

**TEC (Peltier) Controller PLC-15V6A / PLC-24V6A
Setting Software
"PLC-24V6A Manager.exe"
Operating Manual
(Rev.1.10)**

Software Version: 1.1.0.0

Applicable Model List

| Model Number | Hardware Version | Firmware Version |
|--------------|------------------|------------------|
| PLC-15V6A | 2.00 - | 1.0.0.1 - |
| PLC-24V6A | 2.00 - | 1.0.0.1 - |

[IMPORTANT]

This software supports a product listed in the applicable model list.
It is not available to older products.
When the hardware version and the firmware version of the your product is older than the listed version, please refer for a serial number displayed by the label of the main board.
And then please contact Kurag Electronics Peltier controller support .

Kurag Electronics Peltier controller support
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* The developer of original software "PELTIER_MEAS.exe" is T. S. Laboratory Corporation.

July 22, 2017

KURAG ELECTRONICS LLC



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1. General

This software is dedicated software for Peltier Controller PLC Series (PLC-15V6A, PLC-24V6A).

It can read and write various setting parameter of the PLC series by connecting the PLC series and a PC with a serial communication cable.

[IMPORTANT]

This software is designed for development or production use. Special technical knowledge about temperature control system is necessary in use.
The PLC series may not work definitely when wrong operation or setting is executed.

2. Install / Uninstall

System requirement

Microsoft Windows XP
Microsoft Windows Vista (*1)
Microsoft Windows 7 (*1)(*2)
Microsoft Windows 8 / 8.1 (*1)(*2)
Microsoft Windows 10 (*1)(*2)

(*1) When the program can not start, it may be solved with a compatible mode of Windows XP.

(*2) When the program file is placed in "Program Files" folder, the program may not start.
In such case please place the program file in the place except the "Program Files" folder.

Software framework requirement

Microsoft .NET Framework 4

Install

Copy the program file "PLC-24V6A Manager.exe" to HDD.

(*)In the Windows 7/8/8.1/10 environment please place the program file in the place except the "Program Files" folder.

Uninstall

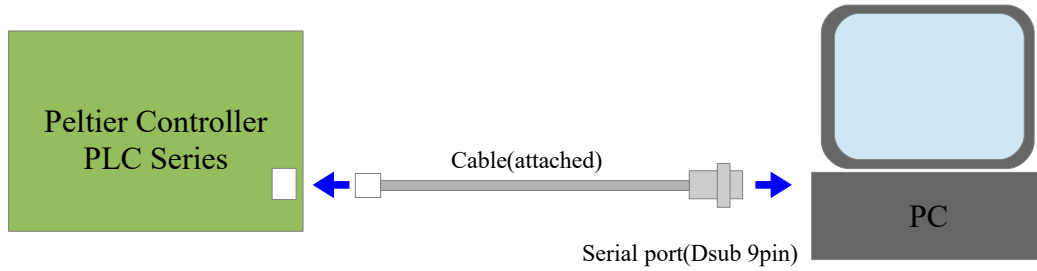
Delete the program file "PLC-24V6A Manager.exe" from HDD.

Version up

Overwrite by a new program file after terminating a program.

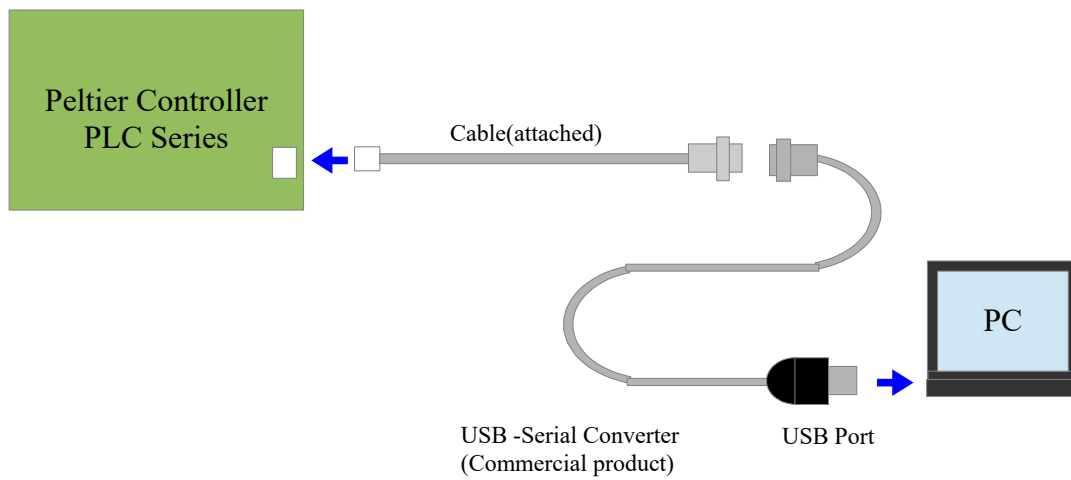
3. Connection

Connect PLC Series and PC with attached communication cable.

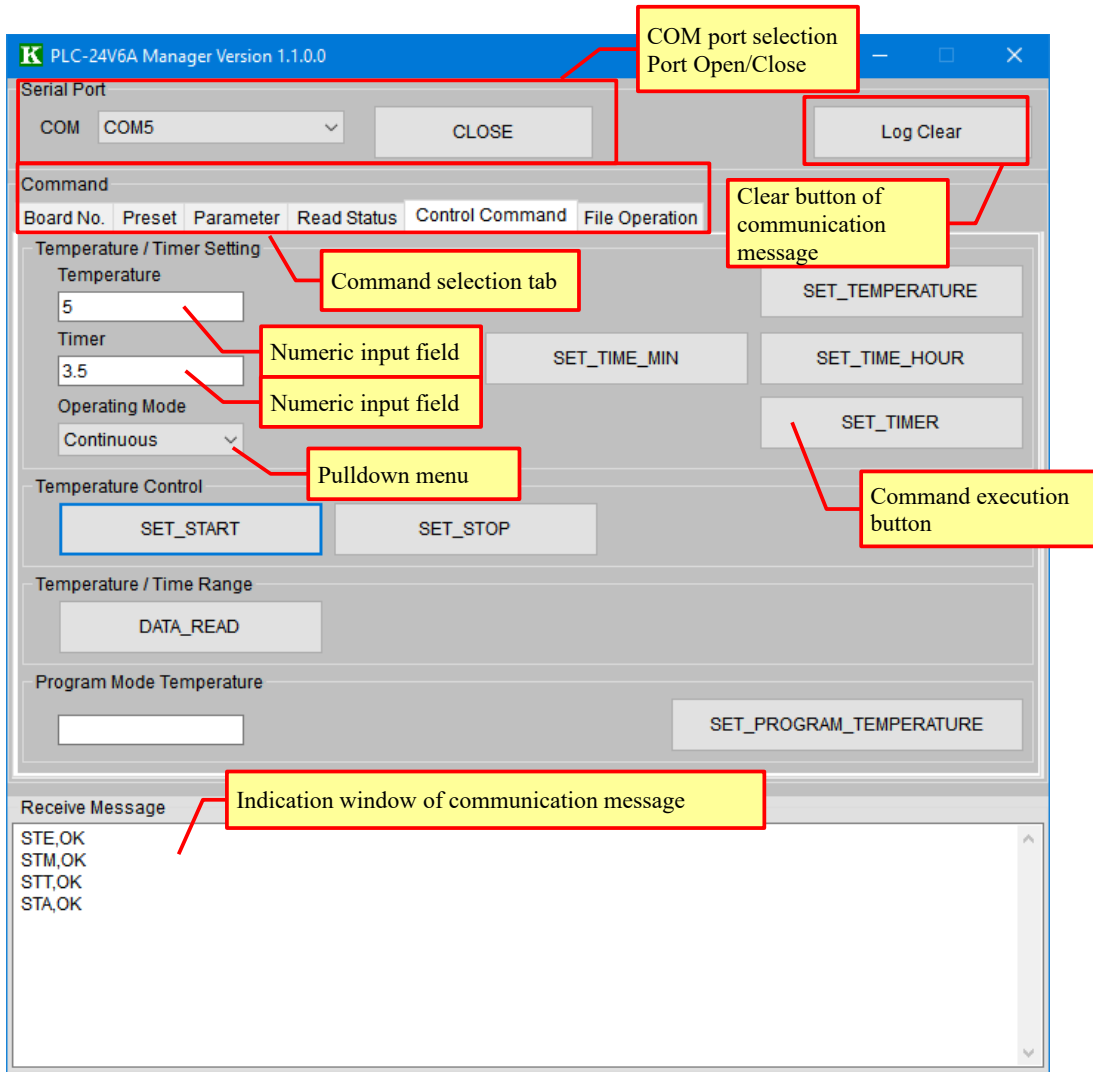


(*) When you extend a cable, please use the Dsub 9pin female – male straight connection cable.

If your PC does not have RS-232 Serial Port, please use a USB – Serial Converter.



4. Screen



Basic operation

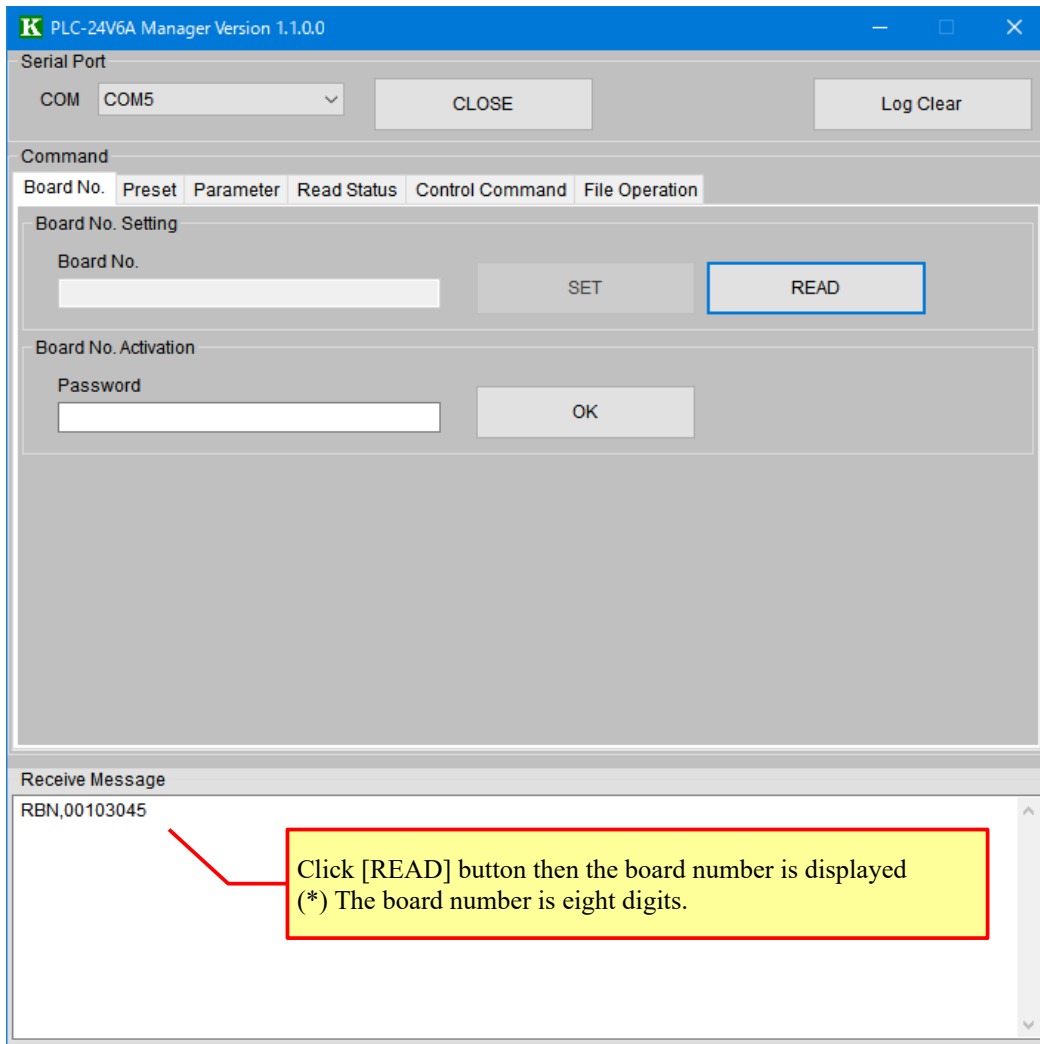
- 1) Select COM port and click [OPEN] button. Then the button changes from [OPEN] to [CLOSE].
- 2) Click command selection tab. Then operation window is appeared.
- 3) When you read a status or parameter from PLC Series, click the READ button which you want to read. Then command response is displayed in the communication message window.
- 4) When you send control command to PLC Series, input numerical value or select pull-down menu and click submit button. Then the control command is executed.
- 5) When you write a parameter to PLC Series, input numerical value or select pull-down menu or select radio button and and click submit button. Then the parameter is written to the EEPROM of PLC Series.
- 6) When you close communication, click [CLOSE] button. Then the button changes from [CLOSE] to [OPEN].

5. Board No.

Write and read the board ID number.

[IMPORTANT]

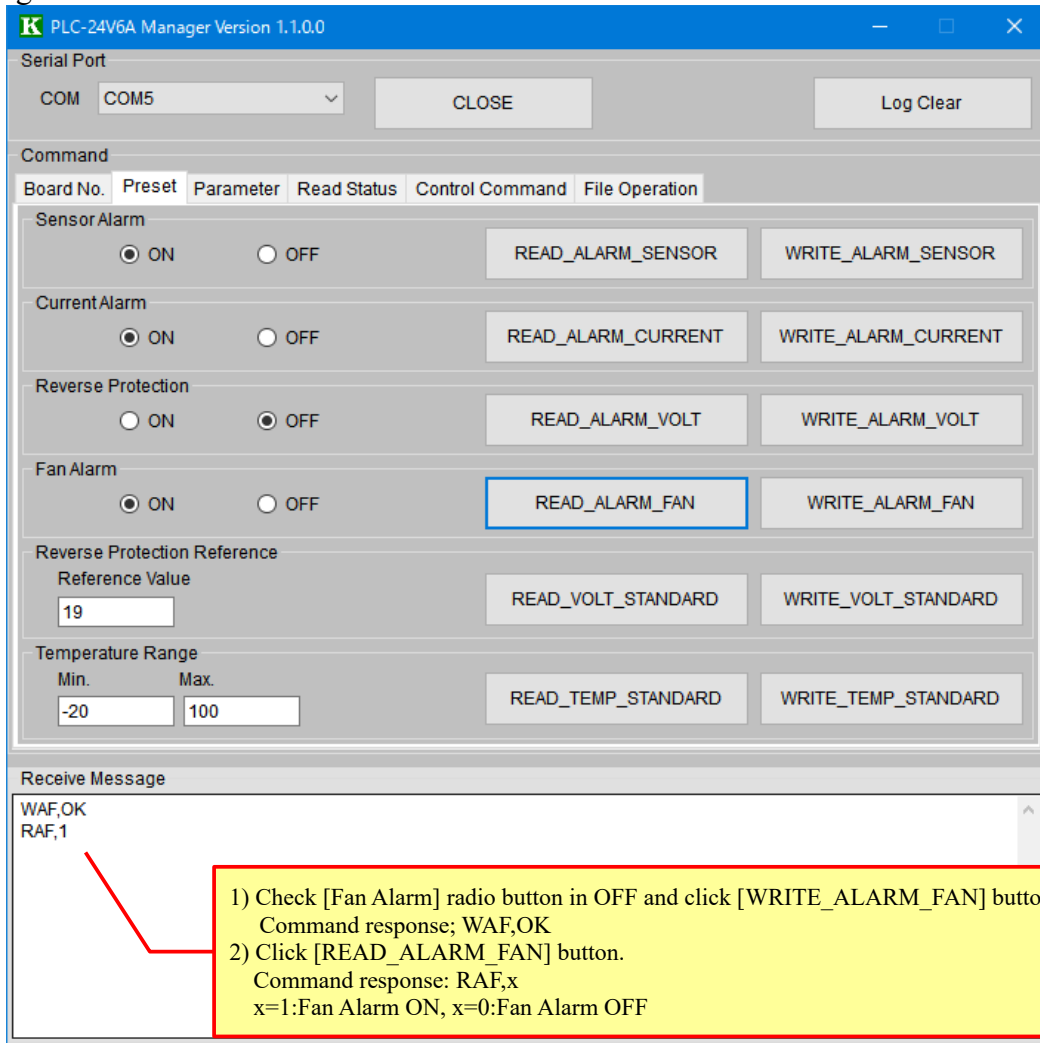
Never change the board number except a special case.
 Password is required to change the board number.



| Item | Button | Description |
|--------------------|--------|--|
| Read board number | READ | Read the board number from EEPROM of PLC Series. |
| Write board number | SET | Write the board number to EEPROM of PLC Series. |
| Password | OK | Password to input the board number. |

6. Preset

Setting of various functions of PLC Series.



(*) It is able to save or read settings of this screen at once. (Refer to section 10. File Operation)

| Item | Button | Command Response |
|------------------------------|---|--|
| Sensor Alarm | READ_ALARM_SENSOR WRITE_ALARM_SENSOR | RAS,x (x=1:ON,x=0:OFF) WAS,OK |
| Current Alarm | READ_ALARM_CURRENT WRITE_ALARM_CURRENT | RAC,x (x=1:ON,x=0:OFF) WAC,OK |
| Reverse Protection | READ_ALARM_VOLT WRITE_ALARM_VOLT | RAV,x (x=1:ON,x=0:OFF) WAV,OK |
| Fan Alarm | READ_ALARM_VOLT WRITE_ALARM_VOLT | RAF,x (x=1:ON,x=0:OFF) WAF,OK |
| Reverse Protection Reference | READ_VOLT_STANDARD WRITE_VOLT_STANDARD | RVS,xx (xx: A/D converter value of voltage detector) WVS,OK |
| Temperature Range | READ_TEMP_STANDARD WRITE_TEMP_STANDARD | RTS,-1000,8000 (ex. -10° to 80°C) WTS,OK |

7. Parameter

Setting of various parameters of PLC Series.

[IMPORTANT]

If you set wrong parameter, temperature control operation may be unstable or malfunctioning. Please do not change parameter carelessly. More detail, please refer technical manuals.

1) Read present parameters

[Caution]
The values in the numeric input fields are not the read values from PLC Series. The read values are indicated in the lower indication window.

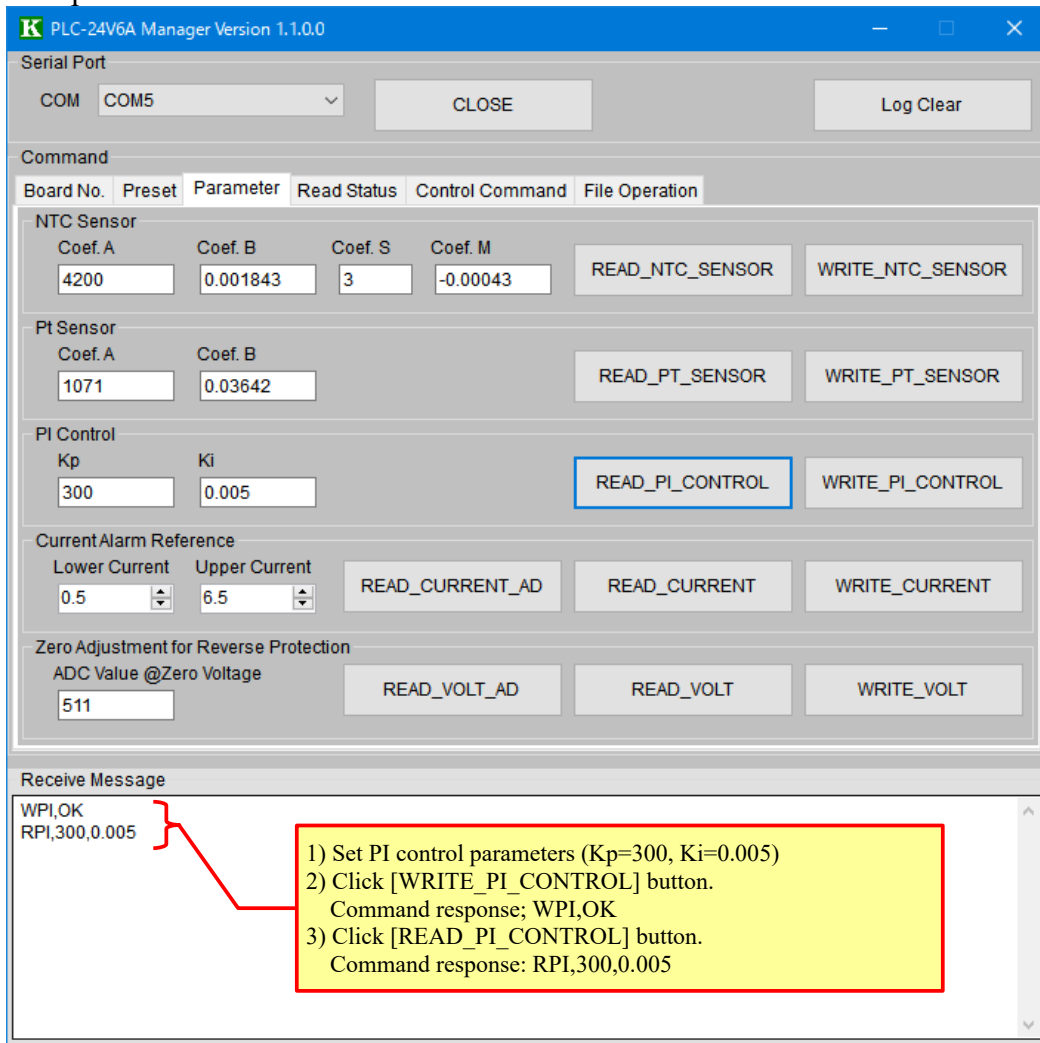
Click [READ_NTC_SENSOR], [READ_PT_SENSOR], [READ_PI_CONTROL], [READ_CURRENT] and [READ_VOLT] button. Each parameters are indicated in the indication window.

(*) It is able to save or read settings of this screen at once. (Refer to section 10. File Operation)

| Item | Button | Description |
|------------------------------------|-----------------|---|
| NTC Sensor | READ_NTC_SENSOR | Temperature conversion factor for NTC thermistor |
| Pt Sensor | READ_PT_SENSOR | Temperature conversion factor for Pt sensor |
| PI Control | READ_PI_CONTROL | PI control Kp: Proportion coefficient Ki: Integral coefficient |
| Current Alarm Reference | READ_CURRENT | Threshold of current alarm detection Lower limit and upper limit (Unit: A) |
| Zero Adjustment Reverse Protection | WRITE_VOLT | Reference of voltage detection (A/D converter value) |

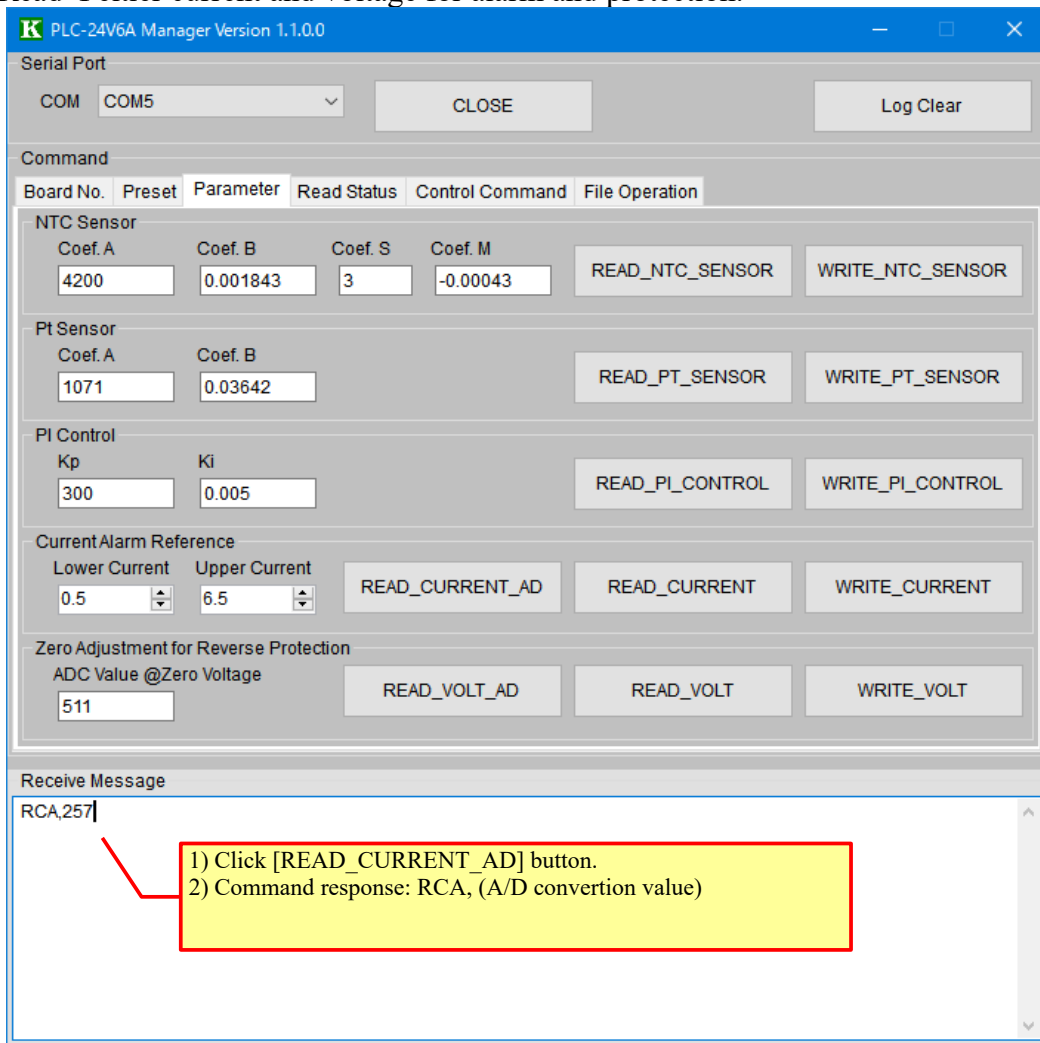
2) Write new parameters

Input or select value and click [WRITE] button.
Then parameters are written to EEPROM of PLC Series.



| Item | Button | Description |
|------------------------------------|------------------|---|
| NTC Sensor | WRITE_NTC_SENSOR | Temperature conversion factor for NTC thermistor |
| Pt Sensor | WRITE_PT_SENSOR | Temperature conversion factor for Pt sensor |
| PI Control | WRITE_PI_CONTROL | PI control Kp: Proportion coefficient Ki: Integral coefficient |
| Current Alarm Reference | WRITE_CURRENT | Threshold of current alarm detection Lower limit and upper limit (Unit: A) |
| Zero Adjustment Reverse Protection | WRITE_VOLT | Reference of voltage detection (A/D converter value) |

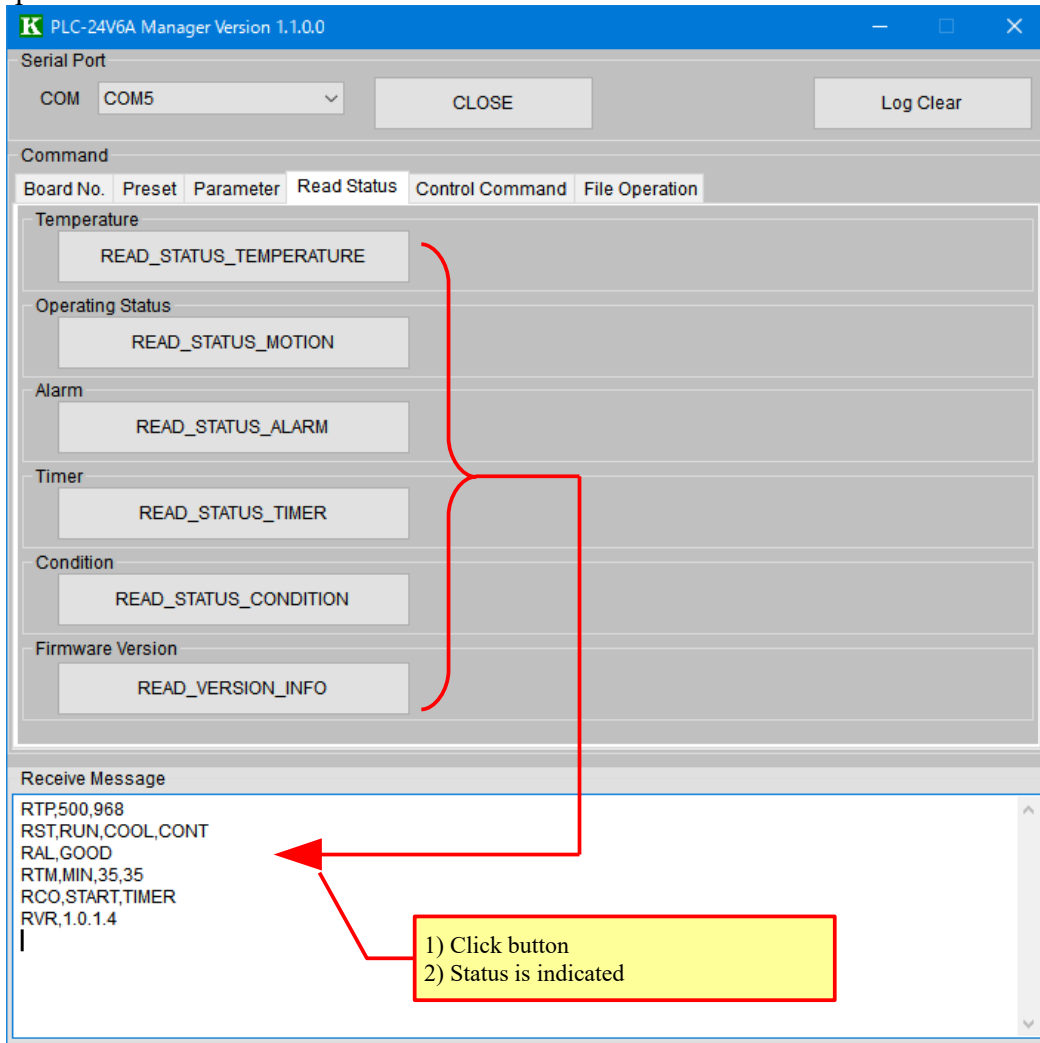
3) Read A/D converter value of Peltier current and voltage
 Read Peltier current and voltage for alarm and protection.



| Item | Button | Description |
|------------------------------------|-----------------|---|
| Current Alarm Reference | READ_CURRENT_AD | Peak value of Peltier current |
| Zero Adjustment Reverse Protection | READ_VOLT_AD | Voltage of Peltier element (*) It is only effective under non-operation. |

8. Read Status

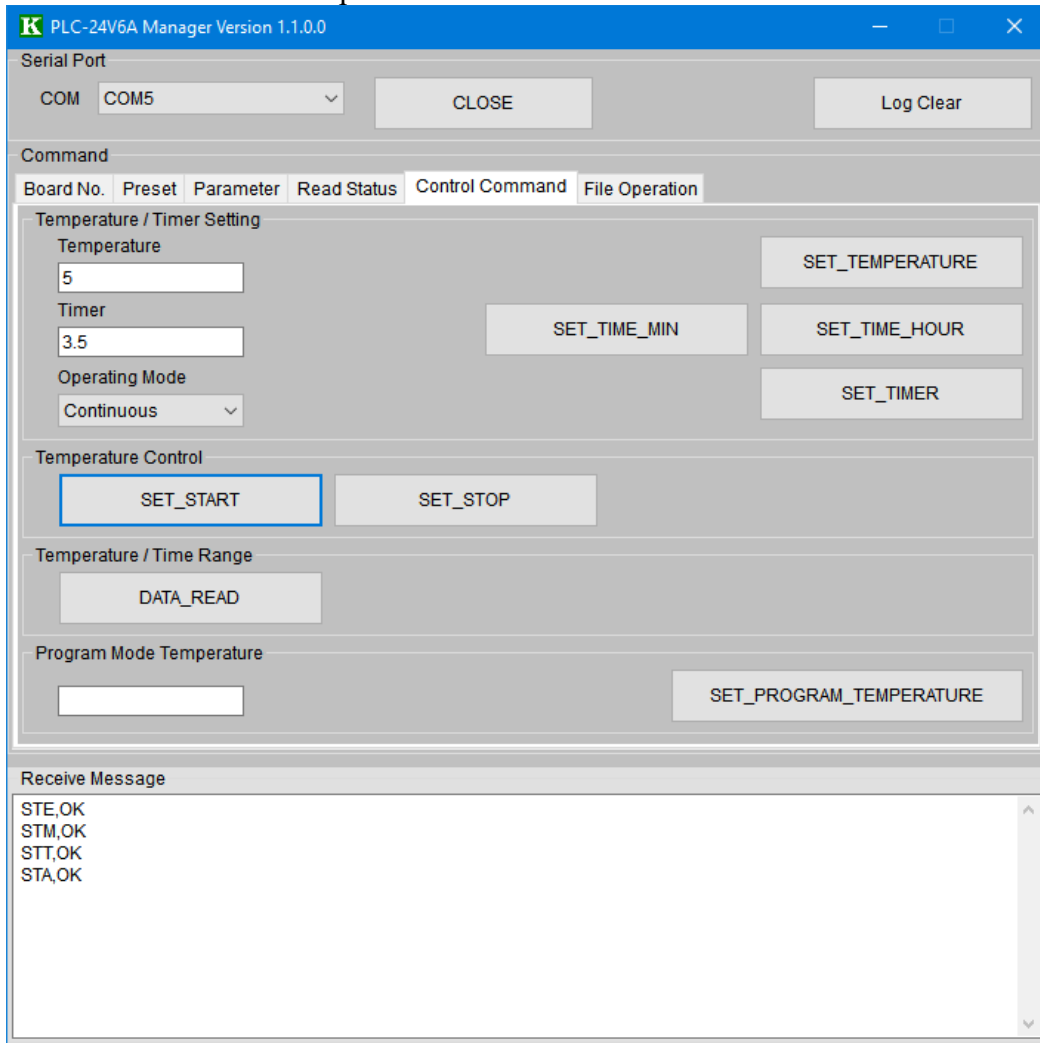
Read present status.



| Item | Button | Response |
|------------------|-------------------------|---|
| Temperature | READ_STATUS_TEMPERATURE | RTP,(setting value),(present value) (ex.) 1725: 17.25°C |
| Operating Status | READ_STATUS_MOTION | RTP,(operation),(polarity),(timer/continuous) |
| Alarm | READ_STATUS_ARARM | RAL,(alarm status) GOOD/SENSOR/CURRENT/FAN/VOLTAGE |
| Timer | READ_STATUS_TIMER | RTM,(minute/hour),(setting time),(remain time) |
| Condition | READ_STATUS_CONDITION | RCO,(START/STOP),(CONT/TIMER) (*) Switch status on PLC Series. |
| Firmware Version | READ_VERSION_INFO | RVR,(version) (*) Firmware version of PLC Series |

9. Control Command

Send control command for temperature control.

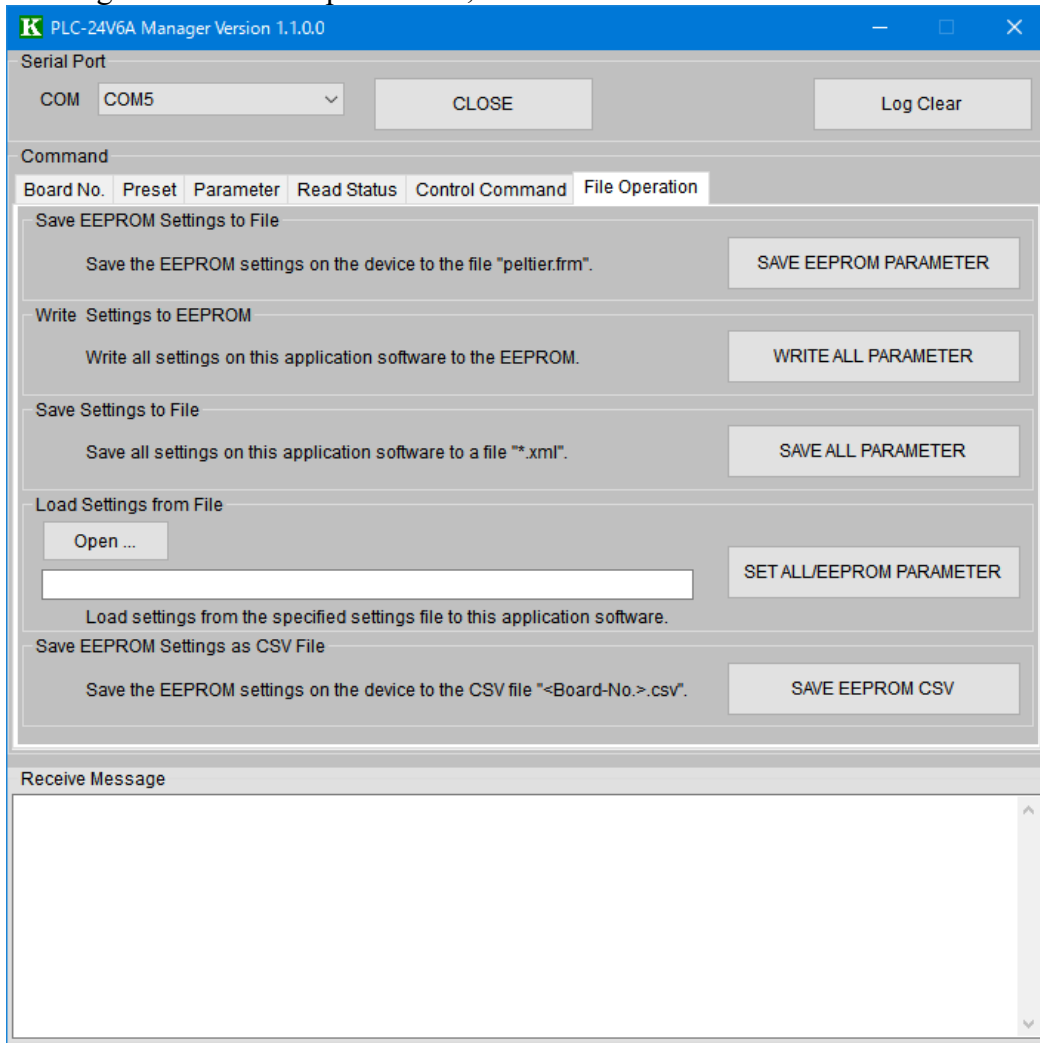


| Item | Button | Description |
|--------------------------|-------------------------|---|
| Temperature | SET_TEMPERATURE | Enter in 0.1°C increments |
| Timer(minute) | SET_TIME_MIN | Enter in 0.1 minute increments |
| Timer(hour) | SET_TIME_HOUR | Enter in 0.1 hour increments |
| Operating Mode | SET_TIMER | Select Continuous Mode / Timer Mode |
| Temperature Control | SET_START/SET_STOP | START / STOP of temperature control operation |
| Temperature / Time Range | DATA_READ | Read temperature range and time range RLD,(temperature min),(temperature max),(minute min),(minute max),(hour min),(hour max) (ex.) RLD,-1000,8000,1,9999,1,7200 Temperature: -10°C - 80°C, Time(minute):0.1min - 999.9min, Time(hour):0.1hour - 720hour |
| Program Mode Temperature | SET_PROGRAM_TEMPERATURE | Temperature setting command for program mode (SPT command - Do not write to EEPROM) Enter in 0.1°C increments |

(*) Error message is displayed when you input a value out of the set range.

10. File Operation

Read EEPROM data of PLC Series at once. And save the values and parameters to PC file. Also write the values and parameters to EEPROM of PLC Series at once. Before change the values and parameters, it is recommended to save to PC file for recovery.



| Item | Button | Description |
|---------------------------------|--------------------------|--|
| Save EEPROM Setting to File | SAVE EEPROM PARAMETER | Read EEPROM data of PLC Series at once. And save temporary PC file. |
| Write setting to EEPROM | WRITE ALL PARAMETER | Write all values and parameters which set this software to EEPROM of PLC Series at once. |
| Save Setting to File | SAVE ALL PARAMETER | Save all values and parameters which set this software to PC file (xml format) at once. |
| Load Setting from File | SET ALL/EEPROM PARAMETER | Load fall values and parameters which saved file to this software. |
| Save EEPROM Setting as CSV File | SAVE EEPROM CSV | Read EEPROM data of PLC Series at once. And save csv format file. |

Operating procedure

1) Save EEPROM setting to PC file

Click [SAVE EEPROM PARAMETER] button. Read EEPROM data of PLC Series at once. And save temporary PC file (named "peltier.frm").

(*) Can not change file name. When "peltier.frm" already exists, it is overwritten.

(*) At this timing, the set values and parameters are not reflected to screens of this software.

It is necessary reading operation from PC file to let you reflect it to this software.

2) Load setting from PC file

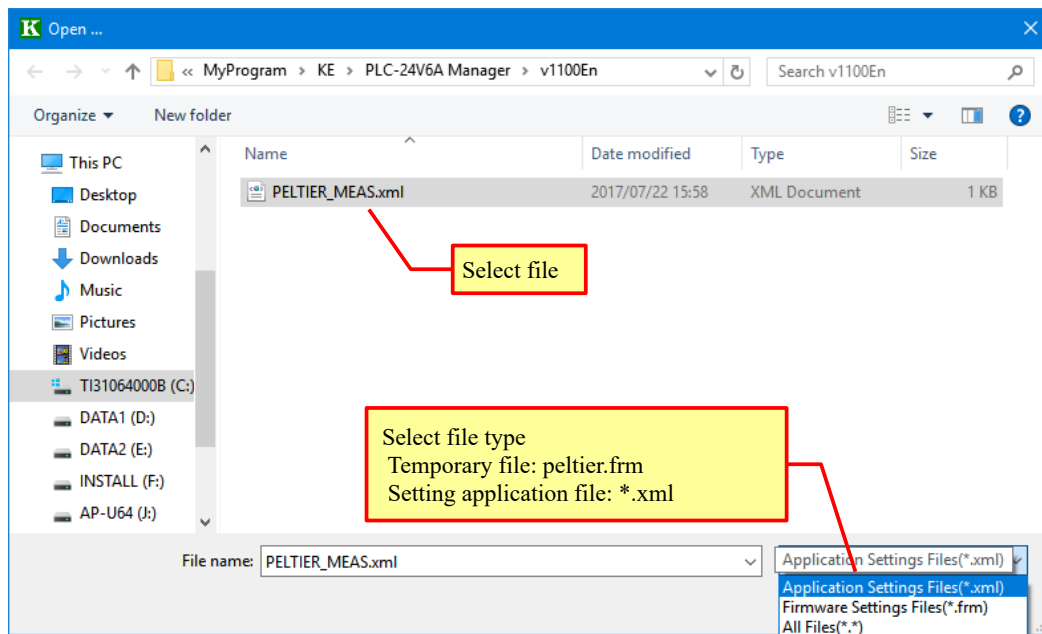
Load temporary file(peltier.frm) or setting application file(file extension: .xml).

And reflect to to screens of this software.

Click [OPEN] button.

Select file and open.

Click [SET ALL/EEPROM PARAMETER] button.



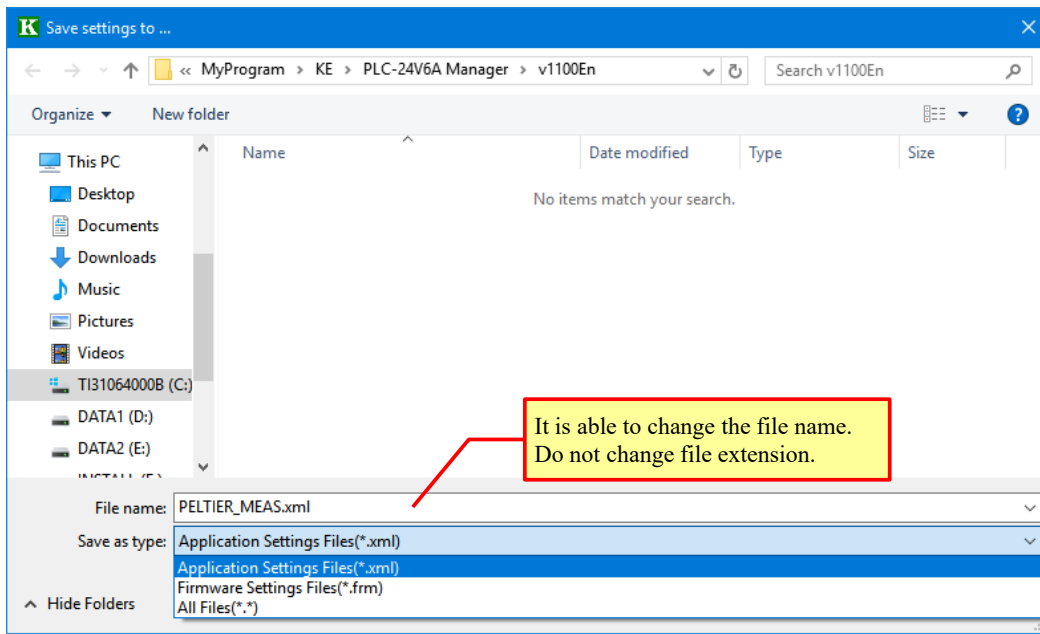
3) Save application setting to PC file

Click [SAVE ALL PARAMETER] button

Save all values and parameters which set this software to PC file (xml format) at once.

(*) Default file name is "PELTIER_MEAS.xml". It is able to change the file name.

(*) Saved values and parameters in this operation are values and parameters which set this software. It is not EEPROM data of PLC Series.



4) Write to EEPROM

Click [WRITE ALL PARAMETER] button.

Write all values and parameters which set this software to EEPROM of PLC Series at once.

Procedure to restore the changed setting to the original setting

- 1) Save EEPROM data by [SAVE EEPROM PARAMETER] button before changing.
- 2) Load "peltier.frm" by [SET ALL/EEPROM PARAMETER] button to reflect to screens of this software.
- 3) Change value or parameter. Save values and parameters by [SAVE ALL PARAMETER] button as necessary.
- 4) If you restore the setting, reload "peltier.frm" by [SET ALL/EEPROM PARAMETER] button.
- 5) Write original setting to EEPROM by [SET ALL/EEPROM PARAMETER] button.

Revision History

| Rev. | Date | Description | Editor |
|------|------------|--|--------|
| 1.00 | 07/29/2010 | Initial release | Y.O |
| 1.01 | 08/10/2010 | Software Ver1.0.0.1 Add [READ_VERSION_INFO] button in [Read Status] tab. | Y.O |
| 1.03 | 09/03/2010 | Software Ver1.0.0.3 Add [File operation] tab. Add current alarm lower limit in [Parameter] tab. (FW1.0.0.3 -) | YO |
| 1.04 | 12/09/2010 | Software Ver1.0.0.4 Add coefficient M in NTC sensor parameter of [Parameter] tab. | Y.O |
| 1.05 | 04/06/2011 | Software Ver1.0.0.5 Support all Firmware version (Auto detection) | Y.O |
| 1.06 | 10/17/2011 | Change the name of product from "PLC-15V6A" to "PLC Series" | Y.O |
| 1.07 | 02/26/2015 | Software Ver1.0.1.3 Support English language Add explanation of [NTC Reference Temperature] tab. | Y.O |
| 1.08 | 04/17/2015 | Software Ver1.0.1.4 Modification about CSV export of EEPROM setting value. | Y.O |
| 1.09 | 04/07/2017 | Change the support window from T.S.Laboratory to KURAG ELECTRONICS Change the name of product from "PLC Series" to "PLC-15V6A / PLC-24V6A" | Y.O |
| 1.10 | 07/22/2017 | Software Ver1.1.0.0 Change program name from "PELTIER_MEAS" to "PLC-24V6A Manager". Change icon and copylight from TSL to KE. Change window size (720x720), Delete NTC standard temperture tab. | Y.O |
| | | | |

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July 22, 2017

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