

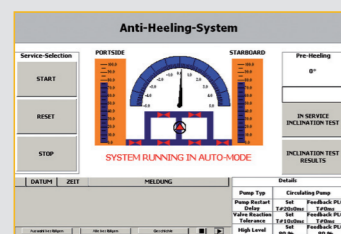
AHS Configuration

Inclinometer

This sensor provides the calibrating input signal for the anti-heeling control system. **BESI** recommends this inclinometer to be installed in the control cabinet which has to be mounted in transversal direction of the ship.

If this is not possible, the inclinometer should be arranged transversally and rigid to the ship's structure, in a small box near the control cabinet.

Operator Panel



This panel is designed to monitor and operate the **AHS** from remote position, for example, from the wheelhouse. The panel is prepared for flush mounting into an existing control console.

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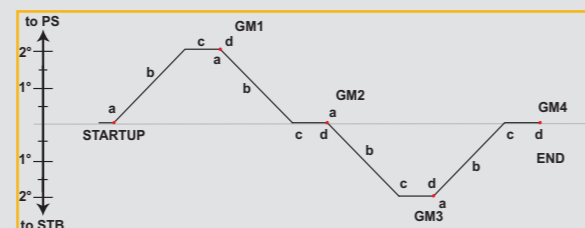
REFERENCES

Partnership in Flow Management

We associate with nearly all major shipyards worldwide. Until this moment, more than 4000 ships and offshore facilities have been equipped with **BESI** systems. To get a complete reference list, please get in contact with us.

Stability Test

This feature is optional and comes with a printer for documenting the test reports. The testing procedure is based on the regulations of **IMO. RES. A 749 (18) Chapter 7.3.1.**



The **BESI AHS** is designed according to the **Germanischer Lloyd (GL)** rules and is also type-approved by **GL**.

AHS BESI Anti-Heeling System

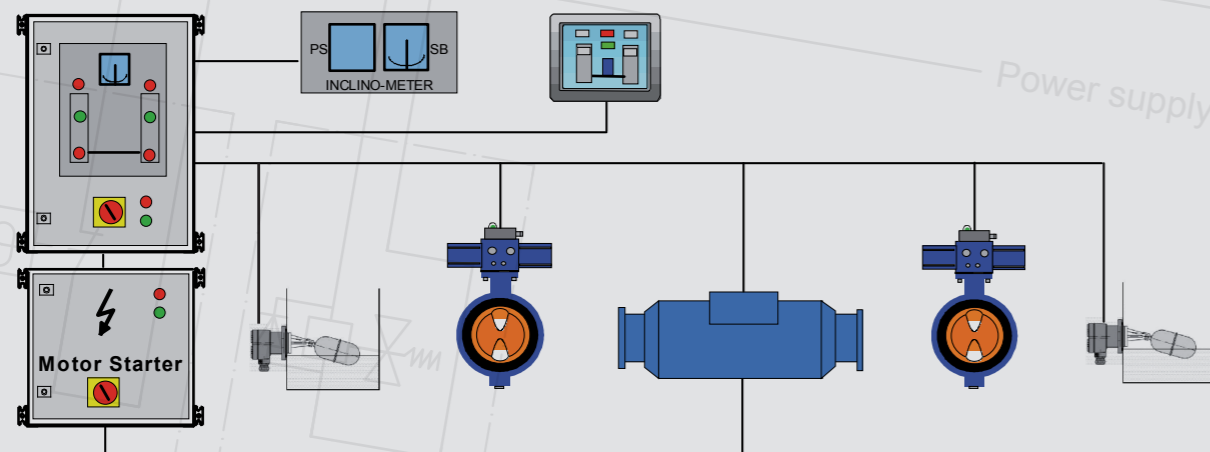


BESI Anti-Heeling System

The **BESI Anti-Heeling System (AHS)** can either be provided as a stand-alone system or as a sub-system integrated in the ballast control. The **AHS** provides manual or automatic heel correction to keep the ship on “**even keel**” during cargo operation. The heel angle is measured by an inclinometer which generates a signal for the control system initiating the necessary actions to keep the vessel in a horizontal position. In automatic mode, the system operator can pre-select a heel angle of up to three degrees starboard or portside which is kept by the system automatically.

The prevailing heel angle is indicated on the panel. However, all operations are interrupted when the heel exceeds five degrees, or when one of the limiting tank level sensors has indicated low or high water level.

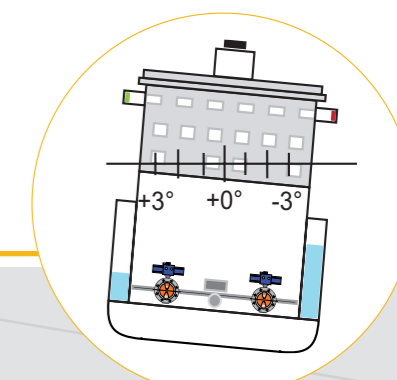
The **AHS** usually operates a pair (or multiple pairs) of anti-heeling tanks (portside and starboard) which are connected via cross-pipes. The nominal transfer rate of ballast water from one ballast tank to the other on the opposite side depends on the cross-duct diameter, tank height (**max. water-head amplitude**) and the capacity of the ballast / heeling pump. A stability test system is available as an optional feature, which is considered useful to specify and report the actual stability of the vessel, after discharging and/or loading operations.



Certificates

BESI possesses the required certificates from major classification societies.

AHS Configuration



Approved Design and Installation

The **BESI AHS** has been designed with flexibility to meet clients' requirements: to operate as an independent system or as an integrated system with the **anti-heeling sub-system incorporated** into the ballast control.

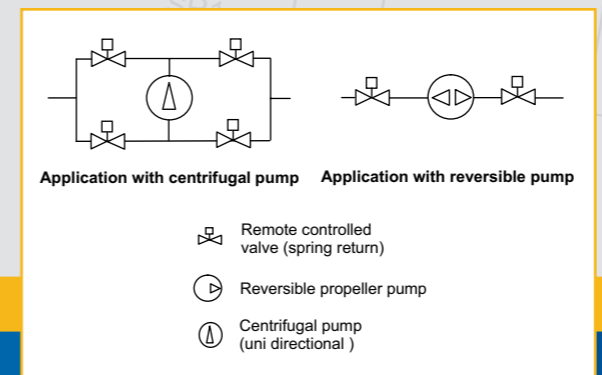
The multifunctional control system runs on various hardware configurations and can integrate several types of pumps. The flexibility of the system also allows the use of the ballast pump(s) and remote-controlled valves of the ballast system for anti-heeling operations.

Anti-Heeling Pump

The integrated system uses designated ballast pumps and assigned valves for anti-heeling operations. The independent **AHS** uses a reversible propeller pump - available in different designs - or a centrifugal pump.

Valves

The **AHS** operating independently from the ballast system requires two **remote controlled valves (RCV)**. Each **RCV** assembly consists of a butterfly valve and an actuator moving the valve into the desired position.



For detailed information about the components shown please refer to the specific datasheets.

Tank Level Sensor / Level Switch

For detecting actual tank levels, tank sensors and level switches are needed.

If the **AHS** is designed as an integrated system, the tank levels are determined by the **BESI-supplied Tank Level Gauging system**. If it is an independent system, the following sensors are provided:

- For each **Anti-Heeling** tank, one pressure **Sensor G1-D**.
- For each **Anti-Heeling** tank, one level switch for detecting minimum water level.

Motor Starter for Heeling Pump

Wall-mounted type installation: cabinet designed as **DOL** or **Y/D MCC (Motor Control Centre)**. The cabinet is equipped with all necessary power distribution and control components.

Anti-Heeling Control Cabinet

Wall-mounted type installation: This cabinet is designed as the dedicated control cabinet and is equipped with all necessary control components.

On the front door, an operator panel is installed for monitoring and operating the system.

Example configurations include

- A reversible in-line (tunnel) propeller pump in combination with two remote-controlled valves.
- A reversible propeller pump in combination with two remote-controlled valves.
- An unidirectional centrifugal pump in combination with a maximum of six remote-controlled valves.
- Existing ballast pumps (max. 2) plus remote-controlled valves. For this application, an online connection to the remote controlled valve system is needed.