TABLETOP CENTRIFUGE

Model: PLC-01, 02, 03, 04, 05

USER'S MANUAL

Operation / Maintenance
And Parts List

⚠ Safety Information

This manual contains important and safety information.
The user must carefully read and understand the contents of this manual prior to use of this equipment.

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TABLETOP CENTRIFUGE

Model: PLC-01, 02, 03, 04, 05

(ISO9002, EN46002, *CE*)

CONTENT

Safety Information

Your Tabletop Centrifuge has been designed with functions, reliability, and safety in mind. This manual contains important operation and safety information. The users must carefully read and understand the contents of this manual prior to install your centrifuge in conformance with your local electrical codes.

Classification: This equipment is classified as " Class 1 " equipment
Thermal cutout operation temperature: 105°C

This equipment complies with EC Electromagnetic Compatibility requirement of EN60601-1-2. EMI filter is designed in conformity with 89/336 EEC-EMC Directive.

Motor: AC, high torque carbon brush, 2 poles
Power: 115/230V, 50/60HZ (please specify when ordering)
Rotor: 45° fixed angle rotor

Ordering information:

PLC-01: Rotor A-0415, 4 x 15ml.
PLC-02: Rotor A-0615, 6 x 15ml.
PLC-03: Rotor A-0815, 8 x 15ml.
PLC-04: Rotor A-1015, 10 x 15ml.
PLC-05: Rotor A-1215, 12 x 15ml.
PLC-05: Rotor A-1205, 12 x 5ml.

Suggested Tubes:
5ml. : 12 x 75mm
10ml : 16 x 100mm
15ml : 17 x 117mm (120mm)

Intended use:

To provide a desired testing within the range of 1000 – 4500 rpm for test tubes containing in ***vitro diagnostic*** specimens for qualitative or quantitative test procedures. Refer to the clinic laboratory method specified by the reagent manufacturer or established by medical technology for products applications.

Installation:

Remove centrifuge from the packing materials carefully. Check the electrical specifications located on back of this unit. Plug into a properly grounded receptacle.

Your Centrifuge contains:
Rotor : 1
Carbon brush: 1 pair (convenient for your maintenance)
Fuse : 1 (convenient for your maintenance)

Definition:

g Force:
the measurement for samples undergoing the stress of acceleration in a centrifuge.

RCF (relative Centrifuge Force):
RCF is the centrifugal force that the samples undergoes which relies on the speed of rotation (**N**) in rpm and the rotating radius (**R**). The rotating radius is measured from the center axis of rotor to the extreme end of the centrifuge tubes.

Formula:

RCF = 11.18 x R x (rpm/1000)²

Operation:

- Check the electrical specification to meet your local codes.
- Plug cord in a properly grounded receptacle.
- Place the test tubes into the tube adapters. Be sure to place tubes diagonally to keep the rotor balance.
- Lock the cover completely.
- Preset your desired time by turning the control knob for any spin interval from 0 – 60 minutes. This equipment is working in Timer-Activated operation.
- The pilot lamp indicates the power is ON
- Adjust control knob of speed regulator to bring speed to your desired operation speed and centrifugal force.
- The power will shut out automatically when the setting time has elapsed and the pilot lamp will put out simultaneously.

Option:
1) Automatic shutout safety device when lid is opened during spinning.
2) Lock set for lid

WARNING:
Unlock lid only after rotor has stopped completely.

Do not stop rotor manually, there is possibility of personal injury.

Recalibration procedure for speed:

Tools required: 1 regular tip 7/32" screwdriver
1 LCD tachometer

this centrifuge was initially set by its speed from 1000 – 4500 rpm (or 4000rpm). Supposed that the min/max speed varied, the control can be recalibrated as depicted below:

1) Remove the bottom plate, switch power on by turning control knob of timer. **CAUTION: Electrical shock**
2) Turn knob of speed regulator to the extreme LOW position, adjust SVR P2/204 (for 1000rpm control) clockwise to get a higher speed until the speed to reach 1000rpm, and *vice versa.*
   For 4000 or 4500 rpm adjustment, turn speed regulator to HIGH position and adjust SVR (P1/104) right/left slightly until it reaches 4000 or 4500 rpm.
3) Use tachometer to measure the speed and repeat the procedure 2 until the desired speeds are achieved.

Speed and RCF indication: *(for reference only)*

Step	PLC-01 – PLC-03		PLC-04/05	
	Speed	RCF x g	Speed	RCF x g
LOW	1000rpm	120 X g	1000rpm	129 x g
1	1090	145	1115	160
2	1235	185	1214	190
3	1375	228	1305	219
4	1477	264	1440	267
5	1772	379	1605	331
6	2080	522	1814	423
7	2455	728	1966	497
8	3266	1288	2853	1046
9	4080	2010	3517	1590
HIGH	4500	2445	4000	2057

NOTE:

- The above data is measured from 20 random samples.
- The measurement is for reference only, data varies with samples and operating environment.
- Confidence interval ± 98%

Maintenance & Servicing

1) Always disconnect form power supply prior to maintenance & servicing
2) Refer servicing to qualified personnel or licensed engineers.
3) To avoid electrical shock this equipment must always use a properly grounded electrical receptacle of correct voltage and current handling.
4) Any voltage other than the specified specifications will influence the operation by its speed and centrifugal force.
5) The drive motor and linkage assembly does not require lubrication.
6) Maintenance must be conducted periodically or anytime when required.
7) Clean equipment after every use.
8) Check carbon brushes every month or anytime when required. Refer to Disassembly for carbon brush maintenance.
9) Balance the rotor always
10) responsibility is to supply a good quality centrifuge, your responsibility is to maintain a good quality centrifuge.
11) will not assure any responsibility on persons who violate the above regulations.

Disassembly:

Warning:

Those other than the qualified personnel or licensed engineers are strictly prohibited for disassembly.

- Remove bottom plate by loosening the three screws
- Loosen the nuts from rubber supports attached to the base to remove the rack of motor
- Unscrew the motor from the rack
- Disconnect wires from assembly prior to disassemble the electronic parts.
- Loosen the bolt to remove the rotor
- Remove the control knobs of timer and speed regulator by loosening the screws in it.
- The front control panel is glued
- Unscrew the set bolts to remove timer and speed regulator
- Loosen screws for chamber removal.
- Always disconnect from power supply prior to disassembly

Troubleshooting:

Problem	Possible cause	Corrective action
Vibration	Imbalanced rotor Loosen rubber support	Place tube diagonally Position rubber support
Erratic speed	Wearing carbon brush Defective triac Defective regulator	Replace carbon brush Replace triac Replace VR
Failure of operation	Wearing carbon brush Mal-funcitonal motor Defective circuit board Blowout fuse Disengaged linkage	Replace carbon brush Replace motor Replace circuit board Replace fuse Wiring linkage
Burnout motor & Circuit board	Misuse power supply Overload current	Refer to manual prior to operation
Improper MAX and MIN rpm	Loosen SVR	Calibrate SVR P2/204 and P1/104
Unworkable timer	Improper operation	Turn control knob to 30 minutes, then turn to " O " prior to time setting.

NOTE:

- Always refer to your local distributors or a licensed engineers for troubleshooting.
- Always disconnect from power supply prior to troubleshooting.
- Always operate the equipment under normal condition to minimize the troubles.

Direction to clean:

- Disconnect from power supply prior to clean
- Clean the equipment after every use.
- Use a moist cleaning cloth to clean the case, rotor and tube holders.
- Dry the equipment thoroughly before operation.

WARNING:

Never use benzine or paint thinner for cleaning
Do not immerse this equipment in water.

Transportation:

- Fragile, Handle with Care
- Use No Hook
- Do not drop this equipment
- Do not place this equipment upside down
- Prevent this equipment from vibrating. Keep it balanced during transportation.
- Do not vibrate this equipment during transportation.

Storage:

- Do not place this equipment in the draft, sunlight or near a piece of equipment that emits heat and electromagnetic conduction emission.
- Disconnect power supply while storing this equipment.
- This equipment shall be stored under the condition of room temperature.
- Do not place any heave load on this equipment.

Conditions for Transportation & Storage:

- Temperature 10°C – 40°C
- Humidity 40 % – 90 %

NOTE

- This equipment complies with EC Electromagnetic Compatibility requirement of EN60601-1-2
- EMI filter is designed in conformity with 89/336 EEC-EMC Directive
- This equipment complies with IEC 801 series regulations.

Parts List

No.	Description	No.	Description
1	Lid	13	Motor
2	Chamber, upper	14	Carbon brush, 2 required
3	Screw, 4 required	15	Rubber support, 3 required
4	Bolt, 4 required	16	Bracket, motor
5	Chamber, lower	17	Circuit board
6	Rubber gasket	18	Brass spacer, 2 required
7	Pilot lamp	19	SVR, P2/204
8-1	Knob, regulator	20	SVR, P1/104
8-2	VR, speed regulator	21	Nut, 2 required
9-1	Knob, timer	22	Screw, 3 required
9-2	Timer, 60 minutes	23	Bottom plate
10	Connector, rotor	24	Suction feet, 3 required
11	Test tube adapter (holder)	25	Power cord (please specify your desired plug type)
12	Rotor		

NOTE:
When ordering for replacement, be sure to order by its part number.

Wiring Diagram

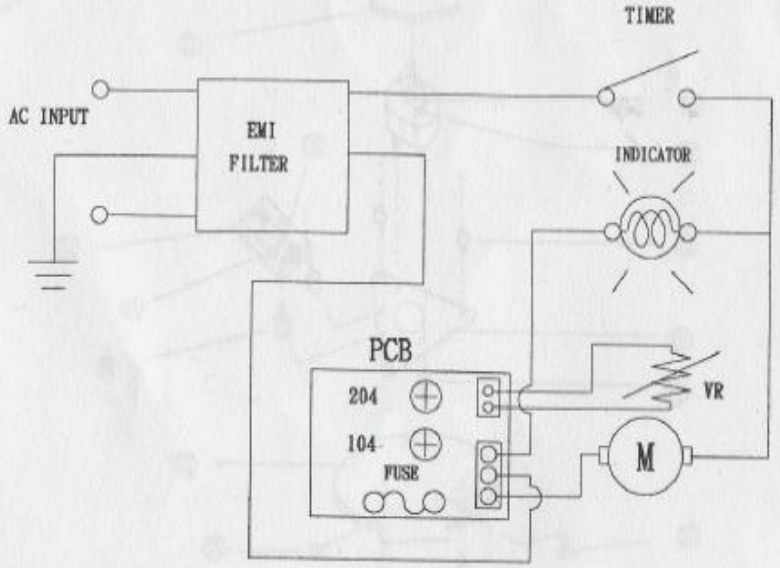

Diagram of Components