FURUNO DEEPSEA WORLD

FURUNO®

AUTOMATIC RADAR PLOTTING AID

Models FAR-2800 series

Add-on ARPA Model FA-2800

The future today with FURUNO's electronics technology.

FURUNO ELECTRIC CO., LTD.

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Catalogue No.R-117

FURUNO's Second Generation Daylight ARPA Offering Quality, High-resolution Picture With Unrivalled Target Tracking Capability

- 28" diagonal CRT presents radar picture of 360 mm effective diameter with alphanumeric data area around it
- Acquires up to 20 targets automatically plus up to 20 targets manually, or all 40 targets manually
- Movement of tracked targets shown by true vectors and plots, or relative vectors and plots (Vector length 1 to 99 min. selected in 1 min. steps)
- On-screen digital readouts of range, bearing, course, speed, CPA (Closest Point of Approach), TCPA (Time to CPA), BCR (Bow Crossing Range) and BCT (Bow Crossing Time) of up to 3 target ships as well as own ship's speed and course
- Setting of nav lines, buoy marks and other symbols to enhance navigation safety
- Audible and visual alarms against threatening targets coming into operator-selected CPA/TCPA limits, lost targets, targets in two guard rings; visual alarm against system failure and target full situation
- Easy operation by combination of tactile backlit touchpads, a trackball and rotary controls
- Stylish display designed for self-standing or panel mounting
- Options: A built-in Interswitch RJ-6 and a built-in Gyro Interface GC-6

Control panel illuminated

The field-proven radiators are mounted on a rugged turning unit capable of 100 knot wind velocity.

S-band Antenna for FAR-2830S, 2832S, 2862S

with 12-ft radiator (SN7AF)

The S-band antenna consists of a 12-ft radiator and a powerful gearbox. On FAR-2830S, the transceiver is built in the gearbox.

The new FAR-2800 series of ARPA's are the results of combination of the FURUNO's many years of experience in the marine field and the advanced computer technology. The FAR-2800 series are designed to fully meet the exacting rules of the International Maritime Organization (IMO) for installations on all classes of vessels.

The display unit employs a 28" diagonal high-resolution green-phosphor CRT. It provides an effective radar picture of 360 mm diameter leaving sufficient space for on-screen alphanumeric data.

Target detection is enhanced by the sophisticated signal processing technique such as multi-level quantization (MLQ), echo stretch, echo average, and a built-in radar interference rejector. And an audible and visual guard zone alarm is provided as standard. Other ship's movement can be visually assessed by echo trails or echo plots in addition to vectors and textual readouts.

On-screen data readouts include CPA, TCPA, range, bearing, speed/course of own ship and up to 3 targets. The ARPA functions include automatic acquisition of up to 20 targets plus manual acquisition of up to 20 targets, or manual acquisition of all 40 targets. In addition, the ARPA features display of a traffic lane, buoys, dangerous points, and other important reference points.

X-band Antenna for FAR-2822, 2822X, 2852X

with 8-ft radiator (XN4A)

The X-band antenna consists of a selectable 6.5-, 8- or 10-ft radiator and a powerful gearbox. On FAR-2822, the transceiver is built in the gearbox.

Modular Display Unit

Modular type display is available for mounting on table or in bridge console. The control head can be installed at any convenient place for operation up to 5 meters from the processor unit, and the processor unit may be installed in a hide-away place.

MODELS include:

ARPA's	Basic Specs.
FAR-2822	X-band, 25 kW, TR up
FAR-2822X	X-band, 25 kW, TR down
FAR-2852X	X-band, 50 kW, TR down
FAR-2830S	S-band, 30 kW, TR up
FAR-2832S	S-band, 30 kW, TR down
FAR-2862S	S-band, 60 kW, TR down
FA-2800	Add-on ARPA

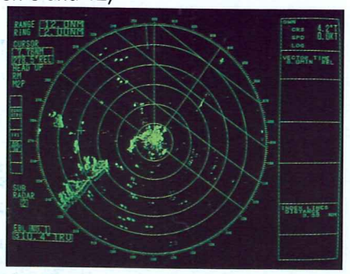
Modular Type (separation type) available.

NAVIGATION FAIRWAYS, NAVIGATION POINTS

To help you maneuver the ship in the critical area, two nav lines and five nav points can be drawn. Each nav line may be a straight line or string of lines containing a maximum of five vertexes (corners). Five nav points can be registered to represent buoys or other important nav reference, and a selected point is displayed for readout.

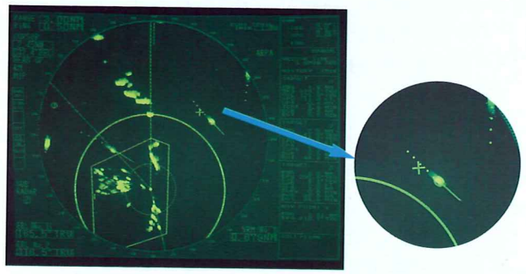
PARALLEL INDEX LINES

An electronic parallel cursor is useful for navigation maintaining a constant distance between own ship and a coastline or a reference. The cursor comprises 5 (0.5 and 0.75 nm scales) or 6 parallel lines (1.5 nm scale and above) in coincidence with the fixed range rings. (In regular version, the number of the lines is adjustable between 3 and 12)



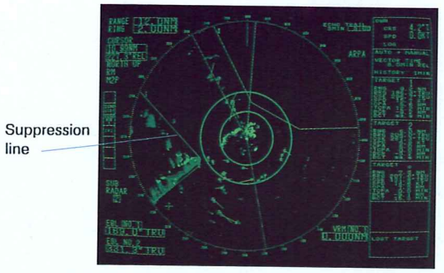
ECHO TRAIL

Available on ARPA and Radar modes. Course and speed of other targets can be intuitively assessed by low intensity trail painted along their courseline. Interval is selected from 30 sec, 1 min, 3 min, or continuous.



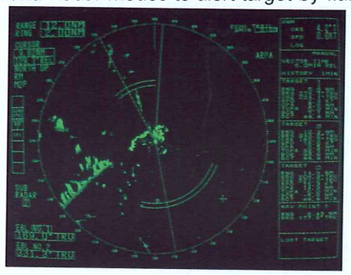
AUTO ACQUISITION SUPPRESSION LINES

To protect the processor from overload or miscalculation, non-auto tracking zones can be established by 3 lines and a circle. Each line can be a straight line or a string of lines containing a maximum of five vertexes, fixed on land or ship. Acquisition circle is adjustable at 0.3 nm or more to avoid sea clutter. The lines are gyro stabilized so that frequent adjustment is not required.



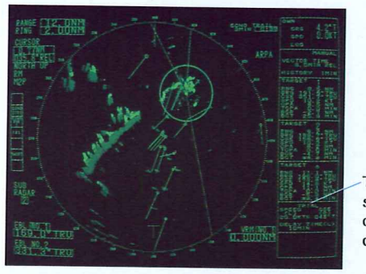
GUARD RING, GUARD ZONE

Two guard rings are available between 0.2 and 32 nm with a width of 0.5 nm, in sector or full circle on ARPA mode. Targets coming into the ring from outside are marked with inverse triangles (▽). A guard zone is additionally available on ARPA and Radar modes to alert target by flashing.



TRIAL MANEUVER

Shows the likely consequences of proposed changes of own ship's speed or course. The ARPA simulates the future positions and speed/course of the nearby targets after the operator-selected time delay and new resulting CPA/TCPA is indicated on screen. If that CPA/TCPA is unsatisfactory, various trial courses, trial speed and delay time can be entered until the safe course and speed are found.



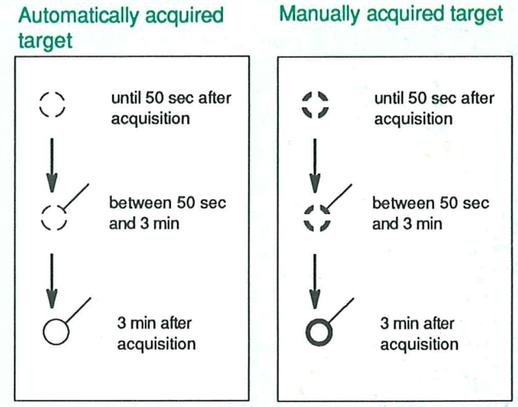
TARGET ACQUISITION

The ARPA acquires up to 20 targets automatically plus up to 20 targets manually, or all 40 targets manually. The FURUNO's exclusive advanced auto-tracking circuit assures reliable target acquisition and tracking.

In the automatic acquisition mode, the closest 20 targets within 0.3 and 32 nm are automatically acquired. Other targets within 32 nm range are continuously monitored, and if one of the monitored targets comes closer than one of the 20 targets being tracked, the ARPA will cancel tracking the farthest one and the new target will be acquired.

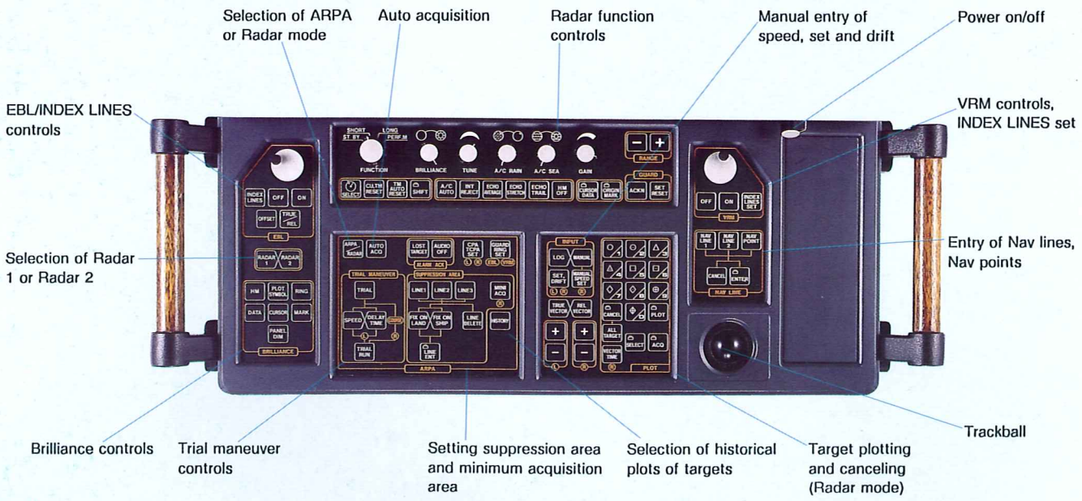
If an important target automatically acquired approaches the suppression area, it can be changed to manual acquisition; thus the target can continue to be tracked beyond the limit line. In this case, the ARPA symbol will change from a thin circle to a heavy circle.

Marks of acquired target changes in the following sequences:



Easy-to-control

The combination of push buttons, rotary controls, and trackball allows easy and intuitive operation. For the modular (separation) type, the control head comes with 5 m cable from the processor unit.



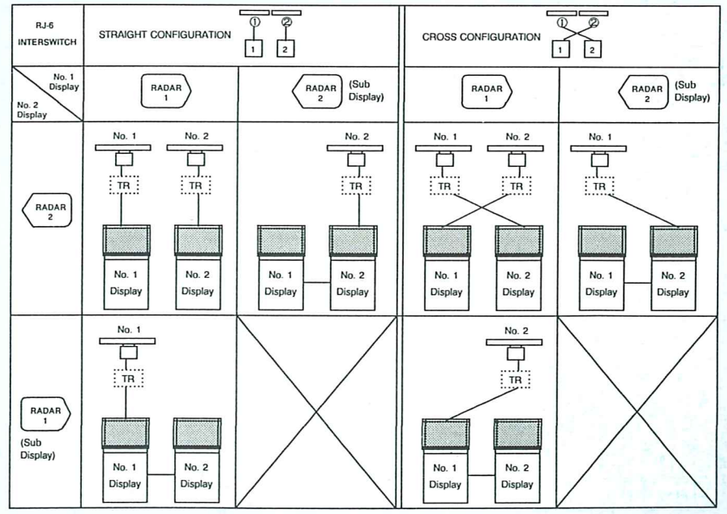
Performance Monitors PM-30, PM-50 (option)

To meet IMO requirements, the performance monitor is mandatory on Convention ships. The PM-30 (X-band) and PM-50 (S-band), working as a low-power transponder, check radar transmitter and receiver circuits under normal radar operating condition. The unit is easily mounted behind the antenna and no modification in the radar unit is required.

PM-30: X-band
PM-50: S-band

Radar Interswitch Unit RJ-6 (option)

The FAR-2800 series is provided with an interface for an extra radar signal.
The RJ-6, which is built in the display unit (or in the processor unit on modular type), allows dual radar/ARPA installation with full interswitching capability.



SPECIFICATIONS OF FAR-2800 series, FA-2800

ANTENNA RADIATORS (not provided for FA-2800)

1. **Type** Slotted waveguide array

	6.5'(XN3)	8'(XN4A)	10'(XN5A)	12'(SN7AF)
2. Beamwidth		X-band		S-band
Hor:	1.23°	0.95°	0.75°	1.9°
Vert:	25°	20°	20°	25°
3. Sidelobe Attenuation				
Within ±10°:	24 dB	28 dB	26 dB	25 dB
Outside ±10°:	30 dB	32 dB	30 dB	30 dB

4. **Polarization** Horizontal
5. **Rotation** 26 rpm (60 Hz) or 21 rpm (50 Hz)
6. **Wind Load** Relative wind 100 knots

RF TRANSCEIVER (not provided for FA-2800)

Contained in the gear box on FAR-2822/2830S
Contained in the transceiver unit on FAR-2822X/2852X/2862S

1. **Frequency**
   FAR-2822, FAR-2822X: 9410 ±30 MHz
   FAR-2852X: 9415 ±30 MHz
   FAR-2830S, FAR-2832S, FAR-2862S: 3050 ±30 MHz
2. **Output Power**
   FAR-2822, FAR-2822X: 25 kW
   FAR-2852X: 50 kW
   FAR-2830S, FAR-2832S: 30 kW
   FAR-2862S: 60 kW
3. **Pulselength/PRR**
   0.08 µs, 2200 Hz (0.25, 0.5 nm)
   0.08/0.3 (or 0.2*) µs, 2200/1100 Hz (0.75, 1.5 nm)
   0.3 (or 0.2*)/0.6 µs, 1100/600 Hz (3 nm)
   0.6/1.2 µs, 600 Hz (6, 12, 24 nm)
   1.2 µs, 600 Hz (48 nm)/500 Hz (120 nm)
   * *FAR-2852X and FAR-2862S*
4. **I.F.**
   60 MHz, Logarithmic
   Bandwidth: 28 MHz (short pulse), 3 MHz (med/long pulse)
5. **Duplexer** Ferrite circulator with limiter diode
6. **Noise Figure**
   FAR-2822, FAR-2822X, FAR-2852X: 6 dB nominal
   FAR-2830S, FAR-2832S: 4 dB nominal
   FAR-2862S: 4.5 dB nominal

DISPLAY UNIT

1. **Type**
   28" diagonal high-resolution green-phosphor CRT (with 15-level quantization) Effective diameter: 360 mm
2. **Presentation Modes**
   Relative motion Head-up, North-up*, Course-up*, True motion North-up* (reset at 70% radius)
   **Gyro interface GC-6 or gyro converter AD-100 required.*
3. **Range Scales and Range Ring Intervals**

Range:	0.25,	0.5,	0.75,	1.5,	3,	6,	12,	24,	48,	120 nm
Rings:	0.05,	0.1,	0.25,	0.25,	0.5,	1,	2,	4,	8,	20 nm

4. **Offcenter** 50% radius of range scale in use
5. **Minimum Range** 25 m
6. **Range Discrimination** 20 m on 0.25 nm scale
7. **Bearing Readout** By EBL, floating origin, 0.1° resolution
8. **Accuracy**
   Range: 0.85% of range scale in use or 7m, whichever is the greater
   Bearing: EBL accuracy ±1°
9. **Echo Plot**
   Manual entry, automatic calculation of CPA/TCPA/vector/course/speed. Up to 10 targets being tracked can be marked with 10 different plot symbols such as circle, triangle, etc. with or without center dot. *Automatically disabled when ARPA is activated.*
10. **Echo Trail** For radar and ARPA
11. **Echo Average** Scan-to-scan correlation to improve detection in sea clutter
12. **Guard Zone**
    Radius: Both inner and outer limits confined between 3 and 6 nm for N-type; free setting for Regular-type
    Sector angle: 1-360° in any direction
13. **VRM** Two Variable Range Markers switched (floating origin)
14. **EBL** Two Electronic Bearing Lines switched (floating origin)

ARPA FUNCTIONS

1. **Acquisition**
   Automatic mode: Automatic acquisition of up to 20 targets, plus manual acquisition of additional 20 targets.
   Manual mode: Manual only acquisition of up to 40 targets
2. **Suppression Areas**
   Three limit lines to define suppression areas in which automatic target acquisition will not occur. Each limit line, either fixed on land or fixed on ship, may be a single straight line or a string of lines containing up to 5 corners.
3. **Acquisition Range** 0.3 to 32 nm
4. **Tracking** Range: 0.2 to 32 nm, Speed: 99.9 knots max.
5. **Vector Presentation**
   True or relative vectors switchable. Trend within 1 min., full accuracy within 3 min.
6. **Vector Length**
   1 to 99 min. in steps of 1 min, front panel control
7. **Past Positions**
   5, 10, 20 or 50 past positions of any targets being tracked at intervals of 15 or 30 s, 1, 2, 3, 6 or 12 min. (The number of plots and plot interval preset internally.)
8. **Target Data Display**
   Range, bearing, course, speed, CPA, TCPA, BCR (bow crossing range) and BCT (time to BCR) of up to 3 targets
9. **Own Ship Data Display** Course and speed
10. **Alarms**
    Audible and visual alarms against threatening targets coming into the preset CPA/TCPA limits, lost targets, targets crossing guard rings. Visual alarm against system failure and target full situation.
11. **Collision Warning**
    CPA limit: 0.2 to 10 nm
    TCPA limit: 0 to 99 min.
12. **Guard Rings**
    2 guard rings, 0.5 nm wide, between 0.7 and 32 nm, Sector 1-360° in any direction
13. **Trial Maneuver**
    Simulates the effect on all tracked targets of an own ship maneuver without interrupting the updating of target information. Operator can change course, speed and delay time for simulation.

INTERFACING

1. **Gyrocompass**
   Built-in interface accepts synchro signal (20-50 V, 50-400 Hz) or stepper signal (20-50 VDC, any polarity).
2. **Speed Log**
   Contact closure or DC signal at 200, 400 or 500 pulses/nm.
3. **External Radar**
   FAR-2800 series: Interface provided for one external radar.
   FA-2800: Interface provided for two external radars.

POWER SUPPLY

1. **Display and Transceiver Units**
   110 VAC, 50/60 Hz, 1ø
2. **Antenna Unit**
   220 VAC, 50 Hz, 1ø; 220 VAC, 60 Hz, 3ø; 380 VAC, 50 Hz, 3ø; 440 VAC, 60 Hz, 3ø

For the other input, optional transformer required, see connection diagram.

EQUIPMENT LIST

Standard Supply

For FAR-2822/2830S

1. Display Unit	1 unit
2. Antenna Unit	1 unit
3. Standard Spare Parts	1 set
4. Installation Materials incl. 30m antenna cable	1 set

For FAR-2822X/2852X/2832S/2862S

1. Display Unit	1 unit
2. Antenna Unit	1 unit
3. Transceiver Unit	1 unit
4. Standard Spare Parts	1 set
5. Installation Materials incl. 30m antenna cable	1 set

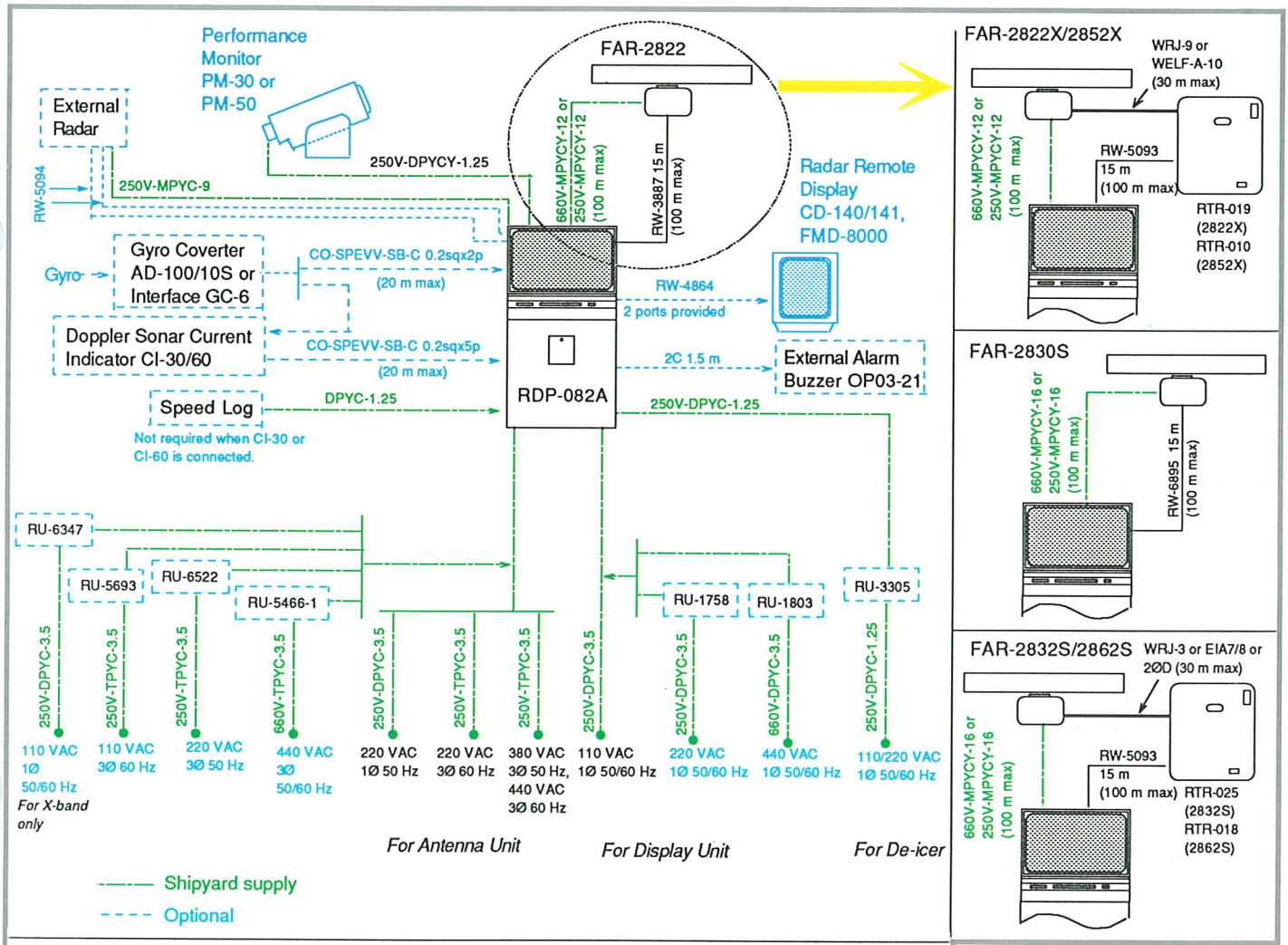
For FA-2800

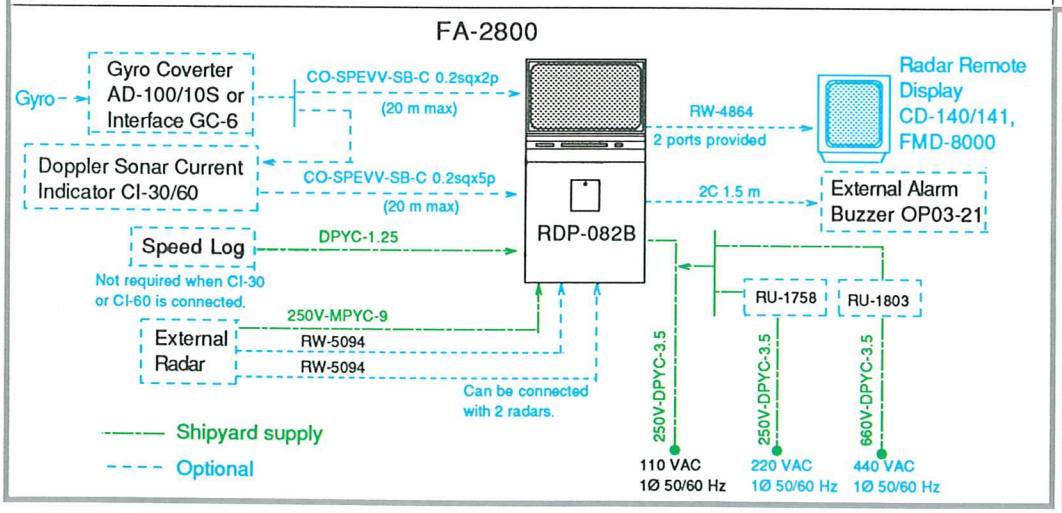
1. Display Unit	1 unit
2. Standard Spare Parts	1 set

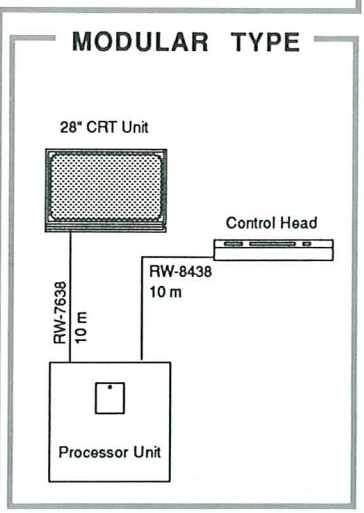
For modular (separation) type, display unit is divided into CRT unit, control head and processor unit.

Optional

1. Transformer
2. Performance Monitor PM-30 (X-band) or PM-50 (S-band)
3. Remote Display CD-140, CD-141, GD-1400 or FMD-8000
4. Gyro Interface GC-6 (built-in) or Gyro Converter AD-100 (or AD-10S) (external)
5. Interswitch RJ-6 (built-in)
6. External Buzzer OP03-21 for Radar Alarm

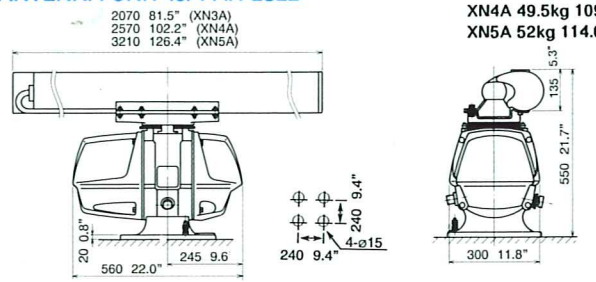






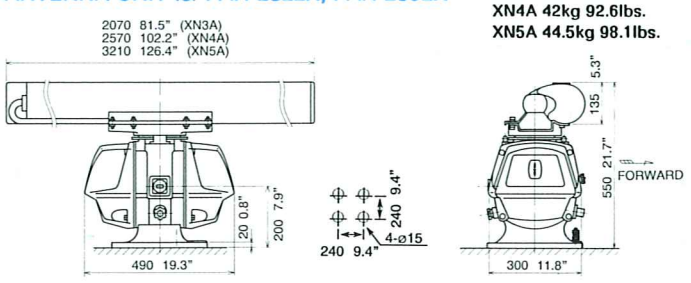
ANTENNA UNIT for FAR-2822

XN3A 47kg 103.6lbs.
XN4A 49.5kg 109.1lbs.
XN5A 52kg 114.6lbs.



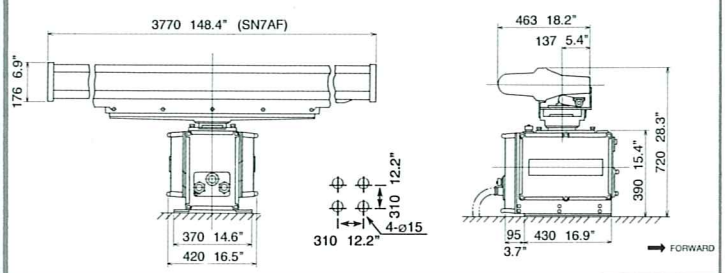
ANTENNA UNIT for FAR-2822X, FAR-2852X

XN3A 39.5kg 87.1lbs.
XN4A 42kg 92.6lbs.
XN5A 44.5kg 98.1lbs.



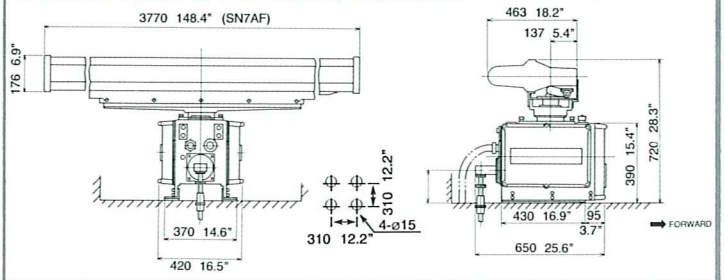
ANTENNA UNIT for FAR-2830S

SN7AF 130kg 286.6lbs.



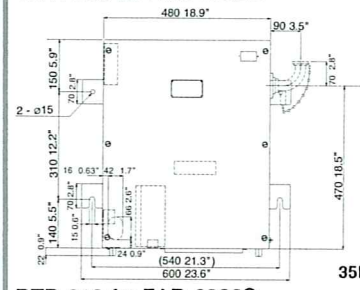
ANTENNA UNIT for FAR-2832S, FAR-2862S

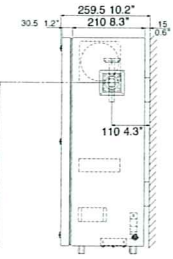
SN7AF 125kg 275.6lbs.



TRANSCEIVER UNIT

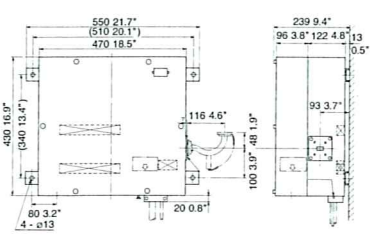
RTR-010 for FAR-2852X





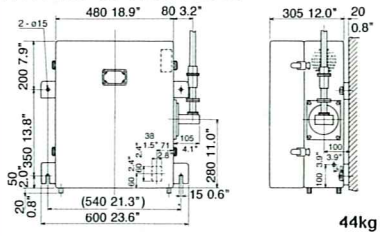
35kg 77.2lbs.

RTR-019 for FAR-2822X



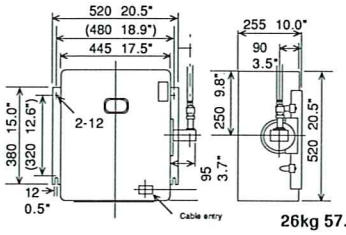
23kg 50.7lbs.

RTR-018 for FAR-2862S



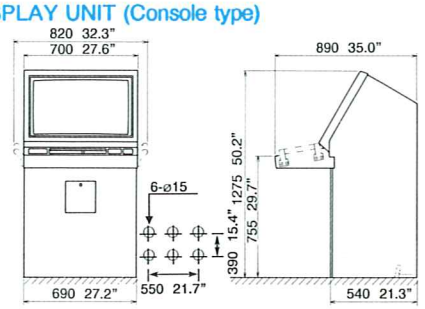
44kg 97.0lbs.

RTR-025 for FAR-2832S



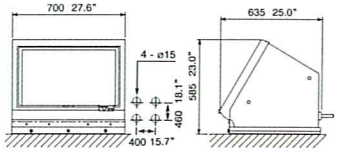
26kg 57.3lbs.

DISPLAY UNIT (Console type)



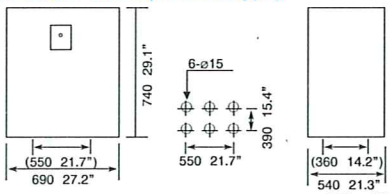
100kg 220.5lbs.

DISPLAY UNIT (Modular type)



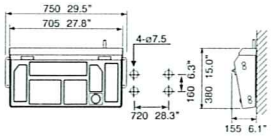
65kg 143.3lbs.

PROCESSOR UNIT (Modular type)



55kg 121.3lbs.

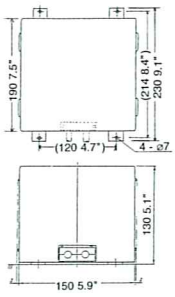
CONTROL UNIT (Modular type)



15kg 33.1lbs.

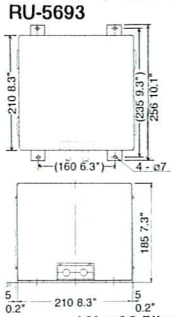
TRANSFORMER UNIT

RU-6347, RU-6522



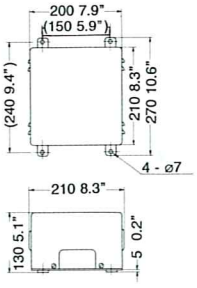
12kg 26.5lbs.

RU-5466-1, RU-6764, RU-5693



12kg 26.5lbs.

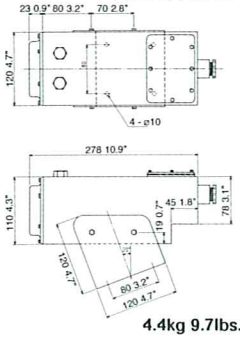
RU-1758, RU1803, RU-3305



12kg 26.5lbs.

PERFORMANCE MONITOR

PM-30, PM-50



4.4kg 9.7lbs.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

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