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OXE DIESEL Design process

2012

- Cimco funded.
- Technical pre study.
- Initial design layout and packaging study.
- Product and design FMEA.
- Engine evaluation and management design in test cell.

2013 - 2014

- Concept validation of complete outboard
- Validation and durability testing of subsystem
- Running design update to validation units and subsystems

2016

- Field validation
- Production preparations
- SOP
- Production validation
- SOCOP

the technology used in a belt driven sterndrive Phase 4 Conceptual designs Patent Phase 3 Phase 2

2007 - 2012

Market analysis

Step4

- **Funding**
- Conceptual designs
- Belt and gearbox system validation in sterndrive and test cell

2012 - 2013

- **Engine marinization**
- Belt transmission design
- Gearbox transmission design
- Transom assembly and PTT system design
- Cowl and latch system design
- Hydraulic system design
- Complete Prototype outboard build

2015

- Production design and tool update
- Complete preproduction outboard build
- Design validation of complete outboard
- Service / User / Rigging and Assembly manuals



Feasibility study of an horizontally

mounted diesel engine on top of a

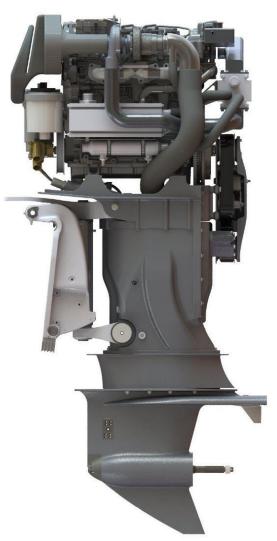
power transfer system based on

2007

OXE DIESEL Key Advantage

- Diesel
- Automotive (CI) diesel engine with a proven design.
- Low fuel consumption
- Low emissions (EPA, IMO, RCD)
- Closed cooling system with cabin heating possibility
- Commercial gearbox with electro hydraulic clutch and built in trolling.
- Patented high torque belt-transmission.
- Robust modular design





Service points for easy access

Horizontally mounted high torque automotive diesel engine

Modular design allows for an easily interchangeable power unit

Primary Belt system allows for adaptable gear ratio

Robust NVH dampening rubber bushings

Hydraulic clutch allows quick seamless shifting with trolling functionality

Crash stop capable, heavy-duty, multi-plate gearbox allows for clockwise and counter clockwise propulsion

Adapter for 20"- 25"- 30" leg



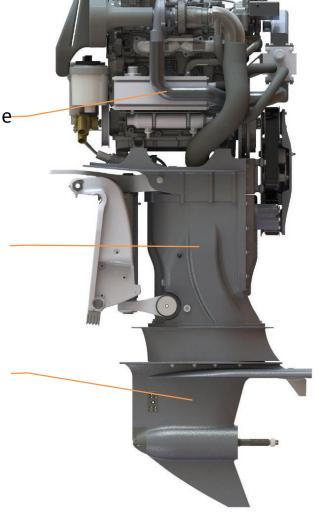
Hydrodynamic optimized lower housing for reduced drag



Automotive diesel engine

Gearbox

Belt Propulsion

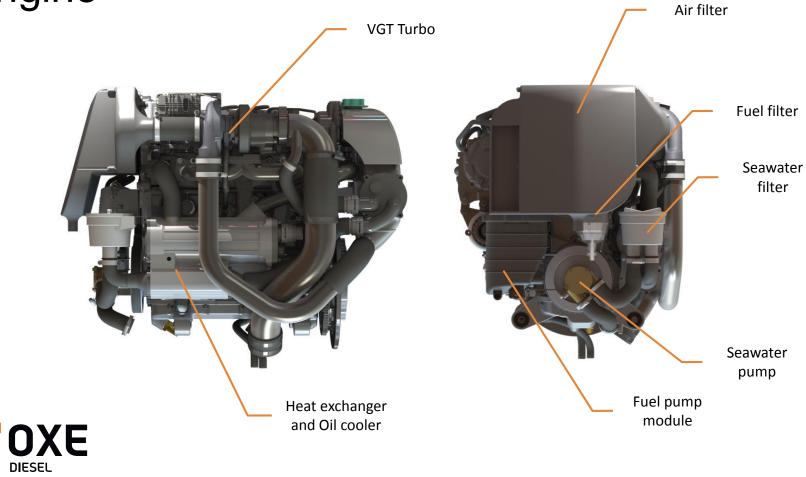




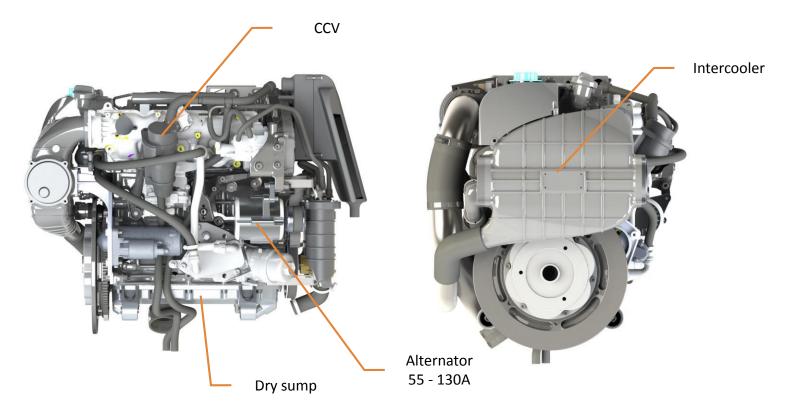
Engine



Engine



Fnaine





Electronic Control



OXE EC	2015
System	Step 3
Engine	NIRA - ECU
Propulsion	NIRA
Display	CAN
Trim/Tilt	PSU - Electrical
Throttle	CAN
Shift	CAN
Diagnose	Engine, Propulsion & Helm
Steer by wire/Joystick	Yes
Multiple Engines	Yes
Dual helm station	Yes
Joystick docking	Yes
Autopilot	Yes

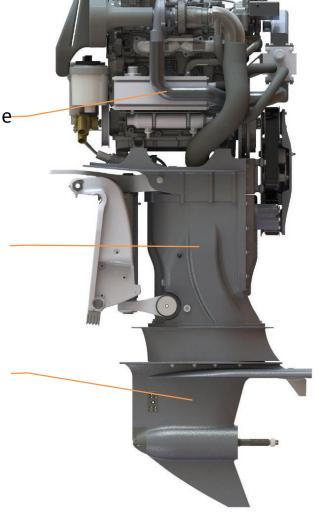




Automotive diesel engine

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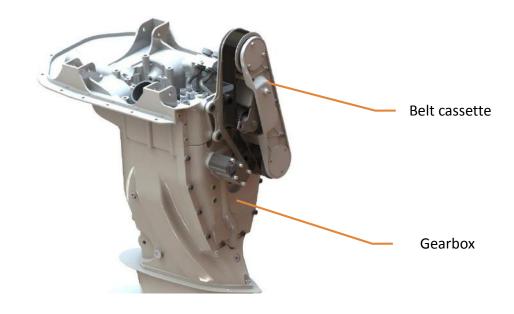




Gearbox

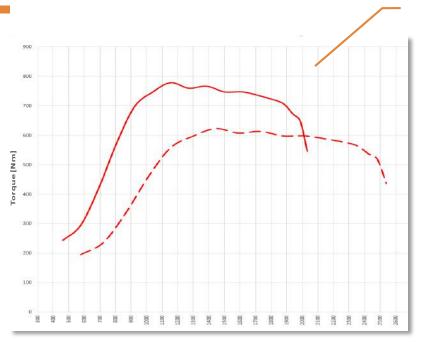


Gearbox

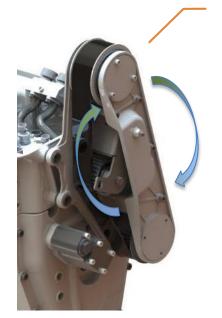




Belt casette



2.17 : 1 1.73 : 1

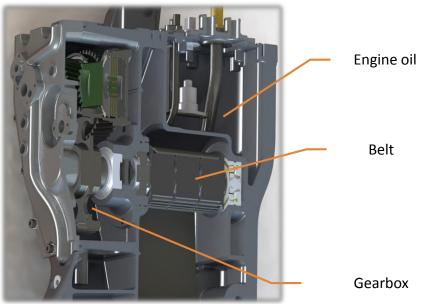


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Gearbox





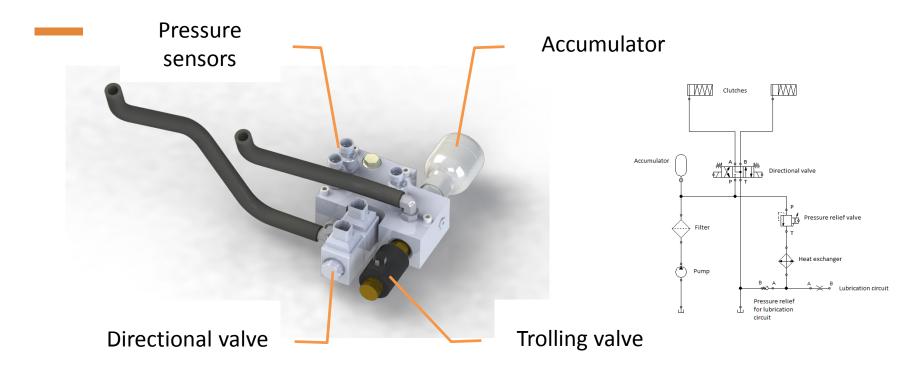


Gearbox





Gearbox Hydraulic



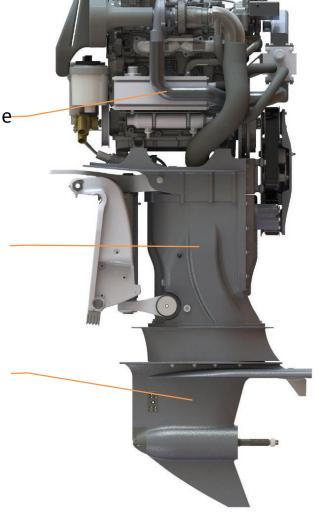




Automotive diesel engine

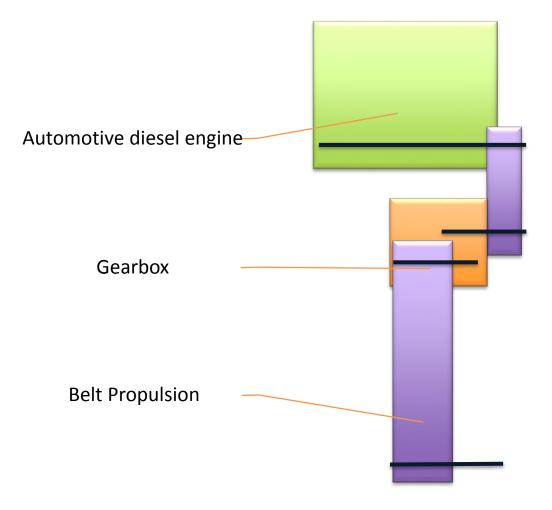
Gearbox

Belt Propulsion



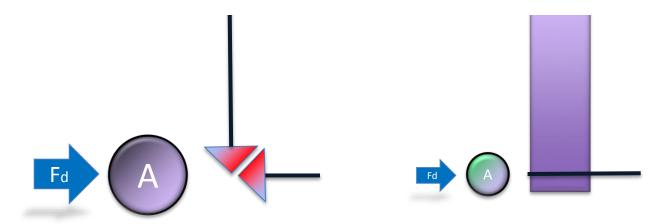






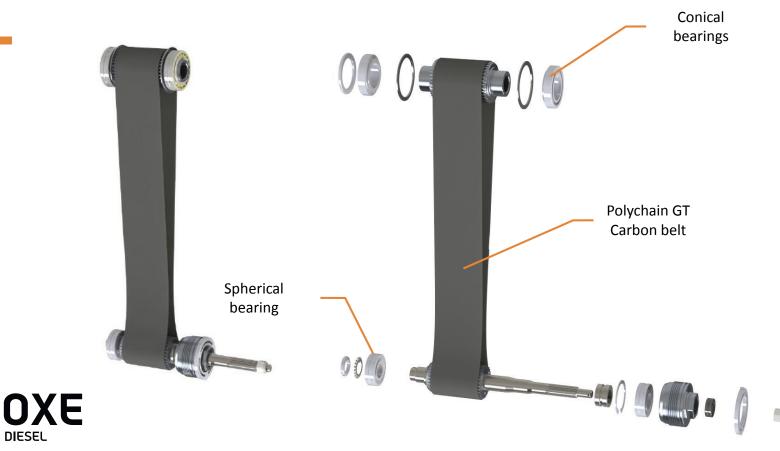


Belt propulsion





Belt propulsion



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