

# KODEN

## 12-INCH HIGH-RESOLUTION MARINE RADAR

# MD-3840

Dual speed antenna that promises faster picture update on short range and stable picture acquisition in mid and long ranges!

Flexible user defined keys and optional ranges to customize your radar!

An optional built-in ATA module, featuring multi-vessel tracking capability, provides complete situational awareness.

Newly developed high performance receiver promises the best definition on short ranges with better long range performance!

3.5 ft/4.5 ft, 4 kW, Open scanner



## FEATURES

### • Dual speed antenna

By using two levels of antenna speeds you have an optimized target reception capability, i.e., on short range, the 50 rpm speed provides faster update of the targets approaching or passing nearby, promising a secured watch and safer navigation in close range. With 25 rpm speed, the targets will be illuminated for relatively longer period of time by the slower speed. This causes the targets to be presented strongly on the screen. This speed is also good for long range observation.

### • Function keys and menu system

By assigning your most frequently used functions to the two FUNC keys, you can quickly access favorite radar functions. The menu system also makes for easy selection of the different menu choices.

### • The pointing device

Newly developed pointing device allows the setting up of the offcentering position, pointing cursor, etc. in quicker and more accurate manners.

### • Optional range scales

In addition to the standard range scales you can add optional ranges to your needs via the menu.

### • GPS receiver module built-in

A GPS receiver module can be built in to the display unit. No external connection is needed except the GPS antenna cable. By using a GPS receiver, the radar can be upgraded to provide various navigational information, including your position, waypoints, etc., plus various radar picture modes including north up, course up and true motion displays.

### • Man Over Board function

By assigning the MEMO L/L function to either of the FUNC key, you can immediately enter your current position by pressing the assigned key. (The GPS receiver module must be connected) This function is particularly useful for locating a "Man Over Board".

### • Flexible warning zone setting

Warning zone can be created easily by designating two points using the pointing device anywhere on the screen. The alarm zone can be set either IN or OUT alarm mode.

### • Improved receiver performance

The performance of the receiver section has been improved to provide a higher definition picture on short range and to enhance the long range performance as well.

### • Wide picture area

The 180 mm circular area is maintained across the screen for radar picture presentation for better observation.

### • Target Tracking (ATA: Option)

Using this feature you can plot a target and obtain CPA (Closest Point of Approach) and TCPA (Time to CPA) to aid in avoiding potential collision hazards. Using ATA, up to 10 targets can be acquired manually. Once acquired, the targets are automatically tracked with vectors developed. The navigational information such as CPA, TCPA, speed and the target course are shown in the digital window on the screen.

## SPECIFICATIONS

### Antenna unit

Aerial	3.5 feet / 4.5 feet
Peak power output	4 kW
Transmitting frequency	9410 ± 30 MHz
Beam width	Horizontal 2.4 ° (3.5 feet) / 1.7 ° (4.5 feet) Vertical 25 °
Rotation speed	50/25 rpm
Pulse length (µsec)/ PRF (Hz)	S 0.06/4000 M1 0.15/2000 M2 0.4/1000 L 1.0/500
IF center frequency	60 MHz
IF band width	S, M1 20 MHz M2, L 5 MHz
Noise figure	Better than 5 dB
Operating temperature	-25 °C to +55 °C (-13 °F to +131 °F)
Operation in wind (relative)	70 knots

### GPS receiver section (Option)

Receiving frequency	1575.42 MHz ± 1 MHz
Receiving channel	Digital 11-channel parallel/sequential
Receiving code	C/A code
Sensitivity	Better than -130 dBm (elevation angle: 5 ° or over)
Tracking speed	200 knots maximum
Accuracy	Position 15 m RMS (without SA), 100 m 2D RMS (with SA) Velocity 1 m/sec (with SA)

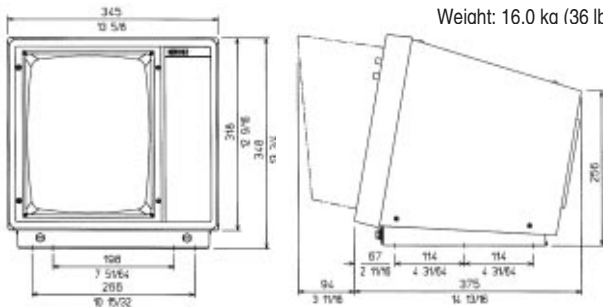
**Note:** Accuracy is subject to change in accordance with DoD civil GPS user policy.

## DIMENSIONS AND WEIGHT

### Display unit MRD-92

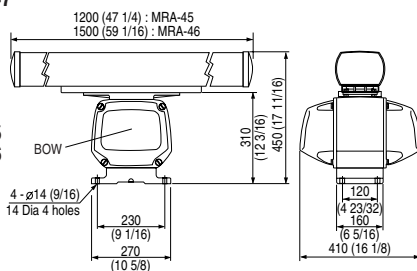
Unit: mm (inch)

Weight: 16.0 ka (36 lb)



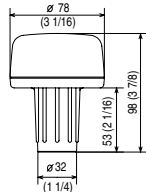
### Antenna unit MRT-147

Weight:  
21.2 kg (47 lb) : MDA-45  
21.9 kg (49 lb) : MRA-46



### Antenna unit (GPS) : GA-08/08L

Weight:  
0.19 kg (0.42 lb)  
0.62 kg (1.4 lb) : GA-08  
0.81 kg (1.8 lb) : GA-08L



### Display unit

Display	12-inch green monochrome high resolution CRT
Resolution	480 x 640 pixels
Video level	8 levels
Presentation modes	Head up, *north up, *course up, **true motion
Range scales (nm)	1/16 1/8 1/4 1/2 3/4 1 1.5 2 3 4 6 8 12 16 24 32 48
Rings interval (nm)	1/32 1/16 1/8 1/4 1/2 1 2 4 8 16
Range scales (m)	125 250 500 1k 1.5k 2k 3k 4k 6k 8k 12k 16k 24k 32k 48k 64k 96k
Rings interval (m)	25 50 100 200 300 500 1k 1k 2k 2k 4k 4k 8k 8k 16k 16k
Off-center	Sweep origin can be moved to any position within 75 % of the effective diameter
Echo trail interval	Continuous, 15, 30 sec., 1, 3, 6 min., OFF
Alarm	Alarm can be optionally set (entry/breakaway), proximity, cross track error
Minimum range	Less than 20 m (66 feet) on 1/8 nm range
Range discrimination	Better than 20 m (66 feet)
Range accuracy	Better than 7 m (23 feet) or 0.8 % of the maximum range of the scale in use, which is the greater
Bearing accuracy	Better than ± 1 °
Navigation data display	Boat position (Latitude/longitude, Loran C LOP) or speed/heading
Instants (event) memory	9 points
Waypoint memory	90 points
Route memory	5 routes (Max. 20 waypoints) with reverse trail
Other functions	Gain, STC, FTC, auto tune, heading marker off, Interference rejection, target expansion, zoom, two VRMs, two EBLs (0.1 ° step), floating EBL, cursor position (latitude/longitude), parallel cursor, bearing of target (true/relative), distance unit (nm/km), signal processing, location memory
Input data format	NMEA-0183 (BOD, BWC, GGA, GLL, GTD, HCC, HDM, HDT, HSC, VHW, VTG, WDC), NMEA-0182, CIF, JRC
Output data format (Option)	NMEA-0183 (For MRG-100: APB, BWC, GGA, RMB, VTG, ZDA), (For MRE-220: TTM)
Power supply	10.8 to 41.6 VDC
Power consumption	80 W or less (at 24 VDC)
Operating temperature	-15 °C to +55 °C (+5 °F to +131 °F)

\* North up and course up mode : Bearing data from an electric compass, a gyro compass or a navigator is required.  
\*\* True motion : Speed data from a speed log, and bearing data from an electric compass, a gyro compass or a navigator is required.  
Registrations of present position, any location and route : The position data is required from GPS or DGPS receiver module (Option).

## EQUIPMENT LIST

### Standard equipment

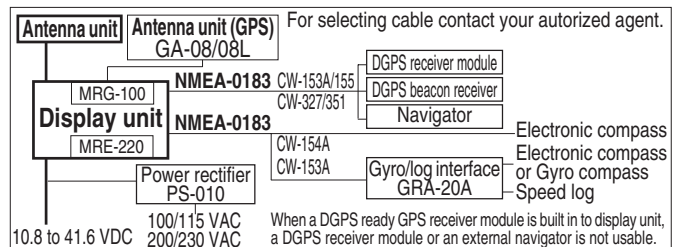
Antenna unit	Aerial	MRA-45	3.5 feet	1
		MRA-46	4.5 feet	
	Transceiver	MRT-147		1
Display unit		MRD-92	With vinyl cover	1
Connecting cable		CW-526	10 m, with 24-pin and one end plain	1
DC power cable		CW-89	3 m, with 3-pin connector and one end plain	1
Spare parts kit				1 set
Installation materials				1 set
Operation manual				1

### Option

Select either MRG-100 or MRE-230.

GPS receiver module	MRG-100	
ATA module kit	MRE-220	
Antenna unit	GA-08	With antenna cable (10 m, with BNC connector)
	GA-08L	With antenna cable (15 m, with BNC connector)
Gyro/log interface	GRA-20A	With power and connecting cable
Hood	MRH-130	
EMI filter	MRF-130	
Magnifying lens	MRL-130	
Connecting cable	CW-153A	5 m, with 6-pin connectors
	CW-154A	5 m, with 6-pin connector and one end plain
	CW-155	5 m, with BNC and 6-pin connectors
	CW-351/327	5 m, with 6-pin connectors
Power rectifier	PS-010	With two 5 A fuses
AC power cable	VV-2D8	3 m, both ends plain

## CONNECTIONS



\* Specifications subject to change without notice.

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Certified to ISO 9001 ( TUV PRODUCT SERVICE )



To ensure proper and safe use of the equipment, please carefully read and follow the instructions in the OPERATION MANUAL.

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