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Bharat Bijlee

USER GUIDE

Permanent Magnet Synchronous Machine

Contents

1- GENERAL INFORMATION

1.1 GREENSTAR (Gearless machine)

GREENSTAR, Bharat Bijlee's new generation **P**ermanent **M**agnet **S**ynchronous **M**otor (**PMSM**) gearless machine for Lifts, is manufactured under the highest quality standards in collaboration with Permagsa, Spain.

In a conventional traction machine, speed reduction and requisite torque are achieved through a gearbox. GREENSTAR uses a low RPM and high torque motor, which eliminates the need for a gearbox. GREENSTAR's modular technology provides high efficiency, cost effectiveness and flexibility in mounting.

Greenstar's compact design, eco-friendliness and special features ensure superior value for money.

- Light weight
- Low Noise
- Energy Efficiency
- High braking security
- Suitable for lifts with or without Machine Room
- Ease of installation & maintenance

1.2 OBJECTIVE

This Guide provides information about the characteristics of GREENSTAR. It also includes directions on mounting, installation and maintenance.

This Guide should be read by all installation and maintenance teams & all instructions therein be strictly followed before attempting the Installation.

For further information, suggestion and clarification, please contact Bharat Bijlee, elevatorsales@bharatbijlee.com or visit www.bharatbijlee.com.

1.3 SAFETY

The mounting, installation, and maintenance of the GREENSTAR machine, is allowed only to qualified personnel following the safety at work regulations and general recommendations.

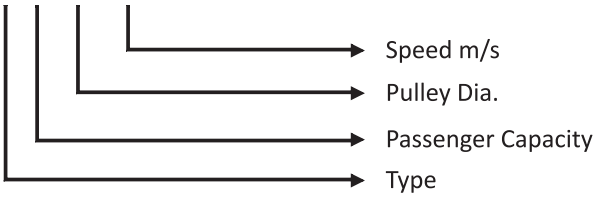
	• The instructions given in this manual or any other instructions supplied must always be observed to avoid danger or damage. • When rotating this series of traction machines manually, the traction machines will be working as generator and the terminals will produce high voltage, so one should protect from electric shock, and the peripheral equipment should be protected from that high Voltage. • Check the proper functioning of the motor and the brake after installing the machine. • Repairs may only be carried out by the manufacturer. Unauthorised opening and tampering may lead to injuries to persons and property. • There is a high risk of jamming between the wire ropes and the pulley.
	• The machines are not designed for direct connection to the three-phase system but are to be operated via an electronic frequency converter. Direct connection to the system may destroy the motor. • High surface temperatures may occur on the external parts of the machine. Therefore, no temperature-sensitive parts may contact these parts or be attached to them. Protection against accidental contact should be provided, if required. • The disc brake is designed to hold the system at standstill. It must not be used as a working brake. • The machines are not designed for bottom driven installation. • All our gearless lift machines are designed solely for use with electronic frequency converters.
	• Do not commission the machine without proper earthing. • Voltage between Earth and Neutral should be less than 3 Volts at standstill as well as during running of the Lift. • It is mandatory to provide proper access to the machine unit for maintenance purpose.

*** The operator must observe the safety item in this manual strictly.

2 - MACHINE INFORMATION

2.1 MODEL CODE

GC XX-XXX-XXX



e.g. GC06-320-100

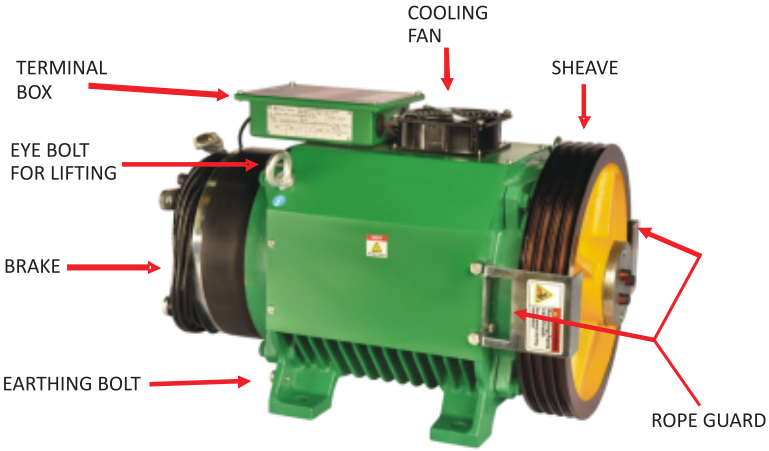
GC - Greenstar Cantilver / GCH- Green Star Max/GH-Home Lift

06 - 6 Passengers

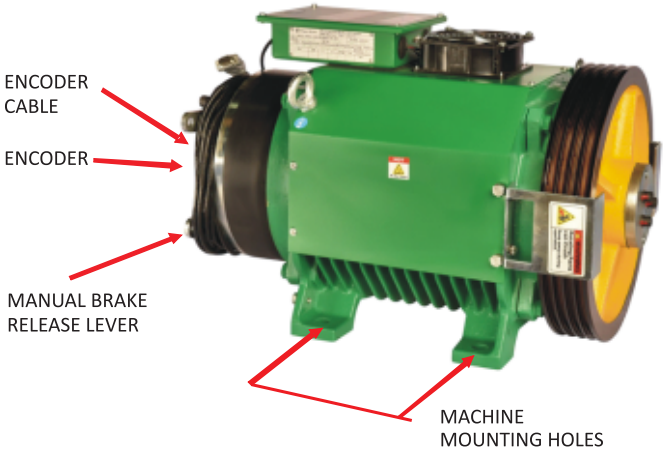
320 - Pulley Dia. in mm

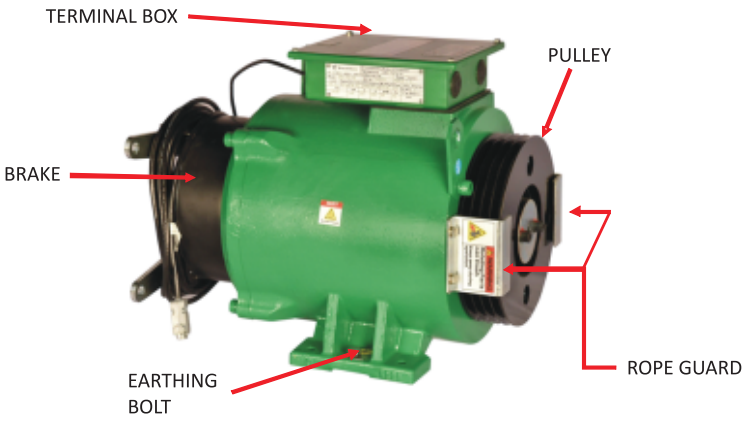
100 - Speed 1m/s

2.2 Machine parts identification

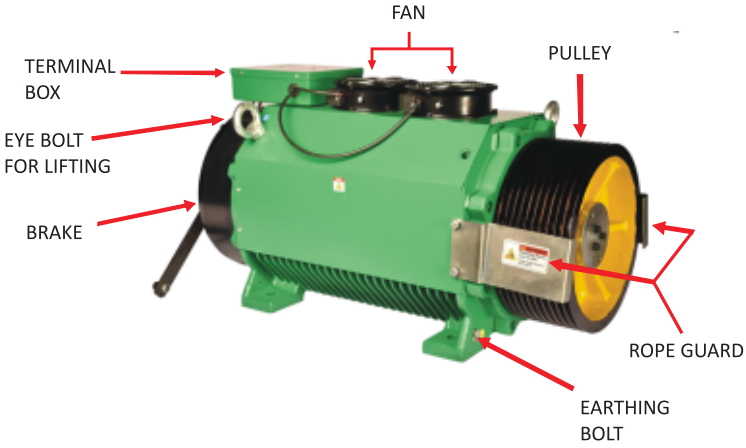


Greenstar-Cantilever

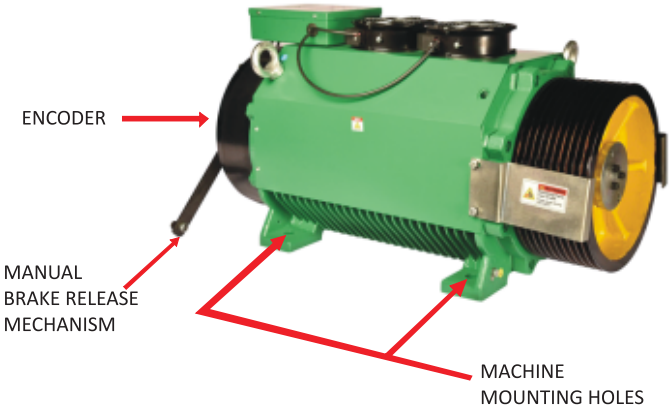




Greenstar-Mini

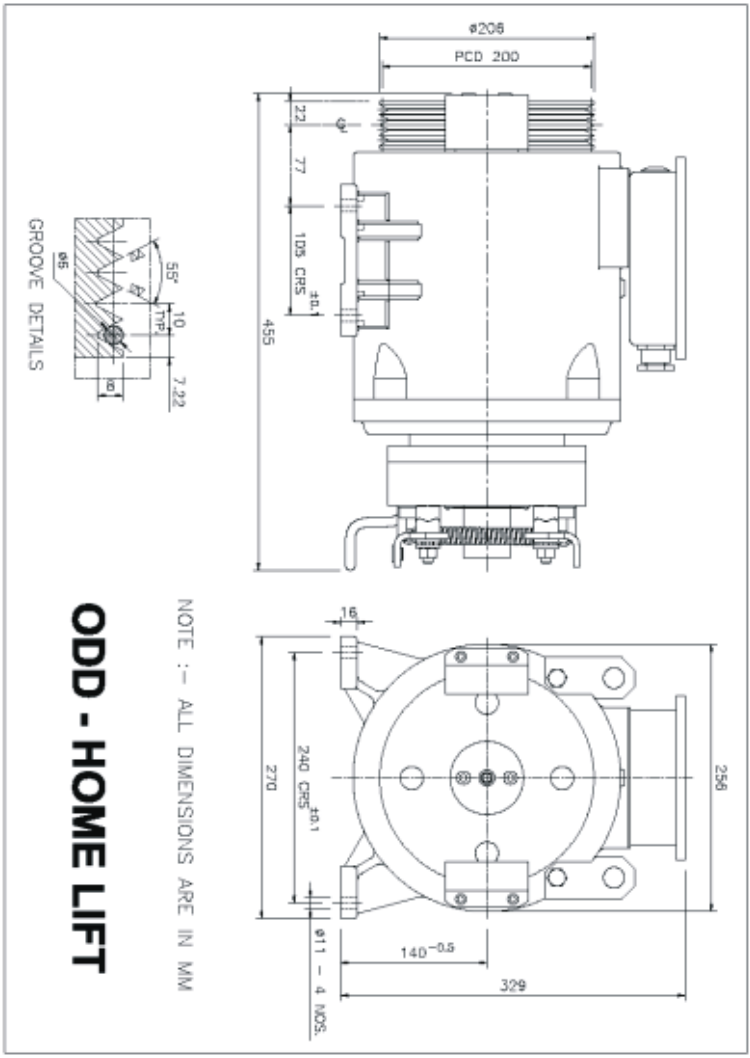


Greenstar-Max

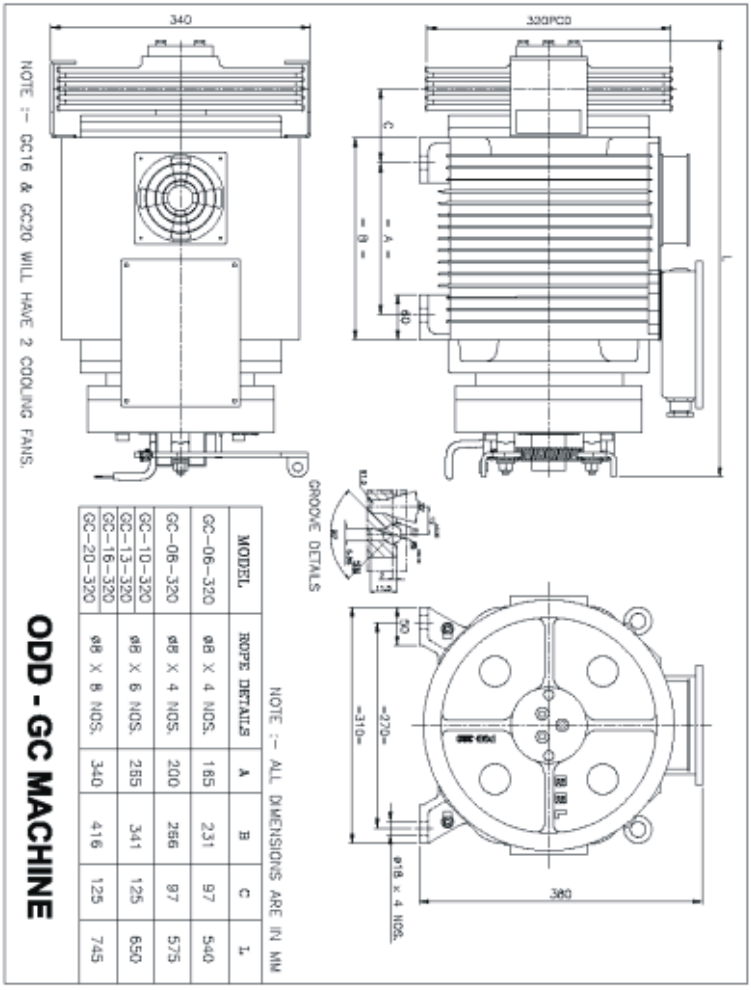


2.3 General Dimensions

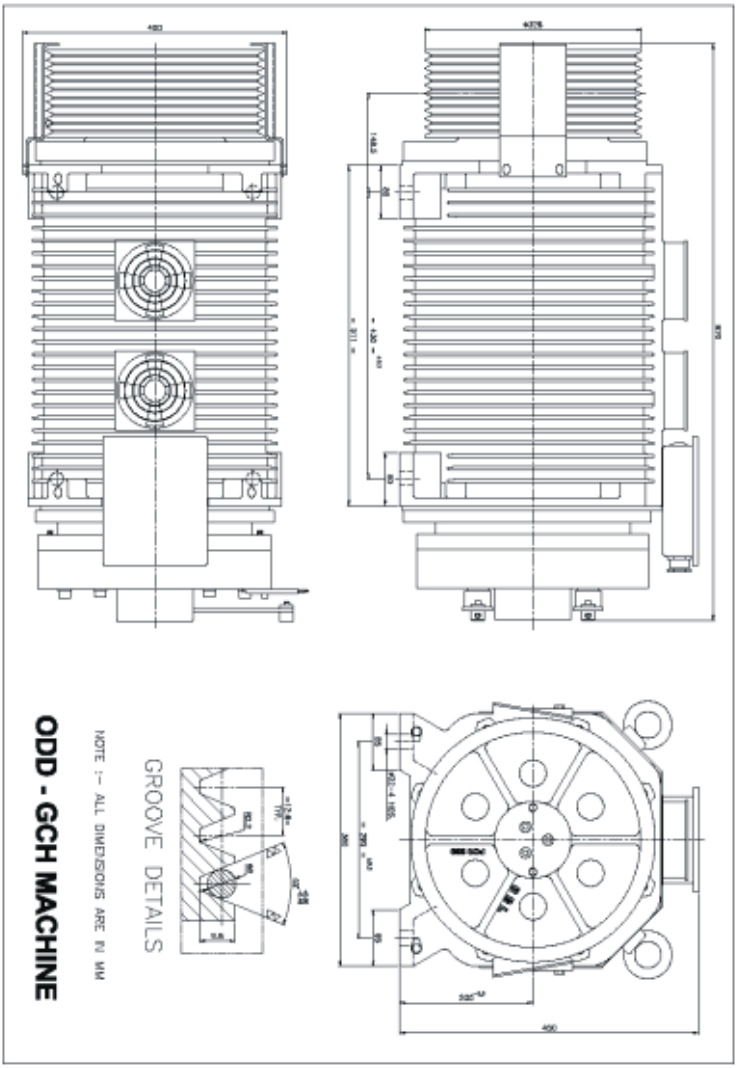
a. Greenstar Mini.



b. Greenstar Cantilever Machine



c. Greenstar Max



3 - TECHNICAL INFORMATION

3.1 MOUNTING

3.1.1 - Functions

Greenstar is specially designed for lift application. The traction pulley and braking systems are directly fitted on the motor shaft, which eliminates intermediate coupling and provides added safety. The braking system is composed of an electromechanical disc brake. The machine is driven and controlled by the frequency inverter with closed loop.

3.1.2 Check before use

- Before you start to use the machine, you should check the following items earnest first.
- Check whether the package is integral or not before opening it, and make sure that there is no injury to anyone or affected with damp;
- Check whether the machine documents and other related accessories are well-found or not;
- Check the name plate data seriously, and make sure that this type of machine which you require.
- Check-up whether the traction machine structure is integrated or not, whether the bolt is fixed tight or not, and whether the brake system is agile or not.
- Measure the insulation resistance of the gearless motor winding and brake winding. If the insulation resistance has dropped below 2 MΩ the winding needs be dried (Insulation Meter: 500V DC).
- Check whether the brake system works effectively and brake manual handle device works agile and effective or not.
- The machine selection should be as per the manufacturer's recommendations. For any special requirements, contact the manufacturer. The machine is not designed for any use or working condition other than those specified in this manual. The manufacturer will not be responsible for faults and errors arising out of disregard to these instructions.

3.1.3 Load Capacity

Each model of motor used in the machine is designed for a particular duty load,duty cycle and starts per hour. Duty load may be calculated by using the following formula. Both duty cycle and starts per hour should be less than or

equal to that specified on the name plate.

$$Q = \frac{2 \text{ X } T}{9.8 \text{ X } r \text{ X } Eff}$$

Where:

Q = Duty Load (Kg)

T = Nominal Torque (Nm) of the machine

Eff = Efficiency of the system

r = Radius of Traction Pulley (Meter)

3.1.4 Energy Sources

The machine works through a frequency inverter, and the power supply will depend on the configuration of the frequency inverter. The rated current and power of the motor is marked on the name plate. The frequency inverter should be selected accordingly.

The cooling fan is activated through a thermal switch (Except Green star Mini) when the motor body temperature reaches 60C. The terminal for connecting the fan is provided in the terminal box. In addition,a Thermister inside the winding protects from overheating; its connection is provided inside the motor terminal box. (Refer the motor terminal connection drawing given on section **- 3.2.10**)

3.1.5 Operating Conditions

- The machine must be installed in a building or a closed hoist- way.
- Be aware of the protection class specified on the motor name plate.
- Do not operate the motor in an explosive atmosphere.
- The ambient temperature must be within +0ºC and +50ºC
- Maximum permissible humidity is 85%.(No moisture condensation)
- The deviation of the supply voltage fluctuation and rating does not exceed ±7%.
- No lubricant and sundries on rope surface.

3.1.6 Machine Selection to use

The machine selection should be as per the manufacturer's recommendations. For any special requirements, contact the manufacturer. The machine is not designed for any use or working condition other than, those specified in this manual. The manufacturer will not be responsible for faults and errors arising out of disregard to these instructions.

3.2 INSTALLATION

3.2.1 Fixing

- Use eye-bolts provided for lifting of the machine.
- Check that the ropes are as per below specification.

➢ For Greenstar Cantilever use 8 mm (8x19 Constructions, Lift Duty) ropes.

➢ For Greenstar Mini use 6 mm (6x19 Constructions, Lift Duty) ropes.

Greenstar machine should be fitted in horizontal position with 04 Nos. mounting holes, Green Star Mini-M10, Green Star-M16 Screws and Green Star Max-M20 all with 8.8 grade minimum on a rigid structural support, either at the top of the lift shaft or in a top machine room.

Gearless machine is provided with rope slip-off guards. After fitting the ropes in place, adjust them so that the distance between the rope and the rope slip-off guard dose not exceed.

The angular misalignment between pulley axis and the rope falls should not exceed 3° to protect against premature failure of the pulley and motor bearings.

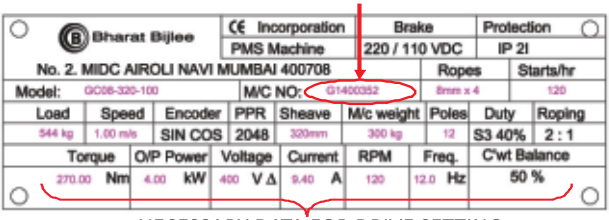
Gearless Machines are designed with IP21 degree of protection. Make sure that the cable entries to the terminal box are sealed properly when making the electrical installation.

3.2.2 Name Plate

The name plate is riveted on the machine, It includes some necessary parameters for setting frequency inverter. Please refer the parameters for frequency inverter setting.

For Example :

MACHINE SR. NO.



NECESSARY DATA FOR DRIVE SETTING

3.2.3 Electrical Connection

Qualified personnel should do the electrical connections of the motor. There must be no foreign bodies, dirt or moisture in the terminal box, in order to keep the connection in safe and credible condition. Use factory supplied 4 core shielded cable.

3.2.4 Motor Connection

Connect the frequency inverter output & earthing to motor as shown in motor terminal connection diagram. Ensure that there is no short-circuit between winding & ground after connections.

3.2.5 Thermister

Class B type thermister is used and the normal resistance range is between 140 ohms and 200 ohms. Thermister will give tripping signal to the drive, when temperature of motor winding reaches 130°C.

3.2.6 Earthing

For safety reason, it is very important that the motor should have properly earthing. Voltage between Earth and Neutral should be less than 3 Volts at standstill as well as during running of the Lift. Gearless machine unit contains two earthing points, use the earthing bolts provided on the machine.

3.2.7 Brake

Brakes are design to operate with overexcited voltage 220 VDC-110VDC. Each machine comes with over-excitation rectifier PCB. Connections are shows in the circuit diagram.

3.2.8 Brake PCB

Brake PCB, requires input of 230VAC supply and gives output of 220VDC for 1 second thereafter switches to 110VDC.

3.2.9 Thermal Switch/ Thermostat & Fan

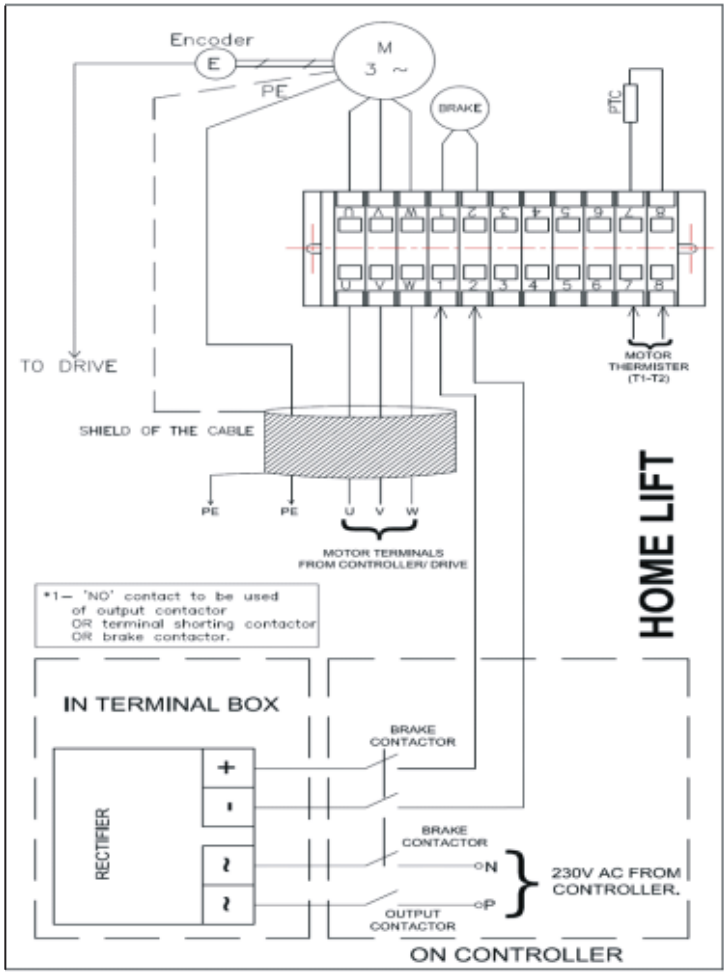
The cooling fan activates through a thermal switch, when motor body temperature reaches 60° C.

- Use the factory supplied 4-core, shielded cable for motor connection.
- Ensure that the shielding of the cable & 4th Core of the cable is connected to earth at motor as well as controller end.
- Use the factory supplied brake PCB only for smooth operation of brake.

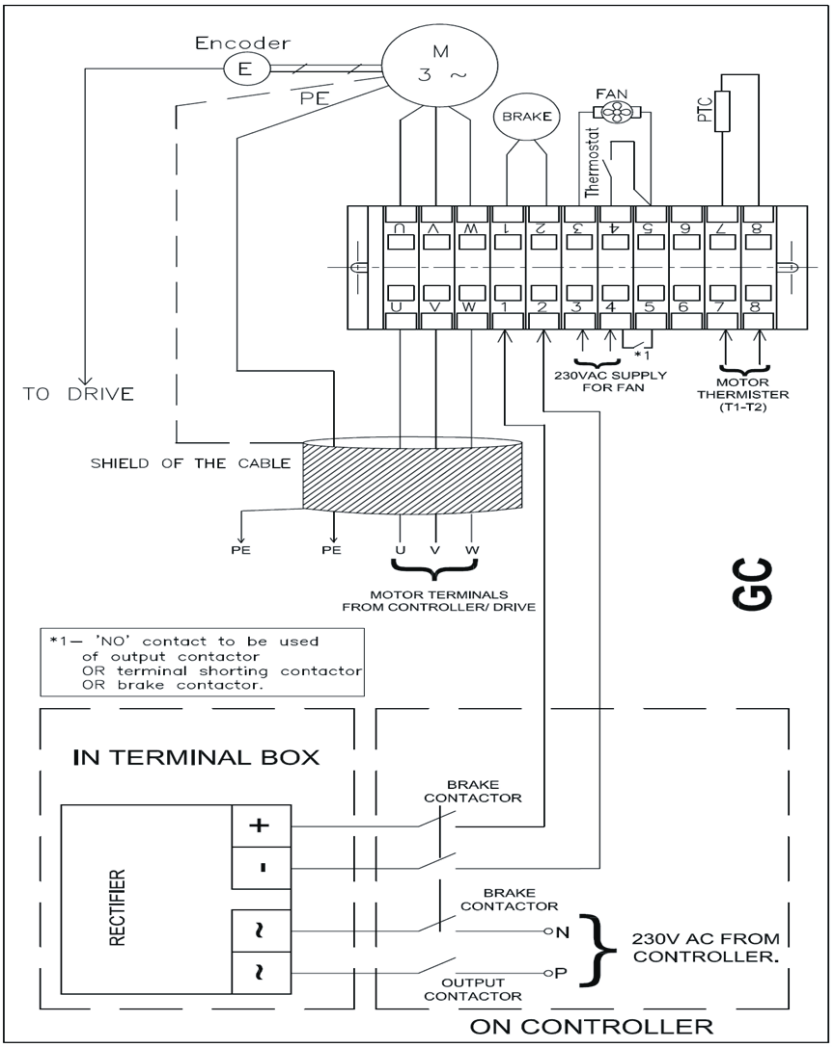
3.2.10 Connection Diagrams

The electrical connection diagram comprises the motor terminal connections and brake connection:

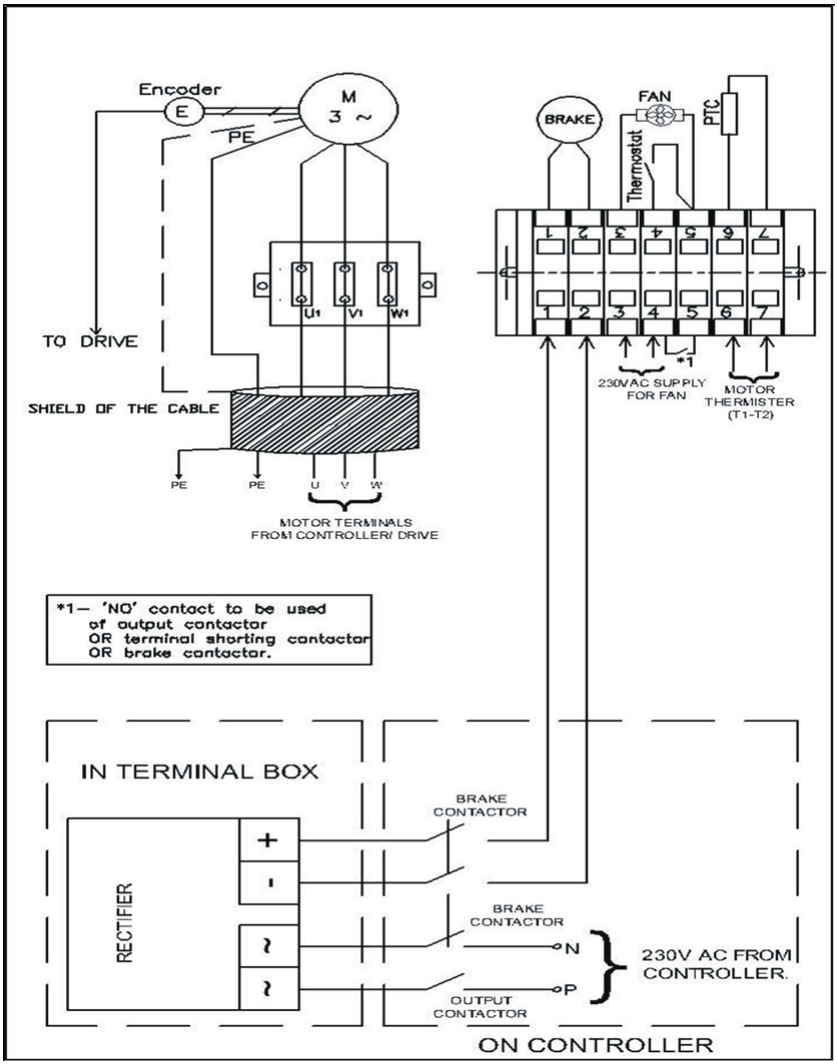
A) Motor Terminal connection for Greenstar Mini.



B) Motor Terminal connection for Greenstar Cantilever GC06 to GC08

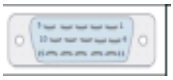
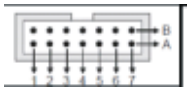


C) Motor Terminal connection for Greenstar GC10 to GC 20 and GCH 1.6T, 2T, 2.5T



3.3 Encoder Deails:

Applicable Pole tuning to set the offset angle during commissioning will need to be performed.

Encoder Type	**Absolute Sin Cos**				
Make	Heidenhain				
Moddel	ERN 1387				
PPR (pulse per revolution)	2048				
Incremental Signals	~ 1 VPP				
Absolute position values	~ 1 VPP				
Power Supply Voltage	5 VDC				
				15 Pin Connector	2 x7 Connector
Image					
Power Supply Signal	+5 VDC		Blue	12	1b
	0 VDC		Grey	13	5b
Incremental Signals	**Internal Shield**	A+	Sky Blue	8	6b
		A-	Orange	3	2a
		B+	White	9	3b
		B-	Yellow	4	5a
Absolute Position Signals	C+		Red	6	7b
	C-		Green	1	1a
	D+		Violet	7	2b
	D-		Black	2	6a
Mark Signals	R+		Brown	15	4b
	R-		Pink	14	4a

Refer the following table for details of encoder cable connections with different drives

Encoder Heidenhain ERN1387 & Hengstler S21 signals connection details for various Drives- PG Cards

Pins of Heidenhain ERN1387 & Hengstler S21 (Male connector on encoder)	Signals	BBL Encoder Cable Color code	KEB F5 Series	Delta VFD-VL	Yaskawa L1000A	Fuji Frenic-Lift	Gefran ADL230	Inovа Nice-series	Schneider Altivar
1b	+5V	Blue	12	9	IP	PO	15	9	+5V
2b	D+	Violet	7	12	D+	PD+	5	12	CI-
3b	B+	White	9	8	B+	PB+	11	8	C+
4b	R+/Z+	Brown	15	3	R+/Z+		9	3	R+
5b	0V	Grey	13	7	IG	CM	14	7	0V
6b	A+	Light Blue	8	5	A+	PA+	13	5	S+
7b	C+	Red	6	11	C+	PC+	7	10	D+
1a	C-	Green	1	10	C-	PC-	6	11	D-
2a	A-	Orange	3	6	A-	PA-	12	6	S-
4a	R-/Z-	Pink	14	4	R-/Z-		8	4	R-
5a	B-	Yellow	4	1	B-	PB-	10	1	C-
6a	D-	Black	2	13	D-	PD-	4	13	CI+
Connections Type			(15-pin D Sub)	(15-pin D Sub)	(Terminal Strip)	(Terminal Strip)	(Terminal Strip)	(Terminal Strip)	(Terminal Strip)
PG Feedback Card		1MF5280-2056	EMVL-PGH01	PG-E3	OPC-LM1-PR	—	—	—	

***This information is provided only for reference; please conform to drive concerned persons before configuration.

****BBL will not be responsible for any wrong connection.

	• Internal Shield to be connected to 0 VDC • Outer Shield to be connected to Housing of 15 Pin Connector • Encoder cable must be routed separately and carefully with minimum 100 mm clearance from all the power cables. • Use the factory supplied 4-Core, shielded cable for motor connection. • Ensure that the shielding of the cable & 4th Core of the cable is connected to earth at motor as well as controller end.

3.4 Operations and Settings

3.4.1 Operating Principle of the motor :

- The principle of functioning of a gearless motor with permanent magnets in the rotor is to achieve high torque at low RPM. Hence the motor is directly applied without a gear, to reduce the speed and increase the torque.
- The Gearless machines are not designed for direct connection to three phase system but are to be operated via variable frequency drive. Direct connection to the machine may destroy the motor.
- Due to the use of a variable frequency drive the surface of machine may induce some faradism voltages during the operation of synchronous motors, so the earthing should be connected.
- Check the proper functioning of the motor and brake after installing the machine.
- The braking system consists of an electromagnetic brake which is located at non driving end of the motor.
- High surface temperatures may occur on the external parts of the machine. Therefore, no temperature sensitive parts should come in contact with the hot surface. Protection against accidental contact should be provided, if necessary.

3.4.2 Settings :

- Integration of Gearless machine with the frequency drive depends on the make of the Drive.
- The parameter settings of the drive must comply with the motor name-

plate. E.g. Motor Current, Voltage, RPM, rated frequency etc.

- For further details consult / take advise from the qualified engineers of BBL / respective Drive suppliers.

3.5 Before Starting up the Machine

Before starting the machine, go through the following checklist:

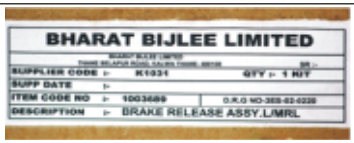
Sr. No	Check list	Recommended	YES	NO
1.	Machine Mounting Bolts	Tighten		
2.	Check Input Voltage to Drive	390 Volt A.C. to 415 volt A.C.		
3.	Check Machine Earthing during standstill & Running	< 3 Volt		
4.	Winding Insulation resistance	2 M-ohm		
5.	Terminal Connection	No Loose (All Connections proper)		
6.	Power Cable and Encoder Cable	**Routed Separately minimum 100mm clearance**		
7.	**Use only the BBL supplied 4 core cable, shielded cable for motor**	Connected		
8.	Earthing at 2 points to Gearless machine unit	Connected		
9.	Shield of power cable is connected to Earth at Motor end as well as at controller end.	Connected		
10.	Thermister connected with drive	Connected		
11.	Thermostat and fan connected to supply	Connected		
12.	Brake Input Supply	220V DC-110 V DC Over Excited		
13.	Rectifier Input and output	Input 230 Volt A.C. Output 220V DC-110 V DC		
14.	Wrap Angle	Minimum 175 degree		
15.	Balancing done	Completed		
16.	Assume Car Weight = 1.2×Duty Load	Ok		
17.	After Balancing 50% Load is added in counter weight	Ok		
18.	Compensation chain necessary for travel more than 20 meters	Connected		
19.	Check Manual Release Operation	Heavier should come up direction		

3.6 Manual Evacution System

3.6.1 Type 1 Manual Release

Stepwise Procedure For Fixing Manual Brake Release For Greenstar Machine.

A Accessories

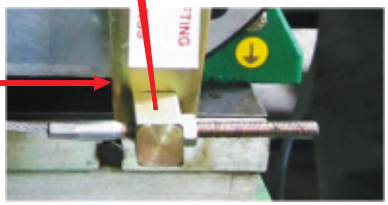
1. Open the box with the description "Brake Release Assy. L/MRL".	
2. Open the packet containing these items. (As shown in picture)	
Fix the "rope clamp" on the one handle of brake as shown with the help of Allen screw. 3. Fix the "adjuster fixing pin" on the other handle of brake as shown with the help of Allen screw.	 ADJUSTER FIXING PIN  ROPE CLAMP 
	 BRAKE RELEASE CABLE

B Installation

Insert the long threaded end of brake release outer cable in the adjuster-fixing pin from bottom.
(Sticker on the brake release cable indicates which end will be fixed on brake end).

The outer cable will be locked by the adjuster-fixing pin as shown.

The (inner cable) threaded end to be locked at rope clamp end by m6 nut (provided in the kit) as shown.



Fix the clamp directly on a rigid support (shaft wall/inside controller) or with the spacer (not provided in kit) at the back to avoid fouling of manual release cable with the wall, as shown.

Clamp should be positioned from where lift movement can be seen during rescue operation or nearer to controller.

Distance of clamp from floor level should be 1400mm or at an ergonomic height to pull the brake rod in upward direction.

Insert the short threaded end of brake release outer cable in the clamp's fixed end as shown. (Sticker on the brake release cable indicates which end to be fixed on clamp).

The outer cable will be locked by clamp's fixed end as shown.

The (inner cable) threaded end to be locked at clamp's moving end by M6 nut (provided in the kit) as shown.

Clamp

C Operating Process

1. Insert the brake rod in the clamp.
2. Now adjust the play by tightening M6 nut at clamp end.
3. Ensure that there is minimum endplay between inner & outer cable. It is recommended to keep this play zero or just enough, to slightly preload the brake handle.
4. Pull the rod in upward direction, by doing so both the brake handles will come closer, hence releasing the brake.
5. If end play is adjusted properly, heavier side of the lift i.e. Car or C'wt will move in downward direction.
6. Now release the rod, check that the 'brake release handle' returns to the 'brake closed position', by itself.
7. If the handle does not return, check the route of the cable & eliminate sharp corners & twist etc., which can cause the non return of the 'brake release handle'.

3.6.2 Type 2 Manual Release

1. Components of Manual release Assembly.

1. MANUAL RELEASE ASSEMBLY WITH CABLE CODE NO.- 1012435 (5 Mtr) CODE NO.- 1012821 (10 Mtr)	
2. HARDWARE FOR MANUAL RELEASE ASSEMBLY CODE NO.- 1009195	

2. Manual release Assembly.

Fixing of Bracket.

1. Fix the manual release bracket directly on a rigid support (shaft wall / channel), as shown.

2. Make a hole for release cable to pass into the shaft. (dia of hole should be 30mm to 40mm)

3. Route the cable so that it eliminates sharp corners & twist etc., which can cause non return of the 'brake release handle'.

4. Manual release bracket should be positioned from where lift movement can be seen during rescue operation or nearer to controller.

5. Distance of clamp from floor level should be 1400mm or at an ergonomic height to pull the brake rod in downward direction.

Fixing of cable.

6. Open the packet containing hardware items. (As shown in pic.)

7. Fix the “rope clamp” (with small hole on the bottom lever of brake (as shown) with the help of Allen screw.

8. Fix the “adjuster pin” on the top lever of brake (as shown) with the help of Allen screw. Insert the threaded end of brake release outer cable in the adjuster fixing pin.

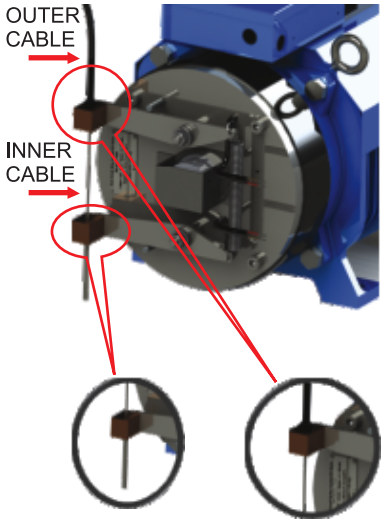
9. The outer cable will be locked by the adjuster fixing pin as shown.

10. The (inner cable) threaded end to be locked at rope clamp end by m6 nut (provided in the kit) as shown.

HARDWARE

ROPE CLAMP

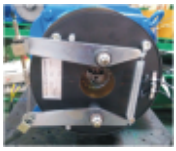
ADJUSTER PIN



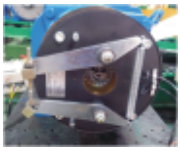
3. Operating Process.

1. Remove the locking pin.
2. Ensure that the handle is free to rotate.
3. Pull the rod in downward direction, by doing so both the brake levers will come closer, hence releasing the brake.
4. If end play is adjusted properly, heavier side of the lift i.e. Car or C'wt will move in downward direction.
5. Now release the rod, check that the 'brake release handle' returns to the 'brake closed position', by itself.
6. If the handle does not return, check the route of the cable & eliminate sharp corners & twist etc., which can cause the non return of the 'brake release handle'.

LOCKING PIN



NORMAL CONDITION



OPERATED CONDITION

3.6.3 Manual release testing

a. How to test the Mechanical Brake Release system

1. Ensure the Lift is in Normal operation and lifting the Full load.
2. DO NOT KEEP THE Brake release HANDLE in PULLED condition IF THE LIFT IS ALREADY IN OPERATION.
3. Ensure the Car is at Standstill condition.
4. Pull the handle as shown above, to release the Brake mechanically.
5. The Car should start moving in
   a. UP direction if Car is Empty
   b. DOWN direction if Car is fully loaded.

As the machine terminals are SHORTED by Contactor on controller,the speed of the lift will be controlled.

b. If the Car is not moving, then check the following

- Brake release Cable is routed freely.
- Avoid sharp bends of release cable.
- Rails are lubricated.
- Appropriate DBG should be maintained.
- Guide shoes / Liners of Car and Counter weight are not tight.
- Car and Counter weight may be in balanced condition.
- Check the movement of Car by giving supply to Brake only.
- In this condition also if Car is not moving then check the installation.

3.7 Encoder Removal Process

- This SOP is applicable to use for fixing and removal of ERN 1387 Encoder of BBL gearless Machine, at field.

A) **Required Tools:**

Sr. No.	Tools	Image
1	Allen Key Set	
2	Screw driver set	
3	Slotted set screw (M5 X 20mm) and Allen cap screw (M6 x 55mm).	

Precautions :

	1. Please remove all the encoder connection before removal of Encoder. 2. Switch off Mains supply before removing or fixing of machine components

B) STEP BY STEP PROCEDURE

(Part 1: Removal of Encoder)

STEP 1 : Loosen the 2mm Allen screw located at coupling ring with the help of 2mm Allen key. Remove Encoder cap and Screw Plug. (As shown in Fig.1 and Fig. 2)

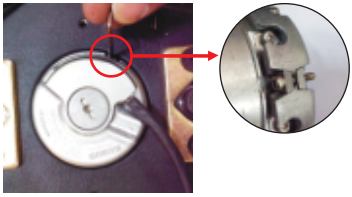


Fig.1

Fig.2

REMARK : Do not try to remove the encoder without loosening the 2mm Allen screw. Encoder may get damaged.

STEP 2 : Carefully remove the encoder cable from Encoder (as shown in fig.3) & Remove m5x55 mm Allen bolt from Encoder shaft.(As shown in Fig 4)

Fig.3

Fig.4

STEP 3 : After M5x55mm Allen bolt is removed, insert the Slotted Set Screw inside encoder shaft and tighten it using screw driver. (As shown in Fig 5 & Fig. 6)

Fig.5

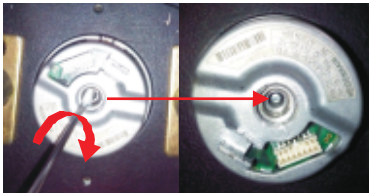


Fig.6

STEP 4 : After tightening the Slotted Set Screw; Insert m6x55mm Allen Bolt and tighten it carefully. While tightening the m6x55mm Allen Bolt Encoder will be released from shaft and will move backwards. Carefully remove the encoder from Machine.

Fig.7

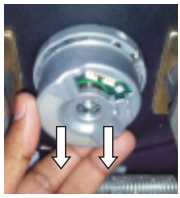


Fig.8

STEP 5 : Remove m6x55mm Allen Bolt from the encoder shaft and Slotted Set Screw from the motor's encoder fixing adapter. (As shown in Fig.9 and Fig.10)

Fig.9

Remove Slotted Set Screw from encoder adaptor

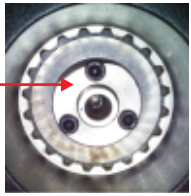


Fig.10

(PART 2: Fixing of Heidenhain encoder)

STEP 1 : Insert encoder shaft inside encoder adapter. (As shown in Fig 11) After Inserting m5x55mm mounting bolt tighten the bolt using 4 mm allen key (as shown in fig 12).

Fig.11

Fig.12

STEP 1: Carefully Insert Encoder cable 12 pin connector in Encoder side 12 pin connector.

Put encoder cap, Screw plug and Tighten the 2mm Allen screw for fixing the position of encoder (as shown in fig 14)

Fig.13

Fig.14

NOTE : After Replacement/Refixing of Encoder. Encoder tuning needs to be done for proper operation of machine. Follow TUNING PROCEDURE recommended by drive manufacturer.

4 - MAINTENANCE AND TROUBLESHOOTING

4.1 Start-up

The lift operator should carry out periodic maintenance for the machine, to ensure that the machine and all its associated components are kept in a proper state of repair and in safe working order.

The responsible person for the Machine should take note of the following points

(1) Suitable skilled person should be employed to manage the operation, repair and examination of the Machine;

(2) When regular maintenance, machine works are carried out, the concerned person should notify residents of the suspension of lift services for smooth conduction of work;

(3) Fire fighting equipment for electrical fire (such as carbon dioxide type fire extinguishers) should be made available in the machine room;

(4) When moving heavy objects that may overload the lift, contact the registered lift contractor for advice to avoid accidents;

(5) Remind passengers to use the lift properly to avoid lift failure, damage or wear and tear caused by improper use;

(6) Ensure that there is adequate lighting in the lift machine room;

(7) The lift machine room should be well ventilated and the temperature inside be kept below 40°C to avoid affecting the effective operation of the lift;

(8) Damage to the building, such as water leakage or concrete spilling affecting the operation of the machine should be repaired immediately.

The operator is responsible for the requirements, which are concerning applicable safety regulations.

4.2 Maintenance Intervals

Following maintenance activities are recommending to be performed. Only qualified personnel are allowed to perform any maintenance work and follow the checklist given below :

Check list	Recommended	Duration
Motor		
Machine Mounting Bolts	No Loose	Three Months
Clean Machine Surface	No Dust	Three Months
Check Input Voltage to Drive	415 volt A.C.	Three Months
Check Machine Earthing	< 3 Volt	Three Months
Motor Vibration	< 0.50 mm/s	Three Months
Winding Insulation resistance	2 M-ohm	Six Months
Load Current	Rated Current	Three Months
Bearing Noise	No Abnormal Noise	Three Months
Sheave Fix State	No Loose	Six Months
Sheave	No Serious Abrasion	Six Months
Terminal Connection	No Loose	Three Months
Connection Cable	No Aging	Six Months
Brake		
Brake System	Work Effective Braking	Six Months
Open Airgap	> 0.2 to 0.3 mm	Three Months
Brake liner thickness	Contact BBL	Six Months
Brake Input Supply	220v DC-110 V DC Over Excited	Three Months
Rectifier Input and output	Input 230 Volt A.C. Output 220v DC-110 V D.C.	Three Months
Check Manual Release Operation	Heavier should come up direction	Three Months
Lubricating Manual Release Bearing	Clean bearing & put oil Drop	Three Months
Other Components		
Thermostat	Operate at 60 Deg. C	Three Months
Fan	Working OK	Three Months

4.3 Faults & Remedy

The proper maintenance of the gearless machines requires adequately trained specialist personnel and specific devices and auxiliaries.

Fault	Causes	Remedy
Motor dose not start	Input supply cut	Provide supply to VFD
	Motor terminal connection loose	Tight the terminal connection of VFD & Motor
	VFD setting wrong	Correct the VFD setting
	VFD defective	Replace the VFD
	Motor is mechanically jam	Contact to BBL
	Brake is faulty	See below
Drive trips after start	Wrong VFD selection	Change with higher capability
	VFD setting faulty	Correct the VFD setting
	Short circuit in winding	Check winding resistance
	Short-circuiting to earth	Take off connection and check
	Short-circuiting to control	Exchange the faulty parts
	Brake is faulty	See below
Brake dose not release	Input supply cut	Provide proper input to the brake card
	Brake card may be defective	Check output voltage of the brake card must be 220VDC-110VDC overexcited
	Brake coil dose not pull	Excessive air gap between armature and pressure plate. set 0.2mm
	Brake coil defective	Check resistance of brake coil and contact to BBL
Abnormal running noise or vibration	Motor alignment with diverter/deflecting pulleys in the installation is faulty.	Make correct alignment
	VFD setting wrong	Check parameter of VFD carrier frequency & Check VFD setting
	Encoder cable routed with power cable	Make power cable and encoder cable routed separately
	Encoder defective	Change Encoder
	Brake is faulty	See above
	Bearing is faulty	Replace the defective bearing
Motor taking more current	Not proper balancing	Make proper balancing
	Rail is rusted	Make rail rust free by lubrication
	Rail shoe jam	Make it free
	Encoder not fixed properly	Fix encoder properly
	Encoder cable connection wrong	Make encoder cable correctly
	Brake dose not release	See brake dose not release points
Excessive Temperature	Fan is not connected properly connected	Check the wiring and make it correct
	Thermal switch is faulty	Replace the thermal switch
	Cooling fan is faulty	Replace the cooling fan
	VFD setting is wrong	Check VFD setting
	Brake is faulty	See brake dose not release points

5 - WARRANTY

Bharat Bijlee Ltd (BBL) warrants that:

1. Its Products and Components are free from any defects in design, material and workmanship for a period of 12 months from date of purchase.

2. In the unlikely event of failure of the product or component(s) while under normal use within the above 12 month period, and if in the opinion of BBL the defect is due to inherent defects in design or material or poor workmanship, BBL will repair or replace at its sole discretion free of charge the defective component or product subject to the following terms and conditions:

   a. BBL or its authorized repairer alone can inspect, service or repair the component Or Product

   b. Proof of purchase (original sales invoice and receipt) duly signed by BBL officials or its authorized dealers must be provided with All warranty claims or requests

   c. This warranty is void if any of the following circumstances occur :

      i. If the customer modifies any part of the product or component without notifying BBL. If unauthorized attachments are made to component/ product

      ii. If the product is not installed in accordance with the user/installation manual and application guidelines of BBL

      iii. The Product/ component for which the claim is requested is tampered with

      iv. The Product has been used in a way that does not confirm to the specifications for which it has been built as indicated in the User Manual

      v. The Identification plates are missing and therefore it is impossible to identify the product

      vi. If any moneys remain outstanding and due to be paid by the customer on the total price of the product as per the sales invoice, in the books of account of BBL.

   d. This warranty expressly excludes the following:

      i. Brake liners

      ii. Electrical components and windings

iii. Bearings

iv. Work surface damage/chipped, paint peel off due to wear and tear or misuse

v. Motor power cable

vi. Encoder cable

vii. Cooling fan

viii. Manual brake release system

3. All warranty claims must be communicated to BBL in writing within 7 days from the date of occurrence of the problem.

4. All defective material /component/ product(s) replaced will the sole property of BBL and shall be returned by the customer to BBL.

5. Under any circumstances, BBL is not liable for any direct /indirect consequential loss or damage or expenses incurred by the buyer/user due to use of the product sold by BBL.

6. All disputes arising out of claims under this Warranty are to be first settled by mutual agreement, failing which should be referred to a Sole Arbitrator to be appointed by the Managing Director's of BBL and the award of such arbitrator shall be final and binding on parties. The Arbitration shall be conducted in accordance with the Arbitration & Conciliation Act, 1996 and any of its amendments/modifications thereon. The seat of Arbitration shall be Mumbai and only courts in Mumbai shall have exclusive jurisdiction notwithstanding that the product/ component may have been sold or delivered or installed elsewhere.

6 CERTIFICATES

6.1 IP21 Certificates:-

working for a safer tomorrow

KARANDIKAR LABORATORIES PVT. LTD. BOISAR Format: FR07 b.2 Rev 07

TYPE TEST REPORT

IS/IEC 60034-5:2000

Degrees of Protection Provided by Enclosures (IP Code)

T - 1641

Report No. ..... : KLPL/BTG/17/11-40

Date of issue..... : 18.01.2018

No. of pages ..... : 07 PAGES

Compiled by (+ signature)..... : Rupesh Mukane

Approved by (+ signature)..... : Atul Marathe

Item Received On ..... : 19.11.2017 in Good Condition

Test Completion Date ..... : 10.01.2018

Client

Name ..... : M/s. Bharat Bijlee Limited.
: No. 2, MIDC, Thane-Belapur Road,
Airoli, Navi Mumbai-400 708.

Test Specification

Standard ..... : IS/IEC 60034-5:2000

Specified IP-Code..... : IP-31

Equipment Under Test

Type of Test Object ..... : Motor- Elevator machine, 400VΔ, 15.1 kW

Motor Type ..... : gch 2.5T-320-100

Serial No. ..... : M/C No. G1701365

Manufacturer ..... : M/s. Bharat Bijlee Limited.

KARANDIKAR LABORATORIES PVT. LTD. BOISAR 401501

Annexure :-

Drawing No. ..... : -------

NOTE : 1) This refers only to the particular item(s) submitted for testing.
2) If necessary, this report shall be reproduced ONLY in full.

Head Office: B-101, Ansa Industrial Estate, Saki Vihar Road, Saki Naka, Andheri (E) Mumbai-400072 INDIA Ph: (022) 28471395
Laboratory: Gat#142, Betegaon, Boisar Chilhar Road, Opp. Union Park, Boisar (E), Tal-Palghar, Dist Palghar-401501 INDIA
Phone (02525) 284881/931
Email: sales@karandikarlab.com Website: www.karandikarlab.com

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6.2 CE Incorporation:-

TUV INDIA

Statement of Compliance

No.: CE 98/07.553.09

Customer's reference

Technical File Number: ESD/CE/1/2010-11

Name & Address of Manufacturer

Bharat Bijlee Ltd.
No.2, MIDC, Thane Belapur Road,
Airoli, Navi Mumbai- 400708 INDIA.

Product Nomenclature: **Permanent Magnet Synchronous Machine**
Type/Model: -

Review Results/Observations

The Technical File referenced above submitted by the manufacturer has been reviewed.

The Technical File adequately covers the requirements under the provisions of the European Directive/s:

- **EC Machinery Directive 2006/42/EC**
- **EC Low Voltage Directives 2006/95/EC**

Standards Applied:

- **EN 14121-1, EN 12100-1 :2003, EN 12100-2 :2003, EN 60034-1**

Product Classification:

- **Incomplete Machine**

The Manufacturer is advised to issue the necessary : EC Declaration of Incorporation
Marking to be put up on the product: -

Date:

K.M.Deshmukh
Lead Assessor-Product Certification.

M.S.Ogale
Head - Homologation & Product Certification.

(This Statement of Compliance is valid under the conditions stated overleaf) P.T.O

Regd. & Head Office: 801, Ashoka Tower-I, J.B.S. Marg, Dadar(W), Mumbai-400 028
Phone: (022) 6647 7666 Fax: (022) 6647 7699 E-mail: info@tuvindia.co.in

Bharat Bijlee

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