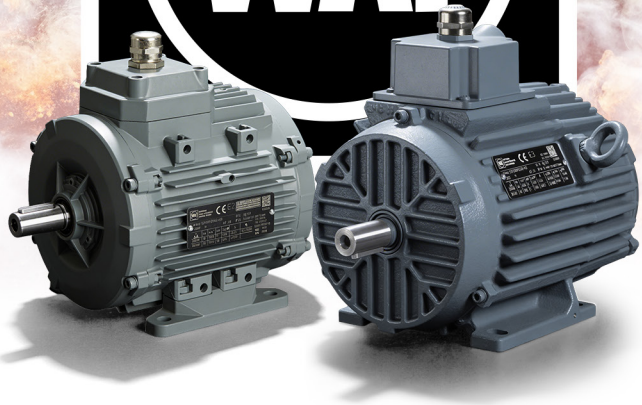
AGILITY IN MOTION



SMOKE EXTRACTION MOTORS

OPERATING MANUAL

wat.com.tr

Please read this manual first!

Dear Customer,
We wish that your product, manufactured in modern facilities and subjected to meticulous quality control processes, will provide you with the best performance. Therefore, we kindly request that you carefully read this guide in full before using your product and keep it as a reference.

This operating manual:

- Will help you use your motor quickly and safely.
- Read the operating instructions before operating and starting your motor.
- Follow the instructions, particularly those related to safety.
- Keep the operating manual in an easily accessible place in case you need it later.
- Also, read the other documents provided with the motor. Please keep in mind that this operating manual may also apply to other models. The differences between the models are clearly highlighted in the manual.

Symbols and their explanations

The following symbols are used in the operating manual:

Warning against conditions that are hazardous to life and property

Warning against electrical voltage

Marking important information related to the subject

This product is manufactured in environmentally-friendly modern facilities without causing any harm to nature.

Table of Contents

SMOKE EXTRACTION MOTORS

1. NORMS, STANDARDS, AND CONDITIONS OF USE

WAT electric motors are manufactured in compliance with international standards.

IEC 60034-1	Classification and performance
IEC 60034-2-1	Loss and efficiency measurement methods
IEC 60034-5	Classification of protection rating
IEC 60034-6	Cooling methods
IEC 60034-7	Symbols for construction and mounting arrangements
IEC 60034-8	Terminal markings and direction of rotation
IEC 60034-9	Noise limits
IEC 60034-11	Thermal protection
IEC 60034-12	Starting Properties
IEC 60034-14	Vibration limits
IEC 60034-18-1	Functional evaluation of insulation systems
IEC 60034-18-41	Partial discharge-free electrical insulation systems used in rotating electrical machines powered by voltage transformers
IEC 60085	Thermal testing of insulation materials used in electrical machinery
IEC 60034-30-1 ve 30-2	Classification of efficiency
IEC 60038	Standard voltages
TS EN 50347 & IEC 60072-1 ve 2	Dimensions and output power for electric machines
EN 55014-1 EN 61000-3-2 EN 61000-3-3	Electromagnetic compatibility

During the maintenance and inspection of the motor, necessary precautions shall be taken for circuits and connections that may be under voltage. Motors shall be protected against excessive loads by fuses, thermal protection, thermistors, thermal switches, or electronic protection circuits suitable for the full load current specified on the rating plate. The appropriate selection and accuracy of these circuits shall be verified.

The specifications provided on the rating plate of the motor, the relevant standards, and the conditions specified in this manual must be observed for the warranty to be valid.

2. ENVIRONMENTAL SPECIFICATIONS

According to IEC 60034-1, three-phase and single-phase motors are designed to operate at a maximum altitude of 1000 meters above sea level and within an ambient temperature range of –20 to +40°C. The following coefficients, expressed as percentages, shall be used for the power calculations at other altitudes and ambient temperatures.

Height		Up to 1000 m	Up to 1500 m	Up to 2000 m	Up to 2500 m	Up to 3000 m	Up to 3500 m	Up to 4000 m
In % by insulation class Times of the catalogue powers	B	100	97	94	90	86	82	77
	F	100	98	95	91	87	83	78

Ambient temperature		30°C	35°C	40°C	45°C	50°C	55°C	60°C
In % by insulation class Times of the catalogue powers	B	106	106	100	97	92	86	60
	F	105	102	100	97	93	87	82

3. INSTALLATION, OPERATION, MAINTENANCE AND SAFETY

WAT MOTOR F300 & F400-2 Hours Smoke Extraction motors
Installation, Operation, Maintenance and Safety Manual

3.1. SAFETY INFORMATION

Follow these instructions to ensure the safe and proper installation, operation, and maintenance of WAT F300 Aluminum Body and F400 Cast Iron Body Smoke Extraction Motors. This manual shall be made available to all persons who install, operate, or maintain the motor or related equipment, including fans, OEMs, and end users. The motor shall be installed and operated by qualified personnel who are familiar with health and safety requirements and the applicable national regulations. Failure to follow these instructions may render all applicable warranties void. Operation by unauthorized persons may result in serious injury and property damage.

PLEASE READ THE USER MANUAL CAREFULLY BEFORE OPERATING THE MOTORS. PLEASE OBSERVE AND FOLLOW THE SAFETY INSTRUCTIONS.

This operating manual will help you use your electric motor safely.

- Before installing and starting your motor, please read the user manual and other documents provided with the machine carefully.
- Please follow the safety instructions.
- Please keep the operating manual in an easily accessible place for future reference.

WARNING
This symbol indicates a warning against the risk of injury or damage.
Please be careful and follow the safety instructions.

ELECTRICAL HAZARD
This symbol indicates the risk of electric shock.
This is a warning against electrical voltage.

NOTE
This symbol indicates important information related to the subject.

- Follow the technical information in the catalogues and the on the electric motors. Carefully review the operating instructions.
- The start-up and shutdown procedures according to the electrical connection diagrams shall only be performed by authorized operators.
- The operation, maintenance, and any intervention in case of malfunction of electric motors shall be performed only by authorized operators.
- Before starting any maintenance work on an electric motor, the power supply to the motor shall be disconnected and the motor shall be secured with warning signs to maintain safety.
- After disconnecting the power supply to the motor, the operator shall wait until all moving parts have come to a complete stop before making any operation on the motor.
- Inspect the electrical and mechanical connections before reconnecting the electrical connections of the motor. Provide proper grounding.
- Tighten electrical terminal connections with the appropriate torque to ensure the connection does not cause problems.

- Parts that are energized or rotating and that can generate high temperatures are present in this type of equipment during operation. Thus, exposed terminal boxes, unprotected couplings, and improper operation can cause serious injury and/or damage to property.
- Persons responsible for installation safety shall ensure the following:
- Only qualified personnel may perform the installation and operation services for the equipment;
- This personnel shall carry this manual along with other documents provided with the motor, and work shall be performed in accordance with the standards and documents specific to this product.
- Unqualified personnel shall never perform any work on electrical equipment;
- Warranty may become void if installation and safety instructions are not followed properly.

Qualified personnel shall ensure the following:

- Technical data regarding permitted applications (assembly, storage, connection, installation, and operating conditions) included in this Manual, Purchase Order documents, operating instructions, manu-als, and other documents;
- Instructions and special conditions for installation on site;
- Use of suitable tools and equipment;
- Points to be considered during use and transport;
- Removal of all protective devices from each component before in-stallation;

- Avoiding lifting and carrying operations outside the points specified in this manual;
- Furthermore, all motors shall be stored in vibration-free rooms to prevent damage to the bearings. For practical reasons, it is not possible to include detailed information covering all construction variables or all possible assembly, opera-tion, or maintenance alternatives in this manual. Please contact WAT directly for clarification if you have any questions or concerns.

3.2 INSULATION RESISTANCE

Measure the insulation resistance of motors stored for extended periods before shipping. If the windings are damaged due to moisture during storage, measure the insulation resistance and make a decision about the motor according to the following table:
If it is 2 MΩ or less, it shall be inspected by the motor service operator.
If it is between 2 MΩ and 100 MΩ, the motor is hazardous.
If it is 100 MΩ or above, the motor is suitable.

> There is a risk of electric shock when operating an electric motor with an improper insulation resistance. The motor shall not be started if its measured insulation resistance is low.

> Ensure that the power is turned off and the motor is not running before measuring the insulation resistance.. The body of the motor and any thermal protectors shall be grounded.

> Disconnect the motor from its power supply before performing any insulation measurements.. Discharge the terminals immediately after taking the measurement to prevent any risk of electrical discharge. Do not touch the terminals during measurement and immediately after measurement, as they may still carry a hazardous voltage. Also, if power cables are connected, make sure to disconnect the main power supply properly. This applies to both main and auxiliary circuits, and particularly to anti-condensation heating circuits.

> Be careful when lifting to measure insulation resistance:
Do not lift the motor by its shaft;
Check the weight of the motor to be lifted.

3.3 INSTALLATION OF THE MOTOR AND MECHANICAL CONNECTIONS

Before Installation

- Ensure that the motor is not damaged during transportation and storage.
- Check whether the information on the motor ‘s rating plate is con-sistent with the current line voltage.
- Check if the motor is suitable for its intended use.
- Check that the accessories (if any) of the motor are complete and in operational condition.

Preparation for Installation

- Remove the rust inhibitor on the shaft using a suitable agent.
- Check for friction by rotating the motor shaft by hand.
- Measure the insulation resistance.

WAT Motors are dynamically balanced by installing half keys. Therefore, the transmission elements shall be balanced with a half-key.

Installation

- The motor shall be mounted on a flat surface with a vibration damper and in a location resistant to torsion.
- The load and motor shaft shall be on the same axis and parallel to each other.
- The air intake of the motor shall be adequately open.
- The terminal box and cover for the electrical connections shall be easily accessible after installation.

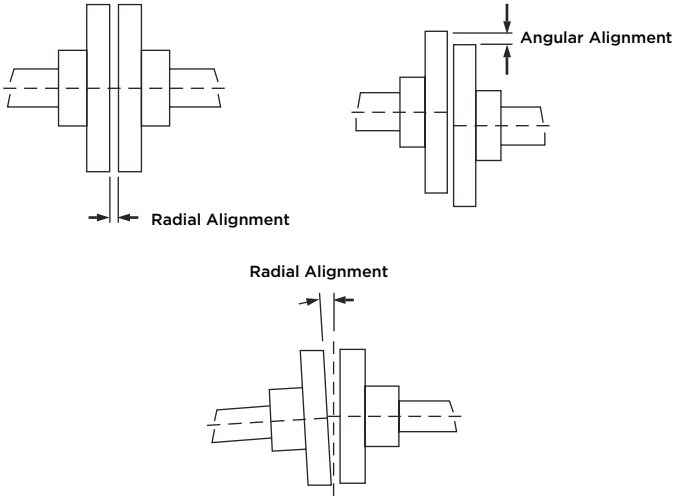
If motors are connected by couplings and similar components, parallelism and axial concentricity are critical for the performance and service life of the motor. Therefore, it shall be properly aligned and measured. Vibration may occur in the motor if the alignment is not correct. Some parts may be damaged if the eccentricity is too high.

In belt and pulley applications, pulleys shall be positioned parallel to each other, and the belt and pulley system shall be adjusted with appropriate belts at the correct tension. Excessive tension in the belts may result in excessive vibration and also cause breakage of the shaft or damage to the bearings. As the motor is balanced with a half key, the pulleys and couplings to be used shall also be balanced with a half key.

The ventilation of the electric motor at the installation site shall not be obstructed. There shall be sufficient space behind the motor fan to allow for suction. The motor shall be installed in a way that allows for electrical connections and maintenance. In case of the presence of airborne dust in the environment, the resulting change and drop in the airflow created by the fan will result in a decrease in cooling performance.

Installation sites shall allow easy access for inspection and maintenance services. WAT is not responsible for bringing motors to the assembly area or removing them from the site.

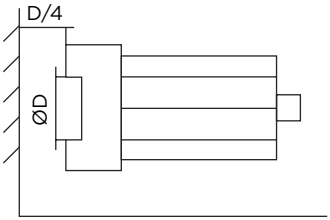
The cable glands supplied with the motor shall be installed to protect the phase connection cables. In general, do not lift the motor by its cable or hose assembly to prevent damage to the insulation on the cables and hoses.



3.4 COOLING

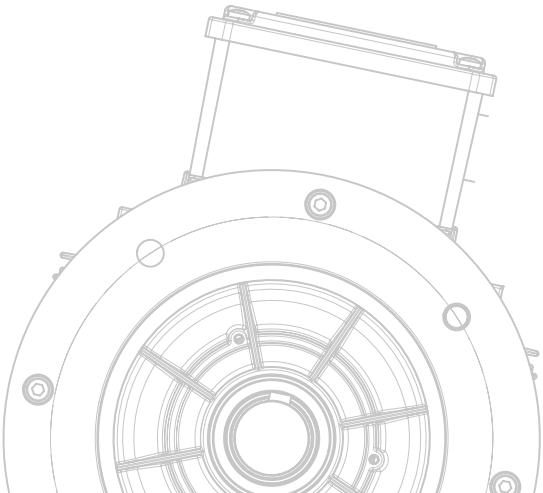
Smoke Extraction Motors are designed to operate at a maximum ambient temperature of 40°C and at a maximum altitude of 1000 meters above sea level.

Ensure that no equipment, surface, or direct sunlight nearby radiates additional heat to the motor. To allow free air circulation around the motor, TEFC (Totally Enclosed Fan-Cooled) machines shall not be mounted closer than 1/4 of the air inlet diameter to the walls or other obstacles.



The distance to the nearest object on the air intake side of the motor shall be at least one-fourth of the fan cover hole diameter.

WAT F300 Smoke Extraction Motors are designed and approved to operate with the IC 418, TEAO cooling method. The fans shall provide adequate airflow for the motor to perform the desired operation when in blowing or suction mode. Otherwise, it cannot provide min. fan system airflow; increased temperature may cause overheating and motor failure.



3.5 ELECTRICAL CONNECTIONS AND GROUNDING

Before Installation

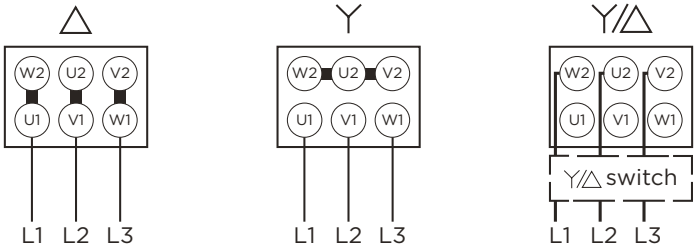
- The connections shall be made according to the electrical connection diagram provided with the motor. Do not connect the motor without checking the diagram.
- Examine the voltage and frequency information on the rating plate of the motor carefully and check that it is suitable for the power line.

Preparation for Installation

- Check for corrosion on the connection side of the cables to the windings.
- The cross-section of the cables used and the distance to the mo-tor control panel shall be appropriate for the motor power. (In case the loose cable extensions are not long enough)
- The suitability of the cable glands in the terminal box shall be inspected according to the cable diameter to be used.
- Determine the rotation direction before connecting the motor to the load, and then connect it after ensuring compatibility with the load.

Connection Diagram for Single Speed Motors with Winding

3-Phase, Single Speed



Starting with direct start

The simplest way to start a squirrel cage asynchronous motor is to connect the mains supply directly to the motor. The only equipment required for starting is a direct online starter. While this is the most preferred method, current limitations and regulations shall be observed due to the high starting current.

Star/Delta (Y/Δ) Starting

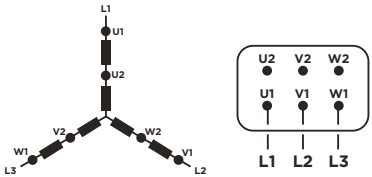
If the starting current of the motor exceeds the power supply limit, Y/Δ starting can be used. A motor with a 380 or 400V (Δ) winding is started with the winding connected in Y. This method reduces the starting current and torque to approximately one-third of the starting value. In order to limit current and torque fluctuations during the switch from Y to Δ, the switching operation shall be performed when the motor approaches its nominal speed as much as possible (93–95%).

Connection Diagram for Dual Speed Motors with Winding

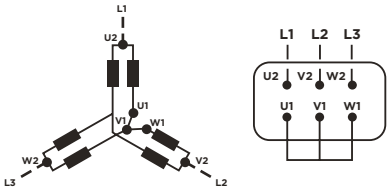
Winding Connection Diagram for Dahlander Motors

Dahlander motors are designed to operate in different modes depending on torque and power requirements. These are fixed torque, fixed power, and variable torque. Variable torque operating mode is commonly preferred in fan applications where F300 and F400 Dahlander motors are used. The terminal connections for these Y/YY-connected motors shall be made as follows.

Low Speed Connection – Star Series (Y)



High Speed Connection – Parallel Star (YY)



All motors are capable of running in both directions of rotation. If power supply phase conductors, viewed from the driver side: are connected to terminals L1, L2, L3, U1, V1, W1, the motor will rotate clockwise. If the connections of any two terminals are reversed, the motor will rotate counterclockwise. Before connecting the motor, quickly turn it ON/OFF to check the rotation direction.

The motor shall be connected to a proper grounding system.
Thermal protection is not available as standard on smoke extraction motors.

» All WAT F300 & F400 smoke extraction motors are supplied with ZZ sealed bearings. The bearings are filled with DuPont Krytox GPL 226 bearing grease, which is resistant to high temperatures. Use equivalent bearing grease if the bearing needs to be replaced during operation.

» WAT F300 & F400 smoke extraction motors are not supplied with any kind of thermal protector. If external protectors are connected through the operating system, please ensure that this will not adversely affect the operations of the motor during fire mode.

» Please check that the motor is running without load. Is it rotating freely without abnormal noise? Is the direction of rotation correct? (Reverse either terminal of the power source to reverse the direction of rotation).

» Please check the following;

» Is the air flowing through the motor at the recommended speed?

» **Visual inspection:** Cleanliness in the working area, terminal box, cables, terminals, stud bolts, fan and fan cover, couplings, connecting parts, and drain plug.

» **Alignment type:** Which type used? (clock – radial/radial; clock – radial/axial; optical; rule based on rollers)

» **Alignment values:** Radial (....mm) and axial (....mm).

» **Starting type:** DOL, Soft Starter, frequency inverter, etc. (Model, capacity, etc.)

» **Voltage:** Measure the voltages between phases and check the tolerance according to IEC60034-1.

» **Voltage Unbalance:** Calculate the voltage imbalance as per IEC60034-26 and check if there is a problem;.

» **Current:** Check the current in each phase and compare it with the current on the rating plate.

» **Current Unbalance:** Calculate the current imbalance as per IEC60034-26 and check if there is a problem.

» **Speed:** Check the speed (rpm).

» **Ambient Temperature:** Measure the ambient temperature at a distance of 1 m from the motor.

» **Height:** Determine the field height.

» **Air flow rate:** Check if the TEAO motor is receiving the required air flow rate as recommended.

» **Bearing housing temperature:** DE and NDE temperature.

» **Winding temperature:** Check if the winding temperature is in compliance with the insulation class limit.

» **Vibration values:** As recommended by standard practice, check the vibration at all 6 points on the DE and NDE bearings (if possible). Also check the acceleration.

» **Final condition:** Whether it has been approved or not and who approved it.

General observation: All details that were verified during startup

3.6 STORAGE

If the motors are to be stored for a long period of time, they shall be stored in a dry, vibration-free, clean, well-ventilated room. Before starting the motors, check the insulation resistance and dry the windings if necessary (see the Maintenance section). The water drain holes plugged, if available, shall be located at the lowest point of the enclosure according to the construction and mounting arrangement of the motor and shall be kept clean. When these plugs are removed, the protection rating will be reduced to IP44.
To prevent migration of grease and corrosion, it is recommended that the shaft be manually rotated once a month (at least 10 turns). It is also recommended to move the shaft to another position after 10 turns.

3.7 LIFTING AND HANDLING

WAT F300 Smoke Extraction Motors are manufactured in sizes ranging from 80 to 315 Frame. Motor bodies up to 250 Frame are made of aluminum, while 280 and 315 Frame motors have cast iron bodies. All aluminum body motors feature an optional foot mount, and motors with 80, 90, and 100 bodies can be converted to the B30 - PAD Mounted option using the separately provided attachments.

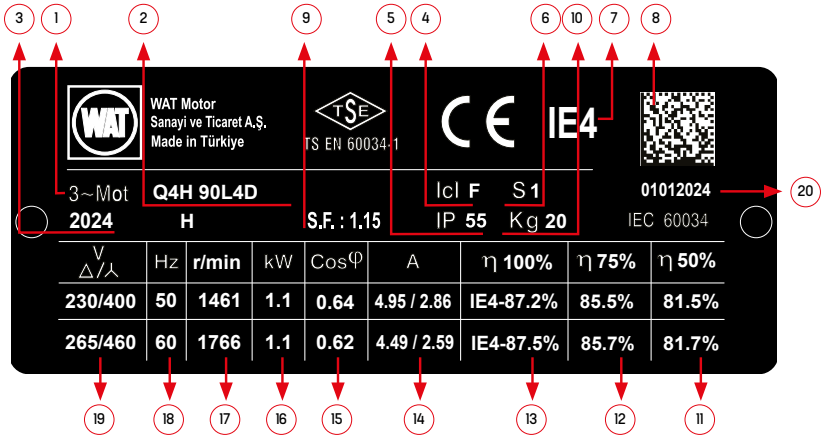
WAT F400 Smoke Extraction Motors are manufactured with Cast Iron bodies, with or without legs, in sizes ranging from 80 to 315 Frame.

4. RATING PLATE

The rating plate of the electric motor is as follows. The plate may feature the WAT or TEE branded logo.

According to the EC 640/2009 Directive, motor rating plates shall display 50Hz and 60Hz motor data, IE codes, and efficiency values.

Thanks to the 2D barcodes available on our WAT and TEE-branded motors, it is possible to access traceability information such as the motor's production date, routine test results (neutral, current, resistance, power, etc.), and serial number.



1. Motor Type
2. Motor Code
3. Year of Production
4. Insulation Class
5. IP Protection Class
6. Operating Mode
7. Efficiency Class (According to 60034-30-1)
8. QR code
9. Service Factor
10. Motor Weight
11. Efficiency Value (According to 60034-2-1)
12. Efficiency Value
13. Efficiency Value
14. Nominal Current Value
15. Power Factor
16. Motor Output Power
17. RPM
18. Motor Nominal Frequency
19. Operating Voltage
20. Manufacturing Tracking Number (Serial Number)

The cable and lug cross-sections used in F300 and F400 Smoke Exhaust Motors are as follows.

80 FRAME	6 BRUSHES X 0,75 mm^2	M4 / 0,75 mm^2
90 FRAME	6 BRUSHES X 1 mm^2	M5 / 1 mm^2
100 FRAME	6 BRUSHES X 1 mm^2	M5 / 1 mm^2
112 FRAME	6 BRUSHES X 1.5 mm^2	M5 / 1,5 mm^2
132 FRAME	6 BRUSHES X 2.5 mm^2	CABLE LUG (2.5-6 mm^2)
160 FRAME	6 BRUSHES X 4 mm^2	CABLE LUG GK 8-6
180 FRAME - 22 kW - 2 POLES ONLY	6 BRUSHES X 2 X 2,5 mm^2	M10 CABLE LUG10-6
180 FRAME	6 BRUSHES X 6 mm^2	CABLE LUG GK 8-6
200 FRAME	6 BRUSHES X 2 X 4 mm^2	M10 CABLE LUG10-6
225 FRAME	6 BRUSHES X 2 X 6 mm^2	M10 CABLE LUG10-6
250 FRAME	6 BRUSHES X 16 mm^2	M10 CABLE LUG10-6
280 FRAME	6 BRUSHES X 25 mm^2	CABLE LUG35
315 FRAME	6 BRUSHES X 2 X 25 mm^2	M12 CABLE LUG50

5. SPARE PARTS AND SERVICE

Dear Customer,
We believe in the importance of providing good service as well as offering you good products. Accordingly, we continue to offer you, as our knowledgeable consumers, a wide range of new services.

Our Authorized Service Centers are now providing service 5 days a week from 8:00 to 18:00. You can contact WAT Electric Motors Customer Service Hotline by dialing this number directly and request the service you require.

Customer Services Department
Tel: +90 850 399 49 28

We kindly request that you comply with the following recommendations.

- When you receive your product, please have the Warranty Certificate approved by your Authorized Dealer.
- Use your product in accordance with the principles of the operating manual.
- If you have a request for service regarding your product, please contact Customer Service using the phone numbers above.
- Service Life: 10 years. (The spare parts necessary for the product to function will be available for this period.)

WAT electric motors are under warranty for 2 years against manufacturing defects.

SERVICE CONTACT INFORMATION
Factory/Customer Services Department
WAT Motor Sanayi ve Ticaret A.Ş. Organize Sanayi Bölgesi Karaağaç Mahallesi,
8. Sokak, No: 4, A/2 59510 KAPAKLI/TEKİRDAĞ
Tel: (0-282) 292 22 69
Fax: (0-282) 292 22 23
E-mail: support@wat.com.tr
Web: www.tee.com.tr - www.wat.com.tr

Our Authorized Service Stations are registered in the Service Information System (www.servis.gov.tr) established by the Ministry of Trade.

You can find the current contact information for our authorized services and spare parts dealers on our website.

Electric Motor
WARRANTY CERTIFICATE

The WAT Electric Motor, including all its components, is guaranteed against defects in material, workmanship, and manufacturing, provided that it is used as specified in the operating manual and has not been serviced, repaired, or otherwise interfered with for maintenance, repair, or any other reason by persons other than those authorized by WAT Motor Sanayi ve Ticaret A.Ş. ***IS GUARANTEED FOR A PERIOD OF 2 (TWO) YEARS.*** *In the event that the product malfunctions within the cover of warranty period due to both material and workmanship and assembly errors, no labour costs, replacement part fees, or other charges will be applied for the repairs performed. The time taken for repairs carried out within the warranty period shall be added to the warranty period. The repair period is maximum 20 work days. This period begins on the date the product is reported to our authorized service workshop, or if we do not have authorized service workshops in the region, to our Authorized Dealers or our Company. If the defect in the product cannot be repaired within 10 business days, WAT Motor Sanayi ve Ticaret A.Ş. shall assign another product with similar features to the customer for use until the repair of the product is completed.*

The determination of the technical methods to be applied to resolve the malfunction and the determination of the parts to be replaced are entirely the responsibility of our company. The repair of the fault can be carried out at the location where the product is located or at Authorized Service Workshops. Our customer's approval is required for this purpose.

However;
Despite the consumer has exercised his/her right to repair the goods, in case;

1. *Within one year from the date of delivery to the consumer, provided that it remains within the warranty period, if the product malfunctions at least four times or six times within the warranty period specified by the manufacturer and/or importer, and if these malfunctions prevent the continuous use of the product,*
2. *The maximum term necessary to repair is exceeded,*
3. *The service station of the company, and in case the service station is not available, the seller, dealer, agent, representative, importer or one of the manufacturer-producer of the goods determines that the repair of the malfunctioning is not possible, the consumer may request free replacement of the goods, reimbursement or price reduction.*

For any issues that may arise regarding the warranty certificate, you may apply to the Directorate of Consumer Protection and Market Surveillance of the Ministry of Customs and Trade of the Republic of Turkey. The use of this Warranty Certificate has been authorized by the Directorate General for Consumer Protection and Market Surveillance of the Ministry of Customs and Trade of the Republic of Turkey, in accordance with Law No. 4077 on the Protection of Consumers and the Regulation on the Implementation Principles of the Warranty Certificate enacted based on this Law.

WAT MOTOR SANAYİ VE TİCARET A.Ş.
GENERAL MANAGER

Serial No.:
Type:

Date and Location of Delivery:	*Address:*
Invoice Date, No:	*Tel-Fax:*
Seller Company Name:	*Seller Company Name (Stamp and Signature)*

document has been issued in accordance with the Directorate of Consumer Protection and Market Surveillance of the Ministry of Customs and Trade, document number 10934, dated August 22, 2013.
This part to be signed and stamped by the Authorized Dealer.

The Issues Consumers ***Should Pay Attention Regarding Warranty***

This warranty provided by WAT Motor Industry and Trade Inc. does not cover the repair of faults arising from the abnormal use of the electric motor, and the following cases are also excluded from the warranty.

1. *Damages and failures resulting from misuse,*
2. *Damages and failures that occur during loading, unloading, and transportation after the product is delivered to the customer,*
3. *Damages and failures caused by voltage drops or surges, faulty electrical installations, or operation at a voltage different from the voltage specified on the rating plate of the product,*
4. *Failures and damages caused by fire and lightning strikes,*
5. *Failures resulting from use of the Product in violation of the instructions provided in the operating manual.*

The warranty granted for the product shall be void if unauthorized persons tamper with the product.

The malfunctions stated above are repaired against a fee.

The installation and transportation of the product to its place of operation are not included in the product price.

The responsibility for completing and submitting the warranty certificate to the consumer lies with the seller, dealer, agent, or representative from whom the consumer purchased the goods. This warranty is void if the warranty certificate is damaged, the original serial number on the product is removed or damaged.

The CE conformity assessment of your product has been carried out at the facilities of WAT Motor Sanayi ve Ticaret A.Ş.

Address: WAT Motor Sanayi ve Ticaret A.Ş. Organize Sanayi Bölgesi Karaağaç Mahallesi, 8. Sokak, No: 4, A/2 Kapaklı 59510 TEKİRDAĞ/TÜRKİYE

Customer Services Department: +90 850 399 4928 / +90 282 292 2269

WAT_DTM_0426

WAT MOTOR SANAYİ VE TİCARET A.Ş.
KARAAĞAÇ MAHALLESİ, 8. SOKAK, NO: 4, A/2
KAPAKLI, 59510 TEKİRDAĞ/TURKEY

wat.com.tr