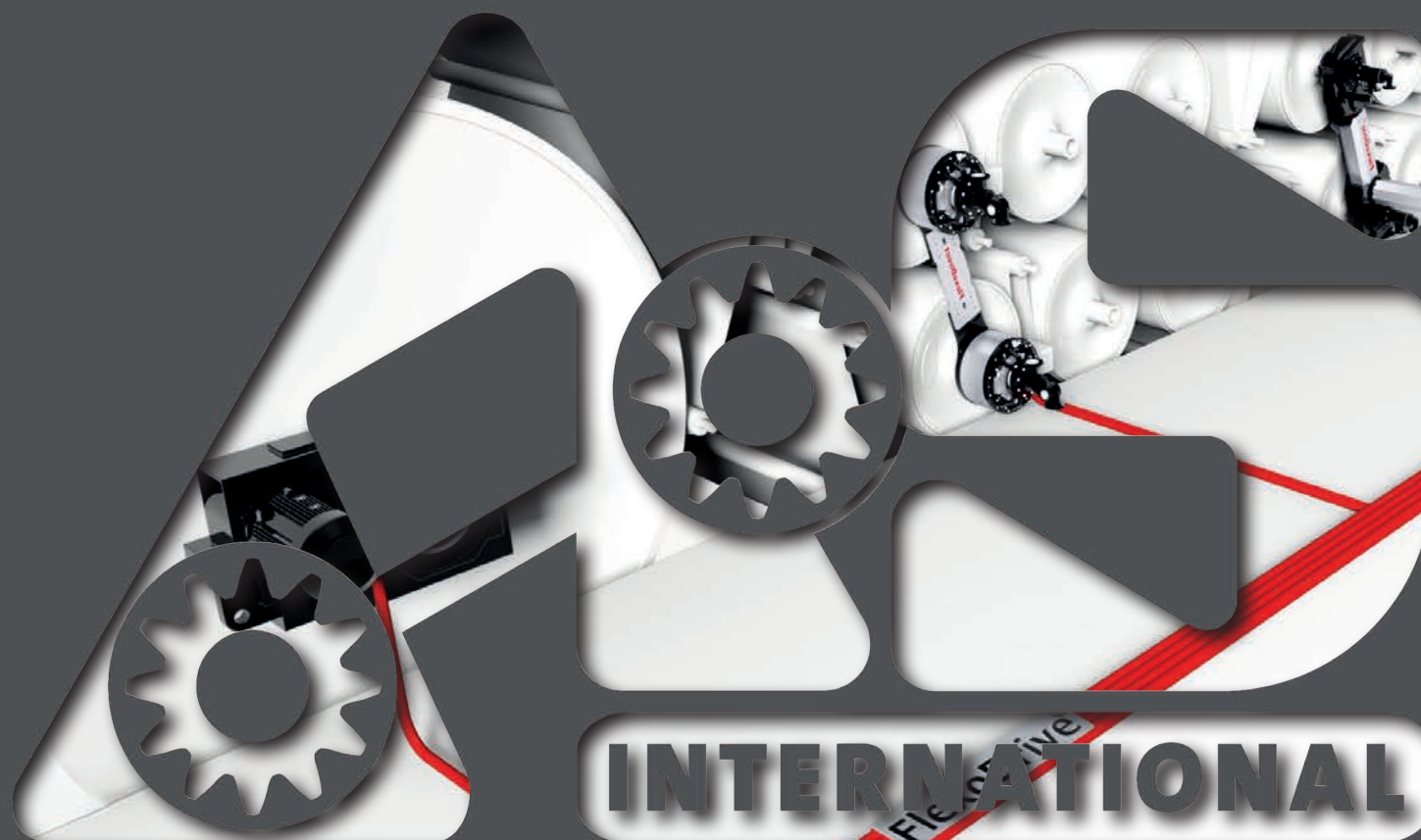




Engineering 

FlexoDirect® 

Cooliflex® 

FlexoGear® 

Lubriflex® 

FlexoFlow® 

Service 

Innovative Drive Specialists from Germany



Who We Are

- Innovative drive specialist
- Flexible mid-sized company
- More than 35 years in the market
- Around 200 employees
- Apprentice ratio of 15 %
- Continuous training programmes keep our team at the cutting edge of drive technology

Added Value for Our Customers

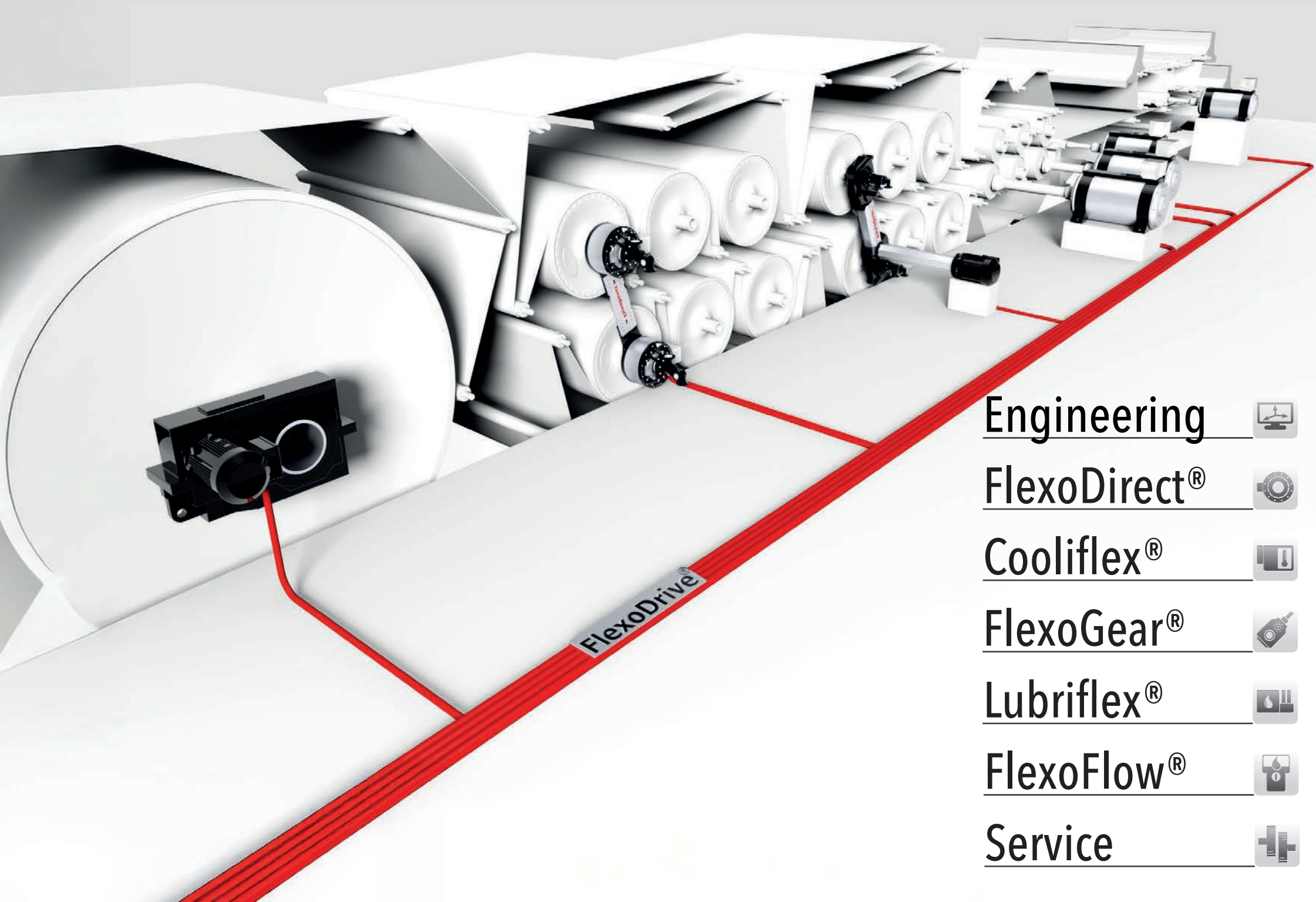
- Customer-specific solutions take centre stage
- Holistic view of drive and lubrication systems
- Small batch sizes are no problem
- Quality certified to DIN EN ISO 9001
- Safety certified to SCC** (Safety Certificate Contractors)

Our Facilities

- 6 assembly halls with more than 3,250 m² of production space
- Crane capacity up to 40 tonnes
- 2 test stands for motors and gearboxes
- Custom-built tooling systems
- Mobile measurement, scanning and analysis systems
- Professional paint shop
- Multi-axis CNC machining
- 5-axis CAM milling
- 3D printing systems



About Us



Engineering 

FlexoDirect® 

Cooliflex® 

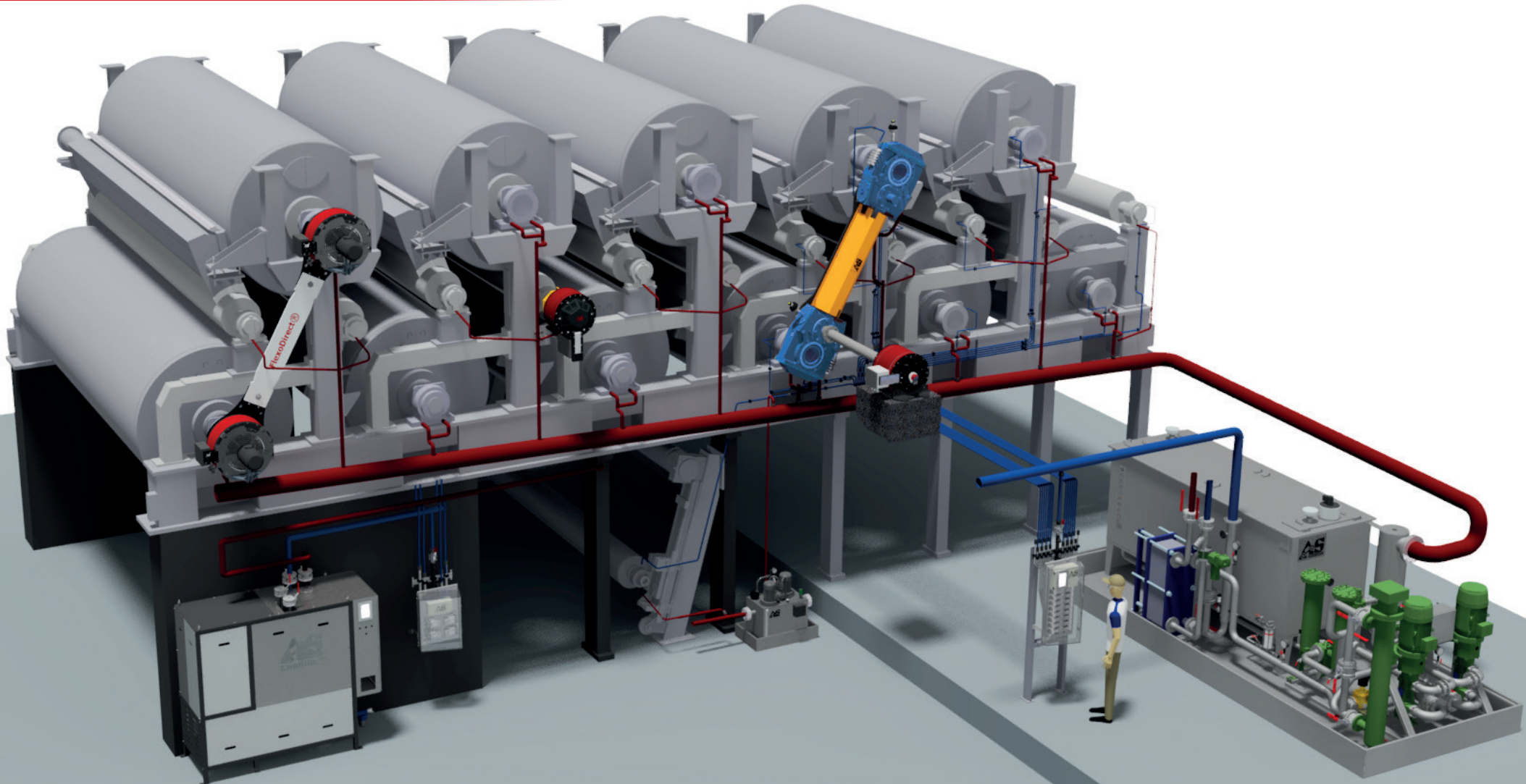
FlexoGear® 

Lubriflex® 

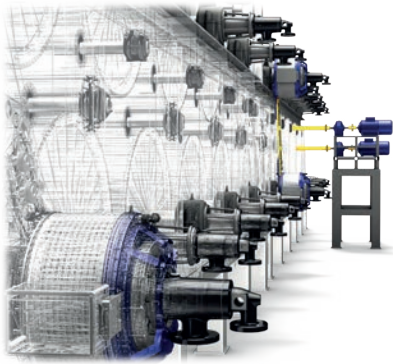
FlexoFlow® 

Service 

**Products and
Services**
for Maximum Availability

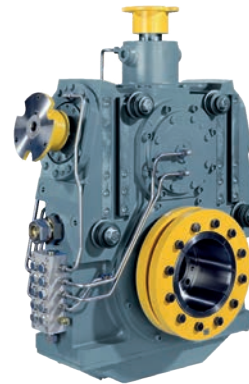


Drives and Lubrication



Drive Engineering

Planning, design and execution of drive retrofits



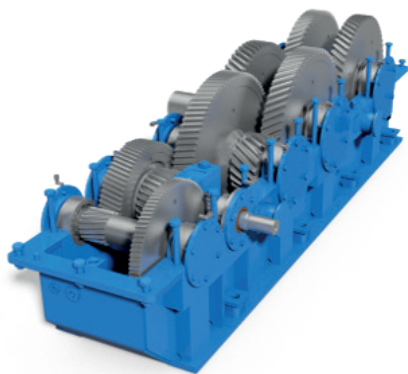
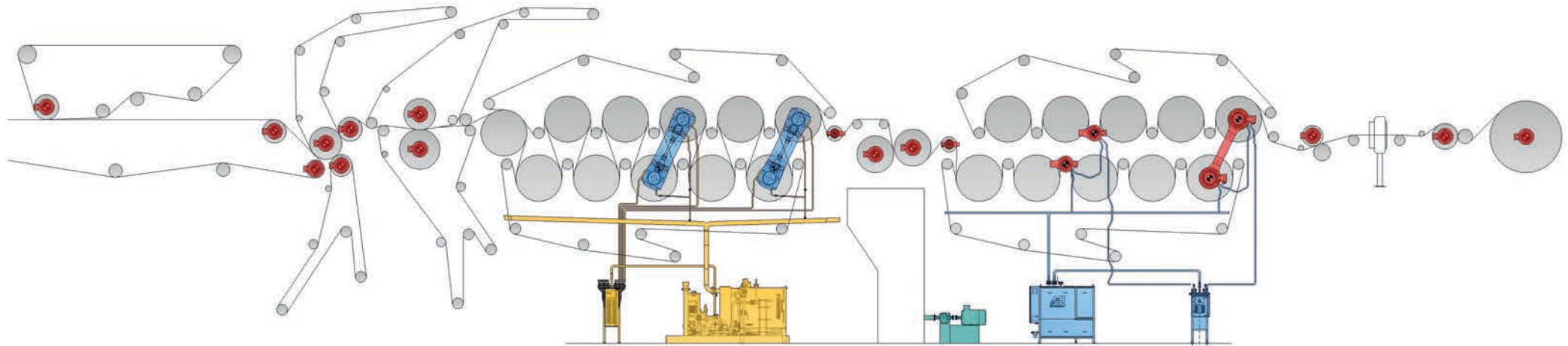
FlexoGear®

The dedicated shaft-mounted gearbox for drying cylinder drives



FlexoDirect®

The water-cooled direct drive for every drive point on a paper machine



Gearbox Service

On-site service, removal and installation, professional overhaul of gearboxes and motors



FlexoFlow®

The right, fully automatic lubrication flow for every lubrication point



Lubriflex®

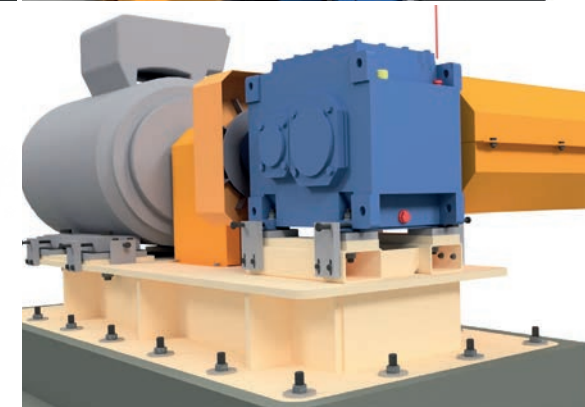
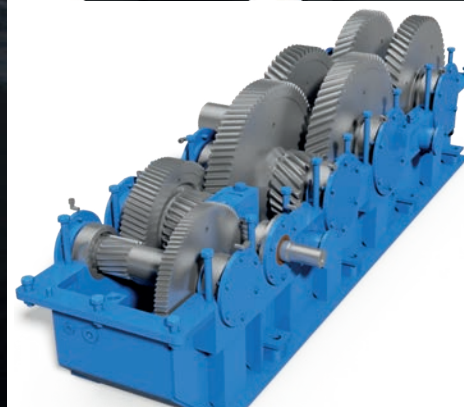
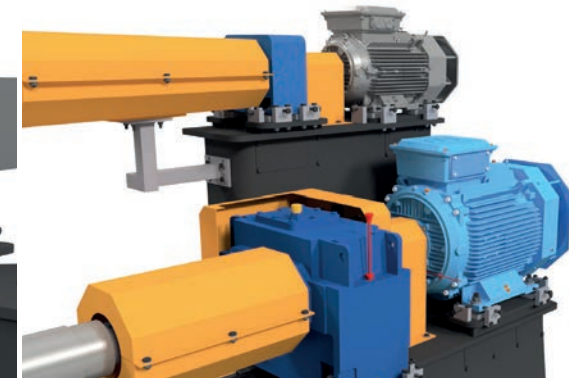
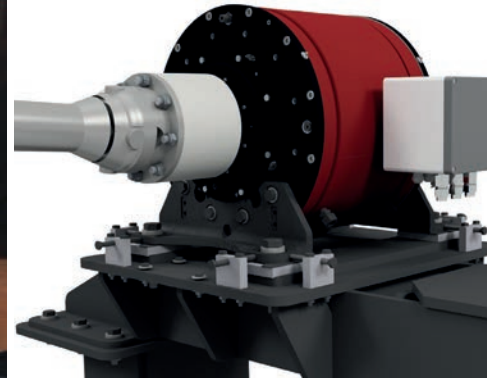
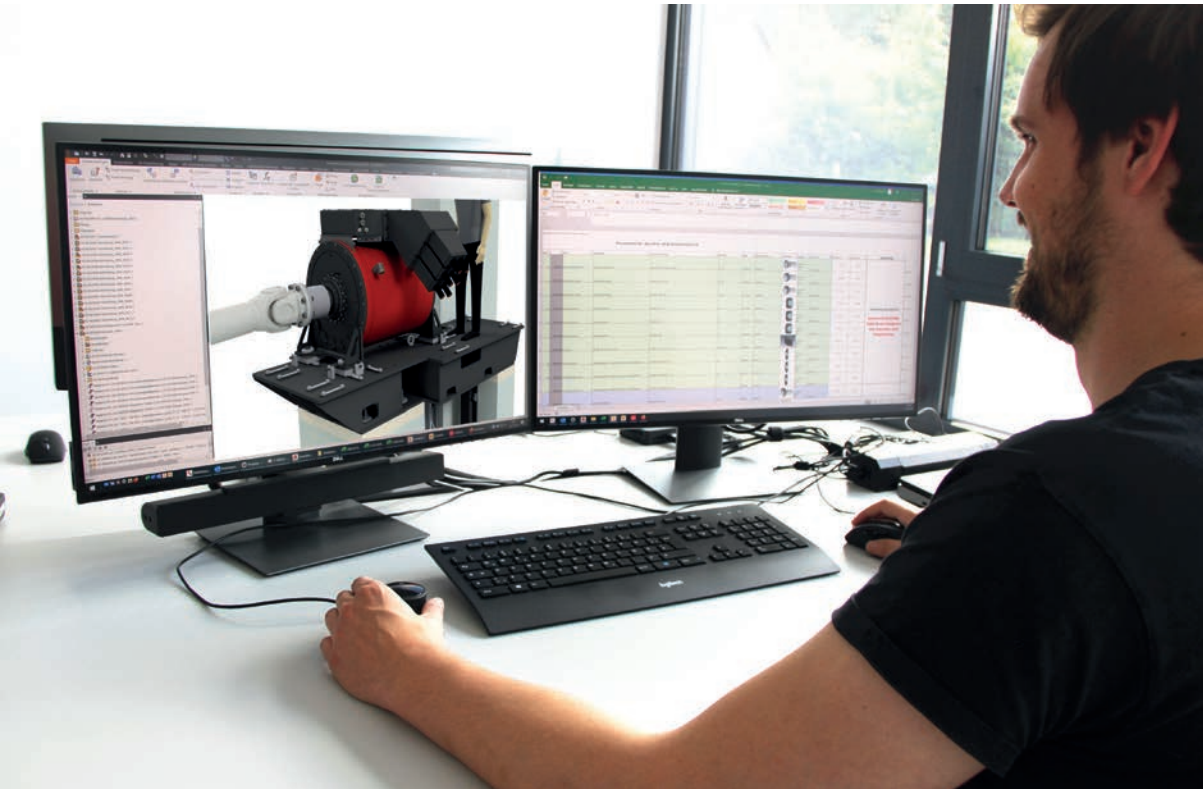
Oil circulation system with optimised tank volume – less oil, compact footprint



Cooliflex®

Water tempering for motors and converters, including flow-controlled distribution

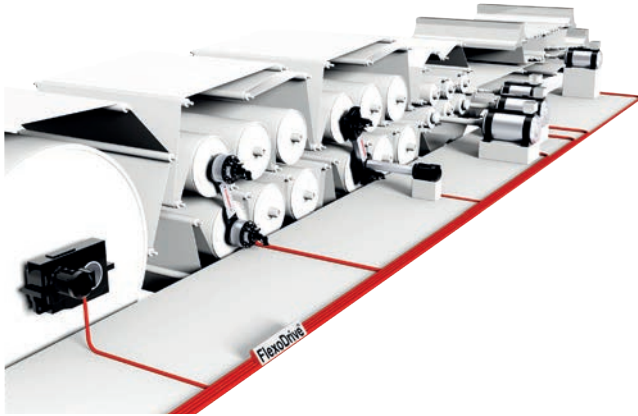
Drive Engineering from A to Z for Industrial Applications



...turnkey solutions for your machine

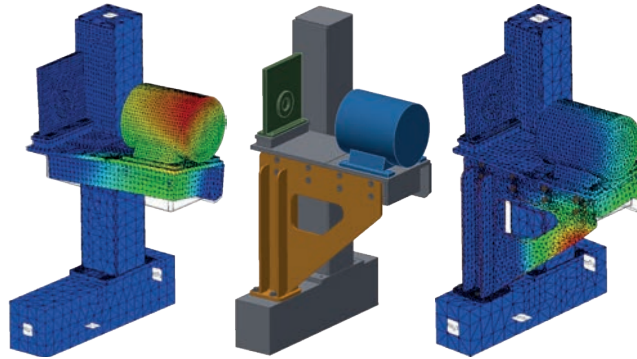
Engineering

Preliminary Planning



- Modernisation (retrofit)
- Speed upgrades
- Greenfield drive installations
- Calculation and visualisation
- Technical documentation of drive systems
- Reduction of maintenance and energy costs

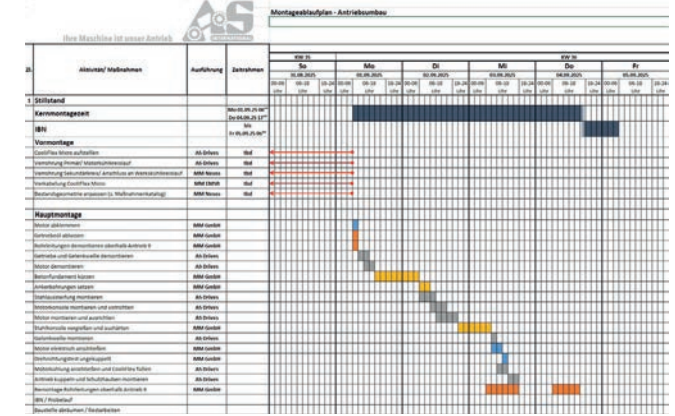
Calculation of Retrofit Components



Your calculation service for:

- Gearboxes, motors, bearings and shafts
- FEM strength analysis for every machine component
- Natural frequency calculations
- CFD simulations

Project and Site Management



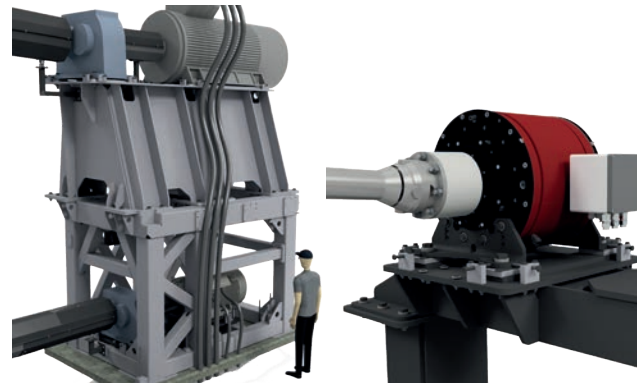
- We meet your deadlines through:
- Project planning and online meetings
- Site preparation and pre-assembly
- Installation drawings
- Turnkey installation or supervision of key activities
- Commissioning
- Service and training

Detail Design



- Digital on-site dimensional survey (3D laser scanning and tactile component capture)
- Conversion into the 3D CAD system
- Overlay of as-built versus target state
- Collision detection including action list
- Detail design of the new build or retrofit

Design of Retrofit Components



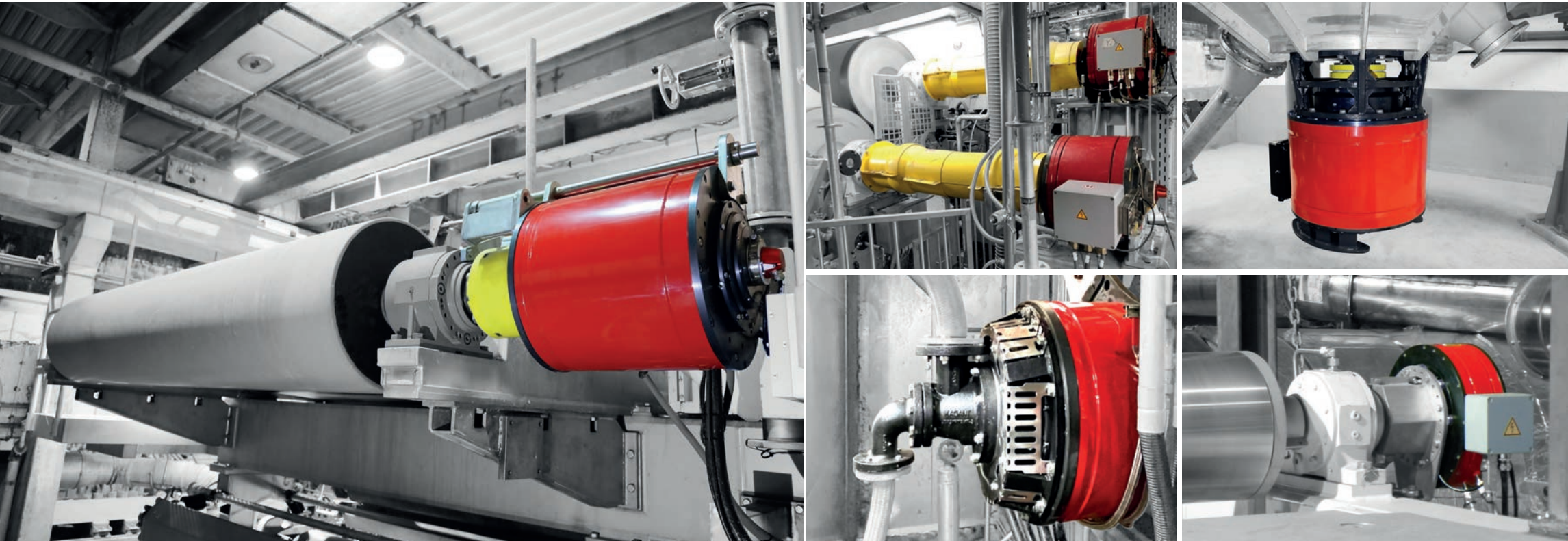
- Turnkey solutions from a single source – from initial survey to commissioning:
- Special and custom gearboxes
- Gearboxes, geared motors and motors
- Our own FlexoDirect® synchronous motors
- Steel substructures
- Couplings, cardan shafts
- Safety guards

Our Service Team



- The AS Drives team is the key to delivering your project successfully – including:
- Planning and project managers
- Site managers
- Senior and specialist fitters
- Installation supervisors
- Commissioning engineers

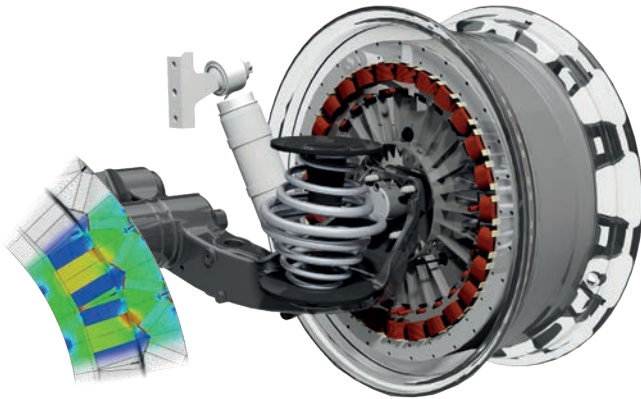
**Gearless
Drive Technology**
FlexoDirect® powerSERIES



...motor design, our passion

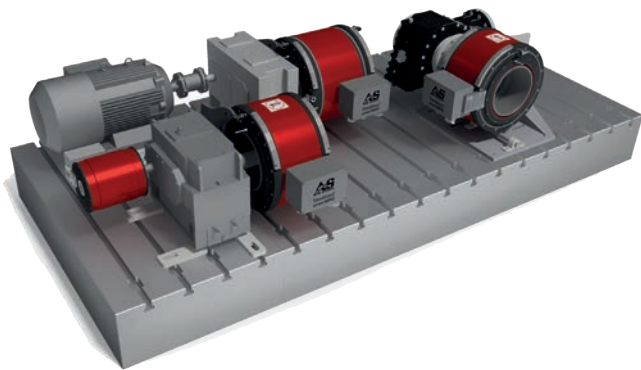
FlexoDirect® powerSERIES

Design and Calculation



- Non-linear field calculation
- Manufacture of polyphase winding systems
- FEM of thermodynamic processes
- Strength analysis (static / dynamic, linear / non-linear FEM)
- Bearing calculation to DIN / ISO
- Prototypes and sample motors for industry, universities and research institutes

Test Bench Technology



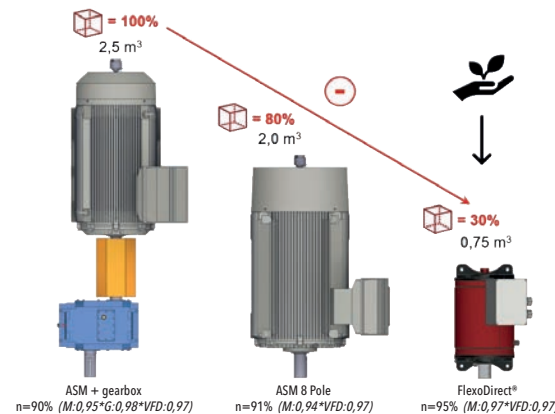
- In-house test stands (low voltage)
- Gearboxes and motors up to 100,000 Nm under load
- Full Factory Acceptance Test (FAT) and complete system commissioning at our works
- Commissioning at customer site
- Acceptance documentation included

FlexoDirect® powerSERIES



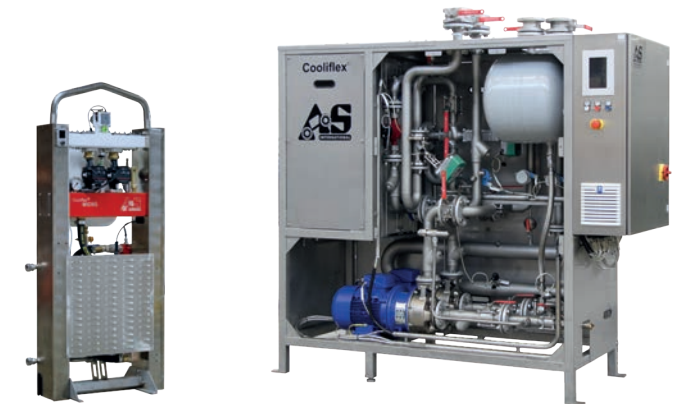
- Permanent Magnet Synchronous Machines (PMSM)
- Frame sizes 150 to 600 mm
- Torque S1 0 – 100,000 Nm
- Voltage up to 690 V
- Foot, shaft-mounted and hollow-shaft versions
- Electrical machines also available for special applications (e.g. high temperature, high IP ratings up to IP66 / IP69K, vibration-proof)
- Single units and series production of synchronous machines

Power Density



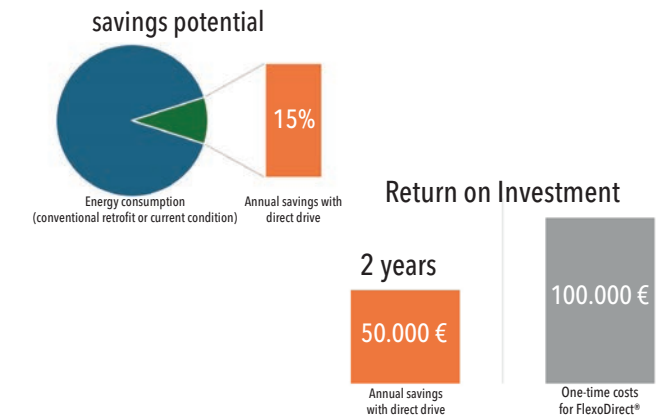
- Around 70 % less installation space versus conventional drive technology
- Fewer wear-prone components
- Efficiency up to 98 %
- High dynamics, low inertia

Motor temperature control



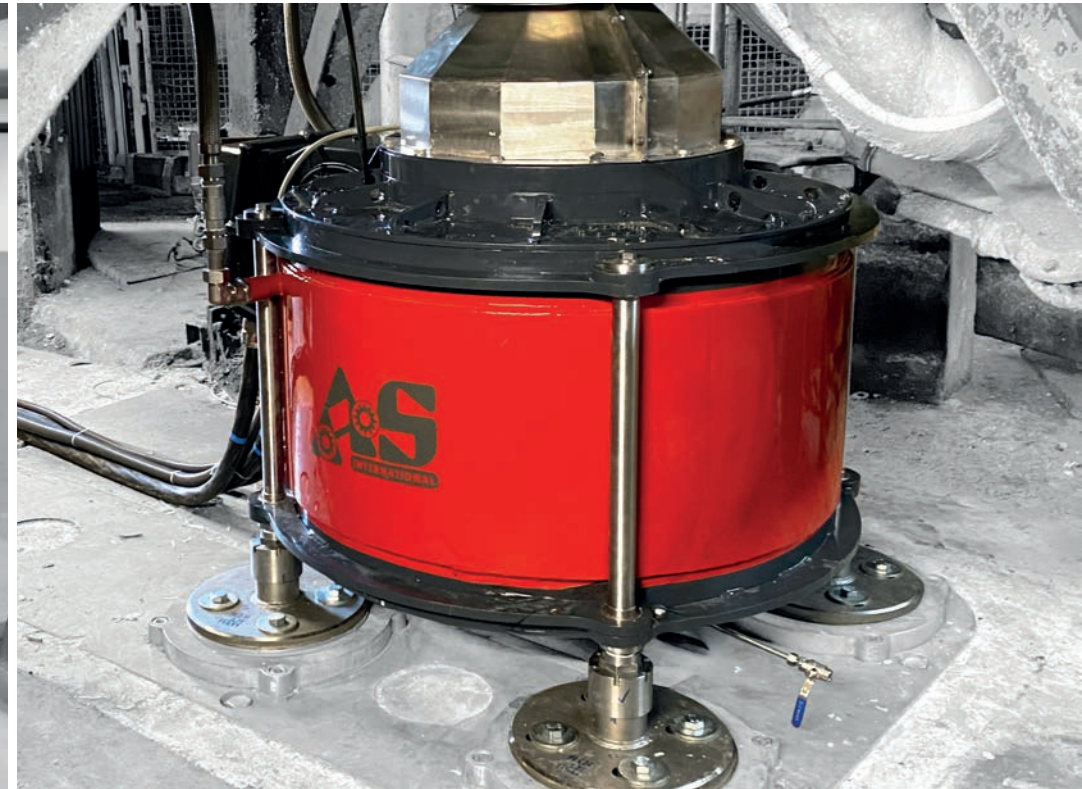
- Tempering unit for water-cooled motors
- System for creating a closed-loop, flow-controlled water circuit
- Condition monitoring of all process parameters and motor temperatures
- Data integration via common bus systems
- Factory-tested: set up, connect, start up

Energy Savings



- Calculation of energy use and savings potential
- Return on Investment (ROI) statement
- Reduced maintenance and servicing effort
- Significant simplification of the drivetrain

**Direct Motors
for Pulpers**
FlexoDirect®



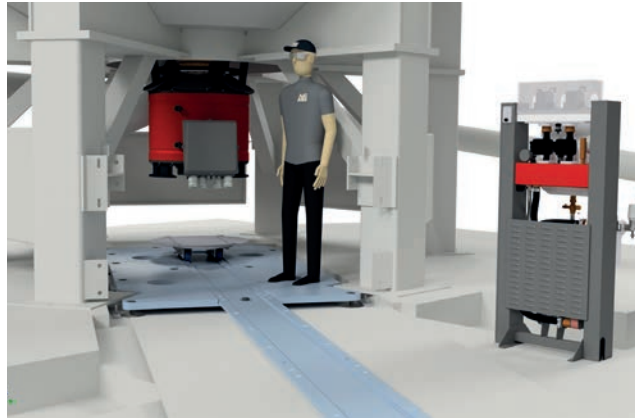
... powerhouses from AS Drives

FlexoDirect® powerPULP

FlexoDirect® Direct Motor



FlexoDirect® Motor Series

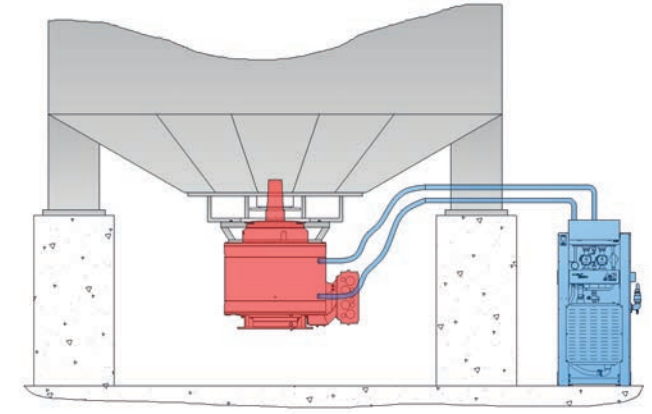


FlexoDirect® Series	F_12	F_09	F_07	F_05
Outer diameter [mm]	1.200	900	700	500
Torque 0 to ... [Nm]	70.000	30.000	15.000	8.000
Speed 0 to ... [min ⁻¹]	350	350	350	350
Voltage 230 VAC to ... [V]	690	690	690	690
Available as shaft-mounted or foot version	x	x	x	x

Benefits

- Highest possible efficiency of 98 %
- Typically around 15 % energy savings versus conventional drive technology
- Significantly reduced wear parts and maintenance effort
- No damage to the drive if the pulper blocks!
Reason: no mechanical form fit between rotor and stator – shocks dissipate in the air gap

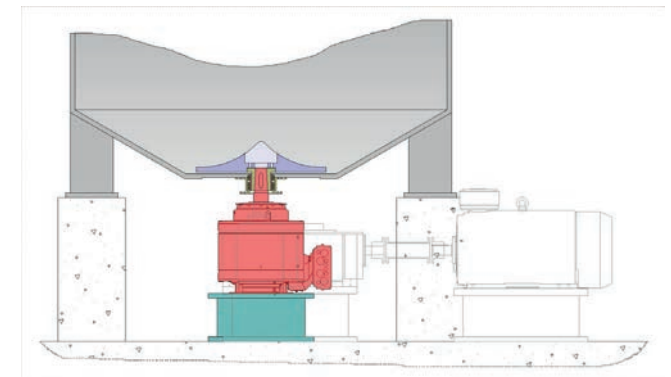
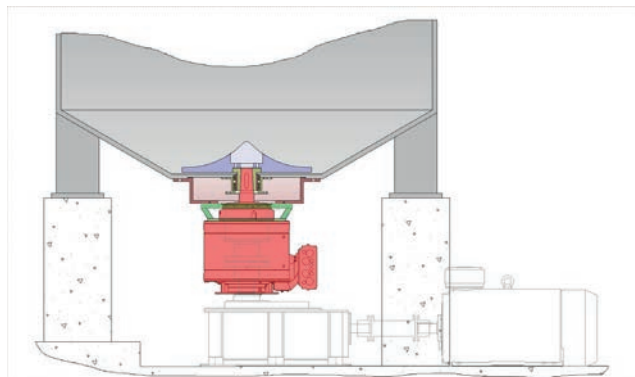
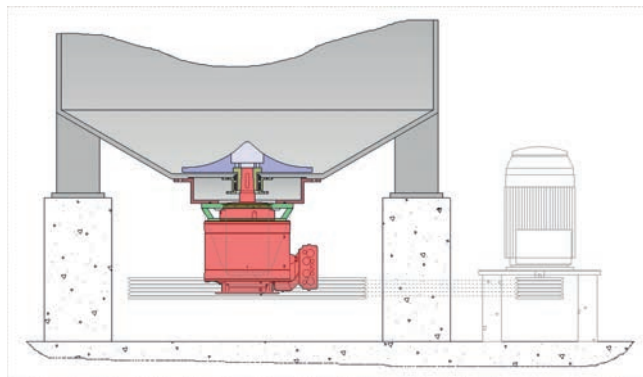
Motor temperature control



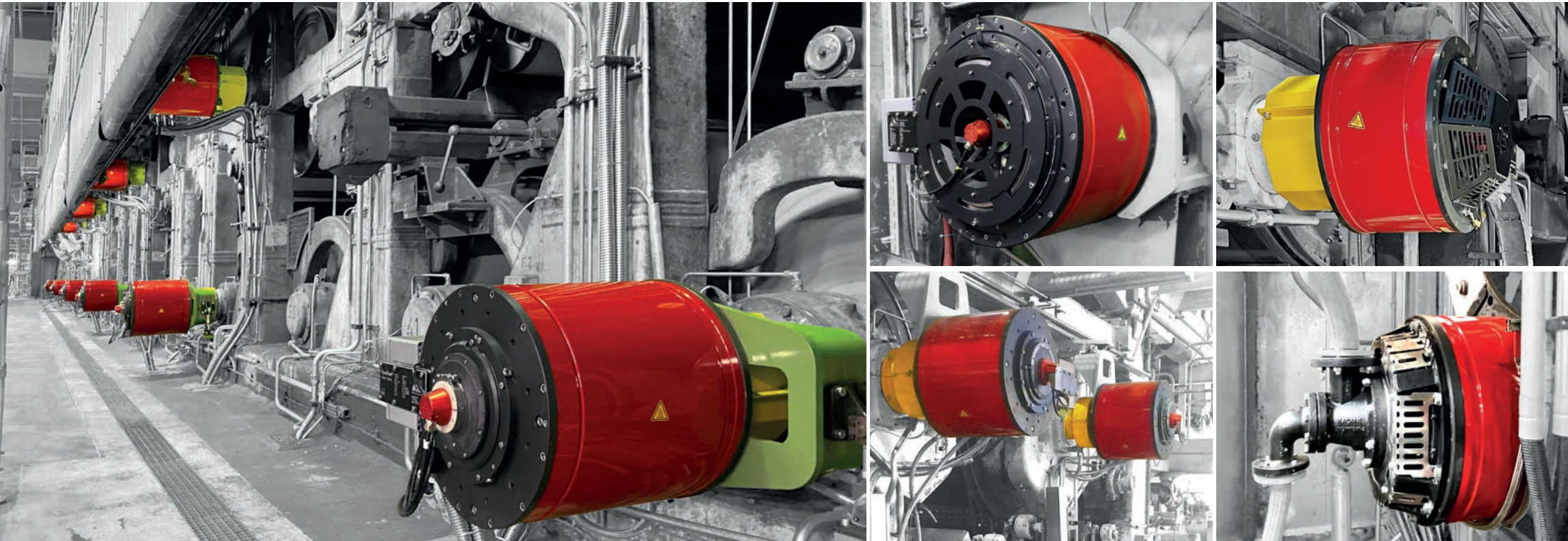
- The FlexoDirect® is designed to run on a water tempering system
- AS Drives supplies the matching Cooliflex® product

Description

- Drive specifically designed for pulpers and mixers
- Permanent Magnet Synchronous Motor – water-cooled and dirt-tolerant
- Operates under high ambient temperatures and humidity
- Multiple mounting options on the pulper – foot or flange version
- The FlexoDirect® can replace the pulper shaft entirely



Direct Motors
for Dryer Sections
FlexoDirect®



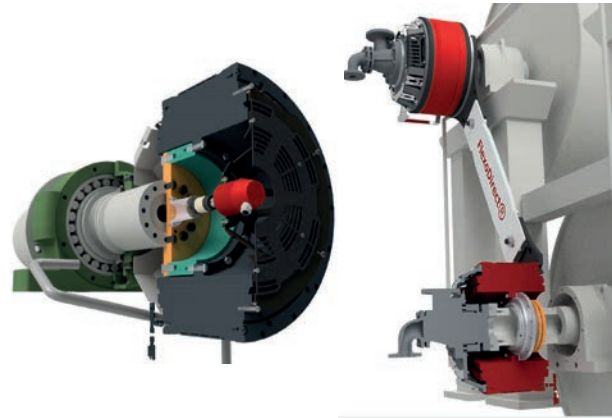
... on the drive side as well as the tender side

FlexoDirect® powerDRY

FlexoDirect® Direct Motor

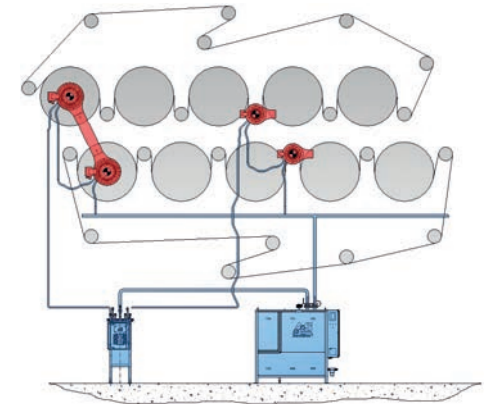


FlexoDirect® Motor Series



FlexoDirect® Series	F_09	F_07	F_05	F_03
Outer diameter [mm]	900	700	500	300
Torque 0 to ... [Nm]	12.500	8.500	5.500	1.000
Speed 0 to ... [min ⁻¹]	450	500	750	1.000
Voltage 230 VAC to ... [V]	690	690	690	690
Installation with rotary union	x	x	x	-
Shaft-mounted or foot version	x	x	x	x
Hollow shaft for journal up to [mm]	350	350	180	-

Motor temperature control



- The FlexoDirect® is designed for operation with a water tempering system
- AS Drives provides the matching products Cooliflex® and FlexoFlow® for this purpose

Description

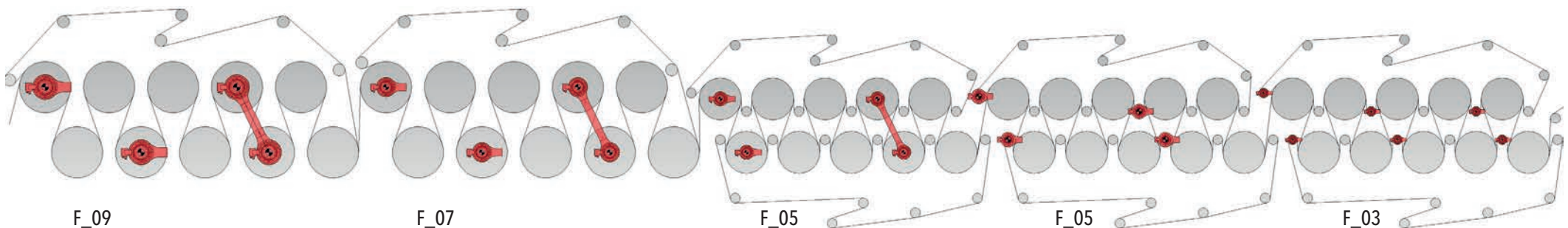
- Developed specifically for the drive of drying cylinders and guide rolls in paper machines
- Permanent Magnet Synchronous Motor – water-cooled, dirt-tolerant
- Operates under high ambient temperatures and humidity
- Rotary union for steam and condensate
- Replaces open and closed gear drives

Benefits

- Reduces wear, noise and vibration
- Prevents web breaks caused by cylinders being dragged across the wire
- Installation inside the machine hood on the journal – saves space, no hood penetrations, free passageways
- No torque arm at the machine frame – two motors brace each other
- Energy savings

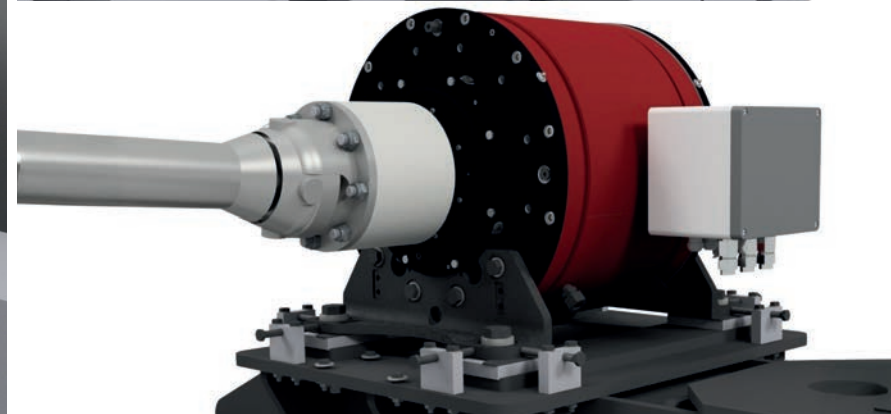
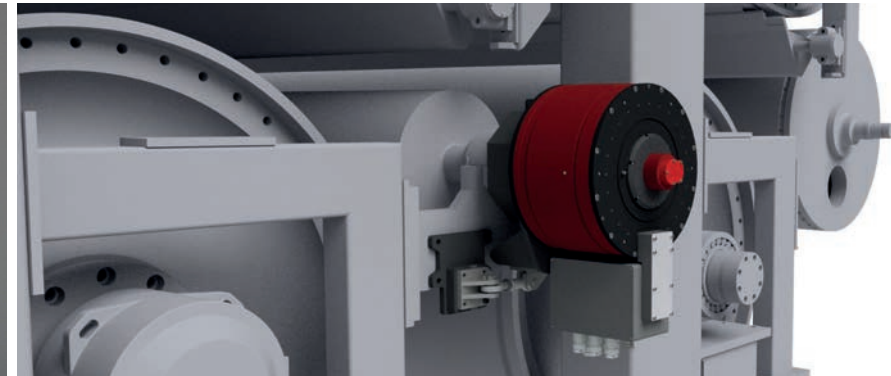
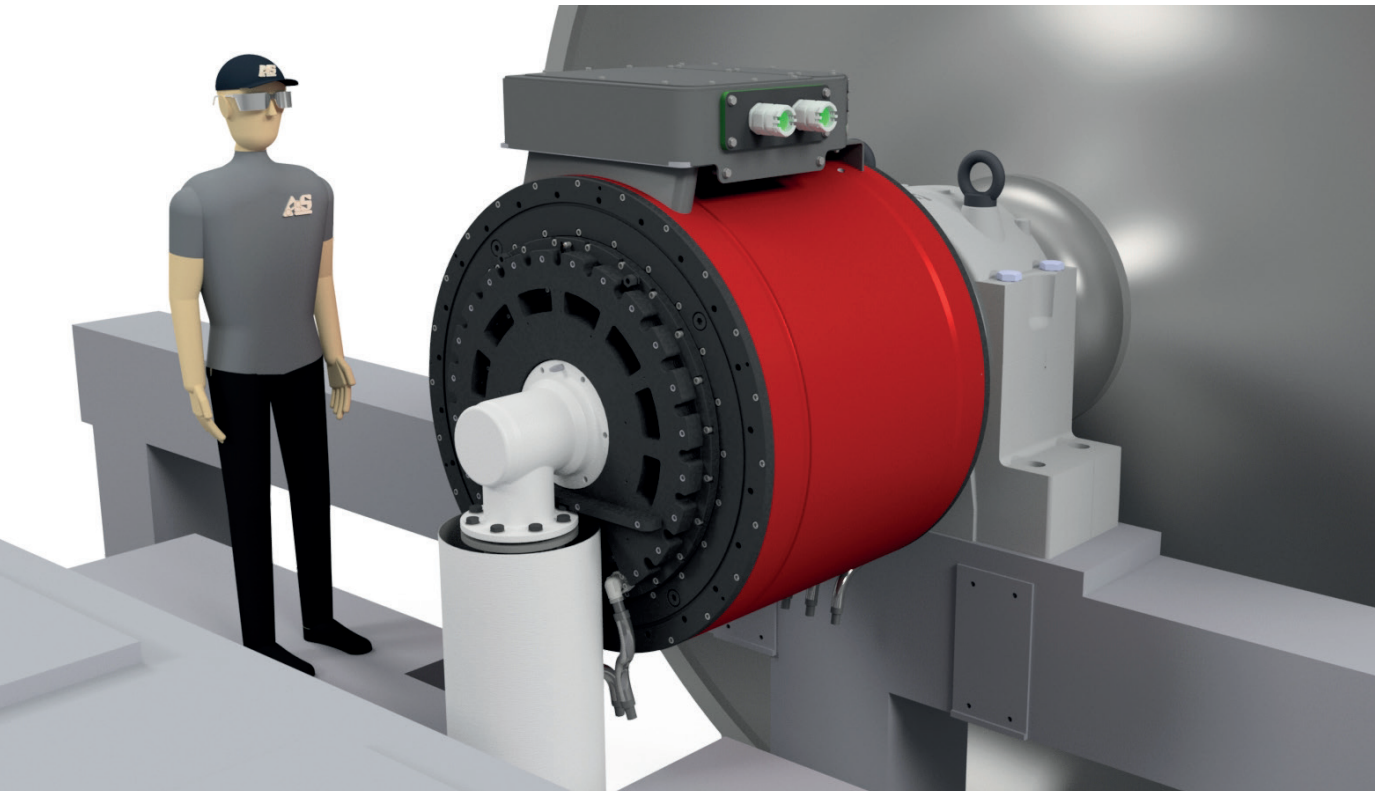
References

- Installations across the paper industry
- More than 300 units since 2010
- In dryer sections, e.g. VAC rolls, drying cylinders, guide rolls
- Installations on both drive side and tender side
- With or without rotary union
- Hollow-shaft or solid-shaft version
- Foot or shaft-mounted version



Direct Motors for Tissue Machines

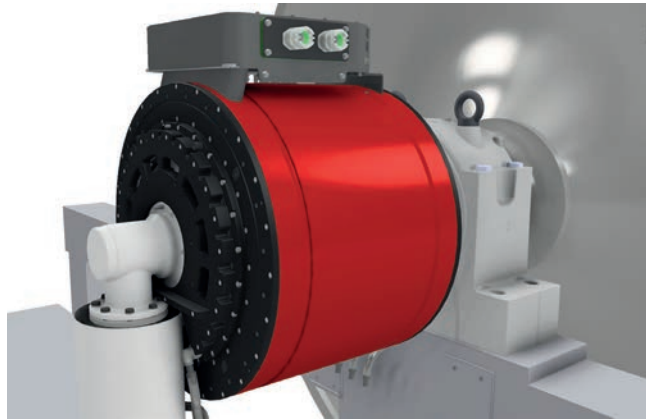
FlexoDirect®



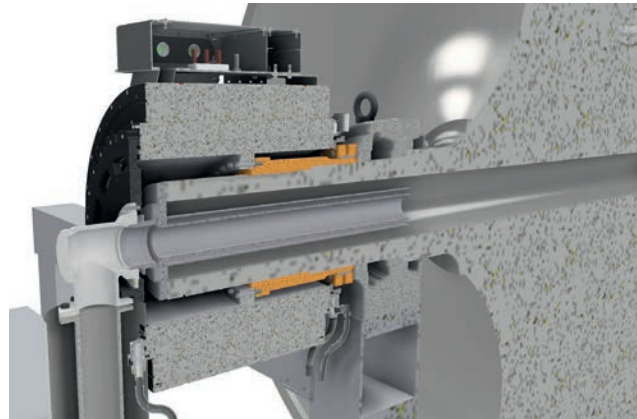
...standing up to the harshest conditions

FlexoDirect® powerTISSUE

FlexoDirect® Direct Motor



FlexoDirect® Motor Series



FlexoDirect® Series	F_12	F_09	F_07	F_05
Outer diameter [mm]	1.200	900	700	500
Torque 0 to ... [Nm]	70.000	30.000	15.000	8.000
Speed 0 to ... [min ⁻¹]	350	650	850	1.000
Voltage 230 VAC to ... [V]	690	690	690	690
Shaft-mounted or foot version	x	x	x	x

Motor temperature control

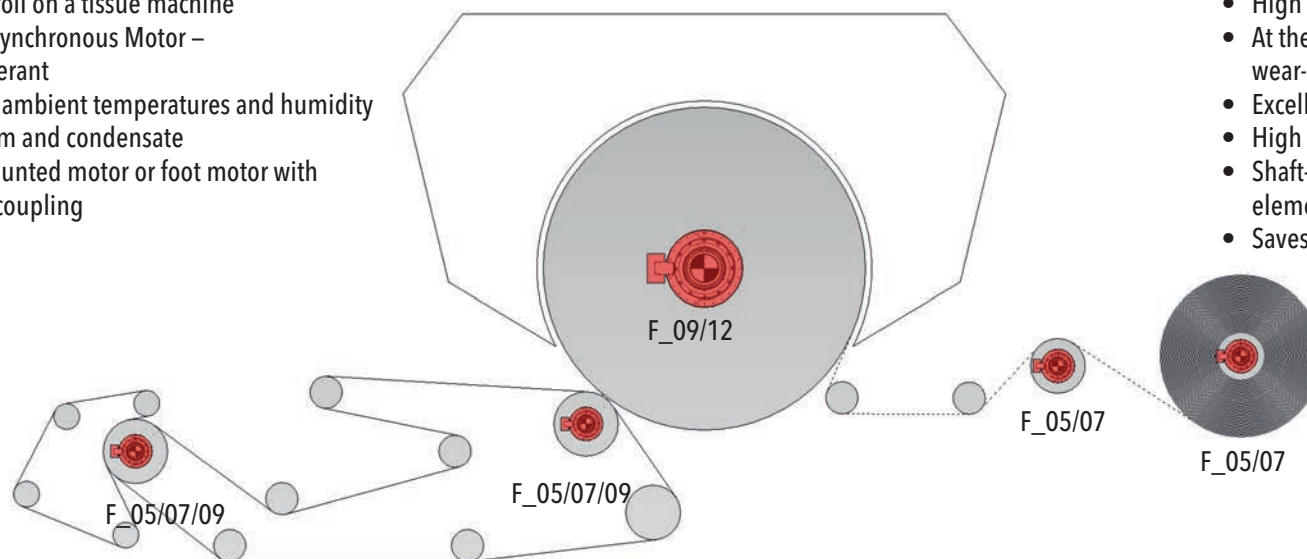


- The FlexoDirect® is designed to run on a water tempering system
- AS Drives supplies the matching Cooliflex® and FlexoFlow® products
- With a maximum of two Cooliflex® MICRO units, every motor on a tissue machine can be tempered

Description

- Not just for Yankee drives – developed for every roll on a tissue machine
- Permanent Magnet Synchronous Motor – water-cooled, dirt-tolerant
- Operates under high ambient temperatures and humidity
- Rotary union for steam and condensate
- Available as shaft-mounted motor or foot motor with cardan shaft or rigid coupling

Available Series



Benefits

- Reduces wear, noise and vibration
- High efficiency (approx. 97 %) and significant energy savings
- At the Yankee: eliminates the multi-stage, wear-prone shaft-mounted gearbox
- Excellent control behaviour
- High drive stiffness
- Shaft-mounted motor with journal connection via locking element and adapter bushing – no key required
- Saves space on the drive side

Tempering for Direct Motors

Cooliflex®



... motor tempering at the highest level

Cooliflex®

The Cooliflex®

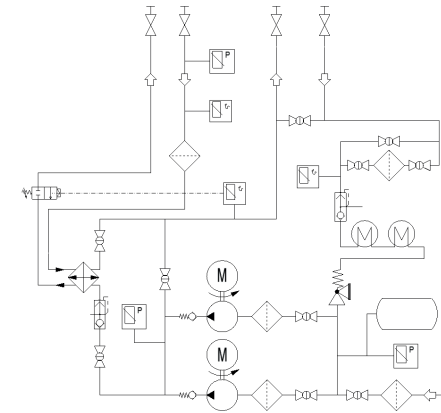


Cooliflex® Series



Cooliflex® Series	Q800	Q400	Q100	MICRO
Max. flow rate [l/min]	800	400	100	70
Voltage 400 VAC up to ... [V]	690	690	690	400

Example system diagram



Description

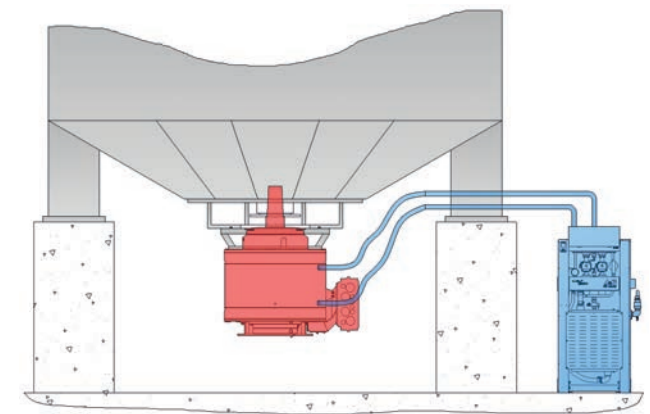
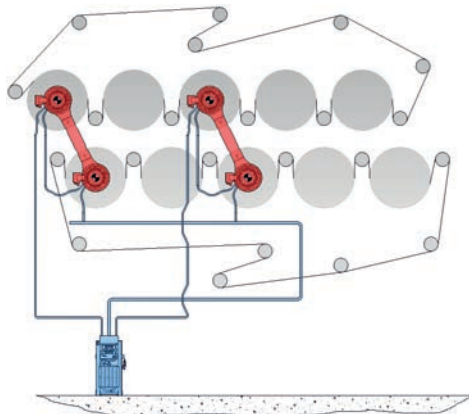
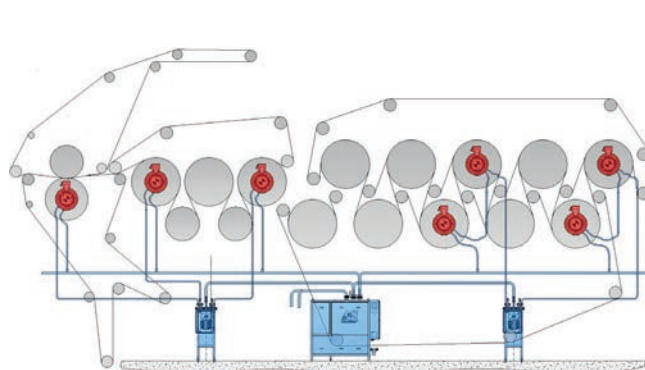
- Tempering system for water-cooled motors and converters in a closed loop
- The system ships with a fully tested controller – once power is connected, it is „ready to use“
- The FlexoFlow® ensures the correct, demand-driven flow rate
- Heat exchanger available as water-water or water-air variant

Benefits

- Fully integrated control system
- No complex PLC programming required
- Capture and transmission of all system data via PROFINET or PROFIBUS
- Extended monitoring and trend recording of motor bearing and winding temperatures – in a single system
- High redundancy at component level – replacement during operation possible

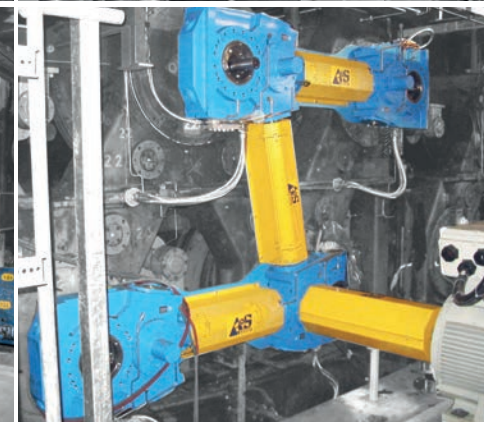
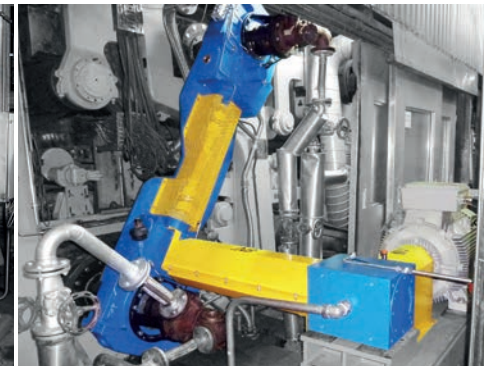
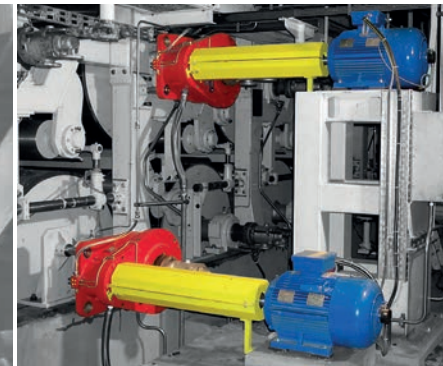
References

- Installations across the paper industry
- More than 20 units installed since 2010
- For motor cooling in wire and press sections, dryer sections, pulpers
- Converter cooling
- Complete installation and commissioning by AS Drives – including pipework planning and routing



Special Gearboxes for Dryer Sections

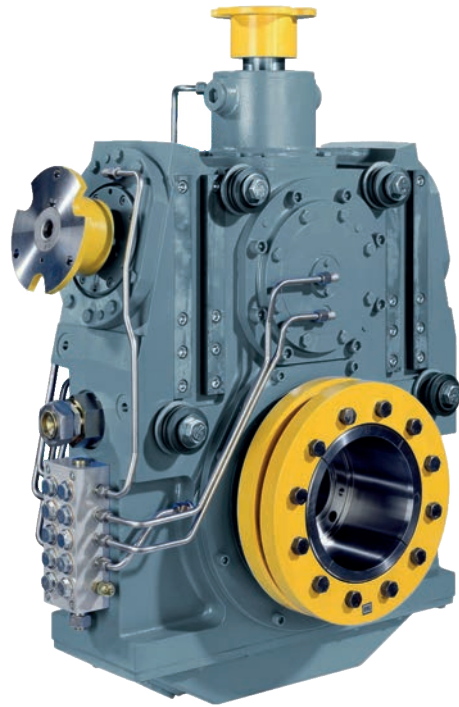
FlexoGear®



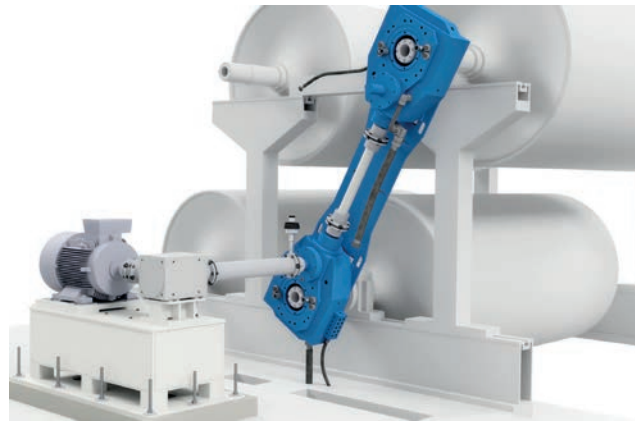
... the flexible gearbox concept

FlexoGear®

The FlexoGear® Gearbox



FlexoGear® Series



FlexoGear® Baureihen	KSZ 250	KS 295	KS 340	SZ 300
Max. journal diameter [mm]	180	200	230	200
Nominal output torque [Nm]	5.100	5.000	6.400	9.500
Nominal power at 1,500 min ⁻¹ [kW]	50	135	160	up to 160
Gear ratio	10,704	5,929	6,261	2,8 to 20,5
Max. gearboxes in cluster	2	2	4	-
System configuration	Single, Duo	Single, Duo	Single, Duo, Triple, Quattro	Single
Mounting orientation	0-360°	0-360°	0-360°	0-360°
Weight [kg]	335	550	745	700

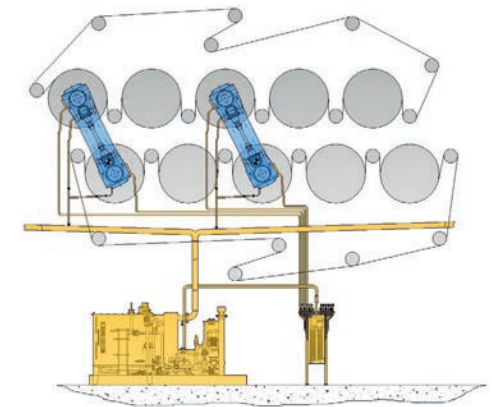
Description

- Dedicated hollow-shaft, shaft-mounted gearbox for drying cylinder drives in paper machines
- Designed for high temperatures and humidity
- Rotary union for steam and condensate
- Replaces open and closed gear drives
- Connection via shrink disc on the journal – no key required

Benefits

- Freely combinable gearbox system – unlike rigid conventional solutions
- Application examples shown below
- Retrofittable to almost any drive journal
- Few mechanical drive components
- No stresses in the drive system
- No torque arm on the machine frame
- Reduces noise and vibration
- Continued use of existing motors
- Energy savings

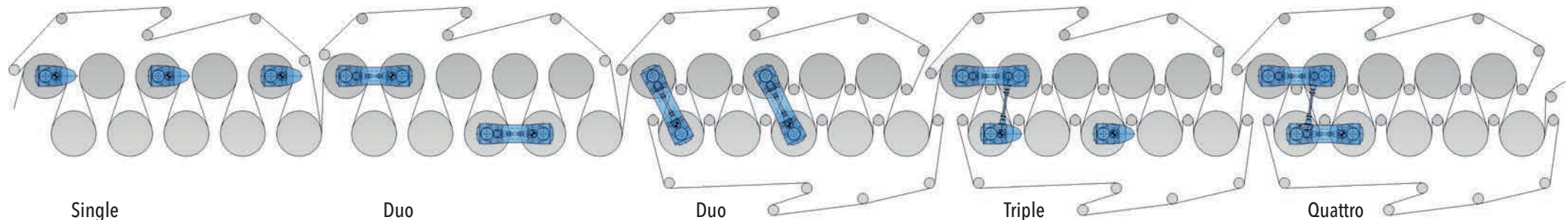
Central Oil Lubrication



- The FlexoGear® is designed to run on an oil circulation system
- AS Drives supplies the matching Lubriflex® and FlexoFlow® products

References

- Installations across the paper industry
- Worldwide
- More than 700 units since 1997
- KS 295 – more than 250 units
- KS 340 – more than 300 units
- SZ 300 – more than 150 units

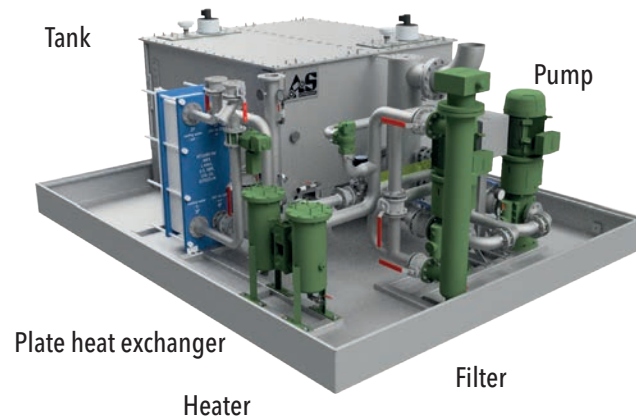




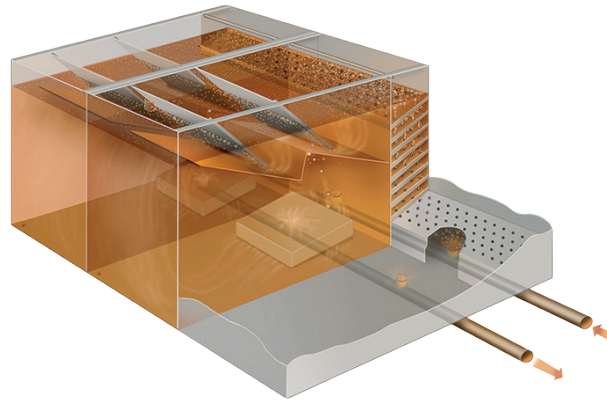
... perfectly conditioned oil, at any moment

Lubriflex®

The Lubriflex®



Lubriflex® Tank

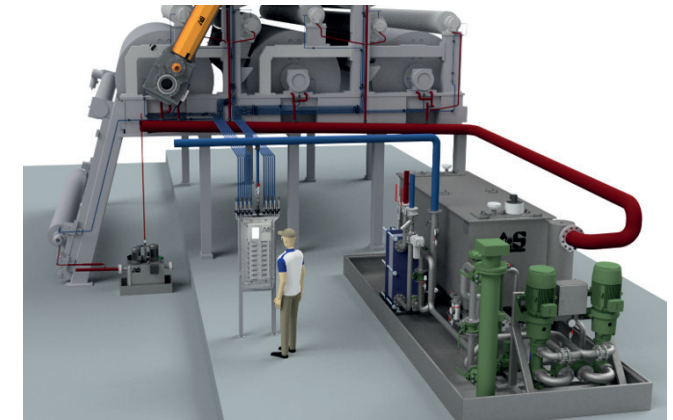


The Lubriflex® is a dedicated oil circulation system:

- Designed and built by AS Drives in-house
- All oil conditioning functions combined in one compact unit: degassing, filtration, water separation, plus heater for reaching operating temperature
- Controls oil flow and the set operating temperature
- The distinctive feature is the tank – a specifically engineered, fast and effective degassing process makes it significantly smaller than conventional units

- Tank volume below 50 % of conventional systems
- Smaller overall footprint
- Reduced investment cost
- Reduced operating cost
- Energy savings through optimised pumps and heating capacity
- High reliability through component redundancy
- Parts can be replaced during operation
- Easy maintenance and cleaning through removable internals

System Setup



- In combination with FlexoFlow®
- Automatic flow control per lubrication point possible
- No bearing flooding caused by viscosity changes

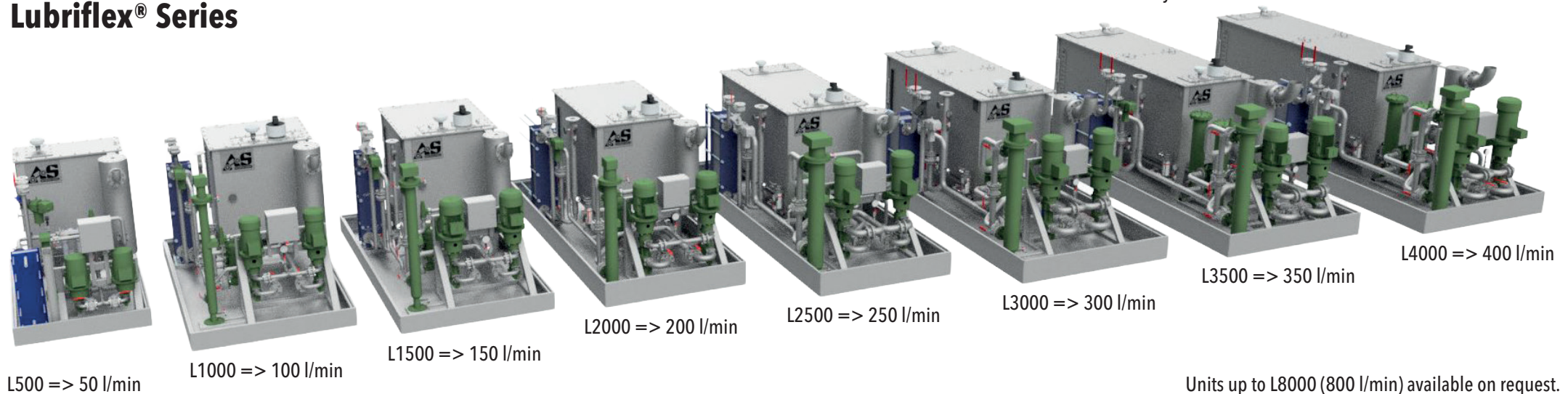
References

More than 100 installations across Europe

Application areas:

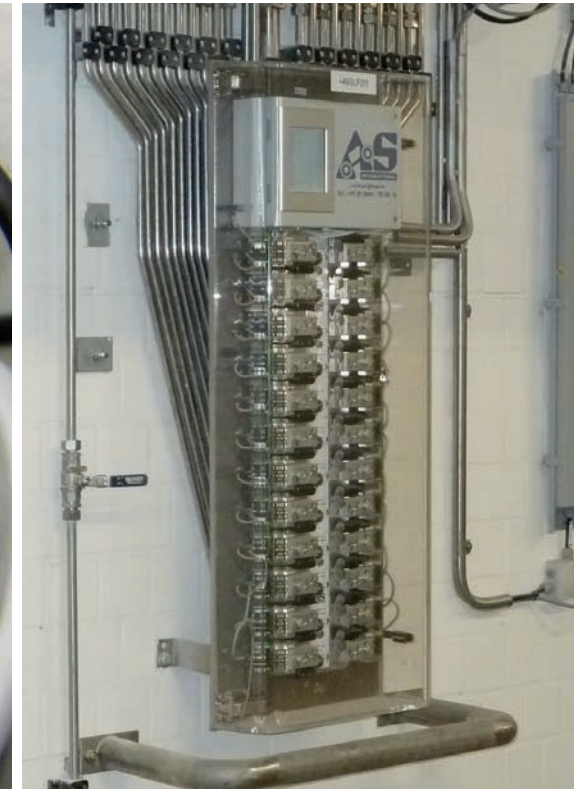
- Paper and pulp industry
- Metal industry
- Power plants
- and many more

Lubriflex® Series



Fully Automatic Flow Control

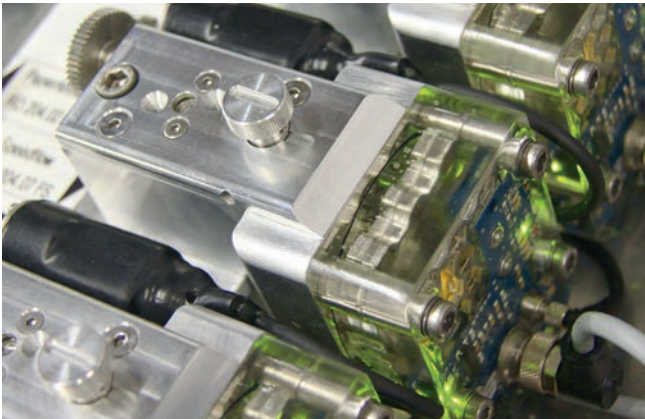
FlexoFlow® Series



many can monitor, only the FlexoFlow® controls

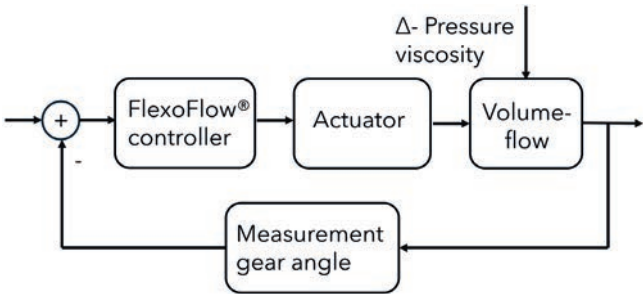
FlexoFlow®

Intelligent Flow Controller



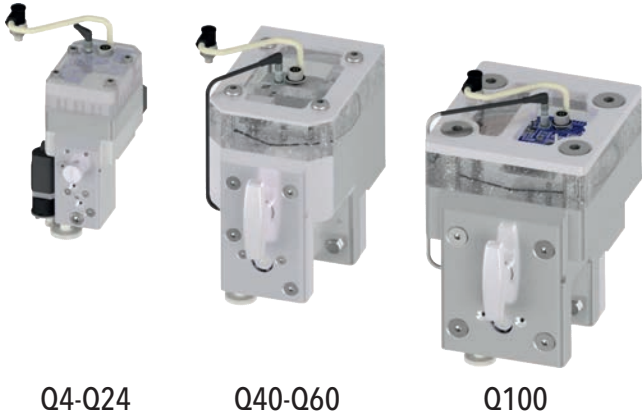
- The FlexoFlow® is a fully automatic flow controller
- The measuring unit captures the actual flow
 - An actuator drives a throttle to the setpoint
 - Control is independent of pressure, temperature and viscosity
 - Multiple FlexoFlow® units can be coupled via one terminal and controlled centrally through the FlexoBus

Benefits



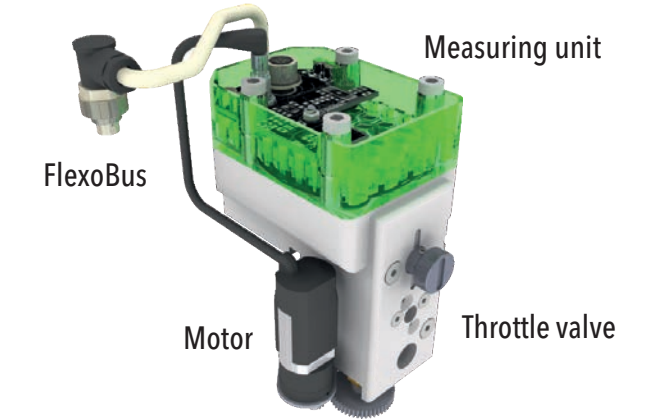
- Simultaneous measurement and control of flow rates
- Easy setpoint entry via touchpad or PROFIBUS / PROFINET interface
- Presets for different machine states
- Individual ramps enable a smooth cold start
- Maintenance-friendly: bypass and shut-off mode during operation

FlexoFlow® Series



FlexoFlow® Type	Q4	Q12	Q24	Q40	Q60	Q100
Measuring range [l/min]	0,07-4	0,25-12	1-24	5-40	7,5-60	10-100
Recommended operating range [l/min]	0,07-1,5	0,5-8	8-20	10-30	15-45	20-75
FlexoFlow® per Terminal	≤ 24			≤ 12		1

Design



- Modular design
- Individually adapted to the flow rate
- Same base body throughout
- Low spare-parts stock requirement

FlexoFlow® Terminal



- Floor or wall mounting
- Pre-piped with ball valve and strainer
- Transparent protective cover

FlexoFlow® Family	FFT	FFMT	FFLT
FlexoFlow® per Terminal	≤ 24	≤ 12	1
Supply line [mm]	Ø42 or Ø60,3		
Connection thread [mm]	Ø18 (1/2")	Ø28 (3/4")	
Medium	oil or water		

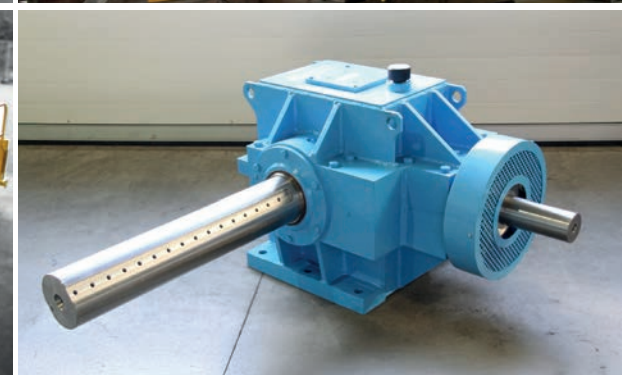
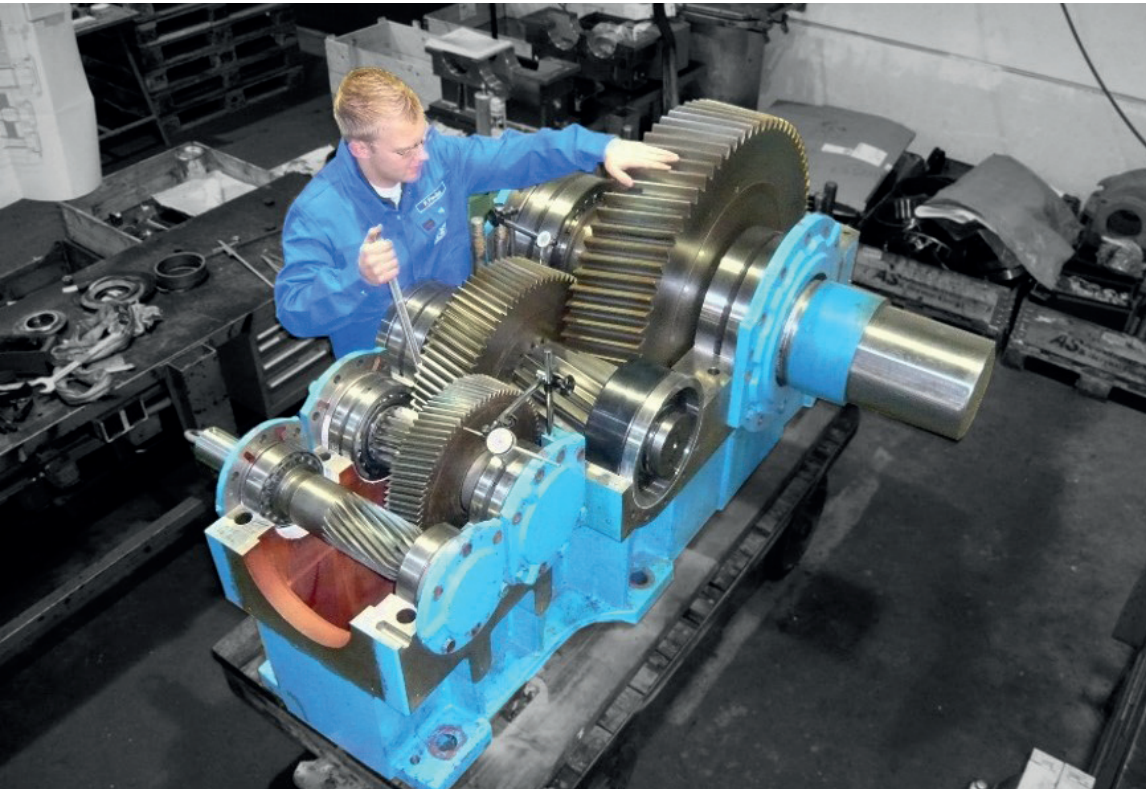
References



- Installations
- 6.000 FlexoFlow®
 - 400 Terminals

- Application areas
- Paper and pulp industry
 - Metal industry
 - Power plants

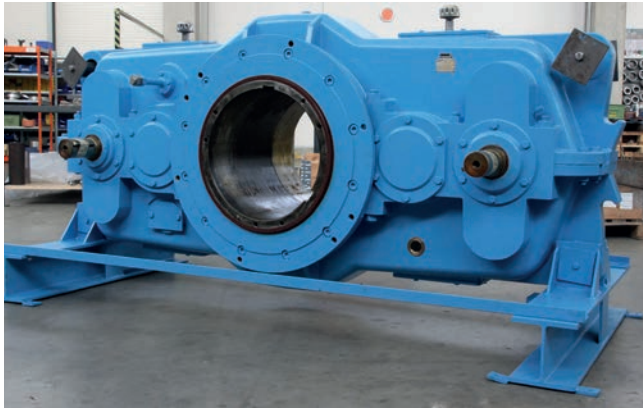
Gearbox Overhaul and Installation Service



... our experience, your added value

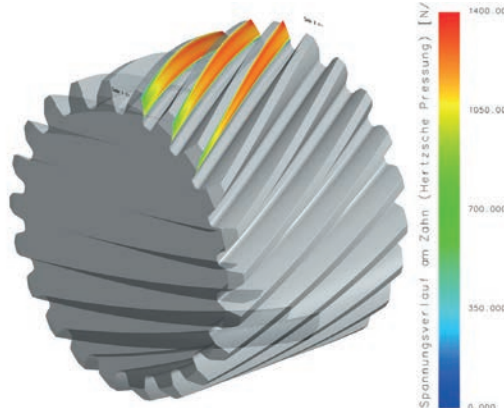
Service

Repair / Overhaul



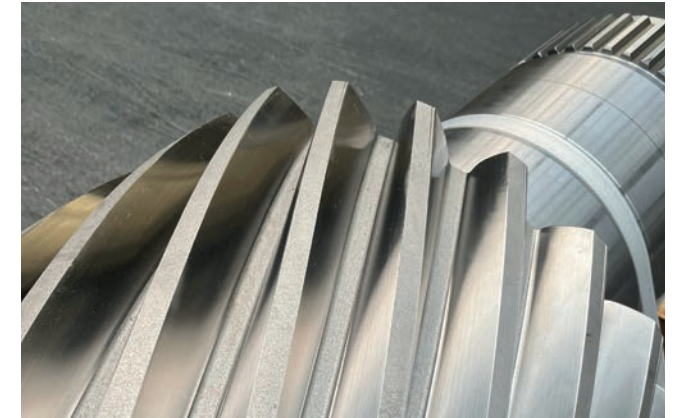
- Independent of manufacturer and type
- Disassembly and damage analysis
- Design
- Parts manufacture
- Overhaul (and modification where required)
- Trial run, paintwork, analysis

Improvement / Optimisation



- Analysis of issues (on-site if needed)
- Power measurement, dimensioning and recalculation
- Selection of alternative technologies and materials (gearing, rolling bearings, lubrication, etc.)
- Implementation through design and manufacturing drawings

Spare Parts Management



- In-house design and inspection
- Drawings in 2D and 3D
- Procurement and manufacture of every drive component
- Cooperation partnerships with leading manufacturers
- Quality control and documentation
- Certified to DIN EN ISO 9001

Redesign / New Build



- Dimensional survey of the existing drive
- Design of the new drive / gearbox
- Power calculation and re-rating
- Procurement and manufacture of every drive component
- Installation including trial run and paintwork
- Installation and commissioning

On-Site Inspection



- Visual inspection (video endoscopy)
- Vibration measurement
- Oil analysis
- Thermal imaging
- Damage assessment and root cause analysis
- Documentation including recommendations for action

On-Site Installation



- Planning and project management
- Replacement and repair of drive components
- Dedicated mobile tooling systems
- Experienced, well-trained in-house specialists
- Certified to SCC** (Safety Certificate Contractors)

Notes





AS Drives & Services GmbH
Industriestraße 30
48734 Reken (Germany)

+49 2864 9008-0
info@as-drives.com
www.as-drives.com