

# OMNI

POWERTRAIN TECHNOLOGIES

## COMPANY PROFILE



# OMNI

**POWERTRAIN TECHNOLOGIES**



THE SPLINE 'B'

A02  
5 X M10X1.5  
TAP  $\nabla$  23  
DRILL  $\nabla$  28  
MARKED TYPE 'A'

4 X M10X1.5  $\nabla$  16mm

4 X M12X1.75  $\nabla$  24mm

78.52  
59.39  
55.48  
26.84  
20.28  
0  
65.89  
97.48  
78.52  
107.17  
114.72

50.38

50.33

# OVERVIEW



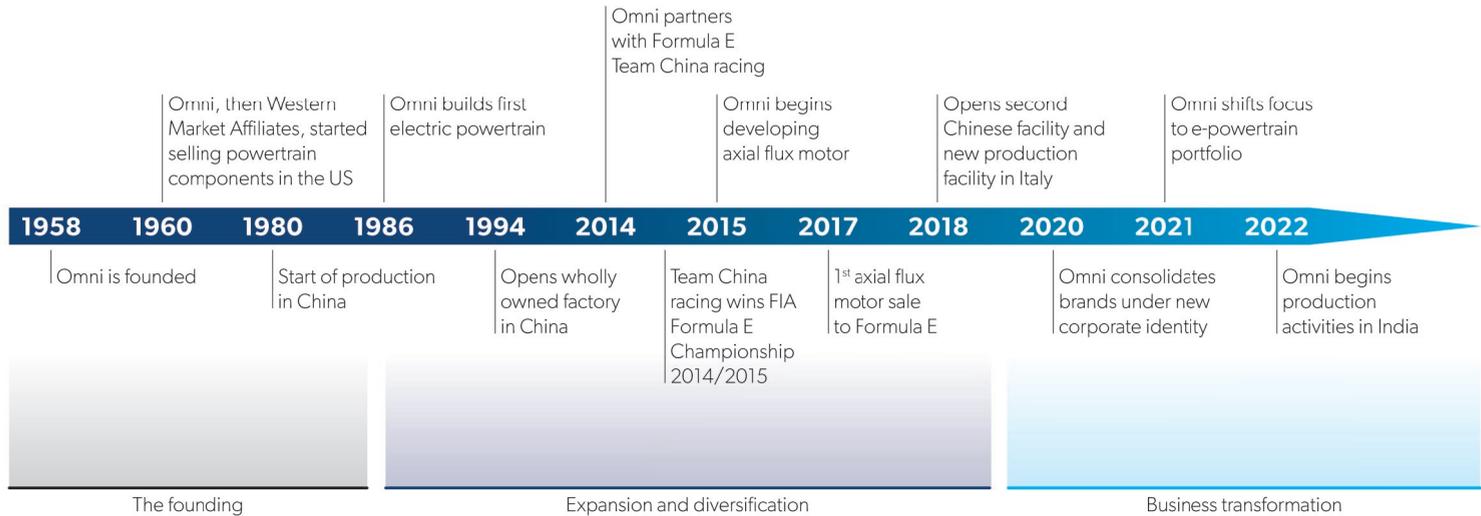
- Omni Powertrain is a 60-year-old privately owned firm providing hydrostatic, mechanical and electrically driven powertrain solutions.
- Originally founded as a trading company for agricultural implements, Omni Powertrain has evolved into an established driveline manufacturer with global operations.
- Headquartered in Houston, Texas, its products are sold under five brands to leading OEMs who manufacture equipment for both on and off highway applications.



# HISTORY



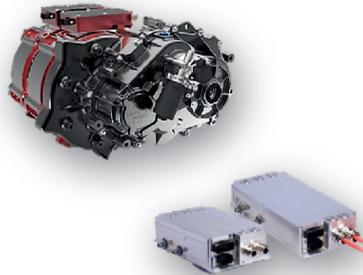
- Evolved from trading company to established traditional and electric powertrain manufacturer.
- 100% privately held by Jeff & Craig Daniel.



## GROUP PRODUCTS



Off-highway planetary  
and parallel shaft gearboxes



Electric motors, e-drive transmissions  
and power electronics



The new flexible brand of Omni  
Powertrain Technologies Group for  
mobile and industrial applications

# GROUP MANUFACTURING



MAGELEC Propulsion Shanghai  
15.000 m<sup>2</sup> Production facility



- Axial Flux Motor Production
  - Stator: Vertical
  - Rotor: Vertical
  - Assembly: Semi Automated w/ EOL
- Inverter Assembly: Manual w/ EOL
- Powertrain Assembly, Semi Automated w/ EOL

Omni Gear Shanghai  
13.000 m<sup>2</sup> Production facility



- Planetary, Parallel, Cycloidal Gearbox Production and Assembly
  - CNC Turning, Milling and Shaping
  - NC Vertical Broaching
  - Powertrain Assembly w/ EOL

Omni Gear Reggio Emilia  
15.000 m<sup>2</sup> Production facility



- Planetary, Right Angle, Parallel Gearbox Production and Assembly
- Powertrain Assembly w/ EOL Testing

Omni Powertrain Tech. Houston  
7.000 m<sup>2</sup> Production facility



- Powertrain Assembly w/ EOL Testing

## LEADING EDGE ELECTRIC PROPULSION TECHNOLOGY

- Axial flux motor technology
- IGBT & silicon carbide MOSFET motor power switches
- Industry leading flexible transmission architectures
- Fully integrated electric powertrain solutions

## AXIAL FLUX MOTORS

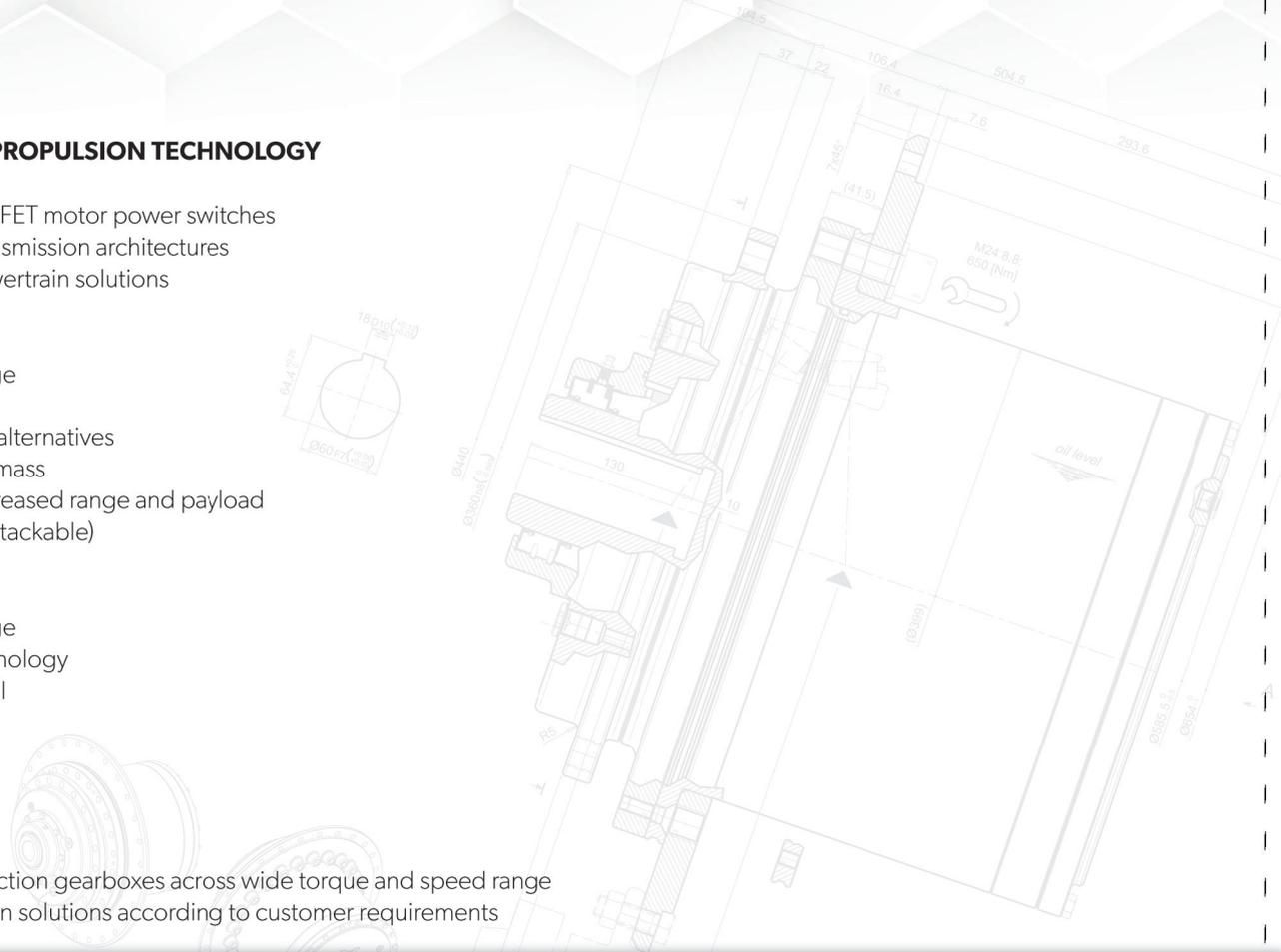
- Low voltage and high voltage
- High power density
- Specific torque in excess of alternatives
- Reduced package size and mass
- Improved performance, increased range and payload
- Flexible pancake package (stackable)

## SiC MOSFET MCU'S

- Low voltage and high voltage
- Latest motor controller technology
- Extremely light and powerful
- Efficiency up to 99%
- Functional Safety Capable
- IP67 compliant

## TRANSMISSION

- Single and multispeed reduction gearboxes across wide torque and speed range
- Planetary and other gear train solutions according to customer requirements

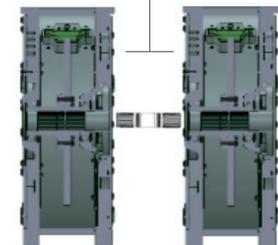
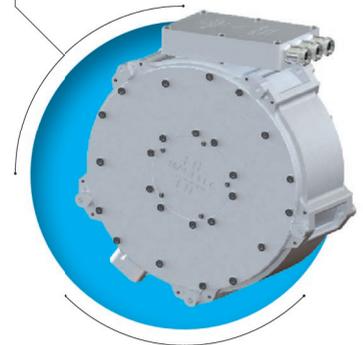


# 400V AND 800V AXIAL FLUX MOTOR



	M19P4-S-19	M21P4-S-19	M24P4-S-19	M27P4-S-19	M34P4-S-19
<b>Battery Voltage [Vdc]</b>	200 - 800	200 - 800	200 - 800	200 - 800	200 - 800
<b>Peak Current [Arms]</b>	408	437	554	641	639
<b>Continuous Torque [Nm]</b>	46	85	152	215	445
<b>Peak Torque (20s) [Nm]</b>	131	206	352	580	1,114
<b>Continuous Power (600V) [kW]</b>	44	65	94	96	81
<b>Peak Power (600V, 20s) [kW]</b>	145	150	201	218	228
<b>Peak Torque/kg[Nm/kg]</b>	6,72	8,96	10,83	13,33	16,03
<b>Peak Power/kg@600V [kw/kg]</b>	7,44	6,52	6,18	5,01	3,27
<b>Rated Speed (600V) [rpm]</b>	10.600	7.000	5.500	3.600	2.000
<b>Max Speed (600V) [rpm]</b>	15.000	12.000	9.000	7.350	4.650
<b>Peak Efficiency [%]</b>	≥ 95				
<b>Environmental Protection Class</b>	IP67				
<b>Main Outer Diameter [mm]</b>	268	288	323	348	433
<b>Length [mm]</b>	119	119	129	143	155
<b>Weight (dry) [kg]</b>	19,5	23	32,5	43,5	69,5
<b>Technology</b>	Axial Flux PMSM				
<b>Coolant</b>	Water & Glycol				
<b>Connecting Box</b>	Flexible				

- Single motors can be easily assembled in series
- Multiple motor performance 2x, 3x, etc



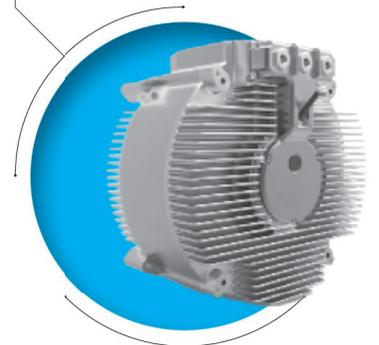
Stated performance is for 'MGU-only', Values may change when MGU is paired with MCU.

# 24V TO 160V AXIAL FLUX MOTORS



	M13C9-S-21	M15C6-S-21	M17C3-S-21
<b>Battery Voltage [Vdc]</b>	24~160	24~160	24~160
<b>Peak Current [Arms]</b>	237	384	638
<b>Continuous Torque [Nm]</b>	14,5	21,7	30
<b>Peak Torque (20s) [Nm]</b>	44	58	80
<b>Continuous Power (48V) [kW]</b>	3,7	5,2	10,5
<b>Peak Power (48V, 20s) [kW]</b>	5,8	10,4	20,2
<b>Rated Speed (48V) [rpm]</b>	1.300	1.500	2.000
<b>Max Speed (48V) [rpm]</b>	4.500	4.500	6.000
<b>Peak Efficiency [%]</b>		≥ 94	
<b>Environmental Protection Class</b>		IP67	
<b>Main Outer Diameter [mm]</b>	194	214	239
<b>Length [mm]</b>	120	130	143
<b>Weight (dry) [kg]</b>	9	12	14,5
<b>Technology</b>		Axial Flux PMSM	
<b>Coolant</b>		Air Cooling	

- Compact design / Low weight
- High power / Torque factor
- Top efficiency
- Suitable for 24V, 48V, 72V, 96V battery voltage
- IP67
- Temperature sensor 2xPT100 – other type on demand
- Resolver or sin / cos encoder - other type on demand



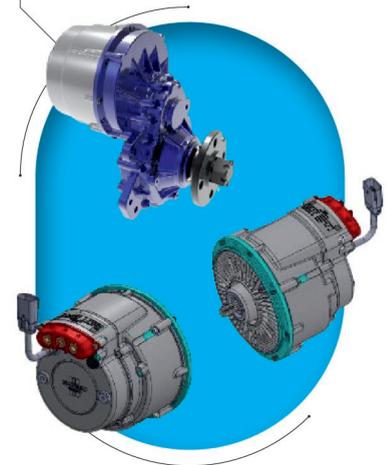
Stated performance is for 'MGU-only', Values may change when MGU is paired with MCU.

# 24V TO 160V AXIAL FLUX CARTRIDGE MOTORS



	M13C9-C-21	M15C6-S-21	M17C3-S-21
<b>Battery Voltage [Vdc]</b>	24~160	24~160	24~160
<b>Peak Current [Arms]</b>	237	384	638
<b>Continuous Torque [Nm]</b>	11	17	19
<b>Peak Torque (20s) [Nm]</b>	44	58	80
<b>Continuous Power (48V) [kW]</b>	2,5	3,8	5,5
<b>Peak Power (48V, 20s) [kW]</b>	5,8	10,4	20,2
<b>Rated Speed (48V) [rpm]</b>	1.300	1.500	2.000
<b>Max Speed (48V) [rpm]</b>	4.500	4.500	6.000
<b>Peak Efficiency [%]</b>		≥ 94	
<b>Environmental Protection Class</b>		IP67	
<b>Main Outer Diameter [mm]</b>	204	232	263
<b>Length [mm]</b>	152	161	167
<b>Weight (dry) [kg]</b>	10,4	14,6	18
<b>Technology</b>		Axial Flux PMSM	
<b>Coolant</b>		Air Cooling	

- Light weight and compact design
- Integrated electric emergency & parking brake
- Easy to assembly with Omni Gear planetary or other parallel shaft gearbox
- Suitable for 24V, 48V, 72V, 96V Battery voltage
- Resolver or sin / cos encoder - other type on demand



# 48V AND 96V MOTOR CONTROL UNITS



	N21M2	N38M2	N64M2	N10M3	N19M3	N32M3
<b>Motor Type</b>	3 or 6 phases Axial or Radial Flux PMSM					
<b>Nominal Battery Voltage [VDC]</b>	48			96		
<b>Operating Voltage Range [VDC]</b>	10...70			10...139		
<b>Non-Operational Overvoltage Limit [VDC]</b>	79			148		
<b>Peak Current (20s) [Arms]</b>	210	390	640	110	200	320
<b>Cont. Current (60min) [Arms]</b>	105	195	320	55	100	160
<b>Switching Frequency [KHZ]</b>	4 ~16					
<b>Peak Efficiency [%]</b>	≥ 98					
<b>Environmental Protection Class</b>	IP67					
<b>Dimensions (LxWxH) [mm]</b>	165 x 165 x 74			/		
<b>Volume [L]</b>	1,60			/		
<b>Weight (kg)</b>	2,0			/		
<b>CAN</b>	CANopen, SAE J1939, CAN 2.0 customized protocol					
<b>Usable Temperature Sensors</b>	Up to 2 PT100, PT1000, NTC 10k and similar					
<b>LV Connector Solution</b>	JAE MX23A series, 12pin and 26pin					
<b>LED Lights On-Board</b>	Single LED In Three Colour					
<b>Technology</b>	MOSFET					
<b>Coolant</b>	Air Cooled / Water Cooled optional					



# 400V TO 800V MOTOR CONTROL UNIT



	N40S6
<b>Motor Type</b>	3 phases Axial or Radial Flux PMSM
<b>Nominal Battery Voltage [VDC]</b>	750
<b>Operating Voltage Range [VDC]</b>	100...900
<b>Non-Operational Overvoltage Limit [VDC]</b>	1000
<b>Peak Current (60s) [Arms]</b>	400
<b>Cont. Current (60min) [Arms]</b>	250
<b>Switching Frequency [KHZ]</b>	15...35
<b>Peak Efficiency [%]</b>	> 99
<b>Environmental Protection Class</b>	IP67, IP6K9K (ISO 20653)
<b>Dimensions (LxWxH) [mm]</b>	262 x 208 x 90
<b>Volume [L]</b>	4.2
<b>Weight (kg)</b>	5
<b>CAN</b>	CAN 2.0A/B, CAN FD
<b>Usable Position Sensors</b>	Resolver
<b>HV Connector Solution</b>	DC: Amphenol Powerlok 200 Series (+/-) AC: Amphenol Powerlok 120 Series (U,V,W)
<b>LV Connector Solution</b>	Deutsch AS Series Connector AS010-35 and AS012-35
<b>Technology</b>	SiC MOSFET
<b>Coolant</b>	Water-Glycol

### Features:

- Latest AC Motor Controller technology
- Extremely light and powerful
- SiC MOSFET high-tech design
- Super High efficiency (up to 99%)

### Safety functions:

- Functional safety (ISO26262) up to ASIL D prepared
- Interlock system support for all electric connectors
- Current/Voltage and temperature monitoring
- Automatic DC-Link discharge - function
- 2 LS indicator outputs



# P4 AND BEV GEARBOXES



	F03L1-x-21	F03T1-x-22	F06L1-x-21	F06T1-x-22
<b>Max Input Torque [Nm]</b>	300	300	600	600
<b>Max Input Speed [rpm]</b>	15.000	15.000	12.000	12.000
<b>Center Distance [mm]</b>	120	265	120	265
<b>Reduction Ratio Range</b>	1,35 - 4,43	5,20 - 13,35	1,1 - 3,5	5,9 - 13,32
<b>Weight (dry) [kg]</b>	17,5	39,5	19,5	49,5
<b>Peak Efficiency [%]</b>	≥ 98	≥ 97	≥ 98	≥ 97
<b>Application</b>	Longitudinal	Transversal	Longitudinal	Transversal
<b>Fit with MAGELEC MGUs</b>	M19Px, M21Px	M19Px, M21Px	M21Px, M24Px, M27Px	M21Px, M24Px, M27Px
<b>Differential Type</b>	NA	Open	NA	Open
<b>Max Output Torque [Nm]</b>	1.330	4.000	2.100	7.500
<b>Gear Type</b>	Helical			
<b>Lubrication Type</b>	Splash			
<b>Park Lock (Option)</b>	No	Yes	No	Yes
<b>Output Flange (Option)</b>	Yes	Yes	Yes	Yes

- High speed/low drag design
- Optimized for high drive cycle efficiency and lowest system NVH
- Innovative passive lubrication system with channel flow for lowest efficiency losses
- Ootional Park-lock System with integrated Actuator/ECU



# P4 AND BEV GEARBOXES



	F12L1-x-22	F12L-2S-x-21
<b>Max Input Torque [Nm]</b>	1.200	1.200
<b>Max Input Speed [rpm]</b>	7.500	12.000
<b>Center Distance [mm]</b>	165	265
<b>Reduction Ratio Range</b>	1,0 - 3,94	2,98 - 6,03
<b>Weight (dry) [kg]</b>	23,5	49,5
<b>Peak Efficiency [%]</b>	≥ 98	≥ 97
<b>Application</b>	Longitudinal	Transversal
<b>Fit with MAGELEC MGUs</b>	M24Px, M27Px, M34Px	M21Px, M24Px, M27Px
<b>Differential Type</b>	NA	NA
<b>Max Output Torque [Nm]</b>	4.770	7.200
<b>Gear Type</b>		Helical
<b>Lubrication Type</b>		Splash
<b>Park Lock (Option)</b>	No	No
<b>Output Flange (Option)</b>	Yes	Yes

- High speed/low drag design
- Optimized for high drive cycle efficiency and lowest system NVH
- Innovative passive lubrication system with channel flow for lowest efficiency losses

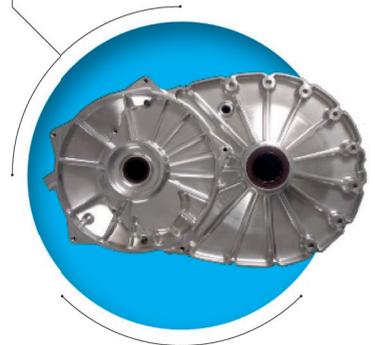


# P4 AND BEV HIGH PERFORMANCE GEARBOXES



	F06V1-Z-19-SX	F06V1-Z-20-XX	F05T1-Z-19-RA
<b>Max Input Torque [Nm]</b>	600x2	600x2	500x2
<b>Max Input Speed [rpm]</b>	12.500	12.500	12.500
<b>Center Distance [mm]</b>	215	215	247,4
<b>Reduction Ratio Range</b>	5,67 - 6,00	5 - 5,33 - 5,68 - 6	6 - 7,5
<b>Weight (dry) [kg]</b>	22,5	37,6	25
<b>Peak Efficiency [%]</b>	≥ 98	≥ 98	≥ 98
<b>Application</b>	Vector Drive	Vector Drive	Transversal
<b>Fit with MAGELEC MGUs</b>	M21x	M21x	M21x
<b>Differential Type</b>	NA	NA	NA
<b>Max Output Torque [Nm]</b>	3.600x2	3.600x2	3.750
<b>Gear Type</b>	Spur	Helical	Spur
<b>Lubrication Type</b>	Splash (E-Pump Option)	Splash (E-Pump Option)	Splash (E-Pump Option)
<b>Park Lock (Option)</b>	No	No	No
<b>Output Flange (Option)</b>	Yes	Yes	Yes

- F05T 2 Stage reduction
- F06V-2S Stage reduction
- Torque vectoring capable
- Optimized for high drive cycle efficiency and lowest system NVH
- Innovative passive lubrication system with channel flow for highest efficiency
- Optional Park-lock System with integrated Actuator/ECU
- Optional temperature and o-level sensing port



# APPLICATIONS



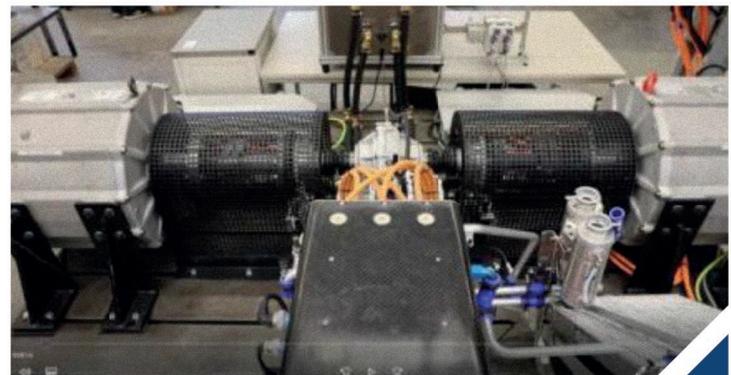
## POWERTRAIN SOLUTION FOR:

- Motorcycles
- Passenger Car
- Pickup, MPV, SUV
- Light & Medium Duty
- Bus & Coach
- Supercar
- Motorsport
- Off High Way



**INDUSTRY LEADING IN HOUSE AND ESTABLISHED  
OUTSOURCED TESTING FOR ELECTRICAL POWERTRAIN  
SYSTEMS AND COMPONENTS:**

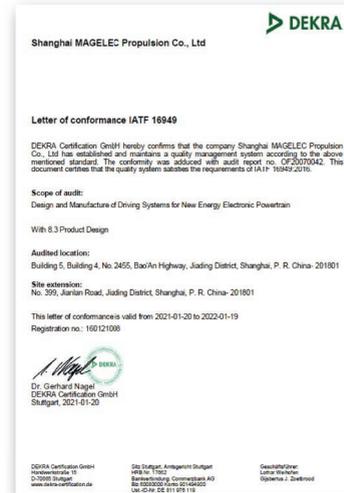
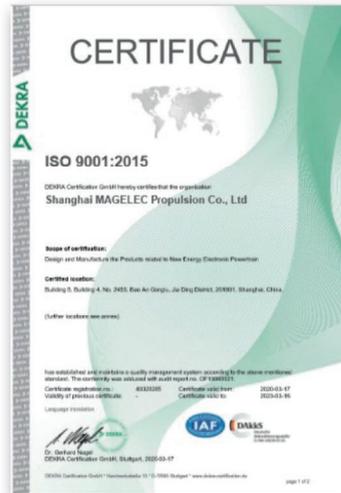
- MGU and MCU Performance Testing
- MGU and MCU Characterization
- MGU and MCU Endurance Testing
  - Climatic
  - Vibration/Shock
  - NVH
- Transmission Performance Testing
- Transmission Lubrication Analysis
- Powertrain System Performance Testing
- Powertrain System Endurance Testing
- 2022 expansion inhouse HiL bench SW validation



# QUALITY MANAGEMENT SYSTEM



- MAGELEC is dedicated to provide high technology, outstanding quality and fast solution to exceed customer expectations in products and service for new energy electronic powertrain



Internal QMS ready mainly according to IATF standard

ISO9001:2015 Certificate

IATF 16949: 2016 LOC Certificate

IATF 16949:2016 Certificate

2019

2020

2021

2022

# OMNI

## POWERTRAIN TECHNOLOGIES





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