

Universal Peltier Driver

PLP-300W14A

Instruction Manual

(Rev.2.20)



Thank you for purchasing the Universal TEC (Peltier) Driver **PLP-300W14A**.
Read these operating instructions carefully to ensure effective use of all the performance
this product as to offer, and then use the product properly.
In particular, **please be sure to read "Cautions on use" before use**.
After reading these operating instructions, be sure to store them in a place where they can
be readily consulted whenever necessary.

Technical support and after-sales service

About support, such as an inquiry about this product, a request for repair, and download of
application software, and after-sale service, it is accepted at the WEB site of our company.
Please contact the address listed below.

Kurag Electronics WEB site: <http://kurag.o.oo7.jp/kurag-el/>

Peltier Controller Support: kurag.tslab@biz.nifty.jp

[IMPORTANT] Initial setting

When use this product for the first time, please set the maximum voltage and the maximum
current of TEC(Peltier) drive. Please refer to "6. Initial setting" of this instruction manual.
TEC(Peltier) might be damaged if the initial setting is not done properly.

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1. Cautions on use

- ✓ The use of KE (Kurag Electronics LLC) products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
- ✓ The exports of KE products or technology from one country to another are governed by the relevant security laws and regulation of the countries involved in the transaction. Prior to shipment of KE product to another country, assure that all local rules governing that export are known and followed.
- ✓ You agree to comply with all applicable international and national laws that apply to the Product, including Japanese Export Trade Control Order, as well as end-user, end-use, and destination restrictions issued by Japanese and other governments.
- ✓ We can bear absolutely no responsibility whatsoever for any direct or indirect damage that may occur due to the use of this product in your applications.
- ✓ This product is to be used with general industrial product, but not designed or manufactured to be used under such special conditions and environments as nuclear energy control, aerospace, transportation, medical equipment, various safety equipment or equipment which require high level reliability that may cause personal death when it is failed. We assume no liability for any direct or indirect damages that may occur due to applying this product to such equipment or apparatus.
- ✓ If you notice smoke, strange smells or noise coming from the product, cut off the power supply. Continued use of the product in these conditions will result in fire or electric shock.
- ✓ If a liquid like water or foreign objects like pins and clips which have conductivity adhere to the product, cut off the power supply immediately. Continued use of the product in these conditions will result in fire or electric shock.
- ✓ If the product is dropped or strongly shocked or excess power added, cut off the power supply immediately. Continued use of the product in these conditions will result in fire or electric shock
- ✓ When electric power is connected to the product, be careful to apply the proper voltage specified in the product specification. Improper voltage may cause malfunction or destroy the circuit. Moreover, please do not use it with the power supply voltage exceeding the rated voltage/current of the peltier device to be connected. (A same voltage is supplied to the peltier device.) Please confirm the polarity of connections. If a mistake made, regarding polarity, it may result in fire or electric shock, and it may cause malfunction of the product or peltier device.
- ✓ When you install this product into equipment or wiring the circuit, don't turn on the power until work is completed. A large current flows into wiring of a power supply or a peltier device. So please select the wiring material with suitable diameters.
- ✓ Do not operate at temperatures or humidity, etc. beyond the range of specifications.
- ✓ Please do not use it in a dusty place, the place where direct sun beam hit and the environment where corrosive gases exist. If a dew condensation is generated, you should not use the product until it dries completely.

1. Cautions on use (continued)

- ✓ Never attempt to perform dismantle or modification. And when the product breaks down, do not repair it by yourself. If the product broke down, please consult to our support dept.
- ✓ Failure to heed this instruction may cause in fire, electric shock, personal injury or malfunction.
- ✓ Do not touch directly the electrical components which are mounted on the printed wiring board. And please take care not to charge the static electricity to the electrical components.
- ✓ To transport this product, it should be put in the shipping carton, or please put a printed circuit board into an anti-static bag or a conductive bag, and pack up using suitable shock absorbing material so that vibration and a shock are not added.
- ✓ Dispose of the product according to all national laws and regulations.

2. General

- TEC (Peltier) controller and driver.
- Maximum drive power is 24V/14A with DC drive.
- NTC thermistor or PT sensor is suitable for the thermal sensor of this product.
- An output for DC fan motor is available. (12V/1A, support pulse sensor)
- Continuous operation mode and timer operation mode.
- Built-in AC/DC power supply
- The communication port of USB conformity is equipped.
- Free control software and setting software are available from Kurag Electronics WEB site.
- Optional RS-232 communication port or parallel interface port.

(*) These options are specified by each customer at the time of an order.

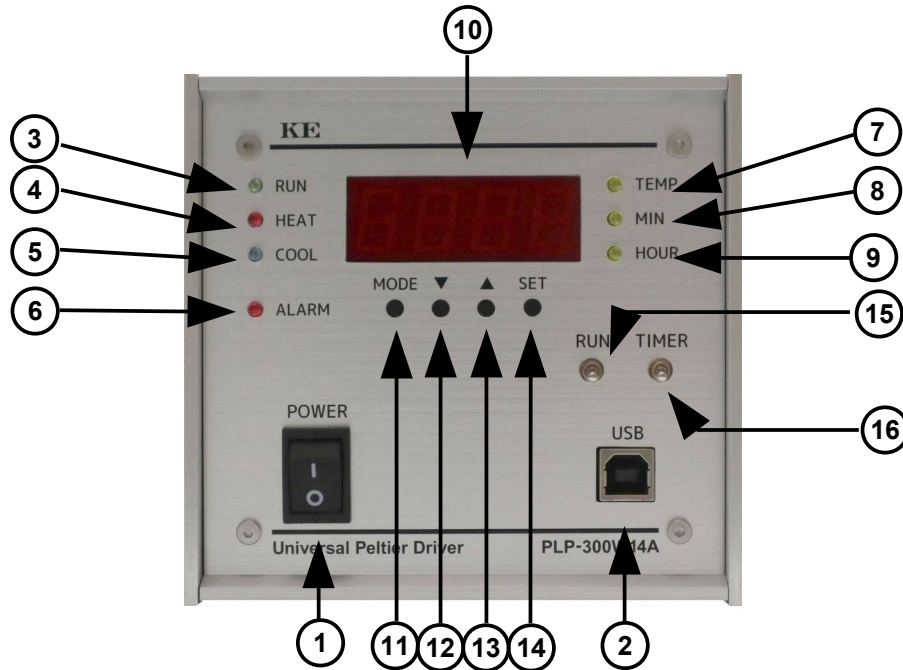
(*) More detail please refer to “PLP-300W14A option instruction manual”.

3. Contents

- Listed items are included in this product package.
- Please check that these items are included.

PLP-300W14A	x
AC power cable	x
Instruction Manual	x

4. Names of parts and functions (front panel)



- ① Power switch
- ② USB communication port

USB type-B connector for external control.

IMPORTANT

It is necessary to install the device driver of USB-Serial converter IC to PC.
This product uses USB-Serial converter IC FTDI FT232R .
If necessary, please download the device driver from FTDI WEB site.
<http://www.ftdichip.com/FTDrivers.htm>

③ ④ ⑤ Status LED

These LED lamps display the product status.

- ③ The temperature control is at work: Lights up “RUN” (GREEN)
- ④ The heater mode is working: Lights up “HEAT” (RED)
- ⑤ The cooler mode is working: Lights up “COOL” (BLUE)

⑥ Alarm LED

When alarm occurred: Blinks “ALARM” (RED) and the temperature control is stopped automatically.

When event (temperature monitoring) occurred: Lights on “ALARM” (RED) .

In this case the temperature control is not stopped.

⑦ ⑧ ⑨ Display status LED lamps

These LED lamps display the content of 7 segments LED displays. It blinks during a setup and lights up continuously after decision or during display.

- ⑦ Display the temperature: Lights up “TEMP.” (YELLOW)
- ⑧ Display the time (unit: minute): Lights up “MIN.” (YELLOW)
- ⑨ Display the time (unit: hour): Lights up “HOUR.” (YELLOW)

⑩ 7 segment LED (4 digit)

This LED displays the temperature or time.

⑪ MODE key

⑫ DOWN key

⑬ UP key

⑭ SET key

These keys are for setting of temperature or timer operation.

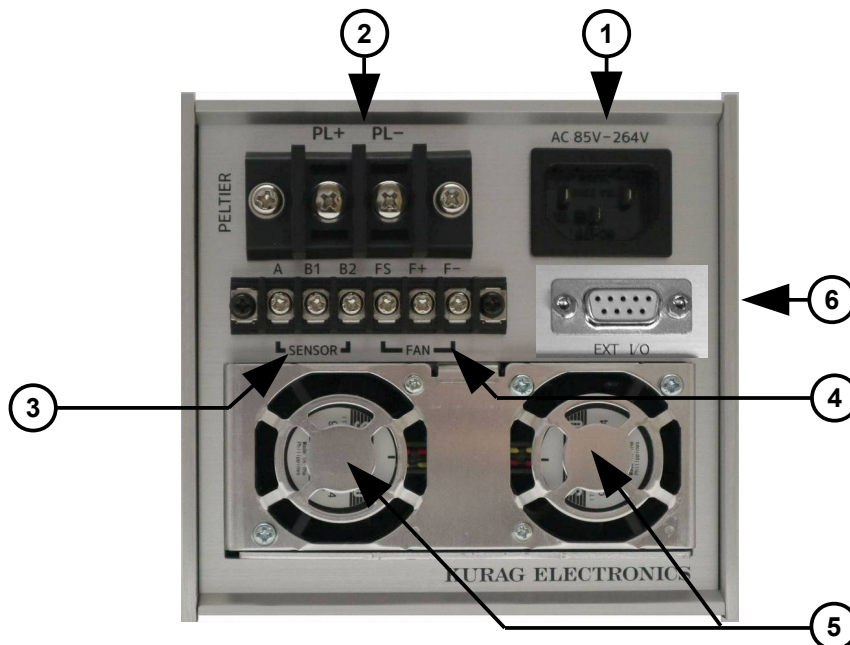
⑮ ⑯ Operation switch

Start/stop the continuous operation.

Start/stop the timer operation.

(*) Position of switch is upper side: Start, lower side: Stop

5. Names of parts and functions (rear panel)



① AC inlet (IEC C14 type 3pins)

Supply voltage range is AC 85V ~ 264V.

② TEC (Peltier) terminal (M4 screw type)

Terminal for TEC (Peltier)

③ Temperature sensor terminal (M3 screw type)

Terminal for main temperature sensor

④ DC fan terminal (M3 screw type)

Terminal for DC fan. Output: 12V/Max1A

FS terminal is used for DC fan with pulse sensor.

⑤ Cooling fan

The ventilation fan of this product. Do not disturb the ventilation.

⑥ External I/O connector (Dsub 9pins)

The sub temperature sensor is located in this connector with the standard model.

6. Initial setting

When use this product for the first time, please set the maximum voltage and the maximum current of TEC (Peltier) drive.

(*) The setting is saved even if power is turned off.

Procedure

- 1) Connect AC power cable, and turn on power switch while pushing the SET key.
 - 2) A maximum current is displayed by 7 segment LED. (TEMP LED lighting)
 - 3) Change value with the UP key / the DOWN key and push the SET key to set value.
 - 4) Push the MODE key.
 - 5) The maximum voltage is displayed by 7 segment LED. (MIN. LED lighting)
 - 6) Change value with the UP key / the DOWN key and push the SET key to set value.
 - 7) Turn off the power switch
 - 8) Turn on the power switch again. (Do not push any keys.)
 - 9) The product works within settled current and voltage.
- (*) Also it is able to set the maximum voltage and current by using setting software.
 (*) Please confirm the TEC(Peltier) specifications and set less than maximum rating.

7. Connection

1) Connecting TEC (Peltier)

M4 screw type terminal

Terminal	Name	Connection
PELTIER	PL+	Please connect the each lead wire of TEC (Peltier) device respectively as follows. The surface of Peltier device which should be temperature controlled is cooling when a current flows from PL+ to PL-.
	PL-	

(*) It is recommended the use of a crimp terminal for M4 screws for reliable connection.

2) Connecting of peltier and temperature sensor

M3 screw type terminal

Terminal	Name	3-wire Pt sensor	2-wire Pt sensor	NTC thermistor
SENSOR	A	A	A	Th+
	B1	B	B	Th-
	B2	B	Short with pin B1	GND(open or shield)

(*)Connect the main temperature sensor for temperature control.

(*)If the Pt sensor is designated or no designation at order, this terminal is the Pt sensor input.

(*)If the NTC thermistor is designated for main sensor at order, this terminal is the NTC thermistor input.

(*)In case of 3-wire Pt sensor, a current flows into B2 from A and B1.

(*)In case of 2-wire Pt sensor and NTC thermistor, a current flows into B1 from A.

(*)When using shielded cable, please connect to B2(GND).

(*)It is recommended the use of a crimp terminal for M3 screws for reliable connection.

3) Connecting of DC fan motor

M3 screw type terminal

Terminal	Name	Connection
FAN	FS	PULSE (when use pulse sensor) or open
	F+	Vcc
	F-	GND

(*)Output voltage of F+(Vcc) is DC12V

(*)It is able to turn on/off DC fan power by using communication command.

In this case F- is GND(ON) / Open(OFF)

(*)It is recommended the use of a crimp terminal for M3 screws for reliable connection.

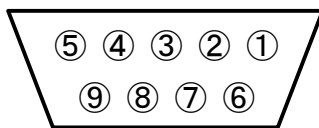
4) Connecting of sub temperature sensor

The sub temperature sensor is used for temperature monitoring.

Terminal	No.	3-wire Pt sensor	2-wire Pt sensor	NTC thermistor
EXT I/O	4	A	A	TH+
	5	B	B	TH-
	9	B	Short with pin#5	GND

(*)EXT I/O terminal is Dsub 9pins female.

Pin assignment



EXT I/O

(*)Please connect Dsub 9pins male connector.

(*)If the Pt sensor is designated for main sensor or no designation at order, this terminal is the NTC thermistor input.

(*)If the NTC thermistor is designated for main sensor at order, this terminal is the Pt sensor input.

(*)When optional RS-232C port is mounted, the sub temperature sensor can not be used.

5) Connecting of AC power supply

Please connect attached AC power cable to AC inlet.

(*)Do not use a table tap and the extension cable, please connect to the wall outlet directly.

(*)When attached AC power cable is unmatched, please prepare a suitable AC power cable by yourselves.

6) Connecting USB port

When connecting to PC, connect USB Type-B cable to the USB port.

More detail please refer software manual.

(*)About software please refer “11. Software”.

(*)USB cable is not included. Please prepare the USB cable by yourselves.

6) A remaining time of timer is displayed if the SET key is pressed.

(Displays current temperature if the SET key is pressed again)

7) When the timer reached the setup time, the operation of temperature control is automatically stopped.

* If a TIMER switch is turned off before the end of a timer, temperature control is kept in the continuous mode.

* If a TIMER switch is turned off and turned on again, the timer will start again from the beginning.

The setting of the timer is stored in the memory even if the power is turned off. (However, priority is given to "HOUR" unit)

Operation procedure to indicate firmware version

1) Push the UP key and the DOWN key at the same time.

2) Firmware version is displayed at 7 segment LED.

3) Push the SET key.

4) Return to the normal indication.

(*) During alarm occurs, the firmware version is not displayed.

9. Alarm and event functions

This product has functions of ALARM/EVENT as follows. Once the ALARM is occurred, the ALARM LED is blinking and the control of temperature is stopped.

Each function can be set to ON or OFF by the software developed for this product.

(*)Default settings at shipment are wrote in the inspection report.

Name	Error code indication	Description	Release
Temperature sensor	---1	This alarm is generated by the temperature sensor, dis-connecting or wire disconnection.	Auto
DC fan	---2	At the time of DC fan (3 wire type) use with a pulse sensor, if a rotation pulse is not detected for more than 5 seconds, this alarm will be generated.	Auto
Power	---3	Some problem of switching regulator in this product is occurred.	Power OFF/ON
Peltier (System)	---4 ---5 ---6	This alarm is generated when the Peltier drive voltage or current is abnormal by any trouble of the product or TEC (Peltier) and mis-connection. (*) Error code means; 4:Low voltage, 5:Low current, 6:Over voltage/current	Power OFF/ON
Sub temperature sensor	---7	This alarm is generated by the sub temperature sensor, dis-connecting or wire disconnection. (*) Only the sub temperature sensor is active.	Auto
Event (Temperature monitor)	n/a	ALARM LED is light on when the temperature of sensor is lower than lower limit or higher than upper limit. (*) Control operation does not stop.	Auto

10. Specifications

Item	Value	Remarks
Supply voltage	AC 85V to 264V	50Hz/60Hz Commercial power source
Power consumption	450VA (Max)	
Peltier drive output	24V / 14A(Max)	
Peltier drive method	DC drive	CC(Constant Current)/CV(Constant Voltage) combination
DC fan output	12V(fixed) / 1A(Max)	Support pulse sensor
Temperature sensor	Pt (Platinum) sensor or NTC Thermistor	Support 3-wire or 2-wire Pt sensor Default sensor setting Main sensor: Pt100 Sub sensor: SEMITEC 103JT It is able to select sensor type and temperature range by setting software.
Control method	Digital PID Control	Proportional-integral-differential control
Control range (Default)	-10.0 to +80.0 °C	NTC thermistor
	-40.0 to +100.0 °C	Pt sensor
Setting/display resolution	0.1 °C	
Timer range	0.1min to 999.9min 0.1hour to 720hour	Accuracy of time: +/-1%
Operation temperature/ humidity	10 to 40 °C 5 to 85%RH	No condensation
Storage temperature/ humidity	-20 to 60 °C 5 to 90%RH	No condensation
Dimension/Weight	115(W)x120(H)x230(D)mm 2.5kg	Not include projection part

11. Software

Free control software and setting software for PLP-300W14A are available.

(*) More detail please refer operation manual of the software.

1) Control software “PLC Controller.exe”

- ✓ Continuous mode operation
- ✓ Timer mode operation
- ✓ Program mode operation (Temperature profile control)

How to obtain

It is able to download from Kurag Electronics web site.

URL: <http://kurag.o.oo7.jp/kurag-el/>

2) Setting software “PLP-300W14A Manager.exe”

- ✓ Alarm/Event function ON/OFF
- ✓ Setting maximum voltage and maximum current of TEC (Peltier) driving
- ✓ Setting PID parameters
- ✓ Selection temperature sensor type and swapping main/sub temperature sensor
- ✓ Calibration of temperature sensor

How to obtain

Please contact kurag.tslab@biz.nifty.jp by E-mail.

Please inform the model number and the serial number (they are indicated by the bottom side of the product).

Then we will send an execute file and a manual by an email in reply.

Command reference

Command reference manual of PLP-300W14A is available.

Please contact kurag.tslab@biz.nifty.jp by E-mail.

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Instruction Manual
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Developer: T.S. Laboratory Corporation URL <http://tslab.com/>
Manufacturer: Kurag Electronics LLC URL <http://kurag.o.oo7.jp/kurag-el/>