MEGO AFEK AC Ltd.

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Compression Therapy System

Lympha Press® Plus Model 1033-AL/EL
Ballancer® Professional Model 1033-AB/EB

Maintenance Manual

L93101B0-A

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Main Document Control Log

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1.0	Initial release		Mr. A. Weiss	20.05.2003
1.1	Adding figure of testing set & Update references	2 & 7	Mr. A. Weiss	14.09.2003
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Section 1 General Description

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Adding Symbols & Conventions sub-section	2	Mr. N. Ben-Shalom	31.05.2010
Updating Labels sub-section	2	Mr. N. Ben-Shalom	31.05.2010
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Change of Authorized Representative in Europe	3	Mr. Yaron Zarhi	05.01.2012
Replacement of UL Label & description with CSA Label & description	3	Mr. Yaron Zarhi	16.01.2012

1.1 General

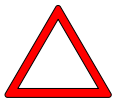
Lympha Press® Plus and Ballancer® Pro are fully programmable sequential compression therapy devices with compression garments.

Lympha Press® Plus is for medical use only. Ballancer® Pro is for use by professional aestheticians. Both offer a variety of treatment cycles.

This manual describes service and maintenance procedures for both devices. For descriptions of device features and treatment cycles, and for operation instructions, please consult the User Manuals L98101B0 and L98101B1.

If you have any questions or require any further information, please contact us. You can reach us at Phone: +972-77-9084277; Fax: +972 4 8784148.

1.2 Symbols and Conventions used in this Manual

Symbol	Description
	**Note**: Describes how Lympha Press® Plus or Ballancer® Pro functions or provides a note on how best to use it.
	**Caution**: Refers to the safe operation of Lympha Press® Plus or Ballancer® Pro and provides cautions where the possibility of loss of data or damage to equipment exists.
	**Warning**: Indicates a situation in which the operator or the patient may be in danger of injury or death.

1.3 Labels

The following labels and symbols appear on the pressure control unit, compression garments and/or packaging.

Label	Description	Location
	Read instructions before use	On model number and electrical data label on base of pressure control unit
	Read instructions before use	On compression garment label
	Temperature limitations for storage and/or transport of the pressure control unit	On pressure control unit carton package
	Level of protection type BF equipment	On model number and electrical data label on base of pressure control unit
	Manufacturer's name and address	On compression garment label
2008 	Date of Manufacture	On base of pressure control unit

Label	Description	Location
	Separate collection for waste electrical and electronic equipment	On bottom of pressure control unit
	Warning on Ballancer® Pro only for USA.	On front of pressure control unit, near the power switch
CE 0344	CE label showing compliance with EC Directive 93/42/EEC. Medical device directive.	On the technical information label
	CSA c/us Certification with respect to electric shock, fire and mechanical hazards only in accordance with CAN/CSA C22.2 No. 601.1-M90 (AM1+AM2) and UL 60601-1 (1st Edition)	On back of pressure control unit
	Serial number of the pressure control unit	On back of pressure control unit, near the power connector

1.4 Contact Information

1.4.1 Manufacturer

Mego Afek AC Ltd. Kibbutz Afek 30042 Israel
Tel: 972-77-9084277 Fax: 972-4-8784148
E-mail: info@megoafek.co.il
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1.4.2 Authorized Representative in Europe

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Borkstraße 10
48163 Münster
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Web: http://www.medneteurope.com

1.4.3 Authorized Representative in USA

Lympha Press USA
232 Park Avenue
Manalapan, New Jersey 07726
Toll-free: 888-LYMPHA-1
Tel: 732-792-9677 Fax: 732-792-9745
E-mail: info@lympha-press.com
Web: www.lympha-press.com

1.4.4 Authorized Representative in Canada

Paradigm Medical Inc.
100 Broadview Avenue, Suite 302,
Toronto, Ontario
M4M 3H3
Tel.: 416-362-0844
Fax: 416-362-0729
Toll-free: 800-931-2739

1.5 Specifications

Table 1.1 - Dimensions

	Lympha Press® Plus	Ballancer® Professional
Height	140 mm	140 mm
Length	410 mm	410 mm
Width	340 mm	340 mm
Net Weight	10 kg	10 kg

Table 1.2 - 1033 Model Family

Cat. No.	Model	Pressure Range	Voltage	Current	Fuses
L10002B1	1033-AL	20-120 mmHg	115V	0.7A	2 X 1A
L10002B3	1033-EL		230V	0.5A	
L10002B2	1033-AB	20-80 mmHg	115V	0.7A	
L10002B4	1033-EB		230V	0.5A	

Figure 1.1 - General View

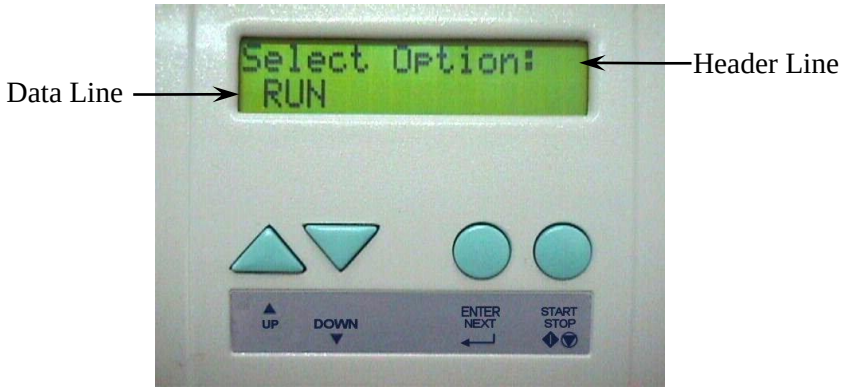

Figure 1.2 - Control Panel and Display Window

The display window shows the Header Line describing your present location within the program.

The Data Line is where you choose your setting. All data is entered by means of the four keys on the panel. The **UP** and **DOWN** keys scroll throughout the setting options. The **ENTER/NEXT** key inputs your setting and moves on to the next programming step. The **START/STOP** key activates the device, initiating and halting the treatment cycle.

Figure 1.3 - Fuse Insertion

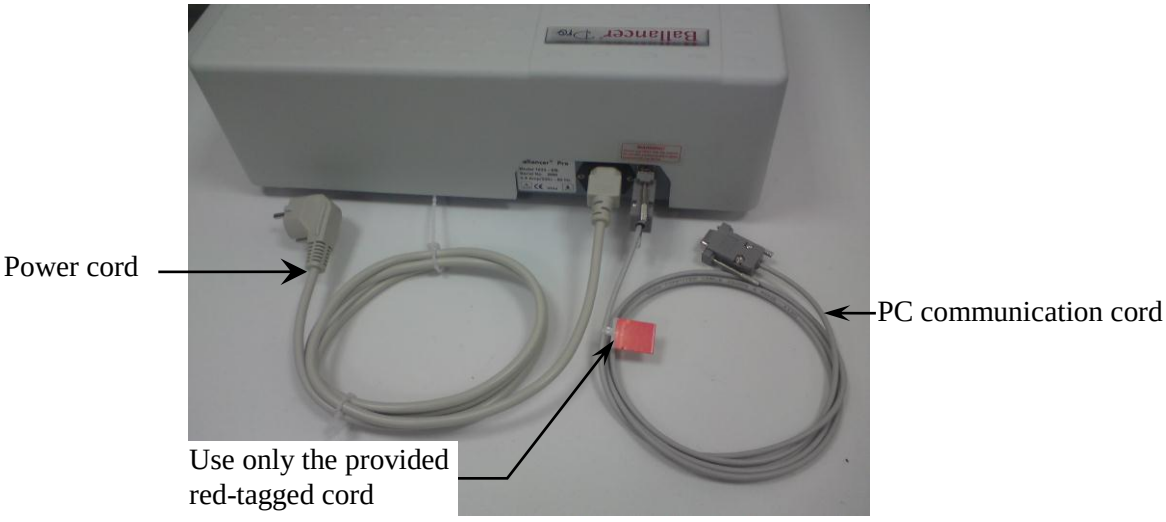

Figure 1.4 - Power Cord and PC Communication Cord

Section 2 Theory of Operation

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Update reference to the testing set figure in table 2.1	6	Mr. A. Weiss	14.09.2003
Update paragraph 18 in Electric/pneumatic system	2	Mr. N. Ben-Shalom	08.07.2007
Update Figure 2.1 - Electro-Pneumatic diagram	3	Mr. N. Ben-Shalom	08.04.2010
Add Paragraph 21 in Electric/pneumatic system	2	Mr. N. Ben-Shalom	08.04.2010
Update Paragraph 2.4.5 & Figure 2.2 & its caption	5	Mr. N. Ben-Shalom	28.04.2010

2.1 General

An air compressor in the unit distributes air pressure through a series of hoses. The hoses are connected to a garment containing air cells, which apply the pressure to the body part being treated.

The Lympha Press® Plus and Ballancer® Pro each have five different massage cycles which can be combined to create individualized treatment programs.

Please see the **Lympha Press® Plus User Manual Cat. No. L98101B0 or the Ballancer® Pro User Manual Cat. No. L98101B1** for descriptions of the cycles and the various treatment parameters set by the operator for each cycle.

2.2 Electric/Pneumatic System

(See Figure 2.1)

- No. 1 - power cord receptacle with 2 fuses.
- No. 2 - Main Switch (illuminate).
- No. 3 - Relay switches the compressor.
- No. 4 - Compressor, supplies the air pressure.
- No. 5 - Distributor controls the device cycle.
- No. 6 - Silencer (1/8").
- No. 7 - Pressure over load.
- No. 8 - Silencer (1/4").
- No. 9 - Check Valve.
- No. 10 - Main Board controls the entire system and safety functions.
- No. 11 - Pressure sensors (on the main board).
- No. 12 - Processor (replaceable, on the main board).
- No. 13 - Flat cable assembly connects the control panel (14) to the Main board (10).
- No. 14 - Control board, with four keys: UP, DOWN, ENTER/NEXT, START/STOP.
- No. 15 - Display assembly (with integral flat cable).
- No. 16 - Fan cools down the heat from the compressor (4) and Transformer (18).
- No. 17 - D9 Connector enables PC communication with the Main Board (10).
- No. 18 - Switching Power Supply, output 14 VDC.
- No. 19 - PC communication cable (specially made) enables editing the device program via PC.
- No. 20 - Remote stop button (optional) enables the patient to stop the device without reaching the control panel (14).
- No. 21 - Line Filter, to reduce emission level on the power line.

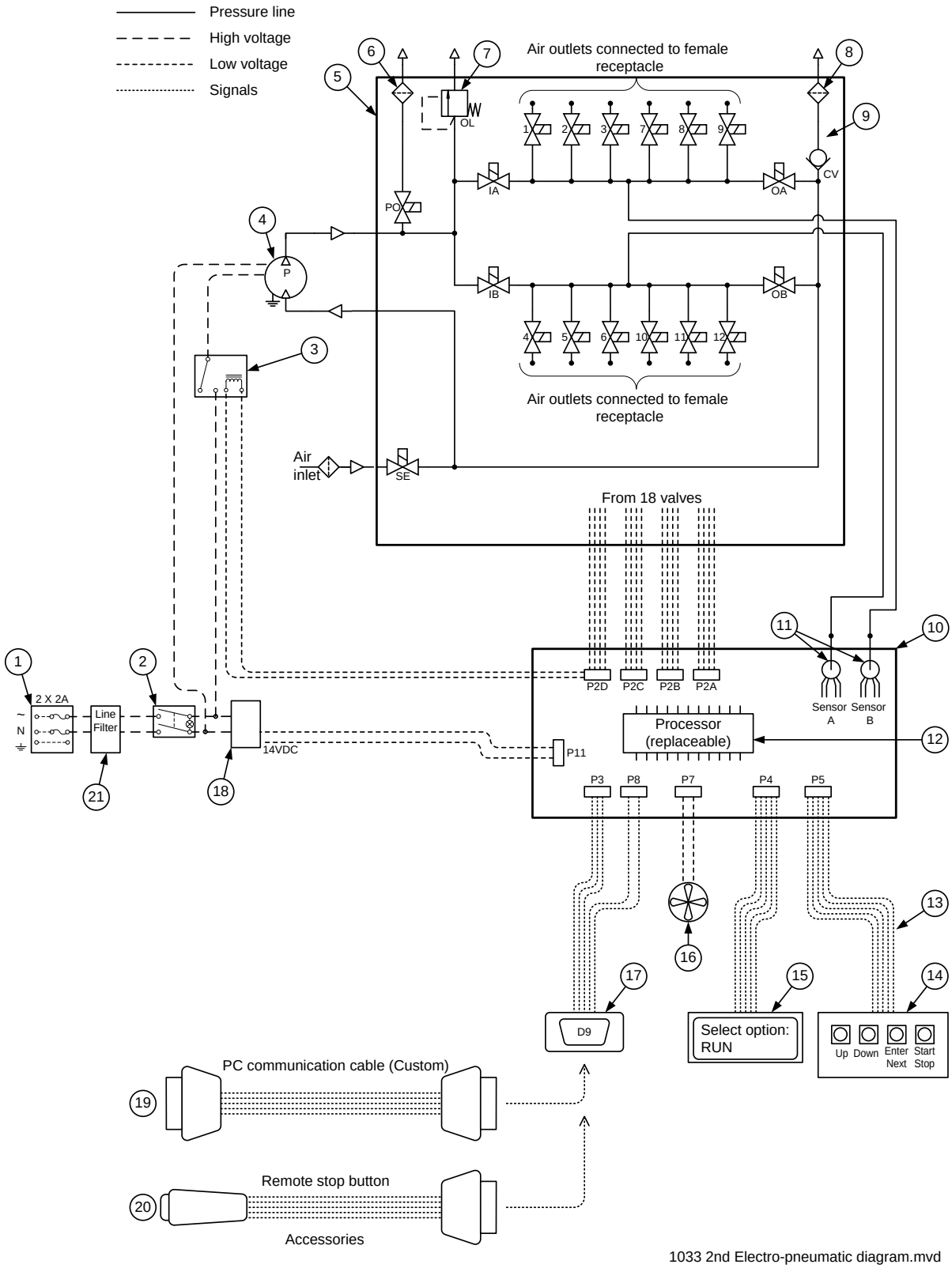

Figure 2.1 - Electro-Pneumatic Diagram

2.3 Theory of Operation

1. The compressor is turned on and off by means of the relay, so that it can be completely controlled by the processor on the main board.
2. The distributor is divided into two sections, A and B. Valves IA and IB are the inlet valves to these two sections, while OA and OB are their outlets.
3. The cycle is performed by opening and closing the 12 valves numbers 1 to 12. These 12 valves are divided into four groups of three valves each. Groups #1 and #3 belong to section A, while groups #2 and #4 belong to section B. The cycle starts with group #1 (1, 2, 3, one by one) via valve IA. Then IA is closed and IB is opened, enabling the pressure to group #2 (4, 5, 6). Then again IA and IB are switched to inflate group #3 (7, 8, 9). The cycle ends with group #4 (10, 11, 12) again, via IB. This system enables the device to produce the several different cycles that are described in the User Manuals.
4. At the end of treatment, the device goes into the active deflation stage when IA and IB are closed. When OA and OB opened, most of the air deflates via the Check Valve (9) until the pressure in the cells is low. Then the compressor sucks the extra air from the garment via OA and OB.
5. The valve PO opens whenever it is necessary to release air.
6. The valve SE closes to produce vacuum in the system when the device is actively deflating the garments.
7. The Processor (12) on the Main Board (10) is pre-programmed at the factory according to the specific model. This Processor is replaceable. If a new version of software is released, it can be replaced by another processor programmed with the new version. The version of the software is written on a label on the processor. To recognize the version without opening the device, see Paragraph 7.4.2 - PC program - Identifying Software Version.

2.4 Safety Precautions

2.4.1 Safety Valve

The line of the pressure that comes from the compressor is protected by a mechanical **Safety Valve** (7) that does not allow the pressure in the device to rise over its value. Sometimes the Safety Valve will be audible while working.

2.4.2 Normally Open Valve System

Normally Open Valve System means that in case of **electric breakdown or power failure,** all valves will open, letting out the air pressure from all the cells of the garments and allowing the garments to passively deflate.

2.4.3 Watchdog

In case of any malfunction in the program **Software**, an electronic safety device called "Watchdog" will identify the problem and stop the treatment immediately, allowing the air pressure to deflate from the garments. The device will return to Main menu - "RUN".

2.4.4 Stopping the Device

To stop the device at any time during treatment, press the Start/Stop button (or the Remote Stop button). The device will start deflating the garment. In case the device continues inflating, shutting down the **ON/OFF** switch will open all the valves, allowing the air pressure out of the garments.

2.4.5 Single Connection Option

The hose bundle connector is shaped asymmetrically and features a positioning mark. This is in order to ensure correct connection to the device.

Figure 2.2 - Hose Bundle Connector with Snap & Red Arrow (Positioning Mark)

2.4.6 Air Cell Identification Numbers

Identification numbers are affixed to the air hose tips to enable the operator to ascertain the proper inflation order.

Figure 2.3 - Numbered Air Hose Tips

2.4.7 Overload Protection Fuse

The device is equipped with two overload protection fuses to protect in case of a short circuit (see Figure 1.3).

2.5 Performance Verification / Test Procedure

To verify that the device is operational, and that it meets its performance specifications.
If malfunctions are detected during Test Procedure, refer to Troubleshooting (Section 4).

Note:
Always record the device cycle/program parameters before making any changes for testing/diagnostic purposes. Unless otherwise specified, device must be returned to customer with customer settings restored.

Table 2.1 - Device Cycle/Program Record Parameters

No.	Instructions / Comments	Parameters Tested	Test Results
1	Connect the right pressure outlet of device to the Standard Testing Set (see Figure 7.1) Plug the second air outlet	None	N.A.
2	Turn on the main switch	Main switch illuminates	
		The fan exhausts air downward from the base of the device.	
		LCD backlight is working	
		LCD letters are clear	
3	Edit Step 1 as follows: Cycle: Wave Pressure: 60 mmHg Operating time: 20 minutes Pause time: 4 seconds	Programming keys are functioning O.K.	
4	Operate the device and wait for 3 Complete cycles after the system has finished "learning".	No irregular noise.	
		All 12 pressures (when each gage is stabilized) are in the range of 47 mmHg to 73 mmHg.	
		Each of the 12 cells deflates completely as the pressure wave advances, and at the beginning of pause time.	
5	Press Start/Stop button	The device goes into "deflating…" stage	
		The device stops after deflation is complete	
6	Turn off device	None	N.A.

Section 3 Garments

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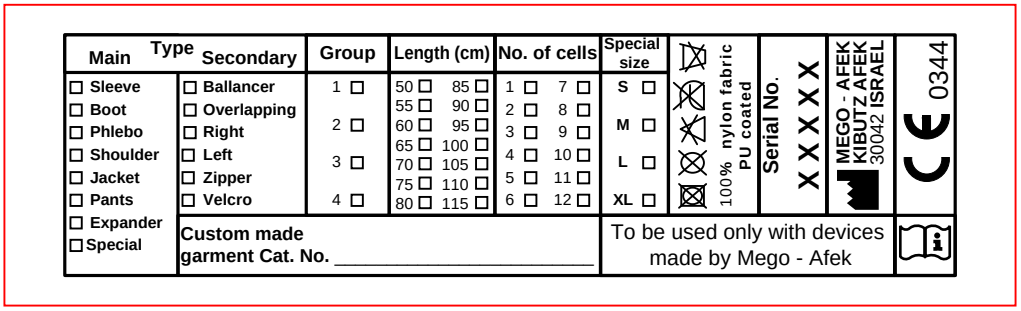
Initial release		Mr. A. Weiss	20.05.2003
Update garment identification label	2	Mr. I. Blaufeld	16.05.2006

3.1 The Garment Label

The label inside the sleeve (see Figure 3.1) is standard for all Mego Afek compression therapy garments, and shows the following categories listed below. (From left to right)

- Type - The model & type of sleeve (Main & Secondary).
- Group - The various sleeves are divided into four groups according to circumference..
- Length - The length of the sleeve from heel to top rounded to the nearest 5cm.
- No. of cells - The number of cells (inflatable chambers) in the sleeve.
- Special size - Within a group, the further breakdown of sizes.
- Custom Made - Custom made garments and their Cat. Number.
- International symbols with cleaning instructions of the garments (see User Manual)
- Serial No. - Serial number of the Compression Garment.
- The name and address of the manufacturer.
- CE label.



Garment label Rev-05

Figure 3.1 - Garment Identification Label

3.2 Garment Types

Garments for the Lympha Press® Plus fall into three categories:

- Zipper sleeve - for all pressures.
- Velcro sleeve - for pressures up to 80 mmHg only.
- Limb/torso garments - Medical overlapping pants, Ballancer Pro Pants, Ballancer Pants, and Ballancer Jacket.

The medical garments and the Ballancer Pro Pants have three fastening points for adjustable fit.

3.3 Garment Structure

1. Garment
2. Velcro strap
3. Zipper or Velcro
4. Bracket
5. Air cell
6. Plug (used when inserting a cell)
7. Cabin of air cell
8. Label

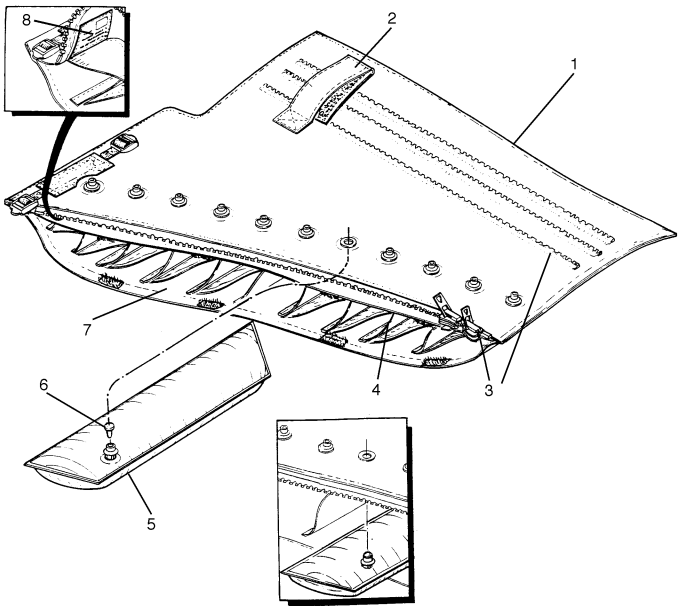


Figure 3.2 - Garment Structure

3.4 Replacing Air Cells

Note:
Single cells can be replaced in Zipper and Velcro leg/arm sleeves. Single cells in the pants and jacket cannot be replaced.

1. Verify that the air cell should be replaced.
2. Verify that the new air cell is identical.
3. Completely deflate the faulty air cell.
4. Push the air inlet of the faulty air cell against the sleeve with your thumbs, pushing out the air inlet from its place.
5. Pull out the faulty air cell (see Figure 3.2).
6. Inflate the new air cell.
7. Lock the air in the air cell using the plug (Figure 3.2 part 6).
8. Place the new air cell in the cabin.
9. Place the air inlet to the right hole (see Figure 3.2).
10. Push the air inlet into the hole using your thumbs. Position the air inlet correctly.
11. Disconnect the plug and empty the air cell.

3.5 Washing Instructions

Caution:

Zipper and Velcro leg/arm sleeves can be washed. The pants and jacket garments **CANNOT** be washed, and must be surface cleaned **ONLY**. See the User Manuals for surface cleaning instructions.

1. Remove the air cells from the sleeve. Do not wash the air cells.
   (For removal instructions see Paragraph 3.4 - Replacing Air Cells).
2. Gently hand or machine wash in lukewarm water using normal detergent or soap powder, not exceeding 40° C (100° F).
3. Drip dry only.
4. When dry, the sleeve may be wiped over with antiseptic lotion, alcohol or cream.
5. Return air cells to sleeve only after making sure that the sleeve is totally dry inside and outside.

3.5.1 To Sterilize

See User Manuals for instructions.

Warning:

DO NOT Autoclave, dry clean, hand or power wring, iron-tumble or force heat dry.

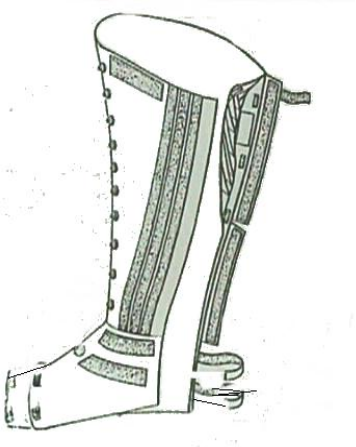


Figure 3.3 - View of Velcro Sleeve

3.6 Repair of Garment Zippers

Garment zippers may be repaired. Please contact us for specific instructions.

Section 4 Troubleshooting

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Updating Table 4.1 (Fuses - Corrective Action last paragraph) to Power Supply Board replacement	3	Mr. N. Ben-Shalom	17.06.2010

4.1 General

This section describes the procedures for troubleshooting the Lympha Press® Plus and the Ballancer® Professional to a specific Shop Replaceable Unit (SRU). Use the procedures when a problem or malfunction is detected during operation or during the testing procedures.

Warning:

Only an authorized technician should open the device and use the troubleshooting guide.

4.2 Troubleshooting Guide

The troubleshooting guide, described in Table 4.1, is used when a problem or malfunction is detected during operation or during the test procedures.

The troubleshooting guide consists of the following columns:

Symptom:	Describes problems and malfunctions that might be detected during operation or during test procedures.
Possible Cause:	Describes the most likely reasons for malfunction symptoms.
Corrective Action:	Details the maintenance procedures required to repair the device. The maintenance procedures often lead to the replacement of one or more of the device Shop Replaceable Units (SRUs).

4.3 How to Use the Troubleshooting Guide

When a malfunction symptom is detected, start with the first possible cause and perform the first appropriate recommended action. If the symptom persists, perform the next recommended action, and so on, until the problem is solved.

Note:

Replace a defective SRU with one known to be operational for replacement. Follow removal and installation procedures.

4.4 Fault Isolation

Listed below are a few reminders of basic fault isolation.

- Check associated equipment connections. Make sure that all connections are securely connected to the correct connector.
- Before continuing, check all accessories visually for any defects.
- Visually check the interior of the device. Inspect for evidence of overheating or short-circuiting. Check hoses and wires for good physical connections. Look for such indications as cut wires, charred components and loose leads. Correct any discrepancies detected.
- Try to isolate the problem to a specific unit by checking operation in all modes and referring to the disassembling procedures.

Warning:

Before replacement of any SRU, remove the electric cord from the power supply.

Table 4.1 - Troubleshooting Guide

Symptom	Possible Cause	Corrective Action
No power - The main switch does not illuminate	No electricity	Check the power outlet
	Power cord	Check power cord visually for any defects
	Internal disconnection	Check and fasten internal electrical connections
	Fuses	Check the fuses and replace if necessary. Replace fuses only with fuses of same type and rating. Check wiring according to wiring diagram (see Figure 2.1 & Figure 6.6). Disconnect the compressor and turn on the device. If O.K. replace compressor. If not, check and replace Filter Card or Power Supply Board.
The power switch light goes on but the LCD does not, or without backlight	Bad connection or flat cable	Check electrical connection and flat cable
	Defective LCD	Check and replace LCD assembly if necessary.
Invalid LCD display Characters	Defective LCD	Check and replace LCD assembly if necessary.
	CPU problem	Replace CPU
Pressing a button has no expected response	For Start/Stop button only: Using a comunnication cable other than that supplied with the device (no red mark).	Disconnect the comunnication cable and press Start/Stop button.
	Bad connection or flat cable	Check electrical connection and flat cable (Figure 6.2 ID No. 6)
	Defective switch	Replace the control board assembly
	Defective main board	Replace main board
The device starts initializing the system (series of clicks) but the compressor does not turn on	Disconnected compressor	Check compressoer connections
	Defective relay	Replace the relay
	Defective compressor	Replace compressor

Symptom	Possible Cause	Corrective Action
An irregular vibration noise	Transferring of vibrations to the supporting surface	Make sure the device is standing on all its bumpers
	Something touching compressor	Check and fix
	Distributor bracket is touching the base	Check and fix
	Defective compressor	Replace compressor
	Defective fan	Replace fan
1. During scanning, the display shows "0" for for a connected cell. 2. The device halts and shows"Pressure Fault" message	Kinked hose (of the hose bundle)	Check and fix
	Defective valve	Replace distributor assembly
	Defective main board	Replace main board
The device halts and shows "Pneum. Fault" message	Defective accessory	Check customer's accessories for air leaks.
	Leakage from female connectors	Check and replace "O" rings of the female connectors. Replace female connectors if necessary
	Defective valve	Replace distributor assembly
	Defective main board	Replace main board
The device halts and shows "ChkSum err." message	Defective main board	Replace main board
The device shows "Init. Ser Memory" message for few seconds and then "Ready"	Defective main board	Replace main board
The device does not finish "learning" after 10 cycles (when connected to the Standard Testing Unit)	The device is not calibrated	Perform calibration procedure (7.5.3)
	Defective valve	Replace distributor assembly
	Defective main board	Replace main board
PC comunication problem	Communication cable not connected properly	Check and fix
	Wrong Communication port	Select a different COM from the communication software
	Communication ports on the PC do not function properly	Contact your PC service
	Defective inner comunication bundle	Replace inner comunication bundle

Section 5 Disassembling Procedures

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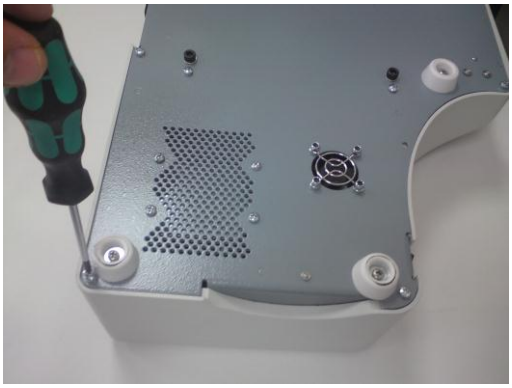
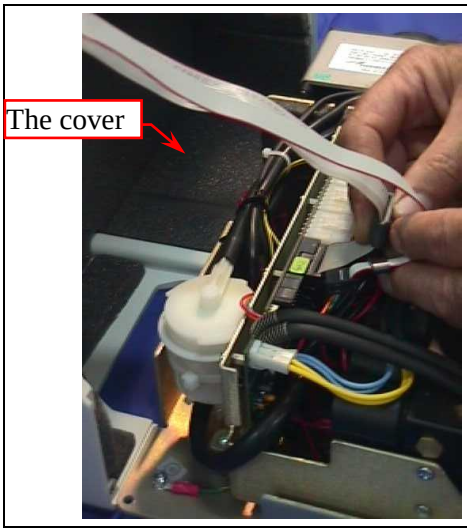
Initial release		Mr. A. Weiss	20.05.2003
Updating & adding photos and texts for device disassemling steps	2 to 6	Mr. N. Ben Shalom	28.04.2010

5.1 Disassembling the Device

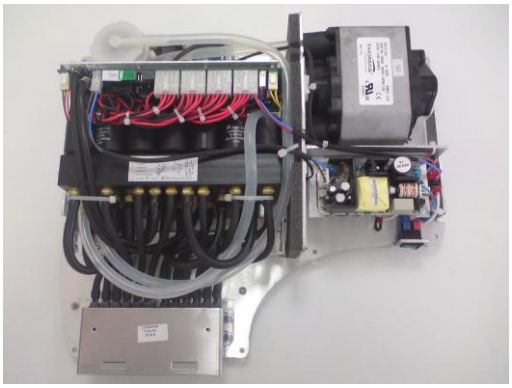


Step A Removing the cover:

1. Turn the device upside down on a clean soft surface.
2. Remove all the 8 screws arround the circumference.
3. Turn back the device and open the cover as shown in step B.

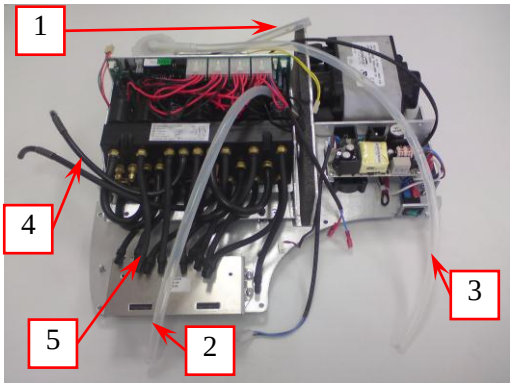


Step B Disconnect the two flat cables from the main board.



Step C Cable ties:

1. Before cutting all the ties that hold together the hoses and the wires, learn them carefully.
2. Cut all the cable ties.



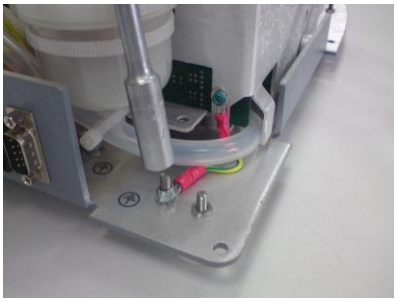
Step D Removing the electro-pneumatic control assembly:

Disconnect the wires and the hoses as follows:

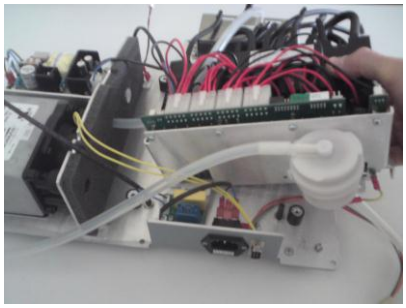
1. The wires coming from the power supply board.
2. The wires from the PCB to the relay.
3. The wires coming from the D-connector.
4. The wires from the fan.
5. The pressure hose (1) - from the compressor.
6. The vacuum hose (2) - from the compressor.
7. The inlet hose (3) - from the filter.
8. The two sensor hoses (4) - from the PCB.
9. The 12 hoses(5) from the female connector.

Step E Remove the 4 nuts and 4 screws that connect the base of the electro-pneumatic assembly to the main base.

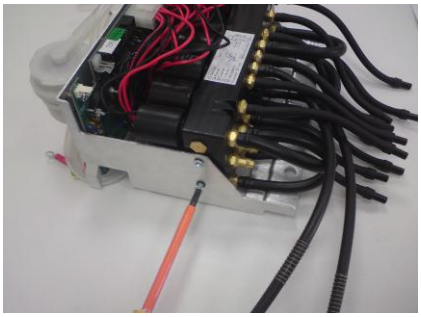
For reassembling please note: tighten the screws but not the nuts.



Step F Disconnect the grounding wire from the base

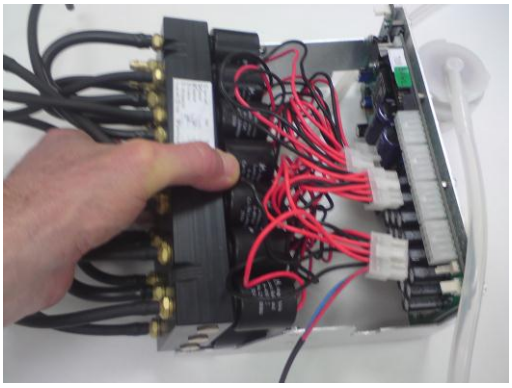


Step G Lift and remove the electro-pneumatic assembly from the base.

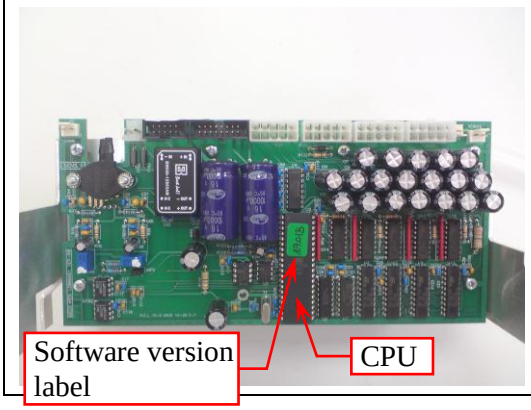


Step H Removing the distributor:

Remove the four screws (two on each side) that fix the distributor to its base.



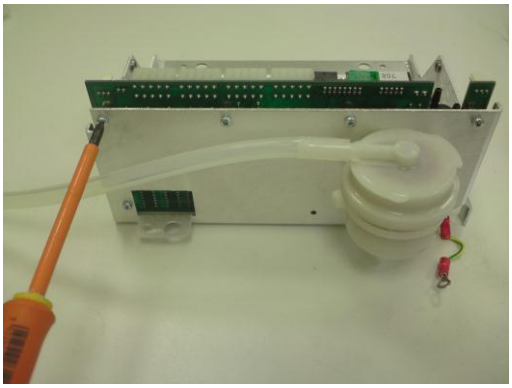
Step I Disconnect the four connectors that belong to the valves and take out the distributor.



Step J Replacing the CPU:

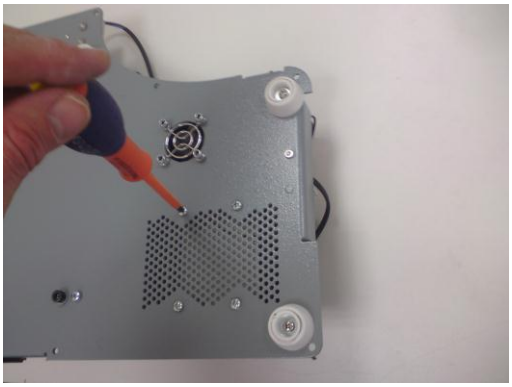
After removing the distributor, the CPU on the main board can be reached easily. Take out the CPU using a flat screwdriver No. 1.

A better way to reach the CPU is to remove the main board from its base without removing the distributor, as shown in step K.



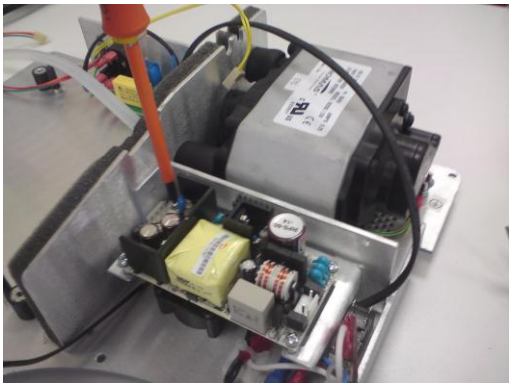
Step K Removing the main board:
(Can be done without removing the distributor).

Remove the six screws as shown.



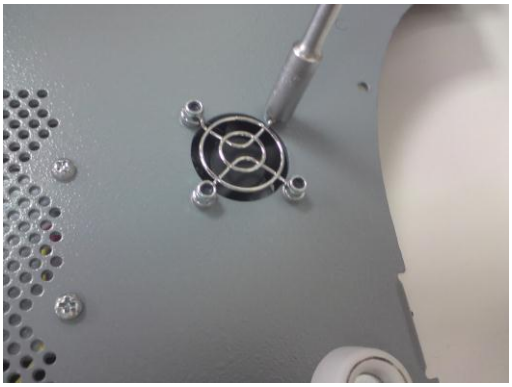
Step L Removing the compressor:

The compressor is fixed with four screws from the bottom side. Before removing, disconnect its grounding wire (see Figure 6.3 ID 16).



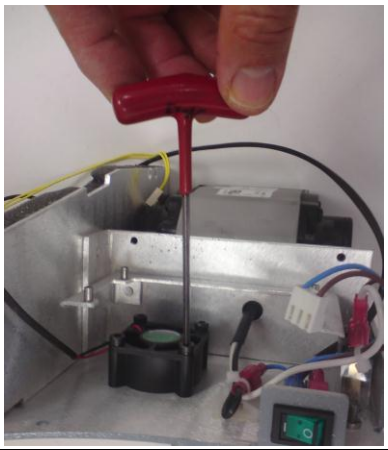
Step M Removing the Switching Power Supply:

The Switching Power Supply is fixed with four screws. Before removing, disconnect its wire connectors.



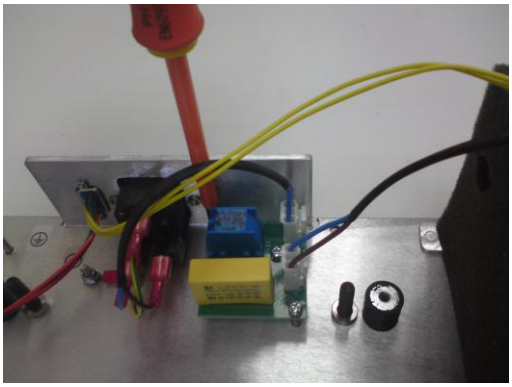
Step N Removing the Fan Guard:

The Fan is fixed with four screws and self-locked nuts. Use a 7-mm socket wrench to release the self-locked nuts.



Step O Removing the Fan:

Use a 3-mm hex driver to release the screws that fix the fan.



Step P Removing the Line Filter:

The Line Filter is fixed with 3 screws. Before removing, disconnect its wire connectors.

5.2 Reassembling the Device

After replacing the required SRU, reassemble the device in reverse order.

Connect all electric and pneumatic connectors according to the diagrams in Figure 2.1, Figure 6.6 & Figure 6.7.

Make sure to tie all wires and hoses as shown in the pictures above.

Note:

Safety electrical tests (see Paragraph 7.6) should be performed whenever an electrical reassembly of the high voltage circuit takes place.

Section 6 Parts List

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None

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Section Control Log

Changes Summary	Page Changed	Approved by	Approval Date
Initial release		Mr. A. Weiss	20.05.2003
Creating separate Parts List Tables for each assembly (Tables 6.1, 6.2, 6.3, 6.4) instead of the general Parts List Table (former Table 6.1)	3, 5, 7, 10	Mr. N. Ben Shalom	24. 05.2010
Updating Tables 6.5, 6.6	12, 14	Mr. N. Ben Shalom	24. 05.2010
Updating all Figures	2, 4, 6, 7, 9, 11, 13	Mr. N. Ben Shalom	24. 05.2010

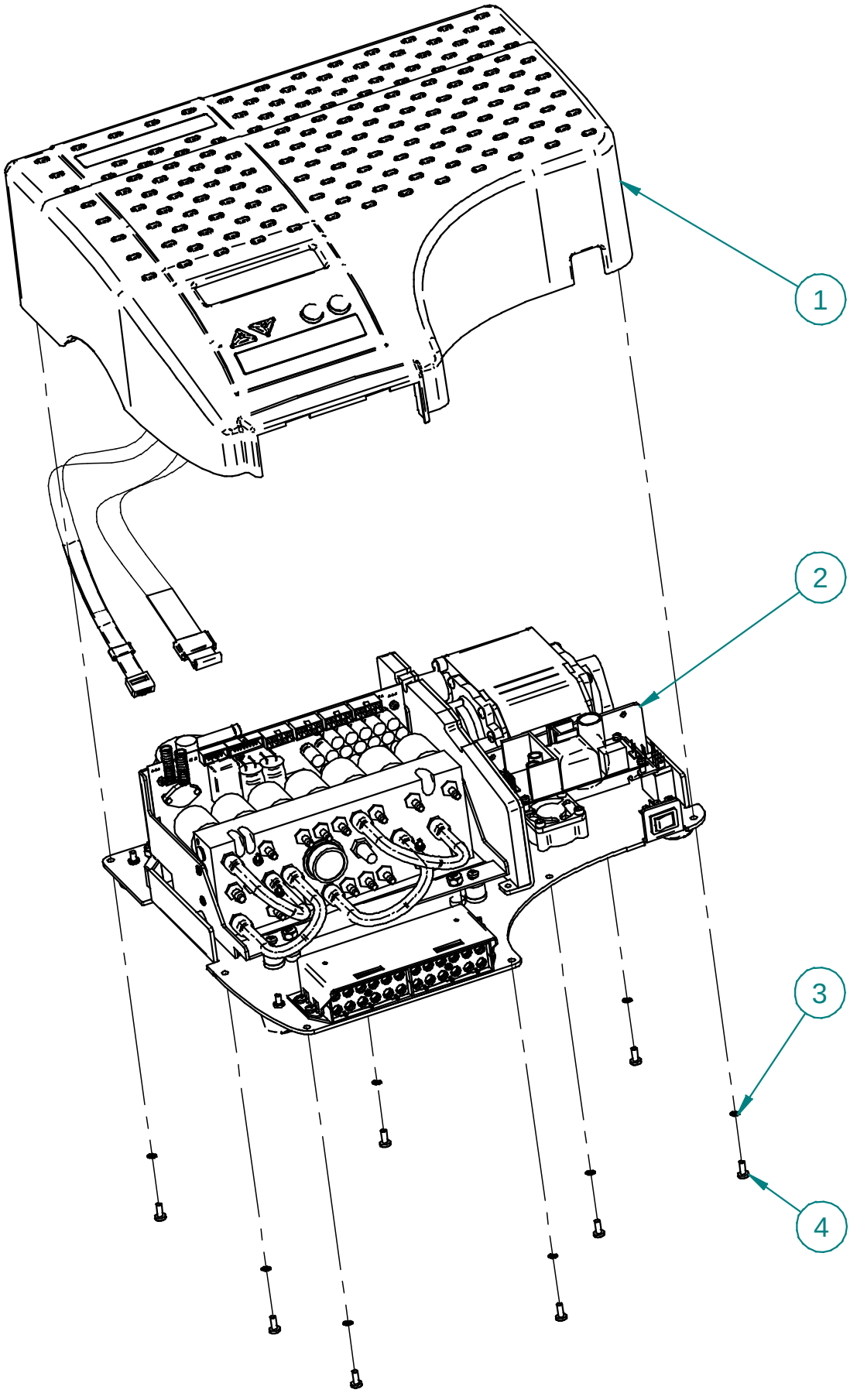


Figure 6.1 - Main Assembly

Table 6.1 - Main Assembly Parts List

Part ID	Part No.	Description	Qty	Recommended SRU
1	L27C02B0	Lympha Press Plus Cover Assy.	1	Including labels and buttons
	L27C02B1	Ballancer Pro. Cover Assy.		
2	L27B00B1	Base Assy. 110V	1	
	L27B00B3	Base Assy. 220V		
3	L6060400	Spring washer 4mm	8	
4	L6030100	Screw M4 X 10	8	

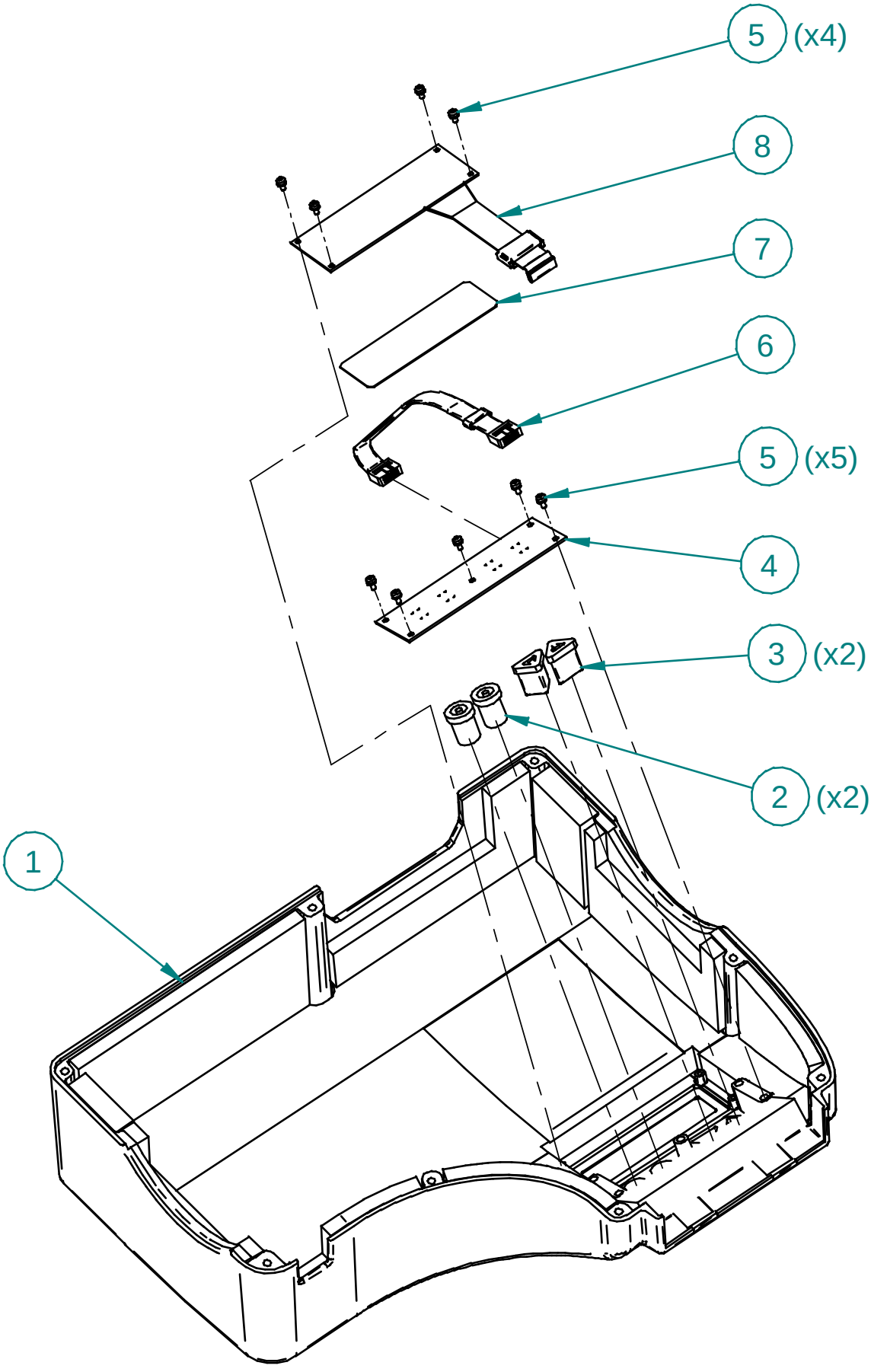


Figure 6.2 - Cover Assembly

Table 6.2 - Cover Assembly Parts List

Part ID	Part No.	Description	Qty	Recommended SRU
1	L27C02B0	Lympha Press Plus Cover Assy.	1	
	L27C02B1	Ballancer Pro. Cover Assy.		
2	L37220B1	Round button	2	
3	L37220B2	Triangular button	2	
4	L2D002B0	Control Board Assy.	1	√
5	L6220306	Screw M3x6 + Integral tooth washer	9	
6	L26200B0	Control Flat Cable Assy.	1	
7	L37551B0	Transparent Window	1	√
8	L2D000B0	Display LCD for B.Pro/LP Plus	1	√

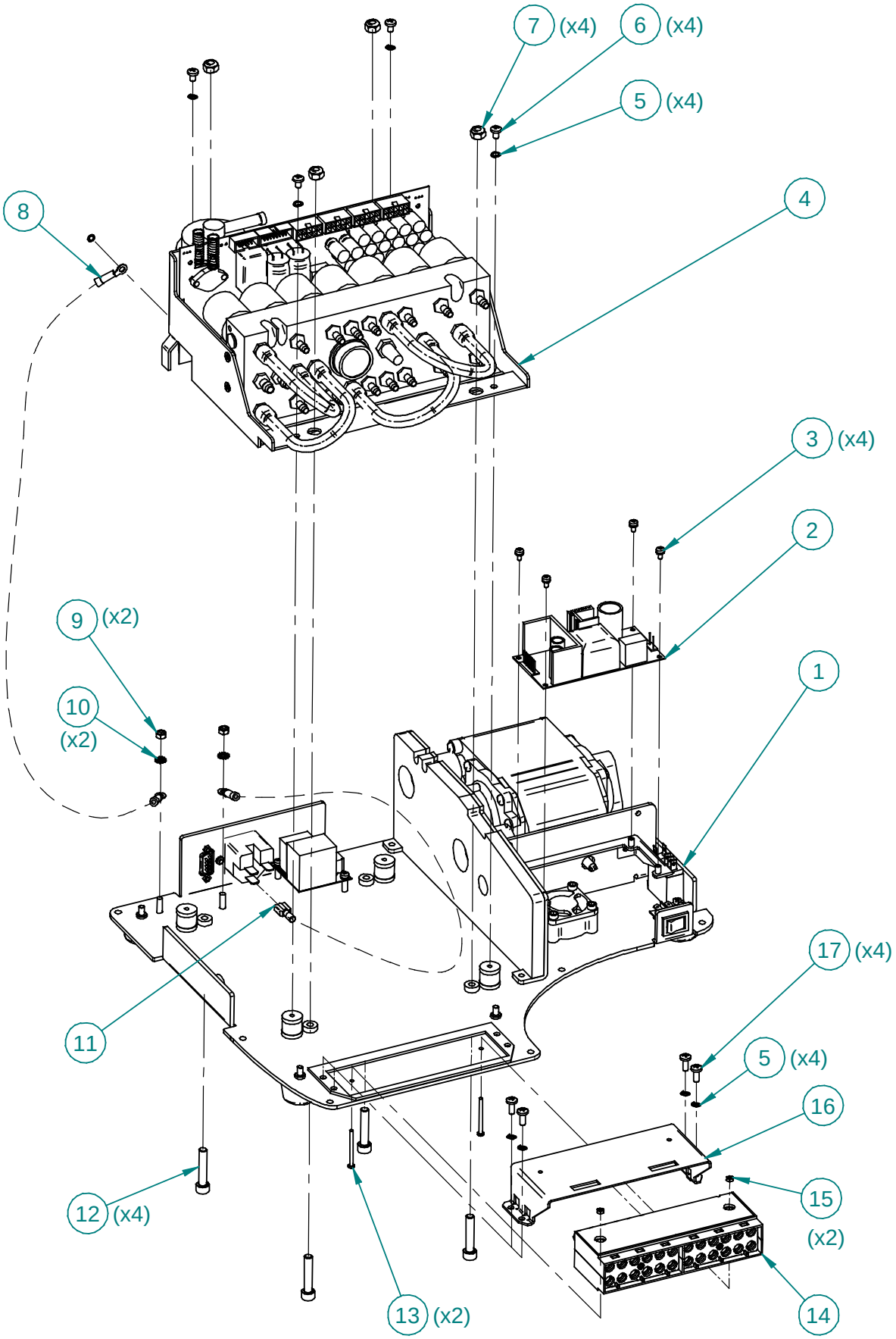


Figure 6.3 - Base Assembly 1

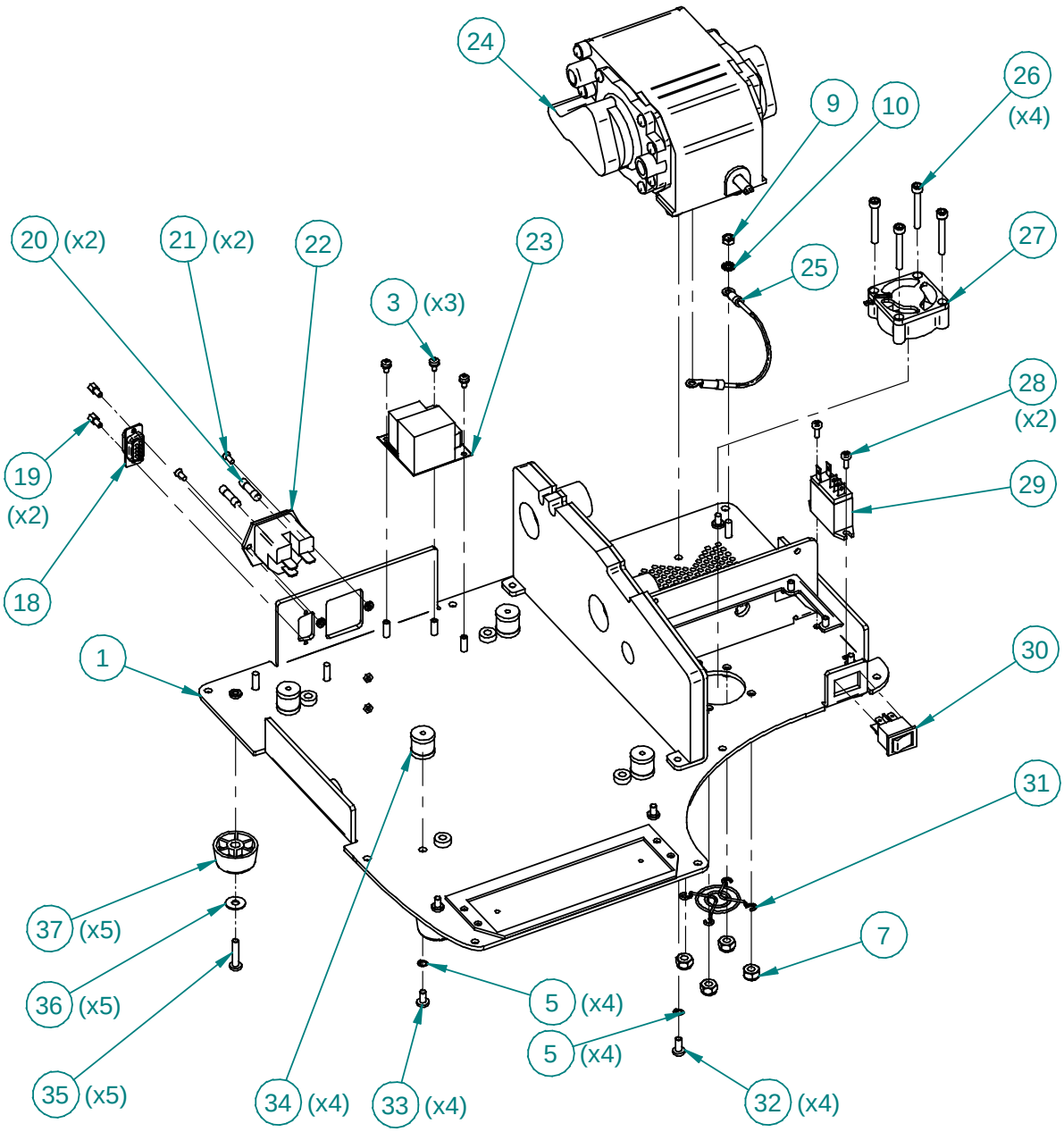
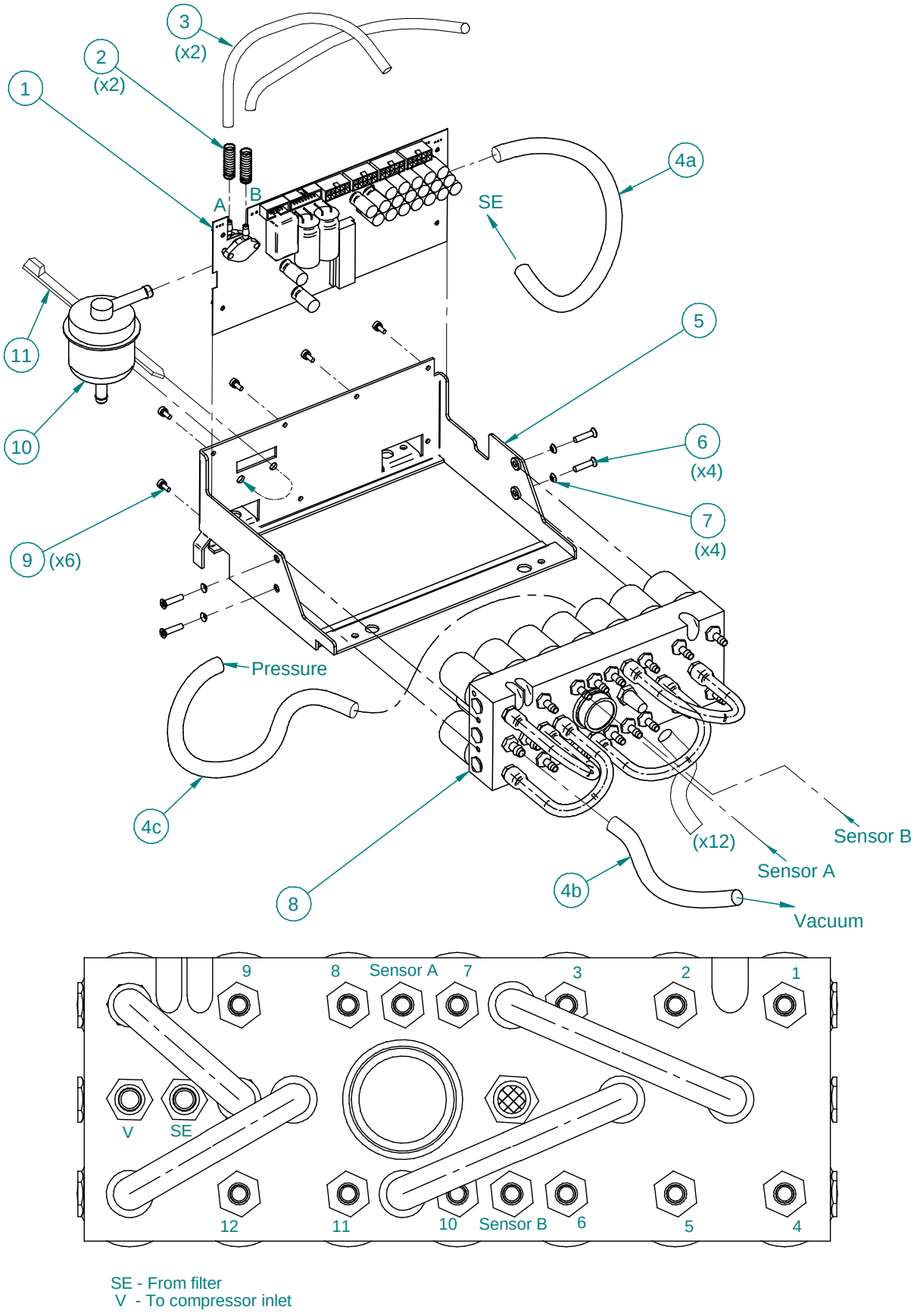


Figure 6.4 - Base Assembly 2

Table 6.3 - Base Assembly Parts List

Part ID	Part No.	Description	Qty	Recommended SRU
1	L37071B0	Base Bracket	1	
2	L2D002B1	Switching Power Supply RPS-60-15V	1	√
3	L6220306	Screw M3x6 + Integral Tooth Washer	6	
4	L29000B0	LPP Electro-Pneumatic Control Assy.	1	
	L29000B1	Bal.Pro. Electro-Pneumatic Control Assy.		
5	L6060400	Spring washer 4mm	16	
6	L6110460	Pan head screw M4x6	4	
7	L6106000	Lock Nut M6	2	

Part ID	Part No.	Description	Qty	Recommended SRU
8	L26D050D	Grounding wire R-R 230V 50 mm	1	
	L26C050D	Grounding wire R-R 115V 50 mm		
9	L6100300	Lock nut M4	2	
10	L6040600	Tooth washer 4mm	3	
11	L26D080E	Grounding wire F-R 230V 80 mm	1	
	L26C080E	Grounding wire F-R 115V 80 mm		
12	L6016030	Allen screw M6x30	4	
13	L6030200	Screw M2.5x30	2	
14	L2300121	Female Connector Assy	1	√
15	L6100100	Nut M2.5	1	
16	L37110B0	Bracket for female connector - LP	1	
17	L6030100	Screw M4 X 10	4	
18	L26160B0	Communication Bundle	1	√
19	LD0J0002	Screw 4-40 for D-type Connector	2	
20	L36651A4	Fuse S.B. 2A 5X20	2	√
21	L6170360	Screw M3 x 6	2	
22	L3646002	Twin Fused Power Inlet	1	
23	L2D004B0	Filter Board	1	
24	L22000B3	Compressor Assy. 230V	1	√
	L22000B0	Compressor Assy. 115V		
25	L26C120D	Grounding wire R-R 115V 120mm	1	
	L26D120D	Grounding wire R-R 230V 120mm		
26	L6010300	Screw M4 x 30	4	
27	L26860B0	Fan Assy.	1	√
28	L6110308	Pan head screw M3x8	2	
29	L3650001	Relay SPDT 12V	1	√
30	L3627005	Main Switch	1	√
31	L3672041	Fan Guard 40mm	1	√
32	L6110200	Pan head screw W5/32x3/8	1	
33	L6110480	Pan head screw M4x8	3	
34	L32521A1	Bumper	4	
35	L6110300	Pan head screw M4x20	5	
36	L6045013	Washer 5X13X1 mm	5	
37	L3752015	Rubber Leg	5	



SE - From filter
V - To compressor inlet

Figure 6.5 - Distributor and Main Board Assembly

Table 6.4 - Distributor & Main Board Assembly Parts List

Part ID	Part No.	Description	Qty	Recommended SRU
1	L2D003BL	Main Board LP Plus (SPS)	1	√
	L2D003BB	Main Board B. Pro (SPS)		
2	L3118222	Spring	2	√
3	L24B300A	Hose 4/7 300 mm	2	√
4a	L5910610	Silicon hose 6/10	550 mm	√
4b			430 mm	√
4c			430 mm	√
5	L39020B0	Distributor Bracket LP Plus / B. Pro	1	√
6	L6034015	Flat head screw M4x15	4	
7	L6040700	Conic Washer 3.5	4	
8	L29100B0	Distributor Assy. LP Plus / B. Pro	1	√
9	L6230308	Screw M3x8+Integral spring washer	6	
10	L3415121	Air Filter	1	√
11	L9600300	Secure Strap 310 x 5 mm	1	

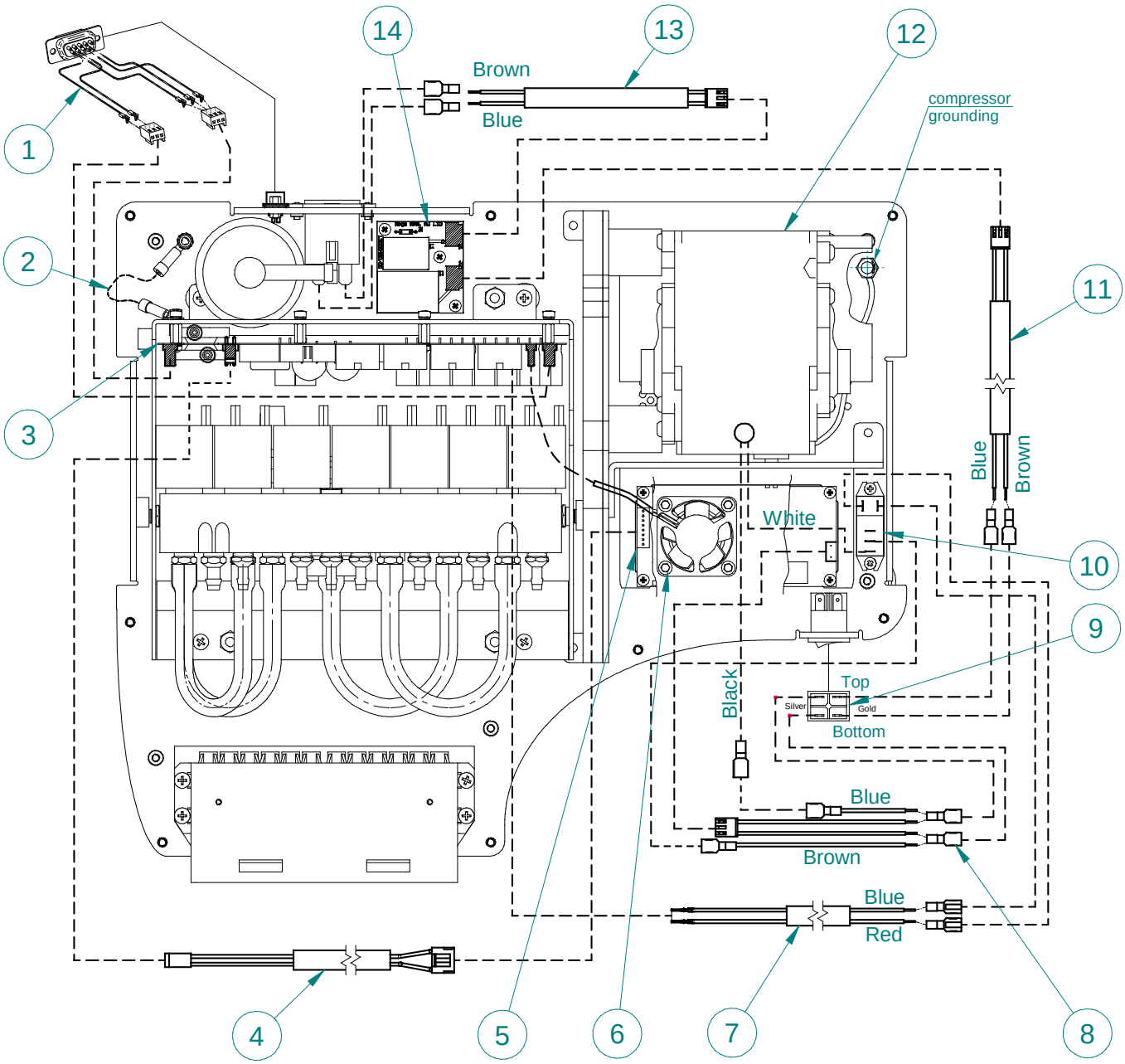


Figure 6.6 - Wiring Diagram

Table 6.5 - Wiring Parts List

ID #	Table #	Part #	Part No.	Description	Qty	Recommended SRU
1	6.3	18	L26160B0	Communication Bundle	1	
2	6.3	8	L26D050D	Grounding wire R-R 230V 50 mm	1	
			L26C050D	Grounding wire R-R 115V 50 mm		
3	6.4	1	L2D003BL	Main Board LP Plus (SPS)	1	√
			L2D003BB	Main Board B. Pro (SPS)		
4	--	--	L26161BD	Bundle D-Power Supply to Main Board	1	
5	6.3	2	L2D002B1	Switching Power Supply RPS-60-15V	1	√
6	6.3	27	L26860B0	Fan Assy.	1	√
7	--	--	L26161BE	Bundle E - Relay control	1	Part of Distributor Assy.
8	--	--	L26161BC	Bundle C-Main Switch to Relay & PS	1	
9	6.3	30	L3627005	Main Switch	1	√
10	6.3	29	L3650001	Relay SPDT 12V	1	√
11	--	--	L26161BB	Bundle B - Filter to Main Switch	1	
12	6.3	24	L22000B3	Compressor Assy. 230V	1	√
			L22000B0	Compressor Assy. 115V		
13	--	--	L26161BA	Bundle A - Power Inlet to Filter	1	
14	6.3	23	L2D004B0	Filter Board	1	√

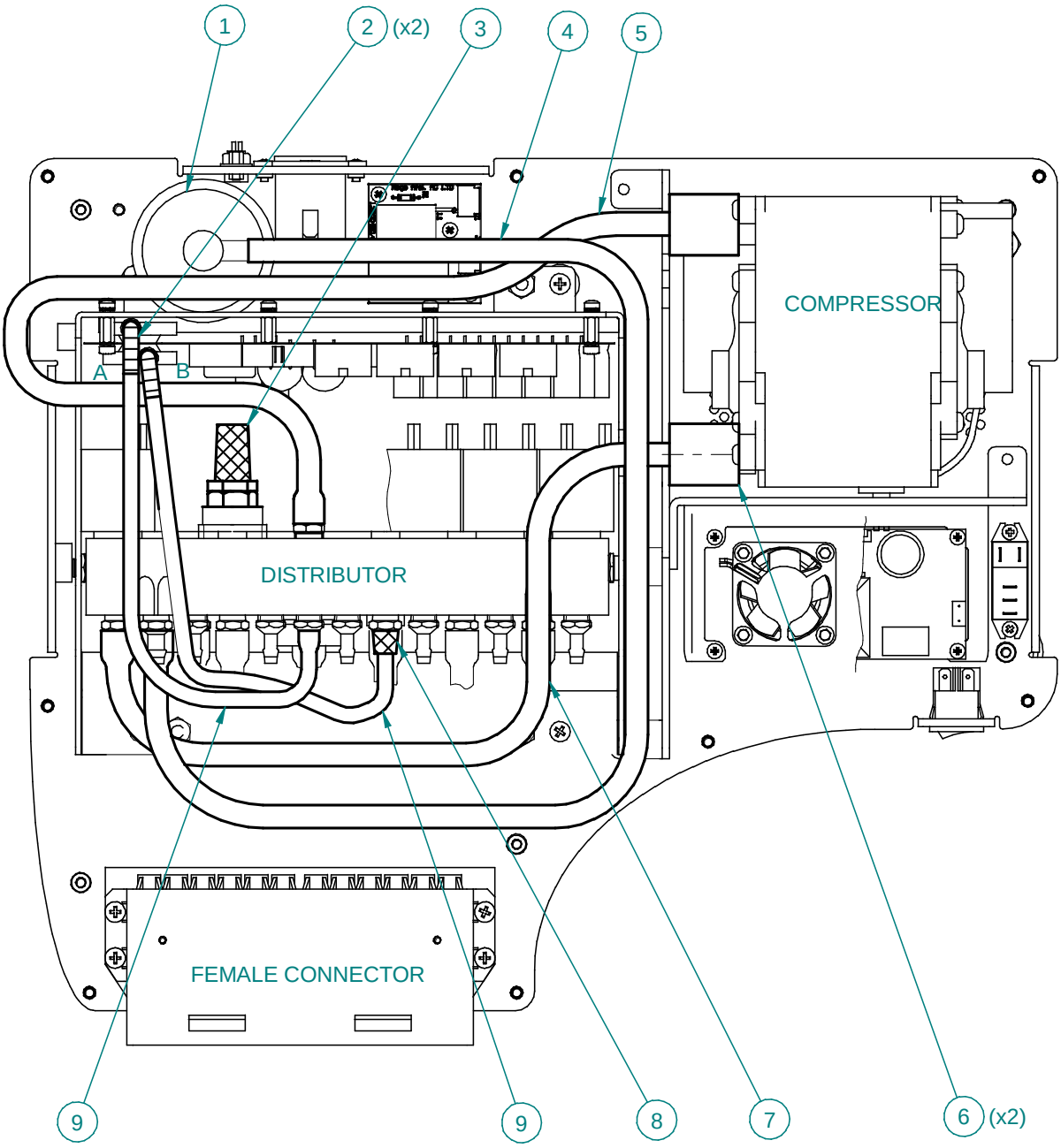


Figure 6.7 - Pneumatic Diagram

Table 6.6 - Pneumatic Parts List

ID #	Table #	Part #	Part No.	Description	Qty	Recommended SRU
1	6.4	10	L3415121	Air filter	1	
2	6.4	2	L3118222	Spring	2	
3	--	--	L3420002	Silencer 1/4 BSPT	1	
4	6.4	4a	L5910610	Silicone hose 6/10 550 mm	1	√
5	6.4	4b	L5910610	Silicone hose 6/10 430 mm	1	√
6	--	--	L3214121	Sponge hose 10/25 40 mm	2	
7	6.4	4c	L5910610	Silicone hose 6/10 430 mm	1	√
8	--	--	L3420001	Silencer 1/8 BSPT	1	
9	6.4	3	L24B300A	Hose 4/7 300 mm	2	√

Section 7 Maintenance

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Changes Summary	Page Changed	Approved by	Approval Date
Initial release		Mr. A. Weiss	20.05.2003
Adding NOTE about annually calibration of test equipment	3	Mr. A. Weiss	14.09.2003
Adding figure (7.1) of testing set	3	Mr. A. Weiss	14.09.2003
Update references to the testing set fig. and other figures	7	Mr. A. Weiss	14.09.2003
Updating Safety Electrical Tests	8	Mr. N. Ben Shalom	01.06.2010
Updating Safety Electrical Tests	8	Mr. Shay Doron	09.02.2012

7.1 General

This section provides instructions and procedures for maintenance of the device, including inspection, cleaning, calibration and electrical performance test.

Warning:

Only an authorized technician should use the instructions and perform the procedures listed below.

7.2 Inspection and Maintenance Schedule

Perform the Test Procedure (see Paragraph 2.5) once a year.

7.3 Cleaning

For operating and maintenance of the devices, cleaning is not required. Should the need arise, clean in accordance with the following procedures:

Clean wiring, connectors, and electrical components with a small, stiff-bristled brush, and cleaning solvent made for electrical parts.

Wipe parts with a clean, dry, lint-free cloth.

Warning:

Cleaning solvent is toxic and flammable. Avoid contact with skin, eyes or breathing of vapors. Protective equipment consisting of goggles and rubber gloves is required. Good general ventilation is normally adequate. Failure to observe this warning may result in serious personal injury or death.

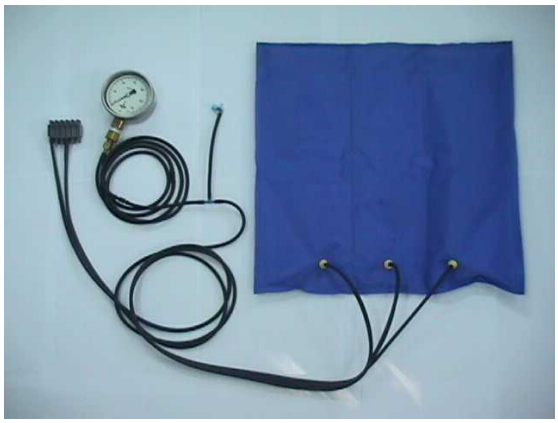
7.4 Special Tools and Test Equipment

Note:

Pressure gauges should be calibrated annually, by an authorized laboratory.

7.4.1 Standard Testing and Calibration Sets

Figure 7.1 - Testing Set (12 Pressure-gauge Board and Hose Bundle)



A. Overall View

B. Connector, Pressure Gauge, and Relief Valve

Figure 7.2 - Calibration Set

7.4.2 PC program - Identifying Software Version

Whenever an old device comes in for service, you need to identify the software version. Although the version is written on a label affixed to the Main Board (see Paragraph 5.1 Step J), there is a much easier way to obtain this information without opening the device:

(a) Connect the device to your PC, using our special PC communication cord (supplied with the device).

(b) Turn On the device and select the "PC Communication" option.

(c) Open the "Version Check" program (see Figure 7.3).

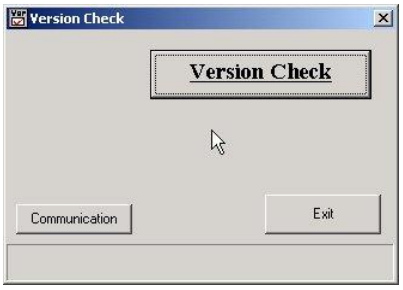


Figure 7.3 - Version Check Program

(d) Press **Version Check**. The software version number appears on the screen.

(e) If you receive an error message, try selecting another COM using the **Communication** button.

7.4.3 PC program - Send Default

When there is a need to reset the program of the device to the default factory parameters, use the **AutoDefault** program:

(a) Connect the device to your PC, using our special PC communication cord (supplied with the device).

(b) Turn On the device and select the **PC Communication** option.

(c) Open the **AutoDefault** Program (see Figure 7.4)

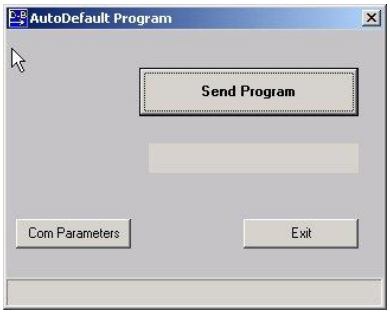


Figure 7.4 - AutoDefault Program (1)

(d) Press **Send Program**.

Figure 7.5 - AutoDefault Program (2)

(e) The software version number appears in the window, informing you that the device has been programmed with the default program.

7.5 Technician Parameters and Calibration Procedure

This section describes special technician settings and their uses. It also describes how to calibrate the device.

7.5.1 Technician Parameters and Calibration Menu

To enter the menu, press and hold both **UP** and **ENTER/NEXT** keys for five seconds.
You will see this screen:

```
Enter PassWord
```

You need to contact the factory to receive your password. Enter your password.
You will see this screen:

```
Calib. MODE?
: NO
```

Selecting **NO** (using **NEXT/ENTER** key) brings you to the Technician Parameter List - 7.5.2.

Changing **NO** to **YES** (using the **UP** key), and then pressing the **ENTER/NEXT** key brings you to the calibration procedure screen (7.5.3).

Note:

Once you enter the calibration procedure, you have to perform the calibration, i.e., to enter the pressure values properly. Otherwise, the device will get out of calibration.

7.5.2 Technician Parameter List

On each of the following screens you can change the value of the parameter, using the **UP** or **DOWN** keys. Pressing the **NEXT/ENTER** key will accept the value on the screen and move you to the next parameter as follows:

- **Vacuum value for deflating - "Vacuum A/D Val":** The active deflation at the end of treatment will stop (and switch the device back to "Run" option) only when the processor gets this value from the pressure sensors. **The default value is 12.** If the device stops the deflation before the garment has completely emptied, increasing this value may help.
- **Maximum excess pressure - "Emrgn Pressure":** This parameter sets the maximum pressure in excess of the requested pressure allowed by the device. When the system reaches the limit set by this maximum excess pressure value, it stops the treatment and displays **"Pressure Fault"** on the screen. **The default value is 60 mmHg**. The most common reason for this error is a kinked hose bundle or a faulty valve in the distributor.
- **Gradient pressure along the sleeve - "Delta Pressure":** This parameter enables the user to set a constant pressure gradient along the sleeve from distal to proximal, according to medical needs. **The default value is 0 mmHg**, which means "no gradient". When a different delta pressure value is given, Cell No. 1 will attain the requested pressure, while the pressure for Cell No. 2 will be lower by the value chosen for "Delta Pressure," Cell No. 3 will be lower than Cell No. 2, and so on. When the cell pressure reaches 20 mmHg, all the following cells will be set to 20 mmHg until the last cell (No.12). For example, if the user requests pressure= 60, with Delta = 5, the pressures will be: 60, 55, 50, 45, 40, 35, 30, 25, 20, 20, 20, 20.
- **Minimum time for filling a cell - "Min Fill Time":** This parameter reinforces the minimum time that the system "stays on a cell" before it starts filling the next cell, even though the cell has already gained the required pressure. **The default value is 20x100ms** (2 seconds). Making it shorter may create a quicker cycle (for Lympha and Wave) if the cells of the sleeve are small enough, but may in some circumstances provide less effective treatment to the limb.
- **Maximum time for filling a cell - "Max Bag Time":** This parameter reinforces the maximum time that the system "stays on a cell" before it stops the treatment, displaying **"Pneum. Fault"** on the screen. This announcement means mostly that there is a leakage somewhere in the system (see Troubleshooting). **The default value is 70 seconds**. If you get this announcement and you have determined that there is no leakage, it may also tell you that the compressor is getting weak. In this case, if the problem occurred at the customer's location and it is urgent that you get the device operational until you replace the compressor, increasing this value can help.
- **Pause time between steps - "Mix Pause":** This pause allows the patient to feel that a step of the treatment has ended, and the next step is about to begin. **The default value is 5 seconds**.
- **Scanning pressure - "Scan Pressure":** This value establishes the pressure at which the device performs the scanning for plugged cells (displaying "1" for an open cell, and "0" for a plugged one). **The default value is 120 mmHg**. Increasing this value may give "0" for an open cell, and decreasing the value may give "1" for a plugged one.

- **Total operating time counter**. This option is for device rentals. The display shows:

```
20:25    Reset?
: NO
```

  - The digits to the right of the colon represent X/100 of an hour, e.g. ":25" = 25/100 of an hour, i.e. 15 minutes. This method of reporting enables easier cost calculations.
  - Choosing "NO" (by pressing **NEXT/ENTER** key) will return you to the main menu, "RUN".
  - Changing NO to YES (using **UP** key) and then pressing **ENTER** will reset the counter to 00:00 and then bring you back to the main menu "RUN". The counter can go up to 999:99 hours before starting from the beginning.

7.5.3 Calibration Procedure

Prior to calibrating the device, connect the right side of the female connector to the special **Calibration Set** (See Figure 7.2). Make sure that its pressure gage has a valid calibration certificate.

(a) Follow the steps indicated by the screens below:

```
Calib. MODE?
NO
```

UP=>

```
Calib. MODE?
YES
```

=>ENTER

```
ENTER Pressure
: 25
```

(b) The device now starts to inflate the cells to the low pressure. If the pressure on the gage is different from 25 mmHg, change the number on the device screen to the real pressure using **UP** or **DOWN** keys. Press **ENTER** when the screen and the gage show the same number.

```
ENTER Pressure
: 90
```

(c) Repeat the instructions above to get the same number on the screen and gage, then press **ENTER.**

(d) The screen now shows two **A/D values** (of the two sensors) and their matching pressures:

```
105          116   <= A/D values
 96           97   <= pressure[mmHg]
```

(e) **Checking the calibration accuracy:** Make sure that the pressures shown on the bottom row are within the range of ±2 mmHg from the pressure gage.

(f) Release the pressure back to a low pressure (30-40) using the relief valve on the **Calibration Set**. Check the accuracy for the low pressure too.

(g) If the calibration accuracy values for both high and low pressures are within the limits, calibration is complete. **Press ENTER** to return to "**Select Option: RUN".**

(h) If one or more of the values are not within the limits, recalibrate the device (starting from the beginning, see Paragraph 7.5).

7.6 Safety Electrical Tests

Perform safety electrical tests that are required in your country.