FURUNO

CHART RADAR

Models:

FAR-3000 series

FURUNO FAR-3000 Chart Radar offers the re
and navigation safety by greatly enhanced t

Newly developed antennas with enhanced high durability and reliability

for S-band

for X-band

▶ **Newly designed antenna scanners to suppress the aerodynamic drag and prevent a spike in temperature**

▶ **Less maintenance required through use of the DC brushless motor**

▶ **Ethernet network link between antenna unit and below deck processor unit**

The analog signals are converted into the digital signals within the antenna unit and sent to the below deck processor unit via Ethernet network. This network technology eliminates loss of signal gain between antenna unit and processor unit that may be seen in conventional Radar system.

▶ **Optional LAN Signal Converter enables users to extend the cable between antenna unit and processor unit or to utilize the existing cables when retrofitting**

Solid State Radar model - NXT - specializes in target detection and maintainability

Compared to the traditional Magnetron Radar, the Solid State Radar NXT Series provide highly reliable target detection while requiring low power.

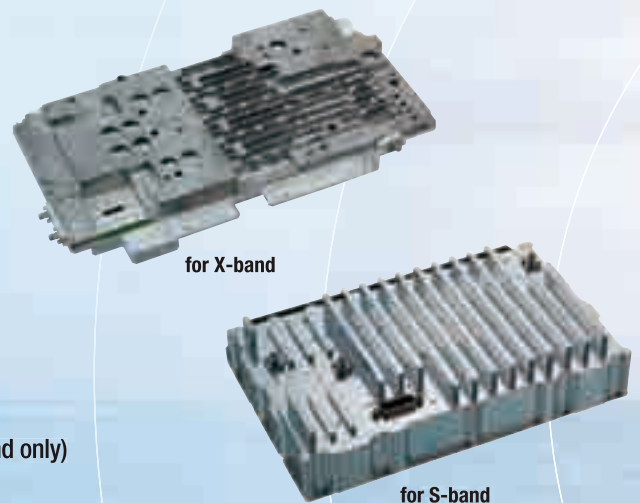Power Amplifier Module of the Solid State transceiver

for X-band

▶ **Clear images**

Furuno Solid State Radar technology generates clear echo images, which allows users to obtain a clear picture of the area around their vessel, including weaker echoes from small crafts.

▶ **Reducing the time and cost for maintenance**

・No need to replace the magnetron
・Removal of the consumable parts thanks to a fan-less antenna (S-band only)

for S-band

eliable situation awareness
target detection

▶ Automatic Clutter Elimination (ACE) function provides clear echoes

Users can quickly adjust the radar image with a single action. When Automatic Clutter Elimination (ACE) function is activated, the system automatically adjusts the clutter reduction filter and gain control according to the sea and weather conditions selected (Calm/Rough Sea/Hard Rain).

Our advanced echo averaging architecture is also incorporated into Automatic Clutter Elimination (ACE) function. Users can avoid complicated adjustment processes, resulting in clear echo images.

> Automatic Clutter Elimination (ACE) function suppresses the false echoes.
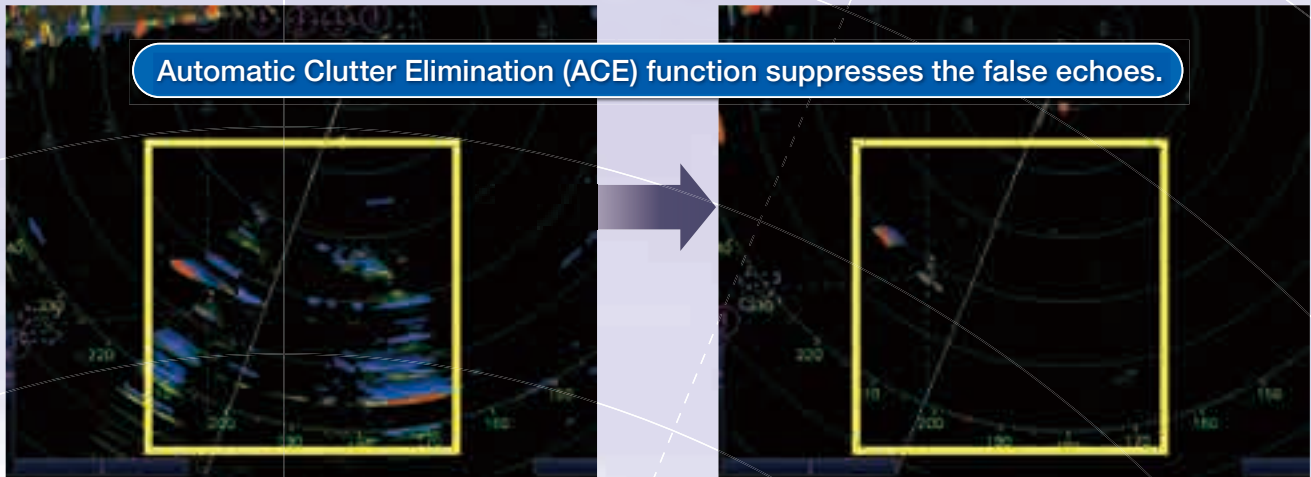
Automatic Clutter Elimination (ACE)
OFF

Automatic Clutter Elimination (ACE)
ON

▶ Improved Target Tracking (TT) function
- **Target acquisition takes only a few seconds**

a few seconds

- **Acquired target does not jump to adjacent target**
- **Reliable and stable tracking of high-speed and rapidly maneuvering vessels**

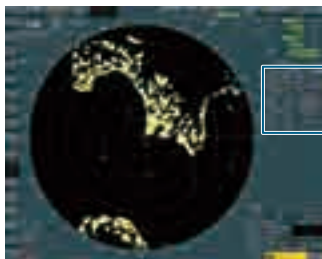## ▶ High performance Radar with Cat.1 and Cat.2 support

▶ Complies with the following regulations:

- **IEC 60945 Ed. 4.0**
- **IEC 61162-1 Ed. 5.0**
- **IEC 61162-2 Ed. 1.0**
- **IEC 61162-450 Ed. 1.0**
- **IEC 61174 Ed. 4.0**
- **IEC 62288 Ed. 2.0**
- **IEC 62388 Ed. 2.0**

Advanced technologies for safer and optimal navigation in all kinds of situations (option)

Wave Analyzer Software *
・Allows real-time monitoring and analysis of wave echoes
・Ensures safety at sea even at night

Ice Mode ** (X-band magnetron only)
・Find the best route through ice
・Obeserve ice conditions by Radar

*More details on the Wave Analyzer brochure
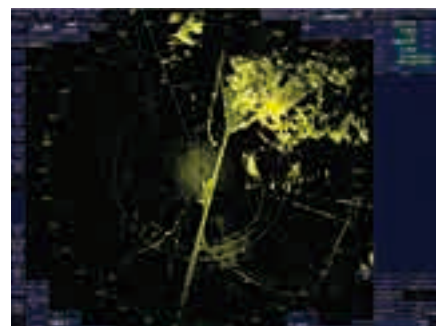
**Please contact your local distributor for more details

Multi Function Display (MFD) capability*

Furuno proposes workstations that combine flexibility and redundancy. Users may easily select ECDIS, Chart Radar, Conning display or Alert Management System at any multi-function display. Navigators will enjoy reduced workload and significant freedom to move about the bridge. All necessary information is available on a variety of displays and at locations that may be altered as required.

*MFD capability is to be implemented as software upgrade
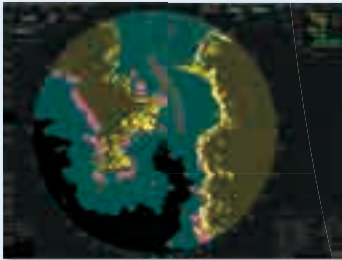
Radar (Chart ON)   **Radar (Chart OFF)**   **ECDIS**   **Conning Information Display**

Sensor Adapter

▶ Common sensor adaptor makes installation and maintenance easy

The Sensor Adapter acts as a central medium to gather all of the sensor data and collectively feed it to all FAR-3000 Chart Radar and FMD-3200/3300 ECDIS in the network. Since the sensor adapter can be extended to interface with all the sensors within the network, individual cable connections 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 new Chart Radar
Model: FAR-3000
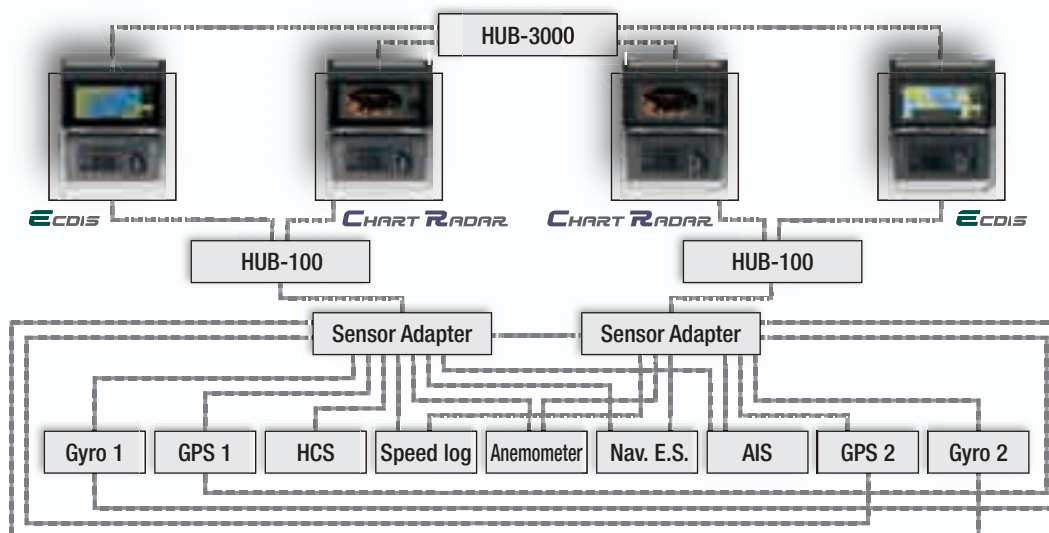
FURUNO's new user interface delivers straightforward operation

Unique & smart operation tool – "Status bar" and "InstantAccess bar™"

The user interface of the Radar utilizes carefully organized operational tools: the Status bar and the InstantAccess bar™. These operational tools deliver straightforward, task-based operation by which the operator can quickly perform tasks without having to navigate 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 or actions) corresponding to the operation mode currently selected so that quick access to necessary functions/actions can be made.

Stress-free operation with the well-designed control unit

Intuitive operation
All operations can be controlled with the trackball.

Contextual menu
The context menu contains all the available actions related to the selected icon or area, it provides quick access to tasks.

SPECIFICATIONS

PRODUCT NAME

MARINE RADAR

GENERAL

Range Scales and Ring Intervals

Range (NM)	0.125	0.25	0.5	0.75	1.5	3	6	12	24	48	96
RI (NM)	0.025	0.05	0.1	0.25	0.25	0.5	1	2	4	8	16
Number of rings	5	5	5	3	6	6	6	6	6	6	6

ANTENNA UNIT

Radiator Type   Slotted waveguide array

Beamwidth and Sidelobe

Radiator Type	XN12CF	XN20CF	XN24CF	SN36CF
Length	4 ft	6.5 ft	8 ft	12 ft
Frequency	X band 9410±30 MHz			S band: 3050±30 MHz
Beamwidth (H) (-3 dB)	1.9°	1.23°	0.95°	1.8°
Beamwidth (H) (-20 dB)	4.5°	2.9°	2.4°	4.5°
Beamwidth (V)	20°	20°	20°	25°
Sidelobe (within ±10°)	-24 dB	-28 dB	-28 dB	-24 dB
Sidelobe (outside ±10°)	-30 dB	-32 dB	-32 dB	-30 dB

TRANSCEIVER UNIT

Transceiver Unit	Magnetron				
Frequency	RTR-105	RTR-106	RTR-108	RTR-107	RTR-109
	X band: 9410±30 MHz			S band: 3050±30 MHz	
Output Power	12 kW	25 kW		30 kW	

Transceiver Unit	Solid State	
Frequency	RTR-123 (X band)	RTR-111 (S band)
	①P0N: 9403.75 MHz/Q0N: 9423.75 ±5MHz ②P0N: 9413.75 MHz/Q0N: 9433.75 ±5MHz	①P0N: 3043.75 MHz/Q0N: 3063.75±5 MHz ②P0N: 3053.75 MHz/Q0N: 3073.75±5 MHz
Output Power	600 W	250 W

Range scale, Pulse Repetition Rate and Pulselength

Magnetron radar: FAR-3210/3310/3220/3320/3320W
FAR-3230S/3330S/3330SW

PRR (Hz approx.)	Range scale (NM)										
	0.125	0.25	0.5	0.75	1.5	3	6	12	24	48	96
3000	S1										
3000			S2								
1500				M1							
1200					M2						
1000						M3					
600*								L			

*: 500 Hz on 96 NM range.

Solid state radar: FAR-3220-NXT/3230-NXT

PRR (Hz approx.)	Range scale (NM)										
	0.125	0.25	0.5	0.75	1.5	3	6	12	24	48	96
1500	S1										
1500			S2								
1200				M1							
1000					M2						
1000						M3					
600								L			

Solid state radar: FAR-3230S-SSD/3330S-SSD

PRR (Hz approx.)	Range scale (NM)										
	0.125	0.25	0.5	0.75	1.5	3	6	12	24	48	96
2400	S1										
2000			S2								
1500				M1							
1060					M2						
1000						M3					
600								L			

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
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 Target information from AIS (waypoint, ship's hull and status)
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 mathmatical filter to generate highly accurate position and speed
Navigation Planning	Planning by rhumb line, great circle
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

DISPLAY UNIT

Display Unit	MU-190	MU-231	MU-270W
Display Type	19" color LCD	23.1" color LCD	27" color wide LCD
Resolution	SXGA (1280x1024 pixels)	UXGA (1600x1200 pixels)	WUXGA (1920x1200 pixels)

INTERFACE

Processor Unit

DVI	2 ports, DVI-D (Video signal from DVI-1 and DVI-2 is identical) 1 port, DVI-I Ver. 1.1 (RGB for VDR)
LAN	2 ports, Ethernet 1000 Base-T (for Interswitch and Sensor Adapter) 1 port, 100 Base-TX (for Radar sensor)
USB	4 ports, USB 2.0 type-A
COM	2 ports, RS232C/RS-485 (for brilliance control)
Serial I/O	8 ports IEC61162-1/2 (2 ports), IEC61162-1 (6 ports)
Sentences	
Input	ABK, ACK, ACM, ALR, CUR, DBT, DPT, DTM, GGA, GLL, GNS, HBT, HDT, MTW, MWV, RMC, THS, VBW, VDM, VDO, VDR, VHW, VTG, ZDA
Output	ABM, ACK, ALC, ALF, ALR, ARC, BBM, EVE, HBT, OSD, RSD, TLB, TTD, TTM, VSD
Digital Input	1 port (for 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 nomal 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)
Analog Input	3 ports/per unit, -10 to +10 V/0 to 10 V, 4 to 20 mA selectable
Digital Input	8 ports/per unit, normal close or open, selectable
Digital Output	8 ports/per unit, normal close or open, selectable

POWER SUPPLY

Monitor unit

MU-270W	100-230 VAC; 0.7-0.4 A, 1 phase, 50/60Hz
MU-231	100-230 VAC; 1.0-0.6 A, 1 phase, 50/60Hz
MU-190	100-230 VAC; 0.7-0.4 A, 1 phase, 50/60Hz
Processor unit	100/230 VAC, 1 phase, 50/60 Hz

Power Supply Unit

FAR-3210/3310	100-230 VAC; 1.8-0.9 (2.5-1.2) A, 1Φ, 50/60 Hz
FAR-3220/3320/3320W	100-230 VAC; 2.0-1.0 (2.8-1.3) A, 1Φ, 50/60 Hz
FAR-3220-NXT/3320-NXT	100-230 VAC; 1.8-0.9 (2.5-1.2) A, 1Φ, 50/60 Hz
FAR-3230S/3330S/3330SW	100-230 VAC; 2.8-1.3 (5.1-2.3) A, 1Φ, 50/60 Hz
FAR-3230S-SSD/3330S-SSD	100-230 VAC; 2.3-1.1 (4.7-2.1) A, 1Φ, 50/60 Hz

( ) : 42 rpm

ENVIRONMENTAL CONDITIONS

Unit	Ambient Temperature	Relative Humidity	Degree of protection	Vibration
Antenna Unit	-25°C to +55°C (storage +70°C)		IP56	
Power Supply Unit		95% or more at 40°C	IP20	IEC 60945 Ed. 4
Processor Unit	-15°C to +55°C		IP20	
Control Unit			IP22	
Sensor Adapter			IP22	
Monitor Unit			IP22	

EQUIPMENT LIST

Standard

Display Unit	MU-190/231/270W	1 unit
Processor Unit	EC-3000	1 unit
Control Unit		1 unit
Radar Control Unit	RCU-025	1 unit (specify when ordering)
Trackball Control Unit	RCU-026	
Antenna Radiator	XN12CF/XN20CF/XN24CF/ SN36CF	1 unit
Transceiver	RTR-105/106/107/108/109/111/123	1 unit
Gear Box	RSB-128/129/130/131/133	1 unit
Performance Monitor	PM-32A/32B/52A/52B	1 unit
Power Supply Unit	PSU-014/015/016/018	1 unit
Cable between Power Supply Unit and Antenna Unit		1 pc
LAN Cable between Processor Unit and Power Supply Unit		1 pc
Standard Spare Parts and Installation Materials		1 set

Option

Sensor Adapter	MC-3000S/3010A/ 3020D/3030D
Sub Display Radar Cable	RW-00136
Deicer	OP03-226/227/231/232
Junction Box (for foremast mounting)	RJB-001
Composite Cable between Junction Box and Antenna/ Power Supply Unit (for foremast mounting)	RW-9600
LAN Signal Converter (for foremast mounting)	OP03-223
Switching Hub for sensor network	HUB-100
Intelligent Hub for interswitch network	HUB-3000
Wave Analyzer Software	WV-100/WV-100ST

INTERCONNECTION DIAGRAM

FAR-3210/3310/3220/3320/3220-NXT/3320-NXT

Radiator XN12CF (4 ft)
XN20CF (6.5 ft)
XN24CF (8 ft)

Gear Box RSB-128
(24/42 rpm)

Performance Monitor
PM-32A
PM-32B (-NXT)

Deicer Kit OP03-226

Transceiver
RTR-105 (12 kw)
RTR-106 (25 kw)
RTR-123 (600 W)

100-115/220-230 VAC
1ø, 50/60 Hz
for Deicer

FAR-3320W

Radiator XN20CF (6.5 ft)
XN24CF (8 ft)

Gear Box RSB-130
(24/42 rpm)

Performance Monitor
PM-32A

Deicer Kit OP03-226

100-115/220-230 VAC
1ø, 50/60 Hz
for Deicer

Transceiver Unit
RTR-108 (25 kW)

FAR-3230S/3330S

Radiator SN36CF (12 ft)

Gear Box RSB-129
(24/42 rpm)

Performance Monitor
PM-52A

Deicer Kit OP03-227

Transceiver
RTR-107 (30 kW)

100-115/220-230 VAC
1ø, 50/60 Hz
for Deicer

FAR-3330SW

Radiator SN36CF (12 ft)

Gear Box RSB-131
(24/42 rpm)

Performance Monitor
PM-52A

Deicer Kit OP03-227

100-115/220-230 VAC
1ø, 50/60 Hz
for Deicer

Transceiver Unit
RTR-109 (30 kW)

FAR-3230S-SSD/3330S-SSD

Radiator SN36CF (12 ft)

Gear Box RSB-133
(24/42 rpm)

Performance Monitor
PM-52B

Deicer Kit OP03-227

Transceiver
RTR-111 (250 W)

100-115/220-230 VAC
1ø, 50/60 Hz
for Deicer

Note:
1. Length of LAN cable is 50 m (max.)
2. Cable between Sensor Adapter components should be no longer than 6 m.

Power Supply Unit

100-230 VAC
1ø, 50/60 Hz

FAR-3210/3310/3220/3320/3320W/3220-NXT/3320-NXT: PSU-014
FAR-3230S/3330S/3330SW (24 rpm) : PSU-014
FAR-3230S/3330S/3330SW (42 rpm) : PSU-015
FAR-3230S-SSD/3330S-SSD (24 rpm): PSU-016
FAR-3230S-SSD/3330S-SSD (42 rpm): PSU-018

Control Unit RCU-025
or
Trackball Control Unit RCU-026

USB Keyboard USB Mouse

Processor Unit EC-3000

Wave Analyzer Software

Processor Unit EC-3000 for ECDIS and Radar*

* Up to 8 EC-3000 Processor Units can be interfaced through single HUB-3000.

Intelligent Hub HUB-3000 8 ports

100-230 VAC
1ø, 50/60 Hz

24 VDC

Sensor Adapter

Serial MC-3000S (8 ports)

Analog MC-3010A (3 ports)

Digital IN/OUT MC-3020D/3030D (8 ports each)

Navigation Sensors
Gyrocompass
AIS
GPS
NAVTEX
Wind Indicator
Echo Sounder
Speed Log
Water Temp. Sensor
etc.

Switching Hub HUB-100

100-230 VAC
1ø, 50/60 Hz

Monitor Unit

19" SXGA (MU-190)
23.1" UXGA (MU-231)
27" WUXGA (MU-270W)

DVI cable
WUXGA monitor: 2 m (max.)
MU-190: 5/10 m (max.)
MU-270W/231: 5 m (max.)

RS-485
MU-190: 10 m (max.)
MU-270W/231: 5 m (max.)
for Brill control

100-230 VAC 1ø, 50-60 Hz

100-115/220-230 VAC
1ø, 50-60 Hz

Navigation Sensors
System Fail
Power Fail
ACK IN

DVI-RGB Cable
VDR

—— Option or connectable equipment

Model	Output Power	Transceiver Unit	Gear Box	Radiator Length	Rotation	Power Supply Unit 24 rpm	Power Supply Unit 42 rpm	Display Unit
FAR-3210	X band 12 kW	RTR-105	RSB-128	4 ft (XN12CF) 6.5 ft (XN20CF) 8 ft (XN24CF)	24/42* rpm	PSU-014		19.0" SXGA (MU-190)
FAR-3310								27" WUXGA (MU-270W) or 23.1" UXGA (MU-231)
FAR-3220	X band 25 kW	RTR-106						19.0" SXGA (MU-190)
FAR-3320								27" WUXGA (MU-270W) or 23.1" UXGA (MU-231)
FAR-3320W		RTR-108	RSB-130	6.5 ft (XN20CF) 8 ft (XN24CF)				27" WUXGA (MU-270W) or 23.1" UXGA (MU-231)
FAR-3220-NXT	X band 600 W	RTR-123	RSB-128	4 ft (XN12CF) 6.5 ft (XN20CF) 8 ft (XN24CF)				19.0" SXGA (MU-190)
FAR-3320-NXT								27" WUXGA (MU-270W) or 23.1" UXGA (MU-231)
FAR-3230S	S band 30 kW	RTR-107	RSB-129	12 ft (SN36CF)		PSU-014	PSU-015	19.0" SXGA (MU-190)
FAR-3330S								27" WUXGA (MU-270W) or 23.1" UXGA (MU-231)
FAR-3330SW		RTR-109	RSB-131					
FAR-3230S-SSD	S band 250 W	RTR-111	RSB-133			PSU-016	PSU-018	19.0" SXGA (MU-190)
FAR-3330S-SSD								27" WUXGA (MU-270W) or 23.1" UXGA (MU-231)

* Except for XN24CF

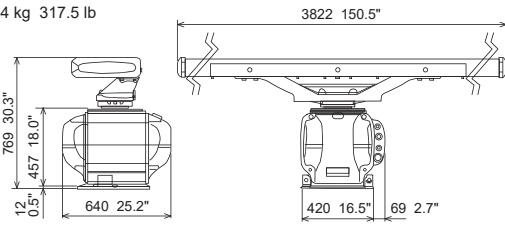## Antenna Unit for FAR-3210/3310/3220/3320/3320W/3220-NXT/3320-NXT

Radiator
XN12CF 46.2 kg 101.9 lb
XN20CF 48.1 kg 106.1 lb
XN24CF 49.3 kg 108.7 lb

XN12CF: 1297 51.1"
XN20CF: 2097 82.6"
XN24CF: 2597 102.2"

109 4.3"
575 22.7"
395 15.6"
15 0.6"
255 10.0" 257 10.1"
409 16.1"
9 0.35"
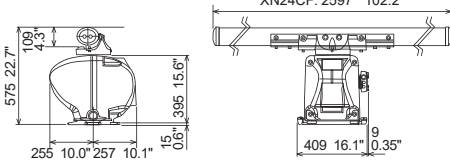
Antenna Unit for FAR-3230S/3330S/3330SW/3230S-SSD/3330S-SSD

Radiator SN36CF 144 kg 317.5 lb

3822 150.5"
769 30.3"
457 18.0"
12 0.5"
640 25.2"
420 16.5"
69 2.7"

Monitor Unit

MU-190
8.8 kg 19.4 lb

110 4.3"
397 15.6"
450 17.7"
489 19.3"
448 17.6"
389 15.3"
4-⌀18
Cutout for flush mount

MU-231
12.8 kg 28.2 lb

112 4.4"
484.9 19"
553 21.8"
592 23.3"
554 21.8"
471 18.5"
4-R10
Cutout for flush mount

MU-270W
13 kg 28.7 lb

95 3.7"
12 0.5"
485 19.1"
313 12.3"
728 28.7"
70 27.8"
4x⌀8x17 fixing hole
less than 4xR10
pilot hole 6
706 27.8"
686 27.0"
471 18.5"
313 12.3"
79
311
Cutout for flush mount
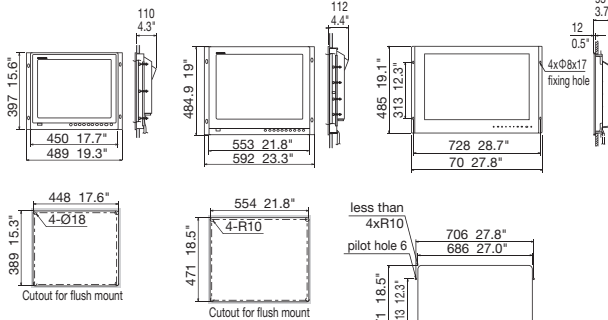
Transceiver Unit for FAR-3320W

RTR-108 17 kg 37.5 lb

37 1.5"
12 0.5"
200 7.9" 200 7.9"
70 2.8"
384 15.1"
422 16.6"
291 11.5"
484 19.1"
8 0.3"
279.5 11.0"
70 2.8"

Transceiver Unit for FAR-3330SW

RTR-109 22 kg 48.5 lb

15 0.6"
260 10.2" 260 10.2"
546 21.5"
606 23.9"
65 2.6"
313 12.3"
10 0.4"
94 3.7"
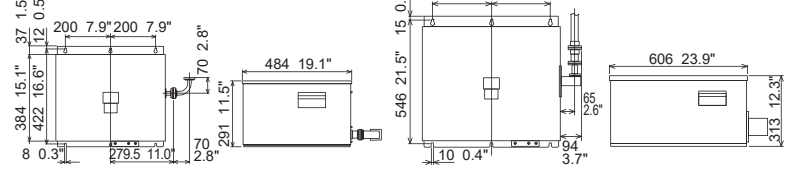
Power Supply Unit

PSU-014/016 8.5 kg 18.7 lb

392 15.4"
370 14.6"
32 1.3"
340 13.4"
405 15.9"
350 13.4"
150 5.9"

PSU-015/018 10 kg 22.0 lb

392 15.4"
370 14.6"
32 1.3"
340 13.4"
405 15.9"
350 13.4"
150 5.9"
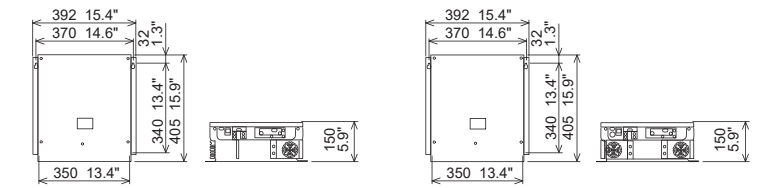
Control Unit

RCU-025 3.1 kg 6.84 lb

32 1.26"
339 13.3"
180 7.09"
398 15.7"
72 2.83" max.
no less than 70 2.76"
216 8.50"
10 to 20 0.39" to 0.79"
55 2.17"
38 1.50"
398 15.7"
170 6.69"
180 7.09"
388 15.3"
Cutout for flush mount

Trackball Control Unit

RCU-026 1.5 kg 3.31 lb

120 4.72"
120 4.72"
no less than 70 2.76"
Max 70 2.76"
180 7.09"
170 6.69"
180 7.09"
110 4.33"
Cutout for flush mount
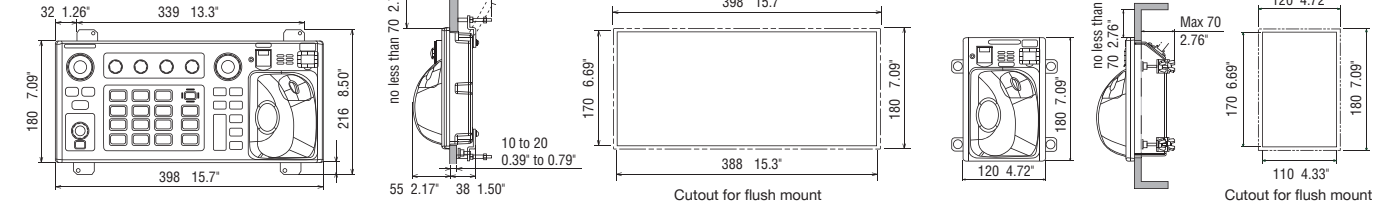
Processor Unit

EC-3000
14 kg 30.9 lb

426 16.77"
15 0.59"
396 15.59"
360 14.17"
45 1.77"
153 6.02"
150 5.9"
150 5.9"
150 5.9"
150 5.9"
3-ø8 Fixing hole

Switching Hub

HUB-100 1.5 kg 3.31 lb

47 1.85"
270 10.63"
255 10.03"
45 1.77"
4-ø5 Fixing Hole
115 4.53"
162 6.38"
145 5.71"
242 9.53"
15 0.59"

Intelligent Hub

HUB-3000
1.5 kg 3.31 lb

350 13.79"
336 12.23"
4-ø5 Fixing hole
33 1.3"
103 4.06"
153 6.02"
172 6.77"
324 12.76"
42 1.65"
no less than 100 3.94"
no less than 150 5.91"
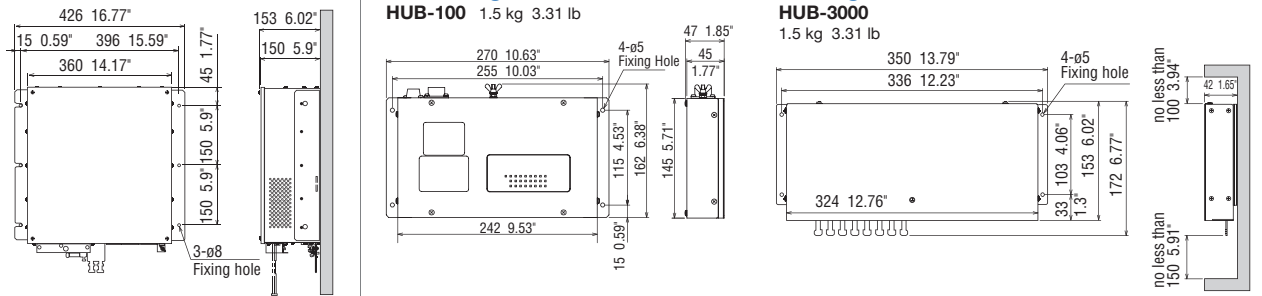
Sensor Adapter

Serial : MC-3000S 1.5 kg 3.3 lb

220 8.66"
180 7.09"
48 1.88"
41 1.61"
4-ø5 Fixing Hole
235.5 9.27"
150 5.91"
64 2.52"
no less than 150 5.91"

Analog : MC-3010A 0.8 kg 1.8 lb

100 3.94"
60 2.36"
48 1.88"
41 1.61"
4-ø5 Fixing Hole
150 5.91"
235.5 9.25"
64 2.51"
no less than 150 5.91"

Digital In : MC-3020D 0.8 kg 1.76 lb

100 3.94"
60 2.36"
48 1.88"
41 1.61"
4-ø5 Fixing Hole
150 5.91"
235.5 9.25"
64 2.52"
no less than 150 5.91"

Digital Out : MC-3030D 0.8 kg 1.76 lb

100 3.94"
60 2.36"
48 1.88"
41 1.61"
4-ø5 Fixing Hole
150 5.91"
235.5 9.25"
64 2.52"
no less than 150 5.91"
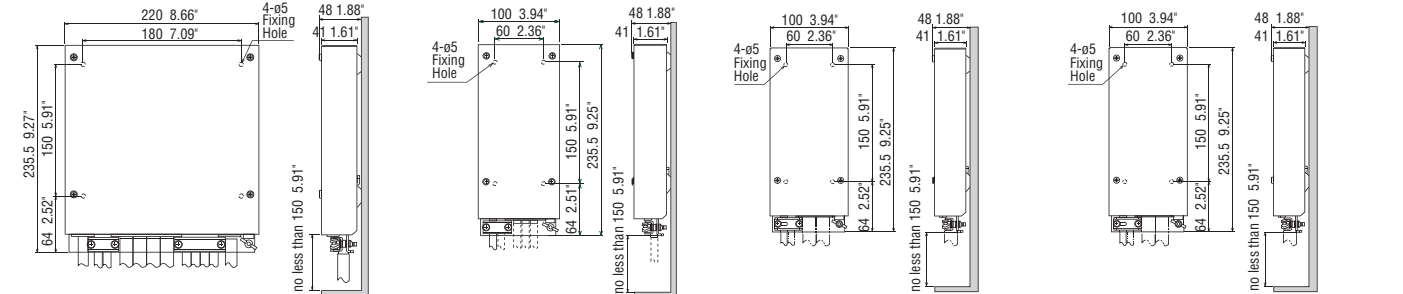
Beware of similar products

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