(F)LS (ES, IA, MV, PX), FCR
3-phase asynchronous TEFV brake motors
Maintenance
**PREFACE: ATEX TRAINING**

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**Contents**

1. **IDENTIFICATION**
   1.1 - Standard nameplate ................................................................. 13
   1.2 - Marking .................................................................................. 13

2. **EXPLODED VIEW AND PARTS LIST FOR FCR BRAKE MOTORS**
   2.1 - Exploded view for FCR brake motors .................................... 14
   2.2 - Parts list for FCR brake motors ............................................. 14

3. **SPARE PARTS**
   3.1 - Procedure ............................................................................. 14
   3.2 - Wearing parts ...................................................................... 14

4. **MAINTENANCE**
   4.1 - Dismantling for FCR brake motors ...................................... 15
   4.2 - Reassembly for FCR brake motors ....................................... 15
   4.3 - Adjustments ......................................................................... 15
   4.4 - Braking torque .................................................................... 15
   4.5 - Electro-magnet characteristics ............................................ 16
   4.6 - Special operating conditions ................................................ 16
   4.7 - ATEX operating .................................................................. 16

5. **TROUBLESHOOTING GUIDE** .................................................. 17

6. **WIRING DIAGRAMS** ............................................................... 18-19

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**IMPORTANT**

These symbols **avoid** appear in this document whenever it is important to take special precautions during installation, operation, servicing or maintenance of the motors.

• The specifications, instructions and descriptions are for standard operation. They do not take account of structural variants or special adaptations. Failure to comply with these recommendations may lead to premature deterioration of the motor and voiding of the manufacturer’s guarantee.

• Check motor compatibility with its environment before installation and over its entire operating lifetime.

• Electric brake motors are industrial products. Therefore, they must only be installed by qualified experienced and authorised personnel. The safety of people, animals and goods should be ensured when fitting the motors into machines (please refer to current standards).

Particular attention should be given to the equipotential ground or earthing connections.

**Workforce safety**: protect all rotating devices before power-up. If running a motor without fitting a coupling device, carefully immobilise the key in its location. All measures must be taken to ensure protection from the risks presented by rotating parts (sleeve, pulley, belt, etc.). Beware of backdriving when the motor is switched off, it is necessary to take appropriate precautions: pumps, install a non-return valve, for example.

• The following precautions must be taken before working on any stopped device:
  - mains voltage disconnected and no residual voltage present
  - careful study of the causes of the stoppage (blocked transmission - loss of phase - cut-out due to thermal protection - lack of lubrication, etc.)

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**4.3 - Dismantling for FCR brake motors**

**4.4 - Braking torque**

**4.5 - Electro-magnet characteristics**

**4.6 - Special operating conditions**

**4.7 - ATEX operating**
1 - IDENTIFICATION

1.1 - Standard nameplate

Following details indicated on name plate:

Motor series, frame size       ①
Brake type (FCR J02)          ②
Speed rotation (min⁻¹)        ③
Rated power (kW)              ④
Motor voltage (V)             ⑤
Manufacturing number          ⑥
M. Braking torque (N.m)        ⑦
Uᵦ Brake coil voltage (V)     ⑧
Duty cycle (S1)               ⑨
Specific ATEX marking         ⑩

(F)LS(IA) : Food processing industry  Option

IP55 IK08 / IP65 IK08 : Index of protection*
S1   : Duty %
...C/h : Number of cycles per hour
40 °C : Contractual ambient operating temperature
(l) cl. F : Insulation class F
Hz   : Supply frequency
kW   : Rated output power
cos ϕ : Power factor
A    : Rated current
Δ    : Delta connection
Y    : Star connection

Shock resistance
The motor can stand a weak mechanical shock (IK 08 according to EN 50-102). The user must provide additional protection if there is a risk of greater mechanical shock.

Specific ATEX marking

0080   : INERIS identification number (Notified Organisation)
          : Specific marking
II 2D Ex tb IIIIC : Group II, category 2, Dust or:
II 3D Ex tc IIIIB : Group II, category 3, non-conducting Dust
T125°C  : Maximum surface temperature: 125°C
Db, Dc  : Protection level of equipment
Ta     : Ambient temperature: -25°C; 40°C for example

Attestation n° : Type test attestation n° issued by INERIS

Legal mark indicating that the equipment conforms to the requirements of the European Directives.
2 - EXPLODED VIEW AND PARTS LIST FOR FCR BRAKE MOTORS

2.1 - Exploded view for FCR brake motors

2.2 - Parts list for FCR brake motors

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Description</th>
<th>Qty</th>
<th>Qty</th>
<th>Qty</th>
<th>Qty</th>
<th>Qty</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stator housing</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Rotor shaft</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Front shield</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>D.E. bearing</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Assembly rods</td>
<td>3 to 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Internal circlip</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Brake bearing</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Brake shield</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Seal</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3 - SPARE PARTS

3.1 - Procedure

All orders for replacement parts must quote:
- the complete motor type, its number and the information given on the nameplate (see §1);
- number and designation of parts (the part numbers can be found on the exploded view § 2.1 and their description in the parts list § 2.2).

In the case of flange mounted motors indicate the type of flange and its dimensions Ø PCD (B5 for flange-mounted, B14 for facemounted or MI integral mounting) and details of gearbox, when fitted.

In order to ensure the safety and good working order of our brake motors, we recommend the use of original manufacturer replacement parts.

If this advice is not followed, the manufacturer cannot be held responsible for any subsequent damage.

3.2 - Wearing parts

<table>
<thead>
<tr>
<th>Parts number</th>
<th>LS 71 FCR</th>
<th>(F)LS 80 FCR</th>
<th>(F)LS 90 FCR</th>
<th>(F)LS 100 FCR</th>
<th>(F)LS 112 FCR</th>
<th>LS 132 S FCR</th>
<th>(F)LS 132 M FCR</th>
<th>LS 160 FCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>6004 2RS</td>
<td>6204 2RS</td>
<td>6205 2RS</td>
<td>6206 2RS</td>
<td>6206 2RS</td>
<td>6208 2RS</td>
<td>6308 2RS</td>
<td>6309 2RS</td>
</tr>
<tr>
<td>7</td>
<td>6202 2RS</td>
<td>6202 2RS</td>
<td>6205 2RS</td>
<td>6205 2RS</td>
<td>6206 2RS</td>
<td>6206 2RS</td>
<td>6307 2RS</td>
<td>6307 2RS</td>
</tr>
<tr>
<td>10</td>
<td>20 x38 x 8</td>
<td>20 x 38 x 8</td>
<td>25 x 40 x 7</td>
<td>30 x 47 x 5</td>
<td>30 x 48 x 8</td>
<td>40 x 62 x 7</td>
<td>40 x 62 x 7</td>
<td>72 x 45 x 8</td>
</tr>
<tr>
<td>11</td>
<td>armature</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>brake lining fan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>splined pin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>101,19 x 3.53</td>
<td>120 x 4</td>
<td>136,12 x 3.53</td>
<td>136,12 x 3.53</td>
<td>164,7 x 3.53</td>
<td>164,7 x 3.53</td>
<td>209,14 x 3.53</td>
<td>209,14 x 3.53</td>
</tr>
</tbody>
</table>
4. MAINTENANCE

Always disconnect the brake motor from its power supply before working on the brake.

4.1 - Dismantling for FCR brake motors
- Dismantle the brake motor using the correct tools (hub remover, bearing remover, plastic or leather mallets, correctly sized keys and screwdrivers, circlips pliers, etc.).
- Disconnect the brake motor from its power supply.
- Open the terminal box, locate the wires and mark their position (power supply to the motor and the brake, probes, etc.).
- Disconnect the power supply wires from the motor terminal block and the brake power supply unit (+ and - terminals).
- Unscrew the handle of the lever 53.1 when fitted (following procedure §4.2).
- Unscrew the cover screws 40, remove the steel cover 23.
- Remove the brake nut 24.
- Remove the sealing ring 50.
- Place an extractor with 2 arms pressing on the end of the shaft and two arms on the armature pins 11.
- Remove the brake lining fan 15 and the armature 11.
- Mark the position of the springs 28 and remove them.
- Unscrew the assembly rods 5.
- Put aside the front shield 3.
- Pull out the stator housing 1 taking care not to damage the winding.
- Remove the internal circlip 6 to free the brake shield 8.
- Clean the parts:
  - by blowing the electrical parts (do not use solvents or products containing moisture);
  - using a non slippery degreasing agent for the mechanical parts;
  - using a scraper for the flanges;
  - if parts 11 and 15 are slippery: change part 15 and degrease part 11 with a non slippery degreasing agent.
- Change the seals and the bearings.
- Disconnect the bridge rectifier and check the insulation of the stator (>10 megOhms).
- Mark all faulty parts so that replacement parts can be ordered.

4.2 - Reassembly for FCR brake motors
- Lightly grease the shafts and bearing cages.
- Cover the seal lips with grease and put the seal back carefully (use the protection sockets of the drive shaft keyway).
- Working in reverse order, assemble the motor.
- Replace the pressure springs 28, change the sealing ring 50.
- Position the housing 11, reposition the brake lining fan 15.
- Adjust the air gap (see above).
- Position the sealing ring 50.
- Fit on the lever 53 (following procedure below).
- Replace the steel cover 23 and fix it using the cover screws 40.
- Reconnect the brake power supply unit, and any probes, and then the motor - making sure that the wires are in the correct order - and close the terminal box.
- Check that it works correctly (if this is not the case check that the release lever is in the right position before coupling to the machine).

4.3 - Adjustments
Adjusting the air gap
The air gap needs to be adjusted when the release mechanism no longer functions normally.
- Unscrew the handle of the lever 53.1 when fitted (following procedure §4.2).
- Unscrew the cover screws 40 which keep the steel cover 23 in place.
- Remove the steel cover 23. Unscrew the brake nut 24, and remove the sealing ring 50. Clean the parts: removal of lining’s friction dust. Insert a 0.4 mm shim between the brake shield 8 and the armature 11. Tighten the brake nut 24 so as to obtain working play of 4/10th between armature 11 and brake shield 8 (the shim should slip slightly).
- The brake nut 24 should be changed after 3 adjustments.
- Replace the sealing ring 50. Replace the lever 53 (following procedure §4.2).
- Replace the steel cover 23 and tighten the cover screws 40.

Adjusting the braking torque
- The braking torque depends on the number of springs and their colour; use the values shown in the table on §4.4.

4.4 - Braking torque (N.m values given for indication only; in case of Standards’ limitation, please consult us)

<table>
<thead>
<tr>
<th>No. of springs</th>
<th>LS 71 FCR</th>
<th>(F)LS 80 FCR</th>
<th>(F)LS 90 FCR</th>
<th>(F)LS 100 FCR</th>
<th>(F)LS 112 FCR</th>
<th>(F)LS 1235 FCR</th>
<th>(F)LS 1325 M1 FCR</th>
<th>(F)LS 160° FCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>white 1.2</td>
<td>blue 2</td>
<td>green 4</td>
<td>green 4</td>
<td>orange 16</td>
<td>orange 16</td>
<td>yellow 40</td>
<td>yellow 40</td>
</tr>
<tr>
<td>4</td>
<td>white 1.6</td>
<td>blue 3</td>
<td>green 6</td>
<td>green 6</td>
<td>orange 16</td>
<td>orange 16</td>
<td>yellow 50</td>
<td>yellow 50</td>
</tr>
<tr>
<td>5</td>
<td>white 2</td>
<td>blue 3.5</td>
<td>green 8</td>
<td>green 8</td>
<td>orange 22</td>
<td>orange 22</td>
<td>grey 15</td>
<td>grey 15</td>
</tr>
<tr>
<td>6</td>
<td>white 2.4</td>
<td>blue 4.5</td>
<td>green 9</td>
<td>green 9</td>
<td>orange 32</td>
<td>orange 32</td>
<td>yellow 80</td>
<td>yellow 80</td>
</tr>
<tr>
<td>8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>orange 43</td>
<td>orange 43</td>
<td>yellow 105</td>
<td>yellow 105</td>
</tr>
<tr>
<td>9</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>yellow 120</td>
<td>yellow 120</td>
</tr>
<tr>
<td>12</td>
<td>blue 4</td>
<td>green 6</td>
<td>grey 15</td>
<td>grey 15</td>
<td>-</td>
<td>-</td>
<td>yellow 160</td>
<td>yellow 160</td>
</tr>
<tr>
<td>15</td>
<td>blue 5</td>
<td>green 8</td>
<td>grey 20</td>
<td>grey 20</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>20</td>
<td>blue 6</td>
<td>green 10</td>
<td>grey 25(32°)</td>
<td>grey 25(32°)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

1. (F)LS 132M, LS 160 - braking torque to be chosen between 40 to 80 Nm or 105 to 120 Nm
   (°) : with machined armature plate
4.5 - Electro-magnet characteristics (à 20°C) ± 5 %

<table>
<thead>
<tr>
<th>Brake motor type</th>
<th>Current</th>
<th>Resistance</th>
<th>Power</th>
<th>Current</th>
<th>Resistance</th>
<th>Power</th>
<th>Current</th>
<th>Resistance</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>LS 71 FCR</td>
<td>0.26</td>
<td>698</td>
<td>46.4</td>
<td>0.21</td>
<td>569</td>
<td>25.3</td>
<td>0.45</td>
<td>223</td>
<td>44.9</td>
</tr>
<tr>
<td>(F)LS 90 FCR</td>
<td>0.29</td>
<td>612</td>
<td>53</td>
<td>0.28</td>
<td>428</td>
<td>33.7</td>
<td>0.52</td>
<td>194</td>
<td>51.6</td>
</tr>
<tr>
<td>(F)LS 100 FCR</td>
<td>0.39</td>
<td>456</td>
<td>71</td>
<td>0.41</td>
<td>293</td>
<td>49.2</td>
<td>0.63</td>
<td>159</td>
<td>63</td>
</tr>
<tr>
<td>(F)LS 112 FCR</td>
<td>0.41</td>
<td>442</td>
<td>73.3</td>
<td>0.74</td>
<td>134</td>
<td>74.4</td>
<td>0.74</td>
<td>134</td>
<td>74.4</td>
</tr>
<tr>
<td>LS 132 S FCR</td>
<td>0.41</td>
<td>442</td>
<td>73.3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.74</td>
<td>134</td>
<td>74.4</td>
</tr>
<tr>
<td>(F)LS 132 S M FCR</td>
<td>0.5</td>
<td>364</td>
<td>89.1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.16</td>
<td>85.9</td>
<td>116</td>
</tr>
<tr>
<td>(F)LS 160 MP, LR FCR</td>
<td>0.75</td>
<td>241</td>
<td>134.2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.16</td>
<td>85.9</td>
<td>116</td>
</tr>
</tbody>
</table>

1. (F)LS 132 S/M with braking torque = 40 to 80 N.m
2. (F)LS 132 M with braking torque = 100 to 160 N.m

4.6 - Special operating conditions
- Thermal protection (see 2908 § 2.6)
- Space heaters (see 2908 § 2.6)
- Temperatures: storage and ambient
  
  Note: Ta = ambient temperature
  
  If it has been stored at a temperature lower than -10°C, heat the motor and turn the shaft manually before operating the machine.
  
  If used at a temperature lower than -25°C, the motor does not require a temperature sensor to be fitted. It can be fitted with thermocouples. Our standard motors are intended to operate at an ambient temperature between -25°C and 40°C.
  
  - Surface temperature
  
  As standard, the maximum surface temperature of our motors is 125°C with a maximum ambient temperature of ≤ 40°C. Without derating the motor, the maximum surface temperature will be:
  
  - 135°C if 40°C ≤ Ta ≤ 50°C
  - 145°C if 50°C ≤ Ta ≤ 60°C
  
  - Contactors - isolators
  
  In all cases, the contactors, isolators, etc. must be installed and connected in an enclosure offering a degree of protection and surface temperature compatible with the installation zone, or outside danger zones (outside zones 20, 21 and 22).
  
  - Connection
  
  Particular attention must be paid to the nameplate so as to choose the correct type of connection for the supply voltage.
  
  - Bearing maintenance
  
  When you detect on the motor:
  
  - a noise or abnormal vibration,
  - abnormal temperature rise in the bearing even though it is lubricated correctly, the state of the bearings must be checked.
  
  Damaged bearings must be replaced as soon as possible to prevent worse damage to the motor and the driven equipment.
  
  When one bearing needs to be replaced, the other bearing must also be replaced.

  The free bearing allows the rotor shaft to expand (make sure it is identified during dismantling).
  
  - Seals
  
  After removing the drain plugs, replace them in order to ensure that the motor conforms to IP 55 or 65 protection. Replace the removed seals with new seals of the same type.
  
  Clean the orifices and plugs before replacing.
  
  On removal, and at least once a year, replace seals on the shaftway, the shield spigots and the terminal box cover with new seals of the same type, after cleaning the parts. The shaftway seals must be fitted using grease of the same type as the bearings.

4.7 - ATEX operating
- IP 65 protection for the motor
  
  Whenever the motor is dismantled, during on-site preventive maintenance, replace the seals for the shaftways, shield spigots, the terminal box cover (if mastic) with new seals of the same type, after cleaning the parts. The shaftway seals must be reassembled using grease of the same type as used on the bearings.

- Variable speed utilisation
  
  Special precautions need to be taken when these motors are powered by a frequency inverter or voltage controller:

  - The reference voltage (drive output or motor input) is 400 V at 50 Hz. The drive should deliver a constant voltage/frequency signal to the motor.
  
  - The operating range is limited to 25 to 50 Hz for 50 Hz supplies and for 50 Hz motors designed with natural cooling.
  
  - The drives and probe connection devices must be installed outside danger zones (outside zones 20, 21 and 22).

  Regardless of the number of poles, the speed must never exceed 3 600 min⁻¹.

  Motors supplied by a frequency inverter must be fitted with winding sensors and a sensor on the DE shield if appropriate. These sensors must be connected to a motor cut-off device placed outside the explosive zone, so that the maximum surface temperature (indicated on the device) is never reached (Ref. 2908 § 2.6).

  Particular points:
  
  - Forced ventilation is forbidden.
  - Incremental encoder utilisation requires ATEX homologation (IP 65) of the encoder.
### 5 - TROUBLESHOOTING GUIDE

<table>
<thead>
<tr>
<th>Incident</th>
<th>Possible cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abnormal noise</td>
<td>Originating in motor or driven machine?</td>
<td>Uncouple the motor from the driven equipment and test the motor on its own Test the brake release system</td>
</tr>
<tr>
<td>Noisy motor</td>
<td>Mechanical cause: if the noise persists after switching off the electrical power supply</td>
<td>- Check that the key conforms with the type of balancing - Change the bearings</td>
</tr>
<tr>
<td></td>
<td>- vibration</td>
<td>- Check</td>
</tr>
<tr>
<td></td>
<td>- damaged bearings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- mechanical friction: ventilation, brake disc, coupling</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electrical cause: if the noise stops after switching off the electrical power supply</td>
<td>- Check the power supply at the motor terminals</td>
</tr>
<tr>
<td></td>
<td>- normal voltage and 3 phases balanced</td>
<td>- Check terminal block connection and tightening of the connectors</td>
</tr>
<tr>
<td></td>
<td>- abnormal voltage</td>
<td>- Check the power supply line</td>
</tr>
<tr>
<td></td>
<td>- phase imbalance</td>
<td>- Check the winding resistance and the supply (voltage) balancing</td>
</tr>
<tr>
<td>Motor heats up abnormally</td>
<td>- faulty ventilation</td>
<td>- Monitor the environment - Clean the fan cover and the cooling fins - Check the fan is correctly mounted on the shaft</td>
</tr>
<tr>
<td></td>
<td>- faulty supply voltage</td>
<td>- Check</td>
</tr>
<tr>
<td></td>
<td>- terminal connection fault</td>
<td>- Check</td>
</tr>
<tr>
<td></td>
<td>- overload</td>
<td>- Check the current consumption against the current shown on the motor nameplate</td>
</tr>
<tr>
<td></td>
<td>- partial short-circuit</td>
<td>- Check the electrical continuity of the windings and/or the installation</td>
</tr>
<tr>
<td></td>
<td>- phase imbalance</td>
<td>- Check the windings resistance</td>
</tr>
<tr>
<td>Motor does not start</td>
<td>no load</td>
<td>Release the brake, and with the motor switched off: - check the shaft rotates freely by hand - check fuses, electrical protection, starting device, electrical continuity</td>
</tr>
<tr>
<td></td>
<td>- mechanical locking</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- broken supply line</td>
<td></td>
</tr>
<tr>
<td></td>
<td>on-load</td>
<td>When switched off: - check the direction of rotation (phase order) - check the resistance and the continuity of the windings - check electrical protection</td>
</tr>
<tr>
<td></td>
<td>- phase imbalance</td>
<td></td>
</tr>
<tr>
<td>The brake does not release</td>
<td>Insufficient supply voltage:</td>
<td>The maximum permissible voltage drop is 15 % of the rated voltage Change the coil</td>
</tr>
<tr>
<td></td>
<td>Defective coil:</td>
<td></td>
</tr>
<tr>
<td>The brake releases but it is very noisy:</td>
<td>Air gap irregular, or too large:</td>
<td>Dismantle if necessary and clean (see §4)</td>
</tr>
<tr>
<td></td>
<td>Foreign body in the air gap:</td>
<td>Clean the parts</td>
</tr>
<tr>
<td>The brake releases but braking is insufficient</td>
<td>Insufficient pressure on springs:</td>
<td>Adjust springs (see instructions §4) and Check for wear on the linings</td>
</tr>
<tr>
<td></td>
<td>Correct pressure on springs:</td>
<td>Check the surface condition of the ring and the brake shield Blow away any friction dust</td>
</tr>
</tbody>
</table>
6 - WIRING DIAGRAMS

1 speed, D.O.L. starting, 50/60 Hz
Built-in power supply: 350 to 460 V, 200 to 265 V
Separate power supply: 350 to 460 V, 200 to 265 V, (24 V*)

1 speed, YΔ starting, 50/60 Hz
Built-in power supply: 350 to 460 V, 200 to 265 V
Separate power supply: 350 to 460 V, 200 to 265 V, (24 V*)

2 speeds Dahlander, 1 voltage, 50/60 Hz
Built-in power supply: 350 to 460 V: coil 180 V
Built-in power supply: 200 to 265 V: coil 100 V
Separate power supply: 350 to 460 V, 200 to 265 V, (24 V*)

2 speeds, 2 windings, 2 voltage, 50/60 Hz
Separate power supply: 350 to 460 V, 200 to 265 V, (24 V*)

2 speeds, 2 windings, 1 voltage, 50/60 Hz
Built-in power supply: 350 to 460 V: brake coil 180 V
Built-in power supply: 200 to 265 V: brake coil 100 V

2 speeds, 2 windings, 2 voltage, 50/60 Hz
(YΔ): LS 80 to 160
Built-in power supply: 200 to 265 V, brake coil 100 V
(F)LS (ES, IA, MV, PX), FCR
3-phase asynchronous TEFV brake motors

2 speeds, 2 windings, 2 voltage, 50/60 Hz
(VY) : LS 71
Built-in power supply : 200 to 265 V : brake coil 100 V

1 speed, Y & starting
Built-in power supply : 350 to 460 V, 200 to 265 V
Separate power supply : 350 to 460 V, 200 to 265 V, (24 V*)

2 speeds, 2 windings, 1 voltage, 50/60 Hz
Separate power supply : 350 to 460 V, 200 to 265 V, (24 V*)

1 speed, 1 windings, 2 voltage, 50/60 Hz
Built-in power supply : 400 to 480 V, 200 to 240 V
Separate power supply : 400 V, 230 V, (24 V*)

Important for lifting application : REMOVE WIRE

** Disconnect the shunts
* according power supply and coil
*suivant alimentation et bobine