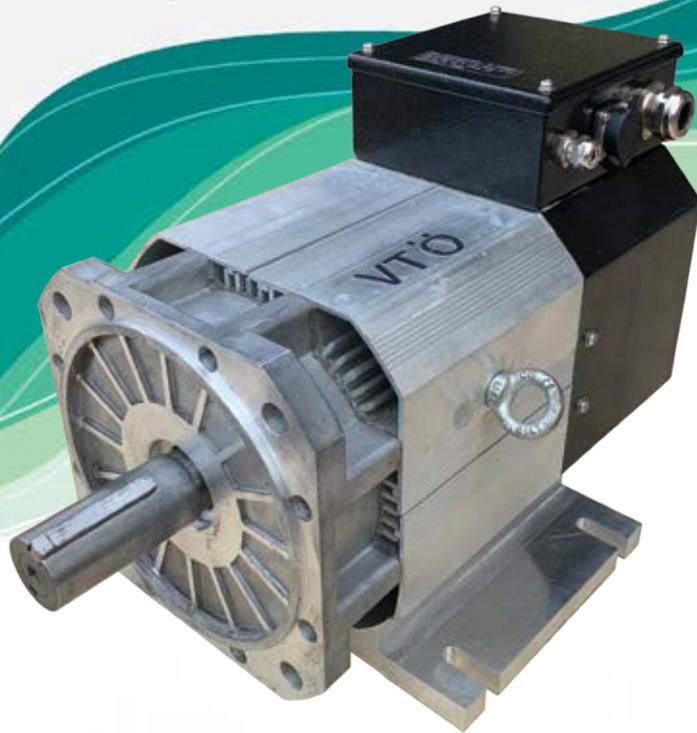




EcoMoto

MAGLEV MOTOR TECHNOLOGY

ULTRA PREMIUM EFFICIENCY



Intellectual Property Corporation of Malaysia
No. : 20-00483-0101
TM2020004867

MyHIJAU - MARK



Certificate no: MyHP00305/22





History & Experience

Founded in Malaysia more than 10 years ago, we have a deep understanding of permanent magnet (PM) motor, electric vehicle (EV) motors and the industries where they are used. While the basic principles of the technology might not have changed much in that time, product performance, documentation and service have.

Today, we believe our extensive experience sets us apart while our focus on customers' needs has helped us to be the leading energy savings technology in the industry. Our deep understanding of the market and your needs is reflected in our flexible service and our product range. Wherever your company or project is located, we are ready to assist you in every possible way. Today, our Malaysia diversified cultures are reflected in our corporate culture where unity, respect and harmony shape the way we do our business.

Intro:

Electric motors convert electrical energy into motion. They are found everywhere, from micro motors in computer hard drives and small motors in domestic appliances to medium and large motors in commercial buildings and factories. A transition to energy-efficient motor systems can reduce their global electricity demand by 20 to 30 per cent in 2030.

Improving energy efficiency is the fastest, cheapest and cleanest way to get reliable power to more people. The industrial and building sectors comprise 90 per cent of the electricity used by motors. The IEA has estimated that 53 per cent of all electrical energy, or 10,500 TWh per year, is used by electric motor systems globally, giving rise to around 6,800 Mt of carbon dioxide (CO₂) emissions (equivalent to the annual electricity generated by approximately 2,200 fossil fuel-fired power plants with a capacity of 1,000 MW).

EcoMoto Technology:

There are several electric motor technologies; DC and AC motors with control and mechanical structures. EcoMoto has a unique technology that pioneer in three phase permanent magnet motor design.

1. EcoMoto is the trademark for our Motor. And represent the **TOTAL SOLUTIONS** below.

- ✓ High efficiency industrial Permanent Magnet Synchronous Motor (PMSM) – IE5 Standard
- ✓ In-build dual speed design to reduce inventory cost and serve a wide application.
- ✓ Design with flexibility, plug & play to retrofit any existing motor for instant hassle-free savings.

2. EcoInverter VFD Drive with Proprietary PMSM Vector Control Algorithm with Torque optimizer.

3. Energy Monitoring System (EMS) IoT Cloud 4.0 technology for preventive maintenance. Ready to capture baseline and carbon credits.





Quality

Our quality is our customer's satisfaction. We continually optimize our products, internal systems, processes and procedures to make sure that our solutions remain best-in-class. Constant focus on meeting customer needs and understanding of their risks and opportunities. We practice 100% QC in our motors before leaving our production line.

Service & Flexibility

Service is in our DNA. You can expect an extremely fast response time, customized solutions, and a deep understanding of the industries we serve. No matter who we're dealing with, no matter which product or solution, and no matter which segment, we're determined to provide a level of service that will inspire maximum confidence among our customers. Great service is seen as an integral element of fast response, proactive approach, flexibility and solution oriented to our customers.



EcoMoto Applications:

EcoMoto offers the medium size from 2.2 kW to 375 kW motors, three-phase electric motors in medium size represent around two-thirds of the energy consumed by motors, globally.

EcoMoto's large size from 400kW to 1000kW motors can provide a huge amount of energy savings per installation. A large motor's savings can be equivalent to 100 units of medium motors.

EcoMoto applications from agricultural, commercial, industrial and water utilities. EcoMoto can be retrofitted to HVAC equipment, pumps, fans, compressors, conveyors and process machines.

Certification and Compliant Testing:

EcoMoto models meet the requirements on mechanical construction, functional performance, safety, hazardous substances and warranty. EcoMoto is rated for performance and operating characteristics according to the International Electrotechnical Commission (IEC) standards; IEC 60034-1:2010, IEC 60034-5:2001/A1:2007, IEC 60034-2-1:2014.

Green Mark

A large number of motors around the world do not even meet IE1. The International Electrotechnical Commission (IEC) is an international standards organisation that prepares and publishes standards for electrical equipment. IEC Standard 60034-30-1 categorises electric motors based on their energy efficiency, either as IE1 (lowest efficiency), IE2, IE3, IE4, or IE5 (highest efficiency).

EcoMoto has an energy-efficiency class of ultra-premium energy-efficiency (IE5), which exceeds the current international best practice policy. This offers greatest energy savings potential. By July 2023, the best-practice regulations coming into effect in the EU is to adopt super-premium energy-efficiency (IE4). EcoMoto easily meets 'Minimum energy performance standard (MEPS)' in every market or country.

Energy Efficiency of EcoMoto

The process of converting electrical energy into mechanical energy delivered at the motor shaft incurs losses. EcoMoto's HMR technology minimizes the input electrical energy lost to heat, and optimizing the usable output mechanical energy.

Advantages:

High torque, wide operating speed range, can reduce to very low speed, low operating temperature

Malaysian Government Endorsement:

Director General of Public Works & Minister of Health for Energy Efficiency EcoMoto.

ECOMOTO G6 MODELS, SELECTIONS AND DIMENSIONS

Power System:

Low voltage from 380 V to 430 V, 50 Hz or 60 Hz.

Product Coverage and Size Range:

Three-phase electric motors from 500 rpm to 5000 rpm.

Medium Size: 2.2 kW to 375 kW range.

Large Size: 400 kW to 1000 kW range.

Operating Ambient Temperature Range:

EcoMoto: -30°C to +60°C

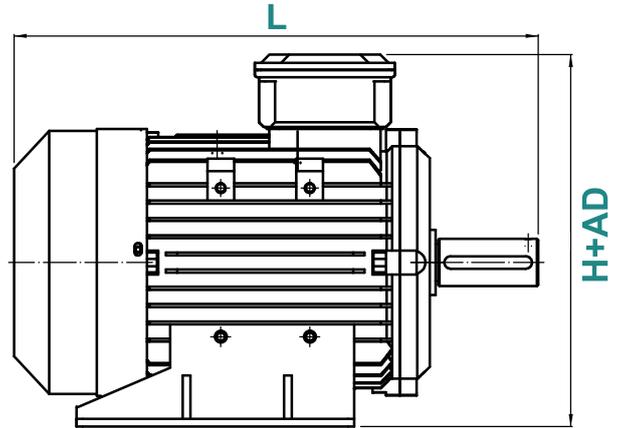
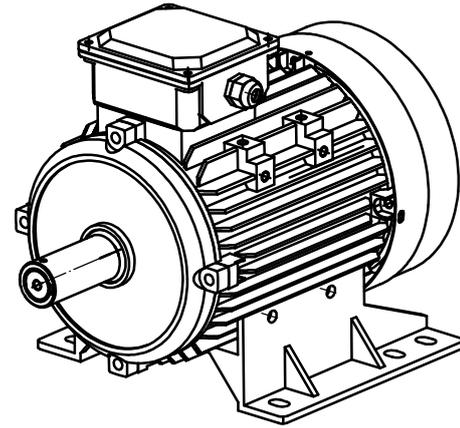
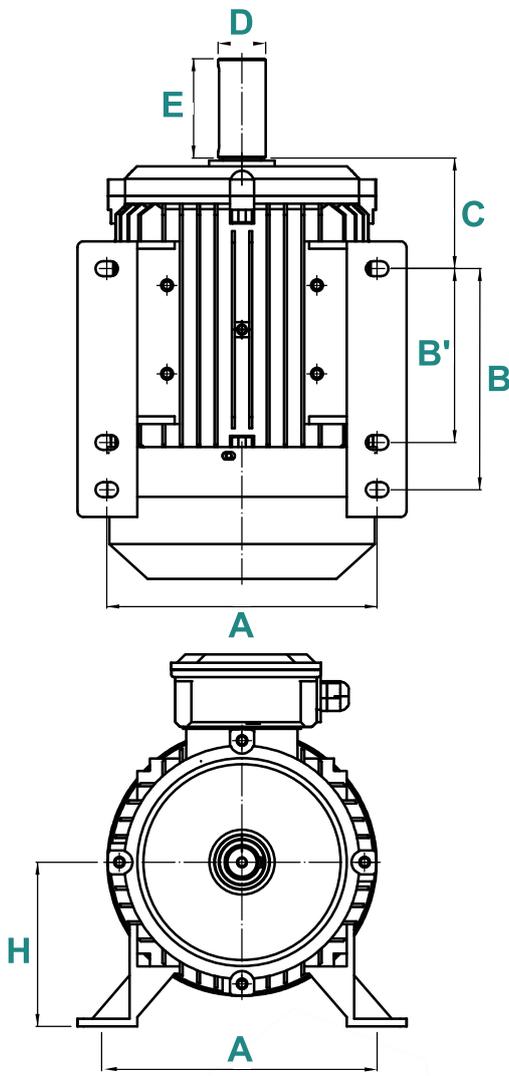
EcoInverter: -20°C to +85°C



Nos.	Power Rating (kW)	Model No.	Input Voltage /Hz	Amp (A)	RPM	Pole	Torque (Nm)	Efficiency (%)	VAC (V)
1	2.2	VE0022-DSP	415V / 50Hz	3.6	1500	6	14.0	89.5	380
2	3.7	VE0037-DSP	415V / 50Hz	6.0	1500	6	23.6	90.9	380
3	5.5	VE0055-DSP	415V / 50Hz	8.8	1500	6	35.0	91.9	380
4	7.5	VE0075-DSP	415V / 50Hz	11.9	1500	6	47.7	92.6	380
5	11	VE0110-DSP	415V / 50Hz	17.3	1500	6	70.0	93.3	380
6	15	VE0150-DSP	415V / 50Hz	23.4	1500	6	95.5	93.9	380
7	18.5	VE0185-DSP	415V / 50Hz	30.9	1500	12	117.8	95.6	350
8	22	VE0220-DSP	415V / 50Hz	37.2	1500	12	140.0	94.7	350
9	30	VE0300-DSP	415V / 50Hz	50.5	1500	12	191.0	95.0	350
10	37	VE0370-DSP	415V / 50Hz	62.1	1500	12	235.5	95.3	350
11	45	VE0450-DSP	415V / 50Hz	75.3	1500	12	286.5	95.6	350
12	55	VE0550-DSP	415V / 50Hz	91.8	1500	12	350.1	95.8	350
13	75	VE0750-DSP	415V / 50Hz	125.0	1500	12	477.4	96.0	350
14	90	VE0900-DSP	415V / 50Hz	150.0	1500	12	572.9	96.2	350
15	110	VE1100-DSP	415V / 50Hz	167.0	1500	12	700.2	96.3	380
16	132	VE1320-DSP	415V / 50Hz	219.0	1500	12	840.3	96.5	350
17	160	VE1600-DSP	415V / 50Hz	265.0	1500	12	1018.5	96.6	350
18	200	VE2000-DSP	415V / 50Hz	330.0	1500	12	1273.2	96.8	350
19	250	VE2500-DSP	415V / 50Hz	412.0	1500	12	1591.5	97.0	350
20	315	VE3150-DSP	415V / 50Hz	519.0	1500	12	2005.2	97.0	350
21	355	VE3550-DSP	415V / 50Hz	583.0	1500	12	2259.9	97.3	350
22	400	VE4000-DSP	415V / 50Hz	660.0	1500	12	2546.3	97.0	350

Note: Suitable for 500 to 1,500 RPM. For 3,000 RPM, please state / request in your order.

ECOMOTO G6 DIMENSIONS



FRAME	H	D	A	B	C	E	EC
100L	100	28	160	140	63	60	123
112M	112	28	190	140	70	60	130
132S	132	38	216	140	89	80	169
132M	132	38	216	178	89	80	169
160M	160	42	254	210	108	110	218
160L	160	42	254	254	108	110	218
180M	180	48	279	241	121	110	231
180L	180	48	279	279	121	110	231
200L	200	55	318	305	133	110	243
225SC	225	60	356	286	149	140	289
225MC	225	60	356	311	149	140	289
250MC	250	65	406	349	168	140	308
280SB	280	75	457	419	190	140	330
280MB	280	75	457	419	190	140	330
315SB	315	80	508	406	216	170	386
315MB	315	80	508	457	216	170	386
315LB	315	80	508	508	216	170	386
355MB	355	100	610	560	254	210	464
355LB	355	100	610	630	254	210	464

VTO ECODRIVE INVERTER

EcoDrive Technical Features

- Patented leading vector control technology and algorithm. For EcoMoto, permanent magnet synchronous motors (PMSM), synchronous reluctance motors (SynRM) and induction motors.
- Low speed 0 Hz achieves 150% starting torque, small starting current, perfect smooth start.
- High-speed magnetic control function.
- Magnetic pole position detection, complete the detection of the motor's initial position through self-learning. Realize precise control of synchronous motors.
- Powerful overload capacity, dual rated specification settings.
- With multiple speed instructions, high-speed pulse input, multi-channel digital input, analog, digital output and other application functions.
- More power-saving than traditional asynchronous motor + inverter, saving about 20-50%. The best energy efficiency solution and trend to replace asynchronous motors.



EcoDrive Specifications

Nos	Power Rating (kW)	Model No.	Input Voltage / Hz	Ampere (A)
1	3.7	VX0037-DSP	415V / 50 Hz	9
2	5.5	VX0055-DSP	415V / 50 Hz	13
3	7.5	VX0075-DSP	415V / 50 Hz	17
4	11	VX0110-DSP	415V / 50 Hz	25
5	15	VX0150-DSP	415V / 50 Hz	32
6	18.5	VX0185-DSP	415V / 50 Hz	37
7	22	VX0220-DSP	415V / 50 Hz	45
8	30	VX0300-DSP	415V / 50 Hz	60
9	37	VX0370-DSP	415V / 50 Hz	75
10	45	VX0450-DSP	415V / 50 Hz	90
11	55	VX0550-DSP	415V / 50 Hz	110
12	75	VX0750-DSP	415V / 50 Hz	152
13	90	VX0900-DSP	415V / 50 Hz	176
14	110	VX1100-DSP	415V / 50 Hz	210
15	132	VX1320-DSP	415V / 50 Hz	252
16	160	VX1600-DSP	415V / 50 Hz	305
17	200	VX2000-DSP	415V / 50 Hz	285

Applications

High-speed engraving and milling machines, lifting, hoisting, electric winches, wire drawing machines, injection molding machines, die-casting machines, shoe machines, crushers, centrifuges, hollow blow molding machines, ball mills, pumping units, electromagnetic stirring, and various textile machinery and equipment, fans, water pumps, lifting machinery, printing machinery, permanent magnet synchronous air compressor matching and energy-saving transformation, industrial washing machines, mixers, cutting machines, food processing, petrochemicals, oil field screw pumps, head-cutting machines and other industry equipment



Oilfield heavy duty machinery



Direct drive motor



Stone saw machinery



Belt conveyors



Mining electric locomotive



Servo motor machinery



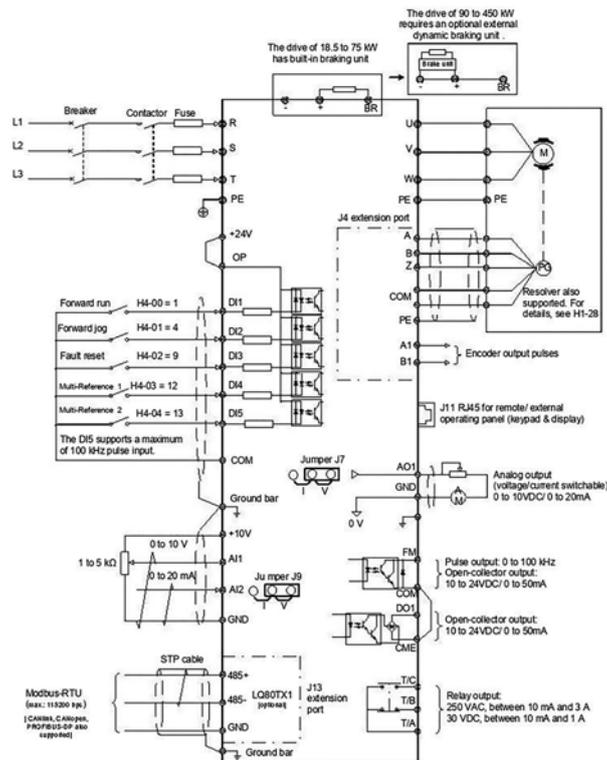
Textile machinery



Ball mill machinery

LV8000-T

Electrical Wiring Diagram



Main Technical Specifications of EcoDrive

Project	Technical Features
Maximum frequency	Vector control: 0-500Hz V/F: 0-3200Hz, (spindle vector: 0-1000Hz FVC)
Control mode	Open loop vector (SVC); Closed loop vector (FVC) V/ F control
Starting torque / overload	0.5Hz/150% (SVC); 0Hz/180% (FVC); 150% rated current 60s; 180% rated current 3s
Capacity acceleration / deceleration curve	Linear or S curve acceleration and deceleration mode. Four acceleration and deceleration times, acceleration and deceleration time range 0.0~6500.0s
Built-in PID	Can easily realize process control closed-loop control system
Virtual input and output IO	Can flexibly realize various simple logic functions
Encoder supports	Support differential, open collector, UVW, resolver, sine and cosine encoders
Speed range/precision	1:50 ±0.1% (SVC); 1:1000 ±0.02% (FVC); torque control accuracy: ±5% (FVC)
Torque limitation and control	"Excavator" characteristics, automatic torque limit during operation to prevent frequent overcurrent tripping; closed-loop vector mode can realize torque control
Motor overheat protection	AI3 can receive motor temperature sensor input (PT100, PT1000) to realize motor overheat protection (Optional: Expansion temperature card required)
Automatic voltage regulation (AVR)	When the grid voltage changes, it can automatically keep the output voltage constant
Fast current limiting	To avoid frequent overcurrent faults of the inverter
Fault handling method	After determining that a specific fault has occurred, the action mode: Free stop, Deceleration stop, and Continue to run. You can also choose the frequency when continuing to run
Optional protection function	Power-on motor short circuit detection, input and output phase loss, overcurrent, overvoltage, undervoltage, overheating, overload and other protection functions
DIDO flexible application	Users can independently set the positive and negative logic of DI and DO, and the response delay time
Instantaneous stop non-stop timing	When the power is off or the voltage drops suddenly, the drive can continue to run for a short time (depending on the power rating and running load)
Operation motor	Supports a maximum of 6500 minutes of timed operation
Overheat protection	Expansion card IO, analog AI3 can accept motor temperature sensor input (PT100, PT1000)
Command source	Operation panel setting, control terminal setting, serial communication port setting
Frequency source	10 frequency sources can be switched in a variety of ways: digital, analog voltage, analog current, pulse, serial port & etc.
Field bus	Support Modbus-RTU, Profibus-DP, CANopen bus

EcoMoto + EcoDrive Applications



Lifting equipment



Forging and hydraulic industry



Printing and industry



Machine tool industry



Stone and masonry Industry



Municipal water treatment plant



Plastic machinery industry



THE NEXT GLOBAL
Retrofitting Energy-efficient
For Building a



Food packaging industry



EPS Industrial Power Supply



New energy vehicles



Rails



GLOBAL MEGATREND

Efficient Electric Motors
and Industries



Timber processing industry



Oilfield CNC equipment

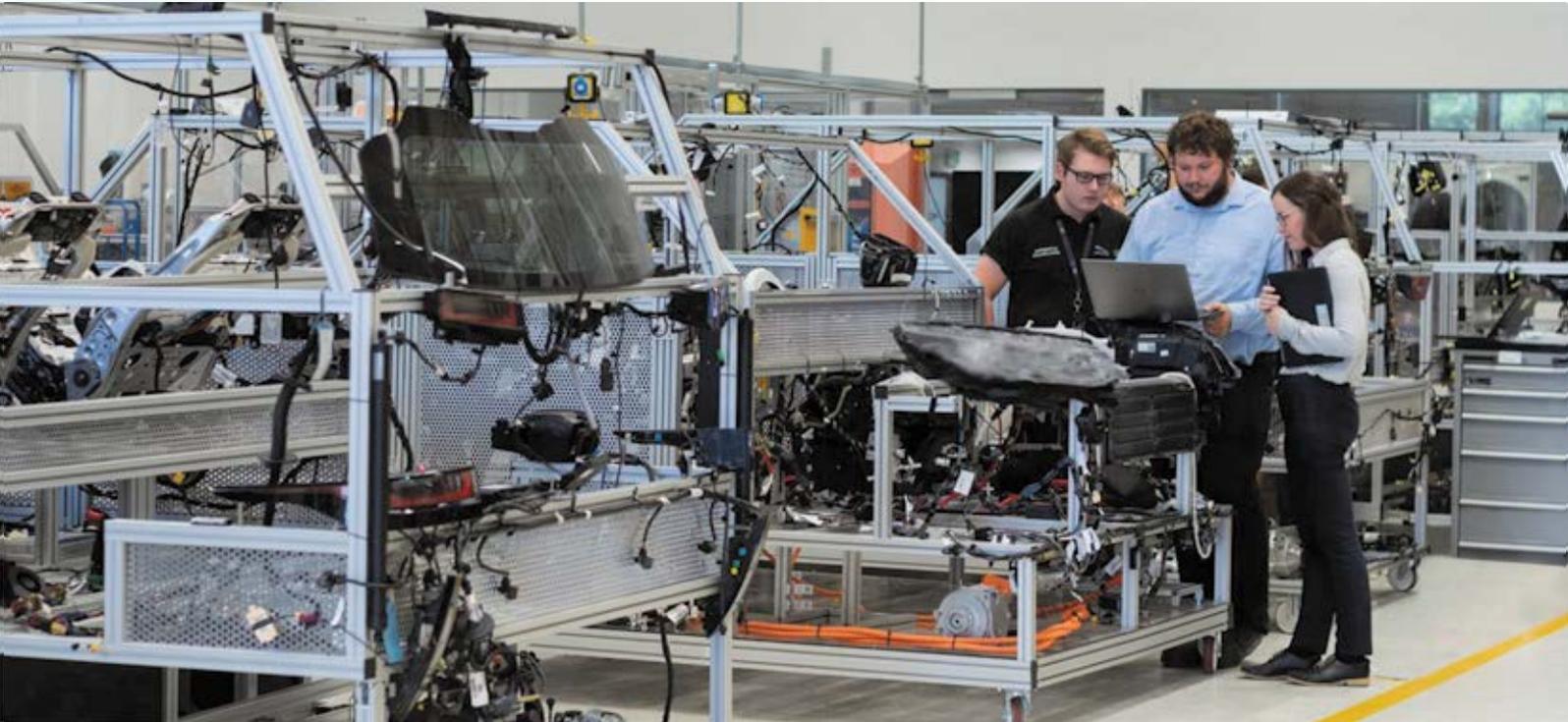


Mine lifting equipment

PROJECT EXAMPLE 1 IN MALAYSIA

WATER PUMP MOTOR 37KW / 1,450RPM

BEFORE & AFTER (PLUG & PLAY ECOMOTO)



*Note: Photo above is not the actual location on the tested EcoMoto below. Please contact us for more info.



1,450Rpm



1,450Rpm

SAVINGS
15-35%



1,450Rpm



1,450Rpm

PROJECT EXAMPLE 2 IN MALAYSIA

CONDENSER WATER PUMP MOTOR 15KW / 1,450RPM

BEFORE & AFTER (PLUG & PLAY ECOMOTO)



*Note: Photo above is not the actual location on the tested EcoMoto below. Please contact us for more info.



BEFORE

1,450Rpm



AFTER

1,450Rpm

SAVINGS
15-35%



BEFORE

1,450Rpm



AFTER

1,450Rpm

PROJECT EXAMPLE 3 IN MALAYSIA

AHU FAN MOTOR 18.5KW / 1,450RPM

BEFORE & AFTER (PLUG & PLAY ECOMOTO)



*Note: Photo above is not the actual location on the tested EcoMoto below. Please contact us for more info.



1,450Rpm



1,450Rpm

SAVINGS
25-55%



1,450Rpm



1,450Rpm

ECOMOTO DYNO TEST

Our Testing Center

Our testing centre is designed to handle on-demand testing of our motors. Without involving third party test centre, we are able to perform various tests according to IEC 60034-2-1 on a day-to-day basis.



The testing we perform on each motors are:

- Winding resistance
- Full load test
- Temperature rise test
- No load test
- Locked rotor test
- Over load test
- Noise and vibration test



Produkt - Product	
Produkt-Nr. / Product No.	620209001
Auftrag-Nr. / Order No.	19020000
Seite 1 von 14 / Page 1 of 14	
Kunden-Referenz-Nr. / Customer Reference No.	N/A
Auftragdatum / Order date	2021.10.20
Auftraggeber / Client	VTO MOTOR SDN BHD NO. 23, JALAN 23, TAMAN BUKIT KUALA, PUCHONG, 47100 SELANGOR, MALAYSIA
Prüfungsort / Test site	VTO EcoMoto-Permanent Magnet Synchronous Motor
Bestätigung - Typ-Nr. / Identification - Type No.	VE0000-D0P
Auftragstyp / Order type	Commission Test Report
Prüfungsnorm / Test specification	Clause 7 of IEC 60034-2-1:2014 Rotating electrical machines - Part 2-1: Standard methods for determining losses and efficiency from test-running methods for traction vehicles
Prüfungstermin / Test date	2021.11.18
Prüfungsort / Test center	AG0318-182
Prüfungsdauer / Testing period	2021.11.09 - 2022.01.08
Ort der Prüfung / Place of testing	See Page 4
Prüfungsinstitut / Testing laboratory	TÜV Rheinland (Rheinland) Co., Ltd.
Prüfungsmittel / Test method	Flow
Erstellt von / created by	<i>els dy</i>
geprüft von / authorized by	<i>william</i>
Datum / Date	2022.02.16
Überprüfung / Prüfung	Elwan Khalil Prüfung / Prüfung
Bemerkungen / Other	

This report does not evidence compliance of the provided sample with the relevant standard but only with the relevant tests. This test report documents the findings of examination conducted on the delivered product mentioned above only. This report does not entitle the applicant to carry any safety mark on his or similar products, neither for sales or other application purposes of the tested product, any reference to TÜV Rheinland or a test through TÜV Rheinland is only permissible with prior written consent of TÜV Rheinland.

Zustand des Prüfgegenstandes bei Ablieferung / Prüfobjekt vorläufig und unvollständig / Condition of the test item at delivery / Test item complete and unaltered

Prüfungsinstitut / Testing laboratory: TÜV Rheinland (Rheinland) Co., Ltd.

Prüfungstermin / Test date: 2021.11.09 - 2022.01.08

Prüfungsort / Test center: AG0318-182

Prüfungsdauer / Testing period: 2021.11.09 - 2022.01.08

Ort der Prüfung / Place of testing: See Page 4

Prüfungsinstitut / Testing laboratory: TÜV Rheinland (Rheinland) Co., Ltd.

Prüfungsmittel / Test method: Flow

Erstellt von / created by: *els dy*

geprüft von / authorized by: *william*

Datum / Date: 2022.02.16

Überprüfung / Prüfung: Elwan Khalil, Prüfung / Prüfung

Bemerkungen / Other:

This report does not evidence compliance of the provided sample with the relevant standard but only with the relevant tests. This test report documents the findings of examination conducted on the delivered product mentioned above only. This report does not entitle the applicant to carry any safety mark on his or similar products, neither for sales or other application purposes of the tested product, any reference to TÜV Rheinland or a test through TÜV Rheinland is only permissible with prior written consent of TÜV Rheinland.

Zustand des Prüfgegenstandes bei Ablieferung / Prüfobjekt vorläufig und unvollständig / Condition of the test item at delivery / Test item complete and unaltered

Prüfungsinstitut / Testing laboratory: TÜV Rheinland (Rheinland) Co., Ltd.

Prüfungstermin / Test date: 2021.11.09 - 2022.01.08

Prüfungsort / Test center: AG0318-182

Prüfungsdauer / Testing period: 2021.11.09 - 2022.01.08

Ort der Prüfung / Place of testing: See Page 4

Prüfungsinstitut / Testing laboratory: TÜV Rheinland (Rheinland) Co., Ltd.

Prüfungsmittel / Test method: Flow

Erstellt von / created by: *els dy*

geprüft von / authorized by: *william*

Datum / Date: 2022.02.16

Überprüfung / Prüfung: Elwan Khalil, Prüfung / Prüfung

Bemerkungen / Other:

CE	
Attestation of Conformity No. NBA 116230 0001 Rev. 00	
Holder of Certificate:	VTO MOTOR SDN BHD No. 23, Jalan 23, Taman Bukit Kuala, Batu 8 47100 Puchong, Selangor, MALAYSIA
Product:	Electric Motors (EcoMoto-Permanent Magnet Synchronous Motor)
This Attestation of Conformity is issued on a voluntary basis according to the Low Voltage Directive (2006/95/EC) relating to electrical equipment designed for use within certain voltage limits. It confirms that the tested equipment complies with the principal protection requirements of the directive and is based on the technical specifications applicable at the time of issuance. It refers only to the particular sample submitted for testing and certification. For details see: www.tuv.com/conform	
Test report no.:	041021000010
Rev.:	2022.09.20
(Marken-Nr.)	

Page 1 of 2

Attestation of conformity of the necessary technical documentation as well as the EU Declaration of conformity the manufacturer may affix on the product. The declaration of conformity is issued under the sole responsibility of the manufacturer. Other relevant EU directives have to be observed.

TÜV SUD Produkt Service GmbH - Certification Body - Heisterstraße 60 - 40549 Mönchengladbach - Germany

MyHJAU · MARK	
This is to certify that	
VTO MOTOR SDN BHD, company No. 23, Jalan 23 Taman Bukit Kuala, Batu 8 47100 Puchong Selangor	
has the rights to use the MyHJAU Mark on the following item:	
(Refer to Schedule Page for more details)	
Compliance Category: Performance Standard Compliance	
Certification Scheme: Motor (IEC 60034-2-1:2014) TÜV China	
Certificate No.: MHP0000022 Issue Date: 20-11-2022 Expiry Date: 24-11-2025	
This is a computer-generated certificate. No signature is required.	

Page 1 of 2

Attestation of conformity of the necessary technical documentation as well as the EU Declaration of conformity the manufacturer may affix on the product. The declaration of conformity is issued under the sole responsibility of the manufacturer. Other relevant EU directives have to be observed.

TÜV SUD Produkt Service GmbH - Certification Body - Heisterstraße 60 - 40549 Mönchengladbach - Germany

EcoMoto

100%
NEW OR
RETROFIT

**PREMIUM
ENERGY
SAVING**

**NEW
PRODUCT**

VTÖ

®