SPECIFICATIONS OF
Electronic Chart Display and Information System (ECDIS)
FMD-3200

1   MONITOR UNIT

1.1   Display type

MU-190	19-inch color LCD, 1280 x 1024 pixel (SXGA)
HD26T22-FUD-MA4-FAGA (option)	
	25.54-inch color LCD, 1920 x 1200 pixel (WUXGA)

1.2   Brilliance

MU-190	450 cd/m^2 typical
HD26T22-FUD-MA4-FAGA	350 cd/m^2 typical

1.3   Visible distance

MU-190	1.02 m nominal
HD26T22-FUD-MA4-FAGA	0.99 m nominal

1.4   Video interface   DVI standard, VESA-DDC2B

1.5   Brilliance control   RS-485, serial data control (DDC sentence)

2.   PROCESSOR UNIT

2.1   Display mode   HU/NU/CU/RU (True/Relative motion)

2.2   Chart materials   IMO/IHO S57-3 ENC or C-MAP CM-93/3 vectorized material
                                BA ARCS rasterized material

2.3   Own ship's indication   Own ship's mark/track and numeral position in lat/lon,
                                speed, course and heading

2.4   Target tracking (TT)   Range, bearing, speed, course, CPA/TCPA
                                Target information from AIS

2.5   Other information   Waypoint, Route monitoring and several alarms

2.6   Display features   Chart zoom-in/out, Cursor (EBL, VRM, parallel index lines),
                                Scroll, Symbol select, Palette select, One touch activation,
                                Electronic chart information auto-update

2.7   Position calculation   Navigation by result of positioning found with external sensor
                                Dead reckoning with gyro and log
                                Highly accurate position, speed and heading from Kalman filter

2.8   Route planning   Planning by rhumb line, great circle, Chart alarm, SAR composition,
                                Optimize

2.9   Route monitoring   Off-track display, Waypoint arrival alarm, Shallow depth alarm
                                Route creation; route data is transferred to radar

2.10   User chart creation   1500 points max. (300 points x 5 files)

2.11   Notes   Create and display notes data; transferred to radar

2.12   AIS safety message   Receive, create and transmit safety messages
                                View and modify own ship information stored in AIS transponder

2.13   NAVTEX message   Receive and display NAVTEX messages (position, etc.)

2.14   MOB (Man Overboard)   Position and other data at time of man overboard are recorded
                                MOB mark is displayed on the screen

2.15   Manual update   User enters, deletes and edits chart objects

2.16   Other functions   Radar overlay, Playback voyage data

3 INTELLIGENT HUB (OPTION)

3.1	Number of ports	8 ports (10/100/1000BASE-T)
3.2	Swiching method	Store and forward, non-blocking L2 switching
3.3	Capacitance of switching	16 Gbps
3.4	Flow Control	Full-Duplex (IEEE802.3x flow-controlled at automatic mode)
3.5	Ring aggregation	8 group max.
3.6	Spanning tree	STP(IEEE802.1D), RSTP(IEEE802.1w), MST(IEEE802.1s)
3.7	IGMP snooping	IGMP v1, v2, v3
3.8	Operation control	PING, SNMPv1, v2c, v3
3.9	VLAN	Port-base VLAN, IEEE802.1Q Tag VLAN supported, VLAN ID：1 to 4094, VLAN registration：128 group
3.10	Multiple VLAN	Communication between isolated ports is disabled
3.11	Cast control	Broadcast, Multicast suppression

4 RADAR OVERLAY (OPTION)

4.1	Picture color	Radar picture: 256 colors
4.2	Range	0.125 to 96 NM
4.3	Display mode	Heading-up, North-up (heading data required)

5 INTERFACE

5.1 Processor unit (EC-3000)

Number of port

Serial	8 ports (IEC61162-1/2: 4 ports, IEC61162-1: 4 ports)
Digital input	1 port: contact signal, 100 ohm max. or 24VDC input
Alarm output	6 ports: contact signal, load current 250 mA (Normal close: 2, Normal open: 2, System fail: 1, Power fail: 1)
DVI output	3 ports: DVI-D (2), DVI-I or RGB picture data (1 port for VDR)
USB	4 ports (3 ports for control units)
LAN	2 ports: Ethernet 1000Base-T for local communication

Data sentences

Input ABK, ACN, ALC, ALF, ALR, ARC, CUR, DBT, DPT, DTM, ETL, GGA, GLL, GNS, HBT, HDT, HTD, MTW, MWV, NRX, OSD, PRC, RMC, ROR, ROT, RPM, RRT, RSA, THS, TRC, TRD, TTD, TTM, VBW, VDM, VDO, VDR, VHW, VSD, VTG, XDR, ZDA

Output ABM, ACK, ACN, ALC, ALF, ARC, BBM, DDC, EVE, HBT, HTC, OSD, RRT, VBW, VDR, VSD, XTE

5.2 Sensor adapter (option)

MC-3000S (serial)	8 ports: I/O, IEC61162-1/2: 4 ports, IEC61162-1: 4 ports
MC-3010A (analog)	3 ports: Input, -10 to +10 V, 0 to 10 V or 4 to 20 mA
MC-3020D (digital-in)	8 ports: relay contact, logics set from program
MC-3030D (digital-out)	8 ports: relay contact, normal open and normal close available

5.3 Ethernet interface for IEC61162-450 (EC-3000)

Port (LAN2) 1000Base-T, IPv4, 8P8C connector

Data sentences

Input ABK, ACN, ALC, ALF, ALR, ARC, CUR, DBT, DPT, DTM, ETL, GGA, GLL, GNS, HBT, HDT, HTD, MTW, MWV, NRX, OSD, PRC, RMC, ROR, ROT, RPM, RRT, RSA, THS, TRC, TRD, TTD, TTM,

VBW, VDM, VDO, VDR, VHW, VSD, VTG, XDR, ZDA

Output ABM, ACK, ACN, ALC, ALF, ARC, BBM, DDC, EVE, HBT, HTC, OSD, RRT, VBW, VDR, VSD, XTE

IEC61162-450 transmission group

Input MISC, TGTD, SATD, NAVD, VDRD, RCOM, TIME, PROP, USR1 to USR8

Output Arbitrary (default: TGTD)

Multicast address 239.192.0.1 to 239.192.0.16

Destination port 60001 to 60016

Re-transmittable binary image transfer

Multicast address 239.192.0.26 to 239,192.0.30

Destination port 60026 to 60030

Other Network function excepted IEC61162-450

HTTP: *.*.*.*:80, XML-RPC: *.*.*.*:6403

Syslog: 239.192.0.254:514

5.4 Ethernet interface for IEC61162-450 (MC-3000S)

Port 100Base-TX, IPv4, 8P8C connector

Maximum data rate 800 sps

Data sentences Output: XDR

IEC61162-450 transmission group

Input MISC, TGTD, SATD, NAVD, VDRD, RCOM, TIME, PROP, USR1 to USR8

Output Arbitrary (default: MISC)

Multicast address 239.192.0.1 to 239.192.0.16

Destination port 60001 to 60016

Re-transmittable binary image transfer

Multicast address 239.192.0.26 to 239,192.0.30

Destination port 60026 to 60030

Other Network function excepted IEC61162-450

HTTP: *.*.*.*:80, XML-RPC: *.*.*.*:6403

Syslog: 239.192.0.254:514

6 POWER SUPPLY

6.1 Monitor unit

MU-190 100-230 VAC: 0.7-0.4 A, 1 phase, 50/60 Hz

HD26T22-FUD-MA4-FAGA (option)

115/230 VAC: 1.1-0.5 A, 1 phase, 50/60 Hz, 24 VDC: 5.2 A

6.2 Processor unit 100-115/220-230 VAC: 1.5-0.7 A, 1 phase, 50/60 Hz

6.3 Sensor adapter (option) 24 VDC: 1.4 A (for 11 units), Input to MC-3000S, the sources of other sensor adapters are fed from MC-3000S

6.4 HUB (HUB-3000, HUB-100, option) 100-230 VAC: 0.1 A, 1 phase, 50/60 Hz

7 ENVIRONMENTAL CONDITION

7.1 Ambient temperature -15°C to +55°C

7.2 Relative humidity 95% or less at +40°C

7.3 Degree of protection

Monitor unit IP22

	HUB	IP22 (HUB-3000), IPX0 (HUB-100)
	Others	IP20 (IP22 by specified mounting method, option)
7.4	Vibration	IEC 60945 Ed.4

8   COATING COLOR

8.1	Monitor unit	N2.5 (fixed)
8.2	Processor/control unit	N3.0 (fixed)
8.3	Sensor adapter	N3.0
8.4	HUB	N2.5 (HUB-3000), N3.0 (HUB-100)
8.5	Console	2.5GY5/1.5 (standard) , 7.5BG7/2, 2.5G7/2, N7.5