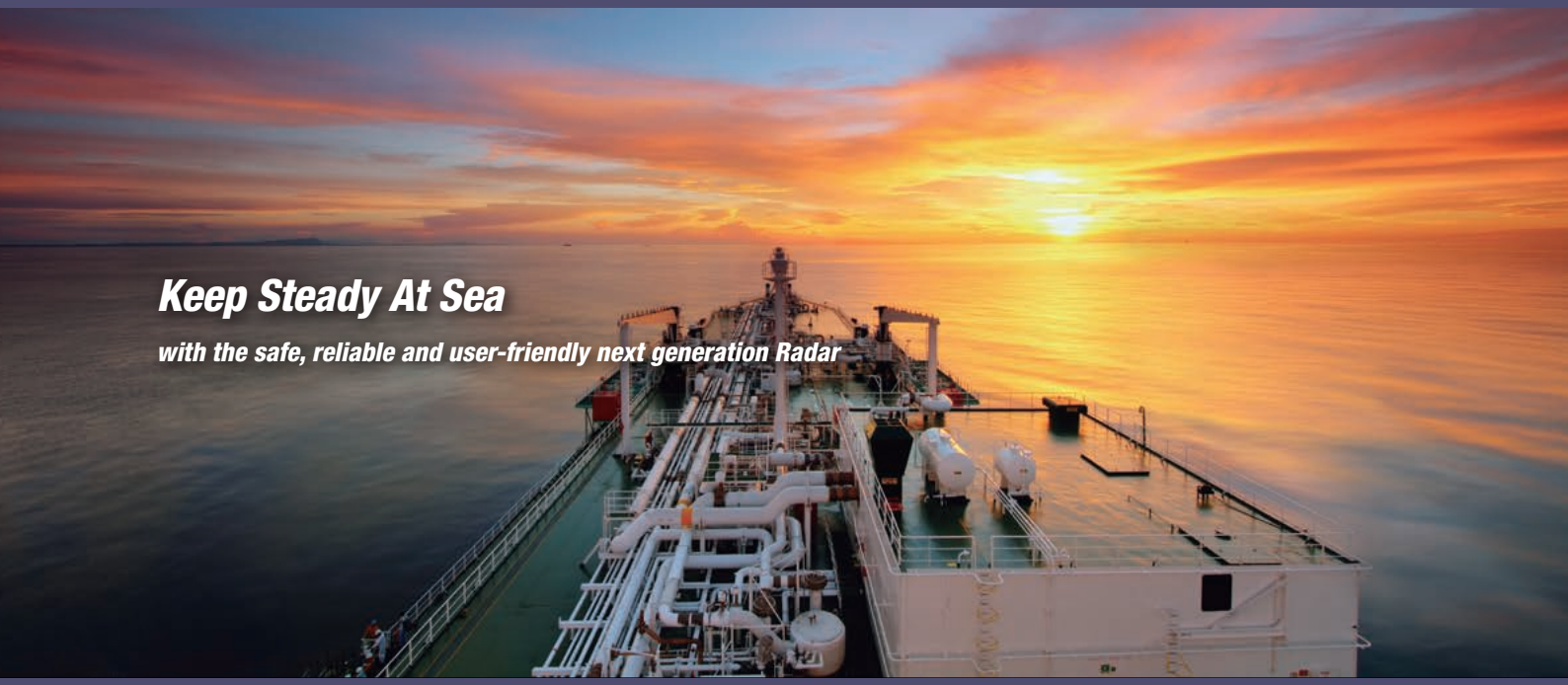
FURUNO

RADAR

Model: FAR-2xx8 series



www.furuno.com

Keep Steady At Sea

with the safe, reliable and user-friendly next generation Radar

RADAR

FAR-23x8 series

for Category 1 of ship/craft, with 27" LCD

FAR-2318	X-band, 12 kW, TR up
FAR-2328/FAR-2328W	X-band, 25 kW, TR up
FAR-2328-NXT	X-band, 600 W, TR up, Solid State
FAR-2338S/FAR-2338SW	S-band, 30 kW, TR up,
FAR-2338S-NXT	S-band, 250 W, TR up, Solid State

FAR-20x8-MARK-2 series

for Category 1/2 of ship/craft, with 27"/19" LCD

FAR-2018-MARK-2	X-band, 12 kW, TR up
FAR-2028-MARK-2	X-band, 25 kW, TR up

FAR-22x8 series

for Category 2 of ship/craft, with 19" LCD

FAR-2218/FAR-2218-BB	X-band, 12 kW, TR up
FAR-2228/FAR-2228-BB	X-band, 25 kW, TR up
FAR-2228-NXT/FAR-2228-NXT-BB	X-band, 600 W, TR up, Solid State
FAR-2238S/FAR-2238S-BB	S-band, 30 kW, TR up,
FAR-2238S-NXT/FAR-2238S-NXT-BB	S-band, 250 W, TR up, Solid State

Complies with the following regulations:

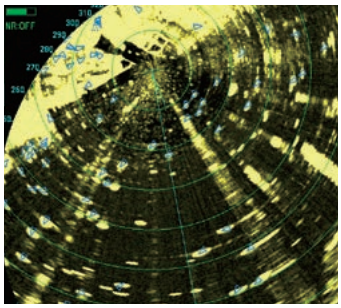
IEC 60945 Ed.4.0	IEC 62288 Ed.3.0
IEC 61162-1 Ed.5.0	IEC 62388 Ed.2.0
IEC 61162-2 Ed.1.0	IEC 62923-1
IEC 61162-450 Ed.2.0	IEC 62923-2
IEC 61174 Ed.4.0	

Advanced technologies for navigation safety

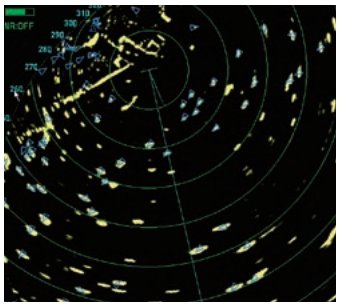
The Furuno FAR-2xx8 series is a brand-new Radar series characterized by its state-of-the-art antenna design and innovative signal processing technologies.
Furuno's latest, advanced technologies and intuitive design will increase situational awareness, facilitating unparalleled navigational safety.

▶ Automatic Clutter Elimination (ACE) for unprecedented echo clarity

Quickly adjusts the Radar image with a single button press. When the ACE function is activated, the system automatically optimizes clutter reduction filters and gain control according to the sea and weather conditions.



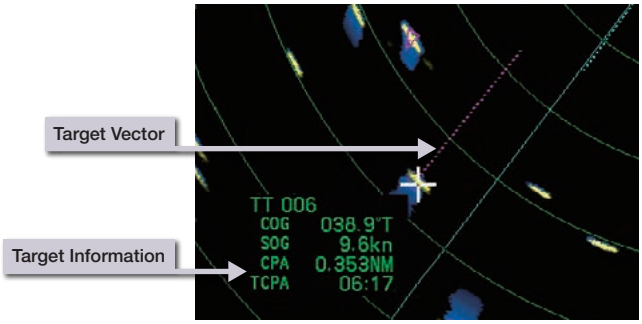
ACE OFF



ACE ON

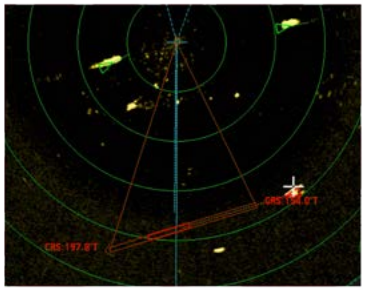
▶ Fast Target Tracking™ function provides early-stage collision avoidance

With Fast Target Tracking™, the FAR-2xx8 series provides accurate tracking information; speed and course vectors are displayed in mere seconds allowing operators to take action and avoid incidents at a very early stage.

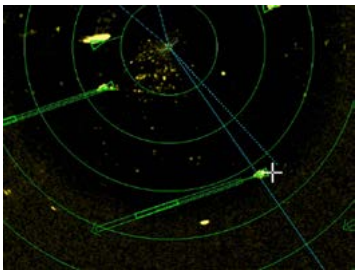


▶ See potential collisions with Risk Visualizer™

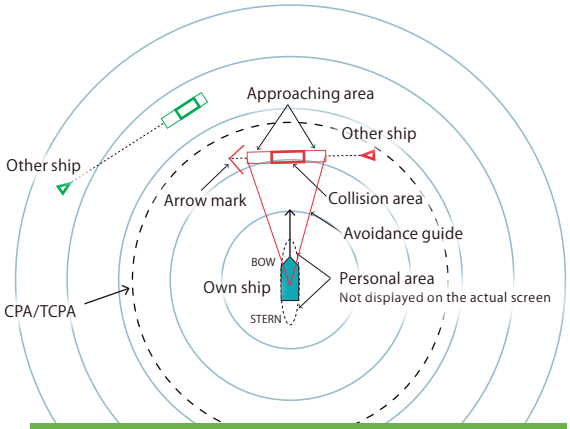
Risk Visualizer™ assists operators in making avoidance decisions by visualizing the areas where there is a risk of collision if own ship keeps current speed and other ship(s) continue to navigate at their current speed and course.
Risk Visualizer™ makes it easier to identify the risk of approaching or colliding with other vessels in challenging environments—such as during nighttime navigation, low-visibility conditions, high-traffic areas, or when the operator is managing a high workload.



In the example image, by altering course so that your ship does not enter the approaching area, you can avoid the other ship by maintaining a distance equal to the personal area.



Risk Visualizer display image

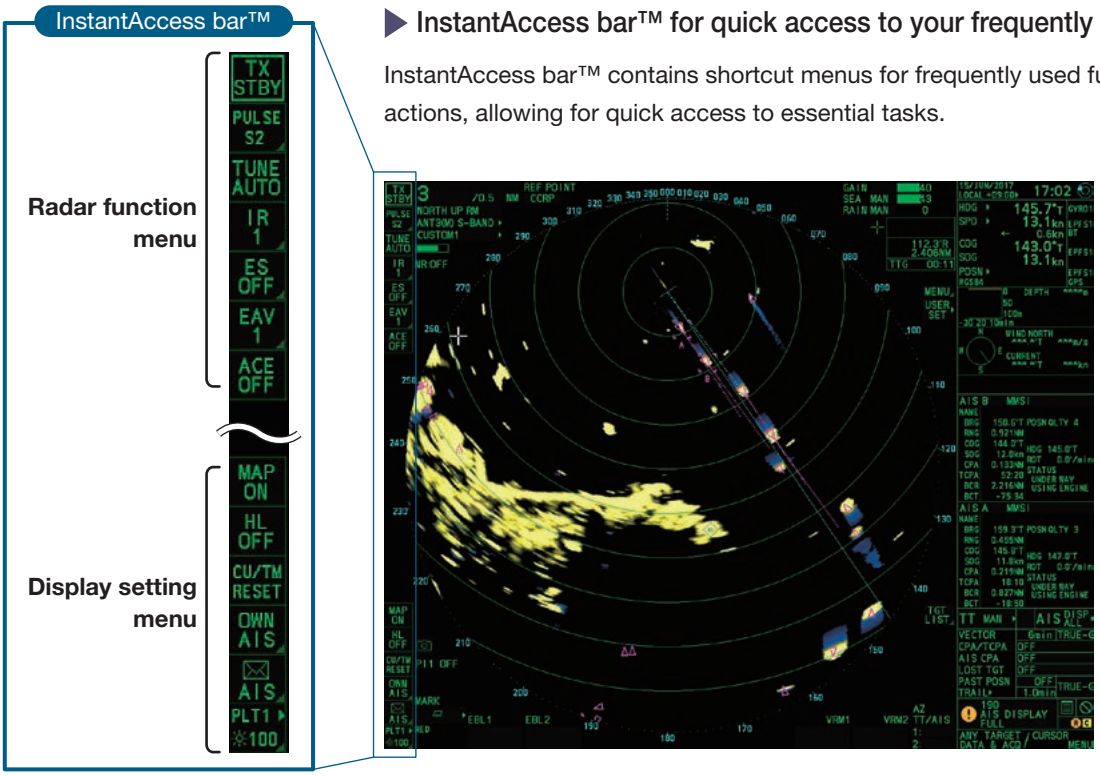


Maneuver your vessel to avoid the approaching/collision areas, you will be able to avoid other ships. If your ship's course is within an approaching area, there is a risk of coming close to other ship, so the operators must steer with caution.

If target's CPA and TCPA are less than the threshold, the approaching /collision area will flash in red and the CPA/TCPA alert occurs. After acknowledging the alert, the flashing stops.

※If a target's speed or course is changed after your vessel changes its course, the risk of collision may increase. Maneuver your vessel accordingly to avoid collision.
※When the vector mode is set to the ground stabilization or sea stabilization(true), the approaching/collision area is shown with a thick solid line in the same direction as the vector of the target that is on a collision course with own ship.
※The color for the approaching/collision areas change according to the color of the target symbol.

Exceptionally intuitive user interface

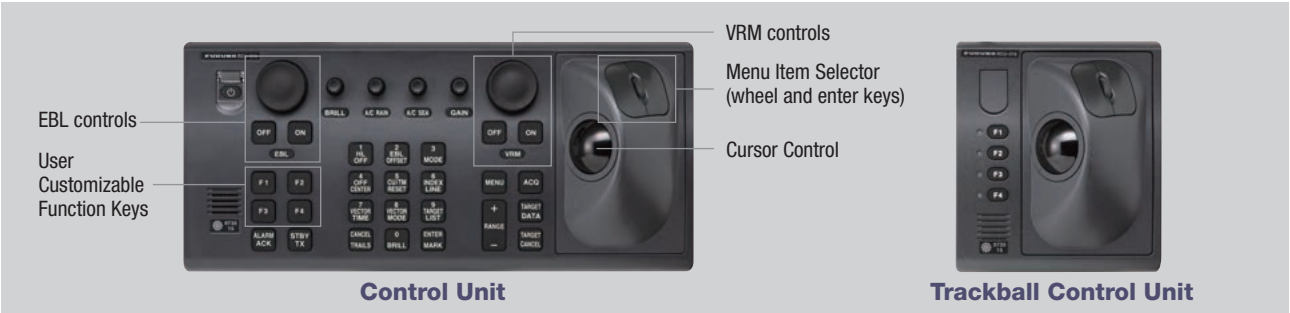


▶ InstantAccess bar™ for quick access to your frequently used functions

InstantAccess bar™ contains shortcut menus for frequently used functions and actions, allowing for quick access to essential tasks.

▶ Well-designed controllers for stress-free operation

Comfortable usability is very important on long voyages. With that in mind, these control units are ergonomically designed to comfortably accommodate the operator's hand. All operations can be performed with the trackball.



Refined antenna design provides excellent reliability and easy maintenance

*Only AF antennas can be connected to FAR-2018/2028-MARK-2, and only CF antennas can be connected to FAR-22x8.

The FAR-2xx8 series is designed to provide clearer and more accurate Radar images of the surroundings, while increasing reliability and decreasing overall cost of ownership with easy maintenance.

The Ethernet network between the antenna and below-deck equipment allows for high reliability, directly converting analog to digital signals before sending them to the main processor unit.

The new antenna's refined shape significantly reduces aerodynamic drag and decreases the burden on the gear box. The gear box itself has also been redesigned. Decreased aerodynamic drag and a DC brushless motor result in a very durable gear box that can be used for prolonged periods of time.

Installation and maintenance are now easier than ever. All components of the gear box are integrated into one block that can easily be removed from the gear box when maintenance is required. The cable to the gear box can be connected from the side of the gear box.

Flexible fit, effortless setup — Perfect for new builds or retrofits

▶ **Existing monitor, control unit and cables can be used in retrofitting*.**
*Only when retrofitting in lieu of FAR-2xx7 series

▶ **Optional LAN Signal Converter enables Ethernet communication. Extend the cable between the antenna unit and the processor unit utilizing existing cables when retrofitting is possible.**

▶ **Ethernet connectivity enables interface and information exchange.**
Ethernet expands the Radar's capability with connection between either existing or a newly installed system, such as ECDIS and VDR.

▶ **Utilize Inter-Switching with optional Ethernet HUB.**

▶ **DVI-I cable can be connectible to VDR in retrofitting.**

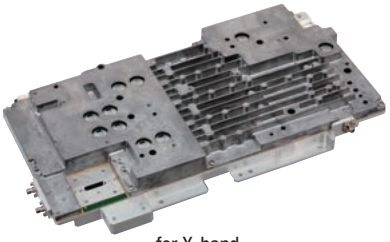
How to connect VDR with FAR-2xx8 series

VR-7000/7000S	Directly connect VDR with LAN.
VR-3000/3000S	Directly input the RGB signal from a DVI-I port to the VDR.
Other manufacturer's VDR	Please check with the VDR manufacturer to connect appropriately.

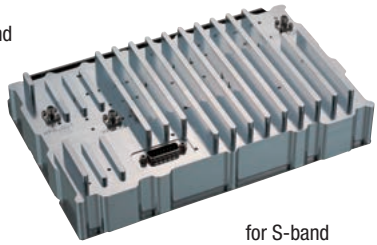
Advanced Detection Meets Low Maintenance — Discover the Power of NXT Solid-State Radar

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

Power Amplifier Module of the Solid State transceiver



for X-band



for S-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)

Cutting-Edge Tech for Safer, Smarter Navigation in Every Situation (optional)

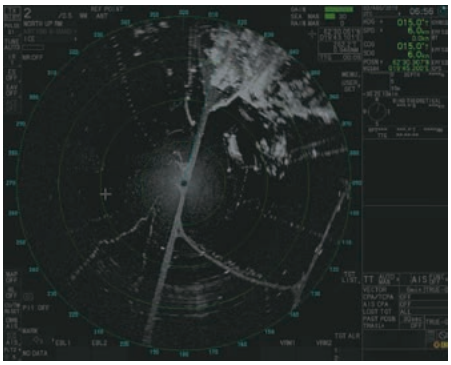
▶ Wave Analyzer Software *

- Allows real-time monitoring and analysis of wave echoes
- Ensures safety at sea even at night

*More details on the Wave Analyzer brochure

▶ Ice Mode ** (X-band magnetron only)

- Find the best route through ice
- Observe ice conditions by Radar



**Please contact your local distributor for more details

Product Name
MARINE RADAR

Antenna Radiator

1. Type Slotted waveguide array

2. Beam width and sidelobe attenuation

Radiator type	X-Band						S-Band
	XN12CF	XN20CF	XN24CF	XN12AF	XN20AF	XN24AF	SN36CF
Length	4 ft	6.5 ft	8 ft	4 ft	6.5 ft	8 ft	12 ft
Horizontal beam width	1.9°	1.23°	0.95°	1.9°	1.23°	0.95°	1.8°
Vertical beam width	20°	20°	20°	20°	20°	20°	25°
Sidelobe within ±10°	-24 dB	-28 dB	-28 dB	-24 dB	-28 dB	-28 dB	-24 dB
Sidelobe outside ±10°	-30 dB	-32 dB	-32 dB	-30 dB	-32 dB	-32 dB	-30 dB

3. Polarization Horizontal

4. Rotation 24 rpm or 42 rpm (for high speed craft)
*XN24CF/XN24AF not available in 42 rpm

5. Wind load 100 kn relative

6. De-icer (option) On: when temperature goes down to 0°C
Off: when temperature goes up to +5°C

Transceiver

1. TX Frequency and modulation

X-band (Magnetron) 9410 MHz ±30 MHz, P0N
S-band (Magnetron) 3050 MHz ±30 MHz, P0N
X-band (Solid state) CH1 P0N: 9403.75 MHz/Q0N: 9423.75 ±5MHz or
CH2 P0N: 9413.75 MHz/Q0N: 9433.75 ±5MHz
S-band (Solid state) CH1 P0N: 3043.75 MHz/ Q0N: 3063.75 MHz ±5 MHz or
CH2 P0N: 3053.75 MHz/ Q0N: 3073.75 MHz ±5 MHz

2. Output power

FAR-2018-MARK-2/2218/2218-BB/2318	12 kW
FAR-2028-MARK-2/2228/2228-BB/2328/2328W	25 kW
FAR-2228-NXT/2228-NXT-BB/2328-NXT	600 W
FAR-2238S/2238S-BB/2338S/2338SW	30 kW
FAR-2238S-NXT/2238S-NXT-BB/2338S-NXT	250 W

3. Range scale, Pulse Repetition Rate and Pulselength

Magnetron radar: FAR-2018-MARK-2/2218/2218-BB/2318/2028-MARK-2/
2228/2228-BB/2328/2328W/2238S/2238S-BB/2338S/2338SW

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-2228-NXT/2228-NXT-BB/2328-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-2238S-NXT/2238S-NXT-BB/2338S-NXT

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

1. Minimum range 22 m

2. Range discrimination 26 m

3. Range accuracy
1% of the maximum range of the scale in use or 10 m, whichever is the greater

4. Bearing discrimination
2.1° (XN12CF/XN12AF), 1.5° (XN20CF/XN20AF), 1.2° (XN24CF/XN24AF), 2.0° (SN36CF)

5. Bearing accuracy ±1°

6. Range scale and Range ring interval (RI)

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

7. Warm-up time 3 min. approx. (solid state radar excluded)

8. Presentation mode
Head-up, STAB head-up, Course-up, North-up (RM/TM), Stern-up

9. Marks
Cursor, Range ring, Heading mark, North mark, Bearing mark,
Target trail, VRM, EBL, Acquisition zone

10. Target tracking (TT)
Auto or manual acquisition 100 targets in 24/32 NM
(range selected from setting menu)
Tracking 5/10 pts on all targets
Vector time Off, 30 s, 1-60 min

11. AIS
Display capacity 350 targets
Tracking 5/10 pts on activated targets
Vector time Off, 30 s, 1-60 min

12. Radar map 20,000 points

13. Acquisition zone 2 zones

14. Interswitch function Selectable from menu

Display Unit

	MU-192	MU-270W
1. Screen type	19-inch color LCD	19-inch color LCD
2. Resolution	1280 x 1024 (SXGA)	1920 x 1200 (WUXGA)
3. Brightness	400 cd/m² typical	400 cd/m² typical
4. Visible distance	1.02 m nominal	1.02 m nominal
5. Radar effective diameter	282 mm	349 mm

Interface

1. Number of port (processor unit)

Serial 7 ports (IEC61162-1/2: 2 ports, IEC61162-1: 4 ports, AD-10: 1 port)
Alarm output 6 ports: contact signal, load current 250 mA
(Normal close/ open: 4, System fail: 1, Power fail: 1)
DVI output 2 ports: DVI-D, DVI-I or RGB picture data (VDR)
LAN 2 ports: Ethernet 100Base-TX
RS-232C 1 port: brilliance control
Sub display (for ECDIS) 2 ports: HD, BP, Trigger and Video signal

2. Data sentences (IEC61162-1/2, IEC61162-450)

Input ABK, ACK, ACN, ALR, BWC, BWR, CUR, DBK*1, DBS*1, DBT, DDC, DPT, DTM, GGA, GLL, GNS, HBT, HDT*1, MTW, MWV, OSD, RAQ, RMB, RMC, ROT, RTE, SRP, THS, VBW, VDM, VDO, VDR, VHW, VSD, VTG, VWR*1, VWT*1, WPL, ZDA
Output ABM, ACK, AIQ, ALC, ALF, ALR, ARC, BBM, DDC, EVE, HBT, OSD, RSD, SRP, TLB, TLL, TTD, TTM, VSD
*1: for retrofit.

3. Ethernet interface for IEC61162-450

Port (LAN2) 100Base-TX, IPv4, 8P8C connector
IEC61162-450 transmission group
Input MISC, TGTD, SATD, NAVD, TIME, PROP
Output Arbitrary (default: TGTD)
Multicast address 239.192.0.1 to 239.192.0.20
Destination port 60001 to 60020
Re-transmittable binary image transfer
Multicast address 239.192.0.1 to 239.192.0.20
Destination port 60026 to 60030
Other network function excepted IEC61162-450
SNMP, HTTP, Syslog, Furuno Management Protocol (FMP)

4. Output port on antenna unit

Sub display (for radar) 1 port: HD, BP, Trigger and Video signal

Power Supply

1. Processor unit

FAR-2018-MARK-2	100-230 VAC: 2.1-1.0 (2.8-1.2)A, 1 phase, 50-60 Hz / 24VDC: 7.7 (10.6)A*
FAR-2218/2318	100-230 VAC: 2.1-1.0 (2.9-1.3)A, 1 phase, 50-60 Hz / 24VDC: 5.4 (9.0)A*
FAR-2028-NARK-2	100-230 VAC: 2.1-1.0 (2.8-1.3)A, 1 phase, 50-60 Hz / 24VDC: 8.1 (11.2)A*
FAR-2228/2328	100-230 VAC: 2.3-1.1 (3.2-1.4)A, 1 phase, 50-60 Hz / 24VDC : 8.9 (12.4)A*
FAR-2228-NXT/2238-NXT	100-230 VAC: 2.1-1.0 (2.9-1.3)A, 1 phase, 50-60 Hz / 24VDC: 8.2 (11.1)A *
FAR-2328W	100-230 VAC: 2.3-1.1 (3.2-1.4)A, 1 phase, 50-60 Hz
FAR-2238S/2338S/2338SW	100-230 VAC: 3.2-1.5 (5.6-2.5)A, 1 phase, 50-60 Hz
FAR-2238S-NXT	100-230 VAC: 2.6-1.2 (5.1-2.2)A, 1 phase, 50-60 Hz
FAR-2328-NXT	100-230 VAC: 2.1-1.0 (2.9-1.3)A, 1 phase, 50-60 Hz
FAR-2338S-NXT	100-230 VAC: 2.6-1.2 (5.1-2.2)A, 1 phase, 50-60 Hz

( ): 42 rpm *Specify when ordering

2. Display Unit

MU-192	100-230 VAC: 0.4-0.3 A, 1 phase, 50-60 Hz
MU-270W	100-230 VAC: 0.6-0.4 A, 1 phase, 50-60 Hz

3. HUB (option) 100-230 VAC: 0.1 A max. 1 phase, 50/60 Hz

4. De-icer (option) 100-115/220-230 VAC: 2.6/1.3 A, 1 phase, 50-60 Hz

Environmental Conditions

1. Ambient temperature

Antenna unit -25°C to +55°C (storage: -25°C to +70°C)
Indoor units -15°C to +55°C (storage: -20°C to +70°C)

2. Relative humidity 95% or less at +40°C

3. Degree of protection

Antenna unit IP56
Processor/ monitor unit IP22
Control unit IP20
HUB IP20 (HUB-100), IP22 (HUB-3000)

4. Vibration IEC 60945 Ed.4

Equipment List

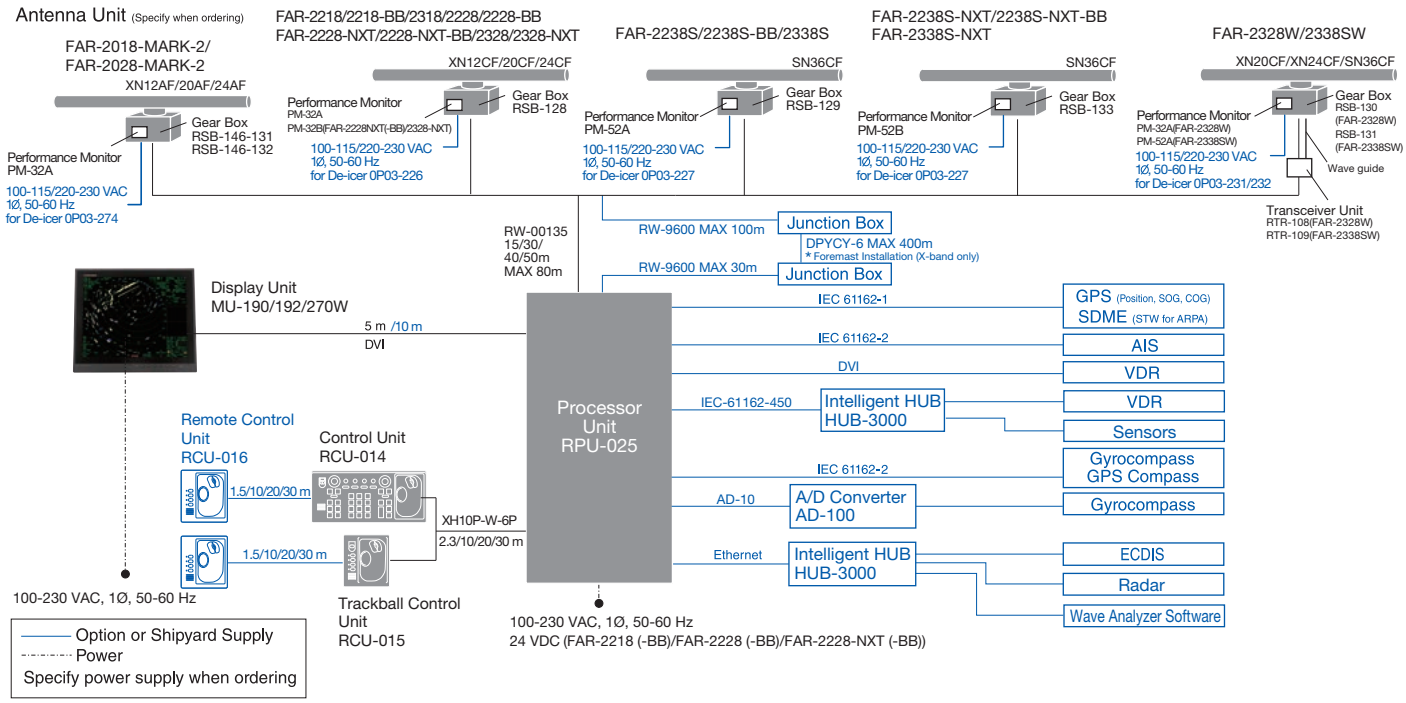
Standard

1. Display Unit MU-192/MU-270W
2. Processor Unit RPU-025
3. Control Unit RCU-014
   Trackball Control Unit (Specify when ordering) RCU-015
4. Antenna Radiator XN12CF/XN20CF/XN24CF/XN12AF/XN20AF/XN24AF/SN36CF
5. Transceiver RTR-105/106/107/108/109/111
6. Gear Box RSB-128/129/130/131/133
7. DVI cable (5 m) DVI-D/D S-LINK 5M, not supplied with BB model
8. Standard Spare Parts and Installation Materials
9. Performance Monitor PM-32A/52A/52B

Option

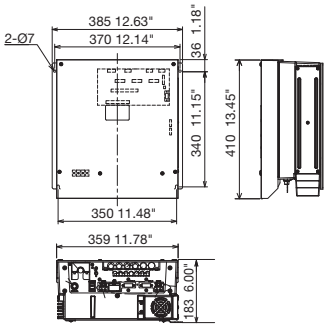
1. Remote Control Unit RCU-016
2. Junction Box RJB-001
3. AD Converter AD-100-E
4. Intelligent HUB HUB-3000
5. De-icer OP03-226/227/231/232/274
6. LAN Signal Converter
   X-band (magnetron) OP03-247-3, X-band (NXT) OP03-247-4,
   S-band (magnetron) OP03-247-2, S-band (NXT) OP03-247-1
7. Wave Analyzer Software WV-100/WV-100ST

INTERCONNECTION DIAGRAM

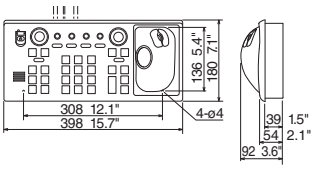


Processor Unit
RPU-025

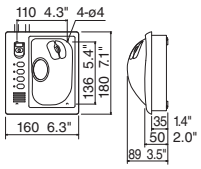
X-band/ S-band 24rpm w/ Fan 9.6 kg 21 lb
S-band 42rpm w/ 2 Fan 11.5 kg 25 lb



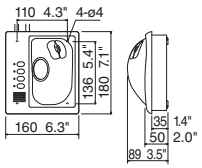
Control Unit
RCU-014 2.5 kg 5.5 lb



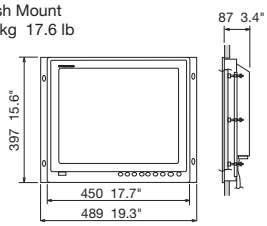
Trackball Control Unit
RCU-015 2.4 kg 5.3 lb



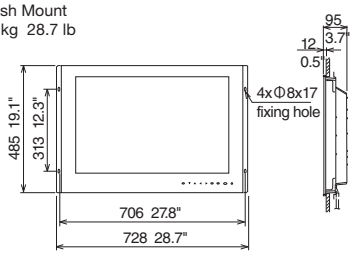
Remote Control Unit
RCU-016 2.4 kg 5.3 lb



Display Unit
MU-192
Flush Mount
8.0 kg 17.6 lb



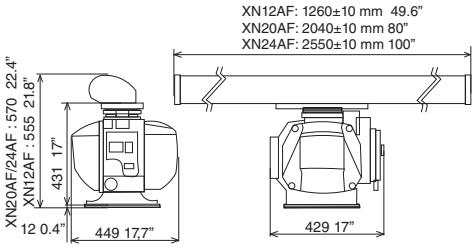
MU-270W
Flash Mount
13 kg 28.7 lb



Antenna Unit
for FAR-2018-MARK-2/2028-MARK-2

Radiator

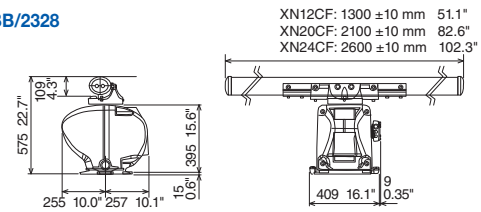
XN12AF	39 kg	86 lb
XN20AF	44 kg	97 lb
XN24AF	46 kg	101 lb



Antenna Unit
for FAR-2218/2218-BB/2318/2228/2228-BB/2328
FAR-2228-NXT/2228-NXT-BB
FAR-2328-NXT

Radiator

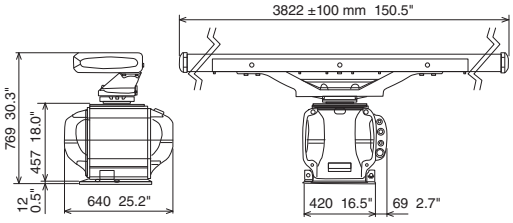
XN12CF	49 kg	108 lb
XN20CF	51 kg	112 lb
XN24CF	52 kg	114 lb



Antenna Unit
for FAR-2238S/2238S-BB/2338S/
FAR-2238S-NXT/2238S-NXT-BB/
FAR-2338S-NXT

Radiator

SN36CF(RSB-129)	140 kg	308 lb
SN36CF(RSB-133)	134 kg	295 lb



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SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

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