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1. General procedure for connecting and disconnecting ships in accordance with IEC 80005-3
2. Stangnes LV Shore Power Facility
3. User guide of CMS
4. How to start the PSW shore power system
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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.

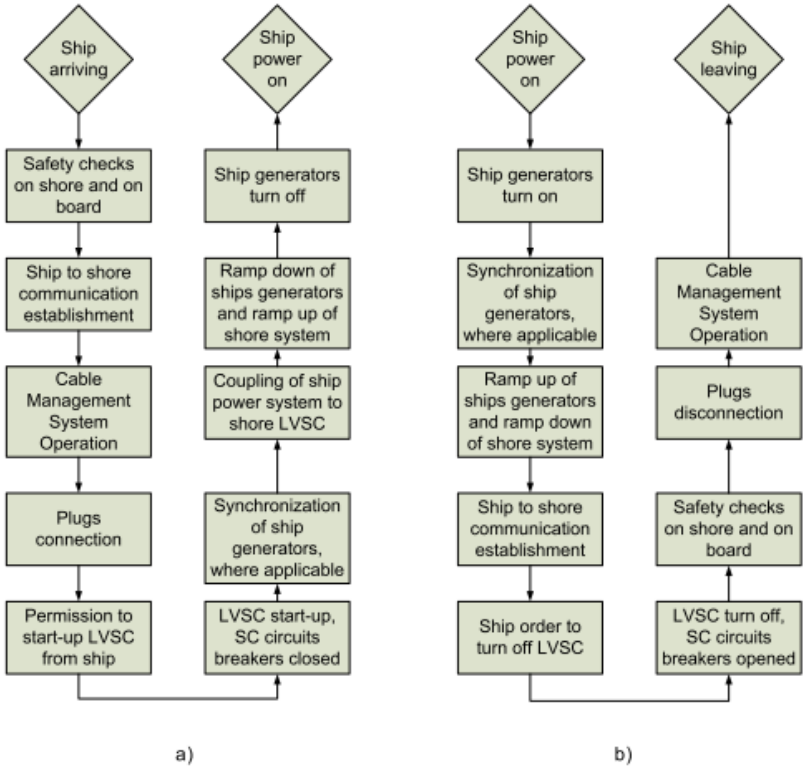

Figure F.1 – LVSC general operating procedures for connection a) and disconnection b)

2. Stangnes LV Shore Power Facility

The Stangnes installation consists of:

- 1000 kVA SPS (Shore Power Supply) container
- CMS

Power Capacity

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

3. User guide of CMS

Stangnes 1:

Stangnes 2/3:

Spooling IN

The hand crank is mounted onto the designated shaft to allow operation.
The crank is used for spooling the cable onto the drum. After spooling, the crank is turned to lock the drum in place.
A 17 mm wrench is used for installing the crank.

Spooling OUT

The hand crank is removed from the drum to disengage it.
The cable is then pulled off the drum carefully. Avoid allowing the drum to rotate at high speed.
Re-mount the hand crank after the cable has been deployed.

The operator must continuously monitor both the spooling process and the surroundings.
Be alert for pinch hazards related to the rotating drum.

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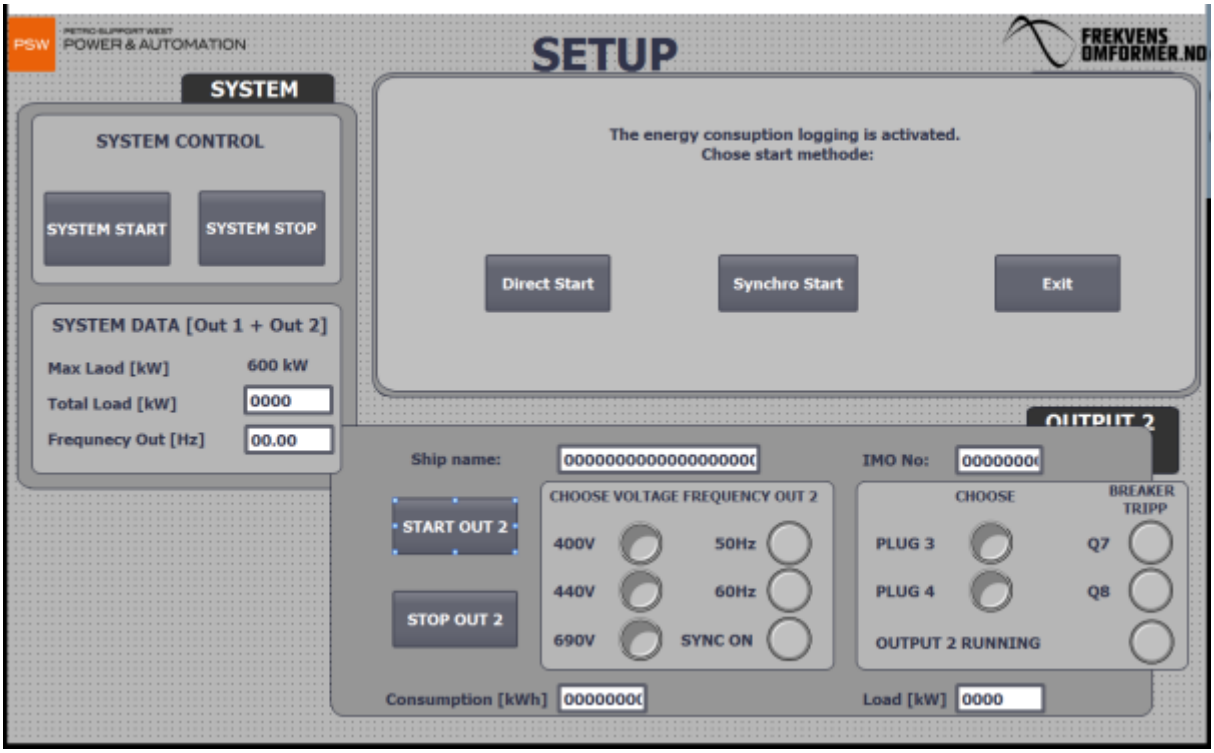
4. How to start the PSW shore power system

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.

4.2 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.

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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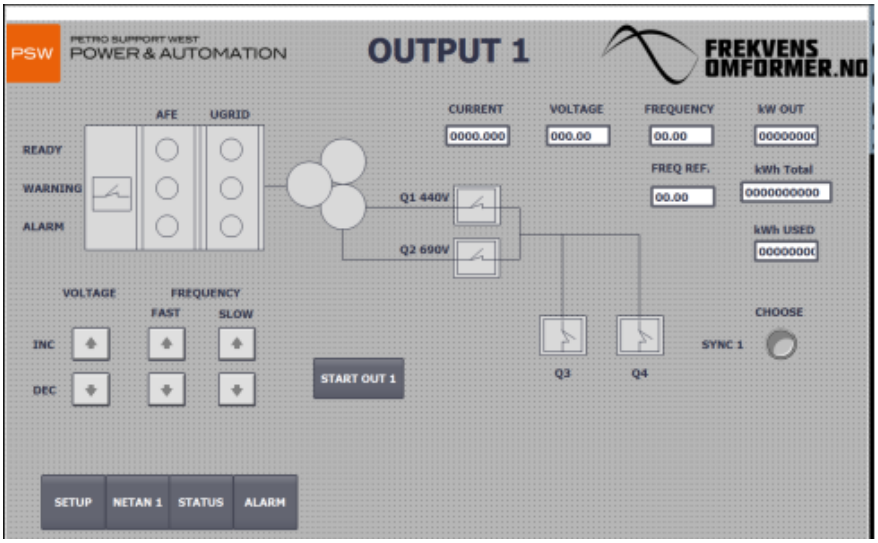

4.3 Starting Syncro mode

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.

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.

5. Contact information for errors or questions

Harbor Master – Harstad Havn

Phone: +47 77 00 12 12

Plug Operations
Phone: +47 475 14 999
Email: operations@plugport.no