



## *Electric motors User Manual*

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 Q1H - Q2H - Q3H - Q4H -  
 Q1HS - Q2HS - Q3HS -  
 Q1B - Q2B - Q3B - ~~Q~~ ~~B~~ ~~Á~~ ~~Q~~ ~~M~~ - ~~Q~~ ~~C~~

*Single phase and three-phase  
squirrel cage  
asynchronous motors*

# Please read this manual first!

Dear Valued Customer,

We hope that your product, which has been manufactured in modern facilities and passed through strict quality control procedures will give you the best results.

Therefore, we advise you to read through this manual carefully before using your product and keep it for future reference.

## This user manual...

is for the following models: QS,Q1E, Q2E, Q3E, Q4E, Q1H, Q2H, Q3H, Q4H, Q1HS, Q2HS, Q3HS, Q1B, Q2B, Q3B QB, QM, QC, and it applies to these models only.

If you are using a different model, please ask

WAT MOTOR SANAYİ VE TİCARET A.Ş. for the user manual.

## This user manual...

Will help you use the motor in a fast and safe way.

- Please read the user manual before installing and starting your motor.
- Particularly follow the instructions related to safety.
- Keep this user manual within easy reach. You may need it in the future.
- Please read all additional documents provided with the motor. Remember that this user manual may also apply to other models. Differences between the models are explicitly highlighted in the manual.

## Symbols and descriptions

This user manual contains the following symbols:



Warning against situations threatening life and/or property



Warning against voltage.

This product has been produced in environmentally-friendly, state-of-the-art facilities without harming the nature.



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# 1

## Safety Warnings

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For a smooth operation, some measures must be taken prior to installation. The person to install mechanical and electrical connections must have adequate training and knowledge. Intervention by unqualified persons may result in serious injuries and material damage.

- Only qualified persons must use and maintain the electric motors, as well as intervening in case of any fault.
- Pay attention to the technical data found in catalogues and on the label of the electric motor. Carefully read the instructions for use.
- Supplying and cutting off the electric power must be done by the authorised personnel.
- Before maintenance on the electric motor, you must cut off the power of the motor against the risk of electric shock and ensure safety through warning signs.
- Since the electric motor is equipped with rotating parts, do not intervene in the motor until it fully stops even if the power is off.

- Before powering the electric motor, check electrical and mechanical connections. Make sure that the grounding is suitable.
- Ensure that the terminal block connections are tightened to the right torque and do not lead to any undesired situation.

Warnings given in the instructions for use and operation, as well as the instructions for commissioning, installation, checks and maintenance of the motor are for the qualified personnel, who have knowledge of the safety standards in IEC 60364 and TS HD 60364. Incorrect installation, irregular maintenance, failure to take necessary measures, unsuitable mechanical and electrical connections might affect human health and cause injuries, as well as damage to the product.

# 2 Models

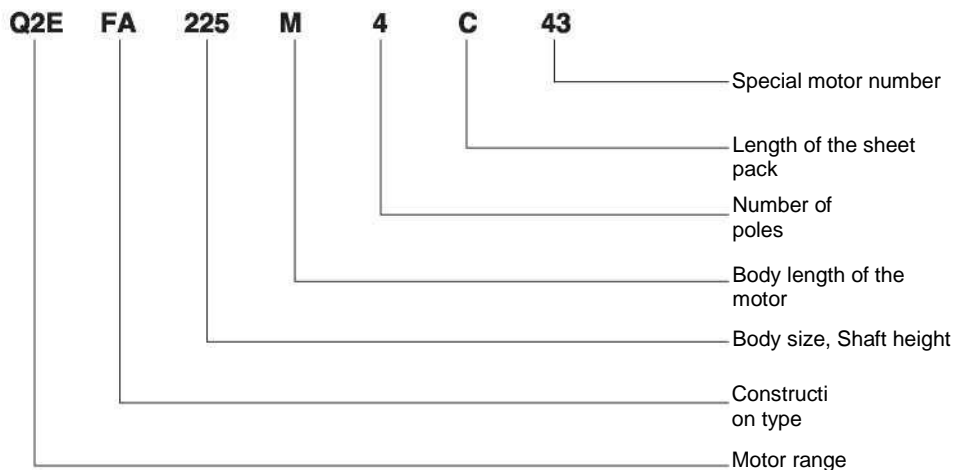
Three-phase motor models mentioned in the installation and user manual are as follows.

Descriptions for the models

QS, Q1 E, Q2E, Q3E, Q4E, Q1H, Q2H, Q3H, Q4H, Q1HS, Q2HS, Q3HS, Q1B, Q2B, Q3B, QB, QM, QC

Q2E P FA 250 M 4 D-43 (Sample model number)

<b>Q2E • Motor type</b> Q1E IE1 Efficient three-phase motor range Q2E IE2 Efficient three-phase motor range Q3E IE3 Efficient three-phase motor range Q4E IE4 Efficient three-phase motor range Q1H IE1 Efficient three-phase motor range Q2H IE2 Efficient three-phase motor range Q3H IE3 Efficient three-phase motor range Q4H IE4 Efficient three-phase motor range Q1HS IE1 Efficient three-phase motor range Q2HS IE2 Efficient three-phase motor range Q3HS IE3 Efficient three-phase motor range QS Standard three-phase motor QB Brake motor range Q1B Brake motor range Q2B Brake motor range Q3B Brake motor range QM Permanent cond. Mono-phase motor range QC Dual cond. Mono-phase motor range	<b>225 • Body size</b>	<b>Shaft height in mm</b>
	<b>M • Motor length</b>	S Short M Medium L Long
	<b>4 • Number of poles</b>	24.6.82/4.4/8.2/12.2/10 Poles
	<b>C • Length of the sheet pack (Irrespective of outer dimensions)</b>	A Short B Medium C Long D,CE,DE Extra long
<b>P • Body raw material</b> Al Aluminium P Peak		
<b>FA • Construction type</b> -- With legs B3,B6,B7,B8,V5,V6/V19 FA With flange A B5,V1 ,V3 FB With flange B B14,V18,V19 FC With flange C B14,V18,V19 FS With special flange PA With legs, with flange A B3/B5,V1/V5,V3/V6 PB With legs, with flange B B3/B14,V5/V18,V6/V19 PC With legs, with flange C B3/B14,V5/V18,V6/V19 PS With legs, with special flange X Without legs, without flange B9,V8,V9		
		<b>43 • Special motor number 01-...-99</b>



### 3 Norms and Terms of Use

WAT electric motors are manufactured in accordance with international standards.

IEC 60034-1	Classification and performance		
IEC 60034-2-1	Loss and efficiency measuring methods		
IEC 60034-5	Protection rating classification		
IEC 60034-6	Cooling methods		
IEC 60034-7	Symbols for types of construction and mounting arrangements		
IEC 60034-8	Terminal markings and direction of rotation		
IEC 60034-9	Noise limits		
IEC 60034-11	Thermal protection	IEC 60034-14	Vibration limits
IEC 60034-18	Functional evaluation of insulation systems		
IEC 60034-30-1	Efficiency classes	IEC 60038	Standard voltages
EN 50347	Dimensions and output powers for electrical machines		
EN 55014-1	EN 61000-3-2	EN 61000-3-3	Electromagnetic compatibility
<u>Turkey</u>	<u>United Kingdom</u>		
TSE EN 60034-1	BS EN 60034		

Necessary measures must be taken for circuits and connections that might be live during maintenance and inspection of the motor. Fuses, thermal elements, thermistors, thermal switches or electronic protection circuits that comply with the full load value current stated on the motor's label must be used to ensure protection against overloading. These circuits must be suitable and correct.



You need to comply with the technical specifications on the motor's label, relevant standards and the conditions in this manual to ensure that the warranty is valid.

#### Environmental conditions

As per IEC 60034-1, three-phase and single phase motors were designed to run at most 1000 meters above sea level and at an ambient temperature of 40°C.

For power calculations at other height and ambient temperature values, the following coefficients in % must be used.

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
Coefficients of catalogue power values in % by insulation class	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
Coefficients of catalogue power values	B	106	106	100	97	92	86	60
	F	105	102	100	97	93	87	82

WAT electric motors must be operated in accordance with the values stated on their labels. Supply voltage must be within the range of 10±% compared to the rated voltage on the label.

Supply frequency must be within the range of 2±% compared to the rated frequency stated.

## 4 Storage and Transportation

Motors are shipped from our factory ready to use and in packages.

Before installing the motor in place, check if it has been damaged during transportation.

Motors must be kept with their original packaging. If the package has been damaged, this must be rectified. If it is going to be stored for a long time, it must be kept at constant temperature, free of vibration and water.

To prevent damage to the bearing, the environment where it is kept must be dry, free of dust and the vibration must be  $V_{eff} < 0.20 \text{ mm/s}$  maximum.

Lifting eyes on the motor are for handling purposes only. They must not be used with extra loads. Check the tightness of the lifting eyes before use.

In long-term storage conditions, resistances of the motors must be measured before they are shipped. If, during storage, motor windings get damaged due to humidity, their insulation resistances must be measured and a decision must be taken regarding the motor according to the table below.

- If it is  $2 \text{ M } \Omega$  or below, it must definitely be checked by the authorised service agent.
- If it is between  $2 \text{ M } \Omega$  and  $50 \text{ M } \Omega$ , it is at risk
- If it is between  $50 \text{ M } \Omega$  and  $100 \text{ M } \Omega$ , it is normal
- If it is above  $50 \text{ M } \Omega$ , it is suitable.



If the insulation resistance measured is not suitable, there is the risk of electric shock when running the electric motor. In such a case, the motor must never be operated.



The insulation resistance is measured when the motor is not powered and is stationary. Motor body and if any, thermal protecting devices must be grounded.



- In case of any damage, the authorised person must be informed and the damage must be recorded.
- As per the instructions, the product must be placed on a wooden pallet during storage and shipping. Stacking must be done in accordance with the instructions.
- Packages of the electric motors must never be opened during storage.

The motor must never be lifted from any part except for the lifting eye.

If long term storage is required,

- The storage place must be closed and covered.
- Vibration must be prevented.
- Ambient temperature must be kept between  $-15^{\circ}\text{C}$  and  $40^{\circ}\text{C}$ .
- Relative humidity in the air must be  $< 50\%$ .
- The product must be kept away from chemical gases.
- Storage place must be protected against rodents.

# 5

## Installation and Mechanical Connections

### Before installation

- For transportation and storage, check if the motor is damaged.
- Make sure that the information on the motor is in compliance with the mains voltage.
- Check the information on the motor to see if it is suitable for the place of use.
- Make sure that the accessories (if any) on the motor are complete and functional.

### Preparation

- Clean the anti-corrosive plastic protection cover and materials on the motor shaft.
- Manually rotate the motor shaft to check if there is friction.
- Measure the insulation resistance. If the insulation resistance is not suitable, do not use the motor.
- Motors are dynamically balanced using the half key found at the shaft end. To do this, powertrains must be balanced with the half key.

### Installation

- Place the motor on a vibration isolating flat surface that is resistant to torsion. It is possible to connect the motor from its feet or the cover.
- Load and motor shaft must be on the same axis and in parallel to each other.
- Ensure that the motor's air cooling inlet is free of obstructions.
- For electrical connections, make sure that the terminal box and cover are accessible after installation.

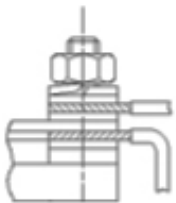
### Balance, alignment

Make sure that the motor is not subject to impacts or stress to prevent deterioration of the bearings when installing the pulley, coupling and other powertrains. If there is an arrangement and accessories that ensure precise installation of powertrains, it is recommended to heat them up to 60-80 C° before installing. After installing the powertrains, fit them tightly onto the shaft block and tighten well so that there is no space.

If the motor is to be connected via couplings, alignment must be suitable and measurements must be taken. If not aligned well, the motor might vibrate. If misalignment is too much, some parts may break or get damaged.



When aligning and levelling couplings, it is important to take into account the effect of the temperature of the running pump and the motor. In coupling systems, different expansion levels might change the alignment/balancing during operation. For this reason, it is important to leave an axial clearance (minimum 3 mm) between couplings. In case of misalignment due to temperature, bearings might deteriorate because of over-vibration.

 <b>Terminal Connection</b>	<b>Terminal Plate Bolt Tightening Values</b>				
	<b>FRAME</b>	<b>M4 (±0,5)</b>	<b>M5 (±0,5)</b>	<b>M6 (±0,5)</b>	<b>M8 (±1)</b>
<b>63-71-80</b>	<b>1,5</b>				
<b>90-100-112</b>		<b>2,0</b>			
<b>132-160</b>			<b>3,5</b>		
<b>180-200</b>				<b>6,0</b>	
<b>225-250-280</b>					<b>8,0</b>



## 5 Installation and Mechanical Connections

In belt-pulley applications, make sure that the pulleys are located in parallel to each other and installed with the belt with a suitable tension. Overtension on the belt may lead to over vibration in the system and it may even cause the shaft to break. On a motor that is balanced according to half key balance, the pulley and couplings used must also be balanced with a half key.



The user is responsible for appropriately installing the electric motor.

The ground to which the motor is to be connected must be able to respond to the weight and mechanical forces of the motor. Size of the bolts to be used to fix the motor must not cause vibration on the motor.



The object closest to the air inlet side of the motor must be located at a distance of at least one-fourth of the dimension of the hole of the fan protection housing.

## 6 Operation

Fuses, thermal elements, thermistors, thermal switches or electronic protection circuits that comply with the full load current value stated on the motor's label must be used to ensure protection against overloading. These circuits must be suitable and correct.

In case of direct starting, squirrel cage asynchronous motors draw 6 to 7 times more current than the one stated on the label. For this reason, it is important that electrical connections of the electric motor can bear such high currents. Make sure to check if the sudden high torque that might be observed on the motor can harm the system.

If the power supply is not adequate or if the power cable is too long and/or its cross-section is low, the voltage of the motor will inevitably decrease.

Star-delta start must be used on three-phase asynchronous motors for the motor to do soft start.

(Start-delta start is recommended for motors with 4kW and above.)

Points to consider at initial start are as follows.

- Make sure that the electric motor has been delivered in good condition from the storage area.
- Make sure that the mechanical and electrical connections of the electric motor are complete. Verify the connection diagram.
- Check the motor's direction of rotation.

- Check the motor ventilation. Make sure that the air inlet is open.
- Make sure that the terminal box is shut.
- Check to see if all bolts of the system and the motor are installed and tightened.
- If possible, rotate the motor shaft by hand to check if the system is correct.
- After these steps, run the motor.

While the motor is running, check if there is vibration on it. Monitor the temperature increase on the bearings.

- After loading the electric motor, compare the measured results with the current and power values stated on the label.
- If the motor is running with rated load, its temperature increase will become stable in 2 or 3 hours. Check if this value is suitable.

Points to consider when determining the motor suitable for the load;

- Mains voltage
- Frequency
- Load characteristics and value
- Ambient conditions
- Structure
- Service factor
- Operating regime



**Important note for QS, Q1E, Q2E, Q3E, Q4E, Q1H, Q2H, Q3H, Q4H, Q1EP, Q2EP, Q3EP, Q1HS, Q2HS, Q3HS, Q1B, Q2B, Q3B, QB:** For three-phase motors with a start current of above 31 A2, conditions given in standards EN61000-3-3 and EN61000-3-11 must be considered or the motors must be connected to the mains where the current capacity is higher than 100A.



### Important note for QM, QC:

For single-phase motors with a start current of above 26A, conditions given in standards EN61000-3-3 and EN61000-3-11 must be considered or the motors must be connected to the mains where the current capacity is higher than 100A.

### Vibration and Balance

All rotors are dynamically balanced with a half key and this is stated with “H” on the motor’s label. According to IEC 60034-14, vibration level A is ensured on standard motors.

It is possible to manufacture motors with vibration level B upon request.

Body size	Vibration level (mm/s)	
	A	B
63-132	1.6	0.7
160-230	2.2	1.1
315-355	2.8	1.8

### Tolerances

Below you can find the electric motor’s measurable parameters’ deviation tolerances from catalogue values (as per IEC 60034-1).

<b>Speed (n)</b>	$\Delta n = \pm 20\% (n_s - n_N), P_N > 1kW$ $\Delta n = \pm 30\% (n_s - n_N), P_N \leq 1kW$
<b>Efficiency % (n)</b>	$\Delta \eta = -15\% (100 - \eta_N), P_N \leq 50kW$ $\Delta \eta = -10\% (100 - \eta_N), P_N > 50kW$
<b>Power factor (cos Q)</b>	$\Delta \cos Q = -1/6 (1 - \cos Q)$
<b>Locked rotor current (IL/IN)</b>	$\Delta (I_L/I_N) = +20\% (I_L/I_N)$
<b>Locked rotor moment (ML/MN)</b>	$\min (M_L/M_N) = -15\% (M_L/M_N)$ $\max (M_L/M_N) = +25\% (M_L/M_N)$
<b>Overturning moment (MK/MN)</b>	$\Delta (M_K/M_N) = -10\% (M_K/M_N)$
<b>MS (MP/MN)</b>	$\Delta (M_P/M_N) = -15\% (M_P/M_N)$
<b>Moment of inertia (J) [kgm2]</b>	$\Delta J = \pm 10\% J$
<b>Volume (LPA) [dB]</b>	$\Delta LPA = +3dB (A)$

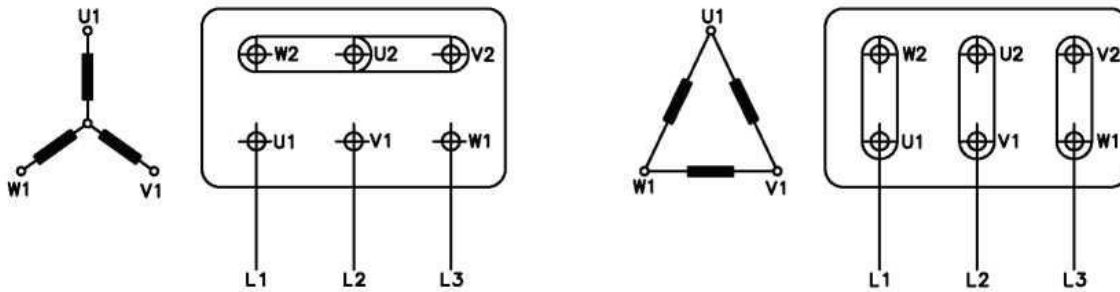


Measured current of the motor must never exceed the rated current stated on the label.

# 7 Electrical Connections and Grounding

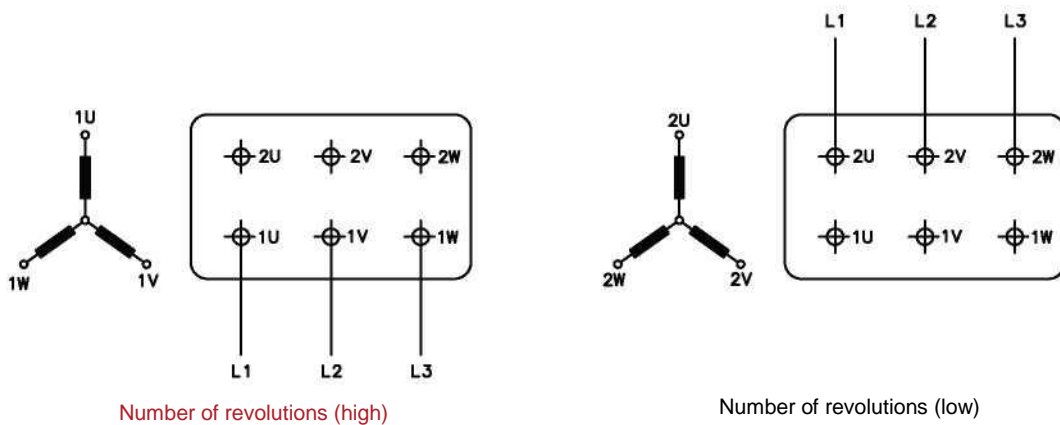
For QS, Q1 E, Q2E, Q3E, Q4E, Q1H, Q2H, Q3H, Q4H, Q1HS, Q2HS, Q3HS, electrical connections must be as follows.

For 3-phase asynchronous motors:

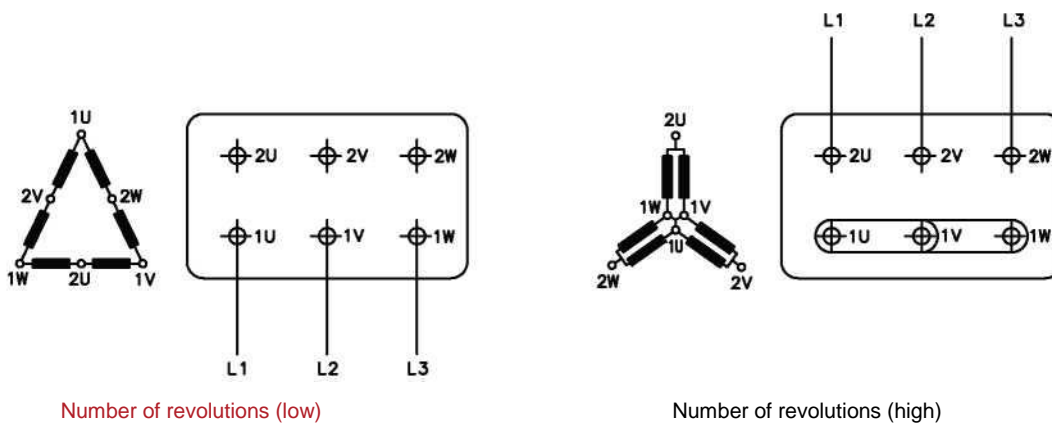


Electrical connection of dual-speed electric motors must be as follows.

Connection Diagram for Motor with Two Split Windings:

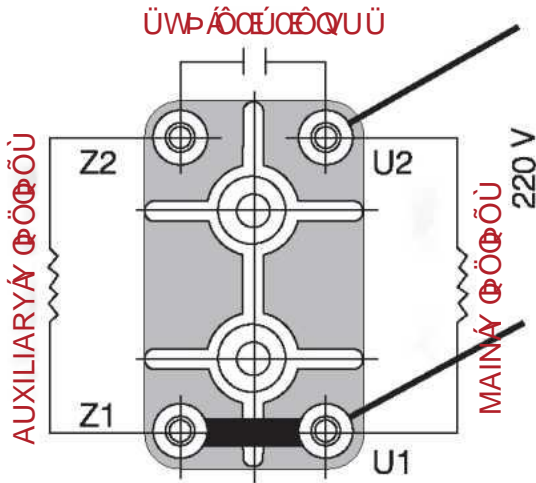


Connection Diagram for Dahlander Motor:



# 7 Electrical Connections and Grounding

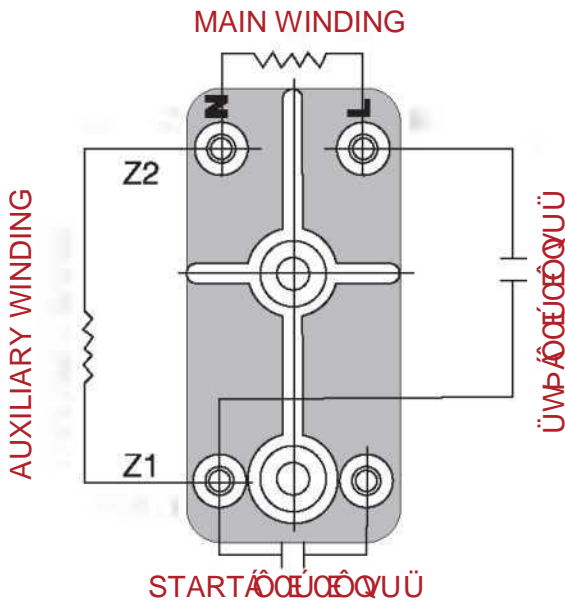
For QM models, electrical connections must be as follows.



Minimum braking moment setting must always be 30% above the normal value.

All parts of the braking system, which is mounted on the motor, must be checked periodically. Brake checks must be done after the electrical connections of the motor and of the brake have been cut off according to the catalogue and the instructions for use. Getting the desired performance from the braking mechanism is only possible through the use of original parts. The abrasion that is observed on the brake lining in time depends on the motor and load inertia, braking speed, frequency of use and hearing of the brake. The brake lining must be replaced in case of a 3 mm abrasion on its material. After replacing the brake linings, make sure to re-adjust the air gap. Once air gap reaches 0.7 mm, you need to re-adjust the air gap to get the desired performance.

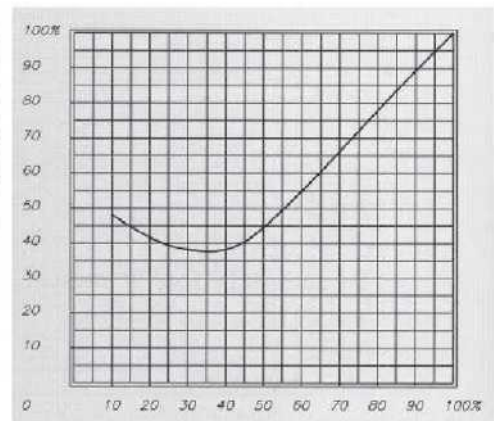
For QC models, electrical connections must be as follows.



## Brake

Normal operation of the brake is guaranteed at room temperature only. If the brake is not going to run for a long time in a cold/humid environment, cover the brake linings so that they do not stick to the friction surface.

Brake Lining Abrasion (%)



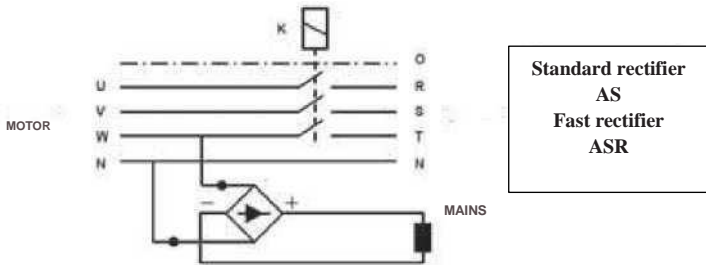
Braking Moment

To adjust the air gap, remove the mounting screws and then turn the nuts. If you are going to adjust the air gap after the brake has run for a certain period of time, wait for the brake to cool down. Normal value for the air gap is 0.2 mm (+0.05 -0). Permission

# 7 Electrical Connections and Grounding

The air gap must be 0.7 mm maximum. If this value is exceeded, braking performance may get affected, braking may not be performed completely, and the motor and brake might get heated.

Results of lining abrasion are given below.



100V DC brake motors are equipped with a half-wave rectifier and must be connected according to the diagram below for normal braking function. Rectifiers required for 24V DC brake motors must be provided by the customer.

Body	Brake Model	Distance Between Adjusting Ring and Electromagnet "A" [in mm]									
		9 mm	8 mm	7 mm	6 mm	5 mm	4 mm	3 mm	2 mm	1 mm	A=0 mm
QB63	K01				0.07	0.14	0.21	0.29	0.36	0.44	0.51
QB71	K02				-	0.20	0.41	0.61	0.92	1.02	1.22
QB80	K03				-	0.27	0.54	0.82	1.08	1.35	1.63
QB90	K04				-		0.41	0.82	1.22	1.64	2.04
QB100	K05	0.41	0.82	1.22	1.64	2.04	2.45	2.86	3.26	3.67	4.08
QB112	K06		0.41	1.12	1.84	2.55	3.26	3.98	4.70	5.40	6.12
Change Distance Braking Moment (Kgm)											Max. Moment

## Direction of rotation

**For QS, Q1 E, Q2E, Q3E, Q4E, Q1H, Q2H, Q3H, Q4H, Q1HS, Q2HS, Q3HS, Q1B, Q2B, Q3B, QB:**

If you want to change the motor's direction of rotation, switch the locations of two phases. Once installation is complete, carefully tighten the cover of the terminal box to ensure that it offers IP specifications.

**For QM, QC models:**

If you want to change the motor's direction of rotation, switch the locations of auxiliary winding whips (Z1- Z2).

Once installation is complete, carefully tighten the cover of the terminal box to ensure that it offers IP specifications.



The user is responsible for establishing the electrical connections appropriately, using the connection parts (nut, washer, spring washer) given in the electric motor's terminal box and referring to the diagrams.



After the connections have been made on the terminal box, close the cover of the box and tighten it according to IP specifications. If left open, cover of the terminal box may lead to electric shock and material damage.

## Grounding

Grounding is a type of electrical connection to the earth, for metal parts that might be live in systems where electric power is used. The purpose of grounding at electrical installations is to ensure life safety of those who use electrical devices and to prevent destruction of such devices. The grounding circuit must be made of a low-resistance conductor (copper or aluminium). It must have the capacity to transmit the biggest residual current observed on the circuit of the device it is connected to, and it must also be protected against chemical effects. The motor's body and terminal box must be grounded. The grounding terminal found inside the terminal box and the grounding bolt on the motor foot must be used to complete electrical connections. Grounding resistance must be below 1 ohm.

## 8 Running the Motors on Inverter

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**For QS, Q1 E, Q2E, Q3E, Q4E, Q1H, Q2H, Q3H, Q4H, Q1HS, Q2HS, Q3HS:**

Squirrel-cage asynchronous motors are the preferred type of motor in the industry due to the fact that they can be manufactured easily, are simple and durable, low-cost and require low maintenance. Use of inverters on asynchronous motors is increasing each day especially due to recent studies regarding efficient use of energy, technological developments in power electronics and circuits, and therefore the decreasing costs. The purpose of this technical information note:

Two different operating modes were taken into account for parameter settings of the inverter.

1. Open loop operating mode (V/f control)
2. Vector control

Parameter settings given in the technical information note applies for the relevant company's stated model. For different models from different manufacturers, please refer to the relevant user manual.

### **Open loop or V/f:**

In this operating mode, the V/f ratio is kept constant to keep the motor's air gap flow Q constant as well. In this operating mode, there is no need for any speed feedback from the motor. For this reason, there is no need to use devices like encoder, tacho, etc.

In this operating mode, label data of the motor must be entered correctly to the inverter.

### **Vector control:**

It is an algorithm that detects the optimum running point of the motor depending on its load to run it at the most efficient point.

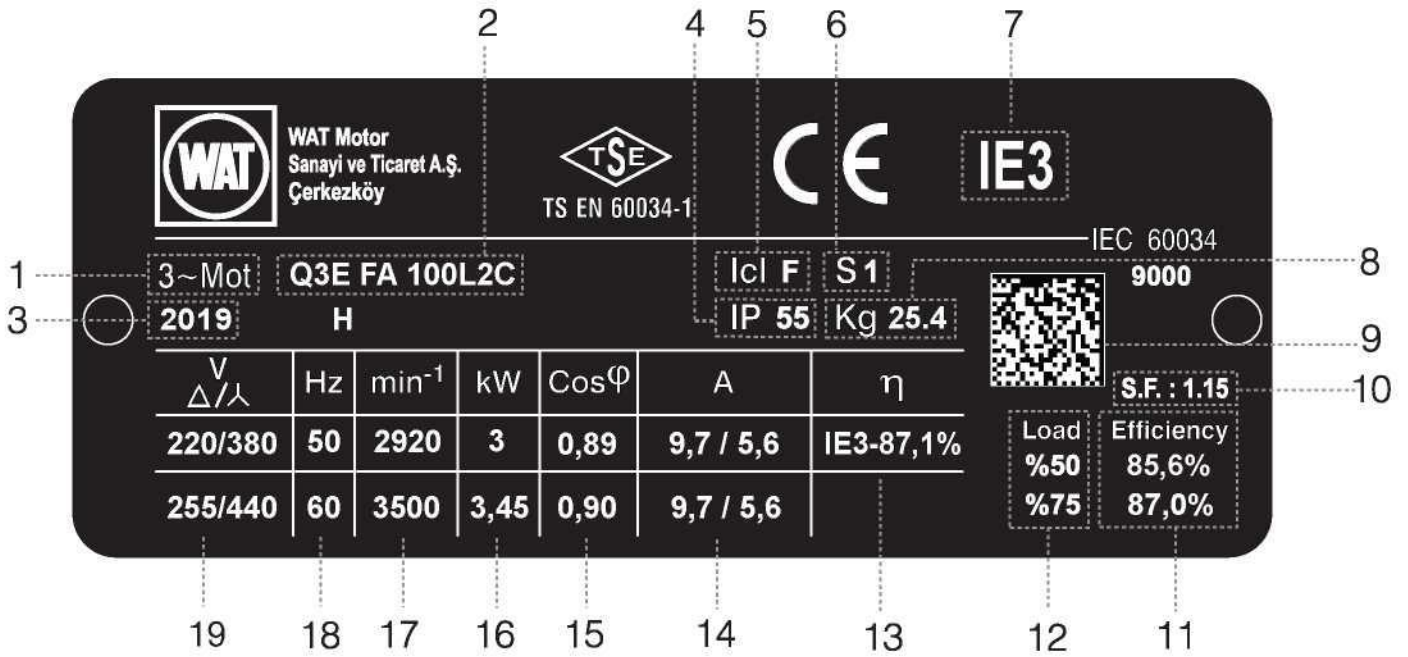
However, not every inverter model has vector control mode. Refer to the inverter catalogue or check with the supplier to see if your inverter has this mode.

The most sensitive point of the vector control algorithm is to correctly determine motor parameters and set them on the inverter. For this reason, we recommend motor parameters to be provided by the motor manufacturer. If possible, check if the motor parameters provided by the motor manufacturer are in compliance with the values calculated by the inverter in autotune mode.



## 9 Labelling

Identification label of the electric motor is as follows. The label may bear a WAT or TEE branded logo.



1. Motor type: Three-phase asynchronous motor
2. Motor code
3. Year of manufacture
4. IP protection rating
5. Insulation class
6. Operating regime
7. Efficiency class (according to IEC 60034-1)
8. Motor weight
9. Barcode
10. Service factor
11. Efficiency (according to IEC 60034-2-1)
12. Load
13. Efficiency (according to IEC 60034-2-1)
14. Rated current
15. Power factor
16. Motor output power
17. Number of revolutions
18. Rated frequency of the motor
19. Operating voltage

The following parameters must be observed when running electric motors.

- Temperature levels of the winding and bearings must be monitored.
- Clean the ventilation channels of the motor and ensure appropriate cooling for the motor.
- Monitor the vibration level of the system.
- Measure the insulation resistance periodically.
- Check the accessories found on the motor.
- Monitor the status of powertrains.

Below you can find the cases where qualified persons can handle before informing the authorised service agent in case of a fault.

**For QS, Q1 E, Q2E, Q3E, Q4E, Q1H, Q2H, Q3H, Q4H, Q1HS, Q2HS, Q3HS, Q1B, Q2B, Q3B, QB, QM, QC, the pre-checks must be done as follows.**

Complaint	Possible causes	Solution
Noisy operation	<ol style="list-style-type: none"> <li>1. Loose parts (Feet, pulley, etc.)</li> <li>2. Breaking or bending on fan blades</li> <li>3. Deterioration on motor bearings</li> <li>4. Fault on motor couplings</li> <li>5. Tension spring of the bearing is broken</li> <li>6. Fan friction</li> <li>7. Motor is left with two phases.</li> <li>8. Loose connections</li> <li>9. Rotor bar is disconnected</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten the connections.</li> <li>2. Replace the fan.</li> <li>3. Check motor bearings.</li> <li>4. Check and fix the coupling.</li> <li>5. Replace the tension spring of the bearing.</li> <li>6. Prevent friction.</li> <li>7. Find the cause and fix it.</li> <li>8. Tighten the connections.</li> <li>9. Contact authorised service agent.</li> </ol>
Overheating	<ol style="list-style-type: none"> <li>1. Mains voltage is low.</li> <li>2. Motor is overloaded.</li> <li>3. Motor is left with two phases.</li> <li>4. Fan is broken.</li> <li>5. Rotor is faulty.</li> <li>6. Ambient temperature is too high.</li> <li>7. Air suction of the motor is blocked.</li> <li>8. Coil short circuited.</li> <li>9. Bearings are broken.</li> </ol>	<ol style="list-style-type: none"> <li>1. Find the cause and fix it.</li> <li>2. Check if the motor is suitable for the load.</li> <li>3. Find the cause and fix it.</li> <li>4. Replace the fan.</li> <li>5. Replace the rotor.</li> <li>6. Use a special motor.</li> <li>7. Find the cause and fix it.</li> <li>8. Contact authorised service agent.</li> <li>9. Check motor bearings.</li> </ol>
Motor is not running; there is no magnetic wheezing sound.	<ol style="list-style-type: none"> <li>1. Fuse is removed or blown.</li> <li>2. Thermal element is blown.</li> <li>3. Cable connections are loose or are not suitable.</li> <li>4. Switch is on.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the fuse.</li> <li>2. Check the thermal element.</li> <li>3. Check the cable connections.</li> <li>4. Check the switch.</li> </ol>



# 10 Maintenance

<p>Motor is not running; there is magnetic wheezing sound, thermal element is blown.</p>	<ol style="list-style-type: none"> <li>1. Cable connections are incorrect.</li> <li>2. Mains voltage is low.</li> <li>3. Motor windings are short circuited or disconnected.</li> <li>4. Mechanical jamming inside the motor.</li> <li>5. Auxiliary winding is disabled.</li> <li>6. Condenser is faulty.</li> <li>7. Motor is left with two phases.</li> <li>8. Relay is broken.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the cable connections.</li> <li>2. Find the cause and fix it.</li> <li>3. Contact authorised service agent.</li> <li>4. Check motor bearings.</li> <li>5. Find the cause and fix it.</li> <li>6. Replace the condenser.</li> <li>7. Replace the relay.</li> </ol>
<p>Motor starts and runs; but thermal element is blown shortly.</p>	<ol style="list-style-type: none"> <li>1. Mains voltage is low.</li> <li>2. Thermal element is faulty.</li> <li>3. Motor is overloaded.</li> <li>4. Motor is left with two phases.</li> </ol>	<ol style="list-style-type: none"> <li>1. Find the cause and fix it.</li> <li>2. Check the thermal element.</li> <li>3. Check if the motor is suitable for the load.</li> <li>4. Find the cause and fix it.</li> </ol>
<p>It is not possible to start the motor.</p>	<p><b>While motor is idling:</b></p> <ol style="list-style-type: none"> <li>1. Rotor buses are disconnected.</li> <li>2. Mains voltage is low.</li> <li>3. Motor is left with two phases.</li> <li>4. Connections are loose.</li> <li>5. Incorrect connection.</li> <li>6. Mechanical jamming inside the motor.</li> </ol> <p><b>While motor is loaded, additionally:</b></p> <ol style="list-style-type: none"> <li>7. Motor is overloaded.</li> <li>8. Relay is broken.</li> <li>9. Time of the time relay is not enough.</li> <li>10. Main or auxiliary winding is disconnected.</li> </ol>	<ol style="list-style-type: none"> <li>1. Contact authorised service agent.</li> <li>2. Find the cause and fix it.</li> <li>3. Find the cause and fix it.</li> <li>4. Tighten the connections.</li> <li>5. Check the connections.</li> <li>6. Check motor bearings.</li> <li>7. Check if the motor is suitable for the load.</li> <li>8. Replace the relay.</li> <li>9. Change the time of the time relay.</li> <li>10. Replace broken coil(s).</li> </ol>
<p>Condenser explodes.</p>	<ol style="list-style-type: none"> <li>1. Too frequent start-ups on load.</li> <li>2. Over vibration on the motor.</li> <li>3. Incorrect connection.</li> <li>4. Condenser is selected at wrong Mfd or voltage.</li> </ol>	<ol style="list-style-type: none"> <li>1. Use a special motor.</li> <li>2. Eliminate the vibration.</li> <li>3. Fix the connection.</li> <li>4. Select a suitable condenser.</li> </ol>

On motors equipped with sealed (2Z) bearings, there is no need for maintenance since the bearings are lubricated with the lubricant stated by the manufacturer. For the operating temperature, vibration level and shaft loads, the bearings must be replaced every 20,000 hours of operation (approx. 2 to 5 years of use). For - 250-280 body sizes, externally lubricated bearings are used as per customer request. Lubricant replacement intervals for these bearings are shown in the table below.

## 10 Maintenance

Number of poles of the motor	Criteria for changing oil	
	Running time (hours)	Amount of Oil (gr)
2	2500	70
4	3500	70



Except for abnormal operating conditions, if there is extreme noise, vibration or heating on the bearings, said bearings must be replaced before the replacement interval. In such cases, make sure to check the connecting parts (couplings, belt, pulley, etc.) that connect the motor shaft to the load.

For externally lubricated bearings used on - 315-355 body sizes, the table below shows the replacement intervals depending on the number of poles of the motor.

Bearing Type	Number of Poles	Running Time (hours)	Amount of Oil (gr)
6316C3	2	2000	35
6316C3	4,6,8	4000	35
6317C3	2	2000	38
6317C3	4,6,8	4000	38
6219C3	2	2000	45
6219C3	4,6,8	4000	45
6320C3	2	2000	50
6320C3	4,6,8	4000	50
6322C3	2	2000	60
6322C3	4,6,8	4000	60
6326C3	4,6,8	4000	85
6328C3	4,6,8	4000	95



At the end of its service life, the motor must be recycled in accordance with national legislations. After all parts are dismantled, all materials (steel, cast iron, copper, aluminium, as well as the plastics used in insulating materials) used in the production of the motor are subject to recycling. All lubricants and greases used must be discarded or burned as per the waste oil regulation. Electronic components of the motor must be recycled separately from other parts.

## 11 Spare Parts



### Spare parts dealer

Arçelik electric motors have spare part warranty of 10 years.

If the motor is dismantled, if a part (e.g. flange, fan or fan cover) is removed or replaced, the warranty will be void.

Vatpa Elektrik Motorları

Address: Gümüşsüyü Cad. Odin İş Merkezi B Blok No:28 D:24 Topkapı, Fatih/ISTANBUL Tel: +90 212 613 51 80

**Dear Valued Customer,**

We believe in the importance of offering you better services just as much the quality of the product we offer. Therefore, we are continuing to offer extensive and new services for our conscious consumers.

Our Authorised Service Providers are now available 5 days a week, from 08:00 to 18:00. You can directly dial this number to access the Customer Services Center of WAT Elektrik Motorları for the service you wish to get.

**Customer Services\***  
**+90 850 399 4 928**

\* Calls on landlines are charged from local rates, mobile phones are charged from GSM-GSM rates.

**We kindly request you to observe the following recommendations.**

1. Please have your Warranty Certificate approved by your Authorised Dealer upon purchasing.
2. Use your product in accordance with the principles in the user manual.
3. If you have any service request related to your product, please refer to our Customer Services at the numbers given above.
4. Ask the technician who came for service for their "Technician ID".
5. Do not forget to ask for the "SERVICE SLIP" from the service technician after your work is done. This Service Slip you will receive will be useful for you for any problem that may arise on your product in the future.
6. Expected life: 10 years. (The period required for availability of spare parts for functioning of the product.)

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

Contact details are below.

Factory and Customer Services:

Wat Motor Sanayi ve Ticaret A.Ş. Organize Sanayi Bölgesi  
Karaağaç Mah. 8. Sokak, No: 4 A/2 Kapaklı 59510 / Tekirdağ

Tel: +90 282 292 22 69

Fax: +90 282 292 22 23

E-mail: support@wat.com.tr

Web: www.tee.com, www.wat.com.tr



## *Issues to be considered by the customer regarding the warranty*

*This warranty provided by WAT Motor Sanayi ve Ticaret A.Ş. does not cover failures that arise from abnormal use of the electric motor as well as the following conditions:*

- 1. Damages and failures arising from incorrect use,*
- 2. Damages and failures that occur during loading, unloading and transportation after delivery of the product to the customer,*
- 3. Damages and failures that arise from reasons such as low voltage or over voltage; incorrect electricity layout; using at voltages different from the one written on the product label,*
- 4. Damages and failures caused by fire or lightning,*
- 5. Failures arising from using the product in a manner that violates the issues mentioned in the product's user manual.*

*Warranty will become void if the product is tampered with by unauthorised people.*

*Above-mentioned failures shall be fixed against a fee.*

*Product's installation at and transportation to the location where it is going to be used is not included in the product price.*

*Responsibility for perfection and handing in the warranty certificate to the customer rests at the vendor, dealer or representative from whom the customer has purchased the product. In the event that the certificate of warranty is falsified, original serial number of the product is removed or falsified, this warranty will be voided.*

*Assessment for CE compliance of your product was conducted at the premises 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 Tekirdağ - TURKEY*

<b>Customer Services</b>		<b>Wat Motor Sanayi ve Ticaret A.Ş.</b> Organize Sanayi Bölgesi Karaağaç Mah. 8. Sokak, No: 4 A/2 Kapaklı 59510 / Tekirdağ
<b>+90 850 399 4 928</b>	<b>0282 292 22 69</b>	



# WARRANTY CERTIFICATE

## electric motors

WAT Electric Motor and its entirety including all of its components are **UNDER WARRANTY FOR 2 (TWO) YEARS** against material, workmanship and manufacturing defects on the condition that it was used according to the instructions given in its user manual and it was not touched by people apart from the service personnel authorised by WAT Motor Sanayi ve Ticaret A.Ş., for maintenance, repair and any other purposes.

In case of failure either because of materials and workmanship or installation faults within the guarantee coverage, no fees shall be charged for the works carried out under workmanship fee, spare part price or any other title. The period elapsed for the repairs to be completed will be added to the warranty period. Repair duration is 20 work days at most. This period starts from the date the product is notified to our Authorised Service Workshops, or to our Authorised Dealers or to our Company if there is not any authorized service workshop available. In case the failure in the product is not eliminated in 10 work days, WAT Motor Sanayi ve Ticaret A.Ş. will assign another product with similar features for use by the customer until the repair of the product is complete.

It is in our company's sole discretion to determine the technical method to be used for the elimination of defect or the part to be replaced. Repair may be performed on site or at the authorised service workshops. Our customer's approval for this is obligatory. However,

Although the consumer used the right to have the product repaired, provided that the product

- Breaks down at least four times within a year during warranty period starting from delivery date, or breaks down six times within the warranty period defined by manufacturer-producer and/or importer and those breakdowns cause constant unavailability of the product,

- The maximum period required for repairing is exceeded,

- Determining that the failure cannot be solved and repaired with a report issued by the service station of the firm or in case of unavailability of a service station, one of its seller, dealer, agency, representation office, importer or manufacturer respectively, the consumer may request that the product be replaced without any charge, its price be refunded or a discount on its price be made in consideration for such defects.

For disputes arising in relation with the Warranty Certificate, General Directorate of Protection of Consumers and Market Surveillance of the Ministry of Customs and Trade is authorised. General Directorate of Protection of Consumers and Market Surveillance of the Ministry of Customs and Trade has given permission for implementation of this Warranty Certificate under the Law numbered 4077 on the Protection of Consumers, and the Communiqué about Principals of Warranty Certificate Application put into force under this law.

**WAT MOTOR SANAYİ VE TİCARET A.Ş.**  
**GENERAL MANAGER**

Serial No:

Type:  QS,  Q1E,  Q2E,  Q3E,  Q4E,  Q1H,  Q2H,  Q3H,  Q4H,  Q1HS,  Q2HS,

Q3HS,  Q1B,  Q2B,  Q3B,  QB,  QM,  QC,

Address:

Place and Date of Delivery:

Invoice Date and No:

Phone-Fax:

Title of the Seller:

Seller (Stamp and Signature):

This document was issued in accordance with the document no 104934 and dated 22.08.2013 of the Directorate General of Consumer Protection and Market Surveillance of the Ministry of Customs and Trade.

**This section shall be signed and stamped by the authorised dealer selling the product.**