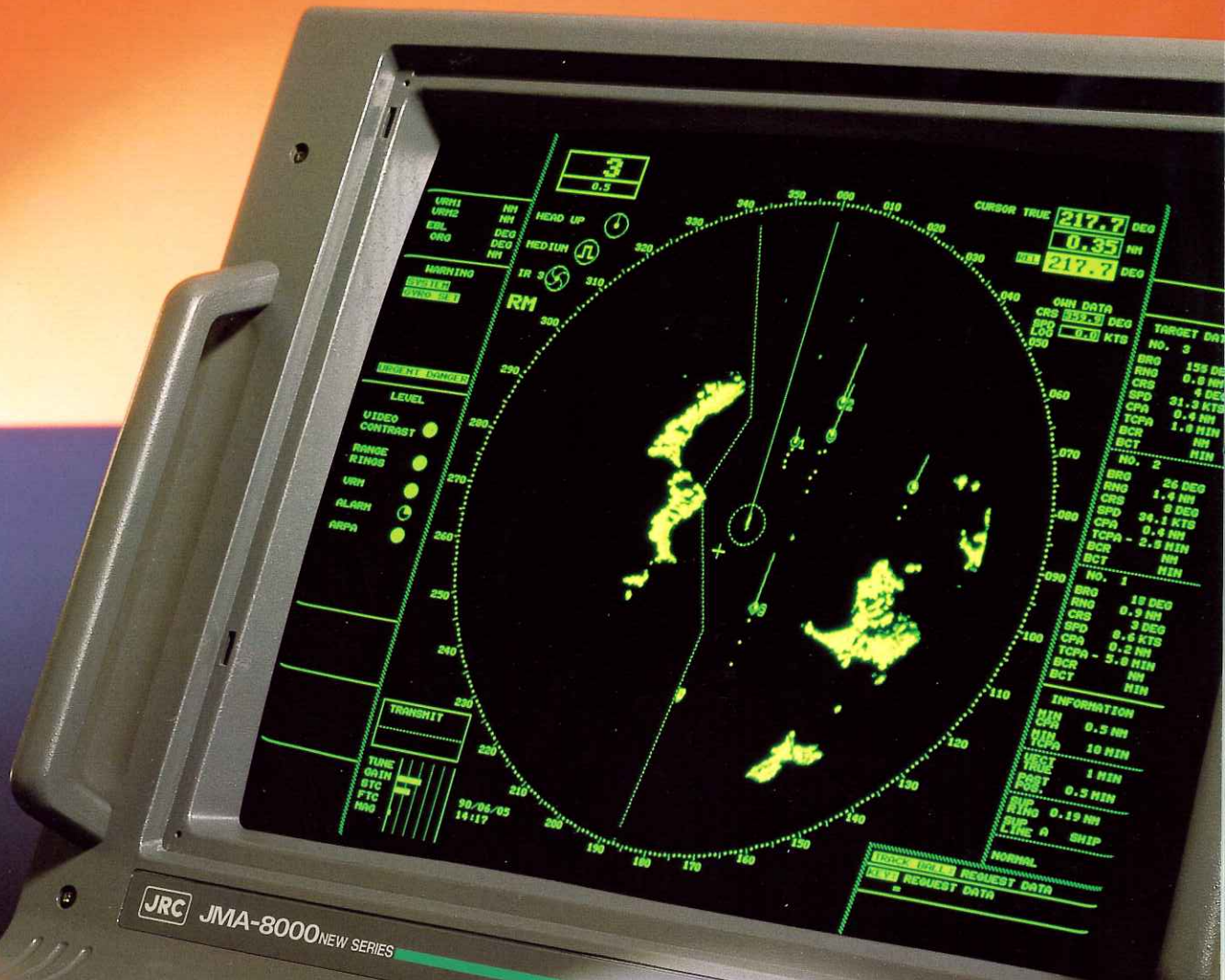


JRC ARPA (AUTOMATIC RADAR PLOTTING AID) SYSTEMS

JMA-8263-CA/8513-CA

3cm, 7ft/9ft, 25kW/50kW, 28in, 120nm

The 28-Inch Raster-Scan Display ARPA Series



The 28-inch raster-scan ARPA monitor enhances efficiency and safety of navigation.

The JMA-8263-CA/JMA-8513-CA is a radar-integrated ARPA system offering accurate navigational data and displays on short to long ranges. The new JMA-8000-CA series has full-scale ARPA functions and presents the vectors and symbols of other ships and collision avoidance information superimposed on radar raw video on an easy-to-see 28-inch raster-scan CRT display. In addition, new features such as latest radar signal processing, ship's trail display and increased navigational data inputs are provided.



FEATURES

High-Resolution Raster-Scan CRT Display

The 28-inch high-resolution raster-scan flat CRT screen provides bright easy-to-see displays, ensuring ease and efficiency of ship operation.

Newest Radar Signal Processing

The adoption of a microwave IC (MIC) front-end and the most advanced video signal processing technology permits the radar to clearly detect even weak signals from targets on long ranges.

Ship's Trail Display

A moving target's trail can be displayed on the video screen, its direction and length presenting the target's course and speed. This function is helpful in ship operation and collision avoidance.



Simple Operation

The operation panel is designed for easy operation by using electronic touchkeys in different colors and a trackball, enabling the operator to take fast actions in case of emergency.

Automatic Acquisition and Tracking of 40 Targets

Up to 40 targets can be selected for automatic/manual acquisition and automatically tracked and plotted on the display. In the automatic acquisition mode, two exclusion areas can be set and displayed in two 4-segment lines in the LAND mode in relation to fixed land or in the SHIP mode in relation to own ship. A short range suppression ring for rejecting acquisition under sea/rain clutter can also be set. Manual acquisition of targets in the exclusion areas is available in the automatic acquisition mode.

Useful Navline Display

Navlines necessary for coastal navigation can be displayed on the radar video and stored in memory. Navlines can be drawn as course lines and exclusion lines, which are useful to monitor own ship's position relative to a planned route on the display.

Various Radar Video Modes

Radar video is presented in True Motion mode or in Relative Motion mode. Bearing presentation is available in North-Up, Head-Up and Course-Up modes, in each of which true or relative vector presentation is available.

Auto-Drift Function

Navlines are displayed in relation to a fixed target, regardless of current's set and drift. In the AUTO-DRIFT mode, a fixed target is tracked to automatically calculate and compensate ship speed errors. This function is particularly useful for coastal navigation along the navlines.

Audible and Visual Warnings of Danger

Safe limits — MIN. CPA (minimum Closest Point of

The JMA-8263-CA/JMA-8513-CA is available in the following models:

Model	Remark
JMA-8263-7CA	Includes X-band 25kW radar with 7-foot scanner
JMA-8263-9CA	Includes X-band 25kW radar with 9-foot scanner
JMA-8513-7CA	Includes X-band 50kW radar with 7-foot scanner
JMA-8513-9CA	Includes X-band 50kW radar with 9-foot scanner

Approach) and MIN. TCPA (minimum Time to CPA) — can be preset and displayed on the screen. Tracked targets are distinguished in three collision risk grades relative to the safe limits and marked with ○ (safe), △ (dangerous), and ◇ (very dangerous). In addition to the visual warnings, an audible alarm by buzzer is given against a very dangerous target.

Navigation Data Display

Own ship's course and speed, and the bearings, distances, courses, speeds, CPA, TCPA, BCR (Bow Cross Range) and BCT (Bow Cross Time) of up to three targets can be digitally displayed simultaneously on the screen. These data are automatically updated as long as the targets are tracked, ensuring accurate evaluation of own ship's situation in relation to those targets.



Trial Maneuver

In the true or relative vector presentation mode, own ship's change in course and speed can be simulated by simple key operation. The simulated results are displayed on the screen without interrupting target data updates.

Self-Testing Diagnostics

ARPA system performance is steadily monitored by a built-in system monitor, and the entire system is programmed for extensive self-testing and trouble-shooting diagnostics, enabling speedy recovery measures to be taken in case of failure.

Digital Display of True Bearing

The system is provided with an electronic NSK (North Stabilizing Kit) using no mechanical repeater motor. The NSK can be connected with any type of gyro-compass by simple switch operation to offer true bearing information. The digital display of own ship's true bearing on the screen is useful for ship operation.

Electronic Parallel Cursors

Electronic parallel lines can be presented on radar video,



giving a great convenience to observe the positions of other ships relative to own ship.

Speedy Measurement with Trackball

The bearing and distance of the cursor position is displayed on the screen all the time. The bearing and distance of a target can easily be measured by positioning the cursor on the target with a trackball.

Electronic Cursor (EBL)

The Electronic Bearing Line can be presented in the radar video circle in two modes; the CENTER mode in which the EBL originates from the radar video center (own ship's position), and the INDEPENDENT mode in which the EBL originates from the cursor mark of the trackball. Using the EBL with the VRM (variable range marker), the distance and bearing between two targets can be measured easily.

Off-Centering

The radar video can be freely off-centered in a range of approximately 65% of the radius of the video circle, presenting more information around own ship fore and aft.

X2 Enlargement

The radar video can be enlarged doubly so that very small targets are easier to see.

Own Ship's Track (Option)

When a navigation unit interfaces with the system by an optional add-on terminal board, own ship's track can be displayed on the radar video.

Pulsewidth in Three Steps

To trade off its resolution and sensitivity requirements, the radar can switch over the pulsewidth in three steps on the ranges of 3, 6 and 12 nautical miles, ensuring optimum clear echo definition.

True Motion Unit

The radar is provided with a TM unit which permits the radar observer to monitor the true motions of other ships at a glance as if they were moving on the sea.

Easy Installation Adjustment

Installation adjustments including antenna bearing and ship's heading marker alignments can be made easily by controls inside the Display Unit.

Options

Performance Monitor

Radar performance can be monitored on the screen. (NJU-13 for the JMA-8513-CA and NJU-14 for the JMA-8263-CA)

External Signal Interface (MDYW03509)

The interface allows the system to connect to navigation equipment (GPS, NS or Loran navigator), a radar adaptor or a radar buoy.

Inter-Switch

The inter-switch permits two radar systems to switch over between the scanner units and the transmitters/receivers, and the display units.

DISPLAY & CONTROL PANEL

- VRM-1 range
- VRM-2 range
- EBL bearing
- EBL start position bearing & distance
- Alarm mode operation sign
- Plot mark
- Brilliance, level signs
- NAVLINE
- NAVLINE operation sign
- Guard ring operation signs (start & end bearing, ARPA distance)
- Operating switch sign (TRANSMIT/ST-BY)
- PROCESS Process video sign (3 steps), Trail 1-10 (10 steps)
- Interswitch sign
- Control bar-graph (TUNE, GAIN, STC, FTC, MAG)



- Drift mode operation sign (course & speed)
- EBL
- ARPA information
- SHM
- AUTO ACQ mode operation sign
- Selectable by SEL DISPLAY from:

NORMAL
NO SYMBOL
◇△ONLY
◇ ONLY
- Suppression line
- Function sign of trackball
- Command sign set from keyboard (up to 5 digits)
- Failure sign: no equip, error operation, over function of ship's plot or NAVLINE,
- TRIAL: course, speed, and loss time sign on trial maneuver

RADAR CONTROL PANEL

- 1 POWER ON:** Power on/off switch
- 2 CRT BRIL:** CRT brilliance adjustment
- 3 TX/ST-BY:** Transmitter operating switch
- 4 GAIN:** Receiver sensitivity adjustment
- 5 TUNE:** Receiver tuning
- 6 ANTI CLUTTER SEA:** Sea clutter suppression
- 7 ANTI CLUTTER RAIN:** Rain clutter suppression
- 8 EBL:** Electronic cursor rotation
- 9 MOTION**
 - TM/RM: Switchover of TM and RM modes
 - RESET: Manual reset to TM mode
- 10 VIDEO**
 - TRAIL: Display of trails
 - PROCESS: "Processed" video display
 - X2: X2emlarge
 - CONTRAST: Video contrast adjustment
- 11 RANGE:** Range scale selection
- 12 SHM OFF:** Temporary SHM erasure
- 13 OFF CENTER:** Off-centered video in RM mode
- 14 BEARING**
 - NORTH UP/HEAD UP/COURSE UP: Selection of bearing presentation mode
- 15 RANGE RINGS:** Fixed range marker display
- 16 DATA ENTRY:** Data entry keys, and increment and decrement keys
- 17 ALARM RESET/VOL:** Alarm tone silencer and volume control
- 18 TRACK:** Display of own ship's track
- 19 GUARD RING:** Display of alarm zone against other target's intrusion
- 20 EBL**
 - CENTER: Display of EBL originating from video center
 - INDP: Display of EBL originating from trackball cursor mark independently
- 21 PLOT:** Display of plot mark
 - CLEAR: Erasure of plot mark
- 22 VRM:** Display of VRMs No.1 and No.2
- 23 ENTER:** Data entry in cursor position
- 24 Trackball:** Cursor move

ARPA CONTROL PANEL

- 25 SEL DISP:** Selection of dangerous targets
- 26 SAFE LIMIT**
 - MIN.CPA: Setting of minimum closest point of approach
 - NIM.TCPA: Setting of time to CPA
- 27 TRIAL MANEUVER**
 - COURSE: Setting of own ship's course to be simulated
 - SPEED: Setting of own ship's speed to be simulated
 - DELAY T: Setting of delay time to be simulated
- 28 VECTOR**
 - TRUE/REL: Switch to select true or relative vector mode
 - LENGTH: Setting of vector length
- 29 PAST POS:** ON/OFF switch for target's past positions and for setting mark intervals
- 30 SUPPRESSION**
 - A LINE: Setting of A-line for exclusion sector in automatic acquisition mode
 - B LINE: Setting of B-line
 - SHIP/LAND: Switch to select own ship-based or land-based exclusion area
 - RING: Setting of short-range suppression ring in automatic acquisition mode
- 31 APPPOINT**
 - ROST DATA: Selection of target for data display
 - AUTO DRIFT: Selection of target for auto-drift correction
- 32 ACQUIRE**
 - MANUAL: Manual target acquisition
 - AUTO: Automatic acquisition ON/OFF
 - CANCEL: Tracked target cancel

SUB PANELS



- 33 VRM BRILLIANCE:** Adjusts VRM brilliance
- RANGE RINGS BRILLIANCE:** Adjusts brilliance of fixed range markers
- PANEL BRILLIANCE:** Adjusts brilliance for control panel
- ARPA BRILLIANCE:** Adjusts brilliance of ARPA marks (vectors, symbols, etc.)

- 34 PULSE WIDTH:** Switchover of pulse width
- 35 IR:** Radar interference rejection
- 36 DRIFT:** Compensation for own ship's speed error due to current set and drift
- MANUAL SPEED:** Manual entry of own ship's speed from LOG
- 37 #:** Spare key
- 38 INTER SW:** Interswitches radar installations
- 39 BAND:** Spare key
- 40 SYSTEM MONITOR**
 - INITIAL: Initializes data entry
 - TEST: Checks operational status of display unit
 - PERF MON: Monitors performance of transmitter/receiver and scanner

- 41 NAVLINE**
 - ON/RECALL: Displays and recalls NAVLINE from memory
 - DRAW: Draws navlines
 - CORRECT: Corrects drawn navlines
 - CLEAR: Clears navlines
 - STORE MEM: Stores navlines in memory

SPECIFICATIONS

RADAR SPECIFICATIONS

Scanner Unit

Model	NKE-1016* for JMA-8263-7CA/ JMA-8513-7CA	NKE-1017* for JMA-8263-9CA/ JMA-8513-9CA
Scanner length	7 feet	9 feet
Polarization	Horizontal	Horizontal
Beamwidth Horizontal	1.0°	0.8°
Vertical	20°	20°
Sidelobes Within ±10°	-26dB	-26dB
Outside ±10°	-30dB	-30dB
Rotation speed (60Hz)	22rpm	22rpm
Winds (relative)	51.5m/s	51.5m/s
Power supply	100/110/115V AC, 50/60Hz, 1φ (NKE-1016-1) or 200/220/230V AC, 50/60Hz, 3φ (NKE-1016-2F)	200/220/230V AC, 50/60Hz, 3φ (NKE-1017-2F)

*NKE-1016-XX or NKE-1017-XX
1: 100/110/115 VAC, 2: 200/220/230 VAC
F: 3φ motor power, D: Deicing type
Example: NKE-1016-2F, NKE-1017-2DF

Transmitter-Receiver Unit

Model	NTG-3025 for JMA-8263- 7CA/9CA	NTG-3050 for JMA-8513- 7CA/9CA
Transmit frequency	9410±30MHz	9375±30MHz
Peak power	25kW	50kW
Pulsewidth (range)	0.08μs(0.25~1.5nm) 0.08/0.25/0.75μs(3nm) 0.25/0.75/1.0μs(6, 12nm) 1.0μs(24, 48, 120nm)	
Duplexer	Circulator + diode limiter	
Mixer local oscillator	MIC(microwave front end)	
Receiving bandwidth	20MHz/3MHz	

Display Unit

Model	NCD-3561									
Display type	28-inch high-resolution, raster-scan, monochrome CRT, 340mm effective diameter									
Range scale	0.25	0.5	0.75	1.5	3	6	12	24	48	120nm
Range ring	0.05	0.1	0.25	0.25	0.5	1	2	4	8	20nm
Range accuracy	1.5% of max. range on each range scale or 70m whichever is larger									
Variable range marker	Two VRMs, 0~120nm, 4-digit display									
Bearing readings	360° in 1° steps									
Off-centering	65% of video circle radius (except 120nm)									
Electronic cursor	EBL in CENTER/INDP mode									
Radar interference rejector	Provided									
Pulsewidth switch	Provided (3, 6, 12nm in 3 steps)									
NAVLIN display	Available									
True motion unit:	Provided (1.5, 3, 6, 12, 24nm)									
Plotting function	Electronic, up to 20 marks									
Ship's trail display	Available									
STC (sea clutter)	Manual/Auto									
FTC (rain clutter)	Provided									
System monitor	Provided									
X2 enlargement	Provided									
Own ship's track	Available (with optional interface for external signal)									

ARPA SPECIFICATIONS

Target acquisition

Mode: Automatic/manual
Exclusion areas: Two 4-segment-line areas and a short-range suppression ring presettable
Manual cancel: Each or all targets

Automatic tracking

Number of targets: Up to 40 targets
Maximum acquisition area: 48nm

Display

Video mode: TM/RM, TM with auto-drift
Bearing mode: North-Up/Head-Up/Course-Up
Vector mode: True/relative vector presentation, variable adjustable from 0 to 60 min.
Past position mark: True/relative, 6 marks per target in mark intervals of 30s, 1, 2 and 4 min.
Range/bearing measurement: VRM1, VRM2 and EBL (CENTER/INDP)
Vector response: Approx. one minute or less
Vector stabilizing time: Within 3 min.

Warning alarms

Guard rings: Two (fixed and variable)
Setting: Variable ring (set by trackball) max. 48nm
Fixed ring (set by ten-key pad) max. 48nm
Alarm: Audible/visual, ☆ mark on CRT

Dangerous target

Setting: MIN.CPA 0~9.9nm
MIN.TCPA 0~99min.

Warnings:

Grade	Mark	Warning	Buzzer
Safe	○	OFF	OFF
Dangerous	△	DANGER	OFF
Very Dangerous	◇	URGENT DANGER	ON

Lost target: Dashed-line vector and symbol, audible/visual alarm

Data display

Target data: Simultaneous continuous data display for three targets: true bearing, distance, true course and speed, CPA, TCPA, BCR and BCT

Own ship data: True course and speed

Trial maneuver

Mode: Manual setting (manual/automatic reset)
Course: Within 180° port/starboard to SHM
Speed: 0~50 knots
Delay time: 0~60 min.

Display accuracy: To IMO standard

Performance testing: By built-in system monitor, sensor monitor and self-diagnostic programs

System failure alarm: Audible/visual

The appearance and specification subject to change for improvement without notice.



NIKE-1017 Scanner Unit (9 feet)

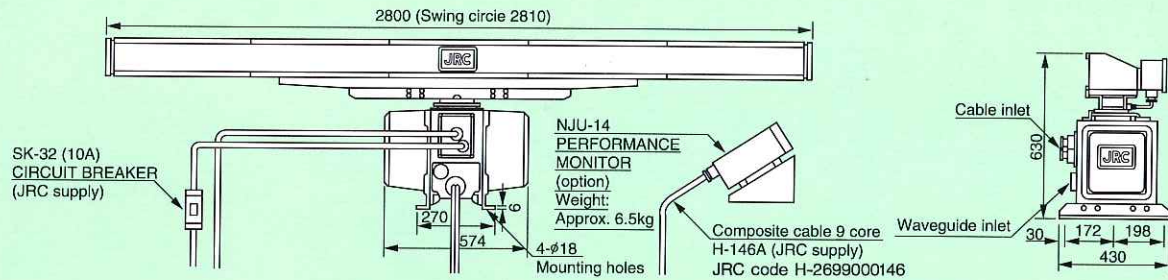


NIKE-1016 Scanner Unit (7 feet)

SYSTEM CONFIGURATION

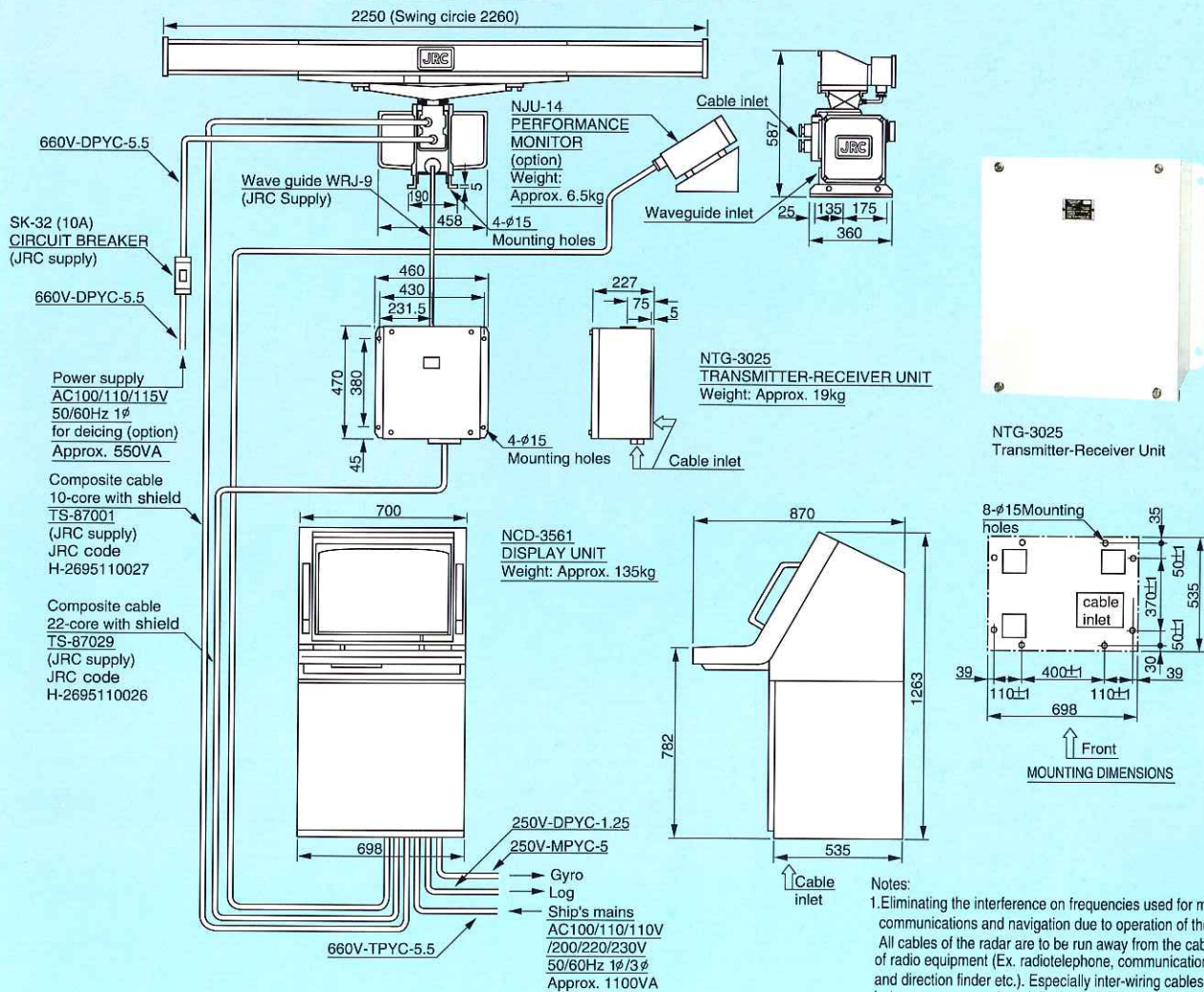
● JMA-8263-9CA

NKE-1017 SCANNER UNIT Weight: Approx. 76kg
 NKE-1017-D DEICING TYPE SCANNER UNIT (option) Weight: Approx. 78kg



● JMA-8263-7CA

NKE-1016 SCANNER UNIT Weight: Approx. 46kg
 NKE-1016-D DEICING TYPE SCANNER UNIT (option) Weight: Approx. 53kg



Notes:
 1. Eliminating the interference on frequencies used for marine communications and navigation due to operation of the radar. All cables of the radar are to be run away from the cables of radio equipment (Ex. radiotelephone, communications receiver and direction finder etc.). Especially inter-wiring cables between scanner unit and display unit of the radar should not be run parallel with the cables of radio equipment.
 2. Consult the performance monitor instruction manual for its installation.

