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1 Technical specifications

<table>
<thead>
<tr>
<th>Size</th>
<th>N max. rpm</th>
<th>P nominal bar</th>
<th>P max. bar</th>
<th>Weight kg</th>
<th>Length “L±0,5” mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>3600</td>
<td>16</td>
<td>12</td>
<td>5,3</td>
<td>81</td>
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<td>200</td>
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<td>10</td>
<td>12</td>
<td>8,5</td>
<td>89</td>
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<tr>
<td>400</td>
<td>2700</td>
<td>8</td>
<td>10</td>
<td>11,5</td>
<td>96</td>
</tr>
<tr>
<td>800</td>
<td>2000</td>
<td>10</td>
<td>10</td>
<td>22</td>
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<tr>
<td>3200</td>
<td>1500</td>
<td>12</td>
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<td>235</td>
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<td>6400</td>
<td>1300</td>
<td>10</td>
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<td>170</td>
<td>290</td>
</tr>
<tr>
<td>12800</td>
<td>1200</td>
<td>16</td>
<td>18</td>
<td>190</td>
<td>330</td>
</tr>
<tr>
<td>25600</td>
<td>1000</td>
<td>16</td>
<td>18</td>
<td>235</td>
<td></td>
</tr>
<tr>
<td>51200</td>
<td>800</td>
<td>22</td>
<td>24</td>
<td>290</td>
<td></td>
</tr>
<tr>
<td>102400</td>
<td>800</td>
<td>24</td>
<td>24</td>
<td>330</td>
<td></td>
</tr>
</tbody>
</table>

NB : data for catalogue equipment

Table 1

Symbol designating an action that might damage the brake
Symbol designating an action that might be dangerous to human safety
Symbol designating an electrical action that might be dangerous to human safety

2 Precautions and restrictions on use

2.1 Restrictions on use

These clutches are designed to run in oil. Dry running will cause premature wear in the disc set.

Exceeding the maximum rotation speed given in the catalogue invalidates the warranty.

These clutches are designed solely to run on a horizontal shaft.
2.2 **Precautions in use and safety measures**

⚠️ During maintenance work, ensure that the mechanism to be driven by the clutch is at rest and that there is no risk of it being started accidentally. All intervention have to be made by qualified personnel, owning this manual.

⚠️ Any modification made to the brake without the express authorisation of a representative of Warner Electric, in the same way than any use out of the contractual specifications accepted by “Warner Electric”, will result in the warranty being invalidated and Warner Electric will no longer be liable in any way with regard to conformity.

3 **Installation**

3.1 **Transport / storage**

These units are supplied as standard in packaging guaranteeing protection for a period of 6 months by land or air transport, or after transport by ship to neighbouring continents (without crossing the tropics).

3.2 **Handling**

The clutch is supplied assembled with the drive flange not fixed.

Avoid any impact on the units so as not to alter their performance.

3.3 **Setting up**

The hub (515) is normally supplied at tolerances H7 for the bore and P9 for the width of the keyway (In accordance with NF E 22-175/DIN 6885/BS 4235/ISO R773).

The drive flange (529) is generally supplied at a bore H7 but without fixing holes. We recommend a tolerance h6 for the shaft and an adjustment H7/f7 for the flange.

⚠️ In cases where two coaxial shafts are fitted, the maximum authorised set-over is 0,05 mm. The angular misalignment should not exceed 0,1 mm over a length of 100 mm.

If these values cannot be attained, we recommend that an elastic coupling is fitted between the drive and receiving parts.

• Put the drive flange (529) in place

After tightening to torque, do not forget to secure the bolts fixing the drive flange (529) with Loctite 243 or an equivalent type of product.

• Slide the hub (515) onto the shaft (after adjusting the keyways) by positioning the teeth of the outer discs (303) or (304) opposite the hollows in the drive flange (529)

Never directly strike the cylinder (401), closing flange (408), or hub (515), use a soft alloy block or drift between these parts and the fitting device provided.

⚠️ It is essential to comply with the length dimension “L ± 0,5” (see table 1) in order to prevent any risk of contact between the drive flange (529) and the hub (515).
4 **Maintenance**

4.1 **Maintenance**

When operating conditions are complied with (running in oil, oil temperature, rotation speed, etc) the wear on the H110 disc set is found to be negligible, in addition, it is automatically compensated for, until all the wear adjustment available is used up, by movement of the piston. So this type of clutch needs little maintenance.

It is however necessary to:

- Change the oil after 40 h running from first use, then every year of normal running
- Regularly check the pressure chamber seal and in the event of leakage, or after 5 years use, change the seals (701, 702)
- Check the wear on the disc set by measuring the travel of the piston (402), using table 2, below

<table>
<thead>
<tr>
<th>Size</th>
<th>100</th>
<th>200</th>
<th>400</th>
<th>800</th>
<th>1600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial travel nominal (mm)</td>
<td>3</td>
<td>2,5</td>
<td>2,5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Travel, clutch worn - max. (mm)</td>
<td>5,5</td>
<td>5</td>
<td>5</td>
<td>7</td>
<td>7,5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
<th>3200</th>
<th>6400</th>
<th>12800</th>
<th>25600</th>
<th>51200</th>
<th>102400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial travel nominal (mm)</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Travel, clutch worn - max. (mm)</td>
<td>10</td>
<td>11,5</td>
<td>12,5</td>
<td>14,5</td>
<td>17,5</td>
<td>17,5</td>
</tr>
</tbody>
</table>

4.2 **Spare parts**

All orders for spare parts must state the size of the unit with its code number, the reference number of the part (see appendix), and the quantity of each component wanted.

4.3 **Dismantling / reassembling**

During maintenance work, ensure that the mechanism to be driven by the clutch is at rest and that there is no risk of it being started accidentally. Also ensure that the hydraulic supply is shut off.

**Dismantling:**

- Remove the fixing screws from the cylinder (401) or closing flange (408)
- Remove the cylinder (401) or closing flange (408)
- Take out the piston (402)
- Remove the worn disc set
- Fit a new disc set
Start with an inner disc, then an outer disc, and then alternate, ending of necessity with an inner disc. For size 3200, after the last inner disc add the thrust disc (310).

- Change the seals (701, 702)
- Refit the piston (402)
- Refit the cylinder (401) or closing flange (408)

Take care not to damage the seals while reassembling.

- Replace the cylinder (401) or closing flange (408) fixing screws, tighten them to the torque shown in table 3, below and secure them with Loctite 243 or an equivalent type of product.

<table>
<thead>
<tr>
<th>Size</th>
<th>100</th>
<th>200</th>
<th>400</th>
<th>800</th>
<th>1600</th>
<th>3200</th>
<th>6400</th>
<th>12800</th>
<th>25600</th>
<th>51200</th>
<th>102400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw</td>
<td>M4</td>
<td>M5</td>
<td>M6</td>
<td>M8</td>
<td>M10</td>
<td>M10</td>
<td>M14</td>
<td>M16</td>
<td>M20</td>
<td>M24</td>
<td>M24</td>
</tr>
<tr>
<td>Torque (Nm)</td>
<td>2,6</td>
<td>5,2</td>
<td>9,1</td>
<td>22</td>
<td>44</td>
<td>44</td>
<td>121</td>
<td>189</td>
<td>370</td>
<td>637</td>
<td>637</td>
</tr>
</tbody>
</table>

**Table 3**

5 **Hydraulic connection**

5.1 **Important recommendations**

- Ensure that working pressures are complied with, to get the nominal performance from the equipment.

- Do not exceed the maximum pressures (see table 1).

- We recommend control oil filtration of about 10 microns in order to guarantee trouble-free operation and full life for the hydraulic components.

- The disc lubricating oil should not exceed a running temperature of 80°C.

5.2 **Hydraulic oils**

The types of oil to be used for lubricating the discs should meet the following criteria:

- Good rust resistance
- No friction modifying additive
- No additive that might corrode the bronze friction surfaces (1a or 1b NF M 07-015)
- Compatible with materials used for hydraulic seals
- High viscosity index (>80)

The oils listed below (see table 4) meet these characteristics. The list is not exhaustive and other lines may be added to it. The viscosity of the oil to be selected varies depending on the running temperature and speed (measured on the outer diameter of the piston).

<table>
<thead>
<tr>
<th>Size</th>
<th>Viscosity Running Speed</th>
<th>Mineraloil</th>
<th>ATF</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP</td>
<td>ISO VG 22 &gt; 12 m/s</td>
<td>Nuto H22</td>
<td>Autran MBX</td>
</tr>
<tr>
<td>ESSO</td>
<td>ISO VG 32 &gt; 12 m/s</td>
<td>DTE 22</td>
<td>AT Dexron II</td>
</tr>
<tr>
<td>MOBIL</td>
<td>ISO VG 46 &gt; 12 m/s</td>
<td>Tellus 22</td>
<td>ATF 220</td>
</tr>
<tr>
<td>SHELL</td>
<td>ISO VG 60 &gt; 12 m/s</td>
<td>Nuto H32</td>
<td>Donax TM Eifmantic</td>
</tr>
<tr>
<td>ELF</td>
<td>ISO VG 80 &gt; 12 m/s</td>
<td>DTE Oil Light</td>
<td>G2&quot;</td>
</tr>
</tbody>
</table>

**Table 4**
5.3 Connection diagram

Figure 2: Basic circuit

a: Tank  
b: Pump  
c: Filter  
d: Pressure gauge  
e: Pressure restrictor  
f: Distributor  
g: Revolving seal  
h: Clutch

The clutch is lubricated by a drip-feed of oil that is not recycled.

Figure 3: Circuit with progressive* clutch and external lubrication of the disc set

a: Tank  
b: Pump  
c: Filter  
d: Pressure gauge  
e: Pressure restrictor  
f: Distributor  
g: Revolving seal  
h: Clutch  
k: Flow restrictor  
l: Flow restrictor with non-return valve  
m: Accumulator with safety unit, clutch speed is adjusted by means of the restrictor \( m \) and the non-return valve enables quick de-clutching.

Once the clutch is engaged, it is retained by the accumulator \( n \). Excess control oil is used to top up the clutch drip-feed.

Figure 4: Circuit with lubrication via the shaft

In the event of especially tough running conditions, equipment can be supplied for lubrication via the shaft.

This requires additional machining of the clutch and the use of a hydraulic circuit including a 2-way rotating seal (1 way pressure and 1 way sprinkling) and an air or water cooler.

a: Tank  
b: Two-stage pump  
c: Filter  
d: Pressure gauge  
e: Pressure restrictor  
f: Distributor  
g: 2-way rotating seal  
h: Clutch  
n: Accumulator with safety unit  
o: Calibrated non-return valve  
p: Filter  
q: Distributor  
r: Cooler

* Ask our technical department for details of progressive clutch conditions depending on use.
Appendix

6.1 Diagram

<table>
<thead>
<tr>
<th>Ref. Nr</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>303</td>
<td>Steel outer disc</td>
</tr>
<tr>
<td>309</td>
<td>Steel inner disc</td>
</tr>
<tr>
<td>310</td>
<td>Thrust disc (SZ3200)</td>
</tr>
<tr>
<td>370</td>
<td>Pressure ring</td>
</tr>
<tr>
<td>401</td>
<td>Cylinder</td>
</tr>
<tr>
<td>402</td>
<td>Piston</td>
</tr>
<tr>
<td>408</td>
<td>Closing flange</td>
</tr>
<tr>
<td>515</td>
<td>Hub</td>
</tr>
<tr>
<td>529</td>
<td>Driving flange</td>
</tr>
<tr>
<td>701</td>
<td>Cylinder ‘O’ ring seal</td>
</tr>
<tr>
<td>702</td>
<td>Piston ‘O’ ring seal</td>
</tr>
<tr>
<td>703</td>
<td>Cylinder quad ring seal</td>
</tr>
<tr>
<td>704</td>
<td>Piston quad ring seal</td>
</tr>
<tr>
<td>740</td>
<td>Spring</td>
</tr>
</tbody>
</table>

7 Troubleshooting

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Reason</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Clutch Slips</td>
<td>• Hydraulic pressure too low</td>
<td>• Check that nominal pressure is complied with (see table 1)</td>
</tr>
<tr>
<td></td>
<td>• Fault in the hydraulic circuit</td>
<td>• Check it</td>
</tr>
<tr>
<td></td>
<td>• Faulty pressure chamber seals</td>
<td>• Check the condition of the contact surface (scratches, foreign particles, etc.) clean, change the seals</td>
</tr>
<tr>
<td></td>
<td>• Wrong lubricating oil</td>
<td>• Change the oil in accordance with the data given in table 4</td>
</tr>
<tr>
<td></td>
<td>• Discs worn or damaged</td>
<td>• Change the discs - Check the condition of the receiving parts’ teeth (hub, flange)</td>
</tr>
<tr>
<td>Oil temperature over 80°C</td>
<td>• Running speed too high</td>
<td>• Reduce the speed - Adopt oil circulation</td>
</tr>
<tr>
<td></td>
<td>• Too little cooling oil</td>
<td>• Adopt oil circulation - Increase flow, where possible</td>
</tr>
</tbody>
</table>

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A purchase receipt or other proof of original purchase will be required before warranty service is rendered. If found defective under the terms of this warranty, repair or replacement will be made, without charge, together with a refund for transportation costs. If found not to be defective, you will be notified and, with your consent, the item will be repaired or replaced and returned to you at your expense.

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