



MEGO AFEK
medical division

Maintenance Manual

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



L93102B0

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Section 1 General Description

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Changing Street address of MDD - Authorized representative in Europe	2	Mr. I. Blaufeld	31.12.2005

1.1 General

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

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

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

If you have any questions or require any further information, please contact us. You can reach us at Phone: +972 4 8784277; Fax: +972 4 8784148.

1.2 Symbols on device



ATTENTION!

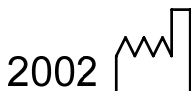
READ INSTRUCTIONS CAREFULLY BEFORE USE

Located on: Back of device.



LEVEL OF PROTECTION - TYPE BF EQUIPMENT

Located on: Back of device.



DATE OF MANUFACTURE

Located on: Bottom of device.



CE MARK SHOWING COMPLIANCE WITH EC DIRECTIVE 93/42/EEC.
(MEDICAL DEVICE DIRECTIVE)

Located on: Back of device.

1.3 Manufacture & authorized details

1.3.1 Manufacture

Mego Afek
Kibbutz Afek 30042
Israel

1.3.2 MDD - Authorized representative in Europe

Rolf Davidsen Helseagenturer A/s
Postboks 238,
Vesttieimvegen 35, Bygnes, 4250 Kopervik
Norway
Tel: +47-52-844500 Fax: +47-52-844509

1.3.3 Authorized representative in USA

Global medical imports inc.
70 Heritage avenue, unit #9
Portsmouth, NH, 03801
Tel: 1-800-301-2103
1-603-334-6800
Fax: 1-603- 334-6464

Table 1.1 - Dimentions

	Lympha Press® Plus	Ballancer® Professional
Height	140 mm	140 mm
Length	410 mm	410 mm
Width	340 mm	340 mm
Net Wt.	10 Kg	10 Kg

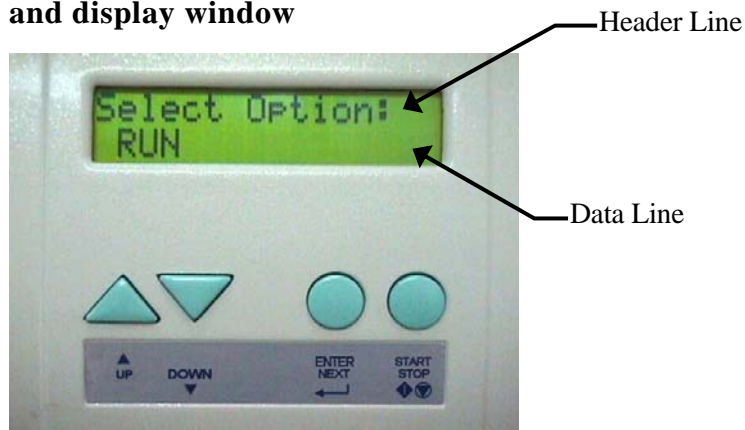
Table 1.2 - Specifications

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

Figure 1.1 - General view



Figure 1.2 - Control panel and display window

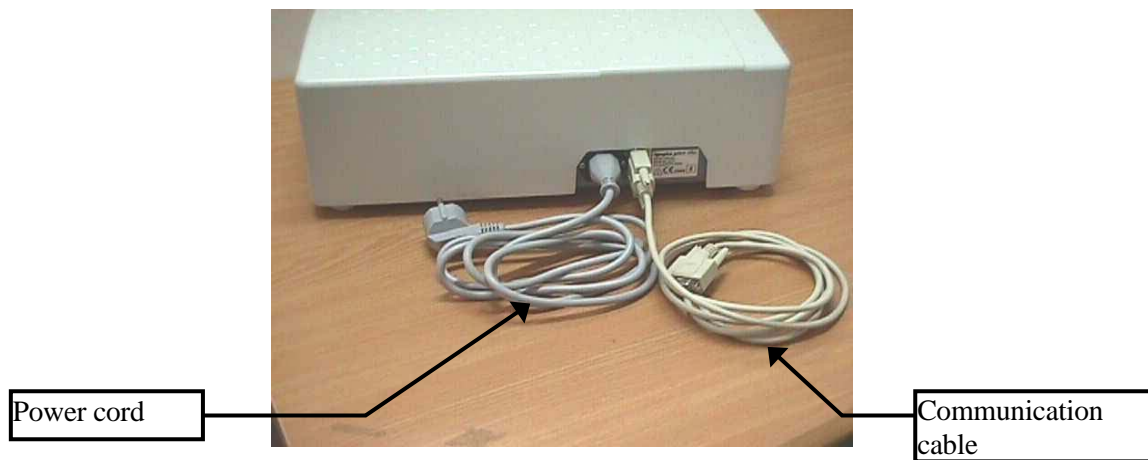


The display window shows the Header Line describing your present location within the program. The Data Line is where you choose your setting. All data is entered by means of the four keys on the panel. The UP and DOWN keys scroll throughout the setting options. The ENTER/NEXT key inputs your setting 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

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.

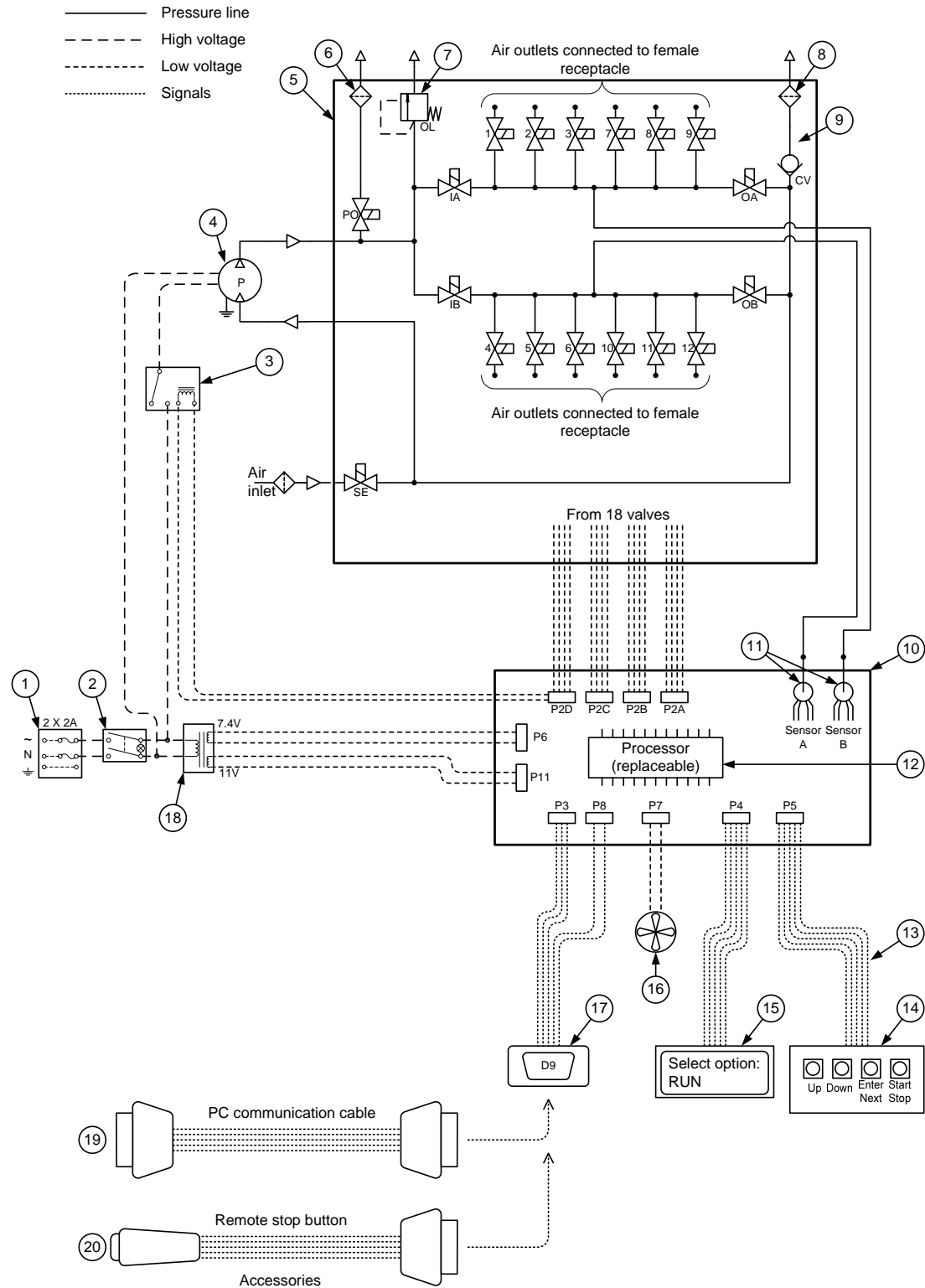
Please see the **LYMPHA PRESS[®] PLUS Operation Manual Cat. No. L98101B0** or the **BALLANCER[®] PRO Operation Manual Cat. No. L98101B1** for descriptions of the cycles and the various treatment parameters set by the operator for each cycle.

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 - Transformer, enables 11V for the valves and 7.4V for the circuit.
- No. 19 - PC communication cable (special made), enables editing the device via PC.
- No. 20 - Remote stop button (optional), enables the patient to stop the device without reaching the control panel (14).

Figure 2.1 - Electro-Pneumatic diagram



1033 Electro-pneumatic diagram.VSD

2.3 The 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 over load valve** (7) that doesn't let the pressure in the device to rise over it's value. Sometimes the Safety Valve will be audible while working.

2.4.2 Normally opened valves system

Normally Open Valves System means that in case of **electric break 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 "Watch dog"

In case of any malfunction in the program **Software**, an electric safety device called "Watch Dog" 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 External 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 12-prong pin air plug is shaped asymmetrically and features a positioning mark. This is in order to ensure correct connection to the device.

Figure 2.2 - 12 Prong plug with 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 Trouble-shooting (Section 4).



NOTE:

Always record the device's 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's 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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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 Operation Manual
- Serial No. - Serial number of the Compression Garment.
- The name and address of the manufacturer.
- CE Marking.

Figure 3.1 - Identification garment label

Main	Type	Secondary	GROUP	Length	No. of cells	Special size				
<input type="checkbox"/> Sleeve		<input type="checkbox"/> Ballancer	1 <input type="checkbox"/>	50 <input type="checkbox"/> 85 <input type="checkbox"/>	1 <input type="checkbox"/> 7 <input type="checkbox"/>	S <input type="checkbox"/>		100% nylon fabric PU coated	Serial No. XXXXX	MEGO - AFEK KIBUTZ AFEK 30042 ISRAEL
<input type="checkbox"/> Boot		<input type="checkbox"/> Overlapping	2 <input type="checkbox"/>	55 <input type="checkbox"/> 90 <input type="checkbox"/>	2 <input type="checkbox"/> 8 <input type="checkbox"/>	M <input type="checkbox"/>				
<input type="checkbox"/> Phlebo		<input type="checkbox"/> Right	3 <input type="checkbox"/>	60 <input type="checkbox"/> 95 <input type="checkbox"/>	3 <input type="checkbox"/> 9 <input type="checkbox"/>	L <input type="checkbox"/>				
<input type="checkbox"/> Shoulder		<input type="checkbox"/> Left	4 <input type="checkbox"/>	65 <input type="checkbox"/> 100 <input type="checkbox"/>	4 <input type="checkbox"/> 10 <input type="checkbox"/>	XL <input type="checkbox"/>				
<input type="checkbox"/> Jacket		<input type="checkbox"/> Zipper	5 <input type="checkbox"/>	70 <input type="checkbox"/> 105 <input type="checkbox"/>	5 <input type="checkbox"/> 11 <input type="checkbox"/>					
<input type="checkbox"/> Pants		<input type="checkbox"/> Velcro	6 <input type="checkbox"/>	75 <input type="checkbox"/> 110 <input type="checkbox"/>	6 <input type="checkbox"/> 12 <input type="checkbox"/>					
<input type="checkbox"/> Expander			Custom made garment Cat. No. _____			To be used only with devices made by Mego - Afek				
<input type="checkbox"/> Special						0344				

Garment Label revision 04.VSD

3.2 Garment types

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

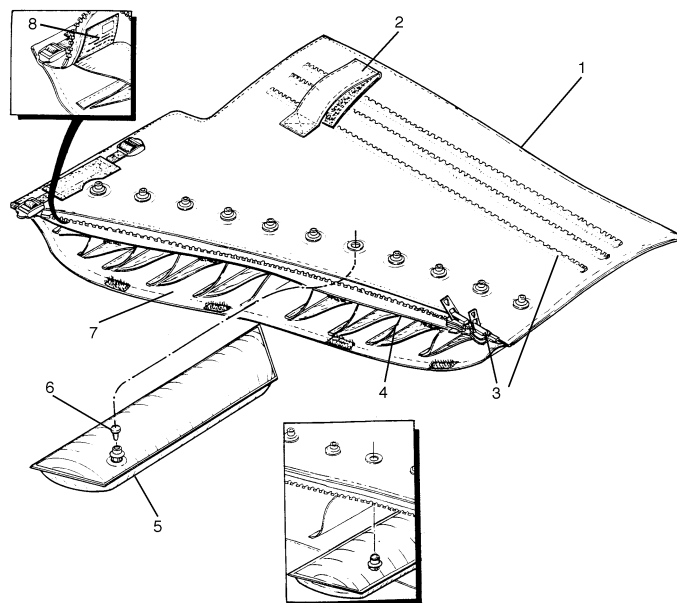
- Zipper sleeve - for all pressures.
- Velcro sleeve - for pressures up to 80mmHg only.
- Limb/torso garments - Medical overlapping pants, Ballancer Pro Pants, Ballancer Pants, Ballancer Jacket.

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:

Individual cells can be replaced in Zipper and Velcro leg/arm sleeves.
Individual 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

**NOTE:**

Zipper and Velcro leg/arm sleeves can be washed. The pants and jacket garments **CAN NOT** be washed, and must be surface cleaned **ONLY**. See the Operations 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.

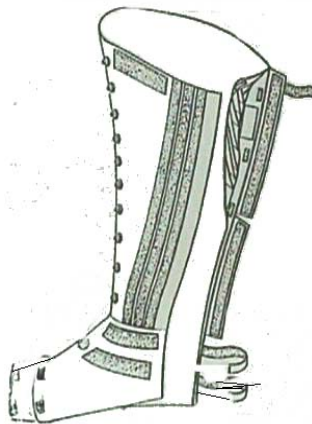
3.5.1 To sterilize

See Operation 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 Trouble shooting

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4.1 General

This section describes the procedures for trouble-shooting 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 trouble-shooting guide.

4.2 Trouble-shooting guide

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

The trouble-shooting 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 (SRU's).

4.3 How to use the trouble-shooting 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 Trouble-shooting isolation

Listed below are a few reminders of basic fault isolation.

- a. Check associated equipment connections. Make sure that all connections are securely connected to the correct connector.
- b. Before continuing, check all accessories visually for any defects.
- c. 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.
- d. Try to isolate the problem to a specific unit by checking operation in all modes and referring to the disassembling procedures.

**NOTE:**

Before replacement of any SRU'S remove electric cord from power supply.

Table 4.1 - Trouble-shooting 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, replace transformer.
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 communication cable other than that supplied with the device (no red mark).	Disconnect the communication cable and press Start/Stop button.
	Bad connection or flat cable	Check electrical connection and flat cable (Figure 6.2 ID No. 10)
	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 compressor's connections
	Defective relay	Replace the relay
	Defective compressor	Replace compressor
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's bracket is touching the base	Check and fix
	Defective compressor	Replace compressor
	Defective fan	Replace fan
1. During scanning, the display shows "0" 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

Symptom	Possible cause	Corrective action
The device halts and shows "Pneum. Fault" message	Defective accessory	Check customer's accessories for air leaks.
	Leakage from female receptacles	Check and replace "O" rings of the female receptacles. Replace female receptacles 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 communication 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 communication bundle	Replace inner communication bundle

Section 5 Disassembling procedures

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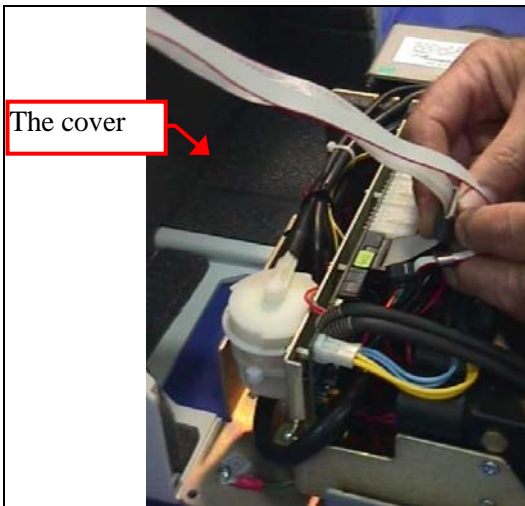
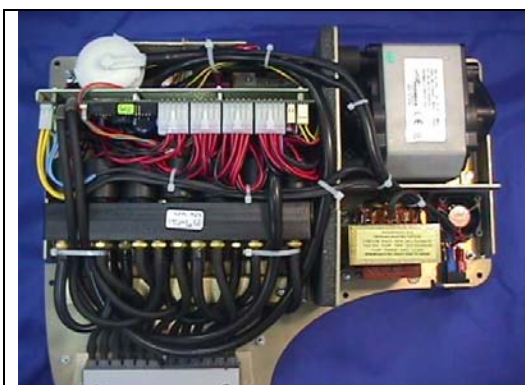
None

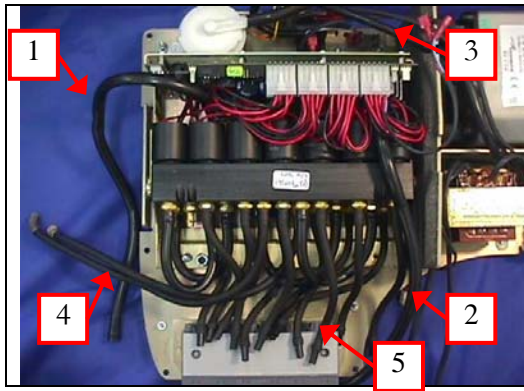
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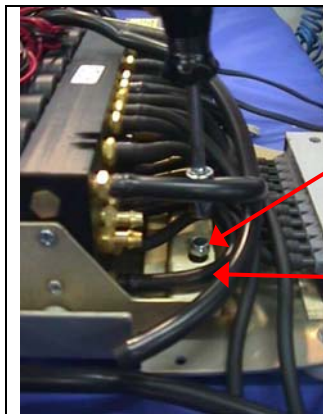
5.1 Disassembling

Figure 5.1 – Disassembling, steps A to L

	<p>Step A <u>Removing the cover:</u> Turn the device up side down on a clean soft surface. Remove all the 8 screws around the circumference. Turn back the device and open the cover as shown in step B.</p>
	<p>Step B <u>Disconnect the two flat cables from the main board.</u></p>
	<p>Step C <u>Tie wraps:</u> Before cutting all the ties that holds together the hoses and the wires, learn them cerfully. Cut all the tie wraps.</p>

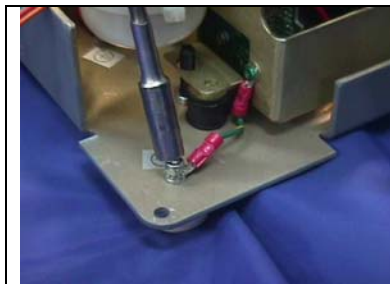


Step D Removing the electro-pneumatic control assembly:
 Disconnect the wires and the hoses as follows:
 The wires coming from the transformer.
 The wires from the PCB to the relay.
 The wires coming from the D-connector.
 The pressure hose (1) - from the compressor.
 The vacume hose (2) - from the distributor.
 The inlet hose (3) - from the distributor.
 The two sensor hoses (4) - from the PCB.
 The 12 hoses(5) from the female receptacle.

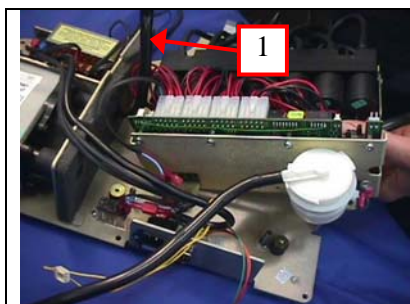


Nut
 Screw (hidden behind the hose) see Figure 6.3 ID 18

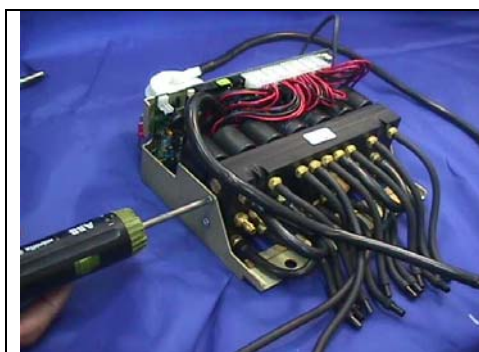
Step E Remove the 4 nuts and 4 screws that connect the base of the electro-pneumatic assembly to the main base.
 For reassembling please note: tighten the screws but not the nuts.



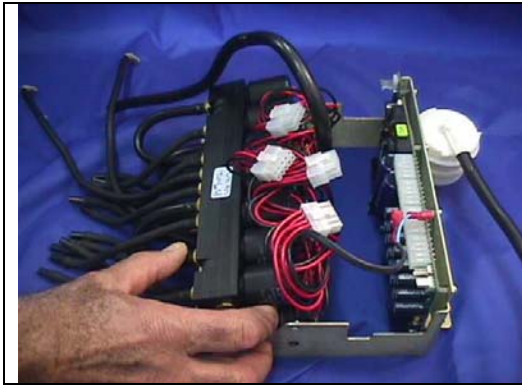
Step F Disconnect the grounding wire from the base



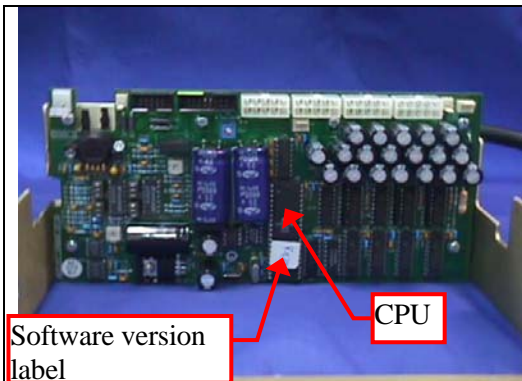
Step G Lift and remove the electro-pneumatic assembly from the base.
 For reassembling please notice how the vacuume hose (1) should go in betwine the valves.



Step H Removing the distributor:
 Remove the four screws (two on each side) that fixed 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 transformer and the compressor:
The transformer is fixed with four screws from the top side. Before removing, disconnect it from the main switch.
The compressor is fixed with four screws from the bottom side. Before removing, disconnect its grounding wire. (Figure 6.4 ID 39)

5.2 Rebuilding the device

After replacing the required SRU, rebuild 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 (paragraph 7.6) should be performed whenever an electrical reassembly of the high voltage circuit takes place.

No text on this page

Section 6 Part list (SRU's)

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Section document control log

Changes summary	Changes in pages	Approver	Date approved
Initial release		Mr. A. Weiss	20.05.2003

Table 6.1 - Part list

Part ID	Part No.	Description	Qty	Recommended SRU
1	L27C02B0	Lympha Press Plus Cover assy.	1	
	L27C02B1	Ballancer Pro. Cover assy.		
2	L27B00B1	Base assy. 110V	1	
	L27B00B3	Base assy. 220V		
3	L6060400	Spring washer 4mm	23	
4	L6030100	Screw M4 X 10	8	
5	L2D002B0	Control board assy.	1	√
6	L37551B0	Transparent window	1	√
7	L2D01B0	Display assy.	1	√
8	L6110380	Screw M3 x 8	11	
9	L6060300	Spring washer 3mm	15	
10	L26200B0	Control flat cable assy.	1	
11	L37220B1	Triangular button	2	
12	L37220B2	Round button	2	
13	L6040600	Tooth washer 4 mm	3	
14	L6100300	Elastic stop nut M4	7	
15	L26C080E	Grounding wire F-R 115V 80 mm	1	
	L26D080E	Grounding wire F-R 230V 80 mm		
16	L26C050D	Grounding wire R-R 115V 50 mm	1	
	L26D050D	Grounding wire R-R 230V 50 mm		
17	L6106000	Elastic stop nut M6	4	
18	L6110460	Screw M4 X 6	4	
19	L29000B0	LPP Electro-Pneumatic control assy	1	
	L29000B1	Bal.Pro. Electro-Pneumatic control assy		
20	L6110480	Screw M4 X 8	8	
21	L6040400	Washer 5/32	4	
22	L26700B1	Trasformer assy. 115V	1	√
	L26700B3	Trasformer assy. 230V		
23	L6100100	Nut 2.5mm	2	
24	L2300121	Female receptcle assy.	1	√
25	L37071B0	Base	1	
26	L3752015	Rubber foot	5	
27	L6045013	Washer 13 X 5	5	
28	L6110300	Screw M4 X 20	5	
29	L6060600	Spring washer 6mm	4	
30	L6016030	Allen screw M6 X 30	4	
31	L32521A1	Bumper	4	
32	L6030200	Screw M2.5 X 30	2	
33	L6110200	Screw 5/32W X 3/8	4	
34	L3672041	Fan gard	1	
35	L3627003	Rocker switch DPST 13 X 19	1	√
36	L26860B0	Fan Assy.	1	√
37	L6010300	Allen screw M4 X 30	4	
38	L22000B1	Compressor Assy. 115V	1	√
	L22000B3	Compressor Assy. 230V		
39	L26C120D	Grounding wire R-R 115V 120mm	1	
	L26D120D	Grounding wire R-R 230V 120mm		

Part ID	Part No.	Description	Qty	Recommended SRU
40	L3650001	Relay SPDT 12V	1	√
41	L3646002	Power inlet connector	1	
42	L36651A4	Fuse 5 X 20mm 2A	2	√
43	L6170360	Screw M3 X 6	2	
44	LD0J0002	Jack screw UNC 4-40 X 1/4	2	
45	L26160B0	Communication inner bunle assy.	1	√
46	L6104400	Nut UNC 4-40	2	
47	L2D001BL	Main board assy. - L.P. plus	1	√
	L2D001BB	Main board assy. - Ballancer Pro.		
48	L9600300	Tying strap 300 mm	1	
49	L3415121	Air filter	1	
50	L6110306	Screw M3 X 6	6	
51	L39020B0	Distributor base	1	
52	L6034015	Screw M4 X 15 cone head	4	
53	L6040700	Cone washer 35 mm	4	
54	L24J430A	Hose 7/10 430 mm	1	√
55	L24J400A	Hose 7/10 400 mm	1	√
56	L29100B0	Ditributor assy.	1	√
57	L24J550A	Hose 7/10 550 mm	1	√
58	L24B300A	Hose 4/7 300 mm	2	√
59	L3118221	Spring	2	

Figure 6.1 - Main assembly

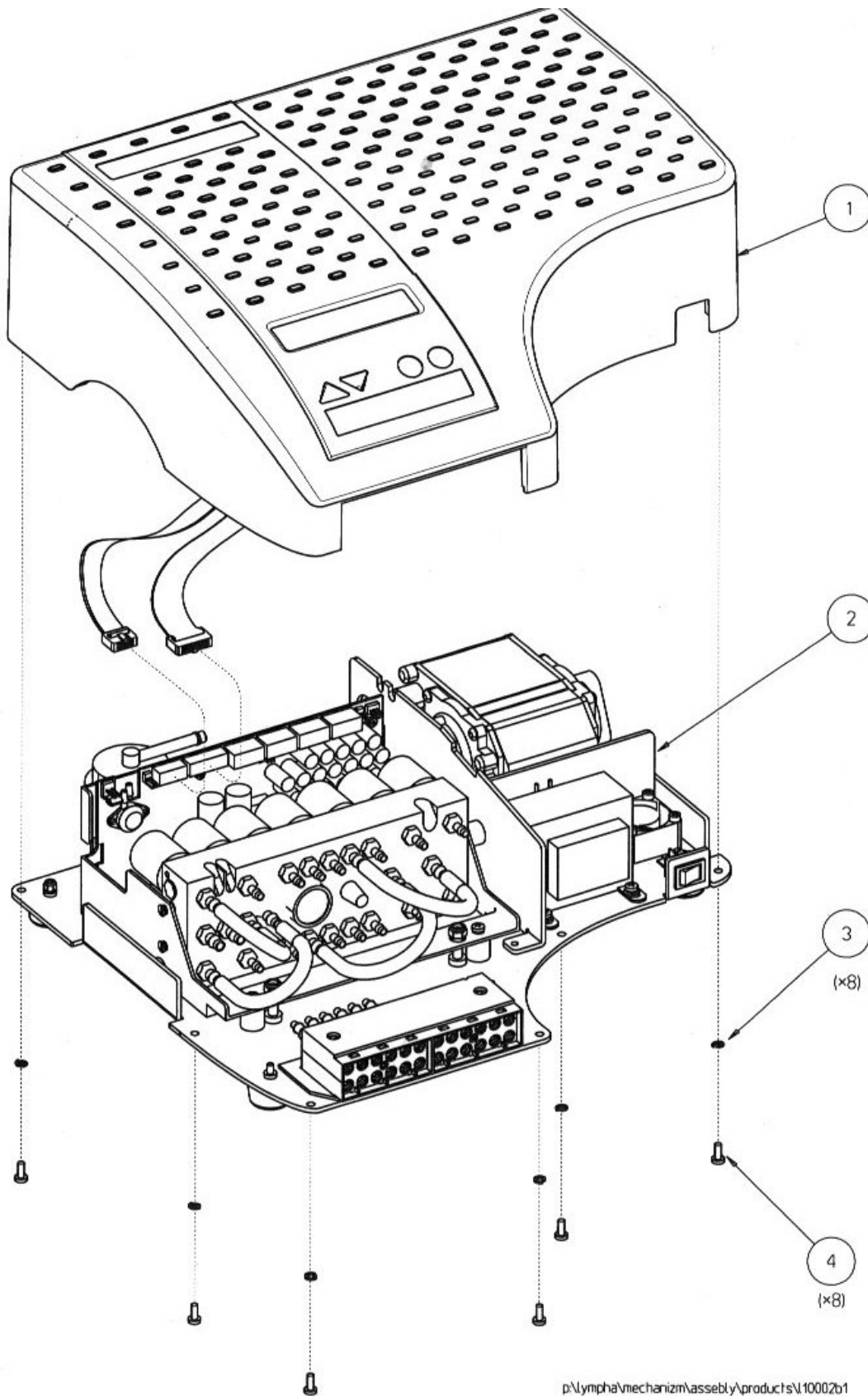


Figure 6.2 - Cover assembly

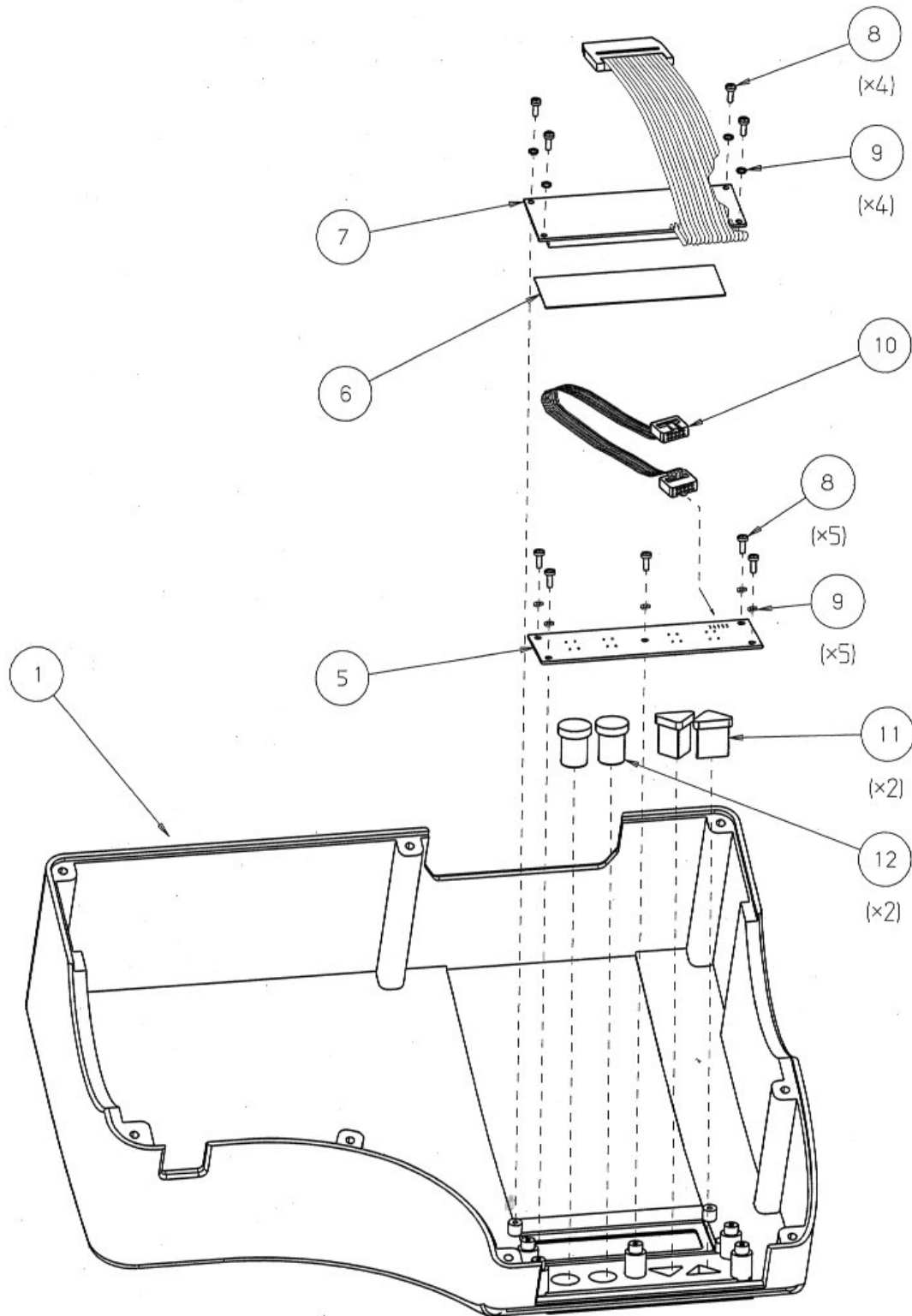
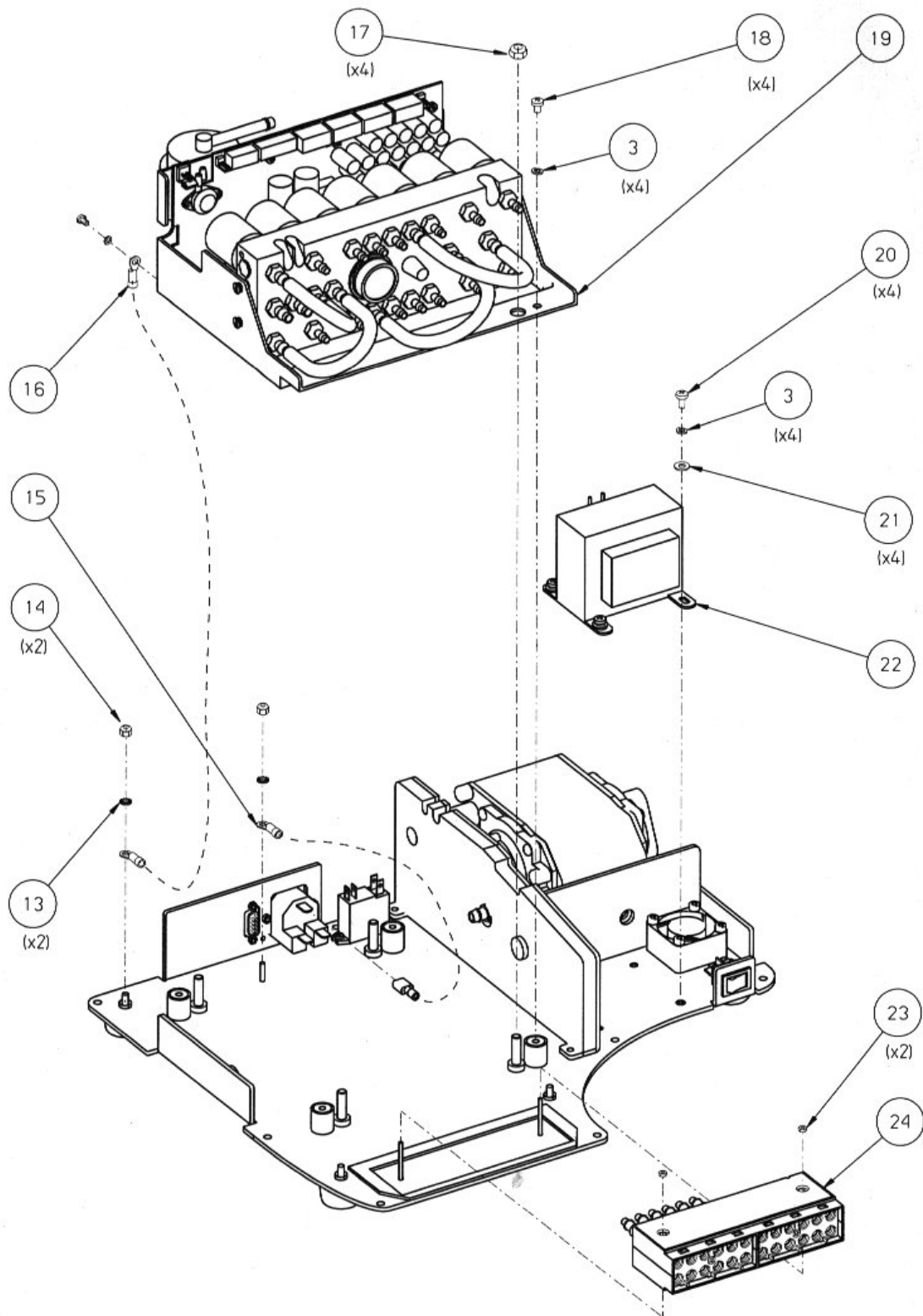


Figure 6.3 - Base assembly (1)



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Figure 6.4 - Base assembly (2)

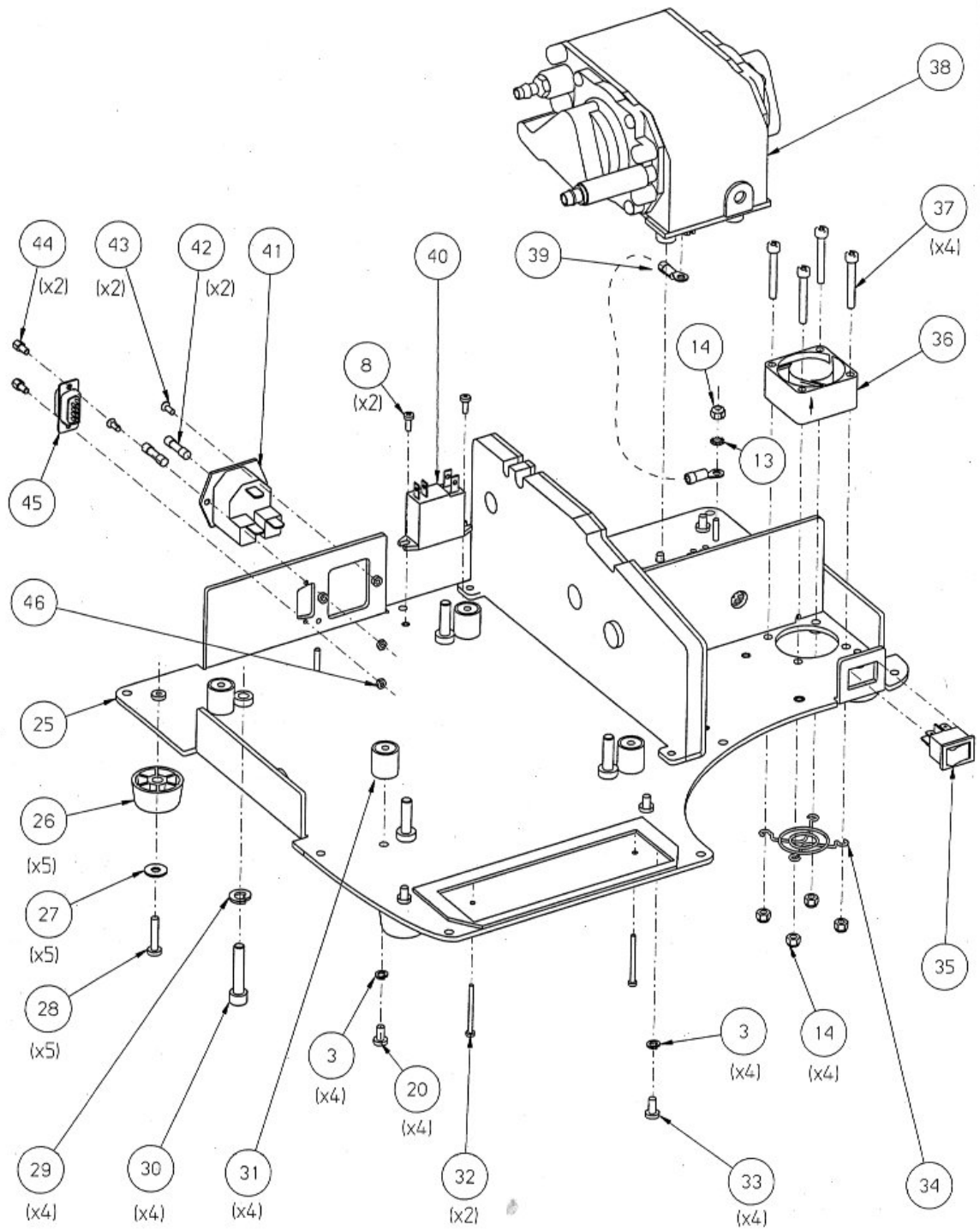
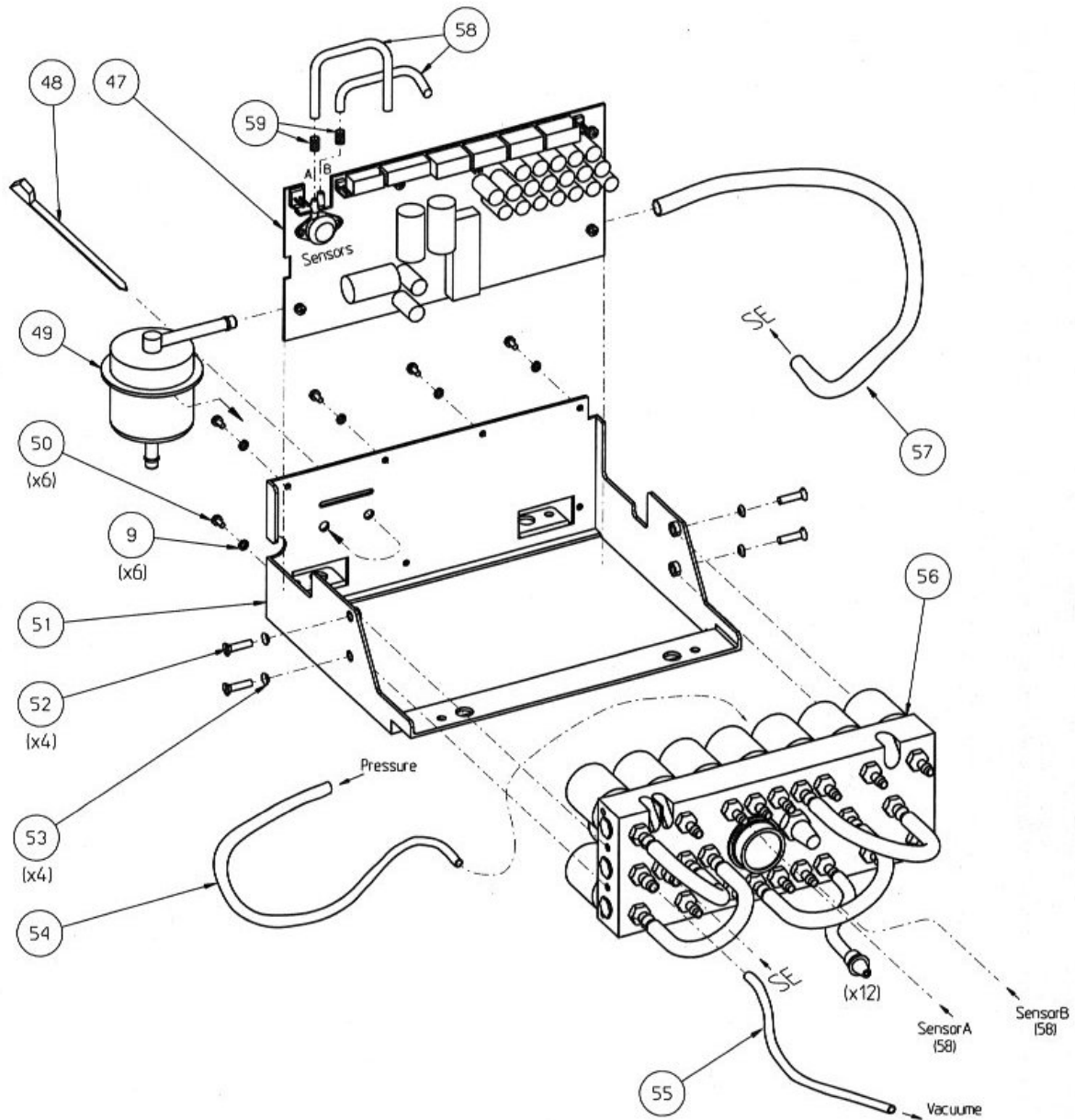


Figure 6.5 - Distributor and main board assembly



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Figure 6.6 - Wiring diagram

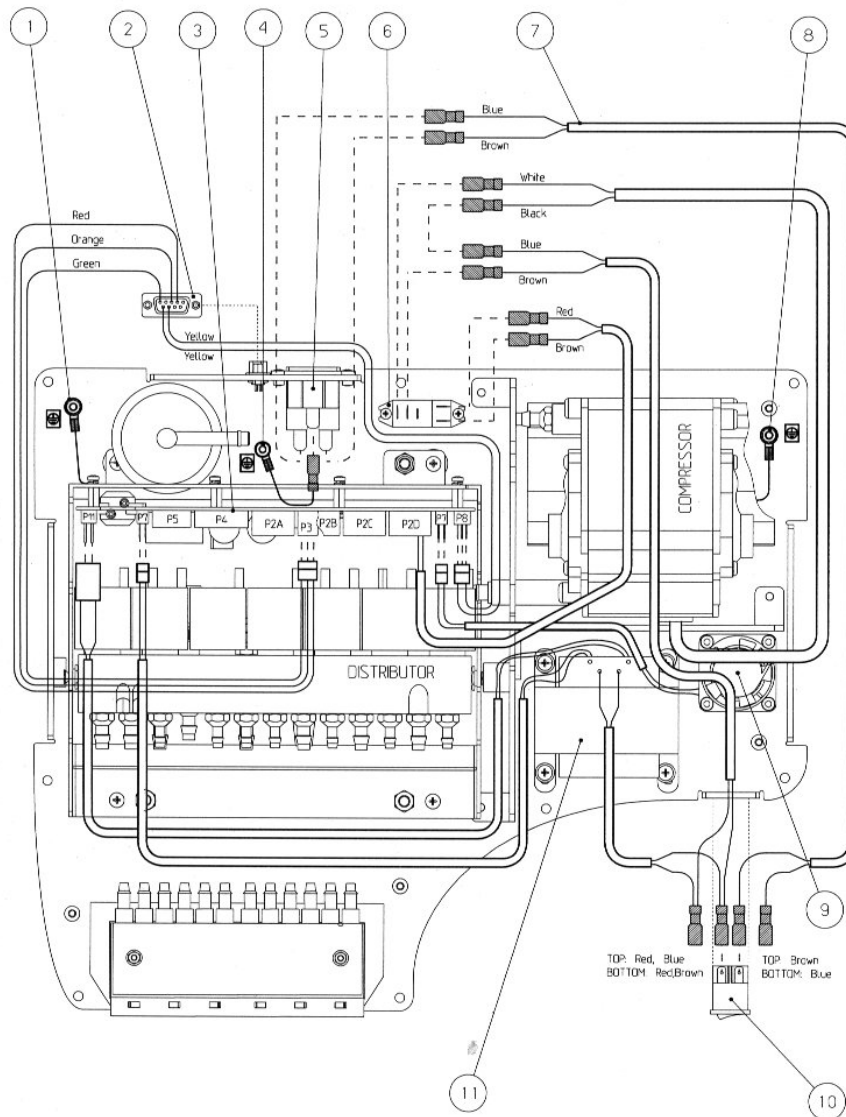


Table 6.2 - wiring SRU

ID #	Part list #	Part No.	Description	Qty	Recommended SRU
1	15	L26C050D	Grounding wire R-R 115V 50mm	1	
		L26D050D	Grounding wire R-R 230V 50mm		
2	45	L26160B0	Communication inner bunle assy.	1	√
		L2D001BL	Main board assy. – L.P. plus		
3	47	L2D001BB	Main board assy. – Ballancer Pro.	1	√
		L26C080E	Grounding wire F-R 115V 80mm		
4	16	L26D080E	Grounding wire F-R 230V 80mm	1	
5	41	L3646002	Power inlet connector	1	
6	40	L3650001	Relay SPDT 12V	1	√
7	---	L6161B0	Power bundle assy.	1	
8	39	L26C120D	Grounding wire R-R 115V 120mm	1	
		L26D120D	Grounding wire R-R 230V 120mm		
9	36	L26860B0	Fan assy.	1	√
10	35	L3627003	Rocker switch DPST 13x19	1	√
11	22	L26700B1	Trasformer assy. 115V	1	√
		L26700B3	Trasformer assy. 230V		

Figure 6.7 - Pneumatic diagram

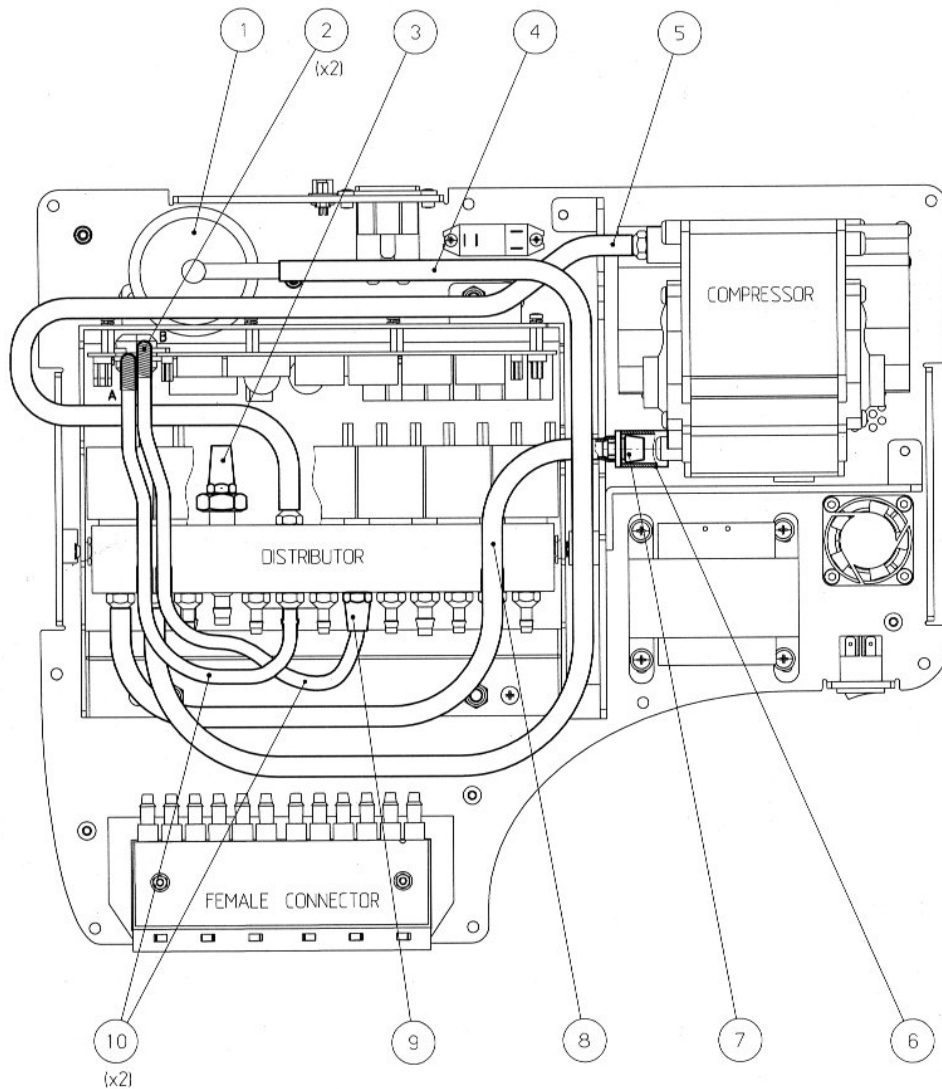


Table 6.3 - Pneumatic SRU

ID #	Part list #	Part No.	Description	Qty	Recommended SRU
1	49	L3415121	Air filter	1	
2	59	L3118221	Spring	2	
3	---	L3420002	Silencer 1/4 BSPT	1	
4	57	L24J550A	Hose 7/10 550mm	1	√
5	54	L24J430A	Hose 7/10 430mm	1	√
6	---	L24R040A	Hose 7/13 40mm	1	
7	---	L3437088	Niple 8/8	1	
8	55	L24J400A	Hose 7/10 400mm	1	√
9	---	L3420001	Silencer 1/8 BSPT	1	
10	58	L24B300A	Hose 4/7 300mm	2	√

Section 7 Maintenance

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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

7.1 General

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



NOTE:

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

7.2 Inspection and maintenance schedule

Once a year, the Test Procedure (paragraph 2.5) should be performed.

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.



NOTE:

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



A. 12 pressure gauges board and hose bundle

Figure 7.2 - Calibration set



A. Total view



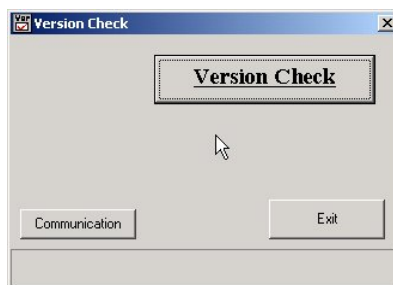
B. Connector, pressure gauge and relief valve

7.4.2 PC program: Identifying software version

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

1. Connect the device to your PC, using our special PC communication cord (supplied with the device).
2. Turn on the device and choose the “PC Communication” option.
3. Open the “Check Version” program:

Figure 7.3 - Check version program



4. Press “Version Check”. An announcement with the software version number will appear on the screen.
5. If you get an error message, try choosing 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 parameters (as it leaves the factory), use the “AutoDefault” program:

1. Connect the device to your PC, using our special PC communication cord (supplied with the device).
2. Turn on the device and choose the “PC Communication” option.
3. Open the “Send Default” program:

Figure 7.4 - Send default program (1)



4. Press “Send Program”.

Figure 7.5 - Send default program (2)

5. An announcement with the software version number will appear in the light window, telling 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, hold down both UP and ENTER/NEXT for keys for 5 seconds.

You will see this screen:

Enter PassWord

You will need to contact the factory to get your password. Enter your password.

You will see this screen:

Calib. MODE?
: NO

Choosing "No" (using Next/Enter key) will bring you to the Technician parameters list 7.5.2.

Changing NO to YES (using UP key) and then pressing Next/Enter key will bring you to the calibration procedure screen 7.5.3).



NOTE:

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

7.5.2 Technician parameters list

On each one 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 60mmHg.** 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 0mmHg,** 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 120mmHg.** 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 receptacle to the special **Calibration Set** (See Figure 7.2). Make sure that its pressure gage has a valid calibration certificate.

1. Follow the steps indicated by the screens below:

```
Calib. MODE?   UP=>   Calib. MODE?   =>ENTER
NO
```

```
ENTER Pressure
: 25
```

2. The device now starts to inflate the cells to the low pressure. If the pressure on the gage is different from 25mmHg, 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
```

3. Repeat the instructions above to get the same number on the screen and gage, then press **ENTER**.
4. 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]
```

5. **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.
6. 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.
7. 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**".
8. 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

Safety electrical tests should be performed whenever an electrical reassembly of the high voltage circuit takes place.

a. Dielectric test:

Equipment: Dielectric tester of 1000V for 100/110V devices, and 1500V for 230V devices.

Test procedure: Connect one electrode clamp of the tester to **both** power pins of the power plug. Connect the second electrode clamp of the tester to ground pin of the power plug. Turn the main switch of the device being tested on. Turn on the tester for 5 seconds and check that the tester indicates no electric breakdown. Turn off the tester and the device, and disconnect the device from the tester.

b. Grounding Continuity Test:

Equipment: Grounding tester that can force 25 Amperes for 10 seconds.

Test procedure: Connect the ground electrode clamp to the ground pin of the power plug. Connect the second electrode clamp to one of the screws on the base). Turn the main switch of the device being tested on. Operate the tester for 10 seconds and check that the tester shows no bad indication (due to resistance over 0.2Ω). Repeat this procedure, once when the clamp is connected to the metal base of the distributor, and then again with the clamp connected to the body of the compressor. Turn off the tester and the device, and disconnect the device from the tester.

c. Leakage Tests:

Equipment: Leakage tester that can measure microamperes up to $500\mu\text{A}$.

Earth leakage test procedure: Connect the device to the tester in “earth leakage” mode. Operate the device and check that the leakage to the ground does not exceed **$500\mu\text{A}$** .

Enclosure leakage test procedure: Connect the device to the tester in “enclosure leakage” mode. Attach tester clamp to one of the screws of the base. Operate the device and check that the leakage to the base does not exceed **$100\mu\text{A}$** .