Operating Manual Number : LEF230PE

Electric Muffle Furnace

Model LEF-203P / LEF-205P / LEF-215P / LEF-230P

Related Products

Model #	Descriptions	Capacity	Electrical Requirements
LEF-103S	Electric Muffle Furnace	3.0 Liters	220 VAC 1Phase or 3Phase 50/60Hz
LEF-105S	Electric Muffle Furnace	4.5 Liters	220 VAC 1Phase or 3Phase 50/60Hz
LEF-115S	Electric Muffle Furnace	14 Liters	220 VAC 1Phase or 3Phase 50/60Hz
LEF-130S	Electric Muffle Furnace	27 Liters	220 VAC 1Phase or 3Phase 50/60Hz

1.1. Tables of Contents

1.1. Tables of Contents……..2
1.2. Getting Started……..2
1.3. Product Overview……..3
1.4. Product Specifications……..4
1.5. Installation……..4
1.6. Cautions in Use……..6
1.7. Parts and Functions……..8
1.8. Operating…… ……10
1.9. Maintenance…… ……15
1.10.Trouble Shooting…… ……16

1.2. Getting Started

Thank you very much for purchasing Daihan Labtech **L**EF Series Muffle Furnace.
Your Electric Muffle Furnace has been designed with function, reliability, and safety in mind. It is your responsibility to install it in conformance with local electrical codes. For safe operation, please pay attention to the alert symbols through the manual.

This manual contains important operating and safety information. You must carefully read and understand the contents 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.

Note
Notes alert you to pertinent facts and conditions.

HOT

Hot Surface
Hot surface alert you possibility of burning injury by hot instrument surface

Explosive
Explosive alerts you to possibility of explosion by high pressure.

1.3. Product Overview

Application

Ideal for ashing organic and inorganic samples, heat treating metals, ignition test, gravimetric analysis and determination of volatiles and suspended solids.

Microprocessor Programmable PID Controller

Provides accuracy and reliability, set point and actual temperature dual display.

Molded Ceramic Fiber Insulation

and air jacked dual case stainless steel provide a compact and perfect working condition

Embedded Heating Element

Replaceable embedded heating elements installed in 4 sides provide a uniform heating level and a long life against corrosive gas, water vapor and contamination

SAFETY PRECAUTIONS

HOT

SURFACE AND INSIDE OF THE FURNACE IS EXTREMELY HOT. TOUCHING THE SURFACE DURING OPERATION COULD RESULT IN SERIOUS INJURY.

DO NOT REMOVE THE GROUND PRONG (THIRD PIN) (IN CASE OF 110V) FROM THE POWER CORD, OR USE AN UNGROUNDED ADAPTER. THE JUMBO HOTPLATE REQUIRES A 3-WIRE RECEPTACLE. IF ONE IS NOT AVAILABLE, CONSULT WITH AN ELECTRICIAN FOR INSTALLATION.

TO REDUCE THE RISK OF ELECTRICAL SHOCK, DO NOT OPEN THE BODY. NO USER SERVICEABLE PARTS INSIDE.

PUTTING VOLATILE, FLAMMABLE AND EXPLOSIVE MATERIAL IN THE FURNACE MAY RESULT IN EXPLOSION OR FIRE

1.4. Product Specifications

Model		LEF-203P	LEF-205P	LEF-215P	LEF-230P
Controller		Microprocessor Step Program Controller			
Dimensions (W x D x H mm)	Inner	130 x 250 x 90	150 x 300 x 100	250 x 350 x 160	300 x 300 x 300
	Outer	390 x 470 x 490	420 x 530 x 510	530 x 585 x 580	580 x 590 x 725
Chamber Capacity		3.0 ℓ	4.5 ℓ	14 ℓ	27 ℓ
Heater		2 Kw	3 Kw	5 Kw	6 Kw
Temperature		Up to 1200℃ Max			
Output Regulator		SSR unit control			
Thermocouple		K type CA Sensor			
Heating Element		Kanthal			
Insulation		Vacuum Molded Ceramic Fiber			
Material		Stainless steel			
Electric Supply		220V 1Phase or 3 Phase 50/60Hz			

1.5. Installation

WARNING

Place the device on a level, horizontal surface to support the capacity of the device without vibration. If there is vibration, install the device on a support material with enough space. Small place may cause the device to drop.

Do not install at a dangerous place.
Do not operate the device where there are flammables. It could be caused serious accidents like explosion or fire.

Do not operate the device outside.
Avoid areas where the sun shines or rain directly on the device. It is very dangerous as cause over-heat or a short circuit.

Do not install the device where it can get damp or dust.
It may be caused overheating, a short circuit or a fire by damp or dust inside of the device.

Do not use this device when temperature fall below 5°C and rise above 40°C.

	Do not use the device at a place with high temperature. Do not operate the device near a heater, blowing an air-conditioner. It may be caused an accident by over-heating.
	The device should be set at a well ventilated place. Be sure the holes on the side or rear surface of the body are blocked by a wall or an object. And do not operate the device at a poor ventilated place or use closed. It may cause a fire or damage of the device as not to release heat or insufficient ventilation may result.
	Set the device a lightening place. When you set the device at a dark place, it may cause an unexpected accident by mistake in operation.
	Depending on the material that shall be treated there could exist unhealthy gases that have to be led-out of the room in the most suitable way (by connecting an exhaust pipe)

1.5.1. Mechanical installation

Please put the furnace on the base, respectively on a bench that has the same height. It must be insured that there is a space of 0.5m around the furnace. The exhaust of hot air must not be prevented.

- Fix the bypass according to below mentioned sketch (not for all furnace models).
- There can be connected a standard pipe made of steel to this bypass. To reach a food exhaust the pipe must be laid upwards. The bypass prevents the furnace chamber of draught that is not wanted during operation.

1.5.2. Electrical connections

- Connect the main plug in a female plug of your net that is will accessible.

1.5.3. First operation

To dry the insulation of the furnace and to reach a good oxide-layer on the heating elements the furnace has to be heated-up for the first time. There could be a smell annoyance that is absolutely safe for the health.

- Empty furnace has to heat-up to 500 ℃ in 6 hours and with full power to 900 ℃, this temperature has to be held for 30 minutes.

1.6. Cautions in Use

WARNING
Be careful to operate the device. You should read this manual carefully before using. The device should only be operated by laboratory personnel especially trained for this purpose and familiar with all precautionary measures required for working in a laboratory.
Operate after check the safety of the device. If there is generated a slight shock or a poisonous gas from a sample, figure it out and make sure the safety using dustproof or a gas mask.
If unexpected sound, smell or smog is generated, pull out the mains plug and contact manufacturer or a supplier.
Do not put any objects insides. When an object that is easy to be combustible is like a stone, a metal or paper goes insides, it may cause a fire, an electric shock or a break down. If do, pull out the mains plug from a socket and contact a manufacturer or a supplier.
Do not disassemble or remodeling by yourself. It may cause damage to the designed safety. We do not have any duties for an accident, quality deterioration or a defect caused by a customer.
All the mechanisms and electric/electronic devices in this machine are designed and developed by the manufacturer. The devices could be disassembled and serviced only by the engineers of manufacturer or by engineers approved by manufacturer.
Do not touch the device with wet hand while operation.
Do not turn on and off frequently. It could damage the compressor by overload.

CAUTION

This device must be connected to an earthed power supply.

No combustible materials must be brought near the furnace.
Please observe combustibility and explosive of gases that are used or arise during the operation of furnace. Please only use materials with well-known characteristics and melting temperatures (please see also marking of these materials)

At some areas of furnace surface if you work with high chamber temperatures.
At the exhaust hole. The exhaust hole can reach temperatures of 200 ℃.

When using an annealing box/gas mandrel for the heat treatment of material, the earthing cable must be connected to the earthing point provided at the furnace.
All parts which protrude from the furnace must be earthed (grounding cable to connect all protruding parts with the furnace casing).

Please only tighten the door closing-mechanism with low force. The air-inlet with magnetic closing mechanism (not for all furnaces) is located either at the left or front side of the furnace.
Heating elements are sensitive against breakage when they are cold. Please take care of this when charging, discharging and cleaning the furnace.

If you use radiation or contaminated samples, the responsibility is to the customer.

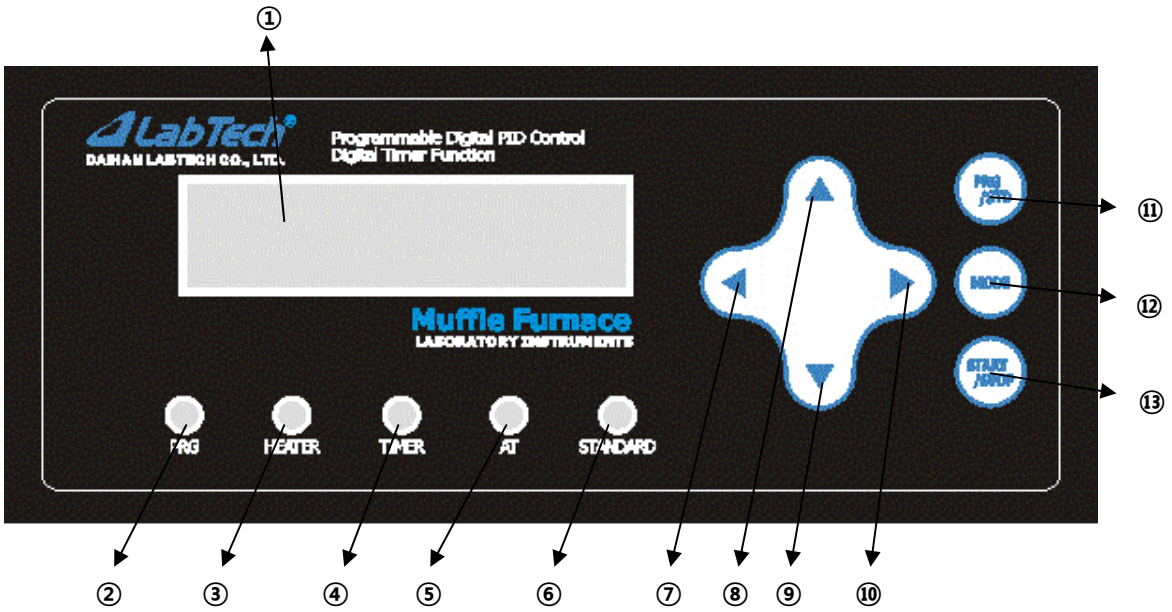
Avoid a sample that is poisonous or flammable.
Never use for a explosive sample.

Please avoid ultrasonic lamps.
It could be cracked or faded.

Disconnect the power supply plug if the unit is not going to be used for an extended period of time.

1.7. Parts and Functions

1.7.1. MAIN CONTROLLER



(NOTE) **SV** : Set Value, **PV** : Present Value

① Digital LCD with back-light :

SV and PV of Temperature, SV and PV of Timer (Operation Timer and Delay Timer) are displayed.

② Program mode operation lamp

③ Heater operation lamp

④ Timer operation lamp

⑤ Auto tune operation lamp

⑥ Standard mode operation lamp

⑦ Left function key

⑧ Right function key (Mute function for when door was opened and operate alarm)

⑨ Up function key

⑩ Down function key (Auto tune operation by push over 5 second when instruments run)

⑪ Select button (Program mode and Standard mode)

⑫ Parameter setting button

⑬ Start and Stop button (Power on/off button when instruments first run)

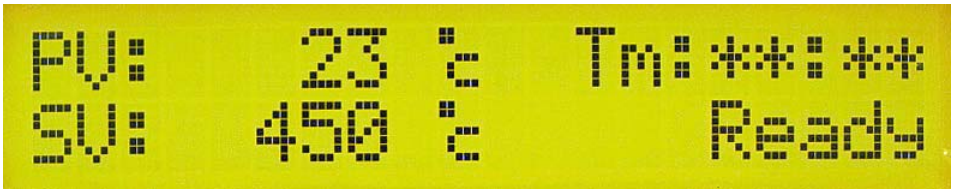
1.7.2. Major Parts

1.8. Operating

1. 8.1.Preparation for Use

- Connect the power cord to the proper power socket.
- Turn on the power button ⑬.

1.8.2. Initial Status

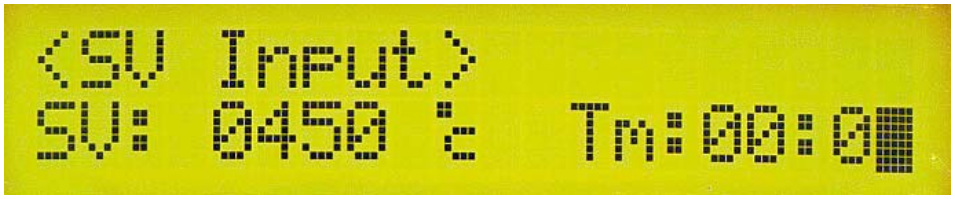


SV : Set Value, **PV** : Present Value, **Tm** : Timer Value

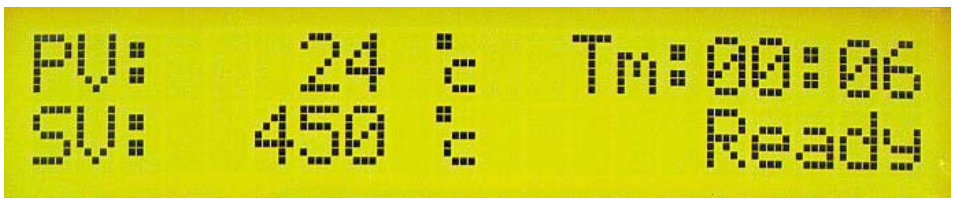
After turn on the power, and push start button. Display will show initial status with signal sound. If instruments was power off by cut the electronic power. Display will show last step or pattern after supply electronic power.

1.8.3. Start of Standard mode

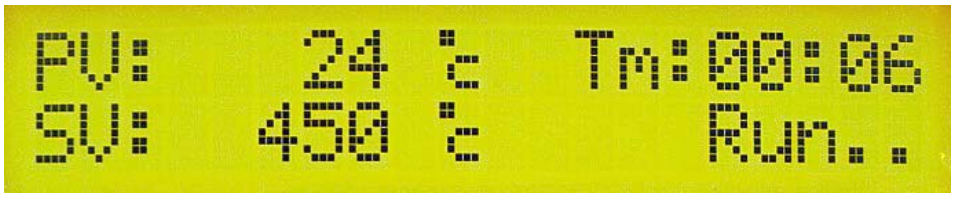
If you want start standard mode, push ‘Parameter setting button ⑫ for setting temperature and time.



You can set temperature and time by using ⑦⑧⑨⑩ button.



If you finish set parameter, push ‘Parameter setting button ⑫. It will go back initial status



By pushing Start and Stop button ⑬, Standard mode operation begins with 'Standard mode operation lamp' on.

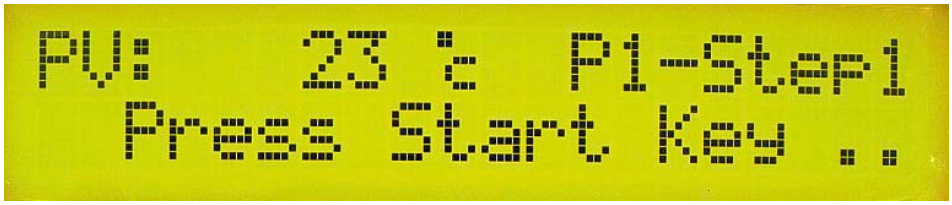
When instrument reach to target temperature, 'Timer operation lamp' ④ will on and maintain target temperature during as you were set time.

If you use instruments first time or If you want adjust instrument accuracy. Push Auto tune operation button ⑩ over 5 seconds.

'Auto tune lamp' ⑤ will on and start 'Auto Tuning' function. It takes about 30 to 40 min. depends on running environment.

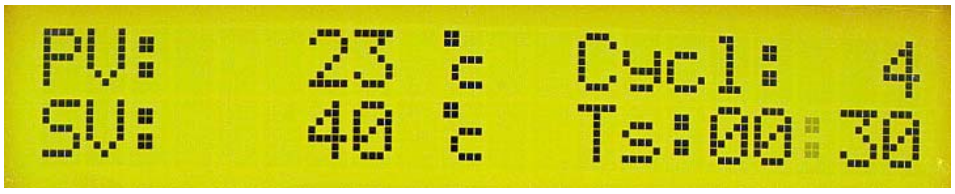
1.8.4. Start of Program mode

If you want start program mode, push 'Select button' ⑪ over 3 seconds. 'Program mode operation lamp' ⑥ will on.



PV : Present Value, **P1-Step1 :** Pattern No. 1 and Step No. 1

Display will show last run program. So If you want run again. Push 'Start/Stop button' ⑬.



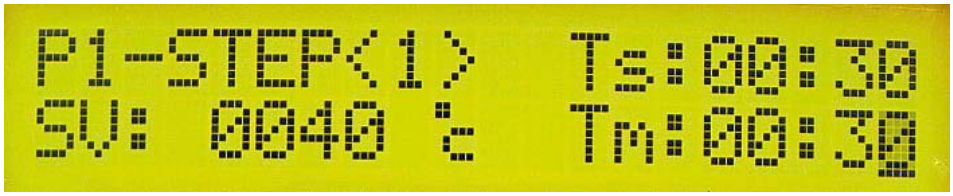
Present temperature is 23℃ and target temperature is 40℃. When instruments reach to target temperature. It will maintain 40℃ during 30min, and later It will run 4 cycle for this pattern.

1.8.5. Set program mode

If you want set program mode. Push ‘Select button’ ⑪ after change to program mode. You can select 1 to 5 pattern by using key button ⑧ ⑨.

If you want start selected pattern, push ‘Start/Stop button ⑬. Or If you want set selected pattern, push ‘Parameter setting button’ ⑫.

Display will show step setting as below with signal sound.

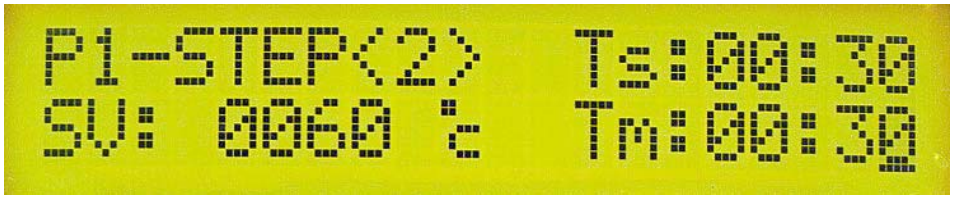


P1-STEP<1> : Pattern No. 1 Step No. 1, **SV** : Set Value, **Tm** : Timer Value

Ts : Time for reach to target temperature.

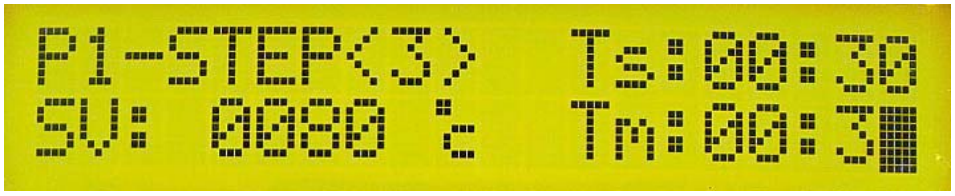
You can set temperature and time by using ⑦⑧⑨⑩ button.

- If you want maintain target temperature exact during time. You have to set ‘Ts’ time.
- ‘Ts’ timer value for present temperature to target temperature. So If you set 30 min ‘Ts’ timer. Instrument will goes up to 40℃ under 30 min. And then maintain 40℃ during 30min. (This value is so long time to 40℃. Normally instrument take 25 to 30 min for reach to 800℃)
- If you set 0 time for ‘Ts’, ‘Tm’ value will start as push start button nevertheless reach to target temperature.



After set step <1>, push ‘Parameter setting button’ ⑫ for go to next step.

And then set step <2>.



Set step <3> as same method. push ‘Parameter setting button’ ⑫ for go to next step.

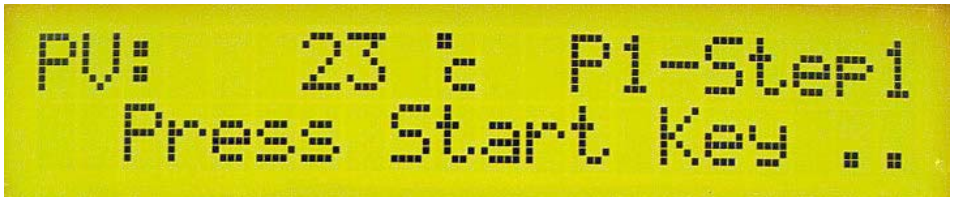
In step <4> If you want finish set step. Do it as below.

Maximum set steps are 9.

After set '0' value for 'Ts', 'Tm'. Push 'Parameter setting button' ⑫ for ending
Display will show as below, you can set cycle number and select 'After End' function.

Adjust cycle number for pattern no. 1 by using key button ⑦⑧⑨⑩. You can set 1 to 999 cycle for pattern and If you want never ending run before push 'Stop button'. Set '000' value for cycle.
After run pattern no. 1 with cycle, you can select next process. Push 'Select button' ⑪ and select 'Stop', 'Next' or 'Menu'
'Next' : After run pattern no.1. Instrument will run pattern no. 2.
'Manu' : After run pattern no. 1. Instrument will run Standard mode.
'Stop' : After run pattern no. 1. Instrument will stop all control.

So you can run several pattern continuously by 'Next' function and also can maintain standard mode temperature after pattern by 'Manu' function.



After all program set as you wish. Push 'Start/Stop button' ⑬.
Instrument will run as you were set pattern no. 1 with cycle number and then go to next pattern, go to standard mode or finish all control as you were select 'Stop', 'Next', or 'Menu'..

You can also adjust instrument accuracy when program running . Push Auto tune operation button ⑩ over 5 seconds.
'Auto tune lamp' ⑤ will on and start 'Auto Tuning' function. It takes about 30 to 40 min. depends on running environment..

**** Go to next stage during step running****

If you want to go to next stage during run step, push ‘Up function key’ ⑨.

Instrument will go to next stage as ignore present running.

When instrument run ‘Ts’ in step 2. Instrument will go to ‘Tm’ stage in step 2. and If you push ‘Up function key’ ⑨ again. Instrument will go to ‘Ts’ stage in step 3.

If value of ‘Ts’ in step 3 is 00:00. Instrument will go to ‘Tm’ stage in step 3 directly.

Manufacturer of Laboratory Instruments
LabTech
247-16, GAGOK-RI, HWADO-EUP,
NAMYANGJU-CITY, KYONGGI-DO, KOREA
TEL : 031-593-9561 FAX : 031-593-9563
EMAIL : info@labtech.co.kr Homepage : http://www.labtech.co.kr

ISO 9001

Quality Warranty

Descriptions	Electric Muffle Furnace
Model	LEF-
Serial No.	
Warranty Period	( ) Months
Date of Purchase	
Purchase From	

WARRANTY COVERAGE

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

Daihan LabTech Co., Ltd. ("LabTech") 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 LabTech within the Warranty Period, at its option, LabTech 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 LabTech 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 LabTech.

LabTech 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 LabTech's property. When a refund is given, your product becomes LabTech's property.

EXCLUSIONS AND LIMITATIONS

This Limited Warranty applies only to the product manufactured by or for LabTech that can be identified by Name Plate.

LabTech 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-LabTech 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-LabTech products; (b) to damage caused by service performed by anyone other than LabTech; (c) to a product or a part that has been modified without the written permission of LabTech; or (d) if any LabTech 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. LABTECH SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IF LABTECH 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 LabTech reseller, agent, or employee is authorized to make any modification, extension, or addition to this warranty.

TO THE MAXIMUM EXTENT PERMITTED BY LAW, LABTECH 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 LABTECH PRODUCT, AND ANY FAILURE TO MAINTAIN THE CONFIDENTIALITY OF DATA STORED ON THE PRODUCT. LABTECH 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, LABTECH'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 LabTech Service Center at service@labtech.co.kr.

LabTech will issue RGA number for authorized return ;

If we agree to the unit being returned, arrange for careful packing and send the unit to

DAIHAN LABTECH CO., LTD.

247-16 GAGOK-RI, HWADO-EUP,

NAMYANGJU-CITY, KYONGGI-DO,

KOREA

TEL : +82-31-593-9561

FAX : +82-31-593-9563

Email : service@labtech.co.kr

Please remember to describe the kind of fault you found and state your complete address.