

# Sumitomo Drive Technologies

Hansen Industrial Transmissions NV

## ACC - COOLING TECHNOLOGY GEARBOX EVOLUTION

*from 'generic' to 'dedicated' fan drives*

Kris Herijgers - Rob Green

2024 July 5<sup>th</sup> version



### 1. Introduction

### 2. History & evolution

- Gearbox
- Features

### 3. Service & after sales

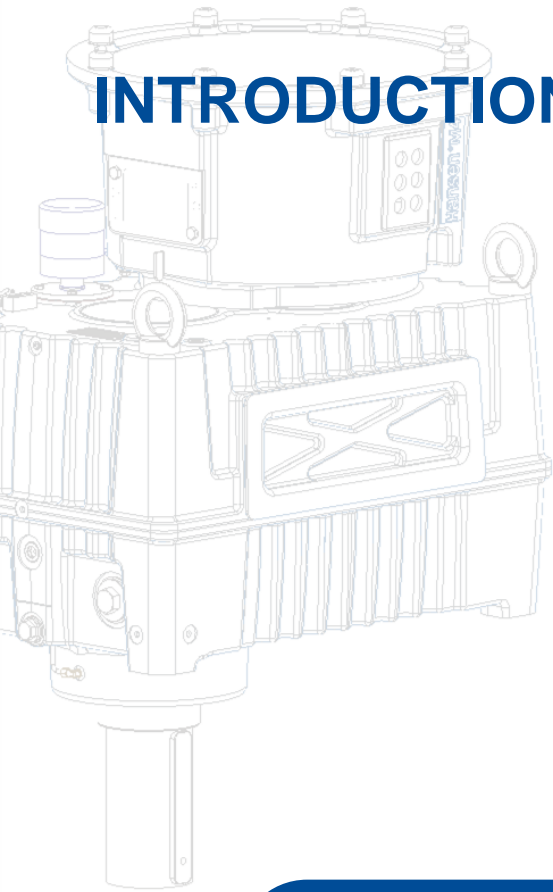
*Gearboxes for Cooling technology in general, and specific Air Cooled Condenser applications, need to be durable and reliable. As the main mechanical component of ACCs, the gearboxes for the fan drives must be durable so as to withstand the rigorous operation of the Cooling power. As a supplier specializing in industrial gearboxes, we have over 100 years of experience and a large installed base, especially in cooling technology fan drives for as well ACC as Wet Cooling Towers. We work with OEMs and end users globally and would like to cover a few main considerations directly related to gearbox durability, history and the future.*

*We take a.o. the example of the Coryton powerplant (Thursday tour) that has some Sumitomo right-angle gearboxes of a previous generation working on site and we look how this drive technology is further developing.*

*This will demonstrate some of the evolution of the gearbox generations over the years and we will highlight how specific gearbox features and dedicated designs for this application leads to increased service life of the unit with the objective decreasing the maintenance to a minimum.*

*Furthermore we clarify the importance of correct gearbox selection, timely adequate maintenance and serviceability options.*

# INTRODUCTION - PRESENTERS

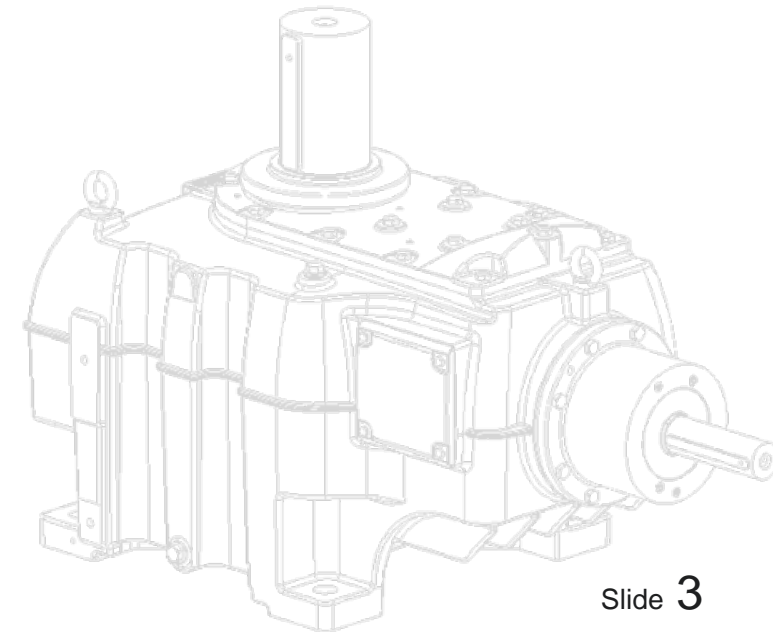


## KRIS HERIJGERS

- Product Manager Industrial gearboxes EMEA
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# 100 years

## Sumitomo Drive Technologies

Hansen Industrial Transmissions NV

- **Drive solutions provider & service**  
Gearbox, Couplings, Baseplates, Motors & frequency drives ...
- **Various applications**, especially where peak loads in rough applications are the rule  
e.g. Mixers & agitators, Heavy duty conveyors, ...
- **Market leader in COOLING TECHNOLOGY** fan drives  
+30.000 Cooling Technolgy installations in the field.
- <https://emeia.sumitomodrive.com/en-de/>

Industrial Gearboxes	Geared Motors	Motion Control Drives	Centrifuge Drives	Service	Motors & Inverter
<ul style="list-style-type: none"><li>• 6 to 1100 kNm</li><li>• Ratio from 5.6:1 up to 630:1</li><li>• Lot of different options</li></ul>  <p>Hansen P4</p>  <p>Paramax 9000</p>  <p>MAACC</p>  <p>M5CT</p>	<ul style="list-style-type: none"><li>• High shock load capacity</li><li>• Motor range 0,75 to 55 kW for highly integrated direct mounted gear motors</li></ul>  <p>Bevel Buddybox</p>  <p>Cyclo® Drive</p>  <p>Hyponic Gearmotor</p>	<ul style="list-style-type: none"><li>• Variety of different series to fit all requirements</li><li>• Production and assembly mostly in Markt Indersdorf</li></ul>  <p>E-CYCLO</p>  <p>Fine Cyclo Series DA</p>  <p>Fine Cyclo Series A</p>  <p>IB Series</p>  <p>Fine Cyclo Series C</p>  <p>Fine Cyclo Series UA</p>	<ul style="list-style-type: none"><li>• Completely adapted to customer needs</li><li>• Single stage ratio up to 87:1</li></ul>  <p>ZS-Cyclo Line</p>  <p>ZSP-Cyclo/Planet Line</p>	<p>Inspection, Maintenance Spare Parts and Repairs</p>  <p>Installation and Commissioning</p>  <p>Analysis and Monitoring. Fast reaction to reduce downtime</p>  	<p><b>LAFERTGROUP</b></p>  <p>Servo Motors</p>  <p>AC Motors</p> <p><b>Invertek Drives.com</b></p>  <p>Inverter</p>



# HISTORY

# SUMITOMO – HANSEN



**Masatomo Sumitomo**  
(1585-1652) who opened a shop for books and medicine in Kyoto



**Sumitomo Machinery Co., Ltd.**  
began manufacturing direct-current electric motors (3.7kW) for the Besshi copper mine



Sumitomo launches the **PARAMAX** generic gearbox range

1630

1911

1990's

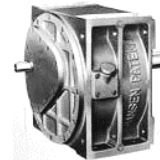
Sumitomo

Sumitomo acquires licence for production and sales in Japan

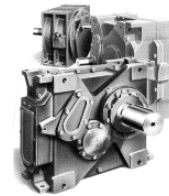


**Founding of Hansen**

David Hansen



David Hansen invents & designs the **unique "Hansen Patent" gear unit** standardization concept



2011



Sumitomo Heavy Industries acquired Hansen Industrial Transmissions nv (HIT)

1923

1950's

1972

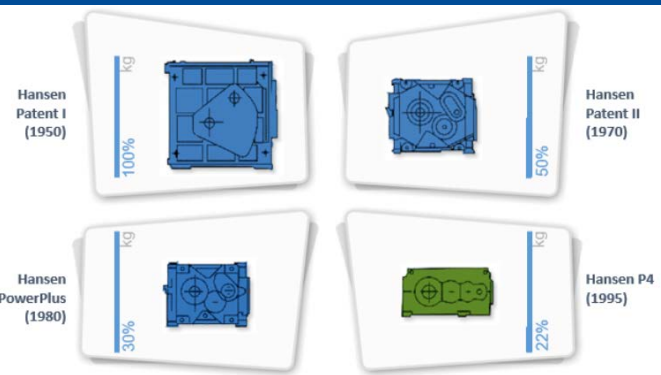
1995



Hansen launches the **Hansen P4 product range** with application oriented design

A significant power squeeze and a remarkable loss in weight!

**P**owerfull standardization **4** Generations  
attented



# GEARBOX PRODUCT EVOLUTION

Sumitomo Drive Technologies

GENERIC

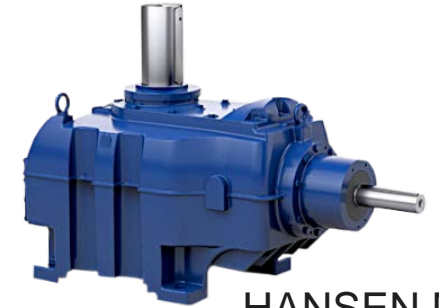


‘DEDICATED’ GEARBOX FOR COOLING TECHNOLOGY

Sumitomo



PARAMAX



HANSEN M5CT

Sumitomo  
Drive Technologies

HANSEN P4  
vertical



Hansen<sup>®</sup>  
industrial gearboxes

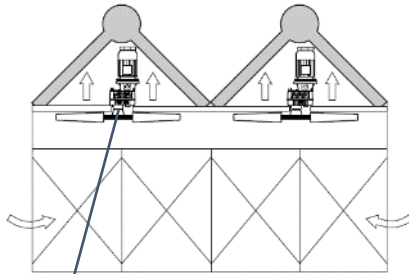
HANSEN P4  
vertical



HANSEN M4ACC

## Parallel gearbox

FOR AIR COOLED  
CONDENSERS  
(Forced draft)



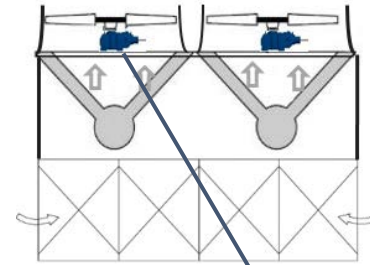
Current  
product



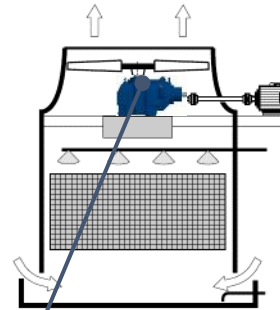
Hansen M4ACC

## Right-angle gearbox

FOR AIR COOLED  
CONDENSERS  
(**new design**, induced draft)



FOR WET COOLING  
TOWERS



Current  
product



Hansen M5CT

Best possible fit for Cooling Technology fan drives:

- Air Cooled Condensers
- Wet Cooling Towers

Designed in accordance with  
CTI – Cooling Technology Institute  
specifications

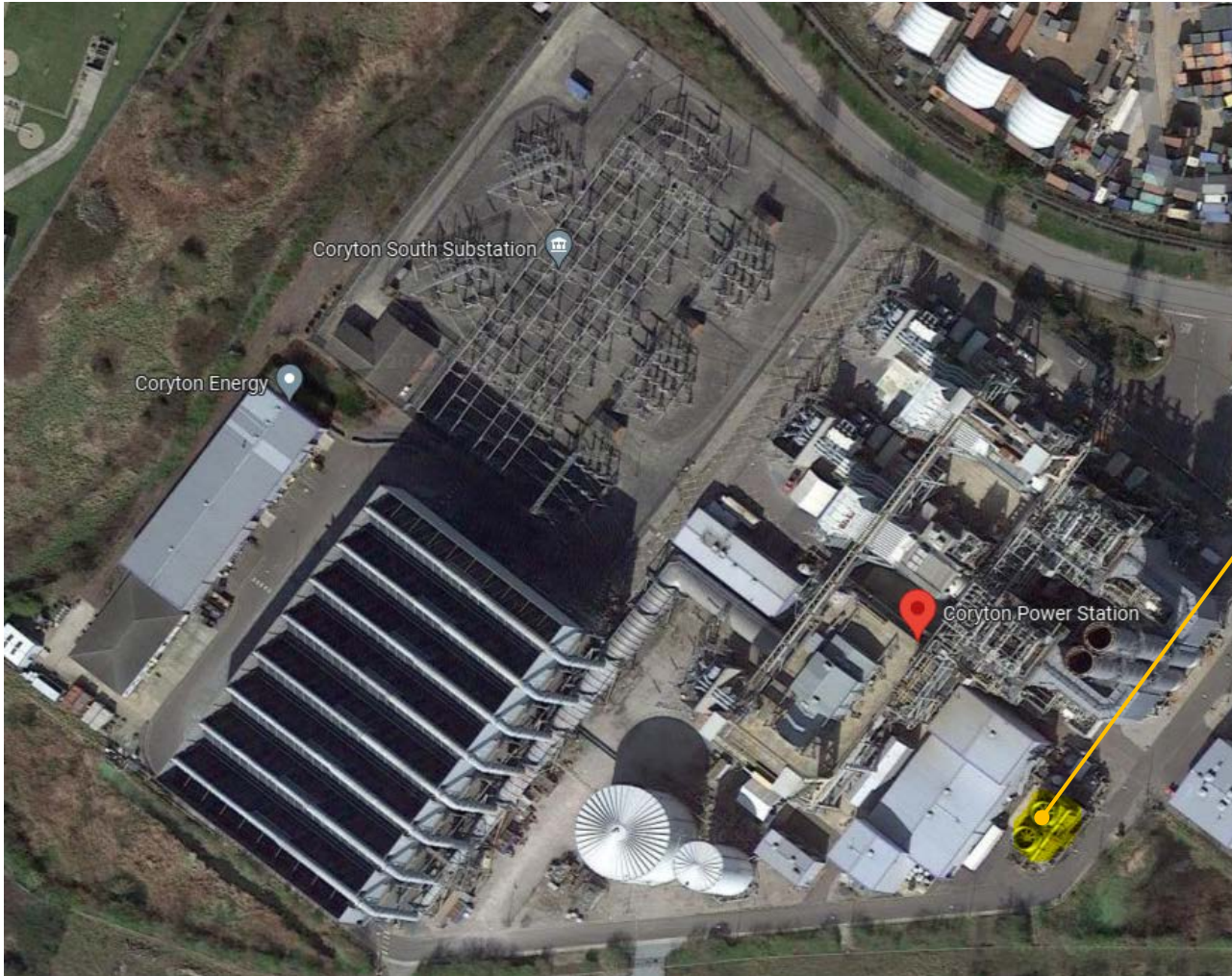




# EXAMPLE CORYTON UK STATION

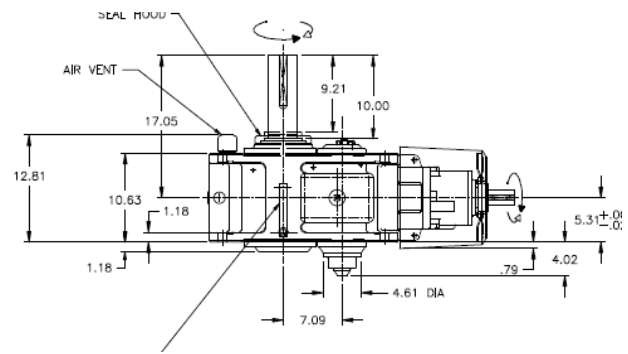
2024 ACC  
UG TOUR

Sumitomo Drive Technologies



2 x PX8045R2 working on smaller Wet cooling units on East side of plant....

PARAMAX



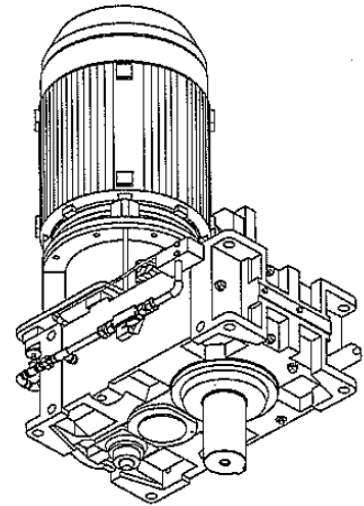
PARAMAX®		MEMBER OF	
MODEL PX8045R2 Y RRV 9		AGMA LUB.	
SERIAL NO. VA0038161		OUTPUT SPEED	AMB. TEMP. °F
INPUT HP 75		14-50	50-95 95-131
INPUT RPM 1485		RPM S/N	4 EP 6 EP 8 EP
HP RATING 210 HP AT 1485 RPM		RPM >N	3 EP 5 EP 7 EP
RATIO 8.875		SIZE	
DATE B-00		400	8015-8035
		200	8045-8085
		120	8090-8115
		75 *	8120-8135
SUMITOMO DRIVE TECHNOLOGIES		CHANGE OIL EVERY 6 MO. OR 2500 HRS WHICHEVER OCCURS FIRST. USE INDUSTRIAL TYPE PETROLEUM BASED (EP) GEAR OIL.	



# EXAMPLE ENFIELD UK STATION



PARAMAX



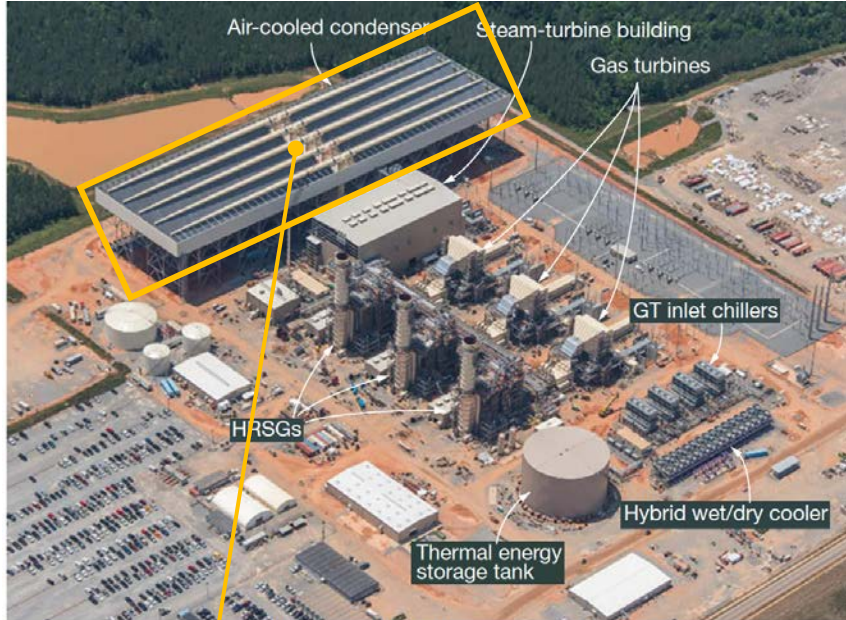
25x PVD9065P2-RL-18 on ACC cels

We also service the gearboxes at this plant



# EXAMPLE GREENSVILLE US STATION

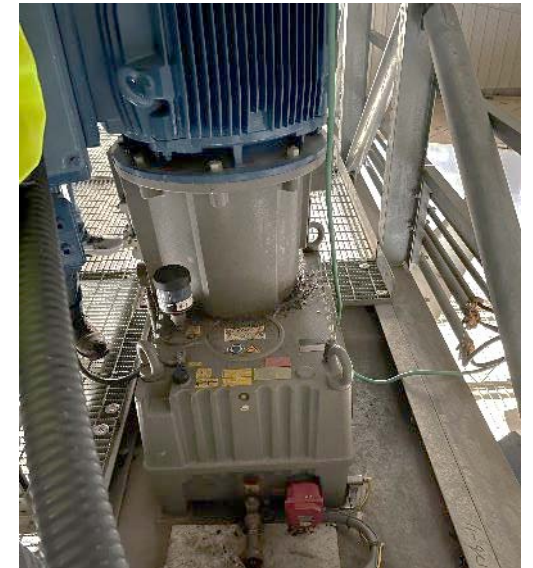
Dominion Energy's



8. Dominion's Greenville is a 1680-MW 3 x 1 combined cycle which began commercial operation in December 2018. It has three Mitsubishi 501J gas turbines with steam-cooled combustors, a four-flow steamer of Alstom design, an 80-cell ACC, GT inlet chillers capable of boosting the plant's output by up to 150 MW, and six levels of duct burners capable of adding 200 MW



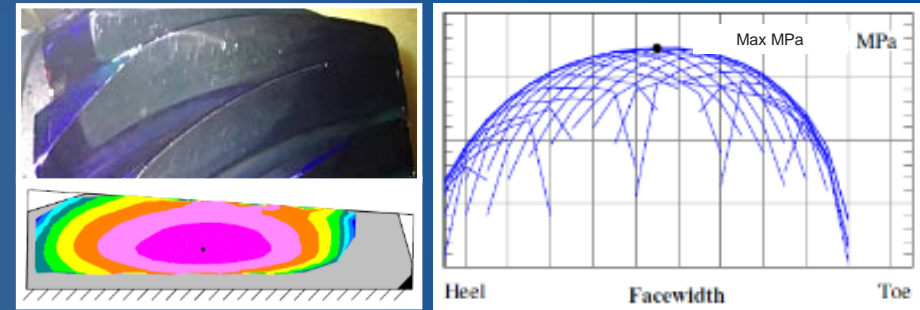
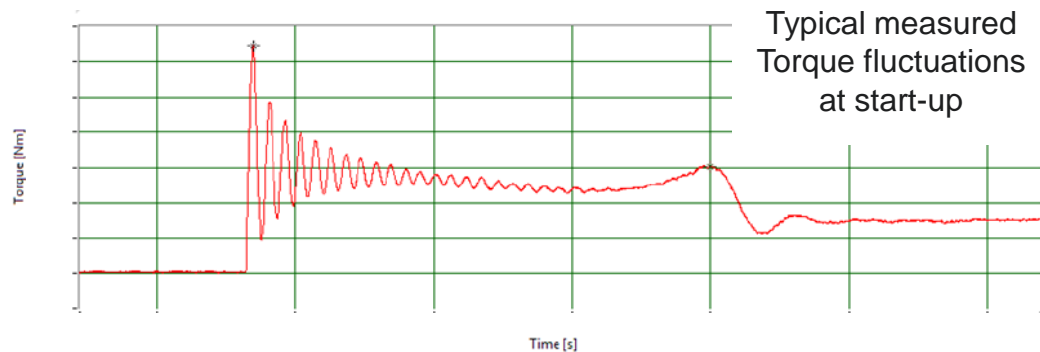
80x Hansen M4ACC



✓ **DEDICATED SELECTION METHOD  
TAKING STARTS AND STOPS INTO  
ACCOUNT**

✓ **DEDICATED GEAR MICRO GEOMETRY  
FOR ACC APPLICATIONS**

Well balanced design to withstand many torque fluctuations at start-up

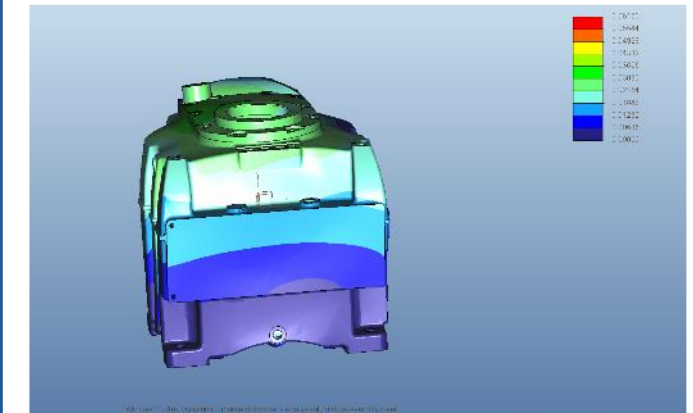
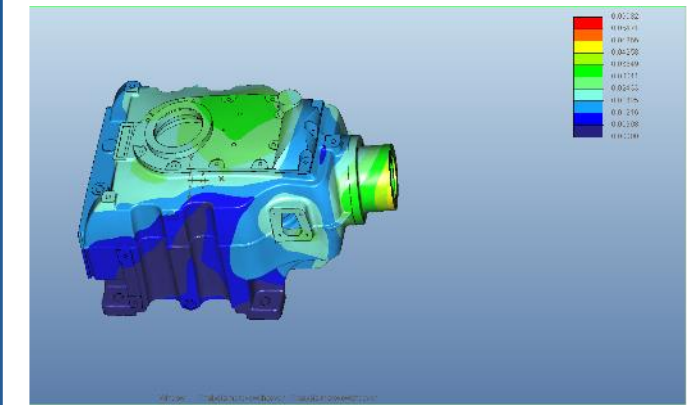


- Advanced designed micro geometry to withstand the peak fluctuations during start-up



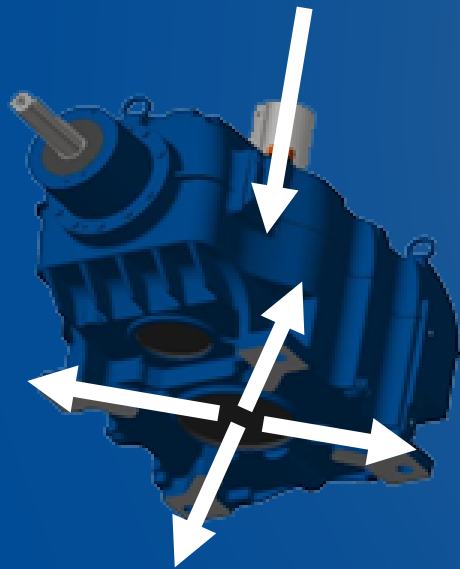
## ✓ RIGID HOUSING DESIGN

- High stiffness
  - Less bolts needed
  - No leakage risk
- 
- FEM analysis used to maximize housing strength and rigidity for these applications, for maximum maintaining correct gear alignment and bearing loading.



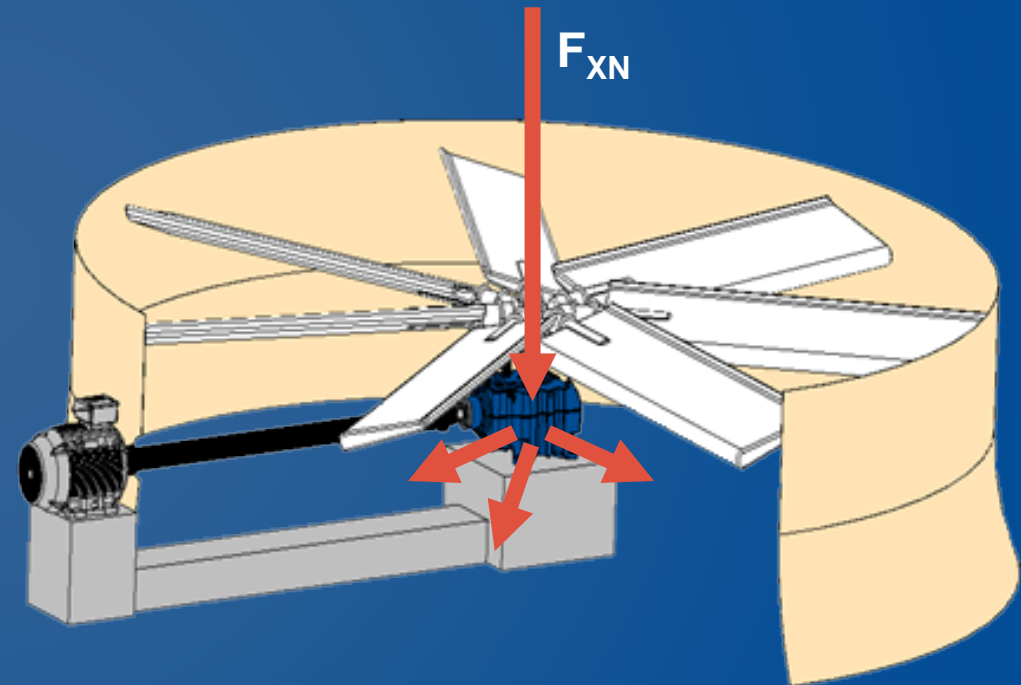
## ✓ STRONG FOOT BASE

Increase of dynamic stability



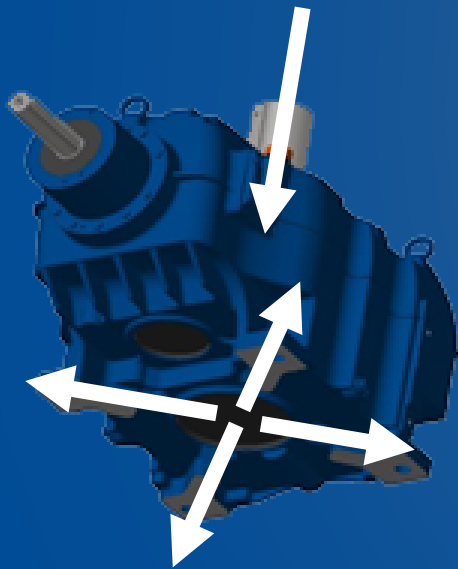
- Smooth transition of high forces from the center bore to the mounting feet, which are positioned **concentric to the low speed shaft.**

Axial load from the fan on the output shaft

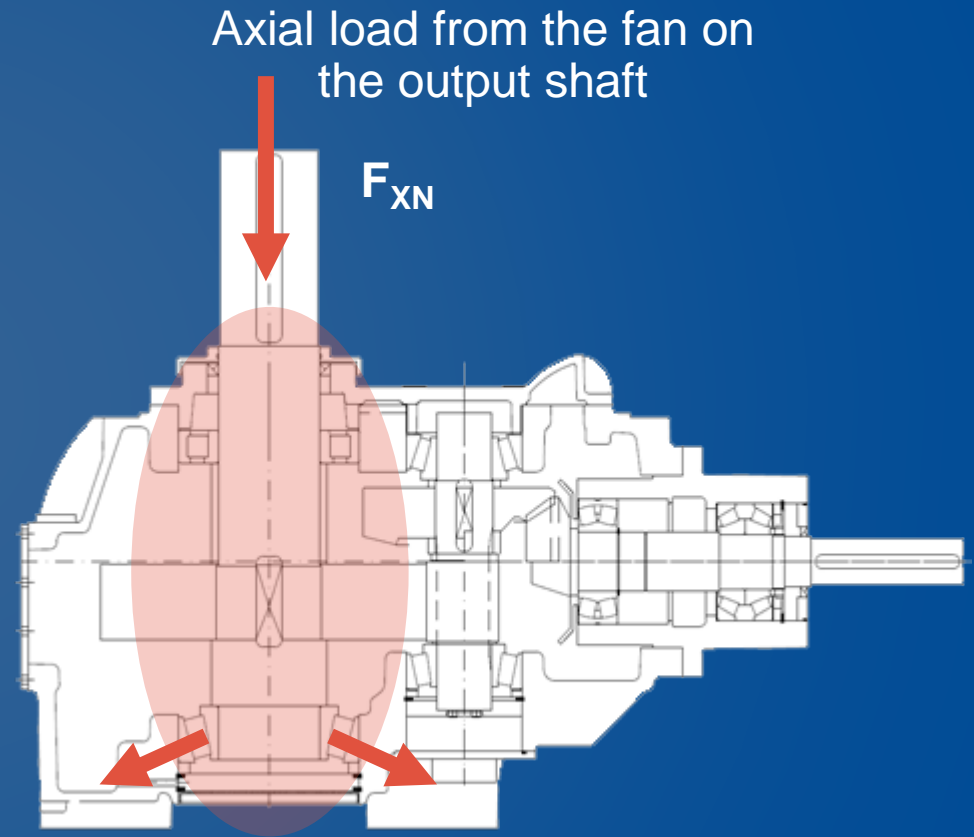


## ✓ EXTENDED BEARING SPAN

Robust to withstand high external loads



- Extended Bearing span with heavy duty roller bearings, specifically selected to handle the high axial thrust loads on the output shaft.



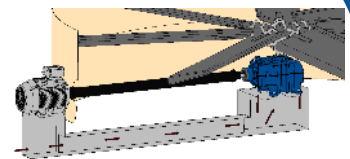


## ✓ CURVED DESIGN WITH COOLING FINS AND FLEXIBLE COOLING OPTIONS

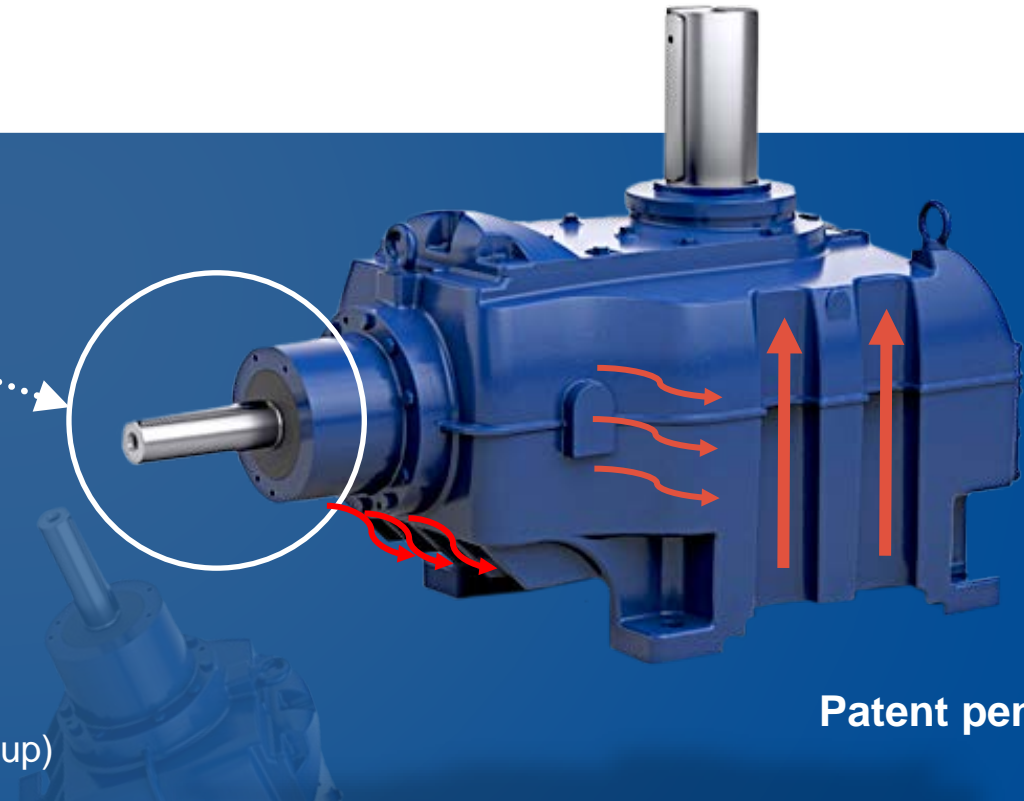
- High thermal ratings



**Cooling fan option**  
(High speed Shaft)



**+ Possibility to flexible integrate other cooling options** (e.g. cooling group)



Patent pending

## ✓ EASY LUBRICATION

- Standard splash lubrication, no pump
- Avoiding grease

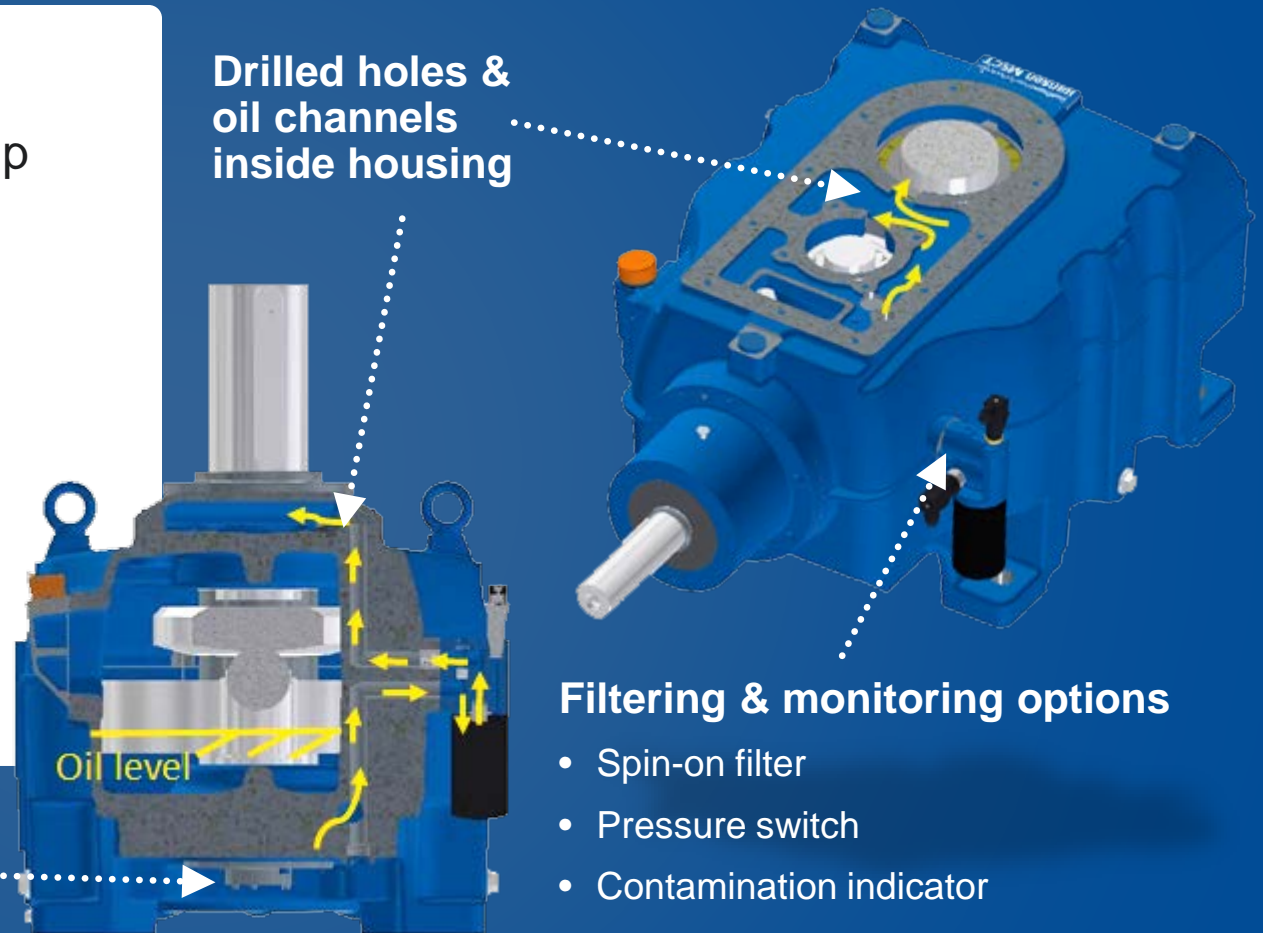
## ✓ NO EXTERNAL PIPING

- Easy to install without damages
- Leakage risk reduction

## ✓ OPTIONS POSSIBLE

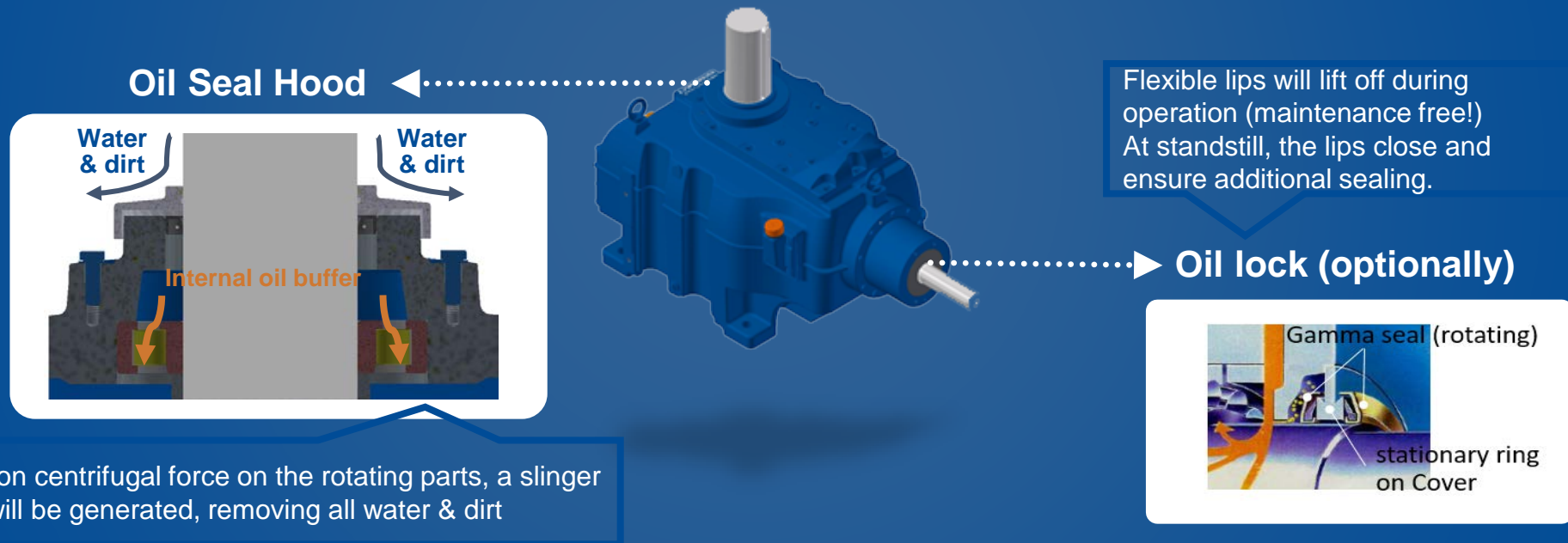
- Oil filtering
- Monitoring

**Pump** is positioned on a higher position than the gearbox feet



## ✓ BEST SEALING SOLUTION

- Maintenance friendly : No grease + centrifugal effect + no wear
- Designed to keep the oil in and dirt out



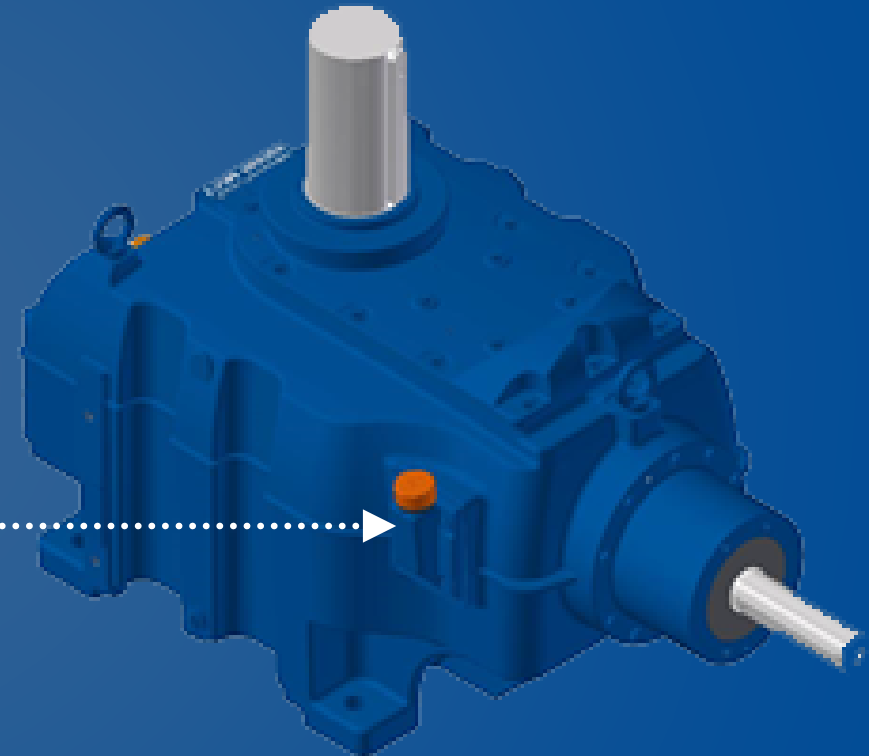


✓ **INSPECTION COVER ABOVE THE OIL LEVEL**

- Easy inspection without draining of oil



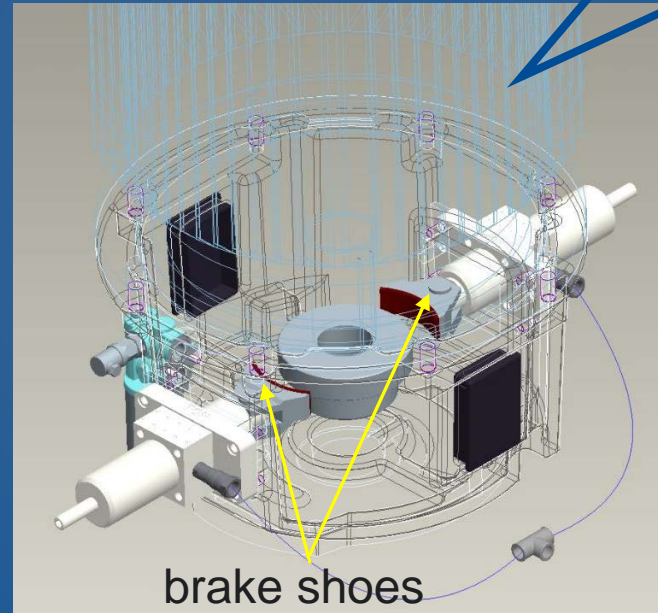
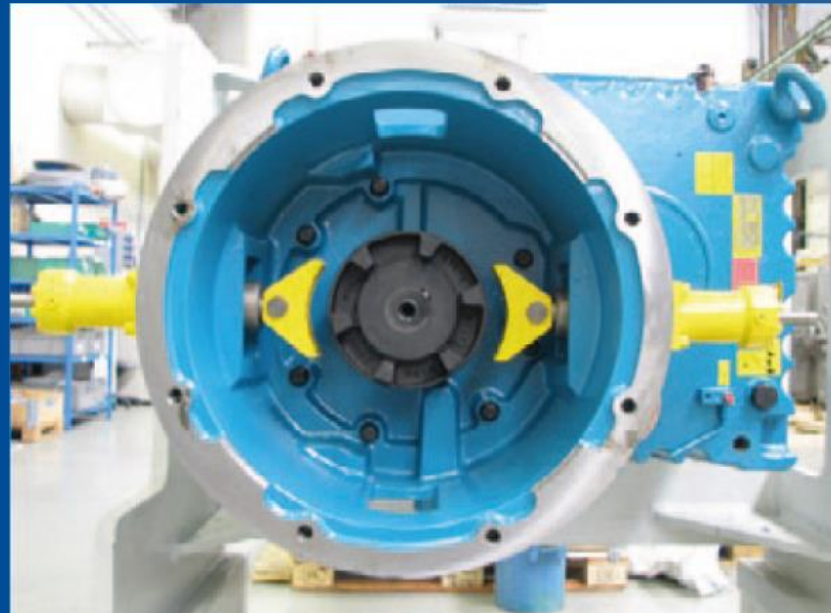
Easy to open for inspection  
and service on-the-spot.



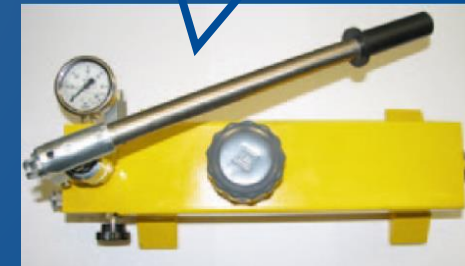
## ✓ BUILT ON HYDRAULIC BRAKE SYSTEM (option)

- Easy & safe (conform Machinery Directive 2006/42/EG)

As the brake works on the coupling half on the shaft of the gear unit, it's possible to remove the motor when the brake is in operation.



The brake is manually activated via a hydraulic mobile pump (reusable over all gear units)



# 'DEDICATED' SUMITOMO SERVICE OFFERS

- GENUINE SUMITOMO SPARES & COMPLETE UNITS IN GOOD LEAD TIMES

✓ Local stocks



✓ short lead time between service centres



✓ Flexible on special or urgent items i.e. extended ops



✓ customer stored stocks

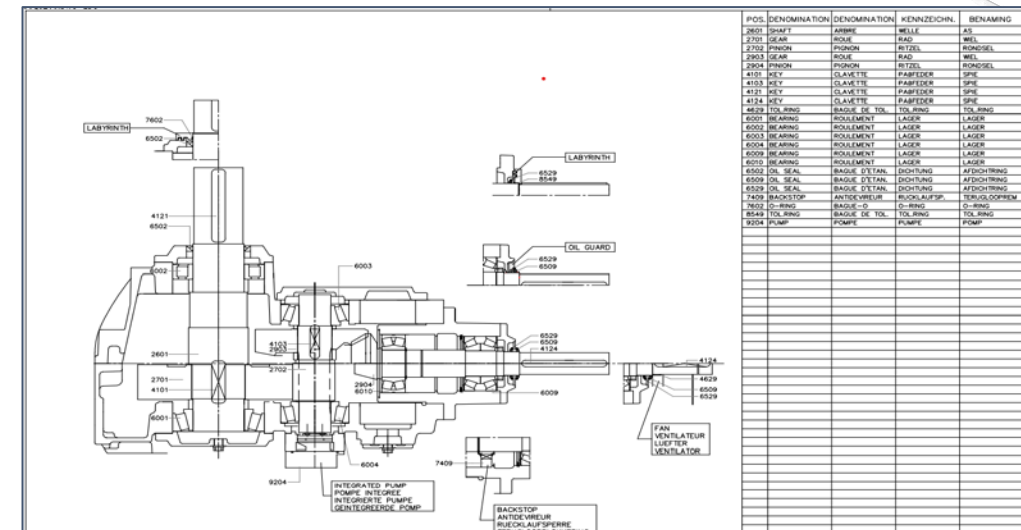




# 'DEDICATED' SUMITOMO SERVICE OFFERS

- TECHNICAL BACKUP & SUPPORT

- ✓ Support on installation and maintenance
- ✓ Professional & friendly technical assistance
- ✓ Customer product data base and history (salesforce)
- ✓ Assist with ga drawings, parts drawings, condition monitoring information ...



# 'DEDICATED' SUMITOMO SERVICE OFFERS

- COMPREHENSIVE FULL OVERHAULS & REPAIRS

Arrange logistics, strip, engineer assess & report, run test, paint...



• before

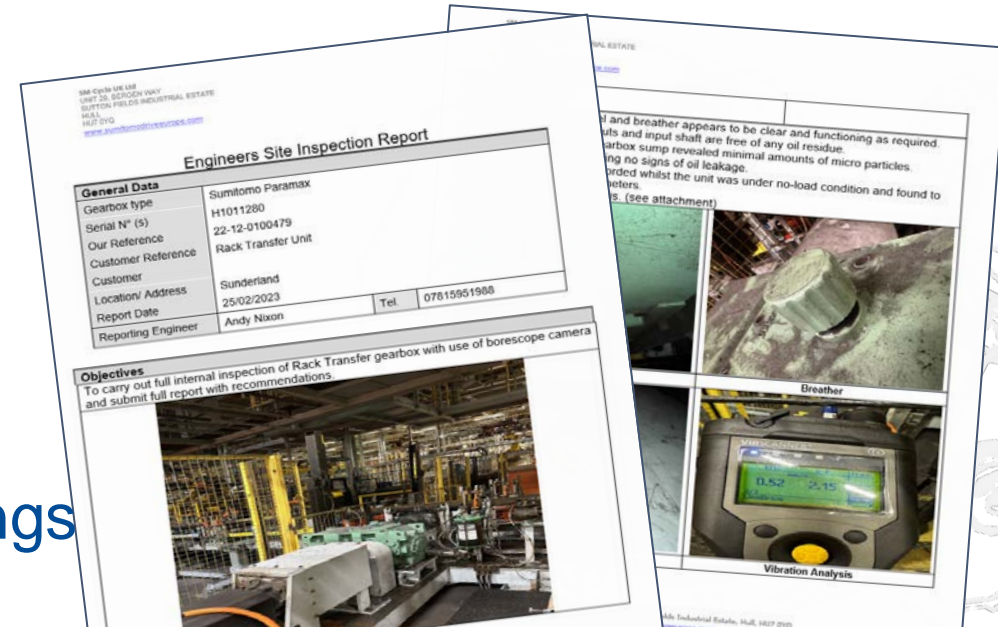
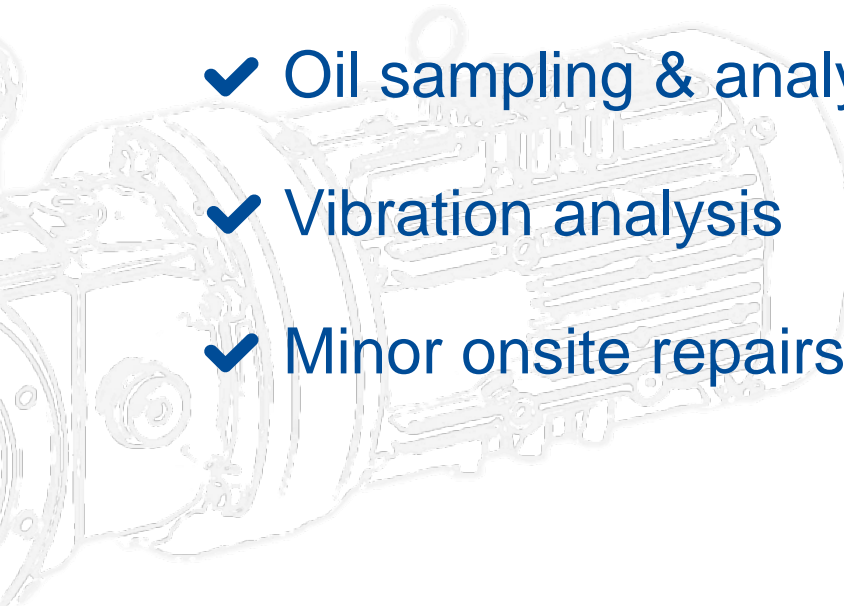


• after



- FIELD SERVICE CAPABILITIES

- ✓ Installation, general inspections & reports
- ✓ In-situ borescope inspection – gears / bearings
- ✓ Oil sampling & analysis
- ✓ Vibration analysis
- ✓ Minor onsite repairs / works







# 'DEDICATED SUMITOMO SERVICE

## CONDITION MONITORING SYSTEMS 'EYE'

Sumitomo Drive Technologies



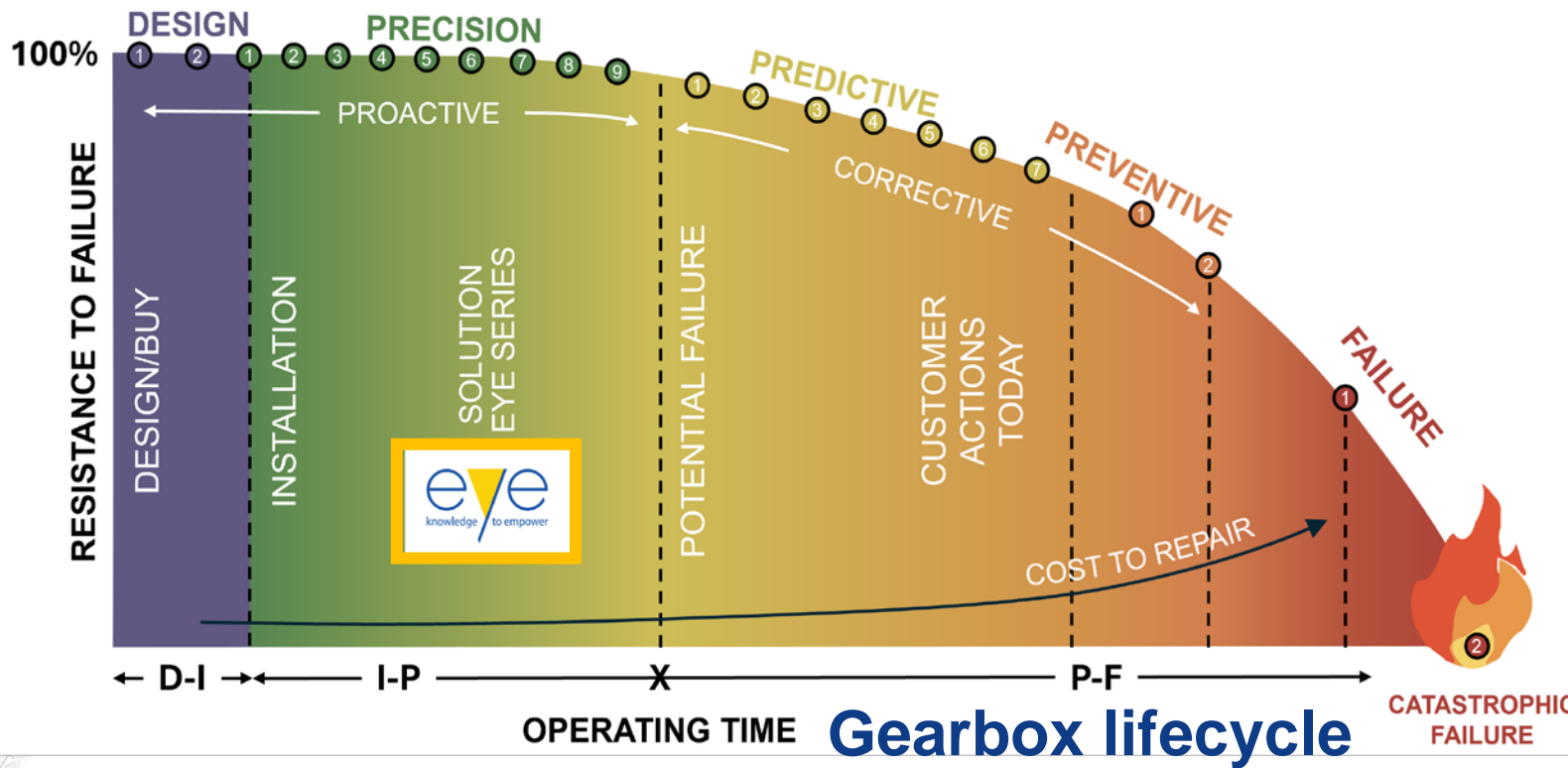
Oil filtering



Oil quality & vibration monitoring



Oil filtering + condition monitoring





# Sumitomo Drive Technologies

Hansen Industrial Transmissions NV

**THANK YOU**  
**FOR YOUR ATTENTION**