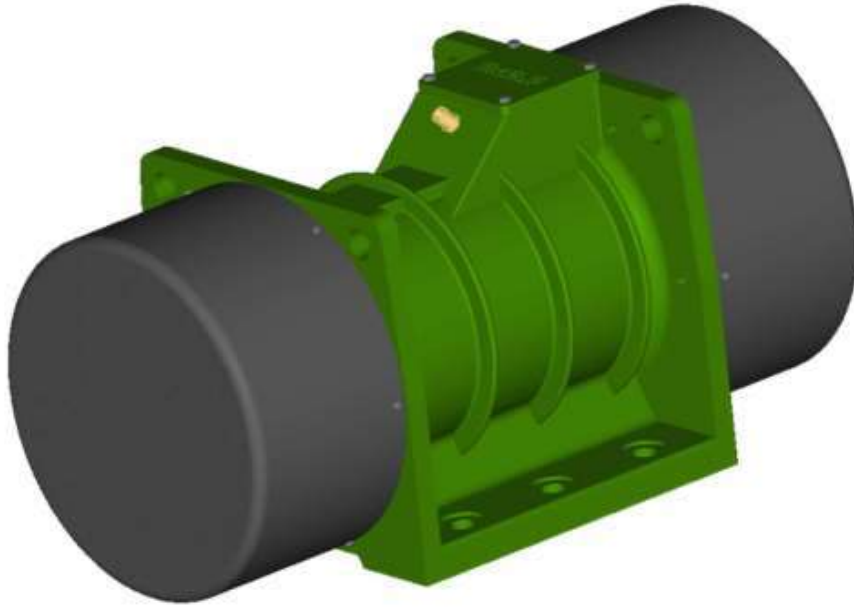




OPERATION AND MAINTENANCE INSTRUCTIONS



VIBRATION MOTOR TOTALLY CLOSED UNCOOLED SQUIRREL CAGE ASYNCHRONOUS MOTORS

ELSAN Elektrik San. ve Tic. A.Ş.





ELSAN ELEKTRİK SANAYİİ VE TİCARET A.Ş.



**EC DECLARATION OF CONFORMITY
AT UYGUNLUK BEYANI**

Document / Belge No: 09-001

Date / Tarih: 07.10.2009

Manufacturer / İmalatçı

ELSAN Elektrik Sanayii ve Ticaret A.Ş.

Products / Ürünler

Alternating Current Cage Type Rotor Vibration Motors
Alternatif Akım Kafes Tipi Rotorlu Vibrasyon Motorları

VEMS / VEMO 80 - 200
0,2 kW - 15 kW

We declare under our sole responsibility that the asynchronous vibration motors with EMTAŞ brand whose sizes and powers given above are in conformity with the following directive and standards.

Yukarıda tipi ve güçleri verilmiş olan EMTAŞ markalı asenkron vibrasyon motorlarımızın, aşağıdaki direktif ve standartlara uygunluğunu beyan ederiz.

Standards Applied / Uygulanan Standartlar

EN 60034-1 EN 60204-1

Directive Applied / Uygulanan Direktif

Low Voltage Directive 2006/95/EC / Düşük Gerilim Direktifi 2006/95/EC

By design, motors are considered as components of the complete machines. The provisions applied to drive systems and their components are out of the scope of EMC Directive 2004/108/EC.

Motorlar tasarım olarak komple bir makinenin parçasıdır. Tahrik edici sistem ve bunun bileşenlerine uygulanabilen kurallar EMC 2004/108/EC direktifi uygulaması dışında bırakılmıştır.

By design, motors, considered as components, comply with the requirements of Machinery Directive 2006/42/EC, provided that the motors are installed, operated and maintained in accordance with our Installation Instructions. The users should obey the safety rules in our instruction manual and the rules in EN 60204-1.

Tasarım olarak komple bir makinenin parçası olan motorlar, işletme ve bakım talimatına göre kurulduğu, işletildiği ve bakımı yapıldığı takdirde 2006/42/EC Makine Emniyet Yönetmeliği'ne uygundur. Motor kullanıcıları, belgelerimizde verilen emniyet kurallarına ve EN 60204-1 standardında verilen kurallara uymalıdır.

The motors above must not be put into service until the machinery into which they have been incorporated have been declared in conformity with the Machinery Directive.

Motorlar, bağlanacakları makinenin Makine Emniyet Yönetmeliği'ne uygunluğu beyan edilmeden devreye alınmamalıdır.

A. Şakir KINACI

Managing Director / Murahhas Aza

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CONTENTS

CONTENTS	1
1. GENERAL INFORMATION	
1.1. Working Conditions	2
1.2. Transportation.....	2
1.3. Storage.....	3
1.4. Safety	3
2. SETUP AND OPERATION	
2.1. Setup	4
2.2. Insulation Resistance.....	4
2.3. Vibration Generation Methods	5
2.3.1. Circular Method	5
2.3.2. Single Direction Method	5
2.4. Setting the Centrifugal Force.....	5-6
2.5. First Start and Running.....	7
2.6. Rotation Direction	7-8
2.7. Final Check	8
3. MAINTENANCE	
3.1. Cleaning	9
3.2. Bearings	9
3.2.1. Lubrication of Bearings	9
3.2.2. Bearing Replacement.....	11
3.3. Sealing Component	11
4. FAULTS, REASONS, AND SOLVINGS	
4.1. Tables of Troubleshooting	12-14
5. IDENTIFICATION AND MARKING	
5.1. Vibration Motor Identification Plate	15
5.2. Description of the sections on the plate	15
6. COMPONENT OF VIBRATOR	
6.1. Part Mapping With Section View	16
6.2. Bill of Material of Vibration Motor.....	17
7. OTHER INFORMATIONS	
7.1. List of the Related Standards	18
7.2. Figure – Table Indexes.....	19
7.3. Authorized Services List	Back cover

1. GENERAL INFORMATION

This operation and maintenance instruction includes low voltage, totally enclosed, cage rotor asynchronous vibration motors manufactured in accordance with TS / EN norms.

This operation and maintenance instruction may not contain specific information about specific applications and areas. In this case, the user must make appropriate protection arrangements during the installation.

The following points should be considered for the matters not mentioned in this instruction,

1. Technical data given in the catalog and on the name plate
2. Information about the facility to use the vibration motor
3. Protective measures according to where the vibration motor will be used



Our vibration motors are 2 (TWO) YEAR WARRANTY. But; vibration motors not operated under the conditions specified in this instruction, catalog, and name plate or not having the necessary protection schemes in accordance with TS 10316 - EN 60204-1 are excluded from the warranty.



The structural changes to be made on the parts and repair and maintenance operations by unauthorized personnel shall cause the vibration motor to be excluded from the warranty.



Bearings used in vibration motors are not guaranteed by the bearing manufacturer.

1.1. OPERATING CONDITIONS

Standard vibration motors, designed to operate at rated voltage and frequency (380 V, 50 Hz), -15 ÷ +40 °C ambient temperature and at sea level up to 1000 m.

Standard vibration motors within the scope of this operation and maintenance instruction are totally enclosed, non-ventilated, and IP55 protection class. Measures should be taken for the vibration motors which operating outdoors to protect against rain, snow, dust etc.

1.2. TRANSPORTING

80 and 90 frame motors have a lifting eye and bigger frames have lifting holes.

1. GENERAL INFORMATION



If the vibration motor has to be lifted together with additional loads, such as the chassis or the driven machine; the additional loads must be lifted by their own system.



Vibration motors should never be placed on the fan covers and they should not be transported and stored in this way.

1.3. STORAGE

The vibration motor must be checked visually if it is damaged or not during transportation. If the vibration motor is to be stored for a long time, it must be kept a place which is clean, free of moisture and vibration.

1.4. SAFETY

Vibrating motors are connected to the power supply network and are rotated by magnetic induction. When they transported, installed, used and maintained according to this operation and maintenance instruction, it does not endanger any life



Vibration motors are industrial products. In this regard, the installation process must be carried out by experienced and qualified personnel. Vibration motors are manufactured by taking precautions against earth leakage and / or static electricity.

2. SETUP AND OPERATION

2.1. SETUP

During the stage of setting up the vibration motor, it should be taken into consideration that the vibration motor can be easily reached during maintenance and repair times.



Vibration motors to work outside; The sun's rays should not come directly into the vibration motor.



During normal operation, the vibration motor body may become too hot to touch. Therefore, the vibration motor must not be touched.

2.2. INSULATION RESISTANCE

In case of vibration motors to be used after a long storage or waiting period, the insulation resistance of the windings must be measured before commissioning. In the insulation resistance measurement process, DC 500V is applied to the windings with insulation resistance measuring device (megaohmmeter) and the resistance is read at the end of one minute.

Insulation resistance value measured at 25 ° C; 10 MΩ' in a new vibration motor and 1 MΩ in a vibration motor that has worked for a period of time.

If the measured insulation resistance value is below the limit values; winding must be cleaned and dried. If the insulation resistance value is still low, the windings must be dried. Drying can be done in an oven or with a heat gun. (heat gun temperature is 80 ° C)

Using DC voltage with the help of a transformer, drying can be achieved by applying a current not exceeding 10% of the rated voltage and 20% of the rated current to the terminals U1 and V1 of the winding.

The insulation resistance must be checked again after the vibration motor has cooled down.



Do not touch the terminals during and after the measurement due to high voltage. After measurement, the windings must be discharged immediately.

2. SETUP AND OPERATION

2.3. VIBRATION GENERATION METHOD

There are basically two vibration generation methods

2.3.1. Circular Method

In this method, vibration force is obtained in a circular direction in 360 ° clockwise and counterclockwise using a vibration motor. (Figure-1.a).

2.3.2. Single Direction Method

In this method, vibration forces are obtained in only one direction and sine curve by using two vibration motors. (Figure-1.b).

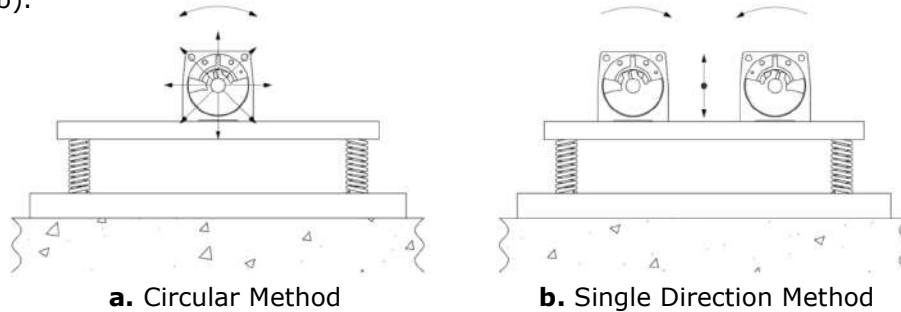


Figure-1. Vibration generation methods

2.4. SETTING THE CENTRIFUGAL FORCE

Vibration motors are vibrated with eccentric hammers on both sides of the motor. A total of four eccentric hammers are available in a vibration motor with two fixed and two adjustable.



Our vibration motors are shipped with the eccentric hammers set to step 3 (85%).

The vibration force is increased or decreased by changing the positions of the tuned hammers. As the angle between the fixed and tuned hammers increases, the vibration force decreases.

To adjust the vibration force:

- Remove the safety cover on both sides of the vibration motor.
- Loosen the bolts on the adjustable (outside) hammers.
- Rotate the adjustable hammers over the shaft to set them to the appropriate setting for your system.
- Tighten the bolts on the adjustable hammers.
- Install the safety cover on both sides of the vibration motor by checking that the sealing piece (oring) between the vibration motor cover and the safety cover is properly installed.

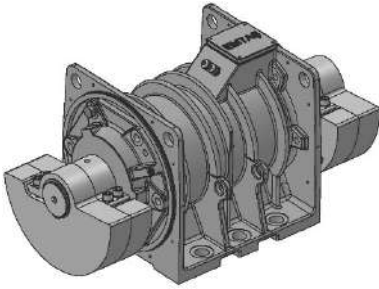
2. SETUP AND OPERATION



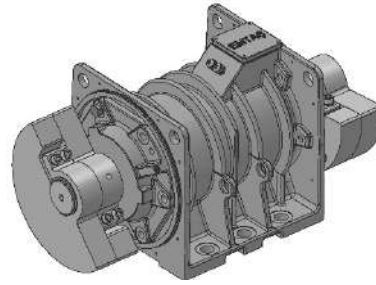
The vibration motors must not be operated when the safety cover on both sides of the motor is not installed.



The position of the hammers on both sides of the vibration motor, must be the same (parallel). If the adjustment is made in a different direction, the position of the hammers on both sides is not the same (parallel), the vibration motor shaft, the vibration motor mounting bolts and / or the chassis to which the vibration motor is connected are damaged.

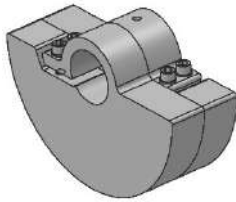


True

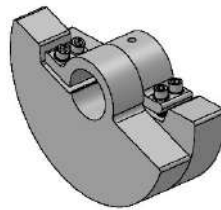


False

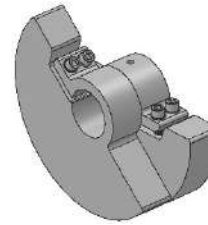
Şekil-2. Setting the centrifugal force



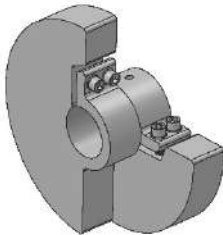
1. Level (% 100)



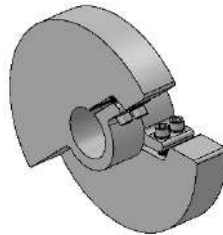
2. Level (% 95)



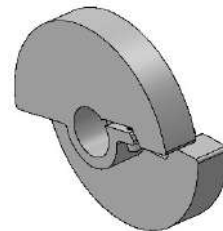
3. Level (% 85)



4. Level (% 70)



5. Level (% 50)



6. Level (% 30)

Figure-3. Setting level of centrifugal force

2. SETUP AND OPERATION

2.5. FIRST START AND RUNNING

Our vibration motors are manufactured as standard only for direct starting. For this reason, our vibration motors have 3 pole outputs in the terminal boxes.

The suitability of the network that will feed the vibration motor to the vibration motor plate information must be checked and the supply cables should be selected according to these values. If the voltage difference is greater than $\pm 5\%$, the vibration motor windings may be damaged.



Check the tightness of the nuts at the terminals. Loosely nuts cause the vibration motor to malfunction.



The user has the responsibility to protect the vibration motor against overload. The vibration motor must be connected to the mains via a thermal-magnetic switch which is capable of protection against overcurrents. The current setting of the switch must not be more than 1.05 times the rated current of the vibration motor. Otherwise, the vibration motor is not covered by the warranty.

Overload protection will only be possible by sensing excessive heat caused by overload and other reasons (two phases, excessive ambient temperature or altitude, excessive starting stop, etc.). Install a thermistor in the winding and to connect the terminals coming from the thermistor to the thermistor relay is necessary for overload protection.

PTC thermistors are mounted as standard on 132, 160, 180 and 200 types of vibration motors and Phase Protection Relay is given as free of charge. On request, our smaller vibration motors are supplied with a thermistor and are supplied with a relay.

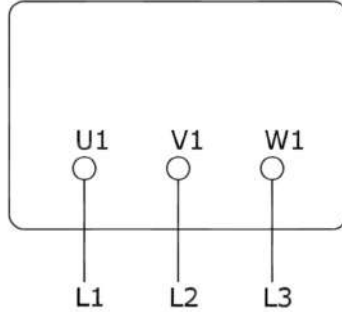


Vibration motors of type 132, 160, 180 and 200 should be used with thermistors. Otherwise, the warranty terms will be invalid.

2.6. ROTATION DIRECTION

Our vibration motors are designed to operate in both directions. The rotation direction of the vibration motor can be changed by replacing any two of the mains phases in the connection diagram L1, L2 and L3.

2. SETUP AND OPERATION



Şekil-4. Running Diagram

2.7. FINAL CHECK



If the mechanical and electrical connections of the vibration motor are technically appropriate, it shall be appropriate to start the operation after the following checks.

1. The operating conditions must be compatible with the vibration motor plate. ($3\sim 380V \pm\%5$, $50Hz \pm\%2$)
2. If the vibration motors are not used for a long time, the insulation resistance values must be sufficient.
3. All mechanical and electrical connections must be tight.
4. The moving and energized parts must be fully protected against touching.
5. The position of the hammers on both sides of the vibration motor must be the same (parallel).



When the vibration motor is being serviced, the vibration motor must not be connected to the mains power (no power) and must be de-energized in the auxiliary circuits (heater etc.).

3. MAINTENANCE

3.1. CLEANING

Before and after work, dust accumulated on the body should be cleaned.

3.2. BEARINGS

Vibration motors are equipped with long-life bearings that can carry axial, radial and combined loads without problems.

3.2.1. Lubrication of bearings

Vibration motors are equipped with lubricating nipples and oil drain channels. The grease type and lubrication range are indicated on the vibration motor plate.



In order not to deteriorate the chemical and physical properties of the greases, different types of greases should never be mixed. When lubricating, be sure to use the type of grease indicated on the vibration motor plate.



In the case of initial lubrication, no grease should be expected from the discharge duct. After several lubrication, dirty grease will appear in the discharge duct.

- For re-lubricating bearings;
- Remove the grease drain plug
- Clean the dirty grease on the drain and make sure the drain is open.
- Clean the grease nipple and the tip of the grease gun.
- Pump up to half the grease of the quantity indicated in the table on page -11.
- Operate the vibration motor at full speed for several minutes.
- When the vibration motor stops, pump the remaining grease into the bearing.
- Install the grease drain plug.

Lubrication hours (operating hours) and grease quantities (gr) for vibration motors with lubricating nipples are given in Table-1.

3. MAINTENANCE

VIBRATION MOTOR / BALL- ROLLER (63/64 SERIES - NJ TYPE) BEARINGS					
VIBRATION MOTOR TYPE	2 Pole	4 Pole	6 Pole	10 Pole	
VEMS 80-2-77 0,7 kW	2.000 4	-	-	-	
VEMS 80-4-47 0,37 kW	-	3.300 5	-	-	
VEMS 90-2-116 1,7 kW	1.750 7	-	-	-	
VEMS 90-4-117 0,55 kW	-	2.800 10	-	-	
VEMS 90-4-159 0,75 kW	-	-	-	-	
VEMS 90-4-181 1,1 kW	-	2.700 12	-	-	
VEMS 90-6-108 1,1 kW	-	-	3.500 10	-	
VEMS 100-4-242 1,5 kW	-	2.250 18	-	-	
VEMS 100-4-282 2,0 kW	-	-	-	-	
VEMS 100-10-80 0,2 kW	-	-	-	5.000 10	
VEMS 112-2-210 2 kW	1.150 15	-	-	-	
VEMS 112-4-327 2,2 kW	-	2.250 15	-	-	
VEMS 112-4-413 2,4 kW	-	2.100 26	-	-	
VEMS 112-4-456 3,2 kW	-	-	-	-	
VEMS 112-6-145 1,5 kW	-	-	2.900 15	-	
VEMS 112-6-202 2 kW	-	-	-	-	
VEMS 132-2-530 4 kW	900 22	-	-	-	
VEMS 132-4-551 3,5 kW	-	2.000 34	-	-	
VEMS 132-6-416 3,2 kW	-	-	2.800 23	-	
VEMS 160-4-736 5,8 kW	-	1.700 44	-	-	
VEMS 160-6-583 4 kW	-	-	2.500 38	-	
VEMS 160-6-705 4,5 kW	-	-	-	-	
VEMS 160-6-881 7,5 kW	-	-	2.400 54	-	
VEMS 160-6-981 8,0 kW	-	-	-	-	
VEMS 180-6-130 9,2 kW	-	-	2.300 78	-	
VEMS 180-6-136 11 kW	-	-	-	-	
VEMS 200-6-137 11,2 kW	-	-	2.300 78	-	
VEMS 200-6-153 12,5 kW	-	-	-	-	
VEMS 200-6-181 15 kW	-	-	2.100 96	-	

Table-1. Lubrication Interval of Bearings [Operating Hours] and Grease Amounts [gr]



The values in the table are calculated for the bearing temperature of 100 ° C.

3. MAINTENANCE



Refer to the vibration motor plate for current bearing and lubrication information.

3.2.2. Bearing Replacement

Dismantling of bearings:

- Roller bearings: The inner ring must be heated with flame and removed by means of a puller. If not, the inner ring should be turned and refuted.
- Ball Bearings: After the inner ring has been heated slightly, it should be removed by using puller. Never use hammer.

Mounting of bearings:

- The inner rings of the ball bearings and roller bearings must be heated to an average temperature of 80 ° C in the induction heater or in the oil bath (open bearings only). The heated bearing can be easily installed on the shaft.
- When the bearings are mounted on the shaft, impacts from the outer ring must not be applied. Instead, light impacts can be applied to the ring-type tools and the bearing inner ring made of the shaft diameter.
- When attaching the vibration motor bearing covers, suitable tools should be used with the cover diameter.



To replace the bearings, the rotor and shaft assembly must be removed. During this time, the stator windings must be observed and the windings must be protected.



A bearing must not be unpacked until it is installed. They must be protected from dirty and dusty environments.

3.3. SEALING COMPONENTS

The sealing components (eg oring) between the vibration motor cover and the housing must be correctly seated in the housing. Damage must be prevented when adjusting the vibration force.

Oil seals with 112 and 132 types and 160 types of vibration motors (excluding 7,5 kW - 1000 1 / min) must be fitted with suitable tools.

The sealing components can be lubricated with machine oil before assembly. The sealing components must be installed in the correct axis to the mounting locations. When they are not fitted on the right axis, they cause excessive friction.

4. TROUBLESHOOTING

4.1. MALFUNCTION OF VIBRATION MOTOR

FAULTS	REASONS	SOLVINGS
The vibration motor does not rotate under voltage, there is no sound from the vibration motor.	Fault in control circuit (panel).	Check terminal ends, if there is no power, check the board for faults.
	There is no energy in at least two phases. In the control with the test light, energy is seen. However, there is no value in the voltmeter.	Check fuses, cables, and the relevant screws and terminals (Deactivate the vibration motor during replacement of defective fuses).
	The thermal relay or thermistor phase protection relay has deactivated the vibration motor.	Check the thermic relay, thermistor and thermistor relay
	The ground mounting bolts are loose.	Tighten the bolts.
The vibration motor does not rotate under voltage and has excessive magnetic sound.	There is no energy in one of the phases.	Find the non-energized phase, replace the relevant fuse.
	The counter torque is too big.	Check and rearrange the system, run the vibration motor with no load.
The vibration motor is not working under load. But the magnetic sound is normal.	The mains voltage is low.	Measure the voltage.
The vibration motor is overheating when running without load.	Mains voltage is high.	Measure the mains voltage and the no load current.

Table-2 - Troubleshooting

4. TROUBLESHOOTING

4.1. MALFUNCTION OF VIBRATION MOTOR

FAULTS	REASONS	SOLVINGS
The vibration motor works fine while unloaded. The speed of the vibration motor is extremely low under load.	One of the phases is die after the vibration motor has started running.	Control the voltage on each phase
	Rotor short-circuit bars are broken, amperemeter reads irregular currents.	Contact an authorized service center.
The current and temperature values exceed the normal values when the vibration motor is running.	Vibration motor overloaded.	Check the current.
The vibration motor is warm when it is running without load.	Mains voltage is high.	Measure the mains voltage and the no-load current.
The vibration motor stops for a certain period of time.	Vibration motor overloaded.	Do not overload the motor.
	The thermic relay is not correctly set or thermistor device active	Correct the thermic relay setting.
The vibration motor is running extremely loud.	The chassis mounting bolts are loose.	Tighten the bolts.
	The welded assembly of the machine are broken.	Repair the assembly connections.
	The eccentric hammer adjustment of the vibration motor is distorted.	Adjust the eccentric hammers of the vibration motor so that they are at the same angle on both sides.

Table-2 - Troubleshooting

4. TROUBLESHOOTING

4.1. MALFUNCTION OF VIBRATION MOTOR

FAULTS	REASONS	SOLVINGS
The phase currents are extremely different.	Phase voltages are different.	Check the voltage.
	The mains voltage or the windings are disconnected.	Check mains voltage and windings.
	Stator winding touches the ground.	
	There is a short circuit in the stator windings.	
The bearing is deteriorating very quickly.	Bearing overloading.	Check the system. Eliminate excessive radial and axial forces, if any.
	Lubrication problem.	Take care to lubricate.
	The eccentric hammer adjustment of the vibration motor is distorted.	Adjust the eccentric hammers of the vibration motor so that they are at the same angle on both sides.
The bearings have overheated after a long period of operation. Grease lubricated bearings have a whistling sound	No oil in the bearing.	Lubricate the bearing, replace if necessary.
	Sealing of the bearing covers (such as seals and seals) is damaged.	Replace the bearing, contact service if necessary.
	Bearing is running dry	Take care to lubricate.
	Error in the bearing cage.	Replace the bearing.

Table-2 - Troubleshooting

5. IDENTIFICATION AND MARKING

5.1. IDENTIFICATION AND MARKING

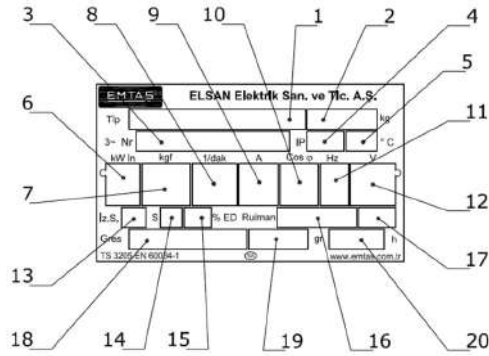


Figure 5- Vibration Motor Name Plate

5.2. DESCRIPTIONS OF THE SECTIONS ON THE NAME PLATE

Number	Definition
1	Vibration Motor Type
2	Vibration Motor Weight, [kg]
3	Serial Number
4	Ingress Progress Class
5	Operating Environment Temperature [°C]
6	Input Power, [kW]
7	Centrifugal Force, [kgf]
8	Rated Speed, [1/dak]
9	Rated Current, [A]
10	Power Factor, Cos ϕ
11	Frequency, [Hz]
12	Voltage, [V]
13	Winding Insulation Class
14	Duty
15	Power Factor, [%]
16	Bearing Data
17	Bearing Data
18	Type of Grease
19	Grease Quantity for Relubrication , [gr]
20	Interval of Lubrication [running time (h)]

Table-3. Name Plate Descriptions of Vibration Motor

6.COMPONENT OF VIBRATOR

6.1. PART MAPING WITH SECTION VIEW

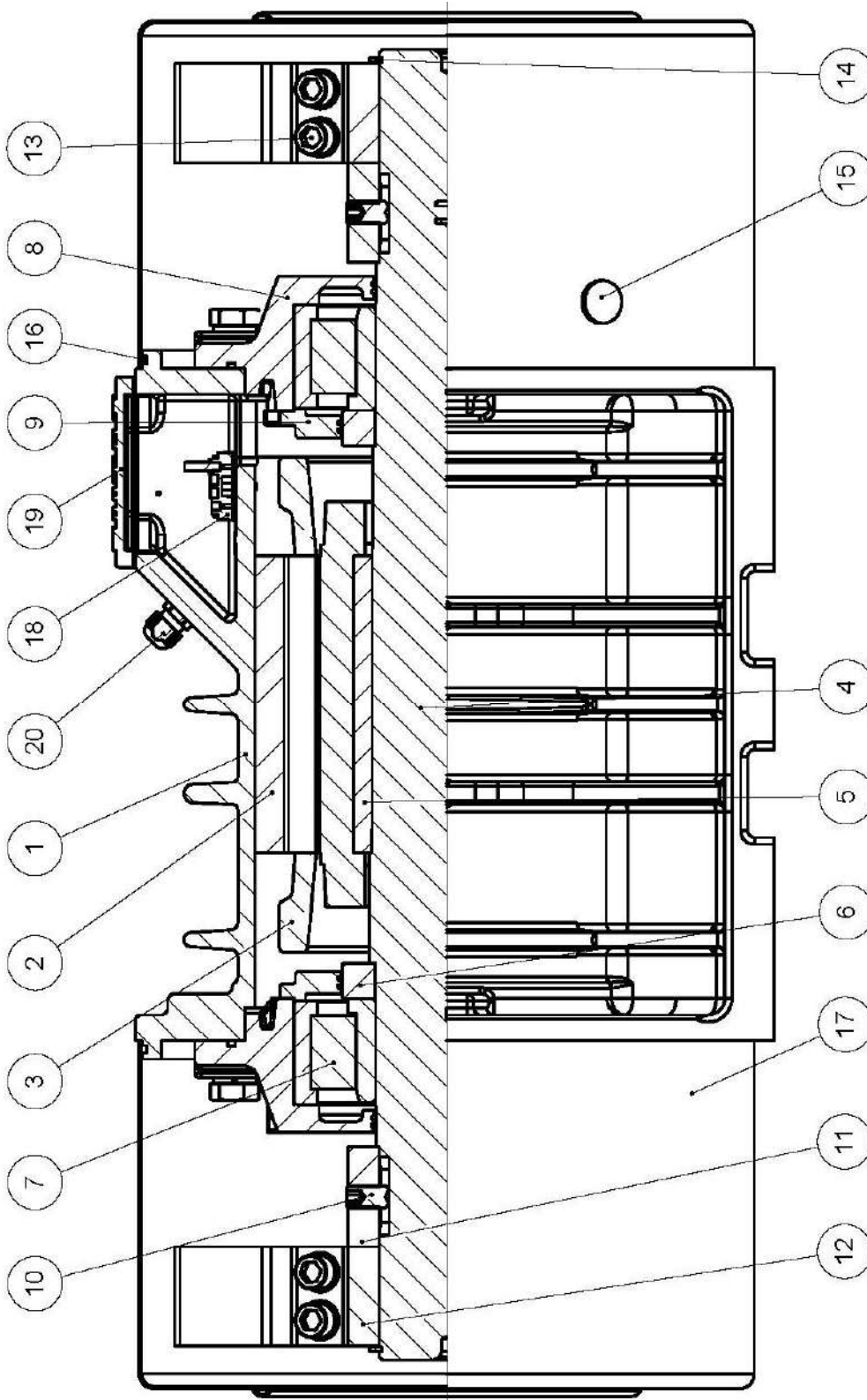


Figure-6. Part mapping of vibration motor

6.COMPONENT OF VIBRATOR

6.2. PART LIST OF VIBRATION MOTOR

PART NUMBER	PART NAME
1	FRAME
2	STATOR PACK
3	STATOR WINDING
4	SHAFT
5	ROTOR PACK
6	SOLID SHAFT RING FOR BEARING
7	BEARING
8	SHIELD
9	OUTER BEARING CAP*
10	SETSCREW BOLT**
11	PERMANENT HAMMER
12	SETTING HAMMER
13	HAMMER CLAMPING BOLT
14	SHAFT RING FOR HAMMER
15	LUBRICATION FITTING
16	O-RING (SEALING COMPONENT)
17	SAFETY COVER
18	TERMINAL BOARD
19	TERMINAL BOX COVER
20	CABLE GLAND

Table-4. Part list of vibration motor

* Outer ball cap (except 7.5 kW - 1000 1 / min) for 160 types of vibration motors with 112/2 and 132 types; There are 100,112 and 160 types and 180 and 200 types of vibration motors with inner ball cap.

** Setscrew mounting should use a removable screw adhesive. (Example: Loctite 243)

7. OTHER INFORMATION

7.1. LIST OF RELATED STANDARDS

DOCUMENT	NAME OF DOCUMENT
TS EN 60034-1	Rated values and performance
TS EN 60034-2-1	Measurement methods of efficiency and loss
TS 3209 EN 60034-5	Ingress Progress Classification (IP Classification)
TS 3210 EN 60034-6	Cooling Method (IC Classification)
TS 3211 EN 60034-7	Construction and assembly arrangements (IM Classification)
TS EN 60034-8	Markings of the terminals and direction of rotation
TS EN 60034-9	Noise level limits
TS 6848 EN 60034-12	Starting Performance
TS EN 60034-14	Vibration limits and measurement
TS EN 60034-15	Voltage resistance in AC machines
TS EN 60034-18-1	Insulation and thermal classification
TS EN 50347	Identification of Induction Motor

Table-5. List of related standarts

7. OTHER INFORMATION

7.2. INDEX OF FIGURE AND TABLE

FIGURE	NAME OF FIGURE	SECTION	PAGE
1	Vibration generation methods	2.3	6
2	Setting the centrifugal force	2.4	6
3	Setting level of centrifugal force	2.4	7
4	Running Diagram	2.6	9
5	Name Plate of Vibration Motor	5.1	18
6	Part Maping of Vibration Motor	6.1	19

Table.6. Index of Figure

TABLE	NAME OF TABLE	SECTION	PAGE
1	Lubrication Interval of Bearing	3.2.1	10
2	Troubleshooting	4.1	12-14
3	Name Plate Descriptions of Vibration Motor	5.2	15
4	Part list of Vibration Motor	6.2	17
5	Related Standarts	7.1	18
6	Index of Figure	7.2	19
7	Index of Table	7.2	19
8	List of Authorized Services	7.3	Back Cover

Table.7. Index of Table

AUTHORIZED SERVICES LIST

	SERVICE	ADDRESS	PHONE (+90)
1	Anıl Elk. Bobinaj	Sultan Orhan Mah. Hasköy San. Sit. 9. Blok No:5 Gebze / KOCAELİ	(262) 646 51 06
2	Aktan Elektrik	Yeni Sanayi 82. Sok. No:6 KAYSERİ	(352) 332 11 22
3	Aslan Bobinaj	Rıza Yalçın Cad. No: 28 Merkez / IĞDIR	5446011810
4	Aygem Plastik	AOSB 10021 Sok. No:11 Çiğli / İZMİR	(232) 376 80 74
5	Bemsan Motor	Küçük San. Sit. C Blok 131/1 Bilecik	(228) 212 74 93
6	Bulut Elk. Bobinaj	San. Sit. 26. Sok. No:5 ELAZIĞ	(424) 224 64 79
7	Can Elk. Bobinaj	Tersaneler Bölgesi G 50 Sok. No:12 Tuzla / İSTANBUL	(216) 494 30 94
8	Dağtekin Elektrik	Turhan Cemal Beriker Bulvarı Mekân Mah. No:728/B Seyhan / ADANA	(322) 441 00 87
9	Demirler Pompa	Küçük San. Sit. B Blok 3 Tıp 3. Cad. No:132 GAZİANTEP	(342) 235 31 39
10	Desa Elektrik	Sahil Mah. Ofis Cad. No:25/A Tatvan / BİTLİS	5327168178
11	Elmotsan	İOSB 1471. Sok. No: 59 Yenimahalle / ANKARA	(312) 394 40 91
12	Garanti Bobinaj	Yeni San. Sit. 7. Cad. 5. Sok. No:5-6 MALATYA	(422) 336 09 09
13	Genel Elektro Motor	Çınartepe Mah. Bülent Ecevit Cad. TTK 69 Ambarları Mevkii ZONGULDAK	(372) 268 08 64
14	Günşah Elektrik	Cumhuriyet Mah. Gürpınar Cad. NO:8 Beykent San. Sit. 209-210 B.Çekmece / İSTANBUL	(212) 872 00 66
15	Gürsel Bobinaj	Çakmak Mah. Nizip Cad. No:58/C 27400 GAZİANTEP	(342) 323 34 65
16	Kardeşler Bobinaj	Çepni Mah. İnönü Cad. NO:75 ÇORUM	(364) 213 23 30
17	Makine Market	Rize Cad. Demirkırlar İş Merk. No:70 Değirmendere / TRABZON	(462) 328 14 80
18	Mepsa Makine	Dörtüol Sanayi Çarşısı Yüksek Mah. Eskişehir Cad. No:44 ADAPAZARI	(264) 275 18 49
19	Omaks Bobinaj	Kurtuluş Cad. Arabacılar Sok. No:3 Yıldırım / BURSA	(224) 327 34 14
20	Özfer Elektrik	Teksan San. Sit. C-6 Blok No: 8 ESKİŞEHİR	(222) 228 06 66
21	Seri Bobinaj	Süleyman Demirel Bulvarı Valide Cami Yanı No:103 İSPARTA	(246) 218 28 17
22	Sezmen Bobinaj	Ege Ticaret İş Merkezi 1201/4 sok. No:4/B Yenişehir / İZMİR	(232) 457 14 65
23	Sünbül Trafo	Küçük San. Sit. 5. Cad. No:46 K.MARAŞ	533 619 84 17
24	Teknik Bobinaj İmas Servis	19 Mayıs San. Sit. Adnan Kahveci Bulvarı No:14 Kutlukent / SAMSUN	(362) 266 96 81 5353397692
25	Uğur Bobinaj	San. Sit. Ş.Efendi Caddesi No:8 ŞANLIURFA	(414) 312 73 45
26	Uşak Dost Elektrik	İslice Mah. Polis Sok. No: 13/A UŞAK	(276) 215 75 75

AUTHORIZED SERVICES LIST

	SERVICE	ADDRESS	PHONE (+90)
27	Ümit Bobinaj	Kurtuluş Mah. Salhane Cad. No:35 Tire / İZMİR	(232) 511 41 67 5365145300
28	Voltaj Elk. Bobinaj	Urfa yolu 1. km No:43 DİYARBAKIR	(412) 237 05 55 (412) 415 06 35
29	Yavuzhan Bobinaj	Karatay San. Sit. Çobandede Sok. No:20 KONYA	(332) 233 29 60



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