Servowatch
Marine Automation & Integrated Ship Solutions
A Larsen & Toubro Group Company

ServoTrim
Trim And Draught Assist System For SWATH Vessels

Engineering Excellence at Sea

Monitor

Control

Support

Protect

Survive

ServoTrim—Trim And Draught Assist System For SWATH Vessels

Amongst the most important measurements that take place on vessels are those needed for calculating ship trim and draugh t, to ensure vessel safety and stability.

The new Servowatch system ServoTrim is designed to control a 'balanced' draught for a vessel with trim conditions that have been set manually, providing automatic follow on control after manual trim has been set.

While the system is not a fully automatic dynamic stabilisation system, the system can be reset to automatically recognise the optimum draught and trim required under different operational conditions, such as loading or unloading fuel, supplies and personnel. .

Employing high accuracy hydrostatic level transmitters, concurrent measurement of ballast tank levels and multi-point draught indication can be achieved. These instruments have an encapsulated stainless steel housing to protection class IP68 and IP69K, this is essential in protecting the measuring cell and electronics from external moisture.

Typical System Structure:

The Vessel may feature:
4 x Ballast tanks.
4 x Ballast tank fill pumps - *1 for each ballast tank with feedback signals, running, stopped, fault from pump starter system.*
4 x Ballast tank empty "dump" valves - *1 for each ballast tank with position sensor feedback signals valve fully open, valve fully closed.*

Sensor Locations:
4 x Ballast tank level sensors - *1 for each ballast tank.*
4 x Draught sensors, seawater - *1 at each "corner" of the vessel mounted internally.*

ServoTrim — Trim And Draught Controller System Could Feature:
1 x System in manual indication.
1 x System in automatic indication.
1 x Automatic pushbutton.
4 x Ballast tank fill control pushbuttons one for each ballast tank.
4 x Ballast tank empty control pushbuttons one for each ballast tank.
1 x Ballast tank 1. Fill pump running, stopped and fault indication.
1 x Ballast tank 2. Fill pump running, stopped and fault indication.
1 x Ballast tank 3. Fill pump running, stopped and fault indication.
1 x Ballast tank 4. Fill pump running, stopped and fault indication.
1 x Ballast tank 1. Empty valve open and closed indication.
1 x Ballast tank 2. Empty valve open and closed indication.
1 x Ballast tank 3. Empty valve open and closed indication.
1 x Ballast tank 4. Empty valve open and closed indication.
1 x Graphic display showing Ballast Tank fill and empty status.

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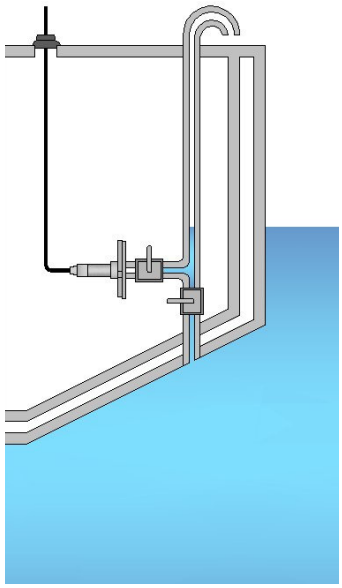
Basic Operation:
The crew manually set the 'datum point' when the vessel is at rest and the loading of fuel, commodities and personnel is complete and stable.

The crew will be responsible for determining the Trim correction required. This is undertaken by manually operating the ballast tanks fill and empty control system until the 'correct' Trim is obtained. This 'correct' Trim 'datum point' is then entered into the control system memory by selecting the automatic control function.

The ServoTrim system will then take a reference signal from the four 'external' draught sensors which are measuring the height of the seawater at each "corner" of the vessel with reference to the fixed height of the side of the vessel.



The draught sensors are mounted within a vented pipe inside the vessel. The bottom of the pipe is open to the sea through the vessel hull. (see diagram)

Each ballast tank is equipped with a level sensor to determine the depth of the water in each ballast tank.

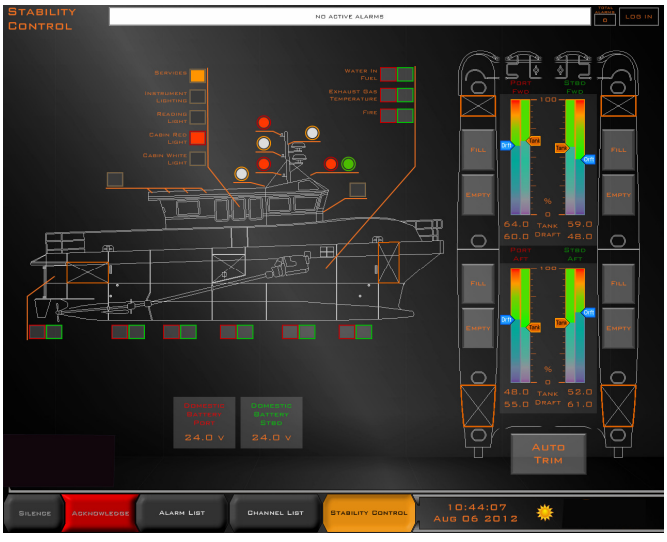
When the 'automatic' mode control is selected the ballast tank sensor data and the draft sensor data is fed into the control system to form a 'datum point' for each ballast tank.

The ServoTrim system will now automatically control the water level in each ballast tank to maintain the vessel selected 'datum point' within the 'dead bands' of the control system.

The system will self check the 'datum point' every 10 minutes by comparing the actual draft level sensor signals with the draught level sensor signals registered following the initial trim and draught manual setting.

The correction will be within the control system limits by the filling and emptying of the ballast tanks.

Should a fault be detected in the signals from any of the sensors, then the system will alarm and if in automatic operation mode; will revert to manual operation mode.



Graphic Display Showing Ballast Tank Fill And Empty Status

Should an empty valve not fully open or fully close, then the system will alarm. If in automatic operation mode; will revert to manual operation mode.

Should a fill pump not start or go to a fault condition, then the system will alarm. If in automatic operation mode; will revert to manual operation mode.