Formula Air
Supporting your performance

IE3 – IE2 – IE1

Electric motors

Maintenance manual (EN)

Content

1. General Information.

1.1. General.

To guarantee correct operation of the motor, it is essential to follow all the instructions indicated in this manual.

Any installer or maintenance operator manipulating the motor must follow the instructions in this manual.

If these instructions are not followed, the guarantee may be invalidated.

This manual does not contain all the safety instructions possible for all normal or special applications. It is the user's and/or installer's responsibility to follow the instructions that they consider appropriate during assembly.

1.2. EC Declaration of Conformity.

The motors pertaining to this user manual are produced according to the following regulations :

- 73/23EEC ; Low Voltage Directive, amended by directive 93/68/EEC.
- 2006/42/EC ; Machines Directive (which repeals Directive 98/37/EC), Annex II, part 1, Section B.
- 89/336/EEC ; electromagnetic-compatibility Directive (and its amendments 92/31/CEE, 93/68/CEE and 2004/108/CE).

1.3. Range of application.

This Instructions Manual is valid and applicable to all electrical motors of size 56 to 355 supplied on Formula Air equipment, where these operate with a motor or generator.

2. Inspection on receipt.

On receipt of the motor, immediately check to see if the motor shows any external damage, and if so, promptly inform the transporter in order to inform the corresponding parties.

The goods shall be delivered with the delivery note, which shows the supply details; immediately check to see if the delivery coincides with the requested order.

Check the data on the specifications plate, power, speed, voltage, etc., to see that they match the requested motor.

Rotate the motor shaft by hand to check that it rotates without difficulty; remove the transport block if there is one.

3. Handling.

3.1. Storage.

The motors must always be stored indoors, in dry atmospheres, with no vibrations or dust.

They may be kept covered outside for short periods, provided they are protected from any environmental or mechanical damage.

The motors must never be positioned on the cooling fan cover.

Unprotected mechanized surfaces (e.g. shafts and flanges) must be protected with anticorrosion treatment.

It is advisable to rotate the shafts by hand to prevent grease displacement and/or leaks during prolonged storage.

It is preferable for the heating resistors, if the motor has them, to be connected.

3.2. Transporting and lifting.

Eyebolts and appropriate suspension methods must be used for transport and placing.

Only the motors must be suspended, with no attached parts such as bedplates, gears, etc.

If the eyebolts are removed, the threaded holes should be properly sealed in accordance with the motor protection grade (see section 4.3).

4. Service start-up.

4.1. Insulation check.

Before initial start-up and particularly after prolonged storage, it is necessary to measure the insulation value of the winding, between phases and earth phases. The check must be carried out with a megger with no more than 500V DC measurement voltage.

During and immediately after measuring, the terminals may be live.

Do not touch them under any circumstances!
Comply meticulously with the service instructions of the measurement device used!

At 25°C and depending on the rated plate voltage, the following minimum values must be obtained:

Rated power PN kW	Insulation resistance referred to rated voltage kΩ /V
$1 > P_N < 10$	6,3
$10 < P_N < 100$	4
$100 < P_N$	2,5

If the minimum values are under these, the winding must be properly dried until the required insulation value is obtained.

The oven temperature must be 90°C for 12-16 hours, followed by 105°C for 6-8 hours.

If the dampness is caused by sea water, the motor must be wound again.

Any drainage caps must be removed before drying in the oven.

4.2. Checking bearings.

After prolonged storage, the grease in the bearings must be inspected visually and replaced with new grease if there is any hardening.

After three years of storage, the grease must be replaced automatically.

After four years, the bearings must be replaced if they were of the closed type (lifetime lubricated).

The bearings' maximum load values must not be exceeded. If necessary, ask the manufacturer.

Motors with roller bearings ; If the motor is operated without a radial loaded applied to the shaft, the roller bearings may be damaged. The roller bearings must always be subjected to a minimum radial load in order to ensure that they operate correctly.

Angular-contact bearing motors ; If the motor is operated without an axial load applied to the shaft in the correct direction, the angular-contact bearings may be damaged.

Motors with lubrication system ; When the motor is started up for the first time, or after a long period of storage (12 months), at least the indicated amount must be applied until the new grease issues from the outlet valve (see section 8.2).

4.3. Checking the protection grade.

The protection grade of the motor is indicated on the specifications plate. The protection grade of the elements attached to the motor may be different, which must be taken into account when fitting the motor.

For outdoor installations (grade > IP 44) it is necessary to protect the motors from the direct action of atmospheric agents (e.g. rain, snow, ice; blockage of fan by freezing).

4.4. Removal of transport safety fastenings.

In motors with transport safety fastenings for the shaft, the hexagonal screws fixing the fastener must be loosened and removed simultaneously.

In the terminal box there is a screw and, if applicable, the safety spring washer to replace the one for transport.

The shaft key is protected by a safety cover to prevent this from deteriorating during transport and storage. Due to the hazard of side slippage of the key, it must be strictly forbidden to start up the motors with the key being only protected by the aforementioned safety cover.

4.5. Terminals and rotation direction.

The rotation direction is clockwise, as seen from the shaft side, and the phase sequences of line L1, L2, and L3 is connected to the terminals (see section 11).

To change the rotation direction, switch the connection of two cables of any line.

If the motor cooling fan only rotates in one direction, ensure that the rotation direction matches that of the arrow drawn on the equipment.

5. Installation and assembly.

5.1. Cooling.

The normal ambient temperature must not exceed 40°C for correct operation.

Even when correctly installed, the motors may, during operation, have surface temperatures of more than 100°C; it is therefore necessary to avoid any contact with them if they are easy to access. It is also necessary to avoid fixing parts or elements that are sensitive to heat.

Keep ventilation holes unimpeded, thus complying with the minimum distances set in the following table, so that the cool air flow is not obstructed and to ensure that the expelled air is not sucked in again.

Build size		Min. safety distance between the cooling fan cover and the wall
IEC standard	Transnorma	
56 / 63	56	14 mm
71	63	14 mm
80	71	16 mm
90	80	16 mm
100	90	18 – 20 mm
112	100	20 mm
132	112	30 mm
160	132	40 mm
180		45 mm
200		50 mm
225		55 mm
250		65 mm
280		70 mm
315		80 mm
355		90 mm

5.2. Anchoring.

The buyer is responsible for preparing the anchoring or base of the motor.

Metal anchors must be painted to prevent corrosion.

The anchoring must be smooth and firm enough to bear the forces that may occur in the case of a tree-phase short-circuit. It must also be able to prevent the vibrations produced by resonance.

Before assembling the motor, the anchoring surfaces where the gauges or feet must be cleaned to eliminate excess paint, paint drops, or dirt.

It is then necessary to check the surface to detect any difference in height between the different feet positions. It is also necessary to check the flatness of the surfaces where the feet will be supported.

5.2.1. Anchor bolts.

Fix the anchor bolts to the motor feet and place a 1-2 mm gauge between the bolt and the foot.

Align the motor directly using appropriate methods. Fix the bolts with cement, check the alignment, and make holes for the screws.

5.3. Drainage.

Places where condensation may appear inside the motor must be drained regularly through purge holes situated at the bottom of the shield, which are then shut.

In very dusty environments, all drainage holes must be shut.

5.4. Coupling, aligning, and balancing.

To couple the transmission element (coupling, pinion, or pulley, for example), the appropriate tools must be used or the piece must be shimmed.

The shaft ends are fitted with threaded holes in accordance with DIN 332 part 2.

The transmission elements must never be adjusted by striking them, as the shaft, bearings, and other motor parts may be seriously damaged.

All transmission elements must be dynamically balanced using the same system as the motor (half key or whole key). The system used is indicated on the specifications plate with a letter situated beneath the motor number: H for half and F for full. The motors must be placed so that they are free of vibration.

For motors with precision balancing, special instructions must be followed.

Once assembly is complete, the protection of the mobile parts must be taken care of and the operating safety standards must be established.

For direct couplings, it is necessary to align the shafts of both machines exactly. The height of the shafts must be aligned by using the appropriate adjustments.

Belt transmissions use relatively large radial loads. In addition to the belt manufacturer's recommendations, it is necessary to check that its drive and tension does not exceed the radial force permissible at the end of the motor. It is important to adjust initial tension well, during assembly.

Excessive tension of the belts may damage the bearings and cause the shaft to break.

5.5. Constructive designs.

The constructive design is indicated on the specifications plate.

For application in a different position, it is necessary to get the corresponding authorization of the manufacturer, and if necessary, make the appropriate modifications. Particularly in vertical positions, the user must ensure that foreign bodies do not fall into the cooling fan cover.

Constructive designs IM B14 and IM B34 have threaded through holes. To avoid deterioration of the front connections of the motor coil, **the maximum admissible penetration reaches must be observed in accordance with the following table**.

Flange type in accordance with DIN 42948	Flange type in accordance with DIN 50347	Penetration reach (mm)
C80	FT65	8
C90	FT75	8
C105	FT85	8,5
C120	FT100	8,5
C140	FT115	10
C160	FT130	10
C200	FT165	12
C250	FT215	13

If any motor of type IM B34 is used without flanges, the user must **take the appropriate measures** in the through holes **to ensure that the specified protection grade is maintained.**

5.6. Motors with thermal protection of the winding.

It is absolutely necessary to avoid checking the PTC detector circuits with a testing lamp, magneto crankshaft, etc., as this would immediately destroy them.

If it is necessary to check the cold resistance of the detector circuits (at about 20°C), the measurement voltage must not exceed 2.5 V DC. It is advisable to measure using a Wheatstone bridge with a supply voltage of 4.5 V DC. The cold resistance of the detector circuit must not exceed 810 Ohms. It is not necessary to carry out a heat resistance measurement.

For motors with thermal protection of the winding, it should be taken into account that, after use and reaction of the thermal protection of the winding and cooling of the motor, it cannot be reassembled automatically.

6. Start-up.

- Please pay attention to the safety standards and regulations.
- Any maintenance work should only be done once the electricity supply is turned off and secured.
- Maintenance should only be performed by qualified personnel with adequate safety equipment and tools.

6.1. Connection.

Firstly, ensure that the grid voltage and frequency matches those indicated on the motor specifications plate. The cable section must be appropriate for the current. Admissible voltage tolerance (DIN VDE 0530) :

- For design voltage: ± 10 %
- For design frequency: ± 2 %

The terminal box of the motors are manufactured in accordance with standard DIN VDE 0530, part 8.

Section 11 of these instructions shows the most common connection diagrams for three-phase motors of basic construction. For other constructions, the necessary diagrams are shown on the inside of the terminal box cover.

Auxiliary terminal boxes may be supplied to connect auxiliary or protection devices (thermal probes, heat resistors, etc.) with the same determining factors as for the main terminal box.

The motors must have the corresponding protection against over currents, duly regulated in accordance with the nominal plate data (= 1.05 Inom.). If they do not, no guarantee may be claimed if any damage occurs in the winding.

In the case of direct connection, the motors must be fitted with a three-pole motor guard.

For star-triangle start-up, an additional motor guard is recommended.

For motors with thermal probe TPM 140, an appropriate security is necessary. And for motors with Microthermal switch TS 140°C, a contactor (auxiliary circuit) is recommended to disconnect the motor in the event of overload.

It is advisable to check the insulation values between phases and earth phases before first start-up (see section 4.1). This is absolutely necessary after a prolonged period of storage.

The following tables indicate the tightening torque for the terminals :

Terminal plate	Connection bolt thread	Admissible tightening torque in Nm
16 A	M4	1,2 ± 0,5
25 A	M5	2,5 ± 0,5
63 A	M6	4 ± 1
100 A	M8	7,5 ± 1,5
200 A	M10	12,5 ± 2,5
400 A	M12	20 ± 4
630 A	M16 / M20	30 ± 4 / 52 ± 4

Before closing the terminal box, it is necessary to check :

- That the connection has been made according to the corresponding diagram.
- That all the connections of the terminal box are properly tightened.
- That the minimum residual-gap distances have been adhered to (8 mm up to 500V, 10 mm up to 750V, and more than 14 mm up to 1000V).
- That the inside of the box is clean and free of foreign bodies.

- That unused cable inputs are sealed and the screws that fix the joints are correctly tightened.
- That the cable clamps have been properly fixed to the terminal box and all the surfaces are in the correct condition to guarantee the protection grade.

6.2. Precautions before starting the motor.

If there is a second shaft, check that the key has been properly fastened.

If possible, actuate the motor without a load, and if it runs regularly and with no strange noises, couple it to the machine.

During the first start-up, we recommend controlling the voltage received by the terminals and the load currents. This will make it possible to immediately recognize any overloads or imbalances in the grid.

During start-up, ensure that the switch is always in the start position.

7. Use with a frequency converter.

In principle, all electric motors can be actuated through frequency converters, but it is necessary to take certain precautions in both the installation and in the motor.

At the level of installations, it is advisable, according to the specific circumstances of each application, to use appropriate filters at the entry and exit point of the converter, line reactance's, etc. and shielded power lines, also ensuring that the earth connection to the converter, shielding, and motor, is correct.

With regard to the motors, it is not necessary to take special precautions for power below 55 kW and voltage below 420 V. For power equal to or greater than 55 kW, we recommend that an insulated bushing be assembled on the fan side. If the line voltage is greater than 420 V up to 690 V, the motor must be manufactured with special winding insulation.

In all cases, and according to the requirements of the application, the use of independent ventilation is optional.

We have a technical department that specializes in these types of applications and can advise you as to the correct choice of motor according to each application.

8. Maintenance.

If maintenance work involves moving the motor from its position, then also disconnect the auxiliary circuits in place (for example, heat resistors, thermal probes, independent ventilation, and brakes).

If it is necessary to disassemble the motor during maintenance work, remove any sealing paste from the corresponding interstices. During assembly, the interstices must be sealed again with an appropriate product. If there are any copper washer-type joints, these must be replaced in all cases.

8.1. General inspection.

Inspect the motor at regular intervals.

Keep the motor clean and ensure that it is well ventilated.

Check the state of the seals (for example, V plug) and replace them if necessary.

Check the state of the connections and the assembly bolts.

Check the state of the bearings, listening for any strange noises, measuring vibration, bearing temperature, inspecting the lubricant used, or with SPM monitoring of the bearing.

If any changes occur in the condition of the motor, disassemble it, check the state of the parts and replace them if necessary.

8.2. Bearings and lubrication.

The bearings of the motors are lubricated in the factory, or by the manufacturer in the case of a closed model, with lubricant for bearings in accordance with standards DIN 51825, according to the following table :

Series	Lubricant grease according to DIN 51825	Lubricant grease base
Motors with squirrel-cage rotor IEC/DIN 132-355 and reduced housings 160-315	L-XBCHA3	Lithium

Under normal effort and ambient conditions, the quality of the grease allows for 10,000 hours of service in two-pole motors and 20,000 for greater polarities. Unless stated otherwise, these periods are understood to be with the original grease, without renewing it. But it is advisable to control the state of this in shorter periods. The indicated duration in hours is only valid at normal speeds.

In work with a frequency converter in which this is exceeded, the re-greasing intervals shall be shortened approximately in inverse ratio to the speed increase.

The bearings must be re-greased after carefully cleaning with appropriate solvents.

The same type of grease must be used. When replacing, only the replacement qualities indicated by the motor manufacturer must be used. Bear in mind that only 2/3 of the free space of the bearing must be filled with grease. Completely filling the bearings and the bearing covers with grease would cause an increase in the bearings temperature and therefore faster wear.

If bearings with a re-greasing device are used, the re-greasing from the greasing nipple must take place while the motor is in operation and in accordance with the quantity of grease predetermined for the corresponding motor.

The following table shows the re-greasing periods and quantities. For the first re-greasing approximately double the amount of grease is required because the grease lubrication pipes are still empty. The used grease is collected in the grease chamber of the external bearing cover. After approximately five re-greasing this old grease should be removed, e.g. as part of inspection work.

MSE SERIES				EGH SERIES			
Size	**Poles**	**Bearing**	**Greasing hours/grs**	**Size**	**Poles**	**Bearing**	**Greasing hours/grs**
56	2 - 4	6201 2RS	---	160	2 - 4 – 6 - 8	6309 / 6309 C3	6000 – 18000 / 13
63	2 – 6	6201 2RS	---	180	2 - 4 – 6 - 8	6311 / 6311 C3	4000 – 16000 / 15
71	2 – 8	6202 2RS	---	200	2 - 4 – 6 - 8	6312 / 6312 C3	3500 – 13000 / 20
80	2 – 8	6204 2RS	---	225	2 - 4 – 6 - 8	6313 / 6313 C3	3000 – 9000 / 22
90	2 – 8	6205 2RS	---	250	2 - 4 – 6 - 8	6314 / 6314 C3	2000 – 8000 / 23
100	2 – 8	6206 2RS	---	280	2	6314 / 6314 C3	1200 / 30
112	2 – 8	6306 2RS	---	280	4 – 6 - 8	6316 / 6316 C3	4000 – 6000 / 30
132	2 – 8	6308 2RS	---	315	2	6316 / 6316 C3	1200 / 30
160	2 - 8	6309 2RS	---	315	4 – 6 - 8	6319 / 6319 C3	2000 – 3000 / 45
				355	2	6319 / 6319 C3	1200 / 30
				355	4 – 6 - 8	NU 322 / 6322 C3	1400 – 2200 / 60

8.3. Cleaning.

The motor must be cleaned regularly so as not to interfere with the action of the cooled air.

It will normally be enough to use compressed air free of water and oil.

It will particularly be necessary to keep the ventilation holes and interstices clean between the cooling fins.

The fine carbon dust formed by the natural abrasion inside the motor must be cleaned out regularly.

It is advisable to regularly check not only the actuated machine but also the electric motors.

8.4. Inspection work.

In compliance with the service reference conditions (DIN VDE 0530), inspection work must be carried out alternately:

- after 4 years if installed indoors
- after 2.5 years in case of application in covered outdoor areas
- when the storage periods are exceeded or under different storage conditions

Execution of this inspection work does not justify any right to guarantee.

The inspection measures are as follows:

- cleaning of dirty components
- removal of corrosion damage
- replacement of bearings
- checking of insulation resistance (see section 4.1)

9. Guarantee, Repair, Replacement parts.

The motors are guaranteed against manufacturing faults for one year from the supply date. Unless specified otherwise, to invoke the warranty, the motor must be taken to the nearest authorized workshop, or to Formula Air, free of carriage, for diagnosis and report. If the guarantee applies, it covers materials and labor, or replacement of the complete motor if necessary, and shipping costs to receive and redispatch. The warranty covers no other expenses.

The maintenance operations described in this manual are not considered to be guarantee jobs and therefore do not cancel it.

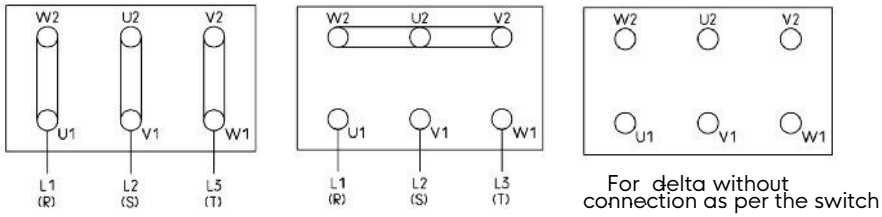
10. Electromagnetic compatibility.

The conformity of the motors, in their capacity as units constituting other assemblies, with EMC standards has been checked.

It is the installation user's responsibility to ensure that all the equipment globally complies with the aforementioned standards of electromagnetic compatibility.

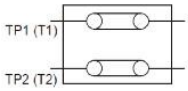
11. Connection diagrams.

11.1. Three-phase motor, 1 Speed.



Δ LOW VOLTAGE **Y** HIGH VOLTAGE STARTER **Y – Δ**

11.2. Winding protection PTC.



Connection of the tripping device. The connection will be implemented as per the connecting diagram of the tripping device.

12. Problems solution.

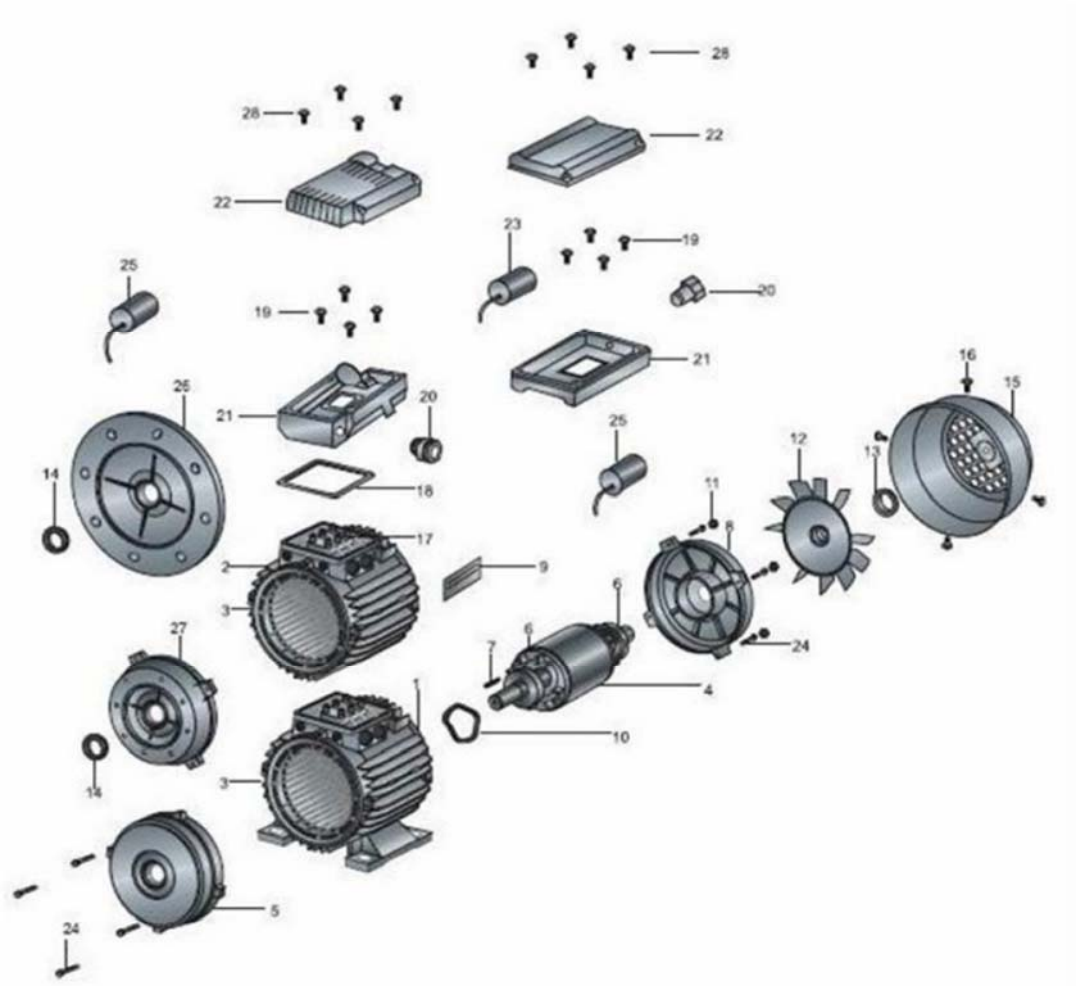
The following table shows the most common problems both mechanical and electronic, but does not take into account all the possible cases that may occur in relation to installation, operation, and maintenance.

Trouble	Possible cause	Solution
The motor doesn't start.	Blown fuses.	Replace the fuses with others of appropriate type and specifications.
	Overload trips.	Check and adjust the start-up overload.
	Incorrect connection to grid.	Check the connections with the diagram supplied with the motor.
	Incorrect power supply.	Check that the supplied power corresponds with the specifications plate of the motor and the load factor.
	Open circuit in the winding or in the operation circuit.	Indicated by a buzzing when the contactor is closed. Check if there are any connections with loose cables. . Also check that all contacts are closed.
	Mechanical fault.	Check that the motor and actuator rotate without difficulty. Check the bearings and lubrication.
	Stator in short circuit.	Indicated by blown fuses. Rewind the motor.
	Fault in the coil connections.	Disconnect terminals and check with test lamp.
	Faulty rotor.	Locate the broken short-circuit bars or rings.
	The motor cannot start.	Possible overload of motor. Reduce the load.
The motor loses speed.	It is possible that a phase is open.	Check the lines and find the open phase.
	Incorrect application.	Change the type and size. Check with the supplier.
	Overload.	Reduce the load.
	Drop in voltage.	Check that the voltage on the specifications plate is maintained. Check connection.
	Open circuit.	Blow fuses; check overload relay, stator, and buttons.
The motor runs and then stops.	Supply fault.	Check if there are loose connections to the network, to the fuses, and to the control cabinet.
The motor does not reach the correct speed.	Motor not appropriate for the application.	Check with the manufacturer for the correct type.
	The voltage is too low in the motor terminals due to a drop in grid voltage.	Use higher voltage or reduce the load. Check connections. Check that the cables are of the correct dimensions.
	The start-up load is too high.	Check the load supported by the motor on start-up.
	Rotor rods broken or loose rotor.	Check to see if there are cracks near the short-circuit rings. A new rotor may be necessary, as repairs are generally temporary.
	Primary circuit open.	Locate the fault with a test instrument and repair.
The motor takes too long to accelerate and/or absorbs an excessively high current.	Excessive load.	Reduce the load.
	Low voltage during start-up.	Check resistance. Adjust cable sizes.
	Faulty squirrel-cage rotor.	Replace with a new motor.
	The applied voltage is too low.	Ask the electrical company to increase power.
Wrong direction of rotation.	Wrong phase sequence.	Switch two phases in the motor terminals or in the switch panel.
The motor overheats while operating with low load.	Overload.	Reduce the load.
	The fan casing or protection grids are full of dirt and impede appropriate motor ventilation.	Clean the grid holes and check that there is still an air current in the motor.
	The motor may have an open phase.	Check that all the cables are properly connected.
	Winding to earth.	Locate the fault and repair.
	Electrical voltage in terminals unbalanced.	Check to see whether there are any faulty cables, connections, and transformers.
The motor vibrates.	Motor poorly aligned.	Re-align.
	Unstable support.	Reinforce the base.
	Unbalanced coupling.	Balance coupling.
	Actuated equipment unbalanced.	Rebalance actuated equipment.

	Faulty bearings.	Replace bearings.
	Misaligned bearings.	Align correctly.
	Change of position of the balancing weights.	Rebalance the motor.
	Conflict between the rotor balance the coupling balance (half key - full key)	Rebalance the motor coupling.
	Tree-phase motor running as single phase.	Find and repair the phase fault.
	Excessive axial clearance.	Adjust the bearing or add a gauge.
Scraping sound.	The cooling fan is chafing against the shield.	Remove interfering objects.
	The fan is hitting the protection.	Check fan.
	Loose base plate.	Tighten the holding screws.
Noisy operation.	Non-uniform residual gap.	Check and correct assembly of shields and bearings.
	Rotor imbalance.	Rebalance.
Overheating of bearings.	Bent or twisted shaft.	Straighten or replace shaft.
	Over tightened belt.	Reduce the belt tightness.
	The pulleys are too far away from the shaft ledge.	Bring the pulley closer to the motor bearing.
	Pulley diameter too small.	Use larger pulleys.
	Poor alignment.	Correct by realigning the motor with the actuated machine.
Overheating of ball bearings.	Not enough grease.	Maintain appropriate quality of grease in bearings.
	Deterioration of grease or lubricant contaminated.	Remove old grease, clean the bearings carefully with paraffin and replace it with new grease.
	Too much lubricant.	Reduce amount of grease Do not fill the bearing up to more than half capacity.
	Bearing overloaded.	Check alignment, magnitude, and push direction of the load.
	Broken ball or damaged wearing course.	Replace bearing, first cleaning the housing carefully.

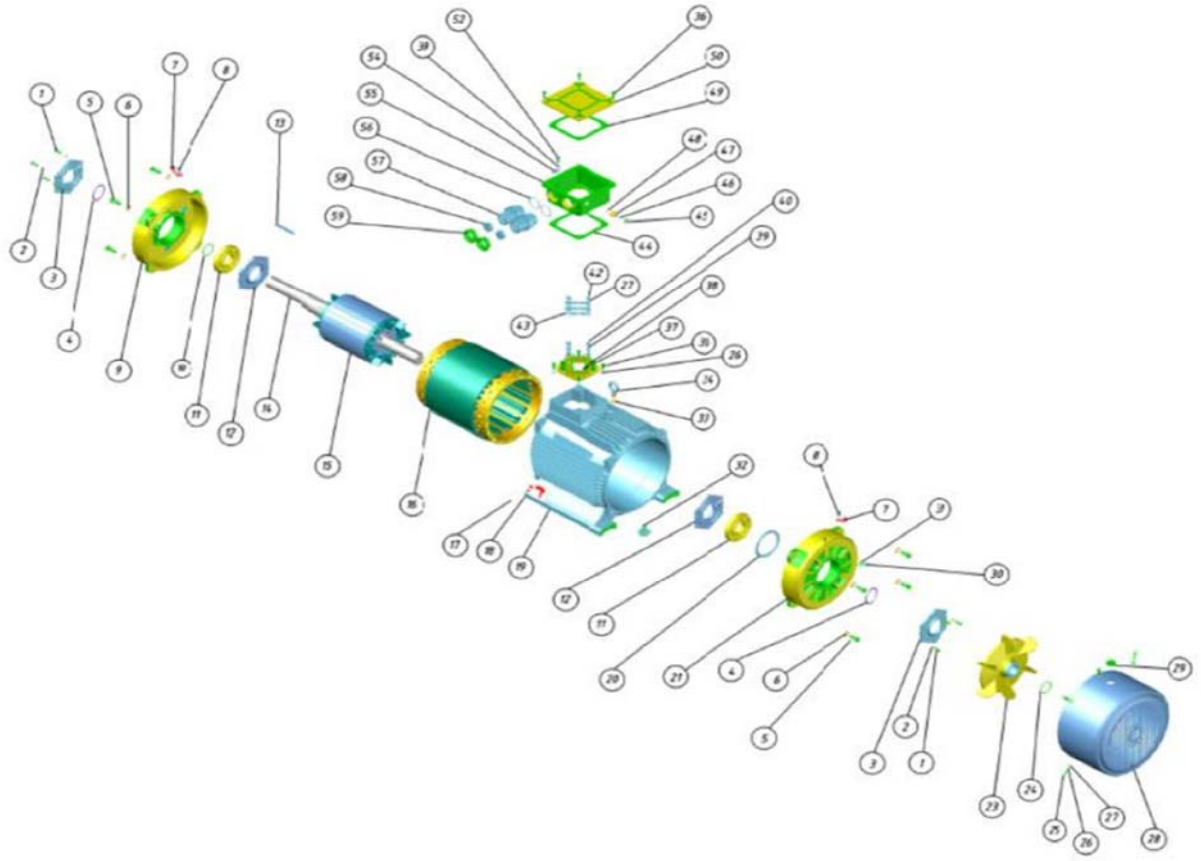
13. Spare parts.

13.1. Motor MSE - size 56 to 160.



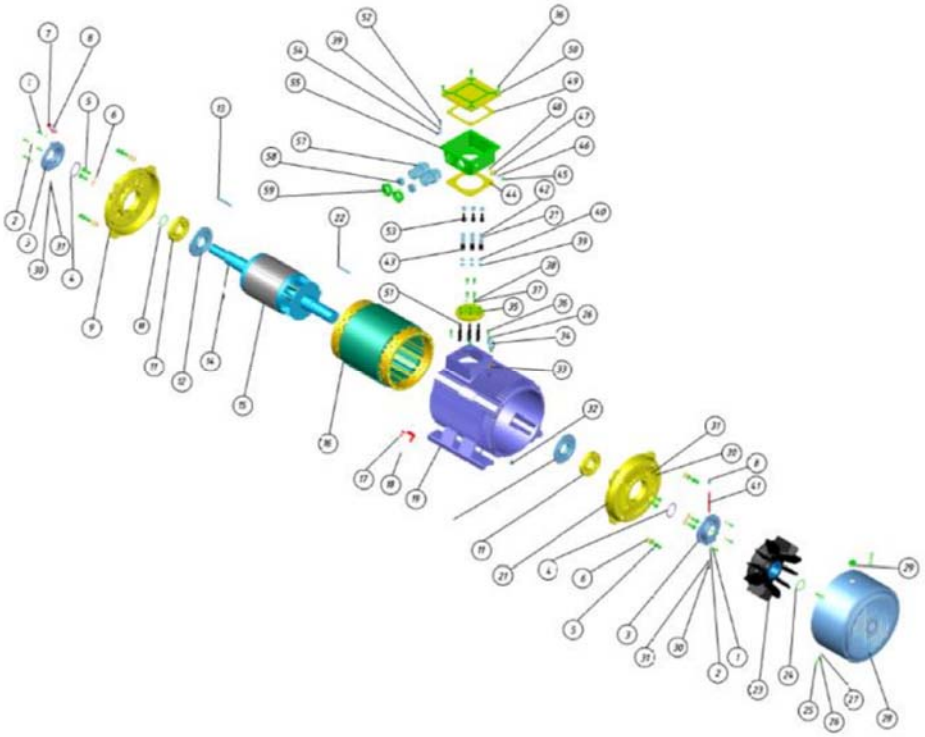
PART N°	DESCRIPTION	PART N°	DESCRIPTION
1	*Carcass shape B3*	15	*Cooling fan cover*
2	*Carcass shape B5*	16	*Screws*
3	*Stator*	17	*Complete terminal base plate*
4	*Rotor*	18	*Terminal box base gasket*
5	*Front cover plate side A*	19	*Screw to fix base of terminal box base*
6	*Bearing*	20	*Cable gland*
7	*Axle shaft key*	21	*Terminal box base*
8	*Back cover plate side B*	22	*Terminal box cover & Terminal box cover gasket*
9	*Nameplate*	23	*Capacitor*
10	*Wave washer*	24	*Screws*
11	*Screws*	25	*Starter capacitor (circuit breaker)*
12	*Cooling fan*	26	*Flange B5*
13	*Elastic ring to fix cooling fan*	27	*Flange B14*
14	*Oil seal*	28	*Screws to fix the terminal box cover*

13.2. Motor EGH - size 160 to 280



PART N°	*DESCRIPTION*	QTY.	PART N°	*DESCRIPTION*	QTY.
1	*Hexagonal screw*	6	28	*Cooling fan cover*	1
2	*Washer*	6	29	*Greasing nipple cap of fan cover*	1
3	*NDE external cover*	2	30	*Hexagonal screw*	2
4	*Oil seal*	2	31	*Washer*	2
5	*Hexagonal screw*	8	32	*Drainage cover*	2
6	*Washer*	8	33	*Washer*	1
7	*Greasing nipple cap*	1	34	*Lifting eyebolt*	1
8	*Grease nipple*	2	35	*Terminal plate*	1
9	*Front cover plate side A*	1	36	*Star type screw*	8
10	*Elastic ring for bearing blockage*	1	37	*Washer*	2
11	*Bearing*	2	38	*Nut*	2
12	*NDE internal cover*	2	39	*Washer*	7
13	*Motor shaft key*	1	40	*Nut*	6
14	*Motor shaft*	1	41	*Greasing tube*	1
15	Rotor	1	42	*Nut*	6
16	*Stator*	1	43	*Connection bridges*	3
17	*Stud*	4	44	*Terminal box base gasket*	1
18	*Nameplate*	1	45, 46, 47, 48	*Cable gland for winding protection*	1
19	*Casing*	1	49	*Terminal box cover gasket*	1
21	*Back cover plate side B*	1	50	*Terminal box cover*	1
22	*Motor shaft key*	1	51	*Terminals*	6
23	*Cooling fan*	1	52	*Earth screw*	1
24	*Elastic ring for fixing of fan*	1	53	*Terminals*	3
25	*Hexagonal screw*	4	54	*Earth plate*	1
26	*Washer*	8	55	*Terminal box base*	1
27	*Washer*	10	56, 57, 58, 59	*Cable gland*	2

13.3. Motor EGH – size 315 to 355



PART N°	*DESCRIPTION*	QTY.	PART N°	*DESCRIPTION*	QTY.
1	*Hexagonal screw*	6	28	Cooling f*an cover*	1
2	*Washer*	6	29	*Greasing nipple cap of fan cover*	2
3	*NDE external cover*	2	30	*Hexagonal screw*	2
4	*Oil seal*	2	31	*Washer*	2
5	*Hexagonal screw*	8	32	*Drainage cover*	2
6	*Washer*	8	33	*Washer*	1
7	*Greasing nipple cap*	1	34	*Lifting eyebolt*	1
8	*Grease nipple*	2	35	*Terminal plate*	1
9	*Front cover plate side A*	1	36	*Star type screw*	8
10	*Elastic ring for bearing blockage*	1	37	*Washer*	2
11	*Bearing*	2	38	*Nut*	2
12	*DE/NDE internal cover*	2	39	*Washer*	7
13	*Motor shaft key*	1	40	*Nut*	6
14	*Motor shaft*	1	41	*Greasing tube*	1
15	Rotor	1	42	*Nut*	6
16	*Stator*	1	43	*Connection bridges*	3
17	*Stud*	4	44	*Terminal box base gasket*	1
18	*Nameplate*	1	45, 46, 47, 48	*Cable gland for winding protection*	1
19	*Casing*	1	49	*Terminal box cover gasket*	1
21	*Back cover plate side B*	1	50	*Terminal box cover*	1
22	*Motor shaft key*	1	51	*Terminals*	6
23	*Cooling fan*	1	52	*Earth screw*	1
24	*Elastic ring for fixing of fan*	1	53	*Terminals*	3
25	*Hexagonal screw*	4	54	*Earth plate*	1
26	*Washer*	8	55	*Terminal box base*	1
27	*Washer*	10	56, 57, 58, 59	*Cable gland*	2

14. Dismantling and recycling

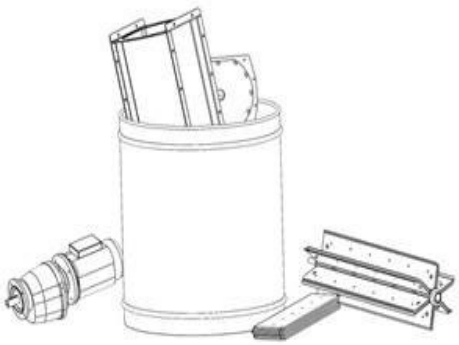
When dismantling a unit, be sure to keep in mind the following important information:

- As the unit is dismantled, set aside all still functioning parts to re-use them on another unit.
- You should always separate the different materials depending on their type: iron, rubber, oils, greases, etc...
- Recyclable parts must be disposed of in the appropriate containers or brought to a local recycling company.

The rubbish must be collected in special containers with appropriate labels and disposed of in compliance with the national laws and/or local legislations in force.

CAUTION!

It is strictly forbidden to dispose of toxic wastes in municipal sewerage and drain systems. This concerns all oils, greases, and other toxic materials in liquid or solid form.



15. Maintenance log

date	description

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