HC PHOTONICS CORP.

Operation Manual

Temperature Controller & Crystal Oven

Temperature Controller

Model: TC-038D

Voltage: 24V

Crystal Oven

Model: OV30D / OV50D

Customer Service

Website: www.hcphotonics.com

E-Mail: service@hcphotonics.com

Tel: +886 3 6662123

Fax: +886 3 6662124

Table of Contents

1. Operation

1.1 General Specifications

1. PID control
2. Auto tuning and programmable
3. Input voltage: 24 VDC
4. Temperature tuning range: Room temperature to 200℃
5. Tuning tuning resolution: 0.1℃
6. Operation temperature: 0 to 55℃
8. Transportation and storage environment: -25 to 70℃
9. Maximum power consumption: 60W
10. Communication Interface: USB
11. Controller dimension: 150(L) x 90(W) x 65(H) cm^3
12. Weight: Controller: 950±50 g
13. Accessories: Crystal oven, connection wire and power supply

Fig. 1.1.1 TC-038D controller, crystal oven, connection wire and power supply.

1.2 Front / Rear Panel Introduction

Fig. 1.2.1 The front panel of TC-038D controller, the function of A ~G has been listed in the table below.

	Name	Function
A	PV display	Indicates PV (measured temperature) or function codes
B	SV display	Indicates SV (target set temperature) or function values
C	Data change key	Changes the value on SV, press to increase the value. Holding down the key will gradually increase the speed of change.
D	Data change key	Changes the parameter value on SV, press to decrease the value. Holding down the key will gradually increase the speed of change.
E	Shift key	Shift the digits on SV, press to shift the digits left.
F	Mode key	Change the displayed function on PV, press to change the content on display.
G	Level key	Change the levels on PV. Press to change the levels (Initial setting level, operation level, adjustment level) Setting -> operation: Hold for >1s Operation -> Setting: Hold for >3s Operation <-> Adjustment: Press for <1s

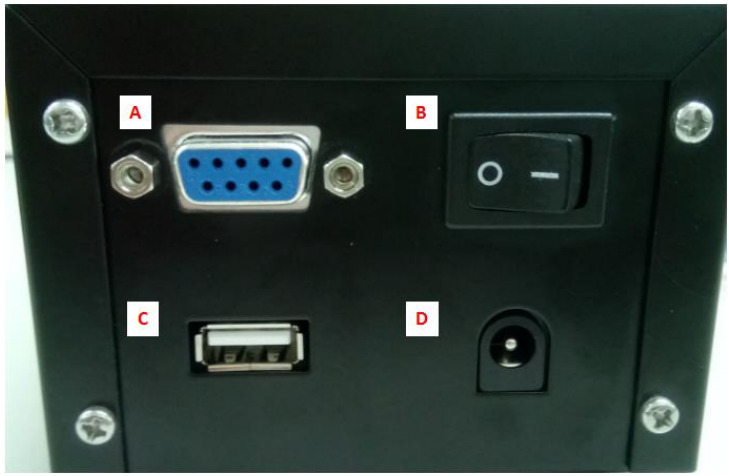


Fig. 1.2.2 The rear panel of the TC-038D controller, **A:** Connection port to crystal oven, **B:** ON/OFF power switch, **C:** Connection port to PC; **D:** Connection port to power supply.

1.3 System Setup

1. Connect the power supply to the temperature controller (Rear - D).
2. Connect the crystal oven to the temperature controller (Rear - A).
3. Open the power switch (Rear - B)
4. Set the target temperature (Front - C/D)
5. Wait till the temperature becomes stable

1.4 Parameters setting

Warning: All the parameters will be set before shipment and not recommend to be changed, table lists below only shows the description for some important parameters for reference.

Level	Name	Function	Description
Setting	IN-t	Sensor input type	Setting the type and the range for the input sensor, value 1 for PT100 sensor with -199~500 deg. C range.
Setting	SL-H	Set point upper ;imit	Setting the set point upper bound for the current operation.
Setting	SL-L	Set point lower limit	Setting the set point lower bound for the current operation.
Adjustment	CMWt	Communications	ON/OFF: Communication enabled / disabled
Adjustment	At	PID auto tuning	Press the switch key and select At-2 to execute PID auto tuning, when the execution ends, it returns to off.

1.5 Error message

Table below shows the error message which can be used quick failure analysis.

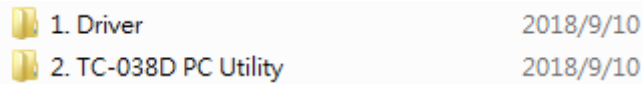
Message	Name	Description
S.ERR	Sensor input error	Temperature sensing error or out of range, typically due to the OVEN has not been connected correctly or the sensor type has been set wrong.
E333	AD converter Error	Error from the internal circuit, if turns off/on the controller doesn't help, need to send back for further investigation.
E111	Memory error	Error from the internal circuit, if turns off/on the controller doesn't help, need to send back for further investigation.

2. Software

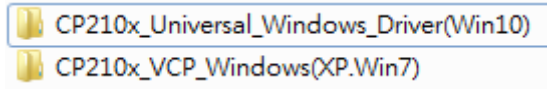
2.1 Installation:

2.1.1 Install drivers

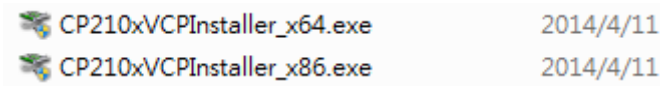
1. Enter the folder “1. Driver”.



2. Select and enter the folder according to your system OS.

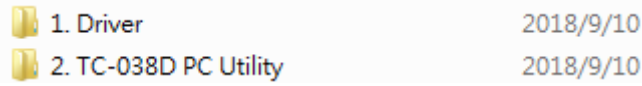


3. Select and install the driver according to your system type(x86 or x64). The system type can be checked in computer -> properties.



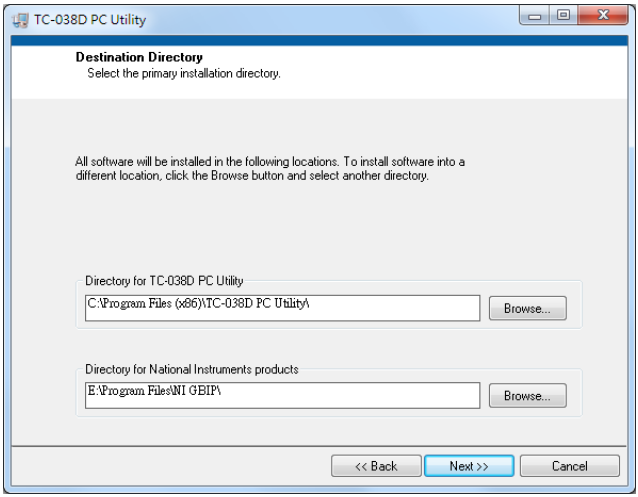
1.2 Install TC-038D PC Utility

1. Enter the folder “2. TC-038D PC Utility”.

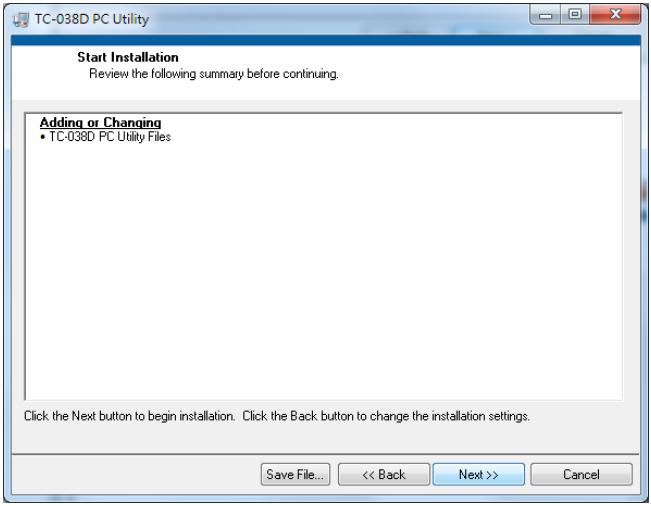


2. Double click the “setup.exe”.

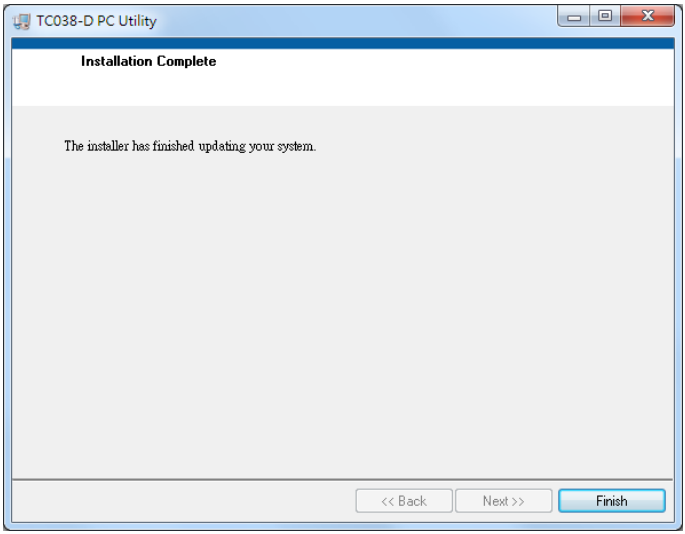
3. Choose the installation folder and target. Then press “Next” button.



4. Press “Next” button to start installation.

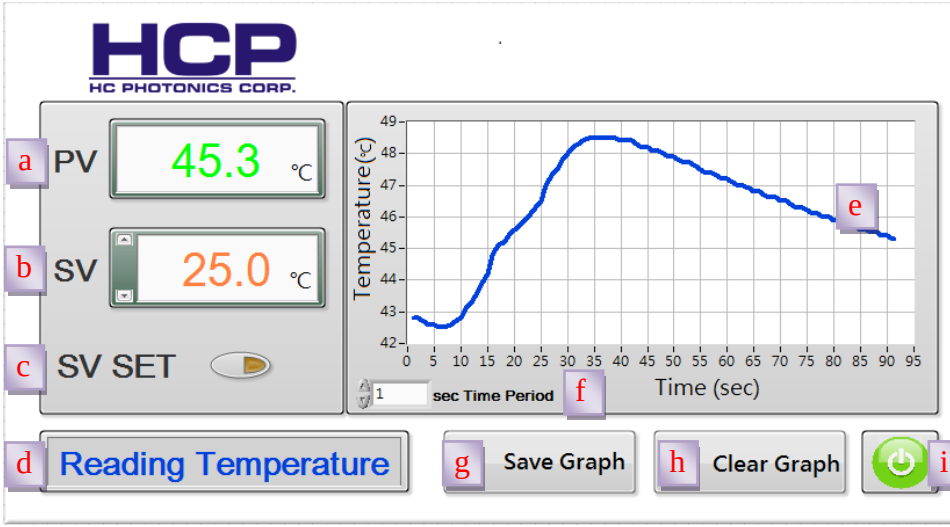


5. Press “Finish” button to finish the installation process.



2.2 Operation:

2.2.1 Program Overview:

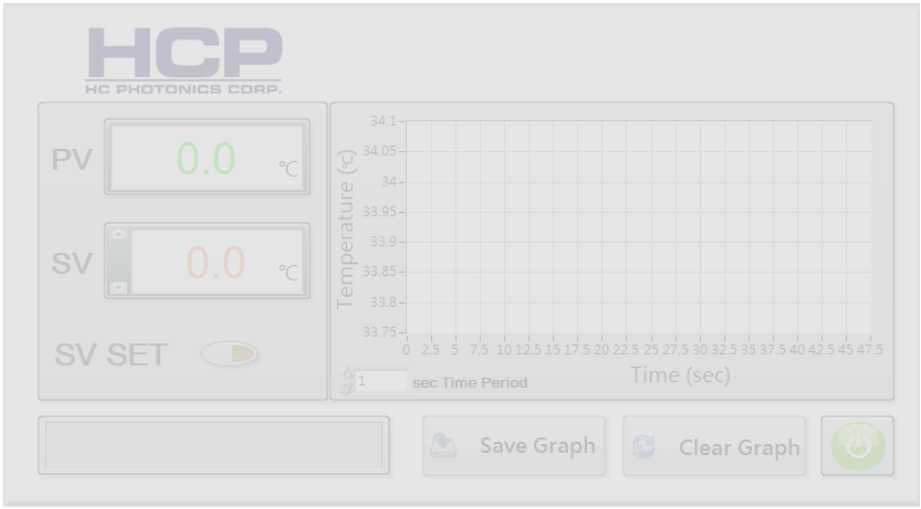


	Name	Function
a.	PV	Show the current temperature.
b.	SV	Show the current set temperature.
c.	SV Set	Set the temperature shown in SV.
d.	Program status	Show the current program status.
e.	PV graph	Temperature recording and displaying.
f.	Time period	Set the PV reading period.
g.	Save graph button	Export the graph data into excel format.
h.	Clear graph button	Clear the graph.
i.	End button	End the software.

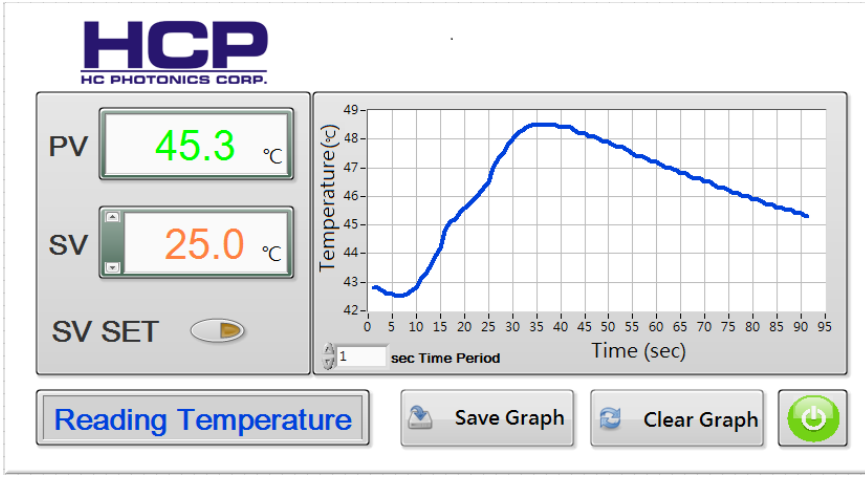
2.2.2 Start To Use:

1. Connect the **TC-038D** power cord and switch on power.
2. Connect the **TC-038D** USB cable to PC.
3. Run **TC-038D** on desktop.

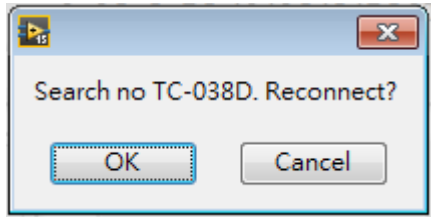
4. The process of initializing will take few seconds, please wait for complete.



5. Begin to Use.



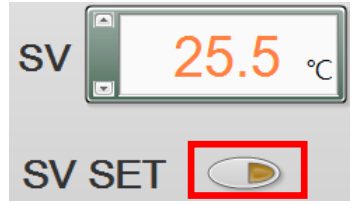
6. If the process of initializing has any problem, the error dialog will show on screen. Please check the power and USB, then press “OK” button.



2.2.3 Temperature control:

1. Adjust the temperature set point in SV textbox. You can key in the set point or adjust by up and down arrow.

2. Set the temperature to the set point by pressing “SV SET” button.



2.2.4 Setting the PV reading period.

Adjust the PV reading period by “Time Period” textbox.

2.2.5 Save data:

Press the “Save Graph” button, an excel window will be popped up that contains the graph data.

2.2.6 Clear graph:

Press the “Clear Graph” button. It will clear all the data on graph.

3. OVEN

3.1 Overview:

The HCP OV-X0D oven is designed for temperature control using the TC-038D controller, the general specification including the dimensions and drawing are shown in the table below.

3.1.1 General specifications

General specification	
Sensor	PT100
Material	Brass and Teflon
Operation range	Ambient temperature to 200 deg. C
Temperature stability	±0.1 deg. C
Power	24V/40W
Storage temperature	-25 ~ 65 deg. C
Over heating protection	~210 deg. C

3.1.2 Dimension

	OV-30D	OV-50D
Dimension (mm)	40x50x43	60x70x43
Heating plate (mm)	35x25	55x45
Over heat protection	Yes	Yes

3.1.3 Drawing

1. OV-30D

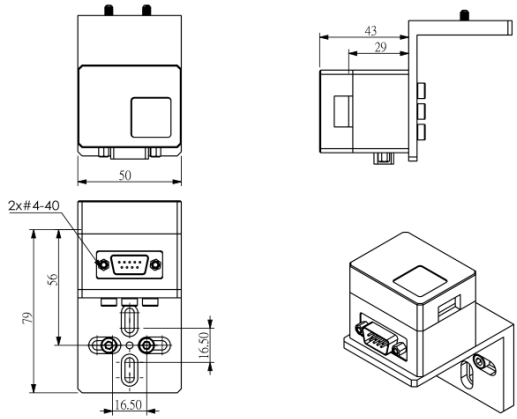


Fig 3.1.3.1 Mechanical drawing of the OV-30D including L-adaptor board

2. OV-50D

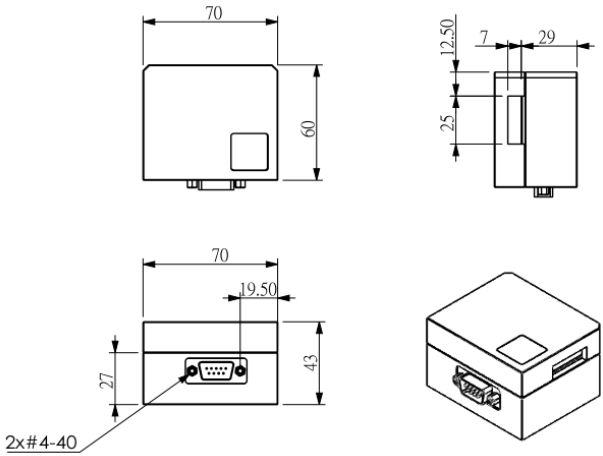


Fig 3.1.3.2 Mechanical drawing of the OV-50D.

3.1.3 Bottom plate and L-adaptor board

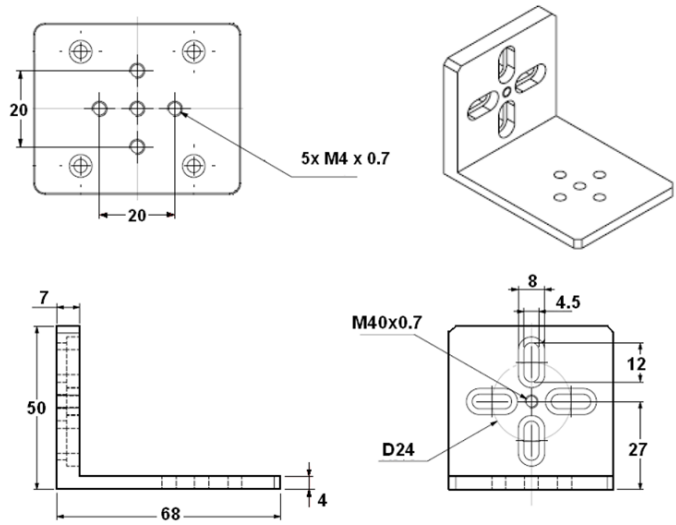
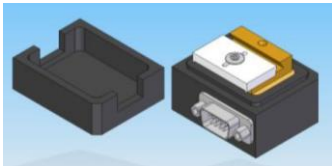
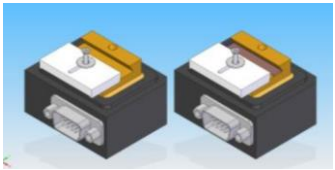
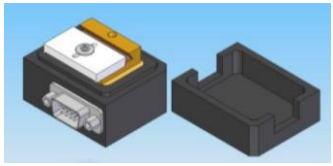


Fig 3.1.3.3 Mechanical drawing of the bottom plate and L-adaptor board.

3.2 Setup procedure for chip holder

No	Figure	Description
1		1.1 Open the Teflon cover.
2		2.1 Slightly loose the screw. 2.2 Move the white teflon to the left slightly. 2.3 Put the crystal into the holder by a clip carefully. * Make sure of avoiding any surface scratch or damage on input/ output surfaces.

3		3.1 Push the white teflon to the right slightly until the crystal has been clamped. 3.2 Tight the screw * Operate without the cover will affect the uniformity of crystal temperature. Please put the cover on after alignment.

4. Safety and warranty

The following are definitions of the warnings that are used to call your attention to important information regarding your safety, the safety and preservation of your equipment or an important tip. WARNING situation has the potential to cause bodily harm or death. CAUTION situation has the potential to cause damage to property or equipment. NOTE Additional information the user or operator should consider.

WARNING

Situation has the potential to cause bodily harm or death.

CAUTION

Situation has the potential to cause damage to property or equipment.

NOTE

Additional information the user or operator should consider.

General Warnings

Observe these general warnings when operating or servicing this equipment:

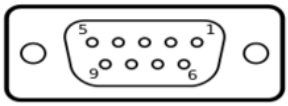
- Heed all warnings on the unit and in the operating instructions.
- Do not use this equipment in or near water.
- This equipment is grounded through the grounding conductor of the power cord.
- Route power cords and other cables so they are not likely to be damaged.
- Disconnect power before cleaning the equipment. Do not use liquid or aerosol cleaners; use only a damp lint-free cloth.
- Lockout all electrical power sources before servicing the equipment.

Warranty

HCP provides warranty of TC-038D for 1 year starting from the day of shipment, for the repair service, the customer needs to contact HCP and carry the shipping cost, repair cost and shipping back cost will be carried from HCP if the failure occurs in proper use.

Appendix

A. Pin assignment

TC-038D & Crystal Oven		
9 pins layout	**Pin Number**	**Functionality**
	1	Empty
	2	Empty
	3	GND
	4	Sensor
	5	Sensor
	6	Heater
	7	Heater
	8	Empty
	9	Empty