

LaboForce-1



Instruction Manual

Manual No.: 15277001

Date of Release F1 .08.2012



LaboForce-1

Instruction Manual

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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LaboForce-1

Safety Precaution Sheet

To be read carefully before use

1. The operator should be fully aware of the use of the machine according to the Instruction Manual. The machine must be mounted securely on the grinding/polishing machine.
2. Be sure that the actual voltage corresponds to the voltage stated on the back of the machine. The machine must be earthed.
3. Blue lubricant: follow the current safety rules for handling, mixing, filling, emptying and disposal of the alcohol-based lubricant.
4. 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 of Packing

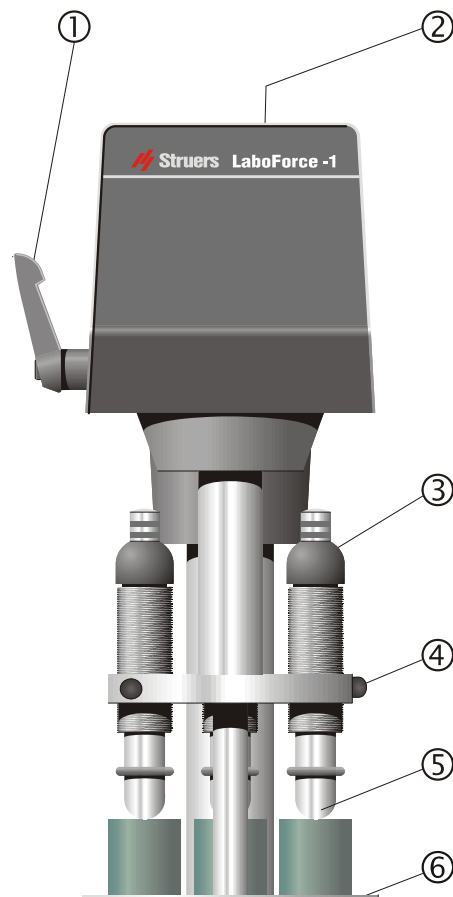
In the packing box you should find the following parts:

- 1 LaboForce-1
- 1 Allen-key 3 mm
- 2 Extra screws M4 for securing the specimen mover plate
- 1 Nut, M16
- 3 Washers, 1 mm for levelling of column height
- 1 Washer, 3 mm for levelling of column height
- 1 Set of Instruction Manuals

Getting Acquainted with LaboForce-1

Take a moment to familiarise yourself with the location and names of the LaboForce-1 components.

- ① Handle
- ② Distance adjustment screw
- ③ Force adjustment screw
- ④ Release button
- ⑤ Thrust pad
- ⑥ Specimen mover plate



Setting up LaboForce-1

LaboForce-1 is prepared to be mounted on Struers grinding/polishing machines, LaboPol-1, -2, -4, -5, -6, -21 or -25.

On LaboPol-1/-2/-4/-5

- Remove the plastic lid from the pre-punched hole for the LaboForce column. Turn the LaboPol machine onto its left-hand side.
- Lead the LaboForce-1 column through the hole. Mount and tighten the bottom nut using a 24 mm spanner.
- Raise the LaboPol machine to upright position.
- Go to paragraph Adjusting the Specimen Mover Position.

On LaboPol-21/-25

- Remove the plastic lid from the pre-punched hole for the LaboForce column. Move LaboPol to the left so that the part of the machine where LaboForce-1 is to be mounted is free of the table.
- Lead the LaboForce-1 column through the hole. Mount and tighten the bottom nut using a 24 mm spanner.
- Move LaboPol back onto the table.
- Go to paragraph Adjusting the Specimen Mover Position.

Adjusting the Specimen Mover Position

To ensure correct working conditions for LaboForce-1 you need to adjust the actual distance between the specimen mover plate and the preparation disc of your grinding/polishing machine.

Distance to Preparation Disc

- Place the specimen mover plate on the shaft and secure it with the screw.
- Remove the plastic cap on top of LaboForce-1, insert the Allen-key and turn it clockwise until LaboForce-1 is in top position.
- Mount a grinding or polishing disc on the LaboPol and swing LaboForce-1 into correct position over the disc.
- Press LaboForce-1 down and adjust the distance between grinding or polishing disc and specimen mover plate to about 1.5 - 2 mm by turning the Allen-key counter clockwise.
- If the distance is too small you must:
 - Remove LaboForce-1 from the grinding/polishing machine.
 - Attach 1 or more additional washers (1-3 mm). Grease the washers and fasten them under the column, using the grease as an adhesive.
 - Mount LaboForce-1 in its hole again and tighten the bottom nut.

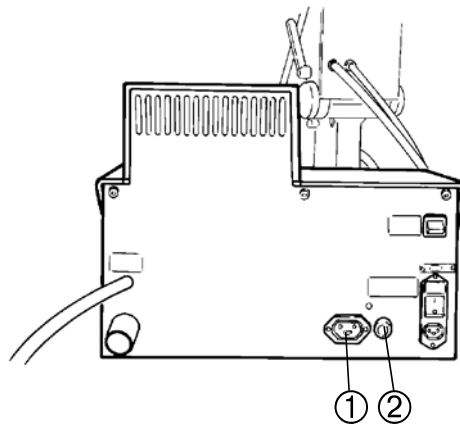
Repeat the above procedure until the correct distance is achieved.
--

- Finally mount a counter nut to ensure that the column remains in the correct position.

Connecting LaboForce-1
Supplying Power

- Connect the power cable to the socket on the back of the LaboPol machine①.

IMPORTANT
Check that the mains voltage corresponds to the voltage stated on the type plate on the back of the machine.



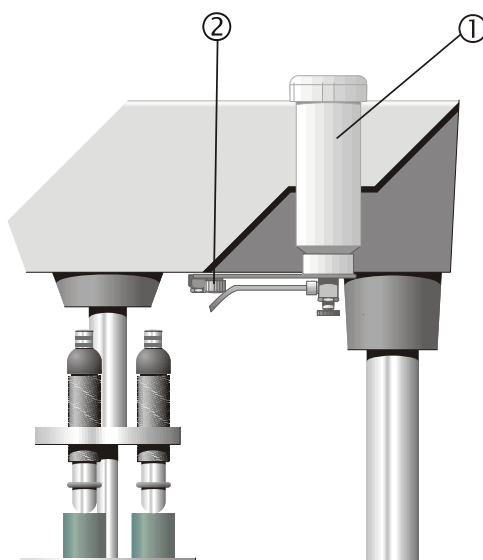
Communication

To let the LaboPol know that a LaboForce-1 is connected, the communications plug attached to the power cable has to be connected to the socket on the back of LaboPol②.

**Mounting a Drip Lubricator
(Accessory)**

A drip lubricator ① can be mounted on the LaboForce-1 to supply the necessary lubricant during the preparation process.

- Remove the drip lubricator from its box.
- Loosen the finger screw ② underneath LaboForce-1.
- Guide the bottom plate of the drip lubricator onto the finger screw and the positioning pin underneath the LaboForce-1, 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.



**Mounting a LaboDoser Dosing
Unit (Accessory)**

Follow the Instructions for Use that are supplied with the Dosing Unit.

2. Operation

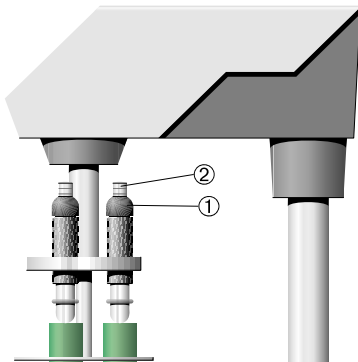
Inserting a Specimen

- 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.

Tip

For quick positioning of the adjustment screw (e.g. for specimens of differing heights), press the release button and move the screw up or down.

Adjusting the Force



- Adjust the force by turning the adjustment screw ①. The marks ② on the spring loaded screw 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
— Thick mark

WARNING

If less than three specimens are prepared, ensure that the unused pressure feet do not touch the preparation surface.

Operating LaboForce-1

- Press LaboForce-1 down and turn it into the correct position over the grinding or polishing disc.

Important

The specimens should run close to the edge of the grinding/polishing disc.
The distance should be about 2 mm.

- Secure LaboForce-1 in that position by locking the handle
- Place 1 to 3 specimens in the specimen mover plate.
- Adjust the force.
- Adjust the lubricant dosing level.
- Press START ◊ on LaboPol.
- Perform the method step and press STOP ⊕ on LaboPol.
- Stop lubricant dosing:
Drip Lubricator: Close the valve on the drip lubricator
LaboDoser: Stops automatically after the pre-set time.

Remember

LaboForce-1 will start rotating as soon as LaboPol is switched on unless the switch "*specimen mover*" on the back of LaboPol has been switched off.

Replacing the Specimen Mover Plate

As specimens must fit the holes in the specimen mover plate quite accurately, the specimen mover plate has to be replaced when samples of another size have to be prepared.

- Unlock LaboForce-1 and let it move into top position.
- Turn LaboForce-1 to the left over the edge of the LaboPol.
- Unscrew the fastening screw of the specimen mover plate.
- Place the new specimen mover plate on the column and secure it with the screw.
- Lower LaboForce-1 again and lock the handle.

**Operating a Drip Lubricator
(Accessory)**

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

Changing Lubricant

Drip Lubricant
(Accessory)

- Remove the drip lubricator from LaboForce-1.
- Hold the lubricant bottle firmly and remove the top 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-1 and tighten the finger screw.
- Refill with lubricant and mount the lid.

LaboDoser Dosing Unit
(Accessory)

Follow the Instructions for Use that are supplied with the Dosing Unit.

Reference Guide

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1. Accessories

Please refer to the *LaboForce brochure* for details of the range available.

Remember...

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

2. Struers Metalog Guide™

LaboForce-1 is designed for preparation of most materials. In Struers Metalog Guide™ you will find a detailed description of grinding/polishing methods for automated mechanical specimen preparation.

Struers Metalog Guide™ offers preparation methods for the most common materials, based on a simple analysis of two key properties: hardness and ductility. Finding the right method is easy, including choice of consumables. Always consult Struers Metalog Guide™ on the Struers website for the correct preparation method for the actual specimens.

Metalog Guide™

A complete guide to materialographic specimen preparation.
[www.struers.com/KNOWLEDGE/Metalog Guide](http://www.struers.com/KNOWLEDGE/Metalog%20Guide).

3. Maintenance

Every Day

Clean the specimen holder plate with a damp cloth.

Every Week

Clean LaboForce-1 with a damp cloth.

Cleaning a Drip Lubricator

- Remove the drip lubricator from LaboForce-1.
- Hold the lubricant bottle firmly and remove the top 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-1 and tighten the finger screw.
- Refill with lubricant and remount the lid.

Cleaning a LaboDoser Dosing Unit

Follow the Instructions for Use that are supplied with the Dosing Unit.

4. Trouble-Shooting

Error	Cause	Action
The specimen mover plate on LaboForce-1 does not start turning.	The switch for the specimen mover on the back of LaboPol is set to "off".	Set the switch to "on".
The specimen mover plate runs unevenly or stops.	Force too high.	Reduce the force.
The column of LaboForce-1 starts turning.	Bottom nut of column is loose.	Immediately tighten the nut at the base of column (See Section INSTALLATION).

5. Technical Data

Subject	Specifications	
	Motor output	0.5 W
	Torque at disc	Continuous 0.5 Nm
	Amperage The motor is equipped with a thermal switch for protection against overload.	16 mA/220-240 V 32 mA/100-120 V
	Rotational speed	8/9.5 rpm at 50/60 Hz
	Force per specimen	Min. approximately 2 N, max. approx. 20 N
Safety Standard	<i>Please refer to the Declaration of Conformity</i>	
Noise Level	46 dB (A) at idle running, at a distance of 0.25m/10" from the machine	
Power Supply	LaboForce-1 is connected directly to LaboPol	
Dimensions and Weight	Width	190 mm/7.5" (including drip lubricator)
	Depth	265 mm/10.5"
	Height	295 mm/11.6" (above grinding/polishing disc)
	Weight	5.9 kg/13 lbs

Quick Reference



Inserting a Specimen

- Lift the thrust pad to make room for the specimen.
- Place the specimen in the specimen holder plate hole and lower the thrust pad. Make sure that the specimen diameter fits the specimen holder plate hole.
- Adjust the force by turning the adjustment screw.

Replacing a Grinding/Polishing Disc

- Stop the grinding/polishing machine.
- Unlock the LaboForce-1 handle and let it move into top position.
- Change the disc on the turntable.
- Lower LaboForce-1 again and lock the handle.

Starting a Preparation Step

- Lower LaboForce-1 and lock the handle.
- Place 1 to 3 specimens in the specimen holder plate on the chosen surface.
- Adjust the lubricant dosing level.
- Press START  on LaboPol.
- Perform the method step and press STOP  on LaboPol.
- Stop lubricant dosing
Drip Lubricator: Close the valve on the drip lubricator
LaboDoser: Stops automatically after the pre-set time.

English

Declaration of Conformity

 **Struers**

**Manufacturer,
responsible for
Technical File**

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

Herewith declares that

<i>Product Name:</i>	LaboForce-1
<i>Type No:</i>	527
<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 12100:2010, EN 60204-1:2006/AC:2010.

EMC-Directive 2014/30/EU according to the following standard(s):
EN 61000-6-1:2007, EN 61000-6-3:2007/A1:2011/AC:2012.

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: 23.02.2016


Christian Skjold Heyde,
Vice President, R & D and Production, Struers ApS

Dansk

Overensstemmelseserklæring

 **Struers**

**Fabrikant,
ansvarlig for Teknisk
Dossier**

Struers ApS
Pederstrupvej 84
DK-2750 Ballerup, Danmark
Telefon 44 600 800

erklærer herved, at

<i>Produktnavn:</i>	LaboForce-1
<i>Type nr.:</i>	527
<i>Maskintype:</i>	Prøvebevæger

er i overensstemmelse med følgende EU-direktiver:

Maskindirektivet 2006/42/EF efter følgende norm(er):
EN ISO 12100:2010, EN 60204-1:2006/AC:2010.

EMC-direktivet 2014/30/EU efter følgende norm(er):
EN 61000-6-1:2007, EN 61000-6-3:2007/A1:2011/AC:2012.

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: 23.02.2016


Christian Skjold Heyde,
Vice President, Udvikling og Produktion, Struers ApS



Pederstrupvej 84
DK-2750 Ballerup
Denmark

LaboForce-1/-3



Spare Parts and Diagrams

Manual No.: 15217001

Date of Release 14.08.2007



LaboForce-1/-3
Spare Parts and Diagrams

**Always state *Serial No* and *Voltage/frequency*
if you have technical questions or when ordering spare parts.**

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Spare Parts and Diagrams

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Circuit diagram, LaboForce-1, 100-120V, 50/60Hz..... 15273115A

LaboForce-3

Spare Parts list for LaboForce-3

Illustration of LaboForce-3

Circuit diagram, LaboForce-3, 220-240V, 50/60Hz..... 15213100B

Circuit diagram, LaboForce-3, 100-120V, 50/60Hz..... 15213110A

Lubricator for LaboForce-1/-3

Spare Parts list for Lubricator

Illustration of Lubricator

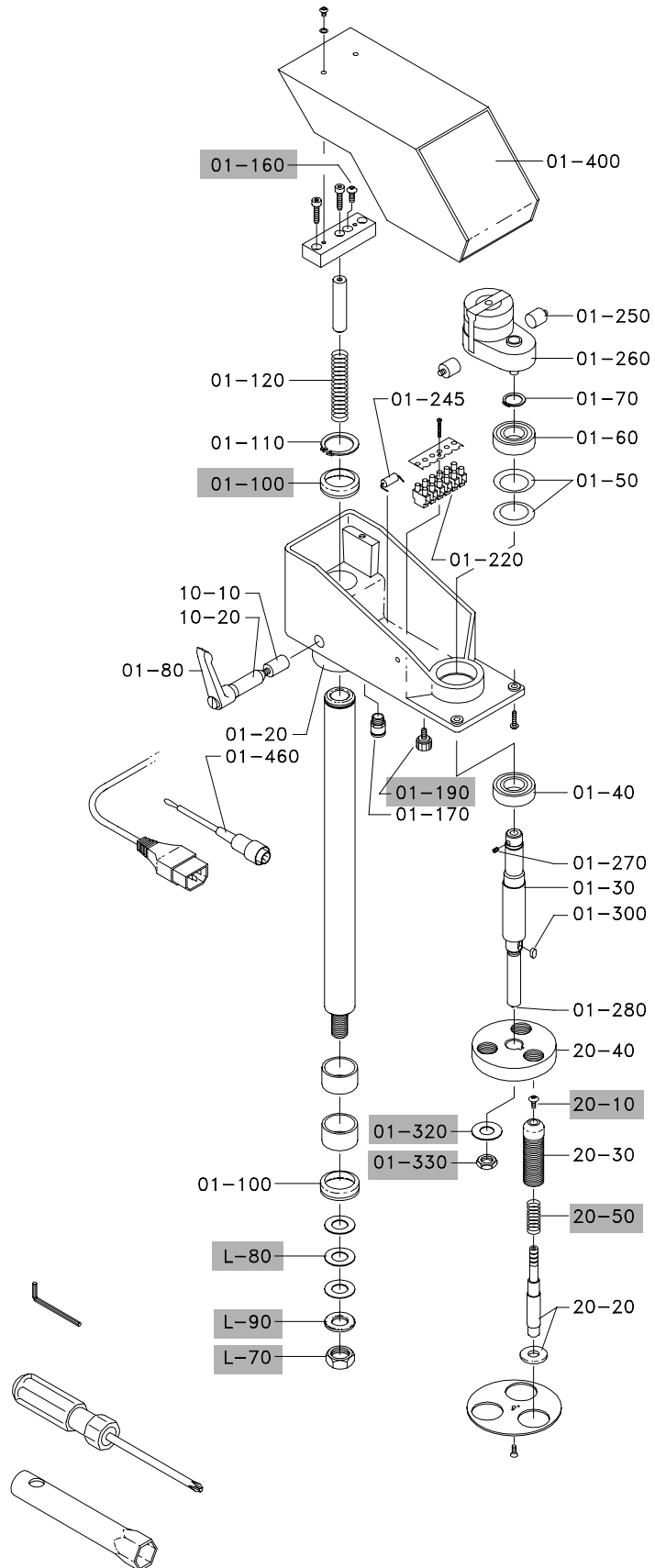
Some of the drawings may contain position numbers not used in connection with this manual.

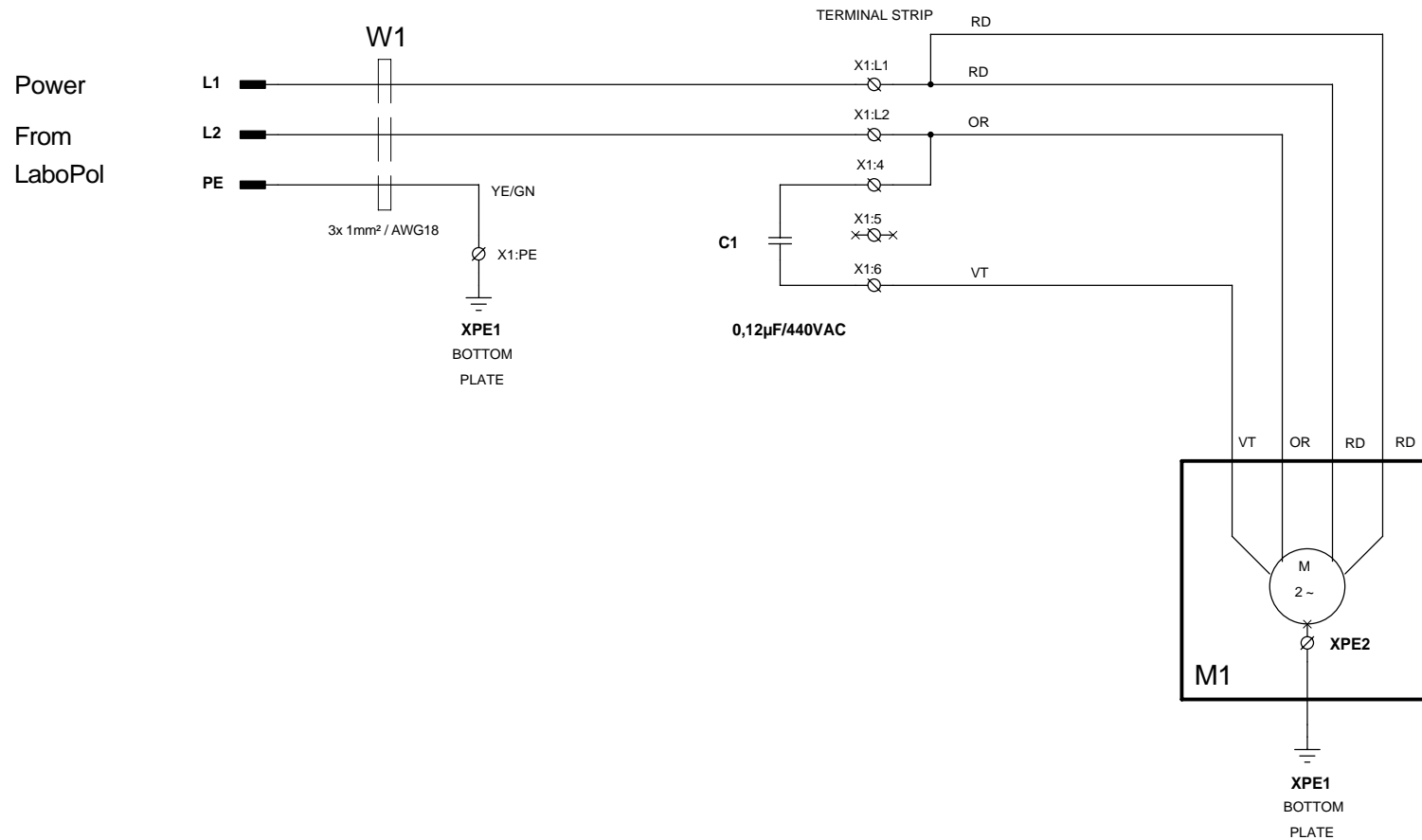
LaboForce-1

Pos.	Spare Part	Part No.
	LaboForce-1	
01-100	V-Ring VS-0030	2IV00030
01-160	ULS Screw M5x12	2TR80512
01-190	Knob	2GH00160
01-200	Nylon Clamp	2GK53304
01-210	Swage Form Screw	2TL90510
01-320	Steel Disc ø6.5x30x1	2ZC01630
01-330	MS-Counter Nut	2TD20102
	Specimen Mover	
20-10	ULS Screw M5x8	2TR80508
20-50	Pressure Spring ø12.5 x ø1	2GF10124
	Various parts for LaboForce-1	
	Lubricator for LaboForce, complete	15210051
L-70	Counter Nut MFG16X1,5	2TC60016
L-80	Steel Disc ø16.5x30x3	2ZC01633
L-90	Steel Disc ø16.5x30x1	2ZC01630

LaboForce-1/-3
Spare Parts and Diagrams

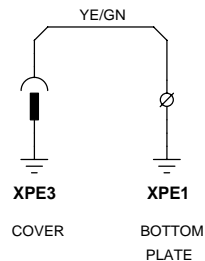
Illustration of LaboForce-1





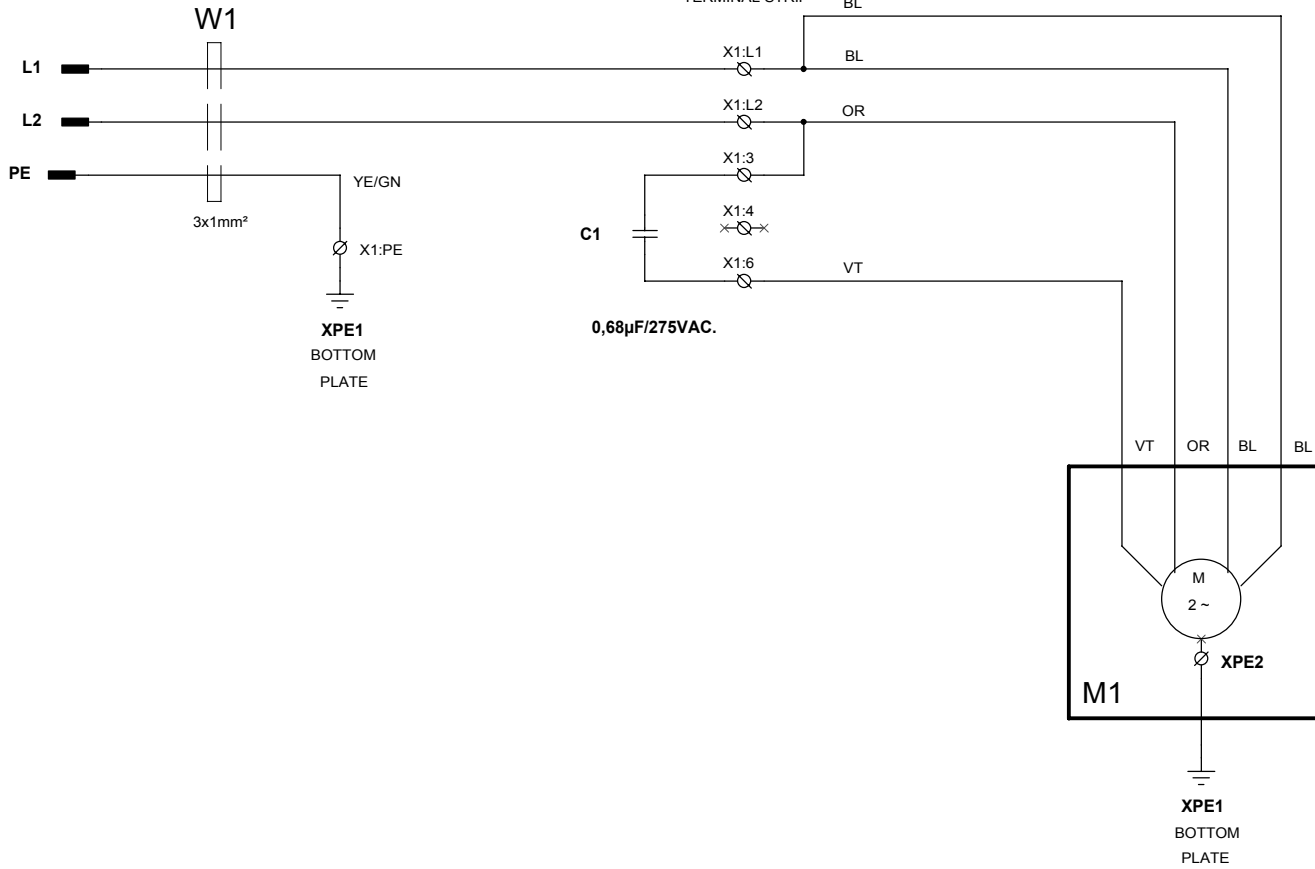
ALL WIRINGS 0,75mm², EXCEPT OTHERWISE MARKED.

- COLOR CODES:
- BK = BLACK
 - BN = BROWN
 - RD = RED
 - OR = ORANGE
 - YE = YELLOW
 - GN = GREEN
 - BU = BLUE
 - VT = VIOLET
 - GY = GREY
 - WH = WHITE



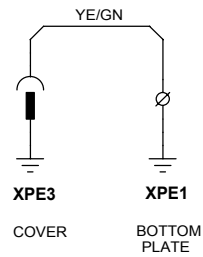
REV. A: VT -> OR, OR -> VT C1 0,1µF -> 0,12µF REV. B: (23-06-2003 FTH) Supply voltage changed to 200-240V / 50-60Hz REV. C: (05-01-2006 FTH) W1, AWG size added	STRUERS A/S VALHOEJSALLE 176 DK-2810 ROEDOVRE DENMARK PHONE: +45 3670 3500			
	CIRCUIT DIAGRAM LaboForce-1 MAINS SUPPLY 200V - 240V 50/60Hz.			
14:19:48	Size A3	CAGE CODE	DWG NO 15273125	Sheet 1 of 1
	SCALE	02-10-95 / DEM		

Power
From
LaboPol-1/5/21.



ALL WIRINGS 0,75mm², EXCEPT OTHERWISE MARKED.

- COLOR CODES:
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 - WH = WHITE



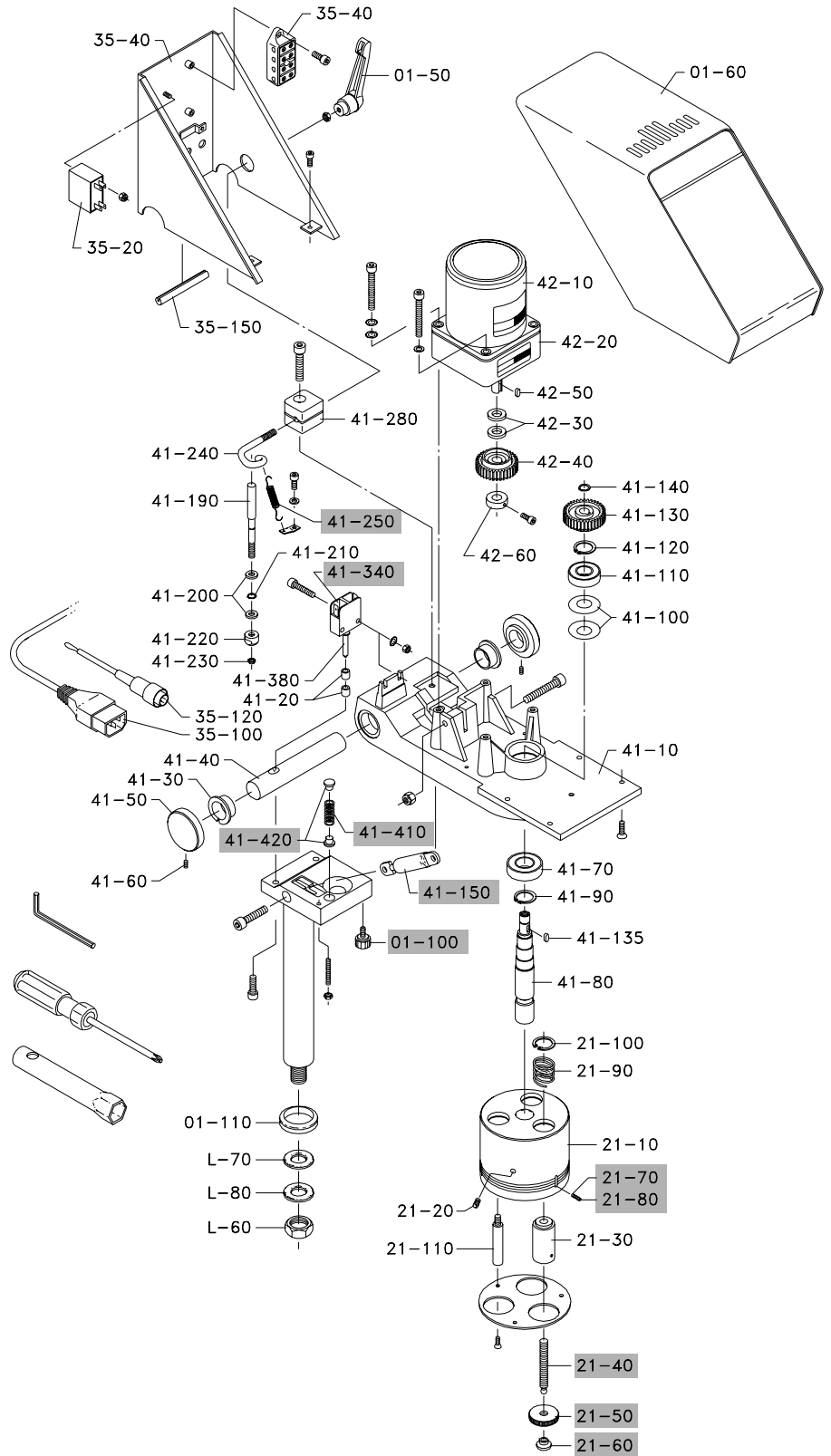
REV. A: OR -> VT, VT -> OR C1 0,6µF -> 0,68µF	STRUERS A/S VALHOEJSALLE 176 DK-2810 ROEDOVRE DENMARK PHONE:+45 3670 3500			
	CIRCUIT DIAGRAM LaboForce-1 MAINS SUPPLY 100V - 120V 50/60Hz.			
Size A3	CAGE CODE	DWG NO	15273115	
11:57:48	SCALE	02-10-95 / DEM	Sheet 1 of 1	Rev A

LaboForce-3

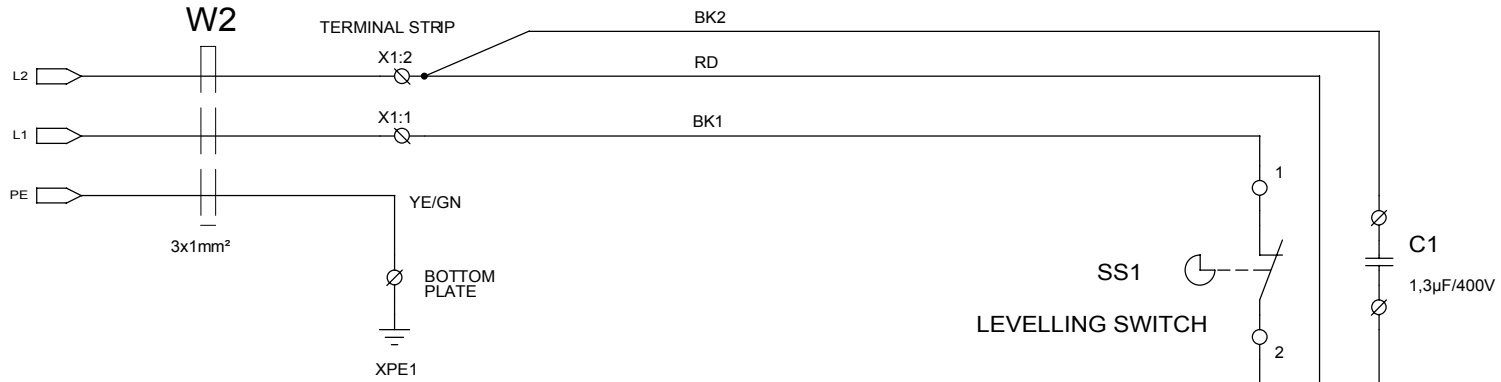
Pos.	Spare Part	Part No.
	LaboForce-3	
	Lubricator for LaboForce	15210051
1-100	Knob	2GH00160
	Specimen Mover	
41-150	Gas Spring 350N	2YS00317
41-250	Release spring	14810024
41-340	Safety Switch	2SS35059
41-410	Lifting Spring	14810025
41-420	Buffer, Rubber	2GS00107
	Head	
	Handle and Threaded Pin	15210025
	21-40 Threaded Pin	
	21-50 Knurled Handle	
21-60	Pressure Part	2TX90864
21-70	Friction pin	15210202
21-80	MSP Screw with threaded closure M3x10 A2	2TI90310

LaboForce-1/-3
Spare Parts and Diagrams

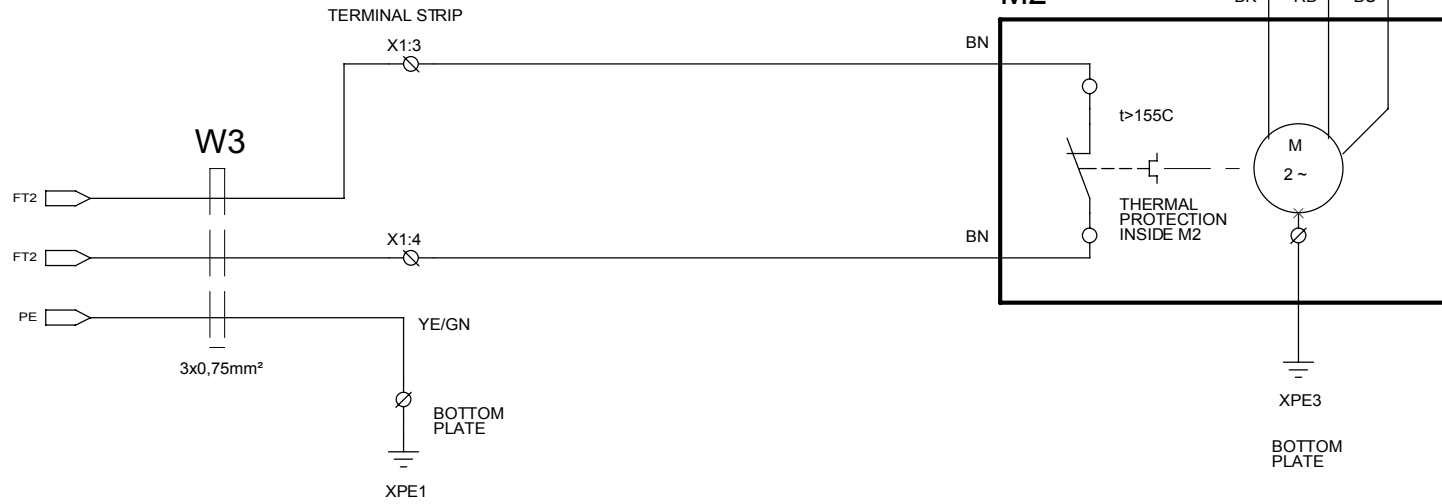
Illustration of LaboForce-3



FROM
LaboPol-x
CONTROL SIGN.
MOTOR RUN

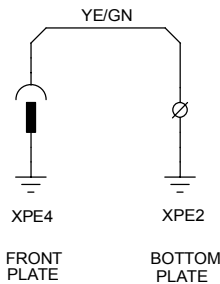


TO
LaboPol-x
THERMAL
PROTECTION
M2



ALL WIRINGS 1², EXCEPT OTHERWISE MARKED.

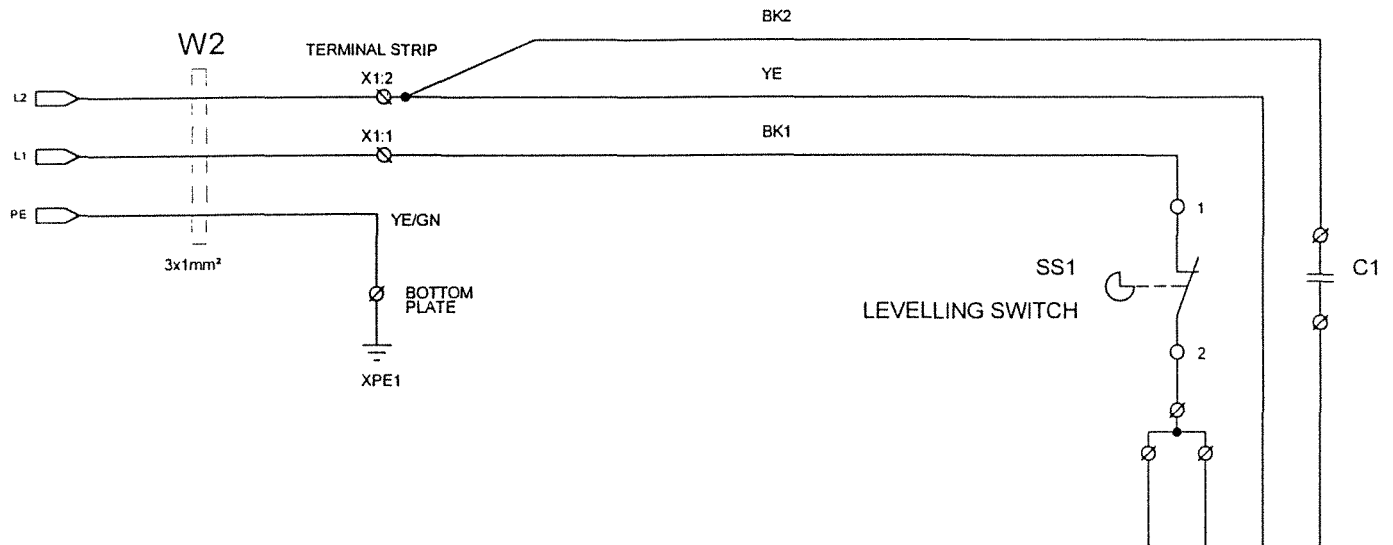
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REV.: B. M2; WIRE COLOR CHANGE	STRUERS A/S VALHOEJSALLE 176 DK-2610 ROEDOVRE DENMARK PHONE: +45 3670 3500		
	CIRCUIT DIAGRAM		LaboForce-3 MAINS SUPPLY, 2ØV - 240V 50/60Hz.
Tuesday, August 01, 2000	Size B	CAGE CODE	DWG NO 15213100
Monday, October 02, 1995	SCALE		Rev B
		DEM	Sheet 1 of 1

FROM
LaboPol-x

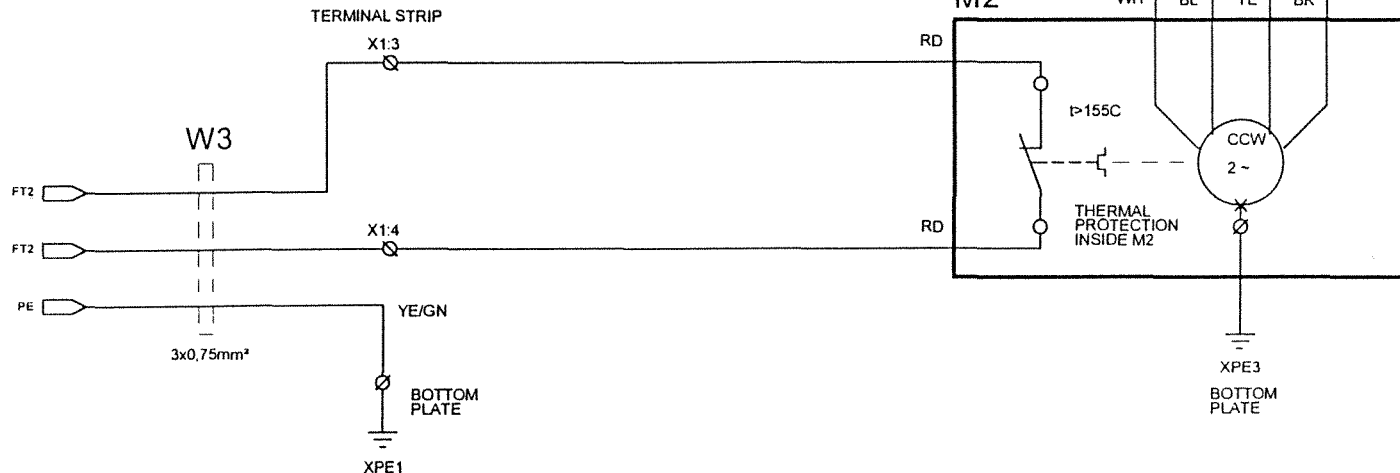
CONTROL SIGN.
MOTOR RUN



100V/50Hz.
C1 = 6µF
100-120V/60Hz.
C1 = 4.5µF

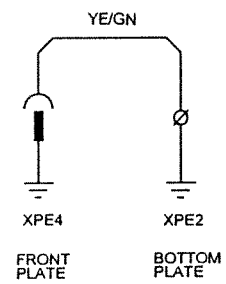
TO
LaboPol-x

THERMAL
PROTECTION
M2



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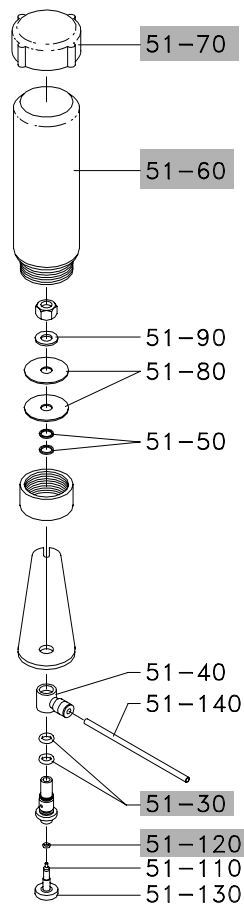


STRUERS A/S VALHOEJSALLE 178 DK-2810 ROEDOVRE DENMARK PHONE +45 3870 3500			
CIRCUIT DIAGRAM: LaboForce-3 MAINS SUPPLY, 100V - 120V 50/60Hz.			
Size B	CAGE CODE	DWG NO 15213110	Rev A
Monday, October 02, 1995	SCALE	DEM/DEM	Sheet 1 of 1

Lubricator for LaboForce

Pos.	Spare Part	Part No.
	O-rings for lubricator	15210055
51-30	O-ring 6.07-1.78	
51-120	O-ring 2.00-1.00	
51-60	Lupo bottle	14820028
51-70	Lid for Lupo	14820056

Illustration of Lupo





Pederstrupvej 84
DK-2750 Ballerup
Denmark