

Godkjent av		Ansvarlig	Lars Tore Sjøstad
Dato		Versjon	1

1. General procedure for connecting and disconnecting ships in accordance with IEC 80005-3
2. Rubbestadneset LV Shore Power Facility
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1. General procedure for connecting and disconnecting ships in accordance with IEC 80005-3

Use of Plug's shore power systems is required to follow the IEC-standard IEC 80005-3 as shown in the picture below.

General operating procedures

A low voltage shore connection system operation, on shore and on board, shall include procedures shown in Figure F.1.

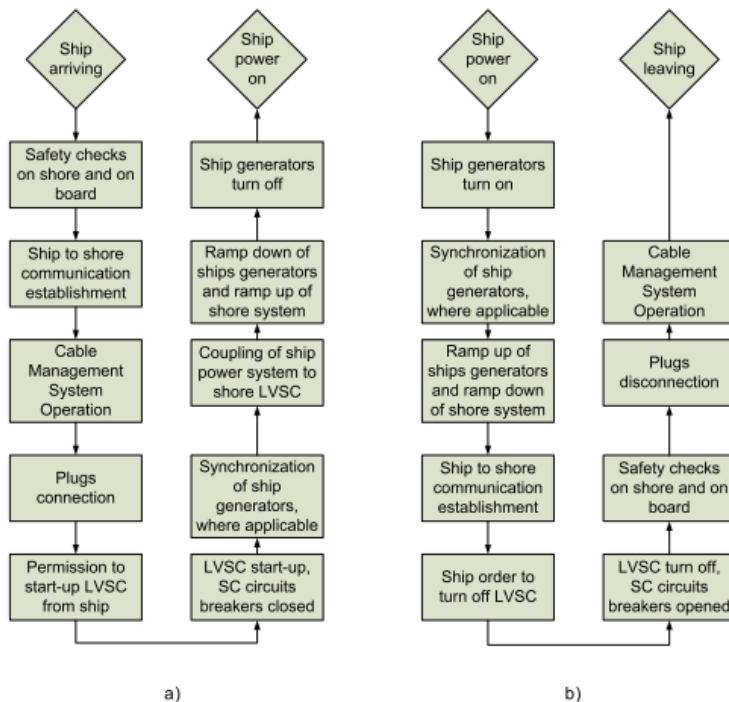


Figure F.1 – LVSC general operating procedures for connection a) and disconnection b)

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2. Rubbestadneset LV Shore Power Facility

The Rubbestadneset installation consists of:

Two identical PSW SPS units (750 kVA)

- Each SPS container has **two independent LV outputs**, each capable of supplying one quay connection point.
- Total facility capacity: **four quay outlets**
 - **Two at Djupvasskaaien**
 - **Two at Nyekaaien**

Zinus ZPP215 CMS

- A single ZPP215 CMS is available at the facility

Power Capacity

- Each plug can deliver **350 A**
- Supported voltage range: **400V, 440V & 690V,**
- **50/60Hz**

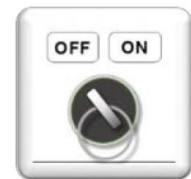
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3. User guide for Zinus cable management system (CMS), ZPP215

Activation of the control panel

- A **key switch** activates the system.
 When turned to **ON**, the CMS becomes fully operational.
- When set to **OFF**, no control buttons are functional. However, all **safety systems** and **signal lamps** remain active.
- When switching from **OFF** → **ON**, the system performs an **indicator lamp test**, cycling through **GREEN**, **YELLOW** and **RED** for approximately **8 seconds**.

The CMS is fully operational during this test.



Emergency stop (EMS).

- Pressing the Emergency Stop (EMS) immediately stops all cable operations.
- When EMS is activated, all signal lamps flash RED continuously until the button is released.



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External signal status

WARNING

Automatically activated when less than **5 meters** of cable remaining on the CMS.
(Indicated with yellow blinking light).

ALARM

Activated under one or more of the following conditions:

- Cable tension exceeds safe limits
- Only 3 meters of cable remain on the drum
- The emergency stop has been triggered

Safety functions

Emergency Stop (EMS)

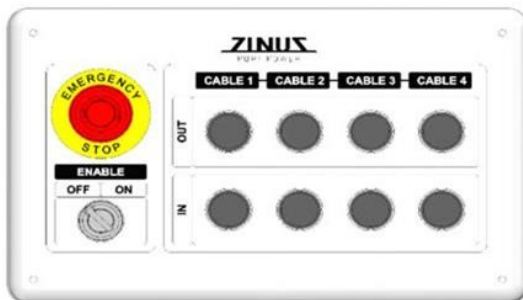
If activated:

- All manual and automatic functions are disabled
- All indicator lamps flash RED
- Further payout is blocked unless the drum brake is manually overridden
(service personnel only)

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Manual Cable Operations

The operator can manually control each cable drum using the front panel.



Cable Payout (OUT)

1. Turn the key switch to ON.
 2. Press and hold the OUT button for the desired cable for at least 5 seconds.
 3. When the indicator lamp flashes GREEN, the cable is ready for payout.
 4. The drum will begin feeding cable out automatically when a constant pulling force is applied.
- Pulling force above the upper limit → drum speed increases
 - Pulling force below the lower limit → drum slows down or stops

Important:

- Only pull out the amount of cable required for a safe connection.
- Never allow the drum to run empty.

Multiple cables may be spooled out at the same time.

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Cable Retrieval (IN)

1. Ensure the key switch is in ON position.
2. Press and hold the IN button for the selected cable.
 - All cables may be retrieved simultaneously if needed.
 - Speed reduces as the cable approaches the inner end position.**

Overload Protection During Cable Retrieval

- If cable tension exceeds the maximum pulling force (>100 kg), the drum motor stops and the RED overload indicator flashes.
- Releasing the IN button allows the cable to automatically move out of the overload condition.
- A load cell continuously monitors cable tension.
When tension exceeds the setpoint, the drum brake is released to prevent damage.
- If the drum becomes completely emptied, a dedicated emergency release system disconnects the cable to prevent the CMS from being pulled out of position.

Cable Length Monitoring

- The PLC monitors drum rotation and continuously calculates the amount of cable deployed.
- The **inner position** is registered by a mechanical stopper, which resets the counter to ensure correct reference.
- If the cable reaches maximum permissible payout, the CMS automatically stops further deployment (manual or automatic).
- If the rotation sensor fails, a **backup break-loop system** stops further payout and de-energizes the drive system.

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Description of Warning Lights

Each cable module has a warning light on the front that changes color depending on various detections, such as ready status, hazard, and alarm. Below is a description of the colors and corresponding actions:

Color	Indication	Description
Green	Steady light	Cable in the inner position
Green	Blinking	Cable is ready for unreeling
Yellow	Steady light	System is set to “service mode” (for service personnel only)
Yellow	Blinking	Warning: Limited cable remaining on the drum (reduced speed) Cable approaching the inner position (reduced speed)
Red	Steady light	Emergency stop activated
Red	Blinking	Alarm: Out of cable Excessive cable tension System set to “Override Mode” (for service personnel only)

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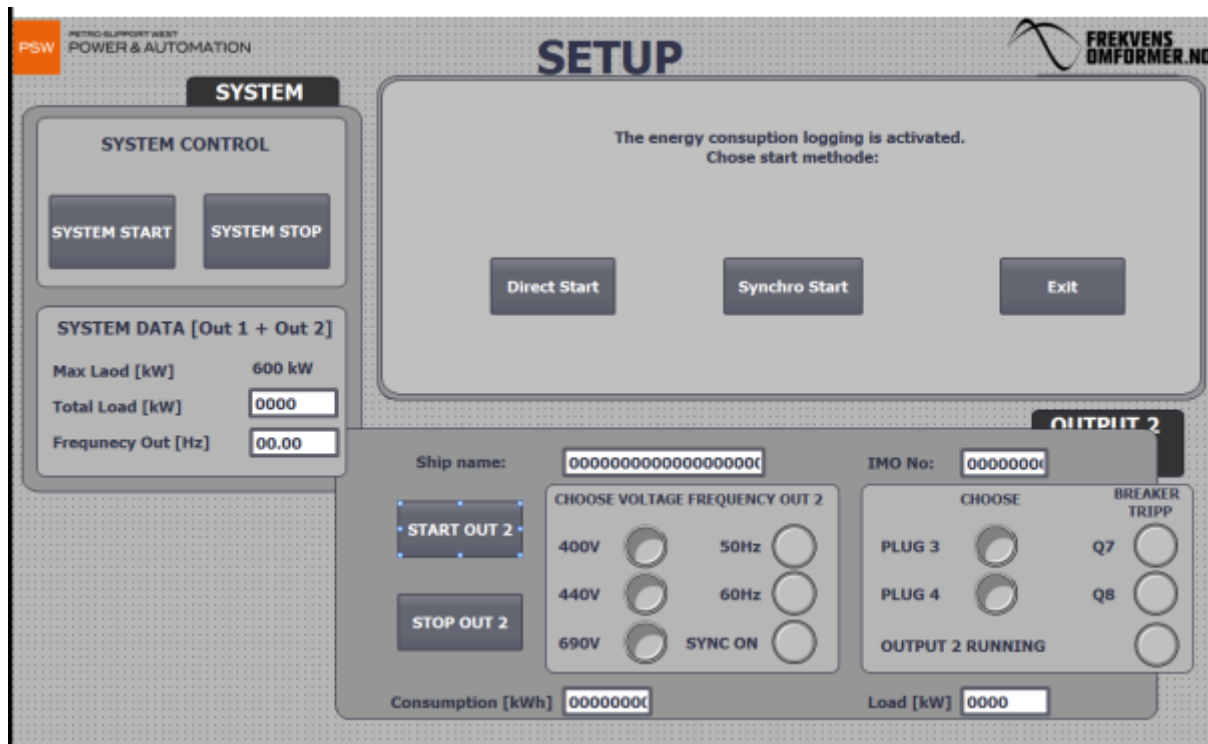
5. How to start the PSW shore power system

4.1 Before startup:

- **Visual inspection** of all ship cables and connection points.
Pay special attention to grounding and the PE system.
- **Check all emergency stops** inside the container and outside.
If Cavotec plugs are used, ensure the **emergency-stop loop is intact**.
- Set the **voltage selector switch** to position **1 – MAIN SUPPLY**
(located on the inner door of the input cabinet).
- **Verify correct voltage** on the voltmeter in the input cabinet (should read **400V** before activation).
- Set the **VFD main switch** to **ON**.
- Verify the **MCCB switch** in the VFD cabinet is in the **REM** position.

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5.2 HMI configuration:



On the HMI screen:

- Enter vessel name and IMO
- Select voltage (400V, 440V or 690V)
- Select frequency (50Hz or 60Hz)
- Select number of outlets used

START SYSTEM

1. If your vessel is the only ship connected to the SPS, press SYSTEM START. The converter will now begin its startup sequence, which takes approximately 20 seconds.
2. Select the desired plug on the HMI screen.

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Output 1

- Plug 1: Green = Active – Breaker Q3 ON (Plug 1)
- Plug 2: Green = Active – Breaker Q4 ON (Plug 2)

Output 2

- Plug 3: Green = Active – Breaker Q7 ON (Plug 3)
- Plug 4: Green = Active – Breaker Q8 ON (Plug 4)

Indicator

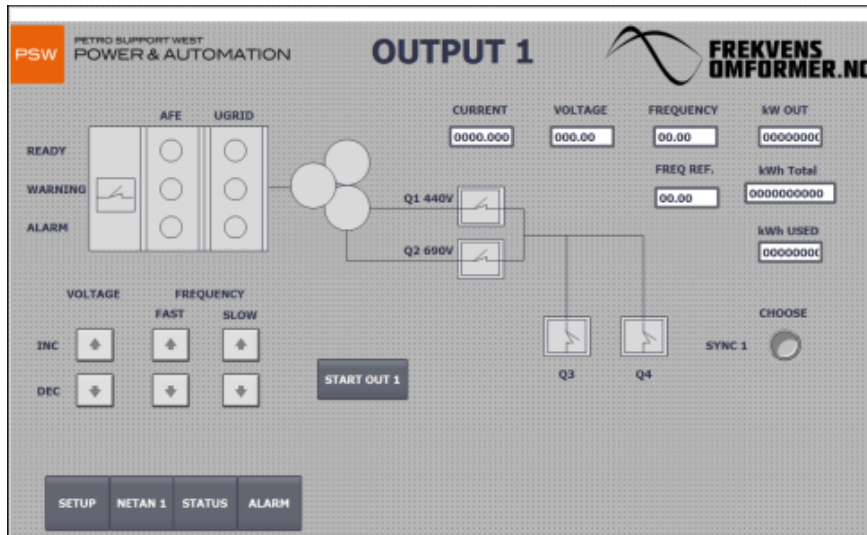
- Output 1:
 - Q3 – Red when breaker is tripped
 - Q4 – Red when breaker is tripped
- Output 2:
 - Q7 – Red when breaker is tripped
 - Q8 – Red when breaker is tripped

3. Press the START LOGGING button.

A pop-up window will appear with two options: Direct Start and Syncro Start.

If the vessel is not energized, select Direct Start.

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4.3 Starting Syncro mode

1. Press Syncro Start on the pop-up window. OUTPUT 1 or OUTPUT 2 synchronization screen will appear.
2. To use synchronization mode, the SYNC function must be activated. SYNC is enabled on OUTPUT 1 and OUTPUT 2 pages.
3. Select the required voltage and frequency.
4. Connect the vessel's voltage to the SPS.
5. Ensure the converter is running and that voltage, frequency, and the selected plugs are correctly configured. Verify that synchronization mode is enabled — the SYNC button will be illuminated green.
6. Verify the readings in the VOLTAGE and FREQUENCY fields. The vessel's values will be displayed.
7. Confirm again that synchronization mode is active — the SYNC button shall remain green.
8. Adjust the frequency using the increase / decrease buttons. Adjust slowly until the synchroscope rotates slowly clockwise.
9. Perform a phase-sequence check to verify matching phase order between the SPS and the ship.

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4.4 Alarms

Alarm Reset

The *Reset* button acknowledges any alarms related to tripped breakers.



Press the reset button located in the lower right corner of the alarm screen to clear acknowledged alarms.

The underlying fault must be corrected before the alarm message will disappear from the list.

Press the **SETUP** button to return to the setup page.

4.5 Stopping the SPS

1. Reduce the output load to below 80% and allow the system to run for 10 minutes before stopping.
2. Press STOP OUT 1 for Output 1 or STOP OUT 2 for Output 2 on the *SETUP* page.

The logging will stop, and the corresponding breakers will open:

- Output 1: Breaker Q1 or Q2
- Output 2: Breaker Q5 or Q6

3. Press RESET OUTPUT 1 if connected to Output 1 (opens breakers Q3 & Q4) or RESET OUT 2 if connected to Output 2 (opens breakers Q7 & Q8).
4. If your vessel is the only ship connected, press SYSTEM STOP to shut down the converter.



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5. Contact information for errors or questions

Plug Operations

Phone: +47 475 14 999

Email: operations@plugport.no

Harbor Master – Rubbestadneset

(Insert local number if available)