fORCED cONVENTION oven

Operation and Service Manual

★

Model : LFO - 250

Labnics Equipment

Table of Content

CHAPTER 1. INTRODUCTION:-

Thank you for choosing **Labnics Laboratory Products**
Please read this operation manual carefully for your safety and for the instrument having optimum operating performance.
If you have any query, please contact our sales representative or service department.

CHAPTER 2. SAFETY PRECAUTIONS:-

This manual contains important operating and safety information. You must carefully read and understand the content of this manual prior to the use of this equipment.

Warning:
Warning alert you to a possibility of personal injury

Caution:
Caution alert you to a possibility of damage to the equipment.

2.1 Power Connection:

Caution ……

1. Your Oven is designed for 110VAC, 60Hz 1P or 220VAC, 50/60Hz 1P.
2. Check electrical requirement given on the name plate before use. Name plate is located in electric cord connection.
3. Connect to receptacle with ground connection.
4. Be sure to supply enough electrical current.

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2.2 Installation:

Caution ……

1. Do not use the instrument in high humid environment
    - May cause Electrical leakage.
    - Water droplet may occur on the door.
    - Corrosion may occur.

2. Do not use it in high temperature environment or so not use besides instrument generating heat.
3. Install oven at least 100mm apart from side wall.
4. Place flat, rigid and leveled surface.
5. When moving oven do not up-side-down.
6. Do not place any object on the top of oven.

2.3 Operation:

Warning ……

1. Hot surface may cause injury. So always wear protective gear.
2. Do not put volatile, flammable and explosive material inside the oven.
3. Do not put volatile, flammable and explosive material nearby oven.

Caution ……

1. Do not spill liquid in the chamber.
2. Be careful not to spill liquid on the control panel.

2.4 Maintenance:

Caution ……

1. Do not pour water or any liquid when you clean oven.
2. Do not use highly organic solvent for cleaning the surface of oven.

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CHAPTER 3. FEATURES:-

Forced Convection Oven is ideal for general laboratory drying application at high temperature range from ambient +10 °C to 250 °C.

Controller:

Digital microprocessor PID Controller with ± 0.1 °C resolution.

Performance:

- Temperature Range : Ambient + 10°C ~ 250 °C
- Resolution : ± 0.1 °C
- Accuracy : ± 0.2 °C
- Uniformity : ± 1.0 °C

Material:

- Inner Chamber : Stainless Steel 304 (ANSI 304) 0.8mm thickness
- Outer Cabinet : Steel with epoxy powder coating
- Glass Window : Tempered Safety Glass 5mm thick Double Layer
- High quality dust-free aluminum barrier mineral wool with air flow layer to protect heat dissipation to the surface of oven

Convenience:

- Seamless round cornered edge of chamber for easy cleaning and decontamination.
- Transparent glass Window.
- Height adjustable shelves of 25mm increment.

Safety:

- Over current cut-off.
- Over temperature cut-off.

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CHAPTER 4. SPECIFICATIONS:-

Model		LFO-250
Chamber Volume		250L
Temperature	Heating Type	Forced Convection
	Range	Ambient + 10 °C ~ 250 °C
	Accuracy	± 0.2 °C at 120 °C
	Uniformity	± 1 °C at 120 °C
	Heat Up Time	within 30 minutes to 120 °C
Heater		2.5 kW
Controller		Digital PID Controller with Timer and Auto-Tuning
Wait off Timer		mm:ss / hh:mm / dd:hh / Continuous Selectable
Sensor		Pt 100?
Safety Device	Temperature	Hydraulic Over Temperature Protection Safety Device
	Electrical Leakage	Electrical Leakage Breaker or CG Fuse
	Limit Switch	Heater and Fan output off on door open
Dimensions	Inner	600 x 600 x 700
(W x D x H)mm	Outer	990 x 750 x 955
	Clearance	995 x 760 x 1005
	Window	W150 x H450
Material	Internal	Stainless Steel 0.8 T Polished (SUS304)
	External	Steel 1T with Epoxy Powder Coating
	Insulation	Mineral Wool 50 mm /w Woven Aluminum Barrier
	Door Gasket	High Temperature Resistance Foamed Silicone Rubber
	Window	Double Layer Tempered Safety Glass 5T
Shelves		Wire Shelve with Chrome Pleated
No of Shelves Included		3
Adjustable Height Between Shelves		25 mm increment
Maximum No of Shelves		24
No of Ventilation Damper		1
Power Consumption		12.3 A
Electrical Requirement		220 VAC 50/60 Hz or 120 VAC 60Hz
Net Weight		72 kg
Shipping Weight		82 kg
Catalog No.		08150503

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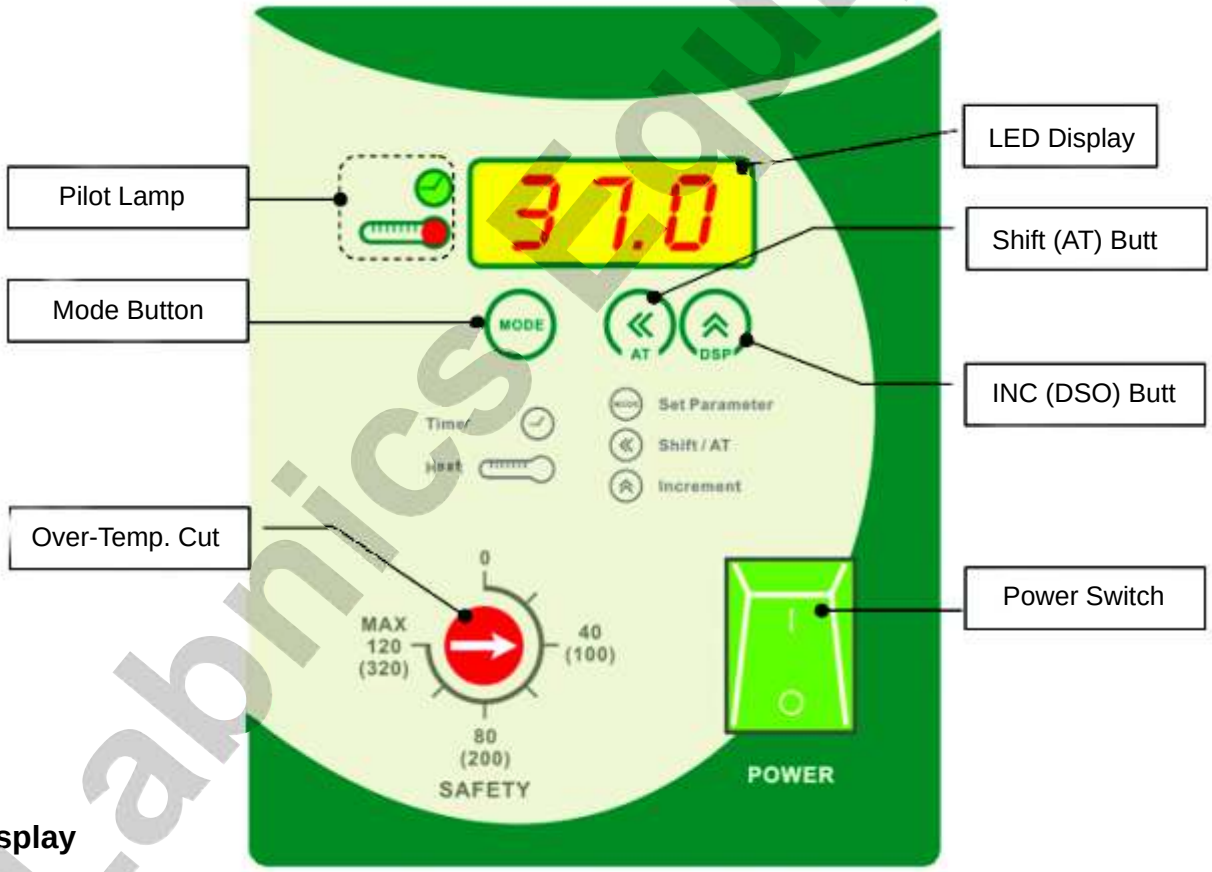
CHAPTER 5. PARTS AND DESCRIPTION:-

CHAPTER 6. MAIN CONTROLLER:-



LED Display

Digital LED Display

Displays current chamber temperature when turned on.

Press INC button to display remaining time when wait-off timer gets activated.

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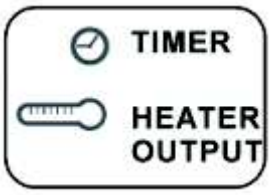
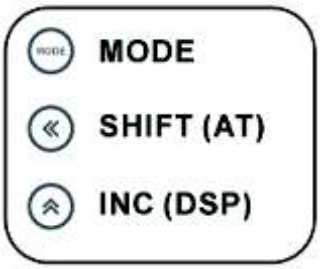
Pilot Lamp



Pilot Lamp

TIMER: Lamp blink or turned on when wait-off timer gets activated.
Lamp blinks until temperature reached upto operating temperature.
Lamp turned on to start count down.
HEATER OUTPUT: Lamp blinks when heater is activated.

Buttons



Mode Button

- Push to Change temperature and time setting.
- Push to change parameters.
- Push and hold for 20 seconds to enter the instrument in parameter mode.

(Remarks) Operating parameters are set before shipment. Do not change without the knowledge of each function of parameters.

Shift (At) Button

- Shift to left digit

Auto Tuning Function

Press and hold for 30 seconds to start auto-tuning.
Auto-tuning will get finished before shipment.

INC (DSP) Button

- Increase value when setting temperature and timer.
- Press to display temperature & timer alternatively in normal display mode.

SAFETY

- Safety dial for over temperature cut-off.
- Set dial 10 ~ 20% higher than operating temperature
- If temperature rise over operating temperature, safety automatically cut-off heater output to prevent over heating.

POWER SWITCH

- Main power switch.

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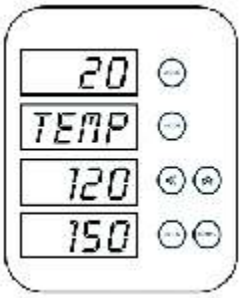
CHAPTER 7. OPERATION:-



Before Operation:

1) Check electrical requirement on the name plate before connecting it to consent.
2) Remove packing material in the chamber and install shelves.
3) Connect power plug between AC inlet consent on the left side of panel and wall mount receptacle.

How to Set Temperature:

1) In normal display mode.
2) Press MODE button.
3) LED displays " TEMP " symbol and prompt user Input.
4) Press MODE button again.
5) LED displays current operating temperature.
6) Enter new operating temperature by using SHIFT and INC button.
7) You can enter operating temperature range from ambient +5 °C to 250 °C.
8) Press MODE button to set timer.
9) Press model button three times to skip timer Setting.

How to Set Timer:

1) Press MODE button twice to set timer.
2) LED displays " TIME " symbol and prompt user input.
3) Press MODE button again.
4) LED displays current timer setting. (ex. 00:00)
5) Input new wait-off timer value by using SHIFT & INC button.
6) Default time scale is HH:MM.
6) For continuous operation set timer at 00.00.
4) You can enter time range from 1min to 99hr 59min.
5) Press MODE button to go back to normal display mode.

(Remarks)- Timer can be changed in different scale by changing parameters

Parameters are:-

1) mm : ss --- 1 sec ~ 99 min 59 sec
2) hh : mm --- 1 min ~ 99 hr 59 min
3) dd : hh --- 1 hr ~ 99 day 23 hr

refer parameter setting to change time scale

MODE 0, N1 : time scale selection parameter

0 : mm:ss
1 : hh:mm
2 : dd:hh

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Over Temperature Protection:

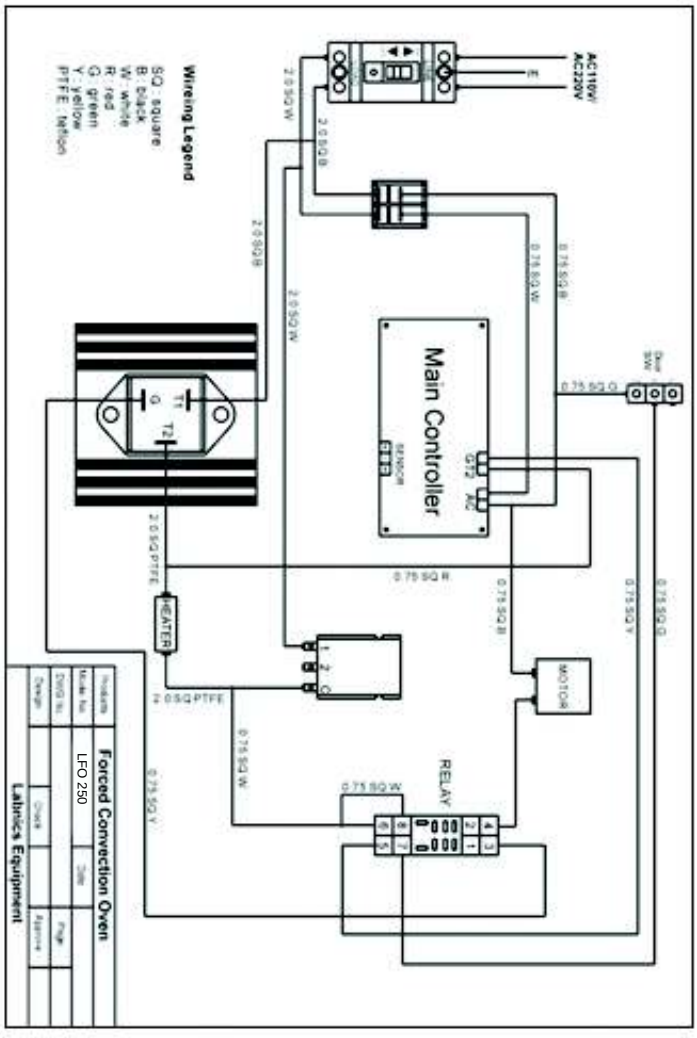
1) User must set the over temperature protection before operation.
2) Turn over temperature protection dial with screw driver.
3) Set temperature about 10~20% higher than the operating (user set) temperature.
4) If over-temp. protection value is below the operating temperature, temp. cannot be reach upto operating temp.

Operation:

1) While setting temperature and time, close door to start temperature control.
2) If you open the door during operation, blower fan and heater stops automatically.
3) Open damper on the top of your oven to vent out vapor.
4) If you keep close damper during operation, temperature over-shooting may occur.

CHAPTER 8. SERVICE MANUAL:-

8.1 Circuit Diagram



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8.2 Frequently Asked Questions:

1) **Why temperature keeps on increasing and decreasing under set temperature?**
   Cause: SAFETY setting is lower than the set temperature.
   Solution: Turn "SAFETY setting" clockwise higher than the set temperature.

2) **Why sometimes temperature does not increase?**
   Cause: Door switch contact.
   Solution: Adjust the height of door-switch for safety purpose when the door is close.

3) **Temperature Overshoot?**
   Cause: Insulation and closed system.
   Solution: Open damper to vent out chamber air to outside.

4) **LED displays uuuu and beep?**
   Cause: Over heating, higher than 250°C
   Solution: Your incubator cannot be used over 250°C.

If temperature increases over 250°C, controller will show a warning "high temperature" and cut-off heater.

8.3 Trouble Shooting Guide:

Error Symbol	Cause	Solution
uuuu	Over heat higher than 250 °C	Call for Service
nnnn	Sensor disconnection	Call for Service

8.4 Spare Part List:

Part No.	Descriptions	LFO 250
OF-HD-01	Damper	
OF-HD-02	Tempered Glass	180x390x5T
OF-HD-03	Door Catch	D-414
OF-HD-04	Silicone Packing	
OF-HD-05	Hinge (top)	
OF-HD-06	Shelf	570 x 580
OF-HD-07	Shelf Support	
OF-ED-01	Main Controller	L-0-v06
OF-ED-02	Power Switch	8206BG
OF-ED-03	Incolony Heater	2.5 kW
OF-ED-04	Safety Thermostat	TS-320
OF-ED-05	Pt100 Sensor	PT-100 ? M10
OF-ED-06	Door Switch	YSP9S-15C
OF-ED-07	TRIAC	TG25C
OF-ED-08	Heat Sink	100*100
OF-ED-09	Circuit Breaker	220V 30A
OF-ED-10	Blower Motor	
OF-ED-11	Fan Blade	D150 x H62 CCW
OF-ED-12	8P Relay	HR710-2PL
OF-ED-13	8P Relay Socket	KLY2

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CHAPTER 9. SETTING PARAMETER:-

9.1 Parameter 1:

1) To set parameters, press and hold "MODE" Button for 5 seconds.
2) Press "SHIFT" and "INC" Button to change values.
3) Press "MODE" Button to go to next parameter.
4) To escape from parameter mode to normal display mode, press & hold "MODE" Button for 5 seconds.

Parameter Symbol	Name of Parameter	Setting Range and Descriptions	Factory Default	User Value
ALH	Alarm Limit High	00.0 ~ 99.9°C	2.0	
ALL	Alarm Limit Low	00.0 ~ 99.9°C	21.0	
HYS	Hysteresis	00.0 ~ 99.9°C	0.2	
BEEP	Beep On Time	0 ~ 9999 Sec.	30	
ADJ	Temperature Calibration	-99.9 ~ 299.9°C		
LOC	Key, Data, Parameter Lock	0000 ~ 1111	0000	

9.2 Parameter 2:

1) To set parameters, press and hold "MODE" Button for 30 seconds.
2) LED Display turn to "ALH" after 5 seconds. Press the button for 25 seconds.
3) Press "SHIFT" and "INC" Button to change values.
4) Press "MODE" Button to go to next parameter.
5) To escape from Parameter mode to normal display mode, press & hold "MODE" Button for 5 seconds.

Parameter Symbol	Name of Parameter	Setting Range and Descriptions	Factory Default	User Value
RNT	Maximum temperature limit to set	-99.9 ~ 299.9°C	251	Do Not Change
ACTP	Temp. where timer activate	-00.0 ~ 99.9°C	0	
	(Parameter can be changed only when the N2 value of Mode0 is 1) Timer starts count down when, (current temp. - set temp.) > ACTP			
Prd	Period (Output Interval)	1 ~ 99 sec.	2	Do Not Change
P	Proportion	0 ~ 6999	Auto-tuned value	Do Not Change
I	Integral	0 ~ 6999	Auto-tuned value	Do Not Change
A	Anti-Intergran	0 ~ 6999	Auto-tuned value	Do Not Change
D	Differential	0 ~ 6999	Auto-tuned value	Do Not Change
Mode0	Operating Mode Control 0 N3 0 = KS, JIS Pt 100 1 = DIN Pt 100 N2 0 = ALH (Relative) 1 = AALH (Absolute) N1 0 = ALL (Relative) 1 = AALL (Absolute) N0 0 = 000°C 1 = Decimal display (000.0°C)	N3 N2 N1 N0 0 0 0 0 1 1 1 1	0001	Do Not Change
Mode1	Operating Mode Control 1 N3 0 = PID Control 1 = ON/OFF Control N2 0 = Timer Disable 1 = Timer N1 0 = Time Scale (mm:ss) 1 = Time Scale (hh:mm) 2 = Time Scale (dd:hh) N0 0 = Power on restore disable 1 = Power on restore	N3 N2 N1 N0 0 0 0 0 1 1 1 1	0111	

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1) **RNT :** Maximum temperature limit to set.
User cannot set temperature higher than this value.
Do not alter the value. Factory default is 251.

2) **ADJ** : Temperature adjustment.
- Sometimes the actual temperature of water is slightly different from the displayed temperature.
- User can adjust the displayed temperature by compensating the difference by Adj value.

Example

1) Measure temperature of Incubator with calibrated thermometer.
2) Read LED display.
3) Change Adj value.

Thermometer	Controller	Adj Value
Temperature Reading	**Temperature Reading**	
120.0 °C	119.0 °C	1
121.0 °C	120.0 °C	- 1

CHAPTER 10. INSPECTION LOG FOR FORCED CONVECTION OVEN:-

Model:..... Serial:..... Client: .....

Date & Time:..... Amb. Temp.:..... Electricity: **VAC Hz**.....

LFO-250 Pretest check list (Initial after each Checkpoint)
If Non-Applicable enter N/A

Termination of each electrical connections		Termination of remote alarm	N/A
Battery termination light	N/A	Surge protection termination	
No metal contact with refrigeration tubes	N/A	No gaps in insulation	
Control panel key switch tight		Equipped with proper accessories	
		Esthetics ok	

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LFO-100 TEST AREA, TEST LOG (NOTE) If units fails any portion of the test enter "NG" in the blank space adjacent to that check point

Technician		Unusual vibration during run	
Volts at plug / terminal strip / Hz		Unusual noise during run	
Fans-Correct blade, no contact		Unusual fan noise or vibration	
Battery Check 12 volts or better	N/A	Display indication and warning functions	
Battery % reading from display	N/A	Leakage or condensation on the tubes	N/A
Cut in voltage		Back Up system	N/A
Display voltage		No condensation on cabinet at BO	N/A
Surge		Check frost on door and interior	N/A
Check Fuse LED		Lid/door seal at pulldown	
RS232	N/A	Door close and latches	
Alarm/remote operation	N/A	Setpoint security verified	
Unusual noise at startup		Labeling on components correct	
No excessive dummy panel vibration		Molded plug not overheated	
Recorder check and calibrated	N/A	No frost on refrigeration components	N/A
Leakage on the water pipe line	N/A	Breaker fit at low temperature	N/A
Verify solenoid valve	N/A	Leak check while running	
Verify over temp. protection of chamber		Verify motor voltage (verify color code)	
Verify over temp. protection of humidity heater	N/A	Check fluorescent lamps and lights	N/A

Released from test by : .....

From#QCF001frm

Approval :

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CHAPTER 11. MAINTENANCE AND SERVICE CHECK LIST:-

Maintenance and Service Check List

Model	**LFO-250**
Descriptions	Forced Convection Oven
Serial No.	

Date	**Check**	**Technician**	**Remarks**	**Sign**
	Shipment			

○ Check ⊙ Clean-Up ☐ Replace

Article	**Every 6 Month**	**Every Year**	**Every 2 Year**
Controller		○	
PT Sensor		○	
Heater		○	
Blower Motor		○	
TRIAC		○	⊙
OPT		○	⊙
Main S/W		○	

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CHAPTER 12. CERTIFICATE OF WARRANTY:-

Descriptions	**Forced Convection Oven**
Model	**LFO-250**
Serial No.	
Warranty Period	**12 Months after purchase**
Date of Purchase	
Purchase From	

WARRANTY COVERAGE

Labnics's warranty obligations for the products are limited to the terms set forth below:

Labnics warrants the product against defects in materials and workmanship for a period of one (1) year from the date of original purchase ("Warranty Period"), providing that the unit is operated according to the instruction in the operating manual.

The guarantee comprises removal of all damages that arises during the guarantee period and that are proven to be due to faulty material or poor workmanship.

If a defect arises and a valid claim is received by Labnics within the Warranty Period, at its option, Labnics will (1) repair the product at no charge, using new or refurbished replacement parts, (2) exchange the product with a product that is new or which has been manufactured from new or serviceable used parts and is at least functionally equivalent to the original product.

If a defect arises and a valid claim is received by Labnics after the first one hundred and eighty (180) days of the Warranty Period, a shipping and handling charge will apply to any repair or exchange of the product undertaken by Labnics.

Labnics warrants replacement products or parts provided under this warranty against defects in materials and workmanship from the date of the replacement or repair for ninety (90) days or for the remaining portion of the original product's warranty, whichever provides longer coverage for you. When a product or part is exchanged, any replacement item becomes your property and the replaced item becomes Labnics's property. When a refund is given, your product becomes Labnics's property.

EXCLUSIONS AND LIMITATIONS

This Limited Warranty applies only to the product manufactured by or for Labnics that can be identified by Name Plate.
Labnics is not liable for any damage to or loss of any products or material stored or tested in the instruments or programs, data, or other information stored on any media contained within the product, or any non-Labnics product or part not covered by this warranty. Recovery or reinstallation of programs, data or other information is not covered under this Limited Warranty.

This warranty does not apply: (a) to damage caused by accident, abuse, misuse, misapplication, or non-Labnics products; (b) to damage caused by service performed by anyone other than Labnics; (c) to a product or a part that has been modified without the written permission of Labnics; or (d) if any Labnics serial number has been removed or defaced; or (e) if the unit is not used according to its purpose; or (f) no original spare parts are used.
TO THE MAXIMUM EXTENT PERMITTED BY LAW, THIS WARRANTY AND THE REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, REMEDIES AND CONDITIONS, WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED. LABNICS SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IF LABNICS CANNOT LAWFULLY DISCLAIM OR EXCLUDE IMPLIED WARRANTIES UNDER APPLICABLE LAW, THEN TO THE EXTENT POSSIBLE ANY CLAIMS UNDER SUCH IMPLIED WARRANTIES SHALL EXPIRE ON EXPIRATION OF THE WARRANTY PERIOD. No Labnics reseller, agent, or employee is authorized to make any modification, extension, or addition to this warranty.

TO THE MAXIMUM EXTENT PERMITTED BY LAW, LABNICS IS NOT RESPONSIBLE FOR DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION, OR UNDER ANY OTHER LEGAL THEORY, INCLUDING ANY COSTS OF RECOVERING OR REPRODUCING ANY PRODUCT OR MATERIAL STORED OR TESTED IN THE INSTRUMENTS, PROGRAM OR DATA STORED IN OR USED WITH THE LABNICS PRODUCT, AND ANY FAILURE TO MAINTAIN THE CONFIDENTIALITY OF DATA STORED ON THE PRODUCT. LABNICS SPECIFICALLY DOES NOT REPRESENT THAT IT WILL BE ABLE TO REPAIR ANY PRODUCT UNDER THIS WARRANTY OR MAKE A PRODUCT EXCHANGE WITHOUT RISK TO OR LOSS OF MATERIAL, PROGRAMS OR DATA.

FOR CONSUMERS WHO HAVE THE BENEFIT OF CONSUMER PROTECTION LAWS OR REGULATIONS IN THEIR COUNTRY OF PURCHASE OR, IF DIFFERENT, THEIR COUNTRY OF RESIDENCE, THE BENEFITS CONFERRED BY THIS WARRANTY ARE IN ADDITION TO ALL RIGHTS AND REMEDIES CONVEYED BY SUCH CONSUMER PROTECTION LAWS AND REGULATIONS. TO THE EXTENT THAT LIABILITY UNDER SUCH CONSUMER PROTECTION LAWS AND REGULATIONS MAY BE LIMITED, LABNICS'S LIABILITY IS LIMITED, AT ITS SOLE OPTION TO REPLACEMENT OR REPAIR OF THE PRODUCT OR SUPPLY OF THE REPAIR SERVICE AGAIN.

Note: Before you deliver your product for warranty service it is your responsibility to remove all products or materials stored in the instrument. Before returning a defective unit, please contact local representative or Labnics Support Center at info@labnics.com. Labnics will issue RGA number for authorized return; If we agree to the unit being returned, arrange for careful packing and send the unit to LABNICS.

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SERVICE REPORT

Customer's Address : _____

Tel.No.:
Fax No.:
Weekly Off.:

Contact Person / Designation :

Dept.:

Date	Time		System Configuration	Model	Serial No.
	From	To			

Date : SR. No.

Status : OK ❑ Not OK ❑

Installation ❑ Warranty ❑
Demonstration ❑
Maintenance ❑ Contract ❑
Repairs ❑
Application ❑ Billable ❑
Calibration ❑
Validation ❑ Courtesy ❑

Nature of Problem :

Observation & Action Taken :

Customer's Remarks :

Parts Replaced :

Parts Recommended / Action Required : Yes ❑ No ❑ Requisition Number :

Service Engineer's Name & Signature	Customer's Name, Signature, Date & Stamp

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