

Ballast systems



Innovative solutions in
valve automation
systems



**DOEDIJNS
PNEUMATICS**



SITE BALLAST SYSTEMS

For applications in a maritime environment where stability is of great importance, e.g. on ships or semi-submersible drilling rigs, Doedijns Pneumatics has designed SITE (submersible) pneumatic and hydraulic ballast systems.

Stability and safety

In cargo ships and semi-submersible drilling rigs, the safety of personnel and cargo depend on stability. This stability is created by a special installation onboard that organises the amount of seawater in several ballast tanks: the ballast system.

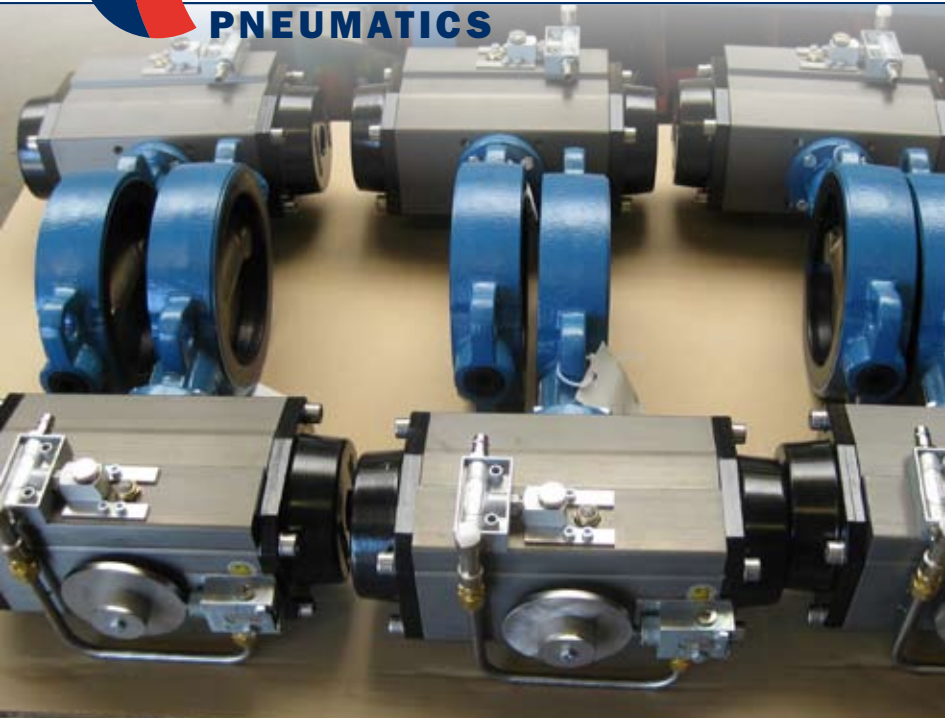
Typically, a ballast system consists of 2 components:

- A control panel which is needed to operate the system
- Valves & actuators to control the amount of water going in or out of the ballast tanks

Most often, ballast valve actuators are placed inside the engine room, pump chamber, bow thruster room or pipe duct where they can be accessed for maintenance or direct control.

In an effort to save valuable space on board, engineers and ship builders choose to mount actuators inside the ballast tanks. Reliability here is of the utmost importance. For this special purpose SITE submersible actuators have been developed. Modern ships are designed to be operated by smaller crews and therefore the need for automated ballast systems has become larger. It is of great importance that the ballast system can be controlled with a minimum chance for failures.





PNEUMATIC SYSTEMS

Traditionally, hydraulic operated actuators are used in ballast systems. The risk of hydraulic oil leakage into the ballast water and overall system cost savings have encouraged our engineers to design and develop pneumatic actuators. These actuators can be mounted directly into ballast tanks and be submerged up to a depth of 30 meters. Doedijns Pneumatics offers complete custom built pneumatic ballast systems comprising valves, actuators, control cabinets or panels and all accessories necessary.

Implementation & technical details

- Installation on valves throughout the ship's ballast system
- Direct operation from the control cabinet in the engine room or remote locations elsewhere on the ship
- Stand-alone operation or by interaction with the cargo management system of the vessel
- Installation of touch screens or integration of all control and signal elements in a pneumatic mimic panel, giving a clear graphic overview of the complete ballast system
- Connection of each actuator to the control cabinet by only 2 air connections:
 - one for opening & closing of the valve
 - one for active & positive position indication
- Quality guaranteeing of supplied air by the use of an adsorption desiccant air dryer unit:
 - preventing moisture settlement in the system
 - guaranteeing optimal functionality at extreme low temperatures, even far below -20 °C



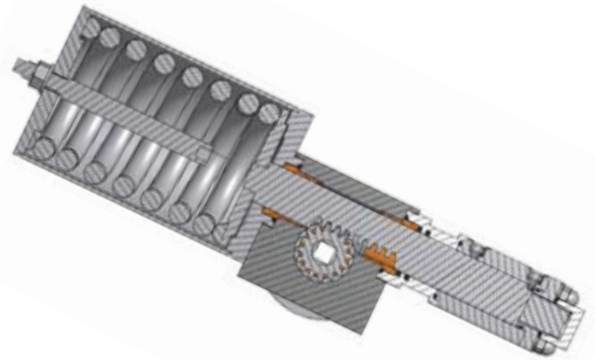


HYDRAULIC SYSTEMS

SITE hydraulic ballast systems are the most reliable systems thanks to the powerful spring return option and a modular design.

Implementation & technical details

- Submerged installation up to a depth of 30 meter inside ballast tanks
- Relative high torques up to 300 Nm
- Fail-safe: spring return
- 360° adjustable in- and outlet position for hydraulic piping
- Adjustable stroke length
- Positive & active position indication directly by the valve stem
- Namur accessory interface
- Flange mounting according ISO5211
- Stand-alone system or integrated in cargo management system of the vessel
- Remote operation from engine room, control room, etc. using a touch screen or mimic control panel
- Modular design: spring cylinder, drive shaft and hydraulic cylinder
- Easy and low cost installation with 2 lines of tubing per actuator:
 - one or active and positive position indication
 - one for opening and closing of the valve
- Low maintenance costs





ADVANTAGES SITE BALLAST SYSTEMS

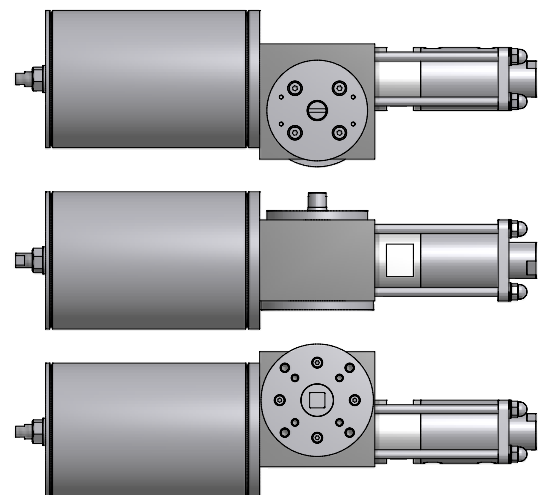
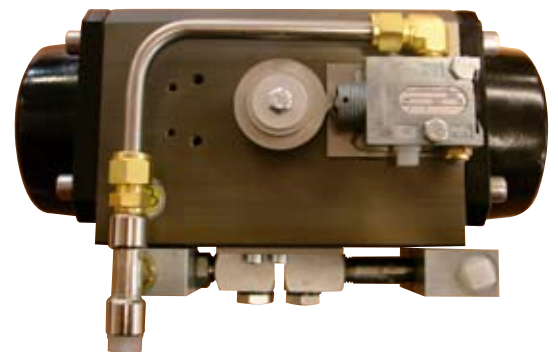
- Positive & active valve position indication generated by the valve stem
- Fail-safe spring return actuators
- No electrical connections or power supply required
- Actuators submersible up to 30 meters
- Interaction with digital control systems or computers is easily established by interface modules
- Low maintenance cost

Pneumatic ballast systems

- No special hydraulic power units required: a simple air compressor is sufficient
- Emergency control consists of a simple foot-pump located near the control cabinet: valves and position indication will function as normal
- Cost of installation is relatively low thanks to simple two-line control: each actuator is controlled by only two (low pressure) PU lines, instead of expensive steel or copper tubing
- Actuators are air to open, spring to close (fail-safe): guaranteeing positive closing of valves in the event of an emergency
- No risk of oil leakage (pollution) in the in- or outboard water
- After mounting of pneumatic lines, there is no need to flush the entire system
- Simple check for air leakage by air consumption and/or pressure drop

Hydraulic ballast systems

- High torques thanks to hydraulics
- Fully adjustable stroke length for both spring and hydraulic cylinder
- 360° adjustable in- and outlet position for easy connection of hydraulic piping
- Modular design





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