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Introduction

SD2.5

variable-speed gearbox

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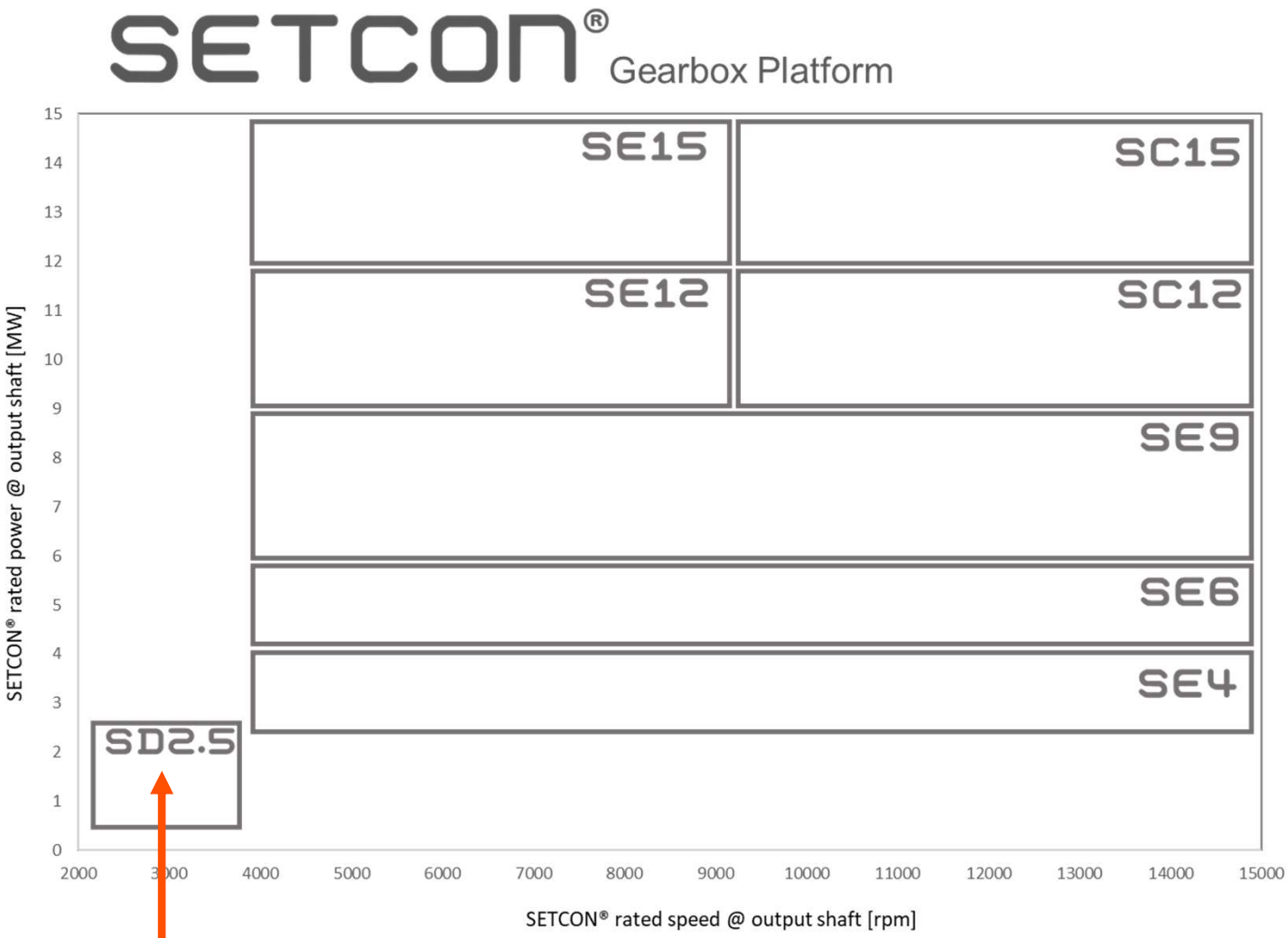
Gearbox Platform Standard Design



Gearbox Platform Topology:

Ideal Solution to replace Turbo Fluid Couplings or for Direct Drive Upgrades

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Gearbox Platform Design

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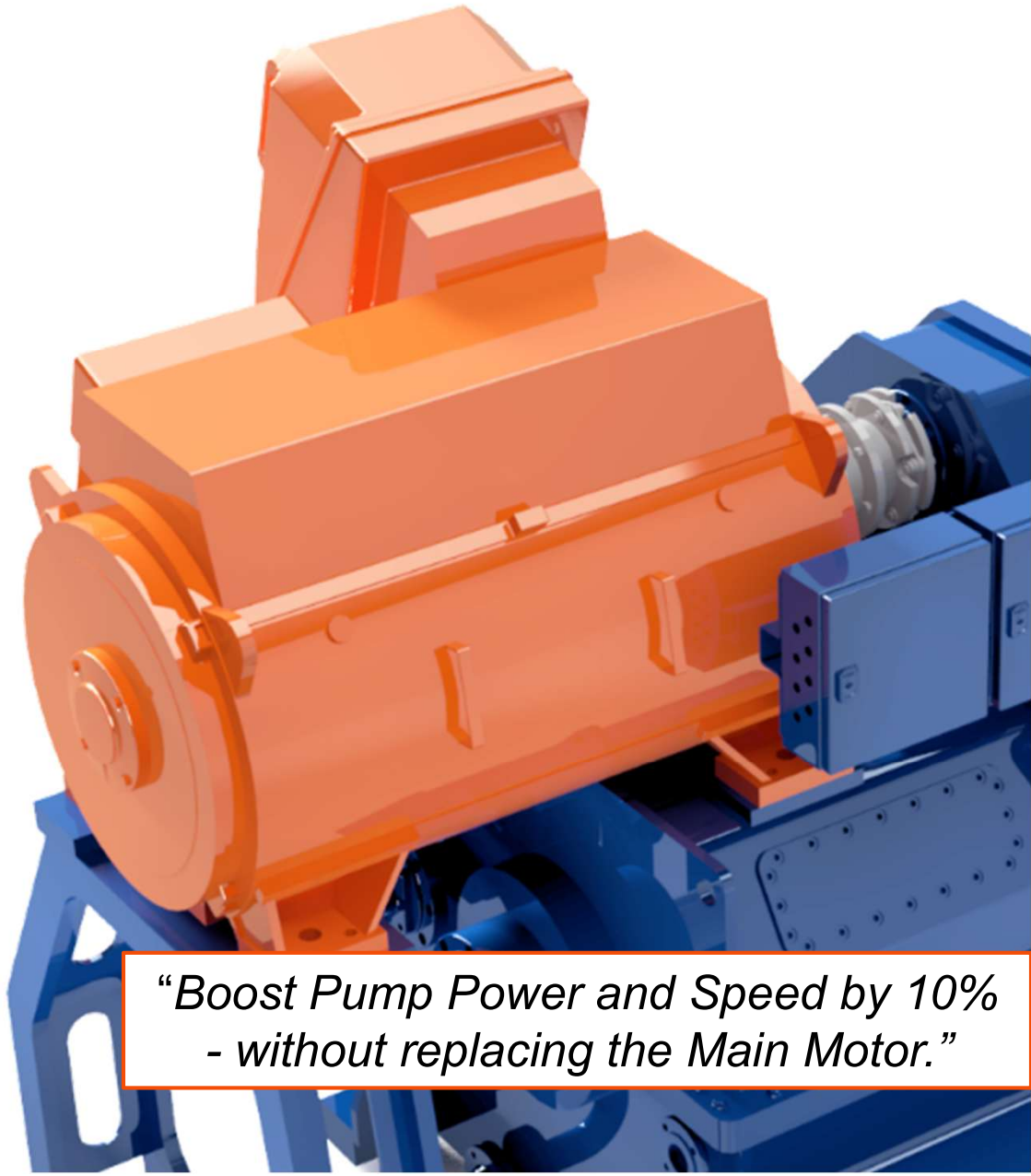
New SETCON SD2.5:

- Rated Power **up to 2.5 MW**
- Input Speed Constant: 3000 / 1500 rpm
- Output Speed Rated: 3000 / 1500 rpm (up to 3500 rpm)
- Speed Range 70% - 100% (or customized)
- **One low-voltage Servo/VFD**
- Integrated Lube Oil System
- Soft-Start of Main Motor

Retrofit:

- **10% improvement** in Pump power and speed can be achieved while reusing the existing Main Motor
- Turbo Fluid Coupling Replacement or Direct Drive Upgrade
- High Energy Efficiency Improvement
- Constant running Main Motor to be reused



"Boost Pump Power and Speed by 10% - without replacing the Main Motor."

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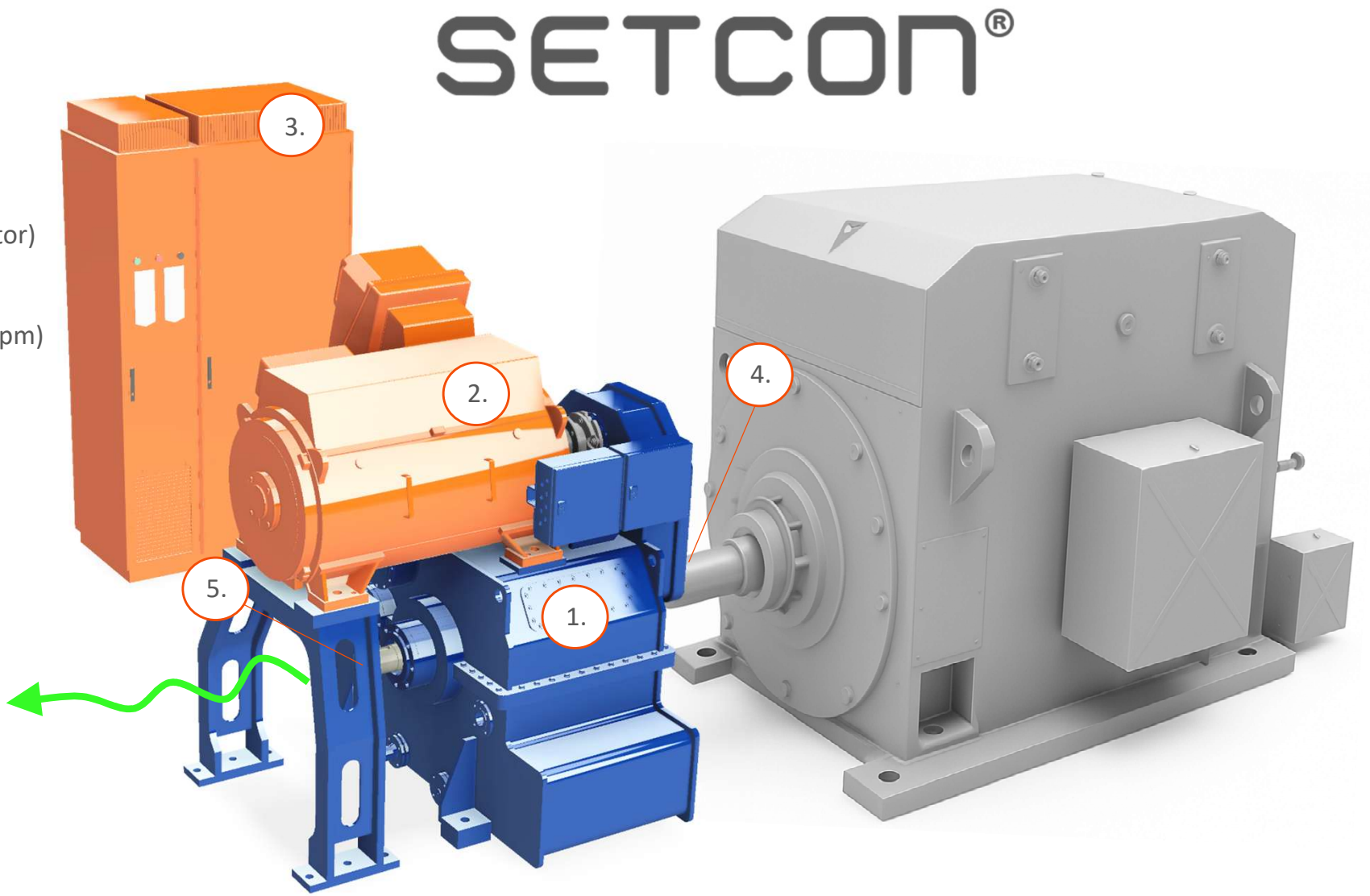
Arrangement

1. Gearbox
2. Servo (LV Motor)
3. LV VFD (not to scale)
4. Input Shaft (Main Motor)
3000 rpm (1500 rpm)
1. Output Shaft (Pump)
n_{rated} = 3000 rpm (1500 rpm)



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Gearbox Platform Design – Power Plant Applications

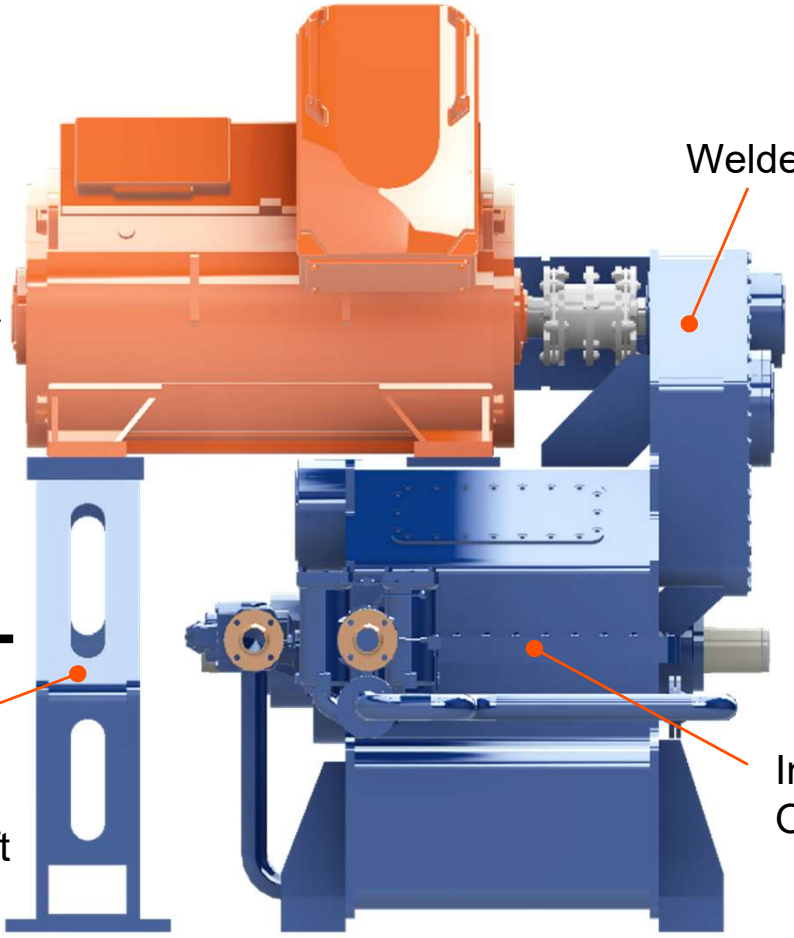
SETCON SD2.5 for Power Plant Applications:

max. 250 kW, 690 V / 400 V, Servo and VFD

+ 0.5 m Clearance for Installation / Overhaul

Variable Output Shaft (CCW)

One-sided removable support for simplified shaft coupling installation



Welded Housing

Constant Input Shaft (CW)

Integrated Lube Oil System

+ 2 m Clearance for Installation / Overhaul

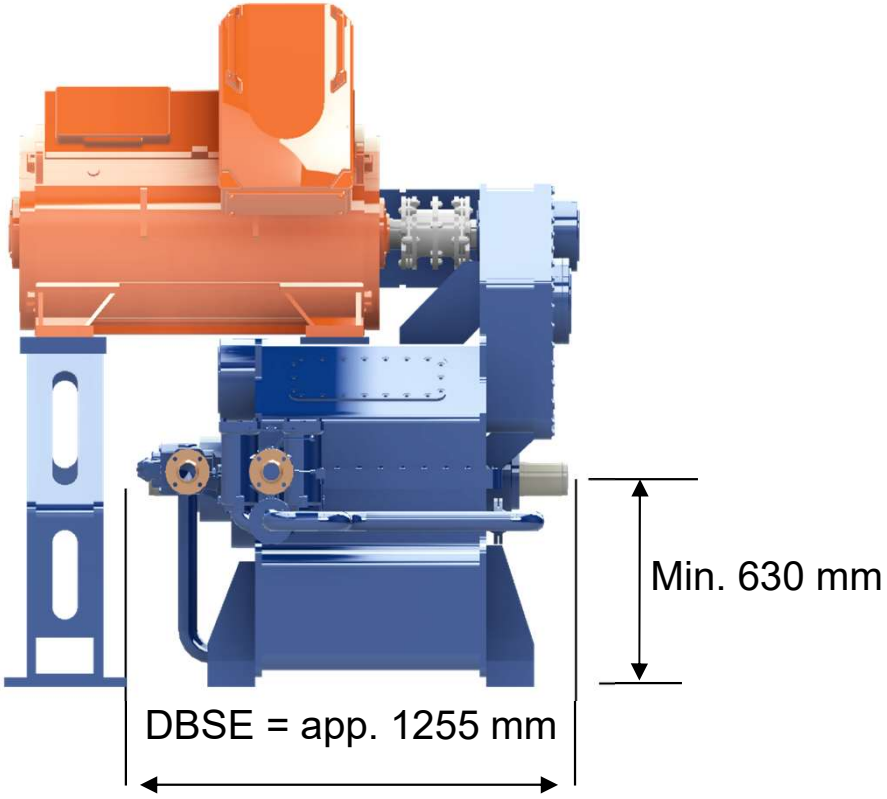
Max. Maintenance Height ~ 1.4 m

KG Max. overhaul weight = 1500 kg

no special tools required for maintenance and installation

SETCON SD2.5 for Power Plant Applications:

Ideal Solution for Replacement of Turbo Fluid Couplings (input = rated output speed)



Dry Weight = app. 4100 kg
Oil Flow SETCON: 130 l/min*
Oil Filling: app. 500 l

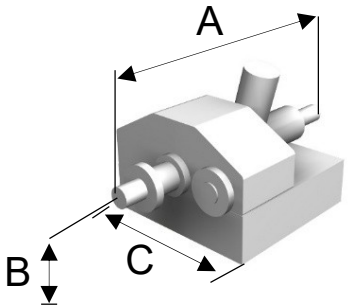
*plus 50 l/min for external consumers

Replaceable SVTL / SVNL – Types (among others):

Type	A [mm]	B [mm]	C [mm]	Oil Filling [l]	Dry Weight [kg]
487 SVTL HP	1 255	800	1 780	500	1 200
562 SVTL 12.1	1 255	800	1 780	500	1 260
562 SVTL HP	1 358	800	1 350	450	2 200
562 SVTL 33	1 358	800	1 350	450	2 200
562 SVTL 33 HP	1 358	800	1 350	450	2 200

Source: Voith Product Folder VT0104, de, wk, 2020-07

A = DBSE
B = Axle Height
C = Overall Width



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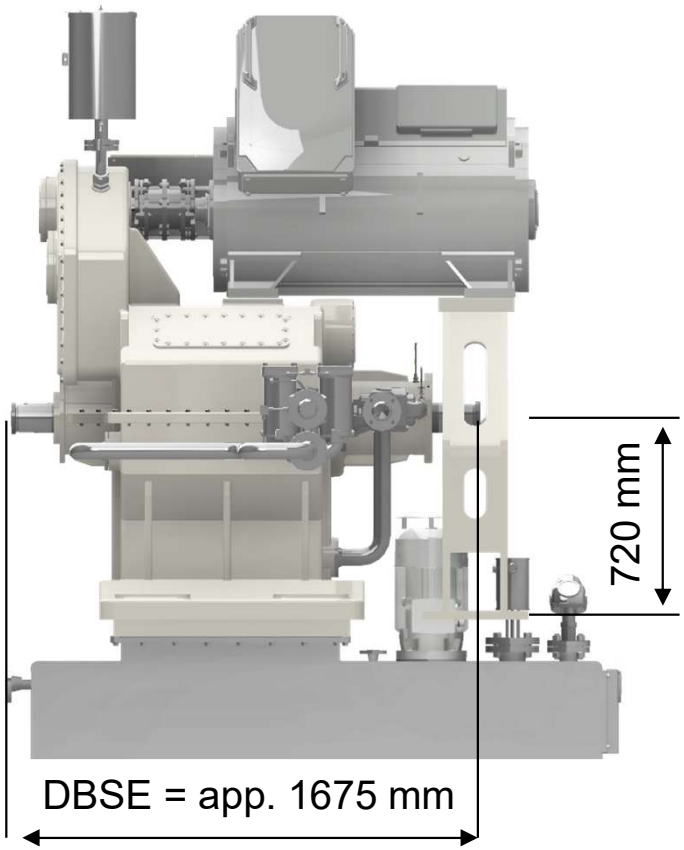
SETCON SD2.5A for Oil&Gas Applications:



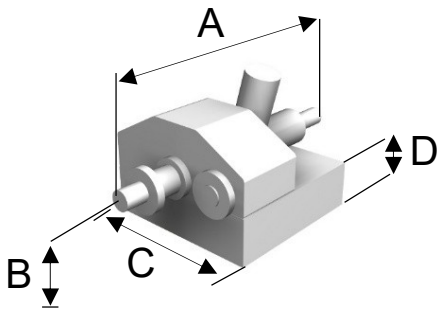
Dry Weight = app. 5700 kg
Oil Flow SETCON: 135 l/min*
Oil Filling: app. 920 l

*plus 50 l/min for external consumers

Upgrade of Standard Design (among others):

- Sleeve bearings input/output shaft
- Casted Gearbox Housing and SS lube oil tank and external piping
- SS Duplex Lube Oil Filter
- Ex-d Servo Motor
- Machinery Protection System acc. API 670
- Integrated Lube Oil System acc. API 614

A = DBSE
B = Axle Height
C = Overall Width
D= Oil Tank Depth



Replaceable SVL M - Types

Type	A [mm]	B [mm]	C [mm]	D [mm]	Oil Filling [l]	Dry Weight [kg]
464 SVL M	1 855	720	1 540	1 280	1 460	6 700
510 SVL M	1 985	720	1 540	1 280	1 460	6 800
562 SVL M	2 045	720	1 540	1 280	1 460	6 900

Source: Voith Product Folder Cr 104 en 12.05 3000 MSWWA

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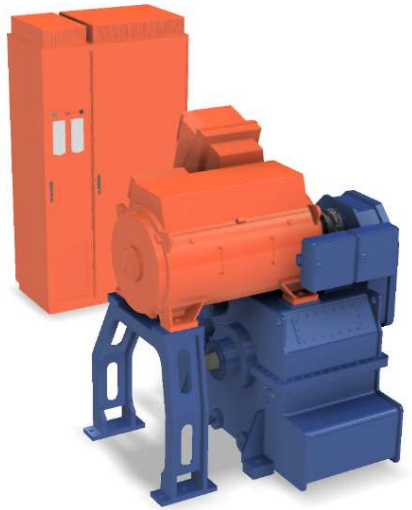
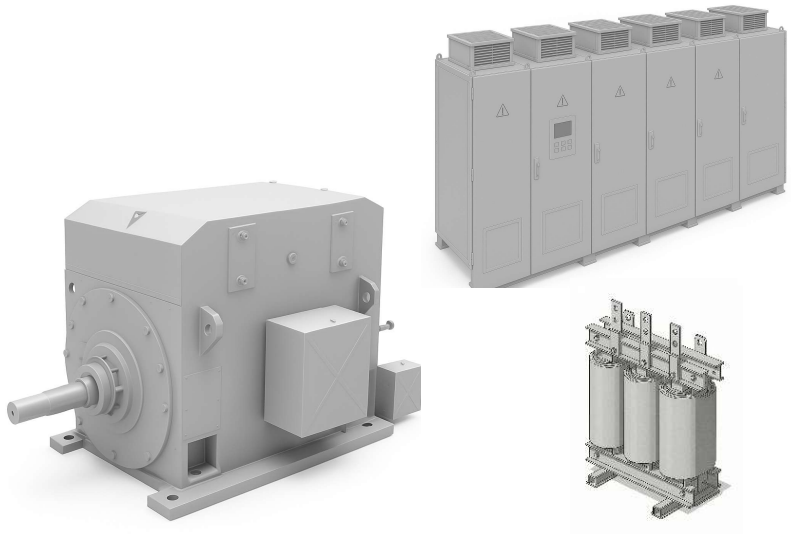
Comparison to MV-VFD Solution



Advantages Compared to **MV-VFD for Retrofit Jobs**:

- **Main Motor Reusability** – Existing Main Motor can be retained, reducing replacement costs.
- **Compact VFD Design** – Small footprint
  from: L 1230 mm × W 636 mm × H 2145 mm to wall mounted
- **Robust Low-Voltage Technology** – Reliable and proven low-voltage components from top quality suppliers as ABB, Siemens etc. with thousands of references.
- **Lower Cabinet Space Requirements** – Optimized layout and compact electrical equipment to reduce off-skid space needs.
- **Enhanced Power & Speed Capabilities** – Enables power and speed increase (+10%) using the existing Main Motor.
- **Improved Energy Efficiency** – Higher efficiency especially in partial load condition compared to MV-VFD: 1% to 5%
- **Integrated Lube Oil System (LOS)** – Simplified lubrication setup with the integrated system.

CONS: Pump Skid Extension Required – Main Motor to be shifted backwards on pump skid (+1500 mm) / Rotation direction of Main Motor to be changed



MV-VFD incl. new Main Motor and Transformer (not to scale)

Ideal Solution for variable speed operation upgrade of **Direct Drives (Pump + Motor)**

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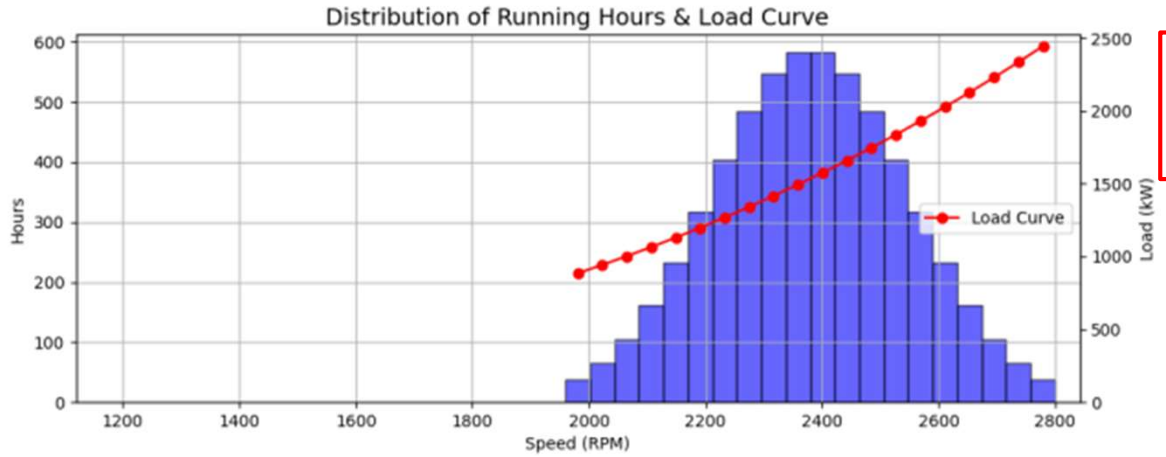
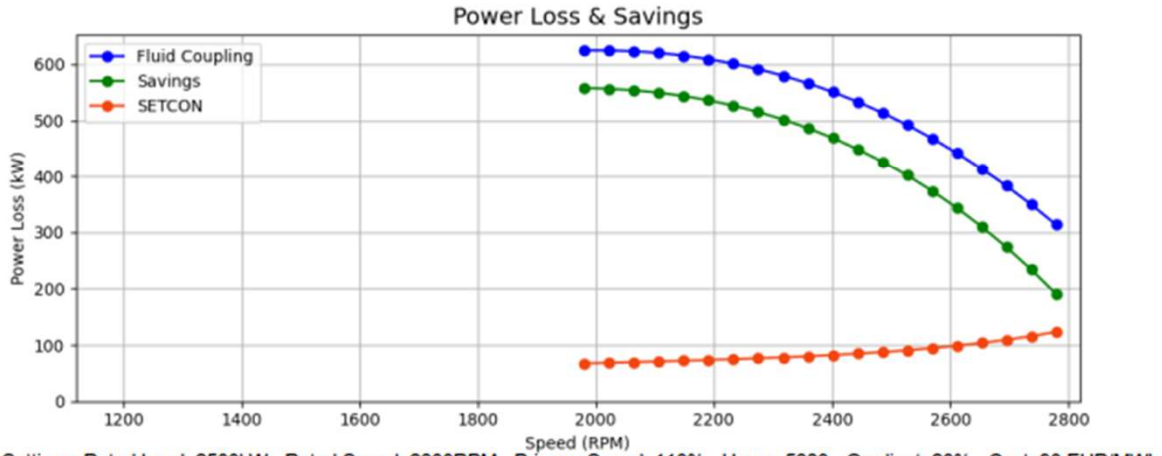
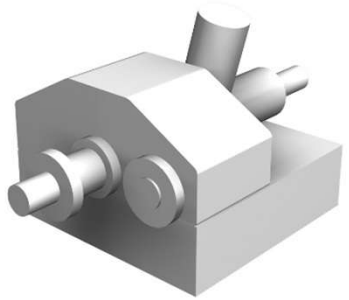
Expected Energy Savings compared to a **Turbo Fluid Coupling**:





System Settings: Rated Load: 2500kW - Rated Speed: 2800RPM - Primary Speed: 110% - Hours: 5880 - Gradient: 20% - Cost: 90 EUR/MWh

Energy Efficiency Improve between 5% - 30%



Estimated Annual Savings:

243,911 Euro

2,710 MWh

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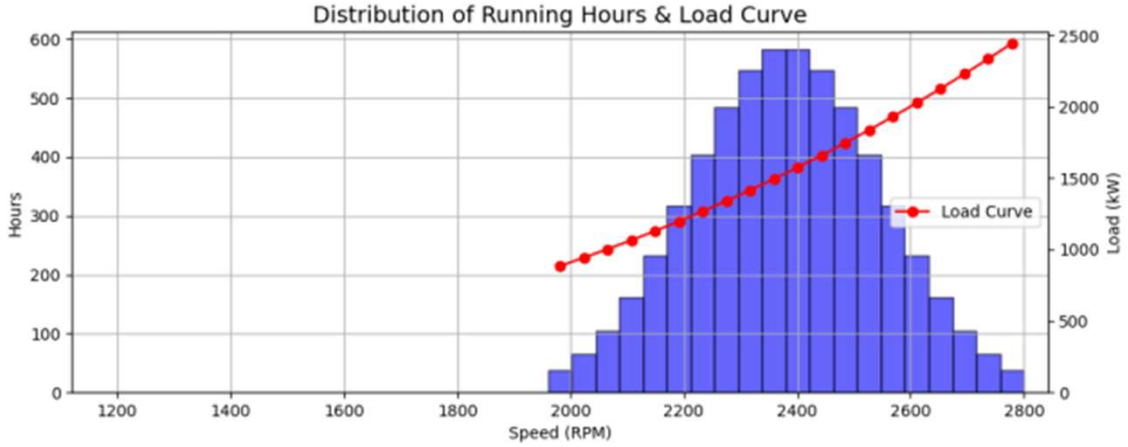
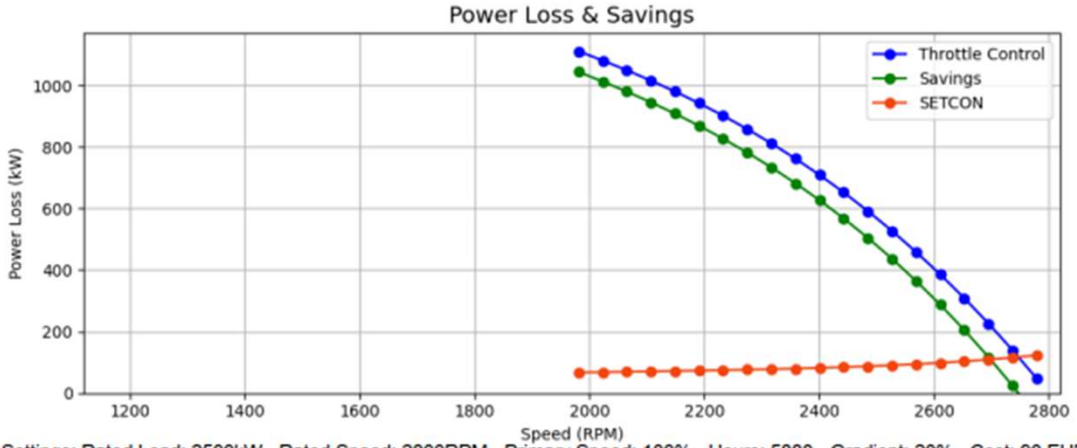
Expected Energy Savings compared to **Direct Drives (Pump + Motor) / Throttle Controlled:**



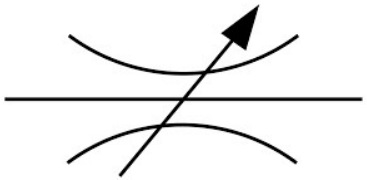


System Settings: Rated Load: 2500kW - Rated Speed: 2800RPM - Primary Speed: 100% - Hours: 5880 - Gradient: 20% - Cost: 90 EUR/MWh

Estimated Annual Savings:

331,697 Euro

3,686 MWh



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Smart technology for our Environment and your benefiT

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