

LaboForce-Mi



Instruction Manual
Gebrauchsanweisung
Mode d'emploi

Manual No.: 16127001

Date of Release 21.01.2011

Spare Parts and Diagrams



LaboForce-Mi
Instruction Manual

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.

Original instructions. The contents of this manual is the property of Struers. Reproduction of any part of this manual without the written permission of Struers is not allowed.

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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  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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1. Getting Started

Checking the Contents

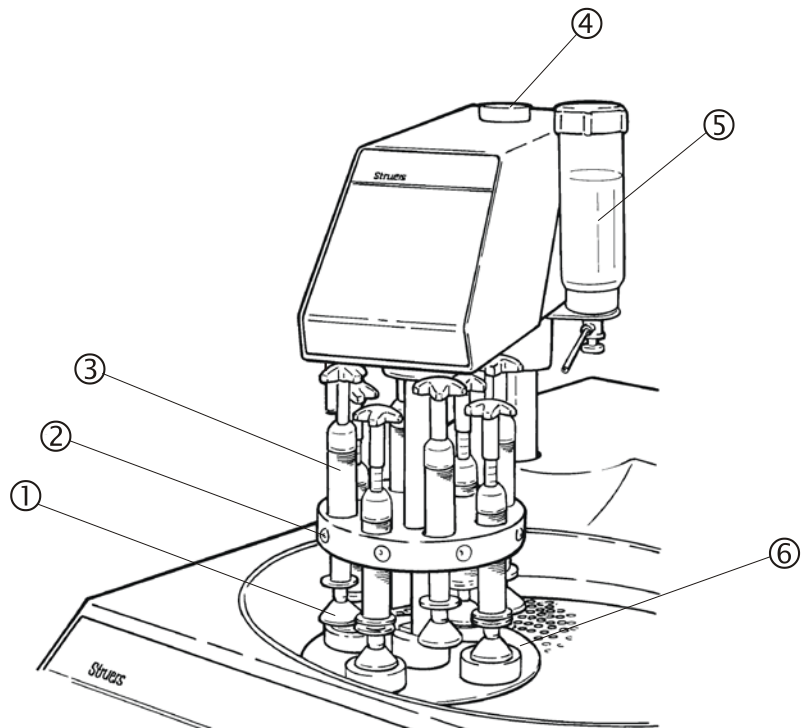
In the packing box you should find the following parts:

- 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

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 re-tighten 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.

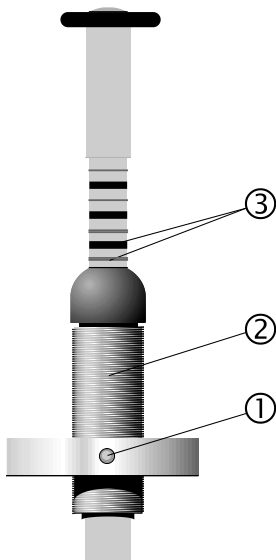
Adjusting the Force Coarse Adjustment

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:



Indication	Force
0	0 N
1 —	2.5 N
2 —	5 N
3 —	7.5 N
4 —	10 N
5 —	12.5 N
6 —	15 N
7 —	17.5 N
8 —	20 N

— Thin mark
— Black mark

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.

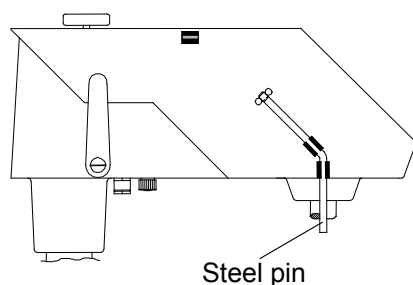
- Secure LaboForce-Mi in that position by locking the handle
- Insert the specimens in the specimen mover plate.

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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1. Accessories

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

Remember...

Struers offers a comprehensive range of consumables for lapping, grinding and polishing. Please ask for separate leaflets.

2. Trouble-Shooting

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

4. Technical Data

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

English

Declaration of Conformity



**Manufacturer,
responsible for
Technical File**

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Pederstrupvej 84
DK-2750 Ballerup, Denmark
Telephone +45 44 600 800

Herewith declares that

<i>Product Name:</i>	LaboForce-Mi
<i>Type No:</i>	612
<i>Machine Type:</i>	Specimen mover

is in conformity with the provisions of the following directives:

Safety of Machinery	2006/42/EC according to the following standard(s): EN ISO 12100:2011, EN 60204-1:2006/AC:2010.
EMC-Directive	2004/108/EC according to the following standard(s): EN 61000-6-1:2007, EN 61000-6-3:2007/A1:2011.
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

Dansk

Overensstemmelseserklæring



**Fabrikant,
ansvarlig for Teknisk
Dossier**

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

erklærer herved, at

<i>Produktnavn:</i>	LaboForce-Mi
<i>Type nr.:</i>	612
<i>Maskintype:</i>	Prøvebevæger

er i overensstemmelse med følgende EU-direktiver:

Maskindirektivet	2006/42/EF efter følgende norm(er): EN ISO 12100:2011, EN 60204-1:2006/AC:2010.
EMC-direktivet	2004/108/EF efter følgende norm(er): EN 61000-6-1:2007, EN 61000-6-3:2007/A1:2011.
RoHS	2011/65/EU efter følgende norm(er): EN 50581:2012.
Supplerende oplysninger	Endvidere overholdes 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



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Denmark

Spare Parts and Diagrams

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<i>Drawings</i>	
LaboForce-Mi, complete	16120010A
Sample Mover Carrousel, complete	15230040A
Pressure Foot assembly	15230050A
Lubricator, complete	15210051E
<i>Diagrams</i>	
Circuit diagrams, LaboForce-Mi	16123100
Wiring Diagrams	15233450B

Some of the drawings may contain position numbers
not used in connection with this manual.

LaboForce-Mi
Spare Parts and Diagrams

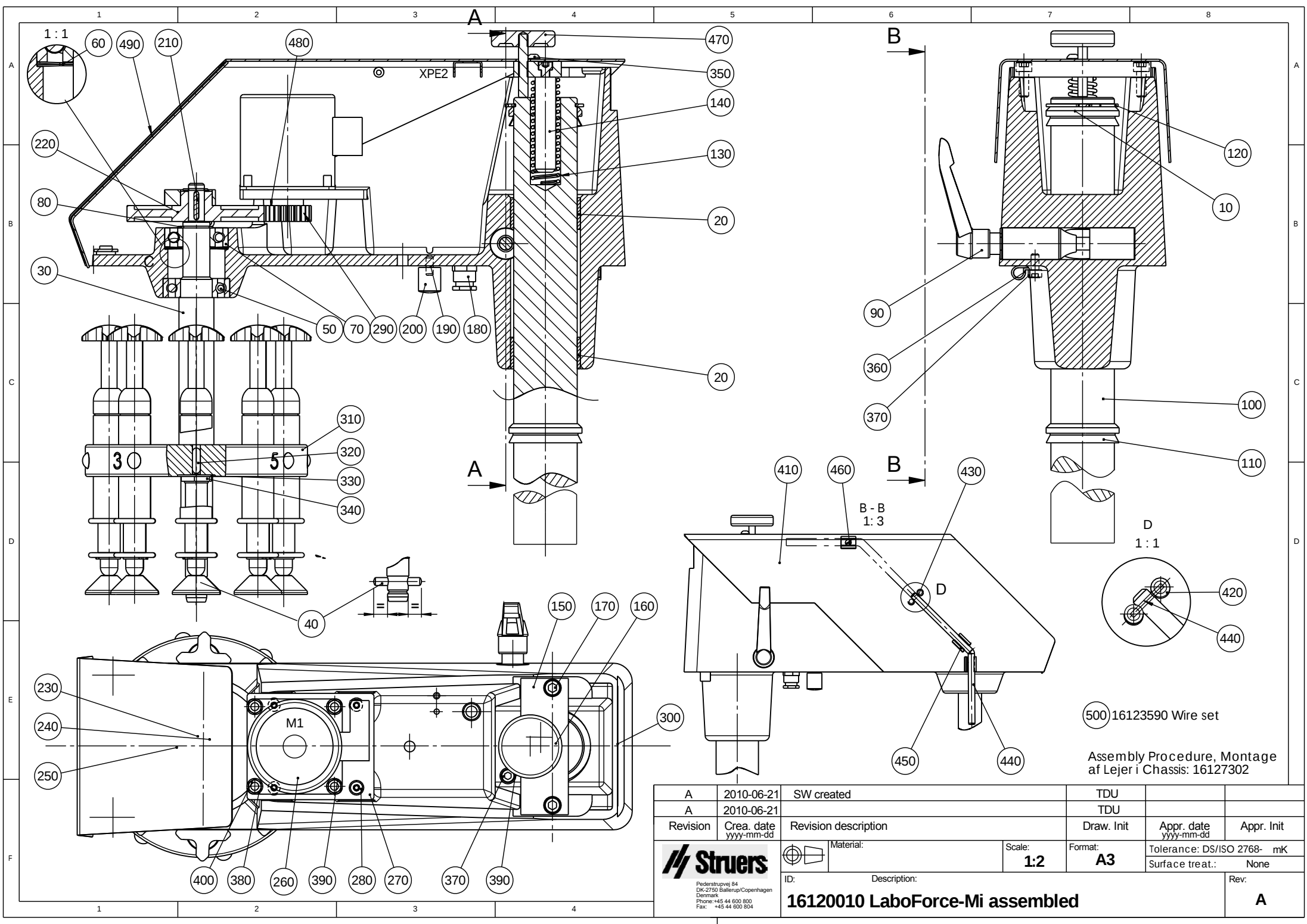
The following is a list of the spare parts that may need replacement during the lifetime of the equipment.

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.

Drawing	Pos.	Spare Parts List, LaboForce-Mi	Part No.
<i>16120010</i>		LaboForce-Mi, complete	
	10	Chassis w. shaft and bearings	R5230102
	40	Drive pin, 5x30 A4 DIN 7 (5 pcs)	RZS11530
	50	Ball bearing 6004-2RSR	2BK00045
	70	Ball bearing 6203-2RSR	2BK00033
	90	Locking mechanism, complete	15230055
	100	Column	15230130
	110	V-ring VS-0040	2IV00040
	120	Locking ring, A40 DIN 471 (10 pcs)	2ZL10400
	130	Pressure spring, $\varnothing 16.0 \times \varnothing 2.0$ Lo=145	2GF10145
	140	Guide pin for spring	15270115
	150	Bridge with screws	R5230140
	200	Elesa button AP B.193/15P-M4X10	2GH00160
	220	Gear wheel with key etc.	R5230200
	260	Gear motor 240V 50/60Hz	2MD00240
	260	Gear motor 120V 50//60Hz	2MD00120
	310	Sample mover, complete	R5230040

LaboForce-Mi
Spare Parts and Diagrams

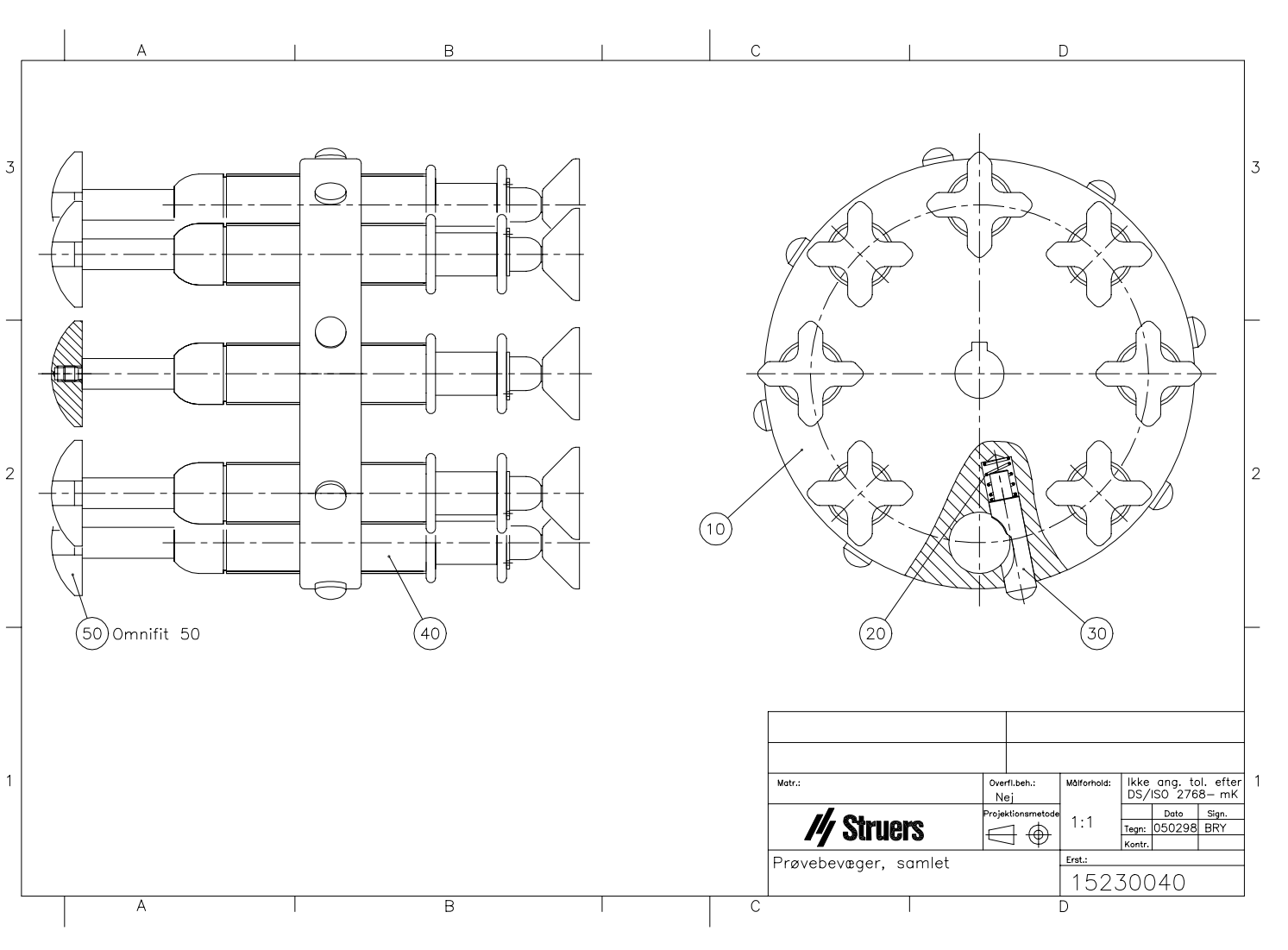
Drawing	Pos.	Spare Parts List, LaboForce-Mi	Part No.
<i>15230040</i>		Sample Mover Carrousel, complete	
	20-30	Locking prawl & spring	R5230290
	40	Pressure foot, complete	15230050
	50	Star Wheel (8 pcs) + Omnifit 50M	R5230230
<i>15230050</i>		Pressure Foot, complete	
	25	O-ring ø5.00-1.00 70 NBR (32 pcs)	RIO10006
	30	Pressure spring, ø12.5 x ø1 Lo=36.5 (8 pcs)	RGF10124
	80	Rubber foot (Thrust pad)	12490156
<i>15210051</i>		Lubricator, complete	
	*	O-rings for lubricator	15210055
		030 O-ring 6.07-1.78	
		120 O-ring 2.00-1.00	
	10	Lubricator bracket	15218503
	40	Flow regulator, complete w. tube	15232905
	60	Lupo bottle	R4820028
	70	Lid for Lupo	14820056
	140	Tube ø4 mm (5 m)	RNU17025



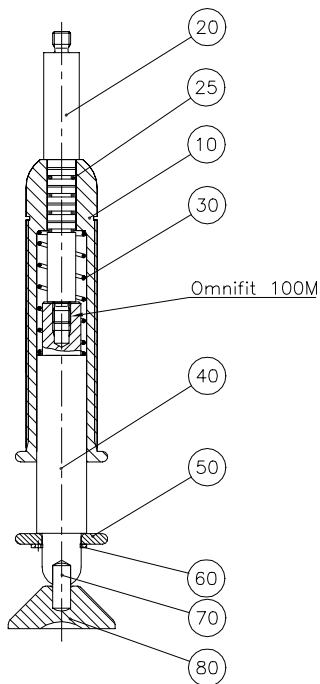
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A		2010-06-21				TDU					
Revision		Crea. date yyyy-mm-dd	Revision description			Draw. Init		Appr. date yyyy-mm-dd	Appr. Init		
 Pedersbuzvej 84 DK-2750 Ballerup/Copenhagen Denmark Phone: +45 44 600 800 Fax: +45 44 600 804			 Material:	Scale:	Format:		Tolerance: DS/ISO 2768- mK				
				1:2	A3		Surface treat.: None				
				ID:		Description:					Rev:
				16120010		LaboForce-Mi assembled					A

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500 16123590 Wire set
Assembly Procedure, Montage
af Lejer i Chassis: 16127302



Matr.:		Overfl. beh.:	Målforhold:	Ikke ang. tol. efter DS/ISO 2768 - mK	
		Nej			
Projektionsmetode			1:1	Dato	Sign.
				Tegn: 050298	BRY
Prøvebevøger, samlet				Kontr.	
				Erst.:	
				15230040	



60 Skarp kant op mod 50

70 Omnitest 100M

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	Trykfod, monteret		Erst.:	15230050	

A

B

C

D

3

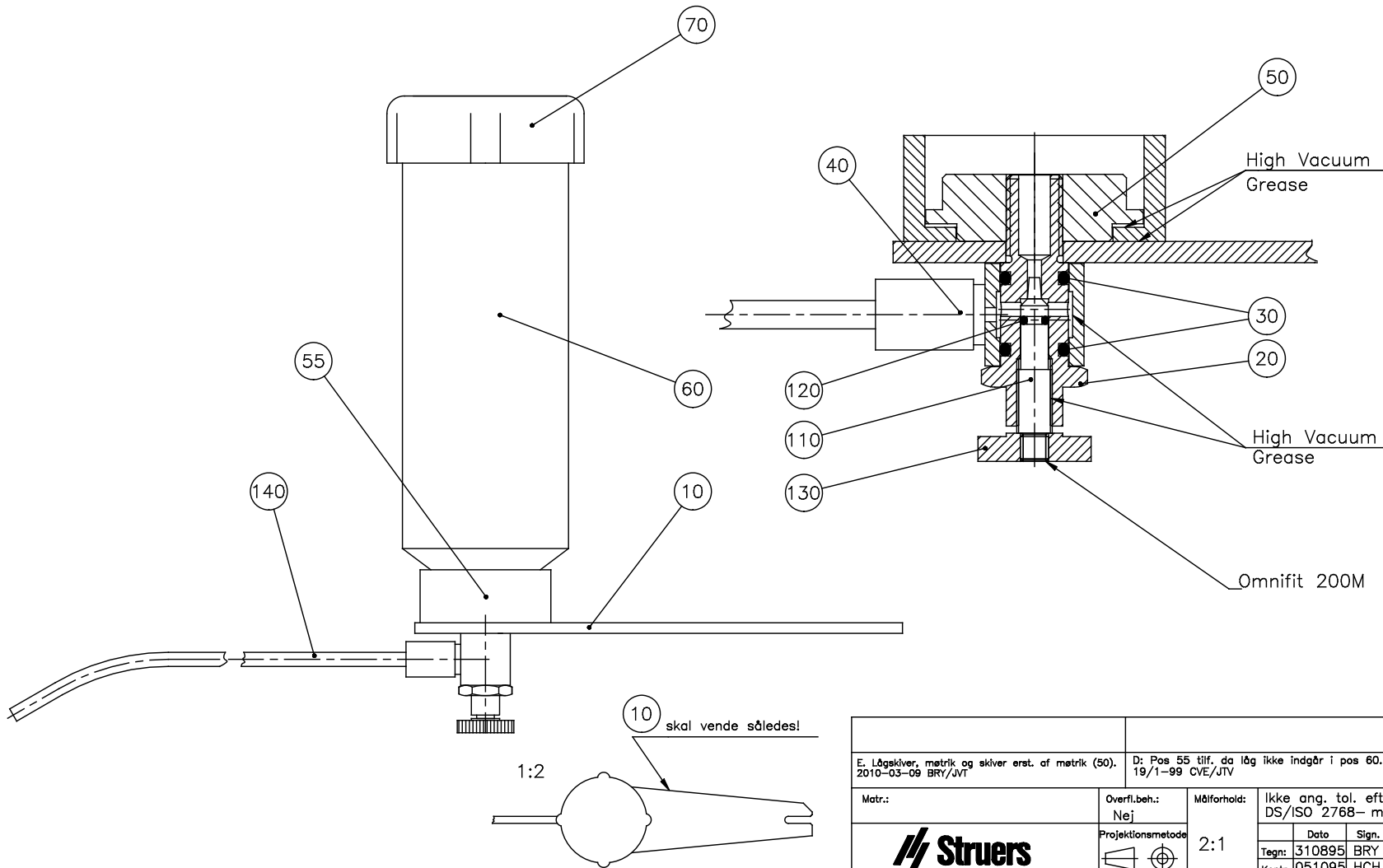
3

2

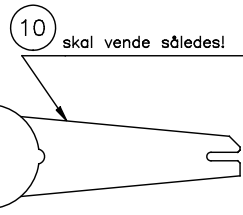
2

1

1



1:2



E. Lågskiver, møtrik og skiver erst. af møtrik (50). 2010-03-09 BRY/JVT		D: Pos 55 tilf. da låg ikke indgår i pos 60. 19/1-99 CVE/JVT	
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	Nej		
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			Dato
			Sign.
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			Kontr. 051095 HCH
Lubrikator, samlet		Erst.:	
		15210051 E	

A

B

C

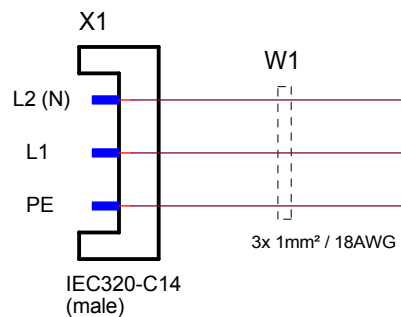
D

Power supplied
from LaboPol

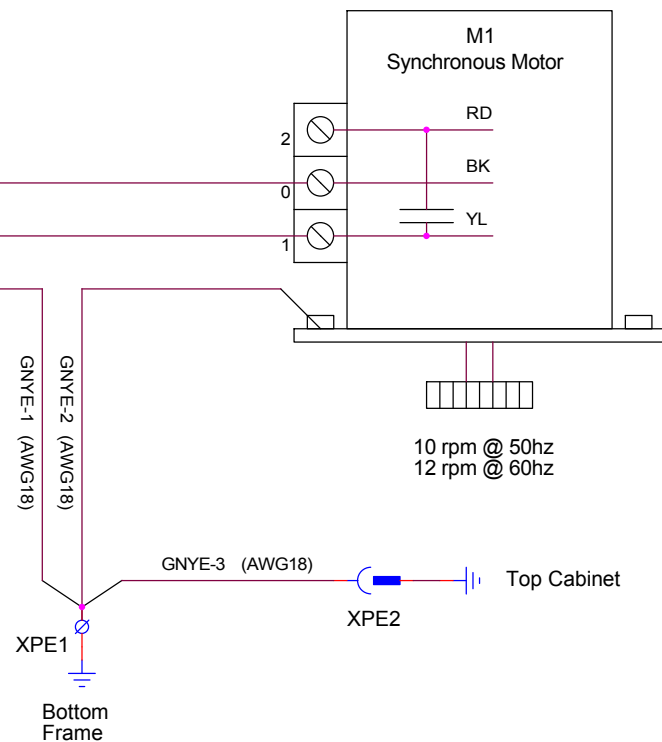
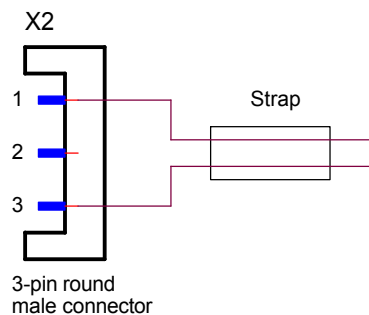
100V
50-60Hz

or

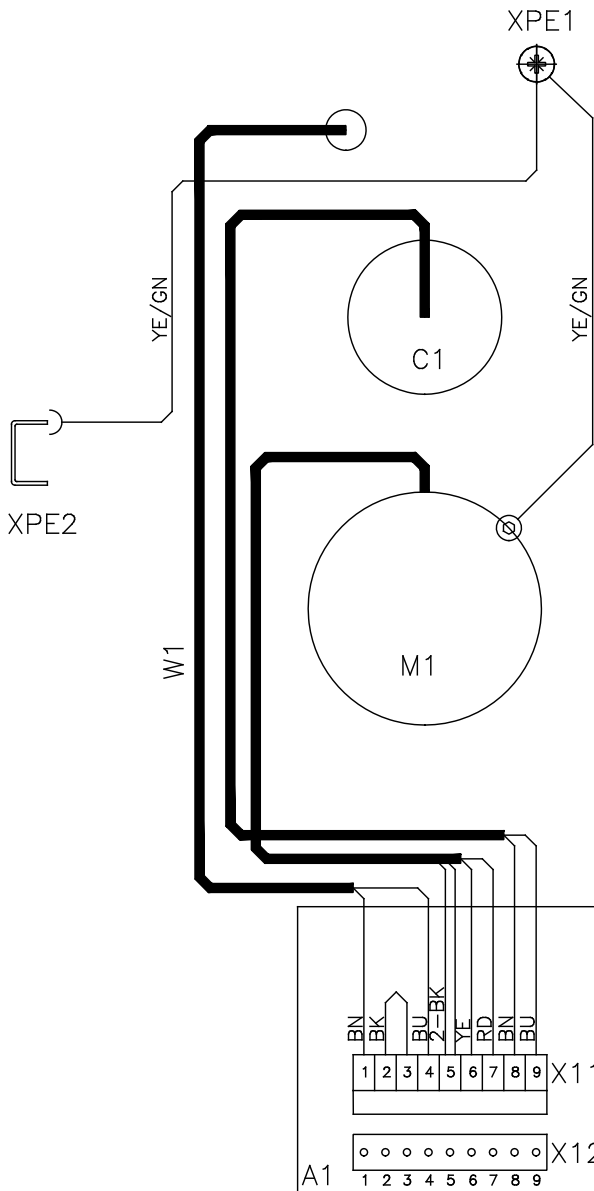
200-240V
50-60Hz

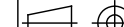


To LaboPol
Control Connector



		Struers A/S Pederstrupvej 84 DK-2750 Ballerup Denmark telephone: +45 44 600 800		
		LaboForce-Mi, Circuit Diagram		
		Size A3	CAGE Code	DWG NO 16123100
Friday, July 16, 2010	Scale	FTH		Sheet 1 of 1



	Matr.:	Overfl.beh.:	Målforhold:	Ikke ang. tol. efter DS/ISO 2768—		
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B. Leder YE og RD byttet rundt i X11:6 og X11:7 2010—05—20 BRY/JTV				Tegn:	170298	BRY
A. Farveskift, ledninger på A1:X11. 2010—03—09 BRY/JTV	Wiring Diagram PdM-Force-20/ LaboForce-Mi		Erst.:	15233450 B		
				Kontr.		



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