LABPLANT SD-05

SPRAY DRYER

SERVICE MANUAL

1.1 Service.

This procedure can be used as either a pre delivery inspection or as a guide to follow when performing a planned maintenance service.

1. With all the glassware in position connect the unit to a suitable mains supply, check that the "mains on" light operates.

2. Switch the unit on at the "mains on" switch, allow time for the electronics to warm up (15 minutes).

3. Check that both the "inlet" and "exhaust" temperatures are approximately the same. (The temperature displayed should be the ambient temperature within the area in which the spray dryer is sited.)

4. Switch on the peristaltic pump using the green touch contact, select the "pump flow" reading using the multi-indicator switch. The pump flow is indicated, on a scale of 10 to 50, on the display adjacent to the multi-indicator switch.
   A, Rotate the "pump speed" knob until the display reads 0, the Pump should stop.
   B. Check that the speed of the pump changes as the pump speed knob is rotated.

5. Turn off the pump.

6. Switch on the blower using the green touch contact, select the "air flow" reading using the multi-indicator switch. The air speed is indicated, on a scale of 10 to 50, on the display adjacent to the multi-indicator switch.
   Use the green "up" button to increase the air flow to its maximum. NB. Maximum flow has been reached when the display ceases to increase. If the machine is cold the meter reading will stop at approximately 46.

7. With the airflow set to maximum switch on the heater, using the green touch contact. Set the inlet temperature to 100^0C, on the CAL temperature controller. Check that, when the set temperature has been reached it remains stable.

8. Turn off the both the blower and the heater. Red touch switches.

9. Switch the multi-indicator switch to "compressor air flow". The air pressure, in bars, will be indicated, on the display adjacent to the multi-indicator switch.

10. Switch on the compressor using the appropriate green touch switch

11. Using the "compressor air pressure control" set the air pressure to maximum.

12. Using the de-blocker control check that the frequency of the de-blocking device can be adjusted.

13. Check all the glassware for damage and clean the machine as necessary.

Servicing 2. Fault Finding.

When turned on at the mains the "Mains on" light does not illuminate.
Check the fuse in the main's plug.
Check the line fuse F1 situated next to the main's inlet.
Check the mains on indicator L1.

The inlet and exhaust temperatures are not the similar.
Are either approximately the same as the ambient temperature.
Disconnect the sensor, which is giving the incorrect reading,
Connect a new sensor and check that the displays are now similar.
If the temperatures are the same, fit the new sensor following the guidelines in the next section.

The peristaltic pump does not work correctly.
Check the pumps power supply.
Check the pump drive motor.

The air blower does not start.
Check the power to the blower motor.
If power present, change the motor. If power is not present check the wiring to the motor starting at the blower on switch.

The air blower makes an excessive noise when running or its speed varies.
Either the fan or the motor bearing is dry or damaged. Replace the fan-motor assembly.

The air heater does not work when turned on in conjunction with the blower.
Check the power to the heater. If power present, change the heater, refer to section 3.4. If power is not present check the wiring to the heater.

The heater cuts out before the set temperature has been reached.
Check the over temperature thermostat,

The needle on the de-blocking device does not move when switched on.
Check the air supply to the deblocker.
Strip down and clean the de-blocking device.

The compressor does not run when turned on.
Check the power to the compressor.
If power present change the compressor, refer to section 3.5. If power is not present check the wiring to the compressor

The air pressure supplied by the compressor is insufficient.
Check the operation of the butterfly valve.

The compressor makes an excessive noise when running
Replace compressor.

Servicing 3. Fitting instructions.

1. Inlet temperature sensor

Removal of existing temperature sensor.

1. Disconnected the power from the unit and isolate fully before commencing any work described below.
2. Remove all the glassware from the unit.

3. Open both doors using the triangular key. Disconnect the earth tags and pull up the spring bolts to remove the doors.

4. Remove the 8 screws securing the electrical compartment cover using a 2.5mm Allen key. Remove the cover after disconnecting the earth tag.

5. Carefully remove the insulation from around the bend at the top of the heater column, so that the input temperature probe and the over temperature sensor are exposed.

6. Separate the thermocouple temperature probe wire from the over temperature probe capillary tube.

7. Inside the electrical compartment disconnect the thermocouple wires from the CAL temperature controller, contacts 1 & 2.

8. Pull the cable out through the grommet in the back of the electrical compartment.

9. Slacken the grub screw holding the sensor in position, and remove the sensor from its housing. If the grub screw has been over-tightened it may be necessary to destroy the sensor in order to remove it.

Fitting a new sensor.

1. Thread the thermocouple cable through the grommet on the case and connect the cable to the CAL controller.

2. Carefully fit the thermocouple into position in the inlet manifold.

3. Tighten the grub screw so that it just nips the thermocouple case, taking care not to crush the stainless tube. The thermocouple should protrude into the air-stream by approximately 15 to 20 mm.

4. Secure the thermocouple cable to the capillary tube and replace the insulation around the inlet manifold.

5. Replace the electrical compartment cover and the doors, ensuring that all the earth tags have been reconnected.

2. Exhaust temperature sensor.

Removal of the existing sensor.

1. Disconnected the power from the unit and isolate fully before commencing any of the work, as described below.

2. Remove all the glassware from the unit

3. Open both doors using the triangular key. Disconnect the earth tags and pull up the spring bolts to remove the doors.

4. Using an 2.5mm Allen key, remove the 8 screws securing the electrical compartment cover

5. On the outside of the machine remove the covers on the sliding glass support head. Inside this head the thermocouple and the outlet pressure detector can be seen.

6. Loosen the grub screw holding the thermocouple, and carefully withdraw it through the bottom of the bracket.

7. Thread the thermocouple back into the case and through the grommet in the control box.

8. Unclip the thermocouple leads from the cable tie securing them to the motherboard.

9. Unplug the 2 way connector from the motherboard.

Refitting the probe.

1. Connect the 2 way plug to the motherboard, fasten the thermocouple leads to the pillar using a cable tie.

2. Thread the thermocouple through the grommet on the case where the other thermocouple wire passes through.

3. Pass the thermocouple through the case and carefully fit the thermocouple tip into its hole on the bracket.

4. Tighten the grub screw so it just nips the thermocouple case, taken care not to crush the stainless tube. The thermocouple should protrude into the exhaust tube the same distance as the outlet pressure pipe, (approx 15 to 20 mm).

5. Replace the electrical compartment cover and the doors, ensuring that all the earth tags have been reconnected.

3. Air Blower.

Removal of the existing air blower.

1. Disconnect the power from the unit and isolate fully before commencing any of the work as described below.

2. Remove all the glassware from the unit.

3. Open both doors using the triangular key. Disconnect the earth tags and pull up the spring bolts to remove the doors.

4. Remove the 8 screws securing the electrical compartment using a 2.5mm allen key. Remove the cover after disconnecting the earth tag.

5. Remove the plug SK8 from the electrical motherboard and cut the cable tie to allow the blower power lead to be removed from the electrical compartment.

6. Remove the power lead from the butterfly valve motor, 2 x push on tags.

7. Disconnect the heater from the flow control valve body by slackening the 3 accessible grub screws on the control valve flange.

8. Undo the 4 motor retaining nuts and remove the blower assembly.

9. With the fan assembly removed from the unit remove the flow control valve from the blower flange, noting the orientation of the valve motor to the fan housing.

10. Remove the two feet, complete with studs, from the air blower motor, noting the position of the feet in respect to the blower assembly.

Fitting a replacement air blower and motor.

1. Check that the alignment of the new unit's blower flange is correct.

2. Remove the foot, plate from the motor, and replace with the feet removed from the old unit. Note. In order for the air blower and motor assembly to be correctly aligned with the heater the feet should be fastened on the motor so that the centre of the first stud is 65mm from the fan casing.

3. Fasten the flow control valve to the air blower flange, making sure that the valve motor is in its correct position.

4. Fit the assembly back into the unit making sure that the flow control valve mates correctly with the heater.

5. Replace the electrical compartment cover and the doors, ensuring that all the earth tags have been reconnected.

4. Air heater.

Removal of the existing air heater.

1. Disconnected the power from the unit and isolate fully before commencing any work described below.
2. Remove all the glassware from the unit.

3. Open both doors using the triangular key. Disconnect the earth tags and pull up the spring bolts to remove the doors.

4. Remove the 8 screws securing the electrical compartment cover using a 2.5mm Allen key. Remove the cover after disconnecting the earth tag.
5. Disconnect the heater wiring from inside the electrical compartment.

6. Carefully remove the insulation from around the heater and disconnect the heater from the flow control valve body by slackening the 3 accessible grub screws on the control valve flange.

7. Remove the air blower assembly, as section 3,

8. Withdraw the heater from the inlet manifold.

Fitting a replacement heater.

1. Slide the replacement heater into the inlet manifold, and refit the blower motor assembly.

2. Reconnect the heater to the flow control valve.

3. Fit the heater wires back into the electrical compartment.

4. Replace the insulation around the heater

5. Rewire the heater before replacing the electrical compartment cover and doors, ensuring that all the earth tags have been reconnected.

5. Compressor

Removal of existing compressor.

1. Disconnected the power from the unit and isolate fully before commencing any work described below.

2. Remove all the glassware from the unit.

3. Open both doors using the triangular key. Disconnect the earth tags and pull up the spring bolts to remove the doors.

4. Remove the 8 screws securing the electrical compartment cover using a 2.5mm Allen key. Remove the cover after disconnecting the earth tag.

5. Pull out and remove the two pipes leading away from the compressor.

6. Remove the plug SK9 from the electrical motherboard and cut the cable tie to allow the compressor power lead to be removed from the electrical compartment.

7. Turn the unit on to its side to allow access to the 4x M4 compressor retaining bolts.

8. Remove all 4 bolts and withdraw the compressor from the unit.

Fittina a new compressor

1. The new compressor is fitted using a reversal of the removal procedure.

Servicing 4, Settings and adjustments.

1. Air flow.

2. Air pressure, Regulator adjustment.

3. Peristaltic pump.

4. Cal temperature controller settings

All setting are as factory default except the following:

LEVEL		
2	INPUT	K
2	UNIT	°C
2	HI.SC	270
3	SP1.D	SSD
1	BAND	47
1	INT.T	0.8
1	DER.T	4
1	CYC.T	1.0
2	SP2.A	DUHI
1	SET.2	10
3	UER	Hold up/down button until LOCK appears.

Press down button until NO.AL appears.
Change to ON.

.

5. Low mains voltage supply

The SD-05 can be run, successfully an 210 to 250 Volts A.C. Outside these limits the unit will malfunction. If however the supply tends to be less than 220 Volts an alteration to the wiring of an internal transformer will improve the performance of the equipment.

To rewire the transformer.

6. 1. Disconnected the power from the unit and isolate fully before commencing any work described below.

7. Open the units side door using the triangular key.

8. Remove the 8 screws securing the electrical compartment cover using a 2.5mm Allen key. Remove the cover after disconnecting the earth tag.

9. Remove and move aside the three PCBs, mounted on the motherboard without disconnecting the pipes.

10. The transformer, to be modified, is the smaller of the two mounted to the left of the three PCBs. Slide the plastic terminal cover over the wires to gain access to the connections.

11. Unsolder the two wires on the top tag , marked xxx ,and re-solder them to the next solder tag. See the diagram below.

12. Replace the plastic terminal cover and the PCBs, reseal the electrical compartment and replace the door.

Appendix 1

Parts lists.

Power supply P.C.B

Part No	Description	Code No	Qty.
R101-103	Resistor	SFR 25 2K7	3
R104-105	Resistor	SFR25 470R	2
R106-107	Resistor	SFR25 1K	2
C101-103	Capacitor	2200uF63V Elect	3
C104-105	Capacitor	4700uF 16V Elect	2
C106-110	Capacitor	220nF 100V Poly	5
C110-115	Capacitor	100nF 63V Poly	5
BR101-102	Bridge Rectifer	2KBB40	2
IC101-102	Voltage regulator	L78S24CV	2
IC103	Voltage regulator	L7924CV	1
IC104	Voltage Reference	LM369DRC	1
IC105	Voltage regulator	LM340T5	1
IC106	Voltage regulator	LM7905CT	1
IC107	Isolated supply	NME0505D	1
D101-103	Diode	1N4002	3
PL12	Connector 32 way		1
F104-104	P.C. Fuse	2amp	4
	Transistor mounting kit		5
	Heatsink	See Drg L0440	1
	P.C.B.	13593 issue 1	

Signal conditioner P.C.B

SD-05 Signal conditioner P.C.B.

RV201-202	Trimmer	43P 100K	2
C201-204	Capacitor	1uF 35V tantalum	4
C205-208	Capacitor	100nF 63V tantalum	4

C209	Capacitor	100uF 10V tantalum	1
IC201-202	Amplifier	INA102KP	2
IC203-204	OP-Amp	LM741CN-8	2
S201	Gauge transducer		1
S202	Differential transducer		1
PL13	Connector 32 way		1
TP20-29	10 way test socket		1
	Bracket	See drg. L0540	1
	IC socket	8 way t.p. d.i.l socket	2
	IC socket	16 way t.p, d.i.l socket	2
	P.C>B.	17593 issue 1	1

SD-05
Pump motor
P.C.B.

R301-302	Resistor	SFR25 470R	2
R303-306	Resistor	SFR25 100K	4
R307	Resistor	SFR25 10M	1
R308-313	Resistor	SFR25 10K	6
R314-315	Resistor	SFR25 2K2	2
R316	Resistor	KN350 R033	1
RV301-302	Trimmer	43P 10K	2
RV303	Trimmer	43P 1K	1
C301	Capicitor	100nF 63V poly	1
C302	Capicitor	2.2uF 50V elect	1
C303-304	Capicitor	10nF 63V poly	2
D301-302	Diode	1N4148	2
D303	Diode	1N4005	1
D304	Diode	BZX85C5V1	1
TR301	Transistor	BC212L	1
TR302	Transistor	TIP141	1
IC301	IC	LM324N	1
F301	P.C. Fuse	2amp	1
Link	Zero ohm link		1
PL15	32 way reversed europlug		1
	P.C.B	15953 issue1	1
	Heatsink for TR302		1
	14 way t.p d.i.l socket		1
	Transistor mounting kit		1

SD-04 Motherboar d

R401	Resistor	SFR25 100R	1
C401	Capicitor	2200uF 50V elect	1
D401-407	Diode	1N4002	7
BR401	Bridge rectifer	2KBB40	1
FL401	Filter choke	RN112	1
F401	Fuse	3.15amp a/s 20mm	1
F402	Fuse	1amp a/s 20mm	1
	PCB Fuseholder		2
	PCB Fuseholder cover		2
O/L 401	Thermal trip	1amp	1
O/L402	Thermal trip	2amp	1
RL401-403	3PCO 10A Relay		3
	Relay socket		3
	Socket clip		3
RL404-405	SPCO 16A Relay		1
SK3	16 way IDC plug		1
SK4	16 way IDC dil header		1
SK5-6	5 Way header		2
SK7	4Way header		1
SK8-10	6 Way header		2
SK11	2 Way header		1
TP401-410	10 Way test socket		1
SK12	32 Way power socket		1
SK13	32 Way europlug		1
SK15	32 Way reversed europlug		1
	P.C.B	26593 issue 1	1

SD-05 Fascia p.c.b

R501-504			

Thank you for reading this data sheet.

For pricing or for further information, please contact us at our UK Office, using the details below.

UK Office
Keison Products,
P.O. Box 2124, Chelmsford, Essex, CM1 3UP, England.
Tel: +44 (0)330 088 0560
Fax: +44 (0)1245 808399
Email: sales@keison.co.uk