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 draught, 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.

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

Employing highly accurate hydrostatic level transmitters, concurrent measurements of ballast tank levels and multi-point draught indication can be taken. These instruments have an encapsulated stainless steel housing qualified to protection class IP68 and IP69K, both essential in protecting the measuring cell and electronics from the harsh environmental conditions.

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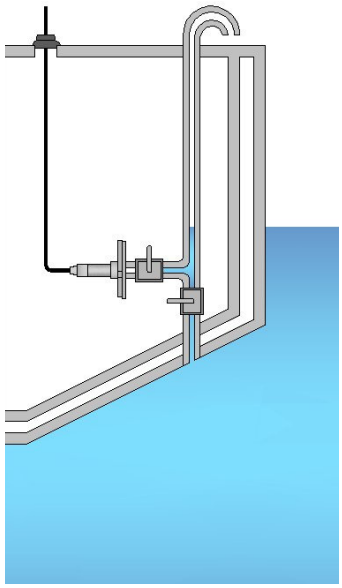
Basic Operation:
The crew manually set the datum point when the vessel is at rest and the loading of fuel, commodities and personnel is complete and stable.

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.

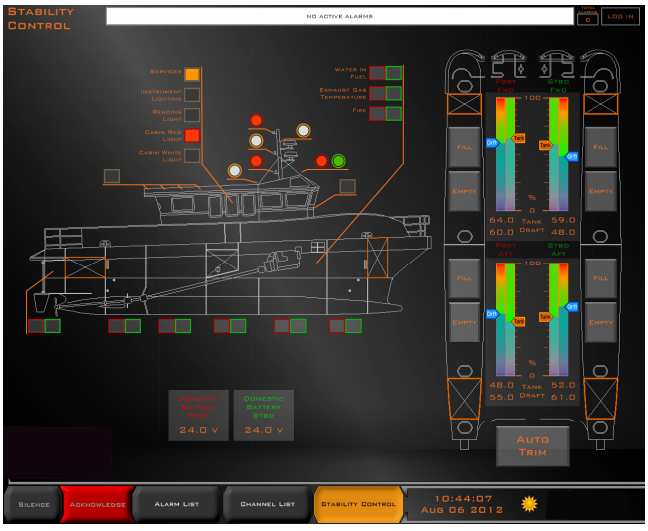
When the automatic mode control is selected the ballast tank sensor data and the draft sensor data is fed into the control system to form a datum point for each ballast tank.

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, 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 close then the system will alarm. If it's in automatic operation mode it will revert to manual operation mode.

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