

11. Forum Elektromobilität Schleswig-Holstein

"Baukasten für integrierte 4 Q MPU"

Henning Brodersen, Director Technology, MOTEG GmbH



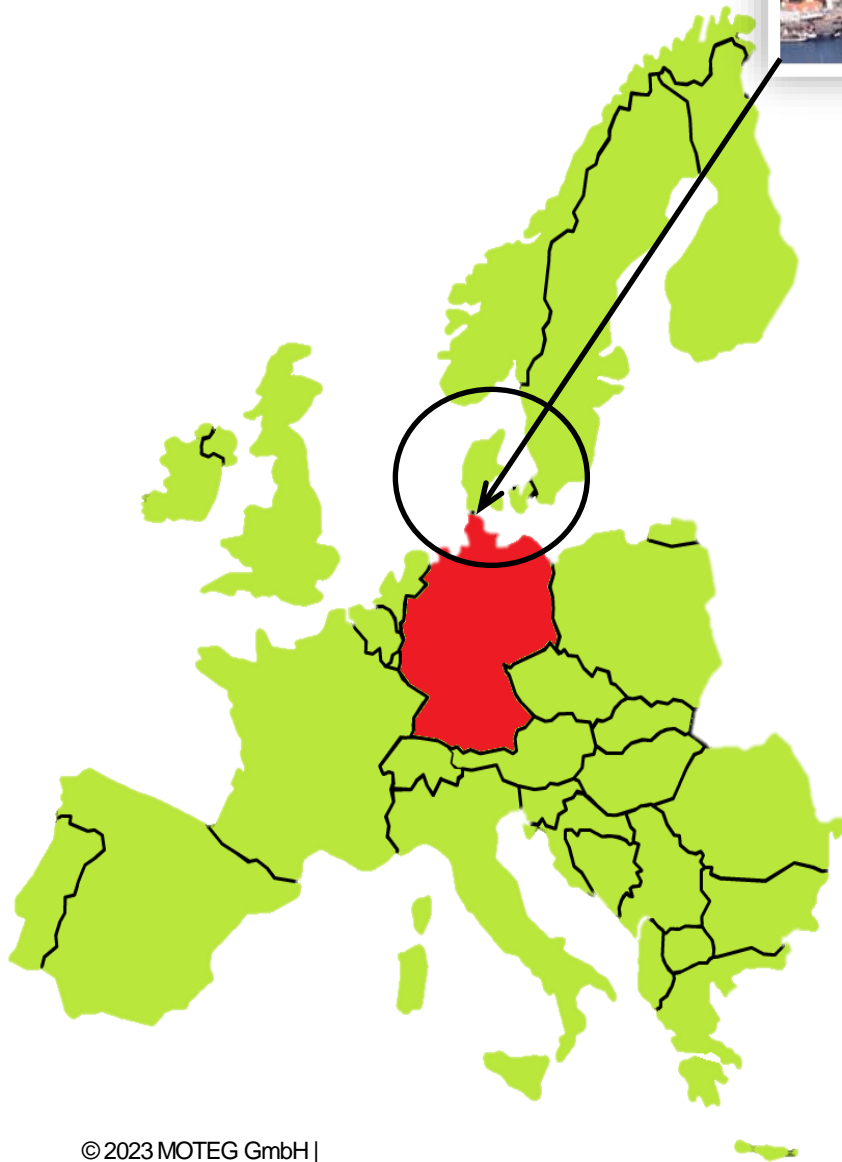
LOCATION



Flensburg, Germany



Handewitt, Germany





MOTEG SHAREHOLDER STRUCTURE

Shareholders combine required skills

- **Dr. Götz:** Accomplished product & process expert
- **HN Holding:** Scaling and mass production expert

Dr. Siegfried Götz

50.00%

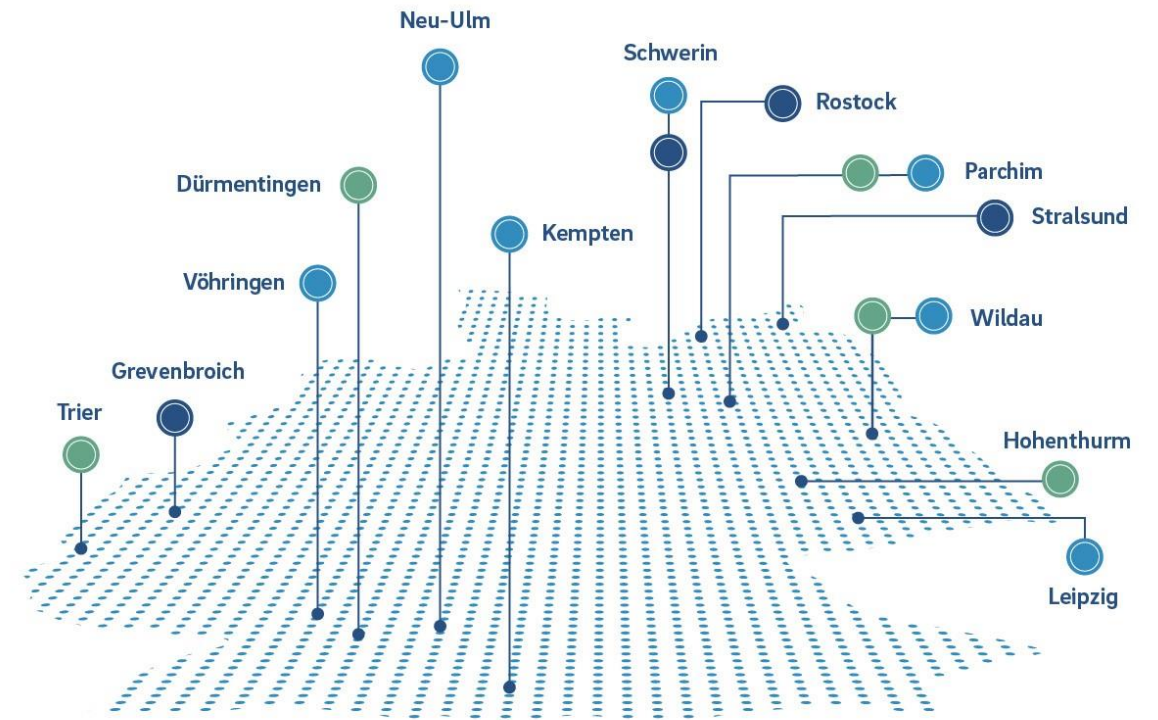
HN Holding

50.00%

MOTEG Shareholding



- A total of approx. 1300 employees
- Planned turnover for 2021 approx. 175 Million €
- Equity HN Holding almost 50 million €, other holding approx. 14 million € Equity
- Working areas are hydraulics, industrial services, mechanical engineering, real estate
- Distributed over the entire federal territory
- Competence in acquisition and integration



AUTOMOTIVE

AVIATION

TECHNOLOGY DRIVER



MOTEG develops and produces electric drives with highest efficiency, lowest weight, smallest dimensions, lowest noise and reasonable costs **for the mobility market.** Main focus are the segments of „On-Highway“ and „Off-Highway“ utility vehicles and Aerospace.



REFERENCE PROJECTS

LEADING ENGINEER KNOWLEDGE

MERCEDES

VINCORION

AIRBUS HELICOPTERS



e-motor development
done for S-class
"Magic Body Control",
SOP in 2018

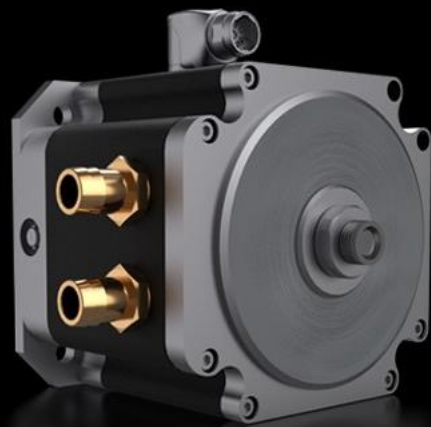
e-motor development
and manufacturing for
rescue hoist for helicopter
SOP 2024 at MOTEG

e-motor for helicopter
pitch-adjustment main
rotor (development
ongoing)



eMOBILITY
SOLUTIONS

With the next generation of intelligent drive systems
MOTEG supplies main systems for the efficient electrification
of commercial vehicles/machines and aviation.



MMA-80
ELECTRIC MOTOR SERIES



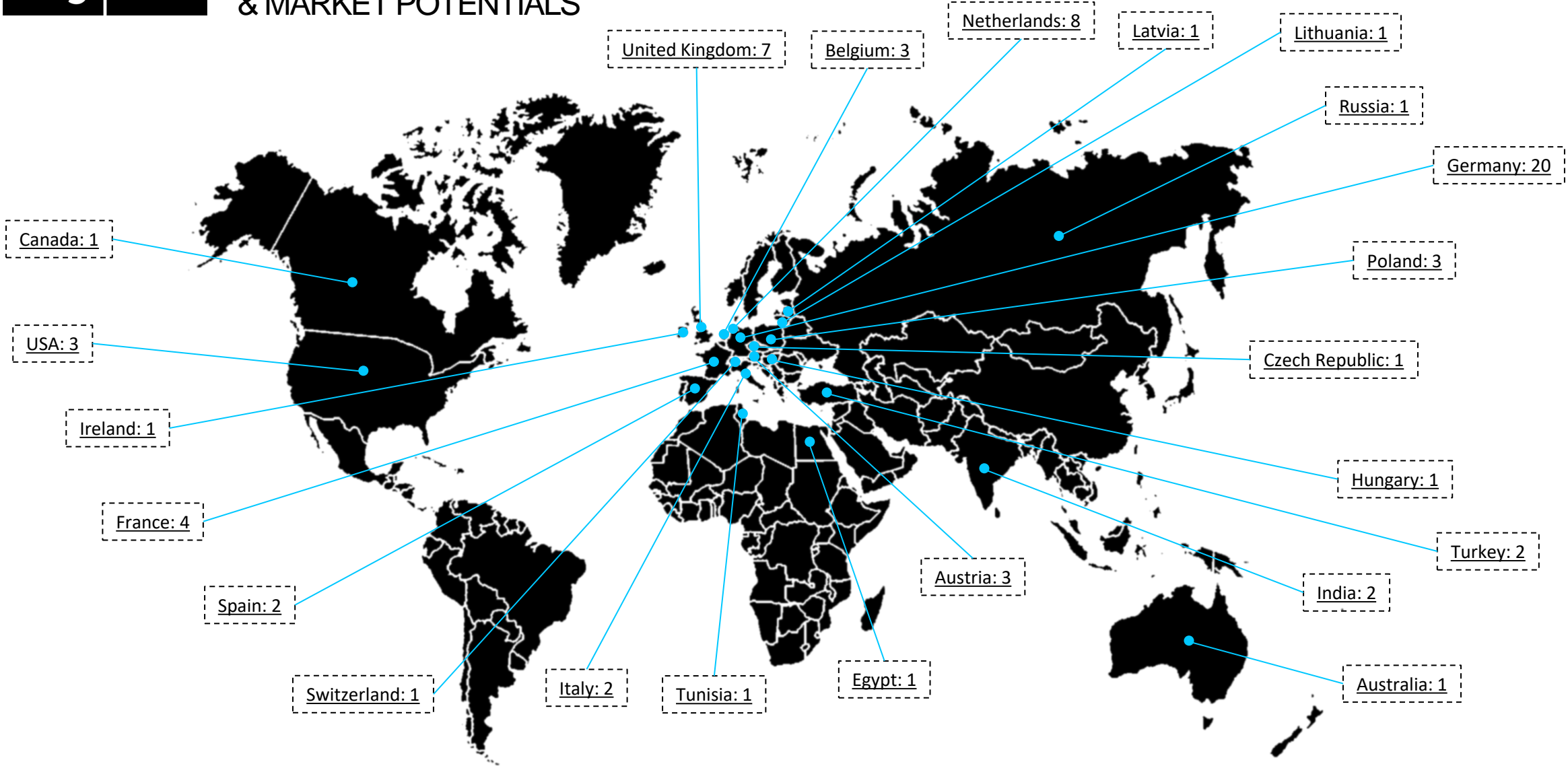
eAIR
COMPRESSOR



eSERVO
STEERING PUMP

CUSTOMER OVERVIEW & MARKET POTENTIALS

Worldwide Customers: 80+
State: Q4 2023



Transitioning an electrohydraulic product from „on-highway“ to „off-highway“

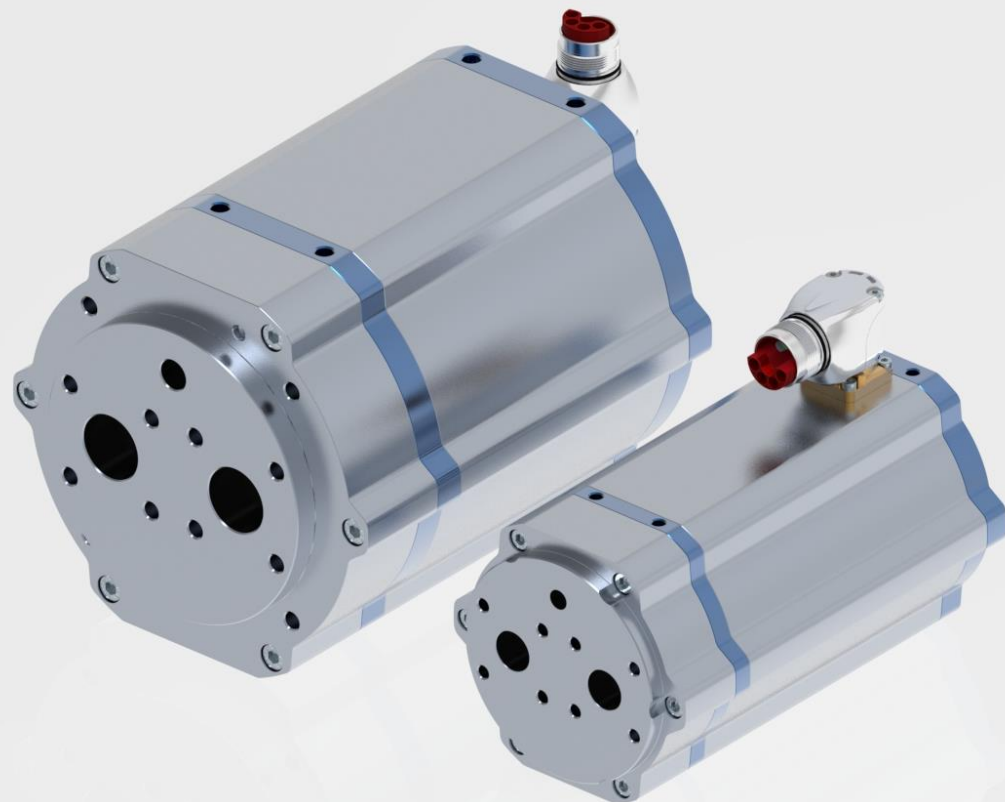
Customer wishes:

- Improved leak tightness
- No water cooling
- Size reduction
- Constant efficiency over lifetime and „drive by wire ready“

Solutions:

- Motor/Pump Integration → No shaft sealing
- Internal cooling through hydraulic oil
- Increase of operational speed
- Switch from external to internal 4Q-gear pump

VX Product Family Target



A fully integrated, modular line of electrohydraulic drive units

Purpose designed for mobile and off-highway applications

Sets a new standard for

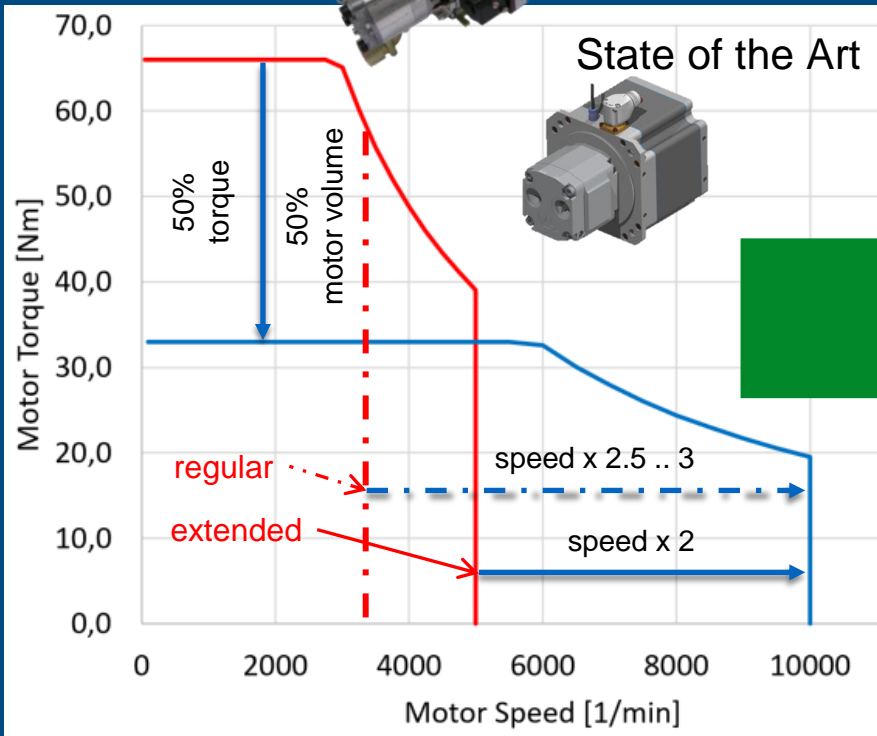
- Efficiency
- Power Density
- Sound
- Robustness



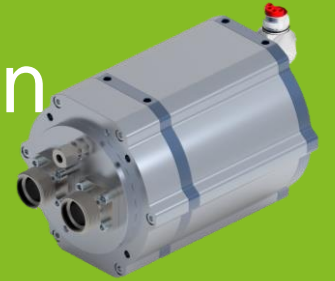
Downsizing for Performance



Conventional



VX Next Generation Product Family



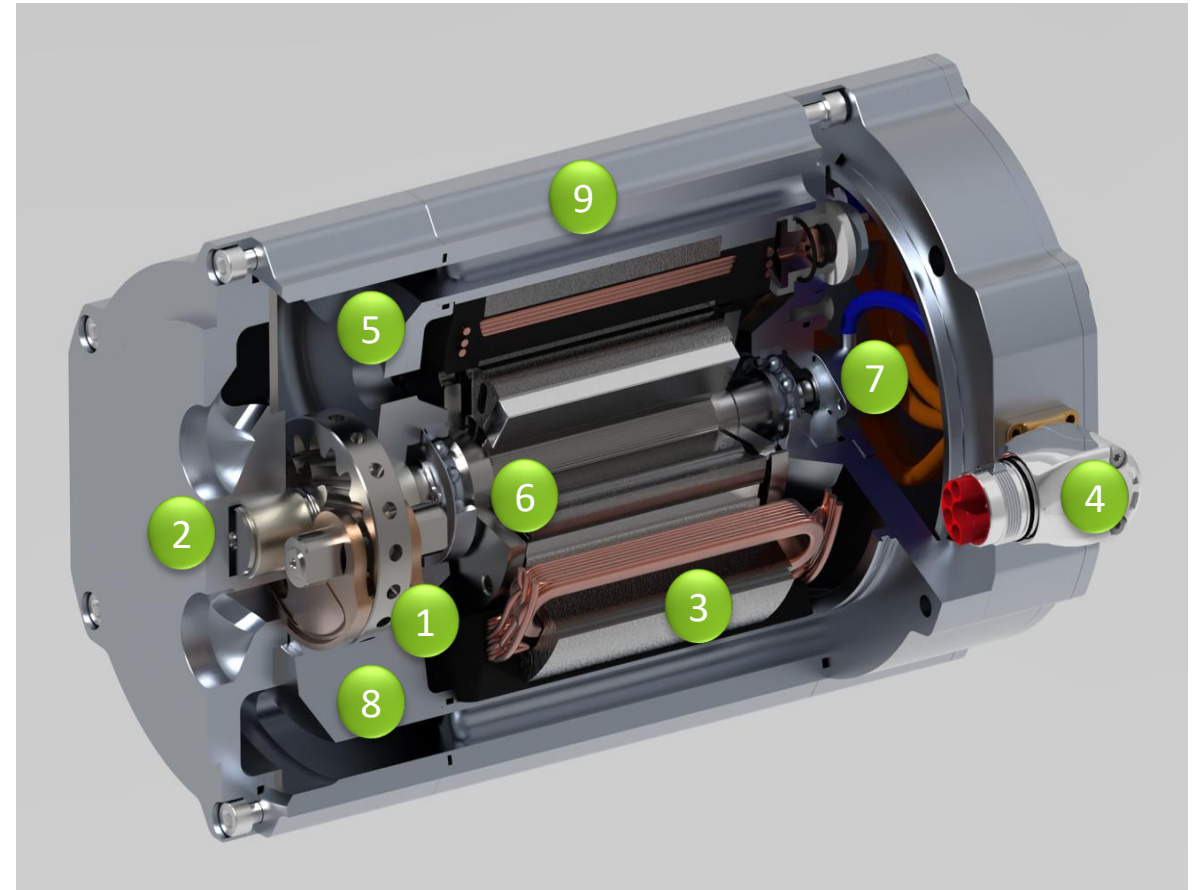
- New, fully compensated internal gear unit
high efficiency, sound optimised, wide speed range
- New, permanently excited synchronous motor
high efficiency, compact size, effective sleeve cooling
- 1, 2 or 4 Quadrant operation
- Enables a broad range of application solutions
including Performance Level d & e (ISO13849)



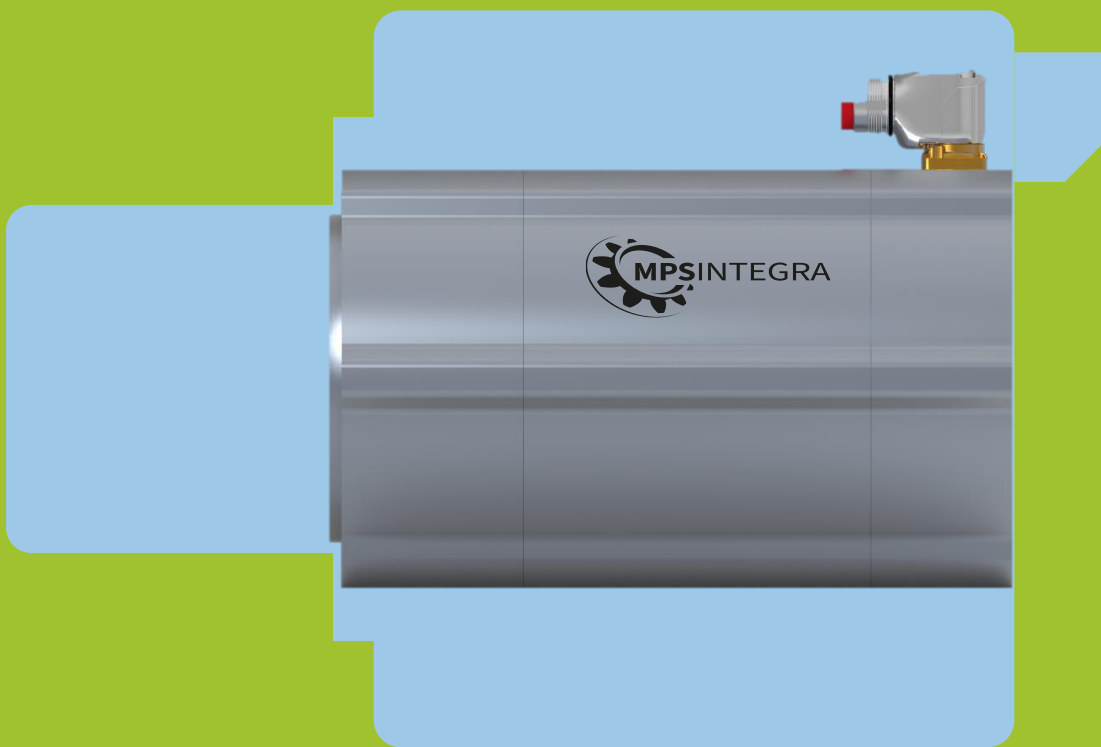
VX - A symbiosis of internal gear unit and permanent magnet motor



- 1) Internal gear pump - fully compensated, bi-directional, high speed, sound optimised
- 2) Optional 1Q/2Q or 4Q porting - end or side ported
- 3) Permanent magnet motor - HV or LV coil
- 4) Connector options: plug or flying leads
- 5) Integrated cooling by work fluid
- 6) Through shaft with no internal sealing
- 7) Speed encoder option
- 8) Space for optional valve and sensor integration
- 9) Modular housing concept

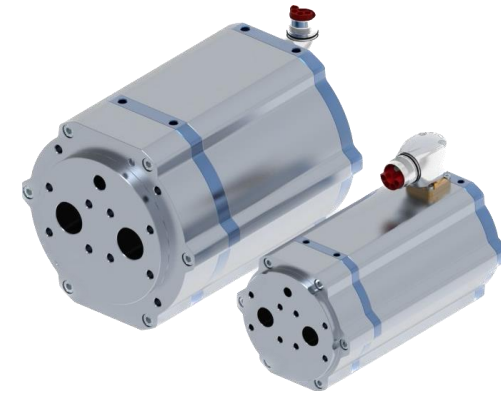


New Generation Sizing for Better Integration



Space claim **MPSINTEGRA VX**
compared to state-of-the-art drive unit

- Small diameter by high speed motor
- Short pump - more flow from less cc
- No connection flange & coupling
- Combined flow path output & cooling



VX Product Family Structure (Preliminary)

Class	supply voltage	nominal power	pump displ.	motor dimension	nominal flow	nominal pressure	mode of operation	Connections	control options	customizing options
A	325+ V (HV)	1 .. 4 kW	4 sizes 1.0 .. 4.0 cc/rev	4 sizes 010 .. 040	10 .. 32 litres/min	280 bar (MP)	1Q/2Q 4Q	flanges connectors ports	valves sensors	i.e. multiple units tank integration cylinder attached control manifold special voltage pressure increase etc.
B	48 .. 96 V (LV)	6 .. 18 kW	4 sizes 5.4 .. 10.9 cc/rev	3 sizes 060 .. 180	38 .. 76 litres/min			flanges connectors ports		
C	325+ V (HV)	20 .. 60 kW	Choice C	Choice C	Choice C	350 bar (HP)	flanges connectors ports			

initial scope

energy efficient – space saving – pleasant sound - durable



Disclaimer

This presentation has been prepared solely for your information and we make no representations to its suitability for your purposes. The recipient is responsible for satisfying itself as to the accuracy and completeness of the information contained herein. We accept no responsibility nor liability for any loss that may arise from any use of this document or in connection with it.

This presentation is provided to you on a strictly confidential basis and may not be copied or distributed in whole or part to any other person. This information does not constitute an offer and is subject to further discussion and documentation.



ELECTRICAL
DRIVE
ENGINEERING

11. Forum Elektromobilität Schleswig-Holstein

"Baukasten für integrierte 4 Q MPU"

29. November 2023

Contact: Henning Brodersen (Director Technology)

MOTEG GmbH

Alter Kirchenweg 87

24983 Handewitt

Mobile: +49 (0) 151 163 697 85

Mail: henning.brodersen@moteg.de

Web: www.moteg.de

