



FURUNO®

Meets IMO specifications for vessels up to 10,000 grt as a primary radar and over 10,000 grt as a secondary radar.

20-INCH X-BAND RADAR

Models **FR-2110/2120/2120W/2150/2150W**



The future today with FURUNO's electronics technology.

FURUNO ELECTRIC CO., LTD.

Catalogue No. R-137a

New Video Processing Technique For Better Short Range Discrimination



Complies with the following Regulations and Specifications

- ◆ IMO A. 477 (XII)
- ◆ IEC 936 Marine radar specifications
- ◆ IEC 945 General requirements
- ◆ National regulations

FR-2110	X-BAND, 10 kW, TR-UP
FR-2120	X-BAND, 25 kW, TR-UP
FR-2120W	X-BAND, 25 kW, TR-DOWN
FR-2150	X-BAND, 50 kW, TR-UP
FR-2150W	X-BAND, 50 kW, TR-DOWN

The FURUNO FR-2100 series of heavy duty commercial radars is the product of many years of experience in radar design and manufacturing. This new series has been designed to fully meet the exacting rules of the International Maritime Organization (IMO) as a primary radar system for vessels up to 10,000 grt and as a secondary system for vessels over 10,000 grt.

Targets are shown either in yellow or green with 16-level quantization. They may also be displayed in three colors of red, yellow and green, depending on echo strengths (R-type).

This series incorporates a number of exciting new features: ① Five transmitter pulselengths, three pulse repetition rates and two IF bandwidths allow a no-compromise tailoring of transmission signal and

receiver response according to selected range. ② A new anti-clutter processing technique yields significantly enhanced short range target discrimination. ③ Gyro-stabilized Echo Trail can be displayed in Head-up mode. This feature eliminates trail smear during own ship yawing.

North-up and Course-up modes are available when a gyro compass is connected. Further addition of a speed log allows True Motion presentation. Echo Trails can be switched between "true" and "relative" to help discriminate moving targets from fixed targets. True Echo Trail can be displayed in Head-up mode.

For high speed vessels, a 36 rpm scanner motor option is available. (For FR-2110/2120)

- 20-inch high-resolution color CRT
- Revolutionary new anti-clutter processing for enhanced target detection on short range
- Gyro-stabilized Echo Trails in Head-up mode
- Automatic tuning
- User-friendly operation via rotary controls, tactile backlit touchpads and trackball
- Proven scanner unit
- Options: Auto Plotter ARP-23
Video Plotter RP-23, Interswitch Box RJ-5/7/8, Performance Monitor PM-30

Auto Plotter ARP-23

ARP-23 option provides Auto acquisition of 20 targets plus manual acquisition of 10 targets and displays various nav data. Digital output in NMEA 0183 (TTM and RSD sentences) is available for external unit.

Floating Origin EBL

The EBL origin can be placed anywhere with the trackball to provide measurements of range and bearing between any two targets. The EBL origin can be instantly reset to own ship position.

Choice of Color

Radar pictures are presented in high-contrast yellow or green. Background can be selected in black or blue for nighttime or daytime.

Echo Trails

You may intuitively assess relative course and speed of other targets with low-intensity trail painted along their track.

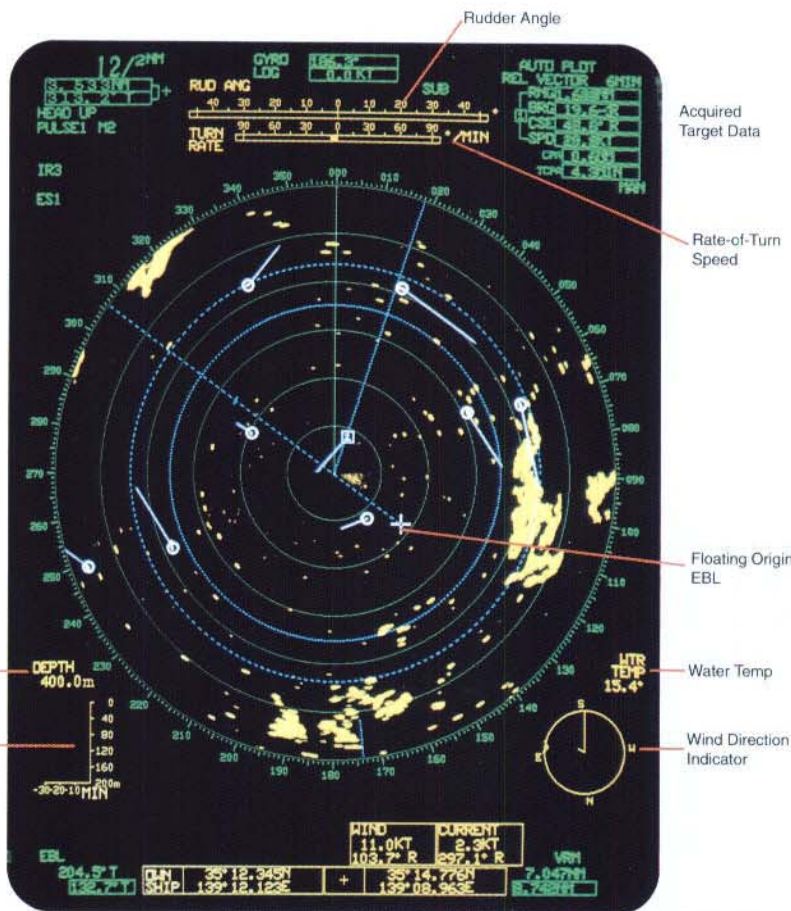
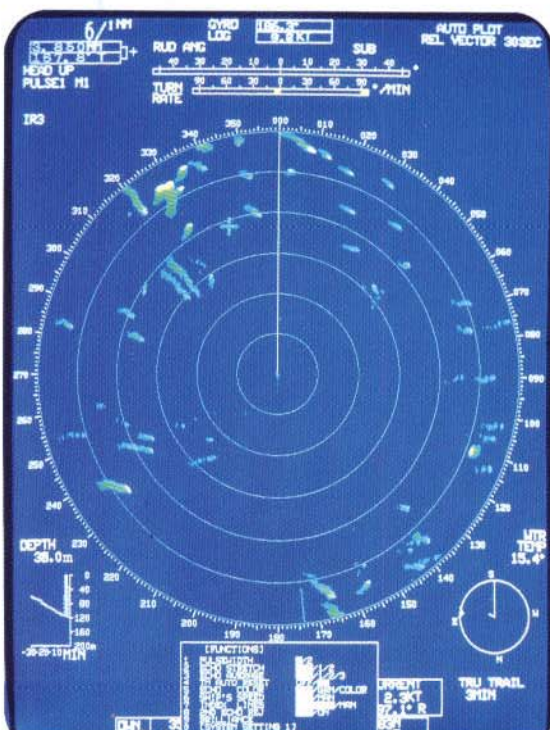


Photo: ARP-23



Video Plotter RP-23



RP-23 option offers a kind of integrated navigation display showing nav lines and digitized chart. (Where full RP-23 function is not allowed on a single display unit by authorities, you may fit this optional card to provide nav lines only.) **Map Area:** 0.125 to 96 nm **Latitude Limits:** Between 85°N and 85°S **Plot Interval:** 10, 30 sec, 1, 5, 10, 30 or 60 min **Built-in Memory:** 6,000 points for course line and marks. 98

SPECIFICATIONS

ANTENNA RADIATOR

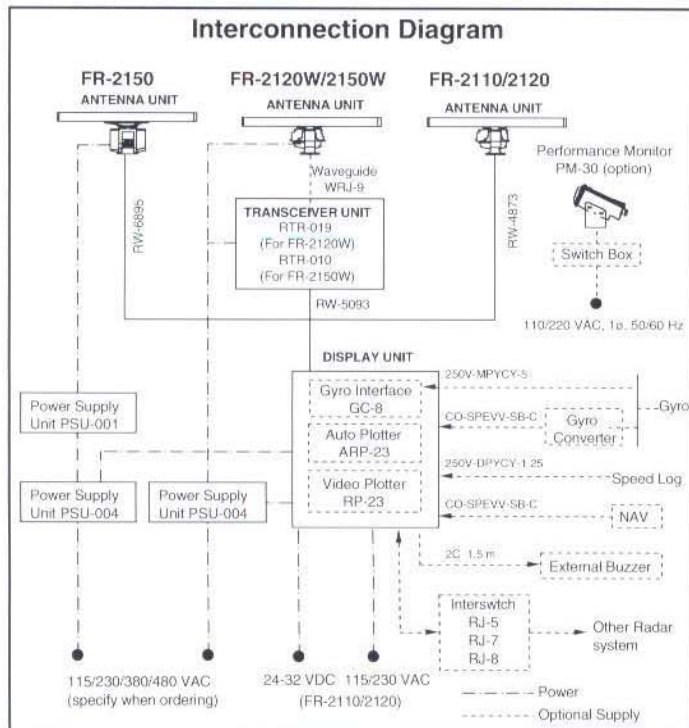
- Type** Slotted waveguide array
- Length** 4 ft (XN2) 6.5 ft (XN3) 8 ft (XN4A) 10 ft (XN5A)
- Beamwidth** Hor: 1.8° 1.23° 0.95° 0.75°
Ver: 25° 20° 20° 20°
- Rotation Speed**
FR-2110/2120: 24 rpm (standard) or 36 rpm (Optional)
FR-2120W/2150W: 24 rpm (60 Hz), 21 rpm (50 Hz)
FR-2150: 20 rpm (60 Hz, DC set), 16 rpm (50 Hz)
Relative wind 100 knots

RF TRANSCEIVER

- Frequency** 9410 ± 30 MHz
- Output Power**
FR-2110 10 kW
FR-2120/2120W: 25 kW
FR-2150/2150W: 50 kW
- Pulselength and Pulse Repetition Rate**
0.125, 0.25, 0.5 (nm) 0.08 (μs) 2200
0.75, 1.5 0.08/0.3 2200/1100
3 2 from 0.08/0.3(0.2)*0.6 2200/1100/600
6 2 from 0.3(0.2)*0.6/1.2 1100/600/600
12, 24 0.6/1.2 1100/600
48, 96 1.2 600
* FR-2150/FR-2150W
- Mixer and Local Osc.** Microwave Integrated Circuit
- IF** 60 MHz, Logarithmic amplifier
Bandwidth: 27 MHz (0.08μs)
3 MHz (0.3 (0.2)*0.6/1.2 μs) * FR-2150/2150W
- Duplexer** Ferrite circulator with limiter diode
- Noise Figure** 6 dB nominal

DISPLAY UNIT

- Picture Tube** 20" color CRT, 800 (H) x 1024 (V) pixels
Monochrome yellow or green with 16-level gradation (3 colors additionally for Regular Type)
- Color** Head-up, Course-up, North-up, TM
- Display Modes**
- Range Scales**
Range: 0.125, 0.25, 0.5, 0.75, 1.5, 3, 6, 12, 24, 48, 96 nm
Rings: 0.025 0.05, 0.1, 0.25, 0.25, 0.5, 1, 2, 4, 8, 16 nm
(16, 32 and 120 nm range scales can be menu-added in Regular Type)
- Minimum Range** 25 meters on 0.25 nm range
- Range Discrimination** Better than 25 meters on 0.75 nm range
- Accuracy** Range: 1% of range in use or 15 m, whichever is greater
Bearing: Better than 1°
- E-Plot** 10 targets with ID symbols
- Echo Trail Interval** 30 sec, 1, 3, 6, 15 or 30 min, or continuous
- Guard Zone Alarm** Targets in the guard zone trigger aural and visual alarms. (3-6 nm for Germany)



ENVIRONMENT

- Ambient Temperature: IEC 945
POWER SUPPLY (specify when ordering)

FR-2110/2120

- DC set: 24 to 32 VDC, 220 W (FR-2110), 250 W (FR-2120)
 AC set: 110/220 VAC, 1ø, 250 VA

FR-2120W/2150/2150W

- Display unit: 115 VAC, 1ø, 320 VA (FR-2120W),
 400 VA (FR-2150/FR-2150W)
 Antenna unit: 115/230 VAC, 1ø, 150 VA
 230 VAC, 3ø, 120 VA
 380/440 VAC, 3ø, 120 VA (FR-2120W/FR-2150W)
 24 VDC, 30 W (FR-2150)

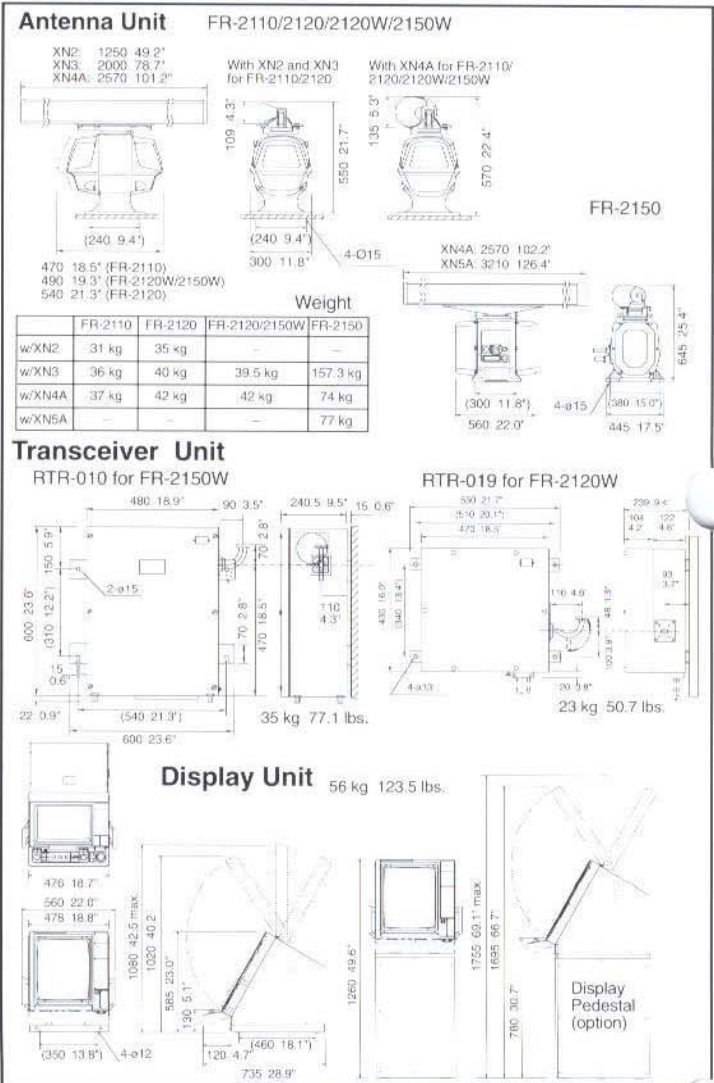
EQUIPMENT LIST

Standard

- Display Unit RDP-106 1 unit
- Antenna Unit with 30 m Antenna Cable (FR-2110/2120/2150) 1 unit
- Transceiver Unit RTR-019 (FR-2120W), RTR-010 (FR-2150W) 1 unit
- Power Supply Unit PSU-004, PSU-001 for FR-2150 antenna 1 unit
- Standard Spare Parts and Installation Materials 1 set

Optional

- Display Pedestal
- Hand Grip
- Waveguide for FR-2120W/2150W
- Gyro Interface GC-8 (built-in type)
- Stepdown Transformer for 440 VAC
- Interswitch Box RJ-5, RJ-7, or RJ-8
- Performance Monitor PM-30
- 36 rpm scanner motor for FR-2110/2120
- Auto Plotter ARP-23
- Video Plotter RP-23
- ROM/RAM Card for RP-23



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE