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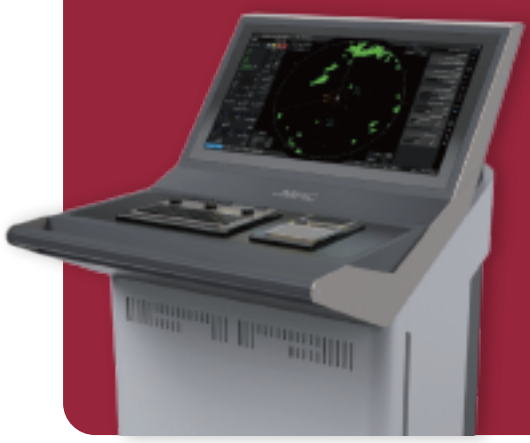
Integrated Marine
Solutions Provider

MRC

ECDIS

DIP

RADAR



MRC
CATALOG

ECDIS / RADAR / DIP

· Electronic Chart Display & Information System
· Marine RADAR System
· Digital Instrument Panel

www.mrckorea.com

ABOUT

MNS-100E Series

ELECTRONIC CHART DISPLAY & INFORMATION SYSTEM

- Enables the navigator to plan the voyage and monitor the route, easier and faster, for safe navigation of the vessel at sea
- Uses various types of data from multiple sources including the GPS and AIS, then displays the images on the electronic navigational chart
- Reads information about specified areas and triggers alerts when the ship enters a hazardous area where the risk of collision or grounding is higher

MNS-100E Series at a Glance

The MNS-100E series offers powerful route planning and route monitoring capabilities as well as support for electronic navigation charts

Improved Situational Awareness

Real-time data on ship position, speed, and course, along with other navigational information, provides a comprehensive view of the ship's surroundings

Accuracy

Provides accurate and reliable navigation information, helping to ensure the safe and efficient passage of the ship

Safety

Provides alerts and warnings if the ship is in danger of grounding or colliding with another vessel, helping to ensure safe navigation

Enhanced Efficiency

Helps the navigators optimize the ship's route and performance so that time and fuel consumption can be reduced

Integration

Integrates with other shipboard systems, such as the Automatic Identification System (AIS) and the radar system, to provide a comprehensive view of the status of the ship, route, and the sea

Compliance

Fully compliant with MED regulations: DNV and the Republic of Korea government certified

User Interface

- The MNS-100E Series provides an intuitive GUI that lets navigators easily utilize the system
- User interface ensures important data will be displayed in a fixed position on the screen
- Always displays the menu bar on the left and the critical vessel data on the right

Route Planning

- Integrated route planning and monitoring function which the navigator can use to place waypoints, either graphically on the chart or numerically on the table, and analyze the route
- Provides waypoint information such as distance between each waypoint on the route, estimated time for the next waypoint, and estimated total voyage time
- Track Control System (TCS): Automatically controls the ship's course and provides alerts such as route departure warnings and route interference warnings to avoid collision

Display

- Corresponds to electronic navigational charts satisfying IHO S-57, S-63, and S-101
- 19", 24", and 27" display providing visibility with wide viewing angles

▲ DNV MED Certificate (ECDIS, TCS)

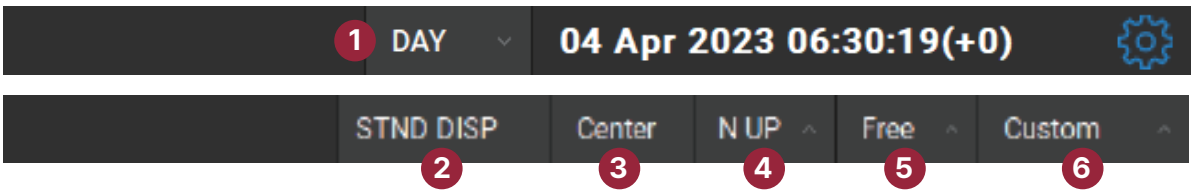
▲ Republic of Korea Government Type Approval (ECDIS)

MAIN SCREEN · MAIN INFORMATION WINDOW

No. & Name	Description
① Chart	Displays digital chart and navigational information on screen
② Function List	List of various functions available: Route Planning, Route Monitoring, EBL/VRM, Target Information, Manual Update, Mariner's Tools, Voyage Log, Anchor, MOB, LOP, Great Circle, Default Setting & TCS(Optional)
③ Setting	Option settings for ECDIS operation
④ Main Information Window	Real-time information of ownship, including alerts, heading, speed through water, course overground, speed over ground, and GPS position

No.		Description
Time	04 Apr 2023 06:30:19(+0)	Current Time in Universal Time Coordinated (UTC)
Alerts	2 GPS Difference ACK	Alert Information : [A]larm. [W]arning, [C]aution, [T]otal Alert Count, Alert List, Alert Silence
HDG	HDG GYRO 1 221.0 °	Heading
STW	STW LOG 1 17.9 kn	Speed Through Water
COG	COG GPS 1 234.0 °	Course Over Ground
SOG	SOG GPS 1 5.0 kn	Speed Over Ground
POSN	POSN GPS 1 LAT 35°03.322' N WGS84 LON 129°07.609' E	Position (Latitude and Longitude)

TOOLBAR

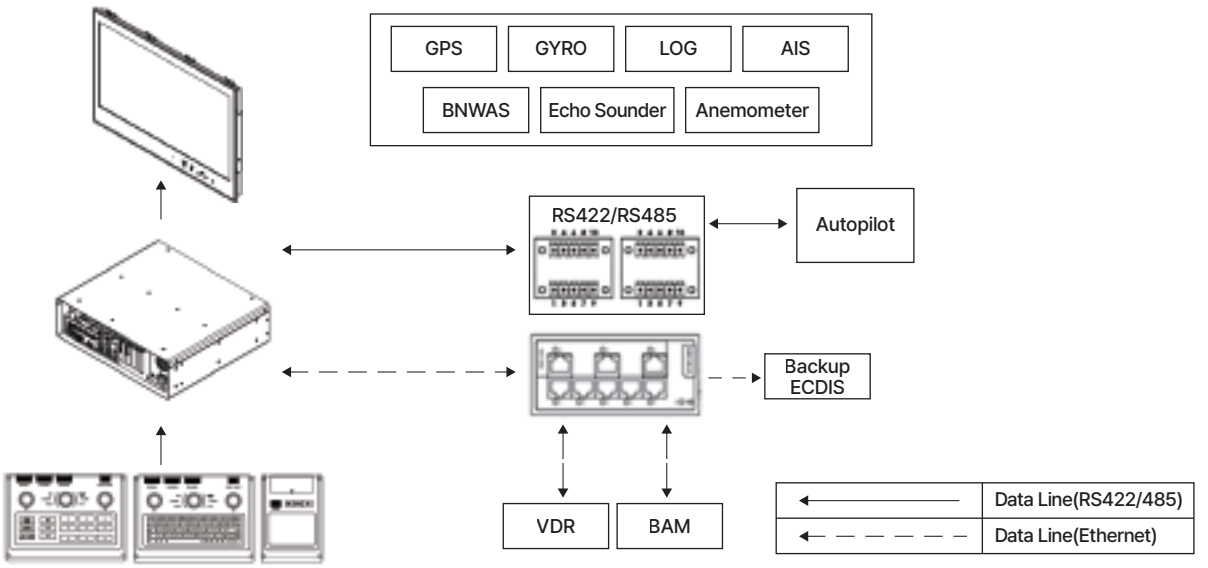


No. & Name	Description
① Brightness	Brightness mode : Day / Night / Dusk
② Standard Display	Standard display single operation button : Return display setting to default
③ Ownship Center	Return the center of the screen to ownship center
④ Orientation	Chart display orientation : North Up / Course Up / Head Up
⑤ Motion	Motion mode : True Motion / Relative Motion / Free Motion
⑥ Object Display	Choose objects displayed : Base / Standard / All Other / Custom

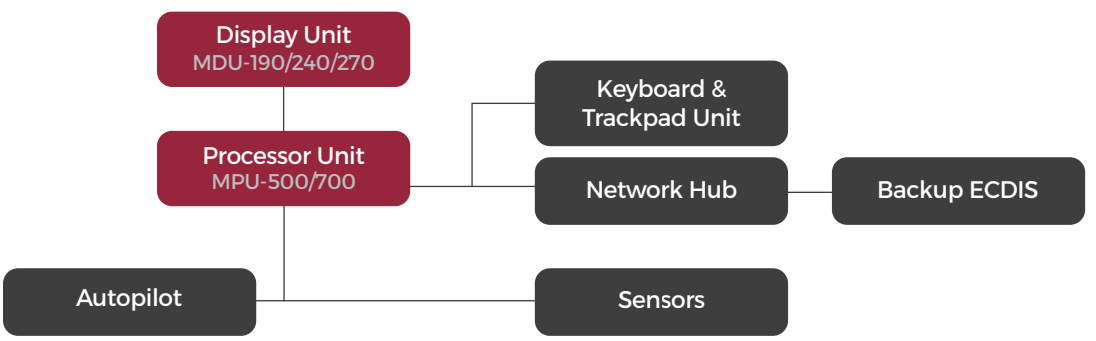
CURSOR MENU

No. & Name	Description
① Panning	Move display
② ACQ	Display acquired target information
③ LOP	Line of Position information
④ Voyage Log	Display voyage log
⑤ Pick Report	Look up information on a selected point, line, or area of the chart
⑥ MONIT	Route Monitoring
⑦ EBL/VRM	Displays EBL / VRM : - EBL : Electronic Bearing Line - VRM : Variable Range Marker

CONNECTION DIAGRAM



SYSTEM BLOCK DIAGRAM



REGULATIONS

The MNS-100E series is certified with:

- EU MED (Marine Equipment Directive) Certification
- Republic of Korea Government Type Approval

The MNS-100E series also conforms to:

- IMO Resolution MSC.191(79) for voyage information display
- IMO Resolution MSC.232(82) for performance standards

The MED type approval certification and other standards are as below :

- EU MED 96/98/EC.A.1/4.30
- IMO Res.A.694 (17)
- IMO Res.MSC.191 (79)
- IMO Res.MSC.232 (82)
- IEC 61174 Ed.4.0
- IEC 62923-1 Ed.1.0
- IEC 62923-2 Ed.1.0
- IEC 62288 Ed.3.0
- IEC 62065 Ed.2.0
- IEC 61162-1 Ed.5.0
- IEC 61162-2 Ed.1.0
- IEC 61162-450 Ed.2.0
- IHO S-52 PresLib ed.4.0.3
- IHO S-57 ed.3.1
- IHO S-63 v.1.2.0
- IEC 60945 Ed.4.0

INTERCONNECTED EQUIPMENT INTERFACE SPECIFICATION

Equipment Category	Equipment Name	Interface	Data Type	Input	Output
Positioning Sensors	**DGPS**	IEC 61162-1/2/450	Position, Time, Speed	GLL, GGA, RMC GNS, VTG, ZDA	-
	Gyro Compass	IEC 61162-1/2/450	Heading Angle, Rate of Turn	HDT, THS, HCR, ROT	-
Sea Surveying Sensor	**EM-Log**	IEC 61162-1/2/450	Water Speed	VBW, VHW	-
	Echo Sounder	IEC 61162-1/2/450	Sea Depth	DBT	-
	Anemometer	IEC 61162-1/2/450	Wind Direction / Speed	MWV	-
	Doppler SONAR Current Indicator	IEC 61162-1/2/450	Set and Drift	VDR	-
RADAR	**RADAR**	IEC 61162-1/2/450	ARPA Target	TTD, TTM	-
AIS	**AIS**	IEC 61162-1/2/450	AIS Target	VDO, VDM	VSD
BAM Interface	**BAM**	IEC 61162-1/2/450	Alert Information	ACN, HBT	ALC, ALF ARC, HBT
BNWAS Interface	**BNWAS**	IEC 61162-1/2	General Event Message	-	EVE
VDR Interface	**VDR**	IEC 61162-450	Display, Display Source Information	-	-
INS Interface	**NSR**	IEC 61162-1/2/450	Navigational Status Report	NSR	-
Track Control Interface	**HCS (YDK, Tokyo Keiki)**	IEC 61162-1/2	Heading & Track Control	HTD, RSA, ROR, ZDL, XDR	HTC, XTE, VTG, VBW
Route Transfer	**Backup ECDIS**	IEC 61162-450	Report Route Transfer	RRT	RRT

ABOUT

MNS-100R Series

MARINE RADAR SYSTEM

- Enhances situational awareness for safe
- navigation at sea
- Detects, tracks, and displays objects around the vessel on the screen
- Reads information about specified areas and triggers alerts when the ship enters hazardous areas where the risk of collision or grounding is higher

MNS-100R Series at a Glance

The MNS-100R series offers powerful object detection and tracking capabilities

Improved Situational Awareness

Real-time data on ship position, speed, and course, along with other navigational information, provides a comprehensive view of the ship's surroundings

Integration

Integrates with other shipboard systems, such as the Automatic Identification System (AIS) and the ECDIS system, to provide a comprehensive view of the status of the ship, route, and the sea

Safety

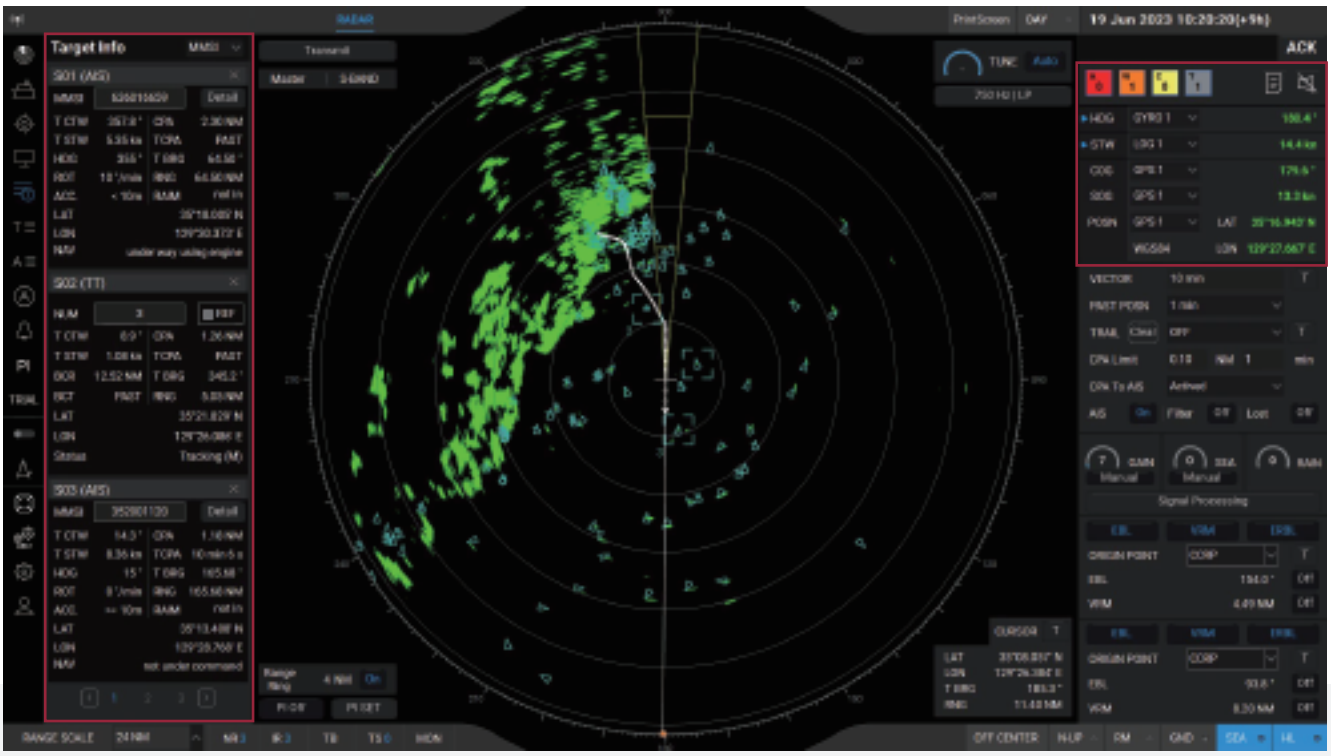
Provides alerts and warnings if the ship is in danger of grounding or colliding with another vessel, helping to ensure safe navigation

Accuracy

Provides accurate and reliable object detection, helping to ensure safe navigation even in low visibility conditions

Compliance

Fully compliant with MED regulations, certified by DNV



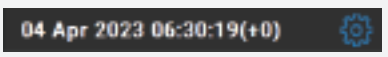
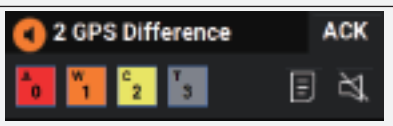
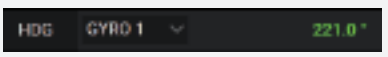
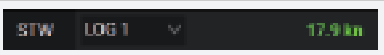
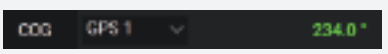
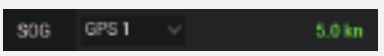
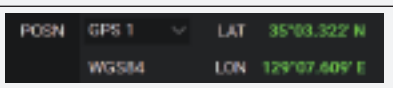
▲ DNV MED Certificate (RADAR)

- Adjustable range scales: 0.125 – 96 NM
- Manual and automatic tuning and clutter reduction supported
- 2 Electronic Bearing Lines (EBL), 2 Variable Range Markers (VRM)
- Target Tracking: Up to 100 targets, Tracking Range 24 NM; 500 AIS targets
- Always displays the menu bar on the left and the critical vessel data on the right
- Manual and automatic target acquisition
- 27-inch display providing visibility with wide viewing angles
- The MNS-100R Series provides an intuitive GUI that lets navigators easily utilize the system
- User interface ensures important data will be displayed in a fixed position on the screen

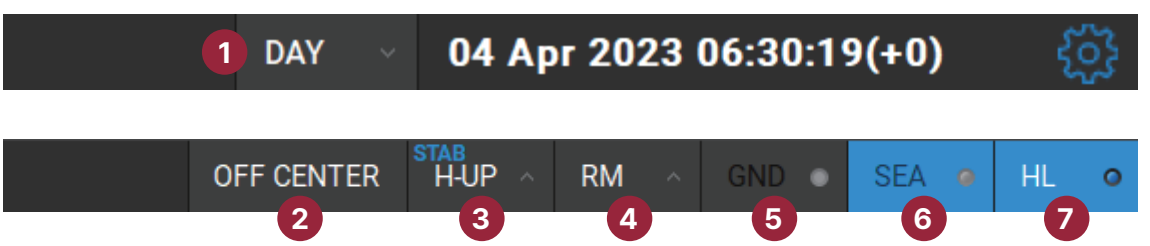
MAIN SCREEN

No.	Description
① PPI	Displays radar image on the screen
② Function List	Various functions can be executed from the function menu
③ Main Info Window	Provides the operator with real-time information about the ship and other sensors
④ Target Function	Simple target display setting menu such as vector, past position, etc.
⑤ Radar Signal Processing	Simple radar sensor operation mode settings menus such as clutter adjustment and interference rejection
⑥ EBL/VRM	Simple EBL/VRM setup menu

MAIN INFORMATION WINDOW

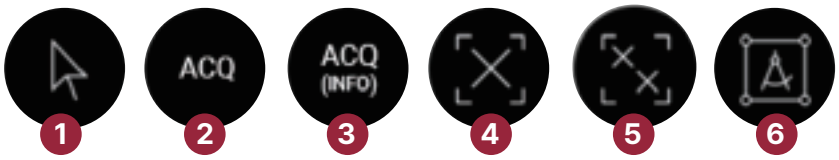
No.		Description
Time		Current Time in Universal Time Coordinated (UTC)
Alerts		Alert Information : [A]larm. [W]arning, [C]aution, [T]otal Alert Count, Alert List, Alert Silence
HDG		Heading
STW		Speed Through Water
COG		Course Over Ground
SOG		Speed Over Ground
POSN		Position (Latitude and Longitude)

TOOLBAR



No. & Name	Description
① Brightness mode	Day / Night / Dusk
② Standard display single operation button	Return display setting to default
③ Ownship Center	Return the center of the screen to ownship center
④ Chart display orientation	North Up / Course Up / Head Up
⑤ Motion mode	True Motion / Relative Motion / Free Motion
⑥ Choose objects displayed	Choose objects displayed : Base / Standard / All Other / Custom

CURSOR MENU



No. & Name	Description
① General	Cursor for general object selection
② Manual Acquisition	Start Radar target manual acquisition
③ Target Info	Display information on AIS target and Radar target
④ Acquisition Cancel	Individually cancels manually acquired Radar targets
⑤ Acquisition All Cancel	Cancel all manually acquired Radar targets
⑥ Map	Use the navigation Map functions

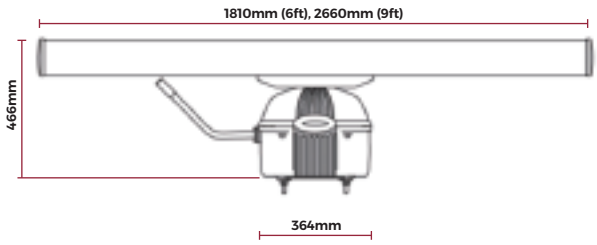
ANTENNA UNIT

▲ X-Band Radar Antenna (6ft, 9ft)

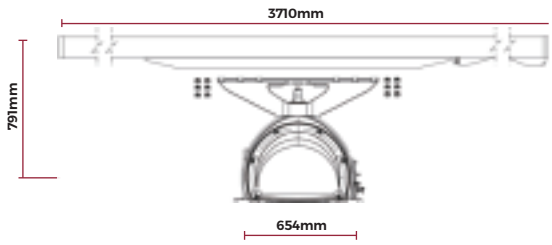
▲ S-Band Radar Antenna (12ft)

- Enhanced radar target detection up to 96 NM
- Minimum detection range: about 20 metres
- Simple installation and wiring: Just connect power cable and data cable (RJ-45)

	X-Band	S-Band
① Antenna length	6ft, 9ft	12ft
② Frequency	9.4GHz	3.0GHz
③ Peak Transmission Output	25kW	30kW
④ Beam Width	1.35°(6ft)/0.9°(9ft) Horizontal; 22° Vertical	1.9° Horizontal; 24° Vertical
⑤ Antenna Gain	29 dB (6ft), 31 dB (9ft)	27 dB



▲ X-Band Antenna

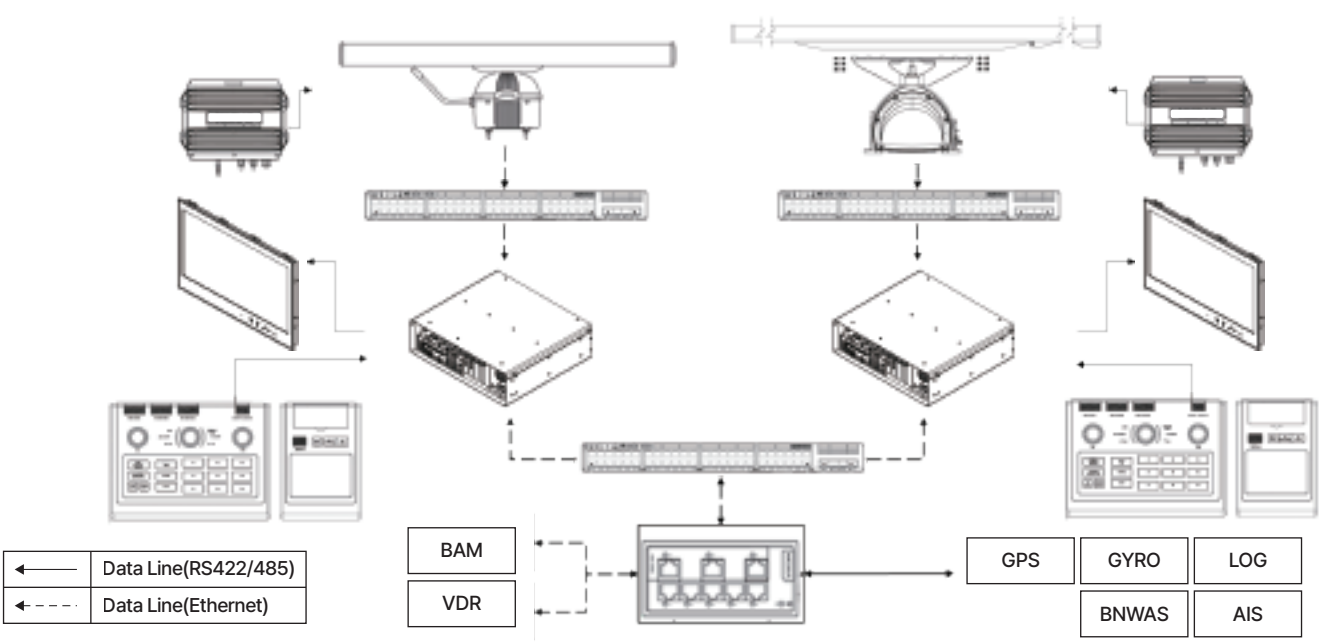


▲ S-Band Antenna

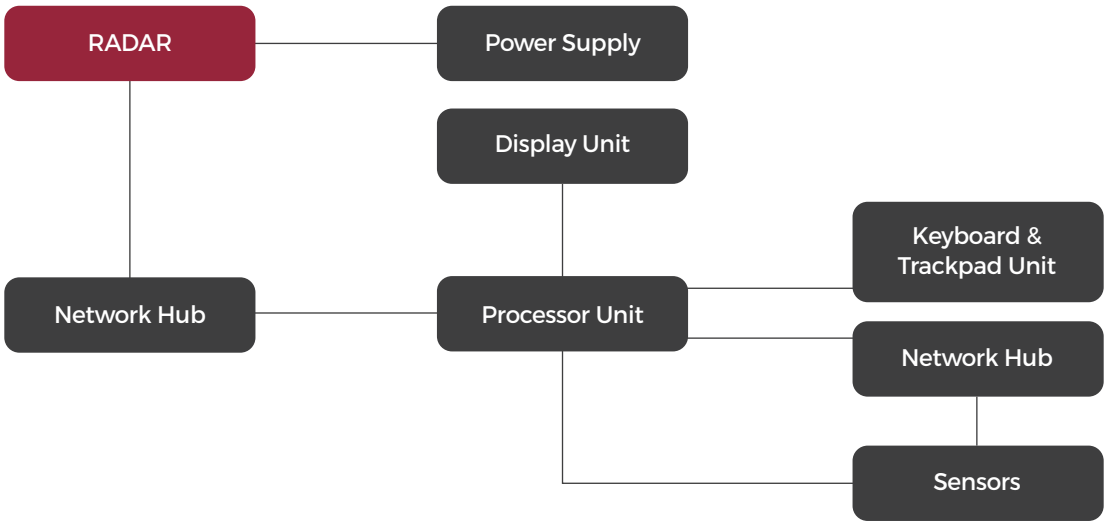
INTERCONNECTED EQUIPMENT INTERFACE SPECIFICATION

Equipment Name		Interface	Data Type	Input	Output
Positioning Sensors	DGPS	IEC 61162-1	Position, Time, Speed	GLL, GGA, RMC GNS, VTG, ZDA	-
	Gyro Compass	IEC 61162-1	Heading Angle, Rate of Turn	HDT, THS	-
Sea Surveying Sensors	EM-Log	IEC 61162-1	Water Speed	VBW, VHW	-
Target Tracking Sensors	RADAR	IEC 61162-1	Tracked Target Objects	-	TTD, TLB, OSD, RSD
	AIS	IEC 61162-1	AIS Target Objects	VBW, VHW	-
BAM Interface	BAM	IEC 61162-2	Alert Information	ACN, HBT	ALC, ALF ARC, HBT
BNWAS Interface	BNWAS	IEC 61162-1	General Event Message	EVE	-
VDR Interface	VDR	IEC 61162–450	Display Radar Image	-	-
INS Interface	NSR	IEC 61924 – 2	Navigational Status Report	-	NSR

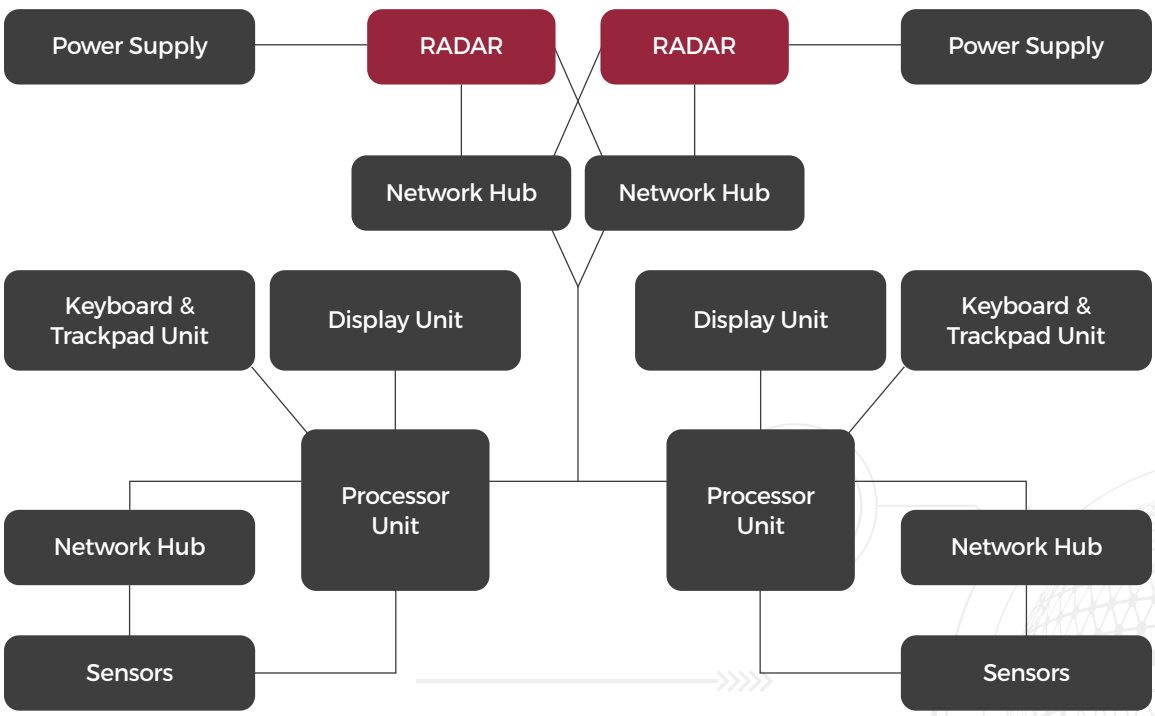
CONNECTION DIAGRAM



SYSTEM BLOCK DIAGRAM (STANDALONE)



SYSTEM BLOCK DIAGRAM (MULTIPLE)



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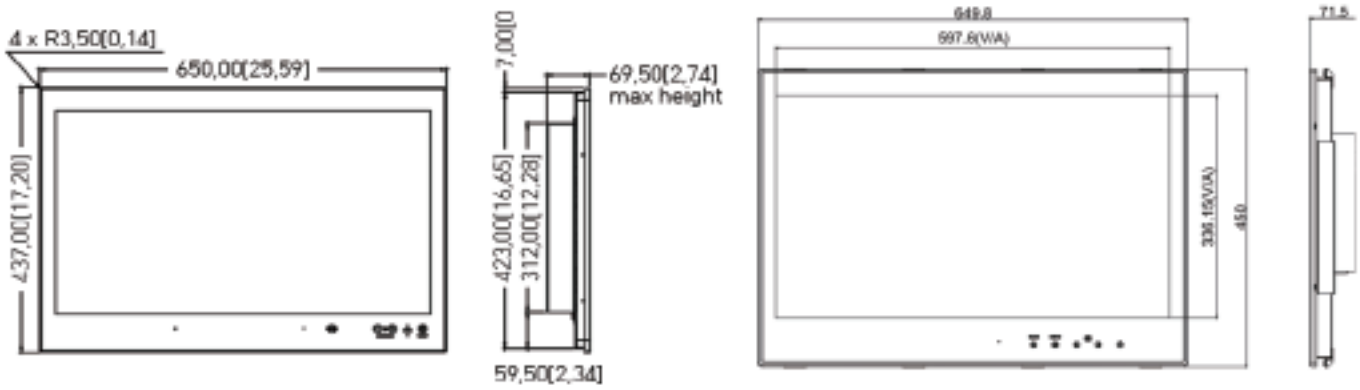
Integrated Marine Solutions Provider

SPECIFICATION & CERTIFICATES

ECDIS / RADAR

DISPLAY UNIT (ECDIS / RADAR)



▲ MDU-270 (Type A)

Component	Specification
Size	27 inch
Pixel Number	1920 × 1080
Pixel Pitch (RGB)	0.31125 (H) x 0.31125 (V) mm
Response Time	12 ms (typical), on/off
Contrast Ratio	3000:1 (typical)
Light Intensity	300 cd/m2 (typical)
Viewable Angle	+/- 89 deg. (typical) (Up/Down/Left/Right)
Active Display Area	597.6 (H) x 336.15 (V) mm
Max Color	16.7 million
Power Supply	100-240V AC - 50/60 Hz + 24V DC
Power Consumption	75W (Max)

▲ MDU-270 (Type B)

Component	Specification
Size	27 inch
Pixel Number	1920 × 1080
Pixel Pitch (RGB)	0.311 (H) x 0.311 (V) mm
Response Time	25 ms (typical), on/off
Contrast Ratio	3000:1 (typical)
Light Intensity	300 cd/m2 (typical)
Viewable Angle	+/- 89 deg. (typical) (Up/Down/Left/Right)
Active Display Area	597.6 (H) x 336.15 (V) mm
Max Color	16.7 million
Power Supply	100-240V AC - 50/60 Hz + 24V DC
Power Consumption	75W (Max)

DISPLAY UNIT (ECDIS)

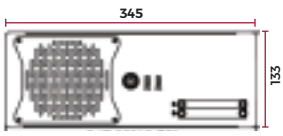
DISPLAY (MDU-240)

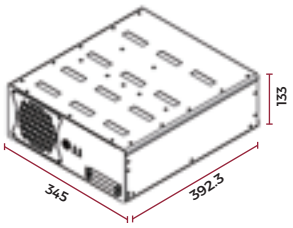
Component	Specification
Size	24 inch
Pixel Number	1920 × 1080
Pixel Pitch (RGB)	0.27675 (H) x 0.27675 (V) mm
Response Time	25 ms (typical), on/off
Contrast Ratio	3000:1 (typical)
Light Intensity	300 cd/m2 (typical)
Viewable Angle	+/- 89 deg. (typical) (Up/Down/Left/Right)
Active Display Area	531.36 (H) x 298.89 (V) mm
Max Color	16.7 million
Power Supply	100-240V AC - 50/60 Hz + 24V DC
Power Consumption	156W (Max)

DISPLAY (MDU-190)

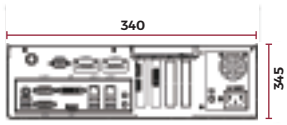
Component	Specification
Size	19 inch
Pixel Number	1280 × 1024
Pixel Pitch (RGB)	0.294 (H) x 0.294 (V) mm
Response Time	35 ms (typical), on/off
Contrast Ratio	1500:1 (typical)
Light Intensity	350 cd/m2 (typical)
Viewable Angle	+/- 89 deg. (typical) (Up/Down/Left/Right)
Active Display Area	376.32 (H) x 301.056 (V) mm
Max Color	16.7 million
Power Supply	100-240V AC - 50/60 Hz + 24V DC
Power Consumption	75W (Max)

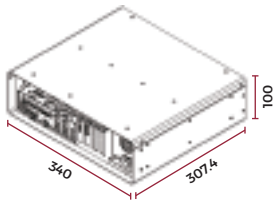
MAIN PROCESSOR UNIT (ECDIS / RADAR)





▲ MPU-500/700 (Type A)





▲ MPU-500/700 (Type B)

Component	Specification
CPU	Intel® Core i5-9500E / i7-9700E
RAM	DDR4 16 GB installed, 64 GB Max
SSD	1 TB SSD installed
Ethernet	4 × 10/100/1000Mbps, RJ45
GPU	NVIDIA Quadro P620
OS	Microsoft® Windows® 10 Pro, 64bit
Power Supply	100 - 240V AC, 50/60 Hz
Power Consumption	70 - 115W (Operating), 240W max

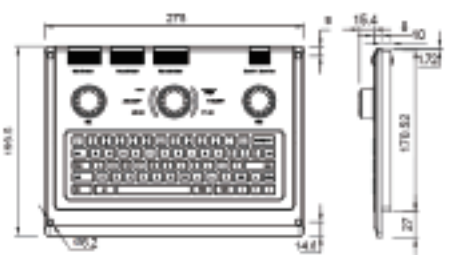
Component	Specification
CPU	Intel® Core i5-8500 / i7-8700
RAM	DDR4 16 GB installed, 32 GB Max
SSD	1 TB SSD installed
Ethernet	4 × 10/100/1000Mbps, RJ45
GPU	NVIDIA GTX 1650
OS	Microsoft® Windows® 10 Pro, 64bit
Power Supply	100 - 240V AC, 50/60 Hz
Power Consumption	115W (Operating), 300W max

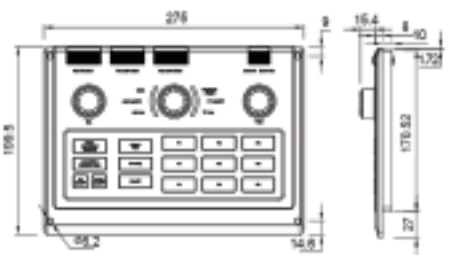
OPERATOR CONTROL UNIT

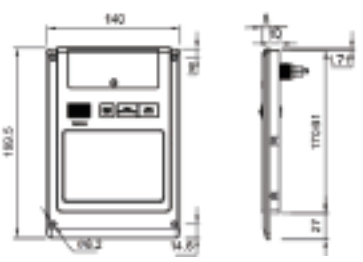
▲ **Keyboard**
(ECDIS Keyboard)

▲ **Keyboard**
(RADAR Keyboard)

▲ **Trackpad**







Dimensions	
Width	275 mm
Height	199.5 mm
Case Depth	23.44 mm

Dimensions	
Width	275 mm
Height	199.5 mm
Case Depth	23.44 mm

Dimensions	
Width	140 mm
Height	199.5 mm
Case Depth	10 mm

CERTIFICATES

▲ DNV MED Certificate (ECDIS, TCS)

▲ Republic of Korea Government Type Approval (ECDIS)

▲ DNV MED Certificate (RADAR)

ABOUT

MDI-5000 · 7000 SERIES DIP

DIGITAL INSTRUMENT PANEL

- **Provides real-time data and information about the ship's operation and systems**
- **Computer-based data acquisition and monitoring system collects and displays the data from the sensors and instruments on the ship**
- **Provides warnings and alerts if any systems malfunction or require attention**
- **Intuitively user configurable:**
  - The display can be configured to match the users' needs
  - The display can dynamically adapt to different situations and change the type of information, which was not possible with analogue instrument panels
- **The DIP uses various types of data from multiple sources including but not limited to the gyrocompass, GPS, thruster, and the engines, and displays the images on the overhead display**

Real-Time Data

Provides real-time data on the ship's operation and systems, allowing the navigators to monitor and adjust performance as needed

Intuitive Data Visualisation

Collects data from multiple sources, including sensors and instruments, providing a more comprehensive view of the ship's status that let the navigators see all the necessary information

User Configurable

User-configurable to match the needs of the navigators and the ship's operations

Safety

Provides alerts and warnings if any systems malfunction or require attention, ensuring safe operation of the ship

Integration

Integrates with other shipboard systems, such as CCTV and RADAR systems (AIS information included), providing a more comprehensive view of the ship

DISPLAYABLE INFORMATION

Sensor Info	Position Speed Course Heading Time Water Depth Wind Direction Wind Speed	Sensor Info	Rate of Turn Rudder Angle Pitch Roll Yaw Thruster Pitch
		Video Info	RADAR Target AIS Target Information

Specification		Quantity
Display	2×24″ 1920×1080 pixel (FHD) on each panel 100 - 240 V AC	2 (PORT, STBD)
Main Unit	Intel i5-13th Generation 16GB RAM (2×8GB DDR4-3200) 600W Power Supply 100 - 240 V AC	1
Configuration Panel	13.3″ 1920×1080 pixel (FHD) touch display	1

SYSTEM DISPLAY CONFIGURATION

PORT Display

STBD Display

Main Unit

Configuration Panel

GYRO
LOG
DGPS
MAIN ENGINE
GENERATOR ENGINE
VDR
AIS
RUDDER
RADAR
RADAR
ANEMOMETER
CCTV