

Cargo Ballasting Systems



Hydraulic Power Unit

Frames solutions typically consist of the following equipment:

- Hydraulic power unit
- Control panel
- Process control valves
- Actuators
- Emergency manual pump unit
- Interface engineering

Product Definition

Frames Cargo Ballasting Systems are used to ensure that the ballast in the hull of a floating production platform (FPSO) is distributed evenly so that the facility is always in balance. We provide the controls, valves and actuators as part of a complete control and safeguarding package.

Product Description

A complete cargo ballasting system consists of two parts: cargo pumps, which transfer cargo fluids such as crude oil and oil products from the storage tanks to the discharge; and ballast pumps, which transfer seawater to the ballast tanks and vice versa. To ensure this process is controlled in a safe manner, a large number of (submersed) valves and actuators ensure a correct flow of fluids and a properly balanced production platform.

Cargo Ballasting Systems

Process Description

Due to the nature of a floating production platform, a cargo ballasting system needs to be located over the entire area of the hull. This requires a specially designed hydraulic system, with particular attention to tubing sizes and lengths, as well as the optimal layout, location and installation of the control panels.

Frames systems include a hydraulic power unit which drives the actuated valves. The power units have a standard industrial design that can be installed in a safe area or engineered according to client specifications for installation in a zone 1 or zone 2 area. The hydraulic pump controls and starters are incorporated in the package to provide a plug & play solution.

Controlled opening of the actuated valves is managed by means of a control panel equipped with solenoid valves for each actuated valve. These solenoid valves are 4/3-way or 3/2-way, depending on the type of actuator (double-acting or spring return).

Valve positioning ensures that the cargo ballasting system knows that subject control valves are in open or closed position. To accommodate this feature, we can provide two options. The first option consists of direct feedback signaling that can be installed at the actuated valve mounted to the stem. As a second option, we can install a volumetric position indicator with transmitter feedback, which determines the position of the actuated valve according to the displaced volume of the actuator.

Depending on the optimum deck layout and location of the controls, we can opt for a shared centralized control panel or decentralized multiple control panels, which are located near a group of actuated valves. This reduces the number of interface lines from control panel to actuator.

Local control panels and their instrumentation can be designed to operate in a zone 1 or zone 2 area, depending on the final location.



Process Control Valves



Local Control Panel



Hydraulic Power Unit

Cargo Ballasting Systems

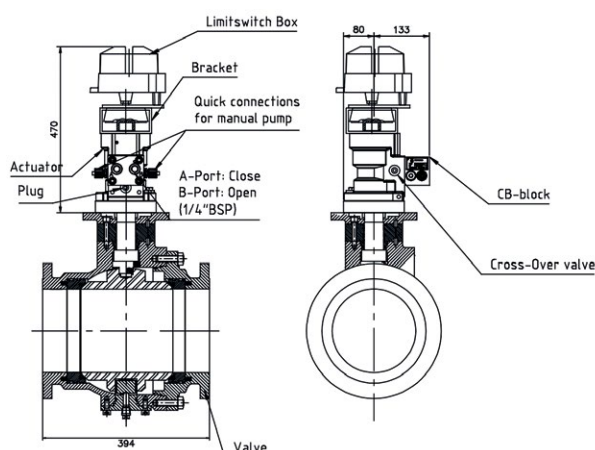
Frames designs and assembles its systems in close consultation with its clients, resulting in solutions that adequately meet our clients' needs. We are specialized in the selection of actuated valves from a range of reliable suppliers, which enables us to provide complete, customized systems. We take full responsibility for the layout, selection, interfacing and functional requirements of the cargo valve ballast control system, and provide an optimized integrated solution that is fully tested and ready for on-board installation.

Project Management

At Frames, we understand that success depends on sharp project management. As our client, we are driven to support your business, with our dedicated project team always on hand for one-on-one contact, providing you with the best possible service.

From concept through to design, production, testing and delivery, our project team will know your operating environment, and will use the latest technology to precisely meet your needs.

We are solution-oriented, understand your industry and always use strict document control and professional planning to exercise tight process control and meet all delivery deadlines. Our global office network, international supply chain and partnerships with leading vendors mean we are always able to supply the best possible systems and meet all of the local requirements and regulations.



Process Control Valves

Technical Details

- **Design pressures** : Typically up to 5000 psi
- **Motor power** : Typically around 22 kW
- **Fluid** : Mineral hydraulic oil
- **Area** : Safe area, zone 1 or zone 2
- **Wetted parts** : Carbon steel, AISI 316

Added Value Frames

- **Compact, modular design**
- **Interface engineering**
- **Total system responsibility**
- **Installation and commissioning**
- **Third-party design appraisals**

References

- **Thunderhawk Semisubmersible, USA**
- **Frade FPSO, Brazil**
- **P55, Brazil**
- **OSX-2 FPSO, Brazil**
- **Baleia Azul FPSO, Brazil**
- **Aasta Hansteen SPAR, Norway**

Contact

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Frames Family Tree



- Multiphase Separation**
 - Production Separators (High & Low Pressure)
 - Test Separator
 - Degasser & Knock-Out Drum
 - Water Oil Separator (WOSEP)
- Compact Inline Separation**
 - SwirlSep
- Electrostatic Coalescers**
 - Dehydrator
 - Desalter
- Produced Water Treatment**
 - Deoiling & Desanding Hydrocyclones
 - Gas Flootation
 - Media Filtration
 - Solids Removal & Cleaning
 - Stripping
- Separation Internals**
- Heat Exchangers**

- Gas Separation**
 - Demisting
 - Scrubbers
 - Filters
 - SwirlSep
- Heat Exchangers**
 - Shell & Tube Heat Exchangers
- Air-Cooled Coolers**
- Gas Sweetening (H₂S & CO₂)**
 - Amines
 - Thiopaq O&G
 - Solid Bed Scavenger
 - Membrane
 - Molecular Sieve
- Gas Dehydration**
 - Glycol (TEG)
 - Molecular Sieve
- Dew Point Control**
 - Low Temperature Separation (LTS)
 - Solid Desiccant
- Hydrate Inhibition**
 - MEG/DEG Recovery
 - Methanol Recovery
 - MEG/DEG Desalination
- Light Hydrocarbon Recovery**
 - Condensate Stabilization
 - Fractionation
- Fuel Gas Treatment**

- Hydraulic Systems**
 - Wellhead Control
 - Subsea Hydraulic Power Units
 - Hydraulic Power Units
 - IWOCs (Intervention Workover Control Systems)
 - TUTU (Topside Umbilical Termination Unit)
 - Cargo Ballasting Systems
- Safety Instrumented Systems**
 - High Integrity Protection Systems (HIPS)
- Chemical Injection**
 - Chemical & Methanol Injection Systems
 - Chemical Distribution Systems
 - Seawater Electrochlorination Systems
- Valve Automation Center**
 - Actuators and Actuated Valve Packages
 - Control Systems
- Automation**
 - Buoy Control
 - Tank Farm Control & Safeguarding

- Services**
- Asset Life Cycle Management**
- Maintenance & Field Services**
- Commissioning**
- Spare Parts**
- Operator Training**
- Engineering Studies**
 - Conceptual
 - FEED and Basic

Integrated Solutions



- Total Plant Solutions**
- Industrial CO₂**
- Modules**
- Early Production Facilities**
- Wellsite Packages**
- Biogas**