

# MARINE ELECTRONICS PRODUCTS

Leading Technology-

To a Brighter Future




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• Design and specifications are subject to change without notice.

 **Safety precaution** To ensure proper and safe use of the equipment, please carefully read and follow the instructions in the Operation Manual.

[www.koden-electronics.co.jp](http://www.koden-electronics.co.jp)

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## Koden opens a new door towards the future.

Koden Electronics was founded in 1947. The free and lively atmosphere generated from the dawn of the company has been passed on to the current firm. While improving reliability and quality on the basis of the ISO certificate which is an international standard of quality assurance, Koden opens a new door towards the future with the unique products as well as cultivated technology in hand.

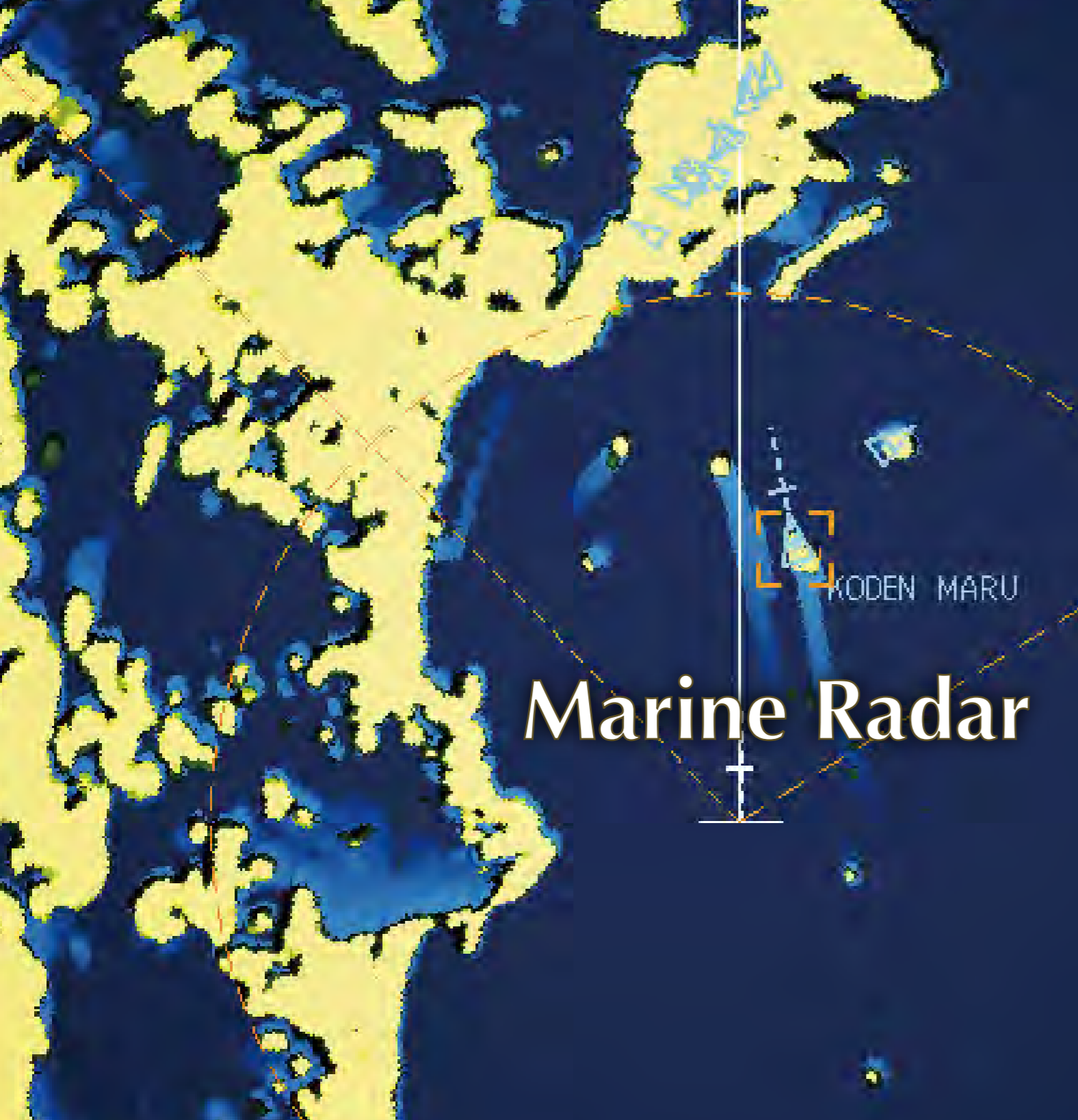
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# Product Line up

Radar												
Model	MDC-900 8.4 inch P9	MDC-2000 10.4 inch P9	MDC-5200 12.1 inch P8	MDC-5500 15 inch P8		MDC-7000 Black Box P7	MDC-7900 19 inch P7	MDC-7000P Black Box P7	MDC-7900P 19 inch P7			
Specifications												
Output power(Peak)	MDC-900 - 2 / 4 kw MDC-900A - 4kw	MDC-2000 - 4 / 6 / 12 kw MDC-2000A - 4kw	4 / 6 / 12 / 25 kw	4 / 6 / 12 / 25 kw		6 / 12 / 25 kw	6 / 12 / 25 kw	12 / 25 kw	12 / 25 kw			
TT(ARPA)	50	50	100	100		100	100	100	100			
AIS	100	100	1000	1000		1000	1000	900	900			
C-Map Chart	-	-	✓	✓		✓	✓	-	-			
Resolution	VGA	VGA	XGA	XGA		(SXGA)*	SXGA	(SXGA)*	SXGA			
Video level	8	8	16	16		16	16	16	16			
USB Trackball connection	-	-	✓	✓		✓	✓	✓	✓			
Echo Sounder												
Model	CVS-126 5.7 inch P14	CVS-128 8.4 inch P14	CVS-128B 8.4 inch P15	CVS-1410/HS 10.4 inch P14	CVS-1410B 10.4 inch P15		CVS-FX1 12.1 inch P15	CVS-FX2 15 inch P15	CVS-FX2BB Black Box P15	CVS-702D 12.1 inch P14	CVS-705D 15 inch P14	CVS-707D 17 inch** P14
Specifications												
<b>(Broadband)</b>	-	-	✓	-	✓		✓	✓	✓	-	-	-
Fish information	✓	✓	✓	✓	✓		-	-	-	-	-	-
Frequency presentation (Max.)	2	2	2	2	2		4	4	4	2	2	2
Resolution	QVGA	VGA	VGA	VGA	VGA		XGA	XGA	(XGA)*	XGA	XGA	XGA
Output power	600W	600W or 1kW	2kW	1kW	2kW		3kW	3kW	3kW	3kW or 5kW	3kW or 5kW	3kW or 5kW
	Sonar	GPS Compass	DGPS Sensor	GPS Sensor		GPS Navigator	Class A AIS Transceiver	Total Navigator	Navigational Echo Sounder			
Model	KDS-6000BB P17	KGC-222 P20	KBG-3 P20	GPS-20A P20		KGP-915 / KGP-920 / KGP-925 P20	KAT-100 P21	KTN-70A P21	CVR-010 P21			
												

\* Display unit : Owner supplied

\*\* For European model, please contact your nearest distributor.



MDC-7900P    MDC-5200  
MDC-7000P    MDC-5500  
MDC-7900    MDC-900  
MDC-7000    MDC-2000

# Marine Radar 19"

**NEW**



MDC-7900P series

**NEW**



MDC-7000P series

**NEW**




12-inch Display type  
4 kW

MDC-7900 series

**NEW**



MDC-7000 series

Model	19-inch Display type			Black Box type		
	6 kW	12 kW	25 kW	6 kW	12 kW	25 kW
Standard model	MDC-7960	MDC-7910	MDC-7920	MDC-7060	MDC-7010	MDC-7020
CE model	MDC-7906	MDC-7912	MDC-7925	MDC-7006	MDC-7012	MDC-7025
IMO 	-	MDC-7912P	MDC-7925P	-	MDC-7012P	MDC-7025P

## Reliable Quality and Safety

MDC-7900 series provide outstanding performance and clear image by 19-inch high resolution SXGA display plus anti-reflection coating.

MDC-7000 series Black Box radars connect to any SXGA type display (owner supplied).

- ▶ Clear image with High-speed sampling in short range.
- ▶ Auto gain with simple operation.
- ▶ Improved visibility of the display by auto STC.
- ▶ Simple and easy operation by trackball unit via USB.
- ▶ Built-in AIS interface for displays targets.  
MDC-7000 / 7900 series: up to 1000 targets.  
MDC-7000P / 7900P series: up to 900 targets.
- ▶ Built-in TT (ARPA) tracks up to 100 targets.
- ▶ MDC-7000P / 7900P series complies with new IMO and IEC regulations.
- ▶ C-Map chart (NT MAX) can be overlaid on the radar screen for MDC-7000 / MDC-7900 series. (Chart: owner supplied)

# Marine Radar 12", 15"

# Marine Radar 8.4", 10.4"

**NEW**



MDC-5200 series

**NEW**



MDC-5500 series

Model	12-inch Display type				15-inch Display type			
Output Power	4 kW	6 kW	12 kW	25 kW	4 kW	6 kW	12 kW	25 kW
Standard model	MDC-5240	MDC-5260	MDC-5210	MDC-5220	MDC-5540	MDC-5560	MDC-5510	MDC-5520
CE model	MDC-5204	MDC-5206	MDC-5212	MDC-5225	MDC-5504	MDC-5506	MDC-5512	MDC-5525

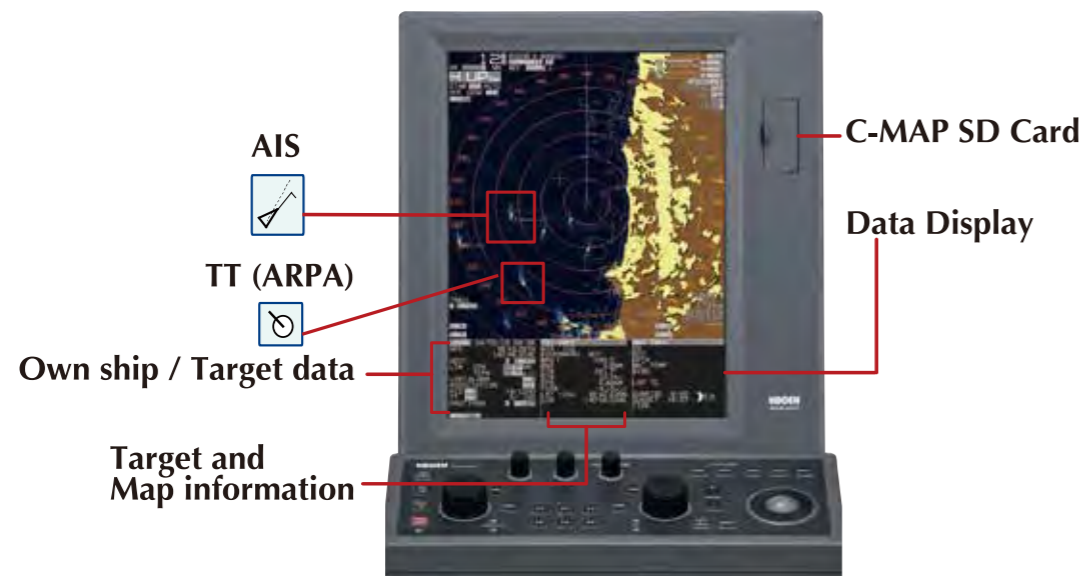


MDC-900 series  
MDC-900A series



MDC-2000 series  
MDC-2000A series

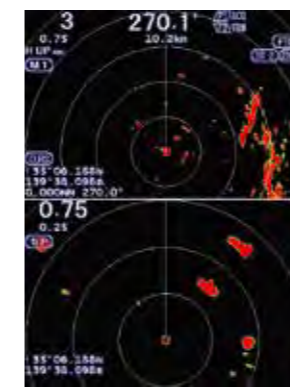
Model	8.4-inch Display type			10.4-inch Display type			
Output Power	2 kW	4 kW	4 kW	4 kW	4 kW	6 kW	12 kW
Standard model	MDC-921	MDC-941	MDC-940	MDC-2041	MDC-2040	MDC-2060	MDC-2010
CE model	-	MDC-941A	MDC-940A	MDC-2041A	MDC-2040A	-	-



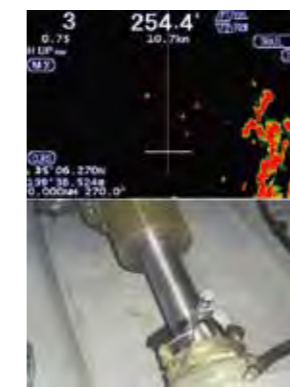
## Powerful. Precise. Professional Grade.

MDC-5200 / 5500 series have superior performance and functions of large grade radars. High resolution XGA display with anti-reflection coating makes clear image.

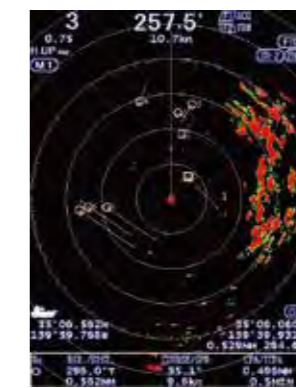
- ▶ Clear image with High-speed sampling in short range.
- ▶ Auto gain with simple operation.
- ▶ Improved visibility of the echos by auto STC.
- ▶ Simple and easy operation by trackball via USB.
- ▶ Built-in AIS interface for displays up to 1000 targets.
- ▶ Built-in TT(ARPA) tracks up to 100 targets.
- ▶ C-Map chart(NT MAX) is overlaid on the radar screen. (Chart : owner supplied)



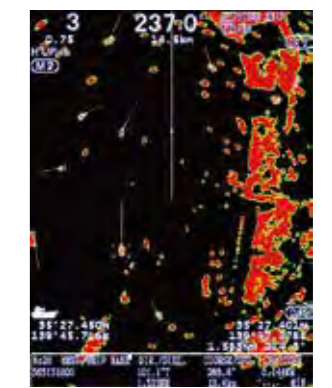
Dual range display



CCD camera input



ATA up to 50 targets as option



AIS interface up to 100 targets as option

## Smart selection for safe navigation

Marine radar MDC-900 series and MDC-2000 series present performance and functions of larger professional grade radars. The series features sophisticated Hyper Digital Processing (HDP™) technology for real-time presentation and superior target discrimination.

The real-time smooth head-up presentation offers smooth movement as bearing changes.



The superior target discrimination virtually eliminates unwanted noise to provide a clearer detailed image of targets and enhances the detection of smaller targets.

Also various functions on the compact body are of considerable utility for both fishing and pleasure boats.

- ▶ True Trail function clearly identifies moving targets from stationary targets like land or buoys.
- ▶ Exclusive dual range radar function lets you have split-screen display of both long and short ranges simultaneously. It is like having two radars in one.
- ▶ The LCD and acrylic sheet with Anti-Reflection coated filter are bonded directly. It increases visibility in direct sunlight and prevents condensation.
- ▶ ATA (Automatic Tracking Aid) tracks up to 50 targets (Option).
- ▶ AIS (Automatic Identification System) interface displays up to 100 AIS targets (Option).
- ▶ Accepts CCD camera input, with which you can watch above or below deck any time you are steering.





# Marine Radar Antenna-Scanner

## Radome for Standard Model

		
Type	RB714A	RB715A
<b>Specifications:</b>		
Antenna length	1.2 feet	2 feet
Output power (Peak)	2 kW	4 kW
Output frequency	9445 ±30 MHz	9410 ± 30 MHz
Horizontal beam width	6.0°	3.9°
Vertical beam width	25°	25°
Rotation	24 rpm	24 rpm or 48 rpm
IF center frequency	60 MHz	
<b>Environmental:</b>		
Operating temperature	-25°C to + 55°C	
Water protection	CFR-46	IPX6 (IEC 60529)
<b>Display / processor connections for marine Radar:</b>		
8.4" color LCD: MRD-103	MDC-921	MDC-941
10.4" color LCD: MRD-104	-	MDC-2041
12" color LCD: MRD-111	-	-
15" color LCD: MRD-109	-	-
19" color LCD: MRD-108	-	-
Processor unit for SXGA LCD Display: MRM-108	-	-




## Open antenna for Standard Model

				
Type	RB716A	RB717A	RB718A	RB719A
<b>Specifications:</b>				
Antenna length	3, 4 or 6 feet	4 or 6 feet	4, 6 or 9 feet**	6 or 9 feet**
Output power (Peak)	4 kW	6 kW	12 kW	25 kW
Output frequency	9410 ±30 MHz			
Horizontal beam width	3 ft: 2.5°, 4 ft: 1.8°, 6 ft: 1.2°	4 ft: 1.8°, 6 ft: 1.2°	4 ft: 1.8°, 6 ft: 1.2°, 9 ft: 0.8°	6 ft: 1.2°, 9 ft: 0.8°
Vertical beam width	22°	22°	4 ft: 22°, 6 ft: 22°, 9 ft: 25°	6 ft: 22°, 9 ft: 25°
Rotation	24 or 48 rpm			24 rpm
IF center frequency	60 MHz			
<b>Environmental:</b>				
Operating temperature	-25°C to + 55°C			
Water protection	IPX6 (IEC 60529)			
<b>Display / processor connections for marine Radar:</b>				
8.4" color LCD: MRD-103	MDC-940*	-	-	-
10.4" color LCD: MRD-104	MDC-2040	MDC-2060	MDC-2010	-
12" color LCD: MRD-111	MDC-5240	MDC-5260	MDC-5210	MDC-5220
15" color LCD: MRD-109	MDC-5540	MDC-5560	MDC-5510	MDC-5520
19" color LCD: MRD-108	-	MDC-7960	MDC-7910	MDC-7920
Processor unit for SXGA LCD Display: MRM-108	-	MDC-7060	MDC-7010	MDC-7020







\* 48 rpm requires for input voltage of 24 VDC or more \*\*9ft antenna is available for MDC-5510, 5520, 7910, 7920, 7010, 7020

## Radome for CE Model **NEW**

	
Type	RB805
<b>Specifications:</b>	
Antenna length	2 feet
Output power (Peak)	4 kW
Output frequency	9410 ± 30 MHz
Horizontal beam width	3.9°
Vertical beam width	25°
Rotation	24 rpm or 48 rpm
IF center frequency	60 MHz
<b>Environmental:</b>	
Operating temperature	-25°C to + 55°C
Water protection	IPX6 (IEC 60529)
<b>Display / processor connections for marine Radar:</b>	
8.4" color LCD: MRD-103A	MDC-941A
10.4" color LCD: MRD-104A	MDC-2041A
12" color LCD: MRD-111	-
15" color LCD: MRD-109	-
19" color LCD: MRD-108	-
19" color LCD: MRD-108P	-
Processor unit for SXGA LCD Display: MRM-108	-
Processor unit for SXGA LCD IMO Display: MRM-108P	-

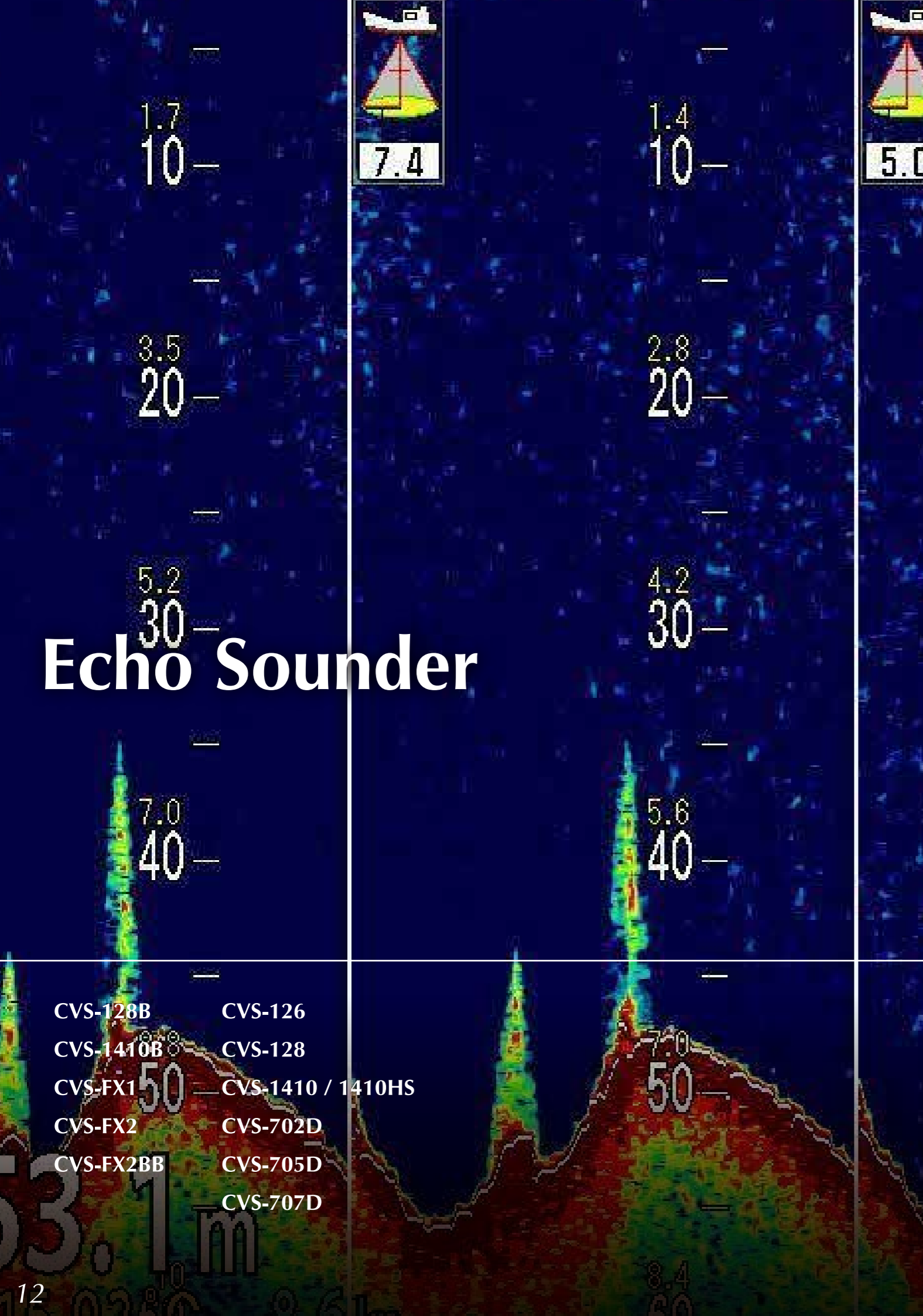


## Open antenna for CE Model **NEW**

						
Type	RB806	RB807	RB808	RB809	RB808P	RB809P
<b>Specifications:</b>						
Antenna length	3, 4 or 6 feet***	4 or 6 feet	4, 6 or 9 feet**	6 or 9 feet**	4, 6 or 9 feet**	
Output power (Peak)	4 kW	6 kW	12 kW	25 kW	12 kW	25 kW
Output frequency	9410 ±30 MHz					
Horizontal beam width	3 ft: 2.5°, 4 ft: 1.8°, 6 ft: 1.2°	4 ft: 1.8°, 6 ft: 1.2°	4 ft: 1.8°, 6 ft: 1.2°, 9 ft: 0.8°	4 ft: 1.8°, 6 ft: 1.2°, 9 ft: 0.8°	4 ft: 1.8°, 6 ft: 1.2°, 9 ft: 0.8°	
Vertical beam width	22°	22°	4 ft: 22°, 6 ft: 22°, 9 ft: 25°	4 ft: 22°, 6 ft: 22°, 9 ft: 25°	4 ft: 22°, 6 ft: 22°, 9 ft: 25°	
Rotation	24rpm or 48rpm		24 rpm or 42rpm		24 rpm	
IF center frequency	60 MHz					
<b>Environmental:</b>						
Operating temperature	-25°C to + 55°C					
Water protection	IPX6 (IEC 60529)					
<b>Display / processor connections for marine Radar:</b>						
8.4" color LCD: MRD-103A	MDC-940A*	-	-	-	-	-
10.4" color LCD: MRD-104A	MDC-2040A	-	-	-	-	-
12" color LCD: MRD-111	MDC-5204	MDC-5206	MDC-5212	MDC-5225	-	-
15" color LCD: MRD-109	MDC-5504	MDC-5506	MDC-5512	MDC-5525	-	-
19" color LCD: MRD-108	-	MDC-7906	MDC-7912	MDC-7925	-	-
19" color LCD: MRD-108P	-	-	-	-	MDC-7912P	MDC-7925P
Processor unit for SXGA LCD Display: MRM-108	-	MDC-7006	MDC-7012	MDC-7025	-	-
Processor unit for SXGA LCD IMO Display: MRM-108P	-	-	-	-	MDC-7012P	MDC-7025P

\* 48 rpm requires for input voltage of 24 VDC or more \*\*9ft antenna is available for MDC-5512, 5525, 7912, 7925, 7012, 7025, 7912P, 7925P, 7012P and 7025P  
\*\*\* 6ft antenna is available for MDC-5204 and MDC-5504

# Echo Sounder



- CVS-128B
- CVS-1410B
- CVS-FX1
- CVS-FX2
- CVS-FX2BB
- CVS-126
- CVS-128
- CVS-1410 / 1410HS
- CVS-702D
- CVS-705D
- CVS-707D

# Koden Digital and Broadband technology

## Wide range, wide variety of uses

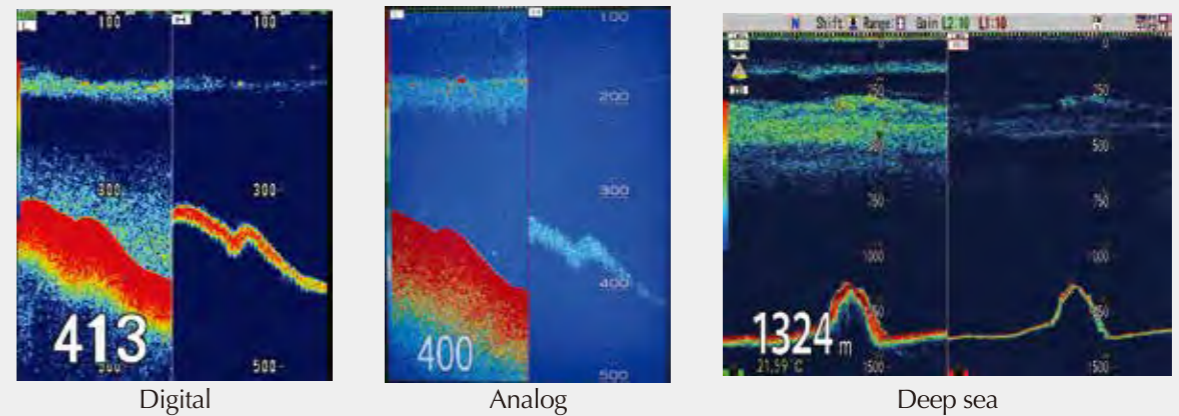
Koden offers a wide range of echo sounders which are designed for a variety of fishing styles from shallow to deep sea applications. Koden Echo Sounders have a unique signal processing system which aids in finding of weak echo of fish school in any ocean conditions.

## Digital



### Koden Digital Filtering (KDF™)

The Koden Digital Filtering (KDF™) feature eliminates clutter by filtering out the noise to provide a clear detailed image that enhances fish targets in shallow and deep sea.

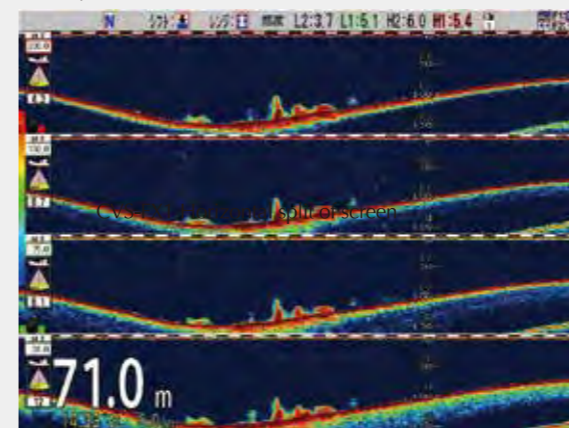


## Broadband



### What are broadband echo sounders?

Broadband digital echo sounders can transmit and receive over a wide range of frequency with only one transducer. In the past, available frequency for an echo sounder has been preset such as 50 kHz and 200 kHz depending on connected transducer. However, Koden broadband digital echo sounders can search from shallow to deep sea with optimized performance in a given environment, water condition or style of fishing by selecting the most suitable frequencies randomly in 0.1 kHz step. Koden CVS-FX series sounders have the ability to transmit and display four separate frequencies simultaneously for different views of seabed composition, structure, fish and their relation to one another. CVS-128B and CVS-1410B can display two separate frequencies in the same manner. This frequency adjustability also provides clear targets and eliminates interference from nearby vessels without conventional interference rejection function.



CVS-FX1 Horizontal split of screen

	Low Frequency2	Low Frequency1	High Frequency2	High Frequency1
Standard	Normal	Normal	Normal	Normal
Echo Display	OFF	Mix	Mix	OFF
Frequency	38.0kHz	75.0kHz	130.0kHz	200.0kHz
Pulse Length	Short	Short	Short	Short
	Middle	Middle	Middle	Middle
	Long	Long	Long	Long
	Fix	Fix	Fix	Fix
Band Width	Super narrow	Super narrow	Super narrow	Super narrow
	Narrow	Narrow	Narrow	Narrow
	Middle	Middle	Middle	Middle
	Fix	Fix	Fix	Fix
Zoom Display	OFF	OFF	OFF	OFF
	B.T.M.	B.T.M.	B.T.M.	B.T.M.
	B.D.	B.D.	B.D.	B.D.
	Zoom	Zoom	Zoom	Zoom
	B.Z.	B.Z.	B.Z.	B.Z.
	B.F.Z.	B.F.Z.	B.F.Z.	B.F.Z.
Gain	Individual			
	Synchronize			
Guide				
ENT	Enter			
Cursor				
	SUBMENU	Return		
	MENU	End		

CVS-FX1 Individual setting menu

# Echo Sounder Digital

# Echo Sounder Digital Broadband

«DIGITAL»

«Broadband»



CVS-126  
5.7 inch



CVS-128  
3.4 inch



CVS-1410 /1410HS  
10.4 inch



CVS-128B  
3.4 inch



CVS-1410B  
10.4 inch

NEW



CVS-702D  
12.1 inch

NEW



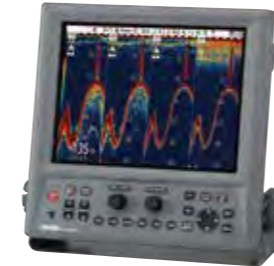
CVS-705D  
15 inch

NEW

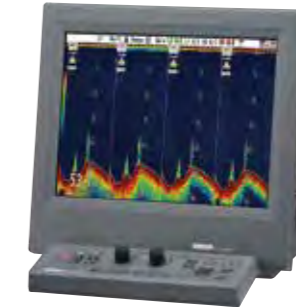


CVS-707D  
17 inch

For European model, please contact your nearest distributor.



CVS-FX1  
12.1 inch



CVS-FX2  
15 inch



CVS-FX2BB  
Black Box

## Transducer



TD-500T-2B  
for CVS-126 / 128



TD-500T-3B  
for CVS-126 / 128



TD-501T-3B  
for CVS-128



TDM-071 / 091D  
for CVS-128B / 1410B



TD-501C  
for CVS-128 / 1410



TDM-031D  
for CVS-1410HS



TDM-052A / 062A  
for CVS-FX1 / FX2 / FX2BB



TD-754  
for CVS-702D / 705D / 707D



TD-756  
for CVS-702D / 705D / 707D



TD-286 / 506F  
for CVS-702D / 705D / 707D



TD-66  
for CVS-702D / 705D / 707D



TD-284 / 404T / 504F / 504T  
for CVS-702D / 705D / 707D

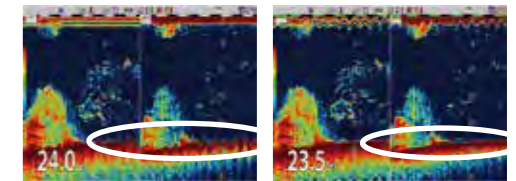
## Detection area display

Know exactly the bottom area covered by the low and high frequency sound beams. This can help you target the fish directly under the boat or off to the side.



## Heaving Compensation

When a vessel moves up and down due to heaving, the bottom image looks bumpy as if the bottom is waving. By using a heaving compensation, the echo sounder can display the actual bottom image by cancelling the heave factor.



Normal image

Image after Heaving Compensation

## Fishing Hot Spot

With data input from external GPS sensor, it can lead you back to your favorite fishing spots or other previously saved positions in memory.



## Store Image

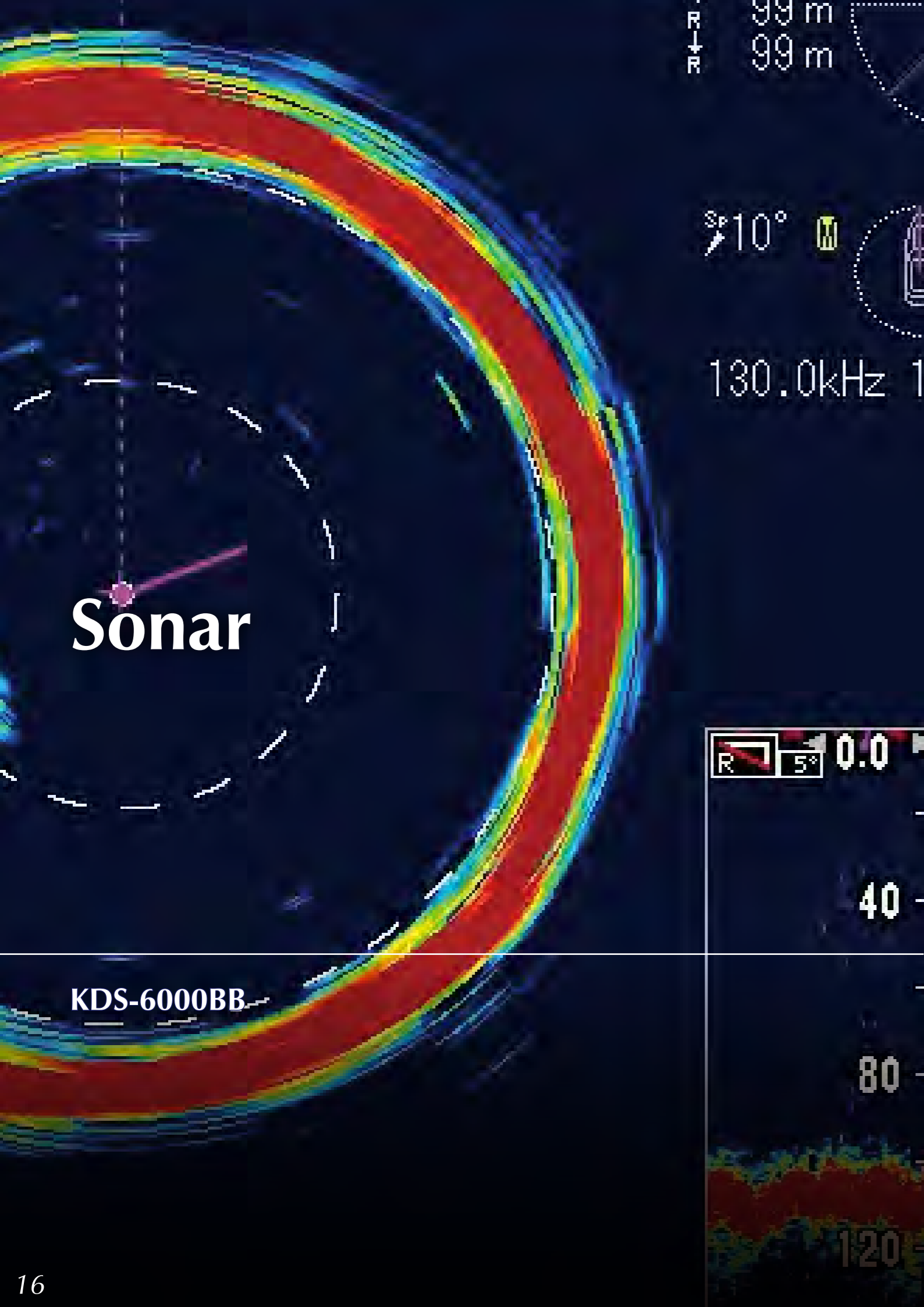
Stores screen images in built-in memory to recall the image later by a single touch.  
Up to 500 screen images : CVS-FX1, CVS-FX2 / FX2BB, CVS-702D, CVS-705D, CVS-707D  
Up to 10 screen images : CVS-126, CVS-128, CVS-128B, CVS-1410 / 1410HS, CVS-1410B

## Condition Memory

Up to six settings created by user can be stored in the Condition Memory (CM). The user can recall each setting quickly by simply pushing the CM keys. It is like having six echo sounders in one. (CVS-FX1, CVS-FX2 / FX2BB, CVS-702D, CVS-705D, CVS-707D)



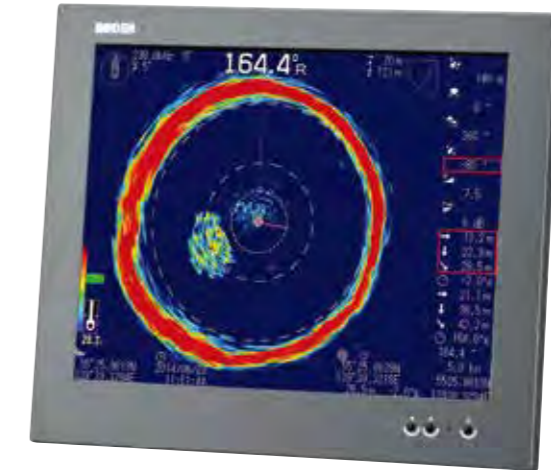




# Digital BroadBand Searchlight Sonar

(((Broadband)))

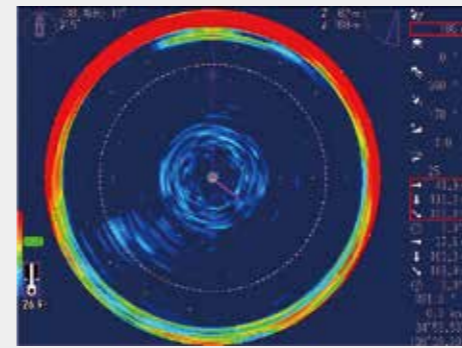
17 inch LCD Monitor(Optional)



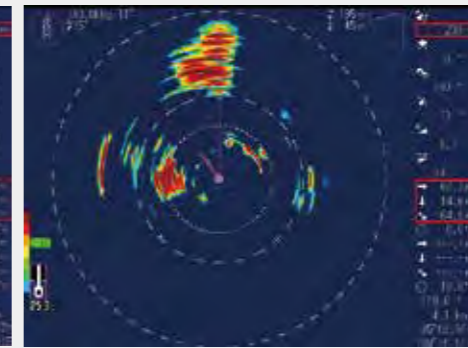
KDS-6000BB

Hull unit

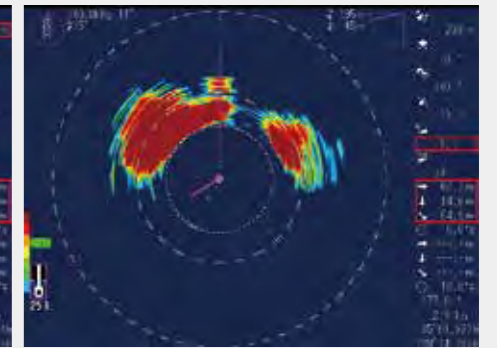
## Screen image



Spear squids at the sea bottom at 130.4 kHz



Tunas attacking school of sardines at 140.0 kHz



Pilchards at 140.0 kHz

## Advanced Broadband Technology

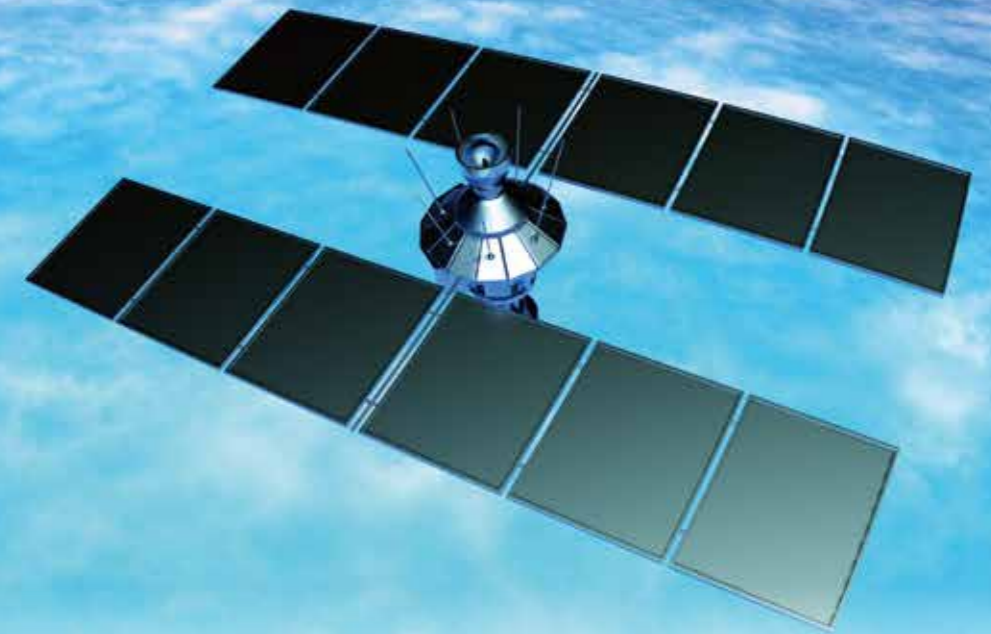
KDS-6000BB is world first Broadband searchlight sonar. With the wide band transducer equipped as standard, the most suitable output frequency can be selected in 0.1 kHz step depending on the fishing method and the target species from closer range to longer range. Selection of frequency is as easy and quick as tuning a radio.

Flexible selection of frequency enables the user to stay away from interference with the sounders on the other vessels.

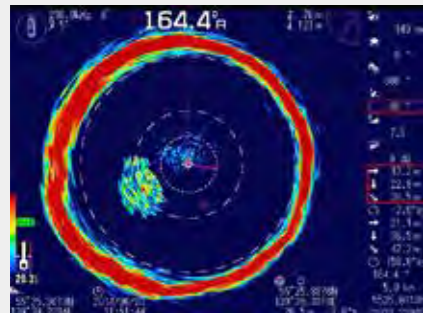
- ▶ Change frequency on the go with our advanced Broadband Technology.
- ▶ Massive improvement in scan speed, making detection of fish schools much faster.
- ▶ Clearest possible images with our digital signal processing.
- ▶ All setup and user settings changed instantly by utilizing Condition Memory function.
- ▶ Black Box sonar with 17 inch LCD Monitor available (Option).

# GPS Navigator / Compass / Sensor

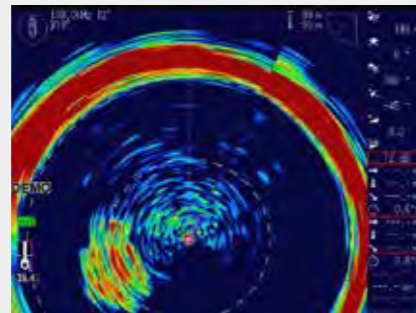
- KGP-915
- KGP-925
- KGP-920
- KGC-222
- KBG-3
- GPS-20A



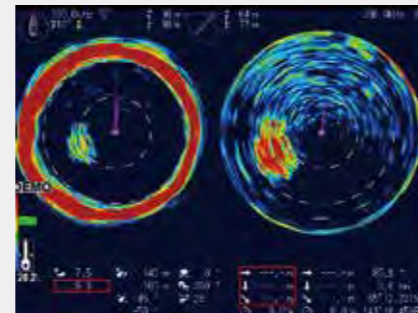
## Six different presentation modes



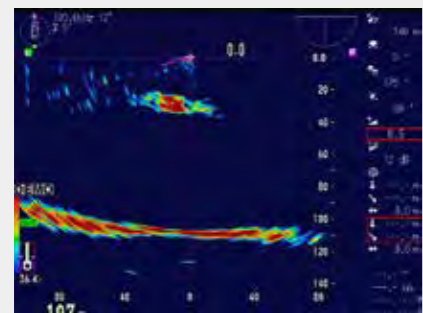
**Sonar mode**  
Search around the ship



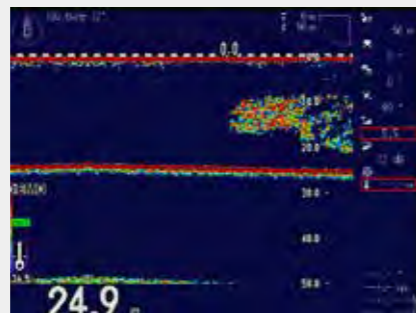
**Off-center mode**  
Show more information of ahead



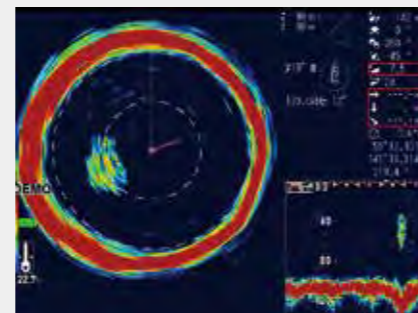
**Sonar x 2 mode**  
Display two different frequencies



**Bottom scan mode**  
Display reflected echo from underwater



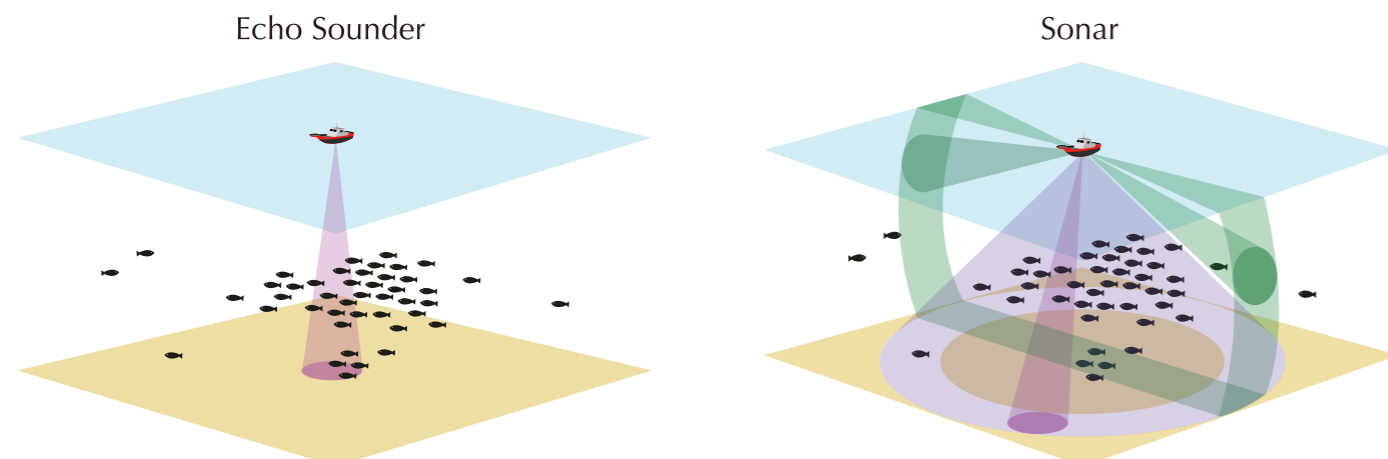
**Echo sounder mode**  
Display image like fishfinder



**One line display mode**  
Show vertical Sonar image like an echo sounder image in the Sub-screen

## What is the difference between the sonar and the echo sounder?

The echo sounder always detects beneath the ship with the transducer installed at bottom of the ship.  
The sonar is a multi-directional echo sounder with a revolving and tilting transducer emitting and receiving ultrasonic waves in various directions.  
The sonar can search 360-degree direction area automatically and the tilt angle can be adjusted from +5 to -90 degrees too.  
A remarkable feature of the sonar is that the transducer can go down toward the sea bottom automatically and operator can control the transducer.  
The operator can adjust the direction and tilt angle for detection as flexibly.



## GPS Navigator, Compass and Sensor for highly-accurate positioning

Koden GPS products support your safe navigation in various fields of Commercial, Fishing and Pleasure. In addition to the GPS, they output accurate position or heading information to your Radar, Echo Sounder, Plotter, and Autopilot for safer and smoother navigation by the differential information from the Satellite Based Augmentation System (SBAS), WASS in the North America and EGNOS in Europe, or the Russian satellite system GLONASS (KGP-915 and KGP-925). SBAS is very effective for pinpoint fishing, harbor approaching and narrow channel running.



## GPS Navigator

KGP-915 / KGP-925 / KGP-920

- ▶ Eye-friendly 4.3-inch high-resolution Color LCD (KGP-915).
- ▶ Beacon receiver built-in for a high-accuracy differential system where beacon stations are located (KGP-925 / KGP-920 option).
- ▶ IMO type approved MSC.112 [73] and IEC61108-1 ED. 2 for SOLAS carriage requirements (KGP-920).
- ▶ Can be used as a GNSS sensor of AIS (KGP-920).
- ▶ GLONASS (the Russian satellite system) compatible (KGP-915 / KGP-925).

**NEW**



**KGP-915** (GPS / DGPS / GLONASS) **KGP-925** (GPS / GLONASS) **KGP-920** (GPS / DGPS)

## GPS Compass

KGC-222

- ▶ 4.0" LCD display unit.
- ▶ Backup sensor built-in.
- ▶ Pitch / roll and heaving data output.
- ▶ 3 heading data output ports expandable to 5 ports (with optional junction box JB-35).
- ▶ SBAS (WASS / EGNOS) enabled.



**KGC-222**

## DGPS Sensor / GPS Sensor

KBG-3 / GPS-20A

- ▶ 18 channel parallel.
- ▶ SBAS (WASS / EGNOS) enabled.
- ▶ Beacon receiver built-in for a high-accuracy differential system where beacon stations are located (KBG-3).



**KBG-3**



**GPS-20A**

## Class A AIS Transceiver

KAT-100

KAT-100 is the combined Class A / Inland AIS transceiver, designed to be fitted to commercial vessels.

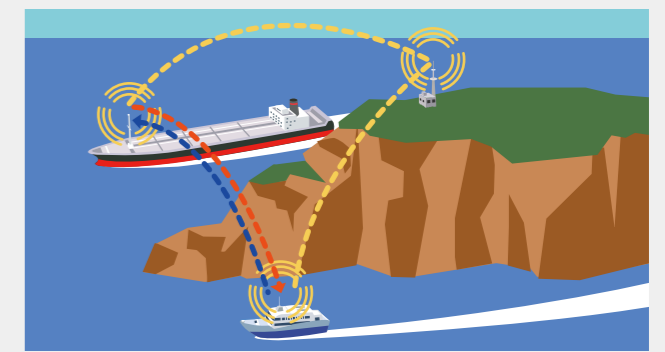
- ▶ Meets IMO Standard MSC. 74 (69) Annex 4.
- ▶ Meets FCC, USCG, IC, TC, CCNR (Inland AIS).
- ▶ High accuracy and reliability.
- ▶ Simple and easy installation.



**KAT-100**

## What's AIS?

The marine Automatic Identification System (AIS) is the location and vessel information reporting system. It allows vessels equipped with AIS to automatically and dynamically share and regularly update their position, speed, course and other information.



## Total Navigator

KTN-70A

- ▶ GPS, Plotter, AIS Receiver.
- ▶ 7-inch Wide Color LCD Display.
- ▶ Radar ATA Target Overlay.
- ▶ High Accuracy Build in Chart.
- ▶ Easy Waypoints Transfer to Radar.

**NEW**



**KTN-70A**

## Navigational Echo Sounder

CVR-010

CVR-010 is a single-channel navigational echo sounder. Featuring a 5.7-inch daylight-viewing, LED backlight color LCD screen, the equipment displays the echogram.

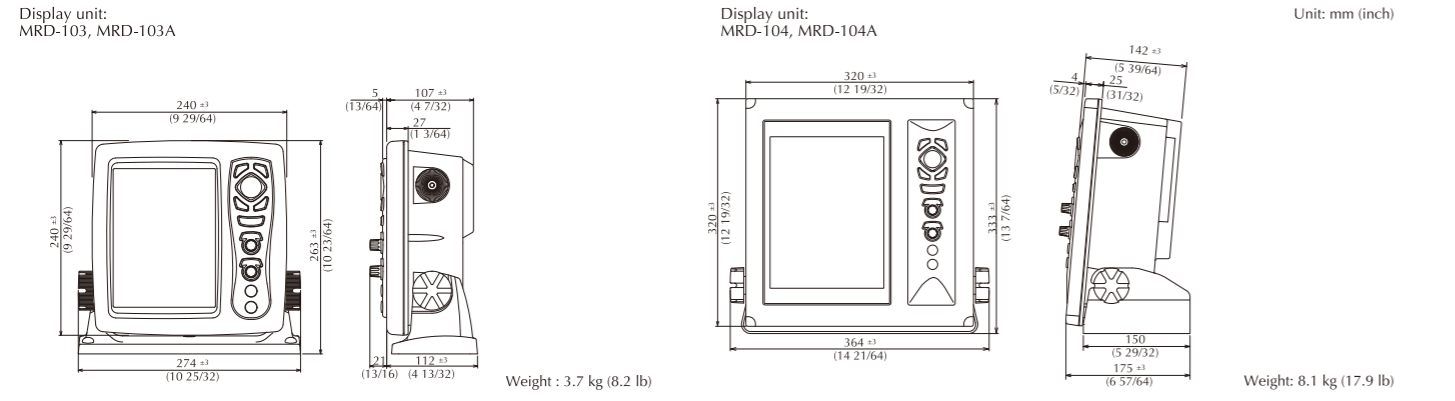
- ▶ Meets IMO Standard MSC. 74 (69) Annex 4, EU Marine Equipment Directive (MED).
- ▶ High accuracy and reliability.
- ▶ Sounding data storage for the last 12 hours.
- ▶ Password protection for keeping the menu settings.



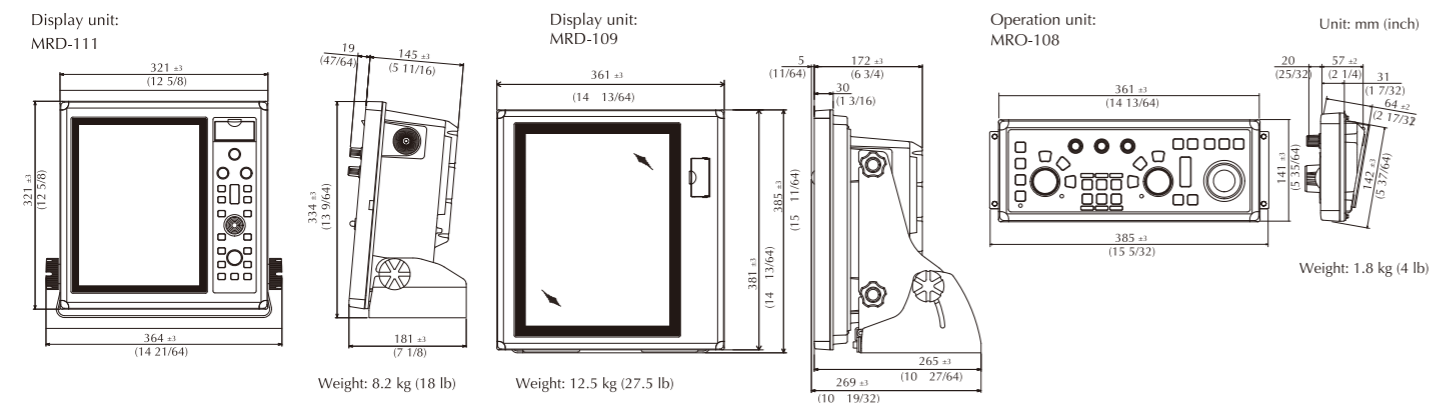
**CVR-010**

# Dimensions and Weight

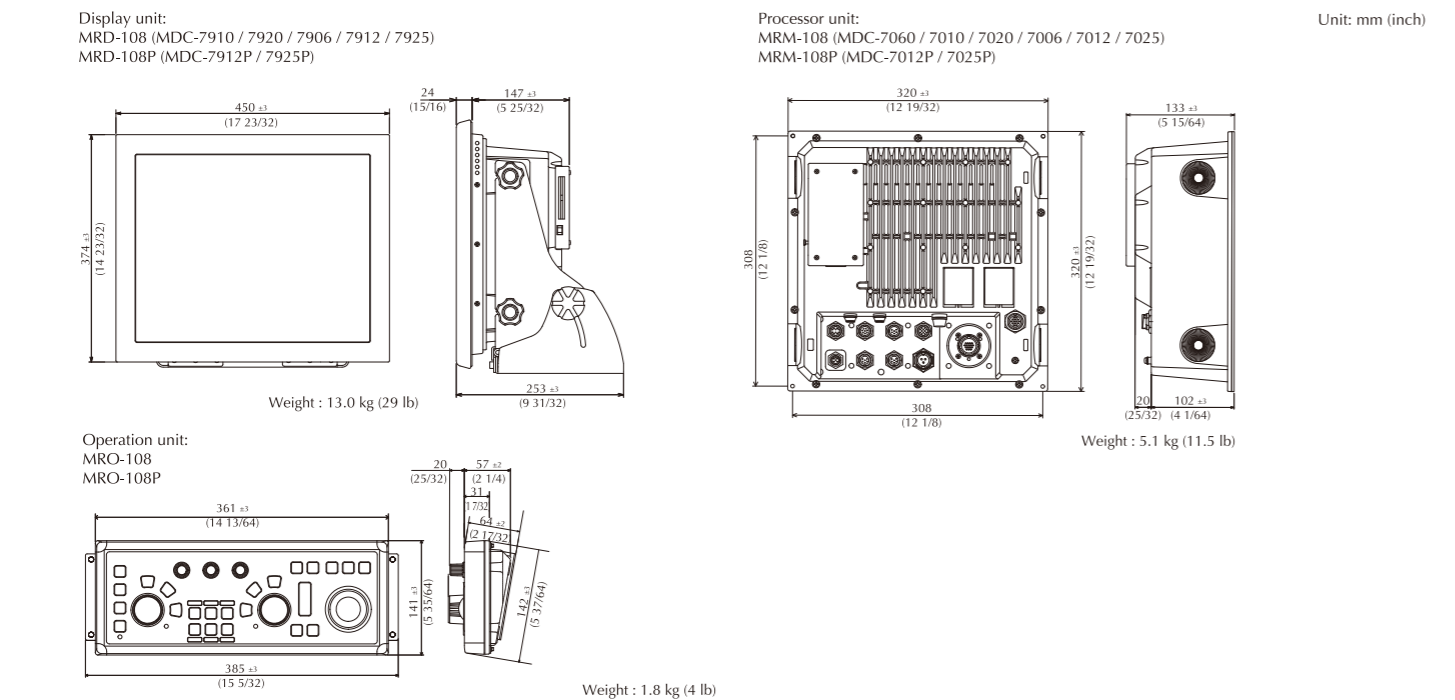
## Marine Radar 8.4" MDC-900 series, 10.4" MDC-2000 series



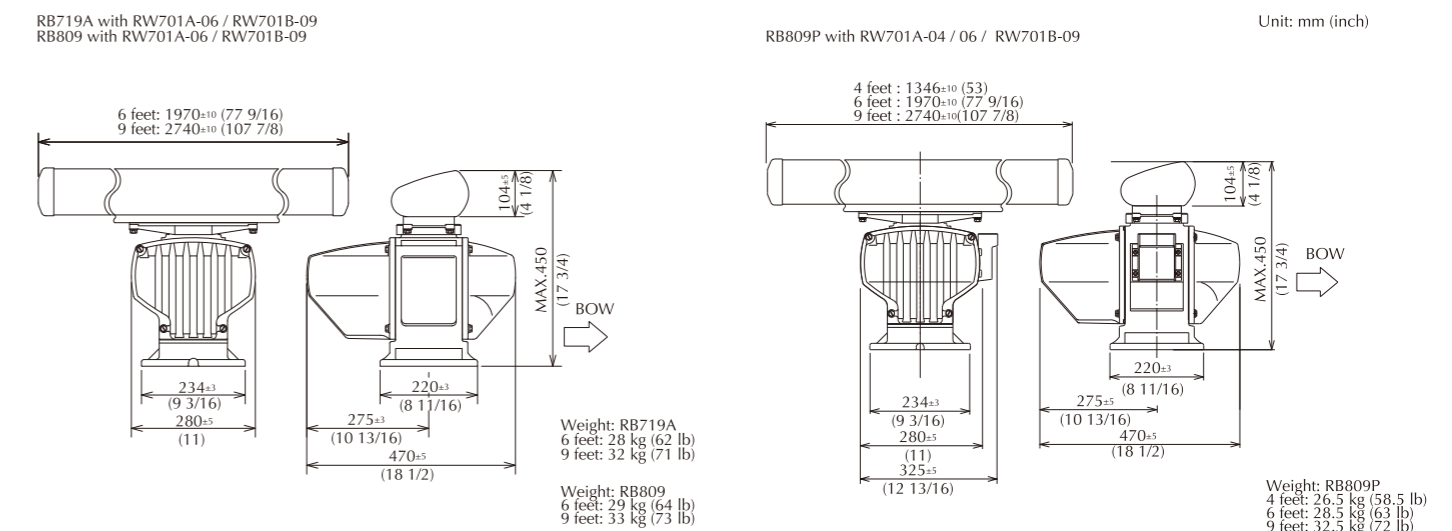
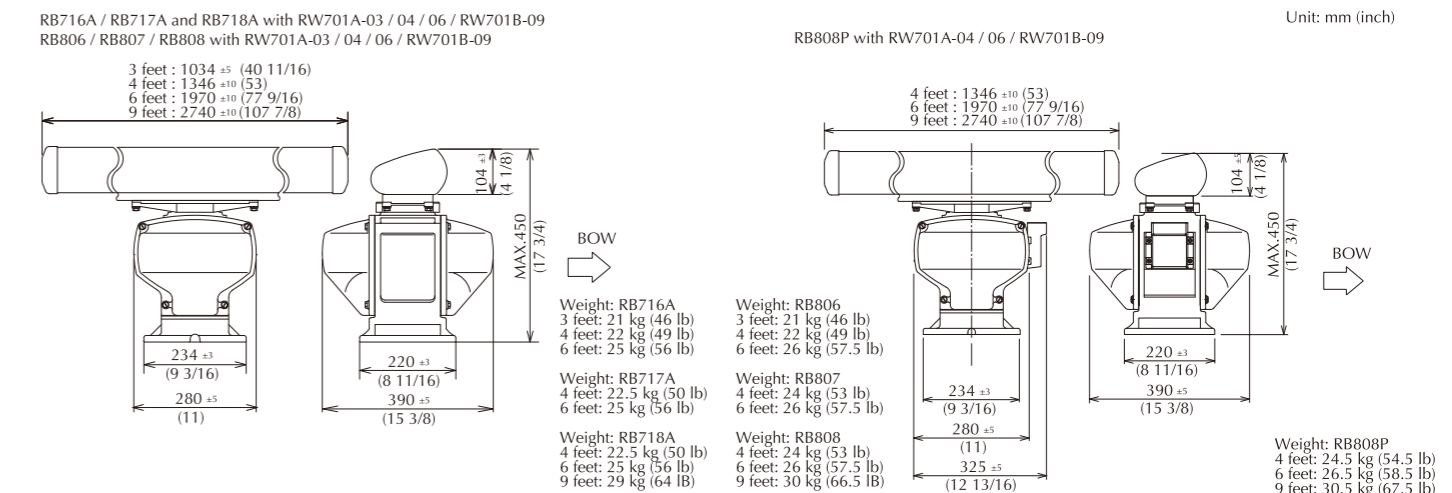
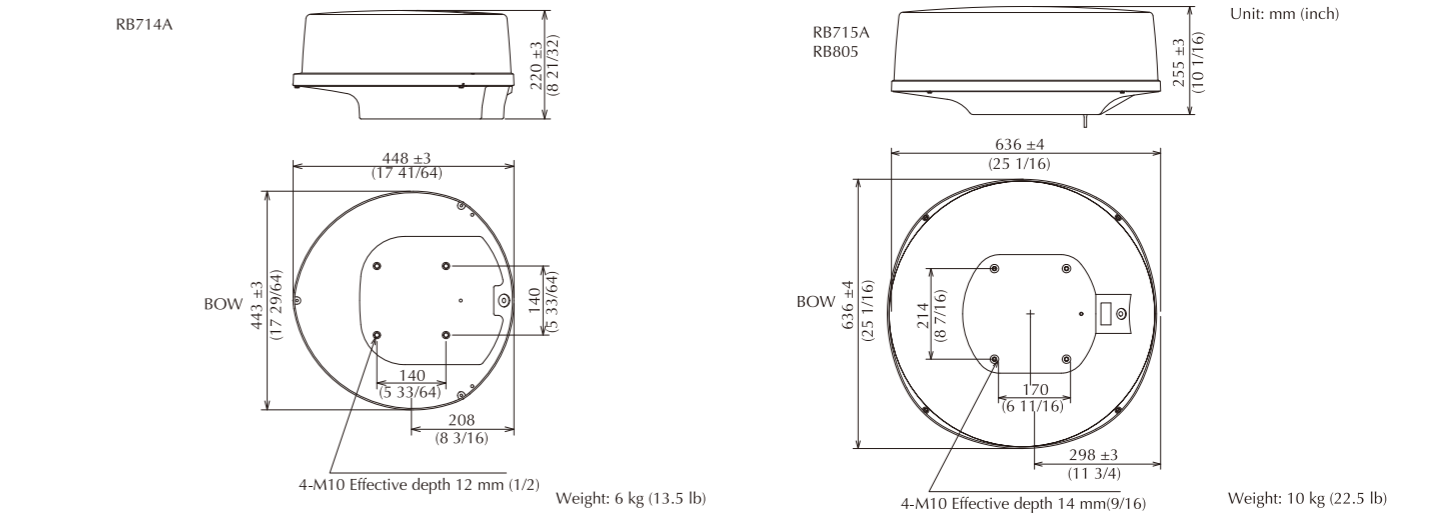
## Marine Radar 12" MDC-5200 series, 15" MDC-5500 series



## Marine Radar 19" MDC-7000 / 7900 / 7000P / 7900P series

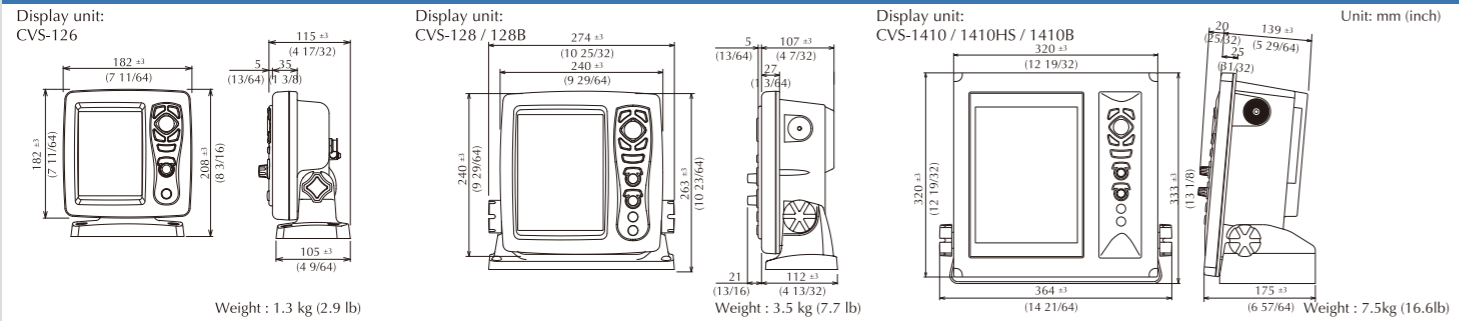


## Antenna - Scanner unit

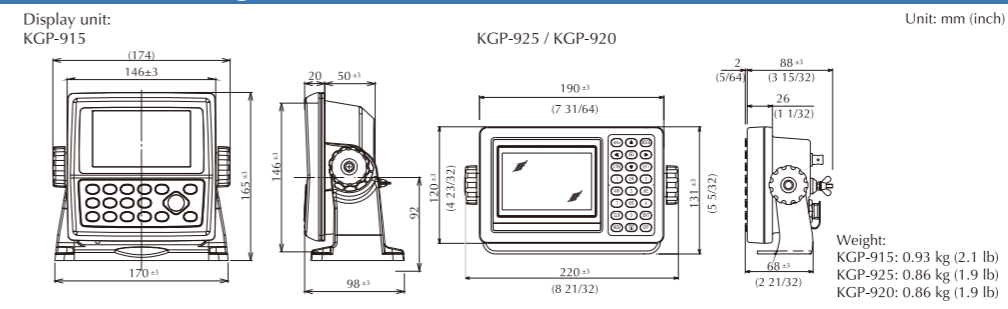


# Dimensions and Weight

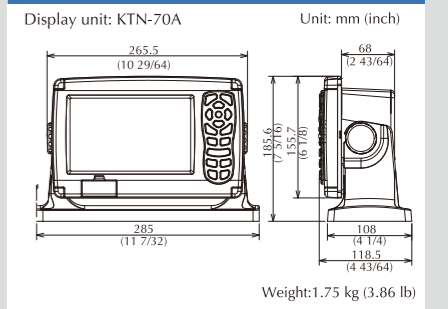
## Echo Sounder CVS-126, CVS-128 / 128B, CVS-1410 / 1410HS / 1410B



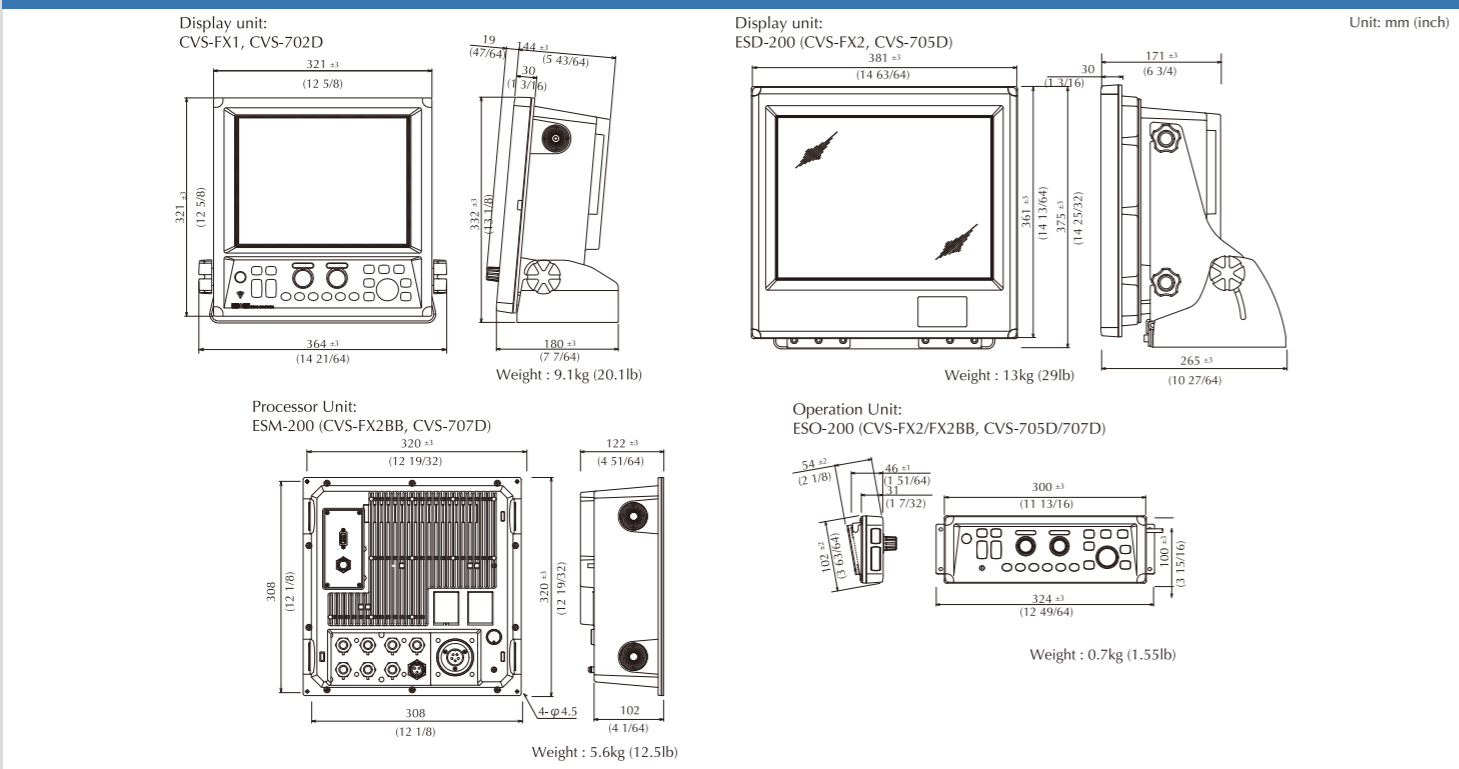
## GPS Navigator KGP-915, KGP-925, KGP-920



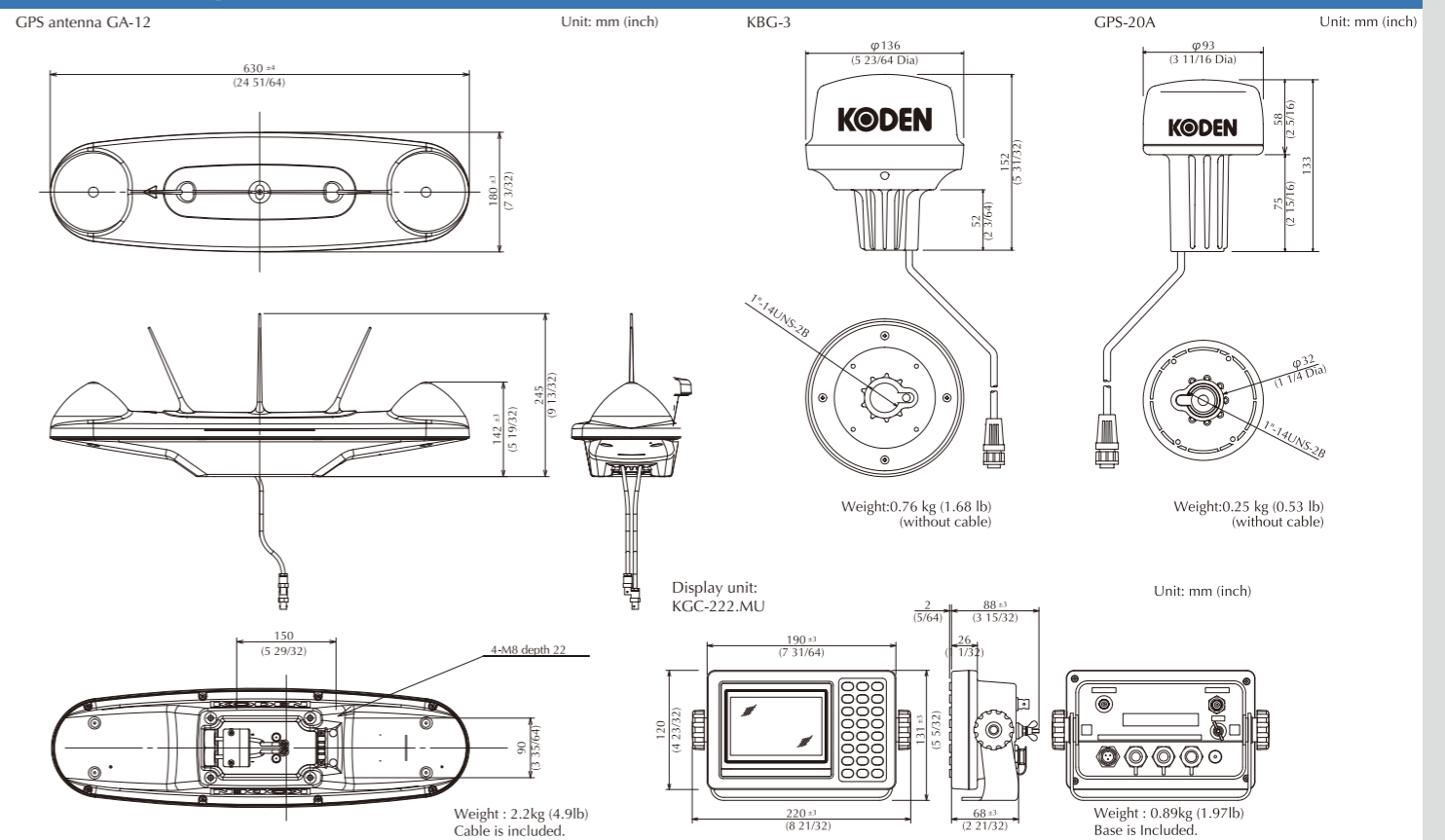
## Total Navigator KTN-70A



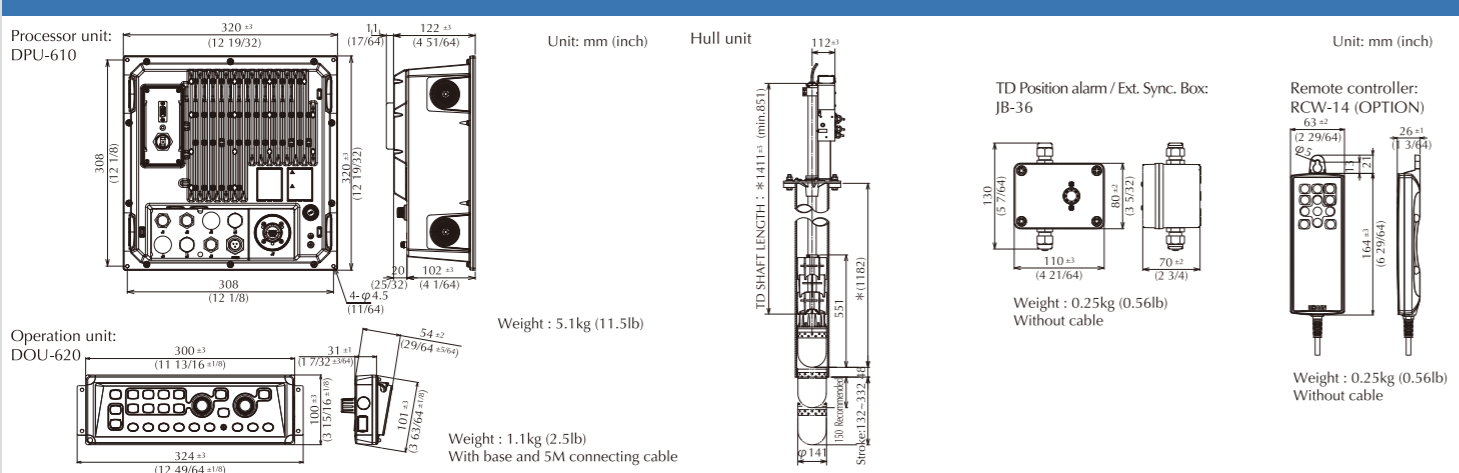
## Echo Sounder CVS-FX1, CVS-FX2 / FX2BB, CVS-702D, CVS-705D, CVS-707D



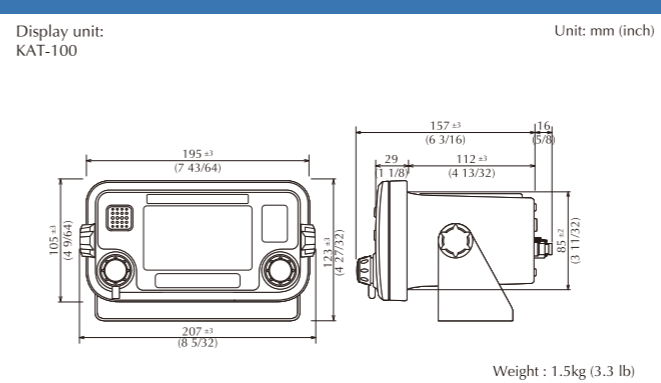
## GPS Compass KGC-222, DGPS Sensor KBG-3, GPS Sensor GPS-20A



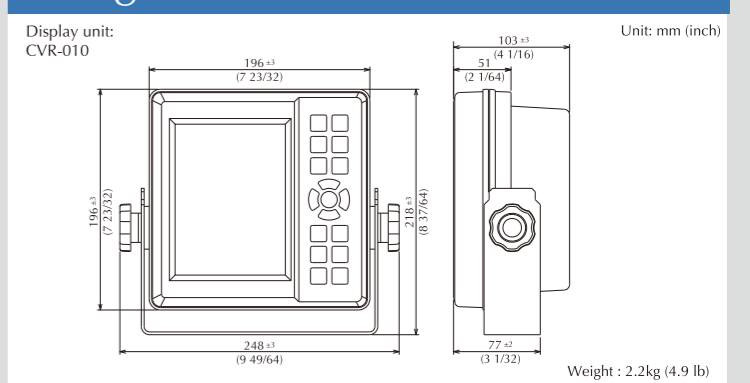
## Sonar KDS-6000BB



## AIS Transceiver KAT-100



## Navigational Echo Sounder CVR-010



# Specifications Radar

Model	MDC-900 Series	MDC-2000 Series	MDC-5200 Series	MDC-5500 Series	MDC-7000 Series	MDC-7900 Series	MDC-7000P	MDC-7900P	
<b>Specifications &amp; Functions:</b>									
Display Unit (Processor unit)	MRD-103 / 103A	MRD-104 / 104A	MRD-111	MRD-109	(MRM-108)	MRD-108	(MRM-108P)	MRD-108P	
Operation unit	-	-	-	-	MRO-108	-	-	MRO-108P	
Display size	8.4"	10.4"	12.1"	15"	-	19"	-	19"	
Display resolution	480 X 640 pixels (VGA)		768 x 1024 pixels (XGA)		1280 x 1024 pixels (SXGA)				
Effective diameter (mm)	127.4	157.4	184	228	-	282	-	282	
Off-centering	Max. 66%				Max. 75%				
Echo area	2 types (Full screen, Inside of effective diameter)							1 type (Inside of effective diameter)	
Presentation modes	Head-up, North-up (True motion)***, North-up (Relative motion)*, Course-up (True motion)***, Course-up (Relative motion)*, WPT-up**			Head-up, North-up (True motion)***, North-up (Relative motion)*, Course-up (True motion)***, Course-up (Relative motion)*					
Indication system	PPI, PPI/PPI, PPI/NAV			PPI					
Video levels	8			16					
Distance unit (VRM unit)	NM, sm, km			NM, sm, km, kf, ky					
Alarms	Echo (IN / OUT), ATA / AIS (CPA / TCPA) etc.			Echo (IN / OUT), TT / AIS (CPA / TCPA), Guard zone etc.					
Functions	Interference rejection, Target expansion, VRM, EBL (true* / relative), Parallel index, Cursor position (Lat / Lon)***, Bearing (true* / relative), Trail***, RGB Monitor output, Slave display monitor input/output, External Buzzer output, Accepts CCD camera input			Map overlay***, CFAR (Clutter rejection), Interference rejection, Target expansion, Process (Averaging), VRM, EBL, Parallel index, ERBL, Cursor position, Bearing (true* / relative), Trail (true / relative)*, Own ship past track*, MAP (Event mark* etc.), Analog RGB output		Map overlay, CFAR (Clutter rejection), Interference rejection, Target expansion, Process (Averaging), VRM, EBL, Parallel index, ERBL, Cursor position, Bearing (true* / relative), Trail (true / relative)*, Own ship past track*, MAP (Event mark* etc.), Analog RGB output, Trial Manoeuvre*			
Input data format and sentences	NMEA0183 (BEC, BWC, BWR, DPT, DBT, GGA, GLL, GNS, HDG, HDM, HDT, MTW, MWD, MWV, RMA, RMB, RMC, VHW, VTG, XTE)			IEC61162-1 / -2 ALF, ALR, BWC, DBT, DPT, DTM, GGA, GLC, GLL, GNS, HBT, HDG, HDT, HDM, MTW, RMA, RMB, RMC, ROT, RTE, THS, TLL, VBW, VDH, VDR, VHW, VTG, WPL, XTE, ZDA					
Output data format and sentences	NMEA0183 (TTM, TLL)			IEC61162 -1 / -2 DTM, GLL, HDT, ROT, RSD, OSD, THS, TLB, TLL, TTD, TTM, VBW, VDR, VHW, VTG, ZDA					
NMEA ports	Total 2: input and output 2			Total 3: input and output 3					
AIS interface***	100 targets (Option)			1000 targets (Standard)					
TT***	50 targets (Option)			100 targets (Standard)					
Power supply	10.8 to 31.2 VDC			21.6 to 41.6 VDC					
<b>Environmental :</b>									
Operating temperature	-15°C to + 55°C (Display Unit) -25°C to + 55°C (Antenna)								
Water Protection	IPX5 (Display Unit) CFR-46 (RB714A) IPX6 (RB715A, RB716A, RB805, RB806)			IPX5 (Display Unit) IPX6 (RB716A, RB717A, RB718A, RB719A)		IPX5 (Display Unit) IP23(Operation unit) IPX6 (RB806, RB807, RB808, RB809)		IP23 (Front panel and Operation unit) : MDC-7900 / 7900P IP23 (Operation unit) : MDC-7000 / 7000P IPX6 (RB717A, RB718A, RB719A, RB807, RB808, RB808P, RB809, RB809P)	

Model	MDC-921	MDC-941 / 2041	MDC-941A / 2041A	MDC-940 / 2040	MDC-940A / 2040A	MDC-2060	MDC-2010	MDC-5240 / 5540	MDC-5260 / 5560	MDC-5210 / 5510	MDC-5220 / 5520	MDC-5204 / 5504	MDC-5206 / 5506	MDC-5212 / 5512	MDC-5225 / 5525	MDC-7060 / 7960	MDC-7010 / 7910	MDC-7020 / 7920	MDC-7006 / 7906	MDC-7012 / 7912	MDC-7025 / 7925	MDC-7012P / 7912P	MDC-7025P / 7925P	
Output power (Peak)	2 kW	4 kW					6 kW	12 kW	4 kW	6 kW	12 kW	25 kW	4 kW	6 kW	12 kW	25 kW	6 kW	12 kW	25 kW	6 kW	12 kW	25 kW	12 kW	25 kW
Basic ranges	0.0625 to 24 NM	0.0625 to 32 NM			0.0625 to 48 NM		0.0625 to 64NM	0.0625 to 72NM	0.125 to 48NM	0.125 to 64NM		0.125 to 96NM	0.125 to 48NM	0.125 to 64NM		0.125 to 96NM	0.125 to 64NM	0.125 to 96NM	0.125 to 64NM		0.125 to 96NM	0.125 to 64NM	0.125 to 96NM	
Power consumption (at 24 VDC)	45 W or less	55 W or less / 65 W or less	55 W or less / 65 W or less	70 W or less / 80 W or less	70 W or less / 80 W or less	110 W or less	130 W or less	80 W or less	110 W or less / 130 W or less	130 W or less / 150 W or less	170 W or less / 200 W or less	80 W or less	110 W or less / 130 W or less	130 W or less / 150 W or less	170 W or less / 200 W or less	130 W or less	150 W or less	200 W or less	130 W or less	150 W or less	200 W or less	150 W or less	200 W or less	

Antenna-scanner connections : (See page 10 - 11 for details)

2 kW Radome antenna	RB714A																								
4 kW Radome antenna	RB715A		RB805																						
4 kW Open antenna					RB716A		RB806				RB716A				RB806										
6 kW Open antenna							RB717A				RB717A				RB807				RB717A				RB807		
12 kW Open antenna									RB718A				RB718A				RB808				RB718A		RB808		
25 kW Open antenna											RB719A				RB809				RB719A				RB809P		
Interconnecting cable length	Standard (m)	242J160680 (10m)		242J58055 (10m)		242J159098 (10m)		242J159098 (15m)				242J159098 (15m)		CW-845 (15m)		242J159098 (15m)				CW-845 (15m)				65	

\* Requires bearing data input.  
 \*\* Requires waypoint data input.  
 \*\*\* Requires bearing data, ship's speed data and latitude / longitude data input.



# Specifications EchoSounder

Model	CVS-128B	CVS-1410B	CVS-FX1	CVS-FX2	CVS-FX2BB
<b>Specifications &amp; Functions:</b>					
Output power (RMS)	2 kW		3 kW		3 kW
Transducer	TDM-071, TDM-091D		TDM-052A	TDM-062A	TDM-052A, TDM-062A
Output frequency	38 to 75 kHz (TDM-071), 42 to 65 kHz and 130 to 210 kHz (TDM-091D)		38 to 75 kHz and 130 to 210 kHz	38 to 75 kHz and 85 to 135 kHz	38 to 75 kHz and 130 to 210 kHz, 38 to 75 kHz and 85 to 135 kHz
Selectable frequency range	24 to 210 kHz 0.1kHz step		24 to 240 kHz 0.1kHz step		24 to 240 kHz 0.1kHz step
Display size and type	8.4 inch color LCD	10.4 inch color LCD	12.1 inch color LCD		15 inch color LCD
Display resolution	640 x 480 pixels (VGA)		1024 x 768 pixels (XGA)		1024 x 768 pixels (XGA)
Basic ranges	2.5 to 1200 (m) 10 to 3600 (ft) 2.5 to 700 (fm / l. fm) (8 ranges can be set to users choice)	2.5 to 2000 (m) 10 to 6000 (ft) 2.5 to 1100 (fm / l. fm) (8 ranges can be set to users choice)	1 to 3000 (m) 5 to 8000 (ft) 1 to 1700 (fm) 1 to 2000 (l. fm) (8 ranges can be set to users choice)		1 to 3000 (m) 5 to 8000 (ft) 1 to 1700 (fm) 1 to 2000 (l. fm) (8 ranges can be set to users choice)
Range units	m, ft, fm, l.fm		m, ft, fm, l.fm		m, ft, fm, l.fm
Presentation modes	High frequency, Low frequency, Dual frequency, Zoom image (Bottom lock, Bottom discrimination, Bottom zoom, Zoom, Bottom follow zoom), Nav mode, Vertical split, Horizontal split A-scope can be displayed at all above modes		High frequency, Low frequency, 1 to 4 frequency, Zoom image (Bottom lock, Bottom discrimination, Bottom zoom, Zoom, Bottom follow zoom), Nav mode, Vertical split, Horizontal split, Mix A-scope can be displayed at all above modes		High frequency, Low frequency, 1 to 4 frequency, Zoom image (Bottom lock, Bottom discrimination, Bottom zoom, Zoom, Bottom follow zoom), Nav mode, Vertical split, Horizontal split, Mix A-scope can be displayed at all above modes
Presentation colors	64 colors,16 colors, 8 colors, Monochrome		64 colors,16 colors, 8 colors, Monochrome		64 colors,16 colors, 8 colors, Monochrome
Alarms	Bottom, Fish, Temperature*, Speed**, Arrival***, XTE***		Bottom, Fish, Temperature*, Speed**, Arrival***, XTE***		Bottom, Fish, Temperature*, Speed**, Arrival***, XTE***
Image speed	9 steps & stop		12 steps & stop		12 steps & stop
Functions	Interference rejection, Color rejection, VRM, Noise reduction, White line, Draft correct, Water temperature correct, Boat speed correct, Store image (10 images), Sona-Tone™, Fishing Hot Spot, Event memory, Simple plotter, Panel illumination, Power reduction, External trigger, Fish information, Detection area display		Interference rejection, Color rejection, VRM, Noise reduction, White line, Draft correct, Water temperature correct, Boat speed correct, Store image (500 images), Sona-Tone™, Homing, Event memory, Simple plotter, Panel illumination, Power reduction, External trigger, Detection area display, CM key, Water Temp.graph, Individual range operation, Individual shift operation, Heaving compensation		Interference rejection, Color rejection, VRM, Noise reduction, White line, Draft correct, Water temperature correct, Boat speed correct, Store image (500 images), Sona-Tone™, Fishing Hot Spot, Event memory, Simple plotter, Panel illumination, Power reduction, External trigger, Detection area display, CM key, Water Temp.graph, Individual range operation, Individual shift operation, External memory storage (SD card, USB memory), Heaving compensation
Auto functions	Range, Shift, TVG		Range, Shift, TVG, TX Power, White Line		Range, Shift, TVG, TX Power, White Line
Input data format and sentences	NMEA0183 Ver.1.5 / 2.0 / 3.0 GGA, GLL, HDT, MTW, MWV, RMC, VHW, VTG, ZDA		NMEA0183 Ver.1.5/2.0/3.0 GGA, GLL, HDT, MTW, MWV, RMC, VHW, VTG, ZDA		NMEA0183 Ver.1.5/2.0/3.0 GGA, GLL, HDT, MTW, MWV, RMC, VHW, VTG, ZDA
Output data format and sentences	NMEA0183 Ver.2.0 (DBT : Ver.1.5) DBT, DPT, GGA, GLL, HDT, MTW, MWV, RMC, TLL, VHW, VTG, ZDA		NMEA0183 Ver.2.0 (DBT : Ver.1.5) DBT, DPT, GGA, GLL, HDT, MTW, MWV, RMC, TLL, VHW, VTG, ZDA		NMEA0183 Ver.2.0 (DBT : Ver.1.5) DBT, DPT, GGA, GLL, HDT, MTW, MWV, RMC, TLL, VHW, VTG, ZDA
NMEA ports	Total 1: input and output		Total 2 : input and output		Total 2 : input and output
Power supply	10.8 to 31.2 VDC		10.8 to 31.2 VDC		21.6 to 31.2 VDC
Power consumption (24 VDC)	25 W or less	30 W or less	60 W or less		70 W or less
<b>Environmental:</b>					
Operating temperature	-15°C to +55°C		-15°C to +55°C		-15°C to +55°C
Water protection	IPX5		IPX5		IPX5

\* Requires data from Temp sensor  
 \*\* Requires speed data from Speed sensor or GPS sensor  
 \*\*\* Requires data from GPS sensor

Model	CVS-126	CVS-128	CVS-1410	CVS-1410HS	CVS-702D	CVS-705D	CVS-707D
<b>Specifications &amp; Functions:</b>							
Output power (RMS)	600 W	600W or 1kW	1 kW		3kW : 28, 40, 50, 75, 200kHz (200kHz is 1kW only) or 5kW : 28, 50, 75, 200kHz (200kHz is 1kW only)		
Output frequency	50 kHz and 200 kHz	50 kHz and 200 kHz	50 kHz and 200 kHz ****	50 kHz and 200 kHz	Single, 2 frequency, Simultaneous		
Display size and type	5.7 inch color LCD	8.4 inch color LCD	10.4 inch color LCD		12.1 inch color XGA LCD	15 inch color XGA LCD	17 inch color XGA LCD****
Display resolution	320 x 240 pixels (QVGA)		640 x 480 pixels (VGA)		1024 x 768 pixels (XGA)		
Basic ranges	2.5 to 800 (m) 10 to 2800 (ft) 2.5 to 600 (fm / l. fm) (8 ranges can be set to users choice)	2.5 to 1200 (m) 10 to 3600 (ft) 2.5 to 700 (fm / l. fm) (8 ranges can be set to users choice)	2.5 to 2000 (m) 10 to 6000 (ft) 2.5 to 1100 (fm / l. fm) (8 ranges can be set to users choice)		1 to 3000 (m) 5 to 8000 (ft) 1 to 1700 (fm) 1 to 2000 (l. fm) (8 ranges can be set to users choice)		
Range units	m, ft, fm, l.fm		m, ft, fm, l.fm		m, ft, fm, l.fm		
Presentation modes	High frequency, Low frequency, Dual frequency, Zoom image (Bottom lock, Bottom discrimination, Bottom zoom, Zoom, Bottom follow zoom), Nav mode, Vertical split, Horizontal split, A-scope can be displayed at all above modes		High frequency, Low frequency, 1 to 2 frequency, Zoom image (Bottom lock, Bottom discrimination, Bottom zoom, Zoom, Bottom follow zoom), Nav mode, Vertical split, Horizontal split, Mix A-scope can be displayed at all above modes		High frequency, Low frequency, 1 to 2 frequency, Zoom image (Bottom lock, Bottom discrimination, Bottom zoom, Zoom, Bottom follow zoom), Nav mode, Vertical split, Horizontal split, Mix A-scope can be displayed at all above modes		
Presentation colors	64 colors,16 colors, 8 colors, Monochrome		64 colors,16 colors, 8 colors, Monochrome		64 colors,16 colors, 8 colors, Monochrome		
Alarms	Bottom, Fish, Temperature*, Speed**, Arrival***, XTE***		Bottom, Fish, Temperature*, Speed**, Arrival***, XTE***		Bottom, Fish, Temperature*, Speed**, Arrival***, XTE***		
Image speed	9 steps & stop		12 steps & stop		12 steps & stop		
Functions	Interference rejection, Color rejection, VRM, Noise reduction, White line, Draft correct, Water temperature correct, Boat speed correct, Store image (10 images), Sona-Tone™, Fishing Hot Spot, Event memory, Simple plotter, Panel illumination, Power reduction, Fish information, Detection area display etc.		Interference rejection, Color rejection, VRM, Noise reduction, White line, Draft correct, Water temperature correct, Boat speed correct, Store image (500 images), Sona-Tone™, Homing, Event memory, Simple plotter, Panel illumination, Power reduction, External trigger, Detection area display, CM key, Water Temp. graph, Individual range operation, Individual shift operation, Heaving compensation		Interference rejection, Color rejection, VRM, Noise reduction, White line, Draft correct, Water temperature correct, Boat speed correct, Store image (500 images), Sona-Tone™, Homing, Event memory, Simple plotter, Panel illumination, Power reduction, External trigger, Detection area display, CM key, Water Temp. graph, Individual range operation, Individual shift operation, Heaving compensation		
Auto functions	Range, Shift, TVG		Range, Shift, TVG, TX Power, White Line		Range, Shift, TVG, TX Power, White Line		
Input data formats and sentences	NMEA0183 Ver.1.5 / 2.0 / 3.0 GGA, GLL, HDT, MTW, MWV, RMC, VHW, VTG, ZDA		NMEA0183 Ver.1.5 / 2.0 / 3.0 GGA, GLL, HDT, MTW, MWV, RMC, VHW, VTG, ZDA		NMEA0183 Ver.1.5 / 2.0 / 3.0 GGA, GLL, HDT, MTW, MWV, RMC, VHW, VTG, ZDA		
Output data formats and sentences	NMEA0183 Ver.2.0 (DBT : Ver.1.5) DBT, DPT, GGA, GLL, HDT, MTW, MWV, RMC, TLL, VHW, VTG, ZDA		NMEA0183 Ver.2.0 (DBT : Ver.1.5) DBT, DPT, GGA, GLL, HDT, MTW, MWV, RMC, TLL, VHW, VTG, ZDA		NMEA0183 Ver.2.0 (DBT : Ver.1.5) DBT, DPT, GGA, GLL, HDT, MTW, MWV, RMC, TLL, VHW, VTG, ZDA		
NMEA ports	Total 1 : input and output		Total 2 : input and output		Total 2 : input and output		
Power supply	10.8 to 31.2 VDC		10.8 to 31.2 VDC		10.8 to 31.2 VDC	21.6 to 31.2 VDC	21.6 to 31.2 VDC
Power consumption (12 VDC)	10 W or less	25 W or less	30 W or less		60 W or less (24 VDC)	70 W or less (24 VDC)	50 W or less (24 VDC) without Display
<b>Environmental:</b>							
Operating temperature	-15°C to +55°C		-15°C to +55°C		-15°C to +55°C		
Water protection	IPX5		IPX5		IPX5(Operatoin unit) n/a (Processor unit)		

\* Requires data from Temp sensor  
 \*\* Requires speed data from Speed sensor or GPS sensor  
 \*\*\* Requires data from GPS sensor  
 \*\*\*\* Installed single frequency transducer of 50 and 200 kHz can be also used. For details, please contact your nearest distributor.  
 \*\*\*\*\* For European model, please contact your nearest distributor.

# Specifications Sonar / Class A AIS Transceiver

# GPS Navigator / GPS Compass / DGPS Sensor / GPS Sensor / Total Navigator / Navigational Echo Sounder

## Sonar

Model	KDS-6000BB										
Specifications & Functions:											
Output power (RMS)	1.5 kW										
Output frequency	130 to 210 kHz ( 0.1 kHz step)										
Tilt angle	+5° to -90° (1°step)										
Beam angle	8° to 12°										
TD stroke	150 to 380 mm (Recommended value 150 mm)										
Display size and type	Any monitor with VGA resolution (Owner supplied)										
Basic ranges	10 to 1000 (m), 30 to 3000 (ft), 10 to 600 (fm), 10 to 700 (l.fm) (8 ranges can be set to users choice)										
Range units	m, ft, fm, l.fm										
Scanning sector angles	Sonar mode 5°step: 5°, 25°, 45°, 85°, 125°, 165°, 205°, 360° 10°step: 10°, 30°, 50°, 90°, 130°, 170°, 210°, 360° 15°step: 15°, 45°, 75°, 105°, 135°, 165°, 225°, 360° 20°step: 20°, 60°, 100°, 140°, 180°, 220°, 260°, 360° Bottom scan mode 3°step: 3°, 27°, 45°, 63°, 93°, 117°, 147°, 177° 5°step: 5°, 25°, 45°, 65°, 95°, 115°, 145°, 175°										
360° Scanning time (extracts)	20	40	60	80	100	120	160	180	200	240	400
Scanning time (sec.) 5° step	6.3	8	10	11.8	14	15.8	19.5	21.6	23.5	27.5	43.3
Scanning time (sec.) 10° step	3.7	4.7	5.6	6.5	7.6	8.6	10.6	11.5	12.5	14.4	22.4
Scanning time (sec.) 15° step	3.3	3.7	4.3	4.9	5.7	6.4	7.9	8.2	8.9	10.3	15.7
Scanning time (sec.) 20° step	3.3	3.4	3.8	4.2	4.8	5.2	6.4	6.6	7.3	8.1	12.2
Bearing center	1°step										
Presentation mode	Sonar, Off-center, Bottom scan, Echo sounder, 2 Mode Display, One line										
Off-Center	Fore, Back, Left, Right										
Target lock	Reverse, Horizontal, Horizontal + Vertical, Marker + Horizontal, Marker + Vertical										
Presentation colors	8 colors, 16 colors										
Functions	TVG, Color rejection, Dynamic range, Compass display, Pulse width, A-scope, CM key, Frequency bandwidth, Image correction, Bearing display, TD auto up, Sonar-Tone™										
Input data format and sentences	NMEA0183 GGA, GLL, HDG, HDM, HDT, RMC, VTG, ZDA										
Output data format and sentences	NMEA0183 DBT, DPT, GGA, GLL, MTW, RMC, TLL, VTG, ZDA										
NMEA ports	Total 1 : input / output										
Power supply	Processor unit	10.8 to 31.2 VDC									
	Hull unit	10.8 to 31.2 VDC									
Power consumption	Processor unit	70 W or less (24 VDC)									
	Hull unit	70 W or less (24 VDC)									
Environmental:											
Operating temperature	-15 °C to +55 °C										
Water protection	-										

## Class A AIS Transceiver

Model	KAT-100 (IMO)										
Specifications:											
Output power	1 W or 12.5 W (automatic selection)										
Display size and type	4 inch, monochrome LCD										
Display resolution	248 x 128 pixels										
TX / RX frequency	156.025 MHz to 162.025 MHz										
Impedance	50Ω										
DSC receiver	156.525MHz(CH70), 1200bps										
Channel bandwidth	25 kHz										
Presentation modes	Target list, Own vessel & Voyage data, Own dynamic data, Received messages, Alarms, Target plot										
Alarms	Transmitter malfunction, Antenna VSWR limit, Receiver malfunction, External EFPS lost, No sensor position in use, No valid COG, No valid SOG, Heading lost or invalid, No valid ROT										
PC	RS-232C										
Receiver channels*	16 channels										
Frequency*	1575.42MHz, L1 band										
Sensitivity*	Acquisition -138dBm, Tracking -146dBm										
Position fixing system*	GPS										
Time to position fix (Cold start)*	Typically 36 seconds										
Accuracy*	GPS 2.5m CEP / 5.0m SEP DGPS 2.0m CEP / 3.0m SEP RTCM SC-104, AIS message #17										
Differential GPS	RTCM SC-104, AIS message #17										
Input data formats and sentences	IEC61162-1/2 ABM, ACA, ACK, AIR, BBM, DTM, GBS, GGA, GLL, GNS, HDT, LRF, LRI, RMC, ROT, SSD, VBW, VSD, VTG										
Output data formats and sentence	IEC61162-1/2 ABK, ACA, ALR, LR1, LR2, LR3, LRF, LRI, TXT, VDM, VDO										
NMEA ports	Sensor data input ports (input) IEC61162-1/2 3ports 4800 or 38400 bps Bidirectional data ports (input / output) IEC61162-1/2 3ports 4800 or 38400 bps										
Power supply	10.8 to 31.2 VDC										
Power Consumption (12 VDC)	12W typical, 4.0A peak										
Environmental:											
Operating temperature	Display unit	-15°C to +55°C									
	GPS Antenna	-30°C to +80°C									
Water protection	Display unit	IP52									
	GPS Antenna	IEC60945 Exposed category									

\* Internal GPS

## GPS Navigator

Model	KGP-915		KGP-925		KGP-920 (IMO)	
Specifications						
Antenna type	GA-09		MA-620G		GA-08	
Display size and type	4.3 inch color LCD		4.0" LCD		4.0" LCD	
Display resolution	480 x 272 pixels		128 x 64 pixels		128 x 64 pixels	
Receiving channel	72 channel parallel		32 channel parallel		18 channel parallel	
Instant (Event) memory	1,000 points		200 points (Incl. one MOB point)		200 points	
Waypoint memory	10,000 points (9,000 + Event 1,000)		200 points		200 points	
Route memory	100 routes reverse trail possible		20 routes (max.400 waypoints) reverse trail possible		20 routes (max.400 waypoints) reverse trail possible	
Alarms	Proximity, Cross track error, CDI, Anchor watch		Arrival proximity, Cross track error, CDI, Anchor watch		Arrival proximity, Cross track error, CDI, Anchor watch	
Position data display	Latitude / longitude in increments of 0.0001 minute converted Loran C LOPs, Loran A LOPs and Decca LOPs		Built-in beacon receiver		Built-in beacon receiver at option	
Differential	Ready by RTCM SC-104 format		-		-	
Input data formats	RTCM SC104 Ver.2.0 (DGNSS), NMEA 0183* (GNSS source: External)		-		-	
Output data formats and sentences	NMEA 0183 Ver.2.0 / 3.0 / 4.1 / CIF AAM, APB, BOD, BWC, DCN, DTM, GGA, GLL, GSA, GSV, MSS, RMB, RMC, RTE, VTG, WPL, XTE, ZDA		IEC 61162-1 / NMEA 0183 Ver.1.5 / CIF / SHIPMATE0183 AAM, APB, BOD, BWC, DCN, DTM, GBS, GGA, GLL, GNS, GSA, GSV, MSS, RMB, RMC, Rnn, RTE, SGR, VTG, WDC, WPL, XTE, ZDA		-	
NMEA ports	Total 2 : input and output		-		-	
Power supply	10.8 to 31.2 VDC		-		-	
Power consumption (24 VDC)	4.5 W or less		4.0 W or less		4.5 W or less	
Environmental:						
Operating temperature	-15°C to +55°C (Display unit), -25°C to +55°C (Antenna unit)		-		-	
Water protection	IPX4 (Display unit), IPX6 (Antenna unit)		-		-	

\* When GPS source is selected as EXT

## GPS Compass

Model	KGC-222	
Specifications:		
Display size and type	4.0" LCD	
Display resolution	128 x 64 pixels	
Receiving channels	16 channel parallel	
Time to heading fix	2 minutes (at standard hot-start time)	
Heading accuracy	1°rms	
Heading resolution	0.1°rms	
Positioning accuracy	Position	GPS: 10m (2 drms, PDOP 3 or less)
	Velocity	1m / sec (rms, SA=OFF, PDOP: 3 or less)
Output data level	RS-422	
Output data formats and sentences	NMEA 0183 Ver.2.0 (ATT, DTM, GGA, GLL, GSA, GSV, HDM, HDT, HVE, MSS, RMC, ROT, VTG, ZDA, PKODA, PKODG1, PKODG7, PKODG21, PKODQ)	
NMEA ports	Total 3 : input / output	
Power supply	10.8 to 31.2 VDC	
Power consumption (24 VDC)	9W or less	
Environmental:		
Operating temperature	-15°C to +55°C (Display unit), -25°C to +55°C (Antenna unit)	
Water protection	IPX4 (Display unit), IPX6 (Antenna unit)	

## Total Navigator

Model	KTN-70A	
Specifications & Functions:		
Display size and type	7-inch Color LCD	
Display resolution	800 x 480 (WVGA)	
Presentation modes	Plotter (Full Screen), Plotter (Exit Full Screen), Compass, NAV	
Drawing	20 blocks (500 points)	
Route	20 routes (48 waypoints)	
Basic ranges	0.01 to 200 NM / 0.02 to 400 km	
Distance unit	Km / NM	
Other ship track	16 colors / 8 colors / Monochrome	
Track point	400,000(1Block:Max20,000)	
Mark point / WPT	100,000	
Input data formats & sentences	NMEA0183 Ver.1.5/2.0 HDG, HDT, GGA, GLL, GVS, MTW, MWD, MWV, RMC, TLL, TTM, VTG, ZDA, DPT	
Output data Format & Sentence	NMEA0183 Ver.1.5/2.0 RMC, GGA, VTG, GLL, ZDA, XTE, APB, BOD, BWC, HDT, DPT, RMA, RMB, RTE, MTW, MWV, TLL	
NMEA Port	Total 2 : input and output	
Power Supply	10.8 to 31.2 VDC	
Environmental:		
Power consumption (24 VDC)	25 W or Less	
Operating temperature	-15°C to +55°C	
Water protection	IPX4	

## DGPS Sensor / GPS sensor

Model	KGB-3		GPS-20A	
Specifications:				
Receiving channel	18 channel parallel		-	
Receiving frequency	Receiving frequency 1575.42 MHz ± 1 MHz		-	
Position accuracy	GPS	10 m (2 drms, SA=OFF, PDOP≤3)	-	
	DGPS(Beacon)	5 m (2 drms, SA=OFF, PDOP≤3)	-	
	SBAS	8 m (2 drms, SA=OFF, PDOP≤3)	-	
	Velocity	0.1 kt (rms, SA=OFF, PDOP≤3)	-	
Time to position fix	Cold start	50 seconds (typical)	-	
	Warm start	45 seconds (typical)	-	
	Hot start	25 seconds (typical)	-	
Differential GPS	Receiver input	SBAS (WAAS, EGNOS, MSAS)		RTCM SC-104
	External input	-		
Data communication	Asynchronous data communication with RS-422			
Output data formats and sentences	NMEA 0183 (GGA, GLL, VTG, RMC, ZDA, GSA, GSV, MSS)		NMEA 0183 (GGA, GLL, VTG, RMC, ZDA, GSA, GSV)	
Input data	Parameter setting, Beacon setting		Parameter setting	
Output data level	RS-422			
Output current	20 mA or less		40 mA or less	
Power supply	10.8 to 31.2 VDC		-	
Power consumption (12 VDC)	2.5 W or less		1.3 W or less	
Environmental:				
Operating temperature	-25°C to +55°C			
Water protection	IPX6			

## Navigational Echo Sounder

Model	CVR-010 (IMO)	
Specifications & Functions:		
Output power (RMS)	600 W	
Transducer	TGM 60-50-20L (TD-26 / 20L)	TGM 80-200-20L (TD-65 / 20L)
Output frequency	50 kHz	
Display size and type	5.7 inch color TFT LCD, LED-backlight	
Display resolution	240 x 320 pixels (QVGA)	
Basic ranges	5 to 800 (m), 2.5 to 400 (fm), 20 to 4000 (ft)	
Range units	m, ft, fm	
Accuracy of measurement	Better than ±2.5% of digital depth readout	
Minimum detectable depth	1 m	0.5 m
Range discrimination	20 m range: 5 mm / m, 200 m range: 0.5 mm / m	
Soundings history	Max. 12 hours	
Data storage interval	At 2 seconds interval	
Presentation colors	8 colors	
Alarms	Depth, Bottom-Missing, Power failure, Power removal / Shutoff	
Image speed	1 step	
Functions	Noise reduction, LOG DATA, White line, VRM, Transducer location, Depth reference, Draft, Date / Time, LAT / LON *	
Auto functions	Range, TVG, GAIN	
Input data format and sentences	NMEA0183 (GGA, VTG, ZDA, RMC, ACK)	
Output data format and sentences	NMEA0183 (DPT, PSKPDP, DBT, DBK, ALR)	
NMEA ports	Total 3 : input and output	
Power supply	24 VDC (11 to 40 VDC)	
Power consumption (24 VDC)	15 W or less	
Environmental:		
Operating temperature	-15°C to +55°C	
Water protection	-	

\* Requires data from GPS sensor