Instruction Manual

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Always state Serial No and Voltage/frequency if you have technical questions or when ordering spare parts. You will find the Serial No. and Voltage on the type plate of the machine itself. We may also need the Date and Article No of the manual. This information is found on the front cover.

The following restrictions should be observed, as violation of the restrictions may cause cancellation of Struers legal obligations:

Instruction Manuals: Struers Instruction Manual may only be used in connection with Struers equipment covered by the Instruction Manual.

Service Manuals: Struers Service Manual may only be used by a trained technician authorised by Struers. The Service Manual may only be used in connection with Struers equipment covered by the Service Manual.

Struers assumes no responsibility for errors in the manual text/illustrations. The information in this manual is subject to changes without notice. The manual may mention accessories or parts not included in the present version of the equipment.

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Struers A/S
Pederstrupvej 84
DK-2750 Ballerup
Denmark
Telephone +45 44 600 800
Fax +45 44 600 801
LaboForce-Mi
Safety Precaution Sheet

To be read carefully
before use

1. The operator(s) should be fully aware of the use of the machine according to the Instruction Manual.

2. The machine must be placed in an adequate working position.

3. If you observe malfunctions or hear unusual noises - stop the machine and call technical service.

The equipment should only be used for its intended purpose and as detailed in the Instruction Manual.

The equipment is designed for use with consumables supplied by Struers. If subjected to misuse, improper installation, alteration, neglect, accident or improper repair, Struers will accept no responsibility for damage(s) to the user or the equipment.

Dismantling of any part of the equipment, during service or repair, should always be performed by a qualified technician (electromechanical, electronic, mechanical, pneumatic, etc.).
Disposal

Equipment marked with a WEEE symbol \( \text{\textcopyright} \) contain electrical and electronic components and must not be disposed of as general waste. Please contact your local authorities for information on the correct method of disposal in accordance with national legislation.
# User’s Guide

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</tr>
<tr>
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<td>7</td>
</tr>
</tbody>
</table>
1. Getting Started

Checking the Contents

In the packing box you should find the following parts:
1. LaboForce-Mi
1. Allen-key 6 mm for securing LaboForce-Mi on LaboPol-35
1. Nylon tube 4 mm dia., 300 mm long
1. Instruction Manual

Getting Acquainted with LaboForce-Mi

Take a moment to familiarise yourself with the location and names of the LaboForce-Mi components.

LaboForce-Mi mounted on LaboPol-35 (accessory)

1. Thrust pad on adjustment column
2. Release knob
3. Force adjustment column
4. Height adjustment screw
5. Drip lubricator (accessory)
6. Specimen mover plate
LaboForce-Mi
Instruction Manual

Setting up LaboForce-Mi

LaboForce-Mi is designed to be mounted on Struers’ grinding/polishing machine LaboPol-35 only.

Please Note
For instructions on how to set up and connect LaboPol-35, please see the LaboPol-35 Instruction Manual.

- Remove the black plastic lid from the pre-punched hole on LaboPol-35.
- Lead the LaboForce-Mi column through the hole, and position the head of LaboForce-Mi over the turntable of LaboPol-35.
- Remove the two light grey caps from the left hand side of LaboPol-35.
- Tighten the two screws with the enclosed allen-key.
- Move the handle on the left hand side of LaboForce-Mi up, to allow the head to move to the uppermost position.
- Mount a specimen mover plate on LaboForce-Mi.
- Mount a grinding/polishing disc on LaboPol-35.
- Press the head down and adjust the distance between preparation disc and specimen mover plate to about 2 mm by turning the black knob on top of LaboForce-Mi.

Electrical Connection

Connect LaboForce-Mi to the female plug on the back of LaboPol-35, marked specimen mover.

Mounting the Drip Lubricator (accessory)

A drip lubricator provides the necessary lubricant during the preparation process.

- Remove the drip lubricator from its box.
- Loosen the finger screw underneath LaboForce-Mi.
- Guide the bottom plate of the drip lubricator onto the finger screw and the positioning pin underneath the LaboForce-Mi, and retighten the finger screw.
- Hold the lubricant bottle with one hand and remove the lid.
- Fill the bottle with lubricant.
- Replace the lid and the drip lubricator is ready to use.

Changing the Lubricator Tube

To apply the lubricant to exactly the right spot on the preparation disc, a different length of lubricator tube may be necessary. 300 mm of spare tube is supplied with LaboForce-Mi.
To remove the present tube from the drip lubricator press back the retaining ring and pull out the tube.
To insert the new tube simply press it into the hole in the retaining ring.
Use a pair of scissors to cut to the correct length.
2. Operation

Mounting the Specimen Mover Plate
- Unlock LaboForce-Mi and let it move into top position.
- Turn LaboForce-Mi to the left over the edge of LaboPol-35.
- Place the specimen mover plate under the column, align the pin and the slot and press it upwards.
- Move LaboForce-Mi back into position, press it down and lock the handle.

Removing the Specimen Mover Plate
As specimens must fit the holes in the specimen mover plate quite accurately, the specimen mover plate must be changed when samples of another size are prepared. To remove a specimen mover plate, turn the plate clockwise to release it.

Inserting a Specimen
- Lift the thrust pad on the adjustment screw to make room for the specimen.
- Place the specimen in one of the holes of the specimen mover plate and lower the thrust pad.

Adjusting the Force

Coarse Adjustment
There are two ways to adjust the force. Press the release knob ① and move the column ② up or down to approximately the correct force.

Fine Adjustment
Adjust the force by turning the column ②. The marks ③ on the spring loaded column correspond to the actual force in Newton as stated below:

<table>
<thead>
<tr>
<th>Indication</th>
<th>Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0 N</td>
</tr>
<tr>
<td>1 —</td>
<td>2.5 N</td>
</tr>
<tr>
<td>2 —</td>
<td>5 N</td>
</tr>
<tr>
<td>3 —</td>
<td>7.5 N</td>
</tr>
<tr>
<td>4 —</td>
<td>10 N</td>
</tr>
<tr>
<td>5 —</td>
<td>12.5 N</td>
</tr>
<tr>
<td>6 —</td>
<td>15 N</td>
</tr>
<tr>
<td>7 —</td>
<td>17.5 N</td>
</tr>
<tr>
<td>8 —</td>
<td>20 N</td>
</tr>
</tbody>
</table>

WARNING
Make sure that the pressure feet not in use do not touch the preparation surface. If necessary, press the release button and move the pressure feet not in use upwards.
Operating LaboForce-Mi

- Press LaboForce-Mi down and turn into the correct position over the preparation disc.

**Important**
The specimens should run close to the edge of the preparation disc. The distance should be about 2 mm.

- Secure LaboForce-Mi in that position by locking the handle
- Insert the specimens in the specimen mover plate.

**Important**
To turn the specimen mover disc use the start and stop keys of LaboForce-Mi. Do not turn the specimen mover disc manually.

- Adjust the force.
- Adjust the amount of lubricant on the drip lubricator.
- Press START ◊ on LaboPol-35, then press START ◊ on LaboForce-Mi.
- Perform the preparation step and press STOP ⬅ on LaboForce-Mi, then press STOP ⬅ on LaboPol-35.
- Close the valve on the drip lubricator.

Forced Rotation of Specimens

To avoid directional abrasion of the specimens during preparation LaboForce-Mi is equipped with the ability to carry out forced rotation of the specimens. Simply move the angled stainless steel pin down and press it into the clips on the left hand side of LaboForce-Mi. If forced rotation is no longer required move the pin back into the upper position and secure.
Operating the Drip Lubricator

- Position the dosing nozzle in the correct position over the preparation disc.
- Open the valve and adjust the amount of lubricant.
- After completion of the preparation step close the valve to stop lubricant dosing.

Changing Lubricant

- Remove the drip lubricator from LaboForce-Mi.
- Hold the lubricant bottle firmly and remove the lid.
- Pour out the lubricant, and fill the bottle with a mild soap solution.
- Open the valve to clean the tube.
- Exchange the soap solution with clean water and repeat the above procedure.
- Empty the lubricator.
- Put the lubricator back on LaboForce-Mi and tighten the finger screw.
- Refill with lubricant and replace the lid.
3. Maintenance

**Every Day**
Clean the specimen mover plate with a damp cloth.

**Every Week**
Clean LaboForce-Mi with a damp cloth.
- Remove the specimen mover plate and thoroughly clean the column and the coupling on the specimen mover plate.
- Remove the drip lubricator from LaboForce-Mi.
- Hold the lubricant bottle firmly and remove the lid.
- Pour out the lubricant, and fill the bottle with a mild soap solution.
- Open the valve to clean the tube.
- Exchange the soap solution with water and repeat the above procedure.
- Empty the lubricator.
- Put the lubricator back on LaboForce-Mi and tighten the finger screw.
- Refill with lubricant and replace the lid.
# Reference Guide

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<td>4. Technical Data</td>
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1. **Accessories**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Cat. No:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen holder plates</td>
<td></td>
</tr>
<tr>
<td>for 8 x ø 25 mm specimens</td>
<td>05236901</td>
</tr>
<tr>
<td>for 8 x ø 30 mm specimens</td>
<td>05236902</td>
</tr>
<tr>
<td>for 4 x ø 40 mm specimens</td>
<td>05236903</td>
</tr>
<tr>
<td>for 4 x ø 60 mm specimens</td>
<td>05236904</td>
</tr>
<tr>
<td>for 8 x specimens 20 x 30 mm</td>
<td>05236905</td>
</tr>
<tr>
<td>Drip lubricator</td>
<td></td>
</tr>
<tr>
<td>Additional drip lubricator for quick changing</td>
<td>05216908</td>
</tr>
<tr>
<td>between different lubricant types</td>
<td></td>
</tr>
</tbody>
</table>

*Remember...*

Struers offers a comprehensive range of consumables for lapping, grinding and polishing. Please ask for separate leaflets.
## 2. Trouble-Shooting

<table>
<thead>
<tr>
<th>Error</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>The machine does not operate when the start switch ◊ is pressed.</td>
<td>- LaboPol-35 is switched off or not connected to the power supply</td>
<td>- Make sure that LaboPol-35 is working correctly</td>
</tr>
<tr>
<td></td>
<td>- LaboForce-Mi is not connected to LaboPol-35</td>
<td>- Connect the plug from LaboForce-Mi to the female plug at the back of LaboPol-35</td>
</tr>
<tr>
<td>The force adjustment screw is rotating when a specimen is passing the centre of the preparation disc.</td>
<td>The friction between the force adjustment screw and the rubber foot is too high</td>
<td>Add a drop of oil in the rubber foot to reduce the friction.</td>
</tr>
</tbody>
</table>
## 4. Technical Data

<table>
<thead>
<tr>
<th>Subject</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety standards</td>
<td>Please refer to the Declaration of Conformity</td>
</tr>
<tr>
<td>Noise level</td>
<td>Approx. 45 dB(A) at idle running at a distance of 1.0 m/39.4” from the machine</td>
</tr>
<tr>
<td>Surrounding temperature</td>
<td>5-40°C / 41-104°F</td>
</tr>
<tr>
<td>Humidity</td>
<td>Non condensing / 0-95%RH</td>
</tr>
<tr>
<td>Supply</td>
<td>Power: Directly from LaboPol-35</td>
</tr>
<tr>
<td></td>
<td>Voltage: 1 x 100 V / 50-60 Hz or 1/3 x 200-240 V / 50-60 Hz</td>
</tr>
<tr>
<td>Dimensions and weight</td>
<td>Width: 140 mm / 5.5”</td>
</tr>
<tr>
<td></td>
<td>Depth: 355 mm / 14.0”</td>
</tr>
<tr>
<td></td>
<td>Height: 315 mm / 12.4”</td>
</tr>
<tr>
<td></td>
<td>Weight: 12 kg / 27 lbs</td>
</tr>
</tbody>
</table>
**Declaration of Conformity**

**Manufacturer, responsible for Technical File**

Struers A/S  
Pederstrupvej 84  
DK-2750 Ballerup, Denmark  
Telephone +45 44 600 800

Herewith declares that

- **Product Name:** LaboForce-Mi  
- **Type No.:** 612  
- **Machine Type:** Specimen mover

is in conformity with the provisions of the following directives:

**Safety of Machinery**  
2006/42/EC according to the following standard(s):  

**EMC-Directive**  
2004/108/EC according to the following standard(s):  

**RoHS**  
2011/65/EU according to the following standard(s):  
EN 50581:2012.

**Supplementary Information**

The equipment complies with the American standards:  
UL508.

The above has been declared according to the global method, module A

Date: 13.02.2015  
Christian Skjold Heyde,  
Vice President, R & D and Production, Struers A/S

---

**Overensstemmelseserklæring**

**Fabrikant, ansvarlig for Teknis Dossier**

Struers A/S  
Pederstrupvej 84  
DK-2750 Ballerup, Danmark  
Telefon 44 600 800

erklærer herved, at

- **Produktnavn:** LaboForce-Mi  
- **Type nr.:** 612  
- **Maskintype:** Prøvebevæger

er i overensstemmelse med følgende EU-direktiver:

**Maskindirektivet**  
2006/42/EF efter følgende norm(er):  

**EMC-direktivet**  
2004/108/EF efter følgende norm(er):  

**RoHS**  
2011/65/EU efter følgende norm(er):  
EN 50581:2012.

**Supplerende oplysninger**  
Endvidere overholder de amerikanske normer:  
UL508

Ovenstående overensstemmelse(r) er erklæret iflg. den globale metode, modul A

Dato: 13.02.2015  
Christian Skjold Heyde,  
Vice President, Udvikling og Produktion, Struers A/S
Spare Parts and Diagrams

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Some of the drawings may contain position numbers
not used in connection with this manual.
The following is a list of the spare parts that may need replacement during the lifetime of the equipment.

To check the availability of other replacement parts, please contact your local Struers Service Technician. It may help identify the part by referral to its position number on the assembly drawings included in this manual.

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Pos.</th>
<th>Part No.</th>
<th>Spare Parts List, LaboForce-Mi</th>
</tr>
</thead>
<tbody>
<tr>
<td>16120010</td>
<td>10</td>
<td>R5230102</td>
<td>Chassis w. shaft and bearings</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>RZS11530</td>
<td>Drive pin, 5x30 A4 DIN 7 (5 pcs)</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>2BK00045</td>
<td>Ball bearing 6004-2RSR</td>
</tr>
<tr>
<td></td>
<td>70</td>
<td>2BK00033</td>
<td>Ball bearing 6203-2RSR</td>
</tr>
<tr>
<td></td>
<td>90</td>
<td>15230055</td>
<td>Locking mechanism, complete</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>15230130</td>
<td>Column</td>
</tr>
<tr>
<td></td>
<td>110</td>
<td>2IV00040</td>
<td>V-ring VS-0040</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>2ZL10400</td>
<td>Locking ring, A40 DIN 471 (10 pcs)</td>
</tr>
<tr>
<td></td>
<td>130</td>
<td>2GF10145</td>
<td>Pressure spring, ø16.0 x ø2.0 Lo=145</td>
</tr>
<tr>
<td></td>
<td>140</td>
<td>15270115</td>
<td>Guide pin for spring</td>
</tr>
<tr>
<td></td>
<td>150</td>
<td>R5230140</td>
<td>Bridge with screws</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>2GH00160</td>
<td>Elesa button AP B.193/15P-M4X10</td>
</tr>
<tr>
<td></td>
<td>220</td>
<td>R5230200</td>
<td>Gear wheel with key etc.</td>
</tr>
<tr>
<td></td>
<td>260</td>
<td>2MD00240</td>
<td>Gear motor 240V 50/60Hz</td>
</tr>
<tr>
<td></td>
<td>260</td>
<td>2MD00120</td>
<td>Gear motor 120V 50/60Hz</td>
</tr>
<tr>
<td></td>
<td>310</td>
<td>R5230040</td>
<td>Sample mover, complete</td>
</tr>
<tr>
<td>Drawing</td>
<td>Pos.</td>
<td>Spare Parts List, LaboForce-Mi</td>
<td>Part No.</td>
</tr>
<tr>
<td>--------------</td>
<td>------</td>
<td>-------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>15230040</td>
<td></td>
<td><strong>Sample Mover Carrousel, complete</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20-30</td>
<td>Locking prawl &amp; spring</td>
<td>R5230290</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>Pressure foot, complete</td>
<td>15230050</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>Star Wheel (8 pcs) + Omnifit 50M</td>
<td>R5230230</td>
</tr>
<tr>
<td>15230050</td>
<td></td>
<td><strong>Pressure Foot, complete</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>O-ring ø5.00-1.00 70 NBR (32 pcs)</td>
<td>RIO10006</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>Pressure spring, ø12.5 x ø1 Lo=36.5 (8 pcs)</td>
<td>RGF10124</td>
</tr>
<tr>
<td></td>
<td>80</td>
<td>Rubber foot (Thrust pad)</td>
<td>12490156</td>
</tr>
<tr>
<td>15210051</td>
<td></td>
<td><strong>Lubricator, complete</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>*</td>
<td>O-rings for lubricator</td>
<td>15210055</td>
</tr>
<tr>
<td></td>
<td>030</td>
<td>O-ring 6.07-1.78</td>
<td></td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>O-ring 2.00-1.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Lubricator bracket</td>
<td>15218503</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>Flow regulator, complete w. tube</td>
<td>15232905</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>Lupo bottle</td>
<td>R4820028</td>
</tr>
<tr>
<td></td>
<td>70</td>
<td>Lid for Lupo</td>
<td>14820056</td>
</tr>
<tr>
<td></td>
<td>140</td>
<td>Tube ø4 mm (5 m)</td>
<td>RNU17025</td>
</tr>
</tbody>
</table>
Assembly Procedure, Montage of Lejer i Chassis 16127302

ID: 16120010 LaboForce-Mi assembled
80) Skarp kant op mod 540
70) Omnilift 100M
Power supplied from LaboPol

100V
50-60Hz
or
200-240V
50-60Hz

or

3x 1mm² / 18AWG

IEC320-C14
(male)

To LaboPol
Control Connector

10 rpm @ 50Hz
12 rpm @ 60Hz

Synchronous Motor

GNYE-1 (AWG18)

GNYE-2 (AWG18)

GNYE-3 (AWG18)

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LaboForce-Mi, Circuit Diagram