTRIC CO., LTD.
Nishinomiya, Hyogo, Japan
www.furuno.com

FURUNO U.S.A., INC.
Camas, Washington, U.S.A.
www.furunousa.com

FURUNO (UK) LIMITED
Havant, Hampshire, U.K.
www.furuno.co.uk

FURUNO FRANCE S.A.S.
Bordeaux-Mérignac, France
www.furuno.fr

FURUNO ESPAÑA S.A.
Madrid, Spain
www.furuno.es

FURUNO DANMARK A/S
Hvidovre, Denmark
www.furuno.dk

FURUNO NORGE A/S
Ålesund, Norway
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FURUNO SVERIGE AB
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FURUNO FINLAND OY
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FURUNO HELLAS S.A.
Piraeus, Greece
www.furuno.gr

RICO (PTE) LTD
Singapore
www.rico.com.sg

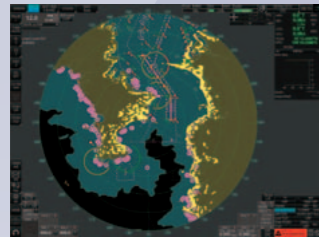
12022SK Printed in Japan
Catalogue No. R-202

www.furuno.com

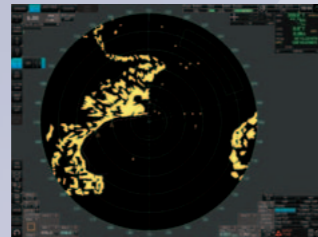
FURUNO integrates advanced signal processing technology with a user-friendly interface, providing reliable situation awareness, and navigation safety

► Multifunction display capability, featuring Chart Radar, ECDIS, conning information display and Alert Management System*

*Multifunction display capability is to be implemented as software update after the product release in autumn 2012. (Option)



Radar (Chart ON)



Radar (Chart OFF)



ECDIS



Conning Information Display

► New user interface delivers straightforward operation

► Instantaneous redraw, scrolling and zoom in/out delivered by FURUNO's advanced drawing engine, making redraw latency a thing of the past

► Complies with the following IMO and IEC regulations:

- IMO Resolution A.278(VIII) • IMO Resolution A.694(17)
- IMO Resolution A.817(19) • IMO Resolution A.820(19)
- IMO Resolution A.823(19) • IMO Resolution MSC.191(79)
- IMO Resolution MSC.192(79) • IMO Resolution MSC.232(82)
- IEC60945 Ed. 4.0 • IEC61162-1 Ed. 4.0 • IEC61162-2 Ed. 1.0
- IEC61174 Ed. 3.0 • IEC61993-2 Ed. 1.0 • IEC62288 Ed. 1.0
- IEC62388 Ed. 1.0

► Interface with Jeppesen Dynamic Licensing service

► High-resolution LCD presents clear radar/chart images



CHART RADAR

► Ease of installation and maintenance thanks to simplified cabling in the sensor-to-Chart Radar/ECDIS interface delivered by common sensor adapter

Sensor Adapter acts as central medium to gather all the sensor data and collectively feed it to all FCR-2xx9 Chart Radar and FMD-3200/3300 ECDIS in the system. Since sensor adapter can be extended to cover all the sensors within the system, individual cabling in the sensor-to-Chart Radar/ECDIS interface can be greatly reduced.

Navigation sensors can be directly interfaced with the processor's 8 serial I/O ports.

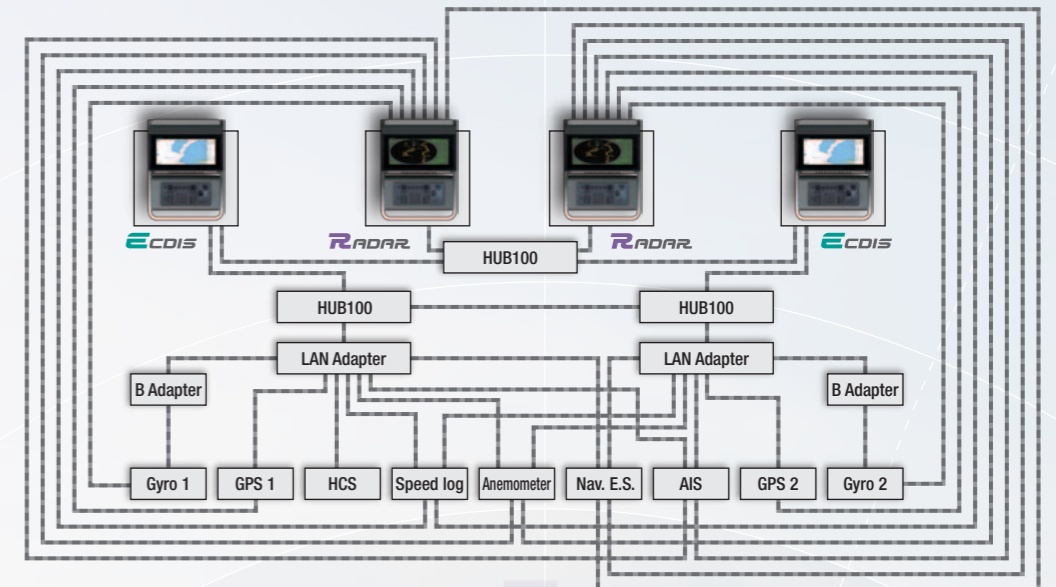
Sensor adapters are required under the following conditions:

- the sensor data is to be shared amongst multiple networked Chart Radar and ECDIS systems,
- the number of sensors interfaced is more than the number of the ports the processor has (8 serial I/O ports, 1 digital IN and 6 digital OUT), and/or
- the networked sensors include analog sensors.

In order to integrate onboard sensors into the navigation network, the sensor adapter may be interfaced with the switching hub HUB-100 from which distribution of the sensor data throughout the network is possible. Alternatively, multiple sensor adapters may be interfaced via Ethernet to integrate onboard sensors for use in the shipboard network.

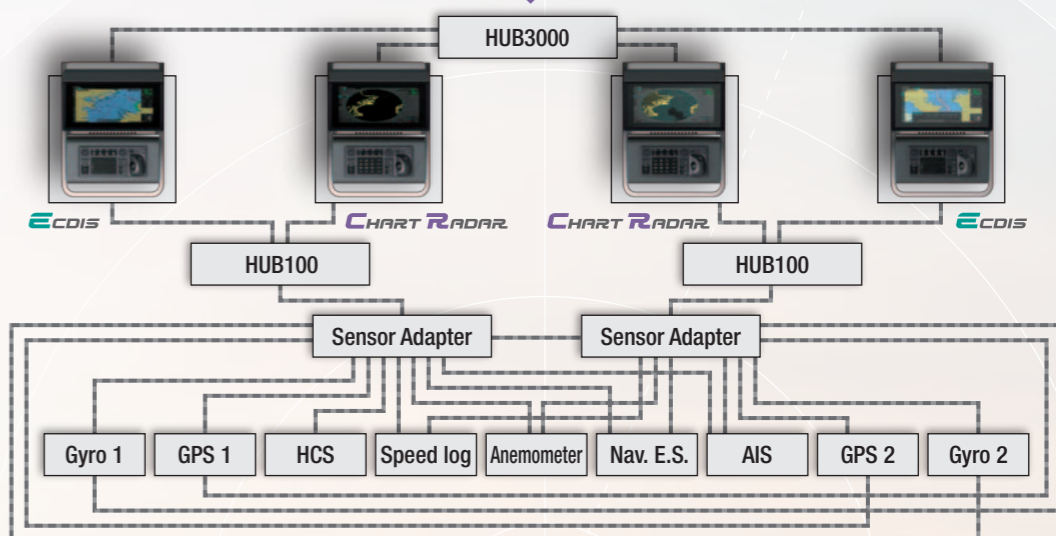
System diagram for the current Radar

Model:
FAR-2xx7



System diagram for the new Chart Radar

Model:
FCR-2xx9



FURUNO's new user interface delivers straightforward operation

Unique & smart operation tool – “Status bar” and “InstantAccess bar”

The user interface of the Chart Radar centers on carefully organized operational tools: Status bar and InstantAccess bar. These operational tools deliver straightforward, task-based operation by which the operator can quickly perform a certain task needed without having to go deeper into an intricate menu tree.

Status bar

Status bar contains information about the operating status, i.e., MFD operating mode, main tasks assigned to each MFD operating mode.

InstantAccess bar

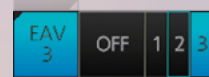
InstantAccess bar contains all the tasks (functions/actions) corresponding to the operation mode currently selected so that quick access to necessary functions/actions can be made.

Toggle button



A toggle button alternately selects one of two functions assigned to the button. The background color of a toggle button is light blue when the button's function is enabled.

Drop-down menu

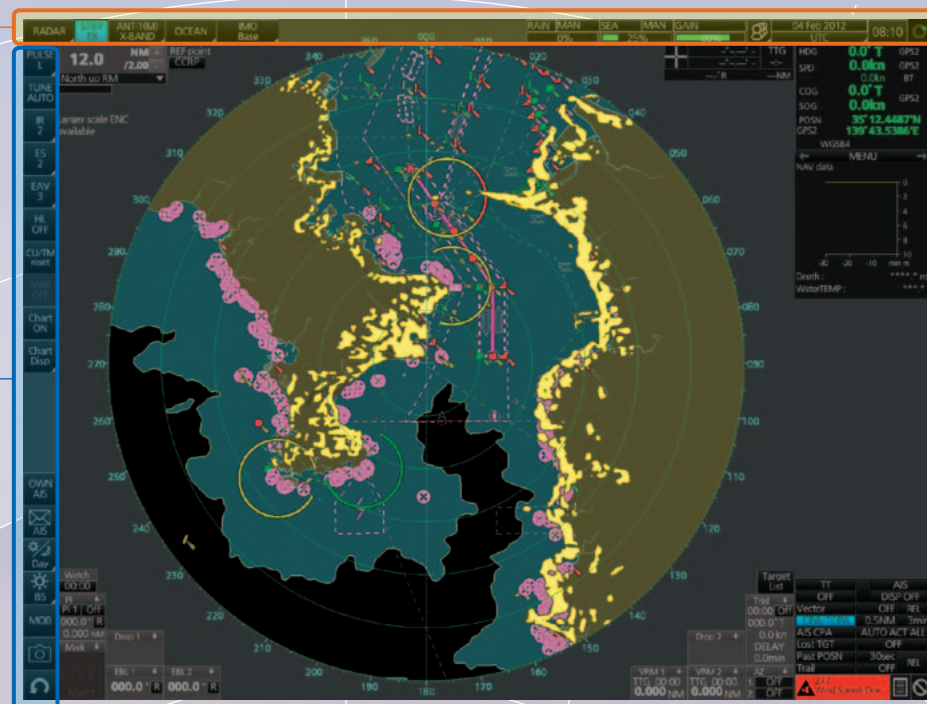


on buttons in the Status bar and InstantAccess bar indicate that there are hidden options of actions/tasks to be performed in the sub-layer, which can be initiated by left-clicking the buttons. This way, the operator can quickly gain access to the related tasks.

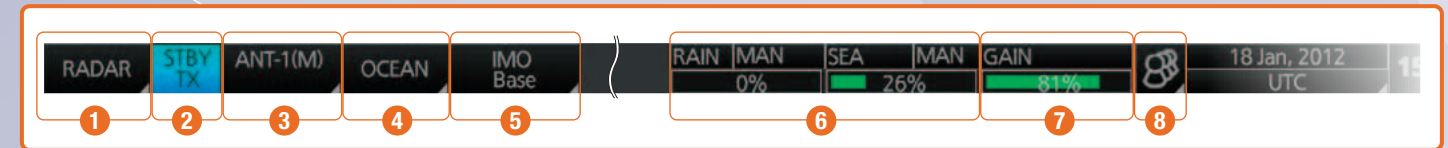
Slider bar



Rain/Sea clutter and gain are set with the slider bars. Slider bars can be controlled by the use of trackball controller.



Status bar



1 MFD operating mode selector



2 Stand-by and transmit

3 Antenna selector

4 Preset picture selector



The FCR-2xx9 offers several picture preset options for specific navigating requirements:

- OCEAN (Optimum setting for long range detection using a range scale of 6 nm or larger)
 - CANAL (Optimum setting for operating in a canal)
 - BERTHING (Optimum setting for berthing)
 - CONGESTION (Optimum setting for short range navigation using a range scale of 1.5 nm or less)
 - ROUGH SEA (Optimum setting for operation in rough seas)
 - HARD RAIN (Optimum setting for rough weather or heavy rain)
- Also, 2 user-programmable presets are provided (labeled CUSTOM1/2)

5 IMO chart database selector (base, standard or all)

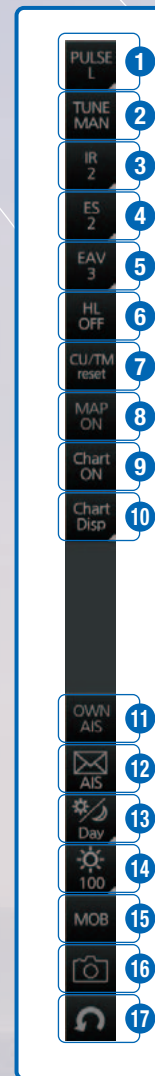
6 Rain/Sea clutter reducer

7 Gain adjuster

8 User profile management

The FCR-2xx9 can store 10 sets of custom settings for some items i.e., display brilliance, color presentation, etc. User profile function allows individual users to quickly set the equipment according to their preferences.

InstantAccess bar



1 Click to select the radar pulse length

2 Click to tune the radar receiver manually

3 Click to activate/deactivate and choose the level (1/2/3) of the interference rejecter

4 Click to activate/deactivate and choose the level (1/2/3) of the echo stretch

5 Click to activate/deactivate and choose the level (1/2/3) of the echo averaging

6 Click to erase everything but radar echoes temporarily

7 Click to reset the ship's position in Course-Up and True Motion modes

8 Click to show/hide the radar map

9 Click to show/hide the chart

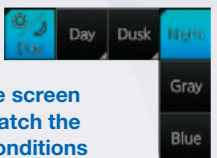
10 Click to configure presentation settings

- Control of what objects and text to show on the chart.
- Temporarily hides the chart symbols (depth contours, navigation buoys, etc.) and shows only the coast line.
- Temporarily puts the chart symbols on the top layer

11 Click to set the AIS information (navigation status, ETA, destination, draught, etc.)

12 Click to open the AIS message menu window from which the operators can handle AIS messages, i.e., sending, viewing and deleting messages

13 Click to select a color palette (color and brilliance set of the screen presentation) to match the ambient lighting conditions



14 Click to summon display brilliance level adjustment window where the brilliance level can be adjusted either manually (by gauge) or automatically (by clicking the automatic brilliance adjustment button, next to the brilliance gauge). (for FURUNO monitor)

15 Click to enter Man Overboard mark on the chart

16 Click to take a screenshot

17 Click to undo the past actions

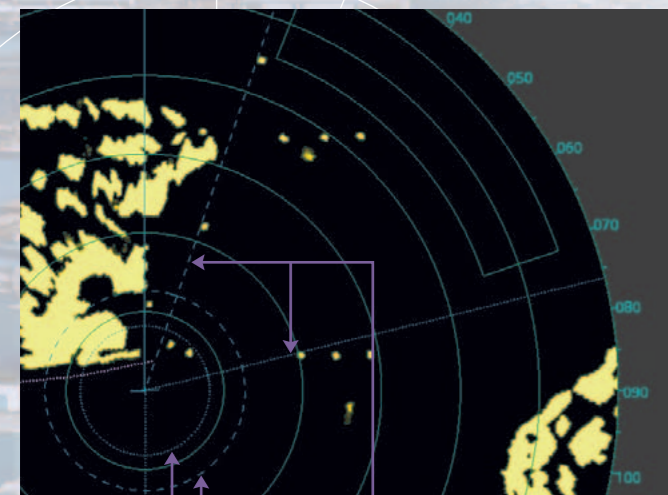
Stress-free operation with the well-designed control unit



InstantAccess Knob

EBL/VRM

EBL/VRM can be set just by pressing the buttons and rotating the encoder.



PC-liked operation

All operations can be controlled with the trackball.

- 1 trackball: to move the cursor and select an object
- 2 left-click: to perform/confirm the action related the selected object
- 3 right-click: to display context menu while a cursor is on the display area, and to cancel action done on the selected object
- 4 scrollwheel: to select menu items

Contextual menu

The context menu that containing all the available actions related to the selected icon or area, hence providing quick access to tasks required.



InstantAccess Knob

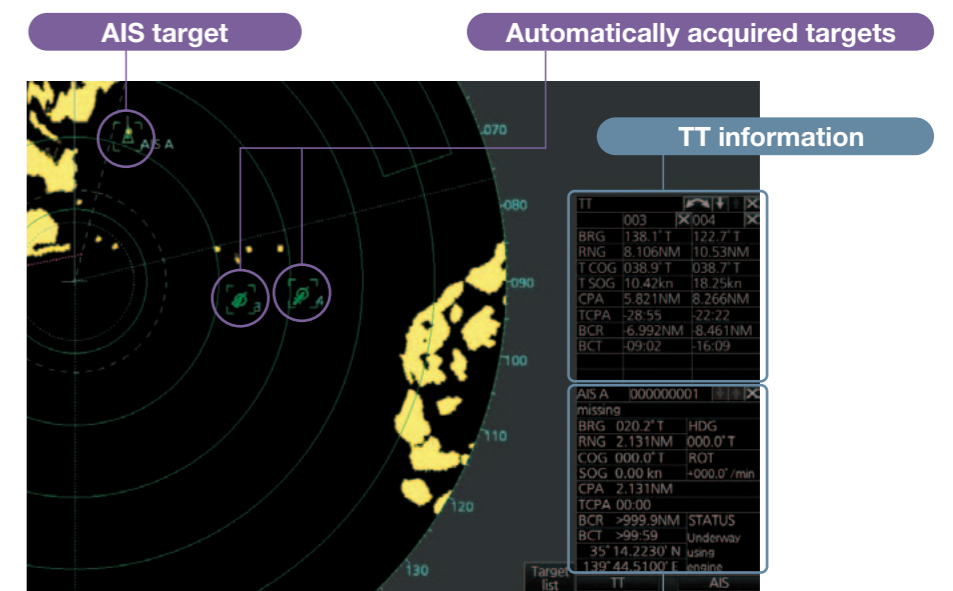
Rotating and pressing InstantAccess Knob leads you easily to the items in InstantAccess bar.



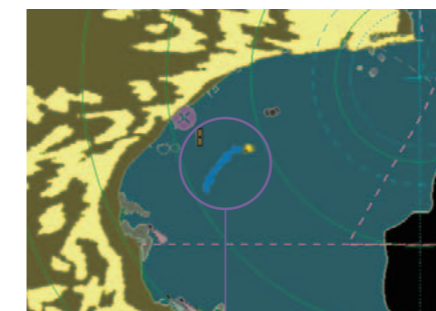
Radar Mode

TT (ARPA)/AIS

The chart radar can track the movement of up to 100 radar targets and display up to 1,000 AIS targets.

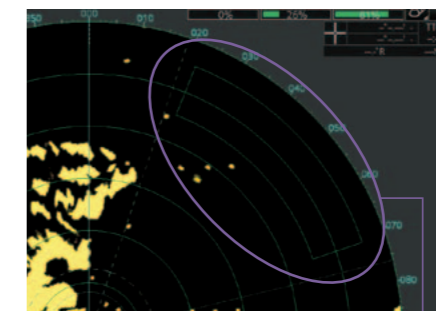


AIS information



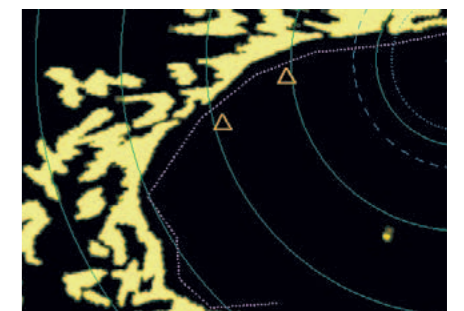
Target trails

The target trails can be displayed in the form of synthetic afterglow. Trail time and the trail plotting interval can be selected. The trails are useful for showing own ship movement and other ship tracks.



Automatic acquisition zone

User can set an automatic acquisition zone anywhere in the radar echo area. When a target enters an acquisition zone, the buzzer sounds and the alert message appears in the Alert box. Further, the AIS display is automatically turned on if it is off.



Radar map

A radar map is a layer consisting of marks and lines that can be produced and overlaid onto the radar display. It is intended for indicating safety-related areas and objects. 10 radar maps can be made and each map can have a total of 4,000 lines and symbols. The map data can be saved to facilitate repeated use on a routine navigation area. The user can create a radar map on-real time while using the radar for navigation or at leisure time at anchor or while the radar is not being used.

ECDIS Mode

ECDIS mode can be selected from the MFD operating mode selector at the Status bar.

In ECDIS mode, the operators can generate and edit route plans. Also, ship's behavior can be monitored in relations to the planned route. The detailed parameters set for each waypoint within the route can be viewed in the route information window.



Route Planning



Route Monitoring

SPECIFICATIONS

GENERAL

Minimum range	22 m
Range discrimination	26 m
Bearing accuracy	±1°
Presentation modes	Head-up, Head-up TB, Course-up, North-up, True Motion (sea or ground stabilization in True Motion)

ANTENNA UNIT

Radiator Type	Slotted waveguide array
Beamwidth and Sidelobe	

Radiator Type	XN-20AF	XN-24AF	SN-36AF
Length	6.5 ft	8 ft	12 ft
Beamwidth (H)	1.23°	0.95°	1.8°
Beamwidth (W)	20°	20°	25°
Frequency	X band: 9410±30 MHz		S band: 3050±30 MHz
Sidelobe (within ±10°)	-28 dB	-28 dB	-24 dB
Sidelobe (outside ±10°)	-32 dB	-32 dB	-30 dB

RADAR PROCESSOR UNIT

Range Scales and Ring Intervals

Range scales (NM)	0.125	0.25	0.5	0.75	1	1.5	2	3	4	6
Ring intervals (NM)	0.025	0.05	0.1	0.25	0.25	0.25	0.5	0.5	1	1
Number of Rings	5	5	5	3	4	6	4	6	4	6

Range scales (NM)	8	12	16	24	32	48	72	96	120
Ring intervals (NM)	2	2	4	4	8	8	12	16	20
Number of Rings	4	6	4	6	4	6	6	6	6

1, 2, 4, 8, 16, 32, 72, 120 NM cannot be selected on IMO radar.

Pulselength, Pulse Repetition Rate (PRR) and Range scale	0.07	0.15	0.3	0.5	0.7	1.2
Pulselength (µs)	3000**	3000**	1500	1000	1000	600*
PRR (Hz approx.)	0.125/0.25/0.5/0.75/1/1.5/2	0.5/0.75/1/1.5/2/3/4	0.75/1/1.5/2/3/4/6/8	3/4/6/8/12/16/24	3/4/6/8/12/16/24	6/8/12/16/24/32/48/96/120
Range scale (NM)	0.125/0.25/0.5/0.75/1/1.5/2	0.5/0.75/1/1.5/2/3/4	0.75/1/1.5/2/3/4/6/8	3/4/6/8/12/16/24	3/4/6/8/12/16/24	6/8/12/16/24/32/48/96/120

*500 Hz on 96/120 NM range
**2200Hz on TT range = 32 NM

Target Tracking (TT)	
Acquisition	100 targets in 0.1-24(32) NM (Auto or Manual)
Auto tracking	All acquired targets
Tracking	5/10 points on all targets

PROCESSOR UNIT

Chart Materials	IMO/IHO S57 edition-3 ENC vectorized material (IHO S-63 ENC data protection scheme), C-MAP and CM-93/3 vectorized materials
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Data Presentation	
Own Ship	Own ship's mark and numeral position in lat/lon, speed and course
Target Data(TT: ARPA, AIS)	Range, bearing, speed, course, CPA/TCPA, BCR/BCT

Position Calculation	Navigation by result from external position sensor Dead reckoning with gyro and log data from gyro, log, and position sensors to be fed to mathematical filter to generate highly accurate position and speed
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Navigation Planning	Planning by rhumb line, great circle
Navigation Recording	Latest 12 hours of navigation data to be recorded
Route Monitoring	Off-track display, waypoint arrival alarm, shallow depth alarm
User Chart	User chart creation and display
Notes Data	Create and display notes data
MOB (Man Overboard)	Position, and other data at time of man overboard are recorded MOB mark is displayed on the screen

MONITOR UNIT

Monitor Unit	MU-190	MU-231
Display Type	19" color LCD	23.1" color LCD
Resolution	SXGA (1280x1024 pixels)	UXGA (1600x1200 pixels)

INTERFACE

DVI	3 ports, DVI-I Ver 1.1 (Video signal from DVI No. 1 and DVI No. 2 is identical)
LAN	3 ports, Ethernet 1000 Base-T (1port for Radar sensor only)
USB	4 ports, USB 2.0 type-A
COM	2 ports, RS-485 for brilliance control
Serial I/O	8 ports, IEC61162-1/2 (2 ports), IEC61162-1 (6 ports) Sentences: AAM, ABK, ABM, ACK, ALR, BBM, BWC, BWR, DBT, DPT, DTM, ETL, GBS, GGA, GLL, GNS, HDT, MTW, MWD, MWV, OSD, RMB, RMC, ROT, RSD, RTE, THS, TTM, VBW, VDM, VDO, VHW, VTG, WPL, ZDA
Digital IN	1 port, ACK signal input
Contact Closure	6 ports: 1 port for system fail, 1 port for power fail, 2 ports for normal close, and 2 ports for normal open

SENSOR ADAPTER

Control and Serial Input	
LAN	1 port, Ethernet 100 Base-TX
Serial	8 ports, IEC 61162-1/2 (4 ports), IEC 61162-1 (4 ports)
Contact Closure	1 port for system fail, normal close or normal open
Analog Input	3 ports/per unit, -10 to +10 V/0 to 10 V, 4 to 20 mA selectable
Digital IN	8 ports/per unit, normal close or open, selectable
Digital Output	8 ports/per unit, normal close or open, selectable

POWER SUPPLY

Monitor unit	100-230 VAC; 1.0-0.6 A, 1 phase, 50/60 Hz
MU-231	100-230 VAC; 0.7-0.4 A, 1 phase, 50/60 Hz
Processor unit	
RPU-013	FCR-2119(-BB)/2819: 100-115 VAC: 2.6 A (3.0 A), 220-230 VAC: 1.6 A (1.7 A) FCR-2129(-BB)/2829: 100-115 VAC: 3.0 A (3.4 A), 220-230 VAC: 1.8 A (1.9 A) () : Value for 42 rpm antenna unit FCR-2829W: 100-115 VAC: 3.2 A, 220-230 VAC: 1.6 A FCR-2139S(-BB)/2839S/2839SW: 100-115 VAC: 3.0 A, 220-230 VAC: 1.5 A 100-115/220-230 VAC, 1 phase, 50/60 Hz

EC-3000	
Antenna unit	S-band: 200/220/380/440 VAC, 4 phase, 50/60 Hz
Model	Antenna voltage input (100 kn)
	200 VAC, ø3, 50 Hz, 220 VAC, ø3, 60 Hz
	380 VAC, ø3, 50 Hz, 440 VAC, ø3, 60 Hz
	220 VAC, ø3, 50 Hz, (HSC)
	220 VAC, ø3, 60 Hz, (HSC)
	440 VAC, ø3, 60 Hz, (HSC)
FCR-2139S(-BB)	3.0A 1.5A 3.5A 3.5A 3.5A
FCR-2839S	3.0A 1.5A - - -
Sensor Adapter	24 VDC, 1.4 A

ENVIRONMENTAL CONDITIONS

Ambient Temperature	Monitor/processor/transceiver/control/power supply unit	-15°C to +55°C
	Antenna unit	-25°C to +55°C (storage +70°C)
Relative Humidity		93 % or less at 40°C
Degree of protection	Monitor unit	IP22
	Processor unit	
	RPU-013	IPX0
	EC-3000	IP20 (IP22: option)
	Transceiver/power supply unit	IPX0
	Control unit	IP22
	Antenna unit	IPX6
Vibration		IEC 60945 Ed.4

EQUIPMENT LIST

Standard		
Monitor Unit	MU-190/MU-231	1unit
Radar Processor Unit	RPU-013	1unit
Processor Unit	EC-3000	1unit
Control Unit		1unit
Control Unit	RCU-025	1unit*
Trackball Control Unit	RCU-026	1unit*
Antenna Radiator	XN-20AF/XN-24AF/SN-36AF	1unit
Transceiver	RTR-078A/079A/080/081A/082	1unit
Gear Box	RSB-096/097/098/099/100/101/102/103/104/105	1unit
Power Supply Unit for S-band (FCR-2139S/2839S)	PSU-007	1unit
Cable between Radar Processor and Antenna Unit		1 pc
LAN Cable between Radar Processor Unit and Processor Unit		1 pc
Power Switch Cable between Radar Processor Unit and Processor Unit		1 pc
Standard Spare Parts and Installation Materials		1 set

Option		
Performance Monitor for X-band/S-band	PM-31/51	
Sensor Adapter	MC-3000S/3010A/3020D/3030D	
Gyro interface	GC-10	
Slave Radar Cable	RW-4864	
Switching Hub for sensor network	HUB-100	
Intelligent Hub for interswitch network	HUB-3000	
Installation Materials		

* Specify when ordering

INTERCONNECTION DIAGRAM

