A09650B5000101B-002

MORITEX
A Cognex Company

CompaVis Series Digital Controller

MLEF-A015G2DT

Instruction Manual

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1. Introduction

To ensure safe operation, please read and thoroughly understand this instruction manual before operating the product. After reading, keep this manual in a convenient location for future reference.

Select either Manual Control or LAN for operation; the parallel port is unavailable.

Meanings of Warning Symbols	The following warning symbols are used in this manual. Make sure that you fully understand the meanings of these warnings before continuing to read this manual.
⚠ Warning	Failure to observe the precaution may cause injury or death to operators or serious damage to equipment and property.

Handling Precautions

 **Warning**	Do not operate the controller before making certain of the following:

- Check the controller for compatibility with other equipment that may be used with it.
- When the controller is used in a system where it is connected to other equipment, check the compliance of the entire system with the relevant standards, codes, and regulations.
- When the controller is used in a system where it is connected to other equipment, confirm that the controller is properly wired, installed, and used in the system in such a way appropriate for your intended application.
- Do not use the controller in facilities which could possibly cause critical risk to life and property if the system is not provided with thorough safety measures.
- Install the controller only in an area where it will not get wet.
- If the controller is soiled by any foreign matter, use a dry cloth to wipe it off completely.
- Periodically inspect the controller and replace any maintainable parts.
- In the event of any problem, do not disassemble the controller, but contact us for inspection and repairs.

Other Precautions

- When disposing of the controller, treat it as industrial waste and follow local regulations for proper disposal.
- Dimensions and weights published in this manual are approximate.
- Specifications of the controller, its attachments, and options are subject to change without prior notice for improvement.
- Do not hesitate to contact us if you have any questions about this controller.

Warranty

Warranty Period

The warranty period of this controller is two years after delivery. We will repair the controller free of charge if it fails within two years after the date of purchase provided that it has been correctly used according to this instruction manual.

Scope of Warranty

We will replace failed parts or repair the controller free of charge if it fails for reasons attributable to us within the warranty period, except in the following cases:

- The failure was unforeseeable with the level of technology prevailing at the time of shipment.
- The failure was caused by other than this controller.
- The controller was modified or repaired by a party other than SCHOTT MORITEX.
- The controller was used in a manner other than specified in this instruction manual.
- The controller received inadequate handling, such as a drop or impact.
- The controller was repaired in the field by our service technician.
- The failure was caused by a natural disaster, pollution, or other reasons beyond our control.
- We were not given an opportunity to confirm an alleged failure.

We do not assume any responsibility for direct or indirect losses related to use of this controller. The warranty shall not extend to any liability in excess of the price of the controller.

2. Features

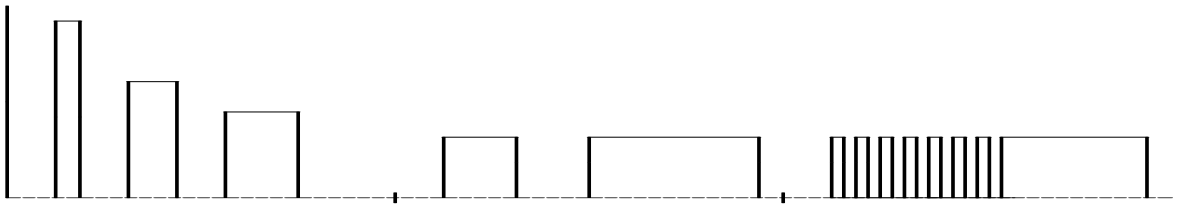
⚠	**Warning**	Do not connect to any other equipment than CompaVis illumination. Total power consumption of the connected illumination must be within 30 [W]. PWM: 30 W (total for 2 channels); STB: 15 W/channel

This product is a 2-channel output industrial controller for LED lights, featuring three selectable lighting modes: PWM, STB, and STBO.

Note 1) Different lighting modes cannot be configured individually for each channel; both channels operate in the same mode.

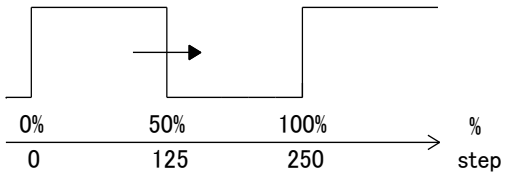
Strobe mode: 190 gradations		PWM mode
STBO:100 gradations in 10us increments	STB: 100 gradations in 0.1ms increments	PWM : 250 gradations

Brightness



- **PWM: Pulse width modulated dimming**

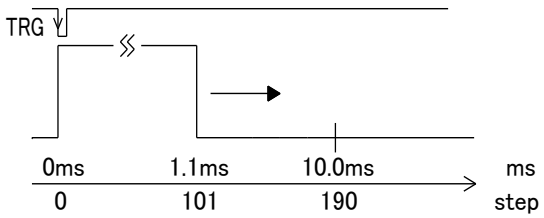
The brightness can be adjusted from 0 to 250 in 250 steps.
A setting of 0 turns the light off, and 250 provides continuous DC output.
The PWM frequency is 100 kHz (Period: 10us).



- **STB: Strobe dimming**

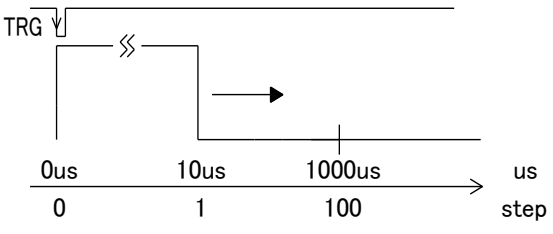
LED lighting can be turned on synchronized with external trigger signals.
The lighting time can be configured from 1.1ms to 10.0ms in 90 steps, in 0.1ms (100us) increments.

Note 2)



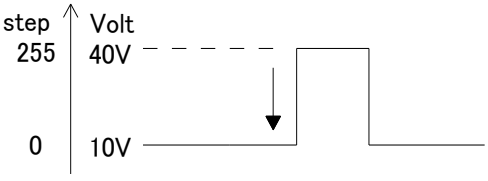
- **STBO: Strobe overdrive dimming**

LED lighting can be turned on in overdrive mode synchronized with external trigger signals.
The lighting time can be configured from 10us to 1,000us in 100 steps, in 10us increments.
The output voltage can be adjusted from 10 V to 40 V.
A setting of 0 corresponds to 10V,
and 255 corresponds to 40V.



In STBO mode, to protect the LEDs, subsequent trigger signals will not be accepted until a period of 10 times the set time has elapsed.

Note 2)



Note 2) When using an external trigger, set the trigger mode to [EXT] in the “Initial Setup Flow.
The trigger mode is set to [INT] by factory default.

- **Memory function**

The current settings can be saved to memory and recalled later.

Manual memory (ROM): 3 memories (Nos. 1 – 3)
Remote LAN memory (RAM): 3 memories (Nos. 1 – 3)
~~Remote parallel memory (RAM): 4 memories (Nos. 1 – 4)~~

- **External control**

Operations can be performed via the LAN port.
The parallel port is not available for external control.

- **Trigger Mode**

Select whether to synchronize the lighting with the internal trigger signals [INT] or external trigger signals [EXT].
When the internal trigger [INT] is selected, the lighting time is limited to either of the following two patterns:

In STBO mode: 10us or 1,000us
In STB mode: 5ms or 10ms

When using external trigger signals, set the trigger mode to [EXT] following the "Initial Setup Flow".
Factory default setting is [INT].

- **Trigger Polarity Selection**

The polarity of the input trigger signal can be selected.

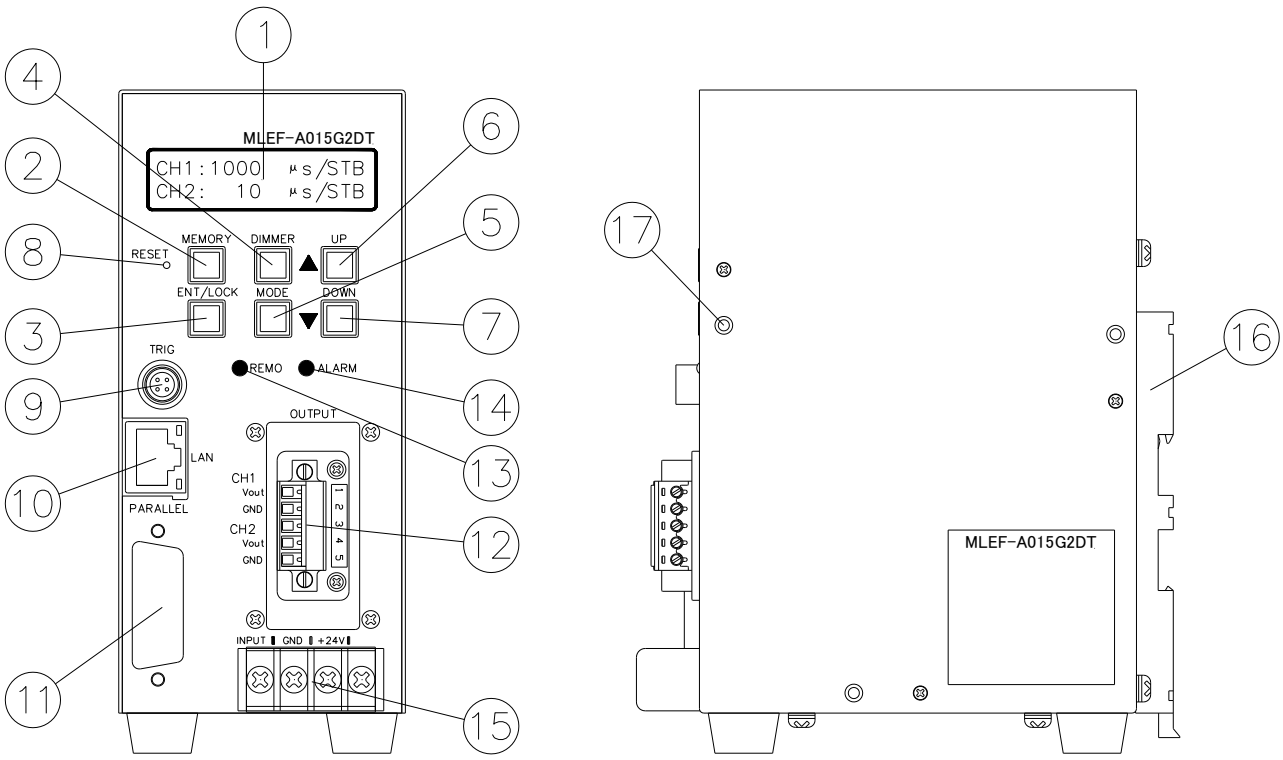
In STB / STBO mode: Operates as an edge trigger.
In PWM mode: Operates as a lighting ON/OFF control signal.

- **Protection**

OCP (over-current protection): Cut off the output if the output overcurrent continues for more than a certain period of time.
OVP (over-voltage protection): Cut off the output if the output overvoltage continues for more than a certain period of time.
OTP (over-time protection): Cut off the output if the output waveform in STB/STBO mode continues for more than a certain period of time.

3. Installation

Names and Functions of Components



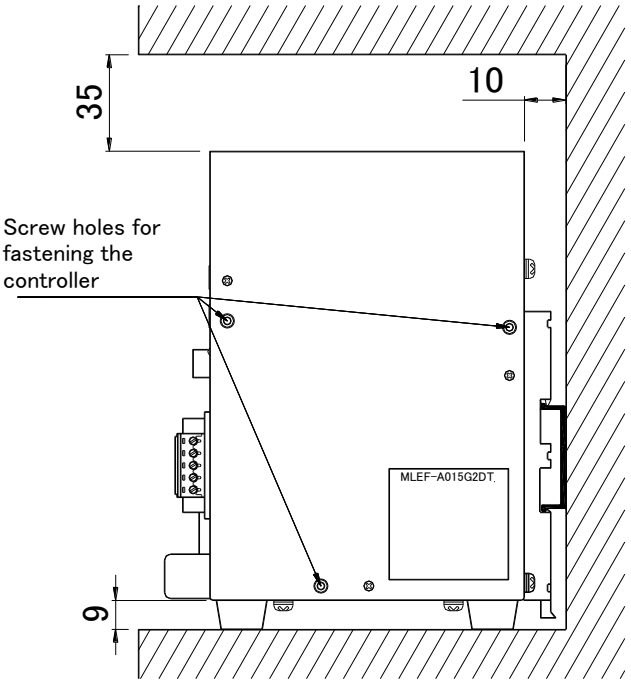
No.	Name	Function
①	Front panel	Displays the lighting mode and setting status.
②	MEMORY button	Used to save and recall settings.
③	ENT/LOCK button	Used to confirm the selection or desired setting status.
④	DIMMER button	Used to select the lighting mode, lighting time, and output voltage.
⑤	MODE button	Used to change initial settings (control port, trigger mode, IP address, etc.).
⑥	UP button	Used to increase the setting values for lighting time or voltage.
⑦	DOWN button	Used to decrease the setting values for lighting time or voltage.
⑧	RESET	Resets to factory default settings.
⑨	TRG input terminal	Terminal for entering trigger signals.
⑩	LAN port	Connects a LAN cable.
⑪	Parallel port	*Currently unavailable.
⑫	Output terminal	Connects CompaVis lighting.
⑬	REMO LED	Lights up during external control.
⑭	ALARM LED	Blinks when an alarm (error) occurs.
⑮	Input terminal	Connects a 24V DC power supply.
⑯	DIN rail adapter	Can be mounted on a 35mm-wide DIN rail.
⑰	Screw hole for fastening	For fastening the controller.

Installation

Warning Provide the specified minimum space around the controller.
Without adequate space for ventilation, heat buildup can cause a risk of fire.

Install the controller upright with the rubber legs on the bottom of the controller in contact with the floor. Provide the following minimum space around the controller:

Above the controller	35mm
Below the controller	9mm
Behind the controller	10mm
On either side of the controller	15mm

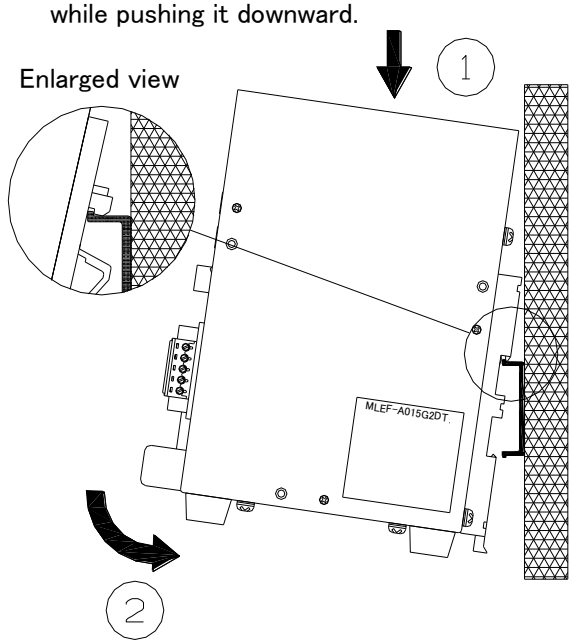


- Select a place where the input terminals and output connectors are easily accessible.
- Select cables that conform to the national and local codes in the location where the controller is being used.
- Use DIN rail stoppers depending on the environment of installation.
- Observe the minimum space requirement and the screw size when fastening the controller using the screw holes on both sides of the controller or when the rubber legs have been removed.
  Screw size: M3 (depth of insertion: 5 mm max.)

Warning *1 Be sure to provide the specified minimum space around the controller.

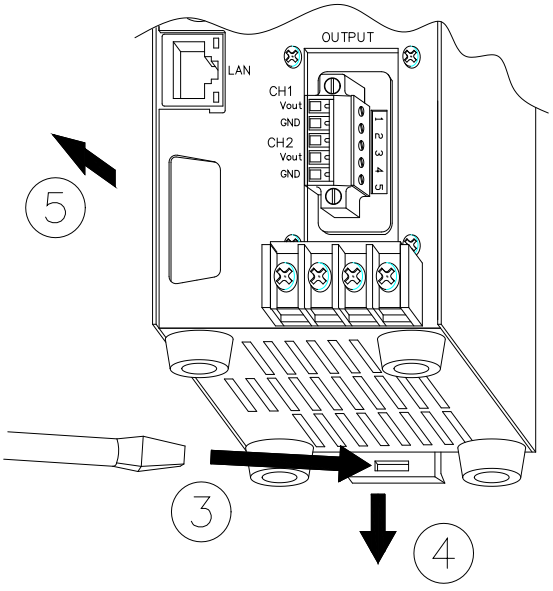
■ Installing the Controller

① Engage the hook on the upper part of the controller with the DIN rail.
② Push the controller in the direction of the arrow while pushing it downward.



■ Removing the Controller

③ Insert a slotted screwdriver into the lever catch hole.
④ Push the lever down to release it.
⑤ Lift up the controller.



* The DIN rail adapter for the controller conforms to a standard DIN rail, 35 mm wide and 7.5 mm high.

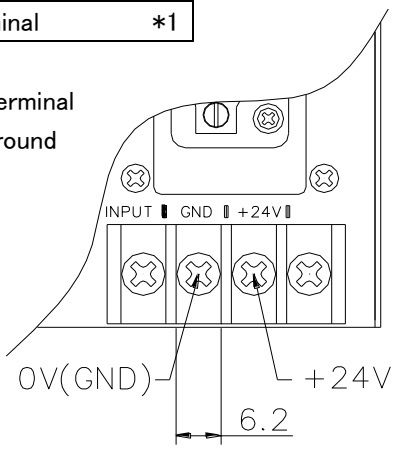
4. Connecting to External Equipment

Warning	• Connect the controller only to an SELV circuit that is isolated from the primary circuit of the connected equipment with reinforced or higher class insulation (equivalent to a SELV circuit according to EN60950-1). • Do not apply excessive input or overload the controller.

Input Terminal Board

Input terminal board of the controller	Crimp terminal on the connected side	
M3 terminal board	M3 round crimp terminal	*1

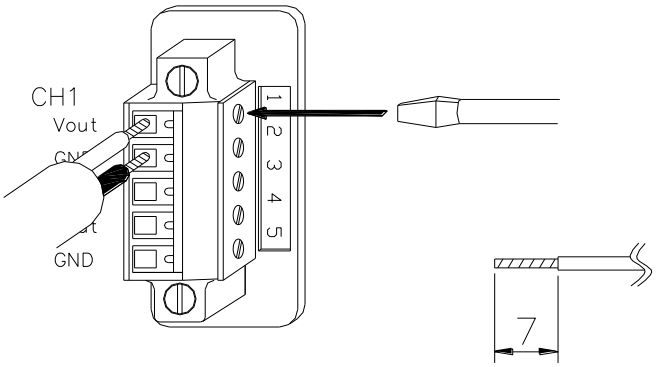
*1: M3 round crimp terminals are recommended to connect to the terminal board. Also note that if the crimp terminal size is large, the resins around the screw on the terminal board may be damaged. Use care when connecting.



Output Connector

Output connector of the controller	Wire on the lighting side
24 03 311 2400 (Phoenix)	Solid or stranded wire: 0.14 – 1.5 mm² (AWG: 28-16) Stripped length: 7 mm

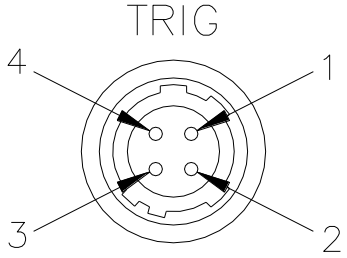
No.	Name
1	CH1 Vout
2	CH1 GND
3	N.C.
4	CH2 Vout
5	CH2 GND



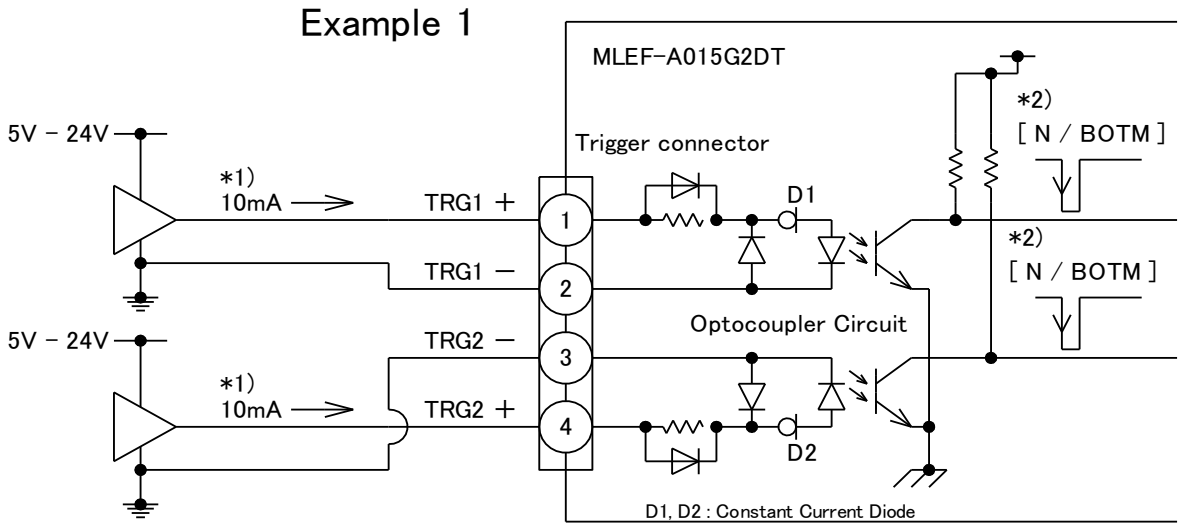
Trigger Connector

Output connector of the controller	Connector on the lighting side
HR10A-7R-4S(73) (HRS)	HR10A-7P-4P(73) (HRS) or equivalent

No.	Name
1	Trigger 1 (+)
2	Trigger 1 (−)
3	Trigger 2 (−)
4	Trigger 2 (+)



Typical Connection Circuit



*1)

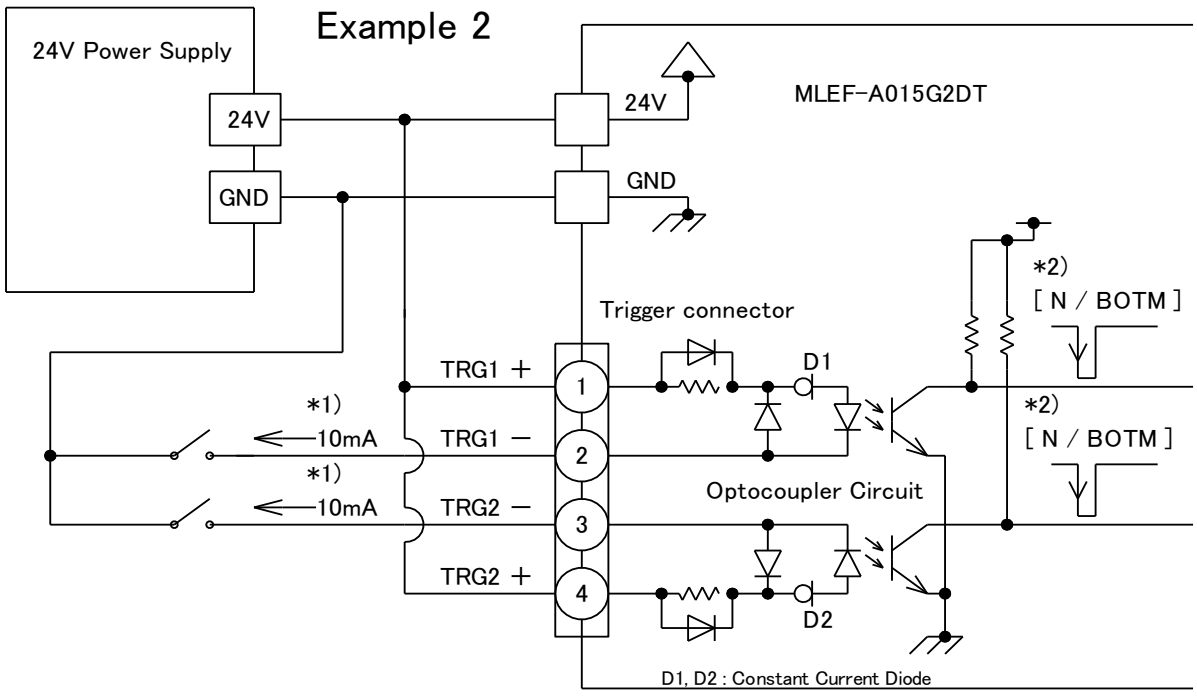
5V～24V入力した時、入力電流は定電流ダイオードにより10mAに制限されます。

A built-in constant-current diode regulates the input current to 10 mA across a 5V to 24V range.

*2)

フォトカプラに電流が流れた瞬間を[N/BOTM]と定義します。

The exact moment when current flows through the optocoupler is defined as [N/BOTM].



5. Operation

Setup

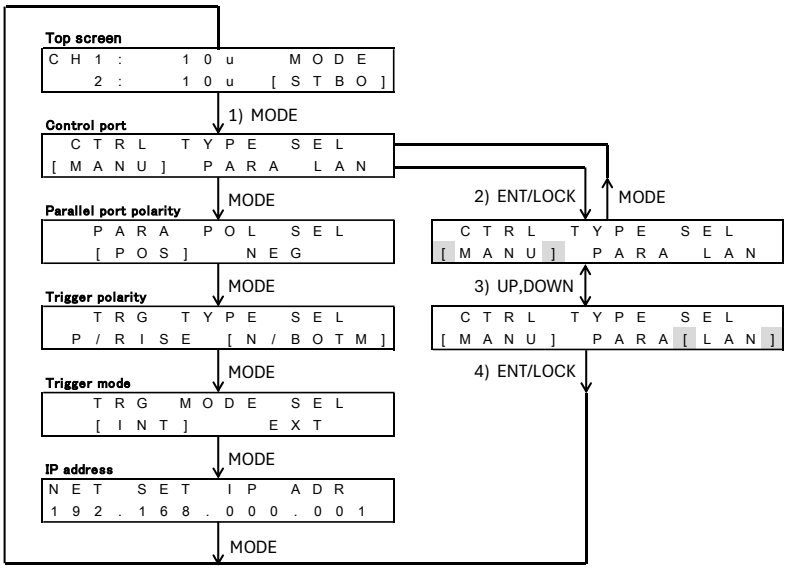
This product is configured with the following factory default settings. Please change the factory default settings as necessary according to your environment and purpose.
Refer to the "Initial Setup Flow" for the procedure to change the settings.
Pressing the [RESET] button on the front panel resets all settings to their factory default values (initial values).

Factory Default settings

Item		Default values
Control port	CTRL TYPE	MANU
Parallel port polarity	PARA POL SEL	POS
Trigger polarity	TRG TYPE SEL	N/BOTM
Trigger mode	TRG MODE SEL	INT
IP address	NET SET IP ADR	192.168.000.001
SubNetMask	NET SET SUBNET	255.255.255.000
DefaultGateway	NET SET GATEWAY	192.168.001.001
Port	NET SET PORT	02000
MAC Address	NET SET MAC ADR	Eigenvalue
MEMORY	MEMORY	NO DATA
Lighting system	PWM/STB/STBO	STBO
Lighting control value	Lighting control value	CH1：10usec, CH2：10usec
Output voltage	VOUT ADJ	CH1：0, CH2：0

Initial Setup Flow

Each time the [MODE] button is pressed, the display on the LCD screen (setting menu) switches.



Example: Changing the control port to [LAN]

1) From the top screen, press the [MODE] button once to display [CTRL TYPE SEL].
2) Press the [ENT/LOCK] button to make the brackets [ ] on the screen blink, making the item selectable.
3) Use the [UP] or [DOWN] button to select [LAN].
4) Press the [ENT/LOCK] button again to confirm (save) the setting and return to the top screen.

Selecting the Control Port

	C	T	R	L		T	Y	P	E		S	E	L		
[	M	A	N	U	]		P	A	R	A		L	A	N	

Select [MANU] or [LAN]. Do not select parallel port [PARA], as it will not function.

Selecting the Parallel Port Polarity

		P	A	R	A		P	O	L		S	E	L		
		[	P	O	S	]			N	E	G				

Press the MODE button to skip.

Selecting the Trigger Polarity

		T	R	G		T	Y	P	E		S	E	L		
	P	/	R	I	S	E		[	N	/	B	O	T	M	]

STB/STBO dimming: Operates as edge trigger.
PWM dimming: Switches ON/OFF.

[P/RISE] :
[N/BOTM]:

Selecting the Trigger Mode

		T	R	G		M	O	D	E		S	E	L		
		[	I	N	T	]				E	X	T			

Select between internal or external trigger operation.

[INT]: Lights with the internal trigger. Lighting time is limited as shown below.
STBO: 10us/1000us STB: 5ms/10ms

[EXT]: Operates by receiving external triggers.
In STBO mode, to protect the LED, triggers will not be accepted until a period equal to 10 times the set time has elapsed. (STBO mode only)

LAN Settings

IP Address Settings

1) Press the [MODE] button several times until [NET SET IP ADR] appears on the screen.
2) Press the [ENT/LOCK] button to make the entrie IP address display blink.
3) Press the [ENT/LOCK] button again to make the 1st digit (righmost digit) blink, allowing the value to be changed,
4) Use the [UP] or [DOWN] button to change the value.
   Pressing and holding the [UP] button continuously increases (increments) the value.
   Pressing and holding the [DOWN] button continuously decreases (decrements) the value.
5) Press the [ENT/LOCK] button to confirm the value of the 1st digit, and the blinking will move to the 2nd digit (the digit to the left).
6) Each time the [ENT/LOCK] button is pressed, the blinking moves to the digit to the left (higher digit).
7) Each time the [MODE] button is pressed, the blinking returns to the digit to the right (lower digit).
8) Finally, change the value of the highest digit (leftmost digit) and press the [ENT/LOCK] button to confirm (save) the new IP address and return to the top screen.

Sub Net Mask Settings

While the entire IP address display is blinking, press the [DOWN] button to move to the [NET SET SUBNET] screen. Press the [ENT/LOCK] button in this state to make the value changeable.
The procedure for changing and confirming is the same as "IP Address Settings".

Default Gateway Settings

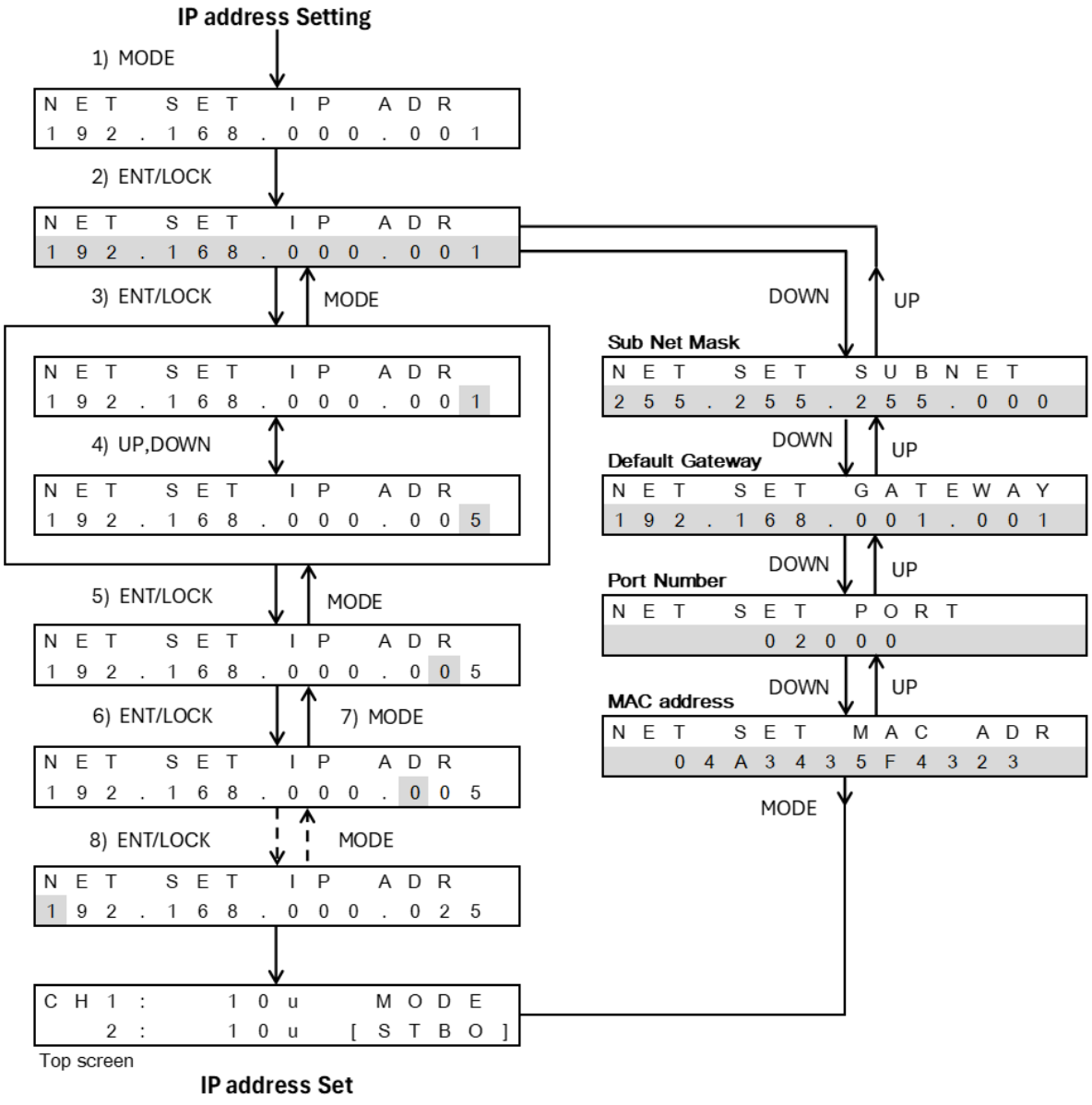
Display [NET SET GATEWAY] on the screen and press the [ENT/LOCK] button to make the value changeable.
The procedure for changing and confirming is the same as "IP Address Settings".

Port Number Settings

Display [NET SET PORT] on the screen and press the [ENT/LOCK] button to make the value changeable.
The procedure for changing and confirming is the same as "IP Address Settings".

Checking the MAC Address

By displaying [NET SET MAC ADR] on the screen, you can check the unique MAC address of the product.
This item is for viewing only, so the value cannot be changed.
After checking the screen, press the 【MODE】 button to return to the top screen.

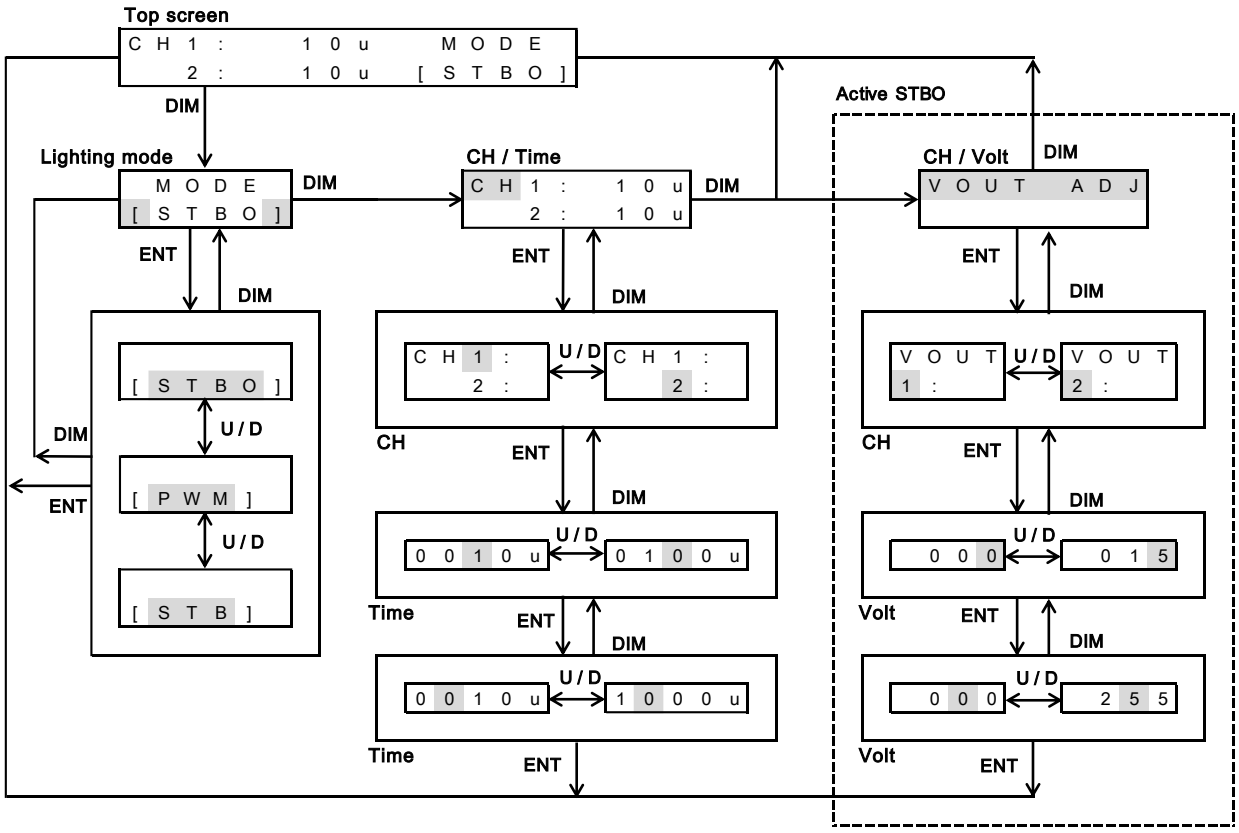


Manual Control

LED lighting can be turned on by operating the buttons while looking at the display screen on the front panel.
First determine the “Lighting mode”, then, set the “Channel” and “Lighting time”.
When operating in STBO mode, the “Output Voltage” must also be configured.

[DIMMER] button: Each time it is pressed, the selected position (blinking position) moves.
Also, if pressed during setting, you can return to the state before confirmation (one step back).
[ENT/LOCK] button: Pressing this button makes the selected item changeable.
[UP] / [DOWN] button: Use these buttons to change modes or values.
(Pressing and holding the button continuously increases or decreases / increments decrements the value.)
Press the [ENT/LOCK] button again to confirm (save) the changes and return to the top screen.

Manual Operation Flow



[DIMMER] DIM: Move. [ENT/LOCK] ENT: Select and confirm [UP], [DOWN] U/D: Set a value.

Note 1) The section surrounded by a dotted line in the above flowchart is only effective for the STBO (strobe overdrive) mode.

Note 2) In the default settings, if the trigger mode is set to [INT], the lighting time is limited to a specific value.

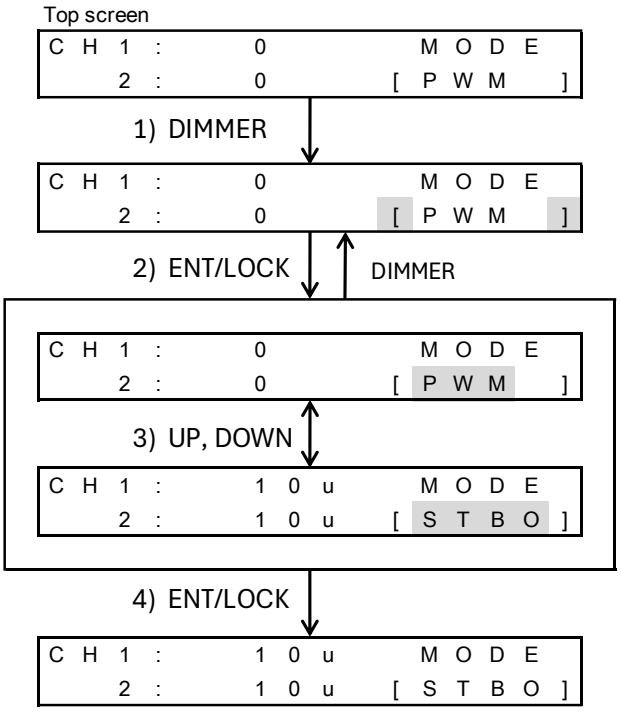
[Example]

Setting procedure for STBO (strobe overdrive) lighting of CH1 with a lighting time of 1,000us and an output voltage of 40 V (max.).
-- Setting Conditions --
Lighting system: STBO (strobe overdrive)
Channel: CH2
Lighting time: 1,000us
Output voltage: 40 V (max.)

Lighting Mode Settings

1) Press the【DIMMER】button to move to the brackets [ ] in the MODE display section.
   The brackets [ ] will blink, indicating that the mode can be selected.
2) Press the【ENT/LOCK】button to make the mode changeable. The mode inside the brackets [ ] will blink.
   At this time, you can press the【DIMMER】button to return to the state before confirmation.
3) Use the [UP] or [DOWN] button to change the lighting mode to [STBO].
4) Press the【ENT/LOCK】button again to confirm (save) the lighting mode and return to the initial top screen.

Lighting Mode Settings

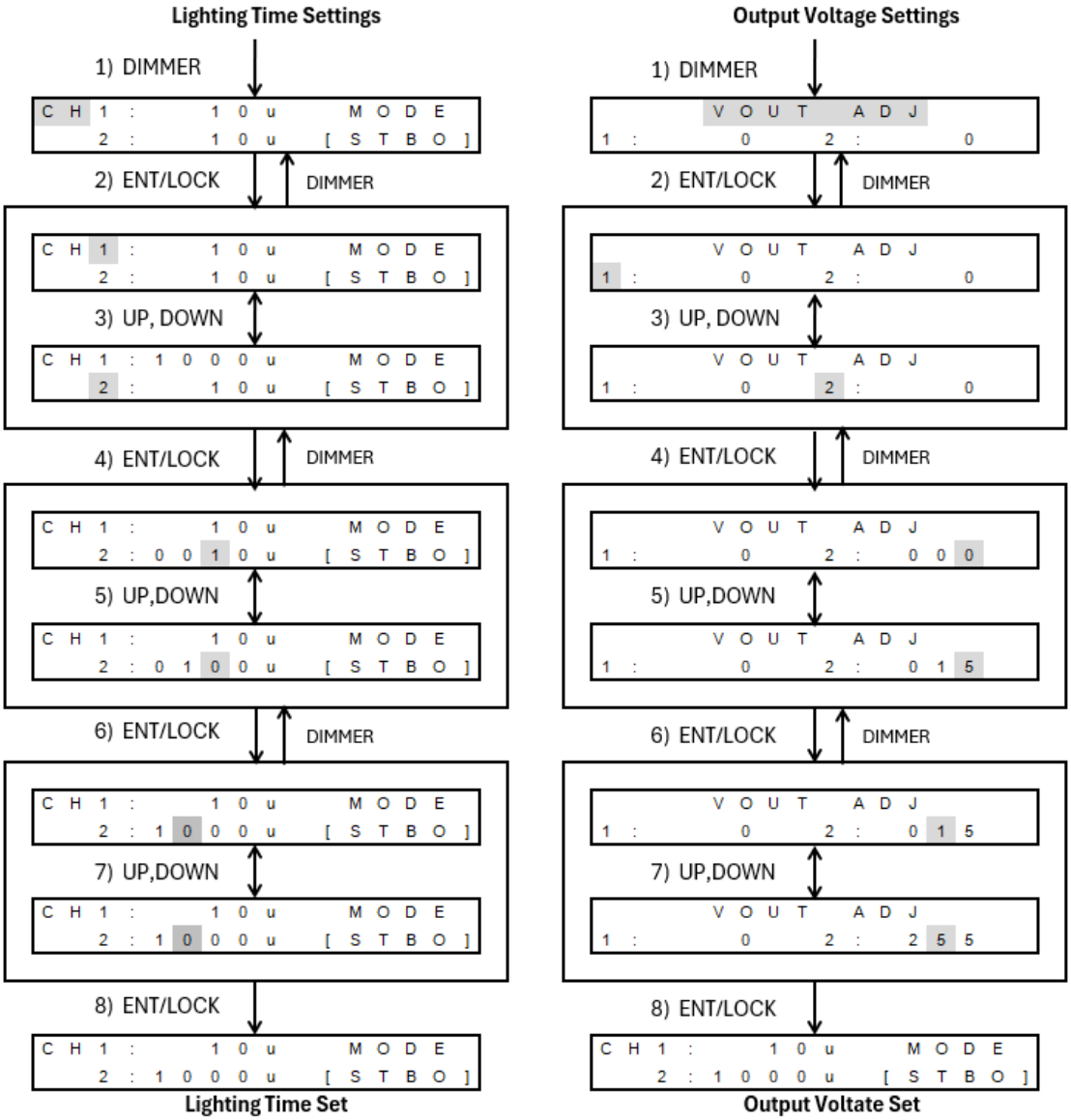


Lighting Mode Set

Lighting Time Settings

1) Press the【DIMMER】button to move the selection to the CH display. "CH" will blink, indicating that the channel can be selected.
2) Press the【ENT/LOCK】button to make "CH1" blink and become changeable.
3) Use the【UP】or【DOWN】button to move to (select) CH2.
4) Press the【ENT/LOCK】button to confirm the channel. The 2nd digit of the time display will then blink, allowing the value to be changed.
5) Use the【UP】or【DOWN】button to change the value.

6) Press the【ENT/LOCK】button to confirm the values up to the 2nd digit, and the blinking will move to the 3rd digit.
   At this time, you can press the【DIMMER】button to return to the state before confirmation.
7) Use the [UP] or [DOWN] button to set the value to 1,000us.
8) Press the【ENT/LOCK】button to confirm (save) the lighting time and return to the top screen.



Output Voltage Settings

1) Press the [DIMMER] button to move to the VOUT ADJ display.
2) Press the【ENT/LOCK】button to make "CH1" on the screen blink and become changeable.
3) Use the【UP】or【DOWN】button to move to (select) CH2.
4) Press the【ENT/LOCK】button to confirm the channel. The 1st digit (rightmost digit) of the voltage display will then blink, allowing the value to be changed.
5) Use the【UP】or【DOWN】button to change the value.
6) Press the【ENT/LOCK】button to confirm the value of the 1st digit, and the blinking will move to the 2nd digit.
   At this time, you can press the【DIMMER】button to return to the state before confirmation.
7) Use the【UP】or【DOWN】button to set the value to 255.
8) Press the【ENT/LOCK】button to confirm (save) the output voltage and return to the top screen.

Set Values when the Lighting Mode is Changed

Settings are initialized as shown below when you change the lighting mode.

Lighting mode			Lighting time			Output voltage		
Before	→	After	Before	→	After	Before	→	After
PWM	→	STB	0–250	→	1.1ms (5ms)	24V	→	24V
PWM	→	STBO	0–250	→	10us	24V	→	Note3)
STB	→	PWM	1.1–10.0ms	→	–	24V	→	24V
STB	→	STBO	1.1–10.0ms	→	10us	24V	→	Note3)
STBO	→	PWM	10us–1,000us	→	–	10–40V	→	24V
STBO	→	STB	10us–1,000us	→	1.1ms (5ms)	10–40V	→	24V

Note 1) If no operations are performed for 2 minutes while a setting is blinking (waiting for confirmation), the current status is automatically confirmed.

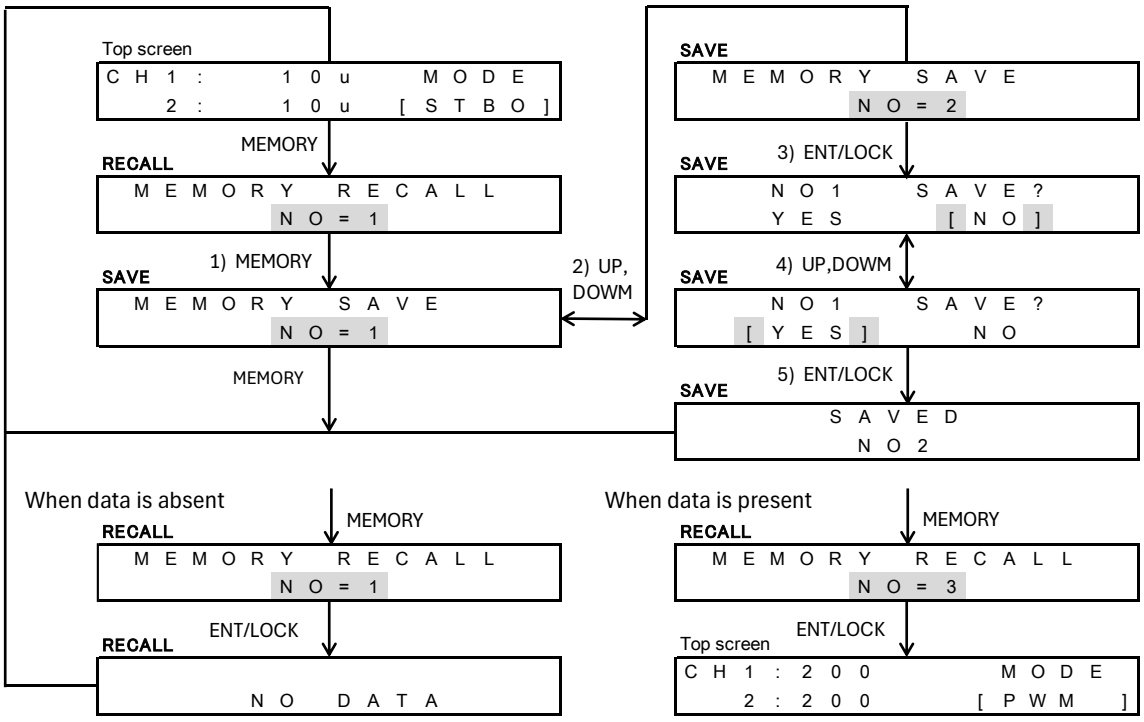
Note 2) Once confirmed, settings are saved in the built-in ROM.

Note 3) Indicates that the value is the same as the one set in the previous STBO setting.

Note 4) "(5m)" in the table indicates the value when the trigger mode is set to internal trigger [INT].

Manual Memory Function

The current settings can be saved to or recalled from the built-in ROM using the [MEMORY] button.



MEMORY SAVE

Example: Saving the current settings to MEMORY NO.2

1) Press the [MEMORY] button to move to the [MEMORY SAVE] display.
2) Press the [UP] or [DOWN] button to change the save destination to [NO. 2].
3) Press the [ENT/LOCK] button to confirm the save destination.

4) To save, press the [UP] or [DOWN] button to select [YES].
5) Press the [ENT/LOCK] button. [SAVED] will be displayed, and the saving process is complete.

MEMORY RECALL

If no data is saved, "[NO DATA]" appears and the screen returns to the top menu.
If data is saved, the previous settings screen appears.

Button Lock Function

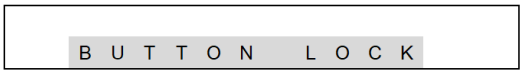
Button operations can be locked and unlocked.

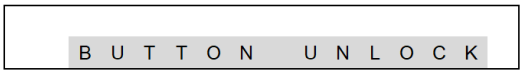
Locking:

Press and hold the [ENT/LOCK] button for 3 seconds or longer to disable button operations and enter the locked state.

Unlocking:

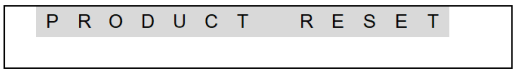
To unlock, press and hold the [ENT/LOCK] button for 3 seconds or longer.
Note: The [RESET] button remains functional even while locked.





PRODUCT RESET Function

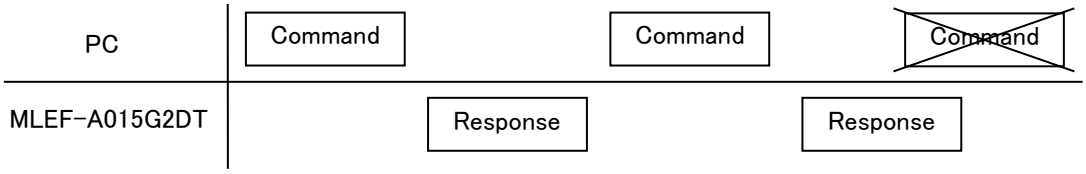
The device can be reset to the factory default settings.
Press the [RESET] button on the front panel; [PRODUCT RESET] will be displayed, and the settings will return to the factory defaults.



Remote Control LAN

The LAN port is available for controlling the lighting modes (PWM, STB, STBO, and STBO VOUTADJ).
The LAN port can also be used to control the RAM memory function.

The communication procedure between a PC and the MLEF-A015G2DT controller is as follows:
The PC sends a command and the controller responds to the command to complete the transaction.
If the PC sends another command before receiving a response, the controller will not accept the second command.



Communication Specifications

Item	Specifications & Default Values
Interface	Ethernet(10BASE-T / 100BASE-TX Auto-Negotiation)
Compatible Cable	Category 5e or higher, straight-through cable
Communication Protocol	TCP/IP (IPv4)
Default IP Address	192.168.0.1 (Subnet Mask: 255.255.255.0)
Default Port Number	2000
Delimiter (End-of-Message Code)	CR+LF

Command response

Item	Reply to	Response	Remarks
1	Common for all commands	INVARID COM	Non-existent command
2	Common for all commands	INVARID PARAM	Abnormal parameter
3	Common for all commands	INVARID RANGE	The set value exceeds the settable range.
4	VOUTADJ setting	NO-SBO NOT ADJ	Unable to set VOUTADJ because the mode is not STBO
5	Memory Read	MRn,NO DATA	No data in the specified RAM memory
6	Status	E:NOR	The system is normal
7	Status	E:OCP	OCP (over-current protection) error
8	Status	E:OVP	OVP (over-voltage protection) error
9	Status	E:OTP	OTP (over-time protection) error
10	Version information	S1.xxN1.xxP1.xx	Information on system version
11	MAC ADDRESS	MAC:xxxxxxxxxxxx	MAC address

Note 1) In an error, except for a status command, even if it transmits other right commands, INVARIDCOM is replied
Note 2) When sending the next command after the response, please send after it passes more than 500mse.

Commands

Function	Header	Command[y]/ Respose	Parameter[xx]				Delimiter	Default settings
			Channel	Data	Channel	Data		
PWM dimming	&	PW	0–2	000–250	0–2	000–250	<CR><LF>	PW,000
STB lighting time		SB	0–2	000–100 (STBO)	0–2	000–100 (STBO)		SB0,001
				101–190 (STB)		101–190 (STB)		SB0,001
VoutADJ		VO	0–2	000–255		000–255		VO0,000
Memory Read		MR	1–3		1–3			
Memory Write		MW						
Status		ST	--	--	--	--		--
Version		V	--	--	--	--		--
IP Address		IP	000.000.000.000–255.255.255.255 Match the number of digits of the values.					192.168.000.001
SubNetMaske		SB						255.255.255.000
Default Gateway		DG						192.168.001.001
Port		PT	02000					02000
MAC Address		MAC	--	--	--	--		--
Reset		REST	--	--	--	--		--

The maximum data length is 256 bytes, and the format is &yxx.
Data length: 256bytes max.
Format: &yxx<XR><LF>

The meanings of the channel numbers for &PW, &SB, and &VO are shown in the table below.

Channel	Meaning
0	Set the data for CH1 and CH2 at the same time.
1	Set the data for CH1.
2	Set the data for CH2.

In &MR, the channel number means the RAM memory storage location.

Description of Commands

[1] Set PWM dimming: &PW

Function: Sets the PWM dim values.

Format 1:	**&**	**P**	**W**	**n**	**,**	**x**	**x**	**x**	**,**	**n**	**,**	**x**	**x**	**x**	**<CR><LF>**
Format 2:	**&**	**P**	**W**	**n**	**,**	**x**	**x**	**x**	**<CR><LF>**						

n = 0, 1, or 2, where 1 = CH1, 2 = CH2, and 0 = CH1 and CH2
xxx = A value between 000 and 250. Values 251 and above are not accepted. Leading zero(s) may not be omitted.

Example 1: & P W 1 , 1 2 8 , 2, 0 0 0 <CR><LF> CH1 is set to 128 and CH2 to 0.
Example 2: & P W 0 , 1 2 8 <CR><LF> CH1 and CH2 are both set to 128.
Example 3: & P W 2 , 1 28 <CR><LF> CH2 is set to 128.
Response: Echo back occurs when the system is running normally. The details are notified in the event of a setting error. See

Command Response.

[2] Set lighting time: &SB

Function: Sets the lighting time in the strobe (STB and STBO) modes.

Format 1:	&	S	B	n	,	x	x	x	,	n	,	x	x	x	<CR><LF>
Format 2:	&	S	B	n	,	x	x	x	<CR><LF>						

n = 0, 1, or 2, where 1 = CH1, 2 = CH2, and 0 = CH1 and CH2

xxx = A value between 000 and 190. Values 191 and above are not accepted. Leading zero(s) may not be omitted.

x x x = 000 to 100 : Strobe Overdrive Mode (STBO)

x x x = 101 to 190 : Strobe Mode (STB)

Note1) When the trigger mode is set to [INT], the lighting time (xxx) accepts only the following values: 001 (10us), 100 (1000us), 140 (5.0ms), and 190 (10.0ms).

When operating in Strobe Mode (STB)

Example 1: & S B 1 , 1 2 8 , 2 , 0 0 0 <CR><LF> CH1 is set to 128 and CH2 to 0.

Example 2: & S B 0 , 1 2 8 <CR><LF> CH1 and CH2 are both set to 128.

Example 3: & S B 2 , 1 2 8 <CR><LF> CH2 is set to 128.

When operating in Strobe Overdrive Mode (STBO)

Example 1: & S B 1 , 1 0 0, 2 , 0 0 0 <CR><LF> CH1 is set to 100 and CH2 to 0.

Example 2: & S B 0 , 1 0 0 <CR><LF> CH1 and CH2 are both set to 100.

Example 3: & S B 2 , 1 0 0 <CR><LF> CH2 is set to 100.

Response: Echo back occurs when the system is running normally.

The details are notified in the event of a setting error. See Command Response.

Relationship Between Value and Lighting Time

When xxx is between 101 and 190, overdrive is disabled and the voltage is fixed at 24V

Value	001	002	–→	110	111	–→	189	190
Time	1.2ms	1.2ms	–→	2.0ms	2.1ms	–→	9.9ms	10.0ms
Formula	Lighting Time ＝ 0.1ms * (xxx – 100) + 1.0ms							

When xxx is between 000 and 1000, overdrive is enabled, allowing the voltage to be adjusted via the VO command.

Value	000	001	002	–→	010	–→	099	100
Time	0us	10us	20us	–→	100us	–→	990us	1000us
Formula	Lighting Time ＝ 10us * (xxx)							

[3] Set adjustable voltage: &VO

Function: Sets the voltage in the STBO mode.

Format 1:	&	V	Ō	n	,	x	x	x	,	n	,	x	x	x	<CR><LF>
Format 2:	&	V	Ō	n	,	x	x	x	<CR><LF>						

n = 0, 1, or 2, where 1 = CH1, 2 = CH2, and 0 = CH1 and CH2

xxx = A value between 000 and 255. Leading zero(s) may not be omitted.

Note2) This command is valid only in STBO mode when the lighting time is set between 000 and 100 (0 to 1000us) using the SB command.

Example 1: & V O 1 , 1 2 8 , 2 , 0 0 0 <CR><LF> CH1 is set to 128 and CH2 to 0.
Example 2: & V O 0 , 1 2 8 <CR><LF> CH1 and CH2 are both set to 128.
Example 3: & V O 2 , 1 2 8 <CR><LF> CH2 is set to 128.

Response: Echo back occurs when the system is running normally. The details are notified in the event of a setting error. See Command Response.
When it is used in the PWM and STB modes, the following is returned to notify the operator that the mode is not correct:

Ex: | N | Ō | - | S | B | O | | N | Ō | T | | A | D | J |

[4] Memory Read: &MR

Function: Reads setting data from the specified ROM memory number.

Format: | & | M | R | n | <CR><LF> |

n = 1, 2, or 3

Response: Echo back occurs when the system is running normally. The details are notified in the event of a setting error. See Command Response. The following is returned when no data is available at the specified memory number:

Ex: | & | M | R | n | , | N | Ō | | D | A | T | A | n = 1, 2, 3

[5] MEMORY WRITE &MW

Function: Saves setting data to the specified ROM memory number.

Format: | & | M | W | n | <CR><LF> |

n = 1, 2, or 3
Response: Echo back occurs when the system is running normally. The details are notified in the event of a setting error. See Command Response.

[6] Status &ST

Function: Checks and returns information on the current status.

Format: | & | S | T | <CR><LF> |

Response 1: &ST, MODE CH1,CH2 E:ERR
Response 2: &ST, MODE CH1,CH2 VOCH1,CH2 E:ERR

MODE	Indicates the current lighting mode. PWM = PW ; STB = SB_ ; STBO = SBO ;
CH1, CH2	Indicates the value currently set to CH1 and CH2.
VOCH1, CH2	In the STBO mode, indicates the value currently set to the VOUTADJ.
E:ERR	Indicates the error status. E:NOR Normal, E:OCP OCP error, E:OVP OVP OCP error, E:OTP OTP error

Ex1: | & | S | T | , | S | B | _ | 1 | 2 | 8 | , | 1 | 5 | 2 | E | : | N | Ō | R |

System is currently in the STB mode; CH1 and CH2 are set to lighting time 128 and 152, respectively; and no error has

occurred.

Ex2:

&	S	T	,	S	B	Õ	0	2	1	,	0	5	2	V	Õ	1	5	2	,	0	8	2	E	:	N	Õ	R

System is currently in the STBO mode; CH1 and CH2 are set to lighting time 021 and 052 and to voltage 152 and 082, respectively; and no error has occurred.

[7] Version Information: &V

Function: Checks and returns firmware version information.

Format:

&	V	<CR><LF>

Response: S1.00, N1.00, and P1.00 are the version numbers of the system microcomputer, net microcomputer, and PLD, respectively.

Ex:

&	V	S	1	.	0	0	,	N	1	.	0	0	,	P	1	.	0	0

[8] Set IP: &IP

Function: Sets the Ethernet IP address.

Format:

&	I	P	x	x	x	.	x	x	x	.	x	x	x	.	x	x	x	<CR><LF>

Response: Echo back occurs when the system is running normally. The details are notified in the event of a setting error. See Command Response.

Note: Be sure to reset the system with the RESET command after setting the IP address or the setting will not take effect.

[9] Set SubNetMask: &SB

Function: Sets the Subnet Mask for Ethernet.

Format:

&	D	G	x	x	x	.	x	x	x	.	x	x	x	.	x	x	x	<CR><LF>

Response: Echo back occurs when the system is running normally. The details are notified in the event of a setting error. See Command Response. Be sure to reset the system with the RESET command after setting the Subnet Mask or the setting will not take effect.

[10] Set Default Gateway: &DG

Function: Sets the Default Gateway address of Ethernet.

Format:

&	D	G	x	x	x	.	x	x	x	.	x	x	x	.	x	x	x	<CR><LF>

Response: Echo back occurs when the system is running normally. The details are notified in the event of a setting error. See Command Response. Be sure to reset the system with the RESET command after setting the Subnet Mask or the setting will not take effect.

[11] Set Port: &PT

Function: Sets the port number for Ethernet.

Format:

&	P	T	x	x	x	x	x	<CR><LF>

xxxxx: Enter a value between 00000 and 65535. Leading zero(s) may not be omitted.

Response: Echo back occurs when the system is running normally. The details are notified in the event of a setting error. See

Command Response. Be sure to reset the system with the RESET command after setting the Ethernet port number or the setting will not take effect.

[12] Set MACADDRESS: &MAC

Function: Gets the MAC address.

Format:

&	M	A	C	<CR><LF>

Response: Echo back occurs when the system is running normally. The details are notified in the event of a setting error. See Command Response.

Ex:

&	M	A	C	:	0	4	A	3	4	3	5	F	4	3	2	3

Example: & M A C : 0 4 A 3 4 3 5 F 4 3 2 3 <CR><LF>

Displays the MAC address.

[13] System Reset: &REST

Function: Reboots the system after changing Ethernet and other settings.

Format:

&	R	E	S	T	<CR><LF>

Response: Echo back occurs when the system is running normally. The details are notified in the event of a setting error. See Command Response.

Lighting Test Procedure Using a PC (Terminal Software)

You can temporarily turn on the LED lighting to verify its operation by sending commands using terminal software (e.g., TeraTerm, PuTTY).

1. Selecting the LAN Port

Change the control port setting of this unit to [LAN] by referring to the "Initial Setup Flow."

(Leave the trigger polarity and trigger mode at their factory defaults: Trigger Polarity = [N/BOTTOM], Trigger Mode = [INT])

2. Terminal Software Configuration

Enter the IP address, port number, and communication protocol of this unit into your terminal software. Depending on the software used, configure the delimiters and local echo settings as well.

- IP Address: 192.168.0.1
- Port Number: 2000
- Communication Protocol: TCP/IP
- TX Delimiter: CR+LF
- Local Echo: Enabled (On)

3. Sending the ST Command

&ST

&ST,SBO001,001VO000,000E:NOR

The factory default settings are STBO mode, lighting time 10 μs (001), and output voltage 10V (000). Once the communication is established, the response shown above will be returned.

4. Sending the VO Command

&VO1,255

&VO1,255

This command increases the CH1 output voltage to 40V (255). The same character string will be returned as an echo-back, and you can verify that the lighting connected to CH1 turns on.

5. Sending the ST Command

&ST,SBO001,001VO255,000E:NOR

You can verify that the CH1 output voltage has been successfully configured to 40V (255).

6. Incorrect Command Transmission

&SB1,101

INVALID RANGE

This is a command intended to set the CH1 lighting time to 1.1 ms (101) in STB mode. A parameter error response (INVALID RANGE) is returned. This occurs because the trigger mode is currently set to internal trigger [INT]. (See Note 1 in Section [2] of Description of Commands).

7. Sending the SB Command

&SB1,140

&SB1,140

This command configures the lighting time to 5 ms (140) in STB mode. Since the lighting time is set to an acceptable value, an echo-back is returned.

8. Sending the ST Command

&ST

&ST,SB, 140,140E:NOR

You can verify that both CH1 and CH2 are set to 5 ms (140). When the trigger mode is set to [INT], both CH1 and CH2 are automatically configured to the same value of 5 ms (140).

9. Sending the PW Command

&PW1,100

&PW1,100

This command sets CH1 to 100 in PWM mode. This mode accepts values from 000 to 250 regardless of the trigger mode setting.

10. Sending the ST Command

&ST

&ST,PW 100, 000E:NOR

You can verify that CH1 has been successfully configured to 100.

6. Maintenance

	**Warning**	• Before starting maintenance work, turn the main power off and disconnect all external equipment from the controller. • Never disassemble the controller.

- Use a dry cloth to wipe any dirt or dust off the controller.
- If the controller is very dirty, wipe it clean with a slightly damp cloth lightly moistened with a diluted neutral detergent.

Troubleshooting

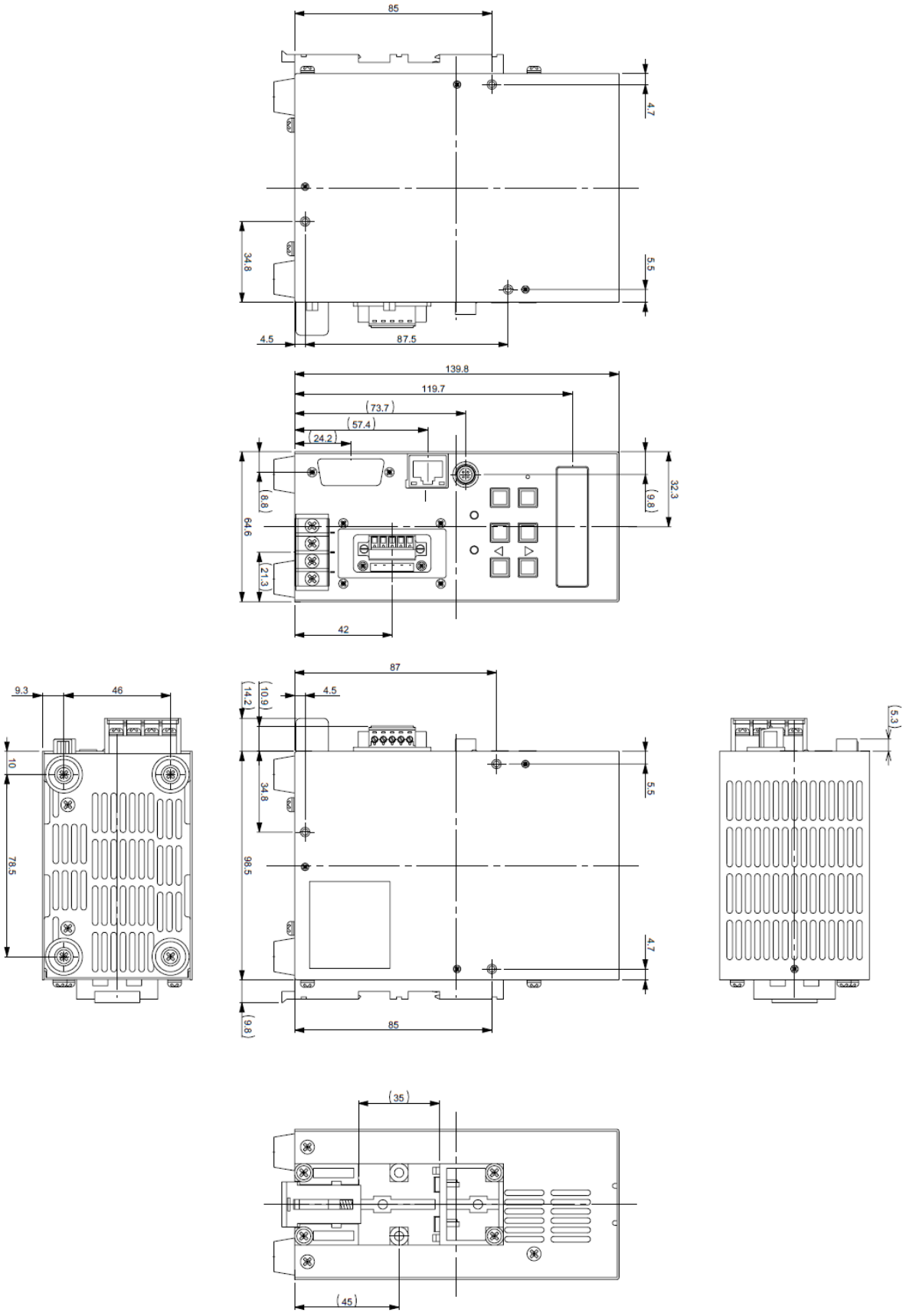
Symptom	Cause	Corrective Action
• Light does not come on. • Light does come on but is darker than usual.	• Is light correctly connected? • Is output properly regulated? • Is external equipment properly connected?	• Properly connect the light. • Adjust the output. • Properly connect the external equipment.

7. Specifications

Model	MLEF-A015G2DT
Input voltage	DC24V ±10% （21.6 – 26.4V）
Input current	Max. 1.8A
Efficiency	70%
Number of outputs	2ch
Output power	PWM: 30W (total of 2 channels) STB: 15W / channel
Output voltage	PWM / STB: 24Vp-p, STBO: 40Vp-p
Output current	PWM / STB: 1.25Ap-p, STBO: 4.0Ap-p
Output variable range	PWM / STB: 0 – 100% STBO: 10 – 40V *1
Remote control	LAN port / ~~parallel port~~
PWM mode	PWM frequency: 100 kHz (dimming steps: 250 gradations)
STB mode	Lighting time: 1.1 – 10.0ms (90 gradations in 0.1ms increments) <<Numeric range: 101 – 190>>
STBO mode	Lighting time: 10 – 1,000us (100 levels in 10us increments) <<Numeric range: 000 – 100>> Flash period restriction: 10% duty (min. period: 10 times the set time) VoutADJ: 0 – 100% (256 levels)
Trigger input	Input voltage range: 5 – 24VDC STB/STBO_TRG input response time: 10us max. PWM_ON/OFF input response time: 10us max.
Setup mode	STB: 5ms / 10ms STBO: 10us / 1,000us
Memory function	Manual memory (ROM): 3 memories ~~Remote LAN memory (RAM): 3 memories~~ Remote parallel memory (RAM): 4 memories
Protection	Output shut-off upon detecting over-current, over-voltage and over-time Fused input protection. (4.0A fuse) At least 1 sec after powering off *2
Time before powering	1 second or more
Environmental conditions	Indoor use Altitude: 2000 m max. Temperature: 0 – 45℃ Humidity: 80% RH up to 31℃, then decreases linearly to 50% RH at 40℃. Contamination level 2
Storage temperature and humidity	-20 – +80℃ / 20 – 85% RH (non-condensing)
Installation method	Upright installation with rubber legs on floor and panel facing front.
Cooling system	Natural air cooling
Protection class	IP 20 (EN 60529) *3
Outside dimensions	W65 × H140 × D99 (Excluding projections)
Weight	Approx. 800g
CE Marking	EMC：2014/30/EU RoHS：2011/65/EU, 2015/863 *4

*1. The lowest voltage is for reference only.
*2. To reset the protection functions (excluding fuses), turn the input power off, wait about 2 to 3 sec and turn the power on again.
*3. Openings in the case are designed to keep out solid objects 12.5 mm in diameter or larger. The case is not water-resistant or water-proof.
*4. Extension or branch cables up to 10 m long may be used to connect CompaVis illumination to the controller.

Outside Dimensions



Package Contents Checklist

Item	Qty	Unit	Notes
Controller	1	unit	–
This Instruction Manual	1	copy	In both English and Japanese