Operating Manual

WYJ140 Series
Synchronous Permanent Magnet Type Gearless Traction Machine

NINGBO XINDA ELEVATOR ACCESSORIES FACTORY

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Contents

1 Precaution for the Machine ................................................................. 3
   1.1 Explanation of symbols used .......................................................... 3
   1.2 Basic safety requirements .............................................................. 3

2 Product Descriptions ............................................................... 4
   2.1 Product Construction ................................................................. 4
   2.2 Product designation method ........................................................ 5
   2.3 Main technical parameters of the product ................................... 6
      2.3.1 Traction technical parameters of the machine ...................... 6
      2.3.2 Technical parameters of drive motor for the traction machine ........................................... 6
      2.3.3 Technical parameters of the brake ......................................... 6
   2.4 Ambient conditions for operation ............................................... 6
   2.5 Contents of the product package .................................................. 6

3 Handling and Storage of Product .................................................. 7
   3.1 Storage ...................................................................................... 7
   3.2 Lifting ...................................................................................... 7

4 Installations .................................................................................. 7
   4.1 Preparations prior to the machine installation ......................... 7
   4.2 Preparations prior to electrical connections ........................... 8
   4.3 Electrical connection ............................................................... 9
      4.3.1 Connection of terminal box of the traction machine ............... 9
      4.3.2 Connection of terminal box of brake electromagnet ............ 10
      4.3.3 Encoder connection .......................................................... 10

5 Commissioning of Traction Machine ............................................ 10

6 Commissioning of Brake Mechanism .......................................... 11
   6.1 Description of Brake Mechanism .............................................. 11
   6.2 Commissioning of brake mechanism ........................................ 12
      6.2.1 Adjustment of air gap among friction disk, armature and electromagnet core .................. 12
      6.2.2 Adjustment of braking torque ............................................ 13

7 Emergent Rescue ......................................................................... 13

8 Protection and Maintenance ...................................................... 13
   8.1 Routine inspection and maintenance of the product ............... 13
   8.2 Inspection and Maintenance of Brake ....................................... 14
      8.2.1 Cleaning the carbide on the friction plate and the brake surface of brakes .................. 14
      8.2.2 Common faults and troubleshooting of brake mechanism .... 15

9 Spare parts list ............................................................................ 16

10 Quality warranty ....................................................................... 16

11 Revision note ............................................................................ 16
1 Precautions for use of the machine

Thank you very much for purchasing our products. In order to ensure that the elevator can run with high safety, reliability and quality, the elevator operators should be trained and become familiar with the installation, commissioning and operation of this product, and know elevator construction very well. This product should be installed, tested, accepted, used and maintained according to this manual and GB7588-2003 “Safety Rules for the Manufacturing and Installation of Electric Lifts”(egvEN81-1:1998“Safety rules for the construction and installation of electric lifts”) as well. The manufacturer will not take any responsibility for any personal injury or equipment damage caused due to improper handling or violating above-mentioned manual and safety rules during the installation, commissioning, acceptance, use and maintenance of the product. To guarantee correct installation and operation of the motor, please read this manual carefully at first.

1.1 Explanation of symbols used

4 types of symbols are used in this operating manual as follows:

- **STOP**
  - Adequate safety measures must be taken, otherwise there will possibly be significant personal injury (even death) or serious equipment damages

- **!**
  - It is necessary to take adequate preventive actions, otherwise personal injury (but not death) or equipment damages may be caused. However, serious personal injury (even death) or serious equipment damages may also be caused when external conditions have changed but preventive actions are not changed accordingly.

- **指**
  - Pay more attention to the inspection and operation, otherwise personal injury or equipment damages may be caused.

- **√**
  - Prompt for relative knowledge.

1.2 Basic safety requirements

Gearless traction machine must be installed in a lockable room, so that only specially-trained persons can have access to it.

- Operators must operate the machine strictly according to the manual and GB7588-2003 (egvEN81-1:1998) rules, otherwise dangers and damages will be caused
- After completion of the installation, check whether the motor and brake can function normally according to the requirements.
- The motor must not be connected directly with 3-phase power supply, but should be powered by the frequency converter which is designed to drive the synchronous permanent-magnet type motor
- The magnet coils of the motor and brake are heating elements, and any objects which will prevent its heat dissipation must not be placed on the coils
- High voltage is generated during motor rotation, and even if the power supply of the frequency converter is disconnected, therefore touching the motor connection terminals is
During high-speed rotation of the motor, it is prohibited to apply brake by directly short-circuiting the terminals. But in case of emergency, terminal short-circuiting is allowed at zero-speed startup in order to move the car up and down slowly for the purpose of rescuing.

2 Product Descriptions

2.1 Product Construction

WYJ140 series permanent-magnetic synchronous gearless traction machine (hereafter called traction machine) adopts the low-speed, high-torque permanent-magnetic synchronous 3-phase motor which provides direct way of drive. Therefore the product has the advantages of low power consumption, low noise, free of pollution and little requirement of maintenance. Its main construction characteristics are:

- The traction sheave side adopts double-row self-aligning roller bearing
- The adopted permanent magnets and the dovetail groove are fixed to the external circle surface of the rotor by high strength adhesive in order to ensure that during the operation course, it will not demagnetize or peel off even if the rotating torque exceeds 2.5 times of the rated torque.
- The brake system consists of two sets of independent working armature, friction disc, electromagnet and brake releasing micro-switch.
This series synchronous permanent-magnet gearless traction machine adopts single wrap method, and wrapping rate is 2:1. If the user has special requirements, he can check with the manufacturer, some types of the machine also can be 1:1.

Encoder installation: one is suitable for the encoder with small volute shaft (for example 1300 series of the Germany Heidenhain Company). Plug the encoder into the volute holes on the main axle of the traction machine and fix it on the main axle with bolts and fix the outside case by internal expanding on the encoder base. Our company’s standard encoder is ERN487 mode manufactured by Germany Heidenhain Company.

2.2 Product designation method

<table>
<thead>
<tr>
<th>W</th>
<th>Y</th>
<th>J140</th>
<th>—</th>
<th>—</th>
<th>—</th>
<th>—</th>
</tr>
</thead>
</table>

- **Traction ratio 2**
- **Traction ratio 2: 1**

- **Load capacity code**
  - 400 stands for 400 kg
  - 450 stands for 450 kg
  - 630 stands for 630 kg

- **Speed code**
  - 4.0 stands for 0.4 m/s
  - 10 stands for 1.0 m/s
  - 16 stands for 1.6 m/s

- **Center height of machine frame**
  - 140mm

- **Traction machine**

- **Permanent magnet excitation**

- **Gearless drive**
2.3 Main technical parameters of the product

2.3.1 Traction technical parameters of the machine

- Duty: S5, 40% load, start times 180/h
- Traction sheave diameter: Ф210mm
- Traction ratio: 2:1
- The wrap angle of traction rope around traction sheave is suggested to be 180º.
- Diameter of the traction rope is Ф6.5, and see attached table 1 for the number of traction rope.
- Groove distance: 11 mm when it is single wrap.
- Max. permissible axle load: 2000Kg
- Max. permissible travel height: 60m (When the travel height is less than 30m, the compensation chain is not necessary.)
- Balance factor: 0.5

If the operating conditions provided by users do not comply with aforesaid requirements, consult the manufacturer before contracts are signed.

2.3.2 Technical parameters of drive motor for the traction machine

- Type: permanent-magnet synchronous motor
- Poles: 10
- Insulation Class: F
- Protection Class: IP44
- Cooling form is IC00.
- Standard-configuration encoder (ERN487-2048) protection class: IP64.
- The heat inspector for the motor winding: PTC120ºC
- Voltage and frequency of the inverter: 3 phases, 200/400V, 50~60Hz

2.3.3 Technical parameters of the brake

- Braking torque: see table 5 in item 6.2.3.
- Voltage: DC 200±10V
- Current: see item 4.3.2
- Working air gap: 0.1~0.2mm (factory setting or after readjustment)
- Max working air gap: 0.3mm
- Work continual rate: 50%

2.4 Ambient conditions for operation

- not exceed 1000m.
- environmental temperature -5ºC ~ 40ºC.
- Under the temperature of 20ºC, the max. relative humidity not exceeds 90%. No condition of dew condensate
- Ventilation should be good enough to ensure that adequate heat can be dissipated through convection and radiation waves

2.5 Contents of the product package

- 1 unit of traction machine.
● Accessories: one encoder connecting cable (which is integrated with the standard encoder ERN487-2048).
● One copy of user’s manual for traction machine and one copy of user’s manual for encoder.
● Parts optional by customers: bed plate, diversion sheave (deflection sheave), etc. as per the order contract.

- User’s special requirements should be specified in the appendix attached to the contract when the contract is made.
- In order to avoid increasing the manufacturer’s cost and affecting delivery time, it will be better if users can make selection within the specified scope of supply

3 Handling and Storage of Product

3.1 Storage

- The traction machine should be stored in an enclosed place which is dry, dustless, well ventilated and without apparent vibrations.
- If the machine has been stored for more than 3 months, it should be operated on two opposite directions for more than 10 minutes at the speed of 20r/min to distribute the lubricating grease evenly in the bearing in order to avoid the bearing being rusted.

3.2 Lifting

- The lifting hook is only used for lifting the traction machine and its bed plate; any other weights must not be added.

![Picture 2 product lifting sketch]

4 Installation

4.1 Preparations prior to the machine installation

- When the boxes are opened, check the goods by visual to see if they are intact. If there is damage, and even if it is urgently needed, do not install and operate the damaged machine.
- Before installation of the machine, calculate permissible load of the base and foundation to see if they are satisfied.
- The base and foundation must be firm and hard enough to ensure the machine can be operated under all permissible load range.
- The planeness of the ground where the machine will be installed should not exceed 0.2mm.
- The machine must be installed in a closed room where relative safety protection measures can be observed. If the machine needs to be installed in a pit, the pit should
be waterproof because if the machine is soaked in water, it may cause destructive damage.
  ● The feet of the traction machine should be fixed with the M16 bolt of 12.9 grade intensity (feet installation). The spanner tightening torque is 320N.m

4.2 Preparations prior to electrical connections

  ● The electrical connection should be connected by qualified electrician after the machine is installed.
  ● Switch off all circuits (including attached or auxiliary ones) before conducting any connection operations, especially before opening the connection box.
  ● Before putting into operation, insulation resistance of the motor and brake magnet should be tested with 500V megohm meter. It’s value should be bigger than 0.5MΩ. If the value is lower than 0.5MΩ, the coil should be heated and dried. Working frequency power can be used to heat it and its voltage value should be 5% lower than the rated voltage value of the motor and 30% lower than the rated voltage of the brake. Observe the heating state momentarily. The outside case surface temperature should not exceed 80℃
  ● The permanent electric connection should ensure reliable connection no looseness.
  ● No external materials, dust and humidity air will be allowed to enter into the connection box. Therefore, strict inspection should be done before connections and locked the cable connector after connections to seal the cable entrance after the cable enter into the connection box.

Operate strictly subject to the following safe rules to avoid personal injury or machinery damage.

  ● Switch off power source.
  ● Any devices that can activate the machine by causal touches should be closed or locked.
  ● Make sure that the power source has been separated with safe devices.
  ● The circuit that can bring high voltage (higher than 1000V) should adopt dependable grounding or short circuit.
  ● Neighboring operating components should take safe devices or protective cover.
  ● The cable connector for the machine is waterproof and in accordance with requirements of EMC.
  ● Max. allowable voltage ascending rate for terminals which are in the terminal box is 1.3kV/μs, and max. voltage is 1.3KV. If above-mentioned values are possibly exceeded, a filter should be installed or an external reactor should be connected in series. The filter or reactor will substantially increase the insulation life of the motor, but also will reduce the max. rotating torque of the motor by 3~5%.
  ● The insulating criterion for the motor is 700V, which is also the maximum DC bus bar voltage that the 400V frequency converter can reach instantaneously.
4.3 Electrical connection

4.3.1 Connection of terminal box of the traction machine

- Electromagnet connects to DC power supply (+, -)
- Wiring of microswitch of electromagnet inlet (C1, NC1, C2, NC2)
- Wiring of PTC heat detector inlet
- Entry of power supply cable and grounding wire for traction machine (U, V, W)

Picture 3  Connection diagram of connection box for traction machine

- In order to ensure that the motor magnet will not be demagnetized permanently due to overheat, causing damage or performance deterioration of the motor, it is necessary to connect the PTC detectors to the corresponding control circuits, so that they can disconnect the power supply in the possible shortest time in case of overheat occurrence.
- Max. operating voltage of PTC heat detectors should not exceed 25V.
- Max. allowable operating temperature of the permanent magnet is 150 °C, but irreversible loss of magnetic performance will occur at this temperature, which will have adverse effect on the operation performance of the motor. In order to improve its reliability, PTC heat detector is set to 120 °C.
- The reliable earthing must be provided for the motor in order to ensure its safe operation.
- In order to prevent the main cables (output cables of the converter) from causing any electromagnetic radiation and interference to the surrounding environment and protect the signal transmission cables (cables connecting the encoder with the frequency converter) from the electromagnetic radiation and interference, the main cables should be as short as possible and should be the shielded 3-core cables. The both ends of metal sheath of the shielded cable should twist and then connect to ground at the same time. The current density of the main cable should not exceed 7A/mm², and its line voltage drop should not exceed 0.3V.

- 3-phase windings in the motor have been connected in “Y” connection and three lead-out lines are provided
- In the adjacent 3-phase winding of the motor, there is 3 PTC heat detecting elements connected with each other in series, and its function temperature is 120 °C.
external voltage of 2.5V is applied, corresponding resistance values at different temperatures are shown in Table 1

Table 1 The inspecting temperature and resistance corresponding table of PTC heat detector

<table>
<thead>
<tr>
<th>Resistance of 3 PTC heat detecting elements connected with each other (Ω)</th>
<th>≤300</th>
<th>≤1650</th>
<th>≥3990</th>
<th>≥12000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature in the corresponding winding (℃)</td>
<td>25</td>
<td>115</td>
<td>125</td>
<td>≥135</td>
</tr>
</tbody>
</table>

4.3.2 Connection of the brake electromagnet connection box

- The electromagnetic coil in the brake electromagnet should be connected with DC voltage. When the brake is required to release, quick response excitation voltage of DC200±10V should be electrified until the power supply is switched off.
- For the connection of the brake, it is necessary to use 2-core cable with its cross-section ≥0.75mm² and its insulating withstand voltage≥500V
- The connection terminals of electromagnetic coil and 2 micro-switches are inside the connection box, and there should be no dust, humidity and others objects inside the connection box during connecting (see picture 3).
- The connection terminal of braking micro-switch should be connected in normally-closed state, namely when the brake is in braking state (the electromagnetic coil is de-energized), the two groups switch contacts are in closed state, and when the electromagnetic coil of the brake is energized (the brake is released), the two groups switch contacts of the braking micro-switch are in open state
- The current is 0.3A when the excitation voltage for braking electromagnetic coil is DC200V.
- For the interrupting capacity of micro-switch, the voltage does not exceed AC250V, current does not exceed 0.5A
- The actuation position of the braking micro-switch can be implemented by the adjusting bolt of brake switch.

4.3.3 Encoder connection

- Before the encoder is connected or disconnected with the frequency converter, power supplied to the frequency converter must be turned off in order to avoid any damages to the inverter and encoder.
- WYJ140 series traction machines may be provided with a wide range of optional encoders so that can select different inverters. On ordering, users should select corresponding encoder according to the used frequency converter, or select the frequency converter according to the used encoder. If users feel difficult to determine it, they should consult the manufacturer of the frequency converter.
- The standard length of the signal cable of encoder is 10m. It also can be provided as per users' requirements, but the max length cannot exceed 10m
- In order to prevent the interfere to the signal cable of encoder from the cable of traction machine, the power supply cable of traction machines and signal cable of encoders should be laid separately.

5 Commissioning of traction machine

- Commissioning of traction machine is actually to ensure optimum adaptation between frequency converter and traction machine. Therefore it is necessary to have a good understanding and abundant experiences to the frequency converter in commissioning and use
● After installation and electrical connections of the traction machine are finished, check carefully whether the fixing and electrical connection of the machine is reliable and correct.

● After checking and no errors are found, before suspending the car and counterweights, enter related parameters of the machine into the frequency converter, and enable the frequency converter to supply power to the motor at no load. In this case, the motor and frequency converter should be in self-learning status. The frequency converter reads out related parameters of the motor and relative position values of magnetic fields of the stator and rotor of the motor.

● After self-learning, supply power in non-load state to check whether the self-learning is completed correctly. After confirmation, suspend the car and counterweights. During commissioning, the learning had better be carried out three or four times. Check if the nonconformance of magnetic-field position readings of the stator and rotor is very slight.

● As different users select the frequency converter from different suppliers and types, the actual operation and commissioning should be conducted strictly according to the operation manuals supplied by the frequency converter manufacturer. If there are any problems during the commissioning, please contact the frequency converter manufacturer in time.

● In order to reduce the braking noise before leaving factory, there is slight gap between the brake shoe and brake wheel rim. During the first self-learning, friction exists and the state is not real no-load state. Therefore, after first learning, run the machine at no load for 3 min or longer before a second learning can be started. Or otherwise, the current on loads will be increased by 10~15%.

### 6 Commissioning of brake mechanism

#### 6.1 Description of brake mechanism

![Brake mechanism diagram](Picture 4)  

<table>
<thead>
<tr>
<th>Ref</th>
<th>Description</th>
<th>Ref</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Electromagnet core</td>
<td>6</td>
<td>Adjusting bolt of braking micro-switch</td>
</tr>
<tr>
<td>2</td>
<td>Armature</td>
<td>7</td>
<td>Jam nut</td>
</tr>
<tr>
<td>3</td>
<td>Friction disk</td>
<td>8</td>
<td>Braking micro-switch</td>
</tr>
<tr>
<td>4</td>
<td>Thread bushing</td>
<td>9</td>
<td>Protecting ring</td>
</tr>
<tr>
<td>5</td>
<td>Lead-out line of electromagnet coil</td>
<td>10</td>
<td>Lock bolt</td>
</tr>
</tbody>
</table>

**Brake**: When the elevator is leveling, de-energized or in inspection of failure, the electromagnet is under de-energized state, the armature pushes the disc under the function of spring, and it brakes by the friction between the friction disc, armature and electromagnet core. As the friction disc and
the main axle of the traction machine are coaxial rotation, the main axle brakes.

**Normal release:** When the traction sheave prepares to rotate or is rotating, the electromagnet coil is energized, and the armature and iron core will pull in with the function of electromagnetic force and overcomes the pressure force of the brake spring and release the brake wheel rim, friction disk and the main axle rotate coaxially.

- The function of the braking micro-switch is to determinate that if the brake is under releasing state or braking state. The terminal of the switch should be connected to the control circuit of the motor. As it is safety switch, when the users need, the brake can be functioned as one part of the up travel car over-speed protection components.

- Brake mechanism consists of two groups of separate operation mechanisms, and each group consists of electromagnet, armature, spring, friction disc and thread bushing. If one group of operation mechanism is damaged, the other group is still in effect to ensure the safety of the elevator operation.

**6.2 Commissioning of brake mechanism**

- The brake is set to rated braking torque before delivery. Generally, users do not need to readjust it.

- As the two groups of operation mechanisms are fixed by the same 4 lock bolts, each group operation mechanism can not be disconnected independently.

- The rated braking torque of brake, refers to the braking torque of all the brakes on the traction machines is 2.5 times of the torque when the machine is at rated torque. For WYJ140 series traction machines, it adopts 2 groups of brakes, so the rated braking torque of brake refers to the braking torque of one group electromagnet is 1.25 times of the torque of the rated torque of traction machine.

**6.2.1 Adjustment of air gap among friction disc, armature and electromagnet core**

**Step 1:** loosen the 4 thread bushings on one brake, do not loosen the thread bushings on another brake

**Step 2:** tighten 4 lock bolts completely to enable the braking surfaces of the friction disc to press on the armature and electromagnet core fully

**Step 3:** loosen 4 lock bolts to angle 72 degrees anticlockwise, at this time, the gap between the friction surface of the friction disc and the two braking surfaces are around 0.15mm, measure

**Step 4:** tighten the 4 thread bushings completely. At this time, one brake is already adjusted. Use this method to adjust another brake.
the gap between friction surface and iron core by filler gauge.

<table>
<thead>
<tr>
<th>Phenomenon</th>
<th>Reason</th>
<th>Disposal method</th>
</tr>
</thead>
<tbody>
<tr>
<td>with friction noise too small gap</td>
<td>As per Step 3 to loosen anticlockwise 4 lock bolts to one small angle, then do as per step 4.</td>
<td></td>
</tr>
<tr>
<td>No friction sound, but too loud when brake and release too big gap</td>
<td>Loosen anticlockwise 4 thread bushings to a small angle, then tighten the 4 lock bolts completely.</td>
<td></td>
</tr>
</tbody>
</table>

- The size of brake gap has direct effect on the brake noises and the reliability, it should be adjusted carefully and in time. When it is greater than 0.2mm or the noise level is increased substantially, it is necessary to do adjustment.
- If the brake can not open fully, which will make the brake plate of the brake disc overheating to reduce braking torque or even lead to carbonization and peeling off during the operation. Besides, it will also possibly cause overload of the motor, and thus the motor will overheat, which will drive the protection circuit to function or will lead to malfunctioning or even damages.
- After adjusting the brake gap, the braking micro-switch should be adjusted to the status which is mentioned in the item 4.3.2.
- The encoder base of the traction machine is fixed on the iron core of brake, so loosen the encoder each time before adjusting brake. Fix the encoder after adjusting the brake, and the position of the encoder is changed, so the self-learning is necessary.

**6.2.2 Adjustment of brake torque**

The brake is already adjusted to the rated brake torque, please see the table 3. Users do not need to readjust it.

<table>
<thead>
<tr>
<th>Specifications of traction machine</th>
<th>Rated torque of traction machine (N.m)</th>
<th>Brake torque of brake (N.m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WYJ140-XX-320-2</td>
<td>115</td>
<td>145</td>
</tr>
<tr>
<td>WYJ140-XX-400-2</td>
<td>132</td>
<td>280</td>
</tr>
<tr>
<td>WYJ140-XX-450-2</td>
<td>160</td>
<td>280</td>
</tr>
<tr>
<td>WYJ140-XX-630-2</td>
<td>225</td>
<td>280</td>
</tr>
</tbody>
</table>

**7 Emergency rescue**

As there is no hand wheel and manual release device, the emergency rescue must be executed by using emergent power supply.

- The emergent rescue can be done by using the potential energy. When the motor has stopped running or it runs at a speed below 5% of its rated speed and the brake is under releasing state, short-circuit connect the 3 lead-in terminals of the motor. The short circuit must be implemented by contactor, and make sure that the 3 lead-in terminals and output end of inverter are in the statues of open circuit.
- Additionally, do not replace the normal brake function with the short-circuiting of motor’s lead-in terminals, which is only an optional emergent rescue measure.

**8 Protection and maintenance of the product**

**8.1 Routine inspection and maintenance of the product**

- After the product is put into operation, it should be made routine inspection, certain
protection and maintenance to make the gearless traction machine operate normally. See Table 4 for the routine inspection contents and the relative maintenance method.

<table>
<thead>
<tr>
<th>Check parts</th>
<th>Check cycle</th>
<th>Check contents</th>
<th>Maintenance method</th>
</tr>
</thead>
<tbody>
<tr>
<td>External surface</td>
<td>Six months</td>
<td>Is it clean?</td>
<td>Clean the dust from the machine surface(never wash it with water)</td>
</tr>
<tr>
<td>Exposed fasteners</td>
<td>Six months</td>
<td>Is it loose?</td>
<td>Tighten the loose fasteners</td>
</tr>
<tr>
<td>Electrical connections</td>
<td>Six months</td>
<td>Have the terminals come loose? Are the cables damaged?</td>
<td>Tighten the loose terminals and replace the damaged cable.</td>
</tr>
<tr>
<td>Bearing noise</td>
<td>Six months</td>
<td>Listen to check if there are any unpitched sounds except harmonic sound?</td>
<td>Replace bearing if it is very serious.</td>
</tr>
<tr>
<td>Encoder</td>
<td>Six months</td>
<td>Has the fixing of the shaft and shell come loose?</td>
<td>Tighten it again.</td>
</tr>
<tr>
<td>Traction sheave</td>
<td>Six months</td>
<td>Be wearing seriously?</td>
<td>Replace the traction sheave when the traction force is not enough.</td>
</tr>
<tr>
<td>Brake</td>
<td>1 month</td>
<td>Is the brake torque not big enough? Are there any black carbonized things on the brake wheel rim? The thickness of brake plate is less than 3mm?</td>
<td>Maintain according to the item 8.2.</td>
</tr>
</tbody>
</table>

8.2 Inspection and maintenance of brake

8.2.1 Cleaning the carbonized things on the friction plate and the surfaces of the two braking surfaces

- After long time running of the gearless traction machine, the brake plate surface will be carbonized and has some black carbonized things left on the surfaces of the brake plate, armature and the iron core because of long time friction among the brake plate, armature and the iron core, which will affect the traction machine to reduce its brake torque. If there is any phenomenon like above, the surfaces of the brake plate, armature and iron core must be cleaned and maintained in time.
- The friction disc consists of splined disc and brake plate. When the thickness of the brake plate which is adhered on the friction disc is less than 3mm, the friction disc should be replaced to ensure the safe operation of the lift.
- Before cleaning the carbonized things, the elevator must be stopped in order to avoid any accidents.
- It is not allowed to operate the traction machine during the gap adjustment. At this time, the position of the encoder is changed due to the adjustment of brake. The self-learning is necessary after both of the brakes are well adjusted.

The maintenance steps of the brake as follows:

- Lift the car, and then remove the wire ropes from the traction sheave.
- Dismantle the encoder, then disconnect the lead-out lines of electromagnetic coil and braking micro-switch from the connection box.
- When disconnect the brake, please loosen the 4 lock bolts, then take out the whole brake and replace the friction disc.
- Install the new brake to the traction machine, adjust the air gaps among the friction disc, armature and electromagnet core according to item 6.2.1.
- Install the encoder after the adjustment of braking gap, then do the self-learning.
### 8.2.2 Common faults and troubleshooting of brake mechanism

<table>
<thead>
<tr>
<th>Phenomena</th>
<th>Causes</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insufficient brake torque</td>
<td>1. Oil grease or dirty things exist on the brake wheel rim&lt;br&gt;2. Friction plate is excessively worn</td>
<td>1. Remove the grease or dirt&lt;br&gt;2. Replace the friction disc</td>
</tr>
<tr>
<td>Brake cannot be released or cannot hold after it is released</td>
<td>1. No power supplied to brake magnet coil.&lt;br&gt;2. brake gap is too large or too small&lt;br&gt;3. voltage is too low&lt;br&gt;4. brake armature assembly is seized&lt;br&gt;5. Excessive heating</td>
<td>1. Check the wire connection.&lt;br&gt;2. check and adjust the brake gap&lt;br&gt;3. check whether the voltage is &lt; 165V DC&lt;br&gt;4. Eliminate the causes&lt;br&gt;5. check if the voltage is too high</td>
</tr>
<tr>
<td>Delay in brake release</td>
<td>1. Too large brake gap&lt;br&gt;2. Too low voltage</td>
<td>1. check and adjust the air gap&lt;br&gt;2. check whether the voltage &lt; 165V DC</td>
</tr>
<tr>
<td>Brake cannot be applied or delays in applying the brake</td>
<td>1. After turning off the switch, high residual voltage exists on the coil&lt;br&gt;2. brake armature assembly is seized&lt;br&gt;3. Friction plate is excessively worn</td>
<td>1. Check residual voltage on the coil&lt;br&gt;2. Eliminate the causes&lt;br&gt;3. replace the friction disc</td>
</tr>
<tr>
<td>Too loud noise is produced when brake is released or applied</td>
<td>Too big brake gap</td>
<td>Check and adjust the air gap</td>
</tr>
</tbody>
</table>

### 8.3 Replacement of traction sheave

Step 1: Disconnect the forcing screw of traction sheave (number 4 in table 1) and retainer ring (number 5).
Step 2: As showed in picture 5, there is a mat which diameter is no more than 65mm between retainer ring and main axle, tighten 3 pcs of M10 bolts evenly, then take out the traction sheave from the main axle.
Step 3: Put the new traction sheave to the main axle, install the retainer ring and then tighten by bolts.
9  **Spare parts list**

<table>
<thead>
<tr>
<th>Ref</th>
<th>Parts description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Traction sheave</td>
<td>According to the load capacity and wrapping of wire ropes around traction sheave.</td>
</tr>
<tr>
<td>2</td>
<td>Bearing of encoder end</td>
<td>Deep groove ball bearings 6312-2RS。</td>
</tr>
<tr>
<td>3</td>
<td>Bearing of traction sheave end</td>
<td>Self-aligning roller bearing 2215</td>
</tr>
<tr>
<td>4</td>
<td>Encoder</td>
<td>ERN487-2048 manufactured by Heidenhain, or other encoders specified by customers.</td>
</tr>
<tr>
<td>5</td>
<td>Brake plate</td>
<td>Non-asbestos type material with high friction coefficient.</td>
</tr>
<tr>
<td>6</td>
<td>Braking micro-switch</td>
<td>V4NS</td>
</tr>
</tbody>
</table>

10  **Quality Warranty**

- The manufacturer shall provide maintenance and repair free of charge within 18 months from the date of Bill of Lading. The manufacturer will provide lifelong maintenance service at proper cost for the damages arising after 18 months or caused due to other factors rather than the faults of the manufacturer within the warranty period.

11 This manual may be subject to revision or the product may be subject to change without notice.

Please contact the manufacturer
**Appendix 1**: Installation size and parameters of motor

<table>
<thead>
<tr>
<th>Type</th>
<th>Load (kg)</th>
<th>Speed (m/s)</th>
<th>Power (kW)</th>
<th>Rev (r/min)</th>
<th>Frequency (Hz)</th>
<th>Cur. (A)</th>
<th>Torque (N·m)</th>
<th>Rope</th>
<th>B (kg)</th>
<th>L (kg)</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WYJ140-6.3-320-2</td>
<td>320</td>
<td>0.63</td>
<td>1.36</td>
<td>114</td>
<td>9.5</td>
<td>3.6</td>
<td>114</td>
<td>265</td>
<td>590</td>
<td>125</td>
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</tr>
<tr>
<td>WYJ140-4.0-400-2</td>
<td>400</td>
<td>0.4</td>
<td>1</td>
<td>72</td>
<td>6</td>
<td>3.3</td>
<td>132</td>
<td>295</td>
<td>620</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>WYJ140-10-450-2</td>
<td>450</td>
<td>1</td>
<td>3</td>
<td>182.4</td>
<td>15.2</td>
<td>8</td>
<td>160</td>
<td>295</td>
<td>620</td>
<td>160</td>
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</tr>
<tr>
<td>WYJ140-16-450-2</td>
<td>450</td>
<td>1.6</td>
<td>4.8</td>
<td>291.6</td>
<td>24.3</td>
<td>12.2</td>
<td>160</td>
<td>295</td>
<td>620</td>
<td>160</td>
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</tr>
<tr>
<td>WYJ140-10-630-2</td>
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<td>1</td>
<td>4.3</td>
<td>182.4</td>
<td>15.2</td>
<td>11.5</td>
<td>225</td>
<td>335</td>
<td>660</td>
<td>180</td>
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</tr>
<tr>
<td>WYJ140-16-630-2</td>
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<td>1.6</td>
<td>6.9</td>
<td>291.6</td>
<td>24.3</td>
<td>17.5</td>
<td>225</td>
<td>335</td>
<td>660</td>
<td>180</td>
<td></td>
</tr>
</tbody>
</table>
**WYJ140 Series**
Synchronous Permanent-Magnet Gearless Traction Machine