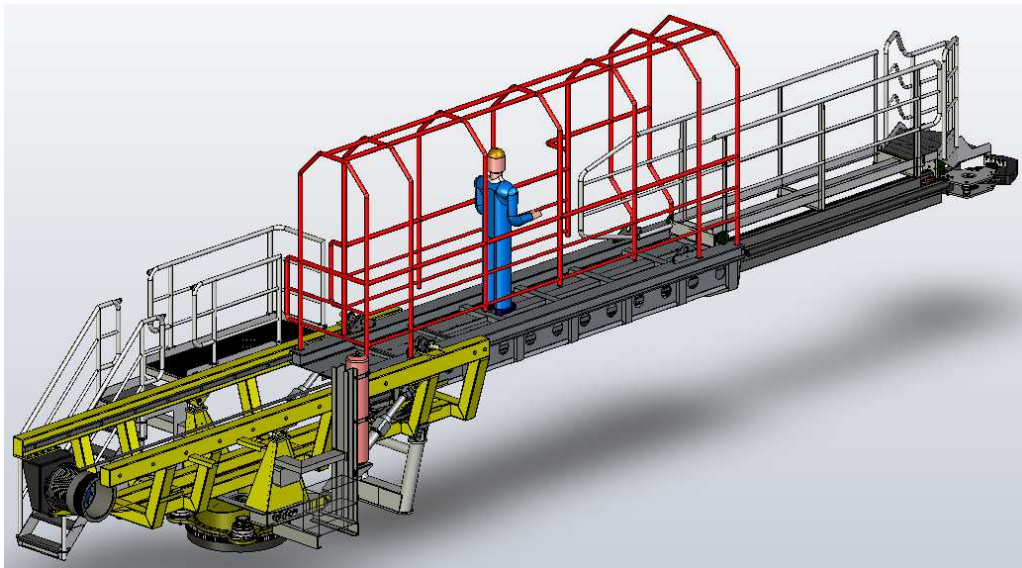


OFFSHORE TRANSFER SYSTEM MARK-1

USER MANUAL



PROJECT: Offshore Transfer System
PROJECT Ref: 75105
CLIENT: -
PREPARED BY: Sebastiaan Zeegers
DOCUMENT No: 75105-000-OUM-001-R2

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3. Nomenclature

The following abbreviations are used throughout this document:

AFD	Alarm Function Diagram
AL	Auto Lowering
CCW	Counter Clock Wise
CW	Clock Wise
FMECA	Failure Mode, Effects and Criticality Analysis
HMI	Human Machine Interface
HPU	Hydraulic Power Unit
LED	Light Emitting Diode
OAS	Offshore Access System
OTS	Offshore Transfer System
PDC	Proportional Directional Control
PLC	Programmable Logic Controller
PMR	Planned Maintenance Routine
PPE	Personal Protective Equipment
RRC	Radio Remote Control
UPS	Uninterruptible Power Supply

4. References

- Basis of design 75105-001-BOD-001
- System specification 75105-001-SPEC-004
- Functional design – Automation 75105-001-SPC-001
- Technical design – Automation 75105-001-SPC-002

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5. Preface

This user manual describes the Offshore Transfer System (OTS) including the procedures for operation and maintenance. The information in this document is essential for the correct and safe functioning of the OTS. If you are not familiar with the operation, installation and controls of the OTS, read this user manual with attention.

Offshore Solutions BV urge that all new users including passengers receive a specific OTS instruction. Operators should have a special training for safe operating the OTS.

Offshore Solutions BV advise to file this document, including the appendices, on a safe place. A working copy is best to be filed on the bridge of the vessel.

The following symbols are used to cite to special subjects:



NOTIFICATION

Gives advise how to perform a specific task easier.



WATCH OUT!

Sign to warn you of a possible problem.



CAUTION!

The system can be damaged when this procedure is not followed carefully.



WARNING FOR DANGER

You can seriously damage yourself or others when you do not follow the procedure.

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6. Introduction

6.1 Description of the OTS

The OTS concept has been developed from the successful patented Offshore Access System (OAS). It is a patented lightweight walkway for use on light crew boats operating in benign water locations, designed to provide a safe and efficient means of personnel transfer between the host vessel and fixed installations such as wind turbines and offshore oil and gas installations. The OTS requires only that the fixed installation has a docking pole installed to allow it to connect.

The OTS is designed to be as unobtrusive as possible when installed and stowed on the working deck of the vessel.

The installation of an OTS onto a light crew boat is designed predominantly to improve the safety of personnel during transfer onto a fixed installation and in doing so will expand the operational envelope of the vessel.

The walkway has three primary movement planes, these being; luffing, slewing and telescoping. The system operates essentially in two modes, the first of which is a fully manual mode. The second active compensating mode (PDC) automatically operates when the walkway is fully connected to the fixed installation. This mode ensures that, once connected, the relative movements between the walkway and fixed installation are absorbed within the movement planes of the walkway.

6.2 Meant use

The OTS is meant to be installed on a vessel and used to transfer people from the vessel to an offshore asset. It is meant to be operated by trained and authorized persons. The training and authorization is done by Offshore Solutions BV or otherwise agreed in writing by both parties. The persons who pass the OTS are also informed on the safety procedures. All have to follow the safety instructions given by the operator.

6.3 Vessel

Specific details of the vessel on which the OTS is installed can be found in appendix A.

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7. Safety

7.1 Installed preventive measures to protect people, OTS and vessel

7.1.1 General

Rubber fenders are installed on the gripper beam to prevent damage to offshore installations and to the OTS.

7.1.2 Signals

The OTS is equipped with visual and audible signals to inform personnel about the status of the OTS. These signals are provided by the horn, the flash light and the traffic lights.

7.1.3 General warning



The installation of the OAS must be done by qualified and authorized personnel.



The OTS only to be put into operation when all components supplied with the original installation are installed.

7.1.4 Safety risk environment

There is a risk of spilling hydraulic oil in sea.

7.1.5 Ergonomics



For the ergonomics of the operator, the radio remote control panel is equipped with a harness. For safety reasons the operator must always use the harness!

LED lighting is installed along the gangway. This light is sufficient for a safe walking over the gangway.

7.1.6 Emergency

If an emergency button is pressed in approach mode the OTS will retain its position until the emergency stop is released.



Figure 1 – Emergency stop

When the OTS is connected to the pole of an asset, the OTS is not joystick controlled. When somebody presses the emergency button now, the OTS remains connected.

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Emergency buttons are located on the RRC panel, outside the HPU, on the electrical cabinet, the remote I/O cabinet, the camera cabinet and on the bridge. If one of the buttons is activated the OTS will emergency stop. The emergency mode will be released when both the emergency stop button is deactivated and the reset emergency stop button is pressed.

7.1.7 Power failure

To prevent the system from danger in case of a power failure the OTS is equipped with a 24V UPS system, which will back up the electrical power for approximately 30 minutes.

The hydraulic system is equipped with an accumulator which has enough pressure to safely disconnect in an emergency situation.

7.2 General safety instructions

Your safety and the safety of others is of vital importance. Please ensure you read this user manual before installing or using the OTS.

7.2.1 General safety



Company management must take care that all inspection, maintenance and installation work is performed by authorized and qualified personnel. Authorized personnel must read the user manual and be instructed about the OTS.



Before performing any actions in relation to or with the OTS read this user manual carefully. Offshore Solutions BV is not responsible for any injuries, damage or wear due to incorrect performed maintenance, misuse or modifications on the OTS.



In case of unforeseen (unexpected) situations occur or situations which are not described in this user manual contact Offshore Solutions BV. Phone: ++31 (0)255 – 549 200.



Do not use the OTS as a lifting device. The OTS is exclusive made for transferring personnel to a maximum of 300kg's (maximum of 2 people and a stretcher patient).



The maximum operating limit is 1.5 significant wave heights. Using the OTS above the operating limits can result in damage to the OTS and will create unsafe situations to operators and users.



Make sure that no person is allowed near the OTS when in Approach mode. Work permits of vessel should take notice of use of OTS.



Safety devices or related products are not allowed to be removed or being brought into not working conditions. All safety devices have to be in good working order and function appropriately.

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If the OTS is used by a third party (other than the owner of the OTS) the owner is responsible for the use of the OTS, except where explicitly agreed otherwise in writing by both parties.



Keep the gangway and the road to the gangway always clear. Remove any obstacles.

7.2.2 Other safety instructions



Repairs to the machine must only be carried out by qualified persons. Repairs carried out by persons who are not authorized could cause injury of people or serious malfunction of the installation.



Never start the machine if the main cables and/ or the electrical cabinets are damaged or when there is oil leakage.



Shut down and switch off the OTS before carrying out any cleaning or maintenance operations. Also secure OTS in boom rest.



Transferring people over the gangway is only allowed when the green traffic lights are on. Walking over the gangway must be in one straight line, do not hesitate or wait for others to come.



Only person at a time is allowed on the walkway.

7.2.3 Warranty

Warranty conditions are subject to terms of delivery according to “Uneto/VNI terms” deposited at the registry of the “arrondissements court” at Amsterdam except where explicitly agreed otherwise in writing by both parties.

The conditions regarding the responsibility are written in English.

The following information is necessary when spare parts are to be ordered:

- Part number
- Machine type
- Serial number

The warranty will expire when the machine is misused or used for applications which are not described in this user manual.

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The warranty will also expire when the machine is used in the wrong way or in conflict with the applicable instructions.

The warranty will expire when the original configuration of the machine is changed without written permission of Offshore Solutions BV.

It is strongly forbidden to change safety devices or safeguards.

It is strongly forbidden to operate the OTS when the safety devices or safeguards are out of order.

The purchaser does not have any right for compensation for the period the machine was not available.

7.2.4 Risks and attention points

OTS operators



General

It is obligatory to wear protective cloths when operating the OTS.



General

It is obligated to wear safety shoes when operating the OTS.



General

It is strongly advised to wear a life harness and secure yourself to prevent falling overboard.



General

It is not permitted to have a mobile phone which is switched on with you when operating the OTS. This could interfere with the radio remote signal

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Maintenance



General

Follow tag and lock procedures for safe maintenance.



Hydraulic System

Before performing maintenance on the hydraulic system, always release pressure.



Electrical system

The OTS is working with 230V. Always check the presence of voltage before performing any activities to the electrical system and take actions when required.



Watch your step when entering the HPU

On the OTS



Wait for the light on the OTS to turn green, before walking to the OTS.



Entering the moving part

Entering the moving part of the installation. Please be aware that you are stepping onto a free moving path.



Watch your step when going onto the access stairway.

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Watch your step when stepping over from the access stairway to the access platform.



Watch your step when stepping over from the access platform to the outer gangway.



Watch your step when stepping over from the outer gangway onto the inner gangway.



Watch your step when stepping over from the inner gangway onto the inner gangway extension.



Watch your step when stepping over from the inner gangway extension onto the offshore platform.

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8. System

8.1 Construction

The OTS consists of two key parts:

- Hydraulic Power Unit (drive)
- Transfer system (installation)

8.1.1 HPU

The drive and control system for the OTS are all installed in one HPU container. The HPU is connected to the transfer system by means of electrical cabling and hydraulic piping and hoses.



Figure 2 – HPU container

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8.1.2 Transfer system

The general elements of the transfer system comprise the following:

- Pedestal
- Spacer ring + rotary joint
- Slew bearing
- Turret
- Cradle
- Outer gangway
- Gripper beam
- Gripper head
- Inner gangway
- Inner gangway extension
- Access stairway
- Access platform

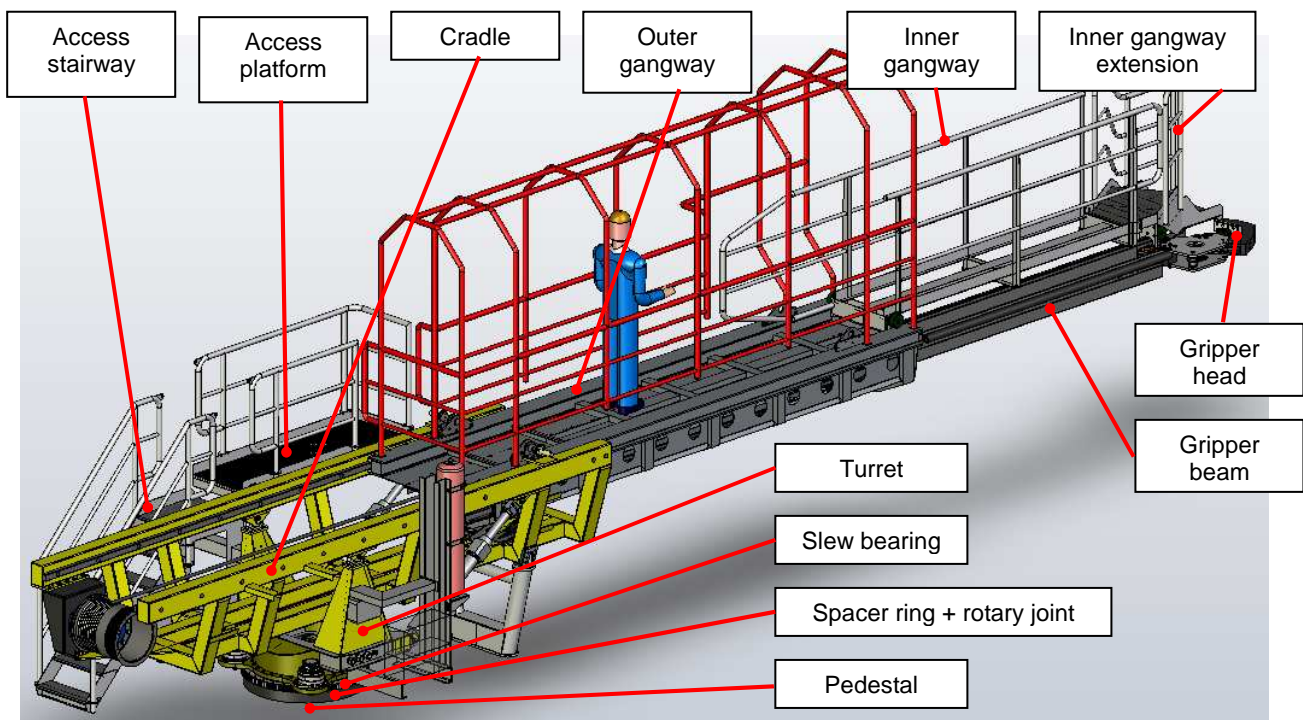


Figure 3 – Transfer system

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8.2 Hydraulic

The main movements of the OTS are hydraulically driven. The hydraulic system consists of the following:

- HPU
- Luffing cylinders
- Slew drives
- Telescope winch
- Locking cylinders
- Manifold

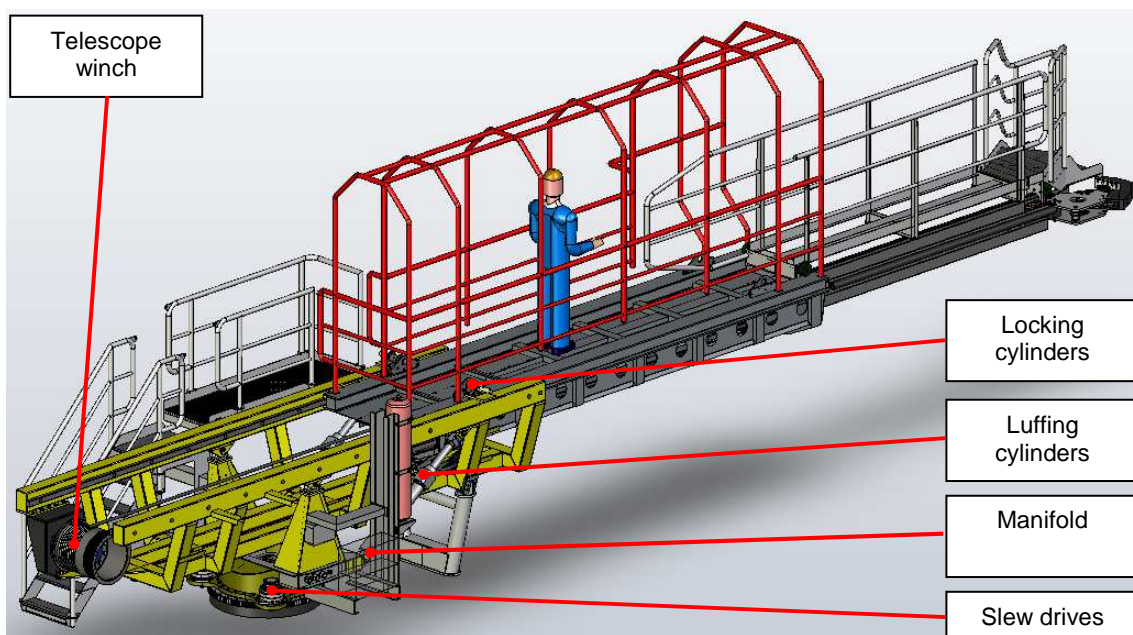


Figure 4 – Hydraulic drives

8.2.1 HPU

The hydraulic power for the OTS is provided by the HPU. The HPU is a 10 feet container with a side door and a double service door and consists of the following:

- Fuel reservoir
- Diesel engine with gearbox, pump set and generator
- Hydraulic oil reservoir
- Valve: pressurize system
- Hydraulic oil conditioning set (filter, cooler and heating)
- Air inlet and outlet system
- Insulated exhaust system

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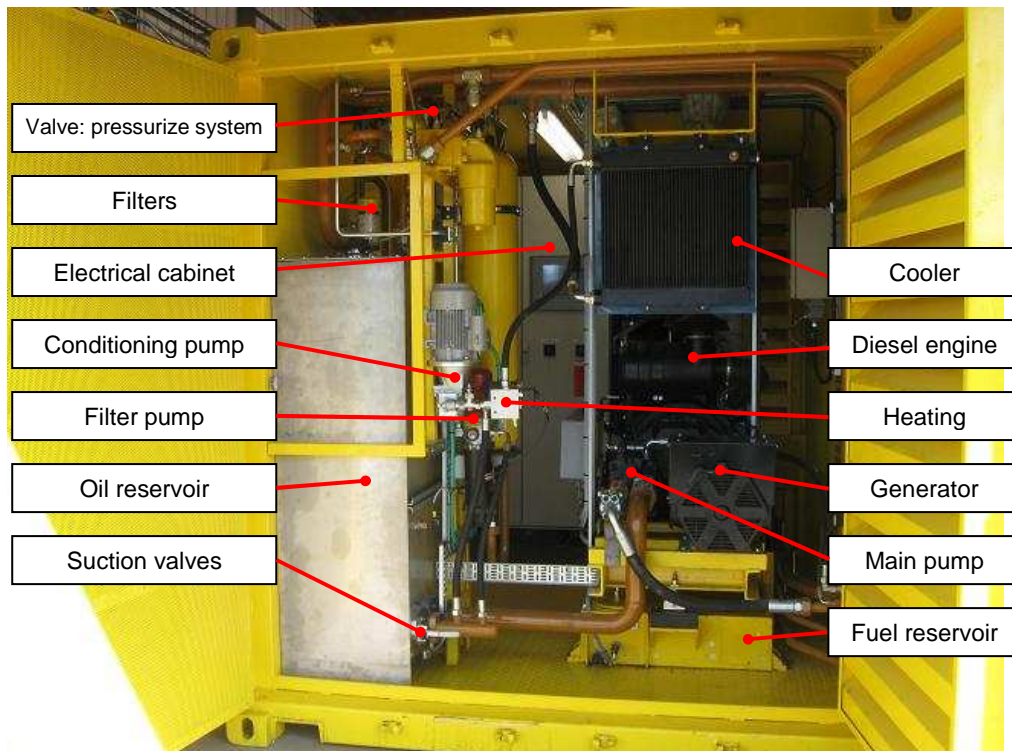


Figure 5 – Inside HPU

Main pump

The main pump is directly driven by the diesel engine.

Conditioning set

The conditioning set is an electrically driven pump unit which filters the hydraulic oil and regulates the oil temperature.

8.2.2 Luffing cylinders

The luffing movement is achieved by two luffing cylinders of which one is shown in the picture below. The cylinders are connected from the turret to the cradle. One cylinder is equipped with a length measuring system to calculate the luffing angle.



Figure 6 – Luffing cylinder

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8.2.3 Slew drives

The slewing movement is provided by two drive units. The outputs of the drives are fitted with spur tooth pinions and interface with an externally geared slew ring bearing whose geared ring is connected to the cradle. One of the slew motors is equipped with a rotary encoder to indicate the slew angle.



Figure 7 – Slew drive

8.2.4 Telescope winch

Two telescope movements are provided by the telescope winch. The first one is to extend the outer gangway section from its stowed position out into the extended position. The second one is to extend the gripper beam. Both movements are driven by the hydraulic winch fitted with a steel cable. The winch is equipped with a rotary encoder to calculate the telescope length.



Figure 8 – Telescope winch

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8.2.5 Locking cylinders

When the outer gangway is completely retracted or completely extended it will be locked with two locking cylinders.



Figure 9 – Locking cylinders

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8.3 Electrical

The electrical and control system consists of the following:

- Electrical cabinet (in HPU)
- Remote I/O cabinet (under deck, near transfer system)
- Radio remote control panel
- Radio remote receiver
- Buttons and LEDs on the bridge
- Horn
- Flash light
- Traffic lights
- Gangway lights
- Camera system
- Sensors
- Solenoids

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8.3.1 Electrical cabinet (in HPU)

Most electrical equipment can be found in the electrical cabinet which can be found in the HPU. Operating elements on the cabinet are:

- Emergency stop button
- Emergency stop reset button
- Gangway lights on/off switch
- Generator power supply switch
- Ships power supply switch
- HMI display

The only operating element inside the cabinet is the traffic light dimmer.

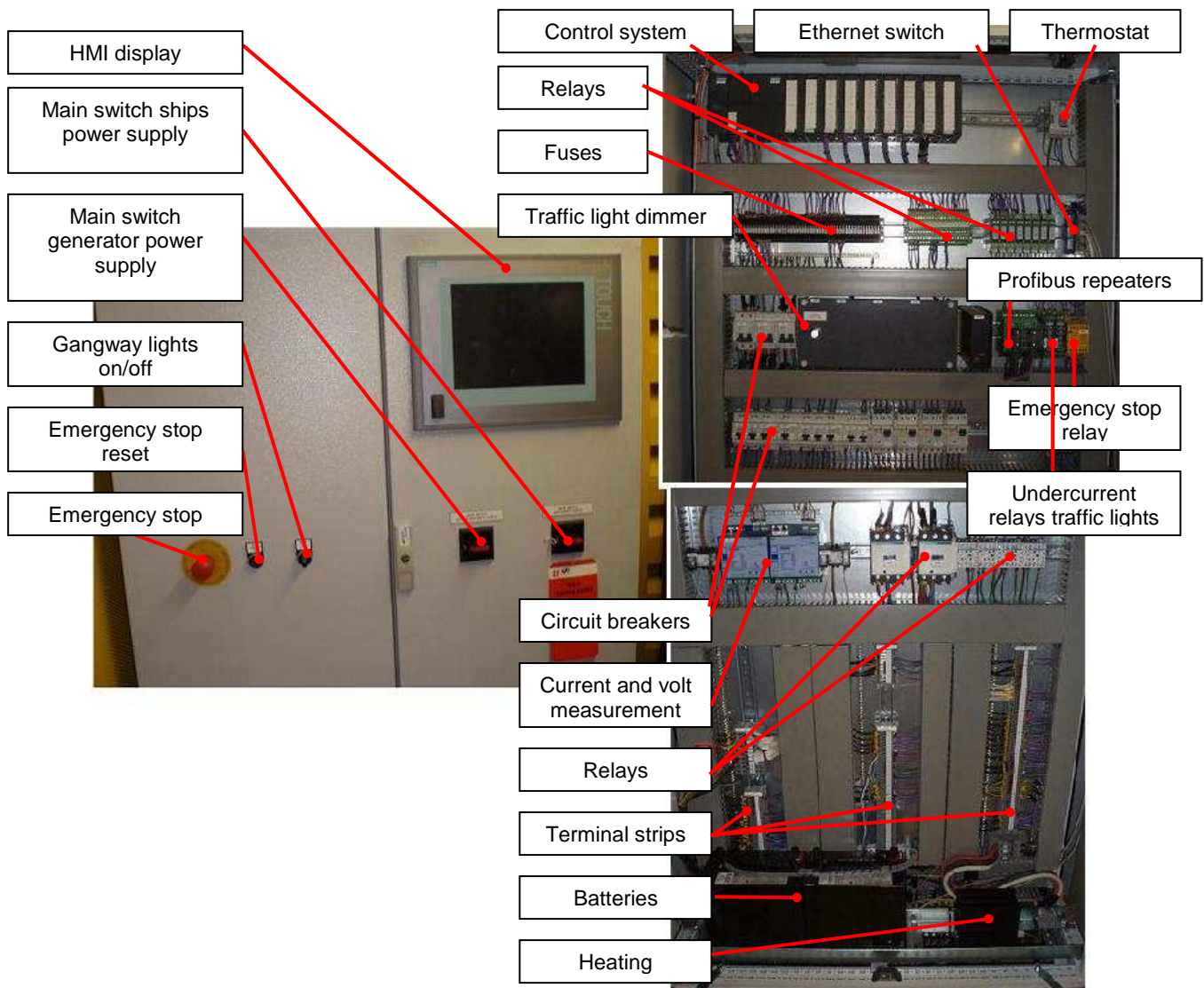


Figure 10 – Electrical cabinet

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8.3.2 Remote I/O cabinet (under deck, near transfer system)

The electrical equipment to control the movements is fitted in the remote I/O cabinet. This cabinet will be placed near the transfer system. The only operating element on the cabinet is the emergency stop.

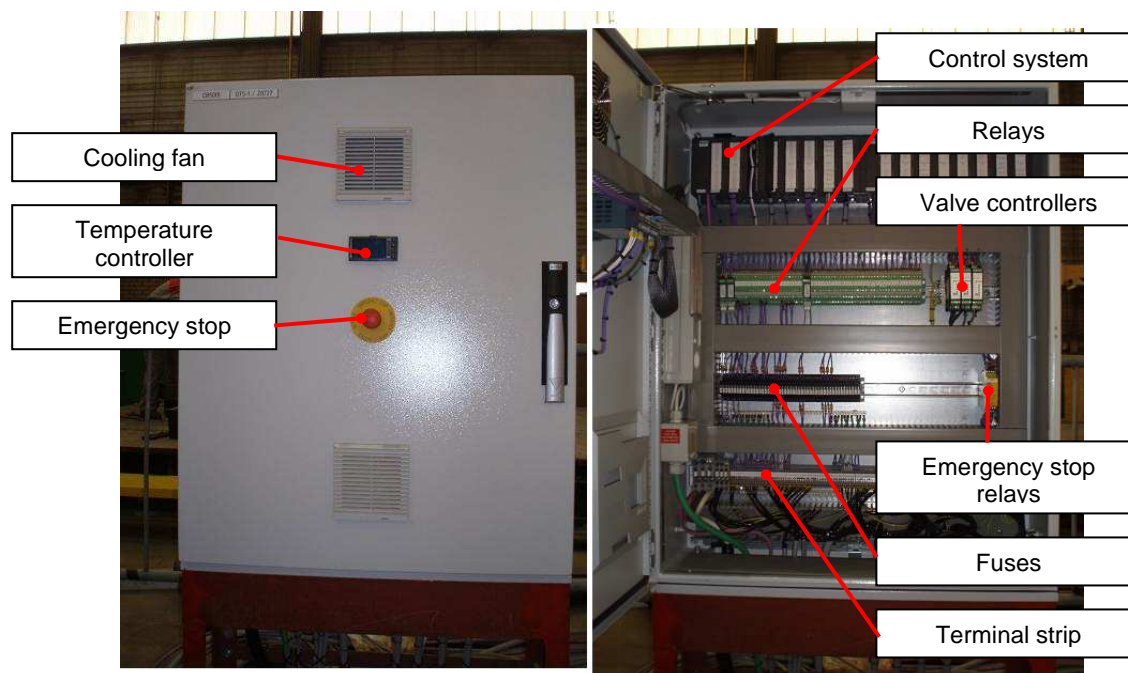


Figure 11 – Remote I/O cabinet

8.3.3 Radio remote control panel

The main control point of the OTS is the RRC panel. This panel is equipped with buttons, switches, joysticks and LEDs.

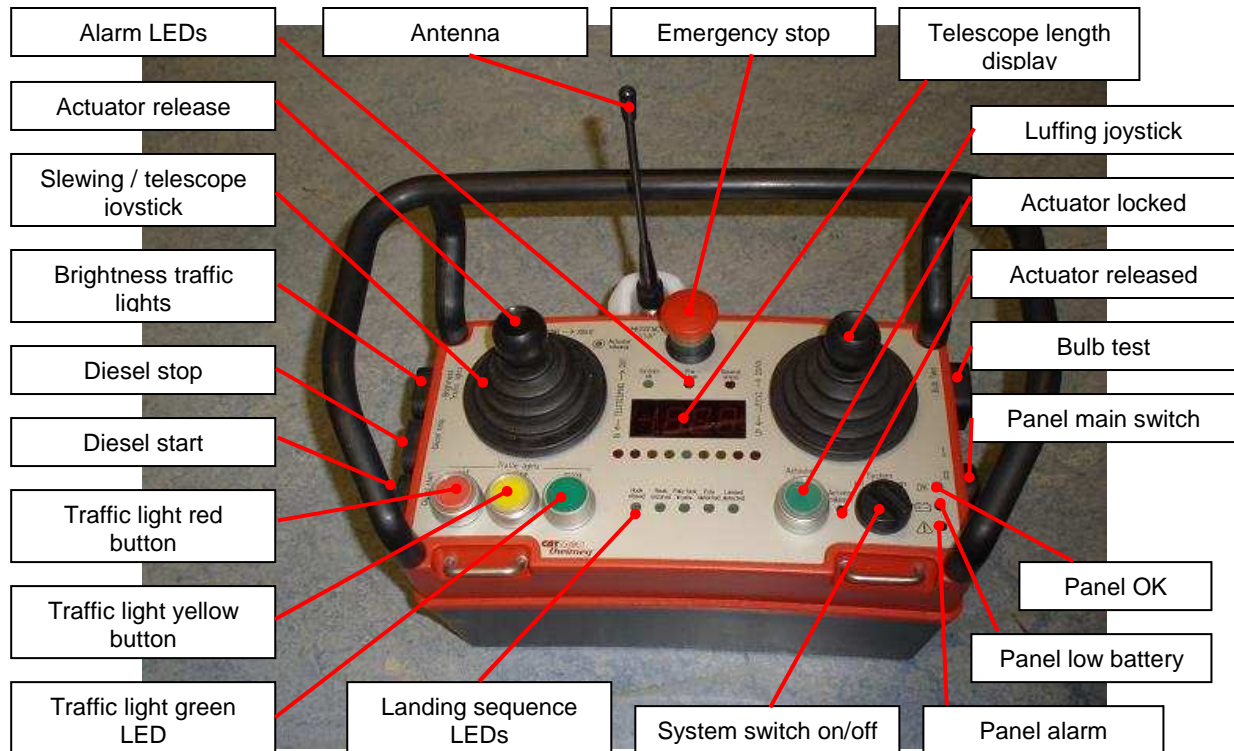


Figure 12 – Radio remote control panel

8.3.4 Radio remote receiver



Figure 13 – Radio remote receiver

The RRC panel communicates with the radio remote receiver. The receiver is placed inside the HPU with an external antenna on top of the HPU.

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8.3.5 Buttons and LEDs on the bridge

On the bridge the following buttons and LEDs are placed:

- Button with LED: Traffic light red
- Button with LED: Traffic light green
- Emergency stop button

8.3.6 Horn and flash light

Outside on the turret the horn and flash light are placed. The flash light indicates a moving machine. The horn is used for sounding alarms.

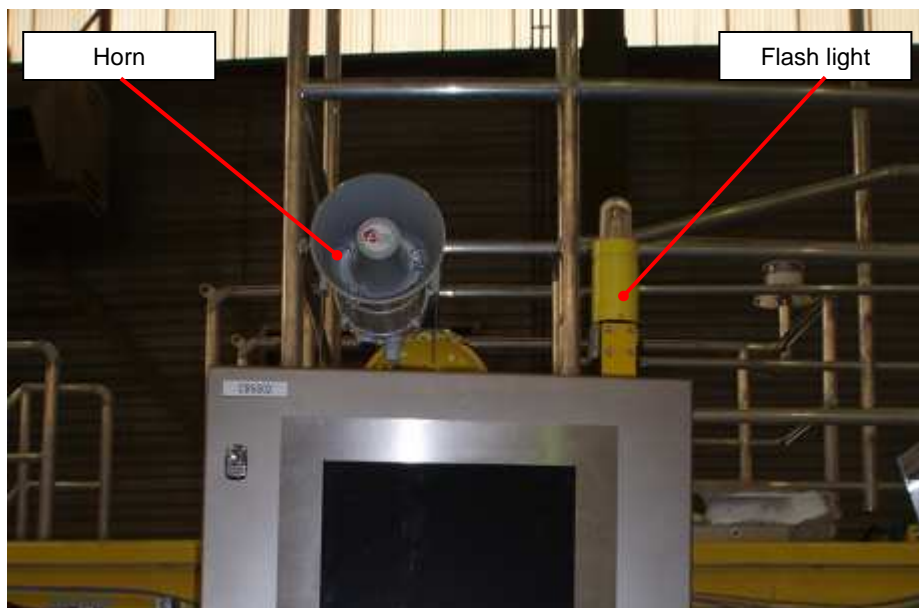


Figure 14 – Horn and flash light

8.3.7 Traffic lights



Figure 15 – Traffic light

Traffic lights are placed on the cradle and the outer gangway. These lights indicate the status of the gangway:

- Red: Nobody allowed on walkway.
- Yellow: Only operator allowed on walkway.
- Green: Personnel transfer allowed.

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8.3.8 Gangway lights

LED lighting is installed along the gangway. This light is sufficient for a safe walking over the gangway.



Figure 16 – Gangway lights

8.3.9 Camera system

The OTS is equipped with a camera system. The camera is monitoring the gripper head and the monitor is placed in a cabinet outside on the turret.

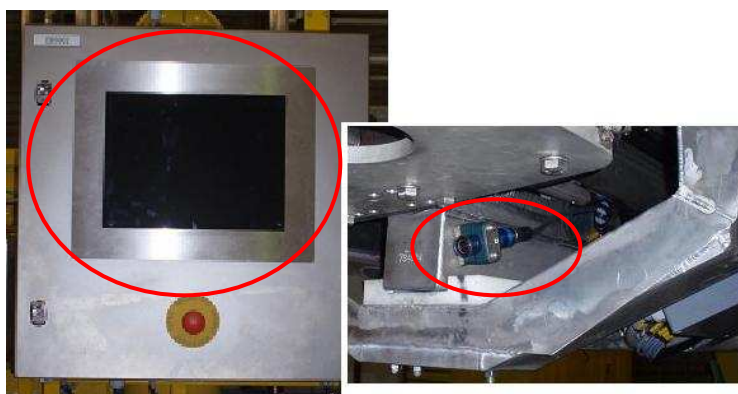


Figure 17 – Camera system

8.3.10 Sensors

The OTS is equipped with a lot of sensors to monitor and control the installation. All sensors can be found in the I/O list in the technical design document and can be tracked by their tag number. The most important sensors are mentioned below:

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Transfer system Luffing encoder



Transfer system Slewing encoder



Transfer system Telescoping encoder



Gripper head Gripper head sensors



Cradle Outer gangway detection



HPU Temperature transmitter

8.3.11 Solenoids

To control the hydraulic system the OTS is equipped with a hydraulic manifold block, fitted with a lot of solenoids. All solenoids can be tracked by their tag number.



Figure 18 – Hydraulic manifold block

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8.4 Software

8.4.1 PLC

The logic of the OTS control system is programmed in the PLC system. The controller is located in the electrical cabinet in the HPU.



Figure 19 – Controller

8.4.2 HMI

For visualization touch panels are used as HMI. One is placed on the electrical cabinet in the HPU. An optional second HMI can be placed on the bridge of the vessel.



Figure 20 – HMI

On the HMI also settings can be changed. This is only allowed for authorized personnel and is protected with a password. On the bridge no user should login, so only the main

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screen is accessible. If the display is too bright for the bridge, navigate to BLACK SCREEN.

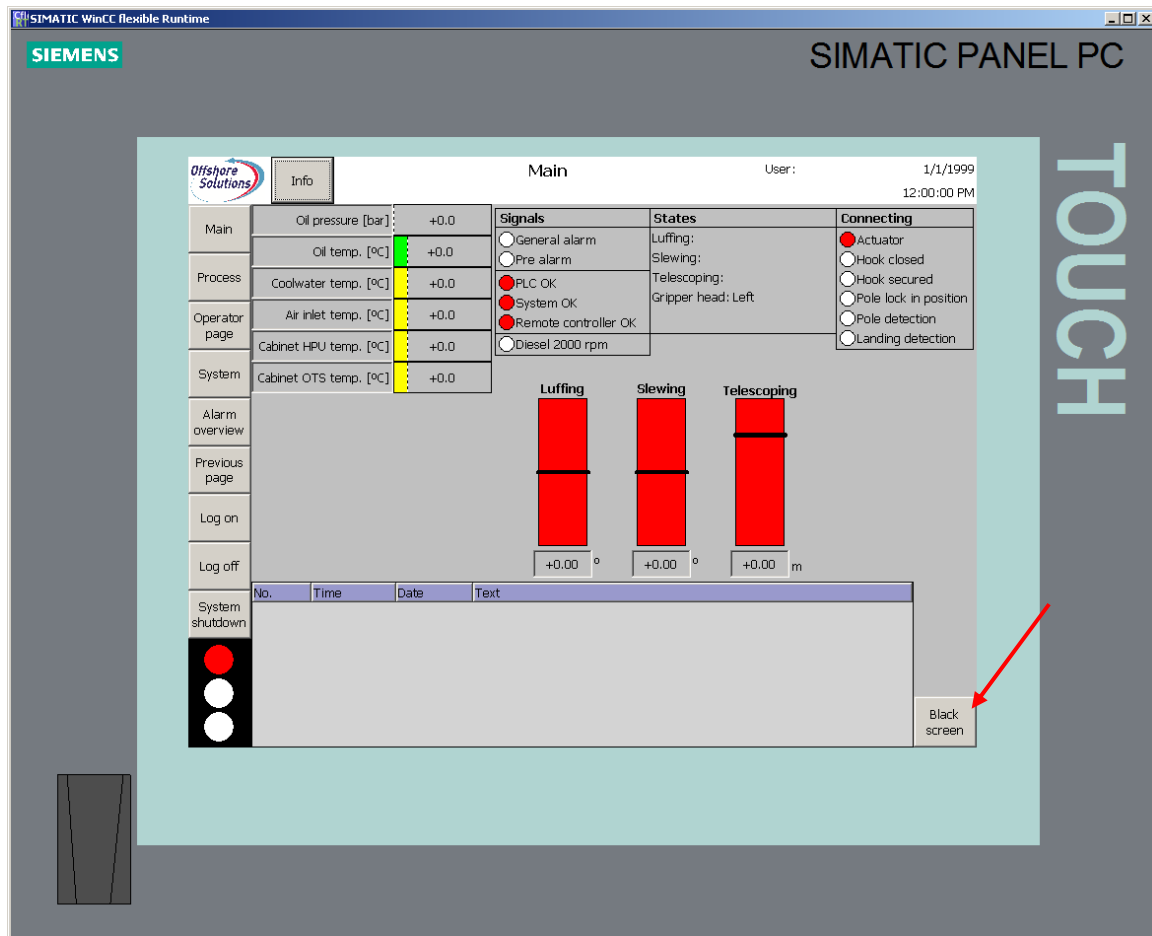


Figure 21 – Blank screen

In the HPU the operator may login with his details:

User: operator

Password: ots

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9. Operating

9.1 Operating parameters

Primary characteristics can be comprised in:

1. Four control modes;
 - Fully manual (approach)
 - Connected to pole engaging controlled landing
 - Connected, landed and PDC activated
 - Connected and lift off.

No heave compensation is included.
2. Walkway width is 600/800mm.
3. Maximum (significant) sea state H_s = 1.5 meter.
4. The procedure allows one person to cross at a time.
5. The system is designed to facilitate the emergency condition of two persons complete with stretcher patient. (300 kg).
6. Overall mass is no higher than 5.000 kg. (Excl. diesel driven hydraulic power unit).
7. Operating length is 9.1 meter from centreline pedestal to the connection point (landing pole on fixed landing structure) at mid stroke.
8. Operating stroke is 3.0 meter. (Structure allows a stroke of 4 meter).
9. Maximum length in operating area is 10.6 meter.
10. Minimum length in operating area is 7.6 meter.
11. Operating angle 60° left and 60° right looking at OTS in longitudinal position and moving round vertical axe, slewing.
12. Operating angle is 24° up and 15° down.
 - 20° up and 11° down are the "green operating area"; safe to cross gangway.
 - $20-22^\circ$ up and $11-13^\circ$ down is the "yellow operating area"; safe to cross gangway, interference needed to bring back system in operating mode.
 - $22-24^\circ$ up and $13-15^\circ$ down is the "red non operating area"; not safe to cross gangway, interference needed to bring back system in operating mode.
13. Working height of the OTS in horizontal position;
 - From slewing bearing till contact point hook assembly : 1.20 meter
 - Host vessel configuration
 - Height of pedestal till top deck : 0.20 meter
 - Freeboard light weight : 1.98 meter
 - Freeboard heavy weight : 1.22 meter
 - Maximum height $1.20+0.20+1.98$: 3.38 meter
 - Minimum height $1.20+0.20+1.22$: 2.62 meter
 - Maximum allowed deviation upwards : 1.40 meter
 - Maximum allowed deviation downwards : 1.40 meter
14. Height landing platform on fixed structure 3.00 ± 0.25 meter above average sea level (MSL).
15. In connected mode the OTS system counteracts the forward thrust of the host vessel by using a proportional directional control system.
16. When maximum allowable bollard pull of 100 kN is applied the OTS system will breakaway.
17. In stowed position the OTS is in horizontal, lateral position and sea fastened on a boom rest structure. All telescopic parts will be fully retracted.
18. Dimensions OTS in stowed position: 5.7m (length) x 1.5m (width) x 2.0m (height),
19. The OTS must be allowed a free movement area of $R = 3$ meter, no obstacles other than boom rest allowed.
20. No obstacles higher than 0.8 meter within the area $> R = 3$ meter and $< R = 3.44$ meter.

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21. To allow the installation of a HPU unit a space from approx. 3.0 by 2.0 meters has to be provided on deck. Additional connecting plates and footprint are to be advised or discussed.
22. Operating conditions: - 15° Celsius and + 45° Celsius.
23. Electrical power supply from vessel shall be 220V 50/60Hz. Only for standby heating and when the OTS system is not active.
25. OTS has its own diesel driven hydraulic power unit of 80 kW, also riving a generator supplying all electrical power the OTS requires.
26. Diesel fuel line should be near to allow filling the fuel tank of the HPU unit.

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9.2 Operating procedure

The conditioning system of the OTS is always running (as long as electrical power is switched on). This means that the hydraulic oil temperature is regulated continuously. It also means that the oil is filtered non-stop.

When powering up the system, the HMI will start up in the display location selector screen. On this screen, choose the location and then push OK.

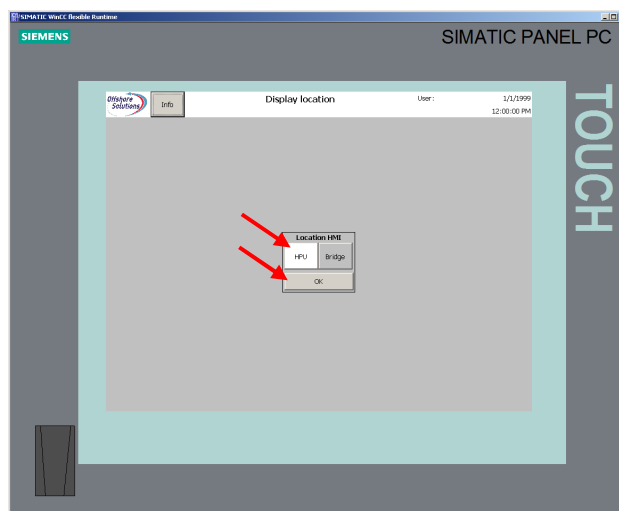


Figure 22 – Display location

The OTS is connected to the fixed installation in accordance with the basic docking operation described below. This method eliminates one motion plane of the OTS at each of the various stages of the procedure, thereby significantly reducing the complexity and stress of the operation.

The OTS has the next operational modes:

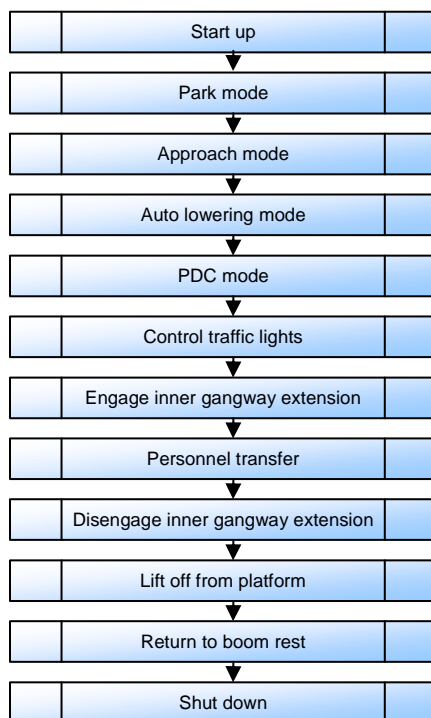
- Park mode (No movements possible)
- Approach mode (Manual mode; movements possible)
- Auto lowering mode (When connected to the pole, slewing and telescoping are free; luffing is automatically lowering)
- Proportional Directional Control mode (When connected to the pole and landed on the platform luffing and slewing are free; telescoping is in PDC mode)

State charts for all movements can be found in the appendix.

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In general the operation includes the following steps:



9.2.1 Start up



OTS is in parked position



Make sure that main switch ships power supply is on.



Make sure that main switch generator power supply is on.



Switch on main switch diesel. (down to the right)



Switch on RRC panel. Make sure all controls are in neutral position.



Reset emergency stop.



Push and hold bulb test button.
Check all lights are on.
Check horn is activated.
Release bulb test button.



Check RRC panel for no alarm LEDs.

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Push button: Diesel start



Wait for diesel to start.



OTS is still in park mode. No movements are possible.



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9.2.2 Park mode



OTS is in park mode. No movements are possible.



Check RRC panel for System OK LED to light up.
Check RRC panel for no alarm LEDs.



Make sure all controls are in neutral position



Switch system switch to on.



OTS is now in approach mode. Movements of the installation are possible now!



Traffic light switches automatically on to red



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9.2.3 Approach mode



OTS is in approach mode. Movements are possible!



Check on RRC panel for no alarm LEDs.
Check on RRC panel for LED: Hook closed.
Check on RRC panel for LED: Hook secured.
Check on RRC panel for LED: Pole lock in position.



Luff complete assembly up free from the boom rest with right joystick.



Slew complete assembly outboard to longitudinal position. With left joystick.



Extend outer gangway with left joystick.
Locks will automatically unlock and lock.
It is possible that the alarm will sound a moment when the locks not yet completely locked.



When the outer gangway is in extended position, the gripper beam can be controlled with the joystick.
Extend gripper beam to approximately +1.00 m position.



Check on RRC panel for no alarm LEDs.
Check on RRC panel for LED: Hook closed.
Check on RRC panel for LED: Hook secured.
Check on RRC panel for LED: Pole lock in position.

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Use left and right joystick to manoeuvre OTS with rubber fender pushed to the pole as high as possible.



Use left joystick to keep the gripper beam pushed to the pole and retract the gripper beam at the same time to catch the pole.



When the gripper head has caught the pole, the OTS will automatically enter Auto Lowering mode.

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9.2.4 Auto lowering mode



The OTS is in Auto Lowering mode. Slewing and telescoping will be free. Luffing will lower with a preset speed.



During AL mode you can luff the OTS up with the right joystick, but you can not luff the OTS down.



If you are not happy with the situation, you can release the hook with the RRC panel to return to approach mode. When the hook is released you must telescope in to release the pole.



When the OTS is in AL mode and the gripper head lands on the platform, the OTS will automatically enter PDC mode.



9.2.5 PDC mode



The OTS is in PDC mode. This means luffing and slewing are free. Telescoping is in PDC mode.



The operator signals to the captain to steam away with minimum thrust to create a stable situation.



The telescope is controlled according to the PDC diagram.

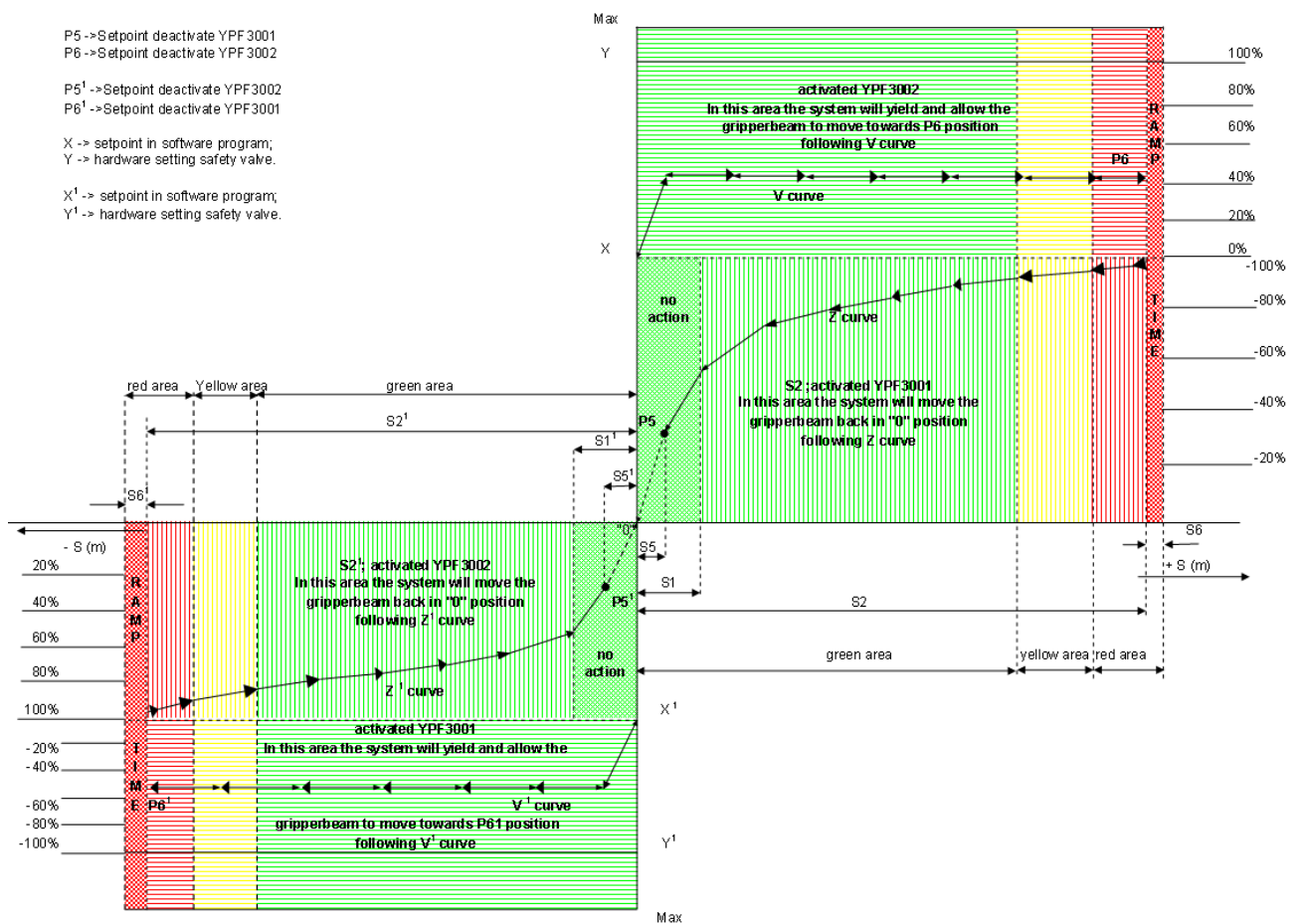


Figure 23 – PDC diagram

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Measured values are the telescope pressure and telescope position.



When the pressure rises higher then X, the telescope will extend or retract with a preset speed.



When the pressure stays below X, the telescope will be moved in or out on internal leakage and will slowly slip.



When the telescope is slipped beyond the dead band it will return to zero position with the speed according to the PDC diagram curve.

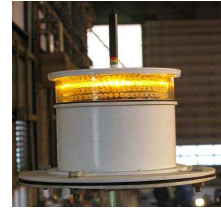
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9.2.6 Control traffic lights



If there is a stable situation, activate the yellow traffic light. This means: Only operator allowed on walkway.



The yellow traffic light can only be activated if no alarm is active.

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9.2.7 Engage inner gangway extension



The yellow light is active. This means: Only operator allowed on walkway.



Switch system switch to off to disable movements.



Enter walkway.



Release inner gangway brake.



Extend inner gangway manually to its maximum and it will lock automatically.



Release and let down inner gangway extension manually.



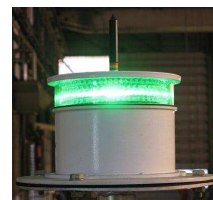
Leave walkway.



Signal to captain to activate green traffic light.



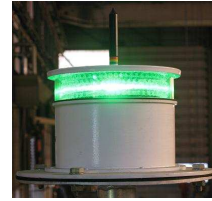
Captain activates green traffic light.



9.2.8 Personnel transfer



Green traffic light must be active, which means: personnel transfer allowed.



Personnel may now access the walkway.



In case of unsafe situations, activate the red traffic light!



The captain can also activate the red traffic light in case of unsafe situations.



In case of an alarm, the red traffic light is activated automatically.

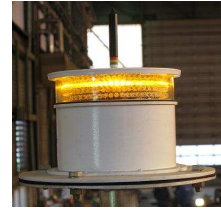


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9.2.9 Disengage inner gangway extension



When personnel transfer is finished, activate the yellow traffic light, which means: Only operator allowed on walkway.



Enter walkway.



Lift inner gangway extension manually. When it is lift to its maximum it will lock automatically.



The inner gangway will stay in its extended position because it is locked on the gripper head. It will be moved in to its rest position automatically by retracting the gripper beam.



Leave walkway.



Activate red traffic light.



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9.2.10 Lift off from platform



Red traffic light is active.



Switch system switch to on.



Signal to captain to hold station.



Wait for signal from captain that vessel is holding station.



Luff gripper beam up as high as possible with right joystick.



When the gripper beam is luffed up, release the hook.



The OTS will now switch to approach mode.



It is important to telescope in quickly, before the vessel moves down and the gripper head will hit the platform.



By telescoping in the gripper will release the pole.



Vessel can slowly sail away now.

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9.2.11 Return to boom rest



The OTS is in approach mode now, so joystick control is available.



Telescope gripper beam and outer gangway completely in with the left joystick.



The gripper beam will retract first because the outer gangway is locked. When the gripper beam is almost in to its minimum the outer gangway locks will unlock.



The outer gangway is now released and can be telescoped in with the left joystick.



When the outer gangway is telescoped completely in to its minimum, it will be locked automatically.



Return OTS back to its boom rest using slewing and luffing with the left and right joystick.

9.2.12 Shut down



When the OTS is on its boom rest, switch system switch to off.



When system switch is switched to off, the traffic light and the flash light will be off.



Push button: Diesel stop.



Diesel will run stationary for 10 seconds and will then stop.



Switch off RRC panel.



Emergency stop will now automatically be activated



Switch off main switch diesel. (up to the left)



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10. Maintenance

Maintenance should be performed according to the Planned Maintenance Routine (PMR).

The maintenance exists of preventive and corrective maintenance. Corrective maintenance is performed after a failure has occurred. Preventive maintenance is performed before the failure occurs. Of course all the corrective maintenance has to be performed to keep the OTS in working order.

Some tasks have to be done while sailing. If there are any problems found, they have to be communicated to the shore, so the necessary parts and/ or people can be bought/ ordered/ hired.

The tasks are performed by the operator/ mechanic and/ or by contracts. The tasks are clustered in job cards which can be found in the appendix. Also the checklists, which are more detailed than the job cards, can be found in the appendix. Finally the work instructions, which also can be found in the appendix, have the most details.

When performing the maintenance, preferably execute with two person's and use a logbook.

During maintenance, use appropriate tools.

All parts that are worn or damaged so they can not function safely have to be replaced.

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11. Trouble shooting

11.1 Operating problems

In case of trouble operating the installation, check the alarm overview or alarm history list on the HMI. On the main screen also a lot of information can be found.

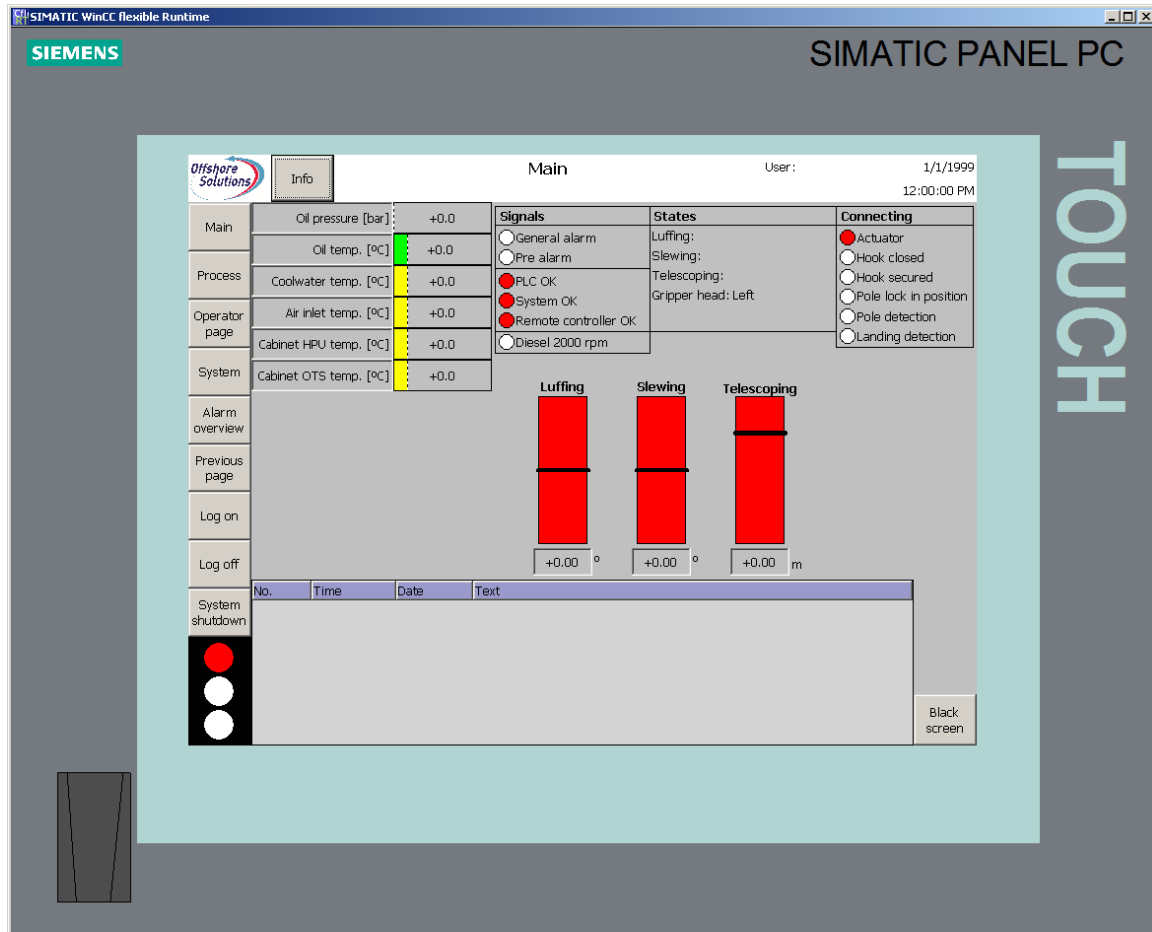


Figure 24 – Main screen

With the INFO button extra information pops up.

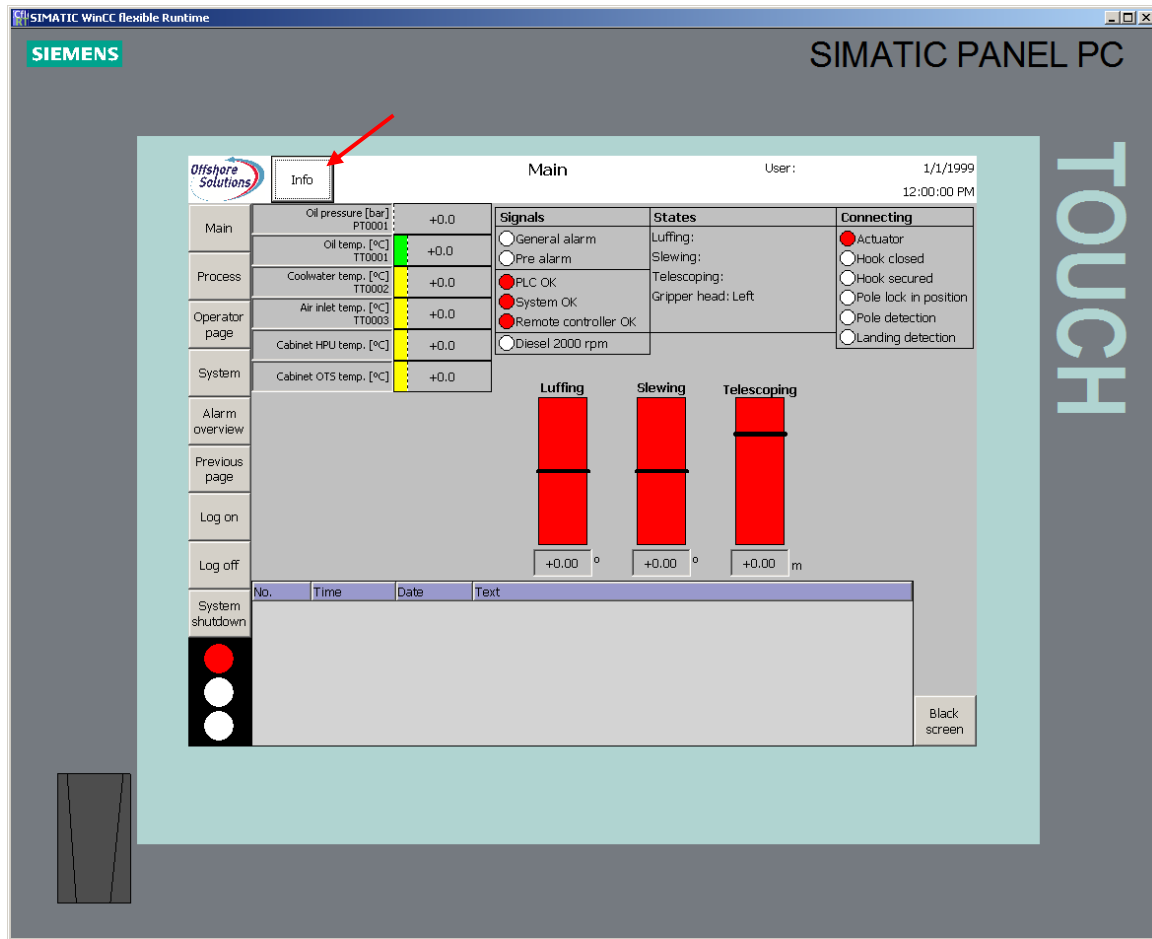


Figure 25 – INFO button

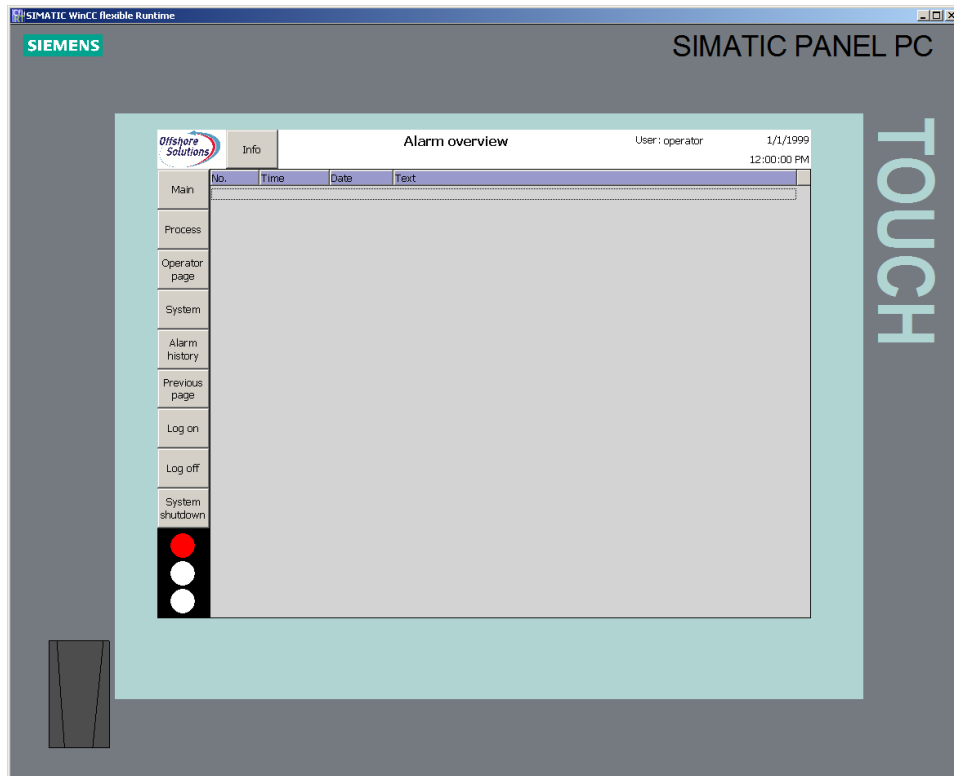


Figure 26 – Alarm overview

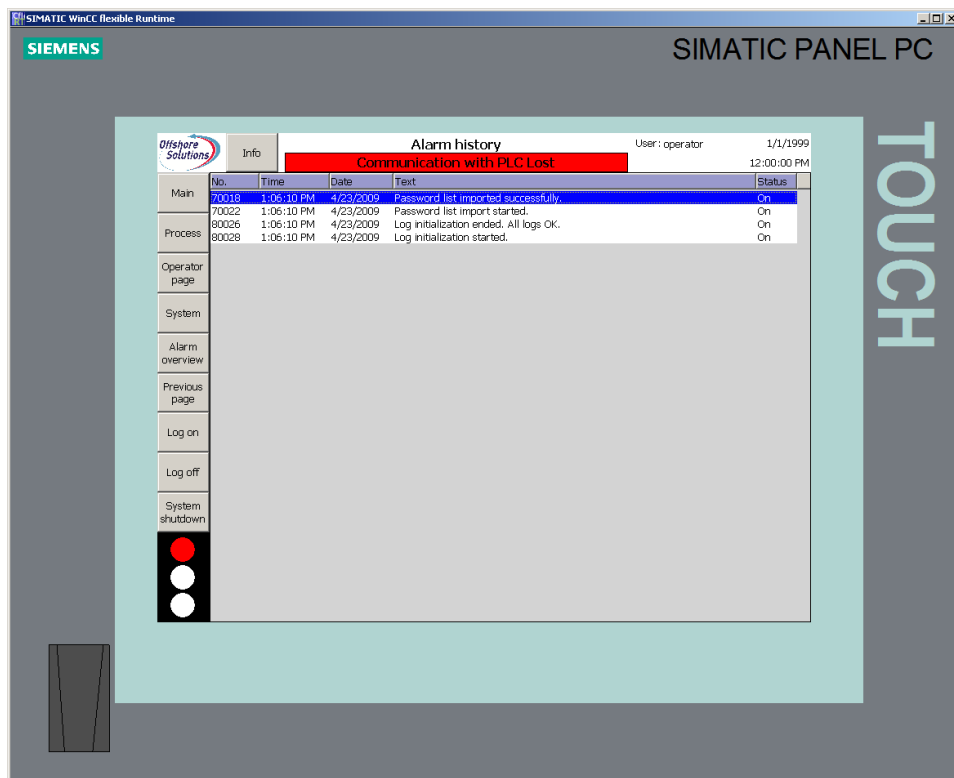


Figure 27 – Alarm history

When a problem occurs, navigate to the operator page to copy the log files to a USB stick.

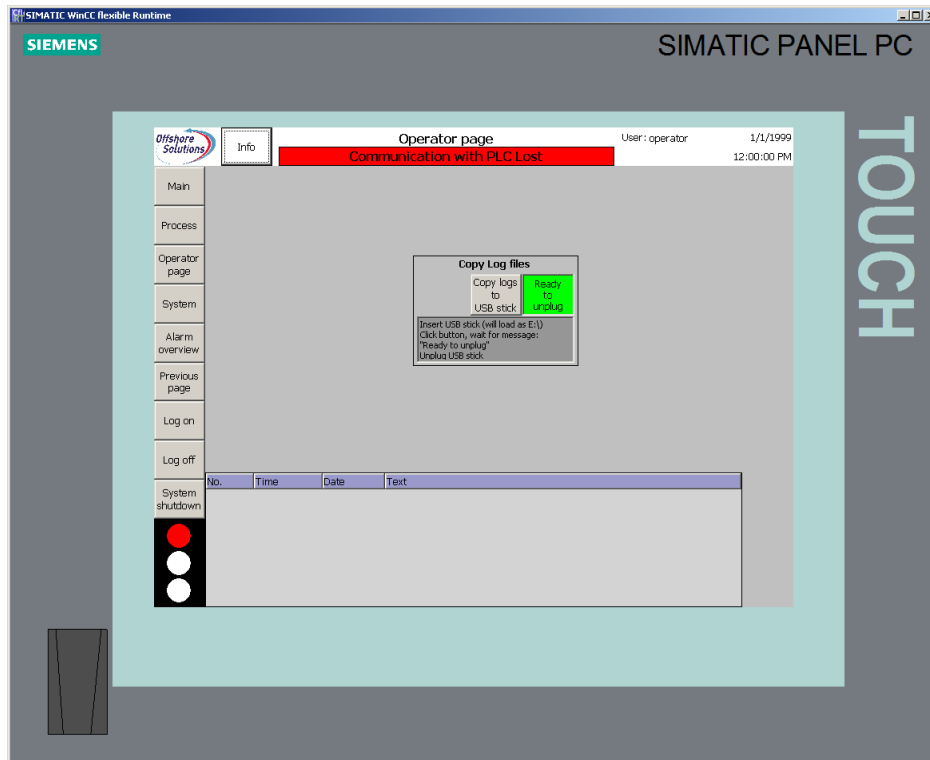


Figure 28 – Operator page

11.2 Emergency stop

In case of an emergency stop the OTS will stay in the mode it was before the emergency stop. When the OTS is in approach mode, the OTS will stay in position and the system can be started up again.

When the OTS is connected and landed and the emergency stop is activated luffing and slewing stay free and telescope is in approach but PDC is not active. The emergency stop must be reset before disconnecting from the pole, because otherwise luffing always stays free!

When the OTS is in auto lowering mode and the emergency stop is activated telescope and slewing will stay free, but luffing stays in approach. Auto lowering is not active. As long as the emergency stop is active switching from free to approach is not possible. The hook can be released to release the pole and the vessel can sail away. The emergency stop must be reset as soon as possible to switch telescope and slewing from free to approach.

It is advisable not to push the emergency stop when the OTS is connected to the pole!

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11.3 Power blackout

When the electrical power fails it is back upped by the UPS. In case of UPS failure, the complete control system will fail and the OTS will stay in the status it was before the power failure.

When hydraulic power fails the accumulator has enough pressure to safely disconnect from the pole. The OTS must be returned in the safest situation as possible.

11.4 Problems during connecting

When – during the connecting cycle – the hook is accidentally released with the button or by the break bolts telescope in and luff up to clear from the pole. Then return to vessel to close the hook and secure the hook with the button.

When – during landed mode – the hook is released with the button or by the break bolts telescope in and luff up to clear from the pole. Then return to vessel to close the hook and secure the hook with the button.

11.5 Contact

In case of unknown installation failure, please contact:

Offshore Solutions BV

P.O. Box 212, 1970 AE IJmuiden, The Netherlands

Strandweg 2, 1976 BS IJmuiden, The Netherlands

T: +31 255 549200

F: +31 255 549219

<http://www.osbv.eu>

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12. Appendices

The following documents are included as appendices within this document:

- A. Vessel details
- B. State charts

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Appendix A: Vessel details

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Appendix B: State charts

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