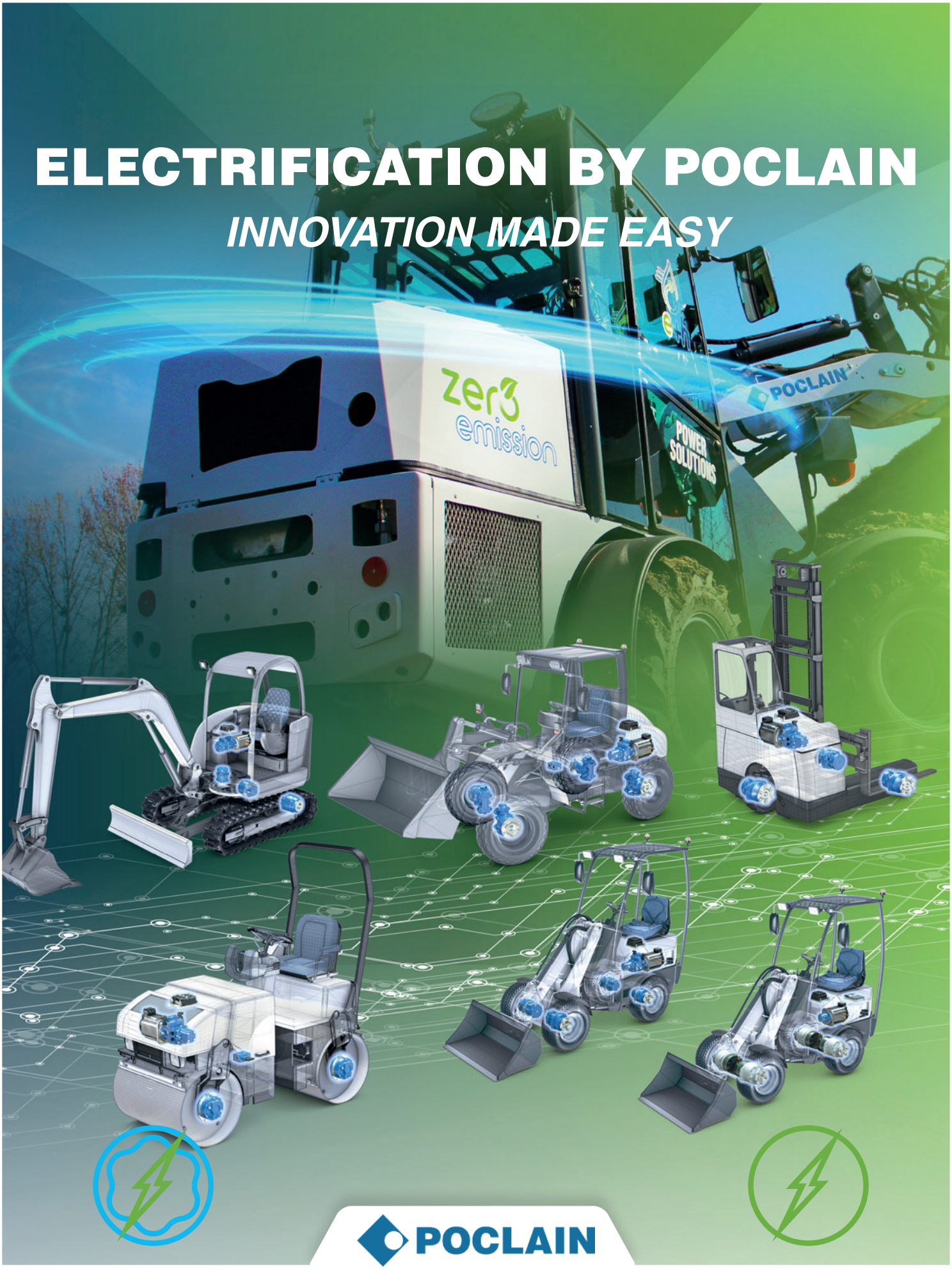
ELECTRIFICATION BY POCLAIN

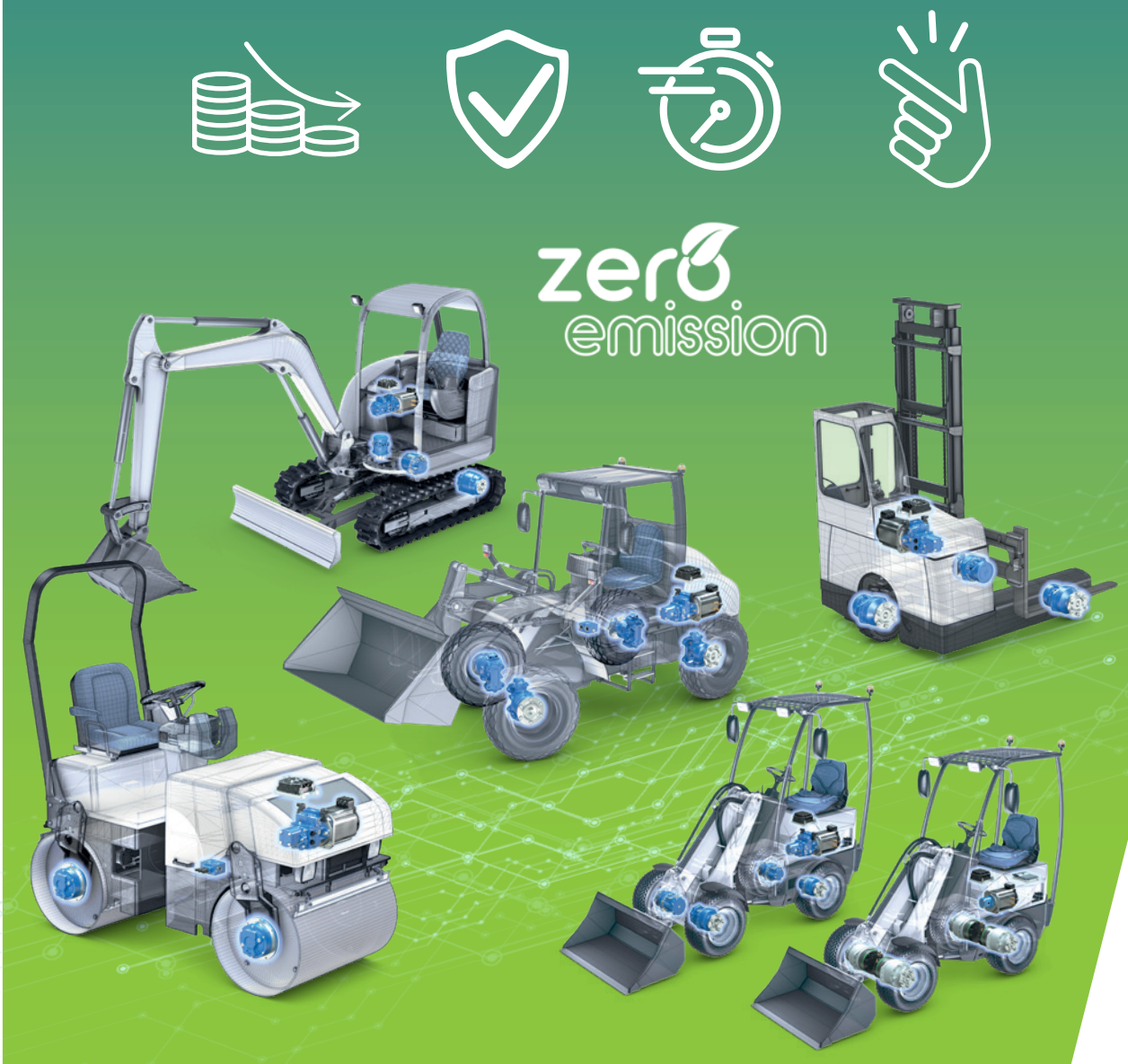
INNOVATION MADE EASY



POCLAIN

ELECTRIFICATION
INNOVATION MADE EASY

Offer electric machines now, combining innovation and simplicity.
Accelerate your time-to-market with solutions that provide the best total cost of ownership, while contributing to a sustainable future.



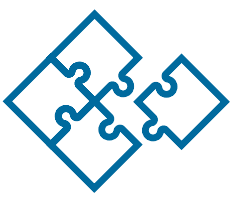
HIGH-PERFORMANCE ELECTRIFICATION SOLUTIONS

Poclain adresses e-mobility applications with an extensive suite of solutions.

OUR SOLUTIONS

- MMA Motors
- emDrive Inverters
- Electro-hydraulic Transmissions
- ePowertrain
- eFlow - Electropump (closed and open loop)
- eWheel
- Hybrid Solutions (Combining ICE and electric drive)
- Engineering support

System platform + Engineering services



OEMs BENEFITS

- Easy integration, easy adoption
- No compromise on performances
- High ruggedness from time-proven experience of off-road application
- Accelerated time to market thanks to our engineering support
- No oversize of battery thanks to high efficiency drivetrain
- One supplier for a complete transmission: We take responsibility for performance, reliability and aftersale

END USER BENEFITS

- Reduced total cost of ownership
- Better productivity
- Zero emission - Access to restricted areas
- Better comfort - Reduced vibration and noise emission
- Low maintenance

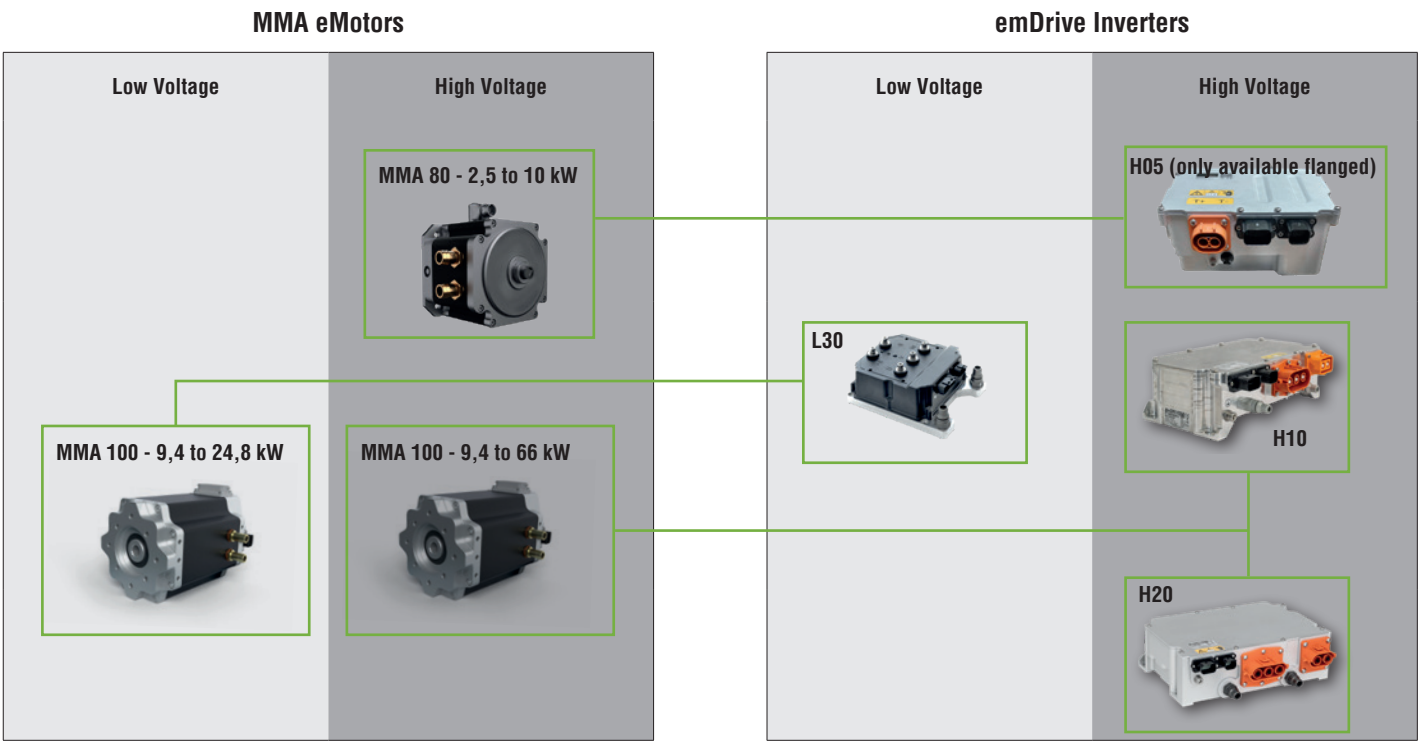
MMA high-power density electric motors

MMA emotor is a high power and torque density PMSM (Permanent Magnet Synchronous Motor) electric motor for propel or work functions electrification. It can be mounted in very small spaces offering best in class efficiency.
This motor is built in Plensburg (Germany) by our sister company, MOTEG, part of the Poclain Group.

- From 5 to 65 kW Continuous, 175 Nm peak – 48V to 850 VDC
- Low and high voltage - liquid cooled
- High power density, efficiency, low noise and vibration
- Efficiency map tailored to auxiliaries or propel type of application
- Customer-specific solutions for flange and shaft
- Perfectly suited to emDrives motor controller

		MMA 80	MMA 100
		400 and 800 V DC	48, 96, 400 and 800 V DC
		Continuous Power kW [HP]	Continuous Power kW [HP]
Standard Speed - RPM	1 500	2,5 - 5,0 [3.35 - 6.71]	9,4 - 16,5 [10.61 - 22.13]
	2 000	3,4 - 6,7 [4.56 - 8.98]	12,5 - 22,0 [16.76 - 29.5]
	2 500	4,3 - 8,3 [5.77 - 11.13]	15,7 - 24,8 [21.05 - 33.26]
	3 000	5,2 -10 [6.97 - 13.41]	18,7 - 33,0 [25.08 - 44.25]
High Speed - RPM	5 000	2,0 -13,3 [2.68 - 17.84]	31,4 - 55,0 [42.11 - 73.76]
	6 000	6,0 -16,0 [8.05 - 21.46]	37,7 - 66,0 [50.56 - 88.51]
Use for propel		•	•
Use for auxiliaries		-	•
Dimensions L x H x W mm [in]		140 to 220 x 150 x157 [5.51 to 8.66 x 5.91 x 6.18]	250 x 325 x 204 x 204 [9.84 to 12.8 x 8.03 x 8.03]

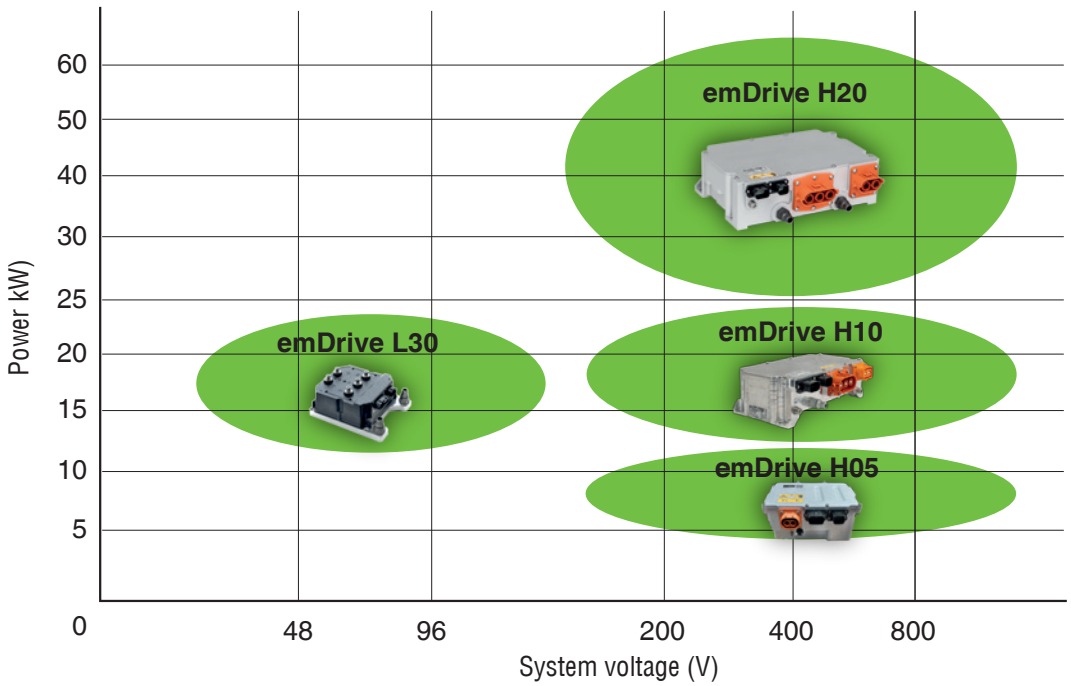
The MMA eMotors are perfectly suited to emDrive motor controllers.



emDrive DC/AC inverter range

The inverters are produced by our sister company, EMSISO, based in Maribor (Slovenia), pat of the Poclain Group.
Low & high voltage, safe and efficient inverters for mobile applications.
emDrives are perfect for various applications, whether you're working on diesel-electric, hybrid, or fully electric powertrains.
These versatile inverters improve integration, performance and efficiency without compromise on safety.

- From 5 to 80kW Continuous – 48 to 850 VDC
- Compact Design: Offers high continuous current within a compact form factor (highpower density)
- Functional Safety (FuSa): ISO 13849, ISO 25119, ISO 19014
- Efficiency Improvements: optimized control algorithms to enhance vehicle autonomy.




EmDrive L30


emDrive H05


emDrive H10


emDrive H20

Motor type		Induction, Permanent Magnet (PMSM, IPM), Sychronous reluctance					
Nominal DC voltage option	V	48	96	H05 not available as stand alone yet. Part of eFlow electropump	200...420	200...800	200...420	200...800
Rated current S2 - 1 min	Arms	650	450		150	75	400*	210*
Rated current continuous S2 - 60 min* **	Arms	450	300		100	60	210*	170*
Dimensions liquid cooled	mm [in]	105 x 65 x 201 [4.13 x 2.56 x 7.91]			96 x 271 x 183 [3.78 x 10.67 x 7.20]		102 x 316 x 253 [4.02 x 12.44 x 9.96]	
Cooling option		Air or liquid					Liquid	

* Depends on modulation type and switching frequency
** Preliminary
*** Liquid cooled version

eFlow - Electropump

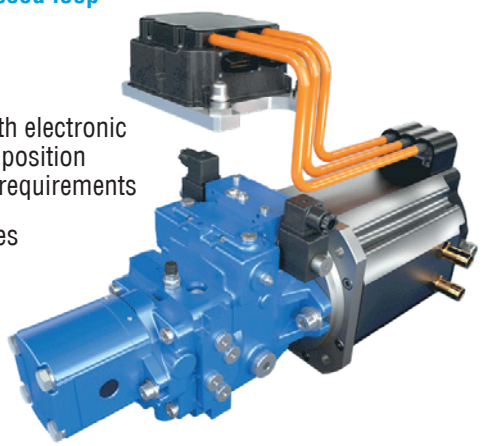
Power up your efficiency with Poclain's eFlow: the smart choice for your electrohydraulic solution.
Enhance your work functions and electrohydraulic systems with our perfectly synchronized inverters, eMotors, and low-noise closed and/or open loop pumps.

Closed loop pumps can be used for propel and open loop pumps are suited for auxiliairies functions.

eFlow for closed loop: up to 105 l/min, 420 bar - 48 to 850 V
eFlow for open loop: up to 100 l/min, 250 bar - 48 to 850 V

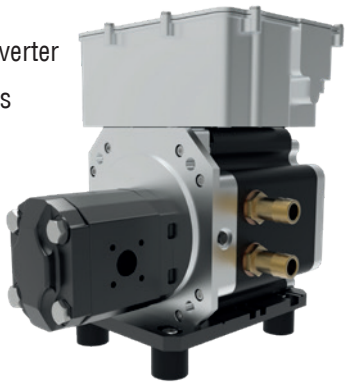
Example of eFlow for closed loop

- MMA 100 eMotor
- L30 emDrive inverter
- PM pump for propel with electronic control and swashplate position sensor to match safety requirements
- Gear pump for auxiliaries



Example of eFlow for open loop

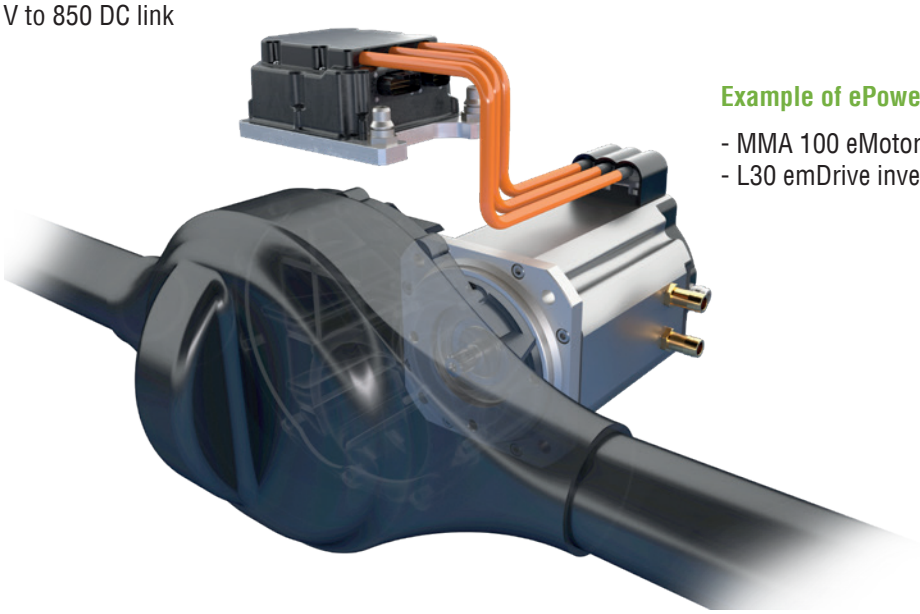
- MMA 80 eMotor
- Flanged H05 emDrive inverter
- Gear pump for auxiliaries
- Silent pump design



ePowertrain

Electrify your axles with the best-in-class power and torque density solution.
Unlock the potential of your axle with ePowertrain's perfectly paired inverters and eMotors. Trust in Poclain's high-value solutions for unmatched performance and dependable support.

Up to 80 kW, 130 Nm peak - 48 V to 850 DC link



Example of ePowertrain

- MMA 100 eMotor
- L30 emDrive inverter

ELECTRO-HYDRAULIC (e+h) TRANSMISSION

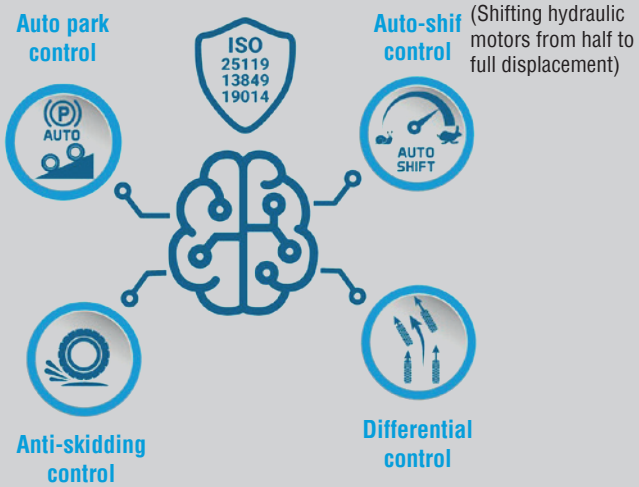
It is a versatile low voltage system for both machine transmission and power distribution to auxiliaries in one e-motor configuration.

It is comprised of rugged hydraulic motors based on cam-lobe in-wheel technology and state-of-the-art eFlow (electropump) combined with our advanced embedded control software: eDrive Transmission Control.

eDrive Transmission Control

With eDrive transmission control maximize the efficiency and productivity of your electrohydraulic machines.

Leveraging Poclain's expertise in transmission management and off-highway applications, eDrive Transmission Control optimizes numerous functions of your electro-hydraulic machines. Tailored to your specific needs, the software is embedded in the emDrive inverter.

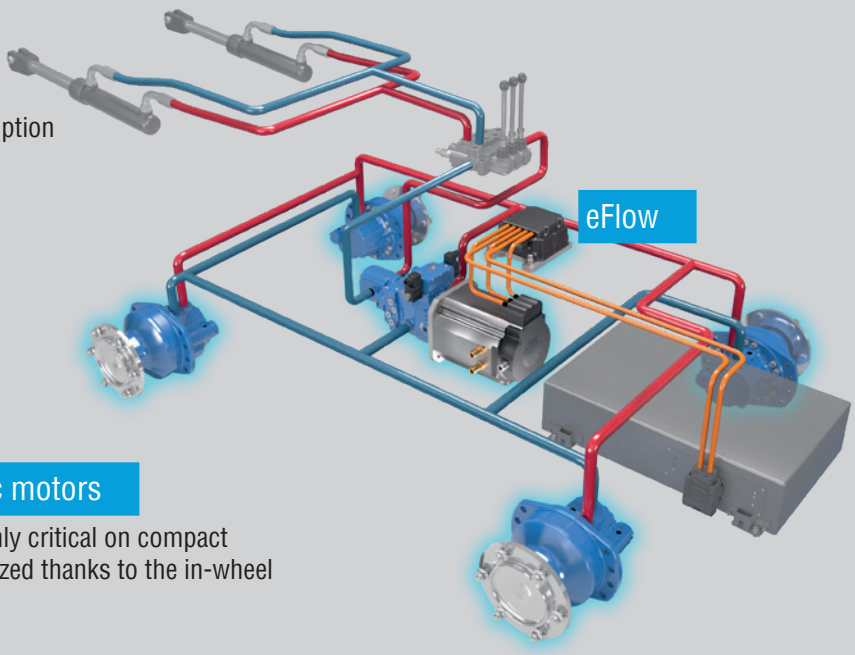


Valuable functions enabled by eDrive:

- Electronic differential
- Speed and torque regulation
- Anti-skid control
- Park brake management hill start)
- Autoshift to optimize energy consumption of hydrostatic transmission

Safety compliance to:

- ISO 25119
- ISO 19014



MS, MG or MK hydraulic motors

The machine integration, highly critical on compact equipment, is strongly optimized thanks to the in-wheel ultra-compact configuration

- Displacement range: 172-750 cm³/rev. [10.5-45.7 cu.in/rev]
- Max. pressure: 450 bar [6,526 PSI]
- Max. torque: 4 770 N.m [3,518lbf.ft]
- Max. power: 29 kW [39 HP]
- Max. speed: 590 rpm
- With or without brake

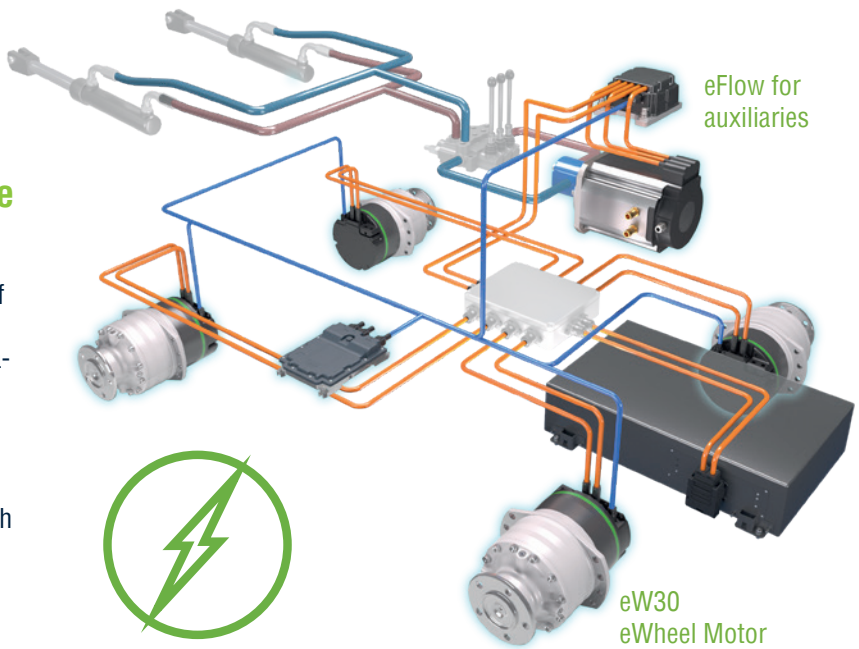
eWheel

Optimize your machine propulsion with the all-in-one eWheel electric drive solution

At Poclain, we believe that a complete transmission solution is a significant advantage for the future of zero-emission off-road machinery. This has driven us to launch an all-in-one electric drive solution that not only enhances the performance of your machine's off-road operations but also streamlines its development, empowering your transition to e-vehicles and fostering your ability to innovate.

This solution simplifies electrification through fully integrated components, offering the flexibility of low and high-voltage configurations to suit diverse needs. It offer the same mechanical interface as with hydrostatic transmission to ensure seamless machine integration. By maximizing drivability and control, our electric drive solution optimizes each wheel's performance and delivers superior off-road capabilities.

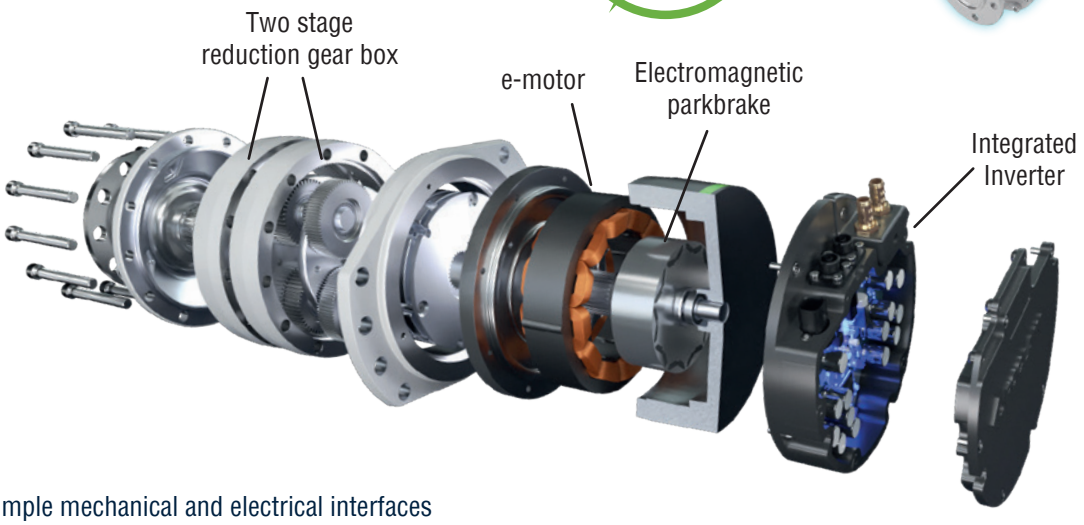
With its ability to enhance in-field performance, reduce the number of components, and improve efficiency, the solution not only supports sustainability but also boosts productivity. Furthermore, it offers exceptional total cost of ownership, providing long-term value to your customers and end-users.



The first Poclain all-in-one full electric drive solution relies on the eW30 eWheel motor.

With a power output of up to 7kW and a torque of 2200 Nm at a 48V DC link, the eWheel is specifically designed for off-highway heavy-duty applications.

The eWheel includes in one envelop an inverter, an e-motor, a cooling circuit, an electromagnetic parkbrake and a two stage reduction gear box with a rotaring shaft.



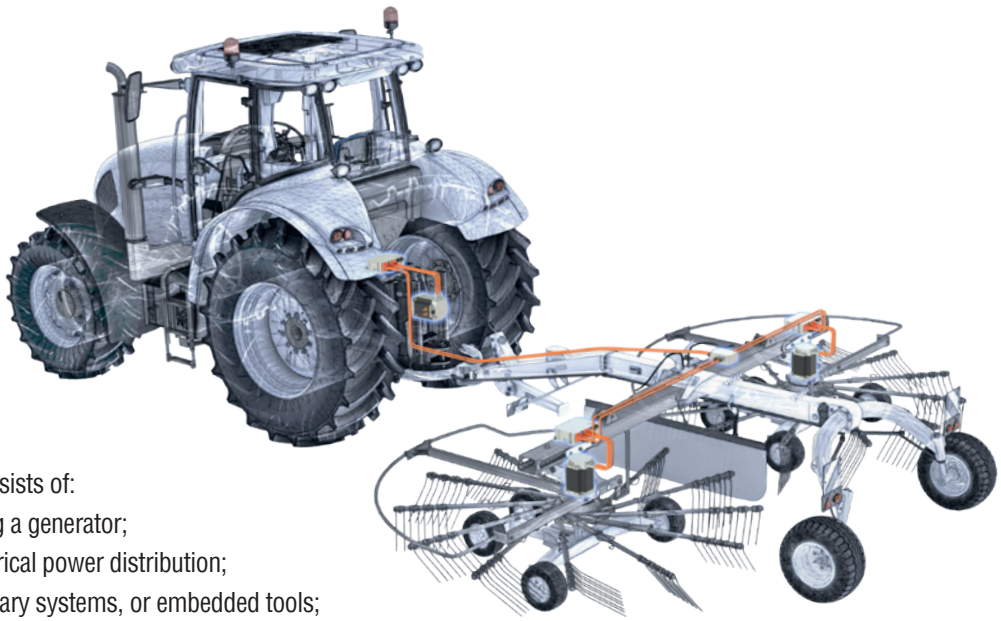
Its simple mechanical and electrical interfaces ensure easy integration, while its robust design guarantees unmatched efficiency and durability in all operating conditions. eWheel will be available in serial production end of 2026.

Step up to hybrid with Poclain

The pressure to reduce emissions and fuel consumption in Non-Road Mobile Machinery (NRMM) is stronger than ever. Stricter regulations, rising fuel costs, and increasing demand for cleaner operations are reshaping the industry. While full electric solutions hold promise, they remain limited by battery size, weight, and autonomy constraints — particularly in heavy-duty applications.

Why hybrid?

NRMM presents unique challenges. Tractors, excavators, harvesters, and other heavy-duty equipment operate for long hours in demanding environments. Providing sufficient energy storage using batteries alone often leads to impractical solutions — oversized, heavy, and expensive machines that compromise usability.
While hydrogen and full battery-electric solutions are advancing, hybrids currently offer the best compromise between performance, cost, and sustainability for heavy-duty applications. By combining the robustness of traditional internal combustion engines (ICEs) with the efficiency of electrified functions, hybrids provide a pragmatic, efficient, and scalable path forward — delivering tangible benefits in sustainability, productivity, and operating costs.



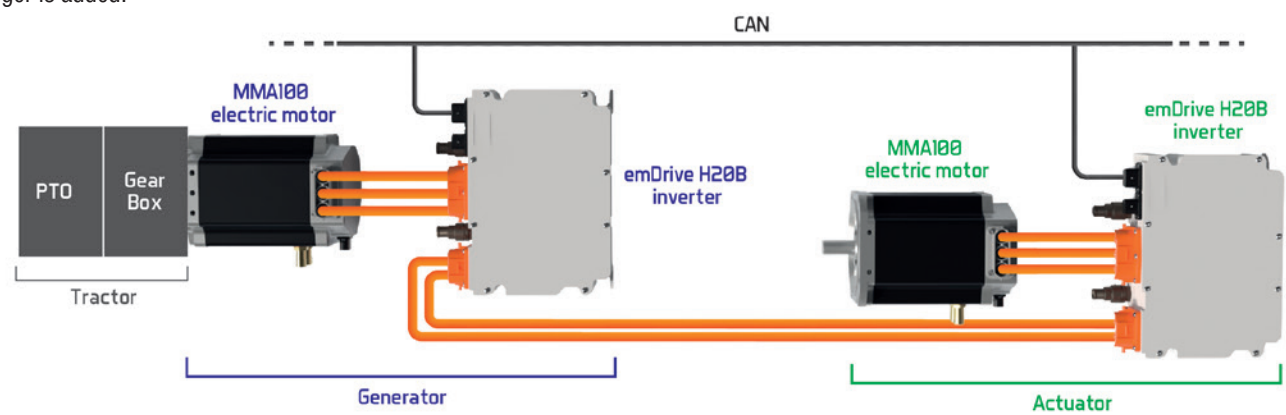
System architecture

A typical hybrid transmission for NRMM consists of:

- An internal combustion engine (ICE) driving a generator;
- A DC bus serving as the backbone for electrical power distribution;
- Electrified functions, such as traction, auxiliary systems, or embedded tools;
- Energy management ensuring optimal allocation of power and smooth shifting between ICE and electric modes.

The decentralized architecture enables each actuator to draw only the power it needs, reducing energy losses compared to centralized hydraulic systems.
It can be enriched with a buffer Li-Ion battery system interfaced between the DC Bus inverter and the electric actuators, thus bringing further optimizations as well as additional working modes:

- Operate the ICE at its most efficient working point (RPM/torque point). At low power workload, it can even be disabled;
- Offer a zero-emission mode for indoor applications, relying purely on battery power. This opens the path to plug-in hybrid design, if an onboard charger is added.



Hybrid solutions bring operators key benefits…

- Fuel and emissions savings: Up to 30% less diesel consumption translates into lower operating costs and reduced carbon footprint;
- Increased productivity: Reduced noise and vibration enable longer daily operation and higher operator comfort;
- Simplified maintenance and reduced costs: ICE Service intervals are extended, electric components are natively self protecting and enable faster diagnosis and servicing thanks to their connectivity.

… and strategic value for OEMs

Hybrid solutions are a strong differentiator and align OEMs with the increasingly strict environmental regulations. Their high adaptability makes them compatible with a range of voltage levels, applications, and machine sizes. They also offer a future-proof transition toward full electrification when battery technologies mature.

Conclusion

Hybrid transmissions represent a powerful transition technology for non-road mobile machinery. They reduce fuel consumption, cut emissions, improve operator experience, and simplify maintenance — all while preserving the reliability and autonomy of diesel-powered machines.

Poclain's hybrid expertise

Poclain has developed a portfolio of solutions tailored for hybrid Non-Road Mobile Machinery up to 870VDC systems. They target the electrification of tractor-mounted implements and, auxiliary systems in forestry and mining equipment, as well as the hybridization of low-power drivetrains in compact construction machines.

Key advantages include:

- High efficiency architecture thanks to unique control software (excellent DC link stability and eMotor control);
- Simplified mechanical and electrical integration, even in tight spaces, thanks to highly compact inverters, e-motors and generators with adaptable interfaces;
- Simplified system integration. Communication is CAN-based (J1939, CANopen) and uses the UDS protocol for diagnostics, flashing, and preventive maintenance. It complies with off- road machinery functional safety standards such as ISO 25119, and can host customer application software in its inverters;
- Rugged components and connectors designed to meet the harsh conditions of off-road applications. The sensorless control option is also available for greater resistance to shocks and vibrations.

Engineering Support

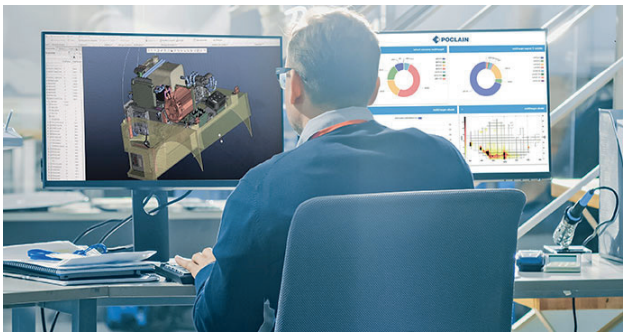
Choose and implement perfectly calibrated electric transmission solutions

With our extensive experience in your applications and electric transmissions, as well as our expertise in system engineering, we help you integrate the best solutions seamlessly and accelerate your time to market. Trust our dedicated team of engineers to turn your challenges into opportunities.

Service can be tuned from support to the delivery of a validated transmission

Typical tasks- Tuning of eDrive to the application

- Duty cycle measurements / load analysis
- Electric/Hydraulic sketch review
- System integration support: Interface Vehicle ECU (VECU) to Transmission ECU (TECU) communication validation
- Machine on-site commissioning



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