OS-650-XXX-MP7600-KM05-Deep Line

Maintenance Manual

Kongsberg Maritime Part no.
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OS-650-HiPAP: 306228
OS-650-DP: P79000/308092
OS-650-TC: P79300
OS-650-AUT: P80000
OS-650-AUT with CANBUS: P80100
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OS-650-General: P80300
OS-650-Safety: P80500

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Note

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Comments

To assist us in making improvements to the product and to this manual, we welcome comments and constructive criticism.
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1 HARDWARE DESCRIPTION

This section describes the OS-650-XXX-MP7600-KM05-Deep Line hardware configuration for the part numbers listed on the front of this document.

Note

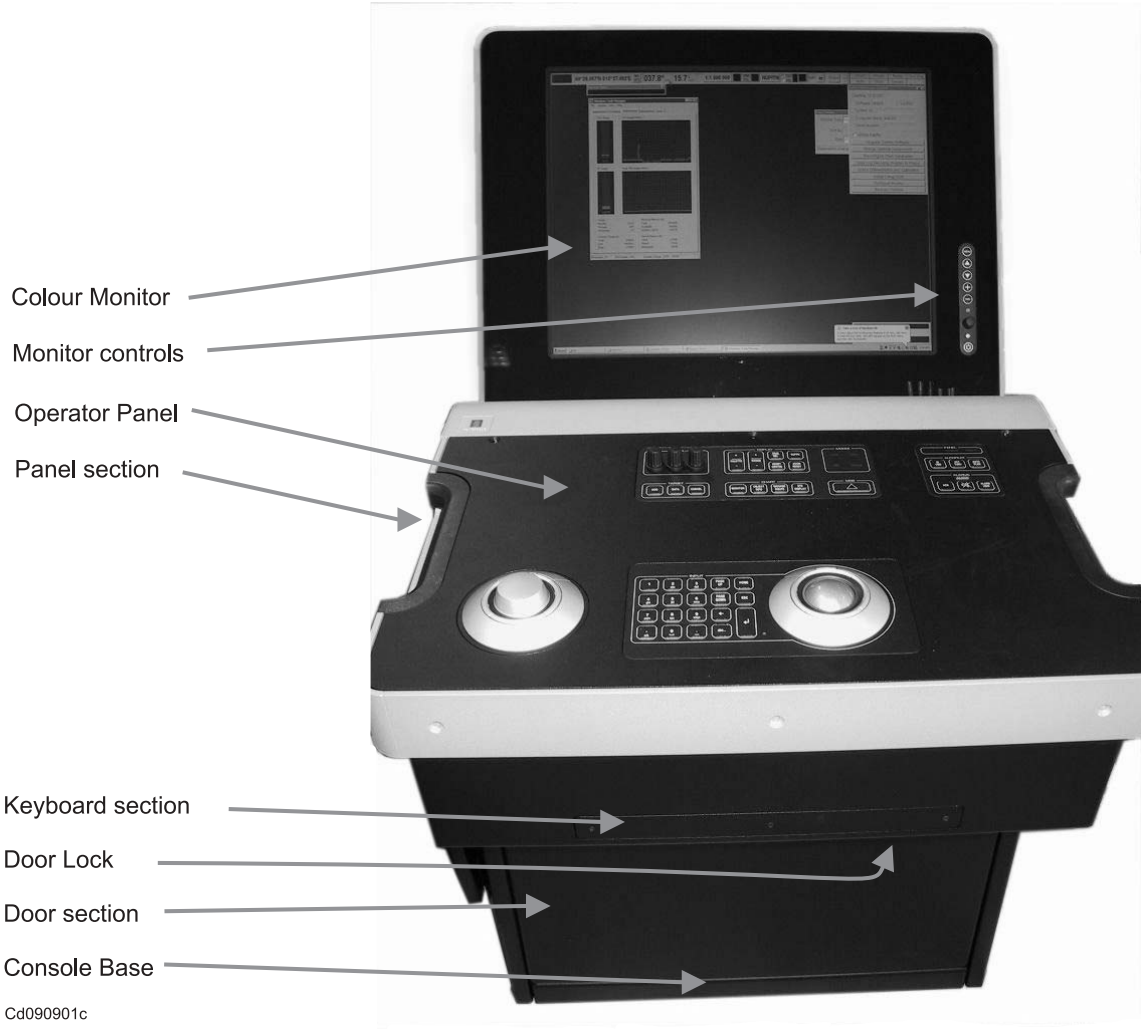
When multiple part numbers are listed for a console, the first part number represents the maximum configuration and the subsequent part numbers represent specific variants.

The OS console comprises a Colour Monitor, an Operator Panel, a Door section with computer attached, a Keyboard section and a Console base.

Access to the computer is obtained by turning the door lock and opening the Operator Station (OS) door. The hardware modules (main mounting plate and side mounting plate) are located inside the OS. An Keyboard section is located on the front of the Operator panel, see Figure 1.

Access to the console base is from inside the OS.

Figure 1 Typical Operator Station, OS-650-XXX-MP7600-KM05-Deep Line console



1.1 Operator Interfaces

1.1.1 Colour monitor

A high-resolution 20" (not for NAV) or 23" TFT colour monitor provides the main graphic display for presentation of data. The signal cable is connected to the graphic interface (VGA port) of the computer.

1.1.2 Operator panel

The Operator panel provides several controls and functions for the different console types. Depending on configuration, the content of the panel system may vary; i.e. different panel types, alphanumeric Keyboard, Heading wheel panel or Joystick panel.

When installed they are all interfaced via the Input panel in the Operator panel. The Input panel is connected to the computer via an USB cable.

Available panel groups are described in sections below.

1.1.2.1 BU-xxx panels

Note

The xxx identifies the system, i.e. DP, TC, NAV, AUT, GEN etc.

The Business Unit (BU) panel is dedicated to each system, contains different buttons and lamps, and is located in the Operator panel. The BU-xxx panel is connected to the Input panel.

1.1.2.2 ALC panels

The Alarm and Command (ALC) panel is dedicated to each system, contains buttons and lamps, and is located in the Operator panel. There is a special version for Navigation (NAV) called: ALC NAV panel. Both ALC panel versions are connected to the Input panel.

1.1.2.3 Heading wheel panel

The Operator panel may provide a Heading wheel with associated buttons, depending on the system supported, to increase or decrease the heading setpoint. The Heading wheel panel is connected to the Input panel.

1.1.2.4 Input panel

The Input panel is dedicated to each system, contains buttons and is located in the Operator panel. The Input panel is the interface for the Panels and alphanumeric Keyboard located in the Operator panel. The Input panel is connected to the computer via an USB serial line.

1.1.2.5 Joystick panel

The Operator panel may provide a three-axis joystick control to control the thrust demand in the surge, sway and yaw axes when these axes are under manual control. The Joystick panel is connected to the BU-DP or the BU-TC panel.

1.1.3 Operator panel types

The Operator panel types are as follows:

- NAV Operator panel (for Navigation systems)
- DP Operator panel (for Dynamic Positioning systems)
- TC or DP Operator panel (for Thruster Control systems)

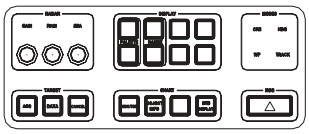
- AUT Operator panel (for Automation (with Canbus, History Station, or Safety) systems)
- General Operator panel (for general use)

The different layouts are displayed in sections below.

1.1.3.1 NAV Operator panel

For NAV systems the following panel types are used as shown in figure below:

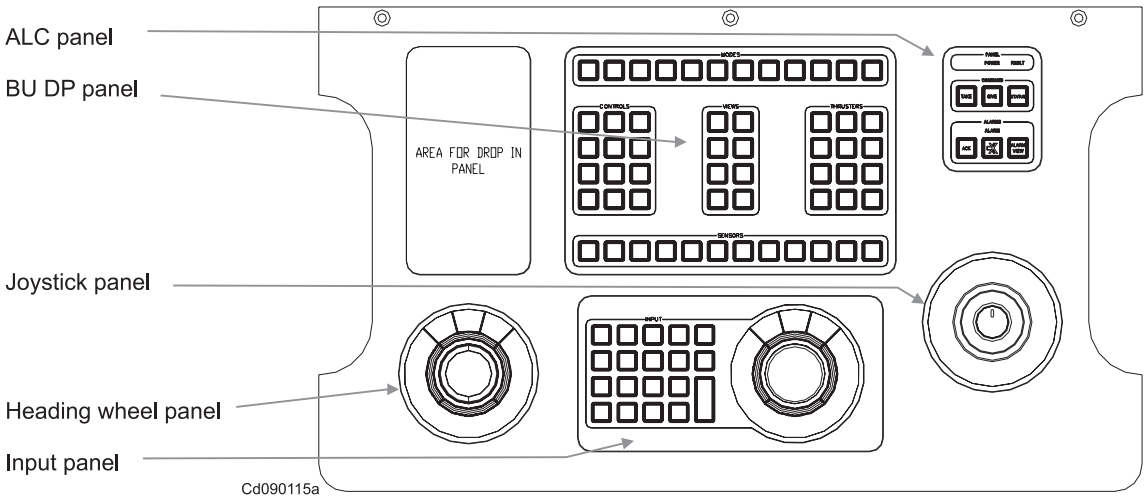
Figure 2 Layout of NAV Operator panel



1.1.3.2 DP Operator panel

For Dynamic Positioning systems the following panel types are used as shown in figure below:

Figure 3 Layout of DP Operator panel



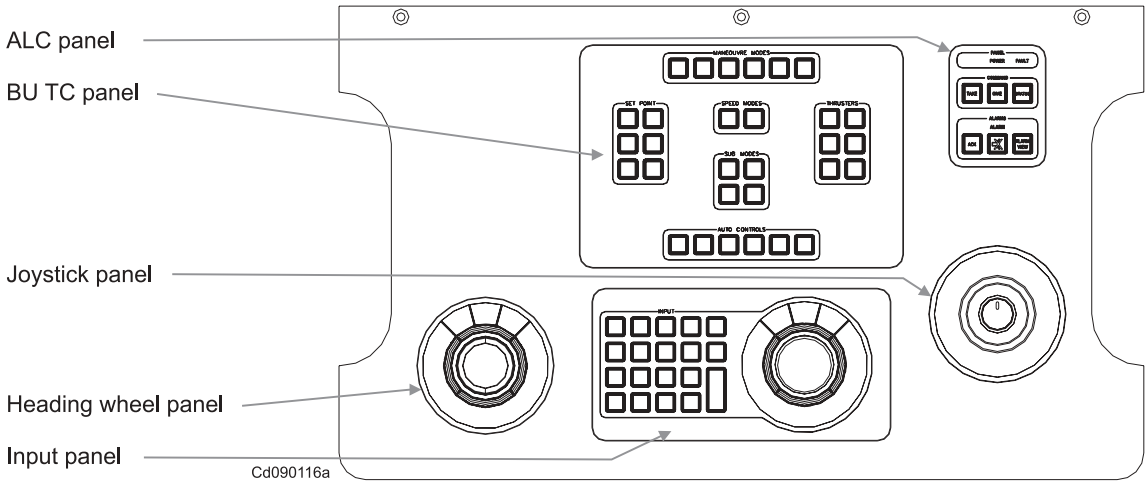
BU-DP panel	contains the following groups; Modes, Control, Views, Thrusters, Sensors for DP commands.
ALC panel	contains the following groups; Panel, Command and Alarms and are used for fault indication, command transfer, and alarm and administration.
Heading wheel panel	mainly used for setting or changing new heading for DP systems.
Input panel	is a general panel for VDU navigation on bridge systems, using alphanumeric keypad and Trackball.
Joystick panel	is used as a Joystick control for the DP system.

1.1.3.3 TC Operator panel

Dynamic Positioning operations in conjunction with Thruster Control (TC) may be performed by use of either the BU-TC panel or the BU-DP panel.

For TC systems the following panel types are used as shown in figure below: (however BU-DP panel may also be used as shown in Figure 3).

Figure 4 Layout of TC Operator panel (example with BU-TC panel)

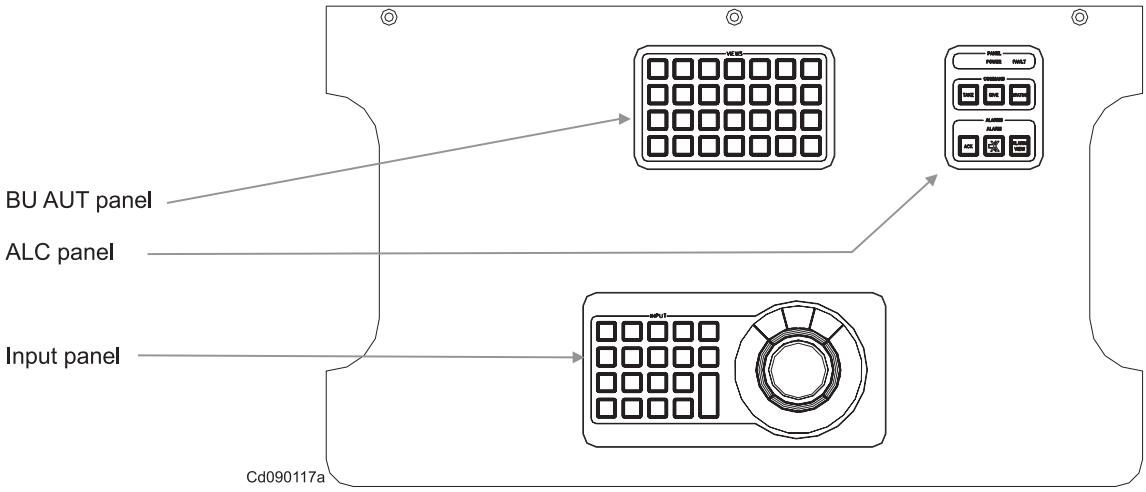


BU-TC panel	contains the following groups; Manoeuvre Modes, Set Point, Speed Modes, Sub Modes, Thrusters, Auto Controls for DP commands.
ALC panel	contains the following groups; Panel, Command and Alarms and are used for fault indication, command transfer, and alarm and administration.
Heading wheel panel	mainly used for setting or changing new heading for DP systems.
Input panel	is a general panel for VDU navigation on bridge systems, using alphanumeric keypad and Trackball.
Joystick panel	is used as a Joystick control for the DP system.

1.1.3.4 AUT Operator panel

For Automation systems the following panel types are used as shown in figure below:

Figure 5 Layout of AUT Operator panel

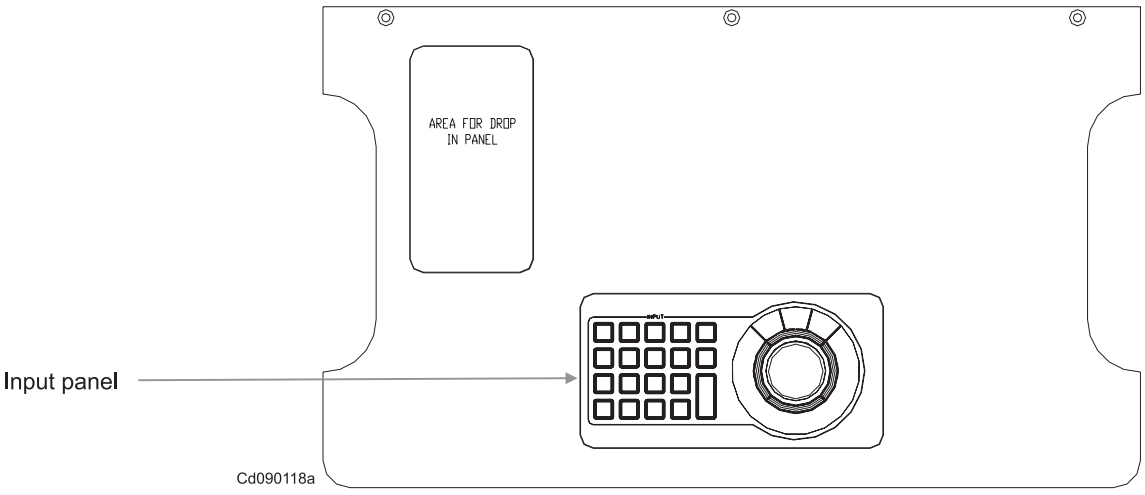


BU-AUT panel	contains the View group as alarm panel for Automation systems.
ALC panel	contains the following groups; Panel, Command and Alarms and are used for fault indication, command transfer, and alarm and administration.
Input panel	is a general panel for VDU navigation on bridge systems, using alphanumeric keypad and Trackball.

1.1.3.5 General/HiPAP Operator panel

For General/HiPAP systems the following panel types are used as shown in figure below:

Figure 6 Layout of General Operator panel

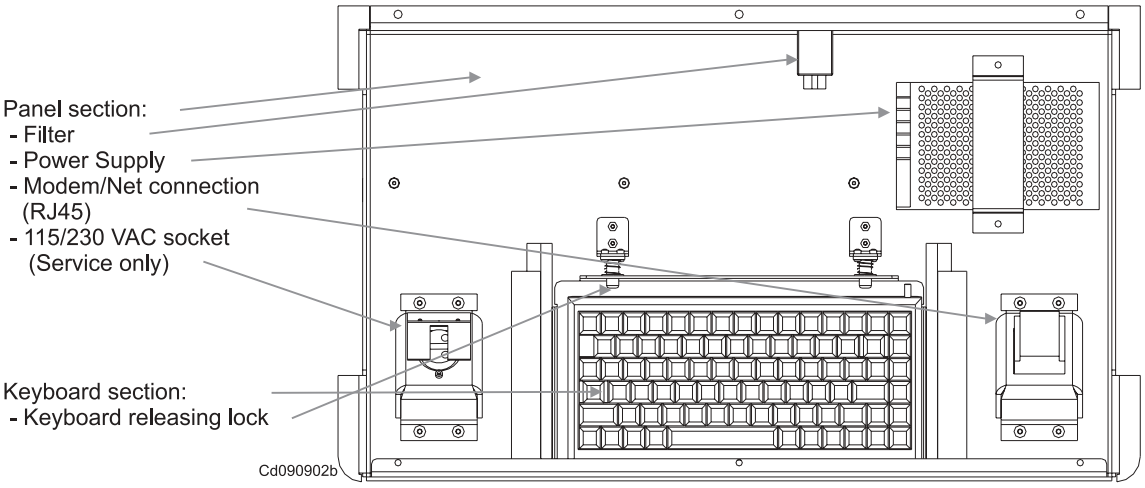


Input panel	is a general panel for VDU navigation on bridge systems, using alphanumeric keypad and Trackball.

1.1.4 Panel section

Layout of the panel section located underneath the Operator panel is as follows:

Figure 7 Layout of panel section



For all systems (except NAV), the panel section contains filter, power supply, modem/net connection and 115/230VAC mains socket (for service purposes only).

Note

For Modem/Net connections and 115/230 VAC socket connections, different versions are available. When Modem/Net connection is mounted (at the right side), only one 115/230 VAC socket is mounted (at the left side). See project specific drawings for exact layout.

1.1.4.1 Keyboard section

For all systems, a standard alphanumeric Keyboard is available in a drawer in front of the Operator panel. It is accessed from the front by pushing the drawer, thus releasing the locks behind the Keyboard, making the drawer open automatically outwards. The Keyboard may then be pulled out and laid down on the upper part of the Operator panel. Input from the Keyboard is interfaced through the Input panel. The Keyboard is for service use only.

1.2 Main mounting plate and Side plate configurations

The following internal Main mounting plate and Side plate configurations are available:

- The Main mounting plate configuration used for AUT, AUT CAN, AUT History Station, AUT Safety, TC and General, is shown in Figure 8.

  The following Side plates are available for different configurations of the operator stations:

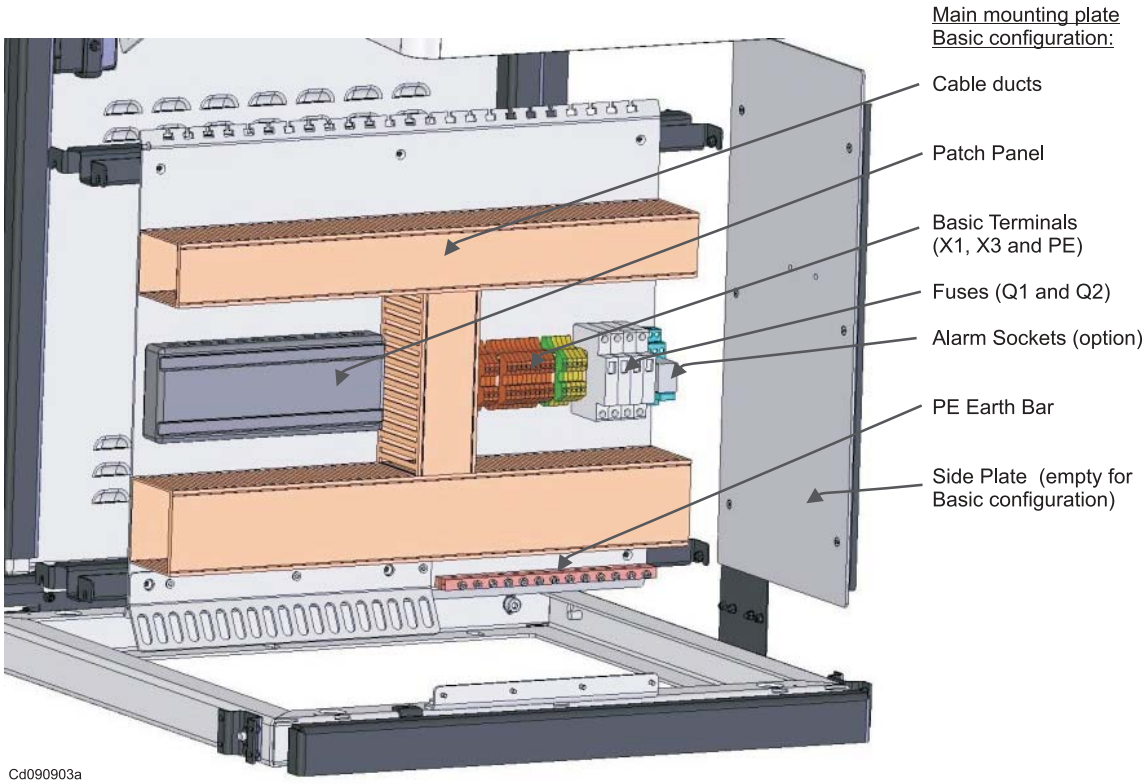
  – An example of AUT CAN side plate, is shown in Figure 9.

  – An example of AUT History side plate, is shown in Figure 10.

  – An example of HPR Serial Line kit side plate, is shown in Figure 11.
- The Main mounting plate for DP configurations and an example of Side plate, is shown in Figure 12.
- The Main mounting plate for NAV is shown in Figure 13.

1.2.1 Main mounting plate layout for AUT, AUT CAN, AUT History Station, AUT Safety, TC and General configurations

Figure 8 Main mounting plate layout for AUT, AUT CAN, AUT History Station, AUT Safety, TC and General configurations



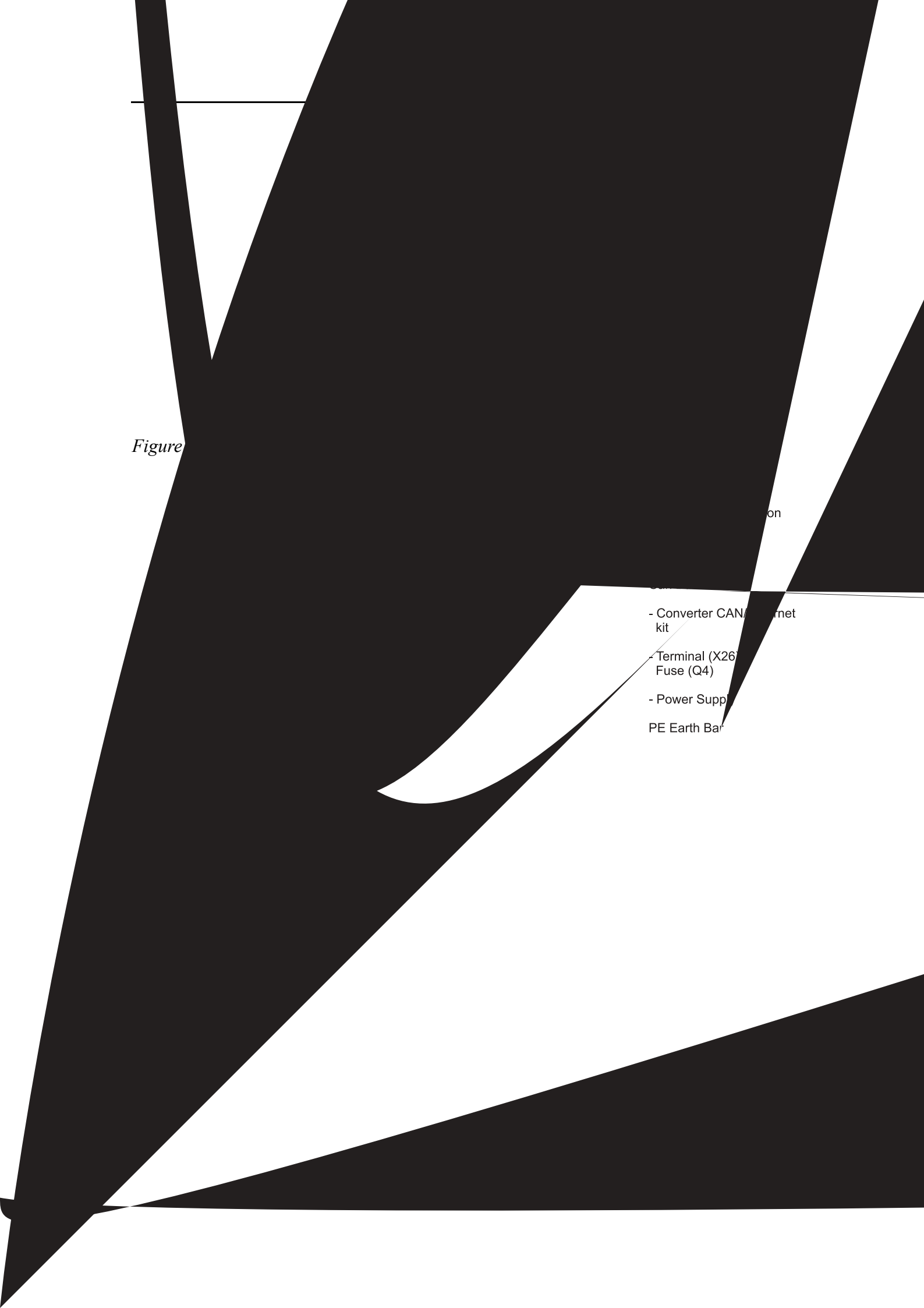
Note

The actual configuration of individual items for a specific vessel may differ slightly from that shown above.

The following main items are located on the Main mounting plate Basic configuration:

Cable ducts	are used for collecting and feeding the interface cables on the mounting plate.
Patch Panel	is used for patching the interface cables from the mounting plate and to the field (LAN cables).
Basic Terminals	are used as connection points for the ships supply voltage (115/230 VAC) to the console.

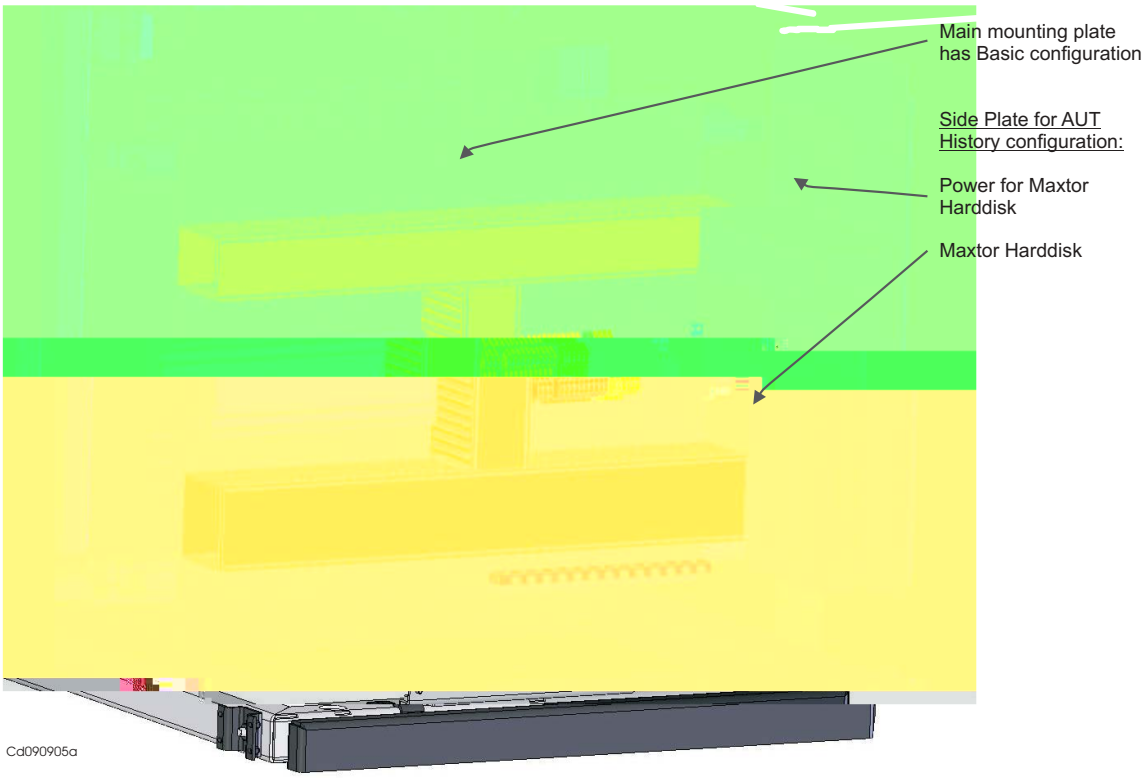
Figure


on
- Converter CAN
net
kit
- Terminal (X26
Fuse (Q4)
- Power Supp
PE Earth Ba

PE Earth Bar	used for connection the equipment to P.E. Earth (ground).
Cable duct	are used for collecting and feeding the interface cables on the mounting plate.

1.2.3 Basic configuration and side plate layout for AUT History station configuration

Figure 10 Basic configuration with example of AUT History station side plate

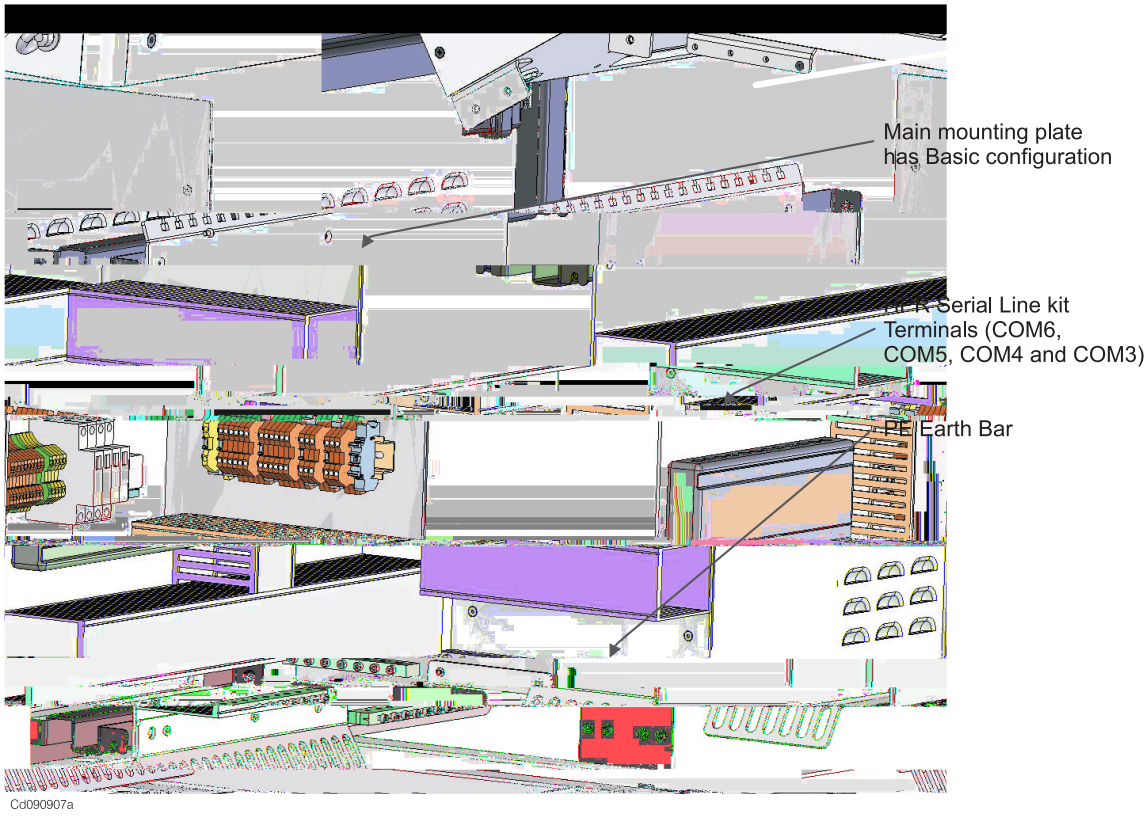


The following main items are located on the Side plate for AUT History configuration:

Power Supply for Maxtor Harddisk	Power supply / power adapter for harddisk.
Maxtor Harddisk	Harddisk used for storage of history data.

1.2.4 Basic configuration with HPR side plate layout

Figure 11 Basic configuration with example of HPR Serial Line kit side plate



The following main items are located on the HPR Serial Line kit side plate:

HPR Serial Line Kit	Kit for Hydro acoustic Position Reference system (HPR).
Terminals (Com6, Com5, Com4 and Com3)	Terminals for serial line communication.
PE Earth Bar	used for connection the equipment to P.E. Earth (ground).

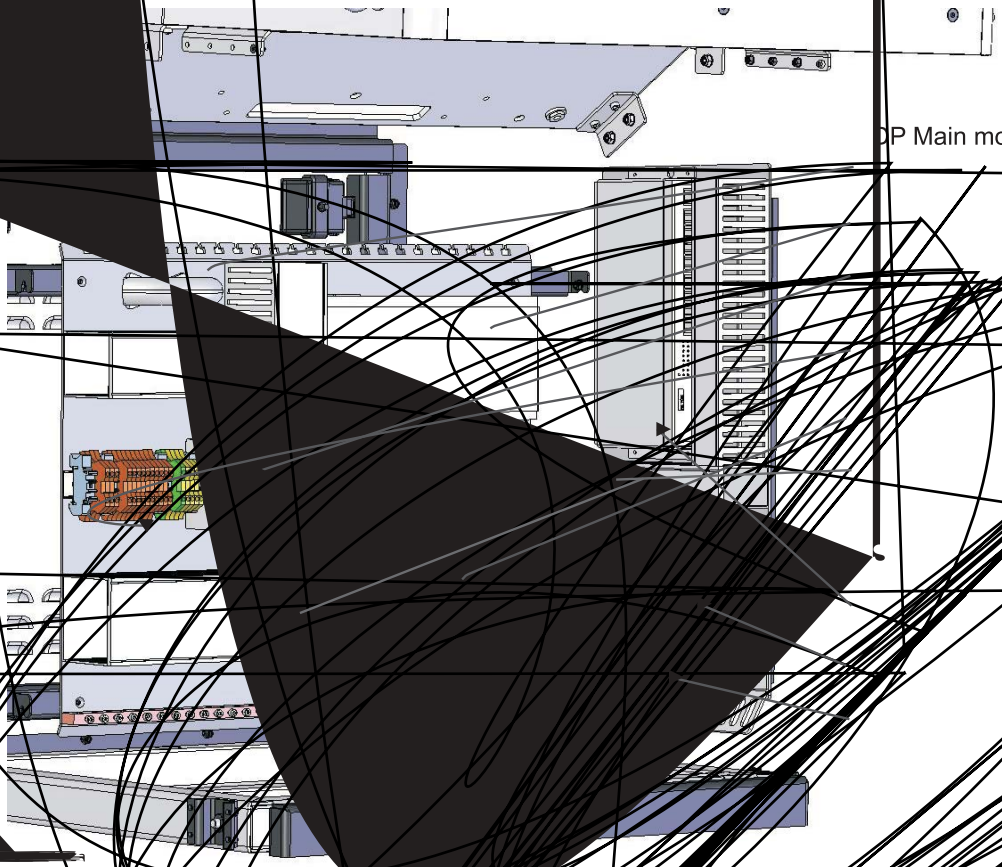
For HPR configurations, the Main mounting plate is standard.

The following optional side plates are available:

- HPR Serial Line kit (as shown above)
- HiPAP 501 Network kit
- Terminals for drop-in panel on OS, HPR Transducer Hoist control kit

1.2.5 Main mounting plate layout for DP and side plates layout for DP configurations

DP configuration with example of Switch and Patch panel side plate



DP Main mounting plate:

Note

The actual configuration of individual items for a specific vessel may differ slightly from that shown above.

The following main items are located on the DP Main mounting plate:

ISDN/USB modem	is used for converting ISDN signals to USB serial communication for remotediagnostic.
Switch	DP configuration with LAN switch.
Fuses	are used for the main supply voltage and the main outlet sockets (servicepurpose only).

Basic terminals	are used as connection points for the ships supply voltage (115/230 VAC) to the console.
Patch panel	is used for patching the interface cables from the mounting plate and to the field (LAN cables).
Cable ducts	are used for collecting and feeding the interface cables on the mounting plate.

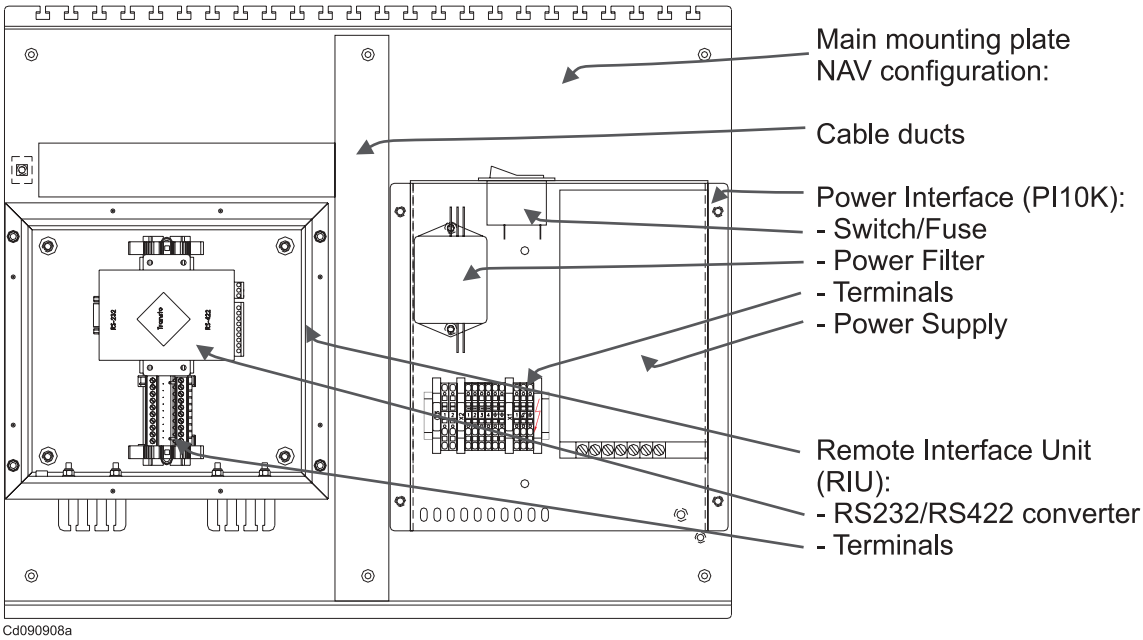
For DP configurations, the DP main mounting plate is standard.

The following optional side plates are available:

- Additional Switch and Patch panel (as shown above)
- Terminals for drop-in panel on OS, HPR Transducer Hoist control
- Terminals for drop-in panel on OS, Alert switch
- Terminals for drop-in panel on OS, 2–pos switch
- Terminals for drop-in panel on OS, 3–pos switch
- Terminals for drop-in panel on OS, 4–pos switch

1.2.6 Main mounting plate layout for NAV configurations

Figure 13 Main mounting plate layout for NAV configurations



The Power Interface (PI10K) and Remote Interface Unit (RIU) are located on the Main mounting plate for NAV, see Figure 13.

The mains voltage passes the circuit breakers, Q1/Q2 and trips and breaks the circuits if the mains current exceeds the rated Q1/Q2 current.

The UPS/AC ship supply is distributed, via row terminals X1, circuit breaker Q1 and row terminals X3, to supply the computer, monitor and the panel system.

From terminals X3 the Panel system get its mains supply via a Schaffner filter and a power supply/converter which supplies the Panel system with 24 VDC. The 24 VDC is entered at the Input panel of the Panel system and supplies the System panels, Keyboard and Heading wheel via USB connections. The Joystick, if used is supplied via the BU-DP or the BU-TC panel.

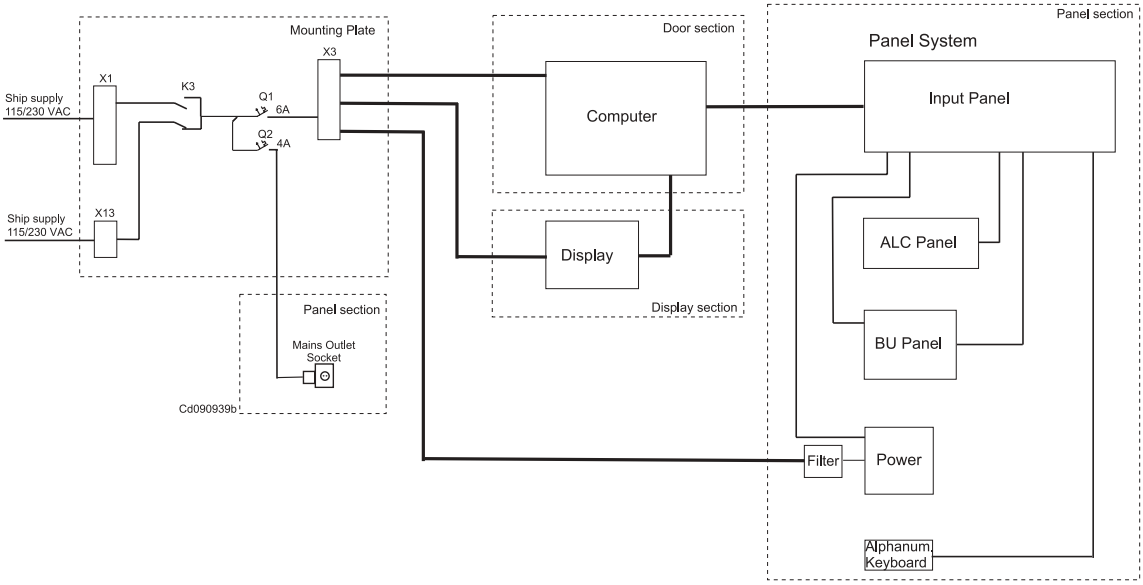
The UPS/AC ship supply also passes the circuit breaker Q2 before it is passed to 115/230VAC Mains outlet socket. The outlet socket is used for service purpose only.

Caution

Do not use the mains outlet for other purposes than servicing the system. Heavy or noisy loads connected here may damage the system.

1.3.2 Safety systems

Figure 15 OS-650-XXX-MP7600-KM05-Deep Line, Safety systems



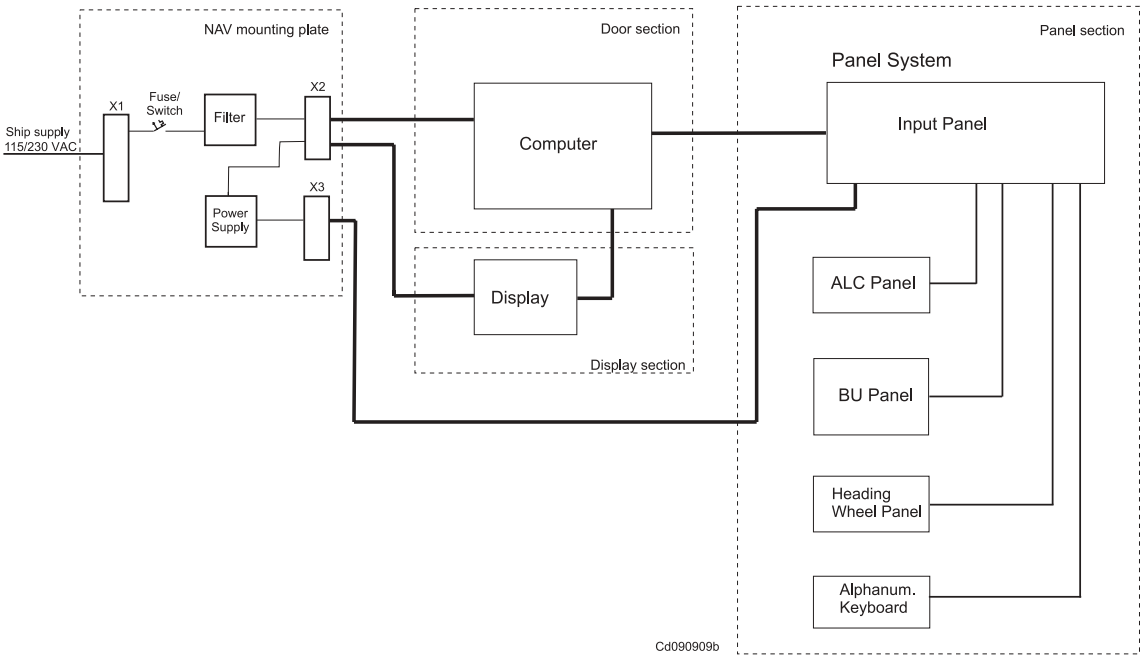
See Figure 15 for block diagram.

The description above, also applies for Safety systems, except that the mains supply voltage (115/230VAC) is from two independent UPSes terminated on row terminals X1 and X13. The input voltage is supplied to the Safety systems via a

Contactor (K3) that senses and switches the mains voltage to row terminals X3 and further to the computer, monitor and panel system as already described.

1.3.3 NAV systems

Figure 16 OS-650-XXX-MP7600-KM05-Deep Line NAV systems



Some minor differences apply for the NAV version compared with the other OSes, refer to Figure 14 and Figure 16.

The filter and power supply are not located in the panel section, as for the other OSes, but on the dedicated NAV mounting plate located inside the operator station, see Figure 13. The NAV version does not have the mains outlet sockets.

A circuit breaker, located on the NAV mounting plate, functions both as a fuse and a power switch.

1.4 Network connections

Figure 17 Example of network connection (OS without switch)

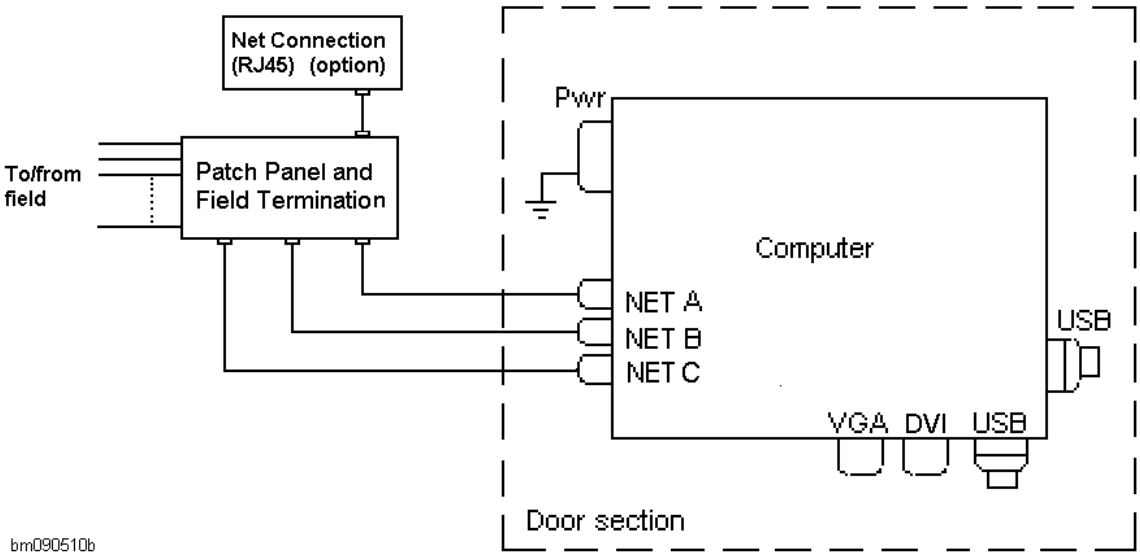
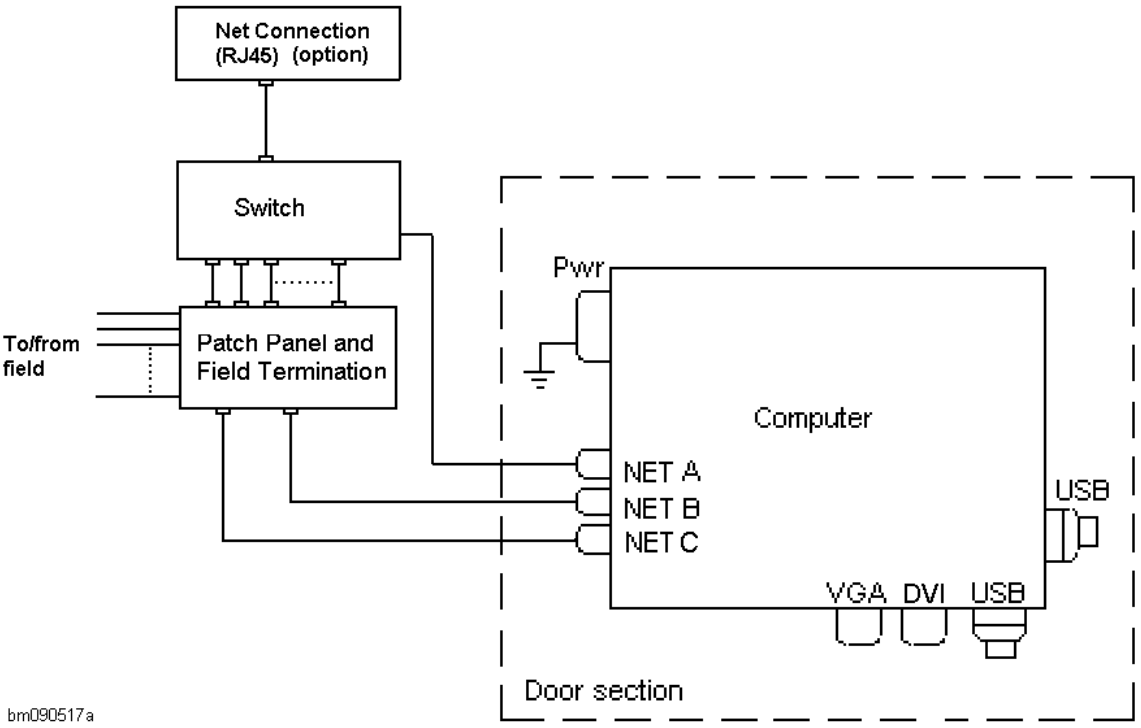


Figure 18 Example of network connection (OS with switch on Net A, e.g. DP OS)



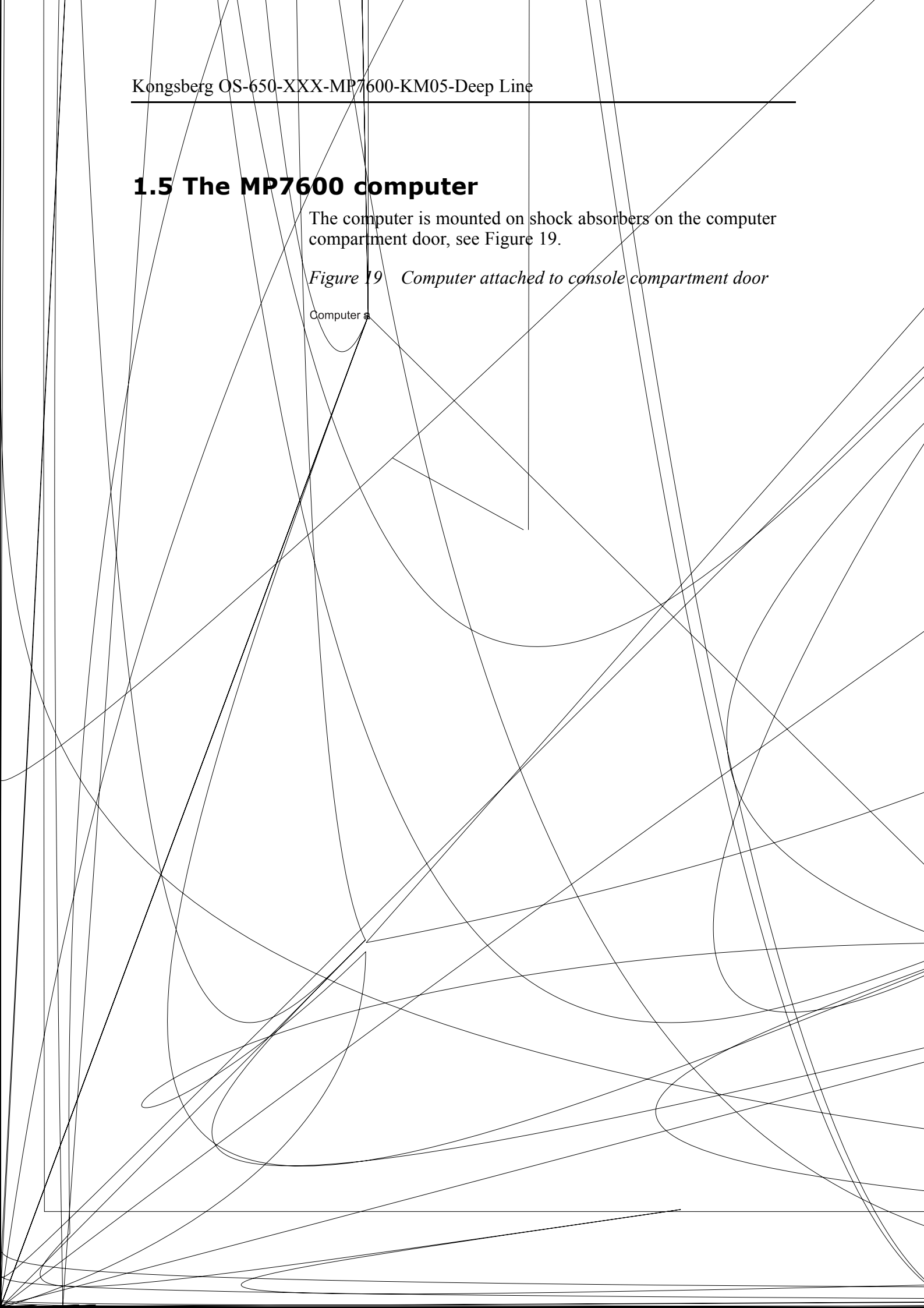
Note

The OS may have installed switch either for Net A or Net B. If the OS is without switch, Figure 17 applies.

1.5 The MP7600 computer

The computer is mounted on shock absorbers on the computer compartment door, see Figure 19.

Figure 19 Computer attached to console compartment door



2 FAULT FINDING

This section presents the fault finding principles for the OS-650-XXX-MP7600-KM05-Deep Line.

2.1 Panel and Alarm lamps and buttons

The Panel and Alarm lamps and buttons are located in two groups on the ALC and ALC NAV panel, refer to Figure 2 and Figure 3.

The Panel group comprises two lamps:

- **POWER**; The lamp is lit green when power is OK.
- **FAULT**; The lamp is lit red when lost contact with the computer, else it is off.

The Alarms group comprises one lamp and three buttons without status lamp:

- **ALARM**; The lamp is flashing red when an alarm has been detected. The lamp is steadily lit when the ACK button has been pressed and the alarm is still active.
- **ACK**; The button, when activated, provides a signal to the computer.
- **"Silence"**; The button, when pressed, silences the buzzer locally and provides a signal to the computer.
- **ALARM VIEW**; The button, when activated, provides a signal to the computer.

2.2 General fault finding and repair

If an error situation has occurred you will need a combination of the following information items to correct the system:

- Power LEDs and other status lamps (LEDs) on hardware items. See the appropriate *Hardware Module Description* for details.
- Status of power voltages and fuses in the system. See the appropriate *Hardware Module Description* for details.
- System-specific diagrams, lists and drawings. See the appropriate *Drawing File* for details.
- Replacement procedures for replaceable modules. See the *Corrective Maintenance* section in this manual, the appropriate *Hardware Module Description* or the appropriate *Maintenance Manual* for details.

2.3 Reading power LED status and measuring supply voltages

For all systems, the mains voltage can be measured, where appropriate, using a multimeter with AC-range.

All OS systems (except NAV)

The Power Supply (S-60–24) is a 115/230VAC to 24VDC converter. The status of the PSUs is shown by a green LED under the cover of the power module. OK state corresponds to green LED colour.

The power supply module is located inside the panel section, refer to Figure 7.

NAV systems

The Power interface, supports 115/230VAC via a AC filter and 24 VDC via power supply/converter (MWS-150–24ME). It is mounted on the NAV mounting plate inside the operator console, see Figure 13.

2.4 The message system

The system contains built-in tests that continually check for faults while the system is running. System messages are generated to inform you of any incorrect system operation or to bring any other relevant information to your attention.

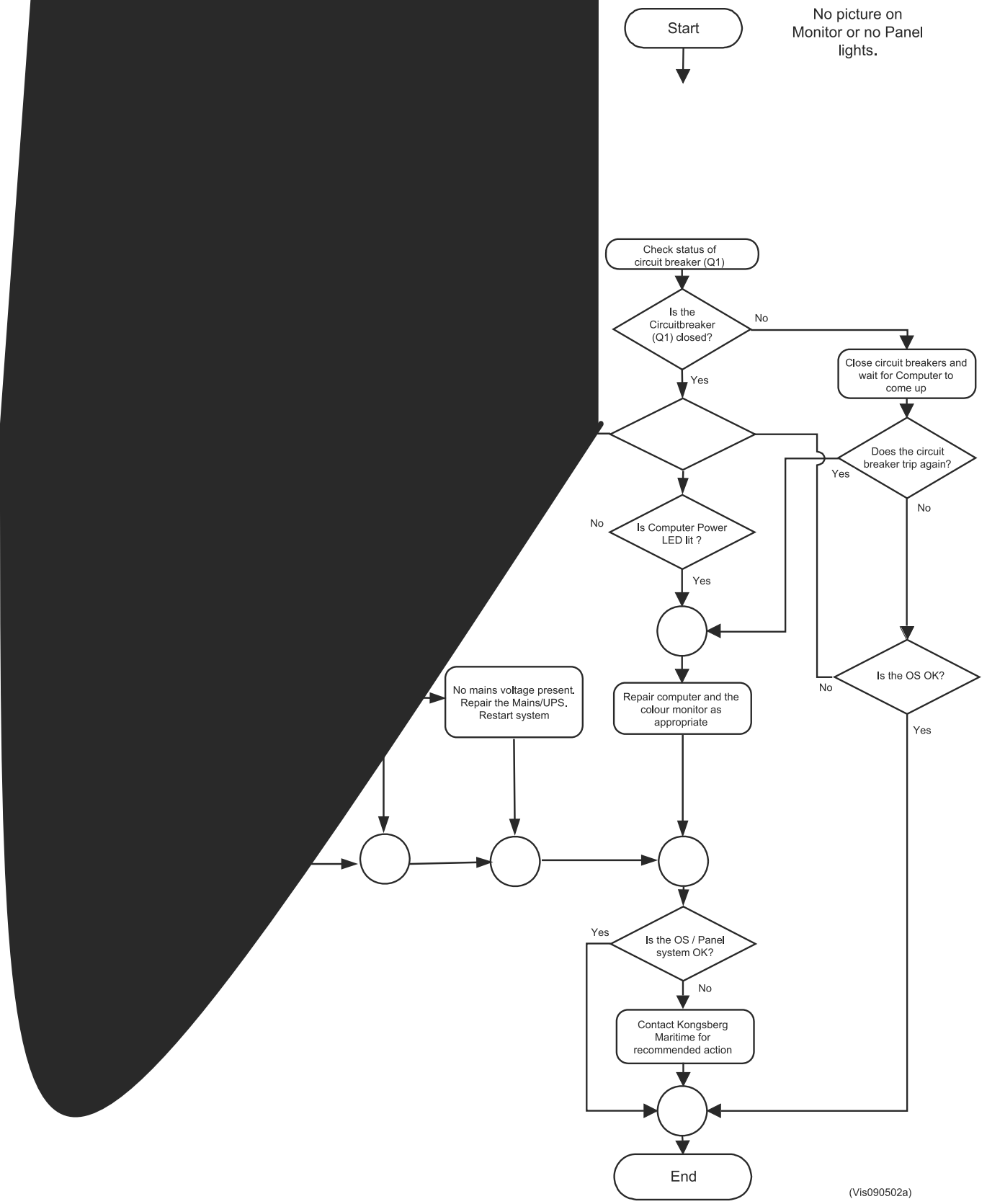
The OS-650-XXX-MP7600-KM05-Deep Line related system messages/alarms are displayed on the operator station and/or event/alarm printer to inform/alarm the operator about process station faults or to bring any other relevant information to the operator's attention.

System messages are displayed on the screen and printed out on the alarm printer. For detailed information concerning system messages, refer to the appropriate *Operator/User Manual* for detailed information on reading the equipment status.

2.5 Online help

When system is running, the message line in the display layout or Event window shows the most recent warning or alarm message that has not yet been acknowledged. Right-clicking the message text opens the System Messages Help with the relevant message explanation displayed online on the OS.

For detailed information concerning online help information, refer to applicable *Operator/User Manual*.


Start
No picture on Monitor or no Panel lights.
Check status of circuit breaker (Q1)
Is the Circuitbreaker (Q1) closed?
No
Yes
Close circuit breakers and wait for Computer to come up
Does the circuit breaker trip again?
Yes
No
Is Computer Power LED lit ?
No
Yes
Is the OS OK?
No
Yes
No mains voltage present. Repair the Mains/UPS. Restart system
Repair computer and the colour monitor as appropriate
Yes
Is the OS / Panel system OK?
No
Contact Kongsberg Maritime for recommended action
End
(Vis090502a)

A more detailed description of the BU-DP panel is found in the *Hardware Module Description*.

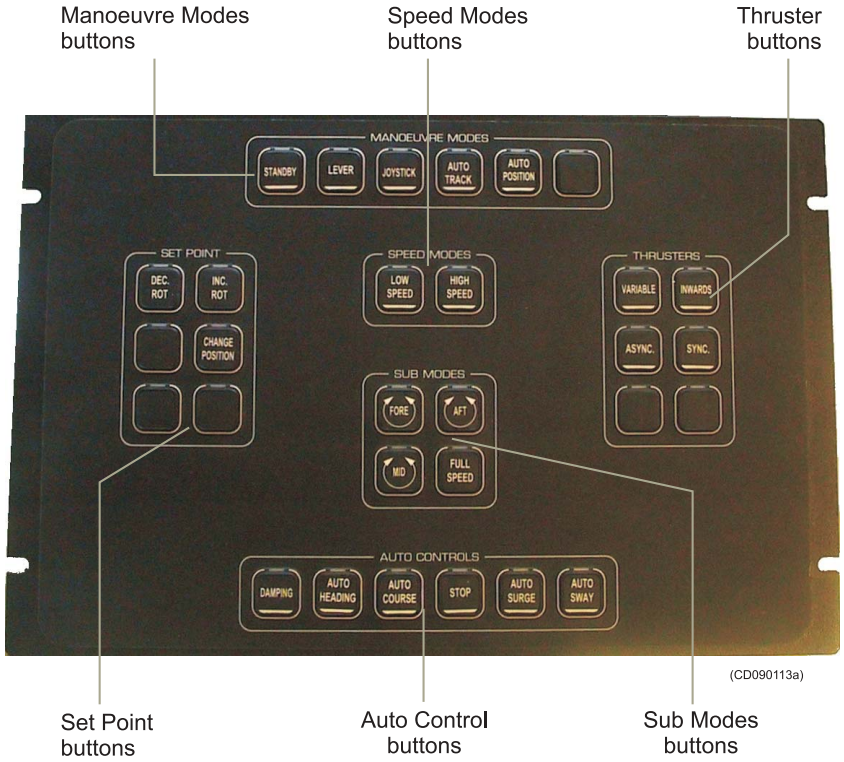
3.3.3 BU-TC panel

The illustration below shows the front layout of the BU-TC panel. It contains 30 buttons and lamps. All buttons group are provided with status lamps.

To perform lamp test the application must be running. Then click the following from the menu bar: **View > Panel > Lamp Test**. In the displayed **Panel Lamp Test** dialog box, click **Start Lamp Test** button and all the panel button status lamps should be lit.

Press in turn, each button that has a status lamp. Each status lamp should extinguish when its associated button is pressed.

Figure 22 Front layout of the BU-TC panel



A more detailed description of the BU-TC panel is found in the *Hardware Module Description*.

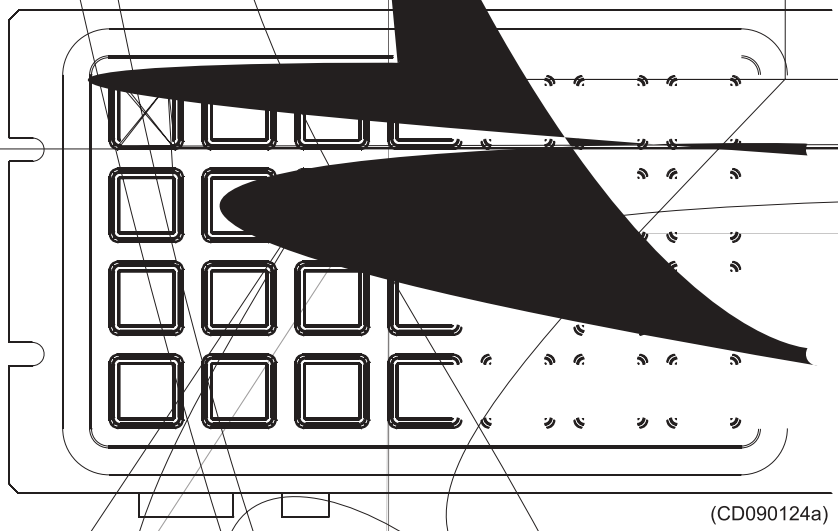
3.3.4 BU-AUT panel

The illustration below shows the front layout of the BU-AUT panel. It contains 28 buttons and lamps. All buttons are provided with status lamps.

To perform lamp test the application must be running. Then click the following from the menu bar: **View > Panel > Lamp Test**. In the displayed **Panel Lamp Test** dialog box, click **Start Lamp Test** button and all the panel button status lamps should be lit.

Press in turn, each button. Each status lamp should extinguish when its associated button is pressed.

Figure 23 Front layout of the BU-AUT panel



A more detailed description of the BU-AUT panel is found in the *Hardware Module Description*.

3.3.5 Input panel

The illustration below shows the front layout of the Input panel. It contains a 19 buttons keypad for screen navigation, entering numbers and text into the system and a Trackball with seven buttons integrated in the circular Trackball cover.

All OS systems (except NAV, AUT, DP and TC)

A function test may be performed via Note Pad. Click the following : **Microsoft Start →Programs →Accessories →Note Pad**.

The alphanumeric input buttons acts as a Keyboard. Press in turn, each button on the Input panel, which is reflected in Note Pad.

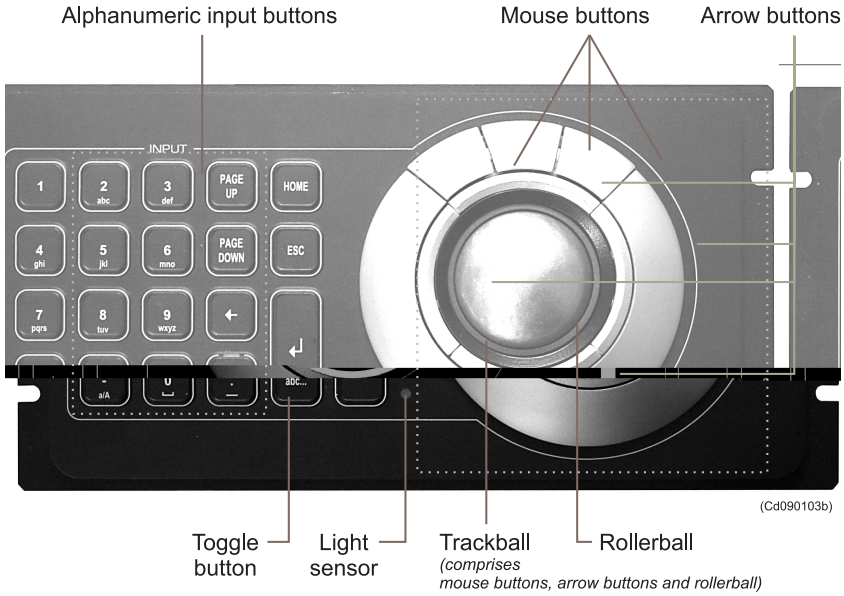
The Trackball with Rollerball, mouse buttons and arrow buttons may also be checked in Note Pad.

Close the **Note Pad** dialog after test.

Note

The 'abc...'-button act as a toggle button between letters and numbers, and the 'a/A'-button acts as CapsLock.

Figure 24 Front layout of the Input panel



A more detailed description of the Input panel is found in the *Hardware Module Description*.

NAV systems

A function test may be performed via dialogs in Radar or ECDIS menu system. Click the following : **Main Menu →Note(s) →Edit Notes→Edit**. This opens the **NAV Note** dialog. Then press in turn, each button on the Input panel, which is reflected in the **Comment** field.

The Trackball with Rollerball, mouse buttons and arrow buttons may also be checked here, see also section 3.9.

Note

The sign of a contaminated Rollerball is when the cursor does not follow the movement of the Rollerball, but stops for short periods.

Close the **NAV Note** dialog after test.

Refer to *K-Bridge Radar Operator Manual* or *K-Bridge ECDIS Operator Manual*, for details.

AUT, DP and TC systems

A function test related to numeric input may be tested when doing ordinary operation interactions.

The Trackball with Rollerball, mouse buttons and arrow buttons may also be checked here, see also section 3.9.

Note

The sign of a contaminated Rollerball is when the cursor does not

8 Mark the defective colour monitor with a label describing the symptoms observed, carefully pack in a shielding bag and place on a secure place.

9 Get the new colour monitor. A 6 mm gasket is delivered with the monitor, but not mounted.

a If the cabinet is **with** 2 off screws on each side on top of frame, the 6 mm gasket is to be mounted at the bottom edge of the front-glass of the monitor.

b If the cabinet is **without** 2 off screws on each side on top of frame, the 4 mm gasket (PN: 2101546) is to be mounted at the bottom edge of the front-glass of the monitor.

Note

Remember to remove the self-adhesive paper from the gasket, before attaching gasket to the monitor.

Take care not to stretch the gasket.

10 To insert the colour monitor into the operator station frame, perform this procedure in reverse order.

11 Turn on power to the operator station by turning on the Q1 fuse (for NAV systems, turn on the fuse/switch).

12 Close and lock the OS front door.

4.4 Replacing the MP7600 computer

For Corrective Maintenance procedures for the MP7600 computer, see the *MP7600 Maintenance Manual.*

4.5 Replacing the Panels from the Operator panel

Note

Different operator station configurations are available, so the Operator panel may look different than the actual figures below.

The following steps must have been performed before doing this procedure:

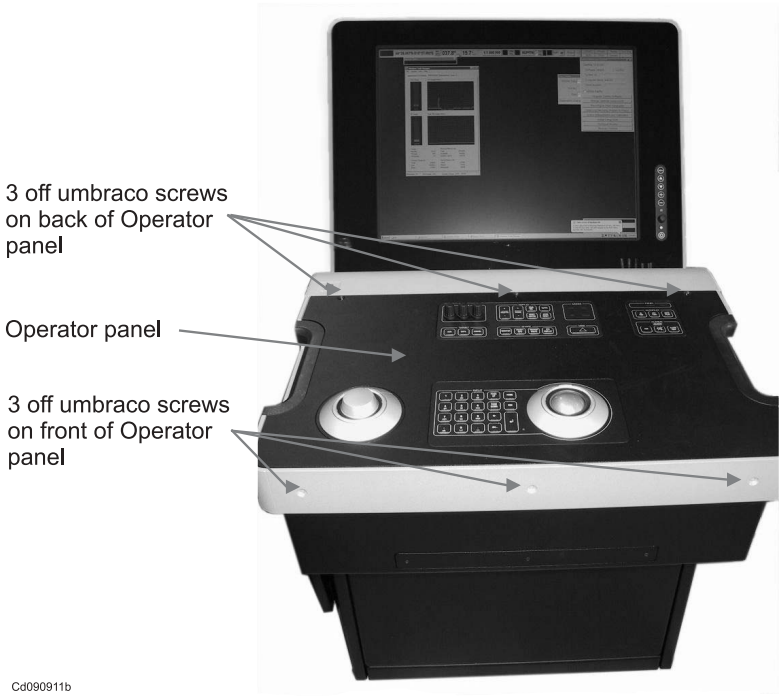
- Ensure that the different panels are the recommended spare part for OS-650-XXX-MP7600-KM05-Deep Line.

The panels located in the Operator panel is to be removed as follows:

1 The power to the OS must have been turned off, see section 4.2.

2 Unscrew 3 off umbraco (6/12mm) screws on back of the Operator panel. See Figure 27.

Figure 27 Removing/attaching the Operator panel



3 Unscrew 3 off umbraco (6/15mm) screws from the front of the Operator panel.

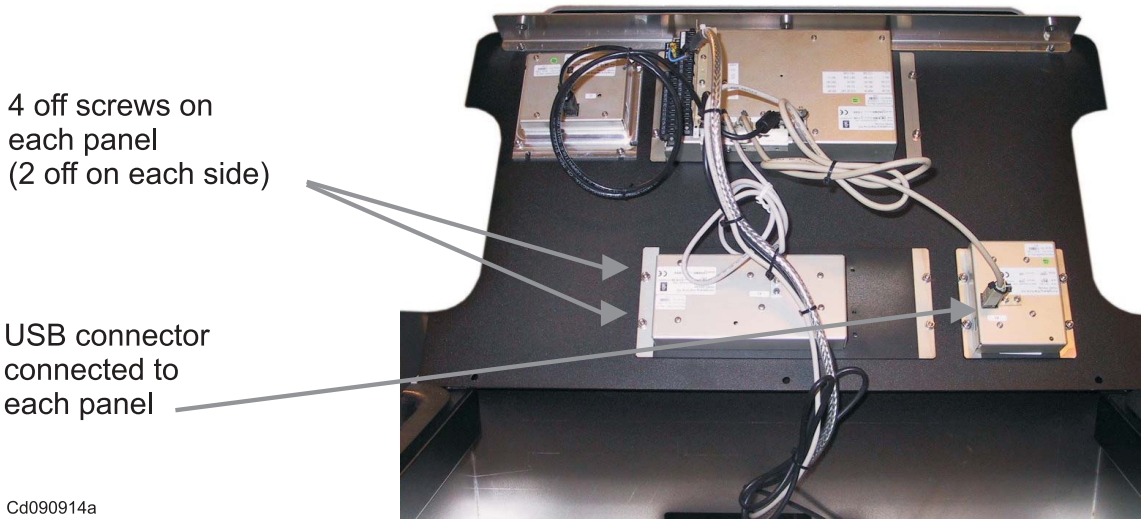
4 Lift the Operator panel by grabbing hold of the plate itself and lift upwards about 2 cm.

Now the Operator panel itself is free to be lifted.

5 When lifted upwards, carefully tilt the front of the Operator panel backwards, about 120°. See Figure 28.

The panels located in the Operator panel are all attached to the panel plate from underneath by 4 off screws attached to the Operator panel.

Figure 28 Operator panel seen from underneath



6 For the panel to be replaced, remove the USB cable and remove the 4 off nuts attaching the panel to the Operator panel. For details refer to steps below for the different panel types:

- **a** Replacing **ALC panel / ALC NAV panel**, see applicable *Hardware Module Description*.
- **b** Replacing **BU-DP panel**, see applicable *Hardware Module Description*.
- **c** Replacing **BU-NAV panel**, see applicable *Hardware Module Description*.
- **d** Replacing **BU-TC panel**, see applicable *Hardware Module Description*.
- **e** Replacing **BU-AUT panel**, see applicable *Hardware Module Description*.
- **f** Replacing **Input panel**, see applicable *Hardware Module Description*.
- **g** Replacing **Heading wheel panel**, see applicable *Hardware Module Description*.
- **h** Replacing **Joystick panel**, see applicable *Hardware Module Description*.

7 Mark the defective panel with a label describing the symptoms observed, carefully pack in a shielding bag and place on a secure place.

8 When defective panel has been replaced, connect the cables to the panel.

9 Lower the Operator panel into position.

10 Attach the 6 off umbraco screws; 3 off 6/12mm to the back and 3 off 6/15 mm to the front of the Operator panel, see Figure 27.

11 Turn on power to the operator station again by turning on the Q1 fuse (for NAV systems, turn on the fuse/switch).

12 Close and lock the OS front door.

4.6 Replacing the Power Supply

4.6.1 For all systems (except NAV systems)

The Power supply is located in the Panel section inside the OS, see section Figure 7.

The following step must have been performed before doing this procedure:

- Ensure that the new power supply module is the recommended spare part for OS-650-XXX-MP7600-KM05-Deep Line.

1 Shut-down and turn-off power as described in section 4.2.1.

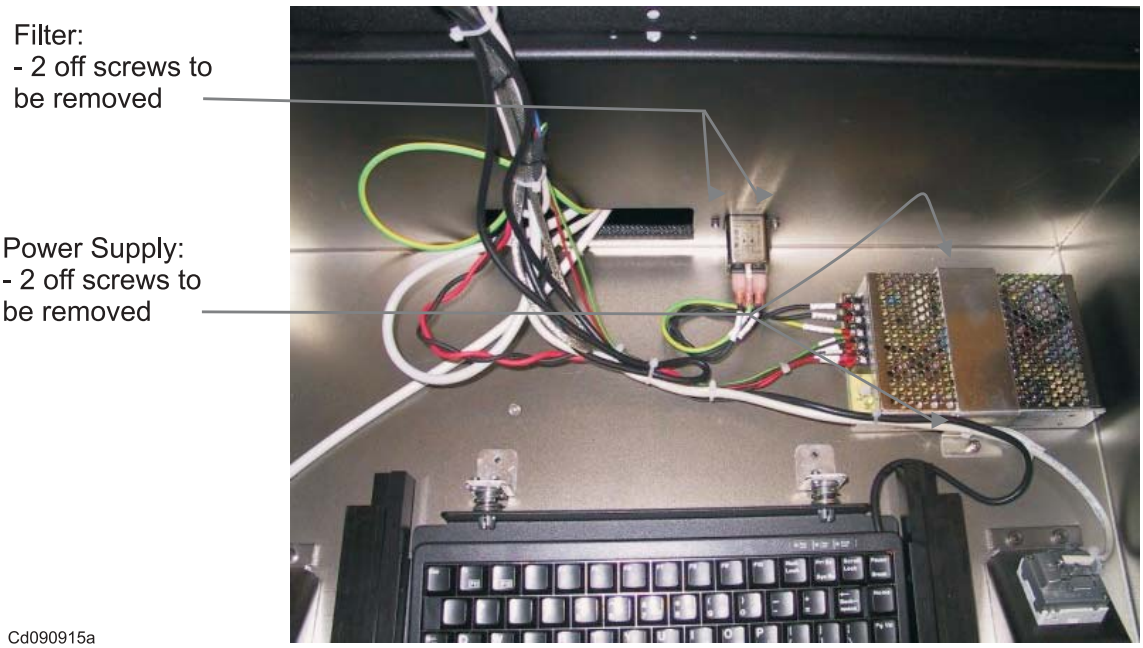
2 Perform step 2–5 of section 4.5 to remove the Operator panel.

3 When the Operator panel has been lifted up and tilted upwards about 120°, locate the power supply in the back, to the right inside the Panel section of the OS.

4 Locate the cables to the power supply, remove the plastic cover and unscrew the cables. See Figure 29.

Make sure the cables are marked so they can be identified for new power supply connection.

Figure 29 Power Supply in panel section of the OS



5 Unscrew the power supply from the Panel section, and remove the 2 off screws.

6 Carefully remove the power supply from the Panel section and place aside.

7 Mark the defective power supply with a label describing the symptoms observed, carefully pack in a shielding bag and place on a secure place.

8 To insert a new power supply, perform this procedure in reverse order.

9 Turn on power to the OS by turning on the Q1 fuse.

Verify that the appropriate voltage is present by measuring at terminals on the power supply – (24VDC: V– and V+).

10 When completed, perform step 9–12 of section 4.5 to attach the Operator panel to the OS.

4.6.2 For NAV systems

The Power interface (PI10K) with its Power supply is located in the NAV mounting plate inside the OS, see section Figure 13.

The following step must have been performed before doing this procedure:

- Ensure that the new power supply module is the recommended spare part for OS-650-XXX-MP7600-KM05-Deep Line.

1 Run standard shut-down procedure, as described in applicable *Operator Manual*.

2 When the shut-down procedure has been completed and the application has closed down, turn off ships supply/UPS to the OS.

3 Locate the cables to the power supply and unscrew these.

Make sure the cables are marked so they can be identified for new power supply connection.

4 Unscrew the 4 off umbraco screws located in each corner of the power interface assembly.

5 Lift the power interface assembly with power supply from the NAV mounting plate, and unscrew the power supply from the power interface assembly.

6 Carefully remove the power supply from the power interface assembly and place aside.

7 Mark the defective power supply with a label describing the symptoms observed, carefully pack in a shielding bag and place on a secure place.

8 To insert a new power supply, perform this procedure in reverse order.

9 Turn on ships supply/UPS to the OS.

Verify that the appropriate voltage is present by measuring at terminals on X3 and X2 – 24VDC on X3–1 and X3–2, and 115/230 VAC on X2–1/2, X2–3/4 and X2–5/6.

4.7 Replacing the Filter

4.7.1 For all systems (except NAV systems)

The Filter is located in the Panel section of the OS, see Figure 7.

The following step must have been performed before doing this procedure:

- Ensure that the new filter is the recommended spare part for OS-650-XXX-MP7600-KM05-Deep Line.

1 Shut-down and turn-off power as described in section 4.2.1.

2 Perform step 2–5 of section 4.5 to remove the Operator panel.

3 When the Operator panel has been lifted up and tilted upwards about 120°, locate the filter in the center inside the Panel section of the OS.

4 Locate the cables to the filter and snap off its connectors. See Figure 29.

Make sure the cables are marked so they can be identified for new filter connection.

5 From inside the panel section, remove 2 off nuts, washers and spring washers.

6 Unscrew the filter from the panel section.

7 Carefully remove the filter from the panel section and place aside.

8 To insert a new filter, perform this procedure in reverse order.

9 Turn on power to the OS by turning on the Q1 fuse.

Verify that the appropriate voltage is present by measuring at terminals on the power supply – (115/230VAC: L, N and PE).

10 When completed, perform step 9–12 of section 4.5 to attach the Operator panel to the OS.

4.7.2 For NAV systems

The Power interface (PI10K) with its Filter is located in the NAV mounting plate inside the OS, see Figure 13.

The following step must have been performed before doing this procedure:

- Ensure that the new filter is the recommended spare part for OS-650-XXX-MP7600-KM05-Deep Line.

1 Shut-down and turn-off power as described in section 4.2.2.

2 Locate the mounting plate inside the OS cabinet, see Figure 13.

3 Locate the cables to the filter and snap off its connectors.

Make sure the cables are marked so they can be identified for new filter connection.

4 Unscrew the 2 off umbraco screws located in end of the filter assembly.

5 Carefully remove the filter from the assembly and place aside.

6 Mark the defective filter with a label describing the symptoms observed, carefully pack in a shielding bag and place on a secure place.

7 To insert a new filter, perform this procedure in reverse order.

8 Turn on power to the OS by turning on the fuse/switch.

Verify that the appropriate voltage is present by measuring at terminals on X2 – (115/230VAC: X2–1/2, X2–3/4 and X2–4/5).

4.8 Replacing Main fuses

4.8.1 For all systems (except NAV systems)

The following steps must have been performed before doing this procedure:

- Ensure that the fuse is the recommended spare part for OS-650-XXX-MP7600-KM05-Deep Line.

1 Run standard shut-down procedure, as described in applicable *Operator Manual*.

2 When the shut-down procedure has been completed and the application has closed down, turn off ships supply/UPS to the OS.

Note

Safety systems have two separate supplies/UPSes. Remember to turn off both supplies/UPSes.

3 Open the front door of the OS.

4 Locate the faulty fuse.

5 Verify that there is no voltage on the input terminals.

6 Remove the busbar between Q1 and Q2, then remove the wires connected to Q1.

7 Remove faulty fuse – Q1 or Q2.

8 Mark the defective fuse with a label describing the symptoms observed, carefully pack in a shielding bag and place on a secure place.

9 Attach the new fuse – Q1 or Q2.

10 Re-attach the busbar and wires to Q1/Q2.

11 Turn on the power (mains) to the OS.

12 Turn on the fuse – Q1 or Q2.

13 Turn on ships supply/UPS to the OS.

Note

Safety systems have two separate supplies/UPSes. Remember to turn on both supplies/UPSes.

14 Verify that the appropriate voltage is present by measuring at terminals on X3 – (115/230VAC: X3–1 and X3–6).

15 Close the front door of the OS.

4.8.2 For NAV systems

This procedure applies for replacing the NAV fuse/switch.

The following step must have been performed before doing this procedure:

- Ensure that the new fuse/switch is the recommended spare part for OS-650-XXX-MP7600-KM05-Deep Line.

1 Run standard shut-down procedure, as described in applicable *Operator Manual*.

2 When the shut-down procedure has been completed and the application has closed down, turn off ships supply/UPS to the OS.

3 Open the front door of the OS.

4 Locate the NAV mounting plate inside the OS cabinet, see section Figure 13.

5 Locate the cables to the fuse/switch and snap off its connectors.

Make sure the cables are marked so they can be identified for new filter connection.

6 Carefully remove the fuse/switch from the assembly by pulling outwards (The fuse/switch is spring-connected to the assembly and comes easily off).

7 Mark the defective fuse/switch with a label describing the symptoms observed, carefully pack in a shielding bag and place on a secure place.

8 To insert a new fuse/switch, perform this procedure in reverse order.

9 Turn on the power (mains) to the OS.

10 Turn on the fuse/switch.

11 Turn on ships supply/UPS to the OS.

12 Verify that the appropriate voltage is present by measuring at filter – (115/230VAC at L, N and PE on the filter).

13 Close the front door of the OS.

4.9 For Safety systems – Replacing Contactor K3

This procedure applies for replacing the Contactor K3 in Safety systems.

- Ensure that the realy is the recommended spare part for OS-650-XXX-MP7600-KM05-Deep Line.

1 Run standard shut-down procedure, as described in applicable *Operator Manual*.

2 When the shut-down procedure has been completed and the application has closed down, turn off power to the OS by turning off the Q1 fuse.

3 Turn off both ship supplies/UPSes.

Note

Safety systems have two separate supplies/UPSes. Remember to turn off both supplies/UPSes.

4 Open the front door of the OS.

5 Verify that there is no voltage on the X1 and X13 row terminals (check both terminals).

6 Locate the faulty Contactor (K3).

7 Remove faulty Contactor (K3) from socket.

8 Mark the defective Contactor (K3) with a label describing the symptoms observed, carefully pack in a shielding bag and place on a secure place.

9 Attach the new Contactor (K3).

10 Turn on both ship supplies/UPSes.

Note

Safety systems have two separate supplies/UPSes. Remember to turn on both supplies/UPSes.

11 Verify that there is voltage on the X1 and X13 row terminals (check both terminals).

12 Verify that Contactor (K3) is closed and the mains voltage is present by measuring at input terminals on Q1 – (115/230VAC: 1 and 3).

To test the Contactor (K3), perform the following:

- **a** At power on, the voltage is supplied via the first supply/UPS (was checked in previous step).
- **b** Test the Contactor (K3), by turning off voltage from the first supply/UPS.
- **c** The Contactor (K3) then senses that voltage is missing from the first supply/UPS and switches to the second supply/UPS.
- **d** You will hear the Contactor (K3) trip as the second supply/UPS takes over.
- **e** Check the mains voltage at input terminals on Q1 – (115/230VAC: 1 and 3).

13 If OK, turn on the first ships supply/UPS again after test.

14 Turn on power to the OS by turning on the Q1 fuse to supply the system (computer, monitor and panel system) with mains voltage.

15 When finished, close the front door of the OS.

16 Run standard start-up procedure for the OS, as described in applicable *Operator Manual*.

4.10 Replacing the alphanumeric Keyboard

The alphanumeric Keyboard is available in a drawer in front of the Operator panel, see Figure 1 and Figure 7.

The following step must have been performed before doing this procedure:

- Ensure that the new alphanumeric Keyboard is the recommended spare part for OS-650-XXX-MP7600-KM05-Deep Line.

1 Shut-down and turn-off power as described in section 4.2.1 or 4.2.2.

2 Perform step 2–5 of section 4.5 to remove the Operator panel.

3 Inside the panel section, locate the cable from the Keyboard to the Input panel.

4 Disconnect the cable and carefully remove the Keyboard.

5 Mark the defective Keyboard with a label describing the symptoms observed, carefully pack in a shielding bag and place on a secure place.

6 To insert a new Keyboard, perform this procedure in reverse order.

7 When completed, perform step 9–12 of section 4.5 to attach the Operator panel to the OS.

5 REPLACEABLE PARTS AND CONSUMABLES

This section contains lists of replaceable parts, recommended spare parts and consumables used in OS-650-XXX-MP7600-KM05-Deep Line. Replacement procedures for the listed parts are described in section 4 and in appropriate *Hardware Module Description*.

5.1 Replaceable parts and recommended spare parts

5.1.1 Common spare parts

Table 2 Common replaceable parts and recommended common spare parts

List ident.	Part name	Recommended as spare part	Part number
1	One of the following colour monitors:	X	
	Colour monitor, 20" (Not for NAV)		703802
	Colour monitor, 23"		703736
2	Alphanumeric Keyboard		704363
3	One of the following computers:	Refer to MP7600 Maintenance Manual	
	MP7600, Base		704293
	MP7600 NAV (without RIC2 card)		704364
	MP7600, with 4–screen		302088
	MP7600, with LAN/CAN connection		302089
	MP7600, with 8 channel Blue Heat		302090
	MP7600, with LAN/CAN + 2 COM ports		304324
4	Power supply (S-60-24 2.5A) (Not for NAV)	X	47745799
5	Filter Schaffner (Not for NAV)	X	700529
6	Fuse Siemens 4A –2p (Not for NAV)	X	702801
7	Fuse Siemens 6A –2p (Not for NAV)	X	702802
8	Net Switch (Not for NAV)	X (if installed)	702403

5.1.2 NAV systems

Table 3 Replaceable parts and recommended spare parts for NAV systems

List ident.	Part name	Recommended as spare part	Part number
Operator panel (ECDIS and Radar)			
1	BU-NAV panel	X	603528
2	ALC NAV panel	X	603527
3	Input panel	X	603524
4	Heading wheel panel		603550
5	PI10K (Power Interface Unit) (Includes pos. 6, 7, 8)		301915
6	Fuse/switch 2 X 5 Amp (Part of pos. 5)	X	3700655
7	Power filter 110/250V AC 3A Type: FN2080-3-07 (Part of pos. 5)	X	3600228
8	Power supply 230V AC/24V DC 150W, MWS-150–24ME (Part of pos. 5)	X	3800288
9	RIU (Radar Interface Unit)	X	301912
Radar			
10	NA1149 (RIC2 card) (Radar only)	X	6200455

5.1.3 Dynamic Positioning system

Table 4 Replaceable parts and recommended spare parts for DP system

List ident.	Part name	Recommended as spare part	Part number
1	BU-DP panel	X	603530
2	ALC panel	X	603526
3	Input panel	X	603524
4	Heading wheel panel		603550
5	Joystick panel (Lilaas), or Joystick panel (Stork Kwart)		301491 304849

5.1.4 Thruster Control system

Table 5 Replaceable parts and recommended spare parts for TC system

List ident.	Part name	Recommended as spare part	Part number
1	BU-TC panel, or BU-DP (according to delivery)	X	603531 603530
2	ALC panel	X	603526
3	Input panel	X	603524
4	Heading wheel panel		603550
5	Joystick panel (Lilaas), or Joystick panel (Stork Kwart)		301491 304849

5.1.5 Automation systems

Table 6 Replaceable parts and recommended spare parts for AUT systems

List ident.	Part name	Recommended as spare part	Part number
1	BU-AUT panel	X	603529
2	ALC panel	X	603526
3	Input panel	X	603524
AUT-CAN			
4	Q4 - Fuse Siemens 10A (1 pol)		47744024
5	PS - Power Supply, MWS-240-24, 100-240VAC/5A, 24VDC/10A	X	47749445
AUT-HS			
6	Maxtor 300GB Hard disk USB2.0, incl. Power supply		703342
AUT-Safety			
7	K3: Telemec contactor	X	700219

5.1.6 General Operator panel

Table 7 Replaceable parts and recommended spare parts for General Operator panel

List ident.	Part name	Recommended as spare part	Part number
1	Input panel	X	603524

APPENDIX A — HW CONFIGURATION STATUS

This manual is based on the following parts lists and drawings. The revisions listed are those that were valid when the manual was produced.

Parts List and Drawings – OS-650-NAV	**303399 Rev. B**
Outline Drawing, OS-IC 650mm Console w.Handels, Deep Line	1012662 Rev. F
Layout dwg, Mountingplate Ass. Nav, Standard	300100 Rev. E
Power and Wiring Diagram, OS-650-NAV-KM05, FOP panel system	1016959 Rev. C
Parts List and Drawings – OS-650-HiPAP	**306228 Rev. A**
Outline Drawing, OS-IC 650mm Console w.Handels, Deep Line	1012662 Rev. F
Layout Drawing, HPR Serial Kit, Right Mounting Plate, KM05	304007 Rev. A
Layout Drawing, 115/230 V panel system, OS-650	300098 Rev. A
Layout Drawing, El.Mech., HiPAP-OS-650, Deep Line	306408 Rev. A
Power & Wiring Diagram, OS-650-HIPAO 501, Network	305725 Rev. B
Power and Wiring Diagram, OS-650-GEN-KM05, FOP panel system	1016988 Rev. A
Wiring Diagram, Net/Service Connection, KM05, IAS Consoles w/NDU	1005085 Rev. A
Wiring Diagram, HPR Serial Line Kit KM05	1005089 Rev. A
Parts List and Drawings – OS-650-DP	**P79000 Rev. C / 308092 Rev. A**
Outline Drawing, OS-IC 650mm Console w.Handels, Deep Line	1012662 Rev. F
Layout Drawing, 115/230 V panel system, OS-650	300098 Rev. A
Layout Drawing, OS-650 DP, Deep Line	300836 Rev. A
Layout Drawing, El. Mech. DP-0S-650, Deep Line	304323 Rev. A
Power and Wiring Diagram, Network Structure, Singe system, OS-650-DP/DP Cabinets	305129 Rev. B
Power and Wiring Diagram, Network Structure, Double system, OS-650-DP/DP Cabinets	305130 Rev. B
Power and Wiring Diagram, Network Structure, Triple system, OS-650-DP/DP Cabinets	301931 Rev. D
Power and Wiring Diagram, Modem for Remote Diagnostic, OS-DP	301953 Rev. A
Power and Wiring Diagram, OS-650-DP/TC-KM05, FOP panel system	1015625 Rev. A
Wiring Diagram, Net/Service Connection, KM05, IAS Consoles w/NDU	1005085 Rev. A
Parts List and Drawings – OS-650-TC	**P79300 Rev. B**
Outline Drawing, OS-IC 650mm Console w.Handels, Deep Line	1012662 Rev. F
Layout Drawing, 115/230 V panel system, OS-650	300098 Rev. A
Layout Drawing, El.Mech. Kit,OS-650, Deep Line	1015277 Rev. B
Power and Wiring Diagram, OS-650-DP/TC-KM05, FOP panel system	1015625 Rev. A
Wiring Diagram, Net/Service Connection, KM05, IAS Consoles w/NDU	1005085 Rev. A

Parts List and Drawings – OS-650-AUT	**P80000 Rev. D**
Outline Drawing, OS-IC 650mm Console w.Handels, Deep Line	1012662 Rev. F
Layout Drawing, 115/230 V panel system, OS-650	300098 Rev. A
Layout Drawing, OS-650-AUT, OS-650, Navigation/Slim line	300840 Rev. B
Layout Drawing, El.Mech.Kit,Os-650 , Deep Line	304821 Rev. A
Layout Drawing, El.Mech.Kit,OS-650, Deep Line	1015277 Rev. B
Power and Wiring Diagram, OS-650-AUT-KM05, FOP Panel system	1016606 Rev. A
Wiring Diagram, Net/Service Connection, KM05, IAS Consoles w/NDU	1005085 Rev. A
Parts List and Drawings – OS-650-AUT with CANBUS	**P80100 Rev. D**
Outline Drawing, OS-IC 650mm Console w.Handels, Deep Line	1012662 Rev. F
Layout Drawing, 115/230 V panel system, OS-650	300098 Rev. A
Layout Drawing, Can Bus Kit Side Plate, OS-650-KM05	303673 Rev. A
Layout Drawing, El.Mech.Kit,Os-650 , Deep Line	304821 Rev. A
Layout Drawing, El.Mech.Kit,OS-650, Deep Line	1015277 Rev. B
Power and Wiring Diagram, CANBUS, Kit KM05	303683 Rev. B
Power and Wiring Diagram, OS-650-AUT-KM05, FOP panel system	1016606 Rev. A
Wiring Diagram, Net/Service Connection, KM05, IAS Consoles w/NDU	1005085 Rev. A
Parts List and Drawings – OS-650-AUT with History Station	**P80200 Rev. D**
Outline Drawing, OS-IC 650mm Console w.Handels, Deep Line	1012662 Rev. F
Layout Drawing, 115/230 V panel system, OS-650	300098 Rev. A
Layout Drawing, OS-650-AUT, OS-650, Navigation/Slim line	300840 Rev. B
Layout Drawing, History Station Kit, Right Side Plate, KM05	303719 Rev. A
Layout Drawing, El.Mech.Kit,Os-650 , Deep Line	304821 Rev. A
Layout Drawing, El.Mech.Kit,OS-650, Deep Line	1015277 Rev. B
Power & Wiring Diagram, Kit, Fiber ST/RJ45, w/Patchbox, Deep Line	304820 Rev. A
Power and Wiring Diagram, OS-650-KM05, External Hard Drive	1005082 Rev. B
Power and Wiring Diagram, OS-650-AUT-KM05, FOP Panel system	1016606 Rev. A
Wiring Diagram, Net/Service Connection, KM05, IAS Consoles w/NDU	1005085 Rev. A
Wiring Diagram, HPR Serial Line Kit KM05	1005089 Rev. A
Parts List and Drawings – OS-650-General	**P80300 Rev. C**
Outline Drawing, OS-IC 650mm Console w.Handels, Deep Line	1012662 Rev. F
Layout drawing, OS-650-General, OS-650, Navigation/Slim line	300842 Rev. A
Layout Drawing, HPR Serial Kit, Right Mounting Plate, KM05	304007 Rev. A
Layout Drawing, El.Mech.Kit, OS-650 , Deep Line	304821 Rev. A
Layout Drawing, El.Mech.Kit,OS-650, Deep Line	1015277 Rev. B
Wiring Diagram, Net/Service Connection, KM05, IAS Consoles w/NDU	1005085 Rev. A
Wiring Diagram, HPR Serial Line, Kit KM05,	1005089 Rev. A

Parts List and Drawings – OS-650-General	**P80300 Rev. C**
Power & Wiring Diagram, Kit, Fiber ST/RJ45, w/Patchbox, Deep Line	304820 Rev. A
Power and Wiring Diagram, OS-650-AUT-KM05, FOP Panel system	1016606 Rev. A
Power and Wiring Diagram, OS-650-GEN-KM05, FOP panel system	1016988 Rev. A
Parts List and Drawings – OS-650-Safety	**P80500 Rev. B**
Outline Drawing, OS-IC 650mm Console w.Handels, Deep Line	1012662 Rev. F
Layout Drawing, 115/230 V panel system, OS-650	300098 Rev. A
Layout Drawing, OS-650-AUT, OS-650, Navigation/Slim line	300840 Rev. A
Layout Drawing El.Mech, 05–Dual Power-650 Deep Line	304774 Rev. A
Power and Wiring Diagram, OS-650–Safety KM05, Dual Power Input	304643 Rev. A
Wiring Diagram, Net/Service Connection, KM05, IAS Consoles w/NDU	1005085 Rev. A

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