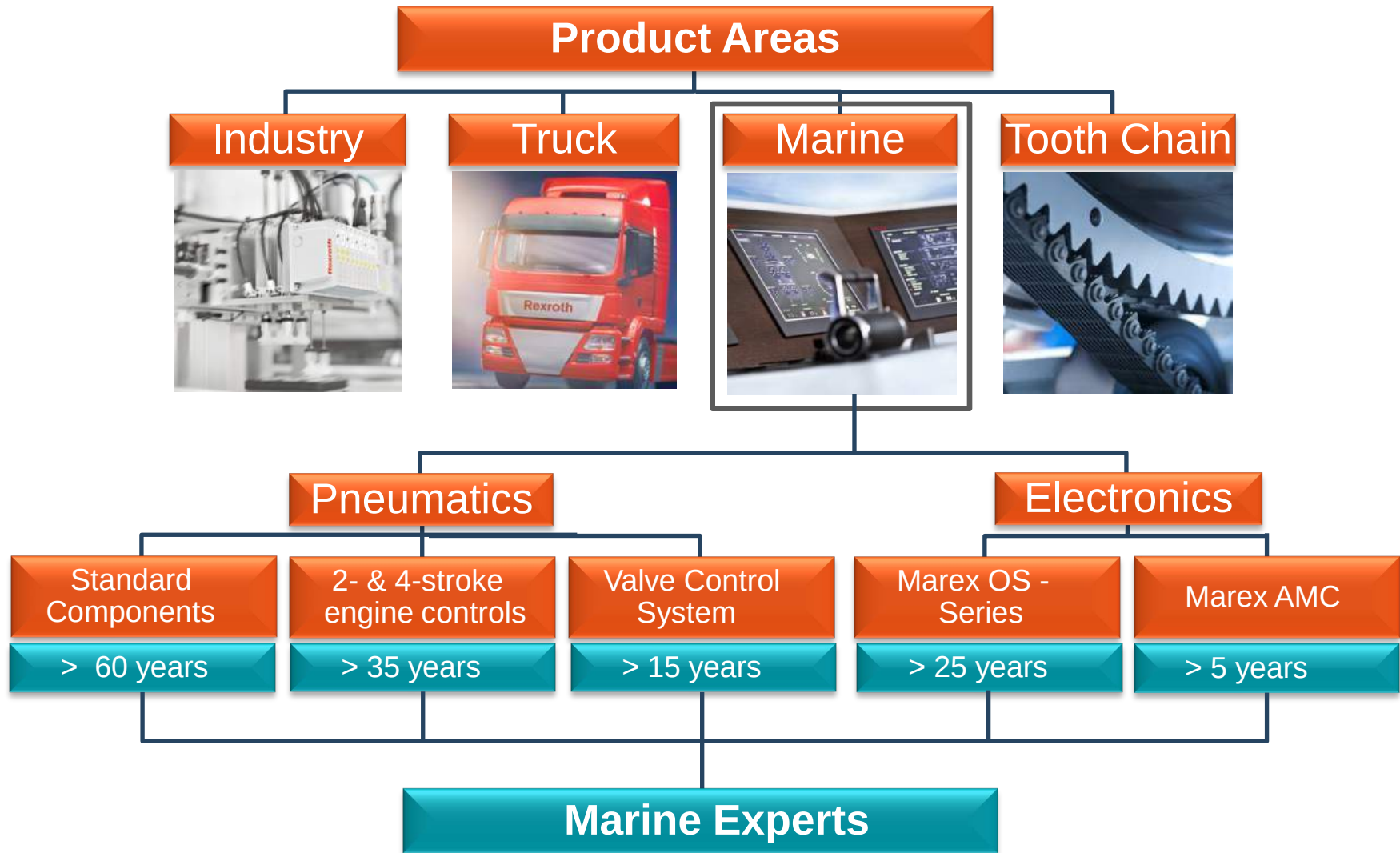








Fuel injection timing



Reversing unit



Cylinder cut-out



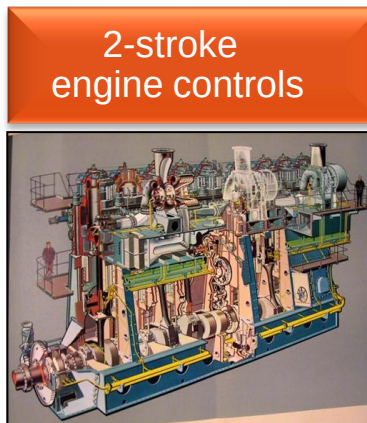
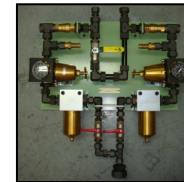
Starting unit

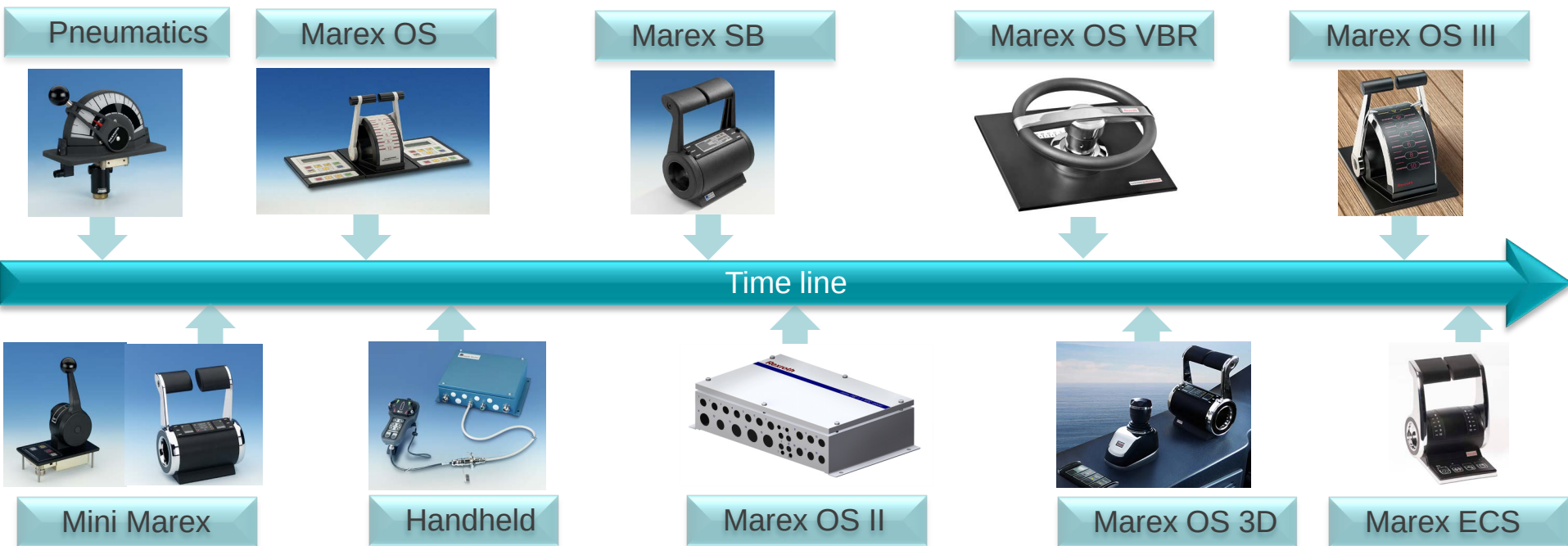
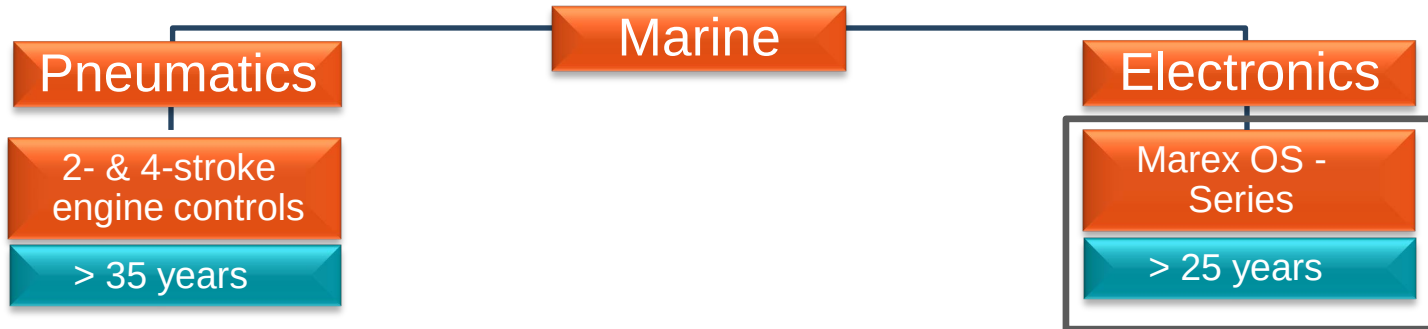


Start & stop unit



Air treatment





Production Sites



- **Production sites**
- Germany: Laatzen/Gronau
- France: Bonneville
- Hungary: Eger
- USA: Lexington
- China: Changzhou

Global indicators

Employees 2.100

Sales offices In 40 countries worldwide

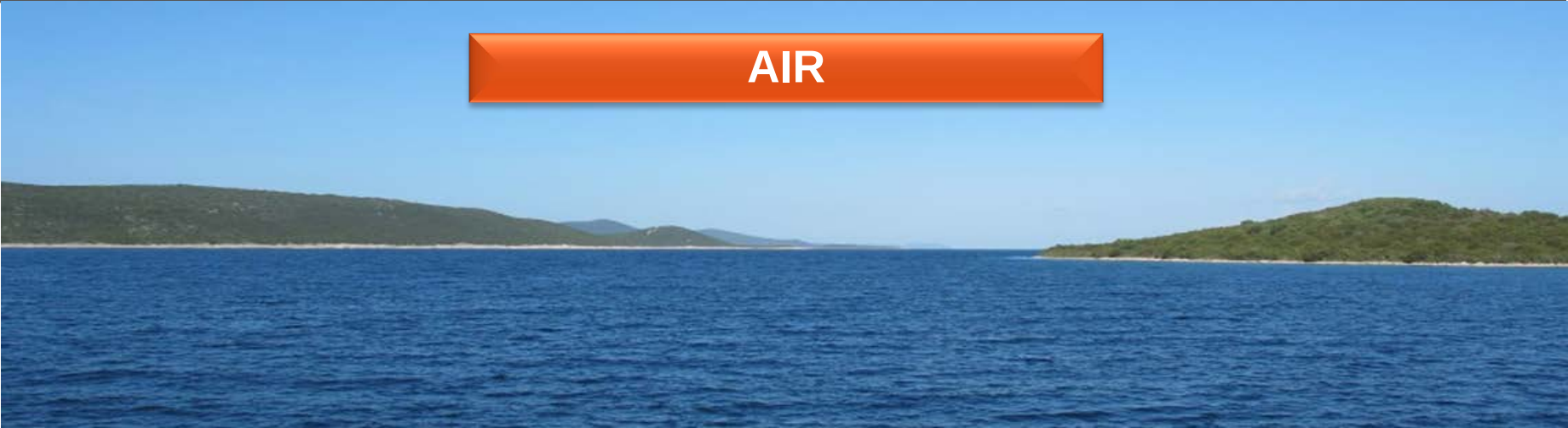
Service network



- AVENTICS Sales Company
- Distribution via Bosch Rexroth
- Main Sales Partner



We won't leave you stranded



AIR

Environment friendly

In the worst case you will
have BUBBLES

No additional medium

Air compressor is already
on board

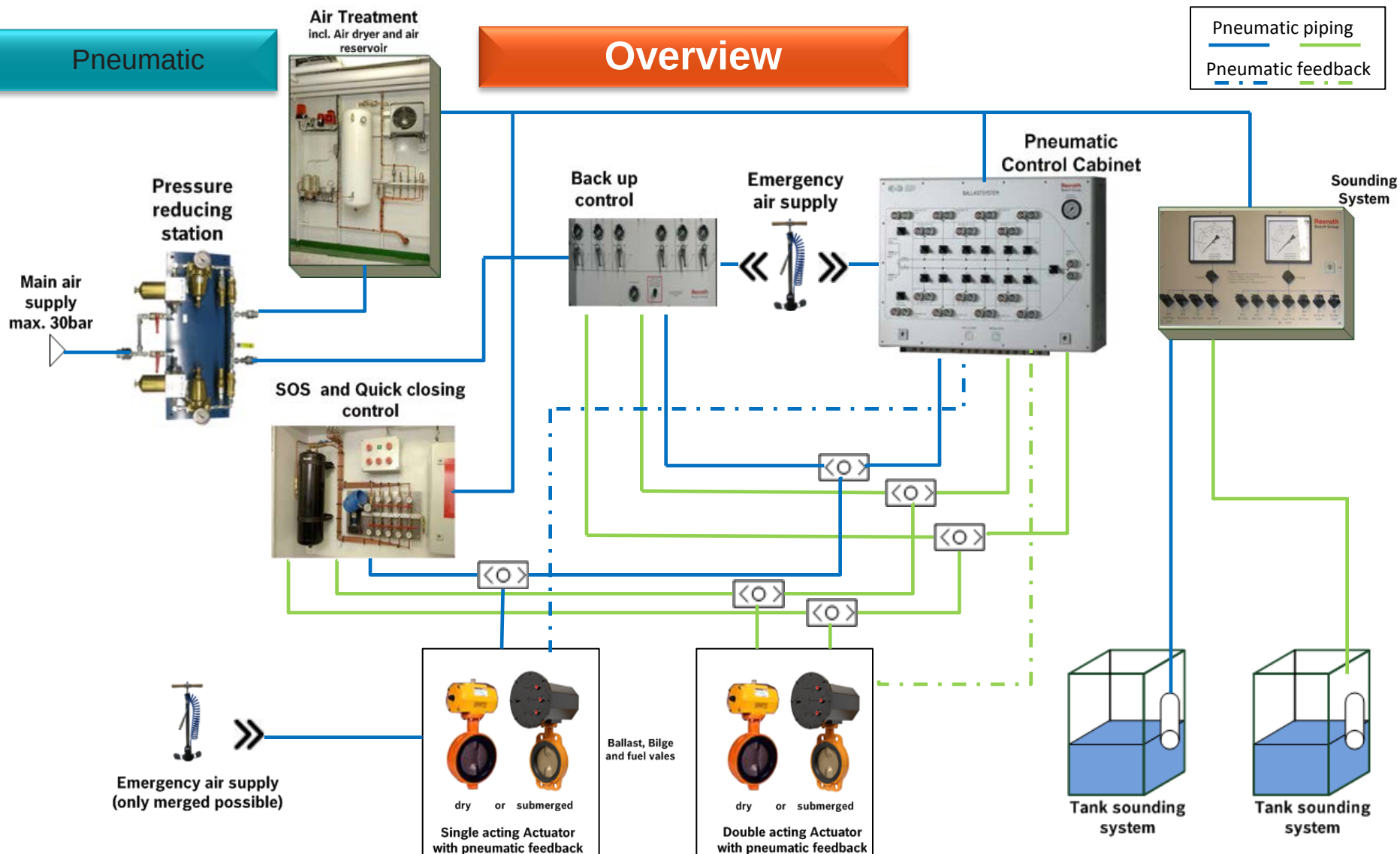
Easy to handle

No dangerous situation for
the crew or environment

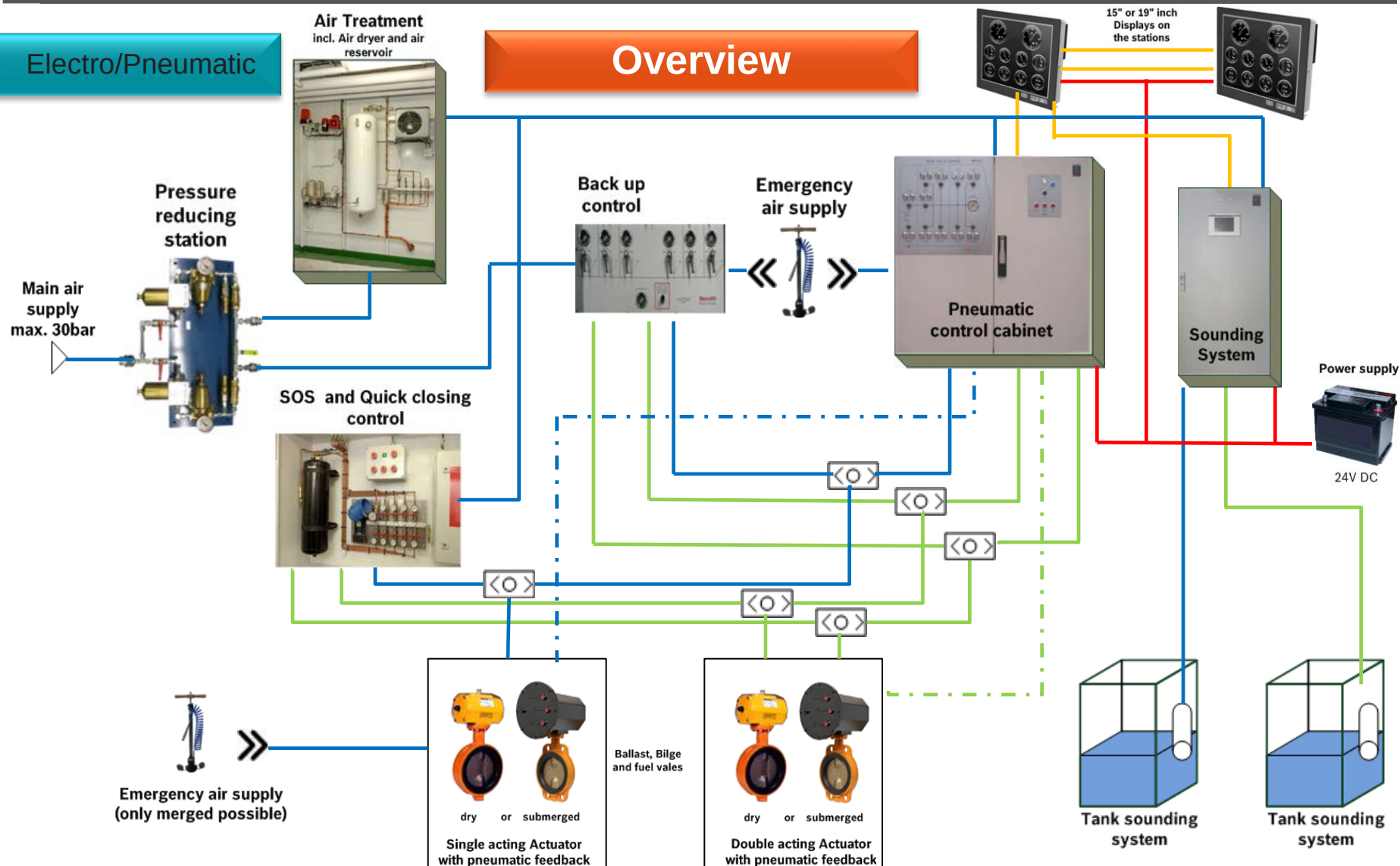
Pneumatic

Overview

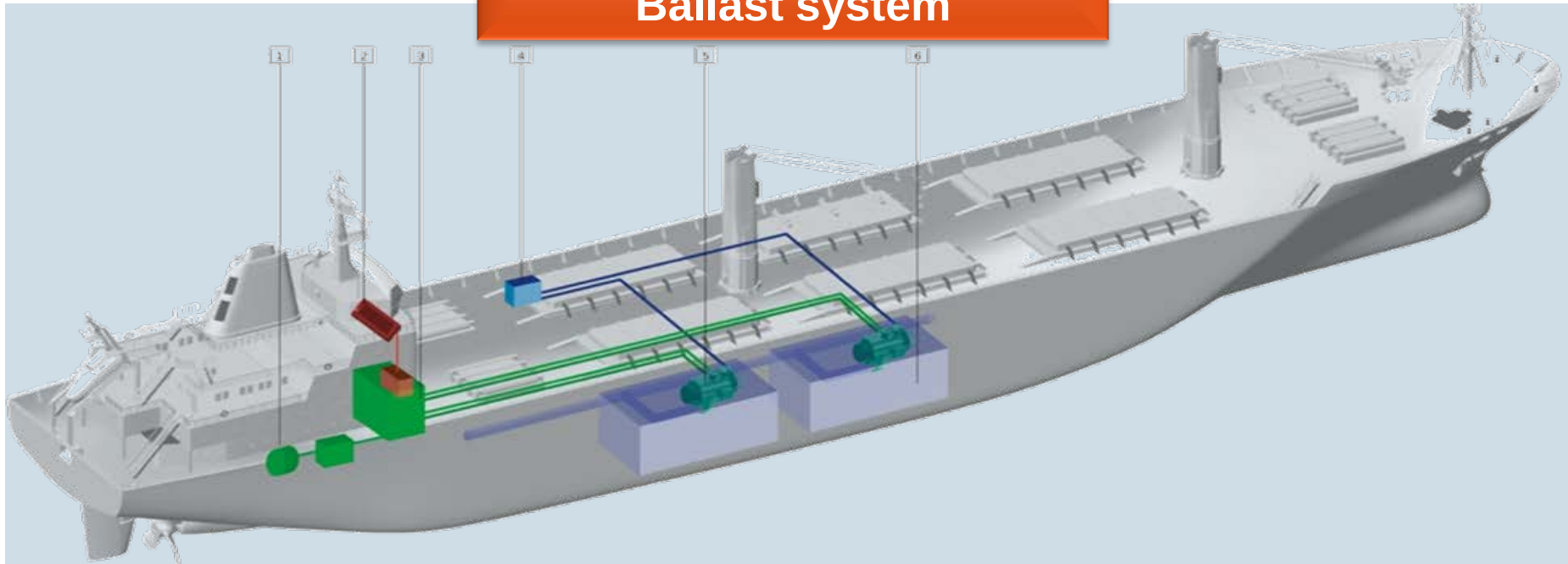
Pneumatic piping
Pneumatic feedback



Electro/Pneumatic



Ballast system



1. Air preparation
2. Marex AMC
3. Pneumatic Control Cabinet
4. Back up
5. Actuator
6. Tank measuring probe

Schematic overview

Cargo management system

Electronic control & visualization

Ballast water
treatment

Ballast
pumps

Air conditioning and preparation

Control cabinets

Emergency operation

Quick closing systems

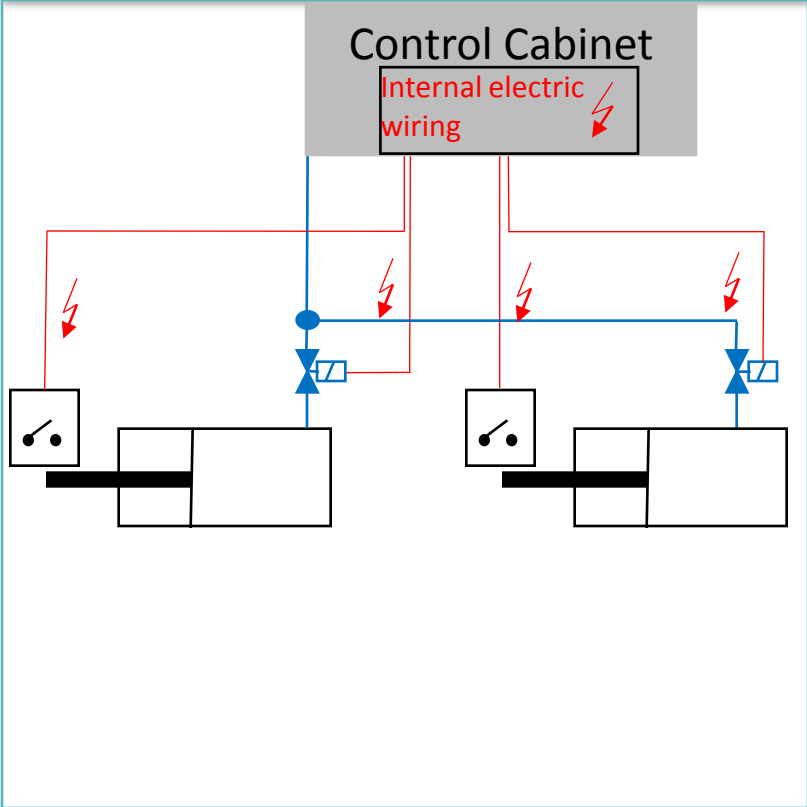
Actuator & Butterfly

Ballast, bilge and fuel piping systems

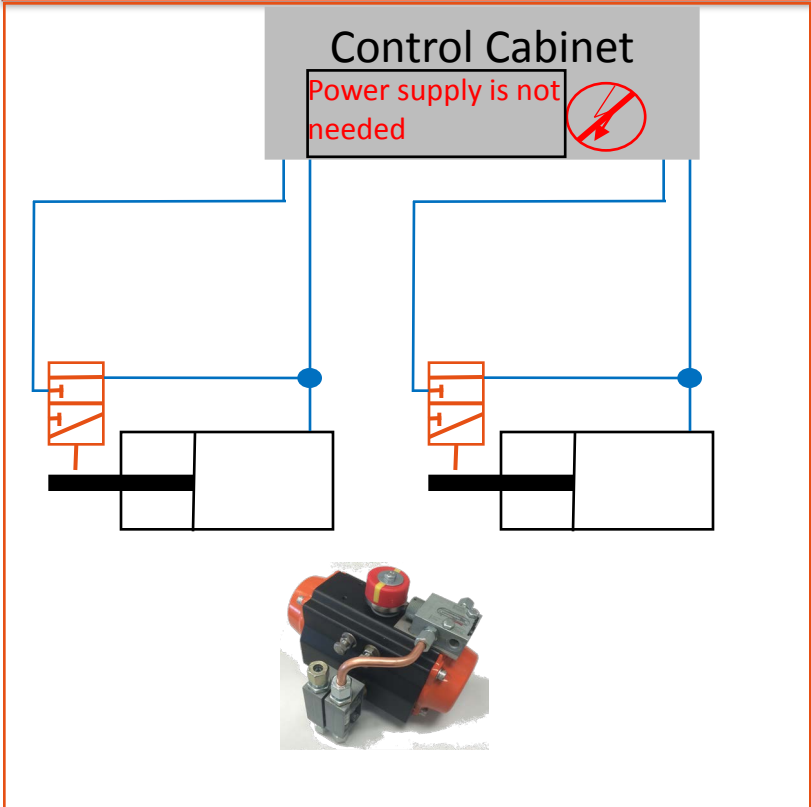
Scope of Supply

Unique design

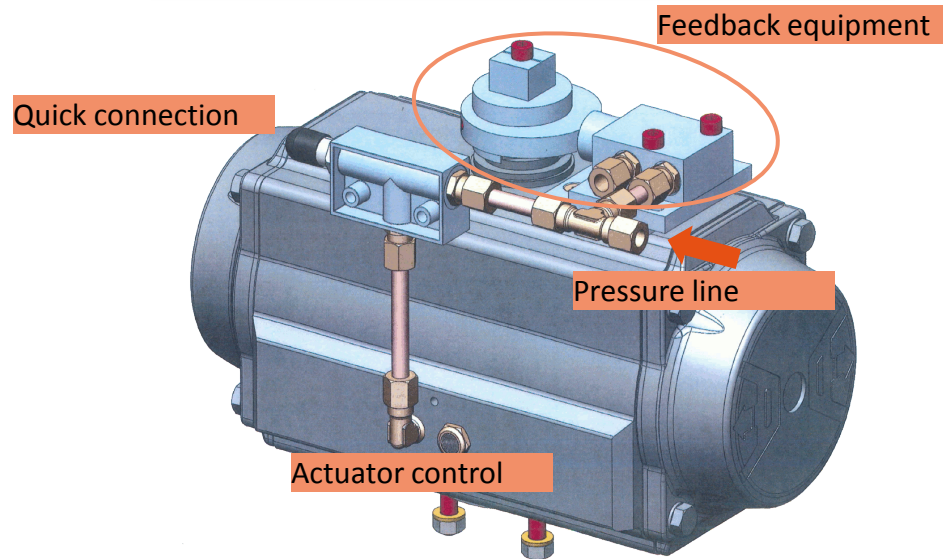
Competitor Pneumatic Solution



Our Pneumatic Solution



Pneumatic feedback



- Benefits of the pneumatic feedback
 - Generated directly from the actuator
 - Fit for Atex & EX
 - Robust
 - No corrosion
 - No re-adjustment

Submerged valve

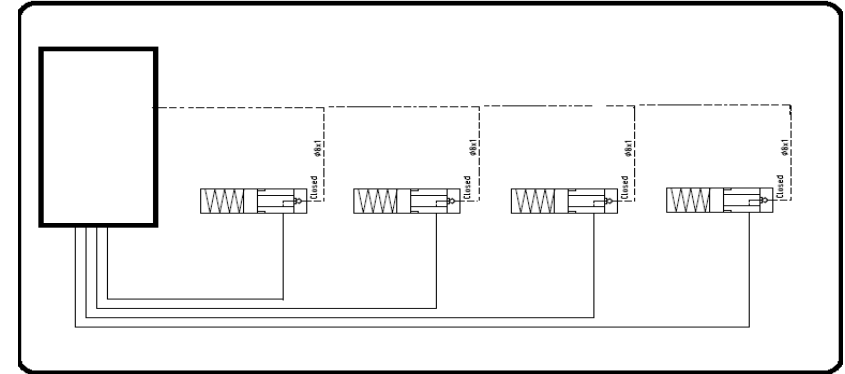


- Benefits of the Pneumatic submerged feedback
 - Generated directly from the actuator
 - Fit for Atex & EX
 - Robust
 - No corrosion
 - No re-adjustment
 - Seawater resistance
 - Easy to mount
 - Fail - safe

Hydraulic feedback

Low pressure (30 bar) central oil supply line create the position feedback

Flow detector system

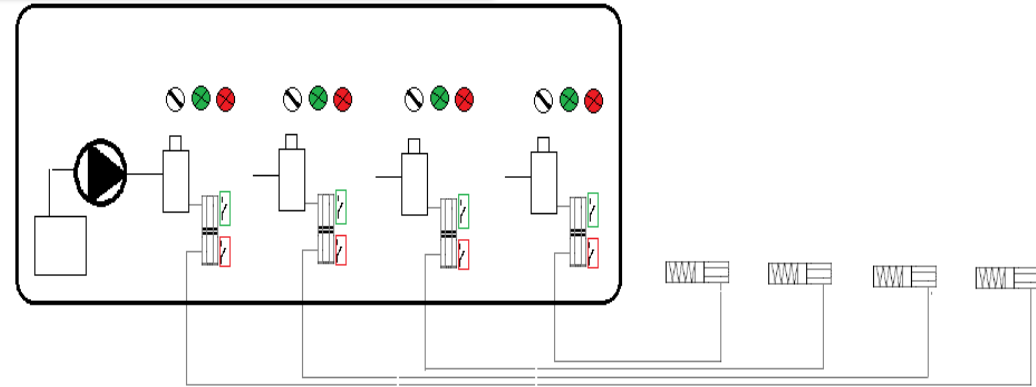


- Feedback needs to connect in line
- No independent position indication
- Flow indication
 - Highly sensitive to low temperature
 - Inaccurate
 - Re-adjustment required
- Actuator
 - When 2 actuators are operated at the same time, the position indication is not accurate

Not safe

Hydraulic feedback

Volumetric position simulation



- Hydraulics and electric components are used
- Volumetric cylinders are inside the control cabinet
- Two separate hydraulic systems are required
- The feedback will be simulated
- If BF valves are not connected, the cabinet will work without an alarm signal
- The actuator has no impact on the feedback

Not safe

Original manufacturer

Technical dates:

- Material Polyamide, Aluminum
- Vibration resistance 5 g
- Shock resistance 30 g
- Working pressure -0.9 bar / 10bar
- Control pressure 3 bar / 8 bar
- Temperature range -10°C / +60°C
- Particle size in compressed air 40µm
- Protection class IP65
- Number of valves 24 / 26
- Operation voltage 24 V



small size

robust

handling

price

Original manufacturer

Data communication



Digital input

Digital output

Field bus

Analogue input

Analogue output

Aventics

Spare parts



Spare parts:

- Cheap devices
- Easy to handle and mount
- Handling by the crew is possible
- No re-adjustment of the system
- Available 48 hours -> standard stock item

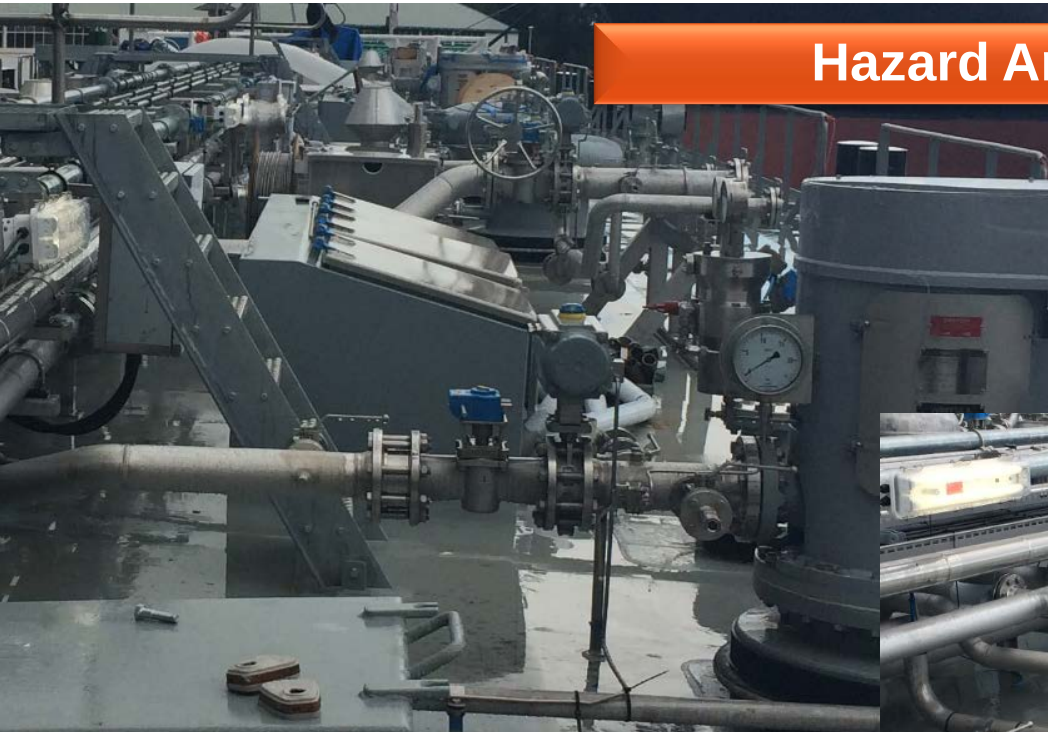
Cost efficient

Piping

Tank type	Case	Place		Piping
Control for Ballast valves	Standard	in engine room		polyamid*)/cooper
		outside engine room	with fire hazard	cooper
			without fire hazard	polyamid*)/cooper
	Emergency	in engine room		steel
Control for Fuel valves	Standard	in engine room		polyamid*)/cooper
		outside engine room	with fire hazard	copper
			without fire hazard	polyamid*)/cooper
	Emergency	in engine room		steel
Control for Bilge valves	Standard	in engine room		polyamid*)/cooper
		outside engine room	with fire hazard	copper
			without fire hazard	polyamid*)/cooper
	Emergency	in any location		steel

*) regarding the IMO Resolution A.753 (18), Appendix 1 and 2)

Hazard Area



Fit for Hazard Area

Commissioning

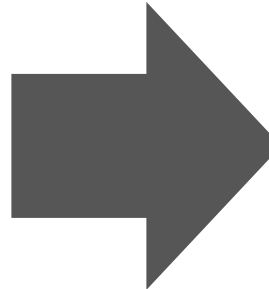
Easy elimination of piping connection errors

No additional material required

Time - saving

Realized through the shipyard

On request: SAP by Aventics



Cost efficient

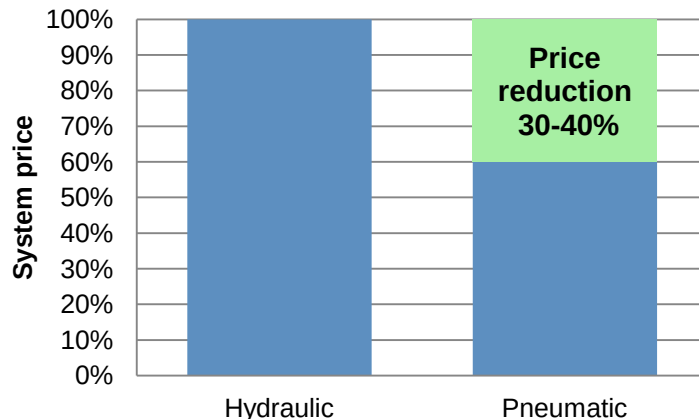
Environment friendly

Fully approved



Benefits

Price



- Financially attractive
- Low material costs
- Low installation/commissioning costs
- Easy to mount

Average 30 - 40% price reduction

Technique

- Pneumatic operation/control
- Pneumatic position feedback of ballast valves
- No electric wiring in tanks
- Approved system
- Operating temperature down to -40 °C
- Submerged active monitoring of valves in tank

=> Environment protection



Perfect addition to Green Passport

Comparison

Systems	Feedback	Skill required	Medium	Submerged	Environment
Electrical	0	-	+	0	+
Hydraulic	-	-	-	+	- -
Pneumatic	+	+	0	+	+

Comparison part II

Systems	Feedback	Skill required	Medium	Submerged	Environment
Electrical	• power supply is necessary • 2 systems (Elec/Pn/Hydr) • Corrosion of contacts • Not immersible	• Hydraulic and Pneumatics • Electrical	• High Power Electrical necessary	• Possible but high risk and very expensive	• Corrosion • Water ingress
Hydraulic	• not a real feedback of the actuator position, because only the control pressure is measured • only one feedback at the time possible	• Hydraulic and Pneumatics • Electrical	• Oil pressure is necessary • Tanks for oil are necessary • an active power unit is necessary • High- and Low-electrical power is necessary	• YES	• High risk for the environment
Pneumatic	• A direct feedback of the actuator position is indicated • Each actuator provides independent indication • Every valve has a independent feedback	• After a product training the shipyard can handle the system	• only compressed air of 7 bar necessary	• YES	• No pollution at all



Critical situation

Main Power supply fails



Flooding



Unreachable main control room



Aventics will provide you with the best solution

Pneumatics: IT MAKES SENSE



AVENTICS