



# Connecting Shore power Bergen LV

Side 1 av 12

|               |  |             |                   |
|---------------|--|-------------|-------------------|
| Approved by   |  | Responsible | Lars Tore Sjøstad |
| Approved date |  | Version     | 1                 |

*This user guide applies to all Plug Low Voltage shore power facilities in Bergen, including Dokken, Festningskaian, Tollboden, Skolten and Nykirkekaian. It serves as a guide for the ship's crew to ensure safe and correct connection and disconnection according to IEC 80005-3*

## **Content:**

1. General procedure for connecting and disconnecting ships in accordance with IEC 80005-3.
2. User guide of Zinus cable management system, ZPP215.
3. How to start the PowerCon shore power system.
4. Contact information for errors or questions

|               |  |             |                   |
|---------------|--|-------------|-------------------|
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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 must comply with IEC 80005-3, the international standard for low-voltage shore connection (LVSC). The ship is responsible for verifying compatibility and ensuring correct settings for voltage, frequency, and phase sequence before connection.

## 2. 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.



|               |  |             |                   |
|---------------|--|-------------|-------------------|
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## 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.



## 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

|               |  |             |                   |
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## Safety functions

### Emergency Stop (EMS)

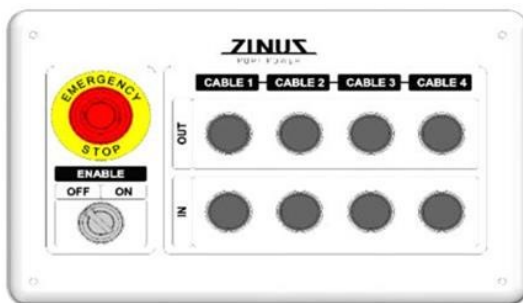
If activated:

- 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. Cables shall be pulled out from the drum manually before being lifted on board by crane.
- 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.

### Cable Retrieval (IN)

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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)<br>Cable approaching the inner position (reduced speed) |
| Red    | Steady light | Emergency stop activated   |
| Red    | Blinking     | Alarm: Out of cable<br>Excessive cable tension<br>System set to "Override Mode" (for service personnel only)         |

|               |  |             |                   |
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## 3. Starting the PowerCon Shore Power System

### Login Screen



Login

The Shore-side cabinet is equipped with an HMI touch panel, used for operating the shore power system.

For username and password, contact the Harbor master's office.

|               |  |             |                   |
|---------------|--|-------------|-------------------|
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| Approved date |  | Version     | 1                 |

Load 1: Off  
Free

Load 2: Off  
Free

Vessel name

IMO number

Start

Stop

Voltage

Select ▼

Frequency

Select ▼

Power outlets

1

2

3

4

Ground supervision

Enabled ▼

Clear

Phase order

Select ▼

Synchronisation method

Select ▼

Droop voltage

+ 0.0% -

Droop frequency

+ 0.0% -

Voltage adjust

+ 0.0% -

The interface allows the vessel to select Voltage Selection, Frequency, Ground Fault Monitoring, Number of Cables, Phase Sequence, and Synchronization Method.

### Ground Fault Monitoring (GFM)

Set **Disabled** if the ship has its own GFM.

Running GFM on both sides may cause unnecessary trips or blackouts.

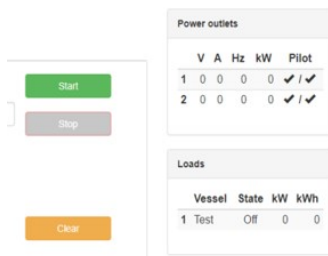
Use Load 1 for connectors 1–2 and Load 2 for connectors 3–4. Each load can supply up to four connectors or be split to serve more than one vessel.

The standard synchronization method is **A1**, where the ship synchronizes with the land-based system.

**Note: Not every facility has the function to adjust voltage.**

|               |  |             |                   |
|---------------|--|-------------|-------------------|
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## Screen for Starting Power Supply to the Ship



| Power outlets |   |   |    |    |       |
|---------------|---|---|----|----|-------|
|               | V | A | Hz | kW | Pilot |
| 1             | 0 | 0 | 0  | 0  | ✓/✓   |
| 2             | 0 | 0 | 0  | 0  | ✓/✓   |

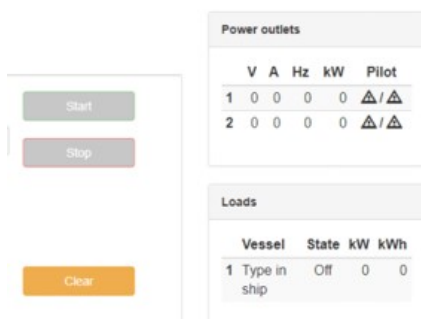
| Loads  |       |    |     |  |
|--------|-------|----|-----|--|
| Vessel | State | kW | kWh |  |
| 1 Test | Off   | 0  | 0   |  |

Once all selections have been entered and the start button lights green, the system is ready to start.

**Note:** Check for signal on pilot circuits (if only one cable is used, only one pilot needs to be OK)

If the start button does not light green, there are typically two reasons for this:

1. A fault in the pilot circuit, which will display a triangle on the screen. The first triangle indicates a fault on the land side, while the second triangle indicates a fault on the ship side. The illustration below shows faults on both sides for demonstration purposes.



| Power outlets |   |   |    |    |       |
|---------------|---|---|----|----|-------|
|               | V | A | Hz | kW | Pilot |
| 1             | 0 | 0 | 0  | 0  | ▲/▲   |
| 2             | 0 | 0 | 0  | 0  | ▲/▲   |

| Loads          |       |    |     |  |
|----------------|-------|----|-----|--|
| Vessel         | State | kW | kWh |  |
| 1 Type in ship | Off   | 0  | 0   |  |

2. Active alarms in the system. These must be deactivated before starting the system.

|               |  |             |                   |
|---------------|--|-------------|-------------------|
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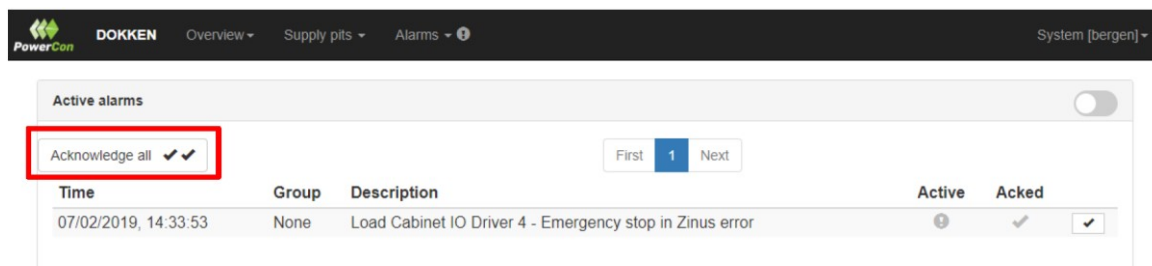
## Screen for Displaying Active Alarms

| Time                | Location                          | Description   | Active | Acked |
|---------------------|-----------------------------------|---|--------|-------|
| 2026-04-26 15:52:51 | Supply pit DV3: Power outlet 1, 2 | High cable tension detected (load interface 1)      |        | ✓     |
| 2026-04-25 20:57:19 | Supply pit DØ: Power outlet 1, 2  | High cable tension detected (load interface 4)      | !      | ✓     |
| 2026-04-23 11:11:50 | Supply pit DV3                    | Emergency stop button activated on supply pit (1)   |        | ✓     |
| 2026-04-22 17:30:01 | Supply pit DTV: Power outlet 1, 2 | Reverse power (IT - InverseTime) trig level 0.80 PU |        | ✓     |
| 2026-04-22 17:30:01 | Supply pit DTV: Power outlet 1, 2 | Reverse power (IT - InverseTime) trig level 0.80 PU |        | ✓     |
| 2026-04-16 18:23:56 | Supply pit DV3: Power outlet 1, 2 | Ground fault warning (load interface 1)             |        | ✓     |
| 2026-04-08 11:57:02 | Supply pit DV2                    | Emergency stop button activated on supply pit (2)   | !      | ✓     |
| 2026-04-07 12:44:27 | Supply pit DV2: Power outlet 1, 2 | Ground fault warning (load interface 2)             |        | ✓     |
| 2026-04-06 17:14:14 | Supply pit DTV                    | Emergency stop button activated on supply pit (3)   |        | ✓     |
| 2026-03-31 15:41:22 | Supply pit DV2: Power outlet 1, 2 | High cable tension detected (load interface 2)      | !      | ✓     |
| 2026-03-28 11:19:43 | Internal                          | Grid fault detected                                 |        | ✓     |

Yellow warnings – The system operate

Red alarms – System trips or cannot start.

To clear warnings / alarms, press “Acknowledge all”



**If the alarm remains active, contact operations to clear the alarm.**

## 4. Disconnecting

1. Press **Stop** on the HMI



|               |  |             |                   |
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2. Remove the plug(s)
3. Ensure the outlet lids close

## Ensure the outlet lids close 4. Contact Information for Issues or Questions

For system issues, report to:

Harbor Masters Office Bergen: +47 55 56 89 50

Plug Operations: +47 475 14 999

Email: [Operations@Plugport.no](mailto:Operations@Plugport.no)