



Corporate presentation



14AT

12V-180A \geq 350A
24V-110A \geq 200A



15AT

12V-250A \geq 400A
24V-150A \geq 250A



18AT

12V-270A \geq 450A
24V-200A \rightarrow 320A



19AT

12V-270A \geq 450A
24V-200A \geq 320A



25AT

12V-700A \geq 900A
24V-450A \geq 750A



96V

Hybrid Electric
Motor

ALMOTT Overview



❖ Established in 2003 as a manufacturer of automotive alternators, starters and spare parts for them; in 2014 started manufacturing high-technological products for heavy duty vehicles, buses and transit buses

❖ Brushless permanent magnet synchronous motors, liquid and air cooled, voltage of 12-600V, designed for Electric and Hybrid Electric vehicle application, up to 200 kW;

❖ Small, emerging technology company - 100% management-owned with experienced management team

❖ Excellent Technology – Unique designs, clear market advantages and patent protection. Exceptional Product Design & Development



Introducing Almott: The Next Generation of Power Technology

ALMOTT Overview



- ❖ Modern manufacturing & test site - Good vertical integration;
- ❖ ISO certified and forthcoming IATF 16 949

Introducing Almott: The Next Generation of Power Technology

ALMOTT Overview



- ❖ Company is located in Bulgaria, the town of Stara Zagora, kv. Kolyo Ganchev.
Total built-up area - 7200 sq.m., 5800 sq.m of which are production area and warehouses,
1400 sq.m. - administrative buildings and auxiliary premises.
Another 3300 sq.m of production areas is under construction.



- ❖ Manufacturing process is managed by ERP system

Introducing Almott: The Next Generation of Power Technology

ALMOTT production facilities



- ❖ Tools Workshop: is equipped with CNC machines, universal milling machines, grinding machines, universal lathes, feeding automats and chuck semi-automats, EDWM and EDM machines, drilling machines; heating furnace – up to 1200° C, manual screw presses.



- ❖ Stamping workshop: Eccentric presses from 25 up to 100 tons, Hydraulic presses from 10 up to 1000 tons.

Introducing Almott: The Next Generation of Power Technology

ALMOTT production facilities



- ❖ Workshop for machining of details: CNC rod automat, CNC lathes (OKUMA, GILDEMEISTER), 3 and 4 axis CNC milling machines (OKUMA, HARTFORD), a thread-broach machine, six-spindle rod automat, one spindle rod automat CITIZEN, spot-welding machine, milling teeth machines.



Introducing Almott: The Next Generation of Power Technology

ALMOTT production facilities



- ❖ Assembly workshop: Starter and Alternator testing machines for final inspection (D/V Electronics), Alternator Computerized test bench with pulley torque sensor and calibrator (D/V Electronics), starter solenoid testing machine for final inspection; CDM measuring machine Mitutoyo, spooling machine, welding machines, rivet fasten machine.



Introducing Almott: The Next Generation of Power Technology



The quality system of the
company is confirmed by
the **ISO 9001:2015**
quality certificate
in October 2018

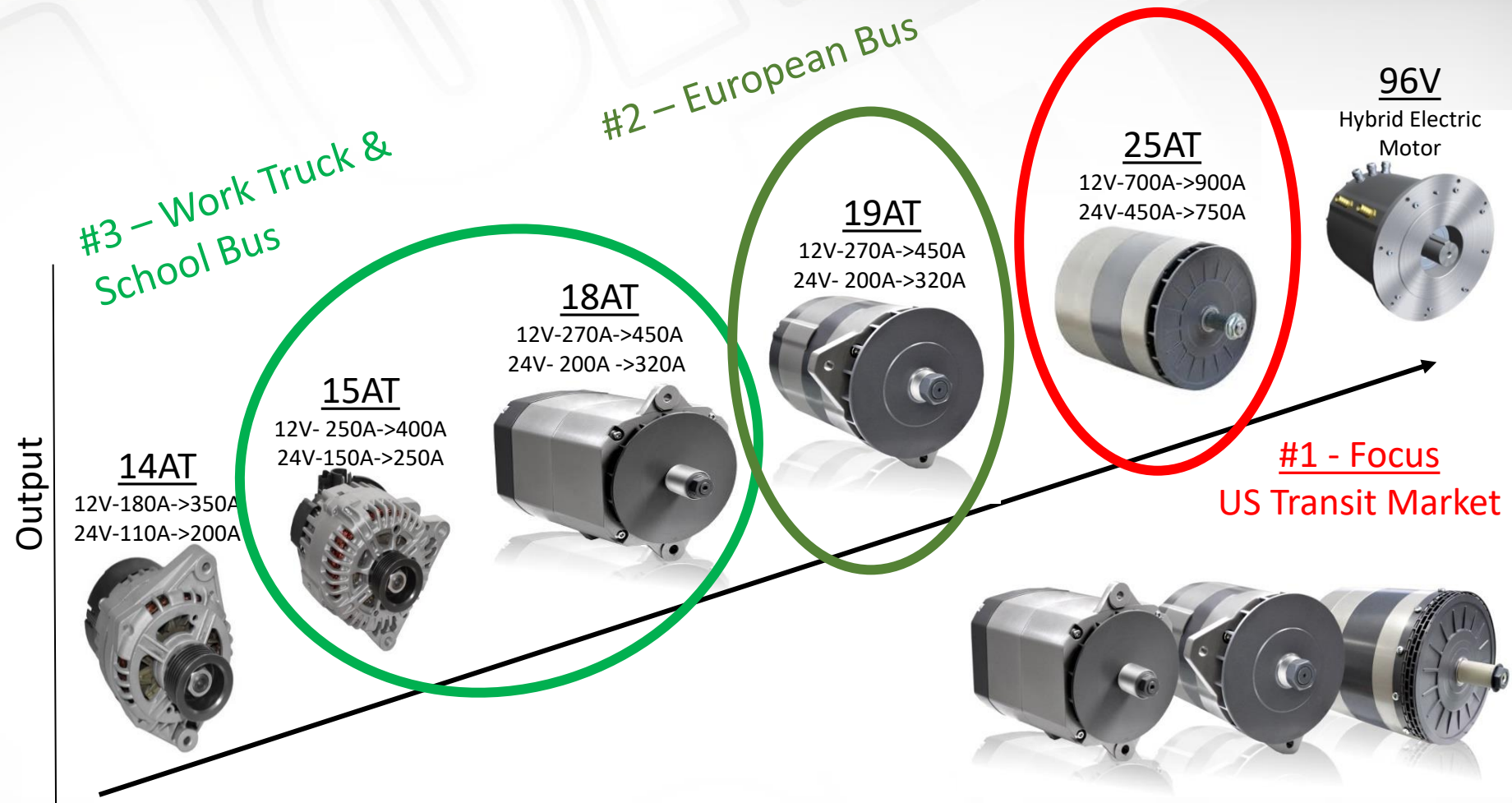
COMPANY PRODUCT RANGE – heavy duty products



- ❖ Brushless air-cooled alternators up to 800 A, voltage of 12, 24 and 48V with J180, PAD, Cradle, T1 mount;
- ❖ Brushless permanent magnet synchronous motors, liquid and air cooled, voltage of 12-600V, designed for Electric and Hybrid Electric vehicle application, up to 200 kW;
- ❖ AC electric motors, liquid and air cooled, voltage of 12-288V up to 100 kW;

Introducing Almott: The Next Generation of Power Technology

ALMOTT Product Portfolio



Broad Alternator & Motor Output Coverage & Capability

Specific Highlights



- **ALMOTT transit bus alternators bring higher performance at lower cost versus the comparable products on the market. This leads to the following opportunities:**
 - Good profit margins for OE and Aftermarket sales
 - Gaining share in the cooling systems market
 - Gaining share in the transit bus and HD markets.
- **Thorough validation process** - field tests and pre-production underway
- **The products have market acceptance** – replacing EMP and CE Niehoff in the North American aftermarket
- **Manufacturing equipment on site** – factory Capacity of 400 units monthly/2 shifts
- **Process and Quality Controls.**



Developments and Technologies

- All developments of Almott are innovative in their design and patented. They are characterized by small dimensions of the stator and high powers with very good efficiency.
- Almott develops and produces only brushless electric machines in a wide range of voltages, powers and rpm for different applications.
- We are ready to answer any inquiry and in short time, engineer and produce the first prototypes.
- Our production has a closed technological cycle, apart from heavy processes like casting, forging and chemical treatment of surfaces.



Developments and Technologies



- Characteristic for our products is the new design of the stator windings - fully produced according to the hairpin technology that enables achieving smaller dimensions and high currents.
- We have technologies for the production of rotors with permanent magnets and asynchronous motors.
- For the permanent magnet rotors we sometimes use shallow-earth magnets with very high inductance.
- We replace the standard technology for production of AC rotors with the new innovative one - with copper. This leads to much lower electromagnetic losses and higher efficiency.

Brushless motors series AL120-AC and AL181-AC induction

ALMOTT

RANGE OF BULGARIAN POWER DRIVE MOTORS FOR ELECTRIC VEHICLES

Brushless motors SERIES

AL120-AC

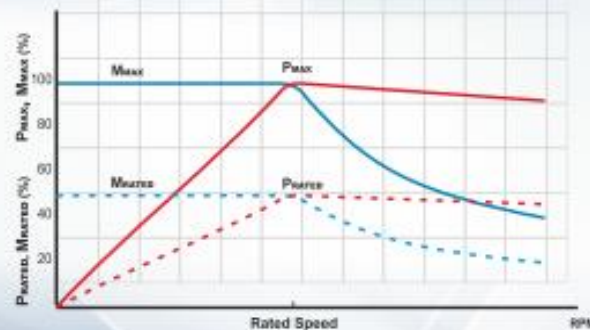
AL181-AC induction



- Pioneering structure of hairpin stator winding, minimizing F_u 's losses;
- Optimized rotor design with copper winding;
- Innovative technological solutions leading to energy efficiency increasing stability of motor work;



- Almott designs and manufactures motors according to the customer requirements for electric vehicles and other drives.



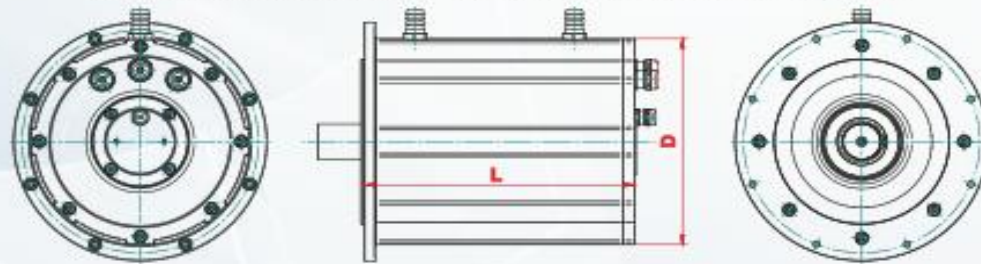
ALMOTT

RANGE OF BULGARIAN POWER DRIVE MOTORS FOR ELECTRIC VEHICLES

No	Item	Battery V	Rated power kW	Rated speed RPM	Rated torque Nm	Rated current kW	efficiency	protection	Diameter STATOR mm	La STATOR mm	L mm	D mm
1	AL120AC-1-24	24	1	1050	9,1	42	0,87	IP54	120	70	180	160
2	AL120AC-1,5-24	24	1,5	1350	10,6	63	0,87	IP54	120	55	165	160
3	AL120AC-2-48	48	2	1150	16,7	42	0,89	IP54	120	125	235	160
4	AL120AC-2,5-48	48	2,5	1500	16	52	0,9	IP54	120	95	205	160
5	AL120AC-3-48	48	3	1050	27,4	63	0,86	IP54	120	140	250	160
6	AL120AC-3,5-48	48	3,5	1310	25,6	73	0,86	IP54	120	110	220	160
7	AL181AC-6-48-S	48	6	1450	38,5	130	0,9	IP54	181	60	170	220
8	AL181PM-10-48-S	48	10	1450	64	215	0,9	IP54	181	85	195	220
9	AL181AC-17-48-S	48	17	1450	109	365	0,87	IP54	181	95	215	220
10	AL181AC-19-48	48	19	1800	101	410	0,92	IP54	181	105	225	220
11	AL181AC-20-48	48	20	1450	128	430	0,9	IP54	181	130	250	220
12	AL181AC-25-48	48	25	2500	96	535	0,92	IP54	181	75	200	220
13	AL181AC-30-48	48	30	1450	198	650	0,88	IP54	181	130	260	220
14	AL181AC-20-96	96	20	1450	128	215	0,92	IP54	181	150	280	220
15	AL181AC-25-96	96	25	1450	165	270	0,9	IP54	181	170	300	220
16	AL181AC-25-144	144	25	2500	96	180	0,93	IP54	181	100	230	220
17	AL181AC-35-144-S	144	35	3500	96	240	0,96	IP54	181	110	240	220
18	AL181AC-50-144-S	144	50	2500	192	360	0,95	IP54	181	230	360	220
19	AL181AC-50-180	180	50	1800	266	290	0,93	IP54	181	230	360	220

Rated power and rated torque- S1 ; Max. power and max. torque- S2- 30 sec.

MOUNTING DIMENSIONS ON CUSTOMER REQUEST



Brushless motors series AL181-PM permanent magnet

ALMOTT

RANGE OF BULGARIAN POWER DRIVE MOTORS FOR ELECTRIC VEHICLES

Brushless motors SERIES

AL181-PM

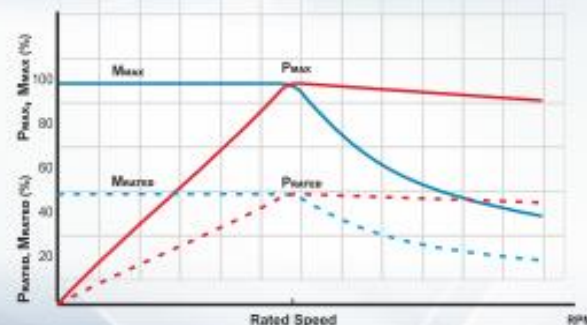
permanent magnet



- Pioneering structure of hairpin stator winding, minimizing F_u 's losses;
- Optimized rotor design with a fluent sinusoidal line of voltage;
- Innovative technological solutions leading to energy efficiency increasing stability of permanent magnets;



- Almott designs and manufactures motors according to the customer requirements for electric vehicles and other drives.



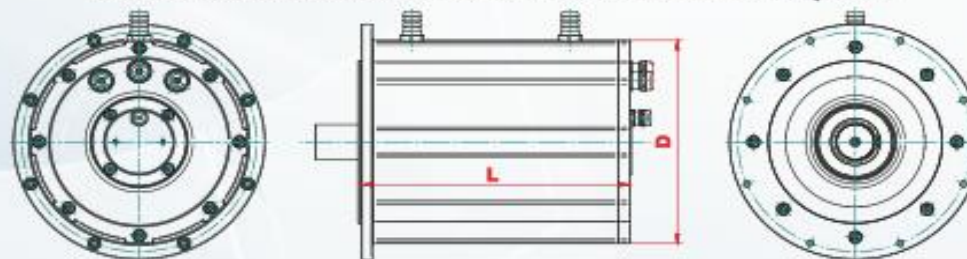
ALMOTT

RANGE OF BULGARIAN POWER DRIVE MOTORS FOR ELECTRIC VEHICLES

Nr	Item	Battery V	Rated power kW	Rated speed RPM	Rated torque Nm	Rated current kW	efficiency	protection	Diameter STATOR mm	La STATOR mm	L mm	D mm
1	AL181PM-6-48	48	6	1450	40	125	0,94	IP54	181	50	170	220
2	AL181PM-6-48-L	48	6	700	80	125	0,92	IP54	181	100	220	220
3	AL181PM-10-48-S	48	10	1450	66	208	0,947	IP54	181	70	190	220
4	AL181PM-10-48-L	48	10	700	136	208	0,94	IP54	181	140	260	220
5	AL181PM-17-48-S	48	17	1450	112	355	0,94	IP54	181	120	240	220
6	AL181PM-17-48-L	48	17	700	232	355	0,92	IP54	181	190	320	220
7	AL181PM-19-48	48	19	1800	101	395	0,94	IP54	181	100	230	220
8	AL181PM-20-48	48	20	1450	132	420	0,94	IP54	181	120	250	220
9	AL181PM-25-48	48	25	2500	96	520	0,95	IP54	181	70	190	220
10	AL181PM-30-48	48	30	1450	198	630	0,94	IP54	181	180	310	220
11	AL181PM-20-96	96	20	1450	132	215	0,94	IP54	181	140	260	220
12	AL181PM-25-96	96	25	1450	165	280	0,94	IP54	181	140	270	220
13	AL181PM-40-96	96	40	1550	246	430	0,93	IP54	181	220	350	220
14	AL181PM-25-144	144	25	2500	96	180	0,95	IP54	181	90	220	220
15	AL181PM-35-144-S	144	35	3500	96	240	0,96	IP54	181	90	220	220
16	AL181PM-35-144-L	144	35	1450	230	240	0,93	IP54	181	220	350	220
17	AL181PM-50-144-S	144	50	2500	191	350	0,96	IP54	181	160	290	220
18	AL181PM-50-144-L	144	50	1450	330	350	0,93	IP54	181	280	420	220
19	AL181PM-50-180	180	50	1800	265	265	0,96	IP54	181	230	360	220

Rated power and rated torque- S1 ; Max. power and max. torque- S2- 30 sec.

MOUNTING DIMENSIONS ON CUSTOMER REQUEST



	PATENT	BG	PCT	WIPO	USA	CANADA
1	BRUSHLESS ALTERNATOR WITH CLAW POLE ROTOR	109856/16.04.2007	PCT/BG2007/000012	WO2008124898	US7915783	
2	STATOR FOR ELECTRIC MACHINE	111369/19.12.2012				
3	BRUSHLESS ALTERNATOR WITH CLAW POLES	111509/24.06.2013	PCT/BG2014/000009	WO2014205524		
4	ELECTRICAL MACHINE WITH INNER STATOR	111518/26.06.2013	PCT/BG2014/000008	WO2014205523	US9887595B2	
5	BRUSHLESS ALTERNATOR WITH CLAW POLES	111823/12.09.2014	PCT/BG2014/000033	WO2016037243	US20160294233	CA 2900370
6	BRUSHLESS ELECTRICAL MACHINE WITH AIR COOLING	111940/23.02.2015	PCT/BG2015/000007	WO2016134428	US20160380514	CA 2900368
7	STATOR FOR ELECTRIC MACHINE	112110/08.10.2015	PCT/BG2016/000024	WO2017059503	PRESENT NOTICE	PRESENT NOTICE
8	ELECTRIC MACHINE WITH CLAW POLES	112334/11.07.2016	PCT/BG2017/000025			
9	BRUSHLESS ELECTRICAL MACHINE WITH PERMANENT MAGNET	112317/09.06.2016				
10	STATOR WITH VENTILATION CHANNELS FOR ELECTRICAL MACHINE	3954/24.01.2018				

Strong patent portfolio in high output alternators and electric motors

Management Team



Atanas Hristozov
CEO and Owner of Almott Ltd.



Professor Encho Popov
Professor of electricity and electrical machines



Ivan Ivanov
Main Engineer of Research
and Development



Irena Nikolova
Head of Sales and Marketing



Mariana Lukova
Production process Engineer



Nikolay Doychev
Tools and Equipment development
Engineer



Marieta Yordanova
Head of Purchasing Department



Krasimir Nikolov
Quality Inspection Engineer



Simeon Simeonov
Electric and Mechanical equipment
Engineer

Technology and Management Team that created high output products

Precision Machining

Die Cast Components



Machined Housings

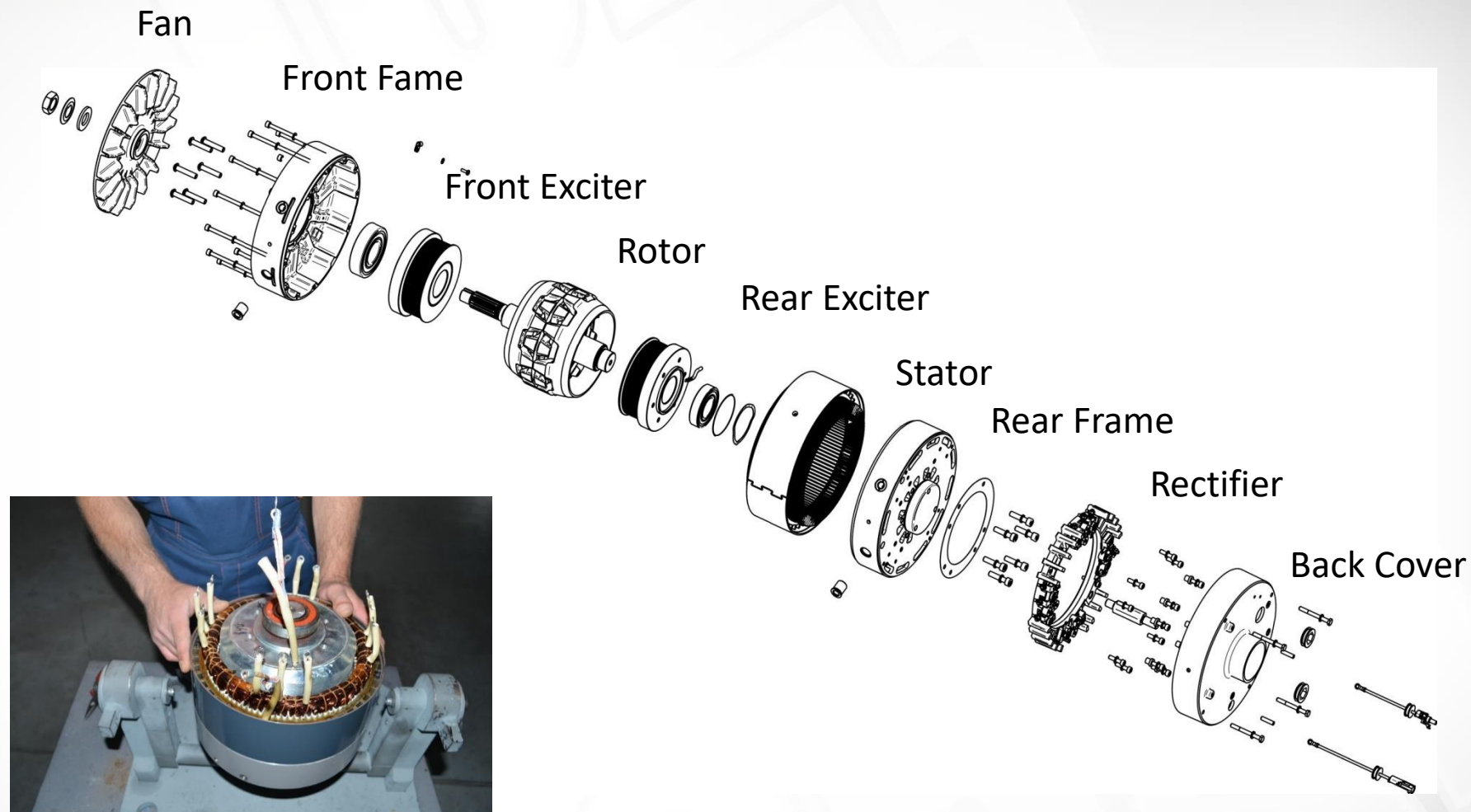


4 axis CNC milling machine HARTFORD LG1000AD

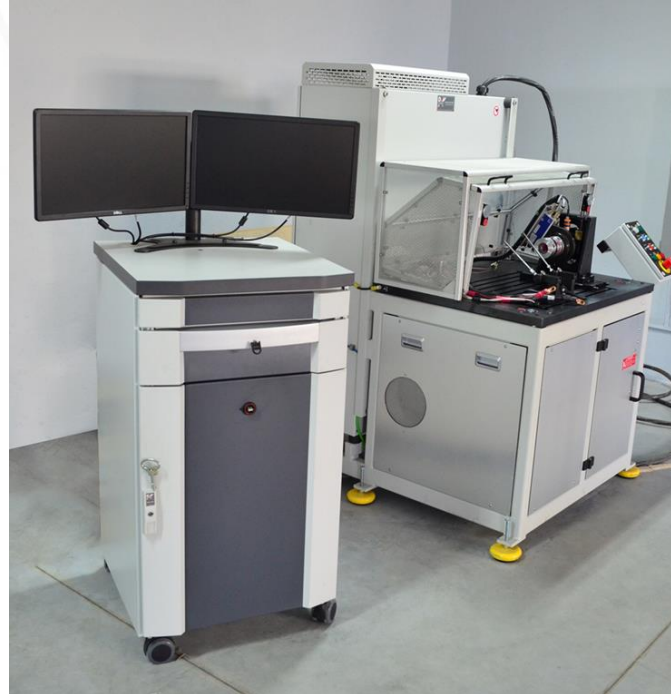
Machining of drilling and milling operation at 4 axis-Cradle mounting holes of 25 AT alternator

Die cast components machined for tight tolerance

Alternator – Assembly process



Testing



Alternator Computerized test bench with pulley torque sensor and calibrator (D/V Electronics).
Capable to measure 16 alternator temperatures.

State of Art Test Equipment

Implemented Projects

- ❖ Propulsion system for electric road train
With the Dutch company **TRENS**, in the beginning of 2019:

Solar Powered Road Train, designed for transportation of people and distribution of goods
- <https://trens.eu/en/#specs>



Motor specifications: 35kW, 144V
Water-cooling

Implemented Projects

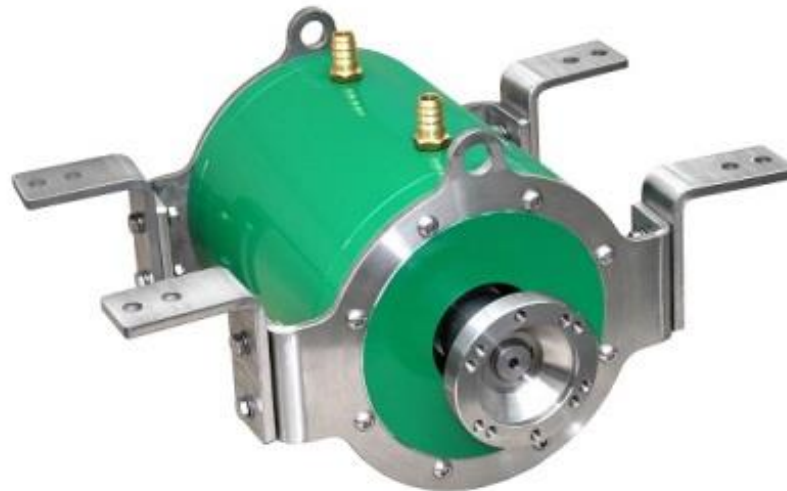
- ❖ Electrification of light-duty electric truck, November 2019
Mercedes-Benz Sprinter, 3.5 tons



Motor specifications: 150kW, 300V
Water-cooling

Implemented Projects

- ❖ Boat propulsion motors for customers in the Netherlands



Motor specifications: 5 up to 50kW, 48V up to 144V
Water-cooling

Summary

Corporate Overview

- Small, Management-owned Company
- Experienced Leadership
- Good Financials
- Excellent Technology and operations
- Impressive patents and products portfolio



Strengths and Advantages

- Highest performance, lowest cost products on market
- Strong economic benefits to OE customers and aftermarket
- Application validated & market tested products
- Manufacturing capacity to meet customer requirements with significant increase potential



THANK YOU!

Contact and further information:

eng. Atanas Hristozov
CEO of ALMOTT LTD
mob. +359888649649
hristozov@almott.net