website

MRC

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MRC

INTEGRATED MARINE SOLUTIONS PROVIDER

MRC KOREA PRODUCT CATALOG

- Electronic Chart Display & Information System
- Marine Radar System
- Digital Instrument Panel
- INS + Smart Ship Solutions
- Public Address & General Alarm System
- Talk-Back Paging System
- VoIP Automatic-Exchanger Telephone System
- Common Battery Telephone System
- Sound Powered Telephone System
- Intrinsically Safe Telephone System
- Communal Aerial System
- Marine Electric Clock System
- CCTV (Closed Circuit Television) System
- VSAT Communication System (V-Series)
- SAT TVRO System (T-Series)
- MRC Infotainment System (VOD, STB)
- Ship's Network (Computer) System
- Integrated Bridge System (IBS)

www.mrckorea.com

MRC SINCE 1961

MRC Inc. was established by Eui Joong Hwang (1927-2016) in 1961 in Busan, Korea.
MRC manufactures navigation, communication, and broadcasting equipment, including smart ship solutions such as INS, ECDIS, RADAR, Digital Instrument Panels, public address systems, automatic telephone exchangers, and communal aerial systems for several kinds of vessels.

MRC occupies around 75% of the Korean shipbuilding market, and exports products and solutions to Japan, China, Taiwan, Singapore, Vietnam, India, and countries in the Middle East.

MRC is a long-established company in the South Korean shipbuilding industry and its equipment market, and it has successfully become one of the world's leading companies in this field. Since 1992, MRC has supplied its originally designed communication systems to more than 11,000 vessels and offshore platforms.
MRC, located in Busan, is composed of three factories and one office building with 140 employees. We work hard to offer safe navigation of ships to our customers, and we hope to get their ultimate satisfaction.



사진제공(한국관광공사)

PRODUCTS

- Electronic Chart Display & Information System
- Marine Radar System
- Digital Instrument Panel
- INS + Smart Ship Solutions
- Public Address & General Alarm System
- Talk-Back Paging System
- VoIP Automatic-Exchanger Telephone System
- Common Battery Telephone System
- Sound Powered Telephone System
- Intrinsically Safe Telephone System
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- Marine Electric Clock System
- CCTV (Closed Circuit Television) System
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- SAT TVRO System (T-Series)
- MRC Infotainment System (VOD, STB)
- Ship's Network (Computer) System
- Integrated Bridge System (IBS)

CERTIFICATE LIST

Product Type	Model	Organization	Certification Type
RADAR	MNS-100R	DNV	MED
ECDIS	MNS-100E	KG	Type Approval
ECDIS	MNS-100E	DNV	MED
TCS	MNS-100ET	DNV	MED
CAS	MAD-100	ICR	CE
CBT	LC-6005	DNV	CE
CBT	LC-6005	DNV	Type Approval
CCTV	MCT SPM-1XEM	DNV	ATEX
CCTV	MCT-SPZ-1WEX	DNV	ATEX
CCTV	MCT-SFX-1WEX	DNV	ATEX
CLOCK	MSC-970	DNV	CE
CLOCK	MSC-980	CCS	Type Approval
CLOCK	MSC-980	DNV	CE
I.S.Barrier	IBP-100	SGS	IECEx
I.S. Barrier	IBP-100 & IBT-200	SGS	IECEx
I.S. PA/GA	MPC-100IS & M7-IS	SGS	IECEx
I.S.Tel	LIS-114 & LIS-117 & MRN-2000 I.S.	SGS	IECEx
PA/GA	MPA-2000S	DNV	CE
PA/GA	MPA-9000S	CCS	Type Approval

Product Type	Model	Organization	Certification Type
PA/GA	MPA-9000S	DNV	Type Approval
PA/GA	MPA-9000S	KR	Type Approval
PA/GA	MPA-9000S	RMRS	Type Approval
PABX	MCX-5000S	DNV	Type Approval
PABX	MED-100	DNV	Type Approval
PABX	MED-100	RMRS	Type Approval
PABX	MED-200	DNV	Type Approval
PABX	OFFICE-7000S	DNV	CE
PABX	Office-7200S/7400S	DNV	Type Approval
Speaker	HS-10Exde/ 30Exde	DNV	ATEX
SPT	LC-800S	CCS	Type Approval
SPT	LC-800S	DNV	CE
SPT	LC-800S	DNV	Type Approval
SPT	LC-800S	RMRS	Type Approval
SPT	LC-800S	DNV	CE
Talk-Back	MTB-1200S	DNV	CE
Talk-Back	MTB-1200S	RMRS	Type Approval
TEL	LC-212A/B	DNV	CE

COMPANY LIST

Company	National	E-mail	Website
Vision Marine	Brazil	celso@vis ionmarine.com.br	www.visionmarine.com.br
MRC Offshore China Co.,Ltd	China	tony@mrc-offshore.com stella@mrc-offshore.com	-
MRC China Ltd.	China	felix@mrc-china.com	-
Junge Marine Technology Co,Ltd	China	allen@jungemarine.com	-
Onetech (One Group)	Cyprus	sales@onetech.global	www.onegroup.global
Digital Ocean Technologies Ltd	Cyprus	service@digitaloceantech.com	www.digitaloceantech.com
NAVTEAM Professional Marine Electronics	Denmark	sales@navteam.com	www.navteam.com
Sea Ergon Marine Ltd.	Greece	info@seaergon.gr	www.seaergon.gr
Radio Holland Hong Kong	Hongkong	service.asia@radioholland.com	www.radioholland.com
Marks Marine Radio Pvt. Ltd.	India	info@mmrindia.com	www.mmrindia.com
AlphaNav India Private Limited	India	sales@alphanavindia.com	https://alphanavinternational.com
PT Penta Tunggal Terpadu	Indonesia	ptt@pentatunggal.com	www.pentatunggal.com
PT Keitoku Teknik Indonesia	Indonesia	sales@keitoku.com	https://daikai.com
Tefin S.C.R.L	Italy	info@tefin.it	www.tefin.it
Kyokuyo Electric Co., Ltd.	Japan	info@kyokuyoe.co.jp	www.kyokuyoe.co.jp
Bogo Co., Ltd. (China)	Korea	bogo@bogoco.co.kr	www.bogoco.co.kr
Sinco Automasi Sdn Bhd	Malaysia	sales@sincoautomasi.com	www.sincoautomasi.com
Multidigital Nigeria Limited	Nigeria	info@multidigitalng.com	www.multidigitalng.com
D2S Engineers(Panama) S. EP.	Panama	services@d2sengineers.com	-
Maretek Singapore Pte Ltd.	Singapore	info@maretek.com.sg	www.maretek.com.sg
Jason Electronics (Pte) Ltd.	Singapore	sales@jason.com.sg	www.jason.com.sg
Urecon Automation Pte Ltd	Singapore	urecon@urecon.com.sg	https://urecon.sg
Alphanav International Sg Pte Ltd	Singapore	service@alphanavindia.com	www.alphanavindia.com
Daikai Engineering Pte Ltd	Singapore	sales@daikai.com	https://daikai.com
SMD Telecommunications (Pty) Ltd	South Africa	sales@smd-marine.com	www.smd-marine.com
Elite Radio & Engineering Co Pvt Ltd	Sri Lanka	info@eliteradio.com	www.eliteradio.com
LSC Multech Co., Ltd.	Taiwan	lsc@mail.lscmultech.com.tw	www.lscmultech.com.tw
Daikai Engineering (Thailand) Co., Ltd.	Thailand	sales@daikai.com	https://daikai.com
Navcom Marine Electronic	Turkey	navcom@navcom.com.tr	www.navcom.com.tr
Elektro Deniz	Turkey	baykul@elektrodeniz.com	https://elektrodeniz.com
Metro Mac	U.A.E.	info@metromac.com	www.metromac.com
Master Systems L.L.C.	U.A.E.	info@mastersystems.com	http://mastersystems.org
C.S. Controls Inc.	USA(California) USA(Louisiana)	pbs@cscontrols.com -	- -

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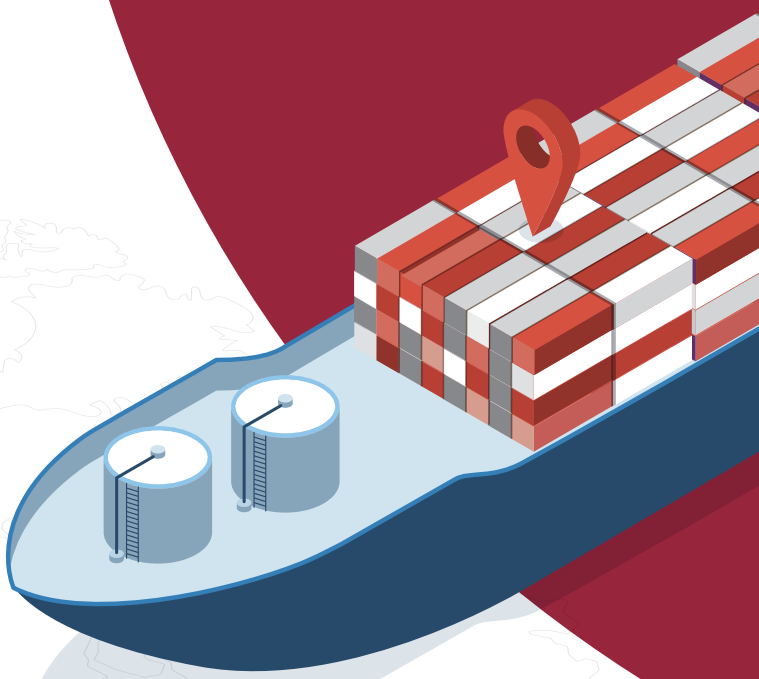
Talk Back Paging System 24

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MNS-100E Series / MNS-100ET Series ECDIS

Electronic Chart Display & Information System

GENERAL DESCRIPTION

- 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
- Track Control System (TCS) automatically maintains the ship's course, provides alerts such as route departure warnings and route interference warnings, adjusts the rudder to avoid collision, and returns the ship to the original course.

PRODUCT INFORMATION

ACCURACY	Provides accurate and reliable navigation information, helping to ensure the safe and efficient passage of the ship
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
ENHANCED EFFICIENCY	Helps the navigators optimize the ship's route and performance so that time and fuel consumption can be reduced
SAFETY	Provides alerts and warnings if the ship is in danger of grounding or colliding with another vessel, helping to ensure safe navigation
COMPLIANCE	Fully compliant with MED regulations: DNV and Republic of Korea government certified
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



▲ **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

REGULATIONS

- EU MED (Marine Equipment Directive) Certification
- Republic of Korea Govemment Type Approval
- IMO Resolution MSC.191(79) for voyage information display
- IMO Resolution MSC.232(82) for performance standards

- EU MED 96/98/EC.A.1/4.30
- IMO Res.A.694 (17)
- IMO Res.MSC.191 (79)
- IMO Res.MSC.232 (82)
- 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
- IEC 62065 Ed.2.0
- IEC 61162-1 Ed.5.0
- IEC 61162-2 Ed.1.0
- IEC 61162-450 Ed.2.0
- IEC 61174 Ed.4.0
- IEC 62923-1 Ed.1.0
- IEC 62923-2 Ed.1.0
- IEC 62288 Ed.3.0

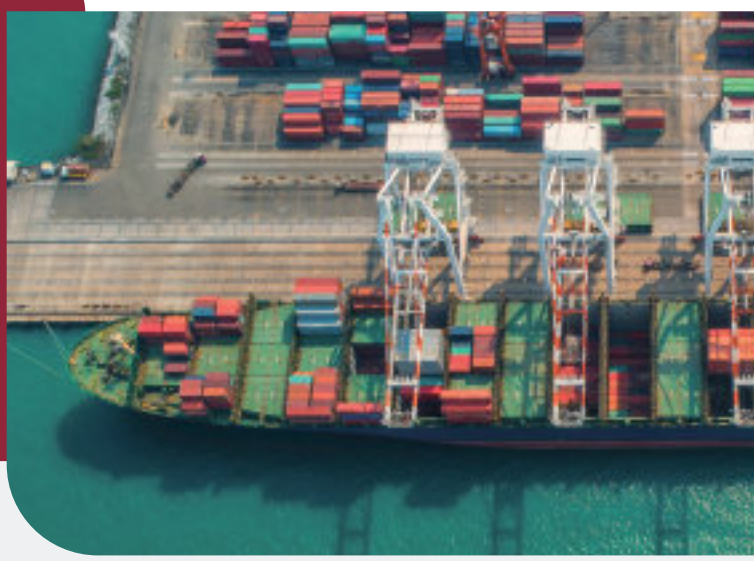
CERTIFICATES



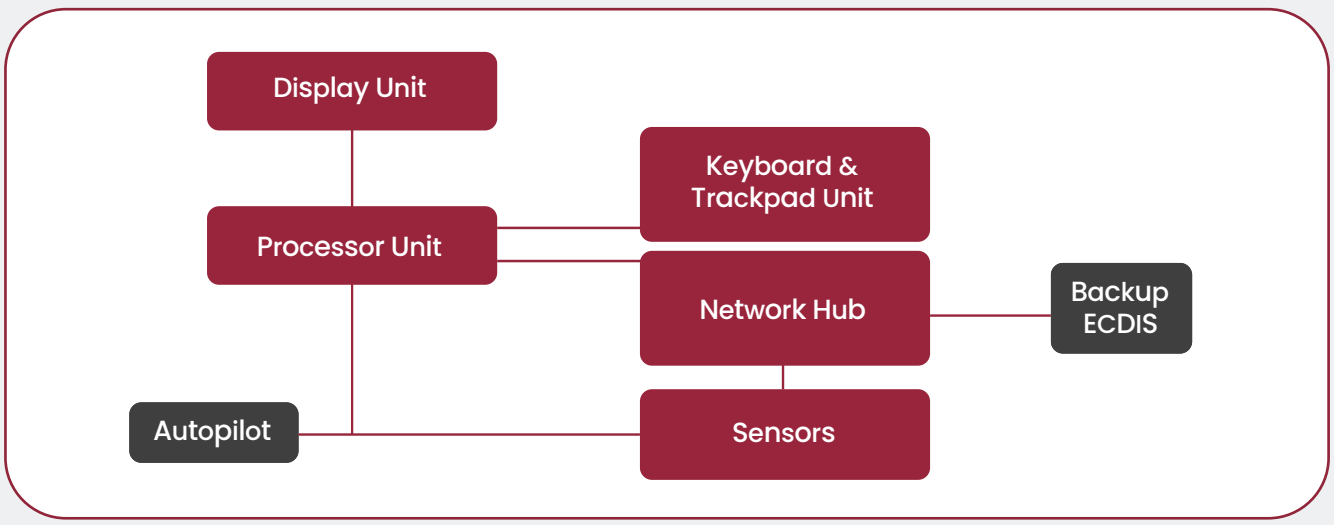
DNV MED Cert (ECDIS, TCS)



Republic of Korea Government Type Approval (ECDIS)



SYSTEM BLOCK DIAGRAM



MNS-100R Series / Marine RADAR System

Marine RADAR System

GENERAL DESCRIPTION

· 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

PRODUCT INFORMATION

ACCURACY	Provides accurate and reliable object detection, helping to ensure safe navigation even in low visibility conditions
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
SAFETY	Provides alerts and warnings if the ship is in danger of grounding or colliding with another vessel, helping to ensure safe navigation
COMPLIANCE	Fully compliant with MED regulations, certified by DNV
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



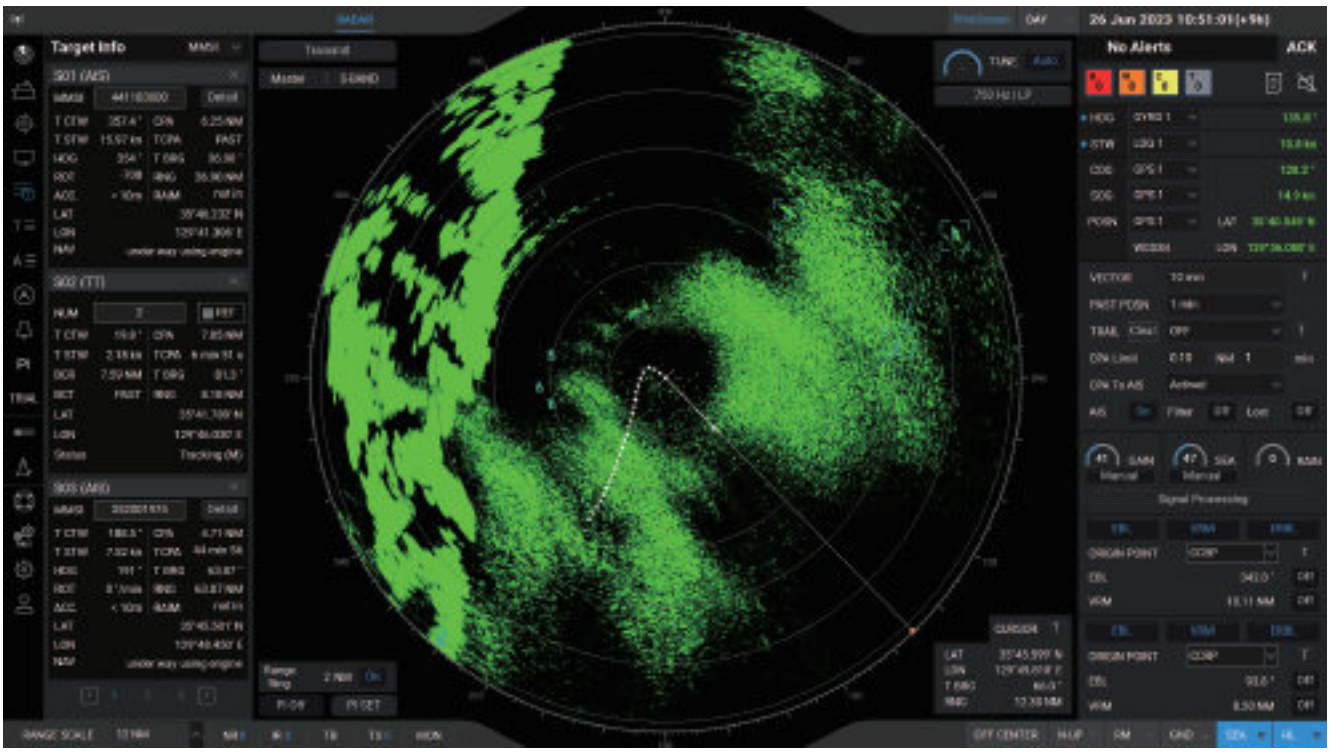
CERTIFICATES



DNV MED Cert (RADAR)

▼ MNS-100R SERIES AT A GLANCE

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



RADAR SYSTEM FEATURES

- 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
- Always displays the menu bar on the left and the critical vessel data on the right
- 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
- Manual and automatic target acquisition
- 27-inch display providing visibility with wide viewing angles

DETAILED SPECIFICATIONS

	X-Band	S-Band
Antenna length	6ft, 9ft	12ft
Frequency	9.4GHz	3.0GHz
Transmission Output	25kW	30kW
Rotational speed	20 rpm	
Pulse length(ns)	60, 250, 800	
PRF	PRF 3000 (3040, 2900, 3100) / 1500(1520, 1450, 1550) / 750(760, 725, 775)	

MDI-5000 · 7000 Series Digital Instrument Panel

Digital Instrument Panel

GENERAL DESCRIPTION

· 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 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

PRODUCT INFORMATION

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 lets the navigators see all 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

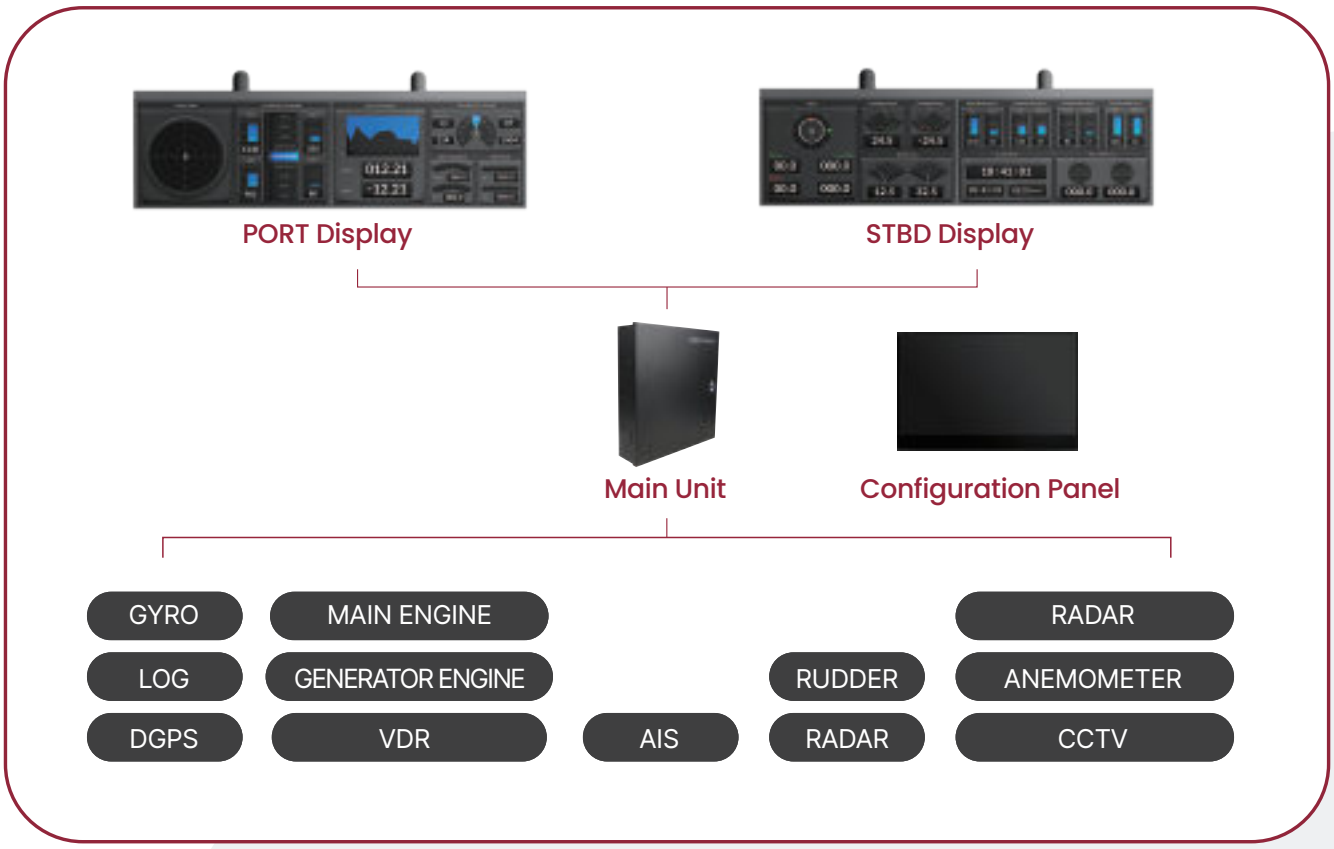
INTEGRATION
Integrates with other shipboard systems, such as CCTV and RADAR systems (AIS information included), providing a more comprehensive view of the ship

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

Sensor Info	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 BLOCK DIAGRAM



INS + SMART SHIP SOLUTIONS

Integrated Navigation System + Smart Ship Solutions

GENERAL DESCRIPTION

· MRC provides custom Smart Ship Solutions for each individual ship in the fleet.
MRC integrated Smart Ship Solutions ensure an optimized voyage by providing a real-time, synchronized, and comprehensive-navigational information.

MAIN SERVICES PROVIDED

SHIP INFORMATION	• AIS • Weather • Design • Service	**ANALYSIS**	• Route Planning • Trim Optimization • Weather Effect • Hull Fouling • Emission Management
MONITORING	• Machinery • Alarm • Overhaul • LNG	**TABLE CARE**	• Fleet Management • Predictive Diagnosis and Maintenance • Life Cycle Assessment

ENGINE STATUS MONITORING SYSTEM

- Transmits the data to shore through satellite
- Analyzes and visualizes the acquired data
- Acquires navigational equipment and engine data (Main Engine, Genset, PMS, etc.)
- Big data based fleet status analysis and predictive diagnosis made available

DIGITAL CHART TABLE

- Route Planning With Multi-Touch Input
- Route Planning
- Route Monitoring
- Route Plan Sharing
- Real-Time Route, Navigational Information, And Hazardous Zone Display

ONE-MAN BRIDGE SYSTEM

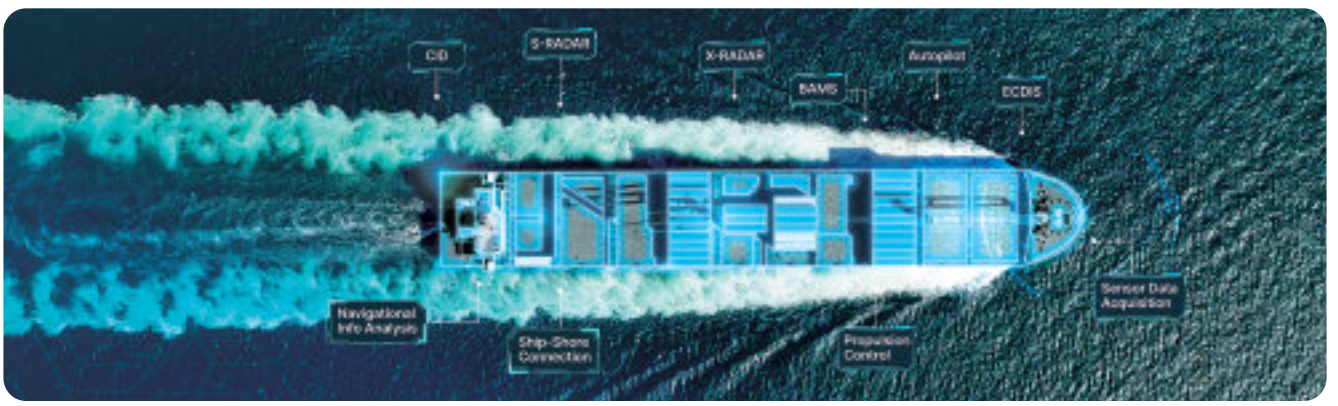
The One-Man Bridge System is a next generation bridge console system, which is a customisable combination of interconnected systems to centralise the access to the ECDIS, RADAR, conning, as well as other sensor information, and to centralise the command and control of the ship.

MRC aims to increase safety and efficiency for the management of ship.

The One-Man Bridge System enables one operator on navigational watch to perform their duty without impairing proper lookout.

This system has taken its shape through rapid development of navigation and communication systems in relation with the bridge configuration, the bridge workstation, and the One-Man Bridge operation system.





INS + Smart Ship Solutions Package Productization

SMART INS	• CID • S-RADAR • X-RADAR • Navigational Info Analysis • Ship-Shore Connection • BAMS • ECDIS • Propulsion Control • Sensor Data Acquisition	**SMART NAVIGATION SUPPORT SOLUTION**	• Multi Source DAQ and Navigation Support • Safe Navigation Tailored to Vessel Performance • Autopilot Control and Collision Avoidance • Onshore Monitoring and Remote Control
		AI-BASED ADDITIONAL SERVICES	• Camera, LIDAR Integrated Recognition • Marine Augmented Reality, HUD • AI-Based Navigational Condition Recognition

MPA-9000 Series PA/GA System

Public Address & General Alarm system

GENERAL DESCRIPTION

The Public Address system is a marine and offshore PA/GA system. The Public Address System (PA) and General Alarm System (GA) are very important in ensuring the safety of facilities and human life. The system accurately and seamlessly addresses emergency situations and integrates with a variety of alarm systems. In particular, this system is designed to respond precisely to emergency situations through the connection with various alarm systems. In explosion endangered areas, the system utilizes explosion-proof speakers and intrinsically safe microphones. This system was tested at the IEC60945 standard and approved for CE by DNV GL . The Type Approval was done by DNV GL, KR, CCS, RMRS.

REGULATIONS:

ⓐ International Electro-Technical Commission (IEC)

ⓑ International Maritime Organization (IMO) SOLAS

ⓒ Nautical Safety (Rules for the Classification of Ships, DNV)

PRODUCT INFORMATION

SYSTEM FEATURES

- MPA-9000 main unit for 19", single/dual rack mount
- Up to 10 MPA 9000 control units connected
- Digitally programmed for priority, input and output, systemdiagnosis, password control
- Up to 11 emergency microphones connected
- External paging (0/8/9) facility from Talkback/PABX etc
- Prepared for A/B dual system, with alarm synchronization
- Interfaces for manual and/or automatic alarms
- Entertainment sources, with free zone selection
- Signal processing capabilities
- Configurable priority levels
- 16 speaker outputs, with unlimited amplifier expansion
- Facility for muting local loudspeaker during paging
- Override of entertainment volume controls during paging
- Output for muting external GA system
- Output for activating external GA system
- Synchronization with external GA tones
- Up to 10 additional alarms in the system
- Chime (ding-dong) generator
- LSC (Light Signal Column) activation
- Interfaces UHF/VHF Transceiver
- Built in audio output for peripheral device
- Mutable external alarm facility
- External general button (Zone 1 and Zone 2)
- Built-in loudspeaker, to monitor activity
- Powered by 110/220V AC with automatic switch to 24V DC
- Overload, fault indication and amplifier monitoring

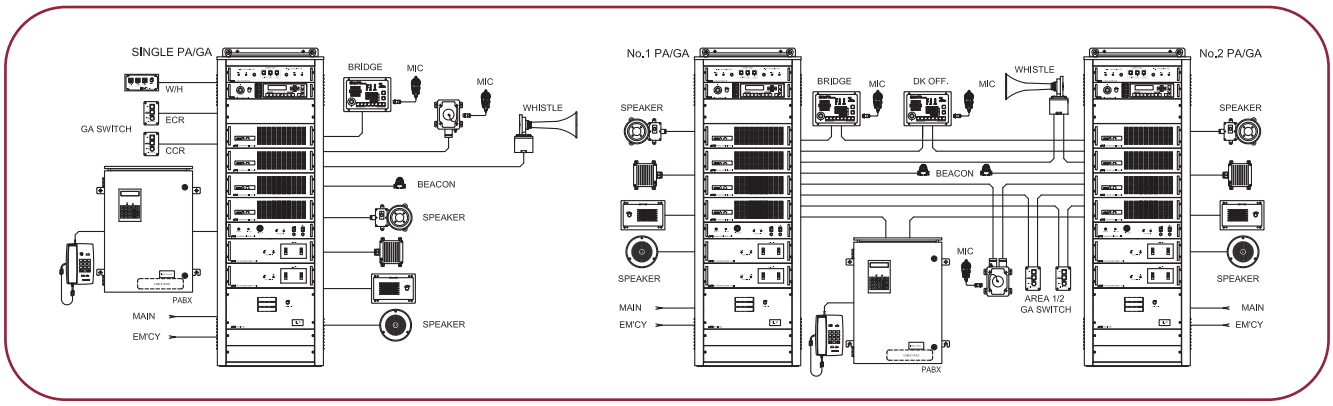


▲ MPA-9000 MAIN CABINET

PRODUCT INFORMATION

Technical Specification (Power)	1. Power Output : 400W ~ 4.8KW 2. Frequency Characteristics : 300 ~ 10,000Hz (6dB) 3. Distortion Ratio : 5% or less 4. S/N Ratio : 50dB or higher 5. Source of Power : AC110/220V 60Hz, DC 6. Power Consumption : 40A (DC) Fuse/NFB 24V 5A (AC), 20A Fuse/NFB 7. Temperature and Humidity Range : -15°C~ 55°C, 90% or less
Alarm Generator Unit, AG-901	1. Power Source : AC110/220V, 1Ø, 50/60 Hz 2. Emergency Power : AC or DC 24V (Ripple less than 5%) 3. Power Consumption : AC - less than 100VA DC - less than 5A (At 24V DC) 4. Temperature : -20°C ~ +45°C 5. Humidity : Less than 90% 6. Certification : Submitted
Signal Type In / Out / Mute Alarm	Signal in : All 18 (Eighteen) 1. Abandon (Muster) : Automatically operated; 1 short & 1 long alarm 2. GA: Hand & Auto : Manually operated & 7 short and 1 long alarms 3. Fire Alarm : 1300Hz, 1100Hz, 0.25 sec. interval, (Alternating) sustained 4. Alarm 7 : Watch Alarm (Optional) 5. Alarm 8 : ESDS Alarm (Optional) 6. Alarm 9 : CO2 Alarm (Optional) 7. Alarm 10 : Machinery Alarm (Optional) 8. Alarm 11 : Steering Gear Alarm (Optional) 9. Alarm 12 : Bilge Alarm (Optional) 10. Alarm 13 : Engineer Alarm (Optional) 11. Alarm 14 : Personal Alarm (Optional) 12. Alarm 15 : Cargo Alarm (Optional) 13. Alarm 16 : Gas Det. Alarm (Optional) 14. General Alarm Test 15. Fire Alarm Test

WIRING DIAGRAM OF PUBLIC ADDRESS & GENERAL ALARM SYSTEM





MPA-2000 Series PA/GA System

Public Address and General Alarm system

GENERAL DESCRIPTION

The Public Address system is a marine and offshore PA/GA system. The Public Address System (PA) and General Alarm System (GA) are very important in ensuring the safety of facilities and human life. The system must be able to address emergency situations accurately and seamlessly, integrated with various other alarm systems. In particular, this system is designed to respond precisely to emergency situations through the connection with various alarm systems. In explosion endangered areas, an explosion-proof speaker or an intrinsically safe microphone is supposed to operate.
This system was tested at the IEC60945 standard and approved for CE by DNV GL.

REGULATIONS:

ⓐ International Electro-Technical Commission (IEC)

ⓑ International Maritime Organization (IMO) SOLAS

ⓒ Nautical Safety (Rules for the Classification of Ships, DNV)

PRODUCT INFORMATION

SYSTEM FEATURES

- Max. 300W audio amplifier per 100W unit
- Up to 2 MPA 2000 control units connected
- Diode Matrix programming for priority, input and output
- Up to 6 talk back microphones connected
- Up to 3-group talk back system
- Up to 10 microphones connected include talk back
- External paging facility for PABX for 3-zone group
- Prepared for General Alarm system
- Interfaces for manual and/or automatic alarms with GAG-95B
- Entertainment sources, with free zone selection
- Configurable priority levels
- 15 speaker outputs, with unlimited amplifier expansion
- Facility for muting local loudspeaker during paging
- Override of entertainment volume controls during paging
- Output for muting external GA system
- Output for activating external GA system
- Mutable external alarm facility
- External general button (Zone 1 and Zone 2) Built-in loudspeaker to monitor activity
- Powered by 110/220V AC with automatic switch to 24V DC
- Built-in 24VDC BK terminal to protect radio receiver



▲ MPA-2000 MAIN CABINET

ELECTRIC & ENVIRONMENT

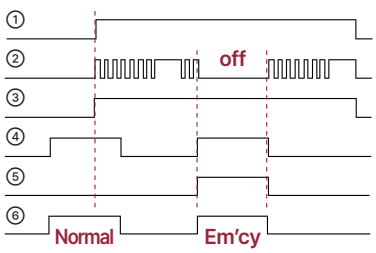
- Power Output : 100W/200W/300W, etc.
- Frequency Characteristics : 300~5000Hz within 6dB
- Distortion & S/N Ratio : Less than 5% / more than 50dB
- Power Source (Single) : AC-220V/100V, DC 24V
- Power Consumption (Single) : 16A, per 200W (DC 24V) & 2.5A per 200W (AC 220V), 5.6A per 200W (AC 100V)
- Operating Temperature Range : -10°C ~ +40°C
- Operating Humidity : Less than 90%

PRODUCT INFORMATION

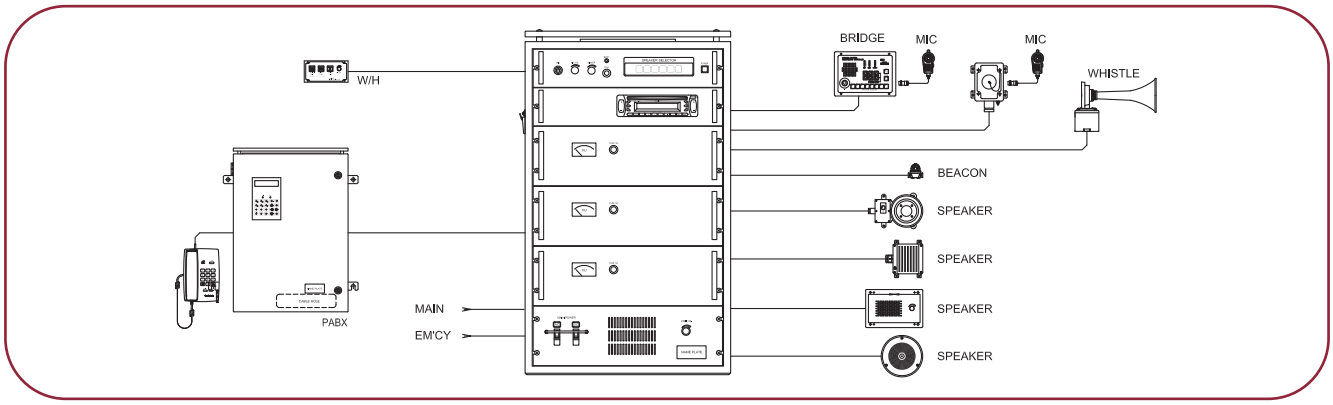
CE

Talk-Back Area	1. Wing (PORT / STBD) 2. Upper Deck FORE / AFT 3. SGR, ECR and CCR
Paging Call	1. All Paging Call : Similar output as PA 2. No.1/2 Group Paging : "8" & "9" (Machinery / Deck Area, Option)
Broadcasting Priority	1. Emergency speech from control panel in wheelhouse overriding general / fire / various alarm 2. Emergency General Alarm (External Input) 3. Public addressing from control panel in main unit 4. Talk-Back 5. Auto-telephone paging "0" 6. Radio, cassette, CD addressing from control panel in main unit 7. External Audio Input
Interfaces with Emergency General Alarm Generator	1. GA switch (Triggered and turned off) 2. GA bell, buzzer, PA speaker or others (7-short and 1-long tones) 3. PA STOP signal : Supply a dry contact signal from the GA equipment to the PA 4. Navigation bridge microphone on/off button 5. GA STOP signal : This dry contact signal is sent from the PA to the GA

PA Equipment Speakers



WIRING DIAGRAM OF PUBLIC ADDRESS AND GENERAL ALARM SYSTEM





Accessories : **Speaker**

Public Address and General Alarm system

ACCESSORY SPEAKER

MODEL	HS-50A(1)/B(1)	HS-25A(1)/B(1)/C(1)/D(1)	BHS-20A(1)/B(1)/C(1)/D(1)	BHS-20VA(1)/B(1)/C(1)/D(1)
PHOTO				
Mounting Type	BRACKET	BRACKET	WALL	WALL
Rated	50W/30W	25W/20W/15W/10W	20W/15W/10W/5W	20W/15W/10W/5W
Impedence	100V	100V	100V	100V
Volume Control	X	X	X	O
IP Grade	IP56	IP56	IP56	IP56
Gland	1	2	2	2
Dimension(WxDxH)mm	347×360×373	252×290×265	157×263×135	157×263×135
Material	AL, ABS	AL, ABS	ABS	ABS
Colour	GRAY	GRAY	GRAY	GRAY
Weight	7kg	.2kg	2.9kg	2.9kg
Install Area	OUTSIDE	MACHINERY/OUTSIDE	MACHINERY/OUTSIDE	MACHINERY/OUTSIDE

MODEL	PHS-20A(1)/B(1)/C(1)/D(1)/E(1)/F(1)	WS-2A/2B	WS-2V-A/B	WS-3A/3B
PHOTO				
Mounting Type	PORTABLE	WALL	WALL	FLUSH
Rated	Max 15W	2W/1W	2W/1W	2W/1W
Impedence	100V	100V	100V	100V
Volume Control	X	X	O	X
IP Grade	IP56	IP56	IP56	IP56
Gland	X	2	2	2
Dimension(WxDxH)mm	120×185×136	157×75×125	157×75×125	137×78×137
Material	ABS	ABS	ABS	ABS
Colour	GRAY	GRAY	GRAY	WHITE
Weight	3kg	1.2kg	1.2kg	1.2kg
Install Area	FORE/AFT	TOILET	TOILET	TOILET

MAIN CABINET

MPA-9000 Series | MPA-2000 Series | MTB-1200 Series

LP-5V-A/B/C	RP-5V-A/B/C	LW-5V-A/B/C	LD-5V-A/B/C
			
FLUSH	CEILING	WALL	BOTH SIDE
5W/2W/1W	5W/2W/1W	5W/2W/1W	5W/2W/1W
100V	100V	100V	100V
O	O	O	O
IP22	IP22	IP22	IP22
X	X	X	X
230×45.5×147	175×125×125	230×92×147	230×125×153
ABS	ABS	ABS	ABS
WHITE	WHITE	IVORY	IVORY
0.7kg	0.5kg	0.8kg	1.1kg
CABIN/PASSAGE	CABIN/PASSAGE	CABIN/PASSAGE	CABIN/PASSAGE

HS-10Exde	HS-30Exde	LPO-5V-A/B/C	RSO-5V-A/B/C	WSO-3A/3B
				
BRACKET	BRACKET	FLUSH	CEILING	FLUSH
30W/15W/7.5W/5W/3W/2W	10W/5W/2.5W/1.5W/1W/0.5W	5W/2W/1W	5W/2W/1W	2W/1W
100V	100V	100V	100V	100V
X	X	O	O	X
IP66	IP66	IP22	IP44	IP56
2	2	X	2	2
164×227×226	216×301×235	230×92×147	188×130×188	137×78×137
AL	AL	STEEL	STEEL	STEEL
DARK BLUE	DARK BLUE	IVORY	IVORY	IVORY
3.4kg	4.5kg	2.5kg	2.5kg	2.3kg
HAZARDOUS AREA	HAZARDOUS AREA	B-O AREA	B-O AREA	B-O AREA

Accessories : **Connection Boxes**

Public Address and General Alarm system

ACCESSORY SPEAKER

MODEL	PB-1	PB-1A	PB-1C	PB-2A
PHOTO				
Specification	AUTO/HAND/DIMMER SW.	AUTO SW. ONLY	AUTO/HAND SW.	AUTO SW. ONLY
Mounting Type	FLUSH	FLUSH	FLUSH	WALL
IP Grade	IP22	IP22	IP22	IP44
Gland	X	X	X	1
Dimension(WxDxH)mm	80×70×128	80×70×128	80×70×128	80×64×128
Material	STEEL	STEEL	STEEL	STEEL
Colour	BLACK	BLACK	BLACK	7.5BG7/2
Weight(QC)	0.5kg	0.3kg	0.5kg	1kg
Install Area	BCC	ECC, FCC	ECC, FCC	ECC, FCC

ACCESSORY SPEAKER

MODEL	MC-2	MSC-2	MC-0	MC-6B
PHOTO				
Mounting Type	WALL	WALL	FLUSH	FLUSH
IP Grade	IP56	IP56	IP56	IP56
Gland	2	2	X	X
Dimension(WxDxH)mm	153×110×160	153×110×160	120×11×160	262×70×162
Material	POLYCARBONATE	POLYCARBONATE	POLYCARBONATE	STEEL
Colour	GRAY	GRAY	BLACK	BLACK
Weight	1.5kg	1.5kg	0.4kg	7.6kg
Install Area	WING, S/G	FORE /AFT	WING CONSOLE	ECC

MAIN CABINET

MPA-9000 Series | MPA-2000 Series | MTB-1200 Series

PB-2D	PB-3A	GAG-95B GENERATOR
		
AUTO/HAND SW.	AUTO SW. (ON/OFF) ONLY	AUTO/HAND/ABANDON/DIMMER SW.
WALL	WALL	FLUSH
IP44	IP56	IP22
1	3	X
80×64×128	66×57×148	184×180×90
STEEL	ABS	STEEL
7.5BG7/2	IVORY	BLACK
1kg	0.3kg	2.5kg
FCS	FCS	BCC

MJ-5	MJ-6(JM-3A)	MJ-6A(JM-3B)
		
FLUSH	WALL	FLUSH
IP22	IP22	IP22
X	X	X
78×52×116	100×50×100	80×57×126
STEEL	STEEL	STEEL
BLACK	BLACK	BLACK
0.5kg	0.4kg	0.4kg
BCC, ECC, CCC	STEERING STAND	STEERING STAND

Intrinsically Safe PA/GA Barrier Box

I.S. PA/GA Barrier Box

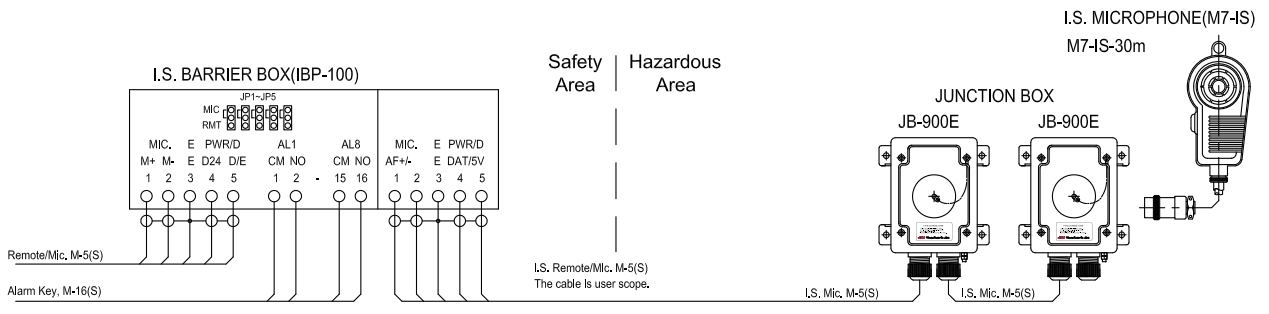
ACCESSORY SPEAKER

MODEL	MPC-100IS	IBP-100	JB-900E	M7-IS
PHOTO				
Cert No.	IECEx BAS 18.0066	IECEx BAS 18.0065	-	IECEx BAS 18.0066
IP Grade	IP44	IP44	IP56	IP56
(WxDxH)mm	300 × 200 × 90	460 × 297 × 83	133 × 160 × 78	65 × 143 × 42
Weight	7.6kg	8.4kg	1.5kg	1.5kg
Colour	BLACK	GRAY	BLACK	DARK BLUE
Material	GRP/SUS	STEEL	PC / GF	AL WITH LEATHER
Install Area	HAZARDOUS AREA	SAFE AREA	HAZARDOUS AREA	HAZARDOUS AREA

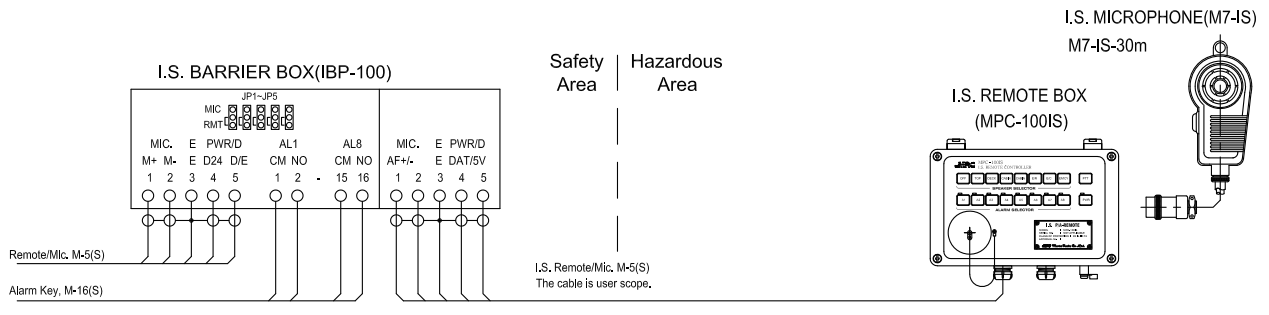
Certified IECEx, IEC 60079-0, 60079-11 (Certified by SGS Baseefa)



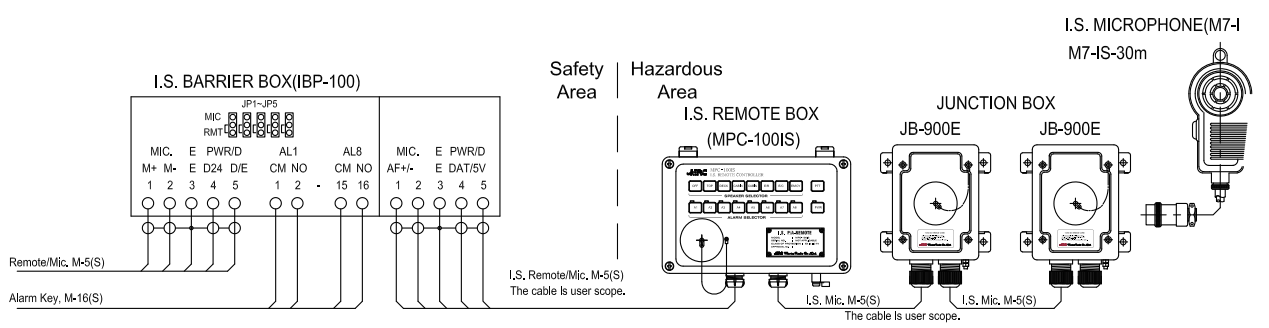
CONNECTION EXAMPLE 1 : IBP-100 & JB



CONNECTION EXAMPLE 2 : IBP-100 & MPC-100IS



CONNECTION EXAMPLE 3 : IBP-100, MPC-100IS & JB



MTB-1200 Talk Back / Paging System

Talk Back Paging System

GENERAL DESCRIPTION

The Talk Back System enables free broadcasting and telecommunication in a particular area such as deck and machinery areas in the offshore. All substations can be connected to the PA/GA and the PABX system as well. Substations include four types : Flush, wall, waterproof and explosion-proof types, all of which can be interfaced to the Horn/Bell/Flashing Light, and the Foot Switch. This system has the function for both call in all and call in group and of the automatic switching of power between main and emergency supplies. This system was tested at the IEC60945 standard and approved for CE by DNV GL . The Type Approval was done by RMRS.

REGULATIONS:

ⓐ IEC 60079-0 (Explosive atmospheres 0 : Equipment general requirements)
ⓑ IEC 60079-1 (Explosive atmospheres 1 : Equipment protection by flameproof enclosures)
ⓒ IEC 60945 (Maritime navigation and radio communication equipment)
ⓓ Quality Management System, Certified by DNV

PRODUCT INFORMATION

SYSTEM FEATURES

- Max 11 substations, interface with PA/GA and intrinsically safe system
- Dry Contact Output Function for Horn, Bell, Flashing Light at Sub-Station
- All/Group Call and Priority Function (Pre-set Assigned)
- Automatic switch between main and emergency power source

ELECTRIC SPECIFICATIONS : MAIN AMPLIFIER UNIT

- Power Output : 200W / 400W / 800W, etc
- Frequency Characteristics : Less than 6dB (300 ~ 10kHz)
- Input Sensitivity : More than - 36dBm
- Distortion Ratio : Less than 5%
- S/N Ratio : More than 50 dB
- Source of Power : AC100 / 240V(50/60Hz), DC24V
- Power Consumption : Max. 20A, 250W (AC 220V)
  Max. 2.5A, 250WC (A220V)
- Input Fuse : AC 30A, DC 30A (In case of 250W)
- Operating Temperature Range : -15°C ~ +55°C
- Operating Humidity : Less than 90%



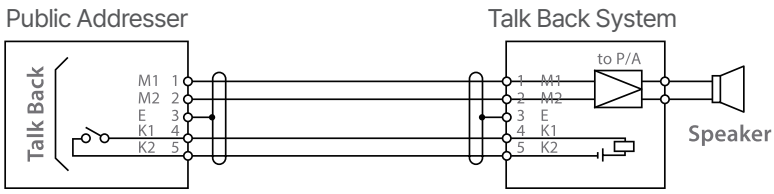
▲ MTB-1200 MAIN CABINET

PRIORITY OF BROADCASTING

- This system is operated in the following order
- (This can be changed by demands)
- Microphone in the external public address system
- Remote station microphone broadcasting
- Main Microphone
- Substation

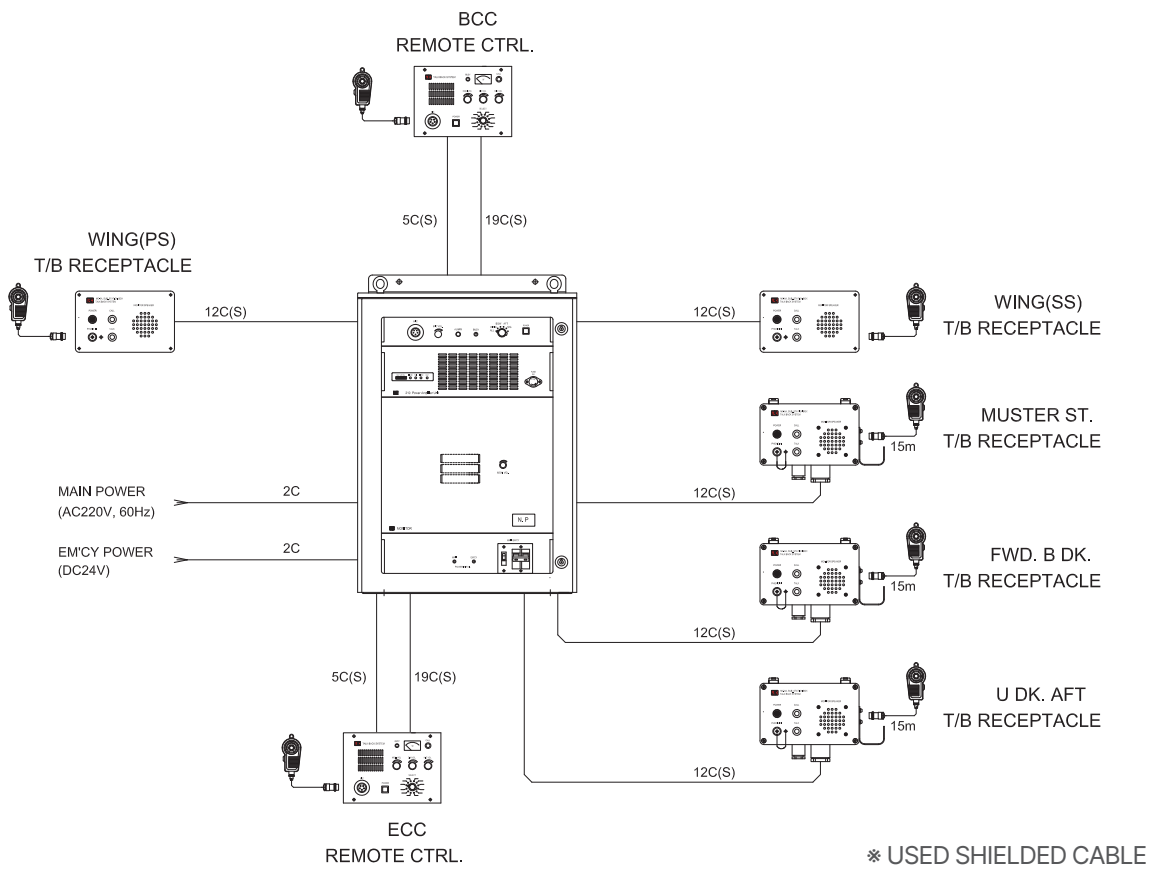
PRODUCT INFORMATION

System Interface with the PA/GA



The system is connected with PA as shown in the figure

TALK BACK / PAGING SYSTEM CONNECTION EXAMPLE





Accessories : **Connection Boxes**

Talk Back Paging System

ACCESSORY TALK BACK CONNECTION BOX

MODEL	TB-3A/M	TB-3A/H
PHOTO		
Mounting Type	WALL	WALL
IP Grade	IP56	IP56
Gland	2	2
Dimension(WxDxH)mm	160×100×152	160×100×152
Material	POLYCARBONATE	POLYCARBONATE
Colour	GRAY	GRAY
Weight	1.6kg	1.6kg
Install Area	FCR	SGR

MODEL	TB-3B/M	TB-3B/H	TB-3B/C
PHOTO			
Mounting Type	FLUSH	FLUSH	FLUSH
IP Grade	IP56	IP56	IP56
Gland	X	X	2
Dimension(WxDxH)mm	160×28×120	160×28×120	262×92×162
Material	POLYCARBONATE	POLYCARBONATE	AL
Colour	GRAY	GRAY	GRAY
Weight	0.4kg	0.4kg	2.6kg
Install Area	FCR	FCR	MOORING

MAIN CABINET

MTB-1200 Series

TB-6A/M	TB-6A/H
	
WALL	WALL
IP56	IP56
2	2
160×100×152	329×90×162
AL	AL
GRAY	GRAY
1.6kg	7.6kg
MUSTER	MUSTER

TB-6B/M	TB-6B/H
	
FLUSH	FLUSH
IP22	IP22
X	X
262×70×162	262×70×162
STEEL	STEEL
BLACK	BLACK
7.6kg	7.6kg
ECR	ECR

MED-100/200 Hybrid and Full IP Telephone System

Auto - Exchanger System

GENERAL DESCRIPTION

The Auto Telephone System is an electronic telephone switchboard with reliability and durability to meet various needs occurring inside or outside the ship. It operates as with the interface between the central exchange unit, which is a micro-computer controlled system, and telecommunication equipment.
Particularly, the system is suited to connecting not only to the telecommunication equipment such as Inmarsat-F, VSAT, Mini-M, and VSM but also to the Internet protocols and network communications. This system contains a maximum of 200 extension lines and a trunk with 8 lines (MED-100).
As for the type of telephone, flush, wall, portable, waterproof, explosion-proof, and intrinsically safe (Used for normal condition or in the area with the possibility of explosive gas in case of accident) types are available, which can be interfaced to Horn/Bell/Flashing Light. This system was tested at the IEC60945 standard. The Type Approval was done by DNV GL, RMRS.

PRODUCT INFORMATION

SYSTEM FEATURES

- 200 Extensions (Including 128 Analog Lines) + 8 Trunk Lines
- Simultaneous Call : 30 Lines
- Paging call : 3 Lines, 10 Groups to PA system
- Priority call / Group call / Call pickup function / Wake-up call
- Call transfer / Call forwarding / Camp-on / Hotline
- Add-on conference : 5 Parties, 6 Groups
- Self-ring testing / System fail alarm & display
- Handset hook fail alarm / Handset hook fail display
- Main / emergency power automatic change & alarm display
- Method for programming at front of main PABX cabinet
- ISDN Connection using gateway (Optional)
- VoIP using gateway (Optional)
- Call accounting by serial printer (Optional)
- EPROM back-up memory (Optional)
- Recording and playback for PA/GA paging (Optional)
- Time synchronization between master clock or GPS system
- Interface among VSAT and LAN/WAN network using IP gateway(Optional)
- Program password protection / Variety application



▲ MED-100 MAIN CABINET

ELECTRIC & ENVIRONMENT

- Power Source : AC110/220V, 1Φ, 50/60 Hz
- Emergency Power : AC or DC 24V (Ripple less than 5%)
- Power Consumption : AC - less than 100VAC
  DC - less than 5A (At 24V DC)
- Temperature : -20°C ~ +45°C
- Humidity : Less than 90%
- Certification : Submitted

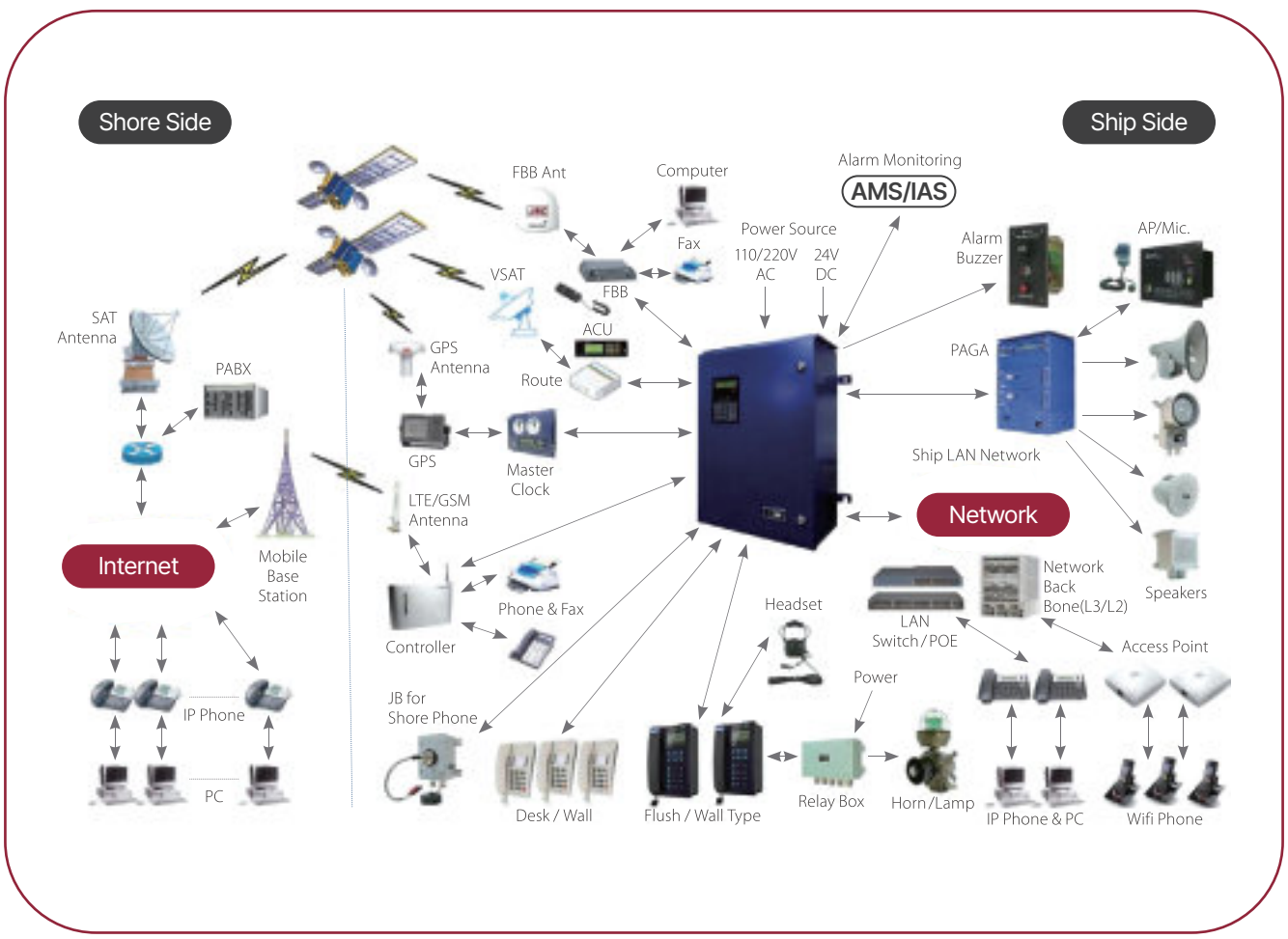
INTEGRATED COMMUNICATION SYSTEM

- PABX system : Analog, IP, Wi-Fi Phone using gateway
- PA/GA system : Single or duplicated applications
- Communal aerial system : IP-TV, CCTV, TVRO, DVD, etc.
  Master clock system : Slave clock interfaced with GPS

PRODUCT INFORMATION

Integrated Communication System	1. PABX system : Analog, IP, Wi-Fi Phone using gateway 2. PA/GA system : Single or duplicated applications 3. Communal aerial system : IP-TV, CCTV, TVRO, DVD & etc 4. Master clock system : Slave clock interfaced with GPS

INTEGRATED COMMUNICATION SYSTEM NETWORK DIAGRAM





MCX-5000 Auto - Exchanger System

Auto - Exchanger System

GENERAL DESCRIPTION

The Auto Telephone System is an electronic telephone switchboard with reliability and durability to meet various needs occurring inside or outside the ship. It operates with the interface between the central exchange unit, which is a micro-computer controlled system, and telecommunication equipment. Particularly, the system is suited to connecting not only to the telecommunication equipment such as Inmarsat-F, VSAT, Mini-M, and VSM but also to the Internet protocols and network communications. This system contains a minimum of 24 extension lines up to 500 and the lines can be installed by 8 or 16 units. As for the type of telephone, flush, wall, portable, waterproof, explosion-proof, and intrinsically safe (Used for normal condition or in the area with the possibility of explosive gas in case of accident) types are available, which can be interfaced to Horn/Bell/Flashing Light. This system was tested at the IEC60945 standard. The Type Approval was done from DNV GL.

PRODUCT INFORMATION

SYSTEM FEATURES

- Extension 40 + Trunk 4 ~ Extension 128 + Trunk 4
- Simultaneous Call : 30 Lines
- Paging call : 3 Lines, 10 Groups to PA system
- Priority call
- Group call
- Call pickup function
- Wake-up call
- Call transfer
- Call forwarding
- Camp-on
- Hotline
- Add-on conference : 5 Parties, 6 Groups
- Self-ring testing
- System fail alarm & display
- Handset hook fail alarm
- Handset hook fail display
- Main / emergency power automatic change & alarm display
- Method for programming at front of main PABX cabinet
- ISDN Connection using gateway (Optional)
- VoIP using gateway (Optional)
- Call accounting by serial printer (Optional)
- EPROM back-up memory (Optional)
- Recording and playback for PA/GA paging (Optional)
- Time synchronization between master clock or GPS system
- Interface among VSAT and LAN/WAN network using IP gateway (Optional)
- Program password protection
- Variety application

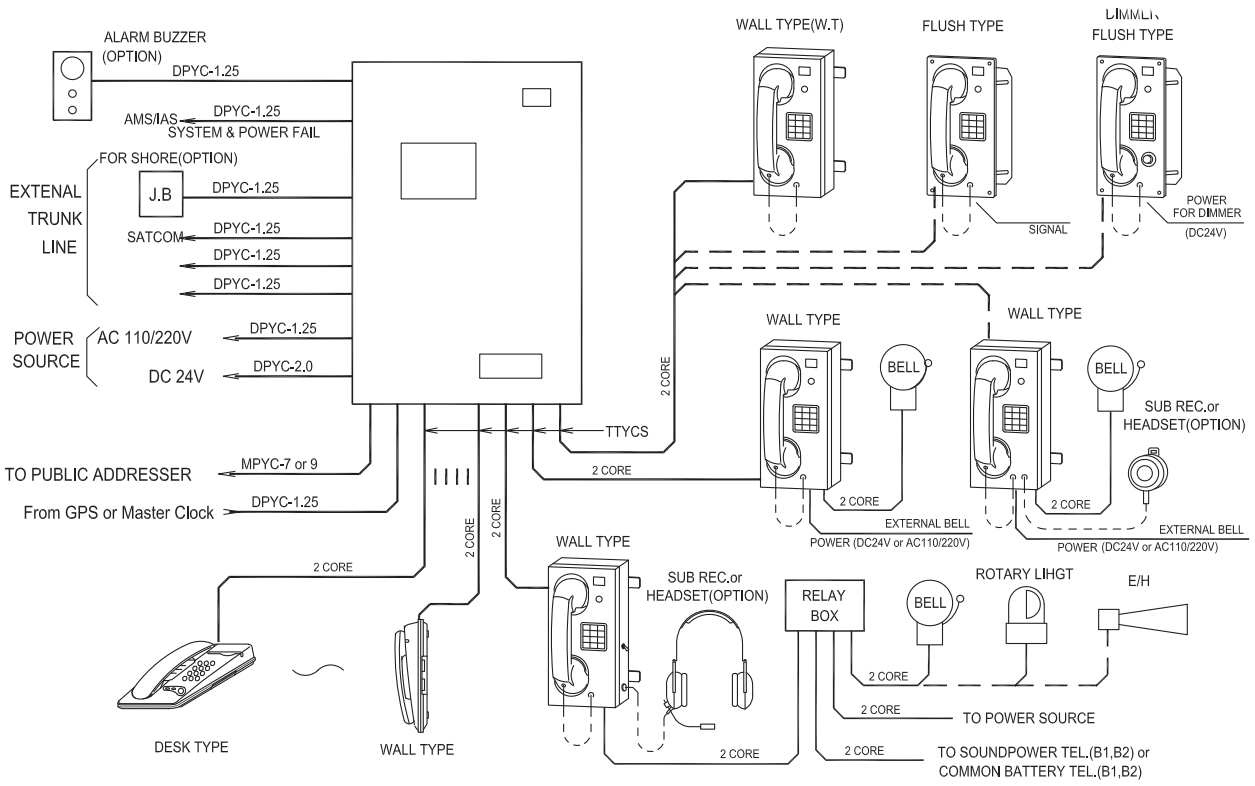


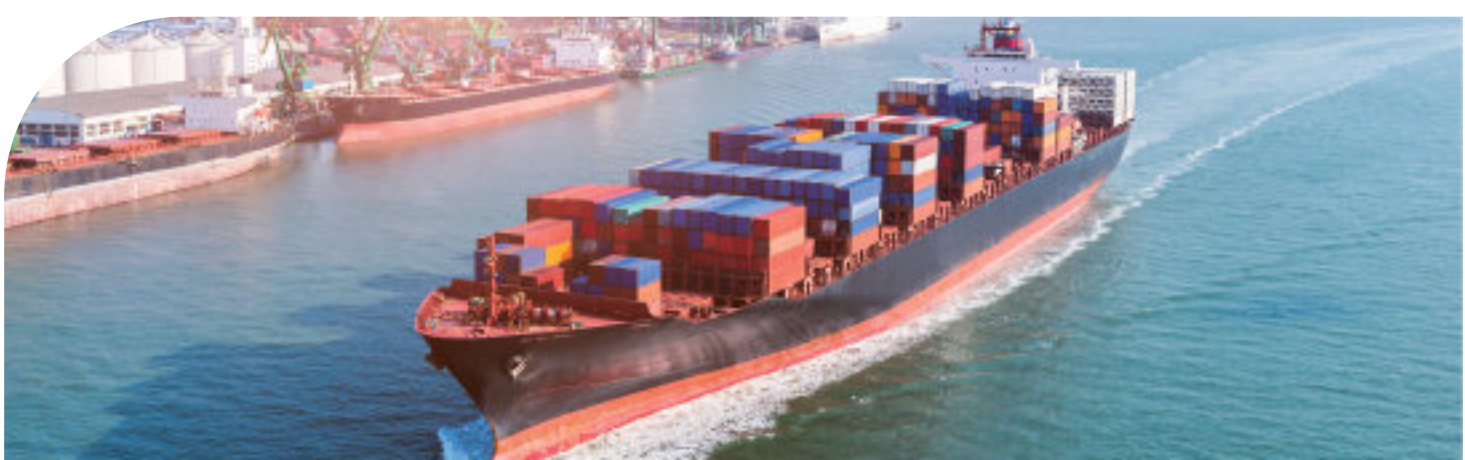
▲ MCX-5000 MAIN CABINET

PRODUCT INFORMATION

Electric & Environment	1. Power Source : AC110/220V, 1θ, 50/60 Hz 2. Emergency Power : AC or DC 24V (Ripple less than 5%) 3. Power Consumption : AC - less than 100VA DC - less than 5A (At 24V DC) 4. Temperature : -20°C ~ +45°C 5. Humidity : Less than 90% 6. Certification : Submitted	**Electric & Environment**	1. PABX system : Analog, IP, Wi-Fi Phone using gateway 2. PA/GA system : Single or duplicated applications 3. Communal aerial system : IP-TV, CCTV, TVRO, DVD & etc 4. Master clock system : Slave clock interfaced with GPS

WIRING DIAGRAM OF AUTO EXCHANGER SYSTEM





Accessories : **Auto Telephone**

Auto - Exchanger System

ACCESSORY TELEPHONE

MODEL	LC-221A	LC-221B	LC-213A	LC-213B
PHOTO				
Mounting Type	DESK	WALL	WALL	WALL
Gland	X	X	X	1
Signal Contact	X	X	O	O
Terminal Device	X	O	O	O
Headset	X	X	X	X
Dimmer	X	X	X	X
IP Grade	IP22	IP22	IP22	IP44
(WxDxH)mm	168×100×210	168×100×210	152×143×270	152×143×270
Weight	0.4kg	0.5kg	2.2kg	2.2kg
Colour	WHITE IVORY	WHITE IVORY	GRAY	GRAY
Material	ABS	ABS	ABS	ABS
Install Area	ACCOMMODATION	ACCOMMODATION	ACCOMMODATION	ACCOMMODATION

MODEL	LC-215A	LC-215C	LC-215AW	LC-217
PHOTO				
Mounting Type	FLUSH	FLUSH	FLUSH	PORTABLE
Gland	X	X	X	X
Signal Contact	O	O	O	X
Terminal Device	O	O	O	X
Headset	X	X	X	X
Dimmer	O	X	X/O	X
IP Grade	IP22	IP22	IP56	IP56
(WxDxH)mm	152×175×270	152×175×270	152×175×270	156×162×274
Weight	1.7kg	1.5kg	2kg	2.5kg
Colour	BLACK	BLACK	BLACK	GRAY
Material	ABS	ABS	ABS	STEEL/ABS
Install Area	CONSOLE	CONSOLE	WING CONSOLE	-

MAIN CABINET

MED-100 | MED-200 | MCX -5000 Series

LC-213C	LC-213E	LC-213G	LC-213G1
			
WALL	WALL	WALL	WALL
2	3	2	3
O	O	O	O
O	O	O	O
X	X	O	O
X	X	X	X
IP44	IP44	IP44	IP44
152×143×270	220×143×270	220×143×270	220×143×270
2.2kg	2.7kg	2.9kg	2.9kg
GRAY	GRAY	GRAY	GRAY
ABS	ABS	ABS	ABS
GALLEY, WORKSHOP	GALLEY, WORKSHOP	MACHINERY	MACHINERY

INTRINSICALLY SAFE TELEPHONE

MODEL	LIS-114	MRN-2000IS	LIS-117	IBT-100	IBT-200
PHOTO					
Cert No		IECEx BAS 17.0014X			IECEx BAS 17.0013
Gland	1	X	X	6	6
IP Grade	IP44	IP22	IP44	IP44	IP44
Weight	2.9kg	0.7kg	4.1kg	8.5kg	8.5kg
Colour	BLACK	BLACK	BLACK	GRAY	GRAY
Material	ABS	ABS	ABS	STEEL	STEEL
Install Area	HAZARDOUS AREA	HAZARDOUS AREA	HAZARDOUS AREA	SAFETY AREA	SAFETY AREA
(WxDxH)mm	189×100×224	200×110×223	194×153×25	406×83×256	406×83×256

Accessories: **Auto Telephone**

Auto - Exchanger System

ACCESSORY TELEPHONE (NEW VERSION)

MODEL	LAA-113A	LAA-114B	LAA-114C	LAA-114HB	LAA-114HC
PHOTO					
Mounting Type	WALL	WALL	WALL	WALL	WALL
Gland	X	2	3	2	3
Signal Contact	O	O	O	O	O
Terminal Device	O	O	O	O	O
Headset	X	X	X	O	O
Dimmer	X	X	X	X	X
IP Grade	IP56	IP56	IP56	IP56	IP56
(WxDxH)mm	189×100×224	189×100×224	189×100×224	189×100×224	189×100×224
Weight	2.9kg	2.9kg	2.9kg	2.9kg	2.9kg
Colour	BLACK	BLACK	BLACK	BLACK	BLACK
Material	ABS	ABS	ABS	ABS	ABS
Install Area	ACCOMMODATION	GALLEY, WORKSHOP	GALLEY, WORKSHOP	MACHINERY	MACHINERY

ACCESSORY TELEPHONE (NEW VERSION)

MODEL	LVD-111A	LVD-112A	LVD-113A	LVD-114B	LVD-114C	LVD-114HB
PHOTO						
Mounting Type	DESK	WALL	WALL	WALL	WALL	WALL
Gland	X	X	X	2	2	2
Signal Contact	X	X	O	O	O	O
Terminal Device	X	X	O	O	O	O
Headset	X	X	X	X	X	X
Dimmer	X	X	X	X	X	X
IP Grade	IP22	IP22	IP56	IP56	IP56	IP56
(WxDxH)mm	220×97×200	220×97×200	189×100×224	189×100×224	189×100×224	189×100×224
Weight	0.9kg	0.9kg	2.9kg	2.9kg	2.9kg	2.9kg
Colour	BLACK	BLACK	BLACK	BLACK	BLACK	BLACK
Material	ABS	ABS	ABS	ABS	ABS	ABS
Install Area	ACCOMMODATION	ACCOMMODATION	GALLEY, WORKSHOP	MACHINERY	MACHINERY	MACHINERY

MAIN CABINET

MED-100 | MED-200

LAA-115A	LAA-115D	LAA-116A	LAA-116D	LAA-117A
				
FLUSH	FLUSH	FLUSH	FLUSH	PORTABLE
X	X	X	X	X
O	O	O	O	X
O	O	O	O	O
X	X	X	X	X
X	O	X	O	X
IP56	IP56	IP56	IP56	IP56
189×100×224	189×100×224	189×100×224	189×100×224	194×153×255
2.9kg	2.9kg	2.9kg	2.9kg	4.1kg
BLACK	BLACK	BLACK	BLACK	BLACK
ABS	ABS	ABS	ABS	STEEL/ABS
CONSOLE	CONSOLE	CONSOLE	CONSOLE	-

LVD-114HC	LVD-115A	LVD-115D	LVD-116A	LVD-116D	LVD-117A
					
WALL	FLUSH	FLUSH	FLUSH	FLUSH	PORTABLE
3	X	X	X	X	X
O	X	O	O	O	X
O	O	O	O	O	X
X	X	O	X	O	X
X	X	O	X	O	X
IP56	IP56	IP56	IP56	IP56	IP56
189×100×224	189×100×224	189×100×224	189×100×224	189×100×224	194×153×255
2.9kg	2.9kg	2.9kg	2.9kg	2.9kg	2.9kg
BLACK	BLACK	BLACK	BLACK	BLACK	BLACK
ABS	ABS	ABS	ABS	ABS	STEEL/ABS
MACHINERY	CONSOLE	CONSOLE	CONSOLE	CONSOLE	-

Accessories : **Auto Telephone**

Auto - Exchanger System

ACCESSORY TALK BACK CONNECTION BOX

MODEL	JB-5A	JB-1A
PHOTO		
Mounting Type	WALL	WALL
IP Grade	IP56	IP56
Gland	2	2
Dimension(WxDxH)mm	153×110×160	153×110×160
Material	POLYCARBONATE	POLYCARBONATE
Colour	GRAY	GRAY
Weight	1.9kg	1.9kg
Install Area	FOR PORTABLE	FOR SHORE TEL

MODEL	BZ-7A	BZ-7B
PHOTO		
Mounting Type	FLUSH	WALL
IP Grade	IP22	IP22
Gland	X	X
Dimension(WxDxH)mm	89×60×156	89×60×156
Material	STEEL	STEEL
Colour	BLACK/IVORY	BLACK/IVORY
Weight	0.7kg	0.7kg
Install Area	-	-

MAIN CABINET

MED-100 | MED-200 | MCX -5000 Series

JB-61A	JB-62A	JB-63A	JB-63B
			
FLUSH	WALL	FLUSH	WALL
IP22	IP22	IP22	IP22
X	X	X	X
80×58×120	80×58×120	72×40×120	68×60×30
ABS	ABS	ABS	ABS
IVORY	IVORY	IVORY	IVORY
0.2kg	0.15kg	0.11Kg	0.11Kg
FOR DESK TEL	FOR DESK TEL	FOR DESK TEL	FOR DESK TEL

RB-25	MR-2000	MRN-2000	ATC-2000'S
			
WALL	-	-	-
IP44	IP22	IP22	IP22
5	X	X	X
140×79×254	200×110×223	200×110×223	5M/10M/15M
ABS	ABS	ABS	PVC Jacket
GRAY	BLACK	BLACK	GRAY
1kg	0.7kg	0.7kg	0.2kg
SAFETY AREA	SAFETY AREA	MACHINERY("N" TYPE TEL)	PORTABLE TYPE TEL

Common Battery Telephone

Common Battery Telephone

GENERAL DESCRIPTION

The Common Battery Telephone system is used for communicating with the wheel house, the engine control room, and the steering gear room in case of emergency and for communicating between the areas or rooms when necessary. It is manufactured to be a waterproof and dustproof system appropriate for the vessel and adopts the input power supply of 24V DC to deliver communications and signals (Bell, Lamp, Etc.). This system includes the following types : Flush, wall, waterproof, portable, and intrinsically safe (Used for normal condition or in the area with the possibility of explosive gas in case of accident) types, all of which can be interfaced to the Horn/Bell/Flashing Light, and the Foot Switch.
This system was tested at the IEC60945 standard and approved for CE by DNV GL.
The Type Approval was done by DNV GL.

PRODUCT INFORMATION

OPERATIONS AND SPECIFICATIONS

- Telephone Sets : The common battery telephone consists of the direct and mutual selection types, and is divided into the following categories according to the purpose.

ELECTRIC SPECIFICATIONS(TELEPHONE)

- Operation Voltage : 24 ~ 32V DC (Min-Max)
- Power Consumption : App. 0.7W, 30mA, at 24VDC (Standard)
- Call Consumption : App. 24W, 1A, DC24V
- In/Out Impedance : App. 600 ohm
- Speech / Side-Tone Amp. Gain : App. 25dB / -15dB
- Operating Temperature/Humidity : -10°C ~ + 40°C / less than 90%



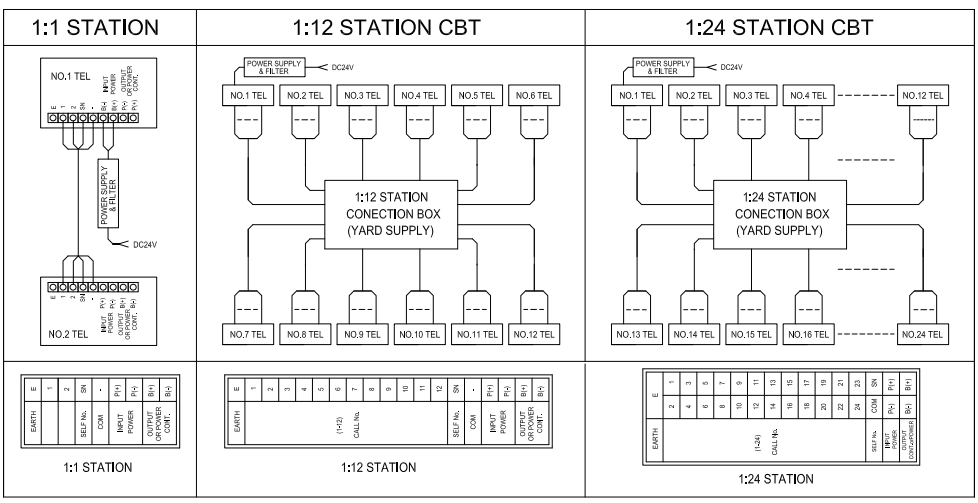
▲ LCA-100 TELEPHONE

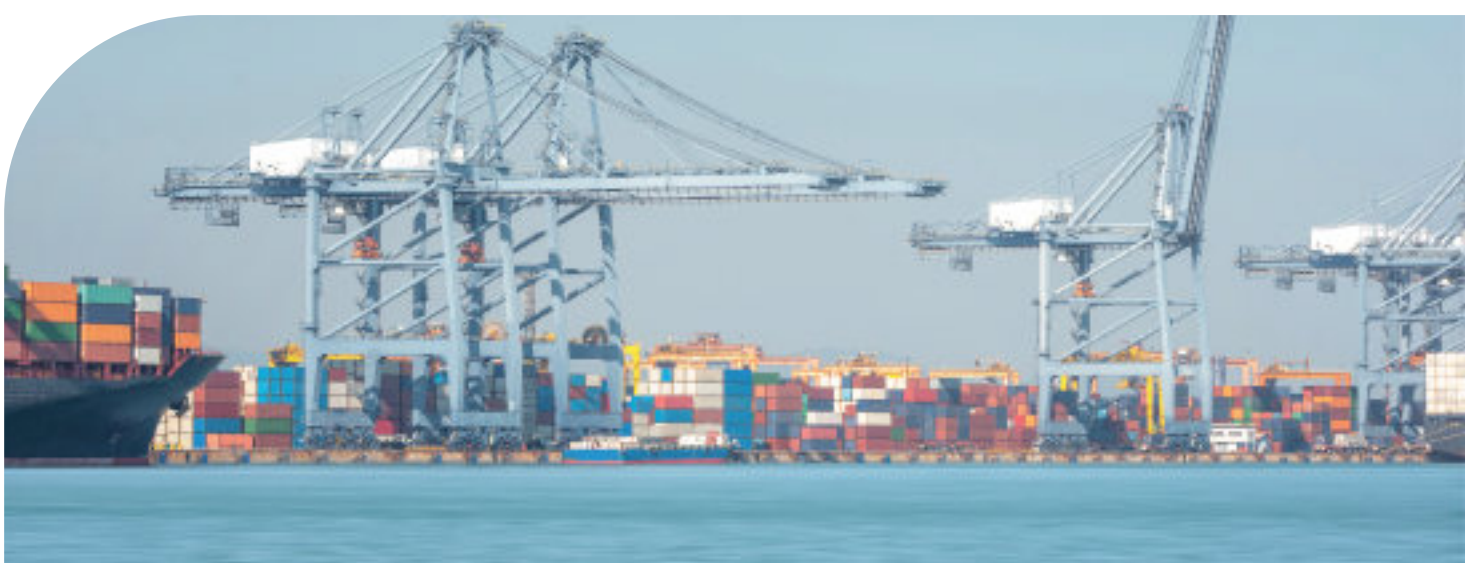
PRODUCT INFORMATION

DNV·GL CE

Mutual Selection Type (Max. 24 Station) - (LC-600 / LCA-100)	1. Calling ⓐ Select a receiving phone ⓑ If the handset is lifted, the call signal is transmitted to the selected slave station ⓒ If the receiver responds, now the phones are connected 2. Answering ⓐ The lamp blinks and the bell rings ⓑ Lift the handset ⓒ Now the phones are connected
Electric Specifications (Power Supply: MPS-050B)	1. Operation Voltage : 19 ~ 36V DC (Min-Max) 2. Output Power : 24V DC, Max. 2.5A 3. Output Adjustment : 24V DC ±10% 4. Ripple Rejection Ratio : Min. 50dB 5. Operating Temperature Range : 0°C ~ +40°C 6. Operating Humidity : Less than 90%
Direct Type (1:1 Station) - (LC-500 Series Only)	1. Calling ⓐ Lift the handset and push the call button ⓑ Then, the call signal is transmitted to the receiver ⓒ If the receiver responds, now the phones are connected 2. Answering ⓐ The lamp blinks and the bell rings ⓑ Lift the handset ⓒ Now the phones are connected

WIRING DIAGRAM OF COMMON BATTERY TELEPHONE SYSTEM





Accessories : **Common Battery Telephone**

Common Battery Telephone

ACCESSORY FOR TELEPHPHONE (OLD VERSION)

MODEL	LC-511	LC-513C	LC-513G	LC-515C	LC-517
PHOTO					
Mounting Type	DESK	WALL	WALL	FLUSH	PORTABLE
Station	1:1 STATION	1:1 STATION	1:1 STATION	1:1 STATION	1:1 STATION
Gland	X	1	2	X	X
Signal Contact	X	O	O	O	X
Terminal Device	X	O	O	O	X
Headset	X	X	O	X	X
Dimmer	X	X	X	X	X
IP Grade	IP22	IP44	IP44	IP22	IP56
(WxDxH)mm	217×226×125	152×143×270	152×143×270	152×160×270	156×166×274
Weight	1.9kg	2.9kg	2.9kg	1.7kg	2.5kg
Colour	BLACK	GRAY	GRAY	BLACK	GRAY
Material	ABS	ABS	ABS	ABS	ABS/STEEL
Install Area	CABIN	MACHINERY	MACHINERY	CONSOLE	-

MODEL	LC-614B / 624B	LC-614C / 624C	LC-614G / 624G
PHOTO			
Mounting Type	WALL	WALL	WALL
Station	12 / 24 STATION	12 / 24 STATION	12 / 24 STATION
Gland	1	2	2
Signal Contact	O	O	O
Terminal Device	O	O	O
Headset	X	X	O
Dimmer	X	X	X
IP Grade	IP44	IP44	IP44
(WxDxH)mm	152×143×270	152×143×270	152×143×270
Weight	2.2kg	2.3kg	2.9kg
Colour	GRAY	GRAY	GRAY
Material	ABS	ABS	ABS
Install Area	MACHINERY	MACHINERY	MACHINERY

* LC-51x - 1:1 Station / LC-61x : MAX 12 Station / LC-62x - MAX 24 Station / "N" - Noise Cancel Type

Marine Common Battery Telephone (LC-600)
For Submarine and Navy

LC-612A / 622A	LC-614A / 624A
	
DESK	WALL
12 / 24 STATION	12 / 24 STATION
X	X
X	O
X	O
X	X
X	X
IP22	IP22
217×226×125	152×143×270
2.1kg	2.9kg
BLACK	GRAY
ABS	ABS
CABIN	MACHINERY

LC-616A / 626A	LC-616C / 626C	LC-618A / 628A
		
FLUSH	FLUSH	PORTABLE
12 / 24 STATION	12 / 24 STATION	12 / 24 STATION
X	X	X
O	O	X
O	O	X
X	X	X
O	X	X
IP22	IP22	IP56
152×160×270	152×160×270	156×166×274
1.7kg	1.7kg	2.5kg
BLACK	BLACK	GRAY
ABS	ABS	ABS/STEEL
CONSOLE	CONSOLE	-

Accessories : **Common Battery Telephone**

Common Battery Telephone

ACCESSORY TELEPHONE (NEW VERSION)

MODEL	LCA-111A / 121A	LCA-113A / 123A	LCA-114B / 124B
PHOTO			
Mounting Type	DESK	WALL	WALL
Station	12 / 24 STATION	12 / 24 STATION	12 / 24 STATION
Gland	X	X	2
Signal Contact	X	O	O
Terminal Device	X	O	O
Headset	X	X	X
Dimmer	X	X	X
IP Grade	IP22	IP56	IP56
(WxDxH)mm	217×226×125	220×97×200	189×100×224
Weight	1.9kg	0.9kg	2.9kg
Colour	BLACK	BLACK	BLACK
Material	ABS	ABS	ABS
Install Area	CABIN	MACHINERY	MACHINERY

MODEL	LCA-116A / 126A	LCA-116D / 126D	LCA-117A / 127A
PHOTO			
Mounting Type	FLUSH	FLUSH	PORTABLE
Station	12 / 24 STATION	12 / 24 STATION	12 / 24 STATION
Gland	X	X	X
Signal Contact	O	O	X
Terminal Device	O	O	X
Headset	X	X	X
Dimmer	X	O	X
IP Grade	IP56	IP56	IP56
(WxDxH)mm	189×90×224	189×90×224	194×153×255
Weight	2.9kg	2.9kg	4.1kg
Colour	BLACK	BLACK	BLACK
Material	ABS	ABS	ABS/STEEL
Install Area	CONSOLE	CONSOLE	-

＊LCA-11x : MAX 12 Station / LCA-12x - MAX 24 Station / "N" - Noise Cancel Type

Marine Common Battery Telephone (LCA-100)
For Submarine and Navy

LCA-114HB / 124HB	LCA-115A / 125A	LCA-115D / 125D
		
WALL	FLUSH	FLUSH
12 / 24 STATION	12 / 24 STATION	12 / 24 STATION
2	X	X
O	O	O
O	O	O
O	X	X
X	X	O
IP56	IP56	IP56
189×100×224	189×90×224	189×90×224
2.9kg	2.9kg	2.9kg
BLACK	BLACK	BLACK
ABS	ABS	ABS
MACHINERY	CONSOLE	CONSOLE

COMMON BATTERY TELEPHONE (CONNECTION BOX etc.)

MODEL	JB-6A/6B	JB-8A/8B	JB-9A/9B	MPS-050B
PHOTO				
Mounting Type	WALL	WALL/FLUSH	WALL/FLUSH	WALL
IP Grade	IP56	IP22	IP22	IP22
Gland	2	X	X	X
Dimension(WxDxH)mm	153×110×160	105×52×157	78×52×140	148×46×170
Material	POLYCARBONATE	STEEL	STEEL	STEEL
Colour	GRAY	IVORY	IVORY	BLACK
Weight	1.9kg	0.5kg	0.6kg	0.6kg
Install Area	FOR PORTABLE (MAX-12, 24 STATION)	FOR DESK TEL (MAX-12, 24 STATION)	FOR DESK TEL (MAX-12,24STATION)	POWER SUPPLY & FILTER

Sound Powered Telephone

Sound Powered Telephone

GENERAL DESCRIPTION

The Sound Powered Telephone system is used for communicating with the wheel house, the engine control room, and the steering gear room in case of emergency and for communicating between the areas or rooms when necessary. Especially, being independent from the power supply of the vessel, this system allows for emergency communication at critical spots in the vessel even in case of power failure. It is manufactured to be a waterproof and dustproof and adopts the input power supply of 24V DC to deliver communications and signals (Bell, Lamp, Etc.).
This system includes the following types: Flush, wall, waterproof, portable, and intrinsically safe (Used for normal condition or in the area with the possibility of explosive gas in case of accident) types, all of which can be interfaced to the Horn/Bell/Flashing Light, and the Foot Switch.
This system was tested at the IEC60945 standard and approved for CE by DNV GL.
The Type Approval was done by DNV GL, CCS, RMRS.

PRODUCT INFORMATION

OPERATIONS AND SPECIFICATIONS

- Telephone Sets : The sound powered (batteryless) telephone consists of the direct and mutual selection types, and is divided into the following categories according to the purpose.

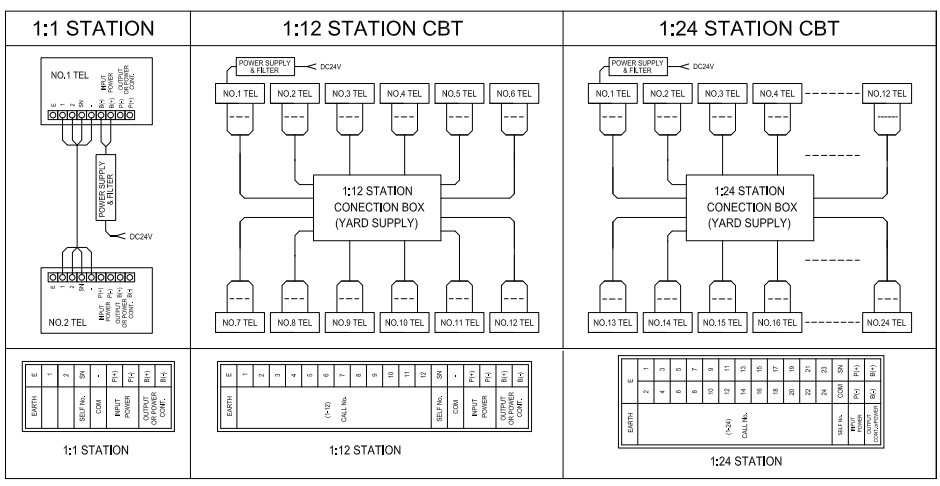


▲ LCA-100 TELEPHONE

PRODUCT INFORMATION

Electric Specifications	1. Compass Safety Distance : Min. 1m 2. Voice Transmitting Sensitivity : 0.2V ± 0.1Vrms 3. Frequency Characteristics : Less than 6dB (300 Hz ~ 3 kHz) 4. Generator Output Voltage : 75V ± 10% 5. DC power can be connected to this telephone for dimmer source only	**Cautions**	1. Power reserve: 30 minutes. 2. Terminal Board "SN" : Connect to self-number. 3. Terminal Board "COM" : Common line of all telephones 4. Terminal Board "+, -" : If the relay box is not used, the bell, R/L and horn are connected to external power (AC/DC).
Mutual Selection Type (Max. 24 Station) - (LC-800 / LAS-100)	1. Calling ⓐ Lift the handset and select the desired switch ⓑ Quickly rotate the handle of the magnetic generator 10 times or more, and then the calling signal is transmitted to the receiver ⓒ The phones are now connected 2. Answering ⓐ The bell rings and the lamp blinks ⓑ Lift the handset ⓒ The phones are now connected	**Direct Type (1:1 Station) - (LC-700 Series Only)**	1. Calling ⓐ Lift the handset and quickly rotate the handle of the magnetic generator 10 times or more ⓑ Then, the calling signal is transmitted to the receiver ⓒ The phones are now connected 2. Answering ⓐ The bell rings and the lamp blinks ⓑ Lift the handset ⓒ The phones are now connected

WIRING DIAGRAM OF SOUND POWERED TELEPHONE SYSTEM





Accessories : **Sound Powered Telephone**

Sound Powered Telephone

ACCESSORY TELEPHONE (OLD VERSION)

MODEL	LC-711	LC-713C	LC-713G	LC-715C	LC-717
PHOTO					
Mounting Type	DESK	DESK	WALL	FLUSH	PORTABLE
Station	1:1 STATION	1:1 STATION	1:1 STATION	1:1 STATION	1:1 STATION
Gland	X	2	2	X	X
Signal Contact	X	O	O	O	X
Terminal Device	X	O	O	O	X
Headset	X	X	O	X	X
Dimmer	X	X	X	X	X
IP Grade	IP22	IP44	IP44	IP22	IP56
(WxDxH)mm	217×226×125	152×143×270	152×143×270	152×160×270	156×166×270
Weight	1.9kg	2.9kg	2.9kg	1.7kg	4.5kg
Colour	BLACK	GRAY	GRAY	BLACK	GRAY
Material	ABS	ABS	ABS	ABS	ABS/STEEL
Install Area	CABIN	MACHINERY	MACHINERY	CONSOLE	-

MODEL	LC-814C / 824C	LC-814E / 824E	LC-814G / 824G	LC-814G1 / 824G1
PHOTO				
Mounting Type	WALL	WALL	WALL	WALL
Station	12 / 24 STATION	12 / 24 STATION	12 / 24 STATION	12 / 24 STATION
Gland	2	3	2	3
Signal Contact	O	O	O	O
Terminal Device	O	O	O	O
Headset	X	X	O	O
Dimmer	X	X	X	X
IP Grade	IP44	IP44	IP44	IP44
(WxDxH)mm	152×143×270	152×143×270	152×143×270	152×143×270
Weight	2.9kg	3.2kg	3.3kg	3.5kg
Colour	GRAY	GRAY	GRAY	GRAY
Material	ABS	ABS	ABS	ABS
Install Area	GALLEY, WORKSHOP	MACHINERY	MACHINERY	MACHINERY

* LC-71x - 1:1 Station / LC-81x : MAX 12 Station / LC-82x - MAX 24 Station / "N" - Noise Cancel Type

Marine Sound Powered Telephone (LC-800)
Batteryless Telephone System

LC-812A / 822A	LC-814A / 824A	LC-814B / 824B
		
DESK	WALL	WALL
12 / 24 STATION	12 / 24 STATION	12 / 24 STATION
X	X	X
X	O	O
X	O	O
X	X	X
X	X	O
IP22	IP22	IP44
217×226×125	152×143×270	152×143×270
2.1kg	2.9kg	2.9kg
BLACK	GRAY	GRAY
ABS	ABS	ABS
CABIN	GALLEY, WORKSHOP	GALLEY, WORKSHOP

LC-816A / 826A	LC-816C / 826C	LC-818 / LC-828
		
FLUSH	FLUSH	PORTABLE
12 / 24 STATION	12 / 24 STATION	12 / 24 STATION
X	X	X
O	O	X
O	O	X
X	X	X
O	X	X
IP22	IP22	IP56
152×160×270	152×160×270	156×166×274
2.2kg	2.1kg	3.9kg
BLACK	BLACK	GRAY
ABS	ABS	ABS/STEEL
CONSOLE	CONSOLE	-

Accessories : **Sound Powered Telephone**

Sound Powered Telephone

ACCESSORY TELEPHONE (NEW VERSION)

MODEL	LSA-111A / 121A	LSA-113A / 123A	LSA-114B / 124B	LSA-114C / 124C
PHOTO				
Mounting Type	DESK	WALL	WALL	WALL
Station	12 / 24 STATION	12 / 24 STATION	12 / 24 STATION	12 / 24 STATION
Gland	X	X	1	2
Signal Contact	X	O	O	O
Terminal Device	X	O	O	O
Headset	X	X	X	X
Dimmer	X	X	X	X
IP Grade	IP22	IP56	IP56	IP56
(WxDxH)mm	217×226×125	220×97×200	189×100×224	189×100×224
Weight	1.9kg	0.9kg	2.9kg	2.9kg
Colour	BLACK	BLACK	BLACK	BLACK
Material	ABS	ABS	ABS	ABS
Install Area	CABIN	CABIN	GALLEY, WORKSHOP	MACHINERY

MODEL	LSA-116A / 126A	LSA-116D / 126D	LSA-117A / 127A
PHOTO			
Mounting Type	FLUSH	FLUSH	PORTABLE
Station	12 / 24 STATION	12 / 24 STATION	12 / 24 STATION
Gland	X	X	X
Signal Contact	O	O	X
Terminal Device	O	O	X
Headset	X	X	X
Dimmer	X	O	X
IP Grade	IP56	IP56	IP56
(WxDxH)mm	189×90×224	189×90×224	194×153×255
Weight	2.9kg	2.9kg	4.1kg
Colour	BLACK	BLACK	BLACK
Material	ABS	ABS	ABS/STEEL
Install Area	CONSOLE	CONSOLE	-

* LSA-11x : MAX 12 Station / LSA-12x : MAX 24 Station / "N" - Noise Cancel Type

Marine Sound Powered Telephone(LSA-100)
Batteryless Telephone System

MODEL	LSA-114HB / 124HB	LSA-114HC / 124HC	LSA-115A / 125A	LSA-115D / 125D
PHOTO				
Mounting Type	WALL	WALL	FLUSH	FLUSH
Station	12 / 24 STATION	12 / 24 STATION	12 / 24 STATION	12 / 24 STATION
Gland	2	3	X	X
Signal Contact	O	O	O	O
Terminal Device	O	O	O	O
Headset	O	X	X	X
Dimmer	X	X	X	O
IP Grade	IP56	IP56	IP56	IP56
(WxDxH)mm	189×100×224	189×100×224	189×100×224	189×100×224
Weight	2.9kg	2.9kg	2.9kg	2.9kg
Colour	BLACK	BLACK	BLACK	BLACK
Material	ABS	ABS	ABS	ABS
Install Area	MACHINERY	MACHINERY	CONSOLE	CONSOLE

ACCESSORY CONNECTION BOX

MODEL	JB-7A/7B	JB-8A1/8B1	JB-9A1/9B1
PHOTO			
Mounting Type	WALL	WALL/FLUSH	WALL/FLUSH
IP Grade	IP56	IP22	IP22
Gland	2	X	X
Dimension(WxDxH)mm	153×100×200	102×52×152	78×52×140
Material	POLYCARBONATE	STEEL	STEEL
Colour	GRAY	IVORY	IVORY
Weight	1.9kg	0.6kg	0.6kg
Install Area	FOR PORTABLE (MAX-12,24STATION)	FOR DESK TEL (MAX-12,24STATION)	FOR DESK TEL (MAX-12,24STATION)

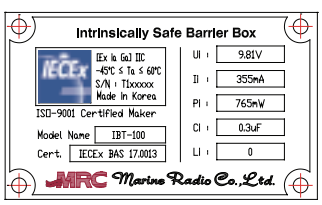
IBT-100 Intrinsically Safe Auto Telephone

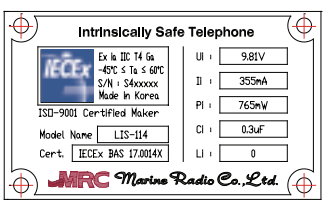
GENERAL DESCRIPTION

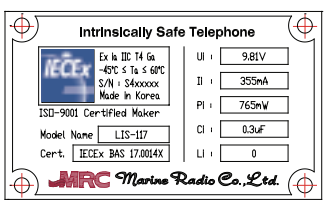
The Intrinsically Safe Auto Telephone system is officially certified by satisfying the IECEx request standard IEC60079-0, IEC60079-11. This type of A.T system can be mounted in areas that requires Group II, Zone 0, Zone 1 and 2, Gas class "C", and temperature class T4 performance standard.
The intrinsically safe construction does not ignite explosive gas or dust when the heat is caused by short circuit, broken line and ground. This system, the telephone set and calling unit, has a switch, terminal and relay. The system uses an air horn in hazardous areas, and uses the buzzer or bell in safety areas. The telephone set adapts the low noise OP-AMP, so it improves call tone and side tone. Moreover, it largely reduces noise incoming through the telephone transmitter, by using a circuit whose CMRR (Common Mode Rejection Ratio) is high. The power is supplied to "PABX".
The current and voltage are limited for explosion-proof architecture.

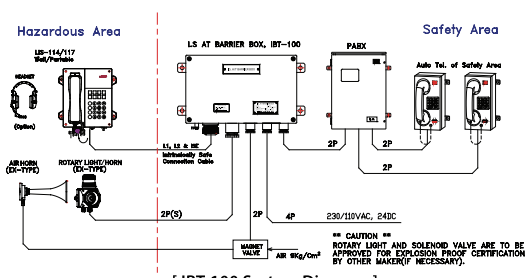
PRODUCT INFORMATION

INTRINSICALLY SAFE

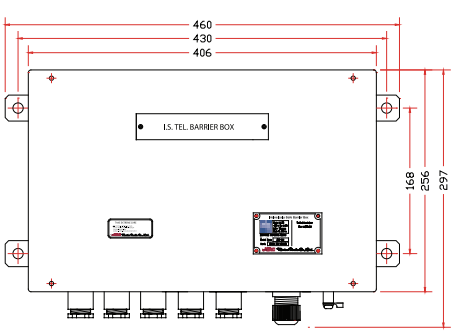








[IBT-100 System Diagram]



[Dimensions]

Specifications

Model	IBT-100
Cert. No.	IECEx BAS 15.xxxxx
Protection	Intrinsic Safety
Standards	IEC60079-0 / 11
Marking	IEC-Ex (Ex ia IIC T6)
Ambient Temp.	-45°C ≤ Ta ≤ 60°C
IP / Weight	IP44 / 8.4Kg
Color	Gray (N7-EPC)
Material	Steel PO 1.6t (Case)
Mounting	4~Ø12 (430-168)
Power	230VAC / 24VDC



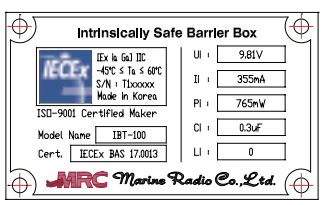
IBT-200 CBT / SPT Intrinsically Safe Auto Telephones

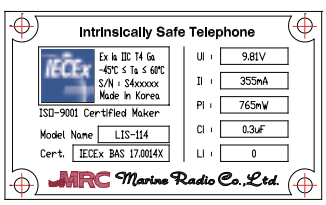
GENERAL DESCRIPTION

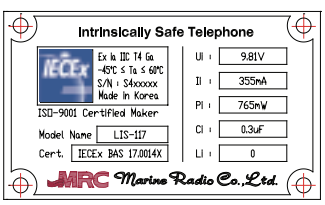
The Intrinsically Safe Auto Telephone system is officially certified by satisfying the IECEx request standard IEC60079-0, IEC60079-11. This type of A.T system can be mounted in areas that requires Group II, Zone 0, Zone 1 and 2, Gas class "C", and temperature class T4 performance standard.
The intrinsically safe construction does not ignite explosive gas or dust when the heat is caused by short circuit, broken line and ground. This system, the telephone set and calling unit, has a switch, terminal and relay. The system uses an air horn in hazardous areas, and uses the buzzer or bell in safety areas. The telephone set adapts the low noise OP-AMP, so it improves call tone and side tone. Moreover, it largely reduces noise incoming through the telephone transmitter, by using a circuit whose CMRR (Common Mode Rejection Ratio) is high. The power is supplied to "PABX".
The current and voltage are limited for explosion-proof architecture.

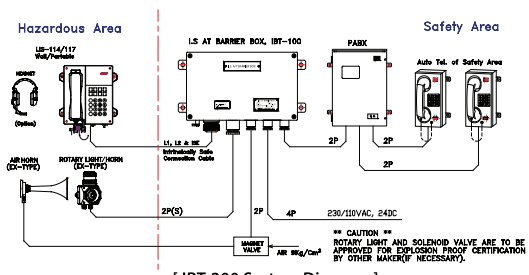
PRODUCT INFORMATION

INTRINSICALLY SAFE

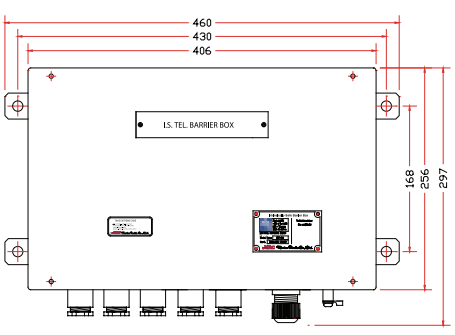








[IBT-200 System Diagram]



[Dimensions]

Specifications

Model	IBT-200
Cert. No.	IECEx BAS 17.0013
Protection	Intrinsic Safety
Standards	IEC60079-0 / 11
Marking	[Ex ia Ga] IIC
Ambient Temp.	-45°C ≤ Ta ≤ 60°C
Weight	8.4 Kg
Color	Gray (N7-EPC)
Material	Steel PO 1.6mm (Case)
Mounting	4-Ø12 (430-168)
Power	220 / 110VAC, 24VDC



Accessories : **Signal Device For Telephone**

Auto - Exchanger System

ACCESSORY SIGNAL DEVICE

MODEL	BZ-1	BZ-2	L00
PHOTO			
Name	BELL	BELL	FLASHING LIGHT
Mounting Type	WALL	WALL	WALL
IP Grade	44	44	56
Gland	1	1	2
Dimension(WxDxH)mm	130×134×241	200×134×300	130×167×265
Material	ABS	ABS	ALUMINIUM
Colour	IVORY	IVORY	GREEN
Weight	1.5kg	1.9kg	2kg
Install Area	MACHINERY	MACHINERY	MACHINERY

MODEL	SL16	AH0601	SV0080
PHOTO			
Name	EX. FLASHING LIGHT W/HORN	AIR HORN	STOP VALVE
Mounting Type	WALL	WALL	COMPONENT
IP Grade	66	56	56
Gland	2	X	X
Dimension(WxDxH)mm	145×145×435	106×117×198	77×55×22
Material	ALUMINIUM	PAGF ,COPPER	BRASS
Colour	BLACK	GREEN	BRASS NATURAL
Weight	4.7kg	1.5kg	0.4kg
Install Area	HAZARDOUS AREA	SAFETY AREA	SAFETY AREA

MODEL	S14	SL14	S16	L16
PHOTO				
Name	HORN	FLASHING LIGHT W/HORN	EX. HORN	EX. FLASHING LIGHT
Mounting Type	WALL	WALL	WALL	WALL
IP Grade	56	56	66	66
Gland	2	2	2	2
Dimension(WxDxH)mm	181X140X140	181X140X243	145×145×208	145×145×298
Material	ABS	ABS	ALUMINIUM	ALUMINIUM
Colour	ORANGE	ORANGE	BLACK	BLACK
Weight	1.4kg	1.6kg	4.3kg	3.4kg
Install Area	MACHINERY	MACHINERY	HAZARDOUS AREA	MACHINERY

MODEL	RV0090	SV17A	SV0070	ASTR0015
PHOTO				
Name	NON RETURN VALVE	SOL VALVE	EX. SOL VALVE	AIR STRAINER
Mounting Type	COMPONENT	COMPONENT	COMPONENT	COMPONENT
IP Grade	56	56	56	56
Gland	X	1	1	X
Dimension(WxDxH)mm	129X22X22	152×119×134	200×293×130	138×65×185
Material	BRASS	ALUMINIUM	ALUMINIUM	RESIN
Colour	BRASS NATURAL	GREEN	GREEN	BLACK
Weight	0.5kg	1kg	5.5kg	0.9kg
Install Area	SAFETY AREA	SAFETY AREA	HAZARDOUS AREA	SAFETY AREA

MAD-100 Communal Aerial System

Communal Aerial System

GENERAL DESCRIPTION

The MAD-100 system supports video from Satellite TV, and CCTV signal interface in addition to broadcasting bandwidths including MF/HF/SW and FM for radio, VHF (H/L), and UHF for television, as well as the video from VCR and DVD. Especially, the Omni-directional antenna is able to stably receive television and radio signals via the whip antenna during the operation of the ship.
To avoid the attenuation of weak signals, the system adopts the Automatic Gain Control (AGC) in the built-in broadband amplifier. This system also boasts solid production so that it does not require any maintenance after installation. As long as the power is on in the system, all functions operate automatically. This system was tested at the IEC60945 standard and approved for CE by ICR.

PRODUCT INFORMATION

SYSTEM FEATURES

- Main amplifier (MAD-100) : Maximum subscriber (96EA), Included AGC and power supply for MF / SW / FM / VHF / UHF
- Sub amplifier (MAD-100A) : Additional subscriber (96EA), Included AGC and power supply for MF / SW / FM / VHF / UHF
- VTR Amplifier (UP-40B, Optional)
- Omni-Directional Antenna (AT-100) : For AM/FM, TV
- Distributor
- Terminal for radio and TV
- Radio / TV, telephone and AC-220 RP terminal
- Radio / TV cord set
- Installation materials : End Resistor (75 ohm and connector)
- Spare parts : Manufacturer standard
- Minimum reception level of TV (Standard) : 0dB
- Minimum reception level of radio (Standard) : 40dB
- Maximum Outlet Box per system : 96EA
- Maximum Outlet Box per line : DB-2 / 3 / 4 / 8
- Terminal Resistor Impedance : 75 ohm



▲ AT-100 ANTENNA

ELECTRIC & ENVIRONMENT

- MF / SW / FM / VHF/ UHF Amplifier Unit (MAD-100, MAD-100A)
- Freq : - MF / SW (150 kHz - 30MHz), Min. 20dB
  - VHF L (45MHz - 110MHz), Min. 20dB
  - VHF H (170MHz - 225MHz), Min. 20dB
  - UHF (470MHz - 850MHz), Min. 20dB
- AGC : 0-37dB
- Gain Deviation : MF / SW (0.8dB), VHF (1.0dB), UHF (2.0dB)
- Noise Figure : MF / SW (7dB), VHF (8dB), UHF (8dB)
- Maximum Output : MF / SW (85dB), FM / VHF / UHF (110dB)
- Power Consumption : DC-12V, 380mA, Max. 45VA / AC-220V, 20mA, Max. 50VA
- Weight : Approx. 6.8Kg
- Temperature : -20°C ~ +40°C
- In/Out Impedance : 75 ohm

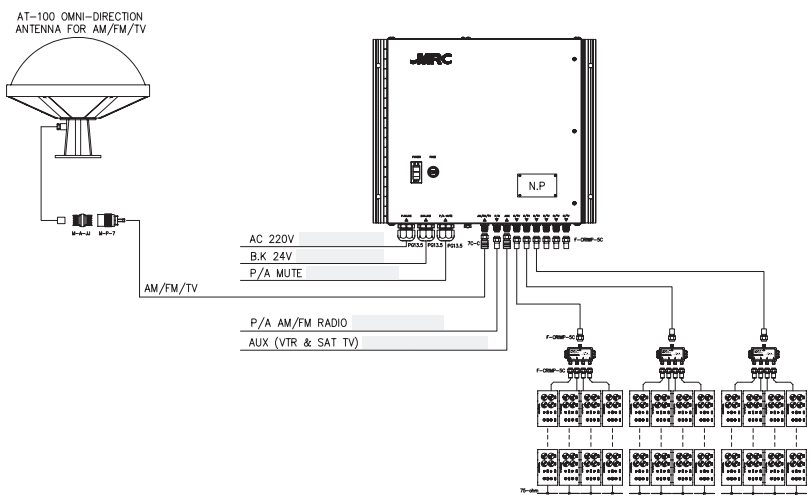


▲ MAD-100 MAIN UNIT

PRODUCT INFORMATION

Main Power Supply	1. Power Source : AC110/220V, 1-ph, 50/60Hz 2. Output Power : DC-12V, 1.2A 3. Fuse : 250V, 1A
Omni-Directional Antenna (AT-100)	1. Frequency Range : 0.1MHz ~ 850MHz 2. Rx Pattern & Polarization : Omni-Directional Type 3. Gain : 20dB ± 3dB 4. Automatic Gain Control : 0 ~ 25dB 5. Output Impedance : 75 ohm 6. Maximum Output Level : 110dB 7. Power Consumption : 120mA 8. Input Voltage : DC-12V 9. Stand Rate for Wind : Max. 60m/s 10. Operation Temperature : -40°C ~ +50°C 11. Approx. 6Kg
VTR Amplifier (UP-40B, Option)	1. Frequency Gain : VHF L (45MHz - 110MHz), Min. 30dB VHF H (170MHz - 225MHz), Min. 30dB UHF (470MHz - 750MHz), Min. 30dB 2. Gain Deviation : VHF (1.0dB), UHF (2.0dB) 3. Noise Figure : VHF (8dB), UHF (8dB) 4. Maximum Output : FM / VHF / UHF (105dB) 5. Power Consumption : AC110 / 220V, 50mA, Ma x. 11VA 6. Weight : Approx. 1.7Kg 7. Color : Black 8.Temperature : -20°C ~ +40°C 9. In/Out Impedance : 75 ohm

WIRING DIAGRAM OF COMMUNAL AERIAL SYSTEM





Accessories : **Communal Aerial System**

Communal Aerial System

ACCESSORY COMBINATION BOX

MODEL	RF	RW	NPTLRF-4
PHOTO			
Mounting Type	FLUSH	WALL	FLUSH
Power Socket	X	X	O
Tel. Module	X	X	O
R/TV Module	O	O	O
Lan. Module	X	X	O
IP Grade	IP22	IP22	IP22
(WxDxH)mm	80×35×126	80×53×123	284×60×138
Material	STEEL	STEEL	ABS
Colour	IVORY	IVORY	WHITE
Weight	0.5kg	0.7kg	1.8kg
Derivative Product			NTLRF-4 NTLRF-4 NTLRF-4

ACCESSORY DISTRIBUTOR & CORD

MODEL	DB-4N	CHT-4CN	CMX-1
PHOTO			
Mounting Type	WALL	WALL	WALL
(WxDxH)mm	71×17×49	75×26×39	113×26×73
Material	ZN	AL	AL
Colour	GRAY	SILVER	GRAY
Weight	0.15kg	0.5kg	0.5kg

Inter-Communication Entertainment System for TV and Radio Broadcasting(MAD-100)

NPTLRW-4	NPTRF-4	NPTRW-4
		
WALL	FLUSH	WALL
O	O	O
O	O	O
O	O	O
O	X	X
IP22	IP22	IP22
284×73×138	284×60×138	284×73×138
ABS	ABS	ABS
WHITE	WHITE	WHITE
2kg	1.8kg	2kg
NTLRW-4	NTLRF-4	NTLRW-4
NTLRW-4	NTLRF-4	NTLRW-4
NTLRW-4	NTLRF-4	NTLRW-4

DB-4N	CHT-4CN	CMX-1
		
WALL		
113×26×73	L=1.5m	L=1.5m
AL	PVC JACKET	PVC JACKET
GRAY	BLACK	BLACK
0.7kg	0.1kg	0.1kg

MCS-970 Clock System

Marine Clock System

GENERAL DESCRIPTION

The Marine Electric Clock System is a device for indicating precise time and date to the analogue/digital slave clocks as well as recording and monitoring the operation data of the vessel. By using a 10.000MHz TCXO crystal oscillator to compensate or temperature, the MCS-970 system excels in safety and precision as the system has 0.1 second error per month. These systems are manufactured to be shock and vibration proof, as well as are protected from air pressure and salt. This system was tested at the IEC60945 standard and approved for CE by DNV GL.

PRODUCT INFORMATION

SYSTEM FEATURES

- Power Source : AC110/220V, 1θ, 50/60 Hz
- Emergency Power : AC or DC 24V (Ripple less than 5%)
- Power Consumption : AC, less than 50VA / DC, less than 1.6A (At 24V DC)
- Automatically switch to DC when AC power fails
- Certification : DNV CE
- Temperature : -20°C ~ +45°C
- Humidity : Less than 90%
- Net Weight : 7.82Kg
- Painting Color : 5.4 PB 2.8 / 3.0 (Dark Blue)
- Dimensions : 386(W) x 316(H) x 110(D)
- Mount Type : Flush Mount (Manufacturer Standard)



▲ MAD-100 MAIN UNIT

CAPACITY & FUNCTION OF THE SYSTEM

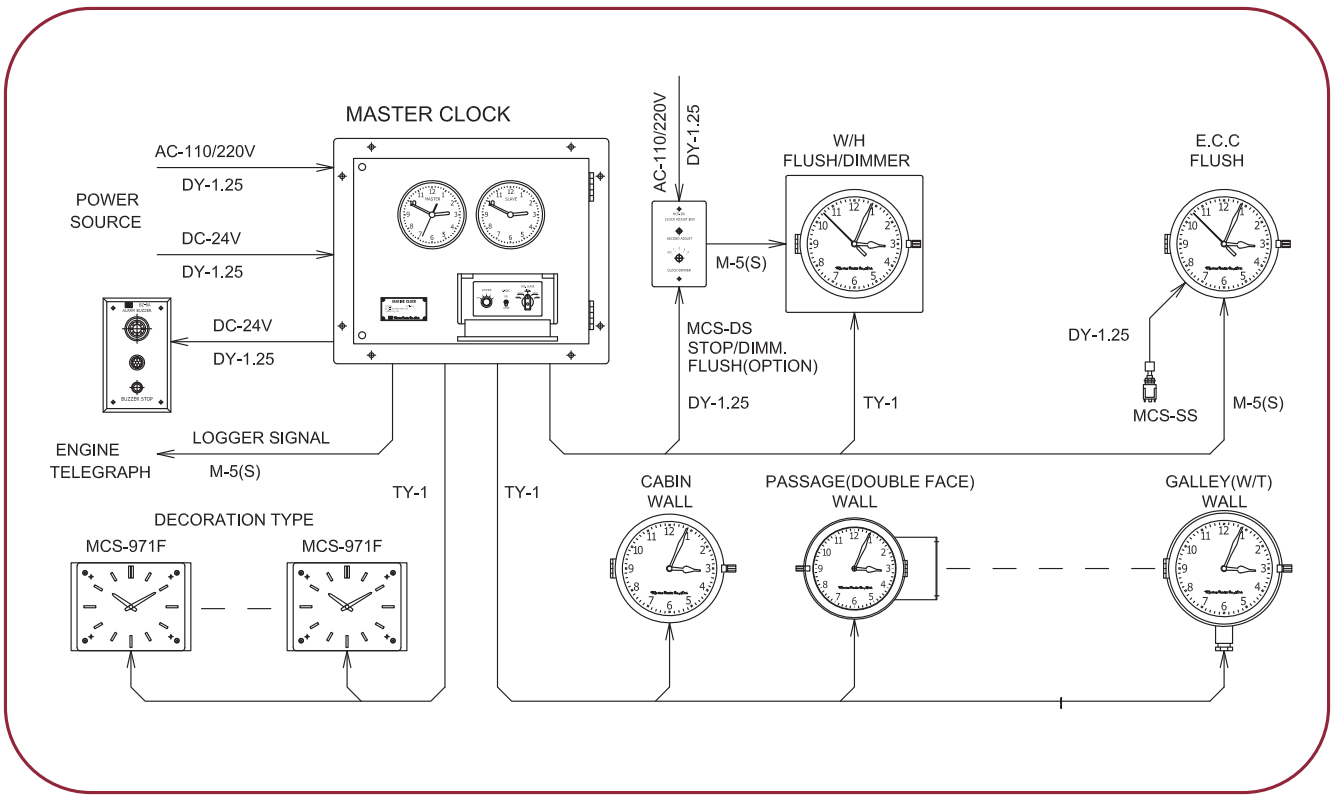
- Crystal Oscillation Frequency : 10.000 MHz (TCXO)
- Accuracy : Within ±1.0 sec per a month
- Dual Clocks in Main Unit :
  - Master (UTC) : Three Hands, 0.5sec. Leap, θ80mm Dial
  - Slave (LTC) : Two / Three Hands, 30sec. Leap, θ80mm Dial
- Output Signal Form
  - For 0.5sec Slave Clock : DC 24V, 0.5sec Polarized Pulse
  - For 30sec Slave Clock : DC 24V, 30sec Polarized Pulse
  - Time Signal for Engine Telegraph Logger : DC 24V, ±30sec Polarized Pulse (ADV / REV)
- Slave Clock : Up to 80ea
- Battery Slave Clock (Optional)
- Digital Slave Clock (Optional)
- Built-in lighting control system (Dimmer)
- Fully protects : Power source and slave line circuit
- Robust mechanism architecture and excellent stability
- Easy time control : CW and CCW direction for slave clocks
- High speed time setup

PRODUCT INFORMATION

CE

Control Panel of Main Unit	Main Unit (MCS-970) 1. UT (Universal Time) 2. LT (Local Time) 3. Mounting Holes 4. Hinge 5. Display & Control 6. Name Plate 7. Front Panel Mount	**Detailed Description of Each Part**	1. 30-Sec Time adjust switch 2. "TIME" : Stopping time of all clocks for a while. 3. "DIMMER" : Adjust illumination of back (EL) light 4/5. AC / DC Power Fuse : 1.3A / 5.0A 6/7. 0.5S / 30S Out Fuse : 1.0A / 1.0A 8/9. DC / AC Power Switch

WIRING DIAGRAM OF COMMUNAL AERIAL SYSTEM





MCD-100 Clock System

Marine Clock System

GENERAL DESCRIPTION

The Marine Electric Clock System is a device for indicating precise time and date to the analogue/digital slave clocks as well as recording and monitoring the operation data of the vessel. By connecting to GPS and other devices, the MCD-100 system receives data from the National Marine Electronics Association (NMEA) and the Internet protocols (LAN) to automatically renew and synchronize the precise local time. These systems are shock and vibration proof, as well as are protected from air pressure and salt.
This system was tested at the IEC60945 standard and approved for CE by DNV GL. The Type Approval was done by CCS.

PRODUCT INFORMATION

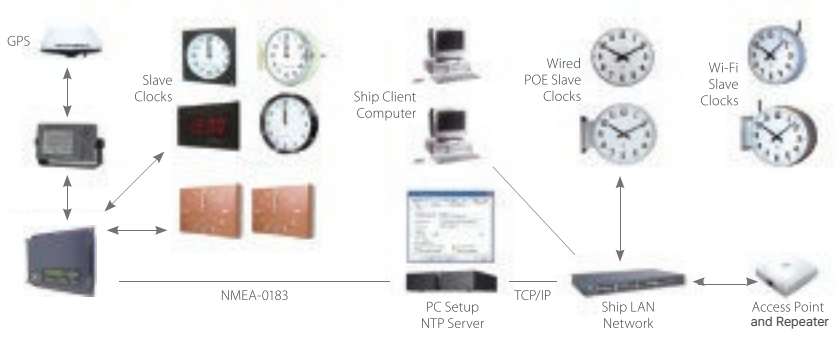
SYSTEM FEATURES

- Power Source : AC110/220V, 1Φ, 50/60 Hz
- Emergency Power : AC or DC 24V (Ripple less than 5%)
- Power Consumption :
  AC, less than 50VA / DC, less than 1.6A (At 24V DC)
- Automatically switch to DC when AC power fails
- Certification : DNV CE Submitted
- Temperature : -20°C ~ +45°C
- Humidity : Less than 90%
- Net Weight : 7.52Kg
- Dimensions : 338(W) x 272(H) x 128(D)
- Mount Type : Flush Mount(Manufacturer Standard)

CAPACITY & FUNCTION OF THE SYSTEM

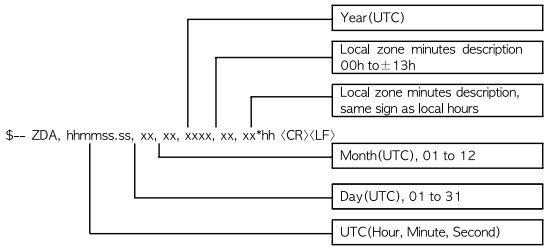
- Crystal Oscillation Frequency : 10.000 MHz (TCXO)
- Accuracy (No GPS) : Within ±1.0 sec per a month
  (With GPS) : Synchronizing from GPS automatically
- Dual Clocks in Main Unit :
  - Master (UTC) : Three Hands, 0.5sec. Leap, Φ80mm Dial
  - Slave (LTC) : Two / Three Hands, 30sec. Leap, Φ80mm Dial
  - LCD Display : UT / LT Year / Month / Day / Hour / Minute / Second 16-Character 2-Line, Back Light
- Output Signal Form
  - For 0.5sec Slave Clock : DC 24V, 0.5sec Polarized Pulse
  - For 30sec Slave Clock : DC 24V, 30sec Polarized Pulse
  - Time Signal for Engine Telegraph Logger :
    DC 24V, ±30sec Polarized Pulse (ADV / REV)
- NMEA-0183 Signal : Time & Date(IEC1162-1, RS-422, ZDA)
- There are 3-set Output Port for NMEA-0183
- Baud Rate Setup (NMEA-0183) :
  Setup, 1200 / 2400 / 4800 / 9600
- +20 / -20 Minute Control (Optional)
- Slave Clock : Up to 80 each
- Battery Slave Clock (Optional)
- Built-in lighting control system (Dimmer)
- Fully protects : Power source and slave line circuit
- Robust mechanism architecture and excellent stability
- Easy time control : CW and CCW direction for slave clocks
- High speed time setup
- NTP Server (Network Time Protocol, Optional)

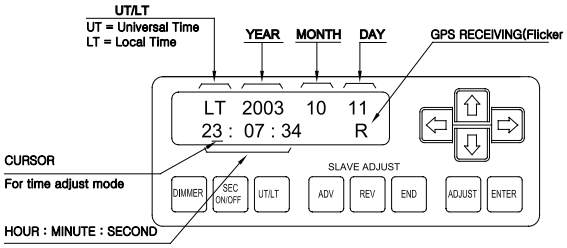
WIRING DIAGRAM OF COMMUNAL AERIAL SYSTEM



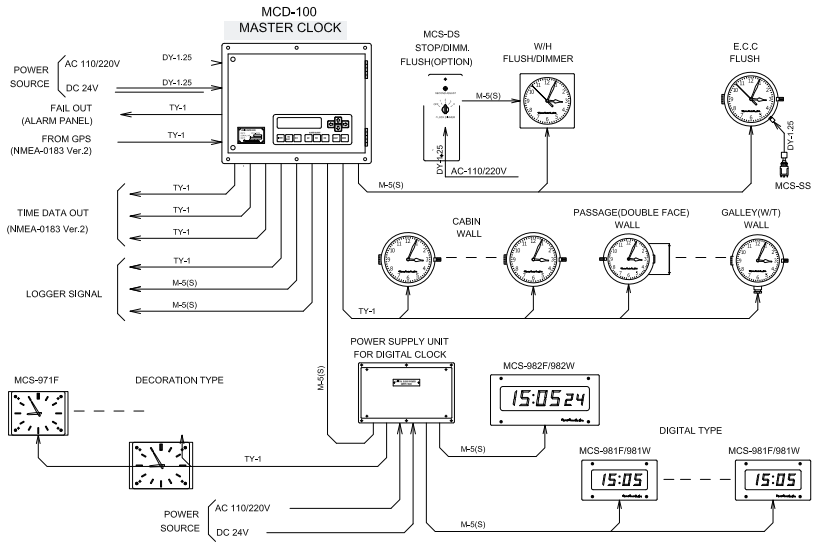
PRODUCT INFORMATION

NMEA-0183, Serial Interface Protocol	1. In(1) / Out(3) (NMEA-0183, IEC1162-1, RS-422 Compatible, $GPZDA) 2. Baud Rate Pre-set : 4800BPS (1200 / 2400 / 4800 / 9600 Compatible) 3. Standard Data Format : 4800-N-8-1(BR-Data-Parity-Stop), ZDA	**Detailed Description**	1. UT / LT : Universal Time / Local Time 2. Synchronizing from GPS signal automatically





WIRING DIAGRAM OF MARINE ELECTRIC CLOCK SYSTEM





Accessories : **Slave Clock**

Marine Clock System

ACCESSORY SLAVE ANALOG CLOCK

MODEL	MCS-975	MCS-975B	MCS-973C1	MCS-973S
PHOTO				
Mounting Type	FLUSH	FLUSH	WALL	FLUSH
Hour / Minute / Second	O	O	O	O
Hour / Minute	X	X	X	X
EL Plate	O	X	X	X
Second SW	X	O	X	X
Silence Mark	X	X	X	O
IP Grade	IP22	IP22	IP22	IP22
Gland	X	X	X	X
(WxDxH)mm	192×48×192	192×48×192	196×78×196	188×81×188
Material	STEEL	STEEL	STEEL	STEEL
Colour	BLACK	BLACK	IVORY	IVORY
Weight	1.6kg	1.6kg	1.2kg	1.3kg
Install Area	BCC	ECC/CCC	CABIN	RADIO SPACE

ACCESSORY SLAVE BATTERY CLOCK

MODEL	MCS-990A	MCS-990B	MCS-990C1
PHOTO			
Mounting Type	FLUSH	FLUSH	WALL
Hour / Minute / Second	O	O	O
EL Plate	O	X	X
IP Grade	IP22	P22	IP22
Silence Mark	X	X	X
(WxDxH)mm	186×80×186	186×80×186	196×74×196
Material	STEEL	STEEL	STEEL
Colour	IVORY	IVORY	IVORY
Weight	1.1kg	1.1kg	1.3kg
Install Area	BCC	ECC	CABIN

Marine Electric Clock

MCS-975C	MCS-976A	MCS-972E	MCS-972F1	MCS-972G
				
FLUSH	WALL	WALL	WALL	DOUBLE FACE
X	X	X	X	X
O	O	O	O	O
X	X	X	X	X
X	X	X	X	X
X	X	X	X	X
IP22	IP22	IP44	IP22	IP22
X	X	1 - 2	X	X
192×48×192	270×48×270	196×78×196	300×49×217	220×133×195
STEEL	STEEL	STEEL	WOOD	STEEL
BLACK	GRAY	IVORY	BROWN	IVORY
1.6kg	1.2kg	1.2kg	1.8kg	2.1kg
ECC/CCC	CABIN	GALLEY	CABIN	PASSAGE

MCS-990E	MCS-990F1	MCS-990S
		
WALL	WALL	FLUSH
O	O	O
X	X	X
P44	P22	IP22
X	X	O
196×74×196	300×49×217	186×80×196
STEEL	WOOD	STEEL
IVORY	BROWN	IVORY
1.2kg	1.8kg	1.1kg
GALLEY	CABIN	RADIO SPACE

Accessories : **Slave Clock**

Marine Clock System

ACCESSORY FOR SLAVE IP CLOCK

MODEL	MCS-961	MCS-961A	MCS-961W
PHOTO			
Mounting Type	WALL	WALL	WALL
Hour / Minute / Second	O	X	O
Hour / Minute	X	O	X
IP Grade	IP22	P22	IP44
Gland	X	X	1
(WxDxH)mm	200×60×100	200×60×100	200×60×100
Material	STEEL	STEEL	STEEL
Colour	BLACK	BLACK	BLACK
Weight	3.7kg	3.3kg	3.7kg
Install Area	CABIN	CABIN	GALLEY

MODEL	MCS-963	MCS-963A	MCS-964	MCS-964A
PHOTO				
Mounting Type	DOUBLE FACE	DOUBLE FACE	WALL	WALL
Hour / Minute / Second	O	X	O	X
Hour / Minute	X	O	X	O
IP Grade	IP22	IP22	IP22	IP22
Gland	X	X	X	X
(WxDxH)mm	200×60×100	200×60×100	200×60×100	200×60×100
Material	STEEL	STEEL	STEEL	STEEL
Colour	BLACK	BLACK	BROWN	BROWN
Weight	3.7kg	3.7kg	3.3kg	3.3kg
Install Area	PASSAGE	PASSAGE	CABIN	CABIN

Marine Electric Clock

MCS-961W/A	MCS-962	MCS-962A
		
WALL	FLUSH	FLUSH
X	O	X
O	X	O
IP44	IP22	IP22
1	X	X
200×60×100	200×61×100	200×61×100
STEEL	STEEL	STEEL
BLACK	BLACK	BLACK
3.7kg	3.3kg	3.3kg
GALLEY	BCC	ECC

ACCESSORY FOR DIMMER, SECOND ADJ. SW, NTP SERVER

MODEL	MCS-DS1	MCS-D	MCS-SS
PHOTO			
Mounting Type	FLUSH	FLUSH	FLUSH
IP Grade	IP22	IP22	IP22
(WxDxH)mm	78×57×116	78×57×116	11.5×12.5×38
Material	STEEL	STEEL	STEEL
Colour	BLACK	BLACK	BLACK
Weight	1kg	1kg	0.01kg
Install Area	BCC	BCC	BCC

NTP-100 IP Clock System

Marine Clock System

GENERAL DESCRIPTION

The NTP-100 provides secure synchronized timing for the ship's network system. The NTP Server is the solution for stable and precise timing on your network with GPS via Marine Master Clock System. The MRC (MCS-980) master clock system ensures the synchronization of all IT devices on the same network. Typically, this is done through the network time protocol (NTP) on the active portion of the communications infrastructure. The MRC NTP-100 is based on GPS and Master clock system technology for synchronizing to satellites' atomic clocks. This enables computer networks to synchronize all elements of network hardware and software (Including system logs) to the millisecond over LANs and/or WANs anywhere on the vessel.

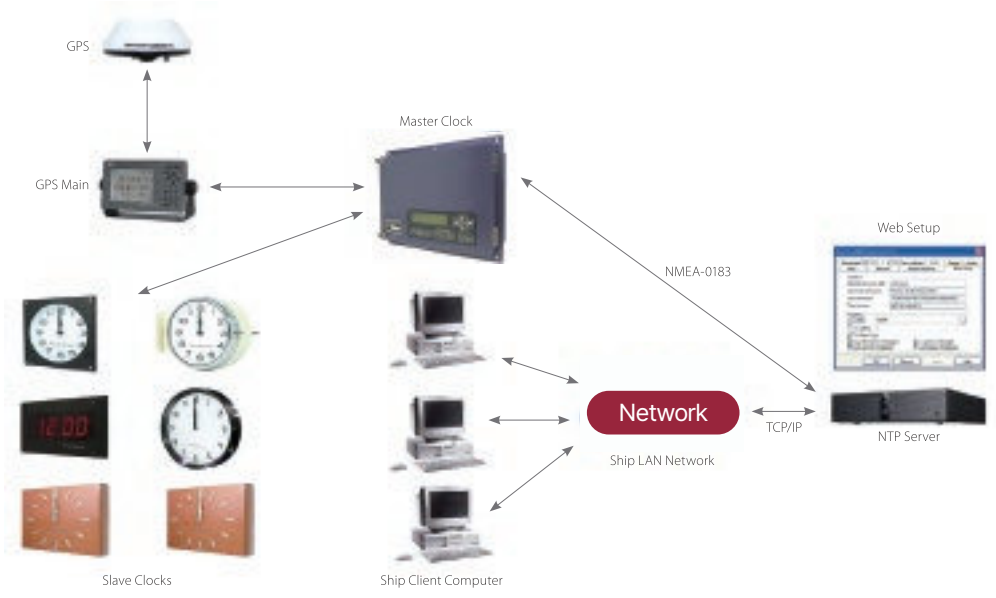
PRODUCT INFORMATION

SYSTEM FEATURES

- Power Source : 90 ~ 264VAC, 1θ, 50/60 Hz
- Em'cy Power(Optional) : AC or 24VDC (Ripple less than 5%)
- Power Consumption :
  AC, approximately 10VA / DC, less than 1A (At 24VDC)
- Automatic power changeover between DC & AC (Optional)
- Timing Accuracy : Better than 50ms
- Temperature : -20°C ~ +45°C
- Humidity : Less than 90%
- Net Weight : 5.2Kg
- Dimensions 1(Wall) : 406(W) x 253(H) x 83(D)
- Dimensions 2(19") : 19" 1-U Standard Rack)
- Mount Type : Wall / 19" Rack Mount

KEY BENEFITS

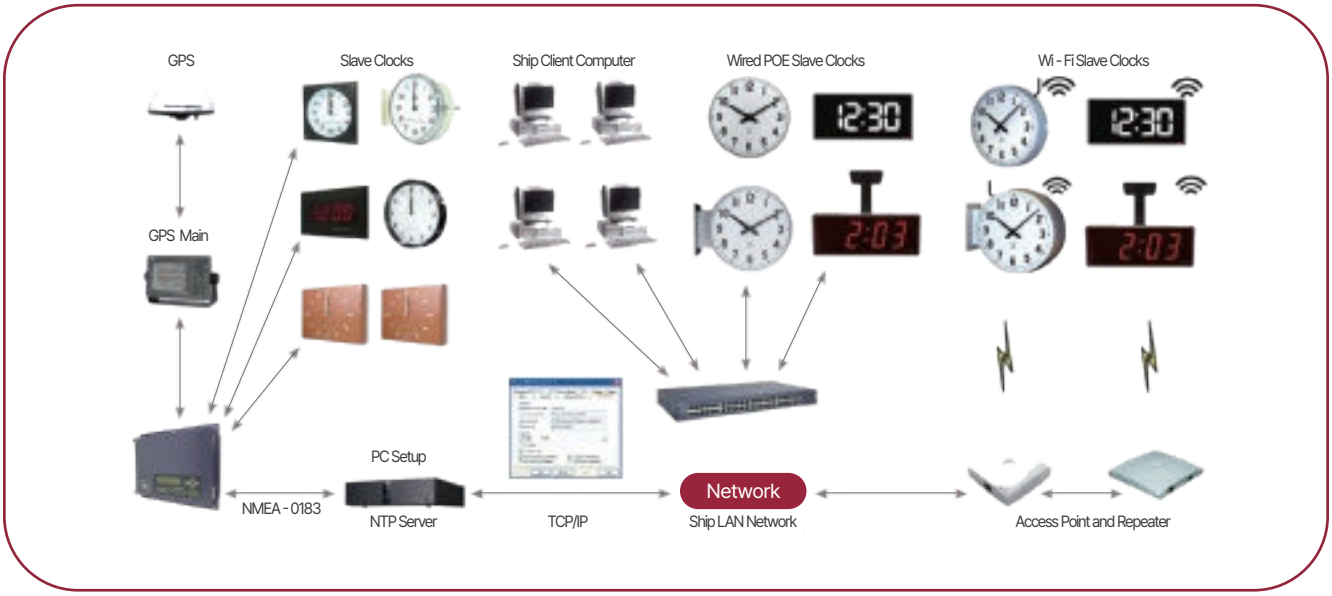
- Synchronized timing via your network using NTP / SNTP protocols Master Clock(Compatible with a range of GPS)ZDA, NMEA-0183(NMEA-2000, NMEA-OneNet, Optional)Simple setup and internal oscillator included



PRODUCT INFORMATION

NMEA-0183, Serial Interface Protocol	Platform : 32bit ARM Processor 2. Input (Master Clock/GPS) : NMEA-0183, RS-422, ZDA Format 3. Baud Rate Input (NMEA-0183) : 4800 / 9600 / 19200 / 38400 4. Output : SNTP / NTP (IEC61162-450) for Ethernet TCP / IP, RJ-45 5. Protocol : NTP4 (RFC-2030), NTP v4/3/2, SNTP v4 6. Local time / UTC : Selectable on individual outputs	7. Setup interface : Using the Web Browser (Password-protected) for system configuration and management. 8. Fault Alarm : Dry contact (NMEA Input, Power Fail) 9. Free firmware upgrades via network 10. Applicable : ECDIS, Radar, Conning, Auto Pilot, VDR, IAS, Fire Alarm ,etc. for all PC based equipment 11. Standard 1-year and 2-year warranty on parts
Wall Type NTP Server	1. Size : 406(W) x 253(H) x 83(D) 2. 19" 1U : Available 3. AC Main Power 4. Dual Power : Option	5. Fail Output 6. App. 5.2Kg 7. -20℃ ~ +45℃ 8. Humidity : L / T 90
NTP Server Interface	1. Input : NMEA-0183, IEC1162-1, RS-422 Compatible, $xxZDA 2. Baud Rate Preset : 4800BPS (4800 / 9600 / 19200 / 38400 Compatible)	3. Standard Data Format : 4800-N-8-1 (BR-Data-Parity-Stop), ZDA 4. Output : Ethernet 10 / 100 Base-T, RJ-45 (Auto sensing)

WIRING DIAGRAM OF NTP SERVER WITH MARINE ELECTRIC CLOCK (MCD-100) & GPS SYSTEM





PRODUCT INFORMATION

ADVANTAGES

- Promote safety by monitoring a particular place or subject
- Improve security enforcement by CCTV
- Provide safe management for hazardous area without human risk
- Overcome visual limitation by environment and conditions
- Preservation of records for reviews
- Manpower utilization and increased operational efficiency

CCTV SYSTEM GENERAL

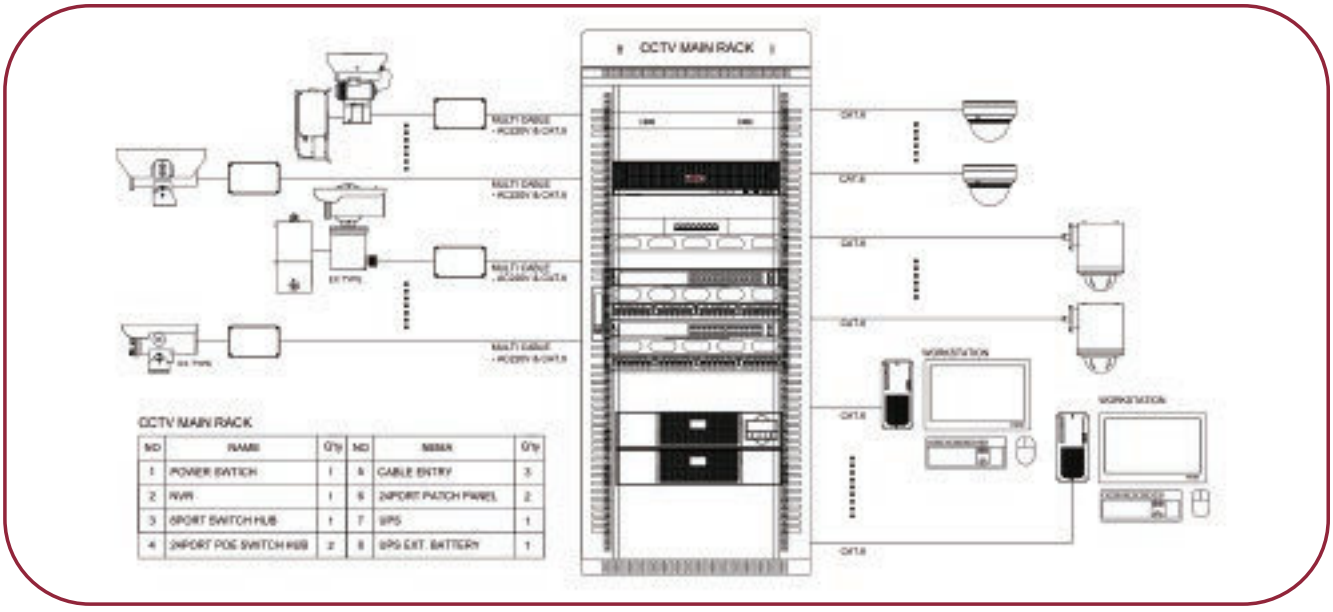
- CCTV System intended for marine and off-shore project is based on a matrix control system. It is a color compatible modular system, which is expandable in steps of 8 camera stations
- The central rack is equipped with hardware to connect 8 camera stations, 2 monitors and 2 keyboards, and is expandable to 16 camera stations, 8 monitors and 4 keyboards

AVAILABLE SYSTEMFUNCTIONS

- Camera Selector : Any camera in a multi camera system can be selected for control and view on the monitor
- Camera Sequence : Selected cameras in a multi camera system can be set for a sequence to view
- Camera Speed : The “dwell” period, i.e. the time for the particular image of the selected camera to remain on the monitor screen, can be adjusted for the installed camera stations
- Pan/Tilt/Focus/Zoom/Iris : When a camera station has pan, tilt and zoom functions, the operator can remotely control the selected camera station as desired

Main Rack Configurable :	1. NVR : 4CH, 16CH, 32CH, 64CH Cameras 2. Hub Switch : 8/16/24-Port(POE. Power Over Ethernet) 3. UPS (Uninterruptible Power Supply) : 2KVA or Other 4. Monitor, keyboard, Mouse etc. (Optional) 5. FDF (Fiber Distribution Frame) Converter (Optional) 6. LAN Extender (Optional)

WIRING DIAGRAM OF CCTV SYSTEM



PRODUCT INFORMATION

FEATURES

- Support Ultra 265/H.265/H.264 video formats
- 8/16/32 channel input
- Plug & Play with 8/16 independent PoE network interfaces(MCT-NVR-P08. MCT-NVR-P16)
- Support mainstream cameras of ONVIF conformance(Profile S, Profile G, Profile T) and RTSP protocols
- VGA and HDMI independent output
- Up to 16 Megapixels resolution recording
- Support N+1 Hot spare
- ANR technology to enhance the storage reliability when the network is disconnected

MODEL	MCT-NVR-P08	MCT-NVR-P16	MCT-NVR-B32
PHOTO			
Incoming Bandwidth	320Mbps	320Mbps	320Mbps
Outgoing Bandwidth	160Mbps	160Mbps	160Mbps
Remote Users	128	128	128
IP Video Input	8-ch	16-ch	32-ch
RCA Audio Input	1-ch	1-ch	1-ch
Hard Disk	2 STAT	4 STAT	8 STAT
Hard Disk Capacity	Up to 16TB for each HDD	Up to 16TB for each HDD	Up to 16TB for each HDD
PoE Interface	8 RJ45 10M/100M self-adaptive Ethernet Interface	16 RJ45 10M/100M self-adaptive Ethernet Interface	N/A
PoE Max Power	Max 30W for single port, Max 130W in total	Max 30W for single port, Max 150W in total	N/A
PoE Supported Standard	IEEE 802.3at, IEEE 802.3af	IEEE 802.3at, IEEE 802.3af	N/A
Working Temperature	-10 °C ~ 55 °C (14 °F ~ 131 °F)	-10 °C ~ 55 °C (14 °F ~ 131 °F)	-10 °C ~ 55 °C (14 °F ~ 131 °F)
Working Humidity	≤ 90% RH (non-condensing)	≤ 90% RH (non-condensing)	≤ 90% RH (non-condensing)
Power Consumption (without HDD)	≤ 20W	≤ 20W	≤ 25W
Weight (without HDD)	≤ 2.6Kg (5.73lb)	≤ 4Kg (8.82lb)	≤ 5.5Kg (12.13lb)
Dimensions	"380mm × 322mm × 53mm (15.0""×12.7""×2.1"")"	"400mm × 368mm × 74mm (15.7""×14.5""×2.9"")"	442mm × 426mm × 89mm (17.4"×16.8"×3.5")



CAMERA HOUSING

MODEL	MCT-300-FHS	MCT-200-FHS
Housing		
Pan-Tilt	O	X
Fan/Heat	O	O
Wiper	Optional	Optional
IR Lamp	Optional (100m)	Optional (100m)
Alarm I/O	1/1	1/1
Audio I/O	1/1	1/1
Resolution	1920 × 1080	1920 × 1080
Focal lenth(Zoom Ratio)	4.5 ~ 148.5mm (33x)	4.5 ~ 148.5mm (33x)
IP Grade	IP66/67	IP66/67
(WxDxH)mm	360×310×368	150×210×198
Material	SUS316L	SUS316L
Colour	SILVER	SILVER
Weight	21kg	18kg
Digital Image Stabilization	O	O
Temperature	-40℃ to +55℃	-25℃ to +55℃ (Option -50℃ to +55℃)
Install Area	Outside	Outside

MODEL	MCT-100-FXD	MCT-PTZ-25D
Housing		
Pan-Tilt	X	O
Fan/Heat	X	O
Wiper	X	X
IR Lamp	40m	150m
Alarm I/O	1/1	2/1
Audio I/O	1/1	1/1
Resolution	1920 × 1080	1920 × 1080
Focal lenth(Zoom Ratio)	2.7 ~ 13.5mm (5x)	5 ~ 125mm (25x)
Protection	IP66	IP66
(WxDxH)mm	Ø 169 × 264mm	Ø 220 × 370mm
Material	SUS316L	Aluminum, Plastic + Metal
Colour	SILVER	White
Weight	10kg	3.3kg
Digital Image Stabilization	O	O
Temperature	-30℃ to +60℃	-40℃ to +65℃
Install Area	Outside	Inside

CAMERA HOUSING

MCT-SPZ-1WEX	MCT-SFX-1WEX	MCT-150-SPD
		
O	X	O
O	O	O
Optional	Optional	X
Optional (100m)	Optional (100m)	150m
1/1	1/1	2/1
1/1	1/1	
1920 × 1080	1920 × 1080	1920 × 1080
4.5 ~ 148.5mm (33x)	4.5 ~ 148.5mm (33x)	5 ~ 125mm (25x)
IP66/67	IP66/67	IP66
353×443×485	117×425×221	Ø 220 × 312mm
SUS316L	SUS316L	SUS316L
SILVER	SILVER	SILVER
45kg	20kg	13kg
O	O	O
-20℃ to +55℃	-20℃ to +55℃	-40℃ to +65℃
Hazardous Area	Hazardous Area	Outside

MCT-PTZ-16AD	MCT-FXD-L28AD	MCT-FXZ-X05AD
		
O	X	X
X	X	X
X	X	X
100m	40m	40m
2/1	1/1	1/1
1/1	1/1 (Built in Mic)	1/1 (Built in Mic)
1920 × 1080	1920 × 1080	1920 × 1080
5.5 ~ 88mm (16x)	2.8mm	2.7 ~ 13.5mm (5x)
IP66 / IK10	IP66 / IK10	IP66 / IK10
Ø 167 × 181mm	Ø111 × 83mm	Ø162 × 149mm
Metal	Metal	Metal
White	White	White
2.3kg	0.42kg	1.40kg
O	O	O
-40℃ to +65℃	-30℃ to +60℃	-30℃ to +60℃
Inside	Inside	Inside

GENERAL DESCRIPTION

Full 3-axis gyro stabilized tracking system keeps the antenna pointing at the satellite, even in rough seas or when maneuvering the ship at high speed provides high quality, consistent, always-on broadband data connections. The Super Track V-series is the perfect solution for owners of leisure craft, small and large commercial vessels, as well as military vessels worldwide, who require the same Internet experience at sea that they use at home and at the office. The V-series antenna will bring lightning-fast broadband connections and simultaneous, reliable telephone service to the vessel at an affordable rate. Best of all, the system's compact design is easy to install and looks great on any vessel. Enjoy always-on high speed internet, e-mail, multiple lines of VoIP Phone and more with this system.

PRODUCT INFORMATION

APPLICATIONS WITH V-SERIES VSAT SYSTEM

- E-mail service with internet environment, Video conference with VoIP telephone lines, and Mobile Wi-Fi phone, wireless Internet with Smartphones and a variety of IP user applications

SELECTION GUIDE OF ANTENNA MODELS

- The MRC V-series line of products is designed for ship owners who need internet and voice systems as well as HDTV, on their vessel regardless of whether it is moored or voyaging in rough conditions

LTEM	V61	V85	V100	V120	V240	V300
Dish	61Cm(24")	85Cm(33")	100Cm(39")	120Cm(47")	240Cm(95.5")	300Cm(118")
Dome(HxD)	82cm x 72cm	121cm x 113cm	151cm x 139cm	161cm x 157cm	310cm x 315cm	375cm x 380cm
Material	ABS/FRP(Option)	FRP	FRP	FRP	FRP	FRP
Weight	40kg(4W)	87kg(4W)	114kg(4W)	142kg(4W)	420kg(4W)	620kg(4W)
G/T	14.0dB/K	17.7dB/K	19.7dB/K	20.4dB/K	20dB/K	20.4dB/K
Rx/Tx Gain	36dB/36.5dBi	38.5dB/38.9dBi	40.5dB41.1dBi	41.9dB/43.7dBi	38.5dB/341.6dBi	40.1dB/43.7dBi
BUC	4/6/8W	4/6/8W	4/6/8/16/25W	4/6/816/25W	25/40/80/100/200W	25/40/80/100/200W
Platform	3-Axis	3-Axis	3-Axis	3-Axis	3-Axis	3-Axis
LNB	Linear/Int. PLL	Linear/Int. PLL	Linear/Int. PLL	Linear/Int. PLL	Linear/Int. PLL	Linear/Int. PLL
Skew Control	Auto/ - 130°C ~ 13°C	Auto/ - 130°C ~ 130°C	Auto/ - 130°C ~ 130°C	Auto/ - 130°C ~ 130°C	Auto/ - 130°C ~ 130°C	Auto/ - 130°C ~ 130°C
El/Az	-10°~100°/Unlimited	-20°~105°/Unlimited	-20°~105°/Unlimited	-20°~110°/Unlimited	-20°~110°/Unlimited	-20°~110°/Unlimited
Cross Angle	+/ -35°C	+/ -30°C	+/ -30°C	+/ -30°C	+/ -30°C	+/ -30°C
Tracking Spd.	90 deg/s	90 deg/s	90 deg/s	90 deg/s	90 deg/s	90 deg/s
Damper	Rubber Damper	Rubber Damper	Wire Rope Isolator	Wire Rope Isolator	None	None
Temp/Humid	-20°C ~ 55°C / 100%	-20°C ~ 55°C / 100%	-20°C ~ 55°C / 100%	-20°C ~ 55°C / 100%	-20°C ~ 55°C / 100%	-20°C ~ 55°C / 100%
GPS/Area	Built-in / Worldwide	Built-in / Worldwide	Built-in / Worldwide	Built-in / Worldwide	Built-in / Worldwide	Built-in / Worldwide
Gyro	NMEA/Synchro/Step	NMEA/Synchro/Step	NMEA/Synchro/Step	NMEA/Synchro/Step	NMEA/Synchro/Step	NMEA/Synchro/Step
Ku/C Band	Ku(Small)	Ku(Commercial)	Ku(Commercial)	Ku(Large)	Ku/C(Passenger)	Ku/C(Cruise/Offshore)

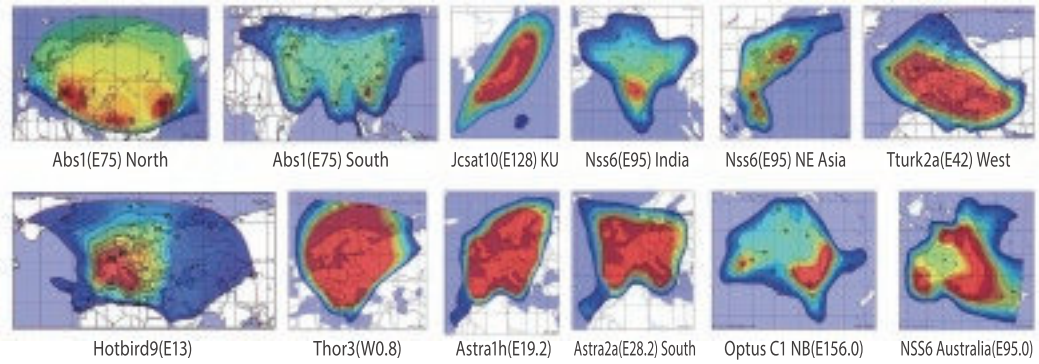
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V240 V85 V61 V100 V120 V300

PRODUCT INFORMATION

Coverage Maps of Satellite TVRO and VSAT

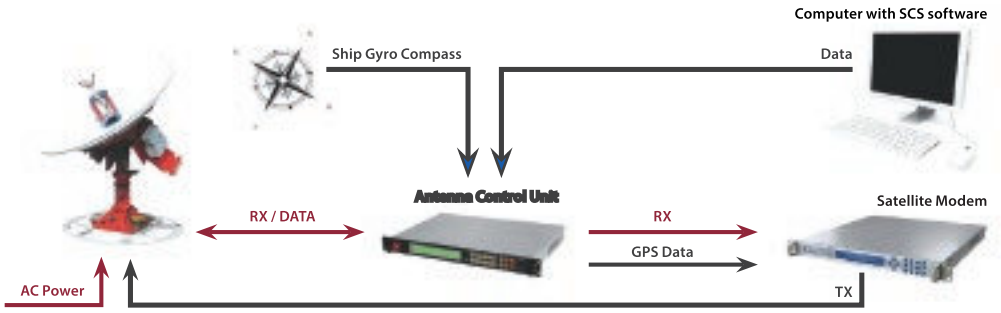


The coverage map is intended as a general guideline.

Optional Features

- Dual-system configuration(With a dual controller and a single modem) to overcome blockage
- ABS(Automatic Beam Switch) function among air-time suppliers
- Terrestrial Telephone & Fax, Video Phone, Video Conference, Remote Monitoring, PC, Wireless or Wired Ethernet Connection with VoIP, CCTV systems

System Diagram



Wiring Diagram of VSAT System for Internet and Telephone(for Reference)



GENERAL DESCRIPTION

quality by MRC Inc. With dish size ranging from 40cm to 300cm, it is perfect for vessels yet still maintains a wide coverage range. The ADE has a 3-axis stabilization system with enhanced reception which many others cannot rival. It has a strong frame antenna and built-in GPS for fast satellite acquisition and higher performance to stay locked on, which helps the mariners to receive analogue, digital, and HDTV signals while the vessel is cruising in rough sea conditions. In addition to wide coverage range and built-in GPS for fast satellite acquisition, it also includes DVB-S2 (Digital video broadcasting) signal identification, and MRC's proprietary antenna control and fast-track signal lock software, plus high-performance stabilization which can track satellites even in inclement weather. Also the system will support multiple receivers and its programs have worldwide coverage.

PRODUCT INFORMATION

SELECTION GUIDE OF ANTENNA MODELS

- The MRC T-series line of products is designed for ship owners who want to watch satellite television on their vessel regardless of whether it is moored or voyaging in rough conditions

LTEM	T40	T60	T80	T100	T120	T240	T300
Dish	45Cm(18")	61Cm(24")	85Cm(33")	100Cm(40")	120Cm(48")	240Cm(95.5")	300Cm(118")
Dome(HxD)	63cm x 51cm	82cm x 72cm	121cm x 113cm	151cm x 139cm	161cm x 157cm	355cm x 320cm	375cm x 380cm
Dome Material	Plastic	Plastic	FRP	FRP	FRP	FRP	FRP
Weight	19kg	37kg	57kg	90kg	105kg	530kg	620kg
Min, EIRP, Ku/C	48dBW	46dBW	44dBW	43dBW	41dBW	36dBW/31dBW	35dBW/30dBW
Az/El	640°/-20°~95°	640°/-15°~85°	640°/-10°~100°	Unlimited/-10°~110°	Unlimited/-20°~110°	Unlimited/-15°~120°	Unlimited/-15°~120°
Skew Control	Auto/ - 130°	Auto/ - 100°	Auto/ -220°	Auto/ 260°	Auto/ 260°	Auto/ 300°	Auto/ 300°
LNB	Quad/Quattro	Quad/Quattro	Quad/Quattro	Quad/Quattro	Quad/Quattro	Dual C/Quattro Ku	Dual C/Quattro Ku
Tracking Spd	More 90° / sec	More 90° / sec	More 90° / sec	More 90° / sec	More 90° / sec	More 90° / sec	More 90° / sec
Platform	3-Axis	3-Axis	3-Axis	3-Axis	3-Axis	3-Axis	3-Axis
Area	Worldwide	Worldwide	Worldwide	Worldwide	Worldwide	Worldwide	Worldwide
GPS	Built-In	Built-In	Built-In	Built-In	Built-In	Built-In	Built-In
Gyro	Option(NMEA)	Option(NMEA)	NMEA	NMEA, Synchro, Step-by-Step	NMEA, Synchro, Step-by-Step	NMEA, Synchro, Step-by-Step	NMEA, Synchro, Step-by-Step
Temp/Humid	-20° ~ 55° / 100%	-20° ~ 55° / 100%	-25° ~ 55° / 100%	-25° ~ 55° / 100%	-25° ~ 55° / 100%	-25° ~ 55° / 100%	-25° ~ 55° / 100%
Ku/C Band	Ku	Ku	Ku	Ku	Ku	Ku/C	Ku/C
Ship	Yacht	Small	Commercial	Commercial	Large	Passenger	Cruise/Offshore

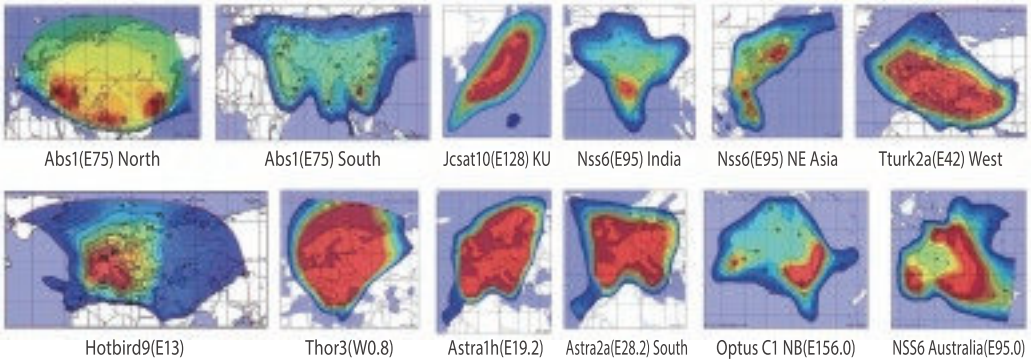
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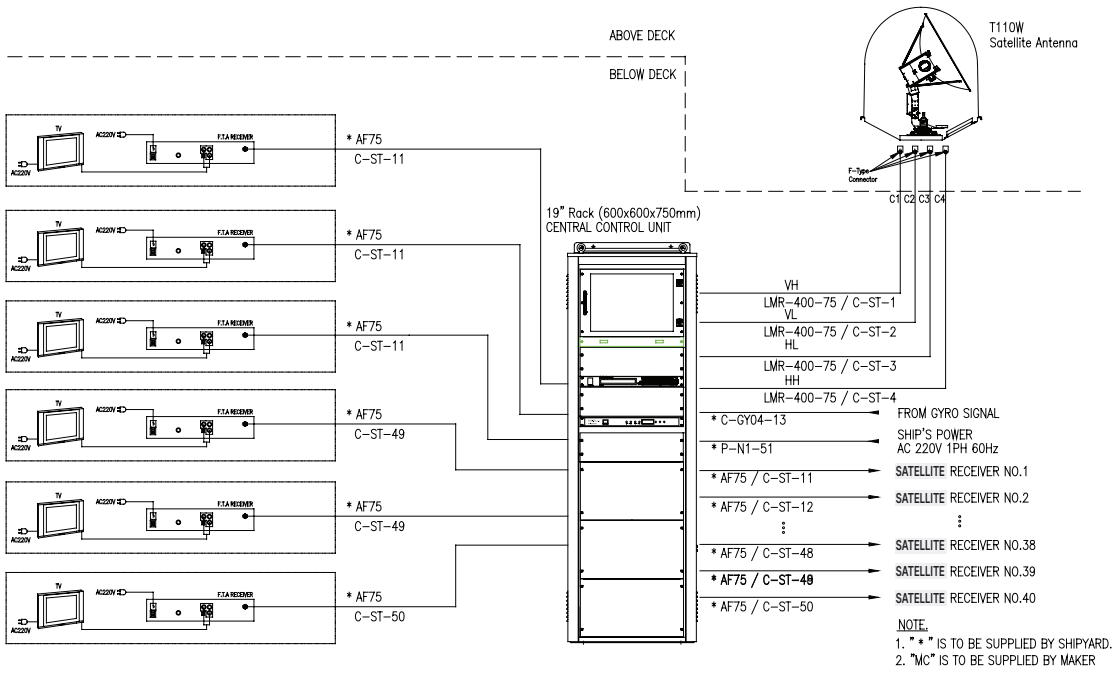
PRODUCT INFORMATION

Coverage Maps of Satellite TVRO and VSAT

The coverage map is intended as a general guideline.



WIRING DIAGRAM OF TVRO SYSTEM FOR MULTIPLE TV(FOR REFERENCE)



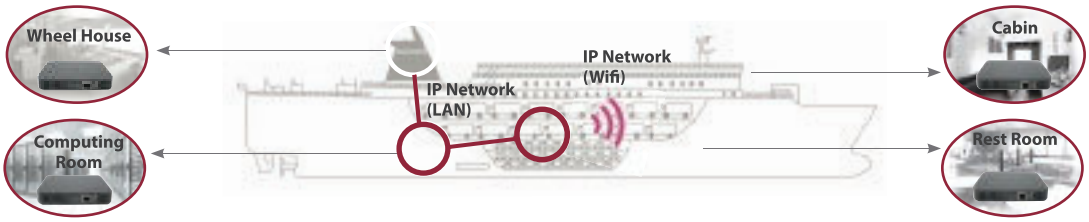


MRC Infotainment System(VOD, STB)

MRC Infotainment System (VOD,STB)

GENERAL DESCRIPTION

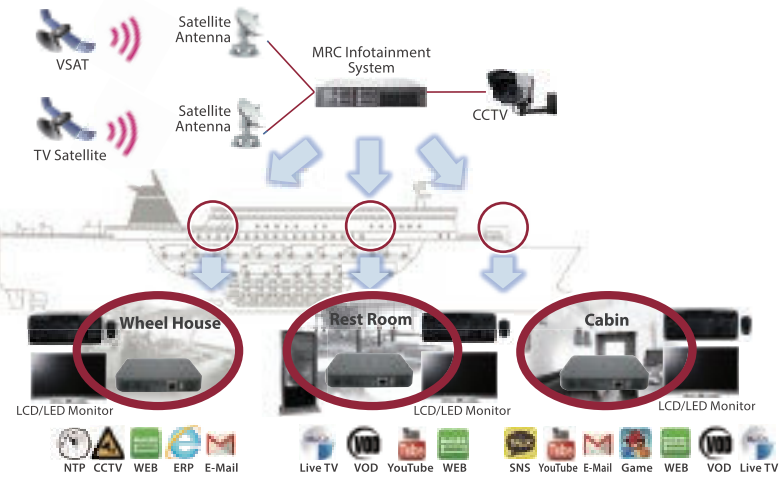
MRC Infotainment system can provide Live TV. VOD (Video on Demand).
And Games and Music to the captain and the crew.
Also, this system can provide the internet, CCTV and NTP (Network Time Protocol).



- MRC Infotainment system operates on Ship IP network network, both wired and wireless.



WIRING DIAGRAM OF COMMUNAL AERIAL SYSTEM



PRODUCT INFORMATION

Key Benefits

- Play video and audio through network
- Use applications from Android Market and Google Play Store
- No additional wiring construction (Can use existing network)
- Various functions with a single STB (VOD, web browsing, game, sns, mail, etc.)

General Features and Specifications

1. VOD Server (19" Rack type - 1/2/4u)

- OS : Embedded Linux
- CPU : Dual-core Intel© CoreTM, i3-4150 3.5 GHz Processor
- RAM : 8GB DDR3 non-ECC RAM
- HDD : 8 ~ 24× 2.5" or 3.5" SATA 6Gb/s, 3Gb/s
- NIC : 4 (Max:8 x Gigabit LAN or 4 ×10 Gigabit + 4 x Gigabit LAN)
- Media Server : DLNA, AIRPLAY
- RAID : RAID 0, RAID 1, RAID 5, RAID 5+ , RAID 6, RAID 6+, RAID 10



2. VVOD Server (Desktop type)

- OS : Embedded Linux
- CPU : Quad-core Intel© Celeron© N3150 1.6GHz
- RAM : 8GB / 4GB SO-DIMM DDR3L-1600
- HDD : 4× 2.5" or 3.5" SATA 6Gb/s, 3Gb/s
- Media Server : DLNA, AIRPLAY
- RAID : RAID 0, RAID 1, RAID 5, RAID 5+, RAID 6, RAID 10



3. STB



- OS : Android
- CPU : ARM
- RAM : 2GB
- HDD : 4× 2.5" or 3.5" SATA 6Gb/s, 3Gb/s
- Media Server : DLNA, AIRPLAY, Miracast
- RAID : RAID 0, RAID 1, RAID 5, RAID 5+, RAID 6, RAID 6+, RAID 10

4. Media Encoder (Optional)

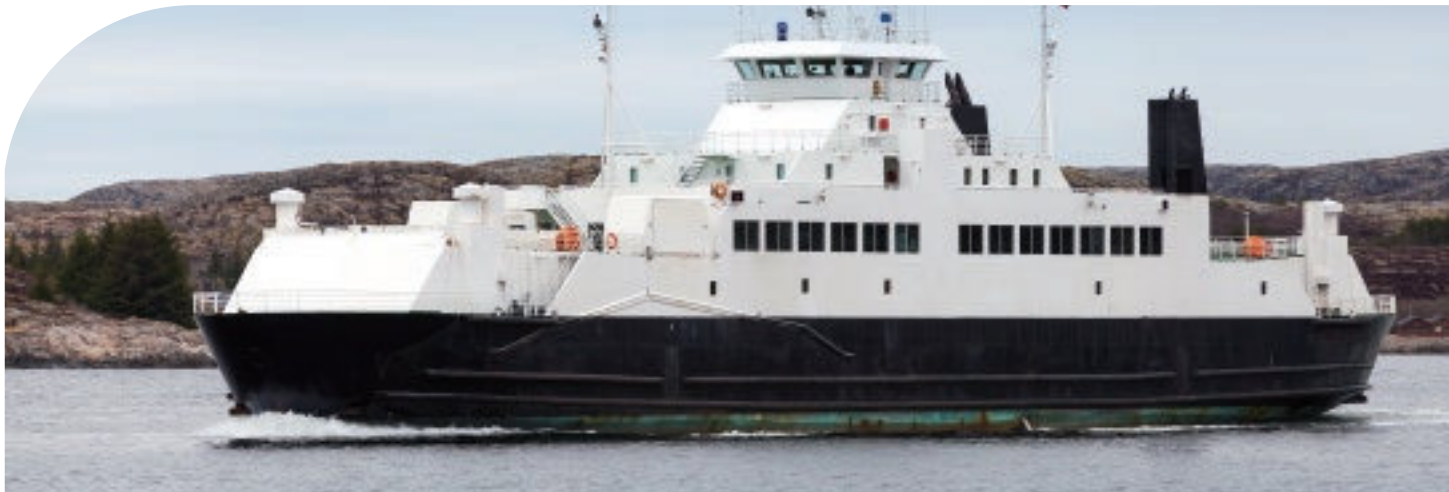
- Video Resolution : 1920 × 1080@60/50 fps
- Video / Audio Input : HDMI or HD-SDI x 4
- Video Compression : H265, H264
- Audio Compression : AAC, MP3 (48k,64k,96k,128k,160k,192k,256k)
- Transport protocol : RTSP / HTTP / UDP or RTMP



5. Video Server (Optional)

- OS : Embedded Linux
- Video Codec : MPEG-2, H.264
- Video HD Format : 1080i, 1080p, 720p
- Video SD Format : 525-NTSC, 625-PAL
- Audio : 16, 20, or 24-bit PCM, 48kHz
- Transport protocol : RTSP / HTTP / UDP or RTMP





Ship's Network(Computer) System

PRODUCT INFORMATION

LAN (LOCAL AREA NETWORK) SERVER SYSTEM

- The local area network in the system is an advanced Layer 2/3 network with a large number of features. PoE function on all ports is the standard feature : i.e. an IP telephone does not need a separate power supply, which makes it easier and cheaper to install.

IPTV/VOD SYSTEM

- This infotainment system contains a media encoder, video server, and a set top box in which it can distribute IPTV, internet radio, and any other video data (Multimedia) source through the network to provide entertainment on board.

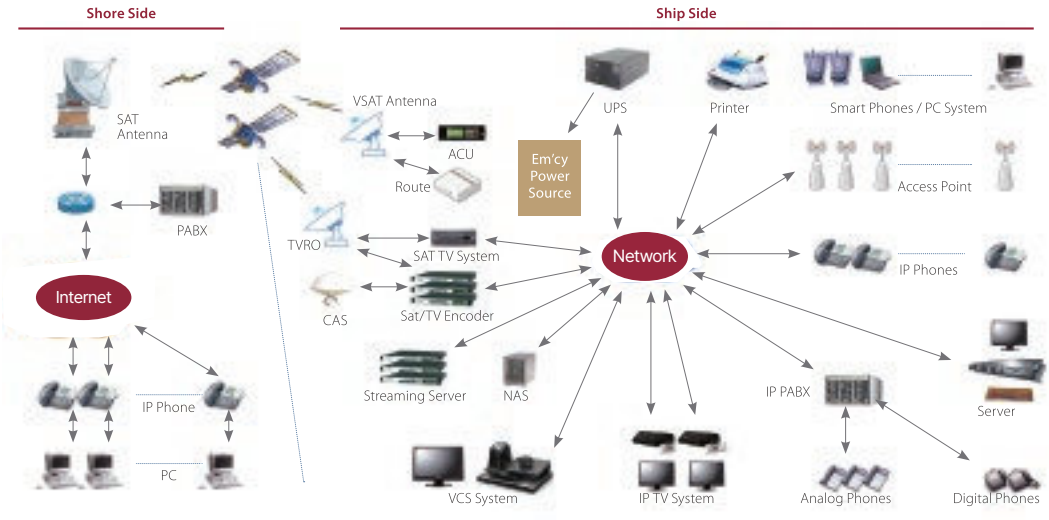
VIDEO CONFERENCE SYSTEM

- The Video Conference system provides organization with a budget friendly video conferencing solution perfect for real-time, multimedia communication. A number of useful software add-ons are available for the system free of charge, such as Screen Share, our wireless content sharing software for PCs, and CV Link, our exclusive app for instantly sharing live images and snapshots from a mobile device.

CCTV (CLOSED CIRCUIT TELEVISION)

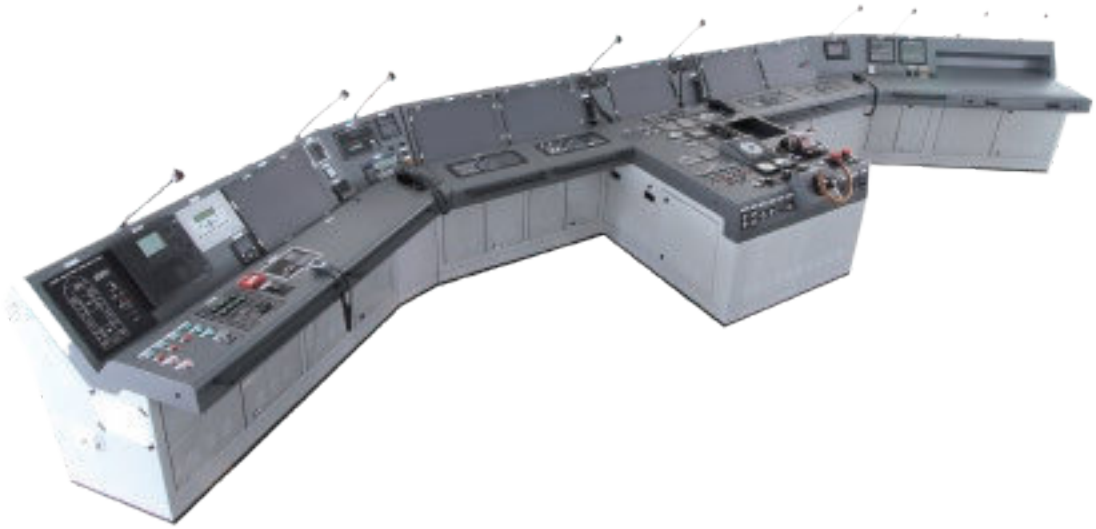
- Video and audio signal for monitoring purpose are digitised and transmitted through the network and internet connection. The ultimate benefit of digital CCTV over analogue CCTV system is greater flexibility, better performance, and easier installation.

- **TVRO (TELEVISION RECEIVE-ONLY)**
  TVRO is a satellite TV system. The term TVRO (C/Ku bands) is used in the North American continent to refer to the Free to Air (FTA) systems of Europe, Asia, and other continents.
- **VSAT (VERY SMALL APERTURE TERMINAL)**
  The VSAT is a two-way satellite ground station or a stabilized maritime mobile antenna with a dish antenna that is smaller than 3 meters. The majority of VSAT antennae range from 75 cm to 1.2 m. Data rates typically range from 56 Kbit/s up to 4 Mbit/s.
- **PABX (PRIVATE AUTOMATIC BRANCH EXCHANGE)**
  Internal and external telephone communications are connected through this system. This system contains a combination of VOIP, digital and analogue internal telephones and external lines. VSAT, GSM and Inmarsat can be interfaced to the system. Wireless phones with roaming function are also available.



GENERAL DESCRIPTION

The Integrated Bridge System (IBS) is a combination of interconnected systems in order to allow centralized access to the sensor information or command control from workstations.
It aims to increase safety and efficiency for the management of the ship by qualified personnel.
The IBS integrates on a bridge console with the primary functions of stand alone navigational aids and communication instruments.
It enables the officers on navigational watch to perform their duty without impairing proper lookout.
The IBS has been taking its shape through rapid development of navigation and communication systems in relation with the bridge configuration, the bridge workstation, and the one man bridge operation system.
MRC Inc. has supplied more than 300 IBSs to several Korean shipyards since 2004.





Thermal Camera

MODEL	MCT-THB-F10		MCT-THD-F07	
Night True Color Camera				
Lens Type	Optical	Thermal	Optical	Thermal
Pan-Tilt	X		X	
Fan/Heat	X		X	
Wiper	X		X	
IR Lamp	50m	-	30m	-
Alarm I/O	2/2		2/2	
Audio I/O	1/1(Built in Mic&Speaker)		1/1(Built in Mic&Speaker)	
Resolution	2688 × 1520	1280 × 960	2688 × 1520	1280 × 960
Focal lenth(Zoom Ratio)	8.0mm	10.0mm	6.0mm	8.0mm
Protection	IP67		IP67	
(WxDxH)mm	269×96×83		Ø129×114mm	
Material	Metal + Plastic		Metal + Plastic	
Colour	White		White	
Weight	0.95kg		0.72kg	
Digital Image Stabilization	X		X	
Temperature	-40℃ to +70℃		-40℃ to +70℃	
Install Area	Δ		Δ	

Lens	FOV	Fire	Smoking	Temperature
Dish	61Cm(24")	85Cm(33")	100Cm(39")	120Cm(47")
Dome(HxD)	82cm x 72cm	121cm x 113cm	151cm x 139cm	161cm x 157cm
Material	ABS/FRP(Option)	FRP	FRP	FRP
Weight	40kg(4W)	87kg(4W)	114kg(4W)	142kg(4W)
G/T	14.0dB/K	17.7dB/K	19.7dB/K	20.4dB/K
Rx/Tx Gain	36dB/36.5dBi	38.5dB/38.9dBi	40.5dB41.1dBi	41.9dB/43.7dBi

Images of IR Camera and Night True Color Camera at the same time





Night True Color Camera

MODEL	MCT-FXB-NV4	MCT-FXD-NV4
Thermal Camera		
Pan-Tilt	X	X
Fan/Heat	X	X
Wiper	X	X
IR Lamp	Not IR Type	Not IR Type
	Eusure Colorful Image without LED On	Eusure Colorful Image without LED On
Alarm I/O	0/0	0/0
Audio I/O	0/0 (Built in Mic)	0/0 (Built in Mic)
Resolution	2688 × 1520 (2560 × 1440)	2688 × 1520 (2560 × 1440)
Focal lenth(Zoom Ratio)	2.8mm	2.8mm
Protection	IP67	IP67&IK10
(WxDxH)mm	206×73×73	Ø128×100mm
Material	Graphene + Metal	Metal + Plastic
Colour	White	White
Weight	0.48kg	0.63kg
Digital Image Stabilization	O	O
Temperature	-30℃ to +60℃	-30℃ to +60℃
Install Area	Inside	Inside

IR CAMERA



NIGHT TRUE COLOR CAMERA



MRC L2 Switch

PRODUCT INFORMATION

SYSTEM FEATURES

- IEC 60945 Cetification
- 10/100/1000M 8/16/24 PoE/Non POE port, Support Giga SFP port
- IEEE802.3 10Base-T, 802.3u 100Base-TX and 100Base-FX, 802.3ab 1000Base-TX
- (TSS) Thyristor Surge Suppressor applied for lightning protection on each port basis
- Network GUI-based management or web support
- Network port Enable/Disable, MAC Based Port Security
- Support IEEE02.1×Port Authentication, User Management and Password
- Support IEEE 802.3× Flow Control Network GUI-based management or web support
- Support IEEE 802.3af or IEEE 802.3at PoE (Depend on port configuration)
- Support IEEE 802.1D/1W/1S STP/RSTP/MSTP
- Support G.8032 ERPS(Ethernet Ring Protection Switching)



APPLICATION

- CCTV, PBX and Traffic Control System
- Ship Computer Network
- Ship Community Network
- Ship Security System
- Process Control and Monitoring System



L2 PoE Switch

MODEL	ML2-G802FPM	ML2-G1604FPM	ML2-G2404FPM
PHOTO			
Standard configuration	3208-Port 10/100/1000Base-T(PoE) + Uplink 2Port + 2-Port SFPMbps	16-Port 10/100/1000Base-T(PoE) + 4-Port SFP	24-Port 10/100/1000Base-T(PoE) + 4-Port SFP
Backplane	24Gbps	40Gbps	56Gbps
Jumbo Frame	10K	10K	10K
Forwarding	17.86Mbps	29.76Mbps	41.67Mbps
Switching	Store forwarding	Store forwarding	Store forwarding
MAC table	16K	8K	8K
RAM	128MB	128MB	128MB
Flash	16MB	16MB	16MB
Power Consumption	120W	240W	380W
Size	270*180*44mm	440*290*44mm	440*290*44mm
Weight	2.2Kg	4.4Kg	4.4Kg
Power Source	90~240VAC (auto-adaptable), 50-60Hz, 2.3A PoE/PoE+	90~240VAC (auto-adaptable), 50-60Hz, 2.3A PoE/PoE+	90~240VAC (auto-adaptable), 50-60Hz, 2.3A PoE/PoE+
Environment	Working temperature: -20 ~ 55°C Storage temperature: -40 ~ 75°C Humidity: 5-95% no condensation	Working temperature: -20 ~ 55°C Storage temperature: -40 ~ 75°C Humidity: 5-95% no condensation	Working temperature: -20 ~ 55°C Storage temperature: -40 ~ 75°C Humidity: 5-95% no condensation

L2 PoE Switch

MODEL	ML2-G802FM	ML2-G2404FM
PHOTO		
Standard configuration	10-Port 10/100/1000Base-T + 2-Port SFP	24-Port 10/100/1000Base-T + 4-Port SFP
Backplane	24Gbps	56Gbps
Jumbo Frame	10K	10K
Forwarding	17.86Mbps	41.67Mbps
Switching	Store forwarding	Store forwarding
MAC table	16K	8K
RAM	128MB	128MB
Flash	16MB	16MB
Power Consumption	12W	30W
Size	270*180*44mm	440*290*44mm
Weight	2.2Kg	4.4Kg
Power Source	90~240VAC (auto-adaptable), 50-60Hz	'90~240VAC (auto-adaptable), 50-60Hz
Environment	Working temperature: -20 ~ 55°C Storage temperature: -40 ~ 75°C Humidity: 5-95% no condensation	Working temperature: -20 ~ 55°C Storage temperature: -40 ~ 75°C Humidity: 5-95% no condensation

IACS UR E26 Cyber Resilience Compliance (Ship Level)

Class-ready engineering, documentation and commissioning evidence for shipboard OT Computer Based Systems (CBS)



What MRC Delivers

A Fully Structured, Class-Ready Compliance Package

- Implementation of minimum cyber resilience controls across the vessel's OT threat surface (UR E26 Section 4)
- Complete Design & Construction submission set, commissioning validation support and operational readiness documentation (UR E26 Section 5)
- Enforced As-built version lock prior to commissioning with full alignment of documentation, system configuration and test procedures under a formal Management of Change (MoC) framework

SI differentiators

Governance Built for Audit Readiness

- **Controlled Annex Management for UR E27 Vendor Documentation per CBS (UR E27 3.1.2–3.1.9)**
  Indexed, revision-controlled and CBS-mapped documentation set with structured missing-item log
- **Class Submission Document Control**
  Need-to-know distribution, controlled external sharing and masked versions for sensitive data (e.g., IP schemes, boundary rules)
- **Commissioning Evidence Pack : Witness Ready**
  Ship cyber resilience test procedure, as-built test report, raw technical logs (e.g., scan logs) and pass/fail traceability matrix

Coverage & Outputs at a Glance

UR E26 Section 4–Technical Coverage		UR E26 Section 5–Submission&Lifecycle Assurance	
IDENTIFY	• Vessel Asset Inventory (VAI) • Lifecycle Update Governance • Access Restriction for Sensitive Data	**Design & Construction (5.1)**	• Zones & Conduit Diagram (5.1.1) • Cyber Security Design Description – CSDD (5.1.2) • Vessel Asset Inventory – VAI (5.1.3) • Exclusion Risk Assessment (5.1.4, if applicable) • Compensating Countermeasures (5.1.5, if applicable)
PROTECT	• Security Zones & Segmentation • Boundary Rule Enforcement • System Hardening • Remote / Wireless / Portable Device Governance	**CSDD Appendices Package**	• Appendix A – Boundary Rule List • Appendix B – IP Addressing Plan • Appendix C – Defined Terms • Appendix D – Hardening Matrix (Vendor Default vs. Ship-Applied)
DETECT	• OT Monitoring & Logging • Diagnostic Capability	**Commissioning (5.2)**	• As-built Documentation Updates • Test Procedure Submission • Society-witnessed Testing • Onboard RecordSet
RESPOND	• Incident Response Procedures • Network Isolation Capability • Fallback to Minimal-risk Condition	**Operation (5.3)**	• Survey Readiness Package • MoC-aligned Lifecycle Maintenance
RECOVER	• Backup & Restore Capability • Controlled Reset / Rollback Procedures		

Typical Execution Flow

1. Vendor Annex Kick-off (UR E27)
   Request, receipt, indexing, revision tracking and structured gap log management

2. Scope Confirmation & CBS Baseline Definition
   Inventory establishment and interface/data-flow mapping (UR E26 4.1.1)

3. Zones & Conduits Design
   Application of the "explicitly allowed traffic" principle (UR E26 4.2.1)

4. Control Engineering & Hardening
   Implementation of safeguards (UR E26 4.2.2–4.2.7)

5. As-Built Version Lock & MoC Gate
   Alignment of documentation, configuration and test procedures prior to submission

6. Commissioning Testing & Evidence Pack Preparation (UR E26 5.2 / 5.2.1)

7. Operational Readiness & Survey Support
   Lifecycle compliance support under UR E26 5.3

