FURUNO

Installation Manual
Electronic Chart Display and Information System (ECDIS)
FEA-2107/2107-BB/2807

FURUNO ELECTRIC CO., LTD.

ECF

(Elemental Chlorine Free)

The paper used in this manual
is elemental chlorine free.

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⚠ SAFETY INSTRUCTIONS

⚠ WARNING

⚠ **Do not open the equipment unless totally familiar with electrical circuits and service manual.**

ELECTRICAL SHOCK HAZARD

Only qualified personnel should work inside the equipment.

Turn off the power at the mains switch-board before beginning the installation.

Fire, electrical shock or serious injury can result if the power is left on or is applied while the equipment is being installed.

Do not install the monitor unit, processor unit or control unit where they may get wet from rain or water splash.

Water in the units can result in fire, electrical shock, or damage the equipment.

Be sure that the power supply is compatible with the voltage rating of the equipment.

Connection of an incorrect power supply can cause fire or damage the equipment .

Use only the specified power cable.

Fire or damage to the equipment can result if a different cable is used.

⚠ WARNING

The PCI-951/PCG820 board is equipped with a litium battery. The lithium battery shouldbe replaced only in the factory.

There is a danger of explosion if the wrong type of battery is used for replacement.

⚠ CAUTION

Attach securely protection earth to the ship's body.

The protection earth (grounding) is required to the AC power supply to prevent electrical shock.

Observe the following compass safe distances to prevent deviation of a magnetic compass:

	Standard compass	Steering compass
Processor Unit (EC-1000C)	1.65 m	1.05 m
LAN Adapter (EC-1010)	1.05 m	0.70 m
B Adapter (EC-1020)	0.80 m	0.50 m
Control Unit (RCU-018)	0.30 m	0.30 m
Control Unit (RCU-015)	0.95 m	0.60 m
Control Unit (RCU-016)	0.65 m	0.45 m
Monitor Unit (MU-201CE-DV15)	2.25 m	1.40 m
Monitor Unit (MU-231CE-DV15)	2.55 m	1.55 m
Switching HUB (HUB-100)	1.00 m	0.60 m

EQUIPMENT LISTS

Standard Supply

Name	Type	Code No.	Qty	Remarks
Monitor Unit	MU-201CE-DVI5	-	1	For FEA-2107, w/DVI cable (5 m), SP03-14700, CP03-29020, FP03-09810
	MU-231CE-DV15	-		For For-2807, w/DVI cable (5 m), SP03-14700, CP03-29020, FP03-09810
Processor Unit	EC-1000C	-	1	Standard type: Processor unit (EC-1000C w/S-DONGLE)
	EC-1000C-R	-		Radar Overlay type: Processor unit (EC1000C w/ S-DONGLE and ROV board)
	EC-1000C-C	-		Conning type: Processor unit (EC-1000C, w/S-DONGLE and VIDEO board)
	EC-1000C-CR	-		Conning/Radar Overlay type: Processor unit (EC-1000C, w/S-DONGLE, ROV board and VIDEO board)
Control Unit	RCU-018-E	-	1	Full keyboard type, w/CP03-25604, FP03-09850
	RCU-015FEA-E	-	1	Trackball type, w/CP03-25604, FP03-09860
LAN Adapter	EC-1010	-	1	
B Adapter	EC-1020	-	1	For EC-1000C-C and EC-1000C-CR
Spare Parts	SP03-14800	000-083-570	1	Fuses
	SP03-14700	008-549-730	1	Fuses, for AC spec.
Accessories	FP03-10700	000-087-221	1	For processor unit
	FP03-09810	008-536-010	1	For Monitor unit
	FP03-09850	008-535-610	1	For Control unit RCU-018-E
	FP03-09860	008-535-690	1	For Control unit RCU-015FEA-E
Installation Materials	CP03-29020	000-082-651	1	For Monitor unit
	CP03-29100	000-087-219	1	For EC-1000C-R Processor unit
	CP03-25604	008-539-850	1	For Control unit RCU-015/018-E
	CP03-29110	000-083-624	1	For EC-1000C-C/CR Processor unit
	CP03-29500	000-083-501	1	For EC-1000C/C-R, D-SUB cable 5 m
	CP03-29510	000-083-502	1	For EC-1000C/C-R, D-SUB cable 10 m
	CP03-29600	000-083-507	1	For EC-1000C-C/CR, D-SUB 5 m
	CP03-29610	000-083-508	1	For EC-1000C-C/CR, D-SUB 10 m

Optional Supply

Name	Type	Code No.	Qty	Remarks
LAN Adapter	EC-1010	-	1	
B Adapter	EC-1020	-	1	
Remote Control Unit	RCU-016	-	1	Remote type, w/CP03-25604, FP03-09860
Monitor Unit	MU-201CE	-	1	
Rectifier	PR-62	000-013-484	1	For 100 VAC
		000-013-487	1	For 230 VAC
Accessory	FP03-09820	008-535-560	1	For MU-201CE, hanger
	FP03-09830	008-536-020	1	For MU-231CE, hanger
Hand Grip	FP03-09840	008-535-570	1	
Dust Cover	03-163-1201	100-307-260	1	For MU-201CE
	03-163-2101	100-307-270	1	For MU-231CE
Clamp Plate	OP03-182	008-535-620	1	For RCU-018
Flush Mount Kit	FP03-09870	008-535-630	1	For RCU-018
Coupling Pedestal	OP03-183	008-535-640	1	For RCU-018
	OP03-184	008-535-650	1	For RCU-018 and MU-231CE
Flush Mount Kit	FP03-09870	008-535-630	1	For RCU-015FEA
Switching HUB	HUB-100	000-083-353	1	w/operator's manual
Installation Materials	CP03-28900	000-082-658	1	LAN cable FR-FTPC-CY 10m, CP03-28901
	CP03-28910	000-082-659	1	LAN cable FR-FTPC-CY 20m, CP03-28901
	CP03-28920	000-082-660	1	LAN cable FR-FTPC-CY 30m, CP03-28901
Cable assy	3COX-2P-6C	000-146-501	1	For external monitor (analog), 10 m
	NH8P-DSUB15BNC2-10M	000-151-857	1	For connecting with a radar
	NH8P-DSUB15BNC2-20M	000-151-858	1	
	NH8P-DSUB15BNC2-30M	000-151-859	1	
	XH8P-NH8P-L10M	000-151-855	1	For connecting Radar switch and radar
	XH8P-NH8P-L20M	000-151-933	1	
	XH8P-NH8P-L30M	000-151-934	1	
	DSUB9P-DSUB9P-L10.0M	000-150-676	1	Between Monitor/Processor unit
	P5E-4PTX-BL L=10M	000-147-510	1	LAN cable (cross)
	P5E-4PTX-BL L=2M	000-150-917	1	
	XH10P-DS-5P L=2.3M	000-150-001	1	For Control unit
	XH10P-DS-5P L=20M	000-149-745	1	
	XH10P-DS-5P L=30M	000-149-746	1	
VIDEO PCB	G45FMDVP32DBF	000-165-667-10	1	Conning Board
ROV PCB	301074	000-150-680	1	Radar Overlay Board
Radar Switch	CP03-29501	008-544-940	1	For 12 VDC, for EC-1000C-R/CR
	CP03-29502	008-544-950		For 24 VDC, for EC-1000C-R/CR

SYSTEM CONFIGURATIONS

The ECDIS EC1000 Workstation displays electronic seachart and operates as user interface for the system. The ECDIS processor is connected to various sensors, and performs navigation calculations and route monitoring. Connections to interfaces are typically made with a LAN (Local Area Network) Adapter. The ECDIS processor can be used for both route planning and route monitoring. If required, there can be additional identical ECDIS EC1000C Workstation(s) connected to the same LAN to share the tasks of the ECDIS. If the system incorporates more than one ECDIS EC1000C Workstation, one or more workstation(s) can be used as a user interface (with "full" usage rights) and one or more workstation(s) may be used as planning stations (usage rights as "planning"). If the system has two Workstations connected together as multi-workstations, the system keeps data on the workstations harmonised and also tracks selections and settings made on any workstation.
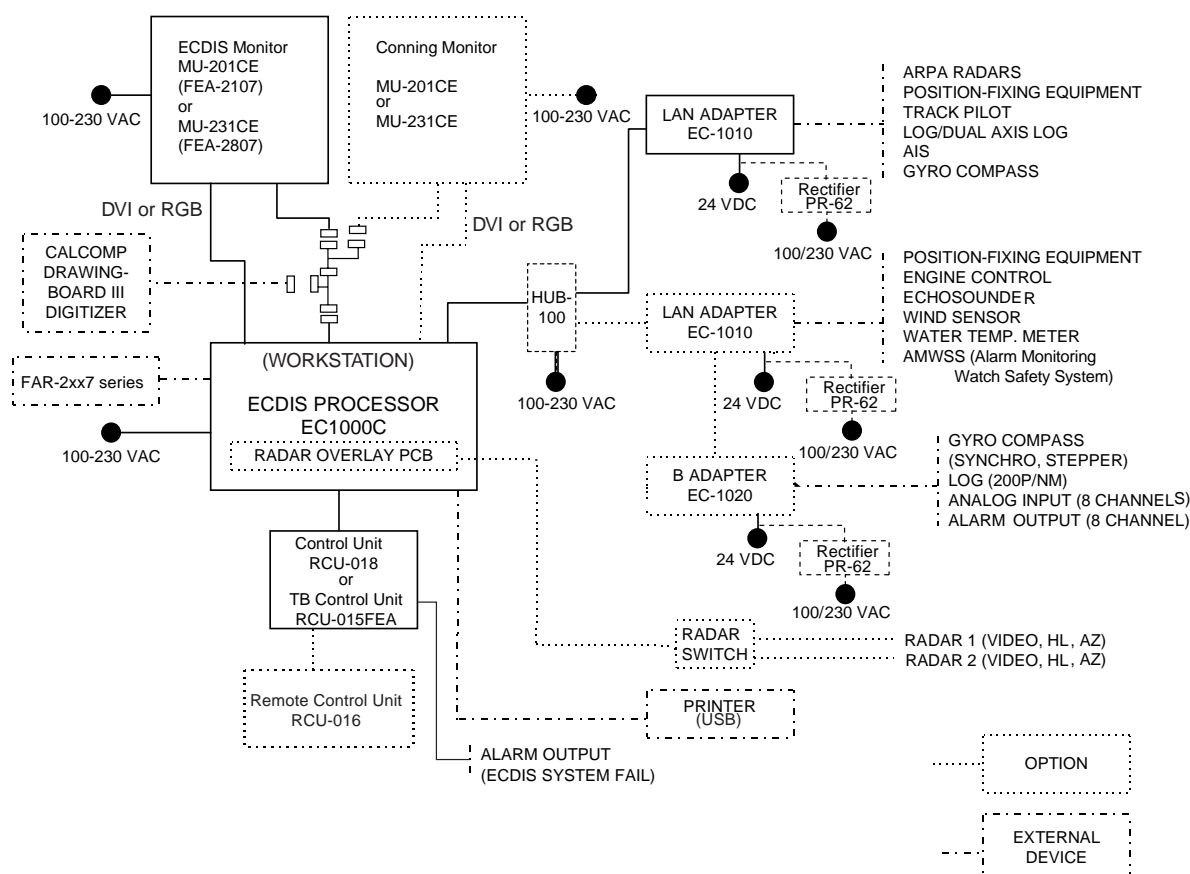
Typically there can be the following kinds of workstation configuration:
Mode as **Single**, only one workstation is used in the system.
Mode as **Multi**, two or more workstations are used in the system where usage rights and sensor source of workstations can be changed by the user.
For more information, see the operator's manual.

One workstation

Multi-workstation configuration

In the multiple workstation configuration, there can be two workstations connected together by a Local Area Network (LAN). In this configuration, one workstation is used as the "sensor source" for navigation sensors and the other workstation(s) are using the sensor source workstation to communicate with sensors, receiving and transmitting data from/to workstation via the LAN. In the multi-workstation configuration (two fully redundant navigation workstations), where navigation sensors are connected to two workstations, the sensor source may be changed and still receive and transmit information from/to the system and to/from navigation sensors. User-defined workstation is responsible for sensors.
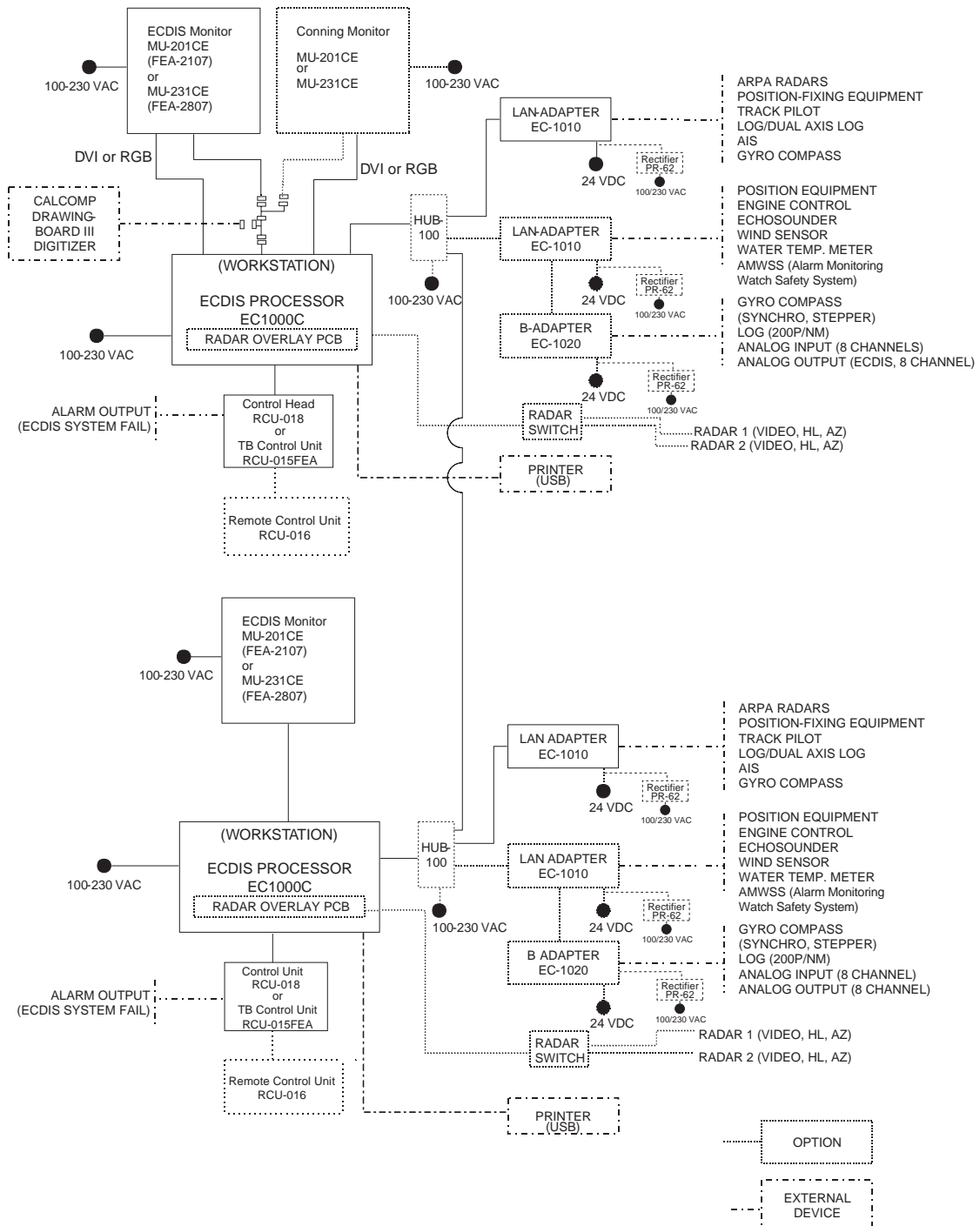
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1. MOUNTING

1.1 Monitor Unit

The monitor unit can be flush mounted in a console panel, or mounted on a desktop using the optional accessories.

Mounting considerations

When selecting a mounting location, keep in mind the following points:

- Select a location where the display unit can be viewed conveniently and where the screen can be viewed while facing towards the bow.

- Locate the unit out of direct sunlight and away from heat sources because of heat that can build up inside the cabinet.

- Locate the equipment away from places subject to water splash and rain.

- Leave sufficient space on the sides and rear of the unit to facilitate maintenance.

- A magnetic compass will be affected if the monitor unit is placed too close to the magnetic compass. Observe the compass safe distances on page ii to prevent deviation of a magnetic compass.

Installation for TCS

- **TCS with separate Conning Display:** To fulfill this requirement, certain installations may require 21" monitor and separate Conning display.

- **TCS without separate Conning Display (Single screen ECDIS):** Require that certain TCS related data is available in main Conning position of the vessel. To fulfill this requirement, certain installations may require large 23" monitor alternative for single screen installation. The viewing distance from main Conning position to installation place of single screen ECDIS are 120 cm (MU-231CE) and 108 cm (MU-201CE). In this mode, TCS related data fields should always be displayed. To prevent this fields obscured by other popular operational dialogs, set dialog box to open next to left of sidebar. See "3.3.3 Activating dialog boxes on the display" in Operator's Manual.
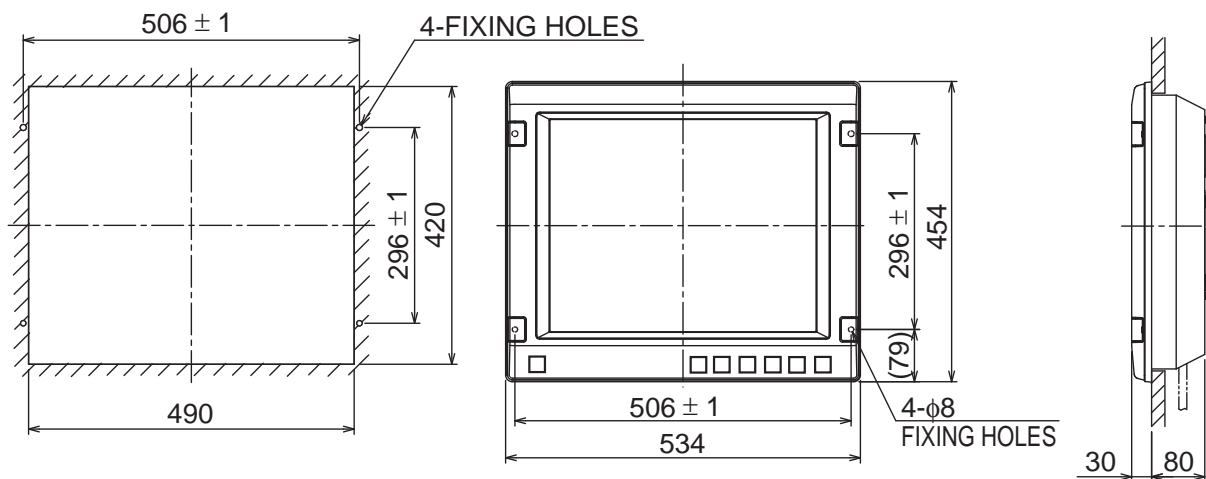
Mounting procedure
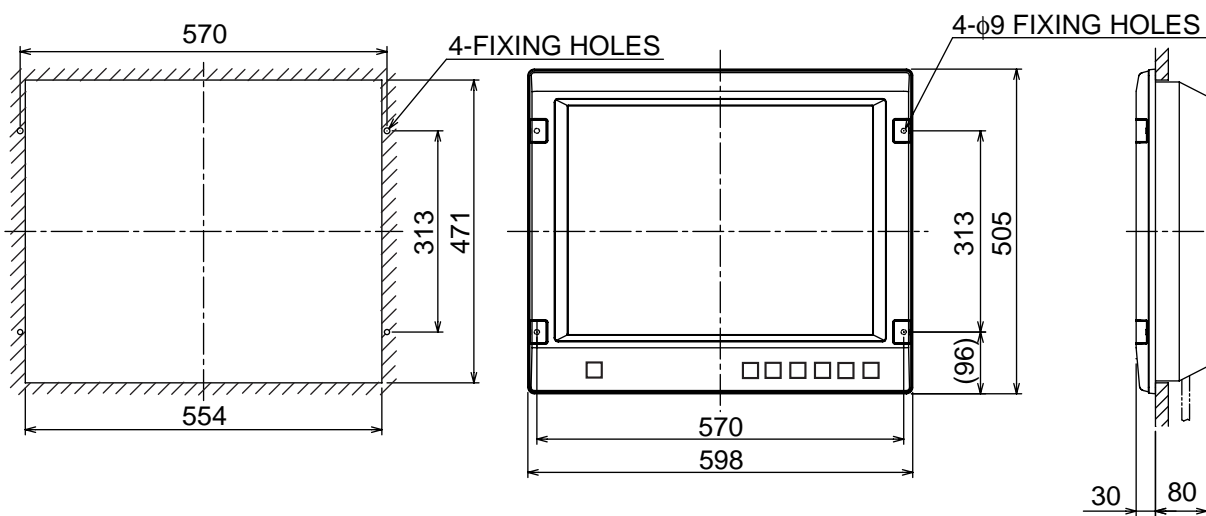
Flush mounting

Follow the procedure below to mount the monitor unit in a console panel.

1. Make cutout in mounting location referring to the outline drawing shown on the next page.
2. Insert the monitor unit to the hole and fix it by four self-tapping screws (6x30).
3. Attach panel hooks near the fixing holes. These are used to pull out the monitor unit from a console panel for servicing.
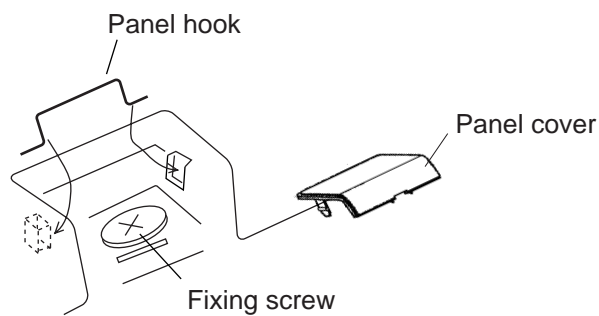4. Attach four panel covers to the fixing holes.

1. MOUNTING

506 ± 1   4-FIXING HOLES

296 ± 1   420

490

506 ± 1   454   296 ± 1   (79)

534   4-φ8
FIXING HOLES

30   80

Monitor unit MU-201CE

570   4-FIXING HOLES   4-φ9 FIXING HOLES

313   471

554

570   505   313   (96)

598

30   80

Monitor unit MU-231CE

Flush mounting of monitor unit

Panel hook

Panel cover

Fixing screw

Attaching panel hook and panel cover

Note: If you need to remove the monitor unit from the panel, remove the four panel covers with your fingernail and use two panel hooks supplied as accessories to lift the monitor unit.

1-2

Desktop mounting

Use the optional accessories to mount the monitor unit on a desktop.

- Necessary parts
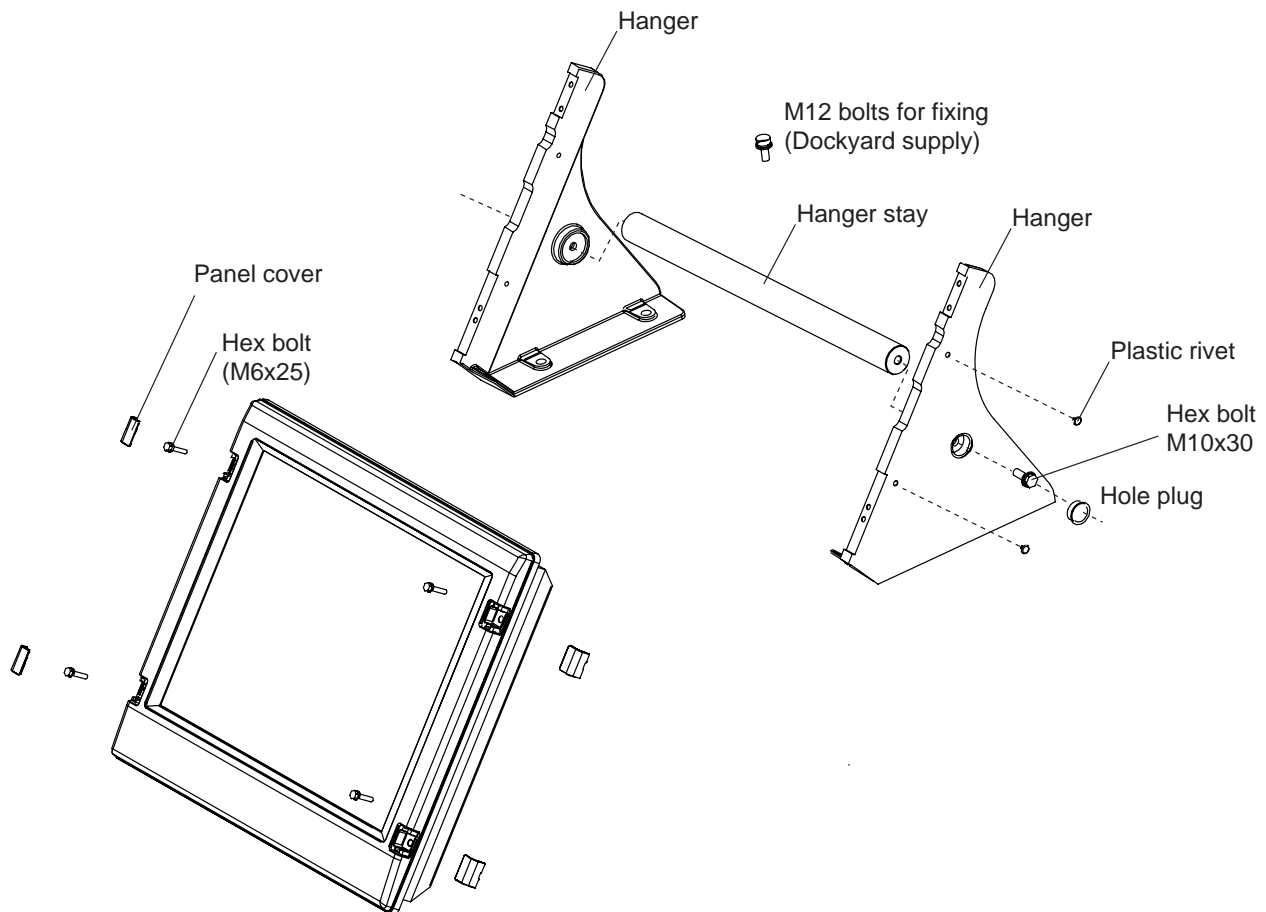 For MU-201CE: FP03-09820 (Code No.: 008-535-560)
  For MU-231CE: FP03-09830 (Code No.: 008-536-020)

Contents of FP03-09820/09830

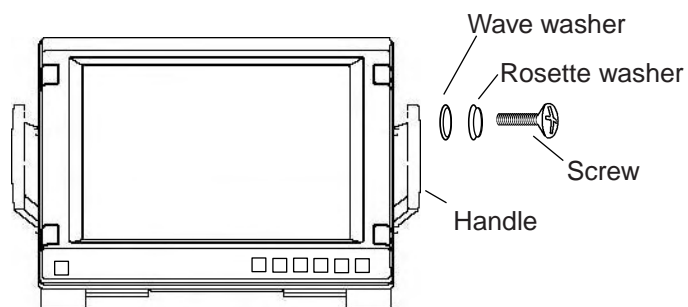| Name	Type	Code No.	Qty	Remarks
Hanger L	03-163-1111-0	100-305-140	1	
Hanger R	03-163-1112-0	100-305-180	1	
Hanger stay	03-163-1113	100-305-370	1	For MU-201CE
	03-163-2071	100-305-370	1	For MU-231CE
Hole plug	CP-30-HP-13	000-147-143	2	
Plastic rivet	KB-13 Rivet Black	000-570-276	4	
Hex. bolt	M6x25	000-802-771	4	
Hex. bolt	M10x30	000-802-182	2	
Spring washer	M10	000-864-261	2	
Flat washer	M10	000-864-131	2	

1. Assemble two hangers and hanger stay with two hex bolts (M10x30), flat washers and spring washers and cover each hex bolt with hole plug.
2. Fix the above assembly to the mounting location with four hex bolts (M12, dockyard supply).
3. Fasten the monitor unit to the mounting hanger assembly with four hex bolts (M6x25, supplied).
4. Cover each hex bolt with a panel cover.
5. Cover each hole for hand grip with a plastic rivet (4 pcs).

Hanger

M12 bolts for fixing
(Dockyard supply)

Hanger stay

Hanger

Panel cover

Hex bolt
(M6x25)

Plastic rivet

Hex bolt
M10x30

Hole plug

Monitor Unit

The hand grip is optionally available for the desktop mounting.

Wave washer

Rosette washer

Screw

Handle

Monitor unit, attaching hand grip

1.2 Control Unit

The control unit may be mounted on a desktop, with or without the KB fixing metal (supplied), which mounts the control unit at an angle.

Mounting considerations

When selecting a mounting location, keep in mind the following points:

- Select a location where the control unit can be operated conveniently.

- Locate the unit away from heat sources because of heat that can build up inside the cabinet.

- Locate the equipment away from places subject to water splash and rain.

- Determine the mounting location considering the length of the signal cable between the control unit and the processor unit. (The length of the signal cable is 10/20/30 m).

- A magnetic compass will be affected if the control unit is placed too close to the magnetic compass. Observe the compass safe distances on page ii to prevent deviation of a magnetic compass.

Fixing without KB fixing plate

1. Fix the KB fixing plate to the rear panel of the control unit.
2. Attach cushions (three for RCU-018, two for RCU-015FEA) to the bottom of the control unit as shown below.
3. Fix it to a desired location with self-tapping screws.


KB fixing plate   Cushion
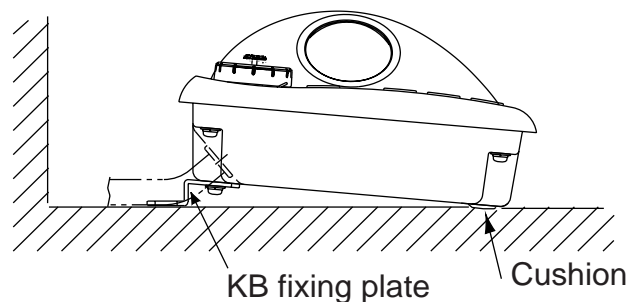
RCU-018/0RCU-15FEA, side view

Fixing without KB fixing metal

1. Drill four mounting holes of 5 mm diameter referring to the outline drawing at the back of this manual.
2. Fix the control unit with four screws (M4) from under side of the desktop. (The M4 screws with a sufficient length for the thickness of the desktop should be provided locally.)
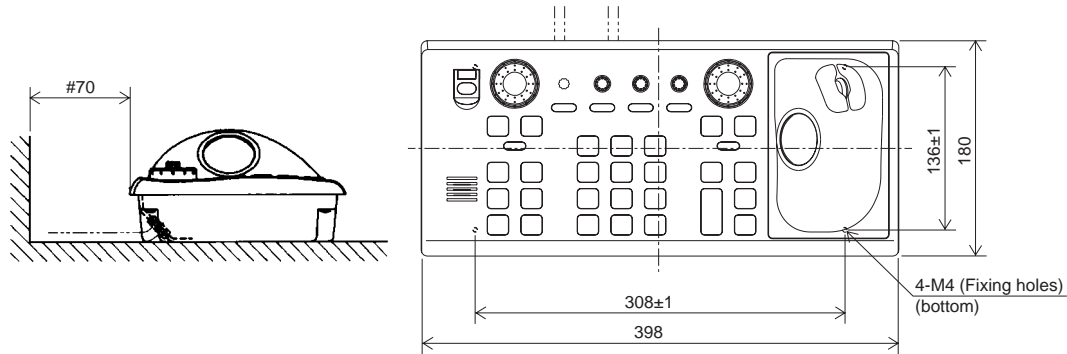
RCU-018
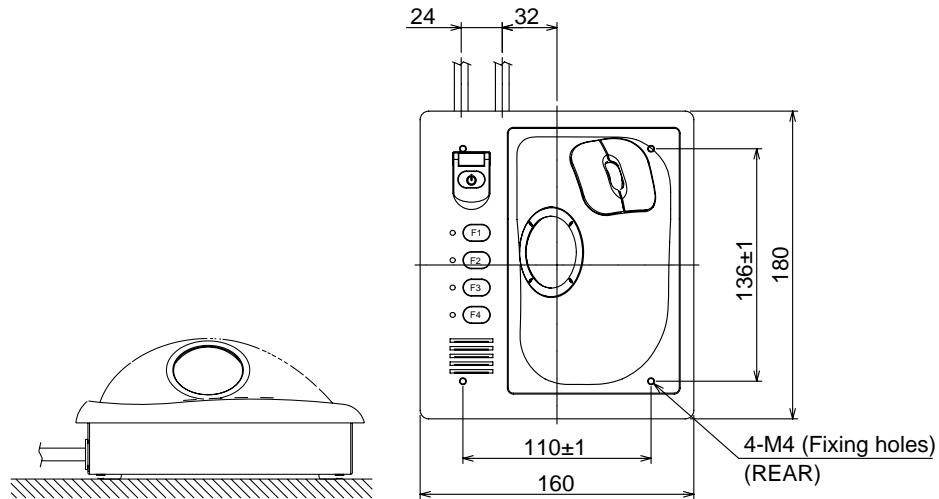
RCU-015FEA/16

Flush mounting

Use the optional flush mount kit FP03-09870 to mount the control unit RCU-018/015FEA and/or RCU-016 to a console panel.
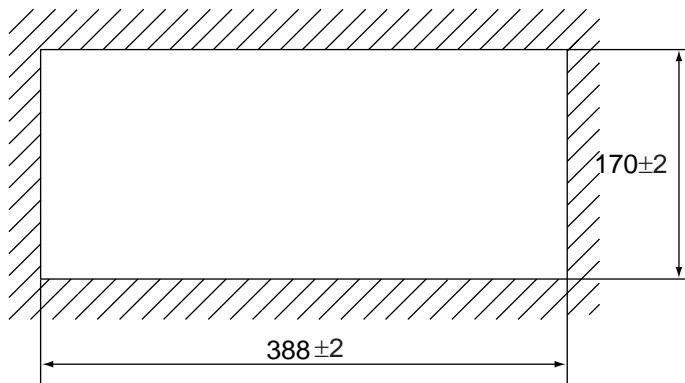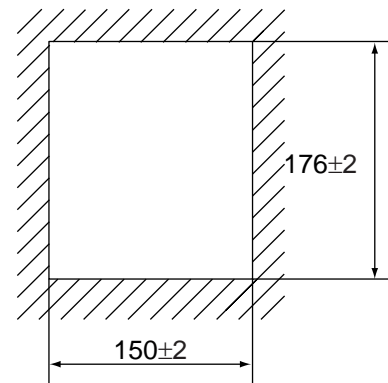
Name: Flush mount kit
Type: FP03-09870
Code No.: 008-535-630

No.	Name	Type	Code No.	Qty
1	Mount plate	03-163-7531	100-306-260	4
2	Hex. nut	M5	000-863-206	4
3	Wing screw	M5x40	008-047-990	4

1. Prepare a cutout in the mounting location as shown in the figure below.
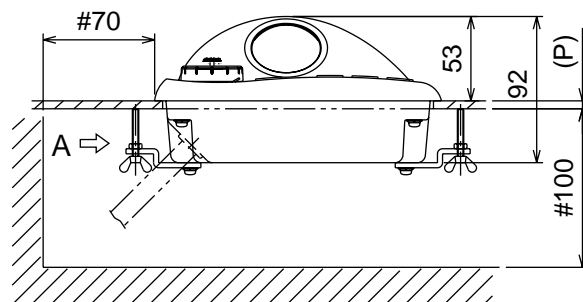

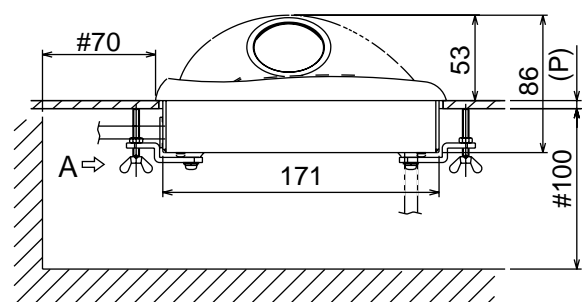*For RCU-018*   *For RCU-015FEA/16*

2. Set the control unit to the cutout.
3. Screw four wing bolts into hex. nuts.
4. Screw the above wing bolts into mounting plates.
5. Attach the mounting plate to the control unit with four screws (M4x12, supplied with the control unit) from the bottom side.
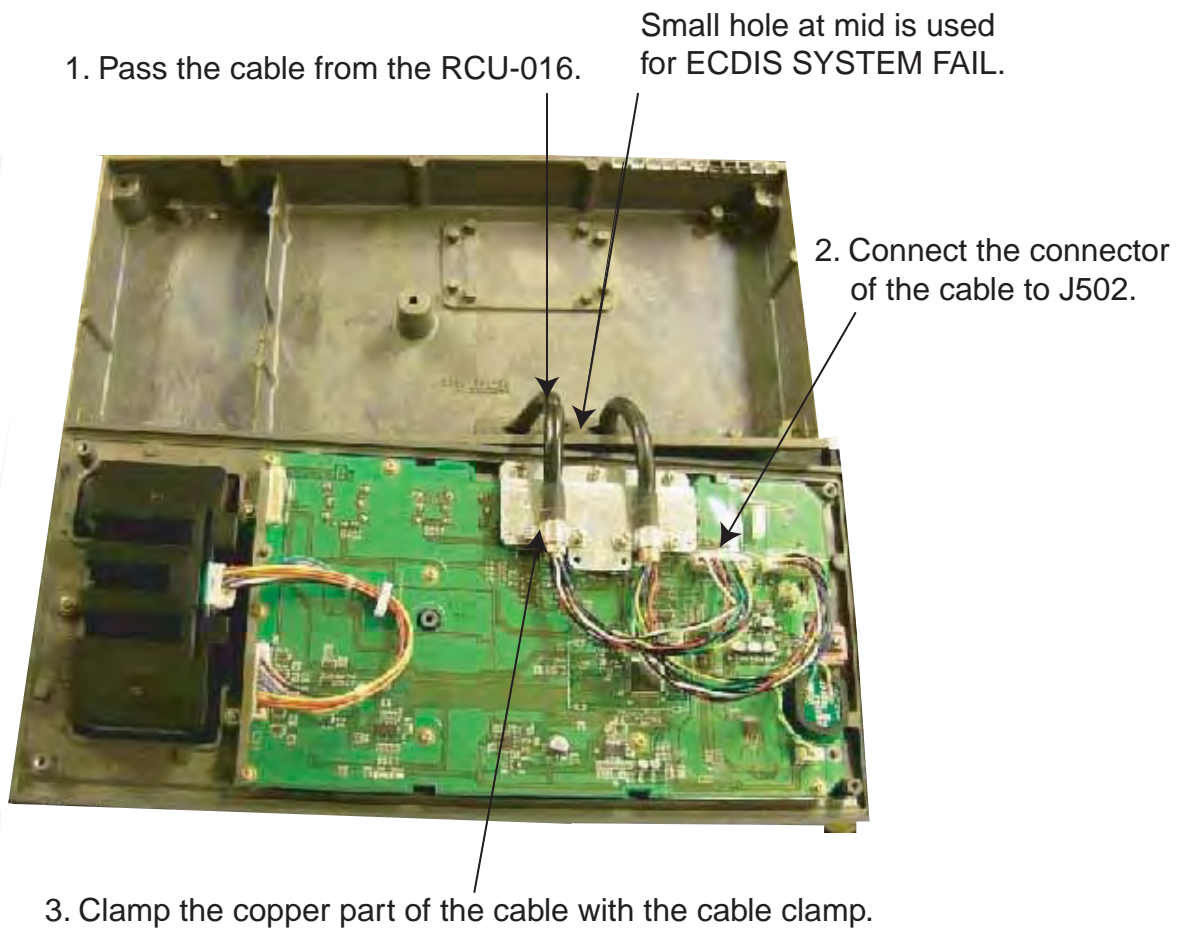6. Fasten four wing screws, and then fasten hex. nuts to fix four wing screws.

RCU-018   *RCU-015FEA/RCU-16*
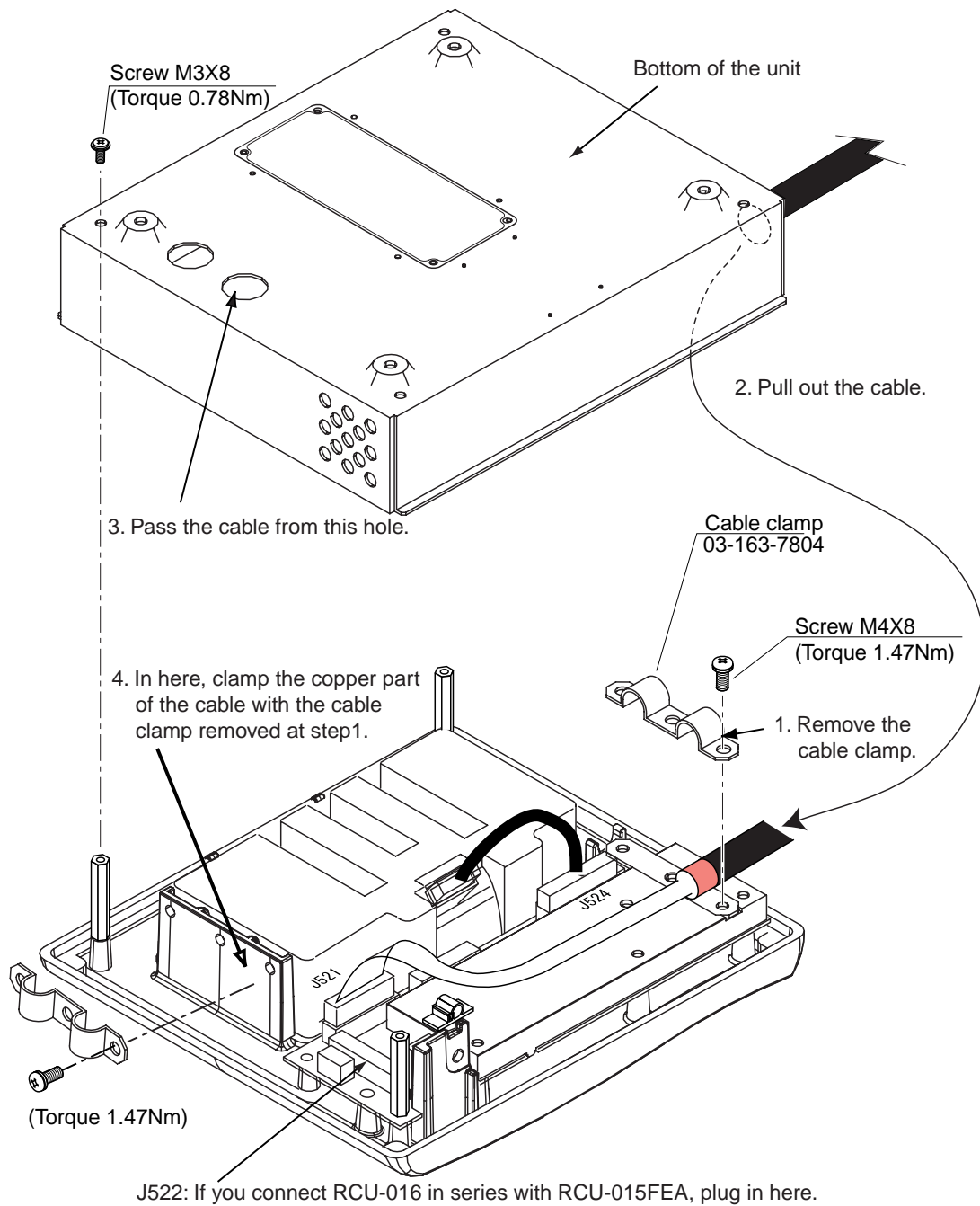
To connect RCU-016 in series with RCU-018

1. Pass the cable from the RCU-016.

Small hole at mid is used
for ECDIS SYSTEM FAIL.

2. Connect the connector
   of the cable to J502.

3. Clamp the copper part of the cable with the cable clamp.

Inside of RCU-018

To change the cable entry

To change the cable entry from the side (default) to the bottom, modify the unit as shown below.

Screw M3X8
(Torque 0.78Nm)

Bottom of the unit

2. Pull out the cable.

3. Pass the cable from this hole.

Cable clamp
03-163-7804

Screw M4X8
(Torque 1.47Nm)

4. In here, clamp the copper part of the cable with the cable clamp removed at step1.

1. Remove the cable clamp.

J524

J521

(Torque 1.47Nm)

J522: If you connect RCU-016 in series with RCU-015FEA, plug in here.

RCU-015FEA/RCU-016, Changing cable entry
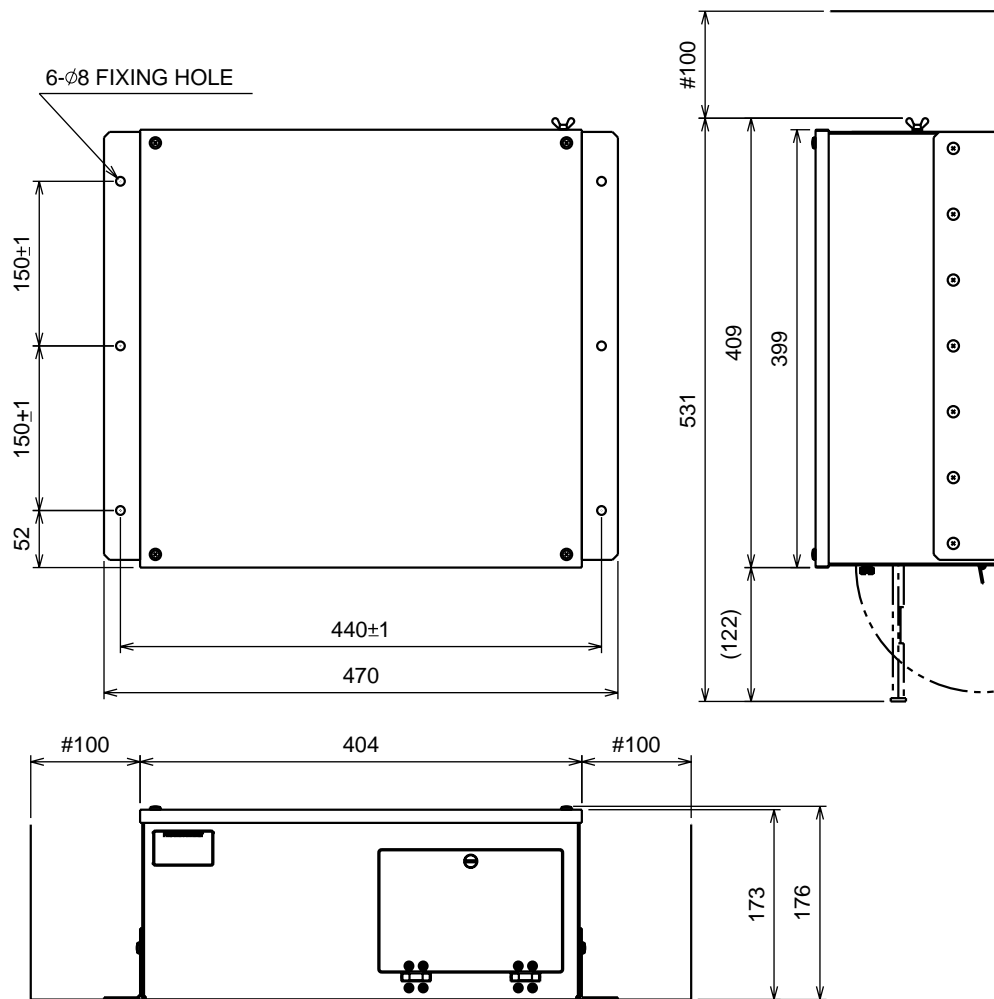
1.3 Processor Unit

Mounting considerations

When selecting a mounting location, keep in mind the following points:

* Locate the processor unit away from heat sources because of heat that can build up inside the cabinet.

* The vibration at the mounting location should be minimum.

* Locate the equipment away from places subject to water splash and rain.

* Leave sufficient space at the sides and rear of the unit to facilitate maintenance.

* A magnetic compass will be affected if the processor unit is placed too close to the magnetic compass. Observe the compass safe distances on page ii to prevent deviation of a magnetic compass.

Mounting procedure

1. Attach two mounting plates to the processor unit with 14 screws (M4X8, supplied).
2. Fix the unit with four M6 bolts, or self-tapping screws (local supply).

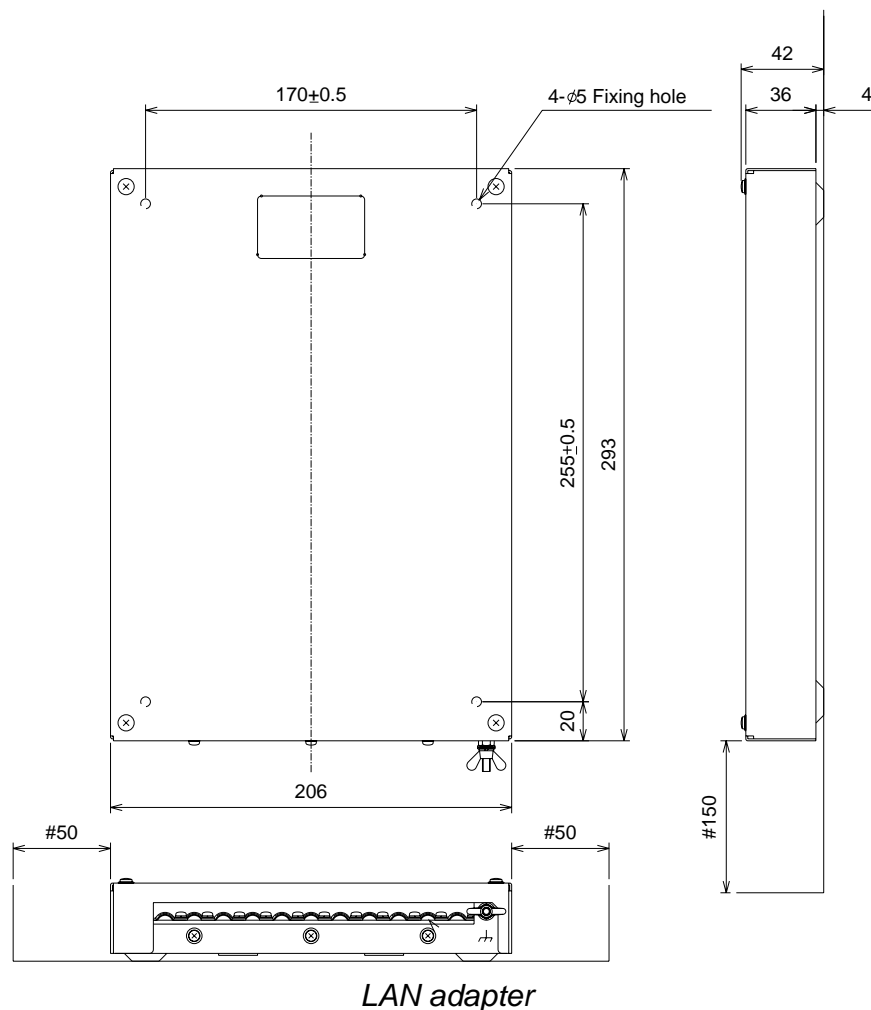

Processor unit

1.4   LAN Adapter/B Adapter

Mounting considerations

When selecting a mounting location, keep in mind the following points:

- Locate the adapter away from heat sources because of heat that can build up inside the cabinet.

- The vibration should be minimal.

- Locate the equipment away from places subject to water splash and rain.

- Leave sufficient space at the sides and rear of the unit to facilitate maintenance.

- A magnetic compass will be affected if the adapter is placed too close to the magnetic compass. Observe the compass safe distances on page ii to prevent deviation of a magnetic compass.
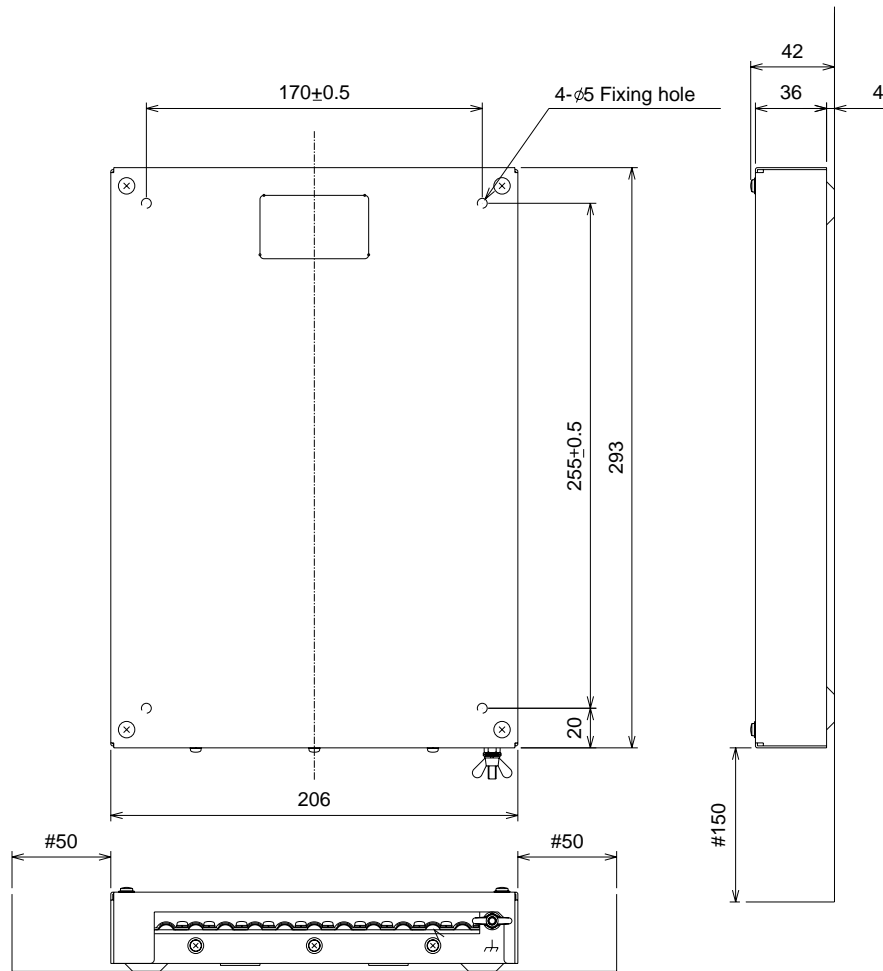
LAN adapter

1. Unfasten a pan head screw to remove the cover from the LAN adapter.
2. Fasten four self-tapping screws (M3) to fix the LAN adapter to the mounting location.
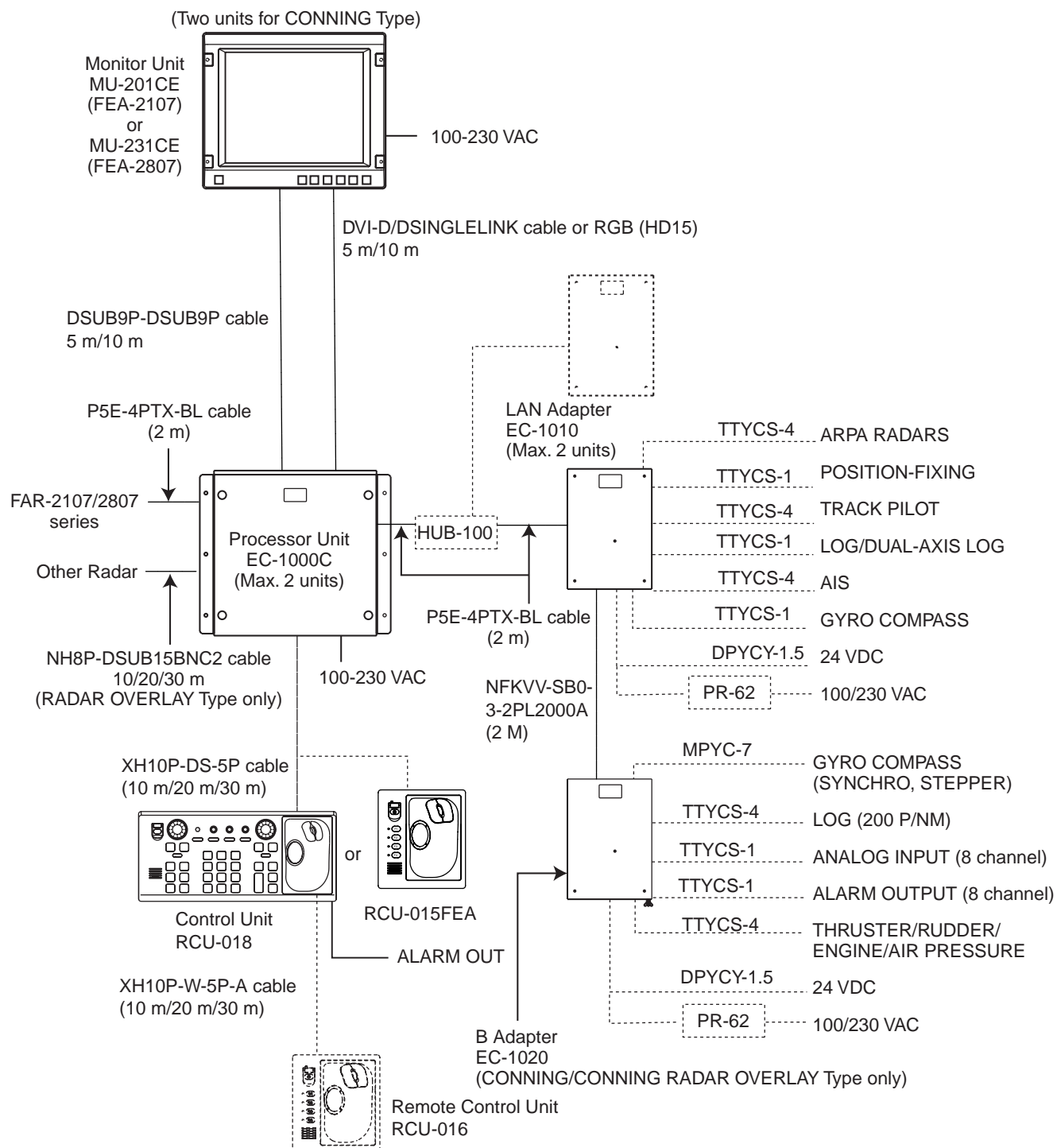3. Reattach the cover.

LAN adapter

B adapter

1. Unfasten a pan head screw to remove the cover from the B adapter.
2. Remove six pan head screws to remove the ADAPTER B Board (220615)
3. Fasten three self-tapping screws (M3) to fix the LAN adapter to the mounting location.
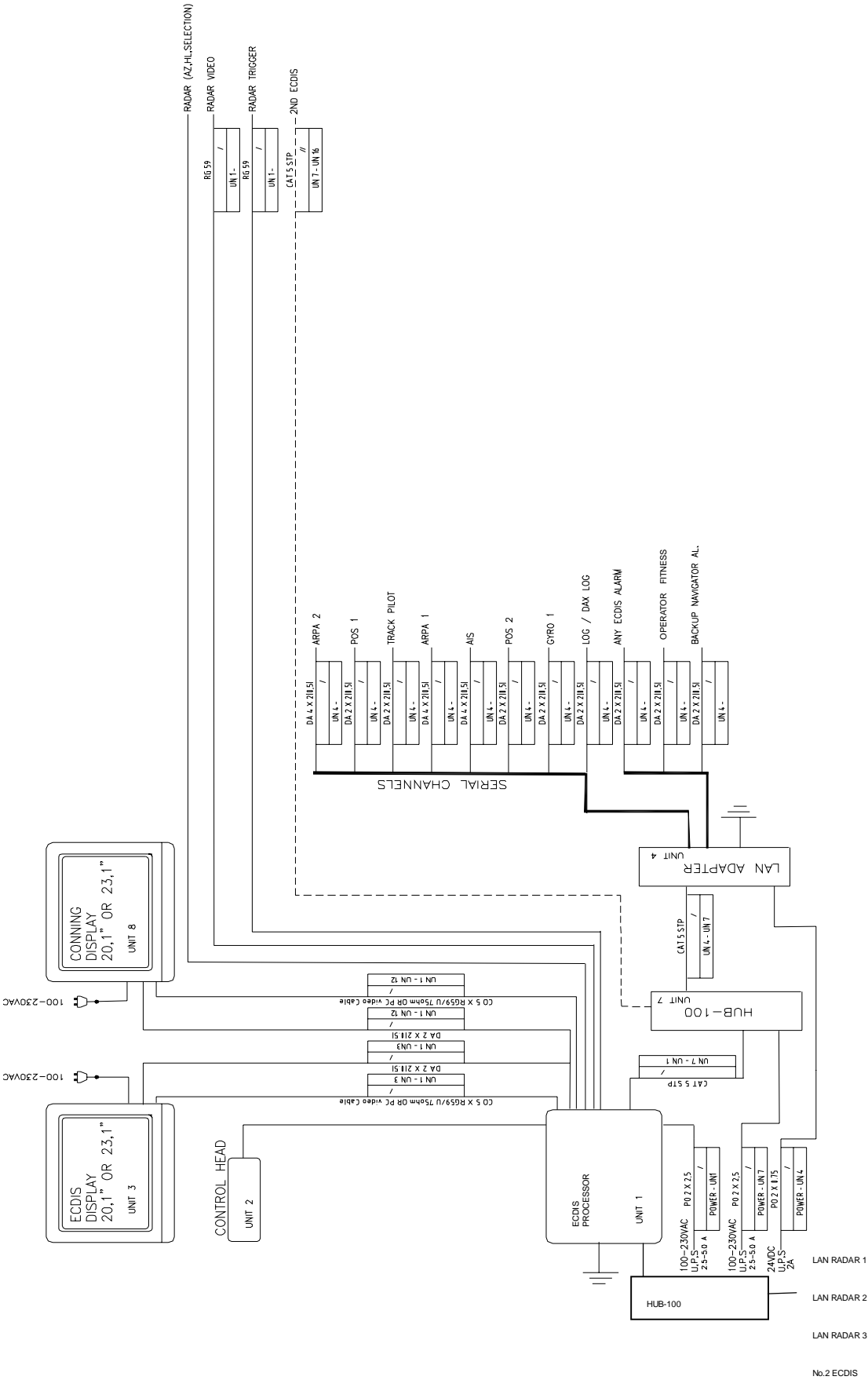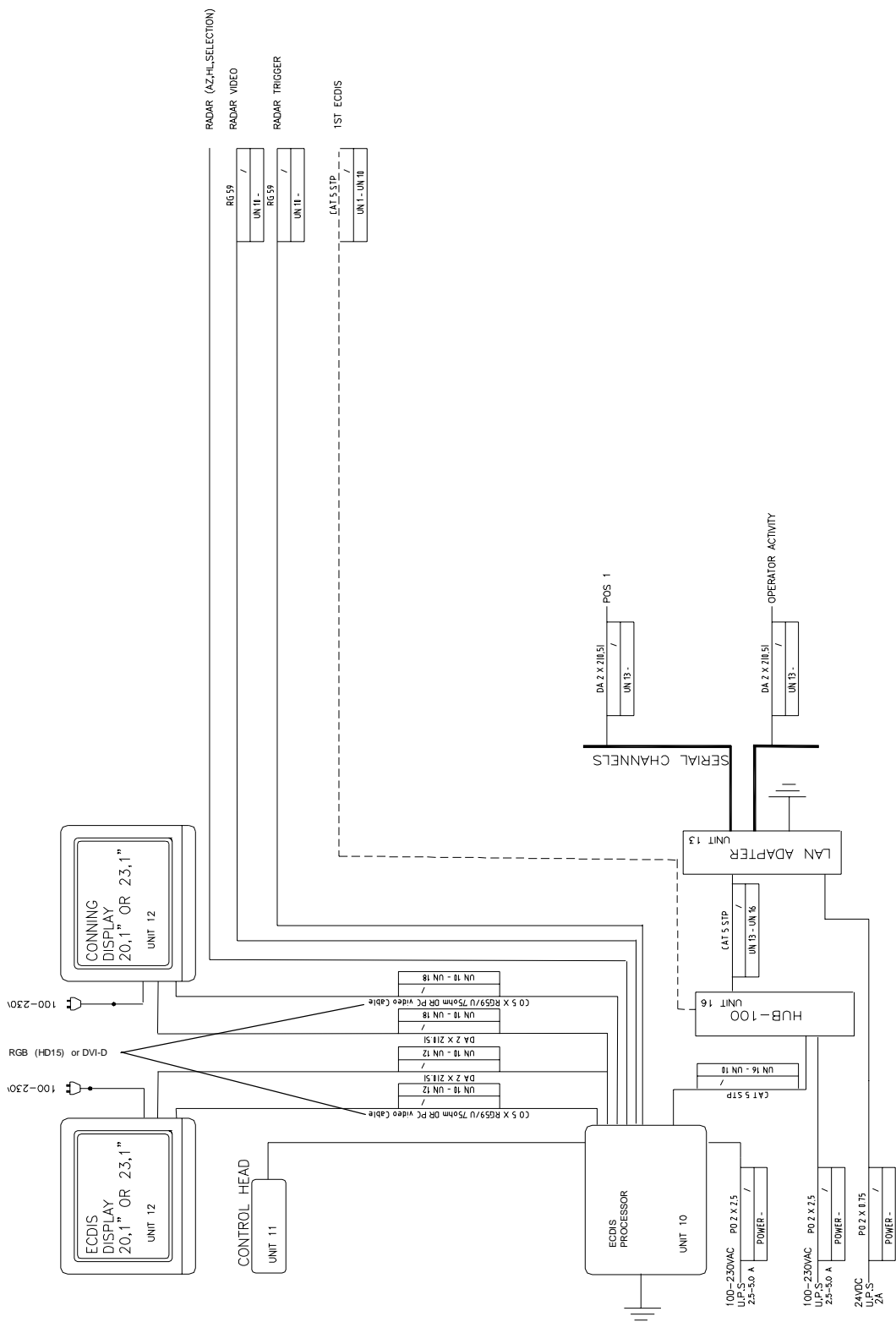4. Reattach the cover.

B adapter

2. WIRING

2.1 Wiring

(Two units for CONNING Type)

Monitor Unit
MU-201CE
(FEA-2107)
or
MU-231CE
(FEA-2807)

100-230 VAC

DVI-D/DSINGLELINK cable or RGB (HD15)
5 m/10 m

DSUB9P-DSUB9P cable
5 m/10 m

P5E-4PTX-BL cable
(2 m)

LAN Adapter
EC-1010
(Max. 2 units)

FAR-2107/2807
series

Processor Unit
EC-1000C
(Max. 2 units)

Other Radar

HUB-100

TTYCS-4   ARPA RADARS
TTYCS-1   POSITION-FIXING
TTYCS-4   TRACK PILOT
TTYCS-1   LOG/DUAL-AXIS LOG
TTYCS-4   AIS
TTYCS-1   GYRO COMPASS
DPYCY-1.5   24 VDC

PR-62   100/230 VAC

NH8P-DSUB15BNC2 cable
10/20/30 m
(RADAR OVERLAY Type only)

100-230 VAC

P5E-4PTX-BL cable
(2 m)

NFKVV-SB0-
3-2PL2000A
(2 M)

MPYC-7   GYRO COMPASS
(SYNCHRO, STEPPER)
TTYCS-4   LOG (200 P/NM)
TTYCS-1   ANALOG INPUT (8 channel)
TTYCS-1   ALARM OUTPUT (8 channel)
TTYCS-4   THRUSTER/RUDDER/
ENGINE/AIR PRESSURE
DPYCY-1.5   24 VDC

PR-62   100/230 VAC

XH10P-DS-5P cable
(10 m/20 m/30 m)

or

Control Unit
RCU-018

RCU-015FEA

ALARM OUT

XH10P-W-5P-A cable
(10 m/20 m/30 m)

B Adapter
EC-1020
(CONNING/CONNING RADAR OVERLAY Type only)

Remote Control Unit
RCU-016

RADAR (AZ,HL,SELECTION)
RADAR VIDEO
RADAR TRIGGER
2ND ECDIS
ACK OUT
OUTSID CH. LIMIT
WAYPOINT APPROACH AL.
NAVIGATION SENSOR ALARM
DEPTH BELOW ALARM
BACKUP NAVIGATOR AL.
ANY ECDIS ALARM
OPERATOR FITNESS
GYRO (SYNCHRO , STEPPER)
LOG (200p/nm)
RUDDER FEEDBACK
R.O.T. GYRO OR SECOND RUDDER FEEDBACK
RPM 1
PITCH 1 OR MAIN ENGINE START AIR PRESSURE
RPM 2 OR FUEL CONSUMPTION
PITCH 2 OR AIR PRESSURE
BOW THRUSTER
STERN THRUSTER

RG 59
UN 1-
RG 59
UN 1-
CAT 5 STP
UN 1- UN 1B
DA 2 X 2(l,5)
UN 6 -
DA 2 X 2(l,5)
UN 6 -
DA 4 X 2(l,5)
UN 6 -
DA 2 X 2(l,5)
UN -
DA 2 X 2(l,5)
UN -
DA 2 X 2(l,5)
UN 6 -
DA 2 X 2(l,5)
UN 6 -
DA 4 X 2(l,5)
UN 6 -
DA 2 X 2(l,5)
UN6-
DA 2 X 2(l,5)
UN 4-
DA 2 X 2(l,5)
UN 6 -
UN-
DA 2 X 2(l,5)
UN 6 -
UN -
DA 2 X 2(l,5)
UN 6 -
DA 2 X 2(l,5)
UN 6 -
DA 2 X 2(l,5)

ANALOG CHANNELS

2

UNIT 6
B-ADAPTER

ROUTE BACKUP
ENGINE CONTROL
AMWSS
POS 3
ECHOSOUNDER
WIND SENSOR
WATER TEMP

DA 2 X 2(l,5)
UN 5 -
DA 2 X 2(l,5)
UN 5 -
DA 4 X 2(l,5)
UN 5 -
DA4X2(l,5)
UN 5 -
DA 4 X 2(l,5)
UN 11-
UN 5 - UN 9
DA 2 X 2(l,5)
UN 5 -
DA 2 X 2(l,5)
UN 5 -
DA 2 X 2(l,5)
UN 5 -

WP APPROACH ALARM
OUTSIDE CH. LIMIT
DEPTH BELOW LIMIT

DA 2 X 2(l,5)
UN 5 -
DA 2 X 2(l,5)
UN 5 -
DA 2 X 2(l,5)
UN 5 -

SERIAL CHANNELS

ARPA 2
POS 1
TRACK PILOT
ARPA 1
AIS
POS 2
GYRO 1
LOG / DAX LOG
ANY ECDIS ALARM
OPERATOR FITNESS
BACKUP NAVIGATOR AL.

DA 4 X 2(l,5)
UN 4 -
DA 2 X 2(l,5)
UN 4-
DA 2 X 2(l,5)
UN 4-
DA 4 X 2(l,5)
UN 4 -
DA 4 X 2(l,5)
UN 4 -
DA 2 X 2(l,5)
UN 4-
DA 2 X 2(l,5)
UN 4 -
DA 2 X 2(l,5)
UN 4 -
DA 2 X 2(l,5)
UN 4 -
DA 2 X 2(l,5)
UN 4 -
DA 2 X 2(l,5)
UN 4 -

SERIAL CHANNELS

UNIT 5
LAN ADAPTER

CAT 5 STP
UN 5 - UN 7

UNIT 4
LAN ADAPTER

CAT 5 STP
UN 4 - UN 7

NOTE! CABLE TYPES:
PO 2 X 1,5=POWER CABLE,COPPER WIRE ARMOUR,2 CORES,1,5 CROSS SECTIONAL AREA (MM²)
SI 3 X 1,5=SIGNAL CABLE,COPPER WIRE ARMOUR,3 CORES,1,5 CROSS SECTIONAL AREA (MM²)
DA 2 X 2(0,5)=DATA CABLE,COPPER WIRE ARMOUR,2 TWISTED PAIR,0,5 CROSS SECTIONAL AREA (MM²)
CAT 5 STP=LAN CABLE, CATEGORY 5, SHIELDED TWISTED PAIR

CONNING
DISPLAY
20,1" OR 23,1"
UNIT 8

100-230VAC

DVI-D or RGP (HD15)

ECDIS
DISPLAY
20,1" OR 23,1"
UNIT 3

100-230VAC

CONTROL HEAD
UNIT 2

UN 1 - UN 12
CO 5 X RG59/U 75ohm OR PC video Cable
UN 1 - UN 12
DA 2 X 2(l,5)
UN 1- UN3
DA 2 X 2(l,5)
UN 1- UN 3
CO 5 X RG59/U 75ohm OR PC video Cable

HUB-100
UNIT 7

CAT 5 STP
UN 7 - UN 1

ECDIS
PROSESSOR
UNIT 1

100-230VAC
U.P.S
2,5-5,0 A
POWER-UN1
PO 2 X 2,5

100-230VAC
U.P.S
2,5-5,0 A
POWER-UN1
PO 2 X 2,5

24VDC
U.P.S
2A
POWER- UN 7
PO 2 X 0,75

24VDC
U.P.S
2A
POWER- UN 4
PO 2 X 0,75

POWER- UN 5
PO 2 X 0,75

POWER- UN 6
PO 2 X 0,75

Typical wiring of ECDIS

2. WIRING

Wiring of 1st ECDIS (One LAN adapter)

Wiring of 2nd ECDIS (backup ECDIS)

2.2 Processor Unit
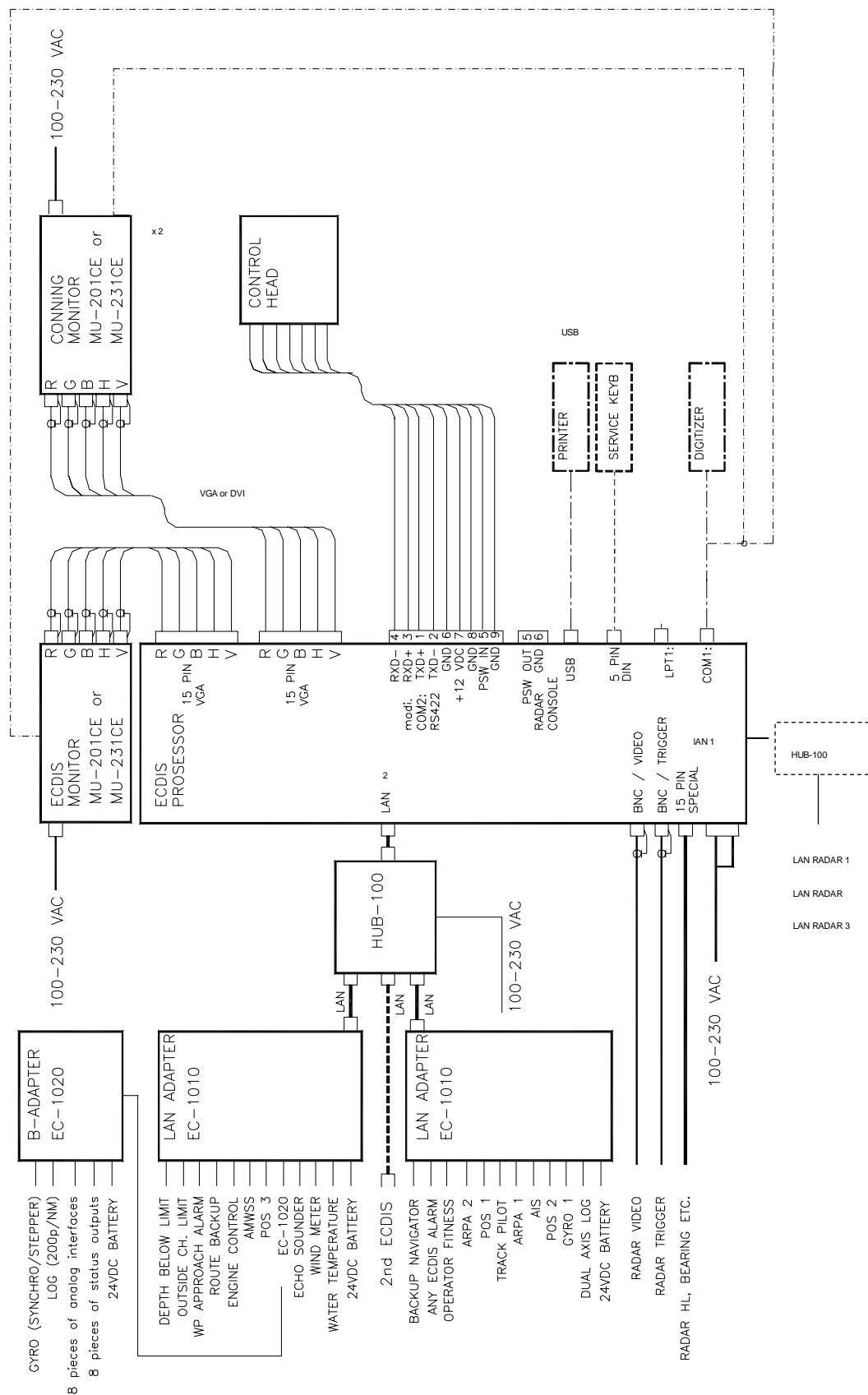
Processor unit
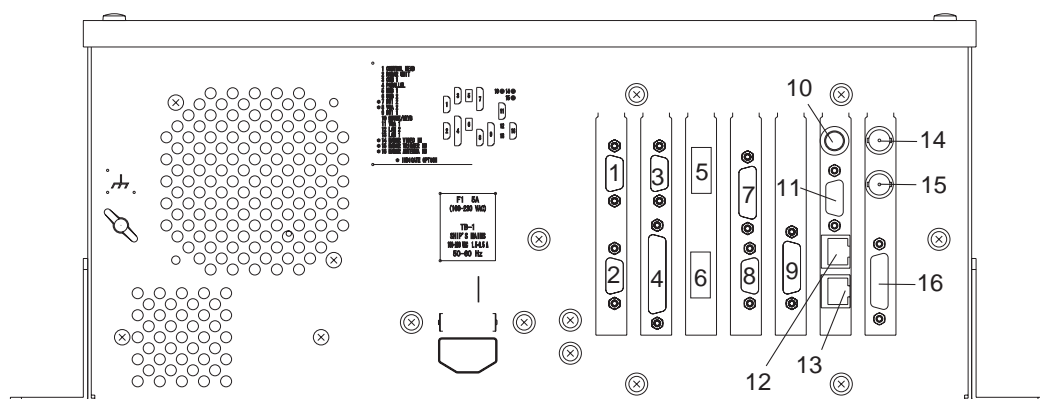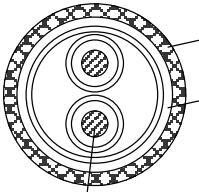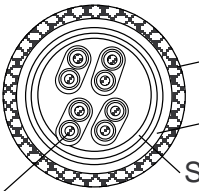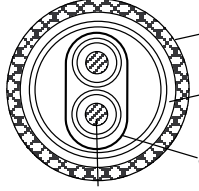
1: CONTROL HEAD   5: USB 1   9: DV1   13: LAN 1
2: RADAR UNIT   6: USB 2 or nothing   10: MOUSE/KEYB.   14: RADAR VIDEO IN (option)
   (for chart radar only) 7: DVI 2 (option)   11: VGA 1   15: RADAR TRIGGER IN (option)
3: COM 1   8: VGA 2 (option)   12: LAN 2   16: RADAR ANTENNA IN (option)
4: PARALLEL

Processor unit, rear view

2.3   LAN Adapter

2.3.1   Cables fabrication for the cables connected to the LAN adapter

Use the following JIS (Japanese Industrial Standards) cables or equivalent. When using the TTYCS-4 cable, connect the appropriate cable to it to pass the cable entrance of the adapter.

DPYC-1.5	TTYCS-4 (Four twisted pairs)	TTYCS-1 (Twisted pair cable)
ϕ = 11.7 mm Armor Sheath Conductor S = 1.5 mm^2 ϕ = 1.56 mm	ϕ = 16.3 mm Armor Sheath Shield Conductor S = 0.75 mm^2 ϕ = 1.11 mm	ϕ = 10.1 mm Armor Sheath Shield Conductor S = 0.75 mm^2 ϕ = 1.11 mm
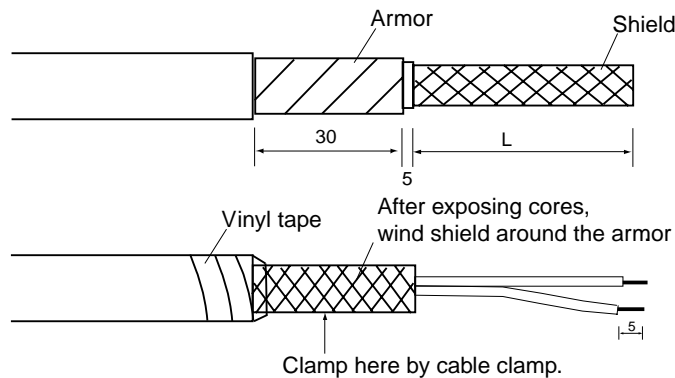
Armor   Shield

30   5   L

L= Depends on equipment connected. Measure at the processor unit.

Vinyl tape

After exposing cores, wind shield around the armor

Clamp here by cable clamp.

5

LAN Adapter (1st)

LAN Adapter (2nd)

LAN-Adapter as Planning / Backup Station (only one position receiver connected)
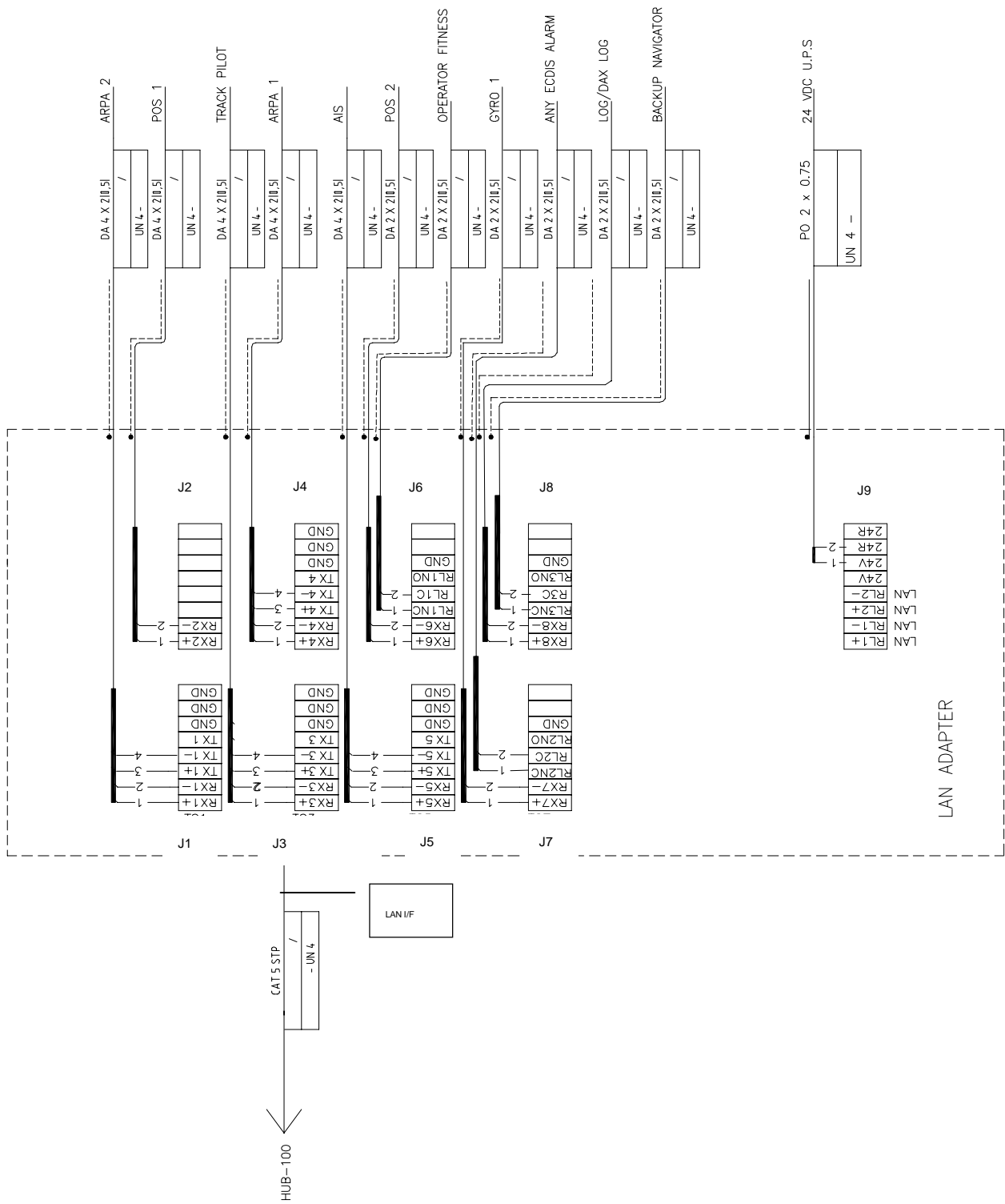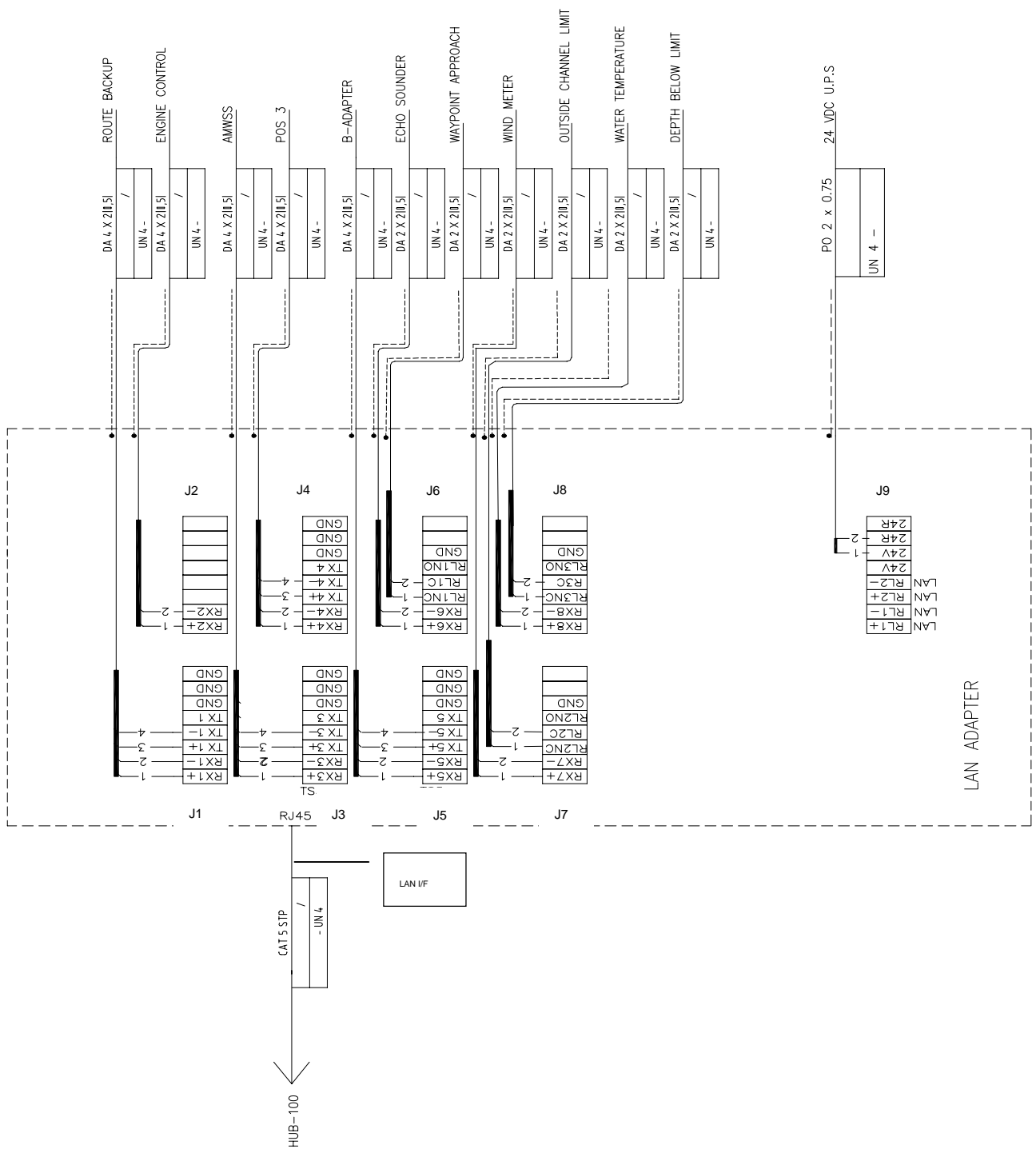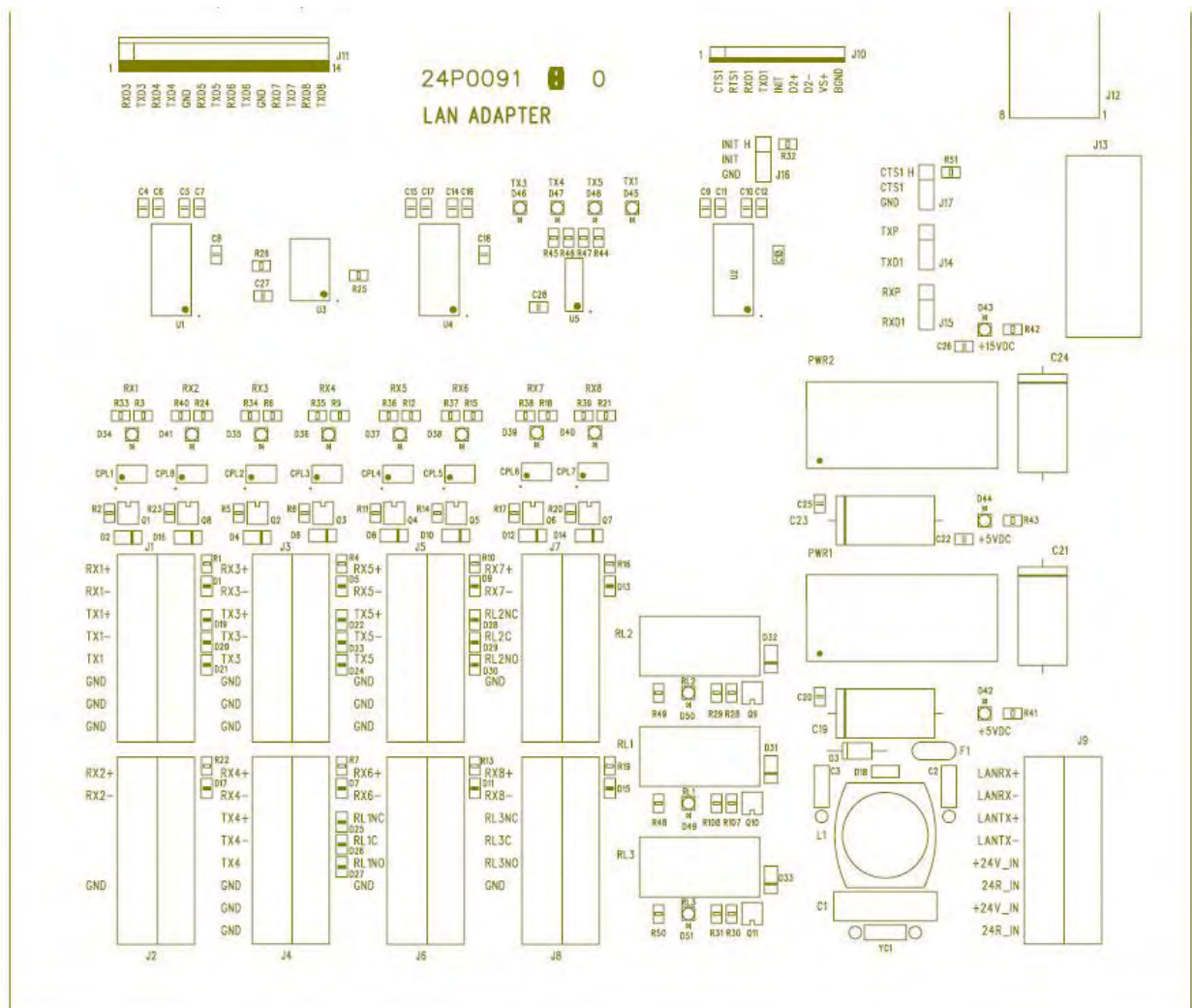
Connectors on LAN-Adapter

2.3.2 Serial data channels in general

An example of serial channel (here channel 1)

RX1+	Input terminals for electrical standards IEC 61162-1, RS-232 and RS-422.
RX1-	"RX+" and "RX-" may be defined as "RX-A" and "RX-B" in IEC 61162-1.
TX1+	Output terminals for electrical standards IEC 61162-1 and RS-422.
TX1-	"TX+" and "TX-" may be defined as "TX-A" and "TX-B" in IEC 61162-1.
TX1	Output terminals for electrical standard RS-232C
GND	Ground terminal for RS-232C

2.3.3 Standard serial data channel assignment

<u>First LAN adapter</u>

Channel	Type	bit/s	Default use
1	rx/tx	4800	ARPA2
2	rx	4800	Pos1
3	rx/tx	4800	Track pilot
4	rx/tx	4800	ARPA1
5	rx/tx	38400	AIS
6	rx	4800	Pos2
7	rx	38400	Gyro1
8	rx	4800	Log/Dual-axis log
Relay1	Relay NO		Operator fitness
Relay2	Relay NC		Any ECDIS alarm
Relay3	Relay NC		Backup navigator

<u>Second LAN adapter</u>
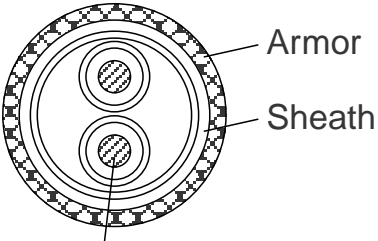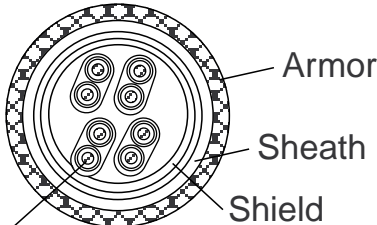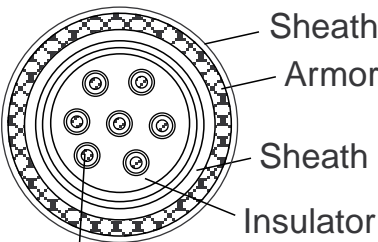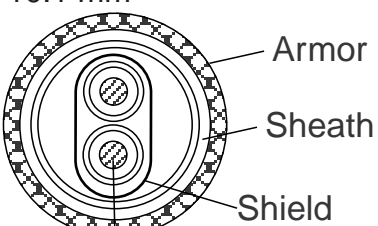
Channel	Type	bit/s	Default use
9	rx/tx	4800	Route Backup
10	rx	4800	Engine Control
11	rx/tx	4800	AMWSS
12	rx/tx	4800	Navtex
13	rx/tx	38400	B-Adapter
14	rx	4800	Echo Sounder
15	rx	38400	Wind Sensor
16	rx	4800	Water temp
Relay4	Relay NC		Waypoint approach
Relay5	Relay NC		Outside channel limit
Relay6	Relay NC		Depth below limit

Note: For Relay 2 to 6: Polarities are depending on Relay outputs settings (Normal open or Normal Close) of "Alarm Inputs+Outputs/AMWSS".
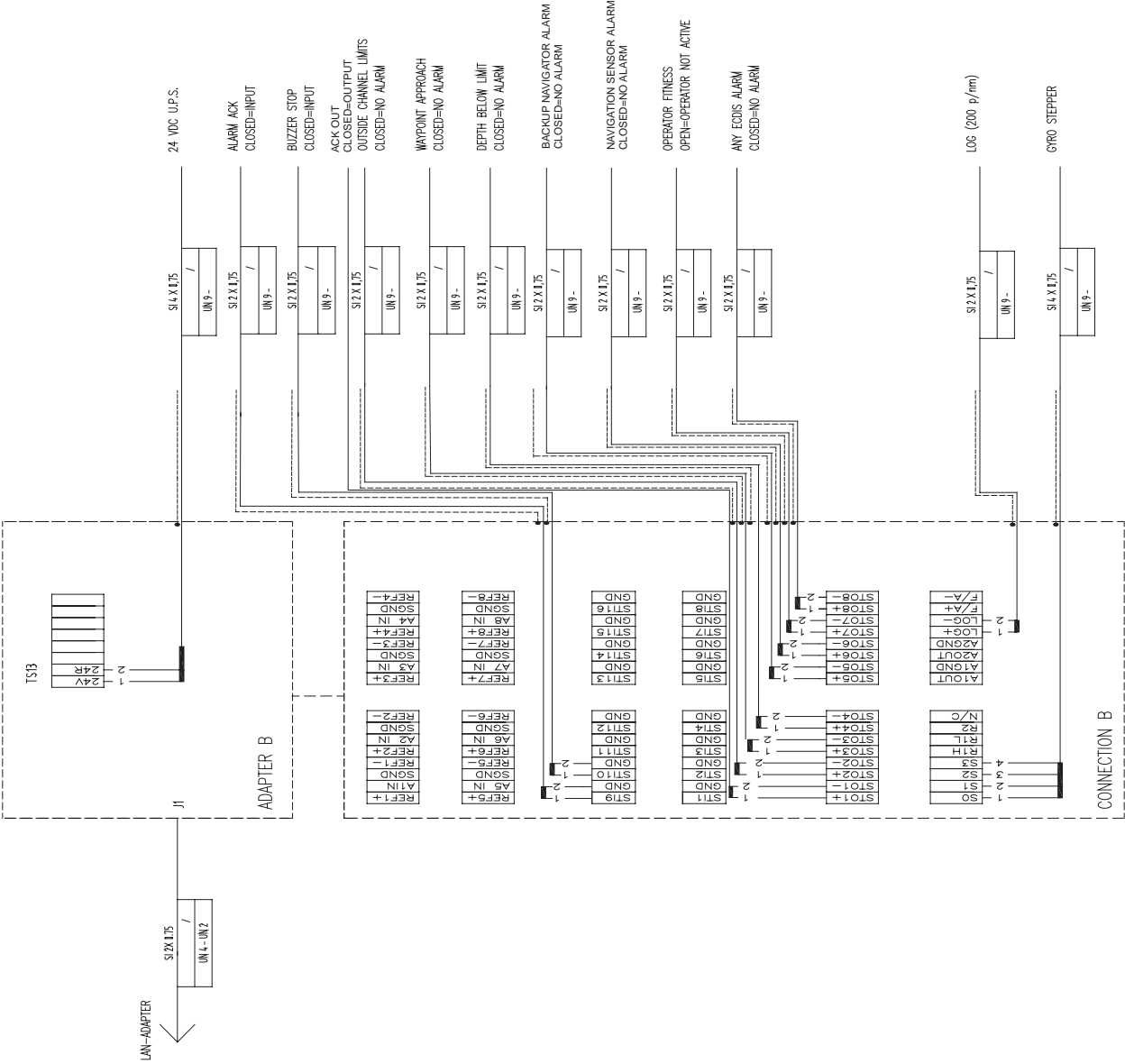
2.4   B Adapter (EC-1000C/EC-1000C-R only)

2.4.1 Cables fabrication for the cables connected to the B adapter

Use the following JIS (Japanese Industrial Standards) cables or equivalent. When using the TTYCS-4 cable, connect the appropriate cable to it to pass the cable entrance of the adapter.

ϕ = 11.7 mm Armor Sheath Conductor S = 1.5 mm^2 ϕ = 1.56 mm	ϕ = 16.3 mm Armor Sheath Shield Conductor S = 0.75 mm^2 ϕ = 1.11 mm
DPYC-1.5	TTYCS-4 (Four twisted pairs)
ϕ = 13.2 mm Sheath Armor Sheath Insulator Conductor S = 1 mm^2 ϕ = 1.29 mm	ϕ = 10.1 mm Armor Sheath Shield Conductor S = 0.75 mm^2 ϕ = 1.11 mm
MPYC-7	TTYCS-1 (Twisted pair cable)

Armor   Shield

30   L   L= Depends on equipment connected. Measure at the processor unit.

5

Vinyl tape   After exposing cores, wind shield around the armor

5

Clamp here by cable clamp.

2-13
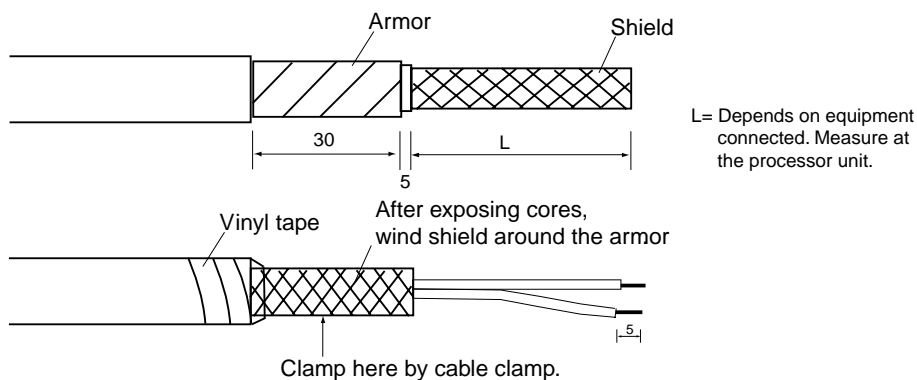
B Adapter (1)

No.1 LAN adapter CH4 or
No.2 LAN adapter CH11, CH12 or CH13

ALL CONNECTIONS ARE SCREW TERMINALS
0,14 −1,0mm^2 AWG 28−16
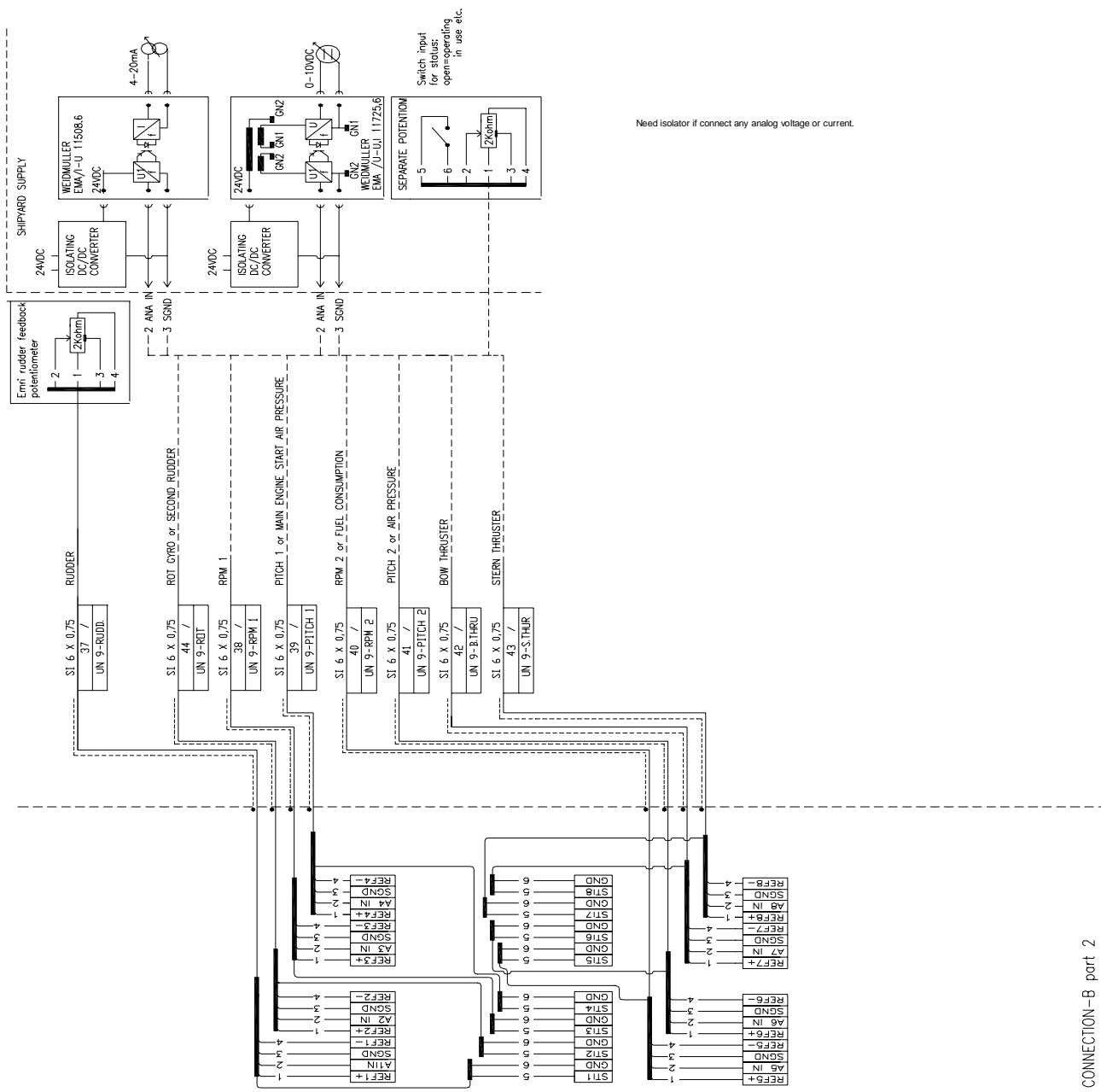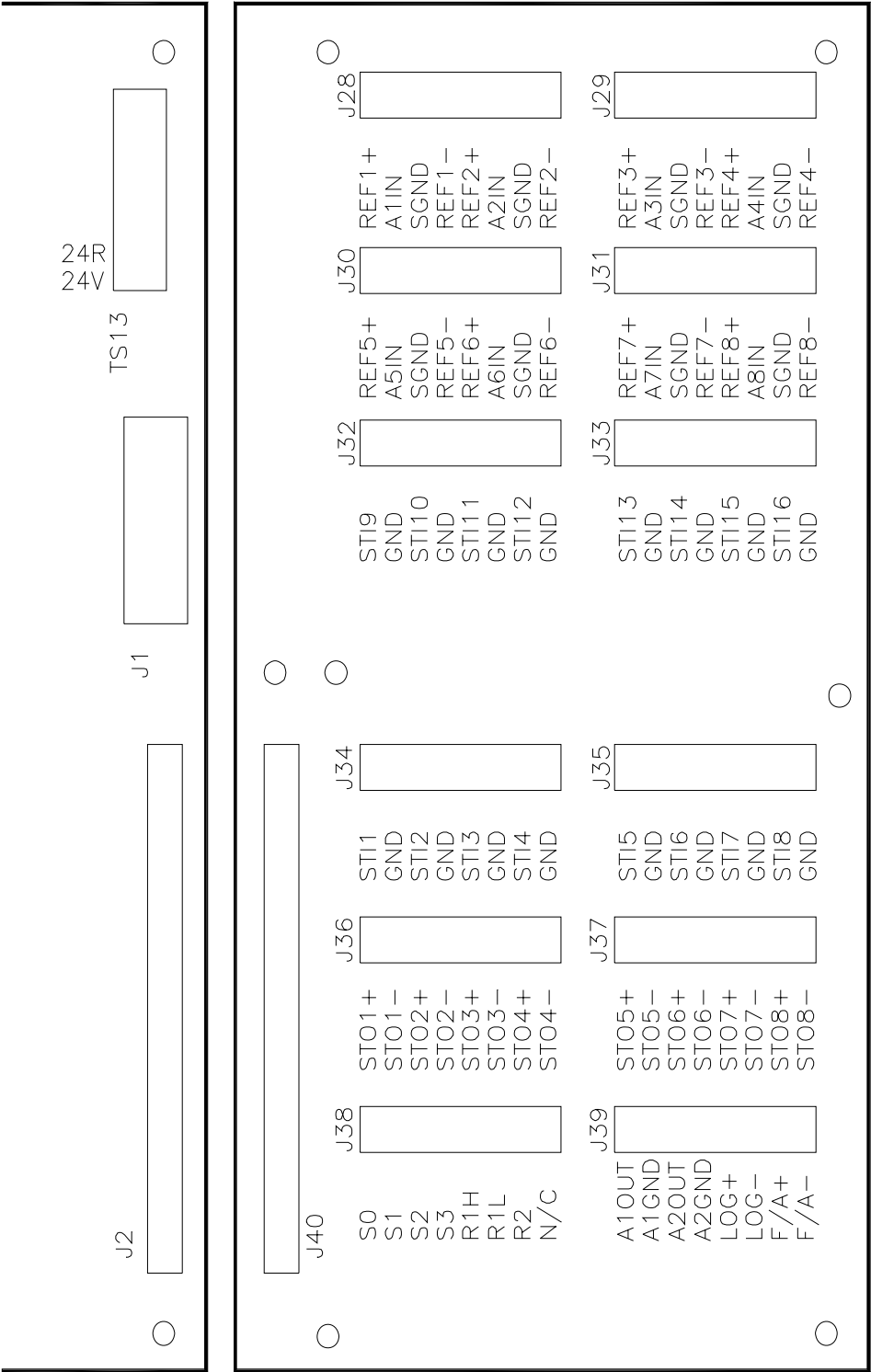
Connectors on B-Adapter

2.4.2   Interface

Status output channels in general

Channel	State
1 (STO1)	ACK OUT
2 (STO2)	ROUTE MONITOR: OUTSIDE CHANNEL LIMITS
3 (STO3)	ROUTE MONITOR: WAYPOINT APPROACH
4 (STO4)	ECHO: DEPTH BELOW LIMIT
5 (STO5)	BACKUP NAVIGATOR ALARM
6 (STO6)	NAVIGATION SENSOR ALARM
7 (STO7)	OPERATOR FITNESS
8 (STO8)	ANY ECDIS ALARM

Pitot log

Pitot log input is for 200 pulses/NM log signal with forward/astern flag.

LOG+	input terminals for log signal
LOG-	
F/A+	input terminals for forward/astern signal (closed = astern)
F/A1-	

Gyro

Gyro input is for stepper (6 steps per degree) of synchro (1:360).

S1	input terminals for gyro phase signals (stepper & synchro)
S2	
S3	
S0	input terminal for stepper common signal
R1H	input terminals for synchro reference signal
R1L	R1H & R2 for high synchro voltage reference (135-90 VAC)
R2	R1L & R2 for low synchro voltage reference

Analog interface

Analog channels in general
An example for analog channel (here, channel 1)
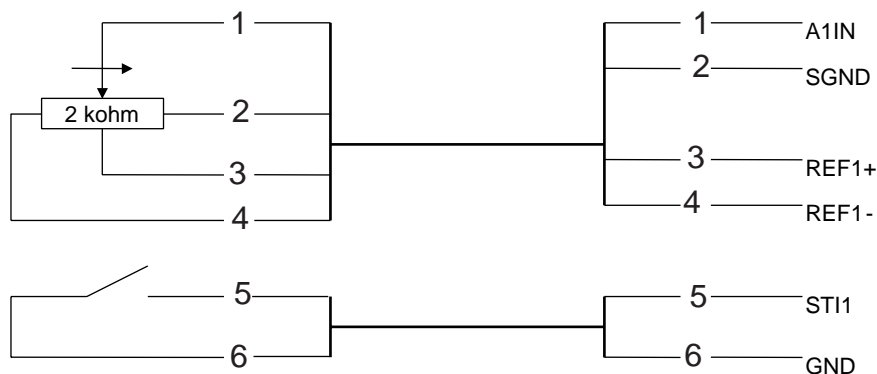
A1IN   input terminals for analog signal
SGND

REF1+   reference output terminals
REF1-

STI1   input terminals for status (open = operating, in use, etc.)
GND

Analog channel assignment

channel	usage	alternative usage
1	rudder feedback	
2	R.O.T. gyro	second rudder feedback
3	RPM 1	
4	PITCH 1	engine start air pressure
5	RPM 2	fuel consumption
6	PITCH 2	air pressure
7	BOW THRUSTER	
8	STERN THRUSTER	

Status input channels assignment

Channel	State
9	ALARM ACK.
10	BUZZER STOP

2.5 Radar Overlay (EC-1000C-R/EC-1000C-CR only)

Radar Overlay has input for one set of radar signals. Radar Overlay can be used to read the picture from three different radar transceivers, because it has two status inputs which change the following characteristics of the Radar Overlay:

- Video gain operating area (low and high voltage)

- FTC adjust operating area (low and high voltage)

- STC adjust operating area (low and high voltage)

- STC curve length and shape

- Number of azimuth pulses per 360°

- Radar antenna headline detector offset

- Radar trigger range offset

- Offset of the radar antenna from the conning position

Following characteristics of the Radar Overlay are common for all radar transceivers:
- Video polarity (positive or negative) and impedance (hi-Z or 75Ω)

- Trigger active edge (positive or negative) and impedance (hi-Z or 75Ω)

- Headline polarity (positive or negative)

- HI and LO video detection level difference

If you want to utilize multiple radar transceivers, then you must have a radar interswitch outside the ECDIS. The inter switch reports to the radar transceiver currently in use to the status inputs of Radar Overlay.

To connect the Radar Overlay (in the processor unit) to the radar, use the cable NH8P—DSUB15BNC cable (option). Note that XH8P-NH8P cable is necessary when the optional radar switch is used.

2.6 Connection of Digitizer and LCD Displays to Processor Unit

The brilliance of ECDIS and Conning Displays (MU-201CE or MU-231CE) can be adjusted at EC-1000C by connecting to COM1 port as below. Also, COM1 port is used for connection of Digitizer (CALCOMP Drawing Board III).
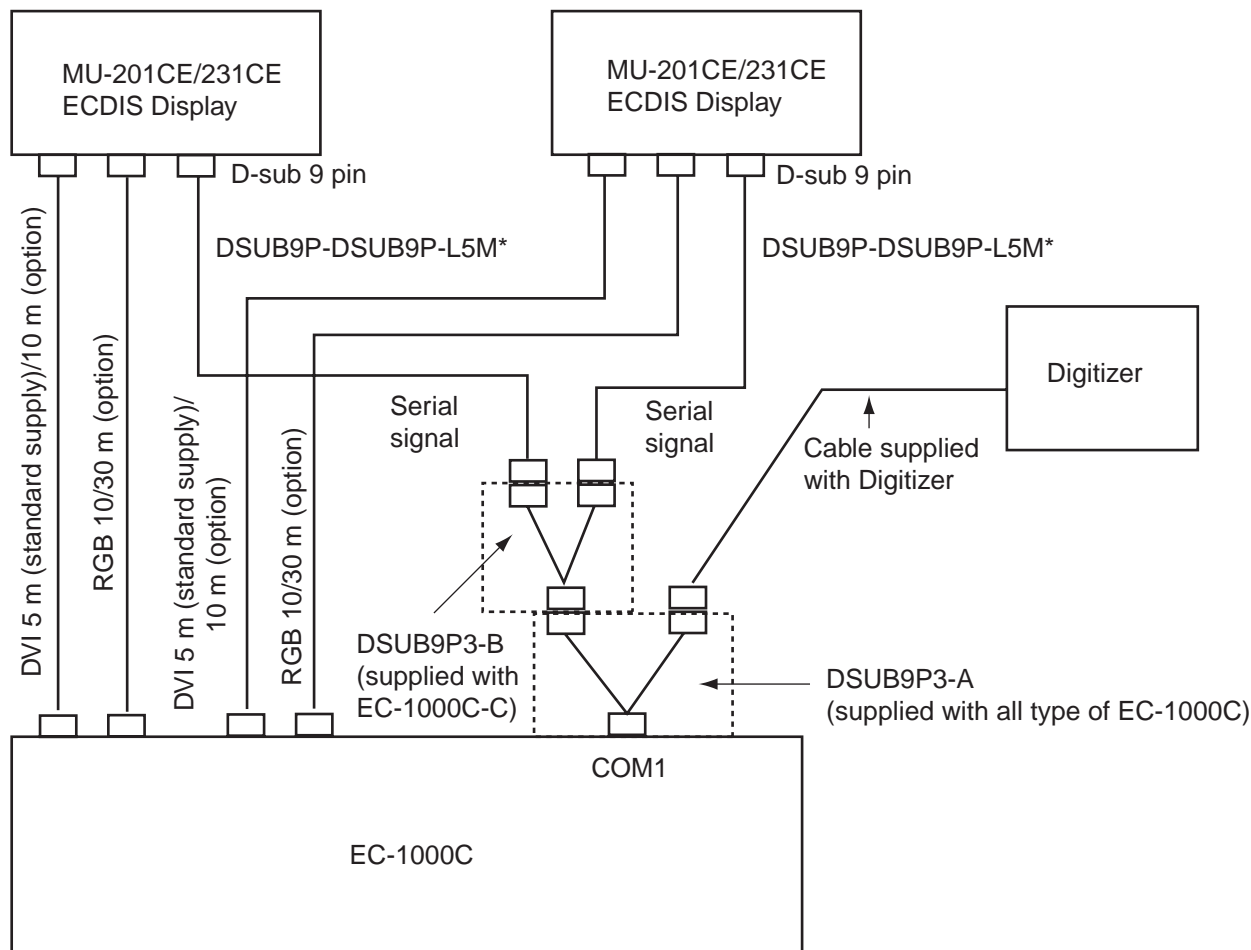

*10 m/30 m: option

2.7 Power Cabling to ECDIS

ECDIS is powered by 100-230 VAC power. See figure below for cabling.
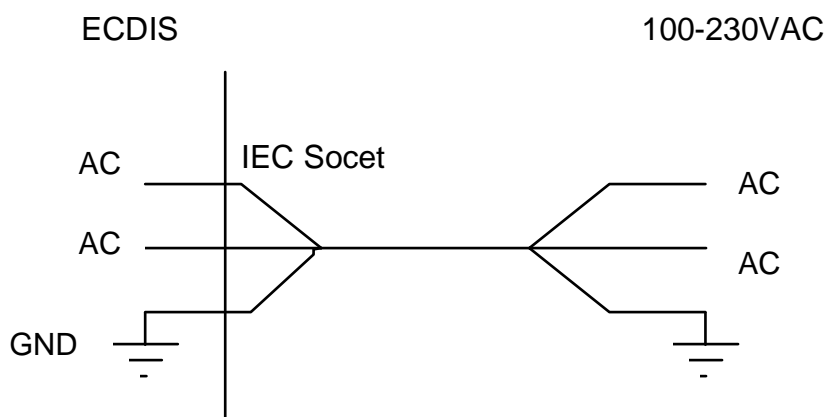
2.8   Ethernet Cable Connection

One ECDIS can be connected to another ECDIS with optional cable P5E-4PT-BL which is 2 m long. If you need a longer cable, use the LAN (Local Area Network) using RJ45 connectors. Cable used between two ECDIS devices should be UTP (Unshielded Twisted Pair). See figures and tables below.
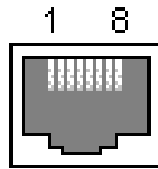
RJ45 Female connector (at the ECDIS)
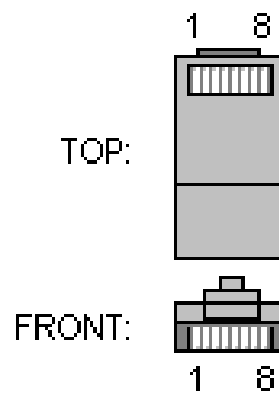
RJ45 Male connector (at the cable)

Pin out of female connector at ECDIS

Pin	Name	Description
1	TX+	Transmit Data +
2	TX-	Transmit Data -
3	RX+	Receiving Data +
4	N/C	Not connected
5	N/C	Not connected
6	RX-	Receive Data -
7	N/C	Not connected
8	N/C	Not connected

Wiring of the twisted cable

First end Pin	Second end Pin
1	3
2	6
3	1
6	2

This page is intentionally left blank.

3. ADJUSTMENTS

3.1 How to Set IP Address for ECDIS

ECDIS has two local area network interfaces, and Interface IP address for the No.2 ECDIS has to be changed. To set the IP addresses, run WindowsXP as follows.

1. Open the cover on the front panel of the processor and connect the service keyboard there.
2. Turn the power on.
3. While pressing down the Alt key, press the Tab key on the service keyboard several times to show ECAWATCH window.
4. Release the keys and press the "Shutdown the ECDIS" button on the screen immediately.
5. Click x mark to close Control Head window.
6. Press the Alt and F4 keys simultaneously to show the WindowsXP screen.

3.1.1 Local Area Connection for LAN 1 (ARPA Radar Network)

To configure IP Address for Local Area Connection interface, proceed as follows:

1. Open the control panel of the Window.
2. Double click the Network Connection icon.
3. Highlight "Local Area Connection", and then select **Properties** in File menu.
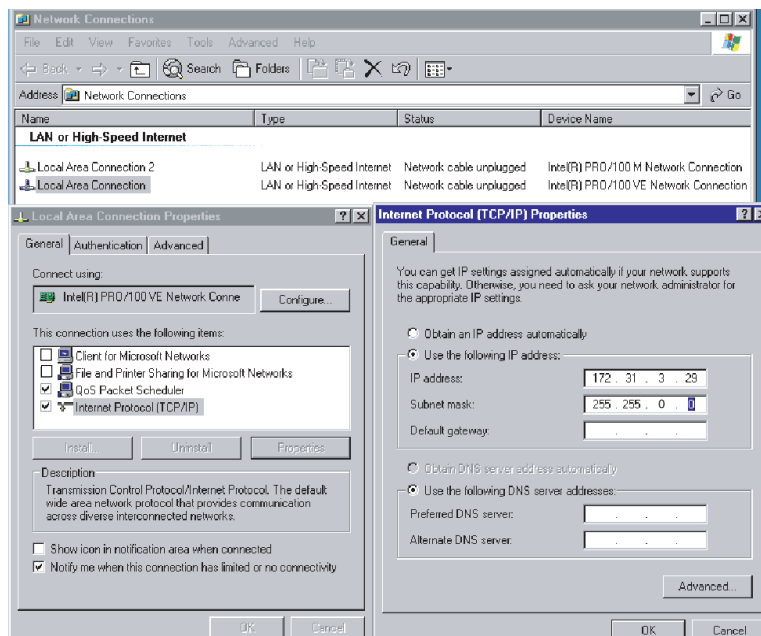
4. In "Local Area Connection Properties", highlight **Internet Protocol (TCP/IP)** in general tab, and then press the Properties button.
5. Set IP Address as 172.31.3.29 (for the first ECDIS) or 172.31.3.30 (for the second ECDIS).
6. Set Subnet mask as 255.255.0.0.
7. Press the OK button to close the window.

3.1.2   Local Area Connection for LAN2 (ECDIS LAN Network)

LAN2 interface is used to connect a LAN Adapter or HUB-100 to ECDIS EC1000C. To configure IP Address for this, proceed as follows:

1. Open Control Panel.
2. Double click Network icon.
3. Highlight **Local Area Connection 2** and then select Properties in File menu.
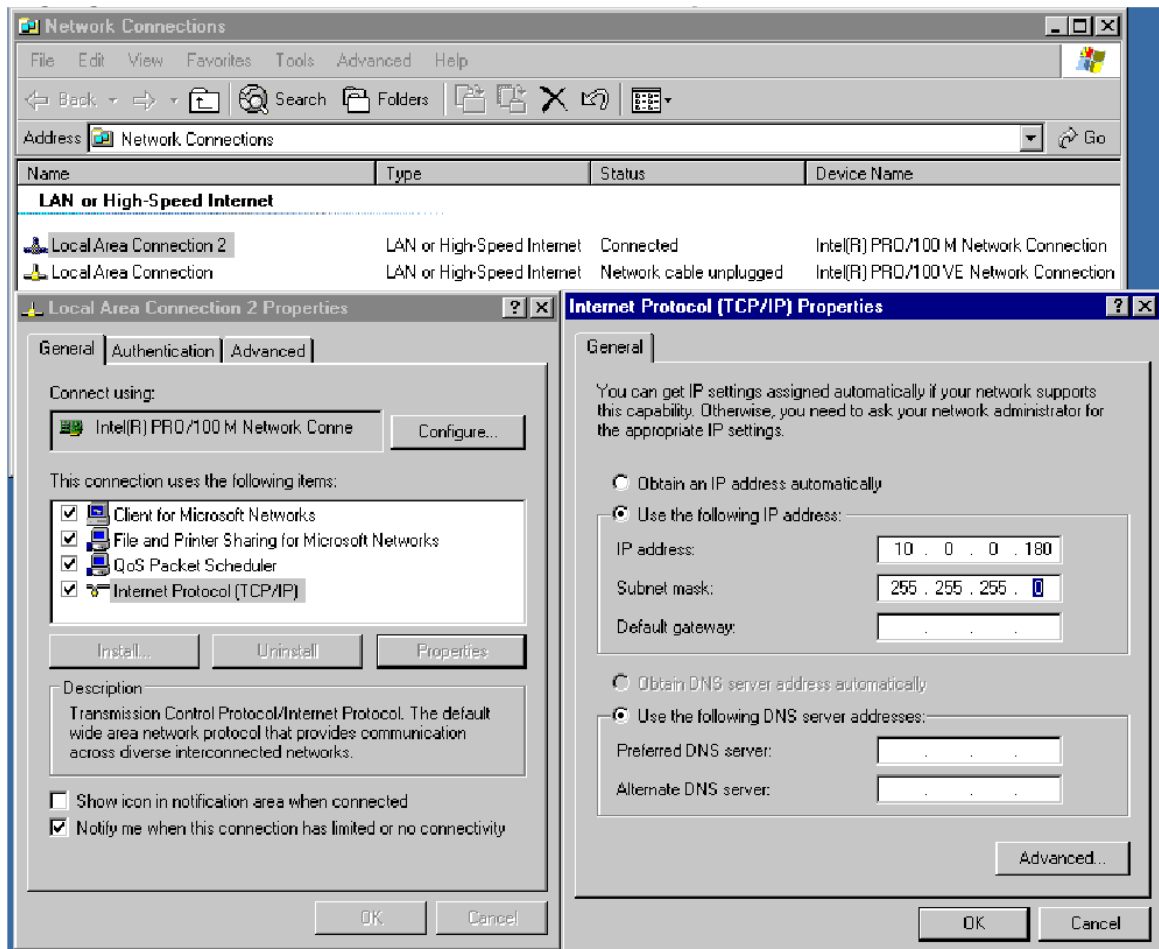
4. In Local Area Connection 2 Properties, highlight Internet Protocol (TCP/IP), and then press Properties button.
5. Set IP Address as 10.0.0.180 (for the first ECDIS) or 10.0.0.181 (for the second ECDIS).
6. Set Subnet mask as 255.255.0.0.
7. Click the OK button to close the window.

3.2 Parameters

NOTE: Special attention to following topics is required to maintain "Consistent Common Reference System."

- The values of center and conning positions depend on size and geometry of the ship.

- Offsets from Antenna Position to Conning Position of Position Sensors depend on the location of position sensor antennas.

- Offsets from Antenna Position to Conning Position of Radars depend on the location of radar antennas.

Installation parameters have limited access, and are controlled by an Authorizing key disk (supplied). The Authorizing key disk is a floppy which contains the necessary key to allow access into editing of the installation parameters. Do the following to access the installation parameters.

1. Insert the "Authorization key disk" to the processor unit.
   Note that the installation parameters have limited access, which is controlled by the Authorization key disk supplied.
2. Press the MENU key on the control unit to open the menu.
3. Roll the wheel to choose Initial Settings, and then push the wheel.
4. Locate the cursor on the ▶ next to INITIAL SETTINGS to show Initial settings menu.
5. Roll the wheel to choose Installation parameters and push the wheel.
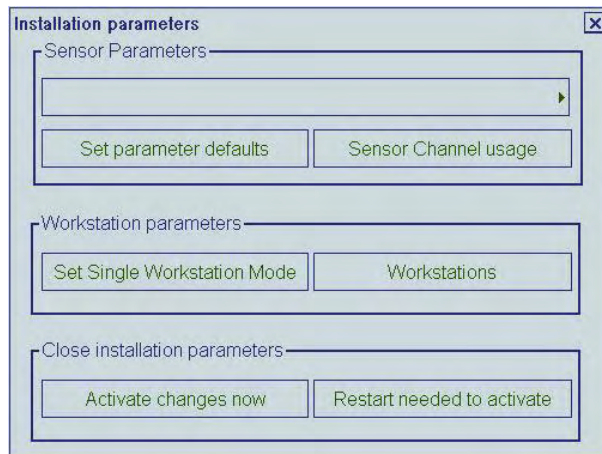
There are several buttons in this dialog box, and they are described below:

Set parameters defaults: This restores Installation parameters which are saved as a backup copy by service personnel. Use this function if you are not sure about Installation parameters values.

Sensor channel usage: The CH and sensors are shown.

Set Single Workstation Mode: This button is used to set Workstation to operate as a single workstation.

Workstations

This button is used to define names, source of sensors and location of Access Server of Workstations if two workstations are installed.

Activate changes now: The changed settings are activated immediately. When canceling the activation, click the "X" at the top of the screen.

Restart needed to activate: The changed settings are activated when the power is turned off and on again.

Sensor Channel Usage

This shows how the serial channels of A adapters are configured and which analog sensors are connected to the system through the B adapter. Notation x (nnnn) (right is an example of x (GYRO2)) is used to show that some sensor data is collected from the data flow of the main sensor.

SioChannel			☒
Chl 1:		Chl 9:	ROUTE TO GP80
Chl 2:	POS EQUIP 1	Chl 10:	
Chl 3:	TRACKPILOT x(GYRO2)	Chl 11:	AMWSS
Chl 4:		Chl 12:	
Chl 5:	AIS	Chl 13:	B-ADAPTER
Chl 6:	POS EQUIP 2	Chl 14:	ECHO SOUNDER (BOW)
Chl 7:	GYRO1	Chl 15:	WIND
Chl 8:	DUAL AXIS LOG x(LOG)	Chl 16:	
		B-Adapter	
Chl 1:		Chl 5:	
Chl 2:		Chl 6:	
Chl 3:		Chl 7:	
Chl 4:		Chl 8:	

What happens after pressing Activate changes now

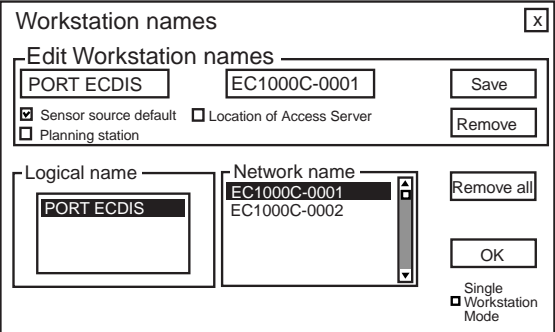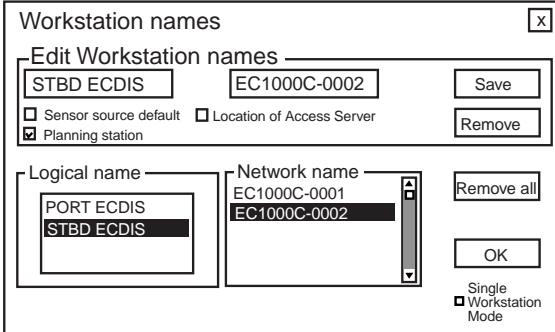After pressing Activate changes now, you may get one of the following alarms.
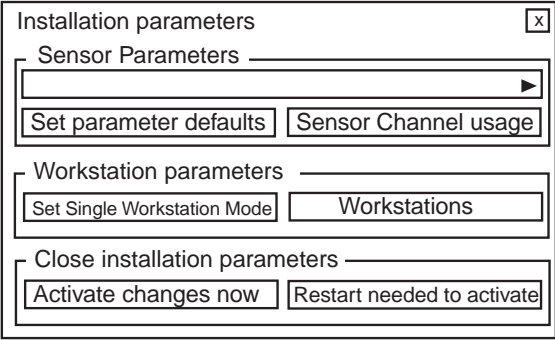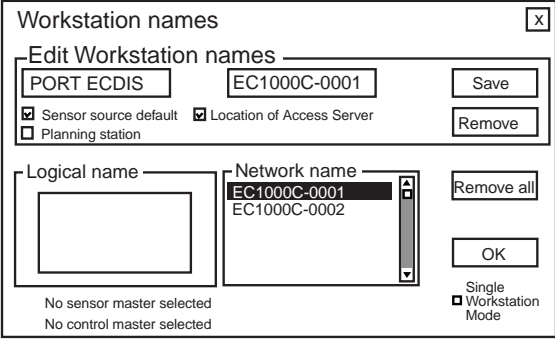
"700 No Sensor parameters": The Sensor Parameters are corrupted. Use backup of Parameters.

"600 Param change disabled": The ECDIS cannot accept change of parameters if Kalman Filter is ON or ECDIS is currently used for steering. Use manual or autopilot steering and turn Kalman Filter OFF when you change parameters.

"459 Steering parameter error": There are incorrect values in the Track pilot installation parameters. Check values of the Track pilot parameters.

Definition of Workstation

Below is a generic description of how to operate the Workstation parameter page.

1.
```
Installation parameters                          [x]
 ┌ Sensor Parameters ─────────────────────────┐
 │                                          ▶ │
 │ [Set parameter defaults] [Sensor Channel usage] │
 └─────────────────────────────────────────────┘
 ┌ Workstation parameters ─────────────────────┐
 │ [Set Single Workstation Mode] [ Workstations ] │
 └─────────────────────────────────────────────┘
 ┌ Close installation parameters ──────────────┐
 │ [Activate changes now] [Restart needed to activate] │
 └─────────────────────────────────────────────┘
```

2.
```
Workstation names                                [x]
┌Edit Workstation names ──────────────────────┐
│ [PORT ECDIS]        [EC1000C-0001]    [ Save ] │
│ ☑ Sensor source default  ☑ Location of Access Server │
│ ☐ Planning station                   [ Remove ] │
└─────────────────────────────────────────────┘
┌Logical name ─┐ ┌ Network name ─┐  [ Remove all ]
│              │ │ EC1000C-0001  │
│              │ │ EC1000C-0002  │  [   OK   ]
│              │ │               │       Single
│              │ │               │     ☐ Workstation
└──────────────┘ └───────────────┘        Mode
   No sensor master selected
   No control master selected
```

3.
```
Workstation names                                [x]
┌Edit Workstation names ──────────────────────┐
│ [PORT ECDIS]        [EC1000C-0001]    [ Save ] │
│ ☑ Sensor source default  ☐ Location of Access Server │
│ ☐ Planning station                   [ Remove ] │
└─────────────────────────────────────────────┘
┌Logical name ─┐ ┌ Network name ─┐  [ Remove all ]
│ PORT ECDIS   │ │ EC1000C-0001  │
│              │ │ EC1000C-0002  │  [   OK   ]
│              │ │               │       Single
│              │ │               │     ☐ Workstation
└──────────────┘ └───────────────┘        Mode
```

4.
```
Workstation names                                [x]
┌Edit Workstation names ──────────────────────┐
│ [STBD ECDIS]        [EC1000C-0002]    [ Save ] │
│ ☐ Sensor source default  ☐ Location of Access Server │
│ ☑ Planning station                   [ Remove ] │
└─────────────────────────────────────────────┘
┌Logical name ─┐ ┌ Network name ─┐  [ Remove all ]
│ PORT ECDIS   │ │ EC1000C-0001  │
│ STBD ECDIS   │ │ EC1000C-0002  │  [   OK   ]
│              │ │               │       Single
│              │ │               │     ☐ Workstation
└──────────────┘ └───────────────┘        Mode
```

1. In the Installation parameters window, click the **Workstations** button.
2. The workstation names window appears and it shows a list of computer names for workstations connected via LAN, in the list box **Network name**. Click a desired computer name of workstation to set workstation function at Edit Workstation names in the **Network name** field.
3. You can enter an alias for Workstation (PORT ECDIS as EC1000-0001) to better describe a Workstation (for example PORT ECDIS for workstation located port side). You can also set if the Workstation is used as master of sensor data and if it is used as Workstation that run an Access Server.

   Note: Check **Sensor source default** for the Workstation where you have sensors connected. One Workstation can be selected to run **Access Server**.

4. When you have defined a Workstation, click the **Save** button.
   The EC-1000 Workstation is set as below:
   Alias: PORT ECDIS, Sensor source: default setting, Access Server: ON
5. Click EC1000-002 at Network name, and set "STBD ECDIS". Then check "Planning station".

Examples:

Settings when workstation EC1000-0001 is used as a stand-alone system.

Workstation names [X]

Edit Workstation names

PORT ECDIS | EC1000C-0001 | Save

☑ Sensor source default ☑ Location of Access Server | Remove
☐ Planning station

Logical name

EC1000

Network name

EC1000C-0001
EC1000C-0002

Remove all

OK

Single
☐ Workstation
Mode

Settings when workstation EC1000-0001 is used as navigation station in a two ECDIS system consisting of one navigation and one planning workstation.

Workstation names [X]

Edit Workstation names

NAVIGATION | EC1000C-0001 | Save

☑ Sensor source default ☑ Location of Access Server | Remove
☐ Planning station

Logical name

NAVIGATION
PLANNING

Network name

EC1000C-0001
EC1000C-0002

Remove all

OK

Single
☐ Workstation
Mode

Settings when workstation EC1000-0002 is used as planning station in a two ECDIS system consisting of one navigation and one planning workstation.

Workstation names [X]

Edit Workstation names

PLANNING | EC1000C-0002 | Save

☐ Sensor source default ☐ Location of Access Server | Remove
☑ Planning station

Logical name

NAVIGATION
PLANNING

Network name

EC1000C-0001
EC1000C-0002

Remove all

OK

Single
☐ Workstation
Mode

Settings when workstation EC1000C-0001 is used as navigation station in a two ECDIS system consisting of two navigation workstations.

```
Workstation names                                    ⌧
 ┌ Edit Workstation names ────────────────────
 │ PORT                │  │ EC1000C-0001 │    │ Save    │
 │ ☑ Sensor source default  ☑ Location of Access Server
 │ ☐ Planning station                         │ Remove  │

 ┌ Logical name ──┐  ┌ Network name ──┐
 │ PORT          │  │ EC1000C-0001 ▲│    │ Remove all │
 │ STBD ECDIS    │  │ EC1000C-0002  │
 │               │  │              │    │ OK         │
 │               │  │            ▼│
                                          Single
                                        ☐ Workstation
                                          Mode
```

Settings when workstation EC1000C-0002 is used as navigation station in a two ECDIS system consisting of two navigation workstations.

```
Workstation names                                    ⌧
 ┌ Edit Workstation names ────────────────────
 │ STBD ECDIS          │  │ EC1000C-0002 │    │ Save    │
 │ ☐ Sensor source default  ☐ Location of Access Server
 │ ☐ Planning station                         │ Remove  │

 ┌ Logical name ──┐  ┌ Network name ──┐
 │ PORT          │  │ EC1000C-0001 ▲│    │ Remove all │
 │ STBD ECDIS    │  │ EC1000C-0002  │
 │               │  │              │    │ OK         │
 │               │  │            ▼│
                                          Single
                                        ☐ Workstation
                                          Mode
```

3-7

Opening each parameter dialog box

1. Locate the cursor on the ► mark on the drop-down list.
2. Choose an item you want to set, by scrolling the list.

AIS transponder
Alarm Inputs / External
Alarm Inputs + Outputs / AMWSS
Central Alarm Output
Central Alarm Text
Conning Display
Dual Axis Log (DAX)
Echo Sounder and Weather
Electronic chart (Laserplot)
Engine Control

General

Enter your ship's name and characteristics referring to next page.

If there is no optional B adapter connected, set parameters as such.

If there is an optional B adapter, set the equipment as such.

Notes:

- Center position is geometrical center of the ship.
- Conning Position is the point of observation.
- Select Connected = NO, if optional B adapter is not used.
- Select Connected = YES, if optional B adapter is used.

Radar Antenna Position

Conning Position

GPS Antenna Position

Dual Axis Log Position

Breadth = 30 m

Length=200 m

From Center Position to Bow Position =100 m

From Center Position to Dual Axis Log Position = 70 m

Center Position

From Center Position to Conning position = -60 m

From Center Position to Stern Position = -100 m

Side Position = 15 m

From Center Position to sidewise Conning position = 10 m
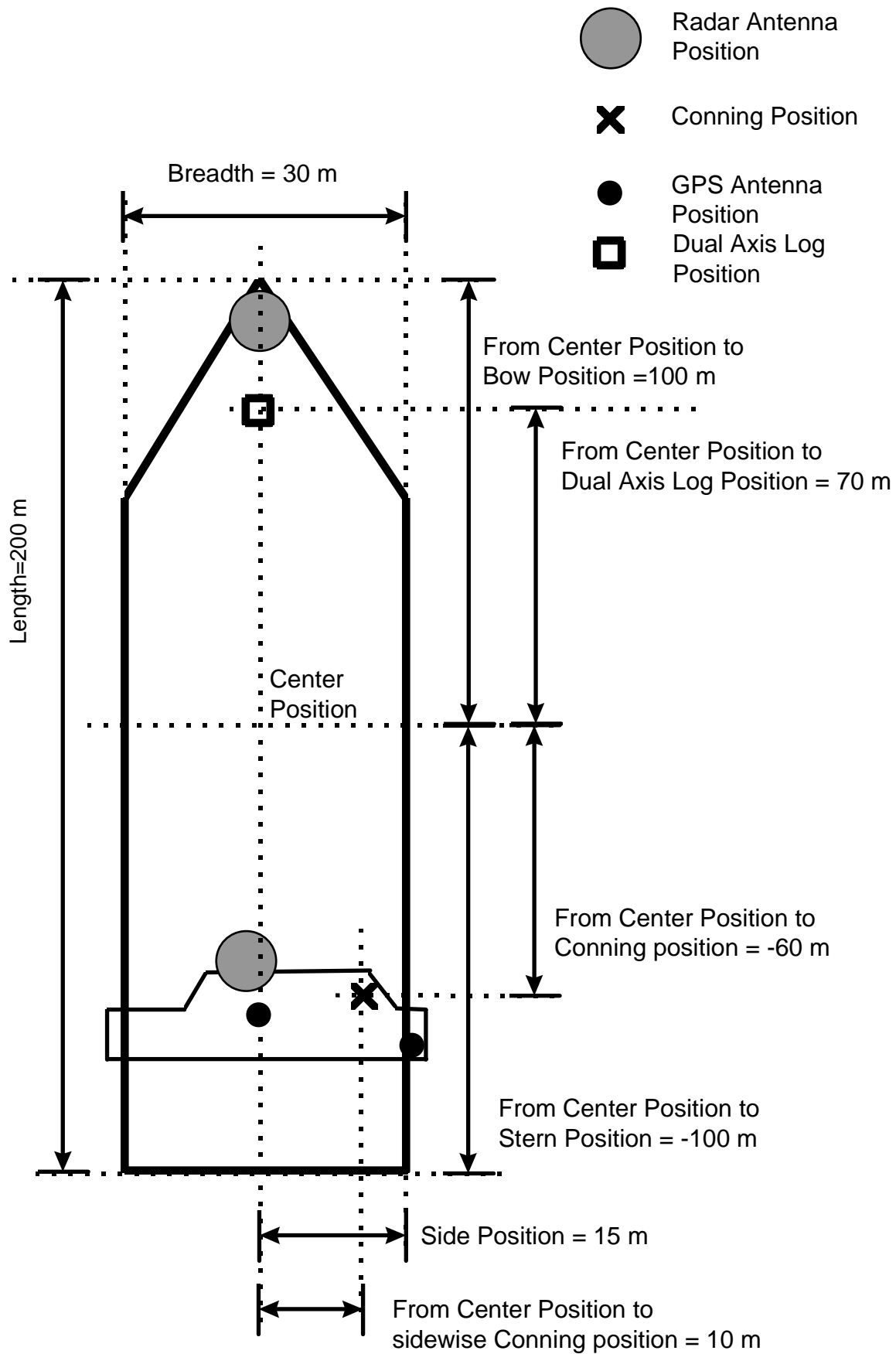
Gyro 1

Settings when Gyro is outputting data in IEC-61162-1 format.

```
Edit parameters - Gyro 1                    [×]

                                         ┌──────────┐
                                         │    OK    │
                         ┌─────────┐     └──────────┘
Connected:     │ YES         ▶ │     ┌──────────┐
                         └─────────┘     │  Cancel  │
                         ┌─────────┐     └──────────┘
Adapter Chl:   │  7          │
                         └─────────┘
                         ┌─────────┐
Gear Box:      │ 1:360       ▶ │
                         └─────────┘
                         ┌─────┐
Talker Identifier │  HE  │    HE=typical; XX=don't care
                         └─────┘
                         ┌─────────────────────────┐
Device Interface: │ IEC-61162-1 ($xxHDT)    ▶ │
                         └─────────────────────────┘
```

Settings when Gyro is Stepper or Synchro with 1:360 gearbox and optional B adapter is used.

```
Edit parameters - Gyro 1                    [×]

                                         ┌──────────┐
                                         │    OK    │
                         ┌─────────┐     └──────────┘
Connected:     │ YES         ▶ │     ┌──────────┐
                         └─────────┘     │  Cancel  │
                         ┌─────────┐     └──────────┘
Adapter Chl:   │  7          │
                         └─────────┘
                         ┌─────────┐
Gear Box:      │ 1:360       ▶ │
                         └─────────┘
                         ┌─────┐
Talker Identifier │  XX  │    HE=typical; XX=don't care
                         └─────┘
                         ┌──────────────────────────────┐
Device Interface: │ Stepper/Synchro (uses B-Adapter) ▶ │
                         └──────────────────────────────┘
```

Settings when Gyro is Synchro with 1:180 gearbox and B adapter is used.

```
Edit parameters - Gyro 1                    [×]

                                         ┌──────────┐
                                         │    OK    │
                         ┌─────────┐     └──────────┘
Connected:     │ YES         ▶ │     ┌──────────┐
                         └─────────┘     │  Cancel  │
                         ┌─────────┐     └──────────┘
Adapter Chl:   │  7          │
                         └─────────┘
                         ┌─────────┐
Gear Box:      │ 1:180       ▶ │
                         └─────────┘
                         ┌─────┐
Talker Identifier │  XX  │    HE=typical; XX=don't care
                         └─────┘
                         ┌──────────────────────────────┐
Device Interface: │ Stepper/Synchro (uses B-Adapter) ▶ │
                         └──────────────────────────────┘
```
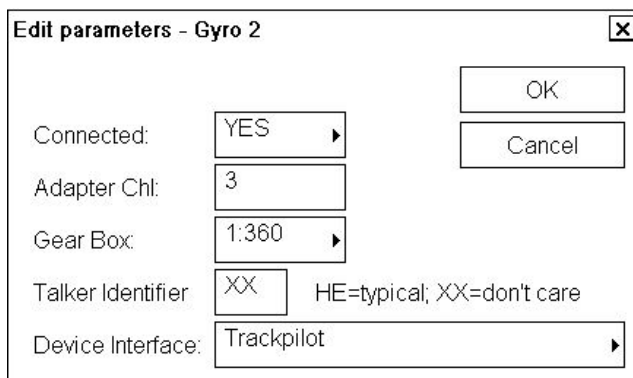
Notes:

- Talker identifier can be defined for IEC 61162-1 (typical talker for gyro is HE). If talker identifier is defined as XX, then it is ignored.

- Analog is either synchro or stepper from optional B adapter.

- IEC-61162-1 uses HDT/THS. IEC-61162-2 uses HDT (CH5, CH7, CH13, CH15)

- For DNV NAUT-AW installations, see the paragraph "Gyro interface only for DNV NAUT-AW rule" on page 3-16 for details.
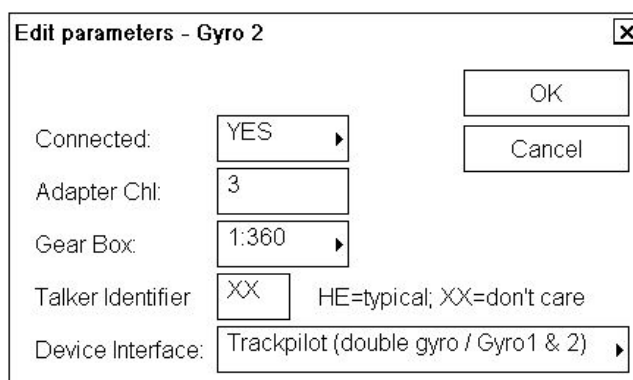
Gyro 2

Settings when Gyro 2 is
receiving from Trackpilot.
If connected TCS.
(BSH type approved)

```
Edit parameters - Gyro 2                    [x]

                              ┌──────────────┐
                              │      OK      │
Connected:       │ YES    ▸ │ └──────────────┘
                              ┌──────────────┐
Adapter Chl:     │ 3      │   │    Cancel    │
                              └──────────────┘
Gear Box:        │ 1:360  ▸ │

Talker Identifier │ XX │    HE=typical; XX=don't care

Device Interface: │ Trackpilot                   ▸ │
```
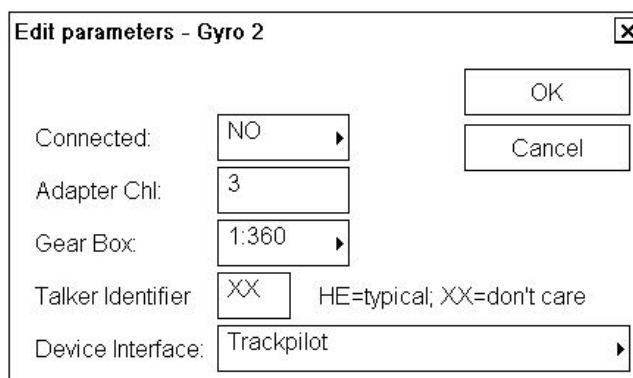
Settings when Gyro 2 is
receiving through Trackpilot.
If connected EMRI TCS.
(DNV NAUT-AW).

```
Edit parameters - Gyro 2                    [x]

                              ┌──────────────┐
                              │      OK      │
Connected:       │ YES    ▸ │ └──────────────┘
                              ┌──────────────┐
Adapter Chl:     │ 3      │   │    Cancel    │
                              └──────────────┘
Gear Box:        │ 1:360  ▸ │

Talker Identifier │ XX │    HE=typical; XX=don't care

Device Interface: │ Trackpilot (double gyro / Gyro1 & 2)  ▸ │
```

Settings when Gyro 2 is not
connected.

```
Edit parameters - Gyro 2                    [x]

                              ┌──────────────┐
                              │      OK      │
Connected:       │ NO     ▸ │ └──────────────┘
                              ┌──────────────┐
Adapter Chl:     │ 3      │   │    Cancel    │
                              └──────────────┘
Gear Box:        │ 1:360  ▸ │

Talker Identifier │ XX │    HE=typical; XX=don't care

Device Interface: │ Trackpilot                   ▸ │
```

3-12

Gyro interface for Track Control System approved by BSH
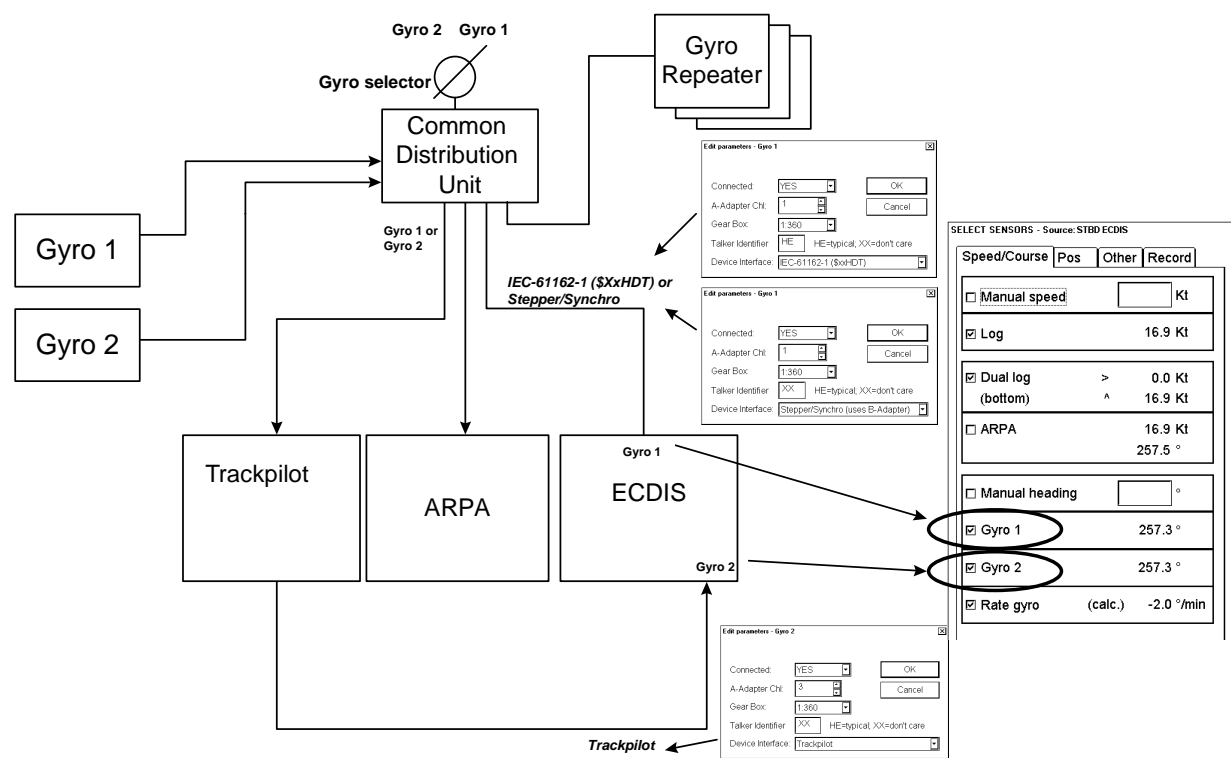
Figure above shows an example where ECDIS Gyro 1 is received from Common Distribution Unit and ECDIS Gyro 2 is received from trackpilot.

Gyro interface only for DNV NAUT-AW rule
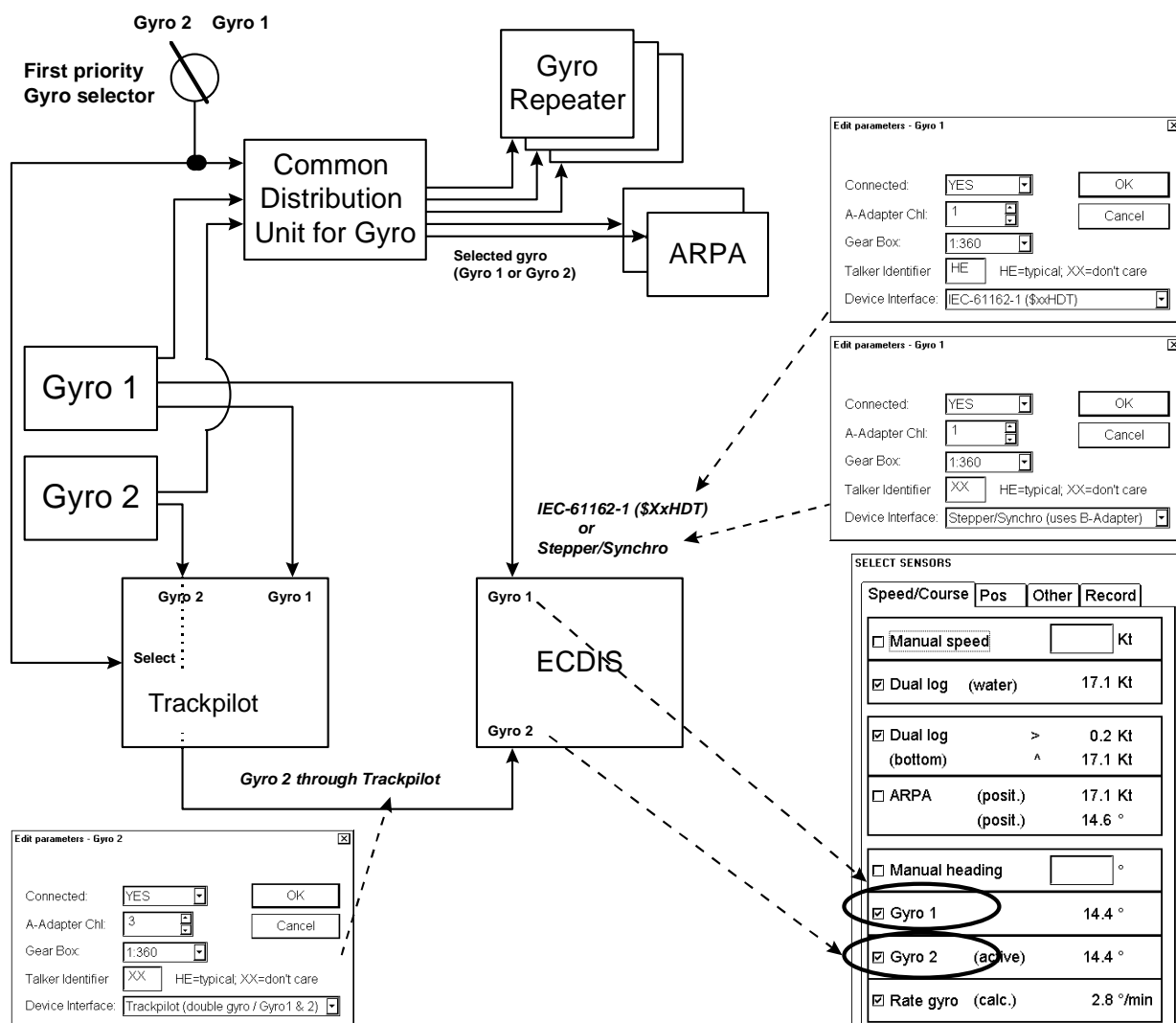
Figure above shows an example where ECDIS Gyro 1 is received directly form Gyro 1 and ECDIS Gyro 2 is received through Track Pilot.

Notes: For receiving Gyro 2 through Trackpilot:

- Software of AEU511 for the Trackpilot must be "SEM200 Version Aeu2_3 Compiled 13-04-2004 11:39".

- MPI31 must be "MIP2 Version Mip2 Compiled 12-03-2004 16:38".

- ExtendedPessa should be checked.

Log

Settings when log is using Analog Pulses 200 p/nm. Note that log is used for water speed component if the dual-axis log is available.

Edit parameters – Log	
Connected:	YES ▸
Adapter Chl:	4
Device Interface:	Analog Pulse (uses B-Adaptor) ▸
Measurement Units:	NM ▸
Prefiltering:	0 ▸
Pulses per Unit:	200

(OK / Cancel)

Settings when log is single axis pilot log transmitting IEC-61162-1. Message used is VBW.

Edit parameters – Log	
Connected:	YES ▸
Adapter Chl:	8
Device Interface:	DAX: IEC 61162-1 ($xxVBW) ▸
Talker Identifier	VD VD=typical; XX=don't care

(OK / Cancel)

Settings when log is used to find out water speed component from a dual-axis log using IEC-61162-1. Sensor log uses water tracking values of VBW message.

Edit parameters – Log	
Connected:	YES ▸
Adapter Chl:	8
Device Interface:	DAX: IEC 61162-1 ($xxVBW) ▸
Talker Identifier	VD VD=typical; XX=don't care

(OK / Cancel)

Notes:

• Talker identifier can be defined for IEC 61162-1 (typical talker for log is VD). If talker identifier is defined as XX, then it is ignored.

• Analog pulses are from optional B-Adapter.

3-15

Dual-axis log

Settings when using
IEC-61162-1.

```
Edit parameters - Dual Axis Log (DAX)                          [×]

  Connected:          YES      ▶                    OK

  Adapter Channel:    8                          Cancel

  Device Interface:   IEC 61162-1 ($xxVBW)                    ▶

  Sign Positive:      for Ahead   ▶      (longitudinal speed)

  Sign Positive:      for Port    ▶      (transversal speed)

  Use Sign Positive parameters to change polarity of speed components

  Status Flag Check:  Check - only "A","B" or "W" accepted     ▶

  Talker Identifier   VD       VD=typical; XX=don't care
```

Settings when no dual-axis log
is available.

```
Edit parameters - Dual Axis Log (DAX)                          [×]

  Connected:          NO       ▶                    OK

  Adapter Channel     8                          Cancel

  Device Interface:   IEC 61162-1 ($xxVBW)                    ▶

  Sign Positive:      for Ahead   ▶      (longitudinal speed)

  Sign Positive:      for Port    ▶      (transversal speed)

  Use Sign Positive parameters to change polarity of speed components

  Status Flag Check:  Check - only "A","B" or "W" accepted     ▶

  Talker Identifier   VD       VD=typical; XX=don't care
```

Notes:

- Talker identifier can be defined for IEC 61162-1 (typical talker for dual axis log is VD). If talker identifier is defined as XX, then it is ignored.

- IEC 61162-1 uses VBW or VTG.

- If you selected VBW message, then bottom track is available from dual-axis log and water track could be available from log.

3-16

Radar Echo Overlay

Radar Echo Overlay can be received by ECDIS in two ways:

- through Radar Overlay card fitted in ECDIS

- through LAN from FAR-2x07

Radar Echo Overlay (analog) through Radar Overlay card fitted in ECDIS
This menu does not appear if Analog Echo Overlay is set for "No use" during installation.

Configuration for Radar Echo Overlay (analog), when Radar overlay card fitted in ECDIS, is done using "Radar Echo Overlay (Analog)" parameter settings.

Here is an example, when Radar Transceiver is not connected (**Connected** as **NO**) through Radar overlay card fitted in ECDIS.
NOTE: You have to define all three Radar transceivers whether they are connected through the Radar overlay or not.

Here is an example of a mast- mounted S-band radar, when mast is in about same position as the conning position.

Here is an example of a bow mounted radar with large distance from the conning position. Bearing and Range offsets are used to align radar and chart displays.

Edit parameters - Radar Echo Overlay (Analog)

Connected:	YES ▶

OK   Cancel

Radar tranciever: 2 ▼
Label: BOW X
Bearing pulses: 360 pulses / antenna rev
From Radar antenna to Conning position: 5 m (+Stbd, -Port)
150 m (+Bow, -Stern)
Bearing offset: 0 °
Range offset: -100 m

Rain clutter filter
Min: 5 V
Max: 1.7 V

Gain
Min: 0 V
Max: -2.5 V

Sea clutter filter
Min: 0 V
Max: -2.5 V

Here is an example of a mast-mounted X-band radar, when mast is in about same position as the conning position. Bearing and Range offsets are used to align radar and chart displays.

Edit parameters - Radar Echo Overlay (Analog)

Connected: YES ▶   OK   Cancel

Radar tranciever: 3 ▼
Label: MAST X
Bearing pulses: 132 pulses / antenna rev
From Radar antenna to Conning position: 0 m (+Stbd, -Port)
0 m (+Bow, -Stern)
Bearing offset: 0 °
Range offset: -100 m

Rain clutter filter
Min: 5 V
Max: 0 V

Gain
Min: 0 V
Max: -5 V

Sea clutter filter
Min: 0 V
Max: -5 V

Radar Overlay has status inputs which are used to select between 3 different setups for parameters. This arrangement allows installation of three different radar transceivers and antennas. Fox example a normal set of one S-band and one X-band radar on a mast and then a third radar at the bow. See examples above.

Each radar can have an antenna with different amount of pulses per revolution. Also operational area of FTC (Rain clutter), STC (Sea clutter) and gain is separately defined for each radar. Offsets defined here are also used indirectly by the ARPA radar display.

3-18

Radar Echo Overlay (LAN) from FAR-2xx7 and FCR 2xx7 series radar through LAN

The following settings are for Radar Echo Overlay (LAN) received from FAR-2xx7 and FCR-2xx7 series radar through LAN.

If Radar overlay is not received through LAN, set **Connected** as **NO** for each transceiver (1-4).

```
Edit parameters - Radar Echo Overlay/Communication (LAN)

Radar transceiver              [ 1    ▶ ]              [  OK  ]

Connected                      [ NO        ▶ ]        [ Cancel ]

Device interface               [ IMO Radar        ▶ ]

Label                          [ MASTS            ]

From Radar antenna             [ 2               ]  m {+Stbd, -Port}
to Conning position            [ 20              ]  m {+Bow, -Stern}
IP address                     172.31.3.6

Port numbers                   10024 for Radar echo output
                               10028 for Radar communication

Radar display number             1
```

Radar transceiver 1 is Connected as Yes.
Device Interface defines source of ARPA target (IMO ARPA or Chart Radar).
Label defines name for source of video.
From Antenna to Conning position defines offset position of radar antenna.

Note that Radar display number is defined in Radar Display settings in the field at right "LAN Radar". See figure below.

```
Edit parameters - Radar Echo Overlay/Communication (LAN)

Radar transceiver              [ 1    ▶ ]              [  OK  ]

Connected                      [ YES       ▶ ]        [ Cancel ]

Device interface               [ IMO Radar        ▶ ]

Label                          [ MASTS            ]

From Radar antenna             [ 2               ]  m {+Stbd, -Port}
to Conning position            [ 20              ]  m {+Bow, -Stern}
IP address                     172.31.3.6

Port numbers                   10024 for Radar echo output
                               10028 for Radar communication

Radar display number             1
```

```
Edit parameters - Radar Display

┌─ Radar Displays ──────────────────────────────────┐
│  Radar Display            [ Display 1    ▶ ]        │
│                                                    │
│  Connected                [ YES         ▶ ]        │
│                                                    │
│  Adapter Channel          [ 4           ▶ ]        │
│                                                    │
│  Device Interface         [ FURUNO FAR-2x07 (LAN)  ▶ ] │
│                                                    │
│  Rx Talker Identifier     [ RA        ]            │
│                                                    │
│  LAN Radar                [ 1               ▶ ]    │
│                                                    │
│  IP address               172.31.3.6               │
└────────────────────────────────────────────────────┘

                    [  OK  ]   [ Cancel ]
```

Radar transceiver 2 is
Connected as Yes.
Device Interface defines
source of ARPA target (IMO
ARPA or Chart Radar).
Label defines name for
source of video.
From Antenna to Conning
position defines offset
position of radar antenna.

Edit parameters - Radar Echo Overlay/Communication (LAN)

Radar transceiver	2 ▶	OK
Connected	YES ▶	Cancel
Device interface	IMO Radar ▶	
Label	MASTS	
From Radar antenna to Conning position	2	m {+Stbd, -Port}
	20	m {+Bow, -Stern}
IP address	172.31.3.7	
Port numbers	10024 for Radar echo output	
	10028 for Radar communication	
Radar display number	2	

Note that ARPA display
number is defined in ARPA
Radar Display settings in the
field "LAN Radar". See figure
at right.

Edit parameters - Radar Display

Radar Displays

Radar Display	Display 2 ▶
Connected	YES ▶
Adapter Channel	1 ▶
Device Interface	FURUNO FAR-2x07 (LAN) ▶
Rx Talker Identifier	RA
LAN Radar	2 ▶
IP address	172.31.3.7

OK   Cancel

Radar Echo Overlay received both through Radar overlay card and through LAN
It is possible that Radar Overlay video from one transceiver is received either through
Radar Overlay card (analog) or through LAN. You have to make configuration as introduced
in previous sections. Pay attention that you set **Connected** as **NO** for transceivers not
connected either through Radar overlay card or through LAN.

Connection of ECDIS and Chart Radar

Settings for INS
The ECDIS sends the route information to the
Chart Radar in real time. However, the route
information cannot be sent to Chart Radar when it
stoops during the route monitor.

-Radar transceiver: Enter the radar No. '1 to 4)
-Device Interface: Choose "Chart Radar with INS".
-IP Address: Enter the IP address of FCR-2xx7
 which receives the information (33 to 36).

Edit parameters - Radar Echo Overlay/Communication (LAN)

Radar transceiver	1 ▶	OK
Connected	YES ▶	Cancel
Device interface	Chart Radar with INS ▶	
Label	1	
From Radar antenna to Conning position	0	m {+Stbd, -Port}
	0	m {+Bow, -Stern}
IP address	172.31.3.6	
Port numbers	10024 for Radar echo output	
	10028 for Radar communication	
Radar display number	1	
IP Address	172.31.3. 33	
Port numbers	15003 for INS communication	

Settings for Chat Radar

Settings for CCRS

Note: These settings is available for the chart radar with version 06.01 and after.

The following data are sent from ECDIS to Chart Radar when starting the route monitor.

-Route data

-User chart

-Notes

-Sensor data other than Gyro

(These data are shown on Chart Radar display even if ECDIS is stopped.)

-Radar transceiver: Enter the radar No. (1 to 4)

-Device interface: Choose "Chart Radar with CCRS".

-IP Address: Enter the IP address of FCR-2xx7 which receives the information (33 to 36).

Settings for Chart Radar

Radar Displays

There are 6 basic device interface alternatives:

1) Device interface **FURUNO: IEC 61162-1** (TX Talker ID = II) includes all standard messages for an ARPA radar target data receive interface. Further it also contains a lot proprietary messages supporting integrated navigation features such as user charts, routes, curved EBL, etc.

2) Device interface **FURUNO: IEC 61162-1** (TX Talker ID = EI)includes all standard messages for an ARPA radar target data receive interface. Further it also contains a lot proprietary messages supporting integrated navigation features such as user charts, routes, curved EBL, etc.

3) Device interface **FURUNO: IEC 61162-1** (TX Talker ID = EC) includes all standard messages for an ARPA radar target data receive interface. Further it also contains a lot proprietary messages supporting integrated navigation features such as user charts, routes, curved EBL, etc.

4) Device interface **IMO IEC 61162-1** ($xxOSD, $xxTTM) uses TTM message for ARPA radar target data receive interface and OSD message for ARPA radar speed and course receive. It sends standard ECGLL, ECDPT and ECMVW messages to the ARPA radar.

5) Device interface **FURUNO: FAR-2x07 (serial)** includes all standard messages for an ARPA radar target data receive interface. Further it also contains a lot proprietary messages supporting integrated navigation features such as user charts, routes, curved EBL, etc

6) Device interface **FURUNO: FAR-2x07 (LAN)** includes all standard messages for an ARPA radar target data receive interface. Further it also contains a lot proprietary messages supporting integrated navigation features such as user charts, routes, curved EBL, etc

In the **Radar Display** field you can select radar displays one by one and define if they are in use, etc.

Radar id and **Radar transceiver** -fields are used to select indirectly radar antenna offsets from Conning position, which is defined as **Conning position** in the **General** parameters page.

In the example above there are settings for ARPA radar **display 1:**

- If ARPA Radar display sends **radar id 1**, it is connected to **Radar transceiver 1** and offset is defined in **Radar Echo Overlay (Analog)** parameters page for Transceiver 1.

- If ARPA radar **display 1** sends **radar id 2**, it is connected to **Radar Transceiver 2** defined in **Radar Echo Overlay (Analog)** parameters page.

Example1:
FURUNO IEC 61162-1 device interface with various TX Talker IDs.

Example 2:
Generic ARPA radar using only IMO standard message.

Example 3
FAR-28x7 ARPA radar connected with serial line.

Example 4
Parameters for one FAR-2xx7 radar and one FCR-28x7 Chart Radar connected with LAN Cable.
First Radar display (FAR-2xx7):

You can define to which LAN radar it is connected, at the "LAN Radar" field.

Note that the settings above together with the settings below must be done for LAN Radar settings:

Note 1: "Radar display number" defines IP address for connected ARPA Radar Display.
Note 2: Following values can be tailored: **Radar transceiver**, **Connected**, **Device Interface, Label and From Radar Antenna to Conning Position**. Leave other values as is.

Second Radar display (FCR-28x7):

```
Edit parameters - Radar Display

  Radar Displays
  Radar Display        Display 2      ▶

  Connected            YES            ▶

  Adapter Channel      1              ▶

  Device Interface     FURUNO FAR-2x07 (LAN)   ▶

  Rx Talker Identifier  RA

  LAN Radar            2              ▶

  IP address           172.31.3.7


                        OK      Cancel
```

You can define to which LAN radar it is connected at the "LAN Radar" field.

Note that the following settings above together with the settings below must be done for LAN Radar settings:

```
Edit parameters - Radar Echo Overlay/Communication (LAN)

   Radar Display          2          ▶          OK

   Connected              YES        ▶          Cancel

   Device Interface       Chart Radar ▶

   Label                  MASTS      ▶

   From Radar antenna     2     m (+Stbd, -Port)
   to Conning position
                          30    m (+Bow, -Stern)

   IP address             172.31.3.7

   Port numbers           10024 for Radar echo output
                          10028 for ARPA communication

   Radar display number   2
```

Note 1: "Radar display number" defines IP address for connected ARPA Radar Display.
Note 2: Following values can be tailored: **Radar transceiver**, **Connected**, **Device Interface, Label**, **From Radar Antenna to Conning Position** and **Radar display number**.   Leave other values as is.

Radar Antenna
Position

Conning Position

GPS Antenna
Position

Dual Axis Log
Position

From Antenna Position to
Conning position = -150 m

From Antenna Position to
Conning position = -5 m

From Antenna Position to
Conning position = 10 m

From Antenna Position to
Conning position = 12 m
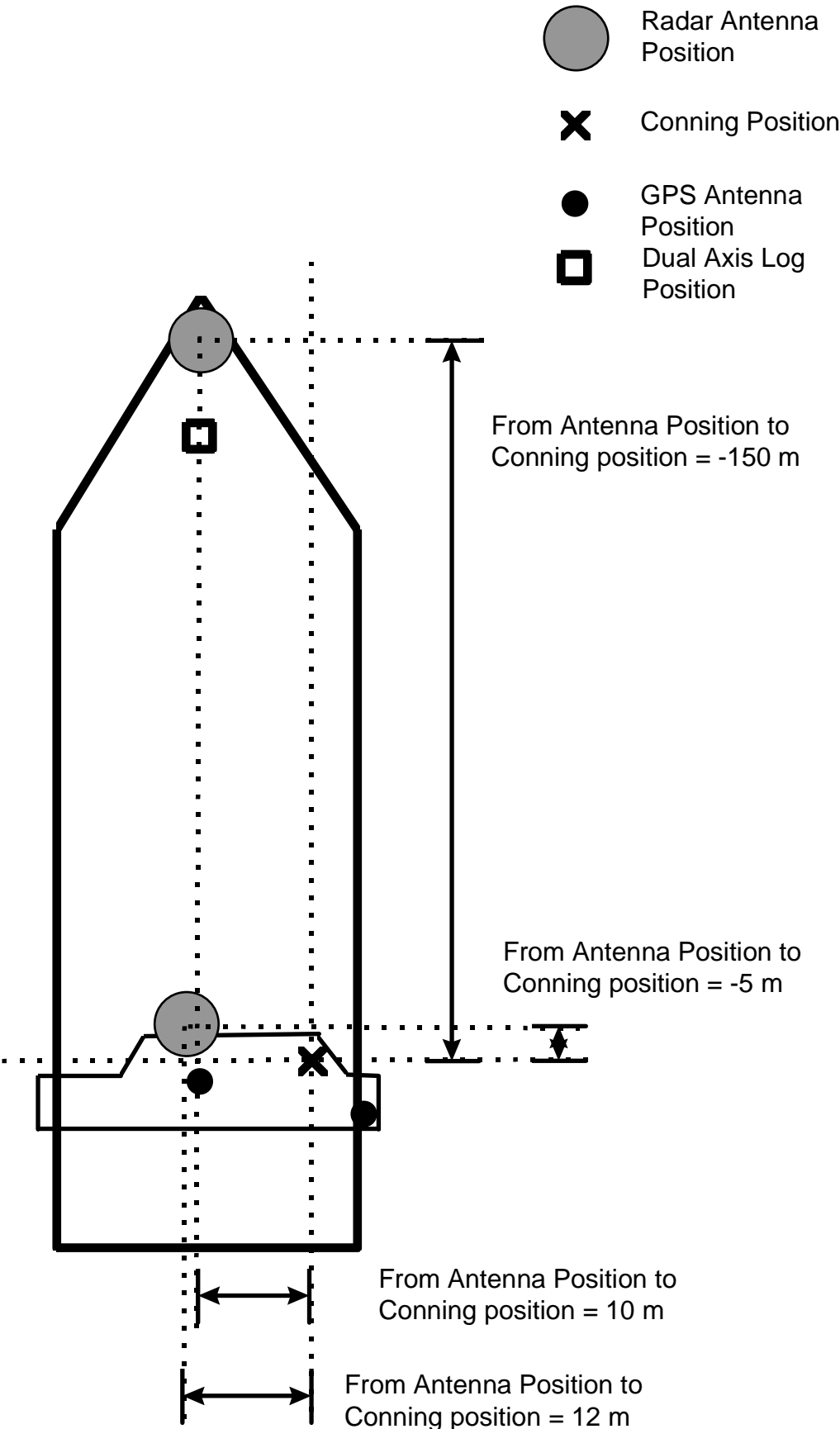
Position equipment

An example of DGPS receiver with talker identifier GP defined for both GGA and VTG messages.
Enter values for Weight Factor and Cmg Delay as follows.
-Weight Factor: 0.1
-Cmg Delay: 0

An example of DGPS receiver which is able to send IEC 61162-1 Ed. 2 messages (includes information about Datum of output position).

Enter values for Weight Factor and Cmg Delay as follows.
-Weight Factor: 0.1
-Cmg Delay: 0

An example of GPS receiver with ignored talker identifiers for both GLL and VTG messages.
Enter values for Weight Factor and Cmg Delay as follows.
-Weight Factor: 0.1
-Cmg Delay: 0

An example of setting for DGPS receiver which is able to send IEC 61162-1 Ed. 2 messages.
Enter values for Weight Factor and Cmg Delay as follows.
-Weight Factor: 0.1
-Cmg Delay: 0

Edit parameters - Positioning Equipment 1

Connected:	YES ▶	Device Name:	DGPS1
Adapter Chl:	2	Device Type:	DGPS ▶
Device Interface:	IEC 61162-1 ed2 ▶	Weight Factor:	0.1
Identification:	GLL+VTG ▶	Cmg Delay:	0 s
Talker Identifier:	GP XX=don't care	Offsets from	0.0 m (+Stbd, -Port)
Speed Talker ID:	GP XX=don't care	Antenna position to Conning position:	0.0 m (+Bow, -Stern)
Device Datum:	WGS 84		▶

Roll and Pitch Receive: Disabled ▶
IEC 61162-1 Transmit checksum Used ▶
$ char included in transmit checksum Included ▶

Weight Factor	dRMS[m]	4dRMS[m]
0.01	1000	4000
0.05	200	800
0.07	143	571
0.1	100	400
0.2	50	200
0.4	25	100
0.6	17	67
0.8	12	50

OK Cancel

An example of setting for Syledis receiver.
Enter values for Weight Factor and Cmg Delay as follows.
-Weight Factor: 0.1
-Cmg Delay: 0

Edit parameters - Positioning Equipment 3

Connected:	YES ▶	Device Name:	SERCEL
Adapter Chl:	12	Device Type:	Syledis ▶
Device Interface:	Syledis ▶	Weight Factor:	0.1
Identification:	GGA+VTG ▶	Cmg Delay:	0 s
Talker Identifier:	XX XX=don't care	Offsets from	10.0 m (+Stbd, -Port)
Speed Talker ID:	XX XX=don't care	Antenna position to Conning position:	5.0 m (+Bow, -Stern)
Device Datum:	WGS 84		▶

Roll and Pitch Receive: Disabled ▶
IEC 61162-1 Transmit checksum Used ▶
$ char included in transmit checksum Included ▶

Weight Factor	dRMS[m]	4dRMS[m]
0.01	1000	4000
0.05	200	800
0.07	143	571
0.1	100	400
0.2	50	200
0.4	25	100
0.6	17	67
0.8	12	50

OK Cancel

An example of setting for Loran receiver.
Enter values for Weight Factor and Cmg Delay as follows.
-Weight Factor: 0.1
-Cmg Delay: 0

Edit parameters - Positioning Equipment 5

Connected:	YES ▶	Device Name:	LORAN C
Adapter Chl:	12	Device Type:	Loran ▶
Device Interface:	IEC 61162-1 ed1 ▶	Weight Factor:	0.1
Identification:	GLL+VTG ▶	Cmg Delay:	0 s
Talker Identifier:	LC XX=don't care	Offsets from	5.0 m (+Stbd, -Port)
Speed Talker ID:	LC XX=don't care	Antenna position to Conning position:	10.0 m (+Bow, -Stern)
Device Datum:	WGS 84		▶

Roll and Pitch Receive: Disabled ▶
IEC 61162-1 Transmit checksum Used ▶
$ char included in transmit checksum Included ▶

Weight Factor	dRMS[m]	4dRMS[m]
0.01	1000	4000
0.05	200	800
0.07	143	571
0.1	100	400
0.2	50	200
0.4	25	100
0.6	17	67
0.8	12	50

OK Cancel

Notes:

- Talker identifier can be separately defined for speed and course (VTG message) and for position (GLL, GGA or PAT message). If talker identifier is defined as XX, then it is ignored.

- IEC 61162-1 ed1 or ed2: GGA uses messages VTG and GGA. Recommended for DGPS. Correct operation of a DGPS sensor requires that the system also receives VTG (COG/SOG) message. If no VTG message is received, the system thinks that there is something wrong in the DGPS and it downgrades the DGPS to an ordinary GPS sensor.

- IEC 61162-1 ed1: GLL uses messages VTG and GLL. Recommended for non-differential position receivers.

- IEC 61162-1 ed2: GLL uses messages VTG and GLL. Recommended for both differential and non-differential position receivers.

- COG delay is the delay between own ship turning and course made good in the VTG message to detect turning. Typically values are from 0 to 15 seconds.

- Because no message has any datum indication, the user is responsible for reference system used in the position receiver. GGA message is supposed to always be in WGS-84, but unfortunately some manufacturers do not follow this standard.

- Only one of connected sensors is allowed to send ZDA message, which will be used to adjust the system clock. If time difference is larger than 5 seconds and if the system is not a part of steering (i.e., mode is not Goto Wp, Goto Track or Program Track Turn) and if the system has Kalman filter in OFF position.

- Offset from antenna position to Conning position is essential for speed, course, drift and predictor related calculation.

- Roll & pitch data may be enabled only with PAT.

- First two channels can also operate as general purpose outputs. Checksum related parameters are for outputs only. Sent messages are GLL, VTG and HDT.

- There are two alternatives for IEC 61162-1 based interface: **ed1** and **ed2**. Ed1 was published in September 1998 and Ed2 was published in July 2000. The differences are new datum message (DTM) and changed content of GLL position message.

- Ed2 requires that position information (in this case GLL or GGA messages) also contain separate indication of datum used (DTM message). IMO rule states that ECDIS can only accept position in WGS84 datum. In practice only EPFS (for example, GPS or DGPS), which has "IEC 61162-1 Ed 2 (2000-7)" indicated in their type approval certificate can detect Datum.

- Ed2 requires that the GLL message includes a quality indicator i.e., the GLL message can indicate if position is based on standard GPS or differential GPS.

Radar Antenna
Position

Conning Position

GPS Antenna
Position

Dual Axis Log
Position

From Antenna Position to
Conning position = 5 m

From Antenna Position to
Conning position = 10 m

From Antenna Position to
Conning position = -5 m

From Antenna Position to
Conning position = 10 m
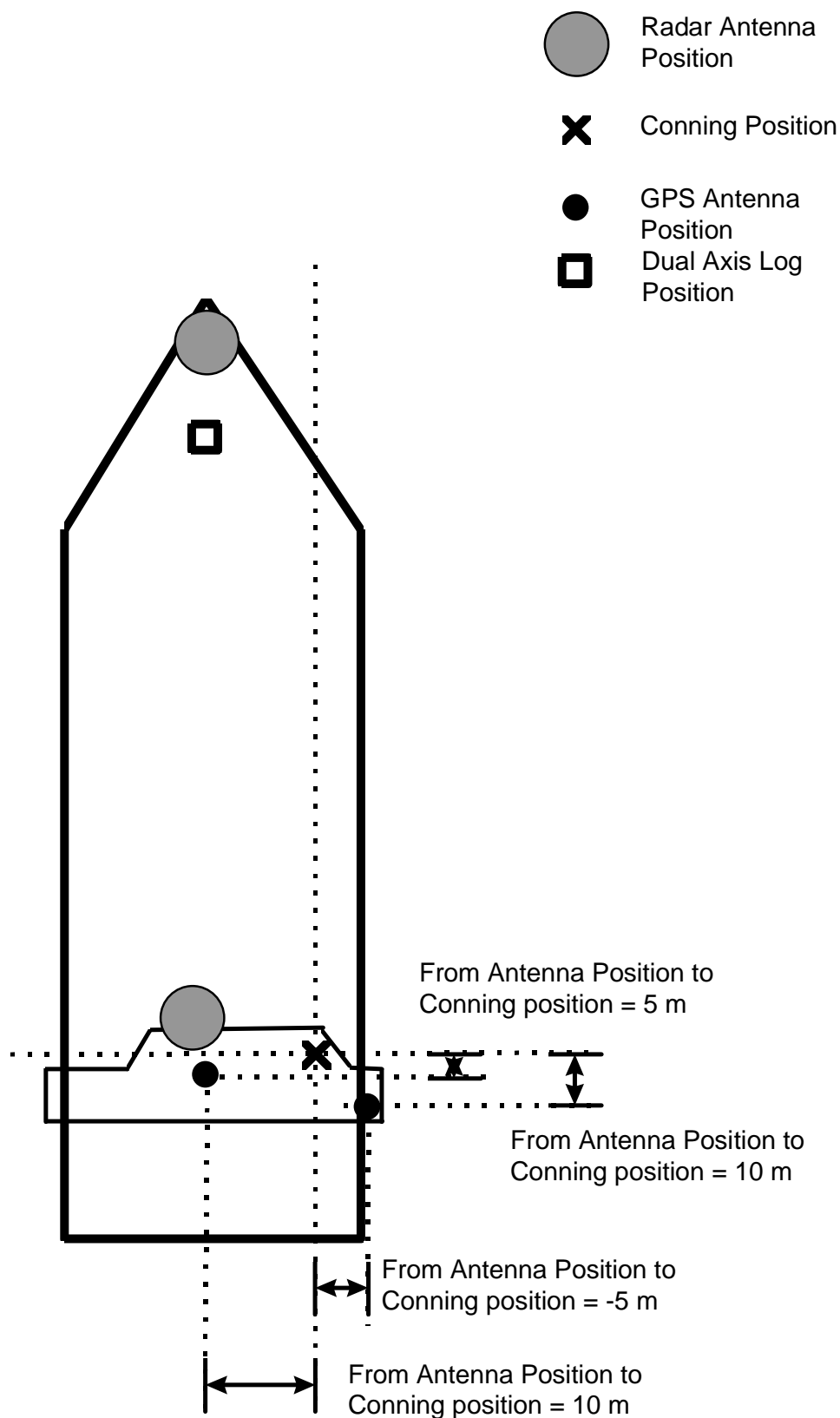
Note for service engineer:
If the vessel has main and backup system, then you must yourself set proper antenna offset
for both systems. Keep in mind that they are two independent and separate systems, but
they should share common antenna offset in case that they are connected to the same
position antenna.

Echo Sounder and Weather

Edit parameters – Echo Sounder and Weather			☒

OK	Cancel

	Echosounder (BOW)	Echosounder (AFT)	Water Current
Connected	YES	YES	YES
Device Interface	IEC61162-1 ($xxDBT)	IEC61162-1 ($xxDBT)	IEC61162-1 ($xxCDR)
Adapter Chl	14	16	12
Talker Identifier	SS	SS	SS
Median Filter	NO	NO	
Sensor to keel distance	0 m	0 m	

	Water Temperature	Air Temperature	Air Pressure	Air Humidity
Connected:	YES	NO	NO	NO
Device Interface:	IEC61162-1 ($xxMTW)	Analog(uses B-Adapter)	Analog(uses B-Adapter)	Analog(uses B-Adapter)
Adapter Chl:	10	8	6	4
Output	0 V (at 0 °C)	0 V (at 0 °C)	0 V (at 800 hPa)	0 V (at 0 %)
Output per Volt:	0 °C / Volt	2 °C / Volt	0 hPa/Volt	0 %/Volt
Prefiltering:	0	0	0	0
B-Adapter Chl:	2	3	7	5

Notes: (air temperature)

- Not used by this system, should have Connected = NO.

Notes: (air pressure)

- Not used by this system, should have Connected = NO.

Wind sensor

Here is an example of a wind sensor which is connected to LAN Adapter channel 15.

Wind modes are defined as: The wind as measured by a wind meter is known as apparent wind. If indicated wind includes speed compensation it is known as relative wind. If indicated wind includes both speed and heading compensation it is known as true wind.

Definitions:

- APPARENT   Wind as measured by wind meter.
- RELATIVE   Wind includes speed compensation.
- TRUE(T)heoretical   Wind includes both speed and heading compensations.
- TRUE(=North)   Wind includes both speed compensation and North stabilization.

Notes:

- Talker identifier is ignored.
- THIES in the Device Interface is a special case.
- Calculation of true from relative can only be used if wind sensor sends TRUE wind according to definition above.
- **Source of True Wind** to define what kind of wind is transmitted by weather station: Receive (T)heoretical Wind (HDG) and calculate True wind is default.
- **Style of Display** to define what kind of wind is displayed on ECDIS, True wind or Relative wind.
- **Style of output to ARPA** to define what kind of wind is transmitted to ARPA.

Trackpilot, autopilot

Settings when no Trackpilot is connected:

Settings for FURUNO FAP-2000/EMRI SEM200 Trackpilot

Notes:

In general all settings above are mandatory for FURUNO FAP-2000/EMRI SEM200 Trackpilot. The following parameters can be used to tailor the system to the vessel:

- Minimum turn radius

- Turn Endline in route steering

- From Conning position to XTE calculation position

- Minimum route speed

- Manual Steering Label

- Forwarding Distance Range

- Route Check (Available when "Connected" is "YES")
  -IEC-62065 (Not required): Route Monitor is available without Route Check.
  -DNV (Required by class note): Route Check is necessary to use Route Monitor.

FURUNO FAP-2000/EMRI SEM200 Trackpilot

FURUNO FAP-2000 Trackpilot is a separate unit. It consists of electronic unit AEU511 and control panel(s) MIP. If it is used with ECDIS some parameters must be as below. For further details, see separate manual for FAP-2000/EMRI SEM 200.

The values of the following remote interface parameters must be checked:

- VMS: **0**   (Vector interface)

- VMSTimeout: **0**   (Vector interface)

- ctsdef: **2**   (cts=hsc when leaving remote (continue turn))

- seldef: **1**   (display hsc as cts during remote track turns)

- lindef :   **1**   (default condition)

- SpeedSource: **3**   (ECDIS is main source of speed)

- LogNmeaCh: **0**   (ECDIS is connected to serial channel 0)

- FreezeRudder: **0**   (Maintain manoeuvre after loss of heading)

- HdtTimeoutLimit   **5**   (For serial data gyro with high message rate more than 5 HDT messages per second. If message rate is less than this, then use HdtTimeoutLimit = 25).

The following parameter can be used to tailor the system to the vessel. Write down values of following parameters:

- fiondly: xx   (Track regulator integrator start delay [sec], 64 is recommended)

- firw: xx   (Track regulator integrator start limit [NM], 0.02 is recommended)

- ficimax   xx   (Max attack angle to track for integral part of cross track error [radians]. 0.2 is recommended, which is about 12 º.)

- fpcimax   xx   (Max attack angle to track for proportional part of cross track error [radians]. 0.2 is recommended, which is about 12 º.)

- Rrudabs: xx   (Rudder limit for Radius and Goto WP mode)

- Grudabs: xx   (Rudder limit for Heading Control, Program Track and Goto Track mode)

- sleng   xxx   (Ships length [m])

- u_norm   xx   (Max speed of vessel [kt])

- BackupSpeedSource x   (Backup speed source if ECDIS fails. If no backup is available then set this as 3.)

- BackupLogNmeaCh   x   (Serial channel for backup speed source. If no backup is available then set this as 0.)

3. ADJUSTMENTS

- GyroNmeaCh   x   (Serial channel for gyro)
- PminRadius   xx   (Minimum available radius. Must be equal to ECDIS parameter.)

For proper track control, software of AEU511 must be "SEM200 Version Aeu2_3 Compiled 6-5-2003 15:37" and MPI31 must be "MIP2 Version Mip2 Compiled 7-5-2003 14:55".

Notes (Emergency instructions for cases when software of AEU511 or MIP31 is older version.)

- Parameter "ctsdef" requires careful special attention.
- When software of AEU511 is <u>older</u> than "SEM200 Version Aeu2_3 Compiled 13-2-2002"
- ctsdef 0   cts=hsc when leaving remote (continue turn)
- When software of AEU511 is <u>newer or equal</u> to "SEM200 Version Aeu2_3 Compiled 13-2-2002"
- ctsdef 2   turn/linear bit control behaviour. For turn, cts=hsc when leaving remote (continue turn).   For linear, cts=hdg; when leaving remote (steady as she goes).

Note also that if software of AEU511 electronic unit is <u>newer or equal</u> to "SEM200 Version Aeu2_3 Compiled 13-2-2002", then software of MIP panel must be <u>newer or equal</u> to "MIP2 Version Mip2 Compiled 7-3-2002 13:33".

Yokogawa PT-500A Autopilot

Below are settings for the Yokogawa PT-500A Autopilot.

GENERAL NOTES:

- In general all settings above are mandatory for Yokogawa PT-500A Autopilot. The following parameters can be used to tailor the system to the vessel:

- Minimum turn radius

- Turn Endline in route steering

- From Conning position to XTE calculation position

- Minimum route speed

NOTES ABOUT PARAMETERS INSIDE YOKOGAWA PT-500A:

Yokogawa PT-500A Autopilot steering control unit is a separate unit, which can operate together with ECDIS. Some parameters must be as below in Autopilot control unit.

For more information see manual of Yokogawa PT-500A Autopilot.

Confirm that the values of following remote interface parameters are as follows:

- INS/GPS Inp: INS-2   (type B)

- INS/GPS Out: $AGHDT (INS-2)

- Rudder State Control: BY-PASS

For proper steering, control software of Yokogawa PT-500A Autopilot must be:

- For Main: CPU-CR155K05 or newer

- For Calc: CPU-CR325A09 or newer

TOKYO KEIKI PR-6000 Autopilot

Settings for TOKYO KEIKI PR 6000 Autopilot in ECDIS:

NOTES:

In general all setting above are mandatory for TOKYO KEIKI PR-6000 Autopilot. Following parameter can be used to tailor the system to the vessel

- Minimum turn radius
- Turn End line in route steering
- From Conning position to XTE calculation position
- minimum route speed
- Forwarding Distance Range

Settings for Tokimec PR 6000 Autopilot:

Tokimec PR 6000 Autopilot Autopilot steering control unit is a separate unit, which can operate together with ECDIS. Some parameters must be as below in Autopilot control unit.

1. Data setting

data 5 (speed compensation):	12 or 92
data 15 (rudder speed):	bit6 = 0, bit7 = 0
data 30 (XTE Gain):	06
data 40 (drift compensation):	00

2. Auto Steering Control Adjusting(Ref AP manual)

	Adjustment	Auto Mode		RC-NAV Mode	Remarks
		PID	ADPT		
1	Rate of turn (RATE)	(1-9)	----	----	
2	Rudder Ratio (Rudder)	(1-9)	----	-----	
3	Weather adjustment (Weather)	(0-10)	----	-----	
4	ADPT(OPN/CNF)	----	OPN/CNF	OPN or CNF	Note 1
5	Pilot watch setting (Pilot Watch)	(5-15°)	(5-15°)	----	Note 3
6	Rudder limit setting (Rudder Limit)	(5-35°)	(5-35°)	----(Note 2)	

---: No function

Note1 Adaptive function becomes OPN on RC-NAV mode (under ECDIS control) when ADPT/Weather knob selected 0-10.

Note2 During RC-NAV mode (under ECDIS control), the Rudder Limit is ignored.

Note3 During RC-NAV mode (under ECDIS control), Pilot watch alarm is not given.

3. Speed selection

	Ship's speed input signal	Example of ordinary display	Example of display when operating CHANGE switch	Remarks
>1	Log pulses input	20.5	P-Lc	Ship's speed is used from ECDIS when RC-NAV is selected.
2	Manual input	C 15.0(Manual)	P 0c - P40c	

(1) During RC-NAV mode, Low Speed Alarm on Autopilot is not given but ECDIS generate own Low Speed Alarm setting by installation parameter of Track pilot.

(2) During RC-NAV mode speed selection of Autopilot could not change.
NAV Ready lamp dose not lit when manual speed is selected on other mode than RC-NAV, then Autopilot could not accept to RC-NAV Mode (Track control).

(3) If speed selection of Autopilot is manual "SPD" indicator will be flicker on "AUTO", "HAND" or "NFU" mode.

Autopilot information area indicate as manual speed on ECDIS screen,

4. Software version

For proper track control, software of PR-6000 must be:

MMA: v3.80 ->

PID: v3.80 ->

ADNCT: v1.40 ->

ROT gyro

No ROT Gyro connected: The system calculates from movement of Gyro heading.

```
Edit parameters - Rate of Turn Gyro                                    ☒

                                                          ┌──────────┐
 Connected:          NO, Caluculated from Gyro source ▶   │    OK    │
                                                          └──────────┘
 Adapter Channel:    1                                    ┌──────────┐
                                                          │  Cancel  │
 Device Type:        Gyro1: IEC 61162-1 ($xxROT)    ▶     └──────────┘

 B-Adapter Channel:  2

 Output at 0 °/min:  -5          V
                                                          Use sign of
 Output per Volt:    -40         (°/min) / V              Output per Volt to
                                                          change polarity of
 Prefiltering:       0                                    Rate of turn

 Max scale           200    ▶
```

ROT gyro value is received from Dolog 23 dual-axis log.

```
Edit parameters - Rate of Turn Gyro                                    ☒

                                                          ┌──────────┐
 Connected:          YES                            ▶     │    OK    │
                                                          └──────────┘
 Adapter Channel:    8                                    ┌──────────┐
                                                          │  Cancel  │
 Device Type:        DAX Dolog23: ($PKDRU)          ▶     └──────────┘

 B-Adapter Channel:  2

 Output at 0 °/min:  -5          V
                                                          Use sign of
 Output per Volt:    -40         (°/min) / V              Output per Volt to
                                                          change polarity of
 Prefiltering:       0                                    Rate of turn

 Max scale           200    ▶
```

ROT gyro value is received from gyro connected as Gyro1.

```
Edit parameters - Rate of Turn Gyro                                    ☒

                                                          ┌──────────┐
 Connected:          YES                            ▶     │    OK    │
                                                          └──────────┘
 Adapter Channel:    7                                    ┌──────────┐
                                                          │  Cancel  │
 Device Type:        Gyro 1: IEC 61162-1 ($xxROT)   ▶     └──────────┘

 B-Adapter Channel:  2

 Output at 0 °/min:  -5          V
                                                          Use sign of
 Output per Volt:    -40         (°/min) / V              Output per Volt to
                                                          change polarity of
 Prefiltering:       0                                    Rate of turn

 Max scale           200    ▶
```

ROT gyro value is received from Trackpilot.

Edit parameters - Rate of Turn Gyro   ⊠

                                                              OK
Connected: YES   ▶
                                                              Cancel
Adapter Channel: 3

Device Type: Trackpilot   ▶

B-Adapter Channel: 2

Output at 0 °/min: -5   V

Output per Volt: -40   (°/min) / V   Use sign of
                                                     Output per Volt to
Prefiltering: 0   change polarity of
                                                     Rate of turn
Max scale   200   ▶

ROT gyro value is received using analog interface directly from a ROT gyro sensor.

Edit parameters - Rate of Turn Gyro   ⊠
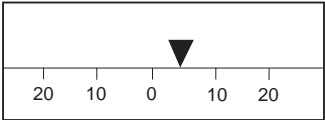
                                                              OK
Connected: YES   ▶
                                                              Cancel
Adapter Channel: 4

Device Type: Analog (uses B-Adapter)   ▶

B-Adapter Channel: 2

Output at 0 °/min: -5   V

Output per Volt: -40   (°/min) / V   Use sign of
                                                     Output per Volt to
Prefiltering: 0   change polarity of
                                                     Rate of turn
Max scale   200   ▶

3-41
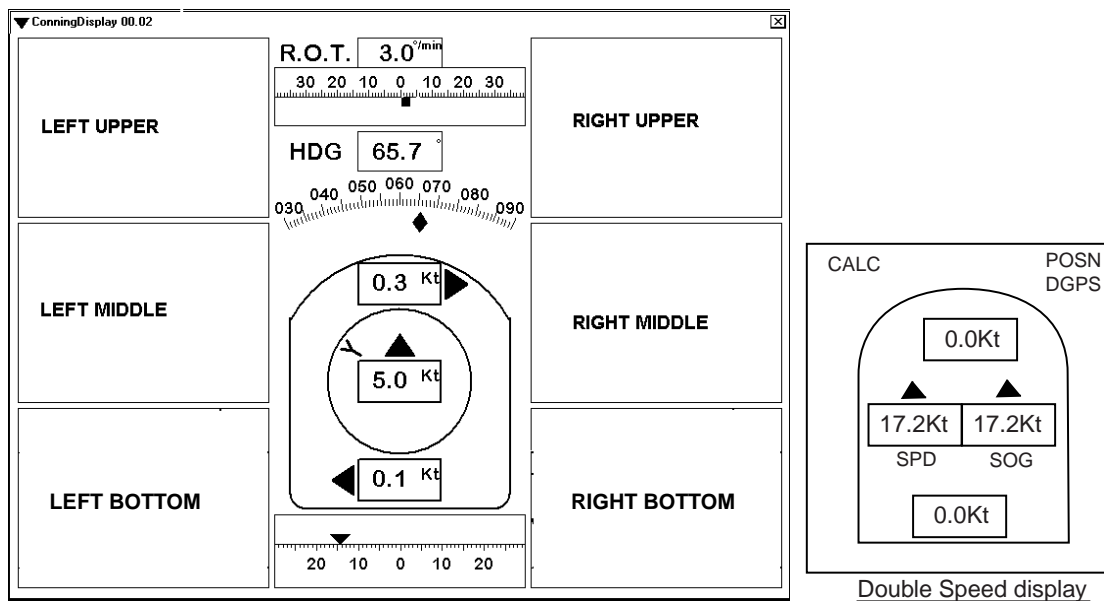
Conning display

Figure above shows how the windows are located in Conning Display.
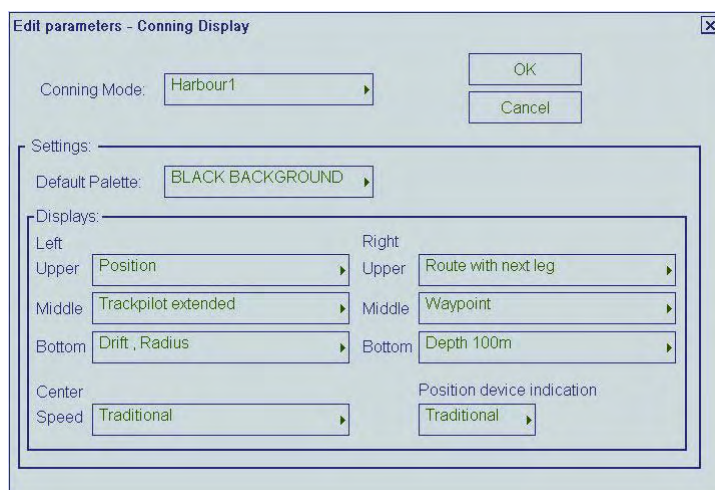
1) Select Conning Mode (Harbour1, Harbour2, Navigate1 or Navigate2).
Note, Stand-alone Conning Mode is used only with Conning Processor CP-01 and sidebar Conning Display.
You can make individual settings for each Conning Mode in the Settings field.
2) Use Default Palette setting to define background of Conning Display. This palette is used when you start Conning Mode in question.
3) Define which windows are displayed in each Conning Mode in the Display field. For more information about content of windows, see the Operator's Manual.

- **Alarm messages** windows are used only if Device Interface of Alarm Inputs is "$CAALA".

- **Track pilot extended** window is used only if steering mode of Trackpilot is "Program Track".

- **Service nnnn** windows are intended for use by a service engineer during sea trials.

4) Select Traditional, Double speed, Small size or Small with Double speed.
5) Select Traditional or Detailed.

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Rudders

Select Connected **NO** if no rudder is connected to the ECDIS.

Edit parameters - Rudders

Connected:	NO
Device Type:	Trackpilot
Number of Rudders:	1
Navigation Display Scale Max:	23 °
Harbour Display Scale Max:	33 °
Rudder type:	Conventional (one scale)
Numerical value:	Not used

OK / Cancel

	Not Used	Not Used	Not Used	Not Used
Label	ACT			
Display method	Normal	Normal	Normal	Normal

One rudder is connected and value is received using analog interface.

20 10 0 10 20

Edit parameters - Rudders

Connected:	YES
Device Type:	Analog (uses B-Adapter)
Number of Rudders:	1
Navigation Display Scale Max:	23 °
Harbour Display Scale Max:	33 °
Rudder type:	Conventional (one scale)
Numerical value:	Not used

OK / Cancel

Use sign of Output per Volt to change polarity of Rudder

	Rudder 1 ACT ANALOG	Not Used	Not Used	Not Used
B-Adapter Channel	1	4	3	1
Output at 0 °	4.00 V	0.00 V	0.01 V	0.01 V
Output per Volt	-5.00 °/V	0.00 °/V	0.01 °/V	0.70 °/V
Prefiltering	0	0	0	0
Label	ACT			
Display method	Normal	Normal	Normal	Normal

Two rudders are connected and one value is received using analog interface and second value is received from Trackpilot.

Edit parameters - Rudders

Connected:	YES
Device Type:	Actual analog, Order Trackpilot
Number of Rudders:	2
Navigation Display Scale Max:	23 °
Harbour Display Scale Max:	33 °
Rudder type:	Conventional (one scale)
Numerical value:	Only ORD/Cornered

OK / Cancel

Use sign of Output per Volt to change polarity of Rudder

	Rudder 1 ACT ANALOG	Rudder 2 ORD TRACKPILOT	Not Used	Not Used
B-Adapter Channel	1			
Output at 0 °	4.00 V			
Output per Volt	-5.00 °/V			
Prefiltering	0			
Label	ACT			
Display method	Normal	Normal	Normal	Normal

Two rudders are connected and values are received using analog interfaces.

Two rudders are connected and values are received from Trackpilot.

Note: You can give "name" for rudder in the Label field. This "name" is displayed in the Rudder window of the Conning Display.

One rudder is connected and value is received from Engine Control.

Two rudders are connected and values are received from Engine Control.

Edit parameters - Rudders ☒

Connected:	YES ▸
Device Type:	Engine Control ▸
Number of Rudders:	2 ▸
Navigation Display Scale Max:	23 °
Harbour Display Scale Max:	33 °
Rudder type:	Conventional (one scale) ▸
Numerical value:	Only ORD/Cornered ▸

OK
Cancel

Use sign of Output per Volt to change polarity of Rudder

┌─ Rudder 1 ─┐ ┌─ Rudder 2 ─┐ ┌─ Not Used ─┐ ┌─ Not Used ─┐
ACT   ORD
ENGINE CTRL ENGINE CTRL

	Rudder 1	Rudder 2	Not Used	Not Used
Output per Volt	-5.00 °/V	0.00 °/V	0.01 °/V	0.70 °/V
Label	ACT			
Display method	Normal ▸	Normal ▸	Normal ▸	Normal ▸

Rudder-type Azimuth Propulsion
Display method = Azimuth 0⁰ up and
Display method = Azimuth 0⁰ down are used to select between alternative scale for Azimuth propulsion window.
Rudder-type-Azimuth Propulsion and values, are received as SIN/COS values using analog interface.
Note: For each rudder required, two analog channels are required to receive both SIN and COS values.

Edit parameters - Rudders ☒

Connected:	YES ▸
Device Type:	Analog SIN/COS (uses B-Adapter) ▸
Number of Rudders:	2 ▸
Navigation Display Scale Max:	23 °
Harbour Display Scale Max:	33 °
Rudder type:	Azimuth Propulsion (no scale) ▸
Numerical value:	Not used ▸

OK
Cancel

Use sign of Polarity to change turning direction of Azimuth

┌─ Azimuth 1 ─┐ ┌─ Azimuth 2 ─┐ ┌─ Azimuth 1 ─┐ ┌─ Azimuth 2 ─┐
ANALOG Sin   ANALOG Sin   ANALOG Cos   ANALOG Cos

	Azimuth 1	Azimuth 2	Azimuth 1	Azimuth 2
B-Adapter Channel	1 SIN	4 SIN	3 COS	1 COS
Output at 0 unit	4.00 V	0.00 V	0.01 Offset °	0.01 Offset °
Output per Volt	-5.00 unit/V	0.00 unit/V	0.01 Polarity	0.70 Polarity
Prefiltering	0 ▸	0 ▸	0 ▸	0 ▸
Label	ACT			
Display method	Azimuth 0° up ▸	Azimuth 0° up ▸		

Two rudders are connected and values are received as IEC 61162-1 ($xxRSA) formatl.

Edit parameters – Rudders				☒

Connected: YES ▶   OK

Device Type: IEC 61162-1 ($xxRSA) ▶   Cancel

Number of Rudders: 2 ▶

Navigation Display Scale Max: 37 °

Harbour Display Scale Max: 37 °

Rudder type: Conventional (one scale) ▶

Numerical value: Cornered ▶

Use scaling factor to generate real Rudder angle from the proportional value in message

	Rudder 1	Rudder 2	Not Used	Not Used
	PORT	STBD		
	RSA (single value)	RSA (single value)		
Adapter Channel	0	16	16	16
Talker Identifier	II			SD
Scaling factor	1.00	1.00	2.00	2.00
Label	ACT	ORD		
Display method	Normal ▶	Normal ▶	Normal ▶	Normal ▶

Propellers

Select Connected **NO** if propeller is not connected to the ECDIS.

Edit parameters - Propellers 1 (stern)

General
Connected: NO ▶
Device Type: Analog (uses B-Adapter) ▶
Label:

OK
Cancel

	RPM	Pitch	Power	Torque	M/E Rpm
In use		NO ▶	NO ▶	NO ▶	YES ▶
B-Adapter channel	3	4	2	2	0
Output at 0	0 v	9.7 v	0 v	0.01 v	0.00 v
B-utput per Volt	-26.45 RPM/V	-28.94 unit/V	0 kW/V	0.01 Nm/V	0.00 RPM/V
Prefiltering	0 ▶	0 ▶	0 ▶	0 ▶	0 ▶
Minimum	0 RPM	-99.96 unit			0 RPM
Maximum	100 RPM	100 unit	30000 kW	70 Nm	0 RPM

Ship has one fixed propeller connected as Propeller 1 (stern).

Edit parameters - Propellers 1 (stern)

General
Connected: YES ▶
Device Type: Analog (uses B-Adapter) ▶
Label:

OK
Cancel

	RPM	Pitch	Power	Torque	M/E Rpm
In use		NO ▶	NO ▶	NO ▶	YES ▶
B-Adapter channel	3	4	2	1	0
Output at 0	0 v	9.7 v	0 v	0.01 v	0.00 v
B-utput per Volt	-26.46 RPM/V	-28.95 unit/V	0 kW/V	0.01 Nm/V	0.00 RPM/V
Prefiltering	0 ▶	0 ▶	0 ▶	0 ▶	0 ▶
Minimum	0 RPM	-99.97 unit			0 RPM
Maximum	100 RPM	100 unit	30000 kW	70 Nm	0 RPM

Ship has one pitch propeller connected as Propeller1 (stern).

Edit parameters - Propellers 1 (stern)

General
Connected: YES ▶
Device Type: Analog (uses B-Adapter) ▶
Label:

OK
Cancel

	RPM	Pitch	Power	Torque	M/E Rpm
In use		YES ▶	NO ▶	NO ▶	YES ▶
B-Adapter channel	3	4	2	1	0
Output at 0	0 v	9.7 v	0 v	0.01 v	0.00 v
B-utput per Volt	-26.47 RPM/V	-28.96 unit/V	0 kW/V	0.01 Nm/V	0.00 RPM/V
Prefiltering	0 ▶	0 ▶	0 ▶	0 ▶	0 ▶
Minimum	0 RPM	-99.98 unit			0 RPM
Maximum	100 RPM	100 unit	30000 kW	70 Nm	0 RPM

Ship has two pitch propellers and the second propeller is connected as Propeller2 (stern).

Edit parameters - Propellers 2 (stern)

General
Connected: YES ▶
Device Type: Analog (uses B-Adapter) ▶
Label: STBD

OK
Cancel

	RPM	Pitch	Power	Torque	M/E Rpm
In use		YES ▶	NO ▶	NO ▶	YES ▶
B-Adapter channel	5	6	7	8	0
Output at 0	0 v	0 v	0 v	0.01 v	0.00 v
Output per Volt	-26.47 RPM/V	-31.96 unit/V	0 kW/V	0.01 Nm/V	0.00 RPM/V
Prefiltering	0 ▶	0 ▶	0 ▶	0 ▶	0 ▶
Minimum	0 RPM	-99.96 unit			0 RPM
Maximum	100 RPM	100 unit	30000 kW	70 Nm	0 RPM

Note: You can give "name" for propeller in Label field. This "name" is displayed in the Propeller window of the Conning Display.

Ship has one pitch propeller connected as Propeller 1 (stern) using Engine Control Device Type "IEC 61162-1 (MAN B+W, $xxXDR, $xxRPM)".

Edit parameters – Engine Control

Connected: YES ▸
Adapter Channel: 15
Device Type: IEC 61162-1 (MAN B+W, $xxXDR, $xxRPM) ▸
Propulsion Control Position Available: YES ▸

OK
Cancel

Edit parameters – Propeller 1 (stern)

General
Connected: YES ▸
Device Type: Engine Control ▸
Label: PB

OK
Cancel

	RPM	Pitch				M/E Rpm
In use		YES ▸				NO ▸
ID	6	5				
B-Adapter channel						
Minimum	0 RPM	-100.0 unit				-500 RPM
Maximum	100 RPM	100.0 unit	30000 kW	70 Nm		500 RPM

Ship has one pitch propeller connected as Propeller1 (stern) using Engine Control "NCDAT", "PNAV" or proprietary message used by Sindel simulators.

Edit parameters – Engine Control

Connected: YES ▸
Adapter Channel: 15
Device Type: $NCDAT,$PNAV,Sindel (timeout 30 s) ▸

OK
Cancel

Switch Input	In Use	Open is OFF	Fixed Use For
1	☐	☐	Propeller 1
2	☐	☐	Propeller 1
3	☐	☐	Propeller 2
4	☐	☐	Propeller 2
5	☐	☐	Not Used
6	☐	☐	Not Used
7	☐	☐	Not Used
8	☐	☐	Not Used
9	☐	☐	Not Used
10	☐	☐	Not Used
11	☐	☐	Not Used
12	☐	☐	Not Used
13	☐	☐	Not Used
14	☐	☐	Not Used
15	☐	☐	Not Used
16	☐	☐	Not Used

Edit parameters – Propeller 1 (stern)

General
Connected: YES ▸
Device Type: Engine Control ▸
Label: PB

OK
Cancel

	RPM	Pitch	Power	Torque	M/E Rpm
In use		NO ▸	NO ▸	NO ▸	NO ▸
B-Adapter channel					
Minimum	0 RPM	-100.0 unit			-500 RPM
Maximum	100 RPM	100.0 unit	30000 kW	70 Nm	500 RPM

Ship has two pitch propellers and the first propeller is connected as Propeller 1 (stern) using Engine Control "NCDAT", "PNAV" or proprietary message used by Sindel simulators.

Edit parameters – Engine Control

Connected:	YES ▸	OK
Adapter Channel:	15	Cancel
Device Type:	$NCDAT,$PNAV,Sindel (timeout 30 s) ▸	

Switch Input	In Use	Open is OFF	Fixed Use For
1	☐	☐	Propeller 1
2	☐	☐	Propeller 1
3	☐	☐	Propeller 2
4	☐	☐	Propeller 2
5	☐	☐	Not Used
6	☐	☐	Not Used
7	☐	☐	Not Used
8	☐	☐	Not Used
9	☐	☐	Not Used
10	☐	☐	Not Used
11	☐	☐	Not Used
12	☐	☐	Not Used
13	☐	☐	Not Used
14	☐	☐	Not Used
15	☐	☐	Not Used
16	☐	☐	Not Used

Edit parameters – Propeller 1 (stern)

General
Connected: YES ▸
Device Type: Engine Control ▸
Label: PB

OK
Cancel

	RPM	Pitch	Power	Torque	M/E Rpm
In use		YES ▸	NO ▸	NO ▸	NO ▸
B-Adapter channel					
Minimum	0 RPM	-100.0 unit			-500 RPM
Maximum	100 RPM	100.0 unit	30000 kW	70 Nm	500 RPM

Ship has two pitch propellers and the second propeller is connected as Propeller 2 (stern) using Engine Control "NCDAT", "PNAV" or proprietary message used by Sindel simulators.

Edit parameters – Propeller 2 (stern)

General
Connected: YES ▸
Device Type: Engine Control ▸
Label: STBD

OK
Cancel

	RPM	Pitch	Power	Torque	M/E Rpm
In use		YES ▸	▸	NO ▸	NO ▸
B-Adapter channel					
Minimum	0 RPM	-100.0 unit			-500 RPM
Maximum	100 RPM	100.0 unit	30000 kW	70 Nm	500 RPM

Ship has one pitch propeller. You can connect and scale Main Engine RPM to be displayed on Conning Display.

Edit parameters – Propeller 1 (stern)

General
Connected: YES ▸
Device Type: Engine Control ▸
Label: PB

OK
Cancel

	RPM	Pitch	Power	Torque	M/E Rpm
In use		YES ▸	NO ▸	NO ▸	YES ▸
B-Adapter channel					
Minimum	0 RPM	-100.0 unit			-500 RPM
Maximum	100 RPM	100.0 unit	30000 kW	70 Nm	500 RPM

Ship has two pitch propellers and the second propeller is connected as Propeller2 (stern) using Engine Control.

Edit parameters - Propellers 2 (stern)

General
Connected: YES ▶
Device Type: Engine Control ▶
Label: STBD

OK
Cancel

	RPM	Pitch	Power	Tprque	M/E Rpm
In use		YES ▶	NO ▶	NO ▶	YES ▶
B-Adapter channel	5	6	7	8	0
Output at 0	0 v	0 v	0 v	0.01 v	0.00 v
Output per Volt	-26.45 RPM/V	-31.94 unit/V	0 kW/V	0.01 Nm/V	0.00 RPM/V
Prefiltering	0 ▶	0 ▶	0 ▶	0 ▶	0 ▶
Minimum	0 RPM	-99.94 unit			0 RPM
Maximum	100 RPM	100 unit	30000 kW	70 Nm	0 RPM

Ship has azimuth propulsion: **Maximum RPM = 800** and **Minimum RPM = 0** creates bar scale from 0 to 800.

Label = PORT is used as label for azimuth propulsion.

Edit parameters - Propellers 2 (stern)

General
Connected: YES ▶
Device Type: Analog (uses B-Adapter) ▶
Label: PORT

OK
Cancel

	RPM	Pitch	Power	Tprque	M/E Rpm
In use		NO ▶	NO ▶	NO ▶	YES ▶
B-Adapter channel	3	4	2	1	0
Output at 0	0 v	9.7 v	0 v	0.01 v	0.00 v
Output per Volt	-26.41 RPM/V	-28.9 unit/V	0 kW/V	0.01 Nm/V	0.00 RPM/V
Prefiltering	0 ▶	0 ▶	0 ▶	0 ▶	0 ▶
Minimum	0 RPM	-99.92 unit			0 RPM
Maximum	800 RPM	100 unit	30000 kW	70 Nm	0 RPM

Ship has azimuth propulsion: **Maximum RPM = 800** and **Minimum RPM = 0** creates bar scale from 0 to 800.

Label = STBD is used as label for azimuth propulsion.

Edit parameters - Propellers 2 (stern)

General
Connected: YES ▶
Device Type: Engine Control ▶
Label: STBD

OK
Cancel

	RPM	Pitch	Power	Tprque	M/E Rpm
In use		NO ▶	NO ▶	NO ▶	YES ▶
B-Adapter channel	5	6	7	8	0
Output at 0	0 v	0 v	0 v	0.01 v	0.00 v
Output per Volt	-26.45 RPM/V	-31.94 unit/V	0 kW/V	0.01 Nm/V	0.00 RPM/V
Prefiltering	0 ▶	0 ▶	0 ▶	0 ▶	0 ▶
Minimum	0 RPM	-99.94 unit			0 RPM
Maximum	800 RPM	100 unit	30000 kW	70 Nm	0 RPM

Ship has azimuth propulsion: **Maximum RPM = 350** and **Minimum RPM = -350** creates bar scale:-350 .. 0 .. 350.

Label = SWNG is used as label for azimuth propulsion.

Edit parameters - Propellers 2 (stern)

General
Connected: YES ▶
Device Type: Analog (uses B-Adapter) ▶
Label: SWNG

OK
Cancel

	RPM	Pitch	Power	Tprque	M/E Rpm
In use		NO ▶	NO ▶	NO ▶	YES ▶
B-Adapter channel	4	5	1	1	0
Output at 0	-4.99 v	0 v	0 v	0.01 v	0.00 v
Output per Volt	20 RPM/V	0 unit/V	0 kW/V	0.01 Nm/V	0.00 RPM/V
Prefiltering	0 ▶	0 ▶	0 ▶	0 ▶	0 ▶
Minimum	-350 RPM	-99.99 unit			0 RPM
Maximum	350 RPM	100 unit	10000 kW	70 Nm	0 RPM

Thrusters

Select Connected **NO** if thruster is not connected to the ECDIS.

```
Edit parameters - Thrusters 1 (stern)                            ☒

    Connected:        NO                         OK

    Device Type:      Analog (uses B-Adapter)    Cancel

    B-Adapter Channel: 5

    Output at 0 rpm:   100       V      Use sign of Output
                                        per Volt to change
    Output per Volt:   85        rpm/V  polarity of bar
                                        presentation
    Prefiltering:      0

    Maximum Power:     100

    Maximum rpm:       100
```

Thruster 1 (stern) is connected to the ECDIS.

```
Edit parameters - Thrusters 1 (stern)                            ☒

    Connected:        YES                        OK

    Device Type:      Analog (uses B-Adapter)    Cancel

    B-Adapter Channel: 7

    Output at 0 rpm:   0         V      Use sign of Output
                                        per Volt to change
    Output per Volt:   30        rpm/V  polarity of bar
                                        presentation
    Prefiltering:      0

    Maximum Power:     100

    Maximum rpm:       100
```

Thruster 3 (bow) is connected to the ECDIS.

```
Edit parameters - Thrusters 3 (bow)                              ☒

    Connected:        YES                        OK

    Device Type:      Analog (uses B-Adapter)    Cancel

    B-Adapter Channel: 8

    Output at 0 rpm:   0         V      Use sign of Output
                                        per Volt to change
    Output per Volt:   -25       rpm/V  polarity of bar
                                        presentation
    Prefiltering:      0

    Maximum Power:     100

    Maximum rpm:       100
```

Thruster 1 (stern) is connected to the ECDIS using Engine Control.

```
Edit parameters - Thrusters 1 (stern)                              ⊠

    Connected:            YES                      ┌──────────────┐
                                                   │      OK      │
    Device Type:          Engine Control           └──────────────┘
    B-Adapter Channel:    8                        ┌──────────────┐
                                                   │    Cancel    │
    Output at 0 rpm:      100        V             └──────────────┘
                                              Use sign of Output
    Output per Volt:      85         rpm/V    per Volt to change
                                              polarity of bar
    Prefiltering:         0                   presentation

    Maximum Power:        10000

    Maximum rpm:          10000
```

Thruster 3 (bow) is connected to the ECDIS using Engine Control.

```
Edit parameters - Thrusters 3 (bow)                               ⊠

    Connected:            YES                      ┌──────────────┐
                                                   │      OK      │
    Device Type:          Engine Control           └──────────────┘
    B-Adapter Channel:    7                         ┌──────────────┐
                                                    │    Cancel    │
    Output at 0 rpm:      100        V              └──────────────┘
                                              Use sign of Output
    Output per Volt:      10         rpm/V    per Volt to change
                                              polarity of bar
    Prefiltering:         0                   presentation

    Maximum Power:        10000

    Maximum rpm:          10000
```

3-52

Main engine start air pressure

Select Connected **NO** if Main
Engine Start Air Pressure is not
connected to the ECDIS.

Edit parameters - Main Engine Start Air Pressure

Connected:	NO
Device Type:	Analog (uses B-Adapter)
B-Adapter Channel:	4
Output at 0 kg/cm2:	0 V
Output per Volt:	5 kg/cm2 / V
Prefiltering:	0
Alarm	20 kg/cm2
Maximum Value:	50 kg/cm2

OK

Cancel

Main Engine Start Air Pressure
connected to the ECDIS.

Edit parameters - Main Engine Start Air Pressure

Connected:	YES
Device Type:	Analog (uses B-Adapter)
B-Adapter Channel:	2
Output at 0 kg/cm2:	0 V
Output per Volt:	-5 kg/cm2 / V
Prefiltering:	0
Alarm	20 kg/cm2
Maximum Value:	50 kg/cm2

OK

Cancel

Main Engine Start Air Pressure
connected to the ECDIS using
Engine Control.

Edit parameters - Main Engine Start Air Pressure

Connected:	YES
Device Type:	Engine Control
B-Adapter Channel:	1
Output at 0 kg/cm2:	0.07 V
Output per Volt:	0 kg/cm2 / V
Prefiltering:	0
Alarm	20 kg/cm2
Maximum Value:	50 kg/cm2

OK

Cancel

3-53

Fuel consumption

Select Connected **NO** if Fuel Consumption is not connected to the ECDIS.

Edit parameters – Fuel Consumption

Connected:	NO	Device Type:	Analog (uses B-Adapter)

	Main Flow	Ret Flow	Temperature
In Use		NO	NO
B-Adapter Channel:	5	8	8
Output at 0 Position:	0.00 V	0.00 V	0.00 V
Output per Volt:	200.00 units / V	0.00 units / V	0.00 °/ V
Prefiltering:	0	0	0
Minimum			0 °
Maximum			1 °

Units: kg
HFO Used: YES

Cancel   OK

Fuel consumption connected to the ECDIS.

Edit parameters – Fuel Consumption

Connected:	YES	Device Type:	Analog (uses B-Adapter)

	Main Flow	Ret Flow	Temperature
In Use		NO	NO
B-Adapter Channel:	5	8	8
Output at 0 Position:	0.00 V	0.00 V	0.00 V
Output per Volt:	200.00 units / V	0.00 units / V	0.00 °/ V
Prefiltering:	0	0	0
Minimum			0 °
Maximum			1 °

Units: kg
HFO Used: YES

Cancel   OK

Fuel consumption connected to the ECDIS using Engine Control.

Edit parameters – Fuel Consumption

Connected:	YES	Device Type:	Engine Control

	Main Flow	Ret Flow	Temperature
In Use		NO	NO
B-Adapter Channel:	5	8	8
Output at 0 Position:	0.00 V	0.00 V	0.00 V
Output per Volt:	200.00 units / V	0.00 units / V	0.00 °/ V
Prefiltering:	0	0	0
Minimum			0 °
Maximum			1 °

Units: kg
HFO Used: YES

Cancel   OK

Alarm inputs+Outputs/AMWSS

Settings for closed contact
external alarm inputs required in
the past to fulfil OMBO class
notation of RINA. If this feature
is activated it generates alarms
4201…4208 "Ext. navigation eq.
Error".

Settings when the ECDIS is
connected to Alarm Monitoring
and Watch Safety System
(AMWSS). ECDIS alarms are
transferred to AMWSS.

Local ECDIS alarm acknowledge
and EMRI trackpilot acknowledge
operate only as buzzer stop.

ECDIS and EMRI trackpilot
alarms can only be
acknowledged from AMWSS.

Alarm 9997 transferred to ECDIS
is used to acknowledged first
alarm (topmost).

Settings when the ECDIS is
connected to Alarm Monitoring
and Watch Safety System
(AMWSS).

ECDIS alarms are transferred to
AMWSS.

ECDIS and EMRI trackpilot
alarms can be acknowledged
locally or from AMWSS.

Local acknowledge of an alarm
removes the alarm also from
AMWSS.
Cursor position of ECDIS is
transmitted.

Sensor Source of ECDIS is transmitted

Settings when the ECDIS is connected to a Central Alarm System which uses only closed contacts. Input channels 9 and 10 of B-Adapter are used for Alarm Ack. and Buzzer Stop.

*:
(Relays energized when no alarm)
Relay outputs: close (no Alarm), open (Alarm active)

(Relays energized when alarm)
Relay outputs; close (Alarm active), open (no Alarm)

3-56

Edit parameters - Alarm Inputs + Outputs / AMWSS

Connected: YES ▸   OK / Cancel

Device Interface: Relays with Central Alarm including pending (use B-Adapter) ▸

Relay outputs
LAN-adapters: Relays energized when no alarm ▸
B-adapter: Relays energized when no alarm ▸

Relays with Central Alarm

Ignore pending state for
☑ 451   ☐ 485
☑ 458

Edit parameters - Alarm Inputs + Outputs / AMWSS

Connected: YES ▸   OK / Cancel

Device Interface: Relays with Central Alarm + SensorSource (use B-Adapter) ▸

Relay outputs
LAN-adapters: Relays energized when no alarm ▸
B-adapter: Relays energized when no alarm ▸

Relays with Central Alarm

Ignore pending state for
☑ 451   ☐ 485
☑ 458

Settings when the ECDIS is connected to Engine Control System.

Edit parameters - Alarm Inputs + Outputs / AMWSS

Connected: YES ▸   OK / Cancel

Device Interface: Engine control ▸

Relay outputs
LAN-adapters: Relays energized when no alarm ▸
B-adapter: Relays energized when no alarm ▸

3-57

Alarm system and Alarm ACK

```
┌─────────────────┐        ──────► System Failure alarm out
│  Control Unit   │
│                 │        ◄────── Buzzer stop input (closed=input)
└─────────────────┘

┌─────────────────┐
│ Processor Unit  │
│   EC-1000C      │
└─────────────────┘

┌─────────────────┐        ──────► ┌──────────────────┐
│  LAN Adapter    │                │  Alarm outputs   │
│   EC-1010       │                └──────────────────┘
└─────────────────┘

┌─────────────────┐        ──────► Alarrm outputs
│   B-Adapter     │                STO2: Off Track
│    EC-1020      │                STO3: WPT Approach
│                 │                STO4: Shallow Depth
│ STO1  STI9/GND  STI10/GND        STO5: Backup Navigator
└─────────────────┘                STO6: Navigation Sensor Alarm
    │      ▲       ▲                STO7: Operator Fitness
    ▼      │       │                STO8: Any ECDIS Alarm
 Alarm ACK  Alarm ACK  Buzzer OFF
(closed=output) (closed=input) (closed=input)

┌─────────────────┐        ──────► Parameter settings
│ EMRI Autopilot  │
│ Control Panel   │                Connected:   "Yes"
│  (MIP-411)      │                Device Interface:
└─────────────────┘                "Relay with Central Alarm (use B-adapter)",
                                   "Relay with Central Alarm including state + pending (use B-adapter)",
                                   "Relay with Central Alarm including Pending (use B-adapter)" or
                                   "Relay with Central Alarm +sensor source (use B-adapter)"
```

NAVTEX Receiver

Check alphabets to receive corresponding data. For details, see the operator's manual for NAVTE receiver connected.

SatCom/External Computer/Sindel repeaters

- Settings for Route backup
  to Furuno GP-80 GPS
  navigator.

- Setting for Ropute Restore
  from Furuno GP-80 GPS
  navigator.

Edit parameters – SatCom / External Computer / Sindel Repeaters

Connected:	YES
Device Interface:	Route backup to FURUNO GP-80
Adapter Channel:	9
IEC 61162-1 Transmit checksum	Used
$ Char Included in Checksum:	Included

OK
Cancel

-Wiring of ECDIS and
  GP-80/90

EC-1010   GP-80/90
(CH1, 3, 4, 9, 11 to 13)   (DATA4)

RXD+ ------------------------------ TD-B
RXD- ------------------------------ TD-A
TXD+ ------------------------------ RD-B
TXD- ------------------------------ RD-A

Settings for route backup to
external equipment which
can receive IEC 61162-1
message.

Edit parameters – SatCom / External Computer / Sindel Repeaters

Connected:	YES
Device Interface:	Route backup IEC 61162-1
Adapter Channel:	9
IEC 61162-1 Transmit checksum	Used
$ Char Included in Checksum:	Included

OK
Cancel

AIS

Settings for AIS Transponder.

ETA display:
"Type approved (adjusted for time zone)"; Displays the local time changed from ETA reported at the ship.
"**Custom (ignore time zone)";** Display ETA reported at the ship as is.

Edit parameters – AIS transponder

Connected:	YES
Adapter Chl:	5
Device Interface:	IEC 61162-2 (38400bit/s)
Device mode:	Normal IEC 61993-2
IEC 61162-1 Transmit checksum	Used
Checksum	$ char not included (IEC 61162-1 & EMRI)
ETA display	Type approved (adjusted for time zone)

OK
Cancel

Engine control

Settings for receiving Fuel
Consumption, Propeller and Main
Engine Air Pressure data from
engine control system
manufactured by NORCONTROL
(used message is $NCDAT).
Note that full use of this feature
requires that you also activate Fuel
Consumption, Propeller and Main
Engine Air Pressure parameters,
set as Engine Control.

```
Edit parameters – Engine Control                              [X]

Connected:          YES   ▶              ┌──────────────┐
                                         │      OK      │
Adapter Channel:    10                   └──────────────┘
                                         ┌──────────────┐
Device Type:        IEC 61162-1 (timeout 30 s)   ▶  │   Cancel   │
                                         └──────────────┘
Switch Input   In Use   Open is OFF   Fixed Use For
     1           ☐          ☐          Propeller 1
     2           ☐          ☐          Propeller 1
     3           ☐          ☐          Propeller 2
     4           ☐          ☐          Propeller 2
     5           ☐          ☐          Not Used
     6           ☐          ☐          Not Used
     7           ☐          ☐          Not Used
     8           ☐          ☐          Not Used
     9           ☐          ☐          Not Used
    10           ☐          ☐          Not Used
    11           ☐          ☐          Not Used
    12           ☐          ☐          Not Used
    13           ☐          ☐          Not Used
    14           ☐          ☐          Not Used
    15           ☐          ☐          Not Used
    16           ☐          ☐          Not Used
```

Settings for receiving Propeller,
Thruster and Rudder data from
simulated engine control system
manufactured by SINDEL (used
message are $PLPRO, $PLTHR
and $PLRAN). Note that full use of
this feature requires that you also
activate Propeller, Thruster and
Rudder parameters, set as Engine
Control.

```
Edit parameters – Engine Control                              [X]

Connected:          YES   ▶              ┌──────────────┐
                                         │      OK      │
Adapter Channel:    10                   └──────────────┘
                                         ┌──────────────┐
Device Type:        IEC 61162-1 (timeout 4 min)   ▶  │   Cancel   │
                                         └──────────────┘
Switch Input   In Use   Open is OFF   Fixed Use For
     1           ☐          ☐          Propeller 1
     2           ☐          ☐          Propeller 1
     3           ☐          ☐          Propeller 2
     4           ☐          ☐          Propeller 2
     5           ☐          ☐          Not Used
     6           ☐          ☐          Not Used
     7           ☐          ☐          Not Used
     8           ☐          ☐          Not Used
     9           ☐          ☐          Not Used
    10           ☐          ☐          Not Used
    11           ☐          ☐          Not Used
    12           ☐          ☐          Not Used
    13           ☐          ☐          Not Used
    14           ☐          ☐          Not Used
    15           ☐          ☐          Not Used
    16           ☐          ☐          Not Used
```

Speed pilot

Settings when speedpilot is **not** connected.

```
Edit parameters – Speedpilot                              [X]

Connected:          [ NO        ▶ ]        [    OK    ]

Adapter Chl:        [ 9         ▶ ]        [  Cancel  ]

Device Interface:   [ Speedpilot (EMRI)                 ▶ ]

Device mode:        [ Normal                            ▶ ]

IEC 61162-1 Transmit checksum   [ Not used              ▶ ]

Checksum   [ $ char not included (IEC 61162-1 & EMRI)   ▶ ]
```

Settings when speedpilot is connected.

```
Edit parameters – Speedpilot                              [X]

Connected:          [ YES       ▶ ]        [    OK    ]

Adapter Chl:        [ 9         ▶ ]        [  Cancel  ]

Device Interface:   [ Speedpilot (EMRI)                 ▶ ]

Device mode:        [ Normal                            ▶ ]

IEC 61162-1 Transmit checksum   [ Not used              ▶ ]

Checksum   [ $ char not included (IEC 61162-1 & EMRI)   ▶ ]
```

Alarm Inputs External

You can define which sensors report alarms to ECDIS.
-Check "Conn" for sensor reporting to ECDIS.
-Check "Bi-dis" option, if acknowledge message will be sent to alarm transmitting sensor
-Check "Retry ack" option, if acknowledge message to alarm transmitting sensor fails to respond (retry three times)

```
Edit parameters - Alarm Inputs/External                        [x]
Ch Conn Bi-dir Retry ack Alarm source name   Ch Conn Bi-dir Retry ack Alarm source name

1   □                    EXT1          9   □                  EXT9
    □  □    □            POS1          10  □                  EXT10
3   □                    RUDR2         11                     BADAP
4   □                    EXT4          12  □                  AMWSS
5   □  □    □            AIS           13  □                  ROUTE
6   □                    POS2          14  □                  ECHO
7   □                    GYRO1         15  □                  WIND
8   □                    LOG           16  □                  EXT16

[ OK ]    [ Cancel ]
```

In this example Position equipment 1 connected to channel 2 of LAN Adapter can report alarm in Position equipment 1.
AIS in channel 5 of LAN Adapter reports alarm in AIS and they can be also acknowledged in ECDIS or Central Alarm System.

Central Alarm Output

You can define channel for Central Alarm System to where report sensor alarms.
-"Bi-directional" as YES, in case that if alarms can be acknowledged from Central Alarm System.
-"Propagate RX alarms" used to define if alarm from alarms transmitting sensor are sent further to Central Alarm System.

```
Edit parameters - Central Alarm Output        [x]

Connected:          [ YES        ▶ ]

Adapter Chl:        [ 13         ▶ ]

Bi-directional:     [ YES        ▶ ]

Propagate RX alarms: [ YES       ▶ ]

Device Type:        [ IEC 61162-1 (4800 bit/s) ▶ ]


[ OK ]    [ Cancel ]
```

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Sensors which are not connected

In installation parameters there are several sensors in a list which are not used with ECDIS and their status should be **Connected = NO**.
The list of sensors which are not connected:
(Electronic Chart, VDR, Position Equipment, Heel and Trim, Steering Info)

Storing default parameters

After installing the equipment, store the default parameters of the ECDIS as follows:

1. Connect service (for PC) keyboard.
2. Press Windows key.
3. Click **Start**, **Programs**, **Accessories** and **Windows Explore** in order.
4. Choose **My Computer**, **Local Disk [C:]**, **ANTS_SYSTEM** and **params** in order to open the params folder.
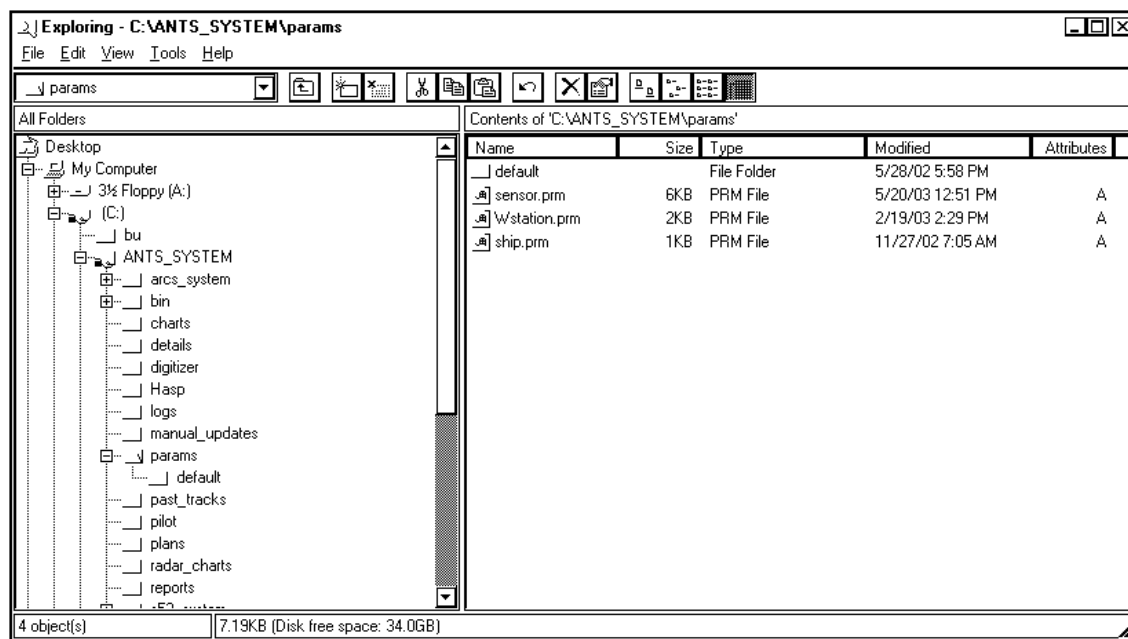
5. Click **sensor.prm**, **ship.prm** and **wstation.prm** while pressing the Shift key.
6. Choose **Copy** from the Edit menu.
7. Open **default** folder, and choose **Paste** from Edit menu. If overwriting them, confirm replacement of existing file by pressing **OK**.
8. Go back to normal ECDIS operation mode.

Note: The above steps allow you to return parameters by clicking "Set parameter defaults" on Installation parameters when changing Sensor parameter settings.

3.3 Adjustments for the LAN Adapter EC-1010

3.3.1 Setup for the LAN adapter EC-1010 program

The following tools are needed for programming LAN adapter:

- Ordinary serial RS-232C line cable to make connection from COM1 port to Connector J13 of LAN Adapter.

You need to set the jumpers of the LAN adapter to enable connector J13 and programming mode.

To change J1 (CH 1) connector to J13 Connector for programming, set as below.

J17	CTS1-GND
J14	TXP
J15	RXP

To enable manual startup and programming, set as below.

J16	INIT-GND

3.3.2 IP address agreement for LAN Adapter EC-1010

The table below shows IP addresses for each device.

Device	IP Address	Function
First ECDIS	10.0.0.180	MAIN
Second ECDIS	10.0.0.181	BACKUP
First LAN adapter	10.0.0.190	MAIN 1st LAN adapter
Second LAN adapter	10.0.0.191	MAIN 2nd LAN adapter
First LAN adapter	10.0.0.192	BACKUP 1st LAN adapter
Second LAN adapter	10.0.0.193	BACKUP 2nd LAN adapter

3.3.3   How to load programs for LAN adapter EC-1010

The following is an example of how to program the first LAN adapter for the first ECDIS.
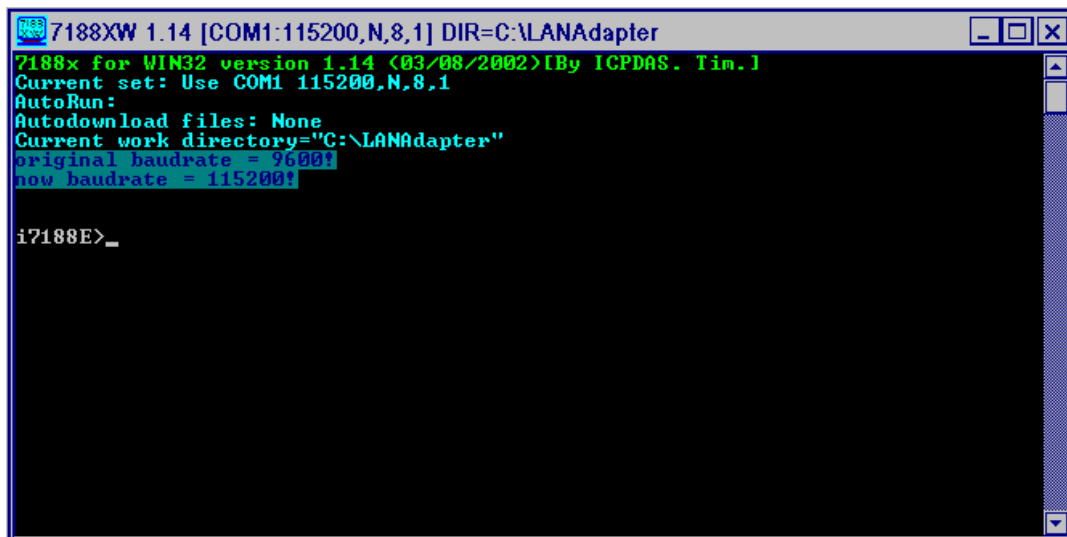
Note: The program version for LAN adapter should be same with ECDIS's.

1. Click **Start**, **Programs**, **Accessories** and **Windows Explore** in order.
2. Click **My Computer**, **Local DisK [C]**, **LAN Adapter** in order to open the LAN Adapter folder.
3. Double click **Shortcut to 7188xw.exe**.
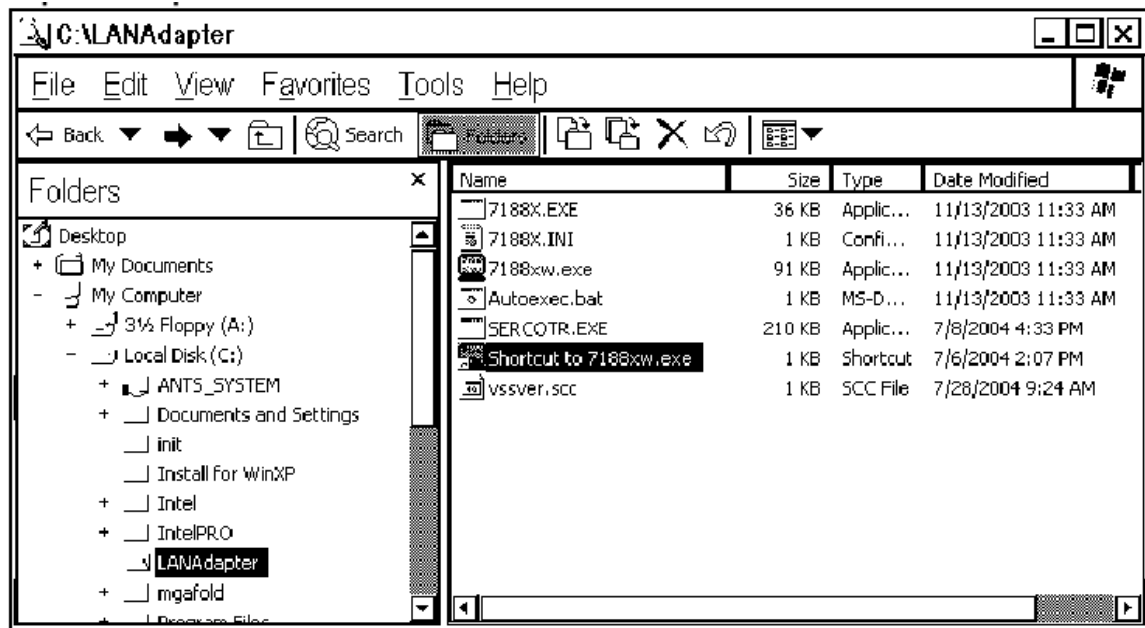
7188XW program will start in MS DOS window.
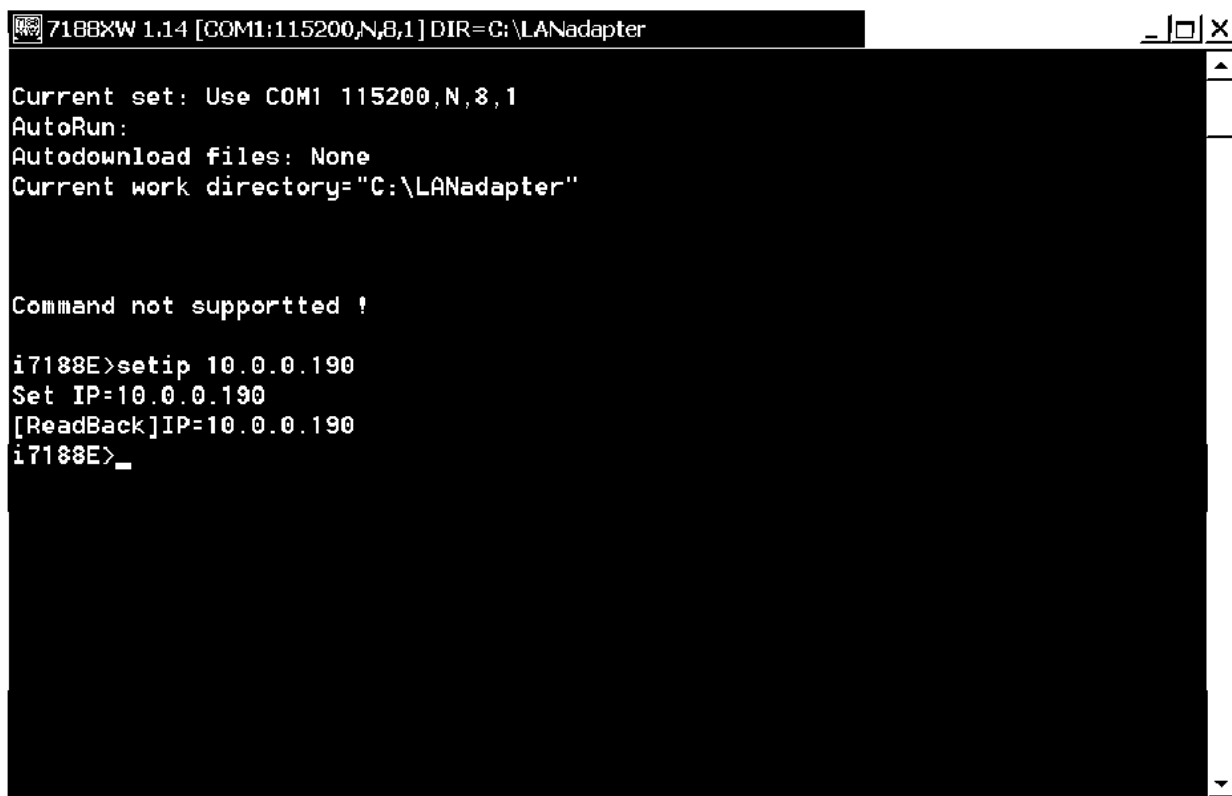
```
7188XW 1.14 [COM1:115200,N,8,1] DIR=C:\LANAdapter        _ □ ✕
7188x for WIN32 version 1.14 (03/08/2002)[By ICPDAS. Tim.]
Current set: Use COM1 115200,N,8,1
AutoRun:
Autodownload files: None
Current work directory="C:\LANAdapter"
original baudrate = 9600!
now baudrate = 115200!


i7188E>_
```

4. Type IP, and then press the ENTER key to confirm the IP address. For the first LAN adapter of MAIN ECDIS, Type SETIP 10.0.0.190, and press the ENTER key.

```
7188XW 1.14 [COM1:115200,N,8,1] DIR=C:\LANadapter        _ □ ✕
Current set: Use COM1 115200,N,8,1
AutoRun:
Autodownload files: None
Current work directory="C:\LANadapter"


Command not supportted !

i7188E>setip 10.0.0.190
Set IP=10.0.0.190
[ReadBack]IP=10.0.0.190
i7188E>_
```

5. Type SETMASK 255.255.0.0 and then press the ENTER key. To confirm the netmask, type MASK, and press the ENTER key.
6. Remove old files from LAN adapter; type del *.*, and then press the ENTER key.

```
7188XW 1.14 [COM1:115200,N,8,1] DIR=C:\LANadapter            _ |□| ×

Current set: Use COM1 115200,N,8,1
AutoRun:
Autodownload files: None
Current work directory="C:\LANadapter"



Command not supportted !

i7188E>setip 10.0.0.190
Set IP=10.0.0.190
[ReadBack]IP=10.0.0.190
i7188E>del *.*
Total File number is 2, do you really want to delete(y/n)?


i7188E>
```

7. Load autoexec.bat and sercotr.exe as shown below.
    a) Type "Load".
    b) Press the Alt key and E key at the same time.
    c) Type the file name to load.

```
7188XW 1.14 [COM1:115200,N,8,1] DIR=C:\LANadapter            _ |□| ×

i7188E>load
File will save to 8000:0000
StartAddr-->7000:FFFF
Press ALT_E to download file!
Input filename:autoexec.bat
Load file:autoexec.bat
Send file info. total 1 blocks
Block 1
Transfer time is: 0.051000 seconds

i7188E>load
File will save to 8002:0009
StartAddr-->8000:0028
Press ALT_E to download file!
Input filename:sercotr.exe
Load file:sercotr.exe
Send file info. total 837 blocks
Block 837
Transfer time is: 43.002000 seconds

i7188E>_
```
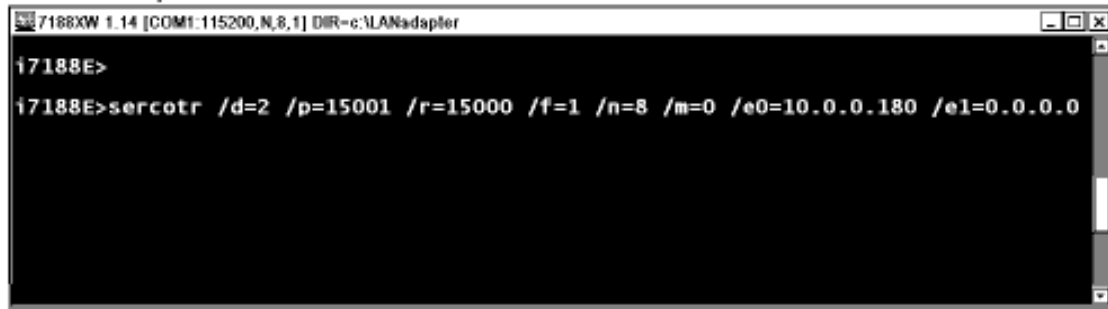
8. Set parameters for LAN adapter as follows:

a) Type command.
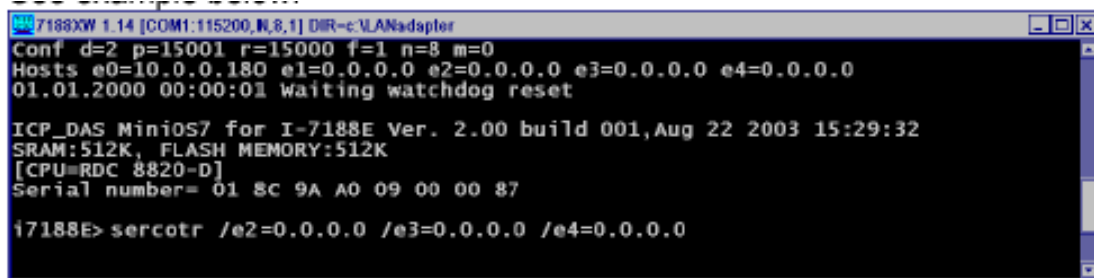
Status	Command
First LAN adapter (MAIN)	sercotr /d=2 /p=15001 /r=15000 /f=1 /n=8 /m=0 /e0=10.0.0.180
Second LAN adapter (MAIN)	sercotr /d=3 /p=15001 /r=15000 /f=9 /n=8 /m=0 /e0=10.0.0.180
First LAN adapter (BACKUP)	sercotr /d=4 /p=15001 /r=15000 /f=1 /n=8 /m=0 /e0=10.0.0.181
Second LAN adapter (BACKUP)	sercotr /d=5 /p=15001 /r=15000 /f=9 /n=8 /m=0 /e0=10.0.0.181

For example, type the command for First LAN adapter (MAIN).

```
7188XW 1.14 [COM1:115200,N,8,1] DIR=c:\LANadapter          _ □ ×

i7188E>

i7188E>sercotr /d=2 /p=15001 /r=15000 /f=1 /n=8 /m=0 /e0=10.0.0.180 /e1=0.0.0.0
```

b) Type the command: **sercotr /e2=0.0.0.0 /e3=0.0.0.0 e4=0.0.0.0**
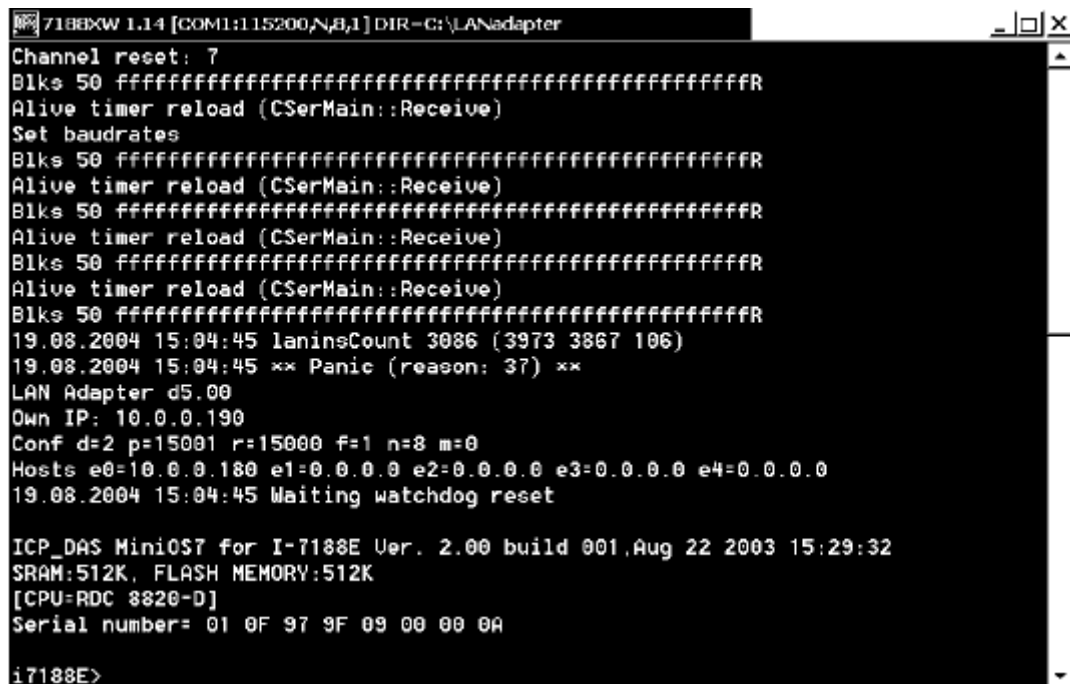
```
7188XW 1.14 [COM1:115200,N,8,1] DIR=c:\LANadapter          _ □ ×
Conf d=2 p=15001 r=15000 f=1 n=8 m=0
Hosts e0=10.0.0.180 e1=0.0.0.0 e2=0.0.0.0 e3=0.0.0.0 e4=0.0.0.0
01.01.2000 00:00:01 Waiting watchdog reset

ICP_DAS MiniOS7 for I-7188E Ver. 2.00 build 001,Aug 22 2003 15:29:32
SRAM:512K, FLASH MEMORY:512K
[CPU=RDC 8820-D]
Serial number= 01 8C 9A A0 09 00 00 87

i7188E> sercotr /e2=0.0.0.0 /e3=0.0.0.0 /e4=0.0.0.0
```

9. Type **sercotr,** and press the ENTER key.

```
7188XW 1.14 [COM1:115200,N,8,1] DIR=C:\LANadapter          _ □ ×
Channel reset: 7
Blks 50 ffffffffffffffffffffffffffffffffffffffffffffffffffR
Alive timer reload (CSerMain::Receive)
Set baudrates
Blks 50 ffffffffffffffffffffffffffffffffffffffffffffffffffR
Alive timer reload (CSerMain::Receive)
Blks 50 ffffffffffffffffffffffffffffffffffffffffffffffffffR
Alive timer reload (CSerMain::Receive)
Blks 50 ffffffffffffffffffffffffffffffffffffffffffffffffffR
Alive timer reload (CSerMain::Receive)
Blks 50 ffffffffffffffffffffffffffffffffffffffffffffffffffR
19.08.2004 15:04:45 laninsCount 3086 (3973 3867 106)
19.08.2004 15:04:45 ×× Panic (reason: 37) ××
LAN Adapter d5.00
Own IP: 10.0.0.190
Conf d=2 p=15001 r=15000 f=1 n=8 m=0
Hosts e0=10.0.0.180 e1=0.0.0.0 e2=0.0.0.0 e3=0.0.0.0 e4=0.0.0.0
19.08.2004 15:04:45 Waiting watchdog reset

ICP_DAS MiniOS7 for I-7188E Ver. 2.00 build 001,Aug 22 2003 15:29:32
SRAM:512K, FLASH MEMORY:512K
[CPU=RDC 8820-D]
Serial number= 01 0F 97 9F 09 00 00 0A

i7188E>
```

10. Confirm that the setting is correct.
11. Set jumpers to the default position.
12. Turn the power of LAN adapter off, and on again.

3. ADJUSTMENTS

3.3.6   Installation of Network Connections

You can install network connections between the Navigation ECDIS and second (for planning/back-up) ECDIS. To install, proceed as follows:

1. Turn the power on.
2. If you already have ECDIS installed, then you have to shut down the ECDIS program before you install network connections.

    To shut down the ECDIS program, use the ECAWATCH window to do it. This window can be shown by pressing the Tab key on the service keyboard several times while pressing down the Alt key.

```
ECAWATCH
              ANTS.ECDIS PROCESS STARTER
       This window control execution of various ECDIS software
       components.  To move this window in background click
                chart area with SELECT pushbutton.

   INS PROCESS              [ Restart ]   [ Stop ]

   HUMAN INTERFACE          [ Restart ]   [ Stop ]

   S57 DRAWING              [ Restart ]   [ Stop ]

   ARCS DRAWING             [ Restart ]   [ Stop ]

   VOYAGE RECORDER          [ Restart ]   [ Stop ]

   CONNING DISPLAY          [ Restart ]   [ Stop ]

   ACCESS SERVER            [ Restart ]   [ Stop ]

              [ Shutdown the ECDIS ]
```

3. Click the **Shutdown the ECDIS** button.
4. Press the Windows key, and choose **Start**, **Programs**, **Accessories** and **Windows Explorer** in order.
5. Choose Map Network Drive from the Tools menu.

```
My Documents                                            _ □ ×
  File   Edit   View   Favorites   Tools   Help

  Folders                                  ×    Name         Size   Type                  Date Modified       Attribu
  Desktop                                        My Music           File Folder           9/5/2003 10:12 AM   R
  - My Documents                                 My Pictures        File Folder           9/5/2003 10:12 AM   R
        My Music                                 desktop.ini  1 KB  Configuration Settings 9/5/2003 10:12 AM   HSA
        My Pictures
  + My Computer
  + My Network Places
     Recycle Bin
```
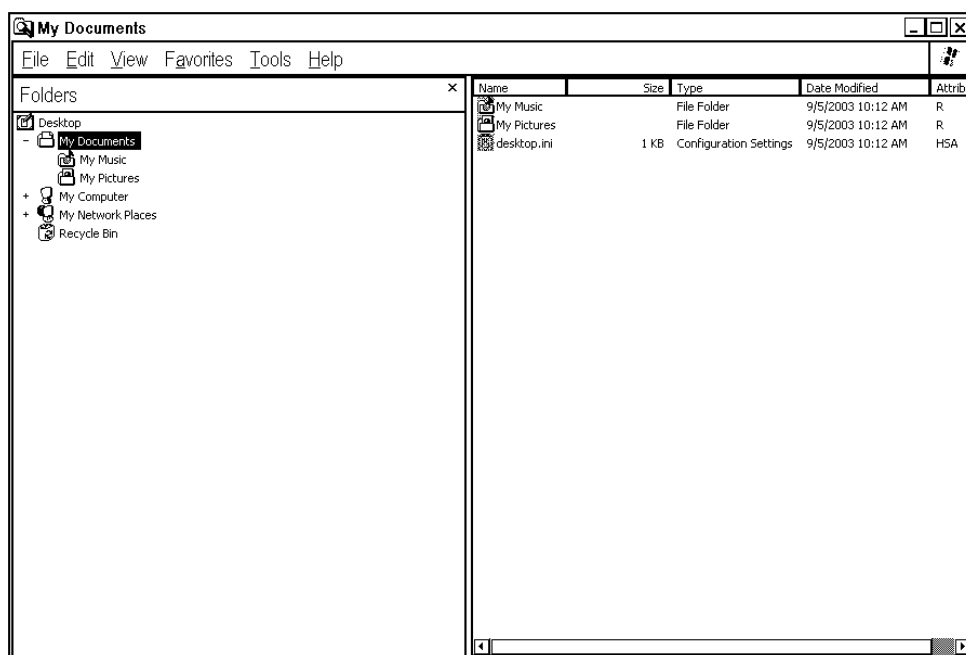
6. Select drive I: for the hard disk of the other ECDIS computer.
   Browse the other ECDIS computer from ECDIS work group.
7. Select **Ec1000C-0001¥ANTS_SYSTEM** and press OK.
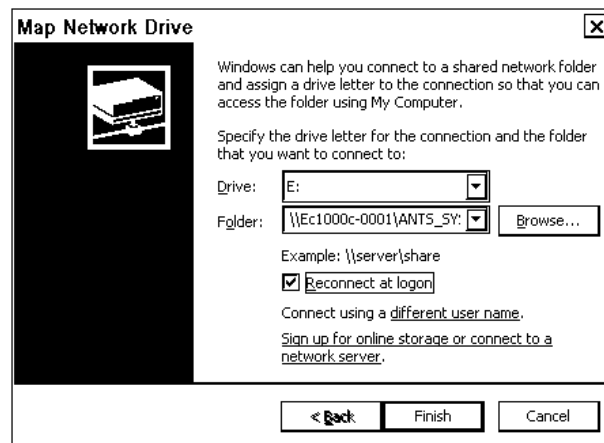
7. Select Tools and Map Network Drive again.
8. Select drive J: for the CD-ROM drive of the other ECDIS computer.
   Browse the other ECDIS computer from ECDIS work group.
9. Select **EC1000C-0001¥CD drive** and press OK. (Note that EC1000C-0001 should be
   replaced with the name of the other computer.)
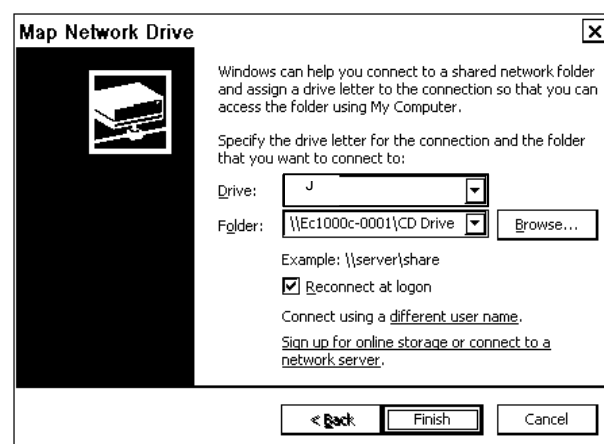
3.4 DIP Switches and Jumper Wires

3.4.1 LAN adapter EC-1010
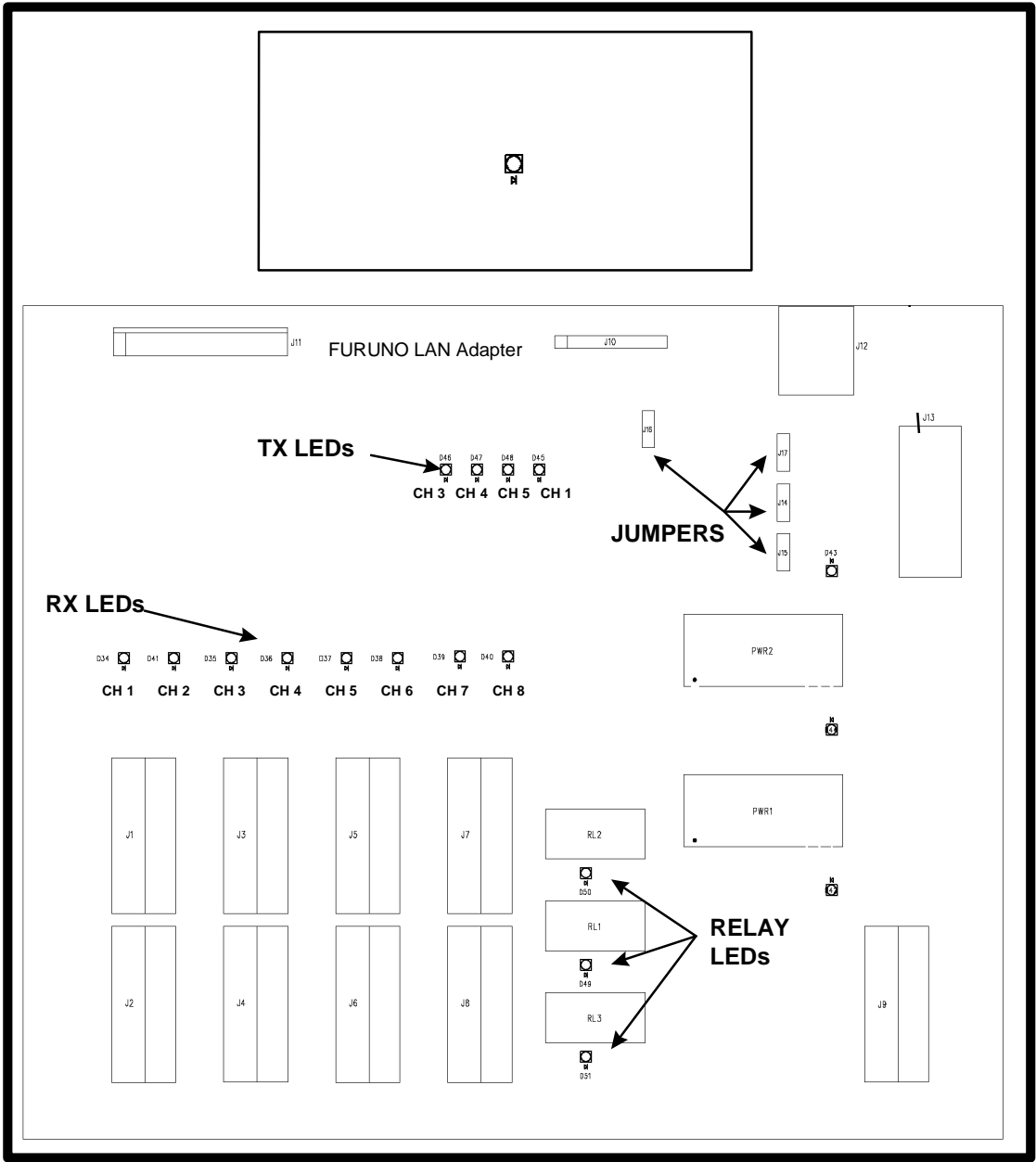
Jumper	Position	Function
J14	TXP	Programming
	TXD1	Normal operation (Default)
J15	RXP	Programming
	RXD1	Normal operation (Default)
J17	CTS1 H-CTS1	Programming
	CTS1-GND	Normal operation (Default)
J16	GND-INIT	Programming
	INIT H-INIT	Normal operation (Default)

3.4.2   Radar overlay (EC-1000-C-R-S/1000C-CR-S only)
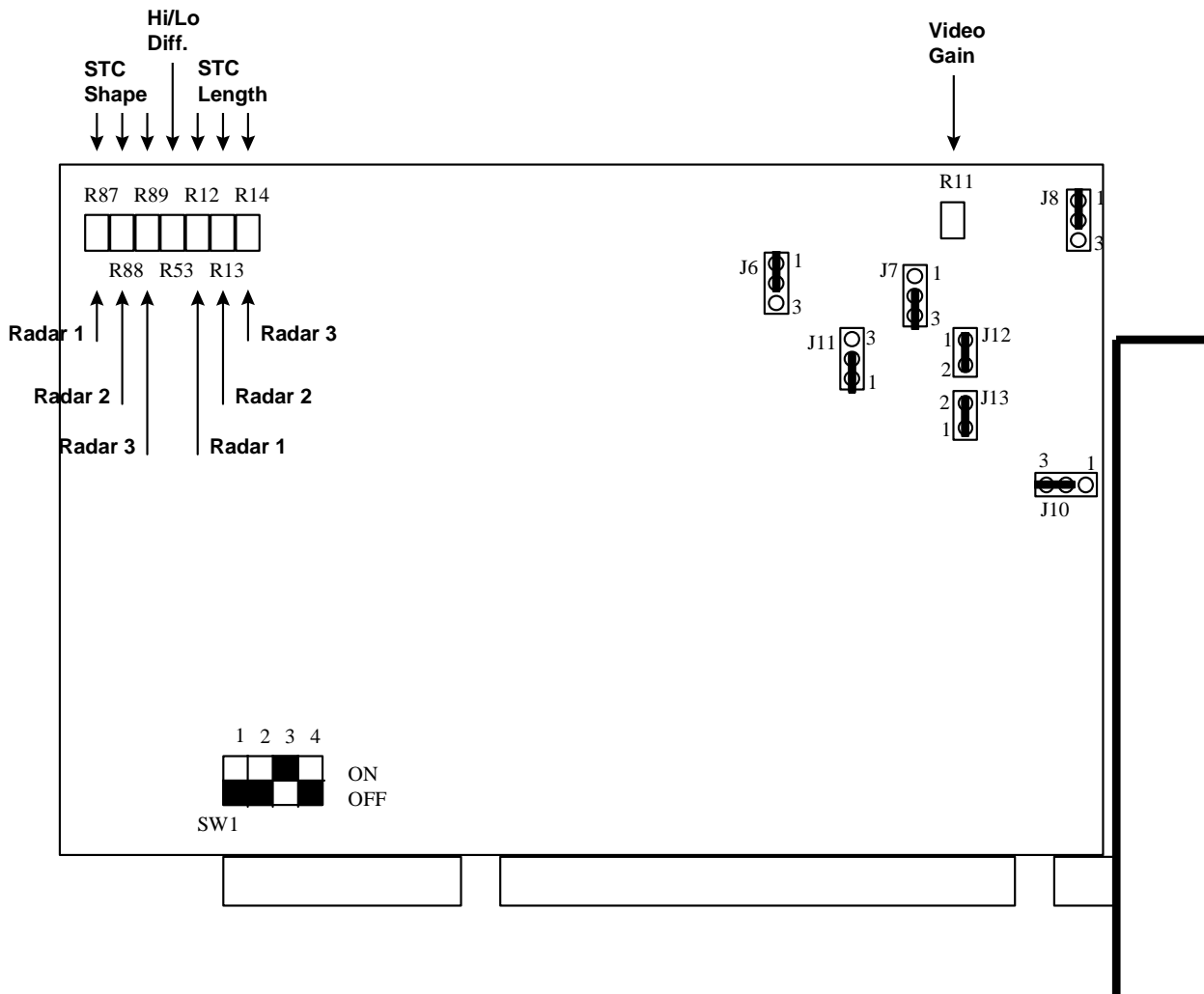
Potentiometer	Function
R53	Difference between HI and LO video
R11	Video gain

Radar 1	Radar 2	Radar 3	Function
R12	R13	R14	STC length
R87	R88	R89	STC shape

Note: When connecting to the FAR-2xx7 radar, remove the jumper J13 (for trigger).

Jumper	Position	Furuno	Function
J6	1-2 2-3	1-2	Factory default
J7	1-2 2-3	2-3	Positive Video Polarity Negative Video Polarity Factory default
J8	1-2 2-3	1-2	Positive Video Polarity Factory default Negative Video Polarity
J10	1-2 2-3	2-3	Positive HL Polarity Negative HL Polarity Factory default
J11	1-2 2-3	1-2	Trigger Polarity Positive Edge Factory default Trigger Polarity Negative Edge
J12	ON		Video 75Ω terminator in use Factory default
J13	ON		Trigger 75Ω terminator in use Factory default

To set card address, use DIP switch **SW1** according to the following table:

SW1/1	SW1/2	SW1/3	SW1/4	Address
ON	ON	ON	ON	200h
OFF	ON	ON	ON	220h
ON	OFF	ON	ON	240h
OFF	OFF	ON	ON	260h
ON	ON	OFF	ON	280h
OFF	ON	OFF	ON	2A0h
ON	OFF	OFF	ON	2C0h
OFF	OFF	OFF	ON	2E0h
ON	ON	ON	OFF	300h
OFF	ON	ON	OFF	320h
ON	OFF	ON	OFF	340h
OFF	OFF	ON	OFF	360h Factory default
ON	ON	OFF	OFF	380h
OFF	ON	OFF	OFF	3A0h
ON	OFF	OFF	OFF	3C0h
OFF	OFF	OFF	OFF	36Eh

3.4.3 B adapter EC-1020

All settings of B adapter are for gyro compass.
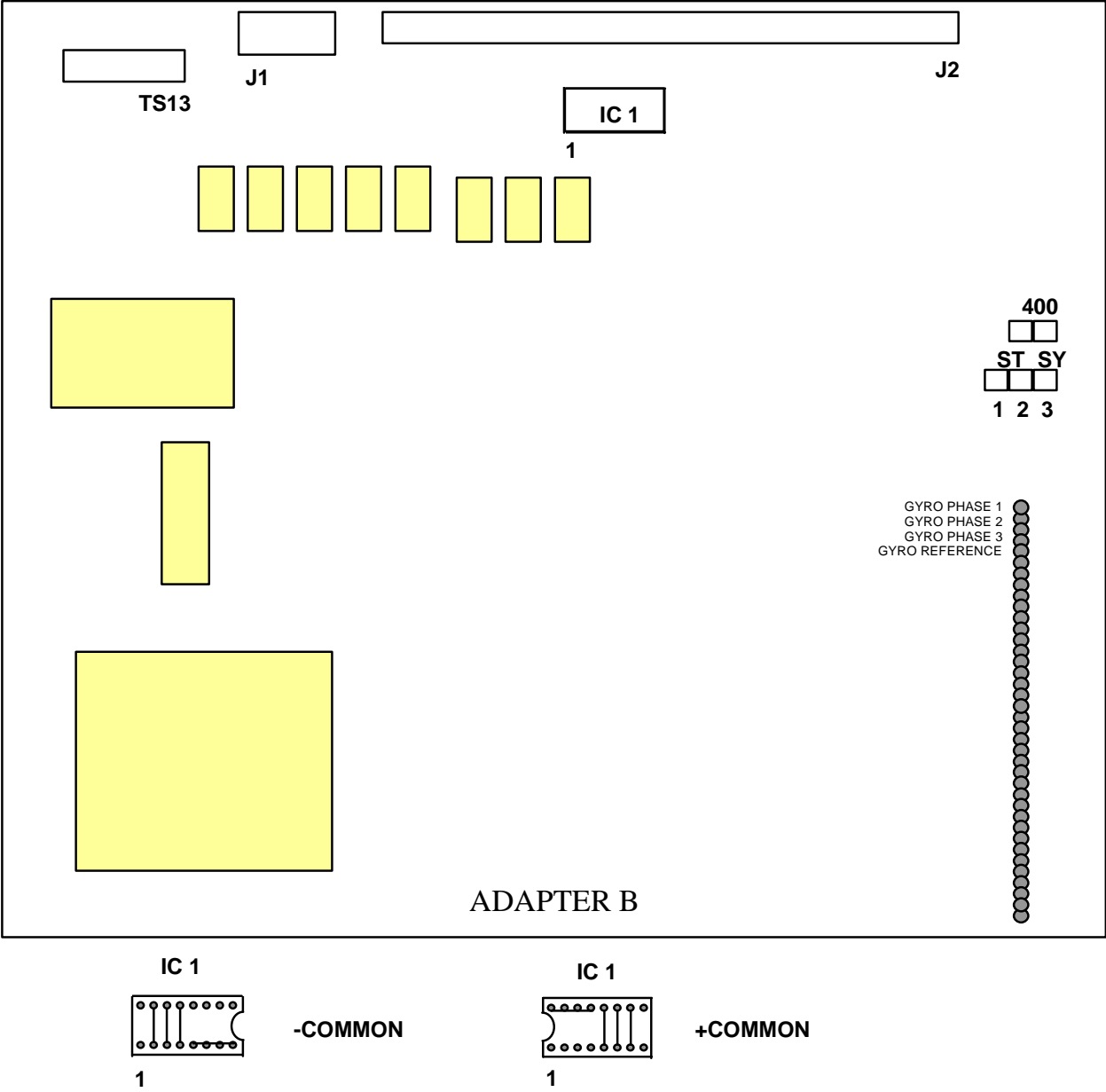
Jumper	Position	Function
400	open	50/60 Hz Synchro
	1-2	400 Hz Synchro
ST SY	1-2	Stepper
	2-3	Synchro

CONNECTION-B

J40

R22 R21

R20 R19

R18 R17

J38   J36   J34   J32   J30   J28

J39   J37   J35   J33   J31   J29
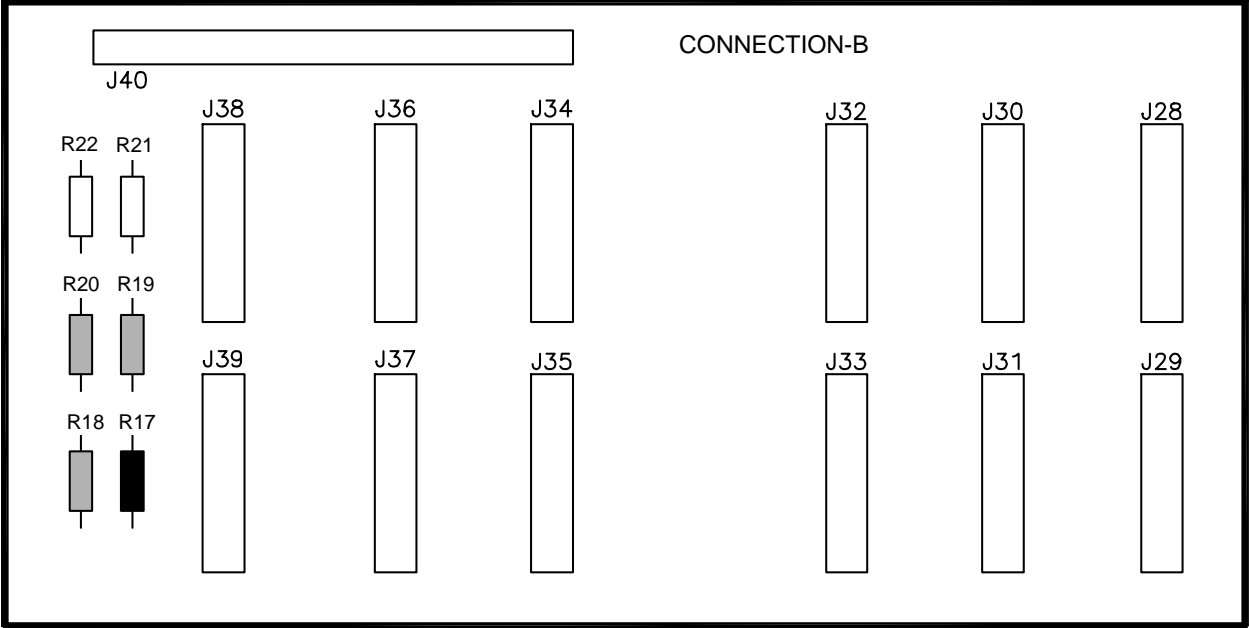
		SYNCHRO 90-135VAC	STEPPER 20-48VDC
▬	R17	2K2	22 ohms (1W)
▬	R18	10K	2K7 (1W)
▬	R19	10K	2K7 (1W)
▬	R20	10K	2K7 (1W)

Factory default is SYNCHRO 90-135 VAC. If you have a STEPPER 20-48 VDC, you need to replace resistors R17, R18, R19 and R20 with values given in the figure above.

Connector J38 pin	Stepper	Synchro
S0	Common	Not used
S1	Phase 1	Phase 1
S2	Phase 2	Phase 2
S3	Phase 3	Phase 3
R1H	Not used	If peak voltage is more than 60V.
R1L	Not used	If peak voltage is less than 60V.
R2	Not used	Common

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3.5 Installation of optional Furuno PP-510 printer

Furuno PP-510 printer can be connected to ECDIS using USB, not directly to LPT1: port. You have to use "**USB to parallel adapter**" to connect Furuno PP-510 printer to the USB port.   If printer is shared then it is possible to print from all workstations in the network.

<u>Installation of printer</u>

1. Connect "USB to parallel adapter" between printer and ECDIS.
2. Turn on printer and ECDIS.
3. Select first "**Settings**" from Start menu and then "**Printers and Faxes**".
4. Double-click the Add Printer icon to show the following window.

5. Press the **Next** button.
6. Select "Local printer attached to this computer".
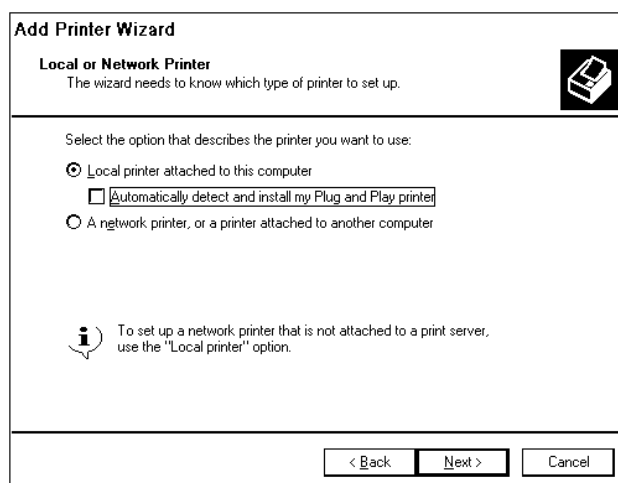
7. Press the **Next** button.
8. Select "Use the following port: USB001". (Virtual printer port for USB)

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9. Press the **Next** button.
10. Select printer Manufacturer as IBM and Printer as **"IBM Proprinter II"** and press the **Next button.**

11. Enter name for printer and press the **Next** button.
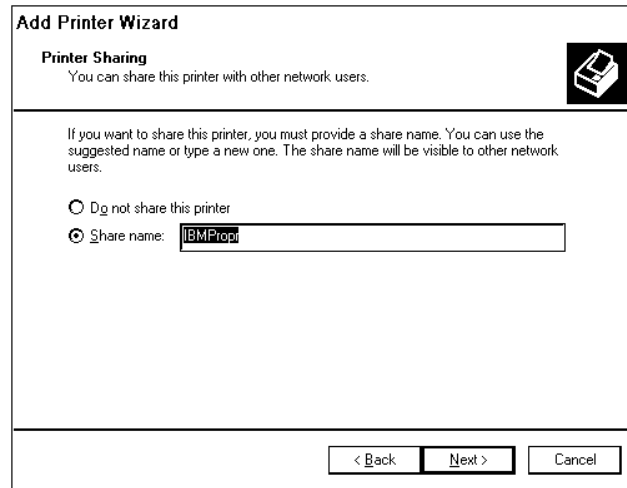
12. To use a network printer, select **"Share name:"** and press the **Next** button**.**

Add Printer Wizard

Printer Sharing
You can share this printer with other network users.
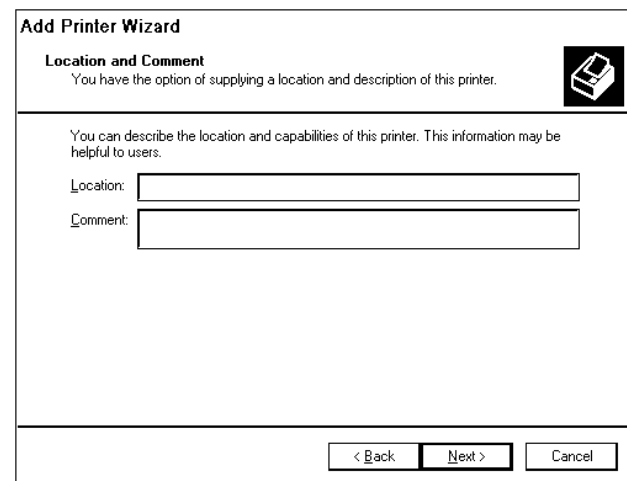
If you want to share this printer, you must provide a share name. You can use the suggested name or type a new one. The share name will be visible to other network users.

○ Do not share this printer

⦿ Share name: IBMPropr

< Back | Next > | Cancel

13. These fields can be left blank. Press the **Next** button.

Add Printer Wizard

Location and Comment
You have the option of supplying a location and description of this printer.
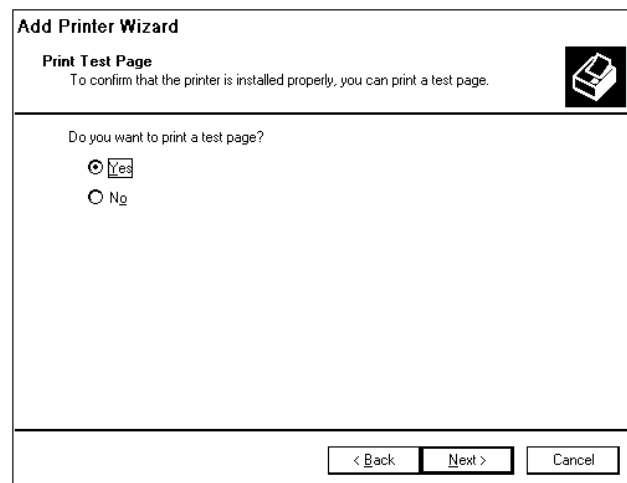
You can describe the location and capabilities of this printer. This information may be helpful to users.

Location:

Comment:

< Back | Next > | Cancel

14. To print test pages after installation, select "Yes" and press the **Next** button.

Add Printer Wizard

Print Test Page
To confirm that the printer is installed properly, you can print a test page.

Do you want to print a test page?

⦿ Yes

○ No

< Back | Next > | Cancel

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15. When installation is ready completed, the following window appears.

16. Press the **Finish** button.

Installation of shared printer

If you want to print from a workstation other than the one to which the printer is directly connected, you have to install Printer software to the workstation in following way:

1. Select first "**Settings**" from Start menu and then "**Printers and Faxes**"

2. Double Click Add Printer icon.

3. Following window appears, and then press the **Next** button.

4. Select "**A network printer, or a printer attached to another computer**", and then press the **Next** button.

5. Select "**Connect to this printer (or to browse for a printer, select this option and click next)**".

6. Press the **Next** button.
7. Click printer name, and then press the **Next** button.

8. Press the **Yes** button.

Connect to Printer

⚠ You are about to connect to a printer on EC1000C-0001, which will automatically install a print driver on your machine. Printer drivers may contain viruses or scripts that can be harmful to your computer. It is important to be certain that the computer sharing this printer is trustworthy. Would you like to continue?

Yes   No

9. Select **Yes.**

Add Printer Wizard

Default Printer
Your computer will always send documents to the default printer unless you specify otherwise.

Do you want to use this printer as the default printer?
⦿ Yes
○ No

< Back   Next >   Cancel
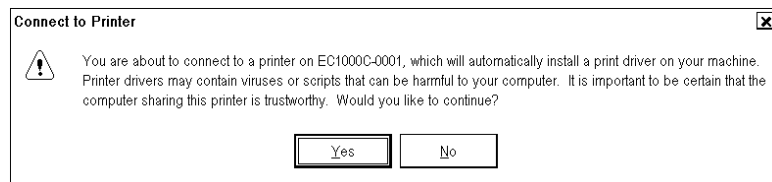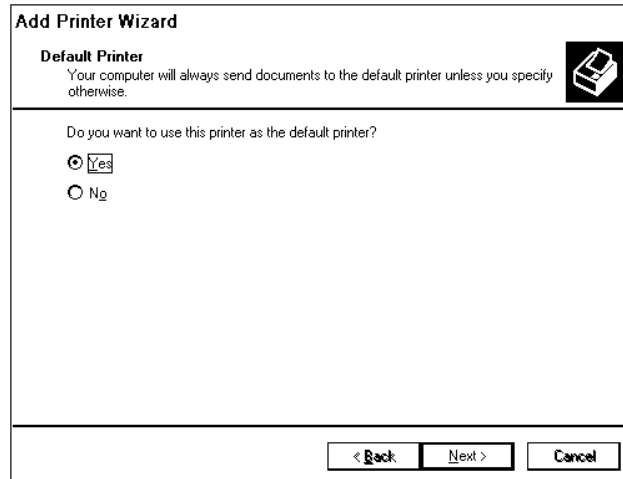
10. Press **Next** button.
11. When installation is completed successfully, the following window appears.

Add Printer Wizard

Completing the Add Printer Wizard

You have successfully completed the Add Printer Wizard.
You specified the following printer settings:

Name: IBM Proprinter II on EC1000C-0001
Default: Yes
Location:
Comment:

To close this wizard, click Finish.

< Back   Finish   Cancel

12. Press the **Finish** button.

3.6 Activation of CM-93/3

Before CM-93/3 charts can be used, you have to activate eToken (the dongle for system ID) of CM-93/3 as follows:

1. Start ECDIS.
2. Select "C-Map Ed3 installation" from Menu -> Initial settings.
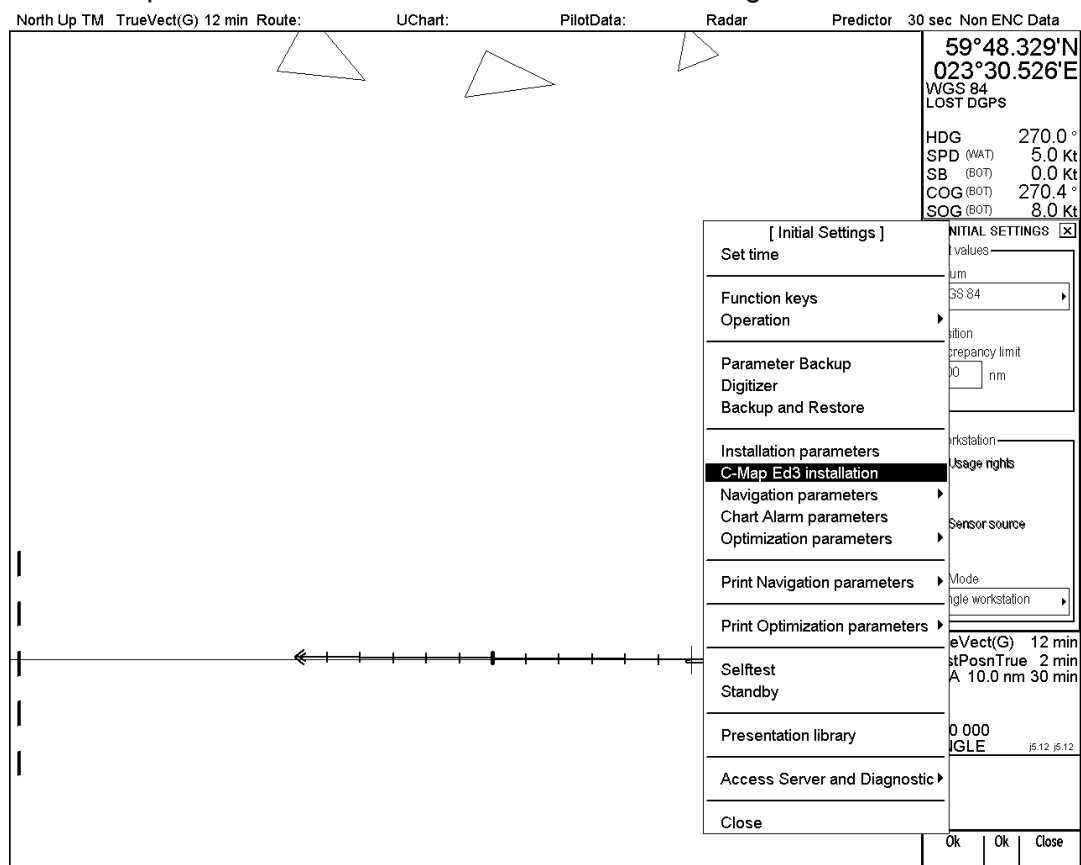
3. C-Map Installation dialog box appears. Press the **Install** button.
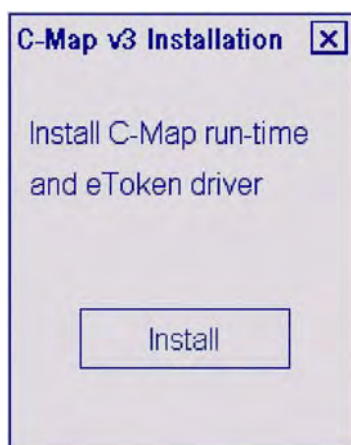
4. The eTInstall dialog box appears.

eTInstall

If you have an eToken please insert it now and choose YES.
If you do not have an eToken please choose NO

| Yes | No |

5. Insert eToken to USB port.

Found New Hardware Wizard

Welcome to the Found New
Hardware Wizard

Windows will search for current and updated software by
looking on your computer, on the hardware installation CD, or on
the Windows Update Web site (with your permission).
Read our privacy policy

Can Windows connect to Windows Update to search for
software?

○ Yes, this time only
○ Yes, now and every time I connect a device
○ No, not this time

Click Next to continue.

| < Back | Next > | Cancel |

6. Press **Cancel** button. Then press the **Yes** button.

eTInstall

If you have an eToken please insert it now and choose YES.
If you do not have an eToken please choose NO

| Yes | No |

7. Remove eToken from USB-port and then press **OK** button.

eToken Run Time Environment

IMPORTANT: Please remove all eTokens from the computer and press OK to continue

| OK |
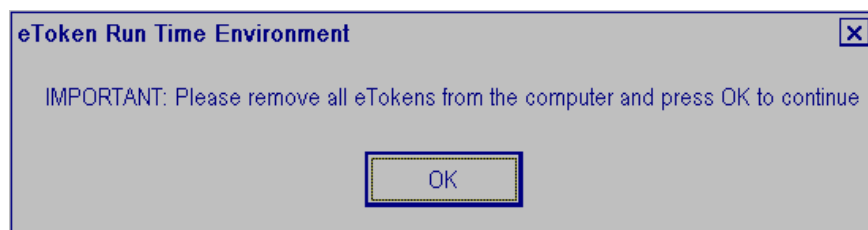
8. Insert eToken into USB port and then press **OK** button.

eToken Run Time Environment

IMPORTANT: Please insert the eToken now and press OK to continue.

| OK |

9. Confirm re-initialization.

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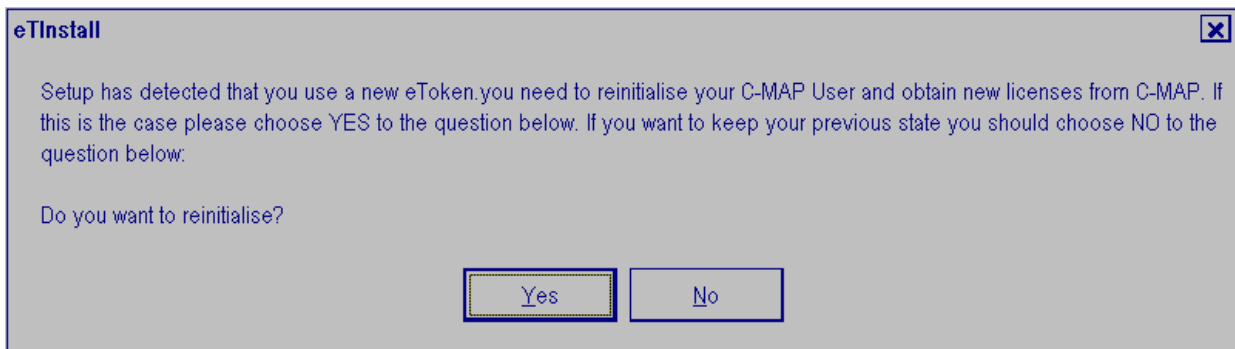
10. Press the **Yes** button
11. You have to remove licenses stored on ECDIS.
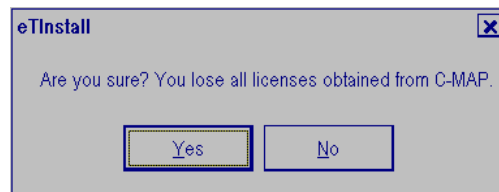
12. Press the **Yes** button.

Note: Press the **No** button to escape from the installation of C-MAP 93/3 to start.
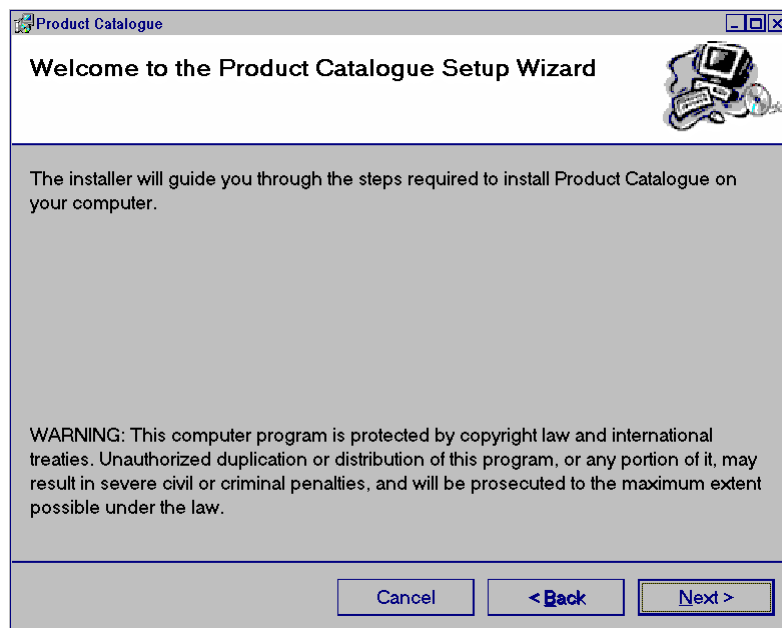
13. Press the **Next** button to start the Product Catalogue Setup Wizard.

14. Make selections as below.
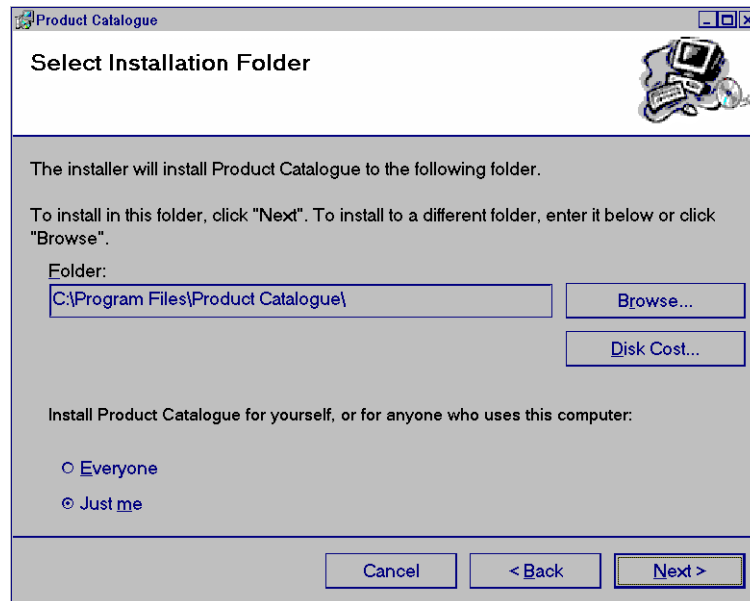
15. Press the **Next** button to start installation.
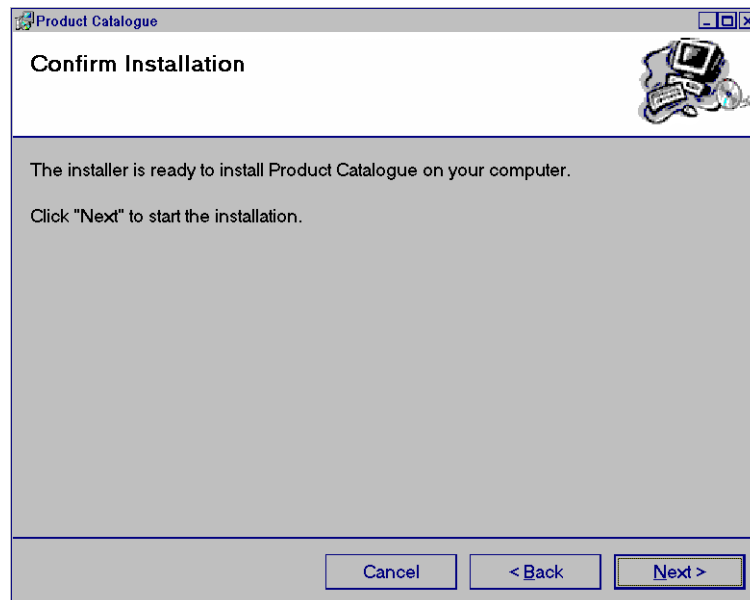
16. Press the **Next** button. Installation starts. This may take a while.
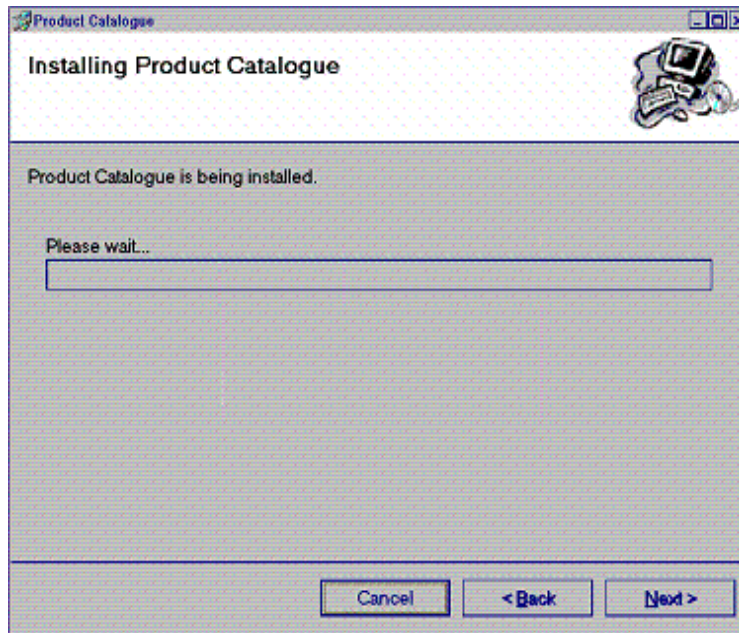
17. When installation is completed the following window appears.
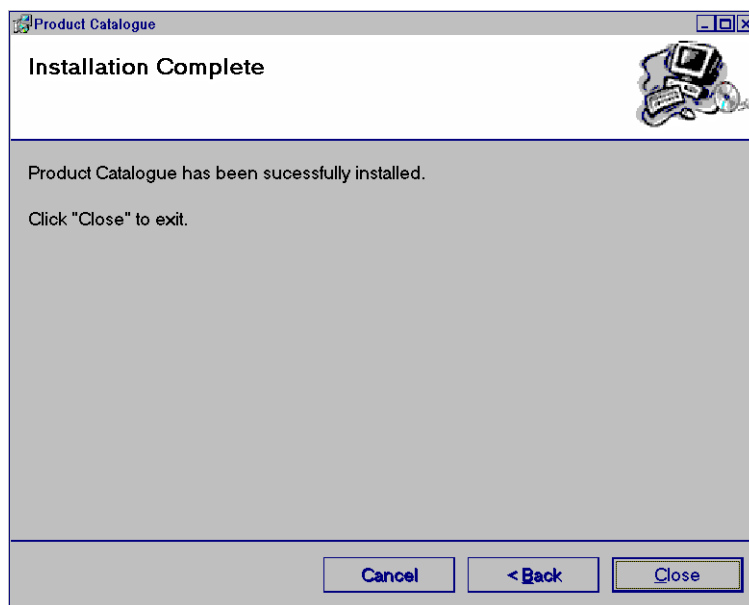
18. Press the **Close** button.

    If the following window appears, you have not removed all licenses stored on ECDIS (see step 17). You have to remove eToken from USB-port and restart ECDIS computer and then start Installation of Product Catalogue in step 14.
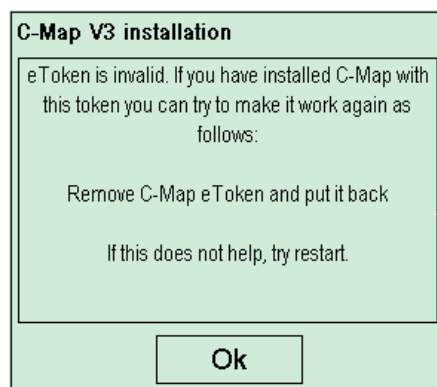
19. Then following window appears.
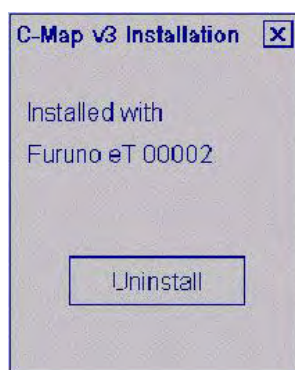
20. Click "X". Chart drawing software restarts automatically.

3.7   Reinstall of ECDIS software

Important things to do before reinstall

When you upgrade ECDIS system some information will be removed permanently from the hard disk. Some of the information you may need later, therefore if it is necessary make a paper copy of Voyage Log files and ship parameters (ship.prm). Make also notes of manual reinstalls which you have to make manually again after reinstalling.

Loading of ECDIS software

You can reinstall ECDIS software by using ECDIS installation CD-ROM. Connect the service keyboard and mouse, then reinstall ECDIS software as follows:

1. You already have ECDIS installed and you have to shut down ECDIS program before you can make a new installation. To shut down ECDIS program, press the **Shutdown the ECDIS** button.

```
ECAWATCH
                    ANTS.ECDIS PROCESS STARTER
        This window control execution of various ECDIS software
        components.  To move this window in background click
                chart area with SELECT pushbutton.

INS PROCESS                    [ Restart ]   [ Stop ]

HUMAN INTERFACE                [ Restart ]   [ Stop ]

S57 DRAWING                    [ Restart ]   [ Stop ]

ARCS DRAWING                   [ Restart ]   [ Stop ]

VOYAGE RECORDER                [ Restart ]   [ Stop ]

CONNING DISPLAY                [ Restart ]   [ Stop ]

ACCESS SERVER                  [ Restart ]   [ Stop ]

                [ Shutdown the ECDIS ]
```

2. Then you will get an empty screen which prevents normal user from entering the operating system. You close the empty screen by pressing Alt and F4 keys of the service keyboard together.

```
Service engineer: If you want to close this window:
    1. Move cursor here and press SELECT button
    2. Use service keyboard and press ALT and F4 keys together

ECDIS user: If this window remains forever you can use Power Off/On
to restart the ECDIS
```
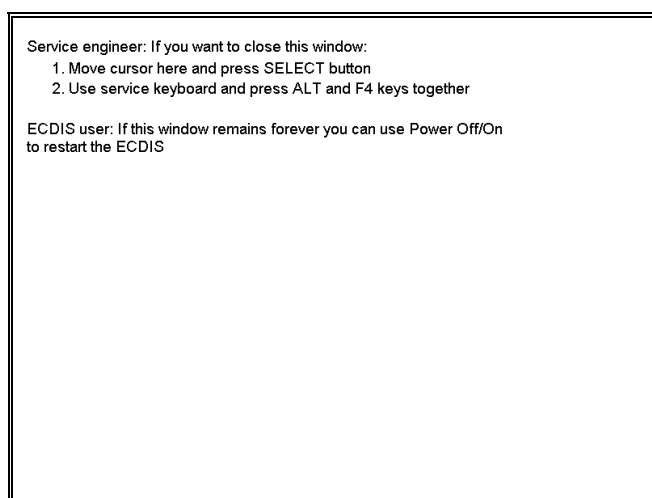
3. Close Control Head program. Use Alt+Tab keys to activate Control Head program on display. Use X in upper right corner to close Control Head.

```
Control Head                                    _ □ ×
Normal mode. Press T to enter test mode
_
```
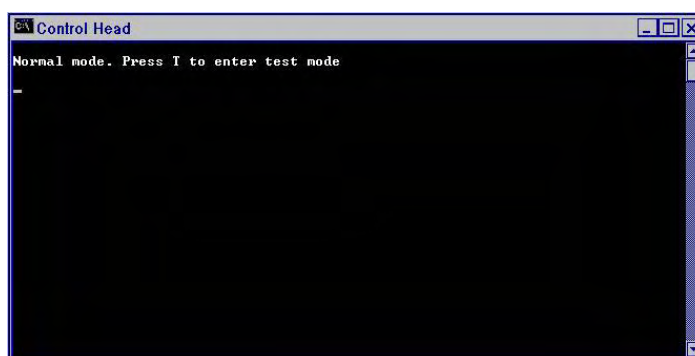
4. Insert the CD-ROM for installation to the processor unit, and then select **Run** from the **Start** menu. Type the name as shown here to run ECDIS software installation.

```
Run                                             ? ×

     Type the name of a program, folder, document, or
     Internet resource, and Windows will open it for you.

Open:  [ D:\install\Setup.exe ]                      ▼

              [ OK ]   [ Cancel ]   [ Browse... ]
```

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5. A **System Information** window appears, press **Yes** button to continue the installation.
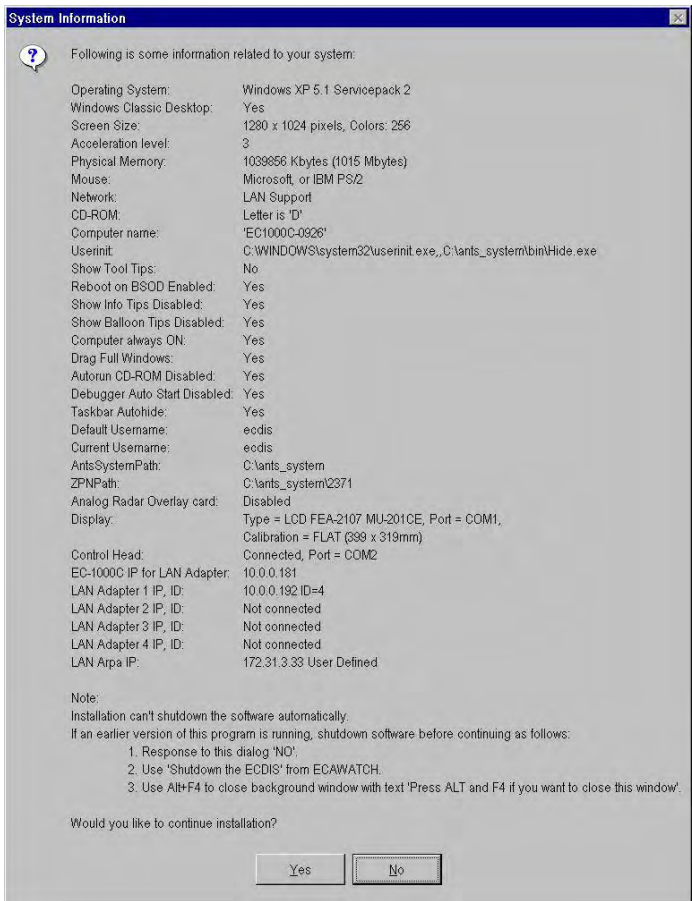
6. If the Windows Classic style is not in use a following window appears. Follow the instructions to enable the Classic style.
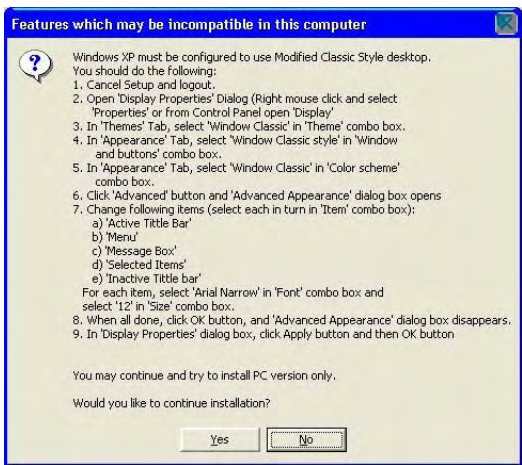
7. Press the **Next** button.
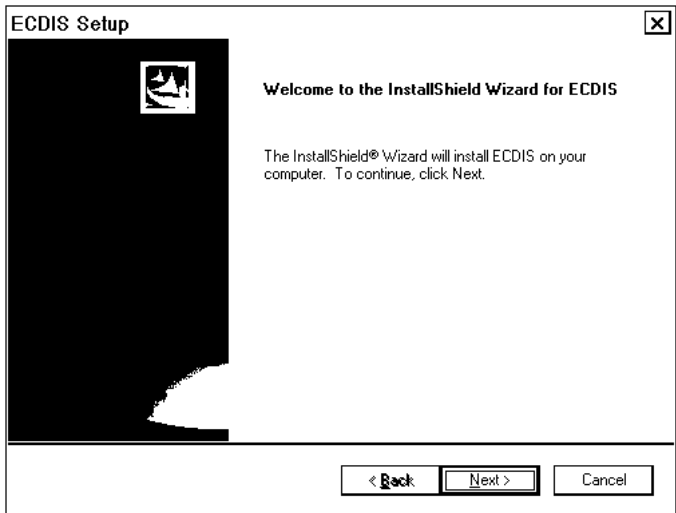
8. Select desired Setup Type.

   Note: This example is full ECDIS installation without Conning Display.

ECDIS / ChartRadar Setup

Setup Type

Click the type of Setup you prefer.

CHART RADAR
ECDIS
ECDIS With Conning (1 Display)
ECDIS With Conning (2 Displays)
PC ECDIS

Description
Full ECDIS installation. Version 06.01

InstallShield

< Back   Next >   Cancel
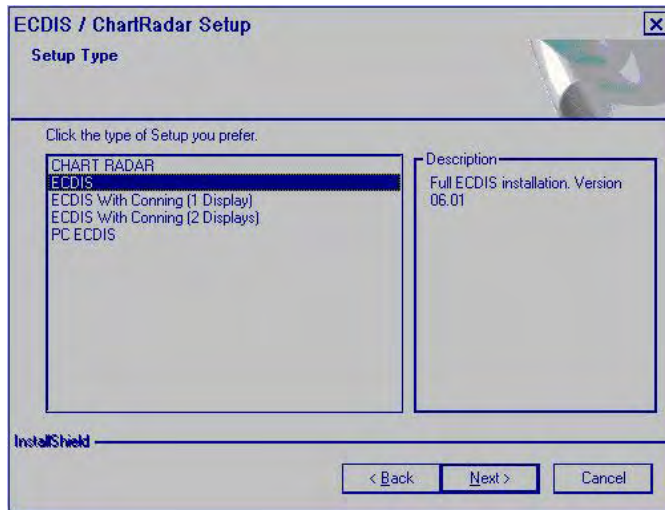
9. Enter password "ecdis" for ecdis user and press the **Next** button.

ECDIS Setup

User Info

Enter your current Windows XP password.

(You are logged on as pete. If the password is invalid then the automatic login will fail after next reboot or logoff.)

Password   ecdis

InstallShield

< Back   Next >   Cancel
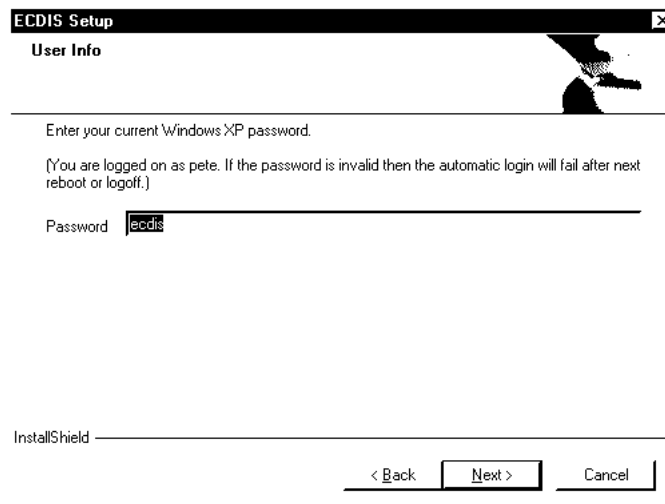
10. Select destination location for ECDIS and press the **Next** button.

ECDIS Setup

Choose Destination Location

Select folder where Setup will install files.

Setup will install ECDIS in the following folder.

To install to this folder, click Next. To install to a different folder, click Browse and select another folder.

Destination Folder
C:\ANTS_SYSTEM   Browse...

InstallShield

< Back   Next >   Cancel
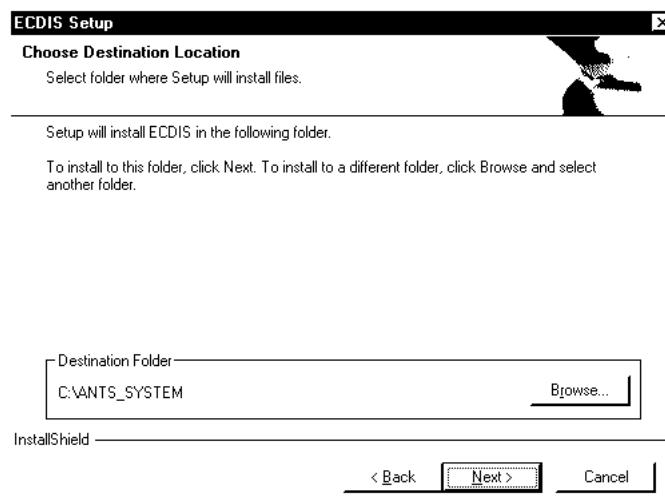
11. Select Components to be installed and press the **Next** button.

    Note: Check "Analog Radar Overlay" when the processor unit contains the optional Analog Radar Overlay board.
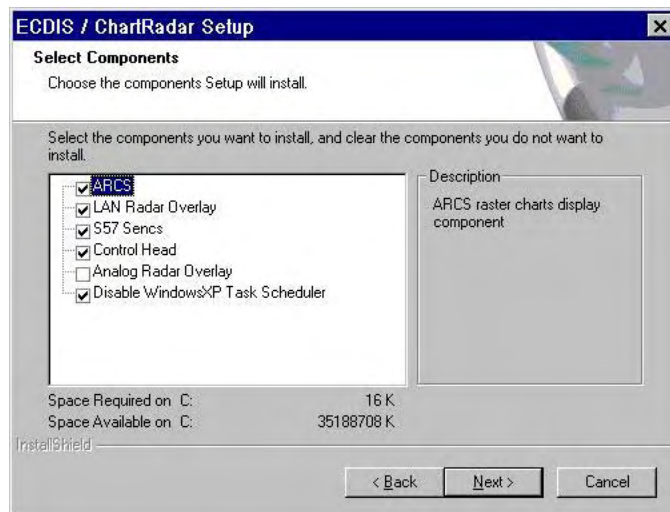
12. Check selection box if C-Map ed. 3 is used.
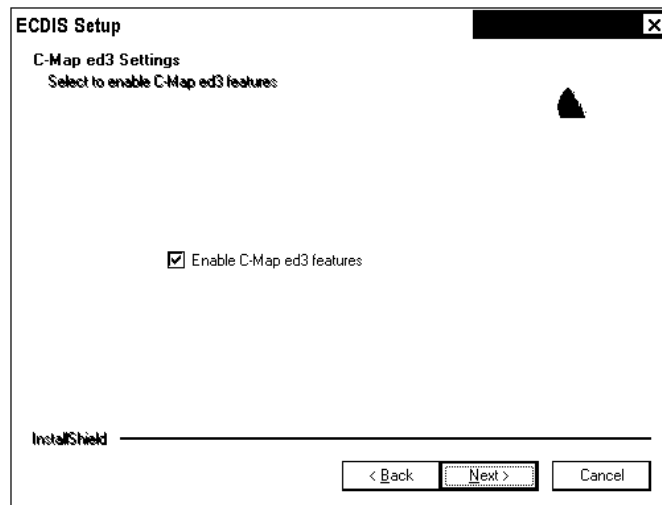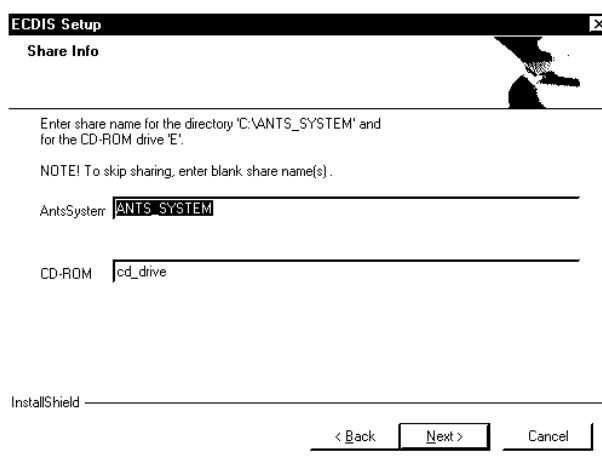
13. Enter HASP PIN Number "2371" and press the **Next** button.
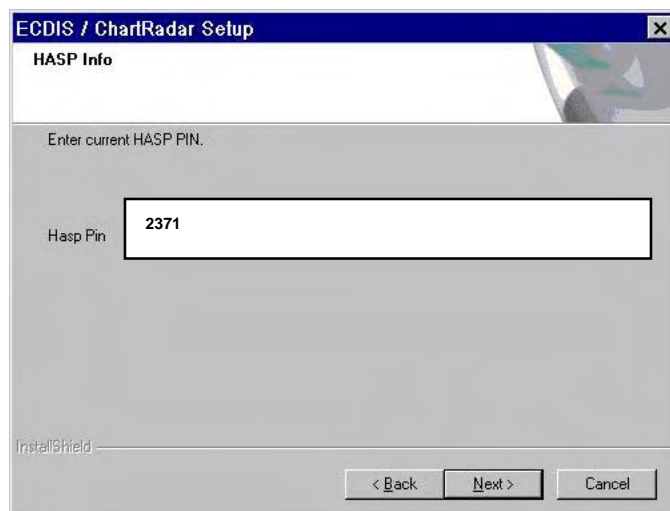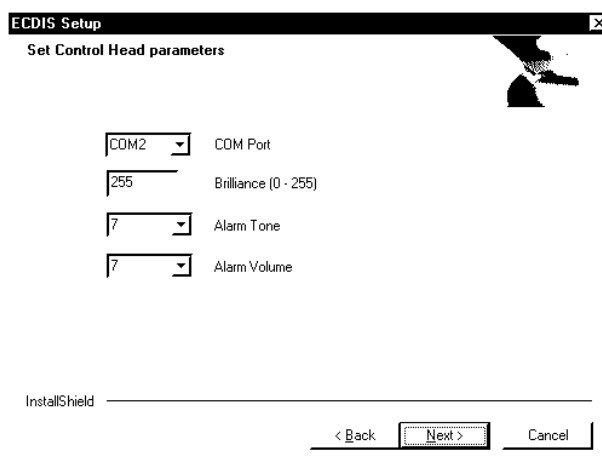
14. Sharing information can be entered here and then press **Next** button.
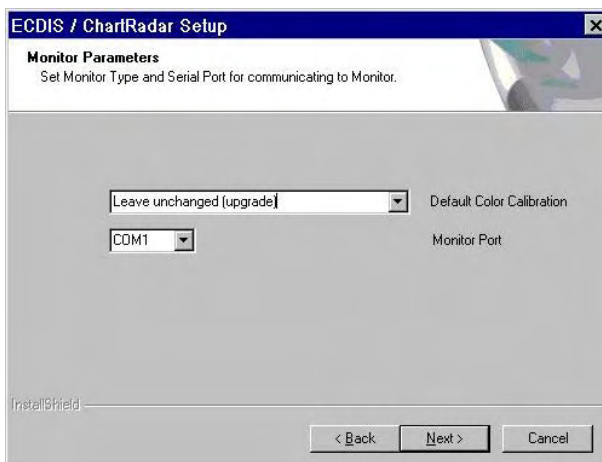
ECDIS Setup

Share Info

Enter share name for the directory 'C:\ANTS_SYSTEM' and for the CD-ROM drive 'E'.

NOTE! To skip sharing, enter blank share name(s).

AntsSystem   ANTS_SYSTEM

CD-ROM   cd_drive

InstallShield

< Back   Next >   Cancel

15. Select a COM Port for the Control Head, set other parameters as appropriate, and press the **Next** button.
COM Port: "COM2" only
Alarm Tone: "7" only
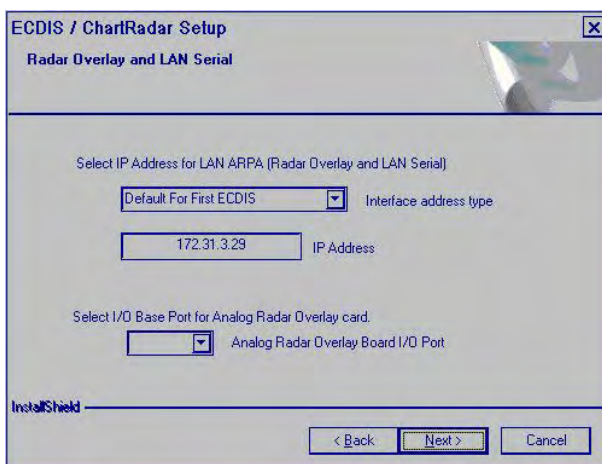
ECDIS Setup

Set Control Head parameters

COM2   COM Port

255   Brilliance (0 - 255)

7   Alarm Tone

7   Alarm Volume

InstallShield

< Back   Next >   Cancel

16. Select Monitor type, calibration and Control Port for display, and press the **Next** button.

ECDIS / ChartRadar Setup

Monitor Parameters
Set Monitor Type and Serial Port for communicating to Monitor.

Leave unchanged (upgrade)   Default Color Calibration

COM1   Monitor Port

InstallShield

< Back   Next >   Cancel

17. Set ECDIS and IP Address for ARPA. Set I/O base port for Radar Overlay, and press the **Next** button.

ECDIS / ChartRadar Setup

Radar Overlay and LAN Serial

Select IP Address for LAN ARPA (Radar Overlay and LAN Serial)

Default For First ECDIS   Interface address type

172.31.3.29   IP Address

Select I/O Base Port for Analog Radar Overlay card.

Analog Radar Overlay Board I/O Port

InstallShield

< Back   Next >   Cancel

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18. Set LAN Adapter parameters and press the **Next** button.
Example of first ECDIS default settings with two LAN Adapters.

ECDIS Setup

LAN Adapter parameters
Set IP addresses and check if this ECDIS is sensor source for LAN Adapter (Sensor source both initializes and sends output to device).

Default For First ECDIS   Interface addresses

10.0.0.180   ECDIS IP for LAN Adapters

LAN Adapter IP   This ECDIS is

10.0.0.190	☑ Install 1	☑ Sensor Source for 1
10.0.0.191	☑ Install 2	☑ Sensor Source for 2
For Future Use	☐ Install 3	☐ Sensor Source for 3
For Future Use	☐ Install 4	☐ Sensor Source for 4

InstallShield

< Back   Next >   Cancel

Example of second ECDIS default settings with one LAN Adapter.

ECDIS / ChartRadar Setup

LAN Adapter parameters
Set IP addresses and check if this ECDIS is sensor source for LAN Adapter (Sensor source both initializes and sends output to device).

Default For Second ECDIS   Interface addresses

10.0.0.181   ECDIS IP for LAN Adapters

LAN Adapter IP   This ECDIS is

10.0.0.192	☑ Install 1	☑ Sensor Source for 1
10.0.0.193	☐ Install 2	☐ Sensor Source for 2
For Future Use	☐ Install 3	☐ Sensor Source for 3
For Future Use	☐ Install 4	☐ Sensor Source for 4

InstallShield

< Back   Next >   Cancel

19. Select files to be deleted from ECDIS, and press the **Next** button**.**

    Note: When upgrading from version 05.xx software, check all boxes to erase corresponding items.
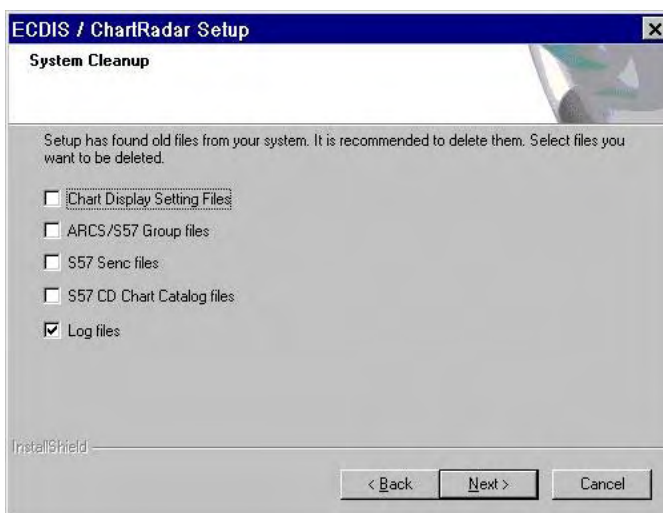
20. Press the **Next** button.
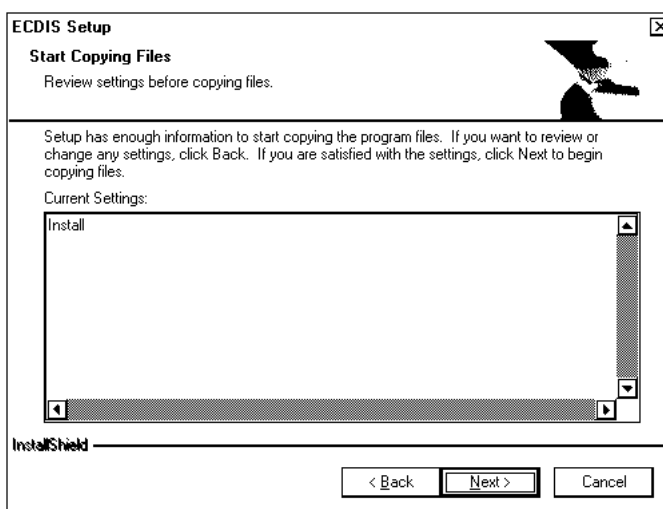
21. Setup progress is shown with a progress book.
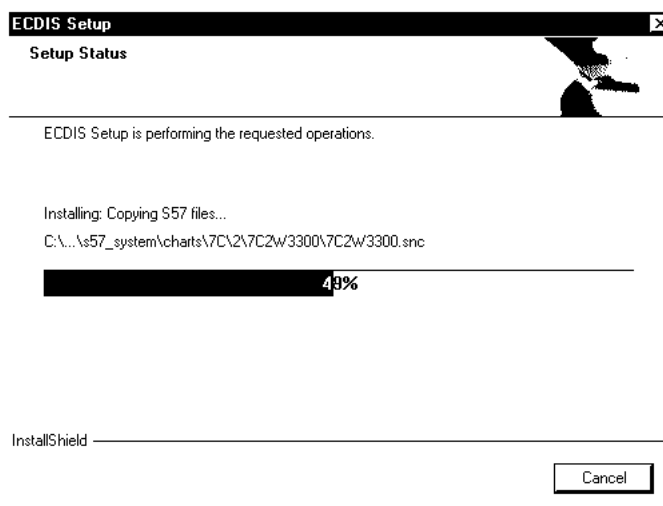
22. Press the **Finish** button to restart ECDIS.

ECDIS Setup

InstallShield Wizard Complete

Setup has finished installing ECDIS on your computer.

(•) Yes, I want to restart my computer now.

( ) No, I will restart my computer later.

Click Finish to exit ECDIS setup.

< Back   Finish   Cancel
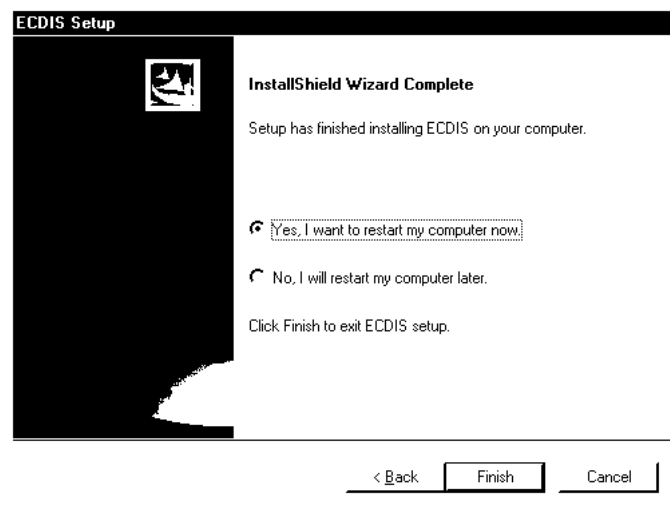
Important things to do after reinstall

After you have reinstall ECDIS program, you will need to initialize ECDIS to restore previous state.
Automatic erase of the old situation memory and internal files has removed the following setups and files from the hard disk.

- Chart details has been set as initial default values. For information about how to set desired values, see "Control of visible chart features" in the Operator's Manual.

- Select Navigation sensors from the Sensor page.

- SENC format of S57 charts has been removed.

- Manual Reinstall has been removed. Make Manual Updates based on the Notes you made before Upgrade.

How to convert already loaded S57 charts into SENC format

You can reconvert hard disk stored charts S57 into SENC format by doing the following:

1. Open the Chart Menu.
2. Choose "Chart Catalogue" .
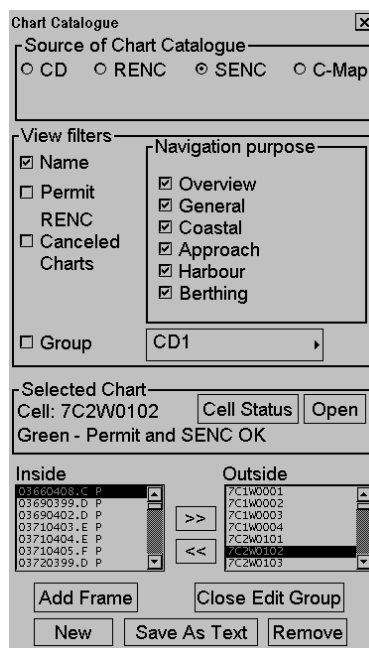
3. Push the **New** button.
4. Create a group named "ALL", and press **OK** button.
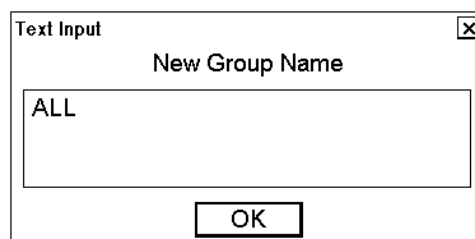
5. Click "Group" in the View filters, and then choose "ALL".
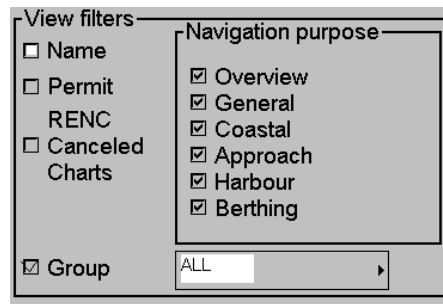
6. Choose all available charts in the Outside window at the bottom of the window.
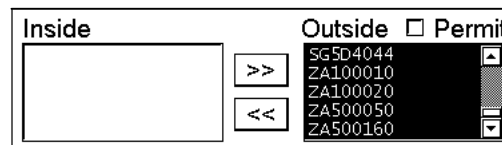
7. Press **<<** button to set group "ALL" as active.
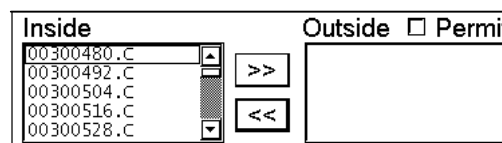
8. Open SENC Convert window from the Chart Menu and activate conversion for group "ALL", press **Convert** button to start conversion for Group "ALL".
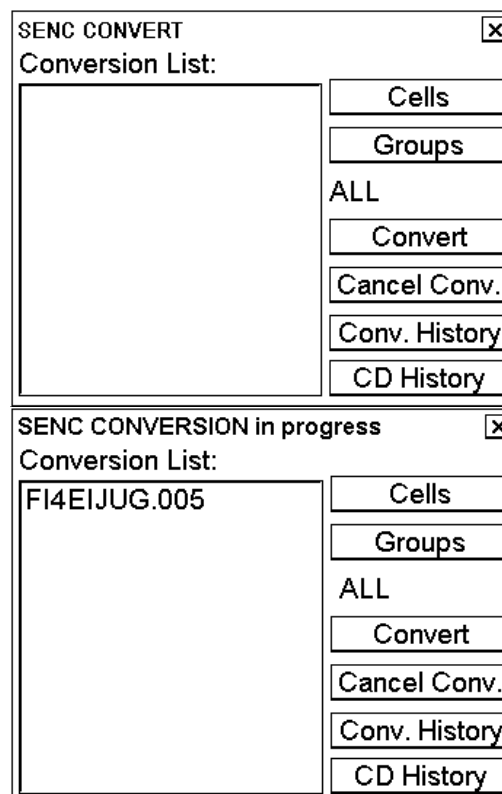
You will get a list of charts to be converted to SENC format. (Content of **Conversion List** depends on charts loaded into ECDIS.)
When conversion is completed, the **Conversion List** will be empty again.

For details, see chapter "How to use SENC Convert window to initiate SENC conversion" in Operator's Manual.

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4. INPUT/OUTPUT SIGNALS

Introduction

The main method for transferring data between a sensor and the ECDIS is IEC 61162-1 Ed.1 or IEC 61162-1 Ed.2 Standard serial communication link.
In the standard configuration, the system has one serial communication channel interface, LAN adapter type EC-1010, to communicate with up to eight external devices in serial format. As an option, second LAN adapter can be connected for max. 16 serial channels in total.
Optionally the ECDIS can be interface to analog signals through a B adapter type EC-1020. For communication with ECDIS this analog adapter use, one serial channel from the LAN adapter.

Standard interfaces

Gyro compass

- One serial input type of gyro compass (IEC 61162-1 Ed.1 or Ed.2 message $XXHDT..., min 1 message per second. With radar overlay the recommendation is 5 messages per second.)

Speed log

- One serial input type of dual-axis speed log (IEC 61162-1 Ed.1 or Ed.2 message $XXVBW.... or NMEA V1.5 message $PKVBW… or NMEA V1.5 message $PSALL, min 1 message per 2 seconds).

Positioning equipment

- Two positioning equipment can be connected using one of the following communication protocols:
  - IEC 61162-1 Ed.1 messages $XXGLL, $XXVTG and $XXZDA
  - IEC 61162-1 Ed.1 messages $XXGGA, $XXVTG and $XXZDA
  - IEC 61162-1 Ed.2 messages $XXDTM, $XXGLL, $XXVTG and $XXZDA
  - IEC 61162-1 Ed.2 messages $XXDTM, $XXGGA, $XXVTG and $XXZDA
- **Notes:**
  - Min message rate is 1 message per 5 seconds
  - Recommended rate is 1 message per second
  - Alternatives 1, 2 and 3 has separate talker identifier selection for VTG and GLL/GGA/PAT.
  - Message $XXZDA should only be used with one of the position equipment.
  - Only alternatives 2 and 3 have Differential-flag for DGPS use.
  - Only equipment, which has fixed datum (like WGS-84) in their position message should be used. Alternatives 6 and 7 check that the used datum is WGS84.

ARPA Radar

- Two ARPA radars can be connected using one of the following communication protocols.

  - IEC 61162-1 Ed.1 or Ed.2 standard messages $XXOSD and $XXTTM for input and messages $ECGLL, $ECDTM, $ECDPT and $ECMWV for output. Targets numbered from 1 to 100 are accepted in TTM message. The datum of GLL message is fixed and it is WGS84 (for serial interface only).

  - FURUNO interface with IEC 61162-1 Ed.1 standard messages $XXOSD and $XXTTM for input and messages $IIGLL, $IIOSD for output + proprietary messages for user charts, routes, curved ebl, etc (for serial interface and LAN).

AIS transponder equipment

- One serial input interface (IEC 61993-2 Ed.1 message !XXVDM, message types 1,2,3 and 5, min 1 message per 10 seconds)

- **Notes:**

  - Max. 1500 simultaneous AIS targets can stored for display purposes.

  - Max. 200 simultaneous AIS targets out of 1500 stored can be displayed.

Trackpilot

- Serial data interface based on NMEA V1.5 messages for EMRI SEM-200 or FURUNO FAP-2000 Trackpilot (IEC 62065 category B and C for TCS)

- Or serial data interface based on NMEA messages for YOKOGAWA autopilot (NOTE: IEC 62065 type approval of category B for TCS)

- Or serial data interface based on NMEA messages for TOKYO KEIKI autopilot (NOTE:IEC 62065 type approval category C for TCS)

External interfaces

Echo Sounder

- One serial input type echo sounder (IEC 61162-1 Ed.1 or Ed.2 message $XXDBT... , min 1 message per 5 seconds)

Wind measuring device

- One serial input type wind sensor (IEC 61162-1 Ed.1 or Ed.2 message $XXMWV..., min 1 message per 10 seconds)

Water temperature measuring device

- One serial input type wind sensor (IEC 61162-1 Ed.1 or Ed.2 message $XXMTW..., min 1 message per 10 seconds)

Positioning equipment

- One additional positioning equipment

Gyro compass

- One analog type of gyro compass (90-135VAC Synchro 1:360 or 20-48 VDC Stepper 1/6º)

Speed log

- One analog pitot log (200 pulses/nm)

Rate of Turn Gyro compass

- ROT information has following alternative sources:
- ROT can be calculated from the ordinary gyro system heading.
- ROT can be received from a serial type Gyro compass ($XXROT...).
- ROT can be received from a ROT gyro with analogic voltage output (+/- 10 V).
- ROT can be received from a serial type dual-axis speed log, if it is equipped with a ROT gyro and if it sends message $PKDRU….

Main propeller

- One or two propellers having RPM and pitch with analog interface.
- 2-kohm potentiometers installed in all propellers.
- Reference voltage to potentiometers (+/-12v), supplied from the ECDIS.
- Each analog input is associated with a status signal (closed contact) which indicates the availability of the analog signal.

Thrusters

- One bow and one stern thruster with analog interface.

- 2-kohm potentiometers installed in all thrusters.

- Reference voltage to potentiometers (+/-12v) supplied from the ECDIS.

- Each analog input is associated with a status signal (closed contact) which indicates the availability of the analog signal.

Rudder

- One or two rudder indicators

- Rudder indicators have the following sources:

  - Both actual and order can be received from a track pilot with serial data.

  - Actual can be received from analog interface and order can be received from a track pilot in serial data.

  - Both actual and order can be received from analog interface.

  - Or alternatively port and starboard rudder feedback can be received from analog interface.

  - Both actual and other can be received from IEC 61162-1 ($xxRSA).

- Analog interface for rudder has following specification.

  - 2-kohm potentiometers installed in the steering gear system.

  - Reference voltage to potentiometers (+/-12v) supplied from the ECDIS.

  - Typically the same rudder feed back unit can be used also for track Pilot system.   (A dual-potentiometer in the feed back unit is then required)

  - Each analog input is associated with a status signal (closed contact) which indicates the availability of the analog signal.

Engine start air pressure

- One engine start air pressure analog interface.

- 2-kohm potentiometers installed in engine start air pressure.

- Reference voltage to potentiometer (+/-12v) supplied from the ECDIS.

- Analog input is associated with a status signal (closed contact) which indicates the availability of the analog signal.

Air pressure

- One air pressure analog interface.
- typical instrument is a VAISALA pressure sensor having current output.

Fuel consumption

- One fuel pump with analog interface
- Analog input is associated with a status signal (closed contact) which indicates the availability of the analog signal.

Route backup to external devices

- One serial output type Furuno DGPS receiver GP-80 (IEC 61162-1 Ed.1 based proprietary messages)
- Or one serial output interface (IEC 61162-1 Ed.1 message $EIRTE, $EIWPL)

Route restore from external devices

- One serial input type Furuno DGPS receiver GP-80 (IEC 61162-1 Ed.1 based proprietary messages)

Speed Pilot

- One serial data interface (IEC 61162-1 Ed.1 based proprietary messages)
- Alarm Management and Watch Safety System (AMWSS)
- One serial data interface (IEC 61162-1 Ed.1 based proprietary messages)

Alarm outputs

- ROUTE MONITOR: OUTSIDE CHANNEL LIMITS alarm as open contact (Contact closed is No Alarm)
- ROUTE MONITOR: WAYPOINT APPROACH alarm as open contact (Contact closed is No Alarm)
- ECHO: DEPTH BELOW LIMIT alarm as open contact (Contact closed is No Alarm)
- NAVIGATION SENSOR ALARM as open contact (Contact closed is No Alarm) from B adapter

Alarm inputs

- Alarm inputs has following sources:
  - Serial messages from EMRI Central Alarm Management
  - Closed/Open contact inputs (max 8 pieces) from B adapter

4-5

Radar Overlay

- Video: min 2 Vpp, max 5 Vpp, positive or negative polarity

- Trigger: min 5 V, max 30 V, positive or negative polarity, zero distance

- Headline: min 5 V, max 30 V, positive or negative polarity

- Azimuth: min 5 V, max 30 V, positive polarity, 128…1024 pulses / 360º

- Selection: 2 pieces of selection inputs to define parameter set selection for Radar Overlay. The inputs are coded and give a possibility to define three alternative radars. Selection input: min 5 V, max 24 V.

5. RADAR SWITCH (OPTION)

To connect two radars excepting FAR-21x7/28x7 series, use the optional radar switch.

Type	Code No.	Remarks
CP03-29501	008-544-940	For 12 VDC
CP03-29502	008-544-950	For 24 VDC

Contents
See the packing lists attached at the back of this manual

Mounting

Radar switch

Mount the switch at the mounting position with four tapping screws (M4, local supply).
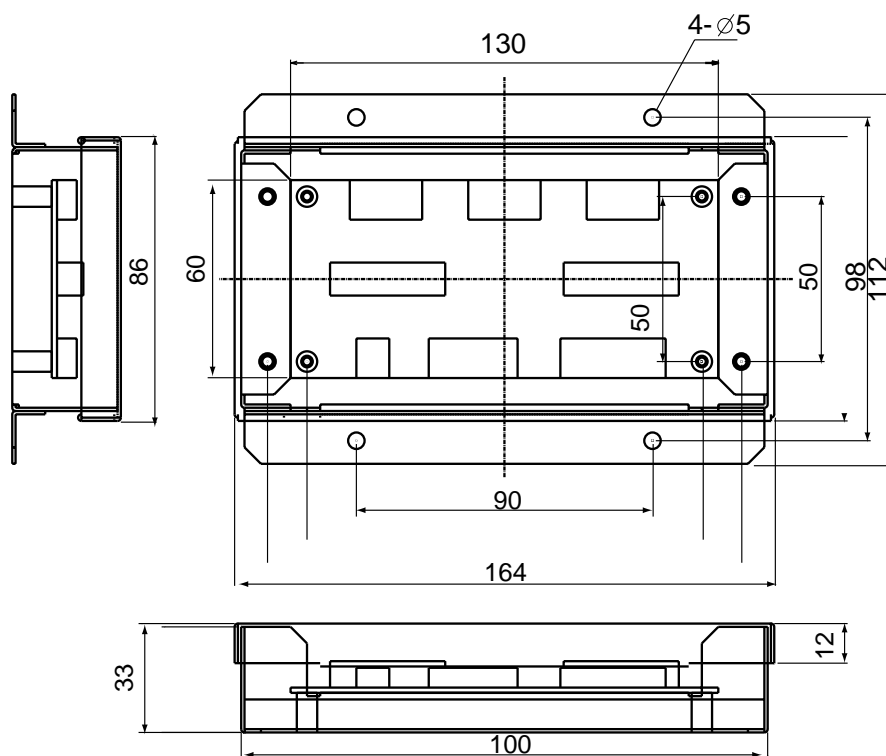
Radar switch

Radar selector

Make five holes (one for toggle switch) to mount the switch on the desktop or bulkhead as below.
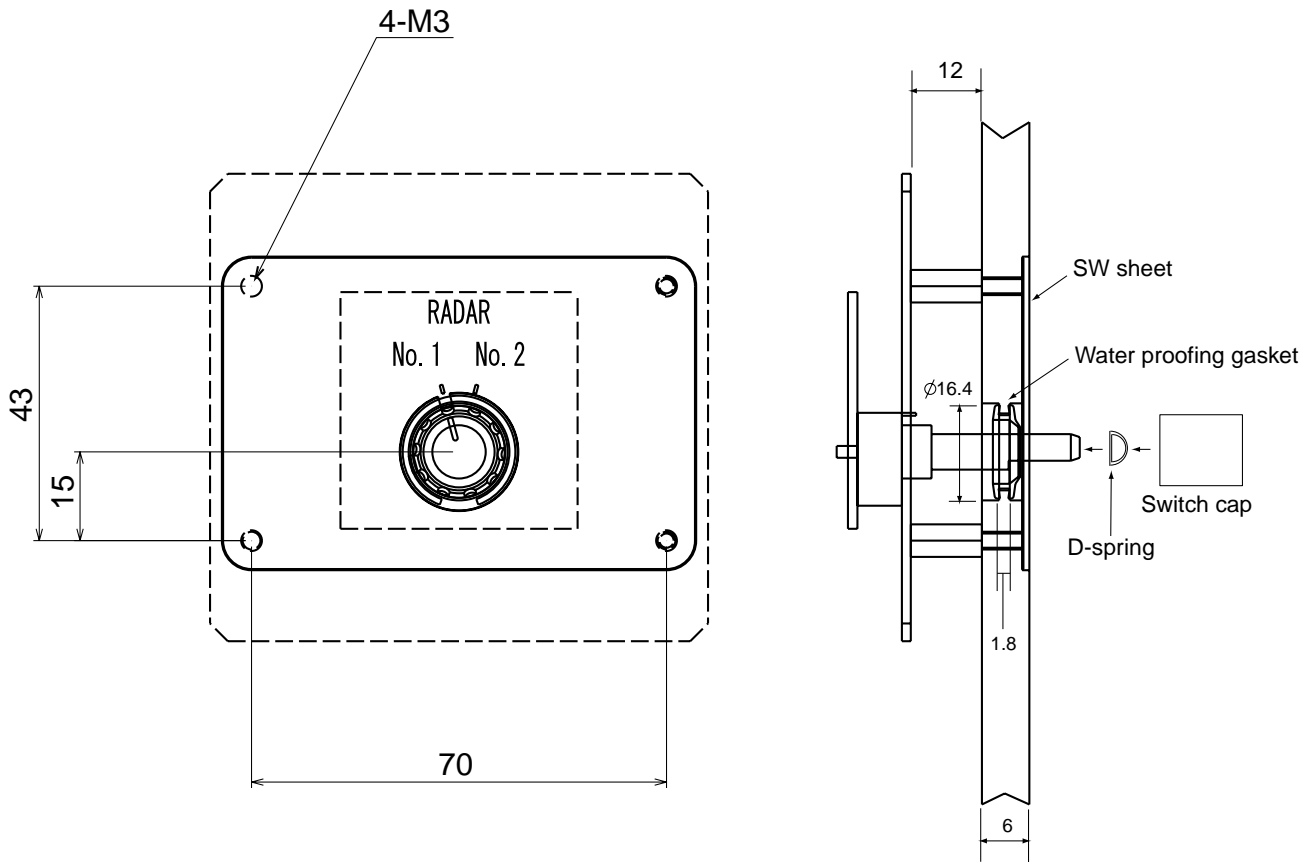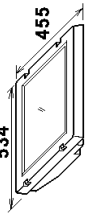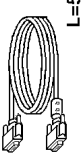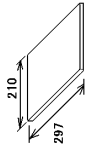
Radar selector

Connection

Connect cables as below.

PACKING LIST

03GR-X-9852 -6　1/1

A-2

MU-231CE-DVI5

NAME		OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット	UNIT			
表示部		599 505	MU-231CE	1
DISPLAY UNIT			000-083-405-00	
予備品	SPARE PARTS			
予備品			SP03-14700	1
SPARE PARTS			008-549-730-00	
付属品	ACCESSORIES			
付属品			FP03-09810	1
ACCESSORIES			008-536-010-00	
工事材料	INSTALLATION MATERIALS			
DVIケーブル		L=5M	CABLE DIGITAL DVI 5M	1
DVI CABLE			999-999-137-00	(*1)
ケーブル組品		L=1.8M	00619-001	1
CABLE ASSEMBLY			000-171-765-10	
図書	DOCUMENT			
取扱説明書		210 297	OMC-41222-*	1
OPERATOR'S MANUAL			000-159-669-1*	

(*1)は、ダミーコードに付き、注文できません。
(*1)THIS CODE CANNOT BE ORDERED.

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
(略図の寸法は、参考値です。DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

03GR-X-9852

PACKING LIST

03GR-X-9851 -6　1/1

A-1

MU-201CE-DVI5

NAME		OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット	UNIT			
表示部		534 455	MU-201CE	1
DISPLAY UNIT			000-083-404-00	
予備品	SPARE PARTS			
予備品			SP03-14700	1
SPARE PARTS			008-549-730-00	
付属品	ACCESSORIES			
付属品			FP03-09810	1
ACCESSORIES			008-536-010-00	
工事材料	INSTALLATION MATERIALS			
DVIケーブル		L=5M	CABLE DIGITAL DVI 5M	1
DVI CABLE			999-999-137-00	(*1)
ケーブル組品		L=1.8M	00619-001	1
CABLE ASSEMBLY			000-171-765-10	
図書	DOCUMENT			
取扱説明書		210 297	OMC-41222-*	1
OPERATOR'S MANUAL			000-159-669-1*	

(*1)は、ダミーコードに付き、注文できません。
(*1)THIS CODE CANNOT BE ORDERED.

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。
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(略図の寸法は、参考値です。DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

03GR-X-9851

EC-1000C-21/28   EC-1000C-R-21/28

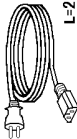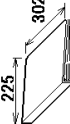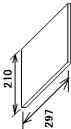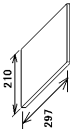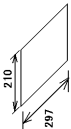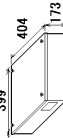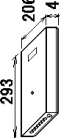| NAME	OUTLINE	DESCRIPTION/CODE	QTY
UNIT			
PROCESSOR UNIT	399 404 173	EC-1000C-* / 000-083-514-00 -**	1
ECDIS LAN ADAPTER	293 206 40	ECDIS LAN EC-1010 / 000-082-657-00	1
SPARE PARTS			
SPARE PARTS		SP03-14800 / 000-083-570-00	1
ACCESSORIES			
PS/2	140	00301P010415100 / 000-164-999-00	1
PS/2 KEYBOARD/MOUSE Y CABLE			
MOUSE	118	LYNX M9 MOUSE / 000-165-011-00	1
KEY BOARD	445 145	KB-6864L5 / 000-165-065-00	1
CD-ROM	142 125	2450036 / 001-007-880-00	1
FD-ROM	98 97	2450037 / 001-007-880-00	1
CD-ROM	142 125	2450023 / 001-008-660-00	1
INSTALLATION MATERIALS		CP03-29100	
WASHER HEAD SCREW(B)	8 φ4	M4X8 C2700W MBNI2 / 000-163-200-10	14

NAME	OUTLINE	DESCRIPTION/CODE	QTY
MOUNTING PLATE	390	14-068-2081-2 / 100-321-552-10	2
OTHER INSTALLATION MATERIALS			
POWER CABLE	L=2.5M	K15031H5183BR / 000-164-998-00	1
DOCUMENT			
OPERATOR'S MANUAL	225 302	OM-41220* / 000-149-774-1*	1
OPERATOR'S GUIDE	210 297	OS*-41220* / 000-149-787-1*	1
INSTALLATION MANUAL	210 297	IM-41220* / 000-149-775-1*	1
DONGLE INFORMATION SHEET	210 297	999-999-095-0	1 (*1)

1. - [**]
CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIA
2 (*1)
"*1" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL

DIMENSIONS IN DRAWING FOR REFERENCE ONLY.

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

O3GR-29110

NAME	OUTLINE	DESCRIPTION/CODE	QTY

INSTALLATION MATERIALS

NAME	OUTLINE	DESCRIPTION/CODE	QTY
WIRE ASSEMBLY	L=2000	KPW-SB0.3-2PL200A / NKW-SB0.3-2PL200A / 000-152-257-11 / 000-152-257-10	1
+B WASHER HEAD SCREW(B)	8, φ4	MAX8 C2700W-MBNi2 / 000-163-200-10	14
MOUNTING PLATE	390	14-058-2081-2 / 100-321-552-10	2

OTHER INSTALLATION MATERIALS

NAME	OUTLINE	DESCRIPTION/CODE	QTY
POWER CABLE	L=2.5M	K1503H5183BR / 000-164-998-00	1

DOCUMENT

NAME	OUTLINE	DESCRIPTION/CODE	QTY
INSTALLATION MANUAL	210 × 297	IM-41220-* / 000-149-775-1*	1
OPERATOR'S MANUAL	225 × 302	OM-41220-* / 000-149-774-1*	1
OPERATOR'S GUIDE	210 × 297	OS-41220-* / 000-149-787-1*	1
DONGLE INFORMATION SHEET	210 × 297	999-999-085-0*	1 (*1)

UNIT

NAME	OUTLINE	DESCRIPTION/CODE	QTY
PROCESSOR UNIT	399, 404, 173	EC-1000C-CR-* / 000-083-517-00 **	1
ECDIS LAN	293, 206, 40	EC-101C / 000-010-105-00	1
ECDIS LAN ADAPTER		000-010-105-00	1
ECDIS B	293, 206	EC-102C / 000-010-107-00	1
ECDIS B ADAPTER			

SPARE PARTS

NAME	OUTLINE	DESCRIPTION/CODE	QTY
SPARE PARTS		SP03-148CC / 000-083-570-00	1

ACCESSORIES

NAME	OUTLINE	DESCRIPTION/CODE	QTY
KEY BOARD	445, 145	KB-6862LS / 000-165-065-00	1
MOUSE	118	LYNX M9 MOUSE / 000-165-011-00	1
PS/2	140	Q501P010415100 / 000-164-999-00	1
PS/2 KEYBOARD/MOUSE Y CABLE	142, 125	24500036- / 001-007-880-00	1
CD-ROM	142, 125	24500023- / 001-008-690-00	1
CD-ROM	98, 97	24500037- / 001-007-880-00	1
FD-ROM			1

1. - [*] "*1" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL

DIMENSIONS IN DRAWING FOR REFERENCE ONLY.

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

A-3

O3GR-X-9856

PACKING LIST

03GR-X-9855 -0 1/1

RCU-015FEA-E

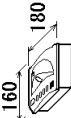| NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
操作部 CONTROL UNIT	160 / 180	RCU-015FEA-E 000-082-663	1
付属品 ACCESSORIES			
付属品 ACCESSORIES		FP03-09860 008-535-690	1
工事材料 INSTALLATION MATERIALS			
工事材料 INSTALLATION MATERIALS		CP03-25604 008-539-850	1

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)
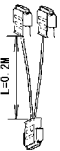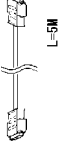
03GR-X-9855

PACKING LIST

03GR-X-9854 -1 1/1

RCU-018-E

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
操作部 CONTROL UNIT	180 / 398	RCU-018-E 000-082-662	1
付属品 ACCESSORIES			
付属品 ACCESSORIES		FP03-09850 008-535-610	1
工事材料 INSTALLATION MATERIALS			
工事材料 INSTALLATION MATERIALS		CP03-25604 008-539-850	1

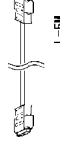(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

03GR-X-9854

FURUNO — SPARE PARTS LIST FOR

CODE NO. 008-549-730 03GR-X-9302 -3 1/1
TYPE SP03-14700 BOX NO. P

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	PER VES	SPARE	REMARKS/CODE NO.
1	ヒューズ FUSE	20 φ5	FGMB 250V 2A PBF / FGMB 2A 250V			4	000-157-497-10 / 000-122-000-00

MFR'S NAME FURUNO ELECTRIC CO., LTD. DWG NO. 03GR-X-9302 1/1

（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）
型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

FURUNO — SPARE PARTS LIST FOR

CODE NO. 000-083-570 03GR-X-9301 -2 1/1
TYPE SP03-14800 BOX NO. P

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	PER VES	SPARE	REMARKS/CODE NO.
1	ヒューズ FUSE	20 φ5	FGMB 250V 5A PBF			4	000-157-570

MFR'S NAME FURUNO ELECTRIC CO., LTD. DWG NO. 03GR-X-9301 1/1

（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO 工事材料表 / INSTALLATION MATERIALS (03GR-X-9406)

CODE NO.	000-083-507-00	03GR-X-9406 -4
TYPE	CP03-29600	1/1

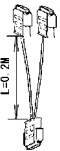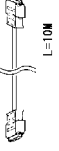| 番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	コネクタ組品 CONNECTOR ASSY.	L=0.2M	DSUB9P3-A / DSUB9P3-A CODE NO. 000-150-677-11 / 000-150-677-00	1	
2	コネクタ組品 CONNECTOR ASSY.	L=0.2M	DSUB9P3-B / DSUB9P3-B CODE NO. 000-150-678-11 / 000-150-678-00	1	
3	コネクタ組品 CONNECTOR ASSY.	L=5M	DSUB9P-DSUB9P-L5.0M / DSUB9P-DSUB9P-L5.0M CODE NO. 000-150-675-11 / 000-150-675-00	2	
4	ケーブル組品 CABLE ASSY.	L=2M	P5E-4PTX-BL CODE NO. 000-164-634-10	1	

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
(略図の寸法は、参考値です。) DIMENSIONS IN DRAWING FOR REFERENCE ONLY.

FURUNO ELECTRIC CO ., LTD.   03GR-X-9406

FURUNO 工事材料表 / INSTALLATION MATERIALS (03GR-X-9405)

CODE NO.	000-083-501-00	03GR-X-9405 -4
TYPE	CP03-29500	1/1

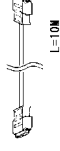| 番号 NO.	名称 NAME	略図 OUTLINE	型名/規格 DESCRIPTIONS	数量 Q'TY	用途/備考 REMARKS
1	コネクタ組品 CONNECTOR ASSY.	L=0.2M	DSUB9P3-A / DSUB9P3-A CODE NO. 000-150-677-11 / 000-150-677-00	1	
2	コネクタ組品 CONNECTOR ASSY.	L=5M	DSUB9P-DSUB9P-L5.0M / DSUB9P-DSUB9P-L5.0M CODE NO. 000-150-675-11 / 000-150-675-00	1	
3	ケーブル組品 CABLE ASSY.	L=2M	P5E-4PTX-BL CODE NO. 000-164-634-10	1	

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
(略図の寸法は、参考値です。) DIMENSIONS IN DRAWING FOR REFERENCE ONLY.

FURUNO ELECTRIC CO ., LTD.   03GR-X-9405

FURUNO 工事材料表 INSTALLATION MATERIALS

CODE NO.	000-083-508-00	03GR-X-9409 -2	1/1
TYPE	CP03-29610		

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	CODE NO.	数量 Q'TY	用途／備考 REMARKS
1	コネクタ組品 CONNECTOR ASSY.	L=0.2M	DSUB9P3-A DSUB9P3-A	000-150-677-11 000-150-677-00	1	
2	コネクタ組品 CONNECTOR ASSY.	L=0.2M	DSUB9P3-B DSUB9P3-B	000-150-678-11 000-150-678-00	1	
3	コネクタ組品 CONNECTOR ASSY.	L=10M	DSUB9P-DSUB9P-L10.0M DSUB9P-DSUB9P-L10.0M	000-150-676-11 000-150-676-00	2	
4	ケーブル組品 CABLE ASSY.	L=2M	P5E-4PTX-BL	000-164-634-10	1	

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
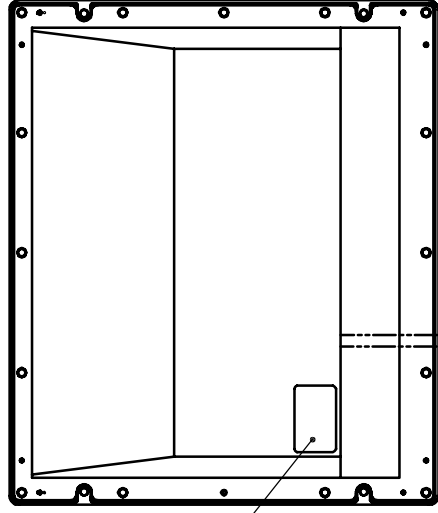（略図の寸法は、参考値です。） DIMENSIONS IN DRAWING FOR REFERENCE ONLY.

FURUNO ELECTRIC CO ., LTD.　　03GR-X-9409

FURUNO 工事材料表 INSTALLATION MATERIALS

CODE NO.	000-083-502-00	03GR-X-9408 -2	1/1
TYPE	CP03-29510		

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	CODE NO.	数量 Q'TY	用途／備考 REMARKS
1	コネクタ組品 CONNECTOR ASSY.	L=0.2M	DSUB9P3-A DSUB9P3-A	000-150-677-11 000-150-677-00	1	
2	コネクタ組品 CONNECTOR ASSY.	L=10M	DSUB9P-DSUB9P-L10.0M DSUB9P-DSUB9P-L10.0M	000-150-676-11 000-150-676-00	1	
3	ケーブル組品 CABLE ASSY.	L=2M	P5E-4PTX-BL	000-164-634-10	1	

型式/コード番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
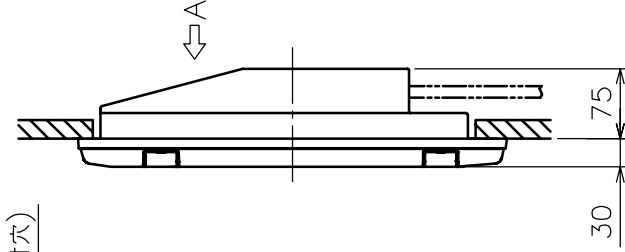（略図の寸法は、参考値です。） DIMENSIONS IN DRAWING FOR REFERENCE ONLY.

FURUNO ELECTRIC CO ., LTD.　　03GR-X-9408

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表 1 TABLE 1

寸法区分 (mm) DIMENSIONS	公差 (mm) TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3
500<L≦1000	±4

矢視A VIEW A

型式銘板
NAMEPLATE

下穴位置（4箇所）
PILOT HOLES (4 PLACES)

405
296±1
46

(63)
506±1
482

取付穴寸法図
CUTOUT DIMENSIONS

75
30

⇦A

4-φ8(取付穴)
FIXING HOLES

454
296±1
(79)

506±1
534

電源コネクタ
POWER CONNECTOR

注 記　1）指定外の寸法公差は表1による。
　　　　2）取付用ネジは＋トラスタッピンネジ6×30を使用のこと。

NOTE　1.　TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
　　　　2.　USE SELF-TAPPING SCREWS 6x30 FOR FIXING THE UNIT.

DRAWN	Jun 17,'05	E. MIYOSHI	FCR-2107 series			
CHECKED		TAKAHASHI. T	FEA-2107			
APPROVED		Y. Hatai				
SCALE	1/8	MASS 10	±10% kg			
DWG.No.	C4122-G08-B				24-005-2006-0	

TITLE　MU-201CE
名称　表示部（埋込装備）
外寸図
NAME　MONITOR UNIT (FLUSH MOUNT)
OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

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表 1 TABLE 1

寸法区分 (mm) DIMENSIONS	公差 (mm) TOLERANCE
L≤50	±1.5
50<L≤100	±2.5
100<L≤500	±3
500<L≤1000	±4

矢視 A
VIEW A

下穴位置（4箇所）
PILOT HOLES (4 PLACES)

469
313±1
(98)
70

570±1

546

取付穴寸法図
CUTOUT DIMENSIONS

型式銘板
NAMEPLATE

⇦A

75

30

4-ø8(取付穴)
FIXING HOLES

505
313±1
(96)

電源コネクタ
POWER CONNECTOR

570±1
598

TITLE	MU-231CE
名称	表示部 (埋込装備)
	外寸図
NAME	MONITOR UNIT (FLUSH MOUNT) OUTLINE DRAWING

DRAWN	Jun 17,'05	E. MIYOSHI	FCR-2807 series
CHECKED	TAKAHASHI.T		FEA-2807
APPROVED	Y. Hatai		
SCALE	1/8	MASS 15 ±10% kg	24-005-210G-0
DWG.No.	C4123-G02-B		

注記 1) 指定外の寸法公差は表1による。
2) 取付用ネジは＋トラスタッピンネジ6×30を使用のこと。

NOTE 1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. USE SELF-TAPPING SCREWS 6x30 FOR FIXING THE UNIT.

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FURUNO
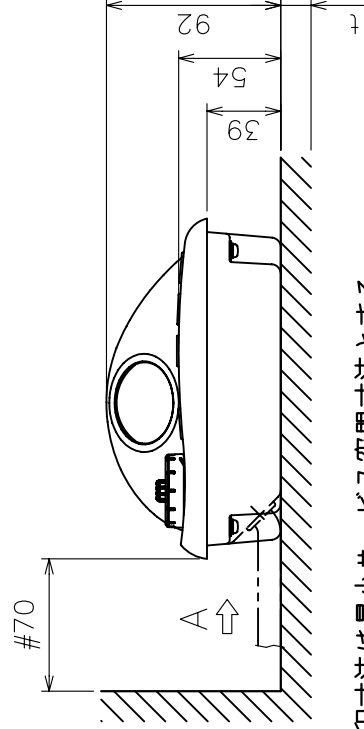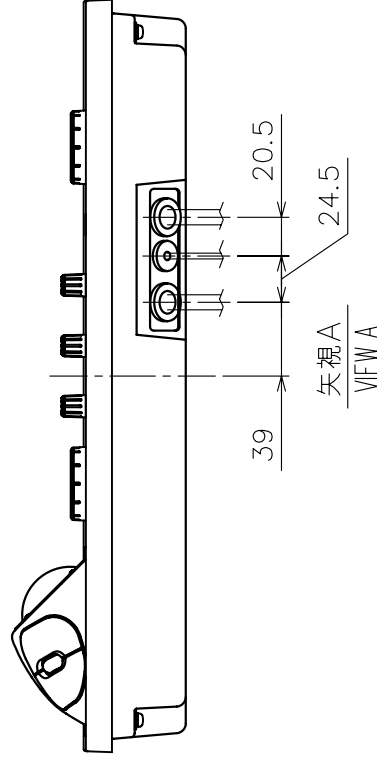
トラックパイロット部用ケーブル（オプション）
TRACKPILOT CABLE (OPTION)

リモート操作部用ケーブル（オプション）
REMOTE CONTROL CABLE (OPTION)

制御部用ケーブル
CONTROL CABLE

4-M4（取付穴）
FIXING HOLES

180
136±1
308±1
398

型式銘板
NAMEPLATE

ON OFF VRM
MOB EVENT TARGET DATA
MENU + RANGE -
GAIN
3/JKL MODE 6/MNO RECORD
2/ABC BRILL 5/AKL SCROLL 8/TUV MONITOR SHIFT HELP
0/←」 A/B/M
1 MARK 4/GHI PLAN 7/PQRS SENSOR CANCEL
A/C RAIN A/C SEA
F1 F2 STD DSP RADAR
ON OFF EBL
ALARM ACK SYSTEM FAILURE

矢視A
VIEW A

20.5
24.5
39

92
54
39
t

#70

A

表1 TABLE1

寸法区分（mm）DIMENSIONS	公差（mm）TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

注 記 1） #印寸法は最小サービス空間寸法とする。
2） 指定外の寸法公差は表1による。
3） 取付にはセムスネジB（M4x12）を使用のこと。取付板厚（t）は2≦t≦4とする。
それ以外はネジ長さを（t+7.8）±2とする。

NOTE 1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE SEMS-B SCREWS (M4x12) FOR FIXING THE UNIT.
THICKNESS (t): 2≦t≦4 OR SCREW LENGTH: t+7.8±2.

DRAWN	Sep. 29 '06 E. MIYOSHI		TITLE	RCU-018
CHECKED	TAKAHASHI. T		名称	操作部（卓上装備）
APPROVED	Y. Hatai	FEA-2107 SER.		外寸図
SCALE	1/4	MASS 3.7 ±10% kg 質量はケーブル（10m²）を含む MASS W/10m CABLE	NAME	CONTROL UNIT (TABLETOP MOUNT) OUTLINE DRAWING
DWG.No.	C4122-G03-B	24-005-750G-1		

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表1 TABLE 1

寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3
500<L≦1000	±4

信号コネクタ
SIGNAL CONNECTOR

背面図
REAR VIEW

ファン
FAN

電源コネクタ
POWER CONNECTOR

アース端子
GND TERMINAL

#100

532
410
399
(122)

CDドライブ
CD DRIVE

176
173
#100
404
470
440±1
150±1
150±1
52
#100

取付穴
6-φ8
FIXING HOLES

型式銘板
NAMEPLATE

注 記
1) #印寸法は最小サービス空間寸法とする。
2) 指定外の寸法公差は表1による。
3) 取付用ネジはM6ボルトまたはコーチボルト呼び径6を使用のこと。
4) 装備ケーブルはサービス時、本体を前方に十分引き出せるよう余裕を持たせること。

NOTE
1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE M6 BOLTS OR COARCH SCREWS φ6 FOR FIXING THE UNIT.
4. KEEP SUFFICIENT CABLE LENGTH BEHIND THE UNIT FOR MAINTENANCE.

DRAWN	24/Apr/08	T.YAMASAKI		
CHECKED	25/Apr/08	R.Esumi		
APPROVED	28/Apr/08	T.TAKENO	FEA-2107	
SCALE	1/6	MASS 17	±10% kg	
DWG.No.	C4122-G01-D	REF.No.	24-005-5000-2	

TITLE EC-1000C
名称 制御部 (床置装備)
外寸図
NAME PROCESSOR UNIT (FLOOR MOUNT)
OUTLINE DRAWING

表1 TABLE 1

寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
L≤50	±1.5
50<L≤100	±2.5
100<L≤500	±3

170±0.5

型式銘板
NAMEPLATE

4-φ5 取付穴
FIXING HOLES

255±0.5

42

36

4

293

20

#150

アース端子
GND TERMINAL

#50

206

#50

ケーブル導入口
CABLE ENTRY

注 記　1)　#印寸法は最小サービス空間寸法とする。
　　　　2)　指定外の寸法公差は表1による。
　　　　3)　取付用ネジはトラスタッピンネジ呼び径4×20を使用のこと。

NOTE　1.　#: MINIMUM SERVICE CLEARANCE.
　　　　2.　TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
　　　　3.　USE SELF-TAPPING SCREWS φ4x20 FOR FIXING THE UNIT.

DRAWN Mar. 26 '07 T.YAMASAKI		TITLE EC-1010
CHECKED Mar. 26 '07 T.TAKENO		名称 ECDIS LANアダプタ
APPROVED Mar. 28 07 R.Esumi	FEA-2107ser.	外寸図
SCALE 1/3	MASS 1.8 ±10% kg	NAME ECDIS LAN ADAPTER
DWG No. C4122-G02- C	REF. No. 24-005-300G-2	OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

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表1 TABLE 1

寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

170±0.5

型式銘板
NAMEPLATE

4-φ5 （取付穴）
FIXING HOLES

255±0.5

42

36

4

293

20

#150

アース端子
GND TERMINAL

#50　206　#50

ケーブル導入口
CABLE ENTRY

注記　1)　#印寸法は最小サービス空間寸法とする。
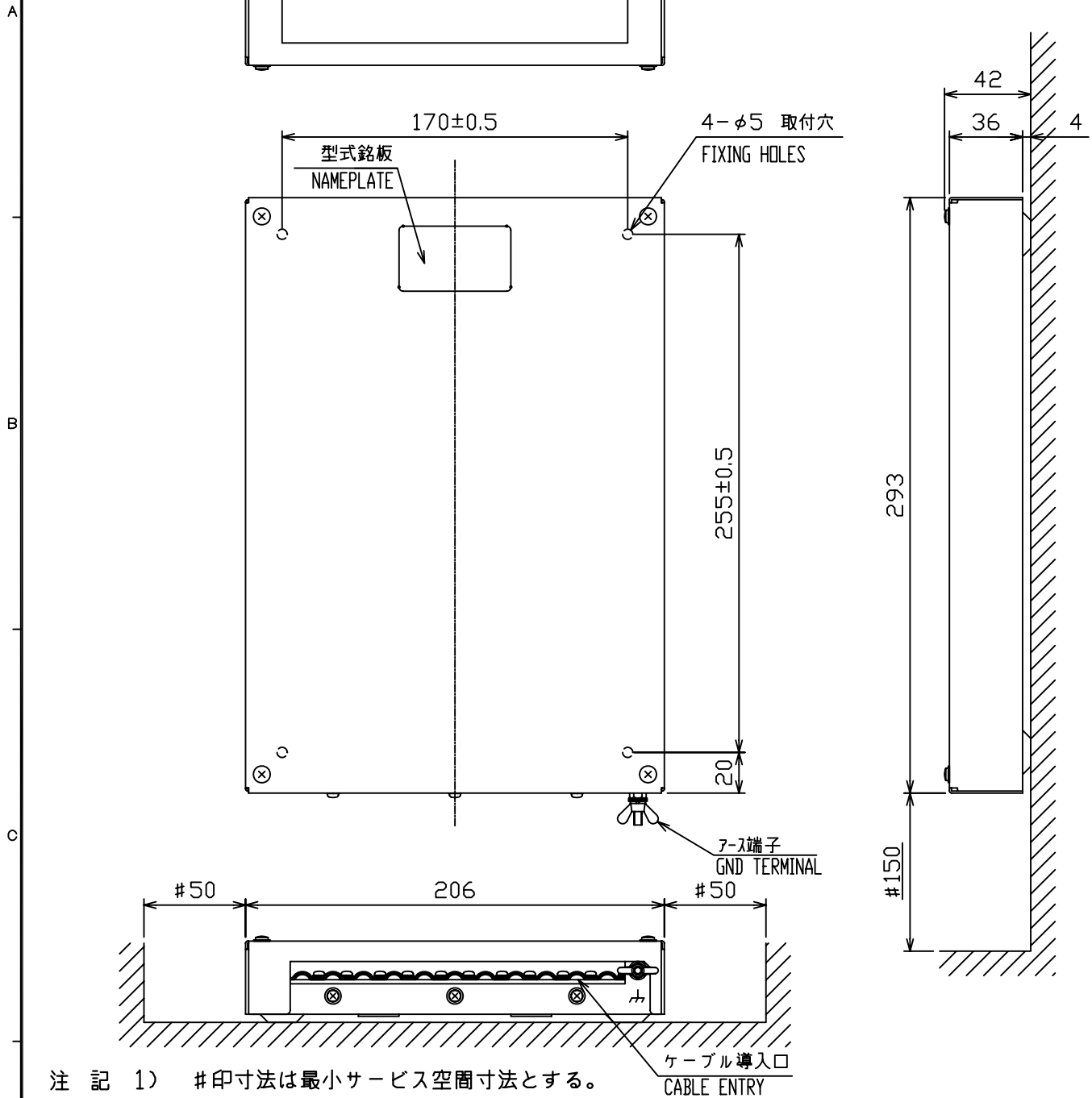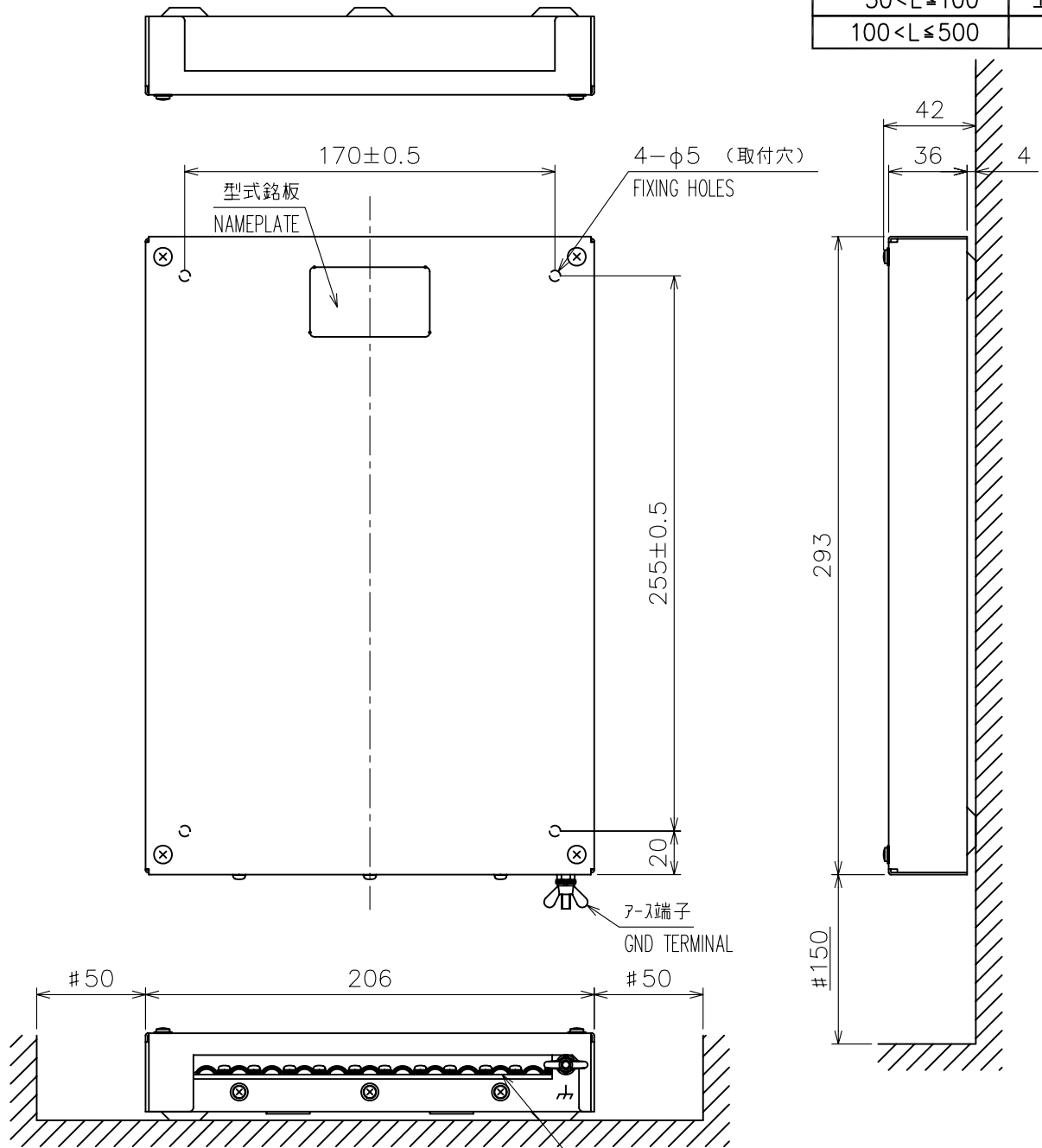2)　指定外の寸法公差は表1による。
3)　取付用ネジはトラスタッピンネジ呼び径4×20を使用のこと。

NOTE　1.　#: MINIMUM SERVICE CLEARNCE.
2.　TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3.　USE SELF-TAPPING SCREWS ø4x20 FOR FIXING THE UNIT.

DRAWN Mar. 26 '07 T.YAMASAKI		TITLE EC-1020
CHECKED Mar. 26 '07 T.TAKENO		名称 ECDIS Bアダプタ
APPROVED Mar. 28 '07 R. Esumi	FEA-2105/2107ser.	外寸図
SCALE 1/3 MASS 1.9 ±10% kg		NAME ECDIS B-ADAPTER
DWG.No. C4120-G06- C	REF.No. 24-005-310G-2	OUTLINE DRAWING

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FURUNO ELECTRIC CO., LTD.

表 1 TABLE 1

寸法区分（mm） DIMENSIONS	公差（mm） TOLERANCE
L ≦ 50	± 1.5
50 < L ≦ 100	± 2.5
100 < L ≦ 500	± 3

トラックパイロット部用ケーブル（オプション）
TRACKPILOT CABLE (OPTION)

リモート操作部用ケーブル（オプション）
REMOTE CONTROL CABLE (OPTION)

制御部用ケーブル
CONTROL CABLE

4-M4（取付穴）
FIXING HOLES

180

136±1

308±1

398

型式銘板
NAMEPLATE

20.5

24.5

39

矢視A
VIEW A

92

54

39

t

#70

A

注 記 1) #印寸法は最小サービス空間寸法とする。
2) 指定外の寸法公差は表1による。
3) 取付にはセムスネジB（M4x12）を使用のこと。取付板厚（t）は2≦t≦4とする。
それ以外はネジ長さを（t+7.8）±2とする。

NOTE 1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE SEMS-B SCREWS (M4x12) FOR FIXING THE UNIT.
THICKNESS (t): 2≦t≦4 OR SCREW LENGTH: t+7.8±2.

DRAWN	Sep. 29 '06 E. MIYOSHI		TITLE	RCU-018
CHECKED	TAKAHASHI. T		名称	操作部（卓上装備）
APPROVED	Y. Hatai	FEA-2107 SER.		外寸図
SCALE	1/4	MASS 3.7 ±10% kg	NAME	CONTROL UNIT (TABLETOP MOUNT)
DWG.No.	C4122-G03-B			OUTLINE DRAWING

質量はケーブル（10m³）を含む
MASS W/10m CABLE

24-005-750G-1

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表 1 TABLE 1

寸法区分(mm) DIMENSIONS	公差(mm) TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

2－φ6.5取付穴
FIXING HOLES

180

280±1

340

トラックパイロット部用ケーブル（オプション）
TO TRACK PILOT (OPTION)

リモート操作部用ケーブル（オプション）
TO REMOTE CONTROL UNIT (OPTION)

制御部用ケーブル
TO PROCESSOR UNIT

398

矢視A
VIEW A

矢視B
VIEW B

20.5

24.5

矢視D
VIEW D

39

86

A

B

195

179

50

8

#50

D
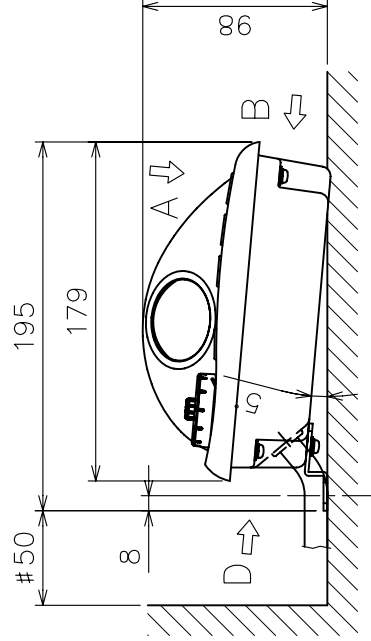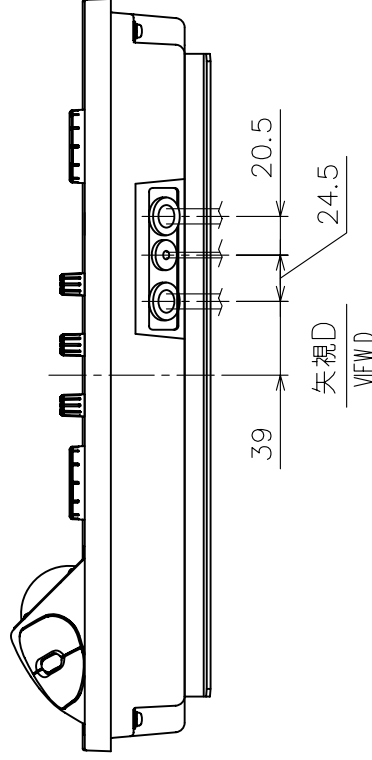
注記
1) #印寸法は最小サービス空間寸法とする。
2) 指定外の寸法公差は表1による。
3) 取付用ネジはトラスタッピンネジ呼び径6、またはM6ボルトを使用のこと。

NOTE
1. # MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE SELF-TAPPING SCREWS φ6 OR M6 BOLTS FOR FIXING THE UNIT.
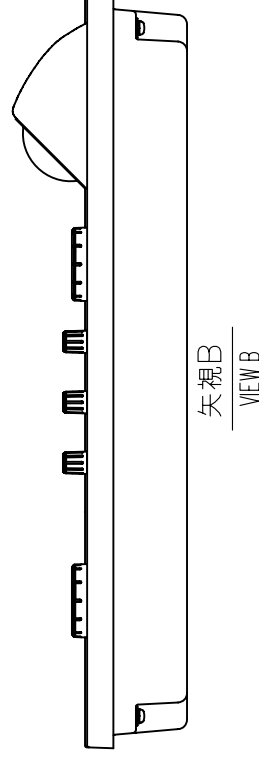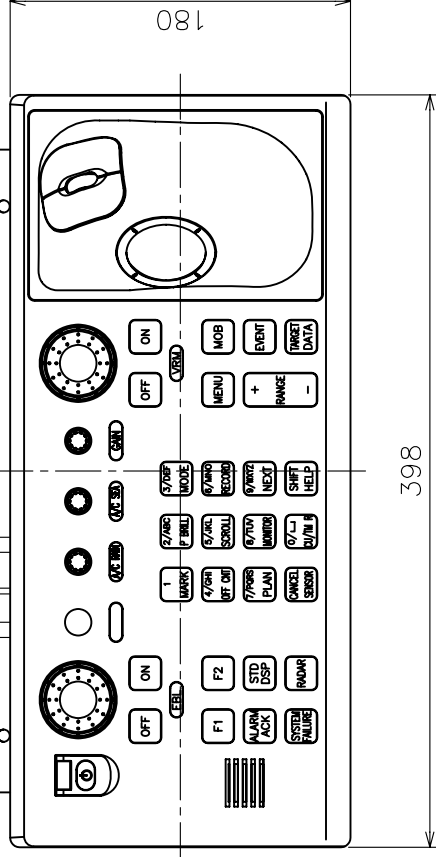
DRAWN Sep.29,'06	E. MIYOSHI	TITLE	RCU-018
CHECKED	TAKAHASHI. T	名称 操作部（取付金具装備）	
APPROVED	Y. Hatai	外寸図	
	FEA-2107	NAME	CONTROL UNIT (TABLETOP MOUNT W/FIXTURE)
SCALE 1/4	MASS 4.0 ±10% 質量はケーブル(10m)を含む kg MASS W/10m CABLE		OUTLINE DRAWING
DWG No.	C4122-G05- B	24-005-752G-1	

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FURUNO ELECTRIC CO., LTD.

トラックパイロット部用ケーブル（オプション）
TO TRACK PILOT (OPTION)

リモート操作部用ケーブル（オプション）
TO REMOTE CONTROL UNIT (OPTION)

制御部用ケーブル
TO PROCESSOR UNIT

216

180

339

398

388±2（開口寸法）
CUTOUT DIMENSION

矢視 A
VIEW A

(P)

92

53

#100

#70

170±2（開口寸法）
CUTOUT DIMENSION

A

表 1 TABLE 1

寸法区分（mm）DIMENSIONS	公差（mm）TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

注 記　1）#印寸法は最小サービス空間寸法とする。
　　　　2）指定外の寸法公差は表1による。
　　　　3）壁の厚さ（P）は最大20とする
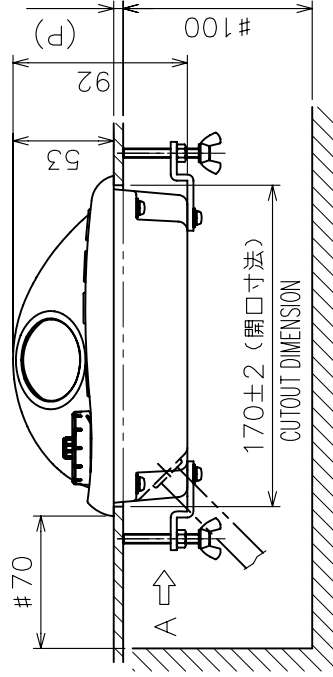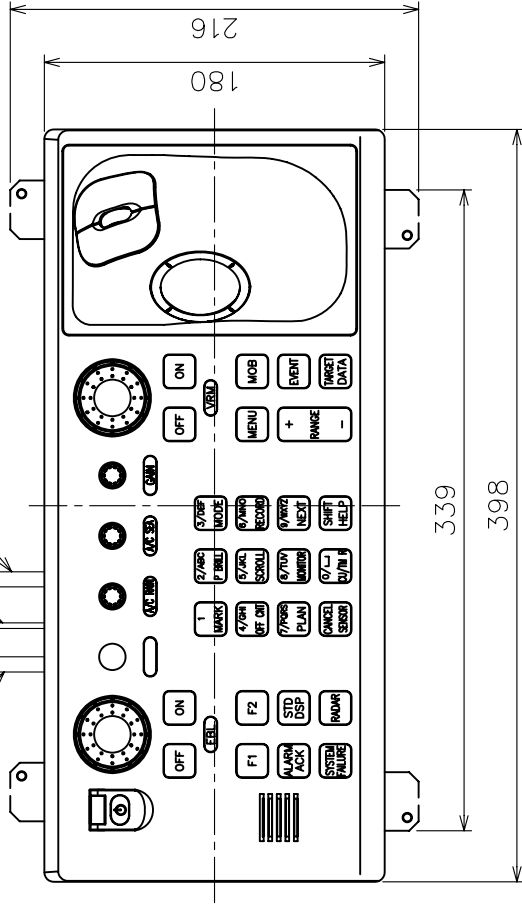
NOTE　1.　#: MINIMUM SERVICE CLEARANCE.
　　　　2.　TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
　　　　3.　THICKNESS (P) IS 20 MM MAX.

DRAWN	Sep. 29, '06	E. MIYOSHI
CHECKED		TAKAHASHI. T
APPROVED		Y. Hatai

FEA-2107

±10% 質量はケーブル（10m）を含む
MASS W/10m CABLE

MASS　3.8　kg

SCALE　1/4

DWG.No.　C4122-G07-B

24-005-751G-1

TITLE　RCU-018
名称　操作部（埋込装備）
　　　外寸図
NAME　CONTROL UNIT (FLASH MOUNT)
OUTLINE DRAWING

FURUNO

S-1

ECDIS INTERCONNECTION DIAGRAM — FEA-2107/2807 電子海図システム 相互結線図

Major units shown: 表示部 MONITOR UNIT MU-201CE(FEA-2107) / MU-231CE(FEA-2807) (ECDIS DISPLAY), CONTROL UNIT RCU-018 操作部, 表示部 MONITOR UNIT (CONNING DISPLAY), 演算部 PROCESSOR UNIT EC-1000C, DIGITIZER, RADAR OVERLAY TYPE 301074, レーダー RADAR, SWITCHING HUB HUB-100, LANアダプタ LAN ADAPTER EC-1010, Bアダプタ B ADAPTER EC-1020, 整流器 RECTIFIER PR-62.

Power inputs: 100-230VAC, 1φ, 50/60Hz ; 100/110/220/230VAC, 1φ, 50/60Hz ; 24VDC.

注記
*1) 造船所手配。
*2) オプション。
*3) LAN1ポートを他のECDIS/レーダーのLANポートと直接つなぐ場合は、クロスケーブルを使用すること。
*4) ロータ電圧により切替。R1H:90-135V、R1L:90V以下。

NOTE
*1: SHIPYARD SUPPLY.
*2: OPTION.
*3: USE A CROSS LAN CABLE WHEN LAN1 PORT IS CONNECTED TO ANOTHER ECDIS/RADAR LAN PORT DIRECTLY.
*4: EXCHANGE AS ROTOR VOLTAGE: R1H:90-135V, R1L: WITHIN 90V.

DRAWN	18/Aug/'09 T. YAMASAKI	
CHECKED	18/Aug/'09 T. TAKENO	
APPROVED	21/Aug/'09 R. Esumi	
SCALE	MASS	
DWG. No. C4122-C01- H	REF. No. 24-005-6001-0	

TITLE: FEA-2107/2807
名称: 電子海図システム 相互結線図
NAME: ECDIS INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.

S-2

FURUNO

FURUNO ELECTRIC CO., LTD.

PROCESSOR UNIT
制御部
EC-1000C-R
or
EC-1000C-CR

レーダー切換器　CP03-29501 (12V仕様) /29502 (24V仕様)
RADAR SWITCH

レーダー切換器　CP03-29503/29504
RADAR SWITCH

レーダー切換基板 *1
RADAR SELECTOR BOARD
14P0336A (12V)
14P0336B (24V)

RSS | 14P0336

J206 (XH12P)

1 GND
2 HDG
3 GND
4 BEARING
5 GND
6 TRIG
7 GND
8 VIDEO
9 SEL-1
10 SEL-2E
11 GND
12 +12V

J17 RADAR
D15 MALE
NC 1
NC 2
ANT HL- 4
ANT HL+ 11
ANT AZ- 3
ANT AZ+
NC 8
NC 9
NC 10
TYPE1- 13
TYPE2- 14
TYPE3- 15
TYPE1+ 5
TYPE2+ 6
TYPE3+ 7

J16 TRIG
BNC-J
J15 VIDEO
BNC-J

24S0117
XH12P-DSUB15BNC2, 2.4m

J202 (XH8P)
1 GND
2 HDG
3 GND
4 BEARING
5 GND
6 TRIG
7 GND
8 VIDEO

J203 (XH8P)
1 GND
2 HDG
3 GND
4 BEARING
5 GND
6 TRIG
7 GND
8 VIDEO

No. 1 レーダー
No. 1 RADAR

No. 2 レーダー
No. 2 RADAR

XH8P-NH8P-L, 10/20/30 m *2
XH-8P-NH8P-L, 10/20/30 m *2

J201
1 12V (24V)
2 NC
3 GND 12V (24V)
XH3P-2P-L2000, 2m
12/24VDC

J205 (XH10P)
1 SEL-2E
2 GND
3 SEL-3E
4 NC
5 SEL-2R
6 SEL-3R
7 GND
8 NC
9 +12V
10 GND

レーダー切換スイッチ
RADAR SELECTOR
J401
RSW | 14P0335

XH5P-XH10P, 3m

レーダー切換スイッチ
RADAR SELECTOR

NOTE
*1. CHOOSE SPECIFICATON FOR 12 OR 24VDC.
*2. OPTION.

注記
*1) 12/24V仕様を選択。
*2) オプション。

TITLE　FEA-2107/2807　(CP03-29501/29502)
名称　レーダー切換器
相互結線図
NAME　RADAR SWITCH
INTERCONNECTION DIAGRAM

DRAWN　MAR. 28, '05　E. MIYOSHI
CHECKED　TAKAHASHI. T
APPROVED　Y. Hatai

DWG. No.　C4122-C03- B