ST Controller User Manual

MMS-750-4-E1D1

This instruction manual contains information on product features, specifications, and operating methods.
Please check the following for proper use.

- This product should be handled by a technician.
- Please fully understand the manual.
- If a problem occurs during use, stop using it and keep it for reference.

■ Introduction

This product is the LED lighting controller made for use in industrial inspection equipment.
Do not use the controller for home lighting and other purposes.

● Before using the product, check the input voltage is within the specified range.

● Lighting products connected to the controller must be applied to the specifications.

- **Otherwise, it may cause performance decreasing and malfunction.**

● Do not use this product in the following environments.

- **Place with water or oil**
- **Place with direct sunlight**
- **Place with drastic temperature changes**
- **Place with a risk of freezing or condensation**
- **Place with a large impact of vibration and impact**

● The operating and storage temperature of this product

- **Operating temperature & Humidity : 5 ~ 40℃ / 20 ~ 85%**

- **Storage temperature & Humidity : -20 ~ 60℃ / 20 ~ 85%**

● For technical requirements, please refer to the contact information.

There shall be a statement in the instructions that, if the equipment is used in a manner not Specified by the manufacturer, the protection provided by the equipment may be impaired.

Safety Precautions

	Do not touch with wet hands. There is a risk of electric shock.		Do not disassemble the product. Such as disassembly, modification, or repair.
	Do not leave the product in a wet or wet place. There is a risk of fire, electric shock, and product damage.		Do not drop the product or give it an impact. The product may not work.
	here is a risk of burns due to surface temperature.		Use the power supply voltage and load within the range of specifications and ratings. There is a risk of product damage and fire or electric shock.

Controller Summary

Item	Description
Model	MMS-750-4-E1D1
Input Voltage	24–30 Vdc, Max. 27.8 A, Max. 750 W, Class 2
Maximum Output	27 Vdc, 8 A Per CH (Total 4 CH) All internal channels do not turn on at the same time, but half of the channels operate sequentially.
Power Consumption	MAX 432W (Internal 2CH)
Number of channels	2 (1 LED OUTPUT has 2 internal channel)
Intensity step	0 ~ 1000 step (0.1us)
Intensity Method	Strobe (ST)
Trigger Level	3.3V Rising Edge, max 100khz
Data Communication	RS-232C / Ethernet
Mode	Manual / Remote
Humidity	20 ~ 85 % R.H
Temperature	Operating : 5 ~ 40 ℃ / Storage : -20 ~ 60 ℃
Weight	1.5Kg
Housing Construction	SPCC (Steel Plate Cold Commercial)
Cooling Method	Natural air cooling
Size	130 x 135 x 270 mm
Expected Service Life	1 Year

Revision History

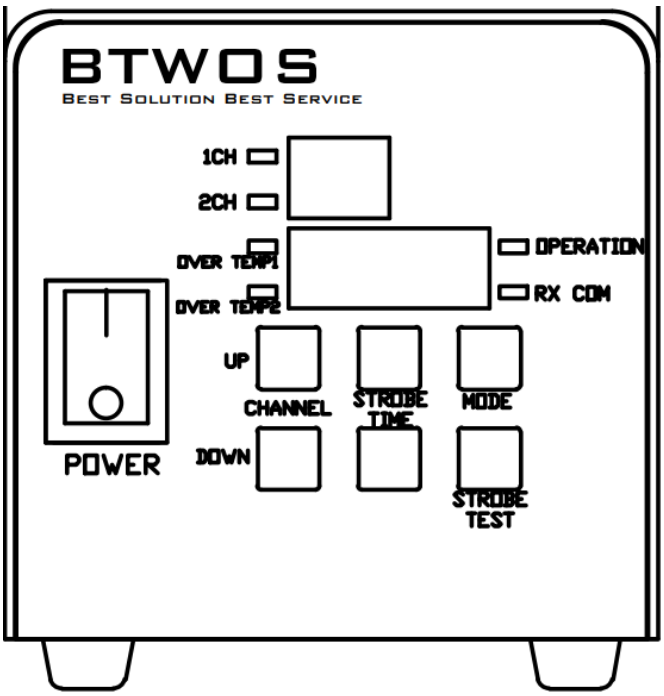
date	Version	Change story	Remark
2024.05.07	1.0	Initial Release	

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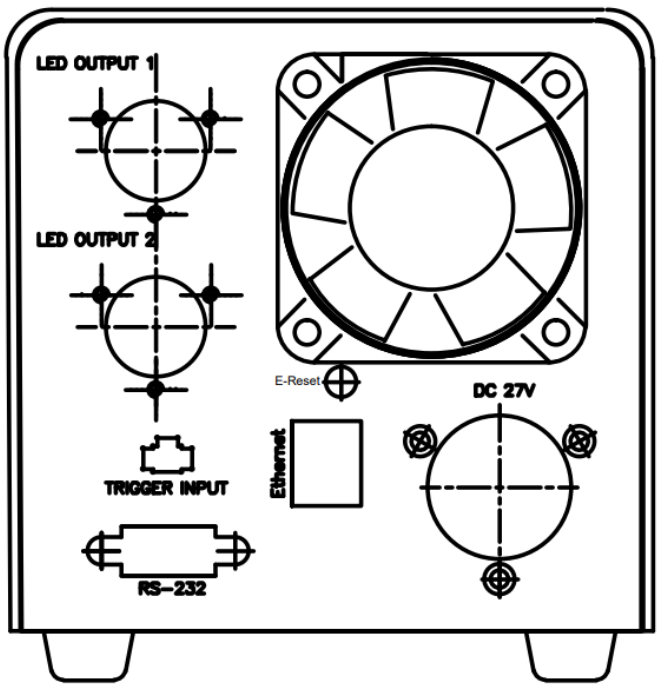
1. Product Composition & Installation
2. Front Detail Composition
3. Rear Detail Composition
4. Connector Pin-Out
5. Timing chart
6. Protocols
7. Environment Conditions
8. Warranty
9. Trouble Shooting
10. Symbols

1. Product Composition & Installation

Front View

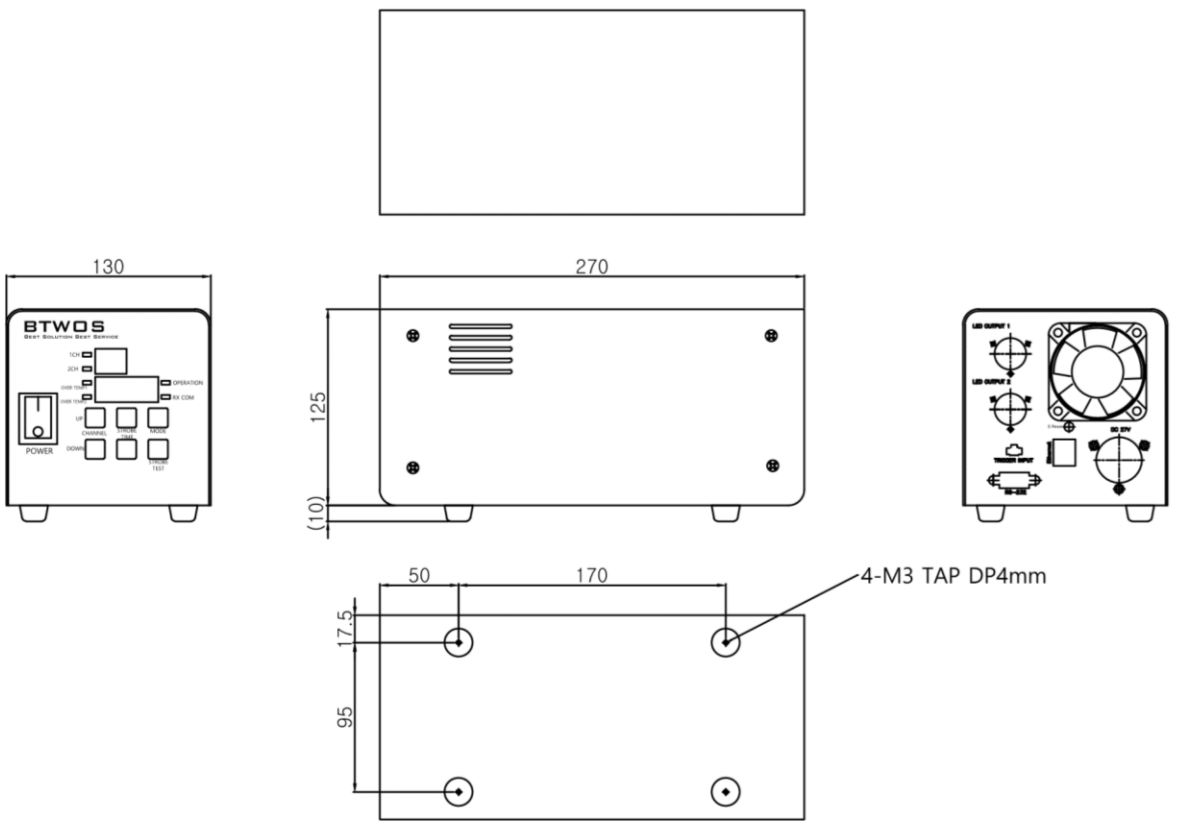


Rear View



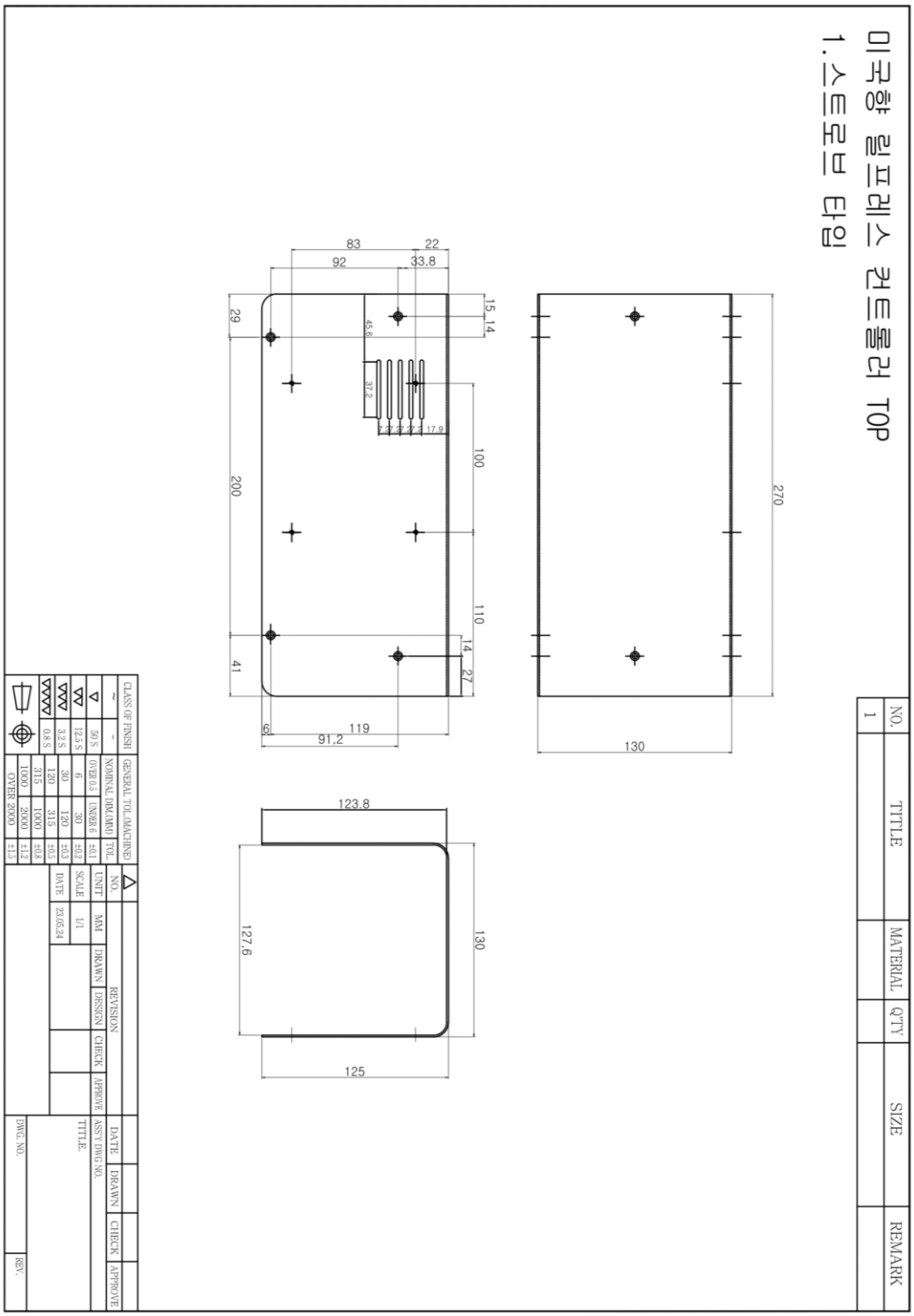
1. Product Composition & Installation

- **Dimension : 130 x 135 x 270 mm**
- **Material : SPCC 2mm**
- **Color : Black Powder Coating**
- **Weight: about 1.5 Kg**
- **Installation : To install the product, remove the rubber feet at the bottom and install using M3 tap.**
- **Outline View:**



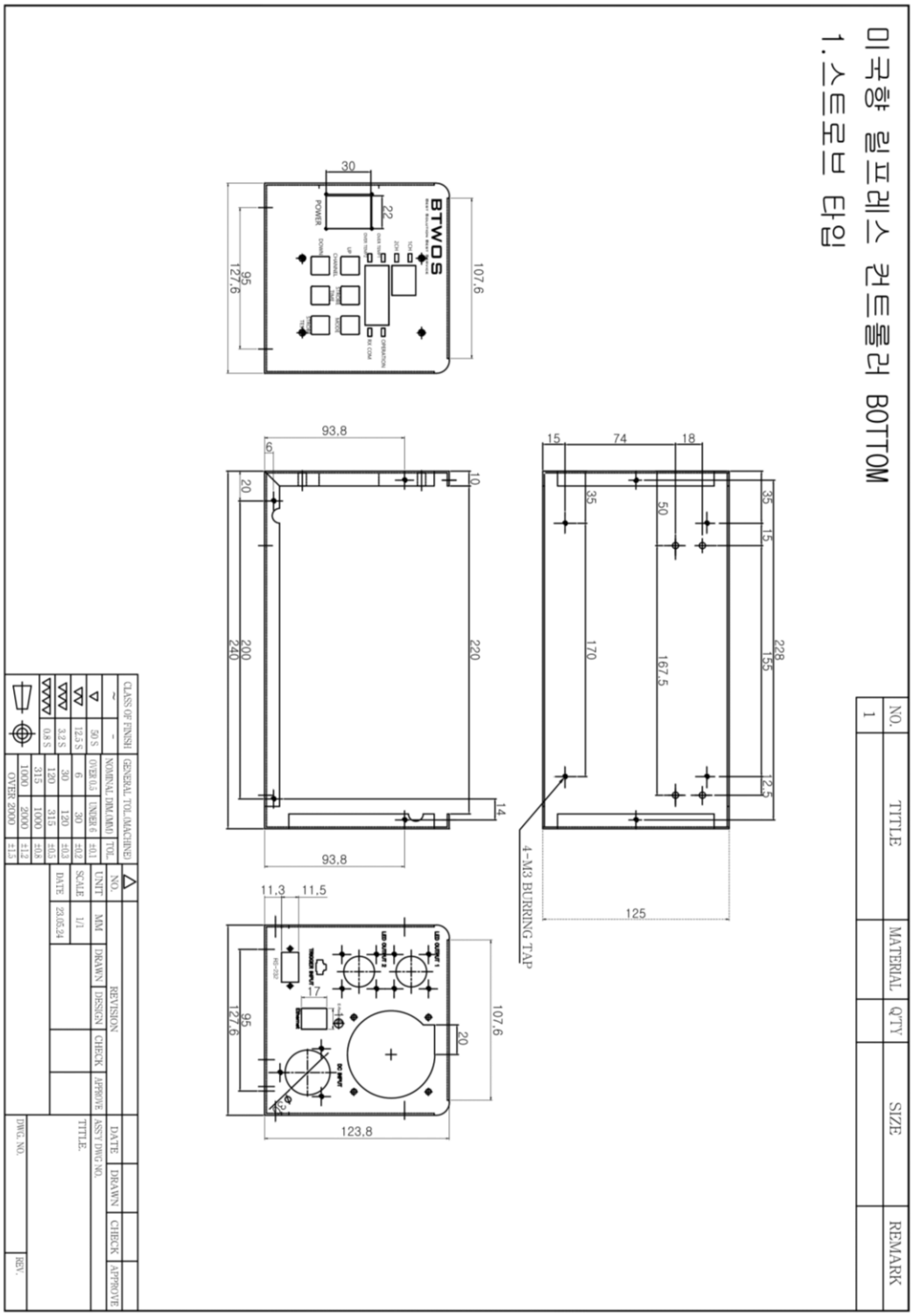
1. Product Composition & Installation

- **Top Cover technical drawing:**



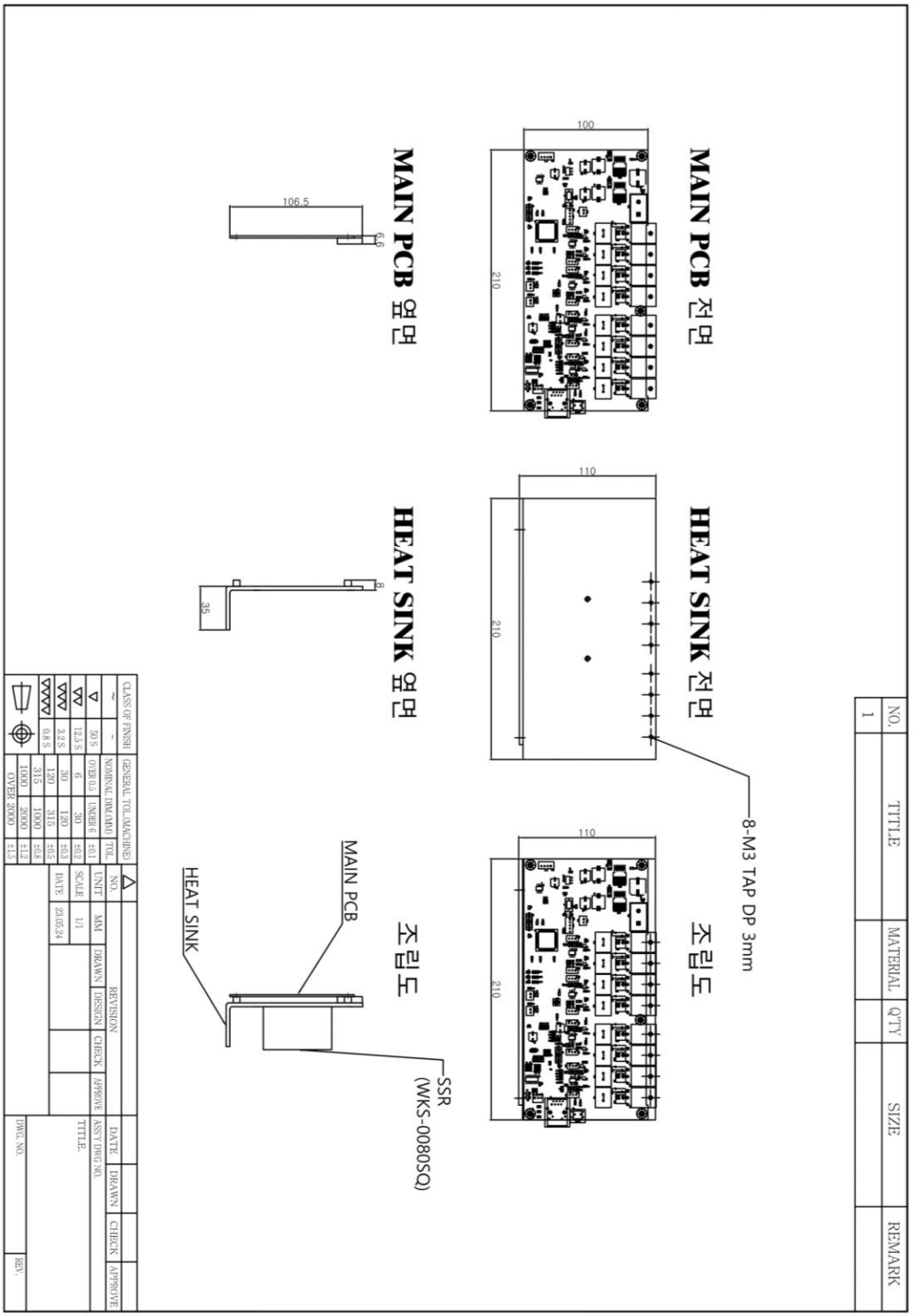
1. Product Composition & Installation

- **Bottom technical drawing:**

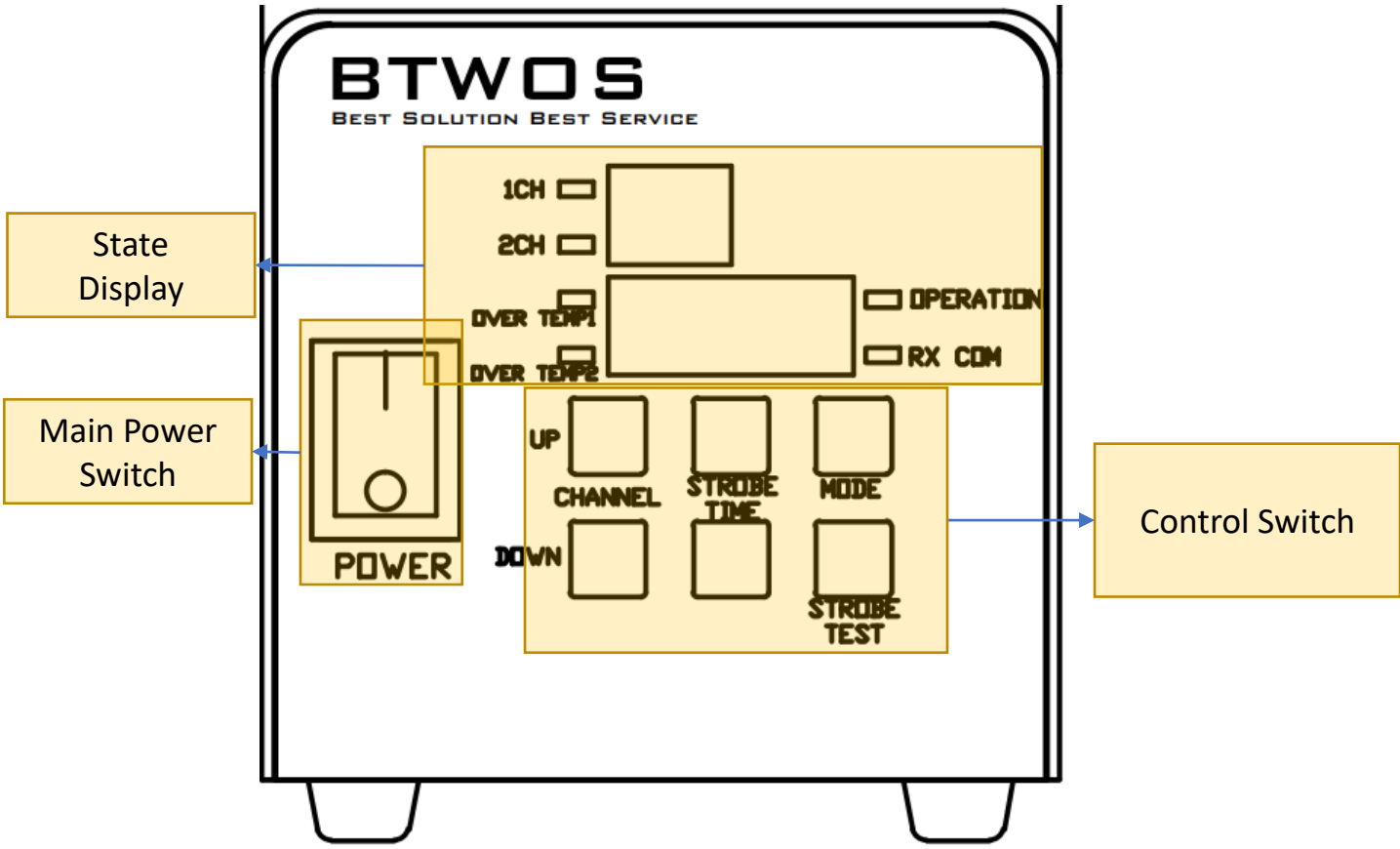


1. Product Composition & Installation

- **Heat sink assembly drawing:**



2. Front Detail Composition



- **State Display: Current state indicate**
  FND : ON_OFF Time Mode / Dimming value
  LED : 1CH / 2CH / Over temp1 / Over temp2 / Operation
  RX COM

- **Main Power Switch : Main Power ON/OFF Switch**

- **Control Switch : CH / Time value / Mode Change / Strobe test**

2. Front Detail Composition

State Display



- **FND**

  1) Time Mode : 0F -> OFF TIME MODE
  0n -> ON TIME MODE

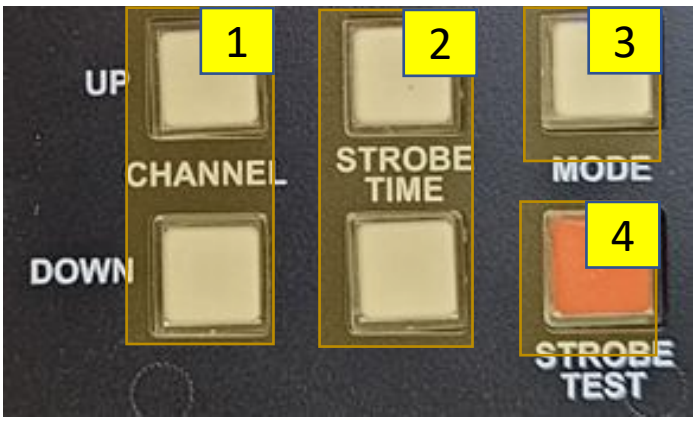
  2) Time Value : Time Value Display 0~1000, 0.1uS step.
  If the mode is OFF TIME MODE, the OFF TIME value is displayed.

- **LED**

  1CH : This Led lights up when channel 1 is selected.
  2CH : This Led lights up when channel 2 is selected.
  * 1CH led and 2CH led light up when channel 1,2 is selected. It is called channel 0
  OVER TEMP1 : This Led lights up when LED lamp 1 temp is high.
  OVER TEMP2 : This Led lights up when LED lamp 2 temp is high.
  OPERATION : This Led blinks when controller is operating.
  RX COM : This Led blinks when host is communicating.

2. Front Detail Composition

Control switch



1) Channel switch

UP button : Increase the Current channel number.
Down button : Decrease the Current channel number.

2) Strobe time switch

UP button : Increase the Current channel OFF or ON time value.
Down button : Decrease the Current channel OFF or ON time value.

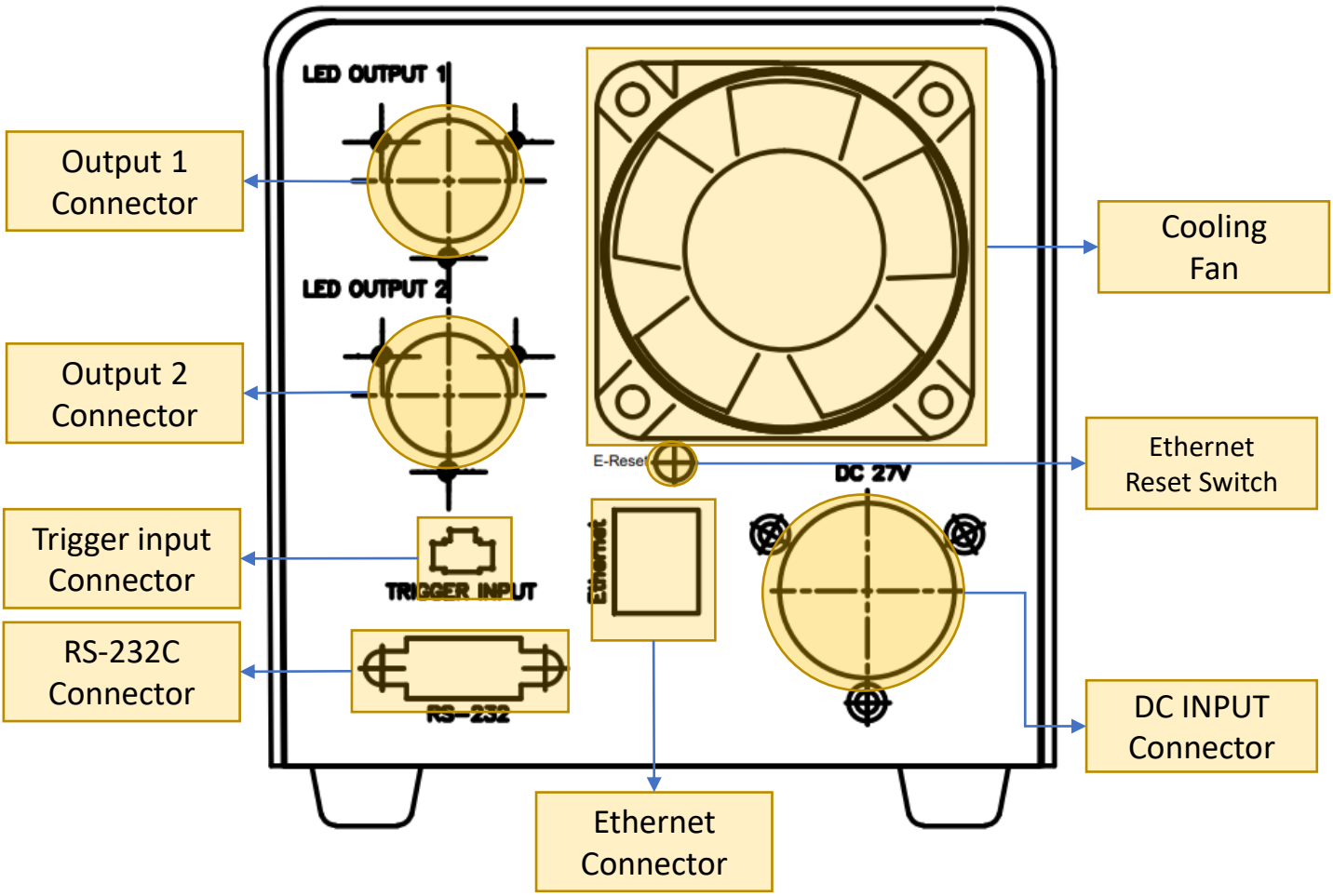
3) Mode switch

Switch OFF time mode <-> ON time mode

4) Strobe test switch

Current Channel Led Lamp output test switch. The lights turn on once for the set time .
* When power on this controller, strobe output function is turned off. It need strobe test switch push or strobe-on-command for strobe function on. When the output function is turned off, it will not work as a trigger.

3. Rear Detail Composition



- **Output 1/2 Connector :** Led Output Connector (SCC2A-16-7S)
- **Trigger input Connector :** Trigger input Connector (JST 2P)
- **Ethernet Connector :** RJ45 Ethernet Connector
- **RS-232C Connector :** Rs-232c Communication Connector (D-sub 9P)
- **Cooling Fan :** Cool inside the controller
- **Ethernet Reset Switch :** Ethernet IP & Mac address Initialize
- **DC INPUT Connector :** Main DC POWER INPUT Connector

4. Connector Pin-Out

1) Output Connector (SCC2A-16-7S)



LED OUTPUT 1

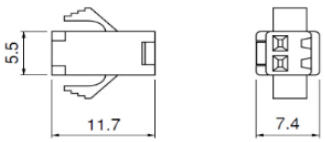
1	2	3	4	5	6	7
1CH +	1CH -	2CH +	2CH -	Temp sensor	Temp sensor	N.C



LED OUTPUT 2

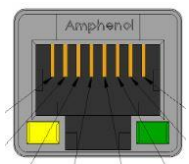
1	2	3	4	5	6	7
3CH +	3CH -	4CH +	4CH -	Temp sensor	Temp sensor	N.C

2) Trigger input Connector (JST 2P SMP-02V-BC)



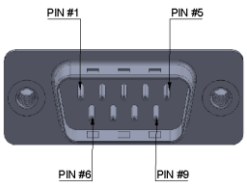
1	2
TRG +	TRG -

3) Ethernet Connector (RJ45)



1	2	3	4	5	6	7	8
Tx +	Tx -	Rx +	N.C	N.C	Rx -	N.C	N.C

4) RS-232C Connector (D-SUB 9P male)



MALE

1	2	3	4	5	6	7	8	9
N.C	Rxd	Txd	N.C	GND	N.C	N.C	N.C	N.C

5) DC INPUT Connector (K-30-2R)



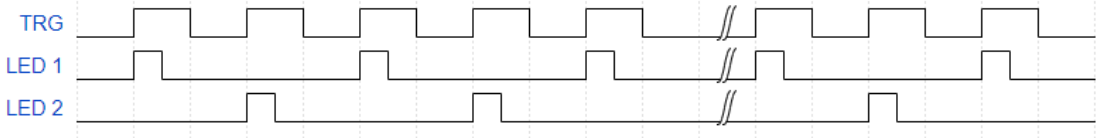
1	2
DC INPUT +	DC INPUT -

5. Timing chart

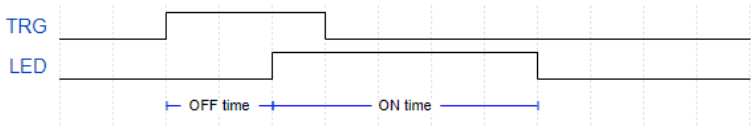
* Output Sequence mode

MODE 1

* Starting from output 1, channels 1 and 2 are sequentially repeated by the trigger.



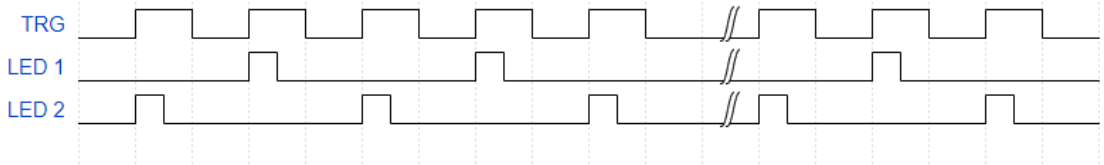
Timing chart



* After inputting the trigger, wait for the OFF time and then turn on the light during the ON time.

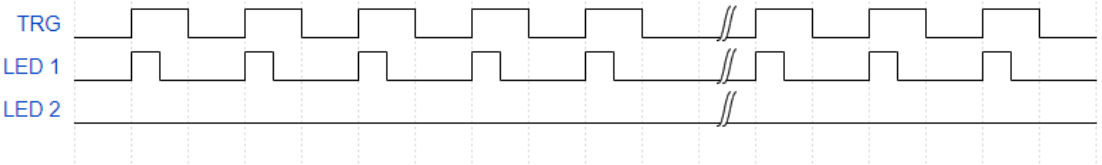
MODE 2

* Starting from output 2, channels 1 and 2 are sequentially repeated by the trigger.



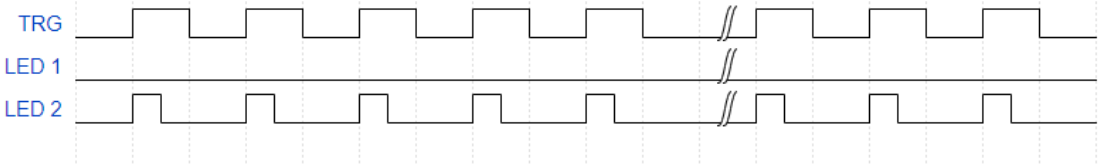
MODE 3

* Starting from output 1, channels 1 looped by the trigger.



MODE 4

* Starting from output 2, channels 2 looped by the trigger.



5. Protocols

- **Communication sequence**

  1. Host(PC) request to Controller
  2. Controller receive from Host, and response to Host
  * response time is about within 10mSec . If controller get wrong protocol then rise timeout after 2Sec, message buffer is initialized

- **Communication initial configuration**

  - Ethernet :
  Controller IP : 192.168.0.150
  NetMask IP : 255.255.255.0
  Gateway IP : 0.0.0.0
  Port num : 1070
  * Controller Socket server. Host Socket client

  -Rs-232:
  Baudrate : 115200
  Data Bits : 8
  Parity : None
  Stop bit : 1
  Flow Control : None

- **Protocol components**

  Header + Command + Length + Data + Footer

  - Host to Contoller
  Header : “P” , 0x50
  Command : Command Code
  Length : Total bytes number
  Data : Value for command and Channel
  Footer : “C” , 0x40

5. Protocols

- **Protocol components**

  - Contoller to Host
  Header : “P” , 0x43
  Command : Command Code
  Length : Total bytes number
  Data : Value for command and channel
  Footer : “C” , 0x50

- **These Protocols is used only remote mode**

5. Protocols

- **Command List**

Command		description	Remark
Set	0x22	Change OFF/ON time value	
Set	0x23	Change all each OFF/ON time value	
Set	0x24	Change ON / OFF strobe function state	
Set	0x25	Change all each ON/OFF strobe function state	
Set	0x27	Change output sequence initialization time	
Set	0x28	Change debounce time	
Set	0x29	Change output sequence	
Set	0x2A	Initialize output sequence	
Set	0x2B	Initialize input trigger count	
Set	0x2C	Test strobe output	
Set	0x2D	Set Lamp OFF temperature	
Set	0x2E	Release high temperature state	
Read	0x1A	Read Firmware version	
Read	0x32	Read OFF/ON time value	
Read	0x33	Read ON / OFF strobe function state	
Read	0x35	Read output sequence initialization time	
Read	0x36	Read debounce time	
Read	0x37	Read output sequence	
Read	0x38	Read input trigger count	
Read	0x39	Read next output number	

5. Protocols

- **Command List**

Command		description	Remark
Read	0x3A	Read current lamp temp temperature	
Read	0x3B	Read Lamp OFF temperature	
Read	0x3C	Read high temperature state	
Set	0x41	Change Ethernet IP	
Read	0x42	Read Ethernet IP	
Set	0x44	Change Mac address	Above Ver 1.4
Read	0x45	Read Mac address	Above ver 1.4

5. Protocols

- **Change OFF/ON time value (0x22)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x22	
Length	0xXX	Total bytes number.
Data 1	0xXX	Channel number, 0x00 all ch, 0x01 ~ 0x02 each ch
Data 2	0xXX 0xXX	OFF Time value 0x00 0x01 ~ 0x03 0xe8 , 1 ~ 1000 value (0.1 uS step)
Data 3	0xXX 0xXX	ON Time value 0x00 0x01 ~ 0x03 0xe8 , 1 ~ 1000 value (0.1 uS step)
Footer	0x43	

Ex)
Req: 50 22 09 00 00 01 03 E8 43 (ALL CH OFF time 0.1uS , ON time 100uS)
Res: 43 22 09 00 00 01 03 E8 50

Ex)
Req: 50 22 09 01 00 01 03 E8 43 (CH-1 OFF time 0.1uS , ON time 100uS)
Res: 43 22 09 01 00 01 03 E8 50

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x22	
Length	0xXX	Total bytes number.
Data 1	0xXX	Channel number, 0x00 all ch, 0x01 ~ 0x02 each ch
Data 2	0xXX 0xXX	OFF Time value 0x00 0x01 ~ 0x03 0xe8 , 1 ~ 1000 value (0.1 uS step)
Data 3	0xXX 0xXX	ON Time value 0x00 0x01 ~ 0x03 0xe8 , 1 ~ 1000 value (0.1 uS step)
Footer	0x50	

5. Protocols

- **Change all each CH Dimming value (0x23)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x23	
Length	0xXX	Total bytes number.
Data	0xXX 0xXX 0xXX 0xXX~	Time value 0x00 0x01 ~ 0x03 0xe8 , data : CH1-OFF-Time, CH1-ON-Time, CH2-OFF-Time, CH2-ON-Time
Footer	0x43	

Ex)
Req: 50 23 0C 00 01 00 0A 00 01 00 0B 43 (CH-1 OFF TIME-> 0.1 uS , CH-1 ON TIME -> 1 uS , CH-2 OFF TIME -> 0.1 uS, CH-2 ON TIME -> 1.1uS)
Res: 43 23 0C 00 01 00 0A 00 01 00 0B 50

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x23	
Length	0xXX	Total bytes number.
Data	0xXX 0xXX 0xXX 0xXX~	Time value 0x00 0x01 ~ 0x03 0xe8 , data : CH1-OFF-Time, CH1-ON-Time, CH2-OFF-Time, CH2-ON-Time
Footer	0x50	

5. Protocols

- **Change ON / OFF strobe function state (0x24)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x24	
Length	0xXX	Total bytes number.
Data 1	0xXX	Channel number, 0x00 all ch, 0x01 ~ 0x02 each ch
Data 2	0xXX	ON / OFF state, 0x00 OFF, 0x01 ON
Footer	0x43	

Ex)
Req: 50 24 06 00 01 43 (All CH Strobe function state ON)
Res: 43 24 06 00 01 50

Ex)
Req: 50 24 06 01 00 43 (CH-1 Strobe function state OFF)
Res: 43 24 06 01 00 50

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x24	
Length	0xXX	Total bytes number.
Data 1	0xXX	Channel number, 0x00 all ch, 0x01 ~ 0x02 each ch
Data 2	0xXX	ON / OFF state, 0x00 OFF, 0x01 ON
Footer	0x50	

5. Protocols

- **Change all each ON/OFF strobe function state (0x25)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x25	
Length	0xXX	Total bytes number.
Data	0xXX 0xXX	0x00 OFF, 0x01 ON DATA : 1CH 2CH
Footer	0x43	

Ex)
Req: 50 25 06 01 01 43 (All CH Strobe function state ON)
Res: 43 25 06 01 01 50

Ex)
Req: 50 25 06 01 00 43 (CH-1 Strobe function state ON , CH-2 Strobe function state OFF)
Res: 43 25 06 01 00 50

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x25	
Length	0xXX	Total bytes number.
Data	0xXX 0xXX	0x00 OFF, 0x01 ON DATA : 1CH 2CH
Footer	0x50	

5. Protocols

- **Change output sequence initialization time (0x27)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x27	
Length	0xXX	Total bytes number.
Data	0xXX 0xXX	0x00 0x00 ~ 0xff 0xff , 0~65535 (1 step -> 1mS) Doesn't work if data is 0
Footer	0x43	

Ex)
Req: 50 27 06 07 D0 43 (initialization time is set 2000ms. if there is no trigger, output sequence is initialized after 2000ms)
Res: 43 27 06 07 D0 50

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x27	
Length	0xXX	Total bytes number.
Data	0xXX 0xXX	0x00 OFF, 0x01 ON DATA : 1CH 2CH
Footer	0x50	

5. Protocols

- **Change debounce time (0x28)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x28	
Length	0xXX	Total bytes number.
Data	0xXX	0x00 ~ 0xff , 0~255 (1 step -> about 0.5uS) Doesn't work if data is 0
Footer	0x43	

Ex)
Req: 50 28 05 0A 43 (debounce time is set about 5uS. The trigger is recognized only when the trigger high state is maintained for more than 5us.)
Res: 43 28 05 0A 50

Req: 50 28 05 00 43 (debounce function off)
Res: 43 28 05 00 50

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x28	
Length	0xXX	Total bytes number.
Data	0xXX	0x00 ~ 0xff , 0~255 (1 step -> about 0.5uS) Doesn't work if data is 0
Footer	0x50	

5. Protocols

- **Change output sequence (0x29)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x29	
Length	0xXX	Total bytes number.
Data	0xXX	0x01 ~ 0x04 (mode 1 ~ mode 4) Note 1)
Footer	0x43	

Note 1) Please refer to Timing Chart.

Ex)
Req: 50 29 05 01 43 (The Sequence is set to mode 1.)
Res: 43 29 05 0A 50

Req: 50 29 05 03 43 (The Sequence is set to mode 2.)
Res: 43 29 05 00 50

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x29	
Length	0xXX	Total bytes number.
Data	0xXX	0x01 ~ 0x04 (mode 1 ~ mode 4) Note 1)
Footer	0x50	

5. Protocols

- **Initialize output sequence (0x2A)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x2A	
Length	0xXX	Total bytes number.
Footer	0x43	

Ex)
Req: 50 29 04 43 (Reset the sequence order to the beginning)
Res: 43 29 04 50

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x29	
Length	0xXX	Total bytes number.
Footer	0x50	

5. Protocols

- **Initialize input trigger count (0x2B)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x2B	
Length	0xXX	Total bytes number.
Footer	0x43	

Ex)
Req: 50 2B 04 43 (Reset trigger count to 0.)
Res: 43 2B 04 50

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x2B	
Length	0xXX	Total bytes number.
Footer	0x50	

5. Protocols

- **Test strobe output (0x2C)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x2C	
Length	0xXX	Total bytes number.
Data	0xXX	Channel number, 0x00 all ch, 0x01 ~ 0x02 each ch
Footer	0x43	

Ex)
Req: 50 2C 05 00 43 (ALL CH turn on once for the set time.)
Res: 43 2C 05 00 50

Ex)
Req: 50 2C 05 02 43 (CH-2 turn on once for the set time.)
Res: 43 2C 05 02 50

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x2C	
Length	0xXX	Total bytes number.
Data	0xXX	Channel number, 0x00 all ch, 0x01 ~ 0x02 each ch
Footer	0x50	

5. Protocols

- **Set Lamp OFF temperature (0x2D)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x2D	
Length	0xXX	Total bytes number.
Data 1	0xXX	LED LAMP number, 0x00 all LED LAMP, 0x01 ~ 0x02 each LED LAMP number
Data 2	0xXX	OFF Temperature value
Footer	0x43	

Ex)
Req: 50 2D 06 00 46 43 (ALL LED LAMP OFF Temp value is set 70 ℃)
Res: 43 2D 06 00 46 50

Ex)
Req: 50 2D 06 01 46 43
Res: 43 2D 06 01 46 50 (1 LED LAMP OFF Temp value is set 70 ℃)

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x2D	
Length	0xXX	Total bytes number.
Data 1	0xXX	LED LAMP number, 0x00 all LED LAMP, 0x01 ~ 0x02 each LED LAMP number
Data 2	0xXX	OFF Temperature value
Footer	0x50	

5. Protocols

- **Release high temperature state (0x2E)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x2E	
Length	0xXX	Total bytes number.
Footer	0x43	

Ex)
Req: 50 2E 04 43 (Release ALL LED LAMP high temperature state)
Res: 43 2E 04 50

*** Note) when LED LAMP high temperature state ,also dimming value change, on/off state change command will clear the high temperature state.

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x2E	
Length	0xXX	Total bytes number.
Footer	0x50	

5. Protocols

- **Read Firmware version (0x1A)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x1A	
Length	0xXX	Total bytes number.
Footer	0x43	

Ex)
Req: 50 1A 04 43
Res: 43 1A 05 01 50 (ver 0.1)

Ex)
Req: 50 1A 04 43
Res: 43 1A 05 0D 50 (ver 1.3 -> 0x0D is integer 13, multiply by 0.1)

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x1A	
Length	0xXX	Total bytes number.
Data	0xXX	version number, Multiply the Integer value by 0.1
Footer	0x50	

5. Protocols

- **Read OFF/ON time value (0x32)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x32	
Length	0xXX	Total bytes number.
Data	0xXX	Channel number, 0x00 all ch, 0x01 ~ 0x02 each ch
Footer	0x43	

Ex)
Req: 50 32 05 00 43 (Read All CH off/on time value)
Res: 43 32 0D 00 00 01 00 0A 00 01 00 0B 50 (CH-1 OFF TIME-> 0.1 uS , CH-1 ON TIME -> 1 uS , CH-2 OFF TIME -> 0.1 uS, CH-2 ON TIME -> 1.1uS)

Ex)
Req: 50 32 05 01 43 (Read CH-1 off/on time value)
Res: 43 32 09 01 00 01 00 0A 50 (CH-1 off time -> 0.1 uS , on time -> 1uS)

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x32	
Length	0xXX	Total bytes number.
Data 1	0xXX	Channel number, 0x00 all ch, 0x01 ~ 0x02 each ch
Data 2	0xXX 0xXX / 0xXX 0xXX ~	Time value 0x00 0x01 ~ 0x03 0xe8 , 1~1000 CHx off time, CHx on time Note 1)
Footer	0x50	

Note 1) When reading all channels, it returns two channel data.
1. read one channel : 0xXX 0xXX
2. read all channel : 0xXX 0xXX 0xXX 0xXX (CH-1 OFF TIME-> 0.1 uS , CH-1 ON TIME -> 1 uS , CH-2 OFF TIME -> 0.1 uS, CH-2 ON TIME -> 1.1uS)

5. Protocols

- **Read ON / OFF strobe function state (0x33)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x33	
Length	0xXX	Total bytes number.
Data	0xXX	Channel number, 0x00 all ch, 0x01 ~ 0x02 each ch
Footer	0x43	

Ex)
Req: 50 33 05 00 43 (Read All CH strobe function ON / OFF STATE)
Res: 43 33 07 00 01 01 50 (ALL CH STATE ON)

Ex)
Req: 50 33 05 01 43 (Read 1 CH strobe function ON / OFF STATE)
Res: 43 33 06 01 01 50 (1CH ON STATE)

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x33	
Length	0xXX	Total bytes number.
Data 1	0xXX	Channel number, 0x00 all ch, 0x01 ~ 0x02 each ch
Data 2	0xXX ~	Read CH -> 0x01 ON , 0x00 OFF
Footer	0x50	

5. Protocols

- **Read output sequence initialization time (0x35)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x35	
Length	0xXX	Total bytes number.
Footer	0x43	

Ex)
Req: 50 35 04 43
Res: 43 35 06 07 D0 50 (initialization time is 2000ms)

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x35	
Length	0xXX	Total bytes number.
Data	0xXX 0xXX	2byte data ex) 0x00 0x01 -> 1 0x01 0x00 -> 256
Footer	0x50	

5. Protocols

- **Read debounce time (0x36)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x36	
Length	0xXX	Total bytes number.
Footer	0x43	

Ex)
Req: 50 36 04 43
Res: 43 36 05 00 50 (debounce function off)
Or
Res: 43 36 05 01 50 (debounce time is about 0.5us. The trigger is recognized only when the trigger high state is maintained for more than 0.5us.)

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x36	
Length	0xXX	Total bytes number.
Data	0xXX	1 step -> about 0.5 uS
Footer	0x50	

5. Protocols

- **Read output sequence (0x37)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x37	
Length	0xXX	Total bytes number.
Footer	0x43	

Ex)
Req: 50 37 04 43
Res: 43 37 05 01 50 (The Sequence is set to mode 1.)

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x37	
Length	0xXX	Total bytes number.
Data	0xXX	0x01 ~ 0x04 (mode 1 ~ mode 4) Note 1)
Footer	0x50	

Note 1) Please refer to Timing Chart.

5. Protocols

- **Read input trigger count (0x38)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x38	
Length	0xXX	Total bytes number.
Footer	0x43	

Ex)
Req: 50 38 04 43
Res: 43 38 08 05 F5 E1 00 50 (There have been 100,000,000 triggers counted so far.)

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x38	
Length	0xXX	Total bytes number.
Data	0xXX 0xXX 0xXX 0xXX	4bytes data 0 ~ 4,294,967,295 After that, it is reset to 0
Footer	0x50	

5. Protocols

- **Read next output number (0x39)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x39	
Length	0xXX	Total bytes number.
Footer	0x43	

Ex)
Req: 50 39 04 43
Res: 43 39 05 01 50 (Next output channel is channel 1.)

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x39	
Length	0xXX	Total bytes number.
Data	0xXX	Next output channel 0x01 or 0x02
Footer	0x50	

5. Protocols

- **Read current lamp temp temperature (0x3A)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x3A	
Length	0xXX	Total bytes number.
Data 1	0xXX	LED LAMP number, 0x00 all LED LAMP, 0x01 ~ 0x02 each LED LAMP number
Footer	0x43	

Ex)
Req: 50 3A 05 00 43 (Read ALL LED LAMP temperature)
Res: 43 3A 07 00 1A 1B 50 (1 LED LAMP temperature is 26 ℃, 2 LED LAMP temperature is 27 ℃)

Ex)
Req: 50 3A 05 01 43 (Read 1 LED LAMP temperature)
Res: 43 3A 06 01 1A 50 (1 LED LAMP temperature is 26 ℃)

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x3A	
Length	0xXX	Total bytes number.
Data 1	0xXX	LED LAMP number, 0x00 all LED LAMP, 0x01 ~ 0x02 each LED LAMP number
Data 2	0xXX / 0xXX 0xXX	Current temperature value Note 1)
Footer	0x50	

Note 1) if Data 1 component is 0x00 (all lamp) , Data 2 component is 2bytes (1 / 2 LED LAMP)

5. Protocols

- **Read Lamp OFF temperature (0x3B)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x3B	
Length	0xXX	Total bytes number.
Data 1	0xXX	LED LAMP number, 0x00 all LED LAMP, 0x01 ~ 0x02 each LED LAMP number
Footer	0x43	

Ex)
Req: 50 3B 05 00 43 (Read ALL LED LAMP OFF temperature)
Res: 43 3B 07 00 46 46 50 (1 LED LAMP OFF temperature is 70 ℃, 2 LED LAMP OFF temperature is 70 ℃)

Ex)
Req: 50 3B 05 01 43 (Read 1 LED LAMP OFF temperature)
Res: 43 3B 06 01 46 50 (1 LED LAMP temperature is 70 ℃)

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x3B	
Length	0xXX	Total bytes number.
Data 1	0xXX	LED LAMP number, 0x00 all LED LAMP, 0x01 ~ 0x02 each LED LAMP number
Data 2	0xXX / 0xXX 0xXX	LED LAMP OFF temperature value Note 1)
Footer	0x50	

Note 1) if Data 1 component is 0x00 (all lamp) , Data 2 component is 2bytes (1 / 2 LED LAMP)

5. Protocols

- **Read high temperature state (0x3C)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x3C	
Length	0xXX	Total bytes number.
Footer	0x43	

Ex)
Req: 50 3C 04 43
Res: 43 3C 05 00 50 (no high temp state)

Ex)
Req: 50 3C 04 43 (1 LED LAMP high temp state)
Res: 43 3C 05 01 50 (1 LED LAMP high temp state)
or
Res: 43 3C 05 02 50 (2 LED LAMP high temp state)
Or
Res: 43 3C 05 03 50 (1,2 LED LAMP high temp state)

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x3C	
Length	0xXX	Total bytes number.
Data 1	0xXX	0x01 -> 1 LED LAMP high temp state 0x02 -> 2 LED LAMP high temp state 0x03 -> 1,2 LED LAMP high temp state
Footer	0x50	

5. Protocols

- **Change Ethernet IP (0x41)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x41	
Length	0xXX	Total bytes number.
Data	0xXX ~	Note 1)
Footer	0x43	

Note 1) Data field -> Controller IP, Netmask IP, Gateway IP, Port Num

Ex) Controller IP 192.168.0.1, Netmask IP 255.255.255.0, Gateway IP 0.0.0.0, Port Num 1070
Req: 50 41 12 C0 A8 00 96 FF FF FF 00 00 00 00 00 04 2E 43
Res: 43 41 12 C0 A8 00 96 FF FF FF 00 00 00 00 00 04 2E 50

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x41	
Length	0xXX	Total bytes number.
Data	0xXX ~	Note 1)
Footer	0x50	

5. Protocols

- **Read Ethernet IP (0x42)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x42	
Length	0xXX	Total bytes number.
Footer	0x43	

Ex)
Req: 50 42 04 43
Res: 43 42 12 C0 A8 00 96 FF FF FF 00 00 00 00 00 04 2E 50

Controller IP 192.168.0.1, Netmask IP 255.255.255.0, Gateway IP 0.0.0.0, Port Num 1070

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x42	
Length	0xXX	Total bytes number.
Data	0xXX ~	Note 1)
Footer	0x50	

Note 1) Data field -> Controller IP, Netmask IP, Gateway IP, Port Num

Ex) Controller IP 192.168.0.1, Netmask IP 255.255.255.0, Gateway IP 0.0.0.0, Port Num 1070
C0 A8 00 96 FF FF FF 00 00 00 00 00 04 2E

5. Protocols

- **Change Mac address (0x44)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x44	
Length	0xXX	Total bytes number.
Data	0xXX 0xXX	Only can change last 2 mac address Note 1)
Footer	0x43	

Note 1) initial mac address 00:80:E1:00:00:00
Only can change last 2 mac address.

Ex)
Req: 50 44 06 00 01 43
Res: 43 44 06 00 01 50 (Now mac address is 00:80:E1:00:00:01)

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x44	
Length	0xXX	Total bytes number.
Data	0xXX 0xXX	Return last 2 mac address
Footer	0x50	

5. Protocols

- **Read Mac address (0x45)**

- Request

Components	Code (HEX CODE)	Remark
Header	0x50	
Command	0x45	
Length	0xXX	Total bytes number.
Footer	0x43	

Ex)
Req: 50 45 04 43
Res: 43 45 06 00 01 50 (mac address is 00:80:E1:00:00:01)

- Response

Components	Code (HEX CODE)	Remark
Header	0x43	
Command	0x45	
Length	0xXX	Total bytes number.
Data	0xXX 0xXX	Return last 2 mac address
Footer	0x50	

6. Environment Conditions

1) Indoor use only

2) Altitude : up to 2000 m

3) Temperature : 5 ~ 40℃

4) Relative humidity : 20 ~ 85%

5) Overvoltage category Ⅱ, except for cord / plug-connected equipment

6) Do not use in wet location

7) Applicable POLLUTION DEGREE (DEGREE 2) of the intended environmental conditions.

There shall be a statement in the instructions that, if the equipment is used in a manner not Specified by the manufacturer, the protection provided by the equipment may be impaired.

● To ensure safety in the event of a problem, place the equipment in a controllable position to operate the disconnecting device.

● To prevent contamination of the product, do not install it where there is dust or oil. Periodically inspect the appearance of the product and wipe it with a dry towel.

● Installation and operation of lighting controller

● Install the lighting controller in a room where there is no moisture and dust.

● Install the lighting controller in a well-ventilated place and do not block the ventilation holes of the lighting controller.

● The lighting and cable used for the lighting controller must be provided with the product provided by the manufacturer.

● Make sure that the cables are connected tightly so that they do not come loose.

● Do not allow the temperature of the lighting controller or lighting to exceed 65℃ during operation, and stop operation if the temperature rises.

● If an inappropriate power cord is used, it may cause product failure. Be sure to use a power cord that meets the rating.

7. Warranty

Model	MMS-750-4-E1D1
Company	MAC LINE
Warranty Period	1 Year (From delivery date)
Warranty Details	

- If a manufacturing defect or natural breakdown occurs within the warranty period, we will provide free repairs or compensation in accordance with consumer damage compensation regulations.

- In the following cases, we will repair for a fee even during the warranty period.

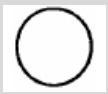
  - Malfunction due to incorrect use or careless handling.
  - When the free warranty period has expired.
  - In case of malfunction due to the consumer's intention or negligence.
  - Breakdown and damage caused by repairs and modifications by other than our C/S personnel

- For other inquiries, please contact us and we will kindly answer you.
  - Company address : MACLINE, C-1010 unit, Incheon-u1 center, 236, Jubuto-ro, Bupyeong-gu, Incheon, Republic of Korea
  (Zip Code : 21330)
  - Phone : +82-10-715-6320
  - E-mail : mac@macline.co.kr
  - Homepage : https://macline.co.kr/

8. Trouble Shooting

CONDITION	SELF-DIAGNOSIS	REMARK
Do not Working controller	1. Check Power Cable (damaged or disconnected) 2. Check Input voltage (Suitable for voltage / Frequency / Rated current) 3. Check Fuse (Only product with AC inlet applied) 4. Check Main SW	
Do not Working Light	1. Check controller Power 2. Check Light Cable (damaged or disconnected) 3. Check the light channel state & dimming value	
In case of smoke or overheating	• Must be turned off immediately. • Contact us (MACLINE)	

9. Symbols

Number	Symbol	Description	Reference
1		Direct current (Courant continu)	IEC 60417-5031 (2002-10)
2		Alternating current (Courant alternatif)	IEC 60417-5032 (2002-10)
3		Earth (Ground) Terminal (Borne de terre)	IEC 60417-5019 (2006-08)
4		On (power)	IEC 60417-5007 (2009-02)
5		Off (power)	IEC 60417-5008 (2009-02)
6		Equipment protected throughout by Double Insulation or Reinforced Insulation (Équipement entièrement protégé par une double isolation ou une isolation renforcée)	IEC 60417-5172 (2003-02)
7		Caution, hot surface (Attention surface chaude)	IEC 60417-5041 (2002-10)
8		Caution (Mise en garde)	IEC 60417-0434B (2004-01)
9		UL Mark (Marque UL)	UL 61010-1, 3rd Edition, May 11, 2012, Revised July 19, 2019, CAN/CSA-C22.2 No. 61010-1(2012-05), 3rd Edition, with revisions through 2018-11