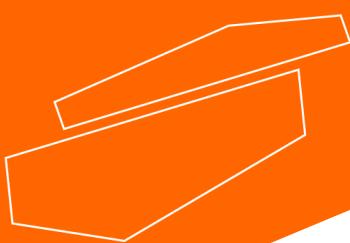




## LBX MF12      Muffle Furnace

*Please read the User Manual carefully before use, and follow all operating and safety instructions!*



**user manual**  
english

## User Manual



### LBX MF12 Muffle Furnace

## Preface

Users should read this Manual carefully, follow the instructions and procedures, and beware of all the cautions when using this instrument.

## Service

If help is needed, you can always contact your dealer or Labbox via [www.labbox.com](http://www.labbox.com) (declare an incidence).

Please, provide the customer service representative with the following information:

- Serial number
- Description of the problem
- Your contact information

## Warranty

This instrument is guaranteed to be free from defects in materials and workmanship under normal use and service, for a period of 24 months from the date of invoice. The warranty is extended only to the original purchaser. It shall not apply to any product or parts which have been damaged on account of improper installation, improper connections, misuse, accident or abnormal conditions of operation.

For claim under the warranty, please contact your supplier.

# Main Technical Parameters

Model		MUFU-020-001	MUFU-072-001	MUFU-120-001
Heating mode		Alloy wire heating in three sides left; right; top side.		
Function	Temp. Range	100-1200°C		
	Temp. Resolution Ratio	1°C		
	Temp. motion	±1°C		
	Temp.Rising time to max temp	≤30min		
Structure	Chamber material	Ceramic fiber		
	Outer shell	cold rolling steel electrostatic spraying exterior		
	Insulation layer	Ceramic fiber		
	Heater	Alloy heating wire		
	Power rating	1.5kW	3.0kW	4.5kW
	Exhaust hole	φ30mm(chimney size 80*60mm)		
Controller	single controller			
	Temp. control mode			
	Temp. setting mode	Touch button setting		
	Temp. display mode	Measuring temperature: LED upper row, setting temperature: lower row		
	Timer	0-9999 min (with timing wait function)		
	Operation function	Fixed temperature operation, timing function, auto stop.		
	Additional function	Sensor deviation correction, Temperature overshoot self-tuning, Internal parameter locked, Power-off parameter memory		
	Sensor	Platinum-rhodium sensor		
Safety device		Manual door security lock, over temperature sound-light alarm, door opening electrical outage, over-temperature protection, thermocouple failure		
Specification	Inner Chamber size (W*L*H)(mm)	120*200*80	200*300*120	200*300*200
	Exterior size (W*L*H)(mm)	450*685*600	530*785*640	530*785*720
	Packing size (W*L*H)(mm)	580*775*730	660*875*770	660*875*850
	Volume	2L	7L	12L
	Current rating (50/60HZ)	AC220V/6.6A	AC220V/13.6A	AC220V/20.4A
	NW/GW (kg)	33/37	45/50	62/68

## Characteristics

1. Double insulation ceramic inner chamber with stable performance.
2. Efficient insulation and three side heating of special alloy heating wire to provide optimum temperature uniformity.
3. High precision micro-computer controller and accurate sensor.
4. Double-shell hollow thermal insulation and double ventilation duct with excellent ventilation, quick internal cooling.
5. Multiple safety protection measures, such as thermocouple failure, over door opening electrical outage, audio-visual alarm, etc.

## Installation and Operation

1. Open the package, check the furnace and make sure that no part is damaged. Place the furnace on smooth ground or on a table. The equipment should avoid contact with vibrating surfaces.
2. Install the power switch at the original power line. To make sure the equipment operates safely, furnace and controller must be grounded reliably.
3. Connect the controller direction to the power line. Turn on the power and set the temperature on the meter. It starts heating when the indicator light of the meter turns green. Adjust the power to reach the target temperature as it is needed, but make sure the voltage and electric current of the product will not surpass the rated power.

## Attentions

	Install the outer ground protection to ensure safety of machine and experiment; ensure power as the machine requires.
	It is forbidden to use this equipment in inflammable, explosive, poisonous or strong corrosive experiments.
	Make sure the equipment is horizontally installed.
	Non-professionals are not allowed to disassemble and repair this machine.
	Pay attention to the setting temperature when dealing with inflammable matters.
	Make sure to dry the resin container, if the temperature is set too high by accident, the container could be dissolved and then fall on the heater, which could cause fire.
	Overfilling of sample will lead to overheating of working room, which could dissolve the inflammable material and cause fire.

	<p>While the machine is working, don't touch the device top, as well as observation window and exhaust port to keep away from high-temperature burns.</p>
	<p>Do not open the door when the temperature more than 500°C</p>
	<p>Set the temp.50°C under the Max. temp. for long experiments</p>
	<p>Read the instruction book before operation.</p>

## Meter Operation Instruction

### Basic Display Status

When powered on, the screen shows the basic display status, upper window displays real temperature value (PV) in red while lower window displays the set temperature value (SV) in green. If the real value overruns measure range (thermocouple breaks for example), upper window will display “orAL” and the highest and lowest values, at this time, the controller will automatically the output.

In the controller, there are various LED lights: OP1, AU1, AU2, RUN respectively stand for output, first alarm, second alarm, and working condition.

### Temperature and Time Program Setting

In basic display status, if the parameter lock “Loc” isn't locked, we can set the temperature point (SV) by pressing  or . When any of those keys is pressed, the upper window will display “SP” in red while a dot (.) will appear in the lower-right of the digit to be modified in the lower window (in green). Press  key to decrease the value of the digit,  key to increase the value of the digit, and  key to move to the digit expected to modify. The temperature value must be input in °C.

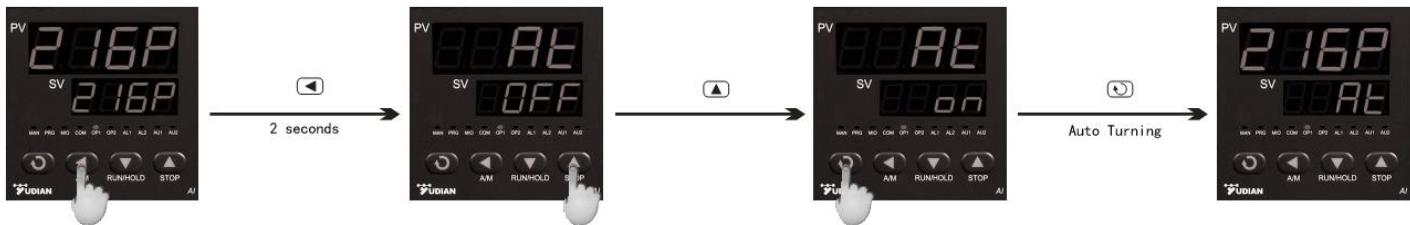
Once the expected temperature is set, press  until the upper window displays “t-1”, then you can set time. The time value must be input in minutes and the last digit is decimal parts of a minute, for example: 60.0 = 60 minutes, 60.5 = 60 minutes and 30 seconds.

### Working Control

When the power is on, the controller is in stop status, you can press  for 2 seconds until the below window shows “run” to start controller's working. Press  for 2 seconds until it shows “stop” to stop the controller's working.

## Auto Tuning

When auto tuning control method is chosen, the PID parameters can be obtained by running auto-tuning. In basal display status, press  for 2 seconds, the “At” parameter will appear. Press  to change the value of “At” from “oFF” to “on”, then press  to active the auto-tuning process. During auto tuning, the instrument executes on-off control. After 2-3 times of on-off action, the instrument will obtain the optimal control parameter value. If you want to escape from auto tuning status, press and hold the  key for about 2 seconds until the “At” parameter appear again. Change “At” from “on” to “oFF”, press  to confirm, then the auto tuning process will be cancelled.



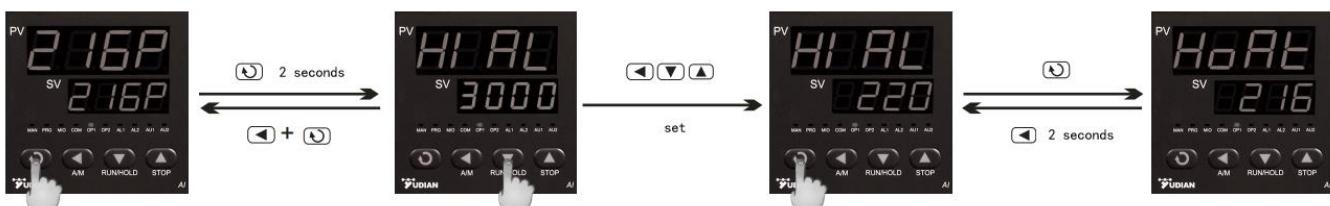
*Note 1: If the setpoint is different, the parameters obtained from auto-tuning are possibly different. So you'd better set setpoint to an often-used value or middle value first, and then start auto-tuning. Depending on the system, the auto-tuning time can be from several seconds to several hours.*

*Note2: Setting of CHYS may have influence on AT. The lower value of CHYS the higher accuracy. But too low CHYS isn't advice, CHYS=2.0 is advised.*

*Note3: At the beginning after AT, the result maybe not table but it will get best result after a time.*

## Parameter Setting

In basic display status, press  and hold for about 2 seconds to access the Field Parameter Table. Pressing  will move to the next parameter; pressing  or  can modify a parameter. Press and hold  can return to the preceding parameter. Press  (don't release) and then press  key simultaneously to escape from the parameter table. The instrument will escape automatically from the parameter table if no key is pressed within 30 seconds. Setting Loc=808 and then press  can access System Parameter Table.



Field parameter table (press  and hold for 2 seconds to access)

Code	Name	Description	Factory value
HIAL	High limit alarm	Alarm on when PV (Process Value) >HIA; alarm off when PV<HIA-AHY	3000
LoAL	Lower limit alarm	Alarm on when PV (Process Value) <LoA; alarm off when PV>LoA-AHY	-999
HdAL	Deviation high alarm	Alarm on when PV-SV>HdA; alarm off when PV-SV<HdA-AHY	50
LdAL	Deviation low alarm	Alarm on when PV-SV<LdA; alarm off when PV-SV>HdA-AHY	-999

Loc	Parameter Lock	Loc=0: Allowed to modify parameters and do AT Loc=1: Allowed to modify parameters but cannot AT Loc=2: Allowed to modify parameters and AT Loc=4-255: NOT allowed to modify parameters except Loc. Loc=808, Set to 808 and press  , allowed modify all parameters.	0																								
AHYS	Hysteresis	Avoid wrong frequent alarm caused by wrong value setting	2																								
AoP	Alarm Output assignment	<p>AoP is to define the place of HIAL,LoAL,HdAL alarms like :</p>  <p>Value 0~4.0 means never alarm, 3 and 4 mean alarm from AU1,AU2. E.g. AOP=403 means HIAL alarm from AU1, HdAL from AU2,LoAL no alarm</p>	0~4444																								
CrL	Control mode	onoF : On-off control, used in normal case APId: high precision control PID mode nPId: standard PID control	APId																								
Srun	Running status	Run, normal running status, PRG light on Stop, stop status, below window shows "stop", PRG light out Hold, keep current status, program stop counting time at this moment	stop																								
Act	Direct/reverse acting function	rE: Reverse acting. Increase in measured variable causes a decrease in the output, such as heating control. dr: Direct acting. Increase in measured variable causes an increase in the output, such as refrigerating control. rEbA: Reverse acting with low limit alarm and deviation low alarm blocking at the beginning of power on. drbA: Direct acting with high limit alarm and deviation high alarm blocking at the beginning of power on.	rE																								
P	Proportional band	Proportional band in PID with unit °C/F. Notes: normally use At to confirm P,I,D and Ctl . But can set known correct value.	30																								
I	Time of Integral	Time of integral in PID. No integral effect when I=0 unit is 1 second	100																								
d	Time of Derivative	Time of derivative in PID. No derivative effect when d=0. Display unit is 0.1 second	50																								
Ctl	Control period	Small value can improve control accuracy. For SSR output, generally 0.5 to 3.0 seconds. For Relay output, generally 15~40 seconds, because small value will cause the frequent On-Off of mechanical switch and shorten its service life. Ctl is recommended to be 1/4 ~ 1/10 of derivative time. When control under on-off control, Ctl use as restart delay time after off, for protect compressor application.	2.0 or 20																								
CHYS	Control Hysteresis	CHY is used for on-off control, if PV > SV, output turns off; PV < SV-CHYS, output turns on.	2																								
InP	Input specification	<table border="1"> <tr> <td>InP</td><td>Input spec</td><td>InP</td><td>Input spec</td></tr> <tr> <td>0</td><td>K</td><td>1</td><td>S</td></tr> <tr> <td>2</td><td>R</td><td>3</td><td>Spare</td></tr> <tr> <td>4</td><td>E</td><td>5</td><td>J</td></tr> <tr> <td>6</td><td>Spare</td><td>7</td><td>N</td></tr> <tr> <td>8-20</td><td>Spare</td><td>21</td><td>Pt100</td></tr> </table>	InP	Input spec	InP	Input spec	0	K	1	S	2	R	3	Spare	4	E	5	J	6	Spare	7	N	8-20	Spare	21	Pt100	
InP	Input spec	InP	Input spec																								
0	K	1	S																								
2	R	3	Spare																								
4	E	5	J																								
6	Spare	7	N																								
8-20	Spare	21	Pt100																								
dPt	Resolution	"0" means 1°C or 1F, "0.0" means 0.1°C/F	0																								
Scb	Input Shift	Scb is used to make input shift to compensate the error produced by sensor or input signal. PV_after_compensation = PV_before_compensation + Scb. Note: normally set it as 0	0																								

FILT	PV input filter	The value of FIL will determine the ability of filtering noise. If great interference exists, then you can increase parameter "FIL" gradually to make momentary fluctuation of measured value less than 2 to 5. When the instrument is being metrological verified, "FIL" s can be set to 0 or 1 to shorten the response time.	1
Fru	Power frequency and display unit	50C --frequency 50Hz,display unit °C. 50F-- frequency 50Hz,display unit F. 60C --frequency 50Hz,display unit °C. 60F-- frequency 50Hz,display unit F.	50C
OPH	Output highest limit	When PV<OEF,max limit 100%	100
OEF	OPH valid range	When PV<OEF,OUTP output highest limit is OPH, When PV>OEF,no limit ,100% output Note:if you want to avoid too quick temperature raising, and temperature is lower than 150C, only 30% is allowed for heating power, then you can set: OEF=150.0 °C, OPH=30%	3200
AF	Senior function code	AF=A*1+B*2+E*16+G*64 A=0,HdAL and LdAL is for Hysteresis alarm;A=1,they are absolute alarm B=0,single loop alarm, B=1,Dual loops alarm E=0,HIAL ,LOAL are absolute highest alarm and lowest alarm E=1,HIAL,LOAL are hysteresis highest alarm and hysteresis lowest alarm G=0,sensor allow ,. G=1,not allow higher than highest alarm value Set it as 0 unless an expert tells you to change.	0
SPL	Lower limit of SV	Minimum value of SV	0
SPH	Upper limit of SV	Maximum value that SV allowed to be.When SPH=400,the SV range will 0~400°C.	1200
SPr	Limit of temperature rising speed	If SPr is set as valid, when controller works, RUN light will shine if wrong or unnormal speed occurs.	0
PonP	Auto running when power on	Cont, controller stop work StoP, when power on, it's in stop status. Run1, continue working dAStr, if now alarm, then work, if alarm, stop working HoLd,(only for AI-518P),if accident short of electricity, stop work.	cont
EP1~EP8	Senior function code	Can set 1~8 field parameter. If not need or less than 8, can set it as nonE.	

## Fault Analysis

Problem		Cause	Possible Solution
No power		1. No Power Supply 2. Switch broken 3. Wire short or fuse broken	1. Check the power or change the plug socket 2. Change the switch 3. Check the wire or change the fuse
SX3	SV display Oral	Sensor broken	Change the sensor
Alarm or over-temperature light on		Machine body higher than the limited temperature, protect now!	The Temperature down to safety temperature and recover by itself (Inspect the reason or change the limited temperature)
Not working		Specification wrong changed	Change the specification
Temperature not rising		1. Controller broken 2. Heating Element broken	Contact with the repair

### **Nota importante para los aparatos electrónicos vendidos en España**

Instrucciones sobre la protección del medio ambiente y la eliminación de aparatos electrónicos:



Los aparatos eléctricos y electrónicos marcados con este símbolo no pueden ser eliminados en forma de residuos urbanos.

De conformidad con la Directiva 2012/19/UE, los usuarios de la Unión Europea de aparatos eléctricos y electrónicos, tienen la posibilidad de devolver sus RAEE para su eliminación al distribuidor o fabricante del equipo después de la compra de uno nuevo. La eliminación ilegal de aparatos eléctricos y electrónicos es castigada con multa administrativa.

### **Remarque importante pour les appareils électroniques vendus en France**

Informations sur la protection du milieu environnemental et élimination des déchets électroniques :



Les appareils électriques et électroniques portant ce symbole ne peuvent pas être jetés dans les décharges.

En réponse à la réglementation, Labbox remplit ses obligations relatives à la fin de vie des équipements électriques de laboratoire qu'il met sur le marché en finançant la filière de recyclage de ecosystem dédiée aux DEEE Pro qui les reprend gratuitement (plus d'informations sur [www.ecosystem.eco](http://www.ecosystem.eco)).

L'élimination illégale d'appareils électriques et électroniques est punie d'amende administrative.

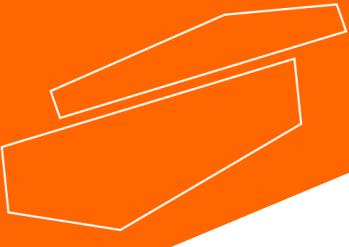
### **Nota importante per le apparecchiature elettroniche vendute in Italia**

Istruzioni sulla protezione ambientale e sullo smaltimento dei dispositivi elettronici:



Le apparecchiature elettriche ed elettroniche contrassegnate con questo simbolo non possono essere smaltite come rifiuti urbani.

In conformità con la Direttiva 2012/19 / UE, gli utenti dell'Unione Europea di apparecchiature elettriche ed elettroniche hanno la possibilità di restituire i propri RAEE per lo smaltimento al distributore o al produttore di apparecchiature dopo averne acquistato uno nuovo. La rimozione illegale di apparecchiature elettriche ed elettroniche è punibile con una sanzione amministrativa.



[www.labbox.com](http://www.labbox.com)