SPECIFICATIONS OF
Electronic Chart Display and Information System (ECDIS)
FMD-3100

1   PANEL COMPUTER UNIT

1.1	Display type	24-inch color LCD, 1,920 x 1,080 pixel (Full-HD)
1.2	Brilliance	300 cd/m^2 typical
1.3	Viewable distance	0.952 m nominal
1.4	Display mode	HU (RM)/NU (TM/RM)/CU (TM/RM)/RU (RM)
1.5	Chart materials	IMO/IHO S57/S63 ENC or C-MAP vectorized material
		BA ARCS rasterized material
1.6	Own ship's indication	Own ship's mark/track and numeral position in lat/lon,
		speed, course and heading
1.7	Target tracking (TT)	Range, bearing, speed, course, CPA/TCPA
		Target information from AIS
1.8	Other information	Route information, Waypoint, Route monitoring and several alarms
1.9	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
1.10	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
1.11	Route planning	Planning by rhumb line, great circle, Chart alarm, Route creation,
		SAR composition, Optimize
1.12	Route monitoring	Off-track display, Waypoint arrival alarm, Shallow depth alarm,
		Route data is transferred to radar
1.13	User chart creation	1500 points max. (300 points x 5 files)
1.14	Notes	Create and display notes data; transferred to radar
1.15	AIS safety message	Receive, create and transmit safety messages
		View and modify own ship information stored in AIS transponder
1.16	NAVTEX message	Receive and display NAVTEX messages (position, etc.)
1.17	MOB (Man Overboard)	Position and other data at time of man overboard are recorded
		MOB mark is displayed on the screen
1.18	Manual update	User enters, deletes and edits chart objects
1.19	Other functions	Radar overlay, Playback voyage data

2   INTELLIGENT HUB (OPTION)

2.1	Number of ports	8 ports (10/100/1000BASE-T)
2.2	Swiching method	Store and forward, non-blocking L2 switching
2.3	Capacitance of switching	16 Gbps
2.4	Flow Control	Full-Duplex (IEEE802.3x flow-controlled at automatic mode)
2.5	Ring aggregation	8 group max.
2.6	Spanning tree	STP(IEEE802.1D), RSTP(IEEE802.1w), MST(IEEE802.1s)
2.7	IGMP snooping	IGMP v1, v2, v3

2.8	Operation control	PING, SNMPv1, v2c, v3
2.9	VLAN	Port-base VLAN, IEEE802.1Q Tag VLAN supported,
		VLAN ID：1 to 4094, VLAN registration：128 group
2.10	Multiple VLAN	Communication between isolated ports is disabled
2.11	Cast control	Broadcast, Multicast suppression

3   RADAR OVERLAY (OPTION)

3.1	Picture color	Radar picture: 256 colors
3.2	Range	0.125 to 96 NM
3.3	Display mode	Heading-up, North-up (heading data required)
3.4	Other functions	Off-center, Echo trail, Interference rejection, Anchor watch

4   INTERFACE

4.1   Panel Computer Unit (PCU-3000)

Serial I/O — 4 ports (IEC61162-1/2: 2 ports, IEC61162-1: 2 ports)

Data sentences (IEC61162-1/2)

Input — ABK, ACN, ALC, ALF, ALR, ARC, CUR, DBT, DPT, DTM, ETL, GGA, GLL, GNS, HBT, HDT, MTW, MWV, NRX, OSD, PRC, RMC, ROR, ROT, RPM, RRT, RSA, RSD, 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, OSD, RRT, VBW, VDR, VSD, XTE

DVI output — 2 ports: DVI-D (DVI1), DVI-I or RGB (DVI2)
Note: Full HD monitor required

LAN — 1 port: Ethernet, 1000Base-T (for local communication)

USB — 4 ports (1 port for control unit), USB2.0 (type-A)

4.2   Sensor adapter (option)

MC-3000S (serial) — 8 ports: I/O, IEC61162-1/2: 4 ports, IEC61162-1: 4 ports

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

4.3   Ethernet interface for IEC61162-450 (PCU-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, MTW, MWV, NRX, OSD, PRC, RMC, ROR, ROT, RPM, RRT, RSA, RSD, 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, OSD, RRT, VBW, VDR, VSD, XTE

IEC61162-450 transmission group

Data sentences

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

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

Port	100Base-TX, IPv4, 8P8C connector
Maximum data rate	800 sps
Data sentence	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

Other Network function excepted IEC61162-450

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

Syslog: 239.192.0.254:514

5   POWER SUPPLY

5.1   Panel Computer unit   100-230 VAC: 0.7-0.4 A, 1 phase, 50/60 Hz or 24VDC: 3.0A

5.2   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

5.3   Radar connection box (option)   24 VDC: 0.6 A

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

6   ENVIRONMENTAL CONDITION

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

6.2   Relative humidity   93% or less at +40°C

6.3   Degree of protection

Panel computer unit   IP65 (panel), IP22 (chassis)

Control unit/ Radar connection box/ Intelligent HUB (HUB-3000)   IP22

Sensor adapter   IP20

Switching HUB (HUB-100)   IPX0

6.4   Vibration   IEC 60945 Ed.4

7   UNIT COLOR

7.1   Panel computer unit   N2.5 (fixed)

7.2   Sensor adapter   N3.0

7.3   Radar connection box   N2.5

7.4   HUB   N2.5 (HUB-3000), N3.0 (HUB-100)