Instructions for the Operation and Maintenance of Electric Motors

General

These instructions deal with electric motors used in the applications from Swegon. The information presented is aimed at facilitating the work involved in their operation and maintenance as well as making it easier to trace any faults that may arise.

WEG

Safety Precautions

Before you begin any work on the motor:

- Remove your wristwatch and rings.
- Make sure that the power supply is isolated.
- Always follow the instructions and regulations.

"Caution!" and "Important!" Notes

"Caution" and "Important" appear where the information below is of special importance. An explanation of both is given below.

Caution!

Warns of risk of injury or danger to life and risk of serious damage to the motor.

Important!

N.B. There is risk of damage to motor.

1. Instructions for Operating the Motors

When the electric motor is installed and taken into operation, it will need to be checked and serviced with regular intervals to ensure good operating economy and a long useful life. The type of motor installed and how it is used determines the length of the intervals between inspection and service. If the motor should malfunction, take the system out of operation and carry out maintenance on the motor. Follow the servicing instructions.
The fault-tracing table below is intended for use as an aid in trouble-shooting. The table provides examples of possible causes and symptoms.

1.1 Fault tracing

Cause:	Symptom:
Impermissible load can cause:	The motor becomes overheated. The motor won't start. The motor consumes too much power.
Rotor problems may cause:	Low starting torque The motor consumes too much power. The motor becomes overheated. Irritating noise Abnormally high vibration
Too much or too little grease can cause:	Bearings become too hot.
A bent axle can cause:	Bearings become too hot. Irritating noise Abnormally high vibration
Bearing problems can cause:	Irritating noise Abnormally high vibration
Ventilation problems can cause:	The motor becomes overheated.
Power supply problems can cause:	The motor won't start Low starting torque Faulty voltage The motor becomes overheated.
Imbalance in the voltage can cause:	Abnormally high vibration

2. Maintenance

Caution!

Isolate the power to the motor before beginning any maintenance work and make sure that all accessories are switched off and disconnected.

Important!

Only qualified and/or authorised personnel are permitted to carry out maintenance on the motor.

Points to Check:

Maintenance should be carried out on the motor if anything abnormal is discovered.

1. Keep the motor clean and make sure that the air intakes are clear and unblocked.
   Use a soft brush or a cotton cloth whenever cleaning is required.
   Use compressed air to remove dust or the like from the fan casing.
2. Check the condition of gaskets or v-rings and replace them if necessary.
3. Check the condition of couplings and screws for tightness.
4. Check the bearings, bearing temperature, the condition of the lubricant and listen to
   detect any unusual noise and/or feel any abnormally high vibration.

2.1 Lubricating

Important!

The max. permissible in-operation temperature of the bearings and the lubricant is 70 °C.
This temperature should not be exceeded. Otherwise, the interval between lubrication will have to be shortened by half for every 15 °C that the in-operation temperature exceeds 70 °C.
Note that unless otherwise specified on the motor rating plate, the max. permissible ambient temperature is 40 °C.

Caution!

Grease can cause skin irritation and eye inflammation. Follow all the safety precautions specified by the supp lier of the grease.

Motors up to size 160 are fabricated without grease fittings.
The size 160-200 motors are normally supplied without grease fittings, but variants with grease fittings are available as an option.
The motors larger than size 200 are fabricated with grease fittings.

The motors without grease fittings can be lubricated in following manner:

1. Isolate the power supply. Carefully disassemble the motor so as not to damage the
   rotor, stator or stator windings. Use appropriate tools and methods for this work.
2. Remove all old grease.
3. Wash the bearings with petrol or diesel oil and inspect the bearings.
4. Add new lubricating grease into bearings and 50-70 % of the space in bearing casing.
   Be careful to fill the right amount of lubricant.
5. Carefully reassemble the motor so as not to damage the rotor, stator or stator
   windings.

Important!

Check everything before you energise and start up the motor.

Motors with grease fittings can be lubricated as follows: (If the grease outlet is plugged, remove the plug before lubricating. The grease outlet should be permanently left unplugged if the motor is fitted with an automatic lubricator).

1. Carefully clean the grease fittings.
2. Keep the motor running while you inject the appropriate amount of grease into your
   motor, using a lubricating gun (see the table or the rating plate on motor).
3. Then let the motor run for a little while to distribute the grease.

If the grease fitting isn't accessible, proceed as follows:

1. Remove any hoods that are in the way.
2. Inject about half of the amount of grease required and run the motor at full speed
   for about one minute.
3. Switch off the motor and inject the rest of the grease.

Important!

Injecting the entire amount of lubricant into the motor that isn't running will allow the grease to force its way past the motor's inner seal, which is undesirable. Use a manual lubricating gun only.

2.2 Lubricant

Use only the types of grease specified below for lubricating bearings:

- First class lithium-based lubricant or lithium lubricant.
- Viskositet 100-140 cST vid 40 °C
- Consistency: NLGI Grade 2 or 3.
- Temperature range: -30 °C to +130 °C, continuous.

A lubricant called Polyrex EM is also available and is described in Item 2.4.

The type of grease and the lubrication interval for special applications is specified on a special rating plate.

Caution!

If standard motors are used at special locations or in special applications, get in touch with the lubricating grease supplier or WEG for advice.

2.3 Lubrication Interval Table:

(First class lithium-based lubricant or lithium lubricant.)
The values tabulated below are applicable to the bearing's and the lubricant's max. permissible operating temperature of 70 °C. The intervals between lubricating should be shortened by half for every 15 °C that the operating temperature exceeds the max. permissible temperature.

Size (IEC)	Amount of grease (g)	3600 r/min	3000 r/min	1800 r/min	1500 r/min	1000 r/min	500-900 r/min
Ball bearings Lubrication intervals in hours							
160 180	10	4300	5900	9500	10900	12700	14400
200	15	3800	5400	9300	10300	12400	14300
225 250 280	30	1100	2000	4100	4700	5700	6500
315	40	700	1600	3700	5400	5400	6100
355	50	-	800	3100	4000	5000	5700
Roller bearings Lubrication intervals in hours							
200	15	1600	2700	6800	8300	9600	10700
225	30	700	1100	2800	3600	4400	5000
250 280	30	1100	2000	4100	4700	5700	6500
315	40	700	1100	2800	3600	4400	5000
355	50	-	-	1900	2600	3900	4400

2.4 Lubrication Interval Table:

(Polyrex EM lubricant, compatible with lithium-based lubricants and lithium lubricants).
The values tabulated below are applicable to the bearing's and the lubricant's max. permissible operating temperature of 70 °C. The intervals between lubricating should be shortened by half for every 15 °C that the operating temperature exceeds the max. permissible temperature.
This chart is applicable only to motors on which Polyrex EM is specified on the rating plate.

Size (IEC)	Amount of grease (g)	3600 r/min	3000 r/min	1800 r/min	1500 r/min	1200 r/min	1000 r/min	900 r/min	750 r/min	720 r/min	600 r/min	500 r/min
Ball bearings Lubrication intervals in hours												
160	13	15700	18100	20000	20000	20000	20000	20000	20000	20000	20000	20000
180	18	11500	13700	20000	20000	20000	20000	20000	20000	20000	20000	20000
200	21	9800	11900	20000	20000	20000	20000	20000	20000	20000	20000	20000
225	27	3600	4500	9700	11600	14200	16400	17300	19700	20000	20000	
250	27	3600	4500	9700	11600	14200	16400	17300	19700	20000	20000	20000
280*	27	3600	4500									
280	34			8500	10400	12800	14900	15900	18700	20000	20000	20000
315*	27	3600	4500									
315	45		2400	7000	9000	11000	13000	14000	17400	17400	20000	20000
355	27	3600	4500									
Roller bearings Lubrication intervals in hours												
200	21	9800	11900	20000	20000	20000	20000	20000	20000	20000	20000	20000
225	27	3600	4500	9700	11600	14200	16400	17300	19700	20000	20000	20000
250	27	3600	4500	9700	11600	14200	16400	17300	19700	20000	20000	20000
280	34		3500	8500	10400	12800	14900	15900	18700	18700	20000	20000
315	60			5100	7200	9200	10800	11800	15100	15100	15500	19000
355	60			5100	7200	9200	10800	11800	15100	15100	15500	19000

2.5 Service

Caution!

Isolate the power to the motor before beginning main tenance service and make sure all accessories are swit ched off and disconnected.

Important!
Only qualified and/or authorised personnel may carry out service on the motor.

Important!

Make sure to specify the correct type designation and production code as well as the serial number when ordering spare parts. You'll find these on the rating plate.

2.5.1 Bearings

It is important that bearing replacement is carried out under clean conditions to ensure good performance and to avoid damage.
Let the new bearing remain in its packaging until it is time to fit it on the motor shaft.
Before fitting the new bearing, check that there are no sharp edges or any other defects on the motor shaft.
It is advisable to place a piece of stiff cardboard between stator and rotor prior to replacement, to protect them from damaging one another.
Use special tools available for the removal of bearings.

The stator should be mounted against the inner ring inside the shield.

3. Motors operated across a Frequency Inverter, VFD

3.1 Standard Motors

If the voltage is less than 440 V, no motor filters / outlet filters are required.
If the voltage is 440 V or less than 575 V, motor filters are required if the connection cable is longer than 20 m.
If the voltage is 575 V, motor filters are required regardless of the length of connection cable.

The use of a VFD without filter can affect the performance of the motor as follows:
- Lower efficiency
- Higher level of vibration
- Higher sound level
- Higher rated current

- Higher temperature rise
- Reduced motor insulation
- Shorter bearing life

3.2 Special Motors for Frequency Inverter Operation, of WEG IDM type

Motor filters / outlet filters aren't needed, regardless of voltage.
If the motor is equipped with separately operated cooling fan, check its power supply voltage.

Caution!

The warranty won't be valid if these instructions are not followed.

4. Motors for Hazardous / Explosive Environments

Follow these instructions for the maintenance of motors in these environments:

- Check that all components are free of sharp edges, deformation and dirt.
- Check that all the parts are in perfect condition.
- Lubricate the surface on the shielded bearing mounts with oil to facilitate mounting.
- Use a rubber hammer only for mounting the parts.
- Check the bolts to make sure that they are correctly tightened.
- Use a gauge to fit the connection plate correctly (gap less than 0.05 mm).

Caution!

The customer is responsible for site and environment where the motor is installed.

Motors for these environments are fabricated in accordance with a specific standard for such zones and are certified by the appropriate international classification associations.

Caution!

The certification will be rejected if electrical or mechanical modifications are made on a motor installed in a hazardous environment.

The maintenance of motors used in these types of environments must be carried out in workshops authorised by WEG.
If a workshop not authorised by WEG carries out maintenance on the motor, that workshop will be responsible for any damages incurred.