

**ABB**

**CE**



**ABB INDIA LTD.**

32, Industrial Area, N.I.T.  
Faridabad - 121 001

**AN ISO-9001, 14001 & 18001 CERTIFIED CO.**



## EU Declaration of Conformity

**The Products :** 3-phase electric motors and generators of the  
series M2BA with center heights 71, 80, 90, 100, 112 and 132 mm  
series E2BA with center heights 71, 80, 90, 100, 112 and 132 mm  
series E2HX with center heights 160, 180, 200, 225 and 250 mm  
series M2BAX with center heights 71,80,90,100,112,132,160,180,225 and 250 mm  
series M3BP with center heights 160, 180, 200, 225 and 250 mm

**The Manufacturer :** **ABB India Limited**  
32, Industrial Area, N.I.T.  
Faridabad-121001 (INDIA)

This declaration of conformity is issued under the sole responsibility of the manufacturer.

The products of the declaration described above are in conformity with the relevant Union harmonization legislation :

**Directive 2006/95/EC (until April 19th, 2016) and Directive  
2014/35/EU (from April 20th, 2016)  
Directive 2009/125/EC (ErP of 20th November 2009)**

The motors that are marked as IE2, IE3 or IE4 are in conformity with the requirements set in the Commission Regulation (EU) No. 4/2014 of 5 January 2014 amending Regulation (EC) No. 640/2009.

### **Directive 2011/65/EU**

Motors are in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

The following applied standards are used in relation to which conformity is declared :

EN 60034-1:2010, EN 60034-2-1:2007, EN 60034-5:2001/A1:2007, EN 60034-6:1993, EN 60034-7:1993/A1:2001, EN 60034-8:2007/A1:2014, EN 60034-9:2005/A1:2007, EN 60034-11:2004, EN 60034-12:2002/A1:2007, EN 60034-14:2004/A1:2007, EN 60034-30:2009 and EN 50581:2012

**Note :** When installing motors for converter supply applications, additional requirements must be respected regarding the motor as well as the installation, as described in installation manual delivered with converters.

The conformity of the end product according to the Directive 2006/42/EC has to be established by the commissioning party when the motor is fitted to the machinery.

Signed for and on behalf of : ABB India Limited  
Place and Date of issue : Faridabad, India 2016-06-15

Signed by

Signed by

Name : Peter J. Isberg (EU representative)  
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## ABB INDIA LTD.

Factory : 32, Industrial Area, N.I.T. Faridabad-121 001  
(Haryana) INDIA

Certified that this 3 phase induction motor has passed all the routine test as per IS/IEC 60034-1 and other relevent standards and found O.K.

**Frame** \_\_\_\_\_

**Motor Sr. No.** \_\_\_\_\_

**3G1J1** \_ \_ \_ **000** \_ \_ \_ \_ \_

**HP** \_\_\_\_\_ **VOLT** \_\_\_\_\_

**EFF. CLASS** \_\_\_\_\_ **M. TYPE** \_\_\_\_\_

Tested by : \_\_\_\_\_ for **ABB India Limited**

Date :

**INSP F03C**

# Low Voltage Motors

## Installation, operation and maintenance manual

GB

Contents	Page
1. General .....	4
1.1 Validity .....	4
2. Installation .....	5
2.1 Putting into service (standing) .....	5
2.1.1 Reception check .....	5
2.1.2 Insulation resistance check .....	5
2.1.3 Direct-on-line or star/delta starting .....	6
2.1.4 Terminals and direction of rotation .....	6
2.2 Handling .....	7
2.2.1 Storage .....	7
2.2.2 Transportation .....	7
2.2.3 Lifting .....	7
2.2.4 Machine weights .....	8
2.3 Installation .....	8
2.3.1 Cooling .....	8
2.3.2 Foundation .....	9
2.3.3 Alignment .....	10
2.3.4 Slide rails and belt drives .....	10
2.4 Connection .....	10
2.4.1 Connection for variable speed drive .....	11
2.5 Balancing .....	12
<b>3. Operating .....</b>	<b>13</b>
3.1 Use .....	13
3.1.1 Operating conditions .....	13
3.2 Safety considerations .....	13
3.2.1 Points to observe .....	13
3.3 Assembly and dismantling .....	13
3.3.1 General .....	13
3.3.2 Bearings .....	14
3.3.3 Fitting coupling halves and pulleys .....	14
<b>4. Maintenance .....</b>	<b>14</b>
4.1 Maintenance and lubrication .....	14
4.1.1 General inspection .....	14
4.1.2 Lubrication .....	15
4.1.3 Machines with permanently greased bearings ..	15
4.1.4 Motors with regreasing nipples .....	16
4.1.5 Lubrication intervals and amounts .....	18
4.1.6 Lubricants .....	19
4.1.7 Frequency converter drives .....	20
4.1.8 Spare parts .....	21
4.1.9 Rewinding .....	21
<b>5. Environmental requirements .....</b>	<b>21</b>
5.1 Noise levels .....	21
<b>6. Troubleshooting .....</b>	<b>22</b>

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# 1. General

**NOTE!**

These instructions must be followed to ensure safe and proper installation, operation and maintenance of the motor. They should be brought to the attention of anyone who installs, operates or maintains this equipment. Ignoring the instruction may invalidate the warranty.

## 1.1 Validity

The instructions are valid for the following ABB electrical machine types, in both motor and generator operation.

series HX\*, MT\*, MBT\*, MXMA,  
series M2A\*/M3A\*, M2B\*/M3B\*, M2C\*/M3C\*, M2F\*/M3F\*,  
M2L\*/M3L\*, M2M\*/M3M\*, M2Q\*, M2R\*/M3R\*,  
M2V\*/M3V\*

in frame sizes 71 - 250.

There is a separate manual for e.g. Ex motors 'Low voltage motors for hazardous areas: Installation, operation and maintenance Manual' (Low Voltage Motors/Manual for Ex-motors).

Additional information is required for some machine types due to special application and/or design

considerations. Additional information is available for the following motors:

- roller table motors
- water-cooled motors
- open drip proof motors
- smoke venting motors
- brake motors
- permanent magnet motors

## 2. Installation

### 2.1 Putting into service (starting)

#### 2.1.1 Reception check

Immediately upon receipt check the machine for external damage and if found, inform the forwarding agent without delay.

Check all rating plate data, especially voltage and winding connection (star or delta). The type of bearing is specified on the rating plate of all motors except the smallest frame sizes.

Remove transport locking if employed. Turn shaft by hand to check free rotation. Do not exceed permissible loading values of bearings stated in the product catalogue.

**Motors equipped with roller bearings:** Running the motor with no radial force applied to the shaft may damage the roller bearing.

**Motors equipped with angular contact bearing :** Running the motor with no axial force applied in the right direction to the shaft may damage the angular contact bearing.

**Motors equipped with regreasing nipples:** When starting the motor for the first time, or after long storage of the motor, apply the specified quantity of grease until grease is forced out of the grease outlet. For details see section "Manual lubrication" on page 16.

#### 2.1.2 Insulation resistance check

Measure insulation resistance before commissioning and when winding dampness is suspected.

Resistance, measured at 25°C, shall exceed the reference value, i.e. 10 M ohm (measured with 500 V dc Megger)

#### **WARNING**

Windings should be discharged immediately after measurement to avoid risk of electric shock.

Insulation resistance reference value is halved for each 20°C rise in ambient temperature.

If the reference resistance value is not attained, the winding is too damp and must be oven dried. Oven temperature should be 90°C for 12-16 hours followed by 105°C for 6-8 hours.

Drain hole plugs, if fitted, must be removed and closing valve, if fitted, must be opened during heating.

Windings drenched in seawater normally need to be rewound.

### **2.1.3 Direct-on-line or star/delta starting**

The terminal box on standard single speed machines normally contains 6 winding terminals and at least one earth terminal.

Earthing must be carried out according to local regulations before the machine is connected to the supply voltage.

The voltage and connection are stamped on the rating plate.

#### **Direct-on-line starting (DOL):**

Y or D winding connections may be used.

e.g. 660 VY, 380 VD indicates Y-connection for 660 V and D-connection for 380 V.

#### **Star/Delta starting (Y/D):**

The supply voltage must be equal to the rated voltage of the machine in D-connection.

Remove all connection links from the terminal block.

For two-speed, single phase and special machines, supply connection must follow the instructions inside the terminal box.

If direct-on-line starting lasts for more than 10 seconds or Y/D starting more than 30 seconds, consult ABB Sales Office or see the publication 'The Motor Guide' (also available on the internet on [www.abb.com/motors & drives](http://www.abb.com/motors&drives)).

### **2.1.4 Terminals and direction of rotation**

Direction of rotation is clockwise when viewing the shaft face at the machine drive end, when the line phase sequence L1, L2, L3 is connected to the terminals as shown in the figure 1.



To alter the direction of rotation, interchange the connection of any two line cables.

If the machine has a uni-directional fan, ensure that the direction of rotation is according to the arrow marked on the machine.

## **2.2 Handling**

### **2.2.1 Storage**

The machine should always be stored indoors, in dry, vibration free and dust free conditions.

Unprotected machined surfaces (shaft-ends and flanges) should be protected with anti-corrosive treatment.

It is recommended that shafts be rotated periodically by hand to prevent grease migration.

Anti condensation heaters, if fitted, should preferably be energised.

The characteristics of electrolytic capacitors, if fitted to single-phase motors, will require “reforming” following periods of storage exceeding 1-2 years.

Contact ABB Sales Office for details.

### **2.2.2 Transportation**

Machines fitted with cylindrical-roller and/or angular contact bearings must be fitted with locking devices during transport.

### **2.2.3 Lifting**

Lift the motor using the lifting lugs only, if not otherwise stated in the separate lifting instruction.

The center of gravity of motors with the same frame may vary due to different outputs, mounting arrangements and auxiliary equipment.

Check that eyebolts or the lifting lugs integrated with the motor frame are undamaged before lifting. Damaged lifting lugs must not be used.

Lifting eyebolts must be tightened before lifting. If needed the position of the eyebolt must be adjusted with suitable washers.

Ensure that proper lifting equipment is used and that the sizes of the hooks are suitable for the lifting lugs.

Care must be taken not to damage auxiliary equipment and cables attached to the motor.

## 2.2.4 Machine weights

Total machine weight can vary within the same frame size (center height) depending on different output, mounting arrangements and added features. The following table shows estimated maximum weights for machines in their basic versions as a function of frame material.

The actual weight of all our motors is stated on the rating plate except the smallest frame sizes.

Frame size	Cast Iron Weight Kg.
56	-
63	-
71	13
80	20
90	30
100	40
112	50
132	90
160	175
180	250
200	310
225	400
250	550

Table 1

## 2.3 Installation

### 2.3.1 Cooling

Normal ambient temperatures should not exceed 40°C (marine standard +45 or +50°C) if standard performance is to be achieved. Check that the motor has sufficient airflow. Ensure that no nearby equipment, surfaces or direct sunshine, radiate additional heat to the motor. For more information

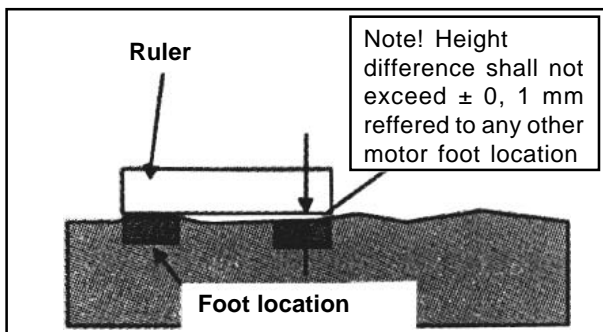
about higher ambient temperatures and cooling, see “the Motor Guide” or contact ABB Sales Office.

### 2.3.2 Foundation

The purchaser bears full responsibility for preparation of the foundation.

Metal foundations should be painted to avoid corrosion.

Foundations must be even, and sufficiently rigid to withstand possible short circuit forces. They shall be dimensioned as to avoid the occurrence of vibration due to resonance.



Before mounting the motor, the foundation surface for the shims or for the feet must be clean from thick paint, paint drops and dirt. Then it should be checked in order to discover any height differences between the individual foot locations. Also, the smoothness within each footprint area has to be checked. The requirements are noted in the figure below.

#### Foundation studs

Bolt the foundation studs to the feet of the motor and place a 1-to-2 mm shim between the stud and the feet. Align the motor directly using appropriate means. Grout the studs with concrete, check alignment and drill holes for locating pins.

#### Drain holes

Always check that open drain holes face downward. In extremely dusty environments, all drain holes should be closed.

### 2.3.3 Alignment

Correct alignment is essential to avoid bearing failures, vibrations and possible fractured shaft extensions.

### 2.3.4 Slide rails and belt drives

- Fasten the machine to the slide rails as shown in figure 2.
- Place the slide rails horizontally on the same level.
- Check that the machine shaft is parallel with driven, or driving, shaft.
- Any belt must be tensioned according to the supplier's instructions.

#### **WARNING**

Excessive belt tension will damage bearings and can cause shaft breakage.

Do not exceed the maximum belt forces (i.e. radial bearing loading) stated in the relevant product catalogues.

## 2.4 Connection

Normal machine design has the terminal box on top with cable entry possible from both sides. Some machines are available with top mounted terminal boxes rotatable 4 x 90°, and some with side mounted terminal boxes.

Availability of these solutions is described in the product catalogues.

Unused cable entries must be closed.

As well as main winding and earthing terminals, the terminal box can also contain connections for thermistors, standstill heating elements, bimetallic, switches, or PT 100 resistance elements.

#### **WARNING**

Voltage may be connected at standstill inside the terminal box for heating elements or direct winding heating.

Connection diagrams for auxiliary elements are found inside the terminal box cover or in additional labels on the frame of the machine.

**WARNING**

The capacitor in single-phase motors can retain a charge that appears across the motor terminals, even when the motor has reached standstill.

**2.4.1 Connection for variable speed drive**

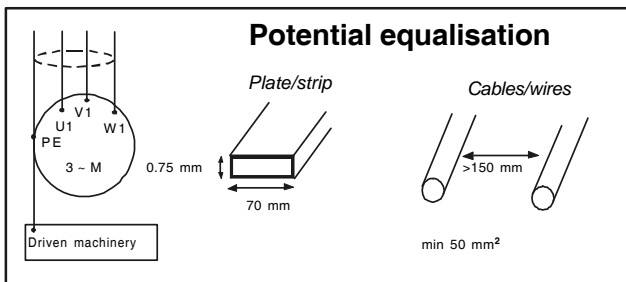
Variable speed drives cause higher voltage stresses than the sinusoidal supply on the winding of the motor and may cause high frequency shaft voltages and bearing currents. Therefore the winding and the bearing insulation of the motor as well as the filter at the converter output must be dimensioned according to "Selection rules for VSD applications/Insulation" (3GZF500930-2), available on request from ABB.

In variable speed drives the motor ( $P_n > 30$  kW) must be cabled by using shielded symmetrical cables and cable glands providing 360° bonding (also called EMC glands). More information can be found in ABB's manual "Grounding and cabling of the drive system" (3AFY61201998).

In frequency converter applications motor frame external earthing must be used for equalising the potential between the motor frame and the driven machine, unless the two machines are mounted on the same metallic base.

For motor frame sizes above IEC 280, use 0.75 x 70 mm flat conductor or at least two 50 mm<sup>2</sup> round conductors. The distance of the round conductors must be at least 150 mm from each other.

This arrangement has no electrical safety function; the purpose is to equalise the potentials. When the motor and the gearbox are mounted on a common steel fundament, no potential equalisation is required.



To comply with EMC-requirements, use only cables and connectors approved for this purpose. (See instruction for frequency converters.)

### WARNING

The maximum operating temperature of the grease and bearings must not be exceeded.

## 2.5 Balancing

The rotor of the machine is dynamically balanced.

As standard, balancing has been carried out using **half key**, and the shaft is marked **with a RED tape**, with the text "Balanced with half key". In case of motors delivered without any tape defining the type of balancing, these motors are also balanced with **half key**.

To avoid vibration the coupling-half or pulley must be balanced with half key after the keyway has been machined.

In the event of balancing **with full key** the shaft is marked **with a YELLOW tape**, with the text "Balanced with full key".

In case balancing **without key**, the shaft is marked **with a BLUE tape**, with the text "Balanced without key".

## 3. Operating

### 3.1 Use

#### 3.1.1 Operating conditions

The machines are intended for use in industrial drive applications.

Normal ambient temperature limits are  $-20^{\circ}$  to  $+40^{\circ}\text{C}$ .  
Maximum altitude 1000 m above sea level.

#### 3.2 Safety considerations

The machine is intended for installation and use by qualified personnel, familiar with relevant safety requirements.

Safety equipment necessary for the prevention of accidents at the installation and operating site must be provided in accordance with the local regulations.

#### **WARNING**

Small motors with supply current directly switched by thermally sensitive switches can start automatically.

#### 3.2.1 Points to observe

1. Do not use the machine to step on.
2. The temperature of the outer casing of the machine may be hot to the touch during normal operation.
3. Some special machine applications require special instructions (e.g. using frequency converter supplies).
4. Lifting lugs must only be used for lifting the motor. They must not be used to lift the motor when it is attached to other equipment.

### 3.3 Assembly and dismantling

#### 3.3.1 General

Dismantling and assembly of machines must be carried out by qualified personnel using only suitable tools and working methods. All repairs

must be carried out according to the standard IEC-60079-19.

### 3.3.2 Bearings

Special care should be taken with the bearings. These must be removed using pullers and fitted by heating or using special tools for the purpose.

How to replace bearings is described in detail in a separate instruction leaflet available from ABB Sales Office.

### 3.3.3 Fitting coupling halves and pulleys

Coupling halves and pulleys must be fitted using suitable equipment and tools that do not damage the bearings.

Never fit a coupling half or pulley by hammering into place or remove it using a lever pressed against the body of the machine.

Mounting accuracy of coupling half :

check that the clearance **b** is less than 0.05 mm and that the difference **a1** to **a2** is also less than 0.05 mm. See figure 3.

## 4. Maintenance

### 4.1 Maintenance and lubrication

#### 4.1.1 General inspection

- Inspect the machine at regular intervals.
- Keep the machine clean and ensure free ventilation airflow.
- Check the condition of shaft seals (e.g. V-ring) and replace if necessary.
- Check the condition of connections and mounting and assembly bolts.
- Check the bearing condition by listening for unusual noise, vibration measurement, bearing temperature, inspection of spent grease or SPM bearing monitoring.

\* When changes of condition occur, dismantle the machine, check the parts and replace if necessary.



## 4.1.2 Lubrication

### WARNING

Beware of all rotating parts.

### WARNING

Grease can cause skin irritation and eye inflammation. Follow all safety precautions specified by the manufacturer.

## 4.1.3 Machines with permanently greased bearings

Bearings are usually permanently greased bearings of either Z or 2Z types.

Bearing types are specified in the respective product catalogues and on the rating plate of all our motors except smaller frame sizes.

As a guide, adequate lubrication for sizes up to 200 can be achieved for the following duration, according to L1 (i.e. that 99 % of the motors are sure to make the interval time) at ambient temperature of 25°C. For duties with ambient temperatures higher than 25°C, see the respective product catalogue.

Frame	size Poles	Duty hours
71-80	2-8	for life
90-112	2-8	40 000
132	2-8	40 000
160	2-8	40 000
180	2-8	40 000
200	2	27 000
200	4	40 000

Table 3

Depending on application and load conditions, see applicable product catalogue.

Hours of operation for vertical motors are half of the above values.

Motors with roller bearings have considerably shorter grease life. For continuous operation regreasing nipples should be considered.

#### **4.1.4 Motors with regreasing nipples**

##### **Lubrication information plate and general lubrication advice**

If the machine is fitted with a lubrication information plate, follow the given values.

On the lubrication information plate, regreasing intervals with regard to mounting, ambient temperature and speed of rotation can be defined.

During the first start or after a bearing lubrication it may appear a temporary temperature rise, appr. 10-20 hours. ABB policy is to have reliability as a vital issue in bearing lubrication intervals. That is why we follow the L1-principle.

#### **A. Manual lubrication**

##### **Regreasing while motor is running**

- Remove grease outlet plug or open closing valve if fitted.
- Be sure that the lubrication channel is open.
- Press the specified amount of grease into the bearing.
- Let the motor run 1-2 hours to ensure that all excess grease is forced out of the bearing. Close the grease outlet plug or closing valve if fitted.

## **Regreasing while motor is at a standstill**

Regrease motors while running. If this is not possible, lubrication can be carried out while the machine is at a standstill.

- In this case, use only half the quantity of grease, then run the motor for a few minutes at full speed.
- When the motor has stopped, press the rest of the specified amount of grease into the bearing.
- After 1-2 running hours close the grease outlet plug or closing valve if fitted.

## **B. Automatic lubrication**

The grease outlet plug must be removed permanently with automatic lubrication or open closing valve if fitted.

Some motors may be equipped with a collector for old grease. Follow the special instructions given for the equipment.

We recommend only the use of electromechanical systems. Contact your local ABB Sales Office.

The amount of grease per each lubrication interval stated in the tables 4-5 should be doubled if an automatic regreasing system is used.

If 2-pole motors are being automatically regreased, the note (NOTE!) concerning lubricant recommendations given for 2-pole motors in the chapter Lubricants shall be followed.

#### 4.1.5 Lubrication intervals and amounts

Frame size	Amount of grease g/bearing	3600 r/min	3000 r/min	1800 r/min	1500 r/min	1000 r/min	500-900 r/min
<b>Ball bearings Lubrication intervals in duty hours</b>							
112	10	10000	13000	18000	21000	25000	28000
132	15	9000	11000	17000	19000	23000	26500
160	25	7000	9500	14000	17000	21000	24000
180	30	6000	8000	13500	16000	20000	23000
200	40	4000	6000	11000	13000	17000	21000
225	50	3000	5000	10000	12500	16500	20000
250	60	2500	4000	9000	11500	15000	18000

Table 4

Frame size	Amount of grease g/bearing	3600 r/min	3000 r/min	1800 r/min	1500 r/min	1000 r/min	500-900 r/min
<b>Roller bearings Lubrication intervals in duty hours</b>							
160	25	3500	4500	7000	8500	10500	12000
180	30	3000	4000	7000	8000	10000	11500
200	40	2000	3000	5500	6500	8500	10500
225	50	1500	2500	5000	6000	8000	10000
250	60	1300	2200	4500	5700	7500	9000

Table 5

#### Factors influencing the lubrication intervals

Lubrication intervals for vertical machines are half of the above values.

The lubrication intervals are based on bearing operating temperature 80°C (ambient temperature of about + 25°). Note! An increase in the ambient temperature raises the temperature of the bearings correspondingly. The values should be halved for 15°C increase in bearing temperature and may be doubled for 15°C decrease in bearing temperature.

**WARNING**

The maximum operating temperature of the grease and bearings must not be exceeded.

### 4.1.6 Lubricants

**WARNING**

**Do not mix different types of grease.**

Incompatible lubricants may cause bearing damage.

When regreasing, use only special ball bearing grease with the following properties:

- good quality grease with lithium complex soap and with mineral- or PAO-oil
- base oil viscosity 100-160 cST at 40°C
- consistency NLGI grade 1.5 - 3 \*
- temperature range -30°C - +120°C, continuously.

\*) For vertical mounted motors or in hot conditions a stiffer end of scale is recommended.

Grease with the correct properties is available from all major lubricant manufacturers.

Admixtures are recommended, but a written guarantee must be obtained from the lubricant manufacturer especially concerning EP admixtures, that admixtures do not damage bearings or the properties of lubricants at the operating temperature range.

**WARNING**

Lubricants containing EP admixtures are not recommended in high bearing temperatures in frame sizes 280 to 450.

If the ambient temperature is below  $-25^{\circ}\text{C}$  or above  $+55^{\circ}\text{C}$ , or bearing temperature is above  $110^{\circ}\text{C}$ , consult ABB Sales Office regarding suitable grease.

The following high performance grease can be used

- Esso Unirex N2, N3 or S2 (lithium complex base)
- Mobil Mobilith SHC 100 (lithium complex base)
- Shell Albida EMS 2 (lithium complex base)
- SKF LGHQ 3 (lithium complex base)
- Klüber Varilub PKS2  
(special lithium base)
- FAG Arcanol TEMP110 (lithium complex base)
- IOC Servoplex LC3 (lithium complex base)

Lubrication intervals for other grease fulfilling the required properties, contact your local ABB Sales Office.

#### **NOTE!**

Always use high speed grease for high speed machines and some other models, e.g. M2 BA 355 and 400 2-pole machines, where the speed factor is higher than 400 000 (calculated as  $D_m \times n$  where  $D_m$  = average bearing diameter, mm;  $n$  = rotational speed, r/min).

The following grease can be used:

- FAG L69 (polyurea base)
- Klüber Klüber quiet BH 72-102 (polyurea base)
- Lubcon Turmogrease PU703 (polyurea base)

If other lubricants are used, check with the manufacturer that the qualities correspond to those of the above mentioned lubricants, or if the compatibility of the lubricant is uncertain, contact your local ABB Sales Office.

#### **WARNING**

Especially in high rotational speed (the speed factor  $> 400000$ ) over greasing may cause damage.

### **4.1.7 Frequency converter drives**

Higher speed operation, e.g. in frequency converter applications, or lower speed with heavy load will require shorter lubrication intervals. Consult your local ABB Sales Office in such cases.

Typically a doubling of speed will require a reduction of lubrication intervals to approx. 40 % of values tabulated above.

### **WARNING**

The constructional maximum speed of the motor must not be exceeded.

Suitability of bearings for high speed operation must be checked.

#### **4.1.8 Spare parts**

When ordering spare parts, the full type designation and product code, as stated on the rating plate, must be specified. If the machine is stamped with a serial manufacturing number, this should also be given.

For more information, please visit our web site [www.abb.com/partsonline](http://www.abb.com/partsonline).

#### **4.1.9 Rewinding**

Rewinding should always be carried out by qualified repair shops.

Smoke venting and other special motors should not be rewound without first contacting ABB.

## **5. Environmental requirements**

### **5.1 Noise levels**

Most of our motors have a sound pressure level not exceeding 82 dB(A) refer to 50 Hz sinusoidal supply conditions, tolerance 3 dB(A).

Values for specific machines can be found in the relevant product catalogues.

For sound pressure levels for 60 Hz sinusoidal supply and with non-sinusoidal supplies, contact ABB Sales Office.

Sound pressure levels for all machines having separate cooling systems and for series M2F\*/M3F\*, M2L\*/M3L\*, M2R\*/M3R\*, M2BJ/M3BJ and M2LJ/M3LJ are indicated in separate Manuals.

## 6. Troubleshooting

These instructions do not cover all details or variations in equipment nor provide for every possible condition to be met in connection with installation, operation or maintenance. Should additional information required, please contact the nearest ABB Sales Office.

### Motor troubleshooting chart

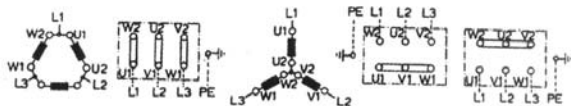
Your motor service and any troubleshooting must be handled by qualified persons with proper tools and equipment.

TROUBLE	CAUSE	WHAT TO DO
Motor fails to start	Blown fuses	Replace fuses with proper type and rating.
	Overload trips	Check and reset overload in starter.
	Improper power supply	Check to see that power supplied agrees with motor rating plate and load factor.
	Improper line connections	Check connections with diagram supplied with motor.
	Open circuit in winding or control switch	Indicated by humming sound when switch is closed. Check for loose wiring connections. Also, ensure that all control contacts are closed.
	Mechanical failure	Check to see if motor and drive turn freely. Check bearings and lubrication.
	Short circuited stator Poor stator coil connection	Indicated by blown fuses. Motor must be rewound. Remove end bells, locate with test lamp.
	Rotor defective	Look for broken bars or end rings.
	Motor may be overloaded	Reduce load.
Motor stalls	One phase may be open	Check lines for open phase.
	Wrong application	Change type or size. Consult manufacturer.
	Overload	Reduce load.
	Low voltage	Ensure the rating plate voltage is maintained. Check connection.
	Open circuit	Fuses blown, check overload relay, stator and push buttons.
Motor runs and then dies down	Power failure	Check for loose connections to line, to fuses and to control.

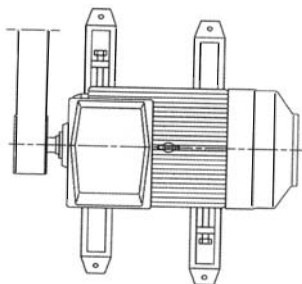


<b>TROUBLE</b>	<b>CAUSE</b>	<b>WHAT TO DO</b>
Motor does not come up to speed	Not applied properly	Consult supplier for proper type.
	Voltage too low at motor terminals because of line drop	Use higher voltage or transformer terminals or reduce load. Check connections. Check conductors for proper size.
	Starting load too high	Check load motor is supposed to carry at start.
	Broken rotor bars or loose rotor	Look for cracks near the rings. A new rotor may be required, as repairs are usually temporary.
	Open primary circuit	Locate fault with testing device and repair.
Motor takes too long to accelerate and/or draws high amp	Excessive load	Reduce load.
	Low voltage during start	Check for high resistance. Adequate wire size.
	Defective squirrel cage rotor	Replace with new rotor.
	Applied voltage too low	Get power company to increase power tap.
Wrong rotation	Wrong sequence of phases	Reverse connections at motor or at switchboard.
Motor overheats while running underloaded	Overload	Reduce load.
	Frame or bracket vents may be clogged with dirt and prevent proper ventilation of motor	Open vent holes and check for a continuous stream of air from the motor.
	Motor may have one phase open	Check to make sure that all leads are well connected.
	Grounded coil	Locate and repair.
	Unbalanced terminal voltage	Check for faulty leads, connections and transformers.
Motor vibrates	Motor misaligned	Realign.
	Weak support	Strengthen base.
	Coupling out of balance	Balance coupling.
	Driven equipment unbalanced	Rebalance driven equipment.
	Defective bearings	Replace bearings.

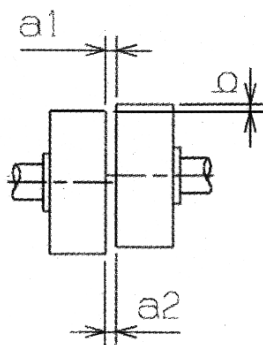
TROUBLE	CAUSE	WHAT TO DO
	Bearings not in line	Line up properly.
	Balancing weights shifted	Rebalance motor.
	Contradiction between balancing of rotor and coupling(half key-full key)	Rebalance coupling or motor.
	Polyphase motor running single phase	Check for open circuit.
	Excessive end play	Adjust bearing or add shim.
Scraping noise	Fan rubbing fan cover	Remove interference.
	Fan striking insulation	Clear fan.
	Motor loose on bedplate	Tighten holding bolts.
Noisy operation	Airgap not uniform	Check and correct bracket fits or bearing.
	Rotor unbalance	Rebalance.
Hot bearings ball	Bent or sprung shaft	Straighten or replace shaft.
	Excessive belt pull	Decrease belt tension.
	Pulleys too far away	Move pulley closer to motor bearing.
	Pulley diameter too small	Use larger pulleys.
	Misalignment	Correct by realignment of drive.
	Insufficient grease	Maintain proper quality of grease in bearing.
	Deterioration of grease or lubricant contaminated	Remove old grease, wash bearings thoroughly in kerosene and replace with new grease.
	Excess lubricant	Reduce quantity of grease, bearing should not be more than 1/2 filled.
	Overloaded bearing	Check alignment, side and end thrust.
	Broken ball or rough races	Replace bearing, first clean housing thoroughly.



- Figure 1. Connection diagram  
 Bild 1. Anschlußdiagramm  
 Figure 1. Connection  
 Figure 1. Conexion  
 Figure 1. Collegamento  
 Figure 1. Anslutning diagram  
 Kuva 1. Kytentäkaavio



- Figure 2. Belt drive  
 Bild 2. Riemetrieb  
 Figure 2. Glissières at entraînements à courroie  
 Figura 2. Carriles tensores y correas  
 Figura 2. Slitte tendicinghia e pulegge  
 Figur 2. Remdrift  
 Kuva 3. Hihnakäyttö



- Figure 3. Mounting of half-coupling or pulley  
 Bild 3. Anbau von Kupplungshälften und Riemenscheiben  
 Figure 3. Montage des demi-accouplements et des poulies  
 Figura 3. Montaje de mitades de acoplamiento y poleas  
 Figura 3. Montaggio di semigiunti e pulegge  
 Figur 3. Montering av kopplinshalvor och drivskivor  
 Kuva 3. Kytkinpuolikkaan ja hihnapyörän asennus

# Service Centres

## EAST

### ● WEST BENGAL

#### **M/s. Kar Bros. Electric**

P/6, Garfa East End Row,  
(Near SD-4 Bus Stand,  
Opposite Sushila Pharmacy)  
Kolkata - 700078  
Ph. : 033-24182339, M : 9433430378

#### **M/s. Ma-kali Engineering Works**

Mr. Chayan Dey : 9433672424  
34, 35/2, Dharanidhar Mullick Lane,  
Howrah - 711 101  
Ph. : 033-26415405, 26534727  
E-mail : enggmakali@yahoo.com

### ● JHARKHAND

#### **M/s. Hindustan Electricals Works**

Mr. P. Chatterjee : 09431112665  
Gowala Para Road, Jugsalai,  
Jamshedpur - 831006  
Ph. : 0657-2293039  
E-mail : hewbkrc@rediffmail.com

### ● ASSAM

#### **M/s. Basar and Sons**

Mr. Aurobindo Basar :  
09435112476/08876512474  
A K Azad Road, Rehabri,  
Guwahati - 781 008  
Ph. : 0361-2606618/2472096  
E-mail : basarandsons@gmail.com

### ● ORISSA

#### **M/s. Pratap Electrical Works**

Mr. Pratap Mohanty :  
Plot No. A/2, Mancheswar Industrial  
Estate 3-B, Bhubaneswar - 751010  
Mob.: 09437013324/09338223076  
Ph. : 0674-2582463  
E-mail : pratapelectricalworks@yahoo.com

### ● CHATTISGARH

#### **M/s. Unique Rewinders**

Mr. Rajesh Pandya : 09827401142  
Ganjpara, Banstal, Raipur  
E-mail : uiquerewinders@rediffmail.com

#### **M/s. Adak Electricals**

Mr. Tarun Adak : 9830041267  
Halderpara, P.O. Jote, Shibrampur,  
Mahestala, Kolkata - 700 141, Tinsukia  
Ph. : 033-24880091/1398/1632  
Fax : 033-24880220  
E-mail : tkadakceew@gmail.com

#### **M/s. Pioneer Electricals**

Mr. Bishwanath Ghosh  
38, Rani Rashmoni Path,  
City Centre, Durgapur  
Ph. : 0343-2391035, Mob.: 9434757716

### ● BIHAR

#### **M/s. ENGICO**

Mr. Ravindra : 09835012292/  
9546730599  
North Chandmari Road, Kabari Gali,  
Kankarbagh, Patna - 800 020 (Bihar)  
E-mail : aewpatna@sancharnet.in

### ● TINSUKIA

#### **M/s. Roy Electric Winders**

Mr. Nabendu Roy : 09435135159  
Nau Pukhuri Road, Tinsukia - 786 125  
E-mail : royelectric@rediffmail.com

### ● CHATTISGARH

#### **M/s. Parmar Rewinders**

Mr. Neeraj Parmar : 09826182352  
Light Industrial Area, Bhilai - 490026  
Ph. : 0788-2286339  
E-mail : parmarrewinders@yahoo.co.in

#### **M/s. New Electrical Engineering Works**

Mr. Gopal Patel : 09826111666  
New City Plaza, Kotra Road,  
Raigarh - 496001  
Ph. : 07762-232126  
E-mail : dnew-electricals@yahoo.co.in

# WEST

## ● MUMBAI

### **M/s. B R Brothers**

Mr. Rikin Padia :  
09869006529 / 022-6715089  
Sabuwala Compound,  
Budhiya Jadhav Wadi,  
Opp. ETP Center,  
Near L & T Gate No. 7  
Saki Vihar Road, Powai,  
Mumbai - 400072  
E-mail : brbrothers1@rediffmail.com

## ● AHMEDABAD

### **M/s. Ameer Electricals**

Mr. Devendra Yadav  
30, Madhav Estate,  
Nr. Jay Yogeshwar School,  
Sardar Patel Ring Road,  
Odhav, Ahmedabad  
Ph. : 079-30918720, Mob.: 9825270627

## ● GANDHIDHAM

### **M/s. Vishal Electricals**

Mr. Deobhai : 09825226547  
Plot No. 330, Ward No. 12-B  
Gandhidam - Kutch  
(Near Bank of Baroda)

## ● AURANGABAD

### **M/s. Satish Electrical Works**

Mr. Dharmendra Soni  
M.I.D.C. Ranjangaon Road,  
Pandharpur, Waluj,  
Aurangabad - 431136  
Ph. : 0240-2554089, Mob. : 9850055388

## ● NAGPUR

### **M/s. S.G. Engg.**

Mr. Sanjay Khandelwal  
S-65, M.I.D.C. Nagpur  
Ph. : 0240-232091  
Mob. : 9823063314

## ● PUNE

### **M/s. Excellent Electrical Corporation**

Mr. N A Mallik : 09822620408  
692/4B/4 Alka House, Opp. Century Enka  
Colony No. 2, Bhosari - Pune - 411 039  
E-mail : eec@pn2.vsnl.net.in

## ● MUMBAI

### **M/s. Gelstar Engg. Services**

Mr. F. Mendonca : 09821167015  
EL 62, Electronic Zone,  
Mahape, TTC Ind. Area,  
Navi Mumbai - 400 710  
Ph. : 022-32985927 / 0923187633  
E-mail : gelstar31@rediffmail.com

## ● JAMNAGAR

### **M/s. Excel Technical Services**

Mr. Suni Patel  
Plot No. 508, GIDC Phase-II, Near Vishal  
Chowk, Odhav Ringh Road Char,  
Jamnagar - 4  
Ph. : 0288-3205447, Mob.: 9825265447

## ● KOLHAPUR

### **M/s. Transcoil Electricals**

Mr. Ashok Gaikwad / Gurav  
P.B. Road, Near Neelam Hotel, Opp.  
Maruti Motors Sai Service Station MIDC,  
Shirili, Kolhapur - 416 122  
Ph. : 0230-2468342, Mob. : 09823172341  
E-mail : trans\_coil@yahoo.co.in

## ● NAGPUR

### **M/s. Akshay Laxmi Electrical Services**

Mr. Mandavkar : 08888844582  
13/67, Butibori MIDC, Nagpur - 440 010  
(Maharashtra)  
Mob. : 09881462241  
E-mail : akshay\_laxmi@gmail.com

## ● PUNE

### **M/s. ACE Contractors & Engineers**

Mr. L. Fernandis  
Barne Building, Opp. Padumjee Paper  
Mill, Thergaon, Chinchwad, Pune-411033  
Ph. : 020-27274038, Mob. : 9822330334

## ● SURAT

### **M/s. Kerala Electric Company**

Mr. Mohandass : 9327332244  
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Sachin - 394230  
E-mail : keralaelectric@yahoo.co.in

# SOUTH

## ● BANGALORE

**M/s. Rajamane & Hegde Services**  
Mr. Shudhakar  
Whitefield Road, Mahadevapura Post,  
Bangalore - 560048  
Ph. : 080-28524252, Mob: 9900592264

## ● CHENNAI

**M/s. Ponni Electrical Works**  
Mr. P. Santosh Kumar  
No. 31, Jawaharlal Nehru Main Road,  
Ekkatuthangal,  
Chennai - 97  
Ph. : 044-22320229, Mob : 9444028084

## ● MANDAPETA

**M/s. Sri Lakshmi Electrical Works**  
Mr. Govindaraj  
D. No. 17-1-24, Alamuru Road,  
Mandapeta  
Ph. : 08855-232471, Mob : 9396536771

## ● HYDERABAD

**M/s. S.V. Electricals**  
Mr. V. Srinivas  
Shed No. 1A, Type-III, APIIC,  
Industrial Estate, Prasanth Nagar,  
Kukatpally, Hyderabad - 500072  
Mob : 9848028003

## ● KOCHI

**M/s. Genmot Electricals**  
Mr. K.G. Dileep Singh  
24/253, Vaikom Mohammed Basheer Road  
Koonamthai East, Changampuzha Nagar  
P.O. Kochi - 682 033  
Ph. : 0484-2540551, Mob: 9846202253

## ● COIMBATORE

**M/s. Shiva Electrical Service**  
Mr. M. Parameswaran  
156, 4th Street Gandhipuram  
Coimbatore-541 012  
Ph. : 0422-2482101, Mob : 9843248210

## ● VIZAG

**M/s. S.V. Ramchandra Engineering Works**  
Mr. Ravi  
Block-B, Plot No. 47,  
Autonagar, Visakhapatnam  
Ph. : 0891-2516502, Mob : 9393126698

## ● SECUNDERABAD

**M/s. Shree Satguru Electrical Works**  
Mr. Sekhar  
Shop No. 41/A, Bansilalpet,  
Near Jabbar Building, Behind Bible House,  
Secunderabad - 500003  
Ph. : 040-27544446, Mob: 9885312554

# CENTRAL

## ● INDORE

**M/s. C. Nigudkar**  
Mr. C. Nigudkar  
43, Raoji Bazar Main Road Juni,  
Indore - 452001  
Ph. : 0731-2361773, Mob : 9826043248

## ● RAIPUR

**M/s. Unique Rewinders**  
Mr. Balu Bhai  
Ganj Para, Banstall,  
Raipur (C.G.)  
Ph. : 0771-2527395, Mob : 9827401142

## ● RAIPUR

**M/s. Parmar Rewinders**  
Mr. Pammu Parmar  
3-B, light Industrial Area, Bhilai (C.G.),  
H.O. Station Road, Raipur  
Ph. : 0778-2393592, Mob : 9826182352

## ● BHOPAL

**M/s. Bharat Enterprises**  
Mr. M.Y. Khan  
2, Bhojpal Market, Chhola Road,  
Near Vishal Shadi Hall, Bhopal - 462001  
Ph. : 0755-2745833, Mob : 9425011833

## ● RAIGARH

**M/s. New Electrical Engineering Works**  
Mr. Gopal Patel  
Near City Plaza, Kotra Road,  
Raigarh  
Ph. : 07762-232126, Mob : 9826111666

● **MOHALI**

**M/s. HSB Electro Hi-Tech Pvt. Ltd.**

Mr. I. P. Singh

C-142, Indus. Area, Phase - VII,

S.A.S. Nagar, Mohali - 160057

Ph. : 0172-2360204, Mob: 9414046955

● **JAIPUR**

**M/s. SBR Saini Electric Works**

Mr. Satyanarayan Saini

314, Behind Sangam Tower Rotary

Club Marg, Charch Road, Jaipur

Ph. : 0141-2360204, Mob : 9414046955

● **JAIPUR**

**M/s. Alpha Engineers**

Mr. Anoop Parakh

H-178, Malviya Industrial Area, Phase-II,

Jaipur - 302017

Mob. : 9829009569

E-mail : anoop\_prakash@hotmail.com

● **UDAIPUR**

**M/s. Power Rewinding**

Mr. Dinesh Shrimali

G-36A, M.I.A. (Ext.) Road No. 12,

Udaipur, Rajasthan

Ph. : 0294-2491683, Mob : 9928082716

● **JODHPUR**

**M/s. Hari Om Electrical & Rewinders**

Mr. Balmukund Goyal

Near Kumharon ka Mandir, 1st 'B' Road

Sardarpur, Jodhpur - 342003

Ph. : 0291-2611181, Mob : 9414247815

● **KANPUR**

**M/s. Narindra Electrical**

Mr. Amarjeet Singh

21B-2, Dada Nagar, Kanpur

Ph. : 0512-22133475

Mob : 9235721531

● **LUDHIANA**

**M/s. Jyoti Electricals**

Mr. Manmohan Singh

Plot No. 8A, Industrial Area A Extn.

Ghora Road, Ludhiana - 141003

Ph. : 0161-5084201, Mob : 09876716964

● **KOTA**

**M/s. New Shakti Rewinders**

Mr. Dilip Kr. Mewara

111, Pliwal Compound Chhawani, Kota

Ph. : 0744-2362729

Mob. : 9235721531

● **HARIDWAR**

**M/s. United Electricals**

Mr. D.K. Verma

1, Ranipur More, P.O. Rishikul,

Haridwar, U.A.

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● **UDAIPUR**

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● **LUCKNOW**

**M/s. Pratap Electricals**

Mr. Amrit Singh

562/32, Ramgarh Colony,

Kanpur Road, Lucknow

Ph. : 0522-2436979, Mob. : 9839279661

● **BHIWADI**

**M/s. National Electric Works**

Mr. Parvez Baig

Plot No. J-1160 B, RIICO Industrial Area,

Bhiwadi, Distt. Alwar, Rajasthan

Mob. : 9414224040

E-mail : nationalelectricworks9@gmail.com

# SOUTH

## ● BANGALORE

### **M/s. Rajamane & Hegde Services**

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Whitefield Road, Mahadevapura Post,  
Bangalore - 560048  
Ph. : 080-28524252  
Mob. : 9900592264

## ● HUBLI

### **M/s. Rajamane & Hegde Services**

Mr. Suryavamshi  
Unit - II, C-31, Industrial Estate,  
Gokul Road, Hubli - 580030, Hubli  
Ph. : 0836-22321158, Mob : 9900592267

## ● THRISSUR

### **M/s. S.S. Electrical Industries**

Mrs. Remy / Mr. Sebi  
Padavarad, Ollur No. 493/A,  
Near KSEB Sub Station, Thrissur-68030  
Ph. : 0487-2352558  
Mob. : 9526825739

## ● CHENNAI

### **M/s. VG Electricals**

Mr. Rajakumar  
134/1, Thilagar Street, Saligramam,  
Chennai - 600093  
Ph. : 044-23761973, Mob : 9841639994

## ● COIMBATORE

### **M/s. Siva Electrical Services**

Mr. Parameshwaran  
No. 1NA, Annayappa Counter Street, Near  
Shabari Kitchen Service, Manikaranpalayam  
Road, Nallalpalayam, Coimbatore - 641006  
Ph. : 0422-2482101, Mob. : 9843248210

## ● HYDERABAD

### **M/s. S.V. Electricals**

Mr. V. Srinivas  
Shed No. 1A, Type-III, APIIC,  
Industrial Estate, Prasanth Nagar,  
Kukatpally, Hyderabad - 500072  
Ph. : 040-23078001, Mob. : 9848028003

## ● BANGALORE

### **M/s. Kokatnur Electric Co.**

Mr. Arun  
No. 50, Byaraveswara Industrial Estate,  
Andra Halli Main Road, Heggana Halli,  
Near Peenya II Stage, Bangalore-560091  
Ph. : 080-28367532, Mob: 9986506453 / 52

## ● COCHIN

### **M/s. Electrocom**

Mr. Joseph  
No. 29/2577-B, Poonithura,  
Near Pettah Jh., Cochin - 682038  
Ph. : 0484-2303103, Mob : 9847378066

## ● CHENNAI

### **M/s. Santhi Enterprises**

Mr. Devraj  
No. 69, Mount Road, Ellis Road,  
Chennai - 600002  
Ph. : 044-43568430 / 28516330  
Mob. : 9840224866

## ● PONDICHERRY

### **M/s. VG Electricals**

Mr. Kumar  
No. 157 A, 100 Feet Road, Next to Hotel  
Sunway Marapalam, Pondicherry  
Ph. : 044-23761973, Mob : 9843045559

## ● MADURAI

### **M/s. Jothi Electricals**

Mr. Eshwaran  
Jothi Electrical Industries No. 2, RC  
Street, Palangantham, Madurai - 3  
Ph. : 0452-2371763 / 6454333  
Mob : 9787761000 / 9842171763

## ● HYDERABAD

### **M/s. Sri Sai Electrical Works**

Mr. Muralikrishna  
No. 25-40/31/2, East Anand Bagh,  
Malkajgiri, Hyderabad - 500072  
Ph. : 040-27242868, Mob : 9848072218



● **MANDAPETA**

**M/s. Sri Lakshmi Electrical Works**  
Mr. Govindraj  
D. No. 17-1-24, Alamuru Road,  
Mandapeta  
Ph. : 08855-232471  
Mob : 9396536771 / 8978444999

● **VISHAKHAPATNAM**

**M/s. S.V. Ramchandra Engineering Works**  
Mr. Krishna Mohan  
Block-B, Plot No. 47, Autonagar,  
Visakhapatnam  
Ph. : 0891-2516502, Mob : 9441920165

● **VIJAYWADA**

**M/s. Sri Venkata Krishan Electrical Works**  
Mr. Shivaprasad  
D. No. 9-64-25, Syed Gulab Street,  
Kothapet, Vijayawada  
Ph. : 0866-2567830  
Mob : 8885221689 / 9391854848

## CENTRAL

● **INDORE**

**M/s. C. Nigudkar**  
Mr. C. Nigudkar  
43, Raoji Bazar Main Road Juni,  
Indore - 452001  
Ph. : 0731-2361773, Mob : 9826043248  
E-mail : prabhat\_nigudkar@yahoo.co.in

● **BHOPAL**

**M/s. Ashok Electrical Works**  
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Ph. : 0755-4289245, Mob. : 9826399245  
E-mail : aew\_bpl@yahoo.co.in

● **REWA**

**M/s. Singh Electrical Works**  
Plot No. 57, Udyog Vihar,  
Chorahata Rewa, MP  
Mr. Pankaj Singh : 9827520714  
E-mail : singh\_ele@rediffmail.com



# WARRANTY

We Guarantee the Electric Motor against defective material and workmanship for 18 Months from the date of invoice or 12 Month from the date of commissioning which ever is earlier. Under this guarantee, we undertake to replace or repair at our option the motor or any defective parts thereof that need replacement or repair by reason of defective material or workmanship within the warranty period provided that, if we so require, the motor/parts are sent to our works as we may determine, at the buyer's expense.

This warranty will lapse if the motor is opened or its parts are tampered with by unauthorised persons. Under no circumstances we undertake liability for indirect or consequential loss or damage of any nature.

**NOTE** : The card alongwith the attached Test Certificate must be produced at the time of lodging complaints.



