MARINE RADIO CO., LTD.

PUBLIC ADDRESS & GENERAL ALARM SYSTEM
TALK-BACK PAGING SYSTEM
VOIP AUTOMATIC-EXCHANGER TELEPHONE SYSTEM
COMMON BATTERY TELEPHONE SYSTEM
SOUND POWERED TELEPHONE SYSTEM
INTRINSIC SAFETY TELEPHONE SYSTEM
COMMUNAL AERIAL SYSTEM
MARINE ELECTRIC CLOCK SYSTEM
CCTV(CLOSED CIRCUIT TELEVISION)SYSTEM
VSAT COMMUNICATION SYSTEM(V-SERIES)
SATTVRO SYSTEM(T-SERIES)
MRC INFOTAINMENT SYSTEM(VOD,STB)
SHIP'S NETWORK(COMPUTER)SYSTEM
INTEGRATED BRIDGE SYSTEM(IBS)

MRC
www.mrckorea.com

HEAD OFFICE
6-19, Namhangseo-ro, Yeongdo-gu, Busan, 49050 Korea
Tel : +82-51-414-7891~7 **Fax :** +82-51-413-2604

CHORYANG OFFICE
MRC Bldg. 7-12, Jungang-daero 236beon-gil, Dong-gu, Busan, 48732 Korea
Tel : +82-51-414-7891~7 **Fax :** +82-51-413-2604

NOKSAN FACTORY
28, Noksansandan 289-ro, Gangseo-gu, Busan, 46754 Korea
Tel : +82-51-831-0591 **Fax :** +82-51-831-0592

CHEONGHAK FACTORY
21, Cheonghak-ro 6beon-gil, Yeongdo-gu, Busan, 49017 Korea
Tel : +82-51-418-6301

MARINE RADIO CO., LTD.
The Best Partner For Your Communication System
PRODUCT CATALOGUE

The Best Partner For Your Communication System

MARINE RADIO CO., LTD.

PRODUCT CATALOGUE

MRC
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COMPANY INTRODUCTION

MARINE RADIO CO., LTD.

Marine Radio Co.Ltd. (MRC) was established by Eui Joong Hwang (1927-2016) in 1961 in Busan, Korea. MRC manufactures internal communication and broadcasting equipment for marine applications, such as public address systems, auto telephone systems, talk-back systems, marine clock systems, and communal aerial systems for serveral kind of vessels. MRC occupies around 75% of the korean shipbuilding market, and experts internal communication systems to Japan, China, Taiwan, Singapore, Vietnam, India, and countries in the Middle East.
MRC is the long-established company in the market of the internal communication systems for vessels in korea, and it has successfully become one of the world's leading companies in field. Since 1992, MRC supplied its originally designed communication systems to more than 8000 vessels and offshore platform. 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.

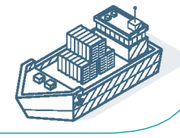
BUSINESS LINE

MARINE RADIO CO., LTD.

- PUBLIC ADDRESS & GENERAL ALARM SYSTEM
- TALK-BACK PAGING SYSTEM
- VOIP AUTOMATIC-EXCHANGER TELEPHONE SYSTEM
- COMMON BATTERY TELEPHONE SYSTEM
- SOUND POWERED TELEPHONE SYSTEM
- INTRINSIC SAFETY TELEPHONE SYSTEM
- COMMUNAL AERIAL SYSTEM
- MARINE ELECTRIC CLOCK SYSTEM
- CCTV(CLOSED CIRCUIT TELEVISION)SYSTEM
- VSAT COMMUNICATION SYSTEME (V-SERIES)
- SAT TVRO SYSTEM (T-SERIES)
- MRC INFOTAINMENT SYSTEM (VOD, STB)
- SHIP'S NETWORK (COMPUTER)SYSTEM
- INTEGRATED BRIDGE SYSTEM (IBS)

CERTIFICATE LIST

MARINE RADIO CO., LTD.



Product Type	Model	Organization	Certification Type
CAS	MAD-100	ICR	CE
CBT	LC-600S	DNV-GL	CE
CBT	LC-600S	DNV-GL	Type Approval
CCTV	MCT-SPM-1XEX	DNV-GL	ATEX
CCTV	MCT-SPZ-1WEX	DNV-GL	ATEX
CCTV	MCT-SFX-1WEX	DNV-GL	ATEX
CLOCK	MCS-970	DNV-GL	CE
CLOCK	MCS-980	CCS	Type Approval
CLOCK	MCS-980	DNV-GL	CE
I.S. Barrier	IBP-100	SGS	IECEx
I.S. Barrier	IBT-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-GL	CE
PA/GA	MPA-9000S	CCS	Type Approval
PA/GA	MPA-9000S	DNV-GL	Type Approval
PA/GA	MPA-9000S	KR	Type Approval
PA/GA	MPA-9000S	RMRS	Type Approval

Product Type	Model	Organization	Certification Type
PABX	MCX-5000S	DNV-GL	Type Approval
PABX	MED-100	DNV-GL	Type Approval
PABX	MED-100	RMRS	Type Approval
PABX	MED-200	DNV-GL	Type Approval
PABX	OFFICE-7000S	DNV-GL	CE
PABX	Office-7200S/7400S	DNV-GL	Type Approval
Speaker	HS-10Exde/30Exde	DNV-GL	ATEX
SPT	LC-800S	CCS	Type Approval
SPT	LC-800S	DNV-GL	CE
SPT	LC-800S	DNV-GL	Type Approval
SPT	LC-800S	RMRS	Type Approval
SPT	LC-820S	DNV-GL	CE
Talk-Back	MTB-1200S	DNV-GL	CE
Talk-Back	MTB-1200S	RMRS	Type Approval
TEL	LC-212A/B	DNV-GL	CE

GLOBAL SALES & SERVICE NETWORK

MARINE RADIO CO., LTD.

Comapny	National	E-mail	Website	Tel No.	Detail
Vision Marine	Brazil	celso@vis ionmarine.com.br	www.visionmarine.com	(+55)21 2111 8077	Service
Jiuxing Marine Pte. Ltd.	China	tony@mrc-offshore.com stella@mrc-offshore.com	-	(+86)21 6155 2160	Sales&Service
Zhen Li(HK) Co., Ltd.	China	felix@mrc-china.com roqer@mrc-china.com	-	(+86)21 65966575	Sales&Service
China Shipping Telecommunication co., Ltd.	China	shenyiqiang@cnshipping.com	www.cstel.com.cn	(+86)21 65966575	Sales&Service
ONETECH (ONE GROUP)	Cyprus	salese@onetech.com.cy	www.onegroup.global	(+357)25828996	Sales&Service
NAVTEAM Professional Marine Electronics	Denmark	hr@navteam.com	www.navteam.com	(+45)63 21 60 80	Sales&Service
Sea Ergon Marine Ltd.	Greece	sales@seaergon.gr	www.seaergon.gr	(+30)213 03 17 542	Sales&Service
Radio Holland Hong Kong	Hong Kong	service.hongkong@ rhmarinegroup.com	www.radioholland.com	(+852)2423 9007	Sales&Service
MARINETECH SAFETY AND SHIPPING CORPORATION	India	info@marinetechss.com mundra@marinetechss.com	www.marinetechss.com	(+91)9819303509 (+91)9909028862	Sales&Service
Marks Marine Radio Pvt. Ltd.	India	info@mmrindia.com sales@mmrindia.com	www.mmrindia.com	(+91)22 2511 4102~4	Sales&Service
PT Penta Tunggal Terpadu	Indonesia	ptt@pentatunggal.com	www.pentatunggal.com	(+62)21 4402459	Sales&Service
Tefin S.C.R.L	Italy	info@tefin.it	www.tefin.it	(+39)081 5592095/5361	Sales&Service
Kyokuyo Elecric Co., Ltd.	Japan	miyamoto@kyokuyoe.co.jp	www.kyokuyoe.co.jp	(+81)6 6581 5814	Sales&Service
Bogo Co., Ltd.	Korea	bogo@bogoco.co.kr	www.bogoco.co.kr	(+82)51 220 2022	Service
Sinco Automasi Sdn Bhd	Malaysia	sales@sincoautomasi.com	www.sincoautomasi.com	(+60)7 255 2898	Sales&Service
Multidigital Nigeria Limited	Nieria	info@multidigitalng.com	www.multidigitalng.com	(+234)84 556080	Sales&Service
Maretek Singapore Pte Ltd.	Singapore	enquriy@maretek.com.sg	www.maretek.com.sg	(+65)6684 8166	Sales&Service
Jason Electronics (Pte) Ltd.	Singapore	sales@jason.com.sg marketing@jason.com.sg	www.jason.com.sg	(+65)6477 7700	Sales&Service
SMD Telecommunications (Pty) Ltd	South Africa	brian.chambers@smd-marinve.com	www.smd-marine.com	(+27)21 511 0556	Sales&Service
Elite Radio & Engineering Co Pvt Ltd	Sri Lanka	service@eliteradio.com	www.eliteradio.com	(+94)11 2368472~4	Sales&Service
LSC Multech Co., Ltd.	Taiwan	shipping@mail.lscmultech.com.tw	www.lscmultech.com.tw	(+886)7 7272727	Sales&Service
Metro Mac	U.A.E	sales@mastersystems-intl.com	www.metromac.com	(+971)4 563 6100	Sales&Service
Master Systems L.L.C	U.A.E	pbs@cscontrols.com	http://mastersystems.org	(+971)6 7411426	Sales&Service
C.S CONTROLS, INC.	USA (Califonia)	info@cscontrols.com	www.cscontrols.com	(+1)504 289 1491	Sales&Service
C.S CONTROLS, INC.	USA (Louisiana)	info@cscontrols.com	info@cscontrols.com	(+1)985 876 6040	Sales&Service

PRODUCT DESCRIPTIONS

MRC
www.mrckorea.com

For Your Communication System

Product Descriptions **Page**

Public Address and General Alarm system

MPA-9000 Series PA/GA System 06

MPA-2000 Series PA/GA System 08

Talk Back Paging System(MTB-1200) 16

Auto-Exchanger System

MED-100/200 Hybrid and Full IP Telephone System 20

MCX-5000 Auto-Exchanger System 22

Common Battery Telephone System (LC-600/LCA-100) 30

Sound Powered Telephone System (LC-800/LSA-100) 36

Intrinsic Safety Telephone System (IBT-100/IBT-200) 42

Communal Aerial System (MAD-100) 46

Marine Electric Clock System

MCS-970 Clock System 50

MCD-100 Clock System 52

NTP-100 IP Clock System 58

CCTV(Closed Circuit Television) 60

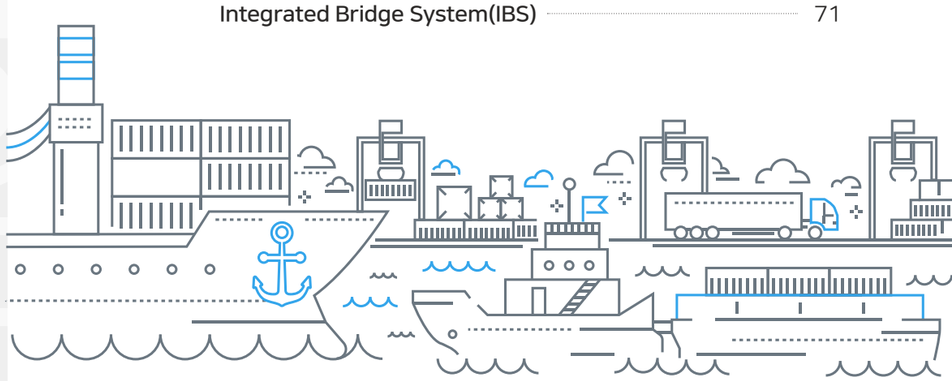
VSAT Communication (V-Series) 64

SAT TVRO System (T-Series) 66

MRC Infotainment System (VOD, STB) 68

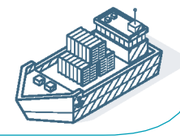
Ship's Network(Computer) System 70

Integrated Bridge System(IBS) 71



MPA-9000 Series PA/GA System

Public Address and General Alarm System
for on and offshore applications



GENERAL DESCRIPTION

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 . The Type Approval was done from DNV GL, KR, CCS, RMRS.

Regulations:

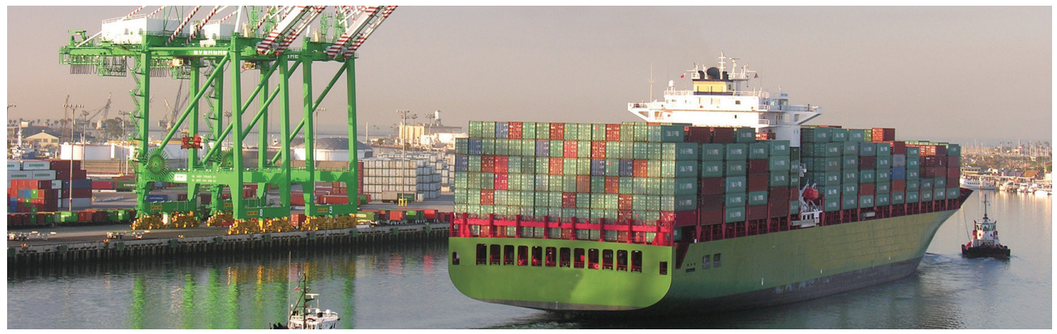
a) International Electro-Technical Commission (IEC)
b) International Maritime Organization (IMO) SOLAS
c) Nautical Safety (Rules for the Classification of Ships, DNV)

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, system diagnosis, 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 ▲

DNV·GL KR CCS CE

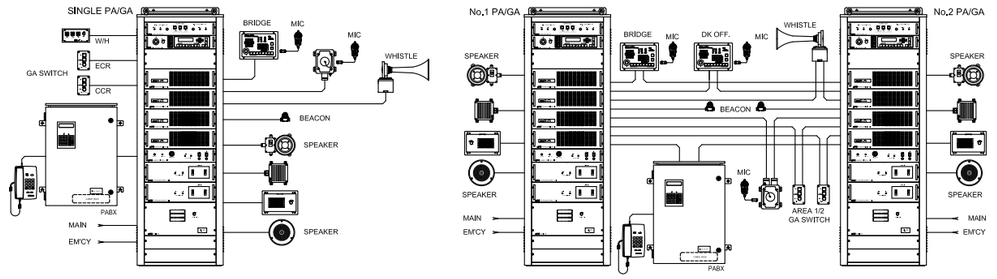


Product Information

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 24V 6. Power Consumption : 40A (DC) Fuse/NFB : 5A (AC), 20A Fuse/NFB 7. Temperature and Humidity Rang : -15℃~ 55℃, 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℃ ~ +45℃ 5. Humidity : Less than 90% 6. Certification : Submitted

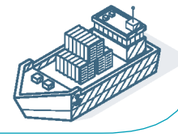
Kind of Signal In / Out / Mute Alarm	Signal in : All 18 (Eighteen) 1. Abandon (Muster) : Automatically operated; 1 short & 1 long alarm 2. GA: Hand & Auto : Manually operated & 7 short and 1 long alarms 3. Fire Alarm : 1300Hz, 1100Hz, 0.25 sec. interval, (Alternating) sustained 4. Alarm 7 : Watch Alarm (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 and General Alarm System



MPA-2000 Series PA/GA System

Public Address & General Alarm System
for on and offshore applications



CE

GENERAL DESCRIPTION

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:

a) International Electro-Technical Commission (IEC)
b) International Maritime Organization (IMO) SOLAS
c) Nautical Safety (Rules for the Classification of Ships, DNV GL)

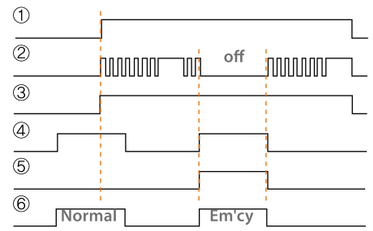
Product Information

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
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℃ ~ +40℃ · Operating Humidity : Less than 90%

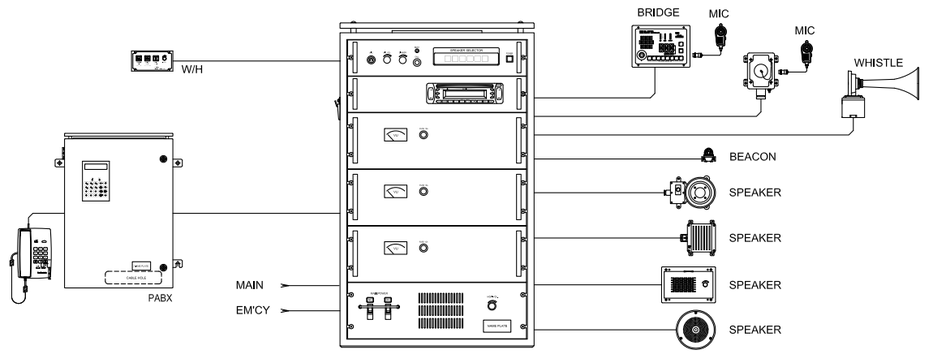
MPA-2000 Main Cabinet ▲

Product Information

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 and 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. E. G/A switch (Triggered and turned off) 2. E. G/A bell, buzzer, P/A speaker or others (7-short and 1-long tones) 3. P/A STOP signal : Supply a dry contact signal from the E. G/A equipment to the P/A 4. Navigation bridge microphone on/off button 5. E. G/A STOP signal : This dry contact signal is sent from the P/A to the E. G/A 6. P/A equipment speakers

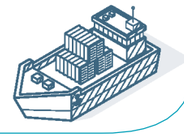


Wiring Diagram of Public Address and General Alarm System



Accessory-Speaker

MAIN CABINET :
MPA-9000 Series | MPA-2000 Series | MTB-1200 Series

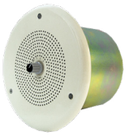


ACCESSORY FOR SPEAKER

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	347x360x373	252x290x265	157x263x135	157x263x135
MATERIAL	AL, ABS	AL, ABS	ABS	ABS
COLOUR	GRAY	GRAY	GRAY	GRAY
WEIGHT	Ab.7kg	Ab.3.2kg	Ab.2.9kg	Ab.2.9kg
INSTALL AREA	OUTSIDE	MACHINERY / OUTSIDE	MACHINERY / OUTSIDE	MACHINERY / OUTSIDE

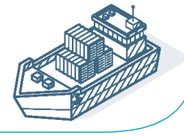
MODEL	PHS-20A(1)/B(1)/C(1)/D(1)/E(1)/F(1)	WS-2A/2B	WS-2V-A/B	WS-3A/3B
PHOTO				
MOUNTING TYPE	PORTABLE	WALL	WALL	FLUSH
RATED	Max 15W	2W/1W	2W/1W	2W/1W
IMPEDENCE	100V	100V	100V	100V
VOLUME CONTROL	X	X	O	X
IP GRADE	IP56	IP56	IP56	IP56
GLAND	X	2	2	2
DIMENSION(WxDxH)mm	120x185x136	157x75x125	157x75x125	137x78x137
MATERIAL	ABS	ABS	ABS	ABS
COLOUR	GRAY	GRAY	GRAY	WHITE
WEIGHT	Ab.3kg	Ab.1.2kg	Ab.1.2kg	Ab.1.2kg
INSTALL AREA	FORE/AFT	TOILET	TOILET	TOILET

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
230x45.5x147	175x125x125	230x92x147	230x125x153
ABS	ABS	ABS	ABS
WHITE	WHITE	IVORY	IVORY
Ab.0.7kg	Ab.0.5kg	Ab.0.8kg	Ab.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
164x227x226	216x301x235	230x92x147	188x130x188	137x78x137
AL	AL	STEEL	STEEL	STEEL
DARK BLUE	DARK BLUE	IVORY	IVORY	IVORY
Ab.3.4kg	Ab.4.5kg	Ab.2.5kg	Ab.2.5kg	Ab.2.3kg
HAZARDOUS AREA	HAZARDOUS AREA	B-O AREA	B-O AREA	B-O AREA

Accessory-Connection boxs

MAIN CABINET :
MPA-9000 Series | MPA-2000 Series | MTB-1200 Series



ACCESSORY PUSH BUTTON FOR G/A

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	80x70x128	80x70x128	80x70x128	80x64x128
MATERIAL	STEEL	STEEL	STEEL	STEEL
COLOUR	BLACK	BLACK	BLACK	7.5BG7/2
WEIGHT(QC)	Ab.0.5kg	Ab.0.3kg	Ab.0.5kg	Ab.1kg
INSTALL AREA	BCC	ECC, FCC	ECC, FCC	ECC, FCC

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
80x64x128	66x57x148	184x180x90
STEEL	ABS	STEEL
7.5BG7/2	IVORY	BLACK
Ab.1kg	Ab.0.3kg	Ab.2.5kg
FCS	FCS	BCC

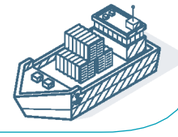
ACCESSORY FOR PA CONNECTION BOX

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	153x110x160	153x110x160	120x11x160	262x70x162
MATERIAL	POLYCARBONATE	POLYCARBONATE	POLYCARBONATE	STEEL
COLOUR	GRAY	GRAY	BLACK	BLACK
WEIGHT	Ab.1.5kg	Ab.1.5kg	Ab.0.4kg	Ab.7.6kg
INSTALL AREA	WING, S/G	FORE /AFT	WING CONSOLE	ECC

MJ-5	MJ-6(JM-3A)	MJ-6A(JM-3B)
FLUSH	WALL	FLUSH
IP22	IP22	IP22
X	X	X
78x52x116	100x50x100	80x57x126
STEEL	STEEL	STEEL
BLACK	BLACK	BLACK
Ab.0.5kg	Ab.0.4kg	Ab.0.4kg
BCC, ECC, CCC	STEERING STAND	STEERING STAND

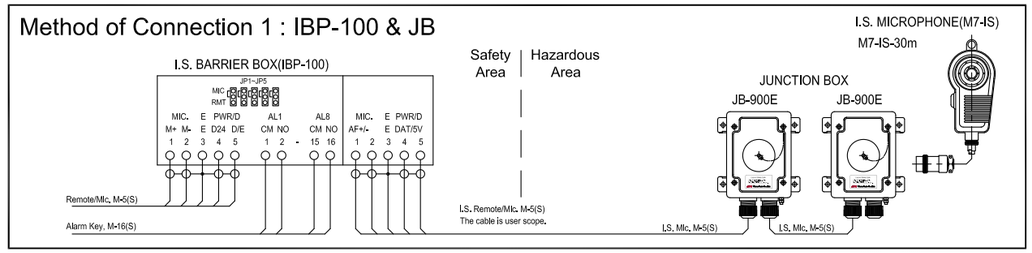
I.S PAGA Barrier Box

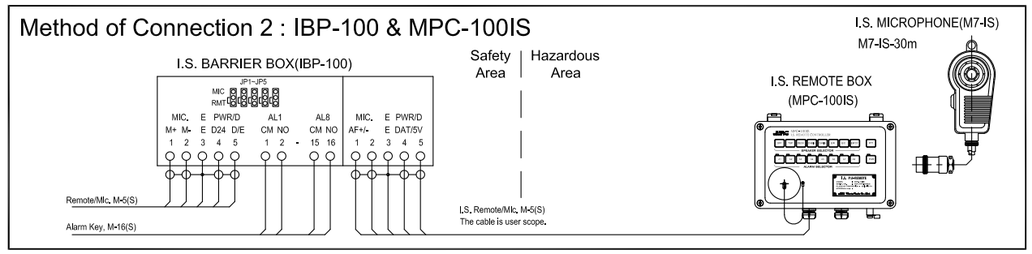
IBP-100 Barrier Box, certified IECEx request standard
IEC60079-0, 11 (SGS Baseefa Certified)

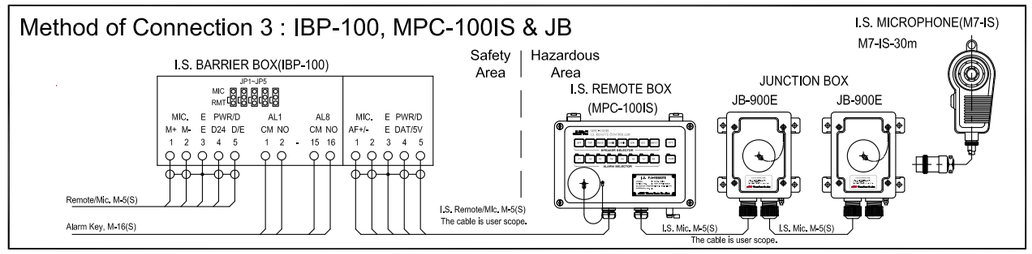


INTRISICALLY SAFE REMOTE & BARRIER BOX

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 x 200 x 90	460 x 297 x 83	133 x 160 x 78	65 x 143 x 42
WEIGHT	7.6Kg	8.4Kg	1.5Kg	1.5Kg
COLOR	BLACK	GRAY	BLACK	DARK BLUE
MATERIAL	GRP/SUS	STEEL	PC / GF	AL WITH LEATHER
INSTALL AREA	HAZARDOUS AREA	SAFE AREA	HAZARDOUS AREA	HAZARDOUS AREA

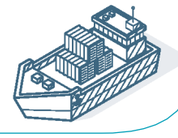






MTB-1200 T/B Paging System

Central Paging System for LNG, Off-shore, Plant and Crane.
Page/Party function with In-outdoor and Hazardous Area



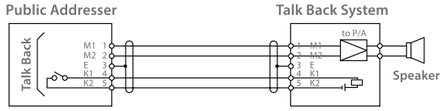
GENERAL DESCRIPTION

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 PAGA 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 switch of power for the main and the emergency situations. This system was tested at the IEC60945 standard and approved for CE by DNV GL . The Type Approval was done from RMRS.

Regulations:

1. IEC 60079-0 (Explosive atmospheres 0 : Equip. general requirements)
2. IEC 60079-1 (Explosive atmospheres 1: Equipment protection by flameproof enclosures)
3. IEC 60945 (Maritime navigation and radio communication equipment)
4. ISO 9001 (DNV Management System Certificate)

Talk Back System Interface with PA



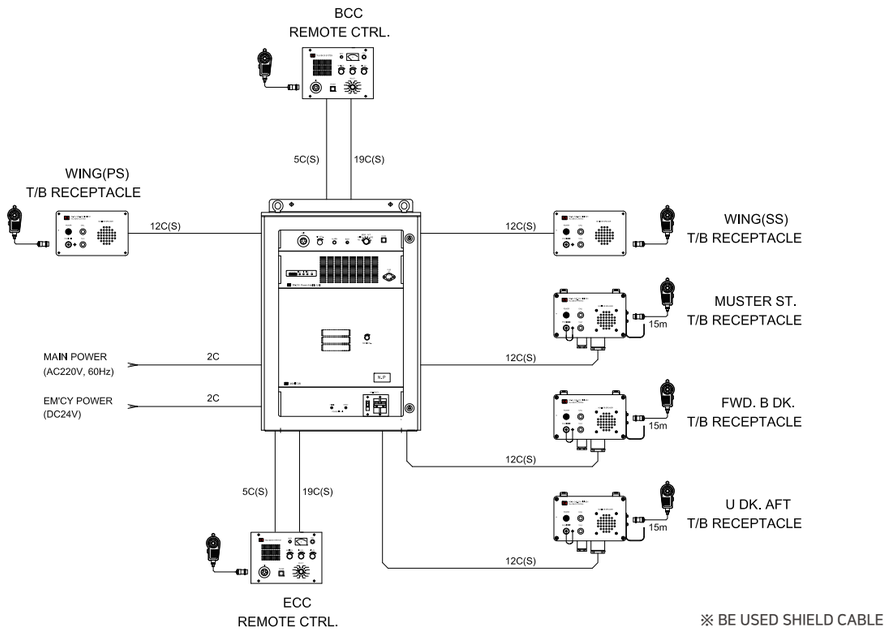
The system is connected with PA as the figure above

Product Information

System Features	· Max. 11 Sub-station, Interface with PAGA and I.S. System · Dry Contact Output Function for Horn, Bell, Flashing Light at Sub-Station · All / Group Call and Priority Function (Pre-set Assigned) · Main / Emergency Power Source Change automatically
Electric Specifications : Main Amplifier Unit	1. Power Output : 200W / 400W / 800W, etc 2. Frequency Characteristics : Less than 6dB (300 ~ 10kHz) 3. Input Sensitivity : More than - 36dBm 4. Distortion Ratio : Less than 5% 5. S/N Ratio : More than 50 dB 6. Source of Power : AC100 / 240V(50/60Hz), DC24V 7. Power Consumption : Max. 20A, 250W (DC 24V) Max. 2.5A, 250W (AC 220V) 8. Input Fuse : AC 30A, DC 30A (In case of 250W) 9. Operating Temperature Range : -15℃ ~ +55℃ 10. Operating Humidity : Less than 90%
Priority of Broadcasting	This system is operated in the following order (This can be changed by demands) 1. Microphone in the external public address system 2. Remote station microphone broadcasting 3. Main Microphone 4. Substation

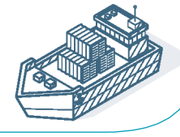
MTB-1200 Main Cabinet ▲

Wiring Diagram of Talk Back/Paging System



Accessory-Connection boxs

MAIN CABINET :
MTB-1200 Series



ACCESSORY FOR 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	160x100x152	160x100x152
MATERIAL	POLYCARBONATE	POLYCARBONATE
COLOUR	GRAY	GRAY
WEIGHT	Ab.1.6kg	Ab.1.6kg
INSTALL AREA	FCR	SGR

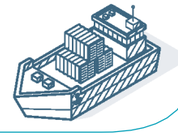
MODEL	TB-3B/M	TB-3B/H	TB-3B/C
PHOTO			
MOUNTING TYPE	FLUSH	FLUSH	WALL
IP GRADE	IP56	IP56	IP56
GLAND	X	X	2
DIMENSION(WxDxH)mm	160x28x120	160x28x120	262x92x162
MATERIAL	POLYCARBONATE	POLYCARBONATE	AL
COLOUR	GRAY	GRAY	GRAY
WEIGHT	Ab.0.4kg	Ab.0.4kg	Ab.2.6kg
INSTALL AREA	FCR	FCR	MOORING

TB-6A/M	TB-6A/H
WALL	WALL
IP56	IP56
2	2
160x100x152	329x90x162
AL	AL
GRAY	GRAY
Ab.1.6kg	Ab.7.6kg
MUSTER	MUSTER

TB-6B/M	TB-6B/H
FLUSH	FLUSH
IP22	IP22
X	X
262x70x162	262x70x162
STEEL	STEEL
BLACK	BLACK
Ab.7.6kg	Ab.7.6kg
ECR	ECR

MED-100/200 Hybrid and Full IP Telephone System

IP Based PABX (Private Automatic Branch eXchange)(MED-100, MED-200)
16~128 Extension, 8-trunk, GPS Interface



GENERAL DESCRIPTION

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 Appraval was done from DNV GL, RMRS.

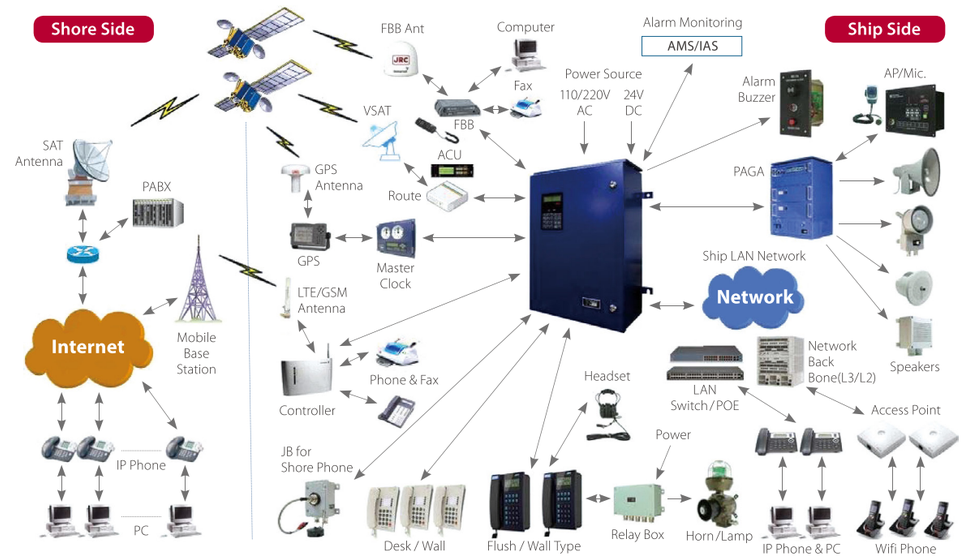
Product Information

System Features	· Extension 40 + Trunk 4 ~ Extension 128 + Trunk 4 · Simultaneous Call : number of lines · Paging call : 3-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 Party, 6 Group · Self-ring testing / System fails 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 PAGA 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
Electric & Environment	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℃ ~ +45℃ 5. Humidity : Less than 90% 6. Certification : Submitted
Integrated Communication System	1. PABX system : Analog, IP, Wi-Fi Phone using gateway 2. PAGA system : Single or duplicated applications 3. Communal aerial system : IP-TV, CCTV, TVRO, DVD & etc 4. Master clock system : Slave clock interfaced with GPS

MED-100 Main Cabinet ▲

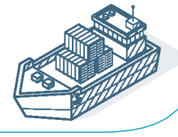
Integrated Communication System	1. PABX system : Analog, IP, Wi-Fi Phone using gateway 2. PAGA system : Single or duplicated applications 3. Communal aerial system : IP-TV, CCTV, TVRO, DVD & etc 4. Master clock system : Slave clock interfaced with GPS

Wiring Diagram of Integrated Communication System



MCX-5000 Auto-Exchanger System

Marine PABX (Private Automatic Branch eXchange)(MCX-5000),
24~128 Extension, 4-trunk, GPS Interface



DNV·GL

GENERAL DESCRIPTION

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

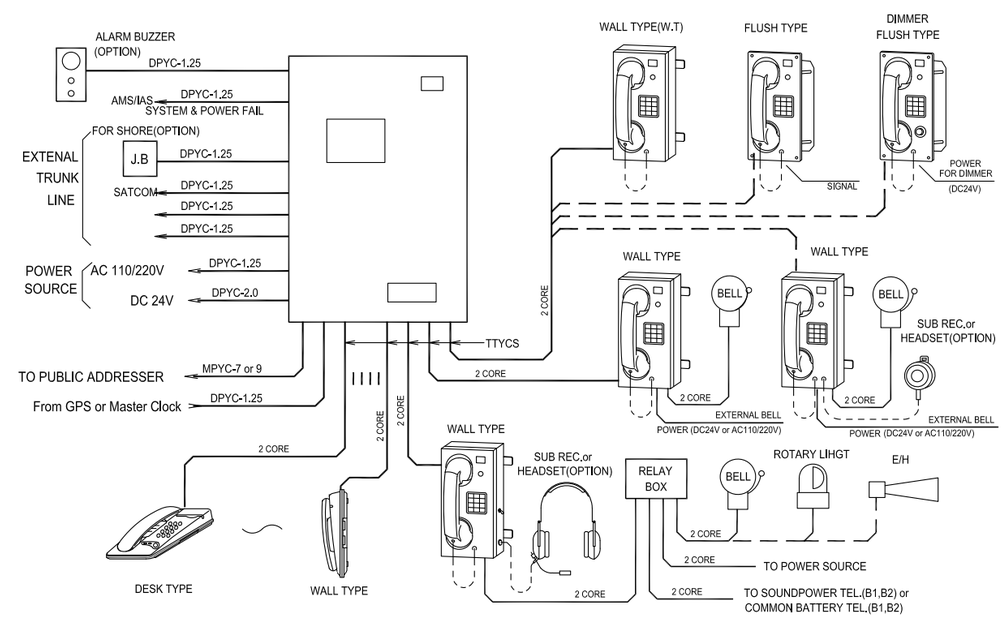
System Features	· Extension 40 + Trunk 4 ~ Extension 128 + Trunk 4 · Simultaneous Call : number of lines · Paging call : 3-Groups to PA system · Priority call · Group call · Call pickup function · Wake-up call · Call transfer · Call forwarding · Camp-on · Hotline · Add-on conference : 5 Party, 6 Group · Self-ring testing · System fails alarmz & 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 PAGA 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 ▲

Electric & Environment	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℃ ~ +45℃ 5. Humidity : Less than 90% 6. Certification : Submitted

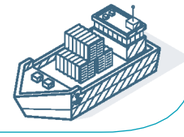
Integrated Communication System	1. PABX system : Analog, IP, Wi-Fi Phone using gateway 2. PAGA system : Single or duplicated applications 3. Communal aerial system : IP-TV, CCTV, TVRO, DVD & etc 4. Master clock system : Slave clock interfaced with GPS

Wiring Diagram of Auto Exchanger System



Accessory-Auto Telephone

MAIN CABINET :
MED-100 I MED-200 I MCX-5000 Series



ACCESSORY FOR 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	0	0
TERMINAL DEVICE	X	0	0	0
HEADSET	X	X	X	X
DIMMER	X	X	X	X
IP GRADE	IP22	IP22	IP22	IP44
(WxDxH)mm	168x100x210	168x100x210	152X143X270	152X143X270
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-213C	LC-213E	LC-213G	LC-213G1
PHOTO				
MOUNTING TYPE	WALL	WALL	WALL	WALL
GLAND	2	3	2	3
SIGNAL CONTACT	0	0	0	0
TERMINAL DEVICE	0	0	0	0
HEADSET	X	X	0	0
DIMMER	X	X	X	X
IP GRADE	IP44	IP44	IP44	IP44
(WxDxH)mm	152X143X270	220X143X270	220X143X270	220X143X270
WEIGHT	2.2kg	2.7kg	2.9kg	2.9kg
COLOUR	GRAY	GRAY	GRAY	GRAY
MATERIAL	ABS	ABS	ABS	ABS
INSTALL AREA	GALLEY,WORK SHOP	GALLEY,WORK SHOP	MACHINERY	MACHINERY

MODEL	LC-215A	LC-215C	LC-215AW	LC-217
PHOTO				
MOUNTING TYPE	FLUSH	FLUSH	FLUSH	PORTABLE
GLAND	X	X	X	X
SIGNAL CONTACT	0	0	0	X
TERMINAL DEVICE	0	0	0	V
HEADSET	X	X	X	X
DIMMER	0	X	X/0	X
IP GRADE	IP22	IP22	IP56	IP56
(WxDxH)mm	152X175X270	152X175X270	152X175X270	156X162X274
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	-

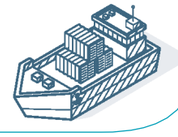
* "N" - Noise Cancel Type

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	189x100x224	200x110x223	194x153x25	406x83x256	406x83x256

Accessory-Auto Telephone

MAIN CABINET :
MED-100 I MED-200



ACCESSORY FOR 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	0	0	0	0	0
TERMINAL DEVICE	0	0	0	0	0
HEADSET	X	X	X	0	0
DIMMER	X	X	X	X	X
IP GRADE	IP56	IP56	IP56	IP56	IP56
(WxDxH)mm	189x100x224	189x100x224	189x100x224	189x100x224	189x100x224
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,WORK SHOP	GALLEY,WORK SHOP	MACHINERY	MACHINERY

LAA-115A	LAA-115D	LAA-116A	LAA-116D	LAA-117A
FLUSH	FLUSH	FLUSH	FLUSH	PORTABLE
X	X	X	X	X
0	0	0	0	X
0	0	0	0	0
X	X	X	X	X
X	0	X	0	X
IP56	IP56	IP56	IP56	IP56
189x100x224	189x100x224	189x100x224	189x100x224	194x153x255
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	-

ACCESSORY FOR VOIP PHONE VERSION

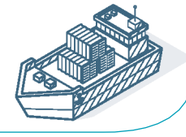
MODEL	LVD-111A	LVD-112A	LVD-113A	LVD-114B	LVD-114C	LVD-114HB
PHOTO						
MOUNTING TYPE	DESK	WALL	WALL	WALL	WALL	WALL
GLAND	X	X	X	2	2	2
SIGNAL CONTACT	X	X	0	0	0	0
TERMINAL DEVICE	X	X	0	0	0	0
HEADSET	X	X	X	X	X	X
DIMMER	X	X	X	X	X	X
IP GRADE	IP22	IP22	IP56	IP56	IP56	IP56
(WxDxH)mm	220x97x200	220x97x200	189x100x224	189x100x224	189x100x224	189x100x224
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,WORK SHOP	MACHINERY	MACHINERY	MACHINERY

* "N" - Noise Cancel Type

LVD-114HC	LVD-115A	LVD-115D	LVD-116A	LVD-116D	LVD-117A
WALL	FLUSH	FLUSH	FLUSH	FLUSH	PORTABLE
3	X	X	X	X	X
0	X	0	0	0	X
0	0	0	0	0	X
X	X	0	X	0	X
X	X	0	X	0	X
IP56	IP56	IP56	IP56	IP56	IP56
189x100x224	189x100x224	189x100x224	189x100x224	189x100x224	194x153x255
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	-

Accessory-Auto Telephone

MAIN CABINET :
MED-100 I MED-200 I MCX-5000 Series



ACCESSORY FOR CONNECTION BOX AND ETC

MODEL	JB-5A	JB-1A
PHOTO		
MOUNTING TYPE	WALL	WALL
IP GRADE	IP56	IP56
GLAND	2	2
DIMENSION(WxDxH)mm	153x110x160	153x110x160
MATERIAL	POLYCARBONATE	POLYCARBONATE
COLOUR	GRAY	GRAY
WEIGHT	1.9kg	1.9kg
INSTALL AREA	FOR PORTABLE	FOR SHORE TEL

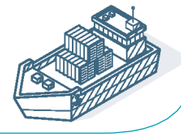
MODEL	BZ-7A	BZ-7B
PHOTO		
MOUNTING TYPE	FLUSH	WALL
IP GRADE	IP22	IP22
GLAND	X	X
DIMENSION(WxDxH)mm	89x60x156	89x60x156
MATERIAL	STEEL	STEEL
COLOUR	BLACK/IVORY	BLACK/IVORY
WEIGHT	0.7kg	0.7kg
INSTALL AREA	-	-

MODEL	JB-61A	JB-62A	JB-63A	JB-63B
PHOTO				
MOUNTING TYPE	FLUSH	WALL	FLUSE	WALL
IP GRADE	IP22	IP22	IP22	IP22
GLAND	X	X	X	X
DIMENSION(WxDxH)mm	80x58x120	80x58x120	72x40x120	68x60x30
MATERIAL	ABS	ABS	ABS	ABS
COLOUR	IVORY	IVORY	IVORY	IVORY
WEIGHT	0.2kg	0.15kg	0.11Kg	0.11Kg
INSTALL AREA	FOR DESK TEL	FOR DESK TEL	FOR DESK TEL	FOR DESK TEL

MODEL	RB-25	MR-2000	MRN-2000	ATC-2000'S
PHOTO				
MOUNTING TYPE	WALL	-	-	-
IP GRADE	IP44	IP22	IP22	IP22
GLAND	5	X	X	X
DIMENSION(WxDxH)mm	140x79x254	200x110x223	200x110x223	5M/10M/15M
MATERIAL	ABS	ABS	ABS	PVC Jacket
COLOUR	GRAY	BLACK	BLACK	GRAY
WEIGHT	1kg	0.7kg	0.7kg	0.2kg
INSTALL AREA	SAFETY AREA	SAFETY AREA	MACHINERY("N" TYPE TEL)	PORTABLE TYPE TEL

Common Battery Telephone

Marine Common Battery Telephone (LC-600/LCA-100)
For Submarine and Navy



GENERAL DESCRIPTION

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 from DNV GL.

Product Information

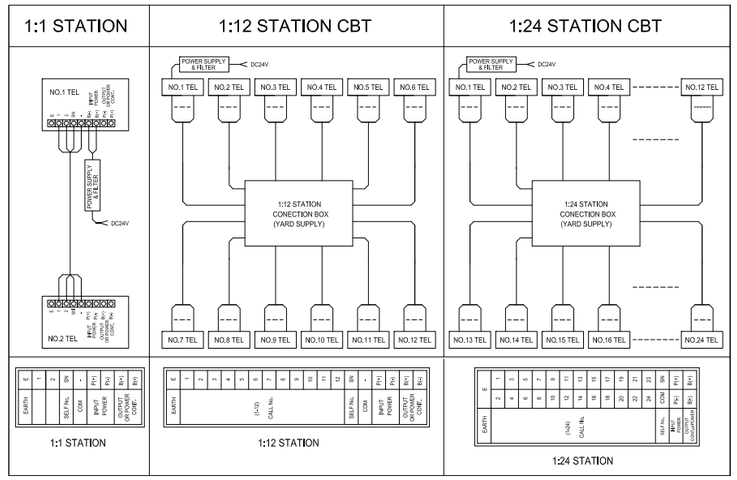
Operations and Specifications	Telephone Sets : The common battery telephone consists of the direct and mutual selection types, and is divided into the following categories according to the purpose.
Electric Specifications (Telephone)	1. Operation Voltage : 24 ~ 32V DC (Min-Max) 2. Power Consumption : App. 0.7W, 30mA, at 24VDC (Standard) 3. Call Consumption : App. 24W, 1A, DC24V 4. In/Out Impedance : App. 600 Ohm 5. Speech / Side-Tone Amp. Gain : App. 25dB / -15dB 6. Operating Temperature/Humidity : -10℃ ~ + 40℃ / less than 90%

Mutual Selection Type (Max. 24 Station) - (LC-600 / LCA-100)	1. Calling a) Select a receiving phone b) If the handset is lifted, the call signal is transmitted to the selected slave station c) If the receiver responds, now the phones are connected 2. Answering a) The lamp blinks and the bell rings b) Lift the handset c) 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℃ ~ +40℃ 6. Operating Humidity : Less than 90%

Direct Type (1:1 Station) - (LC-500 Series Only)	1. Calling a) Lift the handset and push the call button b) Then, the call signal is transmitted to the receiver c) If the receiver responds, now the phones are connected 2. Answering a) The lamp blinks and the bell rings b) Lift the handset c) Now the phones are connected

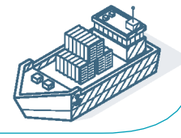
LCA-100 Telephone ▲

Wiring Diagram of Common Battery Telephone System



Accessory-Common Battery Telephone

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



ACCESSORY FOR TELEPH PHONE (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	0	0	0	X
TERMINAL DEVICE	X	0	0	0	X
HEADSET	X	X	0	X	X
DIMMER	X	X	X	X	X
IP GRADE	IP22	IP44	IP44	IP22	IP56
(WxDxH)mm	217x226x125	152x143x270	152x143x270	152x160x270	156x166x274
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	0	0	0
TERMINAL DEVICE	0	0	0
HEADSET	X	X	0
DIMMER	X	X	X
IP GRADE	IP44	IP44	IP44
(WxDxH)mm	152x143x270	152x143x270	152x143x270
WEIGHT	2.2kg	2.3kg	2.9kg
COLOUR	GRAY	GRAY	GRAY
MATERIAL	ABS	ABS	ABS
INSTALL AREA	MACHINERY	MACHINERY	MACHINERY

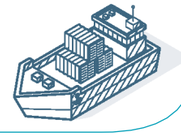
* LC-51x - 1:1 Station / LC-61x : MAX 12 Station / LC-62x - MAX 24 Station / "N" - Noise Cancel Type

LC-612A / 622A	LC-614A / 624A
DESK	WALL
12 / 24 STATION	12 / 24 STATION
X	X
X	0
X	0
X	X
X	X
IP22	IP22
217x226x125	152x143x270
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
0	0	X
0	0	X
X	X	X
0	X	X
IP22	IP22	IP56
152x160x270	152x160x270	156x166x274
1.7kg	1.7kg	2.5kg
BLACK	BLACK	GRAY
ABS	ABS	ABS/STEEL
CONSOLE	CONSOLE	-

Accessory-Common Battery Telephone

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



ACCESSORY FOR TELEPH PHONE (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	217x226x125	220x97x200	189x100x224
WEIGHT	1.9kg	0.9kg	2.9kg
COLOUR	BLACK	BLACK	BLACK
MATERIAL	ABS	ABS	ABS
INSTALL AREA	CABIN	MACHINERY	MACHINERY

MODEL	LCA-114HB / 124HB	LCA-115A / 125A	LCA-115D / 125D
PHOTO			
MOUNTING TYPE	WALL	FLUSH	FLUSH
STATION	12 / 24 STATION	12 / 24 STATION	12 / 24 STATION
GLAND	2	X	X
SIGNAL CONTACT	O	O	O
TERMINAL DEVICE	O	O	O
HEADSET	O	X	X
DIMMER	X	X	O
IP GRADE	IP56	IP56	IP56
(WxDxH)mm	189x100x224	189x90x224	189x90x224
WEIGHT	2.9kg	2.9kg	2.9kg
COLOUR	BLACK	BLACK	BLACK
MATERIAL	ABS	ABS	ABS
INSTALL AREA	MACHINERY	CONSOLE	CONSOLE

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	189x90x224	189x90x224	194x153x255
WEIGHT	2.9kg	2.9kg	4.1kg
COLOUR	BLACK	BLACK	BLACK
MATERIAL	ABS	ABS	ABS/STEEL
INSTALL AREA	CONSOLE	CONSOLE	-

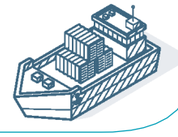
* LCA-11x : MAX 12 Station / LCA-12x - MAX 24 Station / "N" - Noise Cancel Type

COMMON BATTERY TELEPHONE(CONNECTION BOX AND 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	153x110x160	105x52x157	78x52x140	148x46x170
MATERIAL	POLYCARBONATE	STEEL	STEEL	STEEL
COLOUR	GRAY	IVORY	IVORY	BLACK
WEIGHT	1.9kg	0.5kg	0.6kg	0.6kg
INSTALL AREA	FOR PORTABLE(MAX-12,24STATION)	FOR DESK TEL(MAX-12,24STATION)	FOR DESK TEL(MAX-12,24STATION	POWER SUPPLY&FILTER

Sound Powered Telephone

Marine Sound Powered Telephone (LC-800/LSA-100)
Battery less Telephone System



GENERAL DESCRIPTION

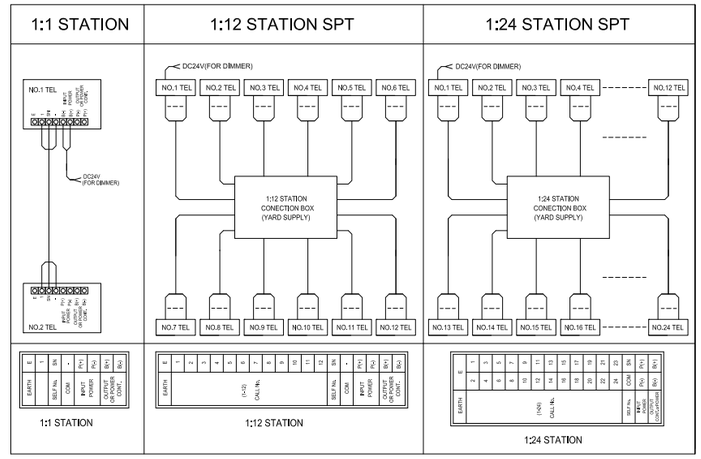
Sound Powered Telephone system is used for communicating with the wheel house, the engine control room, and the steering gear room in case of emergency and for communicating between the areas or rooms when necessary. Especially, being independent from the power supply of the vessel, this system allows for emergency communication at critical spots in the vessel even in case of power failure. It is manufactured to be a waterproof and dustproof 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 from DNV GL, CCS, RMRS.

Product Information

Operations and Specifications	Telephone Sets : The sound power (Battery less) telephone consists of the direct and mutual selection types, and is divided into the following categories according to the purpose.
Electric Specifications	1. Compass Safety Distance : Min. 1-meter 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
Mutual Selection Type (Max. 24 Station) - (LC-800 / LAS-100)	1. Calling a) Lift the handset and select the desired switch b) Quickly rotate the handle of the magnetic generator for 10 times or more, and then the calling signal is transmitted to the receiver c) The phones are now connected 2. Answering a) The bell rings and the lamp blinks b) Lift the handset c) The phones are now connected
Cautions	1. This telephone uses the power charged in capacitor for about 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 connected to the external power (AC/DC).
Direct Type (1:1 Station) - (LC-700 Series Only)	1. Calling a) Lift the handset and quickly rotate the handle of the magnetic generator for 10 times or more b) Then, the calling signal is transmitted to the receiver c) The phones are now connected 2. Answering a) The bell rings and the lamp blinks b) Lift the handset c) The phones are now connected

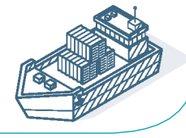
LSA-100 Telephone ▲

Wiring Diagram of Sound Powered Telephone System



Accessory-Sound Powered Telephone

Marine Sound Powered Telephone(LC-800)
Battery less Telephone System



ACCESSORY FOR TELEPHONE (OLD VERSION)

MODEL	LC-711	LC-713C	LC-713G	LC-715C	LC-717
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	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	217x226x125	152x143x270	152x143x270	152x160x270	156x166x27
WEIGHT	1.9kg	2.9kg	2.9kg	1.7kg	42.5kg
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	152x143x270	152x143x270	152x143x270	152x143x270
WEIGHT	9kg	3.2kg	3.3kg	3.5kg
COLOUR	GRAY	GRAY	GRAY	GRAY
MATERIAL	ABS	ABS	ABS	ABS
INSTALL AREA	GALLEY,WORK SHOP	MACHINERY	MACHINERY	MACHINERY

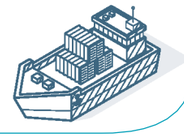
* LC-71x - 1:1 Station / LC-81x : MAX 12 Station / LC-82x - MAX 24 Station / "N" - Noise Cancel Type

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	X
IP22	IP22	IP44
217x226x125	152x143x270	152x143x270
2.1kg	2.9kg	2.9kg
BLACK	GRAY	GRAY
ABS	ABS	ABS
CABIN	GALLEY,WORK SHOP	GALLEY,WORK SHOP

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
152x160x270	152x160x270	156x166x274
2.2kg	2.1kg	3.9kg
BLACK	BLACK	GRAY
ABS	ABS	ABS/STEEL
CONSOLE	CONSOLE	-

Accessory-Sound Powered Telephone

Marine Sound Powered Telephone(LSA-100)
Battery less Telephone System



ACCESSORY FOR 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	217x226x125	220x97x200	189x100x224	189x100x224
WEIGHT	1.9kg	0.9kg	2.9kg	2.9kg
COLOUR	BLACK	BLACK	BLACK	BLACK
MATERIAL	ABS	ABS	ABS	ABS
INSTALL AREA	CABIN	CABIN	GALLEY,WORK SHOP	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	189x90x224	189x90x224	194x153x255
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

LSA-114HB / 124HB	LSA-114HC / 124HC	LSA-115A / 125A	LSA-115D / 125D
WALL	WALL	FLUSH	FLUSH
12 / 24 STATION	12 / 24 STATION	12 / 24 STATION	12 / 24 STATION
2	3	X	X
O	O	O	O
O	O	O	O
O	X	X	X
X	X	X	O
IP56	IP56	IP56	IP56
189x100x224	189x100x224	189x90x224	189x90x224
2.9kg	2.9kg	2.9kg	2.9kg
BLACK	BLACK	BLACK	BLACK
ABS	ABS	ABS	ABS
MACHINERY	MACHINERY	CONSOLE	CONSOLE

ACCESSORY FOR 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	153x100x200	102x52x152	78x52x140
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

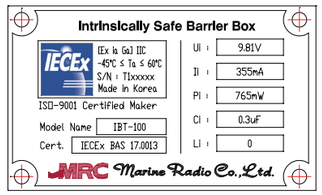
IBT-100 I.S. Auto Telephone

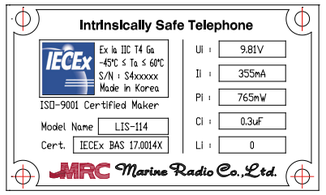
IBT-100 Barrier Box, certified IECEx request standard
IEC60079-0, 11(SGS Baseefa Certified)

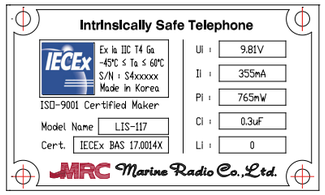
Intrinsic safety auto telephone system is officially certified by satisfying the IECEx request standard IEC60079-0, IEC60079-11. This type of A.T system can be mounted in the area that requires Group II, Zone 0, Zone 1 and 2, Gas class “C”, and temperature class T4. The intrinsically safe construction 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 switch, terminal and replay. In calling, it uses an air horn in hazardous area, and uses the buzzer and bell in safety area.
The telephone set adapts the low noise OP-AMP, so it improves call tone and side tone. Moreover, it largely reduces noise incoming through a telephone transmitter, by using the 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.

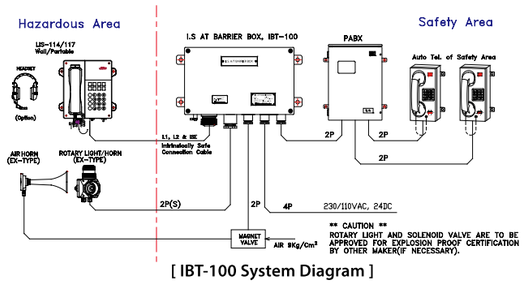
Product Information

Name Plate of I.S. Barrier Box and Telephones

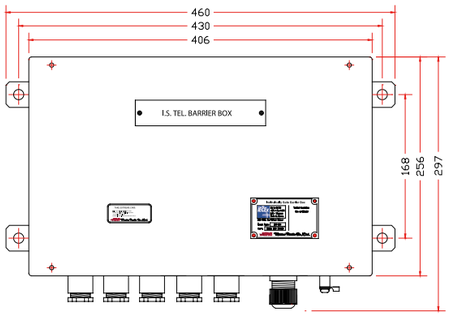








[IBT-100 System Diagram]



[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

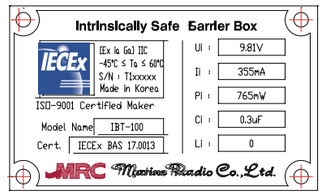
IBT-200 I.S. CBT/SPT Telephone

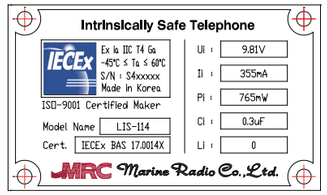
IBT-200 Barrier Box, certified IECEx request standard
IEC60079-0, 11(SGS Baseefa Certified)

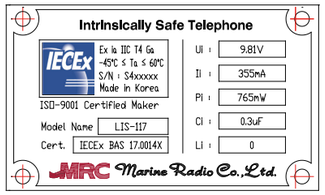
Intrinsic safety CBT and SPT system is officially certified by satisfying the IECEx request standard IEC60079-0, IEC60079-11. This type of CBT/SPT system can be mounted in the area that requires Group II, Zone 0, Zone 1 and 2, Gas class “C”, and temperature class T4. The intrinsically safe construction 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 switch, terminal and replay. In calling, it uses an air horn in hazardous area, and uses the buzzer and bell in safety area.
The telephone set adapts the low noise OP-AMP, so it improves call tone and side tone. Moreover, it largely reduces noise incoming through a telephone transmitter, by using the circuit whose CMRR (Common Mode Rejection Ratio) is high. The power is supplied to “JB-BOX”. The current and voltage are limited for explosion-proof architecture.

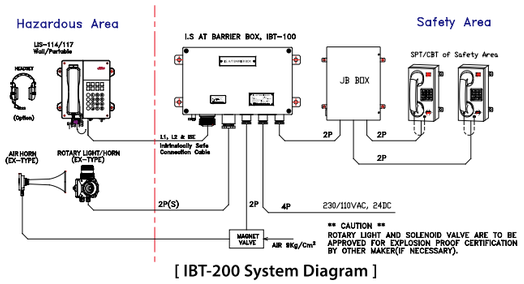
Product Information

Name Plate of I.S. Barrier Box and Telephones

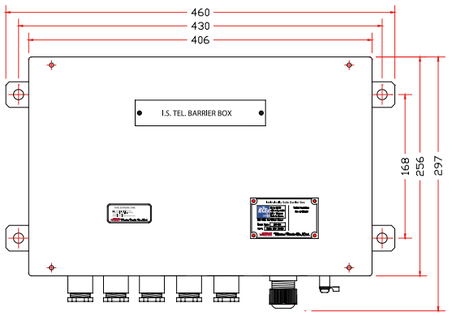








[IBT-200 System Diagram]

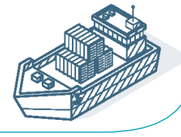


[Dimensions]

Specifications

Model	IBT-200
Cert. No.	IECEx BAS 15.xxxxx
Protection	Intrinsic Safety
Standards	IEC60079-0
Marking	IEC-Ex (Ex ia IIC T6)
Ambient Temp.	-45°C ≤ Ta
IP / Weight	IP44 / 8.4Kg
Color	Gray (N7-EPC)
Material	Steel PO 1.6t (Case)
Mounting	4~Ø12 (430-168
Power	230VAC / 24VDC

SIGNAL DEVICE FOR TELEPHONE



ACCESSORY FOR 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	130x134x241	200x134x300	130x167x265
MATERIAL	ABS	ABS	AL
COLOUR	IVORY	IVORY	GREEN
WEIGHT	Ab.1.5kg	Ab.1.9kg	2kg
INSTALL AREA	MACHINERY	MACHINERY	MACHINERY

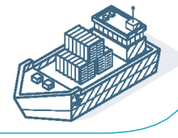
MODEL	SL16	AH0601	SV0080
PHOTO			
NAME	Ex. FLASHING LIGHT W/HORN	AIR HRON	STOP V/V
MOUNTING TYPE	WALL	WALL	COMPONENT
IP GRADE	66	56	56
GLAND	2	X	X
DIMENSION(WxDxH)mm	145x145x435	106x117x198	77x55x22
MATERIAL	AL	PAGF ,Cooper	BRASS
COLOUR	BLACK	GREEN	BRASS NATURAL
WEIGHT	4.7kg	15kg	0.4kg
INSTALL AREA	HAZARDOS AREA	SAFETY AREA	SAFETY AREA

S14	SL14	S16	L16
HORN	FLASHING LIGHT W/HORN	Ex. HORN	Ex. FLASHING LIGHT
WALL	WALL	WALL	WALL
56	56	66	66
2	2	2	2
181X140X140	181X140X243	145x145x208	145x145x298
ABS	ABS	AL	AL
ORANGE	ORANGE	BLACK	BLACK
1.4kg	1.6kg	4.3kg	3.4kg
MACHINERY	MACHINERY	HAZARDOS AREA	HAZARDOS AREA

RV0090	SV17A	SV0070	ASTR0015
NON RETURN V/V	SOL V/V	EX. SOL V/V	Air strainer
COMPONENT	COMPONENT	COMPONENT	COMPONENT
56	56	56	56
X	1	1	X
129X22X22	152x119x134	200x293x130	138x65x185
BRASS	AL	AL	RESIN
BRASS NATURAL	GREEN	GREEN	BLACK
0.5kg	1kg	5.5kg	0.9kg
SAFETY AREA	SAFETY AREA	HAZARDOS AREA	SAFETY AREA

MAD-100 Communal Aerial System

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



CE

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	1. Main amplifier (MAD-100) : Maximum subscriber (96EA), Included AGC and power supply for MF / SW / FM / VHF / UHF 2. Sub amplifier (MAD-100A) : Additional subscriber (96EA), Included AGC and power supply for MF / SW / FM / VHF / UHF 3. VTR Amplifier (UP-40B, Optional) 4. Omni-Directional Antenna (AT-100) : For AM/FM, TV 5. Distributor 6. Terminal for radio and TV 7. Radio / TV, telephone and AC-220 RP terminal 8. Radio / TV cord set 9. Installation materials : End Resister (75 Ohms and connector) 10. Spare parts : Manufacturer standard 11. Minimum reception level of TV (Standard) : 0dB 12. Minimum reception level of radio (Standard) : 40dB 13. Maximum Outlet Box per a system : 96EA 14. Maximum Outlet Box per a line : DB-2 / 3 / 4 / 8 15. Terminal Resistor Impedance : 75 ohm

Electric & Environment	MF / SW / FM / VHF/ UHF Amplifier Unit (MAD-100, MAD-100A) 1. 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 2. AGC : 0-37dB 3. Gain Deviation : MF / SW (0.8dB), VHF (1.0dB), UHF (2.0dB) 4. Noise Figure : MF / SW (7dB), VHF (8dB), UHF (8dB) 5. Maximum Output : MF / SW (85dB), FM / VHF / UHF (110dB) 6. Power Consumption : DC-12V, 380mA, Max. 45VA AC-220V, 20mA, Max. 50VA 7. Weight : Approx. 6.8Kg 8. Temperature : -20℃ ~ +40℃ 9. In/Out Impedance : 75 ohm

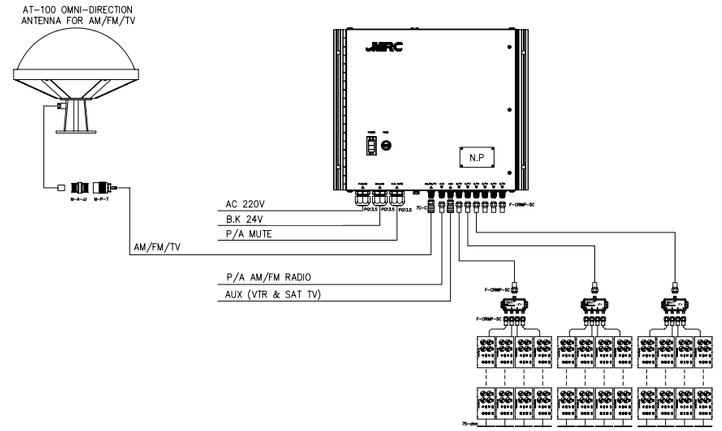
Main Power Supply	1. Power Source : AC110/220V, 1-ph, 50/60Hz 2. Output Power : DC-12V, 1.2A 3. Fuse : 250V, 1A
Omni-Directional Antenna (AT-100)	1. Frequency Range : 0.1MHz ~ 850MHz 2. Rx Pattern & Polarization : Omni-Directional Type 3. Gain : 20dB ± 3dB 4. Automatic Gain Control : 0 ~ 25dB 5. Output Impedance : 75ohm 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℃ ~ +50℃ 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℃ ~ +40℃ 9. In/Out Impedance : 75 ohm

AT-100 Antenna ▲

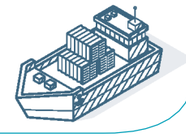
MAD-100 Main Unit ▲

Wiring Diagram of Communal Aerial System



Accessory-Communal Aerial System

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

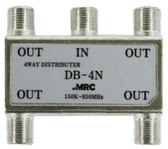
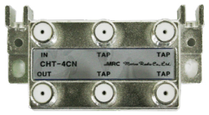


ACCESSORY FOR COMBINATION BOX

MODEL	RF	RW	NPTLRF-4
PHOTO			
MOUNTING TYPE	FLUSH	WALL	FLUSH
POWER SOCKET	X	X	O
TEL. MODULE	X	X	O
R/TV MODELE	O	O	O
LAN. MODULE	X	X	O
IP GRADE	IP22	IP22	IP22
DIMENSION(WxDxH)mm	80x35x126	80x53x123	284x60x138
MATERIAL	STEEL	STEEL	ABS
COLOUR	IVORY	IVORY	WHITE
WEIGHT	Ab.0.5kg	Ab.0.7kg	Ab.1.8kg
DERIVATIVE PRODUCT			NTLRF-4 NTLRF-4 NTLRF-4

NPTLRW-4	NPTRF-4	NPTRW-4
WALL	FLUSH	WALL
O	O	O
O	O	O
O	O	O
O	X	X
IP22	IP22	IP22
284x73x138	284x60x138	284x73x138
ABS	ABS	ABS
WHITE	WHITE	WHITE
Ab.2kg	Ab.1.8kg	Ab.2kg
NTLRW-4	NTLRF-4	NTLRW-4
NTLRW-4	NTLRF-4	NTLRW-4
NTLRW-4	NTLRF-4	NTLRW-4

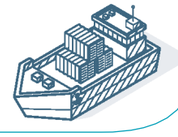
ACCESSORY FOR DISTRIBUTOR & CORD

MODEL	DB-4N	CHT-4CN	CMX-1
PHOTO			
MOUNTING TYPE	WALL	WALL	WALL
DIMENSION(WxDxH)mm	71x17x49	75x26x39	113x26x73
MATERIAL	Zn	AL	AL
COLOUR	GRAY	SILVER	GRAY
WEIGHT	Ab.0.15kg	Ab.0.5kg	Ab.0.5kg

VTS-1	RV-2	VTV-4
WALL		
113x26x73	L=1.5m	L=1.5m
AL	PVC Jacket	PVC Jacket
GRAY	BLACK	BLACK
Ab.0.7kg	Ab.0.1kg	Ab.0.1kg

MCS-970 Clock System

Standard Marine Electric Clock System(MCS-970)
Marine Standard Clock System



CE

GENERAL DESCRIPTION

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 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

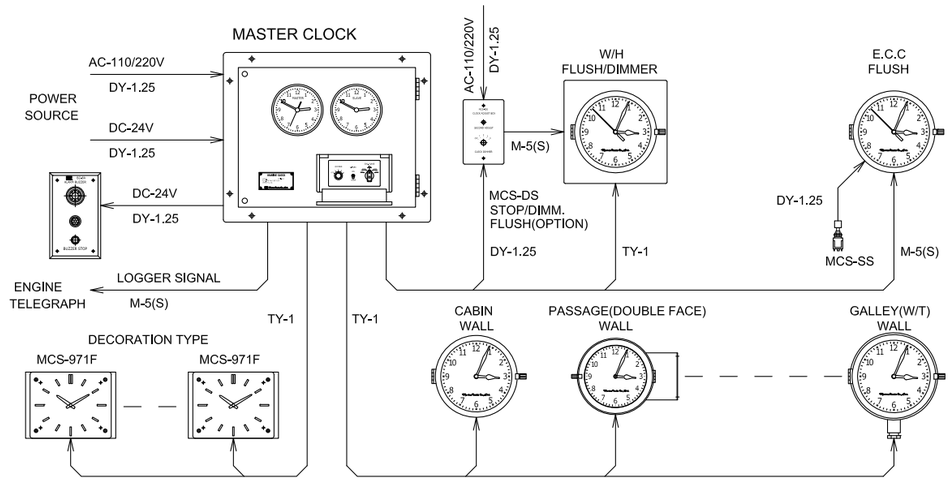
System Features	1. Power Source : AC110/220V, 1Ø, 50/60 Hz 2. Emergency Power : AC or DC 24V (Ripple less than 5%) 3. Power Consumption : AC, less than 50VA DC, less than 1.6A (At 24V DC) 4. Automatically switch to DC when AC power causes failure 5. Certification : DNV CE 6. Temperature : -20℃ ~ +45℃ 7. Humidity : Less than 90% 8. Net Weight : 7.82Kg 9. Painting Color : 5.4 PB 2.8 / 3.0 (Dark Blue) 10. Dimensions : 386(W) x 316(H) x 110(D) 11. Mount Type : Flush Mount (Manufacturer Standard)
Capacity & function of the System	1. Crystal Oscillation Frequency : 10.000 MHz (TCXO) 2. Accuracy : Within ±1.0 sec per a month 3. Dual Clocks in Main Unit : - Master (UTC) : Three Hands, 0.5sec. Leap, Ø80mm Dial - Slave (LTC) : Two / Three Hands, 30sec. Leap, Ø80mm Dial 4. 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) 5. Slave Clock : Up to 80ea 6. Battery Slave Clock (Optional) 7. Digital Slave Clock (Optional) 8. Built-in lighting control system (Dimmer) 9. Fully protects : Power source and slave line circuit 10. Robust mechanism architecture and excellent stability 11. Easy time control : CW and CCW direction for slave clocks 12. High speed time setup

MCS-970 Master Clock ▲

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

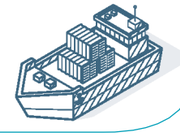
Detailed Description of each part	1. 30-Sec Time adjust switch 2. "TIME" : Stopping time of all clocks for a while. 3. "DIMMER" : Adjust illumination of back (EL) light 4/5. AC / DC Power Fuse : 1.3A / 5.0A 6/7. 0.5S / 30S Out Fuse : 1.0A / 1.0A 8/9. DC / AC Power Switch

Wiring Diagram of Marine Electric Clock System



MCD-100 Clock System

Marine Electric Clock System(MCD-100)
with GPS Interface and NTP Server



GENERAL DESCRIPTION

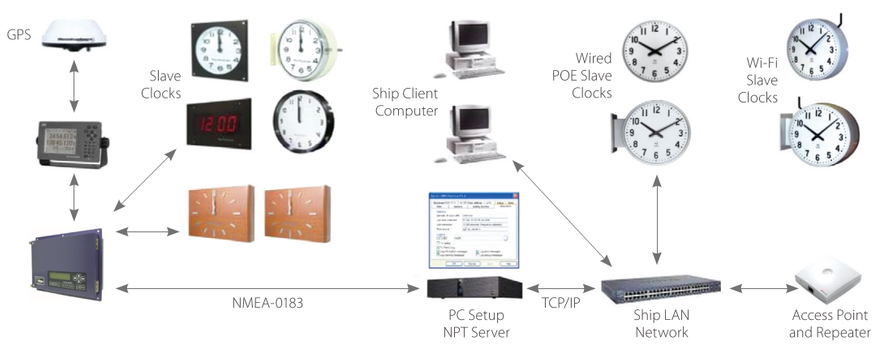
Marine Electric Clock System is a device for indicating precise time and date to the analogue/digital slave clocks as well as recording and monitoring the operation data of the vessel. By connecting to GPS and other devices, the MCD-100 system receives data from the National Marine Electronics Association (NMEA) and the Internet protocols (LAN) to automatically renew and synchronize the precise local time. These systems are 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 . The Type Approval was done from CCS.

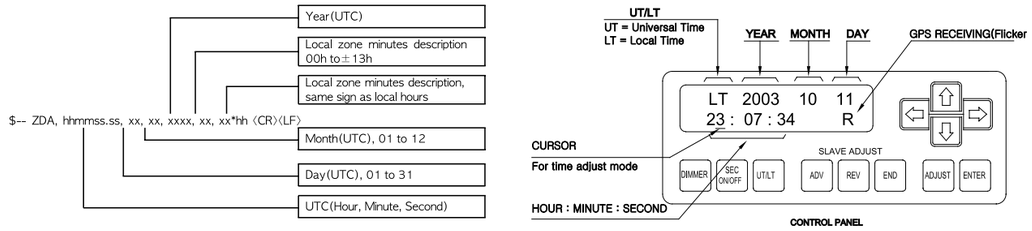
Product Information

System Features	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 50VA DC, less than 1.6A (At 24V DC) 4. Automatically switch to DC when AC power causes failure 5. Certification : DNV CE Submitted	6. Temperature : -20°C ~ +45°C 7. Humidity : Less than 90% 8. Net Weight : 7.52Kg 9. Painting Colour : 5.4 PB 2.8 / 3.0 (Dark Blue) 10. Dimensions : 338(W) x 272(H) x 128(D) 11. Mount Type : Flush Mount (Manufacturer Standard)
Capacity & function of the System	1. Crystal Oscillation Frequency : 10.000 MHz (TCXO) 2. Accuracy (None GPS) : Within ±1.0 sec per a month (With GPS) : Synchronizing from GPS automatically 3. Dual Clocks in Main Unit : - Master (UTC) : Three Hands, 0.5sec. Leap, Ø80mm Dial - Slave (LTC) : Two / Three Hands, 30sec. Leap, Ø80mm Dial - LCD Display : UT / LT Year / Month / Day / Hour / Minute / Second 16-Character 2-Line, Back Light 4. 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)	5. NMEA-0183 Signal : Time & Date (IEC1162-1, RS-422, ZDA) 6. There are 3-set Output Port for NMEA-0183 7. Baud Rate Setup (NMEA-0183) : Setup, 1200 / 2400 / 4800 / 9600 8. +20 / -20 Minute Control (Optional) 9. Slave Clock : Up to 80ea 10. Battery Slave Clock (Optional) 11. Built-in lighting control system (Dimmer) 12. Fully protects : Power source and slave line circuit 13. Robust mechanism architecture and excellent stability 14. Easy time control : CW and CCW direction for slave clocks 15. High speed time setup 16. NTP Server (Network Time Protocol, Option)

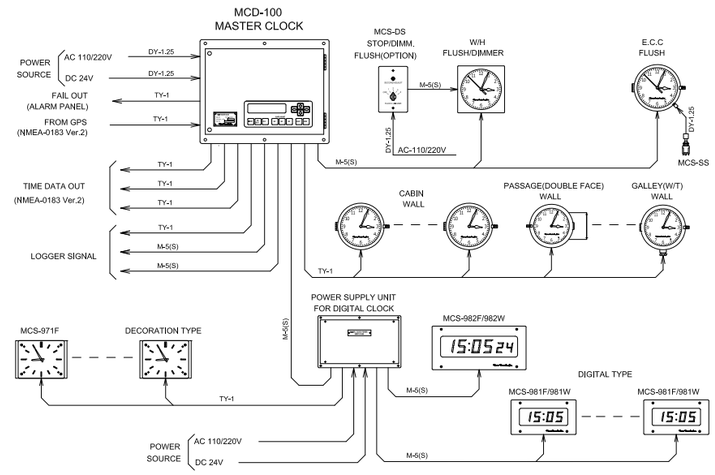
NMEA-0183, Serial Interface Protocol	1. In(1) / Out(3) (NMEA-0183, IEC1162-1, RS-422 Compatible, $GPZDA) 2. Baud Rate Pre-set : 4800BPS (1200 / 2400 / 4800 / 9600 Compatible) 3. Standard Data Format : 4800-N-8-1(BR-Data-Parity-Stop), ZDA
Display of Control Panel of Main Unit	1. UT / LT : Universal Time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

Wiring Diagram of Digital Master Clock (MCD-100) System



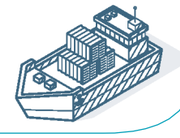


Wiring Diagram of Marine Electric Clock System



Accessory-Slave Clock

Marine Electric Clock



ACCESSORY FOR 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
E.L 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
DIMENSION(WxDxH)mm	192x48x192	192x48x192	196x78x196	188x81x188
MATERIAL	STEEL	STEEL	STEEL	STEEL
COLOUR	BLACK	BLACK	IVORY	IVORY
WEIGHT	Ab.1.6kg	Ab.1.6kg	Ab.1.2kg	Ab.1.3kg
INSTALL AREA	BCC	ECC/CCC	CABIN	RADIO SPACE

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
192x48x192	270x48x270	196x78x196	300x49x217	220x133x195
STEEL	STEEL	STEEL	WOOD	STEEL
BLACK	GRAY	IVORY	DECORATION	IVORY
Ab.1.6kg	Ab.1.2kg	Ab.1.2kg	Ab.1.8kg	Ab.2.1kg
ECC/CCC	CABIN	GALLEY	CABIN	PASSAGE

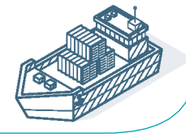
ACCESSORY FOR SLAVE BATTERY CLOCK

MODEL	MCS-990A	MCS-990B	MCS-990C1
PHOTO			
MOUNTING TYPE	FLUSH	FLUSH	WALL
HOUR / MINUTE / SECOND	O	O	O
E.L PLATE	O	X	X
IP GRADE	IP22	IP22	IP22
SILENCE MARK	X	X	X
DIMENSION(WxDxH)mm	186x80x186	186x80x186	196x74x196
MATERIAL	STEEL	STEEL	STEEL
COLOUR	IVORY	IVORY	IVORY
WEIGHT	Ab.1.1kg	Ab.1.1kg	Ab.1.3kg
INSTALL AREA	BCC	ECC	CABIN

MCS-990E	MCS-990F1	MCS-990S
WALL	WALL	FLUSH
O	O	O
X	X	X
IP44	IP22	IP22
X	X	O
196x74x196	300x49x217	186x80x196
STEEL	WOODEN	STEEL
IVORY	DECORATION	IVORY
Ab.1.2kg	Ab.1.8kg	Ab.1.1kg
GALLEY	CABIN	RADIO SPACE

Accessory-Slave Clock

Marine Electric Clock



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	IP22	IP44
GLAND	X	X	1
DIMENSION(WxDxH)mm	200x60x100	200x60x100	200x60x100
MATERIAL	STEEL	STEEL	STEEL
COLOUR	BLACK	BLACK	BLACK
WEIGHT	Ab.3.7kg	Ab.3.3kg	Ab.3.7kg
INSTALL AREA	CABIN	CABIN	GALLEY

MODEL	MCS-961W/A	MCS-962	MCS-962A
PHOTO			
MOUNTING TYPE	WALL	FLUSH	FLUSH
HOUR / MINUTE / SECOND	X	O	X
HOUR / MINUTE	O	X	O
IP GRADE	IP44	IP22	IP22
GLAND	1	X	X
DIMENSION(WxDxH)mm	200x60x100	200x61x100	200x61x100
MATERIAL	STEEL	STEEL	STEEL
COLOUR	BLACK	BLACK	BLACK
WEIGHT	Ab.3.7kg	Ab.3.3kg	Ab.3.3kg
INSTALL AREA	GALLEY	BCC	ECC

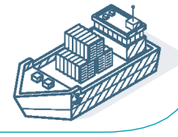
MODEL	MCS-963	MCS-963A	MCS-964	MCS-964A
PHOTO				
MOUNTING TYPE	DOUBLE FACE	DOUBLE FACE	WALL	WALL
HOUR / MINUTE / SECOND	O	X	O	X
HOUR / MINUTE	X	O	X	O
IP GRADE	IP22	IP22	IP22	IP22
GLAND	X	X	X	X
DIMENSION(WxDxH)mm			200x60x100	200x60x100
MATERIAL	STEEL	STEEL	STEEL	STEEL
COLOUR	BLACK	BLACK	DECORATION	DECORATION
WEIGHT			Ab.3.3kg	Ab.3.3kg
INSTALL AREA	PASSAGE	PASSAGE	CABIN	CABIN

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
DIMENSION(WxDxH)mm	78x57x116	78x57x116	11.5x12.5x38
MATERIAL	STEEL	STEEL	STEEL
COLOUR	BLACK	BLACK	BLACK
WEIGHT	Ab.1kg	Ab.1kg	Ab.0.01kg
INSTALL AREA	BCC	BCC	BCC

NTP-100 IP Clock System

Network Time Protocol(NTP-100) with Master Clock via GPS
Interface for a secure and stable time source.

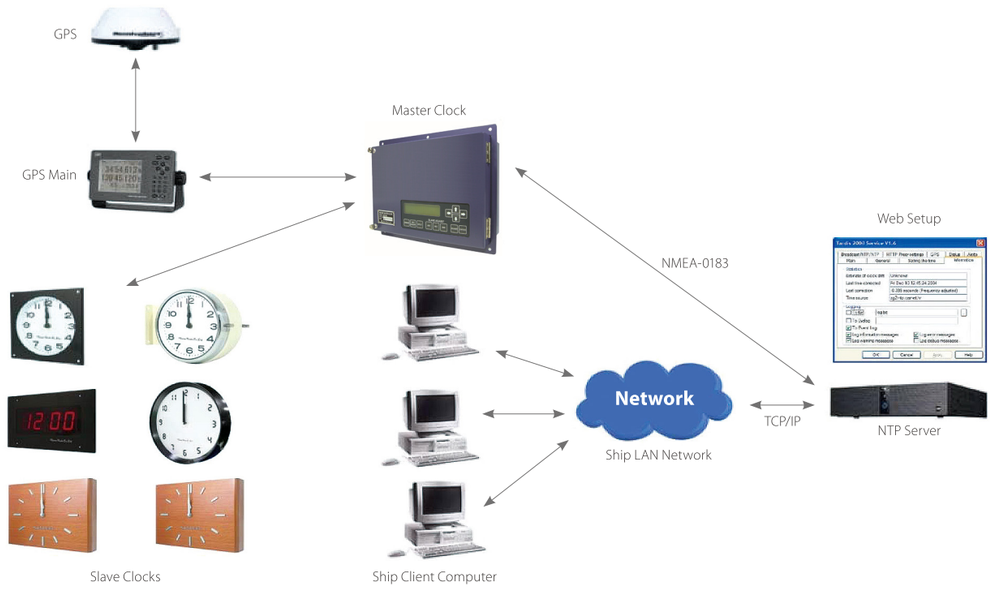


GENERAL DESCRIPTION

The NTP-100 provides secure synchronized timing for ship 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.

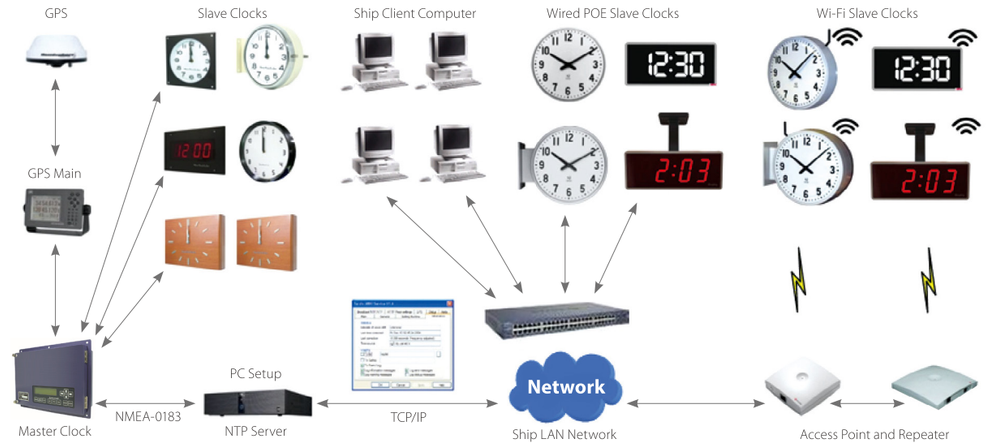
Product Information

System Features	1. Power Source : 90 ~ 264VAC, 1Ø, 50/60 Hz 2. Em'cy Power(Option) : AC or 24VDC (Ripple less than 5%) 3. Power Consumption : AC, approximately 10VA DC, less than 1A (At 24VDC) 4. Automatically power changeover between DC & AC (Option) 5. Timing Accuracy : Better than 50ms 6. Temperature : -20℃ ~ +45℃ 7. Humidity : Less than 90% 8. Net Weight : App. 5.2Kg 9. Painting Color : 5.4 PB 2.8 / 3.0 (Dark Blue) 10. Dimensions 1(Wall) : 406(W) x 253(H) x 83(D) 11. Dimensions 2(19") : 19" 1-U Standard Rack 12. 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, Option) Simple setup and internal oscillator included



Capacity & function of the System	1. 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 and et cetera 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 Pre-set : 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



CCTV(Closed Circuit Television)

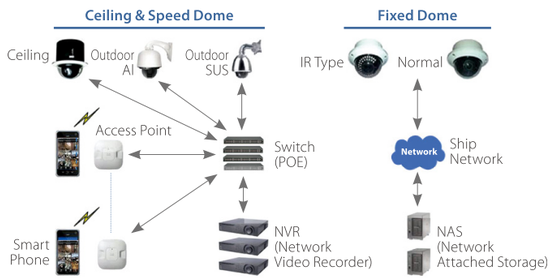
Digital Closed Circuit Television for risk prevention,
security and safety of the ship.

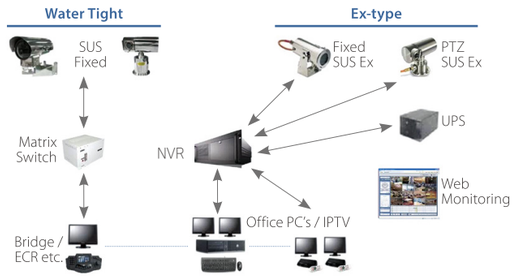
GENERAL DESCRIPTION

Closed-circuit television (CCTV) is a system of cameras to capture the video (With or without audio) about a specific place, and transmit to a different location for viewing and recording. It differs from broadcasting television in that the signal is not openly transmitted, though it may employ point to point (P2P), point to multipoint, or mesh wireless links technologies. Although most video communications fit this definition, the term CCTV is now commonly referred to a video system applied for surveillance purpose in areas which need monitoring, such as engine room, steering gear room, mooring stations, and specific risk areas.
In marine vessel and industrial plant applications, CCTV equipment may be used to monitor parts of a process from a central control room, for example in an environment not suitable for humans. CCTV systems may operate continuously, or as required to monitor a particular event only. More advanced CCTV system utilizes Digital Video Recorder (DVR) for long term recording and playback, with adjustment of various quality and performance options, and provides extra features (Such as motion-detection and thermal infrared cameras)
More recent development, to name a few, are decentralized IP-based CCTV cameras, some equipped with megapixel sensors, supporting direct recording to network attached storage devices, or internal flash memory for completely stand-alone operation.

Product Information

Advantages of CCTV monitoring in vessels	· Promote safety by monitoring of 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 increase operational efficiency
System Features	· The central rack contains the DVR / Matrix and camera power supply. The camera power unit supplies the camera stations with 30 VAC. The operator, with the keyboard, may select video images from the camera stations and view the images from the camera stations and view the images on the monitor, or cabin rooms via main unit of CAS · The operator may also control movement of the camera stations with pan & tilt, wipe & wash and all lens functions with the operator's keyboard
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 station · The central rack is equipped with hardware to connect one 8 camera station, 2 monitors and 2 keyboards, and is expandable to 16 camera stations, 8 monitors and 4 keyboards
Some of the available system functions are :	1. Camera Selector : Any camera in a multi camera system can be selected for control and view on the monitor 2. Camera Sequence : Selected cameras in a multi camera system can be set for a sequence to view 3. 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 4. 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.

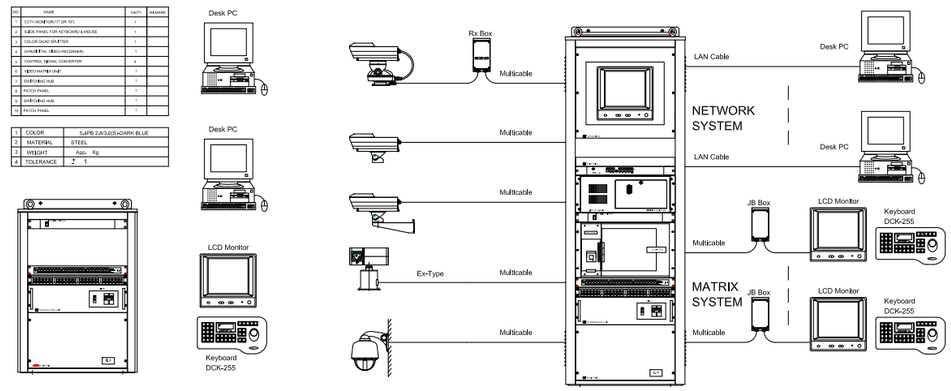




Main Rack of CCTV System : Configurable	1. Matrix : 64 Camera input, 2~32 user monitor, 32-keyboard control 2. VDA (Video Distributor & Amp) : For network system, 10(In)/20(Out) 3. Modulator, Converter (NTSC / PAL / SECAM) for CAS 4. DVR (Digital Video Recorder) : 16Ch, with keyboard & mouse 5. Hub Switch : 8/16/24-Port (POE, Power Over Ethernet) 6. UPS (Uninterruptible Power Supply) : 2KVA (SU2000I) or other 7. LCD Monitor, Keyboard, Mouse and etc (Options)
NVR	1. Control 64 cameras (Up to 255 cameras) / 32 monitors 2. Video Card : Up to 16 cards (1 Card of 64-input, 2-output) 3. Video Input : 64 Camera inputs, control up to 256 cameras 4. Each Video Card (DVC-6432), built-in I/D, TIME Generator 5. Monitor switching : Automatic smooth switching screen 6. Matrix Controller Keyboard : Up to 8-sub keyboard 7. Relayed alarm system : Input up to 512 sensors 8. Can be connected P/C directly due to built-in RS-232 Port

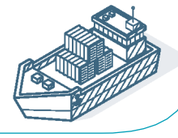
DVR	1. Signal method : NTSC / PAL 2. Compression : Video (MPEG 4), Audio (G.721, 8 kHz) 3. Operating system : Microsoft Windows XP 4. CPU/RAM : Intel Pentium 5 CPU 2.50 / 1GB, DDR3 5. Pixels : NTSC (720x480), PAL (720x576) 6. Hard disk : Max. 4HDDs expandable 7. DVD / CD : Integrated DVD / CD 8. Communications : RS485 / Coaxial superimposition / Network 9. Video in /out : 1V(p-p), 75ohm, BNC (16CH)/VGA, 15-Pin D-bus 10. Audio in /out : Micro Cross x 16 / -8 dBs 600ohm, unbalanced 11. Alarm in /out: 100ms, NO / NC / Max. 25mA, NO / NC available

Wiring Diagram of CCTV System LAN[P] or Analog Type



Accessory-CCTV

Digital Closed Circuit Television for risk prevention,
security and safety of the ship



CAMERA HOUSING

MODEL	MCT-300-FHS	MCT-300-FHW
HOUSING		
PAN-TILT	O	O
WIPER	X	O
FAN/HEAT	O	O
IR LAMP	OPTION	OPTION
RESOLUTION(ANALOG)	1920 x 1080	1920 x 1080
RESOLUTION(IP)	1920 x 1080	1920 x 1080
FOCAL LENTH(ZOOM RATIO) ANALOG	4.44 ~ 142.6mm (Optical 32x)	4.44 ~ 142.6mm (Optical 32x)
FOCAL LENTH(ZOOM RATIO) IP	4.44 ~ 142.6mm (Optical 32x)	4.44 ~ 142.6mm (Optical 32x)
MAX.FRAMERATE(ANALOG)	30fps@1080p	30fps@1080p
MAX.FRAMERATE(IP)	Max. 60fps	Max. 60fps
IP GRADE	66/67	66/67
DIMENSION(WxDxH)mm	360x310x368	360x310x368
MATERIAL	SUS316L	SUS316L
COLOUR	SILVER	SILVER
WEIGHT	21kg	21kg
INSTALL AREA	OUTSIDE	OUTSIDE

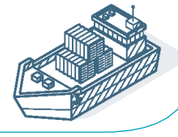
MODEL	MCT-250-FHW	MCT-SPZ-1WEX
HOUSING		
PAN-TILT	X	O
WIPER	O	O
FAN/HEAT	O	O
IR LAMP	OPTION	OPTION
RESOLUTION(ANALOG)	1920 x 1080	1920 x 1080
RESOLUTION(IP)	1920 x 1080	1920 x 1080
FOCAL LENTH(ZOOM RATIO) ANALOG	4mm fixed	4.44 ~ 142.6mm (Optical 32x)
FOCAL LENTH(ZOOM RATIO) IP	2.4mm fixed	4.44 ~ 142.6mm (Optical 32x)
MAX.FRAMERATE(ANALOG)	30fps@1080p	30fps@1080p
MAX.FRAMERATE(IP)	Max. 60fps	Max. 60fps
IP GRADE	66/67	66/67
DIMENSION(WxDxH)mm	150x210x198	353x443x485
MATERIAL	SUS316L	SUS316L
COLOUR	SILVER	SILVER
WEIGHT	18kg	45kg
INSTALL AREA	OUTSIDE	OUTSIDE

MCT-200-FHS	MCT-200-FHW	MCT-250-FHS
X	X	X
X	O	X
O	O	O
OPTION	OPTION	OPTION
1920 x 1080	1920 x 1080	1920 x 1080
1920 x 1080	1920 x 1080	1920 x 1080
4.44 ~ 142.6mm (Optical 32x)	4.44 ~ 142.6mm (Optical 32x)	4mm fixed
4.44 ~ 142.6mm (Optical 32x)	4.44 ~ 142.6mm (Optical 32x)	2.4mm fixed
30fps@1080p	30fps@1080p	30fps@1080p
Max. 60fps	Max. 60fps	Max. 60fps
66/67	66/67	66/67
150x210x198	150x210x198	150x210x198
SUS316L	SUS316L	SUS316L
SILVER	SILVER	SILVER
18kg	18kg	18kg
OUTSIDE	OUTSIDE	OUTSIDE

MCT-SFX-1WEX	MCT-150	MCT-100
X	O	X
O	X	X
O	O	O
OPTION	OPTION	OPTION
1920 x 1080	1920 x 1080	1920 x 1080
1920 x 1080	1920 x 1080	1920 x 1080
4.44 ~ 142.6mm (Optical 32x)	4.44 ~ 142.6mm (Optical 32x)	4.44 ~ 142.6mm (Optical 32x)
4.44 ~ 142.6mm (Optical 32x)	4.44 ~ 142.6mm (Optical 32x)	4.44 ~ 142.6mm (Optical 32x)
30fps@1080p	30fps@1080p	30fps@1080p
Max. 60fps	Max. 60fps	Max. 60fps
66/67	66/67	66/67
117x425x221	176X268X176	176X268X176
SUS316L	SUS316L	SUS316L
SILVER	SILVER	SILVER
12kg	6kg	6kg
OUTSIDE	OUTSIDE	OUTSIDE

VSAT Communication(V-Series)

Internet & Telephone using 3-Axis marine stabilized antenna
for the best maritime broadband services(Ku/C-Band)



GENERAL DESCRIPTION

Full 3-axis gyro stabilized tracking system that 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 commercial vessels as well as large and military vessels worldwide, who require the same Internet experience at sea that they use at home and at 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

Item	V61	V85	V100	V120	V240	V300
Dish	61Cm(24")	85Cm(33")	100Cm(39")	120Cm(47")	240Cm(95.5")	300Cm(118")
Dome(H x D)	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(25W)	620kg(25W)
G/T	14.0dB/K	17.7dB/K	19.7dB/K	20.4dB/K	20dB/K	20.4dB/K
Rx/Tx Gain	36dBi/36.5dBi	38.5dBi/38.9dBi	40.5dBi/41.1dBi	41.9dBi/43.7dBi	38dBi/41.6dBi	40.1dBi/43.7dBi
BUC	4/6/8W	4/6/8W	4/6/8/16/25W	4/6/8/16/25W	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°~130°	Auto/-130°~130°	Auto/-130°~130°	Auto/-130°~130°	Auto/-130°~130°	Auto/-130°~130°
El/Az	-10°~100°/Unlimite d-	-20°~105°/Unlimited	-20°~105°/Unlimited	-20°~110°/Unlimited	-20°~110°/Unlimited	-20°~110°/Unlimited
Cross Angle	+/-35°	+/-30°	+/-30°	+/-30°	+/-30°	+/-30°
Tracking Spd.	More 90°/sec	More 90°/sec	More 90°/sec	More 90°/sec	More 90°/sec	More 90°/sec
Damper	Rubber Damper	Rubber Damper	Wire Rope Isolator	Wire Rope Isolator	None	None
Temp/Humid.	-20°~ 55°/100%	-20°~ 55°/100%	-20°~ 55°/100%	-20°~ 55°/100%	-20°~ 55°/100%	-20°~ 55°/100%
GPS/Area	Built-In/W orldwide	Built-In/Worldwide	Built-In/Worldwide	Built-In/Worldwide	Built-In/Worldwide	Built-In/Worldwide
Gyro	NMEA/Synchr o/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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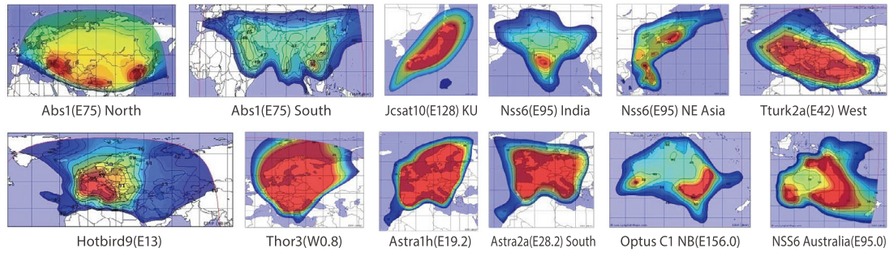
V240 V85 V61 V100 V120 V300

Coverage Maps of Satellite TVRO and VSAT

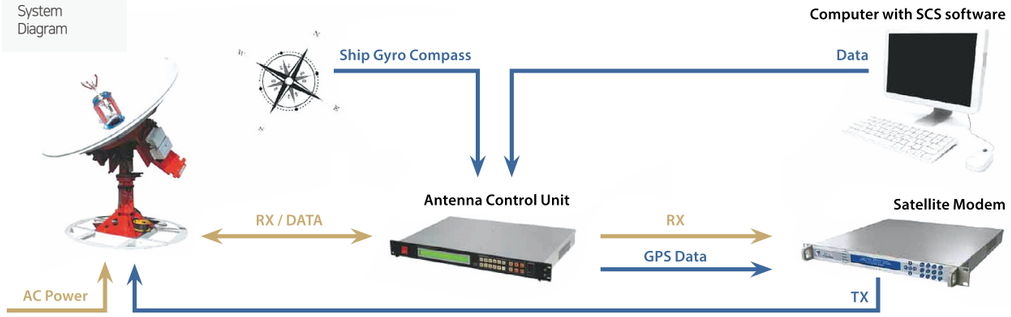
The coverage map is intended as a general guideline.



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

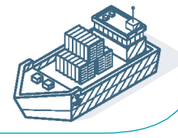
System Diagram



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

SAT TVRO System(T-Series)

Ku/C-Band 3-Axis marine stabilized antenna
for multiple satellite TV selection(45, 61, 85, 100, 120, 240, 300Cm)



GENERAL DESCRIPTION

The T-Series TVRO is a popular maritime satellite television system, made for high performance and superior quality by Marine Radio Co., Ltd. It has a dish from 40cm to 300cm, which 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 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 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

Item	T40	T60	T80	T100	T120	T240	T300
Dish	45Cm(18")	61Cm(24")	85Cm(33")	100Cm(40")	120Cm(48")	240Cm(95.5")	300Cm(118")
Dome(H x D)	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 / -20° ~ 110°	Unlimited / -20° ~ 110°	Unlimited / -15° ~ 120°	Unlimited / -15° ~ 120°
Skew Control	Auto/100°	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.	-25°~55°/ 100%	-25°~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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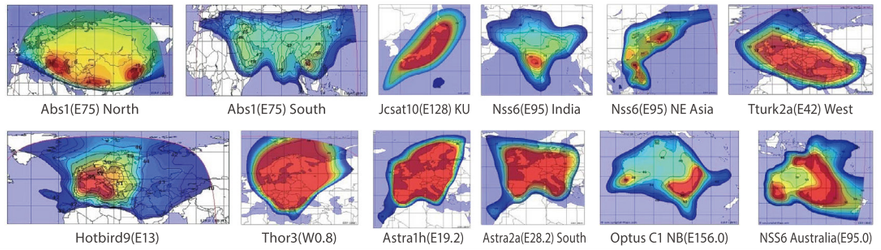
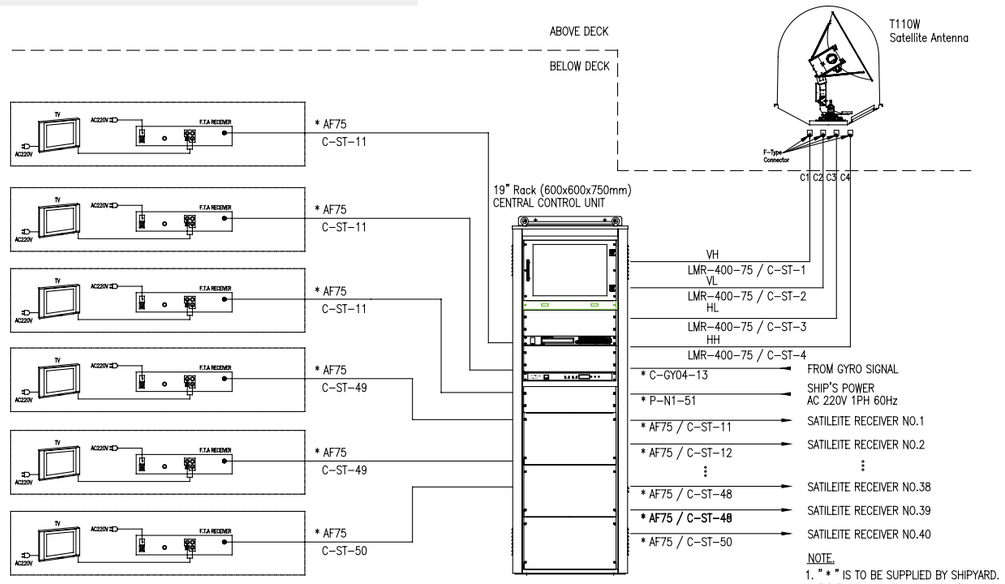
T240 T40 T60 T80 T100 T120 T300

Coverage Maps of Satellite TVRO and VSAT

The coverage map is intended as a general guideline.

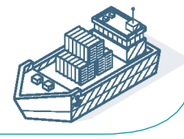


Wiring Diagram of TVRO System for Multiple TV(for Reference



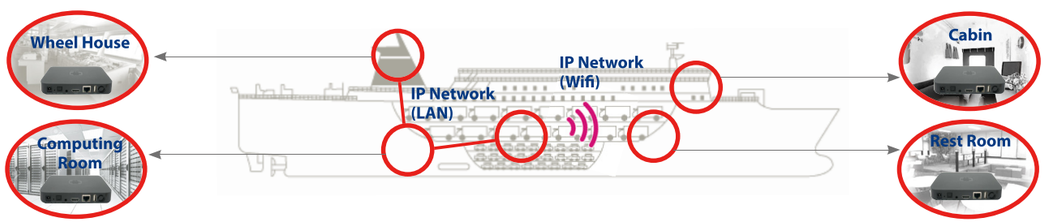
MRC Infotainment System(VOD, STB)

The infotainment system contains a media encoder,
video server and set top box.

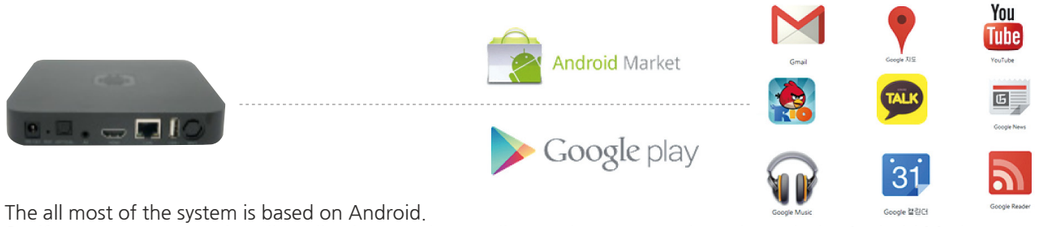


GENERAL DESCRIPTION

This compound word Infotainment is formed from the words Information and Entertainment.
MRC Infotainment system can provide Entertainment, such as Live-TV and VOD (Video on Demand) and Game and Music to the captain and crews. And optionally, this system can provide Information, such as E-mail, Web-Browsing, CCTV and NTP (Network Time Protocol) to the captain and crews, too.
As above, this system can provide some of working process and welfare at break time and cover some of security system.

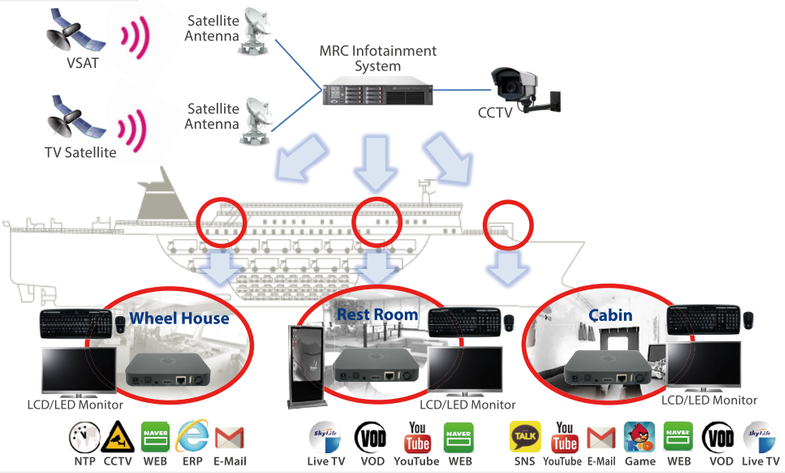


MRC Infotainment system operates on Ship IP network (Wire, wireless). Only a STB, you can enjoy all of the services anywhere in the vessel.



The all most of the system is based on Android.
So, if you want, you can install applications, such as mail, youtube, game and sns through the Android Market or Google Play-store.

Wiring Diagram of MRC Infotainment System



Product Information

Key Benefits	· Play video and audio by network · Use application into 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...)
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 ~ 24x 2.5" or 3.5" SATA 6Gb/s, 3Gb/s · NIC : 4 (Max:8 x Gigabit LAN or 4 x10 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. VOD Server(Desk top type)
· OS : Embedded Linux
· CPU : Quad-core Intel© Celeron© N3150 1.6GHz
· RAM : 8GB / 4GB SO-DIMM DDR3L-1600
· HDD : 4x 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(Android)
· OS : Android
· CPU : ARM
· RAM : 2GB
· HDD : 4x 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 x 1080@60/50 fps or 1920 x 1080@30/25 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

Network Application for Ship
(PC Network, Telephone, Internet, VOD, VCS, CCTV, Etc.)

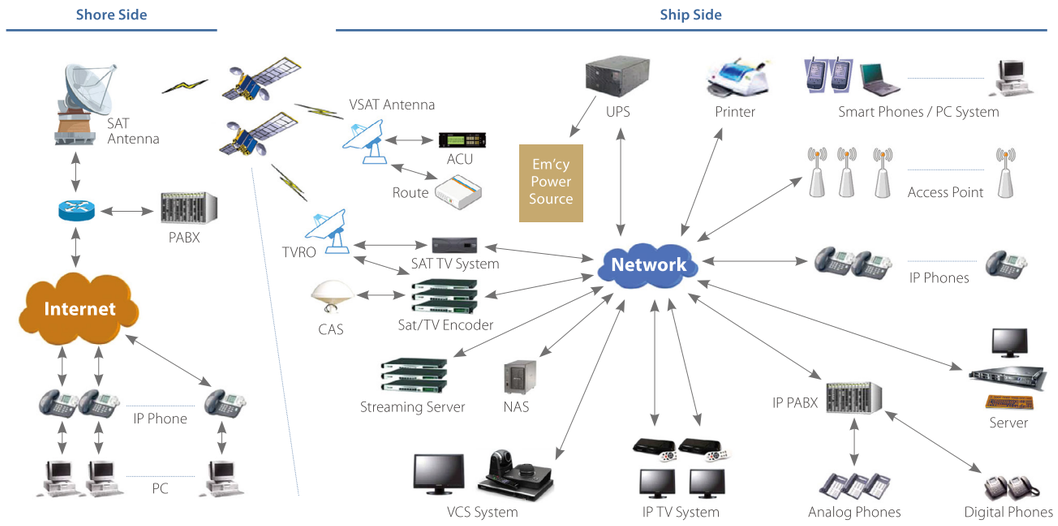
Product Information

LAN (Local Area Network) and 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.
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.
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.
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.

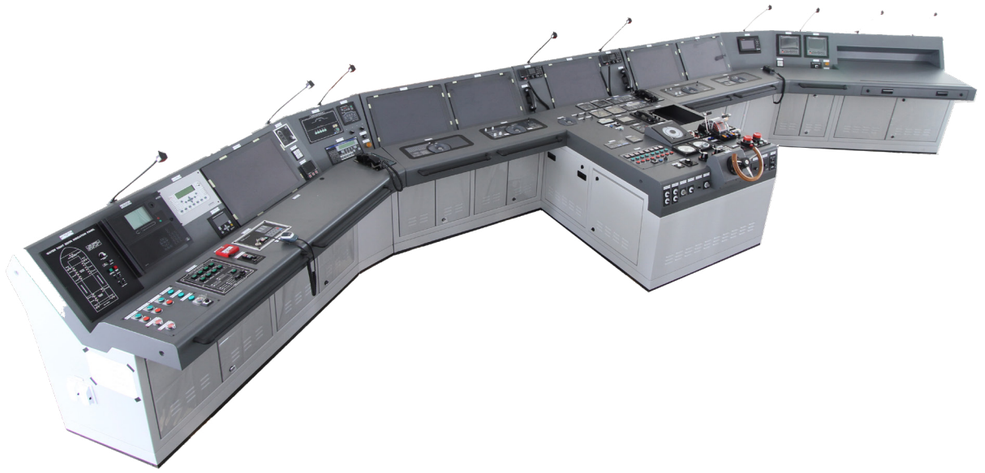
TVRO (Television Receive-Only)
TVRO is one of the satellite TV system. The term TVRO (C/Ku bands) is used in the North American continent to refer the Free to Air (FTA) systems of Europe, Asia, and other continents.

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.



Integrated Bridge System(IBS)

GENERAL DESCRIPTION

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 ship by qualified personnel . The IBS integrates on a consol at bridge 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 . Marine Radio Co. Ltd. (MRC) has been offering more than 3 00 IBSs to several Korean shipyards since 2004.