![Kongsberg logo]

OS-555-COP05 Built-in Operator Station

Maintenance Manual

Kongsberg Maritime Part no.
K-Pos OS-555-BI SA: 306515
K-Chief OS-555-BI: 313170
K-Pos OS-555-BI Int: 313453
HiPAP-501 OS-555-BI: 314222
General OS-555-BI: 314223
K-Thrust OS-555-BI: 314224

Computer (example)

TFT Display
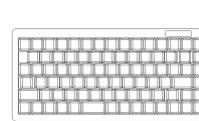
Service keyboard
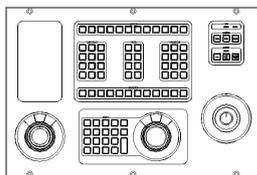
Operator Panel (example)
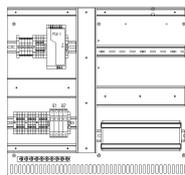
Main Mounting Plate (example)

Side Plate (example)

314640/E

Document history

Document number: 314640		
Rev. A	November 2007	First version.
Rev. B	July 2010	New network switch. New document format, updated with comments from the Product Department. Text regarding the computer made more generic, and descriptive text and procedures amended.
Rev. C	September 2010	Part numbers for colour monitor corrected in *Replaceable Parts and Consumables*.
Rev. D	November 2010	Computer for HiPAP-501 OS-555-BI changed from MPxxxx to APCxx.
Rev. E	June 2011	Circuit breaker Q1 replaced with main switch S1.

Note

Comments

To assist us in making improvements to the product and to this manual, we welcome comments and constructive criticism.
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Table of contents

Glossary

AC	Alternating Current
ALC	Alarm and Command
AUT	Automation
BU	Business Unit
CAN	Controller Area Network
DC	Direct Current
DP	Dynamic Positioning
GEN	General
HiPAP	High Precision Acoustic Positioning
HPR	High Precision, or Hydro acoustic Position Reference
I/O	Input/Output
KM	Kongsberg Maritime
LAN	Local Area Network
LED	Light Emitting Diodes
NAV	Navigation
OS	Operator Station
PSU	Power Supply Unit
TFT	Thin Film Transistor
TC	Thruster Control
UPS	Uninterruptible Power Supply
USB	Universal Serial Bus
VDU	Vessel Display Unit

Hardware description

This section describes the OS-555-COP05 Built-in (BI) hardware configuration for the part numbers listed on the front page of this document.

The Operator Station (OS) is delivered with a computer, a TFT colour monitor, a service alphanumeric keyboard, an Operator panel and a system specific Main Mounting Plate and an optional Side Plate containing system dedicated equipment. These parts may be installed in customer defined consoles.

For typical main parts of the OS, see the pictures on the front page of this document.

Operator Interfaces

Colour monitor

A high-resolution 20" 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.

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 common panel groups are described in the following sections.

BU-xxx panels

Note _____

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

_____

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

ALC panel

The Alarm and Command (ALC) panel is dedicated to each system, contains buttons and lamps, and is located in the Operator panel. The ALC panel is connected to the Input panel.

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.

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.

If the length of the cable between the Input panel and the computer exceeds five metres, then a USB extender kit (part number 334243) must be used.

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.

Drop-In kits

An optional Drop-In kit contains the following:

- Drop-In panel (an example is shown in Figure 1)
- Terminal block (one of the options to the left in Figure 9 on page 17)
- A set of cables between the terminal block and the Drop-In panel

The Drop-In panels are located in the Operator panel of the OS for K-Pos OS-555-BI SA/K-Pos OS-555-BI Int (see Figure 2 on page 10) or HiPAP-501 OS-555-BI (see Figure 5 on page 13).

The following optional Drop-In kits are available:

- Drop-In panel, 2-position switch
- Drop-In panel, 3-position switch
- Drop-In panel, 4-position switch
- Drop-In panel, Fire backup switch
- Drop-In panel, Alert switch
- Drop-In panel, HPR Transducer Control

Figure 1   Example of Drop-In panel, 3-position mode switch
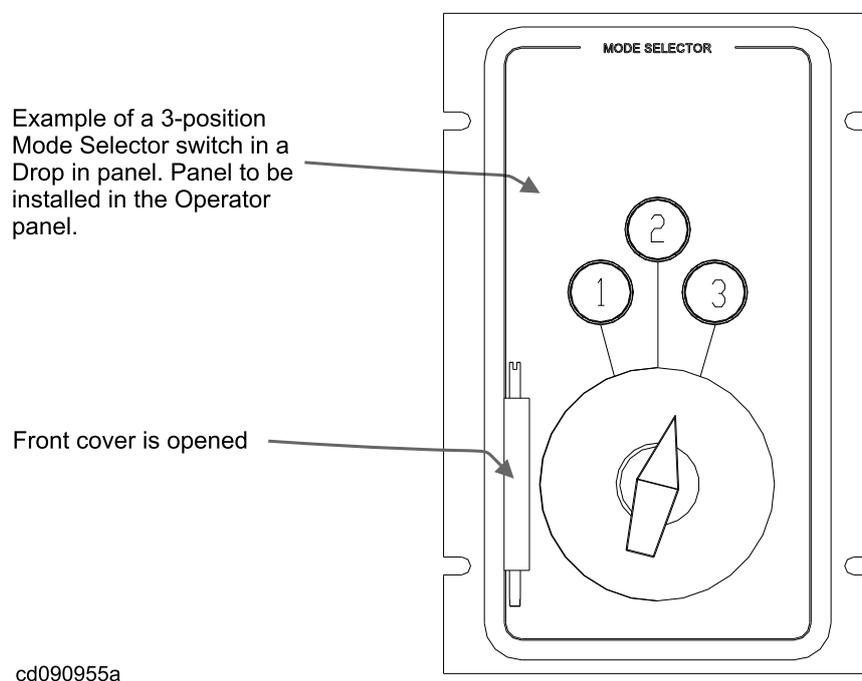
Operator panel types

The Operator panel built-in types for different systems are as follows:

- K-Pos OS-555-BI SA and K-Pos OS-555-BI Int Operator panels (for Dynamic Positioning systems)

  For K-Pos OS-555-BI two different types are available; One SA (Stand Alone) type with network switch, and One Int (Integrated) type without network switch.

- K-Thrust OS-555-BI or K-Pos OS-555-BI Operator panel (for Thruster Control systems)

- K-Chief OS-555-BI Operator panel (for Automation systems)

- General OS-555-BI and HiPAP-501 OS-555-BI (for General use and HiPAP systems)

The different layouts are described in the following sections.

K-Pos OS-555-BI SA and K-Pos OS-555-BI Int Operator panel

For K-Pos OS-555-BI SA and K-Pos OS-555-BI Int systems the following panel types are used as shown in Figure 2 on page 10.

Figure 2   Layout of K-Pos OS-555-BI SA and K-Pos OS-555-BI Int Operator panel
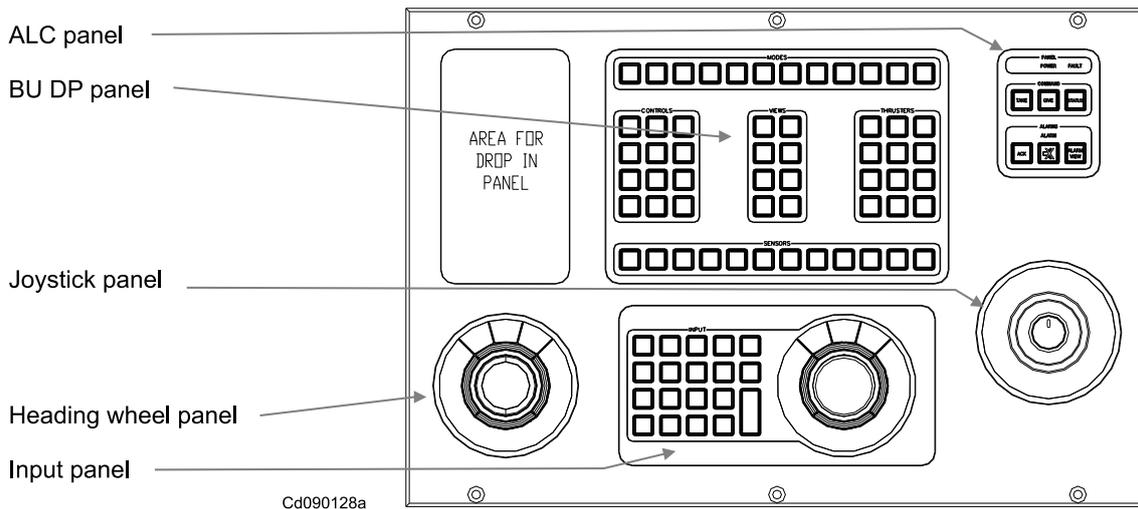
BU-DP panel

The BU-DP panel is a status and command panel module. It provides buttons and lamps for commands in DP systems and contains the following groups; Modes, Control, Views, Thrusters, Sensors for DP commands.

ALC panel

The ALC panel is a status and command panel module. It provides buttons and lamps for command control, and buttons, lamps and buzzers for handling alarms. It contains the following groups; Panel, Command and Alarms and are used for fault indication, command transfer, and alarm and administration.

Heading Wheel panel

The Heading Wheel panel comprises a heading wheel with seven buttons. It is mainly used for setting or changing new heading for DP systems.

Input panel

The Input panel comprises a keypad for entering numbers and letters into the system and a trackball for controlling cursor position on the OS screen. In addition a five port USB hub is provided connecting all panel modules to the computer. It is a general panel for VDU navigation on bridge systems, using alphanumeric keypad and trackball.

Joystick panel

The Joystick panel contains a three-axis joystick used as a joystick control for the DP system. The joystick has three potentiometers that work in the three axis.

For details on each panel type described above, refer to the appropriate *Hardware Module Description*.

K-Thrust OS-555-BI Operator panel

Dynamic Positioning operations in conjunction with K-Thrust OS-555-BI may be performed by use of either the BU-TC panel or the BU-DP panel.

For K-Thrust OS-555-BI systems the following panel types are used as shown in Figure 3. However, the BU-DP panel may also be used as shown in Figure 2 on page 10.

Figure 3   Layout of K-Thrust OS-555-BI Operator panel
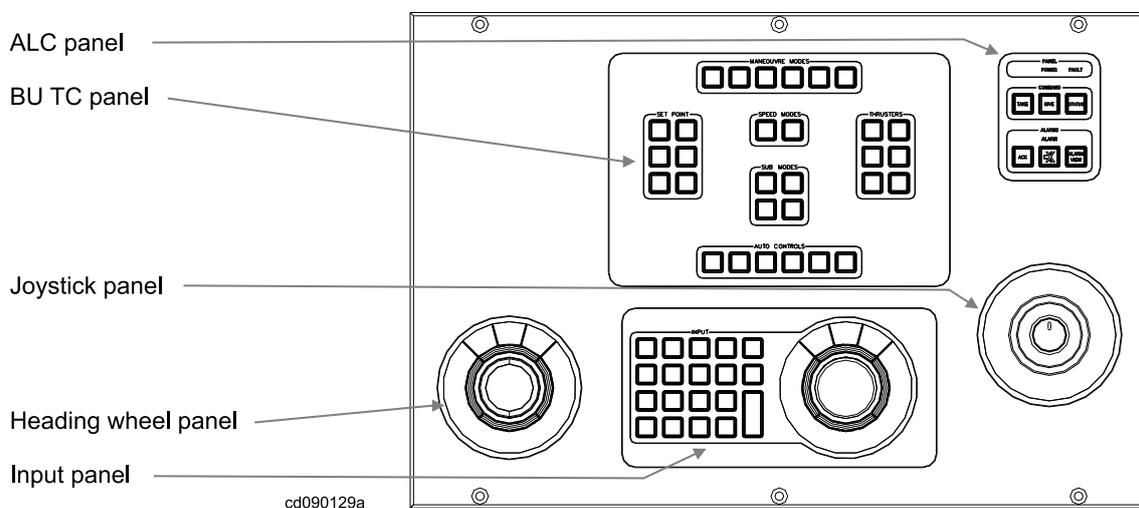
BU-TC panel

The BU-TC panel is a status and command panel module. It provides buttons and lamps for commands in Thruster Control systems and contains the following groups; Manoeuvre Modes, Set Point, Speed Modes, Sub Modes, Thrusters, Auto Controls for K-Thrust commands.

ALC panel

The ALC panel is a status and command panel module. It provides buttons and lamps for command control, and buttons, lamps and buzzers for handling alarms. It contains the following groups; Panel, Command and Alarms and are used for fault indication, command transfer, and alarm and administration.

Heading Wheel panel

The Heading Wheel panel comprises a heading wheel with seven buttons. It is mainly used for setting or changing new heading for DP systems.

Input panel

The Input panel comprises a keypad for entering numbers and letters into the system and a trackball for controlling cursor position on the OS screen. In addition a five port USB hub is provided connecting all panel modules to the computer. It is a general panel for VDU navigation on bridge systems, using alphanumeric keypad and trackball.

Joystick panel

The Joystick panel contains a three-axis joystick used as a joystick control for the DP system. The joystick has three potentiometers that work in the three axis.

For details on each panel type described above, refer to the appropriate *Hardware Module Description*.

K-Chief OS-555-BI Operator panel

For K-Chief OS-555-BI systems the following panel types are used as shown in Figure 4.

Figure 4   Layout of K-Chief OS-555-BI Operator panel
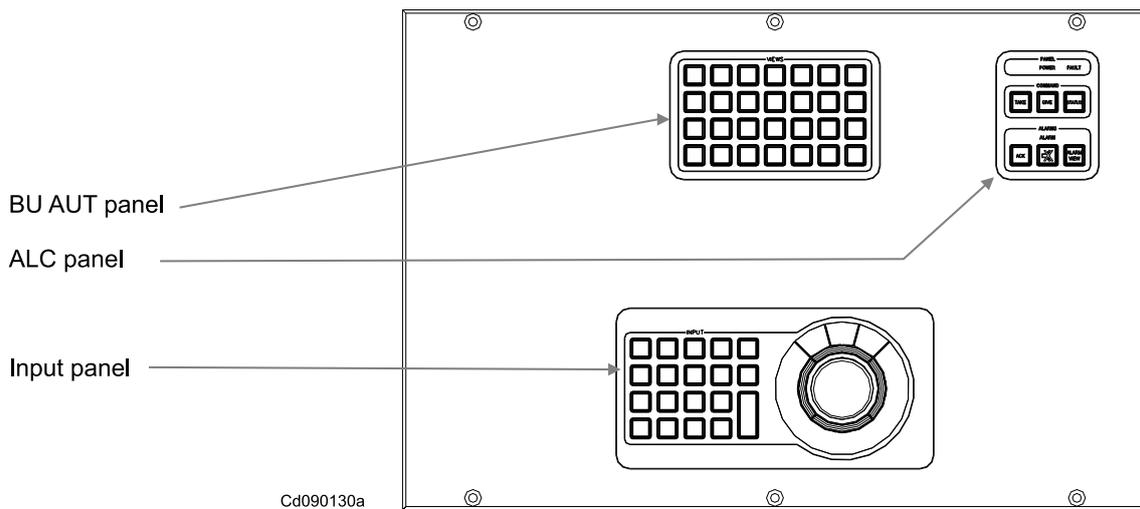
Note _____

The K-Chief OS-555-BI Operator panel is also available in a smaller version (320 mm x 300 mm) populated with the same panels.

BU-AUT panel

The BU-AUT panel is an input panel module. It provides buttons and lamps for Automation systems and contains the View group as alarm panel for K-Chief systems.

ALC panel

The ALC panel is a status and command panel module. It provides buttons and lamps for command control, and buttons, lamps and buzzers for handling alarms. It contains the following groups; Panel, Command and Alarms and are used for fault indication, command transfer, and alarm and administration.

Input panel

The Input panel comprises a keypad for entering numbers and letters into the system and a trackball for controlling cursor position on the OS screen. In addition a five port USB hub is provided connecting all panel modules to the computer. It is a general panel for VDU navigation on bridge systems, using alphanumeric keypad and trackball.

For details on each panel type described above, refer to the appropriate *Hardware Module Description*.

General OS-555-BI and HiPAP-501 OS-555-BI Operator panel

For General OS-555-BI and HiPAP-501 OS-555-BI systems the following panel types are used as shown in Figure 5.

Figure 5   Layout of General OS-555-BI and HiPAP-501 OS-555-BI Operator panel
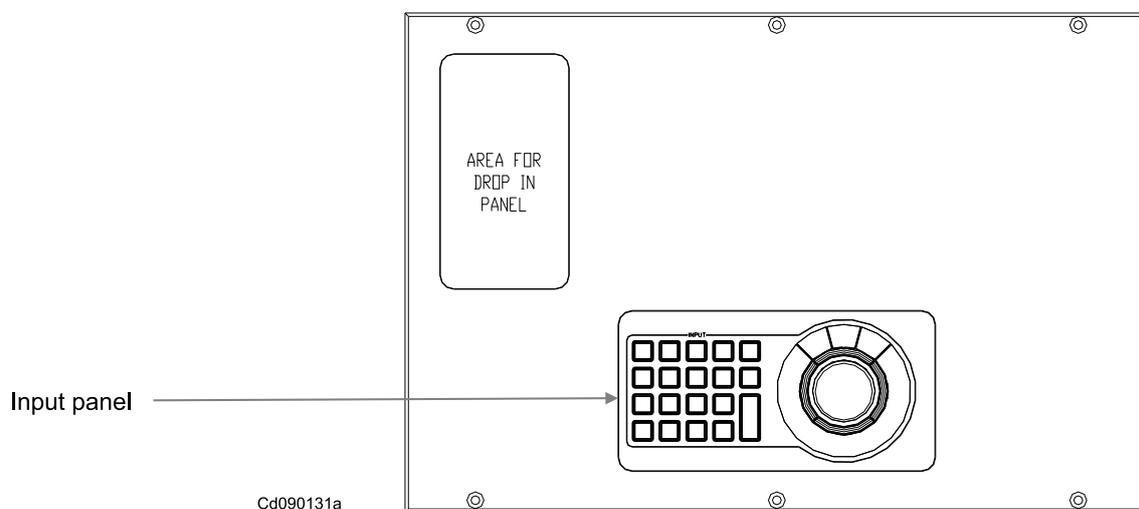
Input panel

The Input panel comprises a keypad for entering numbers and letters into the system and a trackball for controlling cursor position on the OS screen. In addition a five port USB hub is provided connecting all panel modules to the computer. It is a general panel for VDU navigation on bridge systems, using alphanumeric keypad and trackball.

For details on the panel type described above, refer to the appropriate *Hardware Module Description*.

Alphanumeric keyboard

Layout of the alphanumeric keyboard is shown in Figure 6 on page 14.

Figure 6   Layout of alphanumeric keyboard
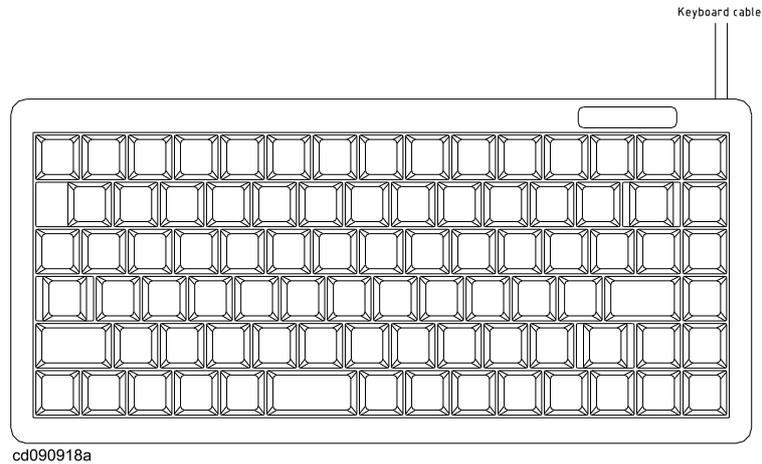
A standard alphanumeric keyboard is available, but is to be used for service purposes only.

Main mounting plate and Side plate configurations

The following internal configurations are available for the OS-555-COP05 Built-in configurations:

Operator Station type	Mounting plate (and drop-in kits if available)
General OS-555-BI, K-Pos OS-555-BI Int, K-Thrust OS-555-BI and K-Chief OS-555-BI	*Main mounting plate layout for General OS-555-BI, K-Pos OS-555-BI Int, K-Thrust OS-555-BI and K-Chief OS-555-BI* on page 15
K-Pos OS-555-BI SA	*Main mounting plate layout for K-Pos OS-555-BI SA* on page 16
K-Pos OS-555-BI Int and the K-Pos OS-555-BI SA	*Side plate layout for K-Pos OS-555-BI* on page 17
	Drop-In kits on page 8
K-Chief OS-555-BI	*K-Chief OS-555-BI kits* on page 18
HiPAP-501 OS-555-BI	*Main mounting plate layout for HiPAP-501 OS-555-BI* on page 24
	Side plate layout for HiPAP-501 OS-555-BI on page 25

Main mounting plate layout for General OS-555-BI, K-Pos OS-555-BI Int, K-Thrust OS-555-BI and K-Chief OS-555-BI

Figure 7   Main mounting plate layout for General OS-555-BI, K-Pos OS-555-BI Int, K-Thrust OS-555-BI and K-Chief OS-555-BI
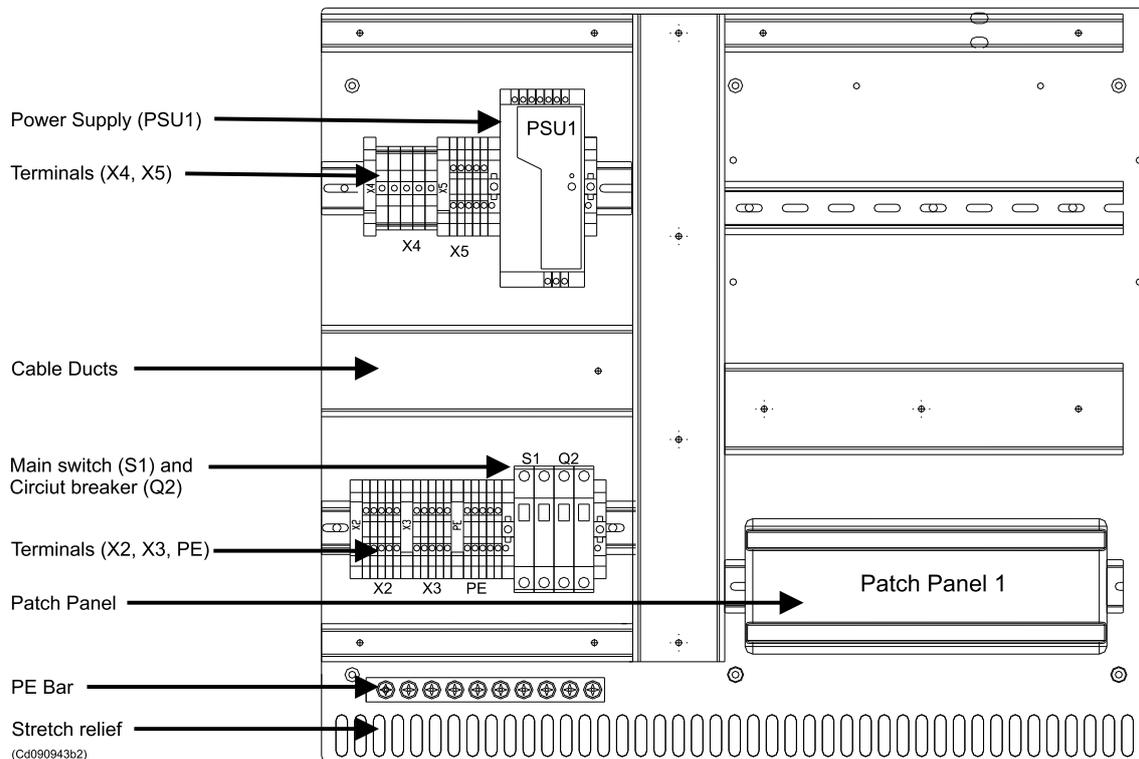
The following main items are located on the Main mounting plate:

Power Supply Unit (PSU1)	Converts 115/230 VAC to 24 VDC.
Terminals (X4 and X5)	Main terminals for 24 VDC and 0 VDC (Gnd).
Cable ducts	are used for collecting and feeding the interface cables on the Main mounting plate.
Main switch (S1)	Main switch for the main supply voltage.
Circuit breaker (Q2)	Main circuit breaker for the main outlet sockets (service purpose only).
Terminals (X2, X3 and PE)	Main terminals which 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 Main mounting plate and to the field (LAN cables).
PE Bar	used for connection the equipment to P.E. earth (ground).
Stretch relief	used for collecting and relieving the patch and interface cables.

Main mounting plate layout for K-Pos OS-555-BI SA

In addition to the General OS-555-BI Main mounting plate configuration (see Figure 7 on page 15) the following items are added as shown in Figure 8.

Figure 8   Main mounting plate layout for K-Pos OS-555-BI SA
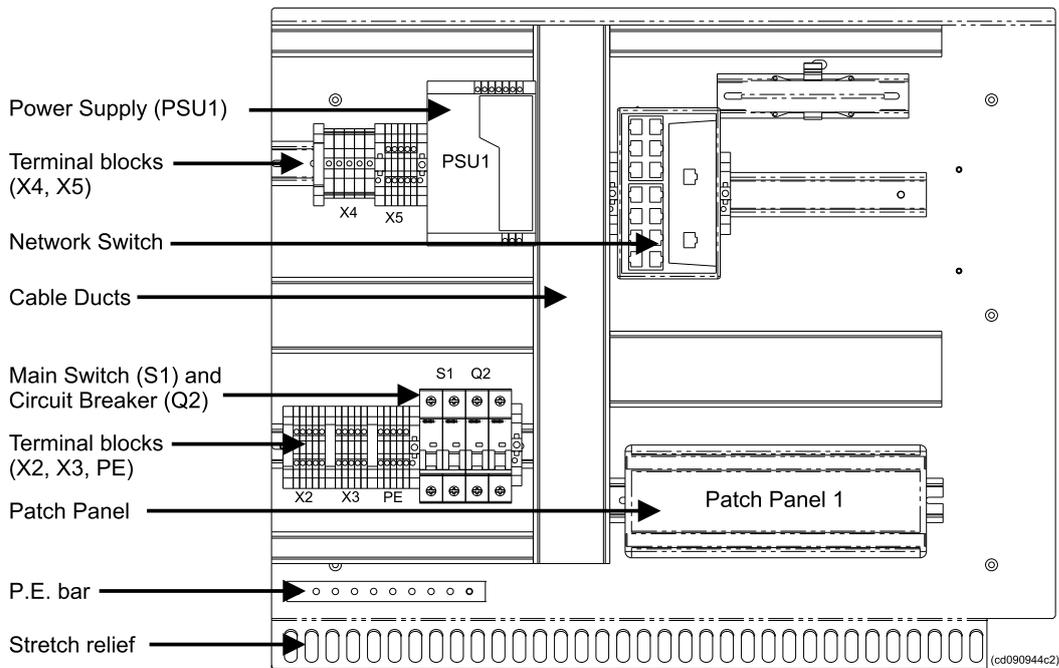
The following extra items are located on the Main mounting plate for the K-Pos OS-555-BI SA.

Power Supply Unit (PSU1)	Converts 115/230 VAC to 24 VDC.
Terminals (X4 and X5)	Main terminals for 24 VDC and 0 VDC (Gnd).
Cable ducts	are used for collecting and feeding the interface cables on the Main mounting plate.
Main switch (S1)	Main switch for the main supply voltage.
Circuit breaker (Q2)	Main circuit breaker for the main outlet sockets (service purpose only).
Terminals (X2, X3 and PE)	Main terminals which are used as connection points for the ships supply voltage (115/230 VAC) to the console.
Switch	DP configuration with LAN switch.
Patch Panel	is used for patching the interface cables from the Main mounting plate and to the field (LAN cables).
PE Bar	used for connection the equipment to P.E. earth (ground).
Stretch relief	used for collecting and relieving the patch and interface cables.

Side plate layout for K-Pos OS-555-BI

Figure 9   Side plate layout for K-Pos OS-555-BI
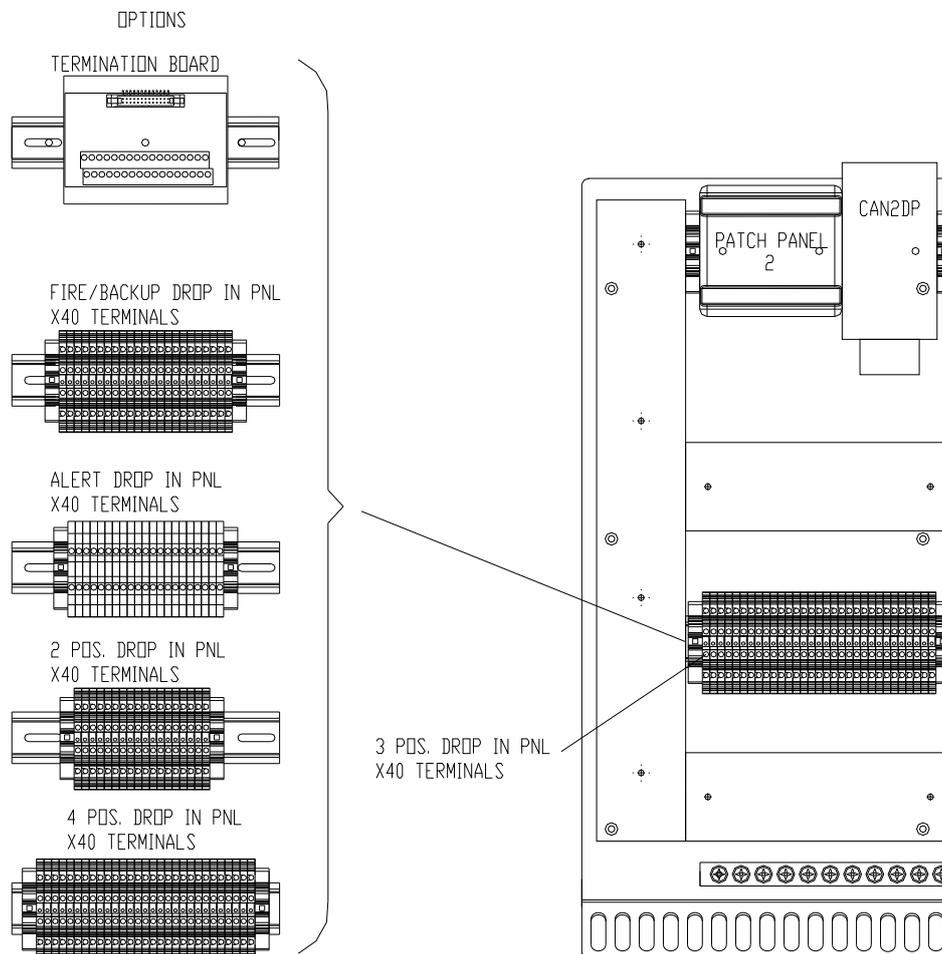
The following main items are located on the Side plate:

CAN to DP Converter   is used for converting the CAN signals to RS232 format.

Patch Panel   is used for patching the interface cables from the Side plate and to the field (LAN cables).

Cable duct   are used for collecting and feeding the interface cables on the Side plate.

Terminals   Main terminals for connecting field signals to terminals. Different options for the terminals are shown at the left of Figure 9.

PE Bar   used for connection the equipment to P.E. earth (ground).

Stretch relief   used for collecting and relieving the patch and interface cables.

K-Chief OS-555-BI kits

Alarm Output kit

In addition to the General OS-555-BI Main mounting plate configuration (see Figure 7 on page 15) the following item are added as shown in Figure 10.

Figure 10   Main mounting plate layout for Alarm Output kit
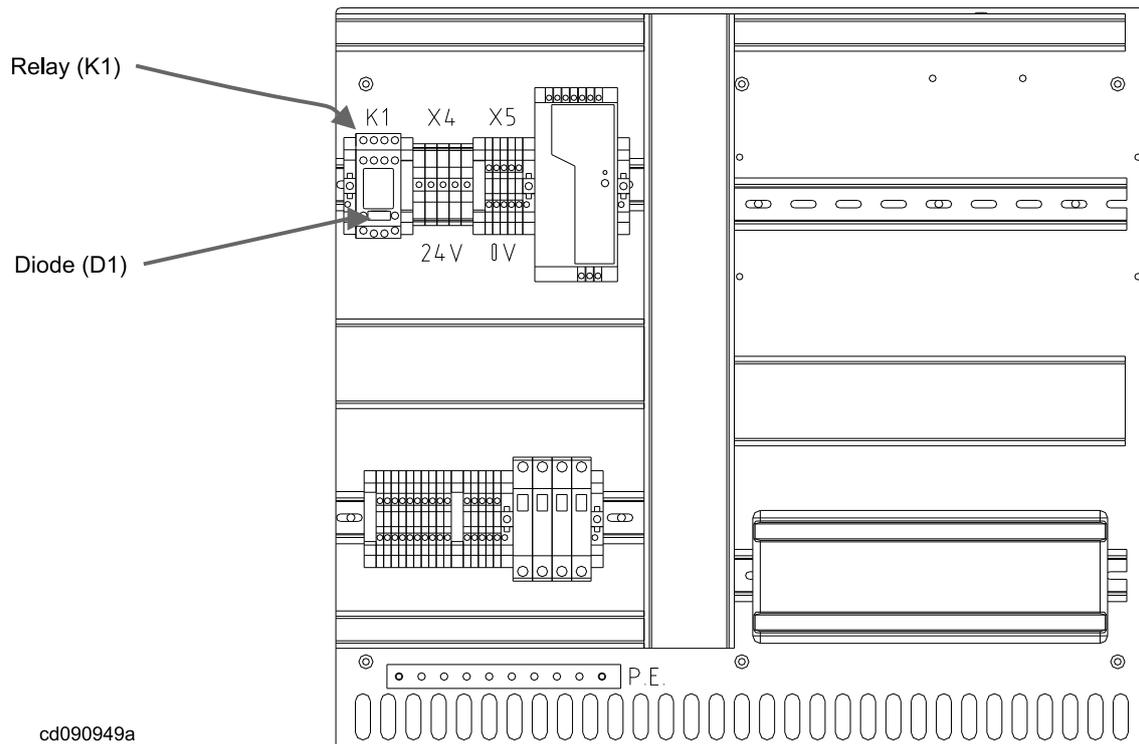
The following extra items are located on the Main mounting plate by the Alarm Output kit:

Relay (K1)	The relay is connected to the Input Panel and gives alarm messages.
Diode (D1)	Diode for the relay of the Alarm output kit.

CANbus to Ethernet kit

The following Side plate is added by the CANbus to Ethernet kit as shown in Figure 11.

Figure 11   Side plate layout for CANbus to Ethernet kit
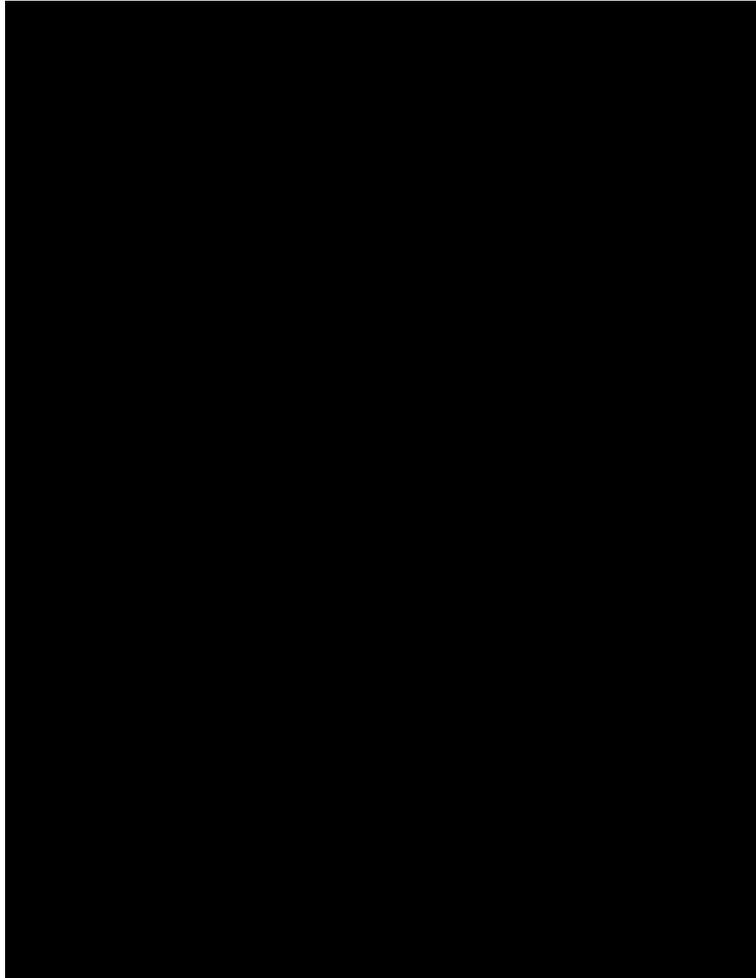
The following main items are located on the Side plate:

Power Supply Unit (PSU2)	24 VDC and 115/230 VAC supplying the CANbus to Ethernet kit.
Circuit breaker (Q4)	24 VDC/10A fuse for the CANbus to Ethernet kit.
CAN Converter	is used to convert CAN signals to ethernet signals to be connected to the computer.
Terminals	Terminals for input voltage and signals.

Dual Power Input kit

In addition to the General OS-555-BI Main mounting plate configuration (see Figure 7 on page 15) the following items are added as shown in Figure 12.

Figure 12   Main mounting plate layout for Dual Power Input kit
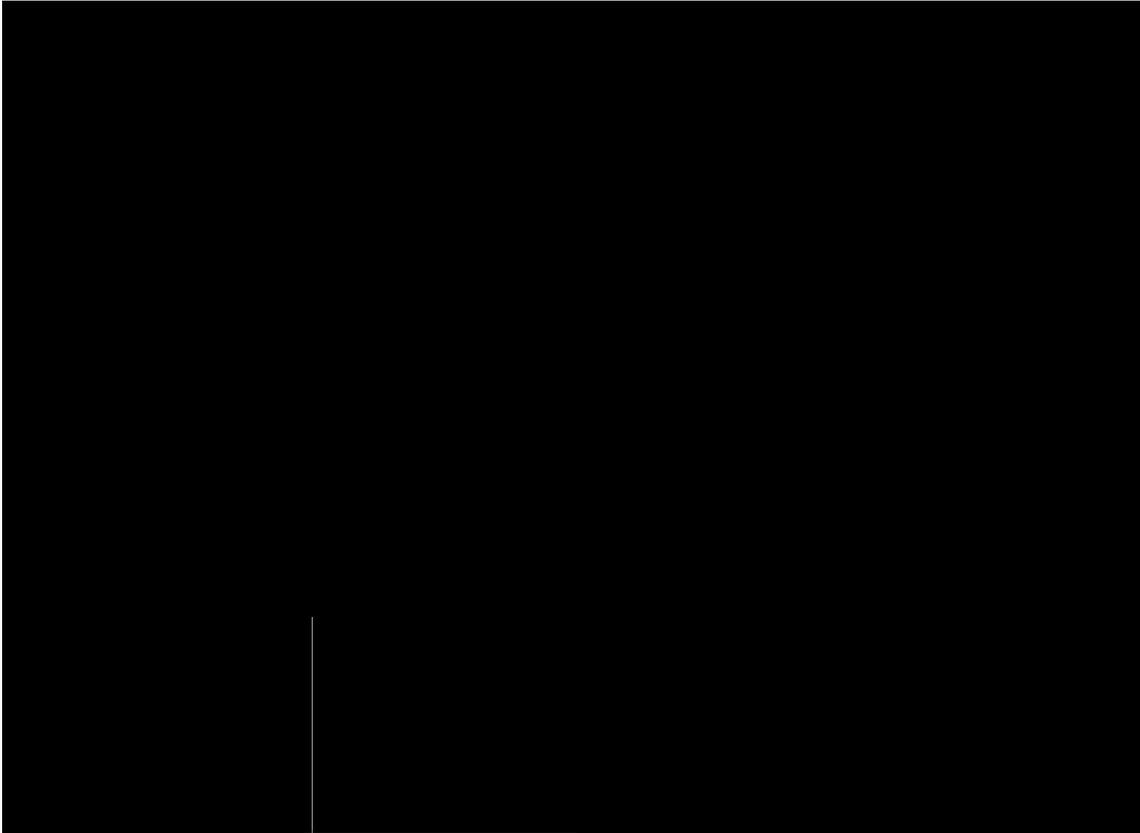
The following extra items are located on the Main mounting plate by the Dual Power Input kit:

Relay (K3)	The relay senses and switches the mains voltage to main switch S1.
Terminals	Terminals for Ships supply (X1) and for Emergency Supply UPS (X13).

Fibre Net kit

In addition to the General OS-555-BI Main mounting plate configuration (see Figure 7 on page 15) the following items are added as shown in Figure 13.

Figure 13   Main mounting plate layout for Fibre Net kit
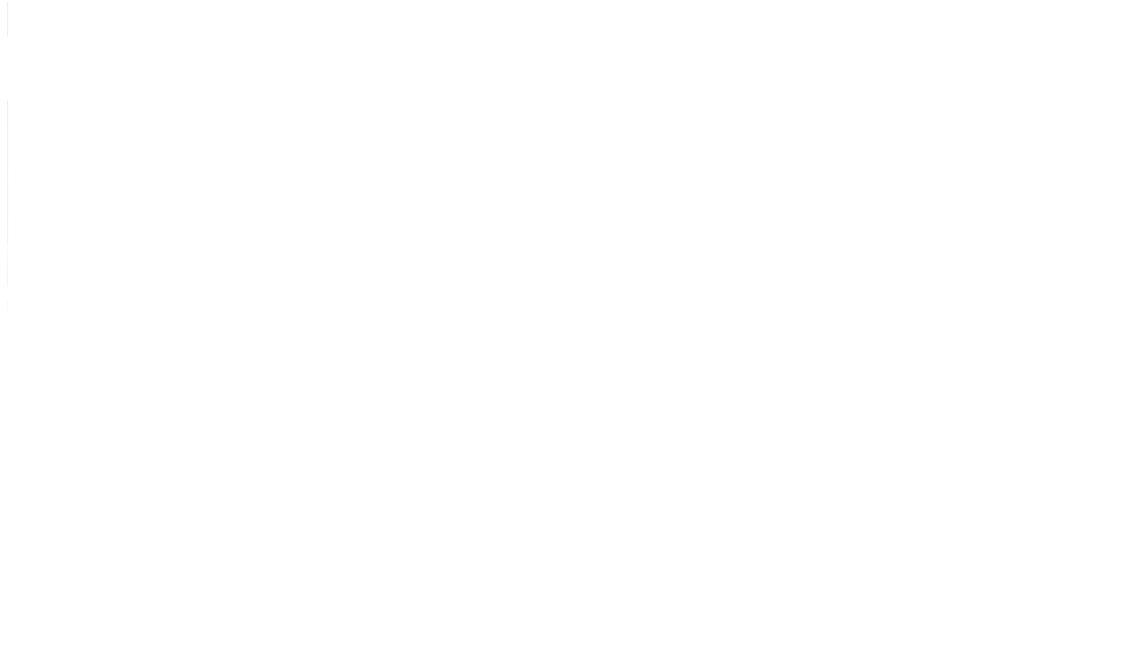
The following extra items are located on the Main mounting plate by the Fibre Net kit:

Converters (Net A, B and C)	are used to convert to/from Fibre signals from/to ethernet on twisted pair signals.
Fibre Splice Box	is used as connection box for 8 fibre cables.

Network Net-A or Net-B kit

In addition to the General OS-555-BI Main mounting plate configuration (see Figure 7 on page 15) the following items are added as shown in Figure 14.

Figure 14   Main mounting plate layout for Network Net-A or Net-B kit
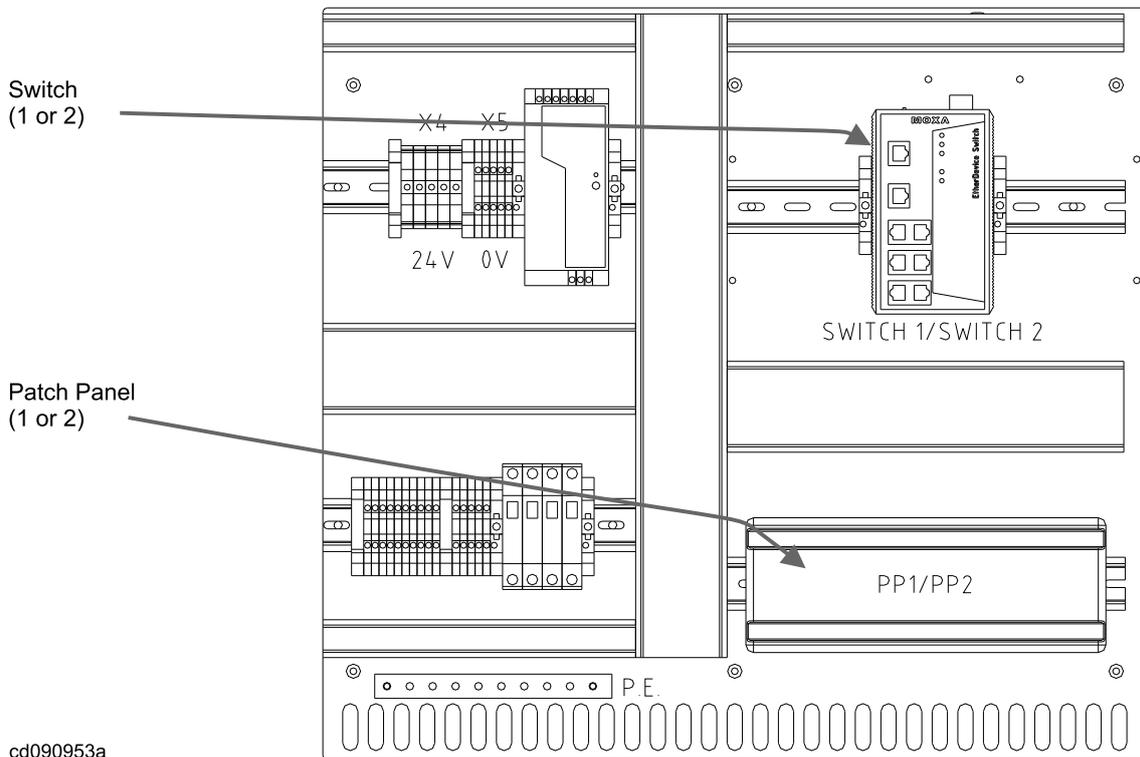
The following extra items are located on the Main mounting plate by the Network Net-A or Net-B kit:

Network Switch 1 or 2	are used as switches for Net A (switch 1) or Net B (switch 2).
Patch Panel 1 or 2	are used as patch panel for Net A (patch panel 1) or Net B (patch panel 2).

Network Net-C kit

In addition to the General OS-555-BI Main mounting plate configuration (see Figure 7 on page 15) the following items are added as shown in Figure 15.

Figure 15   Main mounting plate layout for Network Net-C kit
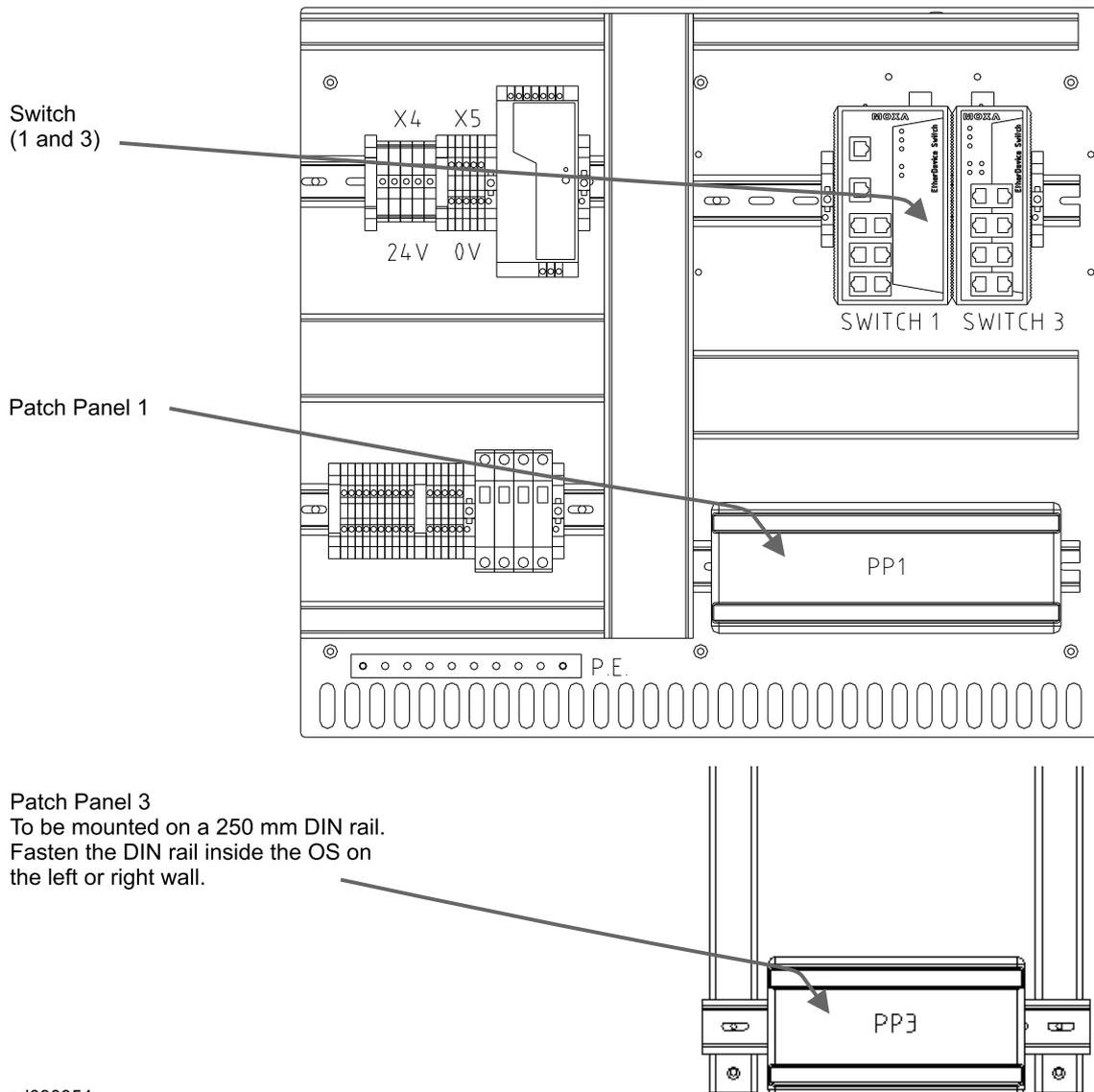
cd090954a

The following extra items are located on the Main mounting plate by the Network Net-C kit:

Network Switch 1 and 3	are used as switches for Net A (switch 1, managed) and Net C (switch 3 unmanaged).
Patch Panel 1 and 3	are used as patch panel for Net A (patch panel 1) and Net C (patch panel 3).

Main mounting plate layout for HiPAP-501 OS-555-BI

In addition to the General OS-555-BI Main mounting plate configuration (see Figure 7 on page 15) the following items are added as shown in Figure 16.

Figure 16   Main mounting plate layout for HiPAP-501 OS-555-BI
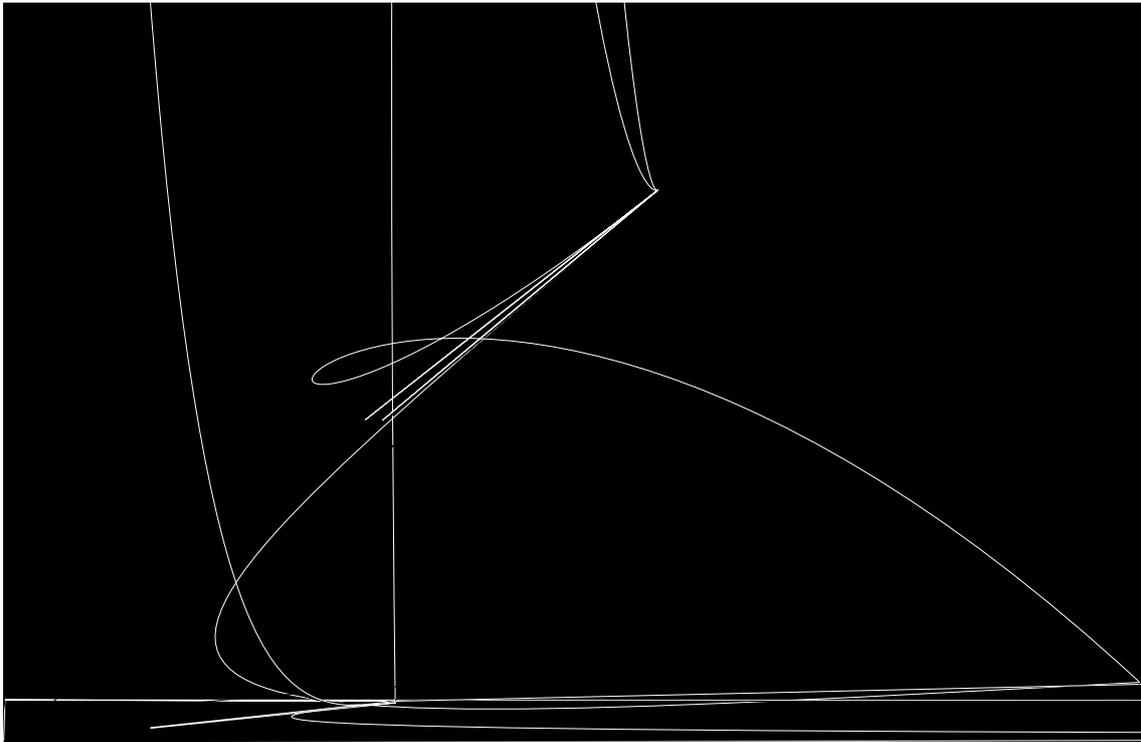
The following main items are located on the Main mounting plate:

HPR Serial line kit	Kit for Hydro-acoustic Position Reference (HPR) system. Kit for RS232; COM1 to COM4 ports.
Power Supply Unit (PSU1)	Converts 115/230 VAC to 24 VDC.
Terminals (X4 and X5)	Main terminals for 24 VDC and 0 VDC (Gnd).
Loose cables inside console	Loose cables for RS485/422; COM7 to COM10.
Cable ducts	are used for collecting and feeding the interface cables on the Rear mounting plate.
Main switch (S1)	Main switch for the main supply voltage.
Circuit breaker (Q2)	Main circuit breaker for the main outlet sockets (service purpose only).
Terminals (X2, X3 and PE)	Main terminals which 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 Rear mounting plate and to the field (LAN cables).
PE Bar	used for connection the equipment to P.E. earth (ground).
Stretch relief	used for collecting and relieving the patch and interface cables.

Side plate layout for HiPAP-501 OS-555-BI

The following Side plate is available as shown in Figure 17.

Figure 17   Side plate layout for HiPAP-501 OS-555-BI
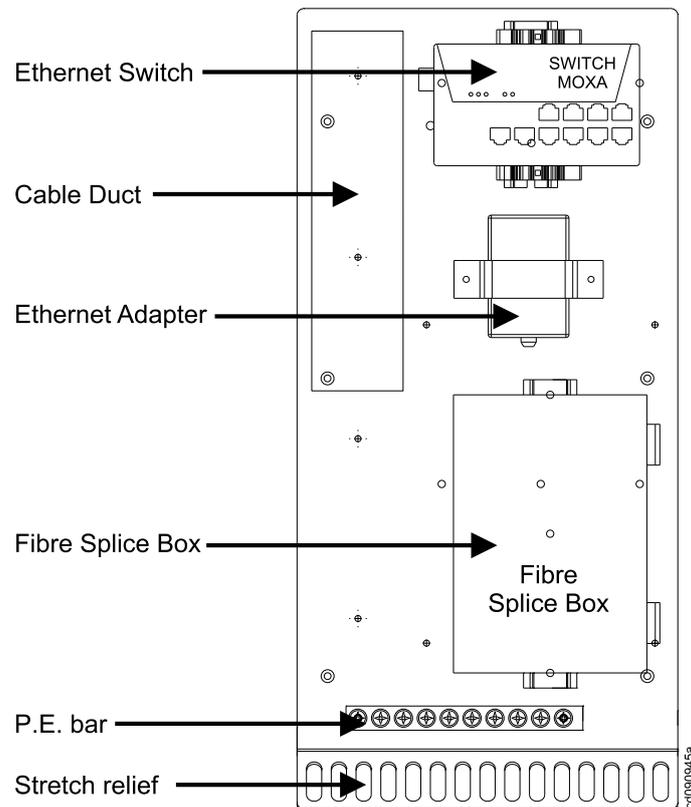
The following main items are located on the Side plate:

Cable duct	are used for collecting and feeding the interface cables on the Side plate.
Switch	is used for converting the fibre signals to ethernet.
Ethernet adapter	USB Ethernet adapter.
Fibre Splice Box	is used as connection box for 8 fibre cables.
PE Bar	used for connection the equipment to P.E. earth (ground).
Stretch relief	used for collecting and relieving the patch and interface cables.

Power supply and signal wiring

All OS systems (except HiPAP)

Figure 18   OS-555-COP05 Built-in equipment and interconnections
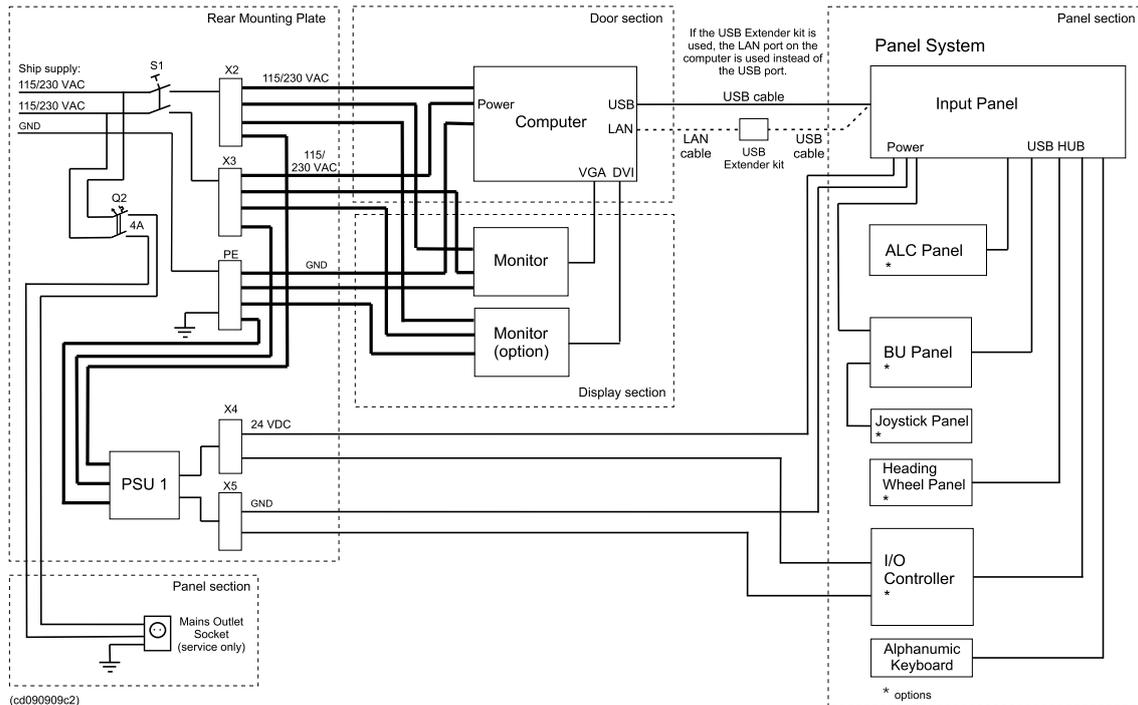
See Figure 18 for block diagram.

The OS handles both 115 VAC and 230 VAC as mains supply. The AC voltage is usually fed from an Uninterruptible Power Supply (UPS) and is terminated on main switch S1 located on the Main mounting plate inside the OS.

The main switch (S1) and circuit breaker (Q2) are located on the Main mounting plate.

The main voltage passes the circuit breaker Q2 and trips and breaks the circuits if the mains current exceeds the rated Q2 current.

The UPS/AC ship supply is distributed, via main switch S1 and row terminals X2 and X3 (and PE for ground), to supply the computer and monitor(s).

The Panel system gets its mains supply from terminals X2, X3 and PE, via a power supply unit (PSU1) 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 I/O Controller (option) gets it supply voltage directly from the 24 VDC power supply unit (PSU1). The Joystick, if used is supplied via the BU-DP or the BU-TC panel.

If the length of the cable between the computer and the Input panel is greater than five metres, a USB extender kit (part number 334243) will be used.

The UPS/AC ship supply also passes the circuit breaker Q2 before it is passed to 115/230 VAC 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.

HiPAP systems

Figure 19   OS-555-COP05 Built-in HiPAP systems
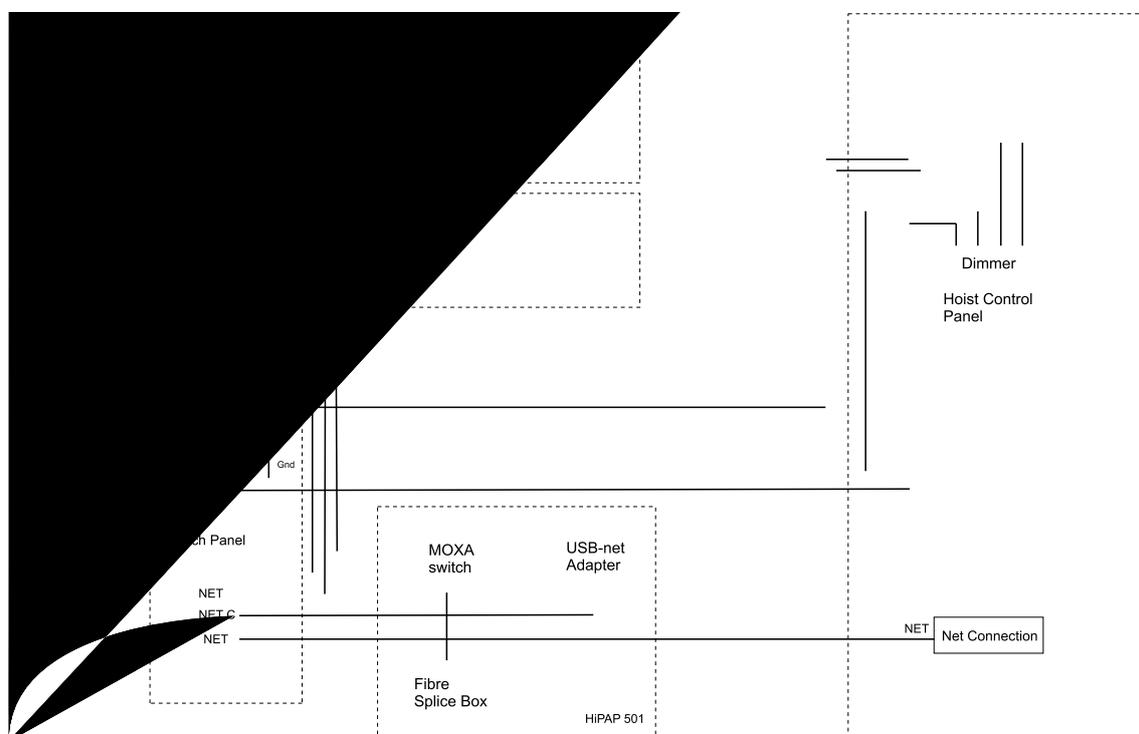
Some additions apply for the HiPAP version compared with the other OSes, refer to Figure 18 on page 26 and Figure 19.

In addition to a standard version, a Side plate is added with the following equipment:

• A Fibre Splice Box

• A Moxa Switch

These two components splice and switch the incoming field signals to ethernet and connects them to the computer.

• An USB Net Adapter – This is an adapter that converts from ethernet to USB on the computer.

Network connections

Figure 20   Example of network connection (OS without switch)
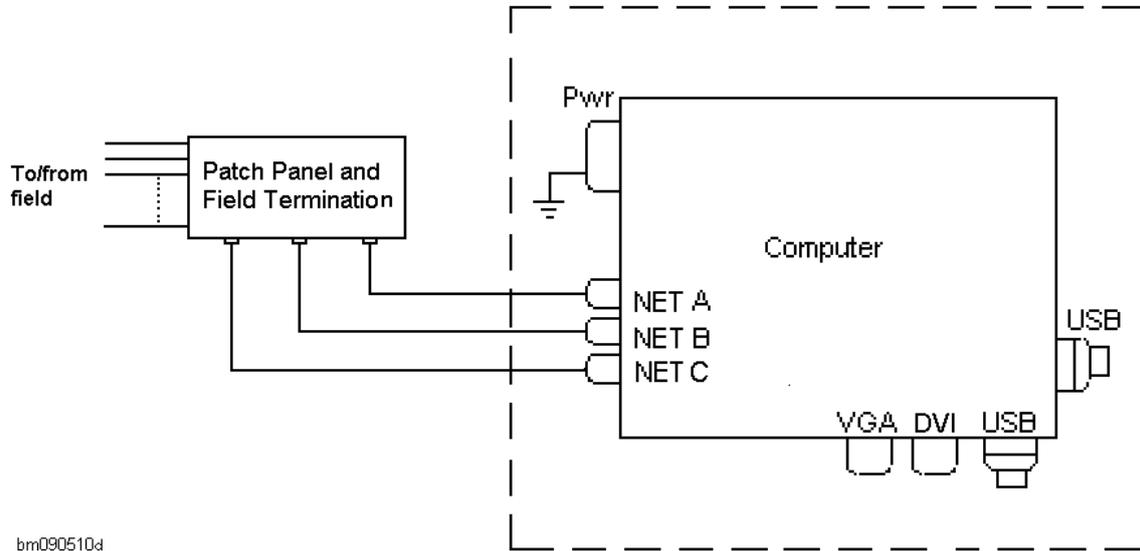
Figure 21   Example of network connection (OS with switch on Net A, e.g. DP OS)
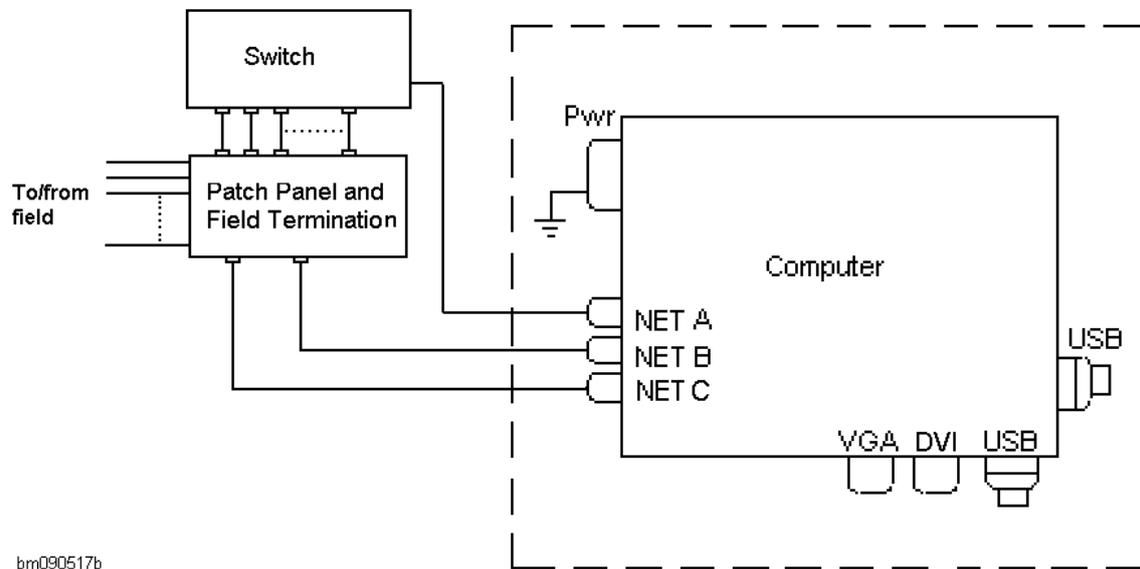
Note

The OS may have a network switch installed for either Net A or Net B. If the OS is without a network switch Figure 20 applies.

Computer

Computer versions

Different computer versions are available, depending on the OS-555-COP05 Built-in system it is supporting.

The following computer versions are available:

- MPxxxx Base model
- MPxxx NAV model
- MPxxx with 8 channel serial interface (Blue Storm) model
- APCxx (for HiPAP-501 OS-555-BI)

For a detailed description of the different computer types, refer to the *MPxxxx Maintenance Manual* or the *APCxx Maintenance Manual*.

Computer damper kits

The computer is mounted on shock absorbers or a damper kit.

The available kits for the MPxxxx are:

- Vertical mounted kit
- Horizontal mounted kit

Figure 22   Damper kit, vertical
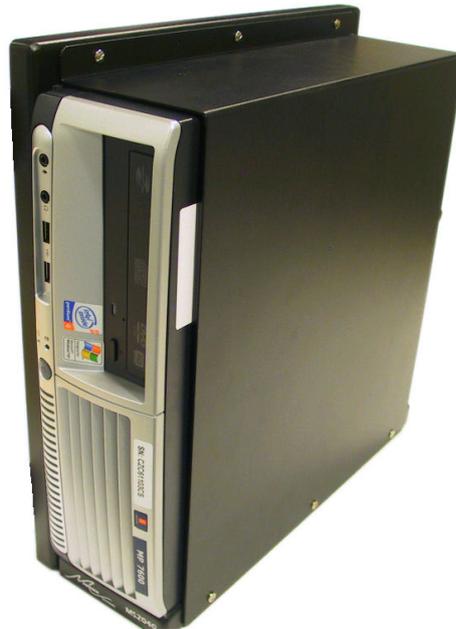
Figure 23   Damper kit, horizontal

The available kit for the APCxx is:

• Mounting kit, APCxx

Fault finding

This section presents the fault finding principles for the OS-555-COP05 Built-in.

Panel and Alarm lamps and buttons

The Panel and Alarm lamps and buttons are located in two groups on the ALC panel (see Figure 2 on page 10).

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.

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. Refer to the appropriate *Hardware Module Description* for details.
- Status of power voltages and fuses in the system. Refer to the appropriate *Hardware Module Description* for details.
- System-specific diagrams, lists and drawings. Refer to the appropriate *Drawing File* for details.
- Replacement procedures for replaceable modules. Refer to *Corrective Maintenance* on page 41, the appropriate *Hardware Module Description* or the appropriate *Maintenance Manual* for details.

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

The power supply unit (QUINT-PS/1AC/24DC/10) is a 115/230 VAC to 24 VDC converter. The status of this power supply unit is shown by a green LED on front of the unit, which when lit green corresponds to an OK state.

The power supply unit is located inside the panel section (see Figure 7 on page 15).

The message system

The OS-555-COP05 Built-in systems contain self 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-555-COP05 Built-in related system messages are displayed on the OS and/or on the event/alarm printer to inform the operator about controller/process station faults or to bring any other relevant information to the operator's attention.

For detailed information concerning system messages, refer to the appropriate *Operator/User Manual* for detailed information on reading the equipment status.

Online help

When system is running, the Message Line in the display layout or Event Window shows the most recent warning, alarm or emergency 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*.

Fault finding flowchart

Check status o
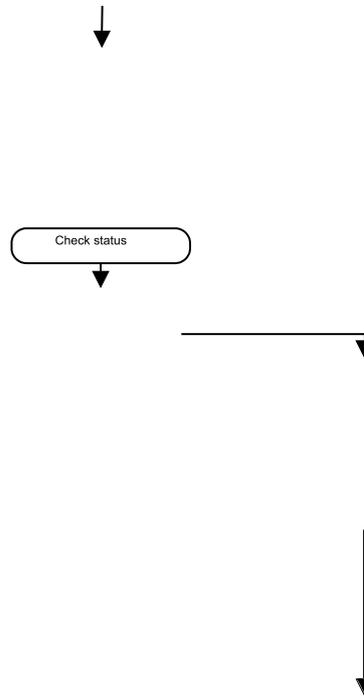
Note

If you are not able to correct the error situation yourself, you should contact your nearest Kongsberg Maritime service office for advice or to request for service.

Preventive Maintenance

This section provides the preventive maintenance for the OS-555-COP05 Built-in.

How to tighten screws in the field termination blocks

Use a screwdriver with isolated handle to tighten any loose screws on patch panel and field termination.

How to check connector locks

Use a screwdriver to tighten locking screws on the D-SUB connector houses.

Check if the RJ45 network connector plugs are locked by pushing them into the connector. If the lock flip is not in lock position, a click will be heard when pushed.

Flat-cable connector locks should be checked by visual inspection only. Ensure that the locks are in correct position.

How to check buttons, lamps and panels

Note

For all panels, the light intensity of the backlighting and status lamps can be dimmed from the OS of which the panel is a part.

BU-DP panel

Figure 24 on page 35 shows the front layout of the BU-DP panel. It contains 56 buttons. All buttons except for those in the **VIEWS** 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 24   Front layout of the BU-DP panel

A more detailed description of the BU-DP panel can be found in the *COP-05 BU-DP Panel Hardware Module Description*.

BU-TC panel

Figure 25 on page 36 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 25   Front layout of the BU-TC panel

Thruster buttons
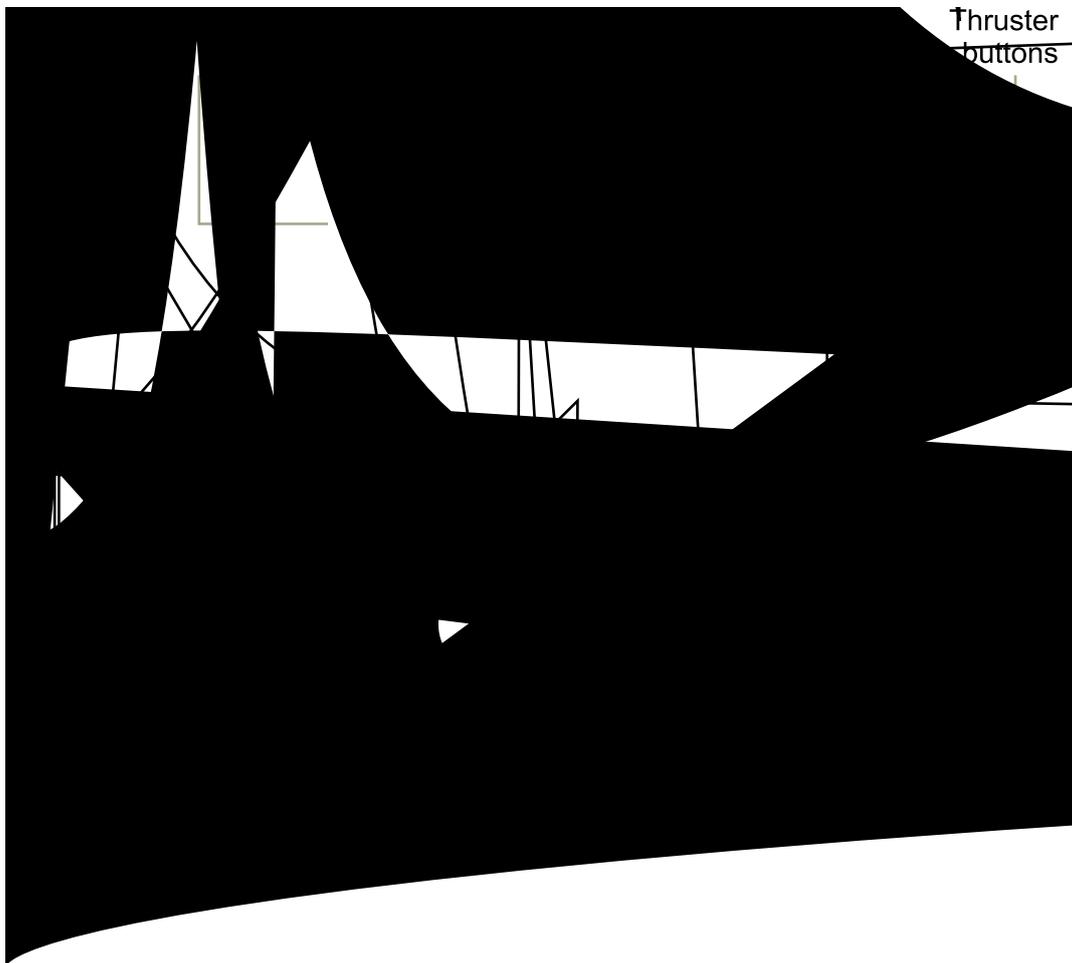
A more detailed description of the BU-TC panel can be found in the *COP-05 BU-TC Panel Hardware Module Description*.

BU-AUT panel

Figure 26 on page 37 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 26   Front layout of the BU-AUT panel
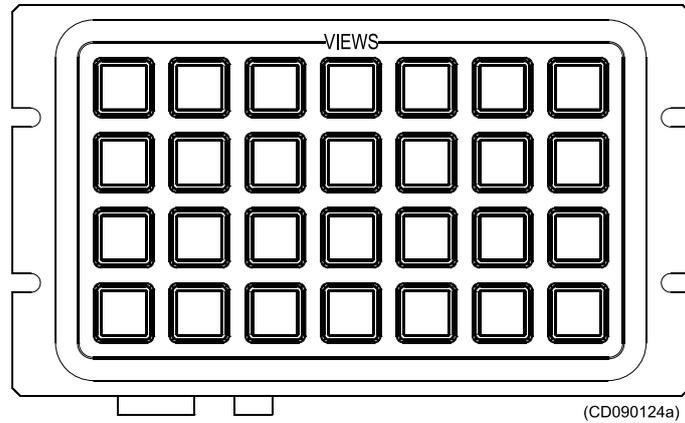
A more detailed description of the BU-AUT panel can be found in the *COP-05 BU-AUT Panel Hardware Module Description*.

Input panel

Figure 27 on page 38 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.

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 her (see also *How to clean the buttons, panels and rollerball* on page 39).

Note _____

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

Figure 27   Front layout of the Input panel
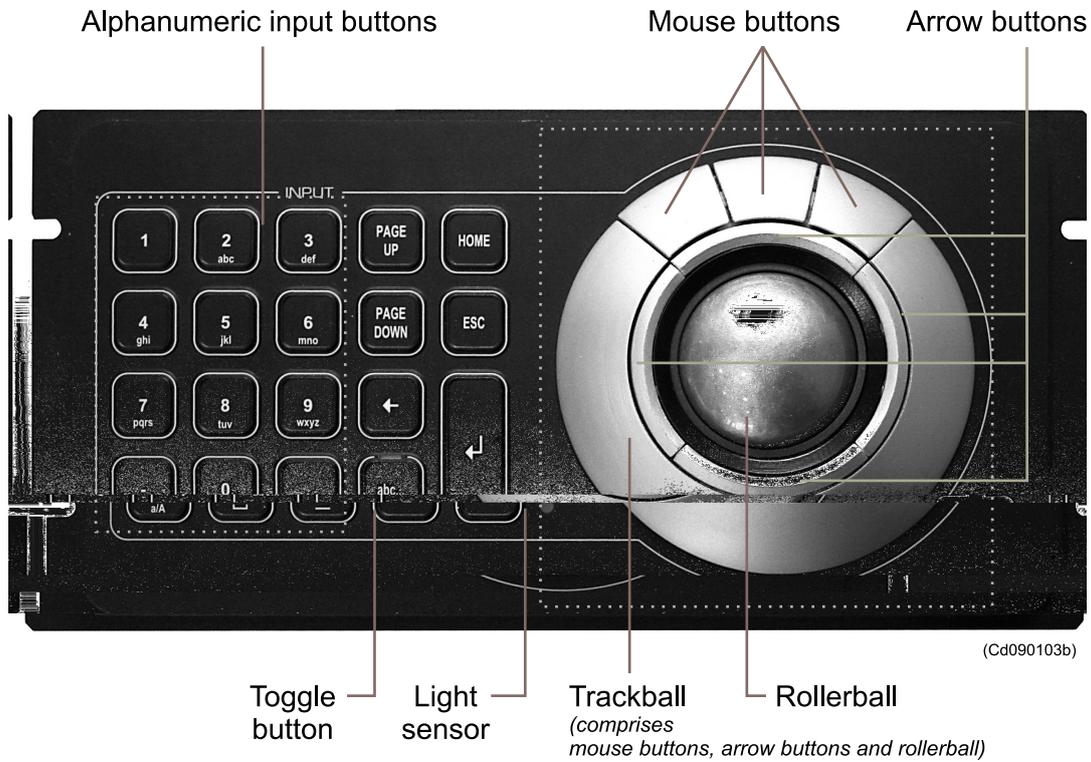
Note

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

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

How to clean the console housing

Use a lint-free, non-abrasive cloth and a neutral or mild soap solution for best result. Use only moistened cloth. Do not use a dripping wet cloth when cleaning.

How to adjust the colour monitor settings

Adjust the appropriate settings in accordance with the colour monitor, refer to the appropriate colour monitor *Hardware Module Description* and/or sub-supplier *User Manual*.

How to clean the colour monitor screen surface

Use a lint-free, non-abrasive cloth and a neutral cleaner based on a non-abrasive cleaning solution or a glass cleaner for best result.

How to access the alphanumeric keyboard

Caution

Use of the alphanumeric keyboard for maintenance purposes is restricted to Kongsberg Maritime service personnel.

The alphanumeric keyboard may be located wherever suitable, but close to the OS.

How to maintain the computer

For preventive maintenance of the computer, refer to the *MPxxxx Maintenance Manual* or the *APCxx Maintenance Manual*.

How to clean the buttons, panels and rollerball

Use a vacuum cleaner with a soft brush to avoid damage to buttons and panels. If required, clean the buttons and panel with a non-abrasive cloth.

Note

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

If the Rollerball has been contaminated with dust particles or similar, it should be cleaned using the procedure given in the *COP-05 Input Panel Hardware Module Description*.

How to clean the Heading Wheel panel

If the heading wheel has been contaminated with dust particles and grease, it should be cleaned using a vacuum cleaner with a soft brush to avoid damage to the buttons and the panel. If required, clean the buttons and panel with a non-abrasive cloth.

How to clean the Joystick panel

If the Joystick panel has been contaminated with dust particles and grease, it should be cleaned using a vacuum cleaner with a soft brush to avoid damage to the buttons and the panel. If required, clean the panel with a non-abrasive cloth.

OS preventive maintenance intervals

Note

Local evaluation should be made to determine site-specific maintenance intervals.

Table 1   *Recommended OS maintenance intervals*

Action	Interval recommended
Clean the colour monitor screen.	One week.
Clean the console housing.	One month.
Check the computer.	One month.
Clean the buttons and panels.	One month or as required.
Adjust the colour monitor settings.	Three months or as required.
Clean the rollerball.	Three months or as required.
Tighten the termination block screws.	Six months.
Clean the heading wheel.	Six months or as required.
Clean the Joystick panel.	Six months or as required.
Check the connector locks.	Twelve months.

For preventive maintenance of the computer MPxxxx, refer to the *MPxxxx Maintenance Manual*, for the computer APCxx, refer to the *APCxx Maintenance Manual* and for the colour monitor, refer to the sub-supplier *User Manual* supplied with the monitor.

Corrective Maintenance

This section presents the corrective maintenance procedures for the OS-555-COP05 Built-in.

Corrective maintenance procedures not described in this section are to be found in the appropriate *Hardware Module Description* for the part numbers referred to in the replaceable parts and recommended spare parts list. Corrective maintenance of parts not provided by any of the above should be performed by Kongsberg Maritime service personnel only.

Precautions and requirements before replacing a Module

Caution

Be careful not to strain the cables between the operator panel and system frame.

Switching off the OS

Before performing corrective maintenance on the OS, power must be turned off as follows:

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

2   When the shut-down procedure has been completed and the application has closed down, turn off main switch S1 (see Figure 7 on page 15).

Note

Circuit breaker Q2 must be turned off, if power to the main outlet socket (for service) is to be turned off.

Replacing the colour monitor

The following step must be done before performing this procedure:

• Ensure that the new colour monitor is the recommended spare part for OS-555-COP05 Built-in.

1 Shut-down and turn off power as described in *Switching off the OS* on page 41.

2 Remove the four 6 mm umbraco screws (two at each side of the defective colour monitor).

Figure 28   Example of colour monitor

3 Disconnect the VGA cable (J1) and Power cable from back of the defective colour monitor.

4 Carefully lift the defective colour monitor out of the OS frame and place aside.

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

6 Get the new colour monitor and loosen the attached brackets.

7 Install the new colour monitor by performing the above procedure in the reverse order.

8 Switch on power to the OS by turning on main switch S1.

Replacing the computer

For corrective maintenance of the computer, refer to the *MPxxxx Maintenance Manual* or the *APCxx Maintenance Manual*.

Replacing the panels in the Operator panel

Note _____

Different OS configurations are available, so the Operator panel may look different than that shown in Figure 29 on page 43 and Figure 30 on page 44.

_____

The following step must be done before performing this procedure:

• Ensure that the different panels are the recommended spare part for OS-555-COP05 Built-in.

The panels located in the Operator panel are replaced as follows:

1   Shut-down and turn-off power as described in *Switching off the OS* on page 41.

2   Remove the six 6/12 mm umbraco screws from the top of the Operator panel (three at the front and three at the rear).

Figure 29   Example of Operator panel layout
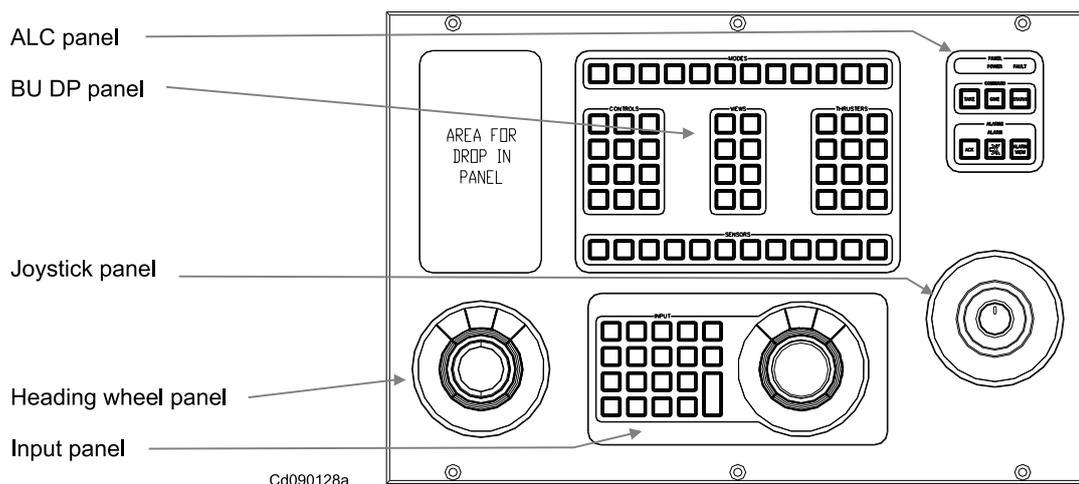
3   Lift the Operator panel plate by taking hold of the plate and raising it upwards about 2 cm.

The Operator panel is now ready to be lifted and tilted up.

4   When lifting the Operator panel upwards, carefully tilt the front of the panel backwards, about 120° (see Figure 30 on page 44).

The panels located in the Operator panel are all attached to the panel plate from underneath by 4 nuts and screws attached to the underside of the Operator panel.

Figure 30   Operator panel seen from underneath

4 off screws on
each panel
(2 off on each side)

USB connector
connected to
each panel

Cd090928

5   For the panel to be replaced, disconnect the USB cable and then remove the four
nuts attaching the panel to the Operator panel.

For further details, refer to following for the different panel types:

a   Replacing the **ALC panel**, refer to the *COP05 ALC Panel Hardware Module
Description*.

b   Replacing the **BU-DP panel**, refer to the *COP05 BU-DP Panel Hardware
Module Description*.

c   Replacing the **BU-TC panel**, refer to the *COP05 BU-TC Panel Hardware
Module Description*.

d   Replacing the **BU-AUT panel**, refer to the *COP05 BU-AUT Panel Hardware
Module Description*.

e   Replacing the **Input panel**, refer to the *COP05 Input panel Hardware Module
Description*.

f   Replacing the **Heading Wheel panel**, refer to the *COP05 Heading Wheel
Panel Hardware Module Description*.

g   Replacing the **Joystick panel**, refer to the *COP05 Hardware Module
Description*.

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

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

8   Lower the Operator panel back down into position.

9   Refit the six 6/12 mm umbraco screws back into to the top of the Operator panel
(three at the front and three at the rear).

10   Switch on power to the OS by turning on main switch S1.

Replacing the power supply unit

The power supply unit is located on the Main mounting plate (see Figure 7 on page 15).

The following step must be done before performing this procedure:

- Ensure that the new power supply unit module is the recommended spare part for OS-555-COP05 Built-in.

1   Shut-down and turn off power to the OS as described in *Switching off the OS* on page 41.

2   Locate the defective power supply unit on the Main mounting plate.

3   Locate the cables connected to the defective power supply unit and disconnect them from the defective power supply unit.

    Make sure the cables are correctly marked so they can be identified for reconnection to the new power supply unit.

4   Insert a flat-head screwdriver into the slot in the mounting plate as shown in Figure 31 on page 46.

5   Push the screwdriver handle in the direction shown in Figure 31 on page 46 to retract the lock.

6   With the lock retracted, remove the power supply unit from the DIN mounting rail.

7   Carefully unscrew the mounting plate from the power supply unit.

8   Mark the defective power supply unit with a label describing the symptoms observed, then pack it in a shielding bag and store it in a safe place.

9   Fasten the mounting plate to the new power supply unit.

10   Position the new power supply unit over the DIN rail with the mounting plate pressed against the DIN rail.

11   Repeat steps 4 and 5 while holding the new power supply unit firmly against the DIN rail.

12   Remove the screwdriver from the slot.

13   Make sure that the new power supply unit is firmly attached to the DIN rail.

14   Connect the cables to the new power supply unit.

15   Switch on power to the OS by turning on main switch S1.

16   Verify, by measuring at the **Output DC 24 V 10 A** terminals (**+** and **–**) on the new power supply unit , that the correct voltage (24 VDC) is present.

17   Close and lock the front door of the OS.

Figure 31   Removing the power supply unit from the DIN rail
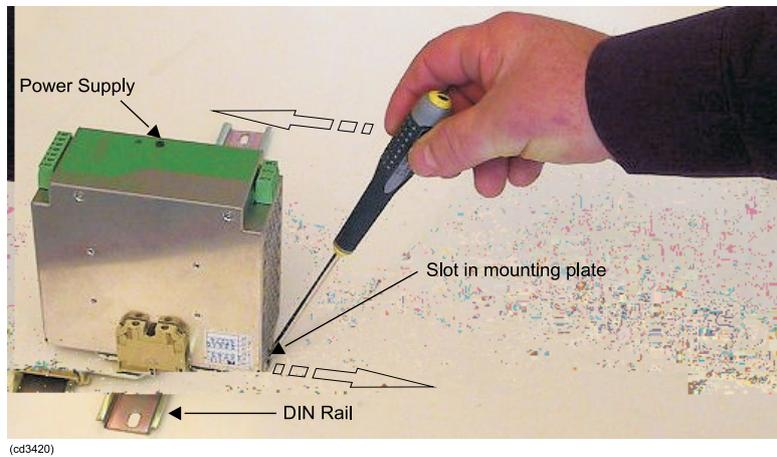
Replacing main switch and circuit breaker

The following step must be done before performing this procedure:

• Ensure that the new main switch or circuit breaker is the recommended spare part for OS-555-COP05 Built-in.

1   Run the 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, switch off the ships supply/UPS to the OS.

> Note
>
> *If Dual Power Input (for Safety system) are used, two separate supplies/UPS. Remember to turn off both supplies/UPS.*

3   Locate the defective main switch (S1) or circuit breaker (Q2).

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

5   Remove the busbar between S1 and Q2, and then remove the wires connected to S1.

6   Remove the defective main switch (S1) or circuit breaker (Q2).

7   Install the new main switch (S1) or circuit breaker (Q2).

8   Re-attach the busbar and wires to S1 and/or Q2.

9   Turn on the new main switch (S1) or circuit breaker (Q2).

10   Switch on the ships supply/UPS to the OS.

> Note
>
> *Safety systems have two separate supplies/UPS. Remember to turn on both supplies/UPS.*

11   Switch on the ships supply/UPS to the OS.

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

12 Verify, by measuring at the terminals of X3, that 115/230 VAC is present at X3-1 and X3-6.

Replacing the alphanumeric keyboard

The following steps must be done before performing this procedure:

- Ensure that the new alphanumeric keyboard is the recommended spare part for OS-555-COP05 Built-in.

1 Shut-down and turn-off power as described in *Switching off the OS* on page 41.

2 Locate the defective alphanumeric keyboard.

3 Locate the cable from the alphanumeric keyboard going to the Input panel.

4 Disconnect the cable and carefully remove the alphanumeric keyboard.

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

7 Switch on power to the OS by turning on main switch S1.

Replaceable Parts and Consumables

This section contains lists of replaceable parts, recommended spare parts and consumables used in OS-555-COP05 Built-in. Replacement procedures for the listed parts are described in *Corrective Maintenance* on page 41 and in the appropriate *Hardware Module Description*.

Replaceable parts and recommended spare parts

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, JH23T02		703099
	• Colour monitor, JH23T12		338518
	• Colour monitor, JH23T14		348048
2	Alphanumeric keyboard		704363
3	One of the following computers:	Refer to MPxxxx or APCxx Maintenance Manual	
	• MPxxx, Base model		
	• MPxxxx NAV model		
	• MPxxxx with 8 channel serial interface (Blue Storm) model		
	• APCxx (for HiPAP-501 OS-555-BI)		
4	Power supply unit Quint-PS/1AC/24DC/10 (Not for K-Bridge)	X	326396
6	Fuse Siemens 4A, 2p (Not for K-Bridge)	X	702801
7	Main switch 2–pole/40A IS-40/2 (Not for K-Bridge)	X	358913

Table 2   Common replaceable parts and recommended common spare parts (cont'd.)

List ident.	Part name	Recommended as spare part	Part number
8	Net Switch (Not for K-Bridge)	X (if installed)	702403
8	USB extender kit	X (if installed)	334243

K-Pos systems

Table 3   Replaceable parts and recommended spare parts for K-Pos 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 (with mechanical trackball)	X	330951
4	Heading Wheel panel		603550
5	Joystick panel (Lilaas)		301491
	Joystick panel (Kwant Controls)		304849
6	Kits for Drop in Panels (if used):		
	• Drop in panel, 2-position switch		603595
	• Drop in panel, 3-position switch		603596
	• Drop in panel, 4-position switch		603697
	• Drop in panel, Fire backup switch		310771
	• Drop in panel, Alert switch		304048
	• Drop in panel, HPR Transducer Control		603591
7	CAN Kit (if used):		
	• CAN2DP Kit		312478

K-Thrust systems

Table 4   Replaceable parts and recommended spare parts for K-Thrust system

List ident.	Part name	Recommended as spare part	Part number
1	BU-TC panel	X	603531
	BU-DP (according to delivery)		603530
2	ALC panel	X	603526
3	Input panel (with mechanical trackball)	X	330951

Table 4   Replaceable parts and recommended spare parts for K-Thrust system (cont'd.)

List ident.	Part name	Recommended as spare part	Part number
4	Heading Wheel panel		603550
5	Joystick panel (Lilaas), or		301491
	Joystick panel (Kwant Controls)		304849

K-Chief systems

Table 5   Replaceable parts and recommended spare parts for K-Chief system

List ident.	Part name	Recommended as spare part	Part number
1	BU-AUT panel	X	603529
2	ALC panel	X	603526
3	Input panel (with mechanical trackball)	X	330951
4	Standard kits (if used):		
	• Kit, Alarm Output		312700
	• Kit, CANbus to Ethernet		313308
	• Kit, Dual Power Input, 230 VAC		313307
	• Kit, Dual Power Input, 115 VAC		313400
	• Kit, Fibre Net		313309
	• Kit, Network Net-A or Net-B		313310
	• Kit, Network Net-C		313311

HiPAP systems

Table 6   Replaceable parts and recommended spare parts for HiPAP systems

List ident.	Part name	Recommended as spare part	Part number
1	Input panel (with mechanical trackball)	X	330951
2	For kits, see List ident. 6 in Table 3 on page 49.		

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 (with mechanical trackball)	X	330951

Appendix A
Hardware configuration status

This manual is based on the following parts lists and drawings.

Common Installation Drawings

HP Compact dc7600 SFF PC (MP7600) Desk-Mount with Mariner Kit, Outline Drawing Standard Product Drawing	HA464390
Installation Drawing, MP7600 Computer with Mariner Kit, Built in, Right Mounted	302962
Installation Drawing, MP7600 Computer with Mariner Kit, Built in, Left Mounted	302963
Layout Drawing, Keyboard Layout, Cherry G85	1003009

Parts List and Drawings – K-Pos OS-555-BI SA	**306515**
Layout Drawing, El. Mech. Rear, K-Pos, SlimLine, OS-650	310843
Layout Drawing, El. Mech. DP, Right, K-Pos OS-650-DeepLine/SlimLine	310844
Layout Drawing, OS-555-DP-BI, Built in	1016173
Power and Wiring Diagram, K-Pos OS, Slim Line/Built-in, KM05	311385

See also *Common Drop-in Kit Drawings* list.

Parts List and Drawings – K-Chief OS-555-BI	**313170**
Layout Drawing, El. Mech. DP/IAS, DeepLine, OS-650	311004
Layout Drawing, OS-555-AUT-BI, Built in	1016239
Power and Wiring Diagram, K-Chief OS, Deep Line/Built-in, KM05	313489

See also *Common Kit Drawings* list.

Parts List and Drawings – K-Pos OS-555-BI Int	**313453**
Layout Drawing, El. Mech. DP/IAS, DeepLine, OS-650	311004
Layout Drawing, OS-555-DP-BI, Built in	1016173
Power and Wiring Diagram, K-Pos/K-Thrust OS, (SlimLine)/DeepLine/Built-in, KM-05	313403

See also *Common Drop-in Kit Drawings* list.

Parts List and Drawings – HiPAP-501 OS-555-BI	**314222**
Layout Drawing, El. Mech. DP/IAS, DeepLine, OS-650	311004
Layout Drawing, El. Mech. DP, Mounting Plate/Right Side, OS-650 HiPAP DeepLine/SlimLine	311043
Layout Drawing, OS-555-GEN-BI, Built In	1016217
Power and Wiring Diagram, HiPAP 501 OS, Slim Line/Deep Line/Built-in, KM05	314203
Wiring Diagram, HPR Serial Line Kit KM05, 4xRS232 + 4xRS422	309087

See also *Common Drop-in Kit Drawings* list.

Parts List and Drawings – General OS-555-BI	**314223**
Layout Drawing, OS-555-GEN-BI, Built In	1016217
Layout Drawing, El. Mech. DP/IAS, DeepLine, OS-650	311004
Power and Wiring Diagram, General OS, Slim Line/Deep Line/Built-in, KM-05	314221

Parts List and Drawings – K-Thrust OS-555-BI	**314224**
Layout Drawing, El. Mech. DP/IAS, DeepLine, OS-650	311004
Layout Drawing, OS-555-TC-BI, Built In	1016248
Power and Wiring Diagram, K-Pos/K-Thrust OS, (SlimLine)/DeepLine/Built-in, KM-05	313403

Common Drop-in Kit Drawings

Layout Drawing, Drop In Panel 2 Position Switch, Deep/Slim Line KM05, Built-in	302424
Wiring Diagram, Drop In Panel 2 Position Switch, COP-05 Panel System	302427
Layout Drawing Drop In Panel 3 Position Switch, COP-05 Panel System	302428
Wiring Diagram, Drop In Panel 3 Position Switch, COP-05 Panel System	302431
Layout Drawing Drop In Panel 4 Position Switch, COP-05 Panel System	1016419
Wiring Diagram, Drop In Panel 4 Position Switch, COP-05 Panel System	1016400
Layout Drawing, Drop In Panel Alert Switch, Deep/Slim Line KM05, Built-in	302965
Wiring Diagram, Drop In Panel Alert Switch, Deep/Slim Line KM05, Built-in	302966
Layout Drawing Drop In Panel 2 Position Switch, Deep/Slim Line KM05, Built-in	302424
Wiring Diagram, Drop In Main/Backup DP Switch, KM05	310951
Layout Drawing Drop In Panel HPR/HiPAP, COP-05 Panel System	1016318
Wiring Diagram, Transducer Control HPR with Gate Vale Status, Drop In Panel	1016321

Common Kit Drawings

Power and Wiring Diagram, Alarm Output, K-Chief OS-650/Built-in	312699
Layout Drawing, CANbus to Ethernet, K-Chief OS-650/Built-in	313313
Power and Wiring Diagram, CANbus to Ethernet, K-Chief OS-650/Built-in	313299
Power and Wiring Diagram, Dual Power Input, K-Chief OS-650/Built-in	312682
Power and Wiring Diagram, Fibre Net, K-Chief OS-650/Built-in	313300

Common Kit Drawings

Power and Wiring Diagram, Network Distribution Net A/B, K-Chief OS-650/Built-in	313301
Power and Wiring Diagram, Network Distribution Net C, K-Chief OS-650/Built-in	313302